YAESU

FT-3000M

2-Meter FM Mobile Transceiver
w/Digital Voice and UHF Receiver
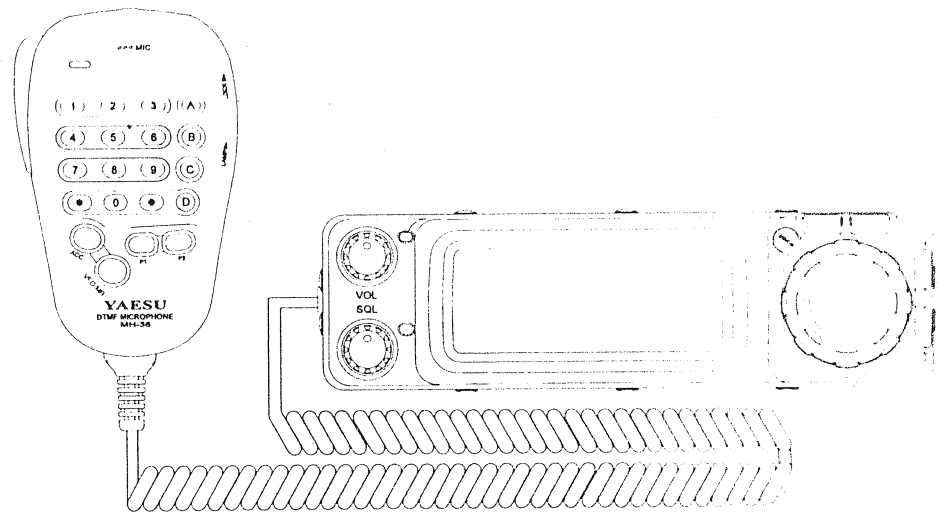
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FT-3000M 2-meter FM Mobile Paging Transceiver with Digital Voice and UHF Receive

The FT-3000M is a deluxe compact FM mobile transceiver for 2-m amateur band operation. New features include the following:

Spare receiver for UHF (70-cm) operation - now operate cross-band split, full-duplex, or repeat (transmit on VHF only).

Extended receiver range - In USA versions, scanning enthusiasts will enjoy the wide-range reception without the need for internal modifications. Receiver coverage is 110-180 MHz (VHF), 300-520 MHz (UHF) and 800-999 MHz (cellular blocked, non-restorable). AM receive activates automatically from 110-137 MHz for airband tuning and scanning.

Menu-style programming - instant-recall menu list allows viewing and programming over 50 important transceiver settings for "set and forget" operation.

Dual, concentric multi-purpose selector knobs - allow tuning, menu programming access and selection entry while keeping front panel knobs and controls to a minimum.

Smart-Search - scans for station activity, then saves active channels directly into memories, arranged according to frequency or signal strength!

Dual-Watch - automatically checks for activity on the sub-channel every two seconds while you are receiving on another frequency.

DCS (Digital Coded Squelch) - offers an added degree of privacy over CTCSS tone squelch with 104 subaudible digitally coded tones.

ARTS (Auto Range Transpond System) - uses DCS to poll other stations, indicating if they are within or out of range, and automatically ID with your callsign in Morse code every 9 minutes.

Digital Recording & Playback Feature - provides 16 seconds of voice recording from the microphone or receiver, for playback through the speaker or the transmitter. Voice recording can be activated manually or by an incoming signal.

Voice Mail Paging System - when used together with DTMF paging, the radio can reply to calls automatically with a pre-stored voice message and CW identifier (optional DVS-4 required).

DTMF Remote Control - uses DTMF tones transmitted from another radio to control and activate FT-3000M functions.

Configurable Memory Banks – seventy general-purpose memories are arranged into seven banks, and

Introduction

you can transfer memories from one bank to others as needed. Eleven special-purpose memories (including an instant-recall Home channel) are also available. Memories can be tagged with an 5-character alphanumeric name, and this name can be displayed instead of the frequency.

Four user-programmed function keys - makes more complex functions as simple as the push of a button.

Standard features include a multi-function LCD that shows channel data and most programmable settings; you can even display the DC supply voltage. The lower display shows programming menus and also doubles as a Spectrum Scope display for viewing channel activity. The LCD has selectable brightness for maximum visibility under varying lighting.

Searching for station activity is easy with VFO, memory and programmed-limit (sub band) scanning and the new Spectrum Scope feature. Select all memories or only those you want to be scanned. Scanning pauses, then resumes after 5-seconds, or only when the station stops transmitting. One priority memory can be monitored every few seconds while operating from the VFO or memories.

The optional CTCSS (Continuous Tone-Coded Squelch System) provides 39 subaudible tones which can be stored in each memory independently. The CTCSS Bell feature can be set to ring when the tone squelch open. DTMF calling and paging quietly monitor until calls to you (or only stations in groups you select) are received. The station's ID code is then displayed so you know who is calling you. With answer-back paging, the FT-3000M can even acknowledge or relay (forward) DTMF paging calls when you are absent. The Trigger Paging function switches from paging to code squelch operation after receiving a page by pressing the PTT so you can talk immediately. The DTMF paging ringer can be disabled, or set to ring 1, 3, or 5 times, and even cycle every minute until you respond. With the one-touch paging feature, selecting and displaying paging codes is simplified.

For autopatch operation, a 10-memory, 24-digit DTMF autodialer stores nine frequently-called numbers and one memory reserved for a user-programmed DTMF melody ringer for playback. The DTMF autodial memories can also be tagged with five-character alphanumeric names.

The Tx time-out timer (TOT) limits key-down time and the selectable-period APO (Automatic Power Off) timer turns off the radio after a period of inactivity. A convenient rear-panel data jack is provided for packet TNC connection. Data rate (1200/9600 BPS) selection can be configured via menu programming. Transceiver cloning are also accomplished using this jack.

Please take some time to review this manual thoroughly before commencing operation.

Specifications

General

Frequency range:	(Rx) 110~180 MHz 300~520 MHz
	800-999 MHz (cellular blocked)
	(Tx) 144~148 MHz
Channel steps:	5*, 10*, 12.5, 15*, 20, 25 & 50 kHz
	(*not available from 800-999 MHz)
Frequency stability:	±5 ppm from -5 to +60° C
Repeater shift:	±600 kHz (programmable)
Emission type:	F3 (G3E), F2
Supply voltage:	13.8 VDC ±15%
Current consumption:	
Receive:	less than 800 mA (signal)
	less than 500 mA (squelched)
Transmit (Max.) (h/m/l)	15/10/7/5 A (H/L3/L2/L1)
Operating temp. range:	-20 to +60° C
Case size (WHD):	140 × 40 × 180 w/o knobs
Weight (approx.):	1.25 kg (2.75 lb)

Transmitter

RF output(H/L3/L2/L1):	70W/50W/25/10 W
Modulation system:	variable reactance
Maximum deviation:	± 5 kHz
Spurious emissions:	> 60 dB below carrier
Microphone type:	2-kΩ condenser

Receiver

Circuit type: double-conversion superheterodyne	
IFs:	45.05 MHz & 455 kHz
12-dB SINAD Sensitivity:	< 0.20 μV (VHF)
	< 0.25 μV (UHF)
Selectivity (-6/-60 dB):	15/28 kHz
Image Rejection:	better than 70 dB (VHF)
Squelch Sensitivity:	better than 0.12 μV (VHF)
	better than 0.16 μV (UHF)
AF Output:	2 W @ 8Ω for 10% THD
AF Output Impedance:	4~16 Ω (8-Ω internal speaker)

Specifications subject to change without notice or obligation Specifications guaranteed within amateur bands only Frequency range and repeater shift vary according to transceiver version.

Accessories & Options

Accessories

MH-36A6J DTMF Microphone   *(or)*

MH-42A6J Hand Scanning Microphone

MMB-36 Mobile Mounting Bracket

DC Power Cord w/fuse

Spare 15-A Fuse

Options

FTS-17A Tone Squelch Unit

SP-7 External Loudspeaker

DVS-4 Digital Voice Recorder Unit

FP-800 AC Power Supply w/Loudspeaker

MMB-60 Quick-Release Mobile Bracket

Availability of accessories may vary. Some accessories are supplied as standard per local requirements, others may be unavailable in some regions. Check with your local Yaesu dealer for changes to the above list.

Controls & Connectors

Front Panel

(1) SQL

This control sets the threshold level at which a received signal (or noise) opens the squelch and can be heard. For maximum squelch sensitivity, set this control just until noise is silenced (and the green lamp turns off) when the channel is clear.

(2) VOL

This control adjusts the volume of receiver audio and of the button beeper.

(3) TX Indicator

This LED indicator glows red when transmitting.

(4) LCD (Liquid Crystal Display)

The display consists of segmented digits for frequency readout and various icons representing enabled transceiver features, as well as for viewing menu programming and alphanumeric names. See the graphics on the next page for descriptions of the display icons and indications.

(5) 🔘

Pressing this starts band scanning of selected PMS memory pairs, and stores up to 20 active channels into reserved memories. Active channels are sorted according to frequency or received signal strength.

(6) [VFO/MR]
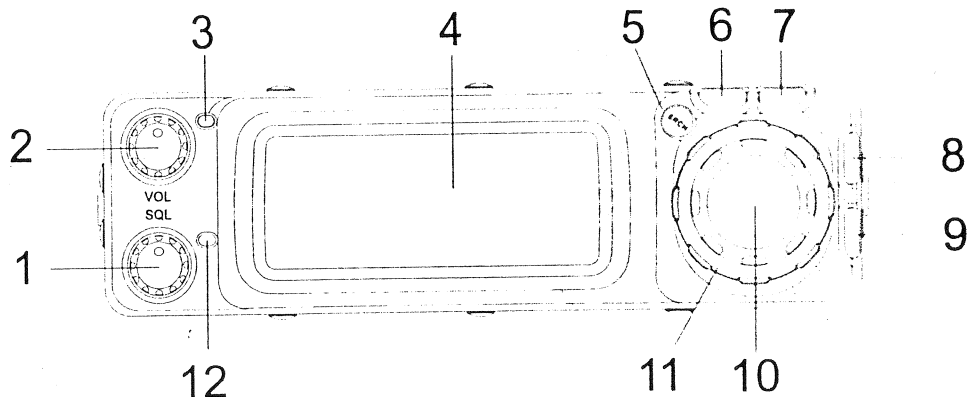
This toggles operation between VFO (dial) and MR (Memory Recall) operation.

(7) [⏻]

Hold this for ½ second to turn the transceiver on/off. Press momentarily to activate the auto-recording mode (optional DVS-4 unit required).

(8) [▣·]

Pressing this recalls the Home channel. This key is user-programmable and can be assigned a different function from the menu list for easier operation.

(9) [▣·] .

Pressing this activates the reverse function. This key is user-programmable and can be assigned a different function from the menu list for easier operation.

(10), (11) Rotary Selectors

In the VFO mode, the outer ring jumps in 1-MHz increments, while the inner knob tunes in the default channel step size. In MR operation, the outer ring selects memory banks, and the inner chooses memories within a bank.

Momentarily *pressing* the inner knob toggles the main and sub-channel display. *Holding* the knob depressed recalls the menu function list, in which the outer knob browses menu entries, and the inner knob changes or selects settings for the function.

(12) BUSY Indicator

This glows green when a signal is received.
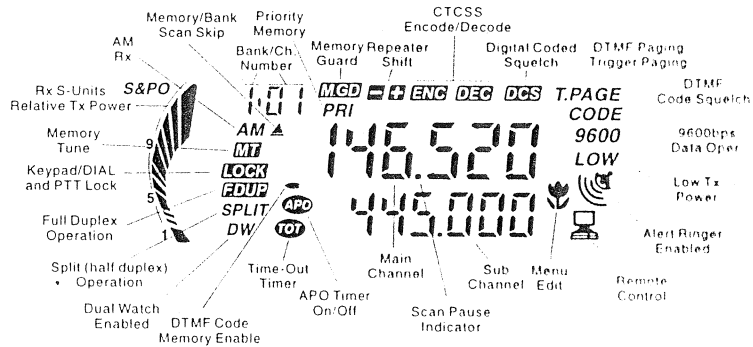
Rear Panel Connections

(1) ANT cable with connector

This Type-"M" connector accepts an antenna designed to provide 50-Ω impedance on 2-m & 70-cm. An external duplexer is not required.

(2) Cooling Fans

These activate and provide forced air cooling for the RF power amplifier heatsink when a preset temperature has been reached.

(3) EXT-SP Jack

This 2-conductor, 3.5-mm mini phone jacks provide audio output for an optional speaker (impedance is 8Ω). Inserting a plug into the jack disables audio from the internal speaker.

(4) +13.8 VDC Cable Pigtail

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 15 amperes (continuous duty). Make certain that the red lead connects to the positive side of the supply.

(5) DATA Jack

This provides interface connections for packet TNC operation and transceiver memory cloning.
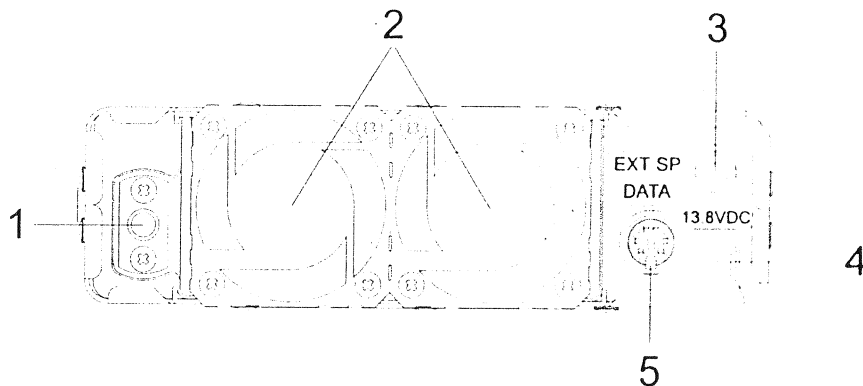
MH-36 Microphone & Keypad

(1) PTT

Press this to transmit, release to receive.

