

Building a MIDI interface for a SB/SB Pro/SB16

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The SoundBlaster MIDI port uses two pins from the 15-pin joystick port. These normally would be redundant +5volt and ground lines. In the SoundBlaster, there are called MIDI TXD (Transmit eXternal Data) and MIDI RXD (Receive eXternal Data). The signals to and from the SoundBlaster are TTL logic signals. MIDI uses a current loop interface, so the job of the interface box is to convert between TTL-level signals and the MIDI current loop.

If you want to use the MIDI interface and the SoundBlaster joystick interface simultaneously, you can make a simple adapter by connecting one male and 2 female 15-pin connectors to a short length of ribbon cable.

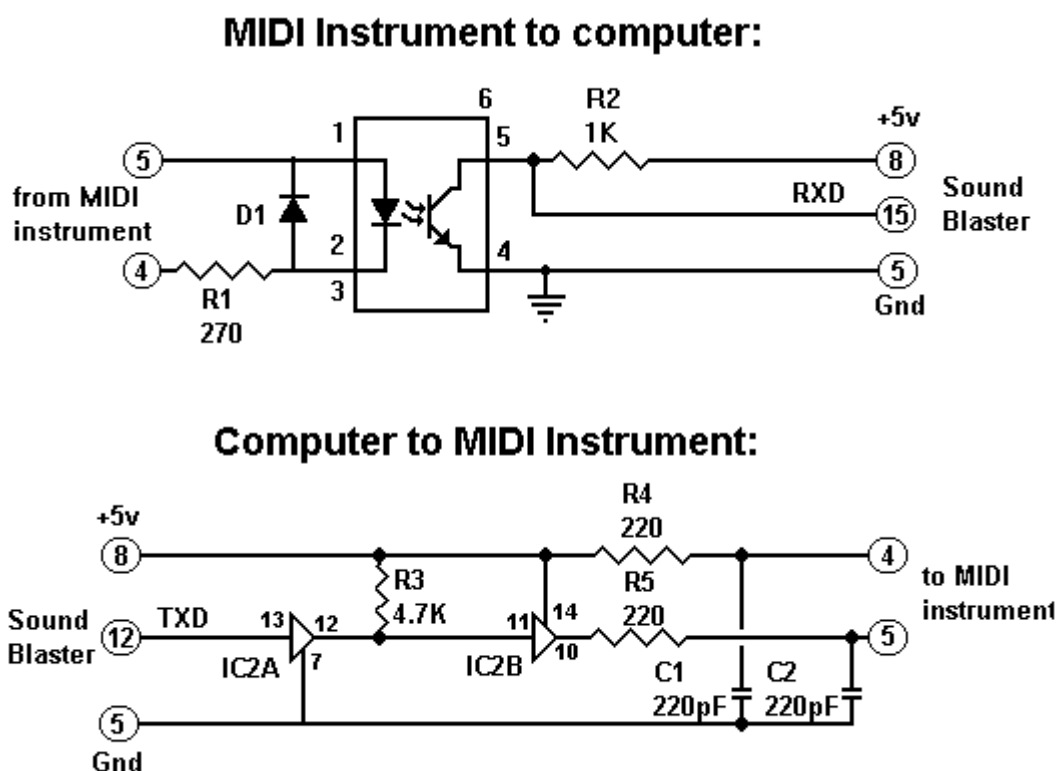


Figure 1: Schematic diagram of MIDI interface

For simplicity, the schematics show the MIDI input and output circuits separately, but they share the +5volt and ground lines. (Pins 8 and 5 on the SoundBlaster). The interface uses 4-wire shielded cable to connect the computer to the interface box and two 2-wire shielded cables to connect the interface box to the input and output ports on the MIDI instrument.

The MIDI input port can connect to only one instrument, but the MIDI Out from the computer can connect to up to 5 MIDI instruments. The schematic diagram only shows one complete MIDI output line. You can connect up to 4 additional MIDI outputs by adding a 220ohm resistor (from the +5volt pin to pin 4 on the MIDI cable) and a 220ohm resistor (from the buffer output to pin 5 of the MIDI plug) for each output. You should also add a 220pf capacitor between each additional MIDI line and ground.

Construction

Preparing the circuit board

The MIDI interface is built on half of a dual, 20-pin, IC board using the first six pins for the optocoupler and the last fourteen pins for the hex buffer. Remove portions of some of the copper lines on the circuit board with an X-Acto knife, as shown by the dashed lines in Figure 2.

