

# MBS Leopard Plugin Documentation

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## 0.1 Introduction

This is the PDF version of the documentation for the Xojo (Real Studio) Plug-in from Monkeybread Software Germany. Plugin part: MBS Leopard Plugin

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# Chapter 5

## Calendar

### 5.1 class CalAlarmMBS

#### 5.1.1 class CalAlarmMBS

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The class for an Alarm in iCal.

**Example:**

```
// start a connection to the calendar database
dim s as new CalCalendarStoreMBS

// needed for the error details
dim e as NSErrorMBS

// create a new calendar
dim c as new CalEventMBS

dim StartDate as date = new date
StartDate.day = StartDate.day + 1 // start tomorrow

dim calendars() as CalCalendarMBS = s.calendars

// set properties
c.Title="new Event"
c.startDate=StartDate
c.calendar=calendars(0) // add to first calendar

dim EndDate as new date(StartDate) // one hour after start
EndDate.hour = EndDate.hour + 1
c.endDate=EndDate
```

```
dim a as new CalAlarmMBS // Send email one hour earlier
a.action = a.CalAlarmActionEmail
a.relativeTrigger = -3600
a.emailAddress="some@email.address"

c.addAlarm a // attach an alarm

// 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:** Requires Mac OS X 10.5 to work.

### 5.1.2 Methods

### 5.1.3 Constructor

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This constructor creates a new empty alarm object.

**Example:**

```
dim a as new CalAlarmMBS // add alarm
a.action = a.CalAlarmActionDisplay
a.relativeTrigger = -3600*24 // 24 Hours before
```

### 5.1.4 triggerDateRelativeTo(currentdate as date) as date

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the date of the trigger relative to the given date.

### 5.1.5 Properties

#### 5.1.6 absoluteTrigger as date

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The absolute trigger value.

**Notes:**

The time that an alarm goes off is referred to as the trigger. Alarms have either a relative trigger, which means the alarm fires a certain number of seconds before an alarm occurs, or an absolute trigger, which specifies the exact time the alarm will trigger off.

Setting an absoluteTrigger will also set the relativeTrigger to 0.  
(Read and Write property)

#### 5.1.7 acknowledged as date

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The acknowledged date for the alarm.

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

#### 5.1.8 action as String

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The action used for this alarm.

**Notes:**

See the CalAlarmAction\* constants.  
(Read and Write property)

#### 5.1.9 emailAddress as String

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The email address to notify.

**Notes:**

Setting an emailAddress will also set the action to CalAlarmEmail as well as set the sound and URL to nil.  
(Read and Write property)

### 5.1.10 relatedTo as String

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Related to text.

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

### 5.1.11 relativeTrigger as Double

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The absolute relative value.

**Notes:**

The time that an alarm goes off is referred to as the trigger. Alarms have either a relative trigger, which means the alarm fires a certain number of seconds before an alarm occurs, or an absolute trigger, which specifies the exact time the alarm will trigger off.

Setting a relativeTrigger will also set the absoluteTrigger to 0.

(Read and Write property)

### 5.1.12 sound as String

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The sound file to play.

**Notes:**

Setting a sound will also set the action to CalAlarmSound as well as set the emailAddress and URL to nil. Expects the name of a system alert. See NSSound.

(Read and Write property)

### 5.1.13 url as string

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The URL to launch when the alarm comes.

**Notes:**

Setting a URL will also set the action to CalAlarmProcedure as well as set the emailAddress and sound to nil. The URL must be a file URL.

(Read and Write property)

### 5.1.14 Constants

#### 5.1.15 CalAlarmActionDisplay="DISPLAY"

Plugin Version: 7.7. **Function:** One of the alarm action constants.

**Notes:** Display the event.

#### 5.1.16 CalAlarmActionEmail="EMAIL"

Plugin Version: 7.7. **Function:** One of the alarm action constants.

**Notes:** Send an email.

#### 5.1.17 CalAlarmActionProcedure="PROCEDURE"

Plugin Version: 7.7. **Function:** One of the alarm action constants.

#### 5.1.18 CalAlarmActionSound="AUDIO"

Plugin Version: 7.7. **Function:** One of the alarm action constants.

**Notes:** Play a sound.

## 5.2 class CalAttendeeMBS

### 5.2.1 class CalAttendeeMBS

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The class for an Attendee.

**Notes:**

Requires Mac OS X 10.5 to work.

This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

### 5.2.2 Methods

### 5.2.3 Constructor

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

### 5.2.4 Properties

### 5.2.5 address as String

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The address of this attendee.

**Notes:** (Read only property)

### 5.2.6 commonName as String

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The user-entered name of the attendee.

**Notes:** (Read only property)

### 5.2.7 Handle as Integer

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal used CalAttendee reference.

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

### 5.2.8 status as String

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The attendee status.  
**Notes:**

Use the CalAttendeeStatus\* constants.

For now (Mac OS X 10.5), it is not possible to modify an event's attendees or the attendees themselves.  
(Read only property)

### 5.2.9 Constants

#### 5.2.10 CalAttendeeStatusAccepted="ACCEPTED"

Plugin Version: 7.7. **Function:** These constants are used to describe the user's confirmation status for an attendee.

#### 5.2.11 CalAttendeeStatusDeclined="DECLINED"

Plugin Version: 7.7. **Function:** These constants are used to describe the user's confirmation status for an attendee.

#### 5.2.12 CalAttendeeStatusNeedsAction="NEEDS-ACTION"

Plugin Version: 7.7. **Function:** These constants are used to describe the user's confirmation status for an attendee.

**Notes:** This is the default status for an attendee.

#### 5.2.13 CalAttendeeStatusTentative="TENTATIVE"

Plugin Version: 7.7. **Function:** These constants are used to describe the user's confirmation status for an attendee.

## 5.3 class CalCalendarItemMBS

### 5.3.1 class CalCalendarItemMBS

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The class for a calendar item in iCal.

**Notes:**

This class and its subclasses should be used to get information about CalEvent and CalTasks. Accessors for properties common to both of these classes are included here.

Requires Mac OS X 10.5 to work.

This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

### 5.3.2 Methods

#### 5.3.3 addAlarm(alarm as CalAlarmMBS)

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Adds one alarm.

#### 5.3.4 addAlarms(alarms() as CalAlarmMBS)

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Adds an array of alarms.

#### 5.3.5 alarms as CalAlarmMBS()

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** An array of CalAlarms associated with the calendar item.

### 5.3.6 Constructor

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

### 5.3.7 hasAlarm as Boolean

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether this item has an alarm associated.

### 5.3.8 nextAlarmDate as date

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the next alarm date.

### 5.3.9 removeAlarm(alarm as CalAlarmMBS)

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Removes one alarm.

### 5.3.10 removeAlarms(alarms() as CalAlarmMBS)

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Removes the alarms.

### 5.3.11 setalarms(alarms() as CalAlarmMBS)

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Sets the alarms for this item.

### 5.3.12 Show

Plugin Version: 12.2, Console & Web: Yes, Mac: Yes, Win: Yes, Linux: Yes. **Function:** Shows the item in iCal.

**Example:**

```
dim c as new CalCalendarStoreMBS

// search for some events within last year
dim d as new date
dim e as new date

d.Year = d.Year -1

dim events() as CalEventMBS = c.events(d, e)
```

```
// pick one, show title and show in iCal
MsgBox Events(30).Title
events(30).show
```

### 5.3.13 Properties

#### 5.3.14 calendar as CalCalendarMBS

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The calendar of this item.

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

#### 5.3.15 dateStamp as date

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The datestamp of this calendar item.

**Notes:**

This value is read only.  
(Read only property)

#### 5.3.16 Handle as Integer

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal used CalCalendarItem reference.

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

#### 5.3.17 notes as String

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The notes text for this item.

**Example:**

```
dim c as new CalCalendarStoreMBS
```

```
// set the date range where we look for event
dim sd as new date(2016,6,7,0,0)
dim ed as new date(2016,6,7,23,59,59)
```

```

// look for an event on that date
dim a() as CalEventMBS = c.events(sd,ed, c.calendars)
dim e as CalEventMBS = a(1)

// show notes
MsgBox e.notes

// change it
e.notes = "Just a test"

// check again
MsgBox e.notes

// Save
dim error as NSErrorMBS
dim ok as Boolean = c.saveEvent(e, c.CalSpanThisEvent, error)

if ok then
MsgBox "OK"
elseif error <> nil then
MsgBox error.LocalizedDescription
else
MsgBox "Failed."
end if

```

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

### 5.3.18 title as String

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The title for this calendar item.

**Example:**

```

// init
dim s as new CalCalendarStoreMBS

// Get date range for today
dim Startdate as new date
dim Enddate as new date

Startdate.hour = 0
Startdate.Minute = 0
Startdate.Second = 0

```

```

Enddate.hour = 23
Enddate.minute = 59
Enddate.second = 59

// Query events on all calendars
dim events() as CalEventMBS = s.events(Startdate,Enddate)

// Display result
dim lines(-1) as string
for each e as CalEventMBS in events
lines.Append e.Title
next

MsgBox Join(lines,EndOfLine)

```

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

### 5.3.19 uid as String

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The unique ID for this item.

**Example:**

```

// start a connection to the calendar database
dim s as new CalCalendarStoreMBS

// needed for the error details
dim e as NSErrorMBS

// create a new calendar event
dim c as new CalEventMBS

dim calendars() as CalCalendarMBS = s.calendars

// set properties
c.Title="new Event"
c.startDate=new date
c.calendar=calendars(0) // add to first calendar

dim d as new date
d.hour=d.hour+1
c.endDate=d

// save event
call s.saveEvent(c,s.CalendarAllEvents, e)

```

```
if e<>nil then
  MsgBox e.localizedDescription
else
  // show the UID
  MsgBox "New event was created with UID: "+c.uid
end if
```

**Notes:**

This value is read only.  
(Read only property)

**5.3.20 URL as String**

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The URL for this calendar item.

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

## 5.4 class CalCalendarMBS

### 5.4.1 class CalCalendarMBS

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A class for the iCal calendars.

**Example:**

```
// start a connection to the calendar database
dim s as new CalCalendarStoreMBS

// needed for the error details
dim e as NSErrorMBS

// create a new calendar
dim c as new CalCalendarMBS

// set properties
c.Title="New Calendar"
c.notes="Just a test"

// save calendar
call s.saveCalendar(c,e)
if e<>nil then
MsgBox e.localizedDescription
else
MsgBox "New calendar was created."
end if
```

**Notes:**

Requires Mac OS X 10.5 to work.

This class can be used to get attributes of a calendar, but cannot be used to get the list of events or tasks in a calendar.

### 5.4.2 Methods

### 5.4.3 Constructor

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The iCal class for a calendar.

**Example:**

```
// start a connection to the calendar database
dim s as new CalCalendarStoreMBS

// needed for the error details
dim e as NSErrorMBS

// create a new calendar
dim c as new CalCalendarMBS

// set properties
c.Title="New Calendar"
c.notes="Just a test"

// save calendar
call s.saveCalendar(c,e)
if e<>nil then
MsgBox e.localizedDescription
else
MsgBox "New calendar was created."
end if
```

**Notes:** All calendars created with this API will be of type CalCalendarTypeLocal.

#### 5.4.4 Properties

#### 5.4.5 Color as NSColorMBS

Plugin Version: 13.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The color for this calendar.

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

#### 5.4.6 Handle as Integer

Plugin Version: 13.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

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

### 5.4.7 isEditable as Boolean

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether this calendar is editable.

**Notes:**

This property is read only.  
(Read only property)

### 5.4.8 notes as String

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The notes for this calendar.

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

### 5.4.9 title as String

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The title of this calendar.

**Example:**

```
dim c as new CalCalendarStoreMBS
dim ca() as CalCalendarMBS = c.calendars
for each cc as CalCalendarMBS in ca
MsgBox cc.Title+EndOfLine+cc.type+EndOfLine+cc.notes
next
```

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

### 5.4.10 type as String

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The type of this calendar.

**Notes:**

This property is read only.

use the CalCalendarType\* constants.  
(Read only property)

### 5.4.11 uid as String

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The unique ID for this calendar.

**Notes:**

This property is read only.  
(Read only property)

### 5.4.12 Constants

### 5.4.13 CalCalendarTypeBirthday="Birthday"

Plugin Version: 7.7. **Function:** One of the calendar types.

**Example:**

```
// searches for the birthday calendar and than lists all birthdays in the next month
```

```
dim cals(-1) as CalCalendarMBS
dim a() as CalCalendarMBS
dim i as Integer
dim cal as CalCalendarMBS
dim sd,ed as date
dim ea() as CalEventMBS
dim e as CalEventMBS

dim c as new CalCalendarStoreMBS

a=c.calendars
for each cal in a
  MsgBox "Calendar: "+cal.Title
  if cal.type=cal.CalCalendarTypeBirthday then
    cals.Append cal
  end if
next

sd=new date
ed=new date
ed.Month=sd.Month+1

ea=c.events(sd,ed,cals)

for each e in ea
  MsgBox "Event: "+e.Title
next
```

#### 5.4.14 CalCalendarTypeCalDAV="CalDAV"

Plugin Version: 7.7. **Function:** One of the calendar types.

#### 5.4.15 CalCalendarTypeExchange="Exchange"

Plugin Version: 9.6. **Function:** One of the calendar types.

**Notes:** New in Mac OS X 10.6.

#### 5.4.16 CalCalendarTypeIMAP="IMAP"

Plugin Version: 7.7. **Function:** One of the calendar types.

#### 5.4.17 CalCalendarTypeLocal="Local"

Plugin Version: 7.7. **Function:** One of the calendar types.

#### 5.4.18 CalCalendarTypeSubscription="Subscription"

Plugin Version: 7.7. **Function:** One of the calendar types.

## 5.5 class CalCalendarStoreMBS

### 5.5.1 class CalCalendarStoreMBS

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The class for the calendar storage.

**Example:**

```
// init
dim s as new CalCalendarStoreMBS

// find calendar by name
dim myCalendar as CalCalendarMBS
dim calendars() as CalCalendarMBS = s.calendars

for each ca as CalCalendarMBS in calendars
if ca.Title = "Private Events" then
myCalendar=ca
exit
end if
next

// Get date range for today
dim Startdate as new date
dim Enddate as new date

Startdate.hour = 0
Startdate.Minute = 0
Startdate.Second = 0

Enddate.hour = 23
Enddate.minute = 59
Enddate.second = 59

// Query events on this calendar
dim events() as CalEventMBS = s.events(Startdate,Enddate, myCalendar)

// Display result
dim lines(-1) as string
for each e as CalEventMBS in events
lines.Append e.Title
next

MsgBox Join(lines,EndOfLine)
```

**Notes:**

Requires Mac OS X 10.5 to work.

Calendar saving and modification errors:

CalCalendarNotEditableError	= 1025	Events and tasks cannot be added to an uneditable calendar
CalDateInvalidError	= 1026	The start date of an event must be earlier than its end date
CalCalendarNotInRepository	= 1027	Events' and tasks' calendar property must be a calendar in the user's calendar store
CalCalendarTitleNotUniqueError	= 1028	Calendar titles must be unique

And the domain for the errors is: CalCalendarStoreErrorDomain

## 5.5.2 Methods

### 5.5.3 calendars as CalCalendarMBS()

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** An array of all the user's calendars, represented as CalCalendars.

**Example:**

```
dim c as new CalCalendarStoreMBS
dim ca() as CalCalendarMBS

ca=c.calendars
for each cc as CalCalendarMBS in ca
MsgBox cc.Title+EndOfLine+cc.type+EndOfLine+cc.notes
next
```

**Notes:**

If the user has iCal data from a previous version of Mac OS X, but has not launched iCal in 10.5, this will return an array of empty calendars. iCal needs to be launched at least once in order to migrate the user's calendar data.

If no calendar data from any version of Mac OS X exists, then this method will create and return two default calendars, named Home and Work.

### 5.5.4 calendarWithTitle(Title as string) as CalCalendarMBS

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Queries all calendars and searches for one with the given title.

**Example:**

```

dim cs as new CalCalendarStoreMBS

// delete one
dim c as CalCalendarMBS = cs.calendarWithTitle("Just Testing")
dim e as NSErrorMBS
if cs.removeCalendar(c, e) then
  MsgBox "deleted"
else
  MsgBox "Failed to remove: "+e.LocalizedDescription
end if

```

**Notes:**

Title comparison is case insensitive.  
Returns nil on any error.

**5.5.5 calendarWithUID(UID as string) as CalCalendarMBS**

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The calendar associated with the specific UID.

**Notes:** If no record with this UID exists, nil is returned.

**5.5.6 Constructor**

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The class for the calendar storage.

**Notes:** This is the main class. Keep an object of it around as long as you use the calendar classes.

**5.5.7 events(StartDate as date, EndDate as date) as CalEventMBS()**

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This method returns an array of all the CalEvents which match the condition.

**Example:**

```

dim c as new CalCalendarStoreMBS

dim i,count as Integer
dim ta() as CalEventMBS
dim ct as CalEventMBS

```

```

dim sd as new date
dim ed as new date

ed.day=ed.day+1
// events within the next 24 hours

ta=c.events(sd,ed)
for each ct in ta
msgbox ct.Title+EndOfLine+ct.location+EndOfLine+ct.startDate.LongDate+" " +ct.startDate.LongTime
next

```

**Notes:**

This is the function which uses all calendars.

For performance reasons, this method will only return occurrences of repeating events that fall within a specific four year timespan. If the date range between the startDate and endDate is greater than four years, then the timespan containing recurrences is always the first four years of date range.

See also:

- 5.5.8 events(StartDate as date, EndDate as date, calendar as CalCalendarMBS) as CalEventMBS() 80
- 5.5.9 events(StartDate as date, EndDate as date, calendars() as CalCalendarMBS) as CalEventMBS() 82
- 5.5.10 events(StartDate as date, EndDate as date, eventUID as string) as CalEventMBS() 82
- 5.5.11 events(StartDate as date, EndDate as date, eventUID as string, calendar as CalCalendarMBS) as CalEventMBS() 83
- 5.5.12 events(StartDate as date, EndDate as date, eventUID as string, calendars() as CalCalendarMBS) as CalEventMBS() 83

### 5.5.8 events(StartDate as date, EndDate as date, calendar as CalCalendarMBS) as CalEventMBS()

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This method returns an array of all the CalEvents which match the condition.

**Example:**

```

// init
dim s as new CalCalendarStoreMBS

// find calendar by name
dim myCalendar as CalCalendarMBS
dim calendars() as CalCalendarMBS = s.calendars

```

```

for each ca as CalCalendarMBS in calendars
if ca.Title = "Private Events" then
myCalendar=ca
exit
end if
next

// Get date range for today
dim Startdate as new date
dim Enddate as new date

Startdate.hour = 0
Startdate.Minute = 0
Startdate.Second = 0

Enddate.hour = 23
Enddate.minute = 59
Enddate.second = 59

// Query events on this calendar
dim events() as CalEventMBS = s.events(Startdate,Enddate, myCalendar)

// Display result
dim lines(-1) as string
for each e as CalEventMBS in events
lines.Append e.Title
next

MsgBox Join(lines,EndOfLine)

```

**Notes:** For performance reasons, this method will only return occurrences of repeating events that fall within a specific four year timespan. If the date range between the startDate and endDate is greater than four years, then the timespan containing recurrences is always the first four years of date range. See also:

- 5.5.7 events(StartDate as date, EndDate as date) as CalEventMBS() 79
- 5.5.9 events(StartDate as date, EndDate as date, calendars() as CalCalendarMBS) as CalEventMBS() 82
- 5.5.10 events(StartDate as date, EndDate as date, eventUID as string) as CalEventMBS() 82
- 5.5.11 events(StartDate as date, EndDate as date, eventUID as string, calendar as CalCalendarMBS) as CalEventMBS() 83
- 5.5.12 events(StartDate as date, EndDate as date, eventUID as string, calendars() as CalCalendarMBS) as CalEventMBS() 83

### 5.5.9 events(StartDate as date, EndDate as date, calendars() as CalCalendarMBS) as CalEventMBS()

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This method returns an array of all the CalEvents which match the condition.

**Notes:** For performance reasons, this method will only return occurrences of repeating events that fall within a specific four year timespan. If the date range between the startDate and endDate is greater than four years, then the timespan containing recurrences is always the first four years of date range.

See also:

- 5.5.7 events(StartDate as date, EndDate as date) as CalEventMBS() 79
- 5.5.8 events(StartDate as date, EndDate as date, calendar as CalCalendarMBS) as CalEventMBS() 80
- 5.5.10 events(StartDate as date, EndDate as date, eventUID as string) as CalEventMBS() 82
- 5.5.11 events(StartDate as date, EndDate as date, eventUID as string, calendar as CalCalendarMBS) as CalEventMBS() 83
- 5.5.12 events(StartDate as date, EndDate as date, eventUID as string, calendars() as CalCalendarMBS) as CalEventMBS() 83

### 5.5.10 events(StartDate as date, EndDate as date, eventUID as string) as CalEventMBS()

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This method returns an array of all the CalEvents which match the condition.

**Notes:**

This is the function which uses all calendars.

For performance reasons, this method will only return occurrences of repeating events that fall within a specific four year timespan. If the date range between the startDate and endDate is greater than four years, then the timespan containing recurrences is always the first four years of date range.

See also:

- 5.5.7 events(StartDate as date, EndDate as date) as CalEventMBS() 79
- 5.5.8 events(StartDate as date, EndDate as date, calendar as CalCalendarMBS) as CalEventMBS() 80
- 5.5.9 events(StartDate as date, EndDate as date, calendars() as CalCalendarMBS) as CalEventMBS() 82
- 5.5.11 events(StartDate as date, EndDate as date, eventUID as string, calendar as CalCalendarMBS) as CalEventMBS() 83
- 5.5.12 events(StartDate as date, EndDate as date, eventUID as string, calendars() as CalCalendarMBS) as CalEventMBS() 83

### 5.5.11 events(StartDate as date, EndDate as date, eventUID as string, calendar as CalCalendarMBS) as CalEventMBS()

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This method returns an array of all the CalEvents which match the condition.

**Notes:** For performance reasons, this method will only return occurrences of repeating events that fall within a specific four year timespan. If the date range between the startDate and endDate is greater than four years, then the timespan containing recurrences is always the first four years of date range.

See also:

- 5.5.7 events(StartDate as date, EndDate as date) as CalEventMBS() 79
- 5.5.8 events(StartDate as date, EndDate as date, calendar as CalCalendarMBS) as CalEventMBS() 80
- 5.5.9 events(StartDate as date, EndDate as date, calendars() as CalCalendarMBS) as CalEventMBS() 82
- 5.5.10 events(StartDate as date, EndDate as date, eventUID as string) as CalEventMBS() 82
- 5.5.12 events(StartDate as date, EndDate as date, eventUID as string, calendars() as CalCalendarMBS) as CalEventMBS() 83

### 5.5.12 events(StartDate as date, EndDate as date, eventUID as string, calendars() as CalCalendarMBS) as CalEventMBS()

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This method returns an array of all the CalEvents which match the condition.

**Notes:** For performance reasons, this method will only return occurrences of repeating events that fall within a specific four year timespan. If the date range between the startDate and endDate is greater than four years, then the timespan containing recurrences is always the first four years of date range.

See also:

- 5.5.7 events(StartDate as date, EndDate as date) as CalEventMBS() 79
- 5.5.8 events(StartDate as date, EndDate as date, calendar as CalCalendarMBS) as CalEventMBS() 80
- 5.5.9 events(StartDate as date, EndDate as date, calendars() as CalCalendarMBS) as CalEventMBS() 82
- 5.5.10 events(StartDate as date, EndDate as date, eventUID as string) as CalEventMBS() 82
- 5.5.11 events(StartDate as date, EndDate as date, eventUID as string, calendar as CalCalendarMBS) as CalEventMBS() 83

### 5.5.13 eventsMT(StartDate as date, EndDate as date, calendars() as CalCalendarMBS = nil) as CalEventMBS()

Plugin Version: 16.5, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This method returns an array of all the CalEvents which match the condition.

**Notes:**

For performance reasons, this method will only return occurrences of repeating events that fall within a specific four year timespan. If the date range between the startDate and endDate is greater than four years, then the timespan containing recurrences is always the first four years of date range.

If calendars array is nil, we use all calendars.

The work is performed on an extra thread, so this function can yield time to other Xojo (Real Studio) threads. For best user experience run this command on a Xojo (Real Studio) thread, so your GUI stays responsive.

### 5.5.14 eventWithUID(UID as string, occurrence as date) as CalEventMBS

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Searches the event with the given unique ID.

**Example:**

```
// connect to calendar storage
dim c as new CalCalendarStoreMBS

// find event with given UID
dim e as CalEventMBS = c.eventWithUID("M2CD-6-1-EEB42862-8BD6-4880-AF91-4AEEADD900B6", nil)

// and display title
MsgBox e.Title
```

**Notes:**

Returns nil on any error.

uid: The unique identifier of an event.

date: The date of a recurring event. Pass nil if the event is not recurring.

Returns a CalEvent object that matches the specified unique identifier and date. Returns nil if the event is not found, or the event is recurring and date is not specified.

Available in Mac OS X v10.5 and later.

**5.5.15 removeCalendar(calendar as CalCalendarMBS, byref error as NSErrorMBS)  
as boolean**

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Deletes a calendar.

**Example:**

```
dim cs as new CalCalendarStoreMBS
```

```
// before
```

```
dim calendars1() as CalCalendarMBS = cs.calendars  
dim list1() as string
```

```
for each c1 as CalCalendarMBS in calendars1  
list1.Append c1.Title  
next
```

```
MsgBox Join(list1, EndOfLine)
```

```
// delete one
```

```
dim c as CalCalendarMBS = cs.calendarWithTitle("Just Testing")  
dim e as NSErrorMBS  
if cs.removeCalendar(c, e) then  
MsgBox "deleted"  
else  
MsgBox "Failed to remove: "+e.LocalizedDescription  
end if
```

```
// after
```

```
dim calendars2() as CalCalendarMBS = cs.calendars  
dim list2() as string
```

```
for each c2 as CalCalendarMBS in calendars2  
list2.Append c2.Title  
next
```

```
MsgBox Join(list2, EndOfLine)
```

**Notes:** Return

### 5.5.16 removeEvent(theEvent as CalEventMBS, span as Integer, byref error as NSErrorMBS) as boolean

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Removes the event from the calendar.

**Example:**

```
// start a connection to the calendar database
dim s as new CalCalendarStoreMBS

// needed for the error details
dim e as NSErrorMBS

// create a new calendar event
dim c as new CalEventMBS

dim calendars() as CalCalendarMBS = s.calendars

// set properties
c.Title="new Event"
c.startDate=new date
c.calendar=calendars(0) // add to first calendar

dim d as new date
d.hour=d.hour+1
c.endDate=d

// save event
call s.saveEvent(c,s.CalSpanAllEvents, e)
if e<>nil then
  MsgBox e.localizedDescription
else
  MsgBox "New event was created with UID: "+c.uid

e = nil

// and delete it
if s.removeEvent(c, s.CalSpanAllEvents, e) then
  MsgBox "Event deleted."
else
  MsgBox e.localizedDescription
end if

end if
```

**Notes:**

Returns true on success and false on failure.  
Error is stored in the error object.

### 5.5.17 removeTask(task as CalTaskMBS, byref error as NSErrorMBS) as boolean

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Removes the task from the calendar.

**Notes:**

Returns true on success and false on failure.  
Error is stored in the error object.

### 5.5.18 saveCalendar(calendar as CalCalendarMBS, byref error as NSErrorMBS) as boolean

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Writes changes to calendar.

**Example:**

```
dim cs as new CalCalendarStoreMBS
dim c as new CalCalendarMBS

c.Title = "Just Testing"

dim e as NSErrorMBS
if cs.saveCalendar(c, e) then
  MsgBox "OK"
else
  MsgBox "Failed " + e.LocalizedDescription
end if
```

**Notes:**

The saveCalendar and the removeCalendar calendars allow the client to add, modify, and remove calendars in the user's calendar store. saveCalendar should be used both to add a new calendar to the calendar store, and to modify a calendar already in the store.

The only calendars that can be added with this API are local calendars; it is not possible to add subscribed or CalDAV calendars, or the birthday calendar.

Changes made to a CalCalendar are not persisted until that calendar has been passed to saveCalendar. If saveCalendar is not called, the changes will be lost.

### 5.5.19 saveEvent(theEvent as CalEventMBS, span as Integer, byref error as NSErrorMBS) as boolean

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This method allows the client to add or modify events in the user's calendar store.

**Notes:**

This method should be used both to add a new event to the calendar store, and to modify an event already in the calendar store.

If the event being saved is a repeating event, the second argument is used to describe whether the change being made should apply to future occurrences of that event, all occurrences, or only this instance. This is analogous to options on the dialog iCal presents when a user modifies a recurring event (though iCal's UI does not provide a way to change all events, past and present).

Changes made to a CalEvent are not persisted until that event has been passed to saveEvent. If saveEvent is not called, the changes will be lost.

Applying changes to all events or all future events may cause the UID or the occurrence date of the event to change.

### 5.5.20 saveTask(task as CalTaskMBS, byref error as NSErrorMBS) as boolean

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Saves the specified task to the calendar store.

**Example:**

```
dim s as new CalCalendarStoreMBS
dim t as new CalTaskMBS
dim a() as CalCalendarMBS = s.calendars
dim d as new date
```

```
d.Month = d.Month + 1
```

```
t.calendar = a(0)
t.Title = "Test"
t.URL = "http://www.mbsplugins.de/"
t.priority = t.CalPriorityMedium
t.dueDate = d
t.notes = "just a test"
t.isCompleted = false
```

```
dim e as NSErrorMBS
```

```

if s.saveTask(t, e) then
  MsgBox "saved"
else
  MsgBox "failed to save"
end if

```

**Notes:**

task: The task to save.

error: If this method returns false, an NSError object describing the error.

Returns true on success; otherwise, returns false and sets the error argument to an NSError object describing the error.

Use this method to save new task objects and modifications to existing task objects. Changes to task objects are not persistent until this method is invoked. The calendar property needs to be set before attempting to save a task.

Available in Mac OS X v10.5 and later.

**5.5.21 tasks as CalTaskMBS()**

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This method returns an array of all the CalTasks.

**Notes:** This is the function which uses all calendars.

See also:

- 5.5.22 tasks(calendar as CalCalendarMBS) as CalTaskMBS() 89
- 5.5.23 tasks(calendars() as CalCalendarMBS) as CalTaskMBS() 90

**5.5.22 tasks(calendar as CalCalendarMBS) as CalTaskMBS()**

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This method returns an array of all the CalTasks which match the condition.

See also:

- 5.5.21 tasks as CalTaskMBS() 89
- 5.5.23 tasks(calendars() as CalCalendarMBS) as CalTaskMBS() 90

### 5.5.23 tasks(calendars() as CalCalendarMBS) as CalTaskMBS()

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This method returns an array of all the CalTasks which match the condition.

See also:

- 5.5.21 tasks as CalTaskMBS() 89
- 5.5.22 tasks(calendar as CalCalendarMBS) as CalTaskMBS() 89

### 5.5.24 TasksCompletedSince(completedSince as date) as CalTaskMBS()

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This method returns an array of all the CalTasks which match the condition.

**Notes:** This is the function which uses all calendars.

See also:

- 5.5.25 TasksCompletedSince(completedSince as date, calendar as CalCalendarMBS) as CalTaskMBS() 90
- 5.5.26 TasksCompletedSince(completedSince as date, calendars() as CalCalendarMBS) as CalTaskMBS() 90

### 5.5.25 TasksCompletedSince(completedSince as date, calendar as CalCalendarMBS) as CalTaskMBS()

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This method returns an array of all the CalTasks which match the condition.

See also:

- 5.5.24 TasksCompletedSince(completedSince as date) as CalTaskMBS() 90
- 5.5.26 TasksCompletedSince(completedSince as date, calendars() as CalCalendarMBS) as CalTaskMBS() 90

### 5.5.26 TasksCompletedSince(completedSince as date, calendars() as CalCalendarMBS) as CalTaskMBS()

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This method returns an array of all the CalTasks which match the condition.

See also:

- 5.5.24 TasksCompletedSince(completedSince as date) as CalTaskMBS() 90
- 5.5.25 TasksCompletedSince(completedSince as date, calendar as CalCalendarMBS) as CalTaskMBS() 90

**5.5.27 taskWithUID(UID as string) as CalTaskMBS**

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Searches the task with the given unique ID.

**Notes:** Returns nil on any error.

**5.5.28 UncompletedTasks as CalTaskMBS()**

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This method returns an array of all the CalTasks which match the condition.

**Example:**

```
dim c as new CalCalendarStoreMBS
```

```
dim ta() as CalTaskMBS = c.UncompletedTasks
```

```
for each ct as CalTaskMBS in ta
```

```
msgbox ct.Title+EndOfLine+str(ct.priority)+EndOfLine+ct.dueDate.LongDate
```

```
next
```

**Notes:** This is the function which uses all calendars.

See also:

- 5.5.29 UncompletedTasks(calendar as CalCalendarMBS) as CalTaskMBS() 91
- 5.5.30 UncompletedTasks(calendars() as CalCalendarMBS) as CalTaskMBS() 91

**5.5.29 UncompletedTasks(calendar as CalCalendarMBS) as CalTaskMBS()**

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This method returns an array of all the CalTasks which match the condition.

See also:

- 5.5.28 UncompletedTasks as CalTaskMBS() 91
- 5.5.30 UncompletedTasks(calendars() as CalCalendarMBS) as CalTaskMBS() 91

**5.5.30 UncompletedTasks(calendars() as CalCalendarMBS) as CalTaskMBS()**

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This method returns an array of all the CalTasks which match the condition.

See also:

- 5.5.28 UncompletedTasks as CalTaskMBS() 91
- 5.5.29 UncompletedTasks(calendar as CalCalendarMBS) as CalTaskMBS() 91

### 5.5.31 UncompletedTasksDueBefore(dueDate as date) as CalTaskMBS()

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This method returns an array of all the CalTasks which match the condition.

**Notes:** This is the function which uses all calendars.

See also:

- 5.5.32 UncompletedTasksDueBefore(dueDate as date, calendar as CalCalendarMBS) as CalTaskMBS() 92
- 5.5.33 UncompletedTasksDueBefore(dueDate as date, calendars() as CalCalendarMBS) as CalTaskMBS() 92

### 5.5.32 UncompletedTasksDueBefore(dueDate as date, calendar as CalCalendarMBS) as CalTaskMBS()

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This method returns an array of all the CalTasks which match the condition.

See also:

- 5.5.31 UncompletedTasksDueBefore(dueDate as date) as CalTaskMBS() 92
- 5.5.33 UncompletedTasksDueBefore(dueDate as date, calendars() as CalCalendarMBS) as CalTaskMBS() 92

### 5.5.33 UncompletedTasksDueBefore(dueDate as date, calendars() as CalCalendarMBS) as CalTaskMBS()

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This method returns an array of all the CalTasks which match the condition.

See also:

- 5.5.31 UncompletedTasksDueBefore(dueDate as date) as CalTaskMBS() 92
- 5.5.32 UncompletedTasksDueBefore(dueDate as date, calendar as CalCalendarMBS) as CalTaskMBS() 92

### 5.5.34 Properties

### 5.5.35 Handle as Integer

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal used CalCalendarStore reference.

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

### 5.5.36 Events

### 5.5.37 CalendarsChanged(Externally as boolean, InsertedRecords() as string, UpdatedRecords() as string, DeletedRecords() as string)

Plugin Version: 11.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The event being called when some calendars changed.

**Notes:**

The Calendar Store frameworks posts notifications when any application, including yours, makes changes to the user's calendar data.

Externally is true if this changes are not made by your application.

The three events give you the unique IDs of the calendars which have been inserted, updated or modified.

If all three arrays are nil/empty, that indicates everything has changed, and the client should refresh the calendar, event, and task information currently being used. Since this tends to be an expensive and inconvenient operation, it will only occur under unusual circumstances, such as when restoring from backup.

### 5.5.38 EventsChanged(Externally as boolean, InsertedRecords() as string, UpdatedRecords() as string, DeletedRecords() as string)

Plugin Version: 11.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The event being called when some events changed.

**Notes:**

The Calendar Store frameworks posts notifications when any application, including yours, makes changes to the user's calendar data.

Externally is true if this changes are not made by your application.

The three events give you the unique IDs of the events which have been inserted, updated or modified.

If all three arrays are nil/empty, that indicates everything has changed, and the client should refresh the calendar, event, and task information currently being used. Since this tends to be an expensive and inconvenient operation, it will only occur under unusual circumstances, such as when restoring from backup.

### 5.5.39 `TasksChanged(Externally as boolean, InsertedRecords() as string, UpdatedRecords() as string, DeletedRecords() as string)`

Plugin Version: 11.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The event being called when some tasks changed.

**Notes:**

The Calendar Store frameworks posts notifications when any application, including yours, makes changes to the user's calendar data.

Externally is true if this changes are not made by your application.

The three events give you the unique IDs of the tasks which have been inserted, updated or modified.

If all three arrays are nil/empty, that indicates everything has changed, and the client should refresh the calendar, event, and task information currently being used. Since this tends to be an expensive and inconvenient operation, it will only occur under unusual circumstances, such as when restoring from backup.

### 5.5.40 `Constants`

#### 5.5.41 `CalSpanAllEvents=2`

Plugin Version: 7.7. **Function:** One of the Calendar Span constants.

#### 5.5.42 `CalSpanFutureEvents=1`

Plugin Version: 7.7. **Function:** One of the Calendar Span constants.

**5.5.43 CalSpanThisEvent=0**

Plugin Version: 7.7. **Function:** One of the Calendar Span constants.

## 5.6 class CalEventMBS

### 5.6.1 class CalEventMBS

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The class to handle events in iCal.

**Example:**

```
// start a connection to the calendar database
dim s as new CalCalendarStoreMBS

// needed for the error details
dim e as NSErrorMBS

// create a new event
dim c as new CalEventMBS

// set properties
dim calendars() as CalCalendarMBS = s.calendars
c.Title="new Event"
c.startDate=new date
c.calendar=calendars(0) // add to first calendar

dim d as new date
d.hour=d.hour+1
c.endDate=d

// 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:**

Requires Mac OS X 10.5 to work.  
Subclass of the CalCalendarItemMBS class.

## 5.6.2 Methods

### 5.6.3 attendees as CalAttendeeMBS()

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The attendees for this event.

**Notes:** It is not possible to modify an event's attendees in Mac OS X 10.5.

### 5.6.4 Constructor

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The constructor to which creates a new event.

**Example:**

```
// start a connection to the calendar database
dim s as new CalCalendarStoreMBS

// needed for the error details
dim e as NSErrorMBS

// create a new event
dim c as new CalEventMBS

// set properties
dim calendars() as CalCalendarMBS = s.calendars
c.Title="new Event"
c.startDate=new date
c.calendar=calendars(0) // add to first calendar

dim d as new date
d.hour=d.hour+1
c.endDate=d

// 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:** The calendar property must be set before calling saveTask on a new task.

### 5.6.5 Properties

#### 5.6.6 endDate as date

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The end date.

**Example:**

```
dim e as CalEventMBS
msgbox e.endDate.longdate+" "+e.endDate.longtime
```

**Notes:**

The client is responsible for making sure they never attempt to save an event with a start date that occurs after the endDate, or an endDate that occurs before the startDate. Calling saveEvent: on an improperly configured event will fail.

(Read and Write property)

#### 5.6.7 isAllDay as boolean

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether this event is all day.

**Notes:**

True for all day events.

(Read and Write property)

#### 5.6.8 isDetached as boolean

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether this event is detached.

**Notes:**

These properties are only meaningful for CalEvents which are instances of a repeating event.

If this CalEvent is an instance of a repeating event, and an attribute of this CalEvent has been changed to from the default value generated by the repeating event, isDetached will return true. If the CalEvent is unchanged from its default state, or is not a repeating event, isDetached returns false.

(Read only property)

### 5.6.9 location as string

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The location of this event.

**Example:**

```

dim c as new CalCalendarStoreMBS

// set the date range where we look for event
dim sd as new date(2016,6,7,0,0)
dim ed as new date(2016,6,7,23,59,59)

// look for an event on that date
dim a() as CalEventMBS = c.events(sd,ed, c.calendars)
dim e as CalEventMBS = a(1)

// show location
MsgBox e.location

// change it
e.location = "Hamburg"

// check again
MsgBox e.location

// Save
dim error as NSErrorMBS
dim ok as Boolean = c.saveEvent(e, c.CalSpanThisEvent, error)

if ok then
MsgBox "OK"
elseif error <> nil then
MsgBox error.LocalizedDescription
else
MsgBox "Failed."
end if

```

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

### 5.6.10 occurrence as date

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The occurrences of this event.

**Notes:**

These properties are only meaningful for CalEvents which are instances of a repeating event.

Returns the occurrence date of a CalEvent. Since all instances of a repeating event have the same UID, we need another way to differentiate between those CalEvents. This method returns the NSDate on which this event was originally scheduled to occur. This value will remain the same even if the event has been detached and its start date has changed. For CalEvents not part of a repeating pattern, this method will return the same value as startDate.

(Read only property)

### 5.6.11 recurrenceRule as CalRecurrenceRuleMBS

Plugin Version: 8.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The recurrence rule for this event.

**Example:**

```
// create a recurrence event:

dim c as new CalCalendarStoreMBS
dim e as new CalEventMBS
dim error as NSErrorMBS
dim s as string
dim ed as new date
dim rule as CalRecurrenceRuleMBS
dim rend as CalRecurrenceEndMBS

ed.day=21
ed.Month=7
ed.Year=2008

e.endDate=ed

dim sd as new date

sd.day=18
sd.Month=7
sd.Year=2008

e.startDate=sd
e.isAllDay=true
e.location="Example Location"

rule=CalRecurrenceRuleMBS.initYearlyRecurrence(1,nil)

dim calendars() as CalCalendarMBS = c.calendars
e.Title="Example Title"
e.calendar=calendars(0) // pick first calendar
```

```
e.notes="Example Notes"  
e.URL="http://www.monkeybreadsoftware.de"  
e.recurrenceRule=rule
```

```
if c.saveEvent(e, c.CalSpanAllEvents, error) then  
if error<>Nil then s=error.localizedDescription  
MsgBox "OK"+EndOfLine+s  
else  
if error<>Nil then s=error.localizedDescription  
MsgBox "Failed"+EndOfLine+s  
end if
```

**Notes:**

Set to nil to remove recurrence rule.  
(Read and Write property)

**5.6.12 startDate as date**

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The start date.

**Example:**

```
dim e as CalEventMBS  
msgbox e.startDate.longdate+" " +e.startDate.longtime
```

**Notes:**

The client is responsible for making sure they never attempt to save an event with a start date that occurs after the endDate, or an endDate that occurs before the startDate. Calling saveEvent: on an improperly configured event will fail.  
(Read and Write property)

## 5.7 class CalNthWeekDayMBS

### 5.7.1 class CalNthWeekDayMBS

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** CalNthWeekDay specifies the nth instance of a particular day of the week, such as the third Tuesday of every month.

**Notes:**

Requires Mac OS X 10.5 to work.

This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

### 5.7.2 Methods

### 5.7.3 Constructor

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

### 5.7.4 Properties

### 5.7.5 dayOfTheWeek as Integer

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The day of the week. **Notes:**

Valid values for dayOfTheWeek are integers 1-7, which correspond to days of the week with Sunday = 1. (Read only property)

### 5.7.6 weekNumber as Integer

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The week number. **Notes:**

Valid values for weekNumber portion are 1, 2, 3, 4, or -1, where a value of -1 indicates the last week. (Read only property)

## 5.8 class CalRecurrenceEndMBS

### 5.8.1 class CalRecurrenceEndMBS

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The class to specify the end of a recurring calendar event.

**Notes:**

CalRecurrenceEnd is an attribute of CalRecurrenceRule that defines how long the recurrence is scheduled to repeat.

The recurrence can be defined either with an integer that indicates the total number times it repeats, or with a date, after which it no longer repeats. An event which is set to never end should have its CalRecurrenceEnd set to nil.

If the end of the pattern is defined with a date, the client must pass a valid date, nil cannot be passed. If the end of the pattern is defined as terms of a number of occurrences, the occurrenceCount passed to the initializer must be positive, it cannot be 0. If the client attempts to initialize a CalRecurrenceEnd with a nil date or OccurrenceCount of 0, an exception is raised.

A CalRecurrenceEnd initialized with an end date will return 0 for occurrenceCount. One initialized with a number of occurrences will return nil for its endDate.

Requires Mac OS X 10.5 to work.

### 5.8.2 Methods

#### 5.8.3 Constructor(endDate as date)

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The constructor for a new recurrence end based on an end date.

See also:

- 5.8.4 Constructor(occurrenceCount as Integer) 103

#### 5.8.4 Constructor(occurrenceCount as Integer)

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The constructor for a new recurrence end based on an occurrence count.

See also:

- 5.8.3 Constructor(endDate as date) 103

## 5.8.5 Properties

### 5.8.6 endDate as date

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The end date.

**Notes:**

This property is read only.  
(Read only property)

### 5.8.7 occurrenceCount as Integer

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The occurrence count.

**Notes:**

This property is read only.  
(Read only property)

### 5.8.8 usesEndDate as boolean

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether the end date is used.

**Notes:**

This property is read only.  
(Read only property)

## 5.9 class CalRecurrenceRuleMBS

### 5.9.1 class CalRecurrenceRuleMBS

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The class for the recurrence rules.

**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

// set properties
dim calendars() as CalCalendarMBS = s.calendars
c.Title="Test Birthday"
c.startDate=d
c.recurrenceRule = r
c.calendar=calendars(1) // add to second 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:**

Requires Mac OS X 10.5 to work.

This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

## 5.9.2 Methods

## 5.9.3 Constructor

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

## 5.9.4 `daysOfTheMonth as Integer()`

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This property can be accessed as an array containing one or more integers corresponding to the days of the month the event recurs.

**Notes:**

This property is valid for rules whose `CalRecurrenceType` is `CalMonthlyRecurrence`, and that were initialized with one or more specific days of the month (not with a day of the week and week of the month).

For all other `CalRecurrenceRules`, this property is empty.

## 5.9.5 `daysOfTheWeek as Integer()`

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This property can be accessed as an array containing one or more integers corresponding to the days of the week the event recurs.

**Notes:** This property is valid for rules whose `CalRecurrenceType` is `CalWeeklyRecurrence`. For all other `CalRecurrenceRules`, this property is empty.

## 5.9.6 `initDailyRecurrence(interval as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS`

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Daily Recurrence initializer.

**Notes:** Two parameters are included in every `CalRecurrenceRule` initializer. The first is the interval, which is described above and indicates how many `CalRecurrenceTypes` make up the period of the recurrence (every week, every other week, etc.). The second is a `CalRecurrenceEnd`, which describes when the `CalRecurrenceRule` ends. If valid values for these two parameters are not included, `nil` is returned. There are simple

initializers for each CalRecurrenceType which take only these two parameters.

### 5.9.7 `initMonthlyRecurrence(interval as Integer, DayOfTheWeek as Integer, WeekOfTheMonth as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS`

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Monthly Recurrence initializer.

**Notes:**

This initializer allows the client to specify a repeating monthly pattern in terms of a day of the week and a week of the month that the event repeats. An example is an event that recurs the first Monday of every month.

Two parameters are included in every CalRecurrenceRule initializer. The first is the interval, which is described above and indicates how many CalRecurrenceTypes make up the period of the recurrence (every week, every other week, etc.). The second is a CalRecurrenceEnd, which describes when the CalRecurrenceRule ends. If valid values for these two parameters are not included, nil is returned. There are simple initializers for each CalRecurrenceType which take only these two parameters.

Valid values for days of the week are integers 1-7, which correspond to days of the week with Sunday = 1. Valid values for weeks of the month are integers 1-4 and -1, which is used to indicate the last week of the month.

See also:

- 5.9.8 `initMonthlyRecurrence(interval as Integer, DaysOfTheMonth() as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS` 107
- 5.9.9 `initMonthlyRecurrence(interval as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS` 108

### 5.9.8 `initMonthlyRecurrence(interval as Integer, DaysOfTheMonth() as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS`

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Monthly Recurrence initializer.

**Notes:**

This initializer allows the client to specify multiple days of the month that an event will recur. This method should be used to initialize events that occur more than once a month, in a set monthly pattern.

Two parameters are included in every CalRecurrenceRule initializer. The first is the interval, which is described above and indicates how many CalRecurrenceTypes make up the period of the recurrence (every week, every other week, etc.). The second is a CalRecurrenceEnd, which describes when the CalRecurrenceRule ends. If valid values for these two parameters are not included, nil is returned. There are simple

initializers for each `CalRecurrenceType` which take only these two parameters.

Valid values for days of the month are integers 1-31.

See also:

- 5.9.7 `initMonthlyRecurrence(interval as Integer, DayOfTheWeek as Integer, WeekOfTheMonth as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS` 107
- 5.9.9 `initMonthlyRecurrence(interval as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS` 108

### 5.9.9 `initMonthlyRecurrence(interval as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS`

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Monthly Recurrence initializer.

**Notes:** Two parameters are included in every `CalRecurrenceRule` initializer. The first is the interval, which is described above and indicates how many `CalRecurrenceTypes` make up the period of the recurrence (every week, every other week, etc.). The second is a `CalRecurrenceEnd`, which describes when the `CalRecurrenceRule` ends. If valid values for these two parameters are not included, `nil` is returned. There are simple initializers for each `CalRecurrenceType` which take only these two parameters.

See also:

- 5.9.7 `initMonthlyRecurrence(interval as Integer, DayOfTheWeek as Integer, WeekOfTheMonth as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS` 107
- 5.9.8 `initMonthlyRecurrence(interval as Integer, DaysOfTheMonth() as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS` 107

### 5.9.10 `initWeeklyRecurrence(interval as Integer, DaysOfTheWeek() as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS`

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Weekly Recurrence initializers.

**Notes:**

This initializer allows the client to specify multiple days of the week that an event will recur. This initializer should be used to initialize events that occur more than once a week, in a set weekly pattern.

Two parameters are included in every `CalRecurrenceRule` initializer. The first is the interval, which is described above and indicates how many `CalRecurrenceTypes` make up the period of the recurrence (every week, every other week, etc.). The second is a `CalRecurrenceEnd`, which describes when the `CalRecurrenceRule` ends. If valid values for these two parameters are not included, `nil` is returned. There are simple initializers for each `CalRecurrenceType` which take only these two parameters.

Valid values for days of the week are integers 1-7, which correspond to days of the week with Sunday = 1. See also:

- 5.9.11 `initWeeklyRecurrence(interval as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS` 109

### 5.9.11 `initWeeklyRecurrence(interval as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS`

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Weekly Recurrence initializers.

**Notes:** Two parameters are included in every `CalRecurrenceRule` initializer. The first is the interval, which is described above and indicates how many `CalRecurrenceTypes` make up the period of the recurrence (every week, every other week, etc.). The second is a `CalRecurrenceEnd`, which describes when the `CalRecurrenceRule` ends. If valid values for these two parameters are not included, `nil` is returned. There are simple initializers for each `CalRecurrenceType` which take only these two parameters.

See also:

- 5.9.10 `initWeeklyRecurrence(interval as Integer, DaysOfTheWeek() as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS` 108

### 5.9.12 `initYearlyRecurrence(interval as Integer, DayOfTheWeek as Integer, WeekOfTheMonth as Integer, MonthsOfTheYear() as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS`

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Yearly Recurrence initializer.

**Notes:**

This initializer allows the client to specify multiple months of the year that an event will recur. This method should be used to initialize events that recur on the same day of the week, in the same week of a month, of possibly more than one month a year, in a set yearly pattern. An example is an event that occurs every year on the last Friday of sixth and twelfth months.

Two parameters are included in every `CalRecurrenceRule` initializer. The first is the interval, which is described above and indicates how many `CalRecurrenceTypes` make up the period of the recurrence (every week, every other week, etc.). The second is a `CalRecurrenceEnd`, which describes when the `CalRecurrenceRule` ends. If valid values for these two parameters are not included, `nil` is returned. There are simple initializers for each `CalRecurrenceType` which take only these two parameters.

Valid values for days of the week are integers 1-7, which correspond to days of the week with Sunday = 1. Valid values for weeks of the month are integers 1-4 and -1, which is used to indicate the last week of the month.

Valid values for months of the year are integers 1-12, which correspond to months of the year with January

= 1.

See also:

- 5.9.13 `initYearlyRecurrence(interval as Integer, MonthsOfTheYear() as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS` 110
- 5.9.14 `initYearlyRecurrence(interval as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS` 110

### 5.9.13 `initYearlyRecurrence(interval as Integer, MonthsOfTheYear() as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS`

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Yearly Recurrence initializer.

**Notes:**

This initializer allows the client to specify multiple months of the year that an event will recur. This method should be used to initialize events that occur on the same date, in more than month a year, in a set monthly pattern. An example is an event that occurs every year on the first day of the first and seventh months.

Two parameters are included in every `CalRecurrenceRule` initializer. The first is the interval, which is described above and indicates how many `CalRecurrenceTypes` make up the period of the recurrence (every week, every other week, etc.). The second is a `CalRecurrenceEnd`, which describes when the `CalRecurrenceRule` ends. If valid values for these two parameters are not included, nil is returned. There are simple initializers for each `CalRecurrenceType` which take only these two parameters.

Valid values for months of the year are integers 1-12, which correspond to months of the year with January = 1.

See also:

- 5.9.12 `initYearlyRecurrence(interval as Integer, DayOfTheWeek as Integer, WeekOfTheMonth as Integer, MonthsOfTheYear() as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS` 109
- 5.9.14 `initYearlyRecurrence(interval as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS` 110

### 5.9.14 `initYearlyRecurrence(interval as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS`

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Yearly Recurrence initializer.

**Example:**

```
// create a recurrence event:
```

```

dim c as new CalCalendarStoreMBS
dim e as new CalEventMBS
dim error as NSErrorMBS
dim s as string
dim ed as new date
dim rule as CalRecurrenceRuleMBS
dim rend as CalRecurrenceEndMBS

ed.day=21
ed.Month=7
ed.Year=2008

e.endDate=ed

dim sd as new date

sd.day=18
sd.Month=7
sd.Year=2008

e.startDate=sd
e.isAllDay=true
e.location="Example Location"

rule=CalRecurrenceRuleMBS.initYearlyRecurrence(1,nil)

dim calendars() as CalCalendarMBS = c.calendars
e.Title="Example Title"
e.calendar=calendars(0) // pick first calendar
e.notes="Example Notes"
e.URL="http://www.monkeybreadsoftware.de"
e.recurrenceRule=rule

if c.saveEvent(e, c.CalSpanAllEvents, error) then
if error<>Nil then s=error.localizedDescription
MsgBox "OK"+EndOfLine+s
else
if error<>Nil then s=error.localizedDescription
MsgBox "Failed"+EndOfLine+s
end if

```

**Notes:** Two parameters are included in every `CalRecurrenceRule` initializer. The first is the interval, which is described above and indicates how many `CalRecurrenceTypes` make up the period of the recurrence (every week, every other week, etc.). The second is a `CalRecurrenceEnd`, which describes when the `CalRecurrenceRule` ends. If valid values for these two parameters are not included, `nil` is returned. There are simple

initializers for each `CalRecurrenceType` which take only these two parameters.

See also:

- 5.9.12 `initYearlyRecurrence(interval as Integer, DayOfTheWeek as Integer, WeekOfTheMonth as Integer, MonthsOfTheYear() as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS` 109
- 5.9.13 `initYearlyRecurrence(interval as Integer, MonthsOfTheYear() as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS` 110

### 5.9.15 `monthsOfTheYear as Integer()`

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This property can be accessed as an array containing one or more integer corresponding to the months of the year the event recurs.

**Notes:** This property is valid for rules whose `CalRecurrenceType` is `CalYearlyRecurrence`. For all other `CalRecurrenceRules`, this property is empty.

### 5.9.16 `nthWeekDaysOfTheMonth as CalNthWeekDayMBS()`

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This property can be accessed as an array containing exactly one `CalNthWeekDay` corresponding to the week of the month the event recurs.

**Notes:** This property is valid for rules whose `CalRecurrenceType` is `CalMonthlyRecurrence` or `CalYearlyRecurrence`, and that were initialized with a day of the week and week of the month. For all other `CalRecurrenceRules`, this property is empty.

### 5.9.17 Properties

#### 5.9.18 `firstDayOfTheWeek as Integer`

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The first day of the week.

**Notes:**

Recurrence patterns can specify which day of the week should be treated as the first day. Possible values for this property are integers 0 and 1-7, which correspond to days of the week with Sunday = 1. Zero indicates that the property is not set for this recurrence. The first day of the week only affects the way the recurrence is expanded for weekly recurrence patterns with an interval greater than 1. For those types of recurrence patterns, the `CalendarStore` framework will set `firstDayOfTheWeek` to be 2 (Monday). In all other cases, this property will be set to zero. The `iCalendar` spec stipulates that the default value is Monday if this property is not set.

(Read only property)

### 5.9.19 Handle as Integer

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal used CalRecurrenceRule reference.

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

### 5.9.20 recurrenceEnd as CalRecurrenceEndMBS

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This property defines when the the repeating event is scheduled to end.

**Notes:**

The end date can be specified by a number of occurrences, or with an end date.

Value can be nil.

This is a read only property.

(Read only property)

### 5.9.21 recurrenceInterval as Integer

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Specifies how often the rule repeats over the given recurrence type.

**Notes:**

An interval of 1 indicates that the event repeats every time unit, while an interval of 2 indicates that the repetition occurs in every other unit, etc.

This is a read only property.

(Read only property)

### 5.9.22 recurrenceType as Integer

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This property designates the unit of time used to describe the recurrence pattern.

**Notes:**

CalRecurrenceType designates the unit of time used to describe the recurrence. It has four possible values, which correspond to recurrence rules that are defined in terms of days, weeks, months, and years.

The interval of a `CalRecurrenceRule` is an `Integer` which specifies how often the recurrence rule repeats over the unit of time described by the `CalRecurrenceType`. For example, if the `CalRecurrenceType` is `CalWeeklyRecurrence`, then an interval of 1 means the pattern is repeated every week. A `NSUInteger` of 2 indicates it is repeated every other week, 3 means every third week, and so on. The `Integer` must be a positive integer; 0 is not a valid value, and `nil` will be returned if the client attempts to initialize a rule with a negative or zero interval.

Together, `CalRecurrenceType` and `interval` define how often the `CalRecurrenceRule`'s pattern repeats. This is a read only property.  
(Read only property)

### 5.9.23 Constants

#### 5.9.24 `CalRecurrenceDaily=0`

Plugin Version: 7.7. **Function:** One of the recurrence type constants.

#### 5.9.25 `CalRecurrenceMonthly=2`

Plugin Version: 7.7. **Function:** One of the recurrence type constants.

#### 5.9.26 `CalRecurrenceWeekly=1`

Plugin Version: 7.7. **Function:** One of the recurrence type constants.

#### 5.9.27 `CalRecurrenceYearly=3`

Plugin Version: 7.7. **Function:** One of the recurrence type constants.

## 5.10 class CalTaskMBS

### 5.10.1 class CalTaskMBS

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The class for tasks in iCal.

**Example:**

```

dim calStore as new CalCalendarStoreMBS
dim err as NSErrorMBS ' needed for the error details
dim newTask as new CalTaskMBS ' create a new reminder