(2) DTMF Indicator

This turns red when the DTMF keys are pressed while transmitting.

(3) (DWN)/(UP)

Press or hold to tune up/down in the default channel step size. During Menu Programming, these move from displayed headings to available entries. With an entry selected, pressing (DWN) or (UP) moves between available fields for data entry.

(4) MIC

Beneath this grill is the condenser microphone element. Speak across this microphone opening in a normal tone of voice while pressing the PTT.
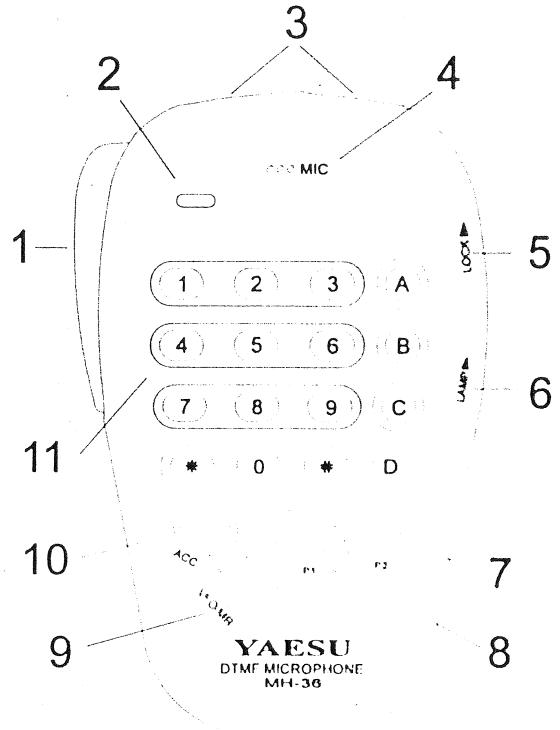
(5) LOCK ►

This switch locks the MH-36 controls and keys. Several locking variations are selectable.

(6) LAMP ►

This switch turns the keypad backlight on for easier viewing at night.

(7) ◯

This activates a user-programmed function, or else selects bands.

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MH-36 Microphone

(8) ◯

This activates a user-programmed function, or else selects transmitter output power levels.

(9) ◯

Pressing this momentarily toggles operation between the VFO or MR (Memory Recall) modes, holding it longer recalls the memory programming mode

(10) ◯

Press to activate the accessory function. In European versions, this keys the transmitter and sends a 1750-Hz tone burst to access repeaters requiring it. In other transceiver versions this key disable the receiver squelch to monitor for weak stations.

(11) ⓪ ~ ⑨, (*), (#), and Ⓐ ~ Ⓓ keys

These keys generate DTMF tones during transmit.

Note - DTMF keys may not be available on some transceiver versions. Microphone appearance may differ slightly from that shown in the drawing.

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Installation

Preliminary Inspection

Inspect the transceiver thoroughly upon opening the box. Confirm that all controls and switches work freely, and inspect the case for any damage. Make sure the accessory fuse is included. If any damage is found, document it completely, and contact the shipping company (or dealer, if you purchased it over the counter) right away. Save the packing materials in case you need to return the set for service. *If you purchased the optional FTS-17A or DVS-4, install them now as described on page 61.*

Installing the MH-36 Microphone

From the factory, the MH-36 is packaged separately from the transceiver body. It is installed by plugging the MH-36 cable into the jack on the left side of the transceiver body.

Antenna Considerations

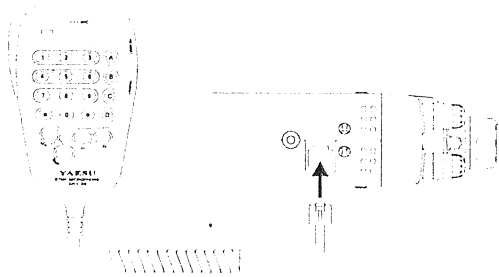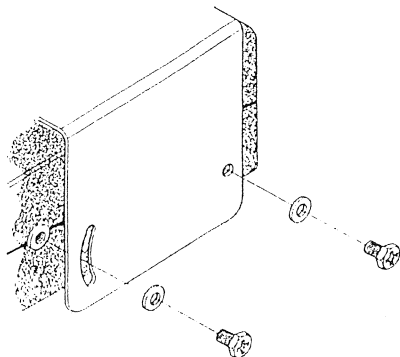Only connect an antenna having an impedance near 50 Ω at all operating frequencies. For optimum performance use a high quality, carefully-designed antenna. The antenna should be connected whenever power is on, to avoid damage that could otherwise result if transmission occurs accidentally without an antenna.

Ensure your antenna is designed to handle 100 Watts continuous transmitter power. For best performance and safety in mobile installations, mount the antenna in the center of a flat surface, out of reach of human hands; 70 Watts can cause an RF burn *to anyone touching the antenna during transmission!*

For best performance use the shortest possible length of quality coaxial cable. Use a matching type-M plug (PL-259) for the jack on the transceiver pigtail.

RF Hazard

The transmitter power output (70 Watts) can cause an RF burn *to anyone touching the antenna during transmission!*

WARNING!

Mobile Installation Tips

The FT-3000M must only be installed in cars having a *negative ground* electrical system, using the supplied MMB-36 mobile mounting bracket, or the optional MMB-60 quick release mounting bracket. Mount the transceiver where the display, controls and microphone are easily accessible.

The transceiver may be installed in any position, but avoid heater vents, or where it could interfere with driving. Make sure to provide plenty of space at the rear so that air can flow freely through the heatsink. Also ensure ample leg room for yourself or passenger when entering or exiting the vehicle. Refer to the diagrams showing installation.

Transceiver Installation

□ Decide the mounting location with sufficient clearance for the transceiver, plus space for ventilation around the cooling fan and above and below the set. Use the mounting bracket as a template to locate the mounting holes. Use a 4.8-mm (3/16") bit to drill the holes, and secure the bracket with the supplied screws, washers and nuts (see diagram).

□ Position the radio in the bracket so that the holes in the side are aligned with those in the bracket, and bolt the transceiver into place using the supplied short screws and flat washers. The MH-36 hanger may be installed wherever convenient.
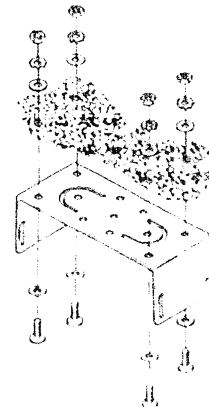
Mobile Operation

The FT-3000M is designed to provide many years of mobile operating pleasure. However, remember the following important advice:

! While driving, do not attempt to program transceiver menu settings, or other operations that might distract your attention from the road - *for safety's sake!*

! Never attempt to defeat or bypass the fuse — *it is there to protect you and the equipment!*

Power Connections

Connect the DC power cable *directly to the vehicle's battery*, rather than via a fuse block terminal, or cigarette lighter plug. This minimizes voltage drop and avoids blowing the car fuses. Determine the shortest, most direct route from the battery to the intended transceiver installation area.

The FT-3000M draws 15 amps during high power (70 watt) transmission, and may exceed the rating of some fuse block terminals. Before connecting the transceiver, check the voltage at the battery terminals while revving the engine. If it exceeds 15 volts, adjust the car regulator before proceeding.

☐ Connect the RED power cable lead to the POSITIVE (+) battery terminal, and the BLACK lead to the NEGATIVE (–) terminal. If you need to extend the power cable use #12 AWG or larger insulated, stranded copper wire. Connect the cable to the transceiver only after connecting to the battery.

☐ After making power connections, inspect the wiring route to ensure that cable leads cannot become pinched or bent due to opening or closing of the vehicle doors, hood, or seat/tilt wheel adjustment.

☐ The electrical distribution system of automobiles can sometime present noise interference to amateur transceivers. In addition to noise from spark plug discharge, modern vehicles use computer-controlled ignition systems, fluorescent discharge panel displays, and other circuitry cable of emitting RF energy. The FT-3000M contains noise filtering circuitry designed to reduce or eliminate this type of interference; however, if you experience vehicle noise, try the following steps to correct the problem.

☐ Ensure suppresser (resistor) type spark plugs are installed in your vehicle.

Warning!

Never apply AC power to the power cable of the transceiver, nor DC voltage greater than 15VDC. When replacing the fuse, only use a 15-A fast-blow type. Failure to observe these safety precautions will void the warranty.

☐ Whenever possible, try to route cables as far away as possible from the vehicle's ignition leads, dashboard, and computer systems (black boxes).

FP-800 AC Power Supply

Operation from the AC line requires a power supply capable of providing at least 15A continuously at 13.8 VDC. The FP-800 AC power supply/loudspeaker is available from your Yaesu dealer to meet these needs. Use the DC power cable supplied with the transceiver for making power connections, and connect the external speaker cable to either speaker jack on the rear panel.

External Speakers

The optional SP-7 External Speaker includes its own swivel-type mounting bracket, and is available from your Yaesu dealer. Of course the SP-3, SP-4, or SP-55 External Speakers may also be used. Plugging in an external speaker disables the speaker in the transceiver.

Menu Function Selections

No.	Label	Function	Page
01	SQL TYP	Select CTCSS encode (*ENC*), encode & decode (*ENC DEC*), digital-coded squelch (*DCS*), or none.	20, 37
02	CTCSS	Select a CTCSS tone (39 available) to be used for encoding and decoding.	20, 37
03	DCS	Select the desired code for DCS operation.	37
04	TX SFT	Select transmitter offset (shift direction) for repeater operation (+/-).	20
05	OFFSET	Select transmit shift offset frequency (in 50-kHz steps) for repeater operation.	20
06	REV	Reverse tx/rx frequency pair to monitor repeater "input."	20
07	ARS	Enable or disable Automatic Repeater Shift.	20
08	T PAGE	Choose a selective calling mode: DTMF Code Squelch (*CODE*). Paging (*PAGE*), or Trigger Paging (*T.PAGE*).	39, 43
09	PAGER	Program code memories 1~6, P & C with 3-digit number, select the desired code memory for operation, or else enable/disable particular code memories from operation.	41
10	ANSBK	Select an automated pager response mode: answer-back, page-forward or off.	44
11	CODE	Enter 3-digit code for use with DTMF code squelch.	39
12	P-DLY	Select a Tx delay time of 250/450/750 ms or 1 second before paging tones are sent.	44
13	DTMF	Select DTMF autodial or DTMF analyzer function.	47
14	TX PWR	Select high or low (L1, L2, or L3) transmitter power.	19
15	STEP	Select the default tuning step size (5, 10, 12.5, 15, 20, 25, or 50 kHz).	18
16	HOME	Recall the programmed home memory channel.	29
17	BAND S	Select VHF or UHF band for the sub receiver.	21
18	BANK	Configure memory channel and memory bank arrangement. Seventy memory channels can be assigned across 1 ~ 7 banks.	30
19	PRI CH	Assign priority to the displayed memory channel.	36
20	GUARD	Tag the displayed memory as "read-only" (guarded).	31

Menu Function Selections

No.	Label	Function	Page
21	M-TUNE	Enable retuning of a displayed memory channel.	29, 31
22	SKIP	Tag a memory channel to be skipped while scanning.	32
23	SCAN	Enable/disable scanning (dial or memory).	32
24	PRISCN	Enable/disable Priority Scanning feature.	36
25	RESUME	Select scan resume mode: pause for 5-seconds, or until carrier drops.	32
26	DUAL	Enable/disable Dual Watch feature.	22
27	MS_TYPE	Memory Scan Type - scan all memories in all banks, or single (displayed) bank.	32
28	PMS	Enable/Disable Programmed Memory Scanning (band-limited scanning).	33, 34
		PMS Channel Selection (SKIP set by VFO/MR).	34
30	SS_CH	Select PMS pair for Smart Search scanning.	35
31	S_SORT	Smart search sort mode: sort by frequency or signal strength.	35
32	NAMTAG	Alphanumeric entry & display alternation between A/N and frequency.	21, 31
33	S DISP	Sub Display format: select function guide / ch. nametag / ch. freq. / DC voltage / off	21
34	DIMMER	Select LCD backlight level from 1 (bright) to 8 (dim).	55
35	ARTS	Select ARTS (Auto Range Transponding System) mode: transceive/transmit/receive/off.	45, 46
36	ID	Program CW ID to be sent during ARTS operation.	46
37	CW ID	Enable/disable auto CW ID transmission during DTMF Paging (answer-back) operation.	46
38	BEEP	Turn the panel key beeper on/off.	55
39	ALTREP	Enable/disable alert ringer, and select 1, 3, or 5 ringer repetitions.	38, 39
40	ALTRNG	Select one of four alert ringer melodies.	39
41	SCOPE	Turn spectrum scope on/off.	24
42	APO	Select delay (1~12 hrs) before Auto Power Off, or disable feature.	55
43	TOT	Select delay (1~60 mins.) before Time-Out Timer unkeys transmitter, or disable feature.	55

Menu Function Selections

No.	Label	Function	Page
44	DUPLEX	Select cross-band split (half-duplex) or full-duplex operation.	22, 23
45	X-RPT	Enable/disable cross-band repeat (Rx:UHF, Tx:VHF only).	58
46	AM ON	Enable/disable automatic AM selection (between 110-137 MHz).	23
47	REMOTE	Enable/disable remote control operation (via DTMF codes).	53
48	PACKET	Select 1200/9600 bps data operation.	57
49	LOCK	Set the lock on/off (all or dial).	36
50	PTTLCK	Set the PTT lock on/off.	36
51	REC	Set recording from channel 1 or 2.	49, 50
52	PLAY	Set playback from channel 1 or 2.	50, 51
53	REC CH	Select recording format: 1ch. x 16 sec. or 2 ch. x 8 secs.	49, 50
54	UD KEY	Start recording using Up/Dwn keys.	50
55	KEY PS	Select key release time	56
56	DCS EN	Invert DCS encode	56
57	DCS DE	Invert DCS decode	56

Basic Operation

Introduction

These first steps will help you get you on the air quickly, while the more complex operating features and custom settings are covered later in the *Advanced Operation* chapter.

Turning the radio on/off.

