

Automatic-Matching 200-Memory Antenna Tuner

FC-40

Installation Instructions

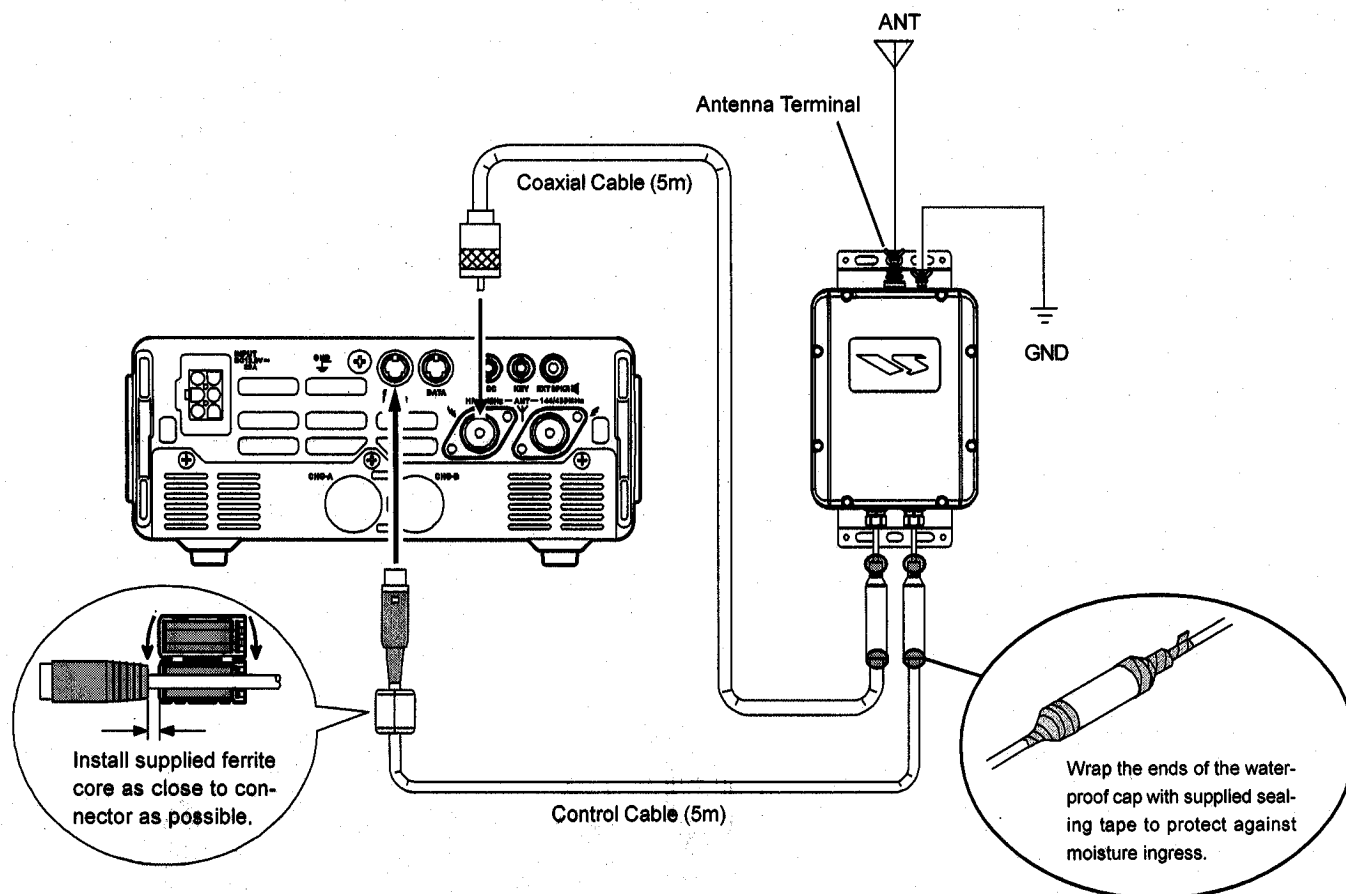
Thank you for your purchase of the model FC-40 Automatic-Matching 200-Memory Antenna Tuner. The FC-40 is a microprocessor-controlled antenna impedance matching network designed to provide wideband transmitting capability with the FT-897/FT-857 Series of transceivers, when used with an end-fed random wire or long whip antenna.

