

# OPERATING MANUAL

## FT-311RM



YAESU MUSEN CO., LTD.  
C.P.O. BOX 1500  
TOKYO, JAPAN

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## YAESU FT-311RM COMPACT SYNTHESIZED 220 MHz FM MOBILE TRANSCEIVER

The FT-311RM is a compact synthesized FM mobile/base transceiver providing switch-selectable power output of either 3 or 25 watts on the 220 MHz amateur band.

The reversible sloped front panel allows convenient overhead mounting, and includes soft green back-lighting of the keys and controls, and the large liquid crystal display (with bargraph PO/S-meter). Inside the FT-311RM, extensive use of chip components assures high circuit reliability, while modular circuit construction makes servicing easy.

Operating features similar to the popular FT-23R/33R/73R Handhelds include both pushbutton and knob memory selection and tuning in selectable steps; ten memory channels storing repeater splits; one-touch repeater reverse and call channel recall; band, memory and partial memory auto-resume scanning and priority channel monitoring.

Any standard repeater shift can be programmed into all memories, and seven can also store independent transmit and receive frequencies. When the optional FTS-12 Tone Squelch Unit is installed, any of 37 standard CTCSS (subaudible) tone frequencies can be displayed, selected and programmed into any memory channel for either silent monitoring or encode-only operation.

The microphone jack includes all signals needed for connection of a packet radio tnc (not supplied). Four different microphones are available for particular operating requirements, and one of them is supplied as standard, along with the MMB-34 Reversible Mobile Bracket. For base station installations, the FP-700 AC Power Supply/External Speaker is optionally available.

Please read this manual before installing or operating the FT-311RM.

## SUPPLIED ACCESSORIES

**MMB-34** Quick-Release Mobile Mounting Bracket  
Power Supply Cable T9015610 with two 10A fuses, 2.8m  
One of the microphones listed below.

## OPTIONS

**FTS-12** Tone Squelch Unit  
**SP-55** External Speaker  
**MH-10E8** Standard Hand Microphone  
**MH-10F8** Hand Speaker/Mic  
**MH-15D8** Hand Mic w/DTMF Autodialler Memory  
**MF-1A3B** Boom Microphone with flexible arm  
**YH-1** Headset (w/microphone)  
**SB-10** PTT Switch Unit for MF-1A3B or YH-1