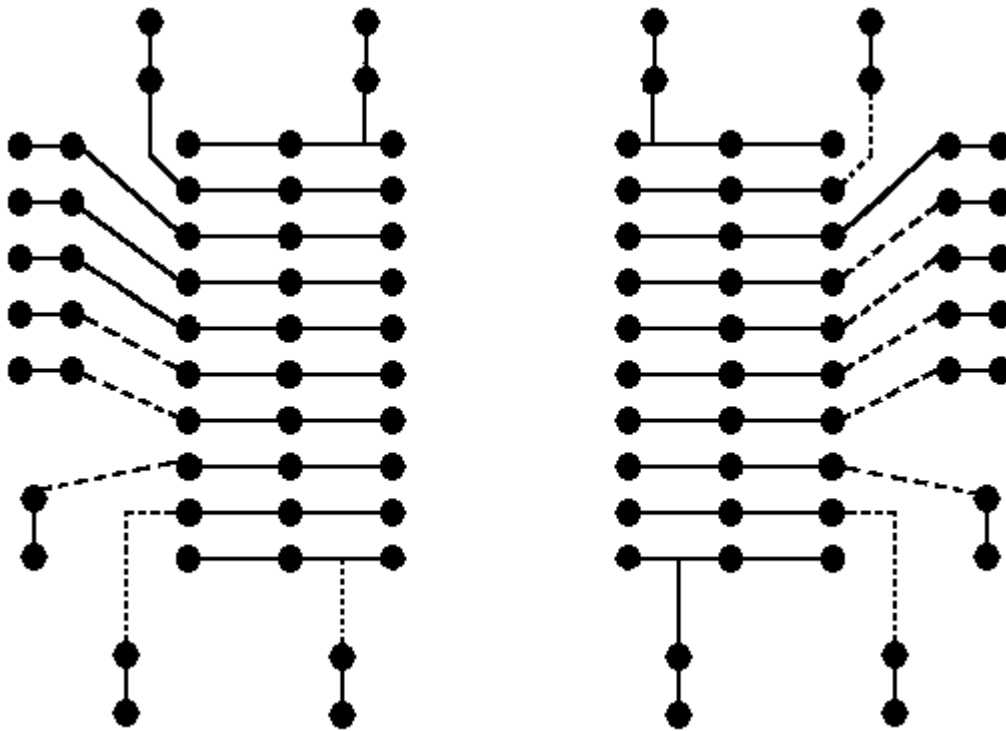


Figure 2: Circuit Board

Cut each trace on both ends first, then remove the copper between the cuts.

component installation

Be sure to use rosin-core solder and a low-wattage soldering iron. Solder the 20-pin socket to the center of the board, being careful not to bridge solder between connections. Install the other components in the locations shown in Figure 3.

