

USB
Dynamic Industrial Interface
V 2.0.1.6
A Universal
Application Programming Interface
To
Data Acquisition Products
Users Manual

Design & Implementation by
Decision Computer International Company

No parts of this documentation may be reproduced or transmitted in any form, by any means (electronic, photocopying, recording, or otherwise) without the prior written permission of Decision Computer International Company.

2010/04/20

Contents

| | |
|---|----|
| 1. Introduction | 3 |
| 2. Features | 4 |
| 3. Device Type definition | 5 |
| 4. Data Types of Function calls..... | 6 |
| 5. Functions to open and close Devices | 7 |
| 6. Functions for digital input/output | 10 |
| 7. Functions for reset hardware device | 16 |
| 8. Functions for analog input/output | 17 |
| 9. Functions for watch dog | 18 |
| 10. Using USB DII with different programming language | 20 |
| 10.1. C++..... | 20 |
| 10.2 Visual Basic | 20 |
| 11. Technical support and Feedback | 20 |

1. Introduction

This document provides the USB Dynamic Industrial Interface Specifications, including all function calls, and operating procedures.

Disclaimer:

Decision Computer International Company (DECISION) cannot take responsibility for consequential damages caused by using this software. In no event shall DECISION be liable for any damages whatsoever (including, without limitation, damages for loss of business profits, business interruption, loss of business information, or any other pecuniary loss) arising out of the use of or inability to use this product, even if we have been advised of the possibility of such damages.

Trademark Acknowledgments:

Windows 98, Windows ME, Windows 2000, Windows XP, Windows 7, Visual Basic, Visual C++ are registered trademarks of Microsoft Corporation.

2. Features

The USB Dynamic Industrial Interface (USBDII) was created to provide a standard way to access the functionality provided by all USB data acquisition products. Specifically, the USBDI provides the following features:

- Platform-independent

The library is compatible under Windows 98, Windows ME, Windows 2000, windows XP, Vista, and Win7. The compatibility under these operation systems guarantees that programs written for either operating system will work unchanged on the other, even without recompilation.

- Abstracts Card Functionality from Card Design

The interface concentrates on a card's functionality and hides the user from having to know specifics about the card design, for example, which port needs to be accessed in order to access specific functionality. All details of the card implementation are hidden from the user.

- Multiple Device Support

You could access device by its name or by its information (device type, id index).

- Programming Language Independent

The library provides a language independent way to access the USB industrial I/O cards, by using a Dynamic-Link-Library architecture.

3. Device Type Definition

Below are names for device types and its' corresponding defined value:

| | | |
|-------------|------|---|
| USB_16PIO | 0x01 | // USB 16 Channel Photo Input / 16 Channel Photo Output Board |
| USB_LABKIT | 0x02 | // USB LABKIT |
| USB_16PR | 0x03 | // USB 16 Channel Photo Input / 16 Channel Relay Output Board |
| USB_STARTER | 0x04 | // USB STARTER |
| USB_8PR | 0x06 | // USB 8 Channel Photo Input / 8 Channel Relay Output Board |
| USB_4PR | 0x07 | // USB 4 Channel Photo Input / 4 Channel Relay Output Board |
| USB_8PI | 0x08 | // USB 8 Channel Photo Input Board |
| USB_8RO | 0x09 | // USB 8 Channel Relay Output Board |
| USB_16PI | 0x0A | // USB 16 Channel Photo Input Board |
| USB_16RO | 0x0B | // USB 16 Channel Relay Output Board |
| USB_32PI | 0x0C | // USB 32 Channel Photo Input Board |
| USB_32RO | 0x0D | // USB 32 Channel Relay Output Board |
| USB_IND | 0x0E | // USB Industry Board |

Notice : Please use this function to open USB_14ADDA or USB_16ADDA.