// find existign tasks
dim tasks() as CalTaskMBS = calStore.tasks

// set properties
newTask.Title="new reminder"
newTask.Priority=9
newTask.DueDate=new date
//

newTask.calendar = tasks(0).calendar ' add to first List of reminders

call calStore.saveTask(newTask,err) ' save reminder
if err<>nil then
MsgBox err.localizedDescription
else
MsgBox "New reminder was created."
end if

```

**Notes:**

Requires Mac OS X 10.5 to work.  
Subclass of the CalCalendarItemMBS class.

### 5.10.2 Methods

### 5.10.3 Constructor

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The constructor to create a new empty task.

**Example:**

```
dim s as new CalCalendarStoreMBS
dim t as new CalTaskMBS
dim a() as CalCalendarMBS = s.calendars
dim d as new date

d.Month = d.Month + 1

t.calendar = a(0)
t.Title = "Test"
t.URL = "http://www.mbsplugins.de/"
t.priority = t.CalPriorityMedium
t.dueDate = d
t.notes = "just a test"
t.isCompleted = false

dim e as NSErrorMBS
if s.saveTask(t, e) then
  MsgBox "saved"
else
  MsgBox "failed to save"
end if
```

**Notes:** The calendar property must be set before calling saveTask on a new task.

#### 5.10.4 Properties

##### 5.10.5 completedDate as date

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The date the task was completed.

**Notes:**

The properties isCompleted and CompletedDate are inextricably linked. Setting isCompleted to be true, will set the completedDate to be now, and setting any completedDate will change isCompleted to be true. Similarly, setting isCompleted to be false will set the completedDate to be nil, and setting the completedDate changes isCompleted to false.

(Read and Write property)

##### 5.10.6 dueDate as date

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The date the task is due.

**Example:**

```
dim c as new CalCalendarStoreMBS

dim i,count as Integer
dim ta() as CalTaskMBS
dim ct as CalTaskMBS

ta=c.UncompletedTasks
for each ct in ta
msgbox ct.Title+EndOfLine+str(ct.priority)+EndOfLine+ct.dueDate.LongDate
next
```

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

### 5.10.7 isCompleted as Boolean

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether the task has been completed.

**Notes:**

The properties isCompleted and CompletedDate are inextricably linked. Setting isCompleted to be true, will set the completedDate to be now, and setting any completedDate will change isCompleted to be true. Similarly, setting isCompleted to be false will set the completedDate to be nil, and setting the completedDate changes isCompleted to false.

(Read and Write property)

### 5.10.8 priority as Integer

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The priority of this task.

**Notes:**

The iCalendar specification allows priority to be specified with an integer in the range of 0-9, with 0 representing an undefined priority, 1 the highest priority, and 9 the lowest priority. When a user sets the priority to high, medium or low in iCal saves the priority as 1, 5, or 9 respectively. Clients are encouraged to use these values when setting a task's priority, but it is possible to specify any integer value from 0 to 9. In iCal, a task with a priority in the range of 1-4 will show up as high priority, a task with a priority of 5 will be displayed as having medium priority, and 6-9 will be displayed as having a low priority.

(Read and Write property)

## 5.10.9 Constants

### 5.10.10 CalPriorityHigh=1

Plugin Version: 7.7. **Function:** One of the constants for the priority property.

### 5.10.11 CalPriorityLow=9

Plugin Version: 7.7. **Function:** One of the constants for the priority property.

### 5.10.12 CalPriorityMedium=5

Plugin Version: 7.7. **Function:** One of the constants for the priority property.

### 5.10.13 CalPriorityNone=0

Plugin Version: 7.7. **Function:** One of the constants for the priority property.

# Chapter 6

## Cocoa

### 6.1 control CocoaControlMBS

#### 6.1.1 control CocoaControlMBS

Plugin Version: 8.4, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The control to embed NSViews into a REALbasic window.

**Notes:**

Due the way Cocoa event handling works, the keydown event handler (and others) do not work with this control. To actually get an event, you'd have to use a subclass of CustomNSViewMBS and handle events there. In the CustomNSViewMBS you add the actual view you like to have. So all events not handled by this view, fall through to your CustomNSViewMBS.

On Carbon the RS framework intercepts events and calls keydown event.

Requires the window being composite for Carbon targets which is currently not available for modal windows in Real Studio.

#### 6.1.2 Properties

#### 6.1.3 Available as Boolean

Plugin Version: 8.4, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Whether this control can work.

**Notes:**

Returns true on Mac OS X 10.5 (or newer) and false on any other OS.  
(Read only property)

### 6.1.4 View as NSViewMBS

Plugin Version: 8.4, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The view used with this control.

**Notes:**

You define this view in the GetView event.  
(Read only property)

### 6.1.5 WantsFocus as Boolean

Plugin Version: 13.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Whether this control wants to have focus.

**Notes:**

By default this is true.  
(Read and Write property)

### 6.1.6 Events

### 6.1.7 EnableMenuItems

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Function:** The event where you can enable menu items.

### 6.1.8 GetView as NSViewMBS

Plugin Version: 8.4, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Asks your application which NSView should be used.

**Example:**

```
// an example on how to use this event:
```

```
Function GetView() As NSViewMBS  
dim n as NSTextViewMBS
```

```
// create a textview:
```

```
n=new NSTextViewMBS(0, 0, CocoaControlMBS1.Width, CocoaControlMBS1.Height)  
n.ContinuousSpellCheckingEnabled=true  
Return n
```

[End Function](#)

**Notes:**

Return a `NSView` setup as you like.

You may also want to keep a reference to the view you use for easier access.

### 6.1.9 `MenuItemAction(HitItem as MenuItem) As Boolean`

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Called when a menuitem is chosen.

**Notes:** This allows the control to react on its relevant menu items. Please return true if you handled it or false to give others a chance.

### 6.1.10 `MouseDown(x as Integer, y as Integer, Modifiers as Integer) As Boolean`

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The mouse button was pressed inside the controls region at the location passed in to x, y.

**Notes:**

The coordinates x and y are local to the control, i.e. they represent the position of the mouse click relative to the upper-left corner of the Control.

Return True if you are going to handle the `MouseDown`. In such a case:

- The Action event, if any, will not execute and the state of the object will not change.
- You will receive the `MouseDown` and `MouseUp` events.

If you return False, the system handles the `MouseDown` so the above event handlers do not get called.

### 6.1.11 `MouseDownDrag(x as Integer, y as Integer)`

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event fires continuously after the mouse button was pressed inside the Control.

**Notes:**

Mouse location is local to the control passed in to x, y.

As this event is fired continuously (hundreds of times per second), it is your responsibility to determine if the mouse has really moved.

### 6.1.12 MouseUp(x as Integer, y as Integer)

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The mouse button was released.

**Notes:** Use the x and y parameters to determine if the mouse button was released within the control's boundaries.

### 6.1.13 ScaleFactorChanged(NewFactor as Double)

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The backing store scale factor has changed.

**Notes:** Please invalidate any cached bitmaps or other relevant state.

## 6.2 module DictionaryServiceMBS

### 6.2.1 module DictionaryServiceMBS

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The Dictionary Services module.

**Notes:**

Dictionary Services provides functions that let you access dictionaries programmatically from within your application.

A dictionary is any look-up reference that is built using the Dictionary Development Kit. The contents of a dictionary can serve many purposes. The most typical use is to provide definitions for a single language, but you can create content for a thesaurus, bilingual dictionaries (such as English-Japanese), in-house glossaries, and professional dictionaries (such as legal, medical, and technical).

Available in Mac OS X v10.5 and later.

### 6.2.2 Methods

#### 6.2.3 GetTermRangeInString(text as string, offset as Integer=0) as boolean

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Determines the range of the longest word or phrase with respect to an offset.

**Notes:**

text: Text that contains the word or phrase to look up.

offset: A character offset in the textString parameter.

#### Return Value

The range that specifies the location, around the specified offset, of the word or phrase, or the value -1. The range is stored in the RangePosition and RangeLength properties and the function returns true. On any error it returns false.

You can use this function to determine the range of text that contains a word or phrase. After you determine the range, you can pass the result to the functions TextDefinition and Show.

To see how this works, follow these steps:

In Mac OS X v10.5 or later, open Text Edit.

Type It is a foggy day in San Francisco, California.

Control-click Francisco (don't select it). Then, choose "Lookup in Dictionary".

Note that the Dictionary window appears with a definition of San Francisco. The function `GetTermRangeInString` automatically detected the range of the phrase San Francisco, using Francisco as the text string to search for and a character offset in this string. The function expanded the range until it found a possible match.

You can also point the cursor at the word Francisco and, without making a selection or clicking, type Command-Control-D. `GetTermRangeInString` detects the range.

The function `GetTermRangeInString` only returns the range. You must call `TextDefinition` to copy the definition and `Show` to display the definition in a Dictionary window.

Available in Mac OS X v10.5 and later.

#### 6.2.4 RangeLength as Integer

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The length from the range.

**Notes:**

This value set by the `GetTermRangeInString` function.  
(Read and Write computed property)

#### 6.2.5 RangePosition as Integer

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The position from the range.

**Notes:**

This value set by the `GetTermRangeInString` function.  
(Read and Write computed property)

#### 6.2.6 Show(text as string, start as Integer = 0, length as Integer = 0, textOriginX as Double = 0, textOriginY as Double = 0) as boolean

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Displays dictionary search result in a dictionary window.

**Notes:**

text: Text that contains the word or phrase to look up.

start and length:

If you are using this function to show the results associated with text selected by the user, then provide the selection range of the `textString` parameter. If you are using this function to show the results associated with calling the `DCSGetTermRangeInString` function, then provide the range returned by that function.

This function opens a window to display the definition of a word or phrase.

Available in Mac OS X v10.5 and later.

### 6.2.7 **TextDefinition(text as string, position as Integer=0, length as Integer=0) as string**

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the definition associated with the provided text range.

**Notes:**

text: Text that contains the word or phrase to look up.

position and length: A range that specifies the location of the word or phrase in the `textString` parameter. If text string exactly specifies the word or phrase that you want to look up, you can pass the range of the text string. For example, for the word `make`, you would pass `(0,4)` to specify the range.

If the `textString` parameter contains the word or phrase, but does not specify it exactly, then pass the range returned by the function `GetTermRangeInString`.

**Return Value:**

The definition of the word or phrase, as plain text. The returned text does not contain any elements that are marked with a priority attribute whose value is 2.

This function returns the description of the first matching record found in the the active dictionaries. It searches first in the default word definition dictionary which, in the English environment, is the Oxford dictionary.

Available in Mac OS X v10.5 and later.

## 6.3 class NSAnimationContextMBS

### 6.3.1 class NSAnimationContextMBS

Plugin Version: 10.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The Cocoa class for the context of a NSAnimation.

**Notes:** Available in Mac OS X v10.5 and later.

### 6.3.2 Methods

### 6.3.3 beginGrouping

Plugin Version: 10.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a new animation grouping.

**Notes:** Available in Mac OS X v10.5 and later.

### 6.3.4 Constructor

Plugin Version: 10.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a new NSAnimationContextMBS object with the current animation context.

**Notes:** Available in Mac OS X v10.5 and later.

### 6.3.5 currentContext as NSAnimationContextMBS

Plugin Version: 10.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the current animation context.

**Notes:** Available in Mac OS X v10.5 and later.

### 6.3.6 endGrouping

Plugin Version: 10.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Ends the current animation grouping.

**Notes:** Available in Mac OS X v10.5 and later.

### 6.3.7 Properties

### 6.3.8 Handle as Integer

Plugin Version: 10.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal reference to the NSAnimationContext object.

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

### 6.3.9 duration as Double

Plugin Version: 10.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The duration used when animating object properties that support animation.

**Example:**

```
NSAnimationContextMBS.currentContext.duration = 0.5
```

**Notes:**

Any animations that occur as a result of setting the values of animatable properties in the current context will run for this duration.

Available in Mac OS X v10.5 and later.  
(Read and Write computed property)

## 6.4 class NSAnimationMBS

### 6.4.1 class NSAnimationMBS

Plugin Version: 10.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Objects of the NSAnimation class manage the timing and progress of animations in the user interface.

**Notes:**

The class also lets you link together multiple animations so that when one animation ends another one starts. It does not provide any drawing support for animation and does not directly deal with views, targets, or actions.

NSAnimation objects have several characteristics, including duration, frame rate, and animation curve, which describes the relative speed of the animation over its course. You can set progress marks in an animation, each of which specifies a percentage of the animation completed; when an animation reaches a progress mark, it notifies its delegate and posts a notification to any observers. Animations execute in one of three blocking modes: blocking, non-blocking on the main thread, and non-blocking on a separate thread. The non-blocking modes permit the handling of user events while the animation is running.

### 6.4.2 Methods

#### 6.4.3 clearStartAnimation

Plugin Version: 10.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Clears linkage to another animation that causes the receiver to start.

#### 6.4.4 clearStopAnimation

Plugin Version: 10.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Clears linkage to another animation that causes the receiver to stop.

#### 6.4.5 Constructor(duration as Double, animationCurve as Integer)

Plugin Version: 10.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Initializes the object with the specified duration and animation-curve values.

**Notes:**

duration: The number of seconds over which the animation occurs. Specifying a negative number raises an exception.

animationCurve: An NSAnimationCurve constant that describes the relative speed of the animation over

its course; if it is zero, the default curve (NSAnimationEaseInOut) is used.

You can always later change the duration of an NSAnimation object by sending it a `setDuration:` message, even while the animation is running. See "Constants" for descriptions of the NSAnimationCurve constants.

#### 6.4.6 `currentValue` as Double

Plugin Version: 10.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the current value of the effect based on the current progress.

#### 6.4.7 `Destructor`

Plugin Version: 13.5, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The destructor.

#### 6.4.8 `isAnimating` as boolean

Plugin Version: 10.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns a Boolean value that indicates whether the receiver is currently animating.  
**Notes:** True if the receiver is animating, false otherwise.

#### 6.4.9 `startAnimation`

Plugin Version: 10.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Starts the animation represented by the receiver.  
**Notes:** The receiver retains itself and is then autoreleased at the end of the animation or when it receives `stopAnimation`. If the blocking mode is `NSAnimationBlocking`, the method only returns after the animation has completed or the delegate sends it `stopAnimation`. If the receiver has a progress of 1.0, it starts again at 0.0.

#### 6.4.10 `stopAnimation`

Plugin Version: 10.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Stops the animation represented by the receiver.  
**Notes:** The current progress of the receiver is not reset. When this method is sent to instances of `NSViewAnimation` (a subclass of `NSAnimation`) the receiver moves to the end frame location.

### 6.4.11 Properties

### 6.4.12 Handle as Integer

Plugin Version: 10.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal reference to the animation object.

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

### 6.4.13 animationBlockingMode as Integer

Plugin Version: 10.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The blocking mode of the receiver.

**Notes:**

A constant representing the blocking mode the animation is next scheduled to run under. See "NSAnimationBlockingMode" for valid values.

If the constant is `NSAnimationNonblocking`, the animation runs in the main thread in one of the standard run-loop modes or in a mode returned from `runLoopModesForAnimating`. If `animationBlockingMode` is `NSAnimationNonblockingThreaded`, a new thread is spawned to run the animation.

The default mode is `NSAnimationBlocking`, which means that the animation runs on the main thread in a custom run-loop mode that blocks user events. The new blocking mode takes effect the next time the receiver is started and has no effect on an animation underway.

(Read and Write computed property)

### 6.4.14 animationCurve as Integer

Plugin Version: 10.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The animation curve the receiver is running under.

**Notes:**

The animation curve describes the relative frame rate over the course of the animation. See `NSAnimation*` constants.

(Read and Write computed property)

### 6.4.15 currentProgress as Double

Plugin Version: 10.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The current progress of the receiver.

**Notes:**

The current progress is a value between 0.0 and 1.0 that represents the percentage of the animation currently completed.

(Read and Write computed property)

#### 6.4.16 duration as Double

Plugin Version: 10.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The duration of the animation, in seconds.

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

#### 6.4.17 frameRate as Double

Plugin Version: 10.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The frame rate of the animation.

**Notes:**

The frame rate is the number of updates per second. It is not guaranteed to be accurate because of differences between systems on the time needed to process a frame.

(Read and Write computed property)

#### 6.4.18 Events

#### 6.4.19 CurrentProgressChanged(progress as Double)

Plugin Version: 10.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The event called whenever the current value changes.

#### 6.4.20 Constants

#### 6.4.21 NSAnimationBlocking=0

Plugin Version: 10.0. **Function:** One of the constants to indicate the blocking mode of an NSAnimation object when it is running.

**Notes:**

Requests the animation to run in the main thread in a custom run-loop mode that blocks user input.

This is the default.

### 6.4.22 `NSAnimationEaseIn=1`

Plugin Version: 10.0. **Function:** One of the constants to describe the curve of an animation that is, the relative speed of an animation from start to finish.

**Notes:** Describes an animation that slows down as it reaches the end.

### 6.4.23 `NSAnimationEaseInOut=0`

Plugin Version: 10.0. **Function:** One of the constants to describe the curve of an animation that is, the relative speed of an animation from start to finish.

**Notes:** Describes an S-curve in which the animation slowly speeds up and then slows down near the end of the animation. This constant is the default.

### 6.4.24 `NSAnimationEaseOut=2`

Plugin Version: 10.0. **Function:** One of the constants to describe the curve of an animation that is, the relative speed of an animation from start to finish.

**Notes:** Describes an animation that slowly speeds up from the start.

### 6.4.25 `NSAnimationLinear=3`

Plugin Version: 10.0. **Function:** One of the constants to describe the curve of an animation that is, the relative speed of an animation from start to finish.

**Notes:** Describes an animation in which there is no change in frame rate.

### 6.4.26 `NSAnimationNonblocking=1`

Plugin Version: 10.0. **Function:** One of the constants to indicate the blocking mode of an `NSAnimation` object when it is running.

**Notes:** Requests the animation to run in a standard or specified run-loop mode that allows user input.

### 6.4.27 `NSAnimationNonblockingThreaded=2`

Plugin Version: 10.0. **Function:** One of the constants to indicate the blocking mode of an `NSAnimation` object when it is running.

**Notes:**

Requests the animation to run in a separate thread that is spawned by the NSAnimation object.

The secondary thread has its own run loop.

## 6.5 control WebViewControlMBS

### 6.5.1 control WebViewControlMBS

Plugin Version: 8.4, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The control for a webview.

**Notes:** Requires the window being composite for Carbon targets which is currently not available for modal windows in Real Studio.

### 6.5.2 Properties

#### 6.5.3 Available as Boolean

Plugin Version: 8.4, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Whether this control can work.

**Notes:**

Returns true on Mac OS X 10.5 (or newer) and false on any other OS.  
(Read only property)

#### 6.5.4 View as WebViewMBS

Plugin Version: 8.4, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The view used with this control.

**Example:**

```
dim w as WebViewMBS = WebViewControlMBS1.View  
w.LoadURL "http://www.apple.com"
```

**Notes:**

The view object is created for you in the constructor.

In version 9.6 it is a WebViewMBS object.

If you have a version declared as NSViewMBS, you need to cast to WebViewMBS yourself.

(Read only property)

#### 6.5.5 WantsFocus as Boolean

Plugin Version: 13.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Whether this control wants to have focus.

**Notes:**

By default this is true.  
(Read and Write property)

### 6.5.6 Events

### 6.5.7 EnableMenuItems

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Function:** The event where you can enable menu items.

### 6.5.8 MenuAction(HitItem as MenuItem) As Boolean

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Called when a menuitem is chosen.

**Notes:** This allows the control to react on its relevant menu items. Please return true if you handled it or false to give others a chance.

### 6.5.9MouseDown(x as Integer, y as Integer, Modifiers as Integer) As Boolean

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The mouse button was pressed inside the controls region at the location passed in to x, y.

**Notes:**

The coordinates x and y are local to the control, i.e. they represent the position of the mouse click relative to the upper-left corner of the Control.

Return True if you are going to handle the MouseDown. In such a case:

- The Action event, if any, will not execute and the state of the object will not change.
- You will receive the MouseDrag and MouseUp events.

If you return False, the system handles the MouseDown so the above event handlers do not get called.

### 6.5.10 MouseDrag(x as Integer, y as Integer)

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event fires continuously after the mouse button was pressed inside the Control.

**Notes:**

Mouse location is local to the control passed in to  $x$ ,  $y$ .

As this event is fired continuously (hundreds of time per second), it is your responsibility to determine if the mouse has really moved.

### 6.5.11 MouseUp( $x$ as Integer, $y$ as Integer)

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The mouse button was released.

**Notes:** Use the  $x$  and  $y$  parameters to determine if the mouse button was released within the control's boundaries.

### 6.5.12 ScaleFactorChanged(NewFactor as Double)

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The backing store scale factor has changed.

**Notes:** Please invalidate any cached bitmaps or other relevant state.

# Chapter 7

## Cocoa Controls

### 7.1 class Control

#### 7.1.1 class Control

Plugin Version: 9.7, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The built in Control class in REALbasic.

#### 7.1.2 Methods

#### 7.1.3 CALayerMBS as CALayerMBS

Plugin Version: 13.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Returns the Core Animation layer that the receiver uses as its backing store.

**Notes:**

Works only in Cocoa target.

Also sets wantsLayer to true for the view to make sure it has a layer.



## Chapter 8

# Cocoa Threading

### 8.1 class NSOperationMBS

#### 8.1.1 class NSOperationMBS

Plugin Version: 8.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The class to do operations in Cocoa.

**Notes:**

Requires Mac OS X 10.5.

The NSOperation class manages the execution of a single encapsulated task. Operations are typically scheduled by adding them to an operation queue object (an instance of the NSOperationQueue class), although you can also execute them directly by explicitly invoking their start method.

Operation objects are single-shot objects, that is, they perform their task once. You cannot reuse the same NSOperation object to perform a task (or a slight variant of the task) multiple times in succession. Attempting to execute an operation that has already finished results in an exception.

When manually executing operations, you are responsible for making sure the object is ready to execute. Starting an operation that is not in the ready state generally results in an exception being thrown. If you use an operation queue to manage the execution, the NSOperationQueue object ensures that the operation is executed only when it is ready.

## 8.1.2 Methods

### 8.1.3 addDependency(op as NSOperationMBS)

Plugin Version: 8.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Makes the receiver dependent on the completion of the specified operation.

**Notes:**

op: The operation on which the operation is dependent. The same dependency should not be added more than once to the operation, and the results of doing so are undefined.

The dependent is not considered ready to execute until all of its dependent operations finish executing. If the receiver is already executing its task, adding dependencies is unlikely to have any practical effect. This method may change the isReady and dependencies properties of the dependent.

It is a programmer error to create any circular dependencies among a set of operations. Doing so can cause a deadlock among the operations and may freeze your program.

Please setup dependencies before you add the operation to a queue. Once the operation is in the queue it may be executed directly.

### 8.1.4 cancel

Plugin Version: 8.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Advises the operation object that it should stop executing its task.

**Notes:**

This method does not force your operation code to stop. The code for your operation must invoke the isCancelled method periodically to determine whether the operation should be stopped. Once cancelled, an operation cannot be restarted.

If the operation is already finished executing, this method has no effect. Canceling an operation that is currently in an operation queue, but not yet executing, causes it to be removed from the queue (although not necessarily right away).

### 8.1.5 Constructor

Plugin Version: 17.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The constructor.  
See also:

- 8.1.6 Constructor(Handle as Integer)

### 8.1.6 Constructor(Handle as Integer)

Plugin Version: 17.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The constructor.

**Notes:** You can pass in handle to NSOperation object.

See also:

- 8.1.5 Constructor

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### 8.1.7 dependencies as NSOperationMBS()

Plugin Version: 8.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** the operations on which the operation is dependent.

**Notes:** The receiver is not considered ready to execute until all of its dependent operations finish executing.

### 8.1.8 dependenciesCount as Integer

Plugin Version: 8.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The number of the dependencies.

### 8.1.9 dependency(index as Integer) as NSOperationMBS

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the dependency at the given index.

**Notes:**

The receiver is not considered ready to execute until all of its dependent operations finish executing.

Operations are not removed from this dependency list as they finish executing. You can therefore use this list to track all dependent operations, including those that have already finished executing. The only way to remove an operation from this list is to use the removeDependency method.

Available in Mac OS X v10.5 and later.

### 8.1.10 isCancelled as boolean

Plugin Version: 8.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns a Boolean value indicating whether the operation has been cancelled.

**Notes:**

True if the operation was explicitly cancelled by an invocation of the operation's cancel method; otherwise, false. This method may return true even if the operation is currently executing.

#### Discussion

Canceling an operation does not actively stop the operation's code from executing. An operation object is responsible for calling this method periodically and stopping itself if the method returns true.

### 8.1.11 isConcurrent as boolean

Plugin Version: 8.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns a Boolean value indicating whether the operation runs asynchronously.

**Notes:** True if the operation is asynchronous; otherwise, false if the operation runs synchronously on whatever thread started it. This method returns false by default.

### 8.1.12 isExecuting as boolean

Plugin Version: 8.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns a Boolean value indicating whether the operation is currently executing.

**Notes:** True if the operation is executing; otherwise, false if the operation has not been started or is already finished.

### 8.1.13 isFinished as boolean

Plugin Version: 8.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A Boolean value indicating whether the operation is done executing.

**Notes:** True if the operation is no longer executing; otherwise, false.

### 8.1.14 isReady as boolean

Plugin Version: 8.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns a Boolean value indicating whether the operation can be performed now.

#### Notes:

True if the operation can be performed now; otherwise, false.

Operations may not be ready due to dependencies on other operations or because of external conditions that might prevent needed data from being ready. The `NSOperation` class manages dependencies on other operations and reports the readiness of the receiver based on those dependencies.

Note: If the operation is cancelled before it starts, operations that are dependent on the completion of the receiver will never become ready.

### 8.1.15 Lock

Plugin Version: 8.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Locks the semaphore.

**Example:**

```
dim o as NSOperationMBS // your operation
dim myarray(-1) as window
```

```
o.lock
myarray.append window1
o.unlock
```

**Notes:**

You need to pair all calls to REALbasic runtime into lock and unlock to make sure you don't crash. REALbasic is not reentrant safe, so you need to lock.

Be aware that locking costs performance. You should do locks often, so in the time between two locks another thread can get a lock. Also you should group locks nearby so you don't waste too much time waiting for the lock. Finally you need your main application thread to run nice so it doesn't lock too much, too.

### 8.1.16 main

Plugin Version: 8.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Performs the operation's non-concurrent task.

**Notes:** This will just call to the work event.

### 8.1.17 removeDependency(op as NSOperationMBS)

Plugin Version: 8.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Removes the operation's dependence on the specified operation.

**Notes:** This method may change the isReady and dependencies properties of the operation.

### 8.1.18 start

Plugin Version: 8.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Begins the execution of the operation.

**Notes:** The default implementation of this method configures the execution environment for a non-concurrent operation and invokes the operation's main method. As part of the default configuration, this method performs several checks to ensure that the non-concurrent operation can actually run and generates appropriate KVO notifications for each change in the operation's state. If the operation's operation has already been performed, was cancelled, or is not yet ready to run, this method throws an `NSInvalidArgumentException` exception. If the operation is to be performed on a separate thread, this method may return before the operation itself completes on the other thread.

### 8.1.19 Unlock

Plugin Version: 8.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Unlocks the semaphore.

**Example:**

```
dim o as NSOperationMBS // your operation
dim myarray(-1) as window
```

```
o.lock
myarray.append window1
o.unlock
```

**Notes:**

You need to pair all calls to REALbasic runtime into lock and unlock to make sure you don't crash. REALbasic is not reentrant safe, so you need to lock.

Be aware that locking costs performance. You should do locks often, so in the time between two locks another thread can get a lock. Also you should group locks nearby so you don't waste too much time waiting for the lock. Finally you need your main application thread to run nice so it doesn't lock too much, too.

### 8.1.20 waitUntilFinished

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Spend time waiting for the operation to finish.

### 8.1.21 Properties

#### 8.1.22 Handle as Integer

Plugin Version: 8.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The handle to the internal used NSOperation reference.

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

#### 8.1.23 queuePriority as Integer

Plugin Version: 8.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The priority of the operation in an operation queue.

**Notes:**

The relative priority of the operation. The returned value always corresponds to one of the predefined constants. If no priority is explicitly set, this method returns NSOperationQueuePriorityNormal.

You should use priority values only as needed to classify the relative priority of non-dependent operations. Priority values should not be used to implement dependency management among different operation objects. If you need to establish dependencies between operations, use the addDependency method instead.

If you attempt to specify a priority value that does not match one of the defined constants, this method automatically adjusts the value you specify towards the NSOperationQueuePriorityNormal priority, stopping at the first valid constant value. For example, if you specified the value -10, this method would adjust that value to match the NSOperationQueuePriorityVeryLow constant. Similarly, if you specified +10, this method would adjust the value to match the NSOperationQueuePriorityVeryHigh constant.

(Read and Write computed property)

#### 8.1.24 threadPriority as Double

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The thread priority to use when executing the operation.

**Notes:**

A floating-point number in the range 0.0 to 1.0, where 1.0 is the highest priority. The default thread priority is 0.5.

Available in Mac OS X v10.6 and later.

(Read and Write computed property)

### 8.1.25 Events

#### 8.1.26 Close

Plugin Version: 8.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The event called just before the operation object is destroyed.

#### 8.1.27 Finished

Plugin Version: 8.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The event called after work has finished.

**Notes:** This event is called on the main thread, so you can do GUI stuff here to show the result.

#### 8.1.28 Open

Plugin Version: 8.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The event called when the object is created.

**Notes:** Called on the main thread.

#### 8.1.29 Work

Plugin Version: 8.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The event called for an operation to do the work.

**Notes:**

You should test `isCancelled` regularly to see whether operation was cancelled.

Please read on the `ThreadMBS.Work` event for more details.

(`NSOperationMBS` is a Mac OS X feature, but the `ThreadMBS` class, does nearly the same on all platforms)

#### 8.1.30 Constants

#### 8.1.31 `NSOperationQueuePriorityHigh=4`

Plugin Version: 8.0. **Function:** One of the constants for the priority property.

**Notes:** Operations receive high priority for execution.

### 8.1.32 NSOperationQueuePriorityLow=-4

Plugin Version: 8.0. **Function:** One of the constants for the priority property.

**Notes:** Operations receive low priority for execution.

### 8.1.33 NSOperationQueuePriorityNormal=0

Plugin Version: 8.0. **Function:** One of the constants for the priority property.

**Notes:** Operations receive the normal priority for execution.

### 8.1.34 NSOperationQueuePriorityVeryHigh=8

Plugin Version: 8.0. **Function:** One of the constants for the priority property.

**Notes:** Operations receive very high priority for execution.

### 8.1.35 NSOperationQueuePriorityVeryLow=-8

Plugin Version: 8.0. **Function:** One of the constants for the priority property.

**Notes:** Operations receive very low priority for execution.

## 8.2 class NSOperationQueueMBS

### 8.2.1 class NSOperationQueueMBS

Plugin Version: 8.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Queues NSOperations for later execution.

**Notes:**

Available in Mac OS X v10.5 and later.

The NSOperationQueue class manages a set of NSOperation objects in a priority queue and regulates their execution. Operations remain in the queue until they are explicitly cancelled or finish executing. An application may create multiple operation queues, with each queue running up to its designated maximum number of operations.

A specific NSOperation object can be in only one operation queue at a time. Operations within a single queue coordinate their execution order using both priority levels and inter-operation object dependencies. Operation objects in different queues can coordinate their execution order using dependencies, which are not queue-specific.

Inter-operation dependencies provide an absolute execution order for operations. An operation object is not considered ready to execute until all of its dependent operations have finished executing. For operations that are ready to execute, the operation queue always executes the one with the highest priority relative to the other ready operations. For details on how to set priority levels and dependencies, see NSOperation Class Reference.

You should never manually start an operation while it is sitting in an operation queue. Once added, an operation stays in its queue until it finishes executing or is cancelled.

### 8.2.2 Methods

#### 8.2.3 addOperation(op as NSOperationMBS)

Plugin Version: 8.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Adds the specified operation object to the operation queue.

**Notes:**

An operation object can be in at most one operation queue at a time and cannot be added if it is currently executing or finished. This method throws an NSInvalidArgumentException exception if any of these conditions is true.

Once added, the specified operation remains in the queue until it is executed or cancelled.

Please setup dependencies before you add the operation to a queue. Once the operation is in the queue it may be executed directly.

#### 8.2.4 addOperations(ops() as NSOperationMBS, wait as boolean)

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Adds the specified array of operations to the queue.

**Notes:**

ops: The array of NSOperation objects that you want to add to the receiver.

wait: If true, the current thread is blocked until all of the specified operations finish executing. If false, the operations are added to the queue and control returns immediately to the caller.

An operation object can be in at most one operation queue at a time and cannot be added if it is currently executing or finished. This method throws an `NSInvalidArgumentException` exception if any of those error conditions are true for any of the operations in the ops parameter.

Once added, the specified operation remains in the queue until its `isFinished` method returns true.

Available in Mac OS X v10.6 and later.

#### 8.2.5 areAllOperationsFinished as boolean

Plugin Version: 8.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns whether all operations have been finished.

**Notes:** True if all operations have finished.

#### 8.2.6 cancelAllOperations

Plugin Version: 8.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Cancels all queued and executing operations.

**Notes:** This method sends a cancel message to all operations currently in the queue or executing. Queued operations are cancelled before they begin executing. If an operation is already executing, it is up to that operation to recognize the cancellation and stop what it is doing.

### 8.2.7 Constructor

Plugin Version: 8.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The constructor creating a new operation queue.

**Notes:** On success the handle property is not 0.

### 8.2.8 currentQueue as NSOperationQueueMBS

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the operation queue that launched the current operation.

**Notes:**

Returns the operation queue that started the operation or nil if the queue could not be determined.

You can use this method from within a running operation object to get a reference to the operation queue that started it. Calling this method from outside the context of a running operation typically results in nil being returned.

Available in Mac OS X v10.6 and later.

### 8.2.9 isOneOperationExecuting as boolean

Plugin Version: 8.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether at least one operation is still executing.

**Notes:**

True if one of the operations is executing.

False if no operation is executing.

### 8.2.10 mainQueue as NSOperationQueueMBS

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the operation queue associated with the main thread.

**Notes:**

The returned queue executes operations serially on the main thread. The main thread's run loop controls the execution times of these operations.

Available in Mac OS X v10.6 and later.

### 8.2.11 operation(index as UInt32) as NSOperationMBS

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns a noperations currently in the queue at the given index.

**Notes:**

You can use this method to access the operations queued at any given moment. Operations remain queued until they finish their task. Therefore, the returned array may contain operations that are either executing or waiting to be executed.

Available in Mac OS X v10.5 and later.

### 8.2.12 operationCount as Integer

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the number of operations currently in the queue.

**Notes:**

The value returned by this method reflects the instantaneous number of objects in the queue and changes as operations are completed. As a result, by the time you use the returned value, the actual number of operations may be different. You should therefore use this value only for approximate guidance and should not rely on it for object enumerations or other precise calculations.

Available in Mac OS X v10.6 and later.

### 8.2.13 operations as NSOperationMBS()

Plugin Version: 8.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The operations currently in the queue.

### 8.2.14 waitUntilAllOperationsAreFinished

Plugin Version: 8.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Blocks the current thread until all of the receiver's queued and executing operations finish executing.

**Notes:** When called, this method blocks the current thread and waits for the receiver's current and pending operations to finish executing. While the thread is blocked, the receiver continues to launch already queued operations and monitor those that are executing. During this time, the current thread cannot add operations to the queue, but other threads may. Once all of the pending operations are finished, this method returns.

### 8.2.15 Properties

### 8.2.16 Handle as Integer

Plugin Version: 8.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The handle to the internal used NSOperationQueue reference.

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

### 8.2.17 isSuspended as boolean

Plugin Version: 8.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A Boolean value indicating whether the receiver is scheduling queued operations for execution.

**Notes:**

True if operations are being scheduled for execution; otherwise, false.

(Read and Write computed property)

### 8.2.18 maxConcurrentOperationCount as Integer

Plugin Version: 8.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The maximum number of concurrent operations that the queue can execute.

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

### 8.2.19 name as string

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The name of this queue.

**Notes:**

The default value of this string is "NSOperationQueue <id>", where <id> is the memory address of the operation queue. If you want to know when a queue's name changes, configure a KVO observer to observe the name key path of the operation queue.

Available in Mac OS X v10.6 and later.

(Read and Write computed property)

### 8.2.20 Constants

#### 8.2.21 NSOperationQueueDefaultMaxConcurrentOperationCount=-1

Plugin Version: 8.0. **Function:** One of the constants to be used with the maxConcurrentOperationCount property.

**Notes:** The default maximum number of operations is determined dynamically by the NSOperationQueue object based on current system conditions.



# Chapter 9

## CoreAnimation

### 9.1 class CALayerMBS

#### 9.1.1 class CALayerMBS

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The plugin class for a CoreAnimation.

**Notes:**

The CALayer class manages image-based content and allows you to perform animations on that content. Layers are often used to provide the backing store for views but can also be used without a view to display content. A layer's main job is to manage the visual content that you provide but the layer itself has visual attributes that can be set, such as a background color, border, and shadow. In addition to managing visual content, the layer also maintains information about the geometry of its content (such as its position, size, and transform) that is used to present that content onscreen. Modifying the properties of the layer is how you initiate animations on the layer's content or geometry. A layer object encapsulates the duration and pacing of a layer and its animations by adopting the CAMediaTiming protocol, which defines the layer's timing information.

If the layer object was created by a view, the view typically assigns itself as the layer's delegate automatically, and you should not change that relationship. For layers you create yourself, you can assign a delegate object and use that object to provide the contents of the layer dynamically and perform other tasks. A layer may also have a layout manager object (assigned to the layoutManager property) to manage the layout of subviews separately.

Available in OS X v10.5 and later.

## 9.1.2 Methods

### 9.1.3 `addSublayer(layer as CALayerMBS)`

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Appends the layer to the layer's list of sublayers.

**Notes:** If the array in the sublayers property is nil, calling this method creates an array for that property and adds the specified layer to it.

### 9.1.4 `available as boolean`

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns true if CALayer is available.

**Notes:** True on Mac and False on Windows/Linux.

### 9.1.5 Constructor

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Initializes the layer.

**Notes:** Available in OS X v10.5 and later.

### 9.1.6 `display`

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Reloads the content of this layer.

**Notes:**

Do not call this method directly. The layer calls this method at appropriate times to update the layer's content. If the layer has a delegate object, this method attempts to call the delegate's `Configuring the Layer's Rendering Behavior` method, which the delegate can use to update the layer's contents. If the delegate does not implement the `Configuring the Layer's Rendering Behavior` method, this method creates a backing store and calls the layer's `drawInContext:` method to fill that backing store with content. The new backing store replaces the previous contents of the layer.

Subclasses can override this method and use it to set the layer's contents property directly. You might do this if your custom layer subclass handles layer updates differently.

### 9.1.7 displayIfNeeded

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Initiates the update process for a layer if it is currently marked as needing an update.

**Notes:**

You can call this method as needed to force an update to your layer's contents outside of the normal update cycle. Doing so is generally not needed, though. The preferred way to update a layer is to call `setNeedsDisplay` and let the system update the layer during the next cycle.

Available in OS X v10.6 and later.

### 9.1.8 layer as CALayerMBS

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates and returns an instance of the layer object.

**Notes:**

Returns the initialized layer object or nil if initialization was not successful.

If you subclass `CALayer`, you may override this method and use it to provide an instance of your specific subclass.

### 9.1.9 layoutIfNeeded

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Recalculate the receiver's layout, if required.

**Notes:** When this message is received, the layer's super layers are traversed until an ancestor layer is found that does not require layout. Then layout is performed on the entire layer-tree beneath that ancestor.

### 9.1.10 layoutSublayers

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Tells the layer to update its layout.

**Notes:**

Subclasses can override this method and use it to implement their own layout algorithm. Your implementation must set the frame of each sublayer managed by the receiver.

The default implementation of this method calls the `layoutSublayersOfLayer` method of the layer's delegate object. If there is no delegate object, or the delegate does not implement that method, this method calls the `layoutSublayersOfLayer` method of the object in the `layoutManager` property.

### 9.1.11 `removeAllAnimations`

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Remove all animations attached to the layer.

### 9.1.12 `removeFromSuperlayer`

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Detaches the layer from its parent layer.

**Notes:**

You can use this method to remove a layer (and all of its sublayers) from a layer hierarchy. This method updates both the superlayer's list of sublayers and sets this layer's superlayer property to nil. Available in OS X v10.5 and later.

### 9.1.13 `renderInContext(CGContextHandle as Integer) as boolean`

Plugin Version: 16.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Renders content of CALayer into given CGContext.

**Notes:**

Renders the receiver and its sublayers into the specified context.

This method renders directly from the layer tree, ignoring any animations added to the render tree. Renders in the coordinate space of the layer.

Returns true if plugin called render command, so layer can draw itself.

Not all layers support drawing into context.

### 9.1.14 `renderInPicture(Pic as Picture) as boolean`

Plugin Version: 16.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Renders content of CALayer into given Picture.

**Notes:**

Renders the receiver and its sublayers into the specified context.

This method renders directly from the layer tree, ignoring any animations added to the render tree. Renders in the coordinate space of the layer.

Returns true if plugin called render command, so layer can draw itself.

Not all layers support drawing into context.

### 9.1.15 setNeedsDisplay

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Marks the layer's contents as needing to be updated.

**Notes:**

Calling this method causes the layer to recache its content. This results in the layer potentially calling either the `displayLayer` or `drawLayer:inContext` method of its delegate. The existing content in the layer's contents property is removed to make way for the new content.

Available in OS X v10.5 and later.

### 9.1.16 setNeedsDisplayInRect(r as CGRectMBS)

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Marks the region within the specified rectangle as needing to be updated.

**Notes:**

r: The rectangular region of the layer to mark as invalid. You must specify this rectangle in the layer's own coordinate system.

Available in OS X v10.5 and later.

### 9.1.17 setNeedsLayout

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Invalidates the layer's layout and marks it as needing an update.

**Notes:**

You can call this method to indicate that the layout of a layer's sublayers has changed and must be updated. The system typically calls this method automatically when the layer's bounds change or when sublayers are added or removed. In OS X, if your layer's `layoutManager` property contains an object that implements the `invalidateLayoutOfLayer` method, that method is called too.

During the next update cycle, the system calls the `layoutSublayers` method of any layers requiring layout updates.

Available in OS X v10.5 and later.

### 9.1.18 sublayers as CALayerMBS()

Plugin Version: 14.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The array with sublayers.

### 9.1.19 Properties

#### 9.1.20 `affineTransform` as `CGAffineTransformMBS`

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The affine version of the layer's transform..

**Notes:**

The affine transform structure that corresponds to the value in the layer's transform property.  
(Read and Write property)

#### 9.1.21 `anchorPoint` as `CGRectMBS`

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Defines the anchor point of the layer's bounds rectangle. Animatable.

**Notes:**

You specify the value for this property using the unit coordinate space. The default value of this property is (0.5, 0.5), which represents the center of the layer's bounds rectangle. All geometric manipulations to the view occur about the specified point. For example, applying a rotation transform to a layer with the default anchor point causes the layer to rotate around its center. Changing the anchor point to a different location would cause the layer to rotate around that new point.

For more information about the relationship between the frame, bounds, `anchorPoint` and position properties, see Core Animation Programming Guide.

Available in OS X v10.5 and later.

(Read and Write property)

#### 9.1.22 `anchorPointZ` as `Double`

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The anchor point for the layer's position along the z axis. Animatable.

**Notes:**

This property specifies the anchor point on the z axis around which geometric manipulations occur. The point is expressed as a distance (measured in points) along the z axis. The default value of this property is 0.

Available in OS X v10.6 and later.

(Read and Write property)

### 9.1.23 AutoresizingMask as Integer

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A bitmask defining how the layer is resized when the bounds of its superlayer changes.

**Notes:**

If your app does not use a layout manager or constraints to handle layout changes, you can assign a value to this property to adjust the layer's size in response to changes in the superlayer's bounds. For a list of possible values, see "Autoresizing Mask".

The default value of this property is `kCALayerNotSizable`.

(Read and Write property)

### 9.1.24 backgroundColor as Variant

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The background color of the receiver. Animatable.

**Notes:**

Value must be a `CGColorMBS`.

The default value of this property is `nil`.

The value of this property is retained using the Core Foundation retain/release semantics. This behavior occurs despite the fact that the property declaration appears to use the default assign semantics for object retention.

(Read and Write property)

### 9.1.25 borderColor as Variant

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The color of the layer's border. Animatable.

**Notes:**

Value must be a `CGColorMBS`.

The default value of this property is an opaque black color.

The value of this property is retained using the Core Foundation retain/release semantics. This behavior occurs despite the fact that the property declaration appears to use the default assign semantics for object retention.

(Read and Write property)

### 9.1.26 borderWidth as Double

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The width of the layer's border. Animatable.

**Notes:**

When this value is greater than 0.0, the layer draws a border using the current `borderColor` value. The border is drawn inset from the receiver's bounds by the value specified in this property. It is composited above the receiver's contents and sublayers and includes the effects of the `cornerRadius` property.

The default value of this property is 0.0.

(Read and Write property)

### 9.1.27 bounds as CGRectMBS

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The layer's bounds rectangle. Animatable.

**Notes:**

The bounds rectangle is the origin and size of the layer in its own coordinate space. When you create a new standalone layer, the default value for this property is an empty rectangle, which you must change before using the layer. The values of each coordinate in the rectangle are measured in points.

For more information about the relationship between the frame, bounds, `anchorPoint` and position properties, see Core Animation Programming Guide.

(Read and Write property)

### 9.1.28 className as string

Plugin Version: 14.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The class name of the layer.

**Notes:**

Useful for debugging.

(Read only property)

### 9.1.29 classPath as string

Plugin Version: 14.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The path of this layer class.

**Notes:**

Useful for debugging to know what super classes the layer has.  
(Read only property)

### 9.1.30 contents as Variant

Plugin Version: 15.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The contents of the layer.

**Notes:**

Currently only CGImageMBS is allowed.  
(Read and Write property)

### 9.1.31 contentsCenter as CGRectMBS

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The rectangle that defines how the layer contents are scaled during a resizing operation. Animatable.

**Notes:**

You can use this property to subdivide the layer's content into a 3x3 grid. The value in this property specifies the location and size of the center rectangle in that grid. If the layer's contentsGravity property is set to one of the resizing modes, resizing the layer causes scaling to occur differently in each rectangle of the grid. The center rectangle is stretched in both dimensions, the top-center and bottom-center rectangles are stretched only horizontally, the left-center and right-center rectangles are stretched only vertically, and the four corner rectangles are not stretched at all. Therefore, you can use this technique to implement stretchable backgrounds or images using a three-part or nine-part image.

The value in this property is set to the unit rectangle (0.0,0.0) (1.0,1.0) by default, which causes the entire image to scale in both dimensions. If you specify a rectangle that extends outside the unit rectangle, the result is undefined. The rectangle you specify is applied only after the contentsRect property has been applied to the image.

Note: If the width or height of the rectangle in this property is very small or 0, the value is implicitly changed to the width or height of a single source pixel centered at the specified location.

(Read and Write property)

### 9.1.32 contentsRect as CGRectMBS

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The rectangle, in the unit coordinate space, that defines the portion of the layer's contents that should be used. Animatable.

**Notes:**

Defaults to the unit rectangle (0.0, 0.0, 1.0, 1.0).

If pixels outside the unit rectangle are requested, the edge pixels of the contents image will be extended outwards.

If an empty rectangle is provided, the results are undefined.

(Read and Write property)

### 9.1.33 contentsScale as Double

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The scale factor applied to the layer.

**Notes:**

This value defines the mapping between the logical coordinate space of the layer (measured in points) and the physical coordinate space (measured in pixels). Higher scale factors indicate that each point in the layer is represented by more than one pixel at render time. For example, if the scale factor is 2.0 and the layer's bounds are 50 x 50 points, the size of the bitmap used to present the layer's content is 100 x 100 pixels.

The default value of this property is 1.0. For layers attached to a view, the view changes the scale factor automatically to a value that is appropriate for the current screen. For layers you create and manage yourself, you must set the value of this property yourself based on the resolution of the screen and the content you are providing. Core Animation uses the value you specify as a cue to determine how to render your content.

Available in OS X v10.7 and later.

(Read and Write property)

### 9.1.34 cornerRadius as Double

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The radius to use when drawing rounded corners for the layer's background. Animatable.

**Notes:**

Setting the radius to a value greater than 0.0 causes the layer to begin drawing rounded corners on its background. By default, the corner radius does not apply to the image in the layer's contents property; it applies only to the background color and border of the layer. However, setting the masksToBounds property to true causes the content to be clipped to the rounded corners.

The default value of this property is 0.0.

(Read and Write property)

### 9.1.35 DoubleSided as boolean

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A Boolean indicating whether the layer displays its content when facing away from the viewer. Animatable.

**Notes:**

When the value in this property is false, the layer hides its content when it faces away from the viewer. The default value of this property is true.

Available in OS X v10.5 and later.

(Read and Write property)

### 9.1.36 drawsAsynchronously as boolean

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A Boolean indicating whether drawing commands are deferred and processed asynchronously in a background thread.

**Notes:**

When this property is set to true, the graphics context used to draw the layer's contents queues drawing commands and executes them on a background thread rather than executing them synchronously. Performing these commands asynchronously can improve performance in some apps. However, you should always measure the actual performance benefits before enabling this capability.

The default value for this property is false.

Available in OS X v10.8 and later.

(Read and Write property)

### 9.1.37 frame as CGRectMBS

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The layer's frame rectangle.

**Notes:**

The frame rectangle is position and size of the layer specified in the superlayer's coordinate space. For layers, the frame rectangle is a computed property that is derived from the values in the bounds, anchorPoint and position properties. When you assign a new value to this property, the layer changes its position and bounds properties to match the rectangle you specified. The values of each coordinate in the rectangle are measured in points.

For more information about the relationship between the frame, bounds, anchorPoint and position properties, see Core Animation Programming Guide.

Note: The frame property is not directly animatable. Instead you should animate the appropriate combination of the bounds, anchorPoint and position properties to achieve the desired result.

(Read and Write property)

### 9.1.38 Handle as Integer

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal reference to the layer.

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

### 9.1.39 Hidden as boolean

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A Boolean indicating whether the layer is displayed. Animatable.

**Notes:**

The default value of this property is false.

(Read and Write property)

### 9.1.40 mask as CALayerMBS

Plugin Version: 15.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The layer to be used as mask for this layer.

**Notes:**

A layer whose alpha channel is used as a mask to select between the layer's background and the result of compositing the layer's contents with its filtered background. Defaults to nil. When used as a mask the layer's 'compositingFilter' and 'backgroundFilters' properties are ignored. When setting the mask to a new layer, the new layer must have a nil superlayer, otherwise the behavior is undefined. Nested masks (mask layers with their own masks) are unsupported.

(Read and Write property)

### 9.1.41 masksToBounds as Boolean

Plugin Version: 15.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether to mask by bounds.

**Notes:**

When true an implicit mask matching the layer bounds is applied to the layer (including the effects of the 'cornerRadius' property). If both 'mask' and 'masksToBounds' are non-nil the two masks are multiplied to get the actual mask values. Defaults to false. Animatable.

(Read and Write property)

### 9.1.42 minificationFilterBias as Double

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The bias factor used by the minification filter to determine the levels of detail.

**Notes:**

This value is used by the minificationFilter when it is set to kCAFilterTrilinear.

The default value of this property is 0.0.

Available in OS X v10.6 and later.

(Read and Write property)

### 9.1.43 modelLayer as CALayerMBS

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the model layer object associated with the receiver, if any.

**Notes:**

Calling this method on a layer in the presentation tree returns the corresponding layer object in the model tree. This method returns a value only when a transaction involving changes to the presentation layer is in progress. If no transaction is in progress, the results of calling this method are undefined.

Available in OS X v10.5 and later.

(Read only property)

### 9.1.44 needsDisplay as boolean

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns a Boolean indicating whether the layer has been marked as needing an update.

**Notes:**

True if the layer needs to be updated.

Available in OS X v10.6 and later.

(Read only property)

### 9.1.45 needsDisplayOnBoundsChange as boolean

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A Boolean indicating whether the layer contents must be updated when its bounds rectangle changes.

**Notes:**

When this property is set to true, the layer automatically calls its setNeedsDisplay method whenever its bounds property changes. The default value of this property is false.

(Read and Write property)

### 9.1.46 needsLayout as boolean

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns a Boolean indicating whether the layer has been marked as needing a layout update.

**Notes:**

True if the layer has been marked as requiring a layout update.

Available in OS X v10.6 and later.

(Read only property)

### 9.1.47 opacity as Double

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The opacity of the receiver. Animatable.

**Notes:**

The value of this property must be in the range 0.0 (transparent) to 1.0 (opaque). Values outside that range are clamped to the minimum or maximum. The default value of this property is 1.0.

(Read and Write property)

### 9.1.48 Opaque as boolean

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A Boolean value indicating whether the layer contains completely opaque content.

**Notes:**

The default value of this property is false. If your app draws completely opaque content that fills the layer's bounds, setting this property to true lets the system optimize the rendering behavior for the layer. Specifically, when the layer creates the backing store for your drawing commands, Core Animation omits the alpha channel of that backing store. Doing so can improve the performance of compositing operations. If you set the value of this property to true, you must fill the layer's bounds with opaque content.

Setting this property affects only the backing store managed by Core Animation. If you assign an image with an alpha channel to the layer's contents property, that image retains its alpha channel regardless of the value of this property.

(Read and Write property)

### 9.1.49 position as CGRectMBS

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The layer's position in its superlayer's coordinate space. Animatable.

**Notes:**

The value of this property is specified in points and is always specified relative to the value in the anchorPoint property. For new standalone layers, the default position is set to (0.0, 0.0). Changing the frame property also updates the value in this property.

For more information about the relationship between the frame, bounds, anchorPoint and position properties, see Core Animation Programming Guide.

(Read and Write property)

### 9.1.50 preferredFrameSize as CGSizeMBS

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the preferred size of the layer in the coordinate space of its superlayer.

**Notes:**

In OS X, the default implementation of this method calls the preferredSizeOfLayer method of its layoutManager that is, the object in its layoutManager property. If that object does not exist or does not implement that method, this method returns the size of the layer's current bounds rectangle mapped into the coordinate space of its superlayer.

(Read only property)

### 9.1.51 presentationLayer as CALayerMBS

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns a copy of the presentation layer object that represents the state of the layer as it currently appears onscreen.

**Notes:**

The layer object returned by this method provides a close approximation of the layer that is currently being displayed onscreen. While an animation is in progress, you can retrieve this object and use it to get the current values for those animations.

The sublayers, mask, and superlayer properties of the returned layer return the corresponding objects from the presentation tree (not the model tree). This pattern also applies to any read-only layer methods. For example, the hitTest: method of the returned object queries the layer objects in the presentation tree.

Available in OS X v10.5 and later.

(Read only property)

### 9.1.52 rasterizationScale as Double

Plugin Version: 15.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The scale at which the layer will be rasterized.

**Notes:**

(when the shouldRasterize property has been set to true) relative to the coordinate space of the layer. Defaults to one. Animatable.

(Read and Write property)

### 9.1.53 shadowColor as Variant

Plugin Version: 15.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The color of the layers shadow. Animatable.

**Notes:**

The default value of this property is an opaque black color.

The value of this property is retained using the Core Foundation retain/release semantics. This behavior occurs despite the fact that the property declaration appears to use the default assign semantics for object retention.

Value is a CGColorMBS object.

(Read and Write property)

### 9.1.54 shadowOffset as CGSizeMBS

Plugin Version: 15.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The offset (in points) of the layers shadow. Animatable.

**Notes:**

The default value of this property is (0.0, -3.0).

(Read and Write property)

### 9.1.55 shadowOpacity as Double

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The opacity of the layer's shadow. Animatable.

**Notes:**

The value in this property must be in the range 0.0 (transparent) to 1.0 (opaque). The default value of this property is 0.0.

Available in OS X v10.5 and later.  
(Read and Write property)

### 9.1.56 shadowPath as Variant

Plugin Version: 15.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The shadow path.  
**Notes:**

Value is a CGPathMBS object.

The default value of this property is nil, which causes the layer to use a standard shadow shape. If you specify a value for this property, the layer creates its shadow using the specified path instead of the layers composited alpha channel. The path you provide defines the outline of the shadow. It is filled using the non-zero winding rule and the current shadow color, opacity, and blur radius.

Unlike most animatable properties, this property (as with all CGPathRef animatable properties) does not support implicit animation. However, the path object may be animated using any of the concrete subclasses of CAGradientLayer. Paths will interpolate as a linear blend of the "on-line" points; "off-line" points may be interpolated non-linearly (to preserve continuity of the curve's derivative). If the two paths have a different number of control points or segments, the results are undefined. If the path extends outside the layer bounds it will not automatically be clipped to the layer, only if the normal layer masking rules cause that.

Specifying an explicit path usually improves rendering performance.

The value of this property is retained using the Core Foundation retain/release semantics. This behavior occurs despite the fact that the property declaration appears to use the default assign semantics for object retention.

(Read and Write property)

### 9.1.57 shadowRadius as Double

Plugin Version: 15.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The blur radius (in points) used to render the layers shadow. Animatable.

**Notes:**

You specify the radius The default value of this property is 3.0.

(Read and Write property)

### 9.1.58 `shouldRasterize` as Boolean

Plugin Version: 15.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether view should raster.

**Notes:**

When true, the layer is rendered as a bitmap in its local coordinate space ("rasterized"), then the bitmap is composited into the destination (with the `minificationFilter` and `magnificationFilter` properties of the layer applied if the bitmap needs scaling). Rasterization occurs after the layer's filters and shadow effects are applied, but before the opacity modulation. As an implementation detail the rendering engine may attempt to cache and reuse the bitmap from one frame to the next. (Whether it does or not will have no affect on the rendered output.) When false the layer is composited directly into the destination whenever possible (however, certain features of the compositing model may force rasterization, e.g. adding filters). Defaults to false. Animatable.

(Read and Write property)

### 9.1.59 `superlayer` as `CALayerMBS`

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The superlayer of the layer.

**Notes:**

The superlayer manages the layout of its sublayers.

Available in OS X v10.5 and later.

(Read only property)

### 9.1.60 `zPosition` as Double

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The layer's position on the z axis. Animatable.

**Notes:**

The default value of this property is 0. Changing the value of this property changes the the front-to-back ordering of layers onscreen. This can affect the visibility of layers whose frame rectangles overlap.

The value of this property is measured in points.

Available in OS X v10.5 and later.

(Read and Write property)

### 9.1.61 Constants

#### 9.1.62 `kCALayerBottomEdge = 4`

Plugin Version: 13.1. **Function:** Edge constants for `edgeAntialiasingMask` property.  
**Notes:** Specifies that the bottom edge of the receiver's content should be antialiased.

#### 9.1.63 `kCALayerHeightSizable = 16`

Plugin Version: 13.1. **Function:** One of the constants for the `autoresizingmask` property.  
**Notes:** The receiver's height is flexible.

#### 9.1.64 `kCALayerLeftEdge = 1`

Plugin Version: 13.1. **Function:** Edge constants for `edgeAntialiasingMask` property.  
**Notes:** Specifies that the left edge of the receiver's content should be antialiased.

#### 9.1.65 `kCALayerMaxXMargin = 4`

Plugin Version: 13.1. **Function:** One of the constants for the `autoresizingmask` property.  
**Notes:** The left margin between the receiver and its superview is flexible.

#### 9.1.66 `kCALayerMaxYMargin = 32`

Plugin Version: 13.1. **Function:** One of the constants for the `autoresizingmask` property.  
**Notes:** The top margin between the receiver and its superview is flexible.

#### 9.1.67 `kCALayerMinXMargin = 1`

Plugin Version: 13.1. **Function:** One of the constants for the `autoresizingmask` property.  
**Notes:** The left margin between the receiver and its superview is flexible.

**9.1.68 kCALayerMinYMargin = 8**

Plugin Version: 13.1. **Function:** One of the constants for the `autoresizingmask` property.

**Notes:** The top margin between the receiver and its superview is flexible.

**9.1.69 kCALayerNotSizable = 0**

Plugin Version: 13.1. **Function:** One of the constants for the `autoresizingmask` property.

**Notes:** The receiver cannot be resized.

**9.1.70 kCALayerRightEdge = 2**

Plugin Version: 13.1. **Function:** Edge constants for `edgeAntialiasingMask` property.

**Notes:** Specifies that the right edge of the receiver's content should be antialiased.

**9.1.71 kCALayerTopEdge = 8**

Plugin Version: 13.1. **Function:** Edge constants for `edgeAntialiasingMask` property.

**Notes:** Specifies that the top edge of the receiver's content should be antialiased.

**9.1.72 kCALayerWidthSizable = 2**

Plugin Version: 13.1. **Function:** One of the constants for the `autoresizingmask` property.

**Notes:** The receiver's width is flexible.

## 9.2 class CATransactionMBS

### 9.2.1 class CATransactionMBS

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The plugin class for a CoreAnimation transaction.

**Notes:**

CATransaction is the Core Animation mechanism for batching multiple layer-tree operations into atomic updates to the render tree. Every modification to a layer tree must be part of a transaction. Nested transactions are supported.

Core Animation supports two types of transactions: implicit transactions and explicit transactions. Implicit transactions are created automatically when the layer tree is modified by a thread without an active transaction and are committed automatically when the thread's run-loop next iterates. Explicit transactions occur when the the application sends the CATransaction class a begin message before modifying the layer tree, and a commit message afterwards.

CATransaction allows you to override default animation properties that are set for animatable properties. You can customize duration, timing function, whether changes to properties trigger animations, and provide a handler that informs you when all animations from the transaction group are completed.

During a transaction you can temporarily acquire a recursive spin-lock for managing property atomicity. This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

### 9.2.2 Methods

### 9.2.3 animationDuration as Double

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the animation duration used by all animations within this transaction group.

### 9.2.4 available as boolean

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns true if transaction class is available.

**Notes:** Returns true on Mac and false on Linux/Windows.

### 9.2.5 begin

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Begin a new transaction for the current thread.

**Notes:**

The transaction is nested within the thread's current transaction, if there is one.  
Available in OS X v10.5 and later.

### 9.2.6 commit

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Commit all changes made during the current transaction.

**Notes:**

Raises an exception if no current transaction exists.  
Available in OS X v10.5 and later.

### 9.2.7 Constructor

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

### 9.2.8 flush

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Flushes any extant implicit transaction.

**Notes:**

Delays the commit until any nested explicit transactions have completed.

Flush is typically called automatically at the end of the current runloop, regardless of the runloop mode. If your application does not have a runloop, you must call this method explicitly.

However, you should attempt to avoid calling flush explicitly. By allowing flush to execute during the runloop your application will achieve better performance, atomic screen updates will be preserved, and transactions and animations that work from transaction to transaction will continue to function.

Available in OS X v10.5 and later.

### 9.2.9 kCATransactionAnimationDuration as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the keys for values of a transaction.

**Notes:**

Duration, in seconds, for animations triggered within the transaction group. The value for this key must be a number.

Available in OS X v10.5 and later.

### 9.2.10 kCATransactionDisableActions as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the keys for values of a transaction.

**Notes:**

If true, implicit actions for property changes made within the transaction group are suppressed. The value for this key must be a boolean.

Available in OS X v10.5 and later.

### 9.2.11 setAnimationDuration(value as Double)

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Sets the animation duration used by all animations within this transaction group.

**Notes:** Available in OS X v10.6 and later.

### 9.2.12 setValue(value as Variant, key as string)

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Sets the arbitrary keyed-data for the specified key.

**Notes:**

value: The value for the key identified by key.

key: The name of one of the receiver's properties.

Nested transactions have nested data scope; setting a key always sets it in the innermost scope.

Available in OS X v10.5 and later.

### 9.2.13 valueForKey(key as string) as Variant

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the arbitrary keyed-data specified by the given key.

**Notes:**

key: The name of one of the receiver's properties.

Returns the value for the data specified by the key.

Nested transactions have nested data scope. Requesting a value for a key first searches the innermost scope, then the enclosing transactions.

Available in OS X v10.5 and later.

### 9.2.14 Properties

### 9.2.15 Handle as Integer

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal transaction handle.

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

# Chapter 10

## CoreGraphics

### 10.1 module CGWindowMBS

#### 10.1.1 module CGWindowMBS

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This module contains CoreGraphics functions related to windows.

**Example:**

