

## TR-45L Operating Instructions



### Cautions

08/01/2023

- 1) Do not apply more than 14.5 volts DC to the TR-45L.
- 2) Never connect a power source other than an approved charger to the RED power jack on the back of the unit. This is for the charger only (5.5x2.1mm)! The unit will not operate from the optional internal battery while the charger is connected.
- 3) External battery power may be applied to the BLACK connector (5.5x2.5mm). The unit will operate with power applied to the black connector even when the charger is connected.

### Switch and Control Overview

The main power switch (red boot) is on the lower right side of the panel.

The volume control is below the power switch.

The notch filter is to the left of the volume control. The frequency of the notch can be varied from about 200 Hz at fully counter-clockwise (Min) to more than 3 kHz fully clockwise (Out). The notch filter is essentially out of the circuit when set fully clockwise because the notch frequency will be well beyond the highest audio frequency available from the receiver.

RF gain control is to the left of the Notch filter control, followed by the keyer speed control.

The tuning control is directly below the display. The tuning speed is selected by short pushes of the knob to select 100 or 10 Hz per step. Longer pushes of the tuning control will select 1 kHz and 1 Hz steps. An underline cursor on the frequency display will indicate the selected tuning step.

The TX power control is to the right of the meter. The switch directly above this pot will select forward or reverse power to be indicated on the meter during transmission. A red "High VSWR" indicator is located just above the RF power selector switch.

The three-position center-off switch (white boot) to the left of the tuning knob actuates the "Dial Lock" (up) and the "Battery Check / Spot" (down) function. The dial lock is alternating, while the batt check and spot function is momentary. If the received signal tone is matched to the spot tone (700 Hz), exact zero-beat is assured.

The three-position center-off switch (white boot) above the power switch is the band switch (up) and VFO select (down). Short upward actuations will advance the band selection. Note that the selection sequence is one direction only, as 80, 40, 30, 20, 17, and then back to 80 with each short actuation. Short downward actuations will switch between VFO A and B. A longer downward actuation of this switch will store into memory the current VFO frequency and mode settings. Note that each band is provided with a separate memory for the A and B VFOs.

The three-position center-off switch (white boot) above the band / VFO switch controls the RIT function and the receiver mode. A short upward actuation will engage the RIT function and the amber warning LED will illuminate. While the RIT function is engaged, the RIT offset can be controlled by the main tuning encoder. The RIT offset frequency will be shown on the display. The RIT function is turned off by another short upward actuation. The receiver bandwidth is selected by short downward actuations of this switch and will alternate between narrow and wideband CW. A longer actuation will set the proper dial frequency calibration for SSB mode.

The three-position center-off switch below the panel meter controls the keyer memory record and playback functions. See below for operational instructions for the recorder.

The short-handle switch to the left of the meter controls the dial light level, both the display backlight and the meter illumination. "DIM" saves about 20 ma of battery current.

The upper short-handle switch on the right side of the panel controls the operation of the narrow band CW 700 Hz audio filter. Note that this filter is available only during narrow band CW operation.

The lower short-handle switch on the right side of the panel controls the internal speaker and the rear panel 3.5mm external speaker jack. It does not affect the front panel headphone jack.

## Using the Optional Z-Match Tuner

The addition of an antenna tuning device adds a high degree of utility to the TR-45L transceiver when used in the field, especially with simple wire antenna systems. Because this tuner does add additional cost to the TR-45L, it is offered as an option at the time the order is placed. The tuner controls are located on the upper rear panel of the radio and consist of two toggle switches and two variable capacitors. The first switch selects either a conventional standard 50-ohm BNC output or places the tuner in-line between the transmitter and antenna connector while the second switch selects balanced or unbalanced outputs.



