Installing a LIF port into the FT-950 transceiver

Introduction

This document describes the procedure for installing a LIF (Low Intermediate Frequency [9 – 18kHz]) port into the FT-950 transceiver. This procedure requires a level of expertise sufficient to dismantle the transceiver and to solder. Nonetheless, the installation is straight forward and should not cause any difficulties for the experienced radio amateur.
It is important to unplug all connectors and power before working on any transceiver. It is also important to be grounded to avoid static discharges.
Please note: no responsibility or liability will be taken by the author of this document for any damage or malfunction caused by user modifications.

FT-950 challenges

The FT-950 has two major differences compared to all the previous transceivers that were fitted with the LIF port.

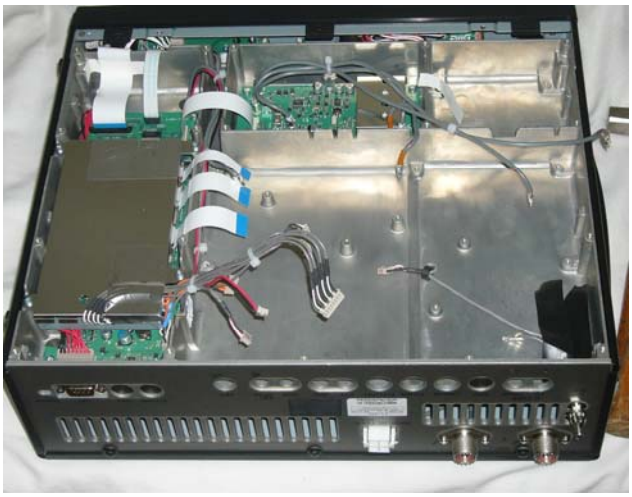
- The 3rd. IF is 450kHz: the LO crystal and IF filters needed to be changed
- Completely separate RX and TX signal paths, requiring the installation of a LIF-TX and a LIF-RX port

LIF port installation

Dismantling the Transceiver

Access to the IF PCB is through the bottom cover. Put a cloth on the workbench. Turn the FT-950 upside down and remove all the screws on the bottom, except the ones that secure the legs. Take off the bottom cover, and now the Main PCB will be visible.
The best way to mount the two SMA connectors (one for RX and one for TX) is by drilling two holes into the rear wall (if you are not comfortable in removing the PCB and drilling holes, the coax cables can be fed through an unused hole). This means that Main PCB has to be removed so that the holes can be drilled without damaging any of the electronics or having metal shavings cause a short. All the openings to the upper housing and the vents in the back have to be taped shut with masking tape to prevent debris falling down while drilling.
When the holes are marked, make sure the connectors clear the back lip of the cover; otherwise the back cover has to be notched before it can be put back in place. Use a center punch and a small hammer to dent the enclosure, so ass to give an easy start point for the drill. Start with a small drill (1/8” or 3.5 mm) and slowly work your way up, increasing the drill size until the connectors fit through the holes.

FT-950 upside down with Main PCB removed

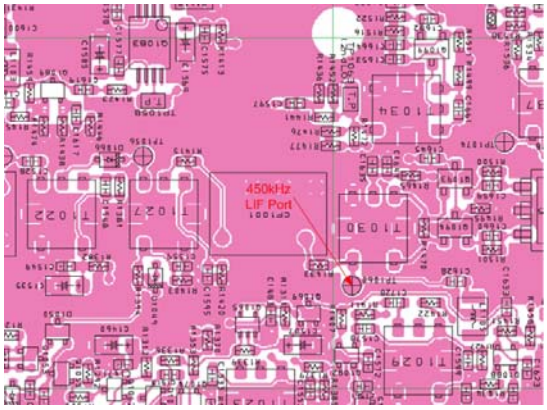


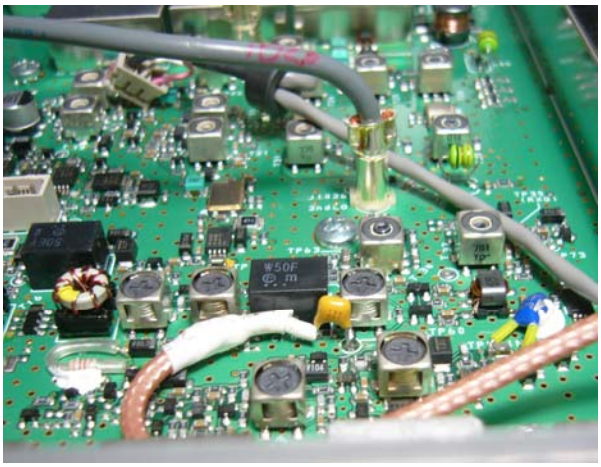
Holes are drilled and one SMA connector installed