```
// screenshot of all windows on screens  
Backdrop = CGWindowMBS.CreateWindowListImage(0, 0, 0, 0, 0, 0, 0)
```

#### 10.1.2 Methods

#### 10.1.3 CreateWindowList(windowOption as Integer, WindowID as Integer = 0) as UInt32()

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the list of window IDs associated with the specified windows in the current user session.

**Example:**

```
dim a(-1) as UInt32 = CGWindowMBS.CreateWindowList(0,0)
```

```
MsgBox str(UBound(a)+1) + " windows"
```

**Notes:**

`windowOption`: The options describing which window IDs to return. Typical options let you obtain IDs for all windows or for windows above or below the window specified in the `relativeToWindow` parameter.

`WindowID`: The ID of the window to use as a reference point when determining which other windows to return. For options that do not require a reference window, this parameter can be `kCGNullWindowID`.

Returns an array of `CGWindowID` values corresponding to the desired windows. If there are no windows matching the desired criteria, the function returns an empty array. If you call this function from outside of a GUI security session or when no window server is running, this function returns `nil`.

Available in Mac OS X v10.5 and later.

#### 10.1.4 `CreateWindowListCGImage(left as Double, top as Double, width as Double, height as Double, windowOption as Integer, WindowID as Integer = 0, ImageOption as Integer = 0) as Variant`

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Takes a screenshot from a list of windows.

**Notes:** Same as `CreateWindowListImage`, but returns a `CGImageMBS`. Declared as `Variant` to reduce plugin interdependencies.

#### 10.1.5 `CreateWindowListImage(left as Double, top as Double, width as Double, height as Double, windowOption as Integer, WindowID as Integer = 0, ImageOption as Integer = 0) as picture`

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Takes a screenshot from a list of windows.

**Example:**

```
dim p as Picture
```

```
// Screenshot of everything:
```

```
p = CGWindowMBS.CreateWindowListImage(0, 0, 0, 0, CGWindowMBS.kCGWindowListOptionAll,0,
CGWindowMBS.kCGWindowImageDefault)
```

```
// Screenshot of everything behind a window:
```

```
p = CGWindowMBS.CreateWindowListImage(0, 0, 0, 0, CGWindowMBS.kCGWindowListOptionOnScreen-
BelowWindow, CGWindowMBS.GetWindowID(window1), CGWindowMBS.kCGWindowImageDefault)
```

```
// Screenshot of everything in front of a window (dock and menubar):
```

```
p = CGWindowMBS.CreateWindowListImage(0, 0, 0, 0, CGWindowMBS.kCGWindowListOptionOnScreen-
AboveWindow, CGWindowMBS.GetWindowID(window1), CGWindowMBS.kCGWindowImageDefault)
```

```

// screenshot of a window
p = CGWindowMBS.CreateWindowListImage(0, 0, 0, 0, CGWindowMBS.kCGWindowListOptionIncludingWindow, CGWindowMBS.GetWindowID(window1), CGWindowMBS.kCGWindowImageDefault)

// only shadow of a window (will be in the mask)
p = CGWindowMBS.CreateWindowListImage(0, 0, 0, 0, CGWindowMBS.kCGWindowListOptionIncludingWindow, CGWindowMBS.GetWindowID(window1), CGWindowMBS.kCGWindowImageOnlyShadows)

// desktop decoration is white
p = CGWindowMBS.CreateWindowListImage(0, 0, 0, 0, CGWindowMBS.kCGWindowListExcludeDesktopElements, CGWindowMBS.GetWindowID(window1), CGWindowMBS.kCGWindowImageShouldBeOpaque)

```

**Notes:**

Parameters:

left	Left coordinate rectangle
top	Top coordinate rectangle
width	Width of rectangle
height	Height of rectangle
windowOption	A combination of kCGWindowListOption* flags
WindowID	The window ID or 0.
ImageOption	A combination of kCGWindowImage* flags

If you pass a rectangle with all values zero, you select the whole screen.  
Returns the screenshot as picture or nil on any error.

## Window Options:

kCGWindowListOptionAll	0	List all windows in this user session, including both on and off-screen windows. relativeToWindow should be kCGNullWindowID=0.
kCGWindowListOptionOnScreenOnly	1	List all on-screen windows in this user session, ordered from front to back. relativeToWindow should be kCGNullWindowID=0.
kCGWindowListOptionOnScreenAboveWindow	2	List all on-screen windows above the specified window ordered from front to back. relativeToWindow should be the window number.
kCGWindowListOptionOnScreenBelowWindow	4	List all on-screen windows below the specified window ordered from front to back. relativeToWindow should be the window number.
kCGWindowListOptionIncludingWindow	8	Include the named window in any list, effectively creating 'at-or-above' or 'at-or-below' lists. relativeToWindow should be the window number.
kCGWindowListExcludeDesktopElements	16	Exclude any windows from the list that are elements of the desktop, including the background picture and icons on the desktop.

## Image Options:

kCGWindowImageDefault	0	Default behavior: If a rect of CGRectNull is used bounds computation includes the framing effects, such as a shadow.
kCGWindowImageBoundsIgnoreFraming	1	If a rect of CGRectNull is used, ignore framing effects for bounds computation
kCGWindowImageShouldBeOpaque	2	The captured image should be opaque. Empty areas are white
kCGWindowImageOnlyShadows	4	Capture only shadows.

### 10.1.6 GetWindowID(w as window) as Integer

Plugin Version: 11.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Queries the CoreGraphics Window ID for the given window.

**Notes:**

Returns 0 on any error.

This ID can be used for CreateWindowListImage.

### 10.1.7 GetWindowListInfo(windowOption as Integer, WindowID as Integer = 0) as dictionary()

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Generates and returns information about the selected windows in the current user session.

**Example:**

```
dim a(-1) as Dictionary = CGWindowMBS.GetWindowListInfo(0,0)

dim u as Integer = UBound(a)
if u > 10 then u = 10 // show only 10 times

dim lines(-1) as string
for i as Integer = 0 to u
dim d as Dictionary = a(i)

lines.Append d.Value(CGWindowMBS.kCGWindowName)+" of "+d.Value(CGWindowMBS.kCGWindowOwnerName)

next

// shows 11 windows with names. Not all windows have names.
MsgBox Join(lines, EndOfLine)
```

**Notes:**

option: The options describing which window dictionaries to return. Typical options let you return dictionaries for all windows or for windows above or below the window specified in the relativeToWindow parameter. For more information, see "Window List Option Constants."

WindowID: The ID of the window to use as a reference point when determining which other window dictionaries to return. For options that do not require a reference window, this parameter can be 0.

Returns an array of CFDictionaryRef types, each of which contains information about one of the windows in the current user session. If there are no windows matching the desired criteria, the function returns an empty array. If you call this function from outside of a GUI security session or when no window server is running, this function returns nil.

You can use this function to get detailed information about the configuration of one or more windows in the current user session. For example, you can use this function to get the bounds of the window, its window ID, and information about how it is managed by the window server. For the list of keys and values that may be present in the dictionary, see kCGWindow\* constants.

Generating the dictionaries for system windows is a relatively expensive operation. As always, you should profile your code and adjust your usage of this function appropriately for your needs.

Available in Mac OS X v10.5 and later.

### 10.1.8 Constants

#### 10.1.9 kCGBackingStoreBuffered = 2

Plugin Version: 11.2. **Function:** One of the backing store constants.

#### 10.1.10 kCGBackingStoreNonretained = 1

Plugin Version: 11.2. **Function:** One of the backing store constants.

#### 10.1.11 kCGBackingStoreRetained = 0

Plugin Version: 11.2. **Function:** One of the backing store constants.

#### 10.1.12 kCGNullWindowID = 0

Plugin Version: 11.2. **Function:** The number for an invalid window ID.

**10.1.13 kCGWindowAlpha = "kCGWindowAlpha"**

Plugin Version: 11.2. **Function:** One of the possible keys in the window info dictionary.

**Notes:** The alpha fade of the window. The value of this key is a floating-point value. The value 1.0 is normal (opaque); the value 0.0 is fully transparent (invisible).

**10.1.14 kCGWindowBackingLocationVideoMemory = "kCGWindowBackingLocationVideoMemory"**

Plugin Version: 11.2. **Function:** One of the possible keys in the window info dictionary.

**Notes:** Optional. If present, true if the window backing store is in video memory, false otherwise. If the key is not present, then the window backing store is in main memory. The value of this key is a Boolean.

**10.1.15 kCGWindowBounds = "kCGWindowBounds"**

Plugin Version: 11.2. **Function:** One of the possible keys in the window info dictionary.

**Example:**

```
dim a(-1) as Dictionary = CGWindowMBS.GetWindowListInfo(CGWindowMBS.kCGWindowListOptionOn-
ScreenOnly,0)
```

```
//cycle thru window names and get window size
```

```
for each d as Dictionary in a
dim windowname as string = d.Lookup(CGWindowMBS.kCGWindowName, "")
if Instr(1,windowname,"Play") >0 then
dim bounds as Dictionary = d.Lookup(CGWindowMBS.kCGWindowBounds,nil)
```

```
dim x as Integer = bounds.Lookup("X", 0)
dim y as Integer = bounds.Lookup("Y", 0)
dim w as Integer = bounds.Lookup("Width", 0)
dim h as Integer = bounds.Lookup("Height", 0)
```

```
MsgBox "Found window at "+str(x)+" / "+str(y)+" with size "+str(w)+" / "+str(h)
end if
next
```

**Notes:** The bounds of the window in screen space, with the origin at the upper-left corner of the main display. The value of this key is a Dictionary.

**10.1.16 kCGWindowImageBoundsIgnoreFraming = 1**

Plugin Version: 11.2. **Function:** One of the image options constants.

**Notes:** If null rect is passed as the screen bounds, then then bounds computation excludes window frame ornamentation, such as a shadow.

**10.1.17 kCGWindowImageDefault = 0**

Plugin Version: 11.2. **Function:** One of the image options constants.

**Notes:** If null rectangle is passed as the screen bounds, then then bounds computation includes window frame ornamentation, such as a shadow.

**10.1.18 kCGWindowImageOnlyShadows = 4**

Plugin Version: 11.2. **Function:** One of the image options constants.

**Notes:** Only draw the windows' shadows, not the windows themselves.

**10.1.19 kCGWindowImageShouldBeOpaque = 2**

Plugin Version: 11.2. **Function:** One of the image options constants.

**Notes:** Force the created image to be opaque. Empty areas are white.

**10.1.20 kCGWindowIsOnscreen = "kCGWindowIsOnscreen"**

Plugin Version: 11.2. **Function:** One of the possible keys in the window info dictionary.

**Notes:** Optional. If present, true if the window is ordered on screen, false otherwise. If the key is not present, then the window is not ordered on screen. The value of this key is a boolean.

**10.1.21 kCGWindowLayer = "kCGWindowLayer"**

Plugin Version: 11.2. **Function:** One of the possible keys in the window info dictionary.

**Notes:** The window layer number of the window. The value of this key is a 32-bit signed integer value.

### 10.1.22 `kCGWindowListExcludeDesktopElements = 16`

Plugin Version: 11.2. **Function:** One of the window list option constants.

**Notes:** Exclude any windows from the list that are elements of the desktop.

### 10.1.23 `kCGWindowListOptionAll = 0`

Plugin Version: 11.2. **Function:** One of the window list option constants.

**Notes:** List all windows in this user session, including both on- and off-screen windows. The parameter WindowID should be `kCGNullWindowID`.

### 10.1.24 `kCGWindowListOptionIncludingWindow = 8`

Plugin Version: 11.2. **Function:** One of the window list option constants.

**Notes:** Include the window specified by WindowID in any list, effectively creating 'at-or-above' or 'at-or-below' lists.

### 10.1.25 `kCGWindowListOptionOnScreenAboveWindow = 2`

Plugin Version: 11.2. **Function:** One of the window list option constants.

**Notes:** List all on-screen windows above the window specified by WindowID, ordered from front to back.

### 10.1.26 `kCGWindowListOptionOnScreenBelowWindow = 4`

Plugin Version: 11.2. **Function:** One of the window list option constants.

**Notes:** List all on-screen windows below the window specified by WindowID, ordered from front to back.

### 10.1.27 `kCGWindowListOptionOnScreenOnly = 1`

Plugin Version: 11.2. **Function:** One of the window list option constants.

**Notes:** List all on-screen windows in this user session, ordered from front to back. The parameter WindowID should be `kCGNullWindowID`.

**10.1.28 kCGWindowMemoryUsage = "kCGWindowMemoryUsage"**

Plugin Version: 11.2. **Function:** One of the possible keys in the window info dictionary.

**Notes:** An estimate of the memory in bytes currently used by the window and its supporting data structures. The value of this key is a 64-bit signed integer value.

**10.1.29 kCGWindowName = "kCGWindowName"**

Plugin Version: 11.2. **Function:** One of the possible keys in the window info dictionary.

**Example:**

```
// find window with containing "Play" in name.
dim a(-1) as Dictionary = CGWindowMBS.GetWindowListInfo(CGWindowMBS.kCGWindowListOptionOn-
ScreenOnly, 0)

for each d as Dictionary in a
dim windowname as string = d.Lookup(CGWindowMBS.kCGWindowName, "")
if Instr(1,windowname,"Play") >0 then
msgBox "I found it and the ID is "+d.Lookup(CGWindowMBS.kCGWindowNumber, "")
end if
next
```

**Notes:** Optional. If present, the name of the window. The value of this key is a string.

**10.1.30 kCGWindowNumber = "kCGWindowNumber"**

Plugin Version: 11.2. **Function:** One of the possible keys in the window info dictionary.

**Example:**

```
// find window with containing "Play" in name.
dim a(-1) as Dictionary = CGWindowMBS.GetWindowListInfo(CGWindowMBS.kCGWindowListOptionOn-
ScreenOnly, 0)

for each d as Dictionary in a
dim windowname as string = d.Lookup(CGWindowMBS.kCGWindowName, "")
if Instr(1,windowname,"Play") >0 then
msgBox "I found it and the ID is "+d.Lookup(CGWindowMBS.kCGWindowNumber, "")
end if
next
```

**Notes:** The window ID, a unique value within the user session representing the window. The value of this

key is a 32-bit signed integer value.

### 10.1.31 `kCGWindowOwnerName = "kCGWindowOwnerName"`

Plugin Version: 11.2. **Function:** One of the possible keys in the window info dictionary.

**Notes:** Optional. If present, the name of the application process which owns the window. The value of this key is a string.

### 10.1.32 `kCGWindowOwnerPID = "kCGWindowOwnerPID"`

Plugin Version: 11.2. **Function:** One of the possible keys in the window info dictionary.

**Notes:** The process ID of the process that owns the window. The value of this key is a 32-bit signed integer value.

### 10.1.33 `kCGWindowSharingNone = 0`

Plugin Version: 11.2. **Function:** One of the sharing state constants.

**Notes:** No sharing.

### 10.1.34 `kCGWindowSharingReadOnly = 1`

Plugin Version: 11.2. **Function:** One of the sharing state constants.

**Notes:** Read only.

### 10.1.35 `kCGWindowSharingReadWrite = 2`

Plugin Version: 11.2. **Function:** One of the sharing state constants.

**Notes:** Read and Write

### 10.1.36 `kCGWindowSharingState = "kCGWindowSharingState"`

Plugin Version: 11.2. **Function:** One of the possible keys in the window info dictionary.

**Notes:** The sharing state of the window, one of `kCGWindowSharingNone`, `kCGWindowSharingReadOnly`, or `kCGWindowSharingReadWrite`. The value of this key is a 32-bit signed integer value.

### 10.1.37 kCGWindowStoreType = "kCGWindowStoreType"

Plugin Version: 11.2. **Function:** One of the possible keys in the window info dictionary.

**Notes:** The backing store type of the window, one of kCGBackingStoreRetained, kCGBackingStoreNonretained, or kCGBackingStoreBuffered. The value of this key is a 32-bit signed integer value.

### 10.1.38 kCGWindowWorkspace = "kCGWindowWorkspace"

Plugin Version: 11.2. **Function:** One of the possible keys in the window info dictionary.

**Notes:** Optional. If present, the workspace ID of the workspace associated with the window. The value of this key is a 32-bit signed integer value.



# Chapter 11

## Files

### 11.1 class Folderitem

#### 11.1.1 class Folderitem

Console & Web: Yes, Mac: Yes, Win: Yes, Linux: Yes. **Function:** One of Realbasic's base classes.  
**Notes:** Handles access to files.

#### 11.1.2 Methods

#### 11.1.3 BackupIsItemExcludedMBS(byref excludeByPath as boolean) as boolean

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Report whether or not an item is being excluded from backup.

**Notes:**

excludeByPath: pass a boolean variable to determine whether or not the given item is excluded as an absolute path or whether it is sticky to the item.

Returns true if the item or any of its ancestors are excluded from backup, false otherwise.

Require Mac OS X 10.5.

### 11.1.4 BackupSetItemExcludedMBS(exclude as boolean, excludeByPath as boolean) as Integer

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Add or remove an item from the list of items excluded from backup.

**Notes:**

When backing up, the backup daemon skips items marked by this call. If a folder is marked for exclusion, it and its contents are excluded from backup. When specifying by path, it is OK to pass a URL of an item/folder that does not exist yet.

Returns the error code. -1 is the error code in case the function is not available.  
Require Mac OS X 10.5.

### 11.1.5 QuickLookMBS(MaxWidth as Integer = 500, MaxHeight as Integer = 500, IconMode as Boolean = false, ScaleFactor as Double = 1.0) as picture

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a thumbnail for the designated file.

**Example:**

```
dim f as FolderItem
```

```
f=SpecialFolder.Desktop.Child("test.jpg")
```

```
// shows the icon in 128x128 scaled by factor 4:
Backdrop=f.QuickLookMBS(128,128,true,4)
```

```
// shows the icon in default size:
Backdrop=f.QuickLookMBS(128,128,true,0)
```

```
// shows preview of image in 128x128 pixels.
Backdrop=f.QuickLookMBS(128,128,false,0)
```

```
// shows preview of image in 512x512 pixels.
Backdrop=f.QuickLookMBS(128,128,false,4)
```

```
// shows preview of image in 512x512 pixels.
Backdrop=f.QuickLookMBS(512,512,false,0)
```

```
// use Icon function in case no preview is available:
Backdrop=f.iconmbs(512)
```

**Notes:**

Returns nil if Quick Look does not support this file type. In that case you may use `folderitem.Icon()` with the given size.

`MaxWidth` and `MacHeight` specify the maximum desired size.

If `ScaleFactor` is bigger than zero, it is used. Else the default value is used.

If `IconMode` is true, QL will produce an icon (ie a thumbnail and all the icon decor, like shadows, curled corner, etc.).

If you look for a control to show quicklook preview like the finder, please check the `QLPreviewPanelMBS` window and the `QLPreviewViewMBS` control.

QuickLook does not provide images for items in special folders like temporary folders.

### 11.1.6 QuickLookMTMBS(`MaxWidth` as Integer = 500, `MaxHeight` as Integer = 500, `IconMode` as Boolean = false, `ScaleFactor` as Double = 1.0) as picture

Plugin Version: 13.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a thumbnail for the designated file.

**Notes:**

Same as `QuickLookMBS`, but thread friendly.

Must be called inside a Xojo (Real Studio) thread so time yields to main thread and you can keep the GUI running.

QuickLook does not provide images for items in special folders like temporary folders.

### 11.1.7 Properties

### 11.1.8 BackupItemExcludedMBS as boolean

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether or not an item is being excluded from backup.

**Notes:**

This is the easy method to just query whether a file is marked as being excluded from backup. You can assign a boolean value to exclude (true) or include (false) the file.

Require Mac OS X 10.5. Returns false on all other operation systems.  
(Read and Write computed property)

### 11.1.9 MacQuarantinePropertiesMBS as MacQuarantinePropertiesMBS

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Gets or sets the quarantine options for a file.

**Example:**

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.app")

// read value
dim q as MacQuarantinePropertiesMBS = f.MacQuarantinePropertiesMBS
MsgBox q.AgentName

// set value
q = new MacQuarantinePropertiesMBS

q.AgentBundleIdentifier = "test.test"
q.AgentName = "testing app"
q.DataURL="http://www.monkeybreadsoftware.de/test.dmg"
q.OriginURL="http://www.monkeybreadsoftware.de/"
q.Type=q.kTypeWebDownload

f.MacQuarantinePropertiesMBS = q

// clear
f.MacQuarantinePropertiesMBS = nil
```

**Notes:**

Requires Mac OS X 10.5.  
(Read and Write computed property)

## 11.2 class MacQuarantinePropertiesMBS

### 11.2.1 class MacQuarantinePropertiesMBS

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The class for quarantine options.

**Example:**

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.app")

// read value
dim q as MacQuarantinePropertiesMBS = f.MacQuarantinePropertiesMBS
MsgBox q.AgentName

// set value
q = new MacQuarantinePropertiesMBS

q.AgentBundleIdentifier = "test.test"
q.AgentName = "testing app"
q.DataURL="http://www.monkeybreadsoftware.de/test.dmg"
q.OriginURL="http://www.monkeybreadsoftware.de/"
q.Type=q.kTypeWebDownload

f.MacQuarantinePropertiesMBS = q

// clear
f.MacQuarantinePropertiesMBS = nil
```

**Notes:** Requires Mac OS X 10.5.

### 11.2.2 Properties

### 11.2.3 AgentBundleIdentifier as String

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The bundle identifier of the quarantining agent, if available.

**Example:**

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.app")
dim q as MacQuarantinePropertiesMBS = f.MacQuarantinePropertiesMBS
MsgBox q.AgentBundleIdentifier
```

**Notes:**

When setting quarantine properties, this value is set automatically if the it is undefined. The automatic value is the main bundle identifier of the current process.

(Read and Write property)

**11.2.4 AgentName as String**

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The name of the quarantining agent (application or program).

**Example:**

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.app")
dim q as MacQuarantinePropertiesMBS = f.MacQuarantinePropertiesMBS
MsgBox q.AgentName
```

**Notes:**

When setting quarantine properties, this value is set automatically to the current process name if this value is not defined.

(Read and Write property)

**11.2.5 DataURL as String**

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The URL from which the data for the quarantined item data was actually streamed or downloaded, if available.

**Notes:**

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.app")
dim q as MacQuarantinePropertiesMBS = f.MacQuarantinePropertiesMBS
MsgBox q.DataURL
(Read and Write property)
```

**11.2.6 Dic as Variant**

Plugin Version: 12.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The original dictionary from Mac OS X.

**Notes:**

This is a CFDictionaryMBS object which we provide for debugging.

You can pass it to CFShowMBS to print on console.

(Read and Write property)

### 11.2.7 OriginURL as String

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The URL of the resource originally hosting the quarantined item, from the user's point of view.

**Example:**

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.app")
dim q as MacQuarantinePropertiesMBS = f.MacQuarantinePropertiesMBS
MsgBox q.OriginURL
```

**Notes:**

For web downloads, this property is the URL of the web page on which the user initiated the download. For attachments, this property is the URL of the resource to which the quarantined item was attached (e.g. the email message, calendar event, etc.). The origin URL may be a file URL for local resources, or a custom URL to which the quarantining application will respond when asked to open it. The quarantining application should respond by displaying the resource to the user. Note: The origin URL should not be set to the data URL, or the quarantining application may start downloading the file again if the user chooses to view the origin URL while resolving a quarantine warning.

(Read and Write property)

### 11.2.8 TimeStamp as Date

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The date and time the item was quarantined.

**Example:**

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.app")
dim q as MacQuarantinePropertiesMBS = f.MacQuarantinePropertiesMBS
MsgBox q.TimeStamp.LongDate+" "+q.TimeStamp.LongTime
```

**Notes:**

When setting quarantine properties, this property is set automatically to the current date and time if this value is not set.

(Read and Write property)

### 11.2.9 Type as String

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A symbolic string identifying the why the item is quarantined, if available.

**Example:**

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.app")
dim q as MacQuarantinePropertiesMBS = f.MacQuarantinePropertiesMBS
MsgBox q.Type
```

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

### 11.2.10 Constants

#### 11.2.11 kTypeCalendarEventAttachment = "LSQuarantineTypeCalendarEventAttachment"

Plugin Version: 9.8. **Function:** One of the type constants.

#### 11.2.12 kTypeEmailAttachment = "LSQuarantineTypeEmailAttachment"

Plugin Version: 9.8. **Function:** One of the type constants.

#### 11.2.13 kTypeInstantMessageAttachment = "LSQuarantineTypeInstantMessageAttachment"

Plugin Version: 9.8. **Function:** One of the type constants.

#### 11.2.14 kTypeOtherAttachment = "LSQuarantineTypeOtherAttachment"

Plugin Version: 9.8. **Function:** One of the type constants.

#### 11.2.15 kTypeOtherDownload = "LSQuarantineTypeOtherDownload"

Plugin Version: 9.8. **Function:** One of the type constants.

**11.2.16 kTypeWebDownload = "LSQuarantineTypeWebDownload"**

Plugin Version: 9.8. **Function:** One of the type constants.



# Chapter 12

## Folder Change Watching

### 12.1 class FSEventsMBS

#### 12.1.1 class FSEventsMBS

Plugin Version: 8.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A class for the Mac OS X 10.5 feature called FSEvents which can be used to monitor a folder hierarchie for changes.

**Notes:**

The text below is from the Apple documentation (With some plugin related modifications). The plugin does currently not support the device related functions, but that can be added later if you need it.

This class provides a mechanism to notify clients about directories they ought to re-scan in order to keep their internal data structures up-to-date with respect to the true state of the file system. (For example, when files or directories are created, modified, or removed.) It sends these notifications "in bulk", possibly notifying the client of changes to several directories in a single callback. By using the API, clients can notice such changes quickly, without needing to resort to recursive polling/scanning of the file system.

Much like kqueues, the FSEvents API allows an application to find near-immediately when the contents of a particular directory has changed. However, unlike kqueues, the FSEvents API allows the application to monitor the whole file system hierarchy rooted at a specified directory (and still get precise per-directory notifications) – to do this with the kqueues API would require the client to monitor each directory individually.

Clients can register interest in a chunk of the filesystem hierarchy and will receive callbacks from their runloop whenever an event occurs that modifies the filesystem therein. The callback will indicate the exact directory in which the event occurred, so the client only has to scan that directory for updated info, not all its children. Clients can supply a "latency" parameter that tells how long to wait after an event occurs before forwarding it; this reduces the volume of events and reduces the chance that the client will see an "intermediate" state, like those that arise when doing a "safe save" of a file, creating a package, or downloading a file via Safari.

The lifecycle of an `FSEventStream` consists of these stages:

1. `new FSEventsMBS(...)` ->Creates an `FSEventStream`.
2. `Start()` ->Starts receiving events and servicing them from the client's runloop(s) using the callback supplied by the client when the stream was created. If a value was supplied for the `sinceWhen` parameter then "historical" events will be sent via your callback first, then a `HistoryDone` event, then "contemporary" events will be sent on an ongoing basis (as though you had supplied `kFSEventStreamEventIdSinceNow` for `sinceWhen`).
3. `Stop()` ->Stops the stream, ensuring the client's callback will not be called again for this stream. After stopping the stream, it can be restarted seamlessly via `Start()` without missing any events.

Once the event stream has been started, the following calls can be used:

`GetLatestEventId()` ->Initially, this returns the `sinceWhen` value supplied when the stream was created; thereafter, it is updated with the highest-numbered event ID mentioned in the current batch of events just before invoking the client's callback. Clients can store this value persistently as long as they also store the UUID for the device (obtained via `CopyUUIDForDevice()`). Clients can then later supply this event ID as the `sinceWhen` parameter to `CreateRelativeToDevice()`, as long as its UUID matches what you stored. This works because the `FSEvents` service stores events in a persistent, per-volume database. In this regard, the stream of event IDs acts like a global, system-wide clock, but bears no relation to any particular timebase.

`FlushAsync()` ->Requests that the `fseventsd` daemon send any events it has already buffered (via the `latency` parameter to one of the constructors). This occurs asynchronously; clients will not have received all the callbacks by the time this call returns to them.

`FlushSync()` ->Requests that the `fseventsd` daemon send any events it has already buffered (via the `latency` parameter to one of the constructors). Then runs the runloop in its private mode till all events that have occurred have been reported (via the clients callback). This occurs synchronously; clients will have received all the callbacks by the time this call returns to them.

`GetDeviceBeingWatched()` ->Gets the `dev_t` value supplied when the stream was created with `CreateRelativeToDevice()`, otherwise 0.

`CopyPathsBeingWatched()` ->Gets the paths supplied when the stream was created with one of the constructors.

Calls that can be made without a stream:

CopyUUIDForDevice() ->Gets a UUID that uniquely identifies the FSEvents database for that volume. If the database gets discarded then its replacement will have a different UUID so that clients will be able to detect this situation and avoid trying to use event IDs that they stored as the sinceWhen parameter to the FSEventStreamCreate...() functions.

GetCurrentEventId() ->Gets the most recently generated event ID, system-wide (not just for one stream).

GetLastEventIdForDeviceBeforeTime() ->Gets the last event ID for the given device that was returned before the given time. This is conservative in the sense that if you then use the returned event ID as the sinceWhen parameter of CreateRelativeToDevice() that you will not miss any events that happened since that time. On the other hand, you might receive some (harmless) extra events.

PurgeEventsForDeviceUpToEventId() ->Purges old events from the persistent per-volume database maintained by the service. You can combine this with GetLastEventIdForDeviceBeforeTime(). Can only be called by the root user.

For Windows, you can use WindowsDirectoryWatcherMBS class.

## 12.1.2 Methods

### 12.1.3 Available as Boolean

Plugin Version: 8.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether the FSEvent functions are working.

**Example:**

```
if FSEventsMBS.Available then
  MsgBox "available"
else
  MsgBox "not available"
end if
```

**Notes:** True on Mac OS X 10.5 and false on other versions and operation systems.

### 12.1.4 Constructor(DeviceToWatch as Integer, path as string, sinceWhen as UInt64, latency as Double, flags as Integer)

Plugin Version: 8.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a new FS event stream object for a particular device with the given parameters.

**Notes:**

In order to start receiving callbacks you must also call `Start()`.

`deviceToWatch`:

A `dev_t` corresponding to the device which you want to receive notifications from. Use `GetDeviceID` to get such a device ID.

`pathsToWatchRelativeToDevice`:

A string, specifying a relative path to a directory on the device identified by the `dev` parameter. The path should be relative to the root of the device. For example, if a volume "MyData" is mounted at "/Volumes/MyData" and you want to watch "/Volumes/MyData/Pictures/July", specify a path string of "Pictures/July". To watch the root of a volume pass a path of "" (the empty string).

`sinceWhen`:

The service will supply events that have happened after the given event ID. To ask for events "since now" pass the constant `kFSEventStreamEventIdSinceNow`. Often, clients will supply the highest-numbered `FSEventStreamEventId` they have received in a callback, which they can obtain via the `GetLatestEventId()` accessor. Do not pass zero for `sinceWhen`, unless you want to receive events for every directory modified since "the beginning of time" – an unlikely scenario.

`latency`:

The number of seconds the service should wait after hearing about an event from the kernel before passing it along to the client via its event. Specifying a larger value may result in more effective temporal coalescing, resulting in fewer callbacks.

`flags`:

Flags that modify the behavior of the stream being created.

On success the `handle` property is not 0.

See also:

- 12.1.5 `Constructor(DeviceToWatch as Integer, paths() as string, sinceWhen as UInt64, latency as Double, flags as Integer)` 205
- 12.1.6 `Constructor(path as folderitem, sinceWhen as UInt64, latency as Double, flags as Integer)` 205
- 12.1.7 `Constructor(path as string, sinceWhen as UInt64, latency as Double, flags as Integer)` 206
- 12.1.8 `Constructor(paths() as folderitem, sinceWhen as UInt64, latency as Double, flags as Integer)` 207
- 12.1.9 `Constructor(paths() as string, sinceWhen as UInt64, latency as Double, flags as Integer)` 207

### 12.1.5 Constructor(DeviceToWatch as Integer, paths() as string, sinceWhen as UInt64, latency as Double, flags as Integer)

Plugin Version: 8.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a new FS event stream object with the given parameters.

**Notes:**

In order to start receiving callbacks you must also call Start.

paths: The folders you want to watch. (more exactly the root folders of the folder hierarchies you want to watch)

sinceWhen: The service will supply events that have happened after the given event ID. To ask for events "since now" pass the constant `kFSEventStreamEventIdSinceNow`. Often, clients will supply the highest-numbered `FSEventStreamEventId` they have received in a callback, which they can obtain via the `GetLatestEventId()` accessor. Do not pass zero for `sinceWhen`, unless you want to receive events for every directory modified since "the beginning of time" – an unlikely scenario.

latency: The number of seconds the service should wait after hearing about an event from the kernel before passing it along to the client via its callback. Specifying a larger value may result in more effective temporal coalescing, resulting in fewer callbacks and greater overall efficiency.

flags: Flags that modify the behavior of the stream being created.

See also:

- 12.1.4 Constructor(DeviceToWatch as Integer, path as string, sinceWhen as UInt64, latency as Double, flags as Integer) 203
- 12.1.6 Constructor(path as folderitem, sinceWhen as UInt64, latency as Double, flags as Integer) 205
- 12.1.7 Constructor(path as string, sinceWhen as UInt64, latency as Double, flags as Integer) 206
- 12.1.8 Constructor(paths() as folderitem, sinceWhen as UInt64, latency as Double, flags as Integer) 207
- 12.1.9 Constructor(paths() as string, sinceWhen as UInt64, latency as Double, flags as Integer) 207

### 12.1.6 Constructor(path as folderitem, sinceWhen as UInt64, latency as Double, flags as Integer)

Plugin Version: 8.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a new FS event stream object with the given parameters.

**Notes:**

In order to start receiving callbacks you must also call Start.

path: The folder you want to watch. (more exactly the root folder of the folder hierarchie you want to watch)

sinceWhen: The service will supply events that have happened after the given event ID. To ask for events

”since now” pass the constant `kFSEventStreamEventIdSinceNow`. Often, clients will supply the highest-numbered `FSEventStreamEventId` they have received in a callback, which they can obtain via the `GetLatestEventId()` accessor. Do not pass zero for `sinceWhen`, unless you want to receive events for every directory modified since ”the beginning of time” – an unlikely scenario.

`latency`: The number of seconds the service should wait after hearing about an event from the kernel before passing it along to the client via its callback. Specifying a larger value may result in more effective temporal coalescing, resulting in fewer callbacks and greater overall efficiency.

`flags`: Flags that modify the behavior of the stream being created.

See also:

- 12.1.4 `Constructor(DeviceToWatch as Integer, path as string, sinceWhen as UInt64, latency as Double, flags as Integer)` 203
- 12.1.5 `Constructor(DeviceToWatch as Integer, paths() as string, sinceWhen as UInt64, latency as Double, flags as Integer)` 205
- 12.1.7 `Constructor(path as string, sinceWhen as UInt64, latency as Double, flags as Integer)` 206
- 12.1.8 `Constructor(paths() as folderitem, sinceWhen as UInt64, latency as Double, flags as Integer)` 207
- 12.1.9 `Constructor(paths() as string, sinceWhen as UInt64, latency as Double, flags as Integer)` 207

### 12.1.7 `Constructor(path as string, sinceWhen as UInt64, latency as Double, flags as Integer)`

Plugin Version: 8.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a new FS event stream object with the given parameters.

**Notes:**

In order to start receiving callbacks you must also call `Start`.

`path`: The folder you want to watch. (more exactly the root folder of the folder hierarchie you want to watch)

`sinceWhen`: The service will supply events that have happened after the given event ID. To ask for events ”since now” pass the constant `kFSEventStreamEventIdSinceNow`. Often, clients will supply the highest-numbered `FSEventStreamEventId` they have received in a callback, which they can obtain via the `GetLatestEventId()` accessor. Do not pass zero for `sinceWhen`, unless you want to receive events for every directory modified since ”the beginning of time” – an unlikely scenario.

`latency`: The number of seconds the service should wait after hearing about an event from the kernel before passing it along to the client via its callback. Specifying a larger value may result in more effective temporal coalescing, resulting in fewer callbacks and greater overall efficiency.

`flags`: Flags that modify the behavior of the stream being created.

See also:

- 12.1.4 `Constructor(DeviceToWatch as Integer, path as string, sinceWhen as UInt64, latency as Double, flags as Integer)` 203

- 12.1.5 Constructor(DeviceToWatch as Integer, paths() as string, sinceWhen as UInt64, latency as Double, flags as Integer) 205
- 12.1.6 Constructor(path as folderitem, sinceWhen as UInt64, latency as Double, flags as Integer) 205
- 12.1.8 Constructor(paths() as folderitem, sinceWhen as UInt64, latency as Double, flags as Integer) 207
- 12.1.9 Constructor(paths() as string, sinceWhen as UInt64, latency as Double, flags as Integer) 207

### 12.1.8 Constructor(paths() as folderitem, sinceWhen as UInt64, latency as Double, flags as Integer)

Plugin Version: 8.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a new FS event stream object with the given parameters.

**Notes:**

In order to start receiving callbacks you must also call Start.

paths: The folders you want to watch. (more exactly the root folders of the folder hierarchies you want to watch)

sinceWhen: The service will supply events that have happened after the given event ID. To ask for events "since now" pass the constant kFSEventStreamEventIdSinceNow. Often, clients will supply the highest-numbered FSEventStreamEventId they have received in a callback, which they can obtain via the GetLatestEventId() accessor. Do not pass zero for sinceWhen, unless you want to receive events for every directory modified since "the beginning of time" – an unlikely scenario.

latency: The number of seconds the service should wait after hearing about an event from the kernel before passing it along to the client via its callback. Specifying a larger value may result in more effective temporal coalescing, resulting in fewer callbacks and greater overall efficiency.

flags: Flags that modify the behavior of the stream being created.

See also:

- 12.1.4 Constructor(DeviceToWatch as Integer, path as string, sinceWhen as UInt64, latency as Double, flags as Integer) 203
- 12.1.5 Constructor(DeviceToWatch as Integer, paths() as string, sinceWhen as UInt64, latency as Double, flags as Integer) 205
- 12.1.6 Constructor(path as folderitem, sinceWhen as UInt64, latency as Double, flags as Integer) 205
- 12.1.7 Constructor(path as string, sinceWhen as UInt64, latency as Double, flags as Integer) 206
- 12.1.9 Constructor(paths() as string, sinceWhen as UInt64, latency as Double, flags as Integer) 207

### 12.1.9 Constructor(paths() as string, sinceWhen as UInt64, latency as Double, flags as Integer)

Plugin Version: 8.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a new FS event stream object for a particular device with the given parameters.

**Notes:**

In order to start receiving callbacks you must also call `Start()`.

**deviceToWatch:**

A `dev_t` corresponding to the device which you want to receive notifications from. Use `GetDeviceID` to get such a device ID.

**pathsToWatchRelativeToDevice:**

An array of strings, each specifying a relative path to a directory on the device identified by the `dev` parameter. The paths should be relative to the root of the device. For example, if a volume "MyData" is mounted at `"/Volumes/MyData"` and you want to watch `"/Volumes/MyData/Pictures/July"`, specify a path string of `"Pictures/July"`. To watch the root of a volume pass a path of `""` (the empty string).

**sinceWhen:**

The service will supply events that have happened after the given event ID. To ask for events "since now" pass the constant `kFSEventStreamEventIdSinceNow`. Often, clients will supply the highest-numbered `FSEventStreamEventId` they have received in a callback, which they can obtain via the `GetLatestEventId()` accessor. Do not pass zero for `sinceWhen`, unless you want to receive events for every directory modified since "the beginning of time" – an unlikely scenario.

**latency:**

The number of seconds the service should wait after hearing about an event from the kernel before passing it along to the client via its event. Specifying a larger value may result in more effective temporal coalescing, resulting in fewer callbacks.

**flags:**

Flags that modify the behavior of the stream being created.

On success the handle property is not 0.

See also:

- 12.1.4 `Constructor(DeviceToWatch as Integer, path as string, sinceWhen as UInt64, latency as Double, flags as Integer)` 203
- 12.1.5 `Constructor(DeviceToWatch as Integer, paths() as string, sinceWhen as UInt64, latency as Double, flags as Integer)` 205
- 12.1.6 `Constructor(path as folderitem, sinceWhen as UInt64, latency as Double, flags as Integer)` 205
- 12.1.7 `Constructor(path as string, sinceWhen as UInt64, latency as Double, flags as Integer)` 206
- 12.1.8 `Constructor(paths() as folderitem, sinceWhen as UInt64, latency as Double, flags as Integer)` 207

### 12.1.10 Description as string

Plugin Version: 8.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns a string containing the description of the stream.

**Notes:** For debugging only.

### 12.1.11 DeviceBeingWatched as Integer

Plugin Version: 8.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Fetches the dev\_t supplied when the stream was created using a Device ID.

**Notes:** Returns 0 if there was an error.

### 12.1.12 ExclusionPaths as String()

Plugin Version: 16.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Queries exclusion paths.

### 12.1.13 FlushAsync as UInt64

Plugin Version: 8.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Flushes all events.

**Notes:**

Asks the FS Events service to flush out any events that have occurred but have not yet been delivered, due to the latency parameter that was supplied when the stream was created. This flushing occurs asynchronously – do not expect the events to have already been delivered by the time this call returns. FlushAsync() can only be called after the stream has been started, via Start().

Returns The largest event id of any event ever queued for this stream, otherwise zero if no events have been queued for this stream.

### 12.1.14 FlushSync

Plugin Version: 8.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Flushes all events.

**Notes:** Asks the FS Events service to flush out any events that have occurred but have not yet been delivered, due to the latency parameter that was supplied when the stream was created. This flushing occurs synchronously – by the time this call returns, your callback will have been invoked for every event that had already occurred at the time you made this call. FlushSync() can only be called after the stream has been started, via Start().

### 12.1.15 GetAbsoluteTime(theDate as date) as Double

Plugin Version: 8.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates an absolute time value based on the system time zone and the values in the date object.

**Example:**

```
dim d as new date
```

```
MsgBox str(FSEventsMBS.GetAbsoluteTime(d))
```

**Notes:** Returns 0 if the date parameter is nil or invalid.

### 12.1.16 GetCurrentEventId as UInt64

Plugin Version: 8.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Fetches the most recently generated event ID, system-wide (not just for one stream).

**Notes:** By the time it is returned to your application even newer events may have already been generated.

### 12.1.17 GetDeviceID(volume as folderitem) as Integer

Plugin Version: 8.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the device ID for the volume the folderitem points to.

**Example:**