4. Data Types of Function calls

Since the USBDI was developed in the C++ language, some data types used may not be present in the programming language you want to use. Please find the following data type conversion table for your convenience:

| | |
|---------|--|
| HANDLE | An opaque 32-bit integer |
| BYTE | A 8-bit unsigned integer |
| BOOL | A 32-bit integer, either 0 (FALSE) or 1 (TRUE) |
| DWORD | A 32-bit unsigned integer |
| HWND | A 32-bit integer representing a valid handle to a Window |
| LPTSTR | A 32-bit flat pointer to a zero terminated string |
| LPBOOL | A 32-bit flat pointer to a variable of type BOOL |
| LPBYTE | A 32-bit flat pointer to a variable of type BYTE |
| LPDWORD | A 32-bit flat pointer to a variable of type DWORD |

Also note that the DLL employs the Standard Call (Pascal) calling mechanism, which is used for all system. USBDI as well and is compatible with VB, VC, Delphi, .NET, and notice the variable with same type name may have different define in different program language. For example, in Visual Basic 6, the width of ***Integer*** is 16 bits and the width of ***Long*** is 32 bits, but in Visual Basic.Net, the width of ***Integer*** becomes 32 bits and the width of ***Long*** becomes 64 bits. If you declare variable with different width from our define, it may cause some run-time error.

5. Functions to open and close Devices

hid_OpenDevice

This function opens a device for further access by USB. Please do not use this function to open USB_14ADDA or USB_16ADDA.

Declaration

```
HANDLE hid_OpenDevice ( DWORD device_type,  
                        DWORD device_id );
```

Parameters

device_type The type of the device to open.

device_id Device's id on the Board.

For more information, please see “Device Type Table & ID Table” following below.

Return value

A valid handle representing the device, or INVALID_HANDLE_VALUE (-1) if an error occurred.

For USB_STARTER, there is no ID selection and device_id = 0

Example

```
HANDLE hDevice = hid_OpenDevice(Device Type, Device Index);  
if (hDevice == INVALID_HANDLE_VALUE)  
{  
    MessageBox (NULL,“Open Failed!“,“Error“,MB_OK);  
}
```

hid_CloseDevice

This function closes a device by USB.

Declaration

```
BOOL hid_CloseDevice (HANDLE hDevice)
```

Parameters

hDevice A valid device handle.

Return value

TRUE if successful, FALSE otherwise.

Example

```
hid_CloseDevice(hDevice);
```

com_OpenDevice

This function opens a device for further access by Serial Port. Please use this function to open USB_14ADDA or USB_16ADDA.

Declaration

```
HANDLE com_OpenDevice ( DWORD device_type,  
                        DWORD device_id,  
                        DWORD port_num );
```

Parameters

device_type The type of the device to open.

device_id Device's id on the board.

For more information, please see “Device Type Table & ID Table” following below.

port_num Com Port Num to open.

Return value

A valid handle representing the device, or INVALID_HANDLE_VALUE (-1) if an error occurred.

Example

```
HANDLE hDevice = com_OpenDevice(Device Type, Device Index, 1);  
if (hDevice == INVALID_HANDLE_VALUE)  
    MessageBox (NULL,“Open Failed!“,“Error“,MB_OK);
```


com_CloseDevice

This function closes a device by Serial Port.

Declaration

```
BOOL com_CloseDevice(HANDLE hDevice)
```

Parameters

hDevice A valid device handle.

Return value

TRUE if successful, FALSE otherwise.

Example

```
com_CloseDevice(hDevice);
```

Remarks

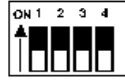
Please see “Serial_Communication.pdf” to set hardware for serial communication, and USB_LABKIT, USB_STARTER, USB_8PR are not supported by serial communication.

