8080 ICE PC board/kit Assembly Notes.   Ver 1.0 7/03/2011
Please read before assembling your kit.

You may want to install the lower components (resistors) first and install the higher ones last. That gives the most time for the board to lie flat while you are trying to solder it. You will need to bend the resistor leads fairly close to the body of the resistors to fit the hole spacing used.

The IC's used in this kit are NMOS (8080) and CMOS types, so avoid static when handling them, and try to avoid touching the pins.

The 10 MHz crystal is a little fragile, like all crystals, so please avoid dropping it.

The right-angle header **must** be mounted on the back side (not the component side) of the PC board. The tin-plated pins are used to solder the right-angle header, not the gold ones. You may want to solder just one pin, then check to make sure the gold pins are parallel to the PC board surface before soldering the remaining pins.

There are a few places where the order of assembly is important. Please install the right-angle header **before** the 40-pin IC socket for the 8080 chip. That will make it easier to get to the innner row of header pins to solder them.   Also, solder the female connector on the top side of the DIP plug **before** soldering the two rows of gold male pins, for the same reason.

The top side of the small DIP plug PC board has the number 1 on it next to pin 1 of the 8080. The female connector mounts on this side, and is soldered on the bottom side of the board.

The double-sided gold pins for the DIP plug have different diameters of pins on the two sides. The thicker pins are inserted from the bottom side of the PC board, and soldered on top. The thinner pins connect to the target system IC socket. You will want to keep the two rows of pins perpendicular to the PC board while soldering. One way to do this is to plug the pins into a socket with 0.6" spacing, to hold them while soldering. A machined IC socket with 0.3" spacing can be used as well. It's best to just solder one pin on each header first, then check to make sure that the headers are positioned the way you want before soldering the rest of the pins.

The notch on each IC socket should be at the pin 1 end of the chip. Pin 1 is marked on the PC board with a "1" and a square pad. Note that pin 1 of the PIC chip is facing in the opposite direction from the 8080 and the RS-232 chip.

Normally the components R1, C17, and D1 are not installed, and jumper JP1 is shorted with a blob of solder. This configuration uses the target system's reset signal to reset the 8080 and the PIC. If the target system has a watchdog timer, you may want to use a local reset circuit on the ICE instead of the target's reset circuit. (If you do this, you'll need to cycle power to the ICE to reset it, since any target system reset switch will no longer function.) To use a local reset circuit, open jumper JP1, and install C17, R1, and D1. (These components are not supplied with the kit.) The values indicated for R1 and C17 have not been tested, and may need to be adjusted for reliable operation. D1 prevents C17 from discharging into the CPLD and 8080 when power is removed.

Two different connectors can be used for the serial connection. If you prefer to use an IDC-type (crimp) DB-9 attached to a ribbon cable, install the 2x5 pin header. If you want to use a USB-to-serial adapter which plugs onto a six-pin header, install the single-row header, and check the pinout of that header on the schematic against the USB adapter that you are using to make sure it is the same as the one the board was designed for.

To attach the 40-pin female IDC connector to the ribbon cable, first locate the extra notch on one side of the IDC connector that indicates pin 1. It's on the same side as the two other notches, all the way at one end. The pin 1 notch should be next to the red wire of the ribbon cable. Place the 6" DIP cable on a flat surface in front of you, with the DIP plug towards you and the ribbon cable facing away from you. The DIP pins should face down. The pin numbers on the back of the DIP plug should be right-side up. With the connector holes facing up, and the pin 1 notch to the right, slide the bare end of the DIP cable into the interior of connector, and allow about one half inch of it to stick out the other side. The ribbon cable should fit nicely into the ribbed part of the connector. Check the centering of the cable to insure that there is a wire below each of the contacts in the connector. The connector should lie across the ribbon cable, perpendicular to it. You may want to place a small piece of adhesive tape on the ribbon cable, across the top part of the connector, and to the ribbon cable on the other side, to hold the connector in the correct position. You can also squeeze the two halves together with your fingers just enough to lightly grab the cable so that it won't move. (You can still slide one end of the connector at this point to get it

perfectly perpendicular to the cable.) Once you have it placed properly, place the connector in a vise and squeeze the two halves of the connector together slowly until the locking pieces snap into place on both ends. Try to apply pressure evenly as you squeeze the two halves together, even if you have to move the connector in the vise to accomplish this. Squeezing will force the cable onto the contacts, which will cut through the insulation and make contact to the wires. Trim the excess cable with diagonal cutters or scissors. (If you are not pleased with the way it looks after the two halves are pressed together, you can gently pry out the locking pieces at either end of the connector and slide the top part up, then carefully remove the cable from the contacts and try again. Don't try taking the connector apart after squeezing it unless you are pretty sure you need to.) An ohmmeter can be used to check for shorts or open contacts. (You can use a resistor lead to probe the connector contacts.) The outer (red) wire of the cable, actually connects to pin 2 of the DIP plug, and to pin 2 of the right angle header and 8080. The second wire connects to pin 1 of the DIP plug and to pin 1 of the right angle header and 8080.

Leaving the red stripe, carefully strip one wire off of the 10-conductor ribbon cable to leave 9 wires. (You can use scissors to cut one wire away from the rest for about ¼" at one end of the cable, then gently pull it away from the other 9.) Insert the 9-pin cable into either side of the 9-pin D female IDC connector, with the red stripe next to pin 1 on the connector. Feed the cable through and sticking out the other side just a little so that it's held by grooves on both sides. Make sure the wire is properly positioned relative to the contacts on the connector, then squeeze the two halves of the connector together in a vise to crimp the wire. Trim the excess cable with diagonal cutters or scissors.   Repeat this procedure for the other end with the 10-pin IDC connector, after locating the pin 1 notch on that connector. (You may want to check the PC board first to see which way you want the cable to feed out of the connector after it's plugged onto the dual-row header on the board.) Make sure that pin 1 of the cable is slid all the way over before crimping. Pin 10 of the connector should not connect to a wire in the cable.

Resistor color bands:

47K Ohms   yellow violet orange gold

Capacitor Marking:

22 pF caps may also be marked "22J"
0.1 uF caps may also be marked "104"

The SMT tantalum capacitor is marked with a line on the **positive** end.

And finally, to quote Heathkit:

Always use rosin core, radio type solder (60:40 or 50-50 tin lead content) for all of the soldering in this kit. The warranty will be void for any kit in which acid core solder or paste has been used.