

# MBS Network 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 Network Plugin

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# Chapter 4

## DNS

### 4.1 class DNSServiceQueryRecordMBS

#### 4.1.1 class DNSServiceQueryRecordMBS

Plugin Version: 16.1, Platforms: macOS, Windows, Targets: All.

**Function:** The class to query for an arbitrary DNS record.

**Notes:** Subclass of the DNSServiceBaseMBS class.

**Blog Entries**

- [MBS Releases the MBS Xojo / Real Studio plug-ins in version 16.1](#)

#### 4.1.2 Methods

#### 4.1.3 QueryRecord(InterfaceIndex as Integer, FullName as string, rrType as Integer, rrClass as Integer, Flags as Integer = 0) as boolean

Plugin Version: 16.1, Platforms: macOS, Windows, Targets: All.

**Function:** Query for an arbitrary DNS record.

**Notes:** Flags: kFlagsForceMulticast or kFlagsLongLivedQuery. Pass kFlagsLongLivedQuery to create a "long-lived" unicast query to a unicast DNS server that implements the protocol. This flag has no effect on link-local multicast queries.

interfaceIndex: If non-zero, specifies the interface on which to issue the query (the index for a given interface is determined via the if\_nametoindex() family of calls.) Passing 0 causes the name to be queried for on all interfaces. See "Constants for specifying an interface index" for more details.

fullname: The full domain name of the resource record to be queried for.

rrtype: The numerical type of the resource record to be queried for (e.g. kType\_PTR, kType\_SRV, etc)

rrclass: The class of the resource record (usually kClass\_IN).

Lasterror is set: Returns `kErr_NoError` on success (any subsequent, asynchronous errors are delivered to the event), otherwise returns an error code indicating the error that occurred.  
Returns false in case of error or true in case of success.

You can use `DNSServiceBaseMBS.ConstructFullName` to build the full name.

#### 4.1.4 Events

#### 4.1.5 ServiceQueryRecord(flags as Integer, InterfaceIndex as Integer, ErrorCode as Integer, Fullname as string, rrType as Integer, rrClass as Integer, Length as Integer, Data as string, ttl as Integer)

Plugin Version: 16.1, Platforms: macOS, Windows, Targets: .

**Function:** The event called when data is received for DNS query.

**Notes:** flags: Possible values are `kFlagsMoreComing` and `kFlagsAdd`. The Add flag is NOT set for PTR records with a ttl of 0, i.e. "Remove" events.

InterfaceIndex: The interface on which the query was resolved.

errorCode: Will be `kErr_NoError` on success, otherwise will indicate the failure that occurred. Other parameters are undefined if errorCode is nonzero.

fullname: The resource record's full domain name.

rrtype: The resource record's type (e.g. `kType_PTR`, `kType_SRV`, etc)

rrclass: The class of the resource record (usually `kClass_IN`).

Length: The length, in bytes, of the resource record rdata.

Data: The raw record data of the resource record.

ttl: If the client wishes to cache the result for performance reasons, the TTL indicates how long the client may legitimately hold onto this result, in seconds. After the TTL expires, the client should consider the result no longer valid, and if it requires this data again, it should be re-fetched with a new query. Of course, this only applies to clients that cancel the asynchronous operation when they get a result. Clients that leave the asynchronous operation running can safely assume that the data remains valid until they get another callback telling them otherwise.

# Chapter 5

## LDAP

### 5.1 class LDAPMBS

#### 5.1.1 class LDAPMBS

Plugin Version: 15.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The class for LDAP connection.

**Example:**

```
// Get a handle to an LDAP connection and set any session preferences.
dim l as new LDAPMBS("localhost", 389)

// Use the ProtocolVersion session preference to specify that the client is an LDAPv3 client.
l.ProtocolVersion = 3
if l.Lasterror <> 0 then
dim error as string = l.ErrorString(l.Lasterror)
Break
end if

// Bind to the server.
// In this example, the client binds anonymously to the server
// (no DN or credentials are specified).

l.SimpleBind("", "")
if l.Lasterror <> 0 then
dim error as string = l.ErrorString(l.Lasterror)
Break
end if

const BASEDN = "dc=example,dc=com"
const SCOPE = l.kScopeSubtree
```

```

const FILTER = "(sn=Jensen)"

dim results() as Dictionary = l.Search(BASEDN, SCOPE, FILTER)

for each dic as Dictionary in results
Break // look in debugger
next

```

**Notes:** On Windows we use Microsoft's WinLDAP Library.

For Mac OS X and Linux we link to OpenLDAP, so be sure to have the right package installed on Linux.

### **Blog Entries**

- [MBS Xojo Plugins, version 20.2pr1](#)
- [MBS Xojo Plugins, version 20.1pr3](#)
- [MBS Xojo Plugins, version 19.4pr1](#)
- [MonkeyBread Software Releases the MBS Xojo Plugins in version 19.3](#)
- [OpenDirectory Framework for Xojo](#)
- [MBS Xojo Plugins, version 19.2pr1](#)
- [MBS Xojo Plugins, version 18.5pr7](#)
- [MBS Xojo / Real Studio Plugins, version 17.1pr1](#)
- [MBS Xojo / Real Studio Plugins, version 16.3pr3](#)
- [MBS Xojo / Real Studio Plugins, version 15.5pr3](#)

### **Xojo Developer Magazine**

- [18.3, page 50: Happy Birthday MonkeyBread Software, What is new in the MBS Xojo Plugins by Stefanie Juchmes](#)
- [17.5, page 9: News](#)

### **5.1.2 Methods**

#### **5.1.3 Add(distinguishedName as string, attrs() as LDAPModMBS)**

Plugin Version: 15.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Adds attributes.

**Example:**

```
// add like this

dim m1 as new LDAPModMBS
dim m2 as new LDAPModMBS

m1.Operation = m1.kOperationAdd
m1.Type = "sn"
m1.addValue "yyy"

m2.Operation = m1.kOperationAdd
m2.Type = "cn"
m2.addValue "xxx"

dim attr() as LDAPModMBS
attr.Append m1
attr.Append m2

l.Add("test", attr)
```

**Notes:** The Add function initiates a synchronous add operation that adds an entry to a tree. The parent of the entry being added must already exist or the parent must be empty (equal to the root distinguished name) for an add operation to succeed.

Before calling Add, you must create an entry by specifying its attributes in LDAPModMBS objects. Set the Operator member of each structure to kOperationAdd, and set the Type and Value members as appropriate for your entry.

#### 5.1.4 Bind(Who as String, Cred as String, AuthMethod as Integer, Domain as String = "")

Plugin Version: 15.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Binds to a server with given credentials and authorization method.

**Notes:** Synchronously authenticates a client to the LDAP server.

Added domain parameter in plugin version 17.1, Windows only.

#### 5.1.5 Connect(TimeoutSeconds as Double = 1.0)

Plugin Version: 15.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Connects to server.

**Notes:** On Mac does nothing.

### 5.1.6 Constructor

Plugin Version: 15.0, Platforms: macOS, Linux, Targets: All.

**Function:** Default constructor.

**Notes:** Creates a new connection without connecting.

See also:

- 5.1.7 Constructor(IP as string, Port as Integer, Open as Boolean = false, Secure as Boolean = false) 26
- 5.1.8 Constructor(URL as string) 27

### 5.1.7 Constructor(IP as string, Port as Integer, Open as Boolean = false, Secure as Boolean = false)

Plugin Version: 15.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a connection to a LDAP server.

**Example:**

```
// connect with SSL
dim ldap as LDAPMBS

#if TargetWin32 then
ldap = new LDAPMBS("192.168.1.123", 636, false, true)
#else
ldap = new LDAPMBS("ldaps://192.168.1.123")
#endif
```

**Notes:** If open is true, we connect directly to server.

Secure: For Windows Vista and newer. Set to true for a secure connection with SSL. (only for open=false)

For connecting via SSL, please use on Mac OS X the Constructor taking the URL and specify ldaps protocol. For Windows use this constructor with secure parameter set to true.

Changed with 16.0 to work on Mac with secure = true. For Windows we switch to Open = false if secure is true.

See also:

- 5.1.6 Constructor 26

## 5.1. CLASS LDAPMBS

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- 5.1.8 Constructor(URL as string)

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### 5.1.8 Constructor(URL as string)

Plugin Version: 15.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a connection to a LDAP server.

**Example:**

```
// connect with SSL
dim ldap as LDAPMBS

#if TargetWin32 then
ldap = new LDAPMBS("192.168.1.123", 636, false, true)
#else
ldap = new LDAPMBS("ldaps://192.168.1.123")
#endif
```

**Notes:** Added Windows support in 16.0 plugins.

See also:

- 5.1.6 Constructor 26
- 5.1.7 Constructor(IP as string, Port as Integer, Open as Boolean = false, Secure as Boolean = false) 26

### 5.1.9 Delete(distinguishedName as string)

Plugin Version: 15.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Deletes an entry.

### 5.1.10 ErrorString(error as Integer) as string

Plugin Version: 15.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries an error message for an error code.

### 5.1.11 Modify(distinguishedName as string, attrs() as LDAPModMBS)

Plugin Version: 15.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Modifies an entry.

**Notes:** Please pass one LDAPModMBS for each attribute to change.

The Modify function initiates a synchronous operation to modify an existing entry. If values are being added to or replaced in the entry, the function creates the attribute, if necessary. If values are being deleted, the function removes the attribute if no values remain. All modifications are performed in the order in which they are listed.

When connecting to an LDAP 2 server, the application must perform a bind operation (by calling one of the Bind or SimpleBind routines) before attempting any other operations.

### 5.1.12 Rename(distinguishedName as string, NewDistinguishedName as String, DeleteOldRdn as Boolean)

Plugin Version: 15.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Renames an item.

See also:

- 5.1.13 Rename(distinguishedName as string, NewRDN as String, NewParent as String, DeleteOldRdn as Boolean) 28

### 5.1.13 Rename(distinguishedName as string, NewRDN as String, NewParent as String, DeleteOldRdn as Boolean)

Plugin Version: 15.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Renames an item and can move it to other parent.

See also:

- 5.1.12 Rename(distinguishedName as string, NewDistinguishedName as String, DeleteOldRdn as Boolean) 28

### 5.1.14 Search(distinguishedName as string, Scope as Integer, Filter as String, Attrs() as String = nil, AttributesOnly as boolean = false, timeout as Double = 1.0, SizeLimit as Integer = 0) as Dictionary()

Plugin Version: 15.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Search for something.

**Example:**

```
// Get a handle to an LDAP connection and set any session preferences.
dim l as new LDAPMBS("localhost", 389)
```

```

// Use the ProtocolVersion session preference to specify that the client is an LDAPv3 client.
l.ProtocolVersion = 3
if l.Lasterror <>0 then
dim error as string = l.ErrorString(l.Lasterror)
Break
end if

// Bind to the server.
// In this example, the client binds anonymously to the server
// (no DN or credentials are specified).

l.SimpleBind("", "")
if l.Lasterror <>0 then
dim error as string = l.ErrorString(l.Lasterror)
Break
end if

const BASEDN = "dc=example,dc=com"
const SCOPE = l.kScopeSubtree
const FILTER = "(sn=Jensen)"

dim results() as Dictionary = l.Search(BASEDN, SCOPE, FILTER)

for each dic as Dictionary in results
Break // look in debugger
next

```

**Notes:** The plugin will return result as array of Dictionaries, one for each item. Dictionary contains attributes with their values. A special entry has key = nil and as value the distinguish name of the item.

### 5.1.15 SimpleBind(Who as String, Cred as String)

Plugin Version: 15.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Simple bind call.

**Example:**

```

// Get a handle to an LDAP connection and set any session preferences.
dim l as new LDAPMBS("localhost", 389)

// Use the ProtocolVersion session preference to specify that the client is an LDAPv3 client.
l.ProtocolVersion = 3
if l.Lasterror <>0 then
dim error as string = l.ErrorString(l.Lasterror)

```

```

Break
end if

// Bind to the server.
// In this example, the client binds anonymously to the server
// (no DN or credentials are specified).

l.SimpleBind("", "")
if l.Lasterror <>0 then
dim error as string = l.ErrorString(l.Lasterror)
Break
end if

const BASEDN = "dc=example,dc=com"
const SCOPE = l.kScopeSubtree
const FILTER = "(sn=Jensen)"

dim results() as Dictionary = l.Search(BASEDN, SCOPE, FILTER)

for each dic as Dictionary in results
Break // look in debugger
next

```

### 5.1.16 StartTLS

Plugin Version: 19.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Sends a StartTLS request to a server, waits for the reply, and then installs TLS handlers on the session if the request succeeded.

**Notes:** Lasterror is set.

### 5.1.17 Properties

### 5.1.18 CACertFile as FolderItem

Plugin Version: 19.4, Platforms: macOS, Linux, Targets: All.

**Function:** The path for CACert file.

**Notes:** Should be PEM format.

Lasterror is set.

(Read and Write property)

## 5.1. CLASS LDAPMBS

### 5.1.19 Handle as Integer

Plugin Version: 15.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The internal object reference.

**Notes:** (Read and Write property)

### 5.1.20 Lasterror as Integer

Plugin Version: 15.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The last error code.

**Notes:** (Read and Write property)

### 5.1.21 NetworkTimeOut as Double

Plugin Version: 19.2, Platforms: macOS, Linux, Targets: All.

**Function:** The network timeout.

**Example:**

`dim l as LDAPMBS`

`l.NetworkTimeOut = 2.5 // 2.5 seconds`

**Notes:** This is the timeout for the underlying sockets.

Value is in seconds with resolution to microseconds.

(Read and Write property)

### 5.1.22 ProtocolVersion as Integer

Plugin Version: 15.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Get or set the protocol version to use.

**Notes:** (Read and Write property)

### 5.1.23 Referrals as Integer

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Specifies whether to automatically follow referrals returned by the LDAP server.

**Notes:** (Read and Write property)

### 5.1.24 TimeOut as Double

Plugin Version: 19.2, Platforms: macOS, Linux, Targets: All.

**Function:** The default timeout.

**Example:**

```
dim l as LDAPMBS
l.TimeOut = 2.5 // 2.5 seconds
```

**Notes:** Value is in seconds with resolution to microseconds.  
(Read and Write property)

### 5.1.25 Events

### 5.1.26 Error(ErrorCode as Integer, ErrorMessage as String, FunctionName as String)

Plugin Version: 15.0, Platforms: macOS, Linux, Windows, Targets: .

**Function:** The error event.

**Notes:** Called for any function which got an error. Provides for your convenience the error code, message and function name.

### 5.1.27 Constants

Auth Modes

Constant	Value	Description
kAuthDigest	&h4086	Only for Windows.
kAuthDPA	&h2086	Only for Windows.
kAuthExternal	&hA6	
kAuthKRBV4	&hFF	Only for Mac OS X and Linux.
kAuthKRBV41	&h81	Only for Mac OS X and Linux.
kAuthKRBV42	&h82	Only for Mac OS X and Linux.
kAuthMSN	&h0886	Only for Windows.
kAuthNegotiate	&h4FF	Only for Windows.
kAuthNegotiateWin	&h0486	Only for Windows.
kAuthNone	0	No auth.
kAuthNTLM	&h1086	Only for Windows.
kAuthSASL	&hA3	Only for Mac OS X and Linux.
kAuthSASLWin	&h83	Only for Windows.
kAuthSicily	&h0286	Only for Windows.
kAuthSimple	&h80	Simple authentication.
kAuthSSPI	&h4FF	Only for Windows.

## Scopes

Constant	Value	Description
kScopeBase	0	
kScopeDefault	-1	
kScopeOneLevel	1	
kScopeSubordinate	3	
kScopeSubtree	2	

## Versions

Constant	Value	Description
kVersion1	1	
kVersion2	2	
kVersion3	3	

## 5.2 class LDAPModMBS

### 5.2.1 class LDAPModMBS

Plugin Version: 15.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The class to hold values being added/modified.

**Example:**

```
dim m1 as new LDAPModMBS
```

```
m1.Operation = m1.kOperationAdd
```

```
m1.Type = "sn"
```

```
m1.addValue "yyy"
```

### 5.2.2 Methods

#### 5.2.3 addValue(value as String)

Plugin Version: 15.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Adds a value.

**Notes:** An item may have one value or several, so the plugin manages an array for you.

#### 5.2.4 clearValues

Plugin Version: 15.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Clears all values.

#### 5.2.5 Constructor

Plugin Version: 15.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The constructor.

#### 5.2.6 setValues(values() as String)

Plugin Version: 15.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Sets the values array to be the one passed.

**Notes:** Does not make a copy of the array, but references it.

### 5.2.7 Values as String()

Plugin Version: 15.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the array with values.

**Notes:** Returns not a copy, but the array used to store values.

### 5.2.8 Properties

#### 5.2.9 Operation as Integer

Plugin Version: 15.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The operation to perform.

**Notes:** Can be kOperationAdd, kOperationDelete or kOperationReplace.  
(Read and Write property)

#### 5.2.10 Type as String

Plugin Version: 15.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** String that specifies the name of the attribute to modify.

**Notes:** (Read and Write property)

#### 5.2.11 Value as String

Plugin Version: 15.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns first value.

**Notes:** Some items only have one value, so this is the value.  
(Read only property)

#### 5.2.12 Constants

Operations

Constant	Value	Description
kOperationAdd	0	Adds a value to the entry. The supplied values are appended to the existing values in the attribute.
kOperationDelete	1	Deletes a value in the entry. The supplied values are deleted from the current attribute values.
kOperationReplace	2	Replaces a value in the entry. The supplied values replace the existing attribute values.

# Chapter 6

## Network

### 6.1 class DatagramMBS

#### 6.1.1 class DatagramMBS

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The class for a datagram.

**Blog Entries**

- [MBS Xojo Plugins, version 19.1pr1](#)

#### 6.1.2 Properties

#### 6.1.3 Address as String

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The address of the datagram.

**Notes:** This is an IPv4.

(Read and Write property)

#### 6.1.4 Data as String

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The data of the datagram.

**Notes:** (Read and Write property)

### 6.1.5 Length as Integer

Plugin Version: 16.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Length of Data in bytes.

**Notes:** (Read and Write property)

### 6.1.6 Port as Integer

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The port of the datagram.

**Notes:** (Read and Write property)

### 6.1.7 rawAddress as MemoryBlock

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The raw address.

**Notes:** This is socket address structure as used in C.  
(Read and Write property)

## 6.2 class DNSLookupMBS

### 6.2.1 class DNSLookupMBS

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** A class for the result of a Lookup query.

**Example:**

```
dim d as DNSLookupMBS = DNSLookupMBS.LookupHostbyName("www.apple.com")

if d=nil then
  MsgBox "No DNS Server available?"
else
  MsgBox DNSLookupMBS.FormatIP(d.Address)
end if
```

#### Blog Entries

- [Multithreaded plugin functions can increase speed of Xojo application](#)
- [Problems with killing Xojo threads with plugin calls.](#)
- [MBS Real Studio Plugins, version 13.1pr12](#)
- [Multithreaded plugin functions can increase speed of Real Studio application](#)
- [MBS Real Studio Plugins, version 12.2pr5](#)
- [MBS Real Studio Plugins, version 11.3pr1](#)
- [MBS REALbasic Plugins Version 10.4 release notes](#)
- [MBS REALbasic Plugins, version 10.4pr3](#)

### 6.2.2 Methods

#### 6.2.3 Addresses(index as Integer) as string

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the address with the given index for this host.

**Example:**

```
dim d as DNSLookupMBS = DNSLookupMBS.LookupHostbyName("www.apple.com")

if d=nil then
  MsgBox "No DNS Server available?"
```

```

else
dim c as Integer = d.AddressesCount-1
for i as Integer = 0 to c
MsgBox d.FormatIP(d.Addresses(i))
next
end if

```

**Notes:** Index from 0 to count-1.

### 6.2.4 Aliases(index as Integer) as string

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the aliasname for the given index.

**Example:**

```

dim d as DNSLookupMBS = DNSLookupMBS.LookupHostbyName("www.apple.com")

if d=nil then
MsgBox "No DNS Server available?"
else
dim c as Integer = d.AliasCount-1
for i as Integer = 0 to c
MsgBox d.Aliases(i)
next

end if

```

**Notes:** Index is from 0 to count-1.

### 6.2.5 FormatIP(ip as string) as string

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Formats an IP from binary representation into string representation.

**Example:**

```

dim s as string = DNSLookupMBS.ParseIPv4("65.66.67.68")

MsgBox s // in binary representation of that IP

dim t as string = DNSLookupMBS.FormatIP(s)

```

MsgBox t

**Notes:** Formats both IPv4 and IPv6 IP addresses in binary representation into human readable text. On Windows IPv6 is only supported on Windows Vista and newer. Returns empty string on failure.

### 6.2.6 LookupHostbyAddress(HostAddressBinary as string) as DNSLookupMBS

Plugin Version: 11.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries the DNS server for information about a host IP address.

**Example:**

```
dim l as DNSLookupMBS
dim a as string

a = DNSLookupMBS.ParseIPv4("17.254.0.91")

// try it...
l = DNSLookupMBS.LookupHostbyAddress(a)

// success...
MsgBox l.Name
```

**Notes:** The address must be a 4 byte IP address like the ones returned by DNSLookupMBS.Address. Returns nil on any error.

### 6.2.7 LookupHostbyAddressMT(HostAddressBinary as string) as DNSLookupMBS

Plugin Version: 11.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries the DNS server for information about a host IP address.

**Example:**

```
dim l as DNSLookupMBS
dim a as string

a = DNSLookupMBS.ParseIPv4("17.254.0.91")

// try it...
l = DNSLookupMBS.LookupHostbyAddressMT(a)
```

```
// success...
MsgBox l.Name
```

**Notes:** Same as `LookupHostbyAddress`, but with additional multithreading.

The address must be a 4 byte IP address like the ones returned by `DNSLookupMBS.Address`. Returns nil on any error.

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.

### 6.2.8 `LookupHostbyName(HostName as string)` as `DNSLookupMBS`

Plugin Version: 11.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries the DNS server for information about a host name.