Device Type Table

| <i>Product</i> | <i>device_type</i> |
|-----------------------|---------------------------|
| USB_16PIO | 0x01 |
| USB_LABKIT | 0x02 |
| USB_16PR | 0x03 |
| USB_STARTER | 0x04 |
| USB_8PR | 0x06 |
| USB_4PR | 0x07 |
| USB_8PI | 0x08 |
| USB_8RO | 0x09 |
| USB_16PI | 0x0A |
| USB_16RO | 0x0B |
| USB_32PI | 0x0C |
| USB_32RO | 0x0D |
| USB_IND | 0x0E |

Device ID Table

(Switch Setting on the Device Board)



| Switch Setting | device_id |
|-----------------------|------------------|
| 1, 2, 3, 4 OFF | 0 |
| 2, 3, 4 OFF, 1 ON | 1 |
| 1, 3, 4 OFF, 2 ON | 2 |
| 3, 4 OFF, 1, 2 ON | 3 |
| 1, 2, 4 OFF, 3 ON | 4 |
| 2, 4 OFF, 1, 3 ON | 5 |
| 1, 4 OFF, 2, 3 ON | 6 |
| 4 OFF, 2, 3, 4 ON | 7 |
| 1, 2, 3 OFF, 4 ON | 8 |
| 2, 3 OFF, 1, 4 ON | 9 |
| 1, 3 OFF, 2, 4 ON | 10 |
| 3 OFF, 1, 2, 4 ON | 11 |
| 1, 2 OFF, 3, 4 ON | 12 |
| 2 OFF, 1, 3, 4 ON | 13 |
| 1 OFF, 2, 3, 4 ON | 14 |
| 1, 2, 3, 4 ON | Firmware update |

6. Functions for digital input/output

hid_SetDigitalByte

This function sets or clears a byte on a digital output line by USB.

Declaration

```
BOOL hid_SetDigitalByte ( HANDLE hDevice,  
                        DWORD dwPort,  
                        BYTE byPortState  
                        );
```

Parameters

hDevice A valid device handle, previously obtained from hid_OpenDeviceDevice
dwPort The index of the port on the card to manipulate. The first port has index 0.
For more information, please see “Write Address Table” following below.
byPortState The new state of the port

Return value

TRUE if successful, FALSE otherwise.

If an error occurred, GetLastError() may return the following values:

ERROR_INVALID_PARAMETER - The handle passed was invalid, or the port number was out of range for the device selected.

Example

```
HANDLE hDevice = hid_OpenDevice(0x01,0);  
if (hDevice != INVALID_HANDLE_VALUE)  
{  
hid_SetDigitalByte( hDevice, 0, 0xFF); // set's all bits on the first port  
hid_CloseDevice(hDevice);  
}
```

com_SetDigitalByte

This function sets or clears a byte on a digital output line by Serial Port.

Declaration

```
BOOL com_SetDigitalByte ( HANDLE hDevice,  
                          DWORD dwPort,  
                          BYTE byPortState  
                          );
```

Parameters

hDevice A valid device handle, previously obtained from com_OpenDevice

dwPort The index of the port on the card to manipulate. The first port has index 0.
For more information, please see “Write Address Table” following below.

byPortState The new state of the port

Return value

TRUE if successful, FALSE otherwise.

If an error occurred, GetLastError() may return the following values:

ERROR_INVALID_PARAMETER - The handle passed was invalid, or the port number was out of range for the device selected.

Example

```
HANDLE hDevice = com_OpenDevice(0x01,0);  
if (hDevice != INVALID_HANDLE_VALUE)  
{  
com_SetDigitalByte( hDevice, 0, 0xFF); // set's all bits on the first port  
com_CloseDevice(hDevice);  
}
```

Remarks

Please see “Serial_Communication.pdf” to set hardware for serial communication, and USB_LABKIT, USB_STARTER, USB_8PR are not supported by serial communication.

