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EL-34
Installation Guide

VFO Stabilizer for KENWOOD TS-830S Transceiver

Required Reference Manual - ELcon FLL VFO-Stabilizer

Figure 1 – KENWOOD TS-830S after Modifications

Installation description

Version 1.0a
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Important! Hints or tips for the correct function of the EL-34.

Watch it! Absolutely observe.

1 Introductory remarks

The KENWOOD TS-830S was launched in 1981. It is known for its excellent reception performance and versatile features, which make it a popular device among amateur radio operators. Special features include a built-in antenna tuner, a powerful receiver, and the ability to perform both SSB and CW transmissions. It also offers a user-friendly interface and a robust design that ensures durability.

The VFO is designed to offer a certain degree of temperature stability. However, extreme temperature fluctuations can cause slight frequency deviations, which is not unusual in older devices.

The VFO may exhibit frequency drift, especially during prolonged operation. This can be caused by the internal components heating up.

The solution is to install the ELcon EL-34 stabilizer. This is an excellent kit that keeps the VFO drift to less than 40 Hz.

This document describes how to install the EL-34 in a KENWOOD TS-830S Transceiver. The EL-34 has two connectors required for installation.

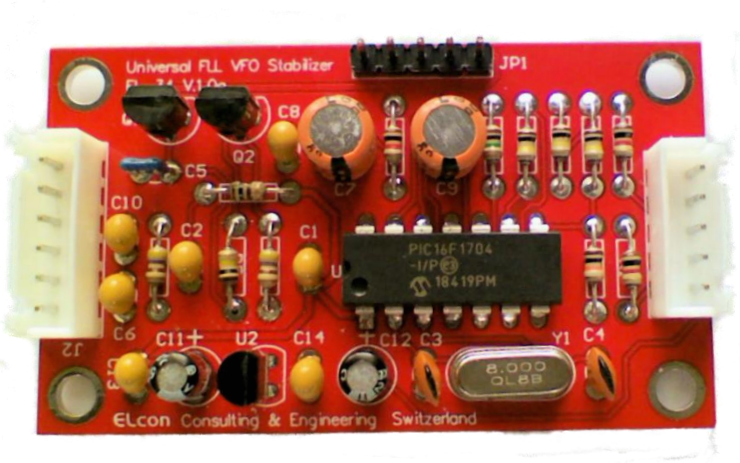


Figure 1 FLL-VFO Stabilizer E-34

2 Installation Summary

Notes: As the **TS-830S** has a varactor diode in the VFO, along with RIT / XIT, we use this existing circuit to interact with the EL-34. The EL-34 kit supplied varactor diode and capacitors is not needed for this use.

2.1 Installation Steps

2.1.1 Mounting for EL-34 in the TS-830S

Suggested mount point is on the metal plate between the **A/C Mains Transformer** and the **IF Unit PCB (X48-1290-00)**. There are two holes **already pre-cut** on this metal plate – the two holes present make for an ideal mount point for the EL-34 PCB. Carefully enlarge the hole – being sure to protect the transformer windings and not spill metal shavings on the PCB. Add a brass standoff as per image.

