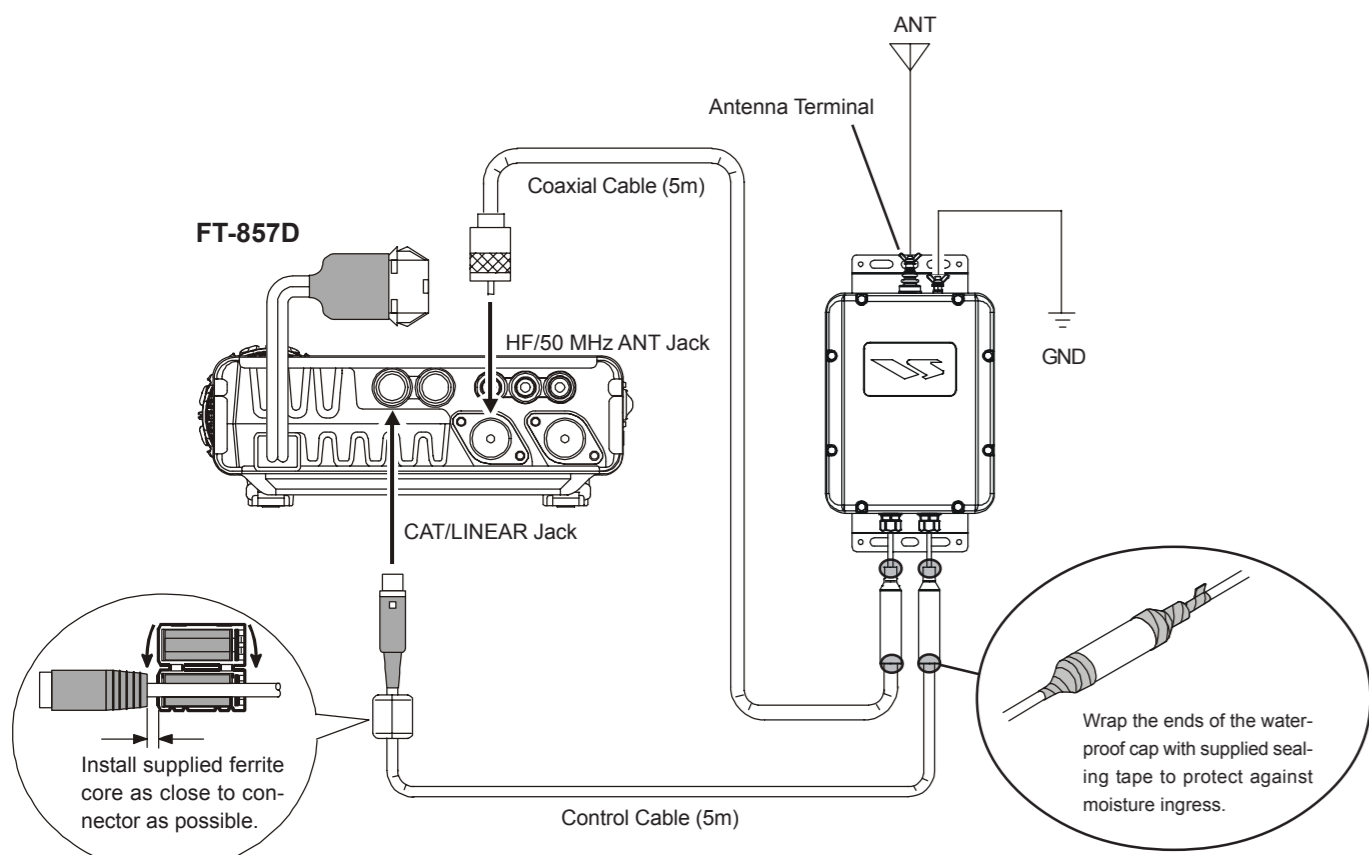
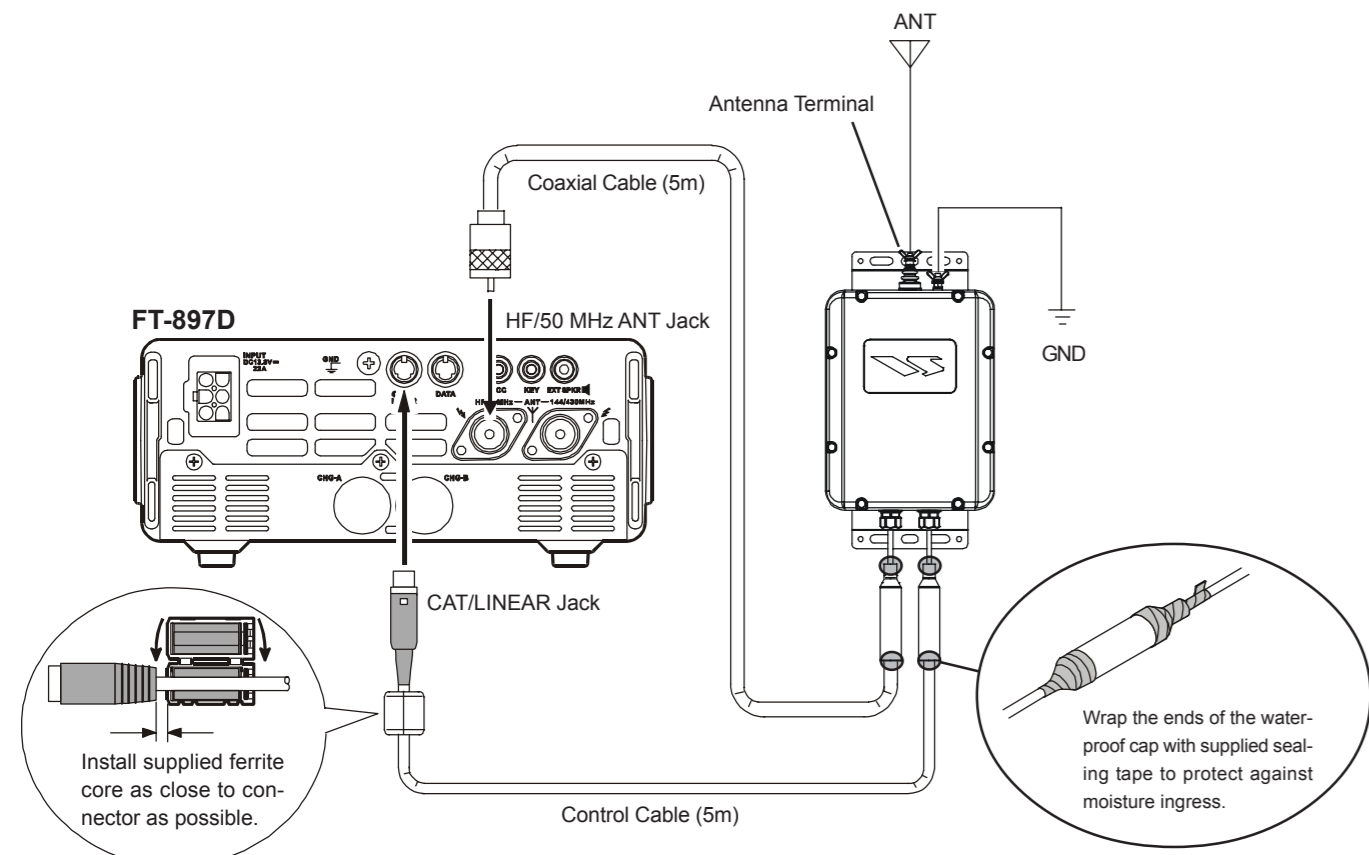