After the holes are drilled, use a vacuum cleaner to remove all the metal shavings before removing the masking tape and reinstalling the PCB.
The easiest way to get two 6” male SMA jumpers is to buy a 12” cable with male ends and cut it in half. On the open end of each jumper, solder a 10nF capacitor on the center conductor. Since a good ground is already given by the mounting of the connectors on the chassis, the ground connection on the main PCB is not connected on the PCB end of the jumper. Place two pieces of shrink wrap around the cable end to insolate the ground and the center solder joint separately.

Connecting the RG-174/U cables to the Main PCB

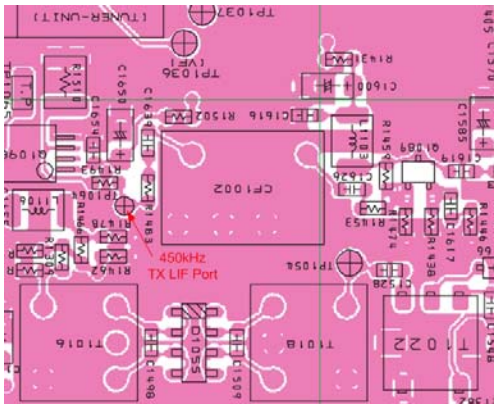
450kHz RX Port TP1060





The loose end of the capacitor for the RX port is soldered on to TP1060. For mechanical stability, it is also recommended to glue the capacitor onto the black filter body.
Now the 450kHz RX IF can be accessed from the rear panel via a SMA cable.

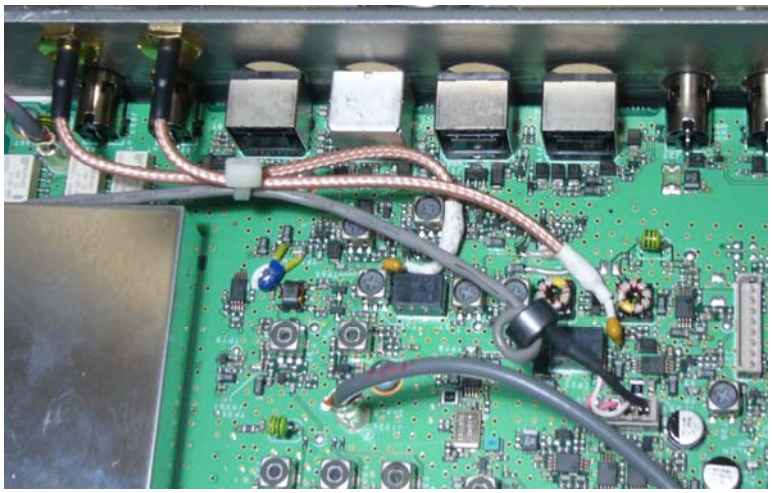
450kHz TX Port TP1064



The loose end of the capacitor for the TX port is soldered on to TP1064. For mechanical stability, it is also recommended to glue the capacitor onto the black filter body.
Now the 450kHz TX IF can be injected into the rear panel via a SMA cable.
⚠**Warning: max input level 1Vpp!**

