MBS USB Plugin Documentation

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March 10, 2024

0.1   Introduction

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

0.2   Content

Chapter 1

List of Topics

Chapter 2

List of all classes

Chapter 3

USB

3.1 class HIDAPIDeviceInfoMBS

3.1.1 class HIDAPIDeviceInfoMBS

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: The class for device information.
Blog Entries

- MBS Xojo Plugins, version 24.1pr4

3.1.2 Properties

3.1.3 BusType as Integer

Plugin Version: 24.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Underlying bus type.
Notes: Not all bus types are actually implemented for all platforms.
(Read only property)

3.1.4 InterfaceNumber as Integer

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: The USB interface which this logical device represents.
Notes: Valid on both Linux implementations in all cases, and valid on the Windows implementation only if the device contains more than one interface.

(Read only property)

3.1.5   ManufacturerString as String

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Manufacturer String.
Notes: (Read only property)

3.1.6   NextDevice as HIDAPIDeviceInfoMBS

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Next device.
Notes: (Read only property)

3.1.7   Path as String

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Platform-specific device path.
Notes: (Read only property)

3.1.8   ProductID as Integer

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Device Product ID.
Notes: (Read only property)

3.1.9   ProductString as String

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Product string.
Notes: (Read only property)

3.1.10 ReleaseNumber as Integer

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Device Release Number in binary-coded decimal, also known as Device Version Number.
Notes: (Read only property)

3.1.11 SerialNumber as String

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Serial Number.
Notes: (Read only property)

3.1.12 Usage as Integer

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Usage for this Device/Interface.
Notes: (Read only property)

3.1.13 UsagePage as Integer

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Usage Page for this Device/Interface.
Notes: (Read only property)

3.1.14 VendorID as Integer

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Device Vendor ID.
Notes: (Read only property)

3.1.15 Constants

Bus Types

Constant	Value	Description
BusTypeBluetooth	2	Bluetooth or Bluetooth LE bus
BusTypeI2C	3	I2C bus
BusTypeSPI	4	SPI bus
BusTypeUnknown	0	Unknown bus type
BusTypeUSB	1	USB bus

3.2 class HIDAPIDeviceMBS

3.2.1 class HIDAPIDeviceMBS

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: The class for a HIDAPI device.
Notes: For HIDAPI see website:
https://github.com/signal11/hidapi

The MBS Plugin includes a copy of hidapi for Mac, Windows and Linux.
The linux version needs libudev installed.

You can optionally load a different version of hidapi with LoadLibrary methods.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- MBS Xojo Plugins, version 24.1pr4

- MBS Xojo Plugins, version 21.2pr3

- MBS Xojo Plugins, version 19.1pr2

- MBS Xojo / Real Studio Plugins, version 16.1pr3

3.2.2 Methods

3.2.3 Close

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Close a HID device.

3.2.4 Constructor

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: The private constructor.

3.2.5 Enumerate(VendorID as Integer = 0, ProduceID as Integer = 0) as HIDAPIDeviceInfoMBS

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Enumerate the HID Devices.
Notes: This function returns a linked list of all the HID devices attached to the system which match VendorID and ProduceID. If VendorID is set to 0 then any vendor matches. If ProduceID is set to 0 then any product matches. If VendorID and ProduceID are both set to 0, then all HID devices will be returned.

3.2.6   GetFeatureReport(ReportID as Integer, MaxLength as Integer) as MemoryBlock

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Get a feature report from a HID device.
Notes: Set the first byte of Data to the Report ID of the report to be read. Make sure to allow space for this extra byte in data. Upon return, the first byte will still contain the Report ID, and the report data will start in data.UInt8(1).

ReportID: The report ID to read.

This function returns the number of bytes read plus one for the report ID (which is still in the first   byte), or -1 on error.

3.2.7   GetInputReport(ReportID as Integer, MaxLength as Integer) as MemoryBlock

Plugin Version: 21.2, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Get a input report from a HID device.
Notes: MaxLength is how many bytes we allocate for receiving buffer.

Returns the data read, which has the report ID as first byte.

3.2.8   GetReportDescriptor as MemoryBlock

Plugin Version: 24.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Get a report descriptor from a HID device.
Notes: Returns the data or nil in case of an error.

3.2.9   IndexedString(Index as Integer, MaxLen as Integer = 1024) as String

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Get a string from a HID device, based on its string index.
Notes: Index: The index of the string to get.
maxlen: The maximum length for read buffer.
Returns text read.

3.2.10   Init as Integer

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Initialize the HIDAPI library.
Notes: This function initializes the HIDAPI library. Calling it is not strictly necessary, as it will be called automatically by Enumerate() and any of the Open*() functions if it is needed. This function should be called at the beginning of execution however, if there is a chance of HIDAPI handles being opened by different threads simultaneously.
This function returns 0 on success and -1 on error.

3.2.11   LoadError as String

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: The load error message.

3.2.12   LoadLibrary(File as FolderItem) as boolean

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Loads the library.
Notes: Returns true on success.
You can load a custom libhidapi.dylib (Mac), libhidapi.so (Linux) or libhidapi.dll (Windows).

But since MBS Plugin contains the code, you may not need to load a custom library.
See also:

- 3.2.13 LoadLibrary(Path as string) as boolean 23

3.2.13   LoadLibrary(Path as string) as boolean

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Loads the library.
Notes: Returns true on success.

You can load a custom libhidapi.dylib (Mac), libhidapi.so (Linux) or libhidapi.dll (Windows).

But since MBS Plugin contains the code, you may not need to load a custom library.
See also:

3.2.14   Open(VendorID as Integer, ProduceID as Integer, SerialNumber as String = "") as HIDAPIDeviceMBS

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Open a HID device using a Vendor ID (VID), Product ID (PID) and optionally a serial number.
Notes: If SerialNumber is "", the first device with the specified VID and PID is opened.
VendorID: The Vendor ID (VID) of the device to open.
ProduceID: The Product ID (PID) of the device to open.
SerialNumber: The Serial Number of the device to open (Optionally "").

This function returns a pointer to a HIDAPIDeviceMBS object on success or nil on failure.

3.2.15   OpenPath(path as string) as HIDAPIDeviceMBS

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Open a HID device by its path name.
Notes: The path name be determined by calling Enumerate(), or a platform-specific path name can be used
(eg: /dev/hidraw0 on Linux).
Path: The path name of the device to open
This function returns a pointer to a HIDAPIDeviceMBS object on success or nil on failure.

For macOS path must be one of:

- in format 'DevSrvsID:<RegistryEntryID>' (as returned by Enumerate().

- a valid path to an IOHIDDevice in the IOService plane (as returned by Path property in IORegistryMBS class, e.g.: "IOService:/AppleACPIPlatformExpert/PCI0@0/AppleACPIPCI/EHC1@1D,7/AppleUSBEHCI/PLAYSTATION(R)3 Controller@fd120000/IOUSBInterface@0/IOUSBHIDDriver");

Second format is for compatibility with paths accepted by older versions of HIDAPI.

3.2.16   Read(MaxLength as Integer) as MemoryBlock

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Read an Input report from a HID device.
Notes: Input reports are returned to the host through the INTERRUPT IN endpoint. The first byte will contain the Report number if the device uses numbered reports.

MaxLength: The number of bytes to read. For devices with multiple reports, make sure to read an extra byte for the report number.

This function returns the actual number of bytes read and -1 on error. If no packet was available to be read and the handle is in non-blocking mode, this function returns 0.

3.2.17   ReadTimeOut(MaxLength as Integer, TimeoutMS as Integer) as MemoryBlock

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Read an Input report from a HID device with timeout.
Notes: Input reports are returned to the host through the INTERRUPT IN endpoint. The first byte will contain the Report number if the device uses numbered reports.

MaxLength: The number of bytes to read. For devices with multiple reports, make sure to read an extra byte for the report number.

TimeoutMS: timeout in milliseconds or -1 for blocking wait.

This function returns the actual number of bytes read and -1 on error. If no packet was available to be read within the timeout period, this function returns 0.

3.2.18   SendFeatureReport(data as MemoryBlock) as Integer

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Send a Feature report to the device.
Notes: Feature reports are sent over the Control endpoint as a Set_Report transfer. The first byte of Data must contain the Report ID. For devices which only support a single report, this must be set to 0. The remaining bytes contain the report data. Since the Report ID is mandatory, calls to SendFeatureReport() will always contain one more byte than the report contains. For example, if a hid report is 16 bytes long, 17 bytes must be passed to SendFeatureReport(): the Report ID (or 0, for devices which do not use

numbered reports), followed by the report data (16 bytes). In this example, the length passed in would be 17.

dat:a The data to send, including the report number as the first byte.

This function returns the actual number of bytes written and -1 on error.
See also:

3.2.19 SendFeatureReport(data as String) as Integer

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Send a Feature report to the device.
Notes: Feature reports are sent over the Control endpoint as a Set_Report transfer. The first byte of Data must contain the Report ID. For devices which only support a single report, this must be set to 0. The remaining bytes contain the report data. Since the Report ID is mandatory, calls to SendFeatureReport() will always contain one more byte than the report contains. For example, if a hid report is 16 bytes long, 17 bytes must be passed to SendFeatureReport(): the Report ID (or 0, for devices which do not use numbered reports), followed by the report data (16 bytes). In this example, the length passed in would be 17.

dat:a The data to send, including the report number as the first byte.

This function returns the actual number of bytes written and -1 on error.
See also:

3.2.20 Shutdown as Integer

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Finalize the HIDAPI library.
Notes: This function frees all of the static data associated with HIDAPI. It should be called at the end of execution to avoid memory leaks.
This function returns 0 on success and -1 on error.

3.2.21 VersionString as String

Plugin Version: 21.2, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Queries version number of the library.
Example:

// shows 0.10.1
MsgBox HIDAPIDeviceMBS.VersionString

3.2.22   Write(data as MemoryBlock) as Integer

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Write an Output report to a HID device.
Notes: The first byte of data must contain the Report ID. For devices which only support a single report, this must be set to 0x0. The remaining bytes contain the report data. Since the Report ID is mandatory, calls to Write() will always contain one more byte than the report contains. For example, if a hid report is 16 bytes long, 17 bytes must be passed to Write(), the Report ID (or 0x0, for devices with a single report), followed by the report data (16 bytes). In this example, the length passed in would be 17.
Write() will send the data on the first OUT endpoint, if one exists. If it does not, it will send the data through the Control Endpoint (Endpoint 0).

data: The data to send, including the report number as the first byte.

This function returns the actual number of bytes written and -1 on error.
Length of data to send is data.size.
See also:

- 3.2.23 Write(data as String) as Integer   27

3.2.23   Write(data as String) as Integer

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Write an Output report to a HID device.
Notes: The first byte of data must contain the Report ID. For devices which only support a single report, this must be set to 0x0. The remaining bytes contain the report data. Since the Report ID is mandatory, calls to Write() will always contain one more byte than the report contains. For example, if a hid report is 16 bytes long, 17 bytes must be passed to Write(), the Report ID (or 0x0, for devices with a single report), followed by the report data (16 bytes). In this example, the length passed in would be 17.
Write() will send the data on the first OUT endpoint, if one exists. If it does not, it will send the data through the Control Endpoint (Endpoint 0).

data: The data to send, including the report number as the first byte.

This function returns the actual number of bytes written and -1 on error.
Length of data to send is LenB(data).
See also:

3.2.24 Properties

3.2.25 DeviceHandle as Integer

Plugin Version: 16.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: The device handle used.
Notes: For Windows a HANDLE to the open device, for Mac a IOHIDDeviceRef reference and Linux the handle from open function.
(Read only property)

3.2.26 DeviceInfo as HIDAPIDeviceInfoMBS

Plugin Version: 24.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Queries the device info for this device.
Notes: Returns nil in case of errors.
(Read only property)

3.2.27 Error as String

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Get a string describing the last error which occurred.
Notes: This function returns a string containing the last error which occurred or ”” if none has occurred.

This provides errors per device.
(Read only property)

3.2.28 FeatureReportLength as Integer

Plugin Version: 16.1, Platforms: macOS, Windows, Targets: Desktop, Console & Web.

Function: The length of a feature report.
Notes: Not implemented for Linux.
Returns -1 if unknown.
On Mac this is more the maximum report length.
(Read only property)

3.2.29   GlobalError as String

Plugin Version: 24.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Get a string describing the last error which occurred.
Notes: This function returns a string containing the last error which occurred or ”” if none has occurred.

GlobalError allows to catch errors without having an instance with an Error property.
Like errors from opening a device.
(Read only property)

3.2.30   Handle as Integer

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: The internal object reference.
Notes: (Read only property)

3.2.31   InputReportLength as Integer

Plugin Version: 16.1, Platforms: macOS, Windows, Targets: Desktop, Console & Web.

Function: The length of an input report.
Notes: Not implemented for Linux.
Returns -1 if unknown.
On Mac this is more the maximum report length.
(Read only property)

3.2.32   ManufacturerString as String

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: The Manufacturer String from a HID device.
Notes: (Read only property)

3.2.33   NonBlocking as Boolean

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Set the device handle to be non-blocking.
Notes: In non-blocking mode calls to Read() will return immediately with a value of 0 if there is no data

to be read. In blocking mode, Read() will wait (block) until there is data to read before returning. Nonblocking can be turned on and off at any time.

Value true: enable or not the nonblocking reads.
Value false: to disable nonblocking.
(Read and Write property)

3.2.34   OutputReportLength as Integer

Plugin Version: 16.1, Platforms: macOS, Windows, Targets: Desktop, Console & Web.

Function: The length of an output report.
Notes: Not implemented for Linux.
Returns -1 if unknown.
On Mac this is more the maximum report length.
(Read only property)

3.2.35   ProductString as String

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: The Product String from a HID device.
Notes: (Read only property)

3.2.36   SerialNumber as String

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: The Serial Number String from a HID device.
Notes: (Read only property)

3.3 class LibUSBConfigDescriptorMBS

3.3.1 class LibUSBConfigDescriptorMBS

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: A class representing the standard USB configuration descriptor.
Notes: This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

3.3.2 Methods

3.3.3 Constructor

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: The private constructor.

3.3.4 GetInterface(index as Integer) as LibUSBInterfaceMBS

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Queries interface by index.

3.3.5 Properties

3.3.6 AttributesBitmap as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Configuration characteristics.
Notes: (Read only property)

3.3.7 Configuration as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Index of string descriptor describing this configuration.
Notes: (Read only property)

3.3.8   ConfigurationValue as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Identifier value for this configuration.
Notes: (Read only property)

3.3.9   DescriptorType as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Descriptor type.
Notes: (Read only property)

3.3.10   extra as MemoryBlock

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Extra descriptors.
Notes: (Read only property)

3.3.11   extraLength as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Length of the extra descriptors, in bytes.
Notes: (Read only property)

3.3.12   InterfaceDescriptors as Variant

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Array of interfaces supported by this configuration.
Notes: (Read only property)

3.3.13   Length as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Size of this descriptor (in bytes)
Notes: (Read only property)

3.3.14   MaxPower as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Maximum power consumption of the USB device from this bus in this configuration when the device is fully opreation.
Notes: Expressed in units of 2 mA when the device is operating in high-speed mode and in units of 8 mA when the device is operating in super-speed mode.
(Read only property)

3.3.15   NumInterfaces as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Number of interfaces supported by this configuration.
Notes: (Read only property)

3.3.16   TotalLength as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Total length of data returned for this configuration.
Notes: (Read only property)

3.4   class LibUSBDeviceDescriptorMBS

3.4.1   class LibUSBDeviceDescriptorMBS

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: A class representing the standard USB device descriptor.
Notes: This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

3.4.2   Methods

3.4.3   Constructor

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: The private constructor.

3.4.4   Properties

3.4.5   DescriptorType as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Descriptor type.
Notes: (Read only property)

3.4.6   DeviceClass as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: USB-IF class code for the device.
Notes: (Read only property)

3.4.7   DeviceProtocol as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: USB-IF protocol code for the device, qualified by the DeviceClass and DeviceSubClass values.
Notes: (Read only property)

3.4.8   DeviceReleaseNumber as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Device release number in binary-coded decimal.
Notes: (Read only property)

3.4.9   DeviceSubClass as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: USB-IF subclass code for the device, qualified by the DeviceClass value.
Notes: (Read only property)

3.4.10   IndexManufacturer as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Index of string descriptor describing manufacturer.
Notes: (Read only property)

3.4.11   IndexProduct as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Index of string descriptor describing product.
Notes: (Read only property)

3.4.12   IndexSerialNumber as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Index of string descriptor containing device serial number.
Notes: (Read only property)

3.4.13   Length as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Size of this descriptor (in bytes).
Notes: (Read only property)

3.4.14   MaxPacketSize0 as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Maximum packet size for endpoint 0.
Notes: (Read only property)

3.4.15   NumConfigurations as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Number of possible configurations.
Notes: (Read only property)

3.4.16   ProductID as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: USB-IF product ID.
Notes: (Read only property)

3.4.17   USBReleaseNumber as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: USB specification release number in binary-coded decimal.
Notes: (Read only property)

3.4.18   VendorID as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: USB-IF vendor ID.
Notes: (Read only property)

3.4.19   Constants

USB Classes

Constant	Value	Description
kClassApplication	&hfe	Application
kClassAudio	1	Audio
kClassComm	2	Comm
kClassContentSecurity	13	Security
kClassData	10	Data
kClassDiagnosticDevice	&hdc	Diagnostic Device
kClassHID	3	HID
kClassHUB	9	HUB
kClassImage	6	Image
kClassMassStorage	8	Storage
kClassPerInterface	0	Classes per Interface
kClassPersonalHealthcare	15	Personal Healthcare
kClassPhysical	5	Physical
kClassPrinter	7	Printer
kClassPTP	6	PTP
kClassSmartCard	11	SmartCard
kClassVendorSpecific	255	Vendor Specific
kClassVideo	14	Video
kClassWireless	&he0	Wireless

3.5 class LibUSBDeviceMBS

3.5.1 class LibUSBDeviceMBS

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: The class for a device.
Notes: This is both for a device as general and an open connection.

LibUSB abstracts on Mac, Windows and Linux for using USB devices. SO far it's the best generic USB interface we have.
You need libUSB dylib (mac), dll (Windows) and so (Linux) files from LibUSB. For Linux the LibUSB library is usually preinstalled with a LibUSB package, so the plugin finds it automatically.

For MacOS you can take a look on the MacUSBDeviceMBS class and the IORegistryMBS class.
See also WindowsDeviceMBS, WinUSBDeviceMBS and WinUSBMBS classes for WIndows.
Blog Entries

- MBS Xojo Plugins, version 18.1pr4
- LibUSB for Xojo in next MBS Plugins

Videos

- Presentation from Munich conference about MBS Plugins.

3.5.2 Methods

3.5.3 AttachKernelDriver(interfaceNumber as Integer)

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Re-attach an interface's kernel driver, which was previously detached using libusb_detach_kernel_driver().
Notes: This call is only effective on Linux and returns kErrorNotSupported on all other platforms.

This functionality is not available on Darwin or Windows.

Parameters:
interfaceNumber: the interface to attach the driver from

Lasterror is set:
0 on success
kErrorNotFound if no kernel driver was active

kErrorInvalidParam if the interface does not exist
kErrorNoDevice if the device has been disconnected
kErrorNotSupported on platforms where the functionality is not available
kErrorBusy if the driver cannot be attached because the interface is claimed by a program or driver
another error code on other failure

3.5.4 BulkTransfer(endpoint as Integer, data as Ptr, Length as Integer, byref ActualLength as Integer, Timeout as Integer)

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Perform a USB bulk transfer.
Notes: The direction of the transfer is inferred from the direction bits of the endpoint address.

For bulk reads, the length field indicates the maximum length of data you are expecting to receive. If less data arrives than expected, this function will return that data, so be sure to check the transferred output parameter.

You should also check the transferred parameter for bulk writes. Not all of the data may have been written.

Also check transferred when dealing with a timeout error code. libusb may have to split your transfer into a number of chunks to satisfy underlying O/S requirements, meaning that the timeout may expire after the first few chunks have completed. libusb is careful not to lose any data that may have been transferred; do not assume that timeout conditions indicate a complete lack of I/O.

Parameters:

endpoint	the address of a valid endpoint to communicate with
data	a suitably-sized data buffer for either input or output (depending on endpoint)
length	for bulk writes, the number of bytes from data to be sent. for bulk reads, the maximum number of bytes to receive into the data buffer.
transferred	output location for the number of bytes actually transferred.
timeout	timeout (in millseconds) that this function should wait before giving up due to no response being received. For an unlimited timeout, use value 0.

Lasterror is set to:
0 on success (and populates transferred)
kErrorTimeout if the transfer timed out (and populates transferred)
kErrorPipe if the endpoint halted
kErrorOverflow if the device offered more data, see Packets and overflows
kErrorNoDevice if the device has been disconnected

another error code on other failures

3.5.5   ClaimInterface(interfaceNumber as Integer)

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Claim an interface on a given device handle.
Notes: You must claim the interface you wish to use before you can perform I/O on any of its endpoints.

It is legal to attempt to claim an already-claimed interface, in which case libusb just returns 0 without doing anything.

Claiming of interfaces is a purely logical operation; it does not cause any requests to be sent over the bus. Interface claiming is used to instruct the underlying operating system that your application wishes to take ownership of the interface.

This is a non-blocking function.

Parameters:
interfaceNumber: the bInterfaceNumber of the interface you wish to claim

Lasterror is set:
0 on success
kErrorNotFound if the requested interface does not exist
kErrorBusy if another program or driver has claimed the interface
kErrorNoDevice if the device has been disconnected
a error code on other failure

3.5.6   ClearHalt(endpoint as Integer)

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Clear the halt/stall condition for an endpoint.
Notes: Endpoints with halt status are unable to receive or transmit data until the halt condition is stalled.

You should cancel all pending transfers before attempting to clear the halt condition.

This is a blocking function.

Parameters:

endpoint: the endpoint to clear halt status

Returns:
0 on success
kErrorNotFound if the endpoint does not exist
kErrorNoDevice if the device has been disconnected
another error code on other failure

3.5.7 Close

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Close a device handle.
Notes: Should be called on all open handles before your application exits.
Internally, this function destroys the reference that was added by Open on the given device.
This is a non-blocking function; no requests are sent over the bus.

3.5.8 ControlTransfer(requestType as Integer, Request as Integer, Value as Integer, Index as Integer, data as Ptr, Length as Integer, Timeout as Integer) as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Perform a USB control transfer.
Notes: The direction of the transfer is inferred from the RequestType field of the setup packet.

The Value, Index and Length fields values should be given in host-endian byte order.

Parameters:

on success, the number of bytes actually transferred is returned.

Lasterror is set to:
kErrorTimeout if the transfer timed out
kErrorPipe if the control request was not supported by the device
kErrorNoDevice if the device has been disconnected
another error code on other failures

RequestType	the request type field for the setup packet
Request	the request field for the setup packet
Value	the value field for the setup packet
Index	the index field for the setup packet
data	a suitably-sized data buffer for either input or output (depending on direction bits within bmRequestType)
Length	the length field for the setup packet. The data buffer should be at least this size.
timeout	timeout (in millseconds) that this function should wait before giving up due to no response being received. For an unlimited timeout, use value 0.

3.5.9   DetachKernelDriver(interfaceNumber as Integer)

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Detach a kernel driver from an interface.
Notes: If successful, you will then be able to claim the interface and perform I/O.
This functionality is not available on Darwin or Windows.

Parameters:
interfaceNumber: the interface to detach the driver from

Lasterror is set:
0 on success
kErrorNotFound if no kernel driver was active
kErrorInvalidParam if the interface does not exist
kErrorNoDevice if the device has been disconnected
kErrorNotSupported on platforms where the functionality is not available
another error code on other failure

3.5.10   Devices as LibUSBDeviceMBS()

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Returns a list of USB devices currently attached to the system.
Notes: This is your entry point into finding a USB device to operate.

This return value of this function indicates the number of devices in the resultant list.

The number of devices in the outputted list.
Lasterror is set to zero on success or or any error codes according to errors encountered by the backend.

3.5.11 ErrorName(ErrorCode as Integer) as String

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Returns a constant string with the ASCII name of a libusb error code.

3.5.12 GetActiveConfigDescriptor as LibUSBConfigDescriptorMBS

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Get the USB configuration descriptor for the currently active configuration.
Notes: This is a non-blocking function which does not involve any requests being sent to the device.

Lasterror is set to:
0 on success
kErrorNotFound if the device is in unconfigured state
another error code on error.

3.5.13 GetConfigDescriptor(Index as Integer) as LibUSBConfigDescriptorMBS

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Get a USB configuration descriptor based on its index.
Notes: This is a non-blocking function which does not involve any requests being sent to the device.

Parameters:

Index   the index of the configuration you wish to retrieve

Lasterror is set to:
0 on success
kErrorNotFound if the configuration does not exist
another error code on error

3.5.14   GetConfigDescriptorByValue(Value as Integer) as LibUSBConfigDescriptorMBS

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Get a USB configuration descriptor with a specific ConfigurationValue.
Notes: This is a non-blocking function which does not involve any requests being sent to the device.

Value: the bConfigurationValue of the configuration you wish to retrieve.

Lasterror is set to:
0 on success
kErrorNotFound if the configuration does not exist
another error code on error

3.5.15   GetConfiguration as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Determine the bConfigurationValue of the currently active configuration.
Notes: You could formulate your own control request to obtain this information, but this function has the advantage that it may be able to retrieve the information from operating system caches (no I/O involved).

If the OS does not cache this information, then this function will block while a control transfer is submitted to retrieve the information.

This function will return a value of 0 in the config output parameter if the device is in unconfigured state.

Returns Configuration value of the active configuration (only valid for return code 0)

The lasterror is set to:
0 on success
kErrorNoDevice if the device has been disconnected
another error code on other failure

3.5.16   GetDescriptor(descType as Integer, descIndex as Integer, data as Ptr, Length as Integer) as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Retrieve a descriptor from the default control pipe.

Notes: This is a convenience function which formulates the appropriate control message to retrieve the descriptor.

Parameters:

descType	the descriptor type, see libusb_descriptor_type
descIndex	the index of the descriptor to retrieve
data	output buffer for descriptor
length	size of data buffer

Returns number of bytes returned in data or zero.
Sets lasterror to error code on failure

3.5.17   GetDeviceDescriptor as LibUSBDeviceDescriptorMBS

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Get the USB device descriptor for a given device.
Notes: This is a non-blocking function; the device descriptor is cached in memory.

Returns 0 on success or a error code on failure.

3.5.18   GetMaxISOPacketSize(EndPoint as Integer) as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Calculate the maximum packet size which a specific endpoint is capable is sending or receiving in the duration of 1 microframe.
Notes: Only the active configuation is examined. The calculation is based on the wMaxPacketSize field in the endpoint descriptor as described in section 9.6.6 in the USB 2.0 specifications.

If acting on an isochronous or interrupt endpoint, this function will multiply the value found in bits 0:10 by the number of transactions per microframe (determined by bits 11:12). Otherwise, this function just returns the numeric value found in bits 0:10.

This function is useful for setting up isochronous transfers, for example you might pass the return value from this function to libusb_set_iso_packet_lengths() in order to set the length field of every isochronous packet in a transfer.

Since v1.0.3.

Parameters:
endpoint: address of the endpoint in question

Returns the maximum packet size which can be sent/received on this endpoint.

The lasterror is set to:
0 for success.
kErrorNotFound if the endpoint does not exist
kErrorOther on other failure

3.5.19   GetMaxPacketSize(EndPoint as Integer) as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Convenience function to retrieve the wMaxPacketSize value for a particular endpoint in the active device configuration.
Notes: This function was originally intended to be of assistance when setting up isochronous transfers, but a design mistake resulted in this function instead. It simply returns the wMaxPacketSize value without considering its contents. If you're dealing with isochronous transfers, you probably want libusb_get_max_iso_packet_size() instead.

Parameters:
endpoint: address of the endpoint in question

Returns the Max Packet Size value.

The lasterror is set:
0 for success.
kErrorNotFound if the endpoint does not exist
kErrorOther on other failure

3.5.20   GetStringDescriptor(descIndex as Integer, LangID as Integer = 0) as String

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Retrieve a descriptor from a device.
Notes: This is a convenience function which formulates the appropriate control message to retrieve the descriptor. The string returned is Unicode, as detailed in the USB specifications.

Parameters:

descIndex	the index of the descriptor to retrieve
LangID	the language ID for the string descriptor

Returns string.
Lasterror is set to zero or error code on failure.
See also:

3.5.21 GetStringDescriptor(descIndex as Integer, LangID as Integer = 0, data as Ptr, Length as Integer) as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Retrieve a descriptor from a device.
Notes: This is a convenience function which formulates the appropriate control message to retrieve the descriptor. The string returned is Unicode, as detailed in the USB specifications.

Parameters:

descIndex	the index of the descriptor to retrieve
LangID	the language ID for the string descriptor
data	output buffer for descriptor
length	size of data buffer

Returns number of bytes returned in data.
Lasterror is set to zero or error code on failure.
See also:

3.5.22 GetStringDescriptorAscii(descIndex as Integer) as String

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Retrieve a string descriptor in ASCII.
Notes: Wrapper around GetStringDescriptor(). Uses the first language supported by the device.

Parameters:

  descIndex   the index of the descriptor to retrieve

Returns string.
Lasterror is set to error code on failure and zero on success.
See also:

- 3.5.23 GetStringDescriptorAscii(descIndex as Integer, data as Ptr, Length as Integer) as Integer   48

3.5.23   GetStringDescriptorAscii(descIndex as Integer, data as Ptr, Length as Integer) as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Retrieve a string descriptor in ASCII.
Notes: Wrapper around GetStringDescriptor(). Uses the first language supported by the device.

Parameters:

descIndex	the index of the descriptor to retrieve
data	output buffer for ASCII string descriptor
length	size of data buffer

Returns number of bytes returned in data.
Lasterror is set to error code on failure and zero on success.
See also:

- 3.5.22 GetStringDescriptorAscii(descIndex as Integer) as String   47

3.5.24   HasCapability(Capability as UInt32) as Boolean

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Check at runtime if the loaded library has a given capability.
Notes: Returns true if the running library has the capability, false otherwise.

3.5.25 Initialize as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Initialize libusb.

3.5.26 InterruptTransfer(endpoint as Integer, data as Ptr, Length as Integer, byref ActualLength as Integer, Timeout as Integer)

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Perform a USB interrupt transfer.
Notes: The direction of the transfer is inferred from the direction bits of the endpoint address.

For interrupt reads, the length field indicates the maximum length of data you are expecting to receive. If less data arrives than expected, this function will return that data, so be sure to check the transferred output parameter.

You should also check the transferred parameter for interrupt writes. Not all of the data may have been written.

Also check transferred when dealing with a timeout error code. libusb may have to split your transfer into a number of chunks to satisfy underlying O/S requirements, meaning that the timeout may expire after the first few chunks have completed. libusb is careful not to lose any data that may have been transferred; do not assume that timeout conditions indicate a complete lack of I/O.

The default endpoint bInterval value is used as the polling interval.

Parameters:

endpoint	the address of a valid endpoint to communicate with
data	a suitably-sized data buffer for either input or output (depending on endpoint)
length	for bulk writes, the number of bytes from data to be sent. for bulk reads, the maximum number of bytes to receive into the data buffer.
transferred	output location for the number of bytes actually transferred.
timeout	timeout (in millseconds) that this function should wait before giving up due to no response being received. For an unlimited timeout, use value 0.

The lasterror property is set to:
0 on success (and populates transferred)
kErrorTimeout if the transfer timed out

kErrorPipe if the endpoint halted
kErrorOverflow if the device offered more data, see Packets and overflows
kErrorNoDevice if the device has been disconnected
another error code on other error

3.5.27   KernelDriverActive(interfaceNumber as Integer) as Boolean

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Determine if a kernel driver is active on an interface.
Notes: If a kernel driver is active, you cannot claim the interface, and libusb will be unable to perform I/O.

This functionality is not available on Windows.

Parameters:
interfaceNumber: the interface to check

Lasterror is set:
0 if no kernel driver is active
1 if a kernel driver is active
kErrorNoDevice if the device has been disconnected
kErrorNotSupported on platforms where the functionality is not available
another error code on other failure

3.5.28   LibraryLoaded as Boolean

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Whether library is loaded.

3.5.29   LibraryLoadErrorMessage as String

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: The last error message from loading library.

3.5.30   LibVersion as LibUSBVersionMBS

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Queries version of library.

3.5.31 LoadLibrary(file as folderitem) as boolean

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Loads the libusb library.
Notes: Returns true on success or false on failure.
The LibraryLoadErrorMessage function returns error message on failure.
See also:

3.5.32 LoadLibrary(path as string) as boolean

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Loads the libusb library.
Notes: Returns true on success or false on failure.
The LibraryLoadErrorMessage function returns error message on failure.
See also:

3.5.33 Open as Boolean

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Open a device and obtain a device handle.
Notes: A handle allows you to perform I/O on the device in question.

Internally, this function adds a reference to the device. This reference is removed during Close().

This is a non-blocking function; no requests are sent over the bus.

The last error to:
0 on success
kErrorNoMemory on memory allocation failure
kErrorAccess if the user has insufficient permissions
kErrorNoDevice if the device has been disconnected
another error code on other failure

3.5.34   OpenDevice(VID as Integer, PID as Integer) as LibUSBDeviceMBS

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Convenience function for finding a device with a particular VID/PID combination.
Notes: This function is intended for those scenarios where you are using libusb to knock up a quick test application - it allows you to avoid calling libusb_get_device_list() and worrying about traversing/freeing the list.

This function has limitations and is hence not intended for use in real applications: if multiple devices have the same IDs it will only give you the first one, etc.

Parameters:

   VID   the idVendor value to search for
   PID   the idProduct value to search for

Returns:
a handle for the first found device, or NULL on error or if the device could not be found.

3.5.35   ReleaseInterface(interfaceNumber as Integer)

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Release an interface previously claimed with ClaimInterface.
Notes: You should release all claimed interfaces before closing a device handle.

This is a blocking function. A SET_INTERFACE control request will be sent to the device, resetting interface state to the first alternate setting.

Parameters:
interfaceNumber: the bInterfaceNumber of the previously-claimed interface

The lasterror:
0 on success
kErrorNotFound if the interface was not claimed
kErrorNoDevice if the device has been disconnected
another error code on other failure

3.5.36 Reset

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Perform a USB port reset to reinitialize a device.
Notes: The system will attempt to restore the previous configuration and alternate settings after the reset has completed.

If the reset fails, the descriptors change, or the previous state cannot be restored, the device will appear to be disconnected and reconnected. This means that the device handle is no longer valid (you should close it) and rediscover the device. An error code of kErrorNotFound indicates when this is the case.

This is a blocking function which usually incurs a noticeable delay.

Lasterror is set:
0 on success
kErrorNotFound if re-enumeration is required, or if the device has been disconnected
another error code on other failure

3.5.37 SetConfiguration(configuration as Integer)

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Set the active configuration for a device.
Notes: The operating system may or may not have already set an active configuration on the device. It is up to your application to ensure the correct configuration is selected before you attempt to claim interfaces and perform other operations.

If you call this function on a device already configured with the selected configuration, then this function will act as a lightweight device reset: it will issue a SET_CONFIGURATION request using the current configuration, causing most USB-related device state to be reset (altsetting reset to zero, endpoint halts cleared, toggles reset).

You cannot change/reset configuration if your application has claimed interfaces - you should free them with libusb_release_interface() first. You cannot change/reset configuration if other applications or drivers have claimed interfaces.

A configuration value of -1 will put the device in unconfigured state. The USB specifications state that a configuration value of 0 does this, however buggy devices exist which actually have a configuration 0.

You should always use this function rather than formulating your own SET_CONFIGURATION control request. This is because the underlying operating system needs to know when such changes happen.

This is a blocking function.

Parameters:
configuration: the bConfigurationValue of the configuration you wish to activate, or -1 if you wish to put the device in unconfigured state

The lasterror is set to:
0 on success
kErrorNotFound if the requested configuration does not exist
kErrorBusy if interfaces are currently claimed
kErrorNoDevice if the device has been disconnected
another error code on other failure

3.5.38   SetDebug(level as integer)

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Set message verbosity.
Notes: Level 0: no messages ever printed by the library (default)
Level 1: error messages are printed to stderr
Level 2: warning and error messages are printed to stderr
Level 3: informational messages are printed to stdout, warning and error messages are printed to stderr
The default level is 0, which means no messages are ever printed. If you choose to increase the message verbosity level, ensure that your application does not close the stdout/stderr file descriptors.

You are advised to set level 3. libusb is conservative with its message logging and most of the time, will only log messages that explain error conditions and other oddities. This will help you debug your software.

If the LIBUSB_DEBUG environment variable was set when libusb was initialized, this function does nothing: the message verbosity is fixed to the value in the environment variable.

If libusb was compiled without any message logging, this function does nothing: you'll never get any messages.
If libusb was compiled with verbose debug message logging, this function does nothing: you'll always get messages from all levels.

3.5.39 SetInterfaceAltSetting(interfaceNumber as Integer, alternateSetting as Integer)

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Activate an alternate setting for an interface.
Notes: The interface must have been previously claimed with ClaimInterface().

You should always use this function rather than formulating your own SET_INTERFACE control request. This is because the underlying operating system needs to know when such changes happen.

This is a blocking function.

Parameters:

| interfaceNumber | the InterfaceNumber of the previously-claimed interface |
| alternateSetting | the AlternateSetting of the alternate setting to activate |

The lasterror:
0 on success
kErrorNotFound if the interface was not claimed, or the requested alternate setting does not exist
kErrorNoDevice if the device has been disconnected
another error code on other failure

3.5.40 Shutdown

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Deinitialize libusb.
Notes: Should be called after closing all open devices and before your application terminates.

3.5.41 Properties

3.5.42 BusNumber as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Get the number of the bus that a device is connected to.
Notes: (Read only property)

3.5.43   DeviceAddress as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Get the address of the device on the bus it is connected to.
Notes: (Read only property)

3.5.44   DeviceHandle as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: The handle to the device.
Notes: (Read only property)

3.5.45   DeviceSpeed as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Get the negotiated connection speed for a device.
Notes: a speed value, where kSpeedUnknown means that the OS doesn't know or doesn't support returning the negotiated speed.
(Read only property)

3.5.46   Handle as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: The handle to the open device.
Notes: (Read only property)

3.5.47   IsOpen as Boolean

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Whether device is open.
Notes: True if you called OpenDevice successful.
(Read only property)

3.5.48   Lasterror as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: The last error code.
Notes: (Read and Write property)

3.5.49   Constants

Capabilities

Constant	Value	Description
kCapabilitiesHasCapabilities	0	The HasCapability() API is available.
kCapabilitiesHasHIDAccess	256	The library can access HID devices without requiring user interventi Note that before being able to actually access an HID device, you have to call additional libusb functions such as DetachKernelDriver.
kCapabilitiesHasHotplug	1	Hotplug support is available on this platform.
kCapabilitiesSupportsDetachKernelDriver	257	The library supports detaching of the default USB driver, using De nelDriver, if one is set by the OS kernel.

Descriptor Types

Constant	Value	Description
kDescriptorTypeBOS	6	BOS descriptor
kDescriptorTypeConfig	2	Configuration descriptor.
kDescriptorTypeDevice	1	Device descriptor.
kDescriptorTypeDeviceCapabilities	16	Device Capability descriptor
kDescriptorTypeEndpoint	5	Endpoint descriptor.
kDescriptorTypeHID	&h21	HID descriptor.
kDescriptorTypeHub	&h29	Hub descriptor.
kDescriptorTypeInterface	4	Interface descriptor.
kDescriptorTypePhysical	&h23	Physical descriptor.
kDescriptorTypeReport	&h22	HID report descriptor.
kDescriptorTypeString	3	String descriptor.
kDescriptorTypeSuperSpeedEndpointCompanion	&h30	SuperSpeed Endpoint Companion descriptor
kDescriptorTypeSuperSpeedHub	&h2A	SuperSpeed Hub descriptor

Errors

Constant	Value	Description
kErrorAccess	-3	Access
kErrorBusy	-6	Busy
kErrorInterrupted	-10	Interrupted
kErrorInvalidParam	-2	Invalid parameter
kErrorIO	-1	I/O Error
kErrorNoDevice	-4	No device.
kErrorNoMemory	-11	Out of Memory
kErrorNotFound	-5	Not found
kErrorNotSupported	-12	Function not supported
kErrorOther	-99	Other errors
kErrorOverflow	-8	Overflow
kErrorPipe	-9	Pipe
kErrorTimeout	-7	Timeout

Log Levels

Constant	Value	Description
kLogLevelDebug	4	debug and informational messages are printed to stdout, warnings and errors to stderr
kLogLevelError	1	error messages are printed to stderr
kLogLevelInfo	3	informational messages are printed to stdout, warning and error messages are printed to stderr
kLogLevelNone	0	no messages ever printed by the library (default)
kLogLevelWarning	2	warning and error messages are printed to stderr

Speed Levels

Constant	Value	Description
kSpeedFull	2	The device is operating at full speed (12MBit/s).
kSpeedHigh	3	The device is operating at high speed (480MBit/s).
kSpeedLow	1	The device is operating at low speed (1.5MBit/s).
kSpeedSuper	4	The device is operating at super speed (5000MBit/s).
kSpeedUnknown	0	The OS doesn't report or know the device speed.

3.6 class LibUSBEndpointDescriptorMBS

3.6.1 class LibUSBEndpointDescriptorMBS

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: A class representing the standard USB endpoint descriptor.
Notes: This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

3.6.2 Methods

3.6.3 Constructor

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: The private constructor.