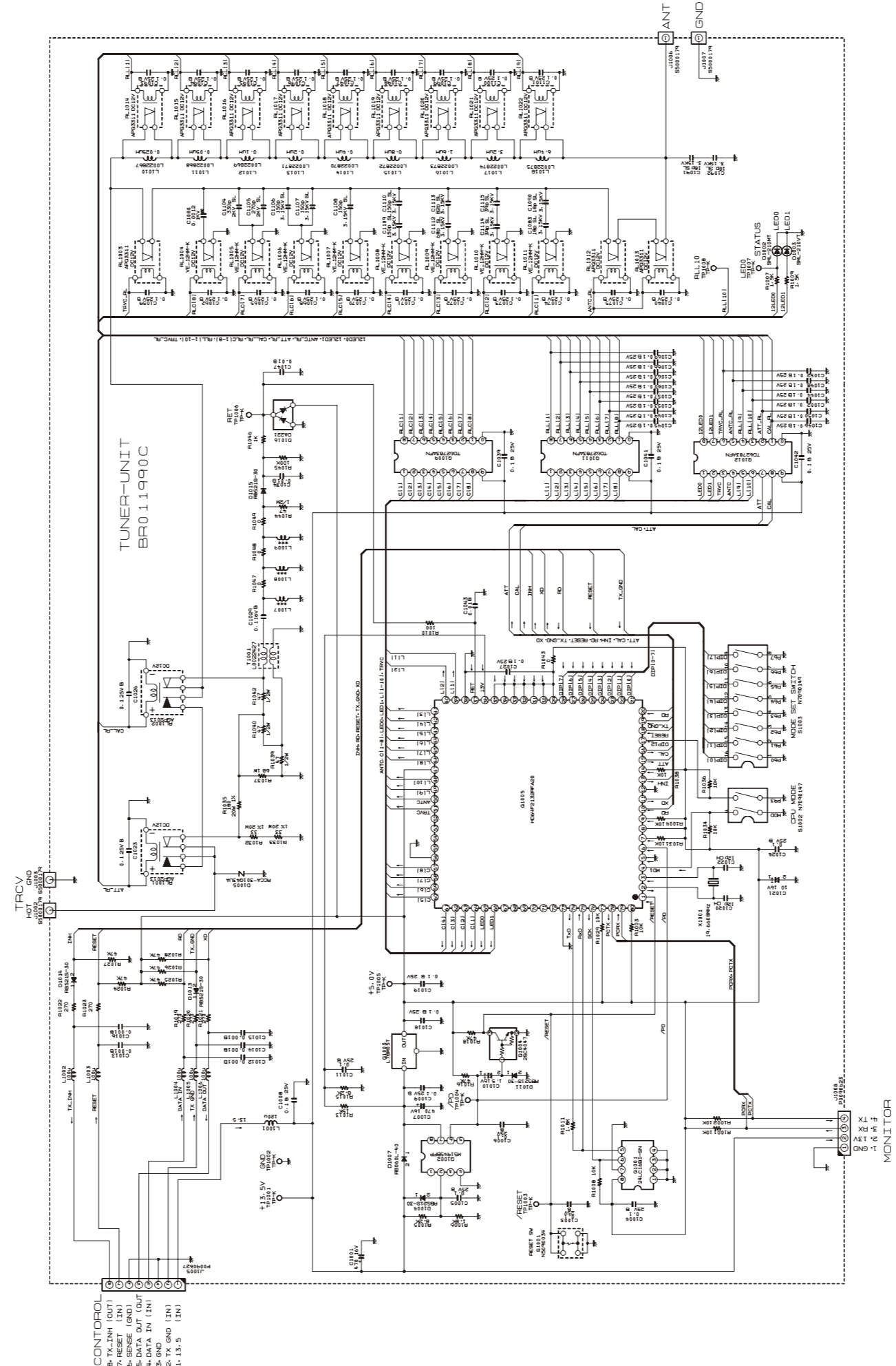


