# YAESU

# FT-6200

## Dual-Band 70/23cm
## Mobile Transceiver

# FT-6200 Features

The FT-6200 is the latest innovation from the originators of mobile cross-band full duplex and detachable front panel design in amateur transceivers. New miniaturization technology allows improvements such as a built-in antenna duplexer, dual full-frequency liquid crystal display (with signal strength/power output bargraphs for each band), 8-level automatic display/button lighting dimmer, and *dual* external speaker jacks (one for each band). An efficient thermally-switched cooling fan allows up to 35 watts output on 70cm and 10 watts on 23cm.

Thirty-two freely tunable memories (sixteen per band) offer complete programmability and scanning functions, such as independent transmit and receive frequencies, programmable repeater offsets and scan limits, selectable scan resume modes and memory skip, priority monitoring and 1-touch instant-recall CALL channels for each band. Channel steps and repeater offsets are user-selectable independently for both bands. Versions are available with microphone button control of a 1750-Hz burst generator (with the MH-26D8 or MH-26E8 Speaker/Mic), vfo/memory or band selection.

When the front panel is connected through an optional cable the transceiver can be installed separately from the panel. Alternatively, the MW-1 *Wireless* Microphone/Controller option duplicates the controls (including volume and squelch), adding a DTMF (Dual-Tone, Multi-Frequency) keypad and microphone. With the FRC-4 Paging/SelCall option you can select a 3-digit ID code and your receiver stays quiet until your code is received (from *any* DTMF-equipped transceiver). You can have a code open the squelch or a ring like a telephone. PAGE mode displays the caller's code so you know who is calling. One-touch paging transmits paging codes whenever the PTT switch is pressed, if desired. Seven 3-digit code memories on each band store your ID plus that of the calling station and those of five other stations or groups for calling/monitoring (autopatching requires the MH-26F8 DTMF keypad microphone or the MH-15D8 with its own auto-dial DTMF memories). The DVS-3 Digital Voice/DTMF Pager option includes all of the paging/selcall features of the FRC-4, and also records both received signals and messages for transmission. A 38-tone programmable CTCSS (Continuous Tone-Coded Squelch System) encoder is built-in, and CTCSS tone squelch operation on both bands is available with the FTS-22 Dual Band CTCSS Decoder option, which also provides a telephone-type CTCSS Bell alerting function.

Please read this manual before installing or operating the FT-6200.

# Contents

The FT-6200 is supplied with a DC Power Supply Cable, Mobile Mounting Bracket, and one of the microphones from the following list. Other items may be supplied per local requirements.

| Model | Description | Order Code |
|-------|-------------|------------|
| | DC Power Supply Cable (2.8 meters) | T9015605 |
| DVS-3 | Digital Voice/DTMF Pager Unit | A02950001 |
| FP-700 | Power Supply for AC Mains Operation | A625501-X |
| FRC-4 | DTMF Pager Unit | A02960002 |
| FTS-22 | Dual-Band Tone Squelch Unit | A02970002 |
| MH-26$_{D8}$ | Hand Microphone w/1750 Hz Burst Button | A04230001 |
| MH-26$_{E8}$ | Hand Speaker/Mic w/1750 Hz Burst | A04240001 |
| MH-26$_{F8}$ | Hand Microphone w/DTMF Keypad | A04250001 |
| MH-27$_{B8}$ | Hand Microphone w/DTMF Keypad | A04280001 |
| MH-15$_{D8}$ | Hand Microphone w/DTMF Memory Keypad | D1000061 |
| MF-1$_{A3B}$ | Boom Microphone w/Flexible Arm | D1000044 |
| MMB-37 | Quick-Release Mobile Mounting Bracket | D6000056 |
| MW-1 | Remote Wireless Controller/DTMF Microphone | A02980002 |
| SB-10 | PTT Switch Unit for MF-1$_{A3B}$ or YH-1 | D3000396 |
| SP-7 | External Loudspeaker | A03590001 |
| YH-1 | Headset | D3000262 |
| YSK-1/1L | Trunk Mount Kits (w/ 3- or 6-m cable, resp.) | A03690001/A03690002 |

## *General*

Frequency Range: see Version Chart below

Channel Steps: (5), 10, 12.5, (15), 20 & 25 kHz
() = 70cm only

Frequency Stability: $< \pm 1.5$ ppm from –0 to +50 °C

Mode of Emission: F3

Antenna Impedance: 50 ohms, unbalanced

Supply voltage: 13.8V DC $\pm 15\%$, negative ground

Current Consumption (typical):
Rx: 600 mA,
Tx hi/low: 9/3.5A (70cm), 4.5/2A (23cm)

Operating Temperature Range:
70cm: –20 to +60 °C,
23cm: –10 to +60 °C

Case Size (WHD): 140 x 40 x 155 mm (w/o knobs)

Weight: 1 kg (2.2 lb)

## *Transmitter*

Output Power (high/low):
35/5W (70cm), 10/1W (23cm)

Modulation Type: Variable Reactance

Maximum Deviation: $\pm 5$ kHz

Spurious Radiation: $< -60/-50$ dB (70/23cm)

Microphone Impedance: 2kΩ

## *Receiver*

Circuit Type: Double Conversion Superheterodyne

IFs: 455 kHz, and 22.5 MHz (70cm),
or 58.3 MHz (23cm)

Sensitivity (for 12dB SINAD):
better than 0.158 µV on 70cm, 0.2 µV on 23cm

Selectivity (–6/–60dB): 12/24 kHz

Image Rejection: better than 60 dB

Squelch Sensitivity: at least 0.1 µV

Maximum AF Output: 3W into 4 Ω @5% THD

AF Output Impedance: 4~16 Ω (8-Ω int. speaker)

*Specifications subject to change without notice or obligation.*

## *Version Chart*

|  | Version → | A1 | B1 | C1 | D1 |
|---|---|---|---|---|---|
| **70cm Range** (MHz) | 430-440 |  | ● | ● |  |
|  | 430-450 | ● |  |  |  |
|  | 432-438 |  |  |  | ● |
| **70cm Rptr Shift** (default, MHz) | 1.6 |  |  | ● | ● |
|  | 5 | ● |  |  |  |
|  | 7.6 |  | ● |  |  |
| **23cm Range** (MHz) | 1240-1300 |  | ● | ● | ● |
| **23cm Rptr Shift** (programmable) | default, MHz | 35 | 0 | 0 | 0 |
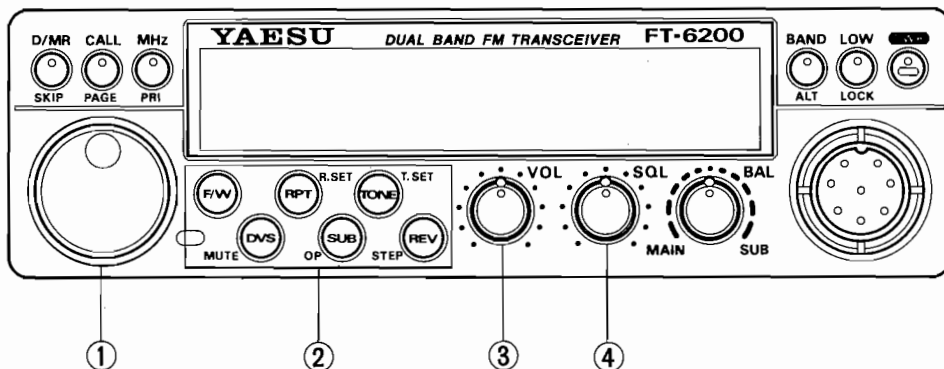
**(1)   Selector Knob**

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

**(2)   Main Function Keys (with white labels)**

These six keys select most of the major operating features. If the button beeper is enabled, one or more beeps sound when a key is pressed, if the corresponding command is accepted. The white labels on the keyfaces show the primary function of each key. However, if you press the **F/W** key first, these keys perform alternate functions indicated by the nearest blue label (and described in the *Operation* chapter).

In this manual we will refer to alternate key functions by preceding the alternate key name with "**F/W+**" in front of it to remind you to press the **F/W** button first. For example, "**F/W+OP**" indicates that you should press the **F/W** button followed by the **SUB** button (within five seconds).

**(3)   VOL Control**

This control adjusts the volume of the receiver audio (both receivers together if dual receive is active), and of the button beeper.

