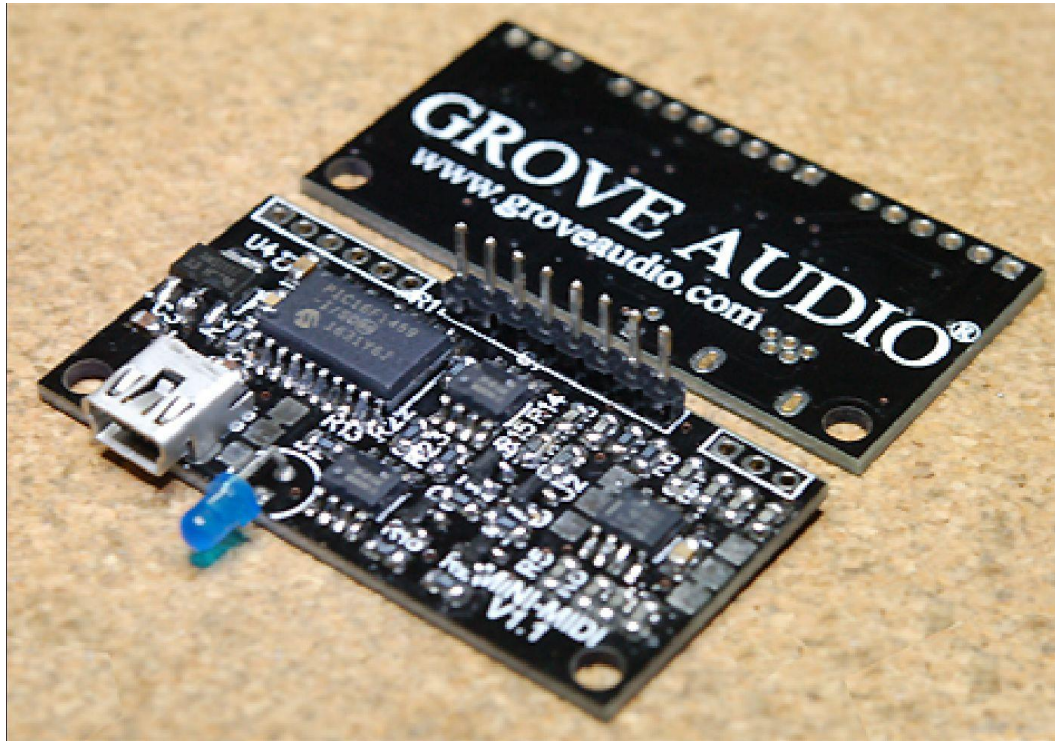


BUILDING THE MINI-MIDI USBMIDI CONVERTER PROJECT

By John Burdick



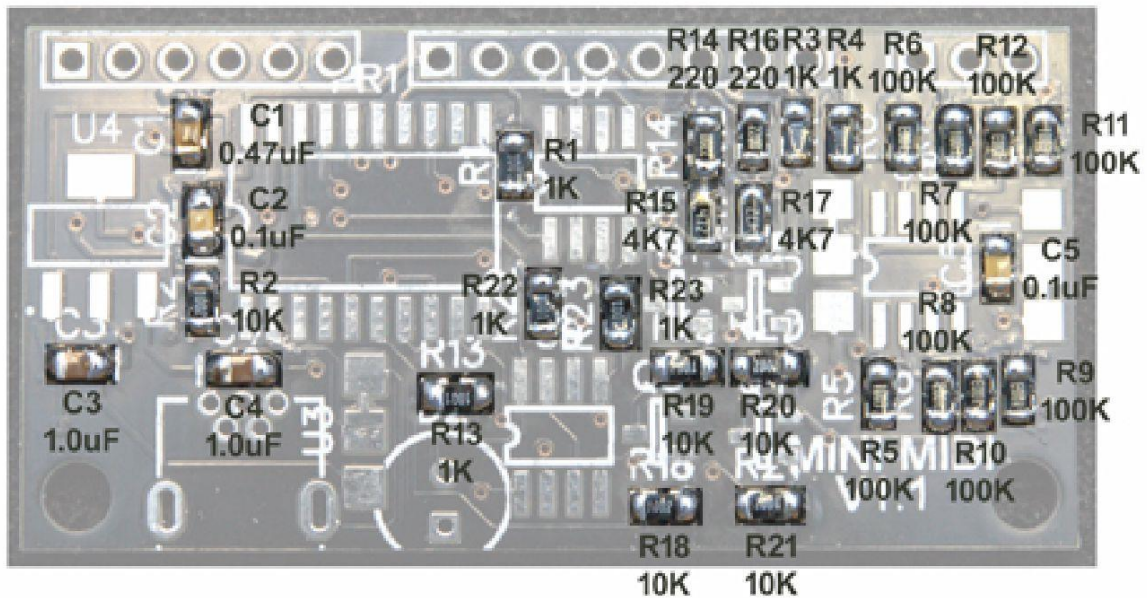
The assembled Mini-MIDI USBMIDI to CV Converter.

