

MBS MacOSX Plugin Documentation

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0.1 Introduction

This is the PDF version of the documentation for the Xojo Plug-in from Monkeybread Software Germany.
Plugin part: MBS MacOSX Plugin

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Chapter 5

Audio

5.1 class AUPlayerMBS

5.1.1 class AUPlayerMBS

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: The audio unit player.

Notes: This is a better Core Audio based player which has a lot of features like pitch, rate, volume, equalizer and other features.

Beside playing audio you can also use this class to get sample data from audio files.

Currently only stereo is supported (2 channels maximum).

Blog Entries

- [MBS Xojo Plugins, version 22.3pr3](#)
- [Multithreaded plugin functions can increase speed of Xojo application](#)
- [MBS Xojo Plugins, version 20.0pr5](#)
- [Problems with killing Xojo threads with plugin calls.](#)
- [MBS Xojo / Real Studio Plugins, version 15.1pr1](#)
- [MonkeyBread Software Releases the MBS Xojo / Real Studio plug-ins in version 15.0](#)
- [MBS Xojo / Real Studio Plugins, version 15.0fc1](#)
- [MBS Xojo / Real Studio Plugins, version 15.0pr12](#)
- [\[ANN \] MonkeyBread Software Releases the MBS Xojo / Real Studio plug-ins in version 14.4](#)
- [MBS Xojo / Real Studio plug-ins in version 14.2](#)

Xojo Developer Magazine

- [13.2, page 8: News](#)
- [13.1, page 10: News](#)
- [12.4, page 9: News](#)

5.1.2 Methods

5.1.3 ChannelMap as Integer()

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Queries current channel map.

Notes: The map should have an entry for each input channel and inside the number of the output channel or -1 to keep it silent.

5.1.4 Data as Memoryblock

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Copies the data to play.

Notes: The other data properties define what format this data has. Typically 4 byte floats per sample interleaved for all channels.

5.1.5 LoadFile(file as folderitem, InputChannels as Integer = 2, OutputChannels as Integer = 2) as boolean

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Loads an audio file.

Notes: InputChannels is the number of channels we want to get back from file reader.

OutputChannels is the number of channels we want to have for output.

Returns true on success or false on failure.

5.1.6 LoadFileMT(file as folderitem, InputChannels as Integer = 2, OutputChannels as Integer = 2) as boolean

Plugin Version: 14.3, Platform: macOS, Targets: All.

Function: Loads an audio file.

Notes: The work is performed on a preemptive thread, so this function does not block the application and

can yield time to other Xojo threads. Must be called in a Xojo thread to enjoy benefits. If called in main thread will block, but keep other background threads running.

InputChannels is the number of channels we want to get back from file reader.

OutputChannels is the number of channels we want to have for output.

Returns true on success or false on failure.

5.1.7 Pause

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Pauses playback.

Notes: Lasterror is set.

5.1.8 Play

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Starts playback.

Notes: Lasterror is set.

5.1.9 Reset

Plugin Version: 14.3, Platform: macOS, Targets: All.

Function: Resets audio units.

Notes: Useful after changing options.

5.1.10 setChannelMap(values() as Integer)

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Sets a new channel map.

Notes: The map should have an entry for each input channel and inside the number of the output channel or -1 to keep it silent.

5.1.11 updateEQ(eqBands() as Double)

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Updates equalizer.

Notes: Please pass array of 32 values from -12 to 12.
Lasterror is set.

See also:

- 5.1.12 updateEQ(eqBands()) as single

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5.1.12 updateEQ(eqBands()) as single

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Updates equalizer.

Notes: Please pass array of 32 values from -12 to 12.
Lasterror is set.

See also:

- 5.1.11 updateEQ(eqBands()) as Double

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5.1.13 Properties

5.1.14 ClientFormatString as String

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: The input format description string.

Notes: (Read only property)

5.1.15 ConverterHandle as Integer

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: The handle to the converter audio unit.

Notes: (Read and Write property)

5.1.16 CurrentDeviceID as UInt32

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Get or set the current device.

Notes: Please check OutputDevices dictionary for which devices are available.
(Read and Write property)

5.1. CLASS AUPLAYERMBS

5.1.17 CurrentTime as Double

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: The current time in seconds.

Notes: Lasterror is set.

(Read and Write property)

5.1.18 DataIsFloat as Boolean

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Whether data is floating point.

Notes: (Read only property)

5.1.19 DataIsInterleaved as Boolean

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Whether data is interleaved.

Notes: (Read only property)

5.1.20 DataIsNativeEndian as Boolean

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Whether data is native endian.

Notes: (Read only property)

5.1.21 DataIsPCM as Boolean

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Whether data is PCM format.

Notes: Linear PCM.

(Read only property)

5.1.22 DataIsSignedInteger as Boolean

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Whether data is signed integers.

Notes: (Read only property)

5.1.23 DataNumberChannels as Integer

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Number of channels.

Notes: (Read only property)

5.1.24 DataNumberChannelStreams as Integer

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Number of channels.

Notes: (Read only property)

5.1.25 DataNumberInterleavedChannels as Integer

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Number of interleaved channels.

Notes: (Read only property)

5.1.26 DataSampleWordSize as Integer

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: The size of a sample word.

Notes: (Read only property)

5.1.27 DefaultDeviceID as UInt32

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Queries the Core Audio ID of the default device.

Notes: (Read only property)

5.1.28 EnablePeakLocking as Boolean

Plugin Version: 14.4, Platform: macOS, Targets: All.

Function: Whether peak locking is enabled.

Notes: Default value is true.

Only if UseNewTimePitchUnit is set to true.

(Read and Write property)

5.1.29 EqualizerHandle as Integer

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: The handle to the equalizer audio unit.

Notes: (Read and Write property)

5.1.30 File as FolderItem

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: The reference to the folderitem used to load audio file.

Notes: (Read only property)

5.1.31 GraphHandle as Integer

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: The handle to the audio graph.

Notes: (Read and Write property)

5.1.32 Lasterror as Integer

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: The last error code.

Notes: Zero is no error.

(Read and Write property)

5.1.33 LoopIn as Double

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: The position where loop starts.

Notes: (Read and Write property)

5.1.34 Looping as Boolean

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Whether to loop.

Notes: (Read and Write property)

5.1.35 LoopOut as Double

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: The position where loop ends.

Notes: (Read and Write property)

5.1.36 MaximumFramesPerSlice as Integer

Plugin Version: 14.3, Platform: macOS, Targets: All.

Function: The maximum number of frames per slice.

Notes: Default seems to be 1156 by Core Audio.

(Read and Write property)

5.1.37 MeterLevel as Double

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Queries meter level.

Notes: Lasterror is set.

Value is smaller than -120 if unknown.

(Read only property)

5.1. CLASS AUPLAYERMBS

5.1.38 MixerHandle as Integer

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: The handle to the mixer audio unit.

Notes: (Read and Write property)

5.1.39 OutputDevices as Dictionary

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Queries a dictionary with output devices.

Example:

```
Dim a As New AUPlayerMBS
Dim d As Dictionary = a.OutputDevices
```

```
For Each key As String In d.keys
  dim name as string = d.Value(key)
```

```
MsgBox key+"": "+name
Next
```

Notes: Key is the ID and value is the name of the device.

e.g. ID 84 for a MacBook Pro Speaker, but the number is certainly different for your computer.

Changed from regular to shared property in version 22.3.
(Read only property)

5.1.40 OutputFormatString as String

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: The output format description string.

Notes: (Read only property)

5.1.41 OutputHandle as Integer

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: The handle to the output audio unit.

Notes: (Read and Write property)

5.1.42 OutputUnit as Integer

Plugin Version: 15.0, Platform: macOS, Targets: All.

Function: Which output unit to use.

Notes: Apple offer various output units and here you can decide which one to use. Setting takes effect the next time you call LoadFile.

(Read and Write property)

5.1.43 OutputVolume as Double

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: The output volume.

Notes: Lasterror is set.

From 0.0 to 1.0.

(Read and Write property)

5.1.44 Overlap as Double

Plugin Version: 14.4, Platform: macOS, Targets: All.

Function: Defines the overlap.

Notes: Range is 3.0 to 32.0 and default is 8.0.

Only if UseNewTimePitchUnit is set to true.

(Read and Write property)

5.1.45 Pan as Double

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: The output pan.

Notes: From -1.0 to 1.0.

Lasterror is set.

(Read and Write property)

5.1.46 PitchRate as Double

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: The pitch rate.

Notes: Lasterror is set.

(Read and Write property)

5.1.47 Playing as Boolean

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Whether the player is playing.

Notes: (Read and Write property)

5.1.48 SampleRate as Double

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: The sample rate of the audio file.

Notes: (Read only property)

5.1.49 Tag as Variant

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: The tag value.

Notes: You can use this property to store whatever you like.

(Read and Write property)

5.1.50 TimePitchHandle as Integer

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: The handle to the time audio unit.

Notes: (Read and Write property)

5.1.51 TimePitchUnit as Integer

Plugin Version: 15.0, Platform: macOS, Targets: All.

Function: Which time pitch unit to use.

Notes: Apple offer various time pitch units and here you can decide which one to use. Setting takes effect the next time you call LoadFile.

(Read and Write property)

5.1.52 TimeRate as Double

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: The time rate.

Notes: Lasterror is set.

(Read and Write property)

5.1.53 TrackLength as Double

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Length of the audio track in seconds.

Notes: Lasterror is set.

(Read only property)

5.1.54 VariSpeedHandle as Integer

Plugin Version: 15.0, Platform: macOS, Targets: All.

Function: The handle to the vari speed audio unit.

Notes: (Read and Write property)

5.1.55 InputEnabled(inputNum as UInt32) as boolean

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Enable or disable input.

Notes: Lasterror is set.

(Read and Write computed property)

5.1.56 InputVolume(inputNum as UInt32) as Double

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: The input volume.

Notes: Lasterror is set.

(Read and Write computed property)

5.1.57 Constants

Output Units

Constant	Value	Description
OutputUnitDefault	0	Plugin default, currently HALOutput.
OutputUnitDefaultOutput	3	A specialisation of AUHAL that is used to track the user's selection of the default device as set in the Sound Prefs
OutputUnitGenericOutput	1	A generic output unit provides the start/stop API, and provides the basic services to convert Linear PCM formats.
OutputUnitHALOutput	2	The audio unit that interfaces to any audio device. The user specifies which audio device to track. The audio unit can do input from the device as well as output to the device. Bus 0 is used for the output side, bus 1 is used to get audio input from the device.
OutputUnitSystemOutput	4	A specialisation of AUHAL that is used to track the user's selection of the device to use for sound effects, alerts and other UI sounds.

Time Pitch Units

Constant	Value	Description
TimePitchUnitDefault	0	Default, plugin chooses one. (normal TimePitch)
TimePitchUnitTimePitch	1	An audio unit that can be used to have independent control of both playback rate and pitch.
TimePitchUnitVarispeed	2	An audio unit that can be used to control playback rate (as the rate is faster, the pitch is higher).

5.2 class `CAPlayThroughMBS`

5.2.1 class `CAPlayThroughMBS`

Plugin Version: 11.1, Platform: macOS, Targets: Desktop, Console & Web.

Function: A class to do active play through on Mac OS X using CoreAudio.

Notes: This class uses newer code than the `AudioPlayThruMBS` class and may work better for some people.

Blog Entries

- [MBS Xojo Plugins, version 23.4pr3](#)
- [MBS Xojo Plugins, version 22.5pr1](#)
- [MBS Real Studio Plugins, version 13.0pr3](#)
- [MBS Real Studio Plugins, version 12.1pr7](#)
- [MBS Plugins 11.1 Release notes](#)
- [MBS Real Studio Plugins, version 11.1pr10](#)
- [MBS Real Studio Plugins, version 11.1pr8](#)

5.2.2 Methods

5.2.3 Constructor(`InputDeviceID` as Integer, `OutputDeviceID` as Integer)

Plugin Version: 11.1, Platform: macOS, Targets: Desktop, Console & Web.

Function: The constructor.

Notes: `Lasterror` is set.

Device IDs are the IDs you get in the CoreAudio classes.

5.2.4 `IsRunning` as boolean

Plugin Version: 11.1, Platform: macOS, Targets: Desktop, Console & Web.

Function: Whether playthrough is running.

5.2.5 Start

Plugin Version: 11.1, Platform: macOS, Targets: Desktop, Console & Web.

Function: Starts play through.

Notes: Lasterror is set.

5.2.6 Stop

Plugin Version: 11.1, Platform: macOS, Targets: Desktop, Console & Web.

Function: Stops play through.

Notes: Lasterror is set.

5.2.7 Properties

5.2.8 ExtraLatency as Integer

Plugin Version: 11.1, Platform: macOS, Targets: Desktop, Console & Web.

Function: Extra latency.

Notes: When the latency is calculated, we add this value.

Unit is bytes.

Calculation of the buffer size is like this:

```

if (UseMinimumLatency)
  InToOutSampleOffset = ExtraLatency + InputDevice.SafetyOffset + OutputDevice.SafetyOffset
else
  InToOutSampleOffset = ExtraLatency + InputDevice.SafetyOffset + InputDevice.BufferSizeFrames + OutputDevice.SafetyOffset + OutputDevice.BufferSizeFrames
(Read and Write property)

```

5.2.9 Lasterror as Integer

Plugin Version: 11.1, Platform: macOS, Targets: Desktop, Console & Web.

Function: The last error code reported.

Notes: (Read and Write property)

5.2.10 OutputUnitHandle as Integer

Plugin Version: 23.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Queries the handle for the output Audio Unit.

Notes: (Read only property)

5.2.11 UseMinimumLatency as Boolean

Plugin Version: 11.1, Platform: macOS, Targets: Desktop, Console & Web.

Function: Whether to reduce latency to the absolute minimum.

Notes: By default a large latency is used to ensure a smoother playthrough. But you can have it set to the absolute minimum.

Calculation of the buffer size is like this:

```
if (UseMinimumLatency)
  InToOutSampleOffset = ExtraLatency + InputDevice.SafetyOffset + OutputDevice.SafetyOffset
else
  InToOutSampleOffset = ExtraLatency + InputDevice.SafetyOffset + InputDevice.BufferSizeFrames + OutputDevice.SafetyOffset + OutputDevice.BufferSizeFrames
(Read and Write property)
```

5.2.12 Volume as Double

Plugin Version: 13.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Get or set the volume of the output audio unit.

Notes: Lasterror is set.

Range is from 0.0 to 1.0.

(Read and Write computed property)

5.3 class CoreAudioListenerMBS

5.3.1 class CoreAudioListenerMBS

Plugin Version: 15.0, Platform: macOS, Targets: All.

Function: The class to watch for changes to CoreAudio property.

Blog Entries

- [MonkeyBread Software Releases the MBS Xojo / Real Studio plug-ins in version 15.0](#)
- [MBS Xojo / Real Studio Plugins, version 15.0pr7](#)

5.3.2 Methods

5.3.3 Constructor(ObjectID as UInt32, PropertySelector as UInt32, PropertyScope as UInt32, PropertyElement as UInt32)

Plugin Version: 15.0, Platform: macOS, Targets: All.

Function: The constructor.

Notes: Please pass object ID and property selector values (see example project).

Lasterror is zero on success.

5.3.4 Destructor

Plugin Version: 15.0, Platform: macOS, Targets: All.

Function: The destructor.

5.3.5 Properties

5.3.6 LastError as Integer

Plugin Version: 15.0, Platform: macOS, Targets: All.

Function: The last error code.

Notes: (Read only property)

5.3.7 ObjectID as UInt32

Plugin Version: 15.0, Platform: macOS, Targets: All.

Function: The object ID used in constructor.

Notes: (Read only property)

5.3.8 PropertyElement as UInt32

Plugin Version: 15.0, Platform: macOS, Targets: All.

Function: The element ID used in constructor.

Notes: (Read only property)

5.3.9 PropertyScope as UInt32

Plugin Version: 15.0, Platform: macOS, Targets: All.

Function: The scope value used in constructor.

Notes: (Read only property)

5.3.10 PropertySelector as UInt32

Plugin Version: 15.0, Platform: macOS, Targets: All.

Function: The selector value used in constructor.

Notes: (Read only property)

5.3.11 Events

5.3.12 Changed

Plugin Version: 15.0, Platform: macOS, Targets: .

Function: The watched property changed.

5.4 class CoreAudioMBS

5.4.1 class CoreAudioMBS

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: A class for low level CoreAudio calls.

Notes: Currently not finished for the 4.0 release.

Blog Entries

- [MBS Xojo Plugins, version 23.0pr8](#)
- [MBS Real Studio Plugins, version 11.4pr2](#)
- [MBS Plugins 11.1 Release notes](#)
- [MBS Real Studio Plugins, version 11.1pr11](#)

5.4.2 Methods

5.4.3 AudioDeviceGetPropertyCFString(AudioDeviceID as Integer, channel as Integer, isinput as boolean, propertyID as string) as string

Plugin Version: 10.2, Platform: macOS, Targets: All.

Function: Gets a property value from the Audio Device.

Example:

```
Dim c As New CoreAudioMBS
```

```
Dim DefaultInputDeviceMem As MemoryBlock = c.AudioHardwareGetPropertyMemory(c.kAudioHardwarePropertyDefaultInputDevice)
```

```
Dim DefaultInputDeviceID As Integer = DefaultInputDeviceMem.Long(0)
```

```
Dim DefaultInputDeviceCFName As CFStringMBS = c.AudioDeviceGetPropertyCFString(DefaultInputDeviceID, 0, True, c.kAudioDevicePropertyDeviceNameCFString)
```

```
Dim DefaultInputDeviceName As String = DefaultInputDeviceCFName.Str
```

```
MessageBox DefaultInputDeviceName
```

Notes: Lasterror is set.

The property you query must be one of the CFString properties.

5.4.4 AudioDeviceGetPropertyInfo(AudioDeviceID as Integer, channel as Integer, isinput as boolean, propertyID as string, byref size as Integer, byref writeable as boolean)

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: Gets property information from an Audio Unit.

Example:

```
Dim c As New CoreAudioMBS
```

```
Dim DefaultInputDeviceMem As MemoryBlock = c.AudioHardwareGetPropertyMemory(c.kAudioHardwarePropertyDefaultInputDevice)
```

```
Dim DefaultInputDeviceID As Integer = DefaultInputDeviceMem.Long(0)
```

```
Dim size As Integer
```

```
Dim writeable As Boolean
```

```
c.AudioDeviceGetPropertyInfo(DefaultInputDeviceID, 0, True, c.kAudioDevicePropertyDeviceName, size, writeable)
```

```
If writeable Then
```

```
  MessageBox "Writeable, "+size.ToString+" bytes"
```

```
Else
```

```
  MessageBox "Read only, "+size.ToString+" bytes"
```

```
End If
```

Notes: Lasterror is set.

5.4.5 AudioDeviceGetPropertyMemory(AudioDeviceID as Integer, channel as Integer, isinput as boolean, propertyID as string) as memoryblock

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: Gets a property value from the Audio Device.

Example:

```
Dim c As New CoreAudioMBS
```

```
Dim DefaultOutputDeviceMem As MemoryBlock = c.AudioHardwareGetPropertyMemory(c.kAudioHardwarePropertyDefaultOutputDevice)
```

```
Dim DefaultOutputDeviceID As Integer = DefaultOutputDeviceMem.Long(0)
```

```
Dim mem1 As MemoryBlock = c.AudioDeviceGetPropertyMemory(DefaultOutputDeviceID, 0, False, c.kAudioDevicePropertyVolumeDecibels)
```

```
Dim VolumeDecibels As Single = mem1.SingleValue(0)
```

```
Dim mem2 As MemoryBlock = c.AudioDeviceGetPropertyMemory(DefaultOutputDeviceID, 0, False, c.kAudioDevicePropertyVolumeScalar)
```

```
Dim VolumeScalar As Single = mem2.SingleValue(0)
```

Break

Notes: Lasterror is set.

5.4.6 AudioDeviceGetPropertyString(AudioDeviceID as Integer, channel as Integer, isinput as boolean, propertyID as string) as string

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: Gets a property value from the Audio Device.

Example:

```
Dim c As New CoreAudioMBS
```

```
Dim DefaultInputDeviceMem As MemoryBlock = c.AudioHardwareGetPropertyMemory(c.kAudioHardwarePropertyDefaultInputDevice)
```

```
Dim DefaultInputDeviceID As Integer = DefaultInputDeviceMem.Long(0)
```

```
Dim DefaultInputDeviceName As String = c.AudioDeviceGetPropertyString(DefaultInputDeviceID, 0, True, c.kAudioDevicePropertyDeviceName)
```

```
MessageBox DefaultInputDeviceName
```

Notes: Lasterror is set.

5.4.7 AudioDeviceSetPropertyMemory(AudioDeviceID as Integer, when as memoryblock, channel as Integer, isinput as boolean, propertyID as string, data as memoryblock, offset as Integer, length as Integer)

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: Sets a property value for the Audio Device.

Example:

```
Dim c As New CoreAudioMBS
```

```
Dim DefaultOutputDeviceMem As MemoryBlock = c.AudioHardwareGetPropertyMemory(c.kAudioHardwarePropertyDefaultOutputDevice)
```

```
Dim DefaultOutputDeviceID As Integer = DefaultOutputDeviceMem.Long(0)
```

```

Dim mem1 As MemoryBlock = c.AudioDeviceGetPropertyMemory(DefaultOutputDeviceID, 0, False, c.kAudioDevicePropertyVolumeScalar)
Dim VolumeScalar As Single = mem1.SingleValue(0)

// set volume to 50%
Dim VolumeScalar2 As Single = 0.5
Dim mem2 As New MemoryBlock(4)
mem2.SingleValue(0) = VolumeScalar2

c.AudioDeviceSetPropertyMemory(DefaultOutputDeviceID, Nil, 0, False, c.kAudioDevicePropertyVolumeScalar,
mem2, 0, mem2.Size)

// now query again
Dim mem3 As MemoryBlock = c.AudioDeviceGetPropertyMemory(DefaultOutputDeviceID, 0, False, c.kAudioDevicePropertyVolumeScalar)
Dim VolumeScalar3 As Single = mem3.SingleValue(0)

Break

```

Notes: Lasterror is set.

5.4.8 `AudioDeviceSetPropertyString(AudioDeviceID as Integer, when as memoryblock, channel as Integer, isinput as boolean, propertyID as string, data as string)`

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: Sets a property value for the Audio Device.

Notes: Lasterror is set.

5.4.9 `AudioHardwareGetPropertyCFString(propertyID as string) as string`

Plugin Version: 10.2, Platform: macOS, Targets: All.

Function: Gets a property value from the Audio Hardware.

Notes: Lasterror is set.

The property you query must be one of the CFString properties.

5.4.10 `AudioHardwareGetPropertyInfo(propertyID as string, byref size as Integer, byref writeable as boolean)`

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: Gets property information from the Audio Hardware.

Example:

```
Dim c As New CoreAudioMBS
```

```
Dim writeable As Boolean
```

```
Dim size As Integer
```

```
c.AudioHardwareGetPropertyInfo(c.kAudioHardwarePropertyDefaultOutputDevice, size, writeable)
```

```
If writeable Then
```

```
    MessageBox "Writeable, "+size.ToString+" bytes"
```

```
else
```

```
    MessageBox "Read only, "+size.ToString+" bytes"
```

```
End If
```

Notes: Lasterror is set.

5.4.11 AudioHardwareGetPropertyMemory(propertyID as string) as memory-block

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: Gets a property value from the Audio Hardware.

Example:

```
Dim c As New CoreAudioMBS
```

```
Dim DefaultInputDeviceMem As MemoryBlock = c.AudioHardwareGetPropertyMemory(c.kAudioHardwarePropertyDefaultInputDevice)
```

```
Dim DefaultInputDeviceID As Integer = DefaultInputDeviceMem.Long(0)
```

```
Dim DefaultInputDeviceName As String = c.AudioDeviceGetPropertyString(DefaultInputDeviceID, 0, True, c.kAudioDevicePropertyDeviceName)
```

```
MessageBox DefaultInputDeviceName
```

Notes: Lasterror is set.

5.4.12 AudioHardwareGetPropertyString(propertyID as string) as string

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: Gets a property value from the Audio Hardware.

Notes: Lasterror is set.

5.4.13 AudioHardwareSetPropertyMemory(propertyID as string, data as memoryblock, offset as Integer, length as Integer)

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: Sets a property value for the Audio Hardware.

Notes: Lasterror is set.

5.4.14 AudioHardwareSetPropertyString(propertyID as string, data as string)

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: Sets a property value for the Audio Hardware.

Notes: Lasterror is set.

5.4.15 AudioObjectGetPropertyData(inObjectID as Integer, AddressSelector as UInt32, AddressScope as UInt32, AddressElement as UInt32, QualifierData as memoryblock = nil, InputData as Memoryblock = nil) as memoryblock

Plugin Version: 14.2, Platform: macOS, Targets: Desktop only.

Function: Queries an AudioObject to get the data of the given property and places it in the provided buffer.

Notes: The plugin queries size and creates a buffer for the result.

inObjectID: The AudioObject to query.

AddressSelector, AddressScope or AddressElement: An audio object property address indicating which property is being queried.

QualifierData: A buffer of data to be used in determining the data of the property being queried. Note that not all properties require qualification, in which case this value will be nil.

If InputData is nil, we query size and allocate buffer of required size.

If InputData is not nil, we use this memoryblock with its size. Result is InputData on success.

Lasterror is set.

5.4.16 **AudioObjectGetPropertyDataSize(inObjectID as Integer, AddressSelector as UInt32, AddressScope as UInt32, AddressElement as UInt32, QualifierData as memoryblock = nil) as UInt32**

Plugin Version: 14.2, Platform: macOS, Targets: Desktop only.

Function: Queries an AudioObject to find the size of the data for the given property.

Notes: inObjectID: The AudioObject to query.

AddressSelector, AddressScope or AddressElement: An audio object property address indicating which property is being queried.

QualifierData: A buffer of data to be used in determining the data of the property being queried. Note that not all properties require qualification, in which case this value will be nil.

Returns an UInt32 indicating how many bytes the data for the given property occupies.

Lasterror is set.

5.4.17 **AudioObjectSetPropertyData(inObjectID as Integer, AddressSelector as UInt32, AddressScope as UInt32, AddressElement as UInt32, Data as Memoryblock, QualifierData as memoryblock = nil)**

Plugin Version: 14.2, Platform: macOS, Targets: Desktop only.

Function: Tells an AudioObject to change the value of the given property using the provided data.

Notes: inObjectID: The AudioObject to query.

AddressSelector, AddressScope or AddressElement: An audio object property address indicating which property is being queried.

QualifierData: A buffer of data to be used in determining the data of the property being queried. Note that not all properties require qualification, in which case this value will be nil.

Lasterror is set.

5.4.18 **AudioOutputUnitStart(componenthandle as Integer) as Integer**

Plugin Version: 4.3, Platform: macOS, Targets: Desktop only.

Function: Starts the Audio Unit.

Notes: Errorcode is returned.

5.4.19 **AudioOutputUnitStop(componenthandle as Integer) as Integer**

Plugin Version: 4.3, Platform: macOS, Targets: Desktop only.

Function: Stops the AudioUnit.

Notes: Errorcode is returned.

5.4.20 **AudioStreamGetPropertyCFString(AudioStreamID as Integer, channel as Integer, propertyID as string) as string**

Plugin Version: 10.2, Platform: macOS, Targets: All.

Function: Gets a property value from the Audio Stream.

Notes: Lasterror is set.

The property you query must be one of the CFString properties.

5.4.21 **AudioStreamGetPropertyInfo(AudioStreamID as Integer, channel as Integer, propertyID as string, byref size as Integer, byref writeable as boolean)**

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: Gets property information from an Audio Stream.

Notes: Lasterror is set.

5.4.22 **AudioStreamGetPropertyMemory(AudioStreamID as Integer, channel as Integer, propertyID as string) as memoryblock**

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: Gets a property value from the Audio Stream.

Notes: Lasterror is set.

5.4.23 **AudioStreamGetPropertyString(AudioStreamID as Integer, channel as Integer, propertyID as string) as string**

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: Gets a property value from the Audio Stream.

Notes: Lasterror is set.

5.4.24 **AudioStreamSetPropertyMemory(AudioStreamID as Integer, when as memoryblock, channel as Integer, propertyID as string, data as memoryblock, offset as Integer, length as Integer)**

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: Sets a property value for the Audio Stream.

Notes: Lasterror is set.

5.4.25 **AudioStreamSetPropertyString(AudioStreamID as Integer, when as memoryblock, channel as Integer, propertyID as string, data as string)**

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: Sets a property value for the Audio Stream.

Notes: Lasterror is set.

5.4.26 **AudioUnitGetParameter(AudioUnit as Integer, ParameterID as Integer, AudioUnitScope as Integer, AudioUnitElement as Integer) as single**

Plugin Version: 4.2, Platform: macOS, Targets: All.

Function: Gets an audio unit parameter.

5.4.27 **AudioUnitGetPropertyCFString(AudioUnit as Integer, propertyID as Integer, AudioUnitScope as Integer, AudioUnitElement as Integer) as string**

Plugin Version: 10.2, Platform: macOS, Targets: All.

Function: Gets a property of an Audio Unit.

Notes: Lasterror is set.

Constants for AudioUnitScope:

kAudioUnitScope_Global	= 0
kAudioUnitScope_Input	= 1
kAudioUnitScope_Output	= 2
kAudioUnitScope_Group	= 3
kAudioUnitScope_Part	= 4

The property you query must be one of the CFString properties.

5.4.28 **AudioUnitGetPropertyInfo(AudioUnit as Integer, propertyID as Integer, AudioUnitScope as Integer, AudioUnitElement as Integer, byref size as Integer, byref writeable as boolean)**

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: Gets property information from the Audio Unit.

Notes: Lasterror is set.

Constants for AudioUnitScope:

```
kAudioUnitScope_Global    = 0
kAudioUnitScope_Input     = 1
kAudioUnitScope_Output   = 2
kAudioUnitScope_Group     = 3
kAudioUnitScope_Part      = 4
```

5.4.29 **AudioUnitGetPropertyMemory(AudioUnit as Integer, propertyID as Integer, AudioUnitScope as Integer, AudioUnitElement as Integer) as memoryblock**

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: Gets a property of an Audio Unit.

Notes: Lasterror is set.

Constants for AudioUnitScope:

```
kAudioUnitScope_Global    = 0
kAudioUnitScope_Input     = 1
kAudioUnitScope_Output   = 2
kAudioUnitScope_Group     = 3
kAudioUnitScope_Part      = 4
```

5.4.30 **AudioUnitGetPropertyString(AudioUnit as Integer, propertyID as Integer, AudioUnitScope as Integer, AudioUnitElement as Integer) as string**

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: Gets a property of an Audio Unit.

Notes: Lasterror is set.

Constants for AudioUnitScope:

```
kAudioUnitScope_Global    = 0
kAudioUnitScope_Input     = 1
kAudioUnitScope_Output    = 2
kAudioUnitScope_Group     = 3
kAudioUnitScope_Part      = 4
```

5.4.31 AudioUnitInitialize(componenthandle as Integer) as Integer

Plugin Version: 4.3, Platform: macOS, Targets: Desktop only.

Function: Initializes the Audio Unit.

Notes: Errorcode is returned.

5.4.32 AudioUnitReset(componenthandle as Integer, scope as Integer, element as Integer) as Integer

Plugin Version: 4.3, Platform: macOS, Targets: Desktop only.

Function: Resets the Audio Unit.

Notes: Errorcode is returned.

Useful constants:

```
kAudioUnitScope_Global    = 0
kAudioUnitScope_Input     = 1
kAudioUnitScope_Output    = 2
kAudioUnitScope_Group     = 3
kAudioUnitScope_Part      = 4
```

5.4.33 AudioUnitSetParameter(AudioUnit as Integer, ParameterID as Integer, AudioUnitScope as Integer, AudioUnitElement as Integer, value as single, BufferOffsetInFrames as Integer)

Plugin Version: 4.2, Platform: macOS, Targets: All.

Function: Sets an audio unit parameter.

5.4.34 `AudioUnitSetPropertyMemory(AudioUnit as Integer, propertyID as Integer, AudioUnitScope as Integer, AudioUnitElement as Integer, data as memoryblock, offset as Integer, length as Integer)`

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: Sets a property of an Audio Unit.

Notes: Lasterror is set.

Constants for AudioUnitScope:

```
kAudioUnitScope_Global    = 0
kAudioUnitScope_Input     = 1
kAudioUnitScope_Output   = 2
kAudioUnitScope_Group     = 3
kAudioUnitScope_Part      = 4
```

5.4.35 `AudioUnitSetPropertyString(AudioUnit as Integer, propertyID as Integer, AudioUnitScope as Integer, AudioUnitElement as Integer, data as string)`

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: Sets a property value for the Audio Unit.

Notes: Lasterror is set.

Constants for AudioUnitScope:

```
kAudioUnitScope_Global    = 0
kAudioUnitScope_Input     = 1
kAudioUnitScope_Output   = 2
kAudioUnitScope_Group     = 3
kAudioUnitScope_Part      = 4
```

5.4.36 `AudioUnitUninitialize(componenthandle as Integer) as Integer`

Plugin Version: 4.3, Platform: macOS, Targets: Desktop only.

Function: Uninitializes the Audio Unit.

Notes: Errorcode is returned.

5.4.37 CloseComponent(componenthandle as Integer)

Plugin Version: 4.3, Platform: macOS, Targets: All.

Function: Closes a component.

Notes: Do not use the componenthandle any more after this call!

5.4.38 CoreAudioConvertHostTimeToNanosMBS(inHostTime as UInt64) as UInt64

Plugin Version: 7.0, Platform: macOS, Targets: All.

Function: Convert the given host time to a time in Nanoseconds.

Example:

```
Dim value1 As UInt64 = CoreAudioMBS.CoreAudioGetCurrentHostTimeMBS
```

```
Dim value2 As UInt64 = CoreAudioMBS.CoreAudioGetCurrentHostTimeMBS
```

```
Dim value3 As UInt64 = CoreAudioMBS.CoreAudioGetCurrentHostTimeMBS
```

```
Dim time1 As UInt64 = CoreAudioMBS.CoreAudioConvertHostTimeToNanosMBS(value1)
```

```
Dim time2 As UInt64 = CoreAudioMBS.CoreAudioConvertHostTimeToNanosMBS(value2)
```

```
Dim time3 As UInt64 = CoreAudioMBS.CoreAudioConvertHostTimeToNanosMBS(value3)
```

```
// HostTime and Nanoseconds can be same on Intel Macs
```

```
// on Apple Silicon they are not the same!
```

```
Break
```

Notes: Returns 0 on any error.

5.4.39 CoreAudioConvertNanosToHostTimeMBS(inNanos as UInt64) as UInt64

Plugin Version: 7.0, Platform: macOS, Targets: All.

Function: Convert the given Nanoseconds time to a time in the host clock's time base.

Notes: Returns 0 on any error.

5.4.40 CoreAudioGetCurrentHostTimeMBS as UInt64

Plugin Version: 7.0, Platform: macOS, Targets: All.

Function: Retrieve the current host time value.

Example:

```
Dim value1 As UInt64 = CoreAudioMBS.CoreAudioGetCurrentHostTimeMBS
Dim value2 As UInt64 = CoreAudioMBS.CoreAudioGetCurrentHostTimeMBS
Dim value3 As UInt64 = CoreAudioMBS.CoreAudioGetCurrentHostTimeMBS
```

Break // you see how it changes and how long a function call can take

Notes: Returns 0 on any error.

5.4.41 CoreAudioGetHostClockFrequencyMBS as Double

Plugin Version: 7.0, Platform: macOS, Targets: All.

Function: Retrieve the number of ticks per second of the host clock.

Example:

```
Dim value As Double = CoreAudioMBS.CoreAudioGetHostClockFrequencyMBS
MessageBox value.ToString // 1 billion
```

5.4.42 GetHostClockMinimumTimeDeltaMBS as Integer

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: Retrieve the smallest number of ticks difference between two succeeding values of the host clock.

Example:

```
Dim value As Integer = CoreAudioMBS.GetHostClockMinimumTimeDeltaMBS
MessageBox value.ToString // 1
```

Notes: For instance, if this value is 5 and the first value of the host clock is X then the next time after X will be at greater than or equal X+5.

Returns an unsigned integer value.

5.4.43 OpenDefaultComponent(type as string, subtype as string) as Integer

Plugin Version: 4.3, Platform: macOS, Targets: All.

Function: Opens the default component for the given type and subtype string.

Example:

```
Dim c As New CoreAudioMBS

Const kAudioUnitComponentType = "aunt"
Const kAudioUnitSubType_Output = "out "
```

```

// open default output component
Dim n As Integer = c.OpenDefaultComponent(kAudioUnitComponentType, kAudioUnitSubType_Output)

If n = 0 Then
Break // failed
Else
Break
// okay, so close
c.CloseComponent(n)
End If

```

Notes: You can check the "QT Components list" example project for which components are installed. Returns 0 on any error. type and subtype must be 4 letter codes.

useful constans:

kAudioUnitComponentType	= "aunt"
kAudioUnitSubType_Output	= "out "
kAudioUnitID_HALOutput	= "ahal"
kAudioUnitID_DefaultOutput	= "def "
kAudioUnitID_SystemOutput	= "sys "
kAudioUnitID_GenericOutput	= "genr"
kAudioUnitSubType_MusicDevice	= "musd"
kAudioUnitID_DLSSynth	= "dls "
kAudioUnitSubType_SampleRateConverter	= "srcv"
kAudioUnitID_PolyphaseSRC	= "poly"
kAudioUnitSubType_FormatConverter	= "fmtc"
kAudioUnitID_Interleaver	= "inlv"
kAudioUnitID_Deinterleaver	= "dnlv"
kAudioUnitID_AUConverter	= "conv"
kAudioUnitSubType_Effect	= "efct"
kAudioUnitID_MatrixReverb	= "mrev"
kAudioUnitID_Delay	= "dely"
kAudioUnitID_LowPassFilter	= "lpas"
kAudioUnitID_HighPassFilter	= "hpas"
kAudioUnitID_BandPassFilter	= "bpas"
kAudioUnitID_PeakLimiter	= "lmtr"
kAudioUnitID_DynamicsProcessor	= "dcmp"
kAudioUnitSubType_Mixer	= "mixr"
kAudioUnitID_StereoMixer	= "smxr"
kAudioUnitID_3DMixer	= "3dmx"

5.4.44 Properties

5.4.45 kAudioDeviceProcessorOverload as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.46 kAudioDevicePropertyActualSampleRate as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Example:

```
Dim c As New CoreAudioMBS
```

```
// find our default output device
```

```
Dim m As MemoryBlock = c.AudioHardwareGetPropertyMemory(c.kAudioHardwarePropertyDefaultOutputDevice)
```

```
Dim deviceID As Integer = m.Int32Value(0)
```

```
// and grab sample rate
```

```
m = c.AudioDeviceGetPropertyMemory(deviceID, 0, False, c.kAudioDevicePropertyActualSampleRate)
```

```
Dim rate As Double = m.DoubleValue(0)
```

```
// e.g. 48000
```

```
Break
```

Notes: (Read only property)

5.4.47 kAudioDevicePropertyAvailableNominalSampleRates as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.48 kAudioDevicePropertyBufferSize as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.49 kAudioDevicePropertyBufferSizeRange as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.50 kAudioDevicePropertyBufferSize as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.51 kAudioDevicePropertyBufferSizeRange as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.52 kAudioDevicePropertyClockSource as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.53 kAudioDevicePropertyClockSourceNameForID as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.54 `kAudioDevicePropertyClockSourceNameForIDCFString` as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.55 `kAudioDevicePropertyClockSources` as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.56 `kAudioDevicePropertyDataSource` as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.57 `kAudioDevicePropertyDataSourceNameForID` as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.58 `kAudioDevicePropertyDataSourceNameForIDCFString` as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.59 kAudioDevicePropertyDataSources as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.60 kAudioDevicePropertyDeviceCanBeDefaultDevice as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.61 kAudioDevicePropertyDeviceCanBeDefaultSystemDevice as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.62 kAudioDevicePropertyDeviceIsAlive as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.63 kAudioDevicePropertyDeviceIsRunning as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.64 kAudioDevicePropertyDeviceIsRunningSomewhere as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.65 kAudioDevicePropertyDeviceManufacturer as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Example:

```
Dim c As New CoreAudioMBS
```

```
Dim DefaultInputDeviceMem As MemoryBlock
Dim DefaultInputDeviceID As Integer
Dim DefaultInputDeviceManufacturerMem As MemoryBlock
Dim DefaultInputDeviceManufacturerName As String
```

```
DefaultInputDeviceMem = c.AudioHardwareGetPropertyMemory(c.kAudioHardwarePropertyDefaultInputDevice)
```

```
DefaultInputDeviceID = DefaultInputDeviceMem.Long(0)
```

```
DefaultInputDeviceManufacturerMem = c.AudioDeviceGetPropertyMemory(DefaultInputDeviceID, 0, True, c.kAudioDevicePropertyDeviceManufacturer)
```

```
DefaultInputDeviceManufacturerName = DefaultInputDeviceManufacturerMem.CString(0)
```

```
If DefaultInputDeviceManufacturerName.Encoding = Nil Then // fix it, if it is not set
```

```
DefaultInputDeviceManufacturerName = DefineEncoding(DefaultInputDeviceManufacturerName, encodings.UTF8)
```

```
End If
```

```
MessageBox DefaultInputDeviceManufacturerName
```

Notes: (Read only property)

5.4.66 kAudioDevicePropertyDeviceManufacturerCFString as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Example:

```
Dim c As New CoreAudioMBS
```

```
Dim DefaultInputDeviceMem As MemoryBlock
Dim DefaultInputDeviceID As Integer
Dim DefaultInputDeviceManufacturerCFName As CFStringMBS
Dim DefaultInputDeviceManufacturerName As String
```

```

DefaultInputDeviceMem = c.AudioHardwareGetPropertyMemory(c.kAudioHardwarePropertyDefaultInput-
Device)
DefaultInputDeviceID = DefaultInputDeviceMem.Long(0)
DefaultInputDeviceManufacturerCFName = c.AudioDeviceGetPropertyCFString(DefaultInputDeviceID, 0,
True, c.kAudioDevicePropertyDeviceManufacturerCFString)
DefaultInputDeviceManufacturerName = DefaultInputDeviceManufacturerCFName.Str

MessageBox DefaultInputDeviceManufacturerName

```

Notes: (Read only property)

5.4.67 kAudioDevicePropertyDeviceName as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.68 kAudioDevicePropertyDeviceNameCFString as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Example:

```
Dim c As New CoreAudioMBS
```

```
Dim DefaultInputDeviceMem As MemoryBlock = c.AudioHardwareGetPropertyMemory(c.kAudioHardware-
PropertyDefaultInputDevice)
```

```
Dim DefaultInputDeviceID As Integer = DefaultInputDeviceMem.Long(0)
```

```
Dim DefaultInputDeviceCFName As CFStringMBS = c.AudioDeviceGetPropertyCFString(DefaultInput-
DeviceID, 0, True, c.kAudioDevicePropertyDeviceNameCFString)
```

```
Dim DefaultInputDeviceName As String = DefaultInputDeviceCFName.Str
```

```
MessageBox DefaultInputDeviceName
```

Notes: (Read only property)

5.4.69 kAudioDevicePropertyDeviceUID as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.70 `kAudioDevicePropertyDriverShouldOwnSub` as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.71 `kAudioDevicePropertyHogMode` as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.72 `kAudioDevicePropertyIOProcStreamUsage` as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.73 `kAudioDevicePropertyJackIsConnected` as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.74 `kAudioDevicePropertyLatency` as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.75 kAudioDevicePropertyMute as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.76 kAudioDevicePropertyNominalSampleRate as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.77 kAudioDevicePropertyPlayThru as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.78 kAudioDevicePropertyPlugIn as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.79 kAudioDevicePropertyPreferredChannelsForStereo as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.80 kAudioDevicePropertyRegisterBufferList as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.81 kAudioDevicePropertySafetyOffset as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.82 kAudioDevicePropertyStreamConfiguration as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.83 kAudioDevicePropertyStreamFormat as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.84 kAudioDevicePropertyStreamFormatMatch as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.85 kAudioDevicePropertyStreamFormats as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.86 kAudioDevicePropertyStreamFormatSupported as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.87 kAudioDevicePropertyStreams as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.88 kAudioDevicePropertySubMute as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.89 kAudioDevicePropertySubVolumeDecibels as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.90 kAudioDevicePropertySubVolumeDecibelsToScalar as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.91 kAudioDevicePropertySubVolumeRangeDecibels as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.92 `kAudioDevicePropertySubVolumeScalar` as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.93 `kAudioDevicePropertySubVolumeScalarToDecibels` as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.94 `kAudioDevicePropertySupportsMixing` as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.95 `kAudioDevicePropertyTransportType` as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.96 `kAudioDevicePropertyUsesVariableBufferFrameSizes` as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.97 kAudioDevicePropertyVolumeDecibels as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.98 kAudioDevicePropertyVolumeDecibelsToScalar as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.99 kAudioDevicePropertyVolumeRangeDecibels as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.100 kAudioDevicePropertyVolumeScalar as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Example:

```
Dim c As New CoreAudioMBS
```

```
Dim DefaultOutputDeviceMem As MemoryBlock = c.AudioHardwareGetPropertyMemory(c.kAudioHardwarePropertyDefaultOutputDevice)
```

```
Dim DefaultOutputDeviceID As Integer = DefaultOutputDeviceMem.Long(0)
```

```
Dim mem1 As MemoryBlock = c.AudioDeviceGetPropertyMemory(DefaultOutputDeviceID, 0, False, c.kAudioDevicePropertyVolumeScalar)
```

```
Dim VolumeScalar As Single = mem1.SingleValue(0)
```

```
// set volume to 50%
```

```
Dim VolumeScalar2 As Single = 0.5
```

```
Dim mem2 As New MemoryBlock(4)
```

```
mem2.SingleValue(0) = VolumeScalar2
```

```
c.AudioDeviceSetPropertyMemory(DefaultOutputDeviceID, Nil, 0, False, c.kAudioDevicePropertyVolumeScalar,
```

```
mem2, 0, mem2.Size)
```

```
// now query again
```

```
Dim mem3 As MemoryBlock = c.AudioDeviceGetPropertyMemory(DefaultOutputDeviceID, 0, False, c.kAudioDevicePropertyVolumeScalar)
```

```
Dim VolumeScalar3 As Single = mem3.SingleValue(0)
```

```
Break
```

Notes: (Read only property)

5.4.101 kAudioDevicePropertyVolumeScalarToDecibels as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.102 kAudioHardwarePropertyBootChimeVolumeDecibels as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: A Float32 that represents the value of the boot chime volume control in dB. This property is implemented by an AudioControl object that is a subclass of AudioBootChimeVolumeControl.

(Read only property)

5.4.103 kAudioHardwarePropertyBootChimeVolumeDecibelsToScalar as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.104 kAudioHardwarePropertyBootChimeVolumeRangeDecibels as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.105 kAudioHardwarePropertyBootChimeVolumeScalar as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.106 kAudioHardwarePropertyBootChimeVolumeScalarToDecibels as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.107 kAudioHardwarePropertyDefaultInputDevice as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Example:

```
Dim c As New CoreAudioMBS
```

```
Dim DefaultInputDeviceMem As MemoryBlock = c.AudioHardwareGetPropertyMemory(c.kAudioHardwarePropertyDefaultInputDevice)
```

```
Dim DefaultInputDeviceID As Integer = DefaultInputDeviceMem.Long(0)
```

```
Dim DefaultInputDeviceName As String = c.AudioDeviceGetPropertyString(DefaultInputDeviceID, 0, True, c.kAudioDevicePropertyDeviceName)
```

```
MessageBox DefaultInputDeviceName
```

Notes: (Read only property)

5.4.108 kAudioHardwarePropertyDefaultOutputDevice as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Example:

```
Dim c As New CoreAudioMBS
```

```
Dim DefaultOutputDeviceMem As MemoryBlock = c.AudioHardwareGetPropertyMemory(c.kAudioHardwarePropertyDefaultOutputDevice)
```

```
Dim DefaultOutputDeviceID As Integer = DefaultOutputDeviceMem.Long(0)
```

```
Dim DefaultOutputDeviceName As String = c.AudioDeviceGetPropertyString(DefaultOutputDeviceID, 0, True, c.kAudioDevicePropertyDeviceName)
```

```
MessageBox DefaultOutputDeviceName
```

Notes: (Read only property)

5.4.109 kAudioHardwarePropertyDefaultSystemOutputDevice as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.110 kAudioHardwarePropertyDeviceForUID as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.111 kAudioHardwarePropertyDevices as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Example:

```
Dim c As New CoreAudioMBS
```

```
Dim m As MemoryBlock = c.AudioHardwareGetPropertyMemory(c.kAudioHardwarePropertyDevices)
```

```
Dim count As Integer = m.Size / 4
Dim IDs() As String

For i As Integer = 0 To count-1
  Ids.append m.Int32Value(i * 4).ToString
Next

MessageBox "Device IDs: "+string.FromArray(IDs)
```

Notes: (Read only property)

5.4.112 kAudioHardwarePropertyRunLoop as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.113 kAudioHardwarePropertySleepingIsAllowed as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.114 kAudioHardwarePropertyUnloadingIsAllowed as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.115 kAudioPropertyWildcardChannel as Integer

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.116 kAudioPropertyWildcardPropertyID as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.117 kAudioPropertyWildcardSection as Integer

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.118 kAudioStreamPropertyDirection as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.119 kAudioStreamPropertyOwningDevice as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.120 kAudioStreamPropertyPhysicalFormat as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.121 kAudioStreamPropertyPhysicalFormatMatch as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.122 kAudioStreamPropertyPhysicalFormats as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.123 kAudioStreamPropertyPhysicalFormatSupported as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.124 kAudioStreamPropertyStartingChannel as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.125 kAudioStreamPropertyTerminalType as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: One of the constants for CoreAudio.

Notes: (Read only property)

5.4.126 Lasterror as Integer

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: The last error code returned.

Notes: 0 for success.

(Read and Write property)

5.5 class CoreAudioPlayerMBS

5.5.1 class CoreAudioPlayerMBS

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: A class to play sounds from a memoryblock using CoreAudio.

Notes: This class uses an internal buffer of around 100000 samples which when played with a samplerate of 8000 will play for 10 seconds.

The music stops playing after this object is destroyed.

Mac OS X is required.

Blog Entries

- [MBS Real Studio Plugins, version 11.4pr2](#)

5.5.2 Methods

5.5.3 AddAudio(Data as memoryblock, offsetBytes as Integer=0, countBytes as Integer=0, BitSize as Integer=16, ClearBuffers as boolean=false) as boolean

Plugin Version: 7.4, Platform: macOS, Targets: All.

Function: Adds integer audio.

Notes: Data: a memoryblock with the sound data

offsetBytes: the number of the bytes to start playing (0=first)

countBytes: the number of bytes to play from offset.

You need to set NumberOfChannels before calling this method.

NumberOfChannels can be 1 or 2. For 2 channels, sound data must be interleaved.

Values for bitsize:

7	signed byte
8	unsigned byte
15	signed short
16	unsigned short
24	unsigned medium
31	signed integer
32	unsigned integer

This method only copies the data to the internal queue. It returns directly.
If ClearBuffers is true the buffer list is cleared before this new data is added.

5.5.4 AddAudioStereo(Data1 as memoryblock, Data2 as memoryblock, offsetBytes as Integer=0, countBytes as Integer=0, BitSize as Integer=16, ClearBuffers as boolean=false) as boolean

Plugin Version: 7.4, Platform: macOS, Targets: All.

Function: Adds integer audio.

Notes: This is a special version of PlayAudio which takes samples from both memoryblocks and interleaves them.

Data1: a memoryblock with the sound data

Data2: a memoryblock with the sound data

offsetBytes: the number of the bytes to start playing (0=first)

countBytes: the number of bytes to play from offset.

You need to set NumberOfChannels before calling this method.
NumberOfChannels must be 2 for this method.

Values for bitsize:

7	signed byte
8	unsigned byte
15	signed short
16	unsigned short
24	unsigned medium
31	signed integer
32	unsigned integer

This method only copies the data to the internal queue. It returns directly.
If ClearBuffers is true the buffer list is cleared before this new data is added.

5.5.5 AddFloatAudio(FloatData as memoryblock, offsetBytes as Integer=0, countBytes as Integer=0, ClearBuffers as boolean=false) as boolean

Plugin Version: 7.4, Platform: macOS, Targets: All.

Function: Adds float audio.

Notes: FloatData: a memoryblock with the sound data filled with single values.

offsetBytes: the number of the bytes to start playing (0=first)

countBytes: the number of bytes to play from offset.

The samples are stored in 32bit float values (memoryblock.SingleValue)

You need to set NumberOfChannels before calling this method.

NumberOfChannels can be 1 or 2. For 2 channels, sound data must be interleaved.

This method only copies the data to the internal queue. It returns directly.

If ClearBuffers is true the buffer list is cleared before this new data is added.

5.5.6 AddFloatAudioStereo(FloatData1 as memoryblock, FloatData2 as memoryblock, offsetBytes as Integer=0, countBytes as Integer=0, ClearBuffers as boolean=false) as boolean

Plugin Version: 7.4, Platform: macOS, Targets: All.

Function: Adds float audio.

Notes: This is a special version of PlayFloatAudio which takes samples from both memoryblocks and interleaves them.

FloatData1: a memoryblock with the sound data filled with single values.

FloatData2: a memoryblock with the sound data filled with single values.

offsetBytes: the number of the bytes to start playing (0=first)

countBytes: the number of bytes to play from offset.

The samples are stored in 32bit float values (memoryblock.SingleValue)

You need to set NumberOfChannels before calling this method.

NumberOfChannels must be 2 for this method.

This method only copies the data to the internal queue. It returns directly.

If ClearBuffers is true the buffer list is cleared before this new data is added.

5.5.7 Close

Plugin Version: 5.1, Platform: macOS, Targets: All.

Function: The destructor.

Notes: There is no need to call this method except you want to free all resources of this object now without waiting for Xojo to do it for you.

5.5.8 FreeSpace as Integer

Plugin Version: 7.4, Platform: macOS, Targets: All.

Function: Returns the number of buffer entries available in the queue.

Notes: The size of the buffers is not limited except your available memory.

5.5.9 HardwareNumberOfChannels as Integer

Plugin Version: 4.3, Platform: macOS, Targets: All.

Function: Returns the actual number of channels in the default device; to set the number of channels being output, use numberOfChannels.

Notes: This class can only play stereo to 2 channel devices or mono to all channels.
Returns 0 on any error.

5.5.10 HardwareSampleRate as single

Plugin Version: 4.3, Platform: macOS, Targets: All.

Function: The hardware sample rate.

Notes: Today this is normally 44100 Hz. Or 0 on any error.

5.5.11 HasFreeSpace as boolean

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: Returns true if the internal sound buffer is not full.

Notes: Returns true if freespace returns a value greater than zero.

This function was named IsQueueEmpty in plugin version 7.4.

5.5.12 **PlayAudio(Data as memoryblock, offsetBytes as Integer=0, countBytes as Integer=0, BitSize as Integer=16, ClearBuffers as boolean=false) as boolean**

Plugin Version: 7.4, Platform: macOS, Targets: All.

Function: Adds integer audio and starts playback.

Notes: Data: a memoryblock with the sound data

offsetBytes: the number of the bytes to start playing (0=first)

countBytes: the number of bytes to play from offset.

You need to set NumberOfChannels before calling this method.

NumberOfChannels can be 1 or 2. For 2 channels, sound data must be interleaved.

Values for bitsize:

7	signed byte
8	unsigned byte
15	signed short
16	unsigned short
24	unsigned medium
31	signed integer
32	unsigned integer

This method only copies the data to the internal queue. It returns directly.

If ClearBuffers is true the buffer list is cleared before this new data is added.

5.5.13 **PlayAudioStereo(Data1 as memoryblock, Data2 as memoryblock, offsetBytes as Integer=0, countBytes as Integer=0, BitSize as Integer=16, ClearBuffers as boolean=false) as boolean**

Plugin Version: 7.4, Platform: macOS, Targets: All.

Function: Adds integer audio and starts playback.

Notes: This is a special version of PlayAudio which takes samples from both memoryblocks and interleaves them.

Data1: a memoryblock with the sound data

Data2: a memoryblock with the sound data

offsetBytes: the number of the bytes to start playing (0=first)

countBytes: the number of bytes to play from offset.

You need to set NumberOfChannels before calling this method.
NumberOfChannels must be 2 for this method.

Values for bitsize:

7	signed byte
8	unsigned byte
15	signed short
16	unsigned short
24	unsigned medium
31	signed integer
32	unsigned integer

This method only copies the data to the internal queue. It returns directly.
If ClearBuffers is true the buffer list is cleared before this new data is added.

5.5.14 PlayFloatAudio(FloatData as memoryblock, offsetBytes as Integer=0, countBytes as Integer=0, ClearBuffers as boolean=false) as boolean

Plugin Version: 7.4, Platform: macOS, Targets: All.

Function: Adds float audio and starts playback.

Notes: FloatData: a memoryblock with the sound data filled with single values.

offsetBytes: the number of the bytes to start playing (0=first)

countBytes: the number of bytes to play from offset.

The samples are stored in 32bit float values (memoryblock.SingleValue)

You need to set NumberOfChannels before calling this method.
NumberOfChannels can be 1 or 2. For 2 channels, sound data must be interleaved.

This method only copies the data to the internal queue. It returns directly.
If ClearBuffers is true the buffer list is cleared before this new data is added.

5.5.15 PlayFloatAudioStereo(FloatData1 as memoryblock, FloatData2 as memoryblock, offsetBytes as Integer=0, countBytes as Integer=0, ClearBuffers as boolean=false) as boolean

Plugin Version: 7.4, Platform: macOS, Targets: All.

Function: Adds float audio and starts playback.

Notes: This is a special version of PlayFloatAudio which takes samples from both memoryblocks and interleaves them.

FloatData1: a memoryblock with the sound data filled with single values.

FloatData2: a memoryblock with the sound data filled with single values.

offsetBytes: the number of the bytes to start playing (0=first)

countBytes: the number of bytes to play from offset.

The samples are stored in 32bit float values (memoryblock.SingleValue)

You need to set NumberOfChannels before calling this method.

NumberOfChannels must be 2 for this method.

This method only copies the data to the internal queue. It returns directly.

If ClearBuffers is true the buffer list is cleared before this new data is added.

5.5.16 Start as boolean

Plugin Version: 7.4, Platform: macOS, Targets: All.

Function: Starts playback.

Notes: use AddAudio, AddAudioStereo, AddFloatAudio and AddFloatAudioStereo first to fill buffers.

5.5.17 Stop

Plugin Version: 5.1, Platform: macOS, Targets: All.

Function: Stops playback.

5.5.18 Properties

5.5.19 HadUnderflow as Boolean

Plugin Version: 7.5, Platform: macOS, Targets: All.

Function: A flag set if a data underflow was found while NoUnderflow is true.

Notes: You may want to set this to false after your application recovered from a data underflow.
(Read and Write property)

5.5.20 IsRunning as Boolean

Plugin Version: 4.3, Platform: macOS, Targets: All.

Function: Whether the class is playing something.

Notes: Returns true while playing.
(Read only property)

5.5.21 NoUnderflow as Boolean

Plugin Version: 7.5, Platform: macOS, Targets: All.

Function: Whether underflows should be prevented.

Notes: If no audio data is there and NoUnderflow=true, the flag HadUnderflow is set to true and 0 values (Silence) is played.

Switching from sound to no sound and back may add some noise.

(Read and Write property)

5.5.22 NumberOfChannels as Integer

Plugin Version: 4.3, Platform: macOS, Targets: All.

Function: The number of output channels.

Notes: Currently only 1 (default) and 2 are supported.
(Read and Write property)

5.5.23 OutputDeviceID as Integer

Plugin Version: 5.1, Platform: macOS, Targets: All.

Function: The output device to use.

Notes: 0 for the default output device.

If you set this property to a bad value you risk a crash.

(Read and Write property)

5.5.24 OutputPosition as Double

Plugin Version: 4.3, Platform: macOS, Targets: All.

Function: The current position in the playing stream.

Notes: May point between samples.

(Read only property)

5.5.25 OutputPositionRelative as Double

Plugin Version: 7.4, Platform: macOS, Targets: All.

Function: The current position in the playing buffer.

Notes: May point between samples.

Will reset to 0 when a new buffer is used.

(Read only property)

5.5.26 SampleRate as Single

Plugin Version: 4.3, Platform: macOS, Targets: All.

Function: The sample rate to use.

Notes: You can use any value between 4000 and 100000.

Default is 44100 Hz.

(Read and Write property)

Chapter 6

CoreAudio

6.1 class AudioPlayThruMBS

6.1.1 class AudioPlayThruMBS

Plugin Version: 6.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: A class to do active play through on Mac OS X using CoreAudio.

Notes: Requires Mac OS X 10.4.

Blog Entries

- [MBS Real Studio Plugins, version 13.0pr3](#)

6.1.2 Methods

6.1.3 Constructor

Plugin Version: 6.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: The constructor.

Example:

```
dim a as AudioPlayThruMBS
a=new AudioPlayThruMBS
```

Notes: Does nothing.

Only useful if you want to create an object, set the buffersize and call Init after that.

See also:

- 6.1.4 Constructor(InputDeviceID as Integer, OutputDeviceID as Integer, BufferSizeWish as Integer = 0) 148

6.1.4 Constructor(InputDeviceID as Integer, OutputDeviceID as Integer, BufferSizeWish as Integer = 0)

Plugin Version: 7.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The constructor.

Example:

```
dim InputDeviceID,OutputDeviceID as Integer
// get device IDs
dim a as AudioPlayThruMBS

a=new AudioPlayThruMBS(InputDeviceID, OutputDeviceID)
```

Notes: Calls Init method behind scenes with default buffer size.

Lasterror is set.

Device IDs are the IDs you get in the CoreAudio classes.

BufferSizeWish is the buffer size you prefer to use. If value is too small the default value will be used.

See also:

- 6.1.3 Constructor

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6.1.5 Init(InputDeviceID as Integer, OutputDeviceID as Integer, BufferSizeWish as Integer = 0)

Plugin Version: 6.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Initializes the engine behind this class.

Example:

```
dim InputDeviceID as Integer
dim OutputDeviceID as Integer
// get device IDs

dim a as AudioPlayThruMBS
a=new AudioPlayThruMBS
a.Init(InputDeviceID, OutputDeviceID)
```

Notes: Lasterror is set.

Device IDs are the IDs you get in the CoreAudio classes.

Can be used to set the buffersize before calling this method.

6.1.6 IsRunning as boolean

Plugin Version: 6.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Whether playthrough is active.

6.1.7 SetInputDeviceAsCurrent(DeviceID as Integer)

Plugin Version: 6.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Sets input device.

Notes: Device IDs are the IDs you get in the CoreAudio classes.

6.1.8 SetOutputDeviceAsCurrent(DeviceID as Integer)

Plugin Version: 6.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Sets output device.

Notes: Lasterror is set.

Device IDs are the IDs you get in the CoreAudio classes.

6.1.9 Start

Plugin Version: 6.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Starts playing.

Notes: Lasterror is set.

6.1.10 Stop

Plugin Version: 6.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Stops playing.

Notes: Lasterror is set.

6.1.11 Properties

6.1.12 Lasterror as Integer

Plugin Version: 6.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: The last error code reported.

Notes: 0 for success. -1 in case function is not available.

(Read and Write property)

6.1.13 Volume as Double

Plugin Version: 13.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Get or set the volume of the output audio unit.

Notes: Lasterror is set.

Range is from 0.0 to 1.0.

(Read and Write computed property)

Chapter 7

CoreGraphics

7.1 class CGSessionMBS

7.1.1 class CGSessionMBS

Plugin Version: 4.2, Platform: macOS, Targets: All.

Function: A class to hold some values about the current CoreGraphics session.

Example:

```
dim c as CGSessionMBS = CGSessionMBS
MsgBox c.UserName
```

Notes: You need to call the CGSessionMBS global method to get a valid object of this class (with values).

7.1.2 Properties

7.1.3 ConsoleSet as Integer

Plugin Version: 4.2, Platform: macOS, Targets: All.

Function: Value is a 32 bit unsigned integer value representing a set of hardware composing a console.

Example:

```
dim c as CGSessionMBS = CGSessionMBS
MsgBox str(c.ConsoleSet)
```

Notes: (Read only property)

7.1.4 LoginDone as Boolean

Plugin Version: 4.2, Platform: macOS, Targets: All.

Function: True if login operation has been done, otherwise False.

Example:

```
dim c as CGSessionMBS = CGSessionMBS
```

```
MsgBox str(c.LoginDone)
```

Notes: (Read only property)

7.1.5 OnConsole as Boolean

Plugin Version: 4.2, Platform: macOS, Targets: All.

Function: True if the session is on a console, otherwise False.

Example:

```
dim c as CGSessionMBS = CGSessionMBS
```

```
MsgBox str(c.OnConsole)
```

Notes: (Read only property)

7.1.6 UserID as Integer

Plugin Version: 4.2, Platform: macOS, Targets: All.

Function: The user id for the session's current user.

Example:

```
dim c as CGSessionMBS = CGSessionMBS
```

```
MsgBox str(c.UserID)
```

Notes: (Read only property)

7.1.7 UserName as String

Plugin Version: 4.2, Platform: macOS, Targets: All.

Function: The session's short user name as set by loginwindow.

Example:

```
dim usr as CGSessionMBS
usr=CGSessionMBS
msgbox usr.UserName
```

Notes: (Read only property)

7.2 Globals

7.2.1 CGSessionMBS as CGSessionMBS

Plugin Version: 4.2, Platform: macOS, Targets: All.

Function: A function to return the current CoreGraphics session information.

Example:

```
dim c as CGSessionMBS
```

```
c=CGSessionMBS
```

```
MsgBox C.UserName+" "+str(c.Userid)
```

Notes: Returns nil on any error.

Returns nil if the caller is not within a GUI session, as when the caller is a UNIX daemon, or if a system is configured to not run a Quartz GUI (window server disabled).

Chapter 8

DNS

8.1 class DNSAddressRecordMBS

8.1.1 class DNSAddressRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The class for an address record.

Example:

```
dim r as DNSReplyMBS = DNSUtilMBS.Lookup("www.six.heise.de", DNSUtilMBS.ClassINTERNET, DNSUtilMBS.TypeA)
```

```
if r<>Nil then
for each d as DNSResourceRecordMBS in r.Answers
if d.A<>Nil then
MsgBox d.A.address
end if
next
end if
```

8.1.2 Properties

8.1.3 address as String

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The IPv4 address.

Example:

```
dim r as DNSReplyMBS = DNSUtilMBS.Lookup("www.six.heise.de", DNSUtilMBS.ClassINTERNET, DNSUtilMBS.TypeA)
```

```
if r<>Nil then  
for each d as DNSResourceRecordMBS in r.Answers  
if d.A<>Nil then  
MsgBox d.A.address  
end if  
next  
end if
```

Notes: (Read and Write property)

8.2 class DNSAFSDBRecordMBS

8.2.1 class DNSAFSDBRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The class for an AFSDB record.

8.2.2 Properties

8.2.3 hostname as String

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The hostname.

Notes: (Read and Write property)

8.2.4 subtype as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The sub type.

Notes: (Read and Write property)

8.3 class DNSDomainNameRecordMBS

8.3.1 class DNSDomainNameRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The class for a domain name record.

8.3.2 Properties

8.3.3 name as String

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The queried name.

Notes: (Read and Write property)

8.4 class DNSHeaderMBS

8.4.1 class DNSHeaderMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The class for a header of a DNS query.

8.4.2 Properties

8.4.3 AdditionalCount as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The number of additional items.

Example:

```
dim r as DNSReplyMBS = DNSUtilMBS.Lookup("www.apple.com", DNSUtilMBS.ClassINTERNET, DNSUtilMBS.TypeA)
```

```
if r<>Nil then  
  MsgBox "AdditionalCount: "+str(r.Header.AdditionalCount)  
end if
```

Notes: (Read and Write property)

8.4.4 AnswerCount as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The number of answers in this query.

Example:

```
dim r as DNSReplyMBS = DNSUtilMBS.Lookup("www.apple.com", DNSUtilMBS.ClassINTERNET, DNSUtilMBS.TypeA)
```

```
if r<>Nil then  
  MsgBox "AnswerCount: "+str(r.Header.AnswerCount)  
end if
```

Notes: (Read and Write property)

8.4.5 AuthorityCount as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The number of authority records.

Example:

```
dim r as DNSReplyMBS = DNSUtilMBS.Lookup("www.apple.com", DNSUtilMBS.ClassINTERNET, DNSUtilMBS.TypeA)

if r<>Nil then
  MsgBox "AuthorityCount: "+str(r.Header.AuthorityCount)
end if
```

Notes: (Read and Write property)

8.4.6 Flags as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The flags.

Example:

```
dim r as DNSReplyMBS = DNSUtilMBS.Lookup("www.apple.com", DNSUtilMBS.ClassINTERNET, DNSUtilMBS.TypeA)

if r<>Nil then
  MsgBox "Flags: "+str(r.Header.Flags)
end if
```

Notes: (Read and Write property)

8.4.7 QuestionCount as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The number of questions in this query.

Example:

```
dim r as DNSReplyMBS = DNSUtilMBS.Lookup("www.apple.com", DNSUtilMBS.ClassINTERNET, DNSUtilMBS.TypeA)

if r<>Nil then
```

```
MsgBox "QuestionCount: "+str(r.Header.QuestionCount)
end if
```

Notes: (Read and Write property)

8.4.8 xid as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The xid value.

Example:

```
dim r as DNSReplyMBS = DNSUtilMBS.Lookup("www.apple.com", DNSUtilMBS.ClassINTERNET, DNSUtilMBS.TypeA)
```

```
if r<>Nil then
MsgBox "xid: "+str(r.Header.xid)
end if
```

Notes: (Read and Write property)

8.5 class DNSHINFORecordMBS

8.5.1 class DNSHINFORecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The class for the host information record.

8.5.2 Properties

8.5.3 CPU as String

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The CPU information string.

Notes: (Read and Write property)

8.5.4 OS as String

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The operation system name.

Notes: (Read and Write property)

8.6 class DNSIN6AddressRecordMBS

8.6.1 class DNSIN6AddressRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The class for an IPv6 address record.

Example:

```
dim r as DNSReplyMBS = DNSUtilMBS.Lookup("www.six.heise.de", DNSUtilMBS.ClassINTERNET, DNSUtilMBS.TypeAAAA)
```

```
if r<>Nil then
for each d as DNSResourceRecordMBS in r.Answers
if d.AAAA<>Nil then
MsgBox d.AAAA.address
end if
next
end if
```

8.6.2 Properties

8.6.3 address as String

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The IPv6 address.

Example:

```
dim r as DNSReplyMBS = DNSUtilMBS.Lookup("www.six.heise.de", DNSUtilMBS.ClassINTERNET, DNSUtilMBS.TypeAAAA)
```

```
if r<>Nil then
for each d as DNSResourceRecordMBS in r.Answers
if d.AAAA<>Nil then
MsgBox d.AAAA.address
end if
next
end if
```

Notes: (Read and Write property)

8.6.4 rawaddress as Memoryblock

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The raw address as a memoryblock.

Notes: (Read and Write property)

8.7 class DNSISDNRecordMBS

8.7.1 class DNSISDNRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The class for an ISDN record.

8.7.2 Properties

8.7.3 isdnAddress as String

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The ISDN address.

Notes: (Read and Write property)

8.7.4 subAddress as String

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The subaddress.

Notes: (Read and Write property)

8.8 class `DNSLocRecordMBS`

8.8.1 class `DNSLocRecordMBS`

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The location record class.

8.8.2 Properties

8.8.3 altitude as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The altitude value.

Notes: (Read and Write property)

8.8.4 horizontalPrecision as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The horizontal precision value.

Notes: (Read and Write property)

8.8.5 latitude as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The latitude value.

Notes: (Read and Write property)

8.8.6 longitude as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The longitude value.

Notes: (Read and Write property)

8.8.7 size as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The size value.

Notes: (Read and Write property)

8.8.8 version as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The version value.

Notes: (Read and Write property)

8.8.9 verticalPrecision as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The vertical precision value.

Notes: (Read and Write property)

8.9 class DNSMINFORRecordMBS

8.9.1 class DNSMINFORRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The MINFO record class.

8.9.2 Properties

8.9.3 emailbx as String

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The emailbx value.

Notes: (Read and Write property)

8.9.4 rmailbx as String

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The rmailbx value.

Notes: (Read and Write property)

8.10 class DNSMXRecordMBS

8.10.1 class DNSMXRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The class for a mx (mailbox) record.

8.10.2 Properties

8.10.3 name as String

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The name of this email server.

Notes: (Read and Write property)

8.10.4 preference as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The preference value for this email server.

Notes: (Read and Write property)

8.11 class DNSQuestionMBS

8.11.1 class DNSQuestionMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The class for a DNS query question.

8.11.2 Properties

8.11.3 dnsclass as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The DNS class value.

Notes: See the Class* constants in DNSUtilMBS module.
(Read and Write property)

8.11.4 dnstype as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The DNS type value.

Notes: See the Type* constants in DNSUtilMBS module.
(Read and Write property)

8.11.5 name as String

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The query in the question.

Notes: (Read and Write property)

8.12 class DNSRawResourceRecordMBS

8.12.1 class DNSRawResourceRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The class for a raw resource record.

8.12.2 Properties

8.12.3 data as String

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The data as a string with no encoding set.

Notes: Just the raw bytes as string.

(Read and Write property)

8.12.4 length as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The length of the data.

Notes: (Read and Write property)

8.13 class DNSReplyMBS

8.13.1 class DNSReplyMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The class for a DNS query reply.

8.13.2 Methods

8.13.3 Additional(index as Integer) as DNSResourceRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: Returns the additional record with the given index.

Notes: index is zero based.

8.13.4 Additional as DNSResourceRecordMBS()

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: Returns an array with the additional records.

8.13.5 Answer(index as Integer) as DNSResourceRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: Returns the answer with the given index.

Notes: index is zero based.

8.13.6 Answers as DNSResourceRecordMBS()

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: Returns an array with the answer records.

8.13.7 Authority(index as Integer) as DNSResourceRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: Returns the authority with the given index.

Notes: index is zero based.

8.13.8 Authoritys as DNSResourceRecordMBS()

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: Returns an array with the authority records.

8.13.9 Question(index as Integer) as DNSQuestionMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The question with the given index.

Notes: index is zero based.

8.13.10 Questions as DNSQuestionMBS()

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: Returns an array with the question records.

8.13.11 Properties

8.13.12 additionalCount as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The number of additional records.

Example:

```
dim r as DNSReplyMBS = DNSUtilMBS.Lookup("www.apple.com", DNSUtilMBS.ClassINTERNET, DNSUtilMBS.TypeA)
```

```
if r<>Nil then  
  MsgBox "additionalCount: "+str(r.additionalCount)  
end if
```

Notes: (Read and Write property)

8.13.13 answerCount as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The number of answer records.

Example:

```
dim r as DNSReplyMBS = DNSUtilMBS.Lookup("www.apple.com", DNSUtilMBS.ClassINTERNET, DNSUtilMBS.TypeA)
```

```
if r<>Nil then  
  MsgBox "answerCount: "+str(r.answerCount)  
end if
```

Notes: (Read and Write property)

8.13.14 authorityCount as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The number of authority records.

Example:

```
dim r as DNSReplyMBS = DNSUtilMBS.Lookup("www.apple.com", DNSUtilMBS.ClassINTERNET, DNSUtilMBS.TypeA)
```

```
if r<>Nil then  
  MsgBox "authorityCount: "+str(r.authorityCount)  
end if
```

Notes: (Read and Write property)

8.13.15 Header as DNSHeaderMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The header values for this query.

Notes: (Read and Write property)

8.13.16 questionCount as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The number of questions.

Example:

```
dim r as DNSReplyMBS = DNSUtilMBS.Lookup("www.apple.com", DNSUtilMBS.ClassINTERNET, DNSUtilMBS.TypeA)
```

```
if r<>Nil then  
  MsgBox "questionCount: "+str(r.questionCount)  
end if
```

Notes: (Read and Write property)

8.13.17 Server as DNSSocketAddressMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The server details from this query.

Notes: (Read and Write property)

8.13.18 Status as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The status of this query.

Example:

```
dim r as DNSReplyMBS = DNSUtilMBS.Lookup("www.apple.com", DNSUtilMBS.ClassINTERNET, DNSUtilMBS.TypeA)
```

```
if r<>Nil then  
  MsgBox "Status: "+str(r.Status)  
end if
```

Notes: See the Status* constants.
(Read and Write property)

8.13.19 Constants

Constants

Constant	Value	Description
StatusBadHandle	1	One of the status constants for the status property.
StatusConnectionFailed	6	One of the status constants for the status property.
StatusMalformedQuery	2	One of the status constants for the status property.
StatusOK	0	One of the status constants for the status property.
StatusReceiveFailed	5	One of the status constants for the status property.
StatusSendFailed	4	One of the status constants for the status property.
StatusTimeout	3	One of the status constants for the status property.
StatusWrongQuestion	9	One of the status constants for the status property.
StatusWrongServer	7	One of the status constants for the status property.
StatusWrongXID	8	One of the status constants for the status property.

8.14 class DNSResourceRecordMBS

8.14.1 class DNSResourceRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The class for a resource record.

Notes: Data contained in unsupported or obsolete Resource Record types may be accessed via RAW as a DNSRawResourceRecordMBS.

8.14.2 Properties

8.14.3 A as DNSAddressRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The record content.

Notes: (Read and Write property)

8.14.4 AAAA as DNSIN6AddressRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The record content.

Notes: (Read and Write property)

8.14.5 AFSDDB as DNSAFSDBRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The record content.

Notes: (Read and Write property)

8.14.6 CNAME as DNSDomainNameRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The record content.

Notes: (Read and Write property)

8.14.7 dnsclass as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The DNS class value.

Notes: See the Class* constants in DNSUtilMBS module.
(Read and Write property)

8.14.8 dnstype as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The DNS type value.

Notes: See the Type* constants in DNSUtilMBS module.
(Read and Write property)

8.14.9 HINFO as DNSHINFORecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The record content.

Notes: (Read and Write property)

8.14.10 ISDN as DNSISDNRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The record content.

Notes: (Read and Write property)

8.14.11 LOC as DNSLocRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The record content.

Notes: (Read and Write property)

8.14.12 MB as DNSDomainNameRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The record content.

Notes: (Read and Write property)

8.14.13 MD as DNSDomainNameRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The record content.

Notes: (Read and Write property)

8.14.14 MF as DNSDomainNameRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The record content.

Notes: (Read and Write property)

8.14.15 MG as DNSDomainNameRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The record content.

Notes: (Read and Write property)

8.14.16 MINFO as DNSMINFORRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The record content.

Notes: (Read and Write property)

8.14.17 MR as DNSDomainNameRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The record content.

Notes: (Read and Write property)

8.14.18 MX as DNSMXRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The record content.

Notes: (Read and Write property)

8.14.19 name as String

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The name.

Notes: (Read and Write property)

8.14.20 NS as DNSDomainNameRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The record content.

Notes: (Read and Write property)

8.14.21 PTR as DNSDomainNameRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The record content.

Notes: (Read and Write property)

8.14.22 RAW as DNSRawResourceRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The record content.

Notes: Data contained in unsupported or obsolete Resource Record types may be accessed via RAW as a DNSRawResourceRecordMBS.

(Read and Write property)

8.14.23 Record as Variant

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The record content as a variant.

Notes: Each resource record contains only one subrecord. So this record property has a reference to it and the corresponding property.

(Read and Write property)

8.14.24 RP as DNSRPRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The record content.

Notes: (Read and Write property)

8.14.25 RT as DNSRTRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The record content.

Notes: (Read and Write property)

8.14.26 SOA as DNSSOARecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The record content.

Notes: (Read and Write property)

8.14.27 SRV as DNSSRVRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The record content.

Notes: (Read and Write property)

8.14.28 ttl as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The time to live value.

Notes: (Read and Write property)

8.14.29 TXT as DNSTXTRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The record content.

Notes: (Read and Write property)

8.14.30 WKS as DNSWKSRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The record content.

Notes: (Read and Write property)

8.14.31 X25 as DNSX25RecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The record content.

Notes: (Read and Write property)

8.15 class DNSRPRecordMBS

8.15.1 class DNSRPRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The class for a RP record.

8.15.2 Properties

8.15.3 mailbox as String

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The mailbox value.

Notes: (Read and Write property)

8.15.4 txtcname as String

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The txtcname value.

Notes: (Read and Write property)

8.16 class DNSRTRecordMBS

8.16.1 class DNSRTRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The class for a RT record.

8.16.2 Properties

8.16.3 intermediate as String

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The intermediate value.

Notes: (Read and Write property)

8.16.4 preference as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The preference value.

Notes: (Read and Write property)

8.17 class DNSSOARRecordMBS

8.17.1 class DNSSOARRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The SOA record class.

Notes: The Start of Authority (SOA) record contains information about the zone.

8.17.2 Properties

8.17.3 expire as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The expire value.

Notes: (Read and Write property)

8.17.4 minimum as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The minimum value.

Notes: (Read and Write property)

8.17.5 mname as String

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The mname value.

Notes: (Read and Write property)

8.17.6 refresh as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The refresh delay in seconds before the slave contacts the master.

Notes: (Read and Write property)

8.17.7 retry as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The retry delay in seconds before the slave contacts the master again.

Notes: (Read and Write property)

8.17.8 rname as String

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The name value.

Notes: (Read and Write property)

8.17.9 serial as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The serial value.

Notes: (Read and Write property)

8.18 class DNSSocketAddressMBS

8.18.1 class DNSSocketAddressMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The DNS socket address class.

8.18.2 Properties

8.18.3 address as String

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The address value.

Example:

```
dim r as DNSReplyMBS = DNSUtilMBS.Lookup("www.apple.com", DNSUtilMBS.ClassINTERNET, DNSUtilMBS.TypeA)
```

```
if r<>Nil then  
  MsgBox "Server.address: "+r.Server.address  
end if
```

Notes: This is IPv4 or IPv6.
(Read and Write property)

8.18.4 data as Memoryblock

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The raw data of this socket address.

Notes: (Read and Write property)

8.18.5 Family as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The family value.

Example:

```
dim r as DNSReplyMBS = DNSUtilMBS.Lookup("www.apple.com", DNSUtilMBS.ClassINTERNET, DNSUtilMBS.TypeA)
```

```
if r<>Nil then  
MsgBox "Server.Family: "+str(r.Server.Family)  
end if
```

Notes: (Read and Write property)

8.18.6 Port as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The port for this socket address.

Example:

```
dim r as DNSReplyMBS = DNSUtilMBS.Lookup("www.apple.com", DNSUtilMBS.ClassINTERNET, DNSUtilMBS.TypeA)
```

```
if r<>Nil then  
MsgBox "Server.Port: "+str(r.Server.Port)  
end if
```

Notes: (Read and Write property)

8.19 class DNSSRVRecordMBS

8.19.1 class DNSSRVRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The class for a RV record.

8.19.2 Properties

8.19.3 port as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The port value.

Notes: (Read and Write property)

8.19.4 priority as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The priority value.

Notes: (Read and Write property)

8.19.5 target as String

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The target value.

Notes: (Read and Write property)

8.19.6 weight as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The weight value.

Notes: (Read and Write property)

8.20 class DNSTXTRecordMBS

8.20.1 class DNSTXTRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The class for a text record.

8.20.2 Methods

8.20.3 Strings(index as Integer) as string

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The strings by index.

Notes: Index is zero based.

8.20.4 Properties

8.20.5 Count as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The number of strings in this text record.

Notes: (Read only property)

8.21 module DNSUtilMBS

8.21.1 module DNSUtilMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The module for DNS queries.

Blog Entries

- [Multithreaded plugin functions can increase speed of Xojo application](#)
- [Problems with killing Xojo threads with plugin calls.](#)
- [Multithreaded plugin functions can increase speed of Real Studio application](#)
- [MBS Real Studio Plugins, version 13.0pr10](#)
- [MBS REALbasic Plugins, version 10.6pr5](#)
- [MBS REALbasic Plugins, version 10.5pr1](#)

8.21.2 Methods

8.21.3 ClassNumber(dnsClass as string, byref n as Integer) as boolean

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: One of the DNS class constants.

Example:

```
dim n as Integer

if DNSUtilMBS.ClassNumber("CH", n) then
  MsgBox str(n) // shows 3
end if
```

Notes: Returns true on success.

8.21.4 ClassString(dnsclass as Integer) as string

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: Returns the string name of this class value.

Example:

```
MsgBox DNSUtilMBS.ClassString(DNSUtilMBS.ClassCHAOS) // shows "CH"
```

8.21.5 Lookup(name as string, dnsclass as Integer, dnsType as Integer) as DNSReplyMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: Performs a DNS query.

Example:

```
// lookup MX record for email sending
dim r as DNSReplyMBS = DNSUtilMBS.Lookup("macsw.de", DNSUtilMBS.ClassINTERNET, DNSUtilMBS.TypeMX)
if r <> nil then
MsgBox "macsw.de ->" + r.Answer(0).MX.name
end if
```

Notes: Use the Class* constants for the dnsclass parameter. And use the Type* constants for the dnsType parameter.

8.21.6 LookupMT(name as string, dnsclass as Integer, dnsType as Integer) as DNSReplyMBS

Plugin Version: 10.5, Platform: macOS, Targets: All.

Function: Performs a DNS query.

Notes: Use the Class* constants for the dnsclass parameter. And use the Type* constants for the dnsType parameter.

The work is performed on a preemptive thread, so this function does not block the application and can yield time to other Xojo threads. Must be called in a Xojo thread to enjoy benefits. If called in main thread will block, but keep other background threads running.

8.21.7 TypeNumber(dnsType as string, byref n as Integer) as boolean

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: One of the DNS type constants.

Example:

```
dim n as Integer

if DNSUtilMBS.TypeNumber("AAAA", n) then
MsgBox str(n) // shows 28
end if
```

Notes: Returns true on success.

8.21.8 TypeString(dnstype as Integer) as string

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: Returns the string name of this type value.

Example:

```
MsgBox DNSUtilMBS.TypeString(DNSUtilMBS.TypeMD) // shows "MD"
```

8.21.9 Constants

Constants

Constant	Value	Description
ClassALL	&hff	One of the DNS class constants.
ClassANY	&hff	One of the DNS class constants.
ClassCHAOS	3	One of the DNS class constants.
ClassCSNET	2	One of the DNS class constants.
ClassHESIOD	4	One of the DNS class constants.
ClassINTERNET	1	One of the DNS class constants.
ClassNONE	&hfe	One of the DNS class constants.
TypeA	1	One of the DNS type constants.
TypeAAAA	&h1c	One of the DNS type constants.
TypeAFSDB	&h12	One of the DNS type constants.
TypeALL	&hff	One of the DNS type constants.
TypeANY	&hff	One of the DNS type constants.
TypeATMA	&h22	One of the DNS type constants.
TypeAXFR	&hfc	One of the DNS type constants.
TypeCNAME	5	One of the DNS type constants.
TypeGPOS	&h1b	One of the DNS type constants.
TypeHINFO	&h0d	One of the DNS type constants.
TypeISDN	&h14	One of the DNS type constants.
TypeIXFR	&hfb	One of the DNS type constants.
TypeKEY	&h19	One of the DNS type constants.
TypeLOC	&h1d	One of the DNS type constants.
TypeMAILA	&hfe	One of the DNS type constants.
TypeMAILB	&hfd	One of the DNS type constants.
TypeMB	7	One of the DNS type constants.
TypeMD	3	One of the DNS type constants.
TypeMF	4	One of the DNS type constants.
TypeMG	8	One of the DNS type constants.
TypeMINFO	&h0e	One of the DNS type constants.
TypeMR	9	One of the DNS type constants.
TypeMX	&h0f	One of the DNS type constants.
TypeNS	2	One of the DNS type constants.
TypeNSAP	&h16	One of the DNS type constants.
TypeNSAPPTR	&h17	One of the DNS type constants.
TypeNULL	&h0a	One of the DNS type constants.
TypeNXT	&h1e	One of the DNS type constants.
TypePTR	&h0c	One of the DNS type constants.
TypePX	&h1a	One of the DNS type constants.
TypeRP	&h11	One of the DNS type constants.
TypeRT	&h15	One of the DNS type constants.
TypeSIG	&h18	One of the DNS type constants.
TypeSOA	6	One of the DNS type constants.
TypeSRV	&h21	One of the DNS type constants.
TypeTEXT	&h10	One of the DNS type constants.
TypeTKEY	&hf9	One of the DNS type constants.
TypeTSIG	&hfa	One of the DNS type constants.
TypeWKS	&h0b	One of the DNS type constants.
TypeX25	&h13	One of the DNS type constants.

8.22 class DNSWKSRecordMBS

8.22.1 class DNSWKSRecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The class for a WKS record.

8.22.2 Methods

8.22.3 Map(index as Integer) as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The map values.

Notes: Index is zero based.

8.22.4 Properties

8.22.5 address as String

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The address.

Notes: (Read and Write property)

8.22.6 maplength as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The number of items in the map array.

Notes: (Read and Write property)

8.22.7 protocol as Integer

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The protocol.

Notes: (Read and Write property)

8.23 class DNSX25RecordMBS

8.23.1 class DNSX25RecordMBS

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The class for a X25 record.

8.23.2 Properties

8.23.3 psdnAddress as String

Plugin Version: 9.7, Platform: macOS, Targets: All.

Function: The psdn address.

Notes: (Read and Write property)

Chapter 9

DVD Playback

9.1 class DVDPlaybackMBS

9.1.1 class DVDPlaybackMBS

Plugin Version: 3.4, Platform: macOS, Targets: Desktop only.

Function: A class for DVD Playback on Mac OS X 10.3

Notes: Requires Mac OS X 10.3 or newer.

The DVD Playback application programming interface (API) gives you access to the DVDPlayback framework, allowing you to offer DVD playback functionality from within your application.

During a playback "session," the application must perform specific minimum operations, as follows:

1. Initialize the playback framework with calling `Open`. The DVDPlayback framework can only be opened by one process at a time. If a second process attempts to initialize it, an error will be returned.
2. Set the playback window with `SetPlayWindow`.
4. Set the video bounds with `SetVideoBounds`. This is the bounds within the window and is in port coordinates.
5. Open the media with `OpenMediaVolume` (DVD disc) or `OpenMediaFile` (VIDEO_TS folder).
6. Play the media.
7. When finished or switching media, close with the appropriate call (`CloseMediaVolume` or `CloseMediaFile`)
8. When quitting or finishing session, tear down the DVDPlayback framework with calling `close`.

Blog Entries

- [MBS Plugins updated for Xojo 2019r2](#)
- [Removing 32-bit Carbon GUI classes](#)

9.1.2 Methods

9.1.3 Available as boolean

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: True if the DVD playback is installed on this Mac.

Notes: Requires Mac OS X 10.3 or newer.

9.1.4 ClearLastPlayBookmark

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Sets the video playback position to the beginning of the disc.

Notes: This function sets the video playback position to the beginning of the disc, but does not begin playing the media. Calling this function is equivalent to calling the function DVDDStop twice in succession. Before calling this function, media needs to be open.

Available in Mac OS X v10.4 and later.

Lasterror is set.

9.1.5 close

Plugin Version: 3.4, Platform: macOS, Targets: Desktop only.

Function: Call when completely done with playback. Usually when the application is quitting.

Notes: Requires Mac OS X 10.3 or newer.

Lasterror is set.

9.1.6 CloseMediaFile

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Closes a previously opened VIDEO_TS folder.

Notes: Requires Mac OS X 10.3 or newer.

Lasterror is set.

9.1.7 CloseMediaVolume

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Closes a previously opened DVD disc.

Notes: Requires Mac OS X 10.3 or newer.
LastError is set.

9.1.8 DisplaySubPicture(value as boolean)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Turns the display of subpictures on or off.

Notes: value: A Boolean value that specifies whether to display subpictures in the current title. To display subpictures, specify TRUE. To hide subpictures, specify FALSE.

LastError is set.

Before calling this function, DVD-Video media needs to be open and video playback started. You can use this function to display or hide additional bitmap graphic elements such as subtitles.

Available in Mac OS X v10.3 and later.

9.1.9 DoButtonActivate(inIndex as Integer)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Selects and activates a menu button by index.

Notes: InIndex: The 1-based index of the menu button the user has selected.

If the index coincides with an active button, this function executes the action corresponding to the button.

Available in Mac OS X v10.4 and later.

9.1.10 DoMenuCGClick(x as Double, y as Double) as Integer

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: If the point (in window root view coordinates) coincides with a menu button, it will be selected.

Notes: Requires Mac OS X 10.5.

LastError is set.

9.1.11 DoMenuCGMouseOver(x as Double, y as Double) as Integer

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: If the point (in window root view coordinates) coincides with a menu button, it will be highlighted.

Notes: Requires Mac OS X 10.5.

Lasterror is set.

9.1.12 DoMenuClick(x as Integer, y as Integer) as Integer

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: If the point (in port coordinates) coincides with a menu button, it will be selected.

Notes: Requires Mac OS X 10.3 or newer.

Lasterror is set.

9.1.13 DoMenuMouseOver(x as Integer, y as Integer) as Integer

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: If the point (in port coordinates) coincides with a menu button, it will be highlighted and it's index returned in outIndex.

Notes: Requires Mac OS X 10.3 or newer.

Lasterror is set.

9.1.14 DoUserNavigation(navigation as Integer)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Allows the user to navigate between menu buttons.

Notes: This is usually done using keyboard keys (arrow keys to move and Enter key to choose a menu item).

Requires Mac OS X 10.3 or newer.

Lasterror is set.

Constants:

9.1.15 EnableWebAccess(enable as boolean)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

kDVDUserNavigationMoveUp	1
kDVDUserNavigationMoveDown	2
kDVDUserNavigationMoveLeft	3
kDVDUserNavigationMoveRight	4
kDVDUserNavigationEnter	5

Function: Turns DVD@ccess support on or off.

Notes: Lasterror is set.

Requires Mac OS X 10.3 or newer.

9.1.16 GetAngle as Integer

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Gets the camera angle displayed.

Notes: Returns the integer contains the 1-based index of the current camera angle.

