FT-73R
OPERATING
MANUAL

E2280100D 8704-VK

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FT-73R
COMPACT 70cm CPU-CONTROLLED
FM TRANSCEIVER

The FT-73R is an ultra compact FM hand-held for the 70cm amateur band that offers the convenience of very small size and light weight combined with the features and flexibility of performance only possible with microprocessor control. A variety of recharge-able battery packs and dry cell cases are available, providing up to five watts of RF power output.

The transceiver is housed entirely in zinc and aluminum die-cast alloys, and battery cases are constructed of thick high-impact polycarbonate plastic, for professional-grade ruggedness required in the most demanding applications. Rubber gasket seals around all external controls and connectors keep out dust and rain or spray, assuring years of reliable operation even in harsh environ-ments.

The latest microprocessor-controlled features are all included: like ten memory channels which each store repeater shifts, CTCSS (Continuous Tone Controlled Squelch System) tone frequencies and tone encode/decode selections*; busy channel and priority channel scanning; 1MHz up/down stepping; plus a top panel rotary dial for memory and frequency selection. Seven of the memories can also be programmed for non-standard repeater shifts. The LCD (Liquid Crystal Display) shows six frequency digits, memory channel selec-tion, and CTCSS tone frequency during tone selection*, and in-cludes a bargraph S/PO meter.

The FTT-4 DTMF keypad unit is available as an option, along with a full line of battery chargers, soft cases, and accessories for mobile operation.

Please read this manual carefully to gain a clear understanding of the features of the FT-73R.

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* CTCSS tone features require optional FTS-12 Tone Squelch Unit.

§1 SPECIFICATIONS

§1.1 GENERAL

Frequency coverage (MHz):
440 to 449.9875 (version A)
430 to 439.9875 (versions B, C & X)

Channel steps:
12.5 & 25 kHz

Standard repeater shift:
±5 MHz (versions A & X)
±7.6 MHz (version B)
±1.6 MHz (version C)

Emission type:
G3E

Supply voltage:
6.0 to 15.0 VDC

Current consumption:
Standby (Saver ON) 19 mA;
Receive   150 mA;
Transmit (5W RF) 1600 mA;
Transmit (2W RF) 1100 mA

Antenna (BNC jack):
YHA-46 rubber flex antenna

Case size (WHD):
55 x 122 x 32mm w/FNB-/FBA-9
55 x 139 x 32mm w/FNB-/FBA-10
55 x 188 x 32mm w/FNB-11

Weight (approx):
430g w/FNB-10
550g w/FNB-11

RF Power Chart

Battery Type	RF Output (watts)
(Dry Cell Cases)	
FBA-9 (6 x 'AAA' cells)	1.0
FBA-10 (6 x 'AA' cells)	1.5
(Ni-Cd Packs)	
FNB-9 (7.2V, 200 mAh)	1.5
FNB-10 (7.2V, 600 mAh)	2.0
FNB-11 (12V, 600 mAh)	5.0

§1.2 RECEIVER

Circuit type:
Double-conversion superheterodyne

Sensitivity:
better than 0.25uV for 12dB SINAD

Adjacent channel selectivity:
better than 60dB

Intermodulation:
better than 65dB

Audio output:
0.4W @8 ohms for 5% THD (12V)

§1.3 TRANSMITTER

Power output:
(see RF Power Chart)

Frequency stability:
better than ±5 ppm

Modulation system:
variable reactance

Maximum deviation:
±5 kHz

FM Noise:
better than -40dB @ 1 kHz

Spurious emissions:
better than 60dB below carrier

Audio distortion:
less than 5% @ 1 kHz,
with 3 kHz deviation

Microphone type:
2-kilohm condenser

Burst tone:
1750 Hz (versions B & C only)

§1.4 ACCESSORIES & OPTIONS

FNB-9	7.2V, 200mAh Ni-Cd Battery Pack
FNB-10	7.2V, 600mAh Ni-Cd Battery Pack
FNB-11	12V, 600mAh Ni-Cd Battery Pack
FBA-9	Dry cell Battery Case for 6 AAA-size cells
FBA-10	Dry cell Battery Case for 6 AA-size cells
NC-18B	117 VAC Compact Wall Charger for FNB-11
NC-18C	220-234 VAC Compact Wall Charger for FNB-11
NC-27B	117 VAC Compact Wall Charger for FNB-9
NC-27C	220-234 VAC Compact Wall Charger for FNB-9
NC-28B	117 VAC Compact Wall Charger for FNB-10
NC-28C	220-234 VAC Compact Wall Charger for FNB-10
NC-29	Desktop Quick Charger for FNB-9/-10/-11
PA-6	Mobile DC Adapter/Charger for FNB-9/-10/-11
CSC-22	Soft Case for Transceiver with FNB-/FBA-9
CSC-23	Soft Case for Transceiver with FNB-/FBA-10
CSC-24	Soft Case for Transceiver with FNB-11
CSC-25	Soft Case for Transceiver with FTT-4 & FNB-/FBA-10
CSC-26	Soft Case for Transceiver with FTT-4 & FNB-11
FTT-4	DTMF Keypad Encoder
MMB-32	Mobile Hanger Bracket
MH-12A2B	External Hand Speaker/Microphone
YHA-46	Rubber flex antenna
FTS-12	Subaudible CTCSS Tone Squelch Unit

Specifications may be subject to change without notice or obligation. Availability of accessories may vary: some accessories are supplied as standard per local regulations and requirements, others may be unavailable in some regions. Check with your Yaesu dealer for new additions to the above list.

§2 CONTROLS & CONNECTORS

§2.1 TOP PANEL
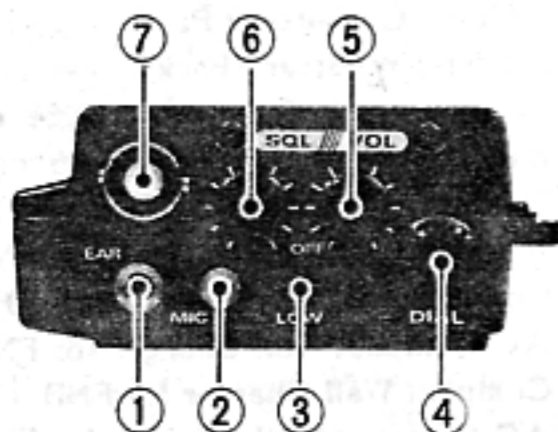
(1) EAR Jack

This 2-conductor mini phone jack provides audio output for an external earphone or the optional MH-12A2B Speaker/Mic. When a plug is installed in this jack the front panel loudspeaker is disabled.

