

HA23R Hardware Pack Instructions

Hardware pack for use with **HOWES TX2000** CW transmitter kit

Parts List

1 off HA23R chassis	1 off HA23R cover
4 off M3 12mm pan head bolts	10 off M3 nuts
2 off M3 6mm pan head bolts	4 off No.4 self tapping screws
4 off self adhesive feet	1 off small grommet
2 off push-on knob	1 off 4 pole, 3 way switch
2 off SO239 antenna sockets	1 off 3.5mm jack socket
1 off 5 pin DIN socket	1 off green LED
1 off red LED	1 off 2.2k Ω resistor
1 off RG174 miniature coax	1 off multicoloured ribbon cable

Mechanical Tools Required

Medium cut flat file for rounding corners of case. Screwdriver and spanner for M3 nuts and bolts. Screwdriver for self-tap screws. Centre punch. Drill with the following size drill bits:- 2, 2.5, 4 & 6.5 (or 7) mm.

Pre-assembly Preparation

Before your hardware can be bolted together, there are a few jobs to do first.

- ✓ Start by using a file to round off the corners of the rear panel and the cover. Round them to match the front panel corners which have already been done for you.

Cover Fixings

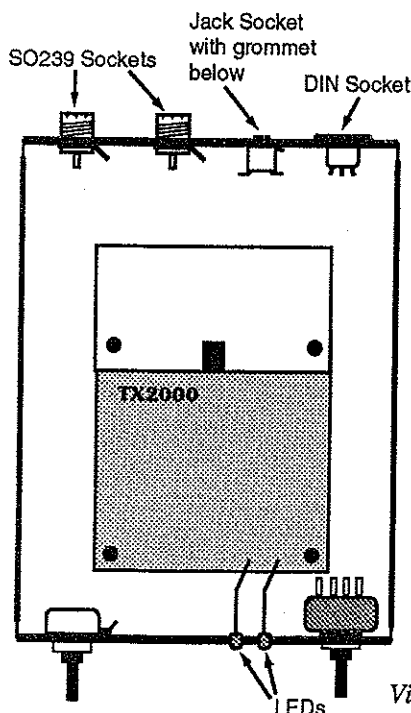
- ✓ Position the cover in place on the chassis, and decide how much overlap you like at the front. Equal overlap of the front and rear panels looks quite good. Hold the cover in position, and mark the chassis through the four fixing holes. Drill the four positions where you marked the chassis with a 2.5mm drill bit (to take the No.4 self tap screws).

Rear Panel Holes

We have already punched the antenna socket holes for you, along with the DIN socket's main hole. You need to drill 6.5 or 7mm holes for the key socket and the grommet (for the power supply leads) These should be drilled one above the other. You will also need to drill the two 4mm fixing holes for the DIN socket. These should be drilled with a 2mm pilot hole first to ensure accuracy, and then enlarged to the correct size.

Drilling the Chassis to take the module.

Position the TX2000 PCB module in place on the chassis, as shown in the diagram. The front edge of the module should be approx. 25mm (1") behind the rear of the front panel to allow for the rotary switch and LED mounting. Mark the chassis through the PCB fixing holes using a felt tip pen or centre punch. Then remove the module and drill the chassis where you have marked it with 2mm pilot holes, these should then be enlarged to 4mm.



View from top showing layout

Sockets

Fit the sockets in place on the rear panel. The SO239 antenna sockets are inserted from the outside of the chassis and the fixing nut screwed on from behind. Their solder tags should be bent away from the panel so that you can solder to them later. The 3.5mm Morse key socket should be fitted in the upper 6.5/7mm hole. The DIN socket should be fixed in place with M3 6mm bolts and nuts. This connector carries the interconnections to the receiver (apart from the antenna).

Controls

The spindles of the IRT pot (supplied in LM2000 kit) and the rotary switch, should be cut down to a length of approx. 11mm. The pot can then be bolted in place on the panel. Fit the crinkle washer behind the panel.

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Pre-Wiring the Switch

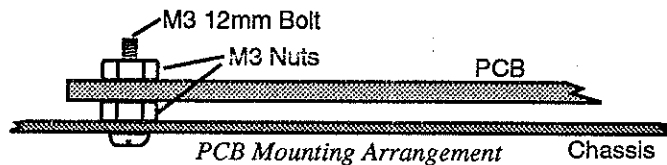
It is best to pre-wire the switch, as shown on the right, before fitting it into the case, as this makes the wiring easier. The recommended wire colours and lengths are shown for guidance. Peel these wires from the length of ribbon cable provided, as required. Once these wires are attached, fit the switch in the case.