**Example:**

```
dim s as DNSLookupMBS = DNSLookupMBS.LookupHostbyName("www.monkeybreadsoftware.de")

dim c as Integer = s.AddressesCount-1
for i as Integer = 0 to c
  dim ss as string = s.Addresses(i)
  print str(s.FormatIP(ss))
next
```

**Notes:** Will fail if you pass an IP as an host. (e.g. 10.20.30.40)

Returns nil on any error.

See also:

- 6.2.9 `LookupHostbyName(HostName as string, AddressType as Integer)` as `DNSLookupMBS` 42

### 6.2.9 `LookupHostbyName(HostName as string, AddressType as Integer)` as `DNSLookupMBS`

Plugin Version: 11.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries the DNS server for information about a host name.

**Example:**

```
dim s as DNSLookupMBS = DNSLookupMBS.LookupHostByName("ipv6.google.com", DNSLookupMBS.AddressTypeIPv6)
```

```
if s<>nil then
dim c as Integer = s.AddressesCount-1
for i as Integer = 0 to c
dim ss as string = s.Addresses(i)
print str(s.FormatIP(ss))
next
end if
```

```
s = DNSLookupMBS.LookupHostByName("www.six.heise.de", DNSLookupMBS.AddressTypeIPv6)
```

```
if s<>nil then
dim c as Integer = s.AddressesCount-1
for i as Integer = 0 to c
dim ss as string = s.Addresses(i)
print str(s.FormatIP(ss))
next
end if
```

**Notes:** Will fail if you pass an IP as an host. (e.g. 10.20.30.40)  
Returns nil on any error.

IPv6 on Windows does not work with this method.  
See also:

- 6.2.8 LookupHostByName(HostName as string) as DNSLookupMBS

### 6.2.10 LookupHostByNameMT(HostName as string) as DNSLookupMBS

Plugin Version: 11.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries the DNS server for information about a host name.

**Example:**

```
dim s as DNSLookupMBS = DNSLookupMBS.LookupHostByNameMT("www.monkeybreadsoftware.de")
```

```
dim c as Integer = s.AddressesCount-1
for i as Integer = 0 to c
dim ss as string = s.Addresses(i)
print str(s.FormatIP(ss))
next
```

**Notes:** Same as `LookupHostbyName`, but with additional multithreading.

Will fail if you pass an IP as an host. (e.g. 10.20.30.40)

Returns nil on any error.

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.

See also:

- 6.2.11 `LookupHostbyNameMT(HostName as string, AddressType as Integer) as DNSLookupMBS` 44

### 6.2.11 `LookupHostbyNameMT(HostName as string, AddressType as Integer) as DNSLookupMBS`

Plugin Version: 11.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries the DNS server for information about a host name.

**Example:**

```
dim s as DNSLookupMBS = DNSLookupMBS.LookupHostbyNameMT("ipv6.google.com", DNSLookupMBS.AddressTypeIPv6)
```

```
if s<>nil then
dim c as Integer = s.AddressesCount-1
for i as Integer = 0 to c
dim ss as string = s.Addresses(i)
print str(s.FormatIP(ss))
next
end if
```

```
s = DNSLookupMBS.LookupHostbyNameMT("www.six.heise.de", DNSLookupMBS.AddressTypeIPv6)
```

```
if s<>nil then
dim c as Integer = s.AddressesCount-1
for i as Integer = 0 to c
dim ss as string = s.Addresses(i)
print str(s.FormatIP(ss))
next
end if
```

**Notes:** Same as `LookupHostbyName`, but with additional multithreading.

Will fail if you pass an IP as an host. (e.g. 10.20.30.40)

Returns nil on any error.

IPv6 on Windows does not work with this method.

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.

See also:

- 6.2.10 LookupHostNameMT(HostName as string) as DNSLookupMBS

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### 6.2.12 ParseIPv4(ip as string) as string

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Parses an IP address in IPv4 format.

**Example:**

```
dim s as string = DNSLookupMBS.ParseIPv4("65.66.67.68")
```

```
MsgBox s // in binary representation of that IP
```

```
dim t as string = DNSLookupMBS.FormatIP(s)
```

```
MsgBox t
```

**Notes:** Returns empty string on failure.

Works only for IPv4 strings.

### 6.2.13 ParseIPv6(ip as string) as string

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Parses an IP address in IPv6 format.

**Example:**

```
dim s as string = DNSLookupMBS.ParseIPv6("2001:0db8:85a3:08d3:1319:8a2e:0370:7344")
```

```
MsgBox s // in binary representation of that IP
```

```
dim t as string = DNSLookupMBS.FormatIP(s)
```

```
MsgBox t
```

**Notes:** Returns empty string on failure.  
Works only for IPv6 strings.

### 6.2.14 Properties

#### 6.2.15 Address as String

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The primary address of the host.

**Example:**

```
dim d as DNSLookupMBS = DNSLookupMBS.LookupHostbyName("www.apple.com")

if d=nil then
  MsgBox "No DNS Server available?"
else
  MsgBox DNSLookupMBS.FormatIP(d.Address)
end if
```

**Notes:** On TCP/IP based system the address is 4 bytes long binary string.  
(Read and Write property)

#### 6.2.16 AddressesCount as Integer

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The number of addresses for this host.

**Example:**

```
dim d as DNSLookupMBS = DNSLookupMBS.LookupHostbyName("www.apple.com")

if d=nil then
  MsgBox "No DNS Server available?"
else
  MsgBox str(d.AddressesCount)
end if
```

**Notes:** (Read and Write property)

### 6.2.17 AddressType as Integer

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The type of the address format.

**Example:**

```
dim d as DNSLookupMBS = DNSLookupMBS.LookupHostbyName("www.apple.com")

if d=nil then
  MsgBox "No DNS Server available?"
else
  MsgBox str(d.AddressType) // shows 2 for IPv4
end if
```

**Notes:** 2 for IPv2

10 for IPv10

(Read and Write property)

### 6.2.18 AliasCount as Integer

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The number of aliases for this host.

**Example:**

```
dim d as DNSLookupMBS = DNSLookupMBS.LookupHostbyName("www.apple.com")

if d=nil then
  MsgBox "No DNS Server available?"
else
  MsgBox str(d.AliasCount)
end if
```

**Notes:** (Read and Write property)

### 6.2.19 Name as String

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The name of the host.

**Example:**

```
dim d as DNSLookupMBS = DNSLookupMBS.LookupHostbyName("www.apple.com")

if d=nil then
MsgBox "No DNS Server available?"
else
MsgBox d.Name
end if
```

**Notes:** (Read and Write property)

### 6.2.20 Constants

Constants

Constant	Value	Description
AddressTypeIPv4	2	One of the address types. An IPv4 address.
AddressTypeIPv6	10	One of the address types. An IPv6 address.

## 6.3 class DNSServiceAddrInfoMBS

### 6.3.1 class DNSServiceAddrInfoMBS

Plugin Version: 15.0, Platforms: macOS, Windows, Targets: All.

**Function:** The class to query IP Address for hostname asynchronously.

**Notes:** Queries for the IP address of a hostname by using either Multicast or Unicast DNS.

Subclass of the DNSServiceBaseMBS class.

#### Blog Entries

- [MBS Xojo Plugins, version 18.1pr3](#)
- [MBS Xojo / Real Studio Plugins, version 16.5pr3](#)
- [MonkeyBread Software Releases the MBS Xojo / Real Studio plug-ins in version 15.0](#)
- [MBS Xojo / Real Studio Plugins, version 15.0pr8](#)

### 6.3.2 Methods

#### 6.3.3 AddrInfo(InterfaceIndex as Integer, protocol as Integer, HostName as string) as boolean

Plugin Version: 15.0, Platforms: macOS, Windows, Targets: All.

**Function:** Queries for the IP address of a hostname by using either Multicast or Unicast DNS.

**Notes:** interfaceIndex: The interface on which to issue the query. Passing 0 causes the query to be sent on all active interfaces via Multicast or the primary interface via Unicast.

protocol: Pass in kDNSServiceProtocol\_IPv4 to look up IPv4 addresses, or kDNSServiceProtocol\_IPv6 to look up IPv6 addresses, or both to look up both kinds. If neither flag is set, the system will apply an intelligent heuristic, which is (currently) that it will attempt to look up both, except:

If "hostname" is a wide-area unicast DNS hostname (i.e. not a ".local." name) but this host has no routable IPv6 address, then the call will not try to look up IPv6 addresses for "hostname", since any addresses it found would be unlikely to be of any use anyway. Similarly, if this host has no routable IPv4 address, the call will not try to look up IPv4 addresses for "hostname".

hostname: The fully qualified domain name of the host to be queried for.

Lasterror is set to kDNSServiceErr\_NoError (0) on success (any subsequent, asynchronous errors are delivered to the callback), otherwise returns an error code indicating the error that occurred.

Returns false on any error and true on success. Please check lasterror property when false is returned.

### 6.3.4 Available as boolean

Plugin Version: 15.0, Platforms: macOS, Windows, Targets: All.

**Function:** Whether this class is available for use.

**Notes:** Older versions of Bonjour did not have such functions, so there it may not be available.

### 6.3.5 Events

#### 6.3.6 ServiceAddrInfo(Flags as Integer, InterfaceIndex as Integer, ErrorCode as Integer, AddressFamily as Integer, IP as string, SockAddr as MemoryBlock, HostName as string, ttl as Integer)

Plugin Version: 15.0, Platforms: macOS, Windows, Targets: .

**Function:** The event called when something is found.

**Notes:** Flags: Possible values are kDNSServiceFlagsMoreComing and kDNSServiceFlagsAdd.

interfaceIndex: The interface to which the answers pertain.

errorCode: Will be kDNSServiceErr\_NoError (0) on success, otherwise will indicate the failure that occurred. Other parameters are undefined if errorCode is nonzero.

hostname: The fully qualified domain name of the host to be queried for.

address: IPv4 or IPv6 address.

ttl: If the client wishes to cache the result for performance reasons, the TTL indicates how long the client may legitimately hold onto this result, in seconds. After the TTL expires, the client should consider the result no longer valid, and if it requires this data again, it should be re-fetched with a new query. Of course, this only applies to clients that cancel the asynchronous operation when they get a result. Clients that leave the asynchronous operation running can safely assume that the data remains valid until they get another callback telling them otherwise.

### 6.3.7 Constants

Address families

Constant	Value	Description
kAddressFamilyIPv4	2	IPv4 protocol
kAddressFamilyIPv6	30	IPv6 protocol

Protocols

Constant	Value	Description
kProtocolAuto	0	Automatic decide.
kProtocolIPv4	1	IPv4 protocol
kProtocolIPv6	2	IPv6 protocol

## 6.4 class DNSServiceBaseMBS

### 6.4.1 class DNSServiceBaseMBS

Plugin Version: 10.1, Platforms: macOS, Windows, Targets: All.

**Function:** The base DNS Service class.

**Blog Entries**

- [MBS Xojo / Real Studio Plugins, version 15.1pr1](#)
- [MBS Xojo / Real Studio Plugins, version 14.2pr4](#)

### 6.4.2 Methods

### 6.4.3 Available as boolean

Plugin Version: 10.1, Platforms: macOS, Windows, Targets: All.

**Function:** Whether Bonjour (zeroconfig) is installed and useable.

**Notes:** If this function returns true, all the needed stuff is installed and the function have been loaded.

### 6.4.4 Close

Plugin Version: 10.1, Platforms: macOS, Windows, Targets: All.

**Function:** Stops the current request and releases all used memory.

**Notes:** This is done automatically for you by the destructor.

### 6.4.5 ConstructFullName(Service as string, regtype as string, domain as string) as string

Plugin Version: 10.1, Platforms: macOS, Windows, Targets: All.

**Function:** Concatenate a three-part domain name (as returned by the above callbacks) into a properly-escaped full domain name.

**Notes:** Note that events in the above functions ALREADY ESCAPE strings where necessary.

service: The service name - any dots or backslashes must NOT be escaped. May be "" (to construct a PTR record name, e.g. "\_ftp.\_tcp.apple.com").

regtype: The service type followed by the protocol, separated by a dot (e.g. "\_ftp.\_tcp").

domain: The domain name, e.g. "apple.com.". Literal dots or backslashes, if any, must be escaped, e.g.

"1st\Floor.apple.com."

Returns 0 on success, -1 on error.

### 6.4.6 GetDaemonVersion as Integer

Plugin Version: 10.1, Platforms: macOS, Windows, Targets: All.

**Function:** Queries the version of the daemon.

**Notes:** Value is zero on any error.

### 6.4.7 Initialize

Plugin Version: 15.1, Platform: Windows, Targets: All.

**Function:** Initializes API.

**Notes:** On Windows the plugin calls this internally at startup of application.

Now if your app installs Bonjour while running, you can call this method to let the plugin load the Bonjour dll.

After successful call, the available functions return true.

Does nothing on Mac OS X or Linux.

### 6.4.8 Running as boolean

Plugin Version: 10.1, Platforms: macOS, Windows, Targets: All.

**Function:** True if there is a running request.

### 6.4.9 Properties

#### 6.4.10 Handle as Integer

Plugin Version: 10.1, Platforms: macOS, Windows, Targets: All.

**Function:** The handle for this request.

**Notes:** (Read and Write property)

### 6.4.11 Lasterror as Integer

Plugin Version: 10.1, Platforms: macOS, Windows, Targets: All.

**Function:** The last error code reported.

**Notes:** 0 if the function succeeded.

-1 if the function used was not available.

See the `kError` constants for possible errors.

(Read and Write property)

### 6.4.12 Constants

Constants

Constant	Value	Description
kClassIN	1	The DNS class for Internet services.
kErrorAlreadyRegistered	-65547	One of the error constants.
kErrorBadFlags	-65543	One of the error constants.
kErrorBadInterfaceIndex	-65552	One of the error constants.
kErrorBadParam	-65540	One of the error constants.
kErrorBadReference	-65541	One of the error constants.
kErrorBadState	-65542	One of the error constants.
kErrorBadTime	-65559	One of the error constants.
kErrorDoubleNAT	-65558	One of the error constants.
kErrorFirewall	-65550	One of the error constants.
kErrorIncompatible	-65551	One of the error constants.
kErrorInvalid	-65549	One of the error constants.
kErrorNameConflict	-65548	One of the error constants.
kErrorNATTraversal	-65557	One of the error constants.
kErrorNoAuth	-65555	One of the error constants.
kErrorNoError	0	One of the error constants.
kErrorNoMemory	-65539	One of the error constants.
kErrorNoSuchKey	-65556	One of the error constants.
kErrorNoSuchName	-65538	One of the error constants.
kErrorNoSuchRecord	-65554	One of the error constants.
kErrorNotInitialized	-65545	One of the error constants.
kErrorRefused	-65553	One of the error constants.
kErrorUnknown	-65537	One of the error constants.
kErrorUnsupported	-65544	One of the error constants.
kFlagsAdd	2	A flag for domain enumeration and browse/query events. "Default" applies only to enumeration and is only valid in conjunction with "Add". An enumeration callback with the "Add" flag NOT set indicates a "Remove", i.e. the domain is no longer valid.
kFlagsAllowRemoteQuery	&h200	Flag for creating a record for which we will answer remote queries (queries from hosts more than one hop away; hosts not directly connected to the local link).
kFlagsBrowseDomains	&h40	Flags for specifying domain enumeration type in <code>DNSServiceEnumerateDomains</code> . <code>BrowseDomains</code> enumerates domains recommended for browsing, <code>RegistrationDomains</code> enumerates domains recommended for registration.
kFlagsDefault	4	A flag for domain enumeration and browse/query events. "Default" applies only to enumeration and is only valid in conjunction with "Add". An enumeration callback with the "Add" flag NOT set indicates a "Remove", i.e. the domain is no longer valid.
kFlagsForceMulticast	&h400	One of the flags. Flag for signifying that a query or registration should be performed exclusively via multicast DNS, even for a name in a domain (e.g. foo.apple.com.) that would normally imply unicast DNS.
kFlagsLongLivedQuery	&h100	Flag for creating a long-lived unicast query for the <code>QueryRecord</code> call.
kFlagsMoreComing	1	One of the flags used for the events. <code>MoreComing</code> indicates to a callback that at least one more result is queued and will be delivered following immediately after this one. Applications should not update their UI to display browse results when the <code>MoreComing</code> flag is set, because this would result in a great deal of ugly flickering on the screen. Applications should instead wait until <code>MoreComing</code> is not set, and then update their UI. When <code>MoreComing</code> is not set, that doesn't mean there will be no more answers EVER, just that there are no more answers immediately available right now at this instant. If more answers become available in the future they will be delivered as usual.
kFlagsNoAutoRename	8	The flag for specifying renaming behavior on name conflict when registering non-shared records. By default, name conflicts are automatically handled by renaming the service. <code>NoAutoRename</code> overrides this behavior - with this flag set, name conflicts will result in a callback. The <code>NoAutorename</code> flag is only valid if a name is explicitly

## 6.5 class DNSServiceBrowseMBS

### 6.5.1 class DNSServiceBrowseMBS

Plugin Version: 5.0, Platforms: macOS, Windows, Targets: All.

**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 Rendezvous.

This class requires Mac OS X 10.3 or Windows (with installed Bonjour support and the dnssd.dll) to work. Use DNSServiceDiscoveryBrowseMBS if you want to support Mac OS X 10.2.

common error codes:

kDNSServiceErr_NoError	= 0
kDNSServiceErr_Unknown	= -65537 (=0xFFFF FFFF)
kDNSServiceErr_NoSuchName	= -65538
kDNSServiceErr_NoMemory	= -65539
kDNSServiceErr_BadParam	= -65540
kDNSServiceErr_BadReference	= -65541
kDNSServiceErr_BadState	= -65542
kDNSServiceErr_BadFlags	= -65543
kDNSServiceErr_Unsupported	= -65544
kDNSServiceErr_NotInitialized	= -65545
kDNSServiceErr_AlreadyRegistered	= -65547
kDNSServiceErr_NameConflict	= -65548
kDNSServiceErr_Invalid	= -65549
kDNSServiceErr_Incompatible	= -65551 (client library incompatible with daemon)
kDNSServiceErr_BadinterfaceIndex	= -65552

Subclass of the DNSServiceBaseMBS class.

### 6.5.2 Methods

#### 6.5.3 Browse(InterfaceIndex as Integer, servicetype as string, domain as string) as boolean

Plugin Version: 5.0, Platforms: macOS, Windows, Targets: All.

**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.

You need to keep this object alive (keep a reference in a window, a module or your app class) so you can receive events.

In a perfect application you use `DNSServiceDomainEnumerationMBS` class to enumerate which domains you should use.

Returns false on any error and true on success. Please check `lasterror` property when false is returned.

#### 6.5.4 Events

#### 6.5.5 ServiceBrowse(Flags as Integer, InterfaceIndex as Integer, ErrorCode as Integer, ServiceName as string, RegType as string, Domain as string)

Plugin Version: 5.0, Platforms: macOS, Windows, Targets: .

**Function:** New service found or lost one.

**Example:**

```
sub ServiceBrowse(Flags as Integer, InterfaceIndex as Integer, ErrorCode as Integer, ServiceName as string,
RegType as string, Domain as string)
// example for event implementation

const kDNSServiceFlagsAdd = 2
const kDNSServiceFlagsRemove = 0
const kDNSServiceFlagsMoreComing = 1
const kDNSServiceFlagsFinished = 0

dim Added as boolean = bitwiseAnd(flags, kDNSServiceFlagsAdd) = kDNSServiceFlagsAdd
dim Removed as boolean = bitwiseAnd(flags, kDNSServiceFlagsAdd) = kDNSServiceFlagsRemove

dim MoreComing as boolean = bitwiseAnd(flags, kDNSServiceFlagsMoreComing) = kDNSServiceFlagsMore-
Coming
dim Finished as boolean = bitwiseAnd(flags, kDNSServiceFlagsMoreComing) = kDNSServiceFlagsFinished

// work with the booleans to decide what to do.

end sub
```

**Notes:** Values for flags:

<code>kDNSServiceFlagsAdd</code>	= 2
<code>kDNSServiceFlagsRemove</code>	= 0 (i.e. bit not set)
<code>kDNSServiceFlagsMoreComing</code>	= 1
<code>kDNSServiceFlagsFinished</code>	= 0 (i.e. bit not set)

`MoreComing` indicates to a Browse callback that another result is queued. Applications should not update their UI to display browse results when the `MoreComing` flag is set, instead deferring the update until the callback's flag is `Finished`.

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.

`InterfaceIndex` can be `kInterfaceIndexLocalOnly`, `kInterfaceIndexAny` or a positive index for the interface index (1 = first device).

For interface indexes, please also check `NetworkInterfaceMBS` class.

## 6.6 class `DNSServiceDomainEnumerationMBS`

### 6.6.1 class `DNSServiceDomainEnumerationMBS`

Plugin Version: 5.0, Platforms: macOS, Windows, Targets: All.

**Function:** A class for Apple's implementation of ZeroConfig named Bonjour.

**Notes:** This class allows you to enumerate domains.

This class requires Mac OS X 10.3 or Windows (with installed Bonjour support and the dnssd.dll) to work. Use `DNSServiceDiscoveryBrowseMBS` if you want to support Mac OS X 10.2.

common error codes:

<code>kDNSServiceErr_NoError</code>	= 0
<code>kDNSServiceErr_Unknown</code>	= -65537 (= &hFFFE FFFF)
<code>kDNSServiceErr_NoSuchName</code>	= -65538
<code>kDNSServiceErr_NoMemory</code>	= -65539
<code>kDNSServiceErr_BadParam</code>	= -65540
<code>kDNSServiceErr_BadReference</code>	= -65541
<code>kDNSServiceErr_BadState</code>	= -65542
<code>kDNSServiceErr_BadFlags</code>	= -65543
<code>kDNSServiceErr_Unsupported</code>	= -65544
<code>kDNSServiceErr_NotInitialized</code>	= -65545
<code>kDNSServiceErr_AlreadyRegistered</code>	= -65547
<code>kDNSServiceErr_NameConflict</code>	= -65548
<code>kDNSServiceErr_Invalid</code>	= -65549
<code>kDNSServiceErr_Incompatible</code>	= -65551 (client library incompatible with daemon)
<code>kDNSServiceErr_BadinterfaceIndex</code>	= -65552

Subclass of the `DNSServiceBaseMBS` class.