Routing the cable and reassembling the transceiver

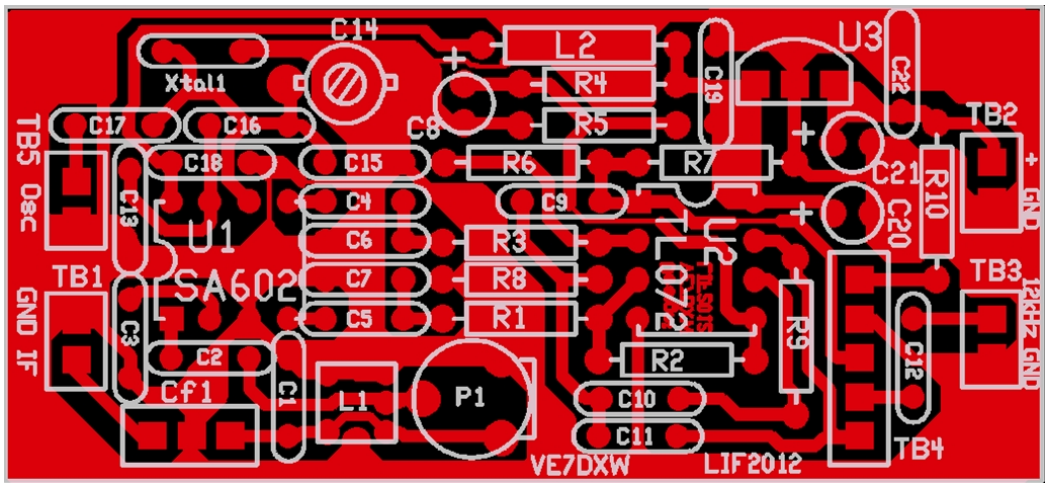
The best routing for the RG-174/U is shown below for the FT-950. The coaxial cable is secured with a tie-wrap to the audio cable. The LIF or BiLiF box is mounted outside of the transceiver and connected to the transceiver via SMA cables.



Connection of the LIF converter (RX-only)

The LIF RX output of the transceiver connects to the IN port (TB1) of the LIF assembly and the audio Line out (TB3) connects to the tip line-in of the sound card. TB2 provides power (+12V). TB5 is not used for the RX-only version. A jumper has to be placed on TB4 between 3-4 to by pass the 7kHz high pass filter or between 4-5 to enable it.

Note: The transmit audio is still filtered with the existing filter inside the FT-950. If the MDSR is properly configured the standard microphone can be used to transmit, while the RX is processed through the computer. For more details see “Lock to TXCR” the MDSR help menu.

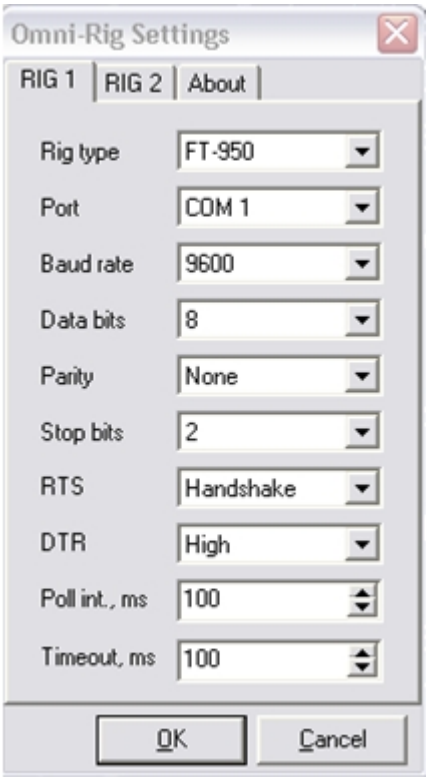


Setup of the CAT interface

The MDSR software controls the transceiver via the CAT port. The connector cable is a straight DB9 cable; all input pins match the output pins (1-1, 2-2,…9-9). This cable can easily be bought or made at home with the right gender connectors. RS-232 port of the computer is then connected to the RS232 connector of the FT-950 and no level converter has to be used. If your computer does not have a RS-232 a virtual RS-232 cable that connects via the USB bus to the computer can be used.

OmniRig Setup for the FT-950 transceiver

To enter setup menu in MDSR-SA select the wrench icon at the bottom center right and select “OmniRig Configuration & Status”, select the key icon “Configure OmniRig”. Only configure RIG 1.



- Select the transceiver to be controlled from the drop down menu.
- Select the port of the computer. If the Com port is not known go to the “Device Manager” and select the ports icon. The port number should be listed there.
- The Baud Rate has to match the setting in the Transceiver. The default setting for the FT-950 is 4800. It should be changed to at least 9600 (menu item 26 - see transceiver manual p110). Faster speeds may cause reliability problems during transmit.
- By default, the FT-950 uses RTS handshake.
- All the other settings should be as displayed here.

That completes the installation of the LIF port of the FT-950. The MDSR team wishes you all the best. If you like the performance of the MDSR software please tell all your friends about it.

73

The MDSR development team

To order the PCB kit or for more information please go to;
Note: if you are interested in the TX – BiLiF option contact VE7DXW directly.
http://users.skynet.be/myspace/mdsr