

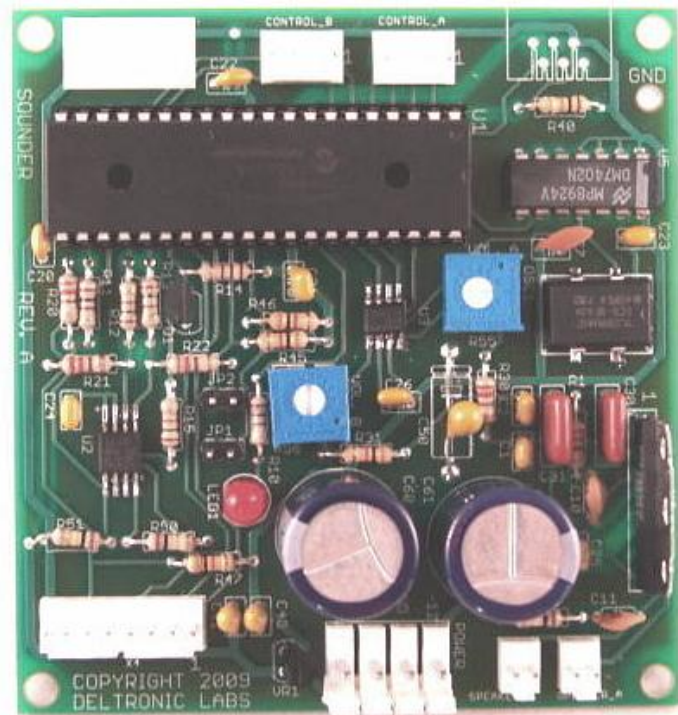


SOUNDER

Sounder is a sound playing system. Sounds are downloaded to the Sounder board from a PC using Sounder Link software. Sounder Link software uses a PC COM port to download sounds and configuration information to the Sounder board.

Sounder has two channels (Channel A and Channel B) providing simultaneous independent control of two speakers. Each channel has its own volume control.

Sounder Link gets the sounds from .WAV files. There are many variations of .WAV files in common use. Sounder Link uses 8 or 16 bit PCM format files with a 22.050 KHz sample rate. Many good programs are available to convert sound files from other formats.



Operation

Sounder has several different control protocols. Sounder Link software is used to select the protocol that best fits your situation. One of the protocols uses a PC COM port connection to control the board. The other protocols use two 8 pin headers on the Sounder board, Control A and Control B. Depending upon the protocol, Sounder can control up to 16 individual sounds. Each sound can be independently configured to automatically re-start as soon as it finishes. The total capacity is 90 seconds of sound.

Protocol 1:

A high to low transition on a Control input pin triggers the playing of a sound. The table shows the sound number and channel for each pin.

Control Input Pin	Sound Number	Channel
A-1	1	A
A-3	2	A
A-5	3	A
A-7	4	A
B-1	1	B
B-3	2	B
B-5	3	B
B-7	4	B

Protocol 2:

A high to low transition on a Control input pin triggers the playing of a sound. The table shows the sound number and channel for each pin.

Control Input Pin	Sound Number	Channel
A-1	1	A
A-3	2	A
A-5	3	A
A-7	4	A
B-1	5	B
B-3	6	B
B-5	7	B
B-7	8	B

Protocol 3:

Protocol 3 is the same as protocol 1 except that the inputs are de-bounced. De-bouncing is used with mechanical switches to prevent multiple triggers which can sound like stuttering at the beginning of a sound. Pins 2, 4, 6, and 8 on both Control inputs are ground. This makes it easy to connect a push button for triggering the sounds. Just connect the button to an odd numbered input pin and an even numbered ground pin.

Protocol 4:

Protocol 4 is the same as protocol 2 except that the inputs are de-bounced. De-bouncing is used with mechanical switches to prevent multiple triggers which can sound like stuttering at the beginning of a sound. Pins 2, 4, 6, and 8 or both Control inputs are ground. This makes it easy to connect a push button for triggering the sounds. Just connect the button to an odd numbered input pin and an even numbered ground pin.

Protocol 5:

Protocol 5 reads the value encoded on pins 1, 3, and 5 when it sees a high to low transition on pin 7, and plays the selected sound. Control input A plays on Channel A. Control input B plays on channel B.