### 6.6.2 Methods

### 6.6.3 `EnumerateDomains(Flags as Integer, InterfaceIndex as Integer)` as boolean

Plugin Version: 5.0, Platforms: macOS, Windows, Targets: All.

**Function:** Asynchronously enumerate domains available for browsing and registration.

**Notes:** Note that the names returned are (like all of DNS-SD) UTF-8 strings, and are escaped using standard DNS escaping rules.

A graphical browser displaying a hierarchical tree-structured view should cut the names at the bare dots to yield individual labels, then de-escape each label according to the escaping rules, and then display the resulting UTF-8 text.

Flags for specifying domain enumeration type in `DNSServiceEnumerateDomains`.

`BrowseDomains` enumerates domains recommended for browsing, `RegistrationDomains` enumerates domains recommended for registration:

```
kDNSServiceFlagsBrowseDomains      = 64
kDNSServiceFlagsRegistrationDomains = 128
```

You need to keep this object alive (keep a reference in a window, a module or your app class) so you can receive events.

For interface indexes, please also check `NetworkInterfaceMBS` class.

Returns false on any error and true on success. Please check `lasterror` property when false is returned.

#### 6.6.4 Events

#### 6.6.5 `ServiceDomainEnumeration(flags as Integer, interfaceIndex as Integer, errorcode as Integer, Domain as string)`

Plugin Version: 5.0, Platforms: macOS, Windows, Targets: .

**Function:** Domains changed.

**Notes:** Flags uses this flags: `kFlagsAdd`, `kFlagsDefault`.

”Default” applies only to enumeration and is only valid in conjunction with ”Add”

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.

For interface indexes, please also check `NetworkInterfaceMBS` class.

## 6.7 class DNSServiceRegisterMBS

### 6.7.1 class DNSServiceRegisterMBS

Plugin Version: 5.0, Platforms: macOS, Windows, Targets: All.

**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.

This class requires Mac OS X 10.3 or Windows (with installed Bonjour support and the dnssd.dll) to work. Use DNSServiceDiscoveryBrowseMBS if you want to support Mac OS X 10.2.

common error codes:

kDNSServiceErr_NoError	= 0
kDNSServiceErr_Unknown	= -65537 (=0xFFFF FFFF)
kDNSServiceErr_NoSuchName	= -65538
kDNSServiceErr_NoMemory	= -65539
kDNSServiceErr_BadParam	= -65540
kDNSServiceErr_BadReference	= -65541
kDNSServiceErr_BadState	= -65542
kDNSServiceErr_BadFlags	= -65543
kDNSServiceErr_Unsupported	= -65544
kDNSServiceErr_NotInitialized	= -65545
kDNSServiceErr_AlreadyRegistered	= -65547
kDNSServiceErr_NameConflict	= -65548
kDNSServiceErr_Invalid	= -65549
kDNSServiceErr_Incompatible	= -65551 (client library incompatible with daemon)
kDNSServiceErr_BadinterfaceIndex	= -65552

Subclass of the DNSServiceBaseMBS class.

#### Blog Entries

- [Using ServerSocket with a system chosen port](#)

### 6.7.2 Methods

### 6.7.3 AddRecord(rrType as Integer, TXTRecord as string, ttl as Integer)

Plugin Version: 8.0, Platforms: macOS, Windows, Targets: All.

**Function:** Add a record to a registered service.

**Notes:** Lasterror is set.

The name of the record will be the same as the registered service's name. The record can later be updated or deregistered by UpdateRecord() or RemoveRecord().

rrtype: The type of the record (e.g. kTypeTXT, kTypeSRV, etc)

data: The raw rdata to be contained in the added resource record.

ttl: The time to live of the resource record, in seconds. Pass 0 to use a default value.

Returns false on any error and true on success. Please check lasterror property when false is returned.

#### 6.7.4 Register(Flags as Integer, interfaceIndex as Integer, servicename as string, servicetype as string, domain as string, host as string, port as Integer, txtRecord as string) as boolean

Plugin Version: 5.0, Platforms: macOS, Windows, Targets: All.

**Function:** Register a service that is discovered via Browse() and Resolve() calls.

**Notes:** Flag for specifying renaming behavior on name conflict when registering non-shared records. NoAutorename is only valid if a name is explicitly specified when registering a service (ie the default name is not used.)

```
kDNSServiceFlagsNoAutoRename    = 8,
kDNSServiceFlagsAutoRename      = 0 (i.e. bit not set)
```

You need to keep this object alive (keep a reference in a window, a module or your app class) so you can receive events.

In a perfect application you use DNSServiceDomainEnumerationMBS class to enumerate which domains you should use.

For interface indexes, please also check NetworkInterfaceMBS class.

Returns false on any error and true on success. Please check lasterror property when false is returned.

#### 6.7.5 RemoveRecord

Plugin Version: 8.0, Platforms: macOS, Windows, Targets: All.

**Function:** Remove a record previously added to a service record set via AddTextRecord.

**Notes:** Returns false on any error and true on success. Please check lasterror property when false is returned.

### 6.7.6 UpdateRecord(TXTRecord as string, ttl as Integer)

Plugin Version: 10.1, Platforms: macOS, Windows, Targets: All.

**Function:** Changes the TXT Record.

**Notes:** data is the TXT Record composed of Pascal Strings.

ttl = time to live.

Returns false on any error and true on success. Please check lasterror property when false is returned.

### 6.7.7 Events

### 6.7.8 ServiceRegistration(flags as Integer, errorcode as Integer, Name as string, RegType as string, Domain as string)

Plugin Version: 5.0, Platforms: macOS, Windows, Targets: .

**Function:** Registration was done.

**Notes:** 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.

## 6.8 class DNSServiceRegisterRecordMBS

### 6.8.1 class DNSServiceRegisterRecordMBS

Plugin Version: 8.0, Platforms: macOS, Windows, Targets: All.

**Function:** A class for Apple's implementation of ZeroConfig named Bonjour.

**Notes:** This class is to register a name record with the dns service.

Subclass of the DNSServiceBaseMBS class.

### 6.8.2 Methods

#### 6.8.3 RegisterRecord(Flags as Integer, interfaceIndex as Integer, fullname as string, rrtype as Integer, rrClass as Integer, data as string, ttl as Integer) as boolean

Plugin Version: 8.0, Platforms: macOS, Windows, Targets: All.

**Function:** Registers a record on the DNS system.

**Example:**

```
const kDNSServiceClass_IN = 1
const kDNSServiceType_SRV = 33
const kDNSServiceFlagsShared = &h10
const kDNSServiceFlagsUnique = &h20
```

**Notes:** flags: Possible values are kDNSServiceFlagsShared or kDNSServiceFlagsUnique (see flag type definitions for details).

interfaceIndex: If non-zero, specifies the interface on which to register the record (the index for a given interface is determined via the if\_nametoindex() family of calls.) Passing 0 causes the record to be registered on all interfaces. See "Constants for specifying an interface index" for more details.

fullname: The full domain name of the resource record.

rrtype: The numerical type of the resource record (e.g. kDNSServiceType\_PTR, kDNSServiceType\_SRV, etc)

rrclass: The class of the resource record (usually kDNSServiceClass\_IN)

data: the raw rdata, as it is to appear in the DNS record.

ttl: The time to live of the resource record, in seconds. Pass 0 to use a default value.

Lasterror is set. kDNSServiceErr\_NoError on success (any subsequent, asynchronous errors are delivered to the event), otherwise returns an error code indicating the error that occurred (the event is never invoked)

You need to keep this object alive (keep a reference in a window, a module or your app class) so you can receive events.

For interface indexes, please also check `NetworkInterfaceMBS` class.

Returns false on any error and true on success. Please check `lasterror` property when false is returned.

#### 6.8.4 UpdateRecord(TXTRecord as string, ttl as Integer)

Plugin Version: 8.0, Platforms: macOS, Windows, Targets: All.

**Function:** Changes the TXT Record.

**Notes:** data is the TXT Record composed of Pascal Strings.

ttl = time to live.

Returns false on any error and true on success. Please check `lasterror` property when false is returned.

#### 6.8.5 Events

#### 6.8.6 ServiceRegistration(flags as Integer, errorcode as Integer)

Plugin Version: 8.0, Platforms: macOS, Windows, Targets: .

**Function:** Registration was done.

**Notes:** 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.

## 6.9 class DNSServiceResolveMBS

### 6.9.1 class DNSServiceResolveMBS

Plugin Version: 5.0, Platforms: macOS, Windows, Targets: All.

**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.

This class requires Mac OS X 10.3 or Windows (with installed Bonjour support and the dnssd.dll) to work. Use DNSServiceDiscoveryBrowseMBS if you want to support Mac OS X 10.2.

common error codes:

kDNSServiceErr_NoError	= 0
kDNSServiceErr_Unknown	= -65537 (= &hFFFE FFFF)
kDNSServiceErr_NoSuchName	= -65538
kDNSServiceErr_NoMemory	= -65539
kDNSServiceErr_BadParam	= -65540
kDNSServiceErr_BadReference	= -65541
kDNSServiceErr_BadState	= -65542
kDNSServiceErr_BadFlags	= -65543
kDNSServiceErr_Unsupported	= -65544
kDNSServiceErr_NotInitialized	= -65545
kDNSServiceErr_AlreadyRegistered	= -65547
kDNSServiceErr_NameConflict	= -65548
kDNSServiceErr_Invalid	= -65549
kDNSServiceErr_Incompatible	= -65551 (client library incompatible with daemon)
kDNSServiceErr_BadinterfaceIndex	= -65552

Subclass of the DNSServiceBaseMBS class.

### 6.9.2 Methods

#### 6.9.3 Resolve(InterfaceIndex as Integer, servicename as string, servicetype as string, domain as string) as boolean

Plugin Version: 10.1, Platforms: macOS, Windows, Targets: All.

**Function:** Resolves a named instance of a service to its address, port, and (optionally) a text description.

**Notes:** You need to keep this object alive (keep a reference in a window, a module or your app class) so you can receive events.

If you call this method in response to a browse call, please pass the domain string you got in the Service-

Browse event and do not replace it with something else.

For interface indexes, please also check `NetworkInterfaceMBS` class.

Returns false on any error and true on success. Please check `lasterror` property when false is returned.

#### 6.9.4 Events

#### 6.9.5 `ServiceResolve(flags as Integer, InterfaceIndex as Integer, ErrorCode as Integer, Fullname as string, Hosttarget as string, Port as Integer, TxtRecord as string)`

Plugin Version: 10.1, Platforms: macOS, Windows, Targets: .

**Function:** Resolve got something.

**Notes:** 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.

For interface indexes, please also check `NetworkInterfaceMBS` class.

## 6.10 class NetSNMPMBS

### 6.10.1 class NetSNMPMBS

Plugin Version: 17.3, Platforms: macOS, Linux, Targets: All.

**Function:** The class to do SNMP queries.

**Example:**

```
dim s as new NetSNMPMBS
```

```
s.Community = "demopublic"
```

```
s.IP = "test.net-snmp.org"
```

```
dim r as string = s.Query("system.sysUpTime.0")
```

```
MsgBox r
```

**Notes:** Performs a SNMP GET query.

Using version 1, no authentication and no security options.

**Blog Entries**

- [Multithreaded plugin functions can increase speed of Xojo application](#)
- [MBS Xojo Plugins, version 18.2pr1](#)
- [Problems with killing Xojo threads with plugin calls.](#)
- [MonkeyBread Software Releases the MBS Xojo Plugins in version 17.3](#)
- [MBS Xojo Plugins, version 17.3pr2](#)
- [MBS Xojo Plugins, version 17.3pr1](#)

**Videos**

- [Presentation from Munich conference about MBS Plugins.](#)
- [Presentation from London conference about MBS Plugins.](#)

**Xojo Developer Magazine**

- [15.5, page 9: News](#)

### 6.10.2 Methods

### 6.10.3 Constructor

Plugin Version: 17.3, Platforms: macOS, Linux, Targets: All.

**Function:** The constructor.

### 6.10.4 Destructor

Plugin Version: 17.3, Platforms: macOS, Linux, Targets: All.

**Function:** The destructor.

### 6.10.5 Query(ObjectID as String) as String

Plugin Version: 17.3, Platforms: macOS, Linux, Targets: All.

**Function:** Performs a SNMP Get Query

**Example:**

```
dim s as new NetSNMPMBS

s.Community = "demopublic"
s.IP = "test.net-snmp.org"

dim r as string = s.Query("system.sysUpTime.0")

MsgBox r
```

**Notes:** Please set community and IP properties before.  
LastError and ErrorMessage properties are set.

### 6.10.6 QueryMT(ObjectID as String) as String

Plugin Version: 17.3, Platforms: macOS, Linux, Targets: All.

**Function:** Performs a SNMP Get Query

**Example:**

```
dim s as new NetSNMPMBS
```

```
s.Community = "demopublic"  
s.IP = "test.net-snmp.org"  
  
dim r as string = s.Query("system.sysUpTime.0")
```

MsgBox r

**Notes:** Please set community and IP properties before.  
LastError and ErrorMessage properties are set.

Same as Query, but thread friendly.

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.

### 6.10.7 Properties

### 6.10.8 Community as String

Plugin Version: 17.3, Platforms: macOS, Linux, Targets: All.

**Function:** The community name to use.

**Notes:** e.g. "public"  
(Read and Write property)

### 6.10.9 ErrorMessage as String

Plugin Version: 17.3, Platforms: macOS, Linux, Targets: All.

**Function:** The last error message as text.

**Notes:** (Read and Write property)

### 6.10.10 IP as String

Plugin Version: 17.3, Platforms: macOS, Linux, Targets: All.

**Function:** The IP and port to connect to.

**Notes:** e.g. "192.168.2.5:1234"

(Read and Write property)

### 6.10.11 LastError as Integer

Plugin Version: 17.3, Platforms: macOS, Linux, Targets: All.

**Function:** The last error code.

**Notes:** (Read and Write property)

### 6.10.12 MaximumReceiveBufferSize as Integer

Plugin Version: 17.3, Platforms: macOS, Linux, Targets: All.

**Function:** The maximum bytes to allocate for receiving buffer.

**Notes:** By default 100000 bytes.

(Read and Write property)

### 6.10.13 Retries as Integer

Plugin Version: 17.3, Platforms: macOS, Linux, Targets: All.

**Function:** Number of retries.

**Notes:** Default is -1 to use system default.

(Read and Write property)

### 6.10.14 Timeout as Integer

Plugin Version: 17.3, Platforms: macOS, Linux, Targets: All.

**Function:** Timeout in seconds.

**Notes:** Default is -1 to use system default.

(Read and Write property)

## 6.11 Globals

### 6.11.1 DNSAddressToNameIPv6MBS(HostAddress as string) as string

Plugin Version: 8.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Resolves an IP to it's name.

**Notes:** Only for IPv6.

Returns "" on any error (like no name known).

Improved in 13.1 plugins to work on all platforms.

**Blog Entries**

- [MBS Real Studio Plugins, version 13.1pr13](#)

### 6.11.2 DNSAddressToNameMBS(HostAddress as string) as string

Plugin Version: 4.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Resolves an IP to it's name.

**Notes:** Only for IPv4.

Returns "" on any error (like no name known).

Improved in 13.1 plugins to work on all platforms.

**Blog Entries**

- [MBS Real Studio Plugins, version 13.1pr13](#)

### 6.11.3 DNSNameToAddressIPv6MBS(HostName as string) as string

Plugin Version: 8.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Resolves the IP address for this name.

**Example:**

```
msgBox dnsnameToAddressIPv6MBS("localhost") + endofLine + dnsnameToAddressMBS("localhost")
```

**Notes:** Only for IPv6.

Returns "" on any error (like no name known).

Improved in 13.1 plugins to work on all platforms.

**Blog Entries**

- [MBS Xojo / Real Studio Plugins, version 13.3pr1](#)
- [MBS Real Studio Plugins, version 13.1pr13](#)

### 6.11.4 `DNSNameToAddressMBS(HostName as string) as string`

Plugin Version: 4.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Resolves the IP address for this name.

**Example:**

```
msgBox dnsnameToAddressIPv6MBS("localhost") + endofLine + dnsnameToAddressMBS("localhost")
```

**Notes:** Only for IPv4.

Returns "" on any error (like no name known).

Improved in 13.1 plugins to work on all platforms.

This may not work on Windows or Linux with Bonjour host names!

**Blog Entries**

- [MonkeyBread Software Releases the MBS Real Studio plug-ins in version 13.1](#)
- [MBS Real Studio Plugins, version 13.1pr13](#)
- [NetworkAvailableMBS](#)

### 6.11.5 `OptionReuseAddressMBS(extends s as SocketCore) as Boolean`

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries whether to allow reuse of same port.

**Notes:** Internally this uses `SOL_SOCKET/SO_REUSEADDR` option.

Raises `UnsupportedOperationException` in case of failure.

See also:

- [6.11.6 `OptionReuseAddressMBS\(extends s as SocketCore, assigns value as Boolean\)`](#)

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### 6.11.6 `OptionReuseAddressMBS(extends s as SocketCore, assigns value as Boolean)`

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Sets whether to allow reuse of same port.

**Notes:** Internally this uses `SOL_SOCKET/SO_REUSEADDR` option.

see also

<http://stackoverflow.com/questions/14388706/socket-options-so-reuseaddr-and-so-reuseport-how-do-they-differ-do-they-mean-t>

Raises `UnsupportedOperationException` in case of failure.

**Blog Entries**

- [MBS Xojo / Real Studio Plugins, version 17.0pr1](#)

See also:

- 6.11.5 `OptionReuseAddressMBS(extends s as SocketCore)` as Boolean

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### 6.11.7 `OptionReusePortMBS(extends s as SocketCore)` as Boolean

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Query whether reuse of same port and IP is allowed.

**Notes:** Internally this uses `SOL_SOCKET/SO_REUSEPORT` option.

On Windows, this is not supported, so this property sets `ReuseAddress`.

Raises `UnsupportedOperationException` in case of failure.

See also:

- 6.11.8 `OptionReusePortMBS(extends s as SocketCore, assigns value as Boolean)`

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### 6.11.8 `OptionReusePortMBS(extends s as SocketCore, assigns value as Boolean)`

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Sets whether to allow reuse of same port and IP.

**Notes:** Internally this uses `SOL_SOCKET/SO_REUSEPORT` option.

On Windows, this is not supported, so this property sets `ReuseAddress`.

Raises `UnsupportedOperationException` in case of failure.

**Blog Entries**

- [MBS Xojo / Real Studio Plugins, version 17.0pr1](#)

See also:

- 6.11.7 `OptionReusePortMBS(extends s as SocketCore)` as Boolean

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### 6.11.9 `VerifyEmailMBS(email as string, NetworkCheck as boolean)` as Integer

Plugin Version: 14.0, Platforms: macOS, Linux, Targets: All.

**Function:** Checks if an email can be valid.

**Example:**

```
// should be okay
dim r1 as Integer = VerifyEmailMBS("testing@monkeybreadsoftware.de", true)
```

```
// should fail
dim r2 as Integer = VerifyEmailMBS("testing@monkeybreadsoftware.test", true)

MsgBox str(r1)+EndOfLine+str(r2)
```

**Notes:** If NetworkCheck is true, the DNS server is queries for whether an email service is available (MX Record).

Else we only do a syntax check.

Result is zero for success or one of this error codes:

- 1 Invalid character in local part of email address.
- 2 Missing dot in local part of email address.
- 3 Invalid character in local part of email address.
- 4 Unescaped special character in local part of email address.
- 5 No local part in email address.
- 6 Dot found before @ character.
- 7 No domain in email address.
- 8 Domain starting with dot.
- 9 Domain is not allowed to have two dots.
- 10 Invalid character in domain of email address.
- 11 Special character in domain of email address.
- 12 No dot in domain in email address.
- 13 Domain longer than allowed in email address.
- 14 DNS failed to find mail server for the domain in email address. (Windows)
- 15 DNS failed to find mail server for the domain in email address. (Mac/Linux)
- 16 DNS did not find a mail server for the domain in email address.
- 17 DNS failed to find mail server for the domain in email address
- 18 DNS server answers try again too often.

IDN support is not included. You may need to preprocess email if you need that.

If you have a DNS server, which will redirect all mistyped domain names to a search website, this won't really work well and detect too many valid domain names.

#### **Blog Entries**

- [MBS Xojo Plugins, version 18.0pr7](#)

- [MonkeyBread Software Releases the MBS Xojo / Real Studio plug-ins in version 14.0](#)
- [MBS Xojo / Real Studio Plugins, version 14.0pr5](#)
- [MBS Xojo / Real Studio Plugins, version 14.0pr4](#)

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- [12.2, page 10: News](#)

#### 6.11.10 ClearOptionsMBS(extends s as SocketCore)

Plugin Version: 8.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Clears all options.

**Notes:** Works only on BSD Sockets and if the socket handle value is valid.

Raises UnsupportedOperationException in case of failure.

#### 6.11.11 OptionKeepAliveMBS(extends s as SocketCore) as Integer

Plugin Version: 15.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Gets the keep alive.

**Notes:** Works only on BSD Sockets and if the socket handle value is valid.

Returns -1 on any error.

Enables the periodic transmission of messages on a connected socket. Should the connected party fail to respond to these messages, the connection is considered broken and processes using the socket are notified via a SIGPIPE signal when attempting to send data.

See also:

- [6.11.12 OptionKeepAliveMBS\(extends s as SocketCore, assigns value as Integer\)](#)

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#### 6.11.12 OptionKeepAliveMBS(extends s as SocketCore, assigns value as Integer)

Plugin Version: 15.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Sets the keep alive.

**Notes:** Works only on BSD Sockets and if the socket handle value is valid.

Enables the periodic transmission of messages on a connected socket. Should the connected party fail to respond to these messages, the connection is considered broken and processes using the socket are notified via a SIGPIPE signal when attempting to send data.