SP-55



YH-1

## SPECIFICATIONS

### GENERAL

**Frequency range:**  
220 - 225 MHz

**Channel steps:**  
5 & 10 kHz

**Standard repeater shift:**  
1.6 MHz

**Mode of emission:**  
G3E

**Antenna impedance:**  
50 ohms, unbalanced

**Supply voltage:**  
13.8 VDC  $\pm 10\%$ , neg. ground

**Supply current:**  
Transmit 3W/25W: 3A/6.5A  
Receive/Standby: 700mA/450mA

**Operating temp. range:**  
-10 to +55 °C

**Case size (WHD):**  
160 x 50 x 145mm

**Weight:**  
Approx. 1.3 kg

### RECEIVER

**Circuit type:**  
Double-conversion superhet

**Intermediate frequencies:**  
21.6 MHz & 455 kHz

**Sensitivity** (for 12dB SINAD):  
better than 0.2 $\mu$ V

**Selectivity** (-6/-60dB):  
15/30 kHz

**Adjacent channel selectivity:**  
better than 60dB @ 20 kHz

**Intermodulation distortion:**  
better than 70dB ( $\pm 20/\pm 40$  kHz)

**Audio Output** (for 5% THD):  
at least 1.5W into 8 ohms

### TRANSMITTER

**RF output power** (into 50 ohms):  
3 and 25 watts, selectable

**Frequency stability:**  
better than  $\pm 10$  ppm

**Modulation method:**  
Variable reactance

**Maximum deviation:**  
 $\pm 5$  kHz

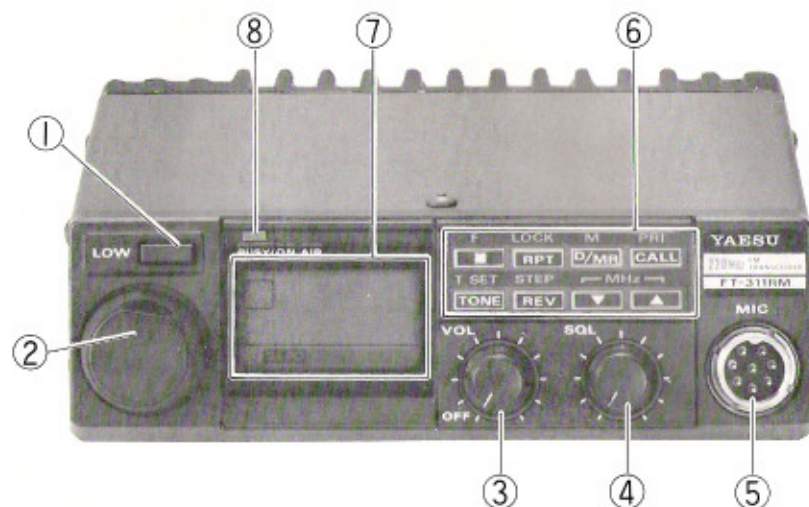
**Spurious emissions:**  
@3W, -48dB; @25W, -57dB  
below carrier

**Audio distortion** (@3.5 kHz dev.):  
less than 10% @1 kHz

Specifications subject to change  
without notice.

## CONTROLS & CONNECTORS

### FRONT PANEL



#### (1) LOW Power Output Button

Keep this button depressed whenever low power (3W) is sufficient for communications.

#### (2) Rotary Selector

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

#### (3) VOL (OFF) Control

This control adjust the volume of the receiver audio. Turn it fully counterclockwise (into the click stop) to turn the transceiver OFF.

#### (4) SQL Control

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

#### (5) MIC Jack

This 8-pin jack accepts microphone input and scanning control from the microphone or packet radio tnc. Pinout is shown on page 12.

#### (6) Function Keys

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

■ is referred to as [BOX]

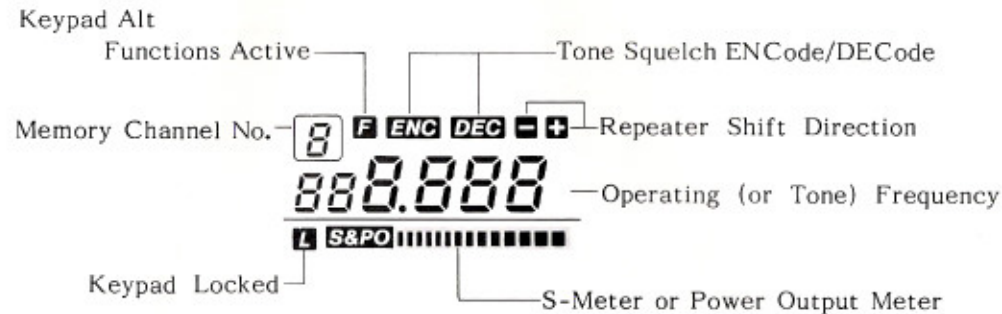
▲ is referred to as [UP]

▼ is referred to as [DOWN]

Alternate key functions are referenced by the alternate label (above the key), with "[F]+" in front of it to remind you to press [F] first. For example, "[F]+[UP]" indicates that you should press the [F] key, followed by the ▲ key within four seconds. All key functions are described in detail in the OPERATION section, and summarized in the Operator's Quick Reference Charts.

### (7) LCD (Liquid Crystal Display)

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



### (8) BUSY/ON AIR Indicator Lamp

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

### REAR PANEL



#### (1) EXT SP (External Speaker) Jack

This 2-contact mini phone jack accepts a 4- to 16-ohm external speaker such as the SP-55. When a plug is inserted into this jack the internal speaker is disabled.

#### (2) 13.8VDC Cable Pigtail

This is the power supply connection for the transceiver. Use the fused DC Cable supplied with the transceiver to make connection between this pigtail and the car battery or other DC power supply capable of at least 7 Amperes (continuous). Make certain that the red lead connects to the positive side of the supply.

#### (3) ANT (Antenna) Jack

Connect a 220 MHz antenna to this type-M socket using 50-ohm coaxial cable and a type-M plug. Make sure the antenna is designed specifically for use at the operating frequency.