The MINI-MIDI USBMIDI to CV converter will convert USBMIDI messages received via USB to two control voltage outputs and produce accompanying gate voltage pulses. When powered by the USB host, the control voltage range is 0 Volts to slightly less than 5 Volts and is scaled at 1V/Octave. If the output circuit is powered by an external power supply, the board can supply a voltage range of 0 Volts to 10 Volts with 1V/Octave scaling.

The board can be used as a first surface mount project, for surface mount soldering practice or as a key fob for that extra set of garage keys. The information below includes assembly instructions for the board and links to obtain programmed microprocessor chips or a complete parts kit.

STEP 1

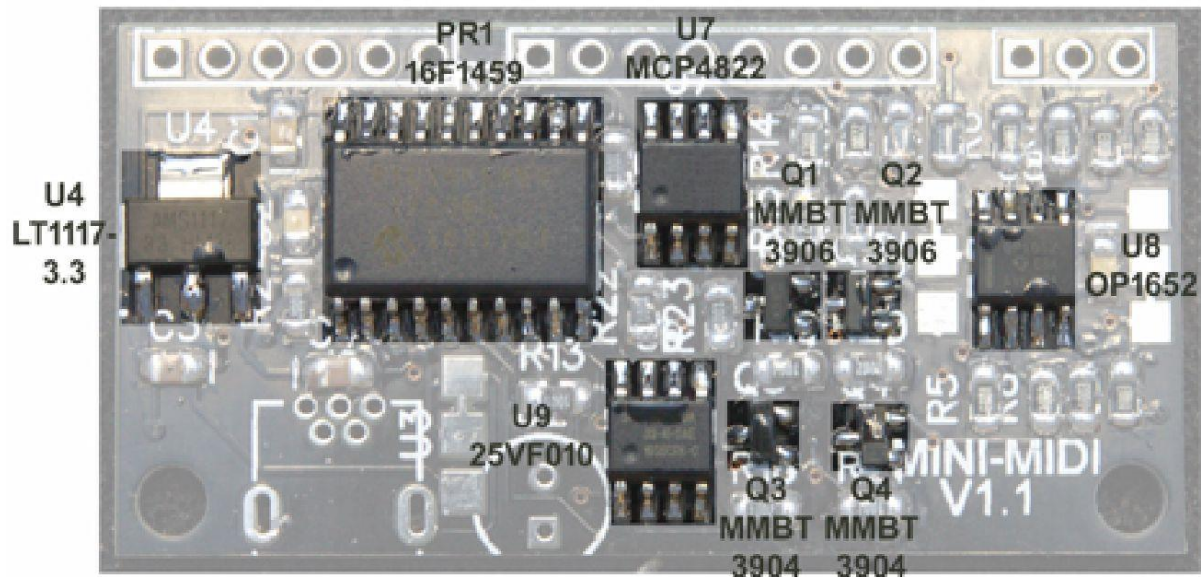
Assemble the passive components (resistors and capacitors) first. Use a fairly fine soldering iron tip for this work and place the part using a pair of tweezers. Click on the image below to see an enlarged view.



Locations of resistors and capacitors for the MINI-MIDI project.

STEP 2

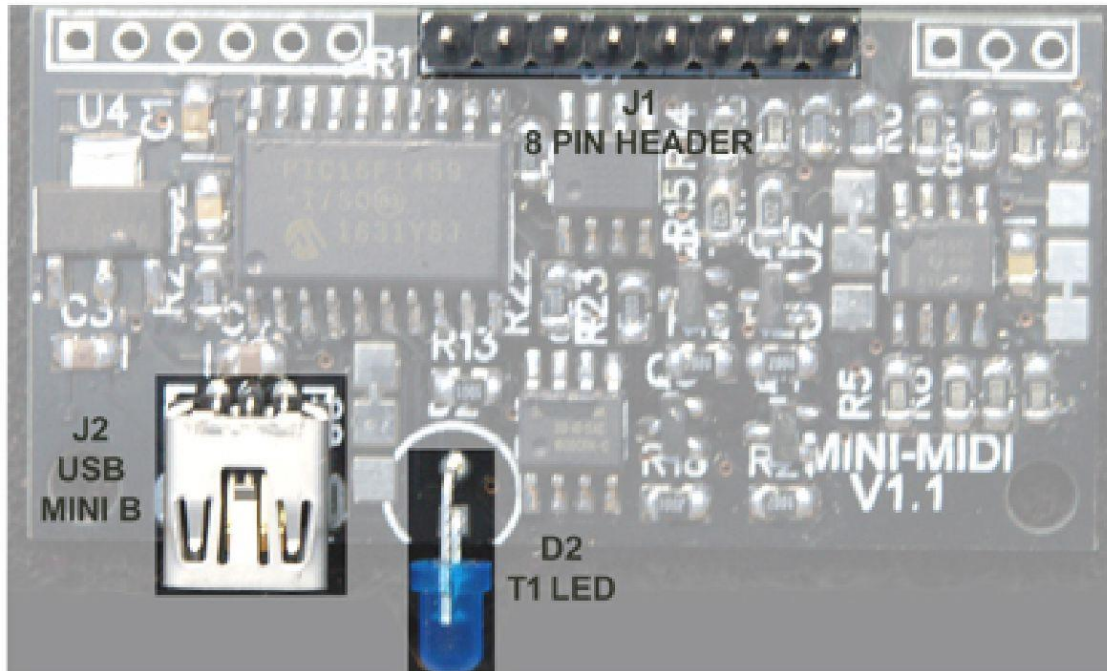
Now assemble the semiconductor components. Start with the four transistors. Be sure to put them in the correct locations. The two PNP (3906) transistors go in the top two positions and the NPN (3904) go in the bottom two positions. Next, assemble the IC packages. Be sure to align pin 1 on each package with the corresponding pins on the board. The board pin 1 is below the notch in the the silk screen package symbol on the board. The voltage regulator (U4) pin 1 is marked by a small dot.