(2) MIC Jack

This 2-conductor micro-mini phone jack accepts microphone input from the MH-12A2B or other external source. When a plug is installed in this jack the front panel microphone is disabled.

(3) LOW Power Output Button

Keep this button depressed whenever low power is sufficient for communications. Low power is 200 to 500 mW, depending on battery voltage.

(4) DIAL Rotary Selector

This 20-position detented rotary switch tunes the operating (or CTCSS tone) frequency or selects the memory channels, according to which function is selected by the keys on the front panel. This knob duplicates the functions of the Up and Down arrow keys for operating convenience.

(5) VOL (OFF) Control

This control adjusts the volume of the receiver. Turn this control to the fully counterclockwise position (into the click stop) to turn the transceiver OFF.

(6) SQL Control

This control sets the threshold level at which received signals (or noise) open the noise squelch. For prolonged battery life and squelch sensitivity when the FTS-12 Tone Squelch Unit is not installed, set this control from counterclockwise just to the point where noise is silenced (and the BUSY/ON AIR indicator on the front panel is off) when the channel is clear.

(7) Antenna Jack

This BNC jack accepts the supplied YHA-46 rubber flex antenna, or any other antenna designed to provide 50-ohm impedance on the 70cm band.
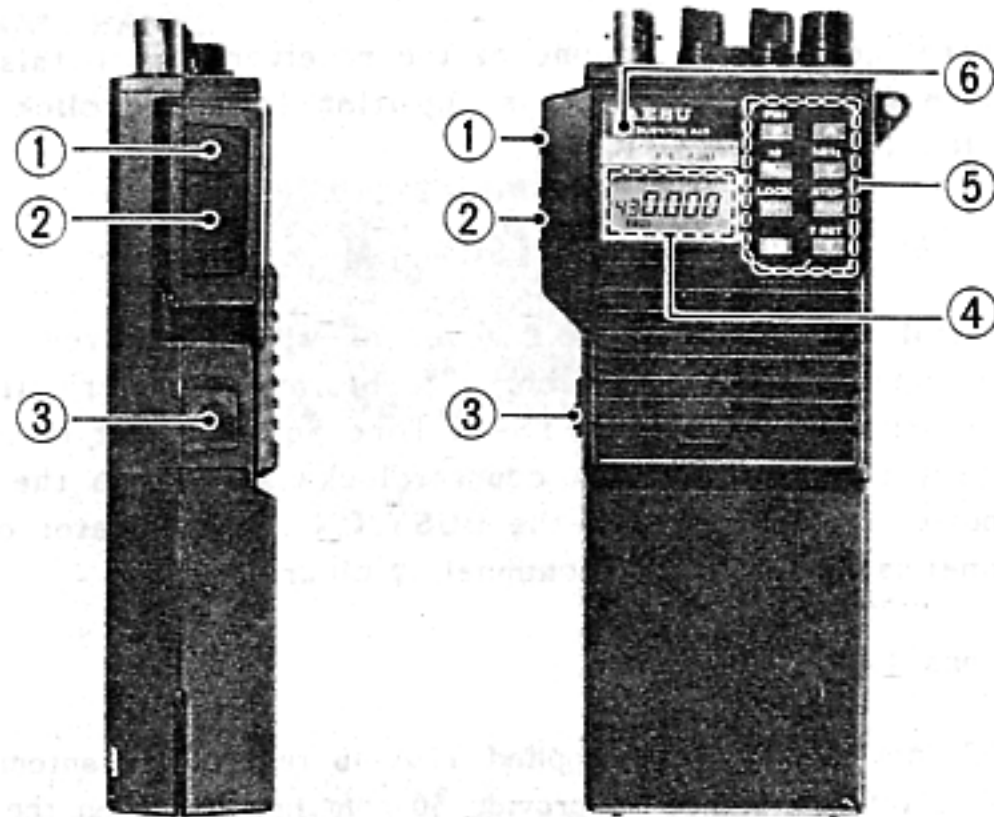
(1) Monitor (Burst) Button

In the 'A' and 'X' versions (without Tone Burst), this button provides a convenient way to open the noise squelch momentarily without disturbing the setting of the SQL control. In the 'B' and 'C' versions, this button activates the 1750 Hz Burst tone generator when pressed together with the PTT button.
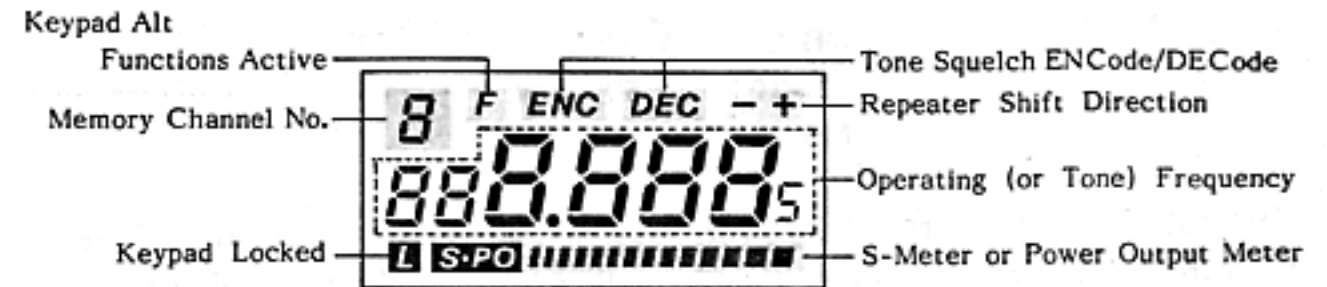
(2) PTT Button

Press and hold this (Push-to-Talk) button to transmit. The BUSY/-ON AIR indicator glows red while transmitting.

(3) Unlock Lever

Slide this mechanical lever upward to release the battery for removal.