## Interconnections to FT-897D and FT-857D

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



## FC-40 Circuit Diagram



## 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 microprocessor controlled antenna impedance matching network is designed to provide wideband transmitting capability for many Vertex Standard / Yaesu 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 1.6 - 54 MHz, 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. The FC-40 is a current feed design and may not be able to match frequencies that are near 1/2 wavelength (or multiple) of the antenna element.

\*: Check with your Vertex Standard /Yaesu dealer for a list of current transceivers that may be used with the FC-40 Antenna Tuner.

### Specifications

Operating Frequency Range:	1.6 - 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 Input Power:	100 W (3 minutes maximum continuous TX)
Matched SWR:	2.0:1 or less (if antenna is not near a 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	Machine Screws, Nuts & Washers (set)	
Coaxial Cable (5D-2V) 5m .....	1	• Screws (5 x 20) .....	4
Sealing Tape 50cm .....	1	• Screws (M5 x 20) .....	4
Ferrite Core .....	1	• Outer washer (OW5) .....	4
U-bolt Kit		• Washers (FW5) .....	8
• U-bolts .....	2	• Nuts (N5) .....	4
• Plate .....	2		
• Washers (FW6) .....	4		
• Spring washers (SW6) .....	4		
• Nuts (N6) .....	4		

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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 the FC-40, connect the cables from the FC-40 to the ANT and TUNER (or CAT/LINEAR) jacks (depends on the transceiver) on the rear panel of the transceiver. Refer to the transceiver's Operating Manual for details of the interconnections with the transceiver. If you use the FC-40 with the Yaesu FT-857D/-897D transceiver, refer to the instructions on the opposite page of this manual for interconnection details.