**(4)   SQL Control**

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 from counterclockwise just until noise is
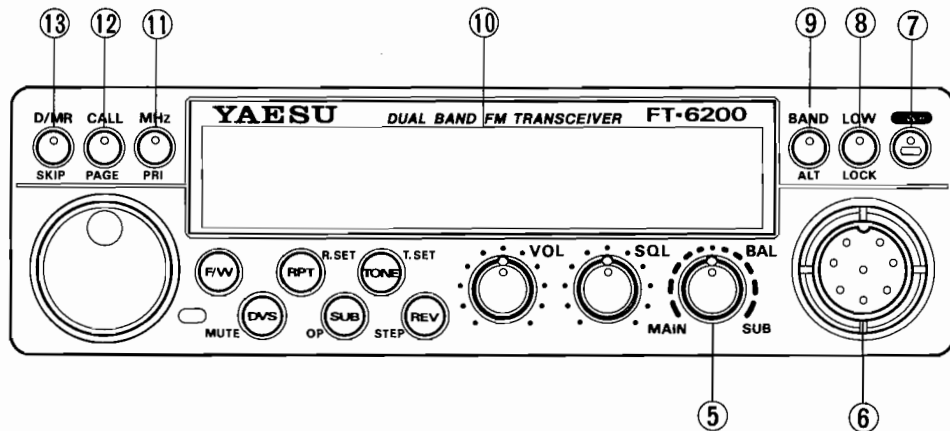
silenced (and the "**BUSY**" indicator on the display is off) when the channel is clear. This control affects only the primary band unless "**ALT**" is blinking on the display, in which case it affects only the secondary band.

**(5)   BAL** Control

This control adjusts the relative balance of receiver audio between the primary (**MAIN**) and the secondary (**SUB**) bands, when receiving on both.

**(6)**   Microphone Jack

This 8-pin jack accepts transmit audio, band selection and scanning control from the microphone, and provides receiver audio (for a speaker/mic). Also,

memories can be copied between two transceivers through this jack, and a packet tnc can be connected.

**(7)   PWR** Button

Press this button to turn the transceiver on, and press and hold it ½-second to turn it off.

**(8)   LOW (LOCK)** Button

Press this button while receiving to toggle high/low transmitter power (35/5 watts on 70cm, 10/1 watts on 23cm). The display shows "**LOW**" (just above the **VOL** Control) when low power is selected. The alternate function of this button disables the selector knob and most of the front panel keys and buttons (except itself, **F/W** and **PWR**). Press **F/W** and this button again to unlock the panel.

### (9) BAND (ALT) Button

This button changes bands: that is, the left (primary) and right (secondary, if enabled) frequency displays reverse, and the main and sub audio (at the BAL control and external speaker jacks) reverses. The alternate function toggles alternating band selection: memory selection and scanning alternate between bands ("ALT" appears at the bottom of the display).

### (10) Display

The display segments are as shown below. You can check them at any time by switching the transceiver on while holding the F/W key.

### (11) MHz (PRI) Button

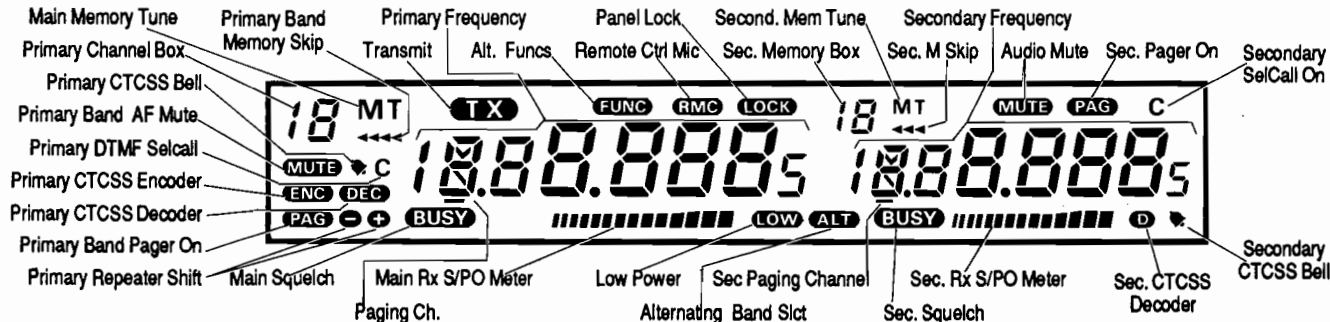This button activates 1-MHz tuning steps (the kHz digits blank on the display). If receiving on a mem-ory, pressing this button the first time activates the "Memory Tuning" (MT) mode, and pressing it again enables 1-MHz steps. The alternate function of this button activates priority monitoring, described in the *Operation* chapter ("P" displayed instead of the memory number to the upper left of the frequency).

### (12) CALL (PAGE) Button

Press this button to jump to and from your CALL channel memory. The alternate function activates the DTMF paging functions (if the FRC-4 or DVS-3 is installed), described later.

### (13) D/MR (SKIP) Button

This button switches operation between the two main tuning modes: dial and memory. The alternate function marks the current memory to be skipped during scanning.



| Label (left side) | Label (right side) |
|---|---|
| Main Memory Tune | Panel Lock |
| Primary Channel Box | Primary Band Memory Skip |
| Primary CTCSS Bell | Primary Frequency |
| Primary Band AF Mute | Transmit |
| Primary DTMF Selcall | Alt. Funcs |
| Primary CTCSS Encoder | Remote Ctrl Mic |
| Primary CTCSS Decoder | Second. Mem Tune |
| Primary Band Pager On | Sec. Memory Box |
| Primary Repeater Shift | Sec. M Skip |
| Main Squelch | Secondary Frequency |
| Paging Ch. | Audio Mute |
| Main Rx S/PO Meter | Sec. Pager On |
| Low Power | Secondary SelCall On |
| Alternating Band Slct | Sec Paging Channel |
| Sec. Rx S/PO Meter | Sec. Squelch |
| Sec. CTCSS Decoder | Secondary CTCSS Bell |

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## (14) **13.8V DC** Cable Pigtail w/Fuse

This is the power supply connection for the transceiver. Use the supplied DC cable to connect this pigtail to the car battery or other DC power supply capable of at least 9 Amperes (continuous duty). Make certain that the red lead connects to the positive side of the supply.

The fuse is a 15-A fast-blow type, and should be replaced only with the same capacity and type.

## (15) **SUB SP & EXT SP** Jacks

These 2-contact mini phone jacks each accept a 4- to 16-ohm external speaker such as the Yaesu SP-3, SP-4, SP-7 or SP-55. Inserting a plug into one of these jacks disables the internal speaker for the corresponding (secondary or primary) band.

## (16) **ANT** Cable Pigtail with Coaxial Socket

Connect a dual-band antenna to this type-N socket using 50-ohm coaxial cable and a type-N plug. Make sure the antenna is designed specifically for use on both bands.
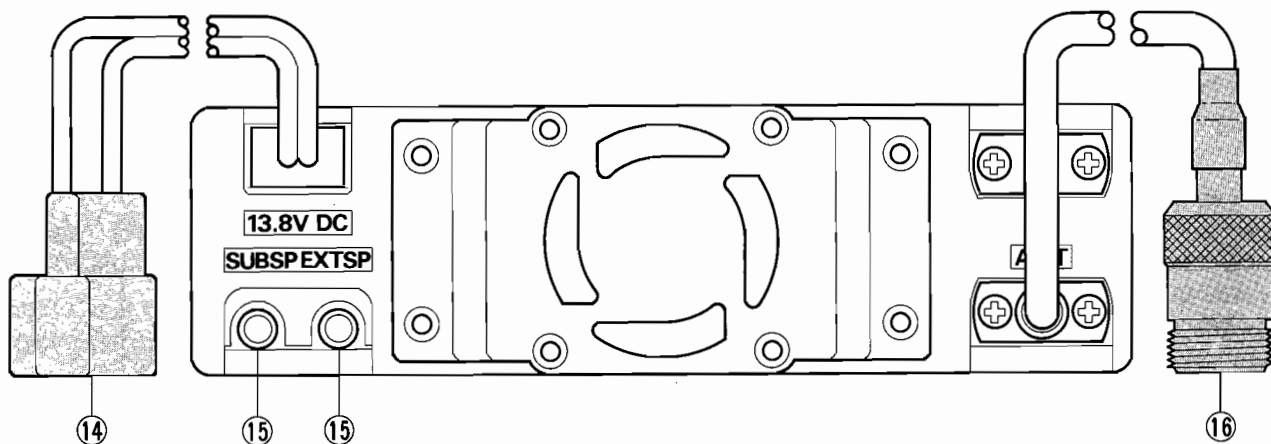
This chapter describes installation of the FT-6200 with typical supplied accessories. Installation of internal options (the FRC-4 or DVS-3 DTMF Paging Units, and the FTS-22 CTCSS Decoder Unit), and transceiver installation with the YSK-1 Trunk Mount Kits are described at the back of this manual. If you have any of these options, turn to *Installation of Options* at the back before installing the transceiver as described below.

## Antenna Considerations

The FT-6200 is designed for use with a dual-band antenna having an impedance near 50 ohms at all operating frequencies on both bands. 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.

Make sure your antenna is designed to handle 35 watts continuous transmitter power. You do not need an antenna duplexer for dual band operation with a dual band antenna, since one is built into the FT-6200. However, you should not use the FT-6200 with a single-band antenna, as accidentally transmitting on the wrong band could harm the transceiver. For best performance and safety in mobile installations, mount the antenna in the center of a flat surface, out of reach of human hands.

Also for best performance use the shortest possible length of thick, top-quality coaxial cable. Be sure to use a matching type-N plug for the jack on the transceiver pigtail.