Write Address Table

| <i>Product</i> | <i>dwPort</i> | <i>Content</i> |
|----------------|---------------|----------------|
| USB_16PIO | 0x02 | OUT07 to OUT00 |
| | 0x03 | OUT15 to OUT08 |
| USB_LABKIT | 0x03 | P1D07 to P1D00 |
| USB_STARTER | 0x03 | P1D07 to P1D00 |
| USB_16PR | 0x02 | OUT07 to OUT00 |
| | 0x03 | OUT15 to OUT08 |
| USB_8PR | 0x01 | OUT07 to OUT00 |
| | 0x02 | DIO7 to DIO0 |
| | 0x03 | DIO15 to DIO8 |
| USB_4PR | 0x02 | OUT03 to OUT00 |
| USB_8RO | 0x02 | OUT07 to OUT00 |
| USB_16RO | 0x02 | OUT07 to OUT00 |
| | 0x03 | OUT15 to OUT08 |
| USB_32RO | 0x00 | OUT07 to OUT00 |
| | 0x01 | OUT15 to OUT08 |
| | 0x02 | OUT23 to OUT16 |
| | 0x03 | OUT31 to OUT24 |
| USB_IND | 0x00 | Port 0 |
| | 0x01 | Port 1 |
| | 0x02 | Port 2 |
| | 0x03 | Port 3 |
| | 0x04 | Port 4 |
| | 0x05 | Port 5 |
| | 0x06 | Port 6 |
| | 0x07 | Port 7 |
| | 0x08 | DIO |
| | 0x0D | IOCONFIG |

hid_GetDigitalByte

This function reads a complete byte from a digital input port of a device by USB.

Declaration

```
BOOL  hid_GetDigitalByte ( HANDLE hDevice,
                          DWORD dwPort,
                          LPBYTE lpbyPortState
                          );
```

Parameters

hDevice A valid device handle, previously obtained from hid_OpenDeviceDevice
dwPort The index of the port on the card to manipulate. The first port has index 0.
 For more information, please see “Read Address Table” following below.
lpbyPortState A pointer to a variable of type BYTE receiving the new state of the port

Return value

TRUE if successful, FALSE otherwise.

If an error occurred, GetLastError() may return the following values:

ERROR_INVALID_PARAMETER – The handle passed was invalid, or the port number was out of range for the device selected.

Example

```
HANDLE hDevice = hid_OpenDevice(0x01,0);
if (hDevice != INVALID_HANDLE_VALUE)
{
hid_GetDigitalByte( hDevice, 0, &byState); // reads the state of the first input port
hid_CloseDevice(hDevice);
}
```

com_GetDigitalByte

This function reads a complete byte from a digital input port of a device by Serial Port.

Declaration

```
BOOL com_GetDigitalByte ( HANDLE hDevice,  
                          DWORD dwPort,  
                          LPBYTE lpbyPortState  
                          );
```

Parameters

hDevice A valid device handle, previously obtained from com_OpenDevice
dwPort The index of the port on the card to manipulate. The first port has index 0.
For more information, please see “Read Address Table” following below.
lpbyPortState A pointer to a variable of type BYTE receiving the new state of the port

Return value

TRUE if successful, FALSE otherwise.

If an error occurred, GetLastError() may return the following values:

ERROR_INVALID_PARAMETER – The handle passed was invalid, or the port number was out of range for the device selected.

Example

```
HANDLE hDevice = com_OpenDevice(0x01,0);  
if (hDevice != INVALID_HANDLE_VALUE)  
{  
com_GetDigitalByte( hDevice, 0, &byState); // reads the state of the first input port  
com_CloseDevice(hDevice);  
}
```

Remarks

Please see “Serial_Communication.pdf” to set hardware for serial communication, and USB_LABKIT, USB_STARTER, USB_8PR are not supported by serial communication.