Turn the transceiver on or off by *holding* 🔲 for ½ second.

Volume & Squelch

Rotate the **VOL** control adjust receiver volume. To set the squelch, turn the **SQL** control counter-clockwise until the green lamp comes on. Then turn it clockwise *a little past the point* where band noise is muted and the lamp turns off.

Adjusting it further allows only strong, relatively nearby stations to be heard. Likewise, with the squelch set just at the threshold, weak stations and channel noise will open the squelch.

Display Items

The LCD consists of a S&PO meter, main and sub operating display, memory readout, and various symbols showing active transceiver settings/functions. The picture on page 6 outlines each of the display symbols.
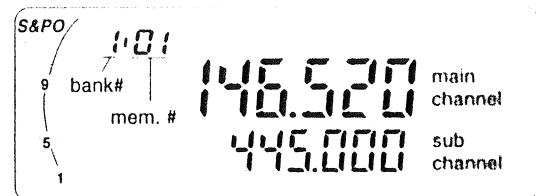
The upper frequency is the *main* channel (you transmit here), and below is the *sub* channel, which can be set to display one of several items, or else disabled. To switch the main/sub channels, *momentarily* (<½ sec.) press the inner selector knob.
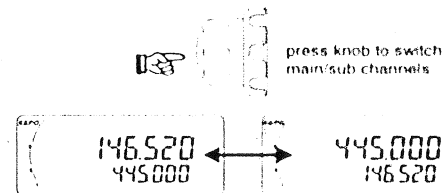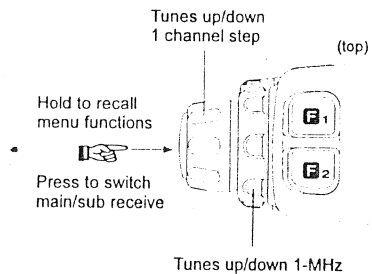
S&PO Meter

The meter segments indicate the relative strength of a received signal, or the RF power level while transmitting. It also shows station activity when the Spectrum Scope feature is activated (covered later).
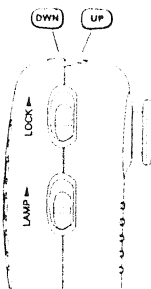
Tuning

You can tune the radio either from the front panel, or the microphone. The inner selector knob tunes in default steps, while the outer ring jumps in 1-MHz steps. Pressing the microphone (DWN) or (UP) keys tune in default steps only. Pressing the knob either toggles the main/sub channel, or recalls the menu list *depending on how long it is held* (see below).

Tunes up/down
1 channel step
(top)

Hold to recall
menu functions

Press to switch
main/sub receive

Tunes up/down 1-MHz

Microphone Keys

Pressing (DWN)/(UP) tunes down/up in the default step size, and holding the appropriate key longer begins scanning up/down. When enabled, direct frequency entry via the keypad can also be accomplished. To disable the microphone keypad (including the (DWN)/(UP) keys), slide the **LOCK►** switch upward. At night, you can turn on the keypad backlight by sliding the **LAMP►** switch upward.

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Channel Tuning Step Size

The default channel step size is set at the factory to match those used in the amateur bands for country the transceiver is shipped, and we recommend not changing them.

However, if your transceiver version permits tuning outside the amateur bands, you may wish to change the step size to match those used in other services (such as 50-kHz for airband channels). However, remember to restore the step size when back inside the amateur band.

You can change the default tuning steps by recalling menu 15, and turning the knob to select 5, 10, 12.5, 15, 20, 25 or 50 kHz steps.

Menu List

The internal menu allows easy access to over fifty essential transceiver settings, keeping only the most commonly used controls on the front panel.

☞ Please review these few steps on how to recall and change settings via the menu, as the basic procedures covered here are used throughout the remainder of the manual. The settings for most functions are changed with just a press and turn of the front panel selector controls - the more involved settings are explained in detail later.

To recall the menu:

☐ Press in the inner knob *longer than ½ second* (a beep sounds). The display shifts from channel data to the menu display mode:

Press and hold knob >1/2 sec. to recall menu list.
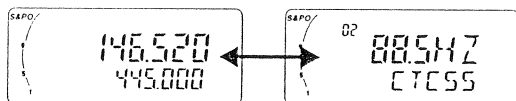
☐ Rotating the outer ring selects menu titles (numbered 01~54, while the inner knob changes the default setting or entry for that menu (or disables it in some cases). As each menu title appears, text describing the recalled menu scrolls below.

SELECT CTCSS TONE
Scrolling Help Guide
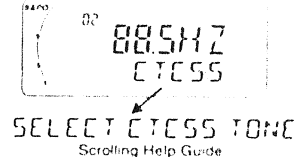
☐ After changing a setting or enabling/disabling a feature, *momentarily* press the inner knob to exit and return to the operating display.

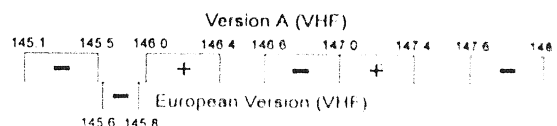## Transmitting

Select high or one of three low transmit power levels by pressing several times, *LOW* appears when a low power level is selected. To transmit, squeeze the PTT while speaking across the microphone in a normal voice. Release the PTT to receive again. During transmission, S&PO meter segments rise and the red transmit lamp glows. Transmit power levels are also selected via menu 14.

Repeater Operation ⊟⊞

The ARS (Auto Repeater Shift) feature automatically selects the correct transmit shift (⊟/⊞) used in standard repeater sub bands (see below).

ARS-Repeater Subbands

Version A (VHF)

| 145.1 | 145.5 | 146.0 | 146.4 | 146.6 | 147.0 | 147.4 | 147.6 | 148 |

European Version (VHF)
145.6 145.8

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Pressing the PTT is all that is normally needed to access most repeaters. To listen on a repeater *input* (to see if you can work a station direct), you can reverse Rx/Tx frequencies by pressing [○·], or via menu_06 (🔲 or 🔳 blink while the frequency pair are reversed).

For repeaters using a reverse shift, non-standard Tx offset, or requiring CTCSS, the following menu functions allow changing default settings as needed:

Tx Shift - recall menu 04, and rotate the knob to select 🔳 or 🔲.

Tx Offset (-600 kHz) is changed (in 50-kHz steps) within menu 05 by rotating the knob.

CTCSS Tones are selected within menu 02, and enabled (for encode) using menu 01.

Auto Repeater Shift (ARS) is turned on and off within menu 07.

Note: European versions can access repeaters requiring a 1750 Hz tone burst by pressing ◯ (this activates the transmitter and sends the 1750 Hz tone). In other versions this switch disables the receiver squelch.

Selecting VFO or MR (Memory Recall) Operation

Momentarily (<½ sec.) pressing ⊟ (or ◡) toggles VFO or MR operation, as outlined below:

VFO - Use this to tune or scan a band for a clear channel. The knob and ◡/◡ keys tune in the selected step size, while the outer ring jumps in 1-MHz steps. Scanning also tunes in the selected step size.

Memory Recall (MR) - This operates on stored memories. After programming commonly-used frequencies, you can recall these memories by selecting the MR mode. The knob, ◡/◡ keys and scanning function now select *stored memories*.

There are seventy regular memories, arranged into seven banks with ten memories in each. Five additional special-purpose memory-pairs store band scanning and tuning limits, and a "home" memory.

Memory Tuning - This allows tuning a programmed memory like a VFO, and overwriting its old contents with a new frequency, or storing the new frequency into another memory.

You easily can which mode is active by looking above and to the left of the first frequency digit. If you see small characters (such as *1-01* or *P 1L*), you are in the *MR mode*. The numbered annotation denotes bank and memory number (e.g. *1-01* indicates bank 1 - memory 1. Pressing ⊟ (or ◡) switches between the VFO and the last-used memory. While in the MR mode, your previous VFO settings are preserved.

Advanced Operation

Special Receiver Features

The sub-display and UHF receive capability of the FT-3000 offers some special display options and operating modes, covered next.

Sub-Display Options

Display appearance depends on the selected band, active (enabled) functions, and which sub-display option is chosen.

Channel	146.520 445.000	DC Volts	146.520 13.5V
Menu Guide	146.520 5 DISP	Name Tag	146.520 VHF
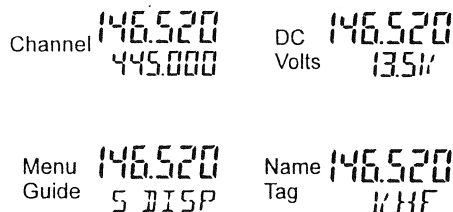
The sub-display can be set to one of five modes by recalling menu 33, and turning the knob to select:

GUIDE - short messages scroll across the lower display, explaining operation.

ALPHA - displays a default or custom alphanumeric name (up to 5 characters). Names are entered using menu 32.

FR/TAG - displays the sub-channel frequency. The default band (VHF or UHF) is selected from menu 17.

VOLTS - display and monitor the battery or DC power supply voltage.

OFF - turns off the sub-display.

For now, keep the sub-display set to FR/TAG (default), as future references and description in the manual assume this is selected.

Dual in-band (V&V/U&U) Channels

By default, the main and sub-channels display a preset VHF and UHF amateur calling channel. However, they can be set to the *same band* if desired:

☐ Press the knob to swap displays and place the band that needs changed into the upper (main channel) display.

☐ Now swap bands for the main channel recalling menu 17, turning the knob to select the desired band, then pressing the knob to exit. Remember, this only affects the *main channel*.

S&PO

145.000
146.520
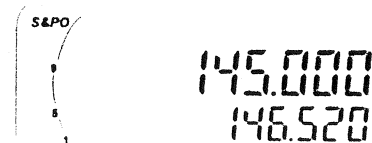
Dual-Watch Operation DW

This monitors the sub-channel for activity every two seconds, then the main and sub channels "swap" while a sub-channel call is received .

The switch occurs even if the main channel is busy. After the station stops transmitting, the sub-and main channels revert, and *dual-watch* starts again.

☐ To use *dual-watch*, set up the main and sub-channel as desired, recall menu 26, turn the knob to select ON, and press the knob to exit (*DW* appears).

When sub-channel activity is detected, the "swap" occurs, and the station is heard .
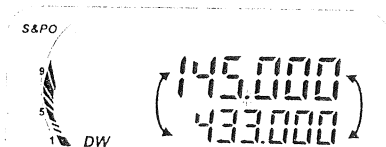
Note - if the sub-channel is a VHF frequency, you can operate during dual-watch by pressing the PTT after the station stops transmitting, but *before the main and sub-channels swap again* (you have about two seconds to do this).

Duplex Operation SPLIT FDUP

UHF receive capability allows cross-band operating choices, such as *split* and *full-duplex cross-band* operation, outlined below:

Split Operation -in this mode the main channel shows your receive frequency, and you transmit on the displayed sub-channel. This can be used to configure two VHF channels with a non-standard transmit split, or a VHF/UHF pair for *half-duplex* cross-band operation (Tx on VHF only).

☐ Set up the main and sub-channels as desired (the main channel can be VHF or UHF, but the sub-channel must be set to VHF to transmit).

☐ Recall menu 44, turn the knob to select SPLIT, then press to exit (*SPLIT* now appears).
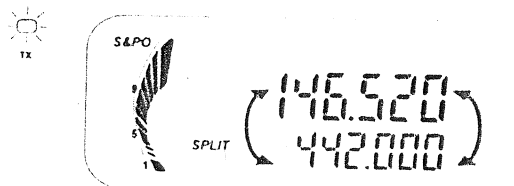
☐ When you press the PTT, the main and sub-channel swap, with your transmit frequency appearing in the main-channel display.

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Full Duplex Operation - this mode allows receiving on UHF while *simultaneously* transmitting on VHF for "telephone-style" QSOs with other stations set up for full-duplex operation, or operation with cross-band, full duplex telephone autopatch units.

☐ Set up a UHF frequency in the main channel, and VHF in the sub-channel as desired. Recall menu 44, turn the knob to select F DUP, then press to exit (FDUP now appears).

☐ When you press the PTT; the main and sub-channel swap, with the VHF transmit frequency appearing in the main-channel display.
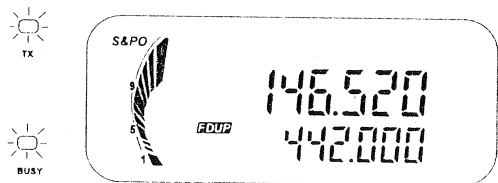
If you intend to transmit for extended periods of time while operating full-duplex, select a low Tx power setting to prevent overheating the radio.

Note!

If a UHF frequency is mistakenly entered in the sub-channel during either split or full-duplex operation, two error beeps sound when the PTT is pressed (transmission not possible)

Auto Mode Selection

While tuning between 110-137 MHz, AM reception activates *automatically* (*AM* appears). You can override AM reception if desired, or else enable AM outside the aeronautical band (not recommended) by recalling menu 46, turning the knob to select AM, FM or AUTO, then pressing to exit.

☞ **Hint** -The aeronautical band is divided into two segments; navigation (108-118 MHz) and communication (118-137 MHz). To monitor voice communications, tune or scan only between 118-137 MHz and set channel tuning step size to 50-kHz.

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Spectrum Scope

This displays station activity above or below the operating channel in the VFO mode, or among six programmed memories in the MR mode.

*To enable the spectrum scope from either mode:*

☐ Recall menu 41, and turn the knob to select ᴼᴺ.

The S&PO segments roll upward as the scope "sweeps" for activity. The colon in the lower display is the center channel (or memory) marker. Single or stacked zeros indicate the relative signal strength of received stations.
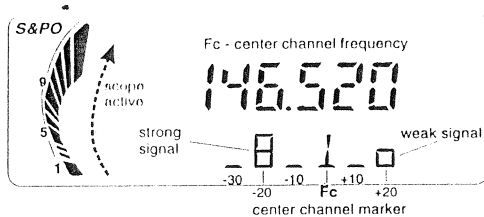
From the VFO, *six* channels are visible. Total scope bandwidth depends on the channel step size, so *match steps with the channel spacing used for that band.* In the example shown above (with 10-kHz steps), the total "view" is 60 kHz (-30, +20 kHz, plus 10 kHz for the center channel). Note that activity can be seen at 146.500 and 146.540 MHz.