3.6.4 Properties

3.6.5 AttributesBitmap as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Attributes which apply to the endpoint when it is configured using the bConfigurationValue.
Notes: (Read only property)

3.6.6 DescriptorType as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Descriptor type.
Notes: (Read only property)

3.6.7 EndpointAddress as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: The address of the endpoint described by this descriptor.
Notes: (Read only property)

3.6.8   EndpointDirection as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: The transfer direction.
Notes: (Read only property)

3.6.9   extra as MemoryBlock

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Extra descriptors.
Notes: (Read only property)

3.6.10   extraLength as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Length of the extra descriptors, in bytes.
Notes: (Read only property)

3.6.11   Interval as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Interval for polling endpoint for data transfers.
Notes: (Read only property)

3.6.12   Length as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Size of this descriptor (in bytes)
Notes: (Read only property)

3.6.13 MaxPacketSize as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Maximum packet size this endpoint is capable of sending/receiving.
Notes: (Read only property)

3.6.14 Refresh as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: For audio devices only: the rate at which synchronization feedback is provided.
Notes: (Read only property)

3.6.15 SynchAddress as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: For audio devices only: the address if the synch endpoint.
Notes: (Read only property)

3.6.16 TransferType as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: The transfer type.
Notes: (Read only property)

3.6.17 Constants

Endpoint Directions

Constant	Value	Description
kEndpointDirectionIn	0	In: device-to-host
kEndpointDirectionOut	128	Out: host-to-device.

Transfer Types

Constant	Value	Description
kTransferTypeBulk	2	Bulk endpoint.
kTransferTypeBulkStream	4	Bulk stream transfer.
kTransferTypeControl	0	Control endpoint.
kTransferTypeInterrupt	3	Interrupt endpoint.
kTransferTypeISOChronous	1	Isochronous endpoint.

3.7 class LibUSBInterfaceDescriptorMBS

3.7.1 class LibUSBInterfaceDescriptorMBS

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: A class representing the standard USB interface descriptor.
Notes: This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

3.7.2 Methods

3.7.3 Constructor

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: The private constructor.

3.7.4 EndpointDescriptor(index as Integer) as LibUSBEndpointDescriptorMBS

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Queries endpoint descriptors by index.

3.7.5 Properties

3.7.6 AlternateSetting as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Value used to select this alternate setting for this interface.
Notes: (Read only property)

3.7.7 DescriptorType as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Descriptor type.
Notes: (Read only property)

3.7.8   Endpoints as Variant

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Array of endpoint descriptors.
Notes: (Read only property)

3.7.9   extra as MemoryBlock

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Extra descriptors.
Notes: (Read only property)

3.7.10   ExtraLength as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Length of the extra descriptors, in bytes.
Notes: (Read only property)

3.7.11   IndexInterface as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Index of string descriptor describing this interface.
Notes: (Read only property)

3.7.12   InterfaceClass as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: USB-IF class code for this interface.
Notes: (Read only property)

3.7.13   InterfaceNumber as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Number of this interface.
Notes: (Read only property)

3.7.14 InterfaceProtocol as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: USB-IF protocol code for this interface, qualified by the InterfaceClass and InterfaceSubClass values.
Notes: (Read only property)

3.7.15 InterfaceSubClass as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: USB-IF subclass code for this interface, qualified by the InterfaceClass value.
Notes: (Read only property)

3.7.16 Length as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Size of this descriptor (in bytes)
Notes: (Read only property)

3.7.17 NumEndpoints as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Number of endpoints used by this interface (excluding the control endpoint).
Notes: (Read only property)

3.8   class LibUSBInterfaceMBS

3.8.1   class LibUSBInterfaceMBS

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: A collection of alternate settings for a particular USB interface.
Notes: This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

3.8.2   Methods

3.8.3   Constructor

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: The private constructor.

3.8.4   InterfaceDescriptor(index as Integer) as LibUSBInterfaceDescriptorMBS

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Queries interface descriptor by index.

3.8.5   Properties

3.8.6   Count as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: The number of alternate settings that belong to this interface.
Notes: (Read only property)

3.8.7   InterfaceDescriptors as Variant

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Array of interface descriptors.
Notes: (Read only property)

3.9 class LibUSBISOPacketDescriptorMBS

3.9.1 class LibUSBISOPacketDescriptorMBS

Plugin Version: 22.2, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Isochronous packet descriptor.
Notes: See LibUSBTransferMBS class.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- News from the MBS Xojo Plugins Version 22.2

3.9.2 Methods

3.9.3 Constructor

Plugin Version: 22.2, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: The private constructor.

3.9.4 Properties

3.9.5 ActualLength as Integer

Plugin Version: 22.2, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Amount of data that was actually transferred.
Notes: (Read and Write property)

3.9.6 Length as Integer

Plugin Version: 22.2, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Length of data to request in this packet.
Notes: (Read and Write property)

3.9.7 Status as Integer

Plugin Version: 22.2, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Status code for this packet.
Notes: See constants in LibUSBTransferMBS class.
(Read and Write property)

3.10   class LibUSBTransferMBS

3.10.1   class LibUSBTransferMBS

Plugin Version: 22.2, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: The class for asynchronous USB transfer.
Notes: The user populates this class and then submits it in order to request a transfer. After the transfer has completed, the library populates the transfer with the results and passes it back to the user.

Please check LibUSB documentation and examples for asynchronous transfers.
Blog Entries

- News from the MBS Xojo Plugins Version 22.2

3.10.2   Methods

3.10.3   Cancel as Integer

Plugin Version: 22.2, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Cancels a running transfer.
Notes: Returns error code.

3.10.4   Constructor(ISOPackets as Integer = 0)

Plugin Version: 22.2, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Allocates usb transfer object with given number of packets.

3.10.5   ControlTransferGetData as Ptr

Plugin Version: 22.2, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Queries pointer ot the setup part of the control transfer structure within the buffer.
Notes: Convenience function since there is a 8 byte control block in front of the data.
Returns nil if not possible.

3.10.6   ControlTransferGetSetup as Ptr

Plugin Version: 22.2, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Queries pointer ot the setup part of the control transfer structure within the buffer.
Notes: Convenience function since there is a 8 byte control block in front of the data.
Returns nil if not possible.

3.10.7 FillBulkStreamTransfer(Device as LibUSBDeviceMBS, EndPoint as Integer, StreamId as Integer, Buffer as MemoryBlock, Timeout as Integer)

Plugin Version: 22.2, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Helper function to populate the required fields for a bulk transfer using bulk streams.
Notes: Device: the device that will handle the transfer
endpoint: address of the endpoint where this transfer will be sent
StreamId: id for this transfer
buffer: data buffer
timeout: timeout for the transfer in milliseconds

3.10.8 FillBulkTransfer(Device as LibUSBDeviceMBS, EndPoint as Integer, Buffer as MemoryBlock, Timeout as Integer)

Plugin Version: 22.2, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Helper function to populate the required fields for a bulk transfer.
Notes: Device: the device that will handle the transfer
endpoint: address of the endpoint where this transfer will be sent
buffer: data buffer
timeout: timeout for the transfer in milliseconds

3.10.9 FillControlSetup(Buffer as MemoryBlock, RequestType as Integer, Request as Integer, Value as Integer, Index as Integer, Length as Integer)

Plugin Version: 22.2, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Helper function to populate the setup packet (first 8 bytes of the data buffer) for a control transfer.
Notes: The Index, Value and Length values should be given in host-endian byte order.

3.10.10 FillControlTransfer(Device as LibUSBDeviceMBS, Buffer as MemoryBlock, Timeout as Integer)

Plugin Version: 22.2, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Helper function to populate the required transfer fields for a control transfer.
Notes: If you pass a transfer buffer to this function, the first 8 bytes will be interpreted as a control setup packet.

Therefore the recommended approach is:

- Allocate a suitably sized MemoryBlock (including space for control setup)

- Call FillControlSetup()

- If this is a host-to-device transfer with a data stage, put the data in place after the setup packet

- Call this function

- Call Submit()

Device: the device that will handle the transfer
buffer: The data buffer. If provided, this function will interpret the first 8 bytes as a setup packet and infer the transfer length from that.
timeout: timeout for the transfer in milliseconds

3.10.11 FillInterruptTransfer(Device as LibUSBDeviceMBS, EndPoint as Integer, Buffer as MemoryBlock, Timeout as Integer)

Plugin Version: 22.2, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Helper function to populate the required fields for an interrupt transfer.
Notes: Device: the device that will handle the transfer
endpoint: address of the endpoint where this transfer will be sent
buffer: data buffer
timeout: timeout for the transfer in milliseconds

3.10.12 FillISOTransfer(Device as LibUSBDeviceMBS, EndPoint as Integer, Buffer as MemoryBlock, NumISOPackets as Integer, Timeout as Integer)

Plugin Version: 22.2, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Helper function to populate the required \ref libusb_transfer fields for an isochronous transfer.
Notes: Device: the device that will handle the transfer
endpoint: address of the endpoint where this transfer will be sent
buffer: data buffer
NumISOPackets: the number of isochronous packets
timeout: timeout for the transfer in milliseconds

3.10.13 ISOPacketBuffer(Index as Integer) as Ptr

Plugin Version: 22.2, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Queries buffer pointer for the packet.
Notes: This points within the buffer MemoryBlock.

3.10.14 ISOPacketDescriptor(index as Integer) as LibUSBISOPacketDescriptorMBS

Plugin Version: 22.2, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Isochronous packet descriptors, for isochronous transfers only.
Notes: Queries packet with given index. Zero based.

3.10.15 SetISOPacketLengths(Length as UInt32)

Plugin Version: 22.2, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Sets length field for all packets.
Example:

```
// 3 buffers
Dim t As New LibUSBTransferMBS(3)
t.buffer = New MemoryBlock(100)


// set all length to 4
t.SetISOPacketLengths 4

Dim p0 As LibUSBISOPacketDescriptorMBS = t.ISOPacketDescriptor(0)
Dim p1 As LibUSBISOPacketDescriptorMBS = t.ISOPacketDescriptor(1)
Dim p2 As LibUSBISOPacketDescriptorMBS = t.ISOPacketDescriptor(2)

Break // check
```

3.10.16 Submit as Integer

Plugin Version: 22.2, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Submits transfer asynchronously.
Notes: Returns error code.

Later Completed event is called.

3.10.17   Properties

3.10.18   ActualLength as Integer

Plugin Version: 22.2, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Actual length of data that was transferred.
Notes: Read-only, and only for use within transfer callback function.
Not valid for isochronous endpoint transfers.
(Read only property)

3.10.19   Buffer as MemoryBlock

Plugin Version: 22.2, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: The memory buffer to use.
Notes: Please assign MemoryBlock of right size as this sets length property.
(Read and Write property)

3.10.20   Device as LibUSBDeviceMBS

Plugin Version: 22.2, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: The device that this transfer will be submitted to.
Notes: (Read and Write property)

3.10.21   Endpoint as Integer

Plugin Version: 22.2, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Address of the endpoint where this transfer will be sent.
Notes: (Read and Write property)

3.10.22   Flags as Integer

Plugin Version: 22.2, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: A bitwise OR combination of flags.
Notes: (Read and Write property)

3.10.23   ISOPackets as Integer

Plugin Version: 22.2, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Number of isochronous packets.
Notes: Only used for I/O with isochronous endpoints.
(Read only property)

3.10.24   Length as Integer

Plugin Version: 22.2, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Length of buffer.
Notes: Set to length of MemoryBlock assigned to buffer property.
(Read only property)

3.10.25   Status as Integer

Plugin Version: 22.2, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: The status of the transfer.
Notes: Read-only, and only for use within transfer callback function.

If this is an isochronous transfer, this field may read kTransferStatusCompleted even if there were errors
in the frames. Use the status in LibUSBISOPacketDescriptorMBS in each packet to determine if errors
occurred.
(Read only property)

3.10.26   Tag as Variant

Plugin Version: 22.2, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: The tag for the transfer.
Notes: A value you can use as you like, e.g. to store reference to your window.
(Read and Write property)

3.10.27 Timeout as Integer

Plugin Version: 22.2, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Timeout for this transfer in millseconds.
Notes: A value of 0 indicates no timeout.
(Read and Write property)

3.10.28 Type as Integer

Plugin Version: 22.2, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Type of the endpoint.
Notes: See kTransferType* constants.
(Read and Write property)

3.10.29 Events

3.10.30 Completed

Plugin Version: 22.2, Platforms: macOS, Linux, Windows, Targets: .

Function: The completion event.
Notes: Called when transfer is done (successful or failed).
Dispatched on main thread.

Not implemented for 32-bit Linux on Intel.

3.10.31 Constants

Flags

Constant	Value	Description
kTransferFlagsAddZeroPacket	4	Terminate transfers that are a multiple of the endpoint's MaxPacketSize with an extra zero length packet.
		This is useful when a device protocol mandates that each logical request is terminated by an incomplete packet (i.e. the logical requests are not separated by other means).
		This flag only affects host-to-device transfers to bulk and interrupt endpoints. In other situations, it is ignored.
		This flag only affects transfers with a length that is a multiple of the endpoint's wMaxPacketSize. On transfers of other lengths, this flag has no effect. Therefore, if you are working with a device that needs a ZLP whenever the end of the logical request falls on a packet boundary, then it is sensible to set this flag on every transfer (you do not have to worry about only setting it on transfers that end on the boundary).
		This flag is currently only supported on Linux. On other systems, libusb_submit_transfer() will return LIBUSB_ERROR_NOT_SUPPORTED for every transfer where this flag is set.
		Available since libusb-1.0.9.
kTransferFlagsShortNotOK	1	Report short frames as errors.

Status Codes

Constant	Value	Description
kTransferStatusCancelled	3	Transfer was cancelled.
kTransferStatusCompleted	0	Transfer completed without error. Note that this does not indicate that the entire amount of requested data was transferred.
kTransferStatusError	1	Transfer failed
kTransferStatusNoDevice	5	Device was disconnected
kTransferStatusOverflow	6	Device sent more data than requested
kTransferStatusStall	4	For bulk/interrupt endpoints: halt condition detected (endpoint stalled). For control endpoints: control request not supported.
kTransferStatusTimeout	2	Transfer timed out.

Transfer Types

Constant	Value	Description
kTransferTypeBulk	2	Bulk endpoint
kTransferTypeBulkStream	4	Stream endpoint.
kTransferTypeControl	0	Control endpoint
kTransferTypeInterrupt	3	Interrupt endpoint
kTransferTypeISOChronous	1	Isochronous endpoint

3.11   class LibUSBVersionMBS

3.11.1   class LibUSBVersionMBS

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Class representing the libusb version.

3.11.2   Methods

3.11.3   Constructor

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: The constructor.
Notes: Queries library version if possible.

3.11.4   Properties

3.11.5   Describe as String

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Output of git describe –tags at library build time.
Notes: (Read only property)

3.11.6   Major as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Library major version.
Notes: Currently 1.
(Read only property)

3.11.7   Micro as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Library micro version.
Notes: (Read only property)

3.11.8   Minor as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Library minor version.
Notes: (Read only property)

3.11.9   Nano as Integer

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Library nano version.
Notes: (Read only property)

3.11.10   RC as String

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Library release candidate suffix string, e.g. ”-rc4”.
Notes: (Read only property)

3.12 class LinuxHIDInterfaceMBS

3.12.1 class LinuxHIDInterfaceMBS

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: The class for linux to connect to USB HID devices.
Notes: For newer development, please use our HIDAPIMBS class.

The constructor does the initialisation of the HID Library and the destructor does the cleanup. This works with several instances, too.

The plugin tries to load one of libhid.so, libhid.so.0 or libhid.so.0.0.0 and one of libusb.so or libusb-0.1.so.4 from your /usr/lib folder (or where else the path environment variable points to). If the libraries are missing, this class will not work properly.
Blog Entries

- MBS Xojo / Real Studio Plugins, version 14.2pr12

- MBS REALbasic Plugins, version 10.6pr1

- MBS REALbasic Plugins Version 10.4 release notes

- MBS REALbasic Plugins, version 10.4pr2

- MBS Plugins 10.3 Release Notes

- MBS REALbasic Plugins, version 10.3pr4

3.12.2 Methods

3.12.3 Available as boolean

Plugin Version: 10.4, Platform: Linux, Targets: Desktop, Console & Web.

Function: Whether libhid is available.
Notes: Not all Linux distribution have libusb and libhid installed by default.

3.12.4 Close as Integer

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: Closes the device.
Notes: Returns error code. See kError* constants.

3.12.5 DumpTreeToStderr as Integer

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: Dumps the device tree to stderr.
Example:

```
dim h as LinuxHIDInterfaceMBS
// open device
call h.DumpTreeToStderr
```

Notes: Returns error code. See kError* constants.

3.12.6 DumpTreeToStdout as Integer

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: Dumps the device tree to stdout.
Example:

```
dim h as LinuxHIDInterfaceMBS
// open device
call h.DumpTreeToStdout
```

Notes: Returns error code. See kError* constants.

3.12.7 ForceOpen(theInterface as Integer, Vendor as Integer, Product as Integer, retries as Integer) as Integer

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: Opens the USB device with the given interface index, vendor and product codes.
Example:

```
dim h as new LinuxHIDInterfaceMBS

const vendor = &h7C0
const product = &h1500
const retries = 3

dim e as Integer = h.ForceOpen(0, vendor, product, retries)
```

Notes: Vendor or Product code can be kMatchAny (0) to match all devices.
You can use the MatchDevice event to learn which devices are there and return true there to select one.
Returns error code. See kError* constants.

3.12.8 GetInputReport(path() as Integer, data as memoryblock, offset as Integer, size as Integer) as Integer

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: Reads an input report.
Notes: Path: The path to the endpoint.
Data: the memoryblock to store the data.
Offset: The offset where to start inside the memoryblock.
Size: the length of the data int he memoryblock.

Returns error code. See kError* constants.

3.12.9 InterruptRead(EndPoint as Integer, mem as memoryblock, size as Integer, timeout as Integer) as Integer

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: Reads data from an endpoint with timeout.
Notes: EndPoint: The index of the endpoint.
mem: the memoryblock where to store the data.
size: the length of the data block to read.
timeout: the timeout in milliseconds.

Returns error code. See kError* constants.

3.12.10 InterruptWrite(EndPoint as Integer, mem as memoryblock, size as Integer, timeout as Integer) as Integer

Plugin Version: 11.0, Platform: Linux, Targets: Desktop, Console & Web.

Function: Writes data from an endpoint with timeout.
Notes: EndPoint: The index of the endpoint.
mem: the memoryblock where to store the data.
size: the length of the data block to read.
timeout: the timeout in milliseconds.

Returns error code. See kError* constants.

3.12.11   IsInitialised as boolean

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: Whether the HID library was initialised in the constructor.
Notes: Should always be true on linux.

3.12.12   IsOpen as boolean

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: Whether the device is opened.
Notes: True if open, false if closed.

3.12.13   Open(theInterface as Integer, Vendor as Integer, Product as Integer) as Integer

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: Opens the USB device with the given interface index, vendor and product codes.
Example:

```
dim h as new LinuxHIDInterfaceMBS

const vendor = &h7C0
const product = &h1500

dim e as Integer = h.Open(0, vendor, product)
```

Notes: Vendor or Product code can be kMatchAny (0) to match all devices.
You can use the MatchDevice event to learn which devices are there and return true there to select one.
Returns error code. See kError* constants.

3.12.14   Reset

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: Resets the device.
Notes: Returns error code. See kError* constants.

3.12.15   SetDebugLevel(level as Integer)

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: Sets the debug level.
Example:

dim h as new LinuxHIDInterfaceMBS
h.SetDebugLevel(h.kDebugWarnings)

3.12.16   SetDebugOutputToStderr

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: Tells HID library to write debug output to stderr.
Example:

dim h as new LinuxHIDInterfaceMBS
h.SetDebugOutputToStderr

3.12.17   SetDebugOutputToStdout

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: Tells HID library to write debug output to stdout.
Example:

dim h as new LinuxHIDInterfaceMBS
h.SetDebugOutputToStdout

3.12.18   SetOutputReport(path() as Integer, data as memoryblock, offset as Integer, size as Integer) as Integer

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: Writes data to the output.
Example:

dim h as LinuxHIDInterfaceMBS // your interface
dim n as Integer // some value

const IOW_PIPE_IO_PINS=0

dim m as MemoryBlock = NewMemoryBlock(4) // a device with 4 byte packets

m.Byte(3)=n
m.Byte(0)=IOW_PIPE_IO_PINS

dim path(-1) as Integer

path.Append &h00010000
path.Append 0

dim e as Integer = h.SetOutputReport(path, m, 0, m.size)

Notes: Path: The path to the endpoint.
Data: the data to write.
Offset: The offset where to start inside the memoryblock.
Size: the length of the data int he memoryblock.

Returns error code. See kError* constants.
See also:

3.12.19   SetOutputReport(path() as Integer, data as string) as Integer

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: Writes data to the output.
Notes: Path: The path to the endpoint.
Data: the data to write.

Returns error code. See kError* constants.
See also:

3.12.20 WriteIdentificationToStderr as Integer

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: Writes identification to stderr.
Notes: Returns error code. See kError* constants.

3.12.21 WriteIdentificationToStdout as Integer

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: Writes identification to stdout.
Notes: Returns error code. See kError* constants.

3.12.22 Properties

3.12.23 Handle as Integer

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: The internal handle to the device connection.
Notes: (Read and Write property)

3.12.24 Events

3.12.25 MatchDevice(usbdev as LinuxUSBDeviceHandleMBS) as boolean

Plugin Version: 10.3, Platform: Linux, Targets: .

Function: The event called to decide whether you want to connect to this device.
Example:

Function MatchDevice(usbdev as LinuxUSBDeviceHandleMBS) As boolean
MsgBox usbdev.Device.Descriptor.SerialNumber
End Function

Notes: If several devices match the given vendor/product codes in Open/ForceOpen, you can decide here which one you accept.
Return true to accept a device.

3.12.26   Constants

Constants

Constant	Value	Description
kDebugAll	31	One of the debug level constants.
		same as kDebugWarnings + kDebugTraces + kDebugNotices + kDebugErrors + kDebugAsserts
kDebugAsserts	16	One of the debug level constants.
kDebugErrors	1	One of the debug level constants.
kDebugNone	0	One of the debug level constants.
kDebugNotices	4	One of the debug level constants.
kDebugNoTraces	23	One of the debug level constants.
		same as kDebugWarnings + kDebugNotices + kDebugErrors + kDebugAsserts
kDebugTraces	8	One of the debug level constants.
kDebugWarnings	2	One of the debug level constants.
kErrorAlreadyInitialised	3	One of the error codes.
		Device alreay initialised.
kErrorDeviceAlreadyOpened	9	One of the error codes.
		Device already opened.
kErrorDeviceNotFound	7	One of the error codes.
		Device is not found.
kErrorDeviceNotOpened	8	One of the error codes.
		Device is not opened.
kErrorFailAlloc	17	One of the error codes.
		Failed to allocate.
kErrorFailClaimIFace	11	One of the error codes.
		Failed to claim the interface.
kErrorFailCloseDevice	10	One of the error codes.
		Failed to close device.
kErrorFailDetachDriver	12	One of the error codes.
		Failed to detach driver.
kErrorFailFindBusses	4	One of the error codes.
		Failed to find buses.
kErrorFailFindDevices	5	One of the error codes.
		Failed to find devices.
kErrorFailGetReport	20	One of the error codes.
		Get Report failed.
kErrorFailIntRead	21	One of the error codes.
kErrorFailOpenDevice	6	One of the error codes.
		Failed to open device.
kErrorFailSetReport	19	One of the error codes.
		Set Report failed.
kErrorHIDDescShort	14	One of the error codes.
kErrorInvalidParameter	1	One of the error codes.
		Invalid Parameter.
kErrorNotFound	22	One of the error codes.
		Device not found.
kErrorNotHIDDevice	13	One of the error codes.
		Not a HID Device.
kErrorNotInitialised	2	One of the error codes.
		Not initialised.
kErrorOutOfSpace	18	One of the error codes.
		Out of space.
kErrorReportDescLong	16	One of the error codes.
kErrorReportDescShort	15	One of the error codes.
kErrorSuccess	0	One of the error codes.
		Success. No error.
kMatchAny	0	The vendor/product ID to match any device.

3.13   class LinuxUSBBusMBS

3.13.1   class LinuxUSBBusMBS

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: The class for an USB Bus on Linux.
Notes: This class only works, if the plugin could load one of libusb.so or libusb-0.1.so.4 from your /usr/lib folder (or where else the path environment variable points to). If the libraries are missing, this class will not work properly.
Blog Entries

- MBS Real Studio Plugins, version 11.3pr7
- MBS Plugins 10.3 Release Notes
- MBS REALbasic Plugins, version 10.3pr4

3.13.2   Methods

3.13.3   Buses as LinuxUSBBusMBS

Plugin Version: 11.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: Returns the buses list.
Notes: This function allows you to query the current buses and devices.
No device is opened and you just read through libusb data structures.

3.13.4   RescanBusses as Integer

Plugin Version: 14.2, Platform: Linux, Targets: Desktop, Console & Web.

Function: Finds all USB busses on system.
Notes: RescanBusses will find all of the busses on the system.
Returns the number of changes since previous call to this function (total of new busses and busses removed).

The plugin performs RescanBusses and RescanDevices automatically on application launch.

3.13.5   RescanDevices as Integer

Plugin Version: 14.2, Platform: Linux, Targets: Desktop, Console & Web.

Function: Find all devices on all USB devices.
Notes: RescanDevices will find all of the devices on each bus.

This should be called after RescanBusses.

Returns the number of changes since the previous call to this function (total of new device and devices removed).

The plugin performs RescanBusses and RescanDevices automatically on application launch. So you can call RescanDevices at any time.

3.13.6 Properties

3.13.7 Devices as LinuxUSBDeviceMBS

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: The devices attached to this bus.
Notes: (Read and Write property)

3.13.8 DirName as String

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: The dir name.
Notes: (Read and Write property)

3.13.9 Location as Integer

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: The location value.
Notes: (Read and Write property)

3.13.10 NextBus as LinuxUSBBusMBS

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: The next bus.
Notes: (Read and Write property)

3.13.11   PrevBus as LinuxUSBBusMBS

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: The previous bus.
Notes: (Read and Write property)

3.13.12   RootDevice as LinuxUSBDeviceMBS

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: The root device on this device.
Notes: (Read and Write property)

3.14   class LinuxUSBDeviceDescriptionMBS

3.14.1   class LinuxUSBDeviceDescriptionMBS

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: A class for an USB device description.
Notes: Some linux installations require app to be run with sudo to allow reading USB device strings.
Blog Entries

- MBS Real Studio Plugins, version 12.1pr6

- MBS Plugins 10.3 Release Notes

- MBS REALbasic Plugins, version 10.3pr4

3.14.2   Properties

3.14.3   cdDevice as Integer

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: The device version.
Notes: Identifies the version of the device. This value is a binary-coded decimal number.
(Read and Write property)

3.14.4   cdUSB as Integer

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: The USB version.
Notes: Identifies the version of the USB specification that this descriptor structure complies with. This value is a binary-coded decimal number.
(Read and Write property)

3.14.5   DescriptorType as Integer

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: The descriptor type.
Notes: Specifies the descriptor type. Must be set to USB_DEVICE_DESCRIPTOR_TYPE.
(Read and Write property)

3.14.6   DeviceClass as Integer

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: The device class.
Notes: Specifies the class code of the device as assigned by the USB specification group.
See the kDeviceClass* constants.
(Read and Write property)

3.14.7   DeviceProtocol as Integer

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: The device protocol.
Notes: Specifies the protocol code of the device as assigned by the USB specification group.
(Read and Write property)

3.14.8   DeviceSubClass as Integer

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: The device sub class.
Notes: Specifies the subclass code of the device as assigned by the USB specification group.
(Read and Write property)

3.14.9   Manufacturer as String

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: The manufacturer name string.
Notes: A string containing the name of the manufacturer of this device.
Some linux installations require app to be run with sudo to allow reading USB device strings.
(Read and Write property)

3.14.10   MaxPacketSize0 as Integer

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: The maximum packet size.
Notes: Specifies the maximum packet size, in bytes, for endpoint zero of the device. The value must be set
to 8, 16, 32, or 64.

(Read and Write property)

3.14.11   NumConfigurations as Integer

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: The number of configurations.
Notes: Specifies the total number of possible configurations for the device.
(Read and Write property)

3.14.12   Product as Integer

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: The product ID for this device.
Notes: Specifies the product identifier. This value is assigned by the manufacturer and is device-specific.
Only available when the device has been opened.
(Read and Write property)

3.14.13   ProductName as String

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: The product name for this device.
Notes: A string that contains a description of the device.
Some linux installations require app to be run with sudo to allow reading USB device strings.
(Read and Write property)

3.14.14   SerialNumber as String

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: The serial number string for this device.
Notes: A string that contains a manufacturer-determined serial number for the device.
Can be empty if the library does not know it.
Some linux installations require app to be run with sudo to allow reading USB device strings.
(Read and Write property)

3.14.15   Vendor as Integer

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: The vendor code for this device.
Notes: Specifies the vendor identifier for the device as assigned by the USB specification committee.
Only available when the device has been opened.
(Read and Write property)

3.14.16   Constants

Constants

Constant	Value	Description
kDeviceClassAudio	1	One of the device class constants. Audio device.
kDeviceClassCOMM	2	One of the device class constants. COMM device.
kDeviceClassDATA	10	One of the device class constants. DATA device.
kDeviceClassHID	3	One of the device class constants. HID device.
kDeviceClassHUB	9	One of the device class constants. The device is an USB HUB.
kDeviceClassMassStorage	8	One of the device class constants. A mass storage device.
kDeviceClassPerInterface	0	One of the device class constants.
kDeviceClassPrinter	7	One of the device class constants. Printer device.
kDeviceClassVendorSpecific	255	One of the device class constants. Some vendor specific device.

3.15   class LinuxUSBDeviceHandleMBS

3.15.1   class LinuxUSBDeviceHandleMBS

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: The class for a device handle.
Blog Entries

- MBS Plugins 10.3 Release Notes

- MBS REALbasic Plugins, version 10.3pr4

3.15.2   Properties

3.15.3   AltSetting as Integer

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: Some alt setting value.
Notes: (Read and Write property)

3.15.4   Bus as LinuxUSBBusMBS

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: The bus for this device handle.
Notes: (Read and Write property)

3.15.5   Config as Integer

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: A config value.
Notes: (Read and Write property)

3.15.6   Device as LinuxUSBDeviceMBS

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: The device.
Notes: (Read and Write property)

3.15.7   InterfaceIndex as Integer

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: The interface index.
Notes: (Read and Write property)

3.16   class LinuxUSBDeviceMBS

3.16.1   class LinuxUSBDeviceMBS

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: The class for an USB device information on Linux.
Blog Entries

- Showing USB Devices

- MBS Plugins 10.3 Release Notes

- MBS REALbasic Plugins, version 10.3pr4

3.16.2   Methods

3.16.3   Children(index as Integer) as LinuxUSBDeviceMBS

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: Returns the child device with the given index.
Notes: Index is zero based and from 0 to ChildrenCount-1.

3.16.4   Properties

3.16.5   Bus as LinuxUSBBusMBS

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: The bus this device is attached to.
Notes: (Read and Write property)

3.16.6   ChildrenCount as Integer

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: The number of child devices.
Notes: (Read and Write property)

3.16.7   Descriptor as LinuxUSBDeviceDescriptionMBS

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: The descriptior for this device.
Notes: (Read and Write property)

3.16.8   Filename as String

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: The filename for this device.
Notes: (Read and Write property)

3.16.9   NextDevice as LinuxUSBDeviceMBS

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: The next device on the same level.
Notes: (Read and Write property)

3.16.10   PrevDevice as LinuxUSBDeviceMBS

Plugin Version: 10.3, Platform: Linux, Targets: Desktop, Console & Web.

Function: The previous device on the same level.
Notes: (Read and Write property)

3.17 class MacHIDMBS

3.17.1 class MacHIDMBS

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

Function: A class to work with HID devices on Mac OS X.
Notes: For newer development, please use our HIDAPIMBS class.
Blog Entries

- MBS Xojo / Real Studio Plugins, version 15.1pr6

- MBS Xojo / Real Studio Plugins, version 15.0pr11

- MBS Xojo / Real Studio Plugins, version 14.0pr3

- MonkeyBread Software Releases the MBS REALbasic plug-ins 8.6

3.17.2 Methods

3.17.3 Close

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

Function: Closes the active connection.

3.17.4 Connect

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

Function: Creates a connection to the current device.
Example:

Function OpenUSBDevice() As boolean
dim i as Integer
dim h as MacHIDMBS

h=FindDevice // see FindFirst example

if h=nil then
MsgBox "No XYZ device found."
Return false
end if

h.Connect

if h.Lasterror<>0 then
MsgBox "Failed to connect to USB Device."
Return false
end if

h.InstallCallback

Return true

End Function

Notes: Lasterror is set.

Lasterror values for this function:

-1	Not supported (Windows and Linux).
0	Everything okay.
1	Failed to get IOKit Plugin Interface for this IO object.
2	Failed to query interface
3	Failed to open interface
4	Failed to create async port
5	Failed to create async event source
6	no longer used
7	Failed to start queue

3.17.5   Disconnect

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

Function: Disconnets current USB device.
Notes: Lasterror is set.

3.17.6   FindFirstDevice as boolean

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

Function: Finds the first device and loads the properties.
Example:

Function FindDevice() As MyMacHIDMBS
dim h as MyMacHIDMBS
dim p as string

h=new MyMacHIDMBS // your own subclass of MacHIDMBS so you can get events

if h.FindFirstDevice then

p=h.Product
if p="MyProduct" then
Return h
end if

while h.FindNextDevice

p=h.Product
if p="MyProduct" then
Return h
end if

wend

end if
End Function

Notes: Returns true on success and false on failure.

3.17.7 FindNextDevice as boolean

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

Function: Finds next device.
Notes: Returns true on success and false on failure.

3.17.8 HIDProperties as Variant

Plugin Version: 15.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Queries HID properties dictionary.
Notes: Value is a CFDictionaryMBS with details about current device. Returned as Variant to reduce plugin dependencies.

The plugin queries this dictionary to return SerialNumber, ProductID, Manufacturer, Product, VendorID and VersionNumber.

3.17.9   InstallCallback

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

Function: Installs the callback used for the event handler.
Notes: Lasterror is set.
Please use after connect. For use with ReceivedData event.

3.17.10   Manufacturer as string

Plugin Version: 7.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: The manufacturer name.
Notes: On any error an empty string is returned.

3.17.11   Product as string

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

Function: The product string of the selected device.
Notes: Lasterror is set.

3.17.12   ProductID as Integer

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

Function: The product ID of the selected device.
Notes: Lasterror is set.

3.17.13   ReadMessage(ReportID as Integer, reportType as Integer, length as Integer) as string

Plugin Version: 14.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Reads a message from usb device.
Notes: This is for synchronously operation without the event/callback.

You can specify report id, report type and the maximum length to read.
Also set timeout property.

Doesn't work if InstallCallback with event is used.

3.17.14   ReadMessageMemory(ReportID as Integer, reportType as Integer, length as Integer) as memoryblock

Plugin Version: 14.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Reads a message from usb device.
Notes: This is for synchronously operation without the event/callback.
You can specify report id, report type and the maximum length to read.
Also set timeout property.

Doesn't work if InstallCallback with event is used.

3.17.15   SendMessage(data as string)

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

Function: Sends a message to the USB device.
Notes: A connection must be open.
Lasterror is set. Lasterror -536854447 is an USB timeout.
Uses kIOHIDReportTypeOutput.
See also:

- 3.17.16 SendMessage(ReportID as Integer, reportType as Integer, data as string)   103

3.17.16   SendMessage(ReportID as Integer, reportType as Integer, data as string)

Plugin Version: 8.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Sends a message to the USB device.
Notes: A connection must be open.
Lasterror is set. Lasterror -536854447 is an USB timeout.
ReportType can be kIOHIDReportTypeOutput or kIOHIDReportTypeFeature.
See also:

- 3.17.15 SendMessage(data as string)   103

3.17.17   SendMessageMemory(data as memoryblock, offset as Integer, length as Integer)

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

Function: Sends a message to the USB device.
Notes: A connection must be open.
Lasterror is set. Lasterror -536854447 is an USB timeout.
Internally ReportID=0 is used.

While writing a crossplatform application for one specific device we saw the following thing: The data buffer for the SendMessageMemory call must be 8 bytes long on Mac (with MacHIDMBS) and 61 bytes long for Windows (with WinHIDMBS) for our HID device. We have 1 byte for the ReportID and 60 data bytes where the first 8 are set like on the Mac. So if the calls fail on Windows, try with a higher length and check the WinHIDMBS.OutputReportByteLength property.
Uses kIOHIDReportTypeOutput.
See also:

- 3.17.18 SendMessageMemory(ReportID as Integer, reportType as Integer, data as memoryblock, offset as Integer, length as Integer)   104

3.17.18   SendMessageMemory(ReportID as Integer, reportType as Integer, data as memoryblock, offset as Integer, length as Integer)

Plugin Version: 8.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Sends a message to the USB device.
Notes: A connection must be open.
Lasterror is set. Lasterror -536854447 is an USB timeout.
ReportType can be kIOHIDReportTypeOutput or kIOHIDReportTypeFeature.
See also:

- 3.17.17 SendMessageMemory(data as memoryblock, offset as Integer, length as Integer)   104

3.17.19   SerialNumber as string

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

Function: The serial number of the current selected device.
Notes: Lasterror is set.

3.17.20   VendorID as Integer

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

Function: The vendor ID of the selected device.
Notes: Lasterror is set.

3.17.21   VersionNumber as Integer

Plugin Version: 7.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: The device specific version number.
Notes: Value can be anything.
On any error, 0 is returned.

3.17.22   Properties

3.17.23   IOHIDDeviceInterface122Handle as Integer

Plugin Version: 15.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: The internal handle for the device interface object.
Notes: This is of type IOHIDDeviceInterface122** from IOKit.
(Read only property)

3.17.24   IOHIDObjectIteratorHandle as Integer

Plugin Version: 15.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: The iterator used to find USB devices.
Notes: This is of type io_iterator_t from IOKit.
(Read only property)

3.17.25   IOObjectHandle as Integer

Plugin Version: 15.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: The internal object reference for current device.
Notes: This is of type io_object_t from IOKit.
(Read only property)

3.17.26   Lasterror as Integer

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

Function: Last error code.
Notes: 0 is success.
-1 means that the function is not available.
else Mac OS USB error codes.
See table below, e.g. error -536854447 (=&he0004051) is an USB timeout.

Constant	Number	LastError value	Description
kIOUSBUnknownPipeErr	&h61	&he0004061	Pipe ref not recognized
kIOUSBTooManyPipesErr	&h60	&he0004060	Too many pipes
kIOUSBNoAsyncPortErr	&h5f	&he000405f	no async port
kIOUSBNotEnoughPipesErr	&h5e	&he000405e	not enough pipes in interface
kIOUSBNotEnoughPowerErr	&h5d	&he000405d	not enough power for selected configuration
kIOUSBEndpointNotFound	&h57	&he0004057	Endpoint Not found
kIOUSBConfigNotFound	&h56	&he0004056	Configuration Not found
kIOUSBPortWasSuspended	&h52	&he0004052	The transaction was returned because the port was suspended
kIOUSBPipeStalled	&h4f	&he000404f	Pipe has stalled, error needs to be cleared
kIOUSBInterfaceNotFound	&h4e	&he000404e	Interface ref not recognized
kIOUSBLowLatencyBufferNotPreviouslyAllocated	&h4d	&he000404d	Attempted to use user land low latency isoc calls w/out calling PrepareBuffer (on the data buffer) first
kIOUSBLowLatencyFrameListNotPreviouslyAllocated	&h4c	&he000404c	Attempted to use user land low latency isoc calls w/out calling PrepareBuffer (on the frame list) first
kIOUSBHighSpeedSplitError	&h4b	&he000404b	Error to hub on high speed bus trying to do split transaction
kIOUSBSyncRequestOnWLThread	&h4a	&he000404a	A synchronous USB request was made on the workloop thread (from a callback?). Only async requests are permitted in that case
kIOUSBDeviceNotHighSpeed	&h49	&he0004049	Name is deprecated, see below
kIOUSBDeviceTransferredToCompanion	&h49	&he0004049	The device has been tranferred to another controller for enumeration
kIOUSBClearPipeStallNotRecursive	&h48	&he0004048	ClearPipeStall should not be called recursively
kIOUSBDevicePortWasNotSuspended	&h47	&he0004047	Port was not suspended
kIOUSBEndpointCountExceeded	&h46	&he0004046	The endpoint was not created because the controller cannot support more endpoints
kIOUSBDeviceCountExceeded	&h45	&he0004045	The device cannot be enumerated because the controller cannot support more devices
kIOUSBStreamsNotSupported	&h44	&he0004044	The request cannot be completed because the XHCI controller does not support streams
kIOUSBInvalidSSEndpoint	&h43	&he0004043	An endpoint found in a SuperSpeed device is invalid (usually because there is no Endpoint Companion Descriptor)
kIOUSBTooManyTransactionsPending	&h42	&he0004042	The transaction cannot be submitted because it would exceed the allowed number of pending transactions
kIOUSBTransactionReturned	&h50	&he0004050	The transaction has been returned to the caller
kIOUSBTransactionTimeout	&h51	&he0004051	Transaction timed out

(Read and Write property)

3.17.27   OnlyOneEventPerTick as Boolean

Plugin Version: 14.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Whether to limit ReceivedData event.
Notes: Some devices send a lot of measurement data.
This option allows to slow down and limit to 60 events per second.
So if device sends a thousand data records per second, we can ignore over 90% and just pick a few to display.
(Read and Write property)

3.17.28　TimeOut as Integer

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

Function: Timeout value to use for sending/reading USB data.
Notes: Please specify time in Milliseconds. Default is 500ms.
(Read and Write property)

3.17.29　Events

3.17.30　DeviceRemoved(result as Integer)

Plugin Version: 8.7, Platform: macOS, Targets: .

Function: The event called whenever the device is removed.
Notes: You need to call connect to install the callback which raises this event.

3.17.31　ReceivedData(data as string, size as Integer)

Plugin Version: 6.4, Platform: macOS, Targets: .

Function: Data was received and is available for processing.
Example:

```
Sub ReceivedData(data as string, size as Integer)
dim m as MemoryBlock
dim s as string
dim n,i as Integer

// Debug Output data received:

m=data

n=lenb(data)-1
for i=0 to n
s=s+str(m.Byte(i))+" "
next

s=s+"= "+data

System.DebugLog s

End Sub
```

Notes: Event is only called when InstallCallback was used and a connection is open.

3.17.32   Constants

Report Types

Constant	Value	Description
kIOHIDReportTypeFeature	2	Feature report.
kIOHIDReportTypeInput	0	Input report.
kIOHIDReportTypeOutput	1	Output report.