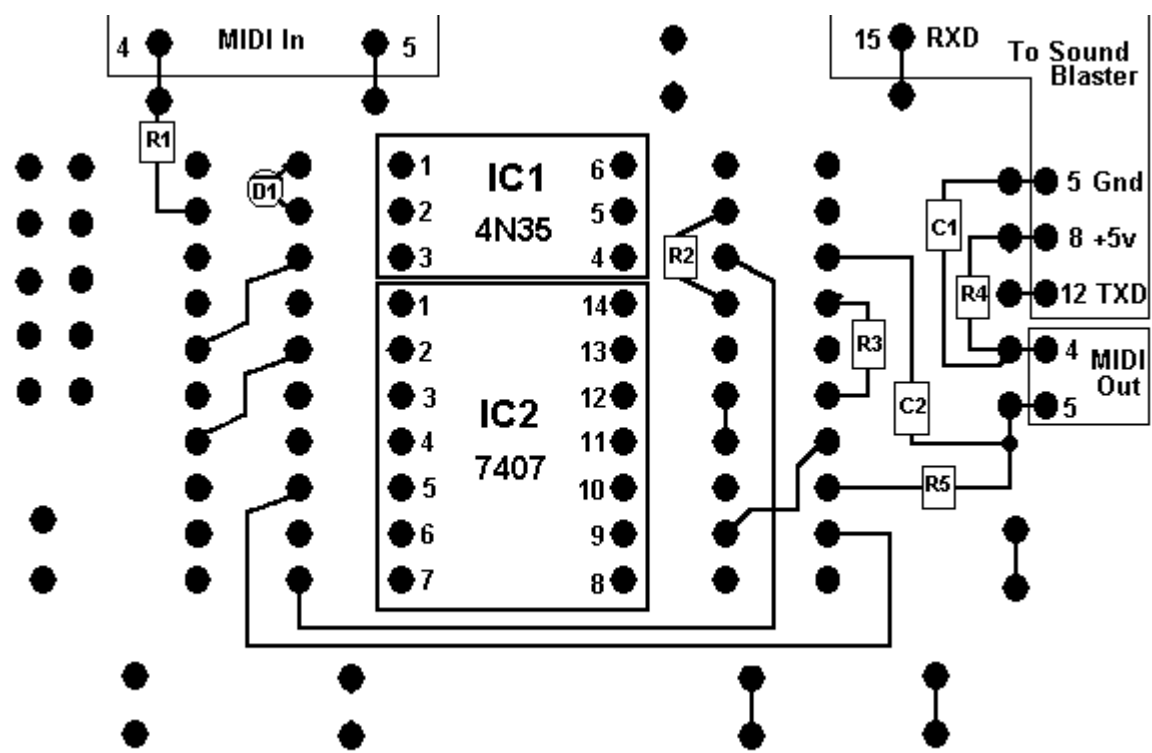


Figure 3: Component Layout

While looking at Figure 3 note that the ringed end of diode D1 is connected to pin1 of the optocoupler. Be sure to run hookup wires from the ground pin on the optocoupler (Pin 4) to the ground pin of the hex buffer (Pin 7) and between

pins 11 and 12 on the hex buffer. The remaining hookup wires are optional for additional MIDI outputs. Notice that both a resistor and a capacitor must be connected in the same hole for each MIDI Out. Connect the 4-conductor shielded cable to pins 5,8,12 and 15 of the 15-pin plug. Connect the shield to the metal case of the plug. Connect the other end of the 4-wire cable to the corresponding locations shown in the Figure 3 schematic. Tie the cable sheild to the large mounting hole in the circuit card and connect one end of each of the two connector shielded cables to pins 4 and 5 of the MIDI plugs. Connnect the shield in the MIDI plugs to pin 2. Mark the cables "MIDI IN" and "MIDI OUT" as they are connected to the circuit. Connect the other end of the cables to the corresponding locations on the circuit card. Tie the shields to mounting holes in the circuit card and connect all three shields together with a hookup wire. Check the card and cables to ensure that all connections are correct, file small notches in the cover of the aluminum box for the cables, and wrap a piece of heavy paper around the circuit card to prevent shorting. Your next step is to plug the 15-pin connector into the SoundBlaster and the MIDI In and Out to the MIDI jacks on your MIDI instrument.

Testing

A MIDI port requires software to function. You can test the input portion of the MIDI interface with the FM Organ program bundled with the SoundBlaster. With "MIDI Mode" selected, MIDI Note-On messages will play sounds from the SoundBlaster card, but only those notes valid for the musical key you have selected. For example, if you select the key of C, only the white keys will sound. To test the MIDI Out portion of the interface, you can use any MIDI sequencer that supports SoundBlaster. All of Voyetra's sequencers, Cakewalk, and Trax are examples of some that are avaiable. When you go shopping for a sequencer, make sure you specify that you have a SoundBlaster. The SoundBlaster/SoundBlaster Pro MIDI interface is NOT Roland MPU-401 compatible, but the SB16's MIDI interface is.

Parts List

Resistors: 1/4 Watt, 1%, Metal film

R1	270
R2	1k
R3	4.7k
R4, 5	220

Capacitors: 25 working Volts or greater

C1, 2	220pf, ceramic
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Diodes

D1	1N914 or 1N4148
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Integrated Circuits

IC1	4N35, Optocoupler
IC2	7407, Hex Buffer

Sockets

IC1	8 pin
IC2	14 pin

Other Components

1	Dual IC board, Radio Shack #276-159.
1	DB-15 Male connector, solder cup type.
1	Hood for DB-15 connector.
2	5 pin DIN plugs, 180 degree.
1	Aluminum project box, approximately 3" x 2".
2 feet, 4 conductor shielded cable.	
8 feet, 2 conductor shielded cable.	

Other info

Creative Labs, Inc. BBS:

(405)742-6660 1200/2400/9600/14400 v32/v32bis

Note: Please do NOT call the Technical Support department of Creative Labs for help on this - With this file, you have just as much information as they do! If you don't want to deal with it, just _buy_ the cable - It costs \$24.95 + S&H direct from Creative Labs. The sales number is (800)998-1000. Good luck!