During MR operation (covered next), you can view three memories above, and *two* below the displayed memory. The example below shows activity on memories 1-03 and 1-07.
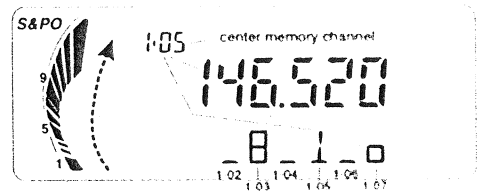
The Spectrum Scope starts sweeping on the main channel, so press the knob (or ↺) if you want to view (sweep) the other band.

☐ Tune until you can see station activity, then turn the knob to move the signal onto the center colon.

To turn the scope off and operate on the tuned channel, *simply press the PTT momentarily.* The spectrum scope remains off until manually activated again.

User-Programmable Function ("shortcut") Keys

As you know, transceiver functions are controlled by front panel and/or microphone buttons, or via the menu list. By default, the ⓐ, ⓐ, ◯ and ◯ keys come programmed with the following functions:

ⓐ - Home memory recall (menu 16).

ⓐ - Reverse (menu 06).

◯ - Transmit power selection (menu 14)

◯ - Band selection (menu 17)

These "shortcut" keys allow transceiver settings or functions to be activated with a single press, without going through the menu recall routine.

Default "shortcut" key assignments can be changed to your preference using a simple procedure:

☐ Recall the menu function list, then turn the ring to display the menu function you would like to assign to one of the "shortcut" keys.

☐ Next, press *and hold* (until a beep sounds) the desired "shortcut" key (ⓐ, ⓐ, ◯ or ◯) you want to assign the menu function to.

☐ You can repeat this process to reassign the other keys, if desired, or else press the knob to exit.

The new key functions takes effect until you reprogram them, or reset the transceiver CPU (hold ⓐ) and ⓐ while turning on the transceiver).

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Memory Operation

Memory Organization

The eighty-one memories in the FT-3000M consist of three types, outline below:

Regular - (70 each) -These store data for general operation and scanning. By default, they are grouped into 7 banks, with 10 memories each. You can change this arrangement, if desired, as described later.

PMS (10 each) - These are for the *Programmable Memory Scan* feature (or for regular operation). Upper and lower band limits for scanning are stored in up to 5 pairs (covered later).

Home Memory (1 each) - This allows quick access to a commonly-used frequency.

A few points to keep in mind about memories are:

- Each can store separate Rx/Tx frequencies, repeater shifts plus DTMF Paging and CTCSS tone data (covered later).

- The Home memory is recalled by pressing ⒜ (unless you change the default key assignment).

- Each can be tagged with an alphanumeric (A/N) name up to five characters, and displayed by this name. Sixty characters include twenty-four special-purpose symbols are available for creating names.

- Pressing 🎚 (or 🔘) from the VFO mode recalls the last-stored or last-used memory.

Memory Programming Procedure

Before programming a memory, know what settings need to be applied besides the desired operating frequency (such as power level, CTCSS encode/decode, DTMF paging modes, repeater offset, etc.).

You can configure these settings beforehand, or else have a *interactive guide* ask you which ones should be applied or not to each memory.

If you have already preset the desired settings, and want to store the data:

☐ Press and hold 🎚 (or 🔘) to recall the memory programming mode (the memory readout flashes).

☐ Rotate the *ring* to select a memory *bank*, then the *knob* to select a *channel* within that bank.

Note - while selecting memories, either ⵊⴄⵞⵔⵍⵟ or ⵎ ⵓⵞⵞⴐ appears, indicating if prior channel data is stored in the memory.

☐ Momentarily press 🎚 (or 🔘) to store the channel settings into the selected memory.

☐ To recall a programmed memory for operation, press 🎚 (or 🔘) and turn the ring (if needed) to select the desired bank and memory.

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Interactive Menu Programming

If you would like to have the *interactive guide* to assist you in configuring each memory, step-by-step, proceed as follows:

☐ Press and hold 🔘 (or 🔘) to recall the memory programming mode (the memory readout flashes).

☐ Rotate the ring to select a memory bank, then the knob for a channel within that selected bank.

☐ Press the knob *momentarily*, so the lower display scrolls the first query. To input settings for each query, rotate the knob so that the display reflects the desired choice.

☐ After entering the setting for the first query, press the knob to proceed to the next one, and so on. You will be queried to input seven settings (see the table at the right for a complete outline of the interactive query sequence).

☐ After responding to all queries, momentarily press 🔘 (or 🔘) to store the channel settings into the selected memory.

☐ To recall the programmed memory for operation, press 🔘 (or 🔘) and turn the ring (if needed) to select the desired bank and memory.

Interactive Menu Programming Outline

Query	Comments
R H FREQ	select the desired operating frequency
T H SHIFT	select **◻**, **◻**, or **◻◻** or none
	OFFSET (for **◻** or **◻**) T H FREQ for **◻ ◻**
STEP	select 5, 10, 12.5, 15, 20, 25, or 50-kHz tuning steps for retuning the memory (covered later)
SQL TYP*	select CTCSS encode (**ENC**), encode & decode (**ENC DEC**), or DCS (**DCS**)
	CTCSS for (**ENC DEC**) DCS for **DCS**
T PAGE*	choose DTMF paging (*PAGE*), trigger paging (*T.PAGE*), Code squelch (*CODE*) operation, or none
T H PWR	select LOW 1, 2 or 3 (*LOW*) or HIGH
M-MASK	rotate the knob for a memory to mask

*Note - CTCSS/DCS and DTMF Paging modes are covered in detail later in the *Operation* chapter.

Recalling Memories

With at least one memory stored, you can recall memories for operation by pressing 🔘 (or 🔘) from the VFO mode, then turning the ring until the desired bank and memory appears.

Only used memories are displayed: vacant ones are skipped (memory 1-01 defaults with 145.000 MHz stored in it, and M USED always appears when it is selected). To exit the memories and return to the previous VFO channel, press 🔘 (or 🔘).

Home Memory

The *home* memory offers quick access to a commonly used frequency. It is recalled from either VFO or MR modes by pressing 🔘; H appears at the upper right as operation shifts to the *home* memory.

The *home* memory is set to 145.000 MHz by default, but can be reprogrammed with any frequency and repeater state, or even a separate transmit frequency. Follow the same procedure as for storing regular memories, but rotate the ring until H appears in the memory readout.

Note - if 🔘 has been assigned a different function, the home channel can still be recalled via menu 16.

Split Operation with Memories

Memories can store an independent transmit frequency, for operation on repeaters with non-standard shift. To do this:

☐ First store the Rx frequency in the desired memory (it does not matter if a repeater offset is active).

☐ Next tune the VFO to the desired Tx frequency, then press and hold 🔘 (or 🔘) to recall the memory programming routine again.

☐ Recall the memory holding the Rx frequency (if not already displayed), then *hold the PTT switch* while momentarily pressing 🔘 (or 🔘) again (this does not key the transmitter. The separate transmit frequency is now stored.

Whenever you recall a "split" memory, **◻◻** appears above the frequency display. You can press 🔘 (except during priority scan) to display the Tx frequency (**◻◻** blinks as you do this). Rewriting the Rx frequency on a "split" memory also deletes the separate Tx frequency.

Tuning Memories

While receiving on a recalled memory, you can retune it and change other memorized settings (such as repeater shift) if so enabled via a menu setting.

☐ Recall menu 21, then turn the knob so the **MT** icon appears. Press the knob again to save the change and exit. You can now tune the memory just like a VFO (including 1-MHz steps).

To store a retuned frequency or setting in the current (or other) memory:

☐ Press and hold 🔘 (or 🔘) so that the memory digits blink. Turn the knob to select a new memory (if desired), then press 🔘 (or 🔘) again to store the change.

☐ Once you have retuned a memory, if you don't want to save your changes, pressing 🔘 (or 🔘) will return the original memory data and reset menu 21 to OFF

Masking Memories

You can temporarily mask any memories you don't need (except memory *I-01*) and restore them any time later when needed.

❏ Press 🔘 (or ⚪) to switch to MR operation, if needed. Now hold 🔘 (or ⚪) again, so that the memory readout blinks, and rotate the ring,and knob to recall the desired memory to be masked.

As you turn the ring, the status of each memory channel appears in the lower display:

- *V RCANT* indicates the memory is empty, or has been masked.

- *M USED* means the memory has been written with data, and has not been cleared.

❏ With the memory to be masked appearing, press the knob several times until *M.MASK* appears (this actually steps through interactive memory queries - covered later).

❏ Turn the knob one click - the display reverts to the first memory, and the masked memory can no longer be recalled within the MR mode.

To restore a masked memory:

❏ From the MR mode, press and hold 🔘 (or ⚪), so that the memory readout blinks, then recall the masked memory (*V RCANT* appears).

❏ Press the knob so that " - - - " and *M.MASK* appear, then turn the knob one click to restore the memory.

Changing Memory Bank Arrangement

By default, the seventy regular memories are arranged into seven banks, with ten memories in each. If you want to change this arrangement, do the following:

❏ Recall menu 18, then press 🔘 (or ⚪). The flashing digits are the bank no., followed by the total memories assigned to that bank.

❏ Turning the outer ring selects the bank number (1-7), while the inner knob assigns the total channels available for that bank (1-70)

A few points to remember when configuring memory bank structure are:

○ The total memory count cannot be changed (all seventy must be used) regardless of bank arrangement.

○ The bank holding memory channel 70 is the *last available bank*: i.e. if you assign all seventy channels into bank 1, banks 2 -7 are no longer available.

○ For banks 2-7 cannot be enabled unless at least one unused memory is "left over" from a preceding bank (i.e. all seventy were not used in the previous bank).

After configuring the bank and memory arrangement as desired, press and hold 🔘 (or ⚪) again, then press the knob to exit.

Naming and Displaying Memories

You can name stored memories with an alphanumeric tag (up to five characters) for easy reference.

To name a memory,

❏ Press 🔘 (or ⚪) and select the memory to be named. Now recall menu 32, and turn the knob to select *V HF* (the factory default tag).

❏ Press 🔘 (or ⚪) once - you will notice the first entry's place blink. Within the A/N entry mode, the knob selects *characters*, and the ring selects the character's *entry place*.

❏ Turn the knob to select the desired number, letter, or symbol, then rotate the ring a click to move to the next character's place.

❏ Do this as necessary to complete a name tag for your memory, then press the knob to save the A/N name entry and exit.

To turn on the memory name display mode:

❏ Recall menu 32 again, turn the knob so that the name you just assigned (not the frequency) appears. *See the note below.*

☞ The name display mode *must be enabled individually for each memory you name*, or they will still be displayed by their frequency.

Memory-Only Mode

This allows operation on stored memories only. Indicators for settings like repeater shift and tone squelch are still displayed, although they cannot be changed. Only TX power, volume/squelch, channel selection and paging operation can still be selected.

❏ After programming memories, you can toggle memory-only operation by holding 🔘 while turning on the power.

Memory Guard **MGD**

If you have a memory whose contents you would like to protect from accidental overwriting, you can assign a "guard" tag to it for protection:

❏ From the memory mode, with the desired memory channel displayed, recall menu 20. Turn the inner knob one click so that **MGD** appears, then press to save and exit.

❏ Now, the memory with **MGD** displayed cannot be overwritten (an error message *"MEMORY GUARDED, PERD ONLY"* appears if you try).

❏ To remove the memory guard, again use menu 20 to turn off **MGD**.

Scanning

Band Scanning (VFO mode)

First ensure the squelch is closed, then start scanning upward or downward by holding ⏵or ⏵. If signals are found, a double-beep sounds, the green LED lights, and scanning stops on the active channel.

While paused, the decimal point in the display blinks. Otherwise, scanning continues until it reaches an upper or lower band limit (determined by transceiver version). A double-beep sounds, and scanning then "loops-around" and continues.

Scanning pauses for as long as the station transmits, or else can be set to only sample for five seconds, then resume. The resume mode is set by recalling menu 25, then selecting either PAUSE or 5 SEC.

Scan Start/Stop

Holding the ⏵ or ⏵ for ½ second normally starts VFO or MR scanning. However, you can also manually start scanning by recalling menu 23, then turning the knob to select ON. Pressing the knob now starts VFO or memory scanning (depending on the last-used mode).

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Memory Bank Scanning (MR mode)

In the MR mode, holding ⏵ or ⏵ only scans programmed memories *in the current bank* (1·01~1·10, for example). To scan another memory bank, turn the ring so the desired bank number appears, then hold ⏵ or ⏵ again. To scan all programmed memories recall menu 27, then change the default setting from BANK to ALL.

When band scanning, a double beep sounds when the scanner reaches a band edge (unless the beeper is disabled in menu 38). In the MR mode, scanning also resumes according to how you set menu 25.

Memory Skip Scanning

You may wish to skip some "nuisance" memories while scanning, but still have them available for manual selection. To mark a memory to be skipped:

☐ Recall menu 22 while receiving on the memory. Turn the knob so the ▲ icon appears, indicating that this memory will be skipped during scanning (you can still recall it manually).

☐ To cancel scan-skip, repeat the above step so that ▲ turns off.

PMS (Programmed Memory Scanning & Tuning)

PMS allows scanning and tuning only inside a band defined by an upper and lower frequency limit stored in a special memory-pair (see below).

PMS Memories									
P1L	P1U	P2L	P2U	P3L	P3U	P4L	P4U	P5L	P5U
P-1		P-2		P-3		P-4		P-5	

There are *five* PMS memory-pairs, for up to five search bands. PMS memories are programmed like regular memories, however, they cannot be recalled, tuned, or scanned from the MR mode, only via the menu.

