

USB – Human Interface Device Class

Examples

<i>Esempio</i>	<i>Software necessario</i>
Controllo Volume	Nessuno
Controllo Media Player	Windows Media Player
Joystick	Nessuno
Ringtones Player	WxRingtonesPlayer

Controllo volume

Controllo del volume di sistema (Windows XP).

S2 ==> Volume Up

S3 ==> Volume Down

HID Descriptor:

```
0x05, 0x0C, // Usage Page (Consumer Devices)
0x09, 0x01, // Usage (Consumer Control)
0xA1, 0x01, // Collection (Application)
0x15, 0x00, // Logical Minimum (0)
0x25, 0x01, // Logical Maximum (1)
0x09, 0xE9, // Usage (Volume Up)
0x09, 0xEA, // Usage (Volume Down)
0x75, 0x01, // Report Size (1)
0x95, 0x02, // Report Count (2)
0x81, 0x02, // Input (Data, Variable, Absolute)
0x09, 0xE2, // Usage (Mute)
0x95, 0x01, // Report Count (1)
0x81, 0x06, // Input (Data, Variable, Relative)
0x95, 0x05, // Report Count (5)
0x81, 0x07, // Input (Constant)
0xC0 // End Collection
```

bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
nu	nu	nu	nu	nu	mute	vol down	vol up

Comandi:

0x01 Volume Up

0x02 Volume Down

0x04 Mute

Controllo “Media Player”

Controllo “remoto” per Windows Media Player

S2 ==> Play / Pause

S3 ==> Next track

Pot ==> Volume

HID Descriptor:

```
0x05, 0x0C, // Usage Page (Consumer Devices)
0x09, 0x01, // Usage (Consumer Control)
0xA1, 0x01, // Collection (Application)
0x05, 0x0C, // Usage Page (Consumer Devices)
0x15, 0x00, // Logical Minimum (0)
0x25, 0x01, // Logical Maximum (1)
0x75, 0x01, // Report Size (1)
0x95, 0x07, // Report Count (7)
0x09, 0xB5, // Usage (Scan Next Track)
0x09, 0xB6, // Usage (Scan Previous Track)
0x09, 0xB7, // Usage (Stop)
0x09, 0xCD, // Usage (Play / Pause)
0x09, 0xE2, // Usage (Mute)
0x09, 0xE9, // Usage (Volume Up)
0x09, 0xEA, // Usage (Volume Down)
0x81, 0x02, // Input (Data, Variable, Absolute)
0x95, 0x01, // Report Count (1)
0x81, 0x01, // Input (Constant)
0xC0 // End Collection
```

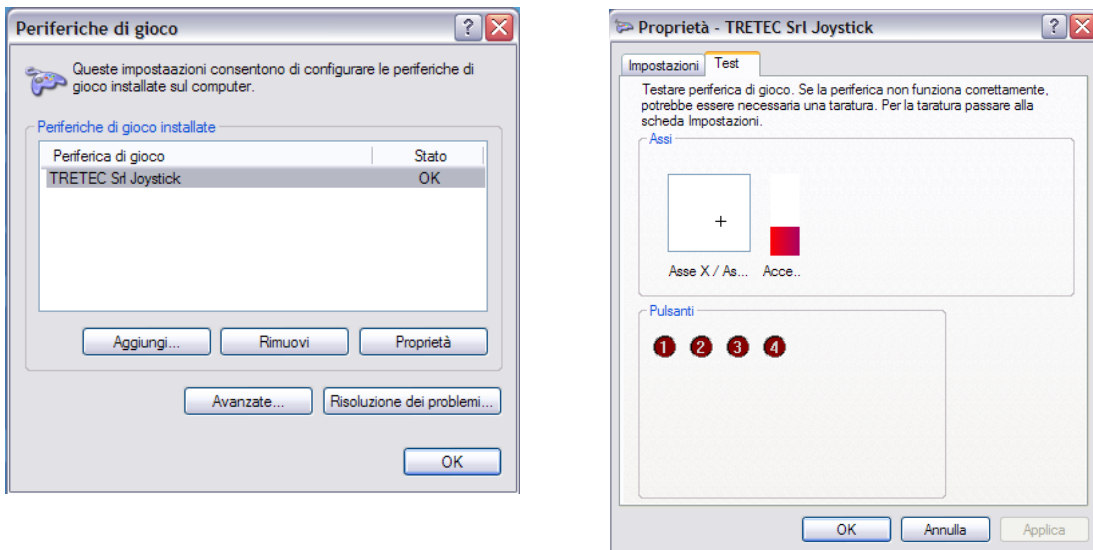
bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
nu	vol down	vol up	mute	play pause	stop	prev track	next track