```
dim v as FolderItem
```

```
v=volume(0)
```

```
MsgBox str(FSEventsMBS.GetDeviceID(v))
```

**Notes:** Returns 0 on any error.

### 12.1.18 GetLastEventIdForDeviceBeforeTime(DeviceID as Integer, theTime as Double) as UInt64

Plugin Version: 8.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Gets the last event ID for the given device that was returned before the given time.

**Example:**

`dim d as new date`

`MsgBox str(FSEventsMBS.GetLastEventIdForDeviceBeforeTime(1,d.TotalSeconds))`

**Notes:** This is conservative in the sense that if you then use the returned event ID as the `sinceWhen` parameter of the constructor that you will not miss any events that happened since that time. On the other hand, you might receive some (harmless) extra events. Beware: there are things that can cause this to fail to be accurate. For example, someone might change the system's clock (either backwards or forwards). Or an external drive might be used on different systems without perfectly synchronized clocks.

### 12.1.19 GetLatestEventId as UInt64

Plugin Version: 8.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Fetches the `sinceWhen` property of the stream.

**Notes:** Upon receiving an event (and just before invoking the client's callback) this attribute is updated to the highest-numbered event ID mentioned in the event.

### 12.1.20 kFSEventStreamEventIdSinceNow as UInt64

Plugin Version: 16.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A special value to pass in if you mean the event ID for now.

**Notes:** Returns `& hFFFFFFFFFFFFFFFF`.

### 12.1.21 PathsBeingWatched as String()

Plugin Version: 8.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns an array with the paths being watched.

**Notes:** Works only on the RB Versions which support array creation in plugins.

### 12.1.22 PurgeEventsForDeviceUpToEventId(DeviceID as Integer, EventID as UInt64) as boolean

Plugin Version: 8.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Purges old events from the persistent per-volume database maintained by the service.

**Notes:** Can only be called by the root user.

### 12.1.23 SetExclusionPaths(paths() as String) as boolean

Plugin Version: 16.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Sets the exclusion paths.

**Notes:**

Sets directories to be filtered from the EventStream.  
A maximum of 8 directories maybe specified.

Requires OS X 10.9 or newer.  
Returns true on success or false on failure.

### 12.1.24 Show

Plugin Version: 8.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Prints a description of the supplied stream to stderr.

**Notes:** For debugging only.

### 12.1.25 Start as boolean

Plugin Version: 8.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Attempts to register with the FS Events service to receive events per the parameters in the stream.

**Notes:**

Once started, the stream can be stopped via Stop().

Returns true if it succeeds, otherwise False if it fails. It ought to always succeed, but in the event it does not then your code should fall back to performing recursive scans of the directories of interest as appropriate.

### 12.1.26 Stop

Plugin Version: 8.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Unregisters with the FS Events service.

**Notes:** The client callback will not be called for this stream while it is stopped. Stop() can only be called if the stream has been started, via Start(). Once stopped, the stream can be restarted via Start(), at which point it will resume receiving events from where it left off ("sinceWhen").

**12.1.27 UUIDForDevice(DeviceID as Integer) as memoryblock**

Plugin Version: 8.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Gets the UUID associated with a device, or nil if not possible (for example, on read-only device).

**Notes:** A (non-nil) UUID uniquely identifies a given stream of FSEvents. If this (non-nil) UUID is different than one that you stored from a previous run then the event stream is different (for example, because FSEvents were purged, because the disk was erased, or because the event ID counter wrapped around back to zero). A nil return value indicates that "historical" events are not available, i.e., you should not supply a "sinceWhen" value to the constructor other than kFEventStreamEventIdSinceNow.

**12.1.28 Properties****12.1.29 Handle as Integer**

Plugin Version: 8.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal stream handle used.

**Notes:** (Read only property)

**12.1.30 Running as Boolean**

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether this object has been started.

**Notes:**

This is set to true when you call Start and set to false when you call Stop.  
(Read only property)

**12.1.31 Events****12.1.32 Callback(index as Integer, count as Integer, path as string, flags as Integer, eventID as UInt64)**

Plugin Version: 8.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The callback received when something changed.

**Notes:**

The plugin receives count events. This event is called count times with index going from 0 to count-1.

Path is the unix file path for the folder. A path might be "/" if either of these flags is set for the event: kFEventStreamEventFlagUserDropped, kFEventStreamEventFlagKernelDropped.

Flags: Flags to specify why the event was called. If no flags are set, then there was some change in the directory at the specific path supplied in this event.

eventID: The event ID for this change. Each event ID comes from the most recent event being reported in the

corresponding directory named in the path parameter. Event IDs all come from a single global source. They are guaranteed to always be increasing, usually in leaps and bounds, even across system reboots and moving drives from one machine to another. Just before invoking your callback your stream is updated so that calling the accessor `GetLatestEventId()` will return the largest of the values passed in the `eventIds` parameter; if you were to stop processing events from this stream after this callback and resume processing them later from a newly-created `FSEventStream`, this is the value you would pass for the `sinceWhen` parameter to constructor.

### 12.1.33 Constants

#### 12.1.34 `kFSEventStreamCreateFlagFileEvents = 16`

Plugin Version: 11.3. **Function:** One of the constants used to create a stream.

**Notes:**

Request file-level notifications. Your stream will receive events about individual files in the hierarchy you're watching instead of only receiving directory level notifications. Use this flag with care as it will generate significantly more events than without it.

Available in Mac OS X 10.7 or newer.

#### 12.1.35 `kFSEventStreamCreateFlagIgnoreSelf = 8`

Plugin Version: 11.3. **Function:** One of the constants used to create a stream.

**Notes:**

Don't send events that were triggered by the current process. This is useful for reducing the volume of events that are sent. It is only useful if your process might modify the file system hierarchy beneath the path(s) being monitored. Note: this has no effect on historical events, i.e., those delivered before the `HistoryDone` sentinel event.

Available in Mac OS X 10.7 or newer.

#### 12.1.36 `kFSEventStreamCreateFlagMarkSelf = 32`

Plugin Version: 16.0. **Function:** One of the constants used to create a stream.

**Notes:** Tag events that were triggered by the current process with the "OwnEvent" flag. This is only useful if your process might modify the file system hierarchy beneath the path(s) being monitored and you wish to know which events were triggered by your process. Note: this has no effect on historical events, i.e., those delivered before the `HistoryDone` sentinel event.

**12.1.37 kFSEventStreamCreateFlagNoDefer = 2**

Plugin Version: 8.1. **Function:** One of the constants used to create a stream.

**Notes:** Affects the meaning of the latency parameter. If you specify this flag and more than latency seconds have elapsed since the last event, your app will receive the event immediately. The delivery of the event resets the latency timer and any further events will be delivered after latency seconds have elapsed. This flag is useful for apps that are interactive and want to react immediately to changes but avoid getting swamped by notifications when changes are occurring in rapid succession. If you do not specify this flag, then when an event occurs after a period of no events, the latency timer is started. Any events that occur during the next latency seconds will be delivered as one group (including that first event). The delivery of the group of events resets the latency timer and any further events will be delivered after latency seconds. This is the default behavior and is more appropriate for background, daemon or batch processing apps.

**12.1.38 kFSEventStreamCreateFlagNone = 0**

Plugin Version: 8.1. **Function:** One of the constants used to create a stream.

**12.1.39 kFSEventStreamCreateFlagUseCFTypes = 1**

Plugin Version: 8.1. **Function:** One of the constants used to create a stream.

**Notes:** The plugin uses this one internally.

**12.1.40 kFSEventStreamCreateFlagWatchRoot = 4**

Plugin Version: 8.1. **Function:** One of the constants used to create a stream.

**Notes:** Request notifications of changes along the path to the path(s) you're watching. For example, with this flag, if you watch `"/foo/bar"` and it is renamed to `"/foo/bar.old"`, you would receive a `RootChanged` event. The same is true if the directory `"/foo"` were renamed. The event you receive is a special event: the path for the event is the original path you specified, the flag `kFSEventStreamEventFlagRootChanged` is set and event ID is zero. `RootChanged` events are useful to indicate that you should rescan a particular hierarchy because it changed completely (as opposed to the things inside of it changing). If you want to track the current location of a directory, it is best to open the directory before creating the stream so that you have a file descriptor for it and can issue an `F_GETPATH` `fcntl()` to find the current path.

**12.1.41 kFSEventStreamEventFlagEventIdsWrapped = 8**

Plugin Version: 8.1. **Function:** One of the flag values you can get on the callback event.

**Notes:** If `kFSEventStreamEventFlagEventIdsWrapped` is set, it means the 64-bit event ID counter wrapped around. As a result, previously-issued event ID's are no longer valid arguments for the `sinceWhen` parameter

of the constructors.

#### 12.1.42 `kFSEventStreamEventFlagHistoryDone = 16`

Plugin Version: 8.1. **Function:** One of the flag values you can get on the callback event.

**Notes:** Denotes a sentinel event sent to mark the end of the "historical" events sent as a result of specifying a `sinceWhen` value in the constructor call that created this event stream. (It will not be sent if `kFSEventStreamEventIdSinceNow` was passed for `sinceWhen`.) After invoking the client's callback with all the "historical" events that occurred before now, the client's callback will be invoked with an event where the `kFSEventStreamEventFlagHistoryDone` flag is set. The client should ignore the path supplied in this callback.

#### 12.1.43 `kFSEventStreamEventFlagItemChangeOwner = & h00004000`

Plugin Version: 11.3. **Function:** One of the flags passed when you use `FileEvents` and a file changes.

**Notes:** File changed owner.

#### 12.1.44 `kFSEventStreamEventFlagItemCreated = & h00000100`

Plugin Version: 11.3. **Function:** One of the flags passed when you use `FileEvents` and a file changes.

**Notes:** File created.

#### 12.1.45 `kFSEventStreamEventFlagItemFinderInfoMod = & h00002000`

Plugin Version: 11.3. **Function:** One of the flags passed when you use `FileEvents` and a file changes.

**Notes:** File meta data in Finder info have changed.

#### 12.1.46 `kFSEventStreamEventFlagItemInodeMetaMod = & h00000400`

Plugin Version: 11.3. **Function:** One of the flags passed when you use `FileEvents` and a file changes.

**Notes:** File meta data in inode have changed.

#### 12.1.47 `kFSEventStreamEventFlagItemIsDir = & h00020000`

Plugin Version: 11.3. **Function:** One of the flags passed when you use `FileEvents` and a file changes.

**Notes:** File is a folder.

**12.1.48 kFSEventStreamEventFlagItemIsFile = & h00010000**

Plugin Version: 11.3. **Function:** One of the flags passed when you use FileEvents and a file changes.  
**Notes:** File is a regular file.

**12.1.49 kFSEventStreamEventFlagItemIsHardlink = & h00100000**

Plugin Version: 16.0. **Function:** One of the flags passed when you use FileEvents and a file changes.  
**Notes:**

Indicates the object at the specified path supplied in this event is a hard link.  
(This flag is only ever set if you specified the FileEvents flag when creating the stream.)

**12.1.50 kFSEventStreamEventFlagItemIsLastHardlink = & h00200000**

Plugin Version: 16.0. **Function:** One of the flags passed when you use FileEvents and a file changes.  
**Notes:**

Indicates the object at the specific path supplied in this event was the last hard link.  
(This flag is only ever set if you specified the FileEvents flag when creating the stream.)

**12.1.51 kFSEventStreamEventFlagItemIsSymlink = & h00040000**

Plugin Version: 11.3. **Function:** One of the flags passed when you use FileEvents and a file changes.  
**Notes:** File is a symlink.

**12.1.52 kFSEventStreamEventFlagItemModified = & h00001000**

Plugin Version: 11.3. **Function:** One of the flags passed when you use FileEvents and a file changes.  
**Notes:** File modified.

**12.1.53 kFSEventStreamEventFlagItemRemoved = & h00000200**

Plugin Version: 11.3. **Function:** One of the flags passed when you use FileEvents and a file changes.  
**Notes:** File deleted.

### 12.1.54 kFSEventStreamEventFlagItemRenamed = & h00000800

Plugin Version: 11.3. **Function:** One of the flags passed when you use FileEvents and a file changes.

**Notes:** File renamed.

### 12.1.55 kFSEventStreamEventFlagItemXattrMod = & h00008000

Plugin Version: 11.3. **Function:** One of the flags passed when you use FileEvents and a file changes.

**Notes:** Extended attributes changed.

### 12.1.56 kFSEventStreamEventFlagKernelDropped = 4

Plugin Version: 8.1. **Function:** One of the flag values you can get on the callback event.

**Notes:** The kFSEventStreamEventFlagUserDropped or kFSEventStreamEventFlagKernelDropped flags may be set in addition to the kFSEventStreamEventFlagMustScanSubDirs flag to indicate that a problem occurred in buffering the events (the particular flag set indicates where the problem occurred) and that the client must do a full scan of any directories (and their subdirectories, recursively) being monitored by this stream. If you asked to monitor multiple paths with this stream then you will be notified about all of them. Your code need only check for the kFSEventStreamEventFlagMustScanSubDirs flag; these flags (if present) only provide information to help you diagnose the problem.

### 12.1.57 kFSEventStreamEventFlagMount = 64

Plugin Version: 8.1. **Function:** One of the flag values you can get on the callback event.

**Notes:** Denotes a special event sent when a volume is mounted. The path in the event is the path to the newly-mounted volume. You will receive one of these notifications for every volume mount event inside the kernel (independent of DiskArbitration). Beware that a newly-mounted volume could contain an arbitrarily large directory hierarchy. Avoid pitfalls like triggering a recursive scan of a non-local filesystem, which you can detect by checking for the absence of the MNT\_LOCAL flag in the f\_flags returned by statfs(). Also be aware of the MNT\_DONTBROWSE flag that is set for volumes which should not be displayed by user interface elements.

### 12.1.58 kFSEventStreamEventFlagMustScanSubDirs = 1

Plugin Version: 8.1. **Function:** One of the flag values you can get on the callback event.

**Notes:** Your application must rescan not just the directory given in the event, but all its children, recursively. This can happen if there was a problem whereby events were coalesced hierarchically. For example, an event in /Users/jsmith/Music and an event in /Users/jsmith/Pictures might be coalesced into an event with this flag set and path=/Users/jsmith. If this flag is set you may be able to get an idea of whether the bottleneck happened in the kernel (less likely) or in your client (more likely) by checking for the presence of the

informational flags `kFSEventStreamEventFlagUserDropped` or `kFSEventStreamEventFlagKernelDropped`.

### 12.1.59 `kFSEventStreamEventFlagNone = 0`

Plugin Version: 8.1. **Function:** The constant to specify that no flags are used.

### 12.1.60 `kFSEventStreamEventFlagOwnEvent = & h00080000`

Plugin Version: 16.0. **Function:** One of the flags passed when you use `FileEvents` and a file changes.

**Notes:**

Indicates the event was triggered by the current process.

(This flag is only ever set if you specified the `MarkSelf` flag when creating the stream.)

### 12.1.61 `kFSEventStreamEventFlagRootChanged = 32`

Plugin Version: 8.1. **Function:** One of the flag values you can get on the callback event.

**Notes:** Denotes a special event sent when there is a change to one of the directories along the path to one of the directories you asked to watch. When this flag is set, the event ID is zero and the path corresponds to one of the paths you asked to watch (specifically, the one that changed). The path may no longer exist because it or one of its parents was deleted or renamed. Events with this flag set will only be sent if you passed the flag `kFSEventStreamCreateFlagWatchRoot` to the constructor when you created the stream.

### 12.1.62 `kFSEventStreamEventFlagUnmount = 128`

Plugin Version: 8.1. **Function:** One of the flag values you can get on the callback event.

**Notes:** Denotes a special event sent when a volume is unmounted. The path in the event is the path to the directory from which the volume was unmounted. You will receive one of these notifications for every volume unmount event inside the kernel. This is not a substitute for the notifications provided by the `DiskArbitration` framework; you only get notified after the unmount has occurred. Beware that unmounting a volume could uncover an arbitrarily large directory hierarchy, although Mac OS X never does that.

### 12.1.63 `kFSEventStreamEventFlagUserDropped = 2`

Plugin Version: 8.1. **Function:** One of the flag values you can get on the callback event.

**Notes:** The `kFSEventStreamEventFlagUserDropped` or `kFSEventStreamEventFlagKernelDropped` flags may be set in addition to the `kFSEventStreamEventFlagMustScanSubDirs` flag to indicate that a problem occurred in buffering the events (the particular flag set indicates where the problem occurred) and that

the client must do a full scan of any directories (and their subdirectories, recursively) being monitored by this stream. If you asked to monitor multiple paths with this stream then you will be notified about all of them. Your code need only check for the `kFSEventStreamEventFlagMustScanSubDirs` flag; these flags (if present) only provide information to help you diagnose the problem.

# Chapter 13

## Image Capture

### 13.1 class ICCameraDeviceMBS

#### 13.1.1 class ICCameraDeviceMBS

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** ICCameraDeviceMBS is a concrete subclass of ICDeviceMBS class.

**Notes:**

ICDeviceBrowserMBS creates instances of this class.

Subclass of the ICDeviceMBS class.

This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

#### 13.1.2 Methods

#### 13.1.3 cancelDelete

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Cancels the current delete operation started by sending a requestDeleteFiles.

#### 13.1.4 cancelDownload

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Cancels the current download operation.

### 13.1.5 Constructor

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

### 13.1.6 contents as ICCameraItemMBS()

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Contents of the camera.

**Notes:** The structure of the elements in this array will reflect the folder structure of the storage reported by the camera. Each item in this array will correspond to a storage on the camera.

### 13.1.7 filesOfType(fileUTType as string) as ICCameraFileMBS()

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This method returns an array of files on the camera of type fileType.

**Notes:**

The fileType string is one of the following Uniform Type Identifier strings: kUTTypeImage, kUTTypeMovie, kUTTypeAudio, or kUTTypeData.

See UTTypeMBS module.

### 13.1.8 ICCameraDeviceCanAcceptPTPCommands as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the constants used to describe capabilities of a camera.

**Notes:** Indicates that the camera can accept PTP commands.

### 13.1.9 ICCameraDeviceCanDeleteAllFiles as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the constants used to describe capabilities of a camera.

**Notes:** Indicates that the camera can delete all files in a single operation while it is connected.

### 13.1.10 ICCameraDeviceCanDeleteOneFile as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the constants used to describe capabilities of a camera.

**Notes:** Indicates that the camera can delete a file at a time while it is connected.

### 13.1.11 ICCameraDeviceCanReceiveFile as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the constants used to describe capabilities of a camera.

**Notes:** Indicates that the host can upload files to the camera.

### 13.1.12 ICCameraDeviceCanSyncClock as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the constants used to describe capabilities of a camera.

**Notes:** Indicates that the camera can synchronize its date and time with that of the host computer.

### 13.1.13 ICCameraDeviceCanTakePicture as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the constants used to describe capabilities of a camera.

**Notes:** Indicates that the camera can capture a picture while it is connected, if the client sends a request-TakePicture message to it.

### 13.1.14 ICCameraDeviceCanTakePictureUsingShutterReleaseOnCamera as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the constants used to describe capabilities of a camera.

**Notes:** Indicates that the camera can capture a picture while it is connected, if the user presses the shutter release on the camera.

### 13.1.15 ICDeleteAfterSuccessfulDownload as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the keys for options dictionary.

**Notes:** The value for this key should be a boolean value. If this value is true, the file will be deleted from the device after it is successfully downloaded.

### 13.1.16 ICDownloadsDirectoryURL as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the keys for options dictionary.

**Notes:**

The value for this key should be an CFURLMBS referencing a writable directory.  
The downloaded files will be saved in that directory.

### 13.1.17 ICDownloadSidecarFiles as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the keys for options dictionary.

**Notes:** The value for this key should be a boolean value. If this value is true, all sidecar files will be downloaded along with the media file.

### 13.1.18 ICOverwrite as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the keys for options dictionary.

**Notes:** The value for this key should be a boolean value. If this value is true, the downloaded file will overwrite an existing file with the same name and extension.

### 13.1.19 ICSaveAsFilename as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the keys for options dictionary.

**Notes:** The value for this key should be a string containing the name to be used for the downloaded file.

### 13.1.20 ICSavedAncillaryFiles as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the keys for options dictionary.

**Notes:** The value for this key will be an array containing names of files associated with the primary file that is downloaded. The options dictionary returned in didDownloadFile may have this key.

### 13.1.21 ICSavedFilename as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the keys for options dictionary.

**Notes:** The value for this key will be a string containing the actual name of the saved file. The options dictionary returned in didDownloadFile will have this key.

### 13.1.22 mediaFiles as ICCameraFileMBS()

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The property mediaFiles represents all image, movie and audio files on the camera.

**Notes:** These files are returned as a single array without regard to the folder hierarchy used to store these files on the camera.

### 13.1.23 requestDeleteFiles(files() as ICCameraFileMBS)

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Deletes files.

### 13.1.24 requestDisableTethering

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Send this message to disable tethered capture on the camera device if the camera has the 'ICCameraDeviceCanTakePicture' capability and if your process has already sent a 'requestEnableTethering' to it.

### 13.1.25 requestDownloadFile(file as ICCameraFileMBS, options as dictionary = nil)

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Download a file from the camera. Please refer to the top of this header for information about the options.

**Notes:**

Calls cameraDeviceDidDownloadFile event later.

The content of error returned should be examined to determine if the request completed successfully.

### 13.1.26 requestEnableTethering

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Send this message to enable tethered capture on the camera device if the camera has the 'ICCameraDeviceCanTakePicture'

capability.

### 13.1.27 `requestReadDataFromFile`(file as `ICCameraFileMBS`, offset as `UInt64`, Length as `UInt64`)

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This method asynchronously reads data of a specified length from a specified offset.

**Notes:**

Calls later `ImageCaptureEventsMBS.cameraDeviceDidReadData` event.

The content of error returned should be examined to determine if the request completed successfully.

### 13.1.28 `requestSendPTPCommand`(command as `MemoryBlock`, dataOut as `MemoryBlock`)

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This method asynchronously sends a PTP command to a camera.

**Notes:** The content of error returned should be examined to determine if the request completed successfully.

### 13.1.29 `requestSyncClock`

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Synchronize camera's clock with the computer's clock.

**Notes:** You should send this request only if the camera has the `'ICCameraDeviceCanSyncClock'` capability.

### 13.1.30 `requestTakePicture`

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Capture a new image using the camera, the camera capabilities include `'ICCameraDeviceCanTakePicture'`.

**Notes:** You MUST send `'requestEnableTethering'` message to the camera before sending `'requestTakePicture'` message.

### 13.1.31 `requestUploadFile`(file as `folderitem`, options as `dictionary = nil`)

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Upload a file at `fileURL` to the camera.

**Notes:**

The options dictionary is not used in this version.

Calls later ImageCaptureEventsMBS.cameraDeviceDidUploadFile event.

The content of error returned should be examined to determine if the request completed successfully.

### 13.1.32 Properties

#### 13.1.33 batteryLevel as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Indicates the battery charge level.

**Notes:**

Its value ranges from 0 to 100.

(Read only property)

#### 13.1.34 batteryLevelAvailable as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Indicates if the device has reported battery charge level.

**Notes:** (Read only property)

#### 13.1.35 contentCatalogPercentCompleted as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Indicates the percentage of content cataloging completed on the device.

**Notes:**

Its value ranges from 0 to 100.

(Read only property)

#### 13.1.36 isAccessRestrictedAppleDevice as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Set to true if the device is made by Apple and is pass-coded locked and connected to an untrusted host.

**Notes:** (Read only property)

### 13.1.37 mountPoint as String

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Filesystem mount point for a device with transportType of ICTransportTypeMassStorage.

**Notes:**

This will be "" for all other devices.

(Read only property)

### 13.1.38 tetheredCaptureEnabled as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This property is set to YES when tethered capture is enabled on the device.

**Notes:**

Use 'requestEnableTethering' and 'requestDisableTethering' to enable or disable tethered capture on the device.

(Read only property)

### 13.1.39 timeOffset as Double

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Indicates the time offset, in seconds, between the camera's clock and the computer's clock.

**Notes:**

This value is positive if the camera's clock is ahead of the computer's clock. This property should be ignored if the camera's capabilities property does not contain ICCameraDeviceCanSyncClock.

(Read only property)

## 13.2 class ICCameraFileMBS

### 13.2.1 class ICCameraFileMBS

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This class represents a file on an ICCameraDevice object.

**Notes:**

Subclass of the ICCameraItemMBS class.

This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

### 13.2.2 Methods

### 13.2.3 Constructor

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

### 13.2.4 sidecarFiles as ICCameraFileMBS()

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns array of sidecar files.

**Notes:** This property is an empty array if there are no sidecar files associated with this file. Otherwise it is an array of ICCameraFile instances of sidecar files associated with this file. An example of a sidecar file is a file with the same base name as this file and having an extension XMP.

### 13.2.5 Properties

### 13.2.6 Duration as Double

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Duration of audio/video file in seconds.

**Notes:** (Read only property)

### 13.2.7 FileSize as UInt64

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Size of file in bytes.

**Notes:** (Read only property)

### 13.2.8 Orientation as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Desired orientation of image to use when it is downloaded.

**Notes:**

This property is set to ICEXIFOrientation1 initially. If the format of this file supports EXIF orientation tag, then this property will be updated to match the value of that tag, when the thumbnail or metadata for this file is received.

Possible values:

ICEXIFOrientation1	1	Normal
ICEXIFOrientation2	2	Flipped horizontally
ICEXIFOrientation3	3	Rotated 180
ICEXIFOrientation4	4	Flipped vertically
ICEXIFOrientation5	5	Rotated 90 CCW and flipped vertically
ICEXIFOrientation6	6	Rotated 90 CCW
ICEXIFOrientation7	7	Rotated 90 CW and flipped vertically
ICEXIFOrientation8	8	Rotated 90 CW

(Read and Write property)

## 13.3 class ICCameraFolderMBS

### 13.3.1 class ICCameraFolderMBS

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This class represents a folder on an ICCameraDevice object.

**Notes:**

Subclass of the ICCameraItemMBS class.

This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

### 13.3.2 Methods

### 13.3.3 Constructor

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

### 13.3.4 contents as ICCameraItemMBS()

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A list of items contained by this folder.

## 13.4 class ICCameraItemMBS

### 13.4.1 class ICCameraItemMBS

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** ICCameraItem is an abstract class that represents an item in an ICCameraDevice object.

**Notes:**

ICCameraDevice object creates instances of two concrete subclasses of ICCameraItem: ICCameraFolder and ICCameraFile.

This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

### 13.4.2 Methods

### 13.4.3 Constructor

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

### 13.4.4 Properties

### 13.4.5 addedAfterContentCatalogCompleted as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This property is set if the file is captured on the device after the device's content is fully enumerated.

**Notes:**

This does not apply to files added as a result of adding a new store to the device.  
(Read only property)

### 13.4.6 CreationDate as Date

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creation date of this file.

**Notes:**

This information is usually the same as the EXIF creation date.  
(Read only property)

### 13.4.7 Device as ICCameraDeviceMBS

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Parent device of this folder.

**Notes:** (Read only property)

### 13.4.8 FileSystemPath as String

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The file system path of the item for items on a device with transportType of ICTransportTypeMassStorage.

**Notes:** (Read only property)

### 13.4.9 Handle as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

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

### 13.4.10 InTemporaryStore as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Indicates if this folder is in a temporary store.

**Notes:**

A temporary store may be used by the device when images are captures on the device when it is tethered to the computer.

(Read only property)

### 13.4.11 largeThumbnailIfAvailable as Variant

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Large thumbnail for the item if one is readily available.

**Notes:**

Value is a CGImageMBS.

If one is not readily available, accessing this property will send a message to the device requesting a thumbnail for the file. The ImageCaptureEventsMBS subclass will be notified via event cameraDevice-DidReceiveThumbnailForItem.

(Read only property)

### 13.4.12 Locked as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Indicates the protection state of this item.

**Notes:**

It is locked if the storage card in the camera is locked.  
(Read only property)

### 13.4.13 MetadataIfAvailable as Dictionary

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Metadata for the file if one is readily available.

**Notes:**

If one is not readily available, accessing this property will send a message to the device requesting a thumbnail for the file. The ImageCaptureEventsMBS subclass will be notified via event cameraDeviceDidReceiveMetadataForItem.

(Read only property)

### 13.4.14 ModificationDate as Date

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Modification date of this file.

**Notes:**

This information is usually the same as the EXIF modification date.  
(Read only property)

### 13.4.15 Name as String

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Name of this file or folder.

**Notes:** (Read only property)

### 13.4.16 ParentFolder as ICCameraFolderMBS

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Parent folder of this folder. The root folder's parentFolder is nil.

**Notes:** (Read only property)

### 13.4.17 ptpObjectHandle as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** PTP object handle value if the item is on a camera that uses PTP protocol.

**Notes:**

The value of this property is set to 0 if the camera does not use PTP protocol.  
(Read only property)

### 13.4.18 Raw as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Indicates if the file is a raw image file.

**Notes:** (Read only property)

### 13.4.19 thumbnailIfAvailable as Variant

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Thumbnail for the item if one is readily available.

**Notes:**

Value is a CGImageMBS.

If one is not readily available, accessing this property will send a message to the device requesting a thumbnail for the file. The ImageCaptureEventsMBS subclass will be notified via event cameraDevice-DidReceiveThumbnailForItem.

(Read only property)

### 13.4.20 UserData as Dictionary

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A mutable dictionary to store arbitrary key-value pairs associated with a camera item object.

**Notes:**

This can be used by view objects that bind to this object to store "house-keeping" information.

In Xojo, please query dictionary, modify it and assign back to this property.

(Read and Write property)

### 13.4.21 UTI as String

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Item UTI.

**Notes:**

This is an Uniform Type Identifier string. It is one of: kUTTypeFolder, kUTTypeImage, kUTTypeMovie, kUTTypeAudio, or kUTTypeData.

See UTTypeMBS module.

(Read only property)

## 13.5 class ICDeviceBrowserMBS

### 13.5.1 class ICDeviceBrowserMBS

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The ICDevice-Browser object is used to find devices such as digital cameras and scanners that are supported by Image Capture.

**Notes:** These device may be directly attached to the USB or FireWire bus on the host computer, shared by other computers, or available over a TCP/IP network. This object communicates with an Image Capture agent process asynchronously to accomplish this.

### 13.5.2 Methods

### 13.5.3 Constructor

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The constructor.

### 13.5.4 Destructor

Plugin Version: 16.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The destructor.

### 13.5.5 devices as ICDeviceMBS()

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** All devices found by the browser.

**Notes:** This property will change as devices appear and disappear. This array is empty before the first invocation of the deviceBrowserDidAddDevice event.

### 13.5.6 Start

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This message tells the receiver to start looking for devices.

**Notes:** Please use ImageCaptureEventsMBS class to receive events.

### 13.5.7 Stop

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This method tells the receiver to stop looking for devices.

**Notes:** This will free all device instances that are not in use.

### 13.5.8 Properties

#### 13.5.9 browsedDeviceTypeMask as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The device type mask.

**Notes:**

A mask whose set bits indicate the type of device(s) being browsed after the receiver receives the start message. This property can be changed while the browser is browsing for devices. This property can be constructed by OR'd values of ICDeviceTypeMask with values of ICDeviceLocationTypeMask. (Read and Write property)

#### 13.5.10 Browsing as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Indicates whether the device browser is browsing for devices.

**Notes:** (Read only property)

#### 13.5.11 Handle as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

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

#### 13.5.12 preferredDevice as ICDeviceMBS

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This method returns a device object that should be selected by the client application when it is launched.

**Notes:**

If the client application that calls this method is the auto-launch application associated with a device and that device is the last device attached (through USB, FireWire or network), then that device will be the preferred device. The best place to call this method is in the event deviceBrowserDidAddDevice, if the

"moreComing" parameter passed to the delegate is false; or in the event `deviceBrowserDidEnumerateLocalDevices`.

(Read only property)

### 13.5.13 Events

#### 13.5.14 DeviceDidChangeName(device as ICDeviceMBS)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent if the name of a device changes.

**Notes:** This happens if the device module overrides the default name of the device reported by the device's transport layer, or if the name of the filesystem volume mounted by the device is changed by the user.

#### 13.5.15 DeviceDidChangeSharingState(device as ICDeviceMBS)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent when the sharing state of a device has changes.

**Notes:** Any Image Capture client application can choose to share the device over the network using the sharing or webSharing facility in Image Capture.

#### 13.5.16 DidAddDevice(device as ICDeviceMBS, moreComing as boolean)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent to inform that a device has been added.

**Notes:** If several devices are found during the initial search, then this event is sent once for each device with the value of 'moreComing' set to true in each event except the last one.

#### 13.5.17 DidEnumerateLocalDevices

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent after the device browser completes sending `deviceBrowser:didAddDevice` event for all local devices.

**Notes:** Detecting locally connected devices (USB and FireWire devices) is faster than detecting devices connected using a network protocol. An Image Capture client application may use this event to update its user interface to let the user know that it has completed looking for locally connected devices and then start looking for network devices.

### 13.5.18 DidRemoveDevice(device as ICDeviceMBS, moreGoing as boolean)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent to the delegate to inform that a device has been removed.

**Notes:** If several devices are removed at the same time, then this event is sent once for each device with the value of 'moreGoing' set to true in each event except the last one.

### 13.5.19 RequestsSelectDevice(device as ICDeviceMBS)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent when an event that occurred on the device may be of interest to the client application.

**Notes:** In Mac OS X 10.6, this event is sent when a button is pressed on a device and the current application is the target for that button press. In the case of the button-press event, if a session is open on the device, this event will not be sent, instead the deviceDidReceiveButtonPress event is sent.

## 13.6 class ICDeviceMBS

### 13.6.1 class ICDeviceMBS

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** ICDevice is an abstract class that represents a device supported by Image Capture.

**Notes:**

ImageCaptureCore defines two concrete subclasses of ICDeviceMBS, ICCameraDeviceMBS and ICScannerDeviceMBS. ICDeviceBrowserMBS creates instances of these two subclasses to represent cameras and scanners it finds.

This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

### 13.6.2 Methods

### 13.6.3 capabilities as Variant()

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The capabilities of the device as reported by the device module.

### 13.6.4 Constructor

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

### 13.6.5 ICButtonTypeCopy as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the constants used to identify button-press on a device.

**Notes:** Indicates that the "Copy" button on the device was pressed.

### 13.6.6 ICButtonTypeMail as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the constants used to identify button-press on a device.

**Notes:** Indicates that the "Mail" button on the device was pressed.

### 13.6.7 ICButtonTypePrint as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the constants used to identify button-press on a device.

**Notes:** Indicates that the "Print" button on the device was pressed.

### 13.6.8 ICButtonTypeScan as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the constants used to identify button-press on a device.

**Notes:** Indicates that the "Scan" button on the device was pressed.

### 13.6.9 ICButtonTypeTransfer as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the constants used to identify button-press on a device.

**Notes:** Indicates that the "Transfer" button on the device was pressed.

### 13.6.10 ICButtonTypeWeb as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the constants used to identify button-press on a device.

**Notes:** Indicates that the "Web" button on the device was pressed.

### 13.6.11 ICDeviceCanEjectOrDisconnect as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the constants used to describe capabilities of a device.

**Notes:** Indicates either the device is mounted as a mass-storage volume and can be ejected or the it is a remote device with an active connection that can be disconnected.

### 13.6.12 ICDeviceLocationDescriptionBluetooth as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This description is returned for locationDescription property of a device connected via Bluetooth.

### 13.6.13 ICDeviceLocationDescriptionFireWire as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This description is returned for locationDescription property of a device connected to a FireWire port.

### 13.6.14 ICDeviceLocationDescriptionMassStorage as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This description is returned for locationDescription property of a device that is mounted as a mass-storage volume.

### 13.6.15 ICDeviceLocationDescriptionUSB as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This description is returned for locationDescription property of a device connected to a USB port.

### 13.6.16 ICLocalizedStatusNotificationKey as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the constants used for device status notifications.

**Notes:** Key for a localized notification string.

### 13.6.17 ICStatusCodeKey as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the constants used for device status notifications.

**Notes:** One of values defined in ICReturnCode.

### 13.6.18 ICStatusNotificationKey as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the constants used for device status notifications.

**Notes:** Key for a non-localized notification string.

### 13.6.19 ICTransportTypeBluetooth as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Indicates that the device uses Bluetooth transport.

### 13.6.20 ICTransportTypeFireWire as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Indicates that the device uses FireWire transport.

### 13.6.21 ICTransportTypeMassStorage as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Indicates that the device use mounts as a mass-storage volume.

### 13.6.22 ICTransportTypeTCPIP as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Indicates that the device uses TCP/IP transport.

**Notes:** These devices are discovered using Bonjour.

### 13.6.23 ICTransportTypeUSB as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Indicates that the device uses USB transport.

### 13.6.24 requestCloseSession

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This message requests to close a previously opened session on this device.

**Notes:** This request is completed when the ImageCaptureEventsMBS subclass receives a deviceDidCloseSessionWithError event.

### 13.6.25 requestEjectOrDisconnect

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Eject the media if permitted by the device, or disconnect from a remote device.

### 13.6.26 requestOpenSession

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This message requests to open a session on the device.

**Notes:**

A client **MUST** open a session on a device in order to use the device.

This request is completed when the ImageCaptureEventsMBS subclass receives a deviceDidOpenSession-WithError event. No more events will be sent to the delegate if this request fails.

### 13.6.27 requestSendMessage(messageCode as UInt32, data as MemoryBlock, maxReturnedDataSize as UInt64)

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This method asynchronously sends an arbitrary message with optional data to a device.

**Notes:**

This method allows developers to send a private message from a client application to a device module. This method is the functional equivalent of calling ICAObjectSendMessage() found in ImageCapture.framework, which has been deprecated in Mac OS X 10.6. The response to this command will be delivered using deviceDidSendMessage event.

The content of error returned should be examined to determine if the request completed successfully.

NOTE: This method **SHOULD NOT BE USED** to send PTP pass-through commands to a PTP camera. Please refer to requestSendPTPCommand defined in ICCameraDeviceMBS for sending PTP pass-through commands.

### 13.6.28 requestYield

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This message requests the device module in control of this device to yield control.

**Notes:** This message should be used only if the client is planning on communicating with the device directly. The device module may not yield control of the device if it has an open session.

### 13.6.29 Properties

#### 13.6.30 AutolaunchApplicationPath as String

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Filesystem path of an application that is to be automatically launched when this device is added.

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

#### 13.6.31 BonjourServiceType as String

Plugin Version: 17.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Service type if device was found via Bonjour..

**Notes:** (Read only property)

#### 13.6.32 BskonjourServiceName as String

Plugin Version: 17.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Service name if device was found via Bonjour..

**Notes:** (Read only property)

#### 13.6.33 ButtonPressed as String

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A string object with one of the ICBUTTONTYPE\* values defined above.

**Notes:** (Read only property)

#### 13.6.34 canDeleteAllFiles as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** If all files can be deleted.

**Notes:** (Read only property)

#### 13.6.35 canDeleteOneFile as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether a file can be deleted.

**Notes:** (Read only property)

### 13.6.36 canEject as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether this device can be ejected.

**Notes:** (Read only property)

### 13.6.37 canReceiveFile as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether this device can receive a file.

**Notes:** (Read only property)

### 13.6.38 canSyncClock as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether this device can sync clock.

**Notes:** (Read only property)

### 13.6.39 canTakePicture as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether this device can take pictures.

**Notes:** (Read only property)

### 13.6.40 fwGUID as Int64

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The FireWire GUID of a FireWire device in the IOKit registry.

**Notes:**

This will be 0 for non-FireWire devices.

(Read only property)

### 13.6.41 Handle as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

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

### 13.6.42 HasConfigurableWiFiInterface as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Indicates whether the device can be configured for use on a WiFi network.

**Notes:** (Read only property)

### 13.6.43 HasOpenSession as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Indicates whether the device has an open session.

**Notes:** (Read only property)

### 13.6.44 Icon as Variant

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Icon image for the device.

**Notes:**

Value is a CGImageMBS.

(Read only property)

### 13.6.45 IconPath as String

Plugin Version: 17.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Path to icon file.

**Notes:** (Read only property)

### 13.6.46 IPAddress as String

Plugin Version: 17.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** IP Address.

**Notes:** (Read only property)

### 13.6.47 IsRemote as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Indicates whether the device is a remote device published by Image Capture device sharing facility.

**Notes:** (Read only property)

### 13.6.48 IsShared as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Indicates whether the device is shared using the Image Capture device sharing facility.

**Notes:**

This value will change when sharing of this device is enabled or disabled.

(Read only property)

### 13.6.49 LocationDescription as String

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A non-localized location description string for the device.

**Notes:**

The value returned in one of the location description strings defined above, or location obtained from the Bonjour TXT record of a network device.

(Read only property)

### 13.6.50 ModuleExecutableArchitecture as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Executable Architecture of the device module in control of this device.

**Notes:**

Possible values:

I386	& h00000007
PPC	& h00000012
X86_64	& h01000007
PPC64	& h01000012

(Read only property)

### 13.6.51 ModulePath as String

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Filesystem path of the device module that is associated with this device.

**Notes:**

Camera-specific capabilities are defined in ICCameraDeviceMBS class and scanner-specific capabilities are defined in ICScannerDeviceMBS class.

(Read only property)

### 13.6.52 ModuleVersion as String

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The bundle version of the device module associated with this device.

**Notes:**

This may change if an existing device module associated with this device is updated or a new device module for this device is installed.

(Read only property)

### 13.6.53 Name as String

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Name of the device as reported by the device module or by the device transport when a device module is not in control of this device.

**Notes:**

This name may change if the device module overrides the default name of the device reported by the device's transport, or if the name of the filesystem volume mounted by the device is changed by the user.

(Read only property)

### 13.6.54 PersistentIDString as String

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A string representation of the persistent ID of the device.

**Notes:** (Read only property)

### 13.6.55 ProductKind as String

Plugin Version: 17.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Product kind.

**Notes:** (Read only property)

### 13.6.56 SerialNumberString as String

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The serial number of the device.

**Notes:**

This will be "" if the device does not provide a serial number.  
(Read only property)

### 13.6.57 TransportType as String

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The transport type used by the device.

**Notes:**

The possible values are: ICTransportTypeUSB, ICTransportTypeFireWire, ICTransportTypeBluetooth, ICTransportTypeTCPIP, or ICTransportTypeMassStorage.  
(Read only property)

### 13.6.58 type as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The type of the device as defined by ICDeviceType OR'd with its ICDeviceLocationType.

**Notes:**

The type of this device can be obtained by AND'ing the value returned by this property with an appropriate ICDeviceTypeMask. The location type of this device can be obtained by AND'ing the value returned by this property with an appropriate ICDeviceLocationTypeMask.  
(Read only property)

### 13.6.59 usbLocationID as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The USB location ID of a USB device in the IOKit registry.

**Notes:**

This will be 0 for non-USB devices.  
(Read only property)

### 13.6.60 `usbProductID` as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The USB product ID of a USB device in the IOKit registry.

**Notes:**

This will be 0 for non-USB devices.  
(Read only property)

### 13.6.61 `usbVendorID` as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The USB vendor ID of a USB device in the IOKit registry.

**Notes:**

This will be 0 for non-USB devices.  
(Read only property)

### 13.6.62 `UserData` as Dictionary

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A mutable dictionary to store arbitrary key-value pairs associated with a device object.

**Notes:**

This can be used by view objects that bind to this object to store "house-keeping" information. In Xojo, please query dictionary, modify it and assign back to this property.  
(Read and Write property)

### 13.6.63 `UUIDString` as String

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A string representation of the Universally Unique ID of the device.

**Notes:** (Read only property)

### 13.6.64 Constants

#### 13.6.65 `ICDeviceLocationTypeBluetooth` = & h00000800

Plugin Version: 14.3. **Function:** One of the device types.

**Notes:** Device found as a paired Bluetooth device.

**13.6.66 ICDeviceLocationTypeBonjour = & h00000400**

Plugin Version: 14.3. **Function:** One of the device types.

**Notes:** Device found over the network by searching for Bonjour services supported by Image Capture.

**13.6.67 ICDeviceLocationTypeLocal = & h00000100**

Plugin Version: 14.3. **Function:** One of the device types.

**Notes:** Device found directly attached to the Macintosh via its USB or FireWire port.

**13.6.68 ICDeviceLocationTypeMaskBluetooth = & h00000800**

Plugin Version: 14.3. **Function:** One of the Image Capture Device Location Type Masks.

**Notes:** Mask to detect paired Bluetooth device.

**13.6.69 ICDeviceLocationTypeMaskBonjour = & h00000400**

Plugin Version: 14.3. **Function:** One of the Image Capture Device Location Type Masks.

**Notes:** Mask to detect a network device that publishes a Bonjour service.

**13.6.70 ICDeviceLocationTypeMaskLocal = & h00000100**

Plugin Version: 14.3. **Function:** One of the Image Capture Device Location Type Masks.

**Notes:** Mask to detect a local (e.g., USB or FireWire) device.

**13.6.71 ICDeviceLocationTypeMaskRemote = & h0000FE00**

Plugin Version: 14.3. **Function:** One of the Image Capture Device Location Type Masks.

**Notes:** Mask to detect a remote (shared, Bonjour, Bluetooth) device.

**13.6.72 ICDeviceLocationTypeMaskShared = & h00000200**

Plugin Version: 14.3. **Function:** One of the Image Capture Device Location Type Masks.

**Notes:** Mask to detect a device by another Macintosh host.

**13.6.73 ICDeviceLocationTypeShared = & h00000200**

Plugin Version: 14.3. **Function:** One of the device types.

**Notes:** Device found over the network by searching for devices shared by other Macintosh hosts.

**13.6.74 ICDeviceTypeCamera = & h00000001**

Plugin Version: 14.3. **Function:** One of the image capture device types.

**Notes:** Camera device.

**13.6.75 ICDeviceTypeMaskCamera = & h00000001**

Plugin Version: 14.3. **Function:** One of the device type masks.

**Notes:** Mask to detect a camera device.

**13.6.76 ICDeviceTypeMaskScanner = & h00000002**

Plugin Version: 14.3. **Function:** One of the device type masks.

**Notes:** Mask to detect a scanner device.

**13.6.77 ICDeviceTypeScanner = & h00000002**

Plugin Version: 14.3. **Function:** One of the image capture device types.

**Notes:** Scanner device.

## 13.7 class ICScannerBandDataMBS

### 13.7.1 class ICScannerBandDataMBS

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The class for band data from scanner.

**Notes:**

If image is too big to be transferred in one big block, it's sent in little chunks using this class. This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

### 13.7.2 Methods

### 13.7.3 Constructor

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

### 13.7.4 Properties

#### 13.7.5 bigEndian as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Describes if the banded image data is reported in big endian.

**Notes:** (Read only property)

#### 13.7.6 bitsPerComponent as UInt64

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Describes the number of bits per component for the banded image.

**Notes:** (Read only property)

#### 13.7.7 bitsPerPixel as UInt64

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Describes the number of bits per pixel for banded the image.

**Notes:** (Read only property)

### 13.7.8 bytesPerRow as UInt64

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Describes how many bytes are in each image band row.

**Notes:** (Read only property)

### 13.7.9 colorSyncProfilePath as String

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the path to the color profile matching the banded data.

**Notes:** (Read only property)

### 13.7.10 dataBuffer as Memoryblock

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The pointer to the data buffer object.

**Notes:**

Plugin returns a copy of the data when you query this property.  
(Read only property)

### 13.7.11 dataNumRows as UInt64

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Describes the number of rows contained in the image band.

**Notes:** (Read only property)

### 13.7.12 dataSize as UInt64

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Describes the actual data size of the image band buffer.

**Notes:** (Read only property)

### 13.7.13 dataStartRow as UInt64

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Describes the start row of the image band.

**Notes:** (Read only property)

#### 13.7.14 fullImageHeight as UInt64

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Describes the full image height of the banded image.

**Notes:** (Read only property)

#### 13.7.15 fullImageWidth as UInt64

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Describes the full image width of the banded image.

**Notes:** (Read only property)

#### 13.7.16 Handle as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

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

#### 13.7.17 numComponents as UInt64

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Describes how many components are contained within the banded image.

**Notes:** (Read only property)

#### 13.7.18 pixelDataType as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Type of pixel data that is contained in the band.

**Notes:**

See `ICScannerFunctionalUnitMBS.ICScannerPixelDataType*` constants.  
(Read only property)

## 13.8 class ICScannerDeviceMBS

### 13.8.1 class ICScannerDeviceMBS

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The class for a scanner device.

**Notes:**

ICScannerDeviceMBS is a concrete subclass of ICDeviceMBS class. ICDeviceBrowserMBS creates instances of this class. In this release, an instance of ICScannerDeviceMBS class is intended to be used by the IKScannerDeviceViewMBS object. The IKScannerDeviceView class encapsulates the complexities of setting scan parameters, performing scans and saving the result. The developer should consider using IKScannerDeviceViewMBS instead of building their own views using the ICScannerDeviceMBS object.

Subclass of the ICDeviceMBS class.

This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

### 13.8.2 Methods

#### 13.8.3 availableFunctionalUnitTypes as Integer()

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** An array of functional unit types available on this scanner device.

**Notes:** This is an array of numbers whose values are of type ICScannerFunctionalUnitType.

#### 13.8.4 cancelScan

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Cancels the current scan operation started by sending a 'requestOverviewScan' or 'requestScan'.

#### 13.8.5 Constructor

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

#### 13.8.6 ICScannerStatusRequestsOverviewScan as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Constants used for device status notifications.

**Notes:** A non-localized notification string to indicate that the scanner is requesting an overview scan to be

performed.

### 13.8.7 ICScannerStatusWarmingUp as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Constants used for device status notifications.

**Notes:** A non-localized notification string to indicate that the scanner is warming up.

### 13.8.8 ICScannerStatusWarmUpDone as string

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Constants used for device status notifications.

**Notes:** A non-localized notification string to indicate that the scanner has warmed up.

### 13.8.9 requestOverviewScan

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Starts an overview scan on selectedFunctionalUnit.

**Notes:** When this request is completed, the delegate will be notified using the scannerDeviceDidCompleteOverviewScanWithError event. The content of error returned should be examined to determine if the request completed successfully.

### 13.8.10 requestScan

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Starts a scan on selectedFunctionalUnit.

**Notes:** When this request is completed, the delegate will be notified using the scannerDeviceDidCompleteScanWithError event. The content of error returned should be examined to determine if the request completed successfully.

### 13.8.11 requestSelectFunctionalUnit(type as Integer)

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Requests the scanner device to select a functional unit.

**Notes:** When this request is completed, the delegate will be notified using the scannerDeviceDidSelectFunctionalUnit.

### 13.8.12 Properties

#### 13.8.13 `documentName` as String

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The document name.

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

#### 13.8.14 `documentUTI` as String

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The document UTI.  
**Notes:**

Currently supported UTIs are: `kUTTypeJPEG`, `kUTTypeJPEG2000`, `kUTTypeTIFF`, `kUTTypePNG` etc. see `UTTypeMBS` module.

(Read and Write property)

#### 13.8.15 `downloadsDirectory` as String

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The downloads directory.

**Notes:**

Download location can be provided as file URL with `downloadsDirectory` property or as `folderitem` with `downloadsFolder` property.

(Read and Write property)

#### 13.8.16 `downloadsFolder` as FolderItem

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The downloads directory.

**Notes:**

Download location can be provided as file URL with `downloadsDirectory` property or as `folderitem` with `downloadsFolder` property.

(Read and Write property)

#### 13.8.17 `maxMemoryBandSize` as UInt64

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The total maximum band size requested when performing a `ICScannerTransferModeMemoryBased`.

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

### 13.8.18 selectedFunctionalUnit as ICScannerFunctionalUnitMBS

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The currently selected functional unit on the scanner device.

**Notes:** (Read only property)

### 13.8.19 transferMode as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The transfer mode for scanned document.

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

### 13.8.20 Constants

#### 13.8.21 ICScannerTransferModeFileBased = 0

Plugin Version: 14.3. **Function:** Transfer mode constants to be used when transferring scan data from the scanner functional unit.

**Notes:** Save the scan as a file.

#### 13.8.22 ICScannerTransferModeMemoryBased = 1

Plugin Version: 14.3. **Function:** Transfer mode constants to be used when transferring scan data from the scanner functional unit.

**Notes:** Transfer the scan as data.

## 13.9 class ICSscannerFeatureBooleanMBS

### 13.9.1 class ICSscannerFeatureBooleanMBS

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** ICSscannerFeatureBoolean object is used to represent a property of a scanner functional unit whose value can be true or false.  
**Notes:**

Subclass of the ICSscannerFeatureMBS class.

This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

### 13.9.2 Methods

### 13.9.3 Constructor

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

### 13.9.4 Properties

### 13.9.5 value as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The value of this feature.

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

## 13.10 class ICScannerFeatureEnumerationMBS

### 13.10.1 class ICScannerFeatureEnumerationMBS

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** ICScannerFeatureEnumeration object is used to represent a feature of a scanner functional unit that can have one of several discrete values.

**Notes:**

Subclass of the ICScannerFeatureMBS class.

This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

### 13.10.2 Methods

### 13.10.3 Constructor

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

### 13.10.4 menuItemLabels as String()

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The human readable menu item labels to be used in a menu to allow the user to select the current value from an array of possible values.

### 13.10.5 menuItemLabelsTooltips as String()

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Tooltip text associated with the menu items.

### 13.10.6 values as Variant()

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** An array of possible values. All items in this array must be of same type.

### 13.10.7 Properties

#### 13.10.8 `currentValue` as Variant

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The current value.

**Notes:**

The current value can be set to one of the possible values in the "values" property below.  
(Read and Write property)

#### 13.10.9 `defaultValue` as Variant

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The default value.

**Notes:**

The default value can be set to one of the possible values in the "values" property below.  
(Read only property)

## 13.11 class ICScannerFeatureMBS

### 13.11.1 class ICScannerFeatureMBS

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** ICScannerFeature class is an abstract base class used to describe a scanner feature.

**Notes:**

ImageCaptureCore defines three concrete subclasses of ICScannerFeatureMBS: ICScannerFeatureEnumerationMBS, ICScannerFeatureRangeMBS and ICScannerFeatureBooleanMBS.

The scanner functional units may have one or more instances of these classes to allow users to choose scanner-specific settings or operations before performing a scan.

This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

### 13.11.2 Methods

### 13.11.3 Constructor

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

### 13.11.4 Properties

### 13.11.5 Handle as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

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

### 13.11.6 humanReadableName as String

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The human readable name of this feature.

**Notes:** (Read only property)

### 13.11.7 internalName as String

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal name of this feature.

**Notes:** (Read only property)

### 13.11.8 tooltip as String

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Tooltip text describing the feature.

**Notes:** (Read only property)

### 13.11.9 type as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Scanner feature type.

**Notes:**

See `ICScannerFeatureType*` constants.  
(Read only property)

### 13.11.10 Constants

#### 13.11.11 `ICScannerFeatureTypeBoolean = 2`

Plugin Version: 14.3. **Function:** One of the feature type constants.

**Notes:** The value of this feature can be true or false.

#### 13.11.12 `ICScannerFeatureTypeEnumeration = 0`

Plugin Version: 14.3. **Function:** One of the feature type constants.

**Notes:** This feature can have one of several discrete values, strings or numbers.

#### 13.11.13 `ICScannerFeatureTypeRange = 1`

Plugin Version: 14.3. **Function:** One of the feature type constants.

**Notes:** This value of this feature lies within a range.

**13.11.14 ICSscannerFeatureTypeTemplate = 3**

Plugin Version: 14.3. **Function:** One of the feature type constants.

**Notes:** A group of features.

## 13.12 class ICScannerFeatureRangeMBS

### 13.12.1 class ICScannerFeatureRangeMBS

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** ICScannerFeatureRange object is used to represent a property of a scanner functional unit whose value lies within a range.

**Notes:**

Subclass of the ICScannerFeatureMBS class.

This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

### 13.12.2 Methods

### 13.12.3 Constructor

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

### 13.12.4 Properties

### 13.12.5 currentValue as Double

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The current value.

**Notes:**

Attempting to set the current value to a value that is not coincident with a step will result in a value corresponding to the nearest step being assigned to the current value.

(Read only property)

### 13.12.6 defaultValue as Double

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The default value.

**Notes:**

Attempting to set the default value to a value that is not coincident with a step will result in a value corresponding to the nearest step being assigned to the default value.

(Read only property)

### 13.12.7 `maxValue` as Double

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The maximum value.

**Notes:** (Read only property)

### 13.12.8 `minValue` as Double

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The minimum value.

**Notes:** (Read only property)

### 13.12.9 `stepSize` as Double

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The step size.

**Notes:** (Read only property)

## 13.13 class ICScannerFeatureTemplateMBS

### 13.13.1 class ICScannerFeatureTemplateMBS

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** ICScannerFeatureTemplate object is used to define a group of one or more rectangular scan areas that can be used with a scanner functional unit.

**Notes:**

Subclass of the ICScannerFeatureMBS class.

This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

### 13.13.2 Methods

### 13.13.3 Constructor

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

### 13.13.4 targets as ICScannerFeatureMBS()

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The target features.

## 13.14 class ICScannerFunctionalUnitDocumentFeederMBS

### 13.14.1 class ICScannerFunctionalUnitDocumentFeederMBS

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** ICScannerFunctionalUnitDocumentFeeder is a concrete subclass of ICScannerFunctionalUnit class.

**Notes:**

ICScannerDevice creates instances of this class.

This represents the document feeder unit on the scanner.

Subclass of the ICScannerFunctionalUnitMBS class.

This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

### 13.14.2 Methods

### 13.14.3 Constructor

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

### 13.14.4 Properties

#### 13.14.5 documentLoaded as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Indicates whether the feeder has documents to scan.

**Notes:**

This value will change when the document is loaded or removed from the feeder, if the scanner module has the capability to detect this state.

(Read only property)

#### 13.14.6 duplexScanningEnabled as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Indicates whether duplex scanning is enabled.

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

### 13.14.7 evenPageOrientation as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Desired orientation of the even pages of the scanned document.

**Notes:**

This property is set to ICEXIFOrientation1 initially.

Possible values:

ICEXIFOrientation1	1	Normal
ICEXIFOrientation2	2	Flipped horizontally
ICEXIFOrientation3	3	Rotated 180
ICEXIFOrientation4	4	Flipped vertically
ICEXIFOrientation5	5	Rotated 90 CCW and flipped vertically
ICEXIFOrientation6	6	Rotated 90 CCW
ICEXIFOrientation7	7	Rotated 90 CW and flipped vertically
ICEXIFOrientation8	8	Rotated 90 CW

(Read and Write property)

### 13.14.8 oddPageOrientation as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Desired orientation of the odd pages of the scanned document.

**Notes:**

This property is set to ICEXIFOrientation1 initially.

Possible values:

ICEXIFOrientation1	1	Normal
ICEXIFOrientation2	2	Flipped horizontally
ICEXIFOrientation3	3	Rotated 180
ICEXIFOrientation4	4	Flipped vertically
ICEXIFOrientation5	5	Rotated 90 CCW and flipped vertically
ICEXIFOrientation6	6	Rotated 90 CCW
ICEXIFOrientation7	7	Rotated 90 CW and flipped vertically
ICEXIFOrientation8	8	Rotated 90 CW

(Read and Write property)

### 13.14.9 reverseFeederPageOrder as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Indicates whether the document feeder reads pages from back to front.

**Notes:** (Read only property)

### 13.14.10 supportsDuplexScanning as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Indicates whether duplex scanning is supported.

**Notes:** (Read only property)

## 13.15 class ICScannerFunctionalUnitFlatbedMBS

### 13.15.1 class ICScannerFunctionalUnitFlatbedMBS

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** ICScannerFunctionalUnitFlatbedMBS is a concrete subclass of ICScannerFunctionalUnitMBS class.

**Notes:**

ICScannerDevice creates instances of this class.

This represents the flatbed unit on the scanner.

Subclass of the ICScannerFunctionalUnitMBS class.

This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

### 13.15.2 Methods

### 13.15.3 Constructor

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

## 13.16 class ICScannerFunctionalUnitMBS

### 13.16.1 class ICScannerFunctionalUnitMBS

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** ICScannerFunctionalUnit is an abstract class that represents a scanner functiona unit.

**Notes:**

ImageCaptureCore defines three concrete subclasses of ICScannerFunctionalUnit: ICScannerFunctionalUnitFlatbed, ICScannerFunctionalUnitPositiveTransparency, ICScannerFunctionalUnitNegativeTransparency and ICScannerFunctionalUnitDocumentFeeder. ICScannerDevice creates instances of these concrete subclasses.

This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

### 13.16.2 Methods

### 13.16.3 Constructor

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

### 13.16.4 templates as ICScannerFeatureTemplateMBS()

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** An array of objects of type ICScannerFeatureTemplate.

### 13.16.5 vendorFeatures as ICScannerFeatureMBS()

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** An array of objects of type ICScannerFeature.

### 13.16.6 Properties

### 13.16.7 acceptsThresholdForBlackAndWhiteScanning as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Indicates if this functional unit accepts threshold value to be used when performing a scan in black & white.

**Notes:** (Read only property)

### 13.16.8 bitDepth as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The bit depth to use when performing the final scan.

**Notes:**

This will always be one of the supported bit depths.  
(Read and Write property)

### 13.16.9 canPerformOverviewScan as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Indicates if this functional unit can perform an overview scan.

**Notes:**

Not all functional units can perform an overview scan. For example, a document feeder or a sheet feeder unit cannot perform an overview scan.  
(Read only property)

### 13.16.10 defaultThresholdForBlackAndWhiteScanning as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Default threshold value used when performing a scan in black & white.

**Notes:**

This value is from 0 to 255.  
(Read only property)

### 13.16.11 documentSize as NSSizeMBS

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Document size of the current document type expressed in current measurement unit.

**Notes:** (Read only property)

### 13.16.12 documentType as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Current document type.

**Notes:**

This will always be one of the supported document types.

(Read and Write property)

### 13.16.13 measurementUnit as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Current measurement unit. This will always be one of the supported measurement units.

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

### 13.16.14 nativeXResolution as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Optical resolution along the X axis.

**Notes:** (Read only property)

### 13.16.15 nativeYResolution as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Optical resolution along the Y axis.

**Notes:** (Read only property)

### 13.16.16 overviewImage as Variant

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Overview scan image.

**Notes:**

This property will be nil for functional units that do not support overview scans.

Value is a CGImageMBS.

(Read only property)

### 13.16.17 overviewResolution as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Overview image resolution.

**Notes:**

Value assigned to this will be constrained by resolutions allowed by the device.

(Read and Write property)

### 13.16.18 `overviewScanInProgress` as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Indicates if an overview scan is in progress.

**Notes:** (Read only property)

### 13.16.19 `physicalSize` as `NSSizeMBS`

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Physical size of the scan area in current measurement unit.

**Notes:** (Read only property)

### 13.16.20 `pixelDataType` as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The pixel data type.  
**Notes:**

See `ICScannerPixelFormat*` constants.

(Read and Write property)

### 13.16.21 `preferredResolutions` as `NSIndexSetMBS`

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Current scan resolution.

**Notes:**

This will always be one of the supported resolution values.

(Read only property)

### 13.16.22 `preferredScaleFactors` as `NSIndexSetMBS`

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Preferred scale factors in percentage.

**Notes:** (Read only property)

### 13.16.23 resolution as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Current scan resolution.

**Notes:**

This will always be one of the supported resolution values.  
(Read and Write property)

### 13.16.24 scaleFactor as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Current scale factor.

**Notes:**

This will always be one of the supported scale factor values.  
(Read only property)

### 13.16.25 scanArea as NSRectMBS

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This property along with scanAreaOrientation describes the area to be scanned.

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

### 13.16.26 scanAreaOrientation as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Desired orientation of the scan area.

**Notes:**

This property along with scanArea describes the area to be scanned.  
This property is set to ICEXIFOrientation1 initially. This property is not used by the ICScannerFunctionalUnitDocumentFeeder subclass.

Possible values:

(Read and Write property)

ICEXIFOrientation1	1	Normal
ICEXIFOrientation2	2	Flipped horizontally
ICEXIFOrientation3	3	Rotated 180
ICEXIFOrientation4	4	Flipped vertically
ICEXIFOrientation5	5	Rotated 90 CCW and flipped vertically
ICEXIFOrientation6	6	Rotated 90 CCW
ICEXIFOrientation7	7	Rotated 90 CW and flipped vertically
ICEXIFOrientation8	8	Rotated 90 CW

### 13.16.27 scanInProgress as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Indicates if a scan is in progress.

**Notes:** (Read only property)

### 13.16.28 scanProgressPercentDone as Double

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Indicates percentage of scan completed.

**Notes:** (Read only property)

### 13.16.29 state as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Indicates the current state of the functional unit.

**Notes:**

See ICScannerFunctionalUnitState\* constants.  
(Read only property)

### 13.16.30 supportedBitDepths as NSIndexSetMBS

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Supported bit depths.

**Notes:**

The values in this set are valid values defined by ICScannerBitDepth.  
(Read only property)

**13.16.31 supportedDocumentTypes as NSIndexSetMBS**

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Supported document types.

**Notes:**

The values in this set are valid values defined by ICScannerDocumentType.  
(Read only property)

**13.16.32 supportedMeasurementUnits as NSIndexSetMBS**

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Supported measurement units. The values in this set are valid values defined by ICScannerMeasurementUnit.

**Notes:** (Read only property)

**13.16.33 supportedResolutions as NSIndexSetMBS**

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Supported scan resolutions in DPI.

**Notes:** (Read only property)

**13.16.34 supportedScaleFactors as NSIndexSetMBS**

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Supported scale factors in percentage.

**Notes:** (Read only property)

**13.16.35 thresholdForBlackAndWhiteScanning as Integer**

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Threshold value to be used when performing a scan in black & white.

**Notes:**

This value should be from 0 to 255.  
(Read and Write property)

### 13.16.36 type as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Functional unit type.

**Notes:**

See `ICScannerFunctionalUnitType*` constants.  
(Read only property)

### 13.16.37 usesThresholdForBlackAndWhiteScanning as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Indicates if this functional unit uses threshold value to be used when performing a scan in black & white.

**Notes:** (Read only property)

### 13.16.38 Constants

#### 13.16.39 ICScannerBitDepth16Bits = 16

Plugin Version: 14.3. **Function:** One of the possible number of bits per channel in the scanned image.

**Notes:** Image with 16 bits per channel.

#### 13.16.40 ICScannerBitDepth1Bit = 1

Plugin Version: 14.3. **Function:** One of the possible number of bits per channel in the scanned image.

**Notes:** 1-bit image.

#### 13.16.41 ICScannerBitDepth8Bits = 8

Plugin Version: 14.3. **Function:** One of the possible number of bits per channel in the scanned image.

**Notes:** Image with 8 bits per channel.

#### 13.16.42 ICScannerColorDataFormatTypeChunky = 0

Plugin Version: 14.3. **Function:** One of the color data formats.

**Notes:**

For multi-channel data (e.g., RGB) data from all channels are interleaved. Identifies color data formats. Only relevant for multi-channel data. Corresponds to "ICAP\_PLANARCHUNKY" of the TWAIN Specification.

#### 13.16.43 ICScannerColorDataFormatTypePlanar = 1

Plugin Version: 14.3. **Function:** One of the color data formats.

**Notes:**

For multi-channel data (e.g., RGB) each channel is transferred sequentially. Identifies color data formats. Only relevant for multi-channel data. Corresponds to "ICAP\_PLANARCHUNKY" of the TWAIN Specification.

#### 13.16.44 ICScannerDocumentType10 = 25

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** A10, 26.00 mm x 37.00 mm

#### 13.16.45 ICScannerDocumentType10R = 67

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** 10R, 10" x 12" 254.00 mm x 304.80 mm 5:6

#### 13.16.46 ICScannerDocumentType110 = 72

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** Instamatic 110, 13.00 mm x 17.00 mm

#### 13.16.47 ICScannerDocumentType11R = 69

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** 11R, 11" x 14" 279.40 mm x 355.60 mm 11:14

**13.16.48 ICSscannerDocumentType12R = 70**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** 12R, 12" x 15" 304.80 mm x 381.00 mm 4:5

**13.16.49 ICSscannerDocumentType135 = 76**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** Standard 35 mm, 36.00 mm x 24.00 mm

**13.16.50 ICSscannerDocumentType2A0 = 18**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** 2A0, 1189.00 mm x 1682.00 mm

**13.16.51 ICSscannerDocumentType3R = 61**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** 3R, 3.5" x 5" 88.90 mm x 127.00 mm 7:10

**13.16.52 ICSscannerDocumentType4A0 = 17**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** 4A0, 1682.00 mm x 2378.00 mm

**13.16.53 ICSscannerDocumentType4R = 62**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** 4R, 4" x 6" 101.60 mm x 152.40 mm 2:3

**13.16.54 ICSscannerDocumentType5R = 63**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** 5R, 5" x 7" 127.00 mm x 177.80 mm 5:7

**13.16.55 ICScannerDocumentType6R = 64**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** 6R, 6" x 8" 152.40 mm x 203.20 mm 3:4

**13.16.56 ICScannerDocumentType8R = 65**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** 8R, 8" x 10" 203.20 mm x 254.00 mm 4:5

**13.16.57 ICScannerDocumentTypeA0 = 19**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** A0, 841.00 mm x 1189.00 mm

**13.16.58 ICScannerDocumentTypeA1 = 20**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** A1, 594.00 mm x 841.00 mm

**13.16.59 ICScannerDocumentTypeA2 = 21**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** A2, 420.00 mm x 594.00 mm

**13.16.60 ICScannerDocumentTypeA3 = 11**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** A3, 297.00 mm x 420.00 mm

**13.16.61 ICScannerDocumentTypeA4 = 1**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** A4, 210.00 mm x 297.00 mm

**13.16.62 ICSscannerDocumentTypeA5 = 5**

Plugin Version: 14.3. **Function:** One of the document types.  
**Notes:** A5, 148.00 mm x 210.00 mm

**13.16.63 ICSscannerDocumentTypeA6 = 13**

Plugin Version: 14.3. **Function:** One of the document types.  
**Notes:** A6, 105.00 mm x 148.00 mm

**13.16.64 ICSscannerDocumentTypeA7 = 22**

Plugin Version: 14.3. **Function:** One of the document types.  
**Notes:** A7, 74.00 mm x 105.00 mm

**13.16.65 ICSscannerDocumentTypeA8 = 23**

Plugin Version: 14.3. **Function:** One of the document types.  
**Notes:** A8, 52.00 mm x 74.00 mm

**13.16.66 ICSscannerDocumentTypeA9 = 24**

Plugin Version: 14.3. **Function:** One of the document types.  
**Notes:** A9, 37.00 mm x 52.00 mm

**13.16.67 ICSscannerDocumentTypeAPSC = 74**

Plugin Version: 14.3. **Function:** One of the document types.  
**Notes:** APS Classic, 25.10 mm x 16.70 mm

**13.16.68 ICSscannerDocumentTypeAPSH = 73**

Plugin Version: 14.3. **Function:** One of the document types.  
**Notes:** APS High Definition, 30.20 mm x 16.70 mm

**13.16.69 ICScannerDocumentTypeAPSP = 75**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** APS Panoramic, 30.20 mm x 9.50 mm

**13.16.70 ICScannerDocumentTypeB5 = 2**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** B5/JIS B5, 182.00 mm x 257.00 mm

**13.16.71 ICScannerDocumentTypeBusinessCard = 53**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** Business Card, 90.00 mm x 55.00 mm

**13.16.72 ICScannerDocumentTypeC0 = 44**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** C0, 917.00 mm x 1297.00 mm

**13.16.73 ICScannerDocumentTypeC1 = 45**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** C1, 648.00 mm x 917.00 mm

**13.16.74 ICScannerDocumentTypeC10 = 51**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** C10, 28.00 mm x 40.00 mm

**13.16.75 ICScannerDocumentTypeC2 = 46**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** C2, 458.00 mm x 648.00 mm

**13.16.76 ICSscannerDocumentTypeC3 = 47**

Plugin Version: 14.3. **Function:** One of the document types.  
**Notes:** C3, 324.00 mm x 458.00 mm

**13.16.77 ICSscannerDocumentTypeC4 = 14**

Plugin Version: 14.3. **Function:** One of the document types.  
**Notes:** C4, 229.00 mm x 324.00 mm

**13.16.78 ICSscannerDocumentTypeC5 = 15**

Plugin Version: 14.3. **Function:** One of the document types.  
**Notes:** C5, 162.00 mm x 229.00 mm

**13.16.79 ICSscannerDocumentTypeC6 = 16**

Plugin Version: 14.3. **Function:** One of the document types.  
**Notes:** C6, 114.00 mm x 162.00 mm

**13.16.80 ICSscannerDocumentTypeC7 = 48**

Plugin Version: 14.3. **Function:** One of the document types.  
**Notes:** C7, 81.00 mm x 114.00 mm

**13.16.81 ICSscannerDocumentTypeC8 = 49**

Plugin Version: 14.3. **Function:** One of the document types.  
**Notes:** C8, 57.00 mm x 81.00 mm

**13.16.82 ICSscannerDocumentTypeC9 = 50**

Plugin Version: 14.3. **Function:** One of the document types.  
**Notes:** C9, 40.00 mm x 57.00 mm

### 13.16.83 ICScannerDocumentTypeDefault = 0

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** This is the platten size. Not valid for scanners without a platten.

### 13.16.84 ICScannerDocumentTypeE = 60

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** Japanese E, 3.25" x 4.75" 82.55 mm x 120.65 mm 11:16

### 13.16.85 ICScannerDocumentTypeISOB0 = 26

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** ISO B0, 1000.00 mm x 1414.00 mm

### 13.16.86 ICScannerDocumentTypeISOB1 = 27

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** ISO B1, 707.00 mm x 1000.00 mm

### 13.16.87 ICScannerDocumentTypeISOB10 = 33

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** ISO B10, 31.00 mm x 44.00 mm

### 13.16.88 ICScannerDocumentTypeISOB2 = 28

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** ISO B2, 500.00 mm x 707.00 mm

### 13.16.89 ICScannerDocumentTypeISOB3 = 12

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** B3/ISO B3, 353.00 mm x 500.00 mm

**13.16.90 ICScannerDocumentTypeISOB4 = 6**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** B4/ISO B4, 250.00 mm x 353.00 mm

**13.16.91 ICScannerDocumentTypeISOB5 = 29**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** ISO B5, 176.00 mm x 250.00 mm

**13.16.92 ICScannerDocumentTypeISOB6 = 7**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** B6/ISO B6, 125.00 mm x 176.00 mm

**13.16.93 ICScannerDocumentTypeISOB7 = 30**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** ISO B7, 88.00 mm x 125.00 mm

**13.16.94 ICScannerDocumentTypeISOB8 = 31**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** ISO B8, 62.00 mm x 88.00 mm

**13.16.95 ICScannerDocumentTypeISOB9 = 32**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** ISO B9, 44.00 mm x 62.00 mm

**13.16.96 ICScannerDocumentTypeJISB0 = 34**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** JIS B0, 1030.00 mm x 1456.00 mm

**13.16.97 ICScannerDocumentTypeJISB1 = 35**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** JIS B1, 728.00 mm x 1030.00 mm

**13.16.98 ICScannerDocumentTypeJISB10 = 43**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** JIS B10, 32.00 mm x 45.00 mm

**13.16.99 ICScannerDocumentTypeJISB2 = 36**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** JIS B2, 515.00 mm x 728.00 mm

**13.16.100 ICScannerDocumentTypeJISB3 = 37**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** JIS B3, 364.00 mm x 515.00 mm

**13.16.101 ICScannerDocumentTypeJISB4 = 38**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** JIS B4, 257.00 mm x 364.00 mm

**13.16.102 ICScannerDocumentTypeJISB6 = 39**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** JIS B6, 128.00 mm x 182.00 mm

**13.16.103 ICScannerDocumentTypeJISB7 = 40**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** JIS B7, 91.00 mm x 128.00 mm

**13.16.104 ICSscannerDocumentTypeJISB8 = 41**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** JIS B8, 64.00 mm x 91.00 mm

**13.16.105 ICScannerDocumentTypeJISB9 = 42**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** JIS B9, 45.00 mm x 64.00 mm

**13.16.106 ICScannerDocumentTypeLF = 78**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** Large Format, 100.00 mm x 120.00 mm

**13.16.107 ICScannerDocumentTypeMF = 77**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** Medium Format, 60.00 mm x 60.00 mm

**13.16.108 ICScannerDocumentTypeS10R = 68**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** S10R, 10" x 15" 254.00 mm x 381.00 mm 2:3

**13.16.109 ICScannerDocumentTypeS12R = 71**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** S12R, 12" x 18" 304.80 mm x 457.20 mm 2:3

**13.16.110 ICScannerDocumentTypeS8R = 66**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** S8R 8" x 12" 203.20 mm x 304.80 mm 2:3

**13.16.111 ICScannerDocumentTypeUSExecutive = 10**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** US Executive, 7.25" x 10.5", 184.15 mm x 266.70 mm

**13.16.112 ICScannerDocumentTypeUSLedger = 9**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** US Ledger, 11" x 17.0", 279.40 mm x 431.80 mm

**13.16.113 ICScannerDocumentTypeUSLegal = 4**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** US Legal, 8.5" x 14.0", 215.90 mm x 355.60 mm

**13.16.114 ICScannerDocumentTypeUSLetter = 3**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** US Letter, 8.5" x 11.0", 215.90 mm x 279.40 mm

**13.16.115 ICScannerDocumentTypeUSStatement = 52**

Plugin Version: 14.3. **Function:** One of the document types.

**Notes:** US Statement, 5.5" x 8.5", 139.70 mm x 215.90 mm

**13.16.116 ICScannerFunctionalUnitStateOverviewScanInProgress = 4**

Plugin Version: 14.3. **Function:** A flag to indicate the scanner functional unit's state.

**Notes:** The scanner functional unit is performing an overview scan.

**13.16.117 ICScannerFunctionalUnitStateReady = 1**

Plugin Version: 14.3. **Function:** A flag to indicate the scanner functional unit's state.

**Notes:** The scanner functional unit is ready for operation.

**13.16.118 ICScannerFunctionalUnitStateScanInProgress = 2**

Plugin Version: 14.3. **Function:** A flag to indicate the scanner functional unit's state.

**Notes:** The scanner functional unit is performing a scan.

**13.16.119 ICScannerFunctionalUnitTypeDocumentFeeder = 3**

Plugin Version: 14.3. **Function:** One of the Scanner Functional Unit Types.

**Notes:** Document feeder functional unit.

**13.16.120 ICScannerFunctionalUnitTypeFlatbed = 0**

Plugin Version: 14.3. **Function:** One of the Scanner Functional Unit Types.

**Notes:** Flatbed functional unit.

**13.16.121 ICScannerFunctionalUnitTypeNegativeTransparency = 2**

Plugin Version: 14.3. **Function:** One of the Scanner Functional Unit Types.

**Notes:** Transparency functional unit for scanning negatives.

**13.16.122 ICScannerFunctionalUnitTypePositiveTransparency = 1**

Plugin Version: 14.3. **Function:** One of the Scanner Functional Unit Types.

**Notes:** Transparency functional unit for scanning positives.

**13.16.123 ICScannerMeasurementUnitCentimeters = 1**

Plugin Version: 14.3. **Function:** One of the units of measurement used by the scanner.

**Notes:** 1 cm = 1.00 cm or 1/2.54 inches

**13.16.124 ICScannerMeasurementUnitInches = 0**

Plugin Version: 14.3. **Function:** One of the units of measurement used by the scanner.

**Notes:** 1 inch = 2.54 cm

**13.16.125 ICScannerMeasurementUnitPicas = 2**

Plugin Version: 14.3. **Function:** One of the units of measurement used by the scanner.

**Notes:** 1 pica = .42333333 cm or 1/6 inches

**13.16.126 ICSscannerMeasurementUnitPixels = 5**

Plugin Version: 14.3. **Function:** One of the units of measurement used by the scanner.

**13.16.127 ICSscannerMeasurementUnitPoints = 3**

Plugin Version: 14.3. **Function:** One of the units of measurement used by the scanner.

**Notes:** 1 point = .0352777775 cm or 1/72 inches

**13.16.128 ICSscannerMeasurementUnitTwips = 4**

Plugin Version: 14.3. **Function:** One of the units of measurement used by the scanner.

**Notes:** 1 twip = .0001763888 cm or 1/1440 inches

**13.16.129 ICSscannerPixelFormatTypeBW = 0**

Plugin Version: 14.3. **Function:** One of the pixel data types.

**Notes:** Monochrome 1 bit pixel image.

**13.16.130 ICSscannerPixelFormatTypeCIEXYZ = 8**

Plugin Version: 14.3. **Function:** One of the pixel data types.

**Notes:** Color image in CIEXYZ color space.

**13.16.131 ICSscannerPixelFormatTypeCMY = 4**

Plugin Version: 14.3. **Function:** One of the pixel data types.

**Notes:** Color image in CMY color space.

**13.16.132 ICSscannerPixelFormatTypeCMYK = 5**

Plugin Version: 14.3. **Function:** One of the pixel data types.

**Notes:** Color image in CMYK color space.

**13.16.133 ICScannerPixelFormatTypeGray = 1**

Plugin Version: 14.3. **Function:** One of the pixel data types.

**Notes:** 8 bit pixel Gray color space.

**13.16.134 ICScannerPixelFormatTypePalette = 3**

Plugin Version: 14.3. **Function:** One of the pixel data types.

**Notes:** Indexed Color image.

**13.16.135 ICScannerPixelFormatTypeRGB = 2**

Plugin Version: 14.3. **Function:** One of the pixel data types.

**Notes:** Color image RGB color space.

**13.16.136 ICScannerPixelFormatTypeYUV = 6**

Plugin Version: 14.3. **Function:** One of the pixel data types.

**Notes:** Color image in YUV color space.

**13.16.137 ICScannerPixelFormatTypeYUVK = 7**

Plugin Version: 14.3. **Function:** One of the pixel data types.

**Notes:** Color image in YUVK color space.

## 13.17 class ICScannerFunctionalUnitNegativeTransparencyMBS

### 13.17.1 class ICScannerFunctionalUnitNegativeTransparencyMBS

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** ICScannerFunctionalUnitNegativeTransparencyMBS is a concrete subclass of ICScannerFunctionalUnitMBS class.

**Notes:**

ICScannerDeviceMBS creates instances of this class.

This represents the transparency unit on the scanner for scanning negatives.

Subclass of the ICScannerFunctionalUnitMBS class.

This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

### 13.17.2 Methods

### 13.17.3 Constructor

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

## 13.18 class ICScannerFunctionalUnitPositiveTransparencyMBS

### 13.18.1 class ICScannerFunctionalUnitPositiveTransparencyMBS

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** ICScannerFunctionalUnitPositiveTransparencyMBS is a concrete subclass of ICScannerFunctionalUnitMBS class.

**Notes:**

ICScannerDeviceMBS creates instances of this class.

This represents the transparency unit on the scanner for scanning postives.

Subclass of the ICScannerFunctionalUnitMBS class.

This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

### 13.18.2 Methods

### 13.18.3 Constructor

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

## 13.19 control IKCameraDeviceViewControlMBS

### 13.19.1 control IKCameraDeviceViewControlMBS

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The Xojo control for a Camera Device View.

**Notes:** For Xojo with Cocoa target.

### 13.19.2 Properties

### 13.19.3 View as IKCameraDeviceViewMBS

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The camera device view used in this control.

**Notes:** (Read only property)

### 13.19.4 Events

### 13.19.5 BoundsChanged

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The event called when the bounds, but not the frame, changed.

### 13.19.6 DidDownloadFile(CameraFile as ICCameraFileMBS, URL as string, File as folderItem, data as MemoryBlock, error as NSErrorMBS)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent for each file that gets downloaded.

**Notes:** Based on the IKCameraDeviceViewDisplayMode the downloaded file will be saved on disk using the 'url', or returned in memory as Memoryblock.

### 13.19.7 DidEncounterError(Error as NSErrorMBS)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent every time the camera device reports an error.

### 13.19.8 EnableMenuItems

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Function:** The event where you can enable menu items.

### 13.19.9 FrameChanged

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The event called when the frame changed.

### 13.19.10 GotFocus

Plugin Version: 16.5, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The control itself got focus.

**Notes:** This only fires if the control itself got focus and not a sub control.

### 13.19.11 LostFocus

Plugin Version: 16.5, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The control lost focus.

**Notes:** This only fires if the control itself lost focus and not a sub control.

### 13.19.12 MenuAction(HitItem as MenuItem) As Boolean

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Called when a menuitem is choosen.

**Notes:** This allows the control to react on its relevant menu items. Please return true if you handled it or false to give others a chance.

### 13.19.13 MouseDown(x as Integer, y as Integer, Modifiers as Integer) As Boolean

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The mouse button was pressed inside the controls region at the location passed in to x, y.

**Notes:**

The coordinates x and y are local to the control, i.e. they represent the position of the mouse click relative to the upper-left corner of the Control.

Return True if you are going to handle the MouseDown. In such a case:

- The Action event, if any, will not execute and the state of the object will not change.
- You will receive the MouseDrag and MouseUp events.

If you return False, the system handles the MouseDown so the above event handlers do not get called.

#### 13.19.14 MouseDrag(x as Integer, y as Integer)

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event fires continuously after the mouse button was pressed inside the Control.

**Notes:**

Mouse location is local to the control passed in to x, y.

As this event is fired continuously (hundreds of time per second), it is your responsibility to determine if the mouse has really moved.

#### 13.19.15 MouseUp(x as Integer, y as Integer)

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The mouse button was released.

**Notes:** Use the x and y parameters to determine if the mouse button was released within the control's boundaries.

#### 13.19.16 ScaleFactorChanged(NewFactor as Double)

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The backing store scale factor has changed.

**Notes:** Please invalidate any cached bitmaps or other relevant state.

#### 13.19.17 SelectionDidChange

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent when the user selection did change.

## 13.20 class IKCameraDeviceViewMBS

### 13.20.1 class IKCameraDeviceViewMBS

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Displays content of a Image Capture supported camera.

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

### 13.20.2 Methods

### 13.20.3 Constructor

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a new box view with size 100/100 and position 0/0

**Example:**