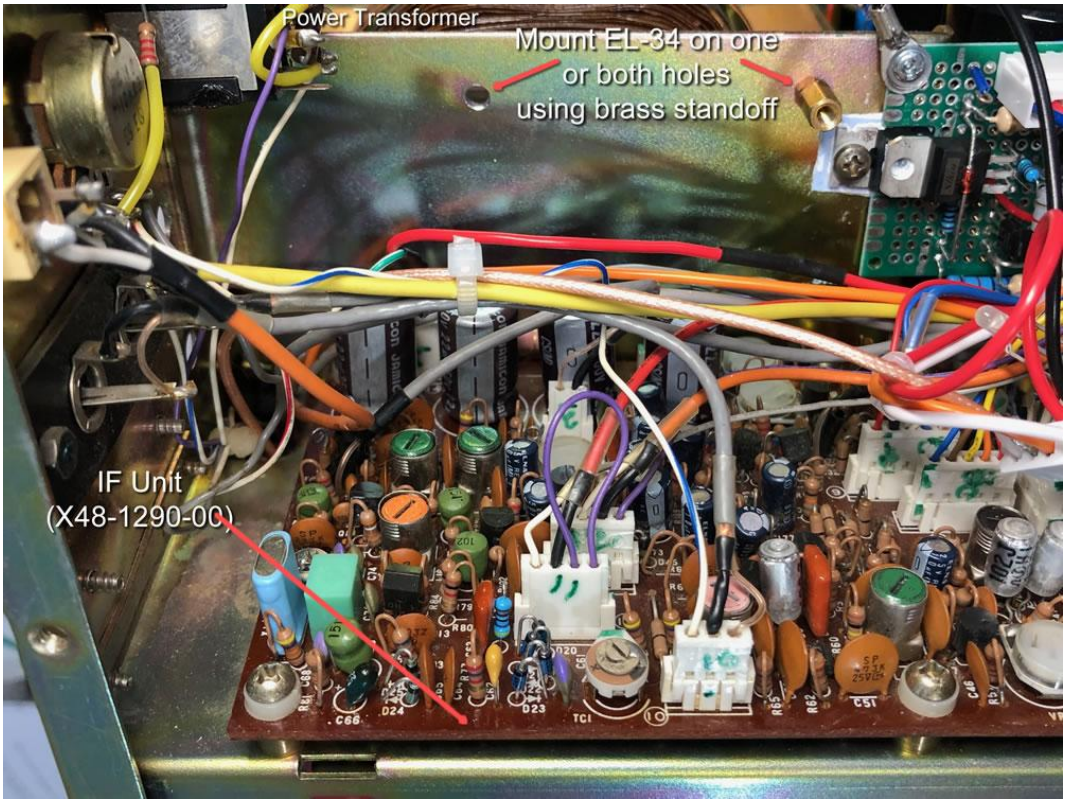


Figure 2- Suggested mounting points

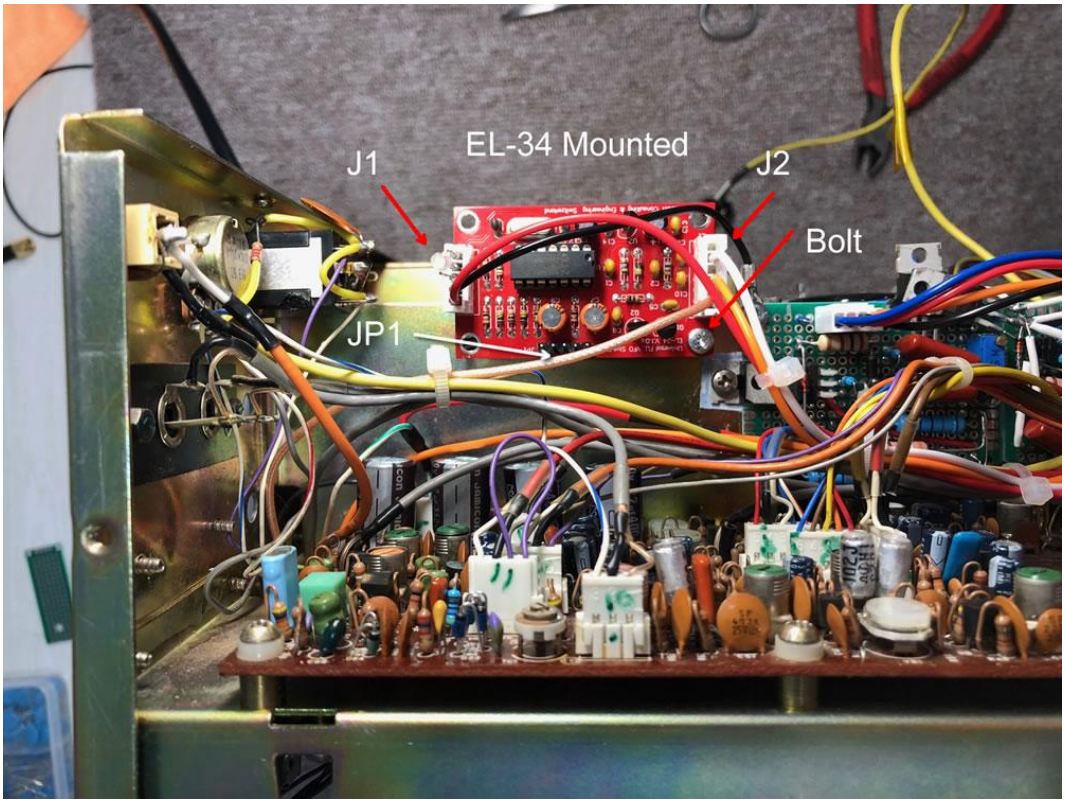


Figure 3- EL-34 Mounted in position

2.1.2 RF from VFO to EL-34

Run a coax from rear chassis **EXT VFO socket** (pins 1 and 7) to pin 6 on J2 of EL-34 – this will be the '**RF from VFO In**' feed for the stabilizer.

PIN	FUNCTION	PIN	FUNCTION
1	VFO signal	5	VFO control
2	Relay control (+ on transmit)	6	Display control
3	+9V	7	Ground
4	CW freq. shift control	8	+12V