(4) LCD (Liquid Crystal Display)

The display shows the selected operating conditions as indicated in the following diagram:

(5) Keypad

These eight keys select the various operating features of the transceiver during reception. A beep will sound whenever one of the keys is pressed. The labels on the faces of the keys indicate their primary functions, while the labels above six of the keys indicate alternate functions, which are activated by pressing the [F] key first, and then the other key within four seconds. For descriptive purposes in this manual, all key label references are enclosed in square brackets []. Throughout this manual, primary key functions are referred to by the labels on the keyfaces, except as follows:

    ⬛ is referred to as [DOT]

    ⬛ is referred to as [UP]

    ⬛ is referred to as [DOWN]

Alternate key functions are referenced by the alternate label (above the key), with '[F]+' in front of it to remind you to press [F] first. For example, '[F]+[UP]' indicates that you should press the [F] key, followed by the ⬛ key within four seconds. All key functions are described in detail in §4, and summarized on the FT-73R Operator's Quick Reference Card.

(6) BUSY/ON AIR Indicator Lamp

This LED indicator glows green when the noise squelch is open during reception, and red when transmitting.

§3 ACCESSORIES AND OPTIONS

The following rechargeable Ni-Cd battery packs are recommended for use with the FT-73R:

FNB-9   7.2V 200 mAh
FNB-10 7.2V 600 mAh
FNB-11 12V 600 mAh

The following battery cases are also available for operating the FT-73R with non-rechargeable dry cell batteries (not supplied):

FBA-9   Battery Case for 6 'AAA' (UM-4) batteries
FBA-10 Battery Case for 6 'AA' (UM-3) batteries

In some countries, one or more of the above may be supplied with the transceiver. If not, contact the nearest Yaesu dealer to purchase the desired battery pack or case. We do not recommend the use of any other type of battery with the FT-73R, and using another type may affect your warranty.

The FNB-9, FNB-10 and FNB-11 may be recharged either while attached to the transceiver or separately, using the battery chargers described on the following pages. Each Ni-Cd pack should be fully charged before it is used with the transceiver for the first time. Note that each of these three packs requires a different wall charger: NC-27B/C for the FNB-9, NC-28B/C for the FNB-10, and NC-18B/C for FNB-11. Make certain that you use the correct charger for each pack. The NC-29 Desktop Quick charger may be used with all of these Ni-Cd packs.

RF power output from the transmitter will differ in some cases according to which type of battery is used, as shown in the RF Power Chart in §1.

§3.2 BATTERY REMOVAL AND REPLACEMENT

1. Make sure that the VOL control is set into the OFF click-stop, and remove the protective soft or hard case, if used.

2. Grasp the upper portion of the transceiver with your left hand, so that your palm is over the speaker and your left thumb is on the UNLOCK button.

3. Move the UNLOCK button in the direction indicated by the small arrowhead, while using your right hand to slide the battery case toward the side with the UNLOCK button. The battery case should slide smoothly out of its track.

4. To open the FBA-9 or FBA-10 battery cases, place both of your thumbs on the mounting tracks on top of the case and gently pry the tracks apart. Install six batteries, paying attention to the polarity indicated inside the case. Always replace all six cells.

Do not attempt to open the FNB-9, FNB-10 or FNB-11 Ni-Cd packs.

5. To replace the battery case or Ni-Cd pack, repeat steps 2 and 3 above, simply sliding the battery case in the other direction after aligning the shorter side of the battery case with the track below the UNLOCK button.

§3.3 BATTERY CHARGERS

It is not necessary to remove the battery pack from the transceiver when charging, but transceiver operation may be impaired (by noise) while charging the battery. Therefore we recommend having an extra battery pack on hand so that the transceiver can be used while the spare pack is being charged.

Do not attempt to recharge dry cell batteries used in the FBA-9 or FBA-10.

NC-18B/C

The NC-18B (117VAC) and NC-18C (220—234VAC) are compact chargers for recharging the FNB-11 Ni-Cd battery pack from the AC line. A completely discharged pack requires approximately 15 hours to recharge with the NC-18B/C. Do not attempt to charge the FNB-9 or FNB-10 with the NC-18B/C, as the charging voltage is too high to safely charge those packs.

NC-27B/C

The NC-27B (117VAC) and NC-27C (220—234VAC) are compact chargers for recharging the FNB-9 Ni-Cd battery pack from the AC line. A completely discharged pack requires approximately 15 hours to recharge with the NC-27B/C. Do not attempt to charge the FNB-10 or FNB-11 with the NC-27B/C, as the charging voltage is not high enough.

NC-28B/C

The NC-28B (117VAC) and NC-28C (220—234VAC) are compact chargers for recharging the FNB-10 Ni-Cd battery pack from the AC line. A completely discharged pack requires approximately 15 hours to recharge with the NC-28B/C. Do not attempt to charge the FNB-9 or FNB-11 with the NC-28B/C, as the charging voltage is not correct for those packs.

NC-29 5-hour Quick Charger

The NC-29 is a universal battery charger with quick and trickle charging modes for the FNB-9, FNB-10 and FNB-11 Ni-Cd packs. The quick mode is automatically selected initially, to bring the battery pack up to full charge as fast as safely possible using an internal timer. Three LED indicators show elapsed charging time after 1, 3 and 5 hours. The charger then automatically reverts to the trickle mode (green LED indicator), to prevent self-discharge. The quick mode recharges a completely discharged battery in about 5 hours, depending on temperature.

CAUTION: When using the NC-29, do not remove and then replace a battery from the charger while it is charging, as this will reset the timer and may then overcharge the battery.

PA-6 Mobile DC-DC Adapter/Charger for FNB-9 and FNB-10

The PA-6 is a DC-DC adapter for use when operating the transceiver mobile, and for charging the FNB-9 or FNB-10 Ni-Cd battery packs. The PA-6 recharges a completely discharged FNB-9 in about 5 hours, or an FNB-10 in about 15 hours. Care must be used to avoid overcharging the batteries, as the PA-6 does not include a timer. The PA-6 cannot be used for charging the FNB-11, as the charging voltage is too low.

Use with 12-volt negative ground electrical systems only.

§3.4 MH-12A2B SPEAKER/MICROPHONE

The Speaker/Mic can be used to increase operating convenience and extend communications range and signal strength. It is equipped with a dual plug connector which mates with the EAR and MIC jacks on the top panel of the transceiver, disabling the internal speaker and microphone. The cable then allows the transceiver to be left clipped to the operator's belt, or to be held overhead above obstructions for improved performance, if required. For mobile operation with the MMB-32 Mobile Hanger, the transceiver can be left in the Hanger during operation.

The Speaker/Mic can be held close to your ear during reception; or if preferred, an external earphone can be connected to the transceiver via the Speaker/Mic plug, attenuating the audio from the speaker in the MH-12A2B. To transmit just hold the Speaker/Mic close to your mouth and close the PTT switch on the microphone.