3.18 class MacUSBDeviceMBS

3.18.1 class MacUSBDeviceMBS

Plugin Version: 10.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: The class for an USB Device on Mac OS X.
Example:

```
// iterate over all devices without recursion and count devices
dim devices(-1) as MacUSBDeviceMBS

devices.Append MacUSBDeviceMBS.root

dim count as Integer = -1 // do not count Mac itself

while UBound(devices)>=0
dim dev as MacUSBDeviceMBS = devices.Pop

count = count + 1

for each child as MacUSBDeviceMBS in dev.children
devices.Append child
next
wend

MsgBox str(Count)+" USB devices."
```

Notes: Use the root method to get the device hierarchy.

For Windows you can take a look on the WindowsDeviceMBS and WinUSBDeviceMBS classes.
For cross platform development also check LibUSBDeviceMBS classes.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- Showing USB Devices

- MBS Real Studio Plugins, version 11.2pr7

- New MBS REALbasic Plugin Version 10.4

- MBS REALbasic Plugins Version 10.4 release notes

- MBS REALbasic Plugins, version 10.4pr5

- MacUSBDeviceMBS

3.18.2   Methods

3.18.3   children as MacUSBDeviceMBS()

Plugin Version: 10.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: The array with all the USB device having the current device as parent.

3.18.4   Constructor

Plugin Version: 10.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: The private constructor.
Notes: This constructor makes sure you don't create useless MacUSBDeviceMBS objects by error. The only way to create an object is to use the root method to get the object hierarchy.
This constructor is private to make sure you don't create an object from this class by error. Please use designated functions to create objects.

3.18.5   root as MacUSBDeviceMBS

Plugin Version: 10.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: The root of the device tree.
Example:

```
// display devices with serialnumbers.
dim devices(-1) as MacUSBDeviceMBS

devices.Append MacUSBDeviceMBS.root

dim lines(-1) as string

while UBound(devices)>=0
dim dev as MacUSBDeviceMBS = devices.Pop

if len(dev.SerialNumber)>0 then
lines.Append dev.name+": "+dev.serialnumber
end if

for each child as MacUSBDeviceMBS in dev.children
devices.Append child
next
wend

MsgBox Join(lines,EndOfLine)
```

Notes: Root is the Mac itself. Below root you find the built in USB hubs.

3.18.6   Properties

3.18.7   Address as Integer

Plugin Version: 10.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: The device address number.
Notes: (Read and Write property)

3.18.8   BusPowerAvailable as Integer

Plugin Version: 10.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: The available bus power.
Notes: Value is in milli ampere.
(Read and Write property)

3.18.9   ClassName as String

Plugin Version: 10.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: The class name for this device.
Notes: Basicly this is what driver Apple uses.
(Read and Write property)

3.18.10   DeviceClass as Integer

Plugin Version: 10.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: The device class.
Notes: See kUSB*Class constants.

And read here:
http://www.usb.org/developers/defined_class
(Read and Write property)

3.18.11   DeviceMaxPacketSize as Integer

Plugin Version: 10.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: The maximum device packet size.
Notes: (Read and Write property)

3.18.12   DeviceNumConfigs as Integer

Plugin Version: 10.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: The number of configurations for this device.
Notes: (Read and Write property)

3.18.13   DeviceProtocol as Integer

Plugin Version: 10.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: The device protocol.
Notes: (Read and Write property)

3.18.14   DeviceReleaseNumber as Integer

Plugin Version: 10.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: The device release number.
Notes: (Read and Write property)

3.18.15   DeviceSpeed as Integer

Plugin Version: 10.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: The device speed.
Notes: (Read and Write property)

3.18.16   DeviceSubClass as Integer

Plugin Version: 10.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: The device sub class.
Notes: See kUSB*SubClass constants.
(Read and Write property)

3.18.17 ExtraPowerForPorts as Integer

Plugin Version: 10.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: The extra power asked for ports.
Notes: Value is in milli ampere.
(Read and Write property)

3.18.18 Name as String

Plugin Version: 10.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: The name of this device node.
Example:

```
// show all names of all devices in a msgbox
dim names(-1) as string

// iterate over all devices without recursion
dim devices(-1) as MacUSBDeviceMBS

devices.Append MacUSBDeviceMBS.root

while UBound(devices)>=0
dim dev as MacUSBDeviceMBS = devices.Pop
names.Append dev.name

for each child as MacUSBDeviceMBS in dev.children
devices.Append child
next
wend

MsgBox Join(names,", ")
```

Notes: (Read and Write property)

3.18.19   NumEndpoints as Integer

Plugin Version: 10.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: The number of endpoints.
Notes: (Read and Write property)

3.18.20   Path as String

Plugin Version: 10.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: The object path.
Notes: This is internally used by the kernel.
(Read and Write property)

3.18.21   Ports as Integer

Plugin Version: 10.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: The number of ports on an USB hub.
Notes: (Read and Write property)

3.18.22   ProductID as Integer

Plugin Version: 10.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: The product ID
Notes: (Read and Write property)

3.18.23   ProductName as String

Plugin Version: 10.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: The product name.
Notes: (Read and Write property)

3.18.24   Properties as Dictionary

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates dictionary with all the properties associated for this USB device in IORegistry.
Notes: (Read and Write property)

3.18.25   RequestedPower as Integer

Plugin Version: 10.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Requested power.
Notes: Value is in milli ampere.
(Read and Write property)

3.18.26   SerialNumber as String

Plugin Version: 10.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: The device serial number.
Notes: (Read and Write property)

3.18.27   VendorID as Integer

Plugin Version: 10.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: The vendor ID.
Notes: Assigned by USB Org.
(Read and Write property)

3.18.28   VendorName as String

Plugin Version: 10.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: The vendor name.
Notes: (Read and Write property)

3.18.29   Constants

Constants

Constant	Value	Description
kUSBApplicationSpecificClass	254	One of the USB device class constants.
kUSBATMNetworkingSubClass	7	One of the USB device sub class constants. For kUSBCommunicationDataInterfaceClass.
kUSBAudioControlSubClass	1	One of the USB device sub class constants. For kUSBAudioInterfaceClass.
kUSBAudioStreamingSubClass	2	One of the USB device sub class constants. For kUSBAudioInterfaceClass.
kUSBCommAbstractSubClass	2	One of the USB device sub class constants. For kUSBCommunicationDataInterfaceClass.
kUSBCommCAPISubClass	5	One of the USB device sub class constants. For kUSBCommunicationDataInterfaceClass.
kUSBCommDirectLineSubClass	1	One of the USB device sub class constants. For kUSBCommunicationDataInterfaceClass.
kUSBCommEthernetNetworkingSubClass	6	One of the USB device sub class constants. For kUSBCommunicationDataInterfaceClass.
kUSBCommMultiChannelSubClass	4	One of the USB device sub class constants. For kUSBCommunicationDataInterfaceClass.
kUSBCommonClassSubClass	2	One of the USB device sub class constants. For kUSBMiscellaneousClass.
kUSBCommTelephoneSubClass	3	One of the USB device sub class constants. For kUSBCommunicationDataInterfaceClass.
kUSBCommunicationClass	2	One of the USB device class constants.
kUSBCompositeClass	0	One of the USB device class constants.
kUSBCompositeSubClass	0	One of the USB device sub class constants.
kUSBDataClass	10	One of the USB device class constants.
kUSBDFUSubClass	1	One of the USB device sub class constants. For kUSBApplicationSpecificInterfaceClass.
kUSBDiagnosticClass	220	One of the USB device class constants.
kUSBHIDBootInterfaceSubClass	1	One of the USB device sub class constants. For kUSBHIDBootInterfaceSubClass.
kUSBHubClass	9	One of the USB device class constants.
kUSBHubSubClass	0	One of the USB device sub class constants.
kUSBIrDABridgeSubClass	2	One of the USB device sub class constants. For kUSBApplicationSpecificInterfaceClass.
kUSBMassStorageATAPISubClass	2	One of the USB device sub class constants. For kUSBMassStorageInterfaceClass.
kUSBMassStorageQIC157SubClass	3	One of the USB device sub class constants. For kUSBMassStorageInterfaceClass.
kUSBMassStorageRBCSubClass	1	One of the USB device sub class constants. For kUSBMassStorageInterfaceClass.
kUSBMassStorageSCSISubClass	6	One of the USB device sub class constants. For kUSBMassStorageInterfaceClass.
kUSBMassStorageSFF8070iSubClass	5	One of the USB device sub class constants. For kUSBMassStorageInterfaceClass.
kUSBMassStorageUFISubClass	4	One of the USB device sub class constants. For kUSBMassStorageInterfaceClass.
kUSBMIDIStreamingSubClass	3	One of the USB device sub class constants. For kUSBAudioInterfaceClass.
kUSBMiscellaneousClass	239	One of the USB device class constants.
kUSBPersonalHealthcareClass	15	One of the USB device class constants.
kUSBReprogrammableDiagnosticSubClass	1	One of the USB device sub class constants. For kUSBDiagnosticDeviceInterfaceClass.
kUSBRFControllerSubClass	1	One of the USB device sub class constants. For kUSBWirelessControllerInterfaceClass.
kUSBTestMeasurementSubClass	3	One of the USB device sub class constants. For kUSBApplicationSpecificInterfaceClass.
kUSBVendorSpecificClass	255	One of the USB device class constants.
kUSBVideoControlSubClass	1	One of the USB device sub class constants.

3.19   class MacUSBMBS

3.19.1   class MacUSBMBS

Plugin Version: 12.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: A class to talk to an USB device.
Notes: Written for a client and probably not yet universally useable, so it may not work with your device.
Blog Entries

- MBS Xojo / Real Studio Plugins, version 14.0pr1

- MBS Xojo / Real Studio Plugins, version 13.5pr10

- MBS Real Studio Plugins, version 13.1pr16

- MBS Real Studio Plugins, version 13.0pr1

- MonkeyBread Software Releases the MBS Real Studio plug-ins in version 12.5

- MBS Real Studio Plugins, version 12.5pr11

3.19.2   Methods

3.19.3   AbortPipe(PipeRef as Integer) as boolean

Plugin Version: 12.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: Aborts any outstanding transactions on the pipe with status kIOReturnAborted.
Notes: If there are outstanding asynchronous transactions on the pipe, the callbacks will happen.
Note that this command will also clear the halted bit on the endpoint in the controller, but will NOT clear the data toggle bit. If you want to clear the data toggle bit as well, see ClearPipeStall or ClearPipeStall-BothEnds for more information. The interface must be open for the pipe to exist.
pipeRef: Index for the desired pipe (1 - GetNumEndpoints).
Lasterror is set to kIOReturnSuccess if successful, kIOReturnNoDevice if there is no connection to an IOService, or kIOReturnNotOpen if the interface is not open for exclusive access.

3.19.4   ClearPipeStall(PipeRef as Integer) as boolean

Plugin Version: 13.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: Clears the halted bit and the data toggle bit on the pipe's endpoint in the controller.
Notes: This function also returns any outstanding transactions on the pipe with status kIOUSBTransactionReturned.
If there are outstanding asynchronous transactions on the pipe, the callbacks will happen. The data toggle may need to be resynchronized. The driver may handle this by sending a ClearFeature(ENDPOINT_HALT)

to the default control pipe, specifying the device's endpoint for this pipe.

pipeRef: Index for the desired pipe (1 - NumEndpoints).
Lasterror is set to kIOReturnSuccess if successful, kIOReturnNoDevice if there is no connection to an IOService, or kIOReturnNotOpen if the interface is not open for exclusive access.

3.19.5   Close

Plugin Version: 12.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: Closes connection to the device.

3.19.6   ConfigurationValue as Integer

Plugin Version: 12.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the current configuration value set in the device (the interface will be part of that configuration.)
Notes: The interface does not have to be open to use this function.
Lasterror is set.

3.19.7   Connect as boolean

Plugin Version: 12.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: Connects to the first device matching product and vendor IDs.
Notes: Returns true on success.

3.19.8   DeviceProduct as Integer

Plugin Version: 12.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the USB Product ID (idProduct) of the device.
Notes: The device does not have to be open to use this function.
Lasterror is set. Returns the actual product ID of the device.

3.19.9   DeviceReleaseNumber as Integer

Plugin Version: 12.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the Device Release Number (bcdDevice) of the device.
Notes: The device does not have to be open to use this function.
Lasterror is set.

3.19.10   DeviceVendor as Integer

Plugin Version: 12.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the USB Vendor ID (idVendor) of the device.
Notes: The device does not have to be open to use this function.
Lasterror is set. Returns the actual vendor ID of the device.

3.19.11   InterfaceClass as Integer

Plugin Version: 12.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the USB Class of the interface.
Notes: Lasterror is set.

3.19.12   InterfaceNumber as Integer

Plugin Version: 12.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the interface number (zero-based index) of this interface within the current configuration
of the device.
Notes: Lasterror is set.

3.19.13   InterfaceProtocol as Integer

Plugin Version: 12.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the USB Protocol of the interface.
Notes: Lasterror is set.

3.19.14   InterfaceSubClass as Integer

Plugin Version: 12.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the USB Subclass of the interface.
Notes: Lasterror is set.

3.19.15   LocationID as Integer

Plugin Version: 12.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the location ID.
Notes: The location ID is a 32 bit number which is unique among all USB devices in the system, and which will not change on a system reboot unless the topology of the bus itself changes. The interface does not have to be open to use this function.
Lasterror is set.

3.19.16   NumEndpoints as Integer

Plugin Version: 12.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the number of endpoints in this interface.
Notes: The interface does not have to be open to use this function.
Lasterror is set.

3.19.17   ReadPacket(PipeRef as Integer, MaxSize as Integer = 1024) as Memoryblock

Plugin Version: 12.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: Reads data packet.
Notes: We developed this function for a client, so it's probably useless for everyone else.

3.19.18   ReadRaw(PipeRef as Integer, MaxSize as Integer = 1024) as Memoryblock

Plugin Version: 12.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: Reads data on a BULK IN or an INTERRUPT pipe.
Notes: Reads up to MaxSize bytes from the given pipe. Pipe is in range 1 to GetNumEndpoints.

3.19.19   ResetPipe(PipeRef as Integer) as boolean

Plugin Version: 12.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: Equivalent to ClearPipeStall.
Notes: The interface must be open for the pipe to exist.
pipeRef: Index for the desired pipe (1 - GetNumEndpoints).
Lasterror is set to kIOReturnSuccess if successful, kIOReturnNoDevice if there is no connection to an IOService, or kIOReturnNotOpen if the interface is not open for exclusive access.

3.19.20   WritePacket(PipeRef as Integer, Data as Memoryblock) as boolean

Plugin Version: 12.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: Sends data packet.
Notes: We developed this function for a client, so it's probably useless for everyone else.
Lasterror is set.
See also:

3.19.21   WritePacket(PipeRef as Integer, Data as string) as boolean

Plugin Version: 12.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: Sends data packet.
Notes: We developed this function for a client, so it's probably useless for everyone else.
Lasterror is set.
See also:

3.19.22   WriteRaw(PipeRef as Integer, Data as Memoryblock) as boolean

Plugin Version: 12.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: Writes data on a BULK OUT or INTERRUPT OUT pipe.
Notes: The interface must be open for the pipe to exist.
PipeRef: Index for the desired pipe (1 - GetNumEndpoints).
Data: the buffer of data to send.
Lasterror is set.
See also:

3.19.23   WriteRaw(PipeRef as Integer, Data as string) as boolean

Plugin Version: 12.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: Writes data on a BULK OUT or INTERRUPT OUT pipe.
Notes: The interface must be open for the pipe to exist.
PipeRef: Index for the desired pipe (1 - GetNumEndpoints).
Data: the buffer of data to send.
Lasterror is set.
See also:

3.19.24   Properties

3.19.25   completionTimeout as Integer

Plugin Version: 12.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: The completion timeout.
Notes: Specifies a time value in milliseconds. Once the request is queued on the bus, if the entire request is not completed in this amount of time, the request will be aborted and returned.
Default is 1000.
(Read and Write property)

3.19.26   LastError as Integer

Plugin Version: 12.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: The last error code.
Notes: (Read and Write property)

3.19.27   noDataTimeout as Integer

Plugin Version: 12.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: The timeout for no data.
Notes: Specifies a time value in milliseconds. Once the request is queued on the bus, if no data is transferred in this amount of time, the request will be aborted and returned.
Default is 1000.
(Read and Write property)

3.19.28   ProductID as Integer

Plugin Version: 12.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: The product ID for connecting to the device.
Notes: (Read and Write property)

3.19.29 VendorID as Integer

Plugin Version: 12.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: The vendor ID for connecting to the device.
Notes: (Read and Write property)

3.19.30 Constants

Errors

Constant	Value	Description
kIOReturnSuccess	0	The error constant for no error.
kIOUSBConfigNotFound	&he0004056	Configuration Not found.
kIOUSBDeviceNotHighSpeed	&he0004049	The device is not a high speed device, so the EHC
kIOUSBDevicePortWasNotSuspended	&he0004050	Port was not suspended.
kIOUSBEndpointNotFound	&he0004057	Endpoint Not found.
kIOUSBHighSpeedSplitError	&he000404b	Error to hub on high speed bus trying to do split
kIOUSBInterfaceNotFound	&he000404e	Interface ref not recognized.
kIOUSBLowLatencyBufferNotPreviouslyAllocated	&he000404d	Attempted to use user land low latency isoc calls (on the data buffer) first.
kIOUSBLowLatencyFrameListNotPreviouslyAllocated	&he000404c	Attempted to use user land low latency isoc calls (on the frame list) first.
kIOUSBNoAsyncPortErr	&he000405f	No async port.
kIOUSBNotEnoughPipesErr	&he000405e	Not enough pipes in interface.
kIOUSBNotEnoughPowerErr	&he000405d	Not enough power for selected configuration.
kIOUSBPipeStalled	&he000404f	Pipe has stalled, error needs to be cleared.
kIOUSBSyncRequestOnWLThread	&he000404a	A synchronous USB request was made on the wo back?). Only async requests are permitted in that
kIOUSBTooManyPipesErr	&he0004060	Too many pipes.
kIOUSBTransactionReturned	&he0004050	The transaction has been returned to the caller.
kIOUSBTransactionTimeout	&he0004051	Transaction timed out.
kIOUSBUnknownPipeErr	&he0004061	Pipe ref not recognized.

3.20   class MacUSBNotificationMBS

3.20.1   class MacUSBNotificationMBS

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The class for receiving notifications if an USB device has been attached or removed.
Notes: Please make a subclass so you can put your own code in the events.

Use WinUSBNotificationMBS for Windows.
Blog Entries

- MBS Xojo Plugins, version 20.6pr1

- Showing USB Devices

- MBS Real Studio Plugins, version 11.2pr3

3.20.2   Methods

3.20.3   Constructor(vendor as Integer = 0, product as Integer = 0)

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Setup the notification system so you are informed about USB devices being attached or removed.
Example:

```
// look only for device with this vendor/product ID
dim m as new MyMacUSBNotificationMBS(&h5AC, &h263)
```

Notes: You can use vendor and product IDs to limit the class to look only for devices with matching IDs.
Lasterror is set.

3.20.4   GetUSBDeviceInfo(DeviceHandle as Integer, byref Vendor as string, byref Product as string, byref SerialNumber as string, byref Revision as Integer) as boolean

Plugin Version: 13.1, Platform: macOS, Targets: Desktop, Console & Web.

Function: Queries USB details for a given handle.
Notes: This is a convenience function to query details on the devices found within the events.
Returns true on success.

3.20.5   QueryBSDName(DeviceHandle as Integer) as string

Plugin Version: 13.1, Platform: macOS, Targets: Desktop, Console & Web.

Function: Function to query BSDName of a given device.
Notes: If the device is a disk or USB stick and has been mounted, this would give the bsd name of the disk.
Returns ”” on any error.

3.20.6   Release(DeviceHandle as Integer)

Plugin Version: 13.1, Platform: macOS, Targets: Desktop, Console & Web.

Function: Releases an object reference when you don't need it any longer.
Notes: Please call Retain and Release in pairs.
Does nothing if handle is zero or when called on Linux/Windows.

3.20.7   Retain(DeviceHandle as Integer)

Plugin Version: 13.1, Platform: macOS, Targets: Desktop, Console & Web.

Function: Retains an object reference so it is available later.
Notes: Please call Retain and Release in pairs.
Does nothing if handle is zero or when called on Linux/Windows.

3.20.8   Properties

3.20.9   LastError as Integer

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The last error code.
Notes: Zero is no error while other values are Mac OS error codes.
(Read and Write property)

3.20.10   Events

3.20.11   DeviceAdded(properties as dictionary, NewDevice as boolean, Class-Name as string, DeviceName as string, DeviceHandle as Integer)

Plugin Version: 11.2, Platform: macOS, Targets: .

Function: This event is called when the device is added.
Notes: You find properties like product and vendor in the dictionary.
This event can be called from the constructor for existing devices with NewDevice = false. Later events have NewDevice = true so you see that this is a new device.

DeviceName and ClassName give details on the USB item found.
DeviceHandle is the internal object reference which can be used with other helper functions in this class (io_service_t).

3.20.12   DeviceRemoved(properties as dictionary, NewDevice as boolean, Class-Name as string, DeviceName as string, DeviceHandle as Integer)

Plugin Version: 11.2, Platform: macOS, Targets: .

Function: This event is called when the device is removed.
Notes: You find properties like product and vendor in the dictionary.
This event can be called from the constructor for existing devices with NewDevice = false. Later events have NewDevice = true so you see that this is a new device.

DeviceName and ClassName give details on the USB item found.
DeviceHandle is the internal object reference which can be used with other helper functions in this class (io_service_t).

3.21 class WinHIDMBS

3.21.1 class WinHIDMBS

Plugin Version: 7.5, Platform: Windows, Targets: Desktop, Console & Web.

Function: A class to work with HID devices on Windows.
Example:

```
dim m as new WinHIDMBS
dim s as string

#if not TargetWin32
MsgBox "This example requires Windows."
#endif

if m.FindFirstDevice then

do
ListBox1.AddRow ""

ListBox1.Cell(ListBox1.LastIndex,0)=hex(m.ProductID)
ListBox1.Cell(ListBox1.LastIndex,1)=hex(m.VendorID)
ListBox1.cell(ListBox1.LastIndex,2)=m.Product
ListBox1.cell(ListBox1.LastIndex,3)=m.Manufacturer
ListBox1.cell(ListBox1.LastIndex,4)=m.SerialNumber
ListBox1.cell(ListBox1.LastIndex,5)=hex(m.VersionNumber)

if left(m.Product,3)="RF1" then // my test device

if m.Connect then
// write 9 bytes report
// first byte is report ID plus 8 byte data
s=chr(0)+"P"+chr(0)+chr(0)+chr(0)+chr(0)+chr(0)+chr(0)+chr(0)

MsgBox "Send bytes: "+str(m.SendMessage(s))

do
s=m.ReadMessage(17)
loop until lenb(s)>0 // until we got something
MsgBox midb(s,2) // shows result. First byte is ReportID again

m.Disconnect
end if
end if

loop until not m.FindNextDevice
```

end if

Title=str(ListBox1.ListCount)+" devices found."

Notes: For newer development, please use our HIDAPIMBS class.

Updated in version 10.4 of plugins to ignore devices which you don't have permissions to access them. So you will now see devices with VendorID=0 and ProductID=0.

This class can be used in three different ways. First normal with Connect and ReadMessage/SendMessage. Second with InstallListener and SendMessage/Poll functions. Third low level via GetInputReport and SetOutputReport.

Blog Entries

- MBS Xojo / Real Studio Plugins, version 15.0pr10

- MBS Xojo / Real Studio Plugins, version 13.3pr2

- MonkeyBread Software Releases the MBS Real Studio plug-ins in version 12.2

- MBS Real Studio Plugins, version 11.3pr10

- Notes...

- MBS REALbasic Plugins Version 10.4 release notes

- MBS REALbasic Plugins, version 10.4pr3

- MBS REALbasic plug-ins version 9.4

Xojo Developer Magazine

- 10.5, page 9: News

3.21.2   Methods

3.21.3   Close

Plugin Version: 7.5, Platform: Windows, Targets: Desktop, Console & Web.

Function: Closes the active connection.

3.21.4 Connect as boolean

Plugin Version: 7.5, Platform: Windows, Targets: Desktop, Console & Web.

Function: Creates a connection to the current device.
Example:

Function OpenUSBDevice() As boolean
dim i as Integer
dim h as WinHIDMBS

h=FindDevice // see FindFirst example

if h=nil then
MsgBox "No XYZ device found."
Return false
end if

call h.Connect

if h.Lasterror<>0 then
MsgBox "Failed to connect to USB Device."
Return false
end if

Return true

End Function

Notes: Lasterror is set.
Returns true on success and false on failure.

The plugin tries to open a read and a write connection. If both fail, connect returns false. If one is okay, it returns true.

Some devices don't allow read or write because of missing permissions.

3.21.5 DevicePath as string

Plugin Version: 9.3, Platform: Windows, Targets: Desktop, Console & Web.

Function: The internal path used by Windows to identify the device.
Notes: Only for debugging.

3.21.6   Disconnect

Plugin Version: 7.5, Platform: Windows, Targets: Desktop, Console & Web.

Function: Disconnets current USB device.
Notes: Lasterror is set.

3.21.7   FindFirstDevice as boolean

Plugin Version: 7.5, Platform: Windows, Targets: Desktop, Console & Web.

Function: Finds the first device and loads the properties.
Example:

Function FindDevice() As MyWinHIDMBS
dim h as MyWinHIDMBS
dim p as string

h=new MyWinHIDMBS // your own subclass of MacHIDMBS so you can get events

if h.FindFirstDevice then

p=h.Product
if p="MyProduct" then
Return h
end if

while h.FindNextDevice

p=h.Product
if p="MyProduct" then
Return h
end if

wend

end if
End Function

Notes: Returns true on success and false on failure.
On Windows finds only devices which can be opened for Read/Write.

3.21.8 FindNextDevice as boolean

Plugin Version: 7.5, Platform: Windows, Targets: Desktop, Console & Web.

Function: Finds next device.
Notes: Returns true on success and false on failure.

3.21.9 GetInputReport(data as MemoryBlock, Offset as Integer = 0, Length as Integer = 0) as boolean

Plugin Version: 15.0, Platform: Windows, Targets: Desktop, Console & Web.

Function: Returns an input reports from a top-level collection.
Notes: This is very low level.
First byte of data block is report ID.
If Length is 0, we use size of memoryblock.
Returns true on success.

see also:
https://msdn.microsoft.com/en-us/library/windows/hardware/ff538945(v=vs.85).aspx

3.21.10 InstallListener(PollSize as Integer) as boolean

Plugin Version: 7.8, Platform: Windows, Targets: Desktop, Console & Web.

Function: Installs a second thread which performs Read.
Example:

```
dim h as new WinHIDMBS

call h.InstallListener 9 // 8 bytes + Report ID
```

Notes: Use PollString or PollMemory in a timer or a loop to get the data.
This is an alternative way compared to ReadMessage functions.

3.21.11 Manufacturer as string

Plugin Version: 7.5, Platform: Windows, Targets: Desktop, Console & Web.

Function: The manufacturer name.
Notes: On any error an empty string is returned.

Lasterror is set.

3.21.12   PollMemory as memoryblock

Plugin Version: 7.8, Platform: Windows, Targets: Desktop, Console & Web.

Function: Reads a message from the device.
Notes: A connection must be open and InstallListener must be used.
Lasterror is set.
You may want to try this function in a loop or a timer till you get data.

3.21.13   PollString as string

Plugin Version: 7.8, Platform: Windows, Targets: Desktop, Console & Web.

Function: Reads a message from the device.
Example:

dim m as WinHIDMBS // your WinHIDMBS object
dim s as string

do
s=m.PollString
loop until lenb(s)>0 // until we got something
MsgBox midb(s,2) // shows result. First byte is ReportID again

Notes: A connection must be open and InstallListener must be used.
Lasterror is set.
You may want to try this function in a loop or a timer till you get data.

3.21.14   Product as string

Plugin Version: 7.5, Platform: Windows, Targets: Desktop, Console & Web.

Function: The product string of the selected device.
Notes: Lasterror is set.

3.21.15   ProductID as Integer

Plugin Version: 7.5, Platform: Windows, Targets: Desktop, Console & Web.

Function: The product ID of the selected device.
Notes: Lasterror is set.

3.21.16   ReadMessage(length as Integer, timeOut as Integer = 0) as string

Plugin Version: 13.3, Platform: Windows, Targets: Desktop, Console & Web.

Function: Reads a message from the device.
Example:

dim m as WinHIDMBS
dim s as string

do
s=m.ReadMessage(48)
loop until lenb(s)>0 // until we got something
MsgBox midb(s,2) // shows result. First byte is ReportID again

Notes: Length is the length of the receive buffer you want to use.
The string returned is 0 to length bytes long.
A connection must be open.
Lasterror is set.
You may want to try this function in a loop till you get data.
Timeout is a timeout value in milliseconds.

3.21.17   ReadMessageMemory(length as Integer, timeOut as Integer = 0) as memoryblock

Plugin Version: 13.3, Platform: Windows, Targets: Desktop, Console & Web.

Function: Reads a message from the device.
Example:

dim m as WinHIDMBS
dim s as memoryblock

do
s=m.ReadMessageMemory(48)
loop until s<>nil // until we got something
MsgBox midb(s,2) // shows result. First byte is ReportID again

Notes: Length is the length of the receive buffer you want to use.

The memoryblock returned has a size of 0 to length bytes.
A connection must be open.
Lasterror is set.
You may want to try this function in a loop till you get data.
Timeout is a timeout value in milliseconds.

3.21.18   SendMessage(data as string) as Integer

Plugin Version: 7.5, Platform: Windows, Targets: Desktop, Console & Web.

Function: Sends a message to the USB device.
Example:

```
dim m as WinHIDMBS // your hid object
dim s as string
// write 9 bytes report
// first byte is report ID plus 8 byte data
s=chr(0)+"P"+chr(0)+chr(0)+chr(0)+chr(0)+chr(0)+chr(0)+chr(0)
MsgBox "Send bytes: "+str(m.SendMessage(s))
```

Notes: A connection must be open.
Returns number of bytes sent.

The first byte must be the Report ID which seems to be zero for most devices.

3.21.19   SendMessageMemory(data as memoryblock, Offset as Integer = 0, length as Integer = 0) as Integer

Plugin Version: 7.5, Platform: Windows, Targets: Desktop, Console & Web.

Function: Sends a message to the USB device.
Notes: A connection must be open.
Lasterror is set.
Returns number of bytes sent.

While writing a crossplatform application we saw the following thing: The data buffer for the SendMessageMemory call must be 8 bytes long on Mac for our device (with MacHIDMBS) and 61 bytes long for Windows (with WinHIDMBS) for our HID device. We have 1 byte for the ReportID and 60 data bytes where the first 8 are set like on the Mac. So if the calls fail on Windows, try with a higher length and check the WinHIDMBS.OutputReportByteLength property.

The first byte must be the Report ID which seems to be zero for most devices.
If length is zero, we use the length of memoryblock.

3.21.20 SerialNumber as string

Plugin Version: 7.5, Platform: Windows, Targets: Desktop, Console & Web.

Function: The serial number of the current selected device.
Notes: Lasterror is set.

3.21.21 SetOutputReport(data as MemoryBlock, Offset as Integer = 0, Length as Integer = 0) as boolean

Plugin Version: 15.0, Platform: Windows, Targets: Desktop, Console & Web.

Function: Sends an output report.
Notes: This is very low level.
First byte of data block is report ID.
If Length is 0, we use size of memoryblock.
Returns true on success.

see also
https://msdn.microsoft.com/en-us/library/windows/hardware/ff539690(v=vs.85).aspx

3.21.22 VendorID as Integer

Plugin Version: 7.5, Platform: Windows, Targets: Desktop, Console & Web.

Function: The vendor ID of the selected device.
Notes: Lasterror is set.

3.21.23 VersionNumber as Integer

Plugin Version: 7.5, Platform: Windows, Targets: Desktop, Console & Web.

Function: The device specific version number.
Notes: Value can be anything.
On any error, 0 is returned.
Lasterror is set.

3.21.24   Properties

3.21.25   FeatureReportByteLength as Integer

Plugin Version: 9.4, Platform: Windows, Targets: Desktop, Console & Web.

Function: Maximum length, in bytes, of all the feature reports, including the report identifier, if report identifiers are used, which is added to the beginning of the report data.
Notes: (Read and Write property)

3.21.26   HidHandle as Integer

Plugin Version: 9.3, Platform: Windows, Targets: Desktop, Console & Web.

Function: The handle for the HID device.
Notes: (Read and Write property)

3.21.27   InputReportByteLength as Integer

Plugin Version: 9.4, Platform: Windows, Targets: Desktop, Console & Web.

Function: Maximum size, in bytes, of the input reports, including the report identifier, if report identifiers are used, which is added to the beginning of the report data.
Notes: (Read and Write property)

3.21.28   Lasterror as Integer

Plugin Version: 7.5, Platform: Windows, Targets: Desktop, Console & Web.

Function: Last error code.
Notes: 0 is success.
-1 means that the function is not available.
else Windows error codes like 5 for Access Denied.
(Read and Write property)

3.21.29   LasterrorString as String

Plugin Version: 9.4, Platform: Windows, Targets: Desktop, Console & Web.

Function: The last error code in a formatted and localized string.
Notes: This does not work for plugin error codes.

Like -1 if the function is not available.
(Read only property)

3.21.30   OutputReportByteLength as Integer

Plugin Version: 9.4, Platform: Windows, Targets: Desktop, Console & Web.

Function: Maximum size, in bytes, of all the output reports, including the report identifier, if report identifiers are used, which is added to the beginning of the report data.
Notes: (Read and Write property)

3.21.31   PnPHandle as Integer

Plugin Version: 9.3, Platform: Windows, Targets: Desktop, Console & Web.

Function: The handle for Plug and Play.
Notes: (Read and Write property)

3.21.32   ReadHandle as Integer

Plugin Version: 9.3, Platform: Windows, Targets: Desktop, Console & Web.

Function: The handle of the stream for reading data from the USB device.
Notes: (Read and Write property)

3.21.33   ThreadHandle as Integer

Plugin Version: 9.3, Platform: Windows, Targets: Desktop, Console & Web.

Function: The handle for the thread which waits in the background for new data.
Notes: (Read and Write property)

3.21.34   WriteHandle as Integer

Plugin Version: 9.3, Platform: Windows, Targets: Desktop, Console & Web.

Function: The handle of the stream for writing data to the USB device.
Notes: (Read and Write property)

3.22   class WinUSBDeviceMBS

3.22.1   class WinUSBDeviceMBS

Plugin Version: 11.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The class to query USB devices.
Example:

dim devices(-1) as WinUSBDeviceMBS = WinUSBDeviceMBS.Devices

for each d as WinUSBDeviceMBS in devices
MsgBox d.Vendor+" - "+d.Product
next

Blog Entries

- Showing USB Devices

- MBS Real Studio Plugins, version 11.2pr6

3.22.2   Methods

3.22.3   Devices as WinUSBDeviceMBS()

Plugin Version: 11.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: Queries a list of all USB Devices.
Example:

dim devices() as WinUSBDeviceMBS = WinUSBDeviceMBS.devices
for each d as WinUSBDeviceMBS in devices
msgbox d.vendor+" "+d.product+" "+d.serialnumber
next

Notes: Returns an emtpy array on errors.

3.22.4   Properties

3.22.5   cdUSB as Integer

Plugin Version: 11.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The device USB version.
Notes: USB Specification Number which device complies too.

The cdUSB field reports the highest version of USB the device supports. The value is in binary coded decimal with a format of 0xJJMN where JJ is the major version number, M is the minor version number and N is the sub minor version number. e.g. USB 2.0 is reported as &h0200, USB 1.1 as 0x0110 and USB 1.0 as &h0100.
(Read and Write property)

3.22.6   DescriptorType as Integer

Plugin Version: 11.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The device descriptor type.
Notes: Device Descriptor (0x01)
(Read and Write property)

3.22.7   DeviceClass as Integer

Plugin Version: 11.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The device class.
Notes: See constants in MacUSBDeviceMBS class.
Assigned by USB Org
(Read and Write property)

3.22.8   DeviceID as Integer

Plugin Version: 11.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The device ID.
Notes: (Read and Write property)

3.22.9   DeviceProtocol as Integer

Plugin Version: 11.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The device protocol.
Notes: Assigned by USB Org
(Read and Write property)

3.22.10   DeviceSubClass as Integer

Plugin Version: 11.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The device sub class.
Notes: See constants in MacUSBDeviceMBS class.
Assigned by USB Org
(Read and Write property)

3.22.11   MaxEP0Size as Integer

Plugin Version: 11.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: Maximum Packet Size for Zero Endpoint.
Notes: Valid Sizes are 8, 16, 32, 64
(Read and Write property)

3.22.12   Product as String

Plugin Version: 11.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The product name.
Notes: (Read and Write property)

3.22.13   ProductID as Integer

Plugin Version: 11.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The product ID of the device.
Notes: (Read and Write property)

3.22.14   SerialNumber as String

Plugin Version: 11.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The serial number of the USB device.
Example:

dim devices(-1) as WinUSBDeviceMBS = WinUSBDeviceMBS.Devices

for each d as WinUSBDeviceMBS in devices
MsgBox d.Vendor+" - "+d.Product+": "+d.SerialNumber

Notes: Not all vendors save the serial number in the device.
(Read and Write property)

3.22.15 Vendor as String

Plugin Version: 11.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The vendor name of the USB device.
Notes: (Read and Write property)

3.22.16 VendorID as Integer

Plugin Version: 11.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The vendor ID of the USB device.
Notes: Assigned by USB Org.
(Read and Write property)

3.23   class WinUSBInterfaceDescriptionMBS

3.23.1   class WinUSBInterfaceDescriptionMBS

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: This class is used by USB clients to retrieve a USB-defined interface descriptor.

3.23.2   Properties

3.23.3   AlternateSetting as Integer

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The index number of the alternate setting of the interface.
Notes: (Read and Write property)

3.23.4   DescriptorType as Integer

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The descriptor type.
Notes: Descriptor must be set to USB_INTERFACE_DESCRIPTOR_TYPE.
(Read and Write property)

3.23.5   InterfaceClass as Integer

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The class code of the device that the USB specification group assigned.
Notes: (Read and Write property)

3.23.6   InterfaceIndex as Integer

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The index of a string descriptor that describes the interface.
Notes: For information about this field, see section 9.6.5 in the "Universal Serial Bus Revision 2.0" specification at USB Technology.
(Read and Write property)

3.23.7   InterfaceNumber as Integer

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The index number of the interface.
Notes: (Read and Write property)

3.23.8   InterfaceProtocol as Integer

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The protocol code of the device that the USB specification group assigned.
Notes: (Read and Write property)

3.23.9   InterfaceSubClass as Integer

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The subclass code of the device that the USB specification group assigned.
Notes: (Read and Write property)

3.23.10   Length as Integer

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The length, in bytes, of the descriptor.
Notes: (Read and Write property)

3.23.11   NumEndpoints as Integer

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The number of endpoints that are used by the interface, excluding the default status endpoint.
Notes: (Read and Write property)

3.24   class WinUSBMBS

3.24.1   class WinUSBMBS

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: Provides access to any USB device on Windows.
Notes: This class provides funtions exposed by Winusb.dll, which user-mode client drivers and applications can use to communicate with USB devices.
WinUSB functions require Windows XP or later.

see also
http://msdn.microsoft.com/en-us/library/windows/hardware/ff540174(v=vs.85).aspx
and
http://msdn.microsoft.com/en-us/library/windows/hardware/ff540046(v=vs.85).aspx#winusb

For PipeIDs, please use 1, 2, 3... for output pipe IDs and &h81, &h82, &h83... for input pipes.

For Mac you can take a look on the MacUSBDeviceMBS class and the IORegistryMBS class.
See also WinUSBDeviceMBS and WindowsDeviceMBS classes.
For cross platform development also check LibUSBDeviceMBS classes.
Blog Entries

- MBS Xojo / Real Studio Plugins, version 16.1pr3

- MonkeyBread Software Releases the MBS Real Studio plug-ins in version 12.5

- MBS Real Studio Plugins, version 12.5pr11

- MBS Real Studio Plugins, version 12.5pr10

- MBS Real Studio Plugins, version 12.3pr17

- MonkeyBread Software Releases the MBS Real Studio plug-ins in version 12.2

- MBS Real Studio Plugins, version 12.2pr7

- MBS Real Studio Plugins, version 12.2pr3

3.24.2   Methods

3.24.3   AbortPipe(PipeID as Integer)

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: Aborts all of the pending transfers for a pipe. This is a synchronous operation.
Notes: To reset a pipe associated with an endpoint in the first interface, use the WinUSBMBS object

created with constructor. For all other interfaces, use the WinUSBMBS objects to the target interface, retrieved by GetAssociatedInterface.

PipeID: The identifier (ID) of the control pipe. The PipeID parameter is an 8-bit value that consists in a 7-bit address and a direction bit. This parameter corresponds to the EndpointAddress field in the endpoint descriptor.

Lasterror is zero on success and false on failure.

3.24.4 Available as boolean

Plugin Version: 12.3, Platform: Windows, Targets: Desktop, Console & Web.

Function: Returns true if winusb.dll has been found and loaded.
Notes: Always false on Linux and Mac OS X.

3.24.5 Constructor(path as string)

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: Creates a WinUSB object for the device specified by a device path.
Example:

Dim path As String = "\\?\usb#vid_0e0f&pid_0003#6&30c8ca5f&0&5# { a5dcbf10-6530-11d2-901f-00c04fb951ed } "
Dim w As New WinUSBMBS(path)

If w.Lasterror <>0 Then
MsgBox "Lasterror: "+Str(w.Lasterror)
else
MsgBox "DeviceHandle: "+Hex(w.DeviceHandle)
End If

Notes: Use WindowsDeviceMBS class to find USB devices and their device paths.
Lasterror is set.
On success DeviceHandle and Handle properties are not nil.

