

ETHERNET I/O BOARD

Assembly Instructions

Follow the checklist below in sequence as listed. The location of each part is clearly marked on the pc board. All surface mount components have been pre-installed.

Step 1.

Install the following **IC Sockets**:

Install the IC sockets correctly with the pin-1 notch corresponding to the silkscreen outline. DO NOT install any ICs in the sockets at this time.

| <u>Qty</u> | <u>Part/Value</u> | <u>Location</u> | <u>(check)</u> |
|------------|----------------------|-----------------|----------------|
| 1 | 40 pin DIP IC socket | U2 | () |
| 1 | 20 pin DIP IC socket | U5 | () |
| 1 | 16 pin DIP IC socket | U4 | () |
| 4 | 6 pin DIP IC socket | U7 ~ 10 | () |

Step 2.

Install the following **Diodes**:

Install the diodes in the correct polarity with the band (Cathode) matching that shown on the silkscreen outline. Be sure the long (Anode) lead of the LEDs are inserted into the hole with the square pad and the flat on the body is lined up as shown on the silkscreen.

* Note that D2 ~ D5 are not required when using the NEC relay.

| <u>Qty</u> | <u>Part/Value</u> | <u>Location</u> | <u>(check)</u> |
|------------|-----------------------------|-----------------|----------------|
| 1 | 1N4006 (alt 4001 to 4007) | D1 | () |
| 4 | 1N4006 (alt 4001 to 4007) * | D2 ~ 5 | () |
| 4 | 1N5231B | D6 ~ 9 | () |
| 10 | Red LEDs | LED1 & 4 ~ 12 | () |
| 1 | Yellow LED | LED2 | () |
| 1 | Green LED | LED3 | () |

Step 3.

Install the following **Relays**:

The board is double-footprinted to accept either NEC EA2-12 or Omron G5V 12 volt (or equivalent) relays. When using the NEC relay, be sure to install them correctly with pin 1 (dot) on the corner of the relay corresponding with the square pad. Note also that diodes D2 ~ 5 are not required when using NEC relays.

| <u>Qty</u> | <u>Part/Value</u> | <u>Location</u> | <u>(check)</u> |
|------------|--------------------------------|-----------------|----------------|
| 4 | NEC-EA2-12 <i>or</i> Omron G5V | K1 ~ 4 | () |

Step 4.

Install the following **Terminals, Jacks, Plug, Header and Switch**:

Install the screw terminals with the wire clamps facing the board edge.
Install the 10 pin shrouded header with the cutout facing the board edge.

| <u>Qty</u> | <u>Part/Value</u> | <u>Location</u> | <u>(check)</u> |
|------------|------------------------|-----------------|----------------|
| 4 | Screw Terminal strips | IN 1 ~ 4 | () |
| 4 | Screw Terminal strips | OUT 1 ~ 4 | () |
| 1 | 2.1mm power jack | J1 | () |
| 1 | DB-9 female | P1 | () |
| 1 | 10 pin shrouded Header | J2 | () |
| 1 | LF1S022 Ethernet Jack | J3 | () |
| 1 | Reset Switch | S1 | () |

Step 5.

Install the following **Crystals**:

| <u>Qty</u> | <u>Part/Value</u> | <u>Location</u> | <u>(check)</u> |
|------------|-------------------|-----------------|----------------|
| 1 | 7.3728 MHz | Y1 | () |
| 1 | 20 MHz | Y2 | () |

Step 6.

Install the following **Capacitors**:

Observe the polarity of the Electrolytic capacitors. The longer lead is positive and the body often has a marking identifying the negative (-) or positive (+) lead.

| <u>Qty</u> | <u>Part/Value</u> | <u>Location</u> | <u>(check)</u> |
|------------|-----------------------------------|-----------------|----------------|
| 1 | 33uf (25v or higher) Electrolytic | C1 | () |
| 4 | 1uf (16v or higher) Electrolytic | C16 ~ 19 | () |

Step 7.

Install the following **Transistors + Regulator**:

Install the TO-92 transistor as per the silkscreen outline.

Bend the leads of regulator U1 down 90 degrees to the body at the point where the lead becomes narrower. Secure U1 to the board using a 4-40 screw and nut before soldering it into place.

| <u>Qty</u> | <u>Part/Value</u> | <u>Location</u> | <u>(check)</u> |
|------------|-------------------|-----------------|----------------|
| 4 | 2N2222A | Q1 ~ 4 | () |
| 1 | 7805 | U1 | () |

Step 8.

Preliminary Check.

Before installing the Integrated Circuits, perform the following checks:

1. Visually inspect the board. Pay particular attention to the correct orientation of polarized parts and look over the soldering job for any bridges or poor looking joints. Repair as necessary.
2. Plug the power connector from a 12 to 15 vdc source into J1 (centre positive). The red Power LED and yellow & green Network Status LEDs should illuminate.

Using a voltmeter, check for 12 to 15 vdc at pin 1 of U1 (relative to ground).
If this voltage is not observed, check that J1 and D1 are installed and soldered correctly and measure the power source to verify that voltage really is present.

3. Check for 5vdc (+/- 0.25v) at:
- | | | |
|-----------|------|-----|
| U2 pin 30 | ok ? | () |
| U4 pin 16 | ok ? | () |
| U5 pin 20 | ok ? | () |

If any one of these pins does not have 5 volts present, look carefully for cold solder joints or shorts.

4. If the voltages check out okay, unplug the power connector and install the 8 DIP I.C.s in the correct orientation with the notch corresponding to the socket and silkscreen.

| | |
|-----------------------------|-----|
| U2 = ATmega microcontroller | () |
| U4 = MAX232 (HIN232) | () |
| U5 = 74HC(T)573 | () |
| U7~10 = 4N25 | () |

DIP I.C.s often come with the leads spread out slightly for automatic insertion purposes. Carefully bend the leads slightly against a flat surface so that they are at 90 degrees to the component body. Do this on both sides then install the IC into its' corresponding socket. Inspect the installed ICs to ensure that all leads are inserted properly with no pins bent out or curled underneath.

5. Once all I.C.s have been properly installed, plug the power connector back into J1. Using a 9-pin serial cable, connect the board to the serial port of a computer and run a terminal program set for 57600,N,8,1. Upon pressing the reset button on the EIO board a sign-on message will be sent from the board to the terminal.

This completes the assembly of the EIO Board. Consult the operating manual for configuration and operation.