Lasterror is set.

Before calling this function, DVD-Video media needs to be open and video playback started.

Available in Mac OS X v10.3 and later.

9.1.17 GetAspectRatio as Integer

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Gets the aspect ratio of the current title or menu.

Notes: Returns the variable specifies the aspect ratio of the current title. For a list of possible aspect ratios see the aspect ration constants.

Lasterror is set.

The aspect ratio of the video can change whenever a different title or menu is displayed. You can use this function together with GetNativeVideoSize to calculate the bounds of the video area in a window.

Available in Mac OS X v10.3 and later.

9.1.18 **GetAudioLanguageCode**(byref DVDLanguageCode as string, byref DVDSubpictureExtensionCode as Integer)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Gets the current audio language code and extension.

Notes: DVDLanguageCode: On return, the variable contains the language code for the current audio stream. For a list of possible values, see the Language Codes constants.

DVDSubpictureExtensionCode: On return, the variable contains the audio extension code for the current audio stream. For a list of possible values, see Audio Extension Codes constants.

Lasterror is set.

Available in Mac OS X v10.3 and later.

9.1.19 **GetAudioLanguageCodeByStream**(StreamIndex as Integer, byref DVDLanguageCode as string, byref DVDSubpictureExtensionCode as Integer)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Gets the audio language code and extension for a specified stream.

Notes: StreamIndex: An integer in the range 1 to 8 that specifies an audio stream in the current title.

DVDLanguageCode: On return, the variable contains the language code for the specified audio stream. For a list of possible values, see Language Codes.

DVDSubpictureExtensionCode: On return, the variable contains the audio extension code for the specified audio stream. For a list of possible values, see Audio Extension Codes.

Lasterror is set.

Available in Mac OS X v10.3 and later.

9.1.20 **GetAudioOutputMode** as Integer

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Gets the current audio mode setting.

Notes: Lasterror is set.

9.1.21 GetAudioOutputModeCapabilities as Integer

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Returns the current possible audio output mode possibilities.

Notes: Lasterror is set.

9.1.22 GetAudioStream as Integer

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Gets the audio stream currently being used.

Notes: Returns the number of the current audio stream, or 0 if the current title has no audio streams.

Lasterror is set.

Before calling this function, DVD-Video media needs to be open and video playback started.

9.1.23 GetAudioStreamFormat(byref outFormat as Integer, byref outBitsPerSample as Integer, byref outSamplesPerSecond as Integer, byref outChannels as Integer)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Gets the current audio format (AC3, for example).

Notes: Lasterror is set.

Requires Mac OS X 10.3.

DVDAudioStreamFormat constants - The different possible audio stream formats.

kDVDAudioUnknownFormat	0
kDVDAudioAC3Format	1
kDVDAudioMPEG1Format	2
kDVDAudioMPEG2Format	3
kDVDAudioPCMFormat	4
kDVDAudioDTSFormat	5
kDVDAudioSDDSFormat	6

9.1.24 **GetAudioStreamFormatByStream(index as Integer, byref outFormat as Integer, byref outBitsPerSample as Integer, byref outSamplesPerSecond as Integer, byref outChannels as Integer)**

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Gets the audio format for a specified stream.

Notes: index: An integer that specifies an audio stream in the current title.

outFormat: On return, the variable contains the audio format of the audio stream for the current title. For a list of possible formats, see "Audio Stream Formats."

outBitsPerSample: On return, the integer contains the number of bits per sample in the current audio stream.

outSamplesPerSecond: On return, the integer contains the number of samples per second in the current audio stream.

outChannels: On return, the integer contains the number of audio channels in the current audio stream.

Lasterror is set.

Before calling this function, DVD-Video media needs to be open.

Available in Mac OS X v10.4 and later.

9.1.25 **GetAudioVolume as Integer**

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Gets the current playback audio volume setting (0 - 255).

Notes: Returns the current playback volume in the range 0 to 255.

Lasterror is set.

This function passes back the current playback audio volume setting. For more information, see DVDSetAudioVolume.

Available in Mac OS X v10.3 and later.

9.1.26 GetBookmark as string

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Requests a bookmark to the current play position.

Notes: This function is used when playing media on a DVD-Video disc. Before calling this function, the media needs to be open and playing. This function passes back a bookmark to the current play position in the current DVD-Video playback session.

For information about requesting a bookmark when the media is not playing, see `GetLastPlayBookmark`.

The result is a binary string!

Available in Mac OS X v10.4 and later.

9.1.27 GetButtoninfo(byref numberOfButtons as Integer, byref selectedButton as Integer, byref forcedActivateButton as Integer, byref userButtonOffset as Integer, byref numberOfUserButtons as Integer)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Gets information about all available menu buttons in the current title, domain, or content.

Notes: `numberOfButtons`: On return, the integer contains the number of buttons in the current menu.

`selectedButton`: On return, the integer contains the 1-based index of the selected button.

`forcedActivateButton`: On return, the integer contains the index of the button whose action is performed when a specified period of time elapses after the menu is first displayed.

`userButtonOffset`: On return, the integer contains the index of the first user-selectable button. If the number of user-selectable buttons in a menu is smaller than the total number of buttons, this index may be greater than zero.

`numberOfUserButtons`: On return, the integer contains the number of user-selectable buttons in the current menu.

`Lasterror` is set.

Available in Mac OS X v10.4 and later.

9.1.28 `GetButtonPosition(index as Integer, byref x as Double, byref y as Double, byref w as Double, byref h as Double, byref autoAction as Integer)`

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Gets the position and default action of a menu button.

Notes: `index`: The zero-based index of a menu button. If your button index is 1-based, you should decrement the index before you pass it to this function.

`x,y,w,h`: On return, the rectangle contains the position and dimensions of the specified button in window local coordinates.

`autoAction`: On return, a value of 1 indicates the button is a forced activate button—that is, the button's action is executed immediately when the button is selected. A value of 0 indicates the button is not a forced activate button.

Lasterror is set.

Available in Mac OS X v10.4 and later.

9.1.29 `GetChapter as Integer`

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Gets the current chapter.

Notes: Lasterror is set.

9.1.30 `GetCurrentAudioVolume as Integer`

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Returns the current video playback volume.

Notes: Lasterror is set.

Currently the minimum and maximum volumes are always 0 and 255.

9.1.31 `GetDiscRegionCode as Integer`

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Gets the region codes available on a DVD-Video disc.

Notes: Returns a bitfield that specifies one or more region codes. For more information about region codes, see Region Codes.

Lasterror is set.

This function passes back the region codes assigned to the DVD-Video disc that's currently in use. Before calling this function, you need to call the function DVDOpenMediaVolume to open the media folder on the disc.

To test whether a disc is authorized for playback in region n, you need to compute the bitwise AND of out-Code with region code n. If the result is equal to region code n, the disc is authorized for playback in region n.

Available in Mac OS X v10.3 and later.

9.1.32 GetDriveRegionCode(byref regioncode as Integer, byref NumberChangesLeft as Integer)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Returns the region code the drive is set to and how many changes are left.

Notes: Lasterror is set.

Requires Mac OS X 10.3.

Region Codes:

The drive region code must match the DVD disc region code. These calls allow getting the disc region code and getting or setting the drive region code.

NOTE: The drive region code is stored in the drive and can only be set a total of 5 times.

On the last time, the drive will be permanently locked to that region code.

9.1.33 GetFormatStandard as Integer

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Gets the video broadcast format of current DVD-Video media.

Notes: Returns the video broadcast format of the current media. For a list of possible values, see Video

Broadcast Formats.

Lasterror is set.

This function determines which video broadcast format (NTSC or PAL) is used in the current media. Before calling this function, DVD-Video media needs to be open.

Available in Mac OS X v10.3 and later.

9.1.34 GetGPRMValue(index as Integer) as Integer

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Returns the current value of a general parameter (GPRM) register.

Notes: index: An integer index that specifies the desired GPRM register. The valid range is 1 to 16.

Returns the current value of the specified GPRM register.

Lasterror is set.

Available in Mac OS X v10.4 and later.

9.1.35 GetLastPlayBookmark as string

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Requests a bookmark to the last play position.

Notes: Returns a binary string!

Lasterror is set.

Available in Mac OS X v10.4 and later.

9.1.36 GetMaxAudioVolume as Integer

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Returns the maximum video playback volume

Notes: Lasterror is set.

Currently the minimum and maximum volumes are always 0 and 255.

9.1.37 GetMediaUniqueID as memoryblock

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Gets a unique identifier for a media folder.

Notes: Returns the unique identifier of the current media.

This function passes back a 64-bit identifier that can help you distinguish between different media folders. While the identifiers generated by this function are not guaranteed to be unique (see below), duplicate identifiers are extremely rare.

There are two known limitations of this function:

Two copies of the same DVD that are produced at different times do not necessarily have the same identifier. This can happen when the two media folders have minor differences. Two different DVDs with similar content—collections of episodes from a television series, for example—do not always have different identifiers. This can happen when the two media folders are identical.

Available in Mac OS X v10.4 and later.

9.1.38 GetMediaVolumeName as string

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Gets the volume name of the current media.

Notes: This function passes back the media volume name as a string. This is the name seen on the desktop when Mac OS X mounts a DVD-Video disc.

Available in Mac OS X v10.4 and later.

9.1.39 GetMenuLanguageCode as string

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Gets the menu language code for the current title.

Notes: Returns the menu language code for the current title. For a list of possible values, see Language Codes.

Lasterror is set.

Available in Mac OS X v10.3 and later.

9.1.40 GetMinAudioVolume as Integer

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Returns the minimum video playback volume.

Notes: Lasterror is set.

Currently the minimum and maximum volumes are always 0 and 255.

9.1.41 GetNativeVideoHeight as Integer

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Returns the native height of the current title.

Notes: Available in Mac OS X v10.3 and later.

Lasterror is set.

9.1.42 GetNativeVideoSize(byref w as Integer, byref h as Integer)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: The native video size.

Notes: Requires Mac OS X 10.3 or newer.

Lasterror is set.

9.1.43 GetNativeVideoWidth as Integer

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Returns the native width of the current title.

Notes: Available in Mac OS X v10.3 and later.

Lasterror is set.

9.1.44 GetNumberOfAngles as Integer

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Gets the number of camera angles currently available.

Notes: Returns the number of different camera angles in the current title. DVD-Video media supports up to 9 camera angles.

Lasterror is set.

Available in Mac OS X v10.3 and later.

9.1.45 GetNumberOfAudioStreams as Integer

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Gets the number of audio streams currently available.

Notes: Returns the number of audio streams available in the current title.

Lasterror is set.

Before calling this function, DVD-Video media needs to be open.

Available in Mac OS X v10.3 and later.

9.1.46 GetNumberOfChapters(title as Integer) as Integer

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Gets the number of chapters in the specified title.

Notes: title: An integer in the range 1 to 99 that specifies a title on the current media.

Returns the number of chapters in the specified title.

Lasterror is set.

If the specified chapter does not exist, this function does nothing and returns an error.

Available in Mac OS X v10.3 and later.

9.1.47 GetNumberOfSubPictureStreams as Integer

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Gets the number of subpicture streams currently available.

Notes: Returns the number of subpicture streams available in the current title. DVD-Video media supports up to 32 subpicture streams per title.

Lasterror is set.

Before calling this function, DVD-Video media needs to be open and video playback started.

Available in Mac OS X v10.3 and later.

9.1.48 GetNumberOfTitles as Integer

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Gets the number of titles available on the media.

Notes: Returns the number of titles on the current media in the range 0 to 99.

Lasterror is set.

Available in Mac OS X v10.3 and later.

9.1.49 GetScanRate(byref scanrate as Integer, byref direction as Integer)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Returns the current scan direction and rate.

Notes: Requires Mac OS X 10.3 or newer.

Lasterror is set.

9.1.50 GetSPDIFDataOutDevice as Integer

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Returns the selected SPDIF capable audio device.

Notes: Lasterror is set.

9.1.51 GetSPDIFDataOutDeviceCount as Integer

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Gets the number of SPDIF capable audio devices.

Notes: Lasterror is set.

9.1.52 GetSPDIFDataOutDeviceName(index as Integer) as string

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Gets the name of a SPDIF capable audio device

Notes: Lasterror is set.

9.1.53 GetState as Integer

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Returns the current play state of the DVDPlayback framework.

Notes: Requires Mac OS X 10.3 or newer.

Lasterror is set.

The current play state of the framework.

Constants:

kDVDStateUnknown	0	
kDVDStatePlaying	1	playing 1x or less (slow mo)
kDVDStatePlayingStill	2	
kDVDStatePaused	3	pause and step frame
kDVDStateStopped	4	
kDVDStateScanning	5	playing greater than 1x
kDVDStateIdle	6	

9.1.54 GetSubPictureLanguageCode(byref DVDLanguageCode as string, byref DVDSubpictureExtensionCode as Integer)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Gets the subpicture language code and extension for the current subpicture stream.

Notes: DVDLanguageCode: On return, the variable contains the language code for the current subpicture.

For a list of possible values, see Language Codes.

DVDSubpictureExtensionCode: On return, the variable contains the extension code for the current subpicture. For a list of possible values, see Subpicture Extension Codes.

If subpictures are not available, this function does nothing and lasterror is set to 0.

Lasterror is set.

Available in Mac OS X v10.3 and later.

9.1.55 **GetSubPictureLanguageCodeByStream(StreamIndex as Integer, byref DVDLanguageCode as string, byref DVDSubpictureExtensionCode as Integer)**

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Gets the subpicture language code and extension for a specified subpicture stream.

Notes: StreamIndex: A subpicture stream number in the current title. Subpicture stream numbers range from 1 to 32.

DVDLanguageCode: On return, the variable contains the language code for the subpicture stream. For a list of possible values, see Language Codes.

DVDSubpictureExtensionCode: On return, the variable contains the extension code for the subpicture stream. For a list of possible values, see Subpicture Extension Codes.

Lasterror is set.

If subpictures are not available, this function does nothing and lasterror is not 0.

Available in Mac OS X v10.3 and later.

9.1.56 **GetSubPictureStream as Integer**

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Gets the current subpicture stream.

Notes: Returns the identifier of the current subpicture stream, or 0 if the current title has no subpictures. DVD-Video media supports up to 32 subpicture streams per title.

Lasterror is set.

Before calling this function, DVD-Video media needs to be open and video playback started.

Available in Mac OS X v10.3 and later.

9.1.57 GetTime(timecode as Integer, byref time as Integer, byref frames as Integer)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Gets the current playback position in the current title in seconds relative to the requested time code (elapsed,remaining).

Notes: Requires Mac OS X 10.3 or newer.

Lasterror is set.

Constants:

kDVDTimeCodeUninitialized	0	
kDVDTimeCodeElapsedSeconds	1	
kDVDTimeCodeRemainingSeconds	2	
kDVDTimeCodeTitleDurationSeconds	3	only useable for GetTime
kDVDTimeCodeChapterElapsedSeconds	4	only useable for GetTime
kDVDTimeCodeChapterRemainingSeconds	5	only useable for GetTime
kDVDTimeCodeChapterDurationSeconds	6	only useable for GetTime

9.1.58 GetTimeEventRate as Integer

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Gets the rate of the time event.

Notes: Returns the current interval between time events in milliseconds.

Lasterror is set.

Available in Mac OS X v10.3 and later.

9.1.59 GetTitle as Integer

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Gets the number of the current title.

Notes: Returns the current title number, or 0 if a menu is active. DVD-Video media can contain up to 99 titles.

Lasterror is set.

Available in Mac OS X v10.3 and later.

9.1.60 `GetVideoBounds`(byref x as Integer, byref y as Integer, byref w as Integer, byref h as Integer)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Returns (in port coordinates) the rect used to play video.

Notes: Lasterror is set.

Requires Mac OS X 10.3.

9.1.61 `GetVideoDisplay` as Integer

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Gets the graphics display for the current DVD-Video playback session.

Notes: Returns the display ID is set to the current video playback display.

Lasterror is set.

Before calling this function, you need to set the video playback display using `SetVideoDisplay` or `SwitchToDisplay`.

Available in Mac OS X v10.3 and later.

9.1.62 `GetVideoKeyColor` as color

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Gets the key color used by the video driver.

Notes: Available in Mac OS X v10.3 and later.

Deprecated in Mac OS X v10.5.

Not available to 64-bit applications.

This function does nothing and returns the color black.

9.1.63 `GetVideoWindowID` as Integer

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Gets the window ID of the Cocoa window in use for DVD-Video playback.

Notes: Returns the window ID of the Cocoa window currently in use for DVD-Video playback, or zero if

there is no Cocoa window.

Lasterror is set.

Available in Mac OS X v10.3 and later.

9.1.64 GoBackOneLevel

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: If a submenu is active, moves up one level in the same domain.

Notes: Lasterror is set.

This function is used to navigate one level up in a hierarchical structure in the same domain—for example, from a scene selection menu back to the main menu. This action is comparable to navigating upwards in the directory or folder hierarchy of a file system.

Available in Mac OS X v10.3 and later.

9.1.65 GotoBookmark(Bookmark as string)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Sets the video playback position using a bookmark, and resumes play.

Notes: This function is used when playing media on a DVD-Video disc. Before calling this function, the media needs to be open. This function uses the specified bookmark to set the video playback position, and begins playing the media.

Bookmark ist a binary string. Make sure you did not destroy it by an encoding conversion!

Requires Mac OS X 10.4 or newer.

Lasterror is set.

9.1.66 GoToMenu(menu as Integer)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Jump to a particular menu (Root Menu,Sub Picture Menu, etc.).

Notes: Requires Mac OS X 10.3 or newer.

Lasterror is set.

9.1.67 HasMedia as boolean

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Returns true if the playback framework has media to play and the framework had received an Open call on the media.

Notes: Requires Mac OS X 10.3 or newer.

Lasterror is set.

9.1.68 HasMenu(menu as Integer) as boolean

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Returns if input menu type is available.

Notes: Requires Mac OS X 10.3 or newer.

Lasterror is set.

9.1.69 HasNextChapter as boolean

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Returns true if there is a chapter after the current chapter.

Notes: Requires Mac OS X 10.3 or newer.

Lasterror is set.

9.1.70 HasPreviousChapter as boolean

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Returns true if there is a chapter before the current chapter.

Notes: Requires Mac OS X 10.3 or newer.

Lasterror is set.

9.1.71 Idle

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Allows the framework to get a consistent time to process at. (Might be removed in the future).

Notes: Requires Mac OS X 10.3 or newer.

Lasterror is set.

9.1.72 IsDisplayingSubPicture as boolean

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Returns true if subpictures are currently being displayed.

Notes: Requires Mac OS X 10.3 or newer.

Lasterror is set.

9.1.73 IsMuted as boolean

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Toggles the mute setting on or off.

Notes: Returns true if the playback volume is currently muted.

Requires Mac OS X 10.3 or newer.

Lasterror is set.

9.1.74 IsOnMenu(byref OnMenu as boolean, byref menu as Integer)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Are we currently on a menu, and if so, which one.

Notes: Requires Mac OS X 10.3 or newer.

Lasterror is set.

9.1.75 IsPaused as boolean

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Returns true if the framework has media and is paused.

Notes: Requires Mac OS X 10.3 or newer.

Lasterror is set.

9.1.76 IsPlaying as boolean

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Returns true if the framework has media and is playing (even if paused).

Notes: Requires Mac OS X 10.3 or newer.

Lasterror is set.

9.1.77 `IsSupportedDisplay(CGVideoDisplayHandle as Integer)` as boolean

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: True if the display is supported.

Notes: Lasterror is set.

Requires Mac OS X 10.3 or newer.

You can use the handle from a `CGDisplayMBS` object.

9.1.78 `IsValidMedia(folder as folderitem)` as boolean

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Returns true if the folderitem points to a valid media layout.

Notes: Requires Mac OS X 10.3 or newer.

Lasterror is set.

9.1.79 `Lasterror` as Integer

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: The last error code reported.

Notes: Requires Mac OS X 10.3 or newer.

9.1.80 `LastErrorString` as string

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Returns an error message for the lasterror code.

Notes: Requires Mac OS X 10.3 or newer.

9.1.81 `Mute(mute as boolean)`

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Toggles the mute setting on or off.

Notes: `mute`: a boolean value that specifies whether to turn the mute setting on or off. To mute the video playback volume, pass `TRUE`. To restore the previous volume setting, pass `FALSE`.

Lasterror is set.

kDVDErrorUnknown	-70001	Catch all error
kDVDErrorInitializingLib	-70002	There was an error initializing the playback framework
kDVDErrorUninitializedLib	-70003	The playback framework has not been initialized.
kDVDErrorNotAllowedDuringPlayback	-70004	action is not allowed during playback
kDVDErrorUnassignedGrafPort	-70005	A grafport was not set.
kDVDErrorAlreadyPlaying	-70006	Media is already being played.
kDVDErrorNoFatalErrCallBack	-70007	The application did not install a callback routine for fatal errors returned by the framework.
kDVDErrorIsAlreadySleeping	-70008	The framework has already been notified to sleep.
kDVDErrorDontNeedWakeup	-70009	DVDWakeUp was called when the framework was not asleep.
kDVDErrorTimeOutOfRange	-70010	Time code is outside the valid range for the current title.
kDVDErrorUserActionNoOp	-70011	The operation was not allowed by the media at this time.
kDVDErrorMissingDrive	-70012	The DVD drive is not available.
kDVDErrorNotSupportedConfiguration	-70013	The current system configuration is not supported.
kDVDErrorNotSupportedFunction	-70014	The operation is not supported. For example, trying to slow mo backwards.
kDVDErrorNoValidMedia	-70015	The media was not valid for playback.
kDVDErrorWrongParam	-70016	The invalid parameter was passed.
kDVDErrorMissingGraphicsDevice	-70017	A valid graphics device is not available.
kDVDErrorGraphicsDevice	-70018	A graphics device error was encountered.
kDVDErrorPlaybackOpen	-70019	The framework is already open (probably by another process).
kDVDErrorInvalidRegionCode	-70020	The region code was not valid.
kDVDErrorRgnMgrInstall	-70021	The region manager was not properly installed or missing from the system.
kDVDErrorMismatchedRegionCode	-70022	The disc region code and the drive region code do not match.
kDVDErrorNoMoreRegionSets	-70023	The drive does not have any region changes left.
kDVDErrorRegionCodeUninitialized	-70024	The drive region code was not initialized.
kDVDErrorAuthentication	-70025	The user attempting to change the region code could not be authenticated.
kDVDErrorOutOfVideoMemory	-70026	The video driver does not have enough video memory available to playback the media.
kDVDErrorNoAudioOutputDevice	-70027	An appropriate audio output device could not be found.
kDVDErrorSystem	-70028	A system error was encountered.
kDVDErrorNavigation	-70029	The user has made a selection not supported in the current menu.

Available in Mac OS X v10.3 and later.

9.1.82 NextChapter

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Sets to the next chapter on the current title.

Notes: Requires Mac OS X 10.3 or newer.

Lasterror is set.

9.1.83 Open

Plugin Version: 3.4, Platform: macOS, Targets: Desktop only.

Function: Call when preparing for playback. Usually when the application is initializing.

Notes: Requires Mac OS X 10.3 or newer.

Lasterror is set.

Returns an error of `kDVDErrorPlaybackOpen` if the playback framework is already being used.

9.1.84 `OpenMediaFile(folder as folderitem)`

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Opens a VIDEO_TS folder (can be on a hard drive or a dvd disc).

Notes: Requires Mac OS X 10.3 or newer.

Lasterror is set.

9.1.85 `OpenMediaVolume(disc as folderitem)`

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Opens a DVD disc for playback.

Notes: Requires Mac OS X 10.3 or newer.

Lasterror is set.

9.1.86 `Pause`

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Pauses the media if currently playing.

Notes: Requires Mac OS X 10.3 or newer.

Lasterror is set.

9.1.87 `Play`

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Starts playing the media.

Notes: Requires Mac OS X 10.3 or newer.

Lasterror is set.

9.1.88 `PreviousChapter`

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Sets to the previous chapter on the current title.

Notes: Requires Mac OS X 10.3 or newer.

Lasterror is set.

9.1.89 Resume

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Starts playing if currently paused.

Notes: Requires Mac OS X 10.3 or newer.

Lasterror is set.

9.1.90 ReturnToTitle

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Returns from the menu back to the current position within the title.

Notes: Requires Mac OS X 10.3 or newer.

Lasterror is set.

9.1.91 SetAngle(angle as Integer)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Sets the camera angle to display.

Notes: angle: A 1-based index that specifies the camera angle to display. The angle number of the main angle is 1. DVD-Video media supports up to nine camera angles.

Lasterror is set.

Before calling this function, DVD-Video media needs to be open and video playback started. The DVD-Video author decides how many camera angles are used. If the specified angle does not exist, this function does nothing.

Available in Mac OS X v10.3 and later.

9.1.92 SetAspectRatio(AspectRatio as Integer)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Sets the aspect ratio for the current title.

Notes: AspectRatio: A constant that specifies the desired aspect ratio for the current title. For a list of

possible values, see Aspect Ratios.

Lasterror is set.

This function does nothing and returns noErr.

Available in Mac OS X v10.3 and later.

9.1.93 SetAudioOutputMode(Mode as Integer)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Set the audio mode.

Notes: Lasterror is set.

9.1.94 SetAudioStream(index as Integer)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Sets the audio stream to use.

Notes: index: An integer from 1 to 8 that specifies an audio stream in the current title. DVD-Video media supports up to 8 audio streams per title.

Lasterror is set.

Before calling this function, DVD-Video media needs to be open and video playback started.

Available in Mac OS X v10.3 and later.

9.1.95 SetAudioVolume(Volume as Integer)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Sets the playback audio volume setting (0 - 255).

Notes: Volume: An integer in the range 0 to 255 that specifies the new video playback volume setting. Larger values are clamped to 255.

Lasterror is set.

This function changes the current playback audio volume setting, not the system audio volume setting. The actual audio volume experienced by the user is a function of these two settings:

Actual audio volume = system volume * playback audio volume / 255

For example, if you set the playback volume to 127, the actual volume is approximately one-half the current system volume.

Available in Mac OS X v10.3 and later.

9.1.96 SetChapter(Chapter as Integer)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Sets the chapter to play.

Notes: Chapter: An integer that specifies the chapter to play.

Lasterror is set.

This function defines the specified chapter to be the current video playback chapter. If video playback is paused, this function starts playing the chapter immediately. Note that some discs do not allow jumping directly to a chapter.

Available in Mac OS X v10.3 and later.

9.1.97 SetDefaultAudioLanguageCode(DVDLanguageCode as string, DVDSubpictureExtensionCode as Integer)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Sets the default audio language code and extension.

Notes: DVDLanguageCode: A constant that specifies the default audio language for the specified audio extension.. For a list of possible values, see Language Codes. If no language is specified—that is, if you pass in kDVDLanguageNoPreference or kDVDLanguageCodeNone—the default audio language is matched to the language setting in the International Preferences Panel.

DVDSubpictureExtensionCode: A constant that specifies an audio extension. For a list of possible values, see Audio Extension Codes.

Lasterror is set.

This function selects an audio language other than the DVD's default language for a specified audio extension. Before calling this function, DVD-Video media needs to be open.

Available in Mac OS X v10.3 and later.

9.1.98 SetDefaultMenuLanguageCode(Code as string)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Sets the default menu language code.

Notes: Code: An integer code that specifies the default menu language for the current title. For a list of possible values, see "Language Codes." If no language is specified—that is, if you pass in `kDVDLanguageNoPreference` or `kDVDLanguageCodeNone`—the default menu language is matched to the language setting in the International Preferences Panel.

Lasterror is set.

This function selects a language other than the DVD's default language for menus in the current title. Before calling this function, DVD-Video media needs to be open and video playback stopped.

Available in Mac OS X v10.3 and later.

9.1.99 SetDefaultSubPictureLanguageCode(DVDLanguageCode as string, DVDSubpictureExtensionCode as Integer)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Sets the default subpicture language and extension when subpictures are enabled.

Notes: DVDLanguageCode: A constant that specifies the default language for the specified subpicture extension. For a list of possible values, see "Language Codes." If no language is specified—that is, if you pass in `kDVDLanguageNoPreference` or `kDVDLanguageCodeNone`—the default subpicture language code is matched to the language setting in the International Preferences Panel.

DVDSubpictureExtensionCode: A constant that specifies a subpicture extension. For a list of possible values, see "Subpicture Extension Codes."

Lasterror is set.

If the current title is playing, this function does nothing and lasterror is set to `kDVDErrorAlreadyPlaying`.

This function is used to select a subpicture language other than the system default language. Before calling this function, DVD-Video media needs to be open and video playback stopped.

Available in Mac OS X v10.3 and later.

9.1.100 SetDriveRegionCode(regioncode as Integer, AuthorizationHandle as Integer)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Sets the drive region code (requires user authentication).

Notes: Lasterror is set.

Requires Mac OS X 10.3.

DVDRegionCode constants - The different possible region codes (used for both the disc and the drive):

kDVDRegionCodeUninitialized	&hff
kDVDRegionCode1	&hfe
kDVDRegionCode2	&hfd
kDVDRegionCode3	&hfb
kDVDRegionCode4	&hf7
kDVDRegionCode5	&hef
kDVDRegionCode6	&hdf
kDVDRegionCode7	&hbf
kDVDRegionCode8	&h7f

9.1.101 SetLastPlayBookmark(Bookmark as string)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Sets the video playback position using a bookmark.

Notes: Lasterror is set.

This function is used when playing media on a DVD-Video disc. Before calling this function, the media needs to be open. This function uses the specified bookmark to set the video playback position, but does not begin playing the media. See also GotoBookmark.

Available in Mac OS X v10.4 and later.

9.1.102 SetScanRate(scanrate as Integer, direction as Integer)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Fast forwards or rewinds depending on the direction parameter at the speed specified in the scanrate parameter.

Notes: Requires Mac OS X 10.3 or newer.

Lasterror is set.

The rate at which to scan:

kDVDScanRateOneEighth	-8
kDVDScanRateOneFourth	-4
kDVDScanRateOneHalf	-2
kDVDScanRate1x	1
kDVDScanRate2x	2
kDVDScanRate4x	4
kDVDScanRate8x	8
kDVDScanRate16x	16
kDVDScanRate32x	32

Direction constants:

kDVDScanDirectionForward	0
kDVDScanDirectionBackward	1

9.1.103 SetSPDIFDataOutDevice(Device as Integer)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Selects a SPDIF capable audio device.

Notes: Lasterror is set.

9.1.104 SetSubPictureStream(index as Integer)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Sets the current subpicture stream.

Notes: index: A positive integer that specifies the subpicture stream to display. Subpicture stream numbers range from 1 to 32.

Lasterror is set.

Before calling this function, DVD-Video media needs to be open and video playback started.

Available in Mac OS X v10.3 and later.

9.1.105 SetTime(timecode as Integer, time as Integer, frames as Integer)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Sets the current playback position in the current title based on a time position in seconds relative to the time code (elapsed,remaining).

Notes: timecode: A time code constant. You must specify one of two values: kDVDTimeCodeElapsedSeconds or kDVDTimeCodeRemainingSeconds.

time: An integer that specifies the position in seconds.

frames: An integer that specifies the frame number. For the NTSC video format, the range of frame numbers is 0 to 29. For the PAL format, the range is 0 to 24.

This function sets the video playback position in the current title. Not all titles permit this operation, so it's important to check the result code returned by this function.

Before calling this function, DVD-Video media needs to be open and video playback started.

Requires Mac OS X 10.3 or newer.

Lasterror is set.

9.1.106 SetTimeEventRate(rate as Integer)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Sets the rate of the DVD Playback time event.

Notes: The new interval between time events, specified in milliseconds.

Lasterror is set.

The default interval between DVD Playback time events is 900 milliseconds. You can use this function to lengthen or shorten the interval between time events. This function is relevant when you have used the function DVDRegisterEventCallBack to register a callback for one or both of the time events: kDVDEventTitleTime and kDVDEventChapterTime . Time event callbacks are typically used for tasks such as updating the elapsed time or remaining time displayed in your user interface.

Available in Mac OS X v10.3 and later.

9.1.107 SetTitle(Title as Integer)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Sets the title to play.

Notes: Title: An integer in the range 1 to 99 that specifies the title to play.

Lasterror is set.

If the specified title exists on the current media and the media permits this operation, this function begins playing the title.

Available in Mac OS X v10.3 and later.

9.1.108 SetVideoBounds(x as Integer, y as Integer, w as Integer, h as Integer)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Sets the bounds in which to display the video.

Notes: x,y,w,h: A rectangle that contains the desired bounds in window local coordinates.

Lasterror is set.

This function is used to set the area inside the current window in which to display the video. The video area is not required to fill the entire window. Generally you should set the video area to be smaller than the window whenever the aspect ratio of the current title and window are different. To find the aspect ratio of the current title, use the function `GetAspectRatio`.

Because the aspect ratios of the titles in a DVD-Video media folder are not always the same, you may need to call this function repeatedly to reset the video area as the user makes different viewing choices.

Available in Mac OS X v10.3 and later.

Deprecated in Mac OS X v10.5.

Not available to 64-bit applications.

9.1.109 `SetVideoDisplay(CGVideoDisplayHandle as Integer)`

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Sets the graphics display for the current DVD-Video playback session.

Notes: The Quartz display ID for the graphics display you want to use for video playback. For information about how to get a display ID, see Quartz Display Services Reference. (or `CGDisplayMBS` class)

Lasterror is set.

You need to call this function or `DVDSetVideoDevice` each time you move the video playback window to a new graphics display. To avoid degrading video performance, you should not attempt to draw a video playback window that spans two different displays.

Available in Mac OS X v10.3 and later.

9.1.110 `SetVideoWindowID(WindowID as Integer)`

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Enables or disables DVD-Video playback in a Cocoa window.

Notes: WindowID: The window ID associated with a Cocoa window, or NULL. For information about when to pass 0, see the Discussion below.

Lasterror is set.

If you're using a Cocoa window for DVD-Video playback, you need to use this function in two different

situations:

Immediately after calling the constructor to start a new DVD-Video playback session, you should call this function and pass the window ID associated with the Cocoa window.

When video is not playing and you want to draw into the area of the window you set by calling the function `SetVideoBounds`, you should call this function and pass 0 in the `inVidWindowID` parameter.

To learn how to obtain the window number for a Cocoa window, see the description of the `windowNumber` method in the `NSWindow` class.

Availability

Available in Mac OS X v10.3 and later.

9.1.111 Sleep

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Call when system is putting machine to sleep so playback information can be saved.

Notes: Requires Mac OS X 10.3 or newer.

Lasterror is set.

The client must register for sleep notifications with the system so that it can notify the framework of sleep and wake notifications.

9.1.112 StepFrame(direction as Integer)

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Steps one frame in the direction specified in `DVDScanDirection`.

Notes: Requires Mac OS X 10.3 or newer.

Lasterror is set.

Currently only supports `kDVDScanDirectionForward`.

9.1.113 Stop

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Stops if playing.

Notes: Requires Mac OS X 10.3 or newer.

Lasterror is set.

9.1.114 SwitchToDisplay(CGVideoDisplayHandle as Integer) as boolean

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Switches the output to the given display.

Notes: Requires Mac OS X 10.3 or newer.

Lasterror is set.

You can use the handle from a CGDisplayMBS object.

9.1.115 UpdateVideo

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Forces the video to be updated.

Notes: Requires Mac OS X 10.3 or newer.

Lasterror is set.

9.1.116 WakeUp

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: Call when system is waking up so playback information can be reset.

Notes: Requires Mac OS X 10.3 or newer.

Lasterror is set.

The client must register for sleep notifications with the system so that it can notify the framework of sleep and wake notifications.

9.1.117 Events**9.1.118 DVDEvent(eventcode as Integer, value1 as Integer, value2 as Integer)**

Plugin Version: 4.0, Platform: macOS, Targets: .

Function: A DVD event.

Notes: Lasterror is set.

Requires Mac OS X 10.3.

DVDEventCode constants - The different event a client can register for to get notified (return value: UInt32)

kDVDEventTitle	1	value1: Title
kDVDEventPTT	2	value1: Chapter
kDVDEventValidUOP	3	value1: UOP code mask (DVDUOPCode)
kDVDEventAngle	4	value1: StreamID
kDVDEventAudioStream	5	value1: StreamID
kDVDEventSubpictureStream	6	value1: streamID / (value2 ! 0): visible
kDVDEventDisplayMode	7	value1: DVDAspectRatio
kDVDEventDomain	8	value1: DVDDomainCode
kDVDEventBitrate	9	value1: Bits / sec
kDVDEventStill	10	value1: On (1) - Off (0)
kDVDEventPlayback	11	value1: DVDState
kDVDEventVideoStandard	12	value1: DVDFormat
kDVDEventStreams	13	value1: None (trigger for general stream change)
kDVDEventScanSpeed	14	value1: Speed (1x,2x,3x,...)
kDVDEventMenuCalled	15	value1: DVDMenu
kDVDEventParental	16	value1: parental level number
kDVDEventPGC	17	value1: PGC number
kDVDEventGPRM	18	value1: GPRM index / value2: data
kDVDEventRegionMismatch	19	value1: disc region
kDVDEventTitleTime	20	value1: elapsed time / value2: duration of title [ms]
kDVDEventSubpictureStreamNumbers	21	value1: number of subpicture streams in title
kDVDEventAudioStreamNumbers	22	value1: number of audio streams in title
kDVDEventAngleNumbers	23	value1: number of angles in title
kDVDEventError	24	value1: DVDErrorCode
kDVDEventCCInfo	25	value1: cc event opcode, value2: cc event data
kDVDEventChapterTime	26	value1: elapsed time / value2: duration of current chapter [ms]

9.1.119 FatalError(errorcode as Integer)

Plugin Version: 4.0, Platform: macOS, Targets: .

Function: A fatal error. Quit the application as soon as possible.

Notes: Lasterror is set.

Requires Mac OS X 10.3.

9.1.120 Constants

Constants

Constant	Value	Description
kDVDAMGMDomain	5	A constant that specifies playback domains or menu actions.
kDVDAspectRatio16x9	3	Audio Manager Menu domain (DVD-Audio only). A constant that specifies the current aspect ratio. The process of displaying a 16:9 video frame on a 4:3 ratio.
kDVDAspectRatio4x3	1	A constant that specifies the current aspect ratio. The process of displaying a 4:3 video frame on a 4:3 ratio.
kDVDAspectRatio4x3PanAndScan	2	A constant that specifies the current aspect ratio. The process of choosing a sample area of a 16:9 4:3 screen, using center-of-interest information stored in the video stream.
kDVDAspectRatioLetterBox	4	A constant that specifies the current aspect ratio. The process of displaying the entire 16:9 video frame on a 4:3 screen by centering the frame and adding mattes or black bars above and below the frame.
kDVDAspectRatioUninitialized	0	A constant that specifies the current aspect ratio. Available in Mac OS X v10.3 and later.
kDVDAudioAC3Format	1	A constant that specifies the audio stream format. The Dolby Digital AC-3 format.
kDVDAudioDDPlusFormat	8	A constant that specifies an audio mode.
kDVDAudioDTSFormat	5	A constant that specifies the audio stream format. The Digital Theater Systems (DTS) format. This format is not supported on all DVD drives.
kDVDAudioDTSHDFormat	9	A constant that specifies an audio mode.
kDVDAudioExtensionCodeDirectorsComment1	3	A constant that specifies the purpose of an audio extension. First audio channel for the artistic director's comment.
kDVDAudioExtensionCodeDirectorsComment2	4	A constant that specifies the purpose of an audio extension. Second audio channel for the artistic director's comment.
kDVDAudioExtensionCodeNormalCaptions	1	A constant that specifies the purpose of an audio extension. Audio channel for extended information about the video.
kDVDAudioExtensionCodeNotSpecified	0	A constant that specifies the purpose of an audio extension. Audio extension not specified.
kDVDAudioExtensionCodeNVisualImpaired	2	A constant that specifies the purpose of an audio extension. Audio channel for the visually impaired.
kDVDAudioMLPFormat	7	A constant that specifies an audio mode.
kDVDAudioModeProLogic	1	A constant that specifies an audio mode.
kDVDAudioModeSPDIF	2	A constant that specifies an audio mode.
kDVDAudioModeUninitialized	0	A constant that specifies an audio mode.
kDVDAudioMPEG1Format	2	A constant that specifies the audio stream format. The MPEG-1 Layer II digital format.
kDVDAudioMPEG2Format	3	A constant that specifies the audio stream format. The MPEG-2 digital format.
kDVDAudioPCMFormat	4	A constant that specifies the audio stream format. The linear pulse-code modulation (PCM) format.
kDVDAudioSDDSFormat	6	A constant that specifies the audio stream format. The Sony Dynamic Digital Sound (SDDS) format. This format is not supported on all DVD drives.
kDVDAudioUnknownFormat	0	A constant that specifies the audio stream format. An unspecified audio format.
kDVDButtonIndexNone	-1	A constant for an index of the selected menu button.
kDVDErrorAlreadyPlaying	-70006	A constant that specify the result codes defined for DVD playback. See kDVDErrorNotAllowedDuringPlayback.
kDVDErrorAuthentication	-70025	A constant that specify the result codes defined for DVD playback. An attempt to change the DVD drive region code failed.
kDVDErrorDontNeedWakeUp	-70009	A constant that specify the result codes defined for DVD playback. DVDWakeUp was called without first calling Sleep.
kDVDErrorGraphicsDevice	-70018	A constant that specify the result codes defined for DVD playback. A graphics device error was encountered.
kDVDErrorInitializingLib	-70002	A constant that specify the result codes defined for DVD playback.

9.2 class DVDPlaybackMissingFunctionExceptionMBS

9.2.1 class DVDPlaybackMissingFunctionExceptionMBS

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: The exception raised if a DVDPlayback function is not available on this Mac OS X version.

Notes: Check the message property.

Subclass of the RuntimeException class.

9.3 class DVDPlaybackNotInitializedExceptionMBS

9.3.1 class DVDPlaybackNotInitializedExceptionMBS

Plugin Version: 9.2, Platform: macOS, Targets: Desktop only.

Function: The exception raised when you use a method on the DVDPlaybackMBS class without initializing it.

Notes: Subclass of the RuntimeException class.

Chapter 10

Encryption and Hash

10.1 class CCCryptorMBS

10.1.1 class CCCryptorMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Generic interface for symmetric encryption.

Example:

```
// initialize
dim h as new CCCryptorMBS(CCCryptorMBS.kCCEncrypt, CCCryptorMBS.kCCAlgorithmAES128, 0,
"Hello12312345678")

if h.Lasterror<>0 then break

// destination memoryblock

dim m as new MemoryBlock(100)
dim Position as UInt64 = 0
dim BytesLeft as UInt64 = m.Size

// add a few bytes
dim q as UInt64 = 0

h.Update "Hello World!1234", m, BytesLeft, q
if h.Lasterror<>0 then break

Position = Position + q
BytesLeft = BytesLeft - q

// now finalize:
```

```
q = 0
```

```
dim dp as ptr = m.AddressPtrMBS(Position)
```

```
h.Final dp, BytesLeft, q
if h.Lasterror<>0 then break
```

```
Position = Position + q
BytesLeft = BytesLeft - q
```

```
// and show result
```

```
dim d as string = m.StringValue(0, Position)
MsgBox EncodingToHexMBS(d)
```

Notes: This interface provides access to a number of symmetric encryption algorithms. Symmetric encryption algorithms come in two "flavors" - block ciphers, and stream ciphers. Block ciphers process data (while both encrypting and decrypting) in discrete chunks of data called blocks; stream ciphers operate on arbitrary sized data.

The object declared in this interface, `CCCryptorMBS`, provides access to both block ciphers and stream ciphers with the same API; however some options are available for block ciphers that do not apply to stream ciphers.

The general operation of a `CCCryptor` is: initialize it with raw key data and other optional fields with `Constructor()`; process input data via one or more calls to `Update()`, each of which may result in output data being written to caller-supplied memory; and obtain possible remaining output data with `Final()`. The `CCCryptor` is disposed of via `Destructor()`, or it can be reused (with the same key data as provided to `Constructor()`) by calling `Reset()`.

One option for block ciphers is padding, as defined in PKCS7; when padding is enabled, the total amount of data encrypted does not have to be an even multiple of the block size, and the actual length of plaintext is calculated during decryption.

Another option for block ciphers is Cipher Block Chaining, known as CBC mode. When using CBC mode, an Initialization Vector (IV) is provided along with the key when starting an encrypt or decrypt operation. If CBC mode is selected and no IV is provided, an IV of all zeroes will be used.

`CCCryptorMBS` also implements block buffering, so that individual calls to `Update()` do not have to provide data whose length is aligned to the block size. (If padding is disabled, encrypting with block ciphers does require that the *total* length of data input to `Update()` call(s) be aligned to the block size.)

This class uses the CommonCrypto interface which is available on Mac OS X 10.5 or newer and also on iOS. So you can use it to get the same results on both operation systems. Also as you simply use Apple provided encryption, you don't need to apply for an export license for this classes here.

Blog Entries

- [News from the MBS Xojo Plugins Version 21.4](#)
- [Xojo News](#)
- [MBS Xojo Plugins, version 21.4pr2](#)
- [MBS Real Studio Plugins, version 11.3pr5](#)

10.1.2 Methods

10.1.3 Constructor(operation as Integer, Algorithm as Integer, options as Integer, key as Ptr, keyLength as UInt64, iv as Ptr = nil)

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Create a cryptographic context.

Notes: operation: Defines the basic operation: kCCEncrypt or kCCDecrypt.

Algorithm: Defines the algorithm.

options: A word of flags defining options.

key: Raw key material, length keyLength bytes.

keyLength: Length of key material. Must be appropriate for the selected operation and algorithm. Some algorithms provide for varying key lengths.

iv: Initialization vector, optional. Used by block ciphers when Cipher Block Chaining (CBC) mode is enabled. If present, must be the same length as the selected algorithm's block size. If CBC mode is selected (by the absence of the kCCOptionECBMode bit in the options flags) and no IV is present, a NULL (all zeroes) IV will be used. This parameter is ignored if ECB mode is used or if a stream cipher algorithm is selected.

Possible error is lasterror are kCCParamError and kCCMemoryFailure.

See also:

- [10.1.4 Constructor\(operation as Integer, Algorithm as Integer, options as Integer, key as String, iv as Ptr = nil\)](#) 241

10.1.4 Constructor(operation as Integer, Algorithm as Integer, options as Integer, key as String, iv as Ptr = nil)

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Create a cryptographic context.

Example:

```
// key length must be 16 bytes for AES128
dim key as string = "1234567890123456"

dim h as new CCCryptorMBS(CCCryptorMBS.kCCEncrypt, CCCryptorMBS.kCCAlgorithmAES128, 0,
key)

if h.Lasterror<>0 then
MsgBox "error: "+str(h.Lasterror)
else
MsgBox "OK"
end if
```

Notes: operation: Defines the basic operation: kCCEncrypt or kCCDecrypt.

Algorithm: Defines the algorithm.

options: A word of flags defining options.

key: Raw key material, length keyLength bytes.

keyLength: Length of key material. Must be appropriate for the selected operation and algorithm. Some algorithms provide for varying key lengths.

iv: Initialization vector, optional. Used by block ciphers when Cipher Block Chaining (CBC) mode is enabled. If present, must be the same length as the selected algorithm's block size. If CBC mode is selected (by the absence of the kCCOptionECBMode bit in the options flags) and no IV is present, a NULL (all zeroes) IV will be used. This parameter is ignored if ECB mode is used or if a stream cipher algorithm is selected.

Possible error is lasterror are kCCParamError and kCCMemoryFailure.

See also:

- 10.1.3 Constructor(operation as Integer, Algorithm as Integer, options as Integer, key as Ptr, keyLength as UInt64, iv as Ptr = nil) 241

10.1.5 Crypt(Operation as Integer, Algorithm as Integer, Options as Integer, key as Ptr, KeyLength as UInt64, IV as Ptr, DataIn as Ptr, DataInLength as UInt64, DataOut as Ptr, DataOutAvailable as UInt64, byref DataOutMoved as UInt64) as Integer

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Stateless, one-shot encrypt or decrypt operation.

Example:

```

dim KeyString as string = "Hello12312345678"
dim InputString as string = "Hello World!1234"

dim InputMemory as MemoryBlock = InputString
dim KeyMemory as MemoryBlock = KeyString
dim IV as ptr = nil // default to zeros
dim OutputMemory as new MemoryBlock(100)
dim Size as UInt64 = 0

dim e as Integer = CCCryptorMBS.Crypt(CCCryptorMBS.kCCEncrypt, CCCryptorMBS.kCCAlgorithmAES128, 0, KeyMemory, KeyMemory.size, IV, InputMemory, InputMemory.size, OutputMemory, OutputMemory.size, size)

if e = CCCryptorMBS.kCCSuccess then
dim result as string = OutputMemory.StringValue(0, size)
MsgBox EncodingToHexMBS(result)
else
MsgBox "Error: "+str(e)
end if

```

Notes: This basically performs a sequence of Constructor, Update, Final and Destructor.

Parameters:

Operation	Defines the basic operation: kCCEncrypt or kCCDecrypt.
Algorithm	Defines the encryption algorithm.
Options	A word of flags defining options. See kCCOption constants.
Key	Raw key material, length keyLength bytes.
keyLength	Length of key material. Must be appropriate for the select algorithm. Some algorithms may provide for varying key lengths.
IV	Initialization vector, optional. Used for Cipher Block Chaining (CBC) mode. If present, must be the same length as the selected algorithm's block size. If CBC mode is selected (by the absence of any mode bits in the options flags) and no IV is present, a nil (all zeroes) IV will be used. This is ignored if ECB mode is used or if a stream cipher algorithm is selected.
dataIn	Data to encrypt or decrypt, length dataInLength bytes.
dataInLength	Length of data to encrypt or decrypt.
dataOut	Result is written here. Allocated by caller. Encryption and decryption can be performed "in-place", with the same buffer used for input and output.
dataOutAvailable	The size of the dataOut buffer in bytes.
dataOutMoved	On successful return, the number of bytes written to dataOut. If kCCBufferTooSmall is returned as a result of insufficient buffer space being provided, the required buffer space is returned here.

Possible errors in `lasterror`:

`kCCBufferTooSmall` indicates insufficient space in the `dataOut` buffer. In this case, the `dataOutMoved` parameter will indicate the size of the buffer needed to complete the operation. The operation can be retried with minimal runtime penalty.

`kCCAlignmentError` indicates that `dataInLength` was not properly aligned. This can only be returned for block ciphers, and then only when decrypting or when encrypting with block with padding disabled.

`kCCDecodeError` Indicates improperly formatted ciphertext or a "wrong key" error; occurs only during decrypt operations.

See also:

- 10.1.6 `Crypt(Operation as Integer, Algorithm as Integer, Options as Integer, key as string, IV as Ptr, DataIn as string, byref DataOut as string) as Integer` 244

10.1.6 `Crypt(Operation as Integer, Algorithm as Integer, Options as Integer, key as string, IV as Ptr, DataIn as string, byref DataOut as string) as Integer`

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Stateless, one-shot encrypt or decrypt operation.

Example:

```
dim KeyString as string = "Hello12312345678"
dim InputString as string = "Hello World!1234"
dim IV as ptr = nil // default to zeros
dim Output as string = ""
```

```
dim e as Integer = CCCryptorMBS.Crypt(CCCryptorMBS.kCCEncrypt, CCCryptorMBS.kCCAlgorithmAES128, 0, KeyString, IV, InputString, Output)
```

```
if e = CCCryptorMBS.kCCSuccess then
  MsgBox EncodingToHexMBS(Output)
else
  MsgBox "Error: "+str(e)
end if
```

Notes: This basically performs a sequence of Constructor, Update, Final and Destructor. This is the convenience function for Xojo with using strings instead of data pointers.

Parameters:

Operation	Defines the basic operation: kCCEncrypt or kCCDecrypt.
Algorithm	Defines the encryption algorithm.
Options	A word of flags defining options. See kCCOption constants.
Key	Raw Key.
IV	Initialization vector, optional. Used for Cipher Block Chaining (CBC) mode. If present, must be the same length as the selected algorithm's block size. If CBC mode is selected (by the absence of any mode bits in the options flags) and no IV is present, a nil (all zeroes) IV will be used. This is ignored if ECB mode is used or if a stream cipher algorithm is selected.
dataIn	Data to encrypt or decrypt.
dataOut	Result is written here.

Possible errors in lasterror:

kCCBufferTooSmall indicates insufficient space in the dataOut buffer. In this case, the dataOutMoved parameter will indicate the size of the buffer needed to complete the operation. The operation can be retried with minimal runtime penalty.

kCCAlignmentError indicates that dataInLength was not properly aligned. This can only be returned for block ciphers, and then only when decrypting or when encrypting with block with padding disabled.

kCCDecodeError Indicates improperly formatted ciphertext or a "wrong key" error; occurs only during decrypt operations.

See also:

- 10.1.5 Crypt(Operation as Integer, Algorithm as Integer, Options as Integer, key as Ptr, KeyLength as UInt64, IV as Ptr, DataIn as Ptr, DataInLength as UInt64, DataOut as Ptr, DataOutAvailable as UInt64, byref DataOutMoved as UInt64) as Integer 242

10.1.7 Final(DataOut as Ptr, dataOutAvailable as UInt64, byref dataOutMoved as UInt64)

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Finish an encrypt or decrypt operation, and obtain the (possible) final data output.

Notes: dataOut: Result is written here. Allocated by caller. Pass a memoryblock of right size.

dataOutAvailable: The size of the dataOut buffer in bytes.

dataOutMoved: On successful return, the number of bytes written to dataOut.

Lasterror is set to:

kCCBufferTooSmall indicates insufficient space in the dataOut buffer. The caller can use GetOutputLength() to determine the required output buffer size in this case. The operation can be retried; no state is lost when

this is returned.

kCCAlignmentError When decrypting, or when encrypting with a block cipher with padding disabled, kCCAlignmentError will be returned if the total number of bytes provided to Update() is not an integral multiple of the current algorithm's block size.

kCCDecodeError Indicates garbled ciphertext or the wrong key during decryption. This can only be returned while decrypting with padding enabled.

Except when kCCBufferTooSmall is returned, the CCCryptorMBS can no longer be used for subsequent operations unless Reset() is called on it.

It is not necessary to call Final() when performing symmetric encryption or decryption if padding is disabled, or when using a stream cipher.

10.1.8 GetOutputLength(inputLength as UInt64, Final as Boolean = true) as UInt64

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Determine output buffer size required to process a given input size.

Example:

```
dim h as new CCCryptorMBS(CCCryptorMBS.kCCEncrypt, CCCryptorMBS.kCCAlgorithmAES128, 0,
"Hello12312345678")
```

```
MsgBox str(h.GetOutputLength(1000))
```

Notes: inputLength: The length of data which will be provided to Update().

Final: If false, the returned value will indicate the output buffer space needed when 'inputLength' bytes are provided to CCCryptorMBS.Update(). When 'final' is true, the returned value will indicate the total combined buffer space needed when 'inputLength' bytes are provided to CCCryptorMBS.Update() and then CCCryptorMBS.Final() is called.

Returns the maximum buffer space need to perform CCCryptorMBS.Update() and optionally CCCryptorMBS.Final().

Some general rules apply that allow clients of this module to know a priori how much output buffer space will be required in a given situation. For stream ciphers, the output size is always equal to the input size, and CCCryptorMBS.Final() never produces any data. For block ciphers, the output size will always be less than or equal to the input size plus the size of one block. For block ciphers, if the input size provided to each call to CCCryptorMBS.Update() is an integral multiple of the block size, then the output size for each call to CCCryptorMBS.Update() is less than or equal to the input size for that call to CCCryptorMBS.Update(). CCCryptorMBS.Final() only produces output when using a block cipher with padding enabled.

10.1.9 RandomGenerateBytes(data as MemoryBlock) as integer

Plugin Version: 21.4, Platform: macOS, Targets: All.

Function: Return random bytes in a buffer allocated by the caller.

Example:

```
Dim m As New MemoryBlock(16)

Dim r As Integer = CCCryptorMBS.RandomGenerateBytes(m)

If r = CCCryptorMBS.kCCSuccess Then
    MsgBox EncodeHex(m)
Else
    MsgBox "Error " + Str(r)
End If
```

Notes: The PRNG returns cryptographically strong random bits suitable for use as cryptographic keys, IVs, nonces etc.

Return kCCSuccess on success.

10.1.10 Reset(iv as Ptr = nil)

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Reinitializes an existing CCCryptorRef with a (possibly) new initialization vector.

Notes: The key is unchanged. Not implemented for stream ciphers.

iv: Optional initialization vector; if present, must be the same size as the current algorithm's block size.

The the only possible errors are kCCParamError and kCCUnimplemented.

This can be called on a CCCryptorMBS with data pending (i.e. in a padded mode operation before Final is called); however any pending data will be lost in that case.

10.1.11 Update(dataIn as Ptr, dataInLength as UInt64, dataOut as Ptr, dataOutAvailable as UInt64, byref dataOutMoved as UInt64)

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Process (encrypt, decrypt) some data.

Notes: The result, if any, is written to a caller-provided buffer.

Parameters:

`dataIn` Data to process, length `dataInLength` bytes.
`dataInLength` Length of data to process.
`dataOut` Result is written here. Allocated by caller. Encryption and decryption can be performed "in-place", with the same buffer used for input and output.

`dataOutAvailable` The size of the `dataOut` buffer in bytes.

`dataOutMoved` On successful return, the number of bytes written to `dataOut`.

Possible error codes:

`kCCBufferTooSmall` indicates insufficient space in the `dataOut` buffer. The caller can use `CCCryptorMBS.GetOutputLength()` to determine the required output buffer size in this case. The operation can be retried; no state is lost when this is returned.

This routine can be called multiple times. The caller does not need to align input data lengths to block sizes; input is buffered as necessary for block ciphers. When performing symmetric encryption with block ciphers, and padding is enabled via `kCCOptionPKCS7Padding`, the total number of bytes provided by all the calls to this function when encrypting can be arbitrary (i.e., the total number of bytes does not have to be block aligned). However if padding is disabled, or when decrypting, the total number of bytes does have to be aligned to the block size; otherwise `CCCryptMBS.Final()` will return `kCCAlignmentError`. A general rule for the size of the output buffer which must be provided by the caller is that for block ciphers, the output length is never larger than the input length plus the block size. For stream ciphers, the output length is always exactly the same as the input length. See the discussion for `CCCryptorMBS.GetOutputLength()` for more information on this topic. Generally, when all data has been processed, call `CCCryptorMBS.Final()`. In the following cases, the `CCCryptorMBS.Final()` is superfluous as it will not yield any data nor return an error:

1. Encrypting or decrypting with a block cipher with padding disabled, when the total amount of data provided to `CCCryptorMBS.Update()` is an integral multiple of the block size.
2. Encrypting or decrypting with a stream cipher.

See also:

- 10.1.12 `Update(dataIn as String, dataOut as Ptr, dataOutAvailable as UInt64, byref dataOutMoved as UInt64)` 248

10.1.12 `Update(dataIn as String, dataOut as Ptr, dataOutAvailable as UInt64, byref dataOutMoved as UInt64)`

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Process (encrypt, decrypt) some data.

Notes: The result, if any, is written to a caller-provided buffer.

Parameters:

<code>dataIn</code>	Data to process, length <code>dataInLength</code> bytes.
<code>dataInLength</code>	Length of data to process.
<code>dataOut</code>	Result is written here. Allocated by caller. Encryption and decryption can be performed "in-place", with the same buffer used for input and output.

`dataOutAvailable` The size of the `dataOut` buffer in bytes.

`dataOutMoved` On successful return, the number of bytes written to `dataOut`.

Possible error codes:

`kCCBufferTooSmall` indicates insufficient space in the `dataOut` buffer. The caller can use `CCCryptorMBS.GetOutputLength()` to determine the required output buffer size in this case. The operation can be retried; no state is lost when this is returned.

This routine can be called multiple times. The caller does not need to align input data lengths to block sizes; input is buffered as necessary for block ciphers. When performing symmetric encryption with block ciphers, and padding is enabled via `kCCOptionPKCS7Padding`, the total number of bytes provided by all the calls to this function when encrypting can be arbitrary (i.e., the total number of bytes does not have to be block aligned). However if padding is disabled, or when decrypting, the total number of bytes does have to be aligned to the block size; otherwise `CCCryptorMBS.Final()` will return `kCCAlignmentError`. A general rule for the size of the output buffer which must be provided by the caller is that for block ciphers, the output length is never larger than the input length plus the block size. For stream ciphers, the output length is always exactly the same as the input length. See the discussion for `CCCryptorMBS.GetOutputLength()` for more information on this topic. Generally, when all data has been processed, call `CCCryptorMBS.Final()`. In the following cases, the `CCCryptorMBS.Final()` is superfluous as it will not yield any data nor return an error:

1. Encrypting or decrypting with a block cipher with padding disabled, when the total amount of data provided to `CCCryptorMBS.Update()` is an integral multiple of the block size.
2. Encrypting or decrypting with a stream cipher.

See also:

- 10.1.11 `Update(dataIn as Ptr, dataInLength as UInt64, dataOut as Ptr, dataOutAvailable as UInt64, byref dataOutMoved as UInt64)` 247

10.1.13 Properties

10.1.14 Handle as Integer

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: The internal handle for the crypter instance.

Notes: (Read and Write property)

10.1.15 Lasterror as Integer

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Last error code.

Notes: (Read and Write property)

10.1.16 Constants

Encryption Algorithms Constants.

Constant	Value	Description
kCCAlgorithm3DES	2	Triple-DES, three key, EDE configuration
kCCAlgorithmAES128	0	Advanced Encryption Standard, 128-bit block. Key length 128 to 256 bits.
kCCAlgorithmBlowfish	6	Blowfish encryption.
kCCAlgorithmCAST	3	CAST
kCCAlgorithmDES	1	Data Encryption Standard
kCCAlgorithmRC2	5	RC2 stream cipher
kCCAlgorithmRC4	4	RC4 stream cipher

Error codes.

Constant	Value	Description
kCCAlignmentError	-4303	Input size was not aligned properly.
kCCBufferTooSmall	-4301	Insufficient buffer provided for specified operation.
kCCCAllSequenceError	-4309	Functions called in wrong order.
kCCDecodeError	-4304	Input data did not decode or decrypt properly.
kCCInvalidKey	-4311	Key is not valid.
kCCKeySizeError	-4310	The key size is incorrect.
kCCMemoryFailure	-4302	Memory allocation failure.
kCCOverflow	-4306	Buffer overflow.
kCCParamError	-4300	Illegal parameter value.
kCCRNGFailure	-4307	Random number generator failed.
kCCSuccess	0	Operation completed normally.
kCCUnimplemented	-4305	Function not implemented for the current algorithm.
kCCUnspecifiedError	-4308	An error occurred, but not matching one of the other error codes.

Block Size Constants.

Constant	Value	Description
kCCBlockSize3DES	8	Triple DES block size.
kCCBlockSizeAES128	16	AES block size (currently, only 128-bit blocks are supported).
kCCBlockSizeBlowfish	8	Blowfish block size.
kCCBlockSizeCAST	8	CAST block size.
kCCBlockSizeDES	8	DES block size.
kCCBlockSizeRC2	8	RC2 block size.

Operation Modes

Constant	Value	Description
kCCDecrypt	1	Symmetric decryption.
kCCEncrypt	0	Symmetric encryption.

Key Size Constants

Constant	Value	Description
kCCKeySize3DES	24	Triple DES key size. DES and TripleDES have fixed key sizes.
kCCKeySizeAES128	16	128 bit AES key size. AES has three discrete key sizes.
kCCKeySizeAES192	24	192 bit AES key size. AES has three discrete key sizes.
kCCKeySizeAES256	32	256 bit AES key size. AES has three discrete key sizes.
kCCKeySizeDES	8	DES key size. DES and TripleDES have fixed key sizes.
kCCKeySizeMaxBlowfish	56	Maximum key size for blowfish. You may better do a hash on the key and use the hash.
kCCKeySizeMaxCAST	16	CAST maximum key size. CAST and RC4 have variable key sizes.
kCCKeySizeMaxRC2	128	RC2 maximum key size. CAST and RC4 have variable key sizes.
kCCKeySizeMaxRC4	512	RC4 maximum key size. CAST and RC4 have variable key sizes.
kCCKeySizeMinBlowfish	8	Minimum key size for blowfish.
kCCKeySizeMinCAST	5	CAST minimum key size. CAST and RC4 have variable key sizes.
kCCKeySizeMinRC2	1	RC2 minimum key size. CAST and RC4 have variable key sizes.
kCCKeySizeMinRC4	1	RC4 minimum key size. CAST and RC4 have variable key sizes.

Option Constants

Constant	Value	Description
kCCOptionCBCMode	0	Cipher Block Chaining Mode. Default is CBC.
kCCOptionECBMode	2	Electronic Code Book Mode. Default is CBC.
kCCOptionPKCS7Padding	1	Perform PKCS7 padding. Stream ciphers currently have no options

10.2 class CCHMacMBS

10.2.1 class CCHMacMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Keyed Message Authentication Code (HMAC) functions.

Example:

```
dim h as new CCHMacMBS(CCHMacMBS.kCCHmacAlgSHA1, "Hello")
h.Update "Hello World!"
dim m as MemoryBlock = h.Finalize
MsgBox EncodingToHexMBS(m)
```

Notes: This class uses the CommonCrypto interface which is available on Mac OS X 10.5 or newer and also on iOS. So you can use it to get the same results on both operation systems. Also as you simply use Apple provided encryption, you don't need to apply for an export license for this classes here.

Blog Entries

- [MBS Real Studio Plugins, version 13.1pr15](#)
- [MBS Real Studio Plugins, version 11.3pr5](#)

10.2.2 Methods

10.2.3 Constructor(algorithm as Integer, key as memoryblock)

Plugin Version: 13.1, Platform: macOS, Targets: All.

Function: Initializes the hmac engine with the given algorithm and key.

See also:

- 10.2.4 Constructor(algorithm as Integer, key as Ptr, keyLength as UInt64) 253
- 10.2.5 Constructor(algorithm as Integer, key as string) 254

10.2.4 Constructor(algorithm as Integer, key as Ptr, keyLength as UInt64)

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Initializes the hmac engine with the given algorithm and key.

See also:

- 10.2.3 Constructor(algorithm as Integer, key as memoryblock) 253
- 10.2.5 Constructor(algorithm as Integer, key as string) 254

10.2.5 Constructor(algorithm as Integer, key as string)

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Initializes the hmac engine with the given algorithm and key.

Example:

```
dim h as new CCHMacMBS(CCHMacMBS.kCCHmacAlgMD5, "Hello")
h.Update "Hello World!"
dim m as MemoryBlock = h.Finalize
MsgBox EncodingToHexMBS(m)
```

See also:

- 10.2.3 Constructor(algorithm as Integer, key as memoryblock) 253
- 10.2.4 Constructor(algorithm as Integer, key as Ptr, keyLength as UInt64) 253

10.2.6 Final(macOut as Ptr)

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Obtain the final Message Authentication Code.

Notes: Writes mac to given pointer.

Please pass a memoryblock with 16 bytes for MD5 and 20 bytes for SHA1.

10.2.7 Finalize as Memoryblock

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Obtain the final Message Authentication Code.

Notes: Returns digest. 16 bytes for MD5 and 20 bytes for SHA1.

10.2.8 Hmac(algorithm as Integer, key as Ptr, keyLength as Integer, data as Ptr, dataLength as Integer, MacOut as Ptr)

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Stateless, one-shot HMAC function.

Notes: Make sure your memoryblock for key, data and macout have the right size and are not nil! keyLength and dataLength are the size of key and data in bytes.

See also:

- 10.2.9 Hmac(algorithm as Integer, key as String, data as String) as String 255

10.2.9 Hmac(algorithm as Integer, key as String, data as String) as String

Plugin Version: 13.1, Platform: macOS, Targets: All.

Function: Stateless, one-shot HMAC function.

See also:

- 10.2.8 Hmac(algorithm as Integer, key as Ptr, keyLength as Integer, data as Ptr, dataLength as Integer, MacOut as Ptr) 254

10.2.10 Update(data as memoryblock)

Plugin Version: 13.1, Platform: macOS, Targets: All.

Function: Process some data.

Notes: Takes bytes in memoryblock.

See also:

- 10.2.11 Update(data as Ptr, dataLength as UInt64) 255
- 10.2.12 Update(data as string) 255

10.2.11 Update(data as Ptr, dataLength as UInt64)

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Process some data.

Notes: Takes given bytes from pointer. You can pass a memoryblock there and pass the size of the memoryblock as length.

See also:

- 10.2.10 Update(data as memoryblock) 255
- 10.2.12 Update(data as string) 255

10.2.12 Update(data as string)

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Process some data.

Notes: Takes bytes in string.

See also:

- 10.2.10 Update(data as memoryblock) 255
- 10.2.11 Update(data as Ptr, dataLength as UInt64) 255

10.2.13 Properties

10.2.14 Algorithm as Integer

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: The algorithm passed in the constructor.

Notes: see kCCHmacAlg* constants.

(Read and Write property)

10.2.15 Constants

Algorithms Constants

Constant	Value	Description
kCCHmacAlgMD5	1	
kCCHmacAlgSHA1	0	
kCCHmacAlgSHA224	5	
kCCHmacAlgSHA256	2	
kCCHmacAlgSHA384	3	
kCCHmacAlgSHA512	4	

Digest Length Constants

Constant	Value	Description
kCCMD5DigestLength	16	
kCCSHA1DigestLength	20	

10.3 class CCMD2MBS

10.3.1 class CCMD2MBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: The class for MD2 hash.

Example:

```
dim s as new CCMD2MBS
s.Update "The quick brown fox jumps over the lazy dog"
```

```
dim m as MemoryBlock = s.Finalize
MsgBox EncodingToHexMBS(m)
```

Notes: This class uses the CommonCrypto interface which is available on Mac OS X 10.4 or newer and also on iOS. So you can use it to get the same results on both operation systems. Also as you simply use Apple provided encryption, you don't need to apply for an export license for this classes here.

Blog Entries

- [MBS Real Studio Plugins, version 11.3pr5](#)

10.3.2 Methods

10.3.3 Constructor

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Initializes the hash engine.

10.3.4 Finalize as Memoryblock

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Finalizes hash and returns digest as memoryblock.

Notes: If you want to show the value to a human, please use EncodingToHexMBS function.

10.3.5 MD2(data as Ptr, dataLength as Integer) as Memoryblock

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One-shot hash calculation with MD2.

Notes: Simply pass in a memoryblock with data and the size in bytes and receive digest as memoryblock. If you need to show digest to human, please use `EncodingToHexMBS` function.

See also:

- 10.3.6 MD2(data as String) as Memoryblock 258

10.3.6 MD2(data as String) as Memoryblock

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One-shot hash calculation with MD2.

Example:

```
dim m as MemoryBlock = CCMD2MBS.MD2("The quick brown fox jumps over the lazy dog")
MsgBox EncodingToHexMBS(m)
```

Notes: Simply pass in a string and receive digest as memoryblock. If you need to show digest to human, please use `EncodingToHexMBS` function.

See also:

- 10.3.5 MD2(data as Ptr, dataLength as Integer) as Memoryblock 257

10.3.7 Update(data as Ptr, dataLength as UInt64)

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Processes some data.

Notes: Pass memoryblock and data length in bytes.

See also:

- 10.3.8 Update(data as string) 258

10.3.8 Update(data as string)

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Processes some data.

Notes: Pass string with data.

See also:

- 10.3.7 Update(data as Ptr, dataLength as UInt64) 258

10.4 class CCMD4MBS

10.4.1 class CCMD4MBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: The class for MD4 hash.

Example:

```
dim s as new CCMD4MBS
s.Update "The quick brown fox jumps over the lazy dog"
```

```
dim m as MemoryBlock = s.Finalize
MsgBox EncodingToHexMBS(m)
```

Notes: This class uses the CommonCrypto interface which is available on Mac OS X 10.4 or newer and also on iOS. So you can use it to get the same results on both operation systems. Also as you simply use Apple provided encryption, you don't need to apply for an export license for this classes here.

Blog Entries

- [MBS Xojo / Real Studio Plugins, version 15.2pr7](#)
- [MBS Real Studio Plugins, version 11.3pr5](#)

10.4.2 Methods

10.4.3 Constructor

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Initializes the hash engine.

10.4.4 Finalize as Memoryblock

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Finalizes hash and returns digest as memoryblock.

Notes: If you want to show the value to a human, please use EncodingToHexMBS function.

10.4.5 MD4(data as Ptr, dataLength as Integer) as Memoryblock

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One-shot hash calculation with MD4.

Notes: Simply pass in a memoryblock with data and the size in bytes and receive digest as memoryblock. If you need to show digest to human, please use `EncodingToHexMBS` function.

See also:

- 10.4.6 MD4(data as String) as Memoryblock 260

10.4.6 MD4(data as String) as Memoryblock

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One-shot hash calculation with MD4.

Example:

```
dim m as MemoryBlock = CCMD4MBS.MD4("The quick brown fox jumps over the lazy dog")
MsgBox EncodingToHexMBS(m)
```

Notes: Simply pass in a string and receive digest as memoryblock. If you need to show digest to human, please use `EncodingToHexMBS` function.

See also:

- 10.4.5 MD4(data as Ptr, dataLength as Integer) as Memoryblock 259

10.4.7 Update(data as Ptr, dataLength as UInt64)

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Processes some data.

Notes: Pass memoryblock and data length in bytes.

See also:

- 10.4.8 Update(data as string) 260

10.4.8 Update(data as string)

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Processes some data.

Notes: Pass string with data.

See also:

- 10.4.7 Update(data as Ptr, dataLength as UInt64) 260

10.5 class CCMD5MBS

10.5.1 class CCMD5MBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: The class for MD5 hash.

Example:

```
dim s as new CCMD5MBS
s.Update "The quick brown fox jumps over the lazy dog"
```

```
dim m as MemoryBlock = s.Finalize
MsgBox EncodingToHexMBS(m)
```

Notes: This class uses the CommonCrypto interface which is available on Mac OS X 10.4 or newer and also on iOS. So you can use it to get the same results on both operation systems. Also as you simply use Apple provided encryption, you don't need to apply for an export license for this classes here.

Blog Entries

- [MBS Real Studio Plugins, version 11.3pr5](#)

10.5.2 Methods

10.5.3 Constructor

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Initializes the hash engine.

10.5.4 Finalize as Memoryblock

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Finalizes hash and returns digest as memoryblock.

Notes: If you want to show the value to a human, please use EncodingToHexMBS function.

10.5.5 MD5(data as Ptr, dataLength as Integer) as Memoryblock

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One-shot hash calculation with MD5.

Notes: Simply pass in a memoryblock with data and the size in bytes and receive digest as memoryblock. If you need to show digest to human, please use `EncodingToHexMBS` function.

See also:

- 10.5.6 MD5(data as String) as Memoryblock 262

10.5.6 MD5(data as String) as Memoryblock

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One-shot hash calculation with MD5.

Example:

```
dim m as MemoryBlock = CCMD5MBS.MD5("The quick brown fox jumps over the lazy dog")
MsgBox EncodingToHexMBS(m)
```

Notes: Simply pass in a string and receive digest as memoryblock. If you need to show digest to human, please use `EncodingToHexMBS` function.

See also:

- 10.5.5 MD5(data as Ptr, dataLength as Integer) as Memoryblock 261

10.5.7 Update(data as Ptr, dataLength as UInt64)

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Processes some data.

Notes: Pass memoryblock and data length in bytes.

See also:

- 10.5.8 Update(data as string) 262

10.5.8 Update(data as string)

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Processes some data.

Notes: Pass string with data.

See also:

- 10.5.7 Update(data as Ptr, dataLength as UInt64) 262

10.6 class CCSHA1MBS

10.6.1 class CCSHA1MBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: The class for SHA-1 hash.

Example:

```
dim s as new CCSHA1MBS
s.Update "The quick brown fox jumps over the lazy dog"
```

```
dim m as MemoryBlock = s.Finalize
MsgBox EncodingToHexMBS(m)
```

Notes: This class uses the CommonCrypto interface which is available on Mac OS X 10.4 or newer and also on iOS. So you can use it to get the same results on both operation systems. Also as you simply use Apple provided encryption, you don't need to apply for an export license for this classes here.

Blog Entries

- [MBS Real Studio Plugins, version 11.3pr5](#)

10.6.2 Methods

10.6.3 Constructor

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Initializes the hash engine.

10.6.4 Finalize as Memoryblock

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Finalizes hash and returns digest as memoryblock.

Notes: If you want to show the value to a human, please use EncodingToHexMBS function.

10.6.5 SHA1(data as Ptr, dataLength as Integer) as Memoryblock

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One-shot hash calculation with SHA-1.

Notes: Simply pass in a memoryblock with data and the size in bytes and receive digest as memoryblock. If you need to show digest to human, please use `EncodingToHexMBS` function.

See also:

- 10.6.6 `SHA1(data as String) as Memoryblock` 264

10.6.6 `SHA1(data as String) as Memoryblock`

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One-shot hash calculation with SHA-1.

Example:

```
dim m as MemoryBlock = CCSHA1MBS.SHA1("The quick brown fox jumps over the lazy dog")
MsgBox EncodingToHexMBS(m)
```

Notes: Simply pass in a string and receive digest as memoryblock. If you need to show digest to human, please use `EncodingToHexMBS` function.

See also:

- 10.6.5 `SHA1(data as Ptr, dataLength as Integer) as Memoryblock` 263

10.6.7 `Update(data as Ptr, dataLength as UInt64)`

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Processes some data.

Notes: Pass memoryblock and data length in bytes.

See also:

- 10.6.8 `Update(data as string)` 264

10.6.8 `Update(data as string)`

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Processes some data.

Notes: Pass string with data.

See also:

- 10.6.7 `Update(data as Ptr, dataLength as UInt64)` 264

10.7 class CCSHA224MBS

10.7.1 class CCSHA224MBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: The class for SHA-224 hash.

Example:

```
dim s as new CCSHA224MBS
s.Update "The quick brown fox jumps over the lazy dog"
```

```
dim m as MemoryBlock = s.Finalize
MsgBox EncodingToHexMBS(m)
```

Notes: This class uses the CommonCrypto interface which is available on Mac OS X 10.5 or newer and also on iOS. So you can use it to get the same results on both operation systems. Also as you simply use Apple provided encryption, you don't need to apply for an export license for this classes here.

Blog Entries

- [MBS Real Studio Plugins, version 11.3pr5](#)

10.7.2 Methods

10.7.3 Constructor

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Initializes the hash engine.

10.7.4 Finalize as Memoryblock

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Finalizes hash and returns digest as memoryblock.

Notes: If you want to show the value to a human, please use EncodingToHexMBS function.

10.7.5 SHA224(data as Ptr, dataLength as Integer) as Memoryblock

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One-shot hash calculation with SHA-256.

Notes: Simply pass in a memoryblock with data and the size in bytes and receive digest as memoryblock. If you need to show digest to human, please use `EncodingToHexMBS` function.

See also:

- 10.7.6 `SHA224(data as String) as Memoryblock` 266

10.7.6 `SHA224(data as String) as Memoryblock`

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One-shot hash calculation with SHA-224.

Example:

```
dim m as MemoryBlock = CCSHA224MBS.SHA224("The quick brown fox jumps over the lazy dog")
MsgBox EncodingToHexMBS(m)
```

Notes: Simply pass in a string and receive digest as memoryblock. If you need to show digest to human, please use `EncodingToHexMBS` function.

See also:

- 10.7.5 `SHA224(data as Ptr, dataLength as Integer) as Memoryblock` 265

10.7.7 `Update(data as Ptr, dataLength as UInt64)`

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Processes some data.

Notes: Pass memoryblock and data length in bytes.

See also:

- 10.7.8 `Update(data as string)` 266

10.7.8 `Update(data as string)`

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Processes some data.

Notes: Pass string with data.

See also:

- 10.7.7 `Update(data as Ptr, dataLength as UInt64)` 266

10.8 class CCSHA256MBS

10.8.1 class CCSHA256MBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: The class for SHA-256 hash.

Example:

```
dim s as new CCSHA256MBS
s.Update "The quick brown fox jumps over the lazy dog"
```

```
dim m as MemoryBlock = s.Finalize
MsgBox EncodingToHexMBS(m)
```

Notes: This class uses the CommonCrypto interface which is available on Mac OS X 10.4 or newer and also on iOS. So you can use it to get the same results on both operation systems. Also as you simply use Apple provided encryption, you don't need to apply for an export license for this classes here.

Blog Entries

- [MBS Real Studio Plugins, version 11.3pr5](#)

10.8.2 Methods

10.8.3 Constructor

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Initializes the hash engine.

10.8.4 Finalize as Memoryblock

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Finalizes hash and returns digest as memoryblock.

Notes: If you want to show the value to a human, please use EncodingToHexMBS function.

10.8.5 SHA256(data as Ptr, dataLength as Integer) as Memoryblock

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One-shot hash calculation with SHA-256.

Notes: Simply pass in a memoryblock with data and the size in bytes and receive digest as memoryblock. If you need to show digest to human, please use `EncodingToHexMBS` function.

See also:

- 10.8.6 `SHA256(data as String) as Memoryblock` 268

10.8.6 `SHA256(data as String) as Memoryblock`

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One-shot hash calculation with SHA-256.

Example:

```
dim m as MemoryBlock = CCSHA256MBS.SHA256("The quick brown fox jumps over the lazy dog")
MsgBox EncodingToHexMBS(m)
```

Notes: Simply pass in a string and receive digest as memoryblock. If you need to show digest to human, please use `EncodingToHexMBS` function.

See also:

- 10.8.5 `SHA256(data as Ptr, dataLength as Integer) as Memoryblock` 267

10.8.7 `Update(data as Ptr, dataLength as UInt64)`

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Processes some data.

Notes: Pass memoryblock and data length in bytes.

See also:

- 10.8.8 `Update(data as string)` 268

10.8.8 `Update(data as string)`

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Processes some data.

Notes: Pass string with data.

See also:

- 10.8.7 `Update(data as Ptr, dataLength as UInt64)` 268

10.9 class CCSHA384MBS

10.9.1 class CCSHA384MBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: The class for SHA-384 hash.

Example:

```
dim s as new CCSHA384MBS
s.Update "The quick brown fox jumps over the lazy dog"
```

```
dim m as MemoryBlock = s.Finalize
MsgBox EncodingToHexMBS(m)
```

Notes: This class uses the CommonCrypto interface which is available on Mac OS X 10.4 or newer and also on iOS. So you can use it to get the same results on both operation systems. Also as you simply use Apple provided encryption, you don't need to apply for an export license for this classes here.

Blog Entries

- [MBS Real Studio Plugins, version 11.3pr5](#)

10.9.2 Methods

10.9.3 Constructor

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Initializes the hash engine.

10.9.4 Finalize as Memoryblock

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Finalizes hash and returns digest as memoryblock.

Notes: If you want to show the value to a human, please use EncodingToHexMBS function.

10.9.5 SHA384(data as Ptr, dataLength as Integer) as Memoryblock

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One-shot hash calculation with SHA-384.

Notes: Simply pass in a memoryblock with data and the size in bytes and receive digest as memoryblock. If you need to show digest to human, please use `EncodingToHexMBS` function.

See also:

- 10.9.6 `SHA384(data as String) as Memoryblock` 270

10.9.6 `SHA384(data as String) as Memoryblock`

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One-shot hash calculation with SHA-384.

Example:

```
dim m as MemoryBlock = CCSHA384MBS.SHA384("The quick brown fox jumps over the lazy dog")
MsgBox EncodingToHexMBS(m)
```

Notes: Simply pass in a string and receive digest as memoryblock. If you need to show digest to human, please use `EncodingToHexMBS` function.

See also:

- 10.9.5 `SHA384(data as Ptr, dataLength as Integer) as Memoryblock` 269

10.9.7 `Update(data as Ptr, dataLength as UInt64)`

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Processes some data.

Notes: Pass memoryblock and data length in bytes.

See also:

- 10.9.8 `Update(data as string)` 270

10.9.8 `Update(data as string)`

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Processes some data.

Notes: Pass string with data.

See also:

- 10.9.7 `Update(data as Ptr, dataLength as UInt64)` 270

10.10 class CCSHA512MBS

10.10.1 class CCSHA512MBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: The class for SHA-512 hash.

Example:

```
dim s as new CCSHA512MBS
s.Update "The quick brown fox jumps over the lazy dog"
```

```
dim m as MemoryBlock = s.Finalize
MsgBox EncodingToHexMBS(m)
```

Notes: This class uses the CommonCrypto interface which is available on Mac OS X 10.4 or newer and also on iOS. So you can use it to get the same results on both operation systems. Also as you simply use Apple provided encryption, you don't need to apply for an export license for this classes here.

Blog Entries

- [MBS Real Studio Plugins, version 11.3pr5](#)

10.10.2 Methods

10.10.3 Constructor

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Initializes the hash engine.

10.10.4 Finalize as Memoryblock

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Finalizes hash and returns digest as memoryblock.

Notes: If you want to show the value to a human, please use EncodingToHexMBS function.

10.10.5 SHA512(data as Ptr, dataLength as Integer) as Memoryblock

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One-shot hash calculation with SHA-512.

Notes: Simply pass in a memoryblock with data and the size in bytes and receive digest as memoryblock. If you need to show digest to human, please use `EncodingToHexMBS` function.

See also:

- 10.10.6 `SHA512(data as String) as Memoryblock` 272

10.10.6 `SHA512(data as String) as Memoryblock`

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One-shot hash calculation with SHA-512.

Example:

```
dim m as MemoryBlock = CCSHA512MBS.SHA512("The quick brown fox jumps over the lazy dog")
MsgBox EncodingToHexMBS(m)
```

Notes: Simply pass in a string and receive digest as memoryblock. If you need to show digest to human, please use `EncodingToHexMBS` function.

See also:

- 10.10.5 `SHA512(data as Ptr, dataLength as Integer) as Memoryblock` 271

10.10.7 `Update(data as Ptr, dataLength as UInt64)`

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Processes some data.

Notes: Pass memoryblock and data length in bytes.

See also:

- 10.10.8 `Update(data as string)` 272

10.10.8 `Update(data as string)`

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Processes some data.

Notes: Pass string with data.

See also:

- 10.10.7 `Update(data as Ptr, dataLength as UInt64)` 272

Chapter 11

Files

11.1 class ACLEntryMBS

11.1.1 class ACLEntryMBS

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: The class for an ACL entry.

Notes: This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

Blog Entries

- [MBS Xojo / Real Studio Plugins, version 14.0pr1](#)

11.1.2 Methods

11.1.3 Constructor

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: The private constructor.

11.1.4 Copy(dest as ACLEntryMBS)

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Copy an ACL entry to another ACL entry.

Notes: see also `acl_copy_entry` man page.

11.1.5 GIDtoUUID(GID as Integer) as memoryblock

Plugin Version: 14.0, Platform: macOS, Targets: All.

Function: Queries the UUID for a group id.

Notes: Returns nil on any error.

11.1.6 GroupFromGID(GID as Integer) as string

Plugin Version: 14.0, Platform: macOS, Targets: All.

Function: Queries the group name for a Group ID.

11.1.7 MaximalPermsetMask as UInt64

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: The maximal permset mask.

Notes: see also `acl_maximal_permset_mask_np` man page.

11.1.8 UIDtoUUID(UID as Integer) as memoryblock

Plugin Version: 14.0, Platform: macOS, Targets: All.

Function: Queries the UUID for an user id.

Notes: Returns nil on any error.

11.1.9 UserFromUID(UID as Integer) as string

Plugin Version: 14.0, Platform: macOS, Targets: All.

Function: Queries the user name for a UID.

11.1.10 UUIDtoID(UUID as memoryblock, byref ID as Integer, byref Type as Integer) as boolean

Plugin Version: 14.0, Platform: macOS, Targets: All.

Function: Queries the GID/UID for an UUID.

Notes: Type is 0 for user and 1 for group.

Returns true on success.

11.1.11 Properties

11.1.12 Handle as Integer

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: The internal object reference.

Notes: (Read only property)

11.1.13 Lasterror as Integer

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: The last error code.

Notes: (Read and Write property)

11.1.14 Parent as Variant

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: The parent object.

Notes: (Read only property)

11.1.15 FlagSet as ACLFlagSetMBS

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Get or Set the flag set.

Notes: see also `acl_get_flagset_np/acl_set_flagset_np` man page.
(Read and Write computed property)

11.1.16 PermSet as ACLPermSetMBS

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Get/Set the permissions set.

Notes: see also `acl_get_permset/acl_set_permset` man page.

(Read and Write computed property)

11.1.17 PermSetMask as UInt64

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Get/Set the permission set mask.

Notes: see also `acl_get_permset_mask_np/acl_set_permset_mask_np` man page.
(Read and Write computed property)

11.1.18 Qualifier as Memoryblock

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Get/Set the qualifier.

Notes: Value is a 16byte big GUID as memoryblock.
see also `acl_set_qualifier/acl_get_qualifier` man page.
(Read and Write computed property)

11.1.19 TagType as Integer

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Sets or gets the the tag type.

Notes: see also `acl_get_tag_type/acl_set_tag_type` man page.
(Read and Write computed property)

11.1.20 Constants

ACL entry tag type bits

Constant	Value	Description
<code>kACLExtendedAllow</code>	1	
<code>kACLExtendedDeny</code>	2	
<code>kACLUndefinedTag</code>	0	

11.2 class ACLFlagSetMBS

11.2.1 class ACLFlagSetMBS

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: The class for an ACL flag set.

Notes: This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

11.2.2 Methods

11.2.3 Add(flag as Integer)

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Adds a flag to the flag set.

Notes: see also `acl_add_flag_np` man page.

11.2.4 Clear

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Clears the flag set.

Notes: see also `acl_clear_flags_np` man page.

11.2.5 Constructor

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: The private constructor.

11.2.6 Delete(flag as Integer)

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Deletes flag from flag set.

Notes: see also `acl_delete_flag_np` man page.

11.2.7 HasFlag(flag as Integer) as Boolean

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Checks if a flag is set in this flag set.

Notes: see also `acl_get_flag_np` man page.

11.2.8 Properties

11.2.9 Handle as Integer

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: The internal object reference.

Notes: (Read only property)

11.2.10 Lasterror as Integer

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: The last error code.

Notes: (Read and Write property)

11.2.11 Parent as Variant

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: The parent object.

Notes: (Read only property)

11.2.12 Constants

ACL Entry Flags

Constant	Value	Description
kACLEntryDirectoryInherit	64	
kACLEntryFileInherit	32	
kACLEntryInherited	16	
kACLEntryLimitInherit	128	
kACLEntryOnlyInherit	256	
kACLFlagDeferInherit	1	
kACLFlagNoInherit	131072	

11.3 class ACLPermSetMBS

11.3.1 class ACLPermSetMBS

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: The class for an ACL permission set.

Notes: This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

11.3.2 Methods

11.3.3 Add(perm as Integer)

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Adds a permission.

Notes: see also `acl_add_perm` man page.

11.3.4 Clear

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Clears the permission set.

Notes: see also `acl_clear_perms` man page.

11.3.5 Constructor

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: The private constructor.

11.3.6 Delete(perm as Integer)

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Deletes a permission.

Notes: see also `acl_delete_perm` man page.

11.3.7 HasPerm(perm as Integer) as Boolean

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Checks if permissions is included in this permission set.

Notes: see also `acl_get_perm_np` man page.

11.3.8 Properties**11.3.9 Handle as Integer**

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: The internal object reference.

Notes: (Read only property)

11.3.10 Lasterror as Integer

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: The last error code.

Notes: (Read and Write property)

11.3.11 Parent as Variant

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: The parent object.

Notes: (Read only property)

11.3.12 Constants

Constants

Constant	Value	Description
<code>kACLMaxEntries</code>	128	Maximum number of entries.

Individual object access permissions

Constant	Value	Description
kACLAddFile	4	
kACLAddSubDirectory	32	
kACLAppendData	32	
kACLChangeOwner	8192	
kACLDelete	16	
kACLDeleteChild	64	
kACLExecute	8	
kACLListDirectory	2	
kACLReadAttributes	128	
kACLReadData	2	
kACLReadExtraAttributes	512	
kACLReadSecurity	2048	
kACLSearch	8	
kACLWriteAttributes	256	
kACLWriteData	4	
kACLWriteExtraAttributes	1024	
kACLWriteSecurity	4096	

11.4 class ACLRightMBS

11.4.1 class ACLRightMBS

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: The class for ACL rights.

11.4.2 Methods

11.4.3 Constructor(count as Integer)

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Allocates and initializes the working storage for an ACL of at least count ACL entries.

Notes: see also `acl_init` man page.

See also:

- 11.4.4 Constructor(text as string) 283

11.4.4 Constructor(text as string)

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Creates new ACL from text representation.

Notes: see also `acl_from_text` man page.

See also:

- 11.4.3 Constructor(count as Integer) 283

11.4.5 CopyData(Native as boolean = false) as String

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Creates external representation.

Notes: see also `acl_copy_int` man page.

11.4.6 CreateEntry as ACLEntryMBS

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Creates a new entry.

Notes: see also `acl_create_entry` man page.

See also:

- 11.4.7 `CreateEntry(entryIndex as Integer, tag_type as Integer = 1) as ACLEntryMBS` 284

11.4.7 `CreateEntry(entryIndex as Integer, tag_type as Integer = 1) as ACLEntryMBS`

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Creates a new entry.

Notes: see also `acl_create_entry_np` man page.

See also:

- 11.4.6 `CreateEntry as ACLEntryMBS` 283

11.4.8 `DeleteEntry(entry as ACLEntryMBS)`

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Deletes an entry.

Notes: see also `acl_delete_entry` man page.

11.4.9 `Duplicate as ACLRightMBS`

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Creates a duplicate of this right set.

Notes: see also `acl_dup` man page.

11.4.10 `Entries as ACLEntryMBS()`

Plugin Version: 14.0, Platform: macOS, Targets: All.

Function: Queries array with all entries in this ACL.

Notes: `Lasterror` is set.

see also `acl_get_entry` man page.

11.4.11 Entry(entryIndex as Integer) as ACLEntryMBS

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Queries entry with given index.

Notes: You can use constants kACLFirstEntry, kACLLastEntry or kACLNextEntry. see also `acl_get_entry` man page.

11.4.12 NewACL(count as Integer) as ACLRightMBS

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Allocates and initializes the working storage for an ACL of at least count ACL entries.