The simplest portable operation solution would involve a length of wire supported at one end with a high support (tree) and the other end connected to one of the TR-45L binding post connectors, with a similar length counterpoise wire stretched out on the ground and connected to the other binding post. Similar setups were tried with different wire lengths and gave good results. The tune-up procedure is as follows:

With the antenna wire and counterpoise connected, flip the tuner toggle switch to the IN position. Adjust both the tune and load capacitors for maximum band noise on receive. Turn down the RF power pot so that the meter indicates power at about half-scale on the meter with the RF Power toggle switch set to read forward power with the key down. The High VSWR indicator might be on but will go out as the reflected power is reduced. Next, switch the RF Power toggle switch to show reflected power on the meter.

Now reach over the top of the radio to the tuning controls and adjust both the tune and load capacitors for minimum reflected power as shown on the meter. Note that there is considerable interaction between the two capacitors. Slowly adjust the caps with short bursts of key-down times of about 5 to maybe 10 seconds or so each with a short rest time between tuning attempts. Admittedly, there is an art to doing this quickly. Sometimes it takes a while to find a deep null in the reflected power which indicates a good match.

## How to use the Keyer Record and Playback Functions

The record and playback functions are initiated with the “Play/Record” switch. There are two message memories provided. Each can store 25 words using the “PARIS” standard, or 125 ASCII characters if stored with no word spacing. This should be plenty for POTA or SOTA activations.

Before starting the recording, set the keyer speed control to a comfortable setting; a little slower than normal might be better. Don’t adjust the speed control while in record mode. To record a

memory, activate the “RECORD” function by momentarily flipping the REC/PLAY switch to the left. The LCD display will show the record menu. Choose message 1 by tapping the “DIT” paddle, or message 2 by tapping the “DAH” paddle. The TR-45L sidetone will immediately respond by sounding a “1” or “2” in morse. If the sidetone sounds a little “clicky”, turn down the RF gain control some. After the morse number is finished playing, you may record your message using the paddles. You can abort a record session by activating the “RECORD” switch again. The transmitter will be inhibited while you record your message. When your message is finished, simply stop sending, and the recording session will time out after about 3 seconds and the TR-45L will revert to regular transceiver mode.

To listen to or play back your message, activate the “PLAY” switch by momentarily flipping the REC/PLAY switch to the right. The playback menu will appear on the display. Be aware that the transmitter will be active while playing back a message, so remember to turn down the RF power control while checking your recorded message. Message 1 is selected by tapping the “DIT” paddle and message 2 by tapping the “DAH” paddle. The selected message will immediately start to play and will play to the end. To stop the playback at any time, tap either the DIT or DAH key. Activating “PLAY” switch during playback will also abort a message playback. The volume control must be up to hear a message. Note: It’s best not to record messages with the band set to 80 meters as it is difficult to hear the recording sidetone on this band because of lower VFO leakage into the receiver on this band. 80-meter playback is not affected.

### **Optional Internal Battery Pack and Charger**

Provisions are made to support an internal high-capacity Lithium-Ion battery. With a rating of 5200 milliamp hours, this battery will operate the transceiver for a long time! Make sure the battery is inserted securely into the padded framework on the inside rear panel and that the Velcro straps are tightened to prevent movement of the battery during handling. Also be certain that the battery wires are not stressed. **Note that the battery is supplied with a low state of charge and must be fully charged before operation.**

Frequently check the battery condition of charge by momentarily pressing downward on the “BATT CHECK/SPOT” switch. If the meter indicates a level close to the lower limit (between S8 and S9) the battery needs to be recharged. Do not allow the battery level to fall too low as this will shorten its usable life. Plug the charger into the RED charge jack on the rear panel. The charger indicator will be red while charging and switch to green when charge is complete. Charging can take several hours. The internal battery will not operate the transceiver while it is charging. You can, however, operate the TR-45L while charging the internal battery by connecting an external DC power source to the BLACK DC input jack on the back of the TR-45L.