## INSTALLATION

### Antenna Considerations

The FT-311RM is designed for use with an antenna having an impedance near 50 ohms at the operating frequency. For optimum performance use a high-quality, carefully designed antenna. The antenna should be connected at all times when power is on, to avoid damage that can otherwise result if transmission occurs accidentally when no antenna is connected.

Another important consideration in installing the antenna for the FT-311RM is the feedline. For optimum performance use the shortest possible length of the best quality coaxial cable available, and be sure to use a properly matching fitting (type-M, PL-259-compatible) for the jack on the transceiver.

### Mobile Installation

The FT-311RM must only be installed in cars having a negative ground electrical system. The transceiver should be located where the display, controls and microphone are easily accessible, and should be securely affixed using the supplied MMB-34 mobile mounting bracket. The transceiver may be installed in any position without adversely affecting its performance, but it should not be mounted near a heater vent or where it could interfere with safe operation of the vehicle. Make sure that plenty of space is provided at the rear of the transceiver so that air can flow freely around the heatsink. Refer to the diagrams on page 12 for reversal of the front panel (if installing the transceiver overhead), and on the facing page for installation of the MMB-34.

- (1) Use the mounting bracket as a template for positioning the mounting holes, after determining the proper location with sufficient clearance for the transceiver. Use a 4.8mm (3/16") bit for drilling the holes. Secure the bracket with the screws, washers and nuts supplied, as shown in Figure 1.

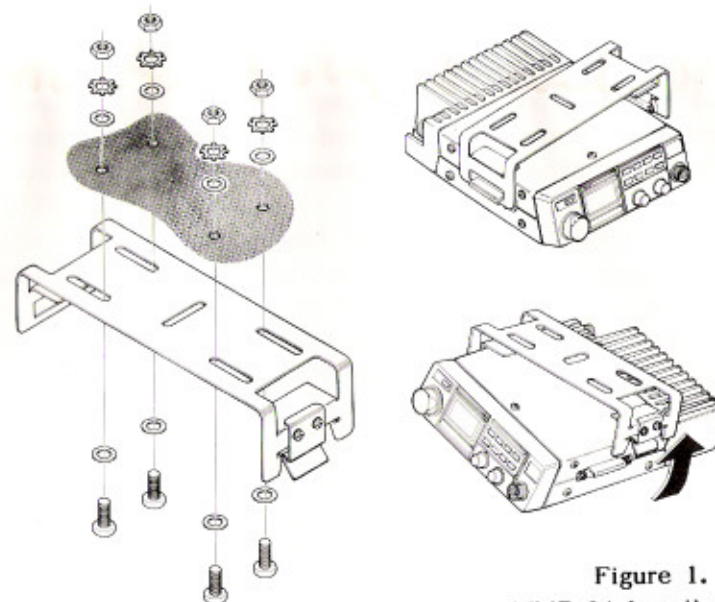


Figure 1.  
MMB-34 Installation

- (2) Screw the two small angle brackets supplied with the MMB-34 to the sides of the transceiver so that the protruding parts are toward the top.

To install the transceiver, clip the left side into the slot in the left side of the bracket, and raise the right side until the latch clicks. To remove the transceiver, support it from underneath while pulling the latch spring on the right side away slightly.

### Mobile Power Connection

Before connecting the power cable the maximum battery charging voltage should be checked to ensure that it remains below 15V when the engine is run fast. If more than 15V, the voltage regulator of the car should be adjusted before connecting the transceiver.

Power connections should be made directly to the automobile battery using the supplied cable with 10A in-line fuses. Connection to the cigarette lighter or other accessory circuit may cause the fuse to blow in that circuit. Connecting the supplied DC power cable to the battery independently of the rest of the automobile electrical system will minimize possible ignition noise pickup and excessive supply voltage drop during transmission, while allowing operation with the ignition off.

Do not connect any power to the transceiver except via the supplied fused cable, and do not attempt to defeat or bypass the fuses - they are there to protect you and the equipment.

Connect the RED lead of the power cable to the POSITIVE (+) battery terminal, and the BLACK lead to the NEGATIVE (-) terminal. If it is necessary to extend the power cable, use #14 AWG or larger insulated, stranded copper wire, and in all cases use the minimum power cable length practicable to keep voltage drop minimal.