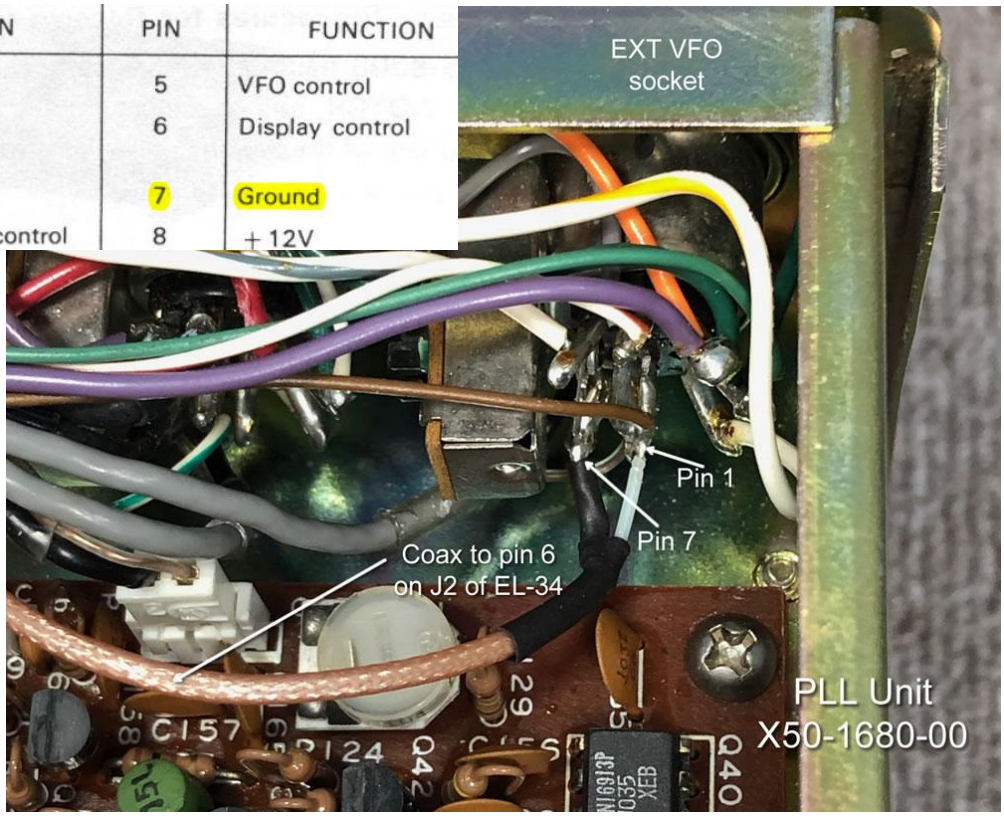


Figure 4- coax from rear chassis EXT VFO socket

2.1.3 RIT Wiring to the EL-34 (Clarifier In and Control Voltage Out)

Find the grey wire from **pin 9** at header connector **(7)** on the **AF UNIT** (X49-1140-00). This is the **RIT** line from the VFO to the RIT / XIT control circuit (clarifier). Cut this grey wire as shown and insert a 120kΩ resistor (Rx), then run a wire (I used white) from the other end of the resistor to pin 2 at J2 on the EL-34.

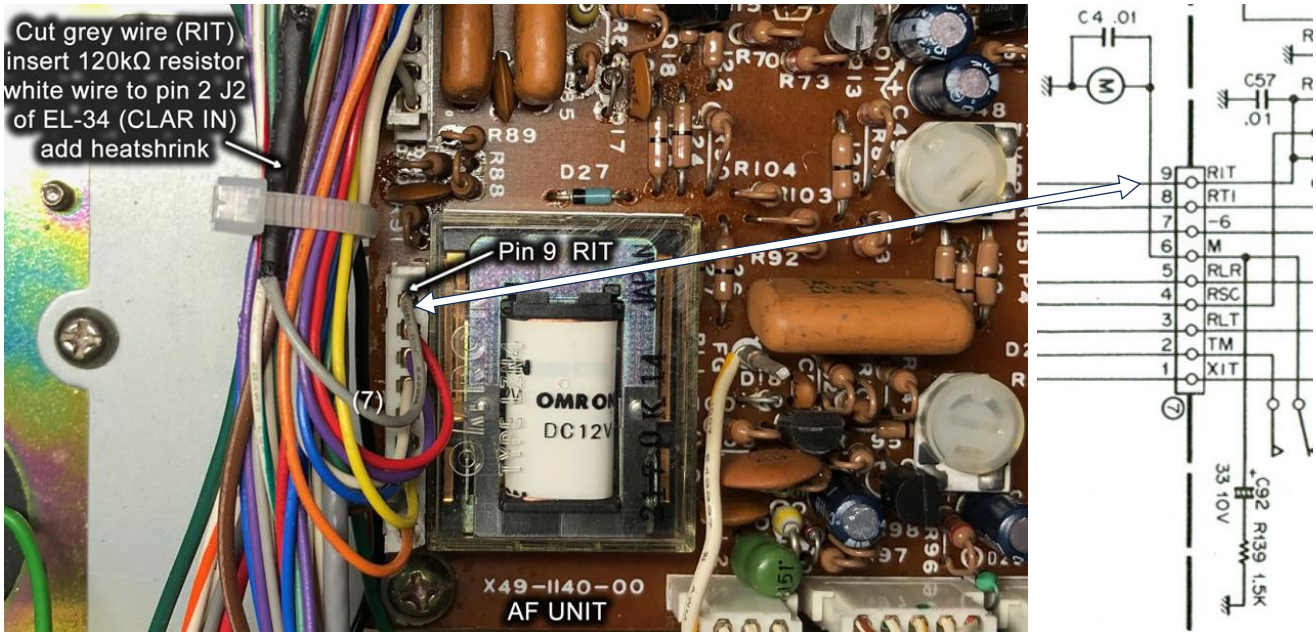


Figure 5- RIT line from the VFO, connector (7) on the AF UNIT

The other end of the (cut) grey wire is the Control Voltage (RIT line) direct to the VFO. Run a wire (I used orange) from the grey wire to pin 4 at J2 on the EL-34.