The FC-40 makes use of the control circuitry built into the transceiver, which allows the operator to control and monitor automatic operation of the FC-40, which mounts near the antenna feedpoint. The FC-40 uses specially selected, thermally-stable components, and is housed in a waterproof case to withstand severe environmental conditions with high reliability.

A carefully-chosen combination of solid-state switching components and high-speed relays allows the FC-40 to match a wide variety of antennas to within a 2:1 SWR on any amateur band frequency (160 through 6 meters), typically in less than eight seconds. Transmitter power required for matching may be as little as 4 - 60 Watts, and matching settings are automatically stored in memory for instant recall when the same frequency range is selected later.

Interconnections to FT-897 and FT-857

After mounting, connect the cables from the FC-40 to the ANT and TUNER jacks on the rear panel of the FT-897/FT-857 Transceiver.



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Mounting the FC-40

The mounting method for the FC-40 is determined by the antenna type and station location. In all installations, however, the FC-40 must be located at the intended feedpoint for the antenna. The drawings below show examples of placement of the FC-40 in typical mounting locations. Following are several important considerations to bear in mind during installation:

- The side of the FC-40 with the cables extruding is oriented downward (to minimize the chance of water leakage through the cable holes).
- The grounding wire (for monopoles) and part(s) of the antenna wire between the tuner terminals and the nearest antenna support should be as short as possible.
- The antenna must not touch anything except supporting insulators.
- If there is any chance of stress on the cables to the transceiver, they should be supported independently, with a slack loop between their support and the FC-40.

For base stations, the FC-40 may be mounted either on a flat surface such as the wooden board shown in Figure 1, or a 2.16" - 2.55" (55-65 mm) mast, using the supplied U-bolt kit shown in Figure 2.

For mobile installations, the FC-40 should be bolted to a flat surface using either bolts or self-tapping screws (Figure 3) inside the trunk or cabin, as close to the base of the antenna as possible. Note that it can be mounted horizontally if well protected from the weather.

After mounting, connect the cables from the FC-40 to the ANT and CAT/LINEAR jacks on the rear panel of the FT-897/-857.

