

$\mathsf{FT-}3000\mathsf{N}$



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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:

<u>Spare receiver for UHF (70-cm) operation</u> - 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.

<u>Menu-style programming</u> - 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.

<u>Smart-Search</u> - scans for station activity, then saves active channels directly into memories, arranged according to frequency or signal strength! <u>Dual-Watch</u> - automatically checks for activity on the sub-channel every two seconds while you are receiv-ing on another frequency.

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

<u>ARTS (Auto Range Transpond System)</u> - 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.

<u>Digital Recording & Playback Feature</u> - 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.

<u>Voice Mail Paging System</u> - 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.

<u>Configurable Memory Banks</u> – seventy general-purpose memories are arranged into seven banks, and Introduction

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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.

General

(Rx) 110 800-999 (Tx) 144
5*, 10*, (*not ava
±5 ppm
±600 kH
F3 (G3E
13.8 VD
n:
less tha less tha
n/l) 15/1
ge: -20 t
140 × 4

Weight (approx.):

Specifications

	-
Rx) 110~180 MHz 300~520 MHz	R
300-999 MHz (cellular blocked)	N
Tx) 144~148 MHz	N
5*, 10*, 12.5, 15*, 20, 25 & 50 kHz (*not available from 800-999 MHz)	S
±5 ppm from -5 to +60° C	N
±600 kHz (programmable)	F
F3 (G3E), F2	C
13.8 VDC ±15%	
	1
less than 800 mA (signal)	
less than 500 mA (squelched)	S
(I) 15/10/7/5 A (H/L3/L2/L1)	
e: -20 to +60° C	S
140 imes40 imes180 w/o knobs	
1.25 kg (2.75 lb)	Ļ
	ļ



Transmitter

Repute the address of variable reactance Modulation system: $\pm 5 \text{ kHz}$ Maximum deviation: > 60 dB below carrier Spurious emissions: $2-k\Omega$ condenser Aicrophone type:

Receiver

Circuit type: double-conversion superheterodyne 45.05 MHz & 455 kHz Fs: 12-dB SINAD Sensitivity: < 0.20 μV (VHF) $< 0.25 \,\mu V \,(UHF)$ Selectivity (-6/-60 dB): 15/28 kHz better than 70 dB (VHF) mage Rejection: better than 0.12 μ V (VHF) Squelch Sensitivity: better than 0.16 μ V (UHF) 2 W @ 8Ω for 10% THD AF Output: AF Output Impedance: $4 \sim 16 \Omega$ (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

MH-36_{A6J} DTMF Microphone *(or)* MH-42_{A6J} 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.

Accessories & Options

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.



Controls & Connectors

(5)

(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.

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. Controls & Connectors



This toggles operation between VFO (dial) and MR (Memory Recall) operation.

7 A.REC

Hold this for $\frac{1}{2}$ 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.

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.

DTMF Code Squelch

> 9600bps Data Oper.

Low Tx Power

Rear Panel Connections

- (1) ANT cable with connector cm. An external duplexer is not required.
- (2) Cooling Fans
 - temperature has been reached.
- (3) EXT-SP Jack
 - audio from the internal speaker.



This Type-"M"connector accepts an antenna designed to provide 50- Ω impedance on 2-m & 70-

These activate and provide forced air cooling for the RF power amplifier heatsink when a preset

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

(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.

V) lectio Conn G Dan Rear

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) OWN (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 on or by 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.

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.

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.

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(11) () ~ (9, *, #), and A) ~ () 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.

Keypad 8 enoudo, -36 Mic

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.



Installation

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Installation



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.



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

RF Hazard

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).
- **1** 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:

- safety's sake!

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.

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

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

Connect the RED power cable lead to the POSI-TIVE (+) 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
- 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 computercontrolled 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
- 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.

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.

noise, try the following steps to correct the problem.

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.



Speakers xtern 8 Supy Power

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Menu Function Selections

No.	Label
01	SQL TYP
02	CTCSS
03	DCS
04	TX SFT
05	OFFSET
06	REV
07	ARS
08	TPAGE
09	PAGER
10	ANSBK
11	CODE
12	P-DLY
13	DTMF
14	TX PWR
15	STEP
16	HOME
17	BAND S
18	BANK
19	PRICH
20	GUARD

Menu Function Selections

	Select CTCSS enc digital
	Select a CTCSS tone (39
	Select th
	Select transmitter off
-	Select transmit shift offset
	Reverse tx/rx fr
	Enable or
	Choose a selective Paging (<i>P</i>
	Program code memories 1~6, P for operation, or else enab
	Select an automated pager
	Enter 3-digit of
	Select a Tx delay time of 250/
	Select DTMF
	Select high or
	Select the default tunir
	Recall the p
	Select VHF
	Configure memor Seventy memory ch
	Assign prior
	Tag the displa

Fu	nction

ncode (**ENC**), encode & decode (**ENC**) al-coded squelch (**DCS**), or none.