PMS Scanning

[P1L P1U] [P2L P2U] [P3L P3U] [P4L P4U] [P5L P5U]

PMS Band Limits

[P1L P1U]

P1L ⟷ P1U
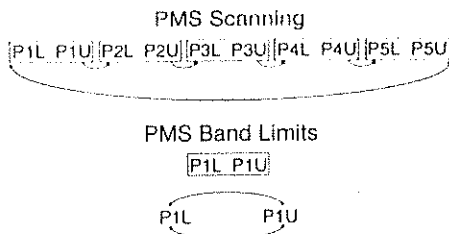
Note that PMS memory pairs are searched in order, i.e., scanning moves from one pair (band) to the next. If you only want to search a particular pair after programming others, un-needed PMS pairs can be disabled/enabled individually, as necessary (covered later).

Programming Band Limits in PMS Memory Pairs

Let's try an example to demonstrate PMS tuning and scanning:

example: Assign the 146 MHz simplex sub-band (146.400~146.600 MHz) to PMS memory pair P·1 (consisting of P1L & P1U).

☐ First store 146.400 (lower band edge) in memory P1L, then 146.600 (upper edge) in P1U.

☐ Next, recall menu 28, turn the knob to select ON, then press to exit. P·1 appears in the memory readout, with the upper and lower band limits.

S&PO
P - 1 PMS Pair •
Lower Band Limit (P1L) 146.400
Upper Band Limit (P1U) 146.600
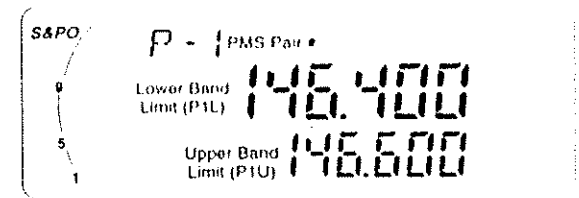
You can now tune and scan as before, however the range is now set by the limits defined in P·1. If ARS or manual repeater shift is activated, the offset is applied automatically when you transmit (even if the resulting *transmit* frequency is outside the subband limits). Memory pairs P·2 through P·5 work together the same way.

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Note - PMS Frequency Entry

The frequency entry resolution for PMS memories is 100 kHz. For example, while 145.100 MHz is a valid entry for a PMS memory, 145.015 MHz is not (15 kHz it is not a multiple of 100 kHz). Remember this when storing PMS memories, as invalid entries are rounded to the nearest 100-kHz channel.

Recalling PMS Memory Pairs

When programming PMS memories, they are selected singly (PIL, PIU, etc.), and later recalled in pairs ($P1$, $P2$, etc.) from the MR mode. However, they can be recalled individually via the menu:

☐ To recall pre-stored PMS pairs, recall menu 28, and turn the knob to select OFF.

☐ Next, turn the *outer* ring one click to the right to select the next menu (*note* - this is menu function "29", however, the PMS memory pair number is displayed in its place):

☐ To browse through the PMS pairs, turn the inner knob. Empty (unfilled) PMS pairs appear as below:
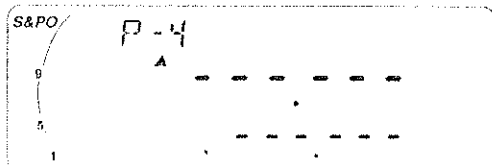

The ▲ symbol indicates the pair *is disabled from PMS tuning and scanning*. This happens automatically for vacant pairs; however you can selectively enable/disable other pairs as desired.

☞ PMS pairs $P-1$ and $P-2$ are preset with the 2-m and 70-cm amateur band limits, but can be overwritten with your choice of frequency pairs.

Disabling PMS Pairs ▲

Remember when tuning or scanning PMS pairs, operation "jumps" from one pair to the next. When scanning, a double-beep sounds when the "jump" occurs, otherwise, if manually tuning, the display shifts to the next PMS pair.

If you want to limit PMS tuning or scanning to only a particular pair (or pairs), you need to temporarily disable the others:

☐ Recall menu 28 and set it to OFF. Turn the ring one click to the right, then turn the knob to display the PMS pair you need to temporarily disable.

☐ Press ☲ (or ⤵) so that ▲ appears in the left of the display. The PMS pair is now disabled from PMS tuning and scanning. Pressing ☲ (or ⤵) again enables the pair (▲ turns off).

☐ Turn the knob again to select other pairs to enable/disable, or else press the knob to save the change and exit. PMS scanning and tuning operates as before, but only enabled pairs are available.

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Note - *if all five pairs are disabled*, the PMS feature is disabled, and menu 28 cannot be set to ON.

☐ Press ☲ (or ⤵) once to return to MR operation, then again for the VFO.

"Smart-Search"

This enhances PMS band searching by storing any active channels into *twenty* reserved memories, and sorting them according to:

* *Signal strength* (sampled S-meter reading)
* *Frequency* (ascending order)

Smart search only operates from VFO and MR operation, and cannot be activated from PMS, or MT (Memory Tuning).

Before using smart search, set up your PMS memory pairs as desired, and menu 28 must be set to OFF. Also, disable any PMS pairs you don't want included in the search. Then, do the following:

☐ Recall menu 30, and turn the knob to select which PMS pair you wish to "smart" search (▲ appears for any disabled pairs.

☐ Turn the ring one click to recall menu 31, then turn the knob to select the sort mode: $FREQ$ or $LEVEL$. Press the knob to return to VFO operation.

☐ To activate smart search, press *and hold* the teardrop-shaped ⓢ button on the front panel.

A beep sounds, $S \cdot C$ appears in the memory readout, and ⓢ glows red as smart search scans from the lower to upper band limit of the selected PMS memory pair. Smart search performs a "one-shot" sweep, and stops when the upper band limit is reached (two beeps sound). After this, you can either:

* *Hold* ⓢ to begin another search, or:
* Press ⓢ *momentarily* to see if active channels were found (each press recalls up to twenty stored active channels).

The lower display scrolls a search "report", announcing upper and lower search limits, channel step size used during the search, and how many active channels where found. Also, the S&PO meter reflects the received signal strength of the station.

After all of the twenty smart-search memories are filled, additional entries overwrite old ones in a first-in, last-out sequence.

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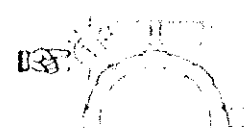
Priority Memory Scanning PRI

This function tags a programmed memory as a "priority" memory, and automatically checks it for activity every five seconds while operating from the VFO or other memories. When a signal appears on the priority memory, operation automatically shifts there while the signal is present (plus a few seconds after the signal disappears).

If you transmit while paused on the priority memory, monitoring ceases and operation stays on the priority memory. From the factory, memory 1-01 is assigned priority by default (*PRI* appears in the display when 1-01 is recalled). However, any one of the the seventy regular memories can be made the priority memory (but not the PMS memories or the Home memory).

To assign priority to a memory:

☐ Recall the memory to be assigned priority (or first store the frequency in a memory, if needed).

☐ Recall menu 19, turn the knob so that *PRI* appears, then press it again to save the change and exit. The memory is now tagged as the priority memory.

To activate priority scanning:

☐ While operating from the VFO or memories, recall menu 24, turn the inner knob to display ON, then press it again to save the change and exit.

Pr i appears in the memory readout, and every five seconds the priority memory is sampled. If no signal

appears on the priority memory to open the squelch, you can tune, transmit and receive on the VFO, or select other memories. Pressing ⊒ (or) to switch operating modes will, however, "dump" priority scanning, and you will have to reset it again.

If a station appears on the priority memory, a double beep sounds, and operation shifts there. If you wish to talk with the station, press the PTT momentarily while receiving their signal to stop priority checking, otherwise, operation reverts and checking continues.

Priority scanning resumes according to the mode selected in menu 25 (page 32). To cancel priority scanning manually, press ⊒ (or), or the knob.

Locking the Controls LOCK

The MH-36 buttons are locked via the slide switch on the side of the microphone. The PTT, DIAL, and/or front panel keys can each be locked (disabled) to prevent inadvertent transmissions or adjustments using menus 49 and 50 (see below); LOCK appears when either of these are enabled.

Lock Type	Slide sw.	Menu 49	Menu 50
Mic. Keys	X		
PTT			ON
DIAL		ON DIAL	
DIAL & Panel		ON ALL *	

* press ⊒ or to toggle between ON DIAL / ON ALL

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Tone Squelch Modes ENC DEC DCS

These systems allow silently monitoring until a call directed to you is received, and offer privacy on an otherwise busy channel.

CTCSS (Continuous Tone Coded Squelch System)

This imposes a continuous, subaudible tone on your transmitted audio. When decoded at the other station, this allows their squelch to open and receive your transmission. Some "closed" repeaters use this to limit access, or to prevent signals intended for other repeaters (with the same input frequency) in fringe areas from locking up the repeater. There are 39 selectable CTCSS tones.

DCS (Digital Coded Squelch)

DCS operation modulates a subaudible tone according to a digital protocol (continuous 32-bit synchronous code). DCS is widely used in the commercial land-mobile industry because of its superior performance and its 104 unique codes offer greater privacy than CTCSS. To use either CTCSS or DCS, both stations must be on the same frequency, and have selected the same CTCSS tone or DCS code.

CTCSS Tone Decode

Note - CTCSS *decode* operation requires the optional FTS-17A tone squelch unit, and ENC DEC cannot be selected until the unit is installed.

To select and activate CTCSS or DCS operation:

☐ Recall menu 01 and turn the knob to select:

ENC (encode) appears when the CTCSS tone generator is activated for *transmission only*.

ENC DEC (encode & decode) appears when the CTCSS tone squelch is activated for both tx & rx (only signals "encoded" with the matching tone open the squelch). *See the box on this page.*

DCS appears when the digital code squelch system (tx & rx) is active.

☐ To enable one of these, press the knob when the desired squelch type appears on the display.

Next, select the CTCSS tone, or DCS code that you and the other station have both agreed to use:

☐ If ENC or ENC DEC is selected, recall menu 02, and choose the desired CTCSS tone (see the table on the next page).

☐ If DCS is selected, recall menu 03 and choose the desired code (see the table on the next page).

CTCSS/DCS settings are stored in each memory in the same manner and at the same time as storing frequencies. To change the programmed tone/code or state, just recall it, reset the tone or function, and store the memory again. If you activate CTCSS/DCS on a PMS memory, it will be active when that memory pair is used to start PMS scanning or tuning

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CTCSS Tone Selection Table (frequencies in 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	162.2	167.9	173.8	179.9	186.2	192.8
203.5	210.7	218.1	225.7	233.6	241.8	250.3	

Digital Coded Squelch Table							
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

*indicates possible codes not available
within the Motorola DPL™ system

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CTCSS or DCS Bell Paging ✔

Bell Paging adds an alert ringer to CTCSS and DCS tone squelch operation, for added convenience. The CTCSS/DCS Bell mode displays ✔ to the right of the frequency display when enabled. When you receive a call with a matching CTCSS tone or DCS code, the ringer sounds to alert you to the call.

To activate CTCSS or DCS Bell operation (with either CTCSS tone squelch (**ENC DEC** ✔), or DCS (**DCS** ✔) operation already enabled)::

☐ Recall menu 39, and turn the knob to change the bell ringer from OFF, to either 1, 3, or 5 rings. Press the knob to save and exit.

As before, calls without a matching CTCSS tone or DCS code are ignored. Those with a matching tone/code cause the transceiver to ring (see the box on the next page) as the squelch opens while the caller transmits. Note that other stations do not need to have the CTCSS or DCS Bell function to call you: they can just use standard CTCSS/DCS encoding.

☞ When you reply to a CTCSS or DCS Bell call, you may want to turn off the Bell function (but leave **ENC DEC** or **DCS** on), or else the transceiver will ring every time your squelch opens.

You can store the Bell ringer activated in a memory, along with different CTCSS tones, DCS codes, and encode/decode states.

DTMF Code Squelch & Paging Modes

DTMF (Dual-Tone, Multi-Frequency) encoding and decoding allow paging and selective calling. This system uses 3-digit codes (000 ~ 999), formatted and transmitted as DTMF sequences. Your receiver remains silent until it receives three DTMF digits that match those stored in a dedicated code memory. The squelch then opens so the caller is heard, and, in the paging modes, an alert ringer sounds.

Introduction to DTMF Code Squelch   CODE

With code squelch, both stations communicate using the same 3-digit DTMF code, sent automatically *at the start of every transmission.* When you receive the correct tone sequence, *CODE* blinks, and your squelch opens and stays open until a few seconds after the end of their transmission.

After you and the other station have agreed upon a 3-digit DTMF code, you need to store this in a special dedicated code memory:

☐ Recall menu 11, then press ⬚ (or ⟳) so the first digit's entry blinks. Rotate the knob to select the first code digit, then turn the ring to move to the next place.

☐ Repeat this step again as necessary to enter all three digits, and press ⬚ (or ⟳) to save the code entry, then the knob to exit.

Now, with your 3-digit squelch code stored, you can activate DTMF Code Squelch operation:

☐ Recall menu 08, then turn the knob so that *CODE* appears. Press the knob again to exit.

When a call opens your squelch, you can begin your QSO as normal. DTMF code squelch "hangs" open for about three seconds after the received carrier drops, to give you time to respond, then "resets" (*CODE* stops blinking).

Each time you transmit, you will hear three DTMF tones - remember to pause a moment before speaking (as the code is sent). You won't hear the DTMF tones the first time you receive a call, as your squelch does not open until *after they are decoded.* Afterwards, however, you will hear them while your squelch remains open.

Ringer Settings ✔

The melody and repetition of alert ringer used for CTCSS/DCS Bell Paging and DTMF Paging can be configured:

One of four *preset* ringer melodies can be selected from menu 40. You can try each type by pressing ⬚ within the menu, then select which one you prefer.

The ringer can be set to sound only once, or else repeat three or five times when a call is received. Recall menu 39, and choose the desired repetition. Setting this to "OFF" *disables the ringer,* so keep this in mind if your ringer doesn't seem to respond correctly.

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Introduction to DTMF Paging

There are two types of DTMF paging calls:

Private Call -you only receive paging calls that are prefixed with your private 3-digit code

Group Call -you can receive paging calls for up to six other groups (3-digit codes).

