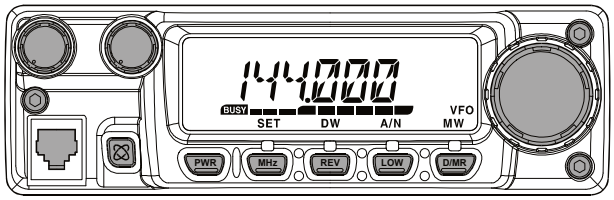
YAESU

FM TRANSCEIVER

FT-2800M

OPERATING MANUAL



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INTRODUCTION

The Yaesu **FT-2800M** is a deluxe, rugged FM mobile transceiver providing high power output and outstanding receiver performance for the 144 MHz Amateur band. Included in the **FT-2800M**'s feature complement are:

- ❒ 65 Watts of power output, with selection of four power levels for every operating situation.
- ❒ Expanded receiver coverage: 137-174 MHz.
- ❒ Keyboard entry of operating frequencies from the microphone.
- ❒ Excellent protection from receiver intermodulation distortion, thanks to Yaesu's renowned Advanced Track Tuning front end.
- ❒ 221 memories which can store repeater shifts, odd repeater shifts, CTCSS/DCS tones, and 6-character Alpha-Numeric labels for easy channel recognition.
- ❒ 10 NOAA Weather Broadcast Channels, with Weather Alert.
- ❒ Built-in CTCSS and DCS Encoder/Decoder circuits.
- ❒ The Smart Search™ feature, which automatically sweeps a band and loads active frequencies into dedicated memory banks, is ideal for identifying active repeaters when visiting a city for the first time.
- ❒ Extensive Menu system, which allows customization of a number of transceiver performance characteristics.
- ❒ The Yaesu-exclusive multi-function LCD display.

Additional features include a transmit Time-Out-Timer (TOT), Automatic Power-Off (APO), Automatic Repeater Shift (ARS), plus provision for reduction of the Tx deviation in areas of high channel congestion. And an RF Squelch circuit allows the owner to set the squelch to open at a programmable setting of the S-Meter, thus reducing guesswork in setting the squelch threshold.

Congratulations on your purchase of the **FT-2800M**! Whether this is your first rig, or if Yaesu equipment is already the backbone of your station, the Vertex Standard organization is committed to ensuring your enjoyment of this high-performance transceiver, which should provide you with many years of satisfying operation. Our dealer network and technical support personnel stand behind every product we sell, and we invite you to contact us should you require technical advice or assistance.

We recommend that you read this manual in its entirety prior to installing the **FT-2800M**, so that you fully understand the capabilities of your new transceiver.

SPECIFICATIONS

General

Frequency Range:	Tx 144 - 146 MHz or 144 - 148 MHz
	Rx 144 - 146 MHz or 137 - 174 MHz
Channel Step:	5/10/12.5/15/20/25/50/100 kHz
Standard Repeater Shift:	±600 kHz
Frequency Stability:	Better than ±10 ppm
	[–4 °F to +140 °F (–20 °C to +60 °C)]
Modes of Emission:	F2/F3
Antenna Impedance:	50 Ohms, unbalanced
Supply voltage:	13.8 V DC ±15%, negative ground
Current Consumption (typical):	Rx: less than 0.7 A, less than 0.3 A (squelched)
	Tx: 10 A (65 W)/7 A (25 W)/5 A (10 W)/4 A (5 W)
Operating Temperature Range:	–4° F to +140° F (–20° C to +60° C)
Case Size (WxHxD):	6.3” x 2.0” x 7.3” (160 x 50 x 185 mm) (w/o knobs)
Weight (Approx.):	4.0 lb (1.8 kg)

Transmitter

Output Power:	65 W/25 W/10 W/5 W
Modulation Type:	Variable Reactance
Maximum Deviation:	±5 kHz/±2.5 kHz
Spurious Radiation:	Better than –60 dB
Microphone Impedance:	2000 Ohms

Receiver

Circuit Type:	Double Conversion Superheterodyne
Ifs:	21.7 MHz & 450 kHz
Sensitivity (for 12dB SINAD):	Better than 0.2 µV
Selectivity (–6/–60dB):	12 kHz/28 kHz
IF Rejection:	Better than 70 dB
Image Rejection:	Better than 70 dB
Maximum AF Output:	3 W into 4 Ohms @10 % THD

Specifications subject to change without notice or obligation. Specifications guaranteed only within Amateur band.

ACCESSORY & OPTIONS

SUPPLIED ACCESSORIES

Microphone **MH-48A6J** 1
Mobile Mounting Bracket **MMB-83** 1
DC Power Cord w/Fuse 1
Spare Fuse 15 A 2
Base Station Feet 2
Operating Manual 1
Warranty Card 1

OPTIONAL ACCESSORIES

High-Power External Speaker	**MLS-100**
AC Power Supply	**FP-1023** (25 A: USA only)
AC Power Supply	**FP-1025A** (25 A)
AC Power Supply	**FP-1030A** (35 A)

INSTALLATION

This chapter describes the installation procedure for integrating the **FT-2800M** into a typical amateur radio station. It is presumed that you possess technical knowledge and conceptual understanding consistent with your status as a licensed radio amateur. Please take some extra time to make certain that the important safety and technical requirements detailed in this chapter are followed closely.

PRELIMINARY INSPECTION

Inspect the transceiver visually immediately upon opening the packing carton. Confirm that all controls and switches work freely, and inspect the cabinet for any damage. Gently shake the transceiver to verify that no internal components have been shaken loose due to rough handling during shipping.

If any evidence of damage is discovered, document it thoroughly and contact the shipping company (or your local dealer, if the unit was purchased over-the-counter) so as to get instructions regarding the prompt resolution of the damage situation. Be certain to save the shipping carton, especially if there are any punctures or other evidence of damage incurred during shipping; if it is necessary to return the unit for service or replacement, use the original packing materials but put the entire package inside another packing carton, so as to preserve the evidence of shipping damage for insurance purposes.

INSTALLATION TIPS

To ensure long life of the components, be certain to provide adequate ventilation around the cabinet of the **FT-2800M**.

Do not install the transceiver on top of another heat-generating device (such as a power supply or amplifier), and do not place equipment, books, or papers on top of the **FT-2800M**. Avoid heating vents and window locations that could expose the transceiver to excessive direct sunlight, especially in hot climates. The **FT-2800M** should not be used in an environment where the ambient temperature exceeds +140 °F (+60 °C).

SAFETY INFORMATION

The **FT-2800M** is an electrical apparatus, as well as a generator of RF (Radio Frequency) energy, and you should exercise all safety precautions as are appropriate for this type of device. These safety tips apply to any device installed in a well-designed amateur radio station.

⚠ Never allow unsupervised children to play in the vicinity of your transceiver or antenna installation.

⚠ Be certain to wrap any wire or cable splices thoroughly with insulating electrical tape, to prevent short circuits.

⚠ Do not route cables or wires through door jambs or other locations where, through wear and tear, they may become frayed and shorted to ground or to each other.

⚠ Do not stand in front of a directional antenna while you are transmitting into that antenna. Do not install a directional antenna in any location where humans or pets may be walking in the main directional lobe of the antenna's radiation pattern.

⚠ In mobile installations, it is preferable to mount your antenna on top of the roof of the vehicle, if feasible, so as to utilize the car body as a counterpoise for the antenna and raise the radiation pattern as far away from passengers as possible.

⚠ During vehicular operation when stopped (in a parking lot, for example), make it a practice to switch to Low power if there are people walking nearby.

⚠ Never wear dual-earmuff headphones while driving a vehicle.

⚠ Do not attempt to drive your vehicle while making a telephone call on an autopatch using the DTMF microphone. Pull over to the side of the road, whether dialing manually or using the auto-dial feature.

INSTALLATION

ANTENNA CONSIDERATION

The **FT-2800M** is designed for use with antennas presenting an impedance of near 50 Ohms at all operating frequencies. The antenna (or a 50 Ohm dummy load) should be connected whenever the transceiver is turned on, to avoid damage that could otherwise result if transmission occurs accidentally without an antenna.

Ensure that your antenna is designed to handle 65 Watts of transmitter power. Some magnetic-mount mobile antennas, designed for use with hand-held transceivers, may not be capable of withstanding this power level. Consult the antenna manufacturer's specification sheet for details.

Most all FM work is performed using vertical polarization. When installing a directional antenna such as a Yagi or Cubical Quad, be certain to orient it so as to produce vertical polarization, unless you are engaged in a special operating situation where horizontal polarization is used. In the case of a Yagi antenna, orient the elements vertically for vertical polarization; for a Cubical Quad, the feedpoint should be at the center of one of the vertical sides of the driven element (or at a side corner, in the case of a diamond-shaped Cubical Quad).

Excellent reference texts and computer software are available for the design and optimization of VHF antennas. Your dealer should be able to assist you with all aspects of your antenna installation requirements.

Use high-quality 50 Ohm coaxial cable for the lead-in to your **FT-2800M** transceiver. All efforts at providing an efficient antenna system will be wasted if poor quality, lossy coaxial cable is used. Losses in coaxial lines increase as the frequency increases, so an 8-meter-long (25' coaxial line with 1/2 dB of loss at 29 MHz may have a loss of 1.8 dB or more at 146 MHz; choose your coaxial cable carefully based on the installation location (mobile vs. base) and the overall length of the cable required (for very short runs of cable in a mobile installation, the smaller, more flexible cable types may be acceptable).

For reference, the chart at the right shows approximate loss figures for typically-available coaxial cables frequently used in VHF installations.

Loss in dB per 30 m (100 feet) for Selected 50-Ohm Coaxial Cables

(Assumes 50-ohm Input/Output Terminations)

CABLE TYPE	LOSS: 144 MHz
RG-58A	6.5
RG-58 Foam	4.7
RG-213	3.0
RG-8 Foam	2.0
Belden 9913	1.5
Times Microwave LMR-400	1.5
7/8" "Hardline"	0.7

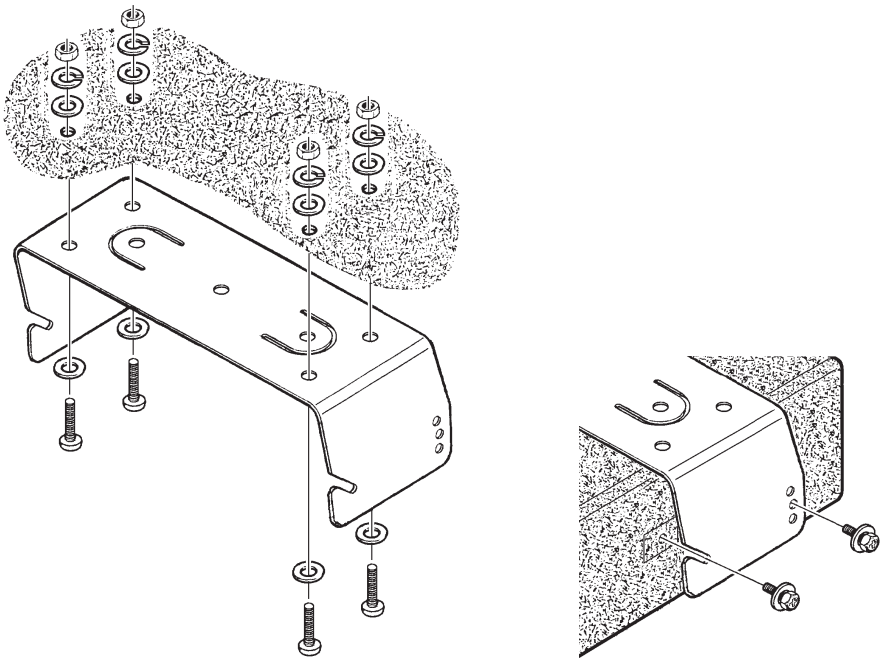
Loss figures are approximate; consult cable manufacturers' catalogs for complete specifications.

In outdoor installations, be certain to weatherproof all connectors thoroughly, as water entering a coaxial cable will cause losses to escalate rapidly, thus diminishing your communications effectiveness. The use of the shortest possible length of the highest quality coaxial cable that fits within your budget will ensure the best performance from your **FT-2800M**.

MOBILE INSTALLATION

The **FT-2800M** must only be installed in vehicles having a 13.8 Volt negative ground electrical system. Mount the transceiver where the display, controls, and microphone are easily accessible, using the supplied **MMB-83** mounting bracket.

The transceiver may be installed in almost any location, but should not be positioned near a heating vent nor anywhere where it might interfere with driving (either visually or mechanically). Make sure to provide plenty of space on all sides of the transceiver so that air can flow freely around the radio's case. Refer to the diagrams showing proper installation procedures.