Pin 5	Pin 3	Pin 1	Sound Played on A	Sound Played on B
1	1	1	1	1
1	1	0	2	2
1	0	1	3	3
1	0	0	4	4
0	1	1	5	5
0	1	0	6	6
0	0	1	7	7
0	0	0	8	8

Protocol 6:

Protocol 6 reads the value encoded on pins 1, 3, and 5 when it sees a high to low transition on pin 7 and plays the selected sound. Control input A plays on Channel A. Control input B plays on channel B.

Pin 5	Pin 3	Pin 1	Sound Played on A	Sound Played on B
1	1	1	1	9
1	1	0	2	10
1	0	1	3	11
1	0	0	4	12
0	1	1	5	13
0	1	0	6	14
0	0	1	7	15
0	0	0	8	16

Protocol 7:

Protocol 7 uses one byte commands received through the RS-232 connection that is also used to program the Sounder board. The RS-232 parameters are 115,200 baud, no parity, 8 bits, 1 stop bit. The RS-232 connection uses the 8 pin PGM connector on the Sounder board.

PGM Connector

Pin	Function	9 Pin Sub D at PC
1	RX (data from PC to Sounder)	3
2	TX (data from Sounder to PC)	2
3	Do not connect	
4	Do not connect	
5	Un-used	
6	Do not connect	
7	Ground	5
8	Un-used	

Note: When used to program the Sounder board, pin 3 is connected to pin 4 and pin 6 is connected to pin 7. When used for control these connections should not be made. The Sounder board should be power cycled (turn off, then on) when switching between control and program modes.

The high nibble of each command indicates the type of action. Except for the special commands, the low nibble encodes the sound number to be used.

Commands

High Nibble	Action
0	Special Command (see the special command table)
1	Play on channel A. Low nibble = sound number -1
2	Play on channel B. Low nibble = sound number -1
3	Play on channel A & B. Low nibble = sound number -1

Special Commands

Low Nibble	Action
0	Stop playing both channels
1	Stop playing channel A
2	Stop playing channel B
3	Stop playing both channels when they finish their current repetition
4	Stop playing channel A when it finishes the current repetition
5	Stop playing channel B when it finishes the current repetition
6	Report the status of channel A
7	Report the status of channel B

Sounder responds to the status report special commands with a single byte which is the number of the sound being played, or zero if no sound is being played.

Protocol 8:

Protocol 8 uses a ccTalk™ interface. The ccTalk connector is a 4 pin header.

ccTalk™ Connector

Pin	Function
1	** DO NOT CONNECT **
2	Un-used
3	Ground
4	Data

The RS232 interface and the ccTalk interface use the same UART, and therefore can not be used at the same time. A jumper on a 3 pin header on the Sounder board must be set to “CC” or “RS” before using either interface. If you are using the RS232 to program the board, to switch to ccTalk you must unplug the programming cable, move the jumper from “RS” to “CC”, and power cycle (turn off, then on) the board.

The ccTalk slave address is programmed into the Sounder board with Sounder Link software.