DTMF Paging uses a specially-formatted string of 7 DTMF digits, as shown below.

Format of DTMF Paging Sequence (sent from left to right)						
1st ⚬	2nd	3rd	✶	4th	5th	6th
ID of *Called* station			flag	ID of *Calling* station		

DTMF Paging uses eight DTMF code memories (labeled *1 - 6*, *C* and *P*), each storing a 3-digit code:

- Code memory *P* stores your private 3-digit paging code.

- Code memories *1 - 6* store the codes of friends or groups other than yourself - but people you expect to call or monitor often.

- Code memory *C* is *read-only*, and stores the 3-digit number decoded from a received DTMF paging string. This can be recalled to see the code of the station who called you.

During *private call*, when a station transmits your *personal* 3-digit code (kept in code memory *P*) in a

properly-formatted paging string, your receiver squelch opens, the alert ringer sounds (see the box on the previous page), and the 3-digit code of the station calling is stored in code memory *C*. At the same time, the frequency display changes to show the contents of code memory *C* - which always contains the identity of the calling station.

For a *group call* (the paging code matches one of those in code memories *1 - 6*), the calling station's ID is still entered in code memory *C*; however, you have to manually recall it to see who called.

This system works the same way when you want to page someone - you must first select the code memory (1 - 6) holding their 3-digit code. Then, when you transmit, their code is automatically formatted along with yours, and is sent as the DTMF paging string. Actually, this sequence can be sent manually if needed using a DTMF keypad to send the seven digits (actually, three digits—"star"—three digits, e.g. 1 2 3 ✶ 4 5 6).

Programming DTMF Paging Code Memories

Before using DTMF Paging, store your ID code in Code Memory *P* to receive *private* calls. *Afterwards, you can store up to six other codes of your friends for group* calls. Follow this procedure to store code memories:

☐ Recall menu 9; the blinking figure is the code memory, followed by the default code (preset to *000*).

☐ Rotate the knob (if necessary) to select code memory *P*, then press ⊟ (or ◔) momentarily so that the first (left-most) digit blinks, awaiting your entry.

☐ Rotate the knob to select the first number of your private code, and turn the ring to step to the next digit's place. Use the knob to again select a number, and the ring to step to the next entry.

> ☞ *Note* - the ➔ symbol that appears when you first turn the knob indicates the code memory is *enabled* for monitoring - we will soon see how to individually enable/disable code memories from operation)

☐ After entering all three numbers of your private ID code, press ⊟ (or ◔) again to return to code memory selection.

If you know other paging codes of other friends or groups, you can enter them now - turn the knob to select code memories *1- 6* (remember *C* is read-only) and repeat the code digit entry process. Otherwise, press the knob to save the code entry and exit.

Select Code Memories for Operation ➔

In the previous step, you entered your private paging ID in code memory *P*, along with other group codes in memories *1 - 6*. By default, code memory *P* is *always enabled* for operation (➔ appears when it is selected), and cannot be turned off. Likewise, code memory *C* is read-only. Code memories *1 - 6*, however, can be enabled/disabled individually, should you not want to be bothered receiving calls for particular groups:

☐ Recall menu 9, and rotate the knob to select a code memory that you want to temporarily disable.

☐ Now, press *and hold* ⊟ (or ◔) as necessary to enable/disable the selected code memory (➔ appears for enabled code memories).

☐ Turn the knob to select other code memories, and repeat the process as needed to enable/disable others (except *P* and *C*) as needed.

DTMF Paging Operation
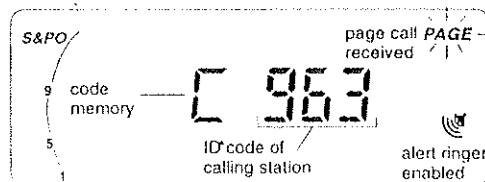
Receiving DTMF Paging Calls *PAGE*

The only difference between receiving *private* and *group* paging calls is how the transceiver responds when the call is decoded.

To set up to receive DTMF paging calls, you must first turn on this feature:

☐ Recall menu 08, then turn the knob until *PAGE* appears (remember that *CODE* squelch is also selected here, and *T.PAGE* is covered later). If the ringer is enabled (see note below), ✆ also appears.

☐ Next, recall menu 09, and turn the knob to select the code memory holding the paging code you want to monitor. To receive *private* calls for you, this of course must code memory *P*, for group calls, select 1 - 5. Press the knob to save and exit.

Note! - if you want the alert ringer to sound, remember to enable (see the box on page 39).

If a private page call is decoded, the alert ringer sounds, the squelch opens, and code memory *C* appears in place of the frequency.

page call *PAGE* received
S&PO
code memory
ID code of calling station
alert ringer enabled

For *group* calls (code memories 1 - 5), the ringer sounds and squelch opens as before, but the *group code* appears instead of the calling station's code:

S&PO
code memory number
code memory enabled
page call *PAGE* received
ID code of paged group
alert ringer enabled

You can still find out who called your group or friend, remember that code memory *C* (read-only) always holds the ID of the station sending the page call. This time, *you must recall it manually* using menu 09 (it only appears automatically for *private* calls).

Sending DTMF Paging Calls

To respond to a *private* page call, pressing the PTT sends the other station's ID code, a DTMF "star" (✳) then your private ID code (code memory *P*) automatically, and resets to receive another call. For *private* page calls, code memory *C* is displayed and formatted so you can respond directly.

For *group* calls, however, pressing the PTT sends a *group* page call using the group ID of the selected (and displayed) code memory. In other words, you wouldn't answer the calling station, but page the called group. Response is designed this way since the original call was directed to a group, rather than to you.

To send a page call:

☐ Recall menu 09, and press the knob to select (display) the code memory of the station you want to page. Press the knob again to exit.

☐ Make sure the channel is clear, and press the PTT (follow with your callsign, of course).

If you want to talk after receiving and responding to their call, just switch from paging to code squelch mode:

☐ Recall menu 08, and turn the knob so that *CODE* appears. When you finish your QSO, reactivate DTMF Code Paging in the same way (*PAGE* displayed).
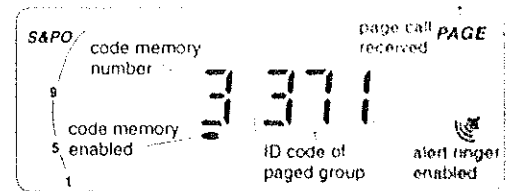
Trigger Paging *T.PAGE*

With regular DTMF paging just described, to have a QSO after responding to a page call, either you or the other station (but not both) must select code memory *C*, to use common DTMF tones when switching to DTMF code squelch operation.

Trigger paging overcomes this inconvenience of manually switching to/from code squelch operation, however, it can only be used between transceivers so equipped with this feature.

To activate *trigger* paging:

☐ Recall menu 08, turn the knob until *T.PAGE* is displayed, then press again to exit.

When a call is received, *T.PAGE* blinks, and the alert ringer sounds. If the other station is also using *trigger* paging, you can respond by just pressing the PTT and talking within 3 seconds after the DTMF code sequence is sent. The pager resets to receive a new call if either station fails to respond to the other within 3 seconds.

Auto-Respond Paging

This feature responds automatically (*without operator intervention*) to received calls by "paging back" the calling station. This has the same effect as if you manually pressed the PTT after receiving a call in either regular or *trigger* paging modes.

There are two auto-respond modes:

Answer-Back - this acknowledges a page call by "paging back" the calling station (just as if you manually selected their 3-digit code and pressed the PTT).

Page Forwarding - this "repeats" a page call *in its original sequence* (rather than reversing the ID code pair as in answer-back format), relaying the call to extend your paging range. The picture on the following page illustrates the difference between these modes.

You can leave your FT-3000M with this mode enabled in your vehicle, office or other vantage point when you are temporarily away, but will be using another transceiver and don't want to miss any paging calls.

To enable *auto-respond* paging:

☐ Recall menu 10 and turn the knob to select RN-$5ER.FORWRI$ (or OFF). Press the knob to save the selection and exit.

Now, with either *auto-respond* option enabled, the transceiver reacts to a valid page call by *answering* or *forwarding* the DTMF page sequence, according to selected mode.

Paging Transmit Delay

When calling other stations using DTMF *paging* or DTMF *code squelch* (particularly through repeaters), you may find that some stations are unable to receive your calls. This can be caused by their squelch not opening fast enough (after receiving your transmitted carrier) to allow all of the DTMF digits to be received and decoded.
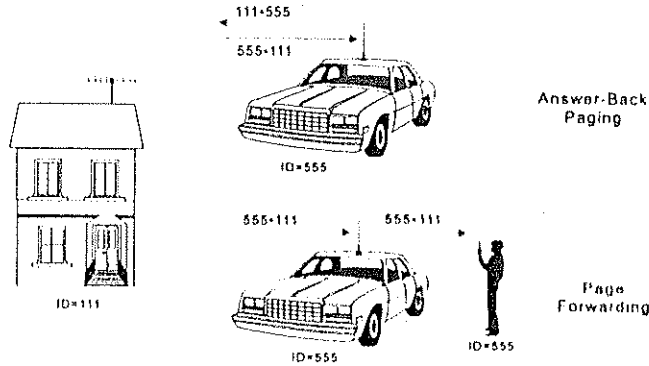
To correct this problem, you can set a longer delay between the time your transmitter is keyed and the first DTMF digit is sent:

☐ Recall menu 12 and turn the knob to change the default delay of 450 msecs to a longer one. Delay time of 250, 450, 750 (ms) or 15 (one second) are available.

☐ Press the knob again to save the selection and exit.

111-555
555-111

ID-555

Answer-Back
Paging

555-111   555-111

ID-111

ID-555

Page
Forwarding

ID-555

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ARTS Auto Range Transpond System

This system uses DCS signaling to inform you when you and *another ARTS-equipped station* are within communications range. Both stations must first select DCS operation using the same DCS code. The ringer can be activated or not, as desired.

Whenever you push the PTT, or every 15 seconds after ARTS is activated, your radio transmits a (subaudible) DCS signal for about 1 second. If the other radio is in range, a melody sounds (ascending tones) and their display shows IN RNG (in range), or yours does if their radio polls yours first.

Whether you talk or not, both radios continue polling each other. If your CW IDer (covered on the next page) is turned on, your radio IDs in Morse code every nine minutes. As long as your stations remain within range, the radios sound off once each time a poll is received (or each time they presses their PTT).

If you move out of range for more than about a minute (four pollings), your radio senses that no signal has been received, a different melody sounds (descending tones), and $OUTRNG$ (out of range) appears. If you then move back into range, as soon as they transmit (or their radio polls) your radio sounds, and IN RNG reappears.

During ARTS operation, your operating frequency is displayed, *but you cannot change it or other settings.* Radios in ARTS operation do not open the squelch

until a signal is received for about one second, so remember to pause before speaking after pressing the PTT.

To use ARTS:

☐ Activate DCS (menu 01), so that **DCS** appears in the display). Next, recall menu 03, display the DCS tone code, and set it to match the other station.

☐ Next, recall menu 35 and select the ARTS operating mode: R^x (receive-only), T^x (transmit-only), TR^x (transceive) or OFF. The operating descriptions assume both radios are set to TR^x.

☐ Press the knob to save the entry and exit. The display now shows $Rt-$ (indicating ARTS is enabled, as opposed to regular DCS operation), with $STRNBY$ appearing in the sub-display.
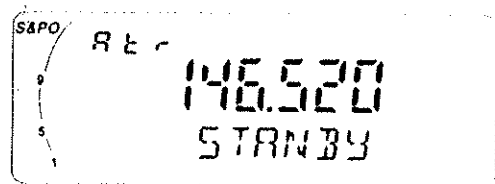
If, after four pollings, a response is not detected, $OUTRNG$ appears, otherwise IN RNG is displayed as long as both stations remain in range.

☐ To cancel ARTS operation, set menu 35 to OFF

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ARTS Modes

In the previous ARTS description, both transceivers were set to the $7.8.8$ (transceive) mode. There are two other ARTS modes available from menu 35, as outlined below:

$R.8$ - Use this mode if you only want your radio to listen, and not poll the other station (in which case their radio should be set to the 7.8 mode). Here, your radio will beep and display $IN.RNG$ or $OUTRNG$ to indicate the state of connection, with $R.r$ appearing at the top left.

7.8 - Likewise, this puts your radio into a *transmit-only* "beacon" mode where you won't hear the polling beeps (but you can still hear when the other station talks). When activated, $R.t$ appears at the top left, but you have *no display of whether the other station is in range*, or not ($IN.RNG$ and $OUTRNG$ do *not* appear). You should have your CW IDer enabled when this mode is activated (explained at the right).

CW ID (Morse Identifier)

The CW IDer sends your CW ID about once every 9 minutes during ARTS polling, DTMF answer-back paging, and in the VMPS (Voice Mail Paging System) mode (covered later).

To store your callsign:

☐ Recall menu 36; the bottom display shows the current ID name (set to $YAESU$ by default).

This ID slot holds up to eight characters (although only six can be displayed at a time) which can be replaced by your callsign.

To enter an ID:

☐ Press ⊟ (or ↵) so that the first character's entry place blinks.

☐ Rotate the knob to select the first letter of you call sign, then rotate the outer ring to move to the next character's place.

☐ Turn the knob to select the next letter of your callsign, and repeat this process until all characters have been entered (for callsigns less than six characters, blank spaces can be entered as needed).

☐ Press ⊟ (or ↵) again to return the menu list, then press the knob to save your callsign and exit.

To activate the IDer:

☐ Recall menu 37, and turn the knob to select ON


DTMF Autodialer Operation

Autodialer memories can be used for remote DTMF control sequences or telephone numbers for repeater or personal autopatch systems.

Nine autodial memories store DTMF tone sequences of up to 24 digits each. An additional memory, labeled $ANL.I.2$, stores DTMF digits decoded off the air for display and later recall.

You may assign a name up to 5 characters long to each DTMF auto-dial memory and display this when the memory is recalled to identify whose numbers you have stored.