When Constructor is called, the policy settings of the interface are reset to the default values.
The Constructor call queries the underlying USB stack for various descriptors and allocates enough memory to store the retrieved descriptor data.
Constructor first retrieves the device descriptor and then gets the associated configuration descriptor. From the configuration descriptor, the call derives the associated interface descriptors and stores them in an array.

The interfaces in the array are identified by zero-based indexes. An index value of 0 indicates the first interface (the default interface), a value of 1 indicates the second associated interface, and so on. Constructor parses the default interface descriptor for the endpoint descriptors and caches information such as the associated pipes or state specific data. The handle received in the InterfaceHandle parameter is a pointer to the memory block allocated for the first interface in the array.

If an application wants to use another interface on the device, it must call GetAssociatedInterface, specify the index of the interface, and retrieve a handle to the memory block allocated for the specified interface.

e.g. path like this format.
\\?\usb#vid_0e0f&pid_0003#6&30c8ca5f&0&5# { a5dcbf10-6530-11d2-901f-00c04fb951ed }

See also WinUSBDeviceMBS and WindowsDeviceMBS classes.
For cross platform development also check LibUSBDeviceMBS classes.

3.24.6   ControlTransfer(SetupPacket as WinUSBSetupPacketMBS, Buffer as MemoryBlock) as Integer

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: Transmits control data over a default control endpoint.
Notes: To send a control request to the entire device or the first interface, use the WinUSBMBS object created with constructor. For all other interfaces, use the WinUSBMBS objects to the target interface, retrieved by GetAssociatedInterface.

SetupPacket: The 8-byte setup packet of type WinUSBSetupPacketMBS.
Buffer: A buffer that contains the data to transfer. Can be empty.

Returns the actual number of transferred bytes.
Lasterror property is set.
See also:

3.24.7   ControlTransfer(SetupPacket as WinUSBSetupPacketMBS, Buffer as String) as Integer

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: Transmits control data over a default control endpoint.
Notes: To send a control request to the entire device or the first interface, use the WinUSBMBS object created with constructor. For all other interfaces, use the WinUSBMBS objects to the target interface,

retrieved by GetAssociatedInterface.

SetupPacket: The 8-byte setup packet of type WinUSBSetupPacketMBS.
Buffer: A buffer that contains the data to transfer. Can be empty.

Returns the actual number of transferred bytes.
Lasterror property is set.
See also:

- 3.24.6 ControlTransfer(SetupPacket as WinUSBSetupPacketMBS, Buffer as MemoryBlock) as Integer 146

3.24.8   DeviceSpeed as Integer

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: Queries device speed.
Notes: Lasteror is set.
Use constants LowSpeed, HighSpeed and FullSpeed.

3.24.9   FlushPipe(PipeID as Integer)

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: Discards any data that is cached in a pipe. This is a synchronous operation.
Notes: To reset a pipe associated with an endpoint in the first interface, use the WinUSBMBS object created with constructor. For all other interfaces, use the WinUSBMBS objects to the target interface, retrieved by GetAssociatedInterface.

PipeID: The identifier (ID) of the control pipe. The PipeID parameter is an 8-bit value that consists in a 7-bit address and a direction bit. This parameter corresponds to the EndpointAddress field in the endpoint descriptor.

Lasterror is zero on success and false on failure.

3.24.10   GetAssociatedInterface(index as Integer) as WinUSBMBS

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: Retrieves a WinUSBMBS object for an associated interface.
Notes: This is a synchronous operation.

AssociatedInterfaceIndex: An index that specifies the associated interface to retrieve. A value of 0 indicates the first associated interface, a value of 1 indicates the second associated interface, and so on.

Returns new WinUBSMBS object.

The first associated interface is the interface that immediately follows the interface whose handle the WinUsb_Initialize routine retrieves.

Callers of GetAssociatedInterfacecan retrieve only one handle for each interface. If a caller attempts to retrieve more than one handle for the same interface, the routine will fail with an error of ERROR_ALREADY_EXISTS.

3.24.11   QueryInterfaceSettings(index as Integer) as WinUSBInterfaceDescriptionMBS

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: Retrieves the interface descriptor for the specified alternate interface settings for a particular interface handle.

Notes: To retrieve the settings of the first interface, use the WinUSBMBS object created with constructor. For all other interfaces, use the WinUSBMBS objects to the target interface, retrieved by GetAssociatedInterface.

AlternateSettingNumber: A value that indicates which alternate settings to return. A value of 0 indicates the first alternate setting, a value of 1 indicates the second alternate setting, and so on.

Returns WinUSBInterfaceDescriptionMBS object on success or nil on any error.

3.24.12   QueryPipe(AlternateInterfaceNumber as Integer, PipeIndex as Integer) as WinUSBPipeInformationMBS

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: Retrieves information about the specified endpoint and the associated pipe for an interface.

Notes: To query a pipe associated with an endpoint in the first interface, use the WinUSBMBS object created with constructor. For all other interfaces, use the WinUSBMBS objects to the target interface, retrieved by GetAssociatedInterface.

AlternateInterfaceNumber: A value that specifies the alternate interface to return the information for.

PipeIndex: A value that specifies the pipe to return information about. This value is not the same as the bEndpointAddress field in the endpoint descriptor. A PipeIndex value of 0 signifies the first endpoint that is associated with the interface, a value of 1 signifies the second endpoint, and so on. PipeIndex must be less

than the value in the NumEndpoints field of the interface descriptor.

Returns pipe information or nil on error. Also sets Lasterror property.

The QueryPipe function does not retrieve information about the control pipe.

Each interface on the USB device can have multiple endpoints. To communicate with each of these endpoints, the bus driver creates pipes for each endpoint on the interface. The pipe indices are zero-based. Therefore for n number of endpoints, the pipes' indices are set from n-1. WinUsb_QueryPipe parses the configuration descriptor to get the interface specified by the caller. It searches the interface descriptor for the endpoint descriptor associated with the caller-specified pipe. If the endpoint is found, the function populates a WinUSBPipeInformationMBS object with information from the endpoint descriptor.

3.24.13   ReadPipeMemory(PipeID as Integer, BufferLength as Integer) as Memoryblock

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: Reads data from the specified pipe.
Notes: To read a pipe associated with an endpoint in the first interface, use the WinUSBMBS object created with constructor. For all other interfaces, use the WinUSBMBS objects to the target interface, retrieved by GetAssociatedInterface.

PipeID: PipeID corresponds to the EndpointAddress field in the endpoint descriptor. For information about the layout of this field, see Table 9-13 in "Universal Serial Bus Specification Revision 2.0" at USB Technology. In the EndpointAddress field, Bit 7 indicates the direction of the endpoint: 0 for OUT; 1 for IN.
BufferLength: The maximum number of bytes to read.

Returns memoryblock with the data read. This may be shorter than BufferLength.
Lasterror is set.

Lasterror is 0 if the operation succeeds. Otherwise, lasterror has the Windows error code.

If the data returned by the device is greater than a maximum transfer length, WinUSB divides the request into smaller requests of maximum transfer length and submits them serially. If the transfer length is not a multiple of the endpoint's maximum packet size (retrievable through the WinUSBPipeInformationMBS class's MaximumPacketSize member), WinUSB increases the size of the transfer to the next multiple of MaximumPacketSize.
USB packet size does not factor into the transfer for a read request. If the device responds with a packet that is too large for the client buffer, the behavior of the read request corresponds to the type of policy set on the pipe. If policy type for the pipe is ALLOW_PARTIAL_READS, WinUSB adds the remaining data to the beginning of the next transfer. If ALLOW_PARTIAL_READS is not set, the read request fails. For

more information about policy types, see WinUSB Functions for Pipe Policy Modification.

When no data is available in the endpoint (pipe is empty), ReadPipe does not return until there is data in the pipe. If an error condition occurs or the application-specified timeout expires, ReadPipe always returns false. To determine the actual reason for that return value, always check LastError. For example, in these cases the GetLastError error value indicates the actual reason:
If the application specified a timeout value in the pipe policy and that timeout expires, ReadPipe returns false and LastError is ERROR_SEM_TIMEOUT.
If an error condition occurs while reading data from the pipe, ReadPipe returns false and LastError is ERROR_GEN_FAILURE.

3.24.14   ReadPipePacket(PipeID as Integer, MaxSize as Integer = 1024) as Memoryblock

Plugin Version: 12.5, Platform: Windows, Targets: Desktop, Console & Web.

Function: Reads a data packet.
Notes: We developed this function for a client, so it's probably useless for everyone else.

3.24.15   ReadPipeString(PipeID as Integer, BufferLength as Integer) as string

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: Reads data from the specified pipe.
Notes: To read a pipe associated with an endpoint in the first interface, use the WinUSBMBS object created with constructor. For all other interfaces, use the WinUSBMBS objects to the target interface, retrieved by GetAssociatedInterface.

PipeID: PipeID corresponds to the EndpointAddress field in the endpoint descriptor. For information about the layout of this field, see Table 9-13 in "Universal Serial Bus Specification Revision 2.0" at USB Technology. In the EndpointAddress field, Bit 7 indicates the direction of the endpoint: 0 for OUT; 1 for IN.
BufferLength: The maximum number of bytes to read.

Returns string with the data read. This may be shorter than BufferLength.
Lasterror is set.

Lasterror is 0 if the operation succeeds. Otherwise, lasterror has the Windows error code.

If the data returned by the device is greater than a maximum transfer length, WinUSB divides the request into smaller requests of maximum transfer length and submits them serially. If the transfer length is not a multiple of the endpoint's maximum packet size (retrievable through the WinUSBPipeInformationMBS

class's MaximumPacketSize member), WinUSB increases the size of the transfer to the next multiple of MaximumPacketSize.

USB packet size does not factor into the transfer for a read request. If the device responds with a packet that is too large for the client buffer, the behavior of the read request corresponds to the type of policy set on the pipe. If policy type for the pipe is ALLOW_PARTIAL_READS, WinUSB adds the remaining data to the beginning of the next transfer. If ALLOW_PARTIAL_READS is not set, the read request fails. For more information about policy types, see WinUSB Functions for Pipe Policy Modification.

When no data is available in the endpoint (pipe is empty), ReadPipe does not return until there is data in the pipe. If an error condition occurs or the application-specified timeout expires, ReadPipe always returns false. To determine the actual reason for that return value, always check LastError. For example, in these cases the GetLastError error value indicates the actual reason:

If the application specified a timeout value in the pipe policy and that timeout expires, ReadPipe returns false and LastError is ERROR_SEM_TIMEOUT.

If an error condition occurs while reading data from the pipe, ReadPipe returns false and LastError is ERROR_GEN_FAILURE.

3.24.16   ResetPipe(PipeID as Integer)

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: Resets the data toggle and clears the stall condition on a pipe.
Notes: To reset a pipe associated with an endpoint in the first interface, use the WinUSBMBS object created with constructor. For all other interfaces, use the WinUSBMBS objects to the target interface, retrieved by GetAssociatedInterface.

PipeID: The identifier (ID) of the control pipe. The PipeID parameter is an 8-bit value that consists in a 7-bit address and a direction bit. This parameter corresponds to the EndpointAddress field in the endpoint descriptor.

Lasterror is zero on success and false on failure.

3.24.17   WritePipe(PipeID as Integer, Buffer as MemoryBlock) as Integer

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: Writes data to a pipe.
Notes: To write to a pipe associated with an endpoint in the first interface, use the WinUSBMBS object created with constructor. For all other interfaces, use the WinUSBMBS objects to the target interface, retrieved by GetAssociatedInterface.

PipeID: PipeID corresponds to the EndpointAddress field in the endpoint descriptor. For information about

the layout of this field, see Table 9-13 in "Universal Serial Bus Specification Revision 2.0" at USB Technology. In the bEndpointAddress field, Bit 7 indicates the direction of the endpoint: 0 for OUT; 1 for IN.
Buffer: A buffer that contains the data to write.

Returns the actual number of bytes that were written to the pipe.
Lasterror is set. Zero for success.

To create a write request, your the application must allocate a buffer, fill it with the data that you want to write to the device, and send the buffer to the host controller by calling WritePipe.
The following restrictions apply to the size of the buffer if RAW_IO is set:

- The buffer length must be a multiple of the maximum endpoint packet size.

- The length must be less than or equal to the value of MAXIMUM_TRANSFER_SIZE retrieved by GetPipePolicy.

There are no restrictions on the size of the buffer if RAW_IO is not set as the pipe's policy type. If the size of the buffer is greater than the maximum transfer length reported by MAXIMUM_TRANSFER_SIZE, WinUSB divides the request into smaller requests and submits them serially to the host controller.
A write request that contains zero-length data is forwarded down the USB stack.
See also:

3.24.18   WritePipe(PipeID as Integer, Buffer as String) as Integer

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: Writes data to a pipe.
Notes: To write to a pipe associated with an endpoint in the first interface, use the WinUSBMBS object created with constructor. For all other interfaces, use the WinUSBMBS objects to the target interface, retrieved by GetAssociatedInterface.

PipeID: PipeID corresponds to the EndpointAddress field in the endpoint descriptor. For information about the layout of this field, see Table 9-13 in "Universal Serial Bus Specification Revision 2.0" at USB Technology. In the bEndpointAddress field, Bit 7 indicates the direction of the endpoint: 0 for OUT; 1 for IN.
Buffer: A buffer that contains the data to write.

Returns the actual number of bytes that were written to the pipe.
Lasterror is set. Zero for success.

To create a write request, your the application must allocate a buffer, fill it with the data that you want to write to the device, and send the buffer to the host controller by calling WritePipe.

The following restrictions apply to the size of the buffer if RAW_IO is set:

- The buffer length must be a multiple of the maximum endpoint packet size.

- The length must be less than or equal to the value of MAXIMUM_TRANSFER_SIZE retrieved by GetPipePolicy.

There are no restrictions on the size of the buffer if RAW_IO is not set as the pipe's policy type. If the size of the buffer is greater than the maximum transfer length reported by MAXIMUM_TRANSFER_SIZE, WinUSB divides the request into smaller requests and submits them serially to the host controller.
A write request that contains zero-length data is forwarded down the USB stack.
See also:

- 3.24.17 WritePipe(PipeID as Integer, Buffer as MemoryBlock) as Integer   151

3.24.19   WritePipePacket(PipeID as Integer, Buffer as MemoryBlock) as Integer

Plugin Version: 12.5, Platform: Windows, Targets: Desktop, Console & Web.

Function: Sends data packet.
Notes: We developed this function for a client, so it's probably useless for everyone else.
See also:

- 3.24.20 WritePipePacket(PipeID as Integer, Buffer as String) as Integer   153

3.24.20   WritePipePacket(PipeID as Integer, Buffer as String) as Integer

Plugin Version: 12.5, Platform: Windows, Targets: Desktop, Console & Web.

Function: Sends data packet.
Notes: We developed this function for a client, so it's probably useless for everyone else.
See also:

- 3.24.19 WritePipePacket(PipeID as Integer, Buffer as MemoryBlock) as Integer   153

3.24.21   Properties

3.24.22   DeviceHandle as Integer

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The internal handle to the device.
Notes: (Read and Write property)

3.24.23   Lasterror as Integer

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The last error code.
Notes: (Read and Write property)

3.24.24   LasterrorMessage as String

Plugin Version: 16.1, Platform: Windows, Targets: Desktop, Console & Web.

Function: The last error message.
Notes: (Read and Write property)

3.24.25   Parent as WinUSBMBS

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: Parent usb object.
Notes: Objects created with GetAssociatedInterface have here the parent object, so you can go back to
main interface.
(Read and Write property)

3.24.26   Tag as Variant

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The attached value.
Notes: You can use this property as you like.
(Read and Write property)

3.24.27   USBHandle as Integer

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The internal handle to the USB device.
Notes: (Read and Write property)

3.24.28 CurrentAlternateSetting as Integer

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The current alternate interface setting for an interface.
Notes: To get the current alternate setting in the first (default) interface on the device, use the WinUSBMBS object created with constructor. For all other interfaces, use the WinUSBMBS objects to the target interface, retrieved by GetAssociatedInterface.

Lasterror is set. You can set and get the value.
(Read and Write computed property)

3.24.29 PipePolicyAllowPartialReads(PipeID as Integer) as boolean

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: Whether to allow partial reads.
Notes: The default value is true. To disable set to false.
Disabling AllowPartialReads causes the read requests to fail whenever the device returns more data (on bulk and interrupt IN endpoints) than the caller requested.
Enabling AllowPartialReads causes WinUSB to save or discard the extra data when the device returns more data (on bulk and interrupt IN endpoints) than the caller requested. This behavior is defined by setting the auto flush value.
Lasterror is set.
(Read and Write computed property)

3.24.30 PipePolicyAutoClearStall(PipeID as Integer) as boolean

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: Whether WinUSB resets the pipe in order to automatically clear the stall condition.
Notes: Data continues to flow on the bulk and interrupt IN endpoints again as soon as a new or a queued transfer arrives on the endpoint. This policy parameter does not affect control pipes.
Disabling AutoClearStall causes all transfers (that arrive to the endpoint after the stalled transfer) to fail until the caller manually resets the endpoint's pipe by calling ResetPipe.
Lasterror is set.
(Read and Write computed property)

3.24.31 PipePolicyAutoFlush(PipeID as Integer) as boolean

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: Whether to use auto flush.
Notes: The default value is false (zero). To enable auto flush set to true.
auto flush must be used with AllowPartialReads enabled. If AllowPartialReads is TRUE, the value of auto flush determines the action taken by WinUSB when the device returns more data than the caller requested. Disabling AllowPartialReads causes WinUSB to ignore the auto flush value.
Disabling auto flush with AllowPartialReads enabled causes WinUSB to save the extra data, add the data to the beginning of the caller's next read request, and send it to the caller in the next read operation.
Enabling auto flush with AllowPartialReads enabled causes WinUSB to discard the extra data remaining from the read request.
Lasterror is set.
(Read and Write computed property)

3.24.32   PipePolicyIgnoreShortPackets(PipeID as Integer) as boolean

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: Enabling IgnoreShortPackets causes the host controller to not complete a read operation after it receives a short packet.
Notes: Instead, the host controller completes the operation only after the host has read the specified number of bytes.
Disabling IgnoreShortPackets causes the host controller to complete a read operation when either the host has read the specified number of bytes or the host has received a short packet.
The default value is false. To enable set to true.
Lasterror is set.
(Read and Write computed property)

3.24.33   PipePolicyMaximumTransferSize(PipeID as Integer) as Integer

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: Gets the maximum size of a USB transfer supported by WinUSB.
Notes: This is a read-only policy.
Lasterror is set.
(Read and Write computed property)

3.24.34   PipePolicyPipeTransferTimeout(PipeID as Integer) as UInt32

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: Specifies the time-out interval.
Notes: The default value is zero.
The PipeTransferTimeout value specifies the time-out interval, in milliseconds. The host controller cancels transfers that do not complete within the specified time-out interval.

A value of zero (default) indicates that transfers do not time out because the host controller never cancels the transfer.
Lasterror is set.
(Read and Write computed property)

3.24.35 PipePolicyRawIO(PipeID as Integer) as boolean

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: Whether to use Raw IO.
Notes: The default value is false.
Enabling raw IO causes WinUSB to send data directly to the USB driver stack, bypassing WinUSB's queuing and error handling mechanism.
The buffers that are passed to ReadPipe must be configured by the caller as follows:

- The buffer length must be a multiple of the maximum endpoint packet size.

- The length must be less than or equal to the value of PipePolicyMaximumTransferSize.

Disabling raw IO (false) does not impose any restriction on the buffers that are passed to ReadPipe.
Lasterror is set.
(Read and Write computed property)

3.24.36 PipePolicyResetPipeOnResume(PipeID as Integer) as boolean

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: Whether to reset pipe on resume.
Notes: True indicates that on resume from suspend, WinUSB resets the endpoint before it allows the caller to send new requests to the endpoint.
Lasterror is set.
(Read and Write computed property)

3.24.37 PipePolicyShortPacketTerminate(PipeID as Integer) as boolean

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: Whether the driver sends a zero-length packet at the end of every write request to the host controller.
Notes: Lasterror is set.
(Read and Write computed property)

3.24.38   Constants

Power Policy Type Constants.

Constant	Value	Description
AutoSuspend	&h81	
SuspendDelay	&h83	

Device Speed Constants

Constant	Value	Description
FullSpeed	2	Full Speed
HighSpeed	3	High Speed
LowSpeed	1	Low Speed

3.25 class WinUSBNotificationMBS

3.25.1 class WinUSBNotificationMBS

Plugin Version: 11.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The class for getting notifications about USB devices being connected or removed.
Notes: Use MacUSBNotificationMBS for Mac OS X.
Blog Entries

- Showing USB Devices

- MBS Real Studio Plugins, version 11.3pr15

- MBS Real Studio Plugins, version 11.2pr3

3.25.2 Methods

3.25.3 Constructor

Plugin Version: 11.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The constructor initializes the notification engine.
Notes: On success WindowHandle and NotifyHandle is not zero.

3.25.4 Properties

3.25.5 NotifyHandle as Integer

Plugin Version: 11.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: Internal handle to the notification system.
Notes: (Read and Write property)

3.25.6 WindowHandle as Integer

Plugin Version: 11.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: Internal handle to the dummy window for receiving notification.
Notes: (Read only property)

3.25.7   Events

3.25.8   DeviceAdded(Name as string)

Plugin Version: 11.2, Platform: Windows, Targets: .

Function: This event is called when a device has been attached.
Notes: Name is typically for an USB device: "\\?\USB#Vid_05ac&Pid_8403#000000009833# { a5dcbf10-6530-11d2-901f-00c04fb951ed } ".
That means you can get Vendor ID and Product ID from this string. Also the unique ID and finally the class GUID.

3.25.9   DeviceRemoved(Name as string)

Plugin Version: 11.2, Platform: Windows, Targets: .

Function: This event is called when a device has been removed.
Notes: Name is typically for an USB device: "\\?\USB#Vid_05ac&Pid_8403#000000009833# { a5dcbf10-6530-11d2-901f-00c04fb951ed } ".
That means you can get Vendor ID and Product ID from this string. Also the unique ID and finally the class GUID.

3.26 class WinUSBPipeInformationMBS

3.26.1 class WinUSBPipeInformationMBS

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The class for pipe details.

3.26.2 Properties

3.26.3 Interval as Integer

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The pipe interval.
Notes: (Read and Write property)

3.26.4 MaximumPacketSize as Integer

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The maximum size, in bytes, of the packets that are transmitted on the pipe.
Notes: (Read and Write property)

3.26.5 PipeId as Integer

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The pipe identifier (ID).
Notes: (Read and Write property)

3.26.6 PipeType as Integer

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The pipe type.
Notes: (Read and Write property)

3.26.7   Constants

Pipe Type Constants

Constant	Value	Description
UsbdPipeTypeBulk	2	Indicates that the pipe is a bulk transfer pipe.
UsbdPipeTypeControl	0	Indicates that the pipe is a control pipe.
UsbdPipeTypeInterrupt	3	Indicates that the pipe is a interrupt pipe.
UsbdPipeTypeIsochronous	1	Indicates that the pipe is an isochronous transfer pipe.

3.27 class WinUSBSetupPacketMBS

3.27.1 class WinUSBSetupPacketMBS

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The metadata needed to create an USB packet.

3.27.2 Properties

3.27.3 Index as Integer

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The meaning of this member varies according to the request.
Notes: For an explanation of this member, see the Universal Serial Bus (USB) specification.
(Read and Write property)

3.27.4 Length as Integer

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The number of bytes to transfer.
Notes: (Read and Write property)

3.27.5 Request as Integer

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The device request.
Notes: The values that are assigned to this member are defined in Table 9.3 of section 9.4 of the Universal Serial Bus (USB) specification.
(Read and Write property)

3.27.6 RequestType as Integer

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The request type.
Notes: The values that are assigned to this member are defined in Table 9.2 of section 9.3 of the Universal Serial Bus (USB) specification (www.usb.org).

(Read and Write property)

3.27.7   Value as Integer

Plugin Version: 12.2, Platform: Windows, Targets: Desktop, Console & Web.

Function: The meaning of this member varies according to the request.
Notes: For an explanation of this member, see the Universal Serial Bus (USB) specification.
(Read and Write property)

Chapter 4

List of Questions in the FAQ

Chapter 5

The FAQ

5.0.1 Can anyone help me convert seconds to time in this format hh:mm:ss?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Sure, here's a routine I use (which has an advantage over the previously-posted Date-based solution in that you don't have to rely on the creation of an object – all that happens is some division and string concatenation):
Example:

```
Function SecsToTimeString(timeInSecs as Integer, padHours as boolean, padMinutes as boolean) as string
// Given an amount time (in seconds), generates a string representing that amount
// of time. The padHours and padMinutes parameters determine whether to display
// hours and minutes if their values are zero.

// Examples:
// timeInSecs = 90, padHours = true; returns "00:01:30"
// timeInSecs = 1, padHours = false, padMinutes = true; returns "00:01"
// timeInSecs = 3601, padMinutes = false; returns "01:00:01"

dim hours, minutes, seconds as Integer
dim hoursString, minutesString as string

hours = timeInSecs / 3600
minutes = (timeInSecs mod 3600) / 60
seconds = timeInSecs mod 60

if hours = 0 then
if padHours then
hoursString = "00:"
else
hoursString = ""
end if
```

```
else
hoursString = Format(hours, "##\:")
end if
if minutes = 0 then
if hours <>0 or padMinutes then
minutesString = "00:"
else
minutesString = ""
end if
else
minutesString = Format(minutes, "00\:")
end if

return hoursString + minutesString + Format(seconds, "00")
End Function
```

Notes: (from the rb mailinglist)

5.0.2   Do you have plugins for Android?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Since there is no plugin SDK for Android, we have no way to make a plugin for Android.
Notes: We support macOS, Windows, Linux and iOS.

5.0.3   How do I get the proper highlight color on Mac OS X for active/inactive selection?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use functions from NSColor to get proper highlight color in RGB:
Example:

```
Function ProperHighlightColor(active as Boolean) As Color
#if TargetCocoa
Dim theColor As NSColorMBS
If active Then
theColor = NSColorMBS.alternateSelectedControlColor
Else
theColor = NSColorMBS.secondarySelectedControlColor
End If

Dim rgbColor As NSColorMBS = theColor.colorUsingColorSpaceName(NSColorSpaceMBS.NSCalibrate-
```

dRGBColorSpace)
If rgbColor <>Nil Then
Dim red as Integer = rgbColor.redComponent * 255.0
Dim green as Integer = rgbColor.greenComponent * 255.0
Dim blue as Integer = rgbColor.blueComponent * 255.0
Return RGB(red, green, blue)
Else
Return HighlightColor
End If
#else
return HighlightColor
#endif
End Function

Notes: As you see we convert color to Calibrated RGB for best results.
See also:

5.0.4   How to catch delete key?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: The following is the code in keydown event catches delete or backspace keys.
Example:

Function KeyDown(Key As String) As Boolean
if asc(key) = 8 or asc(key) = 127 then
MsgBox "Delete"
Return true
end if
End Function

See also:

5.0.5　How to convert cmyk to rgb?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

The following is the code to convert cmyk values to an RGB color datatype.
It's just a basic estimate of the color values. If you are looking for completely color accurate solution, this is not it. It should work for most people. :)
Example:

```
Function CMYKToRGB(c as Integer, m as Integer, y as Integer, k as Integer) As color
// converts c,m,y,k values (0-100) to color data type RGB
// place this in a method. Supply C,M,Y,K values-
// it returns color datatype


dim color_RGB as color
dim r, g, b as Integer

r=255-round(2.55*(c+k))
if r<0 then
r=0
end if
g=255-round(2.55*(m+k))
if g<0 then
g=0
end if
b=255-round(2.55*(y+k))
if b<0 then
b=0
end if

color_RGB=RGB(r,g,b)

return color_RGB

End Function
```

Notes:

(from the rb mailinglist)
See also:

5.0.6   How to delete a folder?

Plugin Version: all, Platforms: macOS, Linux, Windows.

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
fo.delete
else ' file
```

fo.Delete
end if
next

f.Delete
End Sub

See also:

5.0.7   How to detect if CPU if 64bit processor?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Via CPUID you can ask CPU:
Example:

dim c as new CPUIDMBS

if c.Flags(CPUIDMBS.kFeatureLM) then
MsgBox "64-bit CPU"
else
MsgBox "32-bit CPU"
end if

Notes: Should work on all intel compatible CPUs.
See also:

5.0.8   How to query variant type string for a variant?

Plugin Version: 20.5, Platforms: macOS, Linux, Windows.

Answer: The following example function returns type string for variant.
Example:

```
Public Function VariantTypeString(v as Variant) as string
// Xojo's VarType doesn't know Unsigned integers
'Dim type As Integer = VarType(v)

// MBS VarType can detect unsigned integer
Dim type As Integer = GetVariantTypeMBS(v)

Dim IsArray As Boolean = BitwiseAnd(type, Variant.TypeArray) = Variant.TypeArray

// type without array
type = BitwiseAnd(type, Bitwise.OnesComplement(Variant.TypeArray))

// build a dictionary to map types on first call
Static TypeMap As Dictionary
If TypeMap = Nil Then
TypeMap = New Dictionary
TypeMap.Value(Variant.TypeBoolean) = "Boolean"
TypeMap.Value(Variant.TypeCFStringRef) = "CFStringRef"
TypeMap.Value(Variant.TypeColor) = "Color"
TypeMap.Value(Variant.TypeCString) = "CString"
TypeMap.Value(Variant.TypeCurrency) = "Currency"
TypeMap.Value(Variant.TypeDate) = "Date"
TypeMap.Value(Variant.TypeDateTime) = "DateTime"
TypeMap.Value(Variant.TypeDouble) = "Double"
TypeMap.Value(Variant.TypeInt32) = "Int32"
TypeMap.Value(Variant.TypeInt64) = "Int64"
TypeMap.Value(Variant.TypeInteger) = "Integer"
TypeMap.Value(Variant.TypeNil) = "Nil"
TypeMap.Value(Variant.TypeObject) = "Object"
TypeMap.Value(Variant.TypeOSType) = "OSType"
TypeMap.Value(Variant.TypePString) = "PString"
TypeMap.Value(Variant.TypePtr) = "Ptr"
TypeMap.Value(Variant.TypeSingle) = "Single"
TypeMap.Value(Variant.TypeString) = "String"
TypeMap.Value(Variant.TypeStructure) = "Structure"
TypeMap.Value(Variant.TypeText) = "Text"
TypeMap.Value(Variant.TypeWindowPtr) = "WindowPtr"
TypeMap.Value(Variant.TypeWString) = "WString"

// MBS extra types
TypeMap.Value(Variant.TypeInt32+100) = "UInt32"
TypeMap.Value(Variant.TypeInt64+100) = "UInt64"
```

End If

// lookup type

#if DebugBuild then
If Not TypeMap.HasKey(type) Then
Break // missing type
End If
#endif

If IsArray Then
Return "Array of " + TypeMap.Lookup(type,"?")
Else
Return TypeMap.Lookup(type,"?")
End If
End Function

See also:

5.0.9   How to refresh a htmlviewer on Windows?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can ask the browser to reload the website with this code line:
Example:

call htmlViewer1.IERunJavaScriptMBS("javascript:document.location.reload()")

See also:

5.0.10 Is there an example for vector graphics in Xojo?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Try this example inside the paint event of a window:
Example:

```
dim v as Group2D
dim r as RectShape
dim s as StringShape

const pi=3.14

s=new StringShape
s.Text="Hello World!"
s.TextFont="Geneva"
s.TextSize=24
s.FillColor=rgb(0,0,255)
s.Italic=true
s.y=5
s.x=0

r=new RectShape

r.X=0
r.y=0
r.Height=100
r.Width=180
r.BorderColor=rgb(255,0,0)
r.FillColor=rgb(0,255,0)
r.BorderWidth=5
r.Border=50

v=new Group2d
v.Append r
v.Append s
v.Rotation=pi*-20.0/180.0
v.x=150
v.y=150

g.DrawObject v
```

5.0.11   Picture functions do not preserve resolution values?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Yes, the picture functions return pictures with no/default resolution values.
Example:

dim l as Picture = LogoMBS(500)

l.HorizontalResolution = 300
l.VerticalResolution = 300

dim r as Picture = l.Rotate90MBS

MsgBox str(r.HorizontalResolution)+" x "+str(r.VerticalResolution)

r.HorizontalResolution = l.HorizontalResolution
r.VerticalResolution = l.VerticalResolution

MsgBox str(r.HorizontalResolution)+" x "+str(r.VerticalResolution)

Notes: So please fix them yourself after calling a function.

Maybe in the future this changes, but currently you can't really set this easily from plugin code.

5.0.12   A toolbox call needs a rect - how do I give it one?

Plugin Version: all, Platforms: macOS, Windows.

Answer: Fill a memoryblock like this:
Example:

Dim MB As Memoryblock
MB = NewMemoryBlock(8)
MB.Short(0) = window1.Top
MB.Short(2) = window1.Left
MB.Short(4) = window1.Height+window1.Top // bottom
MB.Short(6) = window1.Width+window1.Left // right

5.0.13   API client not supported?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: If you get this exception message on SQLConnectionMBS.Connect, we may have a problem.
Notes: First case is that the given thing is not supported (e.g. MS SQL directly on Mac).
Second case is that the plugin compilation went wrong and the support for the database was not linked into the plugin. Like MySQL missing or MS SQL on Windows missing. In that case please contact us to fix the plugin.

5.0.14   Can I access Access Database with Java classes?

Plugin Version: all, Platform: Windows.

Answer: You can use ucanaccess to access databases created with Microsoft
Example:

dim options(-1) as string

// load all the jar files we have in a folder called java:

dim appFolder as FolderItem = GetFolderItem("")

Dim count as Integer = appFolder.Parent.Child("java").Count
dim libjs() as string
For i as Integer = 1 to count
Dim f As FolderItem = appFolder.Parent.Child("java").item(i)
If f <>Nil and f.Exists Then
libjs.append f.NativePath+";"
End If
Next

// now init virtual machine
dim librery as string = Join(libjs, "")
dim vm as new JavaVMMBS(librery)

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

5.0.15   Can I create PDF from Xojo Report using DynaPDF?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Yes, we have a graphics class integration for DynaPDF.
Notes: Since MBS Plugin in version 19.2, we can integrate reports with Xojo.

5.0.16   Can I use AppleScripts in a web application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Yes, but they run on the server, not on the client.
Example:

dim a as new AppleScriptMBS

// query my application name
a.Compile "tell application ""System Events"" to return name of current application"

// run
a.Execute

// show result
label1.text = a.Result

// shows something like "My Application.fcgi.debug"

Notes: This can be useful to control the server from remote, if and only if the your sever is running Mac
OS X.

5.0.17   Can I use graphics class with DynaPDF?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Sorry, no. We can't provide a graphics subclass from plugin.
Notes: The is a feature request to allow graphics subclasses:
Feedback case 11391: feedback://showreport?report_id=11391

5.0.18   Can I use sockets on a web application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Yes, but they run on the server, not on the client.
Notes: You can use HTTPSocket, SMTPSocket, POP3Socket, SMTPSecureSocket, SecurePOP3Socket, EasyTCPSocket, EasyUDPSocket, AutoDiscovery, our Bonjour classes or our CURL* classes. But all of them work on the server, not on the client.

This means if you search for a printer with Bonjour, you can find the printers in the local network on your server hosting site. Using SMTPSocket may be a good idea for sending emails from the server like notifications.

5.0.19   Can I use your ChartDirector plugin on a web application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Yes, our ChartDirector plugin works just fine on the Xojo Web Edition.
Example:

```
// The data for the pie chart
dim data(-1) as Double=array(55.0, 18.0, 25.0, 22.0, 18.0, 30.0, 35.0)

// The labels for the pie chart, Words are 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(&hFFFFFF)

// Set the center of the pie at (180, 140) and the radius to 100 pixels
c.setPieSize 350,300,150
// Set the sector colors
c.setColors(c.kDataColor, colors)

// Draw the pie in 3D with a pie thickness of 20 pixels
c.set3D(20)

dim t as CDTextBoxMBS = c.setLabelStyle("arialbd.ttf", 10, &h000000)
t.setBackground(CDPieChartMBS.kSameAsMainColor, CDPieChartMBS.kTransparent, CDPieChartMBS.soft-Lighting(CDPieChartMBS.kRight, 0))
t.setRoundedCorners(8)

// Use local gradient shading for the sectors, with 5 pixels wide
// semi-transparent white (bbffffff) borders
c.setSectorStyle(CDPieChartMBS.kLocalGradientShading, &hbbffffff, 0)

// Set the pie data and the pie labels
c.setData data,labels
call c.setLabelStyle "arialbd.ttf",18

dim pic as picture = c.makeChartPicture
dim wp as new WebPicture(pic, Picture.FormatJPEG) // JPEG makes it smaller and faster

ImageView1.Picture=wp

Notes: Be aware that our plugin produces pictures for you, which you assign to ImageViews. Tranferring 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.

5.0.20   Can I use your DynaPDF plugin on a web application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Yes, our DynaPDF plugin works just fine on the Xojo Web Edition.
Notes: PDF files are created on the server. You may want to offer a preview to the user which uses reduced resolution images to reduce the time to download the PDF.

See our Create PDF example for the Xojo Web Edition.

5.0.21   Can I use your plugin controls on a web application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: No.

5.0.22   Can you get an unique machine ID?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: There is nothing like an unique machine ID.
Notes: 1:
You can use the MAC IDs of the network interfaces.
This can be changed by the user with software tools.
And the list of network interfaces changes if user reorder the interfaces.

2:
You can use the system folder creation date/time.
This may stay equal after cloning machines or after migration to
new PC.

3:
You can use the Mac Serialnumber.
Mac only and it can happen that a Mac does not have a serial
number.

4:
You can use the x86 CPU ID.
This is x86 CPU only and does not avoid running on the same CPU in
different PCs.

5.0.23   ChartDirector: Alignment Specification

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

Answer: ChartDirector: Alignment Specification
Notes: In many ChartDirector objects, you may specify the alignment of the object's content relative to its boundary. For example, for a TextBox object, you may specify the text's alignment relative to the box boundary by using TextBox.setAlignment.

The ChartDirector API defines several constants for the alignment options.

ConstantValueDescription

BottomLeft	1	The leftmost point on the bottom line.
BottomCenter	2	The center point on the bottom line.
BottomRight	3	The rightmost point on the bottom line.
Left	4	The leftmost point on the middle horizontal line.
Center	5	The center point on the middle horizontal line.
Right	6	The rightmost point on the middle horizontal line.
TopLeft	7	The leftmost point on the top line.
TopCenter	8	The center point on the top line.
TopRight	9	The rightmost point on the top line.
Bottom	2	The center point on the bottom line. Same as BottomCenter.
Top	8	The center point on the top line. Same as TopCenter.
TopLeft2	10	An alternative top-left position used in Axis.setTitlePos for axis title positioning only. For a vertical axis, TopLeft2 refers to refers to the left of the top side, while TopLeft refers to the top of the left side. The reverse applies for a horizontal axis.
TopRight2	11	An alternative top-right position used in Axis.setTitlePos for axis title positioning only. For a vertical axis, TopRight2 refers to refers to the right of the top side, while TopRight refers to the top of the right side. The reverse applies for a horizontal axis.
BottomLeft2	12	An alternative bottom-left position used in Axis.setTitlePos for axis title positioning only. For a vertical axis, BottomLeft2 refers to refers to the left of the bottom side, while BottomLeft refers to the bottom of the left side. The reverse applies for a horizontal axis.
BottomRight2	13	An alternative bottom-right position used in Axis.setTitlePos for axis title positioning only. For a vertical axis, BottomRight2 refers to refers to the right of the bottom side, while BottomRight refers to the bottom of the right side. The reverse applies for a horizontal axis.

5.0.24   ChartDirector: Color Specification

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

Answer: ChartDirector: Color Specification
Notes: Many functions in the ChartDirector API accept colors as parameters. ChartDirector supports col-

ors specified in web and HTML compatible ARGB format, in which ARGB refers to the Alpha transparency, Red, Green and Blue components of the color.

In addition to ARGB colors, ChartDirector supports "dynamic" colors. A dynamic color is a color that changes depending on the position of the pixels. The "dynamic" colors that ChartDirector supports include "pattern colors", "metal colors", "gradient colors", "zone colors" and "dash line colors".

ChartDirector supports specifying colors indirectly using "palette colors". When a "palette color" is used, the color is specified as an index to a palette. The actual color is looked up from the palette.ARGB Color ARGB color consists of 4 components - alpha transparency, red, green and blue. The four components are encoded as a 32-bit number, with each component occupying 8 bits. In hexadecimal notation, it is AAR-RGGBB, where AA, RR, GG and BB are the alpha transparency, red, green and blue components.

Each component ranges from 00 - FF (0 - 255), representing its intensity. For example, pure red color is 00FF0000, pure green color is 0000FF00, and pure blue color is 000000FF. White color is 00FFFFFF, and black color is 00000000.

Most programming language requires you to put special prefix in front of hexadecimal characters. For C++, the prefix is "0x". For example, the syntax for the hexadecimal number 00FFFFFF is 0x00FFFFFF, or simply 0xFFFFFF.
For the alpha transparency component, a zero value means the color is not transparent all at. This is equivalent to traditional RGB colors. A non-zero alpha transparency means the 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 looks 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

Constant	Value	Description
Palette	FFFF0000	The starting point of the palette. The first palette color is (Palette + 0). The nth palette color is (Palette + n - 1).
BackgroundColor	FFFF0000	The background color.
LineColor	FFFF0001	The default line color.
TextColor	FFFF0002	The default text color.
[Reserved]	FFFF0003 - FFFF0006	These palette positions are reserved. Future versions of ChartDirector may use these palette positions for colors that have special significance.
SameAsMainColor	FFFF0007	A dynamic color that is equal to the data color of the current data set. This color is useful for objects that are associated with data sets. For example, in a pie chart, if the sector label background color is SameAsMainColor, its color will be the same as the corresponding sector color.
DataColor	FFFF0008	The starting point for the automatic data color allocation.

When a chart is created, it has a default palette. You may modify the palette using BaseChart.setColor, BaseChart.setColors, or BaseChart.setColors2.

The advantages of using palette colors are that you can change the color schemes of the chart in one place. ChartDirector comes with several built-in palettes represented by the following predefined constants.