The switch fits in the same way as the IRT pot, with the crinkle washer behind the panel, but before you fix it in position, you need to restrict its rotation to convert it to a two way switch. This is done by ensuring the switch is rotated fully anticlockwise, removing the "stop collar" and relocating its spigot in the two way position hole. The diagram should help make this clear. The stop collar is the silver coloured metal ring found under the crinkle washer.

With the controls in place, the push-on knobs should be fitted. Remove the knob caps, if these are already in the knobs (use your finger nails or a thin tool), and position them so that they line up neatly with the panel markings.

Feet

Stick the self-adhesive feet neatly in position on the base of the chassis, one near each corner of the case.

Mounting the Module

The PCB module is spaced off the chassis on M3 nuts as shown in the diagram. Make sure you have trimmed the leads of all the components short enough, so that they are not going to touch the chassis. There is only enough room in the case to mount the module one nut height above the chassis, so any "blobby" soldering on the PCB may need to be reworked, so that the leads can be trimmed more neatly.

Wiring

With the mechanical work complete, wire up the module as shown in the diagrams. You can also refer to the kit instructions (module wiring page).

The miniature coax provided, should be used to connect the SO239 sockets to the transmitter module, and also the VFO input from the DIN socket to the PCB.

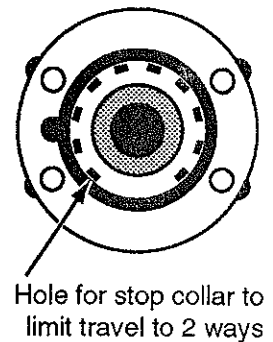
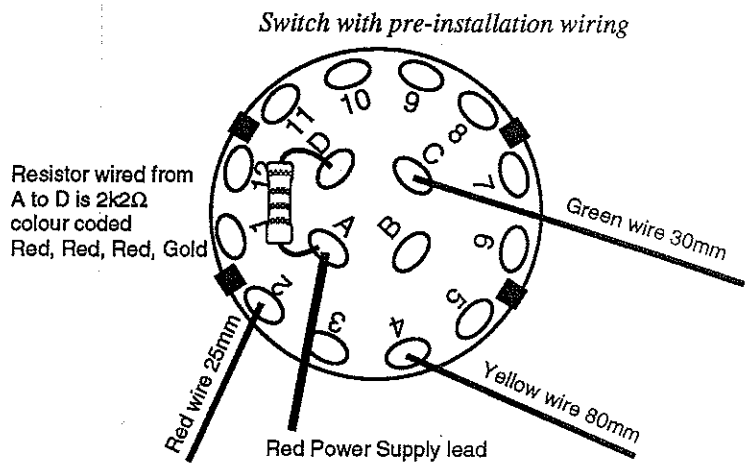
The other connections are made with the multicoloured ribbon cable. Peel off the white / grey / violet / blue section from the rest of the ribbon to make the connections from the DIN socket to the front panel controls.

Note - run all the control wires around the right hand side of the transmitter module (not under or over the module). Only the SO239 coax cable connections should run along the left hand edge of the PCB.

Finishing your Transmitter

Trim and fit the self adhesive label to the rear panel to indicate which antenna socket is which.

To complete your project, you can paint the cover to match your other equipment, or any colour you choose. A satin black finish is used on our demonstration units, and is recommended. If you don't like using spray paints, then a very effective finish can be obtained by covering the cover with "Fablon" or other thin self-adhesive plastic decorative material obtainable from DIY shops. Ensure that the case's top cover can make good electrical contact with the chassis along the length of both sides by masking these areas when you paint them, or trim the covering to avoid these areas, if you are using this method to finish the case.



