# Introduction

#### **HID Class DLL**

HID Class DLL packages up the calls and links to unmanaged code into one simple to use DLL. The result is just a few simple calls. The DLL even handles unplug/replug events seamlessly.

#### **Introduction**

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## **Release Notes**

#### **HID Class DLL**

Version 1.10, 15 April 2010

This version simplifies the naming scheme, though the old names, though deprecated, will continue to be supported. Also it adds an overloaded HIDClassInit that allows specifying the timeout duration. The original defaults to 1000mS.

#### **Release Notes**

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# **Running the Demos**

See "A How to run the Custom HID demos" for running the Demos. This DLL is specifically used in the "Generic HID - HID DLL - PC Software" application.

# **Running the Demos**

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# **HIDClass Namespace**

This is namespace HIDClass.

#### **Classes**

	Name	Description
<b>4</b> \$	MCHPHIDClass	This is class HIDClass::MCHPHIDClass.

# Symbol Reference > <u>HIDClass Namespace</u>

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# **MCHPHIDClass Class**

C

ref class MCHPHIDClass;

# **Description**

This is class HIDClass::MCHPHIDClass.

# **Class Hierarchy**

HIDClass::MCHPHIDClass

### Symbol Reference > <u>HIDClass Namespace</u> > <u>MCHPHIDClass Class</u>

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# **MCHPHIDClass Methods**

Symbol Reference > <u>HIDClass Namespace</u> > <u>MCHPHIDClass Class</u> > <u>MCHPHIDClass Methods</u>

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Files		

# **Files**

Name	Description
II .	The HID Class DLL provides a simple interface to HID Class Devices.

# Symbol Reference > Files

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# HID class.h

#### **HID Class DLL**

The firmware on the corresponding device must have a generic report descriptor. See USB Device HID Custom Demos Firmware project. This hides all the low level details of bridging to unmanaged functions leaving four simple calls.

### **Namespaces**

Name	Description
HIDClass	This is namespace HIDClass.

# Symbol Reference > Files > HID class.h

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# **Using the Library**

# **Topics**

Name	Description	
Library Architecture	HID Class DLL provides a interface to the HID class device.  Your Application  HIDClass DLL  Operating System  The DLL encapsulates the bridge to unmanaged code and interfacing to the operating system from your program.	
How the Library Works	This DLL assumes the device we are attaching to enumerates as a generic HID device. That is the data is passed as an array of bytes (usually 64). See the firmware in the Microchip Applications Library, "USB Device - HID - Custom Demos".  The DLL encapsulates the windows OS calls necessary	

to search though the list of connected devices and find the device with the specified Vendor and Product ID. Then once it's found it opens a pipeline to the device. It also automatically tries to reopen the device in case it has been disconnected and reconnected. This makes recovering... more

## <u>Getting</u> <u>Started</u>

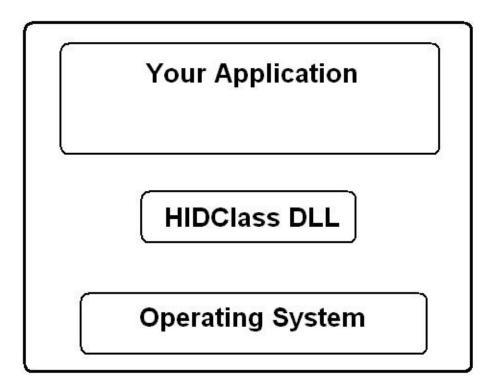
The DLL is simple and easy to use. Associate the DLL with the project, declare the name space, initialize the DLL and then read and write as necessary: First Associate the DLL with the application. In Visual C++ 2008 Express Edition, select Project | Properties (Alt-F7). "Framework and References" tab. Add New Reference button, Browse Tab. Then navigate to the DLL location and add it to the project. Next, Add "using namespace HIDClass;" to the namespace section at the top of your code. Then you only need three calls to use the library. HIDClassInit, HIDWriteReport and HIDReadReport. Other calls... more

#### **Using the Library**

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# **Library Architecture**

HID Class DLL provides a interface to the HID class device.



The DLL encapsulates the bridge to unmanaged code and interfacing to the operating system from your program.

# <u>Using the Library</u> > <u>Library Architecture</u>

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# **How the Library Works**

This DLL assumes the device we are attaching to enumerates as a generic HID device. That is the data is passed as an array of bytes (usually 64). See the firmware in the Microchip Applications Library, "USB Device - HID - Custom Demos".