Read Address Table

| <i>Product</i> | <i>dwPort</i> | <i>Content</i> |
|----------------|---------------|--------------------------|
| USB_16PIO | 0x00 | IN07 to IN00 |
| | 0x01 | IN15 to IN08 |
| USB_LABKIT | 0x02 | P0D07 to P0D00 |
| USB_STARTER | 0x02 | P0D07 to P0D00 |
| USB_16PR | 0x00 | IN07 to IN00 |
| | 0x01 | IN15 to IN08 |
| USB_8PR | 0x00 | IN07 to IN00 |
| | 0x02 | DIO7 to DIO0 |
| | 0x03 | DIO15 to DIO8 |
| | 0x10 | JP9/JP10 Settings |
| USB_4PR | 0x00 | IN03 to IN00 |
| USB_8PI | 0x00 | IN07 to IN00 |
| USB_16PI | 0x00 | IN07 to IN00 |
| | 0x01 | IN15 to IN08 |
| USB_32PI | 0x00 | IN07 to IN00 |
| | 0x01 | IN15 to IN08 |
| | 0x02 | IN23 to IN16 |
| | 0x03 | IN31 to IN24 |
| USB_IND | 0x00 | Port 0 |
| | 0x01 | Port 1 |
| | 0x02 | Port 2 |
| | 0x03 | Port 3 |
| | 0x04 | Port 4 |
| | 0x05 | Port 5 |
| | 0x06 | Port 6 |
| | 0x07 | Port 7 |
| | 0x08 | DIO |
| | 0x0D | IOCONFIG |
| | 0x10 | Port 0 default value |
| | 0x11 | Port 1 default value |
| | 0x12 | Port 2 default value |
| | 0x13 | Port 3 default value |

| | | |
|--|------|------------------------------|
| | 0x14 | Port 4 default value |
| | 0x15 | Port 5 default value |
| | 0x16 | Port 6 default value |
| | 0x17 | Port 7 default value |
| | 0x18 | Port DIO default value |
| | 0x19 | Input/output default setting |

Remarks

In **USB_8PR**, we provide 2 digital ports for user to define either as input or output. It can be defined by Jumper 10 and Jumper 11 on the board. And we can use `hid_GetDigitalByte` / `com_GetDigitalByte` function to read Jumper State to determine which port is either input or output.

`hid_GetDigitalByte(hDevice, 0x10, &byState);` // or use `com_GetDigitalByte` for serial communication

When JP9 is closed, DIO7 - DIO0 is for Input. The fifth bit of byState is 0

When JP9 is opened, DIO7 - DIO0 is for Output. The fifth bit of byState is 1

When JP10 is closed, DIO15 – DIO8 is for Input. The sixth bit of byState is 0

When JP10 is opened, DIO15 – DIO8 is for Output. The sixth bit of byState is 1

7. Functions for reset hardware device

hid_ResetHW

This function directly resets the hardware device by USB. And all channels on the board will load default value. If you need to control the device again, please use `hid_open` to get the handle again.

Declaration

`BOOL hid_ResetHW(HANDLE hDevice)`

Parameters

hDevice A valid device handle.

Return value

TRUE if successful, FALSE otherwise.

Example

`hid_ResetHW (hDevice);`

com_ResetHW

This function directly resets the hardware device by Serial Port. And all channels on the board will load default value.

Declaration

BOOL com_ResetHW(HANDLE hDevice)

Parameters

hDevice A valid device handle.

Return value

TRUE if successful, FALSE otherwise.

Example

```
com_ResetHW(hDevice);
```

8. Functions for analog input/output

hid_GetAnalogChannel

This function reads a complete word from an analog input port of a device by USB.

Declaration

```
BOOL hid_GetAnalogChannel ( HANDLE hDevice,  
                           DWORD dwPort,  
                           LPDWORD lpdwPortState  
                           );
```

Parameters

hDevice A valid device handle, previously obtained from hid_OpenDeviceDevice
dwPort The index of the port on the card to manipulate. The first port has index 0.
lpdwPortState A pointer to a variable of type DWORD receiving the new state of the port

Return value

TRUE if successful, FALSE otherwise.