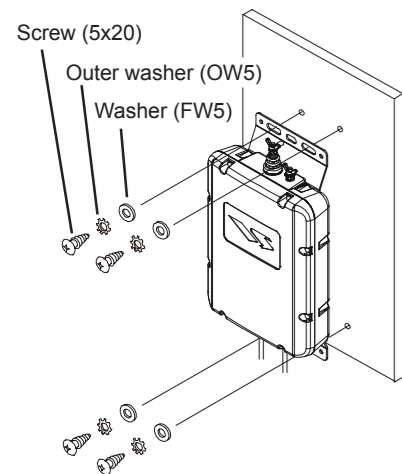


Figure 1

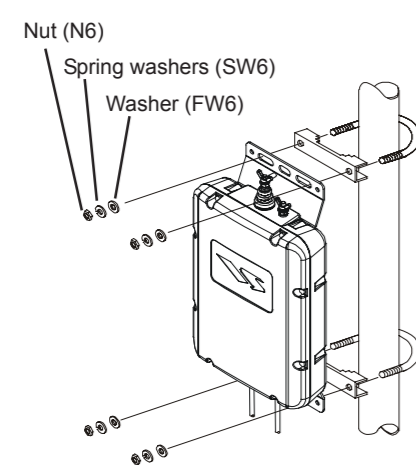


Figure 2

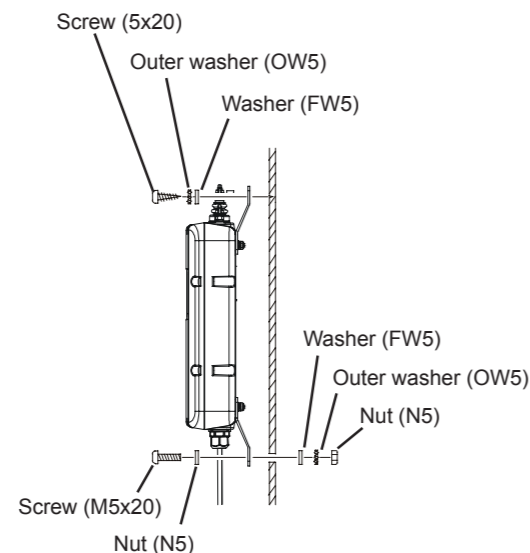
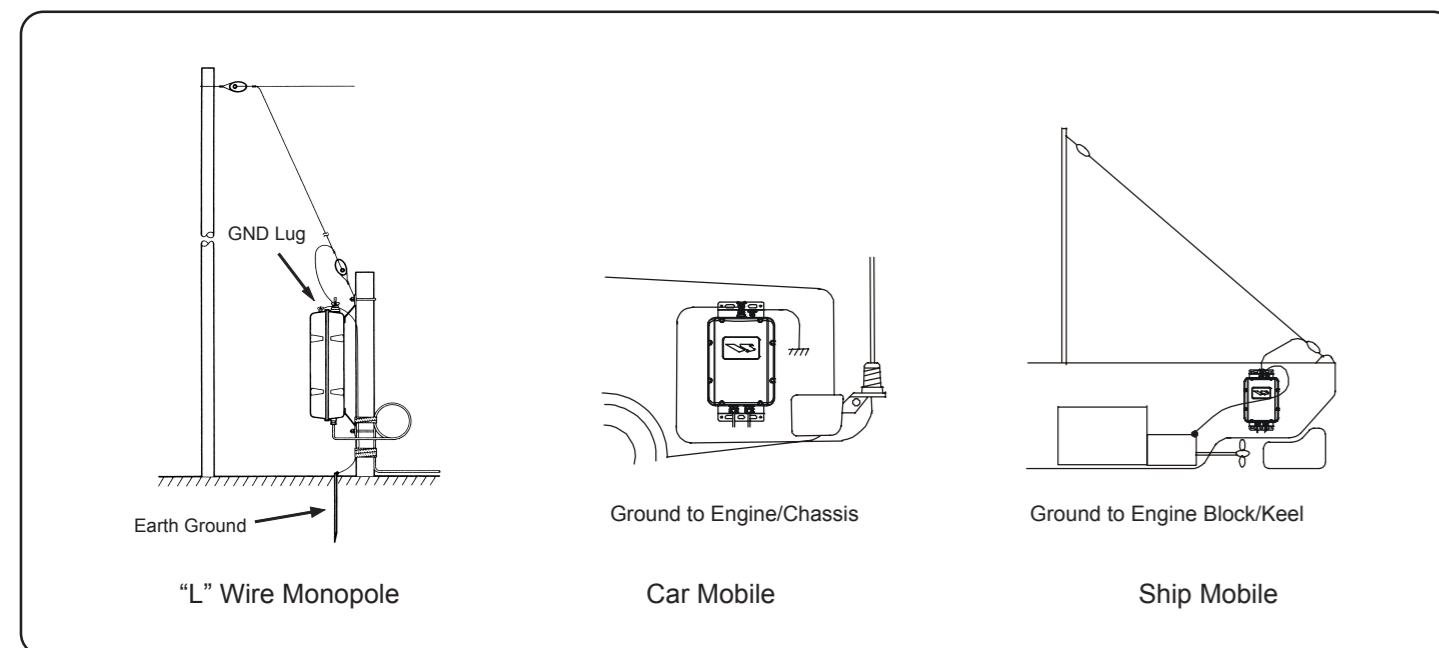


Figure 3



## Tuner Operation

Please see your transceiver's