ConstantDescription

5.0.25 ChartDirector: Font Specification

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

defaultPalette	An array of colors representing the default palette. This palette is designed for drawing charts on white backgrounds (or lightly colored backgrounds).
whiteOnBlackPalette	An array of colors useful for drawing charts on black backgrounds (or darkly colored backgrounds).
transparentPalette	An array of colors useful drawing charts on white backgrounds (or lightly colored backgrounds). The data colors in this palette are all semi-transparent.

Answer: ChartDirector: Font Specification

Notes: Font Name

In ChartDirector, the font name is simply the file name that contains the font. For example, under the Windows platform, the "Arial" font is "arial.ttf", while the "Arial Bold" font is "arialbd.ttf".

NOTE: Mac OS X Specific Information

In Mac OS X, in addition to ".ttf", ChartDirector also supports Mac OS X font file formats, such as Font Suitcase files and Datafork files (.dfont). These files often contain multiple fonts. For example, the "Gill-Sans.dfont" file contains 6 fonts.

So in addition to the file name, an index is needed to determine the font. The index is specified by appending a " | " character to the font name, followed by the index number. For example, the third font in "GillSans.dfont" is denoted as "GillSans.dfont | 2". (Note: The first font starts at 0.) If no index number is provided, the first font is assumed.

ChartDirector also supports using Mac OS X Font Manager names. For example, one may use "Gill Sans Light Italic" instead of using "GillSans.dfont | 1" as the font name. However, the Mac OS X Font Manager is active only if someone has logged into the Mac GUI console, so this method is only recommended for developing applications that run on the GUI console.

The sample programs that come with ChartDirector are designed to run on all operating systems, so they use generic font file names (eg. "arial.ttf") instead of Mac OS X specific names. To allow them to run on Mac OS X, ChartDirector on Mac OS X has a built-in table to map common font file names to Mac OS X font names:

"arial.ttf", "arialbd.ttf", "ariali.ttf" and "arialbi.ttf" are mapped to "Arial | 0" (Arial), "Arial | 1" (Arial Bold), "Arial | 2" (Arial Italic) and "Arial | 3" (Arial Bold Italic)

"times.ttf", "timesbd.ttf", "timesi.ttf" and "timesbi.ttf" are mapped to "Times New Roman | 0" (Times New Roman), "Times New Roman | 1" (Times New Roman Bold), "Times New Roman | 2" (Times New Roman Italic) and "Times New Roman | 3" (Times New Roman Bold Italic)

"cour.ttf", "courbd.ttf", "couri.ttf" and "courbi.ttf" are mapped to "Courier New | 0" (Courier New), "Courier New | 1" (Courier New Bold), "Courier New | 2" (Courier New Italic) and "Courier New | 3" (Courier New Bold Italic)

Font Location

ChartDirector on Windows does not come with any font files. It relies on the operating system's font files in the " [windows] \Fonts" directory. To see what fonts are installed in your operating system and their file names, use the File Explorer to view that directory.

ChartDirector on Windows will also search for the font files in the "fonts" subdirectory (if it exists) under the directory where the ChartDirector DLL "chartdir.dll" is installed. This is useful for private fonts. Also, for some especially secure web servers, the web anonymous user may not have access to the " [windows] \Fonts" directory. In this case, you may copy the font files to the above subdirectory.

ChartDirector on Mac OS X relies on operating system font files in "/Library/Fonts" and "/System/Library/Fonts".

ChartDirector on Linux, FreeBSD and Solaris assume the fonts files are in the "fonts" subdirectory under the directory where the ChartDirector shared object "libchartdir.so" is installed. ChartDirector on Linux, FreeBSD and Solaris come with a number of font files in the "fonts" subdirectory.

To keep the download size small, ChartDirector on Linux, FreeBSD and Solaris only come with some commonly used fonts. You may download additional fonts from the Internet. In particular, the Microsoft fonts at

http://sourceforge.net/project/showfiles.php?group_id=34153&release_id=105355

is highly recommended. Please refer to

http://www.microsoft.com/typography/faq/faq8.htm

on how you could use the fonts legally in your system.

ChartDirector supports True Type fonts (.ttf), Type 1 fonts (.pfa and .pfb) and Windows bitmap fonts (.fon). On Mac OS X, ChartDirector also supports Font Suitcase and Datafork (.dfont) files. On Linux, FreeBSD and Solaris, ChartDirector also supports Portable Compiled Fonts (.pcf fonts).

If you want ChartDirector to search other directories for the font files, you may list the directories in an environment variable called "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 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.

5.0.26 ChartDirector: Mark Up Language

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

Answer: ChartDirector: Mark Up Language
Notes: ChartDirector Mark Up Language (CDML) is a language for including formatting information in text strings by marking up the text with tags.

CDML allows a single text string to be rendered using multiple fonts, with different colors, and even embed images in the text.Font Styles
You can change the style of the text by using CDML tags. For example, the line:

<*font=timesi.ttf,size=16,color=FF0000>Hello <*font=arial.ttf,size=12,color=8000*>world!
will result in the following text rendered:

In general, all tags in CDML are enclosed by <* and *>. Attributes within the tags determine the styles of the text following the tags within the same block.

If you want to include <* in text without being interpreted as CDML tags, use «* as the escape sequence.

The following table describes the supported font style attributes in CDML. See Font Specification for details on various font attributes.

AttributeDescription

Set the following text to be in superscript style. This attribute does not need to have a value. (You may use "super" as the attribute instead of "super=1".)

Note that unlike HTML tags, no double or single quotes are used in the tags. It is because CDML tags are often embedded as string literals in source code. The double or single quotes, if used, will conflict with the string literal quotes in the source code. Therefore in CDML, no quotes are necessary and they must not be used.

Also, unlike HTML tags, CDML uses the comma character as the delimiter between attributes. It is because certain attributes may contain embed spaces (such as the font file name). So space is not used as the delimiter and the comma character is used instead.

Note the font attribute above starts a new style section, while other attributes just modify the current style

font	Starts a new style section, and sets the font name. You may use this attribute without a value (that is, use "font" instead of "font=arial.ttf") to create a new style section without modifying the font name.
size	The font size.
width	The font width. This attribute is used to set the font width and height to different values. If the width and height are the same, use the size attribute.
height	The font height. This attribute is used to set the font width and height to different values. If the width and height are the same, use the size attribute.
color	The text color in hex format.
bgColor	The background color of the text in hex format.
underline	The line width of the line used to underline the following characters. Set to 0 to disable underline.
sub	Set the following text to be in subscript style. This attribute does not need to have a value. (You may use "sub" as the attribute instead of "sub=1".)
super	Set the following text to be in superscript style.

xoffset	Draw the following the text by shifting the text horizontally from the original position by the specified offset in pixels.
yoffset	Draw the following the text by shifting the text vertically from the original position by the specified offset in pixels.
advance	Move the cursor forward (to the right) by the number of pixels as specified by the value this attribute.
advanceTo	Move the cursor forward (to the right) to the position as specified by the value this attribute. The position is specified as the number of pixels to the right of the left border of the block. If the cursor has already passed through the specified position, the cursor is not moved.

section. You may use <*/font*>to terminate a style section, which will restore the font styles to the state before the style section.Blocks and Lines

In CDML, a text string may contain multiple blocks. A block may contain multiple lines of text by separating them with new line characters ("\n") or with <*br*>. The latter is useful for programming languages that cannot represent new line characters easily.

For example, the line:

<*size=15*><*block*><*color=FF*>BLOCK<*br*>ONE<*/*>and <*block*><*color=FF00*>BLOCK<*br*>TWO< will result in the following text rendered:

The above example contains a line of text. The line contains two blocks with the characters " and " in between. Each block in turn contains two lines. The blocks are defined using <*block*>as the start tag and

<*/*>as the end tag.

When a block ends, font styles will be restored to the state before entering the block.Embedding Images
CDML supports embedding images in text using the following syntax:

<*img=my_image_file.png*>
where my_image_file.png is the path name of the image file.

For example, the line:

<*size=20*>A <*img=sun.png*>day
will result in the following text rendered:

ChartDirector will automatically detect the image file format using the file extension, which must either png, jpg, jpeg, gif, wbmp or wmp (case insensitive).

Please refer to BaseChart.setSearchPath or DrawArea.setSearchPath on the directory that ChartDirector will search for the file.

The <*img*>tag may optionally contain width and height attributes to specify its pixel width and height. In this case, ChartDirector will stretch or compress the image if necessary to the required width and height.Blocks Attributes
CDML supports nesting blocks, that is, a block can contain other sub-blocks. Attributes are supported in the <*block*>tag to control the alignment and orientation of the sub-blocks. The <*img=my_image_file.png*>is treated as a block for layout purposes.

For example, the line:

<*block,valign=absmiddle*><*img=molecule.png*><*block*>Hydrazino\nMolecule<*/*><*/*>
will result in the following text rendered:

The the above starts <*block,valign=absmiddle*>which specifies its content should align with each others in the vertical direction using the absolute middle alignment. The block contains an image, followed by a space characters, and then another block which has two lines of text.

The following table describes the supported attributes inside <*block*>tag:

AttributeDescription

The value baseline means the baseline of sub-blocks should align with the baseline of the block. The baseline

width	The width of the block in pixels. By default, the width is automatically determined to be the width necessary for the contents of the block. If the width attribute is specified, it will be used as the width of the block. If the width is insufficient for the contents, the contents will be wrapped into multiple lines.
height	The height of the block in pixels. By default, the height is automatically determined to be the height necessary for the contents of the block. If the height attribute is specified, it will be used as the height of the block.
maxwidth	The maximum width of the block in pixels. If the content is wider than maximum width, it will be wrapped into multiple lines.
truncate	The maximum number of lines of the block. If the content requires more than the maximum number of lines, it will be truncated. In particular, if truncate is 1, the content will be truncated if it exceeds the maximum width (as specified by maxwidth or width) without wrapping. The last few characters at the truncation point will be replaced with ”...”.
linespacing	The spacing between lines as a ratio to the default line spacing. For example, a line spacing of 2 means the line spacing is two times the default line spacing. The default line spacing is the line spacing as specified in the font used.
bgColor	The background color of the block in hex format.
valign	The vertical alignment of sub-blocks. This is for blocks that contain sub-blocks. Supported values are baseline, top, bottom, middle and absmiddle.

is the underline position of text. This is normal method of aligning text, and is the default in CDML. For images or blocks that are rotated, the baseline is the same as the bottom.

The value top means the top line of sub-blocks should align with the top line of the block.

The value bottom means the bottom line of sub-blocks should align with the bottom line of the block.

The value middle means the middle line of sub-blocks should align with the the middle line of the block. The middle line is the middle position between the top line and the baseline.

The value absmiddle means the absolute middle line of sub-blocks should align with the absolute middle line of the block. The absolute middle line is the middle position between the top line and the bottom line.

halign	The horizontal alignment of lines. This is for blocks that contain multiple lines. Supported values are left, center and right.

The value left means the left border of each line should align with the left border of the block. This is the default.

The value center means the horizontal center of each line should align with the horizontal center of the block.

The value right means the right border of each line should align with the right border of the block.

angle   Rotate the content of the block by an angle. The angle is specified in degrees in counter-clockwise direction.

5.0.27   ChartDirector: Parameter Substitution and Formatting

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

Answer: ChartDirector: Parameter Substitution and Formatting
Notes: ChartDirector charts often contain a lot of text strings. For example, sector labels in pie charts, axis labels for x and y axes, data labels for the data points, HTML image maps, etc, are all text strings.

ChartDirector uses parameter substitution to allow you to configure precisely the information contained in the text and their format.
Format Strings
In parameter substitution, format strings are used to specify the entities to be include into labels and how to format numbers and dates.

For example, when drawing a pie chart with side label layout, the default sector label format string is:

" { label } ({ percent } %)"

When the sector label is actually drawn, ChartDirector will replace " { label } " with the sector name, and " { percent } " with the sector percentage. So the above label format will result is a sector label similar to "ABC (34.56%)".

You may change the sector label format by changing the format string. For example, you may change it to:

" { label } : US$ { value | 2 } K ({ percent } %)"

The sector label will then become something like "ABC: US$ 123.00 (34.56%)".

In general, in ChartDirector parameter substitution, parameters enclosed by curly brackets will be substituted with their actual values when creating the texts.

For parameters that are numbers or dates/times, ChartDirector supports a special syntax in parameter substitution to allow formatting for these values. Please refer to the Number Formatting and Date/Time Formatting sections below for details.

Parameter Expressions

ChartDirector supports numeric expressions in format strings. They are denoted by enclosing the expression with curly brackets and using "=" as the first character. For example:

"USD { value } (Euro { = { value } *0.9 })"

In the above, " { value } " will be substituted with the actual value of the sector. The expression " { = { value } *0.9 } " will be substituted with the actual value of the sector multiplied by 0.9.

ChartDirector parameter expressions support operators "+", "-", "*", "/", "%" (modulo) and "^" (exponentiation). Operators "*", "/", "%", "^" is computed first, followed by "+" and "-". Operators of the same precedence are computed from left to right). Parenthesis "(" and ")" can be used to change the computation order.

Parameters for Pie Charts

The following table describes the parameters available for pie charts.

Parameter	Description
sector	The sector number. The first sector is 0, while the nth sector is (n-1).
dataSet	Same as { sector } . See above.
label	The text label of the sector.
dataSetName	Same as { label } . See above.
value	The data value of the sector.
percent	The percentage value of the sector.
fieldN	The (N + 1)th extra field. For example, { field0 } means the first extra field. An extra field is an array of custom elements added using BaseChart.addExtraField or BaseChart.addExtraField2.

Parameters for All XY Chart Layers

The followings are parameters that are apply to all XY Chart layers in general. Some layer types may have additional parameters (see below).

Note that certain parameters are inapplicable in some context. For example, when specifying the aggregate label of a stacked bar chart, the { dataSetName } parameter is inapplicable. It is because a stacked bar is composed of multiple data sets. It does not belong to any particular data set and hence does not have a data set name.

{ fieldN } means the extra field is indexed by the data point number. The Pth data point corresponds to the Pth element of the extra field.

Additional Parameters for Line Layers
The followings are parameters that are in additional to the parameters for all XY Chart layers.

Additional Parameters for Trend Layers
The followings are parameters that are in additional to the parameters for all XY Chart layers.

Additional Parameters for Box-Whisker Layers
The followings are parameters that are in additional to the parameters for all XY Chart layers.

Additional Parameters for HLOC and CandleStick Layers
The followings are parameters that are in additional to the parameters for all XY Chart layers.

Additional Parameters for Vector Layers
The followings are parameters that are in additional to the parameters for all XY Chart layers.

Parameters for All Polar Layers
The followings are parameters that are apply to all Polar Chart layers in general. Some layer types may have additional parameters (see below).

{ fieldN } means the extra field is indexed by the data point number. The Pth data point corresponds to the Pth element of the extra field.

Additional Parameters for PolarVector Layers
The followings are parameters that are in additional to the parameters for all Polar Chart layers.

Parameters for Axis
The following table describes the parameters available for pie charts.

Number Formatting
For parameters that are numbers, ChartDirector supports a number of formatting options in parameter substitution.

For example, if you want a numeric field { value } to have a precision of two digits to the right of the decimal point, use ',' (comma) as the thousand separator, and use '.' (dot) as the decimal point, and you may use { value | 2,. } . The number 123456.789 will then be displayed as 123,456.79.

For numbers, the formatting options are specified using the following syntax:

{ [param] | [a] [b] [c] [d] }

where:

If this field starts with "E" or "e", followed by a number, it means formatting the value using scientific notation with the specified number of decimal places. If the "E" or "e" is not followed by a number, 3 is assumed.

For example, { value | E4 } will format the value 10.3 to 1.0300E+1, and { value | e4 } will format the same value to 1.0300e+1.

If this field starts with "G" or "g", followed by a number, it means formatting the value using the scientific notation only if the value is large and requires more than the specified number of digits, or the value is less than 0.001. If scientific notation is used, the number following "G" or "g" also specifies the number of significant digits to use. If the "G" or "g" is not followed by a number, 4 is assumed.

For example, consider the format string { value | G4 } . The value 10 will be formatted to 10. The value 100000 will be formatted to 1.000E+5. Similarly, for { value | g4 } , the value 10 will be formatted to 10, while the value 100000 will be formatted to 1.000e+5.

If you skip this argument, ChartDirector will display the exact value using at most 6 decimal places.

You may skip [b] [c] [d] . In this case, the default will be used.

Date/Time Formatting
For parameters that are dates/times, the formatting options can be specified using the following syntax:

{ [param] | [datetime_format_string] }

where [datetime_format_string] must start with an english character (A-Z or a-z) that is not "G", "g", "E" or "e", and may contain any characters except ' } '. (If it starts with "G", "g", "E" or "e", it will be considered as a number format string.)

Certain characters are substituted according to the following table. Characters that are not substituted will be copied to the output.

For example, a parameter substitution format of { value | mm-dd-yyyy } will display a date as something similar to 09-15-2002. A format of { value | dd/mm/yy hh:nn:ss a } will display a date as something similar to 15/09/02 03:04:05 pm.

If you want to include characters in the format string without substitution, you may enclose the characters in single or double quotes.

For example, the format { value | mmm '<*color=dd0000*>'yyyy } will display a date as something like Jan <*color=dd0000*>2005 (the <*color=dd0000*>is a CDML tag to specify red text color). Note that the <*color=dd0000*>tag is copied directly without substitution, even it contains "dd" which normally will be substituted with the day of month.
Escaping URL/HTML/CDML characters
Parameter substitution is often used to create HTML image maps. In HTML, some characters has special meanings and cannot be used reliably. For example, the '>' is used to represent the end of an HTML tag.

Furthermore, if the field happens to be used as an URL, characters such as '?', '&' and '+' also have special meanings.

By default, ChartDirector will escape template fields used in URL and query parameters when generating image maps. It will modify URL special characters to the URL escape format "%XX" (eg. "?" will become "%3F"). After that, it will modify HTML special characters to the HTML escape format "&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.

5.0.28   ChartDirector: Shape Specification

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

Answer: ChartDirector: Shape Specification
Notes: Several ChartDirector API accept shape specification as arguments. For example, BarLayer.setBarShape and BarLayer.setBarShape2 can be used to specify shapes of bars in bar charts, while DataSet.setDataSymbol, DataSet.setDataSymbol4, PolarLayer.setDataSymbol and PolarLayer.setDataSymbol4 can be used to specify shapes for data symbols.

Note that in addition to shapes, in many cases ChartDirector also accepts images or custom draw objects for data representation. For example, see DataSet.setDataSymbol2, DataSet.setDataSymbol3, PolarLayer.setDataSymbol2 and PolarLayer.setDataSymbol3.

Built-In Shapes

Built-in shapes are specified as integers. The integers can be explicit constants, or can be generated by a ChartDirector method for parameterized shapes. For example, a circle is represented by an explicit constant CircleShape (=7). On the other hand, the number representing a polygon depends on the number of sides the polygon has, so it is generated by using the PolygonShape method, passing in the number of sides as argument.

The following table illustrates the various ChartDirector shapes:

Custom Shapes

In ChartDirector, custom shapes are specified as an array of integers x0, y0, x1, y1, x2, y2 ... representing the coordinates of the vertices of the custom polygonal shape.

The polygon should be defined with a bounding square of 1000 x 1000 units, in which the x-axis is from -500 to 500 going from left to right, and the y-axis is from 0 to 1000 going from bottom to top.

ChartDirector will automatically scale the polygon so that 1000 units will become to the pixel size as requested by the various ChartDirector API.

As an example, the shape of the standard diamond shape in ChartDirector is represented as an array with 8 numbers:

0, 0, 500, 500, 0, 1000, -500, 500

5.0.29   Copy styled text?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: How to quickly copy styled text from one textarea to another?
Example:

#if TargetWin32 then
TextArea1.WinRTFDataMBS = TextArea2.WinRTFDataMBS
#elseif TargetMacOS then
TextArea1.NSTextViewMBS.textStorage.setAttributedString TextArea2.NSTextViewMBS.textStorage
#else
TextArea1.StyledText = TextArea2.StyledText
#endif

Notes: The code above uses special plugin functions on Mac and Windows and falls back to framework for Linux.

5.0.30 Do you have code to validate a credit card number?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can check the checksum to tell if a credit card number is not valid.
Example:

```
Dim strNumber As String
Dim nLength as Integer
Dim nValue as Integer
Dim nChecksum as Integer
Dim nIndex as Integer

strNumber = EditField1.Text
nLength = Len(strNumber)
nChecksum = 0

For nIndex = 0 To nLength - 2
nValue = Val(Mid(strNumber, nLength - (nIndex + 1), 1)) * (2 - (nIndex Mod 2))
If nValue <10 Then
nChecksum = nChecksum + nValue
Else
nChecksum = nChecksum + (nValue - 9)
End If
Next

If Val(Mid(strNumber, Len(strNumber), 1)) = (10 - (nChecksum Mod 10)) Mod 10 Then
MsgBox("The credit card number looks valid")
Else
MsgBox("The credit card number is invalid")
End IF
```

Notes: Here's some code that will validate the checksum for a credit card. It works for Visa, MasterCard, American Express and Discover. Not sure about others, but I imagine they use the same basic algorithm. Of course, this doesn't actually mean that the credit card is valid, it's only useful for helping the user catch typos.

The above code doesn't have any error checking and it expects that the credit card number will be entered without spaces, dashes or any other non-numeric characters. Addressing those issues will be an exercise left to the reader. :)

(From Mike Stefanik)

5.0.31   Do you have plugins for X-Rite EyeOne, eXact or i1Pro?

Plugin Version: all.

Answer: Our EyeOne plugin is available on request for licensees of the X-Rite SDKs.
Notes: Please first go to X-Rite and get a SDK license.
Than we can talk about the plugin.

5.0.32   Does SQL Plugin handle stored procedures with multiple result sets?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Yes, the plugin can work with multiple recordsets.
Notes: You need to use SQLCommandMBS class. When you get back results, you use FetchNext to walk over all records in the first result set. Than 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.

5.0.33   Does the plugin home home?

Plugin Version: all, Platform: macOS.

Answer: Yes, we like to know who is using the plugin, so the plugin may contact our server.
Example:

none.

Notes: Please note that this does not affect your users as the plugin will only do this in the IDE and the relevant plugin part is never included in your applications.

The plugin if used for some hours, does contact our server to provide statistical data about Xojo version and OS versions. This way we know what versions are used. We can return the version number of the current plugin which may be visible in future versions somehow. And we transmit partial licenses data so we can track use of illegal license keys.

If you do not like to have this, you can block Xojo IDE from contacting our website via your Firewall. Blocking the transfer will not disable the plugin or change the features.
Or contact us for a plugin version which explicitly does not contain this feature.

5.0.34 folderitem.absolutepath is limited to 255 chars. How can I get longer ones?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Paths on a Mac are not unique, so use them only to display them to the user.
Example:

```
Function AbsolutePath(f as FolderItem) As String
Dim s as string
Dim nf as FolderItem
nf = f
s = ""
while nf<>nil
s = nf.name + ":" + s
nf = nf.parent
wend
Return s
End Function
```

5.0.35 Has anyone played round with using CoreImage to do things like add dissolve transitions say when changing from one tab to another within a window?

Platform: macOS.

Answer: This code implements animations for a tabpanel change:
Example:

```
// in a tabpanel.change event:

dim r as CGSTransitionRequestMBS
dim co as new CGSConnectionMBS
dim cw as CGSWindowMBS
dim ct as CGSTransitionMBS
static OldTab as Integer

cw=co.CGSWindow(window1)
If cw = Nil Then
return // 10.3...
End If
r=new CGSTransitionRequestMBS
r.TransitionType=r.CGSFlip
r.HasBackGround=false
r.HasBackColor=false
r.Win=cw
```

```
// watch the value of the clicked tab versus the last tab
if tabpanel1.Value=0 or tabpanel1.Value <OldTab then
r.TransitionOption=r.CGSLeft
ct=co.NewTransition(r)
if ct<>Nil then
Refresh
ct.Invoke(1)
ct.Wait(1)
ct.Release
else
MsgBox "Error creating the transition."
end if
else
r.TransitionOption=r.CGSRight
ct=co.NewTransition(r)
if ct<>Nil then
Refresh
ct.Invoke(1)
ct.Wait(1)
ct.Release
else
MsgBox "Error creating the transition."
end if
end if
// Keep track of the last tab clicked
OldTab = tabpanel1.Value
```

Notes: See CGS* classes for more details.

5.0.36   How about Plugin support for older OS X?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: We support in general Mac OS X 10.5 and newer.
Notes: All the 64-bit plugins on Mac require OS X 10.7.
Intel 32-bit plugins on Mac require OS X 10.5 or newer.

Currently the ChartDirector 6, GraphicsMagick and GameKit plugins requires Mac OS X 10.6.
Also for SQL Plugin the built in SQLite library requires 10.6.

5.0.37 How can I detect whether an Intel CPU is a 64bit CPU?

Plugin Version: all.

Answer: Look on the CPU family returned by sysctl:
Example:

```
Function is64bit() As Boolean

#if TargetLittleEndian

dim m as MemoryBlock = NewMemoryBlock(8)
dim family as Integer
dim s as string

m=SystemControlNameToMIBMBS("hw.cpufamily")
m=SystemControlMBS(m)

if m<>nil then
m.LittleEndian=True
family=m.Long(0)

const CPUFAMILY_INTEL_6_14 = &h73d67300 //* "Intel Core Solo" and "Intel Core Duo" (32-bit
Pentium-M with SSE3) */
const CPUFAMILY_INTEL_6_15 = &h426f69ef //* "Intel Core 2 Duo" */
const CPUFAMILY_INTEL_6_23 = &h78ea4fbc //* Penryn */
const CPUFAMILY_INTEL_6_26 = &h6b5a4cd2 //* Nehalem */

Select case family
case CPUFAMILY_INTEL_6_14
Return false
case CPUFAMILY_INTEL_6_15
Return true
case CPUFAMILY_INTEL_6_23
Return true
case CPUFAMILY_INTEL_6_26
Return true
// newer CPUs may be missing here
end Select

end if

#endif

Return false

Exception
Return false
End Function
```

Notes: This code is written for Mac OS X where you only have a limited number of possible CPUs.

5.0.38   How can I disable the close box of a window on Windows?

Plugin Version: all, Platform: Windows.

Answer: The following code will remove the close item from the system menu of the window.
Example:

```
#if TargetWin32 then
Declare Function GetSystemMenu Lib "user32" (hwnd as Integer, bRevert as Integer) as Integer
Declare Function RemoveMenu Lib "user32" (hMenu as Integer, nPosition as Integer, wFlags as Integer) as
Integer
Dim hSysMenu as Integer
hSysMenu = GetSystemMenu(me.WinHWND, 0)
RemoveMenu hSysMenu, &HF060, &H0
#endif
```

Notes: The window may not be updated directly.

5.0.39   How can I get all the environment variables from Windows?

Plugin Version: all, Platform: Windows.

Answer: Try this code:
Example:

```
#if targetWin32
declare function GetEnvironmentStrings Lib "kernel32" () as ptr
dim m as memoryBlock
dim n as Integer

m=GetEnvironmentStrings()

n=0
do
msgBox m.cstring(n)
while m.byte(n)<>0
n=n+1
wend
n=n+1
```

```
loop until m.byte(n)=0
#endif
```

Notes: The MBS Plugin has an EnvironmentMBS class for this.

5.0.40 How can i get similar behavior to Roxio Toast or iTunes where clicking a 'burn' button allows the next inserted blank CD-R to bypass the Finder and be accepted by my application?

Plugin Version: all, Platform: macOS.

Answer: You need to get a media reservation.
Example:

```
dim d as DRDeviceMBS // get a device
d.AcquireMediaReservation
```

Notes: Use the plugin function AcquireMediaReservation and later release it using ReleaseMediaReservation.
See plugin examples on how to use it and check Apples DiscRecording framework documentation for more details.

5.0.41 How can I get text from a PDF?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Crossplatform you can use DynaPDF Pro.
Notes: On Mac OS X you can also use PDFKit for the same job.
While DynaPDF Pro gives you each bit of text with rotation, font information and encoding details, PDFKit gives you only the text string for a PDF page.

5.0.42 How can I get text from a Word Document?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: to get the text string from a doc file, use the NSAttributedStringMBS class.
Notes: The NSAttributedStringMBS class is Mac OS X only and we have currently no solution for Windows or Linux.

Use the NSAttributedStringMBS.initWithDocFormat(data as string) as boolean method.

5.0.43   How can I get the item string for a given file creator?

Plugin Version: all.

Answer: Try this function:
Example:

```
Sub pullNativeDocs(aCREA As string)
Dim result as Integer
Dim m, k as memoryBlock
Dim f as folderItem
Dim newType as string
Dim anIcon As picture
Dim ofs as Integer

Declare Function GetFileTypesThatAppCanNativelyOpen Lib "Carbon" (appVRefNumHint as Short, appSig-
nature as OSType, nativeTypes as Ptr) as Short Inline68K("701CABFC")
Declare Function GetDocumentKindString Lib "Carbon" (docVRefNum as Short, docType as OSType, doc-
Creator 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.

5.0.44 How can I launch an app using it's creator code?

Plugin Version: all, Platform: macOS.

Answer: Send an AppleEvent "odoc" with the creator code to the Finder ("MACS"):
Example:

Function LaunchByCreator(C As String) As Boolean
Dim A As AppleEvent
A = NewAppleEvent("aevt","odoc","MACS")
A.ObjectSpecifierParam("—-") = GetUniqueIDObjectDescriptor("appf",nil,C)
return A.Send
End Function

5.0.45 How can I learn what shared libraries are required by a plugin on Linux?

Plugin Version: all, Platform: macOS.

Answer: Please use the ldd command in the terminal.
Notes: You build an app on any platform, but for Linux.
For the resulting .so files in the libs folder, you can run the ldd command with the library path as parameter.
It shows you references lib files and you can make sure you have those installed.

This is a sample run of our graphicsmagick plugin:

cs@Ubuntu32:
textasciitilde /MeinProgramm/MeinProgramm Libs$ ldd libMBSGraphicsMagickPlugin17744.so
linux-gate.so.1 =>(0xb76ee000)
libdl.so.2 =>/lib/i386-linux-gnu/libdl.so.2 (0xb6f0e000)
libgtk-x11-2.0.so.0 =>/usr/lib/i386-linux-gnu/libgtk-x11-2.0.so.0 (0xb6aa6000)
libpthread.so.0 =>/lib/i386-linux-gnu/libpthread.so.0 (0xb6a8a000)
libstdc++.so.6 =>/usr/lib/i386-linux-gnu/libstdc++.so.6 (0xb69a5000)
libm.so.6 =>/lib/i386-linux-gnu/libm.so.6 (0xb6979000)
libgcc_s.so.1 =>/lib/i386-linux-gnu/libgcc_s.so.1 (0xb695b000)
libc.so.6 =>/lib/i386-linux-gnu/libc.so.6 (0xb67b1000)

/lib/ld-linux.so.2 (0xb76ef000)
libgdk-x11-2.0.so.0 =>/usr/lib/i386-linux-gnu/libgdk-x11-2.0.so.0 (0xb6701000)
libpangocairo-1.0.so.0 =>/usr/lib/i386-linux-gnu/libpangocairo-1.0.so.0 (0xb66f4000)
libX11.so.6 =>/usr/lib/i386-linux-gnu/libX11.so.6 (0xb65c0000)
libXfixes.so.3 =>/usr/lib/i386-linux-gnu/libXfixes.so.3 (0xb65ba000)
libatk-1.0.so.0 =>/usr/lib/i386-linux-gnu/libatk-1.0.so.0 (0xb659a000)
libcairo.so.2 =>/usr/lib/i386-linux-gnu/libcairo.so.2 (0xb64ce000)
libgdk_pixbuf-2.0.so.0 =>/usr/lib/i386-linux-gnu/libgdk_pixbuf-2.0.so.0 (0xb64ad000)
libgio-2.0.so.0 =>/usr/lib/i386-linux-gnu/libgio-2.0.so.0 (0xb6356000)
libpangoft2-1.0.so.0 =>/usr/lib/i386-linux-gnu/libpangoft2-1.0.so.0 (0xb632a000)
libpango-1.0.so.0 =>/usr/lib/i386-linux-gnu/libpango-1.0.so.0 (0xb62e0000)
libfontconfig.so.1 =>/usr/lib/i386-linux-gnu/libfontconfig.so.1 (0xb62ab000)
libgobject-2.0.so.0 =>/usr/lib/i386-linux-gnu/libgobject-2.0.so.0 (0xb625c000)
libglib-2.0.so.0 =>/lib/i386-linux-gnu/libglib-2.0.so.0 (0xb6163000)
libXext.so.6 =>/usr/lib/i386-linux-gnu/libXext.so.6 (0xb6151000)
libXrender.so.1 =>/usr/lib/i386-linux-gnu/libXrender.so.1 (0xb6147000)
libXinerama.so.1 =>/usr/lib/i386-linux-gnu/libXinerama.so.1 (0xb6142000)
libXi.so.6 =>/usr/lib/i386-linux-gnu/libXi.so.6 (0xb6132000)
libXrandr.so.2 =>/usr/lib/i386-linux-gnu/libXrandr.so.2 (0xb6129000)
libXcursor.so.1 =>/usr/lib/i386-linux-gnu/libXcursor.so.1 (0xb611e000)
libXcomposite.so.1 =>/usr/lib/i386-linux-gnu/libXcomposite.so.1 (0xb611a000)
libXdamage.so.1 =>/usr/lib/i386-linux-gnu/libXdamage.so.1 (0xb6115000)
libfreetype.so.6 =>/usr/lib/i386-linux-gnu/libfreetype.so.6 (0xb607b000)
libxcb.so.1 =>/usr/lib/i386-linux-gnu/libxcb.so.1 (0xb605a000)
libpixman-1.so.0 =>/usr/lib/i386-linux-gnu/libpixman-1.so.0 (0xb5fc2000)
libpng12.so.0 =>/lib/i386-linux-gnu/libpng12.so.0 (0xb5f98000)
libxcb-shm.so.0 =>/usr/lib/i386-linux-gnu/libxcb-shm.so.0 (0xb5f93000)
libxcb-render.so.0 =>/usr/lib/i386-linux-gnu/libxcb-render.so.0 (0xb5f89000)
libz.so.1 =>/lib/i386-linux-gnu/libz.so.1 (0xb5f73000)
libgmodule-2.0.so.0 =>/usr/lib/i386-linux-gnu/libgmodule-2.0.so.0 (0xb5f6e000)
libselinux.so.1 =>/lib/i386-linux-gnu/libselinux.so.1 (0xb5f4f000)
libresolv.so.2 =>/lib/i386-linux-gnu/libresolv.so.2 (0xb5f36000)
libexpat.so.1 =>/lib/i386-linux-gnu/libexpat.so.1 (0xb5f0c000)
libffi.so.6 =>/usr/lib/i386-linux-gnu/libffi.so.6 (0xb5f05000)
libpcre.so.3 =>/lib/i386-linux-gnu/libpcre.so.3 (0xb5ec9000)
librt.so.1 =>/lib/i386-linux-gnu/librt.so.1 (0xb5ec0000)
libXau.so.6 =>/usr/lib/i386-linux-gnu/libXau.so.6 (0xb5ebb000)
libXdmcp.so.6 =>/usr/lib/i386-linux-gnu/libXdmcp.so.6 (0xb5eb4000)
cs@Ubuntu32:
textasciitilde /MeinProgramm/MeinProgramm Libs$

As you see all library have been found and their load address is printed behind the na,e.
If a library is missing, you usually see the address missing there or being zero.

5.0.46 How can I validate an email address?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can try this code:
Example:

```
Dim re As RegEx
re = New RegEx
Dim rm As RegExMatch

re.SearchPattern = " [ a-z0-9!#$ %&'*+/=?^_' { | }
textasciitilde - ] +(?:\. [ a-z0-9!#$ %&'*+/=?^_' { | }
textasciitilde - ] +)*@(?: [ a-z0-9 ] (?: [ a-z0-9- ] * [ a-z0-9 ] )?\.)+ [ a-z0-9 ] (?: [ a-z0-9- ] * [ a-z0-9 ] )?"
rm = re.Search(editField1.Text)

if rm = Nil Then
StaticText2.text = editField1.Text + " not valid email"
Else
StaticText2.Text = editField1.Text + " is valid"
End if
```

Notes: Adapted from:
http://www.regular-expressions.info/email.html

5.0.47 How do I decode correctly an email subject?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: The following code can be used to decode an email subject including several encodings including Base 64.
Example:

```
dim src as string // input

dim theRegex as Regex
dim theRegexMatch as RegexMatch
dim result, infoCharset, encodedPart as string
dim theStart as Integer

if instr(src, "=?") >0 then
theRegex = new Regex
theRegex.Options.Greedy = false
theRegex.searchPattern = "(.*)=\?(.+)\?(Q | B)\?(.+)\?="
theRegexMatch = theRegex.search(src)
```

while theRegexMatch <>nil
theStart = theRegexMatch.subExpressionStartB(0) + len(theRegexMatch.subExpressionString(0))

result = result + theRegexMatch.subExpressionString(1)
infoCharset = theRegexMatch.subExpressionString(2)
encodedPart = theRegexMatch.subExpressionString(4)
if theRegexMatch.subExpressionString(3) = "B" then
encodedPart = DecodeBase64(encodedPart)
elseif theRegexMatch.subExpressionString(3) = "Q" then
encodedPart = DecodeQuotedPrintable(encodedPart)
end if
if right(result, 1) = " " then
result = mid(result, 1, len(result)-1)
end if
encodedPart = encodedPart.DefineEncoding(GetInternetTextEncoding(infoCharset))
result = result + encodedPart

theRegex.SearchStartPosition = theStart
theRegexMatch = theRegex.search()
wend

result = result + mid(src, theStart+1)

else
result = src
end if
// theRegexMatch = theRegex.search

msgbox result

Notes: May not look nice depending on the controls used.
This is no longer needed when using MimeEmailMBS class which decodes for you.

5.0.48   How do I enable/disable a single tab in a tabpanel?

Plugin Version: all, Platform: macOS.

Answer: Use the TabpanelEnabledMBS method.
Example:

TabpanelEnabledMBS(tabpanel1, 1, false)

Notes: Use Carbon for MachO and CarbonLib for Mac Carbon and AppearanceLib for Mac OS Classic as

library.

For Cocoa, please use enabled property of NSTabViewItemMBS class.

5.0.49 How do I find the root volume for a file?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Try this function:
Example:

```
Function GetRootVolume(f as FolderItem) as FolderItem
dim root, dum as folderItem
if f <>nil then
root = f // f might be the volume
do
dum = root.parent
if dum <>nil then
root = dum
end if
loop until dum = nil
return root
end if
End Function
```

5.0.50 How do I get the current languages list?

Plugin Version: all, Platform: macOS.

Answer: Try this code:
Example:

```
dim p as new CFPreferencesMBS
dim a as CFArrayMBS
dim s as CFStringMBS
dim o as CFObjectMBS
dim sa(-1) as string

o=p.CopyAppValue("AppleLanguages",".GlobalPreferences")

if o<>Nil then
a=CFArrayMBS(o)

dim i,c as Integer
```

```
c=a.Count-1
for i=0 to c
o=a.Item(i)

if o isa CFStringMBS then
s=CFStringMBS(o)
sa.Append s.str
end if
next
end if

MsgBox Join(sa,EndOfLine)
```

Notes: On Mac OS X you can get the list of current languages like this list:

```
de
en
ja
fr
es
it
pt
pt-PT
nl
sv
nb
da
fi
ru
pl
zh-Hans
zh-Hant
ko
```

Which has German (de) on the top for a German user.
This code has been tested on Mac OS X 10.5 only.

5.0.51   How do I get the Mac OS Version?

Plugin Version: all, Platform: macOS.

Answer: Try this code:
Example:

```
dim i as Integer
if system.gestalt("sysv", i) then
//do this in an 'If' in case you don't get any value back at all and system.gestalt returns boolean
if i = &h750 then //If OS is 7.5
//do stuff
elseif i = &h761 then //If OS is 7.6.1
//do stuff
end if
end if
```

Notes: The MBS Plugin has a function SystemInformationMBS.OSVersionString for this.

5.0.52   How do I get the printer name?

Plugin Version: all.

Answer: For Mac OS Classic see the code below and for Mac OS X use the Carbon Print Manager Classes from the MBS Plugin.
Example:

```
dim s as String
dim i as Integer

s=app.ResourceFork.GetResource("STR ",-8192)
if s<>"" then
i=ascb(leftb(s,1))
s=mid(s,2,i)

MsgBox s
end if
```

Notes: A note from Craig Hoyt:

After looking at your example I had a little deja-vu experience. Several years ago I played around with this same code if FutureBasic. I discovered that it did not and still doesn't provide the 'Printer Name', it does return the print driver name. If it returns 'LaserWriter 8' as the print driver you can look into this file and get the 'PAPA' resource #-8192 to get the actual Printer Name. Unfortunately this does not hold true for other printers. My Epson and HP Printers (the Epson has an Ethernet Card and the HP is USB) do not provide this info in their drivers. As far as I can tell it only returns the name by polling the printer itself.

5.0.53   How do I make a metal window if RB does not allow me this?

Plugin Version: all, Platform: macOS.

Answer: The following declare turns any window on Mac OS X 10.2 or newer into a metal one.
Example:

declare sub ChangeWindowAttributes lib "Carbon" (win as windowptr, a as Integer, b as Integer)

ChangeWindowAttributes window1,256,0

Notes: May not look nice depending on the controls used.

5.0.54   How do I make a smooth color transition?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

I'd like to show in a report some bars, which start with color A
and end with color B.

The color change should be very smooth.

My problem: If I would start from 255,0,0 and end by 0,0,0, I would have
255 different colors. If the bars are longer than 255 pixels, would
this look nice?
Example:

```
// Window.Paint:
Sub Paint(g As Graphics)
dim w,w1,x,p as Integer
dim c1,c2,c as color
dim p1,p2 as Double

c1=rgb(255,0,0) // start color
c2=rgb(0,255,0) // end color

w=g.Width
w1=w-1

for x=0 to w1
p1=x/w1
p2=1.0-p1
```

c=rgb(c1.red*p1+c2.red*p2, c1.green*p1+c2.green*p2, c1.blue*p1+c2.blue*p2)

g.ForeColor=c
g.DrawLine x,0,x,g.Height

next
End Sub

Notes:

Try the code above in a window paint event handler.

5.0.55 How do I read the applications in the dock app?

Plugin Version: all, Platform: macOS.

Answer: Use CFPreferencesMBS class like in this example:
Example:

```
// Reads file names from persistent dock applications and puts them into the list

dim pref as new CFPreferencesMBS

dim persistentapps as CFStringMBS = NewCFStringMBS("persistent-apps")
dim ApplicationID as CFStringMBS = NewCFStringMBS("com.apple.dock")
dim tiledata as CFStringMBS = NewCFStringMBS("tile-data")
dim filelabel as CFStringMBS = NewCFStringMBS("file-label")

// get the array of persistent applications from dock preferences
dim o as CFObjectMBS = 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.

