

WWVB SndClk pc board/kit Assembly Notes. Ver 1.0 1/04/09

Please read before assembling your kit.

If you are soldering the SMT parts yourself, you may want to install them first. That will give the best access to the leads, as there won't be components nearby which have to be avoided. The PCM1753 DAC chip should be installed on the 16 pads furthest from the edge of the board at site U5, in case that site has 20 pads. (Using a 20-pad site allows several different DAC's to be used, in case one becomes difficult to buy.)

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 10 uF and 1000 uF capacitors are polarized, and must be installed correctly. The square pad is the **positive** end, and is also marked with a + sign nearby on the parts placement diagram. The negative side of the capacitor is marked with a - sign.

The super capacitor is marked with a small minus sign inside a circle on the negative lead. This lead should face towards the center of the PC board. The arrows on the top of the capacitor should point towards the center of the PC board.

The bridge rectifier (BR1) has a slant on one end of the top edge. This is the + end and should face towards D5.

Make sure that all chips are oriented correctly, as shown on the component placement diagram, before soldering.

No socket is used for chip U3. This reduces the capacitance on the 11 MHz main oscillator signal.

Sockets are provided for U4 and U1. Please use them.

The WWVB module needs to have an 8-pin male header soldered to it, to allow it to plug into the 8-pin socket, which should be mounted on the top side main board at J3. The header mounts on the underside of the WWVB module, with the longer side of the header pins facing away from the WWVB module board. Try to keep the header perpendicular to the pc board as you solder just one of the pins. If it's not right, then you can reheat just the one pin and get it in the correct position before soldering the remaining seven pins. Holes are provided on the main board for the WWVB antenna leads, but I tend to attach the antenna directly to the module itself, so that the antenna can be unplugged with the module. The WWVB module shown in the photo on my web site may look different from the one included with the kit. The one I am using now can be purchased at Digi-Key. The pinout is the same. For best results I would suggest using only the leads supplied as part of the ferrite antenna to connect it to the WWVB module. If you must extend the wires, try to keep the overall length as short as possible, to minimize interference. The WWVB signal is measured in uVolts, so it's a very weak signal. Also, try to keep the antenna leads away from the other circuitry on the clock main board, to reduce interference pickup.

The three voltage regulators must be installed as shown in the component placement diagram. The bare metal side of the 7805 faces towards the edge of the board. The flat sides of the smaller voltage regulators face towards the edge of the board with the AC and audio jacks on it.

There are two crystals. The small one is 32 KHz (X2) . I would suggest mounting this laying down on a small strip of double-sticky foam as a cushion, after bending the leads. The larger crystal is installed laying down at X1, after bending the leads. Both crystals are a little fragile, and should not be dropped while you are handling them, to avoid damage.

The flat (or notch) side of the LED's faces in the direction shown on the placement diagram. If the red LED doesn't light when you have power applied to the kit it may be installed backwards. This won't hurt it, it just won't light.

R20 and R19 are optional and are not used. Do not install anything at these positions. R17 is also not installed.

AC adapter choice:

Any 9V adapter with the right size plug can be used. Either polarity is OK. It must be capable of supplying at least 50 mA, which most are. Most "9V" adapters are not regulated, and will put out much more than 9V with such a light load. Anything up to about 20V should be OK.

Speaker choice:

Sound quality varies a great deal between different small "multimedia" powered speakers. Some have very limited lower frequency response and tend to accentuate the treble. Other do much better. The sound quality of the clock recorded waveforms varies a little between the different clock types, but is generally better than most small speakers, so using a better speaker will give you better sound.

Resistor color bands:

10 Ohms	brown black black gold
33 Ohms	orange orange black gold
100 Ohms	brown black brown gold
1.0K Ohms	brown black red gold
1.5K Ohms	brown green red gold
3.3K Ohms	orange orange red gold
10K Ohms	brown black orange gold
20K Ohms	red black orange gold
100K Ohms	brown black yellow gold

Capacitor Marking:

18 pF caps may also be marked "18J"
22 pF caps may also be marked "22J"
47 pF caps may also be marked "47J"
0.1 uF caps may also be marked "104"

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.