If an error occurred, GetLastError() may return the following values:

ERROR_INVALID_PARAMETER - The handle passed was invalid, or the port number was out of range for the device selected.

Example

```
HANDLE hDevice = hid_OpenDevice(0x02,0); // USB_LABKIT  
if (hDevice != INVALID_HANDLE_VALUE)  
{  
    hid_GetAnalogChannel ( hDevice, 0, &dwState); // reads the state of the first analog input port  
    hid_CloseDevice (hDevice);  
}
```

Remarks

This function now only enable in **USB_LABKIT** and **USB_STARTER** device. The range of *dwPort* is from 0~7.

com_GetADHex

This function reads a complete word in hex from an analog input port of a device by USB.

Declaration

```
BOOL com_GetADHex(HANDLE hDevice,  
                  UINT dwPort,  
                  UINT *lpdwValue  
                  );
```

Parameters

hDevice A valid device handle, previously obtained from com_OpenDevice
dwPort The index of the port on the card to manipulate. The first port has index 0.
lpdwValue A pointer to a variable of type UINT receiving the new state of the port

Return value

TRUE if successful, FALSE otherwise.

If an error occurred, GetLastError() may return the following values:

ERROR_INVALID_PARAMETER - The handle passed was invalid, or the port number was out of range for the device selected.

Example

```
HANDLE hDevice = com_OpenDevice(card_id,card_number,10);  
if (hDevice != INVALID_HANDLE_VALUE)  
{  
    com_GetAnalogChannel ( hDevice, 0, &dwState); // reads the state of the first analog input port  
    com_CloseDevice (hDevice);  
}
```

Remarks

This function now only enable in **USB_14ADDA** and **USB_16ADDA** device. The range of *dwPort* is from 0~15.

com_GetADMilli

This function reads the result in decimal millivolt from an analog input port of a device by USB.

Declaration

```
BOOL com_GetADMilli (HANDLE hDevice,  
                    UINT dwPort,  
                    LONG *lpdwValue  
                    );
```

Parameters

hDevice A valid device handle, previously obtained from com_OpenDevice
dwPort The index of the port on the card to manipulate. The first port has index 0.
lpdwValue A pointer to a variable of type signed 32-bit integer receiving the new state of the port

Return value

TRUE if successful, FALSE otherwise.

If an error occurred, GetLastError() may return the following values:

ERROR_INVALID_PARAMETER - The handle passed was invalid, or the port number was out of range for the device selected.

Example

```
HANDLE hDevice = com_OpenDevice(card_id,card_number,10);  
if (hDevice != INVALID_HANDLE_VALUE)  
{  
    com_GetADMilli ( hDevice, 0, &dwState); // reads the state of the first analog input port  
    com_CloseDevice (hDevice);  
}
```

Remarks

This function now only enable in **USB_14ADDA** and **USB_16ADDA** device. The range of *dwPort* is from 0~15.

com_GetADMicro

This function reads the result in decimal microvolt from an analog input port of a device by USB.

Declaration

```
BOOL com_GetADMicro (HANDLE hDevice,  
                    UINT dwPort,  
                    Long *lpValue  
                    );
```

Parameters

hDevice A valid device handle, previously obtained from com_OpenDevice
dwPort The index of the port on the card to manipulate. The first port has index 0.
lpValue A pointer to a variable of type signed 32-bit integer receiving the new state of the port

Return value

TRUE if successful, FALSE otherwise.

If an error occurred, GetLastError() may return the following values:

ERROR_INVALID_PARAMETER - The handle passed was invalid, or the port number was out of range for the device selected.

Example

```
HANDLE hDevice = com_OpenDevice(card_id,card_number,10);  
if (hDevice != INVALID_HANDLE_VALUE)  
{  
    com_GetADMicro ( hDevice, 0, &dwState); // reads the state of the first analog input port  
    com_CloseDevice (hDevice);  
}
```

Remarks

This function now only enable in **USB_14ADDA** and **USB_16ADDA** device. The range of *dwPort* is from 0~15.

com_SetDAHex

This function writes a complete word in hex to an analog output port of a device by USB.