5.0.56   How do I truncate a file?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: In a binarystream you can set the length property to truncate.

5.0.57   How do update a Finder's windows after changing some files?

Plugin Version: all, Platform: macOS.

Answer: Try this code:
Example:

```
dim f as folderitem // some file
dim ae as appleevent
ae=newappleevent("fndr","fupd","MACS")
ae.folderitemparam("—-")=f
if not ae.send then
//something went wrong
```

end if

Notes: The folderitem.finderupdate from the MBS Plugin does something like this.

5.0.58   How to access a USB device directly?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: First, it depends on the device.
Notes: Some devices can be talked directly from user mode code, but some require a kernel driver.

For some devices you can use plugins to access them like:

- Audio and Video sources using the QTGrabberClassMBS

- Mass storage devices using the folderitem class.

- Serial devices using the System.SerialPort function.

- HID USB devices can be used with MacHIDMBS, WinHIDMBS or LinuxHIDInterface class.

- Any USB device may be used with MacUSBMBS or WinUSBMBS classes.

In general it is always the best to take the most high level access to have others do the work for the details.

5.0.59   How to add icon to file on Mac?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use FolderItem.AddCustomIcon or NSWorkspaceMBS.setIcon functions.
Notes: Please close any open stream for the file you want to add an icon.

5.0.60   How to ask the Mac for the Name of the Machine?

Plugin Version: all, Platform: macOS.

Answer: Using Apple Events you can use this code:
Example:

Function Computername() As string

```
dim theEvent as AppleEvent
dim err as boolean

theEvent = newAppleEvent("mchn","getd","MACS")

err = theEvent.send

return theevent.ReplyString

End Function
```

Notes: Code above is for Mac OS 9!
Also the MBS Plugin has a function for this which may be faster and work also on Macs without Filesharing (which handles this event).

5.0.61   How to automatically enable retina in my apps?

Plugin Version: all, Platform: macOS.

Answer: You can run a build script on each build with this code:
Example:

```
Dim App As String = CurrentBuildLocation + "/" + CurrentBuildAppName + ".app"
Call DoShellCommand("/usr/bin/defaults write " + App + "/Contents/Info ""NSHighResolutionCapable""
YES")
```

Notes: This will set the NSHighResolutionCapable flag to YES.

5.0.62   How to avoid leaks with Cocoa functions?

Plugin Version: all, Platform: macOS.

Answer: You can try this code on Mac OS X:
Example:

```
// in a Timer Action event:
Sub Action()
static LastPool as NSAutoreleasePoolMBS = nil
static CurrentPool as NSAutoreleasePoolMBS = nil

LastPool = CurrentPool
CurrentPool = new NSAutoreleasePoolMBS
```

End Sub

Notes: With Xojo 2009r4 the code above should not be needed as Xojo runtime does automatically handle the NSAutoreleasePools for you. For older Xojo versions you need to use code with a timer with the action event above to avoid memory leaks.

Please do not use Xojo 2009r4 and newer with plugins before version 9.5. You can get crashes there which typically show a line with a objc_msgSend call.

5.0.63 How to avoid trouble connecting to oracle database with SQL Plugin?

Plugin Version: all, Platform: macOS.

Answer: For oracle the most important thing is to point the plugin to the libraries from oracle.
Notes: In environment variables, the paths like ORACLE_HOME must be defined.
On Mac OS X you also need to define DYLD_LIBRARY_PATH to point to the dylib files from oracle.

For that you need to modify /etc/launchd.conf for Mac OS X 10.8 and newer.
In older versions those variables in .MacOSX/environment.plist file in user's home.

Another way for the case you bundle things inside your app is to use the LSEnvironment key in info.plist. In info.plist it looks like this:

```
<key>LSEnvironment</key>
<dict>
<key>test</key>
<string>Hello World</string>
</dict>
```

5.0.64 How to avoid ___NSAutoreleaseNoPool console messages in threads?

Plugin Version: all, Platform: macOS.

Answer: You need to use your own NSAutoreleasePool on a thread like this:
Example:

```
sub MyThread.run
dim pool as new NSAutoreleasePoolMBS
// do work here

pool=nil
```

end sub

Notes: For more details read here:
http://developer.apple.com/mac/library/documentation/Cocoa/Reference/Foundation/Classes/NSAutorelease-
Pool_Class/Reference/Reference.html

5.0.65 How to bring app to front?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: On Mac you can use this code:
Example:

```
// First way:
app.FrontMostMBS = true

// second way:
dim p as new ProcessMBS
p.GetCurrentProcess
p.FrontProcess = true

// third way:
NSApplicationMBS.sharedApplication.activateIgnoringOtherApps(true)

// for Windows:
RemoteControlMBS.WinBringWindowToTop
```

Notes: This will bring a Mac app to the front layer.

5.0.66 How to bring my application to front?

Plugin Version: all, Platform: macOS.

Answer: This makes SimpleText (Code ttxt) 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)

5.0.67   How to catch Control-C on Mac or Linux in a console app?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use SignalHandlerMBS class for this.
Example:

```
// watch for Control-C on Mac
call SignalHandlerMBS.SetFlagHandler(2)

dim ende as boolean = false
do
if SignalHandlerMBS.IsFlagSet(2) then
Print "Flag 2 set. Existing..."
ende = true
end if

DoEvents 1
loop until ende
```

Notes: The signal is catched, a flag is set and you can ask later in your normal application flow for the result.

5.0.68   How to change name of application menu?

Plugin Version: all, Platforms: macOS, Windows.

Answer: Use this code to change the application menu name on Mac OS X:
Example:

```
dim mb as new MenubarMBS
dim m as MenuMBS = mb.item(1) // 1 is in my tests the app menu
if m<>Nil then
m.MenuTitle = "Hello World"
end if
```

Notes: This code is for Carbon only.

5.0.69   How to change the name in the menubar of my app on Mac OS X?

Plugin Version: all, Platform: macOS.

Answer:

You mean it screws up if the file name of the bundle itself is different
than the name of the executable file in the MacOS folder within the
bundle? If so, you should find something like this within your
Info.plist file (or the 'plst' resource that the RB IDE builds for you):

<key>CFBundleExecutable</key>
<string>Executable file name here</string>

Just make sure that file name matches.

However, if your question involves how you can change the name of the app
that appears in the menu and the dock, that's different. You can make
this name different from the file name by changing the CFBundleName key:

<key>CFBundleName</key>
<string>Name for menu here</string>

Note that if you use my free AppBundler program, this second part is
taken care of for you – just fill in a custom name in the right field.
You can find AppBundler (from Thomas Reed) at
http://www.bitjuggler.com/products/appbundler/ .

5.0.70   How to check if a folder/directory has subfolders?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use code like this to check all items in a folder:
Example:

```
Function HasSubFolder(folder as FolderItem) As Boolean
dim c as Integer = folder.Count

for i as Integer = 1 to c
dim item as FolderItem = folder.TrueItem(i)

if item<>Nil and item.Directory then
Return true
end if
```

next

End Function

Notes: We use trueitem() here to avoid resolving alias/link files.
Also we check for nil as we may not have permission to see all items.
And if one is a directory, we return without checking the rest.

5.0.71   How to check if Macbook runs on battery or AC power?

Plugin Version: all, Platform: macOS.

Answer: Please use our IOPowerSourcesMBS class like this:
Example:

Function PowerSourceState() as Integer
dim p as new IOPowerSourcesMBS

// check all power sources
dim u as Integer = p.Count-1
for i as Integer = 0 to u
dim d as CFDictionaryMBS = p.Item(i)
if d<>nil then
// check if they have a power source state key:
dim o as CFObjectMBS = d.Value(NewCFStringMBS("Power Source State"))
if o isa CFStringMBS then
dim s as string = CFStringMBS(o).str

'MsgBox s

if s = "AC Power" then
Return 1
elseif s = "Battery Power" then
Return 2
end if
end if
end if
next
Return 0 // unknown
End Function

Notes: If you want to check the CFDictionaryMBS content, simply use a line like "dim x as dictionary = d.dictionary" and check the contents in the debugger.

5.0.72   How to check if Microsoft Outlook is installed?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: If you need Outlook for Scripting, you should simply check registry for the required Outlook.Application class:
Example:

```
Function OutlookInstalled() As Boolean
#if TargetWin32 then

try
dim r as new RegistryItem("HKEY_CLASSES_ROOT\Outlook.Application\CLSID", false)

Return true

catch r as RegistryAccessErrorException
// not installed
Return false

end try

#else

// Windows only, so false on other platforms
Return false

#endif

End Function
```

5.0.73   How to check on Mac OS which country or language is currently selected?

Plugin Version: all, Platform: macOS.

Answer: The code below returns a country value.
Example:

```
dim result as Integer

IF TargetMacOS THEN

CONST smScriptLang = 28
```

CONST smSystemScript = -1

DECLARE FUNCTION GetScriptManagerVariable LIB "Carbon" (selector as Integer) as Integer
DECLARE FUNCTION GetScriptVariable LIB "Carbon" (script as Integer, selector as Integer) as Integer

result=GetScriptVariable(smSystemScript, smScriptLang)

END IF

Notes: Returns values like:

For more values, check "Script.h" in the frameworks.

5.0.74 How to code sign my app with plugins?

Plugin Version: all, Platform: macOS.

Answer: When you try to code sign the application with plugin dylibs on Mac OS X, you may see error message that there is actually a signature included.
Notes: Please use the -f command line parameter with codesign utility to overwrite our MBS signature.
We sign our plugins for MacOS, iOS and Windows to make sure they have not been modified.

In terminal, you do like this:

cd <Path to folder of app>

xattr -cr <Appname>.app
codesign -f -s "Developer ID Application: <Your Name>" <Appname>.app/Contents/Frameworks/*.dylib
codesign -f -s "Developer ID Application: <Your Name>" <Appname>.app/Contents/Frameworks/*.framework
codesign -f -s "Developer ID Application: <Your Name>" <Appname>.app

Please use the name of your certificate (See keychain), the name of your app and the path to the app folder.
If you have helper apps you need to sign them first.
You can use a build step to automatically sign your app on build.

5.0.75 How to collapse a window?

Plugin Version: all, Platform: macOS.

Answer: Use this function (Mac only):
Example:

Sub CollapseRBwindow(w as window, CollapseStatus as boolean)
dim state, err as Integer
dim wh as MemoryBlock

Declare Function CollapseWindow Lib "Carbon" (window as Integer,collapse as Integer) as Integer

IF CollapseStatus THEN
state = 1
ELSE
state = 0
END IF

err = CollapseWindow(w.MacWindowPtr, state)

End Sub

Notes: Also the MBS Plugin has a window.collapsedmbs property you can set.
For Windows the MBS Plugin has a window.isiconicmbs property.

5.0.76   How to compare two pictures?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can try this code:
Example:

Function ComparePictures(p as picture,q as picture) as Integer
dim r,u as RGBSurface
dim x,y,n,m,h,w as Integer
dim w1,w2,h1,h2,d1,d2 as Integer
dim c1,c2 as color

h1=p.Height
h2=q.Height
w1=p.Width
w2=q.Width
d1=p.Depth
d2=q.Depth

if d1<>d2 then
Return 1
elseif w1<>w2 then

```
return 2
elseif h1<>h2 then
Return 3
else
r=p.RGBSurface
u=q.RGBSurface

if r=nil or u=nil then
Return -1
else
h=h1-1
w=w1-1
m=min(w,h)

for n=0 to m
c1=r.Pixel(n,n)
c2=u.Pixel(n,n)
if c1<>c2 then
Return 4
end if
next

for y=0 to h
for x=0 to w
c1=r.Pixel(x,y)
c2=u.Pixel(x,y)
if c1<>c2 then
Return 5
end if
next
next

// 0 for equal
// -1 for error (no RGBsurface)
// 1 for different depth
// 2 for different width
// 3 for different height
// 4 for different pixels (fast test)
// 5 for different pixels (slow test)
end if
end if

Exception
Return -1
End Function
```

Notes: Remember that this only works on bitmap pictures, so the picture.BitmapMBS function may be useful.

5.0.77   How to compile PHP library?

Plugin Version: all, Platform: macOS.

Answer: You have to download the source code and compile a static version of the library.
Notes: This instructions were written based on PHP 5.2.6 on Mac OS X:

- Best take a new Mac with current Xcode version installed.

- Download the source code archive. e.g. "php-5.2.6.tar.bz2"

- Expand that archive on your harddisc.

- Open terminal window

- change directory to the php directory. e.g. "cd /php-5.2.6"

- execute this two lines to define the supported CPU types and the minimum Mac OS X version:

- export CFLAGS="-arch ppc -arch i386 -mmacosx-version-min=10.3"

- export CXXFLAGS="-arch ppc -arch i386 -mmacosx-version-min=10.3"

- the command "./configure help" does show the configure options.

- use configure with a line like this:

- ./configure –enable-embed –with-curl -enable-ftp –enable-zip –enable-sockets –enable-static –enable-soap –with-zlib –with-bz2 –enable-exif –enable-bcmath –enable-calendar

- start the compilation with "make all"

- other option is to use "make install" which first does the same as "make all" and than does some installation scripts.

- you may get an error about a duplicate symbole __yytext. Search the file "zend_ini_scanner.c", search a line with "char *yytext;" and change it to "extern char *yytext;".

- On the end you get a lot of error messages, but you have a working library (named libphp5.so) file in the invisible ".libs" folder inside your php source folder.

Possible problems and solutions:

- If the path to your files has spaces, you can get into trouble. e.g. "/RB Plugins/PHP" is bad as files will be searched sometimes in "/RB".

- If you have in /usr/local/lib libraries which conflict with the default libraries, you can get into trouble.

- If you installed some open source tools which compiled their own libraries, you can get into conflicts.

- if you have to reconfigure or after a problem, you may need to use "make clean" before you start "make all" again.

Feel free to install additional libraries and add more packages to the configure line.

5.0.78 How to convert a BrowserType to a String with WebSession.Browser?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use code like this:
Example:

```
Function GetBrowserName(s as WebSession.BrowserType) As string
Select case s
case WebSession.BrowserType.Android
Return "Andriod"
case WebSession.BrowserType.Blackberry
Return "Blackberry"
case WebSession.BrowserType.Chrome
Return "Chrome"
case WebSession.BrowserType.ChromeOS
Return "ChromeOS"
case WebSession.BrowserType.Firefox
Return "Firefox"
case WebSession.BrowserType.InternetExplorer
Return "InternetExplorer"
case WebSession.BrowserType.Opera
Return "Opera"
case WebSession.BrowserType.Safari
Return "Safari"
case WebSession.BrowserType.SafariMobile
Return "SafariMobile"
case WebSession.BrowserType.Unknown
Return "Unknown"
else
Return "Unkown: "+str(integer(s))
end Select

End Function
```

5.0.79   How to convert a EngineType to a String with WebSession.Engine?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use code like this:
Example:

```
Function GetRenderingEngineName(s as WebSession.EngineType) As string
Select case s
case WebSession.EngineType.Gecko
Return "Gecko"
case WebSession.EngineType.Presto
Return "Presto"
case WebSession.EngineType.Trident
Return "Trident"
case WebSession.EngineType.Unknown
Return "Unknown"
case WebSession.EngineType.WebKit
Return "WebKit"
else
Return "Unkown: "+str(integer(s))
end Select

End Function
```

5.0.80   How to convert a PlatformType to a String with WebSession.Platform?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use code like this:
Example:

```
Function GetPlatformName(s as WebSession.PlatformType) As string
Select case s
case WebSession.PlatformType.Blackberry
Return "Blackberry"
case WebSession.PlatformType.iPad
Return "iPad"
case WebSession.PlatformType.iPhone
Return "iPhone"
case WebSession.PlatformType.iPodTouch
Return "iPodTouch"
case WebSession.PlatformType.Linux
Return "Linux"
case WebSession.PlatformType.Macintosh
Return "Macintosh"
```

```
case WebSession.PlatformType.PS3
Return "PS3"
case WebSession.PlatformType.Unknown
Return "Unknown"
case WebSession.PlatformType.WebOS
Return "WebOS"
case WebSession.PlatformType.Wii
Return "Wii"
case WebSession.PlatformType.Windows
Return "Windows"
else
Return "Unkown: "+str(integer(s))
end Select

End Function
```

5.0.81 How to convert a text to iso-8859-1 using the TextEncoder?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

This code can help you althrough it's not perfect.
You need to set lc to the current color you use.
Example:

```
dim outstring as string
dim theMac, thePC as textencoding
dim Mac2PC as textconverter

theMac = getTextEncoding(0) // MacRoman
thePC = getTextEncoding(&h0201) // ISOLatin1

Mac2PC = getTextConverter(theMac, thePC)
// if you wanted to do the opposite just create a converter
// PC2Mac = getTextConverter(thePC, theMac)

outstring = Mac2PC.convert("Bj√rn, this text should be converted")
Mac2PC.clear
```

Notes:

You have to call Mac2PC.clear after every conversion to reset the encoding engine.
See also newer TextConverterMBS class.

5.0.82   How to convert ChartTime back to Xojo date?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: We have this example code:
Example:

```
Function ChartTimeToDate(ChartTime as Double) As date
static diff as Double = 0.0

if diff = 0.0 then
dim d2 as Double = CDBaseChartMBS.chartTime(2015, 1, 1)
dim da as new date(2015, 1, 1)
dim ts as Double = da.TotalSeconds

diff = ts - d2
end if

dim d as new date
d.TotalSeconds = diff + ChartTime

Return d
End Function
```

Notes: As you see we calculate the difference in base date from Date and ChartTime and later use difference to convert.

5.0.83   How to convert line endings in text files?

Plugin Version: all, Platform: macOS.

Answer: You can simply read file with TextInputStream and write with new line endings using TextOutputStream class.
Example:

```
dim inputfile as FolderItem = SpecialFolder.Desktop.Child("test.txt")
dim outputfile as FolderItem = SpecialFolder.Desktop.Child("output.txt")
dim it as TextInputStream = TextInputStream.Open(inputfile)
dim ot as TextOutputStream = TextOutputStream.Create(outputfile)

ot.Delimiter = EndOfLine.Windows // new line ending
while not it.EOF
ot.WriteLine it.ReadLine
wend
```

Notes: TextInputStream will read any input line endings and with delimiter property in TextOutputStream you can easily define your new delimiter.

5.0.84 How to convert picture to string and back?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use this plugin functions:
Notes: JPEG:

JPEGStringToPictureMBS(buf as string) as picture
JPEGStringToPictureMBS(buf as string,allowdamaged as Boolean) as picture
PictureToJPEGStringMBS(pic as picture,quality as Integer) as string

PNG:

PictureToPNGStringMBS(pic as picture, gamma as single) as string
PictureToPNGStringMBS(pic as picture, mask as picture, gamma as single) as string
PictureToPNGStringMBS(pic as picture, gamma as single, Interlace as Boolean, FilterType as Integer) as string
PictureToPNGStringMBS(pic as picture, mask as picture, gamma as single, Interlace as Boolean, FilterType as Integer) as string
PNGStringToPictureMBS(data as string, gamma as single) as picture
PNGStringToPNGPictureMBS(data as string, gamma as single) as PNGpictureMBS

Tiff:

TIFFStringToPictureMBS(data as string) as picture
TIFFStringToTiffPictureMBS(data as string) as TiffPictureMBS

BMP:

BMPStringtoPictureMBS(data as string) as picture
Picture.BMPDataMBS(ResolutionValueDPI as Integer=72) as string

GIF:

GifStringToGifMBS(data as string) as GIFMBS
GifStringToPictureMBS(data as string) as Picture

5.0.85   How to copy an array?

Plugin Version: all, Platform: macOS.

Answer: You can use a function like this to copy an array:
Example:

```
Function CopyArray(a() as Double) as Double()
dim r() as Double
for each v as Double in a
r.Append v
next
Return r
End Function
```

Notes: If needed make several copies of this method with different data types, not just double.
For a deep copy of an array of objects, you need to change code to also make a copy of those objects.

5.0.86   How to copy an dictionary?

Plugin Version: all, Platform: macOS.

Answer: You can use a function like this to copy a dictionary:
Example:

```
Function CopyDictionary(d as Dictionary) As Dictionary
dim r as new Dictionary
for each key as Variant in d.keys
r.Value(key) = d.Value(key)
next
Return r
End Function
```

Notes: If needed make several copies of this method with different data types, not just double.
For a deep copy of an dictionary of objects, you need to change code to also make a copy of those objects.

5.0.87   How to copy parts of a movie to another one?

Plugin Version: all, Platforms: macOS, Windows.

Answer: The code below copies ten seconds of the snowman movie to the dummy movie starting at the 5th second.

Example:

dim f as FolderItem
dim md as EditableMovie
dim ms as EditableMovie

f=SpecialFolder.Desktop.Child("Our First Snowman.mov")
ms=f.OpenEditableMovie

ms.SelectionStartMBS=5
ms.SelectionLengthMBS=10

f=SpecialFolder.Desktop.Child("dummy.mov")
md=f.CreateMovie

msgbox str(md.AddMovieSelectionMBS(ms))

Notes: If result is not 0, the method fails.

5.0.88   How to create a birthday like calendar event?

Plugin Version: all, Platform: macOS.

Answer: Try this code:
Example:

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

// needed for the error details
dim e as NSErrorMBS

dim r as CalRecurrenceRuleMBS = CalRecurrenceRuleMBS.initYearlyRecurrence(1, nil) // repeat every
year without end

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

// create a new calendar
dim c as new CalEventMBS

dim d as new date(2011, 04, 20) // the date

dim calendars() as CalCalendarMBS = s.calendars
```

```
// set properties
c.Title="Test Birthday"
c.startDate=d
c.recurrenceRule = r
c.calendar=calendars(0) // add to first calendar
c.addAlarm(a)
c.endDate = d
c.isAllDay = true

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

Notes: This adds an event to iCal for the given date with alarm to remember you and repeats it every year.

5.0.89 How to create a GUID?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use the UUIDMBS class for this.

5.0.90 How to create a Mac picture clip file?

Plugin Version: all, Platform: Windows.

Answer: You can use code like this one.
Example:

```
dim f As FolderItem
dim p As Picture

f=SpecialFolder.Desktop.Child("Test.pictClipping")
if f=nil then Return

p=new Picture(300,200,32) 'Make a sample picture
p.Graphics.ForeColor=RGB(0,255,255)
p.Graphics.FillOval 0,0,99,99
```

```
p.Graphics.ForeColor=RGB(255,0,0)
p.Graphics.DrawOval 0,0,99,99

dim r As ResourceFork 'ResourceFork is needed for a clip file

// Please define a file type Any
r=f.CreateResourceFork("Any")

// get PICT data using plugin function
dim pictdata as string = p.PicHandleDataMBS
r.AddResource(pictdata,"PICT",256,"Picture")

dim m as new MemoryBlock(8)

m.LittleEndian = false
m.Int16Value(0) = 0
m.Int16Value(2) = 0
m.Int16Value(4) = p.Width
m.Int16Value(6) = p.Height

r.AddResource(m,"RECT",256,"")

'Values taken from a sample file and irrelevant to the problem
dim data as string = DecodeBase64("AQAAAAAAAAAAAAAAAACAFRDRVIAAAABAAAAAAAAAABUQ0lQAAAAA
r.AddResource(data,"drag",128,"") 'ditto
r.Close
```

Notes: In general Apple has deprecated this, but a few application still support clippings.

5.0.91 How to create a PDF file in Xojo?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Check our DynaPDF plugin and the examples.
Notes: An alternative can be to use the CoreGraphics and Cocoa functions on Mac OS X.
For Windows, we can only suggest our DynaPDF plugin.

5.0.92 How to create EmailAttachment for PDF Data in memory?

Plugin Version: all, Platform: macOS.

Answer: You can use code like the one below:
Example:

Function EmailAttachmentFromPDFData(PDFData as string, filename as string) As EmailAttachment
dim a as new EmailAttachment

a.data = EncodeBase64(PDFData, 76)
a.ContentEncoding = "base64"
a.MIMEType = "application/pdf"
a.MacType = "PDF "
a.MacCreator = "prvw"
a.Name = filename

Return a
End Function

Notes: Compared to sample code from Xojo documentation, we set the mime type correct for PDF.
The MacType/MacCreator codes are deprecated, but you can still include them for older Mac email clients.
"prvw" is the creator code for Apple's preview app.

5.0.93   How to create PDF for image files?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use DynaPDF like this:
Example:

Function CreatePrintPDF(jpgFiles() as folderitem, pdfFile as FolderItem, PageWidth as Integer, PageHeight
as Integer) As Boolean
// have files?
If pdfFile = Nil Then Return False
If jpgFiles = Nil Then Return False

If jpgFiles.Ubound <0 Then Return False

// new DynaPDF
Dim pdf As New MyDynapdfMBS

// page width/height in MilliMeter
Dim pdfWidth as Integer = PageWidth * 72 / 25.4
Dim pdfHeight as Integer = PageHeight * 72 / 25.4

// put your license here
Call pdf.SetLicenseKey "Starter"

// create pdf
Call pdf.CreateNewPDF pdfFile

```
// set a couple of options
Call pdf.SetPageCoords(MyDynaPDFMBS.kpcTopDown)
Call pdf.SetResolution(300)
Call pdf.SetUseTransparency(False)
Call pdf.SetSaveNewImageFormat(False)
Call pdf.SetGStateFlags(MyDynaPDFMBS.kgfUseImageColorSpace, False)
Call pdf.SetJPEGQuality(100)

// set page size
Call pdf.SetBBox(MyDynaPDFMBS.kpbMediaBox, 0, 0, pdfWidth, pdfHeight)
Call pdf.SetPageWidth(pdfWidth)
Call pdf.SetPageHeight(pdfHeight)

// append pages with one image per page
For i as Integer = 0 To jpgFiles.Ubound
Call pdf.Append
Call pdf.InsertImageEx(0, 0, pdfWidth, pdfHeight, jpgFiles(i), 1)
Call pdf.EndPage
Next

// close
Call pdf.CloseFile

Return True
End Function
```

Notes: This is to join image files in paper size to a new PDF.
e.g. scans in A4 into an A4 PDF.

5.0.94 How to CURL Options translate to Plugin Calls?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Below a few tips on how to translate command line CURL calls to plugin calls.
Notes: curl -vX PUT http://localhost:5984/appserials/78569238475/DocumentRegister.docx?rev=3-25634563456
–data-binary @DocumentRegister.docx -H "Content-Type: application/msword"

- The option -v means verbose. You can use OptionVerbose and listen for messages in the DebugMessage event.

- The option -X PUT means we want to do a HTTP PUT Request. So set OptionPut to true. Also you will want to set OptionUpload to true as you upload data.

- We have the URL which you put into OptionURL property.

- The –data-binary option tells CURL to pass the given data. With the @ before the data, it is intrepreted 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/f2f4e540bf8bb60f61cfcd4328001c59 -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)

5.0.95   How to delete file with ftp and curl plugin?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can set post/pre quotes to have ftp commands executed before or after the download/upload.
Example:

```
dim d as CURLMBS // your curl object

// delete file
dim ws() As String
ws.Append "DELE Temp.txt"

d.SetOptionPostQuote(ws)
```

Notes: Use SetOptionPostQuote, SetOptionPreQuote or SetOptionQuote.
The ftp commands you pass here are native ftp commands and not the commands you use with ftp applications. To delete use DELE and the file path.

5.0.96   How to detect display resolution changed?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: On Mac OS X simply listen for display changed notifications.
Notes: Use the "Distribution Notification Center.rbp" example project as a base and use it to listen to notifications with the name "O3DeviceChanged".

5.0.97 How to detect retina?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Please use Window.BackingScaleFactorMBS to query the factor.
Example:

msgbox str(window1.BackingScaleFactorMBS)

5.0.98 How to disable force quit?

Plugin Version: all, Platform: macOS.

Answer:

Please visit this website and get the control panel for Mac OS 9 there:
http://www3.sk.sympatico.ca/tinyjohn/DFQ.html

For Mac OS X use the MBS Plugin with the SetSystemUIModeMBS method.
Notes:

Please use presentationOptions in NSApplicationMBS for Cocoa applications.

5.0.99 How to disable the error dialogs from Internet Explorer on javascript errors?

Plugin Version: all, Platform: Windows.

Answer: You can use this code in the htmlviewer open event:
Example:

if targetwin32 then
htmlviewer1._ole.Content.value("Silent") = True
end if

Notes: This disables the error dialogs from Internet Explorer.

5.0.100 How to display a PDF file in Xojo?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: On Mac OS X you can use CoreGraphics or PDFKit to display a PDF.
Notes: An alternative can be to load the PDF into a htmlviewer so the PDF plugin can display it.
On Windows you may need to use the Acrobat ActiveX control from Adobe or launch Acrobat Reader.

5.0.101   How to do a lottery in RB?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Try this function:
Example:

```
Sub Lotto(max as Integer,count as Integer,z() as Integer)
// Lotto count numbers of max put into the array z beginning at index 0
dim n(0) as Integer ' all the numbers
dim m as Integer ' the highest field in the current array
dim i,a,b,d as Integer ' working variables

'fill the array with the numbers
m=max-1
redim n(m)

for i=0 to m
n(i)=i+1
next

' unsort them by exchanging random ones
m=max*10
for i=1 to m
a=rnd*max
b=rnd*max

d=n(a)
n(a)=n(b)
n(b)=d
next

' get the first count to the dest array
m=count-1
redim z(m)
for i=0 to m
z(i)=n(i)
next

'sort the result
z.sort
End Sub
```

```
Sub Open()
// Test it

dim za(0) as Integer ' the array of the numbers

lotto 49,6,za ' 6 of 49 in Germany


' and display them
staticText1.text=str(za(0))+chr(13)+str(za(1))+chr(13)+str(za(2))+chr(13)+str(za(3))+chr(13)+str(za(4))+chr(13)+str(za
End Sub
```

5.0.102   How to do an asycron DNS lookup?

Plugin Version: all, Platform: Windows.

Answer: use CFHostMBS class (Mac OS X only).
Notes: Xojo internal functions and plugin DNS functions are sycronized.
You can use DNSLookupThreadMBS class for doing them asyncron.

5.0.103   How to draw a dushed pattern line?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can try this code:
Example:

```
// call like this: DrawDushedPatternLine g,0,0,width,height,10

Sub DrawDushedPatternLine(g as graphics,x1 as Integer,y1 as Integer,x2 as Integer,y2 as Integer, partlen
as Integer)
dim x,y,ox,oy as Double
dim dx,dy as Double
dim w,h,d as Double
dim b as Boolean

w=x2-x1
h=y2-y1

d=sqrt(w*w+h*h)

dx=w/d*partlen
dy=h/d*partlen
```

```
b=true
x=x1
while (x<x2) and (y<y2)
ox=x
oy=y

x=x+dx
y=y+dy

if b then
g.DrawLine ox,oy,x,y
end if

b=not b
wend


End Sub
```

Notes: It would be possible to add this to the plugin, but I think it's better if you do it in plain Xojo code, so it even works on Windows.

5.0.104   How to draw a nice antialiased line?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

This code can help you althrough 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.

5.0.105 How to dump java class interface?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: In terminal you can use "javap -s <classname>" to display the class with the method names and parameters.
Notes: For example show ResultSet class: javap -s java.sql.ResultSet

5.0.106 How to duplicate a picture with mask or alpha channel?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use code like this function:
Example:

```
Function Duplicate(extends p as Picture) As Picture
#if RBVersion >= 2011.04 then
if p.HasAlphaChannel then

// create nw picture and copy content:
dim q as new Picture(p.Width, p.Height)
q.Graphics.DrawPicture p,0,0

Return q

end if
#endif

// create new picture
dim q as new Picture(p.Width, p.Height, 32)

// get mask
dim oldMask as Picture = p.mask(false)
if oldMask = nil then
// no mask, so simple copy
q.Graphics.DrawPicture p,0,0
Return q
end if

// remove mask
p.mask = nil

// copy picture and mask
q.Graphics.DrawPicture p, 0, 0
q.mask.Graphics.DrawPicture oldMask,0,0

// restore mask
p.mask = oldmask

Return q
End Function
```

Notes: Simply copy it to a module and call it like this: q = p.duplicate.
The code above works with old Xojo versions because of the #if even if your RS version does not support alpha channel pictures. This way it's future proof.

5.0.107　How to enable assistive devices?

Plugin Version: all, Platform: macOS.

Answer: You can use AppleScript code like below:
Notes: tell application "System Events"
activate

set UI elements enabled to true

return UI elements enabled
end tell

You can run this with AppleScriptMBS class.

5.0.108　How to encrypt a file with Blowfish?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use code like this:
Example:

```
dim fi as FolderItem = SpecialFolder.Desktop.Child("test.xojo_binary_project")
dim fo as FolderItem = SpecialFolder.Desktop.Child("test.encrypted")

// read input
dim bi as BinaryStream = BinaryStream.Open(fi)
dim si as string = bi.Read(bi.Length)
bi.Close

// encrypt
dim so as string = BlowfishMBS.Encrypt("MyKey",si)

// write output
dim bo as BinaryStream = BinaryStream.Create(fo)
bo.Write so
bo.Close
```

Notes: Of course you can decrypt same way, just use Decrypt function and of course swap files.

5.0.109 How to extract text from HTML?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use both RemoveHTMLTagsMBS and DecodingFromHTMLMBS like this:
Example:

```
dim html as string = "<p><B>Gr&uuml;&szlig;e</B></P>"
dim htmltext as string = RemoveHTMLTagsMBS(html)
dim text as string = DecodingFromHTMLMBS(htmltext)

MsgBox text // shows: Gr√º√üe
```

Notes: You can use it together with RemoveHTMLTagsMBS to remove html tags. What you get will be the text without tags.
DecodingFromHTMLMBS turns HTML escapes back to unicode characters. Like ä to √§.

5.0.110 How to find empty folders in a folder?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Try this code:
Example:

```
dim folder as folderitem // your folder

dim c as Integer = folder.count
for i as Integer = 1 to c
dim item as folderitem = folder.trueitem(i)
if item = nil then
// ignore
elseif item.directory then
// folder
if item.count = 0 then
// found empty folder
end if
end if
next
```

5.0.111 How to find iTunes on a Mac OS X machine fast?

Plugin Version: all, Platform: macOS.

Answer: You can try Launch Services.
Example:

dim f as FolderItem

f=LaunchServicesFindApplicationForInfoMBS("hook","com.apple.iTunes","iTunes.app")

MsgBox f.NativePath

5.0.112 How to find network interface for a socket by it's name?

Plugin Version: all, Platform: macOS.

Answer: You can use our plugin to build a lookup table.
Example:

Function FindNetworkInterface(name as string) As NetworkInterface
name = name.trim

if name.len = 0 then Return nil

// search by IP/MAC
dim u as Integer = System.NetworkInterfaceCount-1
for i as Integer = 0 to u
dim n as NetworkInterface = System.GetNetworkInterface(i)
if n.IPAddress = name or n.MACAddress = name then
Return n
end if
next

// use MBS Plugin to build a mapping
dim interfaces() as NetworkInterfaceMBS = NetworkInterfaceMBS.AllInterfaces
dim map as new Dictionary

for each n as NetworkInterfaceMBS in interfaces
dim IPv4s() as string = n.IPv4s
dim IPv6s() as string = n.IPv6s

for each IPv4 as string in IPv4s
map.Value(IPv4) = n.Name
next
for each IPv6 as string in IPv6s
map.Value(IPv6) = n.Name
next
if n.MAC<>"" then
map.Value(n.MAC) = n.Name

```
end if
next


// now search interfaces by name, IPv4 or IPv6
for i as Integer = 0 to u
dim n as NetworkInterface = System.GetNetworkInterface(i)
if map.Lookup(n.IPAddress, "") = name then
Return n
end if

if map.Lookup(n.MACAddress, "") = name then
Return n
end if
next


End Function
```

Notes: The code above uses a lookup table build using NetworkInterfaceMBS class to find the network interface by name.

5.0.113   How to find version of Microsoft Word?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use code like this:
Example:

```
// find Word
dim f as FolderItem = LaunchServicesFindApplicationForInfoMBS("","com.microsoft.Word","")

// open bundle
dim c as new NSBundleMBS(f)

// read info
dim d as Dictionary = c.infoDictionary

// show version
MsgBox d.Lookup("CFBundleVersion","")
```

Notes: Older versions of Word can be found with creator code "MSWD".

5.0.114 How to fix CURL error 60/53 on connecting to server?

Plugin Version: all, Platform: macOS.

Answer: You probably connect with SSL and you have no valid certificate.
Example:

dim d as new CURLSMBS

// Disable SSL verification
d.OptionSSLVerifyHost = 0 // don't verify server
d.OptionSSLVerifyPeer = 0 // don't proofs certificate is authentic

// With SSL Verification:
dim cacert as FolderItem = Getfolderitem("cacert.pem")
d.OptionCAInfo = cacert.NativePath
d.OptionSSLVerifyHost = 2 // verify server
d.OptionSSLVerifyPeer = 1 // proofs certificate is authentic

Notes: You can either use the code above to disable the SSL verification and have no security.
Or you use the cacert file and enable the verification. Than you only get a connection if the server has a valid certificate.

see also:
http://curl.haxx.se/ca/

5.0.115 How to format double with n digits?

Plugin Version: all, Platform: macOS.

Answer: You can use the FormatMBS function for this.
Example:

dim d as Double = 123.4567890
listbox1.AddRow FormatMBS("%f", d)
listbox1.AddRow FormatMBS("%e", d)
listbox1.AddRow FormatMBS("%g", d)

listbox1.AddRow FormatMBS("%5.5f", d)
listbox1.AddRow FormatMBS("%5.5e", d)
listbox1.AddRow FormatMBS("%5.5g", d)

d = 0.000000123456
listbox1.AddRow FormatMBS("%f", d)
listbox1.AddRow FormatMBS("%e", d)

listbox1.AddRow FormatMBS("%g", d)

listbox1.AddRow FormatMBS("%5.5f", d)
listbox1.AddRow FormatMBS("%5.5e", d)
listbox1.AddRow FormatMBS("%5.5g", d)

Notes: see FormatMBS for details.
In general %f is normal style, %e is scientific and %g is whichever gives best result for given space.

5.0.116   How to get a time converted to user time zone in a web app?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use the WebSession.GMTOffset property.
Example:

```
Sub Open()
// current date on server
dim d as new date
dim s as string = d.LongTime

// adjust to client GMT offset
d.GMTOffset = d.GMTOffset + Session.GMTOffset

dim t as string = D.LongTime

MsgBox s+EndOfLine+t
End Sub
```

5.0.117   How to get an handle to the frontmost window on Windows?

Plugin Version: all, Platform: Windows.

Answer: This function returns a handle for the frontmost window:
Example:

```
Function GetForegroundWindowHandle() as Integer
#if targetwin32 then
declare function GetForegroundWindow Lib "user32.dll" as Integer
Return GetForegroundWindow()
#endif
End Function
```

5.0.118   How to get CFAbsoluteTime from date?

Plugin Version: all, Platforms: macOS, Windows.