MMB-83 Installation

INSTALLATION

MOBILE INSTALLATION

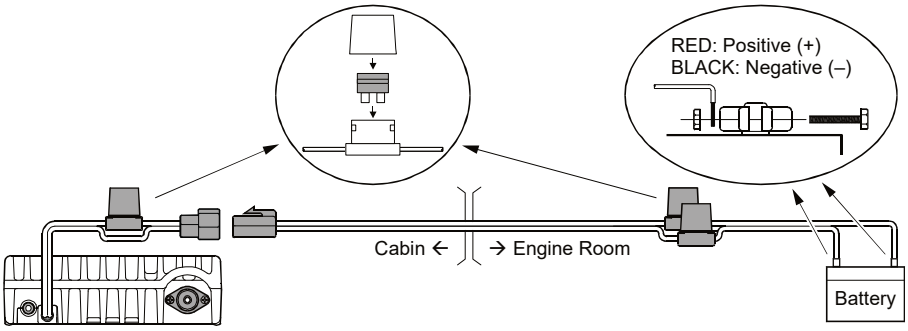
Mobile Power Connections

To minimize voltage drop and avoid blowing the vehicle's fuses, connect the supplied DC power cable directly to the battery terminals. Do not attempt to defeat or bypass the DC cable's fuse - it is there to protect you, your transceiver, and your vehicle's electrical system.

Warning!

Never apply AC power to the power cable of the FT-2800M, nor DC voltage greater than 15.8 Volts. When replacing the fuse, only use a 15-A fuse. Failure to observe these safety precautions will void the Limited Warranty on this product.

- ❒ Before connecting the transceiver, check the voltage at the battery terminals while revving the engine. If the voltage exceeds 15 Volts, adjust the vehicle's voltage regulator before proceeding with installation.
- ❒ Connect the **RED** power cable lead to the **POSITIVE** (+) battery terminal, and the **BLACK** power cable lead to the **NEGATIVE** (–) terminal. If you need to extend the power cable, use #12 AWG or larger insulated, stranded copper wire. Solder the splice connections carefully, and wrap the connections thoroughly with insulating electrical tape.
- ❒ Before connecting the cable to the transceiver, verify the voltage and polarity of the voltage at the transceiver end of the DC cable using a DC voltmeter. Now connect the transceiver to the DC cable.



Mobile Speakers

The optional **MSL-100** External Speaker includes its own swivel-type mounting bracket, and is available from your Yaesu dealer.

Other external speakers may be used with the **FT-2800M**, if they present the specified 4-Ohm impedance and are capable of handling the 3 Watts of audio output supplied by the **FT-2800M**.

BASE STATION INSTALLATION

The **FT-2800M** is ideal for base station use as well as in mobile installations. The **FT-2800M** is specifically designed to integrate into your station easily, using the information to follow as a reference.

AC Power Supplies

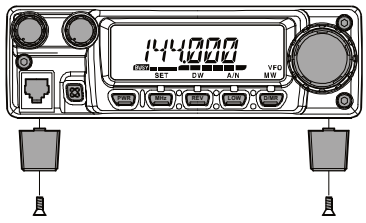
Operation of the **FT-2800M** from an AC line requires a power source capable of providing at least 15 Amps continuously at 13.8 Volts DC. The **FP-1023** and **FP-1030A** AC Power Supplies are available from your Yaesu dealer to satisfy these requirements. Other well-regulated power supplies may be used, as well, if they meet the above voltage and current specifications.

Use the DC power cable supplied with your transceiver for making power connections to the power supply. Connect the **RED** power cable lead to the **POSITIVE** (+) power supply terminal, and connect the **BLACK** power cable lead to the **NEGATIVE** (–) power supply terminal.

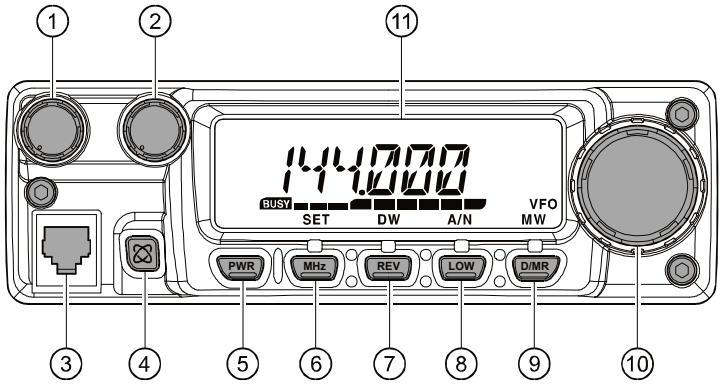
Base Station Feet

The supplied Base Station Feet allow the transceiver to be tilted upward for better viewing.

To install the Base Station Feet, remove the two screws affixing the front side of the bottom cover , then install the Base Station Feet using these screws.



FRONT PANEL CONTROLS & SWITCHES



① **VOL** Knob

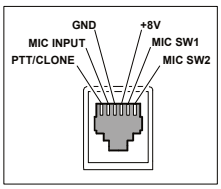
This control adjusts the audio volume level. Clockwise rotation increases the volume level.

② **SQL** Knob

This control is used to silence background noise on the receiver. It should be advanced clockwise just to the point where the noise is silenced (and the "BUSY" indicator on the display turns off), so as to provide the best sensitivity to weak signals.

③ Microphone Jack

Connect the supplied **MH-48A6J** Hand Microphone to this jack.



④ [⊠] Key

This key allows operation in conjunction with the Internet Connection feature.

⑤ **PWR** Key

Press and hold this key for one second to toggle the transceiver's power on and off.

⑥ [**MHz**(**SET**)] Key

This key allows tuning in 1-MHz steps (the MHz digits will blink on the display). If receiving on a memory, pressing this key the first time activates the Memory Tuning mode, and pressing it again enables 1-MHz steps.

Press and hold in this key for one second to activate the "Set" (Menu) mode.

⑦ [**REV**(**DW**)] Key

During split-frequency operation, such as through a repeater, this key reverses the transmit and receive frequencies.*

Press and hold in this key for one second to activate the Dual Watch feature, described in the Operation chapter ("**PRI**" will be displayed on the LCD, indicating "Priority Channel" monitoring).

* Using the Menu, the "Reverse" feature may be disabled in favor of one-touch a access to the "Home" Channel. See page 33 for details.

⑧ [**LOW**(**A/N**)] Key

Press this key momentarily to select the transmitter power output level.

The available power levels are:

HIGH (65W) → MID (25W) → LOW2 (10W) → LOW1 (5W)

To toggle the display between indication of the frequency and the channel's Alpha/Numeric label, press and hold in this key for one second while receiving on that memory channel.

⑨ [**D/MR**(**MW**)] Key

Press this key momentarily to switch the frequency control among the VFO, Memory System, and Home channel.

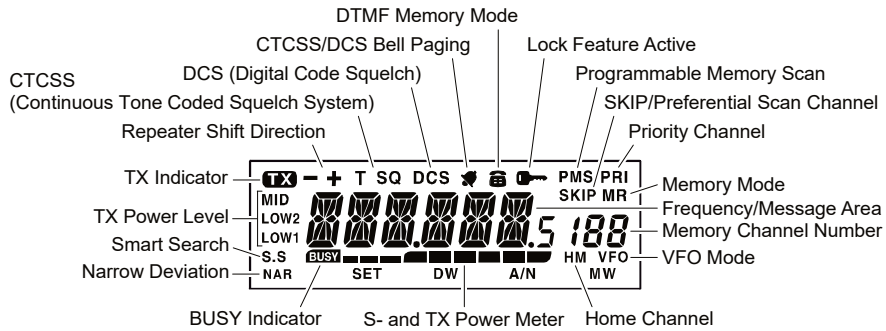
Press and hold in this key for one second to activate the Memory Storage mode.

⑩ **DIAL** Knob

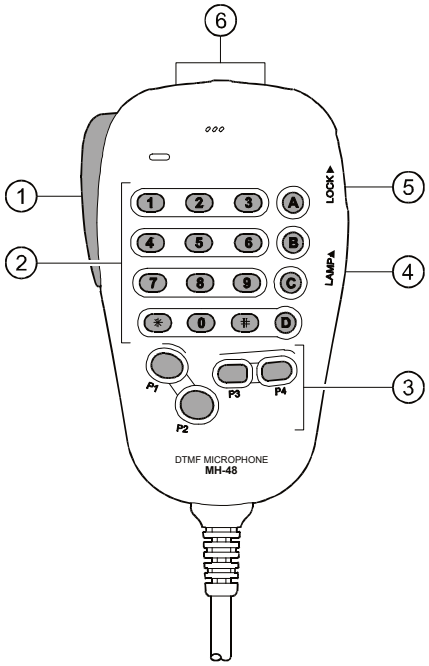
This 24-position detented rotary switch is used for tuning, memory selection and most function settings. The microphone [**UP**]/[**DWN**] buttons duplicate the functions of this knob.

⑪ Display

The main digits on the display may show operating frequency, memory name, or any of many parameters during Menu setup.



MICROPHONE SWITCHES



① **PTT** Switch

Press this switch to transmit, and release it to receive.

② Keypad

These 16 keys generate DTMF tones during transmission.

In the receive mode, these 16 keys can be used for direct frequency entry and/or direct numeric recall of the Memory channels.

The [**A**], [**B**], [**C**], and [**D**] keys, on receive, replicate the functions of the front panel keys ([**MHz**(**SET**)], [**REV**(**D/W**)], [**LOW**(**A/N**)], and [**D/MR**(**MW**)]). See the previous discussion.

③ [**P1**]/[**P2**]/[**P3**]/[**P4**] Buttons

These four keys are user programmable, allowing quick access to features used often. The default functions are described below.

[**P1**] button (**SQL OFF/T.CALL**)

In the USA version, pressing this button disables the noise and tone squelch systems. In the EXP version, pressing this button activates T.CALL (1750 Hz) for repeater access.

[**P2**] button (**S SRCH**)

Press this button to activate the Smart Search feature.

[**P3**] button (**T SRCH**)

Press this button to activate the Tone Search feature.

[**P4**] button (**WX CH**)

Press this button to recall the "Weather" broadcast channel bank.

You can reprogram the [**P1**], [**P2**], [**P3**], and [**P4**] buttons for other functions, if desired. See page 45 for details.

④ **LAMP** Switch

This switch illuminates the Microphone's keypad.

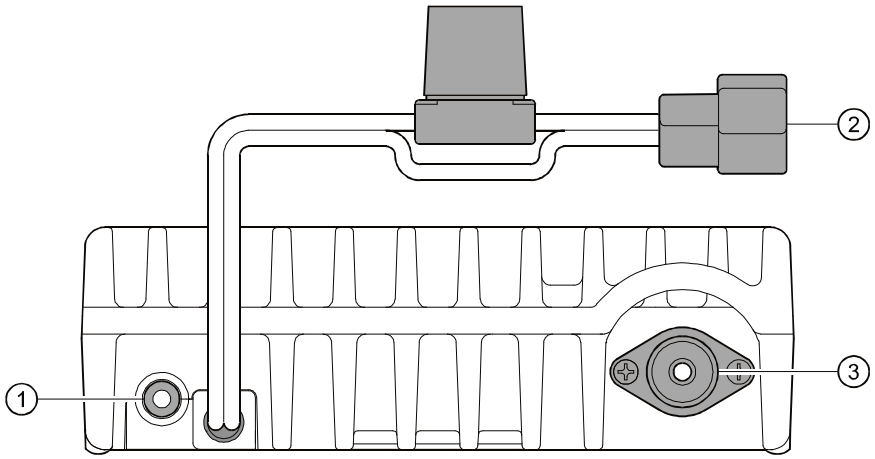
⑤ **LOCK** Switch

This switch locks out the Microphone's buttons (except for the keypad and **PTT** switch).

⑥ [**UP**]/[**DWN**] Button

Press (or hold in) either of these buttons to tune (or scan up or down) the operating frequency or through the memory channels. In many ways, these buttons emulate the function of the (rotary) **DIAL** knob.

REAR PANEL CONNECTORS



① **EXT SP** Jack

This 2-contact mini 3.5-mm mini phone jacks provide receiver audio output for an optional external speaker. The audio impedance is 4 Ohms, and the level varies according to the setting of the front panel's **VOL** control. Inserting a plug into this jack disables audio from the transceiver's internal speaker.

