XRef-FT

Installation Sheet

1. **Overview**

The XRef-FT is a drop-in replacement for the reference board in the Yaesu FT-817, FT-857 and FT-897 transceivers.

The board takes a 10 MHz reference signal from a GPS reference or other high-accuracy source and generates a precision reference at 22.625 MHz for the FT-8x7. If the 10 MHz reference signal is not available, the board reverts to using its onboard TCXO as its source.

The board is based on a Silicon Labs Si-4133-family synthesiser and has an onboard Atmel processor to handle configuration and monitoring.

2. **Installation**

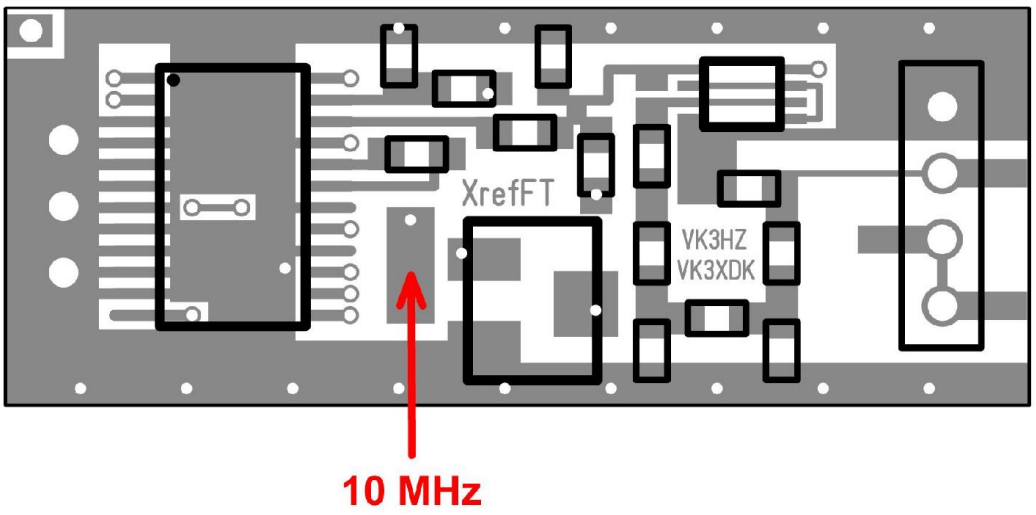
Remove the top cover. If applicable, carefully unplug the speaker lead from the main board.

Locate the OEM reference board. Remove by easing the board upwards off the header pins. Be careful not to bend the pins. Note that one header has 4 pins and the other 3.

Decide what method you want to use to feed the external reference signal into the rig. Some suggestions for the FT-817 are:

- Use the front antenna BNC connector
- Use the headphone socket (tip contact).
- Drill the back panel to take your (small) connector of choice. For convenience, a quick release connector is recommended - RCA, SMB, MCX. Remember to allow enough clearance above the connector for the cover of the rig to fit down into the recess in the back panel.
- While it is possible to feed a cable through a gap in the rear panel, this is not recommended as it can produce RF feedback problems from stray RF entering the rig via the outer of the coax.

Connect the external 10 MHz to the XRef-FT 10 MHz input. The input is the pad on top of the board between the trimpot and the large IC. See diagram below.



Align the XRef-FT board so the black connector is on top and towards the 4-pin header end. The 3-pin header should be in line with three holes in the board. Note that there is no connector on the Xref board at the 3-pin end – these are all ground pins.

Carefully align all header pins with the holes in the XRef-FT. You may need to move the board around to get complete alignment. Once they are all in place, press the board down carefully until it is nearly flush with the plastic surround at the bottom of the header pins. DO NOT FORCE IT. If excessive force is needed, one of the header pins may need straightening.

Turn the radio on and test that it is operating correctly, running on the Xref TCXO.

Tune in to a carrier and note the audio tone. Turn the radio off, connect the 10 MHz lead and turn the radio back on again. The carrier should have almost the same tone as before.

That's it. Replace the top cover and enjoy your new level of frequency accuracy and stability!

3. **Operation**

The board only tests for the presence of the external reference when power is first applied. Therefore, if you plug/unplug the 10 MHz lead during operation, you must cycle power to the radio for it to operate correctly.

The onboard TCXO was set to the correct frequency during testing. However, the TCXO may drift due to aging during early days of operation. The TCXO frequency is set by the multi-turn trimpot on the XRef board.

The 10 MHz external reference signal level should be between 0 and +15 dBm (roughly 0.5V to 3.6V p-p).

It is important that a clean source of 10 MHz be used as a reference. The board is, in effect, converting the signal you are supplying to the reference frequency of the rig, including whatever imperfections there may be. The old adage *garbage-in, garbage-out* applies here.

It is also important that the 10 MHz reference is stable in frequency before the radio is powered up. The synthesiser chip used in the Xref does a self-calibration when powered up based on the actual output frequency. If the reference frequency is varying, this calibration can fail. If using a GPSDO or Rubidium reference, wait for it to lock before switching on the radio.

4. **Support**

If you have any difficulties, you can contact David Smith VK3HZ either:

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- by telephone : (+613)/(03) 9013 1919