The DLL encapsulates the windows OS calls necessary to search though the list of connected devices and find the device with the specified Vendor and Product ID. Then once it's found it opens a pipeline to the device. It also automatically tries to reopen the device in case it has been disconnected and reconnected. This makes recovering from a disconnect/reconnect event seamless to the application.

The compilation setting must be /clr, /clr:pure or /clr:safe. This dll is a .NET assembly, so it can't be used with a compilation setting that produces pure unmanaged code.

# <u>Using the Library</u> > <u>How the Library Works</u>

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# **Getting Started**

The DLL is simple and easy to use. Associate the DLL with the project, declare the name space, initialize the DLL and then read and write as necessary:

First Associate the DLL with the application. In Visual C++ 2008 Express Edition, select Project | Properties (Alt-F7). "Framework and References" tab. Add New Reference button, Browse Tab. Then navigate to the DLL location and add it to the project.

Next, Add "using namespace <u>HIDClass</u>;" to the namespace section at the top of your code.

Then you only need three calls to use the library. HIDClassInit, HIDWriteReport and HIDReadReport. Other calls are provided but are not required to communicate with device.

HID Class Init configures the DLL with the needed information that does not change: Vendor ID, Product ID, Buffer Size and Timeout (optional). This can be called from your application's constructor.

Both Read and Write functions first check to see if the device has been opened before attempting to communication with the device. If it not it opens a channel and then completes the communication. This allows seamless recovery if a device has been disconnected then reconnected.

The read and write functions both return a boolean indicating if the transfer was successful or not. Suggest testing these to verify the transfer and recover gracefully if not.

HIDClassInit (0x04D8, 0x0032, 64);

# <u>Using the Library</u> > <u>Getting Started</u>

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# **Library API**

This section describes the API of the library.

# **Topics**

Name	Description
HID Class	HID Class DLL simplifies the interface to a HID class USB device. It assumes the firmware is configured to send an array of bytes. See the project in Microchip Solutions\USB Device - Custom Demos\Generic HID - Firmware.  While there are quite a number of functions, only three are necessary: HIDClassInit, HIDWriteReport, HIDReadReport. The rest are optional or aliases for backwards
	While there are quite a number of functio only three are necessary: HIDClassInit, HIDWriteReport, HIDReadReport. The re

# **Library API**

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## **HID Class**

HID Class DLL simplifies the interface to a HID class USB device. It assumes the firmware is configured to send an array of bytes. See the project in Microchip Solutions\USB Device - Custom Demos\Generic HID - Firmware.

While there are quite a number of functions, only three are necessary: HIDClassInit, HIDWriteReport, HIDReadReport. The rest are optional or aliases for backwards compatibility.

#### **Public Methods**

	Name	Description
<b>∃</b>	<u>HIDClassInit</u>	This is the overview for the HIDClassInit method overload.
<b>≅</b>	<u>HIDWriteReport</u>	Transfers data to the end device.
<b>≅</b>	<u>HIDReadReport</u>	Transfers a data from the end device.
<b>≓</b>	<u>HIDClassVersion</u>	Returns the version of the DLL
± <b>∲</b>	HIDIsConnected	OS inquiry to find out of the previously specified VID & PID is currently attached.
<b>≡</b>	<u>HIDCloseReport</u>	Closes the communication channel.
<b>≡♦</b>	<u>USBHIDClassInit</u>	Initializes the DLL with the VID, PID and buffersize of the device.
<b>≡♦</b>	USBHIDIsConnected	OS inquiry to find out of the previously specified VID & PID is currently

		attached.
<b>≡</b>	<u>USBHIDReadReport</u>	Transfers data from the end device.
<b>≡</b> •	<u>USBHIDWriteReport</u>	Transfers data to the end device.

# <u>Library API</u> > <u>HID Class</u>

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# **HIDClassInit Method**

	Name	Description
<b>≡</b>		Initializes the DLL with the VID, PID and buffersize of the device.
<b>≓</b> ∳	(unsigned int, unsigned int,	Initializes the DLL with the VID, PID, buffersize and timeout of the device.

# <u>Library API > HID Class</u> > <u>HIDClassInit Method</u>

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# MCHPHIDClass::HIDClassInit Method (unsigned int, unsigned int)

```
static void HIDClassInit(
    unsigned int VendorID,
    unsigned int ProductID,
    unsigned int BuffSize
);
```

# **Description**

Initializes the DLL with the VID, PID, and Buffersize of the device. This function should be called before attempting to communicate with the device.