Answer: Use code like this:
Example:

```
dim d as new date
dim t as CFTimeZoneMBS = SystemCFTimeZoneMBS
dim g as new CFGregorianDateMBS
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.

5.0.119   How to get client IP address on web app?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use the WebSession.RemoteAddress property.
Example:

```
Sub Open()
Title = Session.RemoteAddress
End Sub
```

5.0.120   How to get fonts to load in charts on Linux?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Please use the SetFontSearchPath method in the CDBaseChartMBS class to specify where your fonts are.
Example:

if TargetLinux then
CDBaseChartMBS.SetFontSearchPath "/usr/share/fonts/truetype;/usr/share/fonts/truetype/msttcorefonts"
else
// on Mac and Windows we use system fonts.
end if

// also you can later switch default fonts:

dim Chart as CDBaseChartMBS // your chart

#If TargetARM And TargetLinux Then
// use specific fonts on Linux on Raspberry Pi
Call Chart.setDefaultFonts("/usr/share/fonts/truetype/piboto/PibotoLt-Regular.ttf","/usr/share/fonts/truetype/piboto/Pi
#EndIf

Notes: On macOS, iOS and Windows, the fonts are loaded from the system's font folder.

e.g. if you use ubuntu, you can install the ttf-mscorefonts-installer package and call this method with "/usr/share/fonts/truetype/msttcorefonts" as the path. No backslash on the end of a path, please.

5.0.121 How to get fonts to load in DynaPDF on Linux?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Please use the AddFontSearchPath method in the DynaPDFMBS class to specify where your fonts are.
Example:

dim d as new DynaPDFMBS
if TargetLinux then
call d.AddFontSearchPath "/usr/share/fonts/truetype", true
else
// on Mac and Windows we use system fonts.
end if

Notes: On Mac OS X and Windows, the fonts are loaded from the system's font folder.

e.g. if you use ubuntu, you can install the ttf-mscorefonts-installer package and call this method with "/usr/share/fonts/truetype/msttcorefonts" as the path. No backslash on the end of a path, please.

5.0.122 How to get GMT time and back?

Plugin Version: all, Platform: macOS.

Answer: You can use the date class and the GMTOffset property.
Example:

```
// now
dim d as new date

// now in GMT
dim e as new date
e.GMTOffset = 0

// show
MsgBox str(d.TotalSeconds,"0.0")+" "+str(e.TotalSeconds, "0.0")

dim GMTTimeStamp as Double = e.TotalSeconds

// restore
dim f as new date

// add GMT offset here
f.TotalSeconds = GMTTimeStamp + f.GMTOffset*3600
// because here it's removed
f.GMTOffset = f.GMTOffset

MsgBox d.ShortTime+" ("+str(d.GMTOffset)+") "+str(d.TotalSeconds,"0.0")+EndOfLine+_
e.ShortTime+" ("+str(e.GMTOffset)+") "+str(e.TotalSeconds,"0.0")+EndOfLine+_
f.ShortTime+" ("+str(f.GMTOffset)+") "+str(f.TotalSeconds,"0.0")
```

Notes: It's sometimes a bit tricky with the date class as setting one property often changes the others.

5.0.123 How to get good crash reports?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Check this website from the webkit website:
Notes: http://webkit.org/quality/crashlogs.html

5.0.124   How to get list of all threads?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use the runtime module like in this function:
Example:

```
Function Threads() As Thread()
#pragma DisableBackgroundTasks
dim t() as Thread

Dim o as Runtime.ObjectIterator=Runtime.IterateObjects
While o.MoveNext
if o.Current isa Thread then
t.Append thread(o.current)
end if
Wend

Return t
End Function
```

Notes: This returns an array of all thread objects currently in memory.
The pragma is important here as it avoids thread switches which may cause a thread to be created or deleted.

5.0.125   How to get parameters from webpage URL in Xojo Web Edition?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use the Webpage.ParametersReceived event.
Example:

```
Sub ParametersReceived(Variables As Dictionary)
for each key as Variant in Variables.keys
MsgBox key+" ->"+Variables.Value(key)
next
End Sub
```

Notes: The text encodings of this strings is not defined in Xojo 2010r5. Please use DefineEncoding.

5.0.126   How to get the color for disabled textcolor?

Plugin Version: all, Platform: macOS.

Answer: Ask the appearance manager:
Example:

Function GetThemeTextColor(inColor as Integer, inDepth as Integer, inColorDev as Boolean) As Color
declare function GetThemeTextColor lib "Carbon" (inColor as Integer, inDepth as Integer, inColorDev as Boolean, outColor as Ptr) as Integer

dim i as Integer
dim col as MemoryBlock

col = newMemoryBlock(6)

i = GetThemeTextColor(inColor, inDepth, inColorDev, col)

return RGB(col.UShort(0)\256, col.UShort(2)\256, col.UShort(4)\256)
End Function

Notes: The color for this is:

const kThemeTextColorDialogInactive = 2.

c = GetThemeTextColor(kThemeTextColorDialogInactive, Screen(0).Depth, true)

For Mac OS X you should use "CarbonLib" instead of "AppearanceLib" ...

5.0.127 How to get the current free stack space?

Plugin Version: all, Platform: macOS.

Answer: You can something like the code below:
Example:

Sub ShowStackSize()
dim threadid as Integer
dim size as Integer

declare function GetCurrentThread lib "Carbon" (byref threadid as Integer) as short
declare function ThreadCurrentStackSpace lib "Carbon" (threadid as Integer, byref size as Integer) as short

if GetCurrentThread(threadid)=0 then
if 0=ThreadCurrentStackSpace(threadid,size) then
MsgBox str(size)
end if
end if

End Sub

Notes: For Mac OS 9, use "ThreadLib" instead of "CarbonLib". You can use #if if you like for that.

5.0.128   How to get the current timezone?

Plugin Version: all, Platforms: macOS, Windows.

Answer:

You can use the TimeZoneMBS class or the CFTimeZoneMBS class.
Or code like below:
Example:

```
Function GMTOffsetInMinutes() as Integer
// Returns the offset of the current time to GMT in minutes.
// supports Mac OS and Windows, but not Linux yet (let me know if
// you have code for that, please)
//
// Note that the offset is not always an even multiple of 60, but
// there are also half hour offsets, even one 5:45h offset

// This version by Thomas Tempelmann (rb@tempel.org) on 25 Nov 2005
// with a fix that should also make it work with future Intel Mac targets.
//
// Using code from various authors found on the RB NUG mailing list

dim result, bias, dayLightbias as Integer
dim info as memoryBlock
dim offset as Integer

#if targetMacOS then

Declare Sub ReadLocation lib "Carbon" (location As ptr)

info = NewMemoryBlock(12)
ReadLocation info
if false then
// bad, because it does not work on Intel Macs:
'offset = info.short(9) * 256 + info.byte(11)
else
offset = BitwiseAnd (info.long(8), &hFFFFFF)
end

offset = info.short(9) * 256 + info.byte(11)
```

```
offset = offset \60
return offset

#endif

#if targetWin32 then

Declare Function GetTimeZoneInformation Lib "Kernel32" ( tzInfoPointer as Ptr ) as Integer
// returns one of
// TIME_ZONE_ID_UNKNOWN 0
// – Note: e.g. New Delhi (GMT+5:30) and Newfoundland (-3:30) return this value 0
// TIME_ZONE_ID_STANDARD 1
// TIME_ZONE_ID_DAYLIGHT 2

info = new MemoryBlock(172)
result = GetTimeZoneInformation(info)

bias = info.Long(0)
// note: the original code I found in the NUG archives used Long(84) and switched to Long(0)
// only for result=1 and result=2, but my tests found that Long(0) is also the right value for result=0

if result = 2 then
daylightBias = info.long(168)
end if
offset = - (bias + dayLightbias)
return offset

#endif

End Function
```

5.0.129 How to get the current window title?

Plugin Version: all, Platform: macOS.

Answer: The code below returns the current window title for the frontmost window on Mac OS X if Accessibilty services are
Example:

```
Function CurrentWindowTitle() As string
// your application needs permissions for accessibility to make this work!

dim SystemWideElement,FocusedApplicationElement,FocusedWindowElement as AXUIElementMBS
dim FocusedApplication,FocusedWindow,Title as AXValueMBS
dim s as String
dim cs as CFStringMBS
```

SystemWideElement=AccessibilityMBS.SystemWideAXUIElement
if SystemWideElement<>nil then
FocusedApplication=SystemWideElement.AttributeValue(AccessibilityMBS.kAXFocusedApplicationAttribute)
if FocusedApplication.Type=AccessibilityMBS.kAXUIElementMBSTypeID then
FocusedApplicationElement=new AXUIElementMBS
FocusedApplicationElement.Handle=FocusedApplication.Handle
FocusedApplicationElement.RetainObject

FocusedWindow=FocusedApplicationElement.AttributeValue(AccessibilityMBS.kAXFocusedWindowAttribute)

if FocusedWindow<>nil and AccessibilityMBS.kAXUIElementMBSTypeID=FocusedWindow.Type then

FocusedWindowElement=new AXUIElementMBS
FocusedWindowElement.Handle=FocusedWindow.Handle
FocusedWindowElement.RetainObject

Title=FocusedWindowElement.AttributeValue(AccessibilityMBS.kAXTitleAttribute)
if Title<>nil and Title.Type=kCFStringMBSTypeID then
cs=new CFStringMBS
cs.handle=Title.Handle
cs.RetainObject
Return cs.str
end if
end if
end if
end if
End Function

5.0.130   How to get the cursor blink interval time?

Plugin Version: all, Platform: macOS.

Answer: On Mac OS you can use GetCaretTime from the toolbox.
Example:

declare function GetCaretTime lib ”Carbon” () as Integer

MsgBox str(GetCaretTime())+” ticks”

Notes: 60 ticks make one second.

5.0.131 How to get the list of the current selected files in the Finder?

Plugin Version: all, Platform: macOS.

Answer:

Use the AppleScript like this one:

```
tell application "finder"
return selection
end tell
```

Which translates into this AppleEvent:

Process("Finder").SendAE "core,getd,'—-':obj { form:prop, want:type(prop), seld:type(sele), from:'null'() }
"

and as Xojo code it looks like this:
Example:

```
dim ae as appleevent
dim o1 as appleeventObjectSpecifier
dim f as folderItem
dim aList as appleeventdescList
dim i as Integer
dim dateiname as string

// setup the AppleEvent
o1=getpropertyObjectDescriptor( nil, "sele")
ae= newappleEvent("core", "getd", "MACS")
ae.objectSpecifierParam("—-")=o1

// send it
if ae.send then
// got the list
alist=ae.replyDescList

// now show the list of filename into an editfield:

for i=1 to alist.count
f=alist.folderItemItem(i)

dateiname=f.name
// editfield1 with property "mulitline=true"!
editfield1.text=editfield1.text + dateiname + chr(13)
next
```

end if

5.0.132   How to get the Mac OS system version?

Plugin Version: all, Platform: macOS.

Answer: The following code queries the value and displays the version number:
Example:

```
dim first as Integer
dim second as Integer
dim third as Integer
dim l as Integer

if System.Gestalt("sysv",l) then

Third=Bitwiseand(l,15)
second=Bitwiseand(l\16,15)
first=Bitwiseand(l\256,15)+10*Bitwiseand(l\256\16,15)
end if

if First>=10 then
msgbox "Mac OS X "+str(First)+"."+str(Second)+"."+str(third)
else
msgbox "Mac OS "+str(First)+"."+str(Second)+"."+str(third)
end if
```

5.0.133   How to get the Mac OS Version using System.Gestalt?

Plugin Version: all, Platform: macOS.

Answer: Try this code:
Example:

```
Dim s As String
Dim b As Boolean
Dim i, resp as Integer

// Systemversion
b = System.Gestalt("sysv", resp)
If b then
s = Hex(resp)
```

```
For i =Len(s)-1 DownTo 1
s=Left(s,i)+"."+Mid(s,i+1)
Next
MsgBox "Systemversion: Mac OS " + s
end if
```

Notes: The MBS Plugin has a SystemInformationMBS.OSVersionString function for this.

5.0.134 How to get the screensize excluding the task bar?

Plugin Version: all, Platform: Windows.

Answer: Try this code:
Notes: Use the Screen class with the available* properties.

5.0.135 How to get the size of the frontmost window on Windows?

Plugin Version: all, Platform: Windows.

Answer: Try this code:
Notes: Make yourself a class for the WindowRect with four properties:

```
Bottom as Integer
Left as Integer
Right as Integer
Top as Integer
```

Add the following method to your class:

```
Sub GetWindowRect(windowhandle as Integer)
dim err as Integer
dim mem as memoryBlock
#if targetwin32 then
Declare Function GetWindowRect Lib "user32.dll" (hwnd as Integer, ipRect As Ptr) as Integer

mem = newmemoryBlock(16)
err = GetWindowRect(windowhandle, mem)
Left = mem.long(0)
Top = mem.Long(4)
Right = mem.Long(8)
Bottom = mem.Long(12)
```

#endif
End Sub

Good to use for the MDI Master Window!

5.0.136 How to get the source code of a HTMLViewer?

Plugin Version: all, Platform: macOS.

Answer: Try this code:
Example:

// for Windows:

msgbox HTMLViewer1.IEHTMLTextMBS

// for MacOS with WebKit 2.x:

msgbox HTMLViewer1.WKWebViewMBS.HTMLText

5.0.137 How to get Xojo apps running Linux?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You need to install some requuire 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.

5.0.138 How to handle really huge images with GraphicsMagick or ImageMagick?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Sometimes it may be better to use an extra application to process images.
Notes: A typical 32 bit app made with Xojo can use around 1.8 GB on Windows and 3 GB on Mac OS X. Some images may be huge, so that processing them causes several copies of the image to be in memory. With a 500 MB image in memory, doing a scale or rotation may require a temp image. So with source, temp and dest images with each 500 MB plus your normal app memory usage, you may hit the limit of Windows with 1.8 GB.

In that case it may be worth running a tool like gm in the shell class. gm is the command line version of GraphicsMagick. There you can run the 64 bit version which is not limited in memory like your own application. Also you can monitor progress and keep your app responsive.

5.0.139 How to handle tab key for editable cells in listbox?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use code like this function:
Example:

```
Function HandleTabInList(list as listbox, row as Integer, column as Integer, key as String) As Boolean
// Handle tab character in Listbox.CellKeyDown event

Select case asc(key)
case 9
if Keyboard.AsyncShiftKey then
// back

// look for column left
for i as Integer = column-1 downto 0
if list.ColumnType(i) >= list.TypeEditable then
list.EditCell(row, i)
Return true
end if
next

// not found, so look in row before
row = row - 1
if row >= 0 then
for i as Integer = list.ColumnCount-1 downto 0
if list.ColumnType(i) >= list.TypeEditable then
list.EditCell(row, i)
Return true
end if
next
end if
else
// forward

// look for column right
for i as Integer = column+1 to list.ColumnCount-1
if list.ColumnType(i) >= list.TypeEditable then
list.EditCell(row, i)
Return true
end if
next
```

// not found, so look in row below
row = row + 1
if row <list.ListCount then
for i as Integer = 0 to list.ColumnCount-1
if list.ColumnType(i) >= list.TypeEditable then
list.EditCell(row, i)
Return true
end if
next
end if
end if
end Select
End Function

Notes: You call it from CellKeyDown event like this:

EventHandler Function CellKeyDown(row as Integer, column as Integer, key as String) As Boolean
if HandleTabInList(me, row, column, key) then Return true
End EventHandler

As you see in the code, we handle tab and shift + tab for moving back and forward. Also we wrap to previous/next row if needed. Feel free to extend this to wrap from last to first row or create a new row for editing.

5.0.140   How to hard link MapKit framework?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Our MapKit classes weak link the framework. If you need hard linking it for the App Store, you can add this method to a class:
Example:

Sub ReferenceMapKit()
// just put this in window or app class

#if TargetMachO and Target64Bit then
Declare sub testing Lib "MapKit" Selector "test" (id as ptr)
testing(nil)
#endif

End Sub

Notes: No need to call the method.
Just having it in a window or app, will cause the compiler to hard link the framework.

5.0.141 How to have a PDF downloaded to the user in a web application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use a WebHTMLViewer control and load the PDF file with the PDF plugin from the browser.
Example:

```
dim CurrentFile as WebFile // a property of the WebPage

// define the PDF file
CurrentFile = new WebFile
CurrentFile.Filename = "test.pdf"
CurrentFile.MIMEType = "application/pdf"
CurrentFile.Data = "some pdf data" // MyDynaPDF.GetBuffer
CurrentFile.ForceDownload = true

// start the download
showurl(CurrentFile.url)
```

Notes: See our Create PDF example for the Xojo Web Edition.

5.0.142 How to hide all applications except mine?

Platform: macOS.

Answer: The code below will on Mac OS hide all applications except your one:
Example:

```
dim p as new ProcessMBS

p.GetFirstProcess
do
if not p.FrontProcess then
p.Visible=false
end if
loop until not p.GetNextProcess
```

5.0.143   How to hide script errors in HTMLViewer on Windows?

Plugin Version: all, Platform: Windows.

Answer: Set Internet Explorer to silent mode with code like this:
Example:

htmlviewer1._ole.Content.value("Silent") = True

Notes: Simply put this code in the open event of your htmlviewer control (using me instead of htmlviewer1).

5.0.144   How to hide the grid/background/border in ChartDirector?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: If you want to hide something in a chart, simply assign the kTransparent constant as color.

5.0.145   How to hide the mouse cursor on Mac?

Plugin Version: all, Platform: macOS.

Answer: Try this declare:
Example:

Declare Sub HideCursor Lib "Carbon" () Inline68K("A852")

HideCursor

Notes: The MBS Plugin has this function and supports it on Windows, too.

5.0.146   How to insert image to NSTextView or TextArea?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: With NSTextViewMBS you can use this code to insert file:
Example:

// insert a file to textview

Public Sub InsertFile(textview as NSTextViewMBS, f as FolderItem)
// read to file

```
dim b as BinaryStream = BinaryStream.Open(f)
dim s as string = b.Read(b.Length)

// build wrapper
dim fileWrapper as NSFileWrapperMBS = NSFileWrapperMBS.initRegularFileWithContents(s)
fileWrapper.preferredFilename = f.name

// make attachment
dim fileAttachment as new NSTextAttachmentMBS(fileWrapper)
dim attributedString as NSAttributedStringMBS = NSAttributedStringMBS.attributedStringWithAttach-
ment(fileAttachment)

// add to a NSTextViewMBS
textview.insertText attributedString

End Sub
```

Notes: For TextArea you can query the underlaying NSTextViewMBS object via TextArea.NSTextViewMBS method.

5.0.147   How to jump to an anchor in a htmlviewer?

Plugin Version: all, Platforms: macOS, Windows.

Answer: You can use javascript to change the current window's location.
Example:

```
// load website
htmlviewer1.LoadURL "http://www.monkeybreadsoftware.net/addressbook-abpersonmbs.shtml"

// later jump to anchor named "16":

if TargetWin32 then
call HTMLViewer1.IERunJavaScriptMBS "window.location = ""#16"""
end if
```

5.0.148   How to keep a movieplayer unclickable?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: To keep the user away from clicking on a playing Movie you can just drop a Canvas in front of the Movieplayer and take the clicks there.
Example:

```
Function Canvas1.MouseDown(X as Integer, Y as Integer) as boolean
return true // take it and do nothing
End Function
```

5.0.149   How to keep my web app from using 100% CPU time?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: On Linux and MacOS you can use renice command in the terminal. On Windows use the task manager to reduce priority.

Notes: If you launch your app with nohup on Linux or Mac OS X like this from the terminal or a script:

```
nohup /webapps/MyApp/MyApp &
```

you can simply have a second line saying this:

```
renice 20 $ !
```

which tells the system to lower priority to lowest value for the latest background process.

5.0.150   How to kill a process by name?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can kill a process (or application) by name if you loop over all the processes and kill the one you need.

Example:

```
dim p as new ProcessMBS
p.GetfirstProcess ' get first
do
if p.name = "TextEdit" then
call p.KillProcess
Return
end if
loop until not p.GetNextProcess
```

Notes: You may want to check the result of killProcess function. Not every user is allowed to kill every application.

5.0.151   How to know how many CPUs are present?

Plugin Version: all, Platform: macOS.

Answer: Try this function:
Example:

```
Function GetCPUCount() as Integer
Declare Function MPProcessors Lib "Carbon" () as Integer

Return MPProcessors()
End Function
```

Notes: Your app will than need that library to launch on Classic. To avoid this the MBS plugin checks if this library is available and return 1 if it's not available.

5.0.152   How to know the calling function?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: On Mac you can use a helper function like this this code:
Example:

```
Public Function CallingFunction() as string
// Query name of calling function of a function

#Pragma BreakOnExceptions false

try

// raise a dummy exception
dim r as new NilObjectException
raise r

catch x as NilObjectException

// get stack
dim stack() as string = x.Stack

// pick function name and return
dim name as string = stack(2)
Return name

end try
End Function
```

Notes: You need to include function names in your application.

5.0.153   How to launch an app using it's creator code?

Plugin Version: all, Platform: macOS.

Answer: Send an AppleEvent "oapp" with the creator code to the Finder ("MACS"):
Example:

Dim a as AppleEvent
dim creator as string

creator = "MSIE" ' here the Internet Explorer

a = NewAppleEvent("aevt", "odoc", "MACS")
a.Timeout = -1

a.ObjectSpecifierParam("—-") = GetUniqueIDObjectDescriptor("appf", nil, creator)

if not a.send then
msgBox "An error has occured"
else

end if

5.0.154   How to launch disc utility?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use this code:
Example:

dim f as FolderItem = LaunchServicesFindApplicationForInfoMBS("","com.apple.DiskUtility","")

if f<>Nil then
f.Launch
end if

Notes: This works even if people renamed the disc utility or moved it to another folder.

5.0.155 How to make a lot of changes to a REAL SQL Database faster?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You may try to embed your changes to the database between two transaction calls.
Example:

```
dim db as Database // some database

db.SQLExecute "BEGIN TRANSACTION"
// Do some Stuff
db.SQLExecute "END TRANSACTION"
```

Notes: This can increase speed by some factors.

5.0.156 How to make a NSImage object for my retina enabled app?

Plugin Version: all, Platform: macOS.

Answer: You can use code like this:
Example:

```
Function NewRetinaImage(pic as Picture, mask as Picture = nil) As NSImageMBS
// first make a NSImageMBS from it
dim n as new NSImageMBS(pic, mask)

// now set to half the size, so we have 2x pixels for the image
n.size = new NSSizeMBS(n.width/2, n.height/2)

// and return
Return n
End Function
```

Notes: The thing to do is to have 2x the pixels, but assign a size to the image which gives it the right size in points.
You can pass the NSImageMBS from here to NSMenuItemMBS. For Retina displays, the full resolution is used. For others it will be reduced.

5.0.157 How to make a window borderless on Windows?

Plugin Version: all, Platform: Windows.

Answer: Try this declares:
Example:

```
// Sets window to borderless popup type, and sets its initial dimensions.
// Call this method, then Win32SetBorderlessPos, and then RB's Show
// method. Use RB Frame type 7 (Global Floating Window).

Const SWP_NOMOVE = &H2
Const SWP_FRAMECHANGED = &H20
Const HWND_TOPMOST = -1
Const GWL_STYLE = -16
Const WS_POPUPWINDOW = &H80880000

Dim styleFlags as Integer

#If TargetWin32 Then

Declare Function SetWindowLong Lib "user32" Alias "SetWindowLongA" (hwnd as Integer, nIndex as Integer, dwNewLong as Integer) as Integer
Declare Function SetWindowPos Lib "user32" (hwnd as Integer, hWndInstertAfter as Integer, x as Integer, y as Integer, cx as Integer, cy as Integer, flags as Integer) as Integer

styleFlags = SetWindowLong( w.WinHWND, GWL_STYLE, WS_POPUPWINDOW )
styleFlags = BitwiseOr( SWP_FRAMECHANGED, SWP_NOMOVE )
styleFlags = SetWindowPos( w.WinHWND, HWND_TOPMOST, 0, 0, wd, ht, styleFlags )

#EndIf
```

5.0.158   How to make an alias using AppleEvents?

Plugin Version: all, Platform: macOS.

Answer: Try this code:
Example:

```
Sub MakeAlias(folder as folderitem, target as folderitem, aliasname as string)
dim ev as AppleEvent
dim myResult as boolean
dim properties as AppleEventRecord

ev = NewAppleEvent("core","crel","MACS")
ev.MacTypeParam("kocl") = "alis"
ev.FolderItemParam("to ") = target
ev.FolderItemParam("insh") = folder

properties=new AppleEventRecord
```

properties.StringParam("pnam")=aliasname

ev.RecordParam("prdt")=properties

myResult = ev.send
// true on success, false on error
End Sub

Notes: Call it like this:
MakeAlias SpecialFolder.Desktop, SpecialFolder.Desktop.Child("Gif Copy.rb"), "test.rb alias"

Seems to not work on Mac OS X 10.6

5.0.159   How to make AppleScripts much faster?

Plugin Version: all, Platform: macOS.

Answer: use "ignoring application responses" like in this example:
Notes: on run { fn,fpx,fpy }
ignoring application responses
tell app "Finder" to set the position of folder fn to fpx,fpy
end ignoring
end run

5.0.160   How to make double clicks on a canvas?

Plugin Version: all, Platform: macOS.

Answer:

Update: Newer Xojo versions support DoubleClick event, so you don't need this code.

Here's my tip from the tips list on how to add a double-click event to the Canvas control. The technique could easily be used for a window or any Rectcontrol:

Because of its built-in drawing methods, the Canvas control is often used to create custom interface controls. But while the Canvas control has event handlers for most mouse events, it doesn't have an event handler for DoubleClick events. Fortunately, you can add a double-click event handler to a Canvas control easily. Basically, you're going to create a new class based on Canvas and add a double-click event to that. You can then use the new class anytime you need a Canvas with a double-click event.

To create a new Canvas class with a DoubleClick event handler, do this:

1. Add a new class to your project.
2. Set the Super property of the new class to "Canvas".
3. Change the name of this new class to "DoubleClickCanvas".

A double-click occurs when two clicks occur within the users double-click time (set in the Mouse control panel on both Macintosh and Windows) and within five pixels of each other. So, you'll need a few properties to store when and where the last click occurred.

4. Add a new property with the following declaration and mark it as private: lastClickTicks as Integer
5. Add a new property with the following declaration and mark it as private: lastClickX as Integer
6. Add a new property with the following declaration and mark it as private: lastClickY as Integer

Since the Canvas control doesn't have a DoubleClick event, you will need to add one.

7. Add a new event to your class by choosing New Event from the Edit menu and enter "DoubleClick" as the event name.

Double-clicks occur on MouseUp. In order for the mouseUp event to fire, you must return True in the MouseDown event.

8. In the MouseDown event, add the following code:
Return True

In the MouseUp event, you will need to determine what the users double-click time is. This value is represented on both the Mac and Windows in ticks. A tick is 1/60th of a second. Since there isn't a built-in function for this, you'll need to make a toolbox call. The mouseUp event code below makes the appropriate toolbox call for both Macintosh and Windows. It then compares the time of the users last click to the time of the current click and compares the location of the users last click to the location of the current click.

9. Add the following code to the MouseUp event:

dim doubleClickTime, currentClickTicks as Integer

#if targetMacOS then
Declare Function GetDblTime Lib "Carbon" () as Integer
doubleClickTime = GetDblTime()
#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 occured close enough together in space
if abs(X - lastClickX) <= 5 and abs(Y - LastClickY) <= 5 then
DoubleClick //a double click has occured 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

5.0.161 How to make my Mac not sleeping?

Plugin Version: all, Platform: macOS.

Answer: Just inform the Mac OS about some system activity with code like this:
Example:

Sub UpdateSystemActivity()

#if TargetCarbon
declare function myUpdateSystemActivity lib "Carbon" alias "UpdateSystemActivity" (activity as Integer) as short

const OverallAct = 0 // Delays idle sleep by small amount */
const UsrActivity = 1 // Delays idle sleep and dimming by timeout time */
const NetActivity = 2 // Delays idle sleep and power cycling by small amount */
const 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.

5.0.162   How to make my own registration code scheme?

Plugin Version: all, Platform: Windows.

Answer: There are excellent articles about how to make a 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 Xojo as a starting point?

5.0.163   How to make small controls on Mac OS X?

Plugin Version: all, Platform: macOS.

Answer: You can try this code on Mac OS X:
Example:

'/*
'* Use the control's default drawing variant. This does not apply to
'* Scroll Bars, for which Normal is Large.
'*/
const kControlSizeNormal = 0

'/*
'* Use the control's small drawing variant. Currently supported by
'* the Check Box, Combo Box, Radio Button, Scroll Bar, Slider and Tab
'* controls.
'*/
const kControlSizeSmall = 1

'/*
'* Use the control's small drawing variant. Currently supported by
'* the Indeterminate Progress Bar, Progress Bar and Round Button
'* controls.
'*/
const kControlSizeLarge = 2

```
'/*
'* Control drawing variant determined by the control's bounds. This
'* ControlSize is only available with Scroll Bars to support their
'* legacy behavior of drawing differently within different bounds.
'*/
const kControlSizeAuto = &hFFFF

const kControlSizeTag = "size"

declare function SetControlData lib "Carbon" (controlhandle as Integer, part as short, tagname as OS-
Type, size as Integer, data as ptr) as short

dim m as MemoryBlock

m=NewMemoryBlock(2)
m.UShort(0)=kControlSizeSmall

Title=str(SetControlData(CheckBox1.Handle, 0, kControlSizeTag, 2, m))
```

5.0.164 How to mark my Mac app as background only?

Plugin Version: all, Platform: macOS.

Answer: You can run a build script on each build with this code:
Example:

```
Dim App As String = CurrentBuildLocation + "/" + CurrentBuildAppName + ".app"
Call DoShellCommand("/usr/bin/defaults write " + App + "/Contents/Info ""NSUIElement"" YES")
```

Notes: This will set the NSUIElement flag to YES.

5.0.165 How to move a file or folder to trash?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use code like below:
Example:

```
Function MoveToTrash(f as FolderItem) As Boolean
#if TargetMacOS then
dim r as FolderItem
dim e as Integer = MacFileOperationMBS.MoveObjectToTrashSync(f, r, MacFileOperationMBS.kFSFile-
OperationDefaultOptions)
```

```
if e = 0 then
Return true // Ok
end if

#elseif TargetWin32 then
dim w as new WindowsFileCopyMBS

dim flags as Integer = w.FileOperationAllowUndo + w.FileOperationNoErrorUI + w.FileOperationSilent
+ w.FileOperationNoConfirmation
if w.FileOperationDelete(f, flags) then
Return true // OK
end if

flags = w.FileOperationNoErrorUI + w.FileOperationSilent + w.FileOperationNoConfirmation
if w.FileOperationDelete(f, flags) then
Return true // OK
end if
#else
// Target not supported
break
Return false
#endif
End Function
```

Notes: If you want to move a file to trash, you could use f.movefileto f.trashfolder, but that will overwrite existing files in the trash. You can use our MacFileOperationMBS class to move a file on Mac to the trash. And it uses the same code as the Finder, so files are renamed when the same name is already in use in the trash:

On Windows we use WindowsFileCopyMBS class.
Requires Mac OS X 10.5.

5.0.166   How to move an application to the front using the creator code?

Plugin Version: all, Platform: macOS.

Answer: This makes SimpleText (Code ttxt) to the frontmost application:
Example:

```
dim a as appleevent

a=newappleEvent("misc","actv","ttxt")
```

```
if a.send then
end if
```

Notes: (Code is Mac only)

5.0.167   How to move file with ftp and curl plugin?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can set post/pre quotes to have ftp commands executed before or after the download/upload.
Example:

```
dim d as CURLMBS // your curl object

// rename/move file
dim ws() As String
ws.Append "RNFR Temp.txt"
ws.append "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 RNTO with the new file name. To delete use DELE and the file path.

5.0.168   How to normalize string on Mac?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use code like below:
Example:

```
Function Normalize(t as string) As string
const kCFStringNormalizationFormD = 0 // Canonical Decomposition
const kCFStringNormalizationFormKD = 1 // Compatibility Decomposition
const kCFStringNormalizationFormC = 2 // Canonical Decomposition followed by Canonical Composition
const kCFStringNormalizationFormKC = 3 // Compatibility Decomposition followed by Canonical Composition

dim s as CFStringMBS = NewCFStringMBS(t)
dim m as CFMutableStringMBS = s.Normalize(kCFStringNormalizationFormD)
```

Return m.str
End Function

Notes: This uses Apple's CFString functions to normalize unicode variants.

5.0.169   How to obscure the mouse cursor on Mac?

Plugin Version: all, Platform: macOS.

Answer: Try this declare:
Example:

Declare Sub ObscureCursor Lib "Carbon" ()

ObscureCursor

Notes: The MBS Plugin has this function, but it's not supported for Windows.

5.0.170   How to open icon file on Mac?

Plugin Version: all, Platform: macOS.

Answer: Use the NSImageMBS class like this:
Example:

dim f as FolderItem = SpecialFolder.Desktop.Child("test.ico")
dim n as new NSImageMBS(f)

window1.Backdrop = n.CopyPictureWithMask

5.0.171   How to open PDF in acrobat reader?

Plugin Version: all, Platform: macOS.

Answer: Try this code:
Example:

dim pdf as FolderItem = SpecialFolder.Desktop.Child("test.pdf")

```
// open PDF in Acrobat Reader on Mac:

// find app
dim bundleID as string = "com.adobe.Reader"
dim app as FolderItem = LaunchServicesFindApplicationForInfoMBS("", bundleID, "")

if app<>nil then

// launch app with parameters

dim docs() as FolderItem
docs.Append pdf

dim param as new LaunchServicesLaunchParameterMBS
param.Defaults = true
param.Application = app

dim x as FolderItem = LaunchServicesOpenXMBS(docs, param)

// on failure, simply launch it
if x = nil then
pdf.Launch(true)
end if

else
pdf.Launch(true)
end if
```

Notes: On Windows, simply use pdf.launch or WindowsShellExecuteMBS.

5.0.172   How to open printer preferences on Mac?

Plugin Version: all, Platform: macOS.

Answer: You can use our OpenMacOSXPreferencesPaneMBS function like this:
Example:

```
dim e as Integer = OpenMacOSXPreferencesPaneMBS("PrintAndFax")
if 0 = e then
MsgBox "OK"
elseif e = -43 then
MsgBox "File not found."
else
MsgBox "Error: "+str(e)
end if
```

5.0.173   How to open special characters panel on Mac?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: We have functions for that in Cocoa and Carbon.
Example:

dim a as new NSApplicationMBS
a.orderFrontCharacterPalette

Notes: For Cocoa, you can use orderFrontCharacterPalette method in NSApplicationMBS class.

Or simply for Carbon and Cocoa the ShowCharacterPaletteMBS method.

5.0.174   How to optimize picture loading in Web Edition?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use the WebPicture class.
Notes: Take your picture and create a WebPicture object. Store this WebPicture in a property of the WebPage, Session or app (as global as possible). On the first time you use this picture on an user session, the browser will load it. Second time you use it, the browser will most likely pick it from the cache.
Having pictures in App or some module reuses the same picture for all sessions which reduces memory footprint.
This does not work well with pictures you change very often or use only for one webpage on one user.

If you like to see an example, check our Map example.

5.0.175   How to parse XML?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use code like this:
Example:

dim s as string = "<test><test /></test>"

try

```
dim x as new XmlDocument(s)
MsgBox "OK"
catch xe as XmlException
MsgBox "invalid XML"
end try
```

Notes: If you got an exception, you have a parse error.

5.0.176 How to play audio in a web app?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use the HTML5 audio tag and control it with javscript.
Notes: This is just another example app I made today. It plays a christmas song. The audio file is provided by the application to the server, so no external web server is needed and this application can run stand alone. To compile and run you need Xojo 2010r5.

In the open event we search the audio files and open them as binarystreams. We create the two webfile objects. Those webfiles are part of the app class, so we have them globally. There we set the data with the content of our streams. We also define file names and mime types. They are needed so browser know what we have here:

```
audioFileM4V = new WebFile
audioFileM4V.Data = bM.Read(BM.Length)
audioFileM4V.Filename = "music.m4a"
audioFileM4V.MIMEType = "audio/m4a"


audioFileOGG = new WebFile
audioFileOGG.Data = bO.Read(BO.Length)
audioFileOGG.Filename = "music.ogg"
audioFileOGG.MIMEType = "audio/ogg"
```

Next in the open event of the webpage we have a PageSource control. The location is set to be before content. In the open event we define the html code for this. First we pick the URLs for the audio files. Than we build the html to use the audio tag. As you see, we give it an ID for later use and have it preload automatically. If you add an autoplay tag, you can have the audio play right away. Inside the audio tag we have two sources so we provide audio for both Firefox (OGG) and Safari (MPEG4). Finally we have a text to display if HTML5 audio tag is not supported.

You can set the source in the EditSource event:

dim urlo as string = app.audioFileOGG.URL
dim urlm as string = app.audioFileM4V.URL
me.Source = "<audio id=""mymusic"" preload=""auto""><source src="""+urlo+""" type=""audio/ogg""
/><source src="""+urlm+""" type=""audio/mpeg"" />Your browser does not support the audio ele-
ment.</audio>"

Next in the Play button we execute code to play the audio. This is a short javascript code which searches
in the html document for the element with the ID "mymusic" which is the ID of our audio tag above. Once
we got the object, we call it's play method to start playback.

me.ExecuteJavaScript("document.getElementById('mymusic').play();")

same for pause:

me.ExecuteJavaScript("document.getElementById('mymusic').pause();")

and finally for changing volume:

me.ExecuteJavaScript("document.getElementById('mymusic').volume="+str(me.Value/100.0)+";")

5.0.177 How to pretty print xml?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use the XML Transform method with the right XLS.
Notes: Learn more here:
http://docs.xojo.com/index.php/XMLDocument.Transform

5.0.178 How to print to PDF?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: This code below shows how to redirect printing to a PDF file on Mac OS X.
Example:

```
// get Xojo printer setup
dim p as new PrinterSetup

// now put it into NSPrintInfo to manipulate
dim n as new NSPrintInfoMBS
n.SetupString = p.SetupString
```

```
// change destination to file
dim f as FolderItem = SpecialFolder.Desktop.Child("test.pdf")
n.SetSaveDestination(f)

// move back
p.SetupString = n.SetupString

// and print as usual
dim g as Graphics = OpenPrinter(p)
g.DrawString "Hello World", 20, 20
```

Notes: And you can use normal graphics class for that.

5.0.179 How to query Spotlight's Last Open Date for a file?

Plugin Version: all, Platform: macOS.

Answer: You can use a MDItemMBS objec to query this value:
Example:

```
Function LastOpenedDate(Extends F As FolderItem, DefaultOtherDates As Boolean = True) As Date
#If TargetMacOS Then
Dim xMDItem as New MDItemMBS(F)
Dim xDate as Variant

If xMDItem <>Nil Then
xDate = xMDItem.GetAttribute(xMDItem.kMDItemLastUsedDate).DateValue
If xDate IsA Date Then Return xDate
Else
If xDate <>Nil Then Break
End If
#EndIf

If DefaultOtherDates Then
If F.ModificationDate <>Nil Then Return F.ModificationDate
If F.CreationDate <>Nil Then Return F.CreationDate
End If
End Function
```

Notes: Thanks for Josh Hoggan for this example code.

5.0.180   How to quit windows?

Plugin Version: all, Platform: Windows.

Answer: Try this code:
Example:

```
#if targetwin32 then
dim i1,i2,r as Integer
declare function ExitWindowsEx lib "user32" (uFlags as Integer, dwReserved as Integer) as Integer
i1 = 2
i2 = 0
r = ExitWindowsEx(i1,i2)
if r<>0 then
' Error()
end if

#endif
```

Notes: uFlags parameters:

```
'4 = EWX_Force
'0 = EWX_Logoff
'2 = EWX_Reboot
'1 = EWX_shutdown, should shut down computer
```

Also check the ExitWindowsMBS method.

5.0.181   How to read a CSV file correctly?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: With all the rules for quotes and delimiters, you can simply use the SplitCommaSeparatedValuesMBS method in our plugins like this:
Example:

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.csv")
dim t as TextInputStream = f.OpenAsTextFile

while not t.EOF
dim s as string = t.ReadLine(encodings.ASCII)

dim items() as string = SplitCommaSeparatedValuesMBS(s, ";", """")
```

```
List.AddRow ""
dim u as Integer = UBound(items)
for i as Integer = 0 to u
List.Cell(List.LastIndex,i) = items(i)
next

wend
```

Notes: Please make sure you choose the right text encoding.

5.0.182 How to read the command line on windows?

Plugin Version: all, Platform: Windows.

Answer: Try this code:
Example:

```
#if targetwin32 then
dim line as string
Dim mem as MemoryBlock

Declare Function GetCommandLineA Lib "kernel32" () As Ptr

mem=GetCommandLineA()
s=mem.cstring(0)

#endif
```

Notes: Newer Xojo versions have a system.commandline property.

5.0.183 How to render PDF pages with PDF Kit?

Plugin Version: all, Platform: Windows.

Answer: Try this code:
Example:

```
// choose a file
dim f as FolderItem = SpecialFolder.Desktop.Child("test.pdf")

// open it as PDF Document
dim sourceFile as New PDFDocumentMBS(f)
```

```
if sourceFile.handle <>0 then // it is a PDF file

// get upper bound of pages
dim c as Integer = sourceFile.pageCount-1

// from first to last page
for n as Integer = 0 to c

// pick that page
dim page as PDFPageMBS = sourceFile.pageAtIndex(n)

// render to image
dim p as NSImageMBS = page.Render

// and convert to RB picture and display
Backdrop = p.CopyPictureWithMask

next

end if
```

Notes: PDFKit works only on Mac OS X.

5.0.184   How to restart a Mac?

Plugin Version: all, Platform: macOS.

Answer: Ask the Finder via Apple Events:
Example:

```
dim ae as appleevent
ae=newappleEvent("FNDR","rest","MACS")
if not ae.send then
msgBox "The computer couldn't be restarted."
end if
```

5.0.185   How to resume ftp upload with curl plugin?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: CURL supports that and you simply need to set the right options.

Notes: First of course OptionUpload must be true. Second OptionFTPAppend must be true so the OptionResumeFrom is used. Store there (or in OptionResumeFromLarge) your start value.
Don't forget to implement the read event and return data there as requested.

5.0.186 How to rotate a PDF page with CoreGraphics?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: This code opens a PDF and draws the first page into a new PDF with 90¬∞ rotation.
Example:

```
// Rotate a PDF page

// our files
dim sourcefile as FolderItem = SpecialFolder.Desktop.Child("test.pdf")
dim destfile as FolderItem = SpecialFolder.Desktop.Child("rotated.pdf")

// open PDF
dim pdf as CGPDFDocumentMBS = sourcefile.OpenAsCGPDFDocumentMBS

// query media size of first page
dim r as CGRectMBS = pdf.MediaBox(1)

// create new PDF
dim c as CGContextMBS = destfile.NewCGPDFDocumentMBS(r,"title","Author","Creator")

// create rotated rectangle
dim nr as new CGRectMBS(0,0,r.Height,r.Width)

// create new page
c.BeginPage nr
c.SaveGState

const pi = 3.14159265

// rotate by 90¬∞
c.RotateCTM pi*1.5

// fix origin
c.TranslateCTM -r.width,0

// draw PDF
c.DrawCGPDFDocument pdf,r,1

// cleanup
c.RestoreGState
c.EndPage
```

c = nil

// show in PDF viewer
destfile.Launch

Notes: This code is Mac only as it needs CoreGraphics.

5.0.187 How to rotate image with CoreImage?

Plugin Version: all, Platform: macOS.

Answer: Use the code like the one below:
Example:

```
// Rotate image with CoreImage

// load image
dim f as FolderItem = SpecialFolder.Desktop.Child("test.png")
dim image as new CIImageMBS(f)

// rotate 45 degree
dim n as new NSAffineTransformMBS
n.rotateByDegrees(45)

dim TransformFilter as new CIFilterAffineTransformMBS
TransformFilter.inputImage = image
TransformFilter.inputTransform = n

// get result
dim resultImage as CIImageMBS = TransformFilter.outputImage

// for saving to file
dim outputImage as NSImageMBS = resultImage.RenderNSImage(false)

f = SpecialFolder.Desktop.Child("output.png")
dim b as BinaryStream = BinaryStream.Create(f, true)
b.Write outputImage.PNGRepresentation

// as Xojo picture object for display
dim pic as Picture = outputImage.CopyPictureWithMask

Backdrop = pic
```

5.0.188 How to run a 32 bit application on a 64 bit Linux?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Install 32 bit compatibility libraries.
Notes: The package is called ia32-libs for ubuntu (and others).
Some applications need to be run on a 32 bit system as they need some hardware related libraries. Like libUSB or libHID for USB devices.

5.0.189 How to save HTMLViewer to PDF with landscape orientation?

Plugin Version: all, Platform: macOS.

Answer: You can use NSPrintInfoMBS to change the options for PrintToPDFFile function.
Example:

```
// make it landscape
dim n as NSPrintInfoMBS = NSPrintInfoMBS.sharedPrintInfo
n.orientation = n.NSLandscapeOrientation

// save html to file
dim f as FolderItem = SpecialFolder.Desktop.Child("test.pdf")
call HTMLViewer1.PrintToPDFFileMBS(f,10,30,10,30)
```

Notes: You may want to reset options later.
This code is only for Mac OS X.

5.0.190 How to save RTFD?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: With NSTextViewMBS you can use this code to save to RTFD:
Example:

```
// save text as RTFD including image attachments
dim f as FolderItem = GetSaveFolderItem(FileTypes1.ApplicationRtfd, "test.rtfd")

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 underlaying NSTextViewMBS object via TextArea.NSTextViewMBS method.