**Blog Entries**

- [MBS Xojo / Real Studio Plugins, version 15.0pr6](#)

See also:

- 6.11.11 `OptionKeepAliveMBS`(extends `s` as `SocketCore`) as Integer 75

### 6.11.13 `OptionMaximumSegmentSizeMBS`(extends `s` as `SocketCore`) as Integer

Plugin Version: 13.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries the maximum segment size.

**Example:**

```
dim s as new TCPSocket
```

```
s.Port = 0
```

```
s.listen
```

```
MsgBox str(s.OptionMaximumSegmentSizeMBS)
```

**Notes:** Only for TCP sockets.

Raises `UnsupportedOperationException` in case of failure.

See also:

- 6.11.14 `OptionMaximumSegmentSizeMBS`(extends `s` as `SocketCore`, assigns value as Integer) 76

### 6.11.14 `OptionMaximumSegmentSizeMBS`(extends `s` as `SocketCore`, assigns value as Integer)

Plugin Version: 13.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Adjusts the maximum segment size.

**Notes:** Raises `UnsupportedOperationException` in case of failure.

**Blog Entries**

- [MBS Real Studio Plugins, version 13.0pr7](#)
- [MBS Real Studio Plugins, version 13.0pr6](#)

See also:

- 6.11.13 `OptionMaximumSegmentSizeMBS`(extends `s` as `SocketCore`) as Integer 76

**6.11.15 OptionMutliCastTTLMBS(extends s as SocketCore) as Integer**

Plugin Version: 8.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Gets the multicast time to live value.

**Notes:** Works only on BSD Sockets and if the socket handle value is valid.

Raises UnsupportedOperationException in case of failure.

See also:

- 6.11.16 OptionMutliCastTTLMBS(extends s as SocketCore, assigns value as Integer)

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**6.11.16 OptionMutliCastTTLMBS(extends s as SocketCore, assigns value as Integer)**

Plugin Version: 8.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Sets the multicast time to live value.

**Example:**

```
dim t as new UDPSocket
```

```
// create a socket
```

```
t.Port=80
```

```
t.Connect
```

```
// wait a second to connect
```

```
app.DoEvents 1000
```

```
// shows handle
```

```
MsgBox str(t.Handle)
```

```
// shows current value
```

```
MsgBox str(t.OptionMutliCastTTLMBS)
```

```
t.OptionMutliCastTTLMBS=10
```

```
// shows new value
```

```
MsgBox str(t.OptionMutliCastTTLMBS)
```

**Notes:** Works only on BSD Sockets and if the socket handle value is valid.

Raises UnsupportedOperationException in case of failure.

See also:

- 6.11.15 OptionMutliCastTTLMBS(extends s as SocketCore) as Integer

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### 6.11.17 OptionReceiveBufferSizeMBS(extends s as SocketCore) as Integer

Plugin Version: 13.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries the receiving buffer size.

**Notes:** The buffer size may be increased for high-volume connections, or may be decreased to limit the possible backlog of incoming data. The system places an absolute limit on these values.

Raises UnsupportedOperationException in case of failure.

See also:

- 6.11.18 OptionReceiveBufferSizeMBS(extends s as SocketCore, assigns value as Integer) 78

### 6.11.18 OptionReceiveBufferSizeMBS(extends s as SocketCore, assigns value as Integer)

Plugin Version: 13.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Adjusts the receiving buffer size.

**Notes:** The buffer size may be increased for high-volume connections, or may be decreased to limit the possible backlog of incoming data. The system places an absolute limit on these values.

Raises UnsupportedOperationException in case of failure.

**Blog Entries**

- [MBS Real Studio Plugins, version 13.0pr6](#)

See also:

- 6.11.17 OptionReceiveBufferSizeMBS(extends s as SocketCore) as Integer 78

### 6.11.19 OptionSendBufferSizeMBS(extends s as SocketCore) as Integer

Plugin Version: 13.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries the sending buffer size.

**Example:**

```
dim s as new UDPSocket
```

```
s.Port = 0
```

```
s.Connect
```

```
MsgBox str(s.OptionSendBufferSizeMBS)
```

**Notes:** The buffer size may be increased for high-volume connections, or may be decreased to limit the possible backlog of incoming data. The system places an absolute limit on these values.

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Raises `UnsupportedOperationException` in case of failure.

See also:

- 6.11.20 `OptionSendBufferSizeMBS`(extends `s` as `SocketCore`, assigns value as `Integer`) 79

### 6.11.20 `OptionSendBufferSizeMBS`(extends `s` as `SocketCore`, assigns value as `Integer`)

Plugin Version: 13.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Adjusts the sending buffer size.

**Notes:** The buffer size may be increased for high-volume connections, or may be decreased to limit the possible backlog of incoming data. The system places an absolute limit on these values.

Raises `UnsupportedOperationException` in case of failure.

**Blog Entries**

- [MBS Real Studio Plugins, version 13.0pr6](#)

See also:

- 6.11.19 `OptionSendBufferSizeMBS`(extends `s` as `SocketCore`) as `Integer` 78

### 6.11.21 `OptionTOSMBS`(extends `s` as `SocketCore`) as `Integer`

Plugin Version: 8.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Gets the type of service value.

**Notes:** Works only on BSD Sockets and if the socket handle value is valid.

Raises `UnsupportedOperationException` in case of failure.

See also:

- 6.11.22 `OptionTOSMBS`(extends `s` as `SocketCore`, assigns value as `Integer`) 79

### 6.11.22 `OptionTOSMBS`(extends `s` as `SocketCore`, assigns value as `Integer`)

Plugin Version: 8.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Sets the type of service value.

**Notes:** Works only on BSD Sockets and if the socket handle value is valid.

Possible values:

`IPTOS_MINCOST` = 2

`IPTOS_RELIABILITY` = 4

`IPTOS_THROUGHPUT` = 8

`IPTOS_LOWDELAY` = 16

You may want to set it after connecting.  
 Raises `UnsupportedOperationException` in case of failure.  
 See also:

- 6.11.21 `OptionTOSMBS`(extends `s` as `SocketCore`) as `Integer` 79

### 6.11.23 `OptionTTLMBS`(extends `s` as `SocketCore`) as `Integer`

Plugin Version: 8.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Gets the time to live value.

**Notes:** Works only on BSD Sockets and if the socket handle value is valid.

Raises `UnsupportedOperationException` in case of failure.

See also:

- 6.11.24 `OptionTTLMBS`(extends `s` as `SocketCore`, assigns value as `Integer`) 80

### 6.11.24 `OptionTTLMBS`(extends `s` as `SocketCore`, assigns value as `Integer`)

Plugin Version: 8.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Sets the time to live value.

**Example:**

```
dim t as new TCPSocket

// create a socket
t.Port=80
t.Address="www.apple.com"
t.Connect

// wait a second to connect
app.DoEvents 1000

// shows handle
MsgBox str(t.Handle)

// shows current value
MsgBox str(t.OptionTTLMBS)
t.OptionTTLMBS=10

// shows new value
MsgBox str(t.OptionTTLMBS)
```

**Notes:** Works only on BSD Sockets and if the socket handle value is valid.

## 6.12. CLASS NETWORKINTERFACEMBS

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Raises UnsupportedOperationException in case of failure.

See also:

- 6.11.23 OptionTTLMBS(extends s as SocketCore) as Integer

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### 6.11.25 OptionTypeMBS(extends s as SocketCore) as Integer

Plugin Version: 13.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries the type of socket.

**Example:**

```
dim u as new UDPSocket
```

```
u.Port = 9000
```

```
u.Connect
```

```
// shows 2 for UDP
```

```
MsgBox str(u.OptionTypeMBS)
```

**Notes:** Type is 1 for stream socket, 2 for datagram socket, 3 for raw socket, 4 for reliably-delivered message socket and 5 for a sequenced packet stream.

Raises UnsupportedOperationException in case of failure.

**Blog Entries**

- [MBS Real Studio Plugins, version 13.0pr6](#)

## 6.12 class NetworkInterfaceMBS

### 6.12.1 class NetworkInterfaceMBS

Plugin Version: 13.0, Platforms: macOS, Linux, Targets: All.

**Function:** The class for unix network interfaces.

**Example:**

```
// show IPv4 addresses
```

```
dim interfaces() as NetworkInterfaceMBS = NetworkInterfaceMBS.AllInterfaces
```

```
for each n as NetworkInterfaceMBS in interfaces
```

```
MsgBox n.name+": "+n.IPv4
```

```
next
```

**Notes:** For Windows, please use `WindowsEthernetMBS` class.

The values are not updated for this class. Just when you create the interface objects, you get a snapshot of the current state.

### Blog Entries

- [MBS Xojo Plugins, version 17.1pr3](#)
- [MBS Xojo / Real Studio Plugins, version 17.1pr1](#)
- [MBS Xojo / Real Studio Plugins, version 14.2pr8](#)
- [Tip of the day: Find network interfaces by name](#)
- [MBS Real Studio Plugins, version 13.0pr2](#)

## 6.12.2 Methods

### 6.12.3 AllInterfaces(Merge as boolean = true) as NetworkInterfaceMBS()

Plugin Version: 13.0, Platforms: macOS, Linux, Targets: All.

**Function:** Returns array with all interfaces.

#### Example:

```
// show IPv4 addresses
dim interfaces() as NetworkInterfaceMBS = NetworkInterfaceMBS.AllInterfaces

for each n as NetworkInterfaceMBS in interfaces
  MsgBox n.name+": "+n.IPv4
next
```

**Notes:** By default we merge several records for the same interface. You may see one record for each protocol (IPv4, IPv6, LINK layer).

## 6.12.4 IndexMap as Dictionary

Plugin Version: 14.2, Platforms: macOS, Linux, Targets: All.

**Function:** Builds a dictionary to map indexes to names.

#### Example:

```
dim d as Dictionary = NetworkInterfaceMBS.IndexMap
dim lines() as string

for each key as Variant in d.keys
  lines.Append key+": "+d.Value(key)
```

[next](#)

```
MsgBox Join(lines,EndOfLine)
```

**Notes:** This is convenient method for the case you need to show list to user. On Windows requires Windows Vista or newer.

### 6.12.5 IndexToName(Index as Integer) as string

Plugin Version: 14.2, Platforms: macOS, Linux, Targets: All.

**Function:** Queries name for network interface with index.

**Example:**

```
dim Name as string
```

```
Name = NetworkInterfaceMBS.IndexToName(1)
```

```
msgbox Name
```

**Notes:** On Windows requires Windows Vista or newer.

### 6.12.6 IPv4s as string()

Plugin Version: 13.0, Platforms: macOS, Linux, Targets: All.

**Function:** All IPv4 addresses for this interface.

### 6.12.7 IPv6s as string()

Plugin Version: 13.0, Platforms: macOS, Linux, Targets: All.

**Function:** All IPv6 addresses for this interface.

### 6.12.8 NameToIndex(Name as String) as Integer

Plugin Version: 14.2, Platforms: macOS, Linux, Targets: All.

**Function:** Queries index for network interface with given name..

**Example:**

`dim` index as Integer

```
index = NetworkInterfaceMBS.NameToIndex("en0")
```

**Notes:** On Windows requires Windows Vista or newer.

## 6.12.9 Properties

### 6.12.10 Broadcast as Boolean

Plugin Version: 13.0, Platforms: macOS, Linux, Targets: All.

**Function:** Whether a broadcast address exists for this interface.

**Notes:** (Read and Write property)

### 6.12.11 BroadcastAddress as String

Plugin Version: 13.0, Platforms: macOS, Linux, Targets: All.

**Function:** The broadcast address.

**Notes:** (Read and Write property)

### 6.12.12 Flags as Integer

Plugin Version: 17.1, Platforms: macOS, Linux, Targets: All.

**Function:** The interface flags.

**Notes:** See `if.h` file in C system headers.

(Read and Write property)

### 6.12.13 Index as Integer

Plugin Version: 13.0, Platforms: macOS, Linux, Targets: All.

**Function:** The index of this interface.

**Notes:** (Read and Write property)

### 6.12.14 InterfaceIndex as Integer

Plugin Version: 14.2, Platforms: macOS, Linux, Targets: All.

**Function:** The index of this interface.

**Notes:** Index counts by plugin from 0 on the interfaces.

But this is real index from operation system.

On Windows requires Windows Vista or newer.

(Read and Write property)

### 6.12.15 IPv4 as String

Plugin Version: 13.0, Platforms: macOS, Linux, Targets: All.

**Function:** The IPv4 address for this interface.

**Example:**

```
// show IPv4 addresses
dim interfaces() as NetworkInterfaceMBS = NetworkInterfaceMBS.AllInterfaces

for each n as NetworkInterfaceMBS in interfaces
  MsgBox n.name+": "+n.IPv4
next
```

**Notes:** (Read and Write property)

### 6.12.16 IPv4count as Integer

Plugin Version: 13.0, Platforms: macOS, Linux, Targets: All.

**Function:** Returns the number of IPv4 addresses for this interface.

**Notes:** (Read and Write property)

### 6.12.17 IPv6 as String

Plugin Version: 13.0, Platforms: macOS, Linux, Targets: All.

**Function:** The IPv6 address for this interface.

**Notes:** (Read and Write property)

### 6.12.18 IPv6count as Integer

Plugin Version: 13.0, Platforms: macOS, Linux, Targets: All.

**Function:** Returns the number of IPv6 addresses for this interface.

**Notes:** (Read and Write property)

### 6.12.19 Loopback as Boolean

Plugin Version: 13.0, Platforms: macOS, Linux, Targets: All.

**Function:** Whether this interface is the loopback interface.

**Notes:** (Read and Write property)

### 6.12.20 MAC as String

Plugin Version: 13.0, Platforms: macOS, Linux, Targets: All.

**Function:** The ethernet hardware address (MAC).

**Notes:** (Read and Write property)

### 6.12.21 Multicast as Boolean

Plugin Version: 13.0, Platforms: macOS, Linux, Targets: All.

**Function:** Whether this interface supports multicast.

**Notes:** (Read and Write property)

### 6.12.22 Name as String

Plugin Version: 13.0, Platforms: macOS, Linux, Targets: All.

**Function:** The name of the network interface.

**Notes:** (Read and Write property)

### 6.12.23 Netmask as String

Plugin Version: 13.0, Platforms: macOS, Linux, Targets: All.

**Function:** The network mask.

**Notes:** Returns the IPv4 netmask.  
if that one is undefined, returns the IPv6 netmask.  
This property is just kept for compatibility.  
(Read only property)

#### 6.12.24 NetmaskIPv4 as String

Plugin Version: 13.5, Platforms: macOS, Linux, Targets: All.

**Function:** The network mask for IPv4.

**Notes:** (Read and Write property)

#### 6.12.25 NetmaskIPv6 as String

Plugin Version: 13.5, Platforms: macOS, Linux, Targets: All.

**Function:** The network mask for IPv6.

**Notes:** (Read and Write property)

#### 6.12.26 Running as Boolean

Plugin Version: 17.1, Platforms: macOS, Linux, Targets: All.

**Function:** Whether the interface is running (resources allocated).

**Notes:** (Read and Write property)

#### 6.12.27 Up as Boolean

Plugin Version: 13.0, Platforms: macOS, Linux, Targets: All.

**Function:** Whether the interface is up.

**Notes:** (Read and Write property)

## 6.13 class PacketSocketMBS

### 6.13.1 class PacketSocketMBS

Plugin Version: 8.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** An extension to the socket class for easy sending packets through the net.

**Notes:** A packet is made like this:

- +0: Size of data block
- +4: 4 byte code string
- +8: 4 byte for ID
- +12: variable data.

The numbers are send in low endian format so this is crossplatform.

This socket subclass can be easily made in Xojo code itself. I did it for several of my applications, so if you like it decide between making it yourself or using this one which may even be faster, because it is written in C?

This class is only available in RB 4.0 or newer, because it crashes on RB 3.5.

As the strings are transferred as binary data you need to take care that you send text e.g. as UTF8 and restore this encoding setting on receiving.

Subclass of the TCPSocket class.

#### Blog Entries

- [MBS Xojo Plugins, version 22.5pr4](#)
- [MBS Xojo Plugins, version 21.5pr1](#)
- [MonkeyBread Software Releases the MBS Plugins 8.1](#)

### 6.13.2 Methods

#### 6.13.3 SendPacket(data as string)

Plugin Version: 8.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Sends a packet.

**Notes:** Uses ID=0 and code="" as a shortcut for the long SendPacket call.

See also:

- 6.13.4 SendPacket(data as string,code as string) 89
- 6.13.5 SendPacket(data as string,code as string,ID as Integer) 89

### 6.13.4 SendPacket(data as string,code as string)

Plugin Version: 8.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Sends a packet.

**Notes:** Uses ID=0 as a shortcut for the long SendPacket call.

See also:

- 6.13.3 SendPacket(data as string) 88
- 6.13.5 SendPacket(data as string,code as string,ID as Integer) 89

### 6.13.5 SendPacket(data as string,code as string,ID as Integer)

Plugin Version: 8.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Sends a packet.

**Notes:** code and ID are optional.

Code is a 4 byte string to identify the content.  
(e.g. "mess" for a message or "link" for a link.)

See also:

- 6.13.3 SendPacket(data as string) 88
- 6.13.4 SendPacket(data as string,code as string) 89

### 6.13.6 Events

### 6.13.7 ReceivedPacket(data as string,code as string,ID as Integer)

Plugin Version: 8.1, Platforms: macOS, Linux, Windows, Targets: .

**Function:** A packet was received.

## 6.14 class RAWSocketMBS

### 6.14.1 class RAWSocketMBS

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** A class for low level and raw sockets.

**Example:**

```
dim sock as RAWSocketMBS
```

```
// create UDP socket  
sock = new RAWSocketMBS(RAWSocketMBS.AddressFamilyINet, RAWSocketMBS.SocketTypeDatagram,  
RAWSocketMBS.ProtocolUDP)
```

**Notes:** Similar to Xojo's built in Socket class, but more low level and with more options.

Raw sockets for things like PING may need root permissions.

**Blog Entries**

- [MonkeyBread Software Releases the MBS Xojo Plugins in version 18.4](#)
- [MBS Xojo Plugins, version 18.4pr10](#)
- [MBS Xojo Plugins, version 18.4pr9](#)
- [MBS Xojo Plugins, version 18.3pr3](#)
- [MonkeyBread Software Releases the MBS Xojo Plugins in version 18.0](#)
- [MBS Xojo Plugins, version 18.0pr6](#)
- [MonkeyBread Software Releases the MBS Xojo Plugins in version 17.4](#)
- [MBS Xojo Plugins, version 17.4pr8](#)
- [MBS Xojo Plugins, version 17.4pr5](#)
- [Raw Sockets for Xojo](#)

**Videos**

- [Presentation from Munich conference about MBS Plugins.](#)

**Xojo Developer Magazine**

- [17.1, page 11: News](#)
- [16.6, page 9: News](#)
- [15.6, page 9: News](#)

### 6.14.2 Methods

#### 6.14.3 Accept(byref RemoteAddress as String, byref RemotePort as Integer, NewSocket as RAWSocketMBS) as RAWSocketMBS

Plugin Version: 18.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Listens for connections on this socket.

**Notes:** Lasterror is set.

#### 6.14.4 AddressFamilyINet6 as Integer

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** One of the address family constants.

**Notes:** IPv6

This is a method as value is different.

Mac 30, Windows 23 and Linux 10.

#### 6.14.5 Bind(DestAddr as Ptr, DestAddrByteSize as Integer) as Boolean

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Binds the socket to the given destination address.

**Notes:** Set ReuseAddress to bind to an address which already a socket is bound to.

Lasterror is set.

Returns true on success and false on failure.

Please specify with port and IP in destAddress where to bind against.

Structure of DestAddress is OS and address family dependent.

See also:

- 6.14.6 Bind(Port as Integer, IP as string = "")

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#### 6.14.6 Bind(Port as Integer, IP as string = "")

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Binds the socket to the given port.

**Notes:** If IP is not empty, you can bind the socket to only the given network interface with that IPv4.

Set ReuseAddress to bind to an address which already a socket is bound to.

Lasterror is set.

See also:

- 6.14.5 Bind(DestAddr as Ptr, DestAddrByteSize as Integer) as Boolean

91

### 6.14.7 CalcChecksum(data as ptr, ByteCount as Integer) as UInt16

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates checksum for IP header.

### 6.14.8 Close

Plugin Version: 18.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Closes socket.

**Notes:** Same as destructor.

### 6.14.9 Connect(Address as String, Port as Integer, byref ErrorMessage as String) as Boolean

Plugin Version: 18.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Convenience method to connect.

**Notes:** Will parse IPv4/IPv6 or query DNS server for IP and connect.

Returns true on success.

See also:

- 6.14.10 Connect(DestAddr as Ptr, DestAddrByteSize as Integer) as Boolean 92

### 6.14.10 Connect(DestAddr as Ptr, DestAddrByteSize as Integer) as Boolean

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Connects to destination address.

**Notes:** lasterror is set.

Returns true on success and false on failure.

Please specify with port and IP in destAddress where package is sent to.

Structure of DestAddress is OS and address family dependent.

See also:

- 6.14.9 Connect(Address as String, Port as Integer, byref ErrorMessage as String) as Boolean 92

### 6.14.11 Constructor(AddressFamily as Integer, SocketType as Integer, Protocol as Integer)

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The constructor.

**Example:**

```
dim sock as RAWSocketMBS
```

```
// create UDP socket
```

```
sock = new RAWSocketMBS(RAWSocketMBS.AddressFamilyINet, RAWSocketMBS.SocketTypeDatagram,  
RAWSocketMBS.ProtocolUDP)
```

**Notes:** Please pass valid combination of OS supported sockets.

Raises exception if creation is not possible.

Raw socket requires root access.

### 6.14.12 Destructor

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The destructor.

**Notes:** Closes the socket.

### 6.14.13 htonl(value as UInt32) as UInt32

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Convert 32bit Integer from network to host byte order.

### 6.14.14 htons(value as UInt16) as UInt16

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Convert 16bit Integer from network to host byte order.

### 6.14.15 inet\_addr(IPv4 as String) as UInt32

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Converts IPv4 to numerical representation.

### 6.14.16 `inet_ntoa(IPv4 as UInt32)` as String

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Converts IPv4 to string representation.