#### **Preconditions**

None

#### **Parameters**

Parameters	Description
VendorID	16 bit unsigned integer.
ProductID	16 bit unsigned integer
BufferSize	16 bit unsigned integer. Usually 64

#### **Returns**

Nothing

## **Remarks**

This function, or an overloaded variant, should be called proir to attempting to communicate with the device.

## **Example**

MCHPHIDCLASS::HIDClassInit(0x4D8, 0x0F00, 64);

<u>Library API > HID Class > HIDClassInit Method > MCHPHIDClass::HIDClassInit Method (unsigned int, unsigned int, unsigned int)</u>

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# MCHPHIDClass::HIDClassInit Method (unsigned int, unsigned int, unsigned int)

```
static void HIDClassInit(
    unsigned int VendorID,
    unsigned int ProductID,
    unsigned int BuffSize,
    unsigned int Timeout
);
```

## **Description**

Initializes the DLL with the VID, PID, and Buffersize of the device. This function should be called before attempting to communicate with the device. The reads and write use overlapped transfers. This version allows specifying how long to wait before timing out. The default is 1000mS.

#### **Preconditions**

None

#### **Parameters**

Parameters	Description
VendorID	16 bit unsigned integer.
ProductID	16 bit unsigned integer
BufferSize	16 bit unsigned integer. Usually 64
TimeOut	16 bit unsigned integer. Time in mS to wait for a read or write to timeout before

returning.

#### Returns

Nothing

#### **Remarks**

This function, or an overloaded variant, should be called proir to attempting to communicate with the device.

## **Example**

MCHPHIDCLASS::HIDClassInit(0x4D8, 0x0F00, 64, 250);

<u>Library API > HID Class > HIDClassInit Method > MCHPHIDClass::HIDClassInit Method (unsigned int, unsigned int, unsigned int)</u>

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# MCHPHIDClass::HIDWriteReport Method

```
static bool HIDWriteReport(
    unsigned char buffer[],
    unsigned int nBytes
);
```

## **Description**

Transfers a buffer to the end device. Returns true if successful, false if the transfer fails.

#### **Preconditions**

The DLL should be initialized via a call to **HIDClassInit** or variant.

#### **Parameters**

Parameters	Description
buffer	up to 64 byte array
nBytes	unsigned int. Number of valid bytes in the buffer.

#### Returns

true if the transfer is successful, false if not. A failure to transfer usually means the device has been disconnected.

#### Remarks

The full buffer size is always transfered, regardless of how many are valid

# **Example**

```
ToSendBuffer [0] = 'H';
ToSendBuffer [1] = 'i';
ToSendBuffer [2] = ' ';
ToSendBuffer [3] = 'M';
ToSendBuffer [4] = 'o';
ToSendBuffer [5] = 'm';
ToSendBuffer [6] = '!';
MCHPHIDCLASS::HIDWriteReport (ToSendBuffer, 7);
```

#### <u>Library API > HID Class > MCHPHIDClass::HIDWriteReport Method</u>

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# MCHPHIDClass::HIDReadReport Method

```
c
static bool HIDReadReport(
   unsigned char buffer[]
);
```

## **Description**

Transfers a buffer from the end device. Returns true if successful, false if the transfer fails.

#### **Preconditions**

The DLL should be initialized via a call to HIDClassInit.

#### **Parameters**

Parameters	Description
buffer	A byte array up to 64 bytes long.

#### Returns

true if the transfer is successful, false if not. A transfer failure may mean the device is no longer connected or it could just mean the end device didn't send any data before timeout.

#### Remarks

## **Example**

```
Copy Code
if (MCHPHIDCLASS::HIDReadReport (ReadBuffer))
{
```

```
// Process buffer if arrived
switch (ReadBuffer[0])
{
    }
}
else
{
    // do other stuff if no data
}
```

# <u>Library API > HID Class > MCHPHIDClass::HIDReadReport Method</u>

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# MCHPHIDClass::HIDClassVersion Method

```
c
static unsigned int HIDClassVersion();
```

#### **Description**

Reports back the DLL, Major, Minor and Dot release numbers of the bill.

#### **Preconditions**

None

#### **Returns**

unsigned int representing the version of the DLL. Formatted as three 8 bit unsigned integers, major release.minor release.dot release. For example: Version 1.23.45 would be encoded as 0x00011739

## **Example**

```
Copy Code
Version = MCHPHIDCLASS::HIDClassVersion ()
Major = (Version & 0x00FF0000) >> 16;
Minor = (Version & 0x0000FF00) >> 8;
Dot = Version & 0x000000FF;
```

Library API > HID Class > MCHPHIDClass::HIDClassVersion Method

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# MCHPHIDClass::HIDIsConnected Method

```
C
static bool HIDIsConnected();
```

#### **Description**

Polls the OS to find out if the previously specified VID & PID is currently attached. This is an OS inquiry only. No bus traffic is generated.