```
dim x as new IKCameraDeviceViewMBS
```

**Notes:** On success the handle property is not zero.

See also:

- 13.20.4 Constructor(Handle as Integer) 303
- 13.20.5 Constructor(left as Double, top as Double, width as Double, height as Double) 304

### 13.20.4 Constructor(Handle as Integer)

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates an object based on the given NSView handle.

**Example:**

```
dim t as new IKCameraDeviceViewMBS(0, 0, 100, 100)
```

```
dim v as new IKCameraDeviceViewMBS(t.handle)
```

```
MsgBox str(v.Bounds.Width)+" x "+str(v.Bounds.Height)
```

**Notes:** The handle is casted to a IKCameraDeviceView and the plugin retains this handle.

See also:

- 13.20.3 Constructor 303
- 13.20.5 Constructor(left as Double, top as Double, width as Double, height as Double) 304

### 13.20.5 Constructor(left as Double, top as Double, width as Double, height as Double)

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a new control with the given size and position.

**Example:**

```
dim left,top,width,height as Integer
// define rectangle
dim x as new IKCameraDeviceViewMBS(left, top, width, height)
```

**Notes:** On success the handle property is not zero.

See also:

- 13.20.3 Constructor 303
- 13.20.4 Constructor(Handle as Integer) 303

### 13.20.6 deleteSelectedItems

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Delete selected items.

### 13.20.7 downloadAllItems

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Download all items.

### 13.20.8 downloadSelectedItems

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Download selected items.

### 13.20.9 rotateLeft

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Rotate selected items left.

### 13.20.10 rotateRight

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Rotate selected items right.

### 13.20.11 selectIndexes(indexes as NSIndexSetMBS, extend as boolean)

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Setting current user selection.

### 13.20.12 Properties

### 13.20.13 cameraDevice as ICCameraDeviceMBS

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The camera device.  
**Notes:** (Read and Write property)

### 13.20.14 canDeleteSelectedItems as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Indicates if the user selected items can be deleted.  
**Notes:** (Read only property)

### 13.20.15 canDownloadSelectedItems as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Indicates if the user selected items can be downloaded.  
**Notes:** (Read only property)

### 13.20.16 canRotateSelectedItemsLeft as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Indicates if the user selected items can be rotated left.  
**Notes:** (Read only property)

### 13.20.17 `canRotateSelectedItemsRight` as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Indicates if the user selected items can be rotated right.

**Notes:** (Read only property)

### 13.20.18 `downloadsDirectoryControl` as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Show a downloads directory control.

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

### 13.20.19 `displaysPostProcessApplicationControl` as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Show a postprocessing application control.

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

### 13.20.20 `downloadAllControlLabel` as String

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Label for the 'Download All' control - allows for example renaming to 'Import All'.

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

### 13.20.21 `downloadsDirectory` as String

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Downloads directory. **Notes:**

Download location can be provided as file URL with `downloadsDirectory` property or as folderitem with `downloadsFolder` property.

(Read and Write property)

### 13.20.22 `downloadSelectedControlLabel` as String

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Label for the 'Download Selected' control.

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

### 13.20.23 downloadsFolder as FolderItem

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Downloads directory.  
**Notes:**

Download location can be provided as file URL with downloadsDirectory property or as folderitem with downloadsFolder property.

(Read and Write property)

### 13.20.24 hasDisplayModeIcon as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Support icon view display mode.

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

### 13.20.25 hasDisplayModeTable as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Support table view display mode.

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

### 13.20.26 iconSize as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** in icon mode: size of the image thumbnails.

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

### 13.20.27 mode as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Current display mode.

**Notes:**

see IKCameraDeviceViewDisplayMode constants.

(Read and Write property)

### 13.20.28 `postProcessApplication` as String

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Postprocessing application.

**Notes:**

A file URL to application.  
(Read and Write property)

### 13.20.29 `selectedIndexes` as `NSIndexSetMBS`

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Current user selection.

**Notes:** (Read only property)

### 13.20.30 `transferMode` as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Transfer mode either file based - or - in memory.

**Notes:**

See `IKCameraDeviceViewTransferMode` constants.  
(Read and Write property)

### 13.20.31 Events

#### 13.20.32 `DidDownloadFile(CameraFile as ICCameraFileMBS, URL as string, File as folderItem, data as MemoryBlock, error as NSErrorMBS)`

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent for each file that gets downloaded.

**Notes:** Based on the `IKCameraDeviceViewDisplayMode` the downloaded file will be saved on disk using the 'url', or returned in memory as `Memoryblock`.

#### 13.20.33 `DidEncounterError(Error as NSErrorMBS)`

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent every time the camera device reports an error.

### 13.20.34 SelectionDidChange

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent when the user selection did change.

### 13.20.35 Constants

#### 13.20.36 IKCameraDeviceViewDisplayModeIcon = 1

Plugin Version: 14.3. **Function:** One of the display modes.  
**Notes:** Show Icons

#### 13.20.37 IKCameraDeviceViewDisplayModeTable = 0

Plugin Version: 14.3. **Function:** One of the display modes.  
**Notes:** Show Table

#### 13.20.38 IKCameraDeviceViewTransferModeFileBased = 0

Plugin Version: 14.3. **Function:** One of the transfer mode constants.  
**Notes:** File based download.

#### 13.20.39 IKCameraDeviceViewTransferModeMemoryBased = 1

Plugin Version: 14.3. **Function:** One of the transfer mode constants.  
**Notes:** Memory based download.

## 13.21 control IKDeviceBrowserViewControlMBS

### 13.21.1 control IKDeviceBrowserViewControlMBS

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The Xojo control for a Device Browser View.

**Notes:** For Xojo with Cocoa target.

### 13.21.2 Properties

### 13.21.3 View as IKDeviceBrowserViewMBS

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The device browser view used in this control.

**Notes:** (Read only property)

### 13.21.4 Events

### 13.21.5 BoundsChanged

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The event called when the bounds, but not the frame, changed.

### 13.21.6 DidEncounterError(error as NSErrorMBS)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent every time the device browser reports an error.

### 13.21.7 EnableMenuItems

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Function:** The event where you can enable menu items.

### 13.21.8 FrameChanged

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The event called when the frame changed.

### 13.21.9 GotFocus

Plugin Version: 16.5, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The control itself got focus.

**Notes:** This only fires if the control itself got focus and not a sub control.

### 13.21.10 LostFocus

Plugin Version: 16.5, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The control lost focus.

**Notes:** This only fires if the control itself lost focus and not a sub control.

### 13.21.11 MenuAction(HitItem as MenuItem) As Boolean

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Called when a menuitem is chosen.

**Notes:** This allows the control to react on its relevant menu items. Please return true if you handled it or false to give others a chance.

### 13.21.12 MouseDown(x as Integer, y as Integer, Modifiers as Integer) As Boolean

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The mouse button was pressed inside the controls region at the location passed in to x, y.

**Notes:**

The coordinates x and y are local to the control, i.e. they represent the position of the mouse click relative to the upper-left corner of the Control.

Return True if you are going to handle the MouseDown. In such a case:

- The Action event, if any, will not execute and the state of the object will not change.
- You will receive the MouseDrag and MouseUp events.

If you return False, the system handles the MouseDown so the above event handlers do not get called.

### 13.21.13 `MouseDown(x as Integer, y as Integer)`

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event fires continuously after the mouse button was pressed inside the Control.

**Notes:**

Mouse location is local to the control passed in to x, y.

As this event is fired continuously (hundreds of time per second), it is your responsibility to determine if the mouse has really moved.

### 13.21.14 `MouseUp(x as Integer, y as Integer)`

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The mouse button was released.

**Notes:** Use the x and y parameters to determine if the mouse button was released within the control's boundaries.

### 13.21.15 `ScaleFactorChanged(NewFactor as Double)`

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The backing store scale factor has changed.

**Notes:** Please invalidate any cached bitmaps or other relevant state.

### 13.21.16 `SelectionDidChange(device as ICDeviceMBS)`

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent when the user selection did change.

**Notes:** The device may be a `ICCameraDeviceMBS` or a `ICScannerDeviceMBS`.

## 13.22 class IKDeviceBrowserViewMBS

### 13.22.1 class IKDeviceBrowserViewMBS

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Displays Image Capture cameras and scanners.

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

### 13.22.2 Methods

### 13.22.3 Constructor

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a new box view with size 100/100 and position 0/0

**Example:**

```
dim x as new IKDeviceBrowserViewMBS
```

**Notes:** On success the handle property is not zero.

See also:

- 13.22.4 Constructor(Handle as Integer) 313
- 13.22.5 Constructor(left as Double, top as Double, width as Double, height as Double) 314

### 13.22.4 Constructor(Handle as Integer)

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates an object based on the given NSView handle.

**Example:**

```
dim t as new IKDeviceBrowserViewMBS(0, 0, 100, 100)
```

```
dim v as new IKDeviceBrowserViewMBS(t.handle)
```

```
MsgBox str(v.Bounds.Width)+" x "+str(v.Bounds.Height)
```

**Notes:** The handle is casted to a IKDeviceBrowserView and the plugin retains this handle.

See also:

- 13.22.3 Constructor 313
- 13.22.5 Constructor(left as Double, top as Double, width as Double, height as Double) 314

### 13.22.5 Constructor(left as Double, top as Double, width as Double, height as Double)

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a new control with the given size and position.

**Example:**

```
dim left,top,width,height as Integer
// define rectangle
dim x as new IKDeviceBrowserViewMBS(left, top, width, height)
```

**Notes:** On success the handle property is not zero.

See also:

- 13.22.3 Constructor 313
- 13.22.4 Constructor(Handle as Integer) 313

### 13.22.6 Properties

#### 13.22.7 displaysLocalCameras as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** For device filtering - indicates that the IKDeviceBrowserView should include local cameras.

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

#### 13.22.8 displaysLocalScanners as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** for device filtering - indicates that the IKDeviceBrowserView should include local scanners.

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

#### 13.22.9 displaysNetworkCameras as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** for device filtering - indicates that the IKDeviceBrowserView should include network/shared cameras.

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

### 13.22.10 displaysNetworkScanners as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** for device filtering - indicates that the IKDeviceBrowserView should include network/shared scanners.

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

### 13.22.11 mode as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the supported display modes (table, outline, or icon mode).

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

### 13.22.12 selectedDevice as ICDeviceMBS

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** User selected device (ICCameraDevice or ICScannerDevice).

**Notes:** (Read only property)

### 13.22.13 Events

#### 13.22.14 DidEncounterError(error as NSErrorMBS)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent every time the device browser reports an error.

#### 13.22.15 SelectionDidChange(device as ICDeviceMBS)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent when the user selection did change.

**Notes:** The device may be a ICCameraDeviceMBS or a ICScannerDeviceMBS.

### 13.22.16 Constants

#### 13.22.17 IKDeviceBrowserViewDisplayModeIcon = 2

Plugin Version: 14.3. **Function:** One of the display modes.

**Notes:** Icon

**13.22.18 IKDeviceBrowserViewDisplayModeOutline = 1**

Plugin Version: 14.3. **Function:** One of the display modes.

**Notes:** Outline

**13.22.19 IKDeviceBrowserViewDisplayModeTable = 0**

Plugin Version: 14.3. **Function:** One of the display modes.

**Notes:** Table

## 13.23 control IKScannerDeviceViewControlMBS

### 13.23.1 control IKScannerDeviceViewControlMBS

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The Xojo control for a Scanner Device View.

**Notes:** For Xojo with Cocoa target.

### 13.23.2 Properties

### 13.23.3 View as IKScannerDeviceViewMBS

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The scanner view used in this control.

**Notes:** (Read only property)

### 13.23.4 Events

### 13.23.5 BoundsChanged

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The event called when the bounds, but not the frame, changed.

### 13.23.6 DidEncounterError(error as NSErrorMBS)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent every time the scanner device reports an error.

### 13.23.7 DidScanToBandData(data as ICScannerBandDataMBS, scanInfo as Dictionary, error as NSErrorMBS)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** For memory a based transfer this event is sent for every time an image band of data was scanned.

**Notes:** The 'data' parameter describes the scanned image data. Note that rotation/cropping/image adjustments are not applied yet. The 'scanInfo' parameter contains additional information (rotation angle, ...) that should be applied once the scan is completed.

### 13.23.8 DidScanToURL(url as String, file as FolderItem, fileData as MemoryBlock, error as NSErrorMBS)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** For file based transfer this event is sent for each image that gets scanned.

**Notes:** Based on the IKScannerDeviceViewTransferMode the downloaded file will be saved on disk using the 'url', or returned in memory as Memoryblock.

### 13.23.9 EnableMenuItems

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The event where you can enable menu items.

### 13.23.10 FrameChanged

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The event called when the frame changed.

### 13.23.11 GotFocus

Plugin Version: 16.5, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The control itself got focus.

**Notes:** This only fires if the control itself got focus and not a sub control.

### 13.23.12 LostFocus

Plugin Version: 16.5, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The control lost focus.

**Notes:** This only fires if the control itself lost focus and not a sub control.

### 13.23.13 MenuAction(HitItem as MenuItem) As Boolean

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Called when a menuitem is choosen.

**Notes:** This allows the control to react on its relevant menu items. Please return true if you handled it or false to give others a chance.

**13.23.14 MouseDown(x as Integer, y as Integer, Modifiers as Integer) As Boolean**

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The mouse button was pressed inside the controls region at the location passed in to x, y.

**Notes:**

The coordinates x and y are local to the control, i.e. they represent the position of the mouse click relative to the upper-left corner of the Control.

Return True if you are going to handle the MouseDown. In such a case:

- The Action event, if any, will not execute and the state of the object will not change.
- You will receive the MouseDrag and MouseUp events.

If you return False, the system handles the MouseDown so the above event handlers do not get called.

**13.23.15 MouseDrag(x as Integer, y as Integer)**

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event fires continuously after the mouse button was pressed inside the Control.

**Notes:**

Mouse location is local to the control passed in to x, y.

As this event is fired continuously (hundreds of times per second), it is your responsibility to determine if the mouse has really moved.

**13.23.16 MouseUp(x as Integer, y as Integer)**

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The mouse button was released.

**Notes:** Use the x and y parameters to determine if the mouse button was released within the control's boundaries.

**13.23.17 ScaleFactorChanged(NewFactor as Double)**

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The backing store scale factor has changed.

**Notes:** Please invalidate any cached bitmaps or other relevant state.

## 13.24 class IKScannerDeviceViewMBS

### 13.24.1 class IKScannerDeviceViewMBS

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** IKScannerDeviceView displays a UI to work with Image Capture supported scanners.

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

### 13.24.2 Methods

### 13.24.3 Constructor

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a new box view with size 100/100 and position 0/0

**Example:**

```
dim x as new IKScannerDeviceViewMBS
```

**Notes:** On success the handle property is not zero.

See also:

- 13.24.4 Constructor(Handle as Integer) 320
- 13.24.5 Constructor(left as Double, top as Double, width as Double, height as Double) 321

### 13.24.4 Constructor(Handle as Integer)

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates an object based on the given NSView handle.

**Example:**

```
dim t as new IKScannerDeviceViewMBS(0, 0, 100, 100)
dim v as new IKScannerDeviceViewMBS(t.handle)
```

```
MsgBox str(v.Bounds.Width)+" x "+str(v.Bounds.Height)
```

**Notes:** The handle is casted to a IKScannerDeviceView and the plugin retains this handle.

See also:

- 13.24.3 Constructor 320
- 13.24.5 Constructor(left as Double, top as Double, width as Double, height as Double) 321

### 13.24.5 Constructor(left as Double, top as Double, width as Double, height as Double)

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a new control with the given size and position.

**Example:**

```
dim left,top,width,height as Integer
// define rectangle
dim x as new IKScannerDeviceViewMBS(left, top, width, height)
```

**Notes:** On success the handle property is not zero.  
See also:

- 13.24.3 Constructor 320
- 13.24.4 Constructor(Handle as Integer) 320

### 13.24.6 Properties

#### 13.24.7 displaysDownloadsDirectoryControl as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Show a downloads directory control.

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

#### 13.24.8 displaysPostProcessApplicationControl as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Show a postprocessing application control.

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

#### 13.24.9 documentName as String

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Document name.

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

### 13.24.10 downloadsDirectory as String

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Downloads directory.  
**Notes:**

Download location can be provided as file URL with downloadsDirectory property or as folderitem with downloadsFolder property.  
(Read and Write property)

### 13.24.11 downloadsFolder as FolderItem

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Downloads directory.  
**Notes:**

Download location can be provided as file URL with downloadsDirectory property or as folderitem with downloadsFolder property.  
(Read and Write property)

### 13.24.12 hasDisplayModeAdvanced as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Support advanced scanning UI.  
**Notes:** (Read and Write property)

### 13.24.13 hasDisplayModeSimple as Boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Support a simple scanning UI.  
**Notes:** (Read and Write property)

### 13.24.14 mode as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Current display mode.  
**Notes:**

See IKScannerDeviceViewDisplayMode constants.  
(Read and Write property)

### 13.24.15 overviewControlLabel as String

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Label for the 'Overview' control.

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

### 13.24.16 postProcessApplication as String

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Postprocessing application.

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

### 13.24.17 scanControlLabel as String

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** label for the 'Scan' control.

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

### 13.24.18 scannerDevice as ICSscannerDeviceMBS

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The scanner device.

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

### 13.24.19 transferMode as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** transfer mode either file based - or - in memory.

**Notes:**

See IKScannerDeviceViewTransferMode constants.

(Read and Write property)

### 13.24.20 Events

#### 13.24.21 DidEncounterError(error as NSErrorMBS)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent every time the scanner device reports an error.

### 13.24.22 **DidScanToBandData(data as ICScannerBandDataMBS, scanInfo as Dictionary, error as NSErrorMBS)**

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** For memory a based transfer this event is sent for every time an image band of data was scanned.

**Notes:** The 'data' parameter describes the scanned image data. Note that rotation/cropping/image adjustments are not applied yet. The 'scanInfo' parameter contains additional information (rotation angle, ...) that should be applied once the scan is completed.

### 13.24.23 **DidScanToURL(url as String, file as FolderItem, fileData as MemoryBlock, error as NSErrorMBS)**

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** For file based transfer this event is sent for each image that gets scanned.

**Notes:** Based on the IKScannerDeviceViewTransferMode the downloaded file will be saved on disk using the 'url', or returned in memory as Memoryblock.

### 13.24.24 **Constants**

#### 13.24.25 **IKScannerDeviceViewDisplayModeAdvanced = 1**

Plugin Version: 14.3. **Function:** One of the display mode constants.

**Notes:** Advanced

#### 13.24.26 **IKScannerDeviceViewDisplayModeSimple = 0**

Plugin Version: 14.3. **Function:** One of the display mode constants.

**Notes:** Simple

#### 13.24.27 **IKScannerDeviceViewTransferModeFileBased = 0**

Plugin Version: 14.3. **Function:** One of the transport modes.

**Notes:** File based scan.

**13.24.28 IKScannerDeviceViewTransferModeMemoryBased = 1**

Plugin Version: 14.3. **Function:** One of the transport modes.

**Notes:** Memory based scan.

## 13.25 class ImageCaptureEventsMBS

### 13.25.1 class ImageCaptureEventsMBS

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Central class for Image Capture events.

**Notes:**

Whenever you have an ICA object, the plugin will register a delegate for it and dispatch all events here. For some view classes, events are in addition dispatched to the controls.

### 13.25.2 Properties

### 13.25.3 Handle as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

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

### 13.25.4 Events

### 13.25.5 cameraDeviceDidAddItem(camera as ICCameraDeviceMBS, item as ICCameraItemMBS)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent when an object is added to the device.

**Notes:** The object may be an instance of ICCameraFolder or ICCameraFile class.

### 13.25.6 cameraDeviceDidAddItems(camera as ICCameraDeviceMBS, items() as ICCameraItemMBS)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent when an object or objects are added to the device.

**Notes:**

Instead of receive one event per object, an array of objects is sent. The objects may be instances of ICCameraFolder or ICCameraFile class.

### 13.25.7 cameraDeviceDidBecomeReadyWithCompleteContentCatalog(camera as ICCameraDeviceMBS)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent when the camera device is done enumerating its content and is ready to receive requests.

**Notes:** A session must be opened on the device in order to enumerate its content and make it ready to receive requests.

### 13.25.8 cameraDeviceDidChangeCapability(camera as ICCameraDeviceMBS)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent when the capability of a device changes.

**Notes:** This usually happens when the device module takes control or yields control of the device.

### 13.25.9 cameraDeviceDidCompleteDeleteFilesWithError(camera as ICCameraDeviceMBS, error as NSErrorMBS)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Files have been deleted.

**Notes:** This event is sent after the camera device completes a delete operation initiated by sending a requestDeleteFiles event to that device.

### 13.25.10 cameraDeviceDidDownloadFile(file as ICCameraFileMBS, error as NSErrorMBS, options as Dictionary, device as ICCameraDeviceMBS)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Download of file finished.

### 13.25.11 cameraDeviceDidReadData(data as Memoryblock, file as ICCameraFileMBS, error as NSErrorMBS, device as ICCameraDeviceMBS)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Reading file data finished.

**13.25.12 cameraDeviceDidReceiveDownloadProgressForFile(file as ICCameraFileMBS, downloadedBytes as UInt64, maxBytes as UInt64)**

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent to the delegate to provide status of the download operation.

**13.25.13 cameraDeviceDidReceiveMetadataForItem(camera as ICCameraDeviceMBS, item as ICCameraItemMBS)**

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent when the metadata requested for an item on a device is available.

**13.25.14 cameraDeviceDidReceivePTPEvent(camera as ICCameraDeviceMBS, eventData as MemoryBlock)**

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent to the delegate to convey a PTP event.

**13.25.15 cameraDeviceDidReceiveThumbnailForItem(camera as ICCameraDeviceMBS, item as ICCameraItemMBS)**

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent when the thumbnail requested for an item on a device is available.

**13.25.16 cameraDeviceDidRemoveItem(camera as ICCameraDeviceMBS, item as ICCameraItemMBS)**

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent when an object is removed from the device.

**Notes:** The object may be an instance of ICCameraFolder or ICCameraFile class.

**13.25.17 cameraDeviceDidRemoveItems(camera as ICCameraDeviceMBS, items() as ICCameraItemMBS)**

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent when an object or objects are removed from the device.

**Notes:** The objects may be instances of ICCameraFolder or ICCameraFile class. This method supercedes cameraDeviceDidRemoveItem method described above.

### 13.25.18 cameraDeviceDidRenameItems(camera as ICCameraDeviceMBS, items() as ICCameraItemMBS)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent when an object or objects are renamed on the device.

**Notes:** The objects may be instances of ICCameraFolder or ICCameraFile class.

### 13.25.19 cameraDeviceDidSendPTPCommand(command as Memoryblock, data as Memoryblock, response as MemoryBlock, error as NSErrorMBS, device as ICCameraDeviceMBS)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Called when a requestSendPTPCommand event got a response or error.

### 13.25.20 cameraDeviceDidUploadFile(fileURL as string, file as FolderItem, error as NSErrorMBS, device as ICCameraDeviceMBS)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** A file upload was completed.

### 13.25.21 cameraDeviceViewDidDownloadFile(cameraDeviceView as IKCameraDeviceViewMBS, CameraFile as ICCameraFileMBS, URL as string, File as folderItem, data as MemoryBlock, error as NSErrorMBS)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent for each file that gets downloaded.

**Notes:** Based on the IKCameraDeviceViewDisplayMode the downloaded file will be saved on disk using the 'url', or returned in memory as Memoryblock.

### 13.25.22 cameraDeviceViewDidEncounterError(cameraDeviceView as IKCameraDeviceViewMBS, error as NSErrorMBS)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent every time the camera device reports an error.

### 13.25.23 cameraDeviceViewSelectionDidChange(cameraDeviceView as IKCameraDeviceViewMBS)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent when the user selection did change.

### 13.25.24 deviceBrowserDeviceDidChangeName(browser as ICDeviceBrowserMBS, device as ICDeviceMBS)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent if the name of a device changes.

**Notes:** This happens if the device module overrides the default name of the device reported by the device's transport layer, or if the name of the filesystem volume mounted by the device is changed by the user.

### 13.25.25 deviceBrowserDeviceDidChangeSharingState(browser as ICDeviceBrowserMBS, device as ICDeviceMBS)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent when the sharing state of a device has changes.

**Notes:** Any Image Capture client application can choose to share the device over the network using the sharing or webSharing facility in Image Capture.

### 13.25.26 deviceBrowserDidAddDevice(browser as ICDeviceBrowserMBS, device as ICDeviceMBS, moreComing as boolean)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent to the delegate to inform that a device has been added.

**Notes:** If several devices are found during the initial search, then this event is sent once for each device with the value of 'moreComing' set to true in each event except the last one.

### 13.25.27 deviceBrowserDidEnumerateLocalDevices(browser as ICDeviceBrowserMBS)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent after the device browser completes sending deviceBrowserDidAddDevice event for all local devices.

**Notes:** Detecting locally connected devices (USB and FireWire devices) is faster than detecting devices connected using a network protocol. An Image Capture client application may use this event to update its

user interface to let the user know that it has completed looking for locally connected devices and then start looking for network devices.

### 13.25.28 `deviceBrowserDidRemoveDevice(browser as ICDeviceBrowserMBS, device as ICDeviceMBS, moreGoing as boolean)`

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent to the delegate to inform that a device has been removed.

**Notes:** If several devices are removed at the same time, then this event is sent once for each device with the value of 'moreGoing' set to true in each event except the last one.

### 13.25.29 `deviceBrowserRequestsSelectDevice(browser as ICDeviceBrowserMBS, device as ICDeviceMBS)`

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent when an event that occurred on the device may be of interest to the client application.

**Notes:** In Mac OS X 10.6, this event is sent when a button is pressed on a device and the current application is the target for that button press. In the case of the button-press event, if a session is open on the device, this event will not be sent, instead the `deviceDidReceiveButtonPress` event is sent.

### 13.25.30 `deviceBrowserViewDidEncounterError(deviceBrowserView as IKDeviceBrowserViewMBS, error as NSErrorMBS)`

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent every time the device browser reports an error.

### 13.25.31 `deviceBrowserViewSelectionDidChange(deviceBrowserView as IKDeviceBrowserViewMBS, device as ICDeviceMBS)`

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent when the user selection did change.

**Notes:** The device may be a `ICCameraDeviceMBS` or a `ICScannerDeviceMBS`.

### 13.25.32 `deviceDidBecomeReady(device as ICDeviceMBS)`

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent when the device is ready to receive requests.

**Notes:** A camera device is ready, when it is ready to receive requests. A scanner device is ready when its functional units are found and the default functional unit is selected for use and is ready to receive requests. The device will become ready to receive requests only after a session is opened.

### 13.25.33 `deviceDidChangeName(device as ICDeviceMBS)`

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent if the name of a device changes.

**Notes:** This happens if the device module overrides the default name of the device reported by the device's transport layer, or if the name of the filesystem volume mounted by the device is changed by the user.

### 13.25.34 `deviceDidChangeSharingState(device as ICDeviceMBS)`

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent when the sharing state of a device has changes.

**Notes:** Any Image Capture client application can choose to share the device over the network using the sharing or webSharing facility in Image Capture.

### 13.25.35 `deviceDidCloseSessionWithError(device as ICDeviceMBS, error as NSErrorMBS)`

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent when a session is closed on a device.

**Notes:** This event completes the process initiated by the message "requestCloseSession" sent to the device object. This event is also sent if the device module in control of the device ceases to control the device.

### 13.25.36 `deviceDidEncounterError(device as ICDeviceMBS, error as NSErrorMBS)`

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent to the device delegate when a camera or scanner device encounters an error.

### 13.25.37 `deviceDidOpenSessionWithError(device as ICDeviceMBS, error as NSErrorMBS)`

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent when a session is opened on a device.

**Notes:** This event completes the process initiated by the requestOpenSession sent to the device object.

### 13.25.38 deviceDidReceiveButtonPress(device as ICDeviceMBS, buttonType as String)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent to the device delegate if a button is pressed on the device.

**Notes:** This event is sent only if a session is open on the device. The value of 'buttonType' argument is one of the ICButtonType\* values defined above.

### 13.25.39 deviceDidReceiveCustomNotification(device as ICDeviceMBS, notification as Dictionary, data as Memoryblock)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent to the device delegate the device sends a custom notification 'notification' with an arbitrary byte buffer 'data'.

**Notes:** This event is sent only if a session is open on the device.

### 13.25.40 deviceDidReceiveStatusInformation(device as ICDeviceMBS, status as Dictionary)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent when status information is received from a camera or a scanner.

**Notes:**

In Mac OS X 10.6 this event is not called for camera devices. This may change in the future releases of Mac OS X.

The 'status' dictionary contains two keys, ICStatusNotificationKey and ICLocalizedStatusNotificationKey, which are defined above. If type of 'device' is ICDeviceTypeScanner, the value of ICStatusNotificationKey will be one of the values defined in ICScannerDevice.h (e.g., ICScannerStatusWarmingUp, ICScannerStatusWarmUpDone, or ICScannerStatusRequestsOverviewScan); the value of ICLocalizedStatusNotificationKey will be a localized status information string suitable for displaying to the user.

### 13.25.41 deviceDidRemove(device as ICDeviceMBS)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent to the delegate to inform that a device has been removed.

**13.25.42** `deviceDidSendMessage(messageCode as UInt32, data as Memoryblock, error as NSErrorMBS, device as ICDeviceMBS)`

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The call to requestSendMessage was successful.

**13.25.43** `scannerDeviceDidBecomeAvailable(scanner as ICScannerDeviceMBS)`

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent when another client closes an open session on the scanner.

**Notes:** Scanners require exclusive access, only one client can open a session on a scanner. The scanner is available if it does not have a session opened by another client. Attempting to open a session on a scanner that already has an open session for another client will result in an error. A client that wants to open a session on a scanner as soon as it is available should implement this method and send "requestOpenSession" message to scanner object from that method.

**13.25.44** `scannerDeviceDidCompleteOverviewScanWithError(scanner as ICScannerDeviceMBS, error as NSErrorMBS)`

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent after the scanner device completes an overview scan.

**13.25.45** `scannerDeviceDidCompleteScanWithError(scanner as ICScannerDeviceMBS, error as NSErrorMBS)`

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent after the scanner device completes a scan.

**13.25.46** `scannerDeviceDidScanToBandData(scanner as ICScannerDeviceMBS, Data as ICScannerBandDataMBS)`

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent when the scanner device receives the requested scan progress notification and a band of data is sent for each notification received.

**Notes:** In memory transfer mode, this will send a band of size that has been selected by the client via the `maxMemoryBandSize` property.

**13.25.47 scannerDeviceDidScanToURL(scanner as ICScannerDeviceMBS, URL as string, file as folderitem, data as MemoryBlock)**

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent when the scanner device receives the requested scan.

**Notes:**

If selectedFunctionalUnit is a document feeder, then this event will be sent once for each scanned page. This event is sent when the scanner device receives the requested scan. If selectedFunctionalUnit is a document feeder, then this event will be sent once for each scanned page.

**13.25.48 scannerDeviceDidSelectFunctionalUnit(scanner as ICScannerDeviceMBS, functionalUnit as Variant, Error as NSErrorMBS)**

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent when a functional unit is selected on the scanner device.

**Notes:** A functional unit is selected immediately after the scanner device is instantiated and in response to requestSelectFunctionalUnit method.

**13.25.49 scannerDeviceViewDidEncounterError(scannerDeviceView as IKScannerDeviceViewMBS, error as NSErrorMBS)**

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is sent every time the scanner device reports an error.

**13.25.50 scannerDeviceViewDidScanToBandData(scannerDeviceView as IKScannerDeviceViewMBS, data as ICScannerBandDataMBS, scanInfo as Dictionary, error as NSErrorMBS)**

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** For memory a based transfer this event is sent for every time an image band of data was scanned.

**Notes:** The 'data' parameter describes the scanned image data. Note that rotation/cropping/image adjustments are not applied yet. The 'scanInfo' parameter contains additional information (rotation angle, ...) that should be applied once the scan is completed.

### 13.25.51 scannerDeviceViewDidScanToURL(scannerDeviceView as IScannerDeviceViewMBS, url as String, file as FolderItem, fileData as MemoryBlock, error as NSErrorMBS)

Plugin Version: 14.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** For file based transfer this event is sent for each image that gets scanned.

**Notes:** Based on the IScannerDeviceViewTransferMode the downloaded file will be saved on disk using the 'url', or returned in memory as Memoryblock.

### 13.25.52 Constants

#### 13.25.53 ICReturnCommunicationTimedOut = -9923

Plugin Version: 14.3. **Function:** One of the error constants.

**Notes:** Communication between different components of Image Capture timed out.

#### 13.25.54 ICReturnDeleteFilesCanceled = -9942

Plugin Version: 14.3. **Function:** One of the error constants.

**Notes:** A request to delete files was canceled.

#### 13.25.55 ICReturnDeleteFilesFailed = -9941

Plugin Version: 14.3. **Function:** One of the error constants.

**Notes:** A request to delete files failed.

#### 13.25.56 ICReturnDeviceFailedToCloseSession = -9928

Plugin Version: 14.3. **Function:** One of the error constants.

**Notes:** Failed to close a session on a specified device.

#### 13.25.57 ICReturnDeviceFailedToOpenSession = -9927

Plugin Version: 14.3. **Function:** One of the error constants.

**Notes:** Failed to open a session on a specified device.

**13.25.58 ICReturnDeviceFailedToTakePicture = -9944**

Plugin Version: 14.3. **Function:** One of the error constants.

**Notes:** Failed to take a tethered-capture picture on a camera device.

**13.25.59 ICReturnDeviceIsPasscodeLocked = -9943**

Plugin Version: 14.3. **Function:** One of the error constants.

**Notes:** The device is locked with a passcode. Its contents cannot be seen unless it is unlocked.

**13.25.60 ICReturnDeviceSoftwareInstallationCanceled = -9948**

Plugin Version: 14.3. **Function:** One of the error constants.

**Notes:** Software installation for the device has been canceled.

**13.25.61 ICReturnDeviceSoftwareInstallationCompleted = -9947**

Plugin Version: 14.3. **Function:** One of the error constants.

**Notes:** Software installation for the device has completed successfully.

**13.25.62 ICReturnDeviceSoftwareInstallationFailed = -9949**

Plugin Version: 14.3. **Function:** One of the error constants.

**Notes:** Software installation for the device failed.

**13.25.63 ICReturnDeviceSoftwareIsBeingInstalled = -9946**

Plugin Version: 14.3. **Function:** One of the error constants.

**Notes:** Failed to open session because software to communicate with the device is being installed.

**13.25.64 ICReturnDeviceSoftwareNotAvailable = -9950**

Plugin Version: 14.3. **Function:** One of the error constants.

**Notes:** Software for the device is not available from Apple.

**13.25.65 ICReturnDeviceSoftwareNotInstalled = -9945**

Plugin Version: 14.3. **Function:** One of the error constants.

**Notes:** Failed to open session because software to communicate with the device is not installed.

**13.25.66 ICReturnDownloadCanceled = -9937**

Plugin Version: 14.3. **Function:** One of the error constants.

**Notes:** A download operation was canceled.

**13.25.67 ICReturnDownloadFailed = -9934**

Plugin Version: 14.3. **Function:** One of the error constants.

**Notes:** A non-specific error occurred while downloading a file.

**13.25.68 ICReturnFailedToCompletePassThroughCommand = -9936**

Plugin Version: 14.3. **Function:** One of the error constants.

**Notes:** Failed to complete a pass-through (e.g., PTP pass-through) command.

**13.25.69 ICReturnFailedToCompleteSendMessageRequest = -9940**

Plugin Version: 14.3. **Function:** One of the error constants.

**Notes:** A request to send an event to a device failed.

**13.25.70 ICReturnFailedToDisableTethering = -9939**

Plugin Version: 14.3. **Function:** One of the error constants.

**Notes:** Failed to disable tethered-capture on a camera device.

**13.25.71 ICReturnFailedToEnableTethering = -9938**

Plugin Version: 14.3. **Function:** One of the error constants.

**Notes:** Failed to enable tethered-capture on a camera device.

**13.25.72 ICReturnInvalidParam = -9922**

Plugin Version: 14.3. **Function:** One of the error constants.

**Notes:** An invalid parameter was found.

**13.25.73 ICReturnReceivedUnsolicitedScannerErrorInfo = -9933**

Plugin Version: 14.3. **Function:** One of the error constants.

**Notes:** An unsolicited error information was received from a scanner.

**13.25.74 ICReturnReceivedUnsolicitedScannerStatusInfo = -9932**

Plugin Version: 14.3. **Function:** One of the error constants.

**Notes:** An unsolicited status information was received from a scanner.

**13.25.75 ICReturnScannerFailedToCompleteOverviewScan = -9930**

Plugin Version: 14.3. **Function:** One of the error constants.

**Notes:** Overview scan operation failed to complete on the specified scanner.

**13.25.76 ICReturnScannerFailedToCompleteScan = -9931**

Plugin Version: 14.3. **Function:** One of the error constants.

**Notes:** Scan operation failed to complete on the specified scanner.

**13.25.77 ICReturnScannerFailedToSelectFunctionalUnit = -9929**

Plugin Version: 14.3. **Function:** One of the error constants.

**Notes:** Failed to select a functional unit on the specified scanner.

**13.25.78 ICReturnScannerInUseByLocalUser = -9925**

Plugin Version: 14.3. **Function:** One of the error constants.

**Notes:** Scanner is being used by a remote user.

**13.25.79 ICReturnScannerInUseByRemoteUser = -9926**

Plugin Version: 14.3. **Function:** One of the error constants.

**Notes:** Scanner is being used by a local user.

**13.25.80 ICReturnScanOperationCanceled = -9924**

Plugin Version: 14.3. **Function:** One of the error constants.

**Notes:** The scan operation is canceled.

**13.25.81 ICReturnSuccess = 0**

Plugin Version: 14.3. **Function:** One of the error constants.

**Notes:** Operation successful.

**13.25.82 ICReturnUploadFailed = -9935**

Plugin Version: 14.3. **Function:** One of the error constants.

**Notes:** A non-specific error occurred while updownloading a file.

# Chapter 14

## ImageKit

### 14.1 class `IKImageBrowserCellMBS`

#### 14.1.1 class `IKImageBrowserCellMBS`

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The class for an image browser cell.

**Notes:**

The `IKImageBrowserCell` class is used to display a cell conforming to the `IKImageBrowserItem` Protocol in an `IKImageBrowserView`.

This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

#### 14.1.2 Methods

#### 14.1.3 `cellState` as Integer

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the current cell state of the receiver.

**Notes:**

The `IKImageBrowserView` creates thumbnails asynchronously. This method returns the current state. Available in OS X v10.6 and later.

#### 14.1.4 Constructor

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

### 14.1.5 frame as NSRectMBS

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the receiver's frame rectangle, which defines its position in its `IKImageBrowserView`.

**Notes:** Available in OS X v10.6 and later.

### 14.1.6 `IKImageBrowserCellBackgroundLayer` as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the layer types you can pass to `layerForType`.

**Notes:**

Layer displayed in the background.  
Available in OS X v10.6 and later.

### 14.1.7 `IKImageBrowserCellForegroundLayer` as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the layer types you can pass to `layerForType`.

**Notes:**

Layer displayed in the foreground.  
Available in OS X v10.6 and later.

### 14.1.8 `IKImageBrowserCellPlaceHolderLayer` as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the layer types you can pass to `layerForType`.

**Notes:**

Layer displayed as a placeholder when an image is not yet available.  
Available in OS X v10.6 and later.

### 14.1.9 `IKImageBrowserCellSelectionLayer` as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the layer types you can pass to `layerForType`.

**Notes:**

Layer displayed as the selection.  
Available in OS X v10.6 and later.

#### 14.1.10 imageAlignment as Integer

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the position of the cell's image in the frame.

#### 14.1.11 imageBrowserView as KImageBrowserViewMBS

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the view the receiver uses to display the cell.

**Notes:** Available in OS X v10.6 and later.

#### 14.1.12 imageContainerFrame as NSRectMBS

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the receiver's image container frame rectangle, which defines the position of the container of the thumbnail.

**Notes:**

The coordinates of image container frame, in the KImageBrowserView coordinate space.

The image frame is computed automatically from the image container frame by taking in account the image alignment and the image aspect ratio.

Subclasses can override this method to customize the position of the thumbnail container.

Available in OS X v10.6 and later.

#### 14.1.13 imageFrame as NSRectMBS

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the receiver's image frame rectangle, which defines the position of the thumbnail in its KImageBrowserView.

**Notes:**

Returns the coordinates of the frame, in the KImageBrowserView coordinate space.

It is the developer's responsibility to compute the imageFrame such that it lies entirely within the cell's frame rectangle.

Subclasses can override this method to customize the position of the thumbnail.

Available in OS X v10.6 and later.

#### 14.1.14 `indexOfRepresentedItem` as Integer

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the index of the receiver's represented object in the datasource.

**Notes:** Available in OS X v10.6 and later.

#### 14.1.15 `isSelected` as boolean

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns whether the cell is selected.

**Notes:**

Returns true if the cell is selected, otherwise false.

Subclasses should not override this method.

Available in OS X v10.6 and later.

#### 14.1.16 `layerForType(type as string)` as CALayerMBS

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns a layer for the specified position.

**Notes:**

type: A string representing the layer location. See Cell Layer Positions for possible values.

Return the CALayer to display in the specified position.

Subclasses can override this method to add a Core Animation layer to the cell

Available in OS X v10.6 and later.

#### 14.1.17 `opacity` as Double

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the opacity of the receiver.

**Notes:**

Possible values are between 0.0 (transparent) and 1.0 (opaque).

Subclasses can override this method to customize the opacity of the cell.

Available in OS X v10.6 and later.

#### 14.1.18 `representedItem` as Variant

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the receiver's represented object.

**Notes:**

Subclasses should not override this method.  
Available in OS X v10.6 and later.

**14.1.19 selectionFrame as NSRectMBS**

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the receiver's selection frame rectangle, which defines the position of the selection rectangle in its `IKImageBrowserView`.

**Notes:**

Subclasses can override this method to customize the position of the selection frame.  
Available in OS X v10.6 and later.

**14.1.20 subtitleFrame as NSRectMBS**

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the receiver's subtitle frame rectangle.

**Notes:**

The coordinates of the subtitle frame, in the `IKImageBrowserView` coordinate space.

It is the developer's responsibility to compute the `subtitleFrame` such that it lies entirely within the cell's frame rectangle.

Subclasses can override this method to customize the position of the subtitle.

Available in OS X v10.6 and later.

**14.1.21 titleFrame as NSRectMBS**

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the receiver's title frame rectangle.

**Notes:**

The coordinates of the title frame, in the `IKImageBrowserView` coordinate space.

It is the developer's responsibility to compute the `titleFrame` such that it lies entirely within the cell's frame rectangle.

Subclasses can override this method to customize the position of the title.

Available in OS X v10.6 and later.

### 14.1.22 Properties

#### 14.1.23 Handle as Integer

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

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

#### 14.1.24 Constants

#### 14.1.25 `IKImageStateInvalid = 1`

Plugin Version: 13.1. **Function:** One of the cell state constants.

**Notes:**

The thumbnail is invalid. For example, an unsupported image is provided.  
Available in OS X v10.6 and later.

#### 14.1.26 `IKImageStateNoImage = 0`

Plugin Version: 13.1. **Function:** One of the cell state constants.

**Notes:**

Returned until a thumbnail has been created from the represented object.  
Available in OS X v10.6 and later.

#### 14.1.27 `IKImageStateReady = 2`

Plugin Version: 13.1. **Function:** One of the cell state constants.

**Notes:**

The receiver's represented object has been set and the cell is ready to display.  
Available in OS X v10.6 and later.

## 14.2 class IKImageBrowserItemMBS

### 14.2.1 class IKImageBrowserItemMBS

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The class for items in image browser.

### 14.2.2 Methods

#### 14.2.3 Constructor(imageUID as string, imageRepresentationType as string, imageRepresentation as Variant, imageVersion as Integer = 1, imageTitle as string = "", imageSubtitle as string = "", isSelectable as boolean = true)

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a new item with given values.

#### 14.2.4 ItemWithCGImage(imageUID as string, Image as Variant, imageVersion as Integer = 1, imageTitle as string = "", imageSubtitle as string = "", isSelectable as boolean = true) as IKImageBrowserItemMBS

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a new item with given image.

#### 14.2.5 ItemWithData(imageUID as string, Data as Memoryblock, imageVersion as Integer = 1, imageTitle as string = "", imageSubtitle as string = "", isSelectable as boolean = true) as IKImageBrowserItemMBS

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a new item with given data.

#### 14.2.6 ItemWithFile(imageUID as string, file as folderitem, imageVersion as Integer = 1, imageTitle as string = "", imageSubtitle as string = "", isSelectable as boolean = true) as IKImageBrowserItemMBS

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a new item with given file.

### 14.2.7 ItemWithNSImage(imageUID as string, Image as NSImageMBS, imageVersion as Integer = 1, imageTitle as string = "", imageSubtitle as string = "", isSelectable as boolean = true) as IImageBrowserItemMBS

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a new item with given image.

### 14.2.8 ItemWithPath(imageUID as string, path as string, imageVersion as Integer = 1, imageTitle as string = "", imageSubtitle as string = "", isSelectable as boolean = true) as IImageBrowserItemMBS

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a new item with given path.

### 14.2.9 ItemWithURL(imageUID as string, URL as string, imageVersion as Integer = 1, imageTitle as string = "", imageSubtitle as string = "", isSelectable as boolean = true) as IImageBrowserItemMBS

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a new item with given URL.

## 14.2.10 Properties

### 14.2.11 Handle as Integer

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object handle.

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

### 14.2.12 imageRepresentation as Variant

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the image to display.

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

### 14.2.13 imageRepresentationType as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the representation type of the image to display.

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

### 14.2.14 imageSubtitle as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the display subtitle of the image.

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

### 14.2.15 imageTitle as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the display title of the image.

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

### 14.2.16 imageUID as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns a unique string that identifies the data source item.

**Notes:**

The image browser view uses this identifier to associate the data source item and its cache.  
(Read and Write computed property)

### 14.2.17 imageVersion as Integer

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the version of the item.

**Notes:**

The receiver can return a new version to let the image browser know that it should not use its cache for the item.  
(Read and Write computed property)

**14.2.18 isSelectable as boolean**

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns whether this item is selectable.

**Notes:**

True if the item is selectable; false otherwise.  
(Read and Write computed property)

## 14.3 control `IKImageBrowserViewControlMBS`

### 14.3.1 control `IKImageBrowserViewControlMBS`

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The control to wrap a `IKImageBrowserViewMBS`.

### 14.3.2 Properties

### 14.3.3 Scrollview as `NSScrollViewMBS`

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The scrollview we embed the image browser view inside.

**Notes:** (Read only property)

### 14.3.4 View as `IKImageBrowserViewMBS`

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The image browser view.

**Notes:** (Read only property)

### 14.3.5 Events

### 14.3.6 `backgroundWasRightClickedWithEvent(e as NSEventMBS)`

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Performs custom tasks when the user right-clicks the image browser view background.

**Notes:**

event: The event that invoked the method.

This method signals that the user either right-clicked the background or left-clicked it with the Alt key pressed. You can implement this method if you want to perform custom tasks at that time. Available in OS X v10.5 and later.

### 14.3.7 BoundsChanged

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The event called when the bounds, but not the frame, changed.

### 14.3.8 cellWasDoubleClickedAtIndex(index as Integer)

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Performs custom tasks when the user double-clicks an item in the image browser view.

**Notes:**

index: The index of the cell.

This method signals that the user double-clicked an item in the image browser view. You can implement this method if you want to perform custom tasks at that time.

Available in OS X v10.5 and later.

### 14.3.9 cellWasRightClickedAtIndex(index as Integer, e as NSEventMBS)

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Performs custom tasks when the user right-clicks an item in the image browser view.

**Notes:**

index: The index of the cell.

event: The event that invoked the method.

This method signals that the user either right-clicked an item in the browser or left-clicked the item with the Alt key pressed. You can implement this method if you want to perform custom tasks at that time.

Available in OS X v10.5 and later.

### 14.3.10 concludeDragOperation(sender as NSDraggingInfoMBS)

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Invoked when the dragging operation is complete, signaling the receiver to perform any necessary clean-up.

**Notes:**

sender: The object sending the message; use it to get details about the dragging operation.

For this method to be invoked, the previous `performDragOperation` must have returned true.

The destination implements this method to perform any tidying up that it needs to do, such as updating its visual representation now that it has incorporated the dragged data. This message is the last message sent from sender to the destination during a dragging session.

If the sender object's `animatesToDestination` property was set to true in `prepareForDragOperation`, then the drag image is still visible. At this point you should draw the final visual representation in the view. When this method returns, the drag image is removed from the screen. If your final visual representation matches the visual representation in the drag, this is a seamless transition.

### 14.3.11 `draggingEnded(sender as NSDraggingInfoMBS)`

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Implement this event to be notified when a drag operation ends in some other destination.

**Notes:**

sender: The object sending the message; use it to get details about the dragging operation.  
This method might be used by a destination doing auto-expansion in order to collapse any auto-expands.

### 14.3.12 `draggingEntered(sender as NSDraggingInfoMBS) as Integer`

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Invoked when the dragged image enters destination bounds or frame; delegate returns dragging operation to perform.

**Notes:**

sender: The object sending the message; use it to get details about the dragging operation.

Return one (and only one) of the dragging operation constants described in `NSDragOperation` in the `NSDraggingInfo` reference. The default return value (if this method is not implemented by the destination) is the value returned by the previous `draggingEntered:` message.

Invoked when a dragged image enters the destination but only if the destination has registered for the pasteboard data type involved in the drag operation. Specifically, this method is invoked when the mouse pointer enters the destination's bounds rectangle (if it is a view object) or its frame rectangle (if it is a window object).

This method must return a value that indicates which dragging operation the destination will perform when the image is released. In deciding which dragging operation to return, the method should evaluate the overlap between both the dragging operations allowed by the source (obtained from sender with the `draggingSourceOperationMask` method) and the dragging operations and pasteboard data types the destination itself supports.

If none of the operations is appropriate, this method should return `NSDragOperationNone` (this is the default response if the method is not implemented by the destination). A destination will still receive `draggingUp-`

dated: and draggingExited: even if NSDragOperationNone is returned by this method.

### 14.3.13 draggingExited(sender as NSDraggingInfoMBS)

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Invoked when the dragged image exits the destination's bounds rectangle (in the case of a view object) or its frame rectangle (in the case of a window object).

**Notes:** sender: The object sending the message; use it to get details about the dragging operation.

### 14.3.14 draggingSourceOperationMaskForLocal(flag as boolean) as Integer

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Returns an integer bit mask indicating the types of dragging operations the source object will allow to be performed on the dragged image's data.

**Notes:**

(Deprecated in OS X v10.7. This method is informally deprecated. It is only called if the source does not implement the NSDraggingSource protocol methods. This method will be formally deprecated in a future OS release.)

isLocal: True indicates that the candidate destination object (the window or view over which the dragged image is currently poised) is in the same application as the source, while a false value indicates that the destination object is in a different application.

A mask, created by combining the dragging operations listed in the NSDragOperation section of NSDraggingInfo protocol reference using the C bitwise OR operator. If the source does not permit any dragging operations, it should return NSDragOperationNone.

If not implemented, the default value is NSDragOperationCopy | NSDragOperationLink | NSDragOperationGeneric | NSDragOperationPrivate.

Available in OS X v10.0 and later. Deprecated in OS X v10.7.

### 14.3.15 draggingUpdated(sender as NSDraggingInfoMBS) as Integer

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Invoked periodically as the image is held within the destination area, allowing modification of the dragging operation or mouse-pointer position.

**Notes:**

sender: The object sending the message; use it to get details about the dragging operation.

Returns one (and only one) of the dragging operation constants described in `NSDragOperation` in the `NSDraggingInfo` reference. The default return value (if this method is not implemented by the destination) is the value returned by the previous `draggingEntered:` message.

For this to be invoked, the destination must have registered for the pasteboard data type involved in the drag operation. The messages continue until the image is either released or dragged out of the window or view.

This method provides the destination with an opportunity to modify the dragging operation depending on the position of the mouse pointer inside of the destination view or window object. For example, you may have several graphics or areas of text contained within the same view and wish to tailor the dragging operation, or to ignore the drag event completely, depending upon which object is underneath the mouse pointer at the time when the user releases the dragged image and the `performDragOperation` method is invoked.

You typically examine the contents of the pasteboard in the `draggingEntered` method, where this examination is performed only once, rather than in the `draggingUpdated` method, which is invoked multiple times.

Only one destination at a time receives a sequence of `draggingUpdated` messages. If the mouse pointer is within the bounds of two overlapping views that are both valid destinations, the uppermost view receives these messages until the image is either released or dragged out.

#### 14.3.16 EnableMenuItems

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Function:** The event where you can enable menu items.

#### 14.3.17 FrameChanged

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The event called when the frame changed.

#### 14.3.18 GotFocus

Plugin Version: 16.5, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The control itself got focus.

**Notes:** This only fires if the control itself got focus and not a sub control.

### 14.3.19 groupAtIndex(index as Integer) as Dictionary

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Returns the group at the specified index.

**Notes:**

index: The index of the group you want to retrieve.

Returns a dictionary that defines the group. The keys in this dictionary can be any of the following constants: `IKImageBrowserGroupStyle`, `IKImageBrowserGroupBackgroundColorKey`, `IKImageBrowserGroupTitleKey`, and `IKImageBrowserGroupRangeKey`. For more information on these constants, see `IKImageBrowserView` Class Reference.

This method is optional.

Available in OS X v10.5 and later.

### 14.3.20 itemAtIndex(index as Integer) as IKImageBrowserItemMBS

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Returns an object for the item in an image browser view that corresponds to the specified index.

**Notes:**

index: The index of the item you want to retrieve.

Return an `IKImageBrowserItem` object.

Your data source must implement this method. The returned object must implement the required methods of the `IKImageBrowserItem` protocol.

Available in OS X v10.5 and later.

### 14.3.21 LostFocus

Plugin Version: 16.5, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The control lost focus.

**Notes:** This only fires if the control itself lost focus and not a sub control.

### 14.3.22 MenuItemAction(HitItem as MenuItem) As Boolean

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Called when a menuitem is chosen.

**Notes:** This allows the control to react on its relevant menu items. Please return true if you handled it or false to give others a chance.

### 14.3.23 MouseDown(x as Integer, y as Integer, Modifiers as Integer) As Boolean

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The mouse button was pressed inside the controls region at the location passed in to x, y.

**Notes:**

The coordinates x and y are local to the control, i.e. they represent the position of the mouse click relative to the upper-left corner of the Control.

Return True if you are going to handle the MouseDown. In such a case:

- The Action event, if any, will not execute and the state of the object will not change.
- You will receive the MouseDrag and MouseUp events.

If you return False, the system handles the MouseDown so the above event handlers do not get called.

### 14.3.24 MouseDrag(x as Integer, y as Integer)

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event fires continuously after the mouse button was pressed inside the Control.

**Notes:**

Mouse location is local to the control passed in to x, y.

As this event is fired continuously (hundreds of time per second), it is your responsibility to determine if the mouse has really moved.

### 14.3.25 MouseUp(x as Integer, y as Integer)

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The mouse button was released.

**Notes:** Use the x and y parameters to determine if the mouse button was released within the control's boundaries.

### 14.3.26 `moveItemsAtIndexes(indexes as NSMutableIndexSet, destinationIndex as Integer) as boolean`

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Signals that the specified items should be moved to the specified destination.

**Notes:**

`indexes`: The indexes of the items that should be reordered.

`destinationIndex`: The starting index of the destination the items should be moved to.

Returns true if successful; false otherwise.

This method is optional. It is invoked by the image browser view after Image Kit determines that a reordering operation should be applied. The data source should update itself by reordering its elements.

Available in OS X v10.5 and later.

### 14.3.27 `numberOfGroups as Integer`

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Returns the number of groups in an image browser view.

**Notes:**

Return the number of groups.

This method is optional.

Available in OS X v10.5 and later.

### 14.3.28 `numberOfItems as Integer`

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Returns the number of records managed by the data source object.

**Notes:**

Return the number of records managed by the image browser view.

Your data source must implement this method. An `IKImageView` object uses this method to determine how many cells it should create and display.

Available in OS X v10.5 and later.

### 14.3.29 performDragOperation(sender as NSDraggingInfoMBS) as boolean

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Invoked after the released image has been removed from the screen, signaling the receiver to import the pasteboard data.

**Notes:**

sender: The object sending the message; use it to get details about the dragging operation.

Returns if the destination accepts the data, it returns true; otherwise it returns false. The default is to return false.

For this method to be invoked, the previous prepareForDragOperation message must have returned true. The destination should implement this method to do the real work of importing the pasteboard data represented by the image.

If the sender object's animatesToDestination was set to true in prepareForDragOperation, then setup any animation to arrange space for the drag items to animate to. Also at this time, enumerate through the dragging items to set their destination frames and destination images.

### 14.3.30 prepareForDragOperation(sender as NSDraggingInfoMBS) as boolean

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Invoked when the image is released, allowing the receiver to agree to or refuse drag operation.

**Notes:**

sender: The object sending the message; use it to get details about the dragging operation.

Return true if the receiver agrees to perform the drag operation and false if not.

This method is invoked only if the most recent draggingEntered or draggingUpdated event returned an acceptable drag-operation value.

If you want the drag items to animate from their current location on screen to their final location in your view, set the sender object's animatesToDestination property to true in your implementation of this event.

### 14.3.31 removeItemsAtIndexes(indexes as NSIndexSetMBS)

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Signals that a remove operation should be applied to the specified items.

**Notes:**

indexes: The indexes of the items that should be removed.

This method is optional. It is invoked by the image browser after Image Kit determines that a remove operation should be applied. In response, the data source should update itself by removing the specified items.

Available in OS X v10.5 and later.

### 14.3.32 ScaleFactorChanged(NewFactor as Double)

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The backing store scale factor has changed.

**Notes:** Please invalidate any cached bitmaps or other relevant state.

### 14.3.33 selectionDidChange

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Performs custom tasks when the selection changes.

**Notes:**

This method signals that the user changes the selection in the image browser view. You can implement this method if you want to perform custom tasks at that time.

Available in OS X v10.5 and later.

### 14.3.34 updateDraggingItemsForDrag(sender as NSDraggingInfoMBS)

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Invoked when the dragging images should be changed.

**Notes:**

sender: The object sending the message; use this object to get details about the dragging operation.

While a destination may change the dragging images at any time, it is recommended to wait until this method is called before updating the dragging images.

This allows the system to delay changing the dragging images until it is likely that the user will drop on this destination. Otherwise, the dragging images will change too often during the drag which would be distracting to the user.

During `enumerateDraggingItemsWithOptions` you may set non-acceptable drag items images to nil to hide them or use the enumeration option of `NSDraggingItemEnumerationClearNonenumeratedImages` If there

are items that you hide, then after enumeration, you need to set the `numberOfValidItemsForDrop` to the number of non-hidden drag items. However, if the valid item count is 0, then it is better to return `NSDragOperationNone` from your implementation of `draggingEntered` and, or `draggingUpdated` instead of hiding all drag items during enumeration.

Available in OS X v10.7 and later.

### 14.3.35 `wantsPeriodicDraggingUpdates` as boolean

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Asks the destination object whether it wants to receive periodic `draggingUpdated` events.

**Notes:**

Returns true if the destination wants to receive periodic `draggingUpdated` messages, false otherwise.

If the destination returns false, these messages are sent only when the mouse moves or a modifier flag changes. Otherwise the destination gets the default behavior, where it receives periodic `draggingUpdated` events even if nothing changes.

### 14.3.36 `writeItemsAtIndexes(indexes as NSIndexSetMBS, pasteboard as NSPasteboardMBS) as Integer`

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Signals that a drag should begin.

**Notes:**

`itemIndexes`: The indexes of the items that should be dragged.

`pasteboard`: The pasteboard to copy the items to.

Returns the number of items written to the pasteboard.

This method is optional. It is invoked after Image Kit determines that a drag should begin, but before the drag has been started.

Available in OS X v10.5 and later.

## 14.4 class `IKImageBrowserViewMBS`

### 14.4.1 class `IKImageBrowserViewMBS`

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The `IKImageBrowserView` class is a view for displaying and browsing a large amount of images and movies efficiently.

**Notes:**

Available in OS X v10.5 and later.  
Subclass of the `NSViewMBS` class.

### 14.4.2 Methods

#### 14.4.3 `cellForItemAtIndex(index as Integer)` as `IKImageBrowserCellMBS`

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the browser cell for the item at the specified index.

**Notes:**

Subclasses must not override this method.  
Available in OS X v10.6 and later.

#### 14.4.4 `collapseGroupAtIndex(index as Integer)`

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Collapses a group at the specified index.

**Notes:** index: The index of the group you want to collapse.

#### 14.4.5 `columnIndexesInRect(rect as NSRectMBS)` as `NSIndexSetMBS`

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the column indexes in the specified rectangle.

**Notes:**

rect: The rectangle in the view's coordinate system.  
Returns an index set containing the cell indexes.  
Available in OS X v10.6 and later.

### 14.4.6 Constructor

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a new control with size 100/100 and position 0/0

**Example:**