## Mobile Installation

The FT-6200 must only be installed in cars having a negative ground electrical system. The transceiver can be installed in one piece using the supplied MMB-37 quick-release bracket as described below, or in two pieces with an optional YSK-1 Trunk Mount Kit (see *Installation of Options* at the end of this manual).

### One-Piece Mounting

Mount the transceiver where the display, controls and microphone are easily accessible, using the supplied MMB-37 mobile mounting bracket. The transceiver may be installed in any position, but should not be near a heater vent 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. Refer to the diagrams on the next page for 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 (Figure 1).

☐ Screw the two mounting clips to the sides of the transceiver using the small hex bolts and washers supplied (Figure 2).

To install the transceiver, position it in the bracket so that the clip on the left side fits into the slot in the left side of the bracket (Figure 3), then push the right side of the transceiver upwards until it latches.

To remove the transceiver, place your hand underneath it and pull the latch in the right side of the bracket outward until the right side of the transceiver drops free.
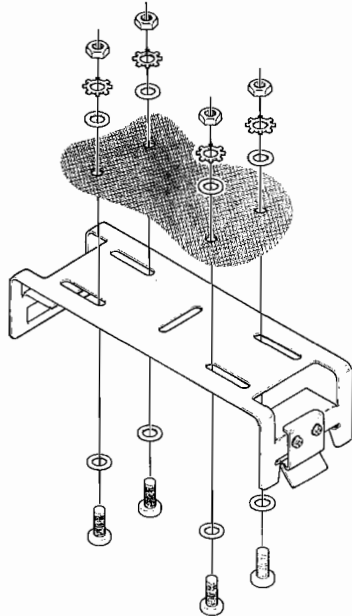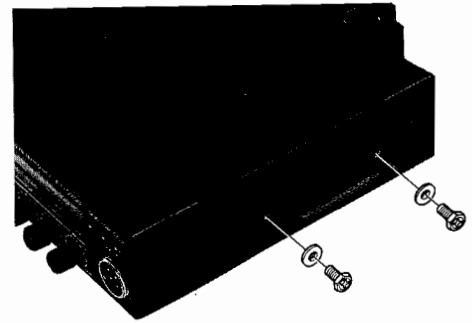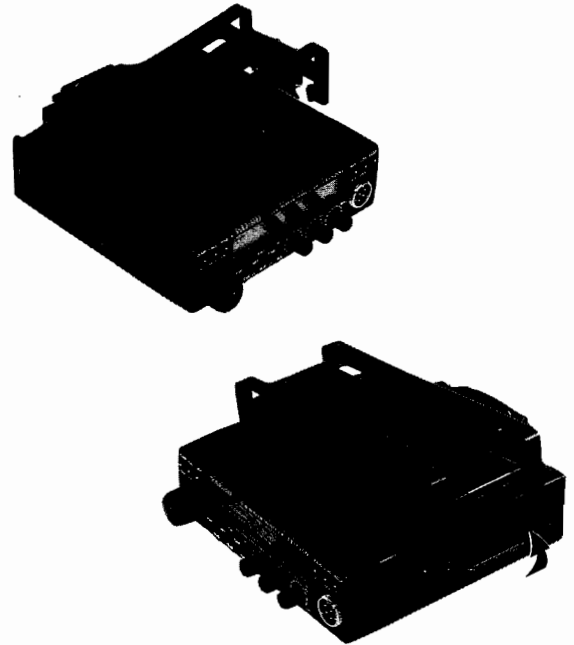
Figure 1.



Figure 2.



Figure 3.

## *Mobile Power Connections*

To minimize voltage drop and avoid blowing the car fuses, connect the supplied DC cable directly to the battery terminals. Do not attempt to defeat or bypass the fuse — it is there to protect you and the equipment.

☐ Check the voltage at the battery terminals with the engine revving. If more than 15 volts is found, adjust the car regulator to reduce the voltage.

☐ 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 #14 AWG or larger insulated, stranded copper wire. Connect the cable to transceiver only after connecting to the battery.

## *External Speakers*

With an external speaker, the FT-6200 lets you monitor each band's audio from different directions, so you know instantly which band a signal is on without having to take your eyes from the road. Connecting one external speaker disables audio from one band in the transceiver's internal speaker. Connecting two external speakers disables the internal speaker entirely, with each external speaker providing the audio for one band. The optional SP-7 External Speaker includes its own swivel-type bracket, and is available from your Yaesu dealer. Of course the earlier model SP-3, SP-4 or SP-55 External Speakers may also be used.

## *Other Mobile Accessories*

Other options to enhance safety and mobile operating convenience are the MW-1 Wireless Remote Controller/DTMF Microphone, which duplicates the front panel controls and adds a DTMF keypad; the YH-1 Headset and the full size MF-1A3B boom mic with flexible arm (both use the SB-10 PTT switch) allowing practically hands-free operation.

## *Base Station Installation*

Operation from the AC line requires a DC supply capable of at least 9A continuously at 13.8 V DC. We recommend at least one external speaker to take advantage of the audio separation of the bands. The FP-700 is available from your Yaesu dealer to meet these needs. Use the DC power cable supplied with the transceiver to make connections, and connect the external speaker cable to either speaker jack on the rear panel.

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This chapter describes the transceiver functions in detail. After studying these descriptions, keep the *FT-6200 Operator's Quick Reference Charts* handy in case you need to refresh your memory.

### Preliminary Setup

Before operating the transceiver, recheck power supply and antenna connections, and connect your microphone (or the module of the MW-1 Wireless Mic) to the front panel jack. Never operate the transceiver without a proper antenna for the operating band. Also, please read the earlier *Front Panel Controls* section, if you have not already, to familiarize yourself with the controls.

As mentioned before, references to alternate key/button functions have "**F/W+**" in front of the key/button name to remind you to press the **F/W** key first momentarily, and then the (blue) named key or button within five seconds (while "FUNC" appears in reverse letters above the leftmost frequency on the display). In some cases we will include the "non-shifted" name in parentheses after the blue label, just to help you find it (this does not mean you should press it twice). Also, don't hold the **F/W** key down, as that will give you a different result. When a button should be held down (as opposed to just pressed momentarily) the instructions will say so.

A five-second timer starts when you press **F / W**, and automatically restarts when you turn the selector knob

## Turning Power Off

To turn the transceiver off, you must press *and hold* the **PWR** button for ½-second.

or press a microphone button. Pressing a key or other button will shut off the timer as the resulting change in operation occurs.

A key/button beeper provides useful audible feedback whenever a button is pressed, at a level determined by the volume control. Each key and button has a different beep pitch, and each function has a unique beep combination. For example, when you press the **BAND** button, you will hear a low-pitched beep followed by a high-pitched beep if switching the primary band from 70cm to 23cm, or a high-pitched beep followed by a low-pitched beep if switching from 23cm to 70cm. You can disable the beeper as described in the box below, but we recommend you keep it enabled while getting to know the controls.

If you have trouble getting the transceiver to work as described, see *In Case of Problems* on page 34.

## Beeper Disabling

If you want to turn the beeper off (or back on), you can press **F/W+TONE** and **F/W+TONE** again (each key, twice alternately).

## Important Terms

If the transceiver has not been used before, the display will look something like that this:



We will call the frequency in larger digits at the left side of the display primary, and the frequency at the right (if any) secondary. You can turn the secondary display on and off (only dashes displayed) by pressing the **SUB** key. As you might expect, dual band reception is active only when both bands displayed.

Using the **BAND** button, you can select either band to be displayed at the left, and we will call this the primary band. The band whose frequency may be displayed at the right will be called the secondary band. Transmis-

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**If nothing happens when you press a button...**

the panel may be "locked" (you normally use this to prevent accidental changes). If you see "LOCK" displayed in reverse letters above the right edge of the primary frequency display, press **F/W+LOCK** (next to the **PWR** button) to unlock the panel. Later you can press **F/W+LOCK** again if necessary to fix your settings and prevent tampering.

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sion is possible only on the primary band, and it is not possible to select the same band as both primary and secondary simultaneously. Each displayed band has its own channel box above and to the left of the frequency, its own busy indicator below left, and its own **S&PO** meter scale below.

Normally, the selector knob, keys, buttons and **SQL** control affect only the primary band and display. However, by pressing **F/W+OP** first so that "ALT" is displayed (blinking) above the **VOL** control, you can cause the controls to act on the secondary band instead. After making adjustments to the secondary band, press the **SUB** key to return control to the primary band.

You can also use the **BAND** button to switch primary and secondary bands and make changes only to the primary band, but this will not work for all functions (most notably, the secondary squelch setting).

Besides the primary and secondary band distinctions, you need to be aware of the two channelling modes provided for different types of operation:

### Dial Mode

This mode is for tuning or scanning the band when looking for a channel on which to operate, when you don't know the specific frequency in advance. In this mode, the selector knob ("dial") and microphone buttons each tune the band in the selected step size, or in 1-MHz steps, and the scanning function tunes in the selected step size. You also need the dial mode, at least

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initially, to store a frequency into a memory (once a memory is stored, you will be able to retune it and store it in a different memory).