② **13.8V DC** Cable Pigtail w/Fuse

This is the power supply connection for the transceiver. Use the supplied DC cable to connect this pigtail to the car battery or other DC power supply capable of at least 10 Amperes (continuous duty). Make certain that the red lead connects to the positive side of the supply. The fuse is 15-A.

③ **ANT** Coaxial Socket

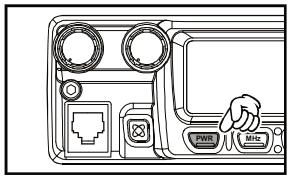
Connect a 144-MHz antenna to this type-M (SO-239) socket using 50-ohm coaxial cable and a type-M (pl-259) plug. Male sure the antenna is designed specifically for use on the operating frequency.

BASIC OPERATION



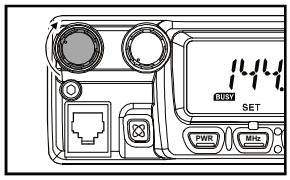
Hi! I'm R. F. Radio, and I'll be helping you along as you learn the many features of the FT-2800M. I know you're anxious to get on the air, but I encourage you to read "Basic Operation" section of this manual as thoroughly as possible, so you'll get the most out of this fantastic new transceiver. Now. . .let's get operating!

TURNING THE TRANSCEIVER ON AND OFF



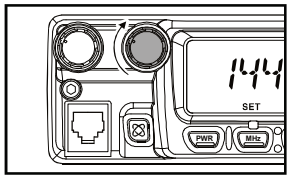
1. To turn the transceiver on, press and hold in the **PWR** key for one second.
   When you turn on the **FT-2800M**, the current DC supply voltage is indicated on the LCD for 2 seconds. After this interval, the display will switch its normal indication of the operating frequency.
2. To turn the transceiver off, again press and hold in the **PWR** key for one second.

ADJUSTING THE AUDIO VOLUME LEVEL



Rotate the **VOL** control to adjust the receiver volume. Clockwise rotation increases the audio output level.

ADJUSTING THE SQUELCH SETTING



Rotate the **SQL** control just to the point where the noise is silenced and the "BUSY" indicator on the display turns off. If the **SQL** control is set further clockwise, sensitivity to weak signals is reduced.

A special "***RF Squelch***" feature is provided on this radio. This feature allows you to set the squelch so that only signals exceeding a certain S-meter level will open the squelch. See page 20 for details

FREQUENCY NAVIGATION

1) Tuning Dial

Rotating the **DIAL** knob allows tuning in the pre-programmed steps. Clockwise rotation of the **DIAL** knob causes the **FT-2800M** to be tuned toward a higher frequency, while counter-clockwise rotation will lower the operating frequency.

Press the [**MHz**(**SET**)] key momentarily, then rotate the **DIAL** knob, to change the frequency steps to 1 MHz per step. This feature is extremely useful for making rapid frequency excursions over the wide tuning range of the **FT-2800M**. Instead of pressing the [**MHz**(**SET**)] button, you may also press the [**A**] key on the Microphone's keypad to engage tuning in 1 MHz steps.

FREQUENCY NAVIGATION

2) Direct Keypad Frequency Entry

The keypad of the **MH-48A6J** DTMF Microphone may be used for direct entry of the operating frequency.

To enter a frequency from the **MH-48A6J** keypad, just press the numbered digits in the proper sequence. There is no "decimal point" key on the **MH-48A6J** keypad. However, there is a short-cut for frequencies ending in zero: press the [**#**] key after the last non-zero digit.

Examples: To enter 146.520 MHz, press [**1**] → [**4**] → [**6**] → [**5**] → [**2**] → [**0**]
To enter 146.000 MHz, press [**1**] → [**4**] → [**6**] → [**#**]



If you cannot get the radio to accept the frequency entry, it is possible that the channel steps are set to an incompatible value (e.g. if you have 25 kHz steps set, you cannot set a frequency of 146.520 MHz). See page 19 to learn how to change the channel step size.

3) Scanning

From the VFO mode, press the microphone's [**UP**]/[**DWN**] keys momentarily to initiate scanning toward a higher- or lower frequency, respectively. The **FT-2800M** will stop when it receives a signal strong enough to break through the squelch threshold. The **FT-2800M** will then hold on that frequency according to the setting of the "Resume" mode (Menu "**23 SCAN**)"; see page 34).

If you wish to reverse the direction of the scan (i.e. toward a lower frequency, instead of a higher frequency), just rotate the **DIAL** knob one click in the counter-clockwise direction while the **FT-2800M** is scanning. The scanning direction will be reversed. To revert to scanning toward a higher frequency once more, rotate the **DIAL** knob one click clockwise.

Press the [**UP**]/[**DWN**] keys again to cancel scanning. You may also press the **PTT** button momentarily; scanning will stop, but you will not transmit until you release the **PTT** button, and press it again.



If you have enabled the "Severe Weather Alert" feature, you will occasionally notice "WX" channels interspersed with the regular channels you are scanning. This is normal, because your radio is constantly monitoring for weather alerts. See page 17.

TRANSMISSION

To transmit, simply close the **PTT** (Push To Talk) switch on the microphone when the frequency is clear. Hold the microphone approximately 1" (25 mm) from your mouth, and speak into the microphone in a normal voice level. When your transmission is complete, release the **PTT** switch; the transceiver will revert to the receive mode.

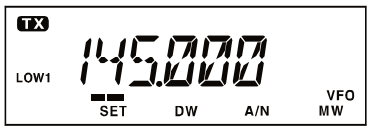
During transmission, the "TX" indicator will appear at the upper left corner on the display.

Changing the Transmitter Power Level

You can select from among a total of four transmit power levels on your **FT-2800M**.

To change the power level, press the [**LOW**(**A/N**)] key (or the microphone's [**C**] key to select one of four power settings. These power levels will be stored, in memory registers, at the time of memory storage (see page 30 for details on Memory operation).

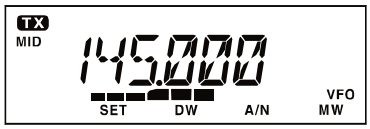
During transmission, the Bar Graph will deflect in the display, according to the power output selected.



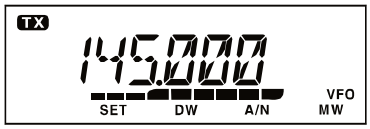
Low 1 (5 watts)



Low 2 (10 watts)



MID (25 watts)

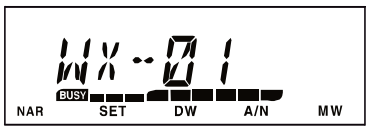


HIGH (65 watts)

WEATHER BROADCAST RECEPTION

The **FT-2800M** includes a unique feature which allows reception of weather broadcasts in the 160-MHz frequency range. Ten standard Weather Broadcast channels are pre-loaded into a special memory bank.

To listen to a Weather Broadcast Channel:



1. Press the Microphone's [**P4**] button to recall the Weather Broadcast channels.
2. Turn the **DIAL** knob to select the desired Weather Broadcast channel.
3. If you wish to check the other channels for activity by scanning, just press the Microphone's **PTT** switch.
4. To exit to normal operation, press the [**P4**] button again. Operation will return to the VFO or Memory channel you were operating on before you began Weather Broadcast operation.

Severe Weather Alert Feature

In the event of extreme weather disturbances, such as storms and hurricanes, the NOAA (National Oceanic and Atmospheric Administration) sends a weather alert accompanied by a 1050 Hz tone and subsequent weather report on one of the NOAA weather channels. You may enable the this feature via Menu "**32 W ALT**," if desired. See page 55 for details.

If NOAA issues a severe weather alert, the **FT-2800M** will issue a warbling pair of audio tones. Press the **PTT** button momentarily to disable the alarm, and the Severe Weather message will now be audible from the speaker.

If you have the Severe Weather Alert feature engaged, and you engage scanning of the Weather Channel bank by pressing and holding in the [**UP**] or [**DWN**] key, the radio will not stop on a "busy" weather broadcast channel *until the 1050 Hz Alert Tone is received from a NOAA weather broadcast station!* You may, however, select any of the ten weather broadcast channels manually by rotating the main tuning dial, or by pressing the [**UP**] or [**DWN**] key momentarily, step by step, to choose the desired station.

When scanning the band or the "regular" memories, with the Severe Weather Alert feature engaged, you will notice that the **FT-2800M** will break over to the Weather Channel bank every five seconds, performing a quick scan of those channels in search for the 1050 Hz alert tone. If the alert tone is received, operation will lock on the weather broadcast station issuing the alert; otherwise, the radio will revert to the VFO or memory scan session in progress without interruption.

LOCK FEATURE

To order to prevent accidental frequency change or inadvertent transmission, various aspects of the **FT-2800M**'s keys and knob may be locked out. The possible lockout combinations are:

KEY: Just the front panel keys are locked out
DIAL: Just the front panel **DIAL** knob is locked out
K+D: Both the keys and **DIAL** knob are locked out
PTT: The **PTT** switch is locked (TX not possible)
K+P: Both keys and **PTT** switch are locked out
D+P: Both **DIAL** knob and **PTT** switch are locked out
ALL: All of the above are locked out
OFF: The Lock feature is disabled

To lock out some or all of the keys, use the "Set" (Menu) mode, described in detail beginning on page 51:

1. Press and hold in the [**MHz**(**SET**)] key for one second, then rotate the **DIAL** knob to select "**14 LOCK**."
2. Press the [**MHz**(**SET**)] key, then rotate the **DIAL** knob to set the display to one of the selections shown above.
3. Press and hold in the [**MHz**(**SET**)] key for one second to save your new setting and exit to normal operation.

When the Lock feature is activated, the "🔑" icon will appear on the LCD.

To disable the Lock feature, repeat the above process, selecting "**OFF**" in step 2 above.

KEYPAD BEEPER

A key/button beeper provides useful audible feedback whenever a key/button is pressed. If you want to turn the beeper off (or back on again):

1. Press and hold in the [**MHz**(**SET**)] key for one second, then rotate the **DIAL** knob to select "**03 BEEP**."
2. Press the [**MHz**(**SET**)] key, then rotate the **DIAL** knob to set the display to "**OFF**."
3. Press and hold in the [**MHz**(**SET**)] key for one second to save your new setting and exit to normal operation.

CHANNEL STEP SELECTION

Tuning steps are factory preset to default increments which are appropriate for the country to which this radio is exported. You may have a reason to use a different step size, however, and here is the procedure for changing the channel steps:

1. Press and hold in the [**MHz**(**SET**)] key for one second, then rotate the **DIAL** knob to select "**29 STEP**."
2. Press the [**MHz**(**SET**)] key, then rotate the **DIAL** knob to select the desired step size (**5**/**10**/**12.5**/**15**/**20**/**25**/**50**/**100** kHz).
3. Press and hold in the [**MHz**(**SET**)] key for one second to save your new setting and exit to normal operation.

DISPLAY BRIGHTNESS

The **FT-2800M** display illumination has been specially engineered to provide high visibility with minimal disruption of your "night vision" while you are driving. The brightness of the display is manually adjustable, using the following procedure:

1. Press and hold in the [**MHz**(**SET**)] key for one second, then rotate the **DIAL** knob to select "**07 DIMR**."
2. Press the [**MHz**(**SET**)] key, then rotate the **DIAL** knob to select a comfortable brightness level (**1**, **2**, **3**, and **OFF**).
3. Press and hold in the [**MHz**(**SET**)] key for one second to save your new setting and exit to normal operation.

RF SQUELCH

A special RF Squelch feature is provided on this radio. This feature allows you to set the squelch so that only signals exceeding a certain S-meter level will open the squelch.

To set up the RF squelch circuit for operation, use the following procedure:

1. Press and hold in the [**MHz**(**SET**)] key for one second, then rotate the **DIAL** knob to select "**20 RF SQL**."
2. Press the [**MHz**(**SET**)] key, then rotate the **DIAL** knob to select the desired signal strength level for the squelch threshold (**1 - 10** or **OFF**).
3. Press and hold in the [**MHz**(**SET**)] key for one second to save your new setting and exit to normal operation.



The receiver's squelch will open based on the highest level set by the two squelch system "Noise Squelch and RF Squelch). For example:

1) If the Noise Squelch (SQL control) is set so that signals at a level of S-3 will open the squelch, but the RF Squelch (Menu #20) is set to "S-9," the squelch will only open on signals which are S-9 or stronger on the S-meter.

2) If the RF Squelch is set to "S-3," but the Noise Squelch is set to a high level which will only pass signals which are Full Scale on the S-meter, the squelch will only open on signals which are Full Scale on the S-meter. In this case, the Noise Squelch overrides the action of the RF Squelch.