#### **Preconditions**

None

#### **Returns**

Nothing

# **Example**

Copy Code
MCHPHIDCLASS::HIDIsConnected ()

<u>Library API > HID Class > MCHPHIDClass::HIDIsConnected Method</u>

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# MCHPHIDClass::HIDCloseReport Method

```
C
static void HIDCloseReport();
```

#### **Description**

Closes the communication channel. The next attempt to read from or write to the device will re-establish communications

#### **Preconditions**

The DLL should be initialized via a call to HIDClassInit or variant.

#### Returns

True if the device is connected, False if not.

## **Example**

```
if (MCHPHIDCLASS::HIDIsConnected ())
{
    MCHPHIDClass::HIDCloseReport ();
}
```

#### Library API > HID Class > MCHPHIDClass::HIDCloseReport Method

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# MCHPHIDClass::USBHIDClassInit Method

```
static void USBHIDClassInit(
    unsigned int VendorID,
    unsigned int ProductID,
    unsigned int BuffSize
);
```

# **Description**

Initializes the DLL with the VID, PID, and Buffersize of the device. This function should be called before attempting to communicate with the device.

#### **Preconditions**

None

#### **Parameters**

Parameters	Description
VendorID	16 bit unsigned integer.
ProductID	16 bit unsigned integer
BufferSize	16 bit unsigned integer. Usually 64

#### **Returns**

Nothing

#### **Remarks**

This function, or an overloaded variant, should be called prior to attempting to communicate with the device.

# **Example**

Copy Code MCHPHIDCLASS::USBHIDClassInit(0x4D8, 0x0F00, 64);

<u>Library API > HID Class > MCHPHIDClass::USBHIDClassInit Method</u>

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# MCHPHIDClass::USBHIDIsConnected Method

C

static bool USBHIDIsConnected();

## **Description**

Polls the OS to find out if the previously specified VID & PID is currently attached. This is an OS inquiry only. No bus traffic is generated.

#### **Preconditions**

None

#### Returns

Nothing

## **Example**

Copy Code

MCHPHIDCLASS:: USBHIDIsConnected ()

Library API > HID Class > MCHPHIDClass::USBHIDIsConnected Method

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# MCHPHIDClass::USBHIDReadReport Method

```
c
static bool USBHIDReadReport(
   unsigned char buffer[]
);
```

## **Description**

Transfers a buffer from the end device. Returns true if successful, false if the transfer fails.

#### **Preconditions**

The DLL should be initialized via a call to **HIDClassInit** or variant.

#### **Parameters**

Parameters	Description
buffer	A byte array up to 64 bytes long.

#### Returns

true if the transfer is successful, false if not. A transfer failure may mean the device is no longer connected or it could just mean the end device didn't send any data before timeout.

#### Remarks

## **Example**

```
Copy Code
if (MCHPHIDCLASS::USBHIDReadReport (ReadBuffer))
{
```

```
// Process buffer if arrived
switch (ReadBuffer[0])
{
    }
}
else
{
    // do other stuff if no data
}
```

# <u>Library API > HID Class > MCHPHIDClass::USBHIDReadReport Method</u>

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# MCHPHIDClass::USBHIDWriteReport Method

```
static bool USBHIDWriteReport(
    unsigned char buffer[],
    unsigned int nBytes
);
```

## **Description**

Transfers the buffer to the end device. Returns true if successful, false if the transfer fails.

#### **Preconditions**

The DLL should be initialized via a call to **HIDClassInit** or variant.

#### **Parameters**

Parameters	Description
buffer	up to 64 byte array
nBytes	unsigned int. Number of valid bytes in the buffer.

#### Returns

true if the transfer is successful, false if not. A failure to transfer usually means the device has been disconnected.

#### Remarks

The full buffer size is always transfered, regardless of how many are valid

# **Example**

```
ToSendBuffer [0] = 'H';
ToSendBuffer [1] = 'i';
ToSendBuffer [2] = ' ';
ToSendBuffer [3] = 'M';
ToSendBuffer [4] = 'o';
ToSendBuffer [5] = 'm';
ToSendBuffer [6] = '!';
MCHPHIDCLASS::USBHIDWriteReport (ToSendBuffer, 7);
```

<u>Library API > HID Class > MCHPHIDClass::USBHIDWriteReport Method</u>

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# **Library Migration**

This release is 100% backwards compatible.. no migration necessary

# **Library Migration**

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