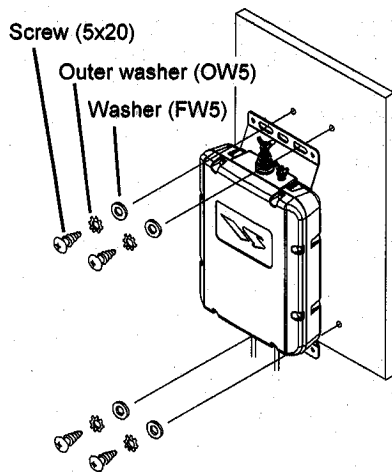


Figure 1

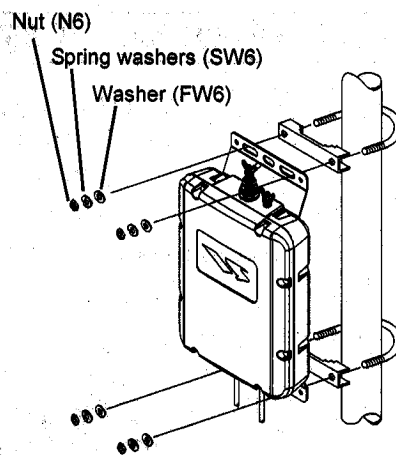


Figure 2

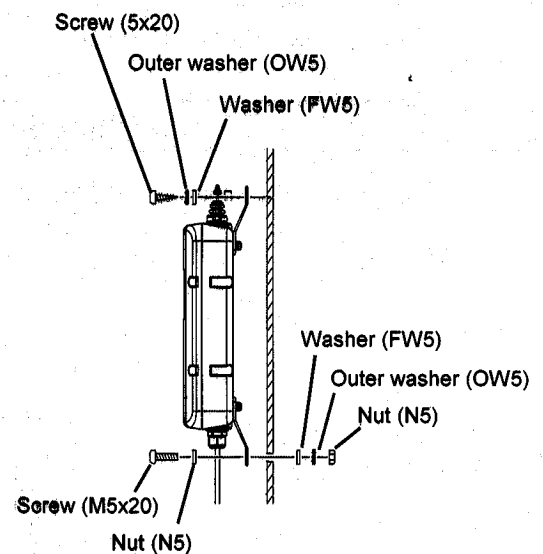
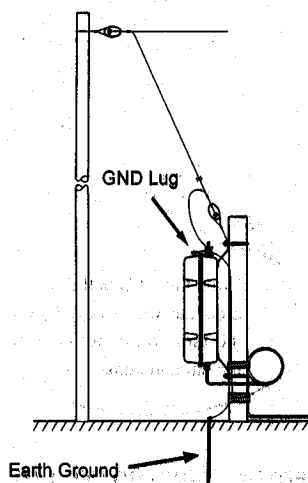
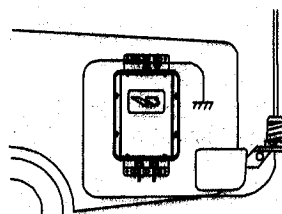


Figure 3

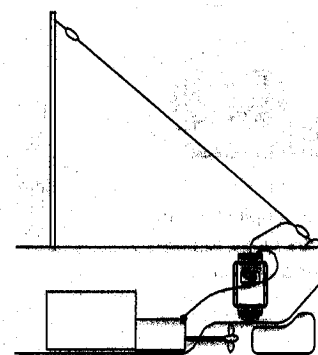


"L" Wire Monopole



Ground to Engine/Chassis

Car Mobile



Ground to Engine Block/Keel

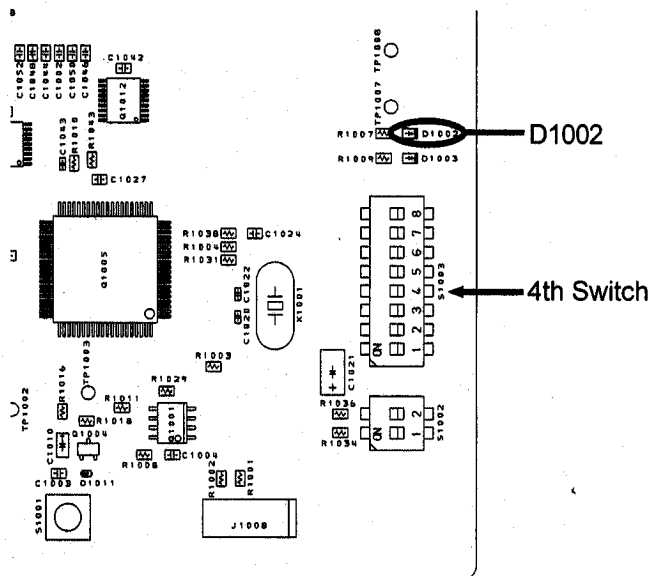
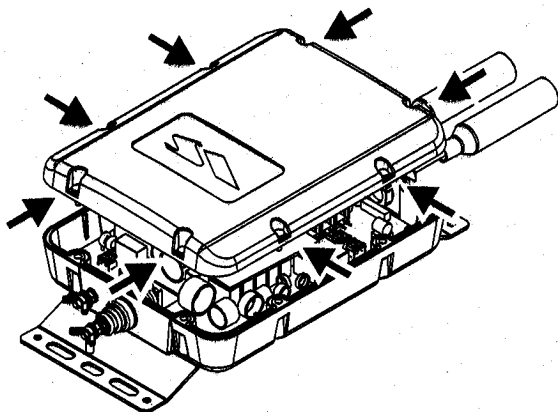
Ship Mobile

Microprocessor Resetting

By changing the configuration of an internal DIP switch, the microprocessor in the FC-40 may be reset. Do this in the event of erratic operation of the tuner, or to clear the tuner's memories.