REPEATER OPERATION

The **FT-2800M** includes a host of convenience features which makes operation on amateur repeaters both efficient and enjoyable.

Repeater Splits

This transceiver offers three methods of setting up split-frequency operation on repeaters:

[1] Manual selection of preset repeater shifts;
[2] Automatic Repeater Shift (ARS), providing automatic activation of repeater shifts during designated repeater frequency subbands; and
[3] Independently stored transmit and receive frequencies (typically not corresponding to established repeater frequency shifts).

[1] Standard Repeater Shift

To activate the standard shift manually, you may use the Set (Menu) mode:

1. Press and hold in the [**MHz**(**SET**)] key for one second, then rotate the **DIAL** knob to select "**21 RPTR**."
2. Press the [**MHz**(**SET**)] key, then rotate the **DIAL** knob to select the desired shift direction (**– RPTR**, **+RPTR**, or **SIMP**).
3. Press and hold in the [**MHz**(**SET**)] key for one second to save your new setting and exit to normal operation.



You also may program one of the Microphone's programmable keys ([**P1**] ~ [**P4**]) ***to allow quick access to the above procedure. See page 45 for details on the setup of the programmable keys.***

With repeater shift activated, you can temporarily reverse the transmit and receive frequencies by pressing the [**REV**(**DW**)] key (or microphone's [**B**] key). Use this feature to display the transmit frequency *without transmitting*, and to check the strength of signals on a repeater uplink frequency (so as to determine whether or not a particular station is within "Simplex" range, for example).

The repeater offset is fixed to 600 kHz from the factory. You can change the offset by the following procedure, if needed for vacation travel or other purposes:

1. Press and hold in the [**MHz**(**SET**)] key for one second, then rotate the **DIAL** knob to select "**24 SHIFT**."
2. Press the [**MHz**(**SET**)] key, then rotate the **DIAL** knob to set the desired offset. Note that the resolution of the "standard" repeater shift is to the nearest 50 kHz multiple.
3. Press and hold in the [**MHz**(**SET**)] key for one second to save your new setting and exit to normal operation.



Do not use this procedure for programming of an "odd split" type repeater pair! The process for programming odd splits is shown on page 23.

REPEATER OPERATION

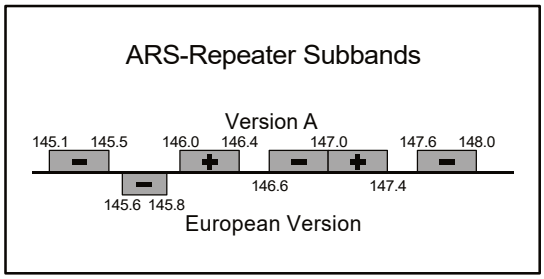
[2] Automatic Repeater Shift

The ARS (Automatic Repeater Shift) feature in this transceiver allows easy and convenient repeater operation by automatically activating the repeater shift function whenever you tune to a standard repeater subband. The ARS function is preset at the factory to conform to the standards for the country to which it is exported.

The ARS function is *enabled* at the factory. To *disable* it:

1. Press and hold in the [**MHz**(**SET**)] key for one second, then rotate the **DIAL** knob to select "**02 ARS**."
2. Press the [**MHz**(**SET**)] key, then rotate the **DIAL** knob to change the display to "**OFF**."
3. Press and hold in the [**MHz**(**SET**)] key for one second to save your new setting and exit to normal operation.

To enable the ARS function again, select to "**ON**" in step 2 above.



REPEATER OPERATION

[3] Separate Transmit Frequency Memories ("Odd Splits")

All memory channels can store independent receive and transmit frequencies, to accommodate occasional non-standard offsets with greater frequency resolution than is available using the "standard" shift feature.

1. First store the *receive* (repeater output) frequency. In the VFO mode, tune the transceiver to the desired receive frequency. Now press and hold in the [**D/MR**(**MW**)] key on the front panel for one second.
2. Within five seconds of pressing the [**D/MR**(**MW**)] key, use the **DIAL** knob or microphone's [**UP**]/[**DWN**] buttons to select the desired memory channel into which you wish to store this frequency pair.
3. Now press the [**D/MR**(**MW**)] key momentarily to store the receive frequency into the selected memory.
4. Next store the *transmit* (repeater input) frequency. Since you are still in the VFO mode, tune the transceiver to the desired transmit frequency.
5. Now press and hold in the [**D/MR**(**MW**)] key for one second.
6. Press and hold in the **PTT** switch, and press the [**D/MR**(**MW**)] key momentarily while holding in the **PTT** switch. This will not cause transmission, but rather it will instruct the transceiver that you are *programming* a separate transmit *frequency* into memory.

When you have finished the above procedure, press the [**D/MR**(**MW**)] key momentarily. The channel number and repeater downlink frequency will appear on the display. If you press the **PTT** switch, you will observe the display changing to indicate the repeater's uplink frequency. Note also that the display shows "**– +**" in the upper left-hand corner; this indicates that an "odd" (non-standard) shift has been stored on this channel.

CTCSS/DCS OPERATION

CTCSS Operation

Many repeater systems require that a very-low-frequency audio tone be superimposed on your FM carrier in order to activate the repeater. This helps prevent false activation of the repeater by radar or spurious signals from other transmitters. This tone system, called "CTCSS" (Continuous Tone Coded Squelch System), is included in your **FT-2800M**, and is very easy to activate.



CTCSS setup involves two actions: setting the Tone Mode and then setting of the Tone Frequency. These actions are set up by using the Set (Menu) mode, selections #28 (SQ TYP) and #27 (SQ TNF).

1. Press and hold in the [**MHz**(**SET**)] key for one second, then rotate the **DIAL** knob to select "**28 SQ TYP**."
2. Press the [**MHz**(**SET**)] key, then rotate the **DIAL** knob so that "**T ENC**" appears on the display; this activates the CTCSS Encoder, which allows repeater access.

   You may notice an additional "DC ENC" and "DCS" appearing while you rotate the DIAL knob in this step. We'll discuss the Digital Code Squelch system shortly. And also, "T+DCS" and "TSQ+DC" appearing while you rotate the DIAL knob in this step. This is a Split Tone Operation, describe later.
3. Rotating the **DIAL** knob one more click clockwise in the above step will cause "**TSQ**" to appear. When "**TSQ**" appears, this means that the Tone Squelch system is active, which mutes your **FT-2800M**'s receiver until it receives a call from another radio sending out a matching CTCSS tone. This can help keep your radio quiet until a specific call is received, which may be helpful while operating in congested areas.
4. When you have made your selection of the CTCSS tone mode, press the [**MHz**(**SET**)] key momentarily, then rotate the **DIAL** knob one click counter-clockwise to select Menu "**27 SQ TNF**." This Menu selection allows setting of the CTCSS tone frequency to be used.
5. Press the [**MHz**(**SET**)] key to enable adjustment of the CTCSS frequency.

CTCSS TONE FREQUENCY (Hz)					
67.0	69.3	71.9	74.4	77.0	79.7
82.5	85.4	88.5	91.5	94.8	97.4
100.0	103.5	107.2	110.9	114.8	118.8
123.0	127.3	131.8	136.5	141.3	146.2
151.4	156.7	159.8	162.2	165.5	167.9
171.3	173.8	177.3	179.9	183.5	186.2
189.9	192.8	196.6	199.5	203.5	206.5
210.7	218.1	225.7	229.1	233.6	241.8
250.3	254.1	–	–	–	–

6. Rotate the **DIAL** knob until the display indicates the Tone Frequency you need to be using.
7. When you have made your selection, press and hold in the [**MHz**(**SET**)] key for one second to save the new setting and exit to normal operation.

CTCSS/DCS OPERATION



Your repeater may or may not re-transmit a CTCSS tone - some systems just use CTCSS to control access to the repeater, but don't pass it along when transmitting. If the S-Meter deflects, but the FT-2800M is not passing audio, repeat steps "1" through "3" above, but rotate the DIAL knob so that "T ENC" appears - this will allow you to hear all traffic on the channel being received.

You may use the Menu to re-program one of the Microphone's programmable keys for quick access to Menu #27 (SQL TNF), from which you can perform the above setup procedure. See page 45 for details on the setup of the programmable keys.

DCS Operation

Another form of tone access control is Digital Code Squelch, or DCS. It is a newer, more advanced tone system which generally provides more immunity from false paging than does CTCSS. The DCS Encoder/Decoder is built into your **FT-2800M**, and operation is very similar to that just described for CTCSS. Your repeater system may be configured for DCS; if not, it is frequently quite useful in Simplex operation if your friend(s) use transceivers equipped with this advanced feature.



Just as in CTCSS operation, DCS requires that you set the Tone Mode to DCS and that you select a Tone Code.

1. Press and hold in the [**MHz**(**SET**)] key for one second, then rotate the **DIAL** knob to select "**28 SQ TYP**."
2. Press the [**MHz**(**SET**)] key, then rotate the **DIAL** knob until "**DCS**" appears on the display; this activates the DCS Encoder/Decoder.
3. Now press the [**MHz**(**SET**)] key momentarily, then rotate the **DIAL** knob to select Menu "**26 SQ DCS**."
4. Press the [**MHz**(**SET**)] key momentarily to enable the adjustment of the DCS code.
5. Rotate the **DIAL** knob to select the desired DCS Code (a three-digit number).
6. When you have made your selection, press and hold in the [**MHz**(**SET**)] key for one second to save the new setting and exit to normal operation.

DCS CODE									
023	025	026	031	032	036	043	047	051	053
054	065	071	072	073	074	114	115	116	122
125	131	132	134	143	145	152	155	156	162
165	172	174	205	212	223	225	226	243	244
245	246	251	252	255	261	263	265	266	271
274	306	311	315	325	331	332	343	346	351
356	364	365	371	411	412	413	423	431	432
445	446	452	454	455	462	464	465	466	503
506	516	523	526	532	546	565	606	612	624
627	631	632	654	662	664	703	712	723	731
732	734	743	754	–	–	–	–	–	–



Remember that the DCS is an Encode/Decode system, so your receiver will remain muted until a matching DCS code is received on an incoming transmission. Switch the DCS off when you're just tuning around the band!

CTCSS/DCS OPERATION

Tone Search Scanning

In operating situations where you don't know the CTCSS tone or DCS code being used by another station or stations, you can command the radio to listen to the incoming signal and scan in search of the tone being used. Two things must be remembered in this regard:

- You must be sure that your repeater uses the same tone type (CTCSS vs. DCS).
- Some repeaters do not pass the CTCSS tone or DCS code; you may have to listen to the station(s) transmitting on the repeater uplink (input) frequency in order to allow Tone Search Scanning to work.

To scan for the tone in use:

1. Set the radio up for either CTCSS or DCS Decoder operation (see the previous discussion). In the case of CTCSS, "**TSQ**" will appear on the display; in the case of DCS, "**DCS**" will appear on the display.
2. Press the Microphone's [**P3**] key momentarily to start scanning for the incoming CTCSS or DCS tone/code.
3. When the radio detects the correct tone or code, it will halt on that tone/code, and audio will be allowed to pass.
4. Press and hold in the [**MHz**(**SET**)] key for one second to lock in that tone/code and exit to normal operation.



If the Tone Scan feature does not detect a tone or code, it will continue to scan indefinitely. When this happens, it may be that the other station is not sending any tone. You can press the Microphone's [**P3**] ***key to halt the scan at any time.***

Tone Scanning works either in the VFO or Memory modes.

CTCSS/DCS OPERATION

CTCSS/DCS Bell Paging

During CTCSS Decode or DCS operation, you may set up the **FT-2800M** such that a ringing "bell" sound alerts you to the fact that a call is coming in. Here is the procedure for activating the CTCSS/DCS Bell:

1. Set the transceiver up for CTCSS Decode ("Tone Squelch") or DCS operation, as described previously.
2. Adjust the operating frequency to the desired channel.
3. Press and hold in the [**MHz**(**SET**)] key for one second, then rotate the **DIAL** knob to select "**04 BELL**."
4. Rotate the **DIAL** knob to set the desired number of rings of the Bell. The available choices are **1**, **3**, **5**, or **8** rings, **REPEAT** (continuous ringing), or **OFF**.
5. Press and hold in the [**MHz**(**SET**)] key for one second to save the new setting and exit to normal operation.

When you are called by a station whose transceiver is sending a CTCSS tone or DCS code which matches that set into your Decoder, the Bell will ring in accordance with this programming.