```
dim t as new IKImageBrowserViewMBS
```

**Notes:** On success the handle property is not zero.

See also:

- 14.4.7 Constructor(Handle as Integer) 363
- 14.4.8 Constructor(left as Double, top as Double, width as Double, height as Double) 363

### 14.4.7 Constructor(Handle as Integer)

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates an object based on the given IKImageBrowserView handle.

**Example:**

```
dim t as new IKImageBrowserViewMBS(0, 0, 100, 100)
```

```
dim v as new IKImageBrowserViewMBS(t.handle)
```

```
MsgBox str(v.Bounds.Width)+" x "+str(v.Bounds.Height)
```

**Notes:** The handle is casted to a IKImageBrowserView and the plugin retains this handle.

See also:

- 14.4.6 Constructor 363
- 14.4.8 Constructor(left as Double, top as Double, width as Double, height as Double) 363

### 14.4.8 Constructor(left as Double, top as Double, width as Double, height as Double)

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a new control with the given size and position.

**Example:**

```
dim x as new IKImageBrowserViewMBS(0, 0, 100, 20)
```

**Notes:** On success the handle property is not zero.

See also:

- 14.4.6 Constructor 363
- 14.4.7 Constructor(Handle as Integer) 363

### 14.4.9 Destructor

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The destructor.

### 14.4.10 dropOperation as Integer

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the current drop operation.

**Notes:**

Returns `IKImageBrowserDropOn` if the drop occurs on an item, otherwise `IKImageBrowserDropBefore`. The returned value is valid when a drop occurred and until next drop.

For example, given a browser with N cells, a cell of N-1 and operation of `IKImageBrowserDropOn` would specify a drop on the last cell. To specify a drop after the last cell, one would use an index of N and `IKImageBrowserDropBefore` for the operation.

Available in OS X v10.6 and later.

### 14.4.11 expandGroupAtIndex(index as Integer)

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Expands a group at the specified index.

**Notes:**

index: The index of the group you want to expand.

Available in OS X v10.5 and later.

### 14.4.12 getValue(name as String) as Variant

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Queries a value for a given key.

### 14.4.13 `IKImageBrowserBackgroundColorKey` as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the keys for image browser view options.

**Notes:**

A key for the background color of the image browser view. The associated value is a `NSColorMBS` object. Available in OS X v10.5 and later.

### 14.4.14 `IKImageBrowserCellsHighlightedTitleAttributesKey` as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the keys for image browser view options.

**Notes:**

A key for the highlighted title attribute for an item in the image browser view. The associated value is a Dictionary.

Available in OS X v10.5 and later.

### 14.4.15 `IKImageBrowserCellsOutlineColorKey` as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the keys for image browser view options.

**Notes:**

A key for the outline color for an item in the image browser view. The associated value is an `NSColorMBS` object.

Available in OS X v10.5 and later.

### 14.4.16 `IKImageBrowserCellsSubtitleAttributesKey` as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the keys for image browser view options.

**Notes:**

A key for a subtitle attribute for an item in the image browser view. The associated value is a dictionary. Available in OS X v10.5 and later.

### 14.4.17 `IKImageBrowserCellsTitleAttributesKey` as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the keys for image browser view options.

**Example:**

```
dim Imagebrowser as IKImageBrowserViewMBS // your control
dim d as new Dictionary
d.Value(NSAttributedStringMBS.NSForegroundColorAttributeName) = NSColorMBS.redColor

Imagebrowser.setValue Imagebrowser.IKImageBrowserCellsTitleAttributesKey, d
```

**Notes:**

A key for title attribute of an item in the image browser view. The associated value is a dDictionary. Available in OS X v10.5 and later.

### 14.4.18 `IKImageBrowserCGImageRepresentationType` as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the image representation types.

**Notes:** A CGImageRef object.

### 14.4.19 `IKImageBrowserCGImageSourceRepresentationType` as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the image representation types.

**Notes:** A CGImageSourceRef object.

### 14.4.20 `IKImageBrowserGroupBackgroundColorKey` as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the group attribute keys.

**Notes:**

A key for the background color of a group. The associated value is an NSColor object. This color is used only for the bezel style.

Available in OS X v10.5 and later.

#### 14.4.21 `IKImageBrowserGroupFooterLayer` as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the group attribute keys.

**Notes:**

A key for the footer layer of the group. The associated value is a `CALayer`. Available in OS X v10.6 and later.

#### 14.4.22 `IKImageBrowserGroupHeaderLayer` as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the group attribute keys.

**Notes:**

A key for the header layer of the group. The associated value is a `CALayer`. Available in OS X v10.6 and later.

#### 14.4.23 `IKImageBrowserGroupRangeKey` as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the group attribute keys.

**Notes:**

A key for the range of a group. The associated value is a `NSRangeMBS`. This is required if the view uses grouping. Available in OS X v10.5 and later.

#### 14.4.24 `IKImageBrowserGroupStyleKey` as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the group attribute keys.

**Notes:**

A key for the style of a group. The associated value is one of the constants defined in "Group Style Attributes". Available in OS X v10.5 and later.

#### 14.4.25 `IKImageBrowserGroupTitleKey` as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the group attribute keys.

**Notes:**

A key for the title of a group. The associated value is a string. This string is used for the disclosure style only.

Available in OS X v10.5 and later.

#### 14.4.26 `IKImageBrowserIconRefPathRepresentationType` as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the image representation types.

**Notes:** A path to an icon.

#### 14.4.27 `IKImageBrowserIconRefRepresentationType` as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the image representation types.

**Notes:** An icon.

#### 14.4.28 `IKImageBrowserNSBitmapImageRepresentationType` as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the image representation types.

**Notes:** An `NSBitmapImageRep` object.

#### 14.4.29 `IKImageBrowserNSDataRepresentationType` as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the image representation types.

**Notes:** Value for this key is a memoryblock.

#### 14.4.30 `IKImageBrowserNSImageRepresentationType` as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the image representation types.

**Notes:** An NSImage object.

#### 14.4.31 **IKImageBrowserNSURLRepresentationType** as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the image representation types.

**Notes:** An NSURL object.

#### 14.4.32 **IKImageBrowserPathRepresentationType** as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the image representation types.

**Notes:** A path representation (string).

#### 14.4.33 **IKImageBrowserPDFPageRepresentationType** as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the image representation types.

**Notes:** A PDFPage instance or a CGPDFPageRef.

#### 14.4.34 **IKImageBrowserQCCompositionPathRepresentationType** as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the image representation types.

**Notes:** A path (String) or URL (NSURL) to a Quartz Composer composition.

#### 14.4.35 **IKImageBrowserQCCompositionRepresentationType** as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the image representation types.

**Notes:** A QCComposition object.

#### 14.4.36 **IKImageBrowserQTMoviePathRepresentationType** as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the image representation types.

**Notes:** A path (string) or URL to a QuickTime movie.

#### 14.4.37 `IKImageBrowserQTMovieRepresentationType` as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the image representation types.

**Notes:** A QTMovie object.

#### 14.4.38 `IKImageBrowserQuickLookPathRepresentationType` as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the image representation types.

**Notes:** A path (string) or URL (NSURL) to load data using QuickLook.

#### 14.4.39 `IKImageBrowserSelectionColorKey` as string

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the keys for image browser view options.

**Notes:**

A key for the color that indicates a selection. The associated value is an NSColorMBS object. Available in OS X v10.5 and later.

#### 14.4.40 `indexAtLocationOfDroppedItem` as Integer

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the index of the cell where the drop operation occurred.

**Notes:**

Returns the index of the cell where the drop operation occurred.

The returned index is valid until the next drop occurs.

Available in OS X v10.5 and later.

#### 14.4.41 `indexOfItemAtPoint(point as NSPointMBS)` as Integer

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the index of the item at the specified location.

**Notes:** Returns the index of the item or NSNotFound (-1) if no item at this location.

**14.4.42 isGroupExpandedAtIndex(index as Integer) as boolean**

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns whether the group at the provided index is expanded.

**Notes:** Return true if the group is expanded; false otherwise.

**14.4.43 itemFrameAtIndex(index as Integer) as NSRectMBS**

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the frame rectangle for the item located at the specified index.

**Notes:**

index: The index of the item whose frame rectangle you want to obtain.

Return the frame rectangle of the item.

**14.4.44 newCellForRepresentedItem(item as IImageBrowserItemMBS) as IImageBrowserCellMBS**

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the cell to use for the specified item.

**Notes:**

Subclasses can override this method to customize the appearance of the cell that will represent anItem.

Available in OS X v10.6 and later.

**14.4.45 numberOfColumns as Integer**

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the current number of columns.

**Notes:** Available in OS X v10.6 and later.

**14.4.46 numberOfRows as Integer**

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the current number of rows.

**Notes:** Available in OS X v10.6 and later.

#### 14.4.47 `rectOfColumn(columnIndex as Integer)` as `NSRectMBS`

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the rectangle containing the specified column.

**Notes:**

Return a rectangle containing the column. Specified in the view's coordinate system.  
Available in OS X v10.6 and later.

#### 14.4.48 `rectOfRow(rowIndex as Integer)` as `NSRectMBS`

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the rectangle containing the specified row.

**Notes:**

Returns a rectangle containing the column. Specified in the view's coordinate system.  
Available in OS X v10.6 and later.

#### 14.4.49 `reloadData`

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Marks the receiver as needing its data reloaded.

#### 14.4.50 `rowIndexesInRect(rect as NSRectMBS)` as `NSIndexSetMBS`

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the row indexes in the specified rectangle.

**Notes:**

`rect`: A rectangle in the view's coordinate system.  
Returns an index set containing the item indexes.  
Available in OS X v10.6 and later.

#### 14.4.51 `scrollIndexToVisible(index as Integer)`

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Scrolls the receiver to the item at the specified index.

#### 14.4.52 selectionIndexes as NSMutableIndexSet

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the indexes of the selected cells.

#### 14.4.53 setDropIndex(index as Integer, operation as Integer)

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Allows the class to retarget the drop action.

**Notes:**

index: The requested drop index.

operation: The requested drop operation. The possible values are described in `IKImageBrowserDropOperation`.

For example, To specify a drop on the second item, one would specify index as 1, and operation as `IKImageBrowserDropOn`. To specify a drop after the last item, one would specify index as the number of items and operation as `IKImageBrowserDropBefore`.

Passing a value of 1 for index, and `IKImageBrowserDropOn` as the operation causes the entire browser view to be highlighted rather than a specific item. This is useful if the data displayed by the receiver does not allow the user to drop items at a specific item location.

#### 14.4.54 setSelectedIndexes(indexes as NSMutableIndexSet, extendSelection as boolean = false)

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Selects cells at the specified indexes.

**Notes:**

indexes: The indexes of the cells you want to select.

extendSelection: A boolean value that specifies whether to extend the current selection. Pass true to extend the selection; false replaces the current selection.

Available in OS X v10.5 and later.

#### 14.4.55 setValue(name as String, value as Variant)

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Sets a value for a given key.

### 14.4.56 `visibleItemIndexes` as `NSIndexSetMBS`

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the indexes of the view's currently visible items.

**Notes:** Available in OS X v10.6 and later.

### 14.4.57 **Properties**

### 14.4.58 `allowsDroppingOnItems` as `boolean`

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether the user can drop on items.

**Notes:**

True if the user is able to drop on items, otherwise false.

Available in OS X v10.6 and later.

(Read and Write computed property)

### 14.4.59 `allowsEmptySelection` as `boolean`

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether an empty selection is allowed.

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

### 14.4.60 `allowsMultipleSelection` as `boolean`

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether the user can select more than one cell at a time.

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

### 14.4.61 `allowsReordering` as `boolean`

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether the user can reorder items.

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

#### 14.4.62 animates as boolean

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether the receiver animates reordering and changes of the data source.

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

#### 14.4.63 backgroundLayer as CALayerMBS

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The Core Animation layer used as the view's background.

**Notes:**

The background layer can have sublayers. Additionally, the layers can also contain animations.

The layer is optional.

Available in OS X v10.6 and later.

(Read and Write computed property)

#### 14.4.64 canControlQuickLookPanel as boolean

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether the view can automatically take control of the QuickLook panel.

**Notes:**

When the browser view displays the QuickLook panel it sets itself as the QuickLook datasource. If the browser cells returned by the datasource return items that are URLs or paths, then the QuickLook panel will display the image at that location. Otherwise, the browser cell must implement the QLPreviewItem protocol and return the requested URL for the custom cell.

Available in OS X v10.6 and later.

(Read and Write computed property)

#### 14.4.65 cellSize as NSSizeMBS

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The cell size.

**Notes:**

You must use CellSize or ZoomValue, but not both. Setting the zoom value changes the cell size, and vice versa.

Available in OS X v10.5 and later.

(Read and Write computed property)

#### 14.4.66 `cellsStyleMask` as Integer

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The appearance style of the cells.

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

#### 14.4.67 `constrainsToOriginalSize` as boolean

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether the receiver constrains the cell's image to its original size.

**Notes:**

The default value is false.

(Read and Write computed property)

#### 14.4.68 `contentResizingMask` as Integer

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The content resizing mask, which determines how its content is resized while zooming.

**Notes:**

You specify a mask by combining any of the following options using the bitwise OR operator: `NSViewWidthSizable` (2), `NSViewHeightSizable` (16). Other values are ignored.

(Read and Write computed property)

#### 14.4.69 `foregroundLayer` as `CALayerMBS`

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the foreground Core Animation layer

**Notes:**

Returns a `CALayer` instance.

Available in OS X v10.6 and later.

(Read and Write computed property)

#### 14.4.70 `intercellSpacing` as `NSSizeMBS`

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the spacing between cells in the view.

**Notes:**

Returns the vertical and horizontal spacing between cells.  
Available in OS X v10.6 and later.  
(Read and Write computed property)

#### 14.4.71 zoomValue as Double

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The zoom value.  
**Notes:**

The zoom value. This value should be greater or equal to zero and less or equal than one. A zoom value of zero corresponds to the minimum size (40x40 pixels). A zoom value of one means images fits the browser bounds. Other values are interpolated.

Discussion

You must use `ZoomValue` or `CellSize`, but not both. Setting the zoom value changes the cell size, and vice versa.

Available in OS X v10.5 and later.

(Read and Write computed property)

#### 14.4.72 Events

#### 14.4.73 backgroundWasRightClickedWithEvent(e as NSEventMBS)

Plugin Version: 13.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Performs custom tasks when the user right-clicks the image browser view background.

**Notes:**

event: The event that invoked the method.

This method signals that the user either right-clicked the background or left-clicked it with the Alt key pressed. You can implement this method if you want to perform custom tasks at that time.

Available in OS X v10.5 and later.

#### 14.4.74 cellWasDoubleClickedAtIndex(index as Integer)

Plugin Version: 13.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Performs custom tasks when the user double-clicks an item in the image browser view.

**Notes:**

index: The index of the cell.

This method signals that the user double-clicked an item in the image browser view. You can implement this method if you want to perform custom tasks at that time.

Available in OS X v10.5 and later.

#### 14.4.75 `cellWasRightClickedAtIndex(index as Integer, e as NSEventMBS)`

Plugin Version: 13.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Performs custom tasks when the user right-clicks an item in the image browser view.

**Notes:**

index: The index of the cell.

event: The event that invoked the method.

This method signals that the user either right-clicked an item in the browser or left-clicked the item with the Alt key pressed. You can implement this method if you want to perform custom tasks at that time.

Available in OS X v10.5 and later.

#### 14.4.76 `concludeDragOperation(sender as NSDraggingInfoMBS)`

Plugin Version: 13.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Invoked when the dragging operation is complete, signaling the receiver to perform any necessary clean-up.

**Notes:**

sender: The object sending the message; use it to get details about the dragging operation.

For this method to be invoked, the previous `performDragOperation` must have returned true.

The destination implements this method to perform any tidying up that it needs to do, such as updating its visual representation now that it has incorporated the dragged data. This message is the last message sent from sender to the destination during a dragging session.

If the sender object's `animatesToDestination` property was set to true in `prepareForDragOperation`, then the drag image is still visible. At this point you should draw the final visual representation in the view. When this method returns, the drag image is removed from the screen. If your final visual representation matches the visual representation in the drag, this is a seamless transition.

#### 14.4.77 `draggingEnded(sender as NSDraggingInfoMBS)`

Plugin Version: 13.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Implement this event to be notified when a drag operation ends in some other destination.

**Notes:**

sender: The object sending the message; use it to get details about the dragging operation.  
This method might be used by a destination doing auto-expansion in order to collapse any auto-expands.

#### 14.4.78 draggingEntered(sender as NSDraggingInfoMBS) as Integer

Plugin Version: 13.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Invoked when the dragged image enters destination bounds or frame; delegate returns dragging operation to perform.

**Notes:**

sender: The object sending the message; use it to get details about the dragging operation.

Return one (and only one) of the dragging operation constants described in NSDragOperation in the NSDraggingInfo reference. The default return value (if this method is not implemented by the destination) is the value returned by the previous draggingEntered: message.

Invoked when a dragged image enters the destination but only if the destination has registered for the pasteboard data type involved in the drag operation. Specifically, this method is invoked when the mouse pointer enters the destination's bounds rectangle (if it is a view object) or its frame rectangle (if it is a window object).

This method must return a value that indicates which dragging operation the destination will perform when the image is released. In deciding which dragging operation to return, the method should evaluate the overlap between both the dragging operations allowed by the source (obtained from sender with the draggingSourceOperationMask method) and the dragging operations and pasteboard data types the destination itself supports.

If none of the operations is appropriate, this method should return NSDragOperationNone (this is the default response if the method is not implemented by the destination). A destination will still receive draggingUpdated: and draggingExited: even if NSDragOperationNone is returned by this method.

#### 14.4.79 draggingExited(sender as NSDraggingInfoMBS)

Plugin Version: 13.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Invoked when the dragged image exits the destination's bounds rectangle (in the case of a view object) or its frame rectangle (in the case of a window object).

**Notes:** sender: The object sending the message; use it to get details about the dragging operation.

#### 14.4.80 draggingSourceOperationMaskForLocal(flag as boolean) as Integer

Plugin Version: 13.5, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Returns an integer bit mask indicating the types of dragging operations the source object will allow to be performed on the

dragged image's data.

**Notes:**

(Deprecated in OS X v10.7. This method is informally deprecated. It is only called if the source does not implement the NSDraggingSource protocol methods. This method will be formally deprecated in a future OS release.)

`isLocal`: True indicates that the candidate destination object (the window or view over which the dragged image is currently poised) is in the same application as the source, while a false value indicates that the destination object is in a different application.

A mask, created by combining the dragging operations listed in the `NSDragOperation` section of `NSDraggingInfo` protocol reference using the C bitwise OR operator. If the source does not permit any dragging operations, it should return `NSDragOperationNone`.

If not implemented, the default value is `NSDragOperationCopy | NSDragOperationLink | NSDragOperationGeneric | NSDragOperationPrivate`.

Available in OS X v10.0 and later. Deprecated in OS X v10.7.

#### 14.4.81 `draggingUpdated(sender as NSDraggingInfoMBS) as Integer`

Plugin Version: 13.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Invoked periodically as the image is held within the destination area, allowing modification of the dragging operation or mouse-pointer position.

**Notes:**

`sender`: The object sending the message; use it to get details about the dragging operation.

Returns one (and only one) of the dragging operation constants described in `NSDragOperation` in the `NSDraggingInfo` reference. The default return value (if this method is not implemented by the destination) is the value returned by the previous `draggingEntered:` message.

For this to be invoked, the destination must have registered for the pasteboard data type involved in the drag operation. The messages continue until the image is either released or dragged out of the window or view.

This method provides the destination with an opportunity to modify the dragging operation depending on the position of the mouse pointer inside of the destination view or window object. For example, you may have several graphics or areas of text contained within the same view and wish to tailor the dragging operation, or to ignore the drag event completely, depending upon which object is underneath the mouse pointer at the time when the user releases the dragged image and the `performDragOperation` method is invoked.

You typically examine the contents of the pasteboard in the `draggingEntered` method, where this examination is performed only once, rather than in the `draggingUpdated` method, which is invoked multiple times.

Only one destination at a time receives a sequence of `draggingUpdated` messages. If the mouse pointer is within the bounds of two overlapping views that are both valid destinations, the uppermost view receives these messages until the image is either released or dragged out.

### 14.4.82 `groupAtIndex(index as Integer)` as Dictionary

Plugin Version: 13.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Returns the group at the specified index.

**Notes:**

`index`: The index of the group you want to retrieve.

Returns a dictionary that defines the group. The keys in this dictionary can be any of the following constants: `IKImageBrowserGroupStyle`, `IKImageBrowserGroupBackgroundColorKey`, `IKImageBrowserGroupTitleKey`, and `IKImageBrowserGroupRangeKey`. For more information on these constants, see `IKImageBrowserView` Class Reference.

This method is optional.

Available in OS X v10.5 and later.

### 14.4.83 `itemAtIndex(index as Integer)` as `IKImageBrowserItemMBS`

Plugin Version: 13.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Returns an object for the item in an image browser view that corresponds to the specified index.

**Notes:**

`index`: The index of the item you want to retrieve.

Return an `IKImageBrowserItem` object.

Your data source must implement this method. The returned object must implement the required methods of the `IKImageBrowserItem` protocol.

Available in OS X v10.5 and later.

#### 14.4.84 `moveItemsAtIndexes(indexes as NSMutableIndexSet, destinationIndex as Integer) as boolean`

Plugin Version: 13.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Signals that the specified items should be moved to the specified destination.

**Notes:**

`indexes`: The indexes of the items that should be reordered.

`destinationIndex`: The starting index of the destination the items should be moved to.

Returns true if successful; false otherwise.

This method is optional. It is invoked by the image browser view after Image Kit determines that a reordering operation should be applied. The data source should update itself by reordering its elements.

Available in OS X v10.5 and later.

#### 14.4.85 `numberOfGroups as Integer`

Plugin Version: 13.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Returns the number of groups in an image browser view.

**Notes:**

Return the number of groups.

This method is optional.

Available in OS X v10.5 and later.

#### 14.4.86 `numberOfItems as Integer`

Plugin Version: 13.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Returns the number of records managed by the data source object.

**Notes:**

Return the number of records managed by the image browser view.

Your data source must implement this method. An `IKImageView` object uses this method to determine how many cells it should create and display.

Available in OS X v10.5 and later.

### 14.4.87 performDragOperation(sender as NSDraggingInfoMBS) as boolean

Plugin Version: 13.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Invoked after the released image has been removed from the screen, signaling the receiver to import the pasteboard data.

**Notes:**

sender: The object sending the message; use it to get details about the dragging operation.

Returns if the destination accepts the data, it returns true; otherwise it returns false. The default is to return false.

For this method to be invoked, the previous prepareForDragOperation message must have returned true. The destination should implement this method to do the real work of importing the pasteboard data represented by the image.

If the sender object's animatesToDestination was set to true in prepareForDragOperation, then setup any animation to arrange space for the drag items to animate to. Also at this time, enumerate through the dragging items to set their destination frames and destination images.

### 14.4.88 prepareForDragOperation(sender as NSDraggingInfoMBS) as boolean

Plugin Version: 13.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Invoked when the image is released, allowing the receiver to agree to or refuse drag operation.

**Notes:**

sender: The object sending the message; use it to get details about the dragging operation.

Return true if the receiver agrees to perform the drag operation and false if not.

This method is invoked only if the most recent draggingEntered or draggingUpdated event returned an acceptable drag-operation value.

If you want the drag items to animate from their current location on screen to their final location in your view, set the sender object's animatesToDestination property to true in your implementation of this event.

### 14.4.89 removeItemsAtIndexes(indexes as NSIndexSetMBS)

Plugin Version: 13.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Signals that a remove operation should be applied to the specified items.

**Notes:**

indexes: The indexes of the items that should be removed.

This method is optional. It is invoked by the image browser after Image Kit determines that a remove operation should be applied. In response, the data source should update itself by removing the specified items.

Available in OS X v10.5 and later.

#### 14.4.90 selectionDidChange

Plugin Version: 13.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Performs custom tasks when the selection changes.

**Notes:**

This method signals that the user changes the selection in the image browser view. You can implement this method if you want to perform custom tasks at that time.

Available in OS X v10.5 and later.

#### 14.4.91 updateDraggingItemsForDrag(sender as NSDraggingInfoMBS)

Plugin Version: 13.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Invoked when the dragging images should be changed.

**Notes:**

sender: The object sending the message; use this object to get details about the dragging operation.

While a destination may change the dragging images at any time, it is recommended to wait until this method is called before updating the dragging images.

This allows the system to delay changing the dragging images until it is likely that the user will drop on this destination. Otherwise, the dragging images will change too often during the drag which would be distracting to the user.

During `enumerateDraggingItemsWithOptions` you may set non-acceptable drag items images to nil to hide them or use the enumeration option of `NSDraggingItemEnumerationClearNonenumeratedImages`. If there are items that you hide, then after enumeration, you need to set the `numberOfValidItemsForDrop` to the number of non-hidden drag items. However, if the valid item count is 0, then it is better to return `NSDragOperationNone` from your implementation of `draggingEntered` and, or `draggingUpdated` instead of hiding all drag items during enumeration.

Available in OS X v10.7 and later.

### 14.4.92 wantsPeriodicDraggingUpdates as boolean

Plugin Version: 13.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Asks the destination object whether it wants to receive periodic draggingUpdated events.

**Notes:**

Returns true if the destination wants to receive periodic draggingUpdated messages, false otherwise.

If the destination returns false, these messages are sent only when the mouse moves or a modifier flag changes. Otherwise the destination gets the default behavior, where it receives periodic dragging-updated events even if nothing changes.

### 14.4.93 writeItemsAtIndexes(indexes as NSIndexSetMBS, pasteboard as NSPasteboardMBS) as Integer

Plugin Version: 13.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Signals that a drag should begin.

**Notes:**

itemIndexes: The indexes of the items that should be dragged.

pasteboard: The pasteboard to copy the items to.

Returns the number of items written to the pasteboard.

This method is optional. It is invoked after Image Kit determines that a drag should begin, but before the drag has been started.

Available in OS X v10.5 and later.

### 14.4.94 Constants

#### 14.4.95 IKCellStyleNone = 0

Plugin Version: 13.1. **Function:** One of the cell style constants.

**Notes:** No style.

#### 14.4.96 IKCellStyleOutlined = 2

Plugin Version: 13.1. **Function:** One of the cell style constants.

**Notes:** Cells are outlined.

#### 14.4.97 `IKCellStyleShadowed = 1`

Plugin Version: 13.1. **Function:** One of the cell style constants.

**Notes:** Cells use shadows.

#### 14.4.98 `IKCellStyleSubtitled = 8`

Plugin Version: 13.1. **Function:** One of the cell style constants.

**Notes:** Cells display a subtitle.

#### 14.4.99 `IKCellStyleTitled = 4`

Plugin Version: 13.1. **Function:** One of the cell style constants.

**Notes:** Cells display a title.

#### 14.4.100 `IKGroupBezelStyle = 0`

Plugin Version: 13.1. **Function:** One of the bevel styles.

**Notes:**

A bezel style.

Available in OS X v10.5 and later.

#### 14.4.101 `IKGroupDisclosureStyle = 1`

Plugin Version: 13.1. **Function:** One of the bevel styles.

**Notes:**

A disclosure triangle.

Available in OS X v10.5 and later.

#### 14.4.102 `IKImageBrowserDropBefore = 1`

Plugin Version: 13.1. **Function:** One of the constants to specify the locations for dropping items onto the browser view.

**Notes:**

Drop the item before the cell.

Available in OS X v10.6 and later.

Used by the method setDropIndex.

#### 14.4.103 **IKImageBrowserDropOn = 0**

Plugin Version: 13.1. **Function:** One of the constants to specify the locations for dropping items onto the browser view.

**Notes:**

Drop the item on the cell.

Available in OS X v10.6 and later.

Used by the method setDropIndex.

## 14.5 class `IKImageEditPanelMBS`

### 14.5.1 class `IKImageEditPanelMBS`

Plugin Version: 8.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The class for the image edit panel from Mac OS X 10.5.

**Notes:** Subclass of the `NSPanelMBS` class.

### 14.5.2 Methods

### 14.5.3 Constructor

Plugin Version: 8.4, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The constructor to create a new image edit panel.

### 14.5.4 `reloadData`

Plugin Version: 8.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Requests the panel to reload the image.

**Notes:** Do call this if you have a new image to return in the image event.

### 14.5.5 Properties

### 14.5.6 `LastImage` as `Picture`

Plugin Version: 8.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The last image passed to you or requested from you.

**Notes:**

This property is set with the picture you return with the image event and is set with the image sent to you using the `Changed` event.

(Read and Write property)

### 14.5.7 Events

### 14.5.8 Changed(pic as picture, CGImageHandle as Integer, metaData as dictionary)

Plugin Version: 8.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The image changed and you should update your GUI.

**Notes:**

pic: The image as a picture.

CGImageHandle: The internal handle to the original CGImage which is used to make the picture.

metaData: additional image data.

### 14.5.9 hasAdjustMode as Boolean

Plugin Version: 13.5, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Returns whether the adjust mode view tab should be displayed.

**Notes:**

Return true if the tab should be displayed, otherwise false.

Available on Mac OS X 10.6 or newer.

### 14.5.10 hasDetailsMode as Boolean

Plugin Version: 13.5, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Returns whether the details mode view tab should be displayed.

**Notes:**

True if the tab should be displayed, otherwise false.

Available on Mac OS X 10.6 or newer.

### 14.5.11 hasEffectsMode as Boolean

Plugin Version: 13.5, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Returns whether the effects mode view tab should be displayed.

**Notes:**

True if the tab should be displayed, otherwise false.

Available on Mac OS X 10.6 or newer.

### 14.5.12 Image as picture

Plugin Version: 8.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The panel needs an image to start with.

**Notes:** Return your image in this event whenever the panel needs it.

### 14.5.13 imageProperties as Dictionary

Plugin Version: 13.5, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Returns a dictionary of the image properties associated with the image in the image edit panel.

**Notes:** Available on Mac OS X 10.5 or newer.

### 14.5.14 thumbnailWithMaximumSize(Width as Double, Height as Double) as picture

Plugin Version: 13.5, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Returns a thumbnail image whose size is no larger than the specified size.

**Notes:** Available in OS X v 10.5 and later.

## 14.6 class IKPictureTakerMBS

### 14.6.1 class IKPictureTakerMBS

Plugin Version: 7.7, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** An IKPictureTaker object is a panel that allows users to choose and crop an image.

**Notes:**

It supports browsing of the file system and includes a recents popup-menu. The IKPictureTaker lets the user to crop a choosen image or to take snapshot from a camera like the built-in iSight.

Requires Mac OS X 10.5.

Subclass of the NSPanelMBS class.

### 14.6.2 Methods

#### 14.6.3 Available as boolean

Plugin Version: 7.7, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Whether the picture taker is available on that platform or not.

**Example:**

```
dim n as Integer
```

```
dim p as new IKPictureTakerMBS
```

```
if not p.Available then
```

```
MsgBox "This application requires Mac OS X 10.5 and a Macho Target"
```

```
Return
```

```
end if
```

**Notes:** True on Mac OS X 10.5.

#### 14.6.4 beginPictureTaker as boolean

Plugin Version: 7.7, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Launch the Picture-Taker.

**Example:**

```
dim p as IKPictureTakerMBS // your picture taker
```

```

if not p.beginPictureTaker then
MsgBox "Can't show picture taker!?"
end if

```

**Notes:**

You will later receive an event for the case the user clicks on OK or Cancel buttons.  
Returns true on success and false on failure.

**14.6.5 beginPictureTakerSheet(parent as NSWindowMBS) as boolean**

Plugin Version: 9.6, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Opens a picture taker as a sheet whose parent is the specified window.

**Notes:**

parent: The parent window of the picture taker sheet.

You will later receive an event for the case the user clicks on OK or Cancel buttons.

Available in Mac OS X v10.5 and later.

See also:

- 14.6.6 beginPictureTakerSheet(parent as window) as boolean 392

**14.6.6 beginPictureTakerSheet(parent as window) as boolean**

Plugin Version: 9.6, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Opens a picture taker as a sheet whose parent is the specified window.

**Notes:**

parent: The parent window of the picture taker sheet.

You will later receive an event for the case the user clicks on OK or Cancel buttons.

Available in Mac OS X v10.5 and later.

See also:

- 14.6.5 beginPictureTakerSheet(parent as NSWindowMBS) as boolean 392

### 14.6.7 Constructor

Plugin Version: 8.4, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The constructor to create a new picture taker panel.

### 14.6.8 CropAreaSizeHeight as Double

Plugin Version: 7.7, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The height of the crop area.

### 14.6.9 CropAreaSizeWidth as Double

Plugin Version: 7.7, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The width of the crop area.

### 14.6.10 outputImage as NSImageMBS

Plugin Version: 7.7, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Return the edited image.

### 14.6.11 OutputImageMaxSizeKeyHeight as Double

Plugin Version: 7.7, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The maximum height of the output image.

### 14.6.12 OutputImageMaxSizeKeyWidth as Double

Plugin Version: 7.7, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The maximum width of the output image.

### 14.6.13 popUpRecentsMenuForView(parent as NSViewMBS) as boolean

Plugin Version: 9.6, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Displays the Open Recent popup menu associated with the picture taker.

**Notes:**

You will later receive an event for the case the user clicks on OK or Cancel buttons.

Available in Mac OS X v10.5 and later.

#### 14.6.14 runModal as Integer

Plugin Version: 7.7, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Launches a modal PictureTaker session.

**Example:**

```
dim p as IKPictureTakerMBS // global property
dim n as Integer

p=new IKPictureTakerMBS

if not p.Available then
  MsgBox "This application requires Mac OS X 10.5 and a Macho Target"
  Return
end if

p.AllowsFileChoosing=true
p.AllowsEditing=true
p.AllowsVideoCapture=true
p.ShowEffects=FALSE // disable if you run modal!
p.ShowRecentPicture=true
p.UpdateRecentPicture=true
p.InformationalText="Please take a picture"

n=p.runModal

if n=1 then // ok
  Backdrop=p.outputImage.CopyPictureWithMask
else
  Title=Str(n)
end if
```

**Notes:**

Returns NSOKButton (1) if the user edits or chooses an image and confirm panel, NSCancelButton (0) if the user canceled or didn't change the image.

You may want to disable effects as they won't work in Realbasic in a modal picture taker dialog.

### 14.6.15 SetCropAreaSize(width as Double, height as Double)

Plugin Version: 7.7, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Sets the crop area.

### 14.6.16 SetOutputImageMaxSize(width as Double, height as Double)

Plugin Version: 7.7, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Sets the maximum output image size.

### 14.6.17 Properties

### 14.6.18 AllowsEditing as boolean

Plugin Version: 7.7, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Whether editing is allowed or not.

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

### 14.6.19 AllowsFileChoosing as boolean

Plugin Version: 7.7, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Whether choosing a file is allowed or not.

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

### 14.6.20 AllowsVideoCapture as boolean

Plugin Version: 7.7, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Whether video capture is allowed or not.

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

### 14.6.21 InformationalText as NSAttributedStringMBS

Plugin Version: 7.7, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The information text as a plain string.

**Notes:**

On getting the value the plugin will check whether the value is a formatted or a plain text. if it is a plain text, it will return the plain text as a NSAttributedStringMBS.

(Read and Write computed property)

See also:

- 14.6.22 InformationalText as string

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### 14.6.22 InformationalText as string

Plugin Version: 7.7, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The information text as a plain string.

**Example:**

```
dim p as IKPictureTakerMBS // your picture taker
p.InformationalText="Please take a picture"
```

**Notes:**

On getting the value the plugin will check whether the value is a formatted or a plain text. if it is a formatted text, it will return the formatted text as plain text.

(Read and Write computed property)

See also:

- 14.6.21 InformationalText as NSAttributedStringMBS

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### 14.6.23 inputImage as NSImageMBS

Plugin Version: 7.7, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The input image.

**Notes:**

The input image is never modified by the PictureTaker.

(Read and Write computed property)

### 14.6.24 mirroring as boolean

Plugin Version: 7.7, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** True if video mirroring is enabled, false otherwise.

**Notes:**

Controls whether the receiver enable/disable video mirroring durring snapshots (default is true).

(Read and Write computed property)

### 14.6.25 RemainOpenAfterValidate as boolean

Plugin Version: 9.6, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Whether the picture taker remains open.

**Notes:**

Requires Mac OS X 10.6.  
(Read and Write computed property)

### 14.6.26 ShowAddressBookPicture as boolean

Plugin Version: 7.7, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Whether the address-book picture is shown or not.

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

### 14.6.27 ShowEffects as boolean

Plugin Version: 7.7, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Whether effects are shown or not.

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

### 14.6.28 ShowEmptyPicture as NSImageMBS

Plugin Version: 13.5, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The image to use for an empty image.

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

### 14.6.29 ShowRecentPicture as boolean

Plugin Version: 7.7, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Whether recent pictures should be shown.

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

### 14.6.30 UpdateRecentPicture as boolean

Plugin Version: 7.7, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Whether recent pictures should be updated.

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

### 14.6.31 Events

### 14.6.32 Finished(returnCode as Integer)

Plugin Version: 7.7, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** beginPictureTaker has finished work.

**Notes:** ReturnCode is 1 if the user clicked OK and 0 if the user clicked false.

## 14.7 class IKSlideshowMBS

### 14.7.1 class IKSlideshowMBS

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The ImageKit class for a slideshow.

**Notes:**

Requires Mac OS X 10.5.

Slideshows can be only with pictures, with PDF pages or with file references.

Those files can be picture files, pdf files or anything you want.

### 14.7.2 Methods

#### 14.7.3 addFile(file as folderitem, name as string="")

Plugin Version: 8.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Adds a file to the items list.

#### 14.7.4 addImage(image as NSImageMBS, name as string="")

Plugin Version: 8.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Adds an image to the items list.

**Example:**

```
dim p as picture
dim n as NSImageMBS
dim s as new IKSlideshowMBS
```

```
// get picture to p
n=new NSImageMBS(p)
s.addImage n
```

#### 14.7.5 addPage(page as Variant, name as string="")

Plugin Version: 8.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Adds a PDF page to the items list.

**Notes:** Page must be a PDFPageMBS object.

### 14.7.6 autoPlayDelay as Double

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The time to wait before the slideshow will start automatically.

**Notes:**

Value is in seconds.

(Read and Write computed property)

### 14.7.7 Available as boolean

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether the slide show functions are available.

**Example:**

```
if IKSideshowMBS.Available=False then
  MsgBox "You need Mac OS X 10.5 for this and a MachO application."
quit
end if
```

**Notes:** Value is true for Mac OS X 10.5.

### 14.7.8 canExportToApplication(applicationBundleIdentifier as string) as boolean

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** is exporting to a given application possible?

**Notes:** (application installed?, right version?, ...)

### 14.7.9 exportSlideshowItems(applicationBundleIdentifier as string)

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Export items to the given application.

**Example:**

```
dim i,c as Integer
dim s as new IKSideshowMBS

// add items here

if false=IKSideshowMBS.canExportToApplication(IKSideshowMBS.iPhotoBundleIdentifier) then
  MsgBox "Can't export to iPhoto."
```

```
else  
if s.itemcount>0 then  
s.exportSlideshowItems IKSlideshowMBS.iPhotoBundleIdentifier  
else  
MsgBox "no slides?"  
end if  
end if
```

#### 14.7.10 indexOfCurrentSlideshowItem as Integer

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The index of the current slide.

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

#### 14.7.11 itemCount as Integer

Plugin Version: 8.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the number of items.

#### 14.7.12 reloadData

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Reloads all slides.

#### 14.7.13 reloadSlideshowItemAtIndex(index as Integer)

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Reloads the slide show with the given index.

#### 14.7.14 removeItem(index as Integer)

Plugin Version: 8.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Removes an item from the item list.

### 14.7.15 removeItems

Plugin Version: 8.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Removes all items from the item list.

### 14.7.16 runSlideshow

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Start the slideshow.

**Example:**