Notes: see also `acl_init` man page.

11.4.13 NewACLFromExternal(data as string, native as boolean = false) as ACLRightMBS

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Creates new ACL object from external representation.

Notes: see also `acl_copy_ext` man page.

11.4.14 NewACLFromFile(file as folderitem, type as Integer) as ACLRightMBS

Plugin Version: 14.0, Platform: macOS, Targets: All.

Function: Creates ACL object from file.

Notes: see also `acl_get_file` man page.

See also:

- 11.4.15 NewACLFromFile(path as string, type as Integer) as ACLRightMBS

285

11.4.15 NewACLFromFile(path as string, type as Integer) as ACLRightMBS

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Creates ACL object from file.

Notes: see also `acl_get_file` man page.

See also:

- 11.4.14 NewACLFromFile(file as folderitem, type as Integer) as ACLRightMBS

285

11.4.16 NewACLFromFilePointer(FilePointer as Integer) as ACLRightMBS

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Creates ACL object from FilePointer.

Notes: see also `acl_get_fd` man page.

See also:

- 11.4.17 NewACLFromFilePointer(FilePointer as Integer, type as Integer) as ACLRightMBS 286

11.4.17 NewACLFromFilePointer(FilePointer as Integer, type as Integer) as ACLRightMBS

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Creates ACL object from FilePointer.

Notes: see also `acl_get_fd_np` man page.

See also:

- 11.4.16 NewACLFromFilePointer(FilePointer as Integer) as ACLRightMBS 286

11.4.18 NewACLFromLink(path as string, type as Integer) as ACLRightMBS

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Creates ACL object from link.

Notes: see also `acl_get_link_np` man page.

11.4.19 NewACLFromText(text as string) as ACLRightMBS

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Creates new ACL from text representation.

Notes: see also `acl_from_text` man page.

11.4.20 SetFile(Path as string, type as Integer) as boolean

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Applies this ACL to a file.

Notes: see also `acl_set_file` man page.

11.4.21 SetFilePointer(FilePointer as Integer) as boolean

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Applies this ACL to a file pointer.

Notes: see also `acl_set_fd` man page.

See also:

- 11.4.22 SetFilePointer(FilePointer as Integer, type as Integer) as boolean

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11.4.22 SetFilePointer(FilePointer as Integer, type as Integer) as boolean

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Applies this ACL to a file pointer.

Notes: see also `acl_set_fd_np` man page.

See also:

- 11.4.21 SetFilePointer(FilePointer as Integer) as boolean

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11.4.23 SetLink(Path as string, type as Integer) as boolean

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Applies this ACL to a link file.

Notes: see also `acl_set_link_np` man page.

11.4.24 Size as Int64

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Queries size of binary representation.

Notes: see also `acl_size` man page.

11.4.25 Text as String

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Queries text representation of this ACL.

Notes: see also `acl_to_text` man page.

11.4.26 Valid as boolean

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Checks if ACL is valid in general.

Notes: see also `acl_valid` man page.

11.4.27 ValidFile(Path as string, type as Integer) as boolean

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Checks if ACL is valid for this file.

Notes: see also `acl_valid_file_np` man page.

11.4.28 ValidFilePointer(FilePointer as Integer, type as Integer) as boolean

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Checks if ACL is valid for this file pointer.

Notes: see also `acl_valid_fd_np` man page.

11.4.29 Properties

11.4.30 Handle as Integer

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: The internal object reference.

Notes: (Read only property)

11.4.31 Lasterror as Integer

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: The last error code.

Notes: (Read and Write property)

11.4.32 FlagSet as ACLFlagSetMBS

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Get/Set the flag set.

Notes: see also `acl_get_flagset_np/acl_set_flagset_np` man page.
(Read and Write computed property)

11.4.33 Constants

ACL Entry Constants

Constant	Value	Description
kACLFIRSTEntry	0	Next entry.
kACLLastEntry	-2	Last entry.
kACLNextEntry	-1	Next entry.

ACL Types

Constant	Value	Description
kACLTypeAccess	0	Posix 1003.1e type, not supported.
kACLTypeAFS	2	No supported on Mac OS X, only for Linux/FreeBSD.
kACLTypeCODA	3	No supported on Mac OS X, only for Linux/FreeBSD.
kACLTypeDefault	1	Posix 1003.1e type, not supported.
kACLTypeExtended	256	Extended ACL.
kACLTypeNTFS	4	No supported on Mac OS X, only for Linux/FreeBSD.
kACLTypeNWFS	5	No supported on Mac OS X, only for Linux/FreeBSD.

11.5 class CopyFileMBS

11.5.1 class CopyFileMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The class for copyfile function.

Notes: We provide a class to hold state and get event for progress.

Uses low level copyfile API from MacOS.

See copyfile man page in terminal.

Blog Entries

- [MonkeyBread Software Releases the MBS Xojo Plugins in version 19.4](#)
- [MBS Xojo Plugins, version 19.4pr3](#)

Videos

- [XDC 2020 MBS Plugins Presentation](#)

Xojo Developer Magazine

- [18.3, page 54: Happy Birthday MonkeyBread Software, What is new in the MBS Xojo Plugins by Stefanie Juchmes](#)

11.5.2 Methods

11.5.3 CopyFile(From as FolderItem, Dest as FolderItem, flags as Integer) as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Copies files or folders.

Notes: Copy a file's data and/or metadata. (Metadata consists of permissions, extended attributes, access control lists, and so forth.)

Recursive Copies When given the `kFlagsRecursive` flag, `copyfile()` will use the `fts(3)` functions to recursively descend into the source file-system object. It then calls `copyfile()` on each of the entries it finds that way. If a progress event is given the event will be called four times for each directory object, and twice for all other objects. (Each directory will be examined twice, once on entry – before copying each of the objects contained in the directory – and once on exit – after copying each object contained in the directory, in order to perform some final cleanup.)

Returns error code or zero for success.

See also:

- 11.5.4 CopyFile(From as String, Dest as String, flags as Integer) as Integer 291

11.5.4 CopyFile(From as String, Dest as String, flags as Integer) as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Copies files or folders.

Notes: Copy a file's data and/or metadata. (Metadata consists of permissions, extended attributes, access control lists, and so forth.)

Recursive Copies When given the kFlagsRecursive flag, copyfile() will use the fts(3) functions to recursively descend into the source file-system object. It then calls copyfile() on each of the entries it finds that way. If a progress event is given the event will be called four times for each directory object, and twice for all other objects. (Each directory will be examined twice, once on entry – before copying each of the objects contained in the directory – and once on exit – after copying each object contained in the directory, in order to perform some final cleanup.)

Returns error code or zero for success.

See also:

- 11.5.3 CopyFile(From as FolderItem, Dest as FolderItem, flags as Integer) as Integer 290

11.5.5 ErrorMessage(error as Integer) as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Queries error message for unix error code.

11.5.6 Properties

11.5.7 BytesCopied as Int64

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Get the number of data bytes copied so far.

Notes: Valid only in Progress event.

If a kFlagsClone or kFlagsCloneForce operation successfully cloned the requested objects, then this value will be 0.

(Read only property)

11.5.8 WasCloned as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Whether file was cloned.

Notes: Valid only in Progress event.

True if a kFlagsClone or kFlagsCloneForce operation successfully cloned the requested objects.

(Read only property)

11.5.9 XAttrName as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Get the name of the extended attribute.

Notes: Valid only in Progress event.

(Read only property)

11.5.10 YieldTicks as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: How much time is given back to Xojo for other ticks.

Example:

```
dim t as new CopyFileMBS
t.YieldTicks=6 // only use 1/10th of a second
```

Notes: If value is greater than zero, the application will yield to another RB thread after the given number of ticks have passed. 60 ticks are one second. Using a small value can slow down processing a lot while a big value keeps your application not responding to mouse clicks.

If you use this property with e.g. 6 as the value, you may also want to use this method in a thread so you can handle mouse events or let Xojo redraw a progressbar.

(Read and Write property)

11.5.11 Events

11.5.12 Progress(What as Integer, Stage as Integer, Source as String, Dest as String) as Integer

Plugin Version: 19.4, Platform: macOS, Targets: .

Function: The progress event called while copying.

Notes: What is one of the kWhat* constants.

Stage is one of the kStage* constants.

Source and Dest point to the current files being copied.

Return one of the kReturn* constants.

11.5.13 Constants

Flags

Constant	Value	Description
kFlagsACL	1	Copy the source file's access control lists.
kFlagsAll	15	Copy the entire file; equivalent to BitwiseOr(kFlagsMetaData, kFlagsData).
kFlagsCheck	&h10000	Return a bitmask (corresponding to the flags argument) indicating which contents would be copied; no data are actually copied. (E.g., if flags was set to kFlagsCheck + kFlagsMetaData, and the from file had extended attributes but no ACLs, the return value would be kFlagsXAttr.)
kFlagsClone	&h1000000	Try to clone the file instead. This is a best try flag i.e. if cloning fails, fallback to copying the file. This flag is equivalent to BitwiseOr(kFlagsExcl, kFlagsACL, kFlagsStat, kFlagsXAttr, kFlagsData, kFlagsNoFollowSource). Note that if cloning is successful, progress event will not be invoked. Note also that there is no support for cloning directories: if a directory is provided as the source and kFlagsCloneForce is not passed, this will instead copy the directory. Recursive copying however is supported.
kFlagsCloneForce	&h2000000	Clone the file instead. This is a force flag i.e. if cloning fails, an error is returned. This flag is equivalent to BitwiseOr(kFlagsExcl, kFlagsACL, kFlagsStat, kFlagsXAttr, kFlagsData, kFlagsNoFollowSource). Note that if cloning is successful, progress callbacks will not be invoked. Note also that there is no support for cloning directories: if a directory is provided as the source, an error will be returned.
kFlagsData	8	Copy the source file's data.
kFlagsDataSparse	&h8000000	Copy a file sparsely. This requires that the source and destination file systems support sparse files with hole sizes at least as large as their block sizes. If kFlagsData is also specified, this will fall back to a full copy if sparse copying cannot be performed for any reason; otherwise, an error is returned.
kFlagsExcl	&h20000	Fail if the to file already exists.
kFlagsMetaData	7	Copy the metadata; equivalent to BitwiseOr(kFlagsSecurity, kFlagsXAttr).
kFlagsMove	&h100000	Unlink (using remove(3)) the from file. No error is returned if remove(3) fails. Note that remove(3) removes a symbolic link itself, not the target of the link.
kFlagsNoFollow	&hC00000	This is a convenience macro, equivalent to BitwiseOr(kFlagsNoFollowDest, kFlagsNoFollowSource).
kFlagsNoFollowDest	&h80000	Do not follow the to file, if it is a symbolic link.
kFlagsNoFollowSource	&h40000	Do not follow the from file, if it is a symbolic link.
kFlagsPack	&h400000	Serialize the from file. The to file is an Apple-Double-format file.
kFlagsRecursive	&h8000	Causes copyfile to recursively copy a hierarchy.
kFlagsRunInPlace	&h4000000	If the src file has quarantine information, add the QTN_FLAG_DO_NOT_TRANSLOCATE flag to the quarantine information of the dst file. This allows a bundle to run in place instead of being translocated.
kFlagsSecurity	3	Copy the source file's POSIX and ACL information; equivalent to BitwiseOr(kFlagsStat, kFlagsACL).
kFlagsStat	2	Copy the source file's POSIX information (mode, modification time, etc.).
kFlagsUnlink	&h200000	Unlink the to file before starting.
kFlagsUnpack	&h800000	Unserialize the from file. The from file is an AppleDouble-format file; the to file will have the extended attributes, ACLs, resource fork, and FinderInfo data from the to file, regardless of the flags argument passed in.
kFlagsVerbose	&h40000000	Verbose messages.
kFlagsXAttr	4	Copy the source file's extended attributes.

Event Return Values

Constant	Value	Description
kReturnContinue	0	The copy will continue as expected.
kReturnQuit	2	The data copy will be aborted; in the case of kStageProgress, result will be set to ECANCELED (89).
kReturnSkip	1	The data copy will be aborted, but without error.

Progress

Constant	Value	Description
kStageError	3	Indicates an error has happened at some stage.
kStageFinish	2	After copying has successfully finished.
kStageProgress	4	Copy in progress.
kStageStart	1	Before copying has begun.

What

Constant	Value	Description
kWhatCopyData	4	Data is copied currently.
kWhatCopyXAttr	5	Extended attributes are copied currently.
kWhatRecurseDir	2	The object being copied is a directory, and is being entered. (That is, none of the filesystem objects contained within the directory have been copied yet.)
kWhatRecurseDirCleanup	3	The object being copied is a directory, and all of the objects contained have been copied. At this stage, the destination directory being copied will have any extra permissions that were added to allow the copying will be removed.
kWhatRecurseError	0	There was an error in processing an element of the source hierarchy; this happens when fts(3) returns an error or unknown file type.
kWhatRecurseFile	1	The object being copied is a file (or, rather, something other than a directory).

11.6 class DADiskMBS

11.6.1 class DADiskMBS

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The class for a disk in Disk Arbitration.

Notes: This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

Blog Entries

- [MBS Xojo / Real Studio Plugins, version 13.2pr1](#)

11.6.2 Methods

11.6.3 BSDName as string

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Obtains the BSD device name for the specified disk.

Example:

```
dim session as new DASessionMBS
dim d as DADiskMBS = DADiskMBS.CreateFromVolume(session,volume(0))
MsgBox d.BSDName
```

11.6.4 Constructor

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The private constructor.

11.6.5 CreateFromBSDName(session as DASessionMBS, name as string) as DADiskMBS

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates a new disk object.

Notes: session: The DASession in which to contact Disk Arbitration.

name: The BSD device name.

Returns a reference to a new DADisk.

11.6.6 CreateFromVolume(session as DASessionMBS, volume as folderitem) as DADiskMBS

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates a new disk object.

Notes: Creates a new disk object.

11.6.7 CreateFromVolumePath(session as DASessionMBS, path as string) as DADiskMBS

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates a new disk object.

Notes: session: The DASession in which to contact Disk Arbitration.

path: The BSD mount point.

Available in OS X v10.7 and later.

11.6.8 Description as dictionary

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Obtains the Disk Arbitration description of the specified disk.

Example:

```
dim session as new DASessionMBS
dim d as DADiskMBS = DADiskMBS.CreateFromVolume(session,volume(0))
dim dic as Dictionary = d.Description
MsgBox dic.Value(d.kDADiskDescriptionVolumeNameKey)
```

Notes: This function will contact Disk Arbitration to acquire the latest description of the specified disk, unless this function is called on a disk object passed within the context of an event, in which case the description is current as of that event.

Available in OS X v10.4 and later.

11.6.9 kDADiskDescriptionBusNameKey as string

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the description dictionary.

Notes: The value in the dictionary for this key is a String.

11.6.10 kDADiskDescriptionBusPathKey as string

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the description dictionary.

Notes: The value in the dictionary for this key is a String.

11.6.11 kDADiskDescriptionDeviceGUIDKey as string

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the description dictionary.

Notes: The value in the dictionary for this key is a memoryblock.

11.6.12 kDADiskDescriptionDeviceInternalKey as string

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the description dictionary.

Notes: The value in the dictionary for this key is a Boolean.

11.6.13 kDADiskDescriptionDeviceModelKey as string

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the description dictionary.

Notes: The value in the dictionary for this key is a String.

11.6.14 kDADiskDescriptionDevicePathKey as string

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the description dictionary.

Notes: The value in the dictionary for this key is a String.

11.6.15 kDADiskDescriptionDeviceProtocolKey as string

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the description dictionary.

Notes: The value in the dictionary for this key is a String.

11.6.16 kDADiskDescriptionDeviceRevisionKey as string

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the description dictionary.

Notes: The value in the dictionary for this key is a String.

11.6.17 kDADiskDescriptionDeviceUnitKey as string

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the description dictionary.

Notes: The value in the dictionary for this key is a Number.

11.6.18 kDADiskDescriptionDeviceVendorKey as string

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the description dictionary.

Notes: The value in the dictionary for this key is a String.

11.6.19 kDADiskDescriptionMediaBlockSizeKey as string

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the description dictionary.

Notes: The value in the dictionary for this key is a Number.

11.6.20 kDADiskDescriptionMediaBSDMajorKey as string

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the description dictionary.

Notes: The value in the dictionary for this key is a Number.

11.6.21 kDADiskDescriptionMediaBSDMinorKey as string

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the description dictionary.

Notes: The value in the dictionary for this key is a Number.

11.6.22 kDADiskDescriptionMediaBSDNameKey as string

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the description dictionary.

Notes: The value in the dictionary for this key is a String.

11.6.23 kDADiskDescriptionMediaBSDUnitKey as string

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the description dictionary.

Notes: The value in the dictionary for this key is a Number.

11.6.24 kDADiskDescriptionMediaContentKey as string

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the description dictionary.

Notes: The value in the dictionary for this key is a String.

11.6.25 kDADiskDescriptionMediaEjectableKey as string

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the description dictionary.

Notes: The value in the dictionary for this key is a Boolean.

11.6.26 kDADiskDescriptionMediaIconKey as string

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the description dictionary.

Notes: The value in the dictionary for this key is a Dictionary.

11.6.27 kDADiskDescriptionMediaKindKey as string

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the description dictionary.

Notes: The value in the dictionary for this key is a String.

11.6.28 kDADiskDescriptionMediaLeafKey as string

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the description dictionary.

Notes: The value in the dictionary for this key is a Boolean.

11.6.29 kDADiskDescriptionMediaNameKey as string

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the description dictionary.

Notes: The value in the dictionary for this key is a String.

11.6.30 kDADiskDescriptionMediaPathKey as string

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the description dictionary.

Notes: The value in the dictionary for this key is a String.

11.6.31 kDADiskDescriptionMediaRemovableKey as string

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the description dictionary.

Notes: The value in the dictionary for this key is a Boolean.

11.6.32 kDADiskDescriptionMediaSizeKey as string

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the description dictionary.

Notes: The value in the dictionary for this key is a Number.

11.6.33 kDADiskDescriptionMediaTypeKey as string

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the description dictionary.

Notes: The value in the dictionary for this key is a String.

11.6.34 kDADiskDescriptionMediaUUIDKey as string

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the description dictionary.

Notes: The value in the dictionary for this key is a CFUUIDMBS.

11.6.35 kDADiskDescriptionMediaWholeKey as string

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the description dictionary.

Notes: The value in the dictionary for this key is a Boolean.

11.6.36 kDADiskDescriptionMediaWritableKey as string

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the description dictionary.

Notes: The value in the dictionary for this key is a Boolean.

11.6.37 kDADiskDescriptionVolumeKindKey as string

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the description dictionary.

Notes: The value in the dictionary for this key is a String.

11.6.38 kDADiskDescriptionVolumeMountableKey as string

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the description dictionary.

Notes: The value in the dictionary for this key is a Boolean.

11.6.39 kDADiskDescriptionVolumeNameKey as string

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the description dictionary.

Notes: The value in the dictionary for this key is a String.

11.6.40 kDADiskDescriptionVolumeNetworkKey as string

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the description dictionary.

Notes: The value in the dictionary for this key is a Boolean.

11.6.41 kDADiskDescriptionVolumePathKey as string

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the description dictionary.

Notes: The value in the dictionary for this key is a folderitem.

11.6.42 kDADiskDescriptionVolumeUUIDKey as string

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the description dictionary.

Notes: The value in the dictionary for this key is a CFUUIDMBS.

11.6.43 Options as Integer

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Obtains the options for the specified disk.

11.6.44 SetOptions(options as Integer, value as boolean) as Integer

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Sets the options for the specified disk.

Notes: options: The options to set or clear.

value: Pass true to set options; otherwise pass false to clear options.

Returns result code.

11.6.45 WholeDisk as DADiskMBS

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Obtain the associated whole disk object for the specified disk.

11.6.46 Properties

11.6.47 Handle as Integer

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The internal object reference.

Notes: (Read and Write property)

11.7 class DADissenterMBS

11.7.1 class DADissenterMBS

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The class for an error.

Example:

```
dim d as new DADissenterMBS(11, "Write Error")
```

```
MsgBox str(d.Status)+" "+d.StatusString
```

Blog Entries

- [MBS Xojo / Real Studio Plugins, version 13.2pr1](#)

11.7.2 Methods

11.7.3 Constructor(status as Integer, s as string)

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates a new dissenter object.

Example:

```
dim d as new DADissenterMBS(11, "Write Error")
```

```
MsgBox str(d.Status)+" "+d.StatusString
```

Notes: status: The return code.

s: The return code string. Pass empty string for no reason.

11.7.4 Properties

11.7.5 Handle as Integer

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The internal object reference.

Notes: (Read and Write property)

11.7.6 Status as Integer

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Obtains the return code.

Notes: (Read only property)

11.7.7 StatusString as String

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Obtains the return code string.

Notes: (Read only property)

11.7.8 Constants

Error Constants

Constant	Value	Description
kDAReturnBadArgument	&hF8DA0003	Bad Argument
kDAReturnBusy	&hF8DA0002	Busy
kDAReturnError	&hF8DA0001	Error
kDAReturnExclusiveAccess	&hF8DA0004	Exclusive Access
kDAReturnNoResources	&hF8DA0005	No Resources
kDAReturnNotFound	&hF8DA0006	Not found
kDAReturnNotMounted	&hF8DA0007	Not mounted
kDAReturnNotPermitted	&hF8DA0008	Not permitted
kDAReturnNotPrivileged	&hF8DA0009	Not privileged
kDAReturnNotReady	&hF8DA000A	Not ready
kDAReturnNotWritable	&hF8DA000B	Not writable
kDAReturnSuccess	0	Success
kDAReturnUnsupported	&hF8DA000C	Unsupported

11.8 class DarwinIFStatInterfaceMBS

11.8.1 class DarwinIFStatInterfaceMBS

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: A class for the statistics of one interface.

Example:

```
dim d as new DarwinIFStatMBS
call d.Update
dim it as DarwinIFStatInterfaceMBS = d.Item(0)
MsgBox it.name
```

Notes: All this integer properties are internally unsigned and they may overflow. Your application may need to take care for this.

Blog Entries

- [MacOSX plugin for iOS](#)

11.8.2 Properties

11.8.3 Baudrate as UInt32

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: The linespeed.

Example:

```
dim d as new DarwinIFStatMBS
call d.Update
dim it as DarwinIFStatInterfaceMBS = d.Item(0)
MsgBox str(it.Baudrate)
```

Notes: (Read only property)

11.8.4 Collisions as UInt64

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: The number of collisions on csma interfaces.

Example:

```
dim d as new DarwinIFStatMBS
call d.Update
dim it as DarwinIFStatInterfaceMBS = d.Item(0)
MsgBox str(it.Collisions)
```

Notes: (Read only property)

11.8.5 InputBytes as UInt64

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: Total number of octets received.

Example:

```
dim d as new DarwinIFStatMBS
call d.Update
dim it as DarwinIFStatInterfaceMBS = d.Item(0)
MsgBox str(it.InputBytes)
```

Notes: (Read only property)

11.8.6 InputErrors as UInt64

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: The number of input errors on interface.

Example:

```
dim d as new DarwinIFStatMBS
call d.Update
dim it as DarwinIFStatInterfaceMBS = d.Item(0)
MsgBox str(it.InputErrors)
```

Notes: (Read only property)

11.8.7 InputMulticasts as UInt64

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: The number of packets received via multicast.

Example:

```
dim d as new DarwinIFStatMBS
call d.Update
dim it as DarwinIFStatInterfaceMBS = d.Item(0)
MsgBox str(it.InputMulticasts)
```

Notes: (Read only property)

11.8.8 InputPackets as UInt64

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: The number of packets received.

Example:

```
dim d as new DarwinIFStatMBS
call d.Update
dim it as DarwinIFStatInterfaceMBS = d.Item(0)
MsgBox str(it.InputPackets)
```

Notes: (Read only property)

11.8.9 MTU as UInt32

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: The maximum transmission unit.

Example:

```
dim d as new DarwinIFStatMBS
call d.Update
dim it as DarwinIFStatInterfaceMBS = d.Item(0)
MsgBox str(it.MTU)
```

Notes: Maximum size of a packet.

none
(Read only property)

11.8.10 Name as String

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: The name of the interface.

Example:

```
dim d as new DarwinIFStatMBS
call d.Update
dim it as DarwinIFStatInterfaceMBS = d.Item(0)
MsgBox it.Name
```

Notes: e.g. lo0 for localhost, en0 for the first ethernet interface, fw0 for the first firewire interface, etc.
(Read and Write property)

11.8.11 OutputBytes as UInt64

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: Total number of octets sent.

Example:

```
dim d as new DarwinIFStatMBS
call d.Update
dim it as DarwinIFStatInterfaceMBS = d.Item(0)
MsgBox str(it.OutputBytes)
```

Notes: (Read only property)

11.8.12 OutputErrors as UInt64

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: The number of output errors.

Example:

```
dim d as new DarwinIFStatMBS
call d.Update
dim it as DarwinIFStatInterfaceMBS = d.Item(0)
MsgBox str(it.OutputErrors)
```

Notes: (Read only property)

11.8.13 OutputMulticasts as UInt64

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: The number of packets sent via multicast.

Example:

```
dim d as new DarwinIFStatMBS
call d.Update
dim it as DarwinIFStatInterfaceMBS = d.Item(0)
MsgBox str(it.OutputMulticasts)
```

Notes: (Read only property)

11.8.14 OutputPackets as UInt64

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: The number of packets sent.

Example:

```
dim d as new DarwinIFStatMBS
call d.Update
dim it as DarwinIFStatInterfaceMBS = d.Item(0)
MsgBox str(it.OutputPackets)
```

Notes: (Read only property)

11.8.15 PhysicalType as Integer

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: The physical network type.

Example:

```
dim d as new DarwinIFStatMBS
```

```
call d.Update
dim it as DarwinIFStatInterfaceMBS = d.Item(0)
MsgBox str(it.PhysicalType)
```

Notes: e.g., AUI, Thinnet, 10base-T, etc

Type is the type of device which includes 1 for ethernet and 6 for Wifi.
(Read and Write property)

11.8.16 Type as Integer

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: The network type.

Example:

```
dim d as new DarwinIFStatMBS
call d.Update
dim it as DarwinIFStatInterfaceMBS = d.Item(0)
MsgBox str(it.type)
```

Notes: e.g. ethernet, tokenring, etc

from if_types.h:

Interface types for benefit of parsing media address headers.
This list is derived from the SNMP list of ifTypes, currently documented in RFC1573.

(Read and Write property)

IFT_OTHER	&h1	none of the following
IFT_1822	&h2	old-style arpanet imp
IFT_HDH1822	&h3	HDH arpanet imp
IFT_X25DDN	&h4	x25 to imp
IFT_X25	&h5	PDN X25 interface (RFC877)
IFT_ETHER	&h6	Ethernet CSMACD
IFT_ISO88023	&h7	CMSA CD
IFT_ISO88024	&h8	Token Bus
IFT_ISO88025	&h9	Token Ring
IFT_ISO88026	&ha	MAN
IFT_STARLAN	&hb	
IFT_P10	&hc	Proteon 10MBit ring
IFT_P80	&hd	Proteon 80MBit ring
IFT_HY	&he	Hyperchannel
IFT_FDDI	&hf	
IFT_LAPB	&h10	
IFT_SDLC	&h11	
IFT_T1	&h12	
IFT_CEPT	&h13	E1 - european T1
IFT_ISDNBASIC	&h14	
IFT_ISDNPRIMARY	&h15	
IFT_PTPSERIAL	&h16	Proprietary PTP serial
IFT_PPP	&h17	RFC 1331
IFT_LOOP	&h18	loopback
IFT_EON	&h19	ISO over IP
IFT_XETHER	&h1a	obsolete 3MB experimental ethernet
IFT_NSIP	&h1b	XNS over IP
IFT_SLIP	&h1c	IP over generic TTY
IFT_ULTRA	&h1d	Ultra Technologies
IFT_DS3	&h1e	Generic T3
IFT_SIP	&h1f	SMDS
IFT_FRELAY	&h20	Frame Relay DTE only
IFT_RS232	&h21	
IFT_PARA	&h22	parallel-port
IFT_ARCNET	&h23	
IFT_ARCNETPLUS	&h24	
IFT_ATM	&h25	ATM cells
IFT_MIOX25	&h26	
IFT_SONET	&h27	SONET or SDH
IFT_X25PLE	&h28	
IFT_ISO88022LLC	&h29	
IFT_LOCALTALK	&h2a	
IFT_SMDSDXI	&h2b	
IFT_FRELAYDCE	&h2c	Frame Relay DCE
IFT_V35	&h2d	
IFT_HSSI	&h2e	
IFT_HIPPI	&h2f	
IFT_MODEM	&h30	Generic Modem
IFT_AAL5	&h31	AAL5 over ATM
IFT_SONETPATH	&h32	
IFT_SONETVT	&h33	
IFT_SMDSICIP	&h34	SMDS InterCarrier Interface
IFT_PROPVIRTUAL	&h35	Proprietary Virtual/internal
IFT_PROPMUX	&h36	Proprietary Multiplexing
IFT_GIF	&h37	
IFT_FAITH	&h38	
IFT_STF	&h39	
IFT_L2VLAN	&h87	Layer 2 Virtual LAN using 802.1Q
IFT_IEEE1394	&h90	IEEE1394 High Performance SerialBus*/

11.9 class DarwinIFStatMBS

11.9.1 class DarwinIFStatMBS

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: A class for network interface throughput statistics.

Example:

```
dim d as new DarwinIFStatMBS
call d.Update
MsgBox str(d.Count)
```

Blog Entries

- [MBS Xojo / Real Studio Plugins, version 16.2pr1](#)

11.9.2 Methods

11.9.3 Item(index as Integer) as DarwinIFStatInterfaceMBS

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: Returns the statistics for the given interface.

Example:

```
dim d as new DarwinIFStatMBS
call d.Update
MsgBox str(d.Item(0).InputBytes)
```

Notes: Index goes from 0 to count-1.

11.9.4 Update as boolean

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: Asks the system for new statistics.

Example:

```
dim d as new DarwinIFStatMBS
call d.Update
MsgBox str(d.Count)
```

Notes: Returns true on success.

11.9.5 Properties

11.9.6 Count as Integer

Plugin Version: 4.0, Platform: macOS, Targets: All.

Function: The number of interfaces in the item array.

Example:

```
dim d as new DarwinIFStatMBS
call d.Update
MsgBox str(d.Count)
```

Notes: (Read only property)

11.10 class DASessionMBS

11.10.1 class DASessionMBS

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The disk arbitration session class from Mac OS X.

Notes: The session manages all the events and operations you may do on disks using Apple's Disk Arbitration framework.

Blog Entries

- [MBS Xojo / Real Studio Plugins, version 13.2pr1](#)

11.10.2 Methods

11.10.3 Constructor

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The constructor.

11.10.4 Eject(disk as DADiskMBS, options as Integer = 0)

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Ejects the specified disk object.

Notes: disk: The disk object.

options: The eject options.

Calls Ejected event later with result.

11.10.5 IsClaimed(disk as DADiskMBS) as boolean

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Reports whether or not the disk is claimed.

Notes: disk: The disk object.

Returns true if the disk is claimed, otherwise false.

11.10.6 Mount(disk as DADiskMBS, path as string, options as Integer = 0)

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Mounts the volume at the specified disk object.

Notes: disk: The disk object.

path: The mount path. Pass empty string for a "standard" mount path.

options: The mount options.

Calls Mounted event later.

11.10.7 MountWithArguments(disk as DADiskMBS, path as string, arguments() as string, options as Integer = 0)

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Mounts the volume at the specified disk object, with the specified mount options.

Notes: disk: The disk object.

path: The mount path. Pass empty string for a "standard" mount path.

options: The mount options.

arguments: The list of mount options to pass to /sbin/mount -o.

11.10.8 Rename(disk as DADiskMBS, name as string, options as Integer = 0)

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Renames the volume at the specified disk object.

Notes: disk: The disk object.

options: The rename options.

Calls later the Renamed event with result.

11.10.9 Unclaim(disk as DADiskMBS)

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Unclaims the specified disk object.

11.10.10 Unmount(disk as DADiskMBS, options as Integer = 0)

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Unmounts the volume at the specified disk object.

Notes: disk: The disk object.

options: The unmount options.

Calles Unmounted event later.

11.10.11 Properties

11.10.12 Handle as Integer

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The internal object reference.

Notes: (Read and Write property)

11.10.13 Events

11.10.14 Appeared(disk as DADiskMBS)

Plugin Version: 13.2, Platform: macOS, Targets: .

Function: The event called when a disk appears.

Notes: disk: A disk object.

11.10.15 DescriptionChanged(disk as DADiskMBS, keys() as string)

Plugin Version: 13.2, Platform: macOS, Targets: .

Function: The event called whenever a disk description has changed.

Notes: disk: A disk object.

keys: A list of changed keys.

11.10.16 Disappeared(disk as DADiskMBS)

Plugin Version: 13.2, Platform: macOS, Targets: .

Function: The event called whenever a disk has disappeared.

11.10.17 Ejected(disk as DADiskMBS, dissenter as DADissenterMBS)

Plugin Version: 13.2, Platform: macOS, Targets: .

Function: Event called after eject operation finished.

Notes: Disk: The disk object.

dissenter A dissenter object on failure or nil on success.

11.10.18 Mounted(disk as DADiskMBS, dissenter as DADissenterMBS)

Plugin Version: 13.2, Platform: macOS, Targets: .

Function: Event called after mount operation finished.

Notes: disk: The disk object.

dissenter: A dissenter object on failure or nil on success.

11.10.19 Peek(disk as DADiskMBS)

Plugin Version: 13.2, Platform: macOS, Targets: .

Function: A disk has been peeked.

11.10.20 Renamed(disk as DADiskMBS, dissenter as DADissenterMBS)

Plugin Version: 13.2, Platform: macOS, Targets: .

Function: Called after the rename operation finished.

Notes: disk: The disk object.

dissenter: A dissenter object on failure or nil on success.

11.10.21 Unmounted(disk as DADiskMBS, dissenter as DADissenterMBS)

Plugin Version: 13.2, Platform: macOS, Targets: .

Function: Called after unmount operation finished.

Notes: disk: The disk object.

dissenter: A dissenter object on failure or nil on success.

11.10.22 Constants

Claim Options

Constant	Value	Description
kDADiskClaimOptionDefault	0	Default

Eject Options

Constant	Value	Description
kDADiskEjectOptionDefault	0	Default

Mount Options

Constant	Value	Description
kDADiskMountOptionDefault	0	Default
kDADiskMountOptionWhole	1	Mount the volumes tied to the whole disk object.

Disk Options

Constant	Value	Description
kDADiskOptionDefault	0	Default
kDADiskOptionEjectUponLogout	1	Eject the disk upon logout.
kDADiskOptionMountAutomatic	16	Mount the disk upon appearance.
kDADiskOptionMountAutomaticNoDefer	32	Mount the disk upon appearance, even if no login.
kDADiskOptionPrivate	256	Hides the disk from callbacks.

Rename Options

Constant	Value	Description
kDADiskRenameOptionDefault	0	Default

Unmount Options

Constant	Value	Description
kDADiskUnmountOptionDefault	0	Default
kDADiskUnmountOptionForce	&h00080000	Unmount the volume even if files are still active.
kDADiskUnmountOptionWhole	0	Unmount the volumes tied to the whole disk object.

11.11 module ExtendedAttributesMBS

11.11.1 module ExtendedAttributesMBS

Plugin Version: 12.5, Platforms: macOS, Linux, Targets: All.

Function: The module for working with extended attributes.

Example:

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.rtf")
```

```
// keys starting with "com.apple.metadata:" are indexed by Spotlight  
call ExtendedAttributesMBS.SetAttribute(f, "com.apple.metadata:test", "testvalue")
```

Notes: Linux support added for plugin version 16.4.

For Windows, please use LargeBinaryStreamMBS class to read/write streams.

Blog Entries

- [Passing an UUID to each app download](#)
- [Query URL from downloaded file](#)
- [MBS Releases the MBS Xojo / Real Studio plug-ins in version 16.4](#)
- [MBS Xojo / Real Studio Plugins, version 16.4pr5](#)
- [MBS Xojo / Real Studio Plugins, version 13.5pr6](#)
- [MonkeyBread Software Releases the MBS Real Studio plug-ins in version 12.5](#)
- [MBS Real Studio Plugins, version 12.5pr12](#)

Videos

- [Presentation from London conference about MBS Plugins.](#)

Xojo Developer Magazine

- [19.2, page 52: Application Instance, Adding an identifier to your app downloads by Christian Schmitz](#)
- [11.1, page 9: News](#)

11.11.2 Methods

11.11.3 Available as boolean

Plugin Version: 12.5, Platforms: macOS, Linux, Targets: All.

Function: Returns true if extended attribute functions are available.

11.11.4 GetAttribute(path as folderitem, name as string, options as Integer = 0) as Variant

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: Get an extended attribute value.

Example:

```
Dim f As FolderItem = SpecialFolder.Desktop.Child("test.txt")
// query attribute
Dim v As Variant = ExtendedAttributesMBS.GetAttribute(f, "com.apple.metadata:_kMDItemUserTags")

// plugin converts it to Xojo data types with variants
If v <> Nil Then
// tags should be an array of Variant with strings
Dim a() As Variant = v

For Each s As String In a
MsgBox s
Next
End If
```

Notes: On Mac the extended attributes are normally formatted property lists, so please use the high level functions SetAttribute/GetAttribute. Raw functions are better for things like resourcefork or FinderInfo.

Extended attributes extend the basic attributes of files and directories in the file system. They are stored as name:data pairs associated with file system objects (files, directories, symlinks, etc).

The GetAttribute function retrieves all bytes of data from the extended attribute identified by name associated with path.

An extended attribute's name is a simple UTF-8 string. position specifies an offset within the extended attribute. In the current implementation, this argument is only used with the resource fork attribute. For all other extended attributes, this parameter is reserved and should be zero.

On success, returns the data associated with name.

Options specify options for retrieving extended attributes:

`kNoFollow` Do not follow symbolic links. `getxattr()` normally returns information from the target of path if it is a symbolic link. With this option, `GetAttribute` will return extended attribute data from the symbolic link instead.

`kShowCompression`: `GetAttribute` will return HFS Plus Compression extended attribute name (if present) for the file referred to by path or fd.

On success, the value is returned. On failure, nil is returned and `lasterror` is set.

See also:

- 11.11.5 `GetAttribute(path as string, name as string, options as Integer = 0) as Variant` 323

11.11.5 `GetAttribute(path as string, name as string, options as Integer = 0) as Variant`

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: Get an extended attribute value.

Example:

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.rtf")
dim v as Variant = ExtendedAttributesMBS.GetAttribute(f, ExtendedAttributesMBS.kAttributeNameFinderComment)
break // see comment string in debugger
```

Notes: On Mac the extended attributes are normally formatted property lists, so please use the high level functions `SetAttribute/GetAttribute`. Raw functions are better for things like `resourcefork` or `FinderInfo`.

Extended attributes extend the basic attributes of files and directories in the file system. They are stored as name:data pairs associated with file system objects (files, directories, symlinks, etc).

The `GetAttribute` function retrieves all bytes of data from the extended attribute identified by name associated with path.

An extended attribute's name is a simple UTF-8 string. `position` specifies an offset within the extended attribute. In the current implementation, this argument is only used with the resource fork attribute. For all other extended attributes, this parameter is reserved and should be zero.

On success, returns the data associated with name.

Options specify options for retrieving extended attributes:

`kNoFollow` Do not follow symbolic links. `getxattr()` normally returns information from the target of path if it is a symbolic link. With this option, `GetAttribute` will return extended attribute data from the symbolic link instead.

`kShowCompression`: `GetAttribute` will return HFS Plus Compression extended attribute name (if present) for the file referred to by path or fd.

On success, the value is returned. On failure, nil is returned and `lasterror` is set.

See also:

- 11.11.4 `GetAttribute(path as folderitem, name as string, options as Integer = 0) as Variant` 322

11.11.6 `GetRawAttribute(path as folderitem, name as string, options as Integer = 0) as memoryblock`

Plugin Version: 12.5, Platforms: macOS, Linux, Targets: All.

Function: Get an extended attribute value.

Example:

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.rtf")
dim value as MemoryBlock = ExtendedAttributesMBS.GetRawAttribute(f, ExtendedAttributesMBS.kAttributeFinderInfo)
break // see in debugger
```

Notes: On Mac the extended attributes are normally formatted property lists, so please use the high level functions `SetAttribute/GetAttribute`. Raw functions are better for things like `resourcefork` or `FinderInfo`.

Extended attributes extend the basic attributes of files and directories in the file system. They are stored as name:data pairs associated with file system objects (files, directories, symlinks, etc).

The `GetRawAttribute` function retrieves all bytes of data from the extended attribute identified by name associated with path.

An extended attribute's name is a simple UTF-8 string. `position` specifies an offset within the extended attribute. In the current implementation, this argument is only used with the resource fork attribute. For all other extended attributes, this parameter is reserved and should be zero.

On success, returns the data associated with name.

Options specify options for retrieving extended attributes:

kNoFollow Do not follow symbolic links. `getxattr()` normally returns information from the target of path if it is a symbolic link. With this option, `GetRawAttribute` will return extended attribute data from the symbolic link instead.

kShowCompression: `GetRawAttribute` will return HFS Plus Compression extended attribute name (if present) for the file referred to by path or fd.

On success, the value is returned. On failure, nil is returned and `lasterror` is set.
See also:

- 11.11.7 `GetRawAttribute(path as string, name as string, options as Integer = 0)` as memoryblock 325

11.11.7 `GetRawAttribute(path as string, name as string, options as Integer = 0)` as memoryblock

Plugin Version: 12.5, Platforms: macOS, Linux, Targets: All.

Function: Get an extended attribute value.

Notes: On Mac the extended attributes are normally formatted property lists, so please use the high level functions `SetAttribute/GetAttribute`. Raw functions are better for things like `resourcefork` or `FinderInfo`.

Extended attributes extend the basic attributes of files and directories in the file system. They are stored as name:data pairs associated with file system objects (files, directories, symlinks, etc).

The `GetRawAttribute` function retrieves all bytes of data from the extended attribute identified by name associated with path.

An extended attribute's name is a simple UTF-8 string. `position` specifies an offset within the extended attribute. In the current implementation, this argument is only used with the resource fork attribute. For all other extended attributes, this parameter is reserved and should be zero.

On success, returns the data associated with name.

Options specify options for retrieving extended attributes:

kShowCompression: `GetRawAttribute` will return HFS Plus Compression extended attribute name (if present)

`kNoFollow` Do not follow symbolic links. `getxattr()` normally returns information from the target of path if it is a symbolic link. With this option, `GetRawAttribute` will return extended attribute data from the symbolic link instead.

for the file referred to by path or fd.

On success, the value is returned. On failure, nil is returned and `lasterror` is set. See also:

- 11.11.6 `GetRawAttribute(path as folderitem, name as string, options as Integer = 0)` as `memoryblock 324`

11.11.8 LastError as Integer

Plugin Version: 12.5, Platforms: macOS, Linux, Targets: All.

Function: The last error code.

Notes: Possible error values:

<code>EPERM</code>	1	Attributes cannot be associated with this type of object. For example, attributes are not allowed for resource forks.
<code>EIO</code>	5	An I/O error occurred while reading from or writing to the file system.
<code>E2BIG</code>	7	The data size of the extended attribute is too large.
<code>EACCES</code>	13	Permissions denied
<code>EFAULT</code>	14	path or name points to an invalid address.
<code>EEXIST</code>	17	options contains <code>XATTR_CREATE</code> and the named attribute already exists.
<code>ENOTDIR</code>	20	A component of path's prefix is not a directory.
<code>EISDIR</code>	21	path or fd do not refer to a regular file and the attribute in question is only applicable to files. Similar to <code>EPERM</code> .
<code>EINVAL</code>	22	name or options is invalid. name must be valid UTF-8 and options must make sense.
<code>ENOSPC</code>	28	Not enough space left on the file system.
<code>EROFS</code>	30	The file system is mounted read-only.
<code>ERANGE</code>	34	The data size of the attribute is out of range (some attributes have size restrictions).
<code>ENOTSUP</code>	45	The file system does not support extended attributes or has the feature disabled.
<code>ELOOP</code>	62	Too many symbolic links were encountered resolving path.
<code>ENAMETOOLONG</code>	63	Name exceeded <code>XATTR_MAXNAMELEN</code> UTF-8 bytes, or a component of path exceeded <code>NAME_MAX</code> characters, or the entire path exceeded <code>PATH_MAX</code> characters.
<code>ENOATTR</code>	93	options is set to <code>kReplace</code> and the named attribute does not exist.

11.11.9 LastErrorMessage as string

Plugin Version: 13.5, Platforms: macOS, Linux, Targets: All.

Function: The error message for the last error.

11.11.10 ListAttributes(path as folderitem, Options as Integer = 0) as string()

Plugin Version: 12.5, Platforms: macOS, Linux, Targets: All.

Function: List extended attribute names.

Example:

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.rtf")
dim names() as string = ExtendedAttributesMBS.ListAttributes(f, ExtendedAttributesMBS.kNoFollow+ExtendedAttributesMBS.kShowCompression)
MsgBox Join(names, EndOfLine)
```

Notes: Extended attributes extend the basic attributes associated with files and directories in the file system. They are stored as name:data pairs associated with file system objects (files, directories, symlinks, etc).

ListAttributes retrieves a list of names of extended attributes associated with the given path in the file system. The list will only include names of extended attributes to which the calling process has access.

Options controls how the attribute list is generated:

kNoFollow: Do not follow symbolic links. ListAttributes normally lists attributes of the target of path if it is a symbolic link. With this option, ListAttributes will list attributes of the link itself.

kShowCompression: ListAttributes will list HFS Plus Compression extended attribute(s) (if present) for the file referred to by path.

On success returns array with names. If no accessible extended attributes are associated with the given path, the function returns empty array. Lasterror is set.

See also:

- 11.11.11 ListAttributes(path as string, Options as Integer = 0) as string()

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11.11.11 ListAttributes(path as string, Options as Integer = 0) as string()

Plugin Version: 12.5, Platforms: macOS, Linux, Targets: All.

Function: List extended attribute names.

Notes: Extended attributes extend the basic attributes associated with files and directories in the file system. They are stored as name:data pairs associated with file system objects (files, directories, symlinks, etc).

ListAttributes retrieves a list of names of extended attributes associated with the given path in the file system. The list will only include names of extended attributes to which the calling process has access.

Options controls how the attribute list is generated:

kNoFollow: Do not follow symbolic links. ListAttributes normally lists attributes of the target of path if it is a symbolic link. With this option, ListAttributes will list attributes of the link itself.

kShowCompression: ListAttributes will list HFS Plus Compression extended attribute(s) (if present) for the file referred to by path.

On success returns array with names. If no accessible extended attributes are associated with the given path, the function returns empty array. Lasterror is set.

See also:

- 11.11.10 ListAttributes(path as folderitem, Options as Integer = 0) as string() 327

11.11.12 RemoveAttribute(path as folderitem, name as string, options as Integer = 0) as boolean

Plugin Version: 12.5, Platforms: macOS, Linux, Targets: All.

Function: Remove an extended attribute value.

Notes: Extended attributes extend the basic attributes associated with files and directories in the file system. They are stored as name:data pairs associated with file system objects (files, directories, symlinks, etc).

RemoveAttribute deletes the extended attribute name associated with path.

An extended attribute's name is a simple UTF-8 string. Options is a bit mask specifying various options:

kNoFollow Do not follow symbolic links. Normally, removexattr() acts on the target of path if it is a symbolic link. With this option, RemoveAttribute will act on the link itself.

kShowCompression: RemoveAttribute will remove HFS Plus Compression extended attribute name (if present) for the file referred to by path or fd.

On success, true is returned. On failure, false is returned and the lasterror value is set.

See also:

- 11.11.13 RemoveAttribute(path as string, name as string, options as Integer = 0) as boolean 329

11.11.13 RemoveAttribute(path as string, name as string, options as Integer = 0) as boolean

Plugin Version: 12.5, Platforms: macOS, Linux, Targets: All.

Function: Remove an extended attribute value.

Notes: Extended attributes extend the basic attributes associated with files and directories in the file system. They are stored as name:data pairs associated with file system objects (files, directories, symlinks, etc).

RemoveAttribute deletes the extended attribute name associated with path.

An extended attribute's name is a simple UTF-8 string. Options is a bit mask specifying various options:

kNoFollow Do not follow symbolic links. Normally, removexattr() acts on the target of path if it is a symbolic link. With this option, RemoveAttribute will act on the link itself.

kShowCompression: RemoveAttribute will remove HFS Plus Compression extended attribute name (if present) for the file referred to by path or fd.

On success, true is returned. On failure, false is returned and the lasterror value is set.

See also:

- 11.11.12 RemoveAttribute(path as folderitem, name as string, options as Integer = 0) as boolean 328

11.11.14 SetAttribute(path as folderitem, name as string, data as Variant, options as Integer = 0) as boolean

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: Set an extended attribute value.

Example:

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.txt")
call ExtendedAttributesMBS.SetAttribute(f, ExtendedAttributesMBS.kAttributeNameFinderComment, "Test Comment")
```

Notes: On Mac the extended attributes are normally formatted property lists, so please use the high level functions SetAttribute/GetAttribute. Raw functions are better for things like resourcefork or FinderInfo.

Extended attributes extend the basic attributes associated with files and directories in the file system. They are stored as name:data pairs associated with file system objects (files, directories, symlinks, etc).

SetAttribute associates name and data together as an attribute of path.

An extended attribute's name is a simple UTF-8 string. Data is a memoryblock with the data and contains textual or binary data to be associated with the extended attribute. Position specifies the offset within the extended attribute. In the current implementation, only the resource fork extended attribute makes use of this argument. For all others, position is reserved and should be set to zero.

Options controls how the attribute is set:

- kNoFollow Do not follow symbolic links. SetAttribute normally sets attributes on the target of path if it is a symbolic link. With this option, SetAttribute will act on the link itself.
- kCreate Fail if the named attribute already exists.
- kReplace Fail if the named attribute does not exist. Failure to specify kReplace or kCreate allows creation and replacement.

On some filesystems, such as HFS+, setting the extended attribute com.apple.ResourceFork will update the modification time of the file.

Returns true on success and false on failure. Lasterror is set.

You may need to inform other applications like Finder that file changed and attributes need to be read.

See also:

- 11.11.15 SetAttribute(path as string, name as string, data as Variant, options as Integer = 0) as boolean
330

11.11.15 SetAttribute(path as string, name as string, data as Variant, options as Integer = 0) as boolean

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: Set an extended attribute value.

Notes: On Mac the extended attributes are normally formatted property lists, so please use the high level functions SetAttribute/GetAttribute. Raw functions are better for things like resourcefork or FinderInfo.

Extended attributes extend the basic attributes associated with files and directories in the file system. They are stored as name:data pairs associated with file system objects (files, directories, symlinks, etc).

SetAttribute associates name and data together as an attribute of path.

An extended attribute's name is a simple UTF-8 string. Data is a memoryblock with the data and contains textual or binary data to be associated with the extended attribute. Position specifies the offset within the extended attribute. In the current implementation, only the resource fork extended attribute makes use of this argument. For all others, position is reserved and should be set to zero.

Options controls how the attribute is set:

- kNoFollow Do not follow symbolic links. SetAttribute normally sets attributes on the target of path if it is a symbolic link. With this option, SetAttribute will act on the link itself.
- kCreate Fail if the named attribute already exists.
- kReplace Fail if the named attribute does not exist. Failure to specify kReplace or kCreate allows creation and replacement.

On some filesystems, such as HFS+, setting the extended attribute com.apple.ResourceFork will update the modification time of the file.

Returns true on success and false on failure. Lasterror is set.

You may need to inform other applications like Finder that file changed and attributes need to be read.

See also:

- 11.11.14 SetAttribute(path as folderitem, name as string, data as Variant, options as Integer = 0) as boolean 329

11.11.16 SetRawAttribute(path as folderitem, name as string, data as memoryblock, options as Integer = 0) as boolean

Plugin Version: 12.5, Platforms: macOS, Linux, Targets: All.

Function: Set an extended attribute value.

Notes: On Mac the extended attributes are normally formatted property lists, so please use the high level functions SetAttribute/GetAttribute. Raw functions are better for things like resourcefork or FinderInfo.

Extended attributes extend the basic attributes associated with files and directories in the file system. They are stored as name:data pairs associated with file system objects (files, directories, symlinks, etc).

SetRawAttribute associates name and data together as an attribute of path.

An extended attribute's name is a simple UTF-8 string. Data is a memoryblock with the data and contains textual or binary data to be associated with the extended attribute. Position specifies the offset within the extended attribute. In the current implementation, only the resource fork extended attribute makes use of this argument. For all others, position is reserved and should be set to zero.

Options controls how the attribute is set:

- `kNoFollow` Do not follow symbolic links. `SetRawAttribute` normally sets attributes on the target of path if it is a symbolic link. With this option, `SetRawAttribute` will act on the link itself.
- `kCreate` Fail if the named attribute already exists.
- `kReplace` Fail if the named attribute does not exist. Failure to specify `kReplace` or `kCreate` allows creation and replacement.

On some filesystems, such as HFS+, setting the extended attribute `com.apple.ResourceFork` will update the modification time of the file.

Returns true on success and false on failure. `Lasterror` is set.

You may need to inform other applications like Finder that file changed and attributes need to be read.

See also:

- 11.11.17 `SetRawAttribute(path as string, name as string, data as memoryblock, options as Integer = 0) as boolean` 332

11.11.17 `SetRawAttribute(path as string, name as string, data as memoryblock, options as Integer = 0) as boolean`

Plugin Version: 12.5, Platforms: macOS, Linux, Targets: All.

Function: Set an extended attribute value.

Notes: On Mac the extended attributes are normally formatted property lists, so please use the high level functions `SetAttribute/GetAttribute`. Raw functions are better for things like `resourcefork` or `FinderInfo`.

Extended attributes extend the basic attributes associated with files and directories in the file system. They are stored as name:data pairs associated with file system objects (files, directories, symlinks, etc).

`SetRawAttribute` associates name and data together as an attribute of path.

An extended attribute's name is a simple UTF-8 string. Data is a memoryblock with the data and contains textual or binary data to be associated with the extended attribute. Position specifies the offset within the extended attribute. In the current implementation, only the resource fork extended attribute makes use of

this argument. For all others, position is reserved and should be set to zero.

Options controls how the attribute is set:

kNoFollow	Do not follow symbolic links. SetRawAttribute normally sets attributes on the target of path if it is a symbolic link. With this option, SetRawAttribute will act on the link itself.
kCreate	Fail if the named attribute already exists.
kReplace	Fail if the named attribute does not exist. Failure to specify kReplace or kCreate allows creation and replacement.

On some filesystems, such as HFS+, setting the extended attribute com.apple.ResourceFork will update the modification time of the file.

Returns true on success and false on failure. Lasterror is set.

You may need to inform other applications like Finder that file changed and attributes need to be read.

See also:

- 11.11.16 SetRawAttribute(path as folderitem, name as string, data as memoryblock, options as Integer = 0) as boolean 331

11.11.18 Constants

Constants

Constant	Value	Description
kAttributeNameFinderComment	"com.apple.metadata:kMDItemFinderComment"	The attribute name for the Finder
kAttributeNameFinderInfo	"com.apple.FinderInfo"	The attribute name for the Finder
kAttributeNameResourceFork	"com.apple.ResourceFork"	The attribute name for the resource

Flags

Constant	Value	Description
kCreate	2	Fail if the named attribute already exists.
kNoDefault	16	
kNoFollow	1	Do not follow symbolic links. ListAttributes normally lists attributes of the target of path if it is a symbolic link. With this option, ListAttributes will list attributes of the link itself.
kNoSecurity	8	
kReplace	4	Fail if the named attribute does not exist. Failure to specify kReplace or kCreate allows creation and replacement.
kShowCompression	32	ListAttributes will list HFS Plus Compression extended attribute(s) (if present) for the file referred to by path.

11.12 class FolderItem

11.12.1 class FolderItem

Platforms: macOS, Linux, Windows, Targets: All.

Function: One of Xojo's base classes.

Notes: Handles access to files.

11.12.2 Methods

11.12.3 AbsolutePath as string

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the absolute path for the file.

Example:

```
// test absolute path
Dim f As FolderItem = SpecialFolder.Desktop.Child("test.txt")
Dim p As String = f.AbsolutePath

Dim g As FolderItem = NewFolderItemFromAbsolutePathMBS(p)
Dim n As String = g.NativePath

MsgBox p+EndOfLine+n
```

Notes: For Xojo we register this function for compatibility to older Xojo and Real Studio versions.

Same as AbsolutePathMBS, but with name AbsolutePath.

On MacOS queries absolute path in MacOS Classic HFS style, but on Windows and Linux just queries native path.

11.12.4 AbsolutePathMBS as string

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the absolute path for the file.

Example:

```
// test absolute path
Dim f As FolderItem = SpecialFolder.Desktop.Child("test.txt")
Dim p As String = f.AbsolutePathMBS
```

```
Dim g As FolderItem = NewFolderItemFromAbsolutePathMBS(p)
```

```
Dim n As String = g.NativePath
```

```
MsgBox p+EndOfLine+n
```

Notes: On MacOS queries absolute path in MacOS Classic HFS style, but on Windows and Linux just queries native path.

Version 20.1 or newer makes sure directories return a path ending in double colon.

Blog Entries

- [MBS Xojo Plugins, version 20.1pr5](#)
- [MBS Xojo Plugins, version 19.5pr8](#)
- [AbsolutePath for Xojo](#)

11.12.5 isApplicationMBS as boolean

Plugin Version: 12.1, Platform: macOS, Targets: All.

Function: Whether the folderitem points to an application.

Example:

```
// try an application
```

```
dim file1 as FolderItem = SpecialFolder.Applications.Child("iTunes.app")
```

```
MsgBox "Bundle: "+str(file1.isBundleMBS)+EndOfLine+"Application: "+str(file1.isApplicationMBS)
```

```
// try some other file
```

```
dim file2 as FolderItem = SpecialFolder.Preferences.Child("com.apple.itunes.plist")
```

```
MsgBox "Bundle: "+str(file2.isBundleMBS)+EndOfLine+"Application: "+str(file2.isApplicationMBS)
```

Notes: Returns true if the folderitem points to an application on Mac.

Upgraded in version 19.5 to use CFURL instead of FSRef APIs.

Blog Entries

- [MBS Xojo Plugins, version 19.5pr1](#)
- [MBS Real Studio Plugins, version 12.1pr2](#)

11.12.6 isBundleMBS as boolean

Plugin Version: 9.1, Platform: macOS, Targets: All.

Function: Whether the folderitem points to a bundle.

Example:

```
// try an application
dim file1 as FolderItem = SpecialFolder.Applications.Child("iTunes.app")
MsgBox "Bundle: "+str(file1.isBundleMBS)+EndOfLine+"Application: "+str(file1.isApplicationMBS)

// try some other file
dim file2 as FolderItem = SpecialFolder.Preferences.Child("com.apple.itunes.plist")
MsgBox "Bundle: "+str(file2.isBundleMBS)+EndOfLine+"Application: "+str(file2.isApplicationMBS)
```

Notes: Returns true if the folderitem points to a directory which is a bundle/package.

For example an application package (.app).

Upgraded in version 19.5 to use CFURL instead of FSRef APIs.

Blog Entries

- [MBS Xojo Plugins, version 19.5pr1](#)
- [MBS Xojo Plugins, version 19.0pr6](#)

11.12.7 LaunchServicesApplicationForItemMBS(role as Integer) as folderitem

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: Return the application used to open an item.

Example:

```
Dim file As FolderItem = SpecialFolder.Desktop.Child("Test.xojo_binary_project")

Const kLSRolesNone = 1 // no claim Is made about support For this type/scheme
Const kLSRolesViewer = 2 // claim To be able To view this type/scheme
Const kLSRolesEditor = 4 // claim To be able To edit this type/scheme
Const kLSRolesAll = -1 // claim To Do it all

Dim appfile As FolderItem = file.LaunchServicesApplicationForItemMBS(kLSRolesEditor)

// shows Xojo
MsgBox appfile.NativePath
```

Notes: Consults the binding tables to return the application that would be used to open the folderitem if it were double-clicked in the Finder. This application will be the user-specified override if appropriate or the default otherwise. If no application is known to LaunchServices suitable for opening this item, nil (kLSApplicationNotFoundErr) will be returned.

Constants you can use for the role parameter:

kLSRolesNone	= 1	no claim is made about support for this type/scheme
kLSRolesViewer	= 2	claim to be able to view this type/scheme
kLSRolesEditor	= 4	claim to be able to edit this type/scheme
kLSRolesAll	= -1	claim to do it all

Upgraded in version 19.5 to use CFURL instead of FSRef APIs.

11.12.8 LaunchServicesApplicationsForItemMBS(role as Integer) as LaunchServicesApplicationListMBS

Plugin Version: 3.4, Platform: macOS, Targets: All.

Function: Returns a list of folderitems to applications that offer the requested role(s) for the input item.

Example:

```
dim l as LaunchServicesApplicationListMBS
dim f as FolderItem

f=GetFolderItem("text file")
l=f.LaunchServicesApplicationsForItemMBS(4)

if l<>nil then
  MsgBox str(l.Count)
  MsgBox l.Item(0).NativePath
end if
```

Notes: Requires Mac OS X 10.3.

If the folderitem is a file reference, it is treated as a document, and applications are selected based on the document's type information. Otherwise, applications are selected based on the folderitem's scheme.

Role:

The role(s) which must intersect with the role provided by an application for the specified item in order for the application to be included in the result. Pass kLSRolesAll if any role is acceptable.

Constants you can use for the role parameter:

Upgraded in version 19.5 to use CFURL instead of FSRef APIs.

kLSRolesNone	= 1	no claim is made about support for this type/scheme
kLSRolesViewer	= 2	claim to be able to view this type/scheme
kLSRolesEditor	= 4	claim to be able to edit this type/scheme
kLSRolesAll	= -1	claim to do it all

11.12.9 LaunchServicesCanApplicationAcceptItemMBS(TargetApp as folderitem, role as Integer, flags as Integer) as boolean

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: Determine whether an item can accept another item.

Example:

```
dim appl,item as FolderItem

appl=LaunchServicesApplicationForInfoMBS("", "", "rb",-1)
item=GetFolderItem("file.rb")

MsgBox appl.Name

if item.LaunchServicesCanApplicationAcceptItemMBS(appl,-1,1) then
MsgBox "accept"
else
MsgBox "not accepted"
end if
```

Notes: Returns whether TargetApp can accept this folderitem as in a drag and drop operation. If role is other than kLSRolesAll then make sure TargetApp claims to fulfill the requested role.

Constants you can use for the role parameter:

kLSRolesNone	= 1	no claim is made about support for this type/scheme
kLSRolesViewer	= 2	claim to be able to view this type/scheme
kLSRolesEditor	= 4	claim to be able to edit this type/scheme
kLSRolesAll	= -1	claim to do it all

Values for the flags:

kLSAcceptDefault	= 1	
kLSAcceptAllowLoginUI	= 2	show UI to log in if necessary

Upgraded in version 19.5 to use CFURL instead of FSRef APIs.

11.12.10 LaunchServicesDisplayNameMBS as string

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: Get the display name for a folderitem.

Example:

```
Dim f As FolderItem = SpecialFolder.Desktop.Child("Test.xojo_binary_project")
```

```
MsgBox f.LaunchServicesKindStringMBS+EndOfLine+f.LaunchServicesDisplayNameMBS#
```

Notes: Return a copy of the display name for a folderitem. Takes into consideration whether this item has a hidden extension or not.

Upgraded in version 19.5 to use CFURL instead of FSRef APIs.

Blog Entries

- [MBS Xojo Plugins, version 19.5pr1](#)

11.12.11 LaunchServicesItemInfoMBS(WhichInfo as Integer) as LaunchServicesItemInfoMBS

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: Return information about an item.

Example:

```
dim l as LaunchServicesItemInfoMBS
```

```
dim f as FolderItem
```

```
f=SpecialFolder.Applications.Child("Mail.app")
```

```
l=f.LaunchServicesItemInfoMBS(-1)
```

```
if l.IsApplication then // True for mail.app
```

```
MsgBox "is Application"
```

```
end if
```

```
if l.IsContainer then // True for mail.app
```

```
MsgBox "is Container"
```

```
end if
```

```
if l.IsPackage then // True for mail.app
```

```
MsgBox "is Package"
```

```
end if
```

Notes: Returns as much or as little information as requested about the folderitem. Some information is available in a thread-safe manner, some is not.

Possible values you can combine for the WhichInfo parameter:

kLSRequestExtension	= &h01	Requests the item's filename extension.
kLSRequestTypeCreator	= &h02	Requests the item's file type and creator signature.
kLSRequestBasicFlagsOnly	= &h04	Requests all item-information flags that are not application-specific: that is, all except IsNativeApp, IsClassicApp, AppPrefersNative, AppPrefersClassic and AppIsScriptable.
kLSRequestAppTypeFlags	= &h08	Requests all application-specific item-information flags: that is, IsNativeApp, IsClassicApp, AppPrefersNative, AppPrefersClassic and AppIsScriptable.
kLSRequestAllFlags	= &h10	Requests all item-information flags.
kLSRequestIconAndKind	= &h20	Not used.
kLSRequestExtensionFlagsOnly	= &h40	Requests only the kLSItemInfoExtensionIsHidden item-information flag.
kLSRequestAllInfo	= -1	

11.12.12 LaunchServicesKindStringMBS as string

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: Get the kind string for an item.

Example:

```
Dim f As FolderItem = SpecialFolder.Desktop.Child("Test.xojo_binary_project")
```

```
MsgBox f.LaunchServicesKindStringMBS+EndOfLine+f.LaunchServicesDisplayNameMBS
```

Notes: Returns the kind string as used in the Finder and elsewhere for the given folderitem.

Upgraded in version 19.5 to use CFURL instead of FSRef APIs.

Blog Entries

- [MBS Xojo Plugins, version 19.5pr1](#)

11.12.13 LaunchServicesOpenMBS as folderitem

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: Launches the given item.

Example:

```
Dim file As FolderItem = SpecialFolder.Desktop.Child("Test.xojo_binary_project")
Dim a As FolderItem = file.LaunchServicesOpenMBS
```

```
MsgBox a.NativePath
```

Notes: Returns the file or folder which was launched, e.g. the application for a file.
Upgraded in version 19.5 to use CFURL instead of FSRef APIs.

11.12.14 LaunchServicesRegisterMBS(update as boolean) as Integer

Plugin Version: 3.4, Platform: macOS, Targets: All.

Function: If the specified folderitem refers to an application or other bundle claiming to handle documents or URLs, add the bundle's document and URL claims to the Launch Services database.

Notes: Requires Mac OS X 10.3.

Update: When false, LaunchServicesRegisterMBS does not register the item if it has already been registered and the current modification date of the item has not changed from when it was last registered. When true, the item's registered info is updated, even if the modification has not changed.

Returns an error code:

An OSStatus value: noErr (0) - Success kLSNoRegistrationInfoErr (-10824) - The item does not contain info requiring registration kLSDataErr (-10817) - The item's property list info is malformed.

Returns -1 if the function is not available.

Blog Entries

- [MBS Plugins updated for Xojo 2019r2](#)

11.12.15 NativePath as string

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the native path for the file.

Example:

```
// test absolute path
Dim f As FolderItem = SpecialFolder.Desktop.Child("test.txt")
Dim p As String = f.AbsolutePath

Dim g As FolderItem = NewFolderItemFromAbsolutePathMBS(p)
Dim n As String = g.NativePath
```

```
MsgBox p+EndOfLine+n
```

Notes: For Real Studio we register this function for compatibility to Xojo. Same as UnixpathMBS, but with name NativePath.

11.12.16 PermissionsMBS(OldWay as boolean) as PermissionsMBS

Platform: macOS, Targets: All.

Function: Returns an object for the Permissions of a file.

Example:

```
dim f as FolderItem
dim p as PermissionsMBS

f=GetOpenFolderItem("special/any")

if f<>nil then
  p=f.PermissionsMBS(true)

  if p<>Nil then // requires Mac OS X
    p.Access=&H6

    // &h000006 = -rw----
    // &h000600 = --rw--
    // &h060000 = ---rw-

    if 0=p.SetPermissions(true) then
      MsgBox "Permissions set"
    else
      MsgBox "Permissions could not be set"
    end if
  else
    MsgBox "We require Mac OS X"
  end if
else
  ' nothing selected
end if
```

Notes: You can use old API if you set Oldway=true. Than you set access value like in older version of the plugin.

If you set Oldway = false, you use the newer API which set unix permissions, but not the old ones. The old way is not supported for 64bit.

11.12.17 SpotlightFileInfoMBS(uti as string = "") as dictionary

Plugin Version: 10.0, Platform: macOS, Targets: All.

Function: Runs the spotlight metadata importer for this file and returns the dictionary with the metadata found in the file.

Example:

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.numbers")
dim d as Dictionary = f.SpotLightFileInfoMBS
```

```
MsgBox "Title: " + d.Value("kMDItemTitle")
MsgBox "Text Content: " + d.Value("kMDItemTextContent")
```

Notes: Returns nil on any error.

Works well with PDF, AppleWorks, Pages, Numbers, Word, Excel, Powerpoint and all other files, where you have an importer.

Does currently not find importers inside an application.

Blog Entries

- [MBS Plugins updated for Xojo 2019r2](#)
- [MBS Xojo Plugins, version 17.5pr2](#)

11.12.18 SpotlightLoadMDImporterMBS as boolean

Plugin Version: 10.0, Platform: macOS, Targets: All.

Function: Loads another MDImporter.

Example:

```
dim f as FolderItem = GetFolderItem("/Developer/Applications/Xcode.app/Contents/Library/Spotlight/Source-Code.mdimporter", FolderItem.PathTypeShell)
```

```
if f.SpotLightLoadMDImporterMBS then
MsgBox "Loaded SourceCode importer."
end if
```

Notes: By default importers are loaded from /Library/Spotlight, textasciitilde /Library/Spotlight and /System/Library/Spotlight. You can load another importers using this method.

Returns true on success and false on failure.

11.12.19 SpotlightTextContentMBS(uti as string = "") as string

Plugin Version: 10.0, Platform: macOS, Targets: All.

Function: Runs the spotlight metadata importer for this file and returns the text content string for the file.

Example:

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.rtf")
MsgBox f.SpotLightTextContentMBS
```

Notes: Returns an empty string on any error.

Works well with PDF, AppleWorks, Pages, Numbers, Word, Excel, Powerpoint and all other files, where you have an importer.

Does currently not find importers inside an application.

Blog Entries

- [MBS Plugins updated for Xojo 2019r2](#)
- [MBS Real Studio Plugins, version 11.2pr8](#)
- [MBS REALbasic plug-ins version 10.0](#)
- [Textpreview for any file using Spotlight](#)

11.12.20 UnixpathMBS as string

Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the native path for the file.

Example:

```
dim sh as Shell
dim fi as FolderItem
dim s as String
dim t as TextConverter

sh = new Shell
fi = getfolderitem("test ,àö") // or try some other file name

if fi = nil or fi.exists = false then
  beep
  return
end if

s="ls -al "" + fi.Unixpathmbs + """"

sh.Execute s
MsgBox sh.Result
```

Notes: test on the Desktop could be this:

On Mac OS X: /Users/cs/Desktop/test

On Mac OS 9: Mac OS 9:Desktop folder:test

On Windows: c:\windows\desktop\test

This function will return an empty string if the path can not be encoded in a Xojo String. For my tests ICQ's path which includes the folder name "ICQ 3.0 i" can not be converted to MacRoman for some reason.

On Mac OS X this function returns the posix path. So if you are looking for POSIXPathMBS or PosixPath this method is it.

This function should do the same as NativePath in Xojo 2013r1.

Blog Entries

- [MBS Xojo / Real Studio Plugins, version 15.0pr10](#)

11.12.21 VolumeSupportsHugeFilesMBS as Integer

Plugin Version: 13.3, Platform: macOS, Targets: All.

Function: Queries whether a volume supports 2 TB file size on Mac OS X.

Notes: Some volumes only support 2 GB or 4 GB file size. Some can handle more than that up to 2 TB. Returns 0 if not supported, 1 if supported and -1 if unknown.

Blog Entries

- [MBS Plugins updated for Xojo 2019r2](#)
- [MBS Xojo / Real Studio Plugins, version 13.4pr1](#)

11.12.22 Properties

11.12.23 MacQuarantinePropertiesMBS as MacQuarantinePropertiesMBS

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: Gets or sets the quarantine options for a file.

Example:

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.app")
```

```
// read value
```

```
dim q as MacQuarantinePropertiesMBS = f.MacQuarantinePropertiesMBS
MsgBox q.AgentName
```

```
// set value
q = new MacQuarantinePropertiesMBS

q.AgentBundleIdentifier = "test.test"
q.AgentName = "testing app"
q.DataURL="http://www.monkeybreadsoftware.de/test.dmg"
q.OriginURL="http://www.monkeybreadsoftware.de/"
q.Type=q.kTypeWebDownload

f.MacQuarantinePropertiesMBS = q

// clear
f.MacQuarantinePropertiesMBS = nil
```

Notes: Requires Mac OS X 10.5.
(Read and Write computed property)

11.13 Globals

11.13.1 FolderItemToPathMBS(file as folderitem) as string

Platform: macOS, Targets: All.

Function: Returns a unix path for the given folderitem.

Notes: Works only on Mac OS X.

This function is not very good, as Apple doesn't document for FSRefMakePath what path it returns, which encoding the path uses (maybe UTF8) and when it fails.

(e.g. it currently doesn't work for volumes)

Blog Entries

- [MBS Plugins updated for Xojo 2019r2](#)

11.13.2 PathToFolderItemMBS(path as string) as folderitem

Platform: macOS, Targets: All.

Function: Returns a folderitem for the given unix path.

Notes: Works only on Mac OS X.

This function is not very good, as Apple doesn't document which path is expected, which encoding the path should use (maybe UTF8) and when it fails.

(e.g. it currently doesn't work for paths with "textasciitilde" inside)

Blog Entries

- [MBS Plugins updated for Xojo 2019r2](#)

11.13.3 NewFolderItemFromAbsolutePathMBS(AbsolutePath as string) as FolderItem

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates new folderitem based on absolute path.

Example:

```
// test absolute path
Dim f As FolderItem = SpecialFolder.Desktop.Child("test.txt")
Dim p As String = f.AbsolutePath

Dim g As FolderItem = NewFolderItemFromAbsolutePathMBS(p)
Dim n As String = g.NativePath
```

```
MsgBox p+EndOfLine+n
```

Blog Entries

- [MBS Xojo Plugins, version 19.5pr8](#)
- [AbsolutePath for Xojo](#)

11.13.4 MountMBS(URL as String, Dest as string = "", Username as String, Password as String, Interactive as boolean = false, Prompt as boolean = false, byref ErrorCode as Integer, Threaded as boolean = false) as String

Plugin Version: 18.3, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Mounts a network share.

Notes: Use on Server may require extra work as server runs with a different user account than you being logged in on the server machine. Permissions don't always allow things to be done.

URL: The URL for the network resource.

Dest: The destination path to mount to. If you leave this empty, the system decides. On Mac this can be the path to a folder where to mount new disk inside, e.g. to make a private mount. For Linux destination is required and must exist.

Username: The user name. If none is provided, system can take credentials from keychain, e.g. "test"

Password: The password to use, e.g. "test"

Interactive: Default is false for no dialogs. But you can pass true to have a dialog show up.

Prompt: Pass true on Windows to show dialog always to enter password.

When used on Linux the parameters are a little bit different:

Please pass source (URL), target (Dest), type (Username) and data (Password).

The dest path may need to be created first as new folder.

Returns the new path to the mounted disk.

Examples for URLs:

"afp://Ablage1.local" to mount on Mac via Apple Filesharing Protocol.

"\\myServer\public" to mount a disk on Windows.

"afp://192.168.168.250/Custom%20Data" to mount disk with space in name (URL encoded).

"\\192.168.0.242\ERP" mounts from Windows Server and e.g. pass "SRV2012\bob" as user name.

Threaded: If true and run on a Xojo thread, we yield time to other thread.

Blog Entries

- [MBS Xojo Plugins 18.3](#)
- [MBS Xojo Plugins, version 18.3pr1](#)

Videos

- [Presentation from Munich conference about MBS Plugins.](#)
- [Presentation from Xojo Developer Conference 2019 in Miami.](#)

11.13.5 MountPathMBS(Path as String) as String

Plugin Version: 18.3, Platforms: macOS, Windows, Targets: Desktop, Console & Web.

Function: Queries mount path for a volume.

Example:

```
MsgBox MountPathMBS("/Volumes/Ablage2")
```

Notes: For a network mounted disk, you can query the original mount point.

May not work on Mac for AFP shares, but for SMB shares.

Returns empty path if no path is known.

See also:

- [11.13.6 MountPathMBS\(Volume as FolderItem\) as String](#)

11.13.6 MountPathMBS(Volume as FolderItem) as String

Plugin Version: 18.3, Platforms: macOS, Windows, Targets: Desktop, Console & Web.

Function: Queries mount path for a volume.

Example:

```
dim f as FolderItem = Volume(VolumeCount-1)
```

```
MsgBox MountPathMBS(f)
```

Notes: For a network mounted disk, you can query the original mount point.

May not work on Mac for AFP shares, but for SMB shares.

Returns empty path if no path is known.

Blog Entries

- [MBS Xojo Plugins 18.3](#)
- [MBS Xojo Plugins, version 18.3pr6](#)

Videos

- [Presentation from Munich conference about MBS Plugins.](#)
- [Presentation from Xojo Developer Conference 2019 in Miami.](#)

See also:

- 11.13.5 MountPathMBS(Path as String) as String 349

11.13.7 UnmountMBS(Path as String, force as boolean = false) as Boolean

Plugin Version: 18.3, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Unmount a volume.

Notes: Path: The local path of the volume, e.g. `"/Volumes/Test"`

Force: Pass true to force unmount, even if files are still open.

Use on Server may require extra work as server runs with a different user account than you being logged in on the server machine. Permissions don't always allow things to be done.

See also:

- 11.13.8 UnmountMBS(Volume as FolderItem, force as boolean = false) as Boolean 350

11.13.8 UnmountMBS(Volume as FolderItem, force as boolean = false) as Boolean

Plugin Version: 18.3, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Unmount a volume.

Notes: Path: The local path of the volume, e.g. `"/Volumes/Test"`

Force: Pass true to force unmount, even if files are still open.

Use on Server may require extra work as server runs with a different user account than you being logged in on the server machine. Permissions don't always allow things to be done.

Blog Entries

- [MBS Xojo Plugins 18.3](#)
- [MBS Xojo Plugins, version 18.3pr1](#)

Videos

- [Presentation from Xojo Developer Conference 2019 in Miami.](#)

See also:

- 11.13.7 UnmountMBS(Path as String, force as boolean = false) as Boolean 350

11.14 class MacQuarantinePropertiesMBS

11.14.1 class MacQuarantinePropertiesMBS

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: The class for quarantine options.

Example:

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.app")

// read value
dim q as MacQuarantinePropertiesMBS = f.MacQuarantinePropertiesMBS
MsgBox q.AgentName

// set value
q = new MacQuarantinePropertiesMBS

q.AgentBundleIdentifier = "test.test"
q.AgentName = "testing app"
q.DataURL="http://www.monkeybreadsoftware.de/test.dmg"
q.OriginURL="http://www.monkeybreadsoftware.de/"
q.Type=q.kTypeWebDownload

f.MacQuarantinePropertiesMBS = q

// clear
f.MacQuarantinePropertiesMBS = nil
```

Notes: Requires Mac OS X 10.5.

Since the LSCopyItemAttribute function got deprecated by Apple, please use NSURLMBS class instead to read various properties.

Blog Entries

- [MBS Plugins updated for Xojo 2019r2](#)
- [MBS Real Studio Plugins, version 12.4pr3](#)
- [Quarantine Properties](#)
- [Files in quarantine](#)

11.14.2 Properties

11.14.3 AgentBundleIdentifier as String

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: The bundle identifier of the quarantining agent, if available.

Example:

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.app")
dim q as MacQuarantinePropertiesMBS = f.MacQuarantinePropertiesMBS
MsgBox q.AgentBundleIdentifier
```

Notes: When setting quarantine properties, this value is set automatically if the it is undefined. The automatic value is the main bundle identifier of the current process.

(Read and Write property)

11.14.4 AgentName as String

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: The name of the quarantining agent (application or program).

Example:

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.app")
dim q as MacQuarantinePropertiesMBS = f.MacQuarantinePropertiesMBS
MsgBox q.AgentName
```

Notes: When setting quarantine properties, this value is set automatically to the current process name if this value is not defined.

(Read and Write property)

11.14.5 DataURL as String

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: The URL from which the data for the quarantined item data was actually streamed or downloaded, if available.

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.app")
dim q as MacQuarantinePropertiesMBS = f.MacQuarantinePropertiesMBS
MsgBox q.DataURL
(Read and Write property)
```

11.14.6 DateTime as DateTime

Plugin Version: 20.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: The date and time the item was quarantined.

Notes: When setting quarantine properties, this property is set automatically to the current date and time if this value is not set.

(Read and Write property)

11.14.7 Dic as Variant

Plugin Version: 12.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: The original dictionary from Mac OS X.

Notes: This is a CFDictionaryMBS object which we provide for debugging.

You can pass it to CFShowMBS to print on console.

(Read and Write property)

11.14.8 OriginURL as String

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: The URL of the resource originally hosting the quarantined item, from the user's point of view.

Example:

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.app")
dim q as MacQuarantinePropertiesMBS = f.MacQuarantinePropertiesMBS
MsgBox q.OriginURL
```

Notes: For web downloads, this property is the URL of the web page on which the user initiated the download. For attachments, this property is the URL of the resource to which the quarantined item was attached (e.g. the email message, calendar event, etc.). The origin URL may be a file URL for local resources, or a custom URL to which the quarantining application will respond when asked to open it. The quarantining application should respond by displaying the resource to the user. Note: The origin URL should not be set to the data URL, or the quarantining application may start downloading the file again if the user chooses to view the origin URL while resolving a quarantine warning.

(Read and Write property)

11.14.9 TimeStamp as Date

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: The date and time the item was quarantined.

Example:

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.app")
```

```
dim q as MacQuarantinePropertiesMBS = f.MacQuarantinePropertiesMBS
MsgBox q.TimeStamp.LongDate+" "+q.TimeStamp.LongTime
```

Notes: When setting quarantine properties, this property is set automatically to the current date and time if this value is not set.
(Read and Write property)

11.14.10 Type as String

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: A symbolic string identifying the why the item is quarantined, if available.