## Memory Mode

This mode is mainly for operating only on specific frequency channels known in advance (and programmed into the memories). For example, after storing the frequencies of your local repeaters into memory channels, you can confine operation to those channels by selecting the memory mode. In this mode, the selector knob, microphone buttons and scanning function select sequentially from the stored memories. The FT-6200 gives you 16 memories on each band. There is also a *Memory Tune* mode, in which you can tune just like the dial mode, and store the resulting retuned memory into the same or another memory. This and other special memory mode functions are described in detail later, but you will want to keep these terms in mind.

Note that the primary and secondary bands can each be set to either dial or memory mode independently. You can tell at a glance which channelling mode a displayed band is in by looking in the shaded memory box above and to the left of the respective frequency display. If the box is empty, you are in the dial mode. If you see a small number or an "L", "U" or "C" in the box, that band is in the memory mode.

The **D/MR** button at the upper left toggles between the dial and memory modes. Press this button alone to toggle the primary band, or after pressing **F/W+OP** to toggle the secondary band.

## Squelch Setup

Before turning on the transceiver for the first time:

☐ Preset the **VOL** and **SQL** controls counterclockwise, then press the **PWR** button (if the transceiver is off) and adjust the **VOL** for comfortable volume on background noise or a signal. "BUSY" should appear in reverse letters to the left of the primary band's **S&PO** meter scale.

☐ Press the **D/MR** button, if necessary to switch the primary band to the dial mode (memory box blank).

☐ If you hear a signal turn the selector knob to a clear channel (only noise).

☐ Turn the **SQL** knob clockwise just to silence the noise. The "BUSY" indicator will disappear. Setting the **SQL** further clockwise reduces sensitivity to weak signals. Whenever a signal reaches the receiver that is strong enough to open the squelch, "BUSY" will be displayed.

Keep in mind that there are two independent squelch settings in the FT-6200 – one for each band.

## Band Selection

Press the **BAND** button above the microphone jack to select the desired primary operating band (at the left), and adjust the squelch if you hear noise.

## Frequency & Step Selection

After selecting the primary band, select the MHz range in which you wish to operate: press the **MHz** button above the selector knob, and then turn the knob. The kHz digits will be blanked while MHz tuning is enabled. For fine tuning, press **MHz** again to redisplay the kHz digits, or just wait five seconds, and then turn

### Channel Step Selection

Tuning steps are factory preset to the correct size for the country to which the FT-6200 is exported. To change to another step size, press **F/W+REV** and use the selector knob or microphone



buttons to select a different step (the "5" or "P" in the memory box is the scan mode indicator, described later). Once the desired step size is displayed, press **REV** to return to the operating frequency display.

the selector knob. Normally the tuning step size will have been preset for your area. If not, you can change the step size as described in the box on this page.

You also can use the UP/DWN buttons on the microphone to select your operating frequency. However, holding one of these buttons for more than ½-second starts the scanner. This is described later, but if you've already started it, just press a microphone button again to stop.

## Dual Band Reception

The **SUB** key (lower center of the 6-key group) allows you to control the secondary band. During the above squelch setting, band and frequency selection procedures, you may have seen the secondary band frequency displayed at the right, or you may have seen "- - - -". By pressing **SUB** you can choose to either display (and receive on) the secondary band, or to hide it and operate the FT-6200 as single band transceiver.



With both bands displayed you can perform most operations on the secondary band (without having swap it to primary), using the alternate (blue **OP**) function of the **SUB** key. For example, to set the secondary band's squelch just press **F/W+OP** first. "ALT" appears blinking

near the bottom center of the display, and turning the squelch control now affects only the secondary band. To clear the blinking ALT and return control to the primary band, press the **SUB** key once momentarily.

```
430.000  1240.000
S&PO        ALT
```

By first displaying ALT as above, most of the functions described in the following pages can be done on the secondary band as well. However, the functions listed below disable the **F/W+0P** selection of the secondary band while they are active:

- Monoband operation (when "- - - -" is displayed).

- During repeater offset, ARS, step, or tone setting.

- During Scan Mode setting.

- While scanning.

Also note that exchanging primary and secondary bands with the **BAND** button cancels the blinking "ALT" function, if it was active.

The FT-6200 combines receiver audio from both bands when both are active, so you can listen for a call on one band while monitoring or working stations on the other. After setting the **VOL** control, use the **BAL** control to adjust the relative audio levels of the two bands as desired.

## Selective Band Receiver Muting

If during dual band reception you want one band to take priority over the other (having signals on one band blank audio of the other so signals from the two bands don't "double"), press **F/W+MUTE**: once to mute the secondary band, or twice (both keys) to mute the primary band. "**MUTE**" appears either above the secondary frequency, or to the left of the primary frequency, according to which band is muted. When you receive signals on both bands simultaneously, the muted band's audio is suppressed by signals on the other band. However, when the unmuted band is quiet, the other is heard at full volume.

## Transmitting

Press the **LOW** button above the mic jack to select 5-watt output ("LOW" appears at the bottom center of the display when low power is selected). When you wish to transmit, wait until the channel is clear ("BUSY" not displayed), and squeeze the PTT switch on the microphone. During transmission, "TX" appears above the primary frequency, and the primary S&PO bargraph shows relative transmitter power output (4 segments for low power, full-scale for high). Release the PTT switch to receive.

If you require more power press the **LOW** button again (to switch to high power). However, we recommend using low power whenever possible to minimize interference, current consumption and heating.

If using a European version, press the **BURST** button on the MH-26A8 microphone to transmit a 1750-Hz Burst Tone to access repeaters that require it.

During dual band reception, you can transmit on the primary band without interrupting reception on the secondary band. This allows full duplex crossband operation when you and the station you are working are tuned to the same frequencies (on both bands).

## *Repeater Splits*

The FT-6200 can be set up for split frequency operation (for repeaters) in two ways: either with a pre-programmed "standard" offset, or by storing memories with independent transmit and receive frequencies. The standard offset method can be applied to any displayed frequency, so that the transmit frequency will be shifted above or below the receive frequency by the programmable offset. This offset is preset at the factory to 35 MHz for the 23cm band in version A1 (0 in other versions), and either 1.6, 5 or 7.6 MHz on the 70cm band (depending on transceiver version). Note that only one offset at a time can be used on each band with the standard offset method. Use the independent transmit frequency method when you want to store other offsets, such as frequencies of repeaters with non-standard splits. This is described later under *Separate Transmit Frequency Memories*.

To activate the standard shift manually, just press the **RPT** key: once for minus shift, again for plus shift, and again to return to simplex. A small "–" or "+" sign will appear at the bottom of the display just above and a little to the left of the key when minus or plus shift is selected, respectively.



*Example:* To operate through a 444.60/449.60 MHz repeater (with a version A1 transceiver - substitute 434.60/439.60 for other versions):

☐ Press the **BAND** button, if necessary, to select 70cm as the primary band, and tune the display to 449.60 MHz (to receive on the output frequency).

☐ Press **RPT** once. A "–" should appear in the bottom left corner of the display (if not keep pressing **RPT** until it does).

☐ When the channel is clear, press the PTT switch on the microphone and send your callsign. The display should shift to 444.60 MHz while you transmit.

Of course this example only works if the offset for 70cm is set to 5 MHz. If it is not, you can change it as described next.

With repeater split activated, you can temporarily reverse the transmit and receive frequencies by pressing the **REV** key. Use this to display the transmit fre-

quency without transmitting, and to check the strength of signals on a repeater uplink frequency. The repeater shift sign blinks while reverse split is selected. Press **REV** again to return to the normal shift direction.

## *Setting Standard Repeater Offset*

As just mentioned, repeater offset is preset to match the requirements of the country to which the FT-6200 is exported. If you need to change the offset (or to set it to be non-zero on the 23cm band in versions B, C and D), do the following:

☐ Select the band for the new offset as the primary band (each band retains its own settings, but they can only be changed on the primary band).

```
    5.000      - - - -
  S&PO
```

☐ Press **F/W+R.SET** (the **RPT** key) to display the current offset. Standard repeater shift (in MHz, to three decimal places) appears in place of the primary frequency.

☐ Select the desired offset with the selector knob or microphone UP/DWN buttons and **MHz** button.

☐ Press the **RPT** key to return the primary display to the operating frequency.

You probably want to keep the repeater offset programmed to the most commonly used split in your area.

```
 A    5.000      - - - -
    S&PO
```
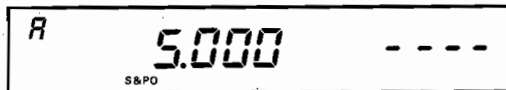
## Simple Memory Storage & Recall

The FT-6200 offers 32 memories (16 on each band), labelled 1 ~ 13, C, L and U. Each can store separate receive and transmit frequencies or repeater shift, and CTCSS tone data. Memory C (the CALL channel memory) can be recalled instantly by the **CALL** button, and memories L and U store programmable subband limits, described later, in addition to general purpose operation.

To store a frequency in memory:

☐ Select the desired frequency (and repeater split manually, if desired) in the dial mode as already described.

☐ Press and hold the **F/W** key for ½-second. A memory number or letter appears blinking in the memory box for the selected band.