### 6.14.17 `Listen(BackLog as Integer = 2)`

Plugin Version: 18.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Accepts a new incoming connection.

**Notes:** Sockets uses the accept function to enable incoming connection attempts on a socket.

RemoteAddress and RemotePort are set to address of remote peer.

If you like to pass in your own subclass object for NewSocket, we can use that socket object. Otherwise, we make a new RAWSocketMBS object.

Lasterror is set.

### 6.14.18 `ntohl(value as UInt32)` as UInt32

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Convert 32bit Integer from host to network byte order.

### 6.14.19 `ntohs(value as UInt16)` as UInt16

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Convert 16bit Integer from host to network byte order.

### 6.14.20 `Poll`

Plugin Version: 18.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Polls for activity.

**Notes:** Calls events if needed.

This is called automatically via timer by the plugin.

**6.14.21 Read(ByteSize as Integer, peek as boolean = false) as MemoryBlock**

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Read at maximum the given number of bytes in buffer.

**Notes:** Pass true for peek if data should not be removed from receiving buffer.  
LastError is set.

Be aware that you may not get whole packages here, so data may come in several chunks.  
For that, please collect the data and look for whether your package is complete or a required end mark arrived.

**6.14.22 ReadAll(peek as boolean = false) as MemoryBlock**

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Read all bytes in buffer.

**Example:**

```
dim sock as RAWSocketMBS
dim data as MemoryBlock = sock.ReadAll
if data = nil then
  // nothing read
else
end if
```

**Notes:** Pass true for peek if data should not be removed from receiving buffer.  
LastError is set.

Be aware that you may not get whole packages here, so data may come in several chunks.  
For that, please collect the data and look for whether your package is complete or a required end mark arrived.

**6.14.23 ReadDatagram(peek as boolean = false) as DatagramMBS**

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Reads a datagram.

**Notes:** If peek is true, the data is not removed from read buffer.  
On error returns nil.

### 6.14.24 Send(Data as Ptr, DataByteSize as Integer, Flags as Integer = 0) as Integer

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Sends data.

**Notes:** Data is sent to address passed with Connect method.

Returns number of bytes sent.

Lasterror is set.

For TCP sockets and similar, which have a stream of data.

### 6.14.25 SendMessage(Data as DatagramMBS) as Integer

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Sends a datagram.

**Notes:** Please specify with port and address of datagram where package is sent to.

Returns number of bytes sent.

Lasterror is set.

For UDP sockets and similar.

See also:

- 6.14.26 SendMessage(Data as MemoryBlock, IP as String, Port as Integer) as Integer 96
- 6.14.27 SendMessage(Data as string, IP as String, Port as Integer) as Integer 97

### 6.14.26 SendMessage(Data as MemoryBlock, IP as String, Port as Integer) as Integer

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Sends a datagram.

**Notes:** Please specify with port and IP where package is sent to.

Returns number of bytes sent.

Lasterror is set.

For UDP sockets and similar.

See also:

- 6.14.25 SendMessage(Data as DatagramMBS) as Integer 96
- 6.14.27 SendMessage(Data as string, IP as String, Port as Integer) as Integer 97

**6.14.27 SendMessage(Data as string, IP as String, Port as Integer) as Integer**

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Sends data to target.

**Notes:** Please specify with port and IP where package is sent to.

Returns number of bytes sent.

Lasterror is set.

For UDP sockets and similar.

See also:

- 6.14.25 SendMessage(Data as DatagramMBS) as Integer 96
- 6.14.26 SendMessage(Data as MemoryBlock, IP as String, Port as Integer) as Integer 96

**6.14.28 SendTo(Data as Ptr, DataByteSize as Integer, Flags as Integer, DestAddr as Ptr, DestAddrByteSize as Integer) as Integer**

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Sends data to dest address.

**Example:**

```
dim sock as RawSocketMBS
```

```
dim Flags as integer
```

```
dim r as Integer
```

```
// port
```

```
dim port as integer = val(iPort.Text)
```

```
if port <= 0 or port >= 65535 then
```

```
break
```

```
MsgBox "Wrong port: "+iPort.Text
```

```
Return
```

```
end if
```

```
// dest address
```

```
/*
```

```
* Socket address, internet style. C declaration for Mac
```

```
*/
```

```
'struct sockaddr_in {
```

```
'__uint8_t sin_len; // 1 byte, Mac only
```

```
'sa_family_t sin_family; // 1 byte
```

```
'in_port_t sin_port; // 2 byte in Network byte order
```

```
'struct in_addr sin_addr; // 4 byte
```

```
'char sin_zero [ 8 ]; // 8 bytes filler
```

```

    };

    // convert IPv4 from text to numeric value
    dim IP as UInt32 = RAWSocketMBS.inet_addr(iIP.Text)

    // create destination address. This is for Mac! Windows and Linux have different structures
    dim dest as new MemoryBlock(16)
    dest.UInt8Value(0) = dest.size
    dest.UInt8Value(1) = RAWSocketMBS.AddressFamilyINet
    dest.UInt16Value(2) = RAWSocketMBS.htons(port)
    dest.UInt32Value(4) = IP

    // message
    dim m as string = ConvertEncoding(iMessage.Text, encodings.UTF8)
    dim data as MemoryBlock = m

    // send
    r = sock.SendTo(data, data.size, Flags, dest, dest.size)

```

**Notes:** Please specify with port and IP in `destAddress` where package is sent to. Returns number of bytes sent. Structure of `DestAddress` is OS and address family dependent. `Lasterror` is set.

For UDP sockets and similar.

### 6.14.29 Properties

#### 6.14.30 AddressFamily as Integer

Plugin Version: 18.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The address family of the socket.

**Notes:** This is either `RAWSocketMBS.AddressFamilyINet (2)` for IPv4 or `RAWSocketMBS.AddressFamilyINet6 (Mac 30, Windows 23 and Linux 10)` for IPv6.

(Read and Write property)

#### 6.14.31 AvailableBytes as Integer

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns number of bytes available for reading.

**Notes:** Lasterror is set.  
(Read only property)

### 6.14.32 Broadcast as Boolean

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Whether broadcasts are allowed.

**Notes:** Set to true before sending a broadcast message.  
Internally this uses SOL\_SOCKET/SO\_BROADCAST option.  
Lasterror is set.  
(Read and Write property)

### 6.14.33 Handle as Integer

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The internal socket handle.  
**Notes:** (Read and Write property)

### 6.14.34 IPHeaderIncluded as Boolean

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Whether the OS provides IP header or you.  
**Notes:** Default is false.  
Set to true when you include IP header in data.  
(Read and Write property)

### 6.14.35 Lasterror as Integer

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The last error code.  
**Notes:** Platform dependent.  
(Read and Write property)

### 6.14.36 LocalIP as String

Plugin Version: 18.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries local IP.

**Notes:** Can be 0.0.0.0 if unknown.

May only be set if connected or binded.

Lasterror is set.

(Read only property)

### 6.14.37 LocalPort as Integer

Plugin Version: 18.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries local port.

**Notes:** Lasterror is set.

Can be -1 if unknown.

(Read only property)

### 6.14.38 Protocol as Integer

Plugin Version: 18.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The socket protocol.

**Notes:** The value from constructor.

(Read and Write property)

### 6.14.39 ReceiveBufferSize as Integer

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries the receiving buffer size.

**Notes:** The buffer size may be increased for high-volume connections, or may be decreased to limit the possible backlog of incoming data. The system places an absolute limit on these values.

Internally this uses SOL\_SOCKET/SO\_RCVBUF option.

Lasterror is set.

(Read and Write property)

### 6.14.40 ReuseAddress as Boolean

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Allows reuse of same port.

**Notes:** Internally this uses SOL\_SOCKET/SO\_REUSEADDR option.

see also

<http://stackoverflow.com/questions/14388706/socket-options-so-reuseaddr-and-so-reuseport-how-do-they-differ-do-they-mean-t>

Lasterror is set.

(Read and Write property)

#### 6.14.41 ReusePort as Boolean

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Allow reuse of same port and IP.

**Notes:** Internally this uses SOL\_SOCKET/SO\_REUSEPORT option.

On Windows, this is not supported, so this property sets ReuseAddress.

Lasterror is set.

(Read and Write property)

#### 6.14.42 SendBufferSize as Integer

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The sending buffer size.

**Notes:** The buffer size may be increased for high-volume connections, or may be decreased to limit the possible backlog of incoming data. The system places an absolute limit on these values.

Internally this uses SOL\_SOCKET/SO\_SNDBUF option.

Lasterror is set.

(Read and Write property)

#### 6.14.43 SocketError as Integer

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The native socket error.

**Notes:** Internally this uses SOL\_SOCKET/SO\_ERROR option.

Lasterror is set.

(Read only property)

#### 6.14.44 SocketType as Integer

Plugin Version: 18.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The socket type.

**Notes:** The value from constructor.  
(Read and Write property)

#### 6.14.45 Events

#### 6.14.46 DataAvailable

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: .

**Function:** This event is called when new data is available.

**Notes:** Requires the socket to be bound.

#### 6.14.47 Error

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: .

**Function:** The event called if socket is in error state.

#### 6.14.48 SendComplete

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: .

**Function:** The last write operation is done.

#### 6.14.49 Constants

Address Families

Constant	Value	Description
AddressFamilyINet	2	IPv4

Protocols

Constant	Value	Description
ProtocolICMP	1	ICMP
ProtocolIP	0	IPv4
ProtocolIPv6	41	IPv6
ProtocolRaw	255	Raw protocol
ProtocolTCP	6	TCP
ProtocolUDP	17	UDP

## Socket Types

Constant	Value	Description
SocketTypeDatagram	2	Datagram, e.g. UDP.
SocketTypeRaw	3	Raw socket, requires root permissions.
SocketTypeStream	1	Stream socket, e.g. TCP/IP.

## 6.15 class SSH2ChannelMBS

### 6.15.1 class SSH2ChannelMBS

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The class for a SSH2 channel.

#### Blog Entries

- [News from the MBS Xojo Plugins Version 20.5](#)
- [MBS Xojo Plugins in version 20.5](#)
- [MBS Xojo Plugins, version 20.5pr3](#)
- [SSH Terminal example for Xojo](#)
- [SSH tunnel in Xojo](#)

### 6.15.2 Methods

#### 6.15.3 Close(Wait as Boolean = true)

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Close a channel.

**Notes:** Lasterror is set.

Close an active data channel. In practice this means sending an SSH\_MSG\_CLOSE packet to the remote host which serves as instruction that no further data will be sent to it. The remote host may still send data back until it sends its own close message in response. To wait for the remote end to close its connection as well, follow this command with WaitClosed.

Lasterror is set to kErrorEAgain when it would otherwise block. While kErrorEAgain is an error, it isn't really a failure per se.

If wait parameter is true, the plugin does a loop to try close until it receives an okay (and not EAGAIN).

### 6.15.4 Constructor

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The private constructor.

See also:

- 6.15.5 Constructor(session as SSH2SessionMBS)

**6.15.5 Constructor(session as SSH2SessionMBS)**

Plugin Version: 20.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The constructor to create new channel.

**Notes:** May raise UnsupportedOperationException if channel creation fails.

See also:

- 6.15.4 Constructor

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**6.15.6 Destructor**

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The destructor.

**6.15.7 EOF as boolean**

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Check a channel's EOF status.

**Example:**

```

dim s as string
dim channel as SSH2ChannelMBS // your channel

// read all till end of channel
s = ""
do
app.YieldToNextThread
dim r as string = channel.Read(50000)
s = s + r

if channel.LastError = SSH2SessionMBS.kErrorEagain then
// no answer yet
Continue
elseif channel.LastError = SSH2SessionMBS.kErrorNone then
// we got something
if channel.EOF then
// done?
MsgBox "Result: " + s
exit
end if
else
exit
end if

```

loop

**Notes:** Check if the remote host has sent an EOF status for the selected stream. Returns true if the remote host has sent EOF, otherwise false. Lasterror is set. On error, this function returns true.

### 6.15.8 Execute(command as string)

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Executes something on the server.

**Notes:** Lasterror is set.

Lasterror is set to kErrorEAgain when it would otherwise block. While kErrorEAgain is an error, it isn't really a failure per se.

### 6.15.9 Flush

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Flush stream for this channel.

**Notes:** Lasterror is set.

### 6.15.10 FlushAll

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Flush all streams for this channel.

**Notes:** Lasterror is set.

### 6.15.11 FlushExtendedData

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Flush extended data stream for this channel.

**Notes:** Lasterror is set.

**6.15.12 FlushStdErr**

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Flush stderr stream for this channel.

**Notes:** Lasterror is set.

**6.15.13 Read(length as Integer = 65536) as string**

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Read data from a channel stream.

**Example:**

```
dim s as string
dim channel as SSH2ChannelMBS // your channel

// read all till end of channel
s = ""
do
app.YieldToNextThread
dim r as string = channel.Read(50000)
s = s + r

if channel.LastError = SSH2SessionMBS.kErrorEagain then
// no answer yet
Continue
elseif channel.LastError = SSH2SessionMBS.kErrorNone then
// we got something
if channel.EOF then
// done?
MsgBox "Result: " + s
exit
end if
else
exit
end if
loop
```

**Notes:** Lasterror is set.

Attempt to read data from a stdout channel stream.

Returns data read.

Lasterror is set to kErrorEAgain when it would otherwise block. While kErrorEAgain is an error, it isn't really a failure per se.

Version up to 18.2 return text marked as UTF-8, but in 18.3 we change to return text without encoding

marking. So if you expect UTF-8, you can apply UTF-8 encoding with `DefineEncoding`.

#### 6.15.14 `ReadStdErr(length as Integer = 65536) as string`

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Read data from a channel stream.

**Notes:** `Lasterror` is set.

Attempt to read data from a `stderr` channel stream.

Returns data read.

`Lasterror` is set to `kErrorEAgain` when it would otherwise block. While `kErrorEAgain` is an error, it isn't really a failure per se.

#### 6.15.15 `RequestPTY(term as string)`

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Request a PTY on an established channel.

**Notes:** `Lasterror` is set.

Note that this does not make sense for all channel types and may be ignored by the server despite returning success.

`Lasterror` is set to `kErrorEAgain` when it would otherwise block. While `kErrorEAgain` is an error, it isn't really a failure per se.

#### 6.15.16 `SendEOF`

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Send EOF to remote server.

**Notes:** `Lasterror` is set.

Tell the remote host that no further data will be sent on the specified channel. Processes typically interpret this as a closed `stdin` descriptor.

`Lasterror` is set to `kErrorEAgain` when it would otherwise block. While `kErrorEAgain` is an error, it isn't really a failure per se.

#### 6.15.17 `SetBlocking(blocking as boolean)`

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Set or clear blocking mode on channel.

### 6.15.18 SetEnv(name as string, value as string)

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Set an environment variable on the channel.

**Notes:** Lasterror is set.

Lasterror is set to kErrorEAgain when it would otherwise block. While kErrorEAgain is an error, it isn't really a failure per se.

### 6.15.19 Shell

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Request a shell on a channel.

**Notes:** Lasterror is set.

Lasterror is set to kErrorEAgain when it would otherwise block. While kErrorEAgain is an error, it isn't really a failure per se.

### 6.15.20 WaitClosed

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Wait for the remote to close the channel.

**Notes:** Lasterror is set.

Enter a temporary blocking state until the remote host closes the named channel. Typically sent after Close in order to examine the exit status.

Lasterror is set to kErrorEAgain when it would otherwise block. While kErrorEAgain is an error, it isn't really a failure per se.

### 6.15.21 WaitEOF

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Wait for the remote end to acknowledge an EOF request.

**Notes:** Lasterror is set.

May give kErrorEAgain error which means you should try again later.

### 6.15.22 Write(data as MemoryBlock) as Integer

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Write data to a channel stdout stream.

**Notes:** Lasterror is set.

Write functions will use as much as possible of the buffer and put it into a single SSH protocol packet. This means that to get maximum performance when sending larger files, you should try to always pass in at least 32K of data to this function.

Returns actual number of bytes written. Lasterror being kErrorEagain when it would otherwise block. While kErrorEagain is an error, it isn't really a failure per se.

See also:

- 6.15.23 Write(text as string) as Integer 110

### 6.15.23 Write(text as string) as Integer

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Write data to a channel stdout stream.

**Notes:** Lasterror is set.

Write functions will use as much as possible of the buffer and put it into a single SSH protocol packet. This means that to get maximum performance when sending larger files, you should try to always pass in at least 32K of data to this function.

Returns actual number of bytes written. Lasterror being kErrorEagain when it would otherwise block. While kErrorEagain is an error, it isn't really a failure per se.

Until version 18.2 we send text as UTF-8. Version 18.3 or newer send bytes as they are in whatever encoding your string has.

See also:

- 6.15.22 Write(data as MemoryBlock) as Integer 109

### 6.15.24 WriteStdErr(data as MemoryBlock) as Integer

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Write data to a channel stderr stream.

**Notes:** Lasterror is set.

Write functions will use as much as possible of the buffer and put it into a single SSH protocol packet. This means that to get maximum performance when sending larger files, you should try to always pass in at least

32K of data to this function.

Returns actual number of bytes written. Lasterror being kErrorEagain when it would otherwise block. While kErrorEagain is an error, it isn't really a failure per se.

See also:

- 6.15.25 WriteStdErr(text as string) as Integer 111

### 6.15.25 WriteStdErr(text as string) as Integer

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Write data to a channel stderr stream.

**Notes:** Lasterror is set.

Write functions will use as much as possible of the buffer and put it into a single SSH protocol packet. This means that to get maximum performance when sending larger files, you should try to always pass in at least 32K of data to this function.

Returns actual number of bytes written. Lasterror being kErrorEagain when it would otherwise block. While kErrorEagain is an error, it isn't really a failure per se.

Until version 18.2 we send text as UTF-8. Version 18.3 or newer send bytes as they are in whatever encoding your string has.

See also:

- 6.15.24 WriteStdErr(data as MemoryBlock) as Integer 110

### 6.15.26 Properties

#### 6.15.27 ExitStatus as Integer

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Get the remote exit code.

**Notes:** Returns the exit code raised by the process running on the remote host at the other end of the named channel. Note that the exit status may not be available if the remote end has not yet set its status to closed.

Returns 0 on failure, otherwise the Exit Status reported by remote host.

(Read only property)

### 6.15.28 Handle as Integer

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Internal object reference.

**Notes:** (Read and Write property)

### 6.15.29 LastError as Integer

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The last error code.

**Notes:** See SSH2SessionMBS.kError\* constants.

(Read and Write property)

### 6.15.30 Session as SSH2SessionMBS

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The session this channel belongs to.

**Notes:** (Read and Write property)

### 6.15.31 Tag as Variant

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The tag value.

**Notes:** A property where you can store any value you like.

(Read and Write property)

### 6.15.32 Events

### 6.15.33 DataAvailable(Data as string, ErrorChannel as boolean)

Plugin Version: 20.5, Platforms: macOS, Linux, Windows, Targets: .

**Function:** The event for new data coming in.

**Notes:** For console app with DoEvents loop or for GUI apps.

Works starting with running Execute as that initializes the DataAvailable event.

ErrorChannel is true, if we got data from the stderr channel instead of stdout channel.

## 6.16 class SSH2ConnectFailedExceptionMBS

### 6.16.1 class SSH2ConnectFailedExceptionMBS

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The exception for an error in the SSH2SessionMBS.Constructor.

**Notes:** Subclass of the RuntimeException class.

#### Blog Entries

- [MBS Xojo / Real Studio Plugins, version 14.0pr5](#)

## 6.17 class SSH2SessionMBS

### 6.17.1 class SSH2SessionMBS

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The class for a SSH2 session.

#### Blog Entries

- [MBS Xojo Plugins, version 22.5pr1](#)
- [MBS Xojo Plugins, version 22.3pr3](#)
- [News from the MBS Xojo Plugins Version 20.5](#)
- [SSH Terminal example for Xojo](#)
- [News from the MBS Xojo Plugins Version 20.4](#)
- [MBS Xojo Plugins, version 18.5pr1](#)
- [MBS Xojo Plugins 18.3](#)
- [MBS Xojo Plugins, version 18.3pr3](#)
- [SSH tunnel in Xojo](#)
- [MonkeyBread Software Releases the MBS Xojo / Real Studio plug-ins in version 15.0](#)

#### Videos

- [Presentation from Xojo Developer Conference 2019 in Miami.](#)

### 6.17.2 Methods

### 6.17.3 Banner as string

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Get the remote banner.

**Notes:** Once the session has been setup and Handshake has completed successfully, this function can be used to get the server id from the banner each server presents.

### 6.17.4 CipherNames as String()

Plugin Version: 18.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries list of all ciphers.

**Example:**

```
// see hash and encryption algorithms available
dim CipherNames() as string = SSH2SessionMBS.CipherNames
dim DigestNames() as string = SSH2SessionMBS.DigestNames
Break
```

**Notes:** The list may not be the same for Mac, Windows and Linux.

### 6.17.5 ConfigureKeepAlive(WantReply as Boolean = true, Interval as Integer = 2)

Plugin Version: 20.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Configures keep alive probes.

**Notes:** Set how often keepalive messages should be sent.

WantReply indicates whether the keepalive messages should request a response from the server.

Interval is number of seconds that can pass without any I/O, use 0 to disable keepalives. To avoid some busy-loop corner-cases, if you specify an interval of 1 it will be treated as 2.

### 6.17.6 Constructor(IP as string, Port as Integer = 22, TimeOut as Integer = 30)

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The constructor for using a new socket.

**Notes:** The plugin creates a new socket, connects to the given IP&Port and than creates a new session for it.

Lasterror is set.

Please check if Handle property is non zero after constructor finishes.

Timeout defines timeout for connection in seconds. While waiting, the plugin yields time to other threads. If timeout is zero, the connection will not yield and take up to the default TCP/IP timeout.

IPv4, IPv6 address or domain name with version 18.3 or newer.

See also:

- 6.17.7 Constructor(socket as TCPSocket) 117
- 6.17.8 Constructor(socketHandle as Integer, CloseSocketLater as boolean = false) 117

**6.17.7 Constructor(socket as TCPSocket)**

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The constructor for using an existing socket.