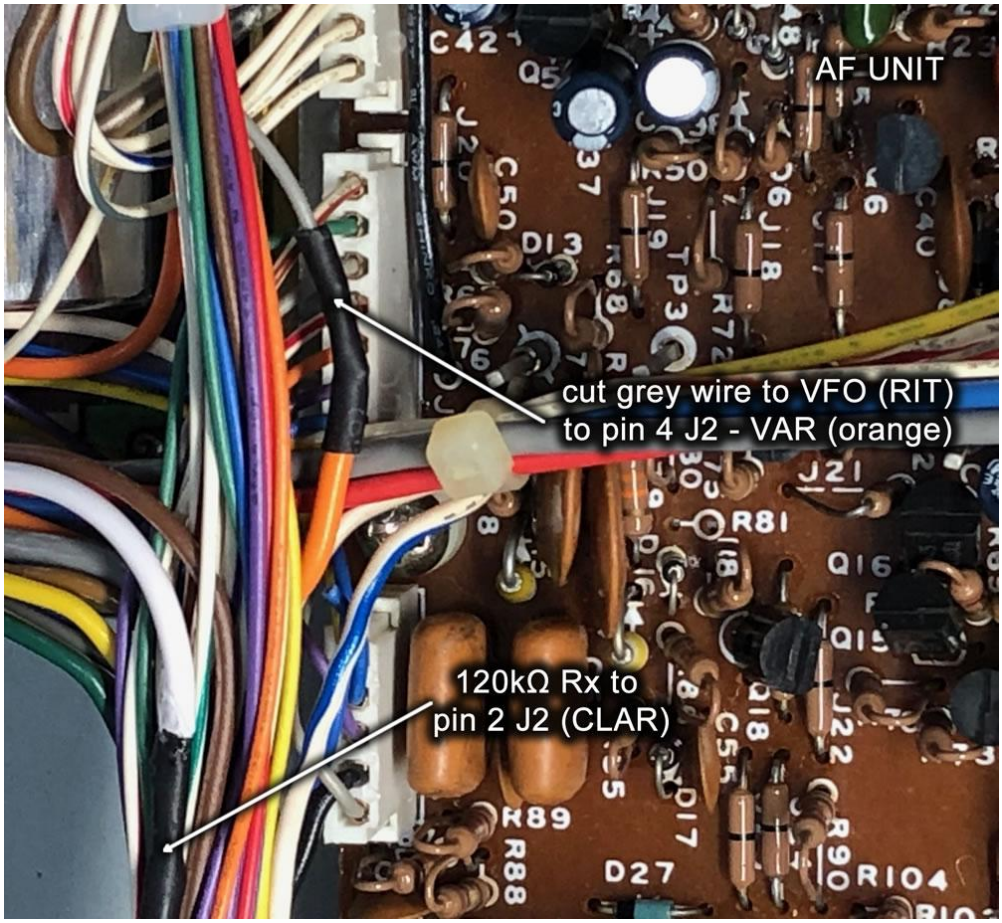


Figure 6- RIT line from the EL-34

2.1.4 V+ source (7-20 volts) to feed EL-34

I suggest to wire a 12v tap from the red wire at **pin 6** of the **header (2)** on the **PLL Unit (X50-1680-00)**. Run a wire (I used red) from this 12v point to pin 1 of J1 at the EL-34.