§3.5 ANTENNA CONSIDERATIONS

While the supplied YHA-46 rubber flex antenna is convenient for short-range portable operation, the standard BNC connector allows for use of a higher gain antenna for extended range in base or mobile operation. However, any antenna used with the FT-73R must have an impedance close to 50 ohms on the 70cm amateur band. Also, if the antenna is connected with a feedline to the transceiver, use only good quality 50-ohm coaxial cable. To obtain a proper fit with some BNC plugs, it may be necessary to remove the rubber gasket around the antenna jack on the transceiver.

§3.6 FTS-12 TONE SQUELCH UNIT INSTALLATION

The FTS-12 is a subaudible CTCSS (Continuous Tone-Controlled Squelch System) which offers programmable selection of 37 tones for transmission and filter/detectors for reception. Transmit-only (encode) and transmit/receive (encode/decode) modes are selectable from keys on the transceiver.

Installation

Make sure the transceiver is off. Remove the hard or soft case, if used, and remove the battery pack. If the FTT-4 DTMF keypad is installed, follow procedure B below. If the FTT-4 is not installed, follow procedure A.

A. If FTT-4 is NOT Installed

1. Remove the four screws affixing the battery spring plate on the bottom of the transceiver and carefully remove the plate.

2. Locate the 1/8-watt, 22-kilohm resistor inserted in one side of the (unused) 10-pin connector in the compartment on the bottom of the transceiver, and pull the resistor out of the connector. It is not needed when the FTS-12 is installed.

CAUTION: if the FTS-12 is later removed, the 22-kilohm resistor must be replaced between pins 3 (red wire) and 5 (yellow wire).

3. Connect the plug in the transceiver to the FTS-12.

4. Locate the double-sided adhesive tape that is already installed inside the compartment on the bottom of the transceiver, and remove the paper cover from the tape. Then mount the FTS-12 by pressing the flat surface of the IC (on the FTS-12) against the tape (see the accompanying drawing).

5. Apply the (supplied) insulating adhesive tape to the battery spring plate.

6. Replace the battery spring plate and its four screws, and the battery pack.

Tone Squelch operation with the FTS-12 is described in §4.9.

B. If FTT-4 is Installed

1. Remove the four long screws at the corners on the bottom of the FTT-4. Using care not to stress interconnecting wires, separate the FTT-4 from the transceiver just enough to gain access to the compartment in the bottom of the transceiver.

2. Perform steps 2, 3 & 4 of Procedure A. The insulating tape supplied with the FTS-12 is not used when the FTS-12 is installed with the FTT-4.

3. Replace the FTT-4 and four screws removed in step 1, and then replace the battery pack.

Tone Squelch operation with the FTS-12 is described in §4.9.
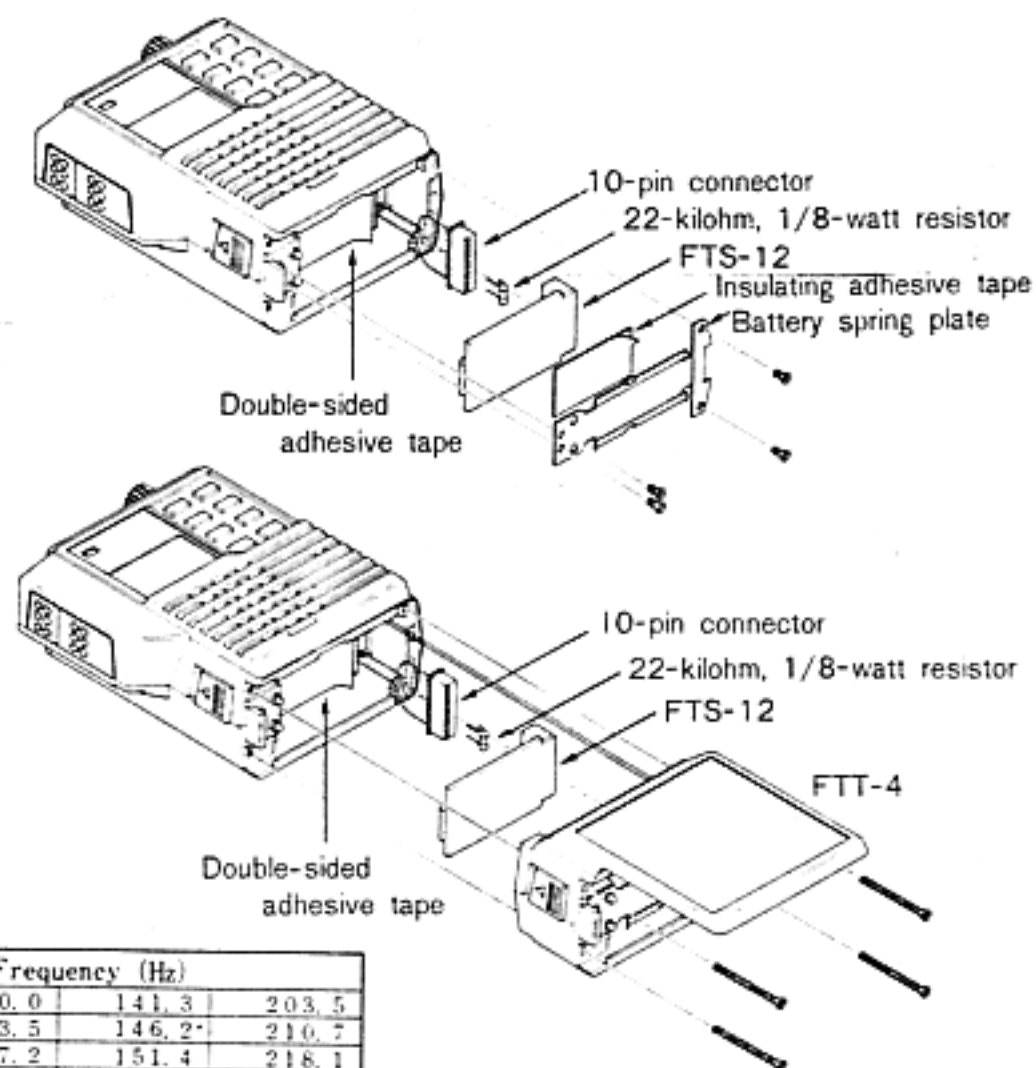
Tone Frequency (Hz)			
67.0	100.0	141.3	203.5
71.9	103.5	146.2	210.7
74.4	107.2	151.4	218.1
77.0	110.9	156.7	225.7
79.7	114.8	162.2	233.6
82.5	118.8	167.9	241.8
85.4	123.0	173.8	250.3
88.5	127.3	179.9	———
91.5	131.8	186.2	———
94.8	136.5	192.8	———

§3.7 FTT-4 DTMF KEYPAD INSTALLATION

The FTT-4 is a 16-key DTMF (Dual Tone Multi Frequency) keypad which generates EIA standard DTMF tone pairs when the keys are pressed during transmission (while the PTT switch is held). The audible tones are used for autopatching (remote radio access to the public telephone network), and for remote control of other DTMF-decoder-equipped devices. The FTT-4 may be installed on all versions of the FT-73R when used with the FNB-10 (or FBA-10) or FNB-11. Special soft cases are designed for use with the FTT-4; check with your Yaesu dealer about availability.