Declaration

```
BOOL com_SetDAHex(HANDLE hDevice,  
                  UINT dwPort,  
                  UINT dwValue  
                  );
```

Parameters

hDevice A valid device handle, previously obtained from hid_OpenDeviceDevice
dwPort The index of the port on the card to manipulate. The first port has index 0.
dwValue An unsigned hexical value to assign new value to DA channel

Return value

TRUE if successful, FALSE otherwise.

If an error occurred, GetLastError() may return the following values:

ERROR_INVALID_PARAMETER - The handle passed was invalid, or the port number was out of range for the device selected.

Example

```
HANDLE hDevice = com_OpenDevice(card_id,card_number,10);  
if (hDevice != INVALID_HANDLE_VALUE)  
{  
    com_SetDAHEX ( hDevice, 0, dwState); // writes the state to the first analog output port  
    com_CloseDevice (hDevice);  
}
```

Remarks

This function now only enable in **USB_14ADDA** and **USB_16ADDA** device. The range of *dwPort* is from 0~15.

com_SetDAMilli

This function writes a signed decimal value in millivolt to an analog output port of a device by USB.

Declaration

```
BOOL com_SetDAMilli(HANDLE hDevice,  
                   UINT dwPort,  
                   LONG InValue  
                   );
```

Parameters

hDevice A valid device handle, previously obtained from com_OpenDevice
dwPort The index of the port on the card to manipulate. The first port has index 0.
InValue An signed decimal value to assign new value to DA channel

Return value

TRUE if successful, FALSE otherwise.

If an error occurred, GetLastError() may return the following values:

ERROR_INVALID_PARAMETER - The handle passed was invalid, or the port number was out of range for the device selected.

Example

```
HANDLE hDevice = com_OpenDevice(card_id,card_number,10);  
if (hDevice != INVALID_HANDLE_VALUE)  
{  
    com_SetDAMilli ( hDevice, 0, dwState); // writes the state to the first analog output port  
    com_CloseDevice (hDevice);  
}
```

Remarks

This function now only enable in **USB_14ADDA** and **USB_16ADDA** device. The range of *dwPort* is from 0~15.

com_SetDAMicro

This function writes a signed decimal value in microvolt to an analog output port of a device by USB.

Declaration

```
BOOL com_GetADHex(HANDLE hDevice,  
                  UINT dwPort,  
                  LONG InValue  
                  );
```

Parameters

hDevice A valid device handle, previously obtained from hid_OpenDeviceDevice
dwPort The index of the port on the card to manipulate. The first port has index 0.
InValue An signed decimal value to assign new value to DA channel

Return value

TRUE if successful, FALSE otherwise.

If an error occurred, GetLastError() may return the following values:

ERROR_INVALID_PARAMETER - The handle passed was invalid, or the port number was out of range for the device selected.

Example

```
HANDLE hDevice = com_OpenDevice(card_id,card_number,10);  
if (hDevice != INVALID_HANDLE_VALUE)  
{  
    com_SetDAMicro ( hDevice, 0, dwState); // writes the state to the first analog output port  
    com_CloseDevice (hDevice);  
}
```

Remarks

This function now only enable in **USB_14ADDA** and **USB_16ADDA** device. The range of *dwPort* is from 0~15.

9. Functions for Watch dog

hid_SetWD

This function sets time interval for Watch Dog.

Declaration

```
BOOL hid_SetWD( HANDLE hDevice,  
                BYTE byMode );
```

Parameters

hDevice A valid device handle, previously obtained from hid_OpenDeviceDevice
byMode Time interval for Watch Dog (Value 1~5 as 1/5/10/30/60 seconds, default as 10s)

Return value

TRUE if successful, FALSE otherwise.

