64- or 128-Output Driver Board Assembly Manual

I. IMPORTANT NOTES BEFORE BEGINNING

A. Failure to take ESD precautions could permanently damage the components. ESD damage is permanent and invisible to the naked eye. (Zapped parts are terribly difficult to find once they are assembled into your MIDItools Computer.)

Although it is best to always wear your ESD ground strap while assembling your kit, all assembly steps that require ESD protection are marked with this symbol in the margin.

B. Many components are *polarized.* This means that they must be installed only in the orientation shown on the layout diagram.

All assembly steps that pertain to polarized, or directional, components are marked with this symbol in the margin. Incorrect orientation can damage components.

C. This manual may make reference to the TOP, BOTTOM, LEFT, or RIGHT sides of the circuit board. These directions correspond to the circuit board held as shown in the layout diagram. In other words, holding the circuit board with the white text markings right side up.

D. The components bodies are installed on the white text side of the circuit board (inside the component outlines). The component leads go through the holes in the circuit board and are soldered on the opposite side.

E. *Integrated circuits (ICs) are not soldered to the circuit board.* Instead, IC sockets are soldered in their place. When solder assembly is finished, ICs are pressed in into the appropriate socket.

II. SET UP YOUR WORK AREA

A. Your work surface should be well lit and well ventilated.

B. Gather your tools: ESD grounding strap; soldering iron; solder (noncorrosive electronics solder); wire cutters; screwdrivers (phillips and pan head); pliers; wire strippers; etc.

C. Prepare ESD grounding protection. A typical ESD ground strap is adequate. Put the strap around your wrist and clip the other end to the head of a slightly-loosened screw of a working, grounded AC outlet plate. The strap should have an internal 10M ohm (or equivalent) resistor in series to ground. This will safely dissipate any static charge that might otherwise damage your components during assembly and test.

D. Lay out the circuit board and components. Do not remove components from their bags yet. Familiarize yourself with the parts list, layout diagram, and part numbers. Notice that the component bags are marked with the item number found on the parts list. Also, note

that the reference designators can be found on the schematic, parts list, and layout diagram.

III. INSTALL THE COMPONENTS

A. Jumpers

1. Install **00093** everywhere you see the jumper wire length designation. They should be bent to .4". There are 8 jumpers on this circuit board. Mount the component bodies flush to the board surface. Solder the leads and trim off the excess.

B. Resistor Network Pack

1. Install **00092** at designator RP9. The pin corresponding to the stripe on the part must be oriented towards the square solder pad on the back of the board (as illustrated by the dot on the assembly diagram). Mount the component body flush to the board surface. Solder the leads.

2. Install **000157** at designators RP1 – RP8. The pin corresponding to the stripe on the part must be oriented towards the square solder pad on the back of the board (as illustrated by the dot on the assembly manual). Mount the component body flush to the board surface. Solder the leads.

C. IC and Connector Sockets

1. Install **00070** flush to the circuit board in position **U17**. The notch on the socket body is used to indicate pin 1 of the IC. As shown in the layout diagram, the notch on the socket should point towards the notch on the circuit board. Solder all 16 socket pins. The notch on the socket board also indicates pin 1 on the ribbon cable.

2. Install **00071** flush to the circuit board in positions **U2, U4, U6, U8, U10, U12, U14 and U16**. The notch on the socket should point towards the notch on the circuit board. Solder all 20 socket pins.

3. Install **00155** flush to the circuit board in positions **U1, U3, U5, U7, U9, U11, U13 and U15**. The notch on the socket should point towards the notch on the circuit board. Solder all 18 socket pins.

D. Connectors

4. Install **00156** flush to the circuit board in positions **J1 and J2**. The long output pins of the socket should face the back of the circuit board. Solder all 34 socket pins. Be patient!

E. Capacitors

1. Install **00089** in positions **C1 through C8 and C17.** Ensure that these are seated as close to the board as possible. Solder and trim the leads.

F. Integrated Circuits

1. Install **00055** in the socket for **U17**. Align the notch on the IC with the notch on the socket. Place the IC in the socket carefully so as not to damage any leads.

Be certain that all IC leads end up in the socket. Push evenly until the IC body rests on the top of the socket. DO NOT SOLDER!

2. Install **00158** in the sockets for **U2, U4, U6, U8, U10, U12, U14, and U16**. Align the notch on the IC with the notch on the socket. Place the IC in the socket carefully so as not to damage any leads. Be certain that all IC leads end up in the socket. Push evenly until the IC body rests on the top of the socket. DO NOT SOLDER!

3. Install **00159** in the socket for **U1, U3, U5, U7, U9, U11, U13, and U15**. Align the notch on the IC with the notch on the socket. Place the IC in the socket carefully so as not to damage any leads. Be certain that all IC leads end up in the socket. Push evenly until the IC body rests on the top of the socket. DO NOT SOLDER!

G. Installing the Expansion Board Cable

1. Solder the 64-Output Driver expansion board cable **00083** to the board at **J5**. The red wire should face pin 1.

IV. INSPECT YOUR WORK

Before proceeding, take some time to inspect your workmanship. Look for and correct the following potential problems:

- solder that bridges two or more traces
- missed solder joints
- untrimmed leads
- incorrect component orientation
- forgotten parts (did you have any leftover components?)
- ICs not inserted in sockets properly
- ICs not oriented properly
- are all the jumpers installed?

V. FINAL ASSEMBLY

A. If you are using only one 64-Output Driver Expansion Board, follow step 7 of the Final Assembly Manual **00116**.

B. If you are using two 64-Output Driver Expansion Boards, for a total of 128 drivers, mount the boards according to the following instructions.

1. Solder the second expansion cable **00083** to position **J6** on both expansion boards. The red wire should face pin 1 on both boards.

2. Solder or screw in wires for the external power supply that the drivers will be switching. (READ THE USER MANUAL **00259** BEFORE COMPLETING THIS STEP).

3. Place four 1.5” screws **00064** through the four remaining holes in the enclosure bottom **00049**. Set the unit on a solid surface so that the screws point upwards into the body of the unit. Slide four ¼” spacers **00113** over the screws.

4. Lift the entire unit so that the screws fall half way out of the board and place the first expansion board **00115** (solder side down) onto the screws. The 34-pin

connectors should face out of the back of the unit. Again place the entire unit on a solid surface so that the screws are fully inserted into the chasis.

5. Slide four 1/2” spacers **00113** over the screws.

6. Again lift the unit up and place the second expansion board onto the screws. Release the board so that it sets back down on the solid surface.

7. Carefully secure the sandwiched circuit boards with the four provided kep nuts **01137**. Inspect the boards to ensure that no components are squashed or the ribbon cables kinked. Also make sure that the external power supply wires are not bound behind the back of the boards. If any problems are detected, loosen the kep nuts and correct.