**Notes:** Initializes a new session.

socket: The socket to use. The plugin keeps reference to this socket in socket property.

You can use a Xojo socket and connect it. Once connected, pass it here, so the session can use this socket for communication.

If you connect the xojo socket in a loop on a thread, be sure to call poll method of socket, so it processes events like connecting. In main thread with timer, you would get this automatically.

See also:

- 6.17.6 Constructor(IP as string, Port as Integer = 22, TimeOut as Integer = 30) 116
- 6.17.8 Constructor(socketHandle as Integer, CloseSocketLater as boolean = false) 117

**6.17.8 Constructor(socketHandle as Integer, CloseSocketLater as boolean = false)**

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The constructor for using an existing socket.

**Notes:** Initializes a new session.

socketHandle: The socket to use. Can be TCPSocket's handle property for a Xojo socket. Or a socket connected via declares.

You can put the socket in the socket property to keep it alive as long as session is in memory.

Set CloseSocketLater = true if you pass a socket which can be closed in destructor. For Xojo socket, pass false as Xojo closes socket later.

You can use a Xojo socket and connect it. Once connected, pass it here, so the session can use this socket for communication.

See also:

- 6.17.6 Constructor(IP as string, Port as Integer = 22, TimeOut as Integer = 30) 116
- 6.17.7 Constructor(socket as TCPSocket) 117

**6.17.9 Destructor**

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The destructor.

### 6.17.10 DigestNames as String()

Plugin Version: 18.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries list of all digest algorithms.

**Example:**

```
// see hash and encryption algorithms available
dim CipherNames() as string = SSH2SessionMBS.CipherNames
dim DigestNames() as string = SSH2SessionMBS.DigestNames
Break
```

**Notes:** The list may not be the same for Mac, Windows and Linux.

### 6.17.11 Disconnect(description as string)

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Terminate transport layer.

**Notes:** Lasterror is set.

description: Human readable reason for disconnection.

See also:

- 6.17.12 Disconnect(reason as Integer, description as string, lang as string = "") 118

### 6.17.12 Disconnect(reason as Integer, description as string, lang as string = "")

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Terminate transport layer.

**Notes:** Lasterror is set.

reason: One of the Disconnect Reason constants.

description: Human readable reason for disconnection.

lang: Localization string describing the language/encoding of the description provided.

See also:

- 6.17.11 Disconnect(description as string) 118

### 6.17.13 HostKey(byref Type as Integer) as string

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Get the remote key.

#### 6.17.14 HostKeyHash(HashType as Integer) as string

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Return a hash of the remote host's key.

**Notes:** HashType: kHostKeyHashSHA1 or kHostKeyHashMD5.

Returns the computed digest of the remote system's hostkey. The length of the returned string is hash\_type specific (e.g. 16 bytes for MD5, 20 bytes for SHA1).

Computed hostkey hash value, or empty string if the information is not available (either the session has not yet been started up, or the requested hash algorithm was not available). The hash consists of raw binary bytes, not hex digits, so it is not directly printable.

#### 6.17.15 OpenDirectTCPIPChannel(host as string, port as integer, sourceHost as string = "127.0.0.1", sourcePort as Integer = 22) as SSH2ChannelMBS

Plugin Version: 18.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Tunnel a TCP connection through an SSH session.

**Notes:** host: Third party host to connect to using the SSH host as a proxy.

port: Port on third party host to connect to.

SourceHost: Host to tell the SSH server the connection originated on.

SourcePort: Port to tell the SSH server the connection originated from.

Tunnel a TCP/IP connection through the SSH transport via the remote host to a third party. Communication from the client to the SSH server remains encrypted, communication from the server to the 3rd party host travels in cleartext.

This is not a replacement for ssh in command line with -L option.

Returns a newly allocated channel object, or nil on errors.

#### 6.17.16 OpenSession as SSH2ChannelMBS

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Establish a generic session channel.

**Notes:** Lasterror is set.

Returns nil if the session start fails.

### 6.17.17 SessionFlag(Flag as Integer, Value as boolean)

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Get/Set a session flag.

**Notes:** See kFlag\* constants.

Lasterror is set.

### 6.17.18 SessionHandshake

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Perform the SSH handshake.

**Notes:** Lasterror is set.

### 6.17.19 SetBanner(Banner as string)

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Set the SSH protocol banner for the local client.

**Notes:** Set the banner that will be sent to the remote host when the SSH session is started with Handshake. This is optional; a banner corresponding to the protocol and libssh2 version will be sent by default.

Lasterror is set.

### 6.17.20 SetMethodPreference(methodType as Integer, Pref as string) as Boolean

Plugin Version: 18.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Set preferred key exchange method.

**Example:**

```
// set preferences for key exchange method:  
dim r as Boolean = s.SetMethodPreference(SSH2SessionMBS.kMethodKEX, "diffie-hellman-group-exchange-  
sha256")
```

**Notes:** methodType: One of the Method Type constants.

Pref: Coma delimited list of preferred methods to use with the most preferred listed first and the least preferred listed last. If a method is listed which is not supported by libssh2 it will be ignored and not sent

to the remote host during protocol negotiation.

Set preferred methods to be negotiated. These preferences must be set prior to calling SessionHandshake, as they are used during the protocol initiation phase.

Return true on success or false on failure. Lasterror is set. Lasterror is set to LIBSSH2\_ERROR\_EAGAIN (-37) when it would otherwise block. While LIBSSH2\_ERROR\_EAGAIN is a negative number, it isn't really a failure per se.

### 6.17.21 SupportedAlgorithms(methodType as Integer) as String()

Plugin Version: 18.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Get list of supported algorithms.

**Example:**

```
dim s as new SSH2SessionMBS("localhost")

dim KeyExchange() as string = s.SupportedAlgorithms(SSH2SessionMBS.kMethodKEX)
dim HostKey() as string = s.SupportedAlgorithms(SSH2SessionMBS.kMethodHostKey)
dim CryptCS() as string = s.SupportedAlgorithms(SSH2SessionMBS.kMethodCryptCS)
dim CryptSC() as string = s.SupportedAlgorithms(SSH2SessionMBS.kMethodCryptSC)
dim MacCS() as string = s.SupportedAlgorithms(SSH2SessionMBS.kMethodMacCS)
dim MacSC() as string = s.SupportedAlgorithms(SSH2SessionMBS.kMethodMacSC)
dim CompCS() as string = s.SupportedAlgorithms(SSH2SessionMBS.kMethodCompCS)
dim CompSC() as string = s.SupportedAlgorithms(SSH2SessionMBS.kMethodCompSC)
dim LangCS() as string = s.SupportedAlgorithms(SSH2SessionMBS.kMethodLangCS)
dim LangSC() as string = s.SupportedAlgorithms(SSH2SessionMBS.kMethodLangSC)
```

Break

**Notes:** Method type: see kMethod\* constants.

Get a list of supported algorithms for the given methodType. The methodType parameter is equivalent to methodType in SetMethodPreference.

In order to get a list of all supported compression algorithms, SessionFlag(SSH2SessionMBS.kFlagCompress, true) must be called before calling this function, otherwise only "none" will be returned.

On success, returns array with algorithms  
Lasterror is set with error code.

### 6.17.22 `UserAuthKeyboardInteractive(Username as string)`

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Authenticate a session using keyboard-interactive authentication.

**Notes:** `username`: Name of user to attempt keyboard-interactive authentication for. `Lasterror` is set.

Calls `KeyboardCallback` callback to query input from user.

### 6.17.23 `UserAuthList(username as string) as string`

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** List supported authentication methods.

**Notes:** `username`: Username which will be used while authenticating. Note that most server implementations do not permit attempting authentication with different usernames between requests. Therefore this must be the same username you will use on later `userauth` calls.

Send a `SSH_USERAUTH_NONE` request to the remote host. Unless the remote host is configured to accept none as a viable authentication scheme (unlikely), it will return `SSH_USERAUTH_FAILURE` along with a listing of what authentication schemes it does support. In the unlikely event that none authentication succeeds, this method will return `NULL`. This case may be distinguished from a failing case by examining `Authenticated`.

### 6.17.24 `UserAuthPassword(Username as string, Password as string)`

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Authenticate a session with username and password.

**Notes:** `username`: Name of user to attempt plain password authentication for.  
`password`: Password to use for authenticating username.

Attempt basic password authentication. Note that many SSH servers which appear to support ordinary password authentication actually have it disabled and use Keyboard Interactive authentication (routed via PAM or another authentication backed) instead.

`Lasterror` is set.

### 6.17.25 `UserAuthPublicKeyFromFile(Username as string, publickey as folderitem, privatekey as folderitem, Passphrase as string)`

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Authenticate a session with a public key, read from a file.

**Notes:** Lasterror is set.

username: user name to authenticate as.

publickey: Path of the public key file. (e.g. /etc/ssh/hostkey.pub). If libssh2 is built against OpenSSL, this option can be set to ""/nil.

privatekey: Path of the private key file. (e.g. /etc/ssh/hostkey)

passphrase: Passphrase to use when decoding privatekey.

Attempt public key authentication using a PEM encoded private key file stored on disk

See also:

- 6.17.26 UserAuthPublicKeyFromFile(Username as string, publickey as string, privatekey as string, Passphrase as string) 123

### 6.17.26 UserAuthPublicKeyFromFile(Username as string, publickey as string, privatekey as string, Passphrase as string)

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Authenticate a session with a public key, read from a file.

**Notes:** Lasterror is set.

username: user name to authenticate as.

publickey: Path of the public key file. (e.g. /etc/ssh/hostkey.pub). If libssh2 is built against OpenSSL, this option can be set to ""/nil.

privatekey: Path of the private key file. (e.g. /etc/ssh/hostkey)

passphrase: Passphrase to use when decoding privatekey.

Attempt public key authentication using a PEM encoded private key file stored on disk

See also:

- 6.17.25 UserAuthPublicKeyFromFile(Username as string, publickey as folderitem, privatekey as folderitem, Passphrase as string) 122

### 6.17.27 UserAuthPublicKeyFromMemory(Username as string, publickey as string, privatekey as string, Passphrase as string)

Plugin Version: 16.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Authenticate a session with a public key, read from memory

**Notes:** This function allows to authenticate a session with a public key read from memory.

Lasterror is set.

username - Remote user name to authenticate as.

publickeydata - Buffer containing the contents of a public key file. Optional.

privatekeydata - Buffer containing the contents of a private key file.  
passphrase - Passphrase to use when decoding private key file.

Keys must have LF as line ending, not CR.

Attempt public key authentication using a PEM encoded private key file stored in memory.

### 6.17.28 Version as string

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries the version for the SSH library.

**Example:**

```
MsgBox SSH2SessionMBS.Version
```

### 6.17.29 WaitSocket(TimeOut as Double = 0.1)

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Waits on the socket for sending or receiving.

**Notes:** Default used to be 10 seconds, but that may be too much, so since v22.3 the value can be customized and is now 1/10th of a second.

### 6.17.30 Properties

#### 6.17.31 Authenticated as Boolean

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Return authentication status.

**Notes:** Indicates whether or not the named session has been successfully authenticated.

Returns true if authenticated and false if not.

(Read only property)

#### 6.17.32 Blocking as Boolean

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The blocking mode on session.

**Notes:** blocking: Set to a non-zero value to make the channel block, or zero to make it non-blocking.

Set or clear blocking mode on the selected on the session. This will instantly affect any channels associated with this session. If a read is performed on a session with no data currently available, a blocking session will wait for data to arrive and return what it receives. A non-blocking session will return immediately with an empty buffer. If a write is performed on a session with no room for more data, a blocking session will wait for room. A non-blocking session will return immediately without writing anything.  
(Read and Write property)

### 6.17.33 Handle as Integer

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Internal object reference.

**Notes:** (Read and Write property)

### 6.17.34 LastErrNo as Integer

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Get the most recent error number.

**Notes:** Returns a numeric error code corresponding to the the Error Code constants.

(Read only property)

### 6.17.35 LastError as Integer

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The last error code.

**Notes:** (Read and Write property)

### 6.17.36 Socket as TCPSocket

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The socket value.

**Notes:** This is set by constructor if you base the session on an existing session.

But you can assign a socket here if you like.

(Read and Write property)

### 6.17.37 Tag as Variant

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The tag value.

**Notes:** A property where you can store any value you like.  
(Read and Write property)

### 6.17.38 TimeOut as Integer

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The timeout for blocking functions.

**Notes:** In milliseconds.  
(Read and Write property)

### 6.17.39 Events

### 6.17.40 KeyboardCallback(Name as string, Instruction as string, PromptCount as Integer, Prompts() as SSH2UserAuthKeyboardInteractivePromptMBS, responses() as SSH2UserAuthKeyboardInteractiveResponseMBS)

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: .

**Function:** Event to ask for user input on a UserAuthKeyboardInteractive run.

**Notes:** You can ask user for password, e.g. with a modal dialog.

You find prompt text in SSH2UserAuthKeyboardInteractivePromptMBS object and place answer in SSH2UserAuthKeyboardInteractiveResponseMBS objects.

### 6.17.41 Constants

Error Codes

Constant	Value	Description
kErrorAgentProtocol	-42	Invalid agent protocol.
kErrorAlloc	-6	Out of memory.
kErrorAuthenticationFailed	-18	Authentication failed.
kErrorBadSocket	-45	Bad socket handle.
kErrorBadUse	-39	Bad use.
kErrorBannerRecv	-2	Failed to receive banner.
kErrorBannerSend	-3	Failed to send banner.
kErrorBufferTooSmall	-38	Memory buffer is too small.
kErrorChannelClosed	-26	Channel is already closed.
kErrorChannelEofSent	-27	Channel sent EOF.
kErrorChannelFailure	-21	Generic error on a channel.
kErrorChannelOutOforder	-20	Channel commands out of order.
kErrorChannelPacketExceeded	-25	Channel packet exceeded.
kErrorChannelRequestDenied	-22	Channel request denied.
kErrorChannelUnknown	-23	Unknown channel.
kErrorChannelWindowExceeded	-24	Channel window exceeded.
kErrorChannelWindowFull	-47	Channel window is full.
kErrorCompress	-40	Compression error.
kErrorDecrypt	-12	Error with decryption.
kErrorEagain	-37	Please try again later.
kErrorEncrypt	-44	Error on encrypting.
kErrorFile	-16	File IO error.
kErrorHostkeyInit	-10	Failed to init host key.
kErrorHostkeySign	-11	Failed to sign host key.
kErrorInval	-34	Input value error.
kErrorInvalidMac	-4	Invalid MAC address.
kErrorInvalidPollType	-35	Invalid poll type.
kErrorKexFailure	-5	Key exchange failed.
kErrorKeyExchangeFailure	-8	Key exchange failed.
kErrorKeyfileAuthFailed	-48	Authorization with key file failed.
kErrorKnownHosts	-46	Unknown host.
kErrorMethodNone	-17	No method.
kErrorMethodNotSupported	-33	Method not supported.
kErrorNone	0	No error.
kErrorOutOfBoundary	-41	Out of Boundary.
kErrorPasswordExpired	-15	Password expired.
kErrorProto	-14	Protocol error.
kErrorPublicKeyProtocol	-36	PublicKey protocol failed.
kErrorPublicKeyUnverified	-19	PublicKey is not verified.
kErrorRequestDenied	-32	Request denied.
kErrorScpProtocol	-28	Error with SCP protocol.
kErrorSftpProtocol	-31	Error with SFTP protocol.
kErrorSocketDisconnect	-13	Socket got disconnected.
kErrorSocketNone	-1	No socket error.
kErrorSocketRecv	-43	Socket receive failed.
kErrorSocketSend	-7	Socket send failed.
kErrorSocketTimeout	-30	Socket timeout.
kErrorTimeout	-9	Timeout.
kErrorZlib	-29	Error with zlib (Compression).

## Flags

Constant	Value	Description
kFlagCompress	2	Set options for the created session. flag is the option to set, while value is typically set to 1 or 0 to enable or disable the option. If set - before the connection negotiation is performed - libssh2 will try to negotiate compression enabling for this connection. By default libssh2 will not attempt to use compression.
kFlagSigPipe	1	Set options for the created session. flag is the option to set, while value is typically set to 1 or 0 to enable or disable the option. If set, libssh2 will not attempt to block SIGPIPEs but will let them trigger from the underlying socket layer.

## Hash Type

Constant	Value	Description
kHostKeyHashMD5	1	MD5
kHostKeyHashSHA1	2	SHA1
kHostKeyHashSHA256	3	SHA256

## Method Preferences

Constant	Value	Description
kMethodCompCS	6	Compression method. e.g. zlib, zlib@openssh.com, none
kMethodCompSC	7	Compression method. e.g. zlib, zlib@openssh.com, none
kMethodCryptCS	2	Crypt Method. e.g. aes128-ctr, aes192-ctr, aes256-ctr, aes256-cbc, rijndael-cbc@lysator.liu.se, aes192-cbc, aes128-cbc, blowfish-cbc, arcfour128, arcfour, cast128-cbc, 3des-cbc.
kMethodCryptSC	3	Crypt Method. e.g. aes128-ctr, aes192-ctr, aes256-ctr, aes256-cbc, rijndael-cbc@lysator.liu.se, aes192-cbc, aes128-cbc, blowfish-cbc, arcfour128, arcfour, cast128-cbc, 3des-cbc
kMethodHostKey	1	Host key method. e.g. ssh-rsa, ssh-dss
kMethodKEX	0	Key Exchange Method. e.g. diffie-hellman-group-exchange-sha256, diffie-hellman-group-exchange-sha1, diffie-hellman-group14-sha1 or diffie-hellman-group1-sha1.
kMethodLangCS	8	Language.
kMethodLangSC	9	Language.
kMethodMacCS	4	MAC method (hash) e.g. hmac-sha2-256, hmac-sha2-512, hmac-sha1, hmac-sha1-96, hmac-md5, hmac-md5-96, hmac-ripemd160, hmac-ripemd160@openssh.com
kMethodMacSC	5	MAC method (hash) e.g. hmac-sha2-256, hmac-sha2-512, hmac-sha1, hmac-sha1-96, hmac-md5, hmac-md5-96, hmac-ripemd160, hmac-ripemd160@openssh.com

## 6.18 class SSH2TunnelMBS

### 6.18.1 class SSH2TunnelMBS

Plugin Version: 18.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The class for a SSH tunnel.

**Notes:** The MBS Plugin can spin of a new preemptive thread to run a tunnel to forward a SSH connection from local socket to remote server via SSH tunnel.

This works well for database access with MySQL.

By using our own thread, we are not blocking or blocked by your Xojo code.

The tunnel allows currently one connection through it, e.g. run one tunnel per MySQL connection to go through the tunnel. If you need multiple tunnels, please create multiple SSH tunnels.

#### Blog Entries

- [MBS Xojo Plugins, version 22.1pr6](#)
- [MBS Xojo Plugins, version 20.3pr1](#)

- [MBS Xojo Plugins, version 20.2pr1](#)
- [MBS Xojo Plugins, version 18.5pr3](#)
- [MBS Xojo Plugins 18.3](#)
- [MBS Xojo Plugins, version 18.3pr3](#)
- [SSH tunnel in Xojo](#)

## Videos

- [Presentation from Munich conference about MBS Plugins.](#)
- [Presentation from Xojo Developer Conference 2019 in Miami.](#)

### 6.18.2 Methods

#### 6.18.3 Constructor(session as SSH2SessionMBS)

Plugin Version: 18.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The constructor.

**Notes:** Please pass connected SSH session.

#### 6.18.4 Destructor

Plugin Version: 18.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The destructor.

#### 6.18.5 Run

Plugin Version: 18.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Runs the thread with the tunnel.

#### 6.18.6 Properties

#### 6.18.7 BytesReceived as Int64

Plugin Version: 18.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Number of bytes received.

**Notes:** (Read only property)

### 6.18.8 BytesSent as Int64

Plugin Version: 18.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Number of bytes sent.

**Notes:** (Read only property)

### 6.18.9 Cancel as Boolean

Plugin Version: 18.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Whether to cancel tunnel.

**Notes:** This property can be set to request end of the thread.

(Read and Write property)

### 6.18.10 Connected as Boolean

Plugin Version: 20.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries whether tunnel is connected and transfers data.

**Notes:** Returns true if connected or false if not.

(Read only property)

### 6.18.11 KeepAlive as Boolean

Plugin Version: 20.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Whether to sent keep-alive packets.

**Example:**

```
dim tunnel as SSH2TunnelMBS // your tunnel
```

```
// avoid timeing out in Socket and SSH layers
```

```
tunnel.KeepAlive = True
```

```
session.ConfigureKeepAlive
```

**Notes:** If set to true, TCP keep alive probes will be sent to avoid TCP/IP timeouts.

Set to false (default behavior) to disable keep alive probes.

You may also need to use `ConfigureKeepAlive` on the `SSH2SessionMBS` class.  
(Read and Write property)

### 6.18.12 LocalAddress as String

Plugin Version: 18.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The local address to use.

**Notes:** Defines where we wait for a connection to forward.

IPv4 or IPv6 address.

(Read and Write property)

### 6.18.13 LocalPort as Integer

Plugin Version: 18.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The local port to use.

**Notes:** (Read and Write property)

### 6.18.14 Messages as String

Plugin Version: 18.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Log messages.

**Notes:** Filled by thread to tell you about errors.

(Read only property)

### 6.18.15 RemoteAddress as String

Plugin Version: 18.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The remote address to use.

**Notes:** When connecting through tunnel this address is used from server to connect to.

IPv4 or IPv6 address.

(Read and Write property)

### 6.18.16 RemotePort as Integer

Plugin Version: 18.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The remote port to use.

**Notes:** When connecting through tunnel this port is used from server to connect to.  
(Read and Write property)

### 6.18.17 Running as Boolean

Plugin Version: 18.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Whether tunnel is running.

**Notes:** True if running, false if not.  
(Read only property)

### 6.18.18 Session as SSH2SessionMBS

Plugin Version: 18.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The session used for the tunnel.

**Notes:** (Read only property)

## 6.19 class SSH2UserAuthKeyboardInteractivePromptMBS

### 6.19.1 class SSH2UserAuthKeyboardInteractivePromptMBS

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The class for an interactive keyboard authentication prompt.