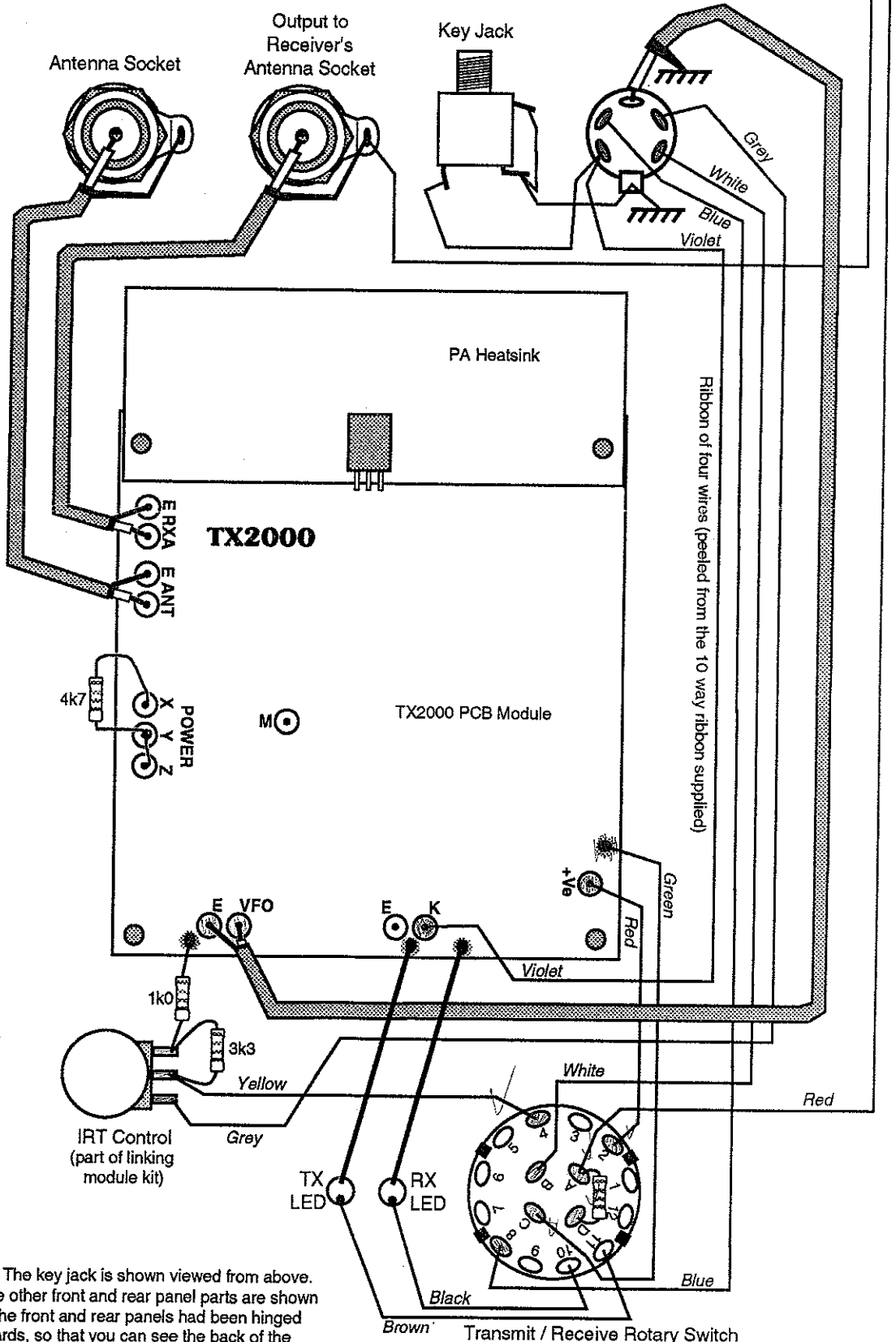
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Wiring Diagram

The diagram below shows the connections for the TX2000 transmitter module when connected to the DC2000 receiver via the LM2000 linking module installed in the receiver. The IRT pot and resistors are part of the LM2000 kit. If you are going to use your transmitter with a separate VFO, then you may like to fit a pot to control the transmitter's output power in place of the IRT control.

Supply 0V (Earth/Ground) should be wired to the chassis via one of the SO239's solder tags. The TX2000 module should connect to the chassis via all four corner fixings.

Supply +13.8V DC Red
Supply 0V(earth) Black



LED Wiring

The shorter lead of the LEDs is the one that connects to the silver coloured earth "spots" on the front edge of the TX2000 PCB. Push the LEDs bodies into their front panel holes (red for TX and green for RX) and solder their short leads to the PCB. After the short leads are soldered, the longer leads should then be cut down to about 5mm ready for the switch connections to be soldered to them. Solder to the cut down leads as quickly as possible, as LEDs seem to be more prone to failure due to overheating than most other components.

Note: The key jack is shown viewed from above. All the other front and rear panel parts are shown as if the front and rear panels had been hinged outwards, so that you can see the back of the switch, sockets etc..