1. Make sure the transceiver is off. Remove the hard or soft case, if used, and remove the battery pack as described in §3.2.

2. Remove the four screws affixing the battery spring plate on the bottom of the transceiver, and carefully remove the plate. These four screws are not used when the FTT-4 is installed.

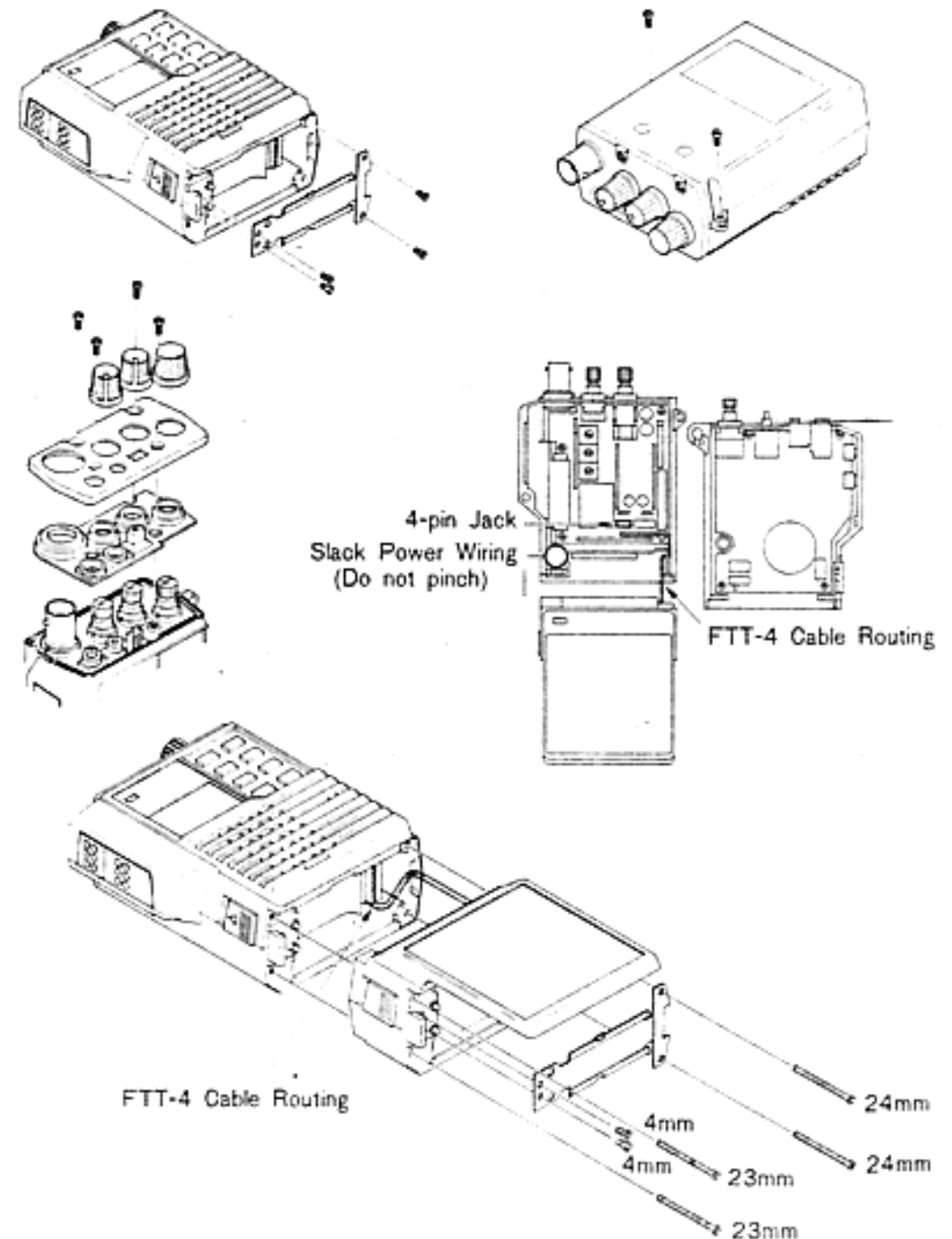3. Remove the four screws affixing the top panel, and carefully remove the panel.

Remove the two screws affixing the front and rear halves of the case, and gently separate the halves, using care not to stress the interconnecting wires.

Locate the empty 4-pin socket on the circuit board inside the rear half of the case. Route the wire from the FTT-4 against the inside surface of the rear cover, over the corner of the board, to the socket. Note this routing carefully as it is necessary to avoid interference with the PLL.

6. Replace the two screws affixing the front and rear halves of the case, and then the top panel and its four screws.

7. Install the battery spring plate on the bottom of the FTT-4 using the two short screws supplied with the FTT-4. These screws go in the two holes close together near the left side.

8. Mount the FTT-4 on the bottom of the transceiver using the four long screws provided: one in each corner (the two at the right go through the battery spring plate).

9. Reinstall the battery pack on the bottom of the FTT-4.

To send DTMF tones, press and hold the PTT switch with your thumb while pressing the FTT-4 keys.

4-pin Jack
Slack Power Wiring
(Do not pinch)

FTT-4 Cable Routing

FTT-4 Cable Routing

4mm
4mm
24mm
23mm
24mm
23mm

§4 OPERATION

This chapter describes the various transceiver functions in detail. After studying these descriptions, keep the FT-73R Operator's Quick Reference Card handy in case you need to refresh your memory.