**Notes:** This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

### 6.19.2 Methods

### 6.19.3 Constructor

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The private constructor.

### 6.19.4 Destructor

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The destructor.

### 6.19.5 Properties

### 6.19.6 Echo as Integer

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The echo flag.

**Notes:** (not sure what this is)  
(Read and Write property)

### 6.19.7 Length as Integer

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The length of the text.

**Notes:** (Read and Write property)

### 6.19.8 Text as String

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The text message.

**Notes:** (Read and Write property)

## 6.20 class SSH2UserAuthKeyboardInteractiveResponseMBS

### 6.20.1 class SSH2UserAuthKeyboardInteractiveResponseMBS

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The class for a response with interactive keyboard login.

**Notes:** This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

### 6.20.2 Methods

### 6.20.3 Constructor

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The private constructor.

### 6.20.4 Destructor

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The destrutor.

### 6.20.5 Properties

### 6.20.6 Text as String

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The response text.

**Notes:** Usually a password.

(Read and Write property)

## 6.21 class TXTRecordMBS

### 6.21.1 class TXTRecordMBS

Plugin Version: 10.1, Platforms: macOS, Windows, Targets: All.

**Function:** The class to represent a DNS-SD TXT record.

**Example:**

```
dim t as new TXTRecordMBS
```

```
call t.SetValue "Hello", "World"
```

```
MsgBox t.Bytes // show complete record
```

```
MsgBox t.Value("Hello") // lookup value
```

**Notes:** The constructor creates an empty TXTRecord where you can add values using TXTRecordSetValue.

### 6.21.2 Methods

#### 6.21.3 Bytes as string

Plugin Version: 10.1, Platforms: macOS, Windows, Targets: All.

**Function:** Allows you to retrieve a copy of the raw bytes within a TXTRecord.

**Example:**

```
dim t as new TXTRecordMBS
```

```
call t.SetValue "Hello", "World"
```

**Notes:** Returns a string with the raw bytes inside the TXTRecord which you can pass directly to `DNSServiceRegisterMBS.Register()` or to `DNSServiceRegisterMBS.UpdateRecord()`.

#### 6.21.4 ContainsKey(key as string) as boolean

Plugin Version: 10.1, Platforms: macOS, Windows, Targets: All.

**Function:** Allows you to determine if a given TXT Record contains a specified key.

**Example:**

```
dim t as new TXTRecordMBS
```

```

call t.SetValue "Hello", "World"

if t.ContainsKey("Hello") then
MsgBox "Hello found."
else
MsgBox "Hello not found ->bug."
end if

if t.ContainsKey("hallo") then
MsgBox "hallo found ->bug."
else
MsgBox "hallo not found."
end if

```

**Notes:** key: An ASCII string containing the key name.

Returns true if the TXT Record contains the specified key. Otherwise, it returns false.  
See also:

- 6.21.5 ContainsKey(txtRecord as string, key as string) as boolean

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### 6.21.5 ContainsKey(txtRecord as string, key as string) as boolean

Plugin Version: 10.1, Platforms: macOS, Windows, Targets: All.

**Function:** Allows you to determine if a given TXT Record contains a specified key.

**Example:**

```

dim t as new TXTRecordMBS

call t.SetValue "Hello", "World"

dim s as string = t.Bytes // copy record to string

// now search in that string:
if TXTRecordMBS.ContainsKey(s, "Hello") then
MsgBox "Hello found."
else
MsgBox "Hello not found ->bug."
end if

if TXTRecordMBS.ContainsKey(s, "hallo") then
MsgBox "hallo found ->bug."
else

```

```
MsgBox "hallo not found."
end if
```

**Notes:** txtRecord: The txt record to search in as a string.  
key: An ASCII string containing the key name.

Returns true if the TXT Record contains the specified key. Otherwise, it returns false.  
See also:

- 6.21.4 ContainsKey(key as string) as boolean

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### 6.21.6 Count as Integer

Plugin Version: 10.1, Platforms: macOS, Windows, Targets: All.

**Function:** Returns the number of keys stored in the TXT Record.

**Example:**

```
dim t as new TXTRecordMBS

call t.SetValue "Hello1", "World1"
call t.SetValue "Hello2", "World2"
call t.SetValue "Hello3", "World3"

MsgBox str(t.Count)
```

See also:

- 6.21.7 Count(txtRecord as string) as Integer

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### 6.21.7 Count(txtRecord as string) as Integer

Plugin Version: 10.1, Platforms: macOS, Windows, Targets: All.

**Function:** Returns the number of keys stored in the TXT Record.

**Example:**

```
dim t as new TXTRecordMBS

call t.SetValue "Hello1", "World1"
call t.SetValue "Hello2", "World2"
call t.SetValue "Hello3", "World3"
```

```
dim s as string = t.Bytes // copy record

// now count in that record
MsgBox str(TXTRecordMBS.Count(s))
```

See also:

- 6.21.6 Count as Integer

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### 6.21.8 KeyAtIndex(index as Integer) as string

Plugin Version: 10.1, Platforms: macOS, Windows, Targets: All.

**Function:** Returns the key with the given index from the txt record.

**Example:**

```
dim t as new TXTRecordMBS

call t.SetValue "Hello", "World"

MsgBox t.KeyAtIndex(0) +EndOfLine + t.ValueAtIndex(0)
```

**Notes:** index: the index you want in the range from zero to GetCount()-1.

It's also possible to iterate through keys in a TXT record by simply calling KeyAtIndex() repeatedly, beginning with index zero and increasing until lasterror is set to kErrorInvalid.

See also:

- 6.21.9 KeyAtIndex(txtRecord as string, index as Integer) as string

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### 6.21.9 KeyAtIndex(txtRecord as string, index as Integer) as string

Plugin Version: 10.1, Platforms: macOS, Windows, Targets: All.

**Function:** Returns the key with the given index from the txt record.

**Example:**

```
dim t as new TXTRecordMBS

call t.SetValue "Hello", "World"

dim s as string = t.Bytes // copy record to string
```

```
// now search in that string:
MsgBox TXTRecordMBS.KeyAtIndex(s,0) +EndOfLine + TXTRecordMBS.ValueAtIndex(s,0)
```

**Notes:** txtRecord: The txt record to search in as a string.  
index: the index you want in the range from zero to GetCount()-1.

It's also possible to iterate through keys in a TXT record by simply calling KeyAtIndex() repeatedly, beginning with index zero and increasing until lasterror is set to kErrorInvalid.  
See also:

- 6.21.8 KeyAtIndex(index as Integer) as string 140

### 6.21.10 Length as Integer

Plugin Version: 10.1, Platforms: macOS, Windows, Targets: All.

**Function:** Allows you to determine the length of the raw bytes within a TXTRecord.

**Example:**

```
dim t as new TXTRecordMBS

call t.SetValue "Hello1", "World1"
call t.SetValue "Hello2", "World2"
call t.SetValue "Hello3", "World3"

MsgBox str(t.Length) // shows 42
```

### 6.21.11 RemoveValue(key as string)

Plugin Version: 10.1, Platforms: macOS, Windows, Targets: All.

**Function:** Removes a key from a TXTRecordRef. The "key" must be an ASCII string which exists in the TXTRecord.

**Example:**

```
dim t as new TXTRecordMBS

call t.SetValue "Hello1", "World1"
call t.SetValue "Hello2", "World2"
call t.SetValue "Hello3", "World3"

t.RemoveValue "Hello2"
```

MsgBox t.Bytes

**Notes:** key: A key name which exists in the TXTRecord.

Lasterror is kErrorNoError on success or kErrorNoSuchKey if the "key" does not exist in the TXTRecord.

### 6.21.12 SetValue(key as string, value as string) as Integer

Plugin Version: 10.1, Platforms: macOS, Windows, Targets: All.

**Function:** Adds a key (optionally with value) to a TXTRecordRef.

**Example:**

```
dim t as new TXTRecordMBS
```

```
call t.SetValue "Hello1", "World1"
```

```
call t.SetValue "Hello2", "World2"
```

```
call t.SetValue "Hello3", "World3"
```

**Notes:** If the "key" already exists in the TXTRecord, then the current value will be replaced with the new value.

Keys may exist in four states with respect to a given TXT record:

- Absent (key does not appear at all)
- Present with no value ("key" appears alone)
- Present with empty value ("key=" appears in TXT record)
- Present with non-empty value ("key=value" appears in TXT record)

For more details refer to "Data Syntax for DNS-SD TXT Records" in

<http://files.dns-sd.org/draft-cheshire-dnsext-dns-sd.txt>

key: A string which only contains printable ASCII values (&h20-&h7E), excluding '=' (&h3D). Keys should be 8 characters or less.

value: Any binary value. For values that represent textual data, UTF-8 is STRONGLY recommended.

Returns kErrorNoError on success. Returns kErrorInvalid if the "key" string contains illegal characters. Returns kErrorNoMemory if adding this key would exceed the available storage.

The plugin currently does not create keys with empty value. If you need that, please email us.

### 6.21.13 Value(key as string) as string

Plugin Version: 10.1, Platforms: macOS, Windows, Targets: All.

**Function:** Allows you to retrieve the value for a given key from a TXT Record.

**Example:**

```
dim t as new TXTRecordMBS

call t.SetValue "Hello", "World"
MsgBox t.Value("Hello") // lookup value
```

**Notes:** key: The ASCII string containing the key name.

Returns an empty string if the key does not exist in this TXT record, or exists with no value (to differentiate between these two cases use ContainsKey()).

See also:

- 6.21.14 Value(txtRecord as string, key as string) as string

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### 6.21.14 Value(txtRecord as string, key as string) as string

Plugin Version: 10.1, Platforms: macOS, Windows, Targets: All.

**Function:** Allows you to retrieve the value for a given key from a TXT Record.

**Example:**

```
dim t as new TXTRecordMBS

call t.SetValue "Hello", "World"

dim s as string = t.bytes
MsgBox TXTRecordMBS.Value(s, "Hello") // lookup value
```

**Notes:** txtRecord: Pointer to the received TXT Record bytes.  
key: The ASCII string containing the key name.

Returns an empty string if the key does not exist in this TXT record, or exists with no value (to differentiate between these two cases use `ContainsKey()`).

See also:

- 6.21.13 `Value(key as string) as string`

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### 6.21.15 `ValueAtIndex(index as Integer) as string`

Plugin Version: 10.1, Platforms: macOS, Windows, Targets: All.

**Function:** Returns the key with the given index from the txt record.

**Example:**

```
dim t as new TXTRecordMBS
```

```
call t.SetValue "Hello", "World"
```

```
MsgBox t.KeyAtIndex(0) +EndOfLine + t.ValueAtIndex(0)
```

**Notes:** index: the index you want in the range from zero to `GetCount()-1`.

It's also possible to iterate through values in a TXT record by simply calling `ValueAtIndex()` repeatedly, beginning with index zero and increasing until `lasterror` is set to `kErrorInvalid`.

See also:

- 6.21.16 `ValueAtIndex(txtRecord as string, index as Integer) as string`

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### 6.21.16 `ValueAtIndex(txtRecord as string, index as Integer) as string`

Plugin Version: 10.1, Platforms: macOS, Windows, Targets: All.

**Function:** Returns the key with the given index from the txt record.

**Example:**

```
dim t as new TXTRecordMBS
```

```
call t.SetValue "Hello", "World"
```

```
dim s as string = t.Bytes // copy record to string
```

```
// now search in that string:
```

```
MsgBox TXTRecordMBS.KeyAtIndex(s,0) +EndOfLine + TXTRecordMBS.ValueAtIndex(s,0)
```

**Notes:** txtRecord: The txt record to search in as a string.  
index: the index you want in the range from zero to GetCount()-1.

It's also possible to iterate through values in a TXT record by simply calling GetValueAtIndex() repeatedly, beginning with index zero and increasing until lasterror is set to kErrorInvalid.  
See also:

- 6.21.15 ValueAtIndex(index as Integer) as string

## 6.22 class UDPSocketMBS

### 6.22.1 class UDPSocketMBS

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** A class for UDP sockets.

**Notes:** Similar to Xojo's built in UDPSocket class, but more low level and with more options.

**Blog Entries**

- [MBS Xojo Plugins, version 21.2pr1](#)
- [MonkeyBread Software Releases the MBS Xojo Plugins in version 18.4](#)
- [MBS Xojo Plugins, version 18.4pr10](#)
- [MBS Xojo Plugins, version 18.3pr3](#)
- [MonkeyBread Software Releases the MBS Xojo Plugins in version 18.0](#)
- [MBS Xojo Plugins, version 18.0pr6](#)
- [Raw Sockets for Xojo](#)
- [MBS Xojo / Real Studio Plugins, version 14.5pr2](#)
- [\[ ANN \] MonkeyBread Software Releases the MBS Xojo / Real Studio plug-ins in version 14.4](#)
- [\[ ANN \] MonkeyBread Software Releases the MBS Xojo / Real Studio plug-ins in version 14.3](#)

**Xojo Developer Magazine**

- [17.1, page 11: News](#)
- [16.6, page 9: News](#)

### 6.22.2 Methods

#### 6.22.3 AddMembership(MultiAddress as string, InterfaceAddress as string = "")

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Adds this socket to a multicast group.

**Notes:** Internally this uses IPPROTO\_IP/IP\_ADD\_MEMBERSHIP option.

Lasterror is set.

MultiAddress: The IPv4 address of the group to join.

InterfaceAddress: The IPv4 address of the network interface to use. Can be empty for any interface.

#### 6.22.4 Bind(Port as Integer, IP as string = "")

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Binds the socket to the given port.

**Notes:** If IP is not empty, you can bind the socket to only the given network interface with that IPv4. Set ReuseAddress to bind to an address which already a socket is bound to. Lasterror is set.

#### 6.22.5 Constructor

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The constructor.

#### 6.22.6 Destructor

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The destructor.

**Notes:** Closes the socket.

#### 6.22.7 DropMembership(MultiAddress as string, InterfaceAddress as string = "")

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Removes this socket from a multicast group.

**Notes:** Internally this uses IPPROTO\_IP/IP\_DROP\_MEMBERSHIP option.

Lasterror is set.

MultiAddress: The IPv4 address of the group to join.

InterfaceAddress: The IPv4 address of the network interface to use. Can be empty for any interface.

#### 6.22.8 Poll

Plugin Version: 18.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Polls for activity.

**Notes:** Calls events if needed.

This is called automatically via timer by the plugin.

### 6.22.9 Read(peek as boolean = false) as DatagramMBS

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Reads a datagram.

**Notes:** If peek is true, the data is not removed from read buffer.

On error returns nil.

### 6.22.10 SendMessage(Data as DatagramMBS) as Integer

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Sends a datagram.

**Notes:** Please specify with port and address of datagram where package is sent to.

Returns number of bytes sent.

Lasterror is set.

See also:

- 6.22.11 SendMessage(Data as MemoryBlock, IP as String, Port as Integer) as Integer 148
- 6.22.12 SendMessage(Data as string, IP as String, Port as Integer) as Integer 148

### 6.22.11 SendMessage(Data as MemoryBlock, IP as String, Port as Integer) as Integer

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Sends a datagram.

**Notes:** Please specify with port and IP where package is sent to.

Returns number of bytes sent.

Lasterror is set.

See also:

- 6.22.10 SendMessage(Data as DatagramMBS) as Integer 148
- 6.22.12 SendMessage(Data as string, IP as String, Port as Integer) as Integer 148

### 6.22.12 SendMessage(Data as string, IP as String, Port as Integer) as Integer

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Sends a datagram.

**Notes:** Please specify with port and IP where package is sent to.

Returns number of bytes sent.

Lasterror is set.

See also:

- 6.22.10 SendMessage(Data as DatagramMBS) as Integer 148
- 6.22.11 SendMessage(Data as MemoryBlock, IP as String, Port as Integer) as Integer 148

### 6.22.13 Properties

#### 6.22.14 AddressFamily as Integer

Plugin Version: 18.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The address family of the socket.

**Notes:** This is either RAWSocketMBS.AddressFamilyINet (2) for IPv4 or RAWSocketMBS.AddressFamilyINet6 (Mac 30, Windows 23 and Linux 10) for IPv6.

(Read and Write property)

#### 6.22.15 AvailableBytes as Integer

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns number of bytes available for reading.

**Notes:** Lasterror is set.

(Read only property)

#### 6.22.16 BindAddress as String

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The IP used for bind operation.

**Notes:** This is set by Bind on success.

(Read and Write property)

#### 6.22.17 BindPort as Integer

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The port used for bind operation.

**Notes:** This is set by Bind on success.

(Read and Write property)

### 6.22.18 Broadcast as Boolean

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Whether broadcasts are allowed.

**Notes:** Set to true before sending a broadcast message.

Internally this uses SOL\_SOCKET/SO\_BROADCAST option.

Lasterror is set.

(Read and Write property)

### 6.22.19 Handle as Integer

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The internal socket handle.

**Notes:** (Read and Write property)

### 6.22.20 Lasterror as Integer

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The last error code.

**Notes:** Platform dependent.

(Read and Write property)

### 6.22.21 LocalIP as String

Plugin Version: 18.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries local IP.

**Notes:** Can be 0.0.0.0 if unknown.

May only be set if connected or binded.

Lasterror is set.

(Read only property)

### 6.22.22 LocalPort as Integer

Plugin Version: 18.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries local port.

**Notes:** Lasterror is set.

Can be -1 if unknown.

(Read only property)

### 6.22.23 MulticastInterface as String

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The interface to use for multicast.

**Notes:** Internally this uses IPPROTO\_IP/IP\_MULTICAST\_IF option.

Lasterror is set.

Assign empty string to use all interfaces.

May return 0.0.0.0 to indicate all interfaces.

(Read and Write property)

### 6.22.24 MulticastLoop as Boolean

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Whether multicast packets are also sent to the sending socket.

**Notes:** Internally this uses IPPROTO\_IP/IP\_MULTICAST\_LOOP option.

Lasterror is set.

(Read and Write property)

### 6.22.25 MulticastTimeToLive as Integer

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The multicast time to live value.

**Notes:** Internally this uses IPPROTO\_IP/IP\_MULTICAST\_TTL option.

Lasterror is set.

Range from 0 to 255.

(Read and Write property)

### 6.22.26 Protocol as Integer

Plugin Version: 18.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The socket protocol.

**Notes:** Is ProtocolUDP (17) for UDP sockets.  
(Read and Write property)

### 6.22.27 ReceiveBufferSize as Integer

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries the receiving buffer size.

**Notes:** The buffer size may be increased for high-volume connections, or may be decreased to limit the possible backlog of incoming data. The system places an absolute limit on these values.

Internally this uses SOL\_SOCKET/SO\_RCVBUF option.

Lasterror is set.

(Read and Write property)

### 6.22.28 ReuseAddress as Boolean

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Allows reuse of same port.

**Notes:** Internally this uses SOL\_SOCKET/SO\_REUSEADDR option.

see also

<http://stackoverflow.com/questions/14388706/socket-options-so-reuseaddr-and-so-reuseport-how-do-they-differ-do-they-mean-t>

Lasterror is set.

(Read and Write property)

### 6.22.29 ReusePort as Boolean

Plugin Version: 14.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Allow reuse of same port and IP.

**Notes:** Internally this uses SOL\_SOCKET/SO\_REUSEPORT option.  
On Windows, this is not supported, so this property sets ReuseAddress.  
Lasterror is set.

(Read and Write property)

### 6.22.30 SendBufferSize as Integer

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The sending buffer size.

**Notes:** The buffer size may be increased for high-volume connections, or may be decreased to limit the possible backlog of incoming data. The system places an absolute limit on these values.

Internally this uses SOL\_SOCKET/SO\_SNDBUF option.

Lasterror is set.

(Read and Write property)

### 6.22.31 SocketError as Integer

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The native socket error.

**Notes:** Internally this uses SOL\_SOCKET/SO\_ERROR option.

Lasterror is set.

(Read only property)

### 6.22.32 SocketType as Integer

Plugin Version: 18.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The socket type.

**Notes:** Is SocketTypeDatagram (2) for UDP sockets.

(Read and Write property)

### 6.22.33 TimeToLive as Integer

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The time to live value.

**Notes:** Internally this uses IPPROTO\_IP/IP\_TTL option.

Lasterror is set.

Range from 0 to 255.

(Read and Write property)

### 6.22.34 Type as Integer

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Socket type.

**Notes:** Always 2 as this is a datagram socket.

Internally this uses SOL\_SOCKET/SO\_TYPE option.

Lasterror is set.

(Read only property)

### 6.22.35 TypeOfService as Integer

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The type of service value.

**Notes:** Works only on BSD Sockets.

Possible values:

`IP_TOS_MINCOST = 2`

`IP_TOS_RELIABILITY = 4`

`IP_TOS_THROUGHPUT = 8`

`IP_TOS_LOWDELAY = 16`

Internally this uses IPPROTO\_IP/IP\_TOS option.

(May not work on Windows.)

Lasterror is set.

(Read and Write property)

### 6.22.36 Events

#### 6.22.37 DataAvailable

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: .

**Function:** This event is called when new data is available.

**Notes:** Requires the socket to be bound.

#### 6.22.38 Error

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: .

**Function:** The event called if socket is in error state.

### 6.22.39 SendComplete

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: .

**Function:** The last write operation is done.

## 6.23 class WindowsEthernetAdapterMBS

### 6.23.1 class WindowsEthernetAdapterMBS

Plugin Version: 3.1, Platform: Windows, Targets: All.

**Function:** A class for the properties of an ethernet adapter.

### 6.23.2 Methods

#### 6.23.3 Gateway(index as Integer) as WindowsIPAddressMBS

Plugin Version: 3.1, Platform: Windows, Targets: All.

**Function:** Returns one of the IP address of the default gateway for this adapter.

**Notes:** Index goes from 0 to GatewayGount-1.

#### 6.23.4 IP(index as Integer) as WindowsIPAddressMBS

Plugin Version: 3.1, Platform: Windows, Targets: All.

**Function:** Returns one of the IP addresses associated with this adapter.

**Notes:** Index goes from 0 to IPcount-1.

### 6.23.5 Properties

#### 6.23.6 AdapterName as String

Plugin Version: 3.1, Platform: Windows, Targets: All.