```
dim s as new IKSlideshowMBS
// add items
s.runSlideshow
```

**Notes:** You may want to set all the properties before.

### 14.7.17 setFile(index as Integer, file as folderitem, name as string="")

Plugin Version: 8.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Sets the file in the items list with the given index.

### 14.7.18 setImage(index as Integer, image as NSImageMBS, name as string="")

Plugin Version: 8.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Sets the image in the items list with the given index.

### 14.7.19 setPage(index as Integer, page as Variant, name as string="")

Plugin Version: 8.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Sets a PDF page in the items list with the given index.

**Notes:** Page must be a PDFPageMBS object.

### 14.7.20 stopSlideshow

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Stops the slideshow.

### 14.7.21 Properties

#### 14.7.22 AudioFile as Folderitem

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Optional audio file to play while running slide show.

**Notes:**

Only used for Mac OS X 10.6.  
(Read and Write property)

#### 14.7.23 PDFDisplayBox as Integer

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The PDF display box mode to use.

**Notes:**

Default value is -1 which means that we use the framework default mode.  
(Read and Write property)

#### 14.7.24 PDFDisplayMode as Integer

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The PDF display mode you want.

**Notes:**

Default value is -1 which means that we use the framework default mode.  
(Read and Write property)

#### 14.7.25 PDFDisplaysAsBook as Boolean

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether PDF should display as book.

**Notes:**

Default value is false.  
(Read and Write property)

### 14.7.26 ScreenIndex as Integer

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The screen to use.

**Notes:**

Default is main screen.

Only used for Mac OS X 10.6.

(Read and Write property)

### 14.7.27 StartIndex as Integer

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The index of the first slide to show.

**Notes:**

Index is from 0 to count-1.

Default value is -1 which means that we use the framework default mode.

(Read and Write property)

### 14.7.28 StartPaused as Boolean

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether to start paused.

**Notes:**

Default is false.

(Read and Write property)

### 14.7.29 WrapAround as Boolean

Plugin Version: 7.7, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether to wrap around when the slideshow runs.

**Notes:**

Default is false.

(Read and Write property)

### 14.7.30 Events

#### 14.7.31 `canExportSlideshowItemAtIndex(index as Integer, applicationBundleIdentifier as string)` as boolean

Plugin Version: 7.7, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Should the export button be enabled for a given item at index?

**Notes:** This event is optional.

#### 14.7.32 `slideshowDidChangeCurrentIndex(newIndex as Integer)`

Plugin Version: 7.7, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Slideshow did change current item index.

#### 14.7.33 `slideshowDidStop`

Plugin Version: 7.7, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Slideshow did stop

**Notes:** This event is optional.

#### 14.7.34 `slideshowWillStart`

Plugin Version: 7.7, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Slideshow will start.

**Notes:** This event is optional.

### 14.7.35 Constants

#### 14.7.36 `iPhotoBundleIdentifier="com.apple.iPhoto"`

Plugin Version: 7.7. **Function:** The iPhoto application identifier.

**Notes:** May be used on the export functions.

#### 14.7.37 `kPDFDisplayBoxArtBox=4`

Plugin Version: 7.7. **Function:** One of the possible values for the PDFDisplayBox property.

**14.7.38 kPDFDisplayBoxBleedBox=2**

Plugin Version: 7.7. **Function:** One of the possible values for the PDFDisplayBox property.

**14.7.39 kPDFDisplayBoxCropBox=1**

Plugin Version: 7.7. **Function:** One of the possible values for the PDFDisplayBox property.

**14.7.40 kPDFDisplayBoxMediaBox=0**

Plugin Version: 7.7. **Function:** One of the possible values for the PDFDisplayBox property.

**14.7.41 kPDFDisplayBoxTrimBox=3**

Plugin Version: 7.7. **Function:** One of the possible values for the PDFDisplayBox property.

**14.7.42 kPDFDisplaySinglePage=0**

Plugin Version: 7.7. **Function:** One of the PDF display mode constants.

**14.7.43 kPDFDisplaySinglePageContinuous=1**

Plugin Version: 7.7. **Function:** One of the PDF display mode constants.

**14.7.44 kPDFDisplayTwoUp=2**

Plugin Version: 7.7. **Function:** One of the PDF display mode constants.

**14.7.45 kPDFDisplayTwoUpContinuous=3**

Plugin Version: 7.7. **Function:** One of the PDF display mode constants.

# Chapter 15

## JavaScript

### 15.1 class JSClassMBS

#### 15.1.1 class JSClassMBS

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The class for a class in javascript.

**Notes:** This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

#### 15.1.2 Methods

#### 15.1.3 Constructor

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

#### 15.1.4 NewObject as JSObjectMBS

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a JavaScript object for current class.

### 15.1.5 Properties

### 15.1.6 context as JSContextMBS

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The context for this class.

**Notes:** (Read only property)

### 15.1.7 Handle as Integer

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The handle for the class object.

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

### 15.1.8 Tag as Variant

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The tag value.

**Notes:**

You can store anything here and as long as the JSClass object exists, this value is kept referenced.  
(Read and Write property)

## 15.2 class JSContextMBS

### 15.2.1 class JSContextMBS

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The class for a javascript execution context.

**Example:**

```
dim c as new JSContextMBS
dim e as JSValueMBS
dim v as JSValueMBS = c.EvaluateScript("1+2", "", nil, e)

if e <> nil then
  // show error
  MsgBox e.StringValue
else
  // show result
  MsgBox str(v.doubleValue)
end if
```

### 15.2.2 Methods

#### 15.2.3 CheckScriptSyntax(script as string, sourceURL as String, startingLineNumber as Integer = 1, byref JSException as JSValueMBS) as Boolean

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Checks for syntax errors in a string of JavaScript.

**Example:**

```
dim c as new JSContextMBS
dim e as JSValueMBS
if c.CheckScriptSyntax("1+", "", e) then
  MsgBox "OK"
else
  // show error

  MsgBox e.StringValue
end if
```

**Notes:**

Script: A string containing the script to check for syntax errors.

sourceURL: A string containing a URL for the script's source file. This is only used when reporting excep-

tions. Pass "" if you do not care to include source file information in exceptions.

startingLineNumber: An integer value specifying the script's starting line number in the file located at sourceURL. This is only used when reporting exceptions. The value is one-based, so the first line is line 1 and invalid values are clamped to 1.

exception: A JSValue in which to store a syntax error exception, if any.

Returns true if the script is syntactically correct, otherwise false.

## 15.2.4 Constructor

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The constructor.

**Notes:** Creates a global JavaScript execution context.

## 15.2.5 EvaluateScript(script as string, sourceURL as String, thisObject as JSValueMBS, startingLineNumber as Integer = 1, byref JSException as JSValueMBS) as JSValueMBS

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Evaluates a string of JavaScript.

**Example:**

```
dim c as new JSContextMBS
dim e as JSValueMBS
dim v as JSValueMBS = c.EvaluateScript("1+", "", nil, e)

if e <> nil then
  // show error
  MsgBox e.StringValue
else
  // show result
  MsgBox str(v.doubleValue)
end if
```

**Notes:**

script: A string containing the script to evaluate.

thisObject: The object to use as "this," or nil to use the global object as "this."

sourceURL: A string containing a URL for the script's source file. This is used by debuggers and when reporting exceptions. Pass "" if you do not care to include source file information.

startingLineNumber: An integer value specifying the script's starting line number in the file located at sourceURL. This is only used when reporting exceptions. The value is one-based, so the first line is line 1 and invalid values are clamped to 1.

exception: A JSValueMBS in which to store an exception, if any.

Returns the JSValue that results from evaluating script, or nil if an exception is thrown.

### 15.2.6 GarbageCollect

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Performs a JavaScript garbage collection.

**Notes:**

JavaScript values that are on the machine stack, in a register, protected by JSValueProtect, set as the global object of an execution context, or reachable from any such value will not be collected.

During JavaScript execution, you are not required to call this function; the JavaScript engine will garbage collect as needed. JavaScript values created within a context group are automatically destroyed when the last reference to the context group is released.

### 15.2.7 NewArray(arguments() as JSValueMBS, byref JSEException as JSValueMBS) as JSObjectMBS

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a JavaScript Array object.

**Example:**

```
dim c as new JSContextMBS

dim e as JSValueMBS
dim v as JSObjectMBS = c.NewArray(nil, e)
v.SetPropertyAtIndex(0, c.valueWithString("Hello"), e)
v.SetPropertyAtIndex(1, c.valueWithString("World"), e)
MsgBox v.JSONString
```

**Notes:**

arguments: A JSValue array of data to populate the Array with.

JSEException: A JSValueMBS in which to store an exception, if any.

Returns a JSObject that is an Array.

The behavior of this function does not exactly match the behavior of the built-in Array constructor. Specifically, if one argument is supplied, this function returns an array with one element.

Requires Mac OS X 10.6 or newer.

### 15.2.8 `NewDate(arguments() as JSValueMBS, byref JSEException as JSValueMBS) as JSObjectMBS`

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a JavaScript Date object, as if by invoking the built-in Date constructor.

**Example:**

```
dim c as new JSContextMBS

dim year as JSValueMBS = c.valueWithDouble(2015)
dim month as JSValueMBS = c.valueWithDouble(5)
dim day as JSValueMBS = c.valueWithDouble(12)

dim e as JSValueMBS // exception
dim d as JSValueMBS = c.NewDate(array(year, month, day), e)

MsgBox d.JSONString
```

**Notes:**

arguments: A JSValue array of arguments to pass to the Date Constructor.

JSEException: A JSValueMBS in which to store an exception, if any.

Returns a JSObject that is a Date.

Requires Mac OS X 10.6 or newer.

### 15.2.9 `NewError(arguments() as JSValueMBS, byref JSEException as JSValueMBS) as JSObjectMBS`

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a JavaScript Error object, as if by invoking the built-in Error constructor.

**Example:**

```
dim c as new JSContextMBS

dim parameters() as JSValueMBS
Parameters.Append c.valueWithString("Hello")

dim ex as JSValueMBS
dim e as JSValueMBS = c.NewError(Parameters, ex)
MsgBox e.StringValue
```

**Notes:**

arguments: A JSValue array of arguments to pass to the Error Constructor.

JSEException: A JSValueMBS in which to store an exception, if any.

Returns a JSObject that is a Error.

Requires Mac OS X 10.6 or newer.

### 15.2.10 NewFunction(name as string) as JSObjectMBS

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Convenience method for creating a JavaScript function which raises FunctionCalled event on invocation.

**Notes:**

name: A string containing the function's name. This will be used when converting the function to string. Pass NULL to create an anonymous function.

Returns a JSObject that is a function. The object's prototype will be the default function prototype.

See also:

- 15.2.11 NewFunction(name as string, parameterNames() as string, Body as String, SourceURL as string = "", startingLineNumber as Integer = 0, byref JSEException as JSValueMBS) as JSValueMBS  
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### 15.2.11 NewFunction(name as string, parameterNames() as string, Body as String, SourceURL as string = "", startingLineNumber as Integer = 0, byref JSEException as JSValueMBS) as JSValueMBS

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a function with a given script as its body.

**Example:**

```
dim c as new JSContextMBS

// create a function
dim parameterNames() as string = array("value")
dim body as string = "return value*value;"
dim name as string = "test"

dim e as JSValueMBS
dim v as JSValueMBS = c.NewFunction(name, parameterNames, body, e )

MsgBox v.StringValue

// put it in global memory
c.globalObject.SetProperty "test", v, e

// and call it
dim r as JSValueMBS = c.EvaluateScript("test(5)", "", nil, e)
```

MsgBox r.StringValue

### Notes:

**name:** A string containing the function's name. This will be used when converting the function to string. Pass "" to create an anonymous function.

**parameterNames:** A string array containing the names of the function's parameters.

**body:** A string containing the script to use as the function's body.

**sourceURL:** A string containing a URL for the script's source file. This is only used when reporting exceptions. Pass "" if you do not care to include source file information in exceptions.

**startingLineNumber:** An integer value specifying the script's starting line number in the file located at sourceURL. This is only used when reporting exceptions. The value is one-based, so the first line is line 1 and invalid values are clamped to 1.

**exception:** A JSValueMBS in which to store a syntax error exception, if any. Pass nil if you do not care to store a syntax error exception.

A JSObject that is a function, or nil if either body or parameterNames contains a syntax error. The object's prototype will be the default function prototype.

Use this method when you want to execute a script repeatedly, to avoid the cost of re-parsing the script before each execution.

See also:

- 15.2.10 NewFunction(name as string) as JSObjectMBS

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## 15.2.12 NewObject as JSObjectMBS

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a new object.

## 15.2.13 NewRegExp(arguments() as JSValueMBS, byref JSException as JSValueMBS) as JSObjectMBS

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a JavaScript RegExp object, as if by invoking the built-in RegExp constructor.

### Notes:

**arguments:** A JSValue array of arguments to pass to the RegExp Constructor.

**JSException:** A JSValueMBS in which to store an exception, if any.

Returns a JSObject that is a RegExp.

Requires Mac OS X 10.6 or newer.

### 15.2.14 valueWithBool(value as boolean) as JSValueMBS

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a JavaScript value of the boolean type.

**Example:**

```
dim c as new JSContextMBS
dim v as JSValueMBS = c.valueWithBool(true)
MsgBox v.JSONString
```

### 15.2.15 valueWithDouble(value as Double) as JSValueMBS

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a JavaScript value of the number type.

**Example:**

```
dim c as new JSContextMBS

dim v as JSValueMBS = c.valueWithDouble(5.6)
MsgBox v.StringValue
```

### 15.2.16 valueWithJSON(JSON as string) as JSValueMBS

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a JavaScript value from a JSON formatted string.

**Example:**

```
dim c as new JSContextMBS

dim v as JSValueMBS = c.valueWithJSON(" [ 1,2,3 ] ")
dim o as JSObjectMBS = JSObjectMBS(v) // arrays are objects

dim e as JSValueMBS
dim p as JSValueMBS = o.GetProperty("length", e)

MsgBox p.StringValue // shows 3
```

**Notes:**

Returns a JSValue containing the parsed value, or nil if the input is invalid.  
Available on Mac OS X 10.7 and newer

### 15.2.17 valueWithNull as JSValueMBS

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a JavaScript value of the null type.

**Example:**

```
dim c as new JSContextMBS
dim j as JSValueMBS = c.valueWithNull

if j.Type = JSValueMBS.kJSTypeNull then
  MsgBox "null"
end if
```

### 15.2.18 valueWithString(value as string) as JSValueMBS

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a JavaScript value of the string type.

**Example:**

```
dim c as new JSContextMBS

dim v as JSValueMBS = c.valueWithString("Hello")
MsgBox v.StringValue
```

### 15.2.19 valueWithUndefined as JSValueMBS

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a JavaScript value of the undefined type.

**Example:**

```
dim c as new JSContextMBS
dim j as JSValueMBS = c.valueWithUndefined

if j.Type = JSValueMBS.kJSTypeUndefined then
  MsgBox "undefined"
end if
```

## 15.2.20 Properties

### 15.2.21 globalObject as JSObjectMBS

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Gets the global object of a JavaScript execution context.

**Example:**

```
dim c as new JSContextMBS
```

```
dim v as JSObjectMBS = c.globalObject
```

```
dim e as JSValueMBS
```

```
v.SetProperty "Hello", c.valueWithString("World"), e
```

```
v.SetProperty "Value", c.valueWithDouble(5), e
```

```
MsgBox c.globalObject.JSONString
```

**Notes:** (Read only property)

### 15.2.22 Handle as Integer

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

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

### 15.2.23 Name as String

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The name.

**Example:**

```
dim c as new JSContextMBS
```

```
c.Name = "Hello"
```

```
MsgBox c.Name
```

**Notes:**

Requires Mac OS X 10.10 and newer.

(Read and Write property)

### 15.2.24 Tag as Variant

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The tag value.

**Notes:**

You can store anything here and as long as the JSContext object exists, this value is kept referenced.  
(Read and Write property)

### 15.2.25 Events

### 15.2.26 FunctionCalled(functionObject as JSObjectMBS, thisObject as JSObjectMBS, arguments() as JSValueMBS, byref JSException as JSValueMBS) as JSValueMBS

Plugin Version: 15.4, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The event called when your custom function is called.

**Notes:** Please return a value and in case of error set exception.

## 15.3 class JSObjectMBS

### 15.3.1 class JSObjectMBS

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The class for a Javascript Object.

**Notes:**

Subclass of the JSValueMBS class.

This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

### 15.3.2 Methods

#### 15.3.3 CallAsConstructor(arguments() as JSValueMBS, byref JSEException as JSValueMBS) as JSValueMBS

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Calls an object as a constructor.

**Notes:**

self: The JSObject to call as a constructor.

arguments: A JSValueMBS array of arguments to pass to the constructor.

JSEException A pointer to a JSValueMBS in which to store an exception, if any.

Returns the JSObject that results from calling object as a constructor, or nil if an exception is thrown or object is not a constructor.

#### 15.3.4 CallAsFunction(thisObject as JSValueMBS, arguments() as JSValueMBS, byref JSEException as JSValueMBS) as JSValueMBS

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Calls an object as a function.

**Notes:**

self: The JSObject to call as a function.

thisObject: The object to use as "this," or nil to use the global object as "this."

arguments: A JSValueMBS array of arguments to pass to the function.

JSEException: A JSValueMBS in which to store an exception, if any.

Returns the JSValue that results from calling object as a function, or nil if an exception is thrown or object is not a function.

### 15.3.5 Constructor

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

### 15.3.6 DeleteProperty(name as string, byref JSException as JSValueMBS) as boolean

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Deletes a property from an object.

**Example:**

```
dim c as new JSContextMBS

dim v as JSObjectMBS = c.globalObject
dim e as JSValueMBS

v.SetProperty "Hello", c.valueWithString("World"), e
v.SetProperty "Value", c.valueWithDouble(5), e
```

```
MsgBox v.JSONString
```

```
call v.DeleteProperty "Hello", e
```

```
MsgBox v.JSONString
```

**Notes:**

Name: A string containing the property's name.

JSException: A JSValueMBS in which to store an exception, if any.

Returns true if the delete operation succeeds, otherwise false (for example, if the property has the kJSPropertyAttributeDontDelete attribute set).

### 15.3.7 GetProperty(name as string, byref JSException as JSValueMBS) as JSValueMBS

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Gets a property from an object.

**Example:**

```
dim c as new JSContextMBS
```

```
dim v as JSObjectMBS = c.globalObject
```

```
dim e as JSValueMBS
```

```
v.SetProperty "Hello", c.valueWithString("World"), e
```

```
MsgBox v.GetProperty("Hello", e).StringValue
```

#### Notes:

object: The JSObject whose property you want to get.

Name: A string containing the property's name.

JSEException: A JSValueMBS in which to store an exception, if any.

Returns the property's value if object has the property, otherwise the undefined value.

### 15.3.8 GetPropertyAtIndex(propertyIndex as Integer, byref JSEException as JSValueMBS) as JSValueMBS

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Gets a property from an object by numeric index.

#### Example:

```
dim c as new JSContextMBS
```

```
dim v as JSValueMBS = c.valueWithJSON(" [ 1,2,3 ] ")
```

```
dim o as JSObjectMBS = JSObjectMBS(v) // arrays are objects
```

```
dim e as JSValueMBS
```

```
dim p as JSValueMBS = o.GetProperty("length", e)
```

```
MsgBox "Length: " + p.StringValue
```

```
dim n as JSValueMBS = o.GetPropertyAtIndex(2, e)
```

```
MsgBox "3rd value in array: " + n.StringValue
```

#### Notes:

The JSObject whose property you want to get.

propertyIndex: An integer value that is the property's name.

JSEException: A JSValueMBS in which to store an exception, if any.

Returns the property's value if object has the property, otherwise the undefined value.

Calling GetPropertyAtIndex is equivalent to calling GetProperty with a string containing propertyIndex,

but `GetPropertyAtIndex` provides optimized access to numeric properties.

### 15.3.9 `HasProperty(name as string)` as boolean

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Tests whether an object has a given property.

**Example:**

```
dim c as new JSContextMBS
```

```
dim e as JSValueMBS
```

```
dim v as JSObjectMBS = c.NewArray(nil, e)
```

```
MsgBox str(v.HasProperty("length"))
```

**Notes:**

name: A string containing the property's name.

Returns true if the object has a property whose name matches `propertyName`, otherwise false.

### 15.3.10 `PropertyNames as String()`

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Gets the names of an object's enumerable properties.

**Example:**

```
dim c as new JSContextMBS
```

```
dim v as JSObjectMBS = c.globalObject
```

```
dim e as JSValueMBS
```

```
v.SetProperty "Hello", c.valueWithString("World"), e
```

```
v.SetProperty "Value", c.valueWithDouble(5), e
```

```
MsgBox Join(v.PropertyNames, EndOfLine)
```

### 15.3.11 `SetProperty(name as string, value as JSValueMBS, byref JSException as JSValueMBS)`

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Sets a property on an object.

**Example:**

```
dim c as new JSContextMBS

dim v as JSObjectMBS = c.globalObject
dim e as JSValueMBS

v.SetProperty "Hello", c.valueWithString("World"), e
v.SetProperty "Value", c.valueWithDouble(5), e
```

**Notes:**

Name: A string containing the property's name.

Value: A JSValue to use as the property's value.

JSExeption A pointer to a JSValueRef in which to store an exception, if any.

### 15.3.12 SetPropertyAtIndex(propertyIndex as Integer, value as JSValueMBS, byref JSExeption as JSValueMBS)

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Sets a property on an object by numeric index.

**Notes:**

propertyIndex: The property's name as a number.

value: A JSValue to use as the property's value.

exception: A JSValueMBS in which to store an exception, if any.

Calling SetPropertyAtIndex is equivalent to calling SetProperty with a string containing propertyIndex, but SetPropertyAtIndex provides optimized access to numeric properties.

### 15.3.13 Properties

#### 15.3.14 isConstructor as Boolean

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Tests whether an object can be called as a constructor.

**Notes:**

Returns true if the object can be called as a constructor, otherwise false.  
(Read only property)

### 15.3.15 isFunction as Boolean

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Tests whether an object can be called as a function.

**Example:**

```
dim c as new JSContextMBS
dim f as JSObjectMBS = c.NewFunction("Hello")
```

```
MsgBox str(f.isFunction)
```

**Notes:**

Returns true if the object can be called as a function, otherwise false.  
(Read only property)

### 15.3.16 Prototype as JSValueMBS

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** An object's prototype.

**Example:**

```
dim c as new JSContextMBS
dim j as JSValueMBS = c.valueWithJSON(" { "tag": 1 } ")
```

```
dim o as JSObjectMBS = JSObjectMBS(j)
MsgBox "object prototyp: " + o.Prototype.StringValue
```

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

## 15.4 class JSValueMBS

### 15.4.1 class JSValueMBS

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The class for a Javascript value.

**Example:**

```
dim c as new JSContextMBS
dim j as JSValueMBS = c.valueWithDouble(1)
MsgBox j.StringValue
```

**Notes:** This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

### 15.4.2 Methods

### 15.4.3 Constructor

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

### 15.4.4 DoubleValue(byref JSEException as JSValueMBS) as Double

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Converts a JavaScript value to number and returns the resulting number.

**Notes:** Returns the numeric result of conversion, or NaN if an exception is thrown.

See also:

- 15.4.15 doubleValue as Double

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### 15.4.5 IsEqual(OtherValue as JSValueMBS, byref JSEException as JSValueMBS) as boolean

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Tests whether two JavaScript values are equal, as compared by the JS == operator.

**Example:**

```
dim c as new JSContextMBS
dim s1 as JSValueMBS = c.valueWithJSON("""Hello""")
dim s2 as JSValueMBS = c.valueWithJSON("""Hello""")
```

```

dim e as JSValueMBS
MsgBox str(s1.IsEqual(s2, e))

```

**Notes:**

OtherValue The second value to test.

exception: A JSValueMBS in which to store an exception, if any.

Returns true if the two values are equal, false if they are not equal or an exception is thrown.

### 15.4.6 IsInstanceOfConstructor(ConstructorFunction as JSObjectMBS, byref JSException as JSValueMBS) as boolean

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Tests whether a JavaScript value is an object constructed by a given constructor, as compared by the JS instanceof operator.

**Notes:**

ConstructorFunction: The constructor to test against.

JSException: A JSValueMBS in which to store an exception, if any.

Returns true if value is an object constructed by constructor, as compared by the JS instanceof operator, otherwise false.

### 15.4.7 IsObjectOfClass(ClassObject as JSValueMBS) as boolean

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Tests whether a JavaScript value is an object with a given class in its class chain.

**Notes:**

ClassObject The JSClass to test against.

Returns true if value is an object and has jsClass in its class chain, otherwise false.

### 15.4.8 IsStrictEqual(OtherValue as JSValueMBS) as boolean

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Tests whether two JavaScript values are strict equal, as compared by the JS === operator.

**Example:**

```

dim c as new JSContextMBS
dim j1 as JSValueMBS = c.valueWithDouble(1)
dim j2 as JSValueMBS = c.valueWithDouble(2)

```

```

MsgBox str(j1.IsStrictEqual(j2)) // false
MsgBox str(j1.IsStrictEqual(j1)) // true

```

**Notes:**

OtherValue: The second value to test.

Returns true if the two values are strict equal, otherwise false.

### 15.4.9 JSONString(indent as Integer = 0, byref JSEException as JSValueMBS) as string

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a JavaScript string containing the JSON serialized representation of a JS value.

**Example:**

```
dim c as new JSContextMBS
dim j as JSValueMBS = c.valueWithJSON(" { ""tag"":""Hello"", ""value"":1 } ")
dim e as JSValueMBS
MsgBox j.JSONString(5, e)
```

**Notes:**

Requires Mac OS X 10.7 and newer.

The number of spaces to indent when nesting. If 0, the resulting JSON will not contains newlines. The size of the indent is clamped to 10 spaces.

JSEException: A JSValueMBS in which to store an exception, if any.

Returns a JSString with the result of serialization, or nil if an exception is thrown.

See also:

- 15.4.25 JSONString as string

### 15.4.10 ObjectValue(byref JSEException as JSValueMBS) as JSValueMBS

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Converts a JavaScript value to object and returns the resulting object.

**Notes:**

JSEException: A JSValueMBS in which to store an exception, if any.

Returns the JSObject result of conversion, or nil if an exception is thrown.

### 15.4.11 StringValue(byref JSException as JSValueMBS) as string

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Converts a JavaScript value to string and copies the result into a JavaScript string.

**Notes:**

JSException: A JSValueMBS in which to store an exception, if any.

Returns a JSString with the result of conversion, or nil if an exception is thrown.

See also:

- 15.4.26 StringValue as String

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### 15.4.12 Properties

#### 15.4.13 booleanValue as Boolean

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Converts a JavaScript value to boolean and returns the resulting boolean.

**Example:**

```
dim c as new JSContextMBS
dim j as JSValueMBS = c.valueWithBool(true)
MsgBox str(j.booleanValue)
```

**Notes:** (Read only property)

#### 15.4.14 context as JSContextMBS

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The context for this value.

**Notes:** (Read only property)

#### 15.4.15 doubleValue as Double

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Converts a JavaScript value to number and returns the resulting number.

**Example:**

```
dim c as new JSContextMBS
dim j as JSValueMBS = c.valueWithDouble(5.3)
MsgBox str(j.doubleValue)
```

**Notes:**

Returns the numeric result of conversion, or NaN if an exception is thrown.

(Read only property)

See also:

- 15.4.4 DoubleValue(byref JSEException as JSValueMBS) as Double

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### 15.4.16 Handle as Integer

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

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

### 15.4.17 isArray as Boolean

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Tests whether a JavaScript value is an array.

**Example:**

```
dim c as new JSContextMBS
```

```
dim e as JSValueMBS
```

```
dim v as JSValueMBS = c.NewArray(nil, e)
```

```
MsgBox str(v.isArray)
```

**Notes:**

Returns true if value is an array, otherwise false.

Requires OS X 10.11 or newer.

(Read only property)

### 15.4.18 isBoolean as Boolean

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Tests whether a JavaScript value's type is the boolean type.

**Example:**

```
dim c as new JSContextMBS
dim j as JSValueMBS = c.valueWithBool(true)
MsgBox str(j.isBoolean)
```

**Notes:**

Returns true if value's type is the boolean type, otherwise false.  
(Read only property)

### 15.4.19 isDate as Boolean

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Tests whether a JavaScript value is a date.

**Example:**

```
dim c as new JSContextMBS

dim year as JSValueMBS = c.valueWithDouble(2015)
dim month as JSValueMBS = c.valueWithDouble(5)
dim day as JSValueMBS = c.valueWithDouble(12)

dim e as JSValueMBS // exception
dim d as JSValueMBS = c.NewDate(array(year, month, day), e)

MsgBox str(d.isDate)
```

**Notes:**

Returns true if value is a date, otherwise false.  
Requires OS X 10.11 or newer.  
(Read only property)

### 15.4.20 isNull as Boolean

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Tests whether a JavaScript value's type is the null type.

**Example:**

```
dim c as new JSContextMBS
dim n as JSValueMBS = c.valueWithNull

MsgBox str(n.isNull)
```

**Notes:**

Returns true if value's type is the null type, otherwise false.  
(Read only property)

**15.4.21 isNumber as Boolean**

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Tests whether a JavaScript value's type is the number type.

**Example:**

```
dim c as new JSContextMBS

dim j as JSValueMBS = c.valueWithDouble(5)
MsgBox str(j.isNumber)
```

**Notes:**

Returns true if value's type is the number type, otherwise false.  
(Read only property)

**15.4.22 isObject as Boolean**

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Tests whether a JavaScript value's type is the object type.

**Example:**

```
dim c as new JSContextMBS

dim e as JSValueMBS
dim v as JSValueMBS = c.NewArray(nil, e)

MsgBox str(v.isObject)
```

**Notes:**

Returns true if value's type is the object type, otherwise false.  
(Read only property)

### 15.4.23 isString as Boolean

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Tests whether a JavaScript value's type is the string type.

**Example:**

```
dim c as new JSContextMBS
dim s as JSValueMBS = c.valueWithJSON("""Hello""")
MsgBox str(s.isString)
```

**Notes:**

Returns true if value's type is the string type, otherwise false.  
(Read only property)

### 15.4.24 isUndefined as Boolean

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Tests whether a JavaScript value's type is the undefined type.

**Example:**

```
dim c as new JSContextMBS
dim j as JSValueMBS = c.valueWithUndefined
MsgBox str(j.isUndefined)
```

**Notes:**

Returns true if value's type is the undefined type, otherwise false.  
(Read only property)

### 15.4.25 JSONString as string

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a JavaScript string containing the JSON serialized representation of a JS value.

**Example:**

```
dim c as new JSContextMBS
dim v as JSValueMBS = c.valueWithString("Hello")
MsgBox v.JSONString
```

**Notes:**

Requires Mac OS X 10.7 and newer.

(Read only property)

See also:

- 15.4.9 JSONString(indent as Integer = 0, byref JSEException as JSValueMBS) as string 427

### 15.4.26 StringValue as String

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Converts a JavaScript value to string and copies the result into a JavaScript string.

**Example:**

```
dim c as new JSContextMBS
```

```
dim v as JSValueMBS = c.valueWithString("Hello")  
MsgBox v.StringValue
```

**Notes:**

Returns a JSString with the result of conversion, or NULL if an exception is thrown.

(Read only property)

See also:

- 15.4.11 StringValue(byref JSEException as JSValueMBS) as string 428

### 15.4.27 Tag as Variant

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The tag value.

**Notes:**

You can store anything here and as long as the JSValue object exists, this value is kept referenced.

(Read and Write property)

### 15.4.28 Type as Integer

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns a JavaScript value's type.

**Example:**

```
dim c as new JSContextMBS  
dim j as JSValueMBS
```

```

j = c.valueWithDouble(1) // double
'j = c.valueWithNull // null
'j = c.valueWithUndefined // undefined
'j = c.valueWithString("Hello") // string
'j = c.valueWithJSON(" { "tag": 1 } ") // object
'j = c.valueWithBool(true)

```

```

Select case j.Type
case JSValueMBS.kJSTypeUndefined
MsgBox "undefined"
case JSValueMBS.kJSTypeNull
MsgBox "null"
case JSValueMBS.kJSTypeBoolean
MsgBox "boolean "+str(j.booleanValue)
case JSValueMBS.kJSTypeNumber
MsgBox "number "+str(j.doubleValue)
case JSValueMBS.kJSTypeString
MsgBox "string "+j.StringValue
case JSValueMBS.kJSTypeObject
MsgBox "object "+j.JSONString
else
Break
end Select

```

**Notes:** (Read only property)

## 15.4.29 Constants

### 15.4.30 kJSTypeBoolean = 2

Plugin Version: 15.4. **Function:** One of the type constant identifying the type of a JSValue.

**Example:**

```

dim c as new JSContextMBS
dim j as JSValueMBS = c.valueWithBool(true)

if j.Type = JSValueMBS.kJSTypeBoolean then
MsgBox "boolean "+str(j.booleanValue)
end if

```

**Notes:** A primitive boolean value, one of true or false.

### 15.4.31 kJSTypeNull = 1

Plugin Version: 15.4. **Function:** One of the type constant identifying the type of a JSValue.

**Example:**

```
dim c as new JSContextMBS
dim j as JSValueMBS = c.valueWithNull

if j.Type = JSValueMBS.kJSTypeNull then
  MsgBox "null"
end if
```

**Notes:** The unique null value.

### 15.4.32 kJSTypeNumber = 3

Plugin Version: 15.4. **Function:** One of the type constant identifying the type of a JSValue.

**Example:**

```
dim c as new JSContextMBS
dim j as JSValueMBS = c.valueWithDouble(1) // double

if j.Type = JSValueMBS.kJSTypeNumber then
  MsgBox "number "+str(j.doubleValue)
end if
```

**Notes:** A primitive number value.

### 15.4.33 kJSTypeObject = 5

Plugin Version: 15.4. **Function:** One of the type constant identifying the type of a JSValue.

**Example:**

```
dim c as new JSContextMBS
dim j as JSValueMBS = c.valueWithJSON(" { ""tag"": 1 } ")

if j.Type = JSValueMBS.kJSTypeBoolean then
  MsgBox "object "+j.JSONString
end if
```

**Notes:** An object value (meaning that this JSValueMBS is a JSObjectMBS).

#### 15.4.34 kJSTypeString = 4

Plugin Version: 15.4. **Function:** One of the type constant identifying the type of a JSValue.

**Example:**

```
dim c as new JSContextMBS
dim j as JSValueMBS = c.valueWithString("Hello")
```

```
if j.Type = JSValueMBS.kJSTypeString then
MsgBox "string " + j.StringValue
end if
```

**Notes:** A primitive string value.

#### 15.4.35 kJSTypeUndefined = 0

Plugin Version: 15.4. **Function:** One of the type constant identifying the type of a JSValue.

**Example:**

```
dim c as new JSContextMBS
dim j as JSValueMBS = c.valueWithUndefined
```

```
if j.Type = JSValueMBS.kJSTypeUndefined then
MsgBox "undefined"
end if
```

**Notes:** The unique undefined value.

# Chapter 16

## Login Items

### 16.1 class LSSharedFileListItemMBS

#### 16.1.1 class LSSharedFileListItemMBS

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The class for a list item.

**Notes:** Requires Mac OS X 10.5.

#### 16.1.2 Methods

#### 16.1.3 DisplayName as string

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Obtain item's display name.

**Example:**

```
dim l as new LSSharedFileListItemMBS(LSSharedFileListItemMBS.kRecentDocumentItems)

if l.Handle=0 then
  MsgBox "Failed to get list."
else
  dim a(-1) as LSSharedFileListItemMBS = l.Snapshot
  dim lines(-1) as string

  for each x as LSSharedFileListItemMBS in a
    lines.append x.DisplayName
  next
```

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

### 16.1.4 Icon as Variant

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Obtain item's icon.  
**Notes:** Returns an IconMBS object.

### 16.1.5 ID as UInt32

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Obtain unique item id.

**Example:**

```
dim l as new LSSharedFileListMBS(LSSharedFileListMBS.kSessionLoginItems)
```

```
if l.Handle=0 then
MsgBox "Failed to get list."
else
dim a(-1) as LSSharedFileListItemMBS = l.Snapshot
dim lines(-1) as string
```

```
for each x as LSSharedFileListItemMBS in a
lines.append x.DisplayName+": "+str(x.ID)
next
```

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

### 16.1.6 Resolve(flags as UInt32) as folderitem

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Resolve item and return its folderitem.

**Example:**

```
dim l as new LSSharedFileListMBS(LSSharedFileListMBS.kRecentDocumentItems)
```

```
if l.Handle=0 then
MsgBox "Failed to get list."
else
dim a(-1) as LSSharedFileListItemMBS = l.Snapshot
```

```

dim lines(-1) as string

for each x as LSSharedFileListItemMBS in a
lines.append x.Resolve(0).AbsolutePath
next

MsgBox Join(lines, EndOfLine)
end if

```

**Notes:** Pass values like 0, kNoUserInteraction, kDoNotMountVolumes or kDoNotMountVolumes+kNoUserInteraction.

### 16.1.7 ResolveURL(flags as UInt32) as string

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Resolve item and return its URL.

**Example:**

```

dim l as new LSSharedFileListMBS(LSSharedFileListMBS.kRecentDocumentItems)

if l.Handle=0 then
MsgBox "Failed to get list."
else
dim a(-1) as LSSharedFileListItemMBS = l.Snapshot
dim lines(-1) as string

for each x as LSSharedFileListItemMBS in a
lines.append x.ResolveURL(x.kNoUserInteraction)
next

MsgBox Join(lines, EndOfLine)
end if

```

**Notes:** Pass values like 0, kNoUserInteraction, kDoNotMountVolumes or kDoNotMountVolumes+kNoUserInteraction.

### 16.1.8 Properties

#### 16.1.9 Handle as Integer

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal reference to the item.

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

#### 16.1.10 Lasterror as Integer

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The last error code.

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

#### 16.1.11 ItemHidden as boolean

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Is item hidden in UI?

**Example:**

```
dim l as new LSSharedFileListMBS(LSSharedFileListMBS.kSessionLoginItems)

if l.Handle=0 then
  MsgBox "Failed to get list."
else
  dim a(-1) as LSSharedFileListItemMBS = l.Snapshot
  dim lines(-1) as string

  for each x as LSSharedFileListItemMBS in a
    lines.append x.DisplayName+": "+str(x.ItemHidden)
  next

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

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

#### 16.1.12 LoginItemHidden as boolean

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Should UI hide login item's window?

**Example:**

```
dim l as new LSSharedFileListMBS(LSSharedFileListMBS.kSessionLoginItems)

if l.Handle=0 then
  MsgBox "Failed to get list."
else
  dim a(-1) as LSSharedFileListItemMBS = l.Snapshot
  dim lines(-1) as string

  for each x as LSSharedFileListItemMBS in a
    lines.append x.DisplayName+": "+str(x.LoginItemHidden)
  next

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

**Notes:**

Requires Mac OS X 10.6.  
(Read and Write computed property)

**16.1.13 Constants****16.1.14 kDoNotMountVolumes = 2**

Plugin Version: 9.8. **Function:** One of the flags for resolve.  
**Notes:** do not mount volumes during resolution

**16.1.15 kNoUserInteraction = 1**

Plugin Version: 9.8. **Function:** One of the flags for resolve.  
**Notes:** no user interaction during resolution

## 16.2 class LSSharedFileListMBS

### 16.2.1 class LSSharedFileListMBS

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The shared list class.  
**Notes:**

The shared file list API is for sharing and storing list of references to file system objects. The shared file list is a persistent list of objects, where each item has assigned display name, icon, and url as well as other optional properties.

Each list can also have various properties attached.

Requires Mac OS X 10.5.

### 16.2.2 Methods

#### 16.2.3 Constructor(type as Integer)

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates shared file list reference to be used for changing list and reading its various properties.

**Notes:** type: A constant indicating list type to create. See the constants in this class.

#### 16.2.4 GetSeedValue as UInt32

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns seed value of the shared list.

#### 16.2.5 InsertFile(AfterItem as LSSharedFileListItemMBS, DisplayName as string, Icon as object, file as folderitem) as LSSharedFileListItemMBS

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Insert item into shared list.

**Example:**

```
// Add iPhoto to launch items

// pick app
dim app as FolderItem = SpecialFolder.Applications.Child("iPhoto.app")

// get list object
dim l as new LSSharedFileListMBS(LSSharedFileListMBS.kSessionLoginItems)
```

```

// insert file
dim item as LSSharedFileListItemMBS = l.InsertFile(l.kLSSharedFileListItemBeforeFirst, "Launch iPhoto",
nil, app)

// check error
if l.Lasterror = 0 then
MsgBox "OK"
else
MsgBox "Failed: "+str(l.Lasterror)
end if

```

**Notes:**

Inserts item into shared list at specified location. If the item already exists in the list it will be moved and its icon, display name and properties will be updated.

AfterItem: Item after which new item has to be inserted. To insert at the beginning of the list use kLSSharedFileListItemBeforeFirst or to insert at the end of the list use kLSSharedFileListItemLast.

DisplayName: Display name of the new item. Can be NULL.

Icon: IconMBS of the new item. Can be nil.

File: Folderitem of the new item.

### 16.2.6 InsertURL(AfterItem as LSSharedFileListItemMBS, DisplayName as string, Icon as object, URL as string) as LSSharedFileListItemMBS

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Insert item into shared list.

**Notes:**

Inserts item into shared list at specified location. If the item already exists in the list it will be moved and its icon, display name and properties will be updated.

AfterItem: Item after which new item has to be inserted. To insert at the beginning of the list use kLSSharedFileListItemBeforeFirst or to insert at the end of the list use kLSSharedFileListItemLast.

DisplayName: Display name of the new item. Can be "".

Icon: IconMBS object for the icon. Can be nil.

URL: URL of the new item.

### 16.2.7 kLSSharedFileListItemBeforeFirst as LSSharedFileListItemMBS

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A virtual item reference for inserting new item at beginning of the list.

**Example:**

```
dim n as LSSharedFileListItemMBS = LSSharedFileListMBS.kLSSharedFileListItemBeforeFirst
MsgBox str(n.Handle) // a special handle value for this virtual item: 1
```

### 16.2.8 kLSSharedFileListItemLast as LSSharedFileListItemMBS

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A virtual item reference for inserting new item at end of the list.

**Example:**

```
dim n as LSSharedFileListItemMBS = LSSharedFileListMBS.kLSSharedFileListItemLast
MsgBox str(n.Handle) // a special handle value for this virtual item: 2
```

### 16.2.9 Move(item as LSSharedFileListItemMBS, MoveAfterItem as LSSharedFileListItemMBS)

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Moves item at specified location.

**Notes:**

item: Item to move.

MoveAfterItem: New icon of the new item. Use kLSSharedFileListItemBeforeFirst and kLSSharedFileListItemLast to move at the beginning or the end of the shared list.

### 16.2.10 Remove(item as LSSharedFileListItemMBS)

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Remove item from shared list.

**Example:**

```
// Remove iPhoto from launch items

// get list object
dim l as new LSSharedFileListMBS(LSSharedFileListMBS.kSessionLoginItems)

// get items
```

```

dim items(-1) as LSSharedFileListItemMBS = l.Snapshot

// check all items
for each item as LSSharedFileListItemMBS in items
dim file as FolderItem = item.Resolve(LSSharedFileListItemMBS.kNoUserInteraction)

if file<>nil then
if file.Name = "iPhoto.app" then
l.Remove item

if l.Lasterror = 0 then
MsgBox "OK"
else
MsgBox "Error: " +str(l.Lasterror)
end if
Return
end if
end if

next

```

### 16.2.11 RemoveAllItems

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Remove all items from shared list.

### 16.2.12 SetAuthorization(handle as Integer)

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Set authorization reference for the shared list.

**Notes:** Before attempting to perform a privileged operation on the shared list caller must authorize appropriate rights. For example, modifying kGlobalLoginItems list requires "system.global-login-items." right authorized.

### 16.2.13 Snapshot as LSSharedFileListItemMBS()

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates snapshot array, which is list of all items at the moment this method was called.

See also:

- 16.2.14 Snapshot(byref seed as UInt32) as LSSharedFileListItemMBS()

### 16.2.14 Snapshot(byref seed as UInt32) as LSSharedFileListItemMBS()

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates snapshot array, which is list of all items at the moment this method was called.

**Notes:** seed: Returned seed value at which snapshot was taken.

See also:

- 16.2.13 Snapshot as LSSharedFileListItemMBS()

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### 16.2.15 Properties

### 16.2.16 Handle as Integer

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal reference to the list.

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

### 16.2.17 Lasterror as Integer

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The last error code.

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

### 16.2.18 RecentItemsMaxAmount as Integer

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Maximum amount of items in the list.

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

### 16.2.19 VolumesComputerVisible as boolean

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Is Computer item visible in favorite volumes list?

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

### 16.2.20 VolumesIDiskVisible as boolean

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Is iDisk item visible in favorite volumes list.

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

### 16.2.21 VolumesNetworkVisible as boolean

Plugin Version: 9.8, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Is Network item visible in favorite volumes list?

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

### 16.2.22 Events

#### 16.2.23 Changed

Plugin Version: 9.8, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The event called whenever the list is changed by an application.

### 16.2.24 Constants

#### 16.2.25 kFavoriteItems = 2

Plugin Version: 9.8. **Function:** One of the list type constants.

**Example:**

```
dim l as new LSSharedFileListMBS(LSSharedFileListMBS.kFavoriteItems)

if l.Handle=0 then
  MsgBox "Failed to get list."
else
  dim a(-1) as LSSharedFileListItemMBS = l.Snapshot
  dim lines(-1) as string

  for each x as LSSharedFileListItemMBS in a
    lines.append x.DisplayName
  next

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

**16.2.26 kFavoriteVolumes = 1**

Plugin Version: 9.8. **Function:** One of the list type constants.

**Example:**

```
dim l as new LSSharedFileListMBS(LSSharedFileListMBS.kFavoriteVolumes)

if l.Handle=0 then
  MsgBox "Failed to get list."
else
  dim a(-1) as LSSharedFileListItemMBS = l.Snapshot
  dim lines(-1) as string

  for each x as LSSharedFileListItemMBS in a
    lines.append x.DisplayName
  next

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

**16.2.27 kGlobalLoginItems = 7**

Plugin Version: 9.8. **Function:** One of the list type constants.

**Example:**

```
dim l as new LSSharedFileListMBS(LSSharedFileListMBS.kGlobalLoginItems)

if l.Handle=0 then
  MsgBox "Failed to get list."
else
  dim a(-1) as LSSharedFileListItemMBS = l.Snapshot
  dim lines(-1) as string

  for each x as LSSharedFileListItemMBS in a
    lines.append x.DisplayName
  next

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

**16.2.28 kRecentApplicationItems = 3**

Plugin Version: 9.8. **Function:** One of the list type constants.

**Example:**

```
dim l as new LSSharedFileListMBS(LSSharedFileListMBS.kRecentApplicationItems)

if l.Handle=0 then
  MsgBox "Failed to get list."
else
  dim a(-1) as LSSharedFileListItemMBS = l.Snapshot
  dim lines(-1) as string

  for each x as LSSharedFileListItemMBS in a
    lines.append x.DisplayName
  next

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

**16.2.29 kRecentDocumentItems = 4**

Plugin Version: 9.8. **Function:** One of the list type constants.

**Example:**

```
dim l as new LSSharedFileListMBS(LSSharedFileListMBS.kRecentDocumentItems)

if l.Handle=0 then
  MsgBox "Failed to get list."
else
  dim a(-1) as LSSharedFileListItemMBS = l.Snapshot
  dim lines(-1) as string

  for each x as LSSharedFileListItemMBS in a
    lines.append x.DisplayName
  next

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

**16.2.30 kRecentServerItems = 5**

Plugin Version: 9.8. **Function:** One of the list type constants.

**Example:**

```
dim l as new LSSharedFileListMBS(LSSharedFileListMBS.kRecentServerItems)

if l.Handle=0 then
  MsgBox "Failed to get list."
else
  dim a(-1) as LSSharedFileListItemMBS = l.Snapshot
  dim lines(-1) as string

  for each x as LSSharedFileListItemMBS in a
    lines.append x.DisplayName
  next

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

**16.2.31 kSessionLoginItems = 6**

Plugin Version: 9.8. **Function:** One of the list type constants.

**Example:**

```
dim l as new LSSharedFileListMBS(LSSharedFileListMBS.kSessionLoginItems)

if l.Handle=0 then
  MsgBox "Failed to get list."
else
  dim a(-1) as LSSharedFileListItemMBS = l.Snapshot
  dim lines(-1) as string

  for each x as LSSharedFileListItemMBS in a
    lines.append x.DisplayName
  next

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

# Chapter 17

## Media Keys

### 17.1 class MediaKeysMBS

#### 17.1.1 class MediaKeysMBS

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Catch some special keys with this class.

**Example:**

```
dim m as MediaKeysMBS // global property!

// app initialization
m = new MediaKeysMBS

// set which keys to watch for
m.Keys(MediaKeysMBS.kMediaKeyEject) = MediaKeysMBS.kModeEventAndBlock

// and start
m.startWatchingMediaKeys
```

**Notes:**

First written to catch play, fast and rewind keys from Apple keyboards.  
Later extended to also catch other keys.  
Still not all keys are available on all keyboards.

Please have only instance of this class running your application.

### 17.1.2 Methods

### 17.1.3 Constructor

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Initializes the key watcher.

### 17.1.4 Keys(keyCode as Integer) as Integer

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Which keys should be intercepted and handled by your application.

**Example:**

```
dim m as new MediaKeysMBS // your MediaKeys object

// watch for this key
m.Keys(MediaKeysMBS.kMediaKeyEject) = MediaKeysMBS.kModeEventAndBlock
```

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

### 17.1.5 startWatchingMediaKeys

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Starts watching for keys.

**Example:**

```
dim m as MediaKeysMBS // global property!

// app initialization
m = new MediaKeysMBS

m.Keys(MediaKeysMBS.kMediaKeyEject) = MediaKeysMBS.kModeEventAndBlock
m.startWatchingMediaKeys
```

### 17.1.6 stopWatchingMediaKeys

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Stops watching for keys.

**Example:**

```
dim m as MediaKeysMBS // global property

// when closing media window
m.stopWatchingMediaKeys
```

**Notes:** The destructor calls this for cleanup.

### 17.1.7 Events

#### 17.1.8 receivedMediaKeyEvent(e as NSEventMBS, keyCode as Integer, keyFlags as Integer, keyState as Integer, keyRepeat as Integer)

Plugin Version: 11.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The event called when the user uses one of the special keys we listen for.

**Notes:**

If you don't get the event, did you make sure all conditions are right?

- Requires Mac OS X 10.5
- Keys(x) set to kModeEventAndBlock or kModeEventAndPass for the keys you need?
- startWatchingMediaKeys called?
- your object is still alive in your application?

### 17.1.9 Constants

#### 17.1.10 kMediaKeyBrightnessDown = 3

Plugin Version: 11.2. **Function:** One of the key constants.

**Example:**

```
dim m as new MediaKeysMBS // your MediaKeys object

// watch for this key
m.Keys(MediaKeysMBS.kMediaKeyBrightnessDown) = MediaKeysMBS.kModeEventAndBlock
```

### 17.1.11 kMediaKeyBrightnessUp = 2

Plugin Version: 11.2. **Function:** One of the key constants.

**Example:**

```
dim m as new MediaKeysMBS // your MediaKeys object

// watch for this key
m.Keys(MediaKeysMBS.kMediaKeyBrightnessUp) = MediaKeysMBS.kModeEventAndBlock
```

### 17.1.12 kMediaKeyCapsLock = 4

Plugin Version: 11.2. **Function:** One of the key constants.

**Example:**

```
dim m as new MediaKeysMBS // your MediaKeys object

// watch for this key
m.Keys(MediaKeysMBS.kMediaKeyCapsLock) = MediaKeysMBS.kModeEventAndBlock
```

**Notes:** Caps Lock

### 17.1.13 kMediaKeyContrastDown = 12

Plugin Version: 11.2. **Function:** One of the key constants.

**Example:**

```
dim m as new MediaKeysMBS // your MediaKeys object

// watch for this key
m.Keys(MediaKeysMBS.kMediaKeyContrastDown) = MediaKeysMBS.kModeEventAndBlock
```

### 17.1.14 kMediaKeyContrastUp = 11

Plugin Version: 11.2. **Function:** One of the key constants.

**Example:**

```
dim m as new MediaKeysMBS // your MediaKeys object

// watch for this key
```

```
m.Keys(MediaKeysMBS.kMediaKeyContrastUp) = MediaKeysMBS.kModeEventAndBlock
```

### 17.1.15 kMediaKeyDownArrow = 9

Plugin Version: 11.2. **Function:** One of the key constants.

**Example:**

```
dim m as new MediaKeysMBS // your MediaKeys object
```

```
// watch for this key
```

```
m.Keys(MediaKeysMBS.kMediaKeyDownArrow) = MediaKeysMBS.kModeEventAndBlock
```

### 17.1.16 kMediaKeyEject = 14

Plugin Version: 11.2. **Function:** One of the key constants.

**Example:**

```
dim m as new MediaKeysMBS // your MediaKeys object
```

```
// watch for this key
```

```
m.Keys(MediaKeysMBS.kMediaKeyEject) = MediaKeysMBS.kModeEventAndBlock
```

**Notes:** Eject key

### 17.1.17 kMediaKeyFast = 19

Plugin Version: 11.2. **Function:** One of the key constants.

**Example:**

```
dim m as new MediaKeysMBS // your MediaKeys object
```

```
// watch for this key
```

```
m.Keys(MediaKeysMBS.kMediaKeyFast) = MediaKeysMBS.kModeEventAndBlock
```

**Notes:** Fast key. On by default.

### 17.1.18 kMediaKeyHelp = 5

Plugin Version: 11.2. **Function:** One of the key constants.

**Example:**

```
dim m as new MediaKeysMBS // your MediaKeys object

// watch for this key
m.Keys(MediaKeysMBS.kMediaKeyHelp) = MediaKeysMBS.kModeEventAndBlock
```

### 17.1.19 kMediaKeyIlluminationDown = 22

Plugin Version: 11.2. **Function:** One of the key constants.

**Example:**

```
dim m as new MediaKeysMBS // your MediaKeys object

// watch for this key
m.Keys(MediaKeysMBS.kMediaKeyIlluminationDown) = MediaKeysMBS.kModeEventAndBlock
```

### 17.1.20 kMediaKeyIlluminationToggle = 23

Plugin Version: 11.2. **Function:** One of the key constants.

**Example:**

```
dim m as new MediaKeysMBS // your MediaKeys object

// watch for this key
m.Keys(MediaKeysMBS.kMediaKeyIlluminationToggle) = MediaKeysMBS.kModeEventAndBlock
```

### 17.1.21 kMediaKeyIlluminationUp = 21

Plugin Version: 11.2. **Function:** One of the key constants.

**Example:**

```
dim m as new MediaKeysMBS // your MediaKeys object

// watch for this key
m.Keys(MediaKeysMBS.kMediaKeyIlluminationUp) = MediaKeysMBS.kModeEventAndBlock
```

### 17.1.22 kMediaKeyLaunchPanel = 13

Plugin Version: 11.2. **Function:** One of the key constants.

**Example:**

```
dim m as new MediaKeysMBS // your MediaKeys object

// watch for this key
m.Keys(MediaKeysMBS.kMediaKeyLaunchPanel) = MediaKeysMBS.kModeEventAndBlock
```

### 17.1.23 kMediaKeyMute = 7

Plugin Version: 11.2. **Function:** One of the key constants.

**Example:**

```
dim m as new MediaKeysMBS // your MediaKeys object

// watch for this key
m.Keys(MediaKeysMBS.kMediaKeyMute) = MediaKeysMBS.kModeEventAndBlock
```

**Notes:** Sound Mute

### 17.1.24 kMediaKeyNext = 17

Plugin Version: 11.2. **Function:** One of the key constants.

**Example:**

```
dim m as new MediaKeysMBS // your MediaKeys object

// watch for this key
m.Keys(MediaKeysMBS.kMediaKeyNext) = MediaKeysMBS.kModeEventAndBlock
```

### 17.1.25 kMediaKeyNumLock = 10

Plugin Version: 11.2. **Function:** One of the key constants.

**Example:**

```
dim m as new MediaKeysMBS // your MediaKeys object

// watch for this key
m.Keys(MediaKeysMBS.kMediaKeyNumLock) = MediaKeysMBS.kModeEventAndBlock
```

**Notes:** Num Lock key

### 17.1.26 kMediaKeyPlay = 16

Plugin Version: 11.2. **Function:** One of the key constants.

**Example:**

```
dim m as new MediaKeysMBS // your MediaKeys object

// watch for this key
m.Keys(MediaKeysMBS.kMediaKeyPlay) = MediaKeysMBS.kModeEventAndBlock
```

**Notes:** Play key. On by default.

### 17.1.27 kMediaKeyPower = 6

Plugin Version: 11.2. **Function:** One of the key constants.

**Example:**

```
dim m as new MediaKeysMBS // your MediaKeys object

// watch for this key
m.Keys(MediaKeysMBS.kMediaKeyPower) = MediaKeysMBS.kModeEventAndBlock
```

**Notes:** Power Key

**17.1.28 kMediaKeyPrevious = 18**

Plugin Version: 11.2. **Function:** One of the key constants.

**Example:**

```
dim m as new MediaKeysMBS // your MediaKeys object

// watch for this key
m.Keys(MediaKeysMBS.kMediaKeyPrevious) = MediaKeysMBS.kModeEventAndBlock
```

**Notes:** Previous key

**17.1.29 kMediaKeyRewind = 20**

Plugin Version: 11.2. **Function:** One of the key constants.

**Example:**

```
dim m as new MediaKeysMBS // your MediaKeys object

// watch for this key
m.Keys(MediaKeysMBS.kMediaKeyRewind) = MediaKeysMBS.kModeEventAndBlock
```

**Notes:** Rewind Key. On by default.

**17.1.30 kMediaKeySoundDown = 1**

Plugin Version: 11.2. **Function:** One of the key constants.

**Example:**

```
dim m as new MediaKeysMBS // your MediaKeys object

// watch for this key
m.Keys(MediaKeysMBS.kMediaKeySoundDown) = MediaKeysMBS.kModeEventAndBlock
```

**Notes:** Sound down

### 17.1.31 kMediaKeySoundUp = 0

Plugin Version: 11.2. **Function:** One of the key constants.

**Example:**

```
dim m as new MediaKeysMBS // your MediaKeys object

// watch for this key
m.Keys(MediaKeysMBS.kMediaKeySoundUp) = MediaKeysMBS.kModeEventAndBlock
```

**Notes:** Sound up

### 17.1.32 kMediaKeyUpArrow = 8

Plugin Version: 11.2. **Function:** One of the key constants.

**Example:**

```
dim m as new MediaKeysMBS // your MediaKeys object

// watch for this key
m.Keys(MediaKeysMBS.kMediaKeyUpArrow) = MediaKeysMBS.kModeEventAndBlock
```

### 17.1.33 kMediaKeyVideoMirror = 15

Plugin Version: 11.2. **Function:** One of the key constants.

**Example:**

```
dim m as new MediaKeysMBS // your MediaKeys object

// watch for this key
m.Keys(MediaKeysMBS.kMediaKeyVideoMirror) = MediaKeysMBS.kModeEventAndBlock
```

### 17.1.34 kModeBlock = 1

Plugin Version: 11.2. **Function:** One of the mode constants.

**Notes:** Block the event.

### 17.1.35 kModeEventAndBlock = 2

Plugin Version: 11.2. **Function:** One of the mode constants.

**Notes:** Call the receivedMediaKeyEvent event and block the event.

### 17.1.36 kModeEventAndPass = 3

Plugin Version: 11.2. **Function:** One of the mode constants.

**Notes:** Call the receivedMediaKeyEvent event and pass the event to other applications.

### 17.1.37 kModePass = 0

Plugin Version: 11.2. **Function:** One of the mode constants.