**WARNING**

NEVER APPLY AC POWER TO THE REAR PANEL POWER JACK OF THE TRANSCEIVER. NEVER CONNECT DC VOLTAGE OF MORE THAN 15 VOLTS TO THE POWER JACK. ALWAYS REPLACE FUSES WITH 10A RATING. FAILURE TO OBSERVE THESE PRECAUTIONS WILL VOID THE WARRANTY.

The SP-55 External Speaker is an optional accessory which allows the source of audio from the transceiver to be repositioned for optimum hearing. Especially practical for the noisy mobile environment, the SP-55 includes its own swivel-type mounting bracket, and is available from your Yaesu dealer. Also available to enhance safety and mobile operating convenience are the YH-1 Headset with miniature boom microphone, and the full size MF-1A3B boom microphone with flexible arm (both of which use the SB-10 PTT switch).

**Base Station Installation**

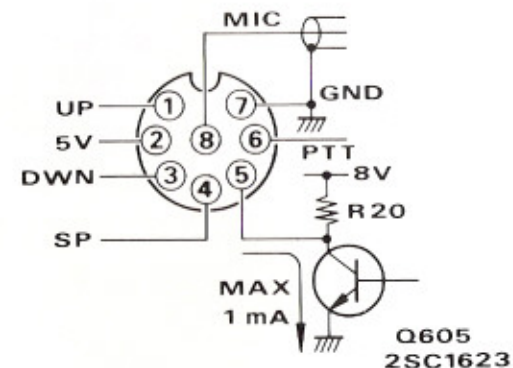
Mounting feet are supplied for the transceiver when used as a base station. A power supply capable of providing at least 7A continuously at 13.8VDC is required for operation from the AC line, and an external speaker is recommended. The FP-700 AC power supply is available from your Yaesu dealer for this purpose. Use the fused DC power cable supplied with the transceiver for making power connections, and connect the external speaker to the EXT SP jack on the rear panel.

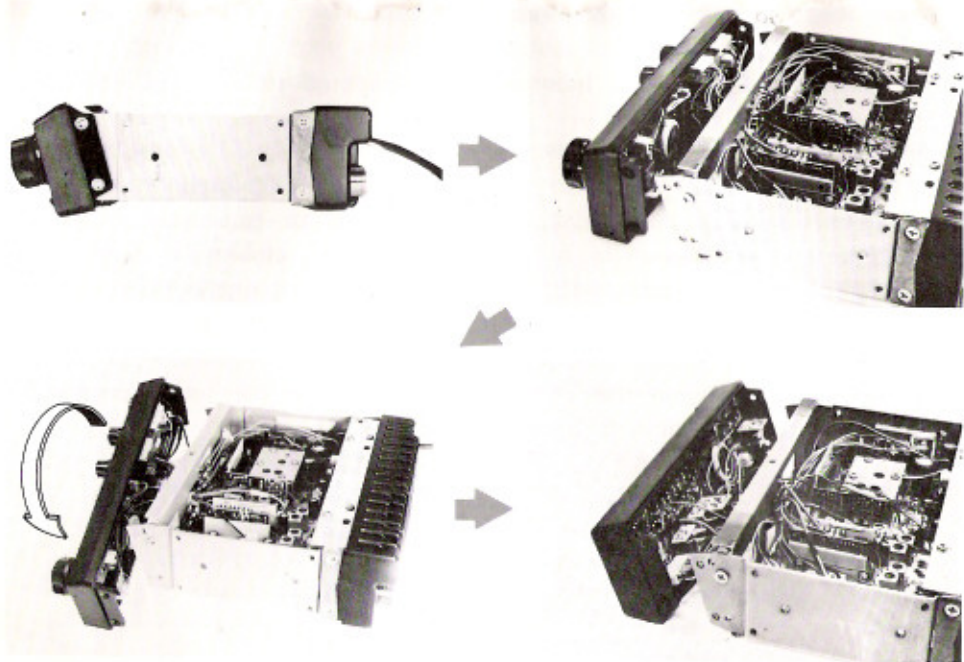
**Packet Radio TNC Interconnections**

Most popular packet radio tncs can be connected to the MIC jack of the FT-311RM as follows:

TNC Transceiver Jack	FT-311RM MIC Jack
Receiver Audio in	pin 4 (8 ohms, de-emphasized)
Squelch Ctrl in	pin 5 (open=8V, closed=0V 1 mA)
PTT (gnd=tx) out	pin 6
Transmit Audio out	pin 8 (400 ohms, pre-emphasized)

Use shielded cable for the audio lines, and keep the interconnecting cable as short as possible to avoid RF pickup.