Split Tone Operation

The **FT-2800M** can be operated in a "Split Tone" configuration, to enable operation on repeaters using a mix of both CTCSS and DCS control. To do this:

1. Press and hold in the [**MHz**(**SET**)] key for one second, then rotate the **DIAL** knob to select "**28 SQ TYP**."
2. Press the [**MHz**(**SET**)] key, then rotate the **DIAL** knob to select the desired operating mode:
   DC ENC: DCS Encode only ("**DC**" icon will appear while operating)
   T+DCS: Encodes a CTCSS Tone and Decodes a DCS code
   (the "**T**" and "**DCS**" icons will appear during operation)
   TSQ+DC: Encodes a DCS code and Decodes a CTCSS Tone
   (the "**TSQ**" and "**DC**" icons will appear during operation)
3. Press the [**MHz**(**SET**)] key momentarily, then rotate the **DIAL** knob one click counterclockwise to select Menu "**27 SQ TNF**."
4. Press the [**MHz**(**SET**)] key momentarily to enable the adjustment of the CTCSS Tone.
5. Rotate the **DIAL** knob to select the desired CTCSS Tone.
6. Press the [**MHz**(**SET**)] key momentarily, then rotate the **DIAL** knob one click counterclockwise to select Menu "**26 SQ DCS**."
7. Press the [**MHz**(**SET**)] key momentarily to enable the adjustment of the DCS Code.
8. Rotate the **DIAL** knob to select the desired DCS Code (a three-digit number).
9. When you have made your selections, press and hold in the [**MHz**(**SET**)] key for one second to save the new setting and exit to normal operation.

DTMF AUTODIALER OPERATION

Nine DTMF Autodialer memories are available on the **FT-2800M**. These DTMF Autodialer memories can store up to 16 digits of a telephone number for repeater autopatch or other use.

To load DTMF Autodialer memories, use the following procedure:

1. Press and hold in the [**MHz**(**SET**)] key for one second, then rotate the **DIAL** knob to select "**10 DT MEM**."
2. Press the [**MHz**(**SET**)] key, then rotate the **DIAL** knob to select the DTMF Autodialer memory channel number into which you wish store a telephone number ("**DTMF-1**" to "**DTMF-9**").
3. Press the [**D/MR**(**MW**)] key momentarily, then rotate the **DIAL** knob to select the first digit of the telephone number you wish to store.
4. When you have selected the correct digit, press the [**REV**(**DW**)] key momentarily. Now, rotate the **DIAL** knob to select the second of 16 available numbers in the current DTMF Autodialer memory register.
5. Repeat this procedure for each digit in the telephone number. If you a mistake, press the microphone's [**DWN**] key to move back to the first digit, then re-enter the correct number.
6. When entry of all digits is complete, press the [**MHz**(**SET**)] key.
7. If you wish to store another DTMF string, repeat steps 2 through 6 above.
8. Press and hold in the [**MHz**(**SET**)] key for one second to save the new setting and exit to normal operation.

To *transmit* the memorized telephone number, use the following procedure:

1. Press and hold in the [**MHz**(**SET**)] key for one second, then rotate the **DIAL** knob to select "**08 DTMF**."
2. Press the [**MHz**(**SET**)] key, then rotate the **DIAL** knob to set the DTMF Autodialer memory function to the "**ON**" position (the "☎" icon will appear).
3. Press and hold in the [**MHz**(**SET**)] key for one second to save the new setting and exit to normal operation.
4. In the Autodialer mode, which you just engaged, first press the **PTT** switch, then press the microphone's numeric key ([**1**] through [**9**]) corresponding to the DTMF memory string you wish to send. Once the string begins, you may release the **PTT** switch, as the transmitter will be held "on the air" until the DTMF string is completed.

To disable the Autodialer function mode, select "**OFF**" in step 2 above.

DTMF AUTODIALER OPERATION

The speed at which the DTMF digits are sent can be changed. Two speed levels are available: Low (10 digits per second) and High (20 digits per second: default). To toggle between Low and High speed, use the following procedure:

1. Press and hold in the [**MHz**(**SET**)] key for one second, then rotate the **DIAL** knob to select "**11 DT SPD**."
2. Press the [**MHz**(**SET**)] key, then rotate the **DIAL** knob to select the desired speed ("**50**": High speed or "**100**": Low speed).
3. Press and hold in the [**MHz**(**SET**)] key for one second to save the new setting and exit to normal operation.

You can also set a longer delay between the time your transmitter is keyed and the first DTMF digit is sent. To set the delay time, use the following procedure:

1. Press and hold in the [**MHz**(**SET**)] key for one second, then rotate the **DIAL** knob to select "**09 DT DLY**."
2. Press the [**MHz**(**SET**)] key, then rotate the **DIAL** knob to select the desired speed (**50/250/450/750/1000** ms).
3. Press and hold in the [**MHz**(**SET**)] key for one second to save the new setting and exit to normal operation.

MEMORY OPERATION

MEMORY STORAGE

A wide array of memory resources are available on the **FT-2800M**. A total of 221 memories are available, and each may be appended with an alpha-numeric label of up to six characters, for quick channel recognition.

The "basic" memory bank for the **FT-2800M** consists of 200 memories. Let's learn the simple procedure for storing and recalling a frequency, then we can move on to some of the more advanced memory features.

To store a frequency into memory:

1. In the VFO mode, select the desired frequency, repeater shift, CTCSS/DCS tone, and TX power level.
2. Press and hold in the [**D/MR**(**MW**)] key for one second. A memory number will appear in the bottom right-hand corner of the display. If the channel number is blinking, there currently is no data stored on that channel; if the channel number is not blinking, that channel is currently "occupied" by other frequency data, and you won't want to use that channel unless the data is no longer of interest.
3. Within five seconds of pressing the [**D/MR**(**MW**)] key, use the **DIAL** knob to select the desired memory into which you wish to store the frequency.
4. Press the [**D/MR**(**MW**)] key again, this time momentarily, to store the displayed data into the selected memory channel slot. The memory label will disappear (since you are still operating in the VFO mode).
5. To store other frequencies, repeat steps 1 through 4, remembering to set the repeater shift, CTCSS/DCS tone, and TX power level, as appropriate.

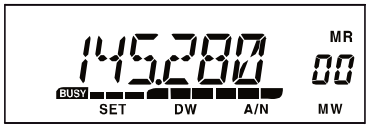


The above procedure will be used for virtually all memory storage circumstances. If you need to program a frequency pair that uses a non-standard shift ("odd split"), use the procedure described on page 23.

MEMORY RECALL

Once you have stored the memory or memories desired, you must now switch from the "VFO" mode to the "Memory Recall" mode, so you can operate on the just-stored memory channels.

1. Press the [**D/MR**(**MW**)] key, repeatedly if necessary, until the "**MR**" icon and a memory channel number appear on the display; this indicates that the "Memory Recall" mode is now engaged.



2. When more than one memory has been stored, use the **DIAL** knob to select any pf the programmed memories for operation. Alternatively, the microphone's [**UP**] or [**DWN**] button may be used to step or scan through the available memories. When using the microphone's buttons, press the button momentarily to move one step up or down; press and hold in the [**UP**] or [**DWN**] button for one second to begin memory scanning.

Memory Recall from the Microphone's Keypad:
While operating in the Memory Recall mode, the keypad of the **MH-48A6J** Microphone may be used for direct recall of memory channels.

To do this, press the Channel Number you wish to recall, then press the [∗] key. For example, to recall Memory Channel "**5**," press [**5**] → [∗]. To recall Memory Channel "**118**," press [**1**] → [**1**] → [**8**] → [∗].

Labeling Memories

You may wish to append an alpha-numeric "Tag" (label) to a memory or memories, to aid in recollection of the channel's use (such as club name, etc.). This is easily accomplished using the Set (Menu) mode.

1. Recall the memory channel on which you wish to append a label.
2. Press and hold in the [**MHz**(**SET**)] key for one second, then rotate the **DIAL** knob to select "**00 ALPH**."
3. Press the [**MHz**(**SET**)] key. You will notice the first character location blinking, indicating that you are now in the Alpha-Numeric ("A/N") entry mode. Within the A/N entry mode, rotate the **DIAL** knob to select *characters*; pressing the [**REV**(**DW**)] key will move the character's *entry location* to the right.
4. Rotate the **DIAL** knob to select the desired number, letter, or symbol, then press the [**D/MR**(**MW**)] key to move the next character's location. Move two slots if you want to put in a space.
5. Repeat step 4, as necessary, to complete the name tag (up to six characters) for your memory, then press the [**MHz**(**SET**)] key momentarily to save the A/N name just entered.
6. Press and hold in the [**MHz**(**SET**)] key for one second to exit to normal operation.

MEMORY OPERATION

MEMORY RECALL

While operating in the Memory Recall mode, press and hold in the [**LOW**(**A/N**)] key for one second to toggle the display between indication of the frequency and the channel's Alpha/Numeric label.

Memory Tuning

Once you have recalled a particular memory channel, you may easily tune off that channel, as though you were in the VFO mode.

1. With the **FT-2800M** in the Memory Recall mode, select the desired memory channel.
2. Press the [**MHz**(**SET**)] key momentarily. The "**MR**" indicator will blink; this indicates that the "Memory Tuning" mode has been engaged.
3. Rotate the **DIAL** knob, or press the [**UP**] or [**DWN**] keys, to tune to a new frequency. The synthesizer steps you have selected for "VFO" operation will be the steps used during Memory Tuning.
4. If you wish to return to the original memory frequency, press the [**D/MR**(**MW**)] key momentarily. The "**MR**" indicator will stop blinking.
5. If you wish to store into memory a new frequency set during Memory Tuning, just press and hold in the [**D/MR**(**MW**)] key for one second, then complete the normal memory storage procedure. Be sure to select an open memory channel when doing so.

Deleting Memories

With 221 total memories available, there frequently are situations where you may desire to delete certain memories temporarily (except the Memory Channel "00" and Home Channel). The procedure for deleting a channel is quite simple:

1. With the **FT-2800M** in the Memory Recall mode, press and hold in the [**D/MR**(**MW**)] key for one second, then rotate the **DIAL** knob to select the memory channel you wish to delete.
2. Press the [**LOW**(**A/N**)] key momentarily. The "**CLEAR**" notation will appear on the display.
3. Press again the [**LOW**(**A/N**)] key momentarily. The previously-selected memory will be deleted.

Once deleted, channel data cannot be recovered!

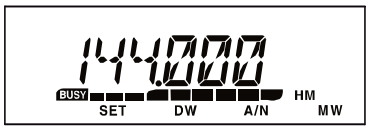
HOME CHANNEL MEMORY

A Convenient one-touch "Home" channel memory is available to simplify return to your most-often-used frequency. This memory does not appear in the regular memory bank, to simplify operation and speed recall of this important channel.

To recall the Home channel, just press the [**D/MR**(**MW**)] key, repeatedly if necessary, until the "**HM**" icon appears on the display; this indicates that the Home Channel has been recalled.



USA version



EXP version

The factory default frequency for the Home channel is 146.520 MHz (USA version, EXP version: 144.000 MHz). You can re-program the Home channel in a manner identical to that used for the regular memories:

1. From the VFO mode, tune in the frequency you wish to store, and set all repeater shifts and other data just the way you do for "normal" memory channel storage.
2. Press and hold in the [**D/MR**(**MW**)] key for one second, then press the [**REV**(**DW**)] key to store the displayed data into the Home channel. The memory label will disappear (since you are still operating in the VFO mode).

You may also append an alpha-numeric "Tag" (label) to a Home channel, as described previously. be sure to recall the Home channel first, then enter the Menu (selection "**00 ALPH**") to program the label's contents.



From the Home channel, you may tune off (as in the Memory Tune mode) without doing anything more than rotating the main DIAL knob. This automatically shifts control to the VFO, making it a good idea to program in your area's "Calling Frequency" as the Home channel. Once contact is established, you may then tune off the Calling Frequency to an open simplex frequency to carry on your QSO.

MEMORY-ONLY MODE

Once memory channel programming has been completed, you may place the radio in a "Memory Only" mode, whereby VFO and Home Channel operation are impossible. This may be particularly useful during public-service events where a number of operators may be using the radio for first time, and ultimate simplicity of channel selection is desired.

To place the radio into the Memory Only mode, turn it off. Now press and hold in the [**MHz**(**SET**)] and [**D/MR**(**MW**)] keys while turning the radio on. The VFO and Home Channel will now be disabled.

To return to normal operation, repeat the above power-on procedure.

SCANNING

The **FT-2800M**'s scanning capability provides the operator with many convenient methods of rapid frequency navigation.

BASIC SCANNER OPERATION

Before activating the scanner, make sure that the Squelch is set to silence the background noise when no signal is present. Scanning is not possible while the Squelch is open (if noise or signals are being heard).