**Function:** Name of the adapter.

**Notes:** (Read and Write property)

#### 6.23.7 Address as String

Plugin Version: 3.1, Platform: Windows, Targets: All.

**Function:** Hardware address for the adapter.

**Notes:** (Read and Write property)

### 6.23.8 CurrentIpAddress as WindowsIPAddressMBS

Plugin Version: 3.1, Platform: Windows, Targets: All.

**Function:** The current IP from within the IP list.

**Notes:** This field is currently normally nil, but in the future it may point to the current IP inside the IP list.

But currently on Windows 2000 it seems to be always nil.

(Read and Write property)

### 6.23.9 Description as String

Plugin Version: 3.1, Platform: Windows, Targets: All.

**Function:** Description for the adapter.

**Notes:** (Read and Write property)

### 6.23.10 DhcpEnabled as Boolean

Plugin Version: 3.1, Platform: Windows, Targets: All.

**Function:** Specifies whether dynamic host configuration protocol (DHCP) is enabled for this adapter.

**Notes:** (Read and Write property)

### 6.23.11 DhcpServer as WindowsIPAddressMBS

Plugin Version: 3.1, Platform: Windows, Targets: All.

**Function:** IP address of the DHCP server for this adapter.

**Notes:** (Read and Write property)

### 6.23.12 Gatewaycount as Integer

Plugin Version: 3.1, Platform: Windows, Targets: All.

**Function:** How many gateway IPs are allocated for this adapter.

**Notes:** (Read and Write property)

### 6.23.13 HaveWins as Boolean

Plugin Version: 3.1, Platform: Windows, Targets: All.

**Function:** Specifies whether this adapter uses Windows Internet Name Service (WINS).

**Notes:** (Read and Write property)

### 6.23.14 Index as Integer

Plugin Version: 3.1, Platform: Windows, Targets: All.

**Function:** Adapter index.

**Notes:** (Read and Write property)

### 6.23.15 IPcount as Integer

Plugin Version: 3.1, Platform: Windows, Targets: All.

**Function:** How many IPs are allocated for this adapter.

**Notes:** (Read and Write property)

### 6.23.16 LeaseExpires as Integer

Plugin Version: 3.1, Platform: Windows, Targets: All.

**Function:** Time when the current DHCP lease expires.

**Notes:** (Read and Write property)

### 6.23.17 LeaseObtained as Integer

Plugin Version: 3.1, Platform: Windows, Targets: All.

**Function:** Time when the current DHCP lease was obtained.

**Notes:** (Read and Write property)

### 6.23.18 PrimaryWinsServer as WindowsIPAddressMBS

Plugin Version: 3.1, Platform: Windows, Targets: All.

**Function:** IP address of the primary WINS server.

**Notes:** (Read and Write property)

### 6.23.19 SecondaryWinsServer as WindowsIPAddressMBS

Plugin Version: 3.1, Platform: Windows, Targets: All.

**Function:** IP address of the secondary WINS server.

**Notes:** (Read and Write property)

### 6.23.20 Type as Integer

Plugin Version: 3.1, Platform: Windows, Targets: All.

**Function:** Adapter type.

**Notes:** The type must be of the following values:

MIB_IF_TYPE_OTHER	1
MIB_IF_TYPE_ETHERNET	6
MIB_IF_TYPE_TOKENRING	9
MIB_IF_TYPE_FDDI	15
MIB_IF_TYPE_PPP	23
MIB_IF_TYPE_LOOPBACK	24
MIB_IF_TYPE_SLIP	28

(Read and Write property)

## 6.24 class WindowsEthernetMBS

### 6.24.1 class WindowsEthernetMBS

Plugin Version: 3.1, Platform: Windows, Targets: All.

**Function:** A list of the Windows Ethernet Interfaces.

**Notes:** Requires Windows 98 or 2000 or newer.

Reports count=0 on Windows 95 and NT 4.0.

Only activate adapters are listed.

### 6.24.2 Methods

#### 6.24.3 Item(index as Integer) as WindowsEthernetAdapterMBS

Plugin Version: 3.1, Platform: Windows, Targets: All.

**Function:** Returns the Ethernet Adapter object for the given index.

**Notes:** Index goes from 0 to count-1.

#### 6.24.4 Update

Plugin Version: 3.1, Platform: Windows, Targets: All.

**Function:** Updates the list.

**Notes:** Calls the Destructor and than the Constructor so the list is completely rebuilt.

#### 6.24.5 Properties

#### 6.24.6 Count as Integer

Plugin Version: 3.1, Platform: Windows, Targets: All.

**Function:** How much ethernet adapters are available.

**Notes:** Note that there may be dummy or virtual adapters.

(Read and Write property)

## 6.25 class WindowsIPAddressMBS

### 6.25.1 class WindowsIPAddressMBS

Plugin Version: 3.1, Platform: Windows, Targets: All.

**Function:** An IP address.

### 6.25.2 Properties

#### 6.25.3 IP as String

Plugin Version: 3.1, Platform: Windows, Targets: All.

**Function:** The IP as a string.

**Notes:** Maximum 15 bytes long.

e.g. "192.168.0.1"

(Read and Write property)

#### 6.25.4 Mask as String

Plugin Version: 3.1, Platform: Windows, Targets: All.

**Function:** The mask for the IP.

**Notes:** e.g. "255.255.255.0"

(Read and Write property)



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## Chapter 8

# The FAQ

### 8.0.1 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)

### 8.0.2 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.

### 8.0.3 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:

- 8.0.4 How to catch delete key? 175
- 8.0.5 How to convert cmyk to rgb? 176
- 8.0.6 How to delete a folder? 177
- 8.0.7 How to detect if CPU is 64bit processor? 178
- 8.0.8 How to query variant type string for a variant? 179
- 8.0.9 How to refresh a htmlviewer on Windows? 180

## 8.0.4 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:

- 8.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 174

- 8.0.5 How to convert cmyk to rgb? 176
- 8.0.6 How to delete a folder? 177
- 8.0.7 How to detect if CPU is 64bit processor? 178
- 8.0.8 How to query variant type string for a variant? 179
- 8.0.9 How to refresh a htmlviewer on Windows? 180

## 8.0.5 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:

- 8.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 174
- 8.0.4 How to catch delete key? 175
- 8.0.6 How to delete a folder? 177
- 8.0.7 How to detect if CPU is 64bit processor? 178
- 8.0.8 How to query variant type string for a variant? 179
- 8.0.9 How to refresh a htmlviewer on Windows? 180

**8.0.6 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:

- 8.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 174
- 8.0.4 How to catch delete key? 175
- 8.0.5 How to convert cmyk to rgb? 176
- 8.0.7 How to detect if CPU is 64bit processor? 178
- 8.0.8 How to query variant type string for a variant? 179
- 8.0.9 How to refresh a htmlviewer on Windows? 180

### 8.0.7 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:

- 8.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 174
- 8.0.4 How to catch delete key? 175
- 8.0.5 How to convert cmyk to rgb? 176
- 8.0.6 How to delete a folder? 177
- 8.0.8 How to query variant type string for a variant? 179
- 8.0.9 How to refresh a htmlviewer on Windows? 180

## 8.0.8 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:

- 8.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 174
- 8.0.4 How to catch delete key? 175
- 8.0.5 How to convert cmyk to rgb? 176
- 8.0.6 How to delete a folder? 177
- 8.0.7 How to detect if CPU is 64bit processor? 178
- 8.0.9 How to refresh a htmlviewer on Windows? 180

### 8.0.9 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:

- 8.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 174
- 8.0.4 How to catch delete key? 175
- 8.0.5 How to convert cmyk to rgb? 176

- 8.0.6 How to delete a folder? 177
- 8.0.7 How to detect if CPU is 64bit processor? 178
- 8.0.8 How to query variant type string for a variant? 179

## 8.0.10 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
```

### 8.0.11 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.

### 8.0.12 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
```

### 8.0.13 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.

### 8.0.14 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>

### 8.0.15 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.

### 8.0.16 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.

### 8.0.17 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)

### 8.0.18 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.

### 8.0.19 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.

## 8.0.20 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.

### 8.0.21 Can I use your plugin controls on a web application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** No.

### 8.0.22 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.

### 8.0.23 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.

### 8.0.24 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.

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.

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.

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.

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 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

## 8.0.25 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](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.

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.

Font Size  
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.

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.

Font Color  
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 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.

## 8.0.26 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:

Attribute	Description
-----------	-------------

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.

### 8.0.27 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 `"&#62;"`). 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.

## 8.0.28 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
```

### 8.0.29 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.

### 8.0.30 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)

### 8.0.31 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.

### 8.0.32 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.

### 8.0.33 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.

### 8.0.34 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
```

### 8.0.35 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.

### 8.0.36 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.

### 8.0.37 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.

### 8.0.38 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.

### 8.0.39 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.

#### 8.0.40 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.

#### 8.0.41 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.

#### 8.0.42 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.

### 8.0.43 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.

#### 8.0.44 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
```

#### 8.0.45 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.



```

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.

### 8.0.48 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.

### 8.0.49 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
```

### 8.0.50 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.

### 8.0.51 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.

### 8.0.52 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.

### 8.0.53 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.

### 8.0.54 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.

**8.0.55 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.

### 8.0.56 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.

### 8.0.57 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.

### 8.0.58 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.

### 8.0.59 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.

### 8.0.60 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).

### 8.0.61 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.

### 8.0.62 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.

### 8.0.63 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>
```

### 8.0.64 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](http://developer.apple.com/mac/library/documentation/Cocoa/Reference/Foundation/Classes/NSAutoreleasePool_Class/Reference/Reference.html)

### 8.0.65 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.

### 8.0.66 How to bring my application to front?

Plugin Version: all, Platform: macOS.

**Answer:** This makes SimpleText (Code txt) 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)

### 8.0.67 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.

### 8.0.68 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.

### 8.0.69 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/>.

### 8.0.70 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.

### 8.0.71 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.

### 8.0.72 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
```

### 8.0.73 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.

### 8.0.74 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.

### 8.0.75 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.

### 8.0.76 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.

### 8.0.77 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.

## 8.0.78 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
```

### 8.0.79 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
```

### 8.0.80 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

### 8.0.81 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.

### 8.0.82 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.

### 8.0.83 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.

### 8.0.84 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

### 8.0.85 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.

### 8.0.86 How to copy a 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 a dictionary of objects, you need to change code to also make a copy of those objects.

### 8.0.87 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.

**8.0.88 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.

### 8.0.89 How to create a GUID?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Use the UUIDMBS class for this.

### 8.0.90 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.

### 8.0.91 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.

### 8.0.92 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.

### 8.0.93 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.

### 8.0.94 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)

### 8.0.95 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.

### 8.0.96 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".

### 8.0.97 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)
```

### 8.0.98 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.

### 8.0.99 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.

### 8.0.100 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.

### 8.0.101 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

```

```

Sub Open()
// Test it

dim za(0) as Integer ' the array of the numbers

lotto 49,6,za ' 6 of 49 in Germany

' and display them
staticText1.text=str(za(0))+chr(13)+str(za(1))+chr(13)+str(za(2))+chr(13)+str(za(3))+chr(13)+str(za(4))+chr(13)+str(za(5))+chr(13)+str(za(6))+chr(13)+str(za(7))+chr(13)+str(za(8))+chr(13)+str(za(9))+chr(13)+str(za(10))+chr(13)+str(za(11))+chr(13)+str(za(12))+chr(13)+str(za(13))+chr(13)+str(za(14))+chr(13)+str(za(15))+chr(13)+str(za(16))+chr(13)+str(za(17))+chr(13)+str(za(18))+chr(13)+str(za(19))+chr(13)+str(za(20))+chr(13)+str(za(21))+chr(13)+str(za(22))+chr(13)+str(za(23))+chr(13)+str(za(24))+chr(13)+str(za(25))+chr(13)+str(za(26))+chr(13)+str(za(27))+chr(13)+str(za(28))+chr(13)+str(za(29))+chr(13)+str(za(30))+chr(13)+str(za(31))+chr(13)+str(za(32))+chr(13)+str(za(33))+chr(13)+str(za(34))+chr(13)+str(za(35))+chr(13)+str(za(36))+chr(13)+str(za(37))+chr(13)+str(za(38))+chr(13)+str(za(39))+chr(13)+str(za(40))+chr(13)+str(za(41))+chr(13)+str(za(42))+chr(13)+str(za(43))+chr(13)+str(za(44))+chr(13)+str(za(45))+chr(13)+str(za(46))+chr(13)+str(za(47))+chr(13)+str(za(48))+chr(13)+str(za(49))+chr(13)+str(za(50))+chr(13)+str(za(51))+chr(13)+str(za(52))+chr(13)+str(za(53))+chr(13)+str(za(54))+chr(13)+str(za(55))+chr(13)+str(za(56))+chr(13)+str(za(57))+chr(13)+str(za(58))+chr(13)+str(za(59))+chr(13)+str(za(60))+chr(13)+str(za(61))+chr(13)+str(za(62))+chr(13)+str(za(63))+chr(13)+str(za(64))+chr(13)+str(za(65))+chr(13)+str(za(66))+chr(13)+str(za(67))+chr(13)+str(za(68))+chr(13)+str(za(69))+chr(13)+str(za(70))+chr(13)+str(za(71))+chr(13)+str(za(72))+chr(13)+str(za(73))+chr(13)+str(za(74))+chr(13)+str(za(75))+chr(13)+str(za(76))+chr(13)+str(za(77))+chr(13)+str(za(78))+chr(13)+str(za(79))+chr(13)+str(za(80))+chr(13)+str(za(81))+chr(13)+str(za(82))+chr(13)+str(za(83))+chr(13)+str(za(84))+chr(13)+str(za(85))+chr(13)+str(za(86))+chr(13)+str(za(87))+chr(13)+str(za(88))+chr(13)+str(za(89))+chr(13)+str(za(90))+chr(13)+str(za(91))+chr(13)+str(za(92))+chr(13)+str(za(93))+chr(13)+str(za(94))+chr(13)+str(za(95))+chr(13)+str(za(96))+chr(13)+str(za(97))+chr(13)+str(za(98))+chr(13)+str(za(99))
End Sub

```

### 8.0.102 How to do an asycron DNS lookup?

Plugin Version: all, Platform: Windows.

**Answer:** use CFHostMBS class (Mac OS X only).

**Notes:** Xojo internal functions and plugin DNS functions are sycronized.

You can use DNSLookupThreadMBS class for doing them asycron.

### 8.0.103 How to draw a dushed pattern line?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** You can try this code:

**Example:**

```
// call like this: DrawDushedPatternLine g,0,0,width,height,10
```

```

Sub DrawDushedPatternLine(g as graphics,x1 as Integer,y1 as Integer,x2 as Integer,y2 as Integer, partlen
as Integer)
dim x,y,ox,oy as Double
dim dx,dy as Double
dim w,h,d as Double
dim b as Boolean

w=x2-x1
h=y2-y1

d=sqrt(w*w+h*h)

dx=w/d*partlen
dy=h/d*partlen

```

```

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.

### 8.0.104 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.

**8.0.105 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

**8.0.106 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.

### 8.0.107 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.

### 8.0.108 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.

**8.0.109 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 &auml; to √§.

**8.0.110 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
```

**8.0.111 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
```

### 8.0.112 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.

### 8.0.113 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".

### 8.0.114 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/>

### 8.0.115 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.

### 8.0.116 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
```

### 8.0.117 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
```

### 8.0.118 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.

### 8.0.119 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
```

### 8.0.120 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.

### 8.0.121 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.

### 8.0.122 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.

### 8.0.123 How to get good crash reports?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Check this website from the webkit website:

**Notes:** <http://webkit.org/quality/crashlogs.html>

**8.0.124 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.

**8.0.125 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.

**8.0.126 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" ...

### 8.0.127 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.

### 8.0.128 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

```

### 8.0.129 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

```

### 8.0.130 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.

### 8.0.131 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

### 8.0.132 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

```

### 8.0.133 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.

### 8.0.134 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.

### 8.0.135 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!

### 8.0.136 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
```

### 8.0.137 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.

### 8.0.138 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.

### 8.0.139 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.

### 8.0.140 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.

### 8.0.141 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.

### 8.0.142 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
```

### 8.0.143 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).

### 8.0.144 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.

### 8.0.145 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.

### 8.0.146 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.

### 8.0.147 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

```

### 8.0.148 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
```

### 8.0.149 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.

### 8.0.150 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.

### 8.0.151 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.

### 8.0.152 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.

### 8.0.153 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
```

### 8.0.154 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.

### 8.0.155 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.SQLiteExecute "BEGIN TRANSACTION"
// Do some Stuff
db.SQLiteExecute "END TRANSACTION"
```

**Notes:** This can increase speed by some factors.

### 8.0.156 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.

### 8.0.157 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 = &H80880000

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
```

### 8.0.158 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

### 8.0.159 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

```

### 8.0.160 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

### 8.0.161 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.

### 8.0.162 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?

### 8.0.163 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))

```

### 8.0.164 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.

### 8.0.165 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.

### 8.0.166 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)

### 8.0.167 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.

### 8.0.168 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.

### 8.0.169 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.

### 8.0.170 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
```

### 8.0.171 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.

### 8.0.172 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

```

### 8.0.173 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.

### 8.0.174 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.

### 8.0.175 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.

### 8.0.176 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 url0 as string = app.audioFileOGG.URL
dim url1 as string = app.audioFileM4V.URL
me.Source = "<audio id=""mymusic"" preload=""auto""><source src="""+url0+""" type=""audio/ogg""
/><source src="""+url1+""" 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)+"");")
```

### 8.0.177 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>

### 8.0.178 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.

### 8.0.179 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.

**8.0.180 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.

**8.0.181 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.

### 8.0.182 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.

### 8.0.183 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.

### 8.0.184 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

```

### 8.0.185 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.

### 8.0.186 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.

### 8.0.187 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
```

### 8.0.188 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.

### 8.0.189 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.

### 8.0.190 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 NSFileWrapperMBS = 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.

### 8.0.191 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.

### 8.0.192 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 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)

// 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.

### 8.0.193 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)

### 8.0.194 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.

### 8.0.195 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.

### 8.0.196 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

```

### 8.0.197 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

```

### 8.0.198 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.SQLExecute "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.

### 8.0.199 How to set the modified dot in the window?

Plugin Version: all, Platform: macOS.

**Answer:** Try this declares:

**Example:**

```

window1.ModifiedMBS=true

```

### 8.0.200 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.

### 8.0.201 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
```

### 8.0.202 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.

### 8.0.203 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
```

### 8.0.204 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","sleep","MACS")
if not ae.send then
msgBox "The computer doesn't want to sleep."
end if
```

### 8.0.205 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.

### 8.0.206 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.

### 8.0.207 How to use quotes in a string?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Just double them.

**Example:**

```
msgbox "This String contains ""quotes"""
```

### 8.0.208 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
```

### 8.0.209 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!

**8.0.210 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.

### 8.0.211 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".

### 8.0.212 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.

#### 8.0.213 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.

#### 8.0.214 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.

### 8.0.215 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(NewCFBinaryDataMBSStr(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.

**8.0.216 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.

**8.0.217 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.

**8.0.218 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)

**8.0.219 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.

**8.0.220 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
```

### 8.0.221 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.

### 8.0.222 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
```

### 8.0.223 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>

### 8.0.224 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)

### 8.0.225 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?

### 8.0.226 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.

### 8.0.227 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.

### 8.0.228 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 QTime ->QTimeMBS
NSValue with QTimeRange ->QTimeRangeMBS
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.

### 8.0.229 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.

### 8.0.230 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.

### 8.0.231 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.

### 8.0.232 What does the NAN code mean?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:**

### 8.0.233 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

```

### 8.0.234 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.

### 8.0.235 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.

### 8.0.236 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.

### 8.0.237 What is the difference between Timer and WebTimer?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Timer is server side and WebTimer client side.

**Notes:** Timer is the normal timer class in Xojo. It runs on the server. On the client 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.

### 8.0.238 What is the list of Excel functions?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Below is 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.

### 8.0.239 What is the replacement for PluginMBS?

Plugin Version: all, Platform: macOS.

**Answer:** Use the SoftDeclareMBS class to load libraries dynamically.

### 8.0.240 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.

### 8.0.241 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.

### 8.0.242 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.

### 8.0.243 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.

### 8.0.244 Where is CGGetActiveDisplayListMBS?

Plugin Version: all, Platform: Windows.

**Answer:** This is now CGDisplayMBS.GetActiveDisplayList.

**8.0.245 Where is CGGetDisplaysWithPointMBS?**

Plugin Version: all, Platform: Windows.

**Answer:** This is now CGDisplayMBS.GetDisplaysWithPoint.

**8.0.246 Where is CGGetDisplaysWithRectMBS?**

Plugin Version: all, Platform: Windows.

**Answer:** This is now CGDisplayMBS.GetDisplaysWithRect.

**8.0.247 Where is CGGetOnlineDisplayListMBS?**

Plugin Version: all, Platform: Windows.

**Answer:** This is now CGDisplayMBS.GetOnlineDisplayList.

**8.0.248 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.

**8.0.249 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.macs.w.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.

### 8.0.250 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.

### 8.0.251 Where is XLSDocumentMBS class?

Plugin Version: all, Platform: macOS.

**Answer:** This class has been removed in favor of XLBookMBS class.

**Notes:** These classes have been removed: XLSCellMBS, XLSDocumentMBS, XLSFormatRecordMBS, XLSMergedCellsMBS, XLSRowMBS and XLSSheetMBS.

### 8.0.252 Where to get information about file formats?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:**

Please visit this web page:

<http://www.wotsit.org>

### 8.0.253 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>

### 8.0.254 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.

### 8.0.255 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.

### 8.0.256 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.

### 8.0.257 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.

### 8.0.258 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.

### 8.0.259 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.

### 8.0.260 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.

**8.0.261 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.

**8.0.262 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.

**8.0.263 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.

**8.0.264 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

### 8.0.265 Xojo doesn't work with your plugins on Windows 98.

Plugin Version: all, Platform: Windows.

**Answer:** Please upgrade your Windows version.

**8.0.266 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,,