9 available) to be used for encoding and he desired code for DCS operation.

fset (shift direction) for repeater operation

t frequency (in 50-kHz steps) for repeat

requency pair to monitor repeater "inpu

or disable Automatic Repeater Shift.

calling mode: DTMF Code Squelch (C(PAGE), or Trigger Paging (T.PAGE).

% C with 3-digit number, select the des ple/disable particular code memories fro

r response mode: answer-back, page-f

code for use with DTMF code squelch.

)/450/750 ms or 1 second before paging

IF autodial or DTMF analyzer function.

or low (L1, L2, or L3) transmitter power. ing step size (5, 10, 12.5, 15, 20, 25, or

programmed home memory channel.

F or UHF band for the sub receiver.

ry channel and memory bank arrangeme hannels can be assigned across 1 ~ 7 b rity to the displayed memory channel. layed memory as "read-only" (guarded).

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No.	Label
21	M-TUNE
22	SKIP
23	SCAN
24	PRISCN
25	RESUME
26	DUAL
27	MS_TYPE
28	PMS
30	SS_CH
31	S_SORT
32	NAMTAG
33	S DISP
34	DIMMER
35	ARTS
36	ID
37	CW ID
38	BEEP
39	ALTREP
40	ALTRNG
41	SCOPE
42	APO
43	TOT

Menu Function Selections

Enable retuning of a displayed memory channel. Tag a memory channel to be skipped while scanning. Enable/disable scanning (dial or memory). Enable/disable Priority Scanning feature. Select scan resume mode: pause for 5-seconds, or until carrier dro Enable/disable Dual Watch feature. Memory Scan Type - scan all memories in all banks, or single (displaye Enable/Disable Programmed Memory Scanning (band-limited scan PMS Channel Selection (SKIP set by VFO/MR). Select PMS pair for Smart Search scanning. Smart search sort mode: sort by frequency or signal strength. Alphanumeric entry & display alternation between A/N and frequer Sub Display format: select function guide / ch. nametag / ch. freq . / DC v Select LCD backlight level from 1 (bright) to 8 (dim). Select ARTS (Auto Range Transponding System) mode: transceive/transm Program CW ID to be sent during ARTS operation. Enable/disable auto CW ID transmission during DTMF Paging (answer-bad Turn the panel key beeper on/off. Enable/disable alert ringer, and select 1, 3, or 5 ringer repetition Select one of four alert ringer melodies. Turn spectrum scope on/off. Select delay (1~12 hrs) before Auto Power Off, or disable featur Select delay (1~60 mins.) before Time-Out Timer unkeys transmitter, or dis

Function

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No.	Label
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45	X-RPT
46	AM ON
47	REMOTE
48	PACKET
49	LOCK
50	PTTLCK
51	REC
52	PLAY
53	REC CH
54	UD KEY
55	KEY PS
56	DCS EN
57	DCS DE

Menu Function Selections

EX	Select cross-band split
T	Enable/disable cross-b
N	Enable/disable automatic
TE	Enable/disable remote
ET	Select 1200
K	Set the I
CK	Set th
	Set record
Y	Set playba
CH	Select recording forma
EY	Start record
S	Selec
EN	Inv
DE	inv

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Function	Page
and split (half-duplex) or full-duplex operation.	22, 23
e cross-band repeat (Rx:UHF, Tx:VHF only).	58
utomatic AM selection (between 110-137 MHz).	23
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ect 1200/9600 bps data operation.	57
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et recording from channel 1 or 2.	49, 50
et playback from channel 1 or 2.	50, 51
ing format: 1ch. x 16 sec. or 2 ch. x 8 secs.	49, 50
art recording using Up/Dwn keys.	50
Select key release time	56
Invert DCS encode	56
Invert DCS decode	56

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 *Ad-vanced Operation* chapter.

Turning the radio on/off.

Turn the transceiver on or off by holding \bigcirc for $\frac{1}{2}$ 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.

Basic Operation



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* (<1/2 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).

press knob to switch main/sub channels

Basic Operation - Introductio

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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 I be 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).

Hold to recall menu functions



Press to switch main/sub receive

Microphone Keys

Pressing www/we 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 www/we 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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Tunes up/down 1-MHz



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 <u>menu 15</u>, and turning the knob to select 5, 10, 12.5, 15, 20, 25 or 50 kHz steps.