Scanning may be started or stopped using the microphone's [**UP**] or [**DWN**] button. The following techniques are used for scanning:

- ❒ Pressing and holding in either the [**UP**] or [**DWN**] button for one second in the *VFO mode* will cause upward or downward *band* scanning, respectively, to begin.
- ❒ Pressing and holding in either the [**UP**] or [**DWN**] button for one second in the *Memory mode* will cause memory channel scanning toward a higher- or lower-numbered *memory channel*, respectively.
- ❒ Scanning pauses when a signal opens the squelch, and the decimal point on the display will blink. You can choose one of three scan-resume modes (described later).
- ❒ To halt the scan manually, the easiest way is to push the **PTT** switch on the microphone momentarily (no transmission will occur while you are scanning). The scan may also be halted manually by pressing the microphone's [**UP**] or [**DWN**] button, or the [**D/MR**(**MW**)] key.

SCAN-RESUME OPTIONS

Three scan-resume modes are available on the **FT-2800M**:

- ❒ In the "**BUSY**" mode, the scanner will remain halted for as long as there is carrier present on the channel; after the carrier drops at the end of the other station's transmission, scanning will resume.
- ❒ In the "**HOLD**" mode, the scanner will halt on a signal it encounters. It will not restart automatically; you must manually re-initiate scanning if you wish to resume.
- ❒ In the "**5 SEC**" mode, the scanner will halt for five seconds *only*, after which scanning will resume (whether or not the other station is still transmitting).

The default scan-stop mode is "**BUSY**." To change the scan-resume mode, use the following procedure:

1. Press and hold in the [**MHz**(**SET**)] key for one second, then rotate the **DIAL** knob to select "**23 SCAN**."
2. Press the [**MHz**(**SET**)] key, then rotate the **DIAL** knob to select the desired scan-resume mode (**BUSY/HOLD/5 SEC**).
3. Press and hold in the [**MHz**(**SET**)] key for one second to save the new setting and exit to normal operation.

MEMORY SKIP SCANNING

When you have some continuously-active channels in memories, you may wish to *skip* them for *scanning*, but still have them available for *manual selection*.

To mask a memory to be skipped during scanning, use the following procedure:

1. Set the radio to Memory Recall mode by pressing the [**D/MR**(**MW**)] key repeatedly, as necessary, until "**MR**" and a channel number appear on the right side of the display.
2. Rotate the **DIAL** knob to select the Memory Channel to be skipped during scanning.
3. Press and hold in the [**MHz**(**SET**)] key for one second, then rotate the **DIAL** knob to select "**25 SKIP**."
4. Press the [**MHz**(**SET**)] key, then rotate the **DIAL** knob so as to select "**SKIP**". The current Memory Channel will now be ignored during scanning. The "**ONLY**" selection is used for "Preferential Memory Scan," described in the next section.
5. Press and hold in the [**MHz**(**SET**)] key for one second to save the new setting and exit to normal operation.

A "**SKIP**" icon will appear when you recall the "skipped" memory channel manually.

To re-institute a channel into the scanning loop, select "**OFF**" in step 4 above, after first recalling the currently-blocked channel (the "Skipped" channel is accessible via manual channel selection methods using the **DIAL** knob in the Memory mode, whether or not it is locked out of the scanning loop).

SCANNING

PREFERENTIAL MEMORY SCAN

The **FT-2800M** also allows you to set up a "Preferential Scan List" of channels which you can "flag" within the memory system. These channels are designated by a blinking "**SKIP**" icon when you have selected them, one by one, for the Preferential Scan List.

When you initiate memory scanning, *beginning on a channel with the Blinking* "**SKIP**" *icon appended*, only those channels bearing the Blinking "**SKIP**" icon will be scanned. If you initiate scanning on a channel which does not have the Blinking "**SKIP**" icon appended, you will scan all channels *including* those with the Blinking "**SKIP**" icon appended.

Here is the procedure for setting up and using the Preferential Scan List:

1. Set the radio to the Memory Recall mode by pressing the [**D/MR**(**MW**)] key repeatedly, if necessary.
2. Rotate the **DIAL** knob to select the Memory Channel which you wish to add to the Preferential Scan List.
3. Press and hold in the [**MHz**(**SET**)] key for one second, then rotate the **DIAL** knob to select "**25 SKIP**."
4. Press the [**MHz**(**SET**)] key, then rotate the **DIAL** knob so as to select "**ONLY**."
5. Press and hold in the [**MHz**(**SET**)] key for one second to save the new setting and exit to normal operation.

To initiate Preferential Memory Scanning:

1. Set the radio to the Memory Recall mode by pressing the [**D/MR**(**MW**)] key repeatedly, if necessary.
2. Rotate the **DIAL** knob to select any memory channel which has a Blinking "**SKIP**" icon appended to the channel number.
3. Press and hold either the microphone's [**UP**] or [**DWN**] button for one second to initiate Preferential Memory Scanning. Only the channels which have a Blinking "**SKIP**" icon appended to the channel number will be scanned.

PROGRAMMABLE BAND-SCAN LIMITS

Besides band and memory scanning, this transceiver can be set to tune or scan only the frequencies between user-defined lower and upper limits. For example, you may wish to limit tuning/scanning to 144.3 - 148.0 MHz, to avoid encroachment on the SSB/CW sub-band between 144.0 and 144.3 MHz

These scanning limits are stored in special "Sub-Band Limit Memories," labeled **L0/U0** through **L9/U9**, with "**L**" and "**U**" designations representing the Lower and Upper limits, respectively.

To utilize this feature, use the following steps:

1. Store the lower edge of the desired scanning/tuning range in memory "**L0**", and the upper edge in memory "**U0**" (or, alternatively, in memories "**L1/U1**" through "**L9/U9**").
2. With any of these memories recalled, press the [**MHz**(**SET**)] key momentarily to activate the Programmable Band-Scan Limits. The "**PMS**" icon will appear. Tuning and scanning will now be limited within the just-programmed range.

To cancel the Sub-Band Limits and return to normal memory operation, press the [**D/MR**(**MW**)] key momentarily.

SCANNING

PRIORITY CHANNEL SCANNING (DUAL WATCH)

The **FT-2800M**'s scanning features include a two-channel scanning capability which allows you to operate on a VFO, Memory channel, or Home channel, while periodically checking a user-defined Memory Channel for activity. If a station is received on the Memory Channel which is strong enough to open the Squelch, the scanner will pause on that station in accordance with the Scan-Resume mode set via Menu mode "**23 SCAN**." See page 34.

Here is the procedure for activating Priority Channel Dual Watch operation:

1. Set the radio to the Memory Recall mode by pressing the [**D/MR**(**MW**)] key repeatedly, if necessary.
2. Press and hold in the [**D/MR**(**MW**)] key for one second (the Memory Channel number will blink), then select the memory channel you wish to be the "Priority" channel.
3. Press and hold in the [**D/MR**(**MW**)] key for one second. The "**P**" icon will appear to the upper left of the "**MR**" icon, indicating it is the Priority channel.
4. Now set the **FT-2800M** for operation on another memory channel, Home channel, or on a VFO frequency.
5. Press and hold in the [**REV**(**DW**)] key for one second. The display will remain on the VFO, selected memory channel, or Home channel, but every five seconds the **FT-2800M** will check the Priority Channel for activity.
6. To cancel Dual Watch operation, press the [**D/MR**(**MW**)] key momentarily.

Priority Revert Mode

During Priority channel operation (Dual Watch), a special feature is available which will allow you to move to the Priority Channel instantly, without waiting for activity to appear on the Priority Channel.

When this feature is enabled, and priority monitoring is engaged, just press the microphone's **PTT** switch. Operation will instantly revert to the Priority Channel.

To enable Priority Revert operation:

1. Press and hold the [**MHz**(**SET**)] key for one second, then rotate the **DIAL** knob to select "**22 RVRT**."
2. Press the [**MHz**(**SET**)] key, then rotate the **DIAL** knob to select "**ON**."
3. Press and hold the [**MHz**(**SET**)] key for one second to save the new setting and exit to normal operation.

To disable Priority Revert operation, select "**OFF**" in step 2 above.

BAND EDGE BEEPER

The **FT-2800M** will automatically "beep" when the receiver's band edge is encountered during scanning (either in standard VFO scanning or during PMS operation). You may additionally enable this feature (band edge beeper) when the frequency reaches the band edge while selecting the VFO frequency manually, using the **DIAL** knob.

The procedure for enabling the Band-Edge Beeper (during manual tuning) is:

1. Press and hold in the [**MHz**(**SET**)] key for one second, then rotate the **DIAL** knob to select "**12 EDG BP**."
2. Press the [**MHz**(**SET**)] key, then rotate the **DIAL** knob to set this Menu item to "**ON**."
3. Press and hold in the [**MHz**(**SET**)] key for one second to save the new setting and exit to normal operation.

SMART SEARCH OPERATION

The Smart Search feature allows you to load frequencies automatically according to where activity is encountered by your radio. When Smart Search is engaged, the transceiver will search above and below your current frequency, storing active frequencies as it goes (without stopping on them even momentarily); these frequencies are stored into a special Smart Search memory band, consisting of 31 memories (15 above the current frequency, 15 below the current frequency, plus the current frequency itself).

Two basic operating modes for Smart Search are available:

SINGLE: In this mode, the transceiver will sweep the current band once in each direction starting on the current frequency. All channels where activity is present will be loaded into the Smart Search memories; whether or not all 31 memories are filled, the search will stop after one sweep in each direction.

CONT: In this mode, the transceiver will make one pass in each direction as with One-Shot searching; if all 31 channels are not filled after the first sweep, however, the radio will continue sweeping until they are all filled.

Setting the Smart Search Mode

1. Press and hold in the [**MHz**(**SET**)] key for one second, then rotate the **DIAL** knob to select "**30 S SRCH**."
2. Press the [**MHz**(**SET**)] key, then rotate the **DIAL** knob to select the desired Smart Search mode (see above).
3. Press and hold in the [**MHz**(**SET**)] key for one second to save the new setting and exit to normal operation.

Storing Smart Search Memories

1. Set the radio to the VFO mode. Be sure that you have the Squelch adjusted properly (so that band noise is quieted).
2. Press the Microphone's [**P2**] key to enter the Smart Search mode. The "**S.S**" icon will appear at the bottom left corner of the display.
3. Press the Microphone's [**A**] key to begin Smart Search scanning.
4. As active channels are detected, they will automatically be stored into the Smart Search memory bank without causing the sweep to halt.
5. Depending on the mode you set for Smart Search operation ("**SINGLE**" or "**CONT**"), the Smart Search scan will eventually terminate, and the LCD will revert to Smart Search Memory Channel "**00**."
6. To recall the Smart Search memories, just rotate the **DIAL** knob to choose from among the Smart Search memories.
7. To return to normal operation, press the [**D/MR**(**MW**)] key.

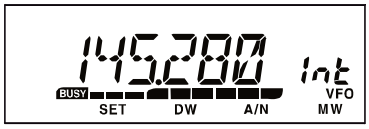


Smart Search is a great tool when visiting a city for the first time. You don't need to spend hours looking up repeater frequencies from a reference guidebook…just ask your FT-2800M where the action is!

INTERNET CONNECTION FEATURE

The **FT-2800M** can be used to access an Internet link on a repeater which is equipped for operation using the Vertex Standard WIRES™ (Wide-Coverage Internet Repeater Enhancement System) Internet linking system.

1. Press the [⊠] key to activate the Internet Connection feature. The "**int**" icon will appear in the memory channel field.
2. Rotate the **DIAL**, while pressing and holding in the [⊠] key, to select the access number corresponding to the WIRES™ repeater to which you wish to establish an Internet link (ask your repeater owner/operator if you don't know the access numbers in the network).



3. With the Internet Connection feature activated (as in step 1 above), the **FT-2800M** will generate a brief (0.2 second) DTMF tone according to your selection in step 2. This DTMF tone is sent at the beginning of every transmission to establish or maintain the link to the remote WIRES™ repeater, while operating in the "SRG" ("Sister Repeater Group") mode.
4. To disable the Internet Connection feature, press the [⊠] key again.

For more information on WIRES™, go online to http://www.yaesu.com/amateur/pdf/brochures/WIRES.pdf for an informative brochure. Or send an e-mail to WIRES@vxstdusa.com.

You may access other Internet Link Systems that use a DTMF string for access.