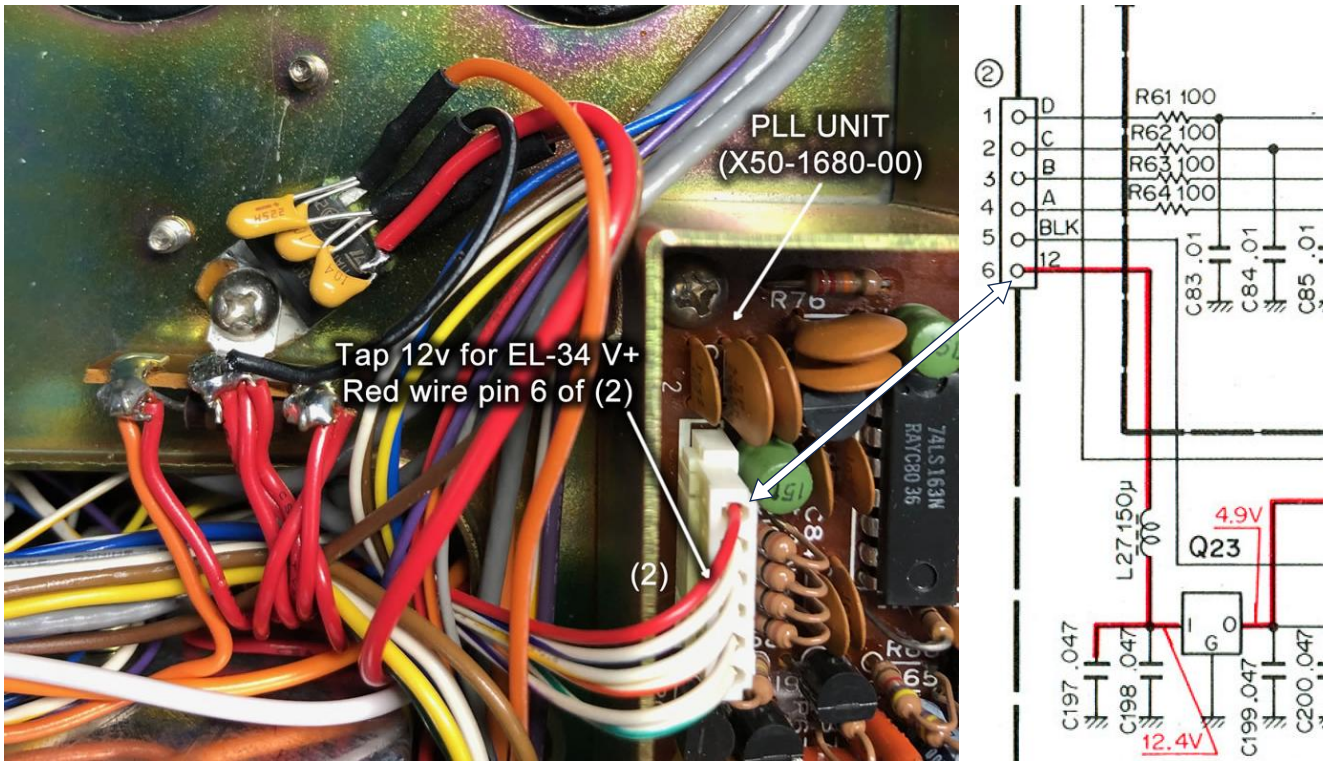


Figure 7- 12V source to feed EL-34

2.2 Programming the EL-34 to set the required 3.3v VREF

Note the required 10kΩ resistor from the config (pin 1) to Gnd (pin 3).

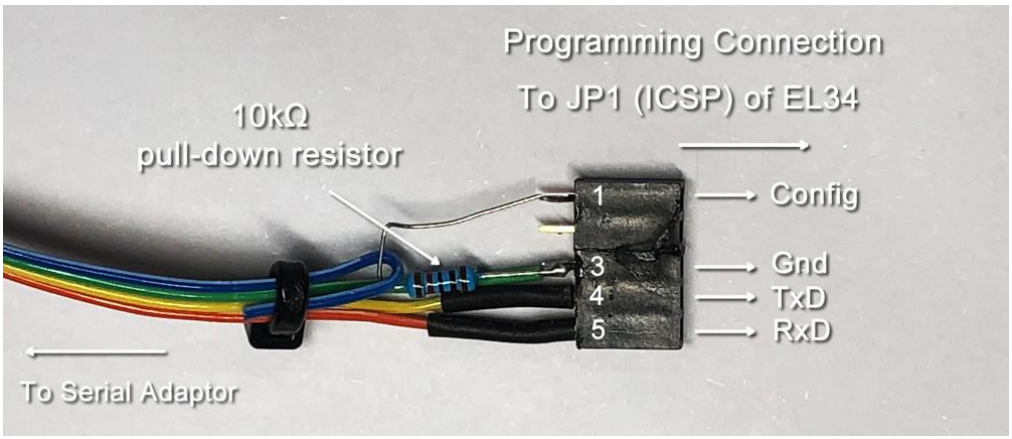


Figure 8- Programming connector

I used a "Duinotech Arduino Compatible USB to Serial Adaptor" to communicate to the FLL VFO Stabilizer.

This is a mini-USB to 6-pin serial port module used to communicate with Arduino boards and modules. It uses the original FT232 chip with power/sending/receiving indicator and also a selectable 3.3V or 5V power option to suit different boards.