5.0.191   How to save RTFD?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: How to load PDF to htmlviewer on desktop?
Example:

Public Sub LoadPDFData(viewer as HTMLViewer, PDFData as string)
Dim base64string As String = EncodeBase64(PDFData)

// remove line endings to make it a big line
base64string = ReplaceLineEndings(base64string, "")

// build data URL
// https://en.wikipedia.org/wiki/Data_URI_scheme
Dim dataURL As String = "data:application/pdf;base64," + base64string

// show in webviewer
HTMLViewer1.LoadURL(dataURL)

// may not work everywhere due to URL length limit
// for Web projects, use WebFile instead!
End Sub

Notes: This avoids a temporary file, which may also work.
For Web Apps, please use WebFile.

5.0.192   How to scale a picture proportionally with mask?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: For a proportional scaling, we calculate the new picture size relative to the target maximum size.
Example:

```
Function ProportinalScaledWithMask(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.

5.0.193   How to scale a picture proportionally?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: For a proportional scaling, we calculate the new picture size relative to the target maximum size.
Example:

```
Function ProportionalScaled(extends pic as Picture, Width as Integer, Height as Integer) As Picture
// Calculate scale factor

dim faktor as Double = min( Height / Pic.Height, Width / Pic.Width)
```

```
// Calculate new size
dim w as Integer = Pic.Width * faktor
dim h as Integer = Pic.Height * faktor

// create new picture
dim NewPic as new Picture(w,h,32)

// draw picture in the new size
NewPic.Graphics.DrawPicture Pic, 0, 0, w, h, 0, 0, Pic.Width, Pic.Height

// return result
Return NewPic
End Function
```

Notes: This does not handle mask, but you can scale the mask the same way and assign it to the new picture.
(see other FAQ entry with mask)

5.0.194   How to scale/resize a CIImageMBS?

Plugin Version: all, Platform: Windows.

Answer: Use the CIFilterLanczosScaleTransform filter to scale down a picture to a specific size.
Example:

```
Dim pic As Picture = LogoMBS(500)
Dim image As CIImageMBS = CIImageMBS.imageWithPicture(pic)

Dim filter As New CIFilterLanczosScaleTransformMBS

Const targetWidth = 600.0
Const targetHeight = 400.0

Dim scale As Double = targetHeight / image.Extent.Height
Dim aspect As Double = targetWidth / (image.Extent.Width * scale)

filter.inputImage = image
filter.inputScale = scale
filter.inputAspectRatio = aspect

Dim result As Picture = filter.outputImage.RenderPicture

Backdrop = result
```

Notes: This is same code as our scaleTo convenience method.

5.0.195   How to scale/resize a picture?

Plugin Version: all, Platform: Windows.

Answer: There are several ways to scale or resize a picture. The easiest way may be the ScaleMBS function in the Picture class.
Example:

dim Original,Scaled as Picture

Original=LogoMBS(500)
Scaled=Original.ScaleMBS(100,100,true)

Notes: The plugin ways:
- GraphicsMagick can scale/resize.
- CoreImage scale filter may result in the fastest and best images on Mac OS X 10.4.
- NSImageMBS can scale, but is Mac OS X only.
- CGImageMBS can scale, but is Mac OS X only.
- CIImageMBS can scale, but is Mac OS X only.
- QuickTime Graphics exporter and importer can be connected to scale. (this was used more often a few years ago)
- ImageMagick can scale very nice and crossplatform. But the ImageMagick libraries are big.
- The picture.ScaleMBS function is self written and results in equal output on Mac, Windows and Linux without any additional libraries installed.
- Picture.ScalingMBS does crossplatform scaling with several modes.

with pure Xojo:
- make a new picture and draw the old one with new size inside.

5.0.196   How to search with regex and use unicode codepoints?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can specify unicode characters in search string with backslash x and digits.
Example:

dim r as RegExMbs
dim s as string
dim c as Integer

s="123 √§√√º 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

5.0.197   How to see if a file is invisible for Mac OS X?

Plugin Version: all, Platform: macOS.

Answer: Try this function:
Example:

```
Function Invisible(F As FolderItem) As Boolean
Dim TIS As TextInputStream
Dim S,All As String
Dim I as Integer
dim g as folderitem

If Left(F.Name,1)="." or not f.visible Then
Return True
End If

g=F.Parent.Child(".hidden")
If g.Exists Then
TIS=g.OpenAsTextFile
if tis<>Nil then
All=TIS.ReadAll
For I=1 to CountFields(All,Chr(11))
S=NthField(All, Chr(11), I)
```

```
If S=F.name Then
Return True
End If
Next
end if
End if
End Function
```

5.0.198 How to set cache size for SQLite or REALSQLDatabase?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You use the pragma cache_size command on the database.
Example:

```
// set cache size to 20000 pages which is about 20 MB for default page size
dim db as REALSQLDatabase
db.SQLExecute "PRAGMA cache_size = 20000"
```

Notes: Default cache size is 2000 pages which is not much.
You get best performance if whole database fits in memory.
At least you should try to have a cache big enough so you can do queries in memory.
You only need to call this pragma command once after you opened the database.

5.0.199 How to set the modified dot in the window?

Plugin Version: all, Platform: macOS.

Answer: Try this declares:
Example:

```
window1.ModifiedMBS=true
```

5.0.200 How to show a PDF file to the user in a Web Application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use a WebHTMLViewer control and load the
Example:

dim CurrentFile as WebFile // a property of the WebPage

// define the PDF file
CurrentFile = new WebFile
CurrentFile.Filename = "test.pdf"
CurrentFile.MIMEType = "application/pdf"
CurrentFile.Data = "some pdf data" // MyDynaPDF.GetBuffer

// load into html viewer
HTMLViewer1.URL = CurrentFile.URL

Notes: See our Create PDF example for the Xojo Web Edition.

5.0.201   How to show Keyboard Viewer programmatically?

Platform: macOS.

Answer: Use Xojo or AppleScript to launch the KeyboardViewerServer.app.
Example:

dim a as new AppleScriptMBS
dim text as string
dim lines(-1) as string

lines.append "set theApplication to ""KeyboardViewerServer"""
lines.append "set thePath to ""/System/Library/Components/KeyboardViewer.component/Contents/Shared-
Support/KeyboardViewerServer.app"""
lines.append ""
lines.append "set POSIXPath to ((POSIX file thePath) as string)"
lines.append "tell application ""System Events"" to set isRunning to 0 <(count (application processes whose
name is theApplication))"
lines.append "if isRunning then tell application POSIXPath to quit"
lines.append "delay 0.15"
lines.append ""
lines.append "ignoring application responses"
lines.append " tell application POSIXPath to run"
lines.append "end ignoring"

text=join(lines,EndOfLine.macintosh)

a.Compile text
a.Execute

Notes: AppleScript code:

set theApplication to "KeyboardViewerServer"
set thePath to "/System/Library/Components/KeyboardViewer.component/Contents/SharedSupport/KeyboardViewerServer.app"

set POSIXPath to ((POSIX file thePath) as string)
tell application "System Events" to set isRunning to 0 <(count (application processes whose name is theApplication))
if isRunning then tell application POSIXPath to quit
delay 0.15

ignoring application responses
tell application POSIXPath to run
end ignoring

5.0.202 How to show the mouse cursor on Mac?

Plugin Version: all, Platform: macOS.

Answer: Try this declare:
Example:

Declare Sub ShowCursor Lib "Carbon" ()

ShowCursor

Notes: The MBS Plugin has this function and supports it on Windows, too.

5.0.203 How to shutdown a Mac?

Plugin Version: all, Platform: macOS.

Answer: Ask the Finder via Apple Events:
Example:

dim ae as appleevent
ae=newappleEvent("FNDR","shut","MACS")
if not ae.send then
msgBox "The computer couldn't be shutdown."
end if

Notes: Or toolbox call (Attention: This method will stop the computer immediataly: No document asked to be saved, all applications quitting without knowing).

Declare Sub ShutDwnPower Lib "Carbon" ()
ShutDwnPower

5.0.204 How to sleep a Mac?

Plugin Version: all, Platform: macOS.

Answer: Ask the Finder via Apple Events:
Example:

dim ae as appleevent
ae=newappleEvent("FNDR","slep","MACS")
if not ae.send then
msgBox "The computer doesn't want to sleep."
end if

5.0.205 How to speed up rasterizer for displaying PDFs with DynaPDF?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Here a few speed tips:
Notes:

- Use the DynaPDFRasterizerMBS function instead of our render functions.

- Reuse DynaPDFRasterizerMBS as long as the target picture size doesn't change.

- Import only the PDF pages you want to display.

- Let DynaPDF do zooming, rotating or other effects instead of you change it.

5.0.206 How to use PDFLib in my RB application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: The PDFlib plugin was discontinued in favor of our DynaPDF plugin.
Notes: If you need help to move, please contact us.

5.0.207 How to use quotes in a string?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Just double them.
Example:

msgbox "This String contains ""quotes"""."

5.0.208 How to use Sybase in Web App?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Please use our MBS Xojo SQL Plugin to connect to a Sybase Database in your web application.
Notes: If you see db.Connect giving the error message "cs_ctx_alloc ->CS_MEM_ERROR", than some things are not setup right for Sybase.
The Apache process may not have all the SYBASE environment variables being set when the CGI was launched.

Adding these lines to /etc/httpd/conf/httpd.conf stopped the faux memory errors for us:

SetEnv LD_LIBRARY_PATH /opt/sybase/OCS-15_0/lib:/opt/sybase/OCS-15_0/lib3p64:/opt/sybase/OCS-15_0/lib3p:
SetEnv SYBROOT /opt/sybase
SetEnv SYBASE_OCS /opt/sybase
SetEnv SYBASE /opt/sybase

5.0.209 How to use the Application Support folder?

Plugin Version: all, Platform: macOS.

Answer:

I was saving a registration code for an app to the Preferencefolder.
People on the list have suggested that it would be better in
the ApplicationSupportFolder. How do I save the file called CWWPrefs
into that folder using MBS?

I have checked for examples and the docs but can't see how to apply it

//f = SpecialFolder.Preferences.child("CWWPrefs")
f = ApplicationSupportFolderMBS(-32768)

Example:

dim folder,file as FolderItem

folder = createApplicationSupportFolderMBS(-32763)

if folder=nil then
// Some very old Mac OS Versions may not support it
// or the plugin may fail for any reason
folder=SpecialFolder.Preferences
end if

file=folder.Child("CWWPrefs")

MsgBox file.NativePath

Notes:

You may not be able to write there with a normal user account!

5.0.210   How to use the IOPMCopyScheduledPowerEvents function in Xojo?

Plugin Version: all, Platform: macOS.

Answer: You can use the following code which does this using the SoftDeclareMBS class.
Example:

Sub Open()
dim c as CFDateMBS
dim t as CFAbsoluteTimeMBS

// get current date
c=NewCFDateMBS

// in absolute time (seconds since x)
t=c.AbsoluteTime

// add 600 seconds (= 10 Minutes)
t.Value=t.Value+600

// Make a Date from it
c=t.Date

// Schedule the event
// 0 on success
// E00002C1 for missing root rights

Title=hex(schedulePowerEvent(c, "wake"))

// Just for information, display the scheduled stuff
CFShowMBS CopyScheduledPowerEvents
End Sub

Function CopyScheduledPowerEvents() As 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 CFDictionaries
'* 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.

5.0.211 How to validate a GUID?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use this function below which uses a regular expression to verify that the string is a valid UUID/GUID:
Example:

Function IsGUID(guid as string) As Boolean
dim r as new RegEx

r.SearchPattern = "^(\{ { 0,1 } ([0-9a-fA-F]) { 8 } -([0-9a-fA-F]) { 4 } -([0-9a-fA-F]) { 4 } -([0-9a-fA-F]) { 4 } -([0-9a-fA-F]) { 12 } \} { 0,1 })$ "

Return r.Search(guid)<>nil
End Function

Notes: Simply parsing the GUID with CFUUIDMBS does not give the same result as CFUUIDMBS will also take a string like "DDDD".

5.0.212 How to walk a folder hierarchie non recursively?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use code like this one:
Example:

Sub Walk(folder as FolderItem)
dim folders() as FolderItem

folders.Append folder

while UBound(folders)>=0

dim currentFolder as FolderItem = folders.pop

dim c as Integer = currentFolder.Count
for i as Integer = 1 to c
dim item as FolderItem = currentFolder.TrueItem(i)

if item = Nil then
// no permission
elseif item.Visible then // only visible

if item.Directory then
folders.Append item

```
else
// work with file here
end if


end if


next


wend
End Sub
```

Notes: As you see we go with a long loop which runs until we don't have more folders to process.
We ignore items we can't access due to permission limits.
And we only work visible items.
If you like, check folderitem.isBundleMBS on item to handle packages and applications better on Mac OS X.

5.0.213 I got this error: PropVal, QDPictMBS.Name (property value), Type mismatch error. Expected CGDataProviderMBS, but got Variant, Name:QDPictMBS

Plugin Version: all, Platform: macOS.

Answer: The plugins MacOSX and MacOSXCF belong together. If you use one part, please also install the other part.
Notes: We splitted the plugin because the Xojo IDE on Windows crashed on compilation.

5.0.214 I registered the MBS Plugins in my application, but later the registration dialog is shown.

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: There are two main reasons.
Notes: 1. you may use the plugin before registering them. This is often the case if you register in a window open event and use the plugin in a control open event.
On the console on Mac OS X or Windows, you may see a message like this "MBS Plugins were used by the application before the RegisterMBSPlugin function was called. Please fix this in your code!".

2. you may have mixed different plugin versions which are not compatible.
In this case you can see a message "Internal plugin registration error." on the console on Mac OS X. Newer plugins may show a message dialog reporting this. Older version simply think they are not registered.

If the installer just merges old and new applications, users may have libraries of older and newer plugin versions in the libs folder. If your application loads the wrong version, the registration fails.

If you use remote debugging, make sure you clear the tempory files there, too. Otherwise you may have old DLLs on your hard disc which may disturb your application.

You can run into issues if you use your registration code on different places of your app. Please register only once in app.open (or app Constructor). If you have several codes, simply call them one after the other.

Also check that you only call RegisterMBSPlugin with valid serial number. If you later call RegisterMBSPlugin with Demo like in example code above, you remove the license.

Next check if you can clear the Xojo caches and that helps. This includes the Xojo Scratch folder and the Plugins & Project caches. Simply locate those folders and delete them. For Windows look in hidden AppData folder in your user folder. For Mac, please check
textasciitilde /Library/Caches and your temp folders.

Finally make sure you use the right serial number. Not an older one or a misspelled one.

5.0.215   I want to accept Drag & Drop from iTunes

Plugin Version: all, Platform: macOS.

Answer: You need to accept AcceptMacDataDrop "itun" and Handle the DropObject.
Example:

```
Sub Open()
window1.AcceptMacDataDrop "itun"
End Sub

Sub DropObject(obj As DragItem)
dim s as string
dim f as folderItem
dim d as CFDictionaryMBS
dim o as CFObjectMBS
dim key as CFStringMBS
dim dl as CFDictionaryListMBS
dim i,c as Integer
dim u as CFURLMBS
dim file as FolderItem

if obj.MacDataAvailable("itun") then
s = obj.MacData("itun")
```

```
// Parse XML
o=NewCFObjectMBSFromXML(NewCFBinaryDataMBSStr(s))

// Make dictionary
if o isa CFDictionaryMBS then
d=CFDictionaryMBS(o)

// get Tracks Dictionary
key=NewCFStringMBS("Tracks")
o=d.Value(key)

if o isa CFDictionaryMBS then
d=CFDictionaryMBS(o)
dl=d.List

// Walk over all entries in the Tracks dictionary
c=dl.Count-1
for i=0 to c
o=dl.Value(i)

if o isa CFDictionaryMBS then
d=CFDictionaryMBS(o)

key=NewCFStringMBS("Location")
o=d.Value(key)
if o isa CFStringMBS then
u=NewCFURLMBSCFStringMBS(CFStringMBS(o),nil)

file=u.file
if file<>nil then
MsgBox file.NativePath
end if
end if
end if
next
end if
end if
end if
End Sub
```

Notes: The code above inside a window on Xojo 5.5 with MBS Plugin 5.3 will do it nice and show the paths.

5.0.216 I'm drawing into a listbox but don't see something.

Plugin Version: all.

Answer: If you draw this in a listbox cellbackground, you need to draw on the correct position
Example:

Function CellBackgroundPaint(g As Graphics, row as Integer, column as Integer) As Boolean
dim f as FolderItem
f=SpecialFolder.Desktop
f.DrawWideIconMBS(g,listbox1.left,listbox1.top+row*20,16)
Return true
End Function

Notes: Try this in a listbox. The Graphics object there has a cliping and an offset which the plugin doesn't know about.

5.0.217 I'm searching for a method or so to move a window from position x.y to somewhere else on the screen.

Platform: macOS.

Answer:

The code I produced in RB isn't smooth enough. Is there a call in MBS, if not, can it be done? The speed of it has to be like the show of a DrawerWindow.

Try the declare below for Carbon. With WindowLib it will work on Mac OS 8.5 and newer.
Notes:

See Window.Transition functions.

5.0.218 If I use one of your plug-ins under windows, would this then impose the use of dll after compilation or my would my compiled soft still be a stand-alone single file software?

Platforms: macOS, Linux, Windows.

Answer: Stand alone.
Notes: Xojo compiles all used plugins into the application binary.
Some plugin parts need external dlls but you will find that in the documentation. (e.g. pdflib for some classes)

5.0.219   Is the fn key on a powerbook keyboard down?

Plugin Version: all, Platform: macOS.

Answer: I am unable to figure out how or if it is possible to detect if the fn key is down on a powerbook keyboard. Is it possible?
Example:

' Window.Open Event of a blank project:

dim i as Integer

for i=0 to 127
if keyboard.asynckeydown(i) then
title=str(i) // found
return
end if
next
title="" // not found

Notes: This test application shows the keycode (decimal) 63 for the fn key.

5.0.220   Is there a case sensitive Dictionary?

Plugin Version: all.

Answer: The MBS Plugin has several classes which can work as a replacement.
Notes: First you could use VariantToVariantHashMapMBS or VariantToVariantOrderedMapMBS.
If you know that all keys are Strings or Integers only, you can use the specialized classes which are a little bit faster due to avoiding variants:

IntegerToIntegerHashMapMBS class
IntegerToIntegerOrderedMapMBS class
IntegerToStringHashMapMBS class
IntegerToStringOrderedMapMBS class
IntegerToVariantHashMapMBS class
IntegerToVariantOrderedMapMBS class
StringToStringHashMapMBS class
StringToStringOrderedMapMBS class
StringToVariantHashMapMBS class
StringToVariantOrderedMapMBS class

5.0.221 Is there a way to use the MBS plugin to get only the visible item and folder count on a volume?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use the DirectorySizeMBS class for this as in the example below:
Example:

dim d as DirectorySizeMBS

d=new DirectorySizeMBS

// volume(1) as my boot volume is very full
if d.update(volume(1),true,0) then
MsgBox str(d.VisibleItemCount)+" visible items, "+str(d.HiddenItemCount)+" invisible items."
end if

Notes: Complete Question: Is there a way to use the MBS plugin to get only the visible item and folder
count on a volume? The FileCount and FolderCount properties of
VolumeInformationMBS seem to provide the total # of items including
invisible items such as .DS_Store and more importantly .Trashes which
is causing me a great amount of difficulty during a recursive scan of a
volume. I've got a progress bar which uses the total of the filecount
and foldercount properties as the maximum value, but my routine needs
to filter out all invisible items, as it is creating a catalog of a
volume for archiving purposes. Any thoughts how I could get accurate
number.

5.0.222 Is there an easy way I can launch the Displays preferences panel?

Plugin Version: all, Platform: macOS.

Answer: Use the code below:
Example:

dim error as Integer

error=OpenMacOSXPreferencesPaneMBS("Displays")
if error<>0 then
MsgBox "Failed to launch QuickTime System Preferences panel."
end if

5.0.223   List of Windows Error codes?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: We have a list of windows error codes on our website.
Notes: http://www.monkeybreadsoftware.de/xojo/winerror.shtml

5.0.224   Midi latency on Windows problem?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: The issue is system related, not a problem with RB or the plugin.
Notes: Two things will adversely affect the timing:

(1) latency of the software synthesizer output driver. The default Windows wavetable synthesizer has considerable latency. I don't know how many milliseconds, but it is noticeable.

(2) latency of the digital audio output driver. Different systems have different drivers for different audio hardware. My Dell laptop has a minimum 15ms latency in the audio driver.

These two things put together were causing a very sluggish MIDI response. I was able to verify these as the culprits by routing MIDI directly out of RB into a sample player, which only introduces the latency of (2) and does not include latency of (1).

I don't know how widely known are these facts, if not then you may want to add this information to the documentation, since Windows programmers using the MIDI plugin may not know those problems, and might mistakenly blame your plugin, as I did :) Sorry about that!

(From Aaron Andrew Hunt)

5.0.225   My Xojo Web App does not launch. Why?

Plugin Version: all, Platform: macOS.

Answer: Here is a list of checks to do for linux apache installations with Xojo or Xojo Web applications:
Notes: Just a list of checks to do for linux apache installations:

- You have 64bit linux? Than you need 32 bit compatibility libraries.
- The folder of your app is writable? Set permissions to 777.
- The cgi script is executable? Set permissions to 755.

- The app file itself is executable? Set permissions to 755.

- You uploaded cgi file as text, so it has unix line endings? (this often gives error "Premature end of script headers" in apache log)

- You uploaded config.cfg file and made it writable? Set permissions to 666.

- Your apache allows execution of cgi scripts? You enabled cgi for apache and uncommented addhandler command for CGI on a new apache installation?

- You uploaded the app file and libraries as binary files? Upload as text breaks them.

- You did upload the libs folder?

- You don't have code in app.open, session.open and other events which crashes app right at launch?

- You don"t have a print command in your app.open event? (see feedback case 23817)

- You allowed htaccess file to overwrite permissions?

5.0.226   SQLDatabase not initialized error?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Before you can use SQLDatabaseMBS, it must be initialized.
Example:

dim d as new SQLDatabaseMBS

Notes: This happens normally when you use "new SQLDatabaseMBS".
But if you just have a SQLConnectionMBS and get a recordset there, the initialization may not have happend, yet.
So please simply add a line "dim d as new SQLDatabaseMBS" to your app.open code after registration, so the plugin part can initialize and late provide recordsets.

5.0.227   Textconverter returns only the first x characters. Why?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

Some older Xojo versions limit the Textconverter to around 1024 characters in input and output.
This should be fixed with RB5.
Notes:

Xojo seems not to support Textconverters at all on Windows.

5.0.228 The type translation between CoreFoundation/Foundation and Xojo data types.

Plugin Version: all, Platform: macOS.

Answer: The plugin does conversion between Cocoa/Carbon data types and native Xojo data types. The following list help you knowing what the current plugins support:
Notes: Cocoa NSObject to Variant:

nil ->nil
NSDictionary ->Dictionary
NSData ->MemoryBlock
NSString ->String
NSAttributedString ->NSAttributedStringMBS
NSDate ->Date
NSNumber ->double/integer/Int64/UInt64/UInt32/Boolean
NSURL ->String
NSValue with NSRect ->NSRectMBS
NSValue with NSPoint ->NSPointMBS
NSValue with NSSize ->NSSizeMBS
NSValue with NSRange ->NSRangeMBS
NSValue with QTTime ->QTTimeMBS
NSValue with QTTimeRange ->QTTimeRangeMBS
NSArray ->Array of Variant
QuartzFilter ->QuartzFilterMBS

- ->*MBS

Variant to Cocoa NSObject:

nil ->nil
Dictionary ->NSDictionary
Boolean ->NSNumber
Integer ->NSNumber
Color ->NSColor
Int64 ->NSNumber
Single ->NSNumber
Double ->NSNumber
Date ->NSDate
MemoryBlock ->NSData
String ->NSString
NSImageMBS ->NSImage
NSAttributedStringMBS ->NSAttributedString
NSColorMBS ->NSColor
NSRectMBS ->NSValue with NSRect
NSSizeMBS ->NSValue with NSSize

NSPointMBS ->NSValue with NSPoint
NSRangeMBS ->NSValue with NSRange
NSBurnMBS ->NSBurn
NSViewMBS ->NSView
NSFontMBS ->NSFont
NSParagraphStyleMBS ->NSParagraphStyle
NSAttributedStringMBS ->NSAttributedString
WebPolicyDelegateMBS ->WebPolicyDelegate
WebUIDelegateMBS ->WebUIDelegate
WebFrameLoadDelegateMBS ->WebFrameLoadDelegate
WebResourceLoadDelegateMBS ->WebResourceLoadDelegate
NSIndexSetMBS ->NSIndexSet
QTTimeMBS ->QTTime
QTTimeRangeMBS ->QTTimeRange
Array of Variant ->NSArray
Array of String ->NSArray
CFStringMBS ->NSString
CFNumberMBS ->NSNumber
CFDataMBS ->NSData
CFURLMBS ->NSURL
CFArrayMBS ->NSArray
CFDictionaryMBS ->NSDictionary
CFBinaryDataMBS ->NSDate

Carbon CFTypeRef 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 CFTypeRef:

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.

5.0.229   Uploaded my web app with FTP, but it does not run on the server!

Plugin Version: all, Platform: Windows.

Answer: If you see errors like a simple "Segmentation Fault" on Linux or some other wired errors, you may want to check your FTP upload mode. It must be binary for web apps. ASCII mode corrupts the application.

5.0.230   What classes to use for hotkeys?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Please use CarbonHotKeyMBS class on Mac and WindowsKeyFilterMBS on Windows.
Notes: CarbonHotKeyMBS will also work fine in Cocoa apps.

5.0.231   What do I need for Linux to get picture functions working?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: In order to get our plugins working on Linux systems without GUI, the plugin loads graphics

libraries dynamically.

Notes: To get it working, the plugin tries to load gtk with this paths:

- libgtk-x11-2.0.so"
- libgtk-x11-2.0.so.0"
- /usr/lib/libgtk-x11-2.0.so"
- /usr/lib32/libgtk-x11-2.0.so"
- /usr/lib/libgtk-x11-2.0.so.0"
- /usr/lib32/libgtk-x11-2.0.so.0"

gdk is loaded with this paths:

- libgdk-x11-2.0.so"
- libgdk-x11-2.0.so.0"
- /usr/lib/libgdk-x11-2.0.so"
- /usr/lib32/libgdk-x11-2.0.so"
- /usr/lib/libgdk-x11-2.0.so.0"
- /usr/lib32/libgdk-x11-2.0.so.0"

For the paths without explicit path, the system will search in /lib, /usr/lib and all directories in the LD_LIBRARY_PATH environment variable.

5.0.232   What does the NAN code mean?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

5.0.233   What font is used as a 'small font' in typical Mac OS X apps?

Plugin Version: all, Platform: macOS.

Answer:

Xojo 4.5 has a constant "SmallSystem" to use for a font name.
For older versions try this code:
Example:

```
Sub GetThemeFont(fontType as Integer, ByRef fontName as String, ByRef fontSize as Integer, ByRef
fontStyle 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
```

5.0.234   What is last plugin version to run on Mac OS X 10.4?

Plugin Version: all, Platform: Windows.

Answer: Last Version with 10.4 support is version 15.4.
Notes: With version 15.4 you can build applications for OS X 10.4 and newer.
For Version 16.0 we disabled 10.4 and moved minimum to 10.5. We may be able to enable it again to build
a version of 16.x, but may need to charge for this by hour.

5.0.235   What is last plugin version to run on PPC?

Plugin Version: all, Platform: Windows.

Answer: Last Version with PPC is 15.4.
Notes: With version 15.4 you can build PPC applications for OS X 10.4 and newer.
For Version 16.0 we disabled PPC. We may be able to enable it again to build a PPC version of 16.x, but
may need to charge for this by hour.

5.0.236   What is last version of the plugins for macOS 32-bit?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Please use version 23.0 or older.
Notes: We stopped including 32-bit code for macOS in version 23.1.
Please us older versions if you use an old Xojo.

Xojo 2017r3 and newer load our 64-bit plugins.

5.0.237   What is the difference between Timer and WebTimer?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Time is server side and WebTimer client side.
Notes: Timer is the normal timer class in Xojo. It runs on the server. On the side the WebTimer runs on the client. It triggers a request to the server to perform the action. So a WebTimer is good to keep the connection running and the website updated regularly. A timer on the server is good to make regular jobs like starting a database backup every 24 hours.

5.0.238   What is the list of Excel functions?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Below a list of function names known by LibXL.
Notes: LibXL parses the functions and writes tokens to the excel file. So even if Excel can do more functions, we can only accept the ones known by LibXL.

ABS, ABSREF, ACOS, ACOSH, ACTIVE.CELL, ADD.BAR, ADD.COMMAND, ADD.MENU, ADD.TOOL-BAR, 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, COR-REL, COS, COSH, COUNT, COUNTA, COUNTBLANK, COUNTIF, COVAR, CREATE.OBJECT, CRIT-BINOM, CUSTOM.REPEAT, CUSTOM.UNDO, DATE, DATEDIF, DATESTRING, DATEVALUE, DAV-ERAGE, DAY, DAYS360, DB, DBCS, DCOUNT, DCOUNTA, DDB, DEGREES, DELETE.BAR, DELETE.COM-MAND, 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, EVAL-UATE, 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.TOOL-BAR, GET.WINDOW, GET.WORKBOOK, GET.WORKSPACE, GETPIVOTDATA, GOTO, GROUP, GROWTH, HALT, HARMEAN, HELP, HLOOKUP, HOUR, HYPERLINK, HYPGEOMDIST, IF, IN-DEX, INDIRECT, INFO, INITIATE, INPUT, INT, INTERCEPT, IPMT, IRR, ISBLANK, ISERR, ISER-ROR, 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.COM-MAND, N, NA, NAMES, NEGBINOMDIST, NEXT, NORMDIST, NORMINV, NORMSDIST, NORM-SINV, NOT, NOTE, NOW, NPER, NPV, NUMBERSTRING, ODD, OFFSET, OPEN.DIALOG, OP-TIONS.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, REFTEXT, REGISTER, REGISTER.ID, RELREF, RENAME.COMMAND, REPLACE, REPLACEB, REPT, REQUEST, RESET.TOOLBAR, RESTART, RESULT, RESUME, RETURN, RIGHT, RIGHTB, ROMAN, ROUND, ROUNDBAHTDOWN, ROUND-BAHTUP, 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, STANDARD-IZE, STDEV, STDEVA, STDEVP, STDEVPA, STEP, STEYX, SUBSTITUTE, SUBTOTAL, SUM, SUMIF, SUMPRODUCT, SUMSQ, SUMX2MY2, SUMX2PY2, SUMXMY2, SYD, T, TAN, TANH, TDIST, TER-MINATE, TEXT, TEXT.BOX, TEXTREF, THAIDAYOFWEEK, THAIDIGIT, THAIMONTHOFYEAR, THAINUMSOUND, THAINUMSTRING, THAISTRINGLENGTH, THAIYEAR, TIME, TIMEVALUE, TINV, TODAY, TRANSPOSE, TREND, TRIM, TRIMMEAN, TRUE, TRUNC, TTEST, TYPE, UNREG-ISTER, UPPER, USDOLLAR, USERDEFINED, VALUE, VAR, VARA, VARP, VARPA, VDB, VIEW.GET, VLOOKUP, VOLATILE, WEEKDAY, WEIBULL, WHILE, WINDOW.TITLE, WINDOWS, YEAR and ZTEST.

5.0.239   What is the replacement for PluginMBS?

Plugin Version: all, Platform: macOS.

Answer: Use the SoftDeclareMBS class to load libraries dynamically.

5.0.240   What to do on Xojo reporting a conflict?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

I get an error like "This item conflicts with another item of the same name" when using one of the plugin functions.

Xojo just wants to tell you that you dropped something in the plugins folder what is not a plugin.
Notes:

Some users dropped the examples, the documentation or other files into the plugins folder. Don't do it.

5.0.241   What to do with a NSImageCacheException?

Plugin Version: all, Platforms: macOS, Windows.

Answer: You need to add exception handlers for NSExceptionMBS 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.

5.0.242   What to do with MySQL Error 2014?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can get this error on MySQL if you have a recordset open while you create another one.

5.0.243   What to do with SQL Plugin reporting Malformed string as error?

Plugin Version: all, Platform: macOS.

Answer: Please make sure the table and/or database fields have a text encoding set.
Notes: For Firebird our plugin tries to use UTF-8 encoding if possible and to correctly convert between various tables, the tables and their fields need to have a text encoding defined.
e.g. if the text field in the table is windows-1252 and the other ISO 8859-5, then the Firebird database can convert them to UTF-8 and deliver texts to the plugin.
If encoding is set to none, it may get confused for non-ascii text.

5.0.244   Where is CGGetActiveDisplayListMBS?

Plugin Version: all, Platform: Windows.

Answer: This is now CGDisplayMBS.GetActiveDisplayList.

5.0.245   Where is CGGetDisplaysWithPointMBS?

Plugin Version: all, Platform: Windows.

Answer: This is now CGDisplayMBS.GetDisplaysWithPoint.

5.0.246   Where is CGGetDisplaysWithRectMBS?

Plugin Version: all, Platform: Windows.

Answer: This is now CGDisplayMBS.GetDisplaysWithRect.

5.0.247   Where is CGGetOnlineDisplayListMBS?

Plugin Version: all, Platform: Windows.

Answer: This is now CGDisplayMBS.GetOnlineDisplayList.

5.0.248   Where is GetObjectClassNameMBS?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Please use this replacement method:
Example:

Function GetObjectClassNameMBS(o as Object) As string
dim t as Introspection.TypeInfo = Introspection.GetType(o)
Return t.FullName
End Function

Notes: GetObjectClassNameMBS was removed from the plugins.

5.0.249   Where is NetworkAvailableMBS?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: We removed NetworkAvailableMBS some versions ago. It was not working right and basicly it's not useful. If you want to check whether you have a network, than do a DNS resolve:
Example:

```
// two independend domain names
const domain1 = "www.google.com"
const domain2 = "www.macsw.de"

// resolve IPs
dim ip1 as string = DNSNameToAddressMBS(Domain1)
dim ip2 as string = DNSNameToAddressMBS(Domain2)

// if we got IPs and not the same IPs (error/login pages)
if len(ip1)=0 or len(ip2)=0 or ip1=ip2 then
MsgBox "no connection"
else
MsgBox "have connection"
end if
```

Notes: This way you can detect whether you got something from DNS. And you can make sure that a DNS redirection to a login page won't catch you.

5.0.250 Where is StringHeight function in DynaPDF?

Plugin Version: all, Platform: Windows.

Answer: Use the function GetFTextHeight or GetFTextHeightEx.
Notes: Be aware that GetFTextHeight works with format commands and you may want to escape your text if you don't use them.

5.0.251 Where is XLSDocumentMBS class?

Plugin Version: all, Platform: macOS.

Answer: This class has been removed in favor of XLBookMBS class.
Notes: This classes have been removed XLSCellMBS, XLSDocumentMBS, XLSFormatRecordMBS, XLSMerged-CellsMBS, XLSRowMBS and XLSSheetMBS.

5.0.252 Where to get information about file formats?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

Please visit this web page:
http://www.wotsit.org

5.0.253   Where to register creator code for my application?

Plugin Version: all, Platform: macOS.

Answer:

Register at Apple:
http://developer.apple.com/dev/cftype/information.html

5.0.254   Which Mac OS X frameworks are 64bit only?

Plugin Version: all, Platform: macOS.

Answer: Some frameworks from Mac OS X do not support 32 bit applications, so we can't provide plugins for Xojo until 64bit target is available.
Notes: For Mac OS X 10.8:

- Accounts
- EventKit
- GLKit
- Social

and in 10.9:

- Accounts
- AVKit
- EventKit
- GameController
- GLKit
- MapKit
- MediaLibrary
- Social
- SpriteKit

In general Apple makes all new frameworks being 64 bit only.

5.0.255   Which plugins are 64bit only?

Plugin Version: all, Platform: macOS.

Answer: Some of our plugins work only in 64 bit modes as operation systems do not provide 32 bit code.
Notes: This effects currently: EventKit, Accounts, Social frameworks from Apple and our matching plugins.

5.0.256   Why application doesn't launch because of a missing ddraw.dll!?

Plugin Version: all, Platform: Windows.

Answer: Some RB versions require that you install DirectX from Microsoft on your Windows.

5.0.257   Why application doesn't launch because of a missing shlwapi.dll!?

Plugin Version: all, Platform: Windows.

Answer: Some RB versions require that you install the Internet Explorer from Microsoft on your Windows.
Notes: This bug is for several older Windows 95 editions.

5.0.258   Why do I hear a beep on keydown?

Plugin Version: all, Platform: Windows.

Answer: When the user presses a key, RB goes through all keydown event handlers till on returns true.
Notes: If no keydown event handler returns true for the key, a beep is performed.

5.0.259   Why does folderitem.item return nil?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Because Xojo fails to make a folderitem for you. Reason may be an alias file which can't be resolved or simply that you don't have enough access rights to read the folder content.
Notes: A more rarely reason is that the directory changed and the file with the given index or name does no longer exist.

5.0.260   Why doesn't showurl work?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

There are three main reasons:

1. showurl is not supported by Xojo in 68k applications.
2. there is now application defined for the protocol (e.g. http) in the Internet Control panel.
3. You don't have Internet Config installed.

You can use the InternetConfigMBS class to check for this stuff.

5.0.261   Why don't the picture functions not work on Linux?

Plugin Version: all, Platform: macOS.

Answer: Please make sure libcairo is installed.
Notes: For accessing pictures on Linux, the MBS Plugin relays on the cairo library.
Please install the package if you don't have it already.
Our plugin looks for library called libcairo.so or libcairo.so.2.

5.0.262   Why have I no values in my chart?

Plugin Version: all, Platforms: macOS, Windows.

Answer: You have no data points visible, there may be several reasons:
Notes: For example one of the data values may be infinite or invalid.
Or the scaling may be out of range, so you simply see nothing.

5.0.263   Will application size increase with using plugins?

Plugin Version: all, Platform: Windows.

Answer: All plugins used by your application will be included in the application.
Notes: If you use no plugins, your application will not change size.
And if you use one class from the plugins, your application size will increase by a few kilobytes.
The documentation of the plugins include a list of all plugin parts and their sizes for the different platforms.

5.0.264   XLS: Custom format string guidelines

Plugin Version: all, Platform: macOS.

Answer: You have to download the source code and compile a static version of the library.

Notes: Up to four sections of format codes can be specified. The format codes, separated by semicolons, define the formats for positive numbers, negative numbers, zero values, and text, in that order. If only two sections are specified, the first is used for positive numbers and zeros, and the second is used for negative numbers. If only one section is specified, it is used for all numbers. Four sections example:

#,###.00_); [Red] (#,###.00);0.00;"sales "@

The following table describes the different symbols that are available for use in custom number formats.

Specify colors

To set the text color for a section of the format, type the name of one of the following eight colors in square brackets in the section. The color code must be the first item in the section.

Instead of using the name of the color, the color index can be used, like this [Color3] for Red. Valid numeric indexes for color range from 1 to 56, which reference by index to the legacy color palette.

Specify conditions

To set number formats that will be applied only if a number meets a specified condition, enclose the condition in square brackets. The condition consists of a comparison operator and a value. Comparison operators include: = Equal to; >Greater than; <Less than; >= Greater than or equal to, <= Less than or equal to, and <>Not equal to. For example, the following format displays numbers that are less than or equal to 100 in a red font and numbers that are greater than 100 in a blue font.

[Red] [<=100] ; [Blue] [>100]

If the cell value does not meet any of the criteria, then pound signs ("#") are displayed across the width of the cell.

Dates and times

Examples

5.0.265   Xojo doesn't work with your plugins on Windows 98.

Plugin Version: all, Platform: Windows.

Answer: Please upgrade your Windows version.

5.0.266   Xojo or my RB application itself crashes on launch on Mac OS Classic. Why?

Plugin Version: all.

Answer:

You may check if the application has enough memory to be loaded.
RB should have on Mac OS Classic more than 20 MB of RAM.
I prefered to use 50 MB and for an application a 10 MB partition is a good way to start.

Parameter	Description
x	The x value of the data point. For an enumerated x-axis (see Axis.setLabels 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 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 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 LineLayer.setSymbolScale.
zy	The symbol scale in the y dimension. Applicable for layers with symbol scales set by LineLayer.setSymbolScale.
z	The symbol scale without distinguishing the dimension to use. Applicable for layers with symbol scales set by LineLayer.setSymbolScale.

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 PolarLayer.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]

textasciitilde ' for no thousand separator. The default is '
textasciitilde ', which can be modified using BaseChart.setNumberFormat.

[c]

[d]
textasciitilde ' for no negative sign character. The default is '-', which can be modified using BaseChart.setNumberFormat.

The thousand separator. Should be a non-alphanumeric character (not 0-9,
A-Z, a-z). Use '

The decimal point character. The default is '.', which can be modified using
BaseChart.setNumberFormat.
The negative sign character. Use '

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 adds 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,,