§4.1 PRELIMINARY OPERATING INFORMATION

Before operating the transceiver for the first time, charge the battery pack completely (if using Ni-Cd batteries) as described in §3.3. If using the FBA-9 or FBA-10 battery case, install the batteries as described in §3.2.

Connect the YHA-46 rubber flex antenna to the antenna jack on the top of the transceiver. Never operate the transceiver without an antenna connected.

For now, do not connect the MH-12A2B Speaker/Mic (until you are familiar with basic operation).

Before proceeding, please read §2 if you have not already, to familiarize yourself with the functions of the controls. Note especially §2.2 item (5) on page 7, which describes the terminology used in this chapter when referring to the keys.

When the front panel keys are pressed during reception, a beep will sound. If the keypad beeper begins to sound continuously the battery pack should be recharged or batteries replaced.

Except for certain special cases mentioned later, the keys are disabled during transmission (those on the FTT-4 DTMF keypad, however, only operate during transmission).

If you have trouble getting the transceiver to work as described, see §4.10, 'In Case of Problems'.

§4.2 SQUELCH SETUP

Before turning on the transceiver, set the SQL control fully counterclockwise. Now rotate the VOL control out of the click-stop and adjust for a comfortable volume on the noise or received signal. The BUSY/ON AIR indicator LED should glow green. If a signal is present, rotate the DIAL selector on the top panel until a frequency is found where only noise is heard.

Rotate the SQL control clockwise just to the point where the noise is silenced and the LED is extinguished. If the SQL control is set further clockwise, sensitivity to weak signals will be reduced. Now, whenever a signal reaches the receiver that is strong enough to open the squelch, the indicator will glow green.

Note that while receiving, one or more bargraph segments may appear along the bottom of the display, indicating signal strength on the receiving frequency. This indication is not affected by the squelch setting, so even squelched signals will have some indication. If you notice more than one or two bargraph segments appearing while the squelch is still closed, try reducing the squelch control setting (if you want to hear weak signals).

The Monitor switch on versions A & X (just above the PTT switch) allows you to check for channel activity beneath the squelch level and to adjust the volume without having to adjust the squelch: just press the Monitor switch and the noise squelch will open (this does not open the tone squelch, however, if the FTS-12 Tone Squelch option is installed and activated).

The FT-73R includes an automatic power saver system, which reduces battery consumption by turning the receiver on (for 300 milliseconds) and off (for 600 milliseconds) when the channel is clear and the squelch is closed. The power saver will not affect your operation, except to prolong the charge life of your batteries.

§4.3 TRANSMITTING PROCEDURE

Press the LOW button to select low power output. When you wish to transmit, wait until the channel is clear (green LED off), and squeeze the PTT switch on the side of the transceiver while speaking into the microphone (just below the keypad on the front panel). During transmission the BUSY/ON AIR indicator will glow red, and the bargraph will now show relative transmitter power output. Release the PTT switch to receive.

If more power is required, set the LOW button to the undepressed position. However, whenever communication is possible with low power, keep the LOW button depressed to conserve battery life and minimize possible interference to other stations.

§4.4 FREQUENCY & STEP SELECTION

There are two ways to select your operating frequency: by turning the DIAL selector on the top panel, or with the [UP] and [DOWN] keys*. For continuous tuning, press and hold the [UP] or [DOWN] key for more than ½-second. The transceiver must be in the Dial mode, which can be selected if in the Memory mode by pressing the [D/MR] key. If no Memory number is present in the upper left-hand corner of the display, the Dial mode is selected.

Channel steps are 12.5 or 25 kHz. To change from one step size to the other press [F]+[STEP]*. When a 12.5 kHz step channel is selected, a small .5 kHz digit is displayed at the right end of the frequency.

One-Megahertz giant steps are also available: just press [F]+[UP] or [F]+[DOWN] (and hold the second key for repeated stepping).

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* if nothing happens when you press a key, see if there is a small 'L' at the lower left corner of the display. If so, press [F]+[LOCK] to unlock the keys.

§4.5 MEMORY STORAGE & RECALL

The FT-73R offers ten programmable memory channels, numbered 0 through 9. When in the Memory mode, the Memory number appears in the upper left corner of the display. To store a frequency in memory:

(1) Select the desired frequency in the Dial mode as described above,

(2) Press [F]+[M] (the Memory number will blink) and select the desired Memory number for storage using the DIAL selector or [UP]/[DOWN] keys,

(3) Press [D/MR] to store the Dial frequency into the selected Memory: the Memory number will disappear, and operation will continue in the Dial mode.

Once the Memory number starts blinking in step (2), you have a maximum of four seconds between DIAL selections or keystrokes until you press [D/MR] in step (3). If you time out, a memory number will be displayed after you press [D/MR]. Simply start again at step (2). Remember that when you store data in memory, the data previously stored in that channel (if any) is erased.

EXAMPLE: to store 435.00 MHz (or 445.00 MHz) in channel 0

(1) Press [D/MR] once if a Memory number is displayed, to select the Dial mode. Then use the DIAL selector or [UP] and [DOWN] keys to select 435.000 (445.000) on the display.

(2) Press [F]+[M] and then rotate the DIAL knob until '0' is displayed (blinking) at the upper left corner.

(3) Press [D/MR]. There should now be no memory number displayed. If there is, you timed out.

To recall prestored memories press [D/MR], if necessary, to select the Memory mode (Memory number is displayed), and then rotate the DIAL selector or press the [UP]/[DOWN] keys, which select the memories when in the Memory mode (as opposed to frequency selection in the Dial mode). Only prestored memories are displayed: empty memories are skipped.

Note: Memory 0 is a special 'Call Channel Memory', which can be instantly recalled from any mode just by pressing [DOT]. Press [D/MR] when finished to return to the previously selected mode.

To exit the Memories and return to Dial mode, press [D/MR].

4.6 REPEATER OPERATION

Before activating repeater shift, tune the Dial mode to the frequency on which you receive the repeater's signals. Then press [RPT]: once for '+' shift (to transmit above your receive frequency by the standard shift for your version), and again for '-' shift (to transmit below your receive frequency). The standard repeater shifts for each version are shown in §1.3. Pressing [RPT] again will return to simplex. '+' or '-' is displayed at the upper right corner when standard repeater shift is selected, and when the PTT switch is pressed to transmit, the displayed frequency will shift up or down, if in band. If the resulting transmit frequency is outside of the ham band, 'Err' is displayed instead.