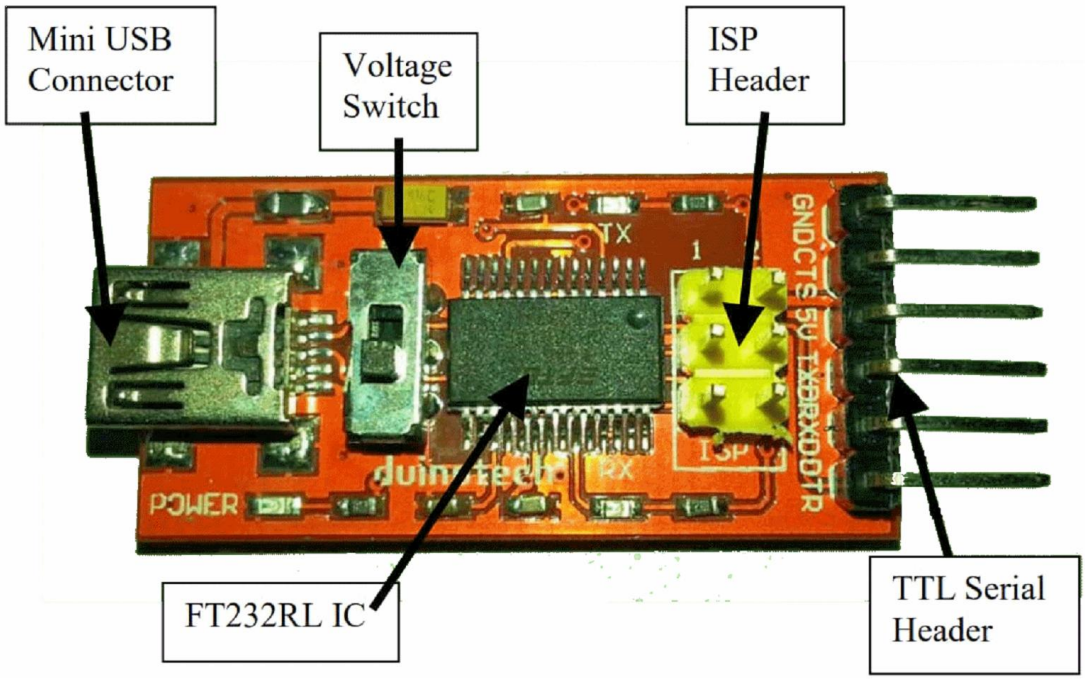


Figure 9- USB to Serial Adaptor

2.2.1 Voltage Switch on Serial Adaptor

Set to 5V to output 5V level TTL signals.

⚠ **Note:** In programming mode, power for the EL-34 is supplied by the transceiver, not the serial adaptor.

Connect the serial adaptor to the EL-34 JP2, then power on the transceiver. LED will light as RED and GREEN to indicate **programming mode**.