### Front Panel Reversal

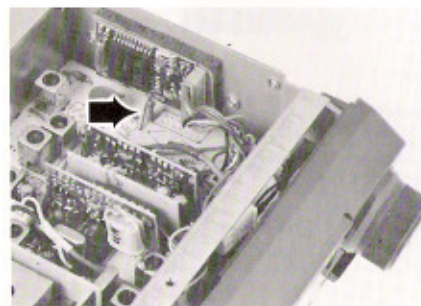
The front panel may be installed so that it is angled either upward (as supplied from the factory), or downward, to accommodate various installation requirements. To reverse the front panel;

- (1) Remove the ten screws affixing the top and bottom covers, and remove the covers, using care not to strain the speaker wires.
- (2) Remove the four screws affixing the front panel, and gently separate it from the chassis.
- (3) Using care not to pull on the interconnecting wiring, turn the front panel over, and remount it.
- (4) Replace the top and bottom covers (now also reversed) and their ten screws.

### FTS-12 Tone Squelch Unit Installation

The FTS-12 provides either encode-only or encode/decode operation with 37 front panel selectable subaudible CTCSS tones, and is available from your local Yaesu dealer. See the "Operation" section for functional details.

- (1) Disconnect the power cable at the rear of the transceiver, and remove the five screws affixing the bottom cover\*. Remove the cover carefully so as not to pull on the speaker wires, and lay the set upside down.
- (2) Locate the unconnected brown 10-pin connector at the front right corner on the Main Board just behind the tuning knob. Align the small tab on one side of this connector with the hole in one side of the FTS-12 connector, and mate these connectors.
- (3) Now locate the double-sided adhesive tape pre-installed on the inside of the side panel. Remove the paper covering from this tape, and press the FTS-12 against it as shown in the diagram below.



CTCSS Tone Frequency (Hz)			
67.0	100.0	141.3	203.5
71.9	103.5	146.2	210.7
74.4	107.2	151.4	218.1
77.0	110.9	156.7	225.7
79.7	114.8	162.2	233.6
82.5	118.8	167.9	241.8
85.4	123.0	173.8	250.3
88.5	127.3	179.9	—
91.5	131.8	186.2	—
94.8	136.5	192.8	—



\* If the front panel has not been reversed (ie., angles upwards), the bottom panel is the larger panel which includes the loud-speaker. Otherwise, the bottom panel is the smaller one.