Comandi:

```
0x01 Next Track
0x02 Prev Track
0x04 Stop
0x08 Play / Pause
0x10 Mute
0x20 Volume Up
0x40 Volume Down
```

Joystick

Pannello di controllo ==> Periferiche di gioco (Game controllers)



S2 ==> Pulsante 2 + cambio variabile (throttle ==> X ==> Y ==> throttle ==> ...)

S3 ==> Pulsante 3

Pot ==> Modifica valore variabile selezionata (throttle, X, Y)

Link di riferimento:

<http://www.helmpcb.com/Electronics/USBJoystick/USBJoystick.aspx>

HID Descriptor:

```
0x05, 0x01, // Usage Page (Generic Desktop)
0x15, 0x00, // Logical Minimum (0)
0x09, 0x04, // Usage (Joystick)
0xA1, 0x01, // Collection (Application)
0x05, 0x02, // Usage Page (Simulation Controls)
0x09, 0xBB, // Usage (Throttle)
0x15, 0x81, // Logical Minimum (-127)
0x25, 0x7F, // Logical Maximum (127)
0x75, 0x08, // Report Size (8)
0x95, 0x01, // Report Count (1)
0x81, 0x02, // Input (Data, Variable, Absolute)
0x05, 0x01, // Usage Page (Generic Desktop)
0x09, 0x01, // Usage (Pointer)
0xA1, 0x00, // Collection (Physical)
0x09, 0x30, // Usage (X)
0x09, 0x31, // Usage (Y)
0x95, 0x02, // Report Count (2)
0x81, 0x02, // Input (Data, Variable, Absolute)
0xC0, // End Collection
0x05, 0x09, // Usage Page (Button)
0x19, 0x01, // Usage Minimum (Button 1)
```

```

0x29, 0x04, // Usage Maximum (Button 4)
0x15, 0x00, // Logical Minimum (0)
0x25, 0x01, // Logical Maximum (1)
0x75, 0x01, // Report Size (1)
0x95, 0x04, // Report Count (4)
0x55, 0x00, // Unit Exponent (0)
0x65, 0x00, // Unit (None)
0x81, 0x02, // Input (Data, Variable, Absolute)
0x95, 0x04, // Report Count (4)
0x81, 0x03, // Input (Constant, Variable, Absolute)
0xC0 // End Collection

```

	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
byte 0	throttle [-127 ÷ +127]							
byte 1	position X [-127 ÷ +127]							
byte 2	position Y [-127 ÷ +127]							
byte 3	nu	nu	nu	nu	btn 4	btn 3	btn 2	btn 1

Esempi:

[0x30][0x00][0xAB][0x02]