2.2.2 Fire up Putty and set the following

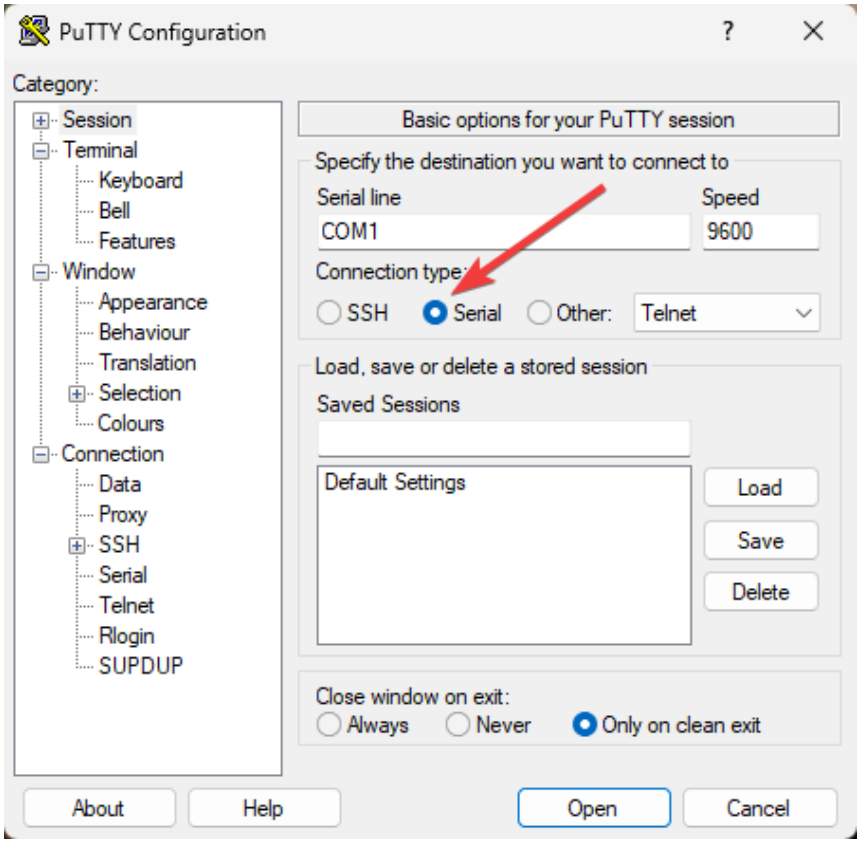


Figure 10- The serial connection type is used

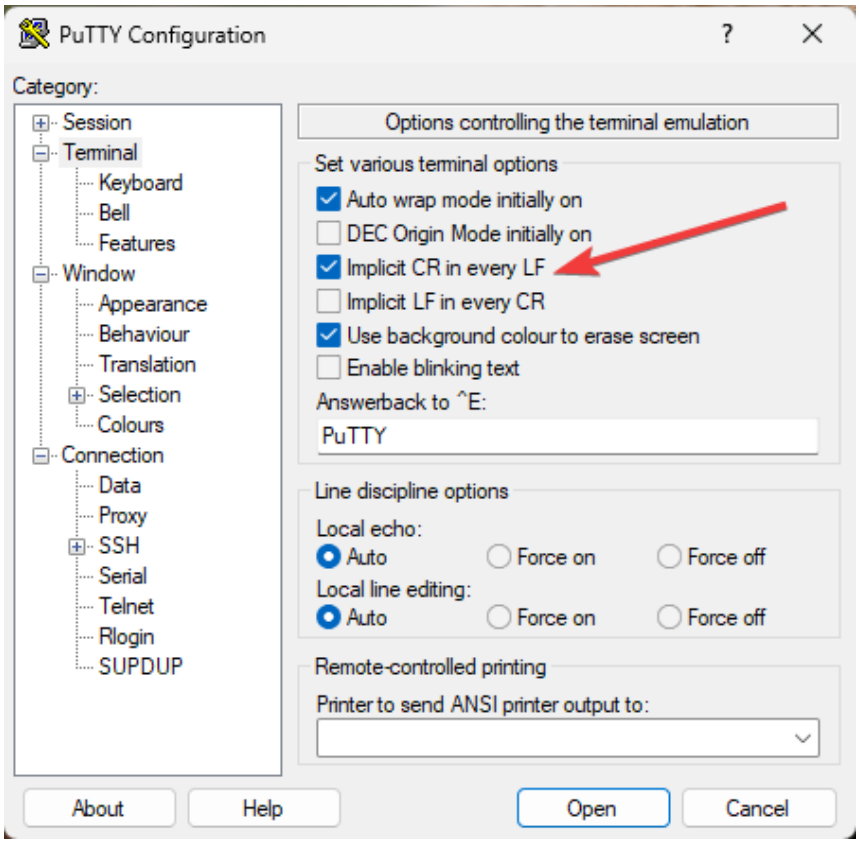


Figure 11- The options must be set correctly

Below: Set the COM # Port your device is using (mine was 4) – disable FLOW control.

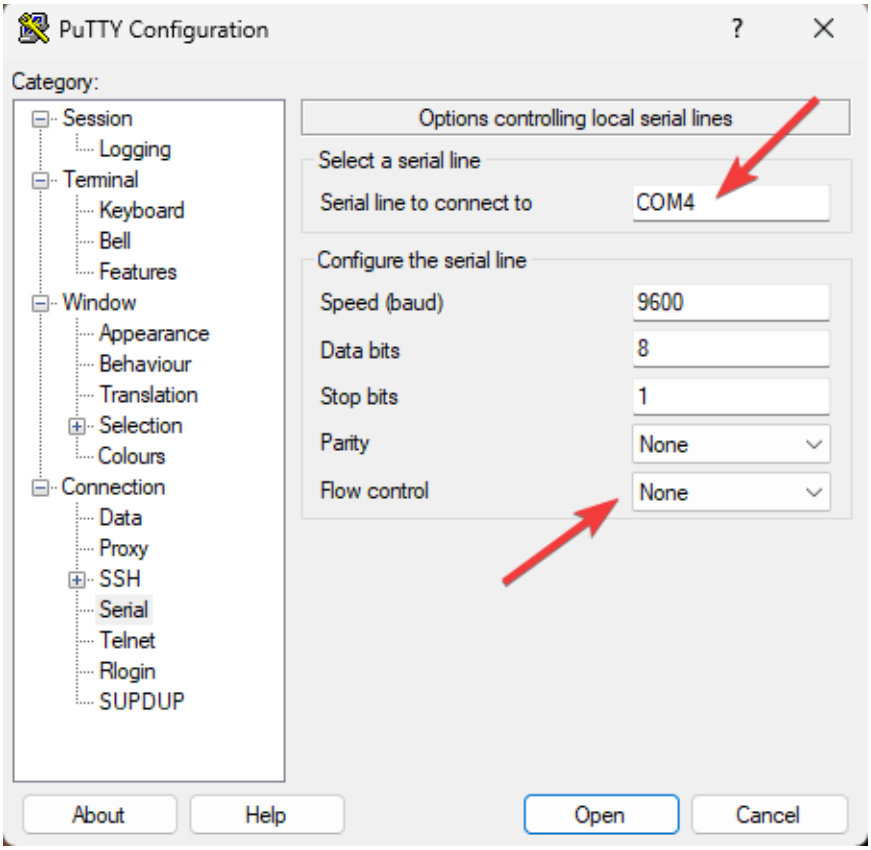


Figure 12- The COM port is individual

2.2.3 set VREF

Enter the following commands:

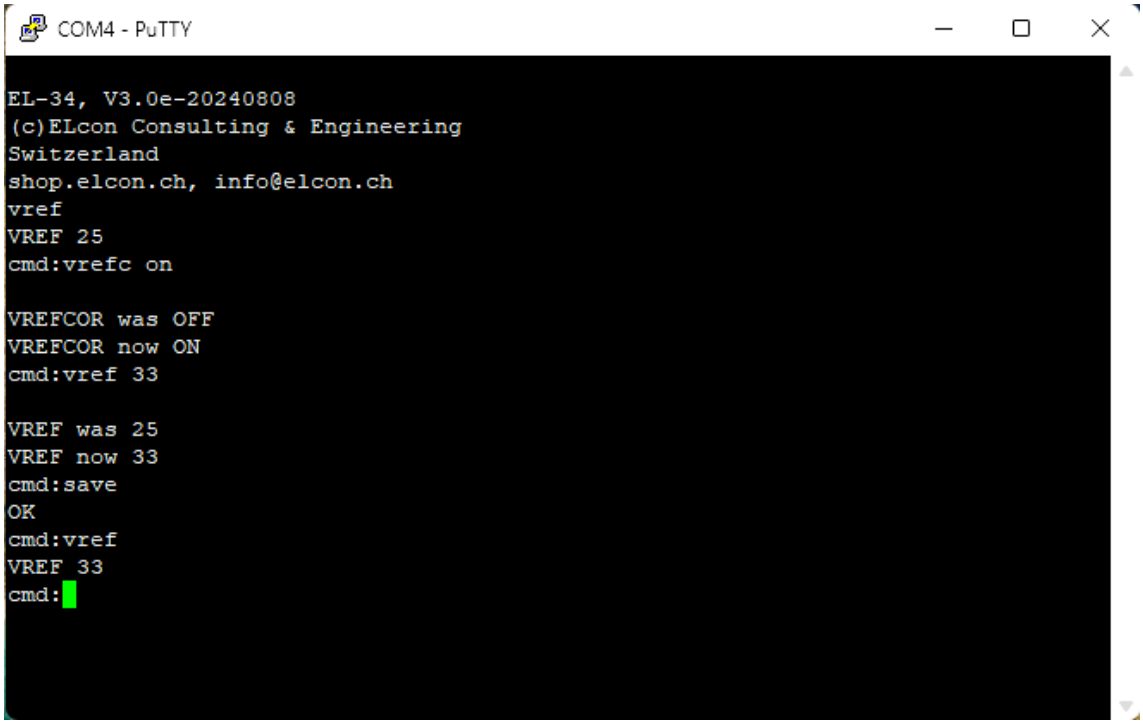


Figure 13- The required 3.3V VREF value has been set

Done!

Turn of the transceiver and remove the serial adaptor used for programming the EL-34.

Now power up the transceiver and test for VFO lock – should occur in less than 2 seconds. If all is well you will have a green LED to indicate VFO lock.

Figure 14- green LED to indicate VFO lock

2.3 Correct mechanical dial discrepancy

Note that there will be a slight discrepancy between the Digital Display (counter) and the mechanical dial. This is normal as the RIT now runs the varactor diode in the VFO at a slightly lower voltage.

Read below to correct:

Figure 15- mechanical dial discrepancy

After installing the EL34, a slight realignment is necessary to correct the discrepancy between the analog and digital frequency display.

To correct this mechanical dial discrepancy, there are two options.

1) You can adjust the mechanical display dial slightly; see chapter 4.7 in the operating manual.

2) You can correct the VFO frequency using the adjustment instructions in the service manual; see item 7 on page 34.

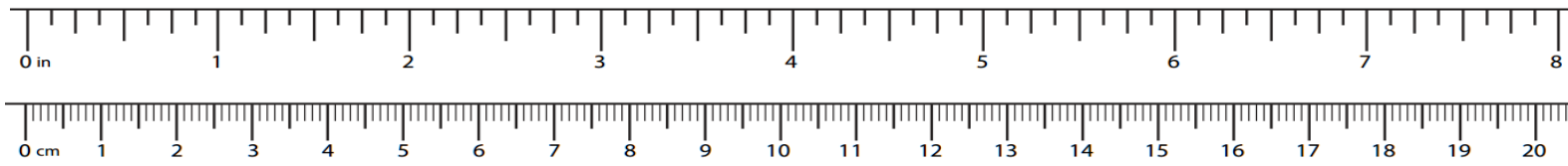
2.4 Reverse the direction of rotation at the RIT/XIT potentiometer VR4

(changed by the EL-34)

In my installation I did not bother to reverse the direction of rotation at the RIT/XIT potentiometer **VR4** and used it happily as is. On the TS-830S it is rather difficult and painstaking to get clear access to VR4 (soldering), and additionally I do not normally use RIT / XIT adjustments often (very rare use).

3 Appendix

3.1 Ruler



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