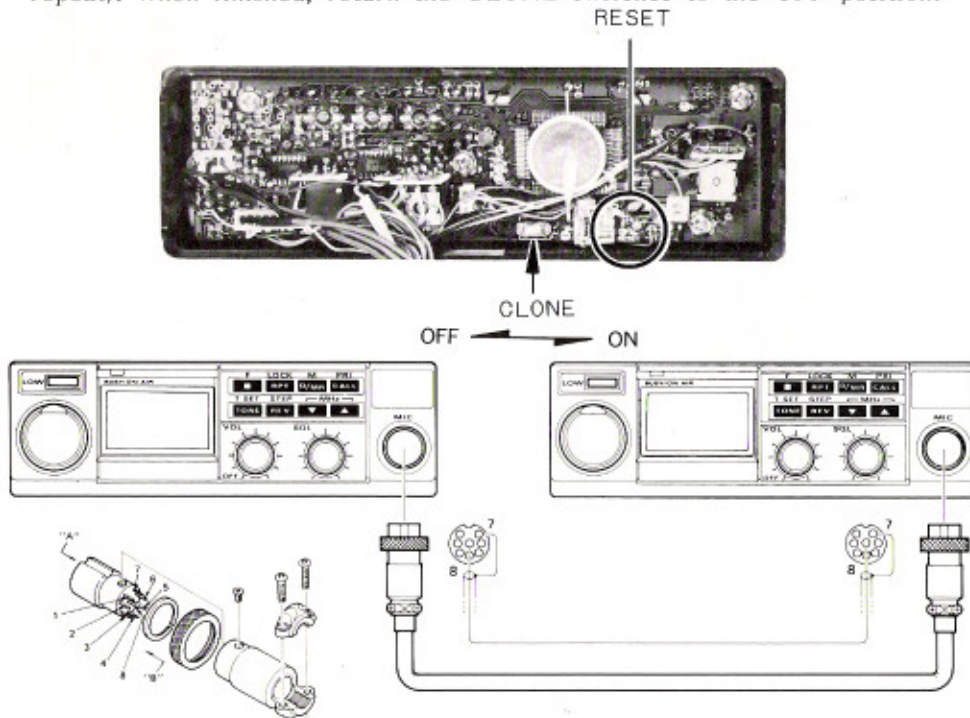


## MEMO:

- (4) On the main circuit board near the FTS-12 mounting position, notice a 27-kilohm resistor (red, violet and orange bands). Cut the exposed lead of this resistor. If the FTS-12 is removed from the transceiver, this resistor must be reconnected.
- (5) Replace the bottom cover. The output tone level (VR1 on the FTS-12) is adjusted at the factory for the proper deviation, so no adjustment should be necessary.

### Memory Cloning

All memory data stored in one transceiver can be moved to another by setting the CLONE switches on and connecting the MIC jacks together as indicated in the diagram below. Press the  key on the destination transceiver, and then the  key on the source transceiver. When transfer is completed, the data from Memory channel 0 in the source transceiver will appear on the destination transceiver of the operation was successful (otherwise, press the arrow keys again to repeat). When finished, return the CLONE switches to the OFF position.



## OPERATION

This chapter describes the various transceiver functions in detail. After studying these descriptions, keep the FT-311RM Operator's Quick Reference Charts handy in case you need to refresh your memory.

### Preliminary Operating Information

Before operating the transceiver, recheck power supply and antenna connections. Never operate the transceiver without an antenna.

Before proceeding, please read the chapter on Controls & Connectors, if you have not already, to familiarize yourself with the functions of the controls. Note especially on page 5 the description of the terminology used when referring to the keys in this manual.

When the function keys are pressed during reception, a single beep will sound if the command is accepted, or a double beep if the command is invalid. Except for certain special cases mentioned later, the keys are disabled during transmission.

If you have trouble getting the transceiver to work as described, see 'In Case of Problems' on page 25.

### Squelch Setup

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

Rotate the SQL control clockwise just to the point where the noise is silenced and the LED turns off. If the SQL control is set further clockwise, sensitivity to weak signals will be reduced. Now, whenever

a signal reaches the receiver that is strong enough to open the squelch, the indicator will glow green.

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

### Transmitting Procedure

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

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

#### NOTE

Operating at high power continuously causes the temperature of the heatsink to rise. If it exceeds 90°C (194°F), protective circuitry will automatically switch the transmitter to low power. However, this is not shown on the bargraph meter. So, if your power output drops off during a long transmission, allow the heatsink to cool, and high power will be restored automatically.

## Frequency & Step Selection

To tune to a new frequency or change tuning steps, the transceiver must be in the Dial mode. If a Memory number is present in the upper left corner of the display, press [D/MR] to select the Dial mode\*. There are two ways to select your operating frequency: by turning the selector knob, or with the [UP] and [DOWN] keys. Holding the [UP] or [DOWN] key\* for more than  $\frac{1}{2}$ -second will start scanning (press one of these keys again to stop).

Channel steps are 5 or 10 kHz. To change from one step size to the other press [F]+[STEP]\*.

One-megahertz steps are also available: just press [F] before turning the selector knob or pressing the [UP]/[DOWN] keys.