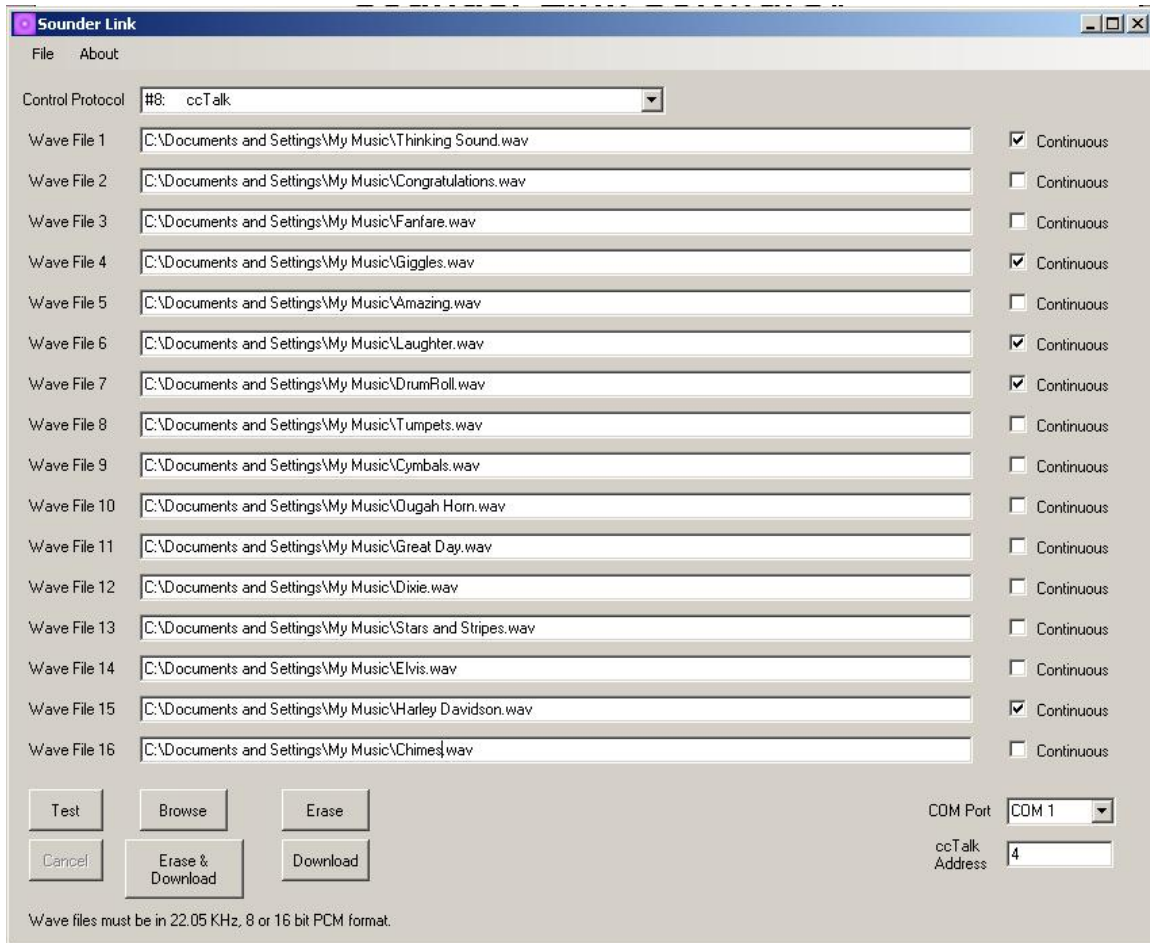
The Sounder board is controlled with 1 byte commands which are sent as data using ccTalk header 20. These 1 byte commands are identical to those used by protocol 7. Sounder responds to the report commands with a 1 byte data packet. It responds to the play and stop other commands with a no data ACK data packet.

The Sounder board also implements ccTalk headers 4, 192, 244, 245, 246, and 254 per ccTalk specification version 4.5.

Header Number	Function
4	Request Comms Revision
192	Request Build Code
244	Request Product Code
245	Request Equipment Category
246	Request Manufacturer ID
254	Simple Poll

Sounder Link Software

Sounds are downloaded to the Sounder board from a PC using Sounder Link software. Sounder Link software uses a PC COM port to download sounds and configuration information to the Sounder board.



Selecting a COM Port

Use the drop-down selection box in the lower right corner to select the COM port that you are using. If your computer does not have a COM port you can use a USB-COM conversion cable.

Selecting a Protocol

Protocols are explained in the operation section of this manual. Use the drop-down selection box at the top to select the protocol.

Selecting a ccTalk™ Address

Use the entry blank in the lower right corner to select the ccTalk address. Valid ccTalk addresses are 2 to 255.

Selecting .WAV files

Enter the complete path and file name for each wave file. To select a file by browsing, click on the entry blank for that file and then click on the Browse button at the bottom. Any blank entries will be replaced with a very short silent sound when you download.

Downloading

Sounder stores the sounds in flash memory. This memory must be erased before it can be reprogrammed. Thus in most cases you should click the Erase & Download button to download sounds. Erasing takes about 30 seconds. The time required for downloading depends upon the total length of the sounds.

Testing the Download

After the download completes you can check its accuracy by clicking the Test button. The test retrieves the downloaded information from the Sounder board and compares it with the information in files.

Specifications

Input Power:

12 VDC regulated, 1.7A

Input Control Pins:

For each channel: 4 pins with +5V pull-ups, 4 ground pins.

Input RS-232:

115,200 baud, 8 data bits, No parity bit, 1 stop bit.

See the section on Protocol 7 for details.

Input ccTalk™:

9600 baud, 8 data bits, No parity bit, 1 stop bit, per ccTalk version 4.5.

See the section on Protocol 8 for details.

Output:

2 Independent channels to drive 8 ohm speakers

5W per channel

Total memory capacity:

90 seconds of sound.

Total number of sounds:

Up to 16 depending upon control protocol used.

Dimensions:

3.625 x 3.3 inches.

5/32 diameter mounting hole in each corner located 1/8 inch from each edge of the board.