

## TR-35 Operating Instructions



The TR-35 is a 4-band 5-watt CW transceiver covering the 40-, 30-, 20-, and 17-meter bands with generous receiver tuning ranges above and below each band. Selectable receiver modes allow for narrow band CW, wideband CW, and SSB reception. Refer to the front panel for the location of the switches and controls. The four rotary controls are pretty much self-explanatory. There is a keyer speed control (5-45 WPM) on the left, then the TX Power (0-5W) adjust pot, an RF gain control, and a volume control. The power on-off switch is at the upper left, the Receiver Mode and AUX switch is in the middle, and the Band selector and RIT switch is to the right. The two right-most switches are 3-position spring return toggle switches. To change bands, momentarily flip this switch upward and allow it to return to the center off position. Do this quickly, and the unit will consecutively switch from one band to another. If you flip the switch up and hold it up for a short while, the current frequency and receive mode will be stored in a semi-permanent memory. The display will momentarily switch to a reverse optical mode to show that the current frequency has been stored. There is a separate memory for each of the four bands. To recall this memory, 2 quick successive upward clicks are required. To engage the RIT function with this switch, a quick

downward push and release of the toggle is needed. The orange RIT warning LED will come on, and the display will read out the offset with 10 Hz resolution as you tune. Another quick downward toggle will dis-engage the RIT function. The Receiver Mode switch will toggle the receive mode through Narrow Band CW, Wide Band CW, and SSB. The receiver IF bandwidth will be changed to accommodate the selected mode, and the display frequency reading will maintain calibration when switching between CW and SSB modes. The AUX switch currently controls a dial lock function. The knob to the right of the blue OLED display is the tuning encoder. The frequency may be change in 10 Hz, 100 HZ or 1 KHz steps. The Tuning encoder will tune at 40 steps per revolution, allowing tuning rates of 400Hz, 4kHz, or 40kHz per revolution. The tuning step resolution is selected by a momentary switch attached internally to the tuning encoder. Short pushes on the tuning knob will alternate between 10 and 100 Hz tuning steps. A long press will enable 1 KHz steps. The frequency readout on the display will show the tuning resolution selected with an underline bar beneath the digit selected. The blue LED Signal indicator can be used to judge the strength of the received signal. A bright blue LED would indicate a strong signal. The red LED is the battery low-level warning indicator. It will blink when the battery voltage drops below a preset level. The warning level is internally adjustable from 9 to 11.5 volts. An external speaker or headphones can be connected to the "Phones" jack on the right side. There is more than ample audio available. Power is connected to the DC input connector on the left side. The voltage should be between 9.5 and 14.5 volts. The center pin polarity is positive, and the pin size is 2.1mm. The key jack and keyer paddle jack are on the left side. Both may be connected and used randomly as you desire. This way, you are always ready for a new "SKCC" contact, as there is no need to reboot the transceiver in order to change from the keyer using paddles to a straight key. The transmitter output power is adjustable from a few milliwatts to 5 watts or more depending on the power supply. It should be possible to achieve the "1000 Miles per Watt" award with a station a few miles away by turning the power output down to a few milliwatts while maintaining contact! With a 12-volt supply, the output is at about 5 watts into a 50-ohm load. The final TO-220 RF transistor is rugged, and has survived delivering 5 watts continuous key down of periods of more than 5 minutes. This is of course not

recommended, but illustrates the ruggedness of the transmitter design. The side-tone that is heard while transmitting is the actual transmitted signal being heard by the receiver. If you match the audio tone of the received signal to the tone of the side-tone, you are guaranteed to be at zero beat with the station you are communicating with.

## Internal adjustments

There are five internally accessible adjustments: PA Bias, sidetone level, signal level LED sensitivity, audio bandpass filter frequency, and low battery detector threshold. The PA bias normally shouldn't need adjustment except at initial build. If your TR-35 is factory built, it would be rare that this control ever needs adjustment, other than if the final RF output transistor should need to be replaced (which would also be rare). The sidetone level pot may be adjusted to set the level your liking, and the low battery level pot can be set to a level consistent with the battery type you use. This level is usually set to about 9.5 volts on factory wired units. In order to access these adjustments, the plastic case bottom must be removed. To do this, remove the four black screws from the case front panel, and remove the board set along with the case top half by lifting up on the left side of the panel and maneuvering the BNC connector through its mounting hole. All five internal adjustments will now be accessible. The sidetone adjustment control is labeled on the left side of the lower board next to the power jack. The PA bias and battery detector adjustments are labeled on the rear of the lower board. To set the low battery point, adjust the input DC voltage to the battery voltage you wish to have the alarm flash, and adjust the low battery pot until the red LED alarm LED blinks. Be careful not to adjust the bias pot by mistake! See the on-line building procedures for instructions on setting the PA bias. The blue signal strength LED sensitivity pot is located between the bias and battery voltage warning adjustment pots and is attached to the upper board

Normally the pot is set for a faint glow of the blue signal quality LED with the RF gain control fully counterclockwise. The audio bandpass filter adjustment is labeled on the lower board at the front of the unit. The pot is adjusted for maximum sidetone audio volume while in narrow CW mode.

## TR-35 Connector Wiring

**Phones Jack:** The Phones (speaker) jack will work with a standard 3.5mm mono plug. A stereo plug may also be used if the connections are made to both the tip (+) and ring (-) or left and right pins. The outer shell (ground) pin of the Phones jack is not connected in the TR-35. The ring pin may be connected to the ground shell if desired. Note that connection must be made to the ring terminal of a stereo plug when used in the phones jack. Standard stereo headphones with a 3.5mm plug will work just fine because the left and right drivers will be in a series configuration due to the floating ground shell. Do not use a stereo plug where the tip and ring connections are tied together. This will cause a short to ground and badly stress the audio power amplifier!

**Key Jack:** The Key jack will work with either a mono or a stereo 3.5mm plug. The tip and ground shell connections are used. There is no connection to the Key jack ring terminal inside the TR-35

**Paddles Jack:** The Paddle jack requires a stereo 3.5mm plug. The tip is the “DIT” connection, and the ring is the “DAH” connection. The shell is the ground.

Note that you may connect both a straight key and paddles, and use either at any time. No need to reboot the transceiver to switch from one to the other. You’re always ready for an unexpected “SKCC” contact with the straight key!

**DC Power Jack:** This requires a standard 5.5mm plug with a 2.1mm center pin diameter. The polarity of the center pin is positive.