☐ Within five seconds of pressing **F/W**, use the selector knob or microphone UP/DWN keys to select the desired memory for storage. If you select one that was already being used, it will be overwritten with new data in the next step.
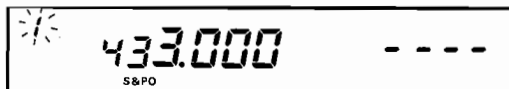


☐ Press **F/W** momentarily to store the displayed data into the selected memory. The memory label will stop blinking for a second, and then disappear as operation continues in the dial mode.

***Example:*** Store the 444.60/449.60 repeater data in memory 5.

☐ First perform the steps in the example on page 15 to set up the desired frequency and offset on the dial.

☐ Press and hold the **F/W** key for ½-second to display the memory label in the primary memory box at the left, then do the next step within 5 seconds.

☐ Turn the selector knob, if necessary, so that "**5**" (the memory number to store) shows in the memory box.

☐ Press **F/W** again, momentarily. That's it. The dial data has been stored in memory 5 for the 70cm band, and you are left operating on the dial.

To confirm that this worked, turn the selector knob to change the dial frequency (to anything), then press **D/MR** to change from dial to memory mode. The numeral 5 should appear in the memory box, and 449.60 (the receive frequency) should appear on the display. Press **REV** to confirm the transmit frequency of 444.60 MHz.

You can use any memory (except C, the CALL channel) with the same result. Memory C requires a slightly different procedure. Notice that pressing **D/MR** from the

dial mode always recalls the last stored or used memory.

## *Recalling Memories*

In confirming the results of the last example, we used the **D/MR** button to change from the dial mode to the memories after they were stored. The memory label appears in the memory box at the upper left corner of the frequency display whenever operating on a memory.

When more than one memory has been stored, you can select a memory for operation with either the selector knob or the microphone UP/DWN buttons. If you use the microphone buttons, press and release the button for each memory: if you hold the button down for ½-second, memory scanning will start.

## *Alternating Band Memory Selection*

If you want to select among previously stored memories on both bands, press **F/W+ALT** to activate alternating band memory selection. "**ALT**" will be displayed (not blinking) at the bottom of the display above the **VOL** control, and memory selection will alternately select memories stored on each band, as pictured above.

This feature is especially convenient for memory scanning both bands, described later.

70cm ch. $\Rightarrow$ 1   2   3   4 ···········

↓ ↗ ↓ ↗ ↓ ↗ ↓

23cm ch. $\Rightarrow$ 1   2   3   4 ···········
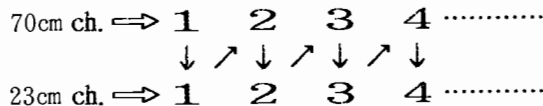
To cancel Alternating Band Memory Selection press the **BAND** button to remain operating on the memory, or **D / M R** to revert the primary band to the dial mode.

## *Call Channel Memory*

Although invisible to the memory recall methods just described, the CALL channel memory can be instantly recalled by the **CALL** button (for the primary band), or **F/W+OP** and then **CALL** for the secondary band. "**C**" appears in the corresponding memory box. The factory default for the CALL channel memory is the bottom edge of the band. You can reprogram it from the dial with any frequency and repeater state, or even a separate transmit frequency.

To store the current dial frequency/repeater state in the CALL channel memory of the primary band, hold the **F/W** key for ½-second to display something in the the memory box, then press the **CALL** button. To store a separate transmit frequency in the CALL channel, after storing the receive frequency, tune the dial to the trans-

mit frequency and repeat the above, but this time holding the PTT switch when you press the **CALL** button.

To store the secondary display data into that band's CALL channel, just press **F/W+OP** to activate the alternate band functions before following the same steps as above.

## *Separate Transmit Frequency Memories*

Besides the CALL memory, all other memories can store independent receive and transmit frequencies. To do this,

☐ Store the receive frequency using the method already described under Simple Memory Storage (it doesn't matter if a repeater offset is active).

☐ Tune to the desired transmit frequency.

☐ Press and hold the **F/W** key for $\frac{1}{2}$-second to display the memory label box again.

☐ Press and hold the PTT switch while pressing **F/W** once more momentarily (this will not key the transmitter).

Whenever you recall a separate transmit frequency memory on the primary band, "—+" appear together near the lower left corner of the display. Again, you can press the **REV** key to display the transmit frequency, and the shift symbols will blink.

After storing a memory with a separate transmit frequency, if you rewrite the receive frequency, the separate transmit frequency is deleted.

## *Memory Tuning*

While receiving on a recalled memory, you can retune it and change other memorized settings (like repeater shift) by first pressing the **MHz** button momentarily. "**MT**" appears to the right of the memory label in the memory box, and you can tune in the same ways as described before (including the 1-MHz button). You can store the new frequency and settings in the current, or another memory. Just press and hold **F/W** for $\frac{1}{2}$-second, select the new memory (if desired), and press **F/W** again momentarily. Operation remains on the (new) memory as the old memory (if different) reverts to its original state.

After retuning a memory, if you don't want to save your changes, just press **D/MR**: once to return to the original memory data, or twice if you want to leave the memories and return to the dial mode.

## *Hiding and Erasing Memories*

As already mentioned, storing data in a memory automatically overwrites previously stored data. However, if you regularly move from one area to another, you may not always want to use the same memories. With the FT-6200, you can select and alter which memories are available without having to rewrite them

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from scratch. This is done by masking certain memories so that they are hidden from operation, and unmasking them only when desired.

To mask a memory,

☐ Recall the memory to be masked.

☐ Press the **F/W** key for ½-second (until the memory label blinks).

☐ Press the **REV** key. This causes the display to change to memory 1, and the previously selected memory to be no longer selectable manually, or by scanning (described later).

To unmask a hidden memory for operation,

☐ Recall any memory.

☐ Press and hold the **F/W** key for ½-second.

☐ Select the memory number to be restored.

☐ Press the **REV** key (*not* **F/W**!).

When you have hidden some memories, be careful not to overwrite them accidentally. If you do, you will loose the previous contents.

## *Scanning*

Before starting the scanner, make sure the **SQL** control is set to squelch off the noise on a clear channel.

You start and stop scanning with the UP or DWN keys on the microphone. Just press and hold the button for more than ½-second to start the scanner. If the transceiver is in the dial mode, band scanning will result. Otherwise, if a memory label is displayed, only the memories will be scanned (on both bands alternately if alternating band memory selection is active).

The scanner pauses when a signal opens the squelch, and the decimal point on the display blinks.

You have a choice of two scan-resume modes: either Pause mode, in which the scanner pauses for as long as the carrier keeps the squelch open; or the 5-second mode, in which the scanner pauses for five seconds and then resumes scanning whether the signal is still present or not. The 5-second mode is the factory default.

To change the scan-resume mode, press **F/W+STEP**. A small "**P**" or "**5**" in the memory box indicates the current mode. If you want to change it, press **F/W** mo-



mentarily. Press the **REV** key to return to the frequency display when the scan-resume mode is set the way you want it.
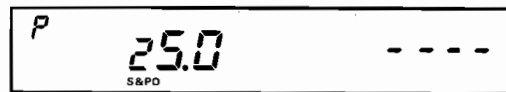
You can stop the scanner manually by pressing the PTT, UP or DWN button on the microphone, or the **D/MR** button.

## Memory Skip Scanning

When you have some very active channels stored in memories, you may wish to skip them when scanning, but still have them available for manual selection. You can mark a memory to be skipped by pressing **F/W+SKIP** (the **D/MR** button at the upper right) while receiving on the memory. A line of several small arrowheads appears just to the right of the memory number box to show that this memory will be skipped during scanning (you can still recall it manually).
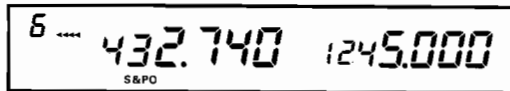


To re-enable a scan-skip memory for scanning, just repeat the steps you took to disable it: select the memory manually, and press **F/W+SKIP**.

## Programmable Subband Limits

Besides band and memory scanning, the FT-6200 can be set to tune or scan only the frequencies between two frequency limits of your choice (with the selected channel steps). These limits are stored in the special memories labelled L (lower) and U (upper):

❏ Store the lower edge of the desired scanning range in memory L, and the upper edge in memory U.

❏ With either memory U or L recalled, press the **MHz** button momentarily.

As described previously in Memory Tuning, "MT" appears in the memory box, and you can tune the memory. The frequencies stored in memories L and U now limit your tuning and scanning range to the resulting subband. If repeater shift is activated, repeater offset is applied automatically when you transmit (even if the resulting transmit frequency is outside the subband limits).

*Note:* The frequency resolution of subband limits is 100 kHz, although the channel resolution of memories L and U is the selected channel step size. Therefore the frequencies stored in both memories L and U are rounded down to the nearest 100 kHz to determine the actual subband limits. Since they are not limited to a specific frequency, you can still use the L and U memories for other purposes on any frequency within the 100-kHz range above the intended subband limit.