Assemble the semiconductor components being careful to align them as shown.

STEP 3

Now assemble the through hole components. Bend the leads on the LED at a 90 degree angle leaving a tenth of an inch spacing between them. Be sure to insert the cathode of the LED in the hole marked by a square pad. The cathode lead of the LED is marked with a flat spot on the side of the plastic package and by the cathode lead being somewhat shorter than the anode lead.



Assemble the through hole parts. Be sure to orient the cathode lead, shorter of the two, so that it goes into the square pad.

STEP FOUR

This completes the assembly of the module. Take some time to inspect the board to be sure that there are no solder bridges between pins and that all the pins have been soldered to their appropriate pads. Look for cold solder joints. A cold joint is usually indicated by the solder on the connection not having a shiny, reflective texture. If you see a connection that doesn't look correct, just reheat it slightly and it should improve. It might be necessary to put some solder flux on the joint or a small amount of additional solder. To remove solder bridges, solder wick is a useful tool.

After inspecting and completing any repairs, it is time for a preliminary functionality test. To do this, plug a MINI B USB cable into the board connector and plug the other end into your computer. The board should be detected and identified in the "Connected

Devices" list. The board uses generic device drivers so no additional software should be necessary. When the board is correctly detected and identified, the LED should be illuminated and will periodically flash off and then back on again to indicate that the USB connection has been established.

MINI-MIDI Parts List

Description	Desig.	Quan	Manufacturer	Mfg. part number	Digikey PN
1K Ohm 1% 0805	R1	1			
10K Ohm 1% 0805	R2	1			
1K Ohm 1% 0805	R3	1			
1K Ohm 1% 0805	R4	1			
100K Ohm 1% 0805	R5	1			
100K Ohm 1% 0805	R6	1			
100K Ohm 1% 0805	R7	1			
100K Ohm 1% 0805	R8	1			
100K Ohm 1% 0805	R9	1			
100K Ohm 1% 0805	R10	1			
100K Ohm 1% 0805	R11	1			
100K Ohm 1% 0805	R12	1			
1K Ohm 1% 0805	R13	1			
220 Ohm 1% 0805	R14	1			
4.7K Ohm 1% 0805	R15	1			
220 Ohm 1% 0805	R16	1			
4.7K Ohm 1% 0805	R17	1			
10K Ohm 1% 0805	R18	1			
10K Ohm 1% 0805	R19	1			
10K Ohm 1% 0805	R20	1			
10K Ohm 1% 0805	R21	1			
1K Ohm 1% 0805	R22	1			
1K Ohm 1% 0805	R23	1			
0.47uF 25V ceramic 0805	C1	1			
0.1uF 50V ceramic 0805	C2	1			
1.0uF 25V ceramic 0805	C3	1			
1.0uF 25V ceramic 0805	C4	1			
0.1uF 50V ceramic 0805	C5	1			
MMBT3906 SOT23	Q1	1	ON Semiconductor	MMBT3906LT1G	MMBT3906LT1GOSCT-ND
MMBT3906 SOT23	Q2	1	ON Semiconductor	MMBT3906LT1G	MMBT3906LT1GOSCT-ND
MMBT3904 SOT23	Q3	1	ON Semiconductor	MMBT3904LT1G	MMBT3904LT1GOSCT-ND
MMBT3904 SOT23	Q4	1	ON Semiconductor	MMBT3904LT1G	MMBT3904LT1GOSCT-ND
PIC 16F1459 SOIC20	PR1	1	Microchip	PIC16F1459-I/SO	PIC16F1459-I/SO-ND

LT1117-3.3 SOT223-3	U4	1	Diodes Inc.	ZLDO1117G33TA	ZLDO1117G33DICT-ND
MCP4822 SOIC8	U7	1	Microchip	MCP4822-E/SN	MCP4822-E/SN-ND
OP1625 SOIC8	U8	1	TI	OPA1652AIDR	296-39101-1-ND
25VF010 SOIC8	U9	1	Microchip	SST25VF010A-33-4I-SAE	SST25VF010A-33-4I-SAE-ND
T1 LED	D2	1			
MINI B USB CONNECTOR TH	J2	1	Molex LLC	548190519	WM17115-ND
8 PIN 0.1 in. header	J1	1			
MINI-MIDI PC board		1			