1. Press and hold in the [**MHz**(**SET**)] key for one second, then rotate the **DIAL** knob to select "**10 DT MEM**."
2. Press the [**MHz**(**SET**)] key momentarily, then load the DTMF tones which you wish to use to establish an Internet link (the linking system's Home Page should have this information) into the desired DTMF Memory channel.
   1). Rotate the **DIAL** knob to select the DTMF Autodialer memory channel number ("**DTMF-1**" through "**DTMF-9**").
   2). Press the [**D/MR**(**MW**)] key momentarily.
   3). Rotate the **DIAL** knob to select the DTMF code, then press the [**REV**(**DW**)] key momentarily to move the digit.
   4). Repeat step 3) above as many times as needed to complete the access string.
   5). Press the [**MHz**(**SET**)] key momentarily to save the new setting.
3. Rotate the **DIAL** knob to select "**13 INTNET**."
4. Press the [**MHz**(**SET**)] key momentarily, then rotate the **DIAL** knob to set this item to "**LINK**" (to enable the alternate Internet Link, and disable the WIRES™ access option).
5. Press and hold in the [**MHz**(**SET**)] key for one second to save the new setting and exit to normal operation.
6. Press the [⊠] key momentarily to activate the Internet Link System. The "**int**" icon will then appear in the memory channel field while the Internet Link System access feature is engaged.

7. Rotate the **DIAL** knob, while pressing and holding in the [⊠] key, to select the DTMF access number ("**DTMF-1**" ~ "**DTMF-9**") corresponding to the Internet link repeater to which you wish to establish an Internet link.
8. With the Internet link feature activated (as in step 6 above), press the [⊠] key or microphone's [**P2**] key to send out the DTMF tones according to your selection in step 7 (to establish the link to the Internet link repeater).
9. To disable the Internet link feature, press the [⊠] key again.

To return to WIRES™, recall Menu "**13 INTNET**" then set it to "**WIRES**."

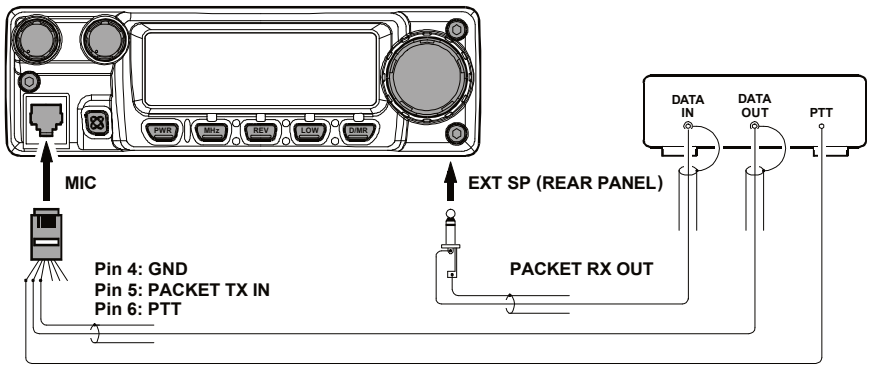
PACKET OPERATION

The **FT-2800M** may be used for 1200 bps Packet operation, using most all commonly-available Terminal Node Controllers (TNCs). Connections between the transceiver and the TNC are accomplished via the front panel Microphone connector and rear panel External Speaker jack, per the diagram below.

The audio level from the receiver to the TNC may be adjusted by using the **VOL** knob, as with voice operation. The input level to the **FT-2800M** from the TNC should be adjusted at the TNC side; the optimum input voltage is approximately 4 mV at 2000 Ohms.

Setting of the optimum TX Audio level: first, connect the **MH-48A6J** to the Microphone connector, and while listening on a monitor receiver, transmit on the **FT-2800M** and press one or more of the Microphone's DTMF keys. Note the audio level of the DTMF tones heard in the monitor receiver, then, after removing the microphone and hooking up the TNC, set the TX Data level "by ear" to about the same level. In most cases, this level of accuracy in adjustment will be sufficient for good throughput.

Be sure to turn the transceiver and TNC off before connecting the cables, so as to prevent voltage spikes from possibly damaging your transceiver.



MISCELLANEOUS SETTINGS

TIME-OUT TIMER

The "Time-Out Timer" (TOT) feature is designed to force the transceiver into the "receive" mode after a preset time period of continuous transmission (the default is 6 minutes). This feature prevents your transceiver from transmitting a "dead carrier" for a long period of time in the event that the microphone **PTT** switch is accidentally locked in the "TX" condition.

The Time-Out Timer's "switch-to-receive" time may be adjusted, in one minute increments, for any period between 1 and 60 minutes.

To change the default (6 minutes) time setting:

1. Press and hold in the [**MHz**(**SET**)] key for one second, then rotate the **DIAL** knob to select "**31 TOT**."
2. Press the [**MHz**(**SET**)] key, then rotate the **DIAL** knob to select the desired interval (between **1** and **60** minutes), or **OFF**.
3. Press and hold in the [**MHz**(**SET**)] key for one second to save the new setting and exit to normal operation.

AUTOMATIC POWER-OFF

The "Automatic Power-Off" (APO) feature will turn the radio completely *off* after a user-defined period of **PTT** or key/button inactivity. If you do not press any front panel keys or buttons, rotate the **DIAL** knob, use the microphone's keys and buttons, or transmit, and so long as the transceiver is not scanning or engaged in priority monitoring, the radio will shut itself off after the specified time period. This feature is useful in minimizing battery drain in a mobile installation if you forget to turn the transceiver off when you leave your vehicle.

To activate the APO feature:

1. Press and hold in the [**MHz**(**SET**)] key for one second, then rotate the **DIAL** knob to select "01 APO."
2. Press the [**MHz**(**SET**)] key, then rotate the **DIAL** knob to select the desired "switch-off" time (between **1** and **12** hours), or **OFF**.
3. Press and hold in the [**MHz**(**SET**)] key for one second to save the new setting and exit to normal operation.

PROGRAMMING THE KEY ASSIGNMENTS

Default **FT-2800M** key functions have been assigned to the Microphone's [**P1**]/[**P2**]/[**P3**]/[**P4**] buttons at the factory. These may be changed by the user, if you wish to assign quick access to another function.

To change the assignments for the programmable keys:

1. Press and hold in the [**MHz**(**SET**)] key for one second, then rotate the **DIAL** knob to select the Menu Item to be configured ("**15 PRG P1**," "**16 PRG P2**," "**17 PRG P3**," or "**18 PRG P4**").
2. Press the [**MHz**(**SET**)] key, then rotate the **DIAL** knob to select the function you wish to assign to the button you selected in the previous step. The available choices are:
   DC IN: Indicates the current DC supply voltage.
   DIMR: Sets the display brightness.
   WX CH: Switches operation to the Weather channels bank.
   INTKEY: Provides On/Off control for Internet access.
   SKIP: Allows you to select channels to be skipped during scanning.
   SQLOFF: Opens the Squelch to allow un-muted reception
   S SRCH: Engages Smart Search operation.
   TONE: Selects the CTCSS frequency
   T SRCH: Engages the Tone Search Scanning feature.
   T CALL: Activates 1750 Hz Tone Burst
   RPTR: Selects the Repeater Shift direction manually.
3. Press the [**MHz**(**SET**)] key momentarily to save the new setting, then rotate the **DIAL** knob to select another programmable button to modify, if desired, and repeat the above steps.
4. Press and hold in the [**MHz**(**SET**)] key for one second to exit to normal operation.

MISCELLANEOUS SETTINGS

MIC GAIN CONTROL

You can reduce the microphone input level when operating on tightly-clustered frequencies (channel spacing of 12.5 or 15 kHz). This will reduce the transmitter deviation, thus minimizing interference to other users.

To configure for the narrower bandwidth, use the following procedure:

1. Press and hold in the [**MHz**(**SET**)] key for one second, then rotate the **DIAL** knob to select "**33 W/N DV**."
2. Press the [**MHz**(**SET**)] key, then rotate the **DIAL** knob to change the display to "**NARROW**."
3. Press and hold the [**MHz**(**SET**)] key for one second to save the new setting and exit to normal operation.
4. To return to wide deviation, repeat the above procedure, selecting "**WIDE**" in step 2 above.

RESET PROCEDURE

In some instances of erratic or unpredictable operation, the cause may be corruption of data in the microprocessor (due to static electricity, etc.). If this happens, resetting of the microprocessor may restore normal operation. Note that all memories will be erased if you do a complete microprocessor reset, as described below.

MICROPROCESSOR RESETTING

To clear all memories and other settings to factory defaults:

1. Turn the radio off.
2. Press and hold in the [**MHz**(**SET**)], [**REV**(**DW**)], [**LOW**(**A/N**)] and [**D/MR**(**MW**)] keys while turning the radio on. The "**MASRST**" notation will appear on the display.
3. Press the [**D/MR**(**MW**)] key momentarily to reset all settings to their factory defaults (press any other key to cancel the Reset procedure).

SET MODE RESETTING

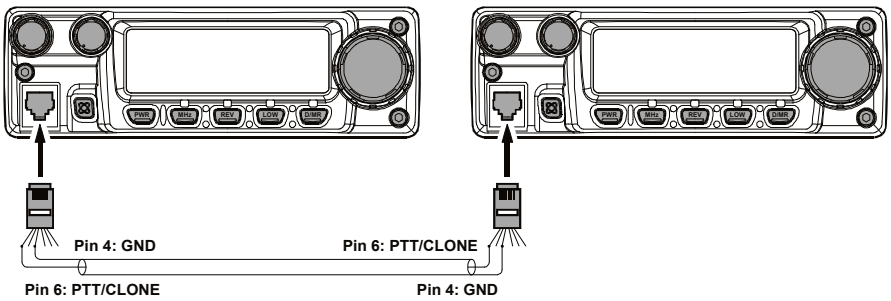
To reset the Set (Menu) mode settings to their factory defaults, while leaving other settings unchanged:

1. Turn the radio off.
2. Press and hold in the [**REV**(**DW**)], [**LOW**(**A/N**)] and [**D/MR**(**MW**)] keys while turning the radio on. The "**SETRST**" notation will appear on the display.
3. Press the [**D/MR**(**MW**)] key momentarily to reset the Set (Menu) mode settings to their factory defaults (press any other key to cancel the Reset procedure).

CLONING

The **FT-2800M** includes a convenient "Clone" feature, which allows the memory and configuration data from one transceiver to be transferred to another **FT-2800M**. This can be particularly useful when configuring a number of transceivers for a public service operation. Here is the procedure for Cloning one radio's data to another:

1. Turn both radios off.
2. Connect the user-constructed cloning cable between the **MIC** jacks of the two radios.
3. Press and hold in the [**MHz**(**SET**)], [**LOW**(**A/N**)], and [**D/MR**(**MW**)] keys while turning the radios on. Do this for both radios (the order of switch-on does not matter). "**TX RX**" will appear on the displays of both radios when the Clone mode is successfully activated in this step.
4. On the ***Destination radio***, press the [**LOW**(**A/N**)] key ("**R**" will appear on the LCD).
5. Press the [**MHz**(**SET**)] key on the ***Source radio***; "**T**" will appear on the Source radio, and the data from this radio will be transferred to the other radio.
6. If there is a problem during the cloning process, "**ERROR**" will be displayed. Check your cable connections and battery voltage, and try again.
7. If the data transfer is successful, "**PASS**" will appear on both displays.
8. Press any key to exit to normal operation.
9. Turn both radios off and disconnect the cloning cable.



"SET" (MENU) MODE

The **FT-2800M** Set (Menu) mode, already described in parts of many previous chapters, is easy to activate and set. It may be used for configuration of a wide variety of transceiver parameters, some of which have not been detailed previously. Use the following procedure to activate the Set (Menu) mode:

1. Press and hold in the [**MHz**(**SET**)] key for one second to enter the Set mode.
2. Rotate the **DIAL** knob to select the Menu Item to be adjusted.
3. Press the [**MHz**(**SET**)] key momentarily to enable adjustment of the selected Menu item, then rotate the **DIAL** knob to perform the actual adjustment.
4. After completing your selection and adjustment, press and hold in the [**MHz**(**SET**)] key for one second to exit the Set mode and exit to normal operation.