## Memory Storage & Recall

The FT-311RM offers ten programmable memory channels, numbered 0 through 9. When in the Memory mode, the Memory number appears in the upper left corner of the display. To store a frequency in memory:

- (1) Tune to the desired frequency in the Dial mode.
- (2) Press [F]+[M] (the Memory number will blink) and select the desired Memory number for storage using the selector knob or [UP]/[DOWN] keys,
- (3) Press [D/MR] to store the Dial frequency into the selected Memory: the Memory number will disappear, and operation will continue in the Dial mode.

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

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

EXAMPLE: to store 224.000 MHz in channel 0

- (1) Press [D/MR] once if a Memory number is displayed, to select the Dial mode. Then use the selector knob or [UP] and [DOWN] keys to select 224.000 on the display.
- (2) Press [F]+[M] and then rotate the selector knob until '0' is displayed (blinking) at the upper left corner.
- (3) Press [D/MR]. There should now be no memory number displayed. If there is, you timed out (press [D/MR] and then repeat step 2).

To recall prestored memories for operation, the transceiver must be in the Memory mode (Memory number displayed). Press [D/MR], if necessary, to select the Memory mode. The last memory channel used is now be recalled.

Rotate the selector knob or press the up/down keys to select other memories. Only prestored memories are displayed: empty memories are skipped.

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

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

## Repeater Operation - Standard Splits

The FT-311RM provides a 'standard split' feature, selected by the [RPT] key, which activates a pre-programmed offset in both Dial and Memory modes. The standard split is pre-programmed at the factory to 1.6 MHz. If you need a different standard repeater split reprogram this function as follows;

- (1) Turn the transceiver off.
- (2) Press and hold the [RPT] key while turning the transceiver back on. '-+' will appear, blinking, along with the currently programmed standard repeater offset.
- (3) Use the [F] key and selector knob or [UP]/[DOWN] keys to set the display to the standard repeater offset used in your area. For example, if you need 1.6 MHz standard split, press [F] and turn the selector knob for 1.600 on the display (at this point it doesn't matter whether the split is + or -).
- (4) Press [RPT] again. The '-+' on the display will stop blinking as the display returns to what was shown before step 1.

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

You can check the frequency to be used for transmission without pressing the PTT switch: just press [REV], to reverse transmit and receive frequencies (if nothing happens, the selected offset is out-of-band). If both receive and transmit frequencies are in band, the '-' or '+' displayed at the upper right will blink, signifying that the transmit and receive frequencies are reversed. Using this REVerse function

also allows you to check the repeater input frequency to see if you can work a particular station direct (on a simplex frequency, of course). Press [REV] again to return to the original repeater split direction.

Storing a memory while standard repeater split is activated in the Dial mode will cause the offset (amount and direction) to be stored along with the displayed frequency\*. Then whenever that memory is recalled, the stored shift will be active (the '-' or '+' will be displayed). The REVerse function cannot be stored in memory, although both [RPT] and [REV] can be pressed to temporarily change repeater operation on that memory: the new setting will not be stored. Repeater shift functions can also be activated while operating on simplex memories, if required.

## Non-Standard Repeater Splits

Memories 0 through 6 can also store an independent transmit frequency, for operation on repeaters with non-standard shift. To do this, first store the receive frequency as described previously. Then retune the Dial to the desired transmit frequency, and repeat the storage procedure, but this time hold the PTT switch at the last step (when you press [D/MR] the last time while the Memory number is blinking). Now when you recall the memory, '-+' will be displayed together at the upper right. The [REV] key will function as described above, but pressing the [RPT] key will disable the non-standard split and make the channel simplex. Pressing [RPT] again will activate the currently programmed standard split offset (in place of the independent transmit frequency). To return to the odd split press [D/MR] twice, to quit and then recall the memory again.