If an error occurred, GetLastError() may return the following values:

ERROR_INVALID_PARAMETER - The handle passed was invalid, or the port number was out of range for the device selected.

hid_EnableWD

This function enables/disables Watch Dog.

Declaration

```
BOOL hid_EnableWD( HANDLE hDevice,  
                   BOOL bEnabled );
```

Parameters

hDevice A valid device handle, previously obtained from hid_OpenDeviceDevice
bEnabled Enable/disable watch dog.

Return value

TRUE if successful, FALSE otherwise.

If an error occurred, GetLastError() may return the following values:

ERROR_INVALID_PARAMETER - The handle passed was invalid, or the port number was out of range for the device selected.

hid_ClearWD

This function cleans and reloads Watch Dog.

Declaration

```
BOOL hid_ClearWD( HANDLE hDevice );
```

Parameters

hDevice A valid device handle, previously obtained from hid_OpenDeviceDevice

Return value

TRUE if successful, FALSE otherwise.

If an error occurred, GetLastError() may return the following values:

ERROR_INVALID_PARAMETER - The handle passed was invalid, or the port number was out of range for the device selected.

Example

```
HANDLE hDevice = hid_OpenDevice(0x01,0); // USB_16PIO
```

```
if (hDevice != INVALID_HANDLE_VALUE)
{
hid_SetWD( hDevice, 5); // set time interval as 60s
hid_EnableWD( hDevice, TRUE); // enable the watchdog
}
```

use a timer or a thread to clear watch dog continually

```
Timer1
{
hid_ClearWD(hDevice);
}
```

If the program doesn't clean the watch dog within 60s (system crashed or program error), the USB device will reset itself and each channel returns its original state.

10. Using the Dynamic Industrial Interface with different programming languages

This chapter provides an overview about how to best utilize the Dynamic Industrial Interface in various programming languages.

If you experience difficulties calling the Dynamic Industrial Interface functions from your programming language, or are using a programming language not covered in this documentation, please feel free to visit our web-site, to which we will post updated information regarding DII programming issues. You may also contact our technical support through our website: www.decision.com.tw

10.1. C++

Since the DII DLL was developed using C++, you may easily use it to access Industrial I/O devices. For this purpose, a C++ header file ("USBDII.h") as well as an import library ("USBDII.lib") are being shipped with the interface library. Make sure that you have installed the development release, not the retail release, which does not include support programming files. In your C/C++ source code files, just include the "USBDII.h" include file, then you can use any of the functions provided by the USBDII DLL. Be sure to include the import library "USBDII.lib" during the linking step of your application. So your applications successfully references the actual interface DLL.

10.2. Visual Basic

Since the Dynamic Industrial Interface is fully 32-bit compliant, only 32-bit versions of Visual Basic are supported. Specifically, Version 6.0 are tested and supported. If you are using Visual Basic to access any I/O Devices supported by the USB Dynamic Industrial Interface (USBDII), you can call the USBDII DLL directly. But before that, you should import them. You may also consult the Visual Basic sample application for more information about using Visual Basic to access the USB Dynamic Industrial Interface (USBDII).

11. Technical Support and Feedback

We believe that customer input is the most valuable source for creating successful products. We continuously update and extend the Dynamic Industrial Interface with new functionality, for specific devices, for specific applications, to meet your specific needs, and provide supportive products around the USBDII. You may also contact our technical support through our website: www.decision.com.tw

12. Release notes

2012/11/09

Version 2.0.1.6

x64 version released

2011/11/17

Version 2.0.1.3

Release analog input/output functions for virtual com port.

2011/11/16

Version 2.0.1.2

Remove address checking

Fix the problem of hid_GetDigitalByte can not read some address of USBIND.

Provide default value read back function for USBIND.

2011/11/3

Version 2.0.1.1

Fix address limitations for USB Industry.

2010/04/20

Version 2.0.1.0

Update for supporting USB Industry.