You can check the frequency to be used for transmission without pressing the PTT switch: just press [REV], to reverse transmit and receive frequencies. If two beeps sound and the frequency does not change, the repeater shift is out-of-band. If both frequencies are in band, the '+' or '-' displayed at the upper right will blink, signifying that the transmit and receive frequencies are reversed. Using this REVerse function also allows you to check the repeater input frequency to see if you can work a particular station direct (on a simplex frequency, of course). Press [REV] again to return to the original repeater shift.

Once standard repeater shift is activated in the Dial mode, it can be stored in any memory along with the frequency as described in §4.5. Then whenever that memory is recalled, the stored shift will be active (the '+' or '-' will be displayed). The REVerse function cannot be stored in memory, although both [RPT] and [REV] can be pressed to temporarily change repeater operation on that memory: the new setting will not be stored. Repeater shift functions can also be activated temporarily on simplex memories, if required.

§4.6.1 Odd Splits

Memories 0 through 6 can also store an independent transmit frequency, for operation on repeaters with non-standard shift. To do this, first store the receive frequency as described in §4.5. Then retune the Dial to the desired transmit frequency, and repeat the storage procedure, but this time hold the PTT switch at the last step (when you press [D/MR] the last time while the Memory number is blinking). Now when you recall the memory, '-+' will be displayed together at the upper right. The [RPT] key will be disabled while operating on the odd-split memory, but the [REV] key will still function as described above.

§4.7 SCANNING

Before starting the scanner, make sure the SQL control is set to squelch off the noise on a clear channel (§4.2). As with frequency selection, two different modes of scanning are available: band scanning or memory scanning. In both modes, scanning is manually activated and deactivated by the [UP] or [DOWN] key. Just press and hold the key for more than one half second to start the scanner. If the transceiver is in the Dial mode, band scanning will result. If a memory number is displayed, the transceiver is in the Memory mode, and only prestored memories will be scanned.

The scanner will pause on any channel where a signal is found strong enough to open the squelch, and will resume scanning about two seconds after the channel becomes clear. To stop the scanner, press any one of [UP], [DOWN], [D/MR] or the PTT switch.

For memory scanning, it is sometimes useful to be able to scan only certain memories. To use this feature, you can 'hide' any memory from the scanner (except Memory 0) without erasing it altogether. To hide a memory, press [F]+[D/MR], select the memory to hide, and press [F]+[D/MR] again while the Memory number is blinking. The display reverts to memory 0, and the hidden memory can no longer be selected or scanned.

To unmask a hidden memory, just repeat the same steps you took to hide it: press [F]+[D/MR], select the Memory number to unmask, and press [F]+[D/MR] again.

§4.8 PRIORITY CHANNEL MONITORING

The Priority function allows periodic checking for activity on Memory 1 while operating on the Dial frequency or other memories. When a signal appears on Memory 1 while receiving, operation will automatically shift to that memory, for as long as a carrier is received. If you transmit while the squelch is open on Memory 1, priority monitoring is cancelled and operation stays on Memory 1.

The squelch must first be preset (§4.2), and the frequency to be monitored must be stored in Memory 1 (§4.5). Press [D/MR] to operate on the Dial, or else select the memory you want to operate on, and then press [F]+[PRI]. A 'P' will appear in the memory window at the upper left corner of the display, and about every five seconds the displayed frequency will shift to Memory 1 briefly while the the receiver checks for a signal.

As long as no signal appears on Memory 1 to open the squelch, you can tune, transmit and receive on the Dial, or select and operate on other memories (although the memory number is not displayed). If a station you wish to talk with appears on Memory 1, press the PTT switch momentarily while receiving his signal, to stop priority checking on Memory 1.

Otherwise, to cancel priority monitoring, press [D/MR].

Note that you can use any other Memory as a priority channel in place of Memory 1 in the above procedure when operation is to be on the Dial.

§4.9 TONE SQUELCH OPERATION

The FT-73R can be used to silently monitor for calls on busy channels when the optional FTS-12 Tone Squelch Unit is installed. A general description and installation instructions are in §3.6.

To check and optionally set the tone frequency, press [F]+[T SET]. The tone frequency will be displayed (in Hz), with a leading zero if that tone selection is a high-Q type. To change the selected tone frequency, rotate the DIAL selector or press UP or DOWN until the display shows the tone frequency you require (the display will step through the standard EIA tones). Press [T] to return to the operating frequency display when the tone frequency is selected.

To activate the tone squelch functions press [T]. With one press, 'ENC' (encode) will be displayed and the tone generator will be activated for transmission. Press [T] again and both 'ENC' and 'DEC' (decode) will be displayed together as the tone squelch system is activated for both transmission and reception (only signals sending the matching tone frequency will open the squelch). Pressing [T] once more disables tone squelch features.

Once you have the tone squelch set up the way you want it, you can store it in memory (or the call channel) by pressing [F]+[M], select the memory to store, and [M] again. Afterwards, to change a setting stored in memory, just recall the memory, reset the tone frequency or function, and press [F]+[M] and [M].

FT-73R operation is not complicated, but it is still possible to get lost, at least until you have had the chance to learn the various functions of the keypad and display. If the display shows nothing at all, check the power switch (VOL control), and if necessary, remove the battery pack and check that the contacts are clean. If all appears to be physically in order, recharge or replace the batteries.

Fortunately, the display itself includes enough symbols and function indicators to let you know what is going on as long as power is applied, so it is well worthwhile to study the display diagram on page 7 carefully. For example, if the frequency display changes unexpectedly when you transmit (or if 'Err' appears), check for a small '+' or '-' at the upper righthand corner. Also, if only a few seemingly non-sensical digits appear, press [T] to disable the tone squelch setting feature.

Attempting an illegal command (such as activating the tone squelch when the FTS-12 is not installed), will cause two beeps to sound. If pressing a key appears to do nothing, first check for a small 'L' at the lower left, which indicates if the keypad is locked. If so, press [F]+[LOCK] to unlock the keys. If the 'L' is not there, press [D/MR], which will terminate any partially entered commands. If you still cannot enter data, check the ON AIR indicator to see if it is red, indicating that the transceiver is transmitting. Releasing the PTT switch should return the set to receive. If still nothing happens, switch the transceiver off, and then back on.

To avoid confusion resulting from inadvertent key presses, set the keypad lock on (press **F+LOCK**) if you set the transceiver down while it is on, and then remember to set the lock back off when you wish to enter data.