Operating Manual for operation with the FC-40 Tuner.

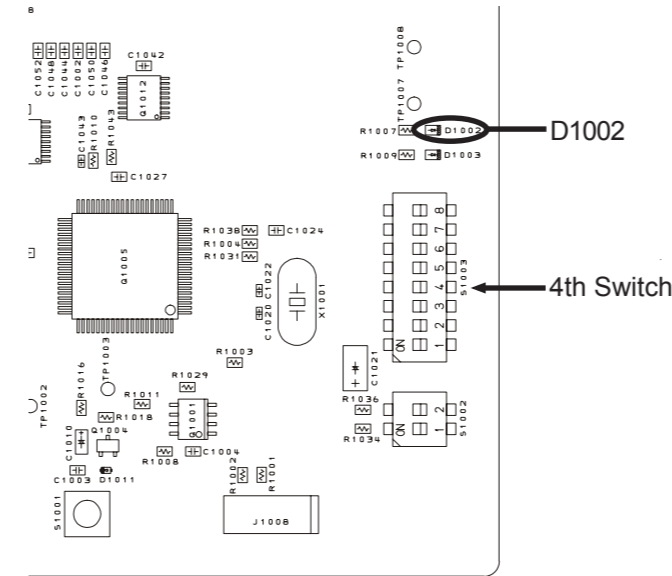
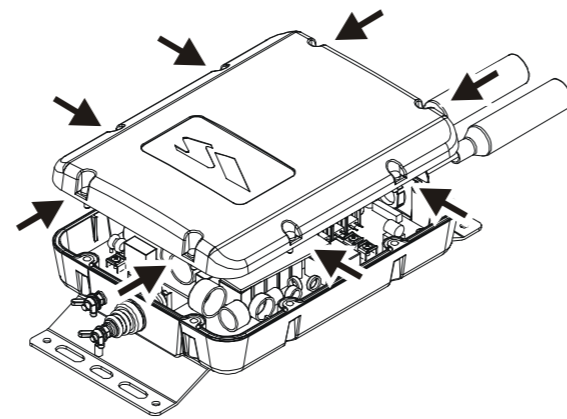
See the instructions at the right side of this page for operation of the FC-40 with FT-857/-897 transceivers.