**Example:** To limit reception to 445.0 ~ 448.0 MHz (only applicable to certain transceiver versions)

❏ Set the primary display to the 70cm band, and tune the dial to *any channel between 445.000 and 445.095 MHz.*

❏ Hold the **F/W** key for ½-second, tune the selector knob so that L appears in the 70cm memory box, and then press **F/W** again momentarily. The displayed frequency is now stored to provide an effective lower subband limit of 445.000 MHz.

☐ Tune the dial to any channel between 448.000 and 448.095 MHz.

☐ Repeat the second step, selecting U in the memory box. This stores the effective upper subband limit of 448.000 MHz.

☐ Press **D/MR** to change to memory operation.

☐ Press the **MHz** button momentarily to activate the 445.000 ~ 448.000 subband limits for tuning and scanning.

To cancel your subband limits and return to memory operation, press **D/MR** (if you are scanning, or want to return to dial operation, you must press it twice). Pressing the **CALL** button also cancels subband limits as operation switches to the CALL channel.

Once you have stored the L and U memories, you can reactivate the subband just by recalling either memory and pressing **MHz**. You can also press the **BAND** button to switch primary and secondary bands, without disturbing subband limits, even if scanning. However, you cannot activate the subband when the L or U memories are marked for skip-scanning, or if either of these memories are masked (hidden).

## *Priority Channel Monitoring*

The priority function allows automatic checking for activity on a memory every five seconds while operating on the dial or other memories. When the receiver detects a signal on the priority memory, operation automatically shifts to that memory while the signal is present (plus a few seconds). If you transmit while paused on the priority memory, priority monitoring ceases and operation stays on the priority memory.

To set up for priority monitoring:

☐ Preset the squelch, and store the frequency to be monitored in a memory (this must be memory 1 if you will be operating on other memories during priority monitoring).

☐ Press **D/MR** to operate in the dial mode, or else select the memory you want to operate on, and then press **F/W+PRI (MHz)**.

A "P" appears in the memory box, and about every five seconds the displayed frequency shifts to the priority memory briefly while the receiver checks for a signal.

While no signal appears on the priority memory to open the squelch, you can tune, transmit and receive on the dial, or select and operate on other memories (but not scan them). If a station you wish to talk with appears on the priority memory, press the PTT switch momentarily while receiving their signal, to stop priority checking. Otherwise, when a signal appears on the priority memory, priority checking will pause and the decimal on the display will blink. Priority monitoring will resume according to how you set the scan-resume

mode - either after a 5-second pause, or after the carrier drops. You can cancel priority monitoring by pressing **D/MR**.

Note that you can use any other memory as a priority channel in the above procedure when you are going to be operating in dial mode. You cannot, however, switch from memory to dial operation or vice-versa without first cancelling priority monitoring (pressing **D/MR** cancels priority monitoring). You also cannot scan on the same band during priority monitoring. You can, however, switch bands and operate on the other band in any way you wish without affecting priority monitoring on the first band. You can even activate both bands for priority monitoring simultaneously, effectively monitoring four frequencies at once (two on each band).

## CTCSS *Operation*

The built-in Tone Encoder function can be used to access repeaters and stations that require a CTCSS tone, by sending a tone whenever you transmit. Also, if you have the FTS-22 CTCSS Decoder Unit option installed, you can silently monitor for calls on busy channels (one FTS-22 includes separate decoders for each band). The encode function superimposes a subaudible tone (at a frequency too low to be heard) on the transmitted carrier. The optional (FTS-22) decode

function monitors receiver audio through a narrow filter at the same subaudible frequency, keeping the squelch closed until you receive a matching tone. *In-*
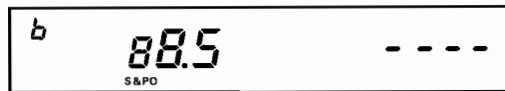


*stallation of Options* at the back of this manual describes installation of the FTS-22.

To check or set the CTCSS tone frequency, press **F/W+T.SET** (the same as the **TONE** key) to see the tone frequency displayed in Hz. To change the tone frequency, rotate the selector knob or press the microphone DWN/UP keys until the display shows the tone frequency you require (from the choices in the table below). Press **TONE** to return to the operating frequency display after checking or selecting the tone frequency.

To activate CTCSS operation just press **TONE** when the operating frequency is displayed. **"ENC"** (encode) appears at the left edge of the display and the tone generator is activated for transmission (on the primary band). If you press **TONE** again without the FTS-22 option, the encoder turns off. If the FTS-22 is installed, both **"ENC"** and **"DEC"** (decode) are displayed together

| CTCSS Tones (Hz) | | | |
|------|------|------|------|
| 67.0 | 97.4 | 136.5 | 192.8 |
| 71.9 | 100.0 | 141.3 | 203.5 |
| 74.4 | 103.5 | 146.2 | 210.7 |
| 77.0 | 107.2 | 151.4 | 218.1 |
| 79.7 | 110.9 | 156.7 | 225.7 |
| 82.5 | 114.8 | 162.2 | 233.6 |
| 85.4 | 118.8 | 167.9 | 241.8 |
| 88.5 | 123.0 | 173.8 | 250.3 |
| 91.5 | 127.3 | 179.9 | |
| 94.8 | 131.8 | 186.2 | |

as tone squelch is activated for both transmission and reception (requiring a matching tone frequency to open the squelch). Pressing **TONE** once more disables tone squelch.

You can store different CTCSS tones (and encode/decode states) in each memory in the same manner (and at the same time) as storing operating frequencies. Later, to change the tone or state stored in a memory, just recall it, reset the tone frequency or function, and store the memory again.

The secondary band display shows a small "**D**" near the bottom right corner only if the CTCSS decoder is active on the secondary band (it shows nothing for the encoder). Of course settings are preserved when switching bands.

### *"CTCSS Bell" Paging with the FTS-22*

CTCSS Bell operation is very similar to the CTCSS encode/decode operation just described, in that subaudible tones open the squelch. However, if you are waiting for a call, it is sometimes convenient to have the transceiver "ring" to get your attention. The CTCSS Bell mode displays a small bell at the left side of the display for the primary band, and at the lower right corner for the secondary band. When you receive a matching CTCSS call, the transceiver rings like a telephone, afterwhich the small bell on the display blinks to indicate you received a call. To activate the CTCSS Bell:

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❑ Set the desired band to the primary display, if necessary, with the **BAND** button, and tune to the desired frequency.

❑ Select a CTCSS tone frequency using the **F/W** and **T.SET** keys as described on the previous page, if you have not already.

❑ When you expect to receive calls from stations using tone squelch (decoding, or CTCSS Bell), activate tone squelch encode/decode operation as described above, so you will not miss calls when you turn off the CTCSS Bell later to reply.

❑ Press **F/W+PAGE** (just above the selector knob). Repeatedly pressing this key combination cycles through the following paging mode/displays:

- DTMF paging ("**PAG**" displayed at the bottom left),

- DTMF tone-coded squelch (small "**C**" displayed immediately to the left of the primary frequency, or at the top right for the secondary band)

- CTCSS Bell paging (the small bell icon left of the primary frequency, or at to bottom right), and

- No paging (none of the above symbols).

❑ Select the CTCSS Bell mode on the primary band.

Now all calls on this band without a matching CTCSS tone will be ignored by your receiver. Any call received with the matching CTCSS tone will cause the transceiver to ring and the squelch to open while the caller transmits. The bell icon begins to blink, and continues until you manually reset it (by pressing the PTT switch to transmit, retuning, or pressing **D/MR**). Note that the other station does not need to be using the CTCSS Bell function to call you: they can use normal CTCSS encode-only (or encode/decode) functions of their transceiver.

When you receive a call, you will need to disable the CTCSS Bell feature to prevent ringing every time the other station transmits: press **F/W+PAGE** to turn it off.

The CTCSS Bell system is band-specific, but not memory-specific. You can activate it on the secondary band (after activating the CTCSS decoder), by pressing **F/W+OP** to display the blinking "**ALT**" indicator before selecting the CTCSS Bell mode. You cannot, however, store the CTCSS Bell mode selection in a memory (although you can store CTCSS tone frequencies and encode/decode states).

## DTMF Paging & Code Squelch
*(with the FRC-4 or DVS-3 Option)*

The FRC-4 option includes a DTMF tone encoder/decoder and a dedicated microprocessor providing paging and selective calling features under DTMF control. The DVS-3 option combines all functions of the FRC-4 with digital voice recording and playback. This section describes the paging and selective calling features common to both options. The next section describes features unique to the DVS-3.

The paging and code squelch systems use 3-digit numeric codes (000 ~ 999), transmitted as DTMF (Dual-Tone, Multi-Frequency) tone pairs. The FRC-4 and DVS-3 each have 14 Code Memories (seven for each band) in which to store 3-digit DTMF paging codes.

With DTMF paging or code squelch activated, the 100's-of-MHz digit of the operating frequency is replaced by a Code Memory number (0 ~ 6). In its most common function, the receiving station remains silent until it receives one of the stored 3-digit codes. Then the squelch opens so the caller is heard, and in the paging mode, the transceiver also rings like a telephone. When you close the PTT to transmit, the same three prestored DTMF code digits are transmitted automatically. In the paging mode, three more DTMF digits are also sent, representing your personal station identification.