throttle= 0x30

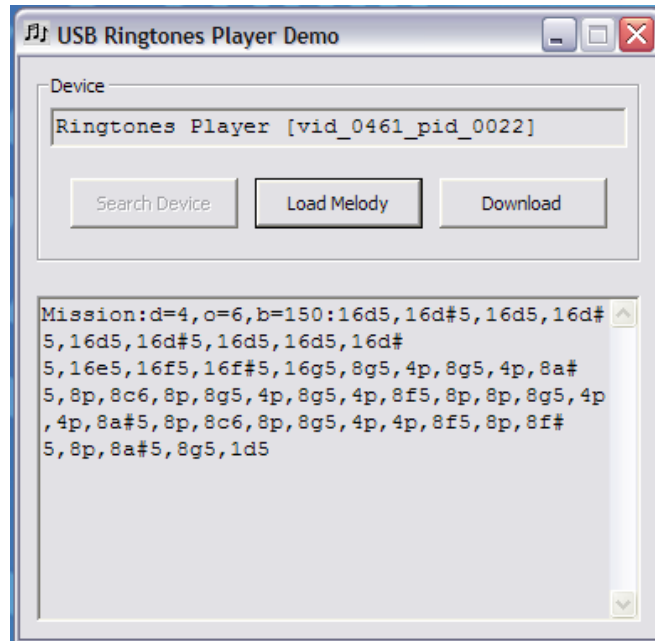
pos X = 0x00

pos Y = 0xAB

0x02 = Button 2 pressed

Ringtones Player

Il software "USB Ringtones Player Demo" consente di scaricare sulla scheda e riprodurre una melodia in formato RTX / RTTTL.



Vendor ID = 0x0461
Product ID = 0x0022

Link di riferimento:

http://www.csoft.co.uk/ringtones/rtttl_rtx.htm
<http://www.beyondlogic.org/pic/ringtones.htm>

HID Descriptor:

```

6, 0, 255, // Usage Page = Vendor Defined
9, 1, // Usage = IO device
0xA1, 1, // Collection = Application
0x19, 1, // Usage minimum
0x29, 8, // Usage maximum
0x15, 0x00, // Logical minimum (0)
0x25, 0xFF, // Logical maximum (255)
0x75, 8, // Report size = 8 (bits)
0x95, 8, // Report count = 8 bytes
0x81, 2, // Input (Data, Var, Abs)
0x19, 1, // Usage minimum
0x29, 8, // Usage maximum
0x75, 8, // Report size = 8 (bits)
0x95, 8, // Report count = 8 bytes
0x91, 2, // Output (Data, Var, Abs)
0xC0 // End Collection

```

Data Input (dal PC al dispositivo) / Output (dal dispositivo al PC)

B0	B1	B2	B3	B4	B5	B6	B7
CMD	DATA						

CMD = 0x01 SET OCTAVE (Input / Output)

B0	B1	B2	B3	B4	B5	B6	B7
0x01	OCT	0xFF					

CMD = 0x02 SET DURATION (Input / Output)

B0	B1	B2	B3	B4	B5	B6	B7
0x02	DUR	0xFF					

CMD = 0x03 SET BEAT (Input / Output)

B0	B1	B2	B3	B4	B5	B6	B7
0x03	BEAT	0xFF					

CMD = 0x04 NOTE (Input / Output)

Input :

B0	B1	B2	B3	B4	B5	B6	B7
0x04	NOTE BUFFER (es. "16d#5" formato ASCII)						

Output :

B0	B1	B2	B3	B4	B5	B6	B7
0x04	NOTE FREQUENCY				0xFF		

CMD = 0x05 PLAY (Input / Output)

B0	B1	B2	B3	B4	B5	B6	B7
0x05	0xFF						

CMD = 0x06 RESET (Input / Output)

B0	B1	B2	B3	B4	B5	B6	B7
0x06	0xFF						

CMD = 0xFF ERROR (Output)

Note

HID Descriptor Tool

This tool allows you to create, edit and validate HID Report Descriptors. The tool also supports a variety of output formats (.txt, .inc, .h, etc.). DT uses ASCII based Usage Tables and supports vendor defined pages as well. Included are Usage Table files for the HID Usage Table document 1.0 Release Candidate 1, Monitor Class 1.0 Release Candidate 2, and Power Class Spec.

download: http://www.usb.org/developers/hidpage/dt2_4.zip

SimpleHIDWrite Utility

Tests HID-class devices. The HidTest utility also tests HIDs with a variety of API calls.

download: <http://www.lvr.com/files/SimpleHIDWrite3.zip>

Altri tools

<http://www.usb.org/developers/tools/>

Link utili

http://www.usb.org/developers/devclass_docs/HID1_11.pdf

<http://www.usb.org/developers/hidpage/>

<http://www.lvr.com/hidpage.htm>

http://www.microsoft.com/whdc/archive/HID_HWID.msp

<http://www.microsoft.com/whdc/archive/audctrl.msp>

<http://www.semifluid.com/?p=23#more-23>

http://electronics-diy.com/electronic_schematic.php?id=640