**Notes:** Pass event to other applications.



## Chapter 18

# QuickLook



## Chapter 19

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# Chapter 20

## The FAQ

### 20.0.1 Can anyone help me convert seconds to time in this format hh:mm:ss?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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)

## 20.0.2 How do I get the proper highlight color on Mac OS X for active/inactive selection?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.NSCalibratedRGBColorSpace)
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:

- 20.0.3 How to catch delete key? 477
- 20.0.4 How to convert cmyk to rgb? 477
- 20.0.5 How to delete a folder? 479
- 20.0.6 How to detect if CPU if 64bit processor? 480
- 20.0.7 How to refresh a htmlviewer on Windows? 480

### 20.0.3 How to catch delete key?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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:

- 20.0.2 How do I get the proper highlight color on Mac OS X for active/inactive selection? 476
- 20.0.4 How to convert cmyk to rgb? 477
- 20.0.5 How to delete a folder? 479
- 20.0.6 How to detect if CPU if 64bit processor? 480
- 20.0.7 How to refresh a htmlviewer on Windows? 480

### 20.0.4 How to convert cmyk to rgb?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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:

- 20.0.2 How do I get the proper highlight color on Mac OS X for active/inactive selection? 476
- 20.0.3 How to catch delete key? 477
- 20.0.5 How to delete a folder? 479
- 20.0.6 How to detect if CPU is 64bit processor? 480
- 20.0.7 How to refresh a htmlviewer on Windows? 480

## 20.0.5 How to delete a folder?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** The following is the code 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
else ' file
fo.Delete
end if
next
```

```
f.Delete
End Sub
```

See also:

- 20.0.2 How do I get the proper highlight color on Mac OS X for active/inactive selection? 476
- 20.0.3 How to catch delete key? 477
- 20.0.4 How to convert cmyk to rgb? 477
- 20.0.6 How to detect if CPU is 64bit processor? 480
- 20.0.7 How to refresh a htmlviewer on Windows? 480

### 20.0.6 How to detect if CPU is 64bit processor?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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:

- 20.0.2 How do I get the proper highlight color on Mac OS X for active/inactive selection? 476
- 20.0.3 How to catch delete key? 477
- 20.0.4 How to convert cmyk to rgb? 477
- 20.0.5 How to delete a folder? 479
- 20.0.7 How to refresh a htmlviewer on Windows? 480

### 20.0.7 How to refresh a htmlviewer on Windows?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** You can ask the browser to reload the website with this code line:

**Example:**

```
call htmlViewer1.IERunJavaScriptMBS("javascript:document.location.reload()")
```

See also:

- 20.0.2 How do I get the proper highlight color on Mac OS X for active/inactive selection? 476
- 20.0.3 How to catch delete key? 477
- 20.0.4 How to convert cmyk to rgb? 477
- 20.0.5 How to delete a folder? 479
- 20.0.6 How to detect if CPU is 64bit processor? 480

## 20.0.8 Is there an example for vector graphics in REALbasic?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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

```

## 20.0.9 Picture functions do not preserve resolution values?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

**20.0.10 A toolbox call needs a rect - how do I give it one?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **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
```

**20.0.11 API client not supported?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.12 Can I access Access Database with Java classes?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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>

### 20.0.13 Can I create PDF from Real Studio Report using DynaPDF?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Sorry, no. We can't provide a graphics subclass from plugin.

**Notes:**

The is a feature request to allow graphics subclasses:

Feedback case 11391: [feedback://showreport?report\\_id=11391](http://feedback://showreport?report_id=11391)

### 20.0.14 Can I use AppleScripts in a web application?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.15 Can I use graphics class with DynaPDF?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Sorry, no. We can't provide a graphics subclass from plugin.

**Notes:**

The is a feature request to allow graphics subclasses:  
Feedback case 11391: [feedback://showreport?report\\_id=11391](https://feedback.adobe.com/showreport?report_id=11391)

### 20.0.16 Can I use OGG with REALbasic?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **Answer:** There is a QuickTime plugin for OGG which works with REALbasic.

**Notes:** That should be a solution for playback and recording on Mac and Windows.

### 20.0.17 Can I use sockets on a web application?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Yes, but they run on the server, not on the client.

**Notes:**

You can use HTTPSocket, SMTPSocket, POP3Socket, SMTPSecureSocket, SecurePOP3Socket, EasyTCP-Socket, 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.

### 20.0.18 Can I use your ChartDirector plugin on a web application?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Yes, our ChartDirector plugin works just fine on the Real Studio 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 choosen 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 & hbbbbbb
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(& hFFFFFFF)

// 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.

**20.0.19 Can I use your DynaPDF plugin on a web application?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Yes, our DynaPDF plugin works just fine on the Real Studio 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 Real Studio Web Edition.  
<http://www.monkeybreadsoftware.de/realbasic/webapps.shtml>

**20.0.20 Can I use your plugin controls on a web application?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** No.

**20.0.21 Can you get an unique machine ID?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.22 ChartDirector: Alignment Specification

Plugin Version: 8.2, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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

### 20.0.23 ChartDirector: Color Specification

Plugin Version: 8.2, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** ChartDirector: Color Specification

#### Notes:

Many functions in the ChartDirector API accept colors as parameters. ChartDirector supports colors 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-

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, <code>TopLeft2</code> refers to the left of the top side, while <code>TopLeft</code> 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, <code>TopRight2</code> refers to the right of the top side, while <code>TopRight</code> 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, <code>BottomLeft2</code> refers to the left of the bottom side, while <code>BottomLeft</code> 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, <code>BottomRight2</code> refers to the right of the bottom side, while <code>BottomRight</code> refers to the bottom of the right side. The reverse applies for a horizontal axis.

RGGBB, where AA, RR, GG and BB are the alpha transparency, red, green and blue components.

Each component ranges from 00 - FF (0 - 255), representing its intensity. For example, pure red color is 00FF0000, pure green color is 0000FF00, and pure blue color is 000000FF. White color is 00FFFFFF, and black color is 00000000.

Most programming language requires you to put special prefix in front of hexadecimal characters. For C++, the prefix is "0x". For example, the syntax for the hexadecimal number 00FFFFFF is 0x00FFFFFF, or simply 0xFFFFFF.

For the alpha transparency component, a zero value means the color is not transparent at all. This is equivalent to traditional RGB colors. A non-zero alpha transparency means the color is partially transparent. The larger the alpha transparency, the more transparent the color will be. If a partially transparent color is used to draw something, the underlying background can still be seen.

For example, 80FF0000 is a partially transparent red color, while 00FF0000 is a non-transparent red color.

Note that `ChartDirector`'s ARGB color is web and HTML compatible. For example, red is `FF0000`, the same as in HTML. There are many resources on the web that provide tables in which you can click a color and it will show its HTML color code. These color codes can be used in `ChartDirector`.

If alpha transparency is `FF` (255), the color is totally transparent. That means the color is invisible. It does not matter what the RGB components are. So in `ChartDirector`, only one totally transparent color is used - `FF000000`. All other colors of the form `FFnnnnnn` are reserved to represent palette colors and dynamic colors, and should not be interpreted as the normal ARGB colors.

The totally transparent color `FF000000` is often used in `ChartDirector` to disable drawing something. For example, if you want to disable drawing the border of a rectangle, you can set the border color to totally transparent.

For convenience, `ChartDirector` defines a constant called `Transparent`, which is equivalent to `FF000000.Pattern Color`

A pattern color is a dynamic color that changes according to a 2D periodic pattern. When it is used to fill an area, the area will look like being tiled with a wallpaper pattern.

Pattern colors are created using `BaseChart.patternColor`, `BaseChart.patternColor2`, `DrawArea.patternColor` and `DrawArea.patternColor2`. The `patternColor` method creates pattern colors using an array of colors as a bitmap. The `patternColor2` method creates pattern colors by loading the patterns from image files.

These methods return a 32-bit integer acting as a handle to the pattern color. The handle can be used in any `ChartDirector` API that expects a color as its input.`Metal Color`

A metal color is a color of which the brightness varies smoothly across the chart surface as to make the surface look shiny and metallic. `ChartDirector` supports using any color as the base color of the metal color. In particular, using yellow and grey as the base colors will result in metal colors that look gold and silver.

Metal colors are most often used as background colors of charts. They are created using `CDBaseChartMBS.metalColor`, `CDBaseChartMBS.goldColor` and `CDBaseChartMBS.silverColor`. The first method allows you to specify an arbitrary base color. The second and third methods use yellow and grey as the base colors, resulting in gold and silver metal colors.

These methods return a 32-bit integer acting as a handle to the gradient color. The handle can be used in any `ChartDirector` API that expects a color as its input.`Gradient Color`

A gradient color is a color that changes progressively across a direction.

Gradient colors are created using `BaseChart.gradientColor`, `BaseChart.gradientColor2`, `DrawArea.gradientColor` and `DrawArea.gradientColor2`. The `gradientColor` method creates a 2-point gradient color that changes from color A to color B. The `gradientColor2` method creates a multi-point gradient colors that changes from color A to B to C ....

These methods return a 32-bit integer acting as a handle to the gradient color. The handle can be used in any `ChartDirector` API that expects a color as its input.

One common use of multi-point gradient colors is to define colors that have metallic look and feel. Please refer to `DrawArea.gradientColor2` for details.

**Dash Line Colors**  
A dash line color is a color that switches on and off periodically. When used to draw a line, the line will appear as a dash line.

Dash line colors are created using `BaseChart.dashLineColor` and `DrawArea.dashLineColor`. They accept a line color and a dash pattern code as arguments, and return a 32-bit integer acting as a handle to the dash line color. The handle can be used in any `ChartDirector` API that expects a color as its input.

**Zone Colors**  
A zone color is for XY charts only. It is a color that automatically changes upon reaching a data threshold value along the x-axis or y-axis. Zone colors are created using `Layer.xZoneColor`, `Layer.yZoneColor`, `XYChart.xZoneColor` or `XYChart.yZoneColor`.

**Palette Colors**  
Palette colors are colors of the format `FFFFnnnn`, where the least significant 16 bits (`nnnn`) are the index to the palette. A palette is simply an array of colors. For a palette color, the actual color is obtained by looking up the palette using the index. For example, the color `FFFF0001` is the second color in the palette (first color is index 0).

The colors in the palette can be ARGB colors or "dynamic" colors (pattern, gradient and dash line colors).

The first eight palette colors have special significance. The first three palette colors are the background color, default line color, and default text color of the chart. The 4th to 7th palette colors are reserved for future use. The 8th color is a special dynamic color that is equal to the data color of the "current data set".

The 9th color (index = 8) onwards are used for automatic data colors. For example, in a pie chart, if the sector colors are not specified, `ChartDirector` will automatically use the 9th color for the first sector, the 10th color for the second sector, and so on. Similarly, for a multi-line chart, if the line colors are not specified, `ChartDirector` will use the 9th color for the first line, the 10th color for the second line, and so on.

The `ChartDirector` API defines several constants to facilitate using palette colors.

#### ConstantValueDescription

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.

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.

### ConstantDescription

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.

## 20.0.24 ChartDirector: Font Specification

Plugin Version: 8.2, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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 "FONTPATH".

If you specify an absolute path name for the font file, ChartDirector will use the absolute path name and will not search other directories.

**Artificial Boldening and Italicizing**  
Whereas most popular font comes with different styles for "normal", "bold", "italic" and "bold italic", some fonts only come with one style (the normal style). For example, the Monotype Corsiva font that comes with MS Office only has the normal style (mtcorsva.ttf). For these cases, you may append the "Bold" and/or "Italic" words after the font file name (separated with a space) to ask ChartDirector to artificially bolden and/or italicize the font. For example, you may specify the font name as "mtcorsva.ttf Bold".

**Font List**  
Instead of specifying a single font file as the font name, you may specify a list of font files as the font name, separated by semi-colons. This is useful when using international characters that are only available in some fonts.

For example, if you would like to use the Arial font ("arial.ttf") for western characters, and the MingLiu font "mingliu.ttc" for Chinese characters (since the Arial font does not have Chinese characters), you may specify the font name as "arial.ttf;mingliu.ttc". In this case, ChartDirector will try the Arial font first. If it cannot find a certain character there, it will try the MingLiu font.

**Indirect Font Names**  
ChartDirector supports several special keywords for specifying the font name indirectly. When these keywords are used as font names, ChartDirector will look up the actual font names from a font table. The keywords are as follows:

KeywordsDescription

"normal"	This default normal font, which is the first font in the font table. This is initially mapped to "arial.ttf" (Arial).
"bold"	The default bold font, which is the second font in the font table. This is initially mapped to "arialbd.ttf" (Arial Bold).
"italic"	The default italic font, which is the third font in the font table. This is initially mapped to "ariali.ttf" (Arial Italic).
"boldItalic"	The default bold-italic font, which is the fourth font in the font table. This is initially mapped to "arialbi.ttf" (Arial Bold Italic).
"fontN"	The (N + 1)th font in the font table (the first font is "font0").

The font table can be modified using BaseChart.setFontTable or DrawArea.setFontTable.

The advantage of using indirect font names is that you can change the fonts in your charts in one place.

#### Font Index

Most font files contain one font. However, it is possible a font file contains multiple fonts (that is, a font collection). For example, in True Type fonts, font files with extension ".ttc" may represent a font collection.

If a font file contains multiple font, the font index can be used to specify which font to use. By default, the font index is 0, which means the first font in the font file will be used.

#### Font Size

The font size decides how big a font will appear in the image. The font size is expressed in a font unit called points. This is the same unit used in common word processors.

Instead of specifying font size, some ChartDirector API (eg. `TextBox.setFontSize`) allow you to specify font height and font width separately. You may use different point sizes for font height and font width to create special effects.

#### Font Color

This is the color to draw the font. (See Color Specification on how colors are represented in ChartDirector.)

#### Font Angle

This is the angle in degrees by which the font should be rotated anti-clockwise.

#### Vertical Layout

By default, text are laid out horizontally, with characters being drawn from left to right.

ChartDirector also supports vertical layout, with characters being drawn from top to bottom. For example, you may use `BaseChart.addText` to add text that are laid out vertically. Vertical layout is common for oriental languages such as Chinese, Japanese and Korean.

## 20.0.25 ChartDirector: Mark Up Language

Plugin Version: 8.2, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

#### AttributeDescription

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.

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".)

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.

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 section. You may use `</font*>` to terminate a style section, which will restore the font styles to the state before the style section.

**Blocks and Lines**  
In CDML, a text string may contain multiple blocks. A block may contain multiple lines of text by separating them with new line characters ("`\n`") or with `<br*>`. The latter is useful for programming languages that cannot represent new line characters easily.

For example, the line:

```
<*size=15*><*block*><*color=FF*>BLOCK<br*>ONE<*/>and <*block*><*color=FF00*>BLOCK<br*>TWO
```

will result in the following text rendered:

The above example contains a line of text. The line contains two blocks with the characters " and " in between. Each block in turn contains two lines. The blocks are defined using `<*block*>` as the start tag and `<*/>` as the end tag.

When a block ends, font styles will be restored to the state before entering the block.

**Embedding Images**  
CDML supports embedding images in text using the following syntax:

```
<*img=my_image_file.png*>
```

where `my_image_file.png` is the path name of the image file.

For example, the line:

```
<*size=20*>A <*img=sun.png*>day
```

will result in the following text rendered:

ChartDirector will automatically detect the image file format using the file extension, which must either `png`, `jpg`, `jpeg`, `gif`, `wbmp` or `wmp` (case insensitive).

Please refer to `BaseChart.setSearchPath` or `DrawArea.setSearchPath` on the directory that ChartDirector will search for the file.

The `<*img*>` tag may optionally contain width and height attributes to specify its pixel width and height. In this case, ChartDirector will stretch or compress the image if necessary to the required width and

## height.Blocks Attributes

CDML supports nesting blocks, that is, a block can contain other sub-blocks. Attributes are supported in the `<*block*>tag` to control the alignment and orientation of the sub-blocks. The `<*img=my_image_file.png*>` is treated as a block for layout purposes.

For example, the line:

```
<*block,valign=absmiddle*><*img=molecule.png*><*block*>Hydrazino\nMolecule<*/*><*/*>
```

will result in the following text rendered:

The the above starts `<*block,valign=absmiddle*>` which specifies its content should align with each others in the vertical direction using the absolute middle alignment. The block contains an image, followed by a space characters, and then another block which has two lines of text.

The following table describes the supported attributes inside `<*block*>tag`:

## AttributeDescription

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.

The value baseline means the baseline of sub-blocks should align with the baseline of the block. The baseline

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.

## 20.0.26 ChartDirector: Parameter Substitution and Formatting

Plugin Version: 8.2, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

#### 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

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 <code>BaseChart.addExtraField</code> or <code>BaseChart.addExtraField2</code> .

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 "& amps;# nn;" (eg. ">" will become "& amps;# 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.

### 20.0.27 ChartDirector: Shape Specification

Plugin Version: 8.2, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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
```

### 20.0.28 Copy styled text?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.29 Do you have code to validate a credit card number?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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)

**20.0.30 Do you have plugins for X-Rite EyeOne, eXact or i1Pro?**

Plugin Version: all, Console & Web: No. **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.

**20.0.31 Does SQL Plugin handle stored procedures with multiple result sets?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.32 Does the plugin home home?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

### 20.0.33 folderitem.absolutePath is limited to 255 chars. How can I get longer ones?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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](#)

### 20.0.34 Future of editablemovie class?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** In short, it will go away, so switch to plugin functions soon.

#### Notes:

The editableMovie class has been deprecated.

Deprecated means that Real Software will remove it someday, but as of today (and probably a few more years) the class will be available and running. Just not forever. The reason is that Apple deprecated the old QuickTime APIs and they are not available for 64 bit.

For 64 bit, you can move to our QTKit plugin.

We expect the old QuickTime classes in Real Studio and our plugins will continue to work in 32 bit applications. Even if editableMovie class is removed next year from Real Studio, our plugin still provides movie class extensions to do similar functions.

### 20.0.35 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?

Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

### 20.0.36 How about Plugin support for older OS X?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

**20.0.37 How can I detect whether an Intel CPU is a 64bit CPU?**

Plugin Version: all, Console & Web: No. **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.

### 20.0.38 How can I disable the close box of a window on Windows?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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.

### 20.0.39 How can I get all the environment variables from Windows?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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.

#### 20.0.40 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, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

#### 20.0.41 How can I get text from a PDF?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

#### 20.0.42 How can I get text from a Word Document?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.43 How can I get the item string for a given file creator?

Plugin Version: all, Console & Web: No. **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.

### 20.0.44 How can I launch an app using it's creator code?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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
```

### 20.0.45 How can I learn what shared libraries are required by a plugin on Linux?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

## 20.0.46 How can I validate an email address?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** You can try this code:  
**Example:**

```

Dim re As RegEx
re = New RegEx
Dim rm As RegExMatch

re.SearchPattern = "[a-z0-9!#$%&'*/=?^_`{|}
textasciitilde - ]+(?:\. [a-z0-9!#$%&'*/=?^_`{|}
textasciitilde - ]+)*@(?: [a-z0-9] (?: [a-z0-9- ] * [a-z0-9] )?\.)+ [a-z0-9] (?: [a-z0-9- ] * [a-z0-9] )?)"
rm = re.Search(editField1.Text)

if rm = Nil Then
StaticText2.text = editField1.Text + " not valid email"
Else
StaticText2.Text = editField1.Text + " is valid"
End if

```

**Notes:**

Adapted from:  
<http://www.regular-expressions.info/email.html>

### 20.0.47 How do I check if the QuickTime component for the JPEG exporting is available?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **Answer:** If you want to know if the PictureToString functions will work, you may try this function:

**Example:**

```

Function IsQTJPEGEExporterAvailable() As boolean
dim q as QTComponentInformationMBS

// search for QuickTime JPEG exporter codec
q=new QTComponentInformationMBS

while q.NextComponent
if q.Type="imco" and q.SubType="jpeg" then
Return true
end if
wend

Return false // not found
End Function

```

**Notes:**

It should work like this for other types like:

```
"tiff" ->TIFF
"PNTG" ->Mac Paint
"gif " ->GIF
"WRLE" ->Windows BMP
"tga " ->Targa
"png " ->PNG
etc.
```

### 20.0.48 How do I check if the QuickTime component for the JPEG importing is available?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **Answer:** If you want to know if the StringToPicture functions will work, you may try this function:

**Example:**

```
Function IsQTJPEGImporterAvailable() As boolean
dim q as QTComponentInformationMBS
```

```
// search for QuickTime JPEG importer codec
q=new QTComponentInformationMBS
```

```
while q.NextComponent
if q.Type="imdc" and q.SubType="jpeg" then
Return true
end if
wend
```

```
Return false // not found
End Function
```

**Notes:**

It should work like this for other types like:

```
"tiff" ->TIFF
"PNTG" ->Mac Paint
"gif " ->GIF
"WRLE" ->Windows BMP
"tga " ->Targa
"png " ->PNG
etc.
```

### 20.0.49 How do I check if the QuickTime component for the Sequence grabber is available?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **Answer:** If you want to know if the QTGrabberClass will work, you can use this code:

**Example:**

```
Function IsQTGrabberAvailable() As boolean
dim q as QTComponentInformationMBS

q=new QTComponentInformationMBS

while q.NextComponent
if q.Type="barg" then
Return true
end if
wend

Return false // not found
End Function
```

**Notes:** Don't forget that you need to check for each other component you use like the compression functions.

### 20.0.50 How do I decode correctly an email subject?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** The following code can be used to decode an email subject including several encodings including Base 64.

**Example:**

```
dim src as string // input

dim theRegex as Regex
dim theRegexMatch as RegexMatch
dim result, infoCharset, encodedPart as string
dim theStart as Integer

if instr(src, "=?") >0 then
theRegex = new Regex
theRegex.Options.Greedy = false
theRegex.searchPattern = "(.*)=?(.+)\?(Q | B)\?(.+)\?="
theRegexMatch = theRegex.search(src)
while theRegexMatch <>nil
theStart = theRegexMatch.subExpressionStartB(0) + len(theRegexMatch.subExpressionString(0))

result = result + theRegexMatch.subExpressionString(1)
```

```

infoCharset = theRegexMatch.subExpressionString(2)
encodedPart = theRegexMatch.subExpressionString(4)
if theRegexMatch.subExpressionString(3) = "B" then
encodedPart = DecodeBase64(encodedPart)
elseif theRegexMatch.subExpressionString(3) = "Q" then
encodedPart = DecodeQuotedPrintable(encodedPart)
end if
if right(result, 1) = " " then
result = mid(result, 1, len(result)-1)
end if
encodedPart = encodedPart.DefineEncoding(GetInternetTextEncoding(infoCharset))
result = result + encodedPart

theRegex.SearchStartPosition = theStart
theRegexMatch = theRegex.search()
wend

result = result + mid(src, theStart+1)

else
result = src
end if
// theRegexMatch = theRegex.search

msgbox result

```

**Notes:** May not look nice depending on the controls used.

### 20.0.51 How do I enable/disable a single tab in a tabpanel?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

**20.0.52 How do I find the root volume for a file?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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
```

**20.0.53 How do I get the current languages list?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

## 20.0.54 How do I get the Mac OS Version?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

### 20.0.55 How do I get the printer name?

Plugin Version: all, Console & Web: No. **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 in 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.

### 20.0.56 How do I make a metal window if RB does not allow me this?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

## 20.0.57 How do I make a smooth color transition?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.58 How do I read the applications in the dock app?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

### 20.0.59 How do I truncate a file?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** In a `binarystream` you can set the `length` property to truncate.

### 20.0.60 How do update a Finder's windows after changing some files?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

### 20.0.61 How to access a USB device directly?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.62 How to add icon to file on Mac?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.63 How to ask the Mac for the Name of the Machine?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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).

### 20.0.64 How to automatically enable retina in my apps?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

### 20.0.65 How to avoid leaks with Cocoa functions?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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 REALbasic 2009r4 the code above should not be needed as REALbasic runtime does automatically handle the NSAutoreleasePools for you. For older REALbasic versions you need to use code with a timer with the action event above to avoid memory leaks.

Please do not use REALbasic 2009r4 and newer with plugins before version 9.5. You can get crashes there which typically show a line with a objc\_msgSend call.

**20.0.66 How to avoid trouble connecting to oracle database with SQL Plugin?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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>
```

**20.0.67 How to avoid \_\_NSAutoreleaseNoPool console messages in threads?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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)

### 20.0.68 How to bring app to front?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.69 How to bring my application to front?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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)

### 20.0.70 How to catch Control-C on Mac or Linux in a console app?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.71 How to change name of application menu?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **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.

### 20.0.72 How to change the name in the menubar of my app on Mac OS X?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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/> .

### 20.0.73 How to check if a folder/directory has subfolders?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.74 How to check if Macbook runs on battery or AC power?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

### 20.0.75 How to check if Microsoft Outlook is installed?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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

```

### 20.0.76 How to check on Mac OS which country or language is currently selected?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

### 20.0.77 How to code sign my app with plugins?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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 Mac and Windows to make sure they have not been modified.

In terminal, you do like this:

```
cd <Path to folder of 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.

### 20.0.78 How to collapse a window?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

### 20.0.79 How to compare two pictures?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.80 How to compile PHP library?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

### 20.0.81 How to convert a `BrowserType` to a `String` with `WebSession.Browser`?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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
```

### 20.0.82 How to convert a `EngineType` to a `String` with `WebSession.Engine`?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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

```

### 20.0.83 How to convert a PlatformType to a String with WebSession.Platform?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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

```

### 20.0.84 How to convert a text to iso-8859-1 using the TextEncoder?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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("Bjrn, this text should be converted")
Mac2PC.clear
```

**Notes:** You have to call Mac2PC.clear after every conversion to reset the encoding engine.

### 20.0.85 How to convert ChartTime back to Xojo date?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.86 How to convert line endings in text files?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

### 20.0.87 How to convert picture to string and back?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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
```

### 20.0.88 How to copy an array?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

**20.0.89 How to copy an dictionary?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Answer:** You can use a function like this to copy a dictionary:

**Example:**

```
Function CopyDictionary(d as Dictionary) As Dictionary
dim r as new Dictionary
for each key as Variant in d.keys
r.Value(key) = d.Value(key)
next
Return r
End Function
```

**Notes:**

If needed make several copies of this method with different data types, not just double.  
 For a deep copy of an dictionary of objects, you need to change code to also make a copy of those objects.

**20.0.90 How to copy parts of a movie to another one?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **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.

### 20.0.91 How to create a birthday like calendar event?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

### 20.0.92 How to create a GUID?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Use the UUIDMBS class for this.

### 20.0.93 How to create a Mac picture clip file?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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("AQAAAAAAAAAAAAAAAAACAFRDRVIAAABAAAAAAAAAAABUQ0IQAAAAA")
r.AddResource(data,"drag",128,"") 'ditto
r.Close
```

**Notes:** In general Apple has deprecated this, but a few application still support clippings.

### 20.0.94 How to create a PDF file in REALbasic?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.95 How to create EmailAttachment for PDF Data in memory?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

## 20.0.96 How to create PDF for image files?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.97 How to CURL Options translate to Plugin Calls?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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. Pas 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)

### 20.0.98 How to delete file with ftp and curl plugin?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.99 How to detect display resolution changed?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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".

### 20.0.100 How to detect retina?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Please use Window.BackingScaleFactorMBS to query the factor.

**Example:**

```
msgbox str(window1.BackingScaleFactorMBS)
```

### 20.0.101 How to disable force quit?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

### 20.0.102 How to disable the error dialogs from Internet Explorer on javascript errors?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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.

### 20.0.103 How to display a PDF file in REALbasic?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.104 How to do a lottery in RB?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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)
```



You can use `DNSLookupThreadMBS` class for doing them asynchron.

### 20.0.106 How to draw a dashed pattern line?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** You can try this code:

**Example:**

*// call like this: DrawDashedPatternLine g,0,0,width,height,10*

```
Sub DrawDashedPatternLine(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 Realbasic code, so it even works on Windows.

### 20.0.107 How to draw a nice antialiased line?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.108 How to draw with CGContextMBS using my own handle?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** You can try this code:

**Example:**

```
Soft Declare Function QDBeginCGContext Lib "Carbon" (port as Integer, ByRef contextHandle as Integer)
as Integer
dim contextRef as Integer
call QDBeginCGContext(g.handle(graphics.HandleTypeCGrafPtr), contextRef)
dim c as new CGContextMBS(contextRef)
```

```
c.BeginPath
c.SetLineWidth(3)
c.SetRGBFillColor(1,0,0,0.5)
c.FillRect(CGMakeRectMBS(0,0,100,100))
c.DrawPath(c.kCGPathFillStroke)
c.Flush // and so on
```

```
Soft Declare Function QDEndCGContext Lib "Carbon" (port as Integer, ByRef contextHandle as Integer)
as Integer
dim h as Integer = c.Handle
call QDEndCGContext(g.handle(graphics.HandleTypeCGrafPtr), h)
c.Handle=0
```

**Notes:** Basicly you can provide your own handle to CGContextMBS. But if you do not set it back to 0 the CGContextMBS destructor will release the handle which can result into a crash. (if the reference count is wrong)

### 20.0.109 How to dump java class interface?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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

## 20.0.110 How to duplicate a picture with mask or alpha channel?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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 Real Studio versions because of the `#` if even if your RS version does not support alpha channel pictures. This way it's future proof.

### 20.0.111 How to enable assistive devices?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

### 20.0.112 How to encrypt a file with Blowfish?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.113 How to extract text from HTML?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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: Gre

**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 .

### 20.0.114 How to find empty folders in a folder?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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
```

**20.0.115 How to find iTunes on a Mac OS X machine fast?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Answer:** You can try Launch Services.

**Example:**

```
dim f as FolderItem
```

```
f=LaunchServicesFindApplicationForInfoMBS("hook","com.apple.iTunes","iTunes.app")
```

```
MsgBox f.AbsolutePath
```

**20.0.116 How to find network interface for a socket by it's name?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

### 20.0.117 How to find version of Microsoft Word?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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".

**20.0.118 How to fix CURL error 60/53 on connecting to server?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.UnixpathMBS
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/>

**20.0.119 How to format double with n digits?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

**20.0.120 How to get a time converted to user time zone in a web app?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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
```

**20.0.121 How to get an handle to the frontmost window on Windows?**

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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
```

### 20.0.122 How to get CFAbsoluteTime from date?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **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.

### 20.0.123 How to get client IP address on web app?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Use the `WebSession.RemoteAddress` property.

**Example:**

```
Sub Open()
Title = Session.RemoteAddress
End Sub
```

### 20.0.124 How to get fonts to load in charts on Linux?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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"
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.

### 20.0.125 How to get fonts to load in DynaPDF on Linux?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

**20.0.126 How to get GMT time and back?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

**20.0.127 How to get good crash reports?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Check this website from the webkit website:

**Notes:** <http://webkit.org/quality/crashlogs.html>

**20.0.128 How to get list of all threads?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.129 How to get parameters from webpage URL in Real Studio Web Edition?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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 Real Studio 2010r5. Please use DefineEncoding.

### 20.0.130 How to get Real Studio apps running Linux?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.131 How to get the color for disabled textcolor?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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" ...

### 20.0.132 How to get the current free stack space?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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 you like for that.

### 20.0.133 How to get the current timezone?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **Answer:**

You can use the TimeZoneMBS class or the CTimeZoneMBS 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

```

### 20.0.134 How to get the current window title?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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
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

```

**20.0.135 How to get the cursor blink interval time?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

### 20.0.136 How to get the list of the current selected files in the Finder?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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 Realbasic 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
```

### 20.0.137 How to get the Mac OS system version?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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
```

### 20.0.138 How to get the Mac OS Version using System.Gestalt?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

### 20.0.139 How to get the screensize excluding the task bar?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **Answer:** Try this code:

**Notes:** Use the Screen class with the available\* properties.

### 20.0.140 How to get the size of the frontmost window on Windows?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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!

### 20.0.141 How to get the source code of a HTMLViewer?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Answer:** Try this code:

**Example:**

*// for Windows:*

```
msgbox HTMLViewer1.IEHTMLTextMBS
```

*// for Mac OS X:*

```
msgbox HTMLViewer1.mainFrameMBS.dataSource.data
```

### 20.0.142 How to handle really huge images with GraphicsMagick or ImageMagick?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Sometimes it may be better to use an extra application to process images.

**Notes:**

A typical 32 bit app made with Xojo (Real Studio) 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.

### 20.0.143 How to handle tab key for editable cells in listbox?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.144 How to hard link MapKit framework?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.145 How to have a PDF downloaded to the user in a web application?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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 Real Studio Web Edition.

### 20.0.146 How to hide all applications except mine?

Console & Web: No, Mac: Yes, Win: No, Linux: No. **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

```

### 20.0.147 How to hide script errors in HTMLViewer on Windows?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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).

### 20.0.148 How to hide the grid/background/border in ChartDirector?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** If you want to hide something in a chart, simply assign the kTransparent constant as color.

### 20.0.149 How to hide the mouse cursor on Mac?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

### 20.0.150 How to insert image to NSTextView or TextArea?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.151 How to jump to an anchor in a htmlviewer?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **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""
elseif TargetMacOS then
call HTMLViewer1.EvaluateJavaScriptMBS "window.location = ""# 16""
else
// not supported
end if
```

### 20.0.152 How to keep a movieplayer unclickable?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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
```

### 20.0.153 How to keep my web app from using 100% CPU time?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** On Linux and Mac OS X 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.

### 20.0.154 How to kill a process by name?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.155 How to know how many CPUs are present?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Answer:** Try this function:

**Example:**

```
Function GetCPUCount() as Integer
Declare Function MPProcessors Lib "Carbon" () as Integer

Return MPProcessors()
End Function
```

**Notes:** Your app will then 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.

### 20.0.156 How to know if a movie is finished?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **Answer:** This code can help you although it's not perfect:

**Example:**

```
Declare Function IsMovieDone Lib "QuickTime" (theMovie as Integer) as Integer
```

```
if IsMovieDone(moviePlayer1.movie.handle) <>0 then
//movie is finished
end if
```

**Notes:** But be carefull! It crashes sometimes for an unknown reason!?

### 20.0.157 How to know if QuickTime is installed on any target and can play MPEG 4 movies?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **Answer:** Try this code:

**Example:**

```
dim q as QTComponentInformationMBS

q=new QTComponentInformationMBS

// "eat " = Movie importers
while q.NextComponentOfType("eat ")
if q.SubType="MP4 " then
MsgBox "found: "+q.Name+ " codec"
end if
wend
```

**Notes:** If you find a MP4 movie importing codec you can be sure that a MP4 movie can be opened.

### 20.0.158 How to know if QuickTime is installed on any target?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **Answer:** Try this function:

**Example:**

```
Dim theEffect as QTEffect

theEffect=GetQTCrossFadeEffect

if theEffect = nil then
msgBox "QuickTime is not installed."
else
msgBox "Quicktime is installed."
end if
```

**Notes:** The problem with this code is that it checks only if the QuickTime part of the cross fade effect is available. Use the QTComponentInformationMBS to check for the features you really need.

### 20.0.159 How to know the calling function?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

**20.0.160 How to launch an app using it's creator code?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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
```

**20.0.161 How to launch disc utility?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.162 How to make a lot of changes to a REAL SQL Database faster?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** You may try to embed your changes to the database between two transaction calls.

**Example:**

```
dim db as Database // some database

db.SQLExecute "BEGIN TRANSACTION"
// Do some Stuff
db.SQLExecute "END TRANSACTION"
```

**Notes:** This can increase speed by some factors.

### 20.0.163 How to make a NSImage object for my retina enabled app?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

### 20.0.164 How to make a window borderless on Windows?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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
```

### 20.0.165 How to make an alias using AppleEvents?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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

**20.0.166 How to make an application smaller?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:**

If you use an older copy of REALbasic, you should try to compile for 68k only instead of PPC. It's a little bit slower, but code is much smaller.

On any Mac OS target you can save your images as JPEG and drop the into your application. REALbasic will include them as JPEGs into the Mac applications (convert to BMP for Windows). This will make the resources of your application smaller, but requires that the user has QuickTime 2.5 or newer installed.

**20.0.167 How to make AppleScripts much faster?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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
```

**20.0.168 How to make double clicks on a canvas?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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 GetDbfTime Lib "Carbon" () as Integer
doubleClickTime = GetDbfTime()
# 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

### 20.0.169 How to make my Mac not sleeping?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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 HDActivity = 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.

**20.0.170 How to make my own registration code scheme?**

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **Answer:** There are excellent articles about how to make a registratin code scheme, but you can also simply use our RegistrationEngineMBS class.

**Notes:** If you need a license text, why not use the one from Real Studio as a starting point?

**20.0.171 How to make small controls on Mac OS X?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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))

```

### 20.0.172 How to mark my Mac app as background only?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

**20.0.173 How to move a file or folder to trash?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.174 How to move an application to the front using the creator code?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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)

### 20.0.175 How to move file with ftp and curl plugin?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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 "RNTO 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 RNTD with the new file name. To delete use DELE and the file path.

### 20.0.176 How to normalize string on Mac?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.177 How to obscure the mouse cursor on Mac?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

### 20.0.178 How to open icon file on Mac?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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
```

### 20.0.179 How to open PDF in acrobat reader?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

### 20.0.180 How to open printer preferences on Mac?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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
```

### 20.0.181 How to open special characters panel on Mac?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.182 How to optimize picture loading in Web Edition?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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:

<http://www.monkeybreadsoftware.de/realbasic/webapps.shtml>

### 20.0.183 How to parse XML?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.184 How to play audio in a web app?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** You can use the HTML5 audio tag and control it with javascript.

**Notes:**

See our web apps here:

<http://www.monkeybreadsoftware.de/realbasic/webapps.shtml>

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 Real Studio 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. Then we build the html to use the audio tag. As you see, we give it an ID for later use and have it preload automatically. If you add an autoplay tag, you can have the audio play right away. Inside the audio tag we have two sources so we provide audio for both Firefox (OGG) and Safari (MPEG4). Finally we have a text to display if HTML5 audio tag is not supported.

You can set the source in the EditSource event:

```
dim urlO as string = app.audioFileOGG.URL
dim urlM as string = app.audioFileM4V.URL
me.Source = "<audio id=""mymusic"" preload=""auto""><source src="""+urlO+""" type=""audio/ogg""
/><source src="""+urlM+""" type=""audio/mpeg"" />Your browser does not support the audio ele-
ment.</audio>"
```

Next in the Play button we execute code to play the audio. This is a short javascript code which searches in the html document for the element with the ID "mymusic" which is the ID of our audio tag above. Once we got the object, we call it's play method to start playback.

```
me.ExecuteJavaScript("document.getElementById('mymusic').play();")
```

same for pause:

```
me.ExecuteJavaScript("document.getElementById('mymusic').pause();")
```

and finally for changing volume:

```
me.ExecuteJavaScript("document.getElementById('mymusic').volume="+str(me.Value/100.0)+"");")
```

### 20.0.185 How to pretty print xml?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Use the XML Transform method with the right XLS.

#### Notes:

Learn more here:

<http://docs.xojo.com/index.php/XMLDocument.Transform>

### 20.0.186 How to print to PDF?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.187 How to query Spotlight's Last Open Date for a file?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

### 20.0.188 How to quit windows?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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.

### 20.0.189 How to read a CSV file correctly?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

## 20.0.190 How to read the command line on windows?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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 Realbasic versions have a system.commandline property.

**20.0.191 How to render PDF pages with PDF Kit?**

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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.

**20.0.192 How to restart a Mac?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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
```

### 20.0.193 How to resume ftp upload with curl plugin?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.194 How to rotate a PDF page with CoreGraphics?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.195 How to rotate image with CoreImage?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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 Real Studio picture object for display
dim pic as Picture = outputImage.CopyPictureWithMask
```

```
Backdrop = pic
```

### 20.0.196 How to run a 32 bit application on a 64 bit Linux?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.197 How to save a quicktime movie as a reference movie?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **Answer:** Example code is below:

**Example:**

```
// save as reference movie
dim f as FolderItem
dim m as movie

f=SpecialFolder.Desktop.Child("test.mov")
m=f.OpenAsMovie

f=SpecialFolder.Desktop.Child("new movie.mov")

msgbox str(m.SaveMBS(f,false,false))
```

### 20.0.198 How to save HTMLViewer to PDF with landscape orientation?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Answer:** You can use `NSPrint-InfoMBS` 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.

**20.0.199 How to save RTFD?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.ApplicationRtf, "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.

**20.0.200 How to scale a picture proportionally with mask?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.201 How to scale a picture proportionally?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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)

**20.0.202 How to scale/resize a picture?**

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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:

- The GWorld class which uses QuickTime. Includes nice Bicubic scaling with QuickTime 6.
- QTGraphicsImporterMBS and QTGraphicsExporterMBS 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.ScopingMBS does crossplatform scaling with several modes.

with pure REALbasic:

- make a new picture and draw the old one with new size inside.

### 20.0.203 How to search with regex and use unicode codepoints?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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

```

### 20.0.204 How to see if a file is invisible for Mac OS X?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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

```

### 20.0.205 How to set cache size for SQLite or REALSQLDatabase?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.206 How to set the modified dot in the window?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Answer:** Try this declares:

**Example:**

```
window1.ModifiedMBS=true
```

### 20.0.207 How to show a PDF file to the user in a Web Application?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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 Real Studio Web Edition.  
<http://www.monkeybreadsoftware.de/realbasic/webapps.shtml>

### 20.0.208 How to show Keyboard Viewer programmatically?

Console & Web: No, Mac: Yes, Win: No, Linux: No. **Answer:** Use Realbasic 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/Key-
boardViewerServer.app"

```

```

set POSIXPath to ((POSIX file thePath) as string)
tell application "System Events" to set isRunning to 0 <(count (application processes whose name is theAp-
plication))
if isRunning then tell application POSIXPath to quit
delay 0.15

```

```

ignoring application responses
tell application POSIXPath to run
end ignoring

```

## 20.0.209 How to show the mouse cursor on Mac?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Answer:** Try this declare:

### Example:

```
Declare Sub ShowCursor Lib "Carbon" ()
```

```
ShowCursor
```

**Notes:** The MBS Plugin has this function and supports it on Windows, too.

### 20.0.210 How to shutdown a Mac?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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 ShutDownPower Lib "Carbon" ()
ShutDownPower
```

### 20.0.211 How to sleep a Mac?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Answer:** Ask the Finder via Apple Events:

**Example:**

```
dim ae as appleevent
ae=newappleEvent("FNDR", "slep", "MACS")
if not ae.send then
msgBox "The computer doesn't want to sleep."
end if
```

**20.0.212 How to speed up rasterizer for displaying PDFs with DynaPDF?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

**20.0.213 How to use PDFLib in my RB application?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** The PDFlib plugin was discontinued in favor of our DynaPDF plugin.  
**Notes:** If you need help to move, please contact us.

**20.0.214 How to use quotes in a string?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Just double them.

**Example:**

```
msgbox "This String contains ""quotes""."
```

**20.0.215 How to use Sybase in Web App?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Please use our MBS Real Studio 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
```

### 20.0.216 How to use the Application Support folder?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.UnixpathMBS
```

**Notes:** You may not be able to write there with a normal user account!

### 20.0.217 How to use the IOPMCopyScheduledPowerEvents function in Real-basic?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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 cfarrayMBS
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.

### 20.0.218 How to validate a GUID?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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".

### 20.0.219 How to walk a folder hierarchie non recursively?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.220 I got this error: PropVal, QDPictMBS.Name (property value), Type mismatch error. Expected CGDataProviderMBS, but got Variant, Name:QDPictMBS

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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 Real Studio IDE on Windows crashed on compilation.

### 20.0.221 I registered the MBS Plugins in my application, but later the registration dialog is shown.

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

Finally make sure you use the right serial number. Not an older one or a misspelled one.

### 20.0.222 I want to accept Drag & Drop from iTunes

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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(CFStringMBS(o),nil)

file=u.file
if file<>nil then
MsgBox file.UnixpathMBS
end if
end if
end if
next
end if
end if

```

```
end if
End Sub
```

**Notes:** The code above inside a window on Realbasic 5.5 with MBS Plugin 5.3 will do it nice and show the paths.

### 20.0.223 I'm drawing into a listbox but don't see something.

Plugin Version: all, Console & Web: No. **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.

### 20.0.224 I'm searching for a method or so to move a window from position x.y to somewhere else on the screen.

Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

**20.0.225** 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?

Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Stand alone.

**Notes:**

REALbasic compiles all used plugins into the application binary.

Some plugin parts need external dlls but you will find that in the documentation. (e.g. pdflib for some classes)

**20.0.226** Is the fn key on a powerbook keyboard down?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

**20.0.227** Is there a case sensitive Dictionary?

Plugin Version: all, Console & Web: No. **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

### 20.0.228 Is there a way to use the MBS plugin to get only the visible item and folder count on a volume?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.229 Is there an easy way I can launch the Displays preferences panel?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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

```

### 20.0.230 Is there an easy way I can launch the Quicktime preferences panel?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Answer:** Use the code below:  
**Example:**

```

dim error as Integer

error=OpenMacOSXPreferencesPaneMBS("QuickTime")
if error<>0 then
MsgBox "Failed to launch QuickTime System Preferences panel."
end if

```

### 20.0.231 List of Windows Error codes?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** We have a list of windows error codes on our website.

**Notes:** <http://www.monkeybreadsoftware.de/xojo/winerror.shtml>

### 20.0.232 Midi latency on Windows problem?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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)

### 20.0.233 My Xojo Web App does not launch. Why?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Answer:** Here is a list of checks to do for linux apache installations with Xojo or Real Studio 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?

**20.0.234 Pictures are not shown in my application. Why?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **Answer:**

On Mac OS Classic, please check the memory partition size which may be too low.  
Else (most times on Windows) you are simple missing the part of QuickTime to load images.

**20.0.235 Realbasic doesn't work with your plugins on Windows 98.**

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **Answer:** Upgrade your Windows version or complain to Realsoftware.

**20.0.236 REALbasic or my RB application itself crashes on launch on Mac OS Classic. Why?**

Plugin Version: all, Console & Web: No. **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.

**20.0.237 SQLiteDatabase not initialized error?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

**20.0.238 Textconverter returns only the first x characters. Why?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:**

Some older REALbasic versions limit the Textconverter to around 1024 characters in input and output. This should be fixed with RB5.

**Notes:** REALbasic seems not to support Textconverters at all on Windows.

### 20.0.239 The type translation between CoreFoundation/Foundation and Realbasic data types.

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Answer:** The plugin does conversion between Cocoa/Carbon data types and native REALbasic data types. The following list help you knowing what the current plugins support:

**Notes:**

Cocoa NSObject to Variant:

```

nil ->nil
NSDictionary ->Dictionary
NSData ->MemoryBlock
NSString ->String
NSAttributedString ->NSAttributedStringMBS
NSDate ->Date
NSNumber ->double/integer/Int64/UInt64/UInt32/Boolean
NSURL ->String
NSValue with NSRect ->NSRectMBS
NSValue with NSPoint ->NSPointMBS
NSValue with NSSize ->NSSizeMBS
NSValue with NSRange ->NSRangeMBS
NSValue with QTTime ->QTTimeMBS
NSValue with QTTimeRange ->QTTimeRangeMBS
NSArray ->Array of Variant
QuartzFilter ->QuartzFilterMBS

```

- ->\*MBS

Variant to Cocoa NSObject:

```

nil ->nil
Dictionary ->NSDictionary
Boolean ->NSNumber
Integer ->NSNumber
Color ->NSColor
Int64 ->NSNumber
Single ->NSNumber
Double ->NSNumber
Date ->NSDate

```

MemoryBlock ->NSData  
 String ->NSString  
 NSImageMBS ->NSImage  
 NSAttributedStringMBS ->NSAttributedString  
 NSColorMBS ->NSColor  
 NSRectMBS ->NSValue with NSRect  
 NSSizeMBS ->NSValue with NSSize  
 NSPointMBS ->NSValue with NSPoint  
 NSRangeMBS ->NSValue with NSRange  
 NSBurnMBS ->NSBurn  
 NSViewMBS ->NSView  
 NSFontMBS ->NSFont  
 NSParagraphStyleMBS ->NSParagraphStyle  
 NSAttributedStringMBS ->NSAttributedString  
 WebPolicyDelegateMBS ->WebPolicyDelegate  
 WebUIDelegateMBS ->WebUIDelegate  
 WebFrameLoadDelegateMBS ->WebFrameLoadDelegate  
 WebResourceLoadDelegateMBS ->WebResourceLoadDelegate  
 NSIndexSetMBS ->NSIndexSet  
 QTTimeMBS ->QTTime  
 QTTimeRangeMBS ->QTTimeRange  
 Array of Variant ->NSArray  
 Array of String ->NSArray  
 CFStringMBS ->NSString  
 CFNumberMBS ->NSNumber  
 CFDataMBS ->NSData  
 CFURLMBS ->NSURL  
 CFArrayMBS ->NSArray  
 CFDictionaryMBS ->NSDictionary  
 CFBinaryDataMBS ->NSData

Carbon CTypeRef to Variant:

CFDictionaryRef ->Dictionary  
 CFStringRef ->String  
 CFDataRef ->String  
 CFURL ->String  
 CFNumber ->Integer/Double/Int64  
 CFArray ->Array  
 CFDate ->date  
 nil ->nil  
 CGColorSpace ->CGColorSpaceMBS  
 CGColor ->CGColorMBS  
 CGImage ->CGImageMBS  
 CF\* ->CF\*MBS

Variant to Carbon CTypeRef:

Dictionary ->CFDictionaryRef  
 Boolean ->CFBooleanRef  
 Color ->CFNumberRef  
 Integer ->CFNumberRef  
 Int64 ->CFNumberRef  
 Single ->CFNumberRef  
 Double ->CFNumberRef  
 String ->CFStringRef  
 Color ->CGColorRef  
 Date ->CFDateRef  
 nil ->nil  
 Memoryblock ->CFDataRef  
 Folderitem ->CFURLRef  
 Dictionary ->CFDictionaryRef  
 Array of Variant/String/Date/Double/Single/Int64/Integer ->CFArray  
 CGRectMBS ->CGRect as CFDataRef  
 CGSizeMBS ->CGSize as CFDataRef  
 CGPointMBS ->CGPoint as CFDataRef  
 CGColorMBS ->CGColor  
 CGColorSpaceMBS ->CGColorSpace  
 CGImageMBS ->CGImage  
 CGDataConsumerMBS ->CGDataConsumer  
 CGDataProviderMBS ->CGDataProvider  
 CF\*MBS ->CF\*

Strings without encodings should be put into dictionaries as memoryblocks.

### 20.0.240 Uploaded my web app with FTP, but it does not run on the server!

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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.

### 20.0.241 What classes to use for hotkeys?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Please use CarbonHotKeyMBS class on Mac and WindowsKeyFilterMBS on Windows.

**Notes:** CarbonHotKeyMBS will also work fine in Cocoa apps.

### 20.0.242 What do I need for Linux to get picture functions working?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.243 What does the NAN code mean?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:**

**20.0.244** What font is used as a 'small font' in typical Mac OS X apps?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Answer:**

REALbasic 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
```

**20.0.245** What is last plugin version to run on Mac OS X 10.4?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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.

### 20.0.246 What is last plugin version to run on PPC?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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.

### 20.0.247 What is the difference between Timer and WebTimer?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Time is server side and WebTimer client side.

**Notes:** Timer is the normal timer class in Real Studio. It runs on the server. On the side the WebTimer runs on the client. It triggers a request to the server to perform the action. So a WebTimer is good to keep the connection running and the website updated regularly. A timer on the server is good to make regular jobs like starting a database backup every 24 hours.

### 20.0.248 What is the list of Excel functions?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Below a list of function names known by LibXL.

**Notes:**

LibXL parses the functions and writes tokens to the excel file. So even if Excel can do more functions, we can only accept the ones known by LibXL.

ABS, ABSREF, ACOS, ACOSH, ACTIVE.CELL, ADD.BAR, ADD.COMMAND, ADD.MENU, ADD.TOOLBAR, ADDRESS, AND, APP.TITLE, AREAS, ARGUMENT, ASC, ASIN, ASINH, ATAN, ATAN2, ATANH, AVEDEV, AVERAGE, AVERAGEA, BAHTTEXT, BETADIST, BETAINV, BINOMDIST, BREAK, CALL, CALLER, CANCEL.KEY, CEILING, CELL, CHAR, CHECK.COMMAND, CHIDIST, CHIINV, CHITEST, CHOOSE, CLEAN, CODE, COLUMN, COLUMNS, COMBIN, CONCATENATE, CONFIDENCE, CORREL, COS, COSH, COUNT, COUNTA, COUNTBLANK, COUNTIF, COVAR, CREATE.OBJECT, CRITBINOM, CUSTOM.REPEAT, CUSTOM.UNDO, DATE, DATEDIF, DATESTRING, DATEVALUE, DAVERAGE, DAY, DAYS360, DB, DBCS, DCOUNT, DCOUNTA, DDB, DEGREES, DELETE.BAR, DELETE.COMMAND, DELETE.MENU, DELETE.TOOLBAR, Deref, DEVSQ, DGET, DIALOG.BOX, DIRECTORY, DMAX, DMIN, DOCUMENTS, DOLLAR, DPRODUCT, DSTDEV, DSTDEVP, DSUM, DVAR, DVARP, ECHO, ELSE, ELSE.IF, ENABLE.COMMAND, ENABLE.TOOL, END.IF, ERROR, ERROR.TYPE, EVALUATE, EVEN, EXACT, EXEC, EXECUTE, EXP, EXPONDIST, FACT, FALSE, FCLOSE, FDIST, FILES, FIND, FINDB, FINV, FISHER, FISHERINV, FIXED, FLOOR, FOPEN, FOR, FOR.CELL, FORECAST, FORMULA.CONVERT, FPOS, FREAD, FREADLN, FREQUENCY, FSIZE, FTEST, FV, FWRITE, FWRITELN, GAMMADIST, GAMMAINV, GAMMALN, GEOMEAN, GET.BAR, GET.CELL, GET.CHART.ITEM, GET.DEF, GET.DOCUMENT, GET.FORMULA, GET.LINK.INFO, GET.MOVIE, GET.NAME, GET.NOTE,

GET.OBJECT, GET.PIVOT.FIELD, GET.PIVOT.ITEM, GET.PIVOT.TABLE, GET.TOOL, GET.TOOLBAR, GET.WINDOW, GET.WORKBOOK, GET.WORKSPACE, GETPIVOTDATA, GOTO, GROUP, GROWTH, HALT, HARMEAN, HELP, HLOOKUP, HOUR, HYPERLINK, HYPGEOMDIST, IF, INDEX, INDIRECT, INFO, INITIATE, INPUT, INT, INTERCEPT, IPMT, IRR, ISBLANK, ISERR, ISERROR, ISLOGICAL, ISNA, ISNONTEXT, ISNUMBER, ISPMT, ISREF, ISTEXT, ISTHAIDIGIT, KURT, LARGE, LAST.ERROR, LEFT, LEFTB, LEN, LENB, LINEST, LINKS, LN, LOG, LOG10, LOGEST, LOGINV, LOGNORMDIST, LOOKUP, LOWER, MATCH, MAX, MAXA, MDETERM, MEDIAN, MID, MIDB, MIN, MINA, MINUTE, MINVERSE, MIRR, MMULT, MOD, MODE, MONTH, MOVIE.COMMAND, N, NA, NAMES, NEGBINOMDIST, NEXT, NORMDIST, NORMINV, NORMSDIST, NORMSINV, NOT, NOTE, NOW, NPER, NPV, NUMBERSTRING, ODD, OFFSET, OPEN.DIALOG, OPTIONS.LISTS.GET, OR, PAUSE, PEARSON, PERCENTILE, PERCENTRANK, PERMUT, PHONETIC, PI, PIVOT.ADD.DATA, PMT, POISSON, POKE, POWER, PPMT, PRESS.TOOL, PROB, PRODUCT, PROPER, PV, QUARTILE, RADIANS, RAND, RANK, RATE, REFTTEXT, REGISTER, REGISTER.ID, RELREF, RENAME.COMMAND, REPLACE, REPLACEB, REPT, REQUEST, RESET.TOOLBAR, RESTART, RESULT, RESUME, RETURN, RIGHT, RIGHTB, ROMAN, ROUND, ROUNDBAHTDOWN, ROUNDBAHTUP, ROUNDDOWN, ROUNDUP, ROW, ROWS, RSQ, RTD, SAVE.DIALOG, SAVE.TOOLBAR, SCENARIO.GET, SEARCH, SEARCHB, SECOND, SELECTION, SERIES, SET.NAME, SET.VALUE, SHOW.BAR, SIGN, SIN, SINH, SKEW, SLN, SLOPE, SMALL, SPELLING.CHECK, SQRT, STANDARDIZE, STDEV, STDEVA, STDEVP, STDEVPA, STEP, STEYX, SUBSTITUTE, SUBTOTAL, SUM, SUMIF, SUMPRODUCT, SUMSQ, SUMX2MY2, SUMX2PY2, SUMXMY2, SYD, T, TAN, TANH, TDIST, TERMINATE, TEXT, TEXT.BOX, TEXTREF, THAIDAYOFWEEK, THAIDIGIT, THAIMONTHOFYEAR, THAINUMSOUND, THAINUMSTRING, THAISTRINGLENGTH, THAIYEAR, TIME, TIMEVALUE, TINV, TODAY, TRANSPOSE, TREND, TRIM, TRIMMEAN, TRUE, TRUNC, TTEST, TYPE, UNREGISTER, UPPER, USDOLLAR, USERDEFINED, VALUE, VAR, VARA, VARP, VARPA, VDB, VIEW.GET, VLOOKUP, VOLATILE, WEEKDAY, WEIBULL, WHILE, WINDOW.TITLE, WINDOWS, YEAR and ZTEST.

### 20.0.249 What is the replacement for PluginMBS?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Answer:** Use the SoftDeclareMBS class to load libraries dynamically.

### 20.0.250 What to do on Realbasic reporting a conflict?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:**

I get an error like "This item conflicts with another item of the same name" when using one of the plugin functions.

REALbasic 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.

### 20.0.251 What to do with a NSImageCacheException?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **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.

### 20.0.252 What to do with MySQL Error 2014?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** You can get this error on MySQL if you have a recordset open while you create another one.

### 20.0.253 What ways do I have to ping?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **Answer:** You have different ways

**Notes:**

1. Use the shell class and the ping utility.
2. Use the MBS Network Plugin and there the SuperSocket part:
  - a) On Windows the ICMPpingMBS works to ping.
  - b) On Mac OS X it uses OpenTransport and needs root rights. You need to use sudo to run this application. This does not work on Intel Macs, because the plugin is not endian safe.

3. The DarwinPingMBS.Ping method:

Compiled for Mac OS X Macho target it works as a synchronized ping method.  
The Windows version had a bug and was fixed in plugin version 8.2pr4. So it works now.

4. The DarwinPingMBS.SimplePing method:

Works on Mac OS X Macho target.

But this method can be called from a thread to make it working in background.

### 20.0.254 Where is CGGetActiveDisplayListMBS?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **Answer:** This is now CGDisplayMBS.GetActiveDisplayList.

### 20.0.255 Where is CGGetDisplaysWithPointMBS?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **Answer:** This is now CGDisplayMBS.GetDisplaysWithPoint.

### 20.0.256 Where is CGGetDisplaysWithRectMBS?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **Answer:** This is now CGDisplayMBS.GetDisplaysWithRect.

### 20.0.257 Where is CGGetOnlineDisplayListMBS?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **Answer:** This is now CGDisplayMBS.GetOnlineDisplayList.

### 20.0.258 Where is GetObjectClassNameMBS?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

### 20.0.259 Where is NetworkAvailableMBS?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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, then 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.

### 20.0.260 Where is StringHeight function in DynaPDF?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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.

### 20.0.261 Where is XLSDocumentMBS class?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Answer:** This class has been removed in favor of XLBookMBS class.

**Notes:** These classes have been removed XLSCellMBS, XLSDocumentMBS, XLSFormatRecordMBS, XLSMergedCellsMBS, XLSRowMBS and XLSSheetMBS.

**20.0.262 Where to get information about file formats?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:**

Please visit this web page:

<http://www.wotsit.org>

**20.0.263 Where to register creator code for my application?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Answer:**

Register at Apple:

<http://developer.apple.com/dev/cftype/information.html>

**20.0.264 Which Mac OS X frameworks are 64bit only?**

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

### 20.0.265 Which plugins are 64bit only?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

### 20.0.266 Why application doesn't launch because of a missing ddraw.dll!?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **Answer:** Some RB versions require that you install DirectX from Microsoft on your Windows.

### 20.0.267 Why application doesn't launch because of a missing shlwapi.dll!?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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.

### 20.0.268 Why do I hear a beep on keydown?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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.

### 20.0.269 Why does folderitem.item return nil?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Because Realbasic 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.

### 20.0.270 Why doesn't showurl work?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:**

There are three main reasons:

1. showurl is not supported by REALbasic 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.

### 20.0.271 Why have I no values in my chart?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **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.

### 20.0.272 Will application size increase with using plugins?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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.

### 20.0.273 XLS: Custom format string guidelines

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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

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,,