Like the CTCSS Bell system described above, the DTMF paging and code squelch systems are selected by the **F/W+PAGE** key combination. Either "**PAG**" or a small "**c**" appears on the display when DTMF paging or code squelch is activated, respectively, and the 100's-of-MHz frequency digit is replaced by a Code Memory number (0 ~ 6). You can select which Code Memory is active using the microphone UP and DWN buttons.

# DTMF *Code Squelch*

The code squelch mode is very simple. Both you and the other station communicate using the same 3-digit DTMF sequence, sent automatically by the FT-6200 at the start of every transmission. Your receiver normally remains silent to all signals that are not prefixed by your selected 3-digit code. When you receive the tones, your squelch opens and stays open until a few seconds after the end of their transmission.

In the code squelch mode, you must first store and then manually select the one Code Memory holding the 3-digit DTMF code required to open your squelch (as described on the following pages). Also, in the code squelch mode, Code Memories 1 ~ 6 always function the same — the distinctions and special settings described below for the paging mode do not apply.

In either code squelch or paging modes, any DTMF-equipped station can call you (they can use a DTMF keypad to send the three digits if you are in code squelch mode, or six digits if you are in paging mode).

# DTMF *Paging*

In the DTMF paging mode, you can receive signals that are prefixed with any of up to six different 3-digit codes (per band), according to the way you program the Code Memories. When you receive a paging call, the selected Code Memory changes automatically, and the display responds in one of two ways, depending on how you stored the paging code:

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# Individual Codes

These are personal ID codes to identify each station uniquely. You store one of these on each band for your ID, in Code Memory 1. You can store up to five other Individual Codes of stations you call often, in Code Memories 2 ~ 6. When someone else transmits your Individual Code your display shows "0" in the Code Memory position (that is, the 100's-of-MHz position), with the other station's Individual Code appearing to the right so you can see who called.

```
┌─────────────────────────────────┐
│        0. 123      ----         │
│ PAG       S&PO                   │
└─────────────────────────────────┘
```
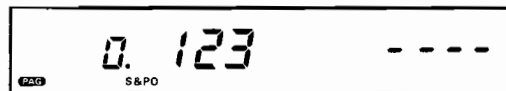
# Group Codes

This type of code identifies a group of stations. You would generally share a Group Code with other club members or friends. When you receive a call with a Group Code the Code Memory number (2 ~ 6) in which you stored that 3-digit Group Code appears in the Code Memory position on your display, with the 3-digit Code number to the right.

```
┌─────────────────────────────────┐
│        2. 321      ----         │
│ PAG       S&PO                   │
└─────────────────────────────────┘
```
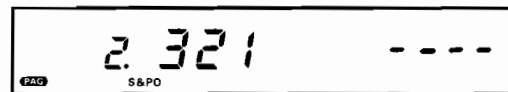
Note that for a Group Code, the display does not show the ID and code of the caller, but those of the group instead. Code Memories 2 ~ 6 can be used to store either Individual Codes (for calling purposes only) or Group Codes (for both calling and receiving), as you desire.

With either type of page, the **PAG** indicator starts blinking when a page is received, and continues until you reset it. This is convenient to let you know if someone called while your attention was elsewhere.

Remember, with code squelch operation (but not with paging), you can only receive a call on the currently-selected Code Memory, and the display does not change when a call is received. So for code squelch, as mentioned above, the Individual/Group distinction does not apply (although you must still store the 3-digit Code Memories).

## Storing Code Memories

The first thing to do before using the paging or code squelch systems is to store your Individual Code in Code Memory 1. Keep in mind that there is a separate set of Code Memories for each band. We will describe the process only for the primary band. To set up the secondary band you can, of course, just switch bands, or you can press **F/W+OP** to activate the keys for the secondary band before starting the following procedure.

☐ Activate the paging or code squelch functions by pressing **F/W+PAGE** (just above the selector knob). As mentioned in the CTCSS Bell procedure, repeatedly pressing this key combination cycles through DTMF paging ("**PAG**" displayed), code squelch (small "**C**" displayed), CTCSS Bell paging (the bell icon displayed), and No paging (none of the above symbols).
You may have to repeat these keystrokes until you get either "**PAG**" or "**C**" displayed (and the 100's-of-MHz digit to change to a Code Memory number).

☐ Press **F/W+R.SET** (the **RPT** key) to enable the Code setting mode. The frequency display is replaced by a blinking Code Memory number at the left, and the corresponding 3-digit Code ("000", if not used before) at the right.
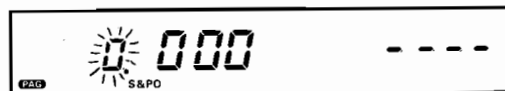


☐ Turn the selector knob to select Code Memory 1 (this digit can be set to 0 ~ 6, with 0 being "read-only", and 2 ~ 6 programmable with group or other individual's IDs). Code Memory 1 is for your personal DTMF paging ID Code.

☐ Press either the **MHz** button or the UP button on the microphone. The Code Memory number will stop

blinking, and the next digit to the right will begin to blink. This is the first digit of the 3-digit DTMF Code to store.

☐ Turn the selector knob to select a DTMF Code digit between 0 and 9, corresponding to the first digit of the personal ID code for your station on this band.

☐ Press **MHz** or the microphone UP button again to cause the next digit to the right to blink, and again turn the selector knob to select the next digit of your ID code.

☐ Repeat the above step to set the last digit.

At this point, if you want to go back and change one of the three code digits, you can press the DWN button on the microphone.

☐ Press the **RPT** key to return the display to its normal paging mode (that is, the operating frequency with the 100's-of-MHz digit replaced by the Code Memory number).

Your ID Code is now stored in Code Memory 1.

You can use the same procedure to store the Memory Codes of other individuals or groups in Code Memories 2 ~ 6, but with an additional feature. Generally, you store another station's ID Code so you can page them, but do not want to have your transceiver ringing every time someone else calls them. On the other hand, you store group codes with the intention of receiving any pages to the group (so you want your squelch to open and the transceiver to ring, if paging).

During the Code Memory storage procedure described above, when storing Code Memories 2 ~ 6, you have an opportunity to decide whether your transceiver should respond to incoming paging calls on a particular Memory Code. After pressing **F/W+R.SET** to activate Code setting, and while the leftmost (Memory Code) digit is blinking, you can press the **F/W** key to toggle DTMF squelch paging capability on and off. When on, that is, when the decoder is enabled to receive paging calls with this Code Memory, a small underbar appears beneath the digit.
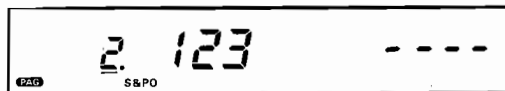


Therefore, if you are setting a Group Code, you want to have the underbar on, and if setting another station's Individual Code, you want it off. As already mentioned, this distinction does not apply to code squelch only (non-paging) operation.

Note that the underbar is displayed permanently on Code Memory 1, since this is your own ID (that you will always want to receive when paging is activated). Also, the underbar never appears on Code Memory 0, since this Memory slot is reserved for display of the ID of incoming paging calls.

## *Replying to a* DTMF *Page, and Resetting*

Now you are ready to receive DTMF Paging calls directed to you. If you monitor with the code squelch activated ("**C**" displayed), your squelch will open when you receive the currently-selected 3-digit code from any DTMF-equipped station. If you are monitoring with the DTMF Paging feature activated ("**PAG**" displayed), a station can page you by sending your 3-digit code (your Code Memory 1), followed by their 3-digit ID Code. For other Codes you have stored with the decoder underbar on, your squelch will open as described above. The paging ringing tones are distinctive for the two bands, so you can distinguish on which band you are paged by ear, as well as by the display.

If you press your PTT switch after receiving a call, the Code (either Individual or Group) is transmitted automatically, and if paging is enabled, your ID Code is sent.

To respond to an individual call, where your display shows Code Memory 0, pressing your PTT switch causes your transceiver to transmit your ID Code and the other station's ID Code automatically (that is, the one displayed in Code Memory 0), and resets the pager to receive another call. The other station will then hear a ring from their receiver, as their squelch opens.

You will want to switch from paging to code squelch mode once contact is established, or your transceiver will continue to ring every time the other station

transmits. To do this for the primary band, press **F/W+PAGE** once, so that a small "**C**" appears to the left center of the frequency. For the secondary band, press **F/W+OP**, if necessary to get the "**ALT**" indicator blinking, and then **F/W+PAGE** once, so that a small "**C**" appears in



the upper right corner. Also, the station who originates the call should switch his set to Code Memory 1 (his own ID), so you will both be using the same DTMF code (as required for Code Squelch operation).

With Code Squelch activated you will hear three DTMF code digits sent at the start of each transmission. This is the Code Memory currently displayed in place of the 100's-of-MHz digit, and it will open the squelch of the other station. Therefore, at the start of each transmission, you must wait a second or two after pressing the PTT switch for the DTMF code to be sent (you will hear it in your speaker).