Clearing Memory

1. Turn the FT-897/-857 **POWER** switch **OFF**.
2. Remove the 8 screws affixing the case of the FC-40, then remove the case.
3. Turn the 4th switch of S1003 to "on."
4. Turn the FT-897/-857 **POWER** switch **ON**.
5. D1002 will glow green briefly, then turn off. This confirms the resetting of the microprocessor.
6. Return the 4th switch of S1003 to "off."
7. Turn the FT-897/-857 **POWER** switch **OFF**.
8. Replace the case, using the 8 screws removed in step (2) above.



Cautions

- Please note the default positions of the internal DIP switch components. All switches, except for the 4th switch of S1003, are for factory setup use only, and they should not be touched. If you accidentally set a switch to the wrong position, please refer to the table below to correct the situation.

S1002

No.	Switch
1	OFF
2	OFF

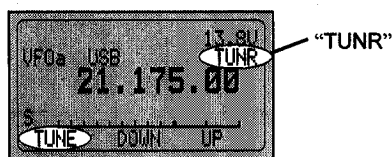
S1003

No.	Switch	No.	Switch
1	OFF	5	ON
2	OFF	6	ON
3	OFF	7	OFF
4	OFF	8	OFF

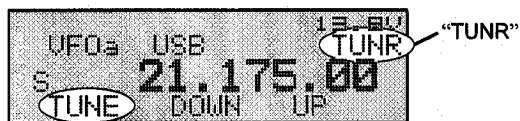
- Only connect cables to the FC-40 after switching the transceiver off.
- If the FC-40 doesn't tune even though you have pushed the TUNER switch of the FT-897/-857, it may be because the antenna or its coaxial cable has a serious problem (very high or low impedance due to "open" or "short"). Please check the antenna and coax if this happens.
- Take appropriate measures to ensure that there is no possibility that someone may come in contact with the antenna or FC-40 ANT terminal while your station is transmitting. Observe all practical and regulatory requirements for protecting yourself and the public from the effects of radio frequency radiation from your antenna system.

Tuner Operation

1. Press and hold in the **[F] (FUNC)** key for one second to activate the Menu mode.
2. Rotate the **MEM/VFO CH** (FT-857 Series: **SELECT**) knob to recall Menu Mode No-001 [EXT MENU], then rotate the **DIAL** to change the setting to "ON" to enable the extended Menu Mode.
3. Rotate the **MEM/VFO CH** (FT-857 Series: **SELECT**) knob to recall Menu Mode No-020 [CAT/LIN/TUN]. The default setting for this Menu is "CAT." Rotate the **DIAL** to change the setting to "TUNER."
4. Press and hold in the **[F] (FUNC)** key for one second to save the new setting and exit, then turn the transceiver off.
5. Set up the **FC-40** and **FT-897** per the illustration, then turn on the transceiver's power again. **Do not set up the FC-40 and FT-897 before changing the Menu Mode, item No-020 [CAT/LIN/TUN].**
6. Press and hold in the **[F] (FUNC)** key for one second to activate the Menu mode.
7. Rotate the **MEM/VFO CH** (FT-857 Series: **SELECT**) knob to recall Menu Mode No-085 [TUNER/ATAS]. The default setting for this Menu is "OFF." Rotate the **DIAL** to change the setting to "TUNER."
8. Press and hold in the **[F] (FUNC)** key for one second to save the new setting and exit.
9. Press the **[F] (FUNC)** key, as needed, to recall Multi Function Row "k" [TUNE, DOWN, UP].
10. Press the **[A](TUNE)** key to turn the **FC-40** on. "Parentheses" will appear on both sides of the "TUNE" indication, and "TUNR" will appear on the LCD.