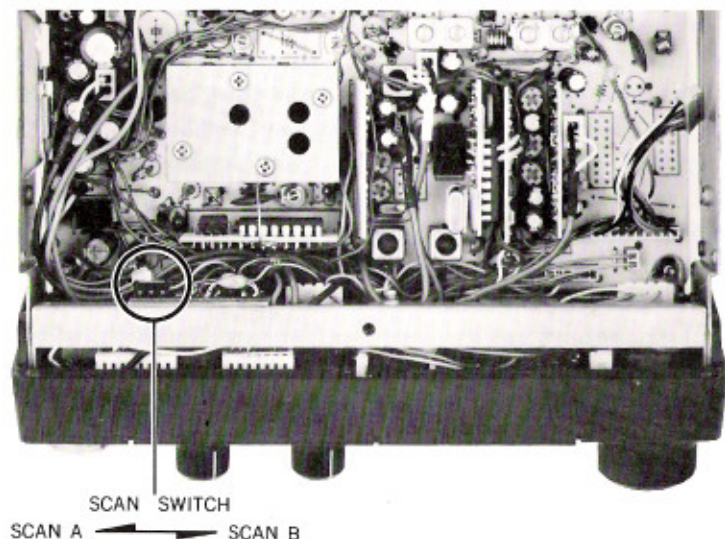
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\* When memories 0 through 6 are stored with standard repeater offset, they will retain the offset which was pre-programmed at the time they are stored. If the standard offset is re-programmed, these memories will not 'know' about it unless the [RPT] key is used, or the memories are restored again from the Dial mode.

## Scanning

Before starting the scanner make sure the SQL control is set to squelch off the noise on a clear channel. Two different modes of scanning are available: band scanning or memory scanning. In both modes, scanning is manually activated and deactivated by the [UP] or [DOWN] key. Just press and hold the key for more than  $\frac{1}{2}$ -second to start the scanner. If the transceiver is in the Dial mode, band scanning will result. If a memory number is displayed, the transceiver is in the Memory mode, and only prestored memories will be scanned.

The scanner is preset at the factory to pause for up to five seconds on any channel where a signal is found strong enough to open the squelch, and then resume scanning (this is SCAN mode A). If you prefer to have the scanner stay paused on a channel (until two seconds after the channel becomes clear), move the SCAN mode selector switch inside the top cover to position B. See the photo below.



To stop the scanner, press any one of [UP], [DOWN], [D/MR] or the PTT switch.

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

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

## Priority Channel Monitoring

The Priority function allows periodic checking for activity on any memory while operating on the Dial frequency, or checking of Memory 1 while operating on other memories. When a signal appears on the priority memory while receiving, operation will automatically shift to that memory, for up to five seconds (in SCAN mode A), or for as long as a carrier is received (SCAN mode B, see page 22). If you transmit while the squelch is open on the priority memory, priority monitoring is cancelled and operation stays on the priority memory.

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

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

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

## Tone Squelch Operation

The FT-311RM can be used to silently monitor for calls on busy channels when the optional FTS-12 Tone Squelch Unit is installed. The encode function superimposes a subaudible tone (at a frequency too low to be heard) on your transmitted carrier, while the decode function monitors the detected receiver audio through a narrow filter at the same subaudible frequency, keeping the squelch closed until a signal appears with a matching tone superimposed. Installation instructions are on page 13.

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

To activate tone squelch functions press [TONE]. With one press, 'ENC' (encode) will be displayed and the tone generator will be activated for transmission. Press [TONE] again and both 'ENC' and 'DEC' (decode) will be displayed together as tone squelch is activated for both transmission and reception (only signals sending the matching tone frequency will open the squelch). Pressing [TONE] once more disables tone squelch features.

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

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\* If nothing happens, the FTS-12 is not installed.

## IN CASE OF PROBLEMS

Basic FT-311RM operation is not complicated, but it is not hard to get lost when first getting acquainted with the display and keypad functions, or when learning to use some of the finer features like split-frequency memories. If the display shows nothing at all, check the power switch (VOL control), and the power supply connections.

Fortunately, the display includes enough symbols and function indicators to let you know what is going on as long as power is applied, so it is well worthwhile to study the display diagram on page 6 carefully. For example, if the frequency display changes unexpectedly when you transmit (or if 'Err' appears), check for a small '+' or '-' at the upper right-hand corner. Also, if only a few seemingly non-sensical digits appear, press [TONE] to disable the tone squelch setting feature.

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

To avoid inadvertent key presses during standby operation, activate the keypad lock (press [F]+[LOCK]). You can still change channels with the selector knob when the keys are locked. Remember to set the lock back off (by the same keystrokes) when you wish to enter data.

If the transceiver still isn't operating as you believe it should after studying the Operation section, remove the top cover and reset the memories by shorting the reset terminals (pictured on page 14).