

USB HID Buzzer Datasheet

905010 – USB HID Buzzer

Delcom Products Inc. USBHIDBUZ Datasheet

Revision 0 – 4/7/2009

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1 Overview

The Delcom USB HID Buzzer is a low cost USB audio device for producing sound. The frequency, on/off duty cycle, repeat count and audio level are all programmable. The device is self power from the USB host port and uses the built in HID driver.

2 Description

The Delcom USB HID Buzzer is powered and controlled via the USB bus. The sound is produced from a small buzzer driven by an H-Bridge circuit and powered from a step up regulator circuit. This configuration produces a high level of sound pressure from limited physical size and power. Due to the circuit design a maximum duty cycle of 80% is suggested at the high volume setting. The device can be used as a desktop unit or secured to a vertical or horizontal surface. Sound is emitter from the center/front of the device. There is also a LED on the front of the enclosure in indicate when power is applied to the device. The LED brightness can also be toggled between dim (normal) and bright.

3 Communications & Operations

There two ways to communicate with the USB HID device. They are the direct and indirect methods. The direct method communicates directly to the USB driver via the OS API functions. The indirect method communicates to the USB HID device via the Delcom DLL. Using the Delcom DLL is the easiest way of communicating with the USB HID device. For more information on communicating to the device see the USBHIDIO Datasheet (see references below). Also see the Delcom website for numerous application examples (See Examples Below).

4 Commands

The following commands are used to control the USB HID buzzer. See the USBHIDIO Datasheet for command implementation (see references below).

H-Bridge Setup Command – Initializes and sets up the H-Bridge driver.

Buzzer Command – Main buzzer command for turning on or off the device.

Audio Level – Sets the buzzer volume to high or low.

LED Level – Sets the LED brightness.

4.1 H-Bridge Setup Command

The H-Bridge setup command is intended to setup the H-Bridge circuit. The H-bridge write command number is 71. The LSB Data parameter is used to set the mode. There are 4 modes; 0=off (All pins high), 1=State 1 On (forward), 2=State 2 On(reverse), 0xFF=Brake (both bottom drivers low). Default boot up value is off. This command must be called once on power up to initialize the H-Bridge driver. The mode parameter should be set to 1 (State 1 On) to initialize the H-Bridge circuit.

```
// Buzzer Initialize Example
MajorCmd =101;           // 8byte write command
MinorCmd =71;           // H-Bridge Init Cmd
LSBData = 0x01;         // Turn H-Bridge on to state 1
MSBData = 0x00;         // Set the frequency
SendPacket();          // Send the command
```

4.2 Buzzer Command

This command is used to start and end a buzzer command. The write command number for this command is 70. The frequency, duty cycle and repeat value are all programmable. The frequency is programmed by setting the buzzer's frequency time variable, the units are in 256us. For example a desired buzzer frequency of ~1KHz would yield a frequency value of around 4. The buzzer's on time and off time variables are used to program the duty cycle of the buzzer. These units are in 50ms. If you want the buzzer to turn on and off every second you would program 10 for the on and off times. The repeat value dictates what mode the buzzer will be in. If a value of zero is used for the repeat value then, the buzzer will sound continuously at the frequency specified until the user turns it off. If a value of 255 is used then the buzzer will sound at the frequency and duty cycle specified until the user turns it off. If any other value is used the buzzer will sound at the frequency and duty cycle specified and repeat for that many times and turns the buzzer off. The DataLSB turns this feature on (1) or off (0). A value of zero will terminate all previous buzzer commands and turn the buzzer off. When Data LSB is zero all other parameters are ignored. The DataMSB sets the frequency value. The DataExt[0] sets the repeat value. The Data Ext[1] sets the on time. And the Data Ext[2] sets the off time.

$$\text{Freq value} = 1 / (\text{fHz} \times 256\text{E-}6)$$

Frequency Table

Freq Value	Freq(Hz)	Freq Value	Freq(Hz)	Freq Value	Freq(Hz)
1	3906	5	781	9	434
2	1953	6	651	10	390
3	1302	7	558	11	355
4	976	8	488	12	325

```
// Buzzer Example (Freq=3906Hz DutyOn=200ms DutyOff=100ms Repeat=3)
MajorCmd =102;           // note this is a 16byte command
MinorCmd =70;           // Buzzer command
LSBData = 0x01;        // Turn buzzer on
MSBData = 0x01;        // Set the frequency
DataExt0 = 3;          // Repeat 3 times
DataExt1 = 4;          // On Duty 200ms
DataExt2 = 2;          // Off Duty 100ms
SendPacket();          // Send the command
```