FT-897 Series



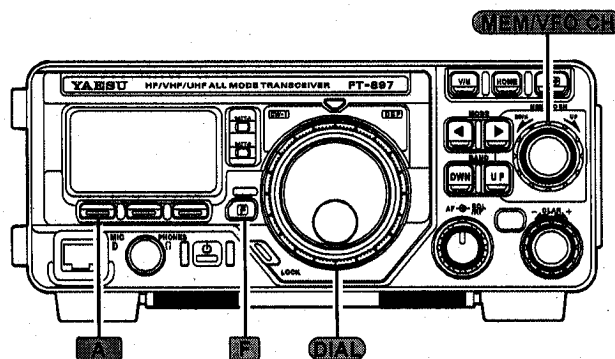
FT-857 Series

11. Press and hold in the **[A](TUNE)** key to initiate automatic tuning. The **FT-897/857** Series transmitter will be activated, a carrier signal will be sent out, and the coils and capacitors in the **FC-40** will be selected/adjusted for optimum SWR. When tuning is complete, the transmission will cease, and you will be ready for operation on this frequency.

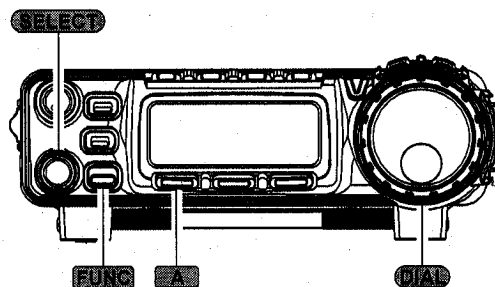


Tuning data will be stored in the FC-40's Memory system. See the discussion below for details on how this works.

If using the FC-40 with the FT-897 under internal battery (FNB-78) power, the FC-40 may not operate properly if the battery voltage is low.



FT-897 Series



FT-857 Series

Important!

The **FC-40**, working in concert with the **FT-897/857** Series, can store impedance matching data in its micro-computer memory, so as to provide instant adjustment as you transmit in different areas of a particular band. A total of 200 memories are provided, with the capability to resolve new tuning data every 10 kHz. A few guidelines should be noted regarding the **FC-40**'s memory system:

Tuning data is stored when you make an active effort to store it by pressing and holding in the **[A](TUNE)** key for one second. Although the tuner will automatically activate itself if it encounters more than 2:1 SWR, this memory will not be stored unless you have pressed the **[A](TUNE)** key for one second. This allows you to store your favorite operating frequency areas into tuner memory without tying up memory space with matching data on seldom-used frequencies.

If the **FC-40** cannot resolve a satisfactory match because the SWR is above 2:1, the tuning process will stop, and no memory data will be stored. However, you may wish to move frequency a few kHz, then press the **[A](TUNE)** key again for one second, as slight changes in the reactance may allow a match to be obtained. Then go back to the original frequency and try again.




If the impedance encountered by the **FC-40** exceeds 2:1, and the "HSWR" icon is illuminated, the microprocessor will not retain the tuning data for that frequency, as the **FC-40** presumes that you will want to adjust or repair your antenna system so as to correct the high SWR condition.

Specifications






Operating Frequency Range:	1.8 - 54 MHz with 20+ m end-fed wire 7 - 54 MHz with YA-007 HF 2.5 m Mobile Whip Antenna
Input Impedance:	50 Ohms
Maximum Power:	100W (3 minutes maximum continuous TX)
Matched SWR:	2.0:1 or less (if antenna is not exact multiple of $\lambda/2$)
Tune-up Power:	4 - 60 W
Tune-up Time:	8 seconds maximum
Impedance Matching Memories:	200 channels
Power supply:	13.8V DC \pm 15% (supplied from transceiver)
Case Size (WHD):	9" x 7" x 2.1" (228 x 175 x 55 mm)
Weight:	2.6 lbs. (1.2kg)

Specifications subject to change without notice of obligation.

Supplied Accessories

Control Cable 5m	1
Coaxial Cable (5D-2V) 5m	1
Sealing Tape 50cm	1
Ferrite Core	1
U-bolt Kit	
•U-bolts	2
•Plate	2
•Washers (FW6) 	4
•Spring washers (SW6) 	4
•Nuts (N6) 	4

Machine Screws, Nuts & Washers (set)

•Screws (5 x 20) 	4
•Screws (M5 x 20) 	4
•Outer washer (OW5) 	4
•Washers (FW5) 	8
•Nuts (N5) 	4

FC-40 Circuit Diagram

