Linking Interface Troubleshooting Tips
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The board assembly is complete but it is not working:

Component level checks

Most kit problems can be narrowed down to two fundamental constructional errors:

1. One or more parts have been incorrectly installed.
Some parts are polarized, that is to say, they must be installed in the correct orientation. The IC's, diodes (including the LEDs), transistors and electrolytic capacitors (round black or blue cans) are polarized parts.

- ICs
A white dot at the corner of each IC outline on the pc board indicates where pin 1 should be.
Pin 1 is normally located at the bottom left when viewing the chip with the text readable, and the notch or dot on the left side.
Also, check that none of the pins bent under the body of the IC when they were installed into their sockets. The board will definitely not work if any of the functional pins were bent and therefor not making contact to the socket contacts. If you notice any bent pins, carefully remove the IC from the socket and use a pair of fine tweezers to *SLOWLY* bend the pins back to their proper shape.

- Diodes
The "band" or "stripe" marking is closest to the Cathode lead. Diodes should be installed so that the band on the part is on the same end as the band on the silkscreen.

- LEDs
The 2 leads of an LED are usually of different lengths. The longer lead is the positive (+).
Also, the base of the plastic body on an LED often has a flat spot identifying the negative (-) lead.

- Transistors
The board can accommodate either TO-18 metal-can or a TO-92 plastic packaged parts at Q1,Q2 & Q3.
The TO-18 metal-can version will drop right in as per the silkscreen layout. When using plastic TO-92 parts, install them in the opposite direction. Bend the middle lead (Base) forward and install them with the flat surface of the body facing the line on the right side of the silkscreen.

- Electrolytic Capacitors
The 2 leads of an Electrolytic Capacitor are usually of different lengths. The longer lead is the "+" (positive). The body of the part may also have a "-" marking on the negative side.

- Passive components
Most passive components (resistors, ceramic & polyester capacitors, crystal) are not polarized and can be installed in either direction.

2. Poor soldering.

Assuming that the builder has some degree of experience in soldering, we will refrain from getting into the "basics" of soldering here. Nonetheless, soldering errors can occur, even with those who are skilled.

Solder joints can appear fine to the naked eye. A visual inspection using a magnifier under good lighting, and continuity checks using an ohmmeter, are the best ways to check the integrity of your soldering and assembly.

Check for "cold" solder joints (poor flow of solder between the component lead and pc board pad, causing a dull or grey connection with little or no contact.). This is usually due to the presence of dirt or residue, or insufficient heating from the soldering iron. Solder joints should have a smooth fillet shape with a slight shine.

Also check for insufficient solder (not enough solder to bridge a connection from the component lead to the pc board pad).

Board level checks

The board has a self-test diagnostic check upon power up. When you first apply power to the board, the PTT and DATA LEDs should illuminate for one second then go off. If this does not occur, check the following:

Is the proper input voltage going to the board ?
- 11 to 15vdc is required at J1.
Any less than the specified minimum voltage could cause erratic, unreliable operation.
Any more than 15v could cause undue heating of the voltage regulator and may burn out the relay.

Is 5vdc present on the output (pin 3) of the 7805 voltage regulator (U6) ?
- If not, make sure nothing is installed backwards, specifically diode D2.
- Also double check that all IC's are inserted the proper way and that no pins have bent out and away or curled underneath the body of the chip.
- The board should consume around 35 milliamps of current in idle mode (Power LED on only, Aux Relay off & no serial communications).
- Use the schematic diagram and your voltmeter to check for correct voltages on the IC's.

The self test works but there appears to be no serial communication with the computer.
- Make sure you are using a proper male-to-female serial cable and not a "Null modem" cable.
- Make sure U3 is installed correctly that no pins are bent under the chip.
- Make sure electrolytic caps C4,C5,C6 and C7 are installed correctly.
- Make sure crystal Y2 is 3.579 MHz and crystal Y1 is **not** installed.
- Make sure capacitor C23 is 33pF.
- Check the configuration of the software.

The DTMF tones are not decoding.
- Make sure U2 is installed correctly and that no pins are bent under the chip.
- Make sure capacitor C2 is 0.1uF.
- Make sure crystal Y2 is 3.579 MHz.
- Make sure that the software is set for "external" DTMF decoding.

The Interface is not keying up the link radio.
- Make sure U4 is installed correctly and that no pins are bent under the chip.
- Make sure radio ground is connected to "sleeve" on the 1/8" connector of that cable.

Basic Functional Check

If you feel that you still have a problem with the interface, use the following functional test to assist you in determining whether or not the problem is truly hardware related:

Assuming that the board is powered and the Power-On Self-Test is functioning, connect the interface to a computer which is known to have a functioning COM port. Run Hyperlink™ or any other terminal program and configure it to run on the COM port that you are connected to using these settings:
2400 BAUD, No parity,8 databits,1 stop bit and no flow control.
Send an upper case T. This should cause the DATA LED to quickly flicker and the PTT LED to turn ON.
Send an upper case R. This should cause the DATA LED to quickly flicker and the PTT LED to turn OFF.
In both cases, the computer should have sent back an upper case K confirmation.

If the functional test is not working, double-check the configuration of the COM port and the terminal program settings. If possible, verify that the computer will talk to other serial peripherals. If all seems well with the computer, you can assume that there is still a problem on the interface board.

If the functional test is working, you can assume that there is a problem with the configuration of the Echolink software and/or the COM port settings on the computer.

The board appears to be functioning but does not work with Echolink

Most problems in this regard end up having to do with the software configuration or pc COM port. The Echolink software is capable of running on various operating systems and particular computer installations vary from users to user, making it difficult to prescribe case-specific checks in a general context.

An initial indication that Echolink is communicating with the interface is a flashing "DATA" LED.
If it is not flashing when Echolink is running then there is a fundamental communication problem. Check the integrity of the cabling and make sure Echolink is configured to communicate through the appropriate COM port.

If the computer appears to be communicating with the interface but you are unable to connect to the Echolink servers, check the following:
If you are running Windows XP or have firewall software running, or you are connected to the Internet through a router, you need to disable the firewall or configure it to pass data through ports 5198-5200 to the IP address of the computer that is running Echolink.

If possible, try running the linking set-up on another computer. There have been reported cases of quirky operation with various combinations of computer motherboards, sound cards, COM ports and operating systems. When a different computer was tried, Echolink and the Interface worked just fine.

Further software or computer troubleshooting exceeds the scope of this Interface Troubleshooting Guide. For more assistance, contact me by e-mail, visit the Echolink homepage or join the Echolink Yahoogroup.

Still not working ?

If you are certain that there is still a problem with the Interface, give yourself a break for a day or two. Go back to it at a later time or have a friend go over it for you. You will be surprised how a little bit of time or a different set of eyes can help identify a problem. Don't get discouraged. There are many VA3TO Linking Interfaces currently in use. There's no "black magic" involved here…it's purely science !

If all else fails, send me an e-mail detailing your problem and what you have already tried.
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