Example:

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.app")
dim q as MacQuarantinePropertiesMBS = f.MacQuarantinePropertiesMBS
MsgBox q.Type
```

Notes: (Read and Write property)

11.14.11 Constants

Constants

Constant	Value	Description
kTypeCalendarEventAttachment	"LSQuarantineTypeCalendarEventAttachment"	One of the type constants.
kTypeEmailAttachment	"LSQuarantineTypeEmailAttachment"	One of the type constants.
kTypeInstantMessageAttachment	"LSQuarantineTypeInstantMessageAttachment"	One of the type constants.
kTypeOtherAttachment	"LSQuarantineTypeOtherAttachment"	One of the type constants.
kTypeOtherDownload	"LSQuarantineTypeOtherDownload"	One of the type constants.
kTypeWebDownload	"LSQuarantineTypeWebDownload"	One of the type constants.

11.15 class NetFSMountMBS

11.15.1 class NetFSMountMBS

Plugin Version: 18.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: Our class for NetFS mounting.

Notes: Based on NetFS framework in MacOS 10.8 or later.

Blog Entries

- [MBS Xojo Plugins 18.3](#)
- [MBS Xojo Plugins, version 18.3pr1](#)

Videos

- [Presentation from Munich conference about MBS Plugins.](#)
- [Presentation from Xojo Developer Conference 2019 in Miami.](#)

Xojo Developer Magazine

- [17.5, page 40: What's New in the MBS Plugins, With the Plugins growing every year, here are new capabilities you may have missed by Stefanie Juchmes](#)

11.15.2 Methods

11.15.3 Cancel

Plugin Version: 18.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: Cancels asynchronous mounting.

Notes: MountURLAsyncCompleted event will not run.

11.15.4 MountURLAsync(URL as String, MountPath as String = "", User as String = "", Password as String = "", OpenOptions as Dictionary = nil, MountOptions as Dictionary = nil) as Integer

Plugin Version: 18.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: MountURLAsync is the same as MountURLSync except it does the mount asynchronously.

Notes: The MountURLAsyncCompleted event is run after the mount with an array of POSIX mountpoint paths.

You can call `Cancel` method to cancel a pending mount request.

11.15.5 `MountURLSync(URL as String, MountPath as String = "", User as String = "", Password as String = "", OpenOptions as Dictionary = nil, MountOptions as Dictionary = nil, byref MountPoints() as String) as Integer`

Plugin Version: 18.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: Given a URL that refers to a file server, connect to that server and mount stuff.

Notes: If the URL just specifies a server and you can't just mount the "root directory" of the server, the user will be prompted with a window to let them select one or more items to mount from that server, otherwise whatever item the URL specifies to mount will be mounted.

If the `mountpath` is provided it will be used as the mount point. If the `mountpath` is set to "", a default mount point will be used.

If the `user` and `passwd` are set, they will override any user name or password that may be set in the URL. These calls go through the NetAuth agent. If the URL doesn't specify a password, and one is needed, the user will be prompted with a window requesting password.

Options can be provided for the session open and the mount itself. If the mount is successful, the POSIX path to each mountpoint is returned as a string in `mountpoints`.

If the return value is zero the mount has succeeded.

A positive non-zero return value represents an `errno` value (see `/usr/include/sys/errno.h`). For instance, a missing mountpoint error will be returned as `ENOENT (2)`.

A negative non-zero return value represents an `OSStatus` error. For instance, error -128 is `userCanceledErr`, returned when a mount operation is canceled by the user.

11.15.6 `URLForRemountingVolume(path as String) as String`

Plugin Version: 18.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: Given a `localPathURL` that refers to a location on a mounted network share, return the URL needed to remount that volume.

Example:

```
dim url as string = NetFSMountMBS.URLForRemountingVolume("/Volumes/Ablage2")
```

MsgBox url

Notes: The return value is an URL of the server, or "" if `localPathURL` isn't a mounted network share. See also:

- 11.15.7 URLForRemountingVolume(vol as FolderItem) as String

11.15.7 URLForRemountingVolume(vol as FolderItem) as String

Plugin Version: 18.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: Given a localPathURL that refers to a location on a mounted network share, return the URL needed to remount that volume.

Example:

```
dim v as FolderItem = volume(VolumeCount-1)
dim url as string = NetFSMountMBS.URLForRemountingVolume(v)
```

MsgBox url

Notes: The return value is an URL of the server, or "" if localPathURL isn't a mounted network share. See also:

- 11.15.6 URLForRemountingVolume(path as String) as String

11.15.8 URLProbe(hostname as String) as String

Plugin Version: 18.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: Checks what protocol may be used to mount disk from this server.

Example:

```
dim protocol as string = NetFSMountMBS.URLProbe("Ablage2.local")
```

MsgBox protocol

Notes: The user may enter a hostname in lieu of a full URL. We need to determine an appropriate protocol for this host and return a scheme from which a URL can be derived. For instance, if we determine that it's an SMB server then we return "smb" which the caller can use to build a URL: "smb://hostname".

We start with a list of likely protocols, e.g. "smb", "afp" and initiate a TCP connection to the port for each protocol. These connect attempts run in parallel. Then wait in a select() call to see which connections are successful, or refused, or do not respond. There is a preference order, even if a protocol later in the list responds first, it may lose out if a protocol earlier in the list responds within the timeout.

Returns "smb" for example.

11.15.9 Properties

11.15.10 Handle as Integer

Plugin Version: 18.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: The handle for a pending request.

Notes: (Read and Write property)

11.15.11 Lasterror as Integer

Plugin Version: 18.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: The last error code.

Notes: (Read and Write property)

11.15.12 Events

11.15.13 MountURLAsyncCompleted(status as Integer, URL as String, mount-points() as String)

Plugin Version: 18.3, Platform: macOS, Targets: .

Function: The event called when mount is done.

11.15.14 Constants

Constants

Constant	Value	Description
kNAUIOptionKey	"UIOption"	One of the keys for open options dictionary. Suppress authentication dialog UI.
kNetFSAllowLoopbackKey	"AllowLoopback"	One of the keys for open options dictionary. Allow a loopback mount.
kNetFSAllowSubMountsKey	"AllowSubMounts"	One of the keys for mount options dictionary. Allow a mount from a dir beneath the share point. Pass boolean value.
kNetFSMountAtMountDirKey	"MountAtMountDir"	One of the keys for mount options dictionary. Mount on the specified mountpath instead of below it. Note that if kNetFSSoftMountKey isn't set, then it's set to true.
kNetFSMountFlagsKey	"MountFlags"	One of the keys for mount options dictionary. Mount flags. e.g. integer with value 1 for read only.
kNetFSSoftMountKey	"SoftMount"	One of the keys for mount options dictionary. Mount with "soft" failure semantics. Pass boolean with true.
kNetFSUseGuestKey	"Guest"	One of the keys for open options dictionary. Login as a guest user. The value is a string with login name.

Error Codes

Constant	Value	Description
kErrorAccountRestricted	-5999	Account is restricted.
kErrorMissingMountpoint	2	The mount point is missing.
kErrorNoAuthMethodSupported	-5997	No supported auth method found.
kErrorNoProtocolVersionSupported	-5996	No Protocol Version Supported.
kErrorNoSharesAvailable	-5998	No shares available.
kErrorPasswordNeedsChange	-5045	The password needs change.
kErrorPasswordPolicy	-5046	Error with Password policy.
kErrorUserCanceled	-128	User cancelled.
kNetAuthErrorAlreadyClosed	-6005	Already closed.
kNetAuthErrorGuestNotSupported	-6004	Guest login not supported.
kNetAuthErrorInternal	-6600	Internal error.
kNetAuthErrorMountFailed	-6602	Mount failed.
kNetAuthErrorNoSharesAvailable	-6003	No shared available.

Mount Flags

Constant	Value	Description
kMountFlagsReadOnly	1	Mount read only.

UIOption

Constant	Value	Description
kNAUIOptionAllowUI	"AllowUI"	Allow user interface.
kNAUIOptionForceUI	"ForceUI"	Force user interface.
kNAUIOptionNoUI	"NoUI"	No user interface.

11.16 class PermissionsMBS

11.16.1 class PermissionsMBS

Platform: macOS, Targets: All.

Function: Gives access to the current Permissions of a file.

Example:

```
dim p as PermissionsMBS
p=file.PermissionsMBS(false)
```

Blog Entries

- [MBS Xojo Plugins, version 21.5pr1](#)
- [MBS Plugins updated for Xojo 2019r2](#)
- [MBS Xojo / Real Studio Plugins, version 14.0pr1](#)

11.16.2 Methods

11.16.3 SetPermissions(OldWay as boolean) as Integer

Platform: macOS, Targets: All.

Function: Sets the Permissions.

Notes: Returns -1 if function is not available.

Any other value is a Mac OS error code including 0 for success. You can use the MacErrorString function to get some details on the error code.

You may not have enough Permissions to set Permissions!

You can use old API if you set Oldway=true. Than you read access value like in older version of the plugin. If you set Oldway = false, you use the newer API which read unix permissions, but not the old ones. The old way is not supported for 64bit.

11.16.4 Properties

11.16.5 Access as Integer

Platform: macOS, Targets: All.

Function: The access mode for this file.

Notes: Only set if you use older API.

Some constants:

AccessOwner	&h80000000	User is owner of directory
AccessBlankAccess	&h10000000	Directory has blank access privileges
AccessUserWrite	&h04000000	User has write privileges
AccessUserRead	&h02000000	User has read privileges
AccessUserSearch	&h01000000	User has search privileges
AccessEveryoneWrite	&h00040000	Everyone has write privileges
AccessEveryoneRead	&h00020000	Everyone has read privileges
AccessEveryoneSearch	&h00010000	Everyone has search privileges
AccessGroupWrite	&h00000400	Group has write privileges
AccessGroupRead	&h00000200	Group has read privileges
AccessGroupSearch	&h00000100	Group has search privileges
AccessOwnerWrite	&h00000004	Owner has write privileges
AccessOwnerRead	&h00000002	Owner has read privileges
AccessOwnerSearch	&h00000001	Owner has search privileges

(Read and Write property)

11.16.6 GroupID as Integer

Platform: macOS, Targets: All.

Function: The Group ID for this file.

Notes: constants:

knoGroup 0

(Read and Write property)

11.16.7 Mode as Integer

Plugin Version: 14.0, Platform: macOS, Targets: All.

Function: The unix file mode.

Notes: Only set if you use newer API.

(Read and Write property)

11.16.8 UserID as Integer

Platform: macOS, Targets: All.

Function: The User ID for this file.

Example:

```
dim f as FolderItem
```

```
f=SpecialFolder.Desktop
```

```
MsgBox str(f.PermissionsMBS(true).UserID) // 501
```

Notes: e.g. User 501 is normally the first user.

constants:

```
knoUser          0,  
kadministratorUser 1
```

(Read and Write property)

Chapter 12

Folder Change Watching

12.1 class FolderChangedNotificationMBS

12.1.1 class FolderChangedNotificationMBS

Plugin Version: 3.3, Platform: macOS, Targets: Desktop only.

Deprecated: This item is deprecated and should no longer be used. You can use FSEventsMBS instead.

Function: A class to receive notifications

Notes: It's only for Mac OS X!

And not every application does send notifications around.

Please use FSEventsMBS for getting better results. This class is deprecated.

Blog Entries

- [MBS Plugins updated for Xojo 2019r2](#)

12.1.2 Methods

12.1.3 Directory as folderitem

Plugin Version: 3.3, Platform: macOS, Targets: Desktop only.

Function: Returns a folderitem for the directory observed.

Notes: Returns nil on any error.

Lasterror is set.

12.1.4 Notify(dir as folderitem)

Plugin Version: 3.3, Platform: macOS, Targets: Desktop only.

Function: Notifies the system about a modification you made in the given directory.

Notes: Lasterror is set.

12.1.5 NotifyAll

Plugin Version: 3.3, Platform: macOS, Targets: Desktop only.

Function: Notifies the system about a modification you made on several directories.

Notes: Used by installers which may change hundreds of directories.

Lasterror is set.

12.1.6 NotifyByPath(path as string)

Plugin Version: 3.3, Platform: macOS, Targets: Desktop only.

Function: Notifies the system about a modification you made in the given directory.

Notes: Path should be a valid Mac OS X path.

Lasterror is set.

12.1.7 Subscribe(dir as folderitem)

Plugin Version: 3.3, Platform: macOS, Targets: Desktop only.

Function: Subscribes the class to observe a specified directory.

Notes: Lasterror is set.

See also:

- 12.1.8 Subscribe(dir as folderitem, flags as Integer)

366

12.1.8 Subscribe(dir as folderitem, flags as Integer)

Plugin Version: 4.3, Platform: macOS, Targets: Desktop only.

Function: Subscribes the class to observe a specified directory.

Notes: Lasterror is set.

Constants for the flags parameter:

See also:

- 12.1.7 Subscribe(dir as folderitem)

366

- | | | |
|------------------------------|---|--|
| kFNNoImplicitAllSubscription | 1 | Specify this option if you do not want to receive notifications on this subscription when FNNotifyAll is called; by default any subscription is also implicitly a subscription to wildcard notifications. |
| kFNNotifyInBackground | 2 | Specify this option if you want to receive notifications on this subscription when your application is in background. By default notifications will be coalesced and delivered when your application becomes foreground. |

12.1.9 SubscribeByPath(path as string)

Plugin Version: 3.3, Platform: macOS, Targets: Desktop only.

Function: Subscribes the class to observe a specified directory.

Notes: Lasterror is set.

Path must be a valid Mac OS X path.

See also:

- 12.1.10 SubscribeByPath(path as string, flags as Integer)

367

12.1.10 SubscribeByPath(path as string, flags as Integer)

Plugin Version: 4.3, Platform: macOS, Targets: Desktop only.

Function: Subscribes the class to observe a specified directory.

Notes: Lasterror is set.

Path must be a valid Mac OS X path.

Constants for the flags parameter:

- | | | |
|------------------------------|---|--|
| kFNNoImplicitAllSubscription | 1 | Specify this option if you do not want to receive notifications on this subscription when FNNotifyAll is called; by default any subscription is also implicitly a subscription to wildcard notifications. |
| kFNNotifyInBackground | 2 | Specify this option if you want to receive notifications on this subscription when your application is in background. By default notifications will be coalesced and delivered when your application becomes foreground. |

See also:

- 12.1.9 SubscribeByPath(path as string)

367

12.1.11 Unsubscribe

Plugin Version: 3.3, Platform: macOS, Targets: Desktop only.

Function: Unsubscribes the current directory.

Notes: Lasterror is set.

This method is called for you by the destructor of the class.

12.1.12 Properties

12.1.13 Handle as Integer

Plugin Version: 3.3, Platform: macOS, Targets: Desktop only.

Function: The handle to the notification object.

Notes: For toolbox development: It's a FNSubscriptionRef.
(Read and Write property)

12.1.14 Lasterror as Integer

Plugin Version: 3.3, Platform: macOS, Targets: Desktop only.

Function: The last error code reported.

Notes: 0 if successfull, -1 if the function is not available or parameters are bad.
Else a Mac OS error code.
(Read and Write property)

12.1.15 Events

12.1.16 DirectoryChanged(message as Integer, flags as Integer)

Plugin Version: 3.3, Platform: macOS, Targets: .

Function: Out directory changed or some directories changed.

Notes: An installer application may send a notification without a specified directory. In this case the event is called and the observed directory may not be changed!

message: An indication of what happened

flags: Options about delivery of the notification (typically 0)

Only one message value is defined:

```
const kFNDirectoryModifiedMessage = 1
```

Chapter 13

Image Capture

13.1 class ImageCaptureMBS

13.1.1 class ImageCaptureMBS

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Deprecated: This item is deprecated and should no longer be used. You can use ICDeviceMBS instead.

Function: The base class to start with image capture.

Example:

```
dim m as new ImageCaptureMBS
dim list as ImageCaptureObjectMBS = m.DeviceList

if List<>Nil then
  // look into properties
  dim dic as Dictionary = list.PropertyDictionary

  // take the devices array there
  if dic<>Nil and dic.HasKey(ImageCaptureObjectMBS.kICADevicesArrayKey) then
    dim a(-1) as Variant = dic.Value(ImageCaptureObjectMBS.kICADevicesArrayKey)

    // display device name
    for each properties as Dictionary in a
      MsgBox Properties.Value("ifl")
    next
  end if
end if
```

Notes: Deprecated. Please stop using this class soon.

On Mac OS X 10.8 some functions stop working as Apple does no longer provide 32 bit libraries.

Blog Entries

- [MBS Xojo Plugins, version 19.3pr2](#)
- [MBS Xojo / Real Studio Plugins, version 15.4pr5](#)

13.1.2 Methods

13.1.3 DeviceList as ImageCaptureObjectMBS

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: Returns the object with the device list.

Example:

```
dim m as new ImageCaptureMBS
dim list as ImageCaptureObjectMBS = m.DeviceList

if List<>Nil then
  // look into properties
  dim dic as Dictionary = list.PropertyDictionary

  // take the devices array there
  if dic<>Nil and dic.HasKey(ImageCaptureObjectMBS.kICADeVICESARRAYKEY) then
    dim a(-1) as Variant = dic.Value(ImageCaptureObjectMBS.kICADeVICESARRAYKEY)

    // display device name
    for each properties as Dictionary in a
      MsgBox Properties.Value("ifil")
    next
  end if
end if
```

Notes: Returns nil on any error.

Lasterror is set.

13.1.4 ImportImage(flags as Integer) as string()

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: This method displays a Common User Interface panel similar to the user interface of Image Capture Application.

Example:

```

dim m as new ImageCaptureMBS
dim flags as Integer = ImageCaptureObjectMBS.kICAAllowMultipleImages + ImageCaptureObjectMBS.kI-
CADownloadAndReturnPathArray

// do the import and allow all file types
dim files(-1) as string = m.ImportImage(flags)

for each path as string in files
// show path
MsgBox path

// open that picture file in preview
dim f as FolderItem = GetFolderItem(path, FolderItem.PathTypeShell)
f.Launch
next

```

Notes: Use this method to allow the user to work a camera or a scanner.

The behavior:

- (a) if no device is connected, a panel saying that there's no device connected is displayed,
- (b) if a single device is connected, an appropriate user interface to access that device will be displayed,
- (c) if several devices are connected, a device selector panel will be displayed.

filetypes: Optional an array of file extension strings such as "jpg", "tif", etc., that are of interest to the calling application. If no array is provided, all files are displayed.

Flag values that can be used in ImportImage:

kICAAllowMultipleImages	= 1	Use this constant to allow users to select multiple images in the Import Image dialog.
kICADownloadAndReturnPathArray	= 2	Use this constant to download the images to a temporary location and return an array of paths to the downloaded images.

Returns an array of Strings for the imported images if the kICADownloadAndReturnPathArray flag is not specified. Otherwise returns an array of Strings holding the paths of the images that are downloaded.

See also:

- 13.1.5 ImportImage(flags as Integer, filetypes() as string) as string()

13.1.5 ImportImage(flags as Integer, filetypes() as string) as string()

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: This method displays a Common User Interface panel similar to the user interface of Image Capture Application.

Example:

```
dim m as new ImageCaptureMBS
dim flags as Integer = ImageCaptureObjectMBS.kICAAllowMultipleImages + ImageCaptureObjectMBS.kI-
CADownloadAndReturnPathArray

// the file types we accept:
dim types(-1) as string

types.Append "tif"
types.Append "tiff"
types.Append "jpg"
types.Append "png"

dim files(-1) as string = m.ImportImage(flags, types)

for each path as string in files
// show path
MsgBox path

// open that picture file in preview
dim f as FolderItem = GetFolderItem(path, FolderItem.PathTypeShell)
f.Launch
next
```

Notes: Use this method to allow the user to work a camera or a scanner.

The behavior:

- (a) if no device is connected, a panel saying that there's no device connected is displayed,
- (b) if a single device is connected, an appropriate user interface to access that device will be displayed,
- (c) if several devices are connected, a device selector panel will be displayed.

filetypes: Optional an array of file extension strings such as "jpg", "tif", etc., that are of interest to the calling application. If no array is provided, all files are displayed.

Flag values that can be used in ImportImage:

kICAAllowMultipleImages	= 1	Use this constant to allow users to select multiple images in the Import Image dialog.
kICADownloadAndReturnPathArray	= 2	Use this constant to download the images to a temporary location and return an array of paths to the downloaded images.

Returns an array of Strings for the imported images if the `kICADownloadAndReturnPathArray` flag is not specified. Otherwise returns an array of Strings holding the paths of the images that are downloaded. See also:

- 13.1.4 `ImportImage(flags as Integer) as string()` 370

13.1.6 `kICABluetoothAddressKey` as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the parameter dictionary for `LoadDeviceModule`.

13.1.7 `kICABluetoothTransportType` as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the transport type constants.

13.1.8 `kICADeviceBrowserDeviceRefKey` as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the parameter dictionary for `LoadDeviceModule`.

13.1.9 `kICADeviceIconPathKey` as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the parameter dictionary for `LoadDeviceModule`.

13.1.10 `kICADeviceModulePathKey` as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the parameter dictionary for `LoadDeviceModule`.

13.1.11 `kICAErrorKey` as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the keys for the notification dictionary.

13.1.12 kICAFireWireGUIDKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the parameter dictionary for LoadDeviceModule.

13.1.13 kICAFireWireTransportType as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the transport type constants.

13.1.14 kICAIOServicePathKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the parameter dictionary for LoadDeviceModule.

13.1.15 kICAIPAddressKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the parameter dictionary for LoadDeviceModule.

13.1.16 kICAIPGUIDKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the parameter dictionary for LoadDeviceModule.

13.1.17 kICAIPNameKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the parameter dictionary for LoadDeviceModule.

13.1.18 kICANotificationClassKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the keys for the notification dictionary.

13.1.19 kICANotificationClassProprietary as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the notification classes.

Notes: A possible value for kICANotificationClassKey.

13.1.20 kICANotificationClassPTPStandard as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the notification classes.

Notes: A possible value for kICANotificationClassKey.

13.1.21 kICANotificationClassPTPVendor as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the notification classes.

Notes: A possible value for kICANotificationClassKey.

13.1.22 kICANotificationDataCookieKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the keys for the notification dictionary.

13.1.23 kICANotificationDataKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the keys for the notification dictionary.

13.1.24 `kICANotificationDataSizeKey` as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the keys for the notification dictionary.

13.1.25 `kICANotificationDeviceICAObjectKey` as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the keys for the notification dictionary.

13.1.26 `kICANotificationDeviceListICAObjectKey` as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the keys for the notification dictionary.

13.1.27 `kICANotificationICAObjectKey` as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the keys for the notification dictionary.

13.1.28 `kICANotificationImageBytesPerRowKey` as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the keys for the notification dictionary.

13.1.29 `kICANotificationImageDataKey` as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the keys for the notification dictionary.

13.1.30 kICANotificationImageDataSizeKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the keys for the notification dictionary.

13.1.31 kICANotificationImageHeightKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the keys for the notification dictionary.

13.1.32 kICANotificationImageKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the keys for the notification dictionary.

13.1.33 kICANotificationImageNumberOfRowsKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the keys for the notification dictionary.

13.1.34 kICANotificationImageStartRowKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the keys for the notification dictionary.

13.1.35 kICANotificationImageWidthKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the keys for the notification dictionary.

13.1.36 kICANotificationNumerOfImagesRemainingKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the keys for the notification dictionary.

13.1.37 kICANotificationPercentDownloadedKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the keys for the notification dictionary.

13.1.38 kICANotificationRawEventKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the keys for the notification dictionary.

13.1.39 kICANotificationScannerButtonTypeKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the keys for the notification dictionary.

13.1.40 kICANotificationScannerDocumentNameKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the keys for the notification dictionary.

13.1.41 kICANotificationSubTypeDocumentLoaded as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the keys for the notification dictionary.

13.1.42 kICANotificationSubTypeDocumentNotLoaded as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the keys for the notification dictionary.

13.1.43 kICANotificationSubTypeKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the keys for the notification dictionary.

13.1.44 kICANotificationSubTypePerformOverviewScan as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the keys for the notification dictionary.

13.1.45 kICANotificationSubTypeWarmUpDone as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the keys for the notification dictionary.

13.1.46 kICANotificationSubTypeWarmUpStarted as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the keys for the notification dictionary.

13.1.47 kICANotificationTypeCaptureComplete as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the notification types for the notification event.

13.1.48 kICANotificationTypeDeviceAdded as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the notification types for the notification event.

13.1.49 kICANotificationTypeDeviceConnectionProgress as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the notification types for the notification event.

13.1.50 kICANotificationTypeDeviceInfoChanged as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the notification types for the notification event.

13.1.51 kICANotificationTypeDevicePropertyChanged as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the notification types for the notification event.

13.1.52 kICANotificationTypeDeviceRemoved as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the notification types for the notification event.

13.1.53 kICANotificationTypeDeviceStatusError as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the notification types for the notification event.

13.1.54 kICANotificationTypeDeviceStatusInfo as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the notification types for the notification event.

13.1.55 kICANotificationTypeDeviceWasReset as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the notification types for the notification event.

13.1.56 kICANotificationTypeDownloadProgressStatus as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the notification types for the notification event.

13.1.57 kICANotificationTypeKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the keys for the notification dictionary.

Notes: The type of notification. See kICANotificationType* constants.

13.1.58 kICANotificationTypeObjectAdded as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the notification types for the notification event.

13.1.59 kICANotificationTypeObjectInfoChanged as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the notification types for the notification event.

13.1.60 kICANotificationTypeObjectRemoved as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the notification types for the notification event.

13.1.61 kICANotificationTypeProprietary as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the notification types for the notification event.

13.1.62 kICANotificationTypeRequestObjectTransfer as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the notification types for the notification event.

13.1.63 kICANotificationTypeScannerButtonPressed as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the notification types for the notification event.

13.1.64 kICANotificationTypeScannerOverviewOverlayAvailable as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the notification types for the notification event.

13.1.65 kICANotificationTypeScannerPageDone as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the notification types for the notification event.

13.1.66 kICANotificationTypeScannerScanDone as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the notification types for the notification event.

13.1.67 kICANotificationTypeScannerSessionClosed as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the notification types for the notification event.

13.1.68 kICANotificationTypeScanProgressStatus as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the notification types for the notification event.

13.1.69 kICANotificationTypeStoreAdded as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the notification types for the notification event.

13.1.70 kICANotificationTypeStoreFull as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the notification types for the notification event.

13.1.71 kICANotificationTypeStoreInfoChanged as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the notification types for the notification event.

13.1.72 kICANotificationTypeStoreRemoved as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the notification types for the notification event.

13.1.73 kICANotificationTypeTransactionCanceled as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the notification types for the notification event.

13.1.74 kICANotificationTypeUnreportedStatus as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the notification types for the notification event.

13.1.75 kICANotificationVendorErrorCodeKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the keys for the notification dictionary.

13.1.76 kICARefconKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the keys for the notification dictionary.

13.1.77 kICASCSITransportType as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the transport type constants.

13.1.78 kICATCPIPTransportType as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the transport type constants.

13.1.79 kICATransportTypeKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the parameter dictionary for LoadDeviceModule.

13.1.80 kICATWAINDSPathKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the parameter dictionary for LoadDeviceModule.

13.1.81 kICATWAINTransportType as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the transport type constants.

13.1.82 kICAUSBLocationIDKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the parameter dictionary for LoadDeviceModule.

13.1.83 kICAUSBTransportType as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the transport type constants.

13.1.84 kICAUserAssignedDeviceNameKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the device properties keys.

Notes: This key may be present in the property dictionary of a device if the device has a user-assigned name.

13.1.85 LoadDeviceModule(params as dictionary)

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: Loads a device module.

Notes: Typically, connecting a FireWire or an USB device will automatically load an appropriate device module. This API is needed only for loading a device module manually for devices that do not use a hot-plug interface, such as Bluetooth, SCSI, or TCP/IP.

Legal Key-Value pairs for populating paramDictionary:

Key	Value	Comment
kICADeviceModulePathKey	String	Path to the device module bundle that needs to be launched.
kICATransportTypeKey	String	Should be one of the six predefined transport types.
kICABluetoothAddressKey	String	Bluetooth device address string formatted as "00-11-22-33-44-55".
kICAUSBLocationIDKey	Number (integer)	32 bit USB location ID.
kICAFireWireGUIDKey	Number (Int64)	64 bit FireWire GUID.
kICAIOServicePathKey	String	IO service path to the device obtained from the IO registry.
kICAIPAddressKey	String	IP address of the device. This can be a host address ("camera.apple.com"), ipv4 address ('192.168.123.10") or ipv6 address ("3ff3:0000:0000:0000:0123:4567:89ab:cdef")
kICAIPPortKey	Number (integer)	IP port number of the device.
kICAIPNameKey	String	Human readable device name.
kICAIPGUIDKey	String	16 byte GUID string of the device formatted as "01234567-89ab-cdef-0123-456789abcdef".
kICATWAINDSPPathKey	String	Path to TWAIN DS bundle.

Lasterror is set.

13.1.86 RegisterForEventNotification(objectOfInterest as ImageCaptureObjectMBS, eventsOfInterest() as string, options as dictionary)

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: Register with Image Capture framework to receive notification about events of interest.

13.1.87 SendNotification(notificationDictionary as dictionary) as Integer

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: Sends notification.

Notes: Returns the reply code.

Lasterror is set.

13.1.88 SendNotificationAndWaitForReply(notificationDictionary as dictionary) as Integer

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: Sends notification and wait for reply.

Notes: Returns the reply code.

Lasterror is set.

13.1.89 ShowDeviceBrowser

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: Displays a device browser user interface from any Image Capture client application.

Notes: The device browser user interface allows the user to do the following:

- enable and disable sharing of locally connected cameras and scanners.
- connect to or disconnect from cameras and scanners shared by other computers.
- configure WiFi capable cameras for use over the WiFi network.

Lasterror is set.

13.1.90 UnloadDeviceModule(deviceObject as ImageCaptureObjectMBS)

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: Unloads a device module.

Notes: The device module providing this object will be unloaded, if this is the last device object provided by the device module.

Lasterror is set.

13.1.91 Properties

13.1.92 Lasterror as Integer

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: The error code from the last function used.

Notes: Value is 0 if the function was successful, -1 if the function is not available, one of the following values or a Mac OS error code:

Possible values:

```

kICACommunicationErr = -9900
kICADeviceNotFoundErr = -9901
kICADeviceNotOpenErr = -9902
kICAFileCorruptedErr = -9903
kICAIOPendingErr = -9904
kICAInvalidObjectErr = -9905
kICAInvalidPropertyErr = -9906
kICAIndexOutOfRangeErr = -9907
kICAPropertyTypeNotFoundErr = -9908
kICACannotYieldDevice = -9909
kICADataTypeNotFoundErr = -9910
kICADeviceMemoryAllocationErr = -9911
kICADeviceInternalErr = -9912
kICADeviceInvalidParamErr = -9913
kICADeviceAlreadyOpenErr = -9914
kICADeviceLocationIDNotFoundErr = -9915
kICADeviceGUIDNotFoundErr = -9916
kICADeviceIOServicePathNotFoundErr = -9917
kICADeviceUnsupportedErr = -9918
kICAFrameworkInternalErr = -9919
kICAExtensionInternalErr = -9920
kICAInvalidSessionErr = -9921
(Read and Write property)

```

13.1.93 Events

13.1.94 Notification(notificationType as string, notificationDictionary as dictionary)

Plugin Version: 10.1, Platform: macOS, Targets: .

Function: The event called for all events coming from Image Capture.

Notes: Use RegisterForEventNotification to register for events.

The Image Capture notification event will be called with a notificationDictionary that may contain one or more key-value pairs as defined below:

Key	Value Type	Comments
kICANotificationICAObjectKey	Number	An object associated with the notification.
kICANotificationDeviceICAObjectKey	Number	A device object associated with the notification.
kICANotificationClassKey	String	See below.
kICANotificationTypeKey	String	See below.
kICANotificationRawEventKey	Number	The unprocessed event code sent by a device.
kICANotificationDataKey	Data String	Data associated with the event.
kICANotificationDataSizeKey	Number	Size of data associated with the event. This is used if the data is not sent with the notification. [Needed for backward compatibility with pre-Leopard device modules] .
kICANotificationDataCookieKey	Number	A token identifying the data associated with this event. This data can be retrieved by calling SendMessage with messageType set to kICAMessageGetEventData, dataType set to value of kICANotificationDataCookieKey and dataSize set to value of kICANotificationDataSizeKey.

The following keys are present if the value of kICANotificationDataKey represents image data. The values of these keys are Numbers representing the width, height, bytes per row, start row, and number of rows of the image:

kICANotificationImageKey	Dictionary	A dictionary that describes an Image associated with the notification.
kICANotificationImageDataKey	Data String	Image data
kICANotificationImageWidthKey	Number	Image width in pixels
kICANotificationImageHeightKey	Number	Image height in pixels
kICANotificationImageBytesPerRowKey	Number	Bytes per row in image
kICANotificationImageStartRowKey	Number	Starting row number of the image.
kICANotificationImageNumberOfRowsKey	Number	Number of rows of image data sent in this notification.

13.2 class ImageCaptureObjectMBS

13.2.1 class ImageCaptureObjectMBS

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Deprecated: This item is deprecated and should no longer be used. You can use ICDeviceMBS instead.

Function: An image capture object.

Blog Entries

- [MBS Plugins updated for Xojo 2019r2](#)
- [MBS Xojo Plugins, version 19.3pr2](#)

13.2.2 Methods

13.2.3 CloseSession

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: Close a session on a camera device.

Notes: Lasterror is set.

For a scanner device use the ScannerCloseSession.

13.2.4 Constructor

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: Creates a new image capture object.

See also:

- [13.2.5 Constructor\(handle as Integer\)](#) 390

13.2.5 Constructor(handle as Integer)

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: Creates a new image capture object with the given handle.

See also:

- [13.2.4 Constructor](#) 390

13.2.6 CopyData(startByte as int64, requestedSize as int64) as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: Get a copy of data associated with a file object.

Example:

```
dim o as ImageCaptureObjectMBS // your object pointing to an image file.
```

```
dim d2 as Dictionary = o.PropertyDictionary
dim size as Integer = d2.Value(o.kICAPropertyImageSize)
```

```
dim data as string = o.CopyData(0, size)
```

```
if lenb(data)>0 then
  // you got the data, now process it.
end if
```

Notes: startByte: Starting byte offset of the data in the file object.

requestedSize: Requested data size in bytes.

If you want to get all bytes of an object, pass startByte = 0 and requestedSize = filesize.

Lasterror is set.

13.2.7 CopyThumbnail(format as string) as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: Get a thumbnail associated with an object.

Notes: This is the recommended way to get the thumbnail of an object.

Use the constants for the format: kICAThumbnailFormatJPEG, kICAThumbnailFormatTIFF or kICAThumbnailFormatPNG

Lasterror is set.

13.2.8 DownloadFile(dir as folderitem, flags as Integer, MacType as string, MacCreator as string, angle as Double) as folderitem

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: Downloads a file to disk.

Notes: This API is a convenient way to download a file to disk. To receive the image data in memory use

CopyObjectData.

Constants for flags:

kDeleteAfterDownload	= 1	Delete file after a successful download.
kCreateCustomIcon	= 2	Create a custom icon for Finder.
kAddMetaDataToFinderComment	= 4	Add basic metadata to finder comment field.
kAdjustCreationDate	= 8	Set creation date of the downloaded file same as the creation date for the file as reported by the device.
kSetFileTypeAndCreator	= &h10	Set 4-char file type and creator code.
kEmbedColorSyncProfile	= &h20	Embed ColorSync profile to the image if one was not already embedded.
kRotateImage	= &h40	Rotate the image.
kDontEmbedColorSyncProfile	= &h80	Do not embed ColorSync profile to the image.

Lasterror is set.

13.2.9 ImportImage(flags as Integer) as string()

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: This method displays a Common User Interface panel similar to the user interface of Image Capture Application.

Notes: Use this method to allow the user to work a camera or a scanner.

The ImageCaptureObjectMBS object you use for this call, should point to a camera or scanner device.

filetypes: Optional an array of file extension strings such as "jpg", "tif", etc., that are of interest to the calling application. If no array is provided, all files are displayed.

Flag values that can be used in ImportImage:

kICAAllowMultipleImages	= 1	Use this constant to allow users to select multiple images in the Import Image dialog.
kICADownloadAndReturnPathArray	= 2	Use this constant to download the images to a temporary location and return an array of paths to the downloaded images.

Returns an array of Strings for the imported images if the kICADownloadAndReturnPathArray flag is not specified. Otherwise returns an array of Strings holding the paths of the images that are downloaded.

See also:

- 13.2.10 ImportImage(flags as Integer, filetypes() as string) as string()

13.2.10 ImportImage(flags as Integer, filetypes() as string) as string()

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: This method displays a Common User Interface panel similar to the user interface of Image Capture Application.

Notes: Use this method to allow the user to work a camera or a scanner.

The ImageCaptureObjectMBS object you use for this call, should point to a camera or scanner device.

filetypes: Optional an array of file extension strings such as "jpg", "tif", etc., that are of interest to the calling application. If no array is provided, all files are displayed.

Flag values that can be used in ImportImage:

kICAAllowMultipleImages	= 1	Use this constant to allow users to select multiple images in the Import Image dialog.
kICADownloadAndReturnPathArray	= 2	Use this constant to download the images to a temporary location and return an array of paths to the downloaded images.

Returns an array of Strings for the imported images if the kICADownloadAndReturnPathArray flag is not specified. Otherwise returns an array of Strings holding the paths of the images that are downloaded.

See also:

- 13.2.9 ImportImage(flags as Integer) as string() 392

13.2.11 kICABonjourServiceNameKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the keys in the dictionaries.

13.2.12 kICABonjourServiceTypeKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the keys in the dictionaries.

13.2.13 kICABonjourTXTRecordKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the keys in the dictionaries.

13.2.14 `kICACreationDateStringKey` as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the keys in the dictionaries.

13.2.15 `kICADataPropertyKey` as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the keys in the dictionaries.

13.2.16 `kICADataSizeKey` as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the keys in the dictionaries.

13.2.17 `kICADataTypeKey` as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the keys in the dictionaries.

13.2.18 `kICADeviceCapabilitiesKey` as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the keys in the dictionaries.

13.2.19 `kICADevicePropArtist` as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the device properties.

13.2.20 kICADevicePropBatteryLevel as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the device properties.

13.2.21 kICADevicePropBurstInterval as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the device properties.

13.2.22 kICADevicePropBurstNumber as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the device properties.

13.2.23 kICADevicePropCaptureDelay as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the device properties.

13.2.24 kICADevicePropCompressionSetting as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the device properties.

13.2.25 kICADevicePropContrast as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the device properties.

13.2.26 kICADevicePropCopyrightInfo as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the device properties.

13.2.27 kICADevicePropDateTime as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the device properties.

13.2.28 kICADevicePropDigitalZoom as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the device properties.

13.2.29 kICADevicePropEffectMode as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the device properties.

13.2.30 kICADevicePropExposureBiasCompensation as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the device properties.

13.2.31 kICADevicePropExposureIndex as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the device properties.

13.2.32 kICADevicePropExposureMeteringMode as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the device properties.

13.2.33 kICADevicePropExposureProgramMode as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the device properties.

13.2.34 kICADevicePropExposureTime as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the device properties.

13.2.35 kICADevicePropFlashMode as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the device properties.

13.2.36 kICADevicePropFNumber as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the device properties.

13.2.37 kICADevicePropFocalLength as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the device properties.

13.2.38 kICADevicePropFocusDistance as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the device properties.

13.2.39 kICADevicePropFocusMeteringMode as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the device properties.

13.2.40 kICADevicePropFocusMode as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the device properties.

13.2.41 kICADevicePropFunctionalMode as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the device properties.

13.2.42 kICADevicePropImageSize as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the device properties.

13.2.43 kICADevicePropRGBGain as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the device properties.

13.2.44 kICADevicePropSharpness as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the device properties.

13.2.45 kICADevicePropStillCaptureMode as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the device properties.

13.2.46 kICADevicePropTimelapseInterval as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the device properties.

13.2.47 kICADevicePropTimelapseNumber as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the device properties.

13.2.48 kICADevicePropUndefined as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the device properties.

13.2.49 kICADevicePropUploadURL as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the device properties.

13.2.50 kICADevicePropWhiteBalance as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the device properties.

13.2.51 kICADevicesArrayKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the keys in the dictionaries.

Example:

```
dim m as new ImageCaptureMBS
dim list as ImageCaptureObjectMBS = m.DeviceList

if List<>Nil then
  // look into properties
  dim dic as Dictionary = list.PropertyDictionary

  // take the devices array there
  if dic<>Nil and dic.HasKey(ImageCaptureObjectMBS.kICADevicesArrayKey) then
    dim a(-1) as Variant = dic.Value(ImageCaptureObjectMBS.kICADevicesArrayKey)

    // display device name
    for each properties as Dictionary in a
      MsgBox Properties.Value("ifl")
    next
  end if
end if
```

13.2.52 kICADeviceSharedKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the keys in the dictionaries.

13.2.53 kICADeviceTypeCamera as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the device type constants.

13.2.54 kICADeviceTypeKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the keys in the dictionaries.

13.2.55 kICADeviceTypeScanner as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the device type constants.

13.2.56 kICADeviceUsedKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the keys in the dictionaries.

13.2.57 kICADeviceWebSharedKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the keys in the dictionaries.

13.2.58 kICAExecutableArchitectureKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the keys in the dictionaries.

13.2.59 kICALockStatusKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the keys in the dictionaries.

13.2.60 kICAMediaDurationInSecondsKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the keys in the dictionaries.

13.2.61 kICAMediaHeightKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the property keys for a device.

Notes: Value for this key in the dictionary is a number.

13.2.62 kICAMediaWidthKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the property keys for a device.

Notes: Value for this key in the dictionary is a number.

13.2.63 kICAModificationDateStringKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the keys in the dictionaries.

13.2.64 kICAObjectKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the property keys for a device.

13.2.65 kICAObjectNameKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the property keys for a device.

13.2.66 kICARawKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the keys in the dictionaries.

13.2.67 kICARemoteDeviceKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the keys in the dictionaries.

13.2.68 kICAThumbnailPropertyKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the keys in the dictionaries.

13.2.69 kICAThumbnailSizeKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the keys in the dictionaries.

13.2.70 kICAUSBProductIDKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the property keys for a device.

13.2.71 kICAUSBVendorIDKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the property keys for a device.

13.2.72 kMetaDataDictionaryKey as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: One of the constants for the keys in the dictionaries.

13.2.73 OpenSession(device as ImageCaptureObjectMBS)

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: Opens a session on a camera device.

Notes: Lasterror is set.

For a scanner device use the ScannerOpenSession method.

13.2.74 PropertyDictionary as dictionary

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: Get a dictionary containing all the properties for an object specified.

Example:

```
dim m as new ImageCaptureMBS
dim list as ImageCaptureObjectMBS = m.DeviceList

if List<>Nil then
  // look into properties
  dim dic as Dictionary = list.PropertyDictionary

  // take the devices array there
  if dic<>Nil and dic.HasKey(ImageCaptureObjectMBS.kICADevicesArrayKey) then
    dim a(-1) as Variant = dic.Value(ImageCaptureObjectMBS.kICADevicesArrayKey)

    // display device name
    for each properties as Dictionary in a
      MsgBox Properties.Value("ifl")
    next
  end if
end if
```

Notes: Lasterror is set.

13.2.75 PropertyDictionaryText as string

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: Get a dictionary containing all the properties for an object specified.

Example:

```
dim m as new ImageCaptureMBS
dim list as ImageCaptureObjectMBS = m.DeviceList

if List<>Nil then
  MsgBox List.PropertyDictionaryText
end if
```

Notes: Lasterror is set.

This is for debugging and may be removed soon.

The format of the text is the plist file format.

13.2.76 ScannerCloseSession

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: Closes a session on a scanner device.

Notes: Lasterror is set.

For a camera device use the CloseSession method.

13.2.77 ScannerGetParameters as dictionary

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: Query scanner parameters.

Notes: Use this method to get information about the scanner such as resolution, scanning area, etc.
Lasterror is set.

13.2.78 ScannerInitialize

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: Initializes a scanner device.

Notes: Lasterror is set.

13.2.79 ScannerOpenSession(device as ImageCaptureObjectMBS)

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: Opens a session on a scanner device.

Notes: Lasterror is set.

For a camera device use the OpenSession method.

13.2.80 ScannerSetParameters(dic as dictionary)

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: Configures a scanner.

Notes: Use this method to specify scan parameters that will be used when a scan is initiated via ScannerStart.

Lasterror is set.

13.2.81 ScannerStart

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: Starts scanning.

Notes: Use this method to start a scan based on the parameters that were specified in a previous ScannerSetParameters call.

Lasterror is set.

13.2.82 ScannerStatus as Integer

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: Returns the scanner status.

Notes: Lasterror is set.

13.2.83 SendMessageMemory(messageType as string, startByte as UInt32, data as memoryblock, dataType as string) as UInt32

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: Sends a message to a device object.

Notes: Use this API to send a message to a device object. All devices do not respond to all the messages

defined above.

messageType: A message type. e.g., kICAMessageCameraCaptureNewImage.
 startByte: Offset in dataPtr from where data access for read/write should occur.
 data: The data to send.
 dataType: Data type.

Lasterror is set.
 Returns the result from this message.

13.2.84 SendMessageString(messageType as string, startByte as UInt32, data as string, dataType as string) as UInt32

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: Sends a message to a device object.

Notes: Use this API to send a message to a device object. All devices do not respond to all the messages defined above.

messageType: A message type. e.g., kICAMessageCameraCaptureNewImage.
 startByte: Offset in dataPtr from where data access for read/write should occur.
 data: The data to send.
 dataType: Data type.

Lasterror is set.
 Returns the result from this message.

13.2.85 UploadFile(file as folderitem, flags as Integer)

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: Uploads a file to a device that supports this capability.

Notes: The device chooses an appropriate destination location for the uploaded image and sends a kICANotificationTypeObjectAdded notification.

Lasterror is set.

Flag values that can be used in UploadFile:

- kICAUploadFileAsIs Use this constant to upload a file as is.
 kICAUploadFileScaleToFit Use this constant to upload a file after scaling to fit a specified bounding rect.

13.2.86 Properties

13.2.87 Handle as Integer

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: The internal object handle.

Notes: (Read and Write property)

13.2.88 Lasterror as Integer

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: The error code from the last function used.

Notes: Value is 0 if the function was successful, -1 if the function is not available, one of the following values or a Mac OS error code:

Possible values:

```
kICACommunicationErr = -9900
kICADeviceNotFoundErr = -9901
kICADeviceNotOpenErr = -9902
kICAFileCorruptedErr = -9903
kICAIOPendingErr = -9904
kICAInvalidObjectErr = -9905
kICAInvalidPropertyErr = -9906
kICAIndexOutOfRangeErr = -9907
kICAPropertyTypeNotFoundErr = -9908
kICACannotYieldDevice = -9909
kICADataTypeNotFoundErr = -9910
kICADeviceMemoryAllocationErr = -9911
kICADeviceInternalErr = -9912
kICADeviceInvalidParamErr = -9913
kICADeviceAlreadyOpenErr = -9914
kICADeviceLocationIDNotFoundErr = -9915
kICADeviceGUIDNotFoundErr = -9916
kICADeviceIOServicePathNotFoundErr = -9917
kICADeviceUnsupportedErr = -9918
kICAFrameworkInternalErr = -9919
kICAExtensionInternalErr = -9920
```

kICAInvalidSessionErr = -9921
(Read and Write property)

13.2.89 ScannerSessionHandle as Integer

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: The internal handle for a scanner session.

Notes: Lasterror is set.

(Read and Write property)

13.2.90 SessionHandle as Integer

Plugin Version: 10.1, Platform: macOS, Targets: Desktop only.

Function: The handle for the session.

Notes: (Read and Write property)

13.2.91 Constants

Constants

Constant	Value	Description
kAddMetaDataToFinderComment	4	One of the flag constants for DownloadFile. Add basic metadata to finder comment field.
kAdjustCreationDate	8	One of the flag constants for DownloadFile. Set creation date of the downloaded file same as the creation date as reported by the device.
kCreateCustomIcon	2	One of the flag constants for DownloadFile. Create a custom icon for Finder.
kDeleteAfterDownload	1	One of the flag constants for DownloadFile. Delete file after a successful download.
kDontEmbedColorSyncProfile	&h80	One of the flag constants for DownloadFile. Do not embed ColorSync profile to the image.
kEmbedColorSyncProfile	&h20	One of the flag constants for DownloadFile. Embed ColorSync profile to the image if one was not already present.
kICAAccessReadOnly	1	One of the constant values for kICAPropertyCameraAccess. Read-only without object deletion.
kICAAccessReadOnlyWithObjectDeletion	2	One of the constant values for kICAPropertyCameraAccess. Read-only with object deletion.
kICAAccessReadWrite	0	One of the constant values for kICAPropertyCameraAccess. Read-write.
kICAAllowMultipleImages	1	One of the flag constants for ImportImage. Use this constant to allow users to select multiple images in the import dialog. Seems like Image Capture in Mac OS X 10.6 ignores this flag and always imports multiple images always.
kICAButtonCopy	"copy"	One of the constants for scanner buttons. Copy button.
kICAButtonEMail	"mail"	One of the constants for scanner buttons. Email button.
kICAButtonScan	"scan"	One of the constants for scanner buttons. Scan button.
kICAButtonWeb	"web "	One of the constants for scanner buttons. Web button.
kICACameraPassThruNotUsed	2	One of the flag constants associated with Image Capture Framework. Use this constant when using a pass-through command for a device when sending or receiving data.
kICACameraPassThruReceive	1	One of the flag constants associated with Image Capture Framework. Use this constant when receiving data from a device using a pass-through command.
kICACameraPassThruSend	0	One of the flag constants associated with Image Capture Framework. Use this constant when sending data to a device using a pass-through command.
kICACannotYieldDevice	-9909	One of the image capture specific error constants. The device module cannot yield the specified device to the user.
kICACapabilityCanCameraCaptureNewImage	"ccni"	One of the Camera capabilities constants. Can capture a new image using the camera.
kICACapabilityCanCameraDeleteAll	"dela"	One of the Camera capabilities constants. Can delete all images stored in the camera.
kICACapabilityCanCameraDeleteOne	"del1"	One of the Camera capabilities constants. Can delete one image stored in the camera.
kICACapabilityCanCameraSyncClock	"sclk"	One of the Camera capabilities constants. Can synchronize camera's clock with the computer's clock.
kICACapabilityCanCameraUploadData	"load"	One of the Camera capabilities constants. Can upload data to the camera.
kICACapabilityMayStoreNewImagesInTempStore	"temp"	One of the Camera capabilities constants. Can store new images in the temporary store.
kICACommunicationErr	-9900	One of the image capture specific error constants. An error occurred in communication between different components of the Image Capture framework.
kICADataTypeNotFoundErr	-9910	One of the image capture specific error constants. Data with the specified data type is not found.

Chapter 14

Launch Services

14.1 class LaunchServicesApplicationListMBS

14.1.1 class LaunchServicesApplicationListMBS

Plugin Version: 3.4, Platform: macOS, Targets: All.

Function: A class for a list of folderitems.

Notes: This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

Blog Entries

- [MBS Xojo / Real Studio Plugins, version 13.4pr2](#)

14.1.2 Methods

14.1.3 Constructor

Plugin Version: 13.4, Platform: macOS, Targets: All.

Function: The private constructor.

14.1.4 Item(index as Integer) as folderitem

Plugin Version: 3.4, Platform: macOS, Targets: All.

Function: Returns an item of this list.

Notes: Index goes from 0 to count-1.

14.1.5 Properties

14.1.6 Count as Integer

Plugin Version: 3.4, Platform: macOS, Targets: All.

Function: The number of items inside this list.

Notes: (Read and Write property)

14.2 class LaunchServicesItemInfoMBS

14.2.1 class LaunchServicesItemInfoMBS

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: A class to represent several details about an application folderitem.

Blog Entries

- [MBS Xojo Plugins, version 19.5pr1](#)

14.2.2 Methods

14.2.3 close

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: The destructor.

Notes: There is no need to call this method except you want to free all resources of this object now without waiting for Xojo to do it for you.

14.2.4 Properties

14.2.5 AppIsScriptable as Boolean

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: Whether the application can be scripted.

Notes: (Read only property)

14.2.6 AppPrefersClassic as Boolean

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: Item is an application that can run either natively or in the Classic emulation environment, but prefers to be launched in the Classic environment.

Notes: This flag is valid only when `kLSItemInfoIsNativeApp` is set.
(Read only property)

14.2.7 AppPrefersNative as Boolean

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: Item is an application that can run either natively or in the Classic emulation environment, but prefers to be launched natively.

Notes: This flag is valid only when `kLSItemInfoIsNativeApp` is set.
(Read only property)

14.2.8 Extension as String

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: The extension for the folderitem.

Notes: You need to specify the `kLSRequestExtension` flag to get this information.
(Read only property)

14.2.9 ExtensionIsHidden as Boolean

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: whether the folderitem has a hidden extension.

Notes: (Read only property)

14.2.10 IconFilename as String

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: The optional filename string for the icon of this application.

Notes: This property is not be used on 64bit Mac targets.
(Read only property)

14.2.11 IsAliasFile as Boolean

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: Whether the folderitem is an alias file (includes sym links)

Notes: (Read only property)

14.2.12 IsApplication as Boolean

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: The folderitem is a Single-file or packaged application.

Example:

```

dim l as LaunchServicesItemInfoMBS
dim f as FolderItem

f=ApplicationsFolderMBS(0).Child("Mail.app")
l=f.LaunchServicesItemInfoMBS(-1)

if l.IsApplication then
MsgBox "Is an application!"
end if

```

Notes: This property is filled when kLSRequestBasicFlagsOnly is requested.
(Read only property)

14.2.13 IsClassicApp as Boolean

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: The folderitem is a CFM Classic application.

Notes: (Read only property)

14.2.14 IsContainer as Boolean

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: The folderitem is a directory (includes packages) or a volume.

Notes: (Read only property)

14.2.15 IsInvisible as Boolean

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: The folderitem is invisible.

Notes: Does not include '?' files or '.hidden' entries.

This property is filled when kLSRequestBasicFlagsOnly is requested.

(Read only property)

14.2.16 IsNativeApp as Boolean

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: The application is a Carbon or Cocoa native application.

Notes: (Read only property)

14.2.17 IsPackage as Boolean

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: whether the folderitem is an Application, document, or bundle package.

Example:

```
dim l as LaunchServicesItemInfoMBS
```

```
dim f as FolderItem
```

```
f=SpecialFolder.Applications.Child("Mail.app")
```

```
l=f.LaunchServicesItemInfoMBS(-1)
```

```
if l.IsPackage then
```

```
MsgBox "Is a package!"
```

```
end if
```

Notes: The item is a packaged directory.

This property is filled when kLSRequestBasicFlagsOnly is requested.

(Read only property)

14.2.18 IsPlainFile as Boolean

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: None of the other attributes is true.

Notes: The item is not a directory, volume, or symlink.

This property is filled when kLSRequestBasicFlagsOnly is requested.

(Read only property)

14.2.19 IsSymlink as Boolean

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: The folderitem is only an UNIX symbolic link.

Notes: (Read only property)

14.2.20 IsVolume as Boolean

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: The folderitem is a volume.

Notes: (Read only property)

14.2.21 KindID as Integer

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: The kind ID of this folderitem.

Notes: This property is not be used on 64bit Mac targets.

(Read only property)

14.2.22 MacCreator as String

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: The Mac OS creator code.

Example:

```
dim f as FolderItem = SpecialFolder.Applications.Child("Firefox.app")

dim l As LaunchServicesItemInfoMBS = f.LaunchServicesItemInfoMBS(&h02)

if l <> nil Then
  MsgBox l.MacCreator // shows "MOZB"
end
```

Notes: You need to specify the kLSRequestTypeCreator flag to get this information.
(Read only property)

14.2.23 MacType as String

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: The Mac OS type code.

Notes: You need to specify the `kLSRequestTypeCreator` flag to get this information.
(Read only property)

14.3 class LaunchServicesLaunchParameterMBS

14.3.1 class LaunchServicesLaunchParameterMBS

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: A class for parameters which can be used to launch an application.

Example:

```
dim f(0) as FolderItem
dim a as FolderItem
dim p as LaunchServicesLaunchParameterMBS

p=new LaunchServicesLaunchParameterMBS

p.Defaults=true
p.Hide=true
f.Append SpecialFolder.Desktop.Child("picture.tiff")

a=LaunchServicesOpenXMBS(f,p)

MsgBox a.Name
```

14.3.2 Methods

14.3.3 close

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: The destructor.

Notes: There is no need to call this method except you want to free all resources of this object now without waiting for Xojo to do it for you.

14.3.4 Properties

14.3.5 Application as FolderItem

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: The application to use to open documents.

Notes: (Read and Write property)

14.3.6 Defaults as Boolean

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: Default settings should be used.

Notes: default means: open, async, use Info.plist, start Classic.
(Read and Write property)

14.3.7 DontAddToRecents as Boolean

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: Do not add application or documents to recents menus.

Notes: (Read and Write property)

14.3.8 DontSwitch as Boolean

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: Don't bring new app to the foreground.

Example:

```
dim l as new LaunchServicesLaunchParameterMBS
```

```
l.DontSwitch=true
```

```
dim files(0) as FolderItem
```

```
files(0)=GetFolderItem("/Applications/iTunes.app", FolderItem.PathTypeShell)
```

```
call LaunchServicesOpenXMBS(files,l)
```

Notes: (Read and Write property)

14.3.9 Hide as Boolean

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: Send child a "hide" request as soon as it checks in.

Notes: (Read and Write property)

14.3.10 HideOthers as Boolean

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: Hide all other apps when child checks in.

Notes: (Read and Write property)

14.3.11 InClassic as Boolean

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: Force app to launch in Classic environment.

Notes: (Read and Write property)

14.3.12 InhibitBGOnly as Boolean

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: Causes launch to fail if target is background-only.

Notes: (Read and Write property)

14.3.13 LastError as Integer

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: The last error value from the LaunchServicesOpenXMBS function.

Notes: Values for errors:

kLSUnknownErr	= -10810	
kLSNotAnApplicationErr	= -10811	
kLSNotInitializedErr	= -10812	
kLSDataUnavailableErr	= -10813	e.g. no kind string
kLSApplicationNotFoundErr	= -10814	e.g. no application claims the file
kLSUnknownTypeErr	= -10815	
kLSDataTooOldErr	= -10816	
kLSDataErr	= -10817	
kLSLaunchInProgressErr	= -10818	e.g. opening an already opening application
kLSNotRegisteredErr	= -10819	
kLSAppDoesNotClaimTypeErr	= -10820	
kLSAppDoesNotSupportSchemeWarning	= -10821	not an error, just a warning
kLSServerCommunicationErr	= -10822	cannot set recent items
kLSCannotSetInfoErr	= -10823	you may not set item info for this item

(Read and Write property)

14.3.14 NewInstance as Boolean

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: Instantiate app even if it is already running.

Notes: (Read and Write property)

14.3.15 NoParams as Boolean

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: Use Info.plist to determine launch parameters.

Notes: (Read and Write property)

14.3.16 Print as Boolean

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: Print items instead of opening them.

Notes: (Read and Write property)

14.3.17 StartClassic as Boolean

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: Start up Classic environment if required for this application.

Notes: (Read and Write property)

14.4 class LaunchServicesStringListMBS

14.4.1 class LaunchServicesStringListMBS

Plugin Version: 6.1, Platform: macOS, Targets: All.

Function: A class for a list of strings.

14.4.2 Methods

14.4.3 Item(index as Integer) as string

Plugin Version: 6.1, Platform: macOS, Targets: All.

Function: Returns an item of this list.

Notes: Index goes from 0 to count-1.

14.4.4 Properties

14.4.5 Count as Integer

Plugin Version: 6.1, Platform: macOS, Targets: All.

Function: The number of items inside this list.

Notes: (Read and Write property)

14.5 Globals

14.5.1 `LaunchServicesAllHandlersForURLSchemeMBS(URLScheme as string) as LaunchServicesStringListMBS`

Plugin Version: 6.1, Platform: macOS, Targets: All.

Function: Returns an array of application bundle identifiers for applications capable of handling the specified URL scheme.

Example:

```
dim l as LaunchServicesStringListMBS
dim s(-1) as string
dim i,c as Integer

l=LaunchServicesAllHandlersForURLSchemeMBS("http")
if l<>nil then
c=l.Count-1
for i=0 to c
s.Append l.Item(i)
next

MsgBox Join(s, ", ")
end if
```

Notes: URL handling capability is determined according to the `kCFBundleURLTypes` listed in an application's `Info.plist`.

Returns nil if no handlers are available.

Example output from the code above:

```
org.videolan.vlc, com.RealNetworks.RealPlayer, org.mozilla.firefox, com.apple.safari, de.icab.iCab, com.microsoft.explorer
```

Requires Mac OS X 10.4 to work correct. Returns always nil on older systems.

14.5.2 `LaunchServicesAllRoleHandlersForContentTypeMBS(ContentType as string, role as Integer) as LaunchServicesStringListMBS`

Plugin Version: 6.0, Platform: macOS, Targets: All.

Function: Returns an array of application bundle identifiers for applications capable of handling the specified content type (UTI) with the specified role(s).

Example:

```

dim l as LaunchServicesStringListMBS
dim s(-1) as string
dim i,c as Integer

const kLSRolesAll=-1

l=LaunchServicesAllRoleHandlersForContentTypeMBS("com.adobe.pdf",kLSRolesAll)
if l<>nil then
c=l.Count-1
for i=0 to c
s.Append l.Item(i)
next

MsgBox Join(s,", ")
end if

```

Notes: Application content handling capabilities are determined according to the kCFBundleDocumentTypes listed in an application's Info.plist). For any role, specify kLSRolesAll. Returns nil if no handlers are available. Requires Mac OS X 10.4.

Constants you can use for the role parameter:

kLSRolesNone	= 1	no claim is made about support for this type/scheme
kLSRolesViewer	= 2	claim to be able to view this type/scheme
kLSRolesEditor	= 4	claim to be able to edit this type/scheme
kLSRolesAll	= -1	claim to do it all

Example output for code above is:

com.adobe.Reader, com.apple.preview, com.adobe.acrobat.reader, com.apple.MDIImporter.PDF

14.5.3 LaunchServicesApplicationForInfoMBS(type as string, creator as string, extension as string, role as Integer) as folderitem

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: Return the application used to open items with particular data.

Example:

```

MsgBox LaunchServicesApplicationForInfoMBS("", "R*ch", "txt", -1).name
MsgBox LaunchServicesApplicationForInfoMBS("TEXT", "", "", -1).name
MsgBox LaunchServicesApplicationForInfoMBS("", "", "txt", -1).name

```

Notes: Consults the binding tables to return the application that would be used to open items with type, creator, and/or extension as provided if they were double-clicked in the Finder. This application will be the default for items like this if one has been set. If no application is known to LaunchServices suitable for opening such items, nil (kLSApplicationNotFoundErr) will be returned. Not all three input parameters can be "" at the same time nor can both output parameters be "" at the same time.

Constants you can use for the role parameter:

kLSRolesNone	= 1	no claim is made about support for this type/scheme
kLSRolesViewer	= 2	claim to be able to view this type/scheme
kLSRolesEditor	= 4	claim to be able to edit this type/scheme
kLSRolesAll	= -1	claim to do it all

Blog Entries

- [MBS Plugins updated for Xojo 2019r2](#)

14.5.4 LaunchServicesApplicationForItemMBS(file as folderitem, role as Integer) as folderitem

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: Return the application used to open an item.

Example:

```
Dim file As FolderItem = SpecialFolder.Desktop.Child("Test.xojo_binary_project")

Const kLSRolesNone = 1 // no claim is made about support for this type/scheme
Const kLSRolesViewer = 2 // claim to be able to view this type/scheme
Const kLSRolesEditor = 4 // claim to be able to edit this type/scheme
Const kLSRolesAll = -1 // claim to do it all

Dim appfile As FolderItem = LaunchServicesApplicationForItemMBS(file, kLSRolesEditor)

// shows Xojo
MsgBox appfile.NativePath
```

Notes: Consults the binding tables to return the application that would be used to open the folderitem if it were double-clicked in the Finder. This application will be the user-specified override if appropriate or the default otherwise. If no application is known to LaunchServices suitable for opening this item, nil

(kLSApplicationNotFoundErr) will be returned.

Constants you can use for the role parameter:

kLSRolesNone	= 1	no claim is made about support for this type/scheme
kLSRolesViewer	= 2	claim to be able to view this type/scheme
kLSRolesEditor	= 4	claim to be able to edit this type/scheme
kLSRolesAll	= -1	claim to do it all

Upgraded in version 19.5 to use CFURL instead of FSRef APIs.

Blog Entries

- [MBS Xojo Plugins, version 19.5pr1](#)

14.5.5 LaunchServicesCanApplicationAcceptItemMBS(item as folderitem, targetapp as folderitem, role as Integer, flags as Integer) as boolean

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: Determine whether an item can accept another item.

Example:

```
Dim file As FolderItem = SpecialFolder.Desktop.Child("Test.xojo_binary_project")
```

```
Dim a As FolderItem = LaunchServicesOpenMBS(file)
```

```
Const kLSRolesNone = 1 // no claim Is made about support For this type/scheme
```

```
Const kLSRolesViewer = 2 // claim To be able To view this type/scheme
```

```
Const kLSRolesEditor = 4 // claim To be able To edit this type/scheme
```

```
Const kLSRolesAll = -1 // claim To Do it all
```

```
Dim accept As Boolean = LaunchServicesCanApplicationAcceptItemMBS(file, a, kLSRolesEditor, 0)
```

```
MsgBox "accept by Xojo: "+Str(accept)
```

Notes: Returns whether TargetApp can accept this folderitem as in a drag and drop operation. If role is other than kLSRolesAll then make sure TargetApp claims to fulfill the requested role.

Constants you can use for the role parameter:

Values for the flags:

kLSRolesNone	= 1	no claim is made about support for this type/scheme
kLSRolesViewer	= 2	claim to be able to view this type/scheme
kLSRolesEditor	= 4	claim to be able to edit this type/scheme
kLSRolesAll	= -1	claim to do it all

kLSAcceptDefault	= 1	
kLSAcceptAllowLoginUI	= 2	show UI to log in if necessary

Upgraded in version 19.5 to use CFURL instead of FSRef APIs.

Blog Entries

- [MBS Xojo Plugins, version 19.5pr1](#)

14.5.6 LaunchServicesDefaultHandlerForURLSchemeMBS(URLScheme as string) as string

Plugin Version: 6.1, Platform: macOS, Targets: All.

Function: Returns the bundle identifier of the default handler for the specified URL scheme.

Example:

```
MsgBox LaunchServicesDefaultHandlerForURLSchemeMBS("http") // shows here: com.apple.safari
```

Notes: Returns "" if no handler is available.

Requires Mac OS X 10.4 to work correct. Returns always "" on older systems.

14.5.7 LaunchServicesDefaultRoleHandlerForContentTypeMBS(ContentType as string, role as Integer) as string

Plugin Version: 6.0, Platform: macOS, Targets: All.

Function: Returns the application bundle identifier of the default handler for the specified content type (UTI), in the specified role(s).

Example:

```
const type="com.adobe.pdf"
msgbox LaunchServicesDefaultRoleHandlerForContentTypeMBS(type,-1)
```

Notes: For any role, specify kLSRolesAll. Returns "" if no handler is available.

Requires Mac OS X 10.4.

Constants you can use for the role parameter:

kLSRolesNone	= 1	no claim is made about support for this type/scheme
kLSRolesViewer	= 2	claim to be able to view this type/scheme
kLSRolesEditor	= 4	claim to be able to edit this type/scheme
kLSRolesAll	= -1	claim to do it all

14.5.8 LaunchServicesDisplayNameForCFURLMBS(cfurlhandle as Integer) as string

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: Get the display name for an url handle.

Notes: Return a copy of the display name for an url handle. Takes into consideration whether this item has a hidden extension or not.

Cfurlhandle should be the non 0 value from a CFURL object handle property.

14.5.9 LaunchServicesFindApplicationForInfoMBS(creator as string, bundleID as string, name as string) as folderitem

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: Locate a specific application.

Example:

```
MsgBox LaunchServicesFindApplicationForInfoMBS("prvw","","").Name
MsgBox LaunchServicesFindApplicationForInfoMBS","","com.apple.iTunes","").Name
MsgBox LaunchServicesFindApplicationForInfoMBS","","","Safari.app").Name
```

Notes: Returns the application with the corresponding input information. The registry of applications is consulted first in order of bundleID, then creator, then name. All comparisons are case insensitive and 'ties' are decided first by version, then by native vs. Classic.

Parameters can be "". The name of the application must be the name with the extension.

Blog Entries

- [MBS Plugins updated for Xojo 2019r2](#)
- [MBS Xojo Plugins, version 19.4pr1](#)
- [Tip of the day: How to launch Disc Utility?](#)

14.5.10 `LaunchServicesItemInfoForCFURLMBS(cfurlhandle as Integer, WhichInfo as Integer) as LaunchServicesItemInfoMBS`

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: Return information about an item.

Notes: Returns as much or as little information as requested about the url. Some information is available in a thread-safe manner, some is not.

Cfurlhandle should be the non 0 value from a CFURL object handle property.

Possible values you can combine for the WhichInfo parameter:

<code>kLSRequestExtension</code>	<code>= &h01</code>	Requests the item's filename extension.
<code>kLSRequestTypeCreator</code>	<code>= &h02</code>	Requests the item's file type and creator signature.
<code>kLSRequestBasicFlagsOnly</code>	<code>= &h04</code>	Requests all item-information flags that are not application-specific: that is, all except <code>IsNativeApp</code> , <code>IsClassicApp</code> , <code>AppPrefersNative</code> , <code>AppPrefersClassic</code> and <code>AppIsScriptable</code> .
<code>kLSRequestAppTypeFlags</code>	<code>= &h08</code>	Requests all application-specific item-information flags: that is, <code>IsNativeApp</code> , <code>IsClassicApp</code> , <code>AppPrefersNative</code> , <code>AppPrefersClassic</code> and <code>AppIsScriptable</code> .
<code>kLSRequest.AllFlags</code>	<code>= &h10</code>	Requests all item-information flags.
<code>kLSRequestIconAndKind</code>	<code>= &h20</code>	Not used.
<code>kLSRequestExtensionFlagsOnly</code>	<code>= &h40</code>	Requests only the <code>kLSItemInfoExtensionIsHidden</code> item-information flag.
<code>kLSRequestAllInfo</code>	<code>= -1</code>	

14.5.11 `LaunchServicesKindStringForCFURLMBS(cfurlhandle as Integer) as string`

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: Get the kind string for an item.

Notes: Returns the kind string as used in the Finder and elsewhere for the given folderitem.

Cfurlhandle should be the non 0 value from a CFURL object handle property.

14.5.12 `LaunchServicesOpenMBS(item as folderitem) as folderitem`

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: Open an application, document, or folder.

Example:

```
Dim file As FolderItem = SpecialFolder.Desktop.Child("Test.xojo_binary_project")
Dim a As FolderItem = LaunchServicesOpenMBS(file)
```

MsgBox a.NativePath

Notes: Opens applications, documents, and folders. Applications are opened via an 'oapp' or 'rapp' event. Documents are opened in their user-overridden or default applications as appropriate. Folders are opened in the Finder. Use the more specific `LaunchServicesOpenXMBS` for more control over launching.

Returns a folderitem to the application which was launched.

Upgraded in version 19.5 to use CFURL instead of FSRef APIs.

Blog Entries

- [MBS Xojo Plugins, version 19.5pr1](#)

14.5.13 `LaunchServicesOpenXMBS(documents() as folderitem, parameter as LaunchServicesLaunchParameterMBS) as folderitem`

Plugin Version: 3.2, Platform: macOS, Targets: All.

Function: Opens an application or one or more documents or folders.

Example:

```
// Open a file in Preview (Mac OS X).
Sub OpenWithPreview(f as folderitem)
  dim p as FolderItem
  dim d(0) as FolderItem
  dim r as FolderItem
  dim param as LaunchServicesLaunchParameterMBS

  // Find preview
  p=LaunchServicesFindApplicationForInfoMBS("prvw", "com.apple.Preview", "Preview.app")

  if p<>Nil then
    d(0)=f

    param=new LaunchServicesLaunchParameterMBS
    param.Application=p
    param.Defaults=true // just default settings

    r=LaunchServicesOpenXMBS(d, param)
    if r<>nil then
      Return //Success
    end if
  end if
end if
```

```
// On failure, just launch normally:
f.Launch true
End Sub
```

Notes: Opens applications, documents, and folders. Applications are opened via an 'oapp' or 'rapp' event. Documents are opened in their user-overridden or default applications as appropriate. Folders are opened in the Finder.

Returns a folderitem to the application which was launched.
Currently this function is not available to RB versions before 3.5.
Note that the documents parameter is an array of folderitem and not just one.

Upgraded in version 19.5 to use CFURL instead of FSRef APIs.

Blog Entries

- [MBS Xojo Plugins, version 19.5pr1](#)

14.5.14 LaunchServicesSetDefaultHandlerForURLSchemeMBS(URLScheme as string, BundleID as string) as Integer

Plugin Version: 6.1, Platform: macOS, Targets: All.

Function: Sets the user's preferred handler for the specified URL scheme.

Example:

```
dim e as Integer
dim old as string

old=LaunchServicesDefaultHandlerForURLSchemeMBS("http")

MsgBox "Before: "+old

e=LaunchServicesSetDefaultHandlerForURLSchemeMBS("http","com.microsoft.explorer")

MsgBox "LaunchServicesSetDefaultHandlerForURLSchemeMBS: "+str(e)

MsgBox "Between: "+LaunchServicesDefaultHandlerForURLSchemeMBS("http")

e=LaunchServicesSetDefaultHandlerForURLSchemeMBS("http",old)

MsgBox "LaunchServicesSetDefaultHandlerForURLSchemeMBS: "+str(e)

MsgBox "After: "+LaunchServicesDefaultHandlerForURLSchemeMBS("http")
```

Notes: Returns Mac OS error code with 0 for success.
The handler is specified as an application bundle identifier.
Requires Mac OS X 10.4 to work correct. Returns always -1 on older systems.

14.5.15 LaunchServicesSetDefaultRoleHandlerForContentTypeMBS(Content Type as string, role as Integer, BundleID as string) as Integer

Plugin Version: 6.0, Platform: macOS, Targets: All.

Function: Sets the user's preferred handler for the specified content type (UTI) in the specified role(s).

Example:

dim e as Integer

```
// makes Acrobat the default pdf reader
'e=LaunchServicesSetDefaultRoleHandlerForContentTypeMBS("com.adobe.pdf",-1,"com.adobe.Reader")

// makes preview the default pdf reader
e=LaunchServicesSetDefaultRoleHandlerForContentTypeMBS("com.adobe.pdf",-1,"com.apple.preview")

msgbox str(e)
```

Notes: For all roles, specify kLSRolesAll. The handler is specified as an application bundle identifier.
Returns a Mac OS error code or -1 if the function is not available.
Requires Mac OS X 10.4.

Constants you can use for the role parameter:

kLSRolesNone	= 1	no claim is made about support for this type/scheme
kLSRolesViewer	= 2	claim to be able to view this type/scheme
kLSRolesEditor	= 4	claim to be able to edit this type/scheme
kLSRolesAll	= -1	claim to do it all

14.6 module UTTypeMBS

14.6.1 module UTTypeMBS

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: The module to wrap all the Apple UTI functions.

Notes: See this webpage for a list of all the predefined types:

http://developer.apple.com/documentation/Carbon/Conceptual/understanding_utis/utilist/chapter_4_section_1.html

Blog Entries

- [MacOSX plugin for iOS](#)
- [MBS Xojo Plugins, version 19.0pr6](#)

14.6.2 Methods

14.6.3 ConformsTo(UTI as string, ConformsToUTI as string) as boolean

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: Checks whether a type is a subtype of the second type.

Example:

```
if UTTypeMBS.ConformsTo("public.jpeg","public.image") then
  MsgBox "ConformsTo"
else
  MsgBox "not ConformsTo"
end if
```

14.6.4 CreateAllIdentifiersForTag(inTagClass as string, inTag as string, inConformingToUTI as string) as string()

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: Creates an array of all uniform type identifiers indicated by the specified tag.

Example:

```
MsgBox join(UTTypeMBS.CreateAllIdentifiersForTag(UTTypeMBS.kUTTagClassFilenameExtension, "txt",
""))
// shows "public.plain-text"

MsgBox join(UTTypeMBS.CreateAllIdentifiersForTag(UTTypeMBS.kUTTagClassFilenameExtension, "xml",
""))
// shows "public.xml com.apple.dashcode.xml"
```

Notes: An overloaded tag (e.g., an extension used by several applications for different file formats) may

indicate multiple types. If no declared type identifiers have the specified tag, then a single dynamic type identifier will be created for the tag. Optionally, the returned type identifiers must conform to the identified "conforming-to" type argument. This is a hint to the implementation to constrain the search to a particular tree of types. For example, the client may want to know the type indicated by a particular extension tag. If the client knows that the extension is associated with a directory (rather than a file), the client may specify "public.directory" for the conforming-to argument. This will allow the implementation to ignore all types associated with byte data formats (public.data base type).

14.6.5 CreatePreferredIdentifierForTag(inTagClass as string, inTag as string, inConformingToUTI as string) as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: Creates a uniform type identifier for the type indicated by the specified tag.

Example:

```
MsgBox UTTypeMBS.CreatePreferredIdentifierForTag(UTTypeMBS.kUTTagClassFilenameExtension, "jpg",
"")
// shows "public.jpeg"
MsgBox UTTypeMBS.CreatePreferredIdentifierForTag(UTTypeMBS.kUTTagClassOSType, "TIFF", "public.image")
// shows "public.tiff"
```

Notes: This is the primary function to use for going from tag (extension/MIMEType/OSType) to uniform type identifier. Optionally, the returned type identifiers must conform to the identified "conforming-to" type argument. This is a hint to the implementation to constrain the search to a particular tree of types. For example, the client may want to know the type indicated by a particular extension tag. If the client knows that the extension is associated with a directory (rather than a file), the client may specify "public.directory" for the conforming-to argument. This will allow the implementation to ignore all types associated with byte data formats (public.data base type). If more than one type is indicated, preference is given to a public type over a non-public type on the theory that instances of public types are more common, and therefore more likely to be correct. When there a choice must be made between multiple public types or multiple non-public types, the selection rules are undefined. Clients needing finer control should use CreateAllIdentifiersWith-Tag. If no declared type is indicated, a dynamic type identifier is generated which satisfies the parameters.

14.6.6 DeclaringBundleURL(UTI as string) as folderitem

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: Returns the folderitem of the bundle containing the type declaration of the identified type.

Example:

```
MsgBox UTTypeMBS.DeclaringBundleURL("public.jpeg").NativePath
```

14.6.7 Description(UTI as string) as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: Returns the localized, user-readable type description string.

Example:

```
MsgBox UTTypeMBS.Description("public.jpeg") // "JPEG-Bild" in German
```

14.6.8 Equal(UTI as string, SecondUTI as string) as boolean

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: Checks whether two types are equal.

Example:

```
if UTTypeMBS.Equal("public.jpeg","public.jpeg") then
MsgBox "equal"
else
MsgBox "not equal"
end if
```

Notes: Returns true if both UTIs are equal.

14.6.9 kUTExportedTypeDeclarationsKey as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the constants for the keys used in type declarations.

Example:

```
MsgBox UTTypeMBS.kUTExportedTypeDeclarationsKey // "UTExportedTypeDeclarations"
```

14.6.10 kUTImportedTypeDeclarationsKey as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the constants for the keys used in type declarations.

Example:

```
MsgBox UTTypeMBS.kUTImportedTypeDeclarationsKey // "UTImportedTypeDeclarations"
```

14.6.11 kUTTagClassFilenameExtension as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the constant strings identify tag classes for use when converting uniform type identifiers to and from equivalent tags.

Example:

```
MsgBox UTTypeMBS.kUTTagClassFilenameExtension // "public.filename-extension"
```

14.6.12 kUTTagClassMIMETYPE as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the constant strings identify tag classes for use when converting uniform type identifiers to and from equivalent tags.

Example:

```
MsgBox UTTypeMBS.kUTTagClassMIMETYPE // "public.mime-type"
```

14.6.13 kUTTagClassNSPboardType as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the constant strings identify tag classes for use when converting uniform type identifiers to and from equivalent tags.

Example:

```
MsgBox UTTypeMBS.kUTTagClassNSPboardType // "com.apple.nspboard-type"
```

14.6.14 kUTTagClassOSType as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the constant strings identify tag classes for use when converting uniform type identifiers to and from equivalent tags.

Example:

```
MsgBox UTTypeMBS.kUTTagClassOSType // "com.apple.ostype"
```

14.6.15 kUTTypeAliasFile as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.16 kUTTypeAliasRecord as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.17 kUTTypeAppleICNS as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.18 kUTTypeAppleProtectedMPEG4Audio as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.19 kUTTypeApplication as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.20 kUTTypeApplicationBundle as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.21 kUTTypeApplicationFile as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.22 kUTTypeArchive as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.23 kUTTypeAudio as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.24 kUTTypeAudiovisualContent as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.25 kUTTypeBMP as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.26 kUTTypeBundle as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.27 kUTTypeCHheader as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.28 kUTTypeCompositeContent as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.29 kUTTypeConformsToKey as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the constants for the keys used in type declarations.

Example:

```
MsgBox UTTypeMBS.kUTTypeConformsToKey // "UTTypeConformsTo"
```

14.6.30 kUTTypeContact as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.31 kUTTypeContent as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.32 kUTTypeCPlusPlusHeader as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.33 kUTTypeCPlusPlusSource as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.34 kUTTypeCSource as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.35 kUTTypeData as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.36 kUTTypeDescriptionKey as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the constants for the keys used in type declarations.

Example:

```
MsgBox UTTypeMBS.kUTTypeDescriptionKey // "UTTypeDescription"
```

14.6.37 kUTTypeDirectory as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.38 kUTTypeDiskImage as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.39 kUTTypeFileURL as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.40 kUTTypeFlatRTFD as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.41 kUTTypeFolder as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.42 kUTTypeFramework as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.43 kUTTypeGIF as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.44 kUTTypeHTML as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.45 kUTTypeICO as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.46 kUTTypeIconFileKey as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the constants for the keys used in type declarations.

Example:

```
MsgBox UTTypeMBS.kUTTypeIconFileKey // "UTTypeIconFile"
```

14.6.47 kUTTypeIdentifierKey as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the constants for the keys used in type declarations.

Example:

```
MsgBox UTTypeMBS.kUTTypeIdentifierKey // "UTTypeIdentifier"
```

14.6.48 kUTTypeImage as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.49 kUTTypeInkText as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.50 kUTTypeItem as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.51 kUTTypeJavaSource as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.52 kUTTypeJPEG as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.53 kUTTypeJPEG2000 as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.54 kUTTypeMessage as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.55 kUTTypeMountPoint as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.56 kUTTypeMovie as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

Example:

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.avi")
dim u as string = UTTypeMBS.UTI(f)

if UTTypeMBS.ConformsTo(u, UTTypeMBS.kUTTypeMovie) then
  MsgBox u+" is movie"
else
  MsgBox u+" is not movie."
end if
```

14.6.57 kUTTypeMP3 as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.58 kUTTypeMPEG as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.59 kUTTypeMPEG4 as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.60 `kUTTypeMPEG4Audio` as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.61 `kUTTypeObjectiveCPlusPlusSource` as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.62 `kUTTypeObjectiveCSource` as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.63 `kUTTypePackage` as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.64 `kUTTypePDF` as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.65 `kUTTypePICT` as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.66 kUTTypePlainText as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.67 kUTTypePNG as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.68 kUTTypeQuickTimeImage as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.69 kUTTypeQuickTimeMovie as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.70 kUTTypeReferenceURLKey as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the constants for the keys used in type declarations.

Example:

```
MsgBox UTTypeMBS.kUTTypeReferenceURLKey // "UTTypeReferenceURL"
```

14.6.71 kUTTypeResolvable as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.72 `kUTTypeRTF` as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.73 `kUTTypeRTFD` as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.74 `kUTTypeSourceCode` as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.75 `kUTTypeSymLink` as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.76 `kUTTypeTagSpecificationKey` as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the constants for the keys used in type declarations.

Example:

```
MsgBox UTTypeMBS.kUTTypeTagSpecificationKey // "UTTypeTagSpecification"
```

14.6.77 `kUTTypeText` as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.78 kUTTypeTIFF as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.79 kUTTypeTXNTextAndMultimediaData as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.80 kUTTypeURL as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.81 kUTTypeUTF16ExternalPlainText as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.82 kUTTypeUTF16PlainText as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.83 kUTTypeUTF8PlainText as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.84 kUTTypeVCard as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.85 kUTTypeVersionKey as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the constants for the keys used in type declarations.

Example:

```
MsgBox UTTypeMBS.kUTTypeVersionKey // "UTTypeVersion"
```

14.6.86 kUTTypeVideo as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.87 kUTTypeVolume as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.88 kUTTypeWebArchive as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.89 kUTTypeXML as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: One of the predefined type constants.

14.6.90 PreferredTagWithClass(inUTI as string, inTagClass as string) as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: Returns the identified type's preferred tag with the specified tag class as a String.

Example:

```
MsgBox UTTypeMBS.PreferredTagWithClass("public.jpeg",UTTypeMBS.kUTTagClassMIMETYPE)
// shows "image/jpeg"
MsgBox UTTypeMBS.PreferredTagWithClass("public.jpeg",UTTypeMBS.kUTTagClassFilenameExtension)
// shows "jpeg"
```

Notes: This is the primary function to use for going from uniform type identifier to tag. If the type declaration included more than one tag with the specified class, the first tag in the declared tag array is the preferred tag.

14.6.91 UTI(file as folderitem) as string

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: Queries the UTI for a given file.

Example:

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.xojo_binary_project")
MsgBox UTTypeMBS.UTI(f) // shows com.xojo.project.binary
```

Notes: Returns "" if no UTI is available.

Chapter 15

Login Items

15.1 class LoginItemsMBS

15.1.1 class LoginItemsMBS

Plugin Version: 7.2, Platform: macOS, Targets: Desktop only.

Deprecated: This item is deprecated and should no longer be used. You can use LSSharedFileListMBS instead. **Function:** A class to handle login items on Mac OS X.

Notes: After creating a new object, the constructor may fail sometimes while updateing the list. lasterror is -609 in that case. His happens most likely just after login when the system events process is not yet ready. In that case, let your app wait a few seconds and try again.

For newer Mac OS X versions, please use LSSharedFileListMBS class instead.

Blog Entries

- [MBS Xojo Plugins, version 22.5pr1](#)
- [Adding Login Items on Mac OS X](#)

15.1.2 Methods

15.1.3 AddFile(file as FolderItem, hidden as boolean=false) as boolean

Plugin Version: 7.2, Platform: macOS, Targets: Desktop only.

Function: Adds a file to the login items.

Notes: Returns true on success.

For newer Mac OS X versions, please use `LSSharedFileListMBS` class instead.

15.1.4 `AddURL(url as string, hidden as boolean=false)` as boolean

Plugin Version: 7.2, Platform: macOS, Targets: Desktop only.

Function: Adds an url to the item list.

Notes: Returns true on success.

For newer Mac OS X versions, please use `LSSharedFileListMBS` class instead.

15.1.5 `DisplayName(index as Integer)` as String

Plugin Version: 7.4, Platform: macOS, Targets: Desktop only.

Function: The display name of the item with the given index.

Example:

```
dim l as LoginItemsMBS
```

```
l=new LoginItemsMBS  
MsgBox l.displayName(0) // shows name of first item
```

Notes: The display name may be localized.

15.1.6 `File(index as Integer)` as FolderItem

Plugin Version: 7.2, Platform: macOS, Targets: Desktop only.

Function: The file reference of the item with the given index.

Notes: Index is from 0 to count-1.

15.1.7 `IsHidden(index as Integer)` as boolean

Plugin Version: 7.2, Platform: macOS, Targets: Desktop only.

Function: Whether the item with the given index should be hidden after launch.

Notes: Index is from 0 to count-1.

This value does not work in Mac OS X 10.4, but works in 10.5.

15.1.8 Name(index as Integer) as String

Plugin Version: 7.4, Platform: macOS, Targets: Desktop only.

Function: The name of the item with the given index.

Example:

```
dim l as LoginItemsMBS
```

```
l=new LoginItemsMBS
MsgBox l.Name(0) // shows name of first item
```

Notes: This is the file name. To get the name for display, use `displayName`.

15.1.9 OldAddLoginItem(file as folderitem,hide as boolean,allusers as boolean) as boolean

Plugin Version: 7.5, Platform: macOS, Targets: Desktop only.

Function: Adds a file to the loginitems list.

Example:

```
dim f as folderItem
dim r as new LoginItemsMBS

f=app.applicationFileMBS
if r.OldAddLoginItem(f,false,false) then
msgBox f.displayName+" has been added to the login items!"
else
msgBox "Something went wrong."
end if
```

Notes: This is the old method which edits the preferences file directly.

Do not use it unless you really need to. The new functions in this class handle login items using a system service and will be safer for future releases of Mac OS X.

`hide` matches the checkbox in the loginitems list.

`allusers` decides whether to set it for all user or the current one.

This function will add a LoginItem to the list of LoginItems when called. The properties given to the new LoginItem are passed when calling the function. Note that **no** check is made when adding the LoginItem to ensure that the path points to a valid application. Note that the LoginItem Is always added to the **end** of the list of LoginItems.

First Parameter (appfile):

The absolute path of the application to be launched expressed as a Xojo folderitem.

Second Parameter (hide):

A value representing if you want your application to be hidden at login time. True if you want the application to be hidden after it is launched. If you want the application to show up normally use be hidden use false.

Third Parameter (allusers):

A constant which represents which users preferences we want to change. In this case there are two alternatives: False which changes the preferences of the current user. The second alternative is True.

The kAllUsers LoginItems are launched for all users on the system. You must be root or admin to use the kAllUsers option.

Function Returns:

This function returns a boolean value representing if the function was successful.

The function returns true if the LoginItem was successfully added. False if otherwise. No additional error codes are returned.

Other Notes:

This code doesn't work properly if more than one application is attempting to write to the LoginItems preference at once.

Also no check is made to ensure that what you are adding to the LoginItem list isn't a duplicate. If there is a duplicate however only one instance of the application is launched.

15.1.10 OldCountOfLoginItems(allusers as boolean) as Integer

Plugin Version: 7.5, Platform: macOS, Targets: Desktop only.

Function: This function will return the number of LoginItems for the user requested.

Example:

```
// Add this code for synchronization:
```

```
dim cf as CFPreferencesMBS
dim b as Boolean
```

```
cf=new CFPreferencesMBS
b=cf.AppSynchronize(cf.kCFPreferencesCurrentApplication)
```

```
// Count items

dim r as new LoginItemsMBS
msgbox str(r.OldCountOfLoginItems(false))
```

Notes: This is the old method which edits the preferences file directly. Do not use it unless you really need to. The new functions in this class handle login items using a system service and will be safer for future releases of Mac OS X.

This function returns the number of LoginItems for the user requested as a signed integer.

15.1.11 OldLoginItemPropertyAtIndex(*what as Integer, index as Integer, allusers as boolean*) as string

Plugin Version: 7.5, Platform: macOS, Targets: Desktop only.

Function: Returns a property from the loginitems list.

Example:

```
dim i as Integer
dim c as Integer
dim l as Integer
dim path,name,hide as string
dim r as new LoginItemsMBS

c=r.OldCountOfLoginItems(false)

MsgBox str(c)+" Login items found for this user."

c=c-1
for i=0 to c
name=r.OldLoginItemPropertyAtIndex(2,i,false)
hide=r.OldLoginItemPropertyAtIndex(3,i,false)
path=r.OldLoginItemPropertyAtIndex(1,i,false)

list.addRow name
l=list.lastIndex
list.cell(1,1)=hide
list.cell(1,2)=path
list.cell(1,3)=str(i)
next
```

Notes: This is the old method which edits the preferences file directly.

Do not use it unless you really need to. The new functions in this class handle login items using a system service and will be safer for future releases of Mac OS X.

Index is from 0 to count-1.

What can be 1 for the absolute path of the LoginItem, 2 for the LoginItem name or 3 for a string with "false" or "true" for the hiding option.

Returns "" on any error.

15.1.12 OldRemoveLoginItem(file as folderitem,allusers as boolean) as boolean

Plugin Version: 7.5, Platform: macOS, Targets: Desktop only.

Function: Removes a file to the loginitems list.

Example:

```
dim f as folderItem
dim r as new LoginItemsMBS

f=app.applicationFileMBS
if r.OldRemoveLoginItem(f,false) then
msgBox f.displayName+" has been added to the login items!"
else
msgBox "Something went wrong."
end if
```

Notes: This is the old method which edits the preferences file directly.

Do not use it unless you really need to. The new functions in this class handle login items using a system service and will be safer for future releases of Mac OS X.

The items are compared by path.

Returns true if item was found and the new list is written correctly to disk.

allusers decides whether to set it for all user or the current one.

15.1.13 OldRemoveLoginItemAtIndex(index as Integer, allusers as boolean) as boolean

Plugin Version: 7.5, Platform: macOS, Targets: Desktop only.

Function: Removes an entry from the loginitem list.

Notes: This is the old method which edits the preferences file directly.

Do not use it unless you really need to. The new functions in this class handle login items using a system service and will be safer for future releases of Mac OS X.

Index is from 0 to count-1.

15.1.14 Remove(index as Integer) as boolean

Plugin Version: 7.2, Platform: macOS, Targets: Desktop only.

Function: Removes the item from the login items list.

Notes: Index is from 0 to count-1.

The count property is updated.

15.1.15 RemoveFile(file as FolderItem) as boolean

Plugin Version: 7.2, Platform: macOS, Targets: Desktop only.

Function: Removes the items matching this file reference from the list.

Notes: Returns true on success.

Count is updated.

15.1.16 RemoveURL(url as string) as boolean

Plugin Version: 7.2, Platform: macOS, Targets: Desktop only.

Function: Removes the item matching the given URL.

Notes: Returns true on success.

15.1.17 Update

Plugin Version: 7.2, Platform: macOS, Targets: Desktop only.

Function: Reloads the list of items.

Notes: Update is done after each modification method and in the constructor.

You should never need to call this method.

15.1.18 URL(index as Integer) as String

Plugin Version: 7.2, Platform: macOS, Targets: Desktop only.

Function: The URL of the item with the given index.

Notes: Index is from 0 to count-1.

15.1.19 Properties

15.1.20 Count as Integer

Plugin Version: 7.2, Platform: macOS, Targets: Desktop only.

Function: Number of items in the list currently.

Notes: (Read and Write property)

15.1.21 Handle as Integer

Plugin Version: 7.2, Platform: macOS, Targets: Desktop only.

Function: The handle to the NSArray Reference used internally for the item list.

Notes: (Read and Write property)

15.1.22 Lasterror as Integer

Plugin Version: 7.2, Platform: macOS, Targets: Desktop only.

Function: The last error code.

Notes: Value can be 0 for success or -1 for a parameter error in the plugins or some other Mac OS X error code.

(Read and Write property)

Chapter 16

Mac

16.1 Globals

16.1.1 CurrentAppearanceThemeMBS as string

Platform: macOS, Targets: Desktop only.

Function: Returns which theme is used on your computer.

Example:

```
msgbox "You are using this theme: "+CurrentAppearanceThemeMBS
```

Notes: Possible values:

com.apple.theme.appearance.platinum

com.apple.theme.appearance.aqua

com.apple.theme.appearance.aqua.blue

com.apple.theme.appearance.aqua.graphite

Returns "" on any error.

Available in CarbonLib 1.4 and later. Available in Mac OS X 10.1 and later.

On Windows or Linux an empty string is returned.

16.2 class TextInputSourceMBS

16.2.1 class TextInputSourceMBS

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: The class for text input source on Mac OS X.

Notes: Text input sources fall into three general categories:

- Keyboard input sources, including keyboard layouts, keyboard input methods and input modes
- Palette input sources, including the character palette, keyboard viewer, and private dictionary panels
- Ink input sources

Palette input sources and ink input source are categorized as non-keyboard input sources. However, palette input sources might still involve some keyboard interaction. Keyboard input methods can be mode-enabled (for instance, Kotoeri). Hence, they are potentially the parent of several input modes directly selectable in the user interface (for instance, hiragana, katakana, and romaji). With mode-enabled input methods, the parent input method is not directly selectable. Non-mode-enabled input methods are directly selectable.

Some input sources are provided and installed with OS X. Other input sources can be installed as third party products themselves or as part of the installation of certain applications. International Preferences displays a list of all visible installed input sources. You can use International Preferences to enable or disable most input sources that are intended to be visible in the user interface. Setup Assistant also enables some input sources. A separate user interface provides a way to enable ink input sources.

You can use some of the functions in Text Input Source Services to enable or disable input sources programmatically in your application. One keyboard input source must be enabled. Only one ink input source may be enabled. Multiple instances of other input source types may be enabled.

Some enabled input sources are invisible but programmatically selectable, such as ink. Some are visible but not programmatically selectable, such as mode-savvy parent input methods (these must be visible so that International Preferences can display the parent input method for a group of input modes).

Input modes can only be changed from disabled to enabled if their parent input method is enabled. Input modes can only be selected if they and their parent input method are enabled.

Exactly one keyboard input source is selected at any time: the current keyboard input source. Selecting a new keyboard input source deselects the previous keyboard input source. Multiple palette input sources may be selected. For instance, there may be one or more character palettes and one or more keyboard viewers selected in addition to the selected keyboard input source. Selecting or deselecting a palette (or ink) input source does not affect any other input source. Input methods that provide associated input palettes may programmatically deselect the palette when the input method is deselected, for example.

Text Input Source Source Services specifies modern, non-Script-Manager-based programming interfaces for operating on text input sources and performs the following functions:

- Finds information about text input sources

- Selects, enables, and disables text input sources
- Receives notifications about relevant changes in text input sources.

Available in OS X v10.5 and later.

see also

<https://developer.apple.com/library/mac/#documentation/TextFonts/Reference/TextInputSourcesReference/Reference/reference.html>

Blog Entries

- [MBS Real Studio Plugins, version 12.5pr8](#)

16.2.2 Methods

16.2.3 BundleID as string

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: The reverse DNS BundleID associated with the input source.

Example:

```
MsgBox TextInputSourceMBS.CurrentKeyboardInputSource.BundleID
```

16.2.4 Category as string

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: The category of this input source.

Example:

```
MsgBox TextInputSourceMBS.CurrentKeyboardInputSource.Category
```

Notes: Can be `kTISCategoryKeyboardInputSource`, `kTISCategoryPaletteInputSource`, and `kTISCategoryInkInputSource`.

16.2.5 CreateASCIICapableInputSourceList as TextInputSourceMBS()

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: Creates a list of ASCII-capable keyboard input sources.

Notes: This list represents a snapshot of ASCII-capable keyboard input sources enabled when the call was

made. Successive calls to `CreateASCIICapableInputSourceList` may return different results because, for example, in between the calls the user may enable or disable an input source in the International Preferences pane. When a keyboard input source is enabled or disabled, by the user or programmatically, the distributed CF notification `kTISNotifyEnabledKeyboardInputSourcesChanged` is posted.

16.2.6 `CreateInputSourceList(properties as dictionary, includeAllInstalled as boolean) as TextInputSourceMBS()`

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: Creates a list of input sources that match specified properties.

Example:

```
// show keyboard viewer
Dim d As New Dictionary
d.Value(TextInputSourceMBS.kTISPropertyInputSourceID) = "com.apple.KeyboardViewer"

Dim sources() As TextInputSourceMBS = TextInputSourceMBS.CreateInputSourceList(d, False)
If UBound(Sources) >= 0 Then
sources(0).SelectIt
End If
```

Notes: `properties`: A dictionary of property keys and corresponding values to filter the input source list. May be nil, in which case no filtering is performed.

`includeAllInstalled`: Typically, set to false so that only enabled input sources are included; set to true to include all installed input sources that match the filter .

Returns an array for a list of text input source references that match the specified properties.

This list represents a snapshot of input sources that matched the properties specified when you made the call. If you want to include input sources that are installed but not currently enabled, set the `includeAllInstalled` parameter to true. Typically, you do this to obtain a text input source reference for a newly installed input source. In this case, the `properties` parameter would include very specific criteria limiting the matching input sources.

Important: Calling this function with the `includeAllInstalled` parameter set to true can have significant memory impact on the calling application if the `properties` parameter is nil (match all) or if it specifies criteria that might match many installed input sources. This setting might force caching of data for all matching input sources and result in an allocation of up to 120K.

If you are calling `CreateInputSourceList` to find a specific input source or sources from among the sources included in the list, first call `CreateInputSourceList` with `includeAllInstalled` set to false and check whether the returned array includes the desired input source(s). If this is not the case, call `CreateInputSourceList` again with the `includeAllInstalled` parameter set to true.

none

16.2.7 CurrentASCIICapableKeyboardInputSource as TextInputSourceMBS

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: Returns a text input source reference for the most recently used ASCII-capable keyboard input source.

Example:

```
dim t as TextInputSourceMBS
t = TextInputSourceMBS.CurrentASCIICapableKeyboardInputSource
```

```
MsgBox t.LocalizedName
```

Notes: Returns text input source reference for the most recently used ASCII-capable keyboard input source.

If no ASCII-capable keyboard input source has been used yet, the function returns the default ASCII-capable keyboard layout chosen by Setup Assistant.

16.2.8 CurrentASCIICapableKeyboardLayoutInputSource as TextInputSourceMBS

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: Returns a text input source reference for the most recently used ASCII-capable keyboard layout.

Example:

```
dim t as TextInputSourceMBS
t = TextInputSourceMBS.CurrentASCIICapableKeyboardLayoutInputSource
```

```
MsgBox t.LocalizedName
```

Notes: Returns A text input source reference for the most recently used ASCII-capable keyboard layout.

If no ASCII-capable keyboard input source has been used, the function returns the default ASCII-capable keyboard layout chosen by Setup Assistant.

This function is used by input methods to get the keyboard layout used for key translation if no specific keyboard layout override exists. The CurrentASCIICapableKeyboardInputSource can return input sources that are not keyboard layouts.

16.2.9 CurrentKeyboardInputSource as TextInputSourceMBS

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: Returns a text input source reference for the currently selected keyboard input source.

Example:

```
dim t as TextInputSourceMBS
t = TextInputSourceMBS.CurrentKeyboardInputSource
MsgBox t.LocalizedName
```

16.2.10 CurrentKeyboardLayoutInputSource as TextInputSourceMBS

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: Returns a text input source reference for the keyboard layout currently in use.

Example:

```
dim t as TextInputSourceMBS
t = TextInputSourceMBS.CurrentKeyboardLayoutInputSource
MsgBox t.LocalizedName
```

Notes: If the currently selected keyboard input source is a keyboard layout, the text input source reference refers to that layout. If the currently selected keyboard input source is an input method or mode, the text input source reference refers to the keyboard layout used by that input method or mode.

16.2.11 Deselect

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: Deselects the specified input source.

Notes: inputSource: The input source you want to deselect.

Lasterror is set.

Deselect is for use with palette or ink input sources only. It has no effect on other input sources. When palette input sources are disabled, the palette disappears. Ink input sources are usually deselected and disabled at the same time.

16.2.12 Disable

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: Disables the specified input source.

Notes: Sets lasterror. Lasterror is paramErr (-50) if the input source cannot be disabled. Otherwise, lasterror is noErr (0).

Disable is primarily intended for input methods, or for applications that supply their own input sources (for example, applications that provide keyboard layouts or palette input methods, and keyboard input methods that provide their own keyboard layouts and input modes). It makes the specified input source unavailable for selection and removes it from the user interface.

16.2.13 Enable

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: Enables the specified input source.

Notes: Lasterror is set. Lasterror is paramErr (-50) if the input source cannot be enabled. Otherwise, it is noErr (0).

Enable is primarily for input methods or for applications that supply their own input sources (for example, applications that provide keyboard layouts or palette input methods, and keyboard input methods that provide their own keyboard layouts and input modes). It makes the specified input source available in the user interface for selection.

For Enable to succeed, the input source must be capable of being enabled (that is, `KTISPropertyInputSourceIsEnableCapable` is set to true). Furthermore, if the input source is an input mode, its parent must already be enabled for the mode to become enabled.

16.2.14 Icon as Variant

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: Queries IconMBS object for this input source.

Notes: Icon references are the typical icon format for keyboard layouts and input methods. If an icon reference is not available for the specified input source, the value is nil.

16.2.15 IconImageFile as folderitem

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: The file containing the image (typically TIFF) to be used as the input source icon.

Notes: If an image file URL is not available for the specified input source, the value is nil. Note that other image formats (for example, JPEG, PNG) may also be used in the future.

16.2.16 IconImageURL as string

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: The URL to the file containing the image (typically TIFF) to be used as the input source icon.

Notes: If an image file URL is not available for the specified input source, the value is nil. Note that other image formats (for example, JPEG, PNG) may also be used in the future.

16.2.17 InputMethodKeyboardLayoutOverride as TextInputSourceMBS

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: Returns a text input source reference for the currently selected input method's keyboard layout override.

Example:

```
dim t as TextInputSourceMBS
t = TextInputSourceMBS.InputMethodKeyboardLayoutOverride
if t = nil then
  MsgBox "Nil"
else
  MsgBox t.LocalizedName
end if
```

Notes: If the current keyboard input source is an input method or mode that has a keyboard layout override, a text input source reference for that keyboard layout is returned. Otherwise, the function returns nil.

16.2.18 InputModeID as string

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: A reverse DNS string that identifies a particular usage class for input modes.

Example:

```
MsgBox TextInputSourceMBS.CurrentKeyboardInputSource.InputModeID
```

Notes: For example, `com.apple.inputmethod.Japanese.Katakana` identifies a standard Katakana-input usage class that may be associated with input modes from several different input methods. You can attach this input mode to a `TSMDocument` using the `TSMSetDocumentProperty` function with the tag `kTSMDocumentInputModePropertyTag`, to control the input mode usage class that should be used with that TSM document.

16.2.19 `InputSourceForLanguage(language as string)` as `TextInputSourceMBS`

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: Returns a text input source reference for the input source that should be used to input the specified language.

Notes: `language`: A BCP 47 language code (in the same form returned by the Core Foundation function `CFLocaleCreateCanonicalLanguageIdentifierFromString` function) that represents the language an input source should be returned for.

Returns an enabled input source that can input the specified language. If more than one such input source exists and at least one has been used, the most recently used input source is chosen. If none has been used, one is chosen based on the intended languages of the input sources. If no enabled input source exists that can input the specified language, the function returns `nil`.

If a text field is expected to have input in a particular language, an application can call `InputSourceForLanguage` and then `SelectIt` to select an input source appropriate for that language. This function is a replacement for the deprecated `KeyScript` programming interface's capability to select the default input source associated with a particular script code.

16.2.20 `IsASCIICapable` as boolean

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: Whether the input source is intended to be capable of ASCII input.

16.2.21 `IsEnableCapable` as boolean

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: Whether the input source can ever be programmatically enabled using `Enable`.

Notes: You can enable most input sources programmatically at any time. `IsEnableCapable` is set to true for these input sources.

Some input sources can never be programmatically enabled. These are mainly input method private keyboard layouts used by the input method via the function `SetInputMethodKeyboardLayoutOverride`. You cannot directly enable these layouts, nor use them as keyboard layout input sources. `IsEnableCapable` is set

to false for these.

Some input sources can be programmatically enabled only under the correct conditions. These are mainly input modes, which can be changed from disabled to enabled only if their parent input method is enabled. However, they can already be in the enabled state, but not currently selectable if their parent input method is disabled. `IsEnableCapable` is true for these.

16.2.22 `IsEnabled` as boolean

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: Whether the input source is currently enabled.

Example:

```
MsgBox str(TextInputSourceMBS.CurrentKeyboardInputSource.IsEnabled)
```

16.2.23 `IsSelectCapable` as boolean

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: Whether the input source can ever be programmatically selected using `Select`.

Notes: This static property of an input source does not depend on any current state. For input sources that can be programmatically selected if they are enabled, `IsSelectCapable` is set to true.

For input sources that can never be programmatically selected even if they are enabled, `IsSelectCapable` is set to false. Such sources are mainly input methods that have modes (parent input methods); only their modes can be selected.

For input sources that are enabled and can only be programmatically selected under the correct conditions, `IsSelectCapable` is set to true. Such input sources are mainly input modes, which can only be selected if both they and their parent input method are enabled.

For input sources that can never be enabled or selected, `IsSelectCapable` is set to false.

16.2.24 `IsSelected` as boolean

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: Whether the input source is currently selected.

Example:

```
MsgBox str(TextInputSourceMBS.CurrentKeyboardInputSource.IsSelected)
```

16.2.25 kTISCategoryInkInputSource as string

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: One of the category identifiers.

Notes: You can install or select 0 or 1 ink input source.

16.2.26 kTISCategoryKeyboardInputSource as string

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: One of the category identifiers.

Notes: This category includes keyboard layouts, keyboard input methods (both with modes and without), and keyboard input modes. At least one input source in this category is installed. Of all input sources in this category, exactly one is selected; selecting a new one deselects the previous one.

16.2.27 kTISCategoryPaletteInputSource as string

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: One of the category identifiers.

Notes: This category includes character palettes and keyboard viewers. You can select 0 or more categories.

16.2.28 kTISNotifyEnabledKeyboardInputSourcesChanged as string

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: The name of the CF distributed notification for a change to the set of enabled keyboard input sources.

Notes: Available in OS X v10.5 and later.

16.2.29 kTISNotifySelectedKeyboardInputSourceChanged as string

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: The name of the CF distributed notification for a change to the selected keyboard input source.

Notes: Available in OS X v10.5 and later.

16.2.30 kTISPropertyBundleID as string

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: One of the property keys.

Notes: This property key designates a property value, which is a string for the reverse DNS BundleID associated with the input source.

16.2.31 kTISPropertyIconImageURL as string

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: One of the property keys.

Notes: This property key designates a property value, which is a CFURLRef indicating the file containing the image (typically TIFF) to be used as the input source icon.

If an image file URL is not available for the specified input source, the value is nil. Note that other image formats (for example, JPEG, PNG) may also be used in the future.

Note: You may not use this key (and its corresponding value) used in the filter dictionary passed to the CreateInputSourceList function.

16.2.32 kTISPropertyIconRef as string

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: One of the property keys.

Notes: This property key designates a property value, which is an IconRef value for the input source icon. Icon references are the typical icon format for keyboard layouts and input methods. If an icon reference is not available for the specified input source, the value is nil.

Note: You may not use this key (and its corresponding value) used in the filter dictionary passed to the CreateInputSourceList function.

16.2.33 kTISPropertyInputModeID as string

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: One of the property keys.

Notes: This property key designates a property value, which is a CFStringRef for a reverse DNS string that identifies a particular usage class for input modes.

For example, com.apple.inputmethod.Japanese.Katakana identifies a standard Katakana-input usage class that may be associated with input modes from several different input methods.

You can attach this input mode to a TSMDocument using the TSMSetDocumentProperty function with the tag kTSMDocumentInputModePropertyTag, to control the input mode usage class that should be used with

that TSM document.

16.2.34 kTISPropertyInputSourceCategory as string

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: One of the property keys.

Notes: This property key designates a property value, which is a string indicating the category of an input source.

Possible values are specified by the following property value constants: kTISCategoryKeyboardInputSource, kTISCategoryPaletteInputSource, and kTISCategoryInkInputSource.

16.2.35 kTISPropertyInputSourceID as string

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: One of the property keys.

Example:

```
// show keyboard viewer
Dim d As New Dictionary
d.Value(TextInputSourceMBS.kTISPropertyInputSourceID) = "com.apple.KeyboardViewer"

Dim sources() As TextInputSourceMBS = TextInputSourceMBS.CreateInputSourceList(d, False)
If UBound(Sources) >= 0 Then
sources(0).SelectIt
End If
```

Notes: This property key designates a property value, which is a CFStringRef for the unique reverse DNS name associated with the input source.

- For keyboard input methods and for palette or ink input sources, typically, the bundle ID, for instance, com.apple.Kotoeri.
- For keyboard input modes, typically, the bundle ID of the parent input method plus a suffix that uniquely identifies the input mode, for instance, com.apple.Kotoeri.Katakana. It is not the generic input mode name used across input methods, for instance, com.apple.inputmethod.Japanese.Katakana.
- For keyboard layouts, a new identification mechanism typically structured as com.company.keyboard-layout.name, for instance, com.apple.keyboardlayout.US.

16.2.36 `kTISPropertyInputSourceIsASCIICapable` as string

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: One of the property keys.

Notes: This property key designates a property value, which is a boolean indicating whether the input source is intended to be capable of ASCII input.

16.2.37 `kTISPropertyInputSourceIsEnableCapable` as string

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: One of the property keys.

Notes: This property key designates a property value which is a boolean indicating whether the input source can ever be programmatically enabled using `TISEnableInputSource`.

You can enable most input sources programmatically at any time. `kTISPropertyInputSourceIsEnableCapable` is set to true for these input sources.

Some input sources can never be programmatically enabled. These are mainly input method private keyboard layouts used by the input method via the function `TISSetInputMethodKeyboardLayoutOverride`. You cannot directly enable these layouts, nor use them as keyboard layout input sources. `kTISPropertyInputSourceIsEnableCapable` is set to false for these.

Some input sources can be programmatically enabled only under the correct conditions. These are mainly input modes, which can be changed from disabled to enabled only if their parent input method is enabled. However, they can already be in the enabled state, but not currently selectable if their parent input method is disabled. `kTISPropertyInputSourceIsEnableCapable` is true for these.

16.2.38 `kTISPropertyInputSourceIsEnabled` as string

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: One of the property keys.

Notes: This property key designates a property value, which is a boolean indicating whether the input source is currently enabled.

16.2.39 `kTISPropertyInputSourceIsSelectCapable` as string

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: One of the property keys.

Notes: This property key designates a property value, which is a boolean indicating whether the input source can ever be programmatically selected using `TISSelectInputSource`.

This static property of an input source does not depend on any current state. For input sources that can be programmatically selected if they are enabled, `kTISPropertyInputSourceIsSelectCapable` is set to true.

For input sources that can never be programmatically selected even if they are enabled, `kTISPropertyInputSourceIsSelectCapable` is set to false. Such sources are mainly input methods that have modes (parent input methods); only their modes can be selected.

For input sources that are enabled and can only be programmatically selected under the correct conditions, `kTISPropertyInputSourceIsSelectCapable` is set to true. Such input sources are mainly input modes, which can only be selected if both they and their parent input method are enabled.

For input sources that can never be enabled or selected, `kTISPropertyInputSourceIsSelectCapable` is set to false.

16.2.40 `kTISPropertyInputSourceIsSelected` as string

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: One of the property keys.

Notes: This property key designates a property value, which is a Boolean indicating whether the input source is currently selected.

16.2.41 `kTISPropertyInputSourceLanguages` as string

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: One of the property keys.

Notes: This property key designates a property value, which is a `CFArrayRef` for an array of `CFStringRef`s, where each string is the language code for a language that can be input using the input source. You can use this constant with the `PropertyValue` function, but you may not use it in the filter dictionary passed to the `CreateInputSourceList` function.

Languages codes are in the same BCP 47 form returned by the `CFLocaleCreateCanonicalLanguageIdentifierFromString` function. The first language code in the array is the language the input source is intended for. If no such language exists (for example, for the Unicode Hex Input keyboard layout), the first language code is an empty string.

16.2.42 `kTISPropertyInputSourceType` as string

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: One of the property keys.

Notes: This property key designates a property value, which is a string indicating the specific type of an input source.

Possible values are specified by the following property value constants: `kTISTypeKeyboardLayout`, `kTISTypeKeyboardInputMethodWithoutModes`, `kTISTypeKeyboardInputMethodModeEnabled`, `kTISTypeKeyboardInputMode`, `kTISTypeCharacterPalette`, `kTISTypeKeyboardViewer`, and `kTISTypeInk`.

16.2.43 `kTISPropertyLocalizedName` as string

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: One of the property keys.

Example:

```
dim t as TextInputSourceMBS
t = TextInputSourceMBS.CurrentKeyboardInputSource
MsgBox t.PropertyValue(t.kTISPropertyLocalizedName)
```

Notes: This property key designates a property value, which is a string for the input source's localized name as intended for user interface use.

Uses the best match (determined by `CFBundle`) between the localization used by the caller and the available localizations of the input source name. In some cases, this might be an unlocalized name.

16.2.44 `kTISPropertyUnicodeKeyLayoutData` as string

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: One of the property keys.

Notes: This property key designates a property value, which is a Memoryblock that refers to the 'uchr' keyboard layout data for a keyboard layout input source.

The 'uchr' data is in native-endian order. If the input source is not a keyboard layout, or is a keyboard layout for which only 'KCHR data' is available, the value is nil.

Note: You may not use this key (and its corresponding value) used in the filter dictionary passed to the `CreateInputSourceList` function.

16.2.45 `kTISTypeCharacterPalette` as string

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: One of the possible type values.

Notes: This type belongs to the category `kTISCategoryPaletteInputSource`.

16.2.46 `kTISTypeInk` as string

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: One of the possible type values.

Notes: This type belongs to the category `kTISCategoryInkInputSource`. Even though it is the only type in that category, a type is provided so that clients who don't need category information can just check input

source type.

16.2.47 `KTISTypeKeyboardInputMethodModeEnabled` as string

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: One of the possible type values.

Notes: This type belongs to the category `KTISCategoryKeyboardInputSource`.

16.2.48 `KTISTypeKeyboardInputMethodWithoutModes` as string

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: One of the possible type values.

Notes: This type belongs to the category `KTISCategoryKeyboardInputSource`.

16.2.49 `KTISTypeKeyboardInputMode` as string

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: One of the possible type values.

Notes: This type belongs to the category `KTISCategoryKeyboardInputSource`.

16.2.50 `KTISTypeKeyboardLayout` as string

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: One of the possible type values.

Notes: This type belongs to the category `KTISCategoryKeyboardInputSource`.

16.2.51 `KTISTypeKeyboardViewer` as string

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: One of the possible type values.

Notes: This type belongs to the category `KTISCategoryPaletteInputSource`.

16.2.52 LocalizedName as string

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: The input source's localized name as intended for user interface use.

Example:

```
MsgBox TextInputSourceMBS.CurrentKeyboardInputSource.LocalizedName
```

Notes: Uses the best match (determined by CFBundle) between the localization used by the caller and the available localizations of the input source name. In some cases, this might be an unlocalized name.

16.2.53 PropertyValue(key as string) as Variant

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: Gets the value of a specified property for a specified input source.

Example:

```
dim t as TextInputSourceMBS
t = TextInputSourceMBS.CurrentKeyboardInputSource
MsgBox t.PropertyValue(t.kTISPropertyLocalizedString)
```

Notes: Key: The property key constant specifying the desired property value.

Returns a variant associated with the property key. The value type is specified for each key. Can be a string, a boolean, a number, an array or an IconMBS. The function might return nil if the specified property is missing or invalid for the specified input source.

16.2.54 RegisterInputSource(file as folderitem) as Integer

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: Registers any new input sources in a file or bundle so a text input source reference can be obtained immediately for each new input source.

Notes: location: The location of the input sources in a file or bundle.

Returns a result code. The function returns paramErr (-50) if location is invalid or the input sources in the specified location cannot be registered. Otherwise, it returns noErr (0).

This function enables an installer for an input method bundle or a keyboard layout file or bundle to notify

the system to register these new input sources. The system can then locate the specified file or bundle and perform any necessary cache rebuilds so that the installer can immediately call `TISCreateInputSourceList` with appropriate properties (for example, a bundle ID or input source ID) to get text input source references for one or more of the newly registered input sources.

You can only use this function to register the following:

Keyboard layout files or bundles in the `/Library/Keyboard Layouts/` or `~/Library/Keyboard Layouts/` directory (available to all users or to the current user, respectively). Such keyboard layouts, once enabled, are selectable.

Input method bundles in the new `~/Library/Input Methods/` or `~/Library/Input Methods/` directories (available to all users or to the current user, respectively).

Note: Input method bundles can include private non-selectable keyboard layouts for use with `SetInputMethodKeyboardLayoutOverride`. These are registered automatically when the input method is registered, and do not need to be separately registered. They are not registered using `TISRegisterInputSource`.

Security: Any code that calls `RegisterInputSource` is part of an application or service that has already been validated in some way (for instance, by the user).

See also:

- 16.2.55 `RegisterInputSource(URL as string) as Integer`

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16.2.55 `RegisterInputSource(URL as string) as Integer`

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: Registers any new input sources in a file or bundle so a text input source reference can be obtained immediately for each new input source.

Notes: location: The location of the input sources in a file or bundle.

Returns a result code. The function returns `paramErr` (-50) if location is invalid or the input sources in the specified location cannot be registered. Otherwise, it returns `noErr` (0).

This function enables an installer for an input method bundle or a keyboard layout file or bundle to notify the system to register these new input sources. The system can then locate the specified file or bundle and perform any necessary cache rebuilds so that the installer can immediately call `TISCreateInputSourceList` with appropriate properties (for example, a bundle ID or input source ID) to get text input source references for one or more of the newly registered input sources.

You can only use this function to register the following:

Keyboard layout files or bundles in the `/Library/Keyboard Layouts/` or `~/Library/Keyboard Layouts/` directory (available to all users or to the current user, respectively). Such keyboard layouts, once enabled, are selectable.

Input method bundles in the new Library/Input Methods/ or textasciitilde /Library/Input Methods/ directories (available to all users or to the current user, respectively).

Note: Input method bundles can include private non-selectable keyboard layouts for use with SetInputMethodKeyboardLayoutOverride. These are registered automatically when the input method is registered, and do not need to be separately registered. They are not registered using TISRegisterInputSource.

Security: Any code that calls RegisterInputSource is part of an application or service that has already been validated in some way (for instance, by the user).

See also:

- 16.2.54 RegisterInputSource(file as folderitem) as Integer

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16.2.56 SelectIt

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: Selects the specified input source.

Example:

```
// show keyboard viewer
Dim d As New Dictionary
d.Value(TextInputSourceMBS.kTISPropertyInputSourceID) = "com.apple.KeyboardViewer"

Dim sources() As TextInputSourceMBS = TextInputSourceMBS.CreateInputSourceList(d, False)
If UBound(Sources) >= 0 Then
sources(0).SelectIt
End If
```

Notes: Lasterror is set. Lasterror is paramErr (-50) if the input source is not selectable. Otherwise, it is noErr (0).

When the input source is a selectable keyboard, the specified input source becomes the new current keyboard input source, and the previous input source is deselected. When the input source is a palette, that palette is displayed and made available for input. Ink input sources are typically enabled and selected at the same time. When you call SelectInputSource for a palette or ink input source, there is no effect on other input sources. When you call SelectInputSource for an already selected input source, there is, similarly, no effect.

For SelectInputSource to succeed, the input source must be selectable (that is, kTISPropertyInputSourceIsSelectable is set to true) and the input source must be enabled (that is, kTISPropertyInputSourceIsEnabled is set to true). Furthermore, if the input source is an input mode, its parent must be enabled for it to be selected.

We named the function SelectIt as Select is a reserved word in Xojo.

16.2.57 SetInputMethodKeyboardLayoutOverride

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: Sets the keyboard layout override for an input method or mode.

Notes: self: The input source for the keyboard layout that should be used until the current input method is deactivated (if it should be something other than the most recently used ASCII-capable keyboard layout).

Lasterorr is set. Value is paramErr (-50) if the current keyboard input source is not an input method or mode or if keyboardLayout does not designate a keyboard layout. Otherwise, it is noErr (0).

When an input method or mode is the selected input source, the most recently used ASCII-capable keyboard layout to translate key events is used. This keyboard layout is also the one that appears in Keyboard Viewer. An input source for this keyboard layout is returned by the function CurrentASCIICapableKeyboardLayoutInputSource. If a different keyboard layout should be used for a particular input method or mode, the activated input method or mode should call SetInputMethodKeyboardLayoutOverride to specify the desired keyboard layout.

For example, when a Kotoeri user selects kana layout for kana input, Kotoeri should call SetInputMethodKeyboardLayoutOverride to set the kana keyboard as the override for the appropriate input modes.

The keyboard layout set in this way is used for the final stage of key translation in the Window Server, the connection, or application-specific key translation.

The override setting is lost when the input method that set it is deactivated.

The keyboard layout used for overriding need not be enabled or explicitly selectable. It can be a non-selectable layout included in an input method bundle and automatically registered.

The default behavior is new with OS X v10.5, and eliminates the necessity that input methods have a user interface for setting the ASCII-capable keyboard for phonetic input based on Latin characters.

16.2.58 SourceID as string

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: The unique reverse DNS name associated with the input source.

Notes:

- For keyboard input methods and for palette or ink input sources, typically, the bundle ID, for instance, com.apple.Kotoeri.
- For keyboard input modes, typically, the bundle ID of the parent input method plus a suffix that

uniquely identifies the input mode, for instance, `com.apple.Kotoeri.Katakana`. It is not the generic input mode name used across input methods, for instance, `com.apple.inputmethod.Japanese.Katakana`.

- For keyboard layouts, a new identification mechanism typically structured as `com.company.keyboard-layout.name`, for instance, `com.apple.keyboardlayout.US`.

16.2.59 SourceLanguages as string()

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: The array of string, where each string is the language code for a language that can be input using the input source.

Notes: Languages codes are in the same BCP 47 form returned by the `CFLocaleCreateCanonicalLanguageIdentifierFromString` function. The first language code in the array is the language the input source is intended for. If no such language exists (for example, for the Unicode Hex Input keyboard layout), the first language code is an empty string.

16.2.60 Type as string

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: Returns the type of an input source.

Example:

```
MsgBox TextInputSourceMBS.CurrentKeyboardInputSource.Type
```

Notes: Value can be `kTISTypeKeyboardLayout`, `kTISTypeKeyboardInputMethodWithoutModes`, `kTISTypeKeyboardInputMethodModeEnabled`, `kTISTypeKeyboardInputMode`, `kTISTypeCharacterPalette`, `kTISTypeKeyboardViewer`, and `kTISTypeInk`.

16.2.61 Properties

16.2.62 Handle as Integer

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: Internal object reference.

Notes: (Read and Write property)

16.2.63 Lasterror as Integer

Plugin Version: 12.5, Platform: macOS, Targets: All.

Function: The last error code.

Notes: (Read and Write property)

Chapter 17

MIDI

17.1 class MidiPlaybackMBS

17.1.1 class MidiPlaybackMBS

Plugin Version: 5.4, Platform: macOS, Targets: All.

Function: A class to do Midi playback on Mac OS X.

Notes: With sandbox, you need the `com.apple.security.temporary-exception.audio-unit-host` entitlement as of September 2013.

see

https://developer.apple.com/library/mac/qa/qa1483/_index.html

See also `AVMIDIPlayerMBS` class for playing midi files.

Blog Entries

- [MacOSX plugin for iOS](#)
- [MBS Plugins updated for Xojo 2019r2](#)
- [MBS Xojo / Real Studio Plugins, version 13.4pr4](#)
- [Sandbox and playing Midi](#)
- [MBS Real Studio Plugins, version 11.2pr2](#)
- [MBS REALbasic plug-ins version 9.4](#)

17.1.2 Methods

17.1.3 Callback as Integer

Plugin Version: 6.0, Platform: macOS, Targets: All.

Function: Needed for the MidiPortMBS class to know which function to call

Example:

```
dim p as MidiPlaybackMBS
dim m as MidiPortMBS
// do something useful
m.SetCallback p.Callback, p
```

Notes: Return the address of the callback method used to process Midi data.

The method is to be used together with the SetCallback method in the MidiPortMBS class.

17.1.4 Constructor(UsesInternalReverb as boolean=false, AutoStart as boolean=true)

Plugin Version: 8.7, Platform: macOS, Targets: All.

Function: Initializes the midi playback.

Notes: After calling the constructor the Inited flag is true on success.

If AutoStart is false the midi playback is not started.

17.1.5 CPUload as single

Plugin Version: 5.4, Platform: macOS, Targets: All.

Function: The CPU load of the graph.

Notes:

Returns a short-term running average of the current CPU load of the graph.

17.1.6 InstrumentCount as Integer

Plugin Version: 5.4, Platform: macOS, Targets: All.

Function: The number of instruments.

17.1.7 InstrumentID(index as Integer) as Integer

Plugin Version: 5.4, Platform: macOS, Targets: All.

Function: The ID of the instrument with the given index.

17.1.8 InstrumentName(index as Integer) as string

Plugin Version: 5.4, Platform: macOS, Targets: All.

Function: The name of the instrument with the given index.

Example:

```
// show list of all names
dim m as new MidiPlaybackMBS

dim u as Integer = m.InstrumentCount-1
for i as Integer = 0 to u
  Listbox1.AddRow m.InstrumentName(i)
next
```

Notes: Index from 0 to InstrumentCount-1.

17.1.9 IsRunning as boolean

Plugin Version: 9.4, Platform: macOS, Targets: All.

Function: Whether the midi playback is running.

Notes: Lasterror is set.

17.1.10 LoadSoundBankFile(file as folderitem)

Plugin Version: 8.5, Platform: macOS, Targets: All.

Function: Loads a sound bank file.

Example:

```
Sub LoadSoundFont (SoundFontName as string)

  dim j as Integer
  dim f as folderitem
  dim e as string
```

```

//GET SOUNDFONT
f = Volume(0).Child("Library").Child("Audio").Child("Sounds").Child("Banks").Child(SoundFontName)

if f <> Nil then
//INSTALL SOUNDFONT
me.LoadSoundBankFile(f)
Window1.PopupMenu1.DeleteAllRows
for j = 0 to 127
if me.InstrumentName(j) <> "" then
Window1.PopupMenu1.addrow me.InstrumentName(j)
end if
next
Window1.PopupMenu1.ListIndex = 0
else
e = "Could not locate the SoundFont: " + SoundFontName
e = e + " Please make sure the file is a valid soundfont file"
e = e + " and is located in the folder YourHardDrive/Library/Audio/Sounds/Banks"
e = e + " and has the extension .sf2"
MsgBox e
end if

End Sub

```

Notes: This function can load files with .sf2 extension placed in the location: Library/Audio/Sounds/Banks.

Lasterror is set.

To avoid crashes on Mac OS X 10.5, the midi playback is stopped before loading is done and restarted if necessary after loading completed.

As a side effect stopping the midi playback may reset volume, reverb and tuning.

17.1.11 MaxCPULoad as single

Plugin Version: 8.7, Platform: macOS, Targets: All.

Function: The Maximum CPU load of the graph

Notes: Returns the max CPU load of the graph since this call was last made or the graph was last started.

17.1.12 SendMidiEvent(Status as Integer, Data1 as Integer, Data2 as Integer, OffsetSampleFrame as Integer)

Plugin Version: 5.4, Platform: macOS, Targets: All.

Function: Sends midi data for playback.

17.1.13 Start

Plugin Version: 9.4, Platform: macOS, Targets: All.

Function: Starts the midi playback.

Notes: Lasterror is set.

17.1.14 Stop

Plugin Version: 9.4, Platform: macOS, Targets: All.

Function: Stops the midi playback.

Notes: Lasterror is set.

As a side effect stopping the midi playback may reset volume, reverb and tuning.

17.1.15 Properties

17.1.16 FilterNodeHandle as Integer

Plugin Version: 11.2, Platform: macOS, Targets: All.

Function: The internal reference for the filter graph node.

Notes: (Read only property)

17.1.17 GraphHandle as Integer

Plugin Version: 8.7, Platform: macOS, Targets: All.

Function: The handle for the AUGraph.

Notes: (Read only property)

17.1.18 Inited as boolean

Plugin Version: 8.7, Platform: macOS, Targets: All.

Function: Whether the constructor was successful.

Notes: This property is false if the constructor failed to initialize.
(Read only property)

17.1.19 Lasterror as Integer

Plugin Version: 5.4, Platform: macOS, Targets: All.

Function: The last error code.

Notes: (Read only property)

17.1.20 OutputNodeHandle as Integer

Plugin Version: 11.2, Platform: macOS, Targets: All.

Function: The internal reference for the output graph node.

Notes: (Read only property)

17.1.21 SynthNodeHandle as Integer

Plugin Version: 11.2, Platform: macOS, Targets: All.

Function: The internal reference for the synth graph node.

Notes: (Read only property)

17.1.22 SynthUnitHandle as Integer

Plugin Version: 11.2, Platform: macOS, Targets: All.

Function: The internal reference for the synth audio unit.

Notes: (Read only property)

17.1.23 InstrumentIDOnChannel(Channel as Integer) as Integer

Plugin Version: 5.4, Platform: macOS, Targets: All.

Function: Which instrument is playing on which channel.

Notes: (Read and Write computed property)

17.1.24 ReverbVolume as single

Plugin Version: 8.7, Platform: macOS, Targets: All.

Function: The reverb volume.

Notes: The value range is -120 to 40 dB.

(Read and Write computed property)

17.1.25 StreamFromDisk as boolean

Plugin Version: 8.7, Platform: macOS, Targets: All.

Function: Whether we are streaming from disk.

Notes: Currently setting this value can crash the application.

(Read and Write computed property)

17.1.26 Tuning as single

Plugin Version: 8.7, Platform: macOS, Targets: All.

Function: The tuning setting.

Notes: Value is in cents from -1200 to 1200.

(Read and Write computed property)

17.1.27 UsesInternalReverb as boolean

Plugin Version: 8.7, Platform: macOS, Targets: All.

Function: One of the audio unit properties.

Example:

```
dim m as new MidiPlaybackMBS
```

```
MsgBox "UsesInternalReverb: "+str(m.UsesInternalReverb)
```

```
m.UsesInternalReverb=true
```

```
MsgBox "UsesInternalReverb: "+str(m.UsesInternalReverb)
```

Notes: Lasterror is set.
(Read and Write computed property)

17.1.28 Volume as single

Plugin Version: 8.7, Platform: macOS, Targets: All.

Function: The volume.

Notes: The value is in dB from -120 to 40.
(Read and Write computed property)

Chapter 18

Network

18.1 class `DNSServiceDiscoveryBrowseMBS`

18.1.1 class `DNSServiceDiscoveryBrowseMBS`

Plugin Version: 5.0, Platform: macOS, Targets: Desktop, Console & Web.

Deprecated: This item is deprecated and should no longer be used. You can use `DNSServiceBrowseMBS` instead. **Function:** A class for Apple's implementation of ZeroConfig named Bonjour.

Notes: This class allows you to browse for services on the local network using Bonjour.

Common error codes for Rendezvous:

<code>kDNSServiceDiscoveryUnknownErr</code>	-65537
<code>kDNSServiceDiscoveryNoSuchNameErr</code>	-65538
<code>kDNSServiceDiscoveryNoMemoryErr</code>	-65539
<code>kDNSServiceDiscoveryBadParamErr</code>	-65540
<code>kDNSServiceDiscoveryBadReferenceErr</code>	-65541
<code>kDNSServiceDiscoveryBadStateErr</code>	-65542
<code>kDNSServiceDiscoveryBadFlagsErr</code>	-65543
<code>kDNSServiceDiscoveryUnsupportedErr</code>	-65544
<code>kDNSServiceDiscoveryNotInitializedErr</code>	-65545
<code>kDNSServiceDiscoveryNoCache</code>	-65546
<code>kDNSServiceDiscoveryAlreadyRegistered</code>	-65547
<code>kDNSServiceDiscoveryNameConflict</code>	-65548
<code>kDNSServiceDiscoveryInvalid</code>	-65549
<code>kDNSServiceDiscoveryMemFree</code>	-65792

But several other Mac OS error codes may also be there.

This class requires Mac OS X 10.2 to work. Use `DNSServiceBrowseMBS` if you want to support Mac OS X 10.3 and Windows.

Not available on Mac OS X 10.9.

Blog Entries

- [MBS Xojo / Real Studio Plugins, version 14.2pr4](#)
- [MBS Xojo / Real Studio Plugins, version 13.2pr7](#)

18.1.2 Methods

18.1.3 Available as boolean

Plugin Version: 5.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Whether Bonjour (zeroconfig) is installed.

Notes: If this function returns true, all the needed stuff is installed and the function have been loaded.

18.1.4 Browse(servicetype as string, domain as string) as boolean

Plugin Version: 5.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Asynchronously create a DNS Service browser to search for matching services in the local network.

Notes: servicetype:
The type of service.

domain:
The domain in which to find the service.

Returns true if successful.
The ServiceBrowse event may be called till this browse request is closed.

18.1.5 Close

Plugin Version: 5.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Stops the current request and releases all used memory.

18.1.6 Running as boolean

Plugin Version: 5.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: True if there is a running request.

18.1.7 Properties

18.1.8 Handle as Integer

Plugin Version: 5.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: The handle for this request.

Notes: (Read only property)

18.1.9 Events

18.1.10 ServiceBrowse(message as Integer, name as string, type as string, domain as string, flags as Integer)

Plugin Version: 5.0, Platform: macOS, Targets: .

Function: New service found or lost one.

Notes: If message=0 a new service was found. Message=1 means that a service was removed.

Flags=1 means that more data is coming. Flags=0 means the end of the current list of services. But several minutes later when a new Mac connects to the network another ServiceBrowse Event may inform you, even if flags was 0.

Starting a new query from within this event on the same object can cause problems. Better you create a new instance for another query if you need one.

18.2 class `DNSServiceDiscoveryDomainEnumerationMBS`

18.2.1 class `DNSServiceDiscoveryDomainEnumerationMBS`

Plugin Version: 5.0, Platform: macOS, Targets: Desktop, Console & Web.

Deprecated: This item is deprecated and should no longer be used. You can use `DNSServiceDomainEnumerationMBS` instead. **Function:** A class for Apple's implementation of ZeroConfig named Bonjour.

Notes: This class allows you to enumerate domains.

Common error codes for Rendezvous:

<code>kDNSServiceDiscoveryUnknownErr</code>	-65537
<code>kDNSServiceDiscoveryNoSuchNameErr</code>	-65538
<code>kDNSServiceDiscoveryNoMemoryErr</code>	-65539
<code>kDNSServiceDiscoveryBadParamErr</code>	-65540
<code>kDNSServiceDiscoveryBadReferenceErr</code>	-65541
<code>kDNSServiceDiscoveryBadStateErr</code>	-65542
<code>kDNSServiceDiscoveryBadFlagsErr</code>	-65543
<code>kDNSServiceDiscoveryUnsupportedErr</code>	-65544
<code>kDNSServiceDiscoveryNotInitializedErr</code>	-65545
<code>kDNSServiceDiscoveryNoCache</code>	-65546
<code>kDNSServiceDiscoveryAlreadyRegistered</code>	-65547
<code>kDNSServiceDiscoveryNameConflict</code>	-65548
<code>kDNSServiceDiscoveryInvalid</code>	-65549
<code>kDNSServiceDiscoveryMemFree</code>	-65792

But several other Mac OS error codes may also be there.

This class requires Mac OS X 10.2 to work. Use `DNSServiceDomainEnumerationMBS` if you want to support Mac OS X 10.3 and Windows.

Not available on Mac OS X 10.9.

Blog Entries

- [MBS Xojo / Real Studio Plugins, version 14.2pr4](#)
- [MBS Xojo / Real Studio Plugins, version 13.2pr7](#)

18.2.2 Methods

18.2.3 Available as boolean

Plugin Version: 5.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Whether Bonjour (zeroconfig) is installed.

Notes: If this function returns true, all the needed stuff is installed and the function have been loaded.

18.2.4 Close

Plugin Version: 5.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Stops the current request and releases all used memory.

18.2.5 EnumerateDomains(domainType as Integer) as boolean

Plugin Version: 5.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Asynchronously create a DNS Domain Enumerator to search for domains in the local network.

Notes: domainType:

A flag indicating whether you are looking for recommended registration domains (value=1, e.g. equivalent to the AppleTalk zone list in the AppleTalk Control Panel) or recommended browsing domains (value=0, e.g. equivalent to the AppleTalk zone list in the Chooser).

Returns true if successful.

The ServiceDomainEnumeration event may be called till this enumerate request is closed.

18.2.6 Running as boolean

Plugin Version: 5.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: True if there is a running request.

18.2.7 Properties

18.2.8 Handle as Integer

Plugin Version: 5.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: The handle for this request.

Notes: (Read only property)

18.2.9 Events

18.2.10 ServiceDomainEnumeration(message as Integer, domain as string, flags as Integer)

Plugin Version: 5.0, Platform: macOS, Targets: .

Function: Domains changed.

Notes: Meaning of message:

- 0: Domain found.
- 1: Domain found (and should be selected by default).
- 2: Domain has been removed from network.

Flags=1 means that more data is coming. Flags=0 means the end of the current list of services. But several minutes later when a new Mac connects to the network another ServiceLookup Event may inform you, even if flags was 0.

Starting a new query from within this event on the same object can cause problems. Better you create a new instance for another query if you need one.

18.3 class DNSServiceDiscoveryRegisterMBS

18.3.1 class DNSServiceDiscoveryRegisterMBS

Plugin Version: 5.0, Platform: macOS, Targets: Desktop, Console & Web.

Deprecated: This item is deprecated and should no longer be used. You can use DNSServiceRegisterMBS instead. **Function:** A class for Apple's implementation of ZeroConfig named Bonjour.

Notes: This class allows you to register names on the local network using Bonjour.

Common error codes for Rendezvous:

kDNSServiceDiscoveryUnknownErr	-65537
kDNSServiceDiscoveryNoSuchNameErr	-65538
kDNSServiceDiscoveryNoMemoryErr	-65539
kDNSServiceDiscoveryBadParamErr	-65540
kDNSServiceDiscoveryBadReferenceErr	-65541
kDNSServiceDiscoveryBadStateErr	-65542
kDNSServiceDiscoveryBadFlagsErr	-65543
kDNSServiceDiscoveryUnsupportedErr	-65544
kDNSServiceDiscoveryNotInitializedErr	-65545
kDNSServiceDiscoveryNoCache	-65546
kDNSServiceDiscoveryAlreadyRegistered	-65547
kDNSServiceDiscoveryNameConflict	-65548
kDNSServiceDiscoveryInvalid	-65549
kDNSServiceDiscoveryMemFree	-65792

But several other Mac OS error codes may also be there.

This class requires Mac OS X 10.2 to work. Use DNSServiceRegisterMBS if you want to support Mac OS X 10.3 and Windows.

Not available on Mac OS X 10.9.

Blog Entries

- [MBS Xojo / Real Studio Plugins, version 14.2pr4](#)
- [MBS Xojo / Real Studio Plugins, version 13.2pr7](#)

18.3.2 Methods

18.3.3 Available as boolean

Plugin Version: 5.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Whether Bonjour (zeroconfig) is installed.

Notes: If this function returns true, all the needed stuff is installed and the function have been loaded.

18.3.4 Close

Plugin Version: 5.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Stops the current request and releases all used memory.

18.3.5 Register(servicename as string, servicetype as string, domain as string, port as Integer, text as string) as boolean

Plugin Version: 5.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Register a named service with DNS Service Discovery.

Notes: servicename:

The name of this service instance (e.g. "Steve's Printer")

servicetype:

The service type (e.g. "_printer._tcp.")

See RFC 2782 (DNS SRV) and this website:

<http://www.iana.org/assignments/port-numbers>

domain:

The domain in which to register the service (e.g. "apple.com.")

port:

The local port on which this service is being offered (in network byte order)

text:

Optional protocol-specific additional information

Returns true if successful.

The ServiceRegistration event may be called till this registration request is closed.

18.3.6 Running as boolean

Plugin Version: 5.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: True if there is a running request.

18.3.7 UpdateText(data as string, ttl as Integer) as Integer

Plugin Version: 5.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Changes the TXT Record.

Notes: data is the TXT Record composed of Pascal Strings.

ttl = time to live.

Returns an error code. (0=success)

18.3.8 Properties

18.3.9 Handle as Integer

Plugin Version: 5.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: The handle for this request.

Notes: (Read only property)

18.3.10 Text as String

Plugin Version: 5.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: The last TXT Record text used.

Notes: (Read only property)

18.3.11 Events

18.3.12 ServiceRegistration(errorcode as Integer)

Plugin Version: 5.0, Platform: macOS, Targets: .

Function: Registration was done.

Notes: errorcode is 0 if successfull.

Starting a new query from within this event on the same object can cause problems. Better you create a new instance for another query if you need one.

18.4 class `DNSServiceDiscoveryResolveMBS`

18.4.1 class `DNSServiceDiscoveryResolveMBS`

Plugin Version: 5.0, Platform: macOS, Targets: Desktop, Console & Web.

Deprecated: This item is deprecated and should no longer be used. You can use `DNSServiceResolveMBS` instead. **Function:** A class for Apple's implementation of ZeroConfig named Bonjour.

Notes: This class allows you to lookup names on the local network using Bonjour.

Common error codes for `Rendevouz`:

<code>kDNSServiceDiscoveryUnknownErr</code>	-65537
<code>kDNSServiceDiscoveryNoSuchNameErr</code>	-65538
<code>kDNSServiceDiscoveryNoMemoryErr</code>	-65539
<code>kDNSServiceDiscoveryBadParamErr</code>	-65540
<code>kDNSServiceDiscoveryBadReferenceErr</code>	-65541
<code>kDNSServiceDiscoveryBadStateErr</code>	-65542
<code>kDNSServiceDiscoveryBadFlagsErr</code>	-65543
<code>kDNSServiceDiscoveryUnsupportedErr</code>	-65544
<code>kDNSServiceDiscoveryNotInitializedErr</code>	-65545
<code>kDNSServiceDiscoveryNoCache</code>	-65546
<code>kDNSServiceDiscoveryAlreadyRegistered</code>	-65547
<code>kDNSServiceDiscoveryNameConflict</code>	-65548
<code>kDNSServiceDiscoveryInvalid</code>	-65549
<code>kDNSServiceDiscoveryMemFree</code>	-65792

But several other Mac OS error codes may also be there.

This class requires Mac OS X 10.2 to work. Use `DNSServiceResolveMBS` if you want to support Mac OS X 10.3 and Windows.

Not available on Mac OS X 10.9.

Blog Entries

- [MBS Xojo / Real Studio Plugins, version 14.2pr4](#)
- [MBS Xojo / Real Studio Plugins, version 13.2pr7](#)

18.4.2 Methods

18.4.3 Available as boolean

Plugin Version: 5.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Whether Bonjour (zeroconfig) is installed.

Notes: If this function returns true, all the needed stuff is installed and the function have been loaded.

18.4.4 Close

Plugin Version: 5.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Stops the current request and releases all used memory.

18.4.5 Lookup(servicename as string, servicetype as string, domain as string) as boolean

Plugin Version: 5.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Resolved a named instance of a service to its address, port, and (optionally) a text description.

Notes: servicename:

The name of the service instance.

servicetype:

The type of service.

domain:

The domain in which to find the service.

Returns true if successful.

The ServiceLookup event may be called till this lookup request is closed.

18.4.6 Running as boolean

Plugin Version: 5.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: True if there is a running request.

18.4.7 Properties

18.4.8 Handle as Integer

Plugin Version: 5.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: The handle for this request.

Notes: (Read only property)

18.4.9 Events

18.4.10 ServiceLookup(ip as string, port as Integer, text as string, flags as Integer)

Plugin Version: 5.0, Platform: macOS, Targets: .

Function: Lookup got something.

Notes: IP is a string like "192.168.1.14".

Flags=1 means that more data is coming. Flags=0 means the end of the current list of services. But several minutes later when a new Mac connects to the network another ServiceLookup Event may inform you, even if flags was 0.

Starting a new query from within this event on the same object can cause problems. Better you create a new instance for another query if you need one.

18.5 class DNSServiceMetaQueryMBS

18.5.1 class DNSServiceMetaQueryMBS

Plugin Version: 12.0, Platforms: macOS, iOS, Targets: All.

Function: Queries all Bonjour services.

Notes: Useful to learn what services are available. This queries the bonjour cache.

Blog Entries

- [MBS Xojo Plugins in version 22.4](#)
- [MBS Xojo Plugins, version 22.4pr1](#)
- [MacOSX plugin for iOS](#)

Xojo Developer Magazine

- [20.6, page 9: News](#)

18.5.2 Properties

18.5.3 Lasterror as Integer

Plugin Version: 12.0, Platforms: macOS, iOS, Targets: All.

Function: The last error code.

Notes: (Read and Write property)

18.5.4 Events

18.5.5 AddService(type as string, domain as string, interfaceName as string, rrtype as Integer, rrclass as Integer)

Plugin Version: 12.0, Platforms: macOS, iOS, Targets: .

Function: A service was found.

18.5.6 RemoveService(type as string, domain as string, interfaceName as string, rrtype as Integer, rrclass as Integer)

Plugin Version: 12.0, Platforms: macOS, iOS, Targets: .

Function: A service was removed.

Notes: Remove is only called when a network interface is disabled or if the record expires from the cache. For network efficiency reasons, clients do not send goodbye packets for meta-query PTR records when deregistering a service.

18.6 class NWEndPointMBS

18.6.1 class NWEndPointMBS

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: The class for a network endpoint.

Notes:

A Network Endpoint is an abstract static representation of a local or remote network entity. Endpoints indicate specific instances that connections may be created between, such as Hostname + Port pairs, IP Address + Port pairs, and named Bonjour Services.

This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

Blog Entries

- [MBS Xojo Plugins, version 24.1pr1](#)

18.6.2 Methods

18.6.3 Constructor

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: The private constructor.

18.6.4 Properties

18.6.5 AddressString as String

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: Returns an allocated IP address string for a network endpoint with the type address.

Notes: Returns the IP address string for the endpoint, or "" if the endpoint is not of type address.
(Read only property)

18.6.6 Handle as Integer

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: The internal object reference.

Notes: (Read and Write property)

18.6.7 HostName as String

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: Retrieves the hostname string for a network endpoint with the type host or URL.

Notes: (Read only property)

18.6.8 Port as Integer

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function:

Retrieves the port for a network endpoint with the type URL, Host, or address.

Notes:

The port will be returned in Host Byte Order.

Returns the port for the endpoint, or 0 if the endpoint is not of type host or address.

(Read only property)

18.6.9 PortString as String

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: Returns an allocated port string for a network endpoint with the type host or address.

Notes: (Read only property)

18.6.10 Type as Integer

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: Retrieves the type of a network endpoint.

Notes: (Read only property)

18.6.11 URL as String

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: Retrieves the URL string from a network endpoint of type URL.

Notes: (Read only property)

18.6.12 Constants

EndPoint Types

Constant	Value	Description
kTypeAddress	1	An IP Address + Port
kTypeBonjourService	3	A Bonjour Service Name + Type + Domain
kTypeHost	2	A Hostname + Port
kTypeInvalid	0	An invalid endpoint
kTypeURL	4	A URL endpoint.

18.7 class NWInterfaceMBS

18.7.1 class NWInterfaceMBS

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: A network interface.

Notes: A Network Interface is an object that represents a static snapshot of an interface that provides network connectivity, such as a Wi-Fi link, an Ethernet connection, a Cellular service, a VPN, or the loopback interface.

This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

Blog Entries

- [MBS Xojo Plugins, version 24.1pr1](#)

18.7.2 Methods

18.7.3 Constructor

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: The private constructor.

18.7.4 Properties

18.7.5 Handle as Integer

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: The internal object reference.

Notes: (Read and Write property)

18.7.6 Index as Integer

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: Retrieves the index of an interface, to be used for reference or logging purposes.

Notes: This is the same value as provided by `if_nametoindex`.

(Read only property)

18.7.7 Name as String

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: Retrieves the name of an interface, to be used for reference or logging purposes.

Notes: (Read only property)

18.7.8 Type as Integer

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: Retrieves the type of an interface.

Notes: This only accesses the type of the specific interface being queried, and will not take into account types used by interfaces that traffic will eventually be routed through. That is, if the interface is a virtual interface (such as a VPN) that eventually forwards traffic through Wi-Fi, the type will be of type other, not wifi.

(Read only property)

18.7.9 Constants

Interface Types

Constant	Value	Description
kInterfaceTypeCellular	2	The network interface type used for communication over cellular networks.
kInterfaceTypeLoopback	4	The network interface type used for communication over local loopback networks.
kInterfaceTypeOther	0	The network interface type used for communication over virtual networks or networks of unknown types.
kInterfaceTypeWifi	1	The network interface type used for communication over Wi-Fi networks.
kInterfaceTypeWired	3	The network interface type used for communication over wired Ethernet networks.

18.8 class NWPathMBS

18.8.1 class NWPathMBS

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: A Network Path object represents a snapshot of network path state.

Notes:

This state represents the known information about the local interface and routes that may be used to send and receive data. If the network path for a connection changes due to interface characteristics, addresses, or other attributes, a new path object will be generated. Note that the difference in the path attributes may not be visible through public accessors, and these changes should be treated merely as an indication that something about the network has changed.

This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

Blog Entries

- [MBS Xojo Plugins, version 24.1pr1](#)

18.8.2 Methods

18.8.3 Constructor

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: The private constructor.

18.8.4 Gateways as NWEndPointMBS()

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: List the IP addresses of the routers acting as the gateways for the path.

18.8.5 Interfaces as NWInterfaceMBS()

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: List all interfaces associated with the path.

18.8.6 IsEqual(other as NWPathMBS) as Boolean

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: Compares two network path objects and checks if their content is equal.

Notes: If they are not equal, they represent two different network states.

Returns true if the paths are equivalent, or false if there is any difference between the paths.

18.8.7 UsesInterfaceType(InterfaceType as Integer) as Boolean

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: Checks if the path uses a network interface with the specified type.

Notes: Returns true if the path uses any network interface with the specified type, false otherwise.

18.8.8 Properties

18.8.9 EffectiveLocalEndPoint as NWEndPointMBS

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: Retrieve the local endpoint that is being used, if present.

Notes:

If this path is the path from an connection, it represents the address that data is sent from.

(Read only property)

18.8.10 EffectiveRemoteEndPoint as NWEndPointMBS

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: Retrieve the remote endpoint that is being used, if present.

Notes: If this path is the path from a connection, it represents the address that data is sent to.

(Read only property)

18.8.11 Handle as Integer

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: The internal object reference.

Notes: (Read and Write property)

18.8.12 HasDNS as Boolean

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: Checks if the path has a DNS server configuration set.

Notes: Returns true if the path has a DNS server configuration set, false otherwise.
(Read only property)

18.8.13 HasIPv4 as Boolean

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: Checks if the path uses a network interface that supports IPv4 connectivity.

Notes: Returns true if the path uses a network interface that supports IPv4, false otherwise.
(Read only property)

18.8.14 HasIPv6 as Boolean

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: Checks if the path uses a network interface that supports IPv6 connectivity.

Notes: Returns true if the path uses a network interface that supports IPv6, false otherwise.
(Read only property)

18.8.15 IsConstrained as Boolean

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: Checks if the path uses any network interfaces that are considered constrained to the user.

Notes: Returns true if the path uses any network interface that is considered constrained, false otherwise.
(Read only property)

18.8.16 IsExpensive as Boolean

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: Checks if the path uses any network interfaces that are considered expensive to the user, such as, but not limited to, a cellular network.

Notes: Returns true if the path uses any network interface that is considered expensive, false otherwise.
(Read only property)

18.8.17 Status as Integer

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: Retrieves the status of a path.

Notes: The status of a specific path object will never change, as the path object itself is static. If there is a network change, the object that generated the path object will generate a new path object.
(Read only property)

18.8.18 UnsatisfiedReason as Integer

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: Retrieves a reason the path is not satisfied.

Notes:

In some cases, the reason helps to determine why the path is not satisfied. While the path may be unsatisfied for more than one reason, only the first reason will be given. In many cases, the path may be unsatisfied with no reason available.

Returns a reason the path is unsatisfied or `kUnsatisfiedReasonNotAvailable` if a reason is not available.
(Read only property)

18.8.19 Constants

Status

Constant	Value	Description
<code>kStatusInvalid</code>	0	The path is not valid
<code>kStatusSatisfiable</code>	3	The path does not currently have a usable route, but a connection attempt will trigger network attachment.
<code>kStatusSatisfied</code>	1	The path has a usable route upon which to send and receive data.
<code>kStatusUnsatisfied</code>	2	The path does not have a usable route. This may be due to a network interface being down, or due to system policy.

Unsatisfied Reason

Constant	Value	Description
<code>kUnsatisfiedReasonCellularDenied</code>	1	The user has disabled cellular
<code>kUnsatisfiedReasonLocalNetworkDenied</code>	3	The user has disabled local network access
<code>kUnsatisfiedReasonNotAvailable</code>	0	No reason is given
<code>kUnsatisfiedReasonVPNInactive</code>	4	A required VPN is not active
<code>kUnsatisfiedReasonWifiDenied</code>	2	The user has disabled Wi-Fi

18.9 class NWPathMonitorMBS

18.9.1 class NWPathMonitorMBS

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: An observer that you use to monitor and react to network changes.

Notes: The Network Path Monitor allows the caller to fetch the current global path (or a path restricted to a specific network interface type). The path is delivered in an event that is called every time the network path changes.

Blog Entries

- [MBS Xojo Plugins, version 24.1pr1](#)

18.9.2 Methods

18.9.3 Cancel

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: Stops receiving network path updates.

Notes: Cancel the path monitor.

Calls Cancel event when done.

See also:

- 18.9.12 Cancel 517

18.9.4 Constructor

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: Initializes a path monitor to observe all available interface types.

Notes: Create a default path monitor, that will allow the enumeration of all available interfaces on the system.

See also:

- 18.9.5 Constructor(requiredInterfaceType as Integer) 516

18.9.5 Constructor(requiredInterfaceType as Integer)

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: Initializes a path monitor to observe a specific interface type.

Notes: Create a path monitor specific to an interface type, that will allow the enumeration of any interface

that matches the type on the system.

See also:

- 18.9.4 Constructor

18.9.6 CreateForEthernetChannel as NWPathMonitorMBS

Plugin Version: 24.1, Platform: macOS, Targets: Desktop & iOS.

Function: Creates a path monitor for the ethernet interface.

Notes: Create a path monitor that enumerates all interfaces that support Ethernet channel.

18.9.7 ProhibitInterfaceType(InterfaceType as Integer)

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: Prohibit this path monitor from using the provided network interface type.

Notes: Call before calling Start.

18.9.8 Start

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: Starts monitoring path changes.

Notes: Starts the path monitor.

18.9.9 Properties

18.9.10 Handle as Integer

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: All.

Function: The internal object reference.

Notes: (Read and Write property)

18.9.11 Events

18.9.12 Cancel

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: .

Function: The event to be called on the queue provided once cancellation has completed.

Notes: Once the cancel handler has been called, the update event will not fire again.

See also:

- 18.9.3 Cancel

516

18.9.13 Update(path as NWPathMBS)

Plugin Version: 24.1, Platforms: macOS, iOS, Targets: .

Function: An event to be called whenever a path monitor has a new snapshot.

Notes: This will be called one or more times after calling Start.

Chapter 19

Power

19.1 class IOPMAssertionMBS

19.1.1 class IOPMAssertionMBS

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The class for PowerManagement assertions.

Notes: You use this class to block a Mac from sleeping display, disk or whole machine.

Blog Entries

- [MBS Xojo / Real Studio Plugins, version 13.2pr9](#)

19.1.2 Methods

19.1.3 AssertionsByProcess as Dictionary

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns a dictionary listing all assertions, grouped by their owning process.

Notes: Notes: One process may have multiple assertions. Several processes may have asserted the same assertion to different levels.

On success, this returns a dictionary of assertions per process. At the top level, keys to the Dictionary are pids stored as Integer. The value associated with each pid is an array of active assertions. Each entry in the array is an assertion represented as a Dictionary. See the keys `kIOPMAssertionTypeKey` and `kIOPMAssertionLevelKey`.

19.1.4 AssertionsStatus as Dictionary

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns a list of available assertions and their system-wide levels.

Notes: The system-wide level is the maximum of all individual assertions' levels.

On success, this returns a Dictionary of all assertions currently available.

The keys in the dictionary are the assertion types, and the value of each is a CFNumber that represents the aggregate level for that assertion.

19.1.5 Constructor(type as string, level as Integer, name as string)

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Calls internally CreateWithName function.

19.1.6 CreateWithDescription(AssertionType as string, Name as string, Details as string = "", HumanReadableReason as string = "", LocalizationBundlePath as string = "", Timeout as Double = 0, TimeoutAction as string = "") as IOPMAssertionMBS

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates an IOPMAssertion.

Notes: This is the preferred API to call to create an assertion. It allows the caller to specify the Name, Details, and HumanReadableReason at creation time. There are other keys that can further describe an assertion, but most developers don't need to use them. Use SetProperty or CreateWithProperties if you need to specify properties that aren't available here.

AssertionType: An assertion type constant. Caller must specify this argument.

Name: A String value to correspond to key kIOPMAssertionNameKey. Caller must specify this argument.

Details: A String value to correspond to key kIOPMAssertionDetailsKey. Caller may pass "", but it helps power users and administrators identify the reasons for this assertion.

HumanReadableReason: A String value to correspond to key kIOPMAssertionHumanReadableReasonKey. Caller may pass "", but if it's specified OS X may display it to users to describe the active assertions on their system.

LocalizationBundlePath: A String value to correspond to key kIOPMAssertionLocalizationBundlePathKey. This bundle path should include a localization for the string HumanReadableReason. Caller may pass "", but this argument is required if caller specifies HumanReadableReason.

Timeout: Specifies a timeout for this assertion. Pass 0 for no timeout.

TimeoutAction: Specifies a timeout action. Caller may pass "". If a timeout is specified but a TimeoutAction is not, the default timeout action is kIOPMAssertionTimeoutActionTurnOff.

On success this function returns a new assertion.

19.1.7 CreateWithHandle(Handle as Integer) as IOPMAssertionMBS

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates a new object with retaining given handle.

19.1.8 CreateWithName(type as string, level as Integer, name as string) as IOPMAssertionMBS

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Dynamically requests a system behavior from the power management system.

Notes: Create is deprecated in favor of CreateWithProperties. Please use that version of this API instead.

No special privileges are necessary to make this call - any process may activate a power assertion. Caller must specify an AssertionName - "" is not a valid input.

Type	The String assertion type to request from the PM system.
Level	Pass kIOPMAssertionLevelOn or kIOPMAssertionLevelOff.
Name	A string that describes the name of the caller and the activity being handled by this assertion (e.g. "Mail Compacting Mailboxes"). Name may be no longer than 128 characters.

On success, returns an IOPMAssertionMBS object.

19.1.9 CreateWithProperties(AssertionProperties as Dictionary) as IOPMAssertionMBS

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates an IOPMAssertion with more flexibility than CreateWithDescription.

Notes: AssertionProperties: Dictionary providing the properties of the assertion that need to be created.

On successful return, returns the assertion.

Create a new PM assertion - the caller must specify the type of assertion, initial level, and its properties as `IOPMAssertionDictionaryKeys` keys in the `AssertionProperties` dictionary. The following keys are recommend and/or required to be specified in the `AssertionProperties` dictionary argument.

- Required `kiOPMAssertionTypeKey` define the assertion type.
- Required `kiOPMAssertionValueKey` define an initial value.
- Required `kiOPMAssertionNameKey` Caller must describe the name for the activity that requires the change in behavior provided by the assertion.
- Optional `kiOPMAssertionDetailsKey` Caller may describe context-specific data about the assertion.
- Optional `kiOPMAssertionHumanReadableReasonKey` Caller may describe the reason for creating the assertion in a localizable String. This should be a human readable phrase that describes the actions the calling process is taking while the assertion is held, like "Downloading TV episodes", or "Compiling Projects"
- Optional `kiOPMAssertionLocalizationBundlePathKey` Caller may provide its bundle's path, where OS X can localize for GUI display the String specified by `kiOPMAssertionHumanReadableReasonKey`.
- Optional `kiOPMAssertionPlugInIDKey` if the caller is a plugin with a different identity than the process it's loaded in.
- Optional `kiOPMAssertionFrameworkIDKey` if the caller is a framework acting on behalf of a process.
- Optional The caller may specify a timeout.

19.1.10 `DeclareUserActivity(assertionName as string, userType as Integer, byref assertionID as Integer) as Integer`

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Declares that the user is active on the system.

Notes: This causes the display to power on and postpone display sleep up to the user's display sleep Energy Saver settings. If you prefer to hold the display awake for a longer period and you know how long you'd like to hold it, consider taking assertion `kiOPMAssertionTypePreventUserIdleDisplaySleep` using `CreateWithDescription` instead.

No special privileges are necessary to make this call - any process may call this API. Caller must specify an `AssertionName`.

`AssertionName`: A string that describes the name of the caller and the activity being handled by this assertion (e.g. "Mail Compacting Mailboxes"). Name may be no longer than 128 characters.

`userType`: This parameter specifies if the active user is located locally in front of the system or connected to the system over the network. Various components of the system are maintained at different power levels depending on user location.

On Success, unique id will be returned in this parameter. Caller may call this function again with the unique id returned previously to report continuous user activity. The unique id returned by this function may change on each call depending on how frequently this function call is repeated and the current display sleep timer value. If you make this call more than once, track the returned value for assertionID, and pass it in as an argument on each call.

Returns kIOReturnSuccess (0) on success, any other return indicates PM could not successfully activate the specified assertion.

19.1.11 Properties as Dictionary

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Copies details about an IOPMAssertion.

Notes: Returns a dictionary describing an IOPMAssertion's specifications and current state.

19.1.12 SetProperty(key as string, value as Variant) as boolean

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Sets a property in the assertion.

Example:

```
dim t as string = IOPMAssertionMBS.kIOPMAssertionTypePreventUserIdleDisplaySleep
dim l as Integer = IOPMAssertionMBS.kIOPMAssertionLevelOn
dim a as IOPMAssertionMBS = IOPMAssertionMBS.CreateWithName(t, l, "Working")
if a.SetProperty(IOPMAssertionMBS.kIOPMAssertionNameKey, "test") then
  MsgBox a.name
end if
```

Notes: Only the process that created an assertion may change its properties.

key: The string key to modify.

Value: The property to set. It must be a number or string, as specified by the property key named in key.

Returns false on any error and true on success.

19.1.13 Properties

19.1.14 Details as String

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The details for this assertion.

Notes: You may provide extra, contextual information about an assertion for admins and for debugging in this key. Setting this key in an assertion dictionary is optional.

Please name your assertion something unique with `kIOPMAssertionNameKey` first.

If you have more data to describe this assertion, put it here as a String.

Example: OS X creates an assertion named `com.apple.powermanagement.tty` to prevent sleep for remote-logged in users. To identify the cause for these assertions, OS X sets `kIOPMAssertionDetailsKey` to the String device path of the active remote session(s), e.g. `"/dev/ttys000"` or `"/dev/ttys004"`

The String you associate with this key does not have to be localizable (OS X will not attempt to localize it.) (Read and Write property)

19.1.15 Handle as Integer

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The internal handle to the assertion.

Notes: Zero is not a valid ID.

(Read only property)

19.1.16 HumanReadableReason as String

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Optional value that provides a localizable string for OS X to display PM Assertions in the GUI.

Notes: The caller should specify this string in `CreateWithProperties`.

If present, OS X may display this string, localized to the user's language, to explain changes in system behavior caused by the assertion.

If set, the caller must also specify a bundle path for the key `kIOPMAssertionLocalizationBundlePathKey`.

The bundle at that path should contain localization info for the specified string.

(Read and Write property)

19.1.17 Level as Integer

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The assertion level.

Notes: (Read and Write property)

19.1.18 LocalizationBundlePath as String

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Refers to a string, identifying the path to the caller's bundle, which contains localization info.

Notes: (Read and Write property)

19.1.19 Name as String

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The name of the assertion.

Example:

```
dim t as string = IOPMAssertionMBS.kIOPMAssertionTypePreventUserIdleDisplaySleep
dim l as Integer = IOPMAssertionMBS.kIOPMAssertionLevelOn
dim a as IOPMAssertionMBS = IOPMAssertionMBS.CreateWithName(t, l, "Working")
MsgBox a.Name
```

Notes: kIOPMAssertionNameKey describes the the activity the assertion is protecting. The creator should specify a String value for this key in the dictionary passed to CreateWithProperties.

The assertion name is separate from the assertion type's behavior - specify a String like "Checking mail" or "Compiling" that describes the task that this assertion protects.

The String you associate with this key does not have to be localizable (OS X will not attempt to localize it.)
(Read and Write property)

19.1.20 RetainCount as Integer

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The retain count of the object.

Notes: (Read only property)

19.1.21 Timeout as Double

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Specifies an outer bound, in seconds, that this assertion should be asserted.

Notes: If your application hangs, or is unable to complete its assertion task in a reasonable amount of time, specifying a timeout allows PM to disable your assertion so the system can resume normal activity.

Once a timeout with the `kIOPMAssertionTimeoutActionTurnOff` assertion fires, the level will be set to `kIOPMAssertionTimeoutActionTurnOff`. The assertion may be re-armed by calling `IOPMAssertionSetLevel`.

(Read and Write property)

19.1.22 TimeoutAction as String

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Specifies the action to take upon timeout expiration.

Notes: Specifying the timeout action only has meaning if you also specify an `kIOPMAssertionTimeoutKey`. If the caller does not specify a timeout action, the default action is `kIOPMAssertionTimeoutActionTurnOff`.

(Read and Write property)

19.1.23 Type as String

Plugin Version: 13.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The assertion type.

Notes: The value for this key will be a `CFStringRef`, with the value of the assertion type specified at creation time.

Note that OS X may substitute a support assertion type string if the caller specifies a deprecated assertion type; in that case the value for this key could differ from the caller-provided assertion type.

(Read and Write property)

19.1.24 Constants

Constants

Constant	Value	Description
kIOPMAssertionDetailsKey	"Details"	<p>One of the keys for the properties of an assertion. You may provide extra, contextual information for debugging in this key. See <code>NSDictionary</code> for optional keys.</p> <p>Please name your assertion something meaningful first.</p> <p>If you have more data to describe the assertion, you can set to add explanation.</p> <p>Example: OS X creates an assertion to prevent sleep for remote-logged-in users. For these assertions, OS X sets <code>kIOPMAssertionDetailsKey</code> to the active remote session(s), e.g. "com.apple.RemoteLoginSession". The String you associate with this key will not attempt to localize it.)</p> <p>Describe your assertion as thoroughly as you can. (You can also set to add explanation.)</p> <p>* Optional <code>kIOPMAssertionNameKey</code> * Optional <code>kIOPMAssertionHumanReadableReasonKey</code> * Optional <code>kIOPMAssertionLocalizationBundlePathKey</code></p>
kIOPMAssertionFrameworkIDKey	"FrameworkBundleID"	One of the keys for the properties of an assertion.
kIOPMAssertionHumanReadableReasonKey	"HumanReadableReason"	<p>One of the keys for the properties of an assertion. Optional key that provides a localized human-readable reason for the assertion in the GUI.</p> <p>The caller should specify this string if present, OS X may display this string to explain changes in system behavior.</p> <p>If set, the caller must also specify a <code>LocalizationBundlePathKey</code>.</p> <p>The bundle at that path should contain a localized string.</p> <p>This key may be specified in the dictionary.</p> <p>This key may be present in the dictionary.</p> <p>Describe your assertion as thoroughly as you can. (You can also set to add explanation.)</p> <p>* Required <code>kIOPMAssertionNameKey</code> * Optional <code>kIOPMAssertionDetailsKey</code></p>
kIOPMAssertionLevelKey	"AssertLevel"	<p>One of the keys for the properties of an assertion. The Dictionary key for assertion level.</p> <p>The value for this key will be an integer or <code>kIOPMAssertionLevelOn</code>.</p> <p>The level reflects the assertion's level. See <code>IOPMAssertionSetLevel</code>.</p>
kIOPMAssertionLevelOff	0	Level for a disabled assertion, passively ignored.
kIOPMAssertionLevelOn	255	Level for an enabled assertion, passively ignored.
kIOPMAssertionLocalizationBundlePathKey	"BundlePath"	<p>One of the keys for the properties of an assertion. Refers to a string, identifying the localization info.</p>
kIOPMAssertionNameKey	"AssertName"	<p>One of the keys for the properties of an assertion. The Dictionary key for assertion name. Required when creating an assertion.</p> <p><code>kIOPMAssertionNameKey</code> describes the assertion. The creator should specify a String when calling <code>IOPMAssertionCreateWithProperties</code>.</p> <p>The assertion name is separate from the localized String like "Checking mail" or "Checking for updates". The assertion protects.</p> <p>The String you associate with this key will not attempt to localize it.)</p> <p>Describe your assertion as thoroughly as you can. (You can also set to add explanation.)</p>

User Activity Constants

Constant	Value	Description
kIOPMUserActiveLocal	0	User is local on the system
kIOPMUserActiveRemote	1	Remote User connected to the system.

19.2 class IOPMMBS

19.2.1 class IOPMMBS

Plugin Version: 8.7, Platform: macOS, Targets: Desktop, Console & Web.

Function: The Mac OS X class which can control the energy settings.

Example:

```
dim p as new IOPMMBS
```

```
Listbox1.AddRow "EthernetWakeOnLANSettings: "+str(p.EthernetWakeOnLANSettings)
Listbox1.AddRow "GeneralAggressiveness: "+str(p.GeneralAggressiveness)
Listbox1.AddRow "MinutesToDim: "+str(p.MinutesToDim)
Listbox1.AddRow "MinutesToSleep: "+str(p.MinutesToSleep)
Listbox1.AddRow "MinutesToSpinDown: "+str(p.MinutesToSpinDown)
Listbox1.AddRow "MotionSensor: "+str(p.MotionSensor)
Listbox1.AddRow "PowerSource: "+str(p.PowerSource)
Listbox1.AddRow "SetProcessorSpeed: "+str(p.SetProcessorSpeed)
```

Notes: The functions and properties are not described from Apple.

19.2.2 Properties

19.2.3 Handle as Integer

Plugin Version: 8.7, Platform: macOS, Targets: Desktop, Console & Web.

Function: The internal reference for the power manager.

Notes: If this value is zero, the properties will not work.

(Read and Write property)

19.2.4 EthernetWakeOnLANSettings as Integer

Plugin Version: 8.7, Platform: macOS, Targets: Desktop, Console & Web.

Function: The setting for whether ethernet wake on LAN.

Notes: Value is 1 if you enable this option in the energy system control panel and 0 if you disable it.

(Read and Write computed property)

19.2.5 GeneralAggressiveness as Integer

Plugin Version: 8.7, Platform: macOS, Targets: Desktop, Console & Web.

Function: The general aggressiveness.

Notes: (Read and Write computed property)

19.2.6 MinutesToDim as Integer

Plugin Version: 8.7, Platform: macOS, Targets: Desktop, Console & Web.

Function: The minutes until the display is dimmed.

Example:

```
dim p as new IOPMMBS
p.MinutesToDim=10 // dim display in 10 minutes
```

Notes: This value is the same as in the energy system control panel.
(Read and Write computed property)

19.2.7 MinutesToSleep as Integer

Plugin Version: 8.7, Platform: macOS, Targets: Desktop, Console & Web.

Function: The time in minutes until the Mac goes to sleep.

Example:

```
dim p as new IOPMMBS
p.MinutesToSleep=10 // sleep display in 10 minutes
```

Notes: (Read and Write computed property)

19.2.8 MinutesToSpinDown as Integer

Plugin Version: 8.7, Platform: macOS, Targets: Desktop, Console & Web.

Function: The time in minutes until the hard discs spin down.

Notes: If you enable the spin down option in the energy system control panel, this value is 10 and if you disable it, it is 180.

(Read and Write computed property)

19.2.9 MotionSensor as Integer

Plugin Version: 8.7, Platform: macOS, Targets: Desktop, Console & Web.

Function: The setting for the motion sensor.

Notes: (Read and Write computed property)

19.2.10 PowerSource as Integer

Plugin Version: 8.7, Platform: macOS, Targets: Desktop, Console & Web.

Function: The power source settings.

Notes: Constants for this property:

```
const kIOPMInternalPower = 1
const kIOPMExternalPower = 2
(Read and Write computed property)
```

19.2.11 SetProcessorSpeed as Integer

Plugin Version: 8.7, Platform: macOS, Targets: Desktop, Console & Web.

Function: The setting for the processor speed.

Notes: (Read and Write computed property)

19.3 class SleepNotificationMBS

19.3.1 class SleepNotificationMBS

Plugin Version: 8.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: The class to listen for sleep notifications on Mac OS X .

Notes: Uses IOKit.

Your application can use the sleep event to deny idle sleep, i.e. sleep after a period of inactivity. Applications should not deny idle sleep unless absolutely necessary.

The kIOMessage* constants in this class are declared in the Mac OS X headers, but they are not all used by the system.

In the plugins is the WakeNotifierMBS class and the SleepNotificationMBS class. WakeNotifierMBS uses the API coming from Mac OS and it can delay sleep. SleepNotificationMBS works on the lower Next APIs.
Blog Entries

- [MBS Xojo / Real Studio Plugins, version 14.1pr1](#)

19.3.2 Properties

19.3.3 running as Boolean

Plugin Version: 8.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Whether this notification class is working.

Notes: Value is true on MachO targets.

(Read and Write property)

19.3.4 Events

19.3.5 Sleep(message as int64) as boolean

Plugin Version: 8.0, Platform: macOS, Targets: .

Function: A message was received.

Notes: Use the constants to check what message you got.

Return true to deny or false to allow.

On the Can Messages the plugin informs the system about Deny or Allow, but on the Will messages, it will not answer if you return true, so the system will wait for an answer and delay sleep. There seems to be no way to delay more than 30 seconds when the user selects the sleep menu command.

The message parameter is an int64 in Plugin version 9.7 so the integer comparison to the constants works better.

19.3.6 Constants

Constants

Constant	Value	Description
kIOMessageCanSystemPowerOff	&he0000240	One of the message constants.
kIOMessageCanSystemSleep	&he0000270	One of the message constants. Idle sleep is about to kick in. Applications have a chance to prevent sleep by returning true in the sleep menu. Most applications should not prevent idle sleep. Power Management waits up to 30 seconds for you to either allow or deny the power change. If you don't acknowledge this power change by returning true, the system will wait 30 seconds then go to sleep.
kIOMessageSystemHasPoweredOn	&he0000300	One of the message constants.
kIOMessageSystemWillNotPowerOff	&he0000260	One of the message constants.
kIOMessageSystemWillNotSleep	&he0000290	One of the message constants.
kIOMessageSystemWillPowerOff	&he0000250	One of the message constants.
kIOMessageSystemWillPowerOn	&he0000320	One of the message constants.
kIOMessageSystemWillRestart	&he0000310	One of the message constants.
kIOMessageSystemWillSleep	&he0000280	One of the message constants.

Chapter 20

QuickTime

20.1 class QTSoundStreamMBS

20.1.1 class QTSoundStreamMBS

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: A class for the QTSoundOutput component which outputs sound using a given AudioUnit.

Notes: Not supported for 64 bit targets.

Blog Entries

- [MBS Real Studio Plugins, version 11.4pr2](#)

20.1.2 Methods

20.1.3 AttachToAudioUnitComponent(componenthandle as Integer) as Integer

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: Attaches the Sound Output component to a given Audio Unit component.

Notes: Returns the error code. (0 for success)

You may call AudioUnitInitialize and AudioOutputUnitStart after this to start the output unit.

See also:

- 20.1.4 AttachToAudioUnitComponent(componenthandle as Integer, element as Integer) as Integer 536

20.1.4 `AttachToAudioUnitComponent(componenthandle as Integer, element as Integer) as Integer`

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: Attaches the Sound Output component to a given Audio Unit component.

Notes: Returns the error code. (0 for success)

You may call `AudioUnitInitialize` and `AudioOutputUnitStart` after this to start the output unit.

See also:

- 20.1.3 `AttachToAudioUnitComponent(componenthandle as Integer) as Integer`

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20.1.5 `AudioOutputUnitStart(componenthandle as Integer) as Integer`

Plugin Version: 4.2, Platform: macOS, Targets: All.

Function: Starts the output unit.

Notes: Returns a Mac OS error code (0 for success).

20.1.6 `AudioUnitInitialize(componenthandle as Integer) as Integer`

Plugin Version: 4.2, Platform: macOS, Targets: All.

Function: Initializes the output unit.

Notes: Returns a Mac OS error code (0 for success).

20.1.7 `closeComponent`

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: Closes the Sound Output component.

20.1.8 `InitComponent`

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: Initializes the sound output component.

Notes: Allocates memory for example.

20.1.9 OpenComponent

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: Opens the SoundOutput component.

20.1.10 OpenDefaultAudioUnitOutputComponent as Integer

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: Opens the default audio unit component and returns the handle.

Notes: Returns 0 on any error.

The component is only available on Mac OS X, so this function will return 0 on all other platforms.

20.1.11 Properties

20.1.12 Handle as Integer

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: The component handle.

Notes: (Read and Write property)

20.1.13 IsOpen as Boolean

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: Whether the sound output component has been opened yet.

Notes: Returns false on any error.

(Read only property)

20.1.14 IsStreamActive as Boolean

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: True in case the stream is active.

Notes: Returns false on any error.

(Read only property)

20.1.15 PostsStatusNotifications as Boolean

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: Whether status notifications should be posted.

Notes: (Read and Write property)

20.1.16 Release as Boolean

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: Whether the constructor should release the handle.

Notes: (Read and Write property)

20.1.17 SoundOutputComponentHandle as Integer

Plugin Version: 4.1, Platform: macOS, Targets: All.

Function: The handle of the used component instance.

Notes: (Read only property)

Chapter 21

Spotlight

21.1 class MDItemMBS

21.1.1 class MDItemMBS

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: This is the class that represents a file and the metadata associated with the file.

Notes: Available in Mac OS X version 10.4 and later.

Blog Entries

- [Query URL from downloaded file](#)
- [MBS Xojo / Real Studio Plugins, version 15.1pr8](#)
- [MBS Real Studio Plugins, version 12.3pr3](#)
- [MBS Plugins 11.1 Release notes](#)
- [MBS Real Studio Plugins, version 11.1pr7](#)
- [MBS REALbasic plug-in 9.6](#)

21.1.2 Methods

21.1.3 AllAttributes as string()

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns a list with all possible attribute names in the system.

Notes: dim item as new MDItemMBS(SpecialFolder.Desktop)

```
MsgBox join(item.AllAttributes, EndOfLine)
```

21.1.4 AttributeBoolean(name as string) as boolean

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the value for this attribute.

21.1.5 AttributeDouble(name as string) as Double

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the value for this attribute.

21.1.6 AttributeMultiValued(name as string) as boolean

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Whether the given attribute is an array of multiple values.

21.1.7 AttributeNames as string()

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns an array containing the attribute names existing in the metadata item.

Example:

```
dim item as new MDItemMBS(SpecialFolder.Desktop)
```

```
MsgBox join(item.AttributeNames, EndOfLine)
```

Notes: Available in Mac OS X version 10.4 and later.

21.1.8 AttributeString(name as string) as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the value for this attribute.

Example:

21.1. CLASS MDITEMMBS

```
dim item as new MDItemMBS(SpecialFolder.Desktop)
```

```
MsgBox item.AttributeString(item.kMDItemFSName)
```

21.1.9 AttributeStringArray(name as string) as string()

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the value for this attribute.

21.1.10 AttributeType(name as string) as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: The type of the attribute.

Example:

```
dim item as new MDItemMBS(SpecialFolder.Desktop)
```

```
MsgBox item.AttributeType(item.kMDItemFSName) // "String"
```

Notes: Returns "Boolean", "Number", "Date" or "String".

21.1.11 Constructor(path as folderitem)

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates an MDItem object for a file at the specified path.

Example:

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.rtf")
```

```
dim m as new MDItemMBS(f)
```

```
MsgBox m.DisplayName
```

Notes: path: A path to the file from which to create the MDItem.

Available in Mac OS X version 10.4 and later.

21.1.12 DisplayDescriptionForAttribute(name as string) as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: The display description for the attribute.

Notes: dim item as new MDItemMBS(SpecialFolder.Desktop)

```
MsgBox item.DisplayDescriptionForAttribute(item.kMDItemDisplayName)
// shows "Lokalisiert angezeigter Name der Datei" in German
```

21.1.13 DisplayNameForAttribute(name as string) as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: The display name for this attribute.

Example:

```
dim item as new MDItemMBS(SpecialFolder.Desktop)
```

```
MsgBox item.DisplayNameForAttribute(item.kMDItemDisplayName)
// shows "Anzeigename" in German
```

21.1.14 GetAttribute(name as string) as Variant

Plugin Version: 9.7, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the value of the given attribute for the item.

Notes: name: The name of the desired attribute.

A variant, or nil on failure, or if the attribute does not exist, or if the attribute is not readable.

21.1.15 GetAttributes as dictionary

Plugin Version: 17.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Queries all attributes with all names and values.

See also:

- 21.1.16 GetAttributes(names() as string) as dictionary

21.1.16 GetAttributes(names() as string) as dictionary

Plugin Version: 9.7, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the values of the given attributes for the item.

Notes: names: An array of the names of the desired attributes.

A dictionary where the keys are the attribute names, and the values are the attribute values, or nil on failure.

If an attribute does not exist, or is unreadable, there will be no key-value pair for it in the dictionary.

See also:

- 21.1.15 GetAttributes as dictionary

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21.1.17 kMDItemAcquisitionMake as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The manufacturer of the device used to acquire the document contents. A string.

21.1.18 kMDItemAcquisitionModel as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The model of the device used to acquire the document contents. For example, 100, 200, 400, etc. A string.

21.1.19 kMDItemAlbum as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The title for a collection of media. This is analogous to a record album, or photo album. A string.

21.1.20 kMDItemAltitude as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The altitude of the item in meters above sea level, expressed using the WGS84 datum. Negative values lie below sea level. A number.

21.1.21 `kMDItemAperture` as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The aperture setting used to acquire the document contents. This unit is the APEX value. A number.

21.1.22 `kMDItemAppleLoopDescriptors` as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Specifies multiple pieces of descriptive information about a loop. An array of strings.

Besides genre and instrument, files can contain descriptive information that help users in refining searches.

21.1.23 `kMDItemAppleLoopsKeyFilterType` as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Specifies key filtering information about a loop. Loops are matched against projects that often in a major or minor key. A string.

To assist users in identifying loops that will “fit” with their compositions, loops can be tagged with one of the following key filters: “AnyKey” “Minor” “Major” “NeitherKey” “BothKeys”. “AnyKey” means that it fits with anything (whether in a major key, minor key or neither). “Minor” fits with compositions in a minor key. “NeitherKey” doesn’t work well with compositions that are in major or minor key. “BothKeys” means it fits with major or minor key.

21.1.24 `kMDItemAppleLoopsLoopMode` as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Specifies how a file should be played. A string.

Tagged files can either be loops or non-loops (e.g., a cymbal crash). “Looping” indicates if the file should be treated as a loop. “Non-looping” indicates the file should not be treated as a loop.

21.1.25 kMDItemAppleLoopsRootKey as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Specifies the loop's original key. The key is the root note or tonic for the loop, and does not include the scale type. A string.

21.1.26 kMDItemApplicationCategories as string

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Available in Mac OS X 10.7 and later.

21.1.27 kMDItemAttributeChangeDate as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The date and time of the last change made to a metadata attribute. A date.

21.1.28 kMDItemAudiences as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The audience for which the file is intended. The audience may be determined by the creator or the publisher or by a third party. An array of strings.

21.1.29 kMDItemAudioBitRate as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The audio bit rate. A number.

21.1.30 kMDItemAudioChannelCount as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Number of channels in the audio data contained in the file. A number.

This integer value only represents the number of discrete channels of audio data found in the file. It does not indicate any configuration of the data in regards to a user's speaker setup.

21.1.31 `kMDItemAudioEncodingApplication` as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The name of the application that encoded the data contained in the audio file. A string.

21.1.32 `kMDItemAudioSampleRate` as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Sample rate of the audio data contained in the file. The sample rate is a float value representing hz (audio_frames/second). For example: 44100.0, 22254.54. A number.

21.1.33 `kMDItemAudioTrackNumber` as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The track number of a song or composition when it is part of an album. A number (integer).

21.1.34 `kMDItemAuthorAddresses` as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: This attribute indicates the author addresses of the document.

An array of string. Requires Mac OS X 10.6.

21.1.35 `kMDItemAuthorEmailAddresses` as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: This attribute indicates the author of the email message addresses. (This is always the email address, and not the human readable version). An array of string. Requires Mac OS X 10.5.

21.1.36 kMDItemAuthors as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The author, or authors, of the contents of the file. An array of strings.

The order of the authors is preserved, but does not represent the main author or relative importance of the authors.

21.1.37 kMDItemBitsPerSample as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The number of bits per sample. For example, the bit depth of an image (8-bit, 16-bit etc...) or the bit depth per audio sample of uncompressed audio data (8, 16, 24, 32, 64, etc...). A number.

21.1.38 kMDItemCameraOwner as string

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Available in Mac OS X 10.7 and later.

21.1.39 kMDItemCFBundleIdentifier as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: If this item is a bundle, then this is the CFBundleIdentifier. A string

21.1.40 kMDItemCity as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Identifies city of origin according to guidelines established by the provider. A string.

For example, "New York", "Cupertino", or "Toronto".

21.1.41 kMDItemCodecs as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The codecs used to encode/decode the media. An array of strings.

21.1.42 kMDItemColorSpace as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The color space model used by the document contents. For example, "RGB", "CMYK", "YUV", or "YCbCr". A string.

21.1.43 kMDItemComment as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: A comment related to the file. This differs from the Finder comment, kMDItemFinderComment. A string.

21.1.44 kMDItemComposer as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The composer of the music contained in the audio file. A string.

21.1.45 kMDItemContactKeywords as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: A list of contacts that are associated with this document, not including the authors. An array of strings.

21.1.46 kMDItemContentCreationDate as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The date that the contents of the file were created. A date.

This is different than the file creation date. Its can be used to store when the file contents were first created, or first modified.

21.1.47 kMDItemContentModificationDate as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The date and time that the contents of the file were last modified. A date.

This is not necessarily the file modification date.

21.1.48 kMDItemContentType as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: For example, a jpeg image file will have a value of public.jpeg/public.image/public.data. The value of this attribute is set by the MDImporter. Changes to this value are lost when the file attributes are next imported.

21.1.49 kMDItemContentTypeTree as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Array of string

21.1.50 kMDItemContributors as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The entities responsible for making contributions to the content of the resource. An array of strings.

Examples of a contributor include a person, an organization or a service.

21.1.51 kMDItemCopyright as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The copyright owner of the file contents. A string.

21.1.52 kMDItemCountry as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The full, publishable name of the country or primary location where the intellectual property of the item was created, according to guidelines of the provider. A string.

21.1.53 kMDItemCoverage as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The extent or scope of the content of the resource. A string.

Coverage will typically include spatial location (a place name or geographic co-ordinates), temporal period (a period label, date, or date range) or jurisdiction (such as a named administrative entity).

Recommended best practice is to select a value from a controlled vocabulary, and that, where appropriate, named places or time periods be used in preference to numeric identifiers such as sets of co-ordinates or date ranges.

21.1.54 kMDItemCreator as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Application used to create the document content (e.g. "Word", "AppleWorks", etc.). A string.

21.1.55 kMDItemDateAdded as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: This is the date that the file was moved into the current location.

Not all files will have this attribute.

Not all file systems support this attribute.

21.1.56 kMDItemDeliveryType as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The delivery type. Values are "Fast start" or "RTSP". A string.

21.1.57 kMDItemDescription as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: A description of the content of the resource. The description may include an abstract, table of contents, reference to a graphical representation of content or a free-text account of the content. A string.

21.1.58 kMDItemDirector as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Director of the movie. A string. Requires Mac OS X 10.5.

21.1.59 kMDItemDisplayName as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The localized version of the file name. A string.

21.1.60 kMDItemDownloadedDate as string

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Available in Mac OS X 10.7 and later.

21.1.61 kMDItemDueDate as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Date this item is due. A date.

21.1.62 kMDItemDurationSeconds as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The duration, in seconds, of the content of file. A value of 10.5 represents media that is 10 and 1/2 seconds long. A number.

21.1.63 kMDItemEditors as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The list of editor/editors that has worked on this file. There could be 0 or more editors of a particular file. The order of the editors in the array is preserved, but is not intended to represent the main editor or relative importance of the editors. Type is An array of strings.

21.1.64 kMDItemEmailAddresses as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Email addresses related to this item. An array of strings.

21.1.65 kMDItemEncodingApplications as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Application used to convert the original content into its current form. For example, a PDF file might have an encoding application set to "Distiller". An array of strings.

21.1.66 kMDItemExecutableArchitectures as string

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Available in Mac OS X 10.7 and later.

21.1.67 kMDItemEXIFGPSVersion as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The version of GPSInfoIFD header that was used to generate the metadata. A string. Requires Mac OS X 10.5.

21.1.68 kMDItemEXIFVersion as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The version of the EXIF header used to generate the metadata. A string.

21.1.69 kMDItemExposureMode as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The exposure mode used to acquire the document contents. A number.

Possible values are 0 (auto exposure), 1 (manual exposure) and 2 (auto bracket).

21.1.70 `kMDItemExposureProgram` as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The class of the exposure program used by the camera to set exposure when the image is taken.

Possible values include: Manual, Normal, and Aperture priority. A string.

21.1.71 `kMDItemExposureTimeSeconds` as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The exposure time, in seconds, used to acquire the document contents. A number.

21.1.72 `kMDItemExposureTimeString` as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The time of the exposure. A string.

21.1.73 `kMDItemFinderComment` as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Finder comments for this file. A string.

21.1.74 `kMDItemFlashOnOff` as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Indicates if a camera flash was used. A number.

21.1.75 kMDItemFNumber as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The diameter of the diaphragm aperture in terms of the effective focal length of the lens.

21.1.76 kMDItemFocalLength as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The actual focal length of the lens, in millimeters. A number.

21.1.77 kMDItemFocalLength35mm as string

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Available in Mac OS X 10.7 and later.

21.1.78 kMDItemFonts as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Fonts used in this item. You should store the font's full name, the postscript name, or the font family name, based on the available information. An array of strings.

21.1.79 kMDItemFSContentChangeDate as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The date the file contents last changed. A date.

21.1.80 kMDItemFSCreationDate as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The date and time that the file was created. A date.

21.1.81 kMDItemFSExists as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: This attribute is deprecated and was never implemented.

21.1.82 kMDItemFSHasCustomIcon as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Boolean indicating if this file has a custom icon. Type is a boolean.

21.1.83 kMDItemFSInvisible as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Indicates whether the file is invisible. A boolean.

21.1.84 kMDItemFSIsExtensionHidden as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Indicates whether the file extension of the file is hidden. A boolean.

21.1.85 kMDItemFSIsReadable as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: This attribute is deprecated and was never implemented.

21.1.86 kMDItemFSIsStationery as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Boolean indicating if this file is stationery. Type is a boolean.

21.1.87 kMDItemFSIsWriteable as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: This attribute is deprecated and was never implemented.

21.1.88 kMDItemFSLabel as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Index of the Finder label of the file. Possible values are 0 through 7. A number.

21.1.89 kMDItemFSName as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The file name of the item. A string.

21.1.90 kMDItemFSNodeCount as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Number of files in a directory. A number.

21.1.91 kMDItemFSOwnerGroupID as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The group ID of the owner of the file. A number.

21.1.92 kMDItemFSOwnerUserID as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The user ID of the owner of the file. A number.

21.1.93 kMDItemFSSize as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The size, in bytes, of the file on disk. A number.

21.1.94 kMDItemGenre as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Genre of the movie. A string.

Requires Mac OS X 10.5.

21.1.95 kMDItemGPSAreaInformation as string

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Available in Mac OS X 10.7 and later.

21.1.96 kMDItemGPSDateStamp as string

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Available in Mac OS X 10.7 and later.

21.1.97 kMDItemGPSDestBearing as string

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Available in Mac OS X 10.7 and later.

21.1.98 kMDItemGPSDestDistance as string

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Available in Mac OS X 10.7 and later.

21.1.99 kMDItemGPSDestLatitude as string

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Available in Mac OS X 10.7 and later.

21.1.100 kMDItemGPSDestLongitude as string

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Available in Mac OS X 10.7 and later.

21.1.101 kMDItemGPSDifferential as string

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Available in Mac OS X 10.7 and later.

21.1.102 kMDItemGPSDOP as string

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Available in Mac OS X 10.7 and later.

21.1.103 kMDItemGPSMapDatum as string

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Available in Mac OS X 10.7 and later.

21.1.104 kMDItemGPSMeasureMode as string

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Available in Mac OS X 10.7 and later.

21.1.105 kMDItemGPSProcessingMethod as string

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Available in Mac OS X 10.7 and later.

21.1.106 kMDItemGPSStatus as string

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Available in Mac OS X 10.7 and later.

21.1.107 kMDItemGPSTrack as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The direction of travel of the item, in degrees from true north. A number. Requires Mac OS X 10.5.

21.1.108 kMDItemHasAlphaChannel as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Indicates if this image file has an alpha channel. A boolean.

21.1.109 kMDItemHeadline as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: A publishable entry providing a synopsis of the contents of the file. For example, "Apple Introduces the iPod Photo". A string.

21.1.110 kMDItemIdentifier as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: A formal identifier used to reference the resource within a given context. A string.

21.1.111 kMDItemImageDirection as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The direction of the item's image, in degrees from true north. A number.
Requires Mac OS X 10.5.

21.1.112 kMDItemInformation as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Information about the item. A string.
Requires Mac OS X 10.5.

21.1.113 kMDItemInstantMessageAddresses as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Instant message addresses related to this item. An array of strings.

21.1.114 kMDItemInstructions as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Editorial instructions concerning the use of the item, such as embargoes and warnings. For example, "Second of four stories". A string.

21.1.115 kMDItemIsApplicationManaged as string

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Available in Mac OS X 10.7 and later.

21.1.116 kMDItemIsGeneralMIDISequence as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Indicates whether the MIDI sequence contained in the file is setup for use with a General MIDI device. A boolean.

21.1.117 kMDItemIsLikelyJunk as string

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Available in Mac OS X 10.7 and later.

21.1.118 kMDItemISOSpeed as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The ISO speed used to acquire the document contents. A number.

21.1.119 kMDItemKeySignature as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The key of the music contained in the audio file. For example: C, Dm, F#m, Bb. A string.

21.1.120 kMDItemKeywords as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Keywords associated with this file. For example, "Birthday", "Important", etc. An array of strings.

21.1.121 kMDItemKind as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: A description of the kind of item this file represents. A string.

21.1.122 kMDItemLabelIcon as string

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Available in Mac OS X 10.7 and later.

21.1.123 kMDItemLabelID as string

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Available in Mac OS X 10.7 and later.

21.1.124 kMDItemLabelKind as string

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Available in Mac OS X 10.7 and later.

21.1.125 kMDItemLabelUUID as string

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Available in Mac OS X 10.7 and later.

21.1.126 kMDItemLanguages as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Indicates the languages of the intellectual content of the resource. Recommended best practice for the values of the Language element is defined by RFC 3066. An array of strings.

21.1.127 kMDItemLastUsedDate as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The date and time that the file was last used. This value is updated automatically by LaunchServices everytime a file is opened by double clicking, or by asking LaunchServices to open a file. A date.

21.1.128 kMDItemLatitude as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The latitude of the item in degrees north of the equator, expressed using the WGS84 datum. Negative values lie south of the equator. A number.

Requires Mac OS X 10.5.

21.1.129 kMDItemLayerNames as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The names of the layers in the file. An array of strings.

21.1.130 kMDItemLensModel as string

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Available in Mac OS X 10.7 and later.

21.1.131 kMDItemLongitude as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The longitude of the item in degrees east of the prime meridian, expressed using the WGS84 datum. Negative values lie west of the prime meridian. A number.

Requires Mac OS X 10.5.

21.1.132 kMDItemLyricist as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The lyricist, or text writer, of the music contained in the audio file. A string.