To assign names and store telephone numbers in the autodial memories, use the following procedure:

☐ First, recall menu "13" dt.1 (found between menus 12 and 14); the display appears as below:
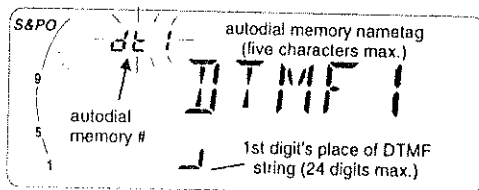
Turning the knob selects autodial memories $dt.1$ through $dt.9$, and Anl (we will discuss Anl later).

☐ Press ⊟ (or ↵) momentarily, so that the first place entry for the name blinks. If you want to rename the autodial memory, turn the knob to select a charac-

ter, then turn the ring one click to move to the next character's place, or else press ⊟ (or ↵) to skip directly to digit entry.
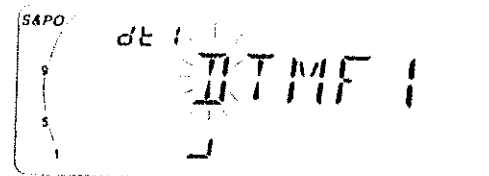
☐ Repeat this sequence to enter a nametag (up to five letters or characters) for the autodial memory.

☐ Pressing ⊟ (or ↵) again changes the display mode for digit entry:
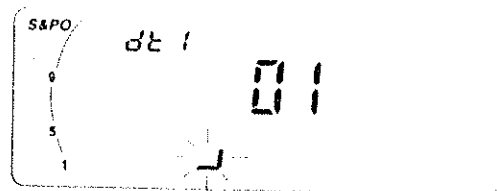
☐ The blinking character is first digit's entry place, while the decimal number above is the digit *counter* $(01-24)$.

☐ Rotate the knob to select the first number of the dialing string, then rotate the ring one click to step to the next entry. As you turn the ring, the *counter* increments accordingly.

☐ Continue using the knob and ring until all of the digits (up to 24) have been entered. Digits will scroll from right to left as the display can only show 6 at a time.

☐ Press ⊡ (or ⟲) to save the entry and continue naming or entering numbers in other autodial memories, or else press the knob to save and exit.

Using the Autodialer

☐ To play back DTMF auto-dial memories on the air, close the PTT switch and press the knob to recall the autodialer mode.

☐ While still holding the PTT, turn the knob to select the auto-dial memory storing the desired dialing sequence to transmit, then press the knob again.

Once the DTMF sequence begins, you may release the PTT (the transmitter stays keyed until the entire DTMF string is sent).

DTMF Analyzer

In addition to DTMF autodial memories, a special memory can be used to decode and view DTMF tones off-the-air:

☐ While tuned to the channel you expect to receive the DTMF tones, recall menu "13", and turn the knob to select the DTMF "Analyzer" autodial mem-

ory, labeled $RNLIZ$ (RnZ appears in the memory readout). You can rename ANLIZ to another name of your choice in the same manner as regular autodial memories (see the previous page).

With the analyzer turned on, and while monitoring a channel, up to six decoded DTMF tones appear in the sub display, with additional ones held in queue.

Up to twenty-four digits can be stored in the analyzer memory (although only six at a time can be displayed). When full, additional decoded tones (digits) replace previous ones in the queue, in a first-in, first-out order.

Like autodialer memories, the contents of analyzer can be recalled and viewed:

☐ Pressing ⊡ (or ⟲) *twice* so the blinking character is first digit's entry place, with the digit *counter* above.

☐ Rotate the knob to step through each of the last-decoded digits from the DTMF string. As you turn the ring, digits scroll from right to left, and the *counter* increments accordingly.

☐ To clear (erase) the stored digits, press *and hold* ⊡ (or ⟲) for ½ second.

☐ Press ⊡ (or ⟲) once to return to the menu list, then press the knob to exit.


Digital Voice Recording System

Introduction

The DVS-4* allows storing audio messages using the microphone, or else recording "live" audio off-the-air. Two recording lengths are offered: one 16-second channel, or two 8-second channels. Likewise, recordings can be played back from the speaker, or else transmitted over the air. Both manual and automatic playback modes are available via menu selection.
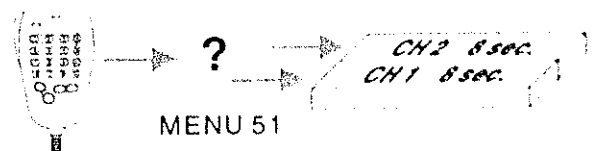
Recording from the Microphone

You can store personal messages for playback to stations who call you while you are away from the radio(be sure to include your station callsign). Before starting, decode if you want to record a single (16 second) message, or two (8 second) messages:

SINGLE   MENU 53   DUAL
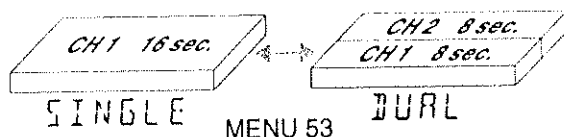
☐ Recall menu 53 and rotate the knob to select SIN-GLE or $DUAL$, then press the knob to exit.

If you selected $DUAL$ message channels, choose which channel your recording will be stored, otherwise, for $SINGLE$ format, they are stored in $CH1$:


MENU 51

☐ Recall menu 51 and rotate the knob to select $CH1$ or $CH2$, *don't exit yet* (leave menu 51 displayed).

☐ Press the PTT and speak into the microphone. You will notice the S&PO segments act as a timer and "count down" the remaining recording time. When you release the PTT, or recording time runs out (whichever happens first), $CH1$ or $CH2$ will blink, indicating that a message is now stored there.

☐ Rotate the knob to select the other channel, and press the PTT to record another message, if desired. Press the knob to save the recording and exit.

To listen to recorded messages through the speaker:

☐ Recall menu 52, turn the knob to select `C H 1` or `C H`

MENU 52
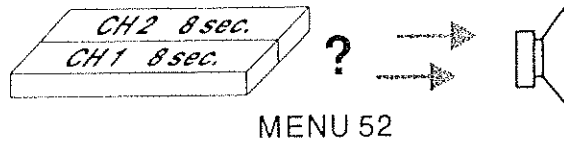
`2`, then press 🖳 (or ◯) to play back the recording.

Recording off-the-air (manually)

Recording receiver audio uses a slightly different procedure than from the microphone, but channel selection and playback operation is the same.

First choose the VFO channel or memory you want to monitor, and set the squelch level as desired.

☐ As before, recall menu 53 to choose single or dual recording channels.

To manually record audio off-the-air, the regular function of the microphone 🖳 and 🖳 keys must be changed:

☐ Recall menu 54, and turn the knob to select `r C /P L Y`. Without exiting, recall menu 51, select the channel you want to record audio into, and press the knob to exit.

☐ When you are ready to record, press 🖳; the count-down timer (S&PO meter segments) responds as before, showing remaining recording time.

☐ If dual channel format is selected, you can recall menu 51 again, select the other channel, exit, and repeat the previous step to record another channel

Record   Menu 54

Rx Audio   `C H1/C H2 ?`
Menu 51
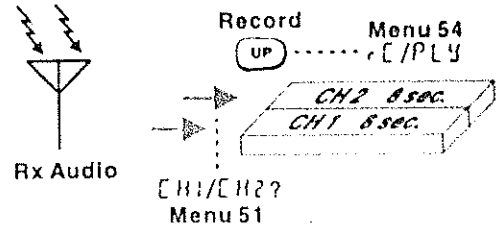
of receiver audio.

To listen to recorded receiver audio through the speaker:

☐ Recall menu 52, turn the knob to select `C H 1` or `C H 2`, then press 🖳 to play back the recording.

Menu 54   Playback
`r C /P L Y`

`C H1/C H2 ?`
Menu 52
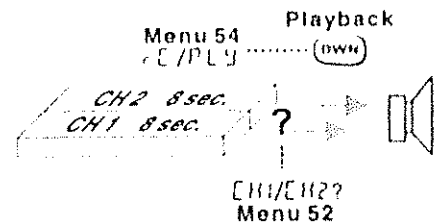
Recording off-the-air (automatic mode)

In the previous step we learned how to record receiver audio into a selected channel. This method requires monitoring the channel until a station transmits and manually starting the recording.

Auto-recording simplifies this process into one step - pressing a single button. One limitation is that *recorded audio always fills* `C H 1`. You can select single (16 sec.) or dual (8 sec.) channel format, however, audio is automatically stored in `C H 1` only.


Auto Record

Press 🖳 <1/2 sec.

Input
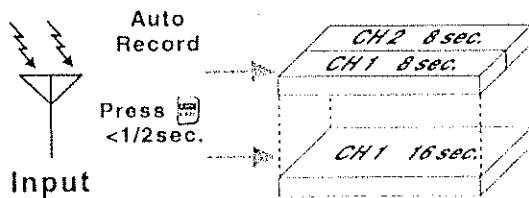
☐ Press 🖳 *momentarily*, (`R REC` blinks), When *the squelch opens and a signal is received*, `REC 1` appears as recording starts.

☐ When recording stops, `R REC` blinks. To replay the recording, press 🖳; `PLAY 1` appears as the recorded audio is heard.

☐ If you want to save the recording and exit, press 🖳, otherwise, if no other action is taken, *the next signal received will start the recorder again* (overwriting the previous recording in `C H 1`).

Transmit Playback

You can manually transmit the recordings stored in `C H 1` and `C H 2`, and monitor via the speaker during transmission:

☐ Recall menu 52, turn the knob to select `C H 1` or `C H 2` for playback, and press the knob to exit.

TX Playback .... PTT + 🖳 (or ◯)

`C H1/C H2 ?`
Menu 52
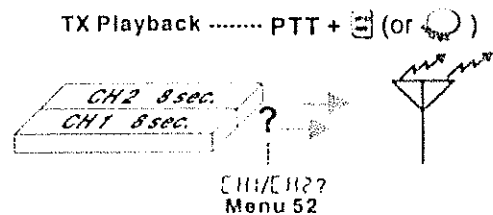
☐ Now, from either the VFO or MR mode, hold the PTT and press 🖳 (or ◯). You can release the PTT, as transmission continues until the recording is played back entirely.

> ☞ *Note* - In either recording mode, the S&PO meter counts-down recording time from full-scale (16 or 8 seconds) to zero. Recording level is not affected by the VOL control.

VMPS (Voice Mail Paging System)

When combined the answer-back feature of DTMF paging, this emulates a personal "voice mail" system. Stations calling you can leave an eight second voice messages which you can later recall. Then, you can have the radio transmit a pre-recorded eight second message automatically to the calling station.

To use this system, a few conditions must be met:

I. The other station must know your private or group DTMF paging ID code (see page 41).

II. Your transceiver must have DTMF paging or trigger paging activated, with the answer-back or forwarding feature enabled (see page 43).

III. You should record a "response" message in $C H$ 2 before activating this feature (see page 49).

IV. Depending on the operating rules and regulations in your country, you may need to store your callsign in the CW IDer memory, and enable it (this mode constitutes unattended operation).

To set up VMPS:

☐ First, ensure your private paging ID code is stored in DTMF code memory P, your station callsign is programmed into menu 36, and the CW IDer is turned on (menu 37).

☐ Select dual-channel digital voice recording format (menu 53), and record your personal message in $C H$ 2 using menu 51.

☐ Activate DTMF paging or trigger paging (menu 08) with the answer-back feature (menu 10) enabled.

☐ The last step needed to start VMPS operation is to turn on the auto-recording mode by momentarily pressing ▩.

Receiving a DTMF page call now starts a sequence of events:

1. **START** - the DTMF sequence is decoded with your private or group ID; the alert ringer sounds (if enabled), and receiver squelch opens.

2. Automatic off-the-air recording starts ($A REC$), storing up to eight seconds of audio in $CH 1$, continuing until the timer expires, or the station stops transmitting (whichever comes first).

3. After a two-second delay, answer-back paging calls back the other station, sending their ID code - * - followed by your private ID code.

4. Next, your callsign stored in the IDer memory (menu 36) is sent, followed by your eight-second pre-recorded voice message in $CH 2$.

5. **END** - the VMPS resets for a new call.

DTMF Remote Control ▩

The FT-3000M can be set to respond to DTMF tones generated from the microphone (on versions with full-keypad microphones), or received off-the-air, for frequency entry, and to enable/disable certain transceiver functions.

Microphone Control

☐ Recall menu 47, turn the knob to select MIC, then press the knob to exit (▩ appears in the display).

You can now enter operating frequencies directly from the microphone; just key in all the needed digits.

For example, for 146.520 MHz enter:

$$①→④→⑥→⑤→②→⓪$$

If you want to enter an even frequency, there's a shortcut. Pressing ⓪ after any entry truncates the remaining digit places to zero:

ex. enter 146.500   ①→④→⑥→⑤→⓪

ex. enter 146.000   ①→④→⑥→⓪

ex. enter 140.000   ①→④→⓪

In addition, four transceiver functions can be accessed to change settings:

Tone Squelch Mode - pressing ⑪→① enables **ENC**, **ENCDCS**, **DCS**, and off, with each entry.

Repeater Shift - pressing ⑪→② selects **▣**, **▤**, or off, with each entry.

Transmit Power - pressing ⑪→③ selects $LOW1$, $LOW2$, $LOW3$, or $HIGH$ power with each entry

Reverse - pressing ⑪→④ reverses the Rx/Tx pair (with an repeater shift active) with each entry.

Remote DTMF Transceiver Control

This allows DTMF tones *transmitted from another radio* to control your FT-3000M. You will need to have a few items set up beforehand to use this feature:

☐ Make sure your private 3-digit paging code is stored in P (menu 09).

☐ Active DTMF paging or trigger paging (menu 08).

With this done:

☐ Recall menu 47, turn the knob to select $R ≔$, then press the knob to exit (▩ *blinks* in the display).

Now, from the other transceiver, you will first need to send a DTMF paging sequence to open your transceivers squelch:

☐ Press the PTT and send [your private or group code] * [three more digits].