How long the batteries last between charges or replacement depends largely on your operating habits, and how you care for the battery pack (if using the FNB-9, FNB-10 or FNB-11 rechargeable Ni-Cds). The FT-73R offers a variety of ways to conserve battery consumption, and thus to extend the charge life of the batteries. Knowing how to use these features can be critical in emergencies.

Obviously the most effective way to save battery life is to always make sure that the set is switched off when not in use. This can also prevent serious damage that might result to the batteries if they are over-discharged.

Keeping the receiver squelched automatically activates the power saver function, which requires only about 15% of the power needed when receiving a signal or noise. So when listening for a call, choose a quiet frequency and set the squelch so that the receiver stays quiet on noise. The FTS-12 Tone Squelch option is useful for creating your own quiet channel if the entire band is crowded. Also, use the lowest possible volume setting when listening to signals. In noise environments, use an earphone or the YH-1 headset.
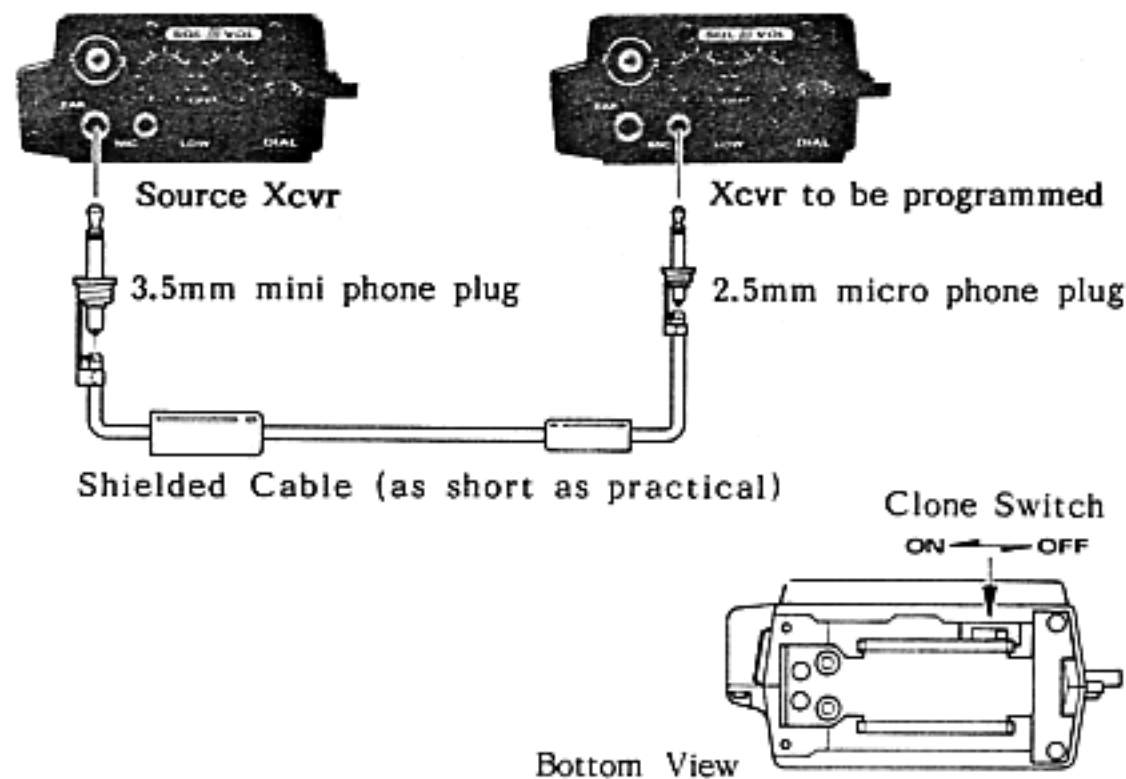
Keeping the LOW power switch on the top panel depressed requires about 60% less current when transmitting, so it is a good idea to develop the habit of always keeping this switch depressed, switching to high power only if low power fails to get through. If you live in a location where high power is almost always needed, consider replacing the antenna with a higher gain type instead of opting for high power (the result is the same). Make sure that any external antenna is designed for 50-ohms impedance on the operating frequency.

As the battery discharges, the voltage drop when transmitting will increase. As the battery voltage drops to around 6.5V, the beeper will begin to sound continuously, indicating that the batteries should be replaced or recharged as soon as possible.

If using rechargeable batteries, do not keep operating once the beeper has come on, as this could cause over-discharge of the cells and destroy the pack. However, recharging Ni-Cd batteries often, with little use in between charges, can also shorten the useful life of the cells. Therefore the best way to get the most out of your Ni-Cds is to use the battery pack just until the beeper comes on, and then immediately give the pack a full recharge. Unfortunately this is not always convenient, since it can be hard to tell exactly when the charge will run out. One solution to this problem is to carry an extra, fully charged pack with you if you do not wish to have operation interrupted.

. . . . ADDENDUM: MEMORY CLONING . . . .

A special function is available in this model which allows the memories stored in one transceiver to be automatically transferred to another set without re-entering data from the keypad. This function requires a user-constructed cable to connect the EAR jack on the source transceiver to the MIC jack on the transceiver to be programmed, and the CLONE switch inside the bottom of both transceivers to be set ON (see following diagrams).

Source Xcvr

Xcvr to be programmed

3.5mm mini phone plug

2.5mm micro phone plug

Shielded Cable (as short as practical)

Clone Switch

ON ◄— —► OFF

Bottom View

Cloning Procedure

Note: if the FTT-4 DTMF keypad is installed, it must be removed and reinstalled twice to access the clone switch after removing the battery pack, in which case it may be more practical simply to enter the memory data manually (and ignore this procedure).

(1) Turn the power switch off, and remove the battery packs. Locate the clone switch inside the bottom of each transceiver, and set to the ON position.

(2) Replace the battery pack and turn on the transceivers. All display digits will be blinking.

(3) Connect the EAR jack of the source transceiver to the MIC jack of the transceiver to be programmed.

(4) Press the down arrow key on the transceiver to be programmed. The display will now stop blinking, and remain either on or off (either is okay).

(5) Press the up arrow key on the source transceiver. The data from Memory channel 0 in the source transceiver will now be displayed on the transceiver being programmed, and all other Memory data will be transferred.

If 'Err' is displayed on the transceiver being programmed, switch the power off and then on again, and repeat steps (4) and (5).

(6) After the data has been transferred, turn the power switches off, remove the cable and battery packs, reset the clone switches to their original (OFF) positions, and replace the battery packs.