21.1.133 kMDItemMaxAperture as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The smallest f-number of the lens. Ordinarily it is given in the range of 00.00 to 99.99. A number.

21.1.134 kMDItemMediaTypes as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The media types present in the content. An array of strings.

21.1.135 kMDItemMeteringMode as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The metering mode used to take the image. A string.

Possible values are: Unknown, Average, CenterWeightedAverage, Spot, MultiSpot, Pattern, and Partial.

21.1.136 kMDItemMusicalGenre as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The musical genre of the song or composition contained in the audio file. For example: Jazz, Pop, Rock, Classical. A string.

21.1.137 kMDItemMusicalInstrumentCategory as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Specifies the category of an instrument. A string.

Files should have an instrument associated with them ("Other Instrument" is provided as a catch-all). For some categories, such as "Keyboards", there are instrument names which provide a more detailed instrument definition, for example "Piano" or "Organ".

21.1.138 kMDItemMusicalInstrumentName as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Specifies the name of instrument relative to the instrument category. A string.

Files can have an instrument name associated with them if they have certain instrument categories. For example, the "Percussion" category has multiple instruments, including "Conga" and "Bongo".

21.1.139 kMDItemNamedLocation as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The name of the location or point of interest associated with the item. The name may be user provided. A string

21.1.140 kMDItemNumberOfPages as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Number of pages in the document. A number.

21.1.141 kMDItemOrganizations as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The company or organization that created the document. An array of strings.

21.1.142 kMDItemOrientation as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The orientation of the document contents. Possible values are 0 (landscape) and 1 (portrait). A number.

21.1.143 kMDItemOriginalFormat as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Original format of the movie.

A string.

Requires Mac OS X 10.5

21.1.144 kMDItemOriginalSource as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Original source of the movie. A string.

Requires Mac OS X 10.5.

21.1.145 kMDItemPageHeight as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Height of the document page, in points (72 points per inch). For PDF files this indicates the height of the first page only. A number.

21.1.146 kMDItemPageWidth as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Width of the document page, in points (72 points per inch). For PDF files this indicates the width of the first page only. A number.

21.1.147 kMDItemParticipants as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The list of people who are visible in an image or movie or written about in a document. Type is array of strings.

Requires Mac OS X 10.6.

21.1.148 kMDItemPath as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The complete path to the file. A string.

21.1.149 kMDItemPerformers as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Performers in the movie. An array of string.

Requires Mac OS X 10.5.

21.1.150 kMDItemPhoneNumbers as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Phone numbers related to this item. An array of strings.

21.1.151 kMDItemPixelCount as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The total number of pixels in the contents. Same as kMDItemPixelWidth x kMDItemPixelHeight. A number.

21.1.152 kMDItemPixelHeight as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The height, in pixels, of the contents. For example, the image height or the video frame height. A number.

21.1.153 kMDItemPixelWidth as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The width, in pixels, of the contents. For example, the image width or the video frame width. A number.

21.1.154 kMDItemProducer as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Producer of the content. A string. Requires Mac OS X 10.5.

21.1.155 kMDItemProfileName as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The name of the color profile used by the document contents. A string.

21.1.156 kMDItemProjects as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The list of projects that this file is part of. For example, if you were working on a movie all of the files could be marked as belonging to the project "My Movie". An array of strings.

21.1.157 kMDItemPublishers as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The entity responsible for making the resource available. For example, a person, an organization, or a service. Typically, the name of a publisher should be used to indicate the entity. An array of strings.

21.1.158 kMDItemRecipientAddresses as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: This attribute indicates the recipient addresses of the document. array of string. Requires Mac OS X 10.6.

21.1.159 `kMDItemRecipientEmailAddresses` as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: This attribute indicates the recipients email addresses. (This is always the email address, and not the human readable version). An array of string.

Requires Mac OS X 10.5.

21.1.160 `kMDItemRecipients` as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Recipients of this item. An array of strings.

21.1.161 `kMDItemRecordingDate` as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The recording date of the song or composition. A date.

This is in contrast to `kMDItemContentCreationDate` which, could indicate the creation date of an edited or 'mastered' version of the original art.

21.1.162 `kMDItemRecordingYear` as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Indicates the year the item was recorded. For example, 1964, 2003, etc. A number.

21.1.163 `kMDItemRedEyeOnOff` as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Indicates if red-eye reduction was used to take the picture. A boolean.

Possible values are 0 (no red-eye reduction mode or unknown) and 1 (red-eye reduction used).

21.1.164 kMDItemResolutionHeightDPI as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Resolution height of this image in DPI. A number.

21.1.165 kMDItemResolutionWidthDPI as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Resolution width, in DPI, of this image. A number.

21.1.166 kMDItemRights as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Provides a link to information about rights held in and over the resource. A string.

Contains a rights management statement for the resource, or reference a service providing such information. Rights information often encompasses Intellectual Property Rights (IPR), Copyright, and various Property Rights.

If this attribute is absent, no assumptions can be made about the status of these and other rights with respect to the resource.

21.1.167 kMDItemSecurityMethod as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The security or encryption method used for the file. A number.

21.1.168 kMDItemSpeed as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The speed of the item, in kilometers per hour. A number.

Requires Mac OS X 10.5

21.1.169 kMDItemStarRating as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: User rating of this item. For example, the stars rating of an iTunes track. A number.

21.1.170 kMDItemStateOrProvince as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Identifies the province or state of origin according to guidelines established by the provider. For example, "CA", "Ontario", or "Sussex". A string.

21.1.171 kMDItemStreamable as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Whether the content is prepared for streaming. A boolean.

21.1.172 kMDItemSubject as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Subject of the this item. Type is a string.

21.1.173 kMDItemSupportFileType as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: array of strings

21.1.174 kMDItemTempo as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: A float value that specifies the beats per minute of the music contained in the audio file. A number.

21.1.175 kMDItemTextContent as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Contains a text representation of the content of the document. Data in multiple fields should be combined using a whitespace character as a separator. A string.

An application's Spotlight importer provides the content of this attribute. Applications can search for values in this attribute, but are not able to read the content of this attribute directly.

21.1.176 kMDItemTheme as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: Theme of the this item. Type is a string.

21.1.177 kMDItemTimeSignature as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The time signature of the musical composition contained in the audio/MIDI file. For example: "4/4", "7/8". A string.

21.1.178 kMDItemTimestamp as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The timestamp on the item. This generally is used to indicate the time at which the event captured by the item took place.

Mac OS X 10.5

21.1.179 kMDItemTitle as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The title of the file. For example, this could be the title of a document, the name of an song, or the subject of an email message. A string.

21.1.180 kMDItemTotalBitRate as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The total bit rate, audio and video combined, of the media. A number.

21.1.181 kMDItemURL as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: URL of the item.

Mac OS X 10.5

21.1.182 kMDItemVersion as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The version number of this file. A string

21.1.183 kMDItemVideoBitRate as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The video bit rate. A number.

21.1.184 kMDItemWhereFroms as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Example:

```
dim file as FolderItem = DownloadsFolderMBS(0).Child("test.html")
dim item as new MDItemMBS(file)
dim value as Variant = item.GetAttribute(MDItemMBS.kMDItemWhereFroms)

if value <> nil then
dim values() as Variant = value
dim Link as String = values(0)
MsgBox link
end if
```

Notes: Describes where the file was obtained from. An array of strings.

For example, a downloaded file may refer to the URL, files received by email may indicate the sender's email address, message subject, etc.

21.1.185 kMDItemWhiteBalance as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the item attribute constants.

Notes: The white balance setting used to acquire the document contents. Possible values are 0 (auto white balance) and 1 (manual). A number.

21.1.186 Properties

21.1.187 DisplayName as String

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: The localized version of the file name.

Example:

```
dim item as new MDItemMBS(SpecialFolder.Desktop)
```

```
MsgBox item.DisplayName // shows "Schreibtisch"
```

Notes: This is a shortcut for `AttributedString(kMDItemDisplayName)`.
(Read only property)

21.1.188 FSName as String

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: The file name of the item.

Example:

```
dim item as new MDItemMBS(SpecialFolder.Desktop)
```

```
MsgBox item.FSName // shows "Desktop"
```

Notes: This is a shortcut for `AttributedString(kMDItemFSName)`.
(Read only property)

21.1.189 FSSize as Int64

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: The size, in bytes, of the file on disk.

Example:

```
dim item as new MDItemMBS(SpecialFolder.Desktop)
```

```
MsgBox str(item.FSSize) // shows 0
```

Notes: This is a shortcut for `AttributedString(kMDItemFSSize)`.
(Read only property)

21.1.190 Handle as Integer

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: The internal reference to the item.

Notes: (Read and Write property)

21.1.191 Path as String

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: The complete path to the file.

Example:

`dim item as new MDItemMBS(SpecialFolder.Desktop)`

`MsgBox item.path // shows "/Users/cs/Desktop"`

Notes: This is a shortcut for `AttributedString(kMDItemPath)`.
(Read only property)

21.1.192 Tag as Variant

Plugin Version: 11.1, Platform: macOS, Targets: Desktop, Console & Web.

Function: The attached value.

Notes: You can use this property as you like.

(Read and Write property)

21.2 class MDQueryBatchingParamsMBS

21.2.1 class MDQueryBatchingParamsMBS

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: This class containing the progress notification batching parameters of an MDQuery.

Notes: The first notification can be triggered by the either firstmaxnum or firstmaxms limit being exceeded. Subsequent notifications are triggered by either the progressmaxnum or progressmaxms limit. The default batching parameters are undefined and subject to change.

21.2.2 Properties

21.2.3 firstMaxMS as Integer

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: The maximum number of milliseconds that can pass before a progress notification is sent out.

Notes: This value is advisory, in that the notification will be triggered "at some point after firstmaxms milliseconds have passed since the query began accumulating results", but generally not very long after, for the first progress notification.

(Read and Write property)

21.2.4 firstMaxNum as Integer

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: The maximum number of results that can accumulate before a progress notification is sent out by the MDQuery, for the first notification.

Notes: (Read and Write property)

21.2.5 progressMaxMS as Integer

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: The maximum number of milliseconds that can pass before a progress notification is sent out.

Notes: This value is advisory, in that the notification will be triggered "at some point after firstmaxms milliseconds have passed since the query began accumulating results", but generally not very long after, for progress notifications after the first, during the initial gathering phase of the query.

(Read and Write property)

21.2.6 progressMaxNum as Integer

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: The maximum number of results that can accumulate before a progress notification is sent out by the MDQuery, for notifications after the first, during the initial gathering phase of the query.

Notes: (Read and Write property)

21.2.7 updateMaxMS as Integer

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: The maximum number of milliseconds that can pass before a progress notification is sent out.

Notes: This value is advisory, in that the notification will be triggered "at some point after firstmaxms milliseconds have passed since the query began accumulating results", but generally not very long after, for update notifications after the gathering phase of the query has finished.

(Read and Write property)

21.2.8 updateMaxNum as Integer

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: The maximum number of results that can accumulate before an update notification is sent out by the MDQuery, for update notifications after the gathering phase of the query has finished.

Notes: (Read and Write property)

21.3 class MDQueryMBS

21.3.1 class MDQueryMBS

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: MDQuery encapsulates all queries against the MetaData database.

Example:

```
dim m as new MDQueryMBS("* == "Hello"wed | | kMDItemTextContent = "Hello"c")
```

```
call m.Execute(m.kMDQuerySynchronous)
```

```
MsgBox str(m.ResultCount) // shows a lot of results
```

Notes: Depending on what and how you want to search, you can decide whether MDQueryMBS or CatSearchMBS is the better choice.

Available in Mac OS X version 10.4 and later.

Queries gather results or process updates only while the current thread's run loop is running. Queries normally operate asynchronously, and only send out progress notifications as the list is being collected. The query list is kept up to date with respect to value lists and sorting as the progress notifications are sent out, so the query is in a good state during those events.

An MDQuery presents its results as if it were a simple array object. The results are MDItem.

Query Sorting Sorting the results from a query can be performed in one of two ways. First is to let the library sort the results for you by passing an array of attributes to sort on to constructor. The default sort provided by the constructor is a ascending sort strings are compared using CFStringCompare() with the options kCFCompareNonliteral | kCFCompareLocalized | kCFCompareNumerically.

If used in a thread, please use a loop with calling NSRunLoopMBS.currentRunLoop.runUntilDate(nil) to give time for update events to fire.

Blog Entries

- [MBS Xojo / Real Studio Plugins, version 13.5pr3](#)
- [MBS Plugins 11.1 Release notes](#)
- [MBS Real Studio Plugins, version 11.1pr10](#)
- [MBS Real Studio Plugins, version 11.1pr7](#)
- [MBS REALbasic plug-in 9.6](#)

21.3.2 Methods

21.3.3 AttributeValueOfResultAtIndex(name as string, index as UInt32) as Variant

Plugin Version: 9.7, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the value of the named attribute for the result at the given index.

Notes: name: The attribute name for which to return the values. If the attribute is not one of those requested in the valueListAttrs or sortingAttrs parameters to one of the query creation functions, the result will be nil.

index: The index into the query's result list. If the index is negative, or is equal to or larger than the current number of results in the query, the behavior is undefined.

Returns the value of the attribute, or nil if the attribute doesn't exist in the query on that result.

21.3.4 Constructor(query as MDQueryMBS, queryString as string)

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates a new query, which is a subset of the given query.

Notes: Only results matched by the given query can be matched by the query expression of this query.

query: The parent query of the new query.

queryString: The query expression string for this query. This expression in effect may further restrict the matches found by the parent query. If the string is empty the behavior is undefined.

valueListAttributes: An optional array of attribute names. The query will collect the values of these attributes into unique lists, which can be used or displayed to summarize the results of the query, or allow a user to further qualify the items for which they are searching. This parameter may be empty if no value lists are desired. Value list collection increases CPU usage and significantly increases the memory usage of an MDQuery. The attribute names are strings.

sortingAttributes: An optional array of attribute names. The query will results of the query based on the values of these attributes. The first name in the array is used as the primary sort key, the second as the secondary key, and so on. The comparison of like-typed values is a simple, literal comparison. This parameter may be empty if no sorting is desired. Sorting increases memory usage and significantly increases the CPU usage of an MDQuery. However, when possible, it is almost always cheaper to have the MDQuery do the sorting, rather than you fetching all the results and attributes from each of them and doing the sorting yourself. The attribute names are strings.

See also:

- 21.3.5 Constructor(query as MDQueryMBS, queryString as string, valueListAttributes() as string) 584
- 21.3.6 Constructor(query as MDQueryMBS, queryString as string, valueListAttributes() as string, sortingAttributes() as string) 584
- 21.3.7 Constructor(queryString as string) 585
- 21.3.8 Constructor(queryString as string, valueListAttributes() as string) 586

- 21.3.9 Constructor(queryString as string, valueListAttributes() as string, sortingAttributes() as string) 587

21.3.5 Constructor(query as MDQueryMBS, queryString as string, valueListAttributes() as string)

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates a new query, which is a subset of the given query.

Notes: Only results matched by the given query can be matched by the query expression of this query.

query: The parent query of the new query.

queryString: The query expression string for this query. This expression in effect may further restrict the matches found by the parent query. If the string is empty the behavior is undefined.

valueListAttributes: An optional array of attribute names. The query will collect the values of these attributes into unqued lists, which can be used or displayed to summarize the results of the query, or allow a user to further qualify the items for which they are searching. This parameter may be empty if no value lists are desired. Value list collection increases CPU usage and significantly increases the memory usage of an MDQuery. The attribute names are strings.

sortingAttributes: An optional array of attribute names. The query will results of the query based on the values of these attributes. The first name in the array is used as the primary sort key, the second as the secondary key, and so on. The comparison of like-typed values is a simple, literal comparison. This parameter may be empty if no sorting is desired. Sorting increases memory usage and significantly increases the CPU usage of an MDQuery. However, when possible, it is almost always cheaper to have the MDQuery do the sorting, rather than you fetching all the results and attributes from each of them and doing the sorting yourself. The attribute names are strings.

See also:

- 21.3.4 Constructor(query as MDQueryMBS, queryString as string) 583
- 21.3.6 Constructor(query as MDQueryMBS, queryString as string, valueListAttributes() as string, sortingAttributes() as string) 584
- 21.3.7 Constructor(queryString as string) 585
- 21.3.8 Constructor(queryString as string, valueListAttributes() as string) 586
- 21.3.9 Constructor(queryString as string, valueListAttributes() as string, sortingAttributes() as string) 587

21.3.6 Constructor(query as MDQueryMBS, queryString as string, valueListAttributes() as string, sortingAttributes() as string)

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates a new query, which is a subset of the given query.

Notes: Only results matched by the given query can be matched by the query expression of this query.

query: The parent query of the new query.

queryString: The query expression string for this query. This expression in effect may further restrict the matches found by the parent query. If the string is empty the behavior is undefined.

valueListAttributes: An optional array of attribute names. The query will collect the values of these attributes into unique lists, which can be used or displayed to summarize the results of the query, or allow a user to further qualify the items for which they are searching. This parameter may be empty if no value lists are desired. Value list collection increases CPU usage and significantly increases the memory usage of an MDQuery. The attribute names are strings.

sortingAttributes: An optional array of attribute names. The query will results of the query based on the values of these attributes. The first name in the array is used as the primary sort key, the second as the secondary key, and so on. The comparison of like-typed values is a simple, literal comparison. This parameter may be empty if no sorting is desired. Sorting increases memory usage and significantly increases the CPU usage of an MDQuery. However, when possible, it is almost always cheaper to have the MDQuery do the sorting, rather than you fetching all the results and attributes from each of them and doing the sorting yourself. The attribute names are strings.

See also:

- 21.3.4 Constructor(query as MDQueryMBS, queryString as string) 583
- 21.3.5 Constructor(query as MDQueryMBS, queryString as string, valueListAttributes() as string) 584
- 21.3.7 Constructor(queryString as string) 585
- 21.3.8 Constructor(queryString as string, valueListAttributes() as string) 586
- 21.3.9 Constructor(queryString as string, valueListAttributes() as string, sortingAttributes() as string) 587

21.3.7 Constructor(queryString as string)

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates a new query with the given query expression.

Notes: queryString: The query expression string for this query. The syntax for query expressions is explained above in the header overview documentation.

valueListAttributes: An optional array of attribute names. The query will collect the values of these attributes into unique lists, which can be used or displayed to summarize the results of the query, or allow a user to further qualify the items for which they are searching. This parameter may be empty if no value lists are desired. Value list collection increases CPU usage and significantly increases the memory usage of an MDQuery. The attribute names are string.

sortingAttributes: An optional array of attribute names. The query will results of the query based on the values of these attributes. The first name in the array is used as the primary sort key, the second as the secondary key, and so on. The comparison of like-typed values is a simple, literal comparison. This parameter may be empty if no sorting is desired. Sorting increases memory usage and significantly increases the CPU usage of an MDQuery. However, when possible, it is almost always cheaper to have the MDQuery do

the sorting, rather than you fetching all the results and attributes from each of them and doing the sorting yourself. The attribute names are strings.

The handle value is zero on failure.

See also:

- 21.3.4 Constructor(query as MDQueryMBS, queryString as string) 583
- 21.3.5 Constructor(query as MDQueryMBS, queryString as string, valueListAttributes() as string) 584
- 21.3.6 Constructor(query as MDQueryMBS, queryString as string, valueListAttributes() as string, sortingAttributes() as string) 584
- 21.3.8 Constructor(queryString as string, valueListAttributes() as string) 586
- 21.3.9 Constructor(queryString as string, valueListAttributes() as string, sortingAttributes() as string) 587

21.3.8 Constructor(queryString as string, valueListAttributes() as string)

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates a new query with the given query expression.

Notes: queryString: The query expression string for this query. The syntax for query expressions is explained above in the header overview documentation.

valueListAttributes: An optional array of attribute names. The query will collect the values of these attributes into unqued lists, which can be used or displayed to summarize the results of the query, or allow a user to further qualify the items for which they are searching. This parameter may be empty if no value lists are desired. Value list collection increases CPU usage and significantly increases the memory usage of an MDQuery. The attribute names are string.

sortingAttributes: An optional array of attribute names. The query will results of the query based on the values of these attributes. The first name in the array is used as the primary sort key, the second as the secondary key, and so on. The comparison of like-typed values is a simple, literal comparison. This parameter may be empty if no sorting is desired. Sorting increases memory usage and significantly increases the CPU usage of an MDQuery. However, when possible, it is almost always cheaper to have the MDQuery do the sorting, rather than you fetching all the results and attributes from each of them and doing the sorting yourself. The attribute names are strings.

The handle value is zero on failure.

See also:

- 21.3.4 Constructor(query as MDQueryMBS, queryString as string) 583
- 21.3.5 Constructor(query as MDQueryMBS, queryString as string, valueListAttributes() as string) 584

- 21.3. CLASS MDQUERYMBS 587
- 21.3.6 Constructor(query as MDQueryMBS, queryString as string, valueListAttributes() as string, sortingAttributes() as string) 584
- 21.3.7 Constructor(queryString as string) 585
- 21.3.9 Constructor(queryString as string, valueListAttributes() as string, sortingAttributes() as string) 587

21.3.9 Constructor(queryString as string, valueListAttributes() as string, sortingAttributes() as string)

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates a new query with the given query expression.

Notes: queryString: The query expression string for this query. The syntax for query expressions is explained above in the header overview documentation.

valueListAttributes: An optional array of attribute names. The query will collect the values of these attributes into uniqued lists, which can be used or displayed to summarize the results of the query, or allow a user to further qualify the items for which they are searching. This parameter may be empty if no value lists are desired. Value list collection increases CPU usage and significantly increases the memory usage of an MDQuery. The attribute names are string.

sortingAttributes: An optional array of attribute names. The query will results of the query based on the values of these attributes. The first name in the array is used as the primary sort key, the second as the secondary key, and so on. The comparison of like-typed values is a simple, literal comparison. This parameter may be empty if no sorting is desired. Sorting increases memory usage and significantly increases the CPU usage of an MDQuery. However, when possible, it is almost always cheaper to have the MDQuery do the sorting, rather than you fetching all the results and attributes from each of them and doing the sorting yourself. The attribute names are strings.

The handle value is zero on failure.

See also:

- 21.3.4 Constructor(query as MDQueryMBS, queryString as string) 583
- 21.3.5 Constructor(query as MDQueryMBS, queryString as string, valueListAttributes() as string) 584
- 21.3.6 Constructor(query as MDQueryMBS, queryString as string, valueListAttributes() as string, sortingAttributes() as string) 584
- 21.3.7 Constructor(queryString as string) 585
- 21.3.8 Constructor(queryString as string, valueListAttributes() as string) 586

21.3.10 CountOfResultsWithAttributeValue(name as string, Value as Variant) as UInt32

Plugin Version: 9.7, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the number of results which have the given attribute and attribute value. Note that this count may change over time, as the query's result list is updated.

Notes: name: The attribute name for which to return the number of results with the given value. If the attribute is not one of those requested in the valueListAttrs parameter to one of the query creation functions, the behavior is undefined.

value: The attribute value for which to return the number of results with that value. This parameter may be nil, in which case the number of results that do not contain the named attribute is returned.

Returns the number of results with that attribute and value.

21.3.11 DisableUpdates

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Disables updates to the query result list.

Notes: This should be called before iterating through the list of results to prevent the result list from changing during the iteration. The disabled state is a counter, and disabling can be done recursively and from different threads.

21.3.12 EnableUpdates

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Re-enables updates to the query result list.

Notes: This should be called when finished iterating through the list of results, to allow changes to the result list to occur. Changes will be allowed when all the disables have been matched by a corresponding enable.

21.3.13 Execute(flags as Integer) as boolean

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Run the query, and populate the query with the results.

Example:

```
dim q as new MDQueryMBS("kMDItemContentModificationDate>=$ time.now")
// you will want to use a MDQueryMBS subclass here to catch the events
```

```

if not q.Execute(q.kMDQueryWantsUpdates) then
MsgBox "Failed to query"
end if

```

Notes: Queries only gather results or process updates while the current thread's run loop is running. Queries normally operate asynchronously, and send out progress and update notifications to report changes to the list of results that has been collected. Queries have two phases: the initial gathering of all currently matching results, and a second live-update phase where queries monitor the state of the system and update themselves to external changes in files or the operating environment (for example, as time advances, files which did not match the query when it was started may later match the query). Query notifications are posted within the context of the same thread which executes the query. [

here are three operational modes: (1) synchronous static queries, which collect the list of current results and then do not watch for updates to the results, (2) asynchronous static queries, which collect the results asynchronously after this function returns, and then do not watch for updates to the results, and (3) asynchronous live queries which collect the initial results asynchronously after this function returns, and then do watch for updates to the results, until the query is destroyed. There is little reason not to allow the fourth case, synchronous collection of initial results, followed by asynchronous monitoring for updates, so this may change in the future.

Flags: Options for the query.

Returns true if the query was started (executed in the case of a synchronous query), false otherwise. Queries cannot be executed more than once.

21.3.14 GetSortOptionFlagsForAttribute(fieldName as string) as Integer

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Gets the sort option flags for a sorting attribute.

Notes: fieldName: The attribute name for which sort option flags are to be fetched.

Returns an integer with flags. Currently can be 0 or 1.

Available on Mac OS X 10.7 or later.

21.3.15 IndexOfResult(it as MDItemMBS) as Integer

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the current index of the given result.

Notes: Note that the index of a result will change over time, as the query's result list is updated.

Returns the index of the given result, or -1 if the value is not one of the query's existing results.

21.3.16 IsGatheringComplete as boolean

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns true if the first phase of a query, the initial result gathering, has finished.

Notes: A boolean indicating whether or not the first phase of a query has completed.

21.3.17 QueryString as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the query string of the query.

21.3.18 ResultAtIndex(index as Integer) as MDItemMBS

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the current result at the given index.

Notes: This function causes the result object to be created if it hasn't been created already. For performance reasons, it is not advisable to ask for results that you don't need, to avoid the cost of creating them. If possible, call this function to fetch only the results you need to display or otherwise process. Note that the index of a particular result will change over time, as the query's result list is updated.

index: The index into the query's result list.

If the index is negative, or is equal to or larger than the current number of results in the query, the behavior is undefined.

Returns the MDItem currently at the given index, or if a result-create function has been set, returns the result returned by that function.

21.3.19 ResultCount as Integer

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the number of results currently collected by the query.

Example:

```
dim m as new MDQueryMBS("kMDItemContentModificationDate>=$ time.today")
```

```
call m.Execute(m.kMDQuerySynchronous)
```

```
MsgBox str(m.ResultCount)+" files modified today"
```

Notes: Note that the number of results in a query will change over time as the query's result list is updated.

21.3.20 Results(limit as Integer = -1) as MDItemMBS()

Plugin Version: 13.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: Queries result items.

Notes: Internally does what ResultAtIndex does for up to limit entries.

Limit with -1 will cause no limit.

If possible, call this function to fetch only the results you need to display or otherwise process.

21.3.21 SetMaxCount(size as Integer)

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Use SetMaxCount to limit the number of results returned by the query engine.

Notes: This must be called before the query is executed.

size: The maximum number of results desired.

21.3.22 SetSearchScope(paths() as folderitem, options() as string)

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Use SetSearchScope to limit the results returned by the query engine to those MDItem that appear within the specified directories.

Example:

```
dim q as MDQueryMBS // your query
```

```
q.SetSearchScope nil, array(q.kMDQueryScopeComputer)
```

Notes: This may be used to limit searching to particular volumes. Tilde paths, or environment variables are not expanded. Calling this multiple times will replace the previous options. This must be called before the query is executed.

paths: An array of directories where you want to search. This array can be empty.

options: An array of scope options. Pass the `kMDQueryScope*` constants. This array can be empty.

21.3.23 `SetSortOptionFlagsForAttribute(fieldName as string, flags as UInt32) as Boolean`

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Sets the sort flags for a query.

Notes: `fieldName`: The attribute name for which sort option flags are to be set.

The attribute name must have been part of the `sortingFlags` when the query was created.

flags: An integer containing `MDQuerySortOptionFlags` to be applied to the attribute

Returns a boolean, true on success, false on failure.

Available on Mac OS X 10.7 or later.

21.3.24 `SetSortOrder(sortingAttrs() as string) as Boolean`

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Sets the sort order for a query.

Notes: `sortingAttrs` An array of attribute names, as in `MDQueryCreate`.

The query's result set will be sorted according to the order of these attributes. All names in the array have to have been passed as `sortingAttrs` when the query was created. The attribute names are strings.

Returns a boolean, true on success, false on failure.

Available on Mac OS X 10.7 or later.

21.3.25 `SortingAttributes` as `string()`

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the list of attribute names the query is using to sort the results.

21.3.26 `Stop`

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Stops the query from ever generating more results.

Notes: Queries may be executed only once, so a stopped query cannot be restarted. The query will also not generate any result updates. The query is static after this function returns. The query will do final processing of results that have come in but not yet been processed (because, say, the batching parameters hasn't triggered that yet). That may trigger a progress notification, so be aware of that if you are stopping a query from within your progress note handler; that is, during this function, a recursive progress and/or finished notification might occur, which might recursively call your notification handler. It is safe to call this function recursively. You would call this function to stop a query that is generating way too many results to be useful, but still want to access the results that have come in so far. If a query is stopped before the gathering phase finishes, it will not report itself as finished, nor will it send out a finished notification.

21.3.27 `ValueListAttributes` as `string()`

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the list of attribute names for which the query is collecting the lists of values.

21.3.28 `ValuesOfAttribute(name as string)` as `Variant()`

Plugin Version: 9.7, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the list of values, from the results of the query, of the named attribute.

Notes: The list is not ordered in any way. The list contains only one occurrence of each value. Note that this list may change over time, as the query's result list is updated.

name: The attribute name for which to return the values. If the attribute is not one of those requested in the `valueListAttrs` parameter to one of the query creation functions, the behavior is undefined.

Returns an array holding the value objects for that attribute.

21.3.29 Properties

21.3.30 Handle as Integer

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: The internal reference for the MDQuery.

Notes: (Read and Write property)

21.3.31 Tag as Variant

Plugin Version: 11.1, Platform: macOS, Targets: Desktop, Console & Web.

Function: The attached value.

Notes: You can use this property as you like.

(Read and Write property)

21.3.32 BatchParameters as MDQueryBatchingParamsMBS

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: The query whose batching parameters are to be set.

Notes: (Read and Write computed property)

21.3.33 Events

21.3.34 Finish()

Plugin Version: 9.6, Platform: macOS, Targets: .

Function: The event called when the query has finished.

Notes: Called when the query has finished with the initial result-gathering phase, and may now proceed into the live-update phase (if that option was chosen when the query was executed). This event often shortly follows after the last progress notification. It is usually not necessary to update any displayed UI in response to this event, since it doesn't indicate any change in the result list of a query.

21.3.35 Progress(AddedItems()) as MDItemMBS, ChangedItems() as MDItemMBS, RemovedItems() as MDItemMBS)

Plugin Version: 9.6, Platform: macOS, Targets: .

Function: The event sent to indicate changes to the query's results list during the initial gathering phase of a query's execution.

Notes: Mostly adds will occur during this phase, but removals and changes can also occur, as in any update. For performance reasons the arrays are empty in newer Mac OS X SDK versions. In that case please use the result functions.

21.3.36 Update(AddedItems() as MDItemMBS, ChangedItems() as MDItemMBS, RemovedItems() as MDItemMBS)

Plugin Version: 9.6, Platform: macOS, Targets: .

Function: The event is sent to indicate changes to the query's results list during the second, live-update, phase of a query's execution.

21.3.37 Constants

Constants

21.4 Globals

21.4.1 SpotlightMBS(searchString as string) as Integer

Plugin Version: 7.7, Platform: macOS, Targets: Desktop, Console & Web.

Function: Displays a Spotlight search window.

Example:

```
call SpotlightMBS("Hello")
```

Notes: searchString: An initial query string. Pass "" to open the search window with no initial query string.

Returns a Mac OS error code and -1 if the function is not available and 0 on success.

Requires Mac OS X 10.4.

Chapter 22

System

22.1 Globals

22.1.1 GetHelpTagDelayMBS as Integer

Platform: macOS, Targets: Desktop only.

Deprecated: This item is deprecated and should no longer be used. **Function:** Returns the delay time for the help tags.

Example:

```
msgbox str(GetHelpTagDelayMBS)
```

Notes: A positive value is for milliseconds and a negative value for microseconds. It looks like the setting of this property is not recognized always. This setting is also per application and not saved between sessions.

Blog Entries

- [MBS Xojo Plugins, version 20.6pr4](#)

22.1.2 GetHelpTagDisplayedMBS as boolean

Platform: macOS, Targets: Desktop only.

Deprecated: This item is deprecated and should no longer be used. **Function:** whether the help tags are displayed.

Notes: This setting is per application and not saved between sessions.

Blog Entries

- [MBS Xojo Plugins, version 20.6pr4](#)

22.1.3 SetHelpTagDelayMBS(value as Integer)

Platform: macOS, Targets: Desktop only.

Deprecated: This item is deprecated and should no longer be used. **Function:** Sets the delay time for the help tags.

Example:

```
if GetHelpTagDelayMBS<>5000 then // change to 5 seconds
SetHelpTagDelayMBS 5000
end if
```

Notes: A positive value is for milliseconds and a negative value for microseconds. It looks like the setting of this property is not recognized always. This setting is also per application and not saved between sessions.

Xojo 2006r3 does set this value whenever a window comes to front, so if you want to set it really, use some code like in the example above in a timer to change it to your need.

Blog Entries

- [MBS Xojo Plugins, version 20.6pr4](#)

22.1.4 SetHelpTagDisplayedMBS(value as boolean)

Platform: macOS, Targets: Desktop only.

Deprecated: This item is deprecated and should no longer be used. **Function:** Sets whether the help tags are displayed.

Notes: This setting is per application and not saved between sessions.

Blog Entries

- [MBS Xojo Plugins, version 20.6pr4](#)

22.1.5 GlobalIdleTimeMBS as Double

Plugin Version: 13.2, Platforms: macOS, Windows, Targets: Desktop, Console & Web.

Function: Queries the current global idle time.

Example:

```
MsgBox Format(GlobalIdleTimeMBS,"0.0")+ " seconds idle"
```

Notes: The return value is the number of seconds the user did not use mouse or keyboard. Returns 0 on any error.

Blog Entries

- [MBS Xojo / Real Studio Plugins, version 13.2pr5](#)

22.1.6 MacGlobalIdleTimeMBS as UInt64

Plugin Version: 10.0, Platform: macOS, Targets: Desktop only.

Function: Queries the current global idle time on a Mac.

Example:

```
MsgBox Format(MacGlobalIdleTimeMBS/1000000000.0,"0.0")+ " seconds idle"
```

Notes: The return value is the number of nanoseconds the user did not use mouse or keyboard. Returns 0 on any error.

Deprecated in 13.2 plugins in favor of GlobalIdleTimeMBS.

Blog Entries

- [MBS Xojo / Real Studio Plugins, version 13.2pr5](#)
- [MBS REALbasic plug-ins version 10.0](#)

22.1.7 MacMountServerVolumeMBS(URL as string, MountDir as String, User as String, Password as String, byref Disk as FolderItem, flags as Integer) as Integer

Plugin Version: 16.1, Platform: macOS, Targets: All.

Function: This routine will mount the server specified by url at mountDir (or the default location if mountDir is empty).

Example:

```
dim flags as Integer = 0
dim disk as FolderItem
dim URL as string = "smb://Test.local"
dim user as string = "root"
dim pass as string = "xxx"
```

```
dim e as Integer = MacMountServerVolumeMBS(URL, "", user, pass, disk, flags)
```

```
if e = 0 then
  MsgBox "OK"
else
  MsgBox disk.NativePath
```

end if

Notes: An optional user and password can be passed in for authentication. If no user or password is provided then the underlying file system will handle authentication if required. This routine returns after the mount is complete.

url: The server to mount.

mountDir: The directory to mount the server to (default if empty).

user: String to pass as user for authentication.

password: String to pass as password for authenticated log in.

Disk: The folderItem of the newly mounted volume.

Flags: Options (such as kFSMountServerMarkDoNotDisplay and kFSMountServerMountOnMountDir).

Constant	Value	Description
kFSMountServerMarkDoNotDisplay	1	Specify this option if you do want the volume displayed as a stand

along volume in the UI.

kFSMountServerMountOnMountDir	4	Specify this option if you want the volume mounted on the mountdir passed in instead of in it.
kFSMountServerSuppressConnectionUI	&h40	Specify this option if you want to suppress connection-time UI when mounting the server volume.

Returns Mac OS X error code. Zero for success.

Blog Entries

- [MBS Plugins updated for Xojo 2019r2](#)
- [MBS Xojo / Real Studio Plugins, version 16.1pr5](#)

22.1.8 MacUnmountVolumeMBS(volume as folderItem, Force as Boolean, byref dissenter as Integer) as Integer

Plugin Version: 16.1, Platform: macOS, Targets: All.

Function: This routine unmounts the volume specified by FolderItem.

Example:

```
dim u as Integer = VolumeCount-1
for i as Integer = 0 to u
dim v as FolderItem = volume(i)

if v.Name = "TestServer" then
```

```
dim dissenter as Integer = 0
dim e as Integer = MacUnmountVolumeMBS(v, false, dissenter)

if e = 0 then
  MsgBox "Unmounted"
else
  MsgBox "Failed to unmount with error "+str(e)+" The app with PID "+str(dissenter)+" blocks it."
end if
end if
next
```

Notes: If the volume cannot be unmounted the pid of the process which denied the unmount will be returned in the dissenter parameter. This routine returns after the unmount is complete.

Force: Specify true if you want the volume forcibly unmounted. Force unmounting a volume will very likely result in data loss since the volume will be ejected even if there are open files on it. This option should be reserved for situations such as the backing store for a volume is gone (so the data is lost regardless).

dissenter: pid of the process which denied the unmount if the unmount is denied.

Returns Mac OS X error code. Zero for success.

Blog Entries

- [MBS Xojo / Real Studio Plugins, version 16.1pr5](#)

22.1.9 StartDictationMBS

Plugin Version: 13.1, Platform: macOS, Targets: Desktop only.

Function: Starts dictation.

Notes: This is for Carbon application. For Cocoa use methods on NSApplicationMBS.

Blog Entries

- [MBS Real Studio Plugins, version 13.1pr1](#)

22.1.10 GetSystemUIModeMBS as Integer

Plugin Version: 2.8, Platform: macOS, Targets: Desktop only.

Function: Returns the current Mac OS X System UI Mode for your application.

Notes: Returns -1 on any error.

See SetSystemUIModeMBS for more details.

Please use `presentationOptions` in `NSApplicationMBS` for Cocoa applications.

22.1.11 `GetSystemUIModeOptionsMBS` as Integer

Plugin Version: 2.8, Platform: macOS, Targets: Desktop only.

Function: Returns the current Mac OS X System UI Mode options for your application.

Notes: Returns -1 on any error.

See `SetSystemUIModeMBS` for more details.

Please use `presentationOptions` in `NSApplicationMBS` for Cocoa applications.

22.1.12 `OpenMacOSXPreferencesPaneMBS(name as string)` as Integer

Plugin Version: 2.8, Platform: macOS, Targets: Desktop only.

Function: Opens a named preference pane on Mac OS X.

Example:

`dim e as Integer`

```
e=OpenMacOSXPreferencesPaneMBS("Network")
```

Notes: Returns a Mac OS X error code. For example -43 if file not found, -1 if function is not available or 0 if successful.

Possible values for Mac OS X:

UniversalAccessPref

StartupDisk

Speech

Sound

Network

MyAccount

Mouse

LoginItems

Localization

Keyboard

Internet

Ink

General

EnergySaver

DigiHubDiscs

DesktopPictures

Dock

ColorSync

22.1. GLOBALS

QuickTime
 Classic
 Bluetooth
 ARDPref
 DateAndTime
 Accounts
 Displays
 SoftwareUpdate
 SharingPref
 ScreenSaver

See content of /System/Library/PreferencePanes/ folder.

In MacOS 10.10 or newer, better use URL schemes:

https://www.mbsplugins.de/archive/2020-04-05/MacOS_System_Preference_Links

Blog Entries

- [MacOS System Preference Links](#)
- [MBS REALbasic plug-in 9.6](#)

22.1.13 RunningOnCarbonXMBS as boolean

Platform: macOS, Targets: Desktop only.

Function: Returns true if we are running Carbon on Mac OS X.

Example:

```
if RunningOnCarbonXMBS then
  ' do Stuff for Mac OS X only
end if
```

Notes: Does always return false on Windows and Mac OS Classic.

22.1.14 SetSystemUIModeMBS(mode as Integer, Options as Integer)

Plugin Version: 2.8, Platform: macOS, Targets: Desktop only.

Function: Sets the current System UI mode for your application.

Notes: Details from Apple's documentation:

Sets the presentation mode for system-provided user interface elements.

The presentation mode of an application determines which system-provided user interface elements are visible on the screen. When the frontmost application changes its presentation mode, a `kEventAppSystemUIModeChanged` Carbon event is sent to all applications that have registered for the event. This event is also sent when an application is activated; it contains the newly active application's presentation mode.

Note that the system UI mode is a per-process state. Switching from a process that is suppressing system UI to another process that is not will cause system UI elements to become visible automatically. Switching back to the first process will suppress system UI elements again.

The modes available:

<code>kUIModeNormal</code>	0	In this mode, all standard system UI elements are visible.
<code>kUIModeContentSuppressed</code>	1	In this mode, system UI elements which cover the "content area" of the screen (the area other than the menubar) are hidden. However, these elements may automatically show themselves in response to mouse movements or other user activity; specifically, the Dock will still show itself automatically when the mouse moves into the Dock's auto-show region.
<code>kUIModeContentHidden</code>	2	In this mode, system UI elements which cover the "content area" of the screen (the area other than the menubar) are hidden. Unlike <code>kUIModeContentSuppressed</code> , most UI elements will not automatically show themselves in this mode.
<code>kUIModeAllHidden</code>	3	In this mode, all system UI elements, including the menubar, are hidden. Most system UI elements will not automatically show themselves in this mode. The application may request that the menubar automatically show itself while in this mode by passing the <code>kUIOptionAutoShowMenuBar</code> flag to <code>SetSystemUIMode</code> .

The options which you can combine:

Please use `presentationOptions` in `NSApplicationMBS` for Cocoa applications.

22.1.15 ShowCharacterPaletteMBS

Plugin Version: 4.1, Platform: macOS, Targets: Desktop only.

Function: Shows the character palette.

Example:

```
ShowCharacterPaletteMBS
```

Notes: Works on Mac OS X 10.3 and newer.

We have no way to close this window.

kUIOptionAutoShowMenuBar	1	Requests that the menubar automatically show itself when the user moves the mouse into the screen area that would ordinarily be occupied by the menubar. Only valid with kUIModeAllHidden.
kUIOptionAnimateMenuBar	2	Requests that the menubar animate on or offscreen, if the UIMode is also being changed such that the menubar will change visibility. Unlike other UI options, this option is not stored and only affects the behavior of this call to SetSystemUIMode. Valid for all modes. Available in Mac OS X 10.7 and later.
kUIOptionDisableAppleMenu	4	Disables all items in the Apple menu. Valid for all modes.
kUIOptionDisableProcessSwitch	8	The active application may not be changed while this process is active. Currently disables the Command-Tab and Command-Shift-Tab key sequences to switch the active process, and the global window rotation key sequence selected by the user in the Keyboard preference pane. SetFrontProcess may still be used to explicitly switch the active process. Only valid with modes other than kUIModeNormal.
kUIOptionDisableForceQuit	16	The Force Quit window may not be displayed while this process is active. Currently disables the Command-Option-Escape key sequence to open the Force Quit window and the Force Quit menu item in the Apple menu. Only valid with modes other than kUIModeNormal.
kUIOptionDisableSessionTerminate	32	The current login session may not be terminated while this process is active. Currently disables the Power key and the Restart, Shut Down, and Log Out menu items in the Apple menu. Only valid with modes other than kUIModeNormal.

Chapter 23

Window

23.1 class DesktopWindow

23.1.1 class DesktopWindow

Plugin Version: 21.5, Platforms: macOS, Linux, Windows, Targets: Desktop only.

Function: Extends Xojo's Window Class.

Example:

```
window1.HasNoTitleBarMBS = true
```

Notes: In Xojo 2005 and newer you need to use `self.` in front of the method as the propertyname alone is not accepted.

23.1.2 Methods

23.1.3 InvalidateShadowMBS

Plugin Version: 21.5, Platform: macOS, Targets: Desktop only.

Function: This method causes a window's shadow to be recalculated.

Notes: `InvalidateShadowMBS` is not typically used by applications. However, it may be useful for applications with customized window frames that change shape dynamically; in this case, after the application has drawn the new window shape, the window shadow must be recalculated to follow the new window shape.

This method causes the window shadow to be immediately recalculated and redrawn based on the current contents of the window's back buffer. For best performance and visual appearance, you should follow these

steps when invalidating a window shadow: disable updates with `DisableScreenUpdatesMBS`, draw, flush, invalidate the shadow, and enable updates. For a compositing window, after invalidating any views that should be redrawn, you will need to explicitly draw and flush using `HIWindowFlush`, rather than waiting for the event loop to draw and flush the window, because you cannot disable updates or invalidate the window shadow if drawing is done via the event loop.

23.1.4 UpdateNowMBS

Plugin Version: 21.5, Platform: macOS, Targets: Desktop only.

Function: On MacOS all windows are doublebuffered and the OS updates the screen from time to time. This method forces a screen update.

Example:

```
Mainwindow.UpdateNowMBS
```

Notes: Updated for 64-bit in plugin version 18.3.

23.1.5 UpdateNowRectMBS(left as integer, top as integer, width as integer, height as integer)

Plugin Version: 21.5, Platform: macOS, Targets: Desktop only.

Function: On Mac OS all windows are doublebuffered and the OS updates the screen from time to time. This method forces a screen update for a part of your window.

Example:

```
Mainwindow.UpdateNowRectMBS Mainwindow.text.left, Mainwindow.text.top, Mainwindow.text.width, Mainwindow.text.height
```

23.2 Globals

23.2.1 DisableScreenUpdatesMBS

Plugin Version: 8.7, Platform: macOS, Targets: Desktop only.

Function: Temporarily disables redraw of the screen after changes to window geometry or window contents.

Notes: It is appropriate to disable updates if you are moving or resizing multiple windows and you want all of the geometry changes to appear onscreen simultaneously. In most other cases, you should strive to avoid disabling screen updates. The window server will automatically re-enable updates (and print a message to the Console log) if you leave updates disabled for a sufficiently long period of time, currently about 1 second.

The window server records the number of calls to `DisableScreenUpdates` and does not re-enable updates until a matching number of calls to `EnableScreenUpdates` have been made.

Updated for 64-bit in plugin version 18.3.

Blog Entries

- [MBS Xojo Plugins, version 18.3pr3](#)

23.2.2 EnableScreenUpdatesMBS

Plugin Version: 8.7, Platform: macOS, Targets: Desktop only.

Function: Re-enables redraw of the screen after changes to window geometry or window contents.

Notes: Screen redraw is not actually enabled until the number of calls to `EnableScreenUpdatesMBS` matches the number of calls to `DisableScreenUpdatesMBS`.

Updated for 64-bit in plugin version 18.3.

Blog Entries

- [MBS Xojo Plugins, version 18.3pr3](#)

23.3 class Window

23.3.1 class Window

Platforms: macOS, Linux, Windows, Targets: Desktop only.

Function: Extends Xojo's Window Class.

Example:

```
window1.HasNoTitleBarMBS = true
```

Notes: In Xojo 2005 and newer you need to use `self.` in front of the method as the propertyname alone is not accepted.

23.3.2 Methods

23.3.3 InvalidateShadowMBS

Plugin Version: 8.7, Platform: macOS, Targets: Desktop only.

Function: This method causes a window's shadow to be recalculated.

Notes: `InvalidateShadowMBS` is not typically used by applications. However, it may be useful for applications with customized window frames that change shape dynamically; in this case, after the application has drawn the new window shape, the window shadow must be recalculated to follow the new window shape.

This method causes the window shadow to be immediately recalculated and redrawn based on the current contents of the window's back buffer. For best performance and visual appearance, you should follow these steps when invalidating a window shadow: disable updates with `DisableScreenUpdatesMBS`, draw, flush, invalidate the shadow, and enable updates. For a compositing window, after invalidating any views that should be redrawn, you will need to explicitly draw and flush using `HIWindowFlush`, rather than waiting for the event loop to draw and flush the window, because you cannot disable updates or invalidate the window shadow if drawing is done via the event loop.

23.3.4 UpdateNowMBS

Platform: macOS, Targets: Desktop only.

Function: On MacOS all windows are doublebuffered and the OS updates the screen from time to time. This method forces a screen update.

Example:

```
Mainwindow.UpdateNowMBS
```

Notes: Updated for 64-bit in plugin version 18.3.

Blog Entries

- [MBS Xojo Plugins, version 18.3pr3](#)

23.3.5 UpdateNowRectMBS(left as Integer, top as Integer, width as Integer, height as Integer)

Platform: macOS, Targets: Desktop only.

Function: On Mac OS all windows are doublebuffered and the OS updates the screen from time to time. This method forces a screen update for a part of your window.

Example:

```
Mainwindow.UpdateNowRectMBS Mainwindow.text.left, Mainwindow.text.top, Mainwindow.text.width, Mainwindow.text.height
```

Notes: Updated for 64-bit in plugin version 18.3.

Chapter 24

XojoRuntime

24.1 class MemoryStatisticsMBS

24.1.1 class MemoryStatisticsMBS

Plugin Version: 21.1, Platforms: macOS, Linux, iOS, Targets: All.

Function: Class for Malloc memory statistics.

Blog Entries

- [News from the MBS Xojo Plugins Version 21.1](#)
- [MonkeyBread Software Releases the MBS Xojo Plugins in version 21.1](#)
- [Understanding Memory Statistics](#)
- [MBS Xojo Plugins, version 21.1pr4](#)

24.1.2 Methods

24.1.3 Compact

Plugin Version: 21.1, Platforms: macOS, Linux, iOS, Targets: All.

Function: Compacts memory.

Notes: Asks malloc to free empty pages to the OS.

24.1.4 Constructor

Plugin Version: 21.1, Platforms: macOS, Linux, iOS, Targets: All.

Function: The constructor.

Notes: Initializes the properties.

24.1.5 MemoryStatistics as MemoryStatisticsMBS

Plugin Version: 21.1, Platforms: macOS, Linux, iOS, Targets: All.

Function: Queries statistics for malloc.

24.1.6 Properties

24.1.7 BytesFree as Integer

Plugin Version: 21.1, Platforms: macOS, Linux, iOS, Targets: All.

Function: Number of bytes free.

Notes: Memory used for objects, but now available for reuse with new objects.

And can't be freed usually as several objects share same memory page, so we keep the page.

(Read only property)

24.1.8 BytesTotal as Integer

Plugin Version: 21.1, Platforms: macOS, Linux, iOS, Targets: All.

Function: Total bytes allocated currently from OS.

Notes: Free and used blocks.

(Read only property)

24.1.9 BytesUsed as Integer

Plugin Version: 21.1, Platforms: macOS, Linux, iOS, Targets: All.

Function: Used bytes of memory.

Notes: Within total memory, the number of bytes currently in use.

This is what Xojo reports for Runtime.MemoryUsed.

(Read only property)

24.1.10 ChunksFree as Integer

Plugin Version: 21.1, Platforms: macOS, Linux, iOS, Targets: All.

Function: Number of free chunks.

Notes: Could be freed.

(Read only property)

24.1.11 ChunksUsed as Integer

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: Number of chunks in use.

Notes: Not available on Linux.

(Read only property)

Chapter 25

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Chapter 26

The FAQ

26.0.1 Can anyone help me convert seconds to time in this format hh:mm:ss?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Sure, here's a routine I use (which has an advantage over the previously-posted Date-based solution in that you don't have to rely on the creation of an object – all that happens is some division and string concatenation):

Example:

```
Function SecsToTimeString(timeInSecs as Integer, padHours as boolean, padMinutes as boolean) as string
// Given an amount time (in seconds), generates a string representing that amount
// of time. The padHours and padMinutes parameters determine whether to display
// hours and minutes if their values are zero.
```

```
// Examples:
// timeInSecs = 90, padHours = true; returns "00:01:30"
// timeInSecs = 1, padHours = false, padMinutes = true; returns "00:01"
// timeInSecs = 3601, padMinutes = false; returns "01:00:01"
```

```
dim hours, minutes, seconds as Integer
dim hoursString, minutesString as string
```

```
hours = timeInSecs / 3600
minutes = (timeInSecs mod 3600) / 60
seconds = timeInSecs mod 60
```

```
if hours = 0 then
if padHours then
hoursString = "00:"
else
hoursString = ""
end if
```

```

else
hoursString = Format(hours, "##\:")
end if
if minutes = 0 then
if hours <>0 or padMinutes then
minutesString = "00:"
else
minutesString = ""
end if
else
minutesString = Format(minutes, "00\:")
end if

return hoursString + minutesString + Format(seconds, "00")
End Function

```

Notes: (from the rb mailinglist)

26.0.2 Do you have plugins for Android?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Since there is no plugin SDK for Android, we have no way to make a plugin for Android.

Notes: We support macOS, Windows, Linux and iOS.

26.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use functions from NSColor to get proper highlight color in RGB:

Example:

```

Function ProperHighlightColor(active as Boolean) As Color
#if TargetCocoa
Dim theColor As NSColorMBS
If active Then
theColor = NSColorMBS.alternateSelectedControlColor
Else
theColor = NSColorMBS.secondarySelectedControlColor
End If

```

```

Dim rgbColor As NSColorMBS = theColor.colorUsingColorSpaceName(NSColorSpaceMBS.NSCalibrate-

```

```

dRGBColorSpace)
If rgbColor <>Nil Then
Dim red as Integer = rgbColor.redComponent * 255.0
Dim green as Integer = rgbColor.greenComponent * 255.0
Dim blue as Integer = rgbColor.blueComponent * 255.0
Return RGB(red, green, blue)
Else
Return HighlightColor
End If
#else
return HighlightColor
#endif
End Function

```

Notes: As you see we convert color to Calibrated RGB for best results.
See also:

- 26.0.4 How to catch delete key? 631
- 26.0.5 How to convert cmyk to rgb? 632
- 26.0.6 How to delete a folder? 633
- 26.0.7 How to detect if CPU is 64bit processor? 634
- 26.0.8 How to query variant type string for a variant? 635
- 26.0.9 How to refresh a htmlviewer on Windows? 636

26.0.4 How to catch delete key?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: The following is the code in keydown event catches delete or backspace keys.

Example:

```

Function KeyDown(Key As String) As Boolean
if asc(key) = 8 or asc(key) = 127 then
MsgBox "Delete"
Return true
end if
End Function

```

See also:

- 26.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 630

- 26.0.5 How to convert cmyk to rgb? 632
- 26.0.6 How to delete a folder? 633
- 26.0.7 How to detect if CPU is 64bit processor? 634
- 26.0.8 How to query variant type string for a variant? 635
- 26.0.9 How to refresh a htmlviewer on Windows? 636

26.0.5 How to convert cmyk to rgb?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

The following is the code to convert cmyk values to an RGB color datatype.

It's just a basic estimate of the color values. If you are looking for completely color accurate solution, this is not it. It should work for most people. :)

Example:

Function CMYKToRGB(c as Integer, m as Integer, y as Integer, k as Integer) As color

// converts c,m,y,k values (0-100) to color data type RGB

// place this in a method. Supply C,M,Y,K values-

// it returns color datatype

```
dim color_RGB as color
```

```
dim r, g, b as Integer
```

```
r=255-round(2.55*(c+k))
```

```
if r<0 then
```

```
r=0
```

```
end if
```

```
g=255-round(2.55*(m+k))
```

```
if g<0 then
```

```
g=0
```

```
end if
```

```
b=255-round(2.55*(y+k))
```

```
if b<0 then
```

```
b=0
```

```
end if
```

```
color_RGB=RGB(r,g,b)
```

```
return color_RGB
```

```
End Function
```

Notes:

(from the rb mailinglist)
See also:

- 26.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 630
- 26.0.4 How to catch delete key? 631
- 26.0.6 How to delete a folder? 633
- 26.0.7 How to detect if CPU is 64bit processor? 634
- 26.0.8 How to query variant type string for a variant? 635
- 26.0.9 How to refresh a htmlviewer on Windows? 636

26.0.6 How to delete a folder?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: The following is the code that deletes a folder recursively.

Example:

```
Sub deletefolder(f as folderitem)
dim files(-1) as FolderItem

if f=nil then Return

// delete single file
if f.Directory=false then
f.Delete
Return
end if

// get a list of all items in that folder
dim i,c as Integer
c=F.Count
for i=1 to c
files.Append f.TrueItem(i)
next

// delete each item
for each fo as FolderItem in files
if fo=nil then
' ignore
elseif fo.Directory then
deletefolder fo
fo.delete
else ' file
```

```
fo.Delete
end if
next
```

```
f.Delete
End Sub
```

See also:

- 26.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 630
- 26.0.4 How to catch delete key? 631
- 26.0.5 How to convert cmyk to rgb? 632
- 26.0.7 How to detect if CPU is 64bit processor? 634
- 26.0.8 How to query variant type string for a variant? 635
- 26.0.9 How to refresh a htmlviewer on Windows? 636

26.0.7 How to detect if CPU is 64bit processor?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Via CPUID you can ask CPU:

Example:

```
dim c as new CPUIDMBS

if c.Flags(CPUIDMBS.kFeatureLM) then
MsgBox "64-bit CPU"
else
MsgBox "32-bit CPU"
end if
```

Notes: Should work on all intel compatible CPUs.

See also:

- 26.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 630
- 26.0.4 How to catch delete key? 631
- 26.0.5 How to convert cmyk to rgb? 632
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- 26.0.8 How to query variant type string for a variant? 635
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26.0.8 How to query variant type string for a variant?

Plugin Version: 20.5, Platforms: macOS, Linux, Windows.

Answer: The following example function returns type string for variant.

Example:

```
Public Function VariantTypeString(v as Variant) as string
// Xojo's VarType doesn't know Unsigned integers
'Dim type As Integer = VarType(v)

// MBS VarType can detect unsigned integer
Dim type As Integer = GetVariantTypeMBS(v)

Dim IsArray As Boolean = BitwiseAnd(type, Variant.TypeArray) = Variant.TypeArray

// type without array
type = BitwiseAnd(type, Bitwise.OnesComplement(Variant.TypeArray))

// build a dictionary to map types on first call
Static TypeMap As Dictionary
If TypeMap = Nil Then
TypeMap = New Dictionary
TypeMap.Value(Variant.TypeBoolean) = "Boolean"
TypeMap.Value(Variant.TypeCFStringRef) = "CFStringRef"
TypeMap.Value(Variant.TypeColor) = "Color"
TypeMap.Value(Variant.TypeCString) = "CString"
TypeMap.Value(Variant.TypeCurrency) = "Currency"
TypeMap.Value(Variant.TypeDate) = "Date"
TypeMap.Value(Variant.TypeDateTime) = "DateTime"
TypeMap.Value(Variant.TypeDouble) = "Double"
TypeMap.Value(Variant.TypeInt32) = "Int32"
TypeMap.Value(Variant.TypeInt64) = "Int64"
TypeMap.Value(Variant.TypeInteger) = "Integer"
TypeMap.Value(Variant.TypeNil) = "Nil"
TypeMap.Value(Variant.TypeObject) = "Object"
TypeMap.Value(Variant.TypeOSType) = "OSType"
TypeMap.Value(Variant.TypePString) = "PString"
TypeMap.Value(Variant.TypePtr) = "Ptr"
TypeMap.Value(Variant.TypeSingle) = "Single"
TypeMap.Value(Variant.TypeString) = "String"
TypeMap.Value(Variant.TypeStructure) = "Structure"
TypeMap.Value(Variant.TypeText) = "Text"
TypeMap.Value(Variant.TypeWindowPtr) = "WindowPtr"
TypeMap.Value(Variant.TypeWString) = "WString"

// MBS extra types
TypeMap.Value(Variant.TypeInt32+100) = "UInt32"
TypeMap.Value(Variant.TypeInt64+100) = "UInt64"
```

End If

```
// lookup type

#if DebugBuild then
If Not TypeMap.HasKey(type) Then
Break // missing type
End If
#endif

If IsArray Then
Return "Array of " + TypeMap.Lookup(type,"?")
Else
Return TypeMap.Lookup(type,"?")
End If
End Function
```

See also:

- 26.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 630
- 26.0.4 How to catch delete key? 631
- 26.0.5 How to convert cmyk to rgb? 632
- 26.0.6 How to delete a folder? 633
- 26.0.7 How to detect if CPU is 64bit processor? 634
- 26.0.9 How to refresh a htmlviewer on Windows? 636

26.0.9 How to refresh a htmlviewer on Windows?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can ask the browser to reload the website with this code line:

Example:

```
call htmlViewer1.IERunJavaScriptMBS("javascript:document.location.reload()")
```

See also:

- 26.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 630
- 26.0.4 How to catch delete key? 631
- 26.0.5 How to convert cmyk to rgb? 632

- 26.0.6 How to delete a folder? 633
- 26.0.7 How to detect if CPU is 64bit processor? 634
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26.0.10 Is there an example for vector graphics in Xojo?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Try this example inside the paint event of a window:

Example:

```
dim v as Group2D
dim r as RectShape
dim s as StringShape
```

```
const pi=3.14
```

```
s=new StringShape
s.Text="Hello World!"
s.TextFont="Geneva"
s.TextSize=24
s.FillColor=rgb(0,0,255)
s.Italic=true
s.y=5
s.x=0
```

```
r=new RectShape
```

```
r.X=0
r.y=0
r.Height=100
r.Width=180
r.BorderColor=rgb(255,0,0)
r.FillColor=rgb(0,255,0)
r.BorderWidth=5
r.Border=50
```

```
v=new Group2d
v.Append r
v.Append s
v.Rotation=pi*-20.0/180.0
v.x=150
v.y=150
```

```
g.DrawObject v
```

26.0.11 Picture functions do not preserve resolution values?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Yes, the picture functions return pictures with no/default resolution values.

Example:

```
dim l as Picture = LogoMBS(500)
```

```
l.HorizontalResolution = 300
```

```
l.VerticalResolution = 300
```

```
dim r as Picture = l.Rotate90MBS
```

```
MsgBox str(r.HorizontalResolution)+" x "+str(r.VerticalResolution)
```

```
r.HorizontalResolution = l.HorizontalResolution
```

```
r.VerticalResolution = l.VerticalResolution
```

```
MsgBox str(r.HorizontalResolution)+" x "+str(r.VerticalResolution)
```

Notes: So please fix them yourself after calling a function.

Maybe in the future this changes, but currently you can't really set this easily from plugin code.

26.0.12 A toolbox call needs a rect - how do I give it one?

Plugin Version: all, Platforms: macOS, Windows.

Answer: Fill a memoryblock like this:

Example:

```
Dim MB As Memoryblock
```

```
MB = NewMemoryBlock(8)
```

```
MB.Short(0) = window1.Top
```

```
MB.Short(2) = window1.Left
```

```
MB.Short(4) = window1.Height+window1.Top // bottom
```

```
MB.Short(6) = window1.Width+window1.Left // right
```

26.0.13 API client not supported?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: If you get this exception message on `SQLConnectionMBS.Connect`, we may have a problem.

Notes: First case is that the given thing is not supported (e.g. MS SQL directly on Mac).

Second case is that the plugin compilation went wrong and the support for the database was not linked into the plugin. Like MySQL missing or MS SQL on Windows missing. In that case please contact us to fix the plugin.

26.0.14 Can I access Access Database with Java classes?

Plugin Version: all, Platform: Windows.

Answer: You can use `ucanaccess` to access databases created with Microsoft

Example:

```
dim options(-1) as string

// load all the jar files we have in a folder called java:

dim appFolder as FolderItem = GetFolderItem("")

Dim count as Integer = appFolder.Parent.Child("java").Count
dim libjs() as string
For i as Integer = 1 to count
Dim f As FolderItem = appFolder.Parent.Child("java").item(i)
If f <> Nil and f.Exists Then
libjs.append f.NativePath+";"
End If
Next

// now init virtual machine
dim library as string = Join(libjs, "")
dim vm as new JavaVMMBS(library)

if vm.Handle = 0 then
MsgBox "Failed to initialize virtual machine"
else
// now make a new database connection with ucanaccess
dim d as new JavaDatabaseMBS(vm,"net.ucanaccess.jdbc.UcanaccessDriver")
Dim DbFile as FolderItem = appFolder.Parent.Child("Database11.accdb")
dim j as JavaConnectionMBS = d.getConnection("jdbc:ucanaccess://" + DbFile.NativePath)

// select and show values
dim r as JavaResultSetMBS = j.MySelectSQL("Select * From test")
while r.NextRecord
MsgBox r.getString("FirstName") + " " + r.getString("LastName")
wend

end if
```

Exception e as JavaExceptionMBS
MsgBox e.message+" **errorcode:** "+str(e.ErrorNumber)

Notes: see website:
<http://ucanaccess.sourceforge.net/site.html>

26.0.15 Can I create PDF from Xojo Report using DynaPDF?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Yes, we have a graphics class integration for DynaPDF.

Notes: Since MBS Plugin in version 19.2, we can integrate reports with Xojo.

26.0.16 Can I use AppleScripts in a web application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Yes, but they run on the server, not on the client.

Example:

```
dim a as new AppleScriptMBS

// query my application name
a.Compile "tell application ""System Events"" to return name of current application"

// run
a.Execute

// show result
label1.text = a.Result

// shows something like "My Application.fcgi.debug"
```

Notes: This can be useful to control the server from remote, if and only if the your sever is running Mac OS X.

26.0.17 Can I use graphics class with DynaPDF?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Sorry, no. We can't provide a graphics subclass from plugin.

Notes: This is a feature request to allow graphics subclasses:

Feedback case 11391: [feedback://showreport?report_id=11391](https://feedback.apple.com/feedback/showreport?report_id=11391)

26.0.18 Can I use sockets on a web application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Yes, but they run on the server, not on the client.

Notes: You can use `HTTPSocket`, `SMTPSocket`, `POP3Socket`, `SMTPSecureSocket`, `SecurePOP3Socket`, `EasyTCPSocket`, `EasyUDPSocket`, `AutoDiscovery`, our Bonjour classes or our `CURL*` classes. But all of them work on the server, not on the client.

This means if you search for a printer with Bonjour, you can find the printers in the local network on your server hosting site. Using `SMTPSocket` may be a good idea for sending emails from the server like notifications.

26.0.19 Can I use your ChartDirector plugin on a web application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Yes, our ChartDirector plugin works just fine on the Xojo Web Edition.

Example:

```
// The data for the pie chart
dim data(-1) as Double=array(55.0, 18.0, 25.0, 22.0, 18.0, 30.0, 35.0)

// The labels for the pie chart, Words are chosen random to check font!
dim labels(-1) as string=array("Germany", "Italy", "France", "Spain", "UK", "Poland", "Russia")

// The colors to use for the sectors
dim colors(-1) as Integer

colors.Append &h66aaee
colors.Append &heebb22
colors.Append &hbbsbbb
colors.Append &h8844ff

if TargetLinux then
CDBaseChartMBS.SetFontSearchPath "/usr/share/fonts/truetype/msttcorefonts"
end if

// Create a PieChart object of size 360 x 300 pixels
dim c as new CDPieChartMBS(700, 600)
```

```

c.setBackground(c.linearGradientColor(0, 0, 0, c.getHeight(), &h0000cc, &h000044))
c.setRoundedFrame(&hffffff, 16)
dim tt as CDTextBoxMBS = c.addTitle("ChartDirector Demonstration", "timesbi.ttf", 18)
tt.setMargin(0, 0, 16, 0)
tt.setFontColor(&hFFFFFF)

// Set the center of the pie at (180, 140) and the radius to 100 pixels
c.setPieSize 350,300,150
// Set the sector colors
c.setColors(c.kDataColor, colors)

// Draw the pie in 3D with a pie thickness of 20 pixels
c.set3D(20)

dim t as CDTextBoxMBS = c.setLabelStyle("arialbd.ttf", 10, &h000000)
t.setBackground(CDPieChartMBS.kSameAsMainColor, CDPieChartMBS.kTransparent, CDPieChartMBS.soft-
Lighting(CDPieChartMBS.kRight, 0))
t.setRoundedCorners(8)

// Use local gradient shading for the sectors, with 5 pixels wide
// semi-transparent white (bbffffff) borders
c.setSectorStyle(CDPieChartMBS.kLocalGradientShading, &hbbffffff, 0)

// Set the pie data and the pie labels
c.setData data,labels
call c.setLabelStyle "arialbd.ttf",18

dim pic as picture = c.makeChartPicture
dim wp as new WebPicture(pic, Picture.FormatJPEG) // JPEG makes it smaller and faster

ImageView1.Picture=wp

```

Notes: Be aware that our plugin produces pictures for you, which you assign to ImageViews. Transferring those pictures takes time, so you can optimize that with using WebPicture class. There you can decide between different compressions to improve speed (use JPEG instead of PNG).

e.g. if you use ubuntu, you can install the ttf-mscorefonts-installer package and call this method with "/usr/share/fonts/truetype/msttcorefonts" as the path. No backslash on the end of a path, please.

26.0.20 Can I use your DynaPDF plugin on a web application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Yes, our DynaPDF plugin works just fine on the Xojo Web Edition.

Notes: PDF files are created on the server. You may want to offer a preview to the user which uses reduced resolution images to reduce the time to download the PDF.

See our Create PDF example for the Xojo Web Edition.

26.0.21 Can I use your plugin controls on a web application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: No.

26.0.22 Can you get an unique machine ID?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: There is nothing like an unique machine ID.

Notes: 1:

You can use the MAC IDs of the network interfaces.

This can be changed by the user with software tools.

And the list of network interfaces changes if user reorder the interfaces.

2:

You can use the system folder creation date/time.

This may stay equal after cloning machines or after migration to new PC.

3:

You can use the Mac Serialnumber.

Mac only and it can happen that a Mac does not have a serial number.

4:

You can use the x86 CPU ID.

This is x86 CPU only and does not avoid running on the same CPU in different PCs.

26.0.23 ChartDirector: Alignment Specification

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

Answer: ChartDirector: Alignment Specification

Notes: In many ChartDirector objects, you may specify the alignment of the object's content relative to its boundary. For example, for a TextBox object, you may specify the text's alignment relative to the box boundary by using `TextBox.setAlignment`.

The ChartDirector API defines several constants for the alignment options.

ConstantValueDescription

BottomLeft	1	The leftmost point on the bottom line.
BottomCenter	2	The center point on the bottom line.
BottomRight	3	The rightmost point on the bottom line.
Left	4	The leftmost point on the middle horizontal line.
Center	5	The center point on the middle horizontal line.
Right	6	The rightmost point on the middle horizontal line.
TopLeft	7	The leftmost point on the top line.
TopCenter	8	The center point on the top line.
TopRight	9	The rightmost point on the top line.
Bottom	2	The center point on the bottom line. Same as BottomCenter.
Top	8	The center point on the top line. Same as TopCenter.
TopLeft2	10	An alternative top-left position used in <code>Axis.setTitlePos</code> for axis title positioning only. For a vertical axis, TopLeft2 refers to refers to the left of the top side, while TopLeft refers to the top of the left side. The reverse applies for a horizontal axis.
TopRight2	11	An alternative top-right position used in <code>Axis.setTitlePos</code> for axis title positioning only. For a vertical axis, TopRight2 refers to refers to the right of the top side, while TopRight refers to the top of the right side. The reverse applies for a horizontal axis.
BottomLeft2	12	An alternative bottom-left position used in <code>Axis.setTitlePos</code> for axis title positioning only. For a vertical axis, BottomLeft2 refers to refers to the left of the bottom side, while BottomLeft refers to the bottom of the left side. The reverse applies for a horizontal axis.
BottomRight2	13	An alternative bottom-right position used in <code>Axis.setTitlePos</code> for axis title positioning only. For a vertical axis, BottomRight2 refers to refers to the right of the bottom side, while BottomRight refers to the bottom of the right side. The reverse applies for a horizontal axis.

26.0.24 ChartDirector: Color Specification

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

Answer: ChartDirector: Color Specification

Notes: Many functions in the ChartDirector API accept colors as parameters. ChartDirector supports col-

ors specified in web and HTML compatible ARGB format, in which ARGB refers to the Alpha transparency, Red, Green and Blue components of the color.

In addition to ARGB colors, ChartDirector supports "dynamic" colors. A dynamic color is a color that changes depending on the position of the pixels. The "dynamic" colors that ChartDirector supports include "pattern colors", "metal colors", "gradient colors", "zone colors" and "dash line colors".

ChartDirector supports specifying colors indirectly using "palette colors". When a "palette color" is used, the color is specified as an index to a palette. The actual color is looked up from the palette. ARGB Color ARGB color consists of 4 components - alpha transparency, red, green and blue. The four components are encoded as a 32-bit number, with each component occupying 8 bits. In hexadecimal notation, it is AAR-RGGBB, where AA, RR, GG and BB are the alpha transparency, red, green and blue components.

Each component ranges from 00 - FF (0 - 255), representing its intensity. For example, pure red color is 00FF0000, pure green color is 0000FF00, and pure blue color is 000000FF. White color is 00FFFFFF, and black color is 00000000.

Most programming language requires you to put special prefix in front of hexadecimal characters. For C++, the prefix is "0x". For example, the syntax for the hexadecimal number 00FFFFFF is 0x00FFFFFF, or simply 0xFFFFFF.

For the alpha transparency component, a zero value means the color is not transparent at all. This is equivalent to traditional RGB colors. A non-zero alpha transparency means the color is partially transparent. The larger the alpha transparency, the more transparent the color will be. If a partially transparent color is used to draw something, the underlying background can still be seen.

For example, 80FF0000 is a partially transparent red color, while 00FF0000 is a non-transparent red color.

Note that ChartDirector's ARGB color is web and HTML compatible. For example, red is FF0000, the same as in HTML. There are many resources on the web that provide tables in which you can click a color and it will show its HTML color code. These color codes can be used in ChartDirector.

If alpha transparency is FF (255), the color is totally transparent. That means the color is invisible. It does not matter what the RGB components are. So in ChartDirector, only one totally transparent color is used - FF000000. All other colors of the form FFnnnnnn are reserved to represent palette colors and dynamic colors, and should not be interpreted as the normal ARGB colors.

The totally transparent color FF000000 is often used in ChartDirector to disable drawing something. For example, if you want to disable drawing the border of a rectangle, you can set the border color to totally transparent.

For convenience, ChartDirector defines a constant called Transparent, which is equivalent to FF000000. Pattern Color

A pattern color is a dynamic color that changes according to a 2D periodic pattern. When it is used to fill an area, the area will look like being tiled with a wallpaper pattern.

Pattern colors are created using `BaseChart.patternColor`, `BaseChart.patternColor2`, `DrawArea.patternColor` and `DrawArea.patternColor2`. The `patternColor` method creates pattern colors using an array of colors as a bitmap. The `patternColor2` method creates pattern colors by loading the patterns from image files.

These methods return a 32-bit integer acting as a handle to the pattern color. The handle can be used in any `ChartDirector` API that expects a color as its input.

Metal Color
A metal color is a color of which the brightness varies smoothly across the chart surface as to make the surface look shiny and metallic. `ChartDirector` supports using any color as the base color of the metal color. In particular, using yellow and grey as the base colors will result in metal colors that look gold and silver.

Metal colors are most often used as background colors of charts. They are created using `CDBaseChartMBS.metalColor`, `CDBaseChartMBS.goldColor` and `CDBaseChartMBS.silverColor`. The first method allows you to specify an arbitrary base color. The second and third methods use yellow and grey as the base colors, resulting in gold and silver metal colors.

These methods return a 32-bit integer acting as a handle to the gradient color. The handle can be used in any `ChartDirector` API that expects a color as its input.

Gradient Color
A gradient color is a color that changes progressively across a direction.

Gradient colors are created using `BaseChart.gradientColor`, `BaseChart.gradientColor2`, `DrawArea.gradientColor` and `DrawArea.gradientColor2`. The `gradientColor` method creates a 2-point gradient color that changes from color A to color B. The `gradientColor2` method creates a multi-point gradient colors that changes from color A to B to C

These methods return a 32-bit integer acting as a handle to the gradient color. The handle can be used in any `ChartDirector` API that expects a color as its input.

One common use of multi-point gradient colors is to define colors that have metallic look and feel. Please refer to `DrawArea.gradientColor2` for details.

Dash Line Colors
A dash line color is a color that switches on and off periodically. When used to draw a line, the line will appear as a dash line.

Dash line colors are created using `BaseChart.dashLineColor` and `DrawArea.dashLineColor`. They accept a line color and a dash pattern code as arguments, and return a 32-bit integer acting as a handle to the dash line color. The handle can be used in any `ChartDirector` API that expects a color as its input.

Zone Colors
A zone color is for XY charts only. It is a color that automatically changes upon reaching a data threshold value along the x-axis or y-axis. Zone colors are created using `Layer.xZoneColor`, `Layer.yZoneColor`, `XYChart.xZoneColor` or `XYChart.yZoneColor`.

Palette Colors
Palette colors are colors of the format `FFFFnnnn`, where the least significant 16 bits (`nnnn`) are the index to the palette. A palette is simply an array of colors. For a palette color, the actual color is obtained by

looking up the palette using the index. For example, the color FFFF0001 is the second color in the palette (first color is index 0).

The colors in the palette can be ARGB colors or "dynamic" colors (pattern, gradient and dash line colors).

The first eight palette colors have special significance. The first three palette colors are the background color, default line color, and default text color of the chart. The 4th to 7th palette colors are reserved for future use. The 8th color is a special dynamic color that is equal to the data color of the "current data set".

The 9th color (index = 8) onwards are used for automatic data colors. For example, in a pie chart, if the sector colors are not specified, ChartDirector will automatically use the 9th color for the first sector, the 10th color for the second sector, and so on. Similarly, for a multi-line chart, if the line colors are not specified, ChartDirector will use the 9th color for the first line, the 10th color for the second line, and so on.

The ChartDirector API defines several constants to facilitate using palette colors.

ConstantValueDescription

Palette	FFFF0000	The starting point of the palette. The first palette color is (Palette + 0). The nth palette color is (Palette + n - 1).
BackgroundColor	FFFF0000	The background color.
LineColor	FFFF0001	The default line color.
TextColor	FFFF0002	The default text color.
[Reserved]	FFFF0003 - FFFF0006	These palette positions are reserved. Future versions of ChartDirector may use these palette positions for colors that have special significance.
SameAsMainColor	FFFF0007	A dynamic color that is equal to the data color of the current data set. This color is useful for objects that are associated with data sets. For example, in a pie chart, if the sector label background color is SameAsMainColor, its color will be the same as the corresponding sector color.
DataColor	FFFF0008	The starting point for the automatic data color allocation.

When a chart is created, it has a default palette. You may modify the palette using BaseChart.setColor, BaseChart.setColors, or BaseChart.setColors2.

The advantages of using palette colors are that you can change the color schemes of the chart in one place. ChartDirector comes with several built-in palettes represented by the following predefined constants.

ConstantDescription

26.0.25 ChartDirector: Font Specification

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

defaultPalette	An array of colors representing the default palette. This palette is designed for drawing charts on white backgrounds (or lightly colored backgrounds).
whiteOnBlackPalette	An array of colors useful for drawing charts on black backgrounds (or darkly colored backgrounds).
transparentPalette	An array of colors useful drawing charts on white backgrounds (or lightly colored backgrounds). The data colors in this palette are all semi-transparent.

Answer: ChartDirector: Font Specification

Notes: Font Name

In ChartDirector, the font name is simply the file name that contains the font. For example, under the Windows platform, the "Arial" font is "arial.ttf", while the "Arial Bold" font is "arialbd.ttf".

NOTE: Mac OS X Specific Information

In Mac OS X, in addition to ".ttf", ChartDirector also supports Mac OS X font file formats, such as Font Suitcase files and Datafork files (.dfont). These files often contain multiple fonts. For example, the "GillSans.dfont" file contains 6 fonts.

So in addition to the file name, an index is needed to determine the font. The index is specified by appending a " | " character to the font name, followed by the index number. For example, the third font in "GillSans.dfont" is denoted as "GillSans.dfont | 2". (Note: The first font starts at 0.) If no index number is provided, the first font is assumed.

ChartDirector also supports using Mac OS X Font Manager names. For example, one may use "Gill Sans Light Italic" instead of using "GillSans.dfont | 1" as the font name. However, the Mac OS X Font Manager is active only if someone has logged into the Mac GUI console, so this method is only recommended for developing applications that run on the GUI console.

The sample programs that come with ChartDirector are designed to run on all operating systems, so they use generic font file names (eg. "arial.ttf") instead of Mac OS X specific names. To allow them to run on Mac OS X, ChartDirector on Mac OS X has a built-in table to map common font file names to Mac OS X font names:

"arial.ttf", "arialbd.ttf", "ariali.ttf" and "arialbi.ttf" are mapped to "Arial | 0" (Arial), "Arial | 1" (Arial Bold), "Arial | 2" (Arial Italic) and "Arial | 3" (Arial Bold Italic)

"times.ttf", "timesbd.ttf", "timesi.ttf" and "timesbi.ttf" are mapped to "Times New Roman | 0" (Times New Roman), "Times New Roman | 1" (Times New Roman Bold), "Times New Roman | 2" (Times New Roman Italic) and "Times New Roman | 3" (Times New Roman Bold Italic)

"cour.ttf", "courbd.ttf", "couri.ttf" and "courbi.ttf" are mapped to "Courier New | 0" (Courier New), "Courier New | 1" (Courier New Bold), "Courier New | 2" (Courier New Italic) and "Courier New | 3" (Courier New Bold Italic)

Font Location

ChartDirector on Windows does not come with any font files. It relies on the operating system's font files in the " [windows] \Fonts" directory. To see what fonts are installed in your operating system and their file names, use the File Explorer to view that directory.

ChartDirector on Windows will also search for the font files in the "fonts" subdirectory (if it exists) under the directory where the ChartDirector DLL "chartdir.dll" is installed. This is useful for private fonts. Also, for some especially secure web servers, the web anonymous user may not have access to the " [windows] \Fonts" directory. In this case, you may copy the font files to the above subdirectory.

ChartDirector on Mac OS X relies on operating system font files in "/Library/Fonts" and "/System/Library/Fonts".

ChartDirector on Linux, FreeBSD and Solaris assume the fonts files are in the "fonts" subdirectory under the directory where the ChartDirector shared object "libchartdir.so" is installed. ChartDirector on Linux, FreeBSD and Solaris come with a number of font files in the "fonts" subdirectory.

To keep the download size small, ChartDirector on Linux, FreeBSD and Solaris only come with some commonly used fonts. You may download additional fonts from the Internet. In particular, the Microsoft fonts at

http://sourceforge.net/project/showfiles.php?group_id=34153&release_id=105355

is highly recommended. Please refer to

<http://www.microsoft.com/typography/faq/faq8.htm>

on how you could use the fonts legally in your system.

ChartDirector supports True Type fonts (.ttf), Type 1 fonts (.pfa and .pfb) and Windows bitmap fonts (.fon). On Mac OS X, ChartDirector also supports Font Suitcase and Datafork (.dfont) files. On Linux, FreeBSD and Solaris, ChartDirector also supports Portable Compiled Fonts (.pcf fonts).

If you want ChartDirector to search other directories for the font files, you may list the directories in an environment variable called "FONTSPATH".

If you specify an absolute path name for the font file, ChartDirector will use the absolute path name and will not search other directories.

Artificial Boldening and Italicizing

Whereas most popular font comes with different styles for "normal", "bold", "italic" and "bold italic", some fonts only come with one style (the normal style). For example, the Monotype Corsiva font that comes with MS Office only has the normal style (mtcorsva.ttf). For these cases, you may append the "Bold" and/or "Italic" words after the font file name (separated with a space) to ask ChartDirector to artificially bolden and/or italicize the font. For example, you may specify the font name as "mtcorsva.ttf Bold".

Font List

Instead of specifying a single font file as the font name, you may specify a list of font files as the font name, separated by semi-colons. This is useful when using international characters that are only available in some fonts.

For example, if you would like to use the Arial font ("arial.ttf") for western characters, and the MingLiu font "mingliu.ttc" for Chinese characters (since the Arial font does not have Chinese characters), you may specify the font name as "arial.ttf;mingliu.ttc". In this case, ChartDirector will try the Arial font first. If it cannot find a certain character there, it will try the MingLiu font.

Indirect Font Names
ChartDirector supports several special keywords for specifying the font name indirectly. When these keywords are used as font names, ChartDirector will look up the actual font names from a font table. The keywords are as follows:

KeywordsDescription

"normal"	This default normal font, which is the first font in the font table. This is initially mapped to "arial.ttf" (Arial).
"bold"	The default bold font, which is the second font in the font table. This is initially mapped to "arialbd.ttf" (Arial Bold).
"italic"	The default italic font, which is the third font in the font table. This is initially mapped to "ariali.ttf" (Arial Italic).
"boldItalic"	The default bold-italic font, which is the fourth font in the font table. This is initially mapped to "arialbi.ttf" (Arial Bold Italic).
"fontN"	The (N + 1)th font in the font table (the first font is "font0").

The font table can be modified using BaseChart.setFontTable or DrawArea.setFontTable.

The advantage of using indirect font names is that you can change the fonts in your charts in one place.

Font Index
Most font files contain one font. However, it is possible a font file contains multiple fonts (that is, a font collection). For example, in True Type fonts, font files with extension ".ttc" may represent a font collection.

If a font file contains multiple font, the font index can be used to specify which font to use. By default, the font index is 0, which means the first font in the font file will be used.

Font Size
The font size decides how big a font will appear in the image. The font size is expressed in a font unit called points. This is the same unit used in common word processors.

Instead of specifying font size, some ChartDirector API (eg. TextBox.setFontSize) allow you to specify font height and font width separately. You may use different point sizes for font height and font width to create special effects.

Font Color
This is the color to draw the font. (See Color Specification on how colors are represented in ChartDirector.)

Font Angle
This is the angle in degrees by which the font should be rotated anti-clockwise.

Vertical Layout
By default, text are laid out horizontally, with characters being drawn from left to right.

ChartDirector also supports vertical layout, with characters being drawn from top to bottom. For example, you may use BaseChart.addText to add text that are laid out vertically. Vertical layout is common for

oriental languages such as Chinese, Japanese and Korean.

26.0.26 ChartDirector: Mark Up Language

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

Answer: ChartDirector: Mark Up Language

Notes: ChartDirector Mark Up Language (CDML) is a language for including formatting information in text strings by marking up the text with tags.

CDML allows a single text string to be rendered using multiple fonts, with different colors, and even embed images in the text. **Font Styles**

You can change the style of the text by using CDML tags. For example, the line:

```
<*font=timesi.ttf,size=16,color=FF0000>Hello <*font=arial.ttf,size=12,color=8000*>world!
```

will result in the following text rendered:

In general, all tags in CDML are enclosed by <*> and *>. Attributes within the tags determine the styles of the text following the tags within the same block.

If you want to include <*> in text without being interpreted as CDML tags, use «* as the escape sequence.

The following table describes the supported font style attributes in CDML. See [Font Specification](#) for details on various font attributes.

Attribute	Description
super	Set the following text to be in superscript style. This attribute does not need to have a value. (You may use "super" as the attribute instead of "super=1".)

Note that unlike HTML tags, no double or single quotes are used in the tags. It is because CDML tags are often embedded as string literals in source code. The double or single quotes, if used, will conflict with the string literal quotes in the source code. Therefore in CDML, no quotes are necessary and they must not be used.

Also, unlike HTML tags, CDML uses the comma character as the delimiter between attributes. It is because certain attributes may contain embed spaces (such as the font file name). So space is not used as the delimiter and the comma character is used instead.

Note the font attribute above starts a new style section, while other attributes just modify the current style

font	Starts a new style section, and sets the font name. You may use this attribute without a value (that is, use "font" instead of "font=arial.ttf") to create a new style section without modifying the font name.
size	The font size.
width	The font width. This attribute is used to set the font width and height to different values. If the width and height are the same, use the size attribute.
height	The font height. This attribute is used to set the font width and height to different values. If the width and height are the same, use the size attribute.
color	The text color in hex format.
bgColor	The background color of the text in hex format.
underline	The line width of the line used to underline the following characters. Set to 0 to disable underline.
sub	Set the following text to be in subscript style. This attribute does not need to have a value. (You may use "sub" as the attribute instead of "sub=1".)
super	Set the following text to be in superscript style.
xoffset	Draw the following the text by shifting the text horizontally from the original position by the specified offset in pixels.
yoffset	Draw the following the text by shifting the text vertically from the original position by the specified offset in pixels.
advance	Move the cursor forward (to the right) by the number of pixels as specified by the value this attribute.
advanceTo	Move the cursor forward (to the right) to the position as specified by the value this attribute. The position is specified as the number of pixels to the right of the left border of the block. If the cursor has already passed through the specified position, the cursor is not moved.

section. You may use `</font*>` to terminate a style section, which will restore the font styles to the state before the style section.

Blocks and Lines

In CDML, a text string may contain multiple blocks. A block may contain multiple lines of text by separating them with new line characters ("`\n`") or with `<br*>`. The latter is useful for programming languages that cannot represent new line characters easily.

For example, the line:

```
<*size=15*><*block*><*color=FF*>BLOCK<*br*>ONE<*/*>and <*block*><*color=FF00*>BLOCK<*br*>TWO
```

will result in the following text rendered:

The above example contains a line of text. The line contains two blocks with the characters " and " in between. Each block in turn contains two lines. The blocks are defined using `<*block*>` as the start tag and

`<*/*>` as the end tag.

When a block ends, font styles will be restored to the state before entering the block. Embedding Images
CDML supports embedding images in text using the following syntax:

```
<*img=my_image_file.png*>
where my_image_file.png is the path name of the image file.
```

For example, the line:

```
<*size=20*>A <*img=sun.png*>day
will result in the following text rendered:
```

ChartDirector will automatically detect the image file format using the file extension, which must either png, jpg, jpeg, gif, wbmp or wmp (case insensitive).

Please refer to `BaseChart.setSearchPath` or `DrawArea.setSearchPath` on the directory that ChartDirector will search for the file.

The `<*img*>` tag may optionally contain width and height attributes to specify its pixel width and height. In this case, ChartDirector will stretch or compress the image if necessary to the required width and height. Blocks Attributes

CDML supports nesting blocks, that is, a block can contain other sub-blocks. Attributes are supported in the `<*block*>` tag to control the alignment and orientation of the sub-blocks. The `<*img=my_image_file.png*>` is treated as a block for layout purposes.

For example, the line:

```
<*block,valign=absmiddle*><*img=molecule.png*><*block*>Hydrazino\nMolecule<*/*><*/*>
will result in the following text rendered:
```

The the above starts `<*block,valign=absmiddle*>` which specifies its content should align with each others in the vertical direction using the absolute middle alignment. The block contains an image, followed by a space characters, and then another block which has two lines of text.

The following table describes the supported attributes inside `<*block*>` tag:

AttributeDescription

The value `baseline` means the baseline of sub-blocks should align with the baseline of the block. The `baseline`

width	The width of the block in pixels. By default, the width is automatically determined to be the width necessary for the contents of the block. If the width attribute is specified, it will be used as the width of the block. If the width is insufficient for the contents, the contents will be wrapped into multiple lines.
height	The height of the block in pixels. By default, the height is automatically determined to be the height necessary for the contents of the block. If the height attribute is specified, it will be used as the height of the block.
maxwidth	The maximum width of the block in pixels. If the content is wider than maximum width, it will be wrapped into multiple lines.
truncate	The maximum number of lines of the block. If the content requires more than the maximum number of lines, it will be truncated. In particular, if truncate is 1, the content will be truncated if it exceeds the maximum width (as specified by maxwidth or width) without wrapping. The last few characters at the truncation point will be replaced with "...".
linespacing	The spacing between lines as a ratio to the default line spacing. For example, a line spacing of 2 means the line spacing is two times the default line spacing. The default line spacing is the line spacing as specified in the font used.
bgColor	The background color of the block in hex format.
valign	The vertical alignment of sub-blocks. This is for blocks that contain sub-blocks. Supported values are baseline, top, bottom, middle and absmiddle.

is the underline position of text. This is normal method of aligning text, and is the default in CDML. For images or blocks that are rotated, the baseline is the same as the bottom.

The value top means the top line of sub-blocks should align with the top line of the block.

The value bottom means the bottom line of sub-blocks should align with the bottom line of the block.

The value middle means the middle line of sub-blocks should align with the the middle line of the block. The middle line is the middle position between the top line and the baseline.

The value absmiddle means the absolute middle line of sub-blocks should align with the absolute middle line of the block. The absolute middle line is the middle position between the top line and the bottom line.

halign The horizontal alignment of lines. This is for blocks that contain multiple lines. Supported values are left, center and right.

The value left means the left border of each line should align with the left border of the block. This is the default.

The value center means the horizontal center of each line should align with the horizontal center of the block.

The value right means the right border of each line should align with the right border of the block.

angle Rotate the content of the block by an angle. The angle is specified in degrees in counter-clockwise direction.

26.0.27 ChartDirector: Parameter Substitution and Formatting

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

Answer: ChartDirector: Parameter Substitution and Formatting

Notes: ChartDirector charts often contain a lot of text strings. For example, sector labels in pie charts, axis labels for x and y axes, data labels for the data points, HTML image maps, etc, are all text strings.

ChartDirector uses parameter substitution to allow you to configure precisely the information contained in the text and their format.

Format Strings

In parameter substitution, format strings are used to specify the entities to be include into labels and how to format numbers and dates.

For example, when drawing a pie chart with side label layout, the default sector label format string is:

```
" { label } ( { percent } %)"
```

When the sector label is actually drawn, ChartDirector will replace " { label } " with the sector name, and " { percent } " with the sector percentage. So the above label format will result is a sector label similar to "ABC (34.56%)".

You may change the sector label format by changing the format string. For example, you may change it to:

```
" { label } : US$ { value | 2 } K ( { percent } %)"
```

The sector label will then become something like "ABC: US\$ 123.00 (34.56%)".

In general, in ChartDirector parameter substitution, parameters enclosed by curly brackets will be substituted with their actual values when creating the texts.