☐ Keep the PTT closed to keep the squelch open on your FT-3000M, and enter the desired DTMF sequence from the keypad. Commands are identical to those used for microphone remote control, as just covered in the previous section.

To disable remote control set menu 47 to OFF

Editing the Menu List ✿

The fifty-four available menu entries provide a comprehensive selection of functions for transceiver control. After becoming familiar with using the menu and the most commonly-used features/functions, you can edit the menu so that only the entries you really need will be accessible. This provides even faster and easier access to only those functions you need the most. You can of course restore the entire list anytime later.

Also, three additional menu entries *which are normally hidden from view* (menus 55, 56 and 57) can be accesses and restored, if so desired (see page 55 and 56 for explanations of these functions).

To edit the menu list:

☐ Press and hold the inner selector knob while turning the transceiver on; the menu list appears for editing.

☐ Turn the outer selector ring to recall a menu entry, then turn the inner knob to mask/restore it for selection (✿ appears for masked menu entries).

☐ Turn off the transceiver to save the changes and exit. When you power on again, the menu entries available for recall will reflect your editing.

☐ Repeat these steps to restore menu entries later, as desired.

Power-on Functions

Certain transceiver settings can be reset to their default state or altered by holding one or several panel keys depressed while turning the power on. These are referenced throughout the manual, but the table below provides a complete list:

Power-on Functions

| Press & power on	Function	Ref. pg. #
🔘	Memory-only mode on/off	31
🔘	LCD test (all segments light)	·
🔘	Transceiver clone mode on/off	59
🔘+🔘	CPU reset - factory default settings	60
knob	Edit the Menu List	54

Miscellaneous Settings

APO (Automatic Power-Off) 🔘

This turns the transceiver off after 1~12 hours of key or PTT inactivity. APO is activated using menu 42. Afterwards, 🔘 appears in the display, and a timer starts every time you press a key. If you don't press any keys for the selected time-out period, and as long as you are not scanning or priority monitoring, the transceiver turns off. After that, you must switch the transceiver back on for use.

Note - Transmission during Packet and X-band repeater operation will not reset the APO (but pressing a key will).

Transmit Time-Out Timer (TOT) 🔘

This limits Tx time after the PTT is held (1~60 mins), after which the transmitter un-keys (even if the PTT is still held). To reset the timer and transmit again, the PTT must first be released. This is useful to limit key-down periods when the cross-band repeater feature is enabled, or in the event of a stuck microphone.

☐ The TOT is enabled via menu 43; select a timer duration of 1~60 mins or OFF. When active, 🔘 appears in the display.

Checking the Battery or DC Supply Voltage

The battery or DC supply voltage can be displayed in place of the sub channel frequency, or else momentarily checked.

☐ Refer to menu 33. **Note** - this feature is for *reference purposes only*, do not rely on it for measurement or circuit testing.

Display Dimmer

LCD illumination can be adjusted to one of eight brightness levels:

☐ Recall menu 34, then turn the knob for a comfortable level.

Disabling the Beeper

You can turn off the beeper that sounds whenever a key or button is pressed. If you lock the keypad, each key will sound a different musical note for as long as it is held.

☐ Recall menu 38 then turn the knob to enable or disable the beeper.

Key Push Time ✿ (normally masked)

As referenced throughout the manual, the *duration* that keys are held determines the function they activate. By default, this key-push duration is ½ second;

pressing a key for less than this activates one function, holding it longer activates another.

The default ½ second release time can be changed to a shorter or longer duration, if desired.

To do this:

☐ Recall menu 55, and turn the knob to select 0.5 (default), 0.75, 1.0, or 1.5 second release time.

☐ Press the knob to save the change and exit.

Longer durations, while increasing access time, generally offer less margin for error when going through programming procedures.

DCS Code Inversion

The DCS system was first introduced in the commercial LMR (Land Mobile Radio) services, where it is now in widespread use. DCS is sometime referred to by its different proprietary names, such as DPL® (Digital Private Line®, registered trademark of Motorola, Inc.).

DCS uses a codeword consisting of a 23-bit frame, transmitted (subaudible) at a data rate of 134.4 bps (bits/sec). Occasionally, signal *inversion* can result in the *complement* of a code to be sent or received. This prevents receiver squelch from opening with DCS enabled, as the decoded bit sequence would not match that selected for operation.

Typical situations that might cause inversion to occur are:

○ Connection of an external receive preamplifier.

○ Operating through a repeater.

○ Connection of an external linear amplifier.

☞ Note that code inversion does *not* mean that any of the above listed equipment is defective!

In certain amplifier configurations, the output signal (phase) is inverted from the input. Small signal or power amplifiers having an odd number (1, 3, 5, etc.) of amplification stages may result in inversion of a transmitted or received DCS code.

While under most circumstances this should not occur (amplifier designs and industry standards take this into account), if you find that your receiver squelch does not open when both you and the other station are using a common DCS code, you or the other station (*but not both*) can try the following:

☐ Invert the transmitted (encoded) DCS code by recalling menu 56, and changing the selection from NOR to REV.

☐ Invert the received (decoded) DCS code by recalling menu 57, and changing the selection from NOR to REV.

☞ Remember to restore the default settings to NOR when done.

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APPENDIX

Packet Radio Operation

The FT-3000M provides a convenient rear-panel DATA jack for easy TNC interconnections. Refer to the graphic and table for pin-out connections.

When the DATA jack PKS line is grounded, data transmission is enabled and the microphone circuit is disabled during transmit. However, keying the MH-36 PTT at the same time defeats this and a "live mic" will occur, so be careful. Data rate selection (1200/9600 BPS) can be selected via menu 48.

Construct or purchase a patch cable for connection between the FT-3000M and your TNC. If your TNC uses a PLL-type DCD (Data Carrier Detect) circuit, you may not require the squelch status input from pin 6 (SQC).

DATA jack Connections		
Pin	Label	Notes
1	PKD	Packet Data Input: Impedance: 10 kΩ Max. Input Level: 40 mVpp @ 1200 bps 2.0 Vpp @ 9600 bps
2	GND	Signal Ground
3	PKS	Packet Send: PTT switching ground-to-transmit - MH-36 mic. circuit disabled during data transmission.
4	RX9600	9600 bps Packet Data Output: Impedance: 10 kΩ Max. Output: 300 mVpp @ 1200 bps
5	RX1200	1200 bps Packet Data Output: Impedance: 10 kΩ Max. Output: 300 mVpp @ 1200 bps
6	SQC	Squelch Control: Squelch Open: +5V (TTL) Squelch closed: 0V (TTL)

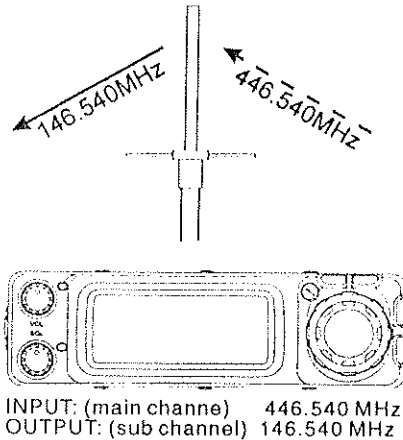**Station Interconnections for Digital Modes**
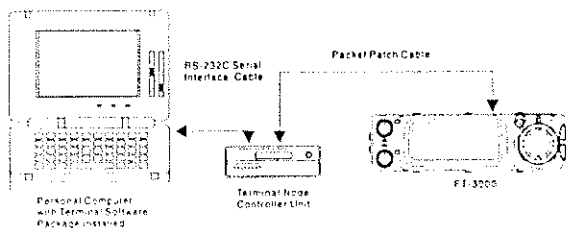
Jack pin-out as viewed from the rear panel.

57
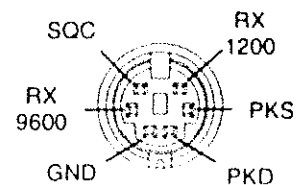
Cross-Band Repeater Operation

The FT-3000M can be set up to operate as a cross-band repeater with a simple power-on procedure. This feature is useful for club station or emergency operation in remote areas, and for cross-band linking. However, remember these few points before using the cross-band repeater function:

- Check with amateur rules and regulations to ensure this type of operation is permitted in your country.

- Pick frequency pairs carefully, so as not to interfere with existing repeaters; cross linking two repeaters on separate bands can cause havoc, and may be illegal! If you are not sure of active repeater frequen-
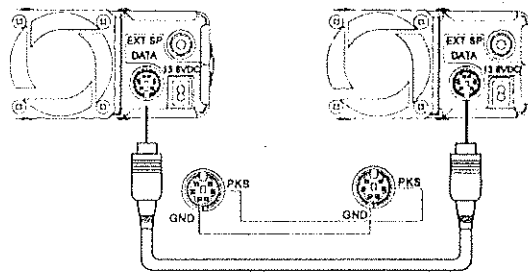
cies, contact the frequency coordinator in your area for guidance.

- Remember that the Tx duty cycle will probably be much greater than before, so use a low Tx power output setting for cooler operation.

Transceiver CTCSS settings (encode/decode) can still be selected for each band, so you can make your repeater "closed" if desired.

☐ First configure both channels as desired. Then, recall menu 45 and turn the inner knob to select ON; **FDUP** appears when the cross-band repeater is enabled.

To exit the cross-band repeater mode, repeat the above procedure so that **FDUP** turns off.

INPUT: (main channe)   446.540 MHz
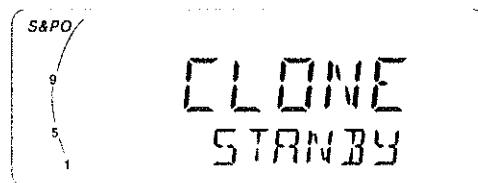OUTPUT: (sub channel) 146.540 MHz

Cross-Band Repeat

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Transceiver Cloning

You can transfer all data stored in one FT-3000M to another set automatically by a cloning procedure. This requires a user-constructed cable to connect the DATA jacks on the two transceivers as shown below.

☐ Insert the clone cable into the DATA jack of each transceiver.

☐ Turn both units off, then press and hold the [a] key of each radio while turning the power on again. The display appears as below.

```
S&PO
        CLONE
        STANDY
```

☐ On the destination transceiver, press [a]; the display appears as below.

```
S&PO
        CLONE
        RX
```
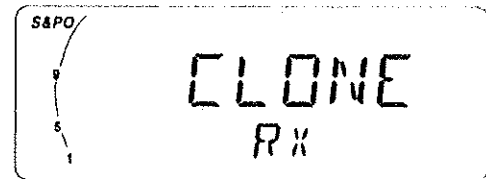
☐ Next press [a] on the source transceiver so the display appears as below.

```
S&PO
        CLONE
        TX
```

☐ After successful data transfer, CLONE DATA appears again on both transceiver displays. If there was a problem, ERROR appears on the display; re-check your cable and then turn both transceivers off and try again.

☐ Remove the cloning cable. Channel and operating data for both transceivers are now identical.

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In Case of Problems

Don't worry if you find transceiver operation somewhat complicated at first. You might find yourself temporarily lost, at least until you have had the chance to learn the various functions of the display and keys.

If the display shows nothing at all, check the power switch, and power supply, fuses and cables. If two beeps sound unexpectedly when you transmit, check for a small 🖸 or 🖸 near the top center of the display, indicating that the operating frequency, with the selected repeater shift, is resulting in an out-of-band Tx frequency.

Invalid key entries usually do nothing, and no beep sounds. However, if the keys are locked, nothing happens when you press a key for even valid commands. Check for **LOCK** (DIAL knob or panel lock) in the display. If you see this, check menus 49 and 50. If nothing happens when you close the PTT, slide the LOCK► switch down.

If you still cannot enter data, check to see if the TX LED is red, indicating the transmitter is activated. Releasing the PTT switch should return the set to receive. If not, switch the transceiver off, and then back on.

Resetting the CPU

As a last resort, if you are unable to gain control of the transceiver, the FT-3000M can be reset to clear all settings, memories, channel steps, and repeater shifts to their factory defaults. Just press and hold ⍩) & ⍩) together while turning the transceiver on

Installation of Options

This describes the installation procedures for the DVS-4 Digital Voice Recorder and FTS-17A Tone Squelch Unit. These options are both available from your Yaesu dealer. See the "*Operation*" chapter for details on these units.

DVS-4 and FTS-17A Installation

☐ Disconnect the DC power cable, and set the transceiver upside-down. Referring to Figure 1, remove the seven screws affixing the bottom cover, and remove the cover.
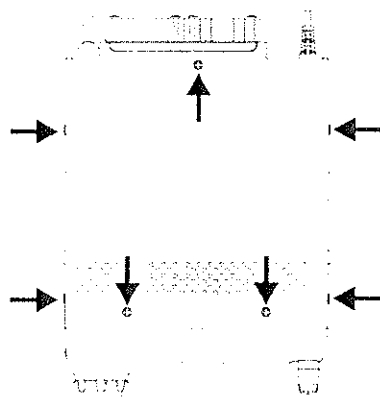
☐ Referring to Figure 2, note the two accessory mounting locations. Position the DVS-4 and press it in place; install the FTS-17A in the same way. After installing the DVS-4 (only), cut the blue wire located near the 8-pin connector.

☐ The factory adjusts the output tone level (VR1 on the FTS-17A) for the proper deviation, so it should require no further adjustment. Replace the bottom cover and seven screws.
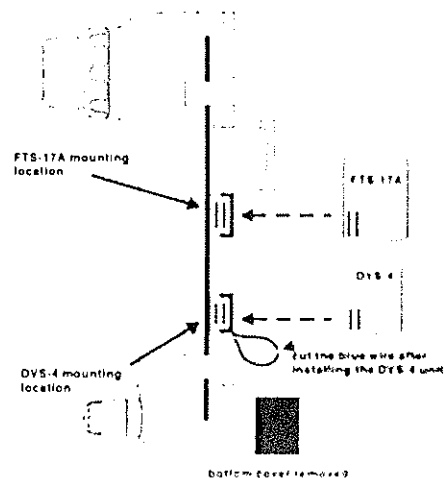

Figure 1.

Figure 2.