## 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 "off" the transceiver.
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 on the transceiver.
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 "off" the transceiver again.
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.

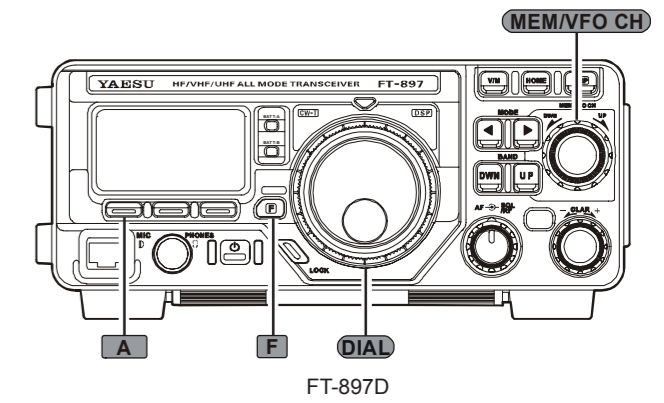
S1002	
No.	Switch
1	OFF
2	OFF

S1003			
No.	Switch	No.	Switch
1	OFF	5	ON
2	OFF	6	ON
3	OFF	7	OFF
4	OFF	8	OFF

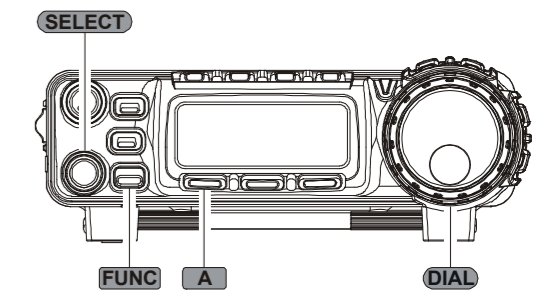
- Only connect cables to the FC-40 after switching the transceiver off.
- If the FC-40 doesn't tune even though you have pushed the TUNER switch of the transceiver, it may be because the antenna or its coaxial cable has a serious problem (very high or low impedance due to "open" or "short") or (the antenna element is near 1/2 wavelength or multiple of the desired frequency). 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.

## FT-857D/-897D 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-857D: **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-857D: **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-897D/-857D** per the illustration on the opposite page of this manual, then turn on the transceiver's power again. **Do not set up the FC-40 and FT-897D/-857D 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-857D: **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-897D



FT-857D

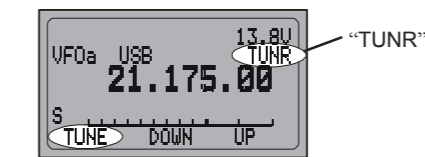
### IMPORTANT!

The **FC-40**, working in concert with the **FT-897D/-857D** transceiver, 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.



FT-897D



FT-857D



**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-897D under internal battery (FNB-78) power, the FC-40 may not operate properly if the battery voltage is low.**

11. Press and hold in the **[A]**(TUNE) key to initiate automatic tuning. The **FT-897D/-857D** 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.