### **About the TR-45L Frequency and Mode Memories**

There are both short-term (RAM) and long-term (EEPROM) memories. The band, frequency, mode, and VFO (A or B) will be stored in RAM and remembered so long as power is on. For

example, if you are operating on 40 meters at 7.030.200 MHz on VFO A in narrow band CW and change bands to 14.258.500 MHz on VFO B to listen to SSB, then go back to VFO-A on 40 meters, the previous 40-meter frequency, mode, and VFO settings will be restored because they were remembered in the short-term RAM - you will be right back on 40 meters where you left it the last time. All of the information for each of the bands will be remembered as you move between bands. Once power is removed, however, this information is lost, except for the band and the VFO (A or B) that were active when power was removed. When power is restored, the TR-45L will switch to the last used band and VFO but will default to the frequency and mode that is stored in the EEPROM for that VFO.

This EEPROM information may be rewritten at any time by holding the VFO A/B switch down until the display backlight goes off. If upon power-up, you want the TR-45L to return to the operating frequency and mode it was set to when powered down, simply save the current frequency and mode in the EEPROM memory before turning the power off. To do this, simply hold down the VFO selection switch for about 2 seconds until the backlight goes out and release the switch. Then turn off the power switch. When you power back up, you will be right where you were when power was last turned off.

### **Opposite Sideband Selection**

The TR-45L defaults to the standard convention of lower sideband use below 10 MHz and upper sideband above this frequency. Operation on the opposite sideband is offered for utility purposes only and is not recommended for normal use because receiver image rejection suffers, and additional spurs could be encountered.

To select the opposite sideband, toggle up and hold the RIT switch for a few seconds. The sideband selection in the display can be observed to change. A second longer actuation of the RIT switch will return the receiver operation to the normal sideband.

**Sidetone Level Adjustment** *All units shipped after Feb 28, 2023 have an external knob on the lower back panel below the red / black binding posts for adjustment of sidetone level.*



For earlier units without the external knob, use this procedure: The sidetone level adjustment can be accessed by removing the front panel assembly from the rear case. First, remove the six screws that secure the panel to the rear case half. Separate the panel assembly and lay it face down on the table. Be careful with the interconnecting cables. While operating the unit, adjust the sidetone level pot (circled in red) for the level of your liking.

Reassemble the panel to the case rear. Be careful not pinch the internal cables.

**Operational Note:** The TR-45L may be able to supply more than 5-watts on some bands. Although not recommended, if you feel you must transmit with absolute maximum power, please be kind to the meter by switching to reflected power so that the meter pointer doesn't bang against the stop. Remember, it's a 5-watt radio...if you can't work them with 5 watts, you probably won't with 7 watts either.

## **TR-45L CW Transceiver Specifications**

Frequency Coverage: Full coverage of the 80-75-, 40-, 30-, 20-, and 17-meter amateur bands with extended coverage above and below.

Power requirements: 9.5 – 14.5V dc at < 125mA receive, < 1.7 A transmit at 5 W.

Modes of operation: CW transmit and receive; SSB receive only.

Receiver sensitivity: -125dBm MDS or better

IF / audio bandwidth: <370 Hz at -6dB CW narrow setting, <200Hz with AF filter on. Measured with -110dBm RF input signal.

Audio Notch Filter attenuation: -30 dB at 1 kHz

Audio power output: 1 W with 8 Ohm load.

Transmitter power output: 5W (CW band portions) with 12 V dc input. Transmit is inhibited outside of ham band limits.

Spurious-signal and harmonic suppression: Complies with FCC emission standards.

Transmit – receive turn-around time: 25 milliseconds.

Internal keyer: Adjustable 5 to 40 wpm, iambic mode B.

Keyer message storage depth: 25 words (PARIS standard) for each message.

Size: (length, height, depth) 8.25 x 6.25 x 5.15 inches including protrusions.

Weight: 3-pounds 2-ounces with internal lithium-ion battery and Z-Match tuner.