For parameters that are numbers or dates/times, ChartDirector supports a special syntax in parameter substitution to allow formatting for these values. Please refer to the Number Formatting and Date/Time Formatting sections below for details.

Parameter Expressions

ChartDirector supports numeric expressions in format strings. They are denoted by enclosing the expression with curly brackets and using "=" as the first character. For example:

```
"USD { value } (Euro { = { value } *0.9 } )"
```

In the above, "{ value }" will be substituted with the actual value of the sector. The expression "{ = { value } *0.9 }" will be substituted with the actual value of the sector multiplied by 0.9.

ChartDirector parameter expressions support operators "+", "-", "*", "/", "%" (modulo) and "^" (exponentiation). Operators "*", "/", "%", "^" is computed first, followed by "+" and "-". Operators of the same precedence are computed from left to right). Parenthesis "(" and ")" can be used to change the computation order.

Parameters for Pie Charts

The following table describes the parameters available for pie charts.

Parameter	Description
sector	The sector number. The first sector is 0, while the nth sector is (n-1).
dataSet	Same as { sector } . See above.
label	The text label of the sector.
dataSetName	Same as { label } . See above.
value	The data value of the sector.
percent	The percentage value of the sector.
fieldN	The (N + 1)th extra field. For example, { field0 } means the first extra field. An extra field is an array of custom elements added using BaseChart.addExtraField or BaseChart.addExtraField2.

Parameters for All XY Chart Layers

The followings are parameters that are apply to all XY Chart layers in general. Some layer types may have additional parameters (see below).

Note that certain parameters are inapplicable in some context. For example, when specifying the aggregate label of a stacked bar chart, the { dataSetName } parameter is inapplicable. It is because a stacked bar is composed of multiple data sets. It does not belong to any particular data set and hence does not have a data set name.

{ fieldN } means the extra field is indexed by the data point number. The Pth data point corresponds to the Pth element of the extra field.

Additional Parameters for Line Layers

The followings are parameters that are in additional to the parameters for all XY Chart layers.

Additional Parameters for Trend Layers

The followings are parameters that are in additional to the parameters for all XY Chart layers.

Additional Parameters for Box-Whisker Layers

The followings are parameters that are in additional to the parameters for all XY Chart layers.

Additional Parameters for HLOC and CandleStick Layers

The followings are parameters that are in additional to the parameters for all XY Chart layers.

Additional Parameters for Vector Layers

The followings are parameters that are in additional to the parameters for all XY Chart layers.

Parameters for All Polar Layers

The followings are parameters that are apply to all Polar Chart layers in general. Some layer types may have additional parameters (see below).

{ fieldN } means the extra field is indexed by the data point number. The Pth data point corresponds to the Pth element of the extra field.

Additional Parameters for PolarVector Layers

The followings are parameters that are in additional to the parameters for all Polar Chart layers.

Parameters for Axis

The following table describes the parameters available for pie charts.

Number Formatting

For parameters that are numbers, ChartDirector supports a number of formatting options in parameter substitution.

For example, if you want a numeric field { value } to have a precision of two digits to the right of the decimal point, use ',' (comma) as the thousand separator, and use '.' (dot) as the decimal point, and you may use { value | 2, . } . The number 123456.789 will then be displayed as 123,456.79.

For numbers, the formatting options are specified using the following syntax:

```
{ [ param ] | [ a ] [ b ] [ c ] [ d ] }
```

where:

If this field starts with "E" or "e", followed by a number, it means formatting the value using scientific notation with the specified number of decimal places. If the "E" or "e" is not followed by a number, 3 is assumed.

For example, { value | E4 } will format the value 10.3 to 1.0300E+1, and { value | e4 } will format the same value to 1.0300e+1.

If this field starts with "G" or "g", followed by a number, it means formatting the value using the scientific notation only if the value is large and requires more than the specified number of digits, or the value is less than 0.001. If scientific notation is used, the number following "G" or "g" also specifies the number of significant digits to use. If the "G" or "g" is not followed by a number, 4 is assumed.

For example, consider the format string { value | G4 } . The value 10 will be formatted to 10. The value 100000 will be formatted to 1.000E+5. Similarly, for { value | g4 } , the value 10 will be formatted to 10, while the value 100000 will be formatted to 1.000e+5.

If you skip this argument, ChartDirector will display the exact value using at most 6 decimal places.

You may skip [b] [c] [d] . In this case, the default will be used.

Date/Time Formatting

For parameters that are dates/times, the formatting options can be specified using the following syntax:

```
{ [ param ] | [ datetime_format_string ] }
```

where [datetime_format_string] must start with an english character (A-Z or a-z) that is not "G", "g", "E" or "e", and may contain any characters except ' ' . (If it starts with "G", "g", "E" or "e", it will be considered as a number format string.)

Certain characters are substituted according to the following table. Characters that are not substituted will be copied to the output.

For example, a parameter substitution format of { value | mm-dd-yyyy } will display a date as something similar to 09-15-2002. A format of { value | dd/mm/yy hh:nn:ss a } will display a date as something similar to 15/09/02 03:04:05 pm.

If you want to include characters in the format string without substitution, you may enclose the characters in single or double quotes.

For example, the format { value | mmm '<*color=dd0000*>'yyyy } will display a date as something like Jan <*color=dd0000*>2005 (the <*color=dd0000*> is a CDML tag to specify red text color). Note that the <*color=dd0000*> tag is copied directly without substitution, even it contains "dd" which normally will be substituted with the day of month.

Escaping URL/HTML/CDML characters

Parameter substitution is often used to create HTML image maps. In HTML, some characters has special meanings and cannot be used reliably. For example, the '>' is used to represent the end of an HTML tag.

Furthermore, if the field happens to be used as an URL, characters such as '?', '&' and '+' also have special meanings.

By default, ChartDirector will escape template fields used in URL and query parameters when generating image maps. It will modify URL special characters to the URL escape format "%XX" (eg. "?" will become "%3F"). After that, it will modify HTML special characters to the HTML escape format "&#nn;" (eg. ">" will become ">"). Similarly, it will escape other attributes in the image map using HTML escape format (but not URL escape format).

In addition to escaping HTML and URL special characters, ChartDirector will also remove CDML fields in creating image maps. It is because CDML is only interpreted in ChartDirector, should not be useful outside of ChartDirector (such as in browser tool tips).

In some cases, you may not want ChartDirector to escape the special characters. For example, if the parameters have already been escaped before passing to ChartDirector, you may want to disable ChartDirector from escaping them again.

ChartDirector supports the following special fields to control the escape methods - " { escape_url } ", " { noescape_url } ", " { escape_html } ", " { noescape_html } ", " { escape_cdml } " and " { noescape_cdml } ". These fields enable/disable the escape methods used in the template fields that follow them.

26.0.28 ChartDirector: Shape Specification

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

Answer: ChartDirector: Shape Specification

Notes: Several ChartDirector API accept shape specification as arguments. For example, BarLayer.setBarShape and BarLayer.setBarShape2 can be used to specify shapes of bars in bar charts, while DataSet.setDataSymbol, DataSet.setDataSymbol4, PolarLayer.setDataSymbol and PolarLayer.setDataSymbol4 can be used to specify shapes for data symbols.

Note that in addition to shapes, in many cases ChartDirector also accepts images or custom draw objects for data representation. For example, see DataSet.setDataSymbol2, DataSet.setDataSymbol3, PolarLayer.setDataSymbol2 and PolarLayer.setDataSymbol3.

Built-In Shapes

Built-in shapes are specified as integers. The integers can be explicit constants, or can be generated by a `ChartDirector` method for parameterized shapes. For example, a circle is represented by an explicit constant `CircleShape (=7)`. On the other hand, the number representing a polygon depends on the number of sides the polygon has, so it is generated by using the `PolygonShape` method, passing in the number of sides as argument.

The following table illustrates the various `ChartDirector` shapes:

Custom Shapes

In `ChartDirector`, custom shapes are specified as an array of integers `x0, y0, x1, y1, x2, y2 ...` representing the coordinates of the vertices of the custom polygonal shape.

The polygon should be defined with a bounding square of 1000 x 1000 units, in which the x-axis is from -500 to 500 going from left to right, and the y-axis is from 0 to 1000 going from bottom to top.

`ChartDirector` will automatically scale the polygon so that 1000 units will become to the pixel size as requested by the various `ChartDirector` API.

As an example, the shape of the standard diamond shape in `ChartDirector` is represented as an array with 8 numbers:

```
0, 0, 500, 500, 0, 1000, -500, 500
```

26.0.29 Copy styled text?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: How to quickly copy styled text from one textarea to another?

Example:

```
#if TargetWin32 then
TextArea1.WinRTFDataMBS = TextArea2.WinRTFDataMBS
#elseif TargetMacOS then
TextArea1.NSTextViewMBS.textStorage.setAttributedString TextArea2.NSTextViewMBS.textStorage
#else
TextArea1.StyledText = TextArea2.StyledText
#endif
```

Notes: The code above uses special plugin functions on Mac and Windows and falls back to framework for Linux.

26.0.30 Do you have code to validate a credit card number?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can check the checksum to tell if a credit card number is not valid.

Example:

```
Dim strNumber As String
Dim nLength as Integer
Dim nValue as Integer
Dim nChecksum as Integer
Dim nIndex as Integer

strNumber = EditField1.Text
nLength = Len(strNumber)
nChecksum = 0

For nIndex = 0 To nLength - 2
    nValue = Val(Mid(strNumber, nLength - (nIndex + 1), 1)) * (2 - (nIndex Mod 2))
    If nValue < 10 Then
        nChecksum = nChecksum + nValue
    Else
        nChecksum = nChecksum + (nValue - 9)
    End If
Next

If Val(Mid(strNumber, Len(strNumber), 1)) = (10 - (nChecksum Mod 10)) Mod 10 Then
    MsgBox("The credit card number looks valid")
Else
    MsgBox("The credit card number is invalid")
End IF
```

Notes: Here's some code that will validate the checksum for a credit card. It works for Visa, MasterCard, American Express and Discover. Not sure about others, but I imagine they use the same basic algorithm. Of course, this doesn't actually mean that the credit card is valid, it's only useful for helping the user catch typos.

The above code doesn't have any error checking and it expects that the credit card number will be entered without spaces, dashes or any other non-numeric characters. Addressing those issues will be an exercise left to the reader. :)

(From Mike Stefanik)

26.0.31 Do you have plugins for X-Rite EyeOne, eXact or i1Pro?

Plugin Version: all.

Answer: Our EyeOne plugin is available on request for licensees of the X-Rite SDKs.

Notes: Please first go to X-Rite and get a SDK license.

Then we can talk about the plugin.

26.0.32 Does SQL Plugin handle stored procedures with multiple result sets?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Yes, the plugin can work with multiple recordsets.

Notes: You need to use SQLCommandMBS class. When you get back results, you use FetchNext to walk over all records in the first result set. Then you simply start again with FetchNext to get the second record set.

Even the RecordSet functions should work, just use them twice to get all records from both record sets.

26.0.33 Does the plugin home home?

Plugin Version: all, Platform: macOS.

Answer: Yes, we like to know who is using the plugin, so the plugin may contact our server.

Example:

none.

Notes: Please note that this does not affect your users as the plugin will only do this in the IDE and the relevant plugin part is never included in your applications.

The plugin if used for some hours, does contact our server to provide statistical data about Xojo version and OS versions. This way we know what versions are used. We can return the version number of the current plugin which may be visible in future versions somehow. And we transmit partial licenses data so we can track use of illegal license keys.

If you do not like to have this, you can block Xojo IDE from contacting our website via your Firewall.

Blocking the transfer will not disable the plugin or change the features.

Or contact us for a plugin version which explicitly does not contain this feature.

26.0.34 folderitem.absolutePath is limited to 255 chars. How can I get longer ones?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Paths on a Mac are not unique, so use them only to display them to the user.

Example:

```
Function AbsolutePath(f as FolderItem) As String
Dim s as string
Dim nf as FolderItem
nf = f
s = ""
while nf<>nil
s = nf.name + "." + s
nf = nf.parent
wend
Return s
End Function
```

26.0.35 Has anyone played round with using CoreImage to do things like add dissolve transitions say when changing from one tab to another within a window?

Platform: macOS.

Answer: This code implements animations for a tabpanel change:

Example:

// in a tabpanel.change event:

```
dim r as CGSTransitionRequestMBS
dim co as new CGSConnectionMBS
dim cw as CGSWindowMBS
dim ct as CGSTransitionMBS
static OldTab as Integer

cw=co.CGSWindow(window1)
If cw = Nil Then
return // 10.3...
End If
r=new CGSTransitionRequestMBS
r.TransitionType=r.CGSFlip
r.HasBackGround=false
r.HasBackColor=false
r.Win=cw
```

```

// watch the value of the clicked tab versus the last tab
if tabpanel1.Value=0 or tabpanel1.Value <OldTab then
r.TransitionOption=r.CGSLeft
ct=co.NewTransition(r)
if ct<>Nil then
Refresh
ct.Invoke(1)
ct.Wait(1)
ct.Release
else
MsgBox "Error creating the transition."
end if
else
r.TransitionOption=r.CGSRight
ct=co.NewTransition(r)
if ct<>Nil then
Refresh
ct.Invoke(1)
ct.Wait(1)
ct.Release
else
MsgBox "Error creating the transition."
end if
end if
// Keep track of the last tab clicked
OldTab = tabpanel1.Value

```

Notes: See CGS* classes for more details.

26.0.36 How about Plugin support for older OS X?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: We support in general Mac OS X 10.5 and newer.

Notes: All the 64-bit plugins on Mac require OS X 10.7.

Intel 32-bit plugins on Mac require OS X 10.5 or newer.

Currently the ChartDirector 6, GraphicsMagick and GameKit plugins requires Mac OS X 10.6. Also for SQL Plugin the built in SQLite library requires 10.6.

26.0.37 How can I detect whether an Intel CPU is a 64bit CPU?

Plugin Version: all.

Answer: Look on the CPU family returned by sysctl:

Example:

Function is64bit() As Boolean

```
#if TargetLittleEndian
```

```
dim m as MemoryBlock = NewMemoryBlock(8)
```

```
dim family as Integer
```

```
dim s as string
```

```
m=SystemControlNameToMIBMBS("hw.cpufamily")
```

```
m=SystemControlMBS(m)
```

```
if m<>nil then
```

```
m.LittleEndian=True
```

```
family=m.Long(0)
```

```
const CPUFAMILY_INTEL_6_14 = &h73d67300 /* "Intel Core Solo" and "Intel Core Duo" (32-bit Pentium-M with SSE3) */
```

```
const CPUFAMILY_INTEL_6_15 = &h426f69ef /* "Intel Core 2 Duo" */
```

```
const CPUFAMILY_INTEL_6_23 = &h78ea4fbc /* Penryn */
```

```
const CPUFAMILY_INTEL_6_26 = &h6b5a4cd2 /* Nehalem */
```

```
Select case family
```

```
case CPUFAMILY_INTEL_6_14
```

```
Return false
```

```
case CPUFAMILY_INTEL_6_15
```

```
Return true
```

```
case CPUFAMILY_INTEL_6_23
```

```
Return true
```

```
case CPUFAMILY_INTEL_6_26
```

```
Return true
```

```
// newer CPUs may be missing here
```

```
end Select
```

```
end if
```

```
#endif
```

```
Return false
```

```
Exception
```

```
Return false
```

```
End Function
```

Notes: This code is written for Mac OS X where you only have a limited number of possible CPUs.

26.0.38 How can I disable the close box of a window on Windows?

Plugin Version: all, Platform: Windows.

Answer: The following code will remove the close item from the system menu of the window.

Example:

```
#if TargetWin32 then
Declare Function GetSystemMenu Lib "user32" (hwnd as Integer, bRevert as Integer) as Integer
Declare Function RemoveMenu Lib "user32" (hMenu as Integer, nPosition as Integer, wFlags as Integer) as Integer
Dim hSysMenu as Integer
hSysMenu = GetSystemMenu(me.WinHWND, 0)
RemoveMenu hSysMenu, &HF060, &H0
#endif
```

Notes: The window may not be updated directly.

26.0.39 How can I get all the environment variables from Windows?

Plugin Version: all, Platform: Windows.

Answer: Try this code:

Example:

```
#if targetWin32
declare function GetEnvironmentStrings Lib "kernel32" () as ptr
dim m as memoryBlock
dim n as Integer

m=GetEnvironmentStrings()

n=0
do
msgBox m.cstring(n)
while m.byte(n)<>0
n=n+1
wend
n=n+1
```

```
loop until m.byte(n)=0
#endif
```

Notes: The MBS Plugin has an EnvironmentMBS class for this.

26.0.40 How can i get similar behavior to Roxio Toast or iTunes where clicking a 'burn' button allows the next inserted blank CD-R to bypass the Finder and be accepted by my application?

Plugin Version: all, Platform: macOS.

Answer: You need to get a media reservation.

Example:

```
dim d as DRDeviceMBS // get a device
d.AcquireMediaReservation
```

Notes: Use the plugin function AcquireMediaReservation and later release it using ReleaseMediaReservation.

See plugin examples on how to use it and check Apples DiscRecording framework documentation for more details.

26.0.41 How can I get text from a PDF?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Crossplatform you can use DynaPDF Pro.

Notes: On Mac OS X you can also use PDFKit for the same job.

While DynaPDF Pro gives you each bit of text with rotation, font information and encoding details, PDFKit gives you only the text string for a PDF page.

26.0.42 How can I get text from a Word Document?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: to get the text string from a doc file, use the NSAttributedStringMBS class.

Notes: The NSAttributedStringMBS class is Mac OS X only and we have currently no solution for Windows or Linux.

Use the `NSAttributedStringMBS.initWithDocFormat(data as string)` as boolean method.

26.0.43 How can I get the item string for a given file creator?

Plugin Version: all.

Answer: Try this function:

Example:

```
Sub pullNativeDocs(aCREA As string)
Dim result as Integer
Dim m, k as memoryBlock
Dim f as folderItem
Dim newType as string
Dim anIcon As picture
Dim ofs as Integer
```

```
Declare Function GetFileTypesThatAppCanNativelyOpen Lib "Carbon" (appVRefNumHint as Short, appSignature as OSType, nativeTypes as Ptr) as Short Inline68K("701CABFC")
Declare Function GetDocumentKindString Lib "Carbon" (docVRefNum as Short, docType as OSType, docCreator as OSType, kindString as ptr) as Short Inline68K("7016ABFC")
```

```
listBox1.deleteAllRows
```

```
m = newMemoryBlock(1024)
result = GetFileTypesThatAppCanNativelyOpen(Volume(0).MacVRefNum, aCREA, m)
if result <> 0 then
listBox1.addRow "<Not found.>"
return
end if
```

```
do
if m.byte(ofs*4) = 0 then
exit
else
newType = m.OSTypeMBS(ofs*4)
listBox1.addRow newType
k = newMemoryBlock(64)
result = GetDocumentKindString(Volume(0).MacVRefNum, newType, aCREA, k)
if result = 0 then
listBox1.cell(ofs,1) = k.pString(0)
ofs = ofs + 1
else
listBox1.cell(ofs,1) = "(unknown)"
end if
end if
```

loop

End Sub

Notes: Change "Translation" to "CarbonLib" for Mac OS X.

26.0.44 How can I launch an app using it's creator code?

Plugin Version: all, Platform: macOS.

Answer: Send an AppleEvent "odoc" with the creator code to the Finder ("MACS"):

Example:

```
Function LaunchByCreator(C As String) As Boolean
Dim A As AppleEvent
A = NewAppleEvent("aevt","odoc","MACS")
A.ObjectSpecifierParam("—") = GetUniqueIDObjectDescriptor("appf",nil,C)
return A.Send
End Function
```

26.0.45 How can I learn what shared libraries are required by a plugin on Linux?

Plugin Version: all, Platform: macOS.

Answer: Please use the ldd command in the terminal.

Notes: You build an app on any platform, but for Linux.

For the resulting .so files in the libs folder, you can run the ldd command with the library path as parameter. It shows you references lib files and you can make sure you have those installed.

This is a sample run of our graphicsmagick plugin:

```
cs@Ubuntu32:
textasciitilde /MeinProgramm/MeinProgramm Libs$ ldd libMBSGraphicsMagickPlugin17744.so
linux-gate.so.1 =>(0xb76ee000)
libdl.so.2 =>/lib/i386-linux-gnu/libdl.so.2 (0xb6f0e000)
libgtk-x11-2.0.so.0 =>/usr/lib/i386-linux-gnu/libgtk-x11-2.0.so.0 (0xb6aa6000)
libpthread.so.0 =>/lib/i386-linux-gnu/libpthread.so.0 (0xb6a8a000)
libstdc++.so.6 =>/usr/lib/i386-linux-gnu/libstdc++.so.6 (0xb69a5000)
libm.so.6 =>/lib/i386-linux-gnu/libm.so.6 (0xb6979000)
libgcc_s.so.1 =>/lib/i386-linux-gnu/libgcc_s.so.1 (0xb695b000)
libc.so.6 =>/lib/i386-linux-gnu/libc.so.6 (0xb67b1000)
```

```

/lib/ld-linux.so.2 (0xb76ef000)
libgdk-x11-2.0.so.0 =>/usr/lib/i386-linux-gnu/libgdk-x11-2.0.so.0 (0xb6701000)
libpangocairo-1.0.so.0 =>/usr/lib/i386-linux-gnu/libpangocairo-1.0.so.0 (0xb66f4000)
libX11.so.6 =>/usr/lib/i386-linux-gnu/libX11.so.6 (0xb65c0000)
libXfixes.so.3 =>/usr/lib/i386-linux-gnu/libXfixes.so.3 (0xb65ba000)
libatk-1.0.so.0 =>/usr/lib/i386-linux-gnu/libatk-1.0.so.0 (0xb659a000)
libcairo.so.2 =>/usr/lib/i386-linux-gnu/libcairo.so.2 (0xb64ce000)
libgdk_pixbuf-2.0.so.0 =>/usr/lib/i386-linux-gnu/libgdk_pixbuf-2.0.so.0 (0xb64ad000)
libgio-2.0.so.0 =>/usr/lib/i386-linux-gnu/libgio-2.0.so.0 (0xb6356000)
libpangoft2-1.0.so.0 =>/usr/lib/i386-linux-gnu/libpangoft2-1.0.so.0 (0xb632a000)
libpango-1.0.so.0 =>/usr/lib/i386-linux-gnu/libpango-1.0.so.0 (0xb62e0000)
libfontconfig.so.1 =>/usr/lib/i386-linux-gnu/libfontconfig.so.1 (0xb62ab000)
libgobject-2.0.so.0 =>/usr/lib/i386-linux-gnu/libgobject-2.0.so.0 (0xb625c000)
libglib-2.0.so.0 =>/lib/i386-linux-gnu/libglib-2.0.so.0 (0xb6163000)
libXext.so.6 =>/usr/lib/i386-linux-gnu/libXext.so.6 (0xb6151000)
libXrender.so.1 =>/usr/lib/i386-linux-gnu/libXrender.so.1 (0xb6147000)
libXinerama.so.1 =>/usr/lib/i386-linux-gnu/libXinerama.so.1 (0xb6142000)
libXi.so.6 =>/usr/lib/i386-linux-gnu/libXi.so.6 (0xb6132000)
libXrandr.so.2 =>/usr/lib/i386-linux-gnu/libXrandr.so.2 (0xb6129000)
libXcursor.so.1 =>/usr/lib/i386-linux-gnu/libXcursor.so.1 (0xb611e000)
libXcomposite.so.1 =>/usr/lib/i386-linux-gnu/libXcomposite.so.1 (0xb611a000)
libXdamage.so.1 =>/usr/lib/i386-linux-gnu/libXdamage.so.1 (0xb6115000)
libfreetype.so.6 =>/usr/lib/i386-linux-gnu/libfreetype.so.6 (0xb607b000)
libxcb.so.1 =>/usr/lib/i386-linux-gnu/libxcb.so.1 (0xb605a000)
libpixman-1.so.0 =>/usr/lib/i386-linux-gnu/libpixman-1.so.0 (0xb5fc2000)
libpng12.so.0 =>/lib/i386-linux-gnu/libpng12.so.0 (0xb5f98000)
libxcb-shm.so.0 =>/usr/lib/i386-linux-gnu/libxcb-shm.so.0 (0xb5f93000)
libxcb-render.so.0 =>/usr/lib/i386-linux-gnu/libxcb-render.so.0 (0xb5f89000)
libz.so.1 =>/lib/i386-linux-gnu/libz.so.1 (0xb5f73000)
libgmodule-2.0.so.0 =>/usr/lib/i386-linux-gnu/libgmodule-2.0.so.0 (0xb5f6e000)
libselinux.so.1 =>/lib/i386-linux-gnu/libselinux.so.1 (0xb5f4f000)
libresolv.so.2 =>/lib/i386-linux-gnu/libresolv.so.2 (0xb5f36000)
libexpat.so.1 =>/lib/i386-linux-gnu/libexpat.so.1 (0xb5f0c000)
libffi.so.6 =>/usr/lib/i386-linux-gnu/libffi.so.6 (0xb5f05000)
libpcre.so.3 =>/lib/i386-linux-gnu/libpcre.so.3 (0xb5ec9000)
librt.so.1 =>/lib/i386-linux-gnu/librt.so.1 (0xb5ec0000)
libXau.so.6 =>/usr/lib/i386-linux-gnu/libXau.so.6 (0xb5ebb000)
libXdmcp.so.6 =>/usr/lib/i386-linux-gnu/libXdmcp.so.6 (0xb5eb4000)
cs@Ubuntu32:
textasciitilde /MeinProgramm/MeinProgramm Libs$

```

As you see all library have been found and their load address is printed behind the na,e. If a library is missing, you usually see the address missing there or being zero.

26.0.46 How can I validate an email address?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can try this code:

Example:

```
Dim re As RegEx
re = New RegEx
Dim rm As RegExMatch

re.SearchPattern = "[a-z0-9!#$%&'*/=?^_`{|}
textasciitilde - ]+(?:\. [a-z0-9!#$%&'*/=?^_`{|}
textasciitilde - ]+)*@(?: [a-z0-9] (?: [a-z0-9- ]* [a-z0-9] )?\.)+ [a-z0-9] (?: [a-z0-9- ]* [a-z0-9] )?)"

rm = re.Search(editField1.Text)

if rm = Nil Then
StaticText2.Text = editField1.Text + " not valid email"
Else
StaticText2.Text = editField1.Text + " is valid"
End if
```

Notes: Adapted from:

<http://www.regular-expressions.info/email.html>

26.0.47 How do I decode correctly an email subject?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: The following code can be used to decode an email subject including several encodings including Base 64.

Example:

```
dim src as string // input

dim theRegex as RegEx
dim theRegexMatch as RegExMatch
dim result, infoCharset, encodedPart as string
dim theStart as Integer

if instr(src, "=") > 0 then
theRegex = new RegEx
theRegex.Options.Greedy = false
theRegex.SearchPattern = "(.*)=\?(.+)\?(Q | B)\?(.+)\?="
theRegexMatch = theRegex.Search(src)
```

```

while theRegexMatch <>nil
theStart = theRegexMatch.subExpressionStartB(0) + len(theRegexMatch.subExpressionString(0))

result = result + theRegexMatch.subExpressionString(1)
infoCharset = theRegexMatch.subExpressionString(2)
encodedPart = theRegexMatch.subExpressionString(4)
if theRegexMatch.subExpressionString(3) = "B" then
encodedPart = DecodeBase64(encodedPart)
elseif theRegexMatch.subExpressionString(3) = "Q" then
encodedPart = DecodeQuotedPrintable(encodedPart)
end if
if right(result, 1) = " " then
result = mid(result, 1, len(result)-1)
end if
encodedPart = encodedPart.DefineEncoding(GetInternetTextEncoding(infoCharset))
result = result + encodedPart

theRegex.SearchStartPosition = theStart
theRegexMatch = theRegex.search()
wend

result = result + mid(src, theStart+1)

else
result = src
end if
// theRegexMatch = theRegex.search

msgbox result

```

Notes: May not look nice depending on the controls used.
This is no longer needed when using MimeEmailMBS class which decodes for you.

26.0.48 How do I enable/disable a single tab in a tabpanel?

Plugin Version: all, Platform: macOS.

Answer: Use the TabpanelEnabledMBS method.

Example:

```
TabpanelEnabledMBS(tabpanel1, 1, false)
```

Notes: Use Carbon for MachO and CarbonLib for Mac Carbon and AppearanceLib for Mac OS Classic as

library.

For Cocoa, please use enabled property of NSTabViewItemMBS class.

26.0.49 How do I find the root volume for a file?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Try this function:

Example:

```
Function GetRootVolume(f as FolderItem) as FolderItem
dim root, dum as folderItem
if f <> nil then
root = f // f might be the volume
do
dum = root.parent
if dum <> nil then
root = dum
end if
loop until dum = nil
return root
end if
End Function
```

26.0.50 How do I get the current languages list?

Plugin Version: all, Platform: macOS.

Answer: Try this code:

Example:

```
dim p as new CFPreferencesMBS
dim a as CFArrayMBS
dim s as CFStringMBS
dim o as CFOBJECTMBS
dim sa(-1) as string

o=p.CopyAppValue("AppleLanguages", ".GlobalPreferences")

if o<>Nil then
a=CFArrayMBS(o)

dim i,c as Integer
```

```
c=a.Count-1
for i=0 to c
o=a.Item(i)

if o isa CFStringMBS then
s=CFStringMBS(o)
sa.Append s.str
end if
next
end if

MsgBox Join(sa,EndOfLine)
```

Notes: On Mac OS X you can get the list of current languages like this list:

```
de
en
ja
fr
es
it
pt
pt-PT
nl
sv
nb
da
fi
ru
pl
zh-Hans
zh-Hant
ko
```

Which has German (de) on the top for a German user.
This code has been tested on Mac OS X 10.5 only.

26.0.51 How do I get the Mac OS Version?

Plugin Version: all, Platform: macOS.

Answer: Try this code:

Example:

```

dim i as Integer
if system.gestalt("sysv", i) then
//do this in an 'If' in case you don't get any value back at all and system.gestalt returns boolean
if i = &h750 then //If OS is 7.5
//do stuff
elseif i = &h761 then //If OS is 7.6.1
//do stuff
end if
end if

```

Notes: The MBS Plugin has a function SystemInformationMBS.OSVersionString for this.

26.0.52 How do I get the printer name?

Plugin Version: all.

Answer: For Mac OS Classic see the code below and for Mac OS X use the Carbon Print Manager Classes from the MBS Plugin.

Example:

```

dim s as String
dim i as Integer

s=app.ResourceFork.GetResource("STR ",-8192)
if s<>"" then
i=ascb(leftb(s,1))
s=mid(s,2,i)

MsgBox s
end if

```

Notes: A note from Craig Hoyt:

After looking at your example I had a little deja-vu experience. Several years ago I played around with this same code if FutureBasic. I discovered that it did not and still doesn't provide the 'Printer Name', it does return the print driver name. If it returns 'LaserWriter 8' as the print driver you can look into this file and get the 'PAPA' resource #-8192 to get the actual Printer Name. Unfortunately this does not hold true for other printers. My Epson and HP Printers (the Epson has an Ethernet Card and the HP is USB) do not provide this info in their drivers. As far as I can tell it only returns the name by polling the printer itself.

26.0.53 How do I make a metal window if RB does not allow me this?

Plugin Version: all, Platform: macOS.

Answer: The following declare turns any window on Mac OS X 10.2 or newer into a metal one.

Example:

```
declare sub ChangeWindowAttributes lib "Carbon" (win as windowptr, a as Integer, b as Integer)
```

```
ChangeWindowAttributes window1,256,0
```

Notes: May not look nice depending on the controls used.

26.0.54 How do I make a smooth color transition?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

I'd like to show in a report some bars, which start with color A and end with color B.

The color change should be very smooth.

My problem: If I would start from 255,0,0 and end by 0,0,0, I would have 255 different colors. If the bars are longer than 255 pixels, would this look nice?

Example:

```
// Window.Paint:
Sub Paint(g As Graphics)
dim w,w1,x,p as Integer
dim c1,c2,c as color
dim p1,p2 as Double

c1=rgb(255,0,0) // start color
c2=rgb(0,255,0) // end color

w=g.Width
w1=w-1

for x=0 to w1
p1=x/w1
p2=1.0-p1
```

```

c=rgb(c1.red*p1+c2.red*p2, c1.green*p1+c2.green*p2, c1.blue*p1+c2.blue*p2)

g.ForeColor=c
g.DrawLine x,0,x,g.Height

next
End Sub

```

Notes:

Try the code above in a window paint event handler.

26.0.55 How do I read the applications in the dock app?

Plugin Version: all, Platform: macOS.

Answer: Use CFPREFERENCESMBS class like in this example:

Example:

```

// Reads file names from persistent dock applications and puts them into the list

dim pref as new CFPREFERENCESMBS

dim persistentapps as CFStringMBS = NewCFStringMBS("persistent-apps")
dim ApplicationID as CFStringMBS = NewCFStringMBS("com.apple.dock")
dim tiledata as CFStringMBS = NewCFStringMBS("tile-data")
dim filelabel as CFStringMBS = NewCFStringMBS("file-label")

// get the array of persistent applications from dock preferences
dim o as CObjectMBS = pref.CopyValue(persistentapps, ApplicationID, pref.kCFPreferencesCurrentUser,
pref.kCFPreferencesAnyHost)

if o isa CFArrayMBS then
dim a as CFArrayMBS = CFArrayMBS(o)

// walk over all items in array
dim c as Integer = a.Count-1
for i as Integer = 0 to c

// get dictionary describing item
o = a.Item(i)

if o isa CFDictionaryMBS then
dim d as CFDictionaryMBS = CFDictionaryMBS(o)

```

```

// and pick tile data dictionary
o = d.Value(tiledata)
if o isa CFDictionaryMBS then
d = CFDictionaryMBS(o)

// and pick there the file label
o = d.Value(filelabel)
if o isa CFStringMBS then
// and display it
dim name as string = CFStringMBS(o).str
List.AddRow name
end if
end if
end if

next

else
MsgBox "Failed to read dock preferences."
end if

```

Notes: You can use the `CFPreferencesMBS.SetValue` to change a value and `CFPreferencesMBS.Synchronize` to write the values to disc. You may need to restart the `Dock.app` if you modified things.

26.0.56 How do I truncate a file?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: In a `binarystream` you can set the `length` property to truncate.

26.0.57 How do update a Finder's windows after changing some files?

Plugin Version: all, Platform: macOS.

Answer: Try this code:

Example:

```

dim f as folderitem // some file
dim ae as appleevent
ae=newappleevent("fndr","fupd","MACS")
ae.folderitemparam("—")=f
if not ae.send then
//something went wrong

```

end if

Notes: The `folderitem.finderupdate` from the MBS Plugin does something like this.

26.0.58 How to access a USB device directly?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: First, it depends on the device.

Notes: Some devices can be talked directly from user mode code, but some require a kernel driver.

For some devices you can use plugins to access them like:

- Audio and Video sources using the `QTGrabberClassMBS`
- Mass storage devices using the `folderitem` class.
- Serial devices using the `System.SerialPort` function.
- HID USB devices can be used with `MacHIDMBS`, `WinHIDMBS` or `LinuxHIDInterface` class.
- Any USB device may be used with `MacUSBMBS` or `WinUSBMBS` classes.

In general it is always the best to take the most high level access to have others do the work for the details.

26.0.59 How to add icon to file on Mac?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use `FolderItem.AddCustomIcon` or `NSWorkspaceMBS.setIcon` functions.

Notes: Please close any open stream for the file you want to add an icon.

26.0.60 How to ask the Mac for the Name of the Machine?

Plugin Version: all, Platform: macOS.

Answer: Using Apple Events you can use this code:

Example:

Function `Computername()` *As string*

```

dim theEvent as AppleEvent
dim err as boolean

theEvent = newAppleEvent("mchn","getd","MACS")

err = theEvent.send

return theevent.ReplyString

End Function

```

Notes: Code above is for Mac OS 9!

Also the MBS Plugin has a function for this which may be faster and work also on Macs without Filesharing (which handles this event).

26.0.61 How to automatically enable retina in my apps?

Plugin Version: all, Platform: macOS.

Answer: You can run a build script on each build with this code:

Example:

```

Dim App As String = CurrentBuildLocation + "/" + CurrentBuildAppName + ".app"
Call DoShellCommand("/usr/bin/defaults write " + App + "/Contents/Info ""NSHighResolutionCapable""
YES")

```

Notes: This will set the NSHighResolutionCapable flag to YES.

26.0.62 How to avoid leaks with Cocoa functions?

Plugin Version: all, Platform: macOS.

Answer: You can try this code on Mac OS X:

Example:

```

// in a Timer Action event:
Sub Action()
static LastPool as NSAutoreleasePoolMBS = nil
static CurrentPool as NSAutoreleasePoolMBS = nil

```

```

LastPool = CurrentPool
CurrentPool = new NSAutoreleasePoolMBS

```

End Sub

Notes: With Xojo 2009r4 the code above should not be needed as Xojo runtime does automatically handle the `NSAutoreleasePools` for you. For older Xojo versions you need to use code with a timer with the action event above to avoid memory leaks.

Please do not use Xojo 2009r4 and newer with plugins before version 9.5. You can get crashes there which typically show a line with a `objc_msgSend` call.

26.0.63 How to avoid trouble connecting to oracle database with SQL Plugin?

Plugin Version: all, Platform: macOS.

Answer: For oracle the most important thing is to point the plugin to the libraries from oracle.

Notes: In environment variables, the paths like `ORACLE_HOME` must be defined.

On Mac OS X you also need to define `DYLD_LIBRARY_PATH` to point to the dylib files from oracle.

For that you need to modify `/etc/launchd.conf` for Mac OS X 10.8 and newer.

In older versions those variables in `.MacOSX/environment.plist` file in user's home.

Another way for the case you bundle things inside your app is to use the `LSEnvironment` key in `info.plist`. In `info.plist` it looks like this:

```
<key>LSEnvironment</key>
<dict>
<key>test</key>
<string>Hello World</string>
</dict>
```

26.0.64 How to avoid `___NSAutoreleaseNoPool` console messages in threads?

Plugin Version: all, Platform: macOS.

Answer: You need to use your own `NSAutoreleasePool` on a thread like this:

Example:

```
sub MyThread.run
dim pool as new NSAutoreleasePoolMBS
// do work here

pool=nil
```

end sub

Notes: For more details read here:

http://developer.apple.com/mac/library/documentation/Cocoa/Reference/Foundation/Classes/NSAutoreleasePool_Class/Reference/Reference.html

26.0.65 How to bring app to front?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: On Mac you can use this code:

Example:

```
// First way:
app.FrontMostMBS = true
```

```
// second way:
dim p as new ProcessMBS
p.GetCurrentProcess
p.FrontProcess = true
```

```
// third way:
NSApplicationMBS.sharedApplication.activateIgnoringOtherApps(true)
```

```
// for Windows:
RemoteControlMBS.WinBringWindowToTop
```

Notes: This will bring a Mac app to the front layer.

26.0.66 How to bring my application to front?

Plugin Version: all, Platform: macOS.

Answer: This makes SimpleText (Code txtxt) to the frontmost application:

Example:

```
Dim A As AppleEvent
A = NewAppleEvent("misc", "actv", "")
If Not A.Send then
Beep
end if
```

Notes: (Code is Mac only)

26.0.67 How to catch Control-C on Mac or Linux in a console app?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use SignalHandlerMBS class for this.

Example:

```
// watch for Control-C on Mac
call SignalHandlerMBS.SetFlagHandler(2)

dim ende as boolean = false
do
if SignalHandlerMBS.IsFlagSet(2) then
Print "Flag 2 set. Existing..."
ende = true
end if

DoEvents 1
loop until ende
```

Notes: The signal is caught, a flag is set and you can ask later in your normal application flow for the result.

26.0.68 How to change name of application menu?

Plugin Version: all, Platforms: macOS, Windows.

Answer: Use this code to change the application menu name on Mac OS X:

Example:

```
dim mb as new MenubarMBS
dim m as MenuMBS = mb.item(1) // 1 is in my tests the app menu
if m<>Nil then
m.MenuTitle = "Hello World"
end if
```

Notes: This code is for Carbon only.

26.0.69 How to change the name in the menubar of my app on Mac OS X?

Plugin Version: all, Platform: macOS.

Answer:

You mean it screws up if the file name of the bundle itself is different than the name of the executable file in the MacOS folder within the bundle? If so, you should find something like this within your Info.plist file (or the 'plst' resource that the RB IDE builds for you):

```
<key>CFBundleExecutable</key>
<string>Executable file name here</string>
```

Just make sure that file name matches.

However, if your question involves how you can change the name of the app that appears in the menu and the dock, that's different. You can make this name different from the file name by changing the CFBundleName key:

```
<key>CFBundleName</key>
<string>Name for menu here</string>
```

Note that if you use my free AppBundler program, this second part is taken care of for you – just fill in a custom name in the right field. You can find AppBundler (from Thomas Reed) at <http://www.bitjuggler.com/products/appbundler/>.

26.0.70 How to check if a folder/directory has subfolders?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use code like this to check all items in a folder:

Example:

```
Function HasSubFolder(folder as FolderItem) As Boolean
dim c as Integer = folder.Count
```

```
for i as Integer = 1 to c
dim item as FolderItem = folder.TrueItem(i)
```

```
if item<>Nil and item.Directory then
Return true
end if
```

next

End Function

Notes: We use trueitem() here to avoid resolving alias/link files. Also we check for nil as we may not have permission to see all items. And if one is a directory, we return without checking the rest.

26.0.71 How to check if Macbook runs on battery or AC power?

Plugin Version: all, Platform: macOS.

Answer: Please use our IOPowerSourcesMBS class like this:

Example:

```
Function PowerSourceState() as Integer
dim p as new IOPowerSourcesMBS

// check all power sources
dim u as Integer = p.Count-1
for i as Integer = 0 to u
dim d as CFDictionaryMBS = p.Item(i)
if d<>nil then
// check if they have a power source state key:
dim o as CFObjectMBS = d.Value(NewCFStringMBS("Power Source State"))
if o isa CFStringMBS then
dim s as string = CFStringMBS(o).str

'MsgBox s

if s = "AC Power" then
Return 1
elseif s = "Battery Power" then
Return 2
end if
end if
end if
next
Return 0 // unknown
End Function
```

Notes: If you want to check the CFDictionaryMBS content, simply use a line like "dim x as dictionary = d.dictionary" and check the contents in the debugger.

26.0.72 How to check if Microsoft Outlook is installed?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: If you need Outlook for Scripting, you should simply check registry for the required Outlook.Application class:

Example:

```
Function OutlookInstalled() As Boolean
    #if TargetWin32 then

    try
    dim r as new RegistryItem("HKEY_CLASSES_ROOT\Outlook.Application\CLSID", false)

    Return true

    catch r as RegistryAccessErrorException
    // not installed
    Return false

    end try

    #else

    // Windows only, so false on other platforms
    Return false

    #endif

End Function
```

26.0.73 How to check on Mac OS which country or language is currently selected?

Plugin Version: all, Platform: macOS.

Answer: The code below returns a country value.

Example:

```
dim result as Integer

IF TargetMacOS THEN
```

```

CONST smScriptLang = 28
CONST smSystemScript = -1

DECLARE FUNCTION GetScriptManagerVariable LIB "Carbon" ( selector as Integer) as Integer
DECLARE FUNCTION GetScriptVariable LIB "Carbon" ( script as Integer, selector as Integer) as Integer

result=GetScriptVariable(smSystemScript, smScriptLang)

END IF

```

Notes: Returns values like:

For more values, check "Script.h" in the frameworks.

26.0.74 How to code sign my app with plugins?

Plugin Version: all, Platform: macOS.

Answer: When you try to code sign the application with plugin dylibs on Mac OS X, you may see error message that there is actually a signature included.

Notes: Please use the `-f` command line parameter with `codesign` utility to overwrite our MBS signature. We sign our plugins for macOS, iOS and Windows to make sure they have not been modified.

In terminal, you do like this:

```
cd <Path to folder of app>
```

```

xattr -cr <Appname>.app
codesign -f -s "Developer ID Application: <Your Name>" <Appname>.app/Contents/Frameworks/*.dylib
codesign -f -s "Developer ID Application: <Your Name>" <Appname>.app/Contents/Frameworks/*.framework
codesign -f -s "Developer ID Application: <Your Name>" <Appname>.app

```

Please use the name of your certificate (See keychain), the name of your app and the path to the app folder. If you have helper apps you need to sign them first.

You can use a build step to automatically sign your app on build.

26.0.75 How to collapse a window?

Plugin Version: all, Platform: macOS.

Answer: Use this function (Mac only):

Example:

```
Sub CollapseRBwindow(w as window, CollapseStatus as boolean)
dim state, err as Integer
dim wh as MemoryBlock
```

```
Declare Function CollapseWindow Lib "Carbon" (window as Integer, collapse as Integer) as Integer
```

```
IF CollapseStatus THEN
state = 1
ELSE
state = 0
END IF
```

```
err = CollapseWindow(w.MacWindowPtr, state)
```

```
End Sub
```

Notes: Also the MBS Plugin has a window.collapsedmbs property you can set. For Windows the MBS Plugin has a window.isiconicmbs property.

26.0.76 How to compare two pictures?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can try this code:

Example:

```
Function ComparePictures(p as picture,q as picture) as Integer
dim r,u as RGBSurface
dim x,y,n,m,h,w as Integer
dim w1,w2,h1,h2,d1,d2 as Integer
dim c1,c2 as color
```

```
h1=p.Height
h2=q.Height
w1=p.Width
w2=q.Width
d1=p.Depth
d2=q.Depth
```

```
if d1<>d2 then
Return 1
elseif w1<>w2 then
```

```

return 2
elseif h1<>h2 then
Return 3
else
r=p.RGBSurface
u=q.RGBSurface

if r=nil or u=nil then
Return -1
else
h=h1-1
w=w1-1
m=min(w,h)

for n=0 to m
c1=r.Pixel(n,n)
c2=u.Pixel(n,n)
if c1<>c2 then
Return 4
end if
next

for y=0 to h
for x=0 to w
c1=r.Pixel(x,y)
c2=u.Pixel(x,y)
if c1<>c2 then
Return 5
end if
next
next

// 0 for equal
// -1 for error (no RGBsurface)
// 1 for different depth
// 2 for different width
// 3 for different height
// 4 for different pixels (fast test)
// 5 for different pixels (slow test)
end if
end if

Exception
Return -1
End Function

```

Notes: Remember that this only works on bitmap pictures, so the `picture.BitmapMBS` function may be useful.

26.0.77 How to compile PHP library?

Plugin Version: all, Platform: macOS.

Answer: You have to download the source code and compile a static version of the library.

Notes: This instructions were written based on PHP 5.2.6 on Mac OS X:

- Best take a new Mac with current Xcode version installed.
- Download the source code archive. e.g. "php-5.2.6.tar.bz2"
- Expand that archive on your harddisc.
- Open terminal window
- change directory to the php directory. e.g. "cd /php-5.2.6"
- execute this two lines to define the supported CPU types and the minimum Mac OS X version:
- export CFLAGS="-arch ppc -arch i386 -mmacosx-version-min=10.3"
- export CXXFLAGS="-arch ppc -arch i386 -mmacosx-version-min=10.3"
- the command "./configure help" does show the configure options.
- use configure with a line like this:
- ./configure --enable-embed --with-curl --enable-ftp --enable-zip --enable-sockets --enable-static --enable-soap --with-zlib --with-bz2 --enable-exif --enable-bcmath --enable-calendar
- start the compilation with "make all"
- other option is to use "make install" which first does the same as "make all" and than does some installation scripts.
- you may get an error about a duplicate symbole __yytext. Search the file "zend_ini_scanner.c", search a line with "char *yytext;" and change it to "extern char *yytext;".
- On the end you get a lot of error messages, but you have a working library (named libphp5.so) file in the invisible ".libs" folder inside your php source folder.

Possible problems and solutions:

- If the path to your files has spaces, you can get into trouble. e.g. "/RB Plugins/PHP" is bad as files will be searched sometimes in "/RB".

- If you have in /usr/local/lib libraries which conflict with the default libraries, you can get into trouble.
- If you installed some open source tools which compiled their own libraries, you can get into conflicts.
- if you have to reconfigure or after a problem, you may need to use "make clean" before you start "make all" again.

Feel free to install additional libraries and add more packages to the configure line.

26.0.78 How to convert a BrowserType to a String with WebSession.Browser?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use code like this:

Example:

```
Function GetBrowserName(s as WebSession.BrowserType) As string
Select case s
case WebSession.BrowserType.Android
Return "Andriod"
case WebSession.BrowserType.Blackberry
Return "Blackberry"
case WebSession.BrowserType.Chrome
Return "Chrome"
case WebSession.BrowserType.ChromeOS
Return "ChromeOS"
case WebSession.BrowserType.Firefox
Return "Firefox"
case WebSession.BrowserType.InternetExplorer
Return "InternetExplorer"
case WebSession.BrowserType.Opera
Return "Opera"
case WebSession.BrowserType.Safari
Return "Safari"
case WebSession.BrowserType.SafariMobile
Return "SafariMobile"
case WebSession.BrowserType.Unknown
Return "Unknown"
else
Return "Unkown: "+str(integer(s))
end Select

End Function
```

26.0.79 How to convert a EngineType to a String with WebSession.Engine?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use code like this:

Example:

```
Function GetRenderingEngineName(s as WebSession.EngineType) As string
Select case s
case WebSession.EngineType.Gecko
Return "Gecko"
case WebSession.EngineType.Presto
Return "Presto"
case WebSession.EngineType.Trident
Return "Trident"
case WebSession.EngineType.Unknown
Return "Unknown"
case WebSession.EngineType.WebKit
Return "WebKit"
else
Return "Unkown: "+str(integer(s))
end Select

End Function
```

26.0.80 How to convert a PlatformType to a String with WebSession.Platform?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use code like this:

Example:

```
Function GetPlatformName(s as WebSession.PlatformType) As string
Select case s
case WebSession.PlatformType.Blackberry
Return "Blackberry"
case WebSession.PlatformType.iPad
Return "iPad"
case WebSession.PlatformType.iPhone
Return "iPhone"
case WebSession.PlatformType.iPodTouch
Return "iPodTouch"
case WebSession.PlatformType.Linux
Return "Linux"
case WebSession.PlatformType.Macintosh
Return "Macintosh"
```

```

case WebSession.PlatformType.PS3
Return "PS3"
case WebSession.PlatformType.Unknown
Return "Unknown"
case WebSession.PlatformType.WebOS
Return "WebOS"
case WebSession.PlatformType.Wii
Return "Wii"
case WebSession.PlatformType.Windows
Return "Windows"
else
Return "Unkown: "+str(integer(s))
end Select

End Function

```

26.0.81 How to convert a text to iso-8859-1 using the TextEncoder?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

This code can help you although it's not perfect.
You need to set lc to the current color you use.

Example:

```

dim outstring as string
dim theMac, thePC as textencoding
dim Mac2PC as textconverter

theMac = getTextEncoding(0) // MacRoman
thePC = getTextEncoding(&h0201) // ISOLatin1

Mac2PC = getTextConverter(theMac, thePC)
// if you wanted to do the opposite just create a converter
// PC2Mac = getTextConverter(thePC, theMac)

outstring = Mac2PC.convert("Bj√rn, this text should be converted")
Mac2PC.clear

```

Notes:

You have to call Mac2PC.clear after every conversion to reset the encoding engine.
See also newer TextConverterMBS class.

26.0.82 How to convert ChartTime back to Xojo date?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: We have this example code:

Example:

```
Function ChartTimeToDate(ChartTime as Double) As date
static diff as Double = 0.0
```

```
if diff = 0.0 then
dim d2 as Double = CDBaseChartMBS.chartTime(2015, 1, 1)
dim da as new date(2015, 1, 1)
dim ts as Double = da.TotalSeconds
```

```
diff = ts - d2
end if
```

```
dim d as new date
d.TotalSeconds = diff + ChartTime
```

```
Return d
End Function
```

Notes: As you see we calculate the difference in base date from Date and ChartTime and later use difference to convert.

26.0.83 How to convert line endings in text files?

Plugin Version: all, Platform: macOS.

Answer: You can simply read file with TextInputStream and write with new line endings using TextOutputStream class.

Example:

```
dim inputfile as FolderItem = SpecialFolder.Desktop.Child("test.txt")
dim outputfile as FolderItem = SpecialFolder.Desktop.Child("output.txt")
dim it as TextInputStream = TextInputStream.Open(inputfile)
dim ot as TextOutputStream = TextOutputStream.Create(outputfile)
```

```
ot.Delimiter = EndOfLine.Windows // new line ending
while not it.EOF
ot.WriteLine it.ReadLine
wend
```

Notes: `TextInputStream` will read any input line endings and with `delimiter` property in `TextOutputStream` you can easily define your new delimiter.

26.0.84 How to convert picture to string and back?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use this plugin functions:

Notes: JPEG:

`JPEGStringToPictureMBS(buf as string)` as picture
`JPEGStringToPictureMBS(buf as string,allowdamaged as Boolean)` as picture
`PictureToJPEGStringMBS(pic as picture,quality as Integer)` as string

PNG:

`PictureToPNGStringMBS(pic as picture, gamma as single)` as string
`PictureToPNGStringMBS(pic as picture, mask as picture, gamma as single)` as string
`PictureToPNGStringMBS(pic as picture, gamma as single, Interlace as Boolean, FilterType as Integer)` as string
`PictureToPNGStringMBS(pic as picture, mask as picture, gamma as single, Interlace as Boolean, FilterType as Integer)` as string
`PNGStringToPictureMBS(data as string, gamma as single)` as picture
`PNGStringToPNGPictureMBS(data as string, gamma as single)` as PNGpictureMBS

Tiff:

`TIFFStringToPictureMBS(data as string)` as picture
`TIFFStringToTiffPictureMBS(data as string)` as TiffPictureMBS

BMP:

`BMPStringtoPictureMBS(data as string)` as picture
`Picture.BMPDataMBS(ResolutionValueDPI as Integer=72)` as string

GIF:

`GifStringToGifMBS(data as string)` as GIFMBS
`GifStringToPictureMBS(data as string)` as Picture

26.0.85 How to copy an array?

Plugin Version: all, Platform: macOS.

Answer: You can use a function like this to copy an array:

Example:

```
Function CopyArray(a() as Double) as Double()
dim r() as Double
for each v as Double in a
r.Append v
next
Return r
End Function
```

Notes: If needed make several copies of this method with different data types, not just double.
For a deep copy of an array of objects, you need to change code to also make a copy of those objects.

26.0.86 How to copy an dictionary?

Plugin Version: all, Platform: macOS.

Answer: You can use a function like this to copy a dictionary:

Example:

```
Function CopyDictionary(d as Dictionary) As Dictionary
dim r as new Dictionary
for each key as Variant in d.keys
r.Value(key) = d.Value(key)
next
Return r
End Function
```

Notes: If needed make several copies of this method with different data types, not just double.
For a deep copy of an dictionary of objects, you need to change code to also make a copy of those objects.

26.0.87 How to copy parts of a movie to another one?

Plugin Version: all, Platforms: macOS, Windows.

Answer: The code below copies ten seconds of the snowman movie to the dummy movie starting at the 5th second.

Example:

```

dim f as FolderItem
dim md as EditableMovie
dim ms as EditableMovie

f=SpecialFolder.Desktop.Child("Our First Snowman.mov")
ms=f.OpenEditableMovie

ms.SelectionStartMBS=5
ms.SelectionLengthMBS=10

f=SpecialFolder.Desktop.Child("dummy.mov")
md=f.CreateMovie

msgbox str(md.AddMovieSelectionMBS(ms))

```

Notes: If result is not 0, the method fails.

26.0.88 How to create a birthday like calendar event?

Plugin Version: all, Platform: macOS.

Answer: Try this code:

Example:

```

// start a connection to the calendar database
dim s as new CalCalendarStoreMBS

// needed for the error details
dim e as NSErrorMBS

dim r as CalRecurrenceRuleMBS = CalRecurrenceRuleMBS.initYearlyRecurrence(1, nil) // repeat every
year without end

dim a as new CalAlarmMBS // add alarm
a.action = a.CalAlarmActionDisplay
a.relativeTrigger = -3600*24 // 24 Hours before

// create a new calendar
dim c as new CalEventMBS

dim d as new date(2011, 04, 20) // the date

dim calendars() as CalCalendarMBS = s.calendars

```

```

// set properties
c.Title="Test Birthday"
c.startDate=d
c.recurrenceRule = r
c.calendar=calendars(0) // add to first calendar
c.addAlarm(a)
c.endDate = d
c.isAllDay = true

// save event
call s.saveEvent(c,s.CalSpanAllEvents, e)
if e<>nil then
MsgBox e.localizedDescription
else
MsgBox "New event was created."
end if

```

Notes: This adds an event to iCal for the given date with alarm to remember you and repeats it every year.

26.0.89 How to create a GUID?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use the UUIDMBS class for this.

26.0.90 How to create a Mac picture clip file?

Plugin Version: all, Platform: Windows.

Answer: You can use code like this one.

Example:

```

dim f As FolderItem
dim p As Picture

f=SpecialFolder.Desktop.Child("Test.pictClipping")
if f=nil then Return

p=new Picture(300,200,32) 'Make a sample picture
p.Graphics.ForeColor=RGB(0,255,255)
p.Graphics.FillOval 0,0,99,99

```

```
p.Graphics.ForeColor=RGB(255,0,0)
p.Graphics.DrawOval 0,0,99,99
```

```
dim r As ResourceFork 'ResourceFork is needed for a clip file
```

```
// Please define a file type Any
r=f.CreateResourceFork("Any")
```

```
// get PICT data using plugin function
dim pictdata as string = p.PicHandleDataMBS
r.AddResource(pictdata,"PICT",256,"Picture")
```

```
dim m as new MemoryBlock(8)
```

```
m.LittleEndian = false
m.Int16Value(0) = 0
m.Int16Value(2) = 0
m.Int16Value(4) = p.Width
m.Int16Value(6) = p.Height
```

```
r.AddResource(m,"RECT",256,"")
```

```
'Values taken from a sample file and irrelevant to the problem
```

```
dim data as string = DecodeBase64("AQAAAAAAAAAAAAAAAAACAFRDRVIAAAABAAAAAAAAAAABUQ0IQAAAAA")
r.AddResource(data,"drag",128,"") 'ditto
r.Close
```

Notes: In general Apple has deprecated this, but a few application still support clippings.

26.0.91 How to create a PDF file in Xojo?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Check our DynaPDF plugin and the examples.

Notes: An alternative can be to use the CoreGraphics and Cocoa functions on Mac OS X. For Windows, we can only suggest our DynaPDF plugin.

26.0.92 How to create EmailAttachment for PDF Data in memory?

Plugin Version: all, Platform: macOS.

Answer: You can use code like the one below:

Example:

Function EmailAttachmentFromPDFData(PDFData as string, filename as string) As EmailAttachment
 dim a as new EmailAttachment

```
a.data = EncodeBase64(PDFData, 76)
a.ContentEncoding = "base64"
a.MIMETYPE = "application/pdf"
a.MacType = "PDF "
a.MacCreator = "prvw"
a.Name = filename
```

Return a

End Function

Notes: Compared to sample code from Xojo documentation, we set the mime type correct for PDF. The MacType/MacCreator codes are deprecated, but you can still include them for older Mac email clients. "prvw" is the creator code for Apple's preview app.

26.0.93 How to create PDF for image files?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use DynaPDF like this:

Example:

```
Function CreatePrintPDF(jpgFiles() as folderitem, pdfFile as FolderItem, PageWidth as Integer, PageHeight as Integer) As Boolean
  // have files?
  If pdfFile = Nil Then Return False
  If jpgFiles = Nil Then Return False

  If jpgFiles.Ubound < 0 Then Return False

  // new DynaPDF
  Dim pdf As New MyDynapdfMBS

  // page width/height in MilliMeter
  Dim pdfWidth as Integer = PageWidth * 72 / 25.4
  Dim pdfHeight as Integer = PageHeight * 72 / 25.4

  // put your license here
  Call pdf.SetLicenseKey "Starter"

  // create pdf
  Call pdf.CreateNewPDF pdfFile
```

```

// set a couple of options
Call pdf.SetPageCoords(MyDynaPDFMBS.kpcTopDown)
Call pdf.SetResolution(300)
Call pdf.SetUseTransparency(False)
Call pdf.SetSaveNewImageFormat(False)
Call pdf.SetGStateFlags(MyDynaPDFMBS.kgfUseImageColorSpace, False)
Call pdf.SetJPEGQuality(100)

// set page size
Call pdf.SetBBox(MyDynaPDFMBS.kpbMediaBox, 0, 0, pdfWidth, pdfHeight)
Call pdf.SetPageWidth(pdfWidth)
Call pdf.SetPageHeight(pdfHeight)

// append pages with one image per page
For i as Integer = 0 To jpgFiles.Ubound
Call pdf.Append
Call pdf.InsertImageEx(0, 0, pdfWidth, pdfHeight, jpgFiles(i), 1)
Call pdf.EndPage
Next

// close
Call pdf.CloseFile

Return True
End Function

```

Notes: This is to join image files in paper size to a new PDF.
e.g. scans in A4 into an A4 PDF.

26.0.94 How to CURL Options translate to Plugin Calls?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Below a few tips on how to translate command line CURL calls to plugin calls.

Notes: `curl -vX PUT http://localhost:5984/appserials/78569238475/DocumentRegister.docx?rev=3-25634563456 -data-binary @DocumentRegister.docx -H "Content-Type: application/msword"`

- The option `-v` means verbose. You can use `OptionVerbose` and listen for messages in the `DebugMessage` event.
- The option `-X PUT` means we want to do a HTTP PUT Request. So set `OptionPut` to true. Also you will want to set `OptionUpload` to true as you upload data.
- We have the URL which you put into `OptionURL` property.

- The `-data-binary` option tells CURL to pass the given data. With the `@` before the data, it is interpreted as a file name, so the data is read from the given file. You'll need to open this file and pass data with the Read event as needed. (See CURLS ftp file upload example project)
- The last option `-H` specifies an additional header for the upload. Pass this additional header with the `SetOptionHTTPHeader` method.

```
curl -X PUT http://127.0.0.1:5984/appserials/f2f4e540bf8bb60f61cfd4328001c59 -d '{ "type": "Product", "description": "Application Serial", "acronym": "AppSerial", "dateAdded": "2011-03-21 14:57:36" } '
```

- Option `-X PUT` like above.
- Pass the URL again in `OptionURL`
- This time data is passed in command line for CURL. You'd put this data in the quotes into a string and make it available in the Read event. (See CURLS ftp upload example project)

26.0.95 How to delete file with ftp and curl plugin?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can set post/pre quotes to have ftp commands executed before or after the download/upload.

Example:

```
dim d as CURLMBS // your curl object
```

```
// delete file
```

```
dim ws() As String
```

```
ws.Append "DELE Temp.txt"
```

```
d.SetOptionPostQuote(ws)
```

Notes: Use `SetOptionPostQuote`, `SetOptionPreQuote` or `SetOptionQuote`.

The ftp commands you pass here are native ftp commands and not the commands you use with ftp applications. To delete use `DELE` and the file path.

26.0.96 How to detect display resolution changed?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: On Mac OS X simply listen for display changed notifications.

Notes: Use the "Distribution Notification Center.rbp" example project as a base and use it to listen to notifications with the name "O3DeviceChanged".

26.0.97 How to detect retina?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Please use Window.BackingScaleFactorMBS to query the factor.

Example:

```
msgbox str(window1.BackingScaleFactorMBS)
```

26.0.98 How to disable force quit?

Plugin Version: all, Platform: macOS.

Answer:

Please visit this website and get the control panel for Mac OS 9 there:

<http://www3.sk.sympatico.ca/tinyjohn/DFQ.html>

For Mac OS X use the MBS Plugin with the SetSystemUIModeMBS method.

Notes:

Please use presentationOptions in NSApplicationMBS for Cocoa applications.

26.0.99 How to disable the error dialogs from Internet Explorer on javascript errors?

Plugin Version: all, Platform: Windows.

Answer: You can use this code in the htmlviewer open event:

Example:

```
if targetwin32 then
htmlviewer1._ole.Content.value("Silent") = True
end if
```

Notes: This disables the error dialogs from Internet Explorer.

26.0.100 How to display a PDF file in Xojo?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: On Mac OS X you can use CoreGraphics or PDFKit to display a PDF.

Notes: An alternative can be to load the PDF into a htmlviewer so the PDF plugin can display it.

On Windows you may need to use the Acrobat ActiveX control from Adobe or launch Acrobat Reader.

26.0.101 How to do a lottery in RB?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Try this function:

Example:

```
Sub Lotto(max as Integer,count as Integer,z() as Integer)
// Lotto count numbers of max put into the array z beginning at index 0
dim n(0) as Integer ' all the numbers
dim m as Integer ' the highest field in the current array
dim i,a,b,d as Integer ' working variables

'fill the array with the numbers
m=max-1
redim n(m)

for i=0 to m
n(i)=i+1
next

' unsort them by exchanging random ones
m=max*10
for i=1 to m
a=rnd*max
b=rnd*max

d=n(a)
n(a)=n(b)
n(b)=d
next

' get the first count to the dest array
m=count-1
redim z(m)
for i=0 to m
z(i)=n(i)
next

'sort the result
z.sort
End Sub
```



```

b=true
x=x1
while (x<x2) and (y<y2)
  ox=x
  oy=y

  x=x+dx
  y=y+dy

  if b then
    g.DrawLine ox,oy,x,y
  end if

  b=not b
wend

```

End Sub

Notes: It would be possible to add this to the plugin, but I think it's better if you do it in plain Xojo code, so it even works on Windows.

26.0.104 How to draw a nice antialiased line?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

This code can help you although it's not perfect.
You need to set lc to the current color you use.

Example:

```

Sub drawLine(xs as Integer, ys as Integer, xe as Integer, ye as Integer, face as RGBSurface, lineColor as
color)
  dim intX, intY, count, n, xDiff, yDiff as Integer
  dim v, v1, floatX, floatY, xx, yy, xStep, yStep as Double
  dim c as color

  const st=1.0

  xDiff=xe-xs
  yDiff=ye-ys
  count=max(abs(xDiff), abs(yDiff))
  xStep=xDiff/count
  yStep=yDiff/count

```

```

xx=xs
yy=ys
for n=1 to count
intX=xx
intY=yy
floatX=xx-intX
floatY=yy-intY

v=(1-floatX)*(1-floatY)*st
v1=1-v
c=face.pixel(intX, intY)
face.pixel(intX, intY)=rgb(v*lineColor.red+v1*c.red, v*lineColor.green+v1*c.green, v*lineColor.blue+v1*c.blue)
v=floatX*(1-floatY)*st
v1=1-v
c=face.pixel(intX+1, intY)
face.pixel(intX+1, intY)=rgb(v*lineColor.red+v1*c.red, v*lineColor.green+v1*c.green, v*lineColor.blue+v1*c.blue)
v=(1-floatX)*floatY*st
v1=1-v
c=face.pixel(intX, intY+1)
face.pixel(intX, intY+1)=rgb(v*lineColor.red+v1*c.red, v*lineColor.green+v1*c.green, v*lineColor.blue+v1*c.blue)
v=floatX*floatY*st
v1=1-v
c=face.pixel(intX+1, intY+1)
face.pixel(intX+1, intY+1)=rgb(v*lineColor.red+v1*c.red, v*lineColor.green+v1*c.green, v*lineColor.blue+v1*c.blue)

xx=xx+xStep
yy=yy+yStep
next

End Sub

```

Notes:

PS: st should be 1 and face should be a RGBSurface or a Graphics object.

26.0.105 How to dump java class interface?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: In terminal you can use "javap -s <classname>" to display the class with the method names and parameters.

Notes: For example show ResultSet class: javap -s java.sql.ResultSet

26.0.106 How to duplicate a picture with mask or alpha channel?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use code like this function:

Example:

```
Function Duplicate(extends p as Picture) As Picture
#if RBVersion >= 2011.04 then
if p.HasAlphaChannel then

// create nw picture and copy content:
dim q as new Picture(p.Width, p.Height)
q.Graphics.DrawPicture p,0,0

Return q

end if
#endif

// create new picture
dim q as new Picture(p.Width, p.Height, 32)

// get mask
dim oldMask as Picture = p.mask(false)
if oldMask = nil then
// no mask, so simple copy
q.Graphics.DrawPicture p,0,0
Return q
end if

// remove mask
p.mask = nil

// copy picture and mask
q.Graphics.DrawPicture p, 0, 0
q.mask.Graphics.DrawPicture oldMask,0,0

// restore mask
p.mask = oldmask

Return q
End Function
```

Notes: Simply copy it to a module and call it like this: `q = p.duplicate`.

The code above works with old Xojo versions because of the `#if` even if your RS version does not support alpha channel pictures. This way it's future proof.

26.0.107 How to enable assistive devices?

Plugin Version: all, Platform: macOS.

Answer: You can use AppleScript code like below:

Notes: tell application "System Events"
activate

```
set UI elements enabled to true
```

```
return UI elements enabled
end tell
```

You can run this with AppleScriptMBS class.

26.0.108 How to encrypt a file with Blowfish?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use code like this:

Example:

```
dim fi as FolderItem = SpecialFolder.Desktop.Child("test.xojo_binary_project")
dim fo as FolderItem = SpecialFolder.Desktop.Child("test.encrypted")
```

```
// read input
```

```
dim bi as BinaryStream = BinaryStream.Open(fi)
```

```
dim si as string = bi.Read(bi.Length)
```

```
bi.Close
```

```
// encrypt
```

```
dim so as string = BlowfishMBS.Encrypt("MyKey",si)
```

```
// write output
```

```
dim bo as BinaryStream = BinaryStream.Create(fo)
```

```
bo.Write so
```

```
bo.Close
```

Notes: Of course you can decrypt same way, just use Decrypt function and of course swap files.

26.0.109 How to extract text from HTML?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use both RemoveHTMLTagsMBS and DecodingFromHTMLMBS like this:

Example:

```
dim html as string = "<p><B>Gr&uuml;&szlig;e</B></P>"
dim htmltext as string = RemoveHTMLTagsMBS(html)
dim text as string = DecodingFromHTMLMBS(htmltext)
```

MsgBox text // shows: Gr√üë

Notes: You can use it together with RemoveHTMLTagsMBS to remove html tags. What you get will be the text without tags.

DecodingFromHTMLMBS turns HTML escapes back to unicode characters. Like ä to √.

26.0.110 How to find empty folders in a folder?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Try this code:

Example:

```
dim folder as folderitem // your folder

dim c as Integer = folder.count
for i as Integer = 1 to c
dim item as folderitem = folder.trueitem(i)
if item = nil then
// ignore
elseif item.directory then
// folder
if item.count = 0 then
// found empty folder
end if
end if
next
```

26.0.111 How to find iTunes on a Mac OS X machine fast?

Plugin Version: all, Platform: macOS.

Answer: You can try Launch Services.

Example:

```
dim f as FolderItem

f=LaunchServicesFindApplicationForInfoMBS("hook","com.apple.iTunes","iTunes.app")

MsgBox f.NativePath
```

26.0.112 How to find network interface for a socket by it's name?

Plugin Version: all, Platform: macOS.

Answer: You can use our plugin to build a lookup table.

Example:

```
Function FindNetworkInterface(name as string) As NetworkInterface
name = name.trim

if name.len = 0 then Return nil

// search by IP/MAC
dim u as Integer = System.NetworkInterfaceCount-1
for i as Integer = 0 to u
dim n as NetworkInterface = System.GetNetworkInterface(i)
if n.IPAddress = name or n.MACAddress = name then
Return n
end if
next

// use MBS Plugin to build a mapping
dim interfaces() as NetworkInterfaceMBS = NetworkInterfaceMBS.AllInterfaces
dim map as new Dictionary

for each n as NetworkInterfaceMBS in interfaces
dim IPv4s() as string = n.IPv4s
dim IPv6s() as string = n.IPv6s

for each IPv4 as string in IPv4s
map.Value(IPv4) = n.Name
next
for each IPv6 as string in IPv6s
map.Value(IPv6) = n.Name
next
if n.MAC<>>" then
map.Value(n.MAC) = n.Name
```

```

end if
next

// now search interfaces by name, IPv4 or IPv6
for i as Integer = 0 to u
dim n as NetworkInterface = System.GetNetworkInterface(i)
if map.Lookup(n.IPAddress, "") = name then
Return n
end if

if map.Lookup(n.MACAddress, "") = name then
Return n
end if
next

End Function

```

Notes: The code above uses a lookup table build using NetworkInterfaceMBS class to find the network interface by name.

26.0.113 How to find version of Microsoft Word?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use code like this:

Example:

```

// find Word
dim f as FolderItem = LaunchServicesFindApplicationForInfoMBS("", "com.microsoft.Word", "")

// open bundle
dim c as new NSBundleMBS(f)

// read info
dim d as Dictionary = c.infoDictionary

// show version
MsgBox d.Lookup("CFBundleVersion", "")

```

Notes: Older versions of Word can be found with creator code "MSWD".

26.0.114 How to fix CURL error 60/53 on connecting to server?

Plugin Version: all, Platform: macOS.

Answer: You probably connect with SSL and you have no valid certificate.

Example:

```
dim d as new CURLSMBS

// Disable SSL verification
d.OptionSSLVerifyHost = 0 // don't verify server
d.OptionSSLVerifyPeer = 0 // don't proofs certificate is authentic

// With SSL Verification:
dim cacert as FolderItem = Getfolderitem("cacert.pem")
d.OptionCAInfo = cacert.NativePath
d.OptionSSLVerifyHost = 2 // verify server
d.OptionSSLVerifyPeer = 1 // proofs certificate is authentic
```

Notes: You can either use the code above to disable the SSL verification and have no security. Or you use the cacert file and enable the verification. Than you only get a connection if the server has a valid certificate.

see also:

<http://curl.haxx.se/ca/>

26.0.115 How to format double with n digits?

Plugin Version: all, Platform: macOS.

Answer: You can use the FormatMBS function for this.

Example:

```
dim d as Double = 123.4567890
listbox1.AddRow FormatMBS("%f", d)
listbox1.AddRow FormatMBS("%e", d)
listbox1.AddRow FormatMBS("%g", d)

listbox1.AddRow FormatMBS("%5.5f", d)
listbox1.AddRow FormatMBS("%5.5e", d)
listbox1.AddRow FormatMBS("%5.5g", d)

d = 0.000000123456
listbox1.AddRow FormatMBS("%f", d)
listbox1.AddRow FormatMBS("%e", d)
```

```
listbox1.AddRow FormatMBS("%g", d)

listbox1.AddRow FormatMBS("%5.5f", d)
listbox1.AddRow FormatMBS("%5.5e", d)
listbox1.AddRow FormatMBS("%5.5g", d)
```

Notes: see FormatMBS for details.

In general %f is normal style, %e is scientific and %g is whichever gives best result for given space.

26.0.116 How to get a time converted to user time zone in a web app?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use the WebSession.GMTOffset property.

Example:

```
Sub Open()
// current date on server
dim d as new date
dim s as string = d.LongTime

// adjust to client GMT offset
d.GMTOffset = d.GMTOffset + Session.GMTOffset

dim t as string = D.LongTime

MsgBox s+EndOfLine+t
End Sub
```

26.0.117 How to get an handle to the frontmost window on Windows?

Plugin Version: all, Platform: Windows.

Answer: This function returns a handle for the frontmost window:

Example:

```
Function GetForegroundWindowHandle() as Integer
#if targetwin32 then
declare function GetForegroundWindow Lib "user32.dll" as Integer
Return GetForegroundWindow()
#endif
End Function
```

26.0.118 How to get CFAbsoluteTime from date?

Plugin Version: all, Platforms: macOS, Windows.

Answer: Use code like this:

Example:

```
dim d as new date
dim t as CFTimeZoneMBS = SystemCFTimeZoneMBS
dim g as new CFGregorianCalendarMBS
g.Day = d.Day
g.Month = d.Month
g.Year = d.Year
g.Minute = d.Minute
g.Hour = d.Hour
g.Second = d.Second

dim at as CFAbsoluteTimeMBS = g.AbsoluteTime(t)
dim x as Double = at.Value
```

```
MsgBox str(x)
```

Notes: As you see we need a timezone and put the date values in a gregorian date record. Now we can query absolute time for the given timezone.

26.0.119 How to get client IP address on web app?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use the WebSession.RemoteAddress property.

Example:

```
Sub Open()
Title = Session.RemoteAddress
End Sub
```

26.0.120 How to get fonts to load in charts on Linux?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Please use the SetFontSearchPath method in the CDBaseChartMBS class to specify where your fonts are.

Example:

```

if TargetLinux then
CDBaseChartMBS.SetFontSearchPath "/usr/share/fonts/truetype;/usr/share/fonts/truetype/msttcorefonts"
else
// on Mac and Windows we use system fonts.
end if

// also you can later switch default fonts:

dim Chart as CDBaseChartMBS // your chart

#If TargetARM And TargetLinux Then
// use specific fonts on Linux on Raspberry Pi
Call Chart.setDefaultFonts("/usr/share/fonts/truetype/piboto/PibotoLt-Regular.ttf", "/usr/share/fonts/truetype/piboto/Pi
#EndIf

```

Notes: On macOS, iOS and Windows, the fonts are loaded from the system's font folder.

e.g. if you use ubuntu, you can install the ttf-mscorefonts-installer package and call this method with "/usr/share/fonts/truetype/msttcorefonts" as the path. No backslash on the end of a path, please.

26.0.121 How to get fonts to load in DynaPDF on Linux?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Please use the AddFontSearchPath method in the DynaPDFMBS class to specify where your fonts are.

Example:

```

dim d as new DynaPDFMBS
if TargetLinux then
call d.AddFontSearchPath "/usr/share/fonts/truetype", true
else
// on Mac and Windows we use system fonts.
end if

```

Notes: On Mac OS X and Windows, the fonts are loaded from the system's font folder.

e.g. if you use ubuntu, you can install the ttf-mscorefonts-installer package and call this method with "/usr/share/fonts/truetype/msttcorefonts" as the path. No backslash on the end of a path, please.

26.0.122 How to get GMT time and back?

Plugin Version: all, Platform: macOS.

Answer: You can use the date class and the GMTOffset property.

Example:

```
// now
dim d as new date

// now in GMT
dim e as new date
e.GMTOffset = 0

// show
MsgBox str(d.TotalSeconds,"0.0")+ " " +str(e.TotalSeconds, "0.0")

dim GMTTimeStamp as Double = e.TotalSeconds

// restore
dim f as new date

// add GMT offset here
f.TotalSeconds = GMTTimeStamp + f.GMTOffset*3600
// because here it's removed
f.GMTOffset = f.GMTOffset

MsgBox d.ShortTime+" (" +str(d.GMTOffset)+") " +str(d.TotalSeconds,"0.0")+EndOfLine+_
e.ShortTime+" (" +str(e.GMTOffset)+") " +str(e.TotalSeconds,"0.0")+EndOfLine+_
f.ShortTime+" (" +str(f.GMTOffset)+") " +str(f.TotalSeconds,"0.0")
```

Notes: It's sometimes a bit tricky with the date class as setting one property often changes the others.

26.0.123 How to get good crash reports?

Plugin Versions: all, Platforms: macOS, Linux, Windows.

Answer: Check this website from the webkit website:

Notes: <http://webkit.org/quality/crashlogs.html>

26.0.124 How to get list of all threads?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use the runtime module like in this function:

Example:

```
Function Threads() As Thread()
#pragma DisableBackgroundTasks
dim t() as Thread

Dim o as Runtime.ObjectIterator=Runtime.IterateObjects
While o.MoveNext
if o.Current isa Thread then
t.Append thread(o.current)
end if
Wend

Return t
End Function
```

Notes: This returns an array of all thread objects currently in memory.

The pragma is important here as it avoids thread switches which may cause a thread to be created or deleted.

26.0.125 How to get parameters from webpage URL in Xojo Web Edition?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use the Webpage.ParametersReceived event.

Example:

```
Sub ParametersReceived(Variables As Dictionary)
for each key as Variant in Variables.keys
MsgBox key+" ->" +Variables.Value(key)
next
End Sub
```

Notes: The text encodings of this strings is not defined in Xojo 2010r5. Please use DefineEncoding.

26.0.126 How to get the color for disabled textcolor?

Plugin Version: all, Platform: macOS.

Answer: Ask the appearance manager:

Example:

```
Function GetThemeTextColor(inColor as Integer, inDepth as Integer, inColorDev as Boolean) As Color
declare function GetThemeTextColor lib "Carbon" (inColor as Integer, inDepth as Integer, inColorDev as
Boolean, outColor as Ptr) as Integer
```

```
dim i as Integer
```

```
dim col as MemoryBlock
```

```
col = newMemoryBlock(6)
```

```
i = GetThemeTextColor(inColor, inDepth, inColorDev, col)
```

```
return RGB(col.UShort(0)\256, col.UShort(2)\256, col.UShort(4)\256)
```

```
End Function
```

Notes: The color for this is:

```
const kThemeTextColorDialogInactive = 2.
```

```
c = GetThemeTextColor(kThemeTextColorDialogInactive, Screen(0).Depth, true)
```

For Mac OS X you should use "CarbonLib" instead of "AppearanceLib" ...

26.0.127 How to get the current free stack space?

Plugin Version: all, Platform: macOS.

Answer: You can something like the code below:

Example:

```
Sub ShowStackSize()
```

```
dim threadid as Integer
```

```
dim size as Integer
```

```
declare function GetCurrentThread lib "Carbon" (byref threadid as Integer) as short
```

```
declare function ThreadCurrentStackSize lib "Carbon" (threadid as Integer, byref size as Integer) as short
```

```
if GetCurrentThread(threadid)=0 then
```

```
if 0=ThreadCurrentStackSize(threadid,size) then
```

```
MsgBox str(size)
```

```
end if
```

```
end if
```

End Sub

Notes: For Mac OS 9, use "ThreadLib" instead of "CarbonLib". You can use #if if you like for that.

26.0.128 How to get the current timezone?

Plugin Version: all, Platforms: macOS, Windows.

Answer:

You can use the TimeZoneMBS class or the CFTimeZoneMBS class.
Or code like below:

Example:

```
Function GMTOffsetInMinutes() as Integer
// Returns the offset of the current time to GMT in minutes.
// supports Mac OS and Windows, but not Linux yet (let me know if
// you have code for that, please)
//
// Note that the offset is not always an even multiple of 60, but
// there are also half hour offsets, even one 5:45h offset

// This version by Thomas Tempelmann (rb@tempel.org) on 25 Nov 2005
// with a fix that should also make it work with future Intel Mac targets.
//
// Using code from various authors found on the RB NUG mailing list

dim result, bias, dayLightbias as Integer
dim info as memoryBlock
dim offset as Integer

#if targetMacOS then

Declare Sub ReadLocation lib "Carbon" (location As ptr)

info = NewMemoryBlock(12)
ReadLocation info
if false then
// bad, because it does not work on Intel Macs:
'offset = info.short(9) * 256 + info.byte(11)
else
offset = BitwiseAnd (info.long(8), &hFFFFFF)
end

offset = info.short(9) * 256 + info.byte(11)
```

```

offset = offset \60
return offset

#endif

#if targetWin32 then

Declare Function GetTimeZoneInformation Lib "Kernel32" ( tzInfoPointer as Ptr ) as Integer
// returns one of
// TIME_ZONE_ID_UNKNOWN 0
// - Note: e.g. New Delhi (GMT+5:30) and Newfoundland (-3:30) return this value 0
// TIME_ZONE_ID_STANDARD 1
// TIME_ZONE_ID_DAYLIGHT 2

info = new MemoryBlock(172)
result = GetTimeZoneInformation(info)

bias = info.Long(0)
// note: the original code I found in the NUG archives used Long(84) and switched to Long(0)
// only for result=1 and result=2, but my tests found that Long(0) is also the right value for result=0

if result = 2 then
daylightBias = info.long(168)
end if
offset = - (bias + dayLightbias)
return offset

#endif

End Function

```

26.0.129 How to get the current window title?

Plugin Version: all, Platform: macOS.

Answer: The code below returns the current window title for the frontmost window on Mac OS X if Accessibility services are

Example:

```

Function CurrentWindowTitle() As string
// your application needs permissions for accessibility to make this work!

dim SystemWideElement,FocusedApplicationElement,FocusedWindowElement as AXUIElementMBS
dim FocusedApplication,FocusedWindow,Title as AXValueMBS
dim s as String
dim cs as CFStringMBS

```

```

SystemWideElement=AccessibilityMBS.SystemWideAXUIElement
if SystemWideElement<>nil then
FocusedApplication=SystemWideElement.AttributeValue(AccessibilityMBS.kAXFocusedApplicationAttribute)
if FocusedApplication.Type=AccessibilityMBS.kAXUIElementMBSTypeID then
FocusedApplicationElement=new AXUIElementMBS
FocusedApplicationElement.Handle=FocusedApplication.Handle
FocusedApplicationElement.RetainObject

FocusedWindow=FocusedApplicationElement.AttributeValue(AccessibilityMBS.kAXFocusedWindowAttribute)

if FocusedWindow<>nil and AccessibilityMBS.kAXUIElementMBSTypeID=FocusedWindow.Type then

FocusedWindowElement=new AXUIElementMBS
FocusedWindowElement.Handle=FocusedWindow.Handle
FocusedWindowElement.RetainObject

Title=FocusedWindowElement.AttributeValue(AccessibilityMBS.kAXTitleAttribute)
if Title<>nil and Title.Type=kCFStringMBSTypeID then
cs=new CFStringMBS
cs.handle=Title.Handle
cs.RetainObject
Return cs.str
end if
end if
end if
end if
End Function

```

26.0.130 How to get the cursor blink interval time?

Plugin Version: all, Platform: macOS.

Answer: On Mac OS you can use GetCaretTime from the toolbox.

Example:

```
declare function GetCaretTime lib "Carbon" () as Integer
```

```
MsgBox str(GetCaretTime()+ " ticks")
```

Notes: 60 ticks make one second.

26.0.131 How to get the list of the current selected files in the Finder?

Plugin Version: all, Platform: macOS.

Answer:

Use the AppleScript like this one:

```
tell application "finder"
return selection
end tell
```

Which translates into this AppleEvent:

```
Process("Finder").SendAE "core,getd,'—':obj { form:prop, want:type(prop), seld:type(sele), from:'null'() }
"
```

and as Xojo code it looks like this:

Example:

```
dim ae as appleEvent
dim o1 as appleEventObjectSpecifier
dim f as folderItem
dim alist as appleEventDescList
dim i as Integer
dim dateiname as string

// setup the AppleEvent
o1=getpropertyObjectDescriptor( nil, "sele")
ae= newappleEvent("core", "getd", "MACS")
ae.objectSpecifierParam("—")=o1

// send it
if ae.send then
// got the list
alist=ae.replyDescList

// now show the list of filename into an editfield:

for i=1 to alist.count
f=alist.folderItem(i)

dateiname=f.name
// editfield1 with property "multiline=true"!
editfield1.text=editfield1.text + dateiname + chr(13)
next
```

end if

26.0.132 How to get the Mac OS system version?

Plugin Version: all, Platform: macOS.

Answer: The following code queries the value and displays the version number:

Example:

```

dim first as Integer
dim second as Integer
dim third as Integer
dim l as Integer

if System.Gestalt("sysv",l) then

Third=Bitwiseand(l,15)
second=Bitwiseand(l\16,15)
first=Bitwiseand(l\256,15)+10*Bitwiseand(l\256\16,15)
end if

if First>=10 then
msgbox "Mac OS X "+str(First)+" "+str(Second)+" "+str(third)
else
msgbox "Mac OS "+str(First)+" "+str(Second)+" "+str(third)
end if

```

26.0.133 How to get the Mac OS Version using System.Gestalt?

Plugin Version: all, Platform: macOS.

Answer: Try this code:

Example:

```

Dim s As String
Dim b As Boolean
Dim i, resp as Integer

// Systemversion
b = System.Gestalt("sysv", resp)
If b then
s = Hex(resp)

```

```

For i =Len(s)-1 DownTo 1
s=Left(s,i)+””+Mid(s,i+1)
Next
MsgBox ”Systemversion: Mac OS ” + s
end if

```

Notes: The MBS Plugin has a SystemInformationMBS.OSVersionString function for this.

26.0.134 How to get the screensize excluding the task bar?

Plugin Version: all, Platform: Windows.

Answer: Try this code:

Notes: Use the Screen class with the available* properties.

26.0.135 How to get the size of the frontmost window on Windows?

Plugin Version: all, Platform: Windows.

Answer: Try this code:

Notes: Make yourself a class for the WindowRect with four properties:

```

Bottom as Integer
Left as Integer
Right as Integer
Top as Integer

```

Add the following method to your class:

```

Sub GetWindowRect(windowhandle as Integer)
dim err as Integer
dim mem as memoryBlock
#if targetwin32 then
Declare Function GetWindowRect Lib ”user32.dll” (hwnd as Integer, ipRect As Ptr) as Integer

mem = newmemoryBlock(16)
err = GetWindowRect(windowhandle, mem)
Left = mem.long(0)
Top = mem.Long(4)
Right = mem.Long(8)
Bottom = mem.Long(12)

```

```
#endif  
End Sub
```

Good to use for the MDI Master Window!

26.0.136 How to get the source code of a HTMLViewer?

Plugin Version: all, Platform: macOS.

Answer: Try this code:

Example:

```
// for Windows:
```

```
msgbox HTMLViewer1.IEHTMLTextMBS
```

```
// for MacOS with WebKit 2.x:
```

```
msgbox HTMLViewer1.WKWebViewMBS.HTMLText
```

26.0.137 How to get Xojo apps running Linux?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You need to install some require packages.

Notes: You need CUPS as well as GTK packages. On 64 bit systems also the ia32-libs package.

Please note that you need a x86 compatible Linux. So no PPC, Power, ARM or other CPUs.

26.0.138 How to handle really huge images with GraphicsMagick or ImageMagick?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Sometimes it may be better to use an extra application to process images.

Notes: A typical 32 bit app made with Xojo can use around 1.8 GB on Windows and 3 GB on Mac OS X. Some images may be huge, so that processing them causes several copies of the image to be in memory. With a 500 MB image in memory, doing a scale or rotation may require a temp image. So with source, temp and dest images with each 500 MB plus your normal app memory usage, you may hit the limit of Windows with 1.8 GB.

In that case it may be worth running a tool like gm in the shell class. gm is the command line version of GraphicsMagick. There you can run the 64 bit version which is not limited in memory like your own application. Also you can monitor progress and keep your app responsive.

26.0.139 How to handle tab key for editable cells in listbox?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use code like this function:

Example:

```
Function HandleTabInList(list as listbox, row as Integer, column as Integer, key as String) As Boolean
// Handle tab character in Listbox.CellKeyDown event
```

```
Select case asc(key)
case 9
if Keyboard.AsyncShiftKey then
// back

// look for column left
for i as Integer = column-1 downto 0
if list.ColumnType(i) >= list.TypeEditable then
list.EditCell(row, i)
Return true
end if
next

// not found, so look in row before
row = row - 1
if row >= 0 then
for i as Integer = list.ColumnCount-1 downto 0
if list.ColumnType(i) >= list.TypeEditable then
list.EditCell(row, i)
Return true
end if
next
end if
else
// forward

// look for column right
for i as Integer = column+1 to list.ColumnCount-1
if list.ColumnType(i) >= list.TypeEditable then
list.EditCell(row, i)
Return true
end if
next
```

```

// not found, so look in row below
row = row + 1
if row <list.ListCount then
for i as Integer = 0 to list.ColumnCount-1
if list.ColumnType(i) >= list.TypeEditable then
list.EditCell(row, i)
Return true
end if
next
end if
end if
end Select
End Function

```

Notes: You call it from CellKeyDown event like this:

```

EventHandler Function CellKeyDown(row as Integer, column as Integer, key as String) As Boolean
if HandleTabInList(me, row, column, key) then Return true
End EventHandler

```

As you see in the code, we handle tab and shift + tab for moving back and forward. Also we wrap to previous/next row if needed. Feel free to extend this to wrap from last to first row or create a new row for editing.

26.0.140 How to hard link MapKit framework?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Our MapKit classes weak link the framework. If you need hard linking it for the App Store, you can add this method to a class:

Example:

```

Sub ReferenceMapKit()
// just put this in window or app class

#if TargetMachO and Target64Bit then
Declare sub testing Lib "MapKit" Selector "test" (id as ptr)
testing(nil)
#endif

End Sub

```

Notes: No need to call the method.

Just having it in a window or app, will cause the compiler to hard link the framework.

26.0.141 How to have a PDF downloaded to the user in a web application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use a WebHTMLViewer control and load the PDF file with the PDF plugin from the browser.

Example:

```
dim CurrentFile as WebFile // a property of the WebPage

// define the PDF file
CurrentFile = new WebFile
CurrentFile.Filename = "test.pdf"
CurrentFile.MIMEType = "application/pdf"
CurrentFile.Data = "some pdf data" // MyDynaPDF.GetBuffer
CurrentFile.ForceDownload = true

// start the download
showurl(CurrentFile.url)
```

Notes: See our Create PDF example for the Xojo Web Edition.

26.0.142 How to hide all applications except mine?

Platform: macOS.

Answer: The code below will on Mac OS hide all applications except your one:

Example:

```
dim p as new ProcessMBS

p.GetFirstProcess
do
if not p.FrontProcess then
p.Visible=false
end if
loop until not p.GetNextProcess
```

26.0.143 How to hide script errors in HTMLViewer on Windows?

Plugin Version: all, Platform: Windows.

Answer: Set Internet Explorer to silent mode with code like this:

Example:

```
htmlviewer1._ole.Content.value("Silent") = True
```

Notes: Simply put this code in the open event of your htmlviewer control (using me instead of htmlviewer1).

26.0.144 How to hide the grid/background/border in ChartDirector?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: If you want to hide something in a chart, simply assign the kTransparent constant as color.

26.0.145 How to hide the mouse cursor on Mac?

Plugin Version: all, Platform: macOS.

Answer: Try this declare:

Example:

```
Declare Sub HideCursor Lib "Carbon" () Inline68K("A852")
```

```
HideCursor
```

Notes: The MBS Plugin has this function and supports it on Windows, too.