4.3 Audio Level Command

The audio level is controlled by pin P1.0. A high on this pin enables the step up regulator and produces a louder sound. A low on this pin disables the step up regulator and produces a lower sound. The option has more effect at lower frequencies. The default boot up value is high (higher sound).

```
// Audio High Example
MajorCmd =101;           // note this is a 16byte command
MinorCmd =12;           // Pin level ctrl command
LSBData = 0x00;        //
MSBData = 0x01;        // Set P1.0 High
SendPacket();          // Send the command
```

```
// Audio Low Example
MajorCmd =101;           // note this is a 16byte command
MinorCmd =12;           // Pin level ctrl command
LSBData = 0x01;        // Set P1.0 Low
MSBData = 0x00;        //
SendPacket();          // Send the command
```

4.4 LED Brightness Command

The LED level is controlled by pin P0.7. A low on this pin makes the LED brighter. A high on this pin makes the LED dimmer. A high (LED dim) is the default power up level.

```
// LED Bright Example
MajorCmd =101;           // note this is a 16byte command
MinorCmd =11;           // Pin level ctrl command
LSBData = 0x01;        // Set P0.7 Low
MSBData = 0x00;        //
SendPacket();          // Send the command
```

```
// LED Dim Example
MajorCmd =101;           // note this is a 16byte command
MinorCmd =11;           // Pin level ctrl command
LSBData = 0x00;        //
MSBData = 0x01;        // Set P0.7 High
SendPacket();          // Send the command
```

5 Specifications

5.1 Absolute Maximum Ratings

Storage Temperature	-65C to +150C
Operating Temperature	-0C to +70C
Max Current	400ma
Standby Current	10ma

5.2 Electrical Characteristics

Max Duty Cycle	80%
Sound output (at rated frequency)	Min 85dBA (Typical 94dBA) @ 10cm
Rated Frequency	2,400 Hz

5.3 Mechanical Characteristics

Overall Length	76.3mm (3.00")
Body Length (w/o mounting tabs)	60mm (2.35")
Mounting Hole Centers	67.5mm (2.66")
Width	35mm (1.375")
Depth	20mm (0.79")
Weight (w/o USB cable)	25g
Color	Black
Enclosure	ABS Plastic

5.4 Product Conformity

CE
RoHS
Low Voltage Directive (LVD) 73/23/EEC
EMC Directive 89/336/EE

6 Ordering Information

Order Number	Description
905010	USB HID Buzzer

7 Examples

7.1 Command Line Utility Example

The following command line examples, first setup the device and then issues the buzzer command to run the buzzer at 1952Hz for 0.5sec on and 1sec on and repeat 4 times and then turns is self off.

```
REM First setup the H-Bridge driver (this only needs to be done once)
C:USBCMDAP WV 0 0 101 71 1 0
USB HID I/O Command Application v0.1 Options: VW
TID =0 SID=0 Maj=101 Min=71 LSB=1 MSB=0 HID0=0 HID1=0 HID2=0 HID3=0
DExt0=0 DExt1=0 DExt2=0 DExt3=0 DExt4=0 DExt5=0 DExt6=0 DExt7=0
Device Found: ?hid#vid_0fc5&pid_b080#6&1992656&0&0000#{4d1e55b2-f16f-
11cf-88cb-001111000030}
DeviceType:5 Serial#:100284 Version:25 DateCode:03/23/2009
Command completed.
Press any key to continue...

REM Buzzer On (Freq=1952Hz, Repeat=4, OnTime=0.5sec OffTime=1sec)
C:USBCMDAP WV 0 0 102 70 1 2 0 0 0 0 10 20
USB HID I/O Command Application v0.1 Options: VW
TID =0 SID=0 Maj=102 Min=70 LSB=1 MSB=2 HID0=0 HID1=0 HID2=0 HID3=0
DExt0=4 DExt1=10 DExt2=20 DExt3=0 DExt4=0 DExt5=0 DExt6=0 DExt7=0
Device Found: ?hid#vid_0fc5&pid_b080#6&1992656&0&0000#{4d1e55b2-f16f-
11cf-88cb-001111000030}
DeviceType:5 Serial#:100284 Version:25 DateCode:03/23/2009
Command completed.
Press any key to continue...
```

8 Notes

8.1 Power Notes

Cable length and cable size should be selected in order to maintain an operating voltage at the USB device of at least 4 volts. Failure to maintain 4 volts at the USB chip will cause it to reset.

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9 References

9.1 Documentation

Delcom USB HID Data Sheet

<https://www.delcom-eng.com/downloads/USBIOHID.pdf>

Delcom USB HID Documentation and Examples

<http://www.delcomproducts.com/productdetails.asp?productnum=900000>

Delcom DLL

<http://www.delcomproducts.com/productdetails.asp?productnum=890510>

9.2 Online Examples

Delcom USB HID C# Buzzer Example

<http://www.delcom-eng.com/productdetails.asp?PartNumber=890670>

Delcom USB HID Command Line Utility

<http://www.delcom-eng.com/productdetails.asp?ProductNum=890601>

Appendix A. Document Revision History

Rev	Date	Author	Description
0	04/07/2009	DL	Initial Release

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