Menu Item	Function	Available Values	Default
00 ALPH	Programming an Alpha/Numeric label for a memory.	—	—
01 APO	Enables/disables the Automatic Power Off feature.	1H - 12 H, or OFF	OFF
02 ARS	Activates/deactivates the Automatic Repeater Shift feature.	ON/OFF	ON
03 BEEP	Enables/disables the key beeper.	ON/OFF	ON
04 BELL	Selects the CTCSS/DCS Bell Ringer repetitions.	1, 3, 5, 8, REPEAT, or OFF	OFF
05 CK SFT	Shifting of the CPU clock frequency.	ON/OFF	OFF
06 DC IN	Indicates the DC Supply Voltage.	—	—
07 DIMR	Setting of the front panel display's illumination level.	1, 2, 3, or OFF	2
08 DTMF	Enables/disables the DTMF Autodialer.	ON/OFF	OFF
09 DT DLY	Setting of the DTMF Autodialer's TX Delay Time.	50/250/450/750/1000 (ms)	450 (ms)
10 DT MEM	Loading of the DTMF Autodialer Memories.	—	—
11 DT SPD	Setting of the DTMF Autodialer Sending Speed.	50/100 (ms)	50 (ms)
12 EDG BP	Enables/disable the Band-edge beeper while scanning.	ON/OFF	ON
13 INTNET	Selects the Internet Connection mode.	WIRES/LINK	WIRES
14 LOCK	Selects the Control Locking Lockout combination.	KEY/DIAL/K+D/PTT/K+P/ D+P/ALL/OFF	OFF
15 PRG P1	Programming the function assigned to Microphone's [**P1**] key.	SQLOFF/S SRCH/TONE/ T SRCH/T CALL/RPTR/ DC IN/DIMR/WX CH/ INTKEY/SKIP	※1
16 PRG P2	Programming the function assigned to Microphone's [**P2**] key.		S SRCH
17 PRG P3	Programming the function assigned to Microphone's [**P3**] key.		T SRCH
18 PRG P4	Programming the function assigned to Microphone's [**P4**] key.		WX CH
19 REV HM	Selects the Primary function of the [**REV**(**DW**)] key.	REV/HOME	REV
20 RF SQL	Adjusts the RF Squelch threshold level.	1 - 10, or OFF	OFF
21 RPTR	Sets the Repeater Shift direction.	–RPTR/+RPTR/SIMP	SIMP
22 RVRT	Enables/disables the "Priority Channel Revert" feature.	ON/OFF	OFF
23 SCAN	Selects the Scan Resume mode.	BUSY/HOLD/5 SEC	BUSY
24 SHIFT	Sets the magnitude of the Repeater Shift	00.00 - 99.95 (MHz)	00.60 (MHz)
25 SKIP	Selects the Memory Scan mode.	SKIP/ONLY/OFF	OFF
26 SQ DCS	Setting of the DCS code	104 standard DCS codes.	023
27 SQ TNF	Setting of the CTCSS Tone Frequency.	50 standard CTCSS tones.	100.0 (Hz)
28 SQ TYP	Selects the Tone Encoder and/or Decoder mode.	T ENC/TSQ/DC ENC/DCS/ T;DCS/TSQ+DC/OFF	OFF
29 STEP	Sets the Synthesizer steps.	5k/10k/12.5k/15k/20k/25k/ 50k/100k (Hz)	※1
30 S SRCH	Selects the Smart Search Sweep mode.	SINGLE/CONT	SINGLE
31 TOT	Sets the Time-Out Timer.	1 MIN - 60 MIN, or OFF	6 MIN
32 W ALT	Enables/disables the Weather Alert feature.	ON/OFF	OFF
33 W/N DV	Reducing the MIC gain	WIDE/NARROW	WIDE

※1: Depends on the Transceiver Version.

"SET" (MENU) MODE

MENU SELECTION DETAILS

00 ALPH
Function: Programming an Alpha/Numeric label for a memory. See page 31 for details.

01 APO
Function: Enables/disables the Automatic Power Off feature.
Available Values: 1H - 12 H, or OFF (1 Hour ~ 12 Hours)
Default: OFF

02 ARS
Function: Activates/deactivates the Automatic Repeater Shift feature.
Available Values: ON/OFF
Default: ON

03 BEEP
Function: Enables/disables the key beeper.
Available Values: ON/OFF
Default: ON

04 BELL
Function: Selects the CTCSS/DCS Bell Ringer repetitions.
Available Values: 1, 3, 5, 8, REPEAT, or OFF
Default: OFF

05 CK SFT
Function: Shifting of the CPU clock frequency.
Available Values: ON/OFF
Default: OFF
This function is only used to move a spurious response "birdie," should it fall on a desired frequency.

06 DC IN
Function: Indicates the DC Supply Voltage.

07 DIMR
Function: Setting of the front panel display's illumination level.
Available Values: 1, 2, 3, or OFF
Default: 2

08 DTMF
Function: Enables/disables the DTMF Autodialer.
Available Values: ON/OFF
Default: OFF

MENU SELECTION DETAILS

09 DT DLY
Function: Setting of the DTMF Autodialer's TX Delay Time.
Available Values: 50/250/450/750/1000 (ms)
Default: 450 (ms)

10 DT MEM
Function: Loading of the DTMF Autodialer Memories. See page 28 for details.

11 DT SPD
Function: Setting of the DTMF Autodialer Sending Speed.
Available Values: 50/100 (ms)
Default: 50 (ms)

12 EDG BP
Function: Enables/disable the Band-edge beeper while scanning.
Available Values: ON/OFF
Default: ON

13 INTNET
Function: Selects the Internet Connection mode.
Available Values: WIRES/LINK
Default: WIRES

14 LOCK
Function: Selects the Control Locking Lockout combination.
Available Values: KEY/DIAL/K+D/PTT/K+P/D+P/ALL/OFF
Default: OFF
KEY: Just the front panel keys are locked out
DIAL: Just the front panel DIAL knob is locked out
K+D: Both the keys and DIAL knob are locked out
PTT: The PTT switch is locked (TX not possible)
K+P: Both keys and PTT switch are locked out
D+P: Both DIAL knob and PTT switch are locked out
ALL: All of the above are locked out
OFF: The Lock feature is disabled

MENU SELECTION DETAILS

15 PRG P1

Function: Programming the function assigned to Microphone's [**P1**] key. See page 45 for details.
Available Values: SQLOFF/S SRCH/TONE/T SRCH/T CALL/RPTR/DC IN/DIMR/WX CH/INTKEY/SKIP
Default: USA version; SQLOFF, EXT version; T CALL

16 PRG P2

Function: Programming the function assigned to Microphone's [**P2**] key. See page 45 for details.
Available Values: SQLOFF/S SRCH/TONE/T SRCH/T CALL/RPTR/DC IN/DIMR/WX CH/INTKEY/SKIP
Default: S SRCH

17 PRG P3

Function: Programming the function assigned to Microphone's [**P3**] key. See page 45 for details.
Available Values: SQLOFF/S SRCH/TONE/T SRCH/T CALL/RPTR/DC IN/DIMR/WX CH/INTKEY/SKIP
Default: T SRCH

18 PRG P4

Function: Programming the function assigned to Microphone's [**P4**] key. See page 45 for details.
Available Values: SQLOFF/S SRCH/TONE/T SRCH/T CALL/RPTR/DC IN/DIMR/WX CH/INTKEY/SKIP
Default: WX CH

19 REV HM

Function: Selects the Primary function of the [**REV**(**DW**)] key.
Available Values: REV/HOME
Default: REV
REV: Pressing the [**REV**(**DW**)] key reverses the transmit and receive frequencies during repeater operation.
HOME: Pressing the [**REV**(**DW**)] key instantly recalls a favorite "Home" channel.

MENU SELECTION DETAILS

20 RF SQL

Function: Adjusts the RF Squelch threshold level.
Available Values: 1 - 10, or OFF
Default: OFF

21 RPTR

Function: Sets the Repeater Shift direction.
Available Values: –RPTR/+RPTR/SIMP
Default: SIMP

22 RVRT

Function: Enables/disables the "Priority Channel Revert" feature.
Available Values: ON/OFF
Default: OFF

23 SCAN

Function: Selects the Scan Resume mode.
Available Values: BUSY/HOLD/5 SEC
Default: BUSY

BUSY: The scanner will remain halted for as long as there is carrier present on the channel; after the carrier drops at the end of the other station's transmission, the scanner will resume.

HOLD: The scanner will halt on a signal it encounters. It will not restart automatically; you must manually re-initiate scanning if you wish to resume.

5 SEC: The scanner will halt for five seconds *only*, after which scanning will resume (whether or not the other station is still transmission).

24 SHIFT

Function: Sets the magnitude of the Repeater Shift
Available Values: 00.00 - 99.95 (MHz) (only shifts of less than 4 MHz will work)
Default: 00.60 (MHz)

25 SKIP

Function: Selects the Memory Scan mode.
Available Values: SKIP/ONLY/OFF
Default: OFF

SKIP: The scanner will "skip" the flagged channels during scanning.

ONLY: The scanner will only scan channels that are flagged (Preferential Scan List).

MENU SELECTION DETAILS

26 SQ DCS

Function: Setting of the DCS code
Available Values: 104 standard DCS codes.
Default: 023

27 SQ TNF

Function: Setting of the CTCSS Tone Frequency.
Available Values: 50 standard CTCSS tones.
Default: 100.0 (Hz)

28 SQ TYP

Function: Selects the Tone Encoder and/or Decoder mode.
Available Values: T ENC/TSQ/DC ENC/DCS/T+DCS/TSQ+DC/OFF
Default: OFF

T ENC: CTCSS Encoder
TSQ: CTCSS Encoder/Decoder
DC ENC: DCS Encoder only
DCS: Digital Code Squelch Encoder/Decoder
T+DCS: Encodes a CTCSS tone and Decodes a DCS code
TSQ+DC: Encodes a DCS tone and Decodes a CTCSS tone

29 STEP

Function: Sets the Synthesizer steps.
Available Values: 5k/10k/12.5k/15k/20k/25k/50k/100k (Hz)
Default: USA version; 5 k (Hz), EXT version; 12.5 k (Hz)

DCS CODE									
023	025	026	031	032	036	043	047	051	053
054	065	071	072	073	074	114	115	116	122
125	131	132	134	143	145	152	155	156	162
165	172	174	205	212	223	225	226	243	244
245	246	251	252	255	261	263	265	266	271
274	306	311	315	325	331	332	343	346	351
356	364	365	371	411	412	413	423	431	432
445	446	452	454	455	462	464	465	466	503
506	516	523	526	532	546	565	606	612	624
627	631	632	654	662	664	703	712	723	731
732	734	743	754	–	–	–	–	–	–

CTCSS TONE FREQUENCY (Hz)					
67.0	69.3	71.9	74.4	77.0	79.7
82.5	85.4	88.5	91.5	94.8	97.4
100.0	103.5	107.2	110.9	114.8	118.8
123.0	127.3	131.8	136.5	141.3	146.2
151.4	156.7	159.8	162.2	165.5	167.9
171.3	173.8	177.3	179.9	183.5	186.2
189.9	192.8	196.6	199.5	203.5	206.5
210.7	218.1	225.7	229.1	233.6	241.8
250.3	254.1	–	–	–	–

MENU SELECTION DETAILS

30 S SRCH

Function: Selects the Smart Search Sweep mode.
Available Values: SINGLE/CONT
Default: SINGLE

SINGLE: In this mode, the transceiver will sweep the current band once in each direction starting on the current frequency. All channels where activity is present will be loaded into the Smart Search memories; whether or not all 31 memories are filled, the search will stop after one sweep in each direction.

CONT: In this mode, the transceiver will make one pass in each direction as with One-Shot searching; if all 31 channels are not filled after the first sweep, however, the radio will continue sweeping until they are all filled.

31 TOT

Function: Sets the Time-Out Timer.
Available Values: 1 MIN - 60 MIN, or OFF
Default: 6 MIN

32 W ALT

Function: Enables/disables the Weather Alert feature.
Available Values: ON/OFF
Default: OFF

33 W/N DV

Function: Reducing the MIC gain.
Available Values: WIDE/NARROW
Default: WIDE

NOTE

1. Changes or modifications to this device not expressly approved by VERTEX STANDARD could void the user's authorization to operate this device.
2. This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions; (1) this device may not cause harmful interference, and (2) this device must accept any interference including interference that may cause undesired operation.
3. The scanning receiver in this equipment is incapable of tuning, or readily being altered, by the User to operate within the frequency bands allocated to the Domestic public Cellular Telecommunications Service in Part 22.

Part 15.21: Changes or modifications to this device not expressly approved by Vertex Standard could void the user's authorization to operate this device.

DECLARATION BY MANUFACTURER

The Scanner receiver is not a digital scanner and is incapable of being converted or modified to a digital scanner receiver by any user.

WARNING: MODIFICATION OF THIS DEVICE TO RECEIVE CELLULAR RADIOTELEPHONE SERVICE SIGNALS IS PROHIBITED UNDER FCC RULES AND FEDERAL LAW.



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