26.0.146 How to insert image to NSTextView or TextArea?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: With NSTextViewMBS you can use this code to insert file:

Example:

```
// insert a file to textview
```

```
Public Sub InsertFile(textview as NSTextViewMBS, f as FolderItem)
```

```
// read to file
```

```

dim b as BinaryStream = BinaryStream.Open(f)
dim s as string = b.Read(b.Length)

// build wrapper
dim fileWrapper as NSFileWrapperMBS = NSFileWrapperMBS.initRegularFileWithContents(s)
fileWrapper.preferredFilename = f.name

// make attachment
dim fileAttachment as new NSTextAttachmentMBS(fileWrapper)
dim attributedString as NSAttributedStringMBS = NSAttributedStringMBS.attributedStringWithAttachment(fileAttachment)

// add to a NSTextViewMBS
textview.insertText attributedString

End Sub

```

Notes: For TextArea you can query the underlying NSTextViewMBS object via TextArea.NSTextViewMBS method.

26.0.147 How to jump to an anchor in a htmlviewer?

Plugin Version: all, Platforms: macOS, Windows.

Answer: You can use javascript to change the current window's location.

Example:

```

// load website
htmlviewer1.LoadURL "http://www.monkeybreadsoftware.net/addressbook-abpersonmbs.shtml"

// later jump to anchor named "16":

if TargetWin32 then
call HTMLViewer1.IERunJavaScriptMBS "window.location = ""#16""
end if

```

26.0.148 How to keep a movieplayer unclickable?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: To keep the user away from clicking on a playing Movie you can just drop a Canvas in front of the Movieplayer and take the clicks there.

Example:

```
Function Canvas1.MouseDown(X as Integer, Y as Integer) as boolean
return true // take it and do nothing
End Function
```

26.0.149 How to keep my web app from using 100% CPU time?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: On Linux and MacOS you can use renice command in the terminal. On Windows use the task manager to reduce priority.

Notes: If you launch your app with nohup on Linux or Mac OS X like this from the terminal or a script:

```
nohup /webapps/MyApp/MyApp &
```

you can simply have a second line saying this:

```
renice 20 $ !
```

which tells the system to lower priority to lowest value for the latest background process.

26.0.150 How to kill a process by name?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can kill a process (or application) by name if you loop over all the processes and kill the one you need.

Example:

```
dim p as new ProcessMBS
p.GetfirstProcess ' get first
do
if p.name = "TextEdit" then
call p.KillProcess
Return
end if
loop until not p.GetNextProcess
```

Notes: You may want to check the result of killProcess function. Not every user is allowed to kill every application.

26.0.151 How to know how many CPUs are present?

Plugin Version: all, Platform: macOS.

Answer: Try this function:

Example:

```
Function GetCPUCount() as Integer
Declare Function MPPProcessors Lib "Carbon" () as Integer
```

```
Return MPPProcessors()
End Function
```

Notes: Your app will than need that library to launch on Classic. To avoid this the MBS plugin checks if this library is available and return 1 if it's not available.

26.0.152 How to know the calling function?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: On Mac you can use a helper function like this this code:

Example:

```
Public Function CallingFunction() as string
// Query name of calling function of a function
```

```
#Pragma BreakOnExceptions false
```

```
try
```

```
// raise a dummy exception
dim r as new NilObjectException
raise r
```

```
catch x as NilObjectException
```

```
// get stack
dim stack() as string = x.Stack
```

```
// pick function name and return
dim name as string = stack(2)
Return name
```

```
end try
End Function
```

Notes: You need to include function names in your application.

26.0.153 How to launch an app using it's creator code?

Plugin Version: all, Platform: macOS.

Answer: Send an AppleEvent "oapp" with the creator code to the Finder ("MACS"):

Example:

```
Dim a as AppleEvent
dim creator as string

creator = "MSIE" ' here the Internet Explorer

a = NewAppleEvent("aevt", "odoc", "MACS")
a.Timeout = -1

a.ObjectSpecifierParam("—") = GetUniqueIDObjectDescriptor("appf", nil, creator)

if not a.send then
msgBox "An error has occured"
else

end if
```

26.0.154 How to launch disc utility?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use this code:

Example:

```
dim f as FolderItem = LaunchServicesFindApplicationForInfoMBS("", "com.apple.DiskUtility", "")

if f<>Nil then
f.Launch
end if
```

Notes: This works even if people renamed the disc utility or moved it to another folder.

26.0.155 How to make a lot of changes to a REAL SQL Database faster?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You may try to embed your changes to the database between two transaction calls.

Example:

```
dim db as Database // some database

db.SQLExecute "BEGIN TRANSACTION"
// Do some Stuff
db.SQLExecute "END TRANSACTION"
```

Notes: This can increase speed by some factors.

26.0.156 How to make a NSImage object for my retina enabled app?

Plugin Version: all, Platform: macOS.

Answer: You can use code like this:

Example:

```
Function NewRetinaImage(pic as Picture, mask as Picture = nil) As NSImageMBS
// first make a NSImageMBS from it
dim n as new NSImageMBS(pic, mask)

// now set to half the size, so we have 2x pixels for the image
n.size = new NSSizeMBS(n.width/2, n.height/2)

// and return
Return n
End Function
```

Notes: The thing to do is to have 2x the pixels, but assign a size to the image which gives it the right size in points.

You can pass the NSImageMBS from here to NSMenuItemMBS. For Retina displays, the full resolution is used. For others it will be reduced.

26.0.157 How to make a window borderless on Windows?

Plugin Version: all, Platform: Windows.

Answer: Try this declares:

Example:

```
// Sets window to borderless popup type, and sets its initial dimensions.
// Call this method, then Win32SetBorderlessPos, and then RB's Show
// method. Use RB Frame type 7 (Global Floating Window).

Const SWP_NOMOVE = &H2
Const SWP_FRAMECHANGED = &H20
Const HWND_TOPMOST = -1
Const GWL_STYLE = -16
Const WS_POPUPWINDOW = &H8080000

Dim styleFlags as Integer

#If TargetWin32 Then

Declare Function SetWindowLong Lib "user32" Alias "SetWindowLongA" (hwnd as Integer, nIndex as Integer, dwNewLong as Integer) as Integer
Declare Function SetWindowPos Lib "user32" (hwnd as Integer, hWndInstertAfter as Integer, x as Integer, y as Integer, cx as Integer, cy as Integer, flags as Integer) as Integer

styleFlags = SetWindowLong( w.WinHWND, GWL_STYLE, WS_POPUPWINDOW )
styleFlags = BitwiseOr( SWP_FRAMECHANGED, SWP_NOMOVE )
styleFlags = SetWindowPos( w.WinHWND, HWND_TOPMOST, 0, 0, wd, ht, styleFlags )

#EndIf
```

26.0.158 How to make an alias using AppleEvents?

Plugin Version: all, Platform: macOS.

Answer: Try this code:

Example:

```
Sub MakeAlias(folder as folderitem, target as folderitem, aliasname as string)
dim ev as AppleEvent
dim myResult as boolean
dim properties as AppleEventRecord

ev = NewAppleEvent("core", "crel", "MACS")
ev.MacTypeParam("kocl") = "alis"
ev.FolderItemParam("to ") = target
ev.FolderItemParam("insh") = folder

properties=new AppleEventRecord
```

```

properties.StringParam("pnam")=aliasname

ev.RecordParam("prdt")=properties

myResult = ev.send
// true on success, false on error
End Sub

```

Notes: Call it like this:

```
MakeAlias SpecialFolder.Desktop, SpecialFolder.Desktop.Child("Gif Copy.rb"), "test.rb alias"
```

Seems to not work on Mac OS X 10.6

26.0.159 How to make AppleScripts much faster?

Plugin Version: all, Platform: macOS.

Answer: use "ignoring application responses" like in this example:

```

Notes: on run { fn,fpx,fpy }
ignoring application responses
tell app "Finder" to set the position of folder fn to fpx,fpy
end ignoring
end run

```

26.0.160 How to make double clicks on a canvas?

Plugin Version: all, Platform: macOS.

Answer:

Update: Newer Xojo versions support DoubleClick event, so you don't need this code.

Here's my tip from the tips list on how to add a double-click event to the Canvas control. The technique could easily be used for a window or any Rectcontrol:

Because of its built-in drawing methods, the Canvas control is often used to create custom interface controls. But while the Canvas control has event handlers for most mouse events, it doesn't have an event handler for DoubleClick events. Fortunately, you can add a double-click event handler to a Canvas control easily. Basically, you're going to create a new class based on Canvas and add a double-click event to that. You can then use the new class anytime you need a Canvas with a double-click event.

To create a new Canvas class with a DoubleClick event handler, do this:

1. Add a new class to your project.
2. Set the Super property of the new class to "Canvas".
3. Change the name of this new class to "DoubleClickCanvas".

A double-click occurs when two clicks occur within the users double-click time (set in the Mouse control panel on both Macintosh and Windows) and within five pixels of each other. So, you'll need a few properties to store when and where the last click occurred.

4. Add a new property with the following declaration and mark it as private: lastClickTicks as Integer
5. Add a new property with the following declaration and mark it as private: lastClickX as Integer
6. Add a new property with the following declaration and mark it as private: lastClickY as Integer

Since the Canvas control doesn't have a DoubleClick event, you will need to add one.

7. Add a new event to your class by choosing New Event from the Edit menu and enter "DoubleClick" as the event name.

Double-clicks occur on MouseUp. In order for the mouseUp event to fire, you must return True in the MouseDown event.

8. In the MouseDown event, add the following code:
Return True

In the MouseUp event, you will need to determine what the users double-click time is. This value is represented on both the Mac and Windows in ticks. A tick is 1/60th of a second. Since there isn't a built-in function for this, you'll need to make a toolbox call. The mouseUp event code below makes the appropriate toolbox call for both Macintosh and Windows. It then compares the time of the users last click to the time of the current click and compares the location of the users last click to the location of the current click.

9. Add the following code to the MouseUp event:

```
dim doubleClickTime, currentClickTicks as Integer

#if targetMacOS then
Declare Function GetDbtTime Lib "Carbon" () as Integer
doubleClickTime = GetDbtTime()
#endif

#if targetWin32 then
Declare Function GetDoubleClickTime Lib "User32.DLL" () as Integer
```

```

doubleClickTime = GetDoubleClickTime()/60 // convert to ticks from milliseconds
#endif

currentClickTicks = ticks
//if the two clicks happened close enough together in time
if (currentClickTicks - lastClickTicks) <= doubleClickTime then
//if the two clicks occurred close enough together in space
if abs(X - lastClickX) <= 5 and abs(Y - LastClickY) <= 5 then
DoubleClick //a double click has occurred so call the event
end if
end if
lastClickTicks = currentClickTicks
lastClickX = X
lastClickY = Y

```

10. Now to test out your new DoubleClickCanvas, drag the class from the Project window to a window in your project to create an instance of it.

11. Double-click on the canvas you just added to your window to open the Code Editor. Notice that the canvas has a DoubleClick event handler. In this event handler, add the following code:
BEEP

26.0.161 How to make my Mac not sleeping?

Plugin Version: all, Platform: macOS.

Answer: Just inform the Mac OS about some system activity with code like this:

Example:

```

Sub UpdateSystemActivity()

#if TargetCarbon
declare function myUpdateSystemActivity lib "Carbon" alias "UpdateSystemActivity" (activity as Integer)
as short

const OverallAct = 0 // Delays idle sleep by small amount */
const UsrActivity = 1 // Delays idle sleep and dimming by timeout time */
const NetActivity = 2 // Delays idle sleep and power cycling by small amount */
const HDAActivity = 3 // Delays hard drive spindown and idle sleep by small amount */
const IdleActivity = 4 // Delays idle sleep by timeout time */

dim e as Integer

e=myUpdateSystemActivity(UsrActivity)

```

```
// you may react on an error if e is not 0 after the call.
```

```
#endif
End Sub
```

Notes: You may use another constant if you prefer some different behavior. Call it maybe every second.

26.0.162 How to make my own registration code scheme?

Plugin Version: all, Platform: Windows.

Answer: There are excellent articles about how to make a registration code scheme, but you can also simply use our RegistrationEngineMBS class.

Notes: If you need a license text, why not use the one from Xojo as a starting point?

26.0.163 How to make small controls on Mac OS X?

Plugin Version: all, Platform: macOS.

Answer: You can try this code on Mac OS X:

Example:

```

'/*
** Use the control's default drawing variant. This does not apply to
** Scroll Bars, for which Normal is Large.
**/
const kControlSizeNormal = 0

'/*
** Use the control's small drawing variant. Currently supported by
** the Check Box, Combo Box, Radio Button, Scroll Bar, Slider and Tab
** controls.
**/
const kControlSizeSmall = 1

'/*
** Use the control's small drawing variant. Currently supported by
** the Indeterminate Progress Bar, Progress Bar and Round Button
** controls.
**/
const kControlSizeLarge = 2

```

```

'/*
' * Control drawing variant determined by the control's bounds. This
' * ControlSize is only available with Scroll Bars to support their
' * legacy behavior of drawing differently within different bounds.
' */
const kControlSizeAuto = &hFFFF

const kControlSizeTag = "size"

declare function SetControlData lib "Carbon" (controlhandle as Integer, part as short, tagname as OS-
Type, size as Integer, data as ptr) as short

dim m as MemoryBlock

m=NewMemoryBlock(2)
m.UShort(0)=kControlSizeSmall

Title=str(SetControlData(CheckBox1.Handle, 0, kControlSizeTag, 2, m))

```

26.0.164 How to mark my Mac app as background only?

Plugin Version: all, Platform: macOS.

Answer: You can run a build script on each build with this code:

Example:

```

Dim App As String = CurrentBuildLocation + "/" + CurrentBuildAppName + ".app"
Call DoShellCommand("/usr/bin/defaults write " + App + "/Contents/Info ""NSUIElement"" YES")

```

Notes: This will set the NSUIElement flag to YES.

26.0.165 How to move a file or folder to trash?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use code like below:

Example:

```

Function MoveToTrash(f as FolderItem) As Boolean
#If TargetMacOS then
dim r as FolderItem
dim e as Integer = MacFileOperationMBS.MoveObjectToTrashSync(f, r, MacFileOperationMBS.kFSFile-
OperationDefaultOptions)

```

```

if e = 0 then
Return true // Ok
end if

#elseif TargetWin32 then
dim w as new WindowsFileCopyMBS

dim flags as Integer = w.FileOperationAllowUndo + w.FileOperationNoErrorUI + w.FileOperationSilent
+ w.FileOperationNoConfirmation
if w.FileOperationDelete(f, flags) then
Return true // OK
end if

flags = w.FileOperationNoErrorUI + w.FileOperationSilent + w.FileOperationNoConfirmation
if w.FileOperationDelete(f, flags) then
Return true // OK
end if
#else
// Target not supported
break
Return false
#endif
End Function

```

Notes: If you want to move a file to trash, you could use `f.movefileto f.trashfolder`, but that will overwrite existing files in the trash. You can use our `MacFileOperationMBS` class to move a file on Mac to the trash. And it uses the same code as the Finder, so files are renamed when the same name is already in use in the trash:

On Windows we use `WindowsFileCopyMBS` class.
Requires Mac OS X 10.5.

26.0.166 How to move an application to the front using the creator code?

Plugin Version: all, Platform: macOS.

Answer: This makes SimpleText (Code ttxt) to the frontmost application:

Example:

```

dim a as appleevent

a=newappleEvent("misc","actv","ttxt")

```

```
if a.send then
end if
```

Notes: (Code is Mac only)

26.0.167 How to move file with ftp and curl plugin?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can set post/pre quotes to have ftp commands executed before or after the download/upload.

Example:

```
dim d as CURLMBS // your curl object

// rename/move file
dim ws() As String
ws.Append "RNFR Temp.txt"
ws.append "RNT0 MyFile.txt"

d.SetOptionPostQuote(ws)
```

Notes: Use SetOptionPostQuote, SetOptionPreQuote or SetOptionQuote.

The ftp commands you pass here are native ftp commands and not the commands you use with ftp applications. So rename is two commands. First RNFR to tell where to rename from and second RNT0 with the new file name. To delete use DELE and the file path.

26.0.168 How to normalize string on Mac?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use code like below:

Example:

```
Function Normalize(t as string) As string
const kCFStringNormalizationFormD = 0 // Canonical Decomposition
const kCFStringNormalizationFormKD = 1 // Compatibility Decomposition
const kCFStringNormalizationFormC = 2 // Canonical Decomposition followed by Canonical Composition
const kCFStringNormalizationFormKC = 3 // Compatibility Decomposition followed by Canonical Composition

dim s as CFStringMBS = NewCFStringMBS(t)
dim m as CFMutableStringMBS = s.Normalize(kCFStringNormalizationFormD)
```

```
Return m.str  
End Function
```

Notes: This uses Apple's CFString functions to normalize unicode variants.

26.0.169 How to obscure the mouse cursor on Mac?

Plugin Version: all, Platform: macOS.

Answer: Try this declare:

Example:

```
Declare Sub ObscureCursor Lib "Carbon" ()
```

```
ObscureCursor
```

Notes: The MBS Plugin has this function, but it's not supported for Windows.

26.0.170 How to open icon file on Mac?

Plugin Version: all, Platform: macOS.

Answer: Use the NSImageMBS class like this:

Example:

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.ico")
```

```
dim n as new NSImageMBS(f)
```

```
window1.Backdrop = n.CopyPictureWithMask
```

26.0.171 How to open PDF in acrobat reader?

Plugin Version: all, Platform: macOS.

Answer: Try this code:

Example:

```
dim pdf as FolderItem = SpecialFolder.Desktop.Child("test.pdf")
```

```

// open PDF in Acrobat Reader on Mac:

// find app
dim bundleID as string = "com.adobe.Reader"
dim app as FolderItem = LaunchServicesFindApplicationForInfoMBS("", bundleID, "")

if app<>nil then

// launch app with parameters

dim docs() as FolderItem
docs.Append pdf

dim param as new LaunchServicesLaunchParameterMBS
param.Defaults = true
param.Application = app

dim x as FolderItem = LaunchServicesOpenXMBS(docs, param)

// on failure, simply launch it
if x = nil then
pdf.Launch(true)
end if

else
pdf.Launch(true)
end if

```

Notes: On Windows, simply use pdf.launch or WindowsShellExecuteMBS.

26.0.172 How to open printer preferences on Mac?

Plugin Version: all, Platform: macOS.

Answer: You can use our OpenMacOSXPreferencesPaneMBS function like this:

Example:

```

dim e as Integer = OpenMacOSXPreferencesPaneMBS("PrintAndFax")
if 0 = e then
MsgBox "OK"
elseif e = -43 then
MsgBox "File not found."
else
MsgBox "Error: "+str(e)
end if

```

26.0.173 How to open special characters panel on Mac?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: We have functions for that in Cocoa and Carbon.

Example:

```
dim a as new NSApplicationMBS
a.orderFrontCharacterPalette
```

Notes: For Cocoa, you can use `orderFrontCharacterPalette` method in `NSApplicationMBS` class.

Or simply for Carbon and Cocoa the `ShowCharacterPaletteMBS` method.

26.0.174 How to optimize picture loading in Web Edition?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use the `WebPicture` class.

Notes: Take your picture and create a `WebPicture` object. Store this `WebPicture` in a property of the `WebPage`, `Session` or `app` (as global as possible). On the first time you use this picture on an user session, the browser will load it. Second time you use it, the browser will most likely pick it from the cache.

Having pictures in `App` or some module reuses the same picture for all sessions which reduces memory footprint.

This does not work well with pictures you change very often or use only for one webpage on one user.

If you like to see an example, check our `Map` example.

26.0.175 How to parse XML?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use code like this:

Example:

```
dim s as string = "<test><test /></test>"
```

```
try
```

```

dim x as new XmlDocument(s)
MsgBox "OK"
catch xe as XmlException
MsgBox "invalid XML"
end try

```

Notes: If you got an exception, you have a parse error.

26.0.176 How to play audio in a web app?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use the HTML5 audio tag and control it with javascript.

Notes: This is just another example app I made today. It plays a christmas song. The audio file is provided by the application to the server, so no external web server is needed and this application can run stand alone. To compile and run you need Xojo 2010r5.

In the open event we search the audio files and open them as binarystreams. We create the two webfile objects. Those webfiles are part of the app class, so we have them globally. There we set the data with the content of our streams. We also define file names and mime types. They are needed so browser know what we have here:

```

audioFileM4V = new WebFile
audioFileM4V.Data = bM.Read(BM.Length)
audioFileM4V.Filename = "music.m4a"
audioFileM4V.MIMEType = "audio/m4a"

```

```

audioFileOGG = new WebFile
audioFileOGG.Data = bO.Read(BO.Length)
audioFileOGG.Filename = "music.ogg"
audioFileOGG.MIMEType = "audio/ogg"

```

Next in the open event of the webpage we have a PageSource control. The location is set to be before content. In the open event we define the html code for this. First we pick the URLs for the audio files. Than we build the html to use the audio tag. As you see, we give it an ID for later use and have it preload automatically. If you add an autoplay tag, you can have the audio play right away. Inside the audio tag we have two sources so we provide audio for both Firefox (OGG) and Safari (MPEG4). Finally we have a text to display if HTML5 audio tag is not supported.

You can set the source in the EditSource event:

```

dim urlO as string = app.audioFileOGG.URL
dim urlM as string = app.audioFileM4V.URL
me.Source = "<audio id=""mymusic"" preload=""auto""><source src="""+urlO+""" type=""audio/ogg""
/><source src="""+urlM+""" type=""audio/mpeg"" />Your browser does not support the audio ele-
ment.</audio>"

```

Next in the Play button we execute code to play the audio. This is a short javascript code which searches in the html document for the element with the ID "mymusic" which is the ID of our audio tag above. Once we got the object, we call it's play method to start playback.

```
me.ExecuteJavaScript("document.getElementById('mymusic').play();")
```

same for pause:

```
me.ExecuteJavaScript("document.getElementById('mymusic').pause();")
```

and finally for changing volume:

```
me.ExecuteJavaScript("document.getElementById('mymusic').volume="+str(me.Value/100.0)+"");")
```

26.0.177 How to pretty print xml?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use the XML Transform method with the right XLS.

Notes: Learn more here:

<http://docs.xojo.com/index.php/XMLDocument.Transform>

26.0.178 How to print to PDF?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: This code below shows how to redirect printing to a PDF file on Mac OS X.

Example:

```

// get Xojo printer setup
dim p as new PrinterSetup

// now put it into NSPrintInfo to manipulate
dim n as new NSPrintInfoMBS
n.SetupString = p.SetupString

```

```

// change destination to file
dim f as FolderItem = SpecialFolder.Desktop.Child("test.pdf")
n.SetSaveDestination(f)

// move back
p.SetupString = n.SetupString

// and print as usual
dim g as Graphics = OpenPrinter(p)
g.DrawString "Hello World", 20, 20

```

Notes: And you can use normal graphics class for that.

26.0.179 How to query Spotlight's Last Open Date for a file?

Plugin Version: all, Platform: macOS.

Answer: You can use a MDItemMBS objec to query this value:

Example:

```

Function LastOpenedDate(Extends F As FolderItem, DefaultOtherDates As Boolean = True) As Date
#If TargetMacOS Then
Dim xMDItem as New MDItemMBS(F)
Dim xDate as Variant

If xMDItem <>Nil Then
xDate = xMDItem.GetAttribute(xMDItem.kMDItemLastUsedDate).DateValue
If xDate IsA Date Then Return xDate
Else
If xDate <>Nil Then Break
End If
#EndIf

If DefaultOtherDates Then
If F.ModificationDate <>Nil Then Return F.ModificationDate
If F.CreationDate <>Nil Then Return F.CreationDate
End If
End Function

```

Notes: Thanks for Josh Hoggan for this example code.

26.0.180 How to quit windows?

Plugin Version: all, Platform: Windows.

Answer: Try this code:

Example:

```
#if targetwin32 then
dim i1,i2,r as Integer
declare function ExitWindowsEx lib "user32" (uFlags as Integer, dwReserved as Integer) as Integer
i1 = 2
i2 = 0
r = ExitWindowsEx(i1,i2)
if r<>0 then
' Error()
end if

#endif
```

Notes: uFlags parameters:

```
'4 = EWX_Force
'0 = EWX_Logoff
'2 = EWX_Reboot
'1 = EWX_shutdown, should shut down computer
```

Also check the ExitWindowsMBS method.

26.0.181 How to read a CSV file correctly?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: With all the rules for quotes and delimiters, you can simply use the SplitCommaSeparatedValuesMBS method in our plugins like this:

Example:

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.csv")
dim t as TextInputStream = f.OpenAsTextFile

while not t.EOF
dim s as string = t.ReadLine(encodings.ASCII)

dim items() as string = SplitCommaSeparatedValuesMBS(s, ";", """")
```

```
List.AddRow """
dim u as Integer = UBound(items)
for i as Integer = 0 to u
List.Cell(List.LastIndex,i) = items(i)
next

wend
```

Notes: Please make sure you choose the right text encoding.

26.0.182 How to read the command line on windows?

Plugin Version: all, Platform: Windows.

Answer: Try this code:

Example:

```
#if targetwin32 then
dim line as string
Dim mem as MemoryBlock

Declare Function GetCommandLineA Lib "kernel32" () As Ptr

mem=GetCommandLineA()
s=mem.cstring(0)

#endif
```

Notes: Newer Xojo versions have a system.commandline property.

26.0.183 How to render PDF pages with PDF Kit?

Plugin Version: all, Platform: Windows.

Answer: Try this code:

Example:

```
// choose a file
dim f as FolderItem = SpecialFolder.Desktop.Child("test.pdf")

// open it as PDF Document
dim sourceFile as New PDFDocumentMBS(f)
```

```

if sourceFile.handle <>0 then // it is a PDF file

// get upper bound of pages
dim c as Integer = sourceFile.pageCount-1

// from first to last page
for n as Integer = 0 to c

// pick that page
dim page as PDFPageMBS = sourceFile.pageAtIndex(n)

// render to image
dim p as NSImageMBS = page.Render

// and convert to RB picture and display
Backdrop = p.CopyPictureWithMask

next

end if

```

Notes: PDFKit works only on Mac OS X.

26.0.184 How to restart a Mac?

Plugin Version: all, Platform: macOS.

Answer: Ask the Finder via Apple Events:

Example:

```

dim ae as appleevent
ae=newappleEvent("FNDR","rest","MACS")
if not ae.send then
msgBox "The computer couldn't be restarted."
end if

```

26.0.185 How to resume ftp upload with curl plugin?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: CURL supports that and you simply need to set the right options.

Notes: First of course OptionUpload must be true. Second OptionFTPAppend must be true so the OptionResumeFrom is used. Store there (or in OptionResumeFromLarge) your start value. Don't forget to implement the read event and return data there as requested.

26.0.186 How to rotate a PDF page with CoreGraphics?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: This code opens a PDF and draws the first page into a new PDF with 90–∞ rotation.

Example:

```
// Rotate a PDF page

// our files
dim sourcefile as FolderItem = SpecialFolder.Desktop.Child("test.pdf")
dim destfile as FolderItem = SpecialFolder.Desktop.Child("rotated.pdf")

// open PDF
dim pdf as CGPDFDocumentMBS = sourcefile.OpenAsCGPDFDocumentMBS

// query media size of first page
dim r as CGRectMBS = pdf.MediaBox(1)

// create new PDF
dim c as CGContextMBS = destfile.NewCGPDFDocumentMBS(r,"title","Author","Creator")

// create rotated rectangle
dim nr as new CGRectMBS(0,0,r.Height,r.Width)

// create new page
c.BeginPage nr
c.SaveGState

const pi = 3.14159265

// rotate by 90–∞
c.RotateCTM pi*1.5

// fix origin
c.TranslateCTM -r.width,0

// draw PDF
c.DrawCGPDFDocument pdf,r,1

// cleanup
c.RestoreGState
c.EndPage
```

```
c = nil

// show in PDF viewer
destfile.Launch
```

Notes: This code is Mac only as it needs CoreGraphics.

26.0.187 How to rotate image with CoreImage?

Plugin Version: all, Platform: macOS.

Answer: Use the code like the one below:

Example:

```
// Rotate image with CoreImage

// load image
dim f as FolderItem = SpecialFolder.Desktop.Child("test.png")
dim image as new CIImageMBS(f)

// rotate 45 degree
dim n as new NSAffineTransformMBS
n.rotateByDegrees(45)

dim TransformFilter as new CIFilterAffineTransformMBS
TransformFilter.inputImage = image
TransformFilter.inputTransform = n

// get result
dim resultImage as CIImageMBS = TransformFilter.outputImage

// for saving to file
dim outputImage as NSImageMBS = resultImage.RenderNSImage(false)

f = SpecialFolder.Desktop.Child("output.png")
dim b as BinaryStream = BinaryStream.Create(f, true)
b.Write outputImage.PNGRepresentation

// as Xojo picture object for display
dim pic as Picture = outputImage.CopyPictureWithMask

Backdrop = pic
```

26.0.188 How to run a 32 bit application on a 64 bit Linux?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Install 32 bit compatibility libraries.

Notes: The package is called ia32-libs for ubuntu (and others).

Some applications need to be run on a 32 bit system as they need some hardware related libraries. Like libUSB or libHID for USB devices.

26.0.189 How to save HTMLViewer to PDF with landscape orientation?

Plugin Version: all, Platform: macOS.

Answer: You can use NSPrintInfoMBS to change the options for PrintToPDFFile function.

Example:

```
// make it landscape
dim n as NSPrintInfoMBS = NSPrintInfoMBS.sharedPrintInfo
n.orientation = n.NSLandscapeOrientation

// save html to file
dim f as FolderItem = SpecialFolder.Desktop.Child("test.pdf")
call HTMLViewer1.PrintToPDFFileMBS(f,10,30,10,30)
```

Notes: You may want to reset options later.
This code is only for Mac OS X.

26.0.190 How to save RTFD?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: With NSTextViewMBS you can use this code to save to RTFD:

Example:

```
// save text as RTFD including image attachments
dim f as FolderItem = GetSaveFolderItem(FileTypes1.ApplicationRtfd, "test.rtf")

if f = nil then Return

dim a as NSAttributedStringMBS = textView.textStorage
dim w as NSFFileWrapperMBS = a.RTFDFileWrapperFromRange(0, a.length, DocumentAttributes)

dim e as NSErrorMBS
if w.writeToFile(f, e) then
```

```

else
MsgBox e.LocalizedDescription
end if

```

Notes: For TextArea you can query the underlying NSTextViewMBS object via TextArea.NSTextViewMBS method.

26.0.191 How to save RTFD?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: How to load PDF to htmlviewer on desktop?

Example:

```

Public Sub LoadPDFData(viewer as HTMLViewer, PDFData as string)
Dim base64string As String = EncodeBase64(PDFData)

// remove line endings to make it a big line
base64string = ReplaceLineEndings(base64string, "")

// build data URL
// https://en.wikipedia.org/wiki/Data_URI_scheme
Dim dataURL As String = "data:application/pdf;base64," + base64string

// show in webviewer
HTMLViewer1.LoadURL(dataURL)

// may not work everywhere due to URL length limit
// for Web projects, use WebFile instead!
End Sub

```

Notes: This avoids a temporary file, which may also work.
For Web Apps, please use WebFile.

26.0.192 How to scale a picture proportionally with mask?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: For a proportional scaling, we calculate the new picture size relative to the target maximum size.

Example:

```

Function ProportionalScaledWithMask(extends pic as Picture, Width as Integer, Height as Integer) As Pic-
ture
// Calculate scale factor

dim faktor as Double = min( Height / Pic.Height, Width / Pic.Width)

// Calculate new size
dim w as Integer = Pic.Width * faktor
dim h as Integer = Pic.Height * faktor

// create new picture
dim NewPic as new Picture(w,h,32)

// check if we have a mask and clear it
dim m as picture = pic.mask(False)
pic.mask = nil

// draw picture in the new size
NewPic.Graphics.DrawPicture Pic, 0, 0, w, h, 0, 0, Pic.Width, Pic.Height

if m <>nil then
// restore mask and scale it
pic.mask = m
NewPic.mask.Graphics.DrawPicture m, 0, 0, w, h, 0, 0, Pic.Width, Pic.Height
end if

// return result
Return NewPic
End Function

```

Notes: This version handles mask. As you see we actually have to remove mask in order to copy the picture part correctly.

26.0.193 How to scale a picture proportionally?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: For a proportional scaling, we calculate the new picture size relative to the target maximum size.

Example:

```

Function ProportionalScaled(extends pic as Picture, Width as Integer, Height as Integer) As Picture
// Calculate scale factor

dim faktor as Double = min( Height / Pic.Height, Width / Pic.Width)

```

```

// Calculate new size
dim w as Integer = Pic.Width * faktor
dim h as Integer = Pic.Height * faktor

// create new picture
dim NewPic as new Picture(w,h,32)

// draw picture in the new size
NewPic.Graphics.DrawPicture Pic, 0, 0, w, h, 0, 0, Pic.Width, Pic.Height

// return result
Return NewPic
End Function

```

Notes: This does not handle mask, but you can scale the mask the same way and assign it to the new picture.
(see other FAQ entry with mask)

26.0.194 How to scale/resize a CIIImageMBS?

Plugin Version: all, Platform: Windows.

Answer: Use the CIFilterLanczosScaleTransform filter to scale down a picture to a specific size.

Example:

```

Dim pic As Picture = LogoMBS(500)
Dim image As CIIImageMBS = CIIImageMBS.imageWithPicture(pic)

Dim filter As New CIFilterLanczosScaleTransformMBS

Const targetWidth = 600.0
Const targetHeight = 400.0

Dim scale As Double = targetHeight / image.Extent.Height
Dim aspect As Double = targetWidth / (image.Extent.Width * scale)

filter.inputImage = image
filter.inputScale = scale
filter.inputAspectRatio = aspect

Dim result As Picture = filter.outputImage.RenderPicture

Backdrop = result

```

Notes: This is same code as our scaleTo convenience method.

26.0.195 How to scale/resize a picture?

Plugin Version: all, Platform: Windows.

Answer: There are several ways to scale or resize a picture. The easiest way may be the ScaleMBS function in the Picture class.

Example:

```
dim Original,Scaled as Picture
```

```
Original=LogoMBS(500)
Scaled=Original.ScaleMBS(100,100,true)
```

Notes: The plugin ways:

- GraphicsMagick can scale/resize.
- CoreImage scale filter may result in the fastest and best images on Mac OS X 10.4.
- NSImageMBS can scale, but is Mac OS X only.
- CGImageMBS can scale, but is Mac OS X only.
- CIImageMBS can scale, but is Mac OS X only.
- QuickTime Graphics exporter and importer can be connected to scale. (this was used more often a few years ago)
- ImageMagick can scale very nice and crossplatform. But the ImageMagick libraries are big.
- The picture.ScaleMBS function is self written and results in equal output on Mac, Windows and Linux without any additional libraries installed.
- Picture.ScalingMBS does crossplatform scaling with several modes.

with pure Xojo:

- make a new picture and draw the old one with new size inside.

26.0.196 How to search with regex and use unicode codepoints?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can specify unicode characters in search string with backslash x and digits.

Example:

```
dim r as RegExMbs
dim s as string
dim c as Integer
```

```

s="123 √√√° ABC 456"

r=new RegExMBS
if r.Compile("√") then
c=r.Execute(s,0)
MsgBox str(c)+" "+str(r.Offset(0))+" "+str(r.Offset(1))
// shows: 1 4 10
// 1 for ubound of the offset array
// 4 for 4 bytes before the matched pattern
// 10 for the 10 bytes before the end of the matched pattern
end if

r=new RegExMBS
if r.Compile("\xF6") then // finds √ using Unicode codepoint
c=r.Execute(s,0)
MsgBox str(c)+" "+str(r.Offset(0))+" "+str(r.Offset(1))
// shows: 1 4 10
// 1 for ubound of the offset array
// 4 for 4 bytes before the matched pattern
// 10 for the 10 bytes before the end of the matched pattern
end if

```

26.0.197 How to see if a file is invisible for Mac OS X?

Plugin Version: all, Platform: macOS.

Answer: Try this function:

Example:

```

Function Invisible(F As FolderItem) As Boolean
Dim TIS As TextInputStream
Dim S,All As String
Dim I as Integer
dim g as folderitem

If Left(F.Name,1)="." or not f.visible Then
Return True
End If

g=F.Parent.Child(".hidden")
If g.Exists Then
TIS=g.OpenAsTextFile
if tis<>Nil then
All=TIS.ReadAll
For I=1 to CountFields(All,Chr(11))
S=NthField(All, Chr(11), I)

```

```

If S=F.name Then
Return True
End If
Next
end if
End if
End Function

```

26.0.198 How to set cache size for SQLite or REALSQLDatabase?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You use the pragma cache_size command on the database.

Example:

```

// set cache size to 20000 pages which is about 20 MB for default page size
dim db as REALSQLDatabase
db.SQLiteExecute "PRAGMA cache_size = 20000"

```

Notes: Default cache size is 2000 pages which is not much.

You get best performance if whole database fits in memory.

At least you should try to have a cache big enough so you can do queries in memory.

You only need to call this pragma command once after you opened the database.

26.0.199 How to set the modified dot in the window?

Plugin Version: all, Platform: macOS.

Answer: Try this declares:

Example:

```

window1.ModifiedMBS=true

```

26.0.200 How to show a PDF file to the user in a Web Application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use a WebHTMLViewer control and load the

Example:

```

dim CurrentFile as WebFile // a property of the WebPage

// define the PDF file
CurrentFile = new WebFile
CurrentFile.Filename = "test.pdf"
CurrentFile.MIMEType = "application/pdf"
CurrentFile.Data = "some pdf data" // MyDynaPDF.GetBuffer

// load into html viewer
HTMLViewer1.URL = CurrentFile.URL

```

Notes: See our Create PDF example for the Xojo Web Edition.

26.0.201 How to show Keyboard Viewer programmatically?

Platform: macOS.

Answer: Use Xojo or AppleScript to launch the KeyboardViewerServer.app.

Example:

```

dim a as new AppleScriptMBS
dim text as string
dim lines(-1) as string

lines.append "set theApplication to ""KeyboardViewerServer""
lines.append "set thePath to ""/System/Library/Components/KeyboardViewer.component/Contents/Shared-
Support/KeyboardViewerServer.app""
lines.append ""
lines.append "set POSIXPath to ((POSIX file thePath) as string)"
lines.append "tell application ""System Events"" to set isRunning to 0 <(count (application processes whose
name is theApplication))"
lines.append "if isRunning then tell application POSIXPath to quit"
lines.append "delay 0.15"
lines.append ""
lines.append "ignoring application responses"
lines.append " tell application POSIXPath to run"
lines.append "end ignoring"

text=join(lines,EndOfLine.macintosh)

a.Compile text
a.Execute

```

Notes: AppleScript code:

```
set theApplication to "KeyboardViewerServer"
set thePath to "/System/Library/Components/KeyboardViewer.component/Contents/SharedSupport/KeyboardViewerServer.app"
```

```
set POSIXPath to ((POSIX file thePath) as string)
tell application "System Events" to set isRunning to 0 <(count (application processes whose name is theApplication))
if isRunning then tell application POSIXPath to quit
delay 0.15
```

```
ignoring application responses
tell application POSIXPath to run
end ignoring
```

26.0.202 How to show the mouse cursor on Mac?

Plugin Version: all, Platform: macOS.

Answer: Try this declare:

Example:

```
Declare Sub ShowCursor Lib "Carbon" ()
```

```
ShowCursor
```

Notes: The MBS Plugin has this function and supports it on Windows, too.

26.0.203 How to shutdown a Mac?

Plugin Version: all, Platform: macOS.

Answer: Ask the Finder via Apple Events:

Example:

```
dim ae as appleevent
ae=newappleEvent("FNDR", "shut", "MACS")
if not ae.send then
msgBox "The computer couldn't be shutdown."
end if
```

Notes: Or toolbox call (Attention: This method will stop the computer immediatly: No document asked to be saved, all applications quitting without knowing).

```
Declare Sub ShutDwnPower Lib "Carbon" ()
ShutDwnPower
```

26.0.204 How to sleep a Mac?

Plugin Version: all, Platform: macOS.

Answer: Ask the Finder via Apple Events:

Example:

```
dim ae as appleevent
ae=newappleEvent("FNDR","slep","MACS")
if not ae.send then
msgBox "The computer doesn't want to sleep."
end if
```

26.0.205 How to speed up rasterizer for displaying PDFs with DynaPDF?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Here a few speed tips:

Notes:

- Use the DynaPDFRasterizerMBS function instead of our render functions.
- Reuse DynaPDFRasterizerMBS as long as the target picture size doesn't change.
- Import only the PDF pages you want to display.
- Let DynaPDF do zooming, rotating or other effects instead of you change it.

26.0.206 How to use PDFLib in my RB application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: The PDFlib plugin was discontinued in favor of our DynaPDF plugin.

Notes: If you need help to move, please contact us.

26.0.207 How to use quotes in a string?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Just double them.

Example:

```
msgbox "This String contains ""quotes"""
```

26.0.208 How to use Sybase in Web App?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Please use our MBS Xojo SQL Plugin to connect to a Sybase Database in your web application.

Notes: If you see db.Connect giving the error message "cs_ctx_alloc ->CS_MEM_ERROR", than some things are not setup right for Sybase.

The Apache process may not have all the SYBASE environment variables being set when the CGI was launched.

Adding these lines to /etc/httpd/conf/httpd.conf stopped the faux memory errors for us:

```
SetEnv LD_LIBRARY_PATH /opt/sybase/OCS-15_0/lib:/opt/sybase/OCS-15_0/lib3p64:/opt/sybase/OCS-15_0/lib3p:
SetEnv SYBROOT /opt/sybase
SetEnv SYBASE_OCS /opt/sybase
SetEnv SYBASE /opt/sybase
```

26.0.209 How to use the Application Support folder?

Plugin Version: all, Platform: macOS.

Answer:

I was saving a registration code for an app to the Preference folder. People on the list have suggested that it would be better in the ApplicationSupportFolder. How do I save the file called CWWPrefs into that folder using MBS?

I have checked for examples and the docs but can't see how to apply it

```
//f = SpecialFolder.Preferences.child("CWWPrefs")
f = ApplicationSupportFolderMBS(-32768)
```

Example:

```

dim folder,file as FolderItem

folder = createApplicationSupportFolderMBS(-32763)

if folder=nil then
// Some very old Mac OS Versions may not support it
// or the plugin may fail for any reason
folder=SpecialFolder.Preferences
end if

file=folder.Child("CWWPrefs")

MsgBox file.NativePath

```

Notes:

You may not be able to write there with a normal user account!

26.0.210 How to use the IOPMCopyScheduledPowerEvents function in Xojo?

Plugin Version: all, Platform: macOS.

Answer: You can use the following code which does this using the SoftDeclareMBS class.

Example:

```

Sub Open()
dim c as CFDateMBS
dim t as CFAbsoluteTimeMBS

// get current date
c=NewCFDateMBS

// in absolute time (seconds since x)
t=c.AbsoluteTime

// add 600 seconds (= 10 Minutes)
t.Value=t.Value+600

// Make a Date from it
c=t.Date

// Schedule the event
// 0 on success
// E00002C1 for missing root rights

```

```

Title=hex(schedulePowerEvent(c, "wake"))

// Just for information, display the scheduled stuff
CFShowMBS CopyScheduledPowerEvents
End Sub

Function CopyScheduledPowerEvents() As carrayMBS
dim s as SoftDeclareMBS
dim m as MemoryBlock

s=new SoftDeclareMBS

if s.LoadLibrary("IOKit.framework") then
if s.LoadFunction("IOPMCopyScheduledPowerEvents") then
if s.CallFunction(0,nil) then
Return NewCFArrayMBSHandle(s.Result,true)
else
MsgBox "Failed to Call IOPMCopyScheduledPowerEvents."
end if
else
MsgBox "Failed to load IOPMCopyScheduledPowerEvents."
end if
else
MsgBox "Failed to load IOKit."
end if

Return nil
End Function

Function SchedulePowerEvent(time_to_wake as CFDateMBS, Type as CFStringMBS) as Integer
dim s as SoftDeclareMBS
dim m as MemoryBlock

'/*
'* Types of power event
'* These are potential arguments to IOPMSchedulePowerEvent().
'* These are all potential values of the kIOPMPowerEventTypeKey in the CFDictionaryes
'* returned by IOPMCopyScheduledPowerEvents().
'*/
'/*!
'@define kIOPMAutoWake
'@abstract Value for scheduled wake from sleep.
'*/
'#define kIOPMAutoWake "wake"
,
'/*!
'@define kIOPMAutoPowerOn
'@abstract Value for scheduled power on from off state.

```

```

*/
#define kIOPMAutoPowerOn "poweron"
,
/*!
#define kIOPMAutoWakeOrPowerOn
@abstract Value for scheduled wake from sleep, or power on. The system will either wake OR
power on, whichever is necessary.
*/
,
#define kIOPMAutoWakeOrPowerOn "wakepoweron"
/*!
#define kIOPMAutoSleep
@abstract Value for scheduled sleep.
*/
,
#define kIOPMAutoSleep "sleep"
/*!
#define kIOPMAutoShutdown
@abstract Value for scheduled shutdown.
*/
,
#define kIOPMAutoShutdown "shutdown"

s=new SoftDeclareMBS

if s.LoadLibrary("IOKit.framework") then
if s.LoadFunction("IOPMSchedulePowerEvent") then

m=NewMemoryBlock(12)
m.Long(0)=time_to_wake.handle
m.Long(4)=0 // nil
m.Long(8)=type.Handle

if s.CallFunction(3,m) then
Return s.Result
end if
end if
end if

End Function

```

Notes: Requires Mac OS X and to execute root rights.

26.0.211 How to validate a GUID?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use this function below which uses a regular expression to verify that the string is a valid UUID/GUID:

Example:

Function IsGUID(guid as string) As Boolean

dim r as new RegEx

```
r.SearchPattern = "^(\{ 0,1 } ([ 0-9a-fA-F ] ) { 8 } - ( [ 0-9a-fA-F ] ) { 4 } - ( [ 0-9a-fA-F ] ) { 4 } - ( [ 0-9a-fA-F ] ) { 4 } - ( [ 0-9a-fA-F ] ) { 12 } \} { 0,1 } )$ "
```

Return r.Search(guid)<>nil

End Function

Notes: Simply parsing the GUID with CFUUIDMBS does not give the same result as CFUUIDMBS will also take a string like "DDDD".

26.0.212 How to walk a folder hierarchie non recursively?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use code like this one:

Example:

Sub Walk(folder as FolderItem)

dim folders() as FolderItem

folders.Append folder

while UBound(folders)>=0

dim currentFolder as FolderItem = folders.pop

dim c as Integer = currentFolder.Count

for i as Integer = 1 to c

dim item as FolderItem = currentFolder.TrueItem(i)

if item = Nil then

// no permission

elseif item.Visible then // only visible

if item.Directory then

folders.Append item

```
else
// work with file here
end if

end if

next

wend
End Sub
```

Notes: As you see we go with a long loop which runs until we don't have more folders to process. We ignore items we can't access due to permission limits. And we only work visible items. If you like, check `folderitem.isBundleMBS` on item to handle packages and applications better on Mac OS X.

26.0.213 I got this error: PropVal, QDPictMBS.Name (property value), Type mismatch error. Expected CGDataProviderMBS, but got Variant, Name:QDPictMBS

Plugin Version: all, Platform: macOS.

Answer: The plugins MacOSX and MacOSXCF belong together. If you use one part, please also install the other part.

Notes: We splitted the plugin because the Xojo IDE on Windows crashed on compilation.

26.0.214 I registered the MBS Plugins in my application, but later the registration dialog is shown.

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: There are two main reasons.

Notes: 1. you may use the plugin before registering them. This is often the case if you register in a window open event and use the plugin in a control open event.

On the console on Mac OS X or Windows, you may see a message like this "MBS Plugins were used by the application before the RegisterMBSPlugin function was called. Please fix this in your code!".

2. you may have mixed different plugin versions which are not compatible.

In this case you can see a message "Internal plugin registration error." on the console on Mac OS X. Newer plugins may show a message dialog reporting this. Older version simply think they are not registered.

If the installer just merges old and new applications, users may have libraries of older and newer plugin versions in the libs folder. If your application loads the wrong version, the registration fails.

If you use remote debugging, make sure you clear the temporary files there, too. Otherwise you may have old DLLs on your hard disc which may disturb your application.

You can run into issues if you use your registration code on different places of your app. Please register only once in app.open (or app Constructor). If you have several codes, simply call them one after the other.

Also check that you only call RegisterMBSPlugin with valid serial number. If you later call RegisterMBSPlugin with Demo like in example code above, you remove the license.

Next check if you can clear the Xojo caches and that helps. This includes the Xojo Scratch folder and the Plugins & Project caches. Simply locate those folders and delete them. For Windows look in hidden AppData folder in your user folder. For Mac, please check textasciitilde /Library/Caches and your temp folders.

Finally make sure you use the right serial number. Not an older one or a misspelled one.

26.0.215 I want to accept Drag & Drop from iTunes

Plugin Version: all, Platform: macOS.

Answer: You need to accept AcceptMacDataDrop "itun" and Handle the DropObject.

Example:

```
Sub Open()
window1.AcceptMacDataDrop "itun"
End Sub
```

```
Sub DropObject(obj As DragItem)
dim s as string
dim f as folderItem
dim d as CFDictionaryMBS
dim o as CFObjectMBS
dim key as CFStringMBS
dim dl as CFDictionaryListMBS
dim i,c as Integer
dim u as CFURLMBS
dim file as FolderItem
```

```
if obj.MacDataAvailable("itun") then
s = obj.MacData("itun")
```

```

// Parse XML
o=NewCFOBJECTMBSFromXML(NewCFBinaryDataMBS(s))

// Make dictionary
if o isa CFDictionaryMBS then
d=CFDictionaryMBS(o)

// get Tracks Dictionary
key=NewCFStringMBS("Tracks")
o=d.Value(key)

if o isa CFDictionaryMBS then
d=CFDictionaryMBS(o)
dl=d.List

// Walk over all entries in the Tracks dictionary
c=dl.Count-1
for i=0 to c
o=dl.Value(i)

if o isa CFDictionaryMBS then
d=CFDictionaryMBS(o)

key=NewCFStringMBS("Location")
o=d.Value(key)
if o isa CFStringMBS then
u=NewCFURLMBS(CFStringMBS(o),nil)

file=u.file
if file<>nil then
MsgBox file.NativePath
end if
end if
end if
next
end if
end if
end if
End Sub

```

Notes: The code above inside a window on Xojo 5.5 with MBS Plugin 5.3 will do it nice and show the paths.

26.0.216 I'm drawing into a listbox but don't see something.

Plugin Version: all.

Answer: If you draw this in a listbox cellbackground, you need to draw on the correct position

Example:

```
Function CellBackgroundPaint(g As Graphics, row as Integer, column as Integer) As Boolean
dim f as FolderItem
f=SpecialFolder.Desktop
f.DrawWideIconMBS(g,listbox1.left,listbox1.top+row*20,16)
Return true
End Function
```

Notes: Try this in a listbox. The Graphics object there has a clipping and an offset which the plugin doesn't know about.

26.0.217 I'm searching for a method or so to move a window from position x.y to somewhere else on the screen.

Platform: macOS.

Answer:

The code I produced in RB isn't smooth enough. Is there a call in MBS, if not, can it be done? The speed of it has to be like the show of a DrawerWindow.

Try the declare below for Carbon. With WindowLib it will work on Mac OS 8.5 and newer.

Notes:

See Window.Transition functions.

26.0.218 If I use one of your plug-ins under windows, would this then impose the use of dll after compilation or my would my compiled soft still be a stand-alone single file software?

Platforms: macOS, Linux, Windows.

Answer: Stand alone.

Notes: Xojo compiles all used plugins into the application binary.

Some plugin parts need external dlls but you will find that in the documentation. (e.g. pdfib for some classes)

26.0.219 Is the fn key on a powerbook keyboard down?

Plugin Version: all, Platform: macOS.

Answer: I am unable to figure out how or if it is possible to detect if the fn key is down on a powerbook keyboard. Is it possible?

Example:

' Window.Open Event of a blank project:

```
dim i as Integer

for i=0 to 127
if keyboard.asynckeydown(i) then
title=str(i) // found
return
end if
next
title="" // not found
```

Notes: This test application shows the keycode (decimal) 63 for the fn key.

26.0.220 Is there a case sensitive Dictionary?

Plugin Version: all.

Answer: The MBS Plugin has several classes which can work as a replacement.

Notes: First you could use VariantToVariantHashMapMBS or VariantToVariantOrderedMapMBS.

If you know that all keys are Strings or Integers only, you can use the specialized classes which are a little bit faster due to avoiding variants:

```
IntegerToIntegerHashMapMBS class
IntegerToIntegerOrderedMapMBS class
IntegerToStringHashMapMBS class
IntegerToStringOrderedMapMBS class
IntegerToVariantHashMapMBS class
IntegerToVariantOrderedMapMBS class
StringToStringHashMapMBS class
StringToStringOrderedMapMBS class
StringToVariantHashMapMBS class
StringToVariantOrderedMapMBS class
```

26.0.221 Is there a way to use the MBS plugin to get only the visible item and folder count on a volume?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use the DirectorySizeMBS class for this as in the example below:

Example:

```
dim d as DirectorySizeMBS

d=new DirectorySizeMBS

// volume(1) as my boot volume is very full
if d.update(volume(1),true,0) then
MsgBox str(d.VisibleItemCount)+" visible items, "+str(d.HiddenItemCount)+" invisible items."
end if
```

Notes: Complete Question: Is there a way to use the MBS plugin to get only the visible item and folder count on a volume? The FileCount and FolderCount properties of VolumeInformationMBS seem to provide the total # of items including invisible items such as .DS_Store and more importantly .Trashes which is causing me a great amount of difficulty during a recursive scan of a volume. I've got a progress bar which uses the total of the filecount and foldercount properties as the maximum value, but my routine needs to filter out all invisible items, as it is creating a catalog of a volume for archiving purposes. Any thoughts how I could get accurate number.

26.0.222 Is there an easy way I can launch the Displays preferences panel?

Plugin Version: all, Platform: macOS.

Answer: Use the code below:

Example:

```
dim error as Integer

error=OpenMacOSXPreferencesPaneMBS("Displays")
if error<>0 then
MsgBox "Failed to launch QuickTime System Preferences panel."
end if
```

26.0.223 List of Windows Error codes?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: We have a list of windows error codes on our website.

Notes: <http://www.monkeybreadsoftware.de/xojo/winerror.shtml>

26.0.224 Midi latency on Windows problem?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: The issue is system related, not a problem with RB or the plugin.

Notes: Two things will adversely affect the timing:

(1) latency of the software synthesizer output driver. The default Windows wavetable synthesizer has considerable latency. I don't know how many milliseconds, but it is noticeable.

(2) latency of the digital audio output driver. Different systems have different drivers for different audio hardware. My Dell laptop has a minimum 15ms latency in the audio driver.

These two things put together were causing a very sluggish MIDI response. I was able to verify these as the culprits by routing MIDI directly out of RB into a sample player, which only introduces the latency of (2) and does not include latency of (1).

I don't know how widely known are these facts, if not then you may want to add this information to the documentation, since Windows programmers using the MIDI plugin may not know those problems, and might mistakenly blame your plugin, as I did :) Sorry about that!

(From Aaron Andrew Hunt)

26.0.225 My Xojo Web App does not launch. Why?

Plugin Version: all, Platform: macOS.

Answer: Here is a list of checks to do for linux apache installations with Xojo or Xojo Web applications:

Notes: Just a list of checks to do for linux apache installations:

- You have 64bit linux? Than you need 32 bit compatibility libraries.
- The folder of your app is writable? Set permissions to 777.
- The cgi script is executable? Set permissions to 755.

- The app file itself is executable? Set permissions to 755.
- You uploaded cgi file as text, so it has unix line endings? (this often gives error "Premature end of script headers" in apache log)
- You uploaded config.cfg file and made it writable? Set permissions to 666.
- Your apache allows execution of cgi scripts? You enabled cgi for apache and uncommented addhandler command for CGI on a new apache installation?
- You uploaded the app file and libraries as binary files? Upload as text breaks them.
- You did upload the libs folder?
- You don't have code in app.open, session.open and other events which crashes app right at launch?
- You don't have a print command in your app.open event? (see feedback case 23817)
- You allowed htaccess file to overwrite permissions?

26.0.226 SQLiteDatabase not initialized error?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Before you can use SQLiteDatabaseMBS, it must be initialized.

Example:

```
dim d as new SQLiteDatabaseMBS
```

Notes: This happens normally when you use "new SQLiteDatabaseMBS".

But if you just have a SQLConnectionMBS and get a recordset there, the initialization may not have happened, yet.

So please simply add a line "dim d as new SQLiteDatabaseMBS" to your app.open code after registration, so the plugin part can initialize and late provide recordsets.

26.0.227 Textconverter returns only the first x characters. Why?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

Some older Xojo versions limit the Textconverter to around 1024 characters in input and output. This should be fixed with RB5.

Notes:

Xojo seems not to support Textconverters at all on Windows.

26.0.228 The type translation between CoreFoundation/Foundation and Xojo data types.

Plugin Version: all, Platform: macOS.

Answer: The plugin does conversion between Cocoa/Carbon data types and native Xojo data types. The following list help you knowing what the current plugins support:

Notes: Cocoa NSObject to Variant:

```

nil ->nil
NSDictionary ->Dictionary
NSData ->MemoryBlock
NSString ->String
NSAttributedString ->NSAttributedStringMBS
NSDate ->Date
NSNumber ->double/integer/Int64/UInt64/UInt32/Boolean
NSURL ->String
NSValue with NSRect ->NSRectMBS
NSValue with NSPoint ->NSPointMBS
NSValue with NSSize ->NSSizeMBS
NSValue with NSRange ->NSRangeMBS
NSValue with QTTime ->QTTimeMBS
NSValue with QTTimeRange ->QTTimeRangeMBS
NSArray ->Array of Variant
QuartzFilter ->QuartzFilterMBS

```

- ->*MBS

Variant to Cocoa NSObject:

```

nil ->nil
Dictionary ->NSDictionary
Boolean ->NSNumber
Integer ->NSNumber
Color ->NSColor
Int64 ->NSNumber
Single ->NSNumber
Double ->NSNumber
Date ->NSDate
MemoryBlock ->NSData
String ->NSString
NSImageMBS ->NSImage
NSAttributedStringMBS ->NSAttributedString
NSColorMBS ->NSColor
NSRectMBS ->NSValue with NSRect
NSSizeMBS ->NSValue with NSSize

```

NSPointMBS ->NSValue with NSPoint
 NSRangeMBS ->NSValue with NSRange
 NSBurnMBS ->NSBurn
 NSViewMBS ->NSView
 NSFontMBS ->NSFont
 NSParagraphStyleMBS ->NSParagraphStyle
 NSAttributedStringMBS ->NSAttributedString
 WebPolicyDelegateMBS ->WebPolicyDelegate
 WebUIDelegateMBS ->WebUIDelegate
 WebFrameLoadDelegateMBS ->WebFrameLoadDelegate
 WebResourceLoadDelegateMBS ->WebResourceLoadDelegate
 NSIndexSetMBS ->NSIndexSet
 QTTimeMBS ->QTTime
 QTTimeRangeMBS ->QTTimeRange
 Array of Variant ->NSArray
 Array of String ->NSArray
 CFStringMBS ->NSString
 CFNumberMBS ->NSNumber
 CFDataMBS ->NSData
 CFURLMBS ->NSURL
 CFArrayMBS ->NSArray
 CFDictionaryMBS ->NSDictionary
 CFBinaryDataMBS ->NSData

Carbon CTypeRef to Variant:

CFDictionaryRef ->Dictionary
 CFStringRef ->String
 CFDataRef ->String
 CFURL ->String
 CFNumber ->Integer/Double/Int64
 CFArray ->Array
 CFDate ->date
 nil ->nil
 CGColorSpace ->CGColorSpaceMBS
 CGColor ->CGColorMBS
 CGImage ->CGImageMBS
 CF* ->CF*MBS

Variant to Carbon CTypeRef:

Dictionary ->CFDictionaryRef
 Boolean ->CFBooleanRef
 Color ->CFNumberRef
 Integer ->CFNumberRef

Int64 ->CFNumberRef
Single ->CFNumberRef
Double ->CFNumberRef
String ->CFStringRef
Color ->CGColorRef
Date ->CFDateRef
nil ->nil
Memoryblock ->CFDataRef
FolderItem ->CFURLRef
Dictionary ->CFDictionaryRef
Array of Variant/String/Date/Double/Single/Int64/Integer ->CFArray
CGRectMBS ->CGRect as CFDataRef
CGSizeMBS ->CGSize as CFDataRef
CGPointMBS ->CGPoint as CFDataRef
CGColorMBS ->CGColor
CGColorSpaceMBS ->CGColorSpace
CGImageMBS ->CGImage
CGDataConsumerMBS ->CGDataConsumer
CGDataProviderMBS ->CGDataProvider
CF*MBS ->CF*

Strings without encodings should be put into dictionaries as memoryblocks.

26.0.229 Uploaded my web app with FTP, but it does not run on the server!

Plugin Version: all, Platform: Windows.

Answer: If you see errors like a simple "Segmentation Fault" on Linux or some other wired errors, you may want to check your FTP upload mode. It must be binary for web apps. ASCII mode corrupts the application.

26.0.230 What classes to use for hotkeys?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Please use CarbonHotKeyMBS class on Mac and WindowsKeyFilterMBS on Windows.

Notes: CarbonHotKeyMBS will also work fine in Cocoa apps.

26.0.231 What do I need for Linux to get picture functions working?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: In order to get our plugins working on Linux systems without GUI, the plugin loads graphics

libraries dynamically.

Notes: To get it working, the plugin tries to load gtk with this paths:

- libgtk-x11-2.0.so”
- libgtk-x11-2.0.so.0”
- /usr/lib/libgtk-x11-2.0.so”
- /usr/lib32/libgtk-x11-2.0.so”
- /usr/lib/libgtk-x11-2.0.so.0”
- /usr/lib32/libgtk-x11-2.0.so.0”

gdk is loaded with this paths:

- libgdk-x11-2.0.so”
- libgdk-x11-2.0.so.0”
- /usr/lib/libgdk-x11-2.0.so”
- /usr/lib32/libgdk-x11-2.0.so”
- /usr/lib/libgdk-x11-2.0.so.0”
- /usr/lib32/libgdk-x11-2.0.so.0”

For the paths without explicit path, the system will search in /lib, /usr/lib and all directories in the LD_LIBRARY_PATH environment variable.

26.0.232 What does the NAN code mean?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

26.0.233 What font is used as a 'small font' in typical Mac OS X apps?

Plugin Version: all, Platform: macOS.

Answer:

Xojo 4.5 has a constant "SmallSystem" to use for a font name.

For older versions try this code:

Example:

```

Sub GetThemeFont(fontType as Integer, ByRef fontName as String, ByRef fontSize as Integer, ByRef
fontName as Integer)
dim err as Integer
dim theFont, theFontSize, theFontStyle as MemoryBlock

const smSystemScript = -1

Declare Function GetThemeFont Lib "Carbon" (inFontID as Integer, inScript as Integer, outFontName
as Ptr, outFontSize as Ptr, outStyle as Ptr) as Integer

theFont = NewMemoryBlock(256) //Str255
theFontSize = NewMemoryBlock(2) //SInt16
theFontStyle = NewMemoryBlock(1) //Style

err = GetThemeFont(fontType, smSystemScript, theFont, theFontSize, theFontStyle)

if err = 0 then
fontName = theFont.PString(0)
fontSize = theFontSize.UShort(0)
fontStyle = theFontStyle.Byte(0)
else
fontName = ""
fontSize = 0
fontStyle = 0
end if
End Sub

```

26.0.234 What is last plugin version to run on Mac OS X 10.4?

Plugin Version: all, Platform: Windows.

Answer: Last Version with 10.4 support is version 15.4.

Notes: With version 15.4 you can build applications for OS X 10.4 and newer.

For Version 16.0 we disabled 10.4 and moved minimum to 10.5. We may be able to enable it again to build a version of 16.x, but may need to charge for this by hour.

26.0.235 What is last plugin version to run on PPC?

Plugin Version: all, Platform: Windows.

Answer: Last Version with PPC is 15.4.

Notes: With version 15.4 you can build PPC applications for OS X 10.4 and newer.

For Version 16.0 we disabled PPC. We may be able to enable it again to build a PPC version of 16.x, but may need to charge for this by hour.

26.0.236 What is last version of the plugins for macOS 32-bit?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Please use version 23.0 or older.

Notes: We stopped including 32-bit code for macOS in version 23.1. Please use older versions if you use an old Xojo.

Xojo 2017r3 and newer load our 64-bit plugins.

26.0.237 What is the difference between Timer and WebTimer?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Time is server side and WebTimer client side.

Notes: Timer is the normal timer class in Xojo. It runs on the server. On the side the WebTimer runs on the client. It triggers a request to the server to perform the action. So a WebTimer is good to keep the connection running and the website updated regularly. A timer on the server is good to make regular jobs like starting a database backup every 24 hours.

26.0.238 What is the list of Excel functions?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Below a list of function names known by LibXL.

Notes: LibXL parses the functions and writes tokens to the excel file. So even if Excel can do more functions, we can only accept the ones known by LibXL.

ABS, ABSREF, ACOS, ACOSH, ACTIVE.CELL, ADD.BAR, ADD.COMMAND, ADD.MENU, ADD.TOOLBAR, ADDRESS, AND, APP.TITLE, AREAS, ARGUMENT, ASC, ASIN, ASINH, ATAN, ATAN2, ATANH, AVEDEV, AVERAGE, AVERAGEA, BAHTTEXT, BETADIST, BETAINV, BINOMDIST, BREAK, CALL, CALLER, CANCEL.KEY, CEILING, CELL, CHAR, CHECK.COMMAND, CHIDIST, CHIINV, CHITEST, CHOOSE, CLEAN, CODE, COLUMN, COLUMNS, COMBIN, CONCATENATE, CONFIDENCE, CORREL, COS, COSH, COUNT, COUNTA, COUNTBLANK, COUNTIF, COVAR, CREATE.OBJECT, CRITBINOM, CUSTOM.REPEAT, CUSTOM.UNDO, DATE, DATEDIF, DATESTRING, DATEVALUE, DAVERAGE, DAY, DAYS360, DB, DBCS, DCOUNT, DCOUNTA, DDB, DEGREES, DELETE.BAR, DELETE.COMMAND, DELETE.MENU, DELETE.TOOLBAR, DEREf, DEVSQ, DGET, DIALOG.BOX, DIRECTORY, DMAX, DMIN, DOCUMENTS, DOLLAR, DPRODUCT, DSTDEV, DSTDEVP, DSUM, DVAR, DVARP, ECHO, ELSE, ELSE.IF, ENABLE.COMMAND, ENABLE.TOOL, END.IF, ERROR, ERROR.TYPE, EVALUATE, EVEN, EXACT, EXEC, EXECUTE, EXP, EXPONDIST, FACT, FALSE, FCLOSE, FDIST, FILES, FIND, FINDB, FINV, FISHER, FISHERINV, FIXED, FLOOR, FOPEN, FOR, FOR.CELL, FORECAST,

FORMULA.CONVERT, FPOS, FREAD, FREADLN, FREQUENCY, FSIZE, FTEST, FV, FWRITE, FWRITELN, GAMMADIST, GAMMAINV, GAMMALN, GEOMEAN, GET.BAR, GET.CELL, GET.CHART.ITEM, GET.DEF, GET.DOCUMENT, GET.FORMULA, GET.LINK.INFO, GET.MOVIE, GET.NAME, GET.NOTE, GET.OBJECT, GET.PIVOT.FIELD, GET.PIVOT.ITEM, GET.PIVOT.TABLE, GET.TOOL, GET.TOOLBAR, GET.WINDOW, GET.WORKBOOK, GET.WORKSPACE, GETPIVOTDATA, GOTO, GROUP, GROWTH, HALT, HARMEAN, HELP, HLOOKUP, HOUR, HYPERLINK, HYPGEOMDIST, IF, INDEX, INDIRECT, INFO, INITIATE, INPUT, INT, INTERCEPT, IPMT, IRR, ISBLANK, ISERR, ISERROR, ISLOGICAL, ISNA, ISNONTEXT, ISNUMBER, ISPMT, ISREF, ISTEXT, ISTHAIDIGIT, KURT, LARGE, LAST.ERROR, LEFT, LEFTB, LEN, LENB, LINEST, LINKS, LN, LOG, LOG10, LOGEST, LOGINV, LOGNORMDIST, LOOKUP, LOWER, MATCH, MAX, MAXA, MDETERM, MEDIAN, MID, MIDB, MIN, MINA, MINUTE, MINVERSE, MIRR, MMULT, MOD, MODE, MONTH, MOVIE.COMMAND, N, NA, NAMES, NEGBINOMDIST, NEXT, NORMDIST, NORMINV, NORMSDIST, NORMSINV, NOT, NOTE, NOW, NPER, NPV, NUMBERSTRING, ODD, OFFSET, OPEN.DIALOG, OPTIONS.LISTS.GET, OR, PAUSE, PEARSON, PERCENTILE, PERCENTRANK, PERMUT, PHONETIC, PI, PIVOT.ADD.DATA, PMT, POISSON, POKE, POWER, PPMT, PRESS.TOOL, PROB, PRODUCT, PROPER, PV, QUARTILE, RADIANS, RAND, RANK, RATE, REFTTEXT, REGISTER, REGISTER.ID, RELREF, RENAME.COMMAND, REPLACE, REPLACEB, REPT, REQUEST, RESET.TOOLBAR, RESTART, RESULT, RESUME, RETURN, RIGHT, RIGHTB, ROMAN, ROUND, ROUNDBAHTDOWN, ROUNDBAHTUP, ROUNDDOWN, ROUNDUP, ROW, ROWS, RSQ, RTD, SAVE.DIALOG, SAVE.TOOLBAR, SCENARIO.GET, SEARCH, SEARCHB, SECOND, SELECTION, SERIES, SET.NAME, SET.VALUE, SHOW.BAR, SIGN, SIN, SINH, SKEW, SLN, SLOPE, SMALL, SPELLING.CHECK, SQRT, STANDARDIZE, STDEV, STDEVA, STDEVP, STDEVPA, STEP, STEYX, SUBSTITUTE, SUBTOTAL, SUM, SUMIF, SUMPRODUCT, SUMSQ, SUMX2MY2, SUMX2PY2, SUMXMY2, SYD, T, TAN, TANH, TDIST, TERMINATE, TEXT, TEXT.BOX, TEXTREF, THAIDAYOFWEEK, THAIDIGIT, THAIMONTHOFYEAR, THAINUMSOUND, THAINUMSTRING, THAISTRINGLENGTH, THAIYEAR, TIME, TIMEVALUE, TINV, TODAY, TRANSPOSE, TREND, TRIM, TRIMMEAN, TRUE, TRUNC, TTEST, TYPE, UNREGISTER, UPPER, USDOLLAR, USERDEFINED, VALUE, VAR, VARA, VARP, VARPA, VDB, VIEW.GET, VLOOKUP, VOLATILE, WEEKDAY, WEIBULL, WHILE, WINDOW.TITLE, WINDOWS, YEAR and ZTEST.

26.0.239 What is the replacement for PluginMBS?

Plugin Version: all, Platform: macOS.

Answer: Use the SoftDeclareMBS class to load libraries dynamically.

26.0.240 What to do on Xojo reporting a conflict?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

I get an error like "This item conflicts with another item of the same name" when using one of the plugin functions.

Xojo just wants to tell you that you dropped something in the plugins folder what is not a plugin.

Notes:

Some users dropped the examples, the documentation or other files into the plugins folder. Don't do it.

26.0.241 What to do with a NSImageCacheException?

Plugin Version: all, Platforms: macOS, Windows.

Answer: You need to add exception handlers for NSExcptionMBS in order to catch this exception.

Notes: You may also add code to write the stack of the exception into a log file for later locating the error source.

A NSImage has several image representations in memory. So basicly you pass in the base image and for whatever size an image is needed, the NSImage class will create a cache image representation of the requested size so on the next query it can use that cache for the same requested size.

26.0.242 What to do with MySQL Error 2014?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can get this error on MySQL if you have a recordset open while you create another one.

26.0.243 What to do with SQL Plugin reporting Malformed string as error?

Plugin Version: all, Platform: macOS.

Answer: Please make sure the table and/or database fields have a text encoding set.

Notes: For Firebird our plugin tries to use UTF-8 encoding if possible and to correctly convert between various tables, the tables and their fields need to have a text encoding defined.

e.g. if the text field in the table is windows-1252 and the other ISO 8859-5, then the Firebird database can convert them to UTF-8 and deliver texts to the plugin.

If encoding is set to none, it may get confused for non-ascii text.

26.0.244 Where is CGGetActiveDisplayListMBS?

Plugin Version: all, Platform: Windows.

Answer: This is now CGDisplayMBS.GetActiveDisplayList.

26.0.245 Where is CGGetDisplaysWithPointMBS?

Plugin Version: all, Platform: Windows.

Answer: This is now CGDisplayMBS.GetDisplaysWithPoint.

26.0.246 Where is CGGetDisplaysWithRectMBS?

Plugin Version: all, Platform: Windows.

Answer: This is now CGDisplayMBS.GetDisplaysWithRect.

26.0.247 Where is CGGetOnlineDisplayListMBS?

Plugin Version: all, Platform: Windows.

Answer: This is now CGDisplayMBS.GetOnlineDisplayList.

26.0.248 Where is GetObjectClassNameMBS?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Please use this replacement method:

Example:

```
Function GetObjectClassNameMBS(o as Object) As string
dim t as Introspection.TypeInfo = Introspection.GetType(o)
Return t.FullName
End Function
```

Notes: GetObjectClassNameMBS was removed from the plugins.

26.0.249 Where is NetworkAvailableMBS?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: We removed NetworkAvailableMBS some versions ago. It was not working right and basically it's not useful. If you want to check whether you have a network, than do a DNS resolve:

Example:

```

// two independent domain names
const domain1 = "www.google.com"
const domain2 = "www.macsw.de"

// resolve IPs
dim ip1 as string = DNSNameToAddressMBS(Domain1)
dim ip2 as string = DNSNameToAddressMBS(Domain2)

// if we got IPs and not the same IPs (error/login pages)
if len(ip1)=0 or len(ip2)=0 or ip1=ip2 then
MsgBox "no connection"
else
MsgBox "have connection"
end if

```

Notes: This way you can detect whether you got something from DNS. And you can make sure that a DNS redirection to a login page won't catch you.

26.0.250 Where is StringHeight function in DynaPDF?

Plugin Version: all, Platform: Windows.

Answer: Use the function GetFTextHeight or GetFTextHeightEx.

Notes: Be aware that GetFTextHeight works with format commands and you may want to escape your text if you don't use them.

26.0.251 Where is XLSDocumentMBS class?

Plugin Version: all, Platform: macOS.

Answer: This class has been removed in favor of XLBookMBS class.

Notes: This classes have been removed XLSCellMBS, XLSDocumentMBS, XLSFormatRecordMBS, XLSMergedCellsMBS, XLSRowMBS and XLSSheetMBS.

26.0.252 Where to get information about file formats?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

Please visit this web page:

<http://www.wotsit.org>

26.0.253 Where to register creator code for my application?

Plugin Version: all, Platform: macOS.

Answer:

Register at Apple:

<http://developer.apple.com/dev/cftype/information.html>

26.0.254 Which Mac OS X frameworks are 64bit only?

Plugin Version: all, Platform: macOS.

Answer: Some frameworks from Mac OS X do not support 32 bit applications, so we can't provide plugins for Xojo until 64bit target is available.

Notes: For Mac OS X 10.8:

- Accounts
- EventKit
- GLKit
- Social

and in 10.9:

- Accounts
- AVKit
- EventKit
- GameController
- GLKit
- MapKit
- MediaLibrary
- Social
- SpriteKit

In general Apple makes all new frameworks being 64 bit only.

26.0.255 Which plugins are 64bit only?

Plugin Version: all, Platform: macOS.

Answer: Some of our plugins work only in 64 bit modes as operation systems do not provide 32 bit code.

Notes: This effects currently: EventKit, Accounts, Social frameworks from Apple and our matching plugins.

26.0.256 Why application doesn't launch because of a missing ddraw.dll!?

Plugin Version: all, Platform: Windows.

Answer: Some RB versions require that you install DirectX from Microsoft on your Windows.

26.0.257 Why application doesn't launch because of a missing shlwapi.dll!?

Plugin Version: all, Platform: Windows.

Answer: Some RB versions require that you install the Internet Explorer from Microsoft on your Windows.

Notes: This bug is for several older Windows 95 editions.

26.0.258 Why do I hear a beep on keydown?

Plugin Version: all, Platform: Windows.

Answer: When the user presses a key, RB goes through all keydown event handlers till on returns true.

Notes: If no keydown event handler returns true for the key, a beep is performed.

26.0.259 Why does folderitem.item return nil?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Because Xojo fails to make a folderitem for you. Reason may be an alias file which can't be resolved or simply that you don't have enough access rights to read the folder content.

Notes: A more rarely reason is that the directory changed and the file with the given index or name does no longer exist.

26.0.260 Why doesn't showurl work?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

There are three main reasons:

1. showurl is not supported by Xojo in 68k applications.
2. there is now application defined for the protocol (e.g. http) in the Internet Control panel.
3. You don't have Internet Config installed.

You can use the InternetConfigMBS class to check for this stuff.

26.0.261 Why don't the picture functions not work on Linux?

Plugin Version: all, Platform: macOS.

Answer: Please make sure libcairo is installed.

Notes: For accessing pictures on Linux, the MBS Plugin relays on the cairo library.

Please install the package if you don't have it already.

Our plugin looks for library called libcairo.so or libcairo.so.2.

26.0.262 Why have I no values in my chart?

Plugin Version: all, Platforms: macOS, Windows.

Answer: You have no data points visible, there may be several reasons:

Notes: For example one of the data values may be infinite or invalid.

Or the scaling may be out of range, so you simply see nothing.

26.0.263 Will application size increase with using plugins?

Plugin Version: all, Platform: Windows.

Answer: All plugins used by your application will be included in the application.

Notes: If you use no plugins, your application will not change size.

And if you use one class from the plugins, your application size will increase by a few kilobytes.

The documentation of the plugins include a list of all plugin parts and their sizes for the different platforms.

26.0.264 XLS: Custom format string guidelines

Plugin Version: all, Platform: macOS.

Answer: You have to download the source code and compile a static version of the library.

Notes: Up to four sections of format codes can be specified. The format codes, separated by semicolons, define the formats for positive numbers, negative numbers, zero values, and text, in that order. If only two sections are specified, the first is used for positive numbers and zeros, and the second is used for negative numbers. If only one section is specified, it is used for all numbers. Four sections example:

```
#,###.00_); [ Red ] (#,###.00);0.00;"sales "@
```

The following table describes the different symbols that are available for use in custom number formats.

Specify colors

To set the text color for a section of the format, type the name of one of the following eight colors in square brackets in the section. The color code must be the first item in the section.

Instead of using the name of the color, the color index can be used, like this [Color3] for Red. Valid numeric indexes for color range from 1 to 56, which reference by index to the legacy color palette.

Specify conditions

To set number formats that will be applied only if a number meets a specified condition, enclose the condition in square brackets. The condition consists of a comparison operator and a value. Comparison operators include: = Equal to; >Greater than; <Less than; >= Greater than or equal to, <= Less than or equal to, and <>Not equal to. For example, the following format displays numbers that are less than or equal to 100 in a red font and numbers that are greater than 100 in a blue font.

```
[ Red ] [ <=100 ] ; [ Blue ] [ >100 ]
```

If the cell value does not meet any of the criteria, then pound signs ("##") are displayed across the width of the cell.

Dates and times

Examples

26.0.265 Xojo doesn't work with your plugins on Windows 98.

Plugin Version: all, Platform: Windows.

Answer: Please upgrade your Windows version.

26.0.266 **Xojo or my RB application itself crashes on launch on Mac OS Classic.
Why?**

Plugin Version: all.

Answer:

You may check if the application has enough memory to be loaded.

RB should have on Mac OS Classic more than 20 MB of RAM.

I preferred to use 50 MB and for an application a 10 MB partition is a good way to start.

Parameter	Description
x	The x value of the data point. For an enumerated x-axis (see <code>Axis.setLabels</code> on what is an enumerated axis), the first data point is 0, and the nth data point is (n-1).
xLabel	The bottom x-axis label of the data point.
x2Label	The top x-axis label of the data point.
value	The value of the data point.
accValue	The sum of values of all data points that are in the same x position and same data group as the current data point, and with data set number less than or equal to the current data point. This is useful for stacked charts, such as stacked bar chart and stacked area chart.
totalValue	The sum of values of all data points that are in the same x position and same data group as the current data point. This is useful for stacked charts, such as stacked bar chart and stacked area chart.
percent	The percentage of the data point based on the total value of all data points that are in the same x position and same data group as the current data point. This is useful for stacked charts, such as stacked bar chart and stacked area chart.
accPercent	The accumulated percentage of the data point based on the total value of all data points that are in the same x position and same data group as the current data point. This is useful for stacked charts, such as stacked bar chart and stacked area chart.
gpercent	The percentage of the data point based on the total value of all data points in a layer.
dataSet	The data set number to which the data point belongs. The first data set is 0. The nth data set is (n-1).
dataSetName	The name of the data set to which the data point belongs.
dataItem	The data point number within the data set. The first data point is 0. The nth data point is (n-1).
dataGroup	The data group number to which the data point belongs. The first data group is 0. The nth data group is (n-1).
dataGroupName	The name of the data group to which the data point belongs.
layerId	The layer number to which the data point belongs. The first layer is 0. The nth layer is (n-1).
fieldN	The (N + 1)th extra field. For example, { field0 } means the first extra field. An extra field is an array of custom elements added using <code>Layer.addExtraField</code> , <code>Layer.addExtraField2</code> , <code>BaseChart.addExtraField</code> or <code>BaseChart.addExtraField2</code> .

diFieldN	Same as fieldN. See above.
dsFieldN	Similar to fieldN, except that dsFieldN means the extra field is indexed by data set number. The Pth data set corresponds to the Pth element of the extra field.
dsdiFieldN	Similar to fieldN, except that dsdiFieldN means the extra fields are indexed by both the data set number and data point number. The Pth data item of the Qth data set corresponds to the Pth element of the (N + Q)th extra field.

Parameter	Description
zx	The symbol scale in the x dimension. Applicable for layers with symbol scales set by <code>LineStyle.setSymbolScale</code> .
zy	The symbol scale in the y dimension. Applicable for layers with symbol scales set by <code>LineStyle.setSymbolScale</code> .
z	The symbol scale without distinguishing the dimension to use. Applicable for layers with symbol scales set by <code>LineStyle.setSymbolScale</code> .

Parameter	Description
slope	The slope of the trend line.
intercept	The y-intercept of the trend line.
corr	The correlation coefficient in linear regression analysis.
stderr	The standard error in linear regression analysis.

Parameter	Description
top	The value of the top edge of the box-whisker symbol.
bottom	The value of the bottom edge of the box-whisker symbol.
max	The value of the maximum mark of the box-whisker symbol.
min	The value of the minimum mark of the box-whisker symbol.
med	The value of the median mark of the box-whisker symbol.

Parameter	Description
high	The high value.
low	The low value.
open	The open value.
close	The close value.

Parameter	Description
dir	The direction of the vector.
len	The length of the vector.

Parameter	Description
radius	The radial value of the data point.
value	Same as { radius } . See above.
angle	The angular value of the data point.
x	Same as { angle } . See above.
label	The angular label of the data point.
xLabel	Same as { label } . See above.
name	The name of the layer to which the data point belongs.
dataSetName	Same as { name } . See above.
i	The data point number. The first data point is 0. The nth data point is (n-1).
dataItem	Same as { i } . See above.
z	The symbol scale. Applicable for layers with symbol scales set by Polar-Layer.setSymbolScale.
fieldN	The (N + 1)th extra field. For example, { field0 } means the first extra field. An extra field is an array of custom elements added using Layer.addExtraField, Layer.addExtraField2, BaseChart.addExtraField or BaseChart.addExtraField2.
diFieldN	Same as fieldN. See above.
dsFieldN	Similar to fieldN, except that dsFieldN means the extra field is indexed by layer index. The Pth layer corresponds to the Pth element of the extra field.
dsdiFieldN	Similar to fieldN, except that dsdiFieldN means the extra fields are indexed by both the data set number and data point number. The Pth data item of the Qth layer corresponds to the Pth element of the (N + Q)th extra field.
Parameter	Description
dir	The direction of the vector.
len	The length of the vector.
Parameter	Description
value	The axis value at the tick position.
label	The axis label at the tick position.
Parameter	Description
[param]	The name of the parameter
[a]	If this field a number, it specifies the number of decimal places (digits to the right of the decimal point).

[b]	The thousand separator. Should be a non-alphanumeric character (not 0-9, A-Z, a-z). Use ' '.
textasciitilde ' for no thousand separator. The default is ' '.	
textasciitilde ', which can be modified using BaseChart.setNumberFormat.	
[c]	The decimal point character. The default is '.', which can be modified using BaseChart.setNumberFormat.
[d]	The negative sign character. Use ' '.
textasciitilde ' for no negative sign character. The default is '-', which can be modified using BaseChart.setNumberFormat.	

Parameter	Description
yyyy	The year in 4 digits (e.g. 2002)
yyy	The year showing only the least significant 3 digits (e.g. 002 for the year 2002)
yy	The year showing only the least significant 2 digits (e.g. 02 for the year 2002)
y	The year showing only the least significant 1 digits (e.g. 2 for the year 2002)
mmm	The month formatted as its name. The default is to use the first 3 characters of the english month name (Jan, Feb, Mar ...). The names can be configured using BaseChart.setMonthNames.
mm	The month formatted as 2 digits from 01 - 12, adding leading zero if necessary.
m	The month formatted using the minimum number of digits from 1 - 12.
MMM	The first 3 characters of the month name converted to upper case. The names can be configured using BaseChart.setMonthNames.
MM	The first 2 characters of the month name converted to upper case. The names can be configured using BaseChart.setMonthNames.
M	The first character of the month name converted to upper case. The names can be configured using BaseChart.setMonthNames.
dd	The day of month formatted as 2 digits from 01 - 31, adding leading zero if necessary.
d	The day of month formatted using the minimum number of digits from 1 - 31.
w	The name of the day of week. The default is to use the first 3 characters of the english day of week name (Sun, Mon, Tue ...). The names can be configured using BaseChart.setWeekDayNames.
hh	The hour of day formatted as 2 digits, adding leading zero if necessary. The 2 digits will be 00 - 23 if the 'a' option (see below) is not specified, otherwise it will be 01 - 12.
h	The hour of day formatted using the minimum number of digits. The digits will be 0 - 23 if the 'a' option (see below) is not specified, otherwise it will be 01 - 12.
nn	The minute formatted as 2 digits from 00 - 59, adding leading zero if necessary.
n	The minute formatted using the minimum number of digits from 00 - 59.
ss	The second formatted as 2 digits from 00 - 59, adding leading zero if necessary.
s	The second formatted using the minimum number of digits from 00 - 59.
a	Display either 'am' or 'pm', depending on whether the time is in the morning or afternoon. The text 'am' and 'pm' can be modified using BaseChart.setAMPM.

Shape Id	Value	Description
SquareShape	1	Square shape. See (1, 1) above.
DiamondShape	2	Diamond shape. See (2, 1) above.
TriangleShape	3	Triangle shape pointing upwards. See (3, 1) above.
RightTriangleShape	4	Triangle shape pointing rightwards. See (4, 1) above.
LeftTriangleShape	5	Triangle shape pointing leftwards. See (5, 1) above.
InvertedTriangleShape	6	Triangle shape pointing downwards. See (1, 2) above.
CircleShape	7	Circle shape. See (2, 2) above.
StarShape	[Method]	Star shapes of various points. See (2, 3), (2, 4), (2, 5), (3, 1), (3, 2), (3, 3), (3, 4), (3, 5) above for stars with 3 to 10 points.
PolygonShape	[Method]	Polygon shapes symmetrical about a vertical axis with a vertex at the top center position. See (4, 1), (4, 3), (4, 5), (5, 1) for polygons of 5 to 8 sides.
Polygon2Shape	[Method]	Polygon shapes symmetrical about a vertical axis but without any vertex at the top center position. See (4, 2), (4, 4) for polygons of 5 and 6 sides.
CrossShape	[Method]	'+' shapes. See (5, 2), (5, 3), (5, 4), (5, 5), (6, 1), (6, 2), (6, 3) for '+' shape with arm width of 0.1 - 0.7.
Cross2Shape	[Method]	'X' shapes. See (6, 4), (6, 5), (7, 1), (7, 2), (7, 3), (7, 4), (7, 5) for 'X' shapes with arm width of 0.1 - 0.7.

langEnglish	0	Roman script
langFrench	1	Roman script
langGerman	2	Roman script
langItalian	3	Roman script
langDutch	4	Roman script
langSwedish	5	Roman script
langSpanish	6	Roman script
langDanish	7	Roman script
langPortuguese	8	Roman script
langNorwegian	9	Roman script
langHebrew	10	Hebrew script
langJapanese	11	Japanese script
langArabic	12	Arabic script
langFinnish	13	Roman script
langGreek	14	Greek script using smRoman script code
langIcelandic	15	modified smRoman/Icelandic script
langMaltese	16	Roman script
langTurkish	17	modified smRoman/Turkish script
langCroatian	18	modified smRoman/Croatian script
langTradChinese	19	Chinese (Mandarin) in traditional characters
langUrdu	20	Arabic script
langHindi	21	Devanagari script
langThai	22	Thai script
langKorean	23	Korean script

Nan	Meaning
1	Invalid square root (negative number, usually)
2	Invalid addition (indeterminate such as infinity + (-infinity))
4	Invalid division (indeterminate such as 0/0)
8	Invalid multiplication (indeterminate such as 0*infinity)
9	Invalid modulo such as (a mod 0)
17	Try to convert invalid string to a number like val("x7")
33	Invalid argument in a trig function
34	Invalid argument in an inverse trig function
36	Invalid argument in a log function
37	Invalid argument in Pow function
38	Invalid argument in toolbox financial function
40	Invalid argument in hyperbolic function
42	Invalid argument in a gamma function

Symbol	Description and result
0	Digit placeholder. For example, if the value 8.9 is to be displayed as 8.90, use the format #.00
#	Digit placeholder. This symbol follows the same rules as the 0 symbol. However, the application shall not display extra zeros when the number typed has fewer digits on either side of the decimal than there are # symbols in the format. For example, if the custom format is #.##, and 8.9 is in the cell, the number 8.9 is displayed.
?	Digit placeholder. This symbol follows the same rules as the 0 symbol. However, the application shall put a space for insignificant zeros on either side of the decimal point so that decimal points are aligned in the column. For example, the custom format 0.0? aligns the decimal points for the numbers 8.9 and 88.99 in a column.
. (period)	Decimal point.
%	Percentage. If the cell contains a number between 0 and 1, and the custom format 0% is used, the application shall multiply the number by 100 and add the percentage symbol in the cell.
, (comma)	Thousands separator. The application shall separate thousands by commas if the format contains a comma that is enclosed by number signs (#) or by zeros. A comma that follows a placeholder scales the number by one thousand. For example, if the format is #.0,, and the cell value is 12,200,000 then the number 12.2 is displayed.
E- E+ e- e+	Scientific format. The application shall display a number to the right of the "E" symbol that corresponds to the number of places that the decimal point was moved. For example, if the format is 0.00E+00, and the value 12,200,000 is in the cell, the number 1.22E+07 is displayed. If the number format is #0.0E+0, then the number 12.2E+6 is displayed.
\$ -+/():space	Displays the symbol. If it is desired to display a character that differs from one of these symbols, precede the character with a backslash (\). Alternatively, enclose the character in quotation marks. For example, if the number format is (000), and the value 12 is in the cell, the number (012) is displayed.
\	Display the next character in the format. The application shall not display the backslash. For example, if the number format is 0\!, and the value 3 is in the cell, the value 3! is displayed.
*	Repeat the next character in the format enough times to fill the column to its current width. There shall not be more than one asterisk in one section of the format. If more than one asterisk appears in one section of the format, all but the last asterisk shall be ignored. For example, if the number format is 0*x, and the value 3 is in the cell, the value 3xxxxxx is displayed. The number of x characters that are displayed in the cell varies based on the width of the column.
_ (underline)	Skip the width of the next character. This is useful for lining up negative and positive values in different cells of the same column. For example, the number format _(0.0_);(0.0) aligns the numbers 2.3 and -4.5 in the column even though the negative number is enclosed by parentheses.
"text"	Display whatever text is inside the quotation marks. For example, the format 0.00 "dollars" displays 1.23 dollars when the value 1.23 is in the cell.
@	Text placeholder. If text is typed in the cell, the text from the cell is placed in the format where the at symbol (@) appears. For example, if the number format is "Bob "@ Smith" (including quotation marks), and the value "John" is in the cell, the value Bob John Smith is displayed.

[Black] [Green] [White] [Blue] [Magenta] [Yellow] [Cyan] [Red]

To display	As	Use this code
Months	1-12	m
Months	01-12	mm
Months	Jan-Dec	mmm
Months	January-December	mmmm
Months	J-D	mmmmm
Days	1-31	d
Days	01-31	dd
Days	Sun-Sat	ddd
Days	Sunday-Saturday	dddd
Years	00-99	yy
Years	1900-9999	yyyy
Hours	0-23	h
Hours	00-23	hh
Minutes	0-59	m
Minutes	00-59	mm
Seconds	0-59	s
Seconds	00-59	ss
Time	4 AM	h AM/PM
Time	4:36 PM	h:mm AM/PM
Time	4:36:03 P	h:mm:ss A/P
Time	4:36:03.75	h:mm:ss.00
Elapsed time	1:02	[h] :mm
Elapsed time	62:16	[mm] :ss
Elapsed time	3735.80	[ss] .00

To display	As	Use this code
1234.59	1234.6	#####.#
8.9	8.900	#.000
.631	0.6	0.#
12	12.0	#.0#
1234.568	1234.57	#.0#
44.398	44.398	???.???
102.65	102.65	???.???
2.8	2.8	???.???
5.25	5 1/4	# ??/??
5.3	5 3/10	# ??/??
12000	12,000	#,####
12000	12	#,
12400000	12.4	0.0,,