When you finish your conversation, to reactivate DTMF Code Paging, press **F/W+PAGE** repeatedly (and alternately) until "**PAG**" is displayed.

## *Digital Voice Operation* (with DVS-3 Option)

The DVS-3 includes all of the DTMF paging/selective calling features described in the previous section.

It adds to these the latest microprocessor-controlled PCM (pulse-code modulation) digital voice recording and memory circuitry, allowing recording either from the microphone or receiver, and playback through the loudspeaker or on the air. See the previous section for details of the DTMF paging/selective calling features. This chapter covers only the digital voice features unique to the DVS-3.

A one-megabit RAM (random access memory) on the DVS-3 can be used as a single block for up to 128 seconds of recording, or be recorded in segments for selective playback. Eight memory segments can be grouped in various ways for recording and playback, as determined by your choice of *Segmentation Codes.*

The sampling bit rate of the A-D (analog-to-digital) converter is front-panel selectable between 8, 11, 16 and 32 kilobits/second. This allows you to select the optimum trade-off between recording time and fidelity. Bit rates may be different for different segments.

The microphone DWN/UP keys activate and deactivate recording and playback, while the S&PO bargraph shows relative record/playback time elapsed.

## Voice System Display

When installed, digital voice operation is toggled on and off by pressing the **DVS** key. With digital voice operation activated the display appears as shown at the top of the next column:

Recording Mode — Segment. Code — Bit Rate No. — Starting Segment — Record Lock — S&PO
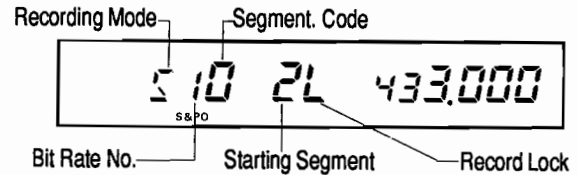
- Recording Mode ("**S**" or "**M**")

    This is either "S" for Speaker or "M" for Microphone: the Speaker Recording Mode indicates that the source of audio for recording is the loudspeaker – that is, received signals. The Microphone Recording Mode indicates that the source of audio for recording is the microphone – that is, messages from the local operator. The **TONE** key toggles between these recording modes.

- Bit Rate (1 ~ 4)

    The number displayed in this location signifies the selected sampling bit rate for recording or playback in this Segmentation Code, as follows:

| Bit Rate No. | kbit/sec. | 1-Segment Play/ Record Time (secs.) | All Segments Play/ Record Time (secs.) |
|---|---|---|---|
| 1 | 32 | 4 | 32 |
| 2 | 16 | 8 | 64 |
| 3 | 11 | 12 | 92 |
| 4 | 8 | 16 | 128 |

Note that the slower bit rates (larger Bit Rate Nos.) provide more recording time, but at reduced fidelity. Press the **REV** key and rotate the selector knob (while the displayed Bit Rate digit is blinking) to select a different rate.

• Segmentation Code (0 ~ 9 or A ~ F)

The character displayed here indicates which memory segment or combination is selected for recording and playback, as follows:

| | |
|---|---|
| **0** | Segments 2 ~ 8 combined |
| **1 ~ 8** | Individual Segment access |
| **9** | Segments 1 and 2 combined |
| **A** | Segments 3 and 4 combined |
| **b** | Segments 5 and 6 combined |
| **C** | Segments 7 and 8 combined |
| **d** | Segments 2 and 4 combined |
| **E** | Segments 5 and 8 combined |
| **F** | Segments 2 – 8 accessed sequentially (1 at a time) |

While the DVS-3 is activated, rotating the tuning knob selects the Segmentation Code. The other displayed parameters change according to the way they are set for each Segmentation Code.

• Starting Segment (1 ~ 8)

The number here identifies the starting Segment number of this Segmentation Code for recording or playback. This is, of course, identical with the Segmentation Code for Codes 1 ~ 8, and is automatic when selecting the Segmentation Code with the selector knob.

• Record Lock ("L" or blank)

"**L**" is displayed here when the displayed Segmentation Code is Locked to prohibit recording. Press the **MHz** button to toggle record locking on and off.

## Segmentation Code Selection Notes

While the DVS-3 is activated, the tuning knob selects from among the sixteen possible Segmentation Codes. As stated above, each Segmentation Code has its own set of associated parameters, displayed when each Code is selected.

Note that Segmentation Codes 0, 9 and A ~ F select the same memory segments as Codes 1 ~ 8, merely with different partitioning. Therefore, if you record in Code 2, for example, the recording will be played back in Codes 0, 2, 9, d and F, since each accesses the same memory segment (2).

## Recording

You may want to partition the memory for two different purposes: storing your replies to incoming calls, and recording incoming messages. You must de-

cide how much of the memory to dedicate to each purpose yourself, which in turn determines which memory segments to use for each purpose. However, despite that consideration, you should record your callsign in Segment 1.
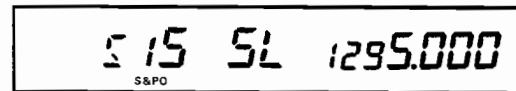
The UP button on the microphone starts recording, and can be used to stop it as well. While recording, the S-meter indicates the relative recording time elapsed: when the S-meter reaches full scale, the currently selected memory is full.

To record your callsign:

☐ Turn on the radio, and press **DVS** to activate digital voice operation.

☐ Press the **TONE** key, if necessary, so that "M" appears at the left (to select Microphone recording).

☐ Rotate the selector knob while watching the Segmentation Code digit in the center of the display (that is, the leftmost of the large digits), and select Segmentation Code 1. Notice that a "1" also appears in the Starting Segment display position (Code 1 always starts with Segment 1).

☐ Note the number (1 ~ 4) displayed just to the right of the "M", signifying the bit rate. You will want to experiment with all four possible bit rates (as detailed below), but for now, let's start with the fastest rate, number 1. If another number is displayed, press

the **REV** key, turn the selector knob until 1 appears next to the "M", and press **REV** again.

☐ Rotate the selector knob to select Segmentation Code 1 in the center of the display.

☐ There should be no "L" at the right side of the display, since you don't want to lock out your callsign. If you see an "L", press the MHz button to clear it.

$$S \ 15 \quad 5L \quad 1295.000$$

☐ Put your finger near the UP button on the microphone, and hold it near your mouth. Now, while watching the S-meter for recording time, press the UP button momentarily and speak your callsign. Then either press UP again to stop recording, or just wait until the S-meter reaches full scale (and recording stops automatically).

You may not have had enough time between the two beeps that signalled the start of recording and the beep at the end. Anyway, to check your results, just press the DWN button on the microphone (and adjust the volume, if necessary).

If you were very close, you might want to just press the UP button again and re-record, speaking a little

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faster. Otherwise (or just for fun), change the bit rate to 2 (press **REV**, turn the tuning knob one click clockwise, and press **REV** again) and try again. Notice you have twice the recording time (the S-meter advances more slowly during recording).

Press the DWN button again to play back this recording. You will notice it sounds a little 'scratchy'. Bit rates 3 and 4 provide even longer recording times, but sound even more scratchy (go ahead and try them). If you find you have much left-over time (as indicated on the S-meter), press any microphone button to stop recording. Pick the fastest bit rate that gives you just the necessary recording time.

You can record any other memory segments in the same way you did your callsign. You may even record while transmitting (if the digital voice system is activated), in which case Microphone recording is selected automatically.

## On-The-Air Recording & Playback

When the digital voice system on, you can play back over the air anything that you have previously recorded: select the Code to play back and then press the DWN button while holding the PTT switch.

You can also record incoming signals heard in the loudspeaker:

☐ Press **DVS** (if displaying frequency) to activate the digital voice system.

☐ Press the **TONE** key, if necessary, to select the Speaker recording mode.

☐ Select the desired Segmentation Code using the selector knob, and then select the desired Bit Rate using the **REV** key and selector knob.

☐ Press the UP button on the microphone to start recording.

☐ Press the DWN button to play back the recording (and hold the PTT if you want to play it back over the air).

Don't worry if you find FT-6200 operation somewhat complicated at first. The small number of controls belies the variety of features that are available, and some keys and buttons have more functions than are indicated by their labels. So it is not difficult to get lost, at least until you have had the chance to learn the various functions of the display and keys. This section provides some tips to help you navigate the various display and key modes.

If the display shows nothing at all, push the power switch, and check the power supply connections.

The state of the display tells a lot (but not all) about the current state of operation. Depending on the options installed, each half of the display can take on as many as six different states. These are shown at the right for the primary band, together with the key to press in each case to return to the main (operating frequency) display.

It is well worthwhile to study the main frequency display diagram on page 5 carefully. This display is the basis for basic operation. For example, if the frequency display changes unexpectedly when you transmit (or if 'Err' appears), check for a small "+" or "–" near the lower left.

If pressing a button appears to do nothing, first check for "**LOCK**" at the center of the display. If you see it, press the **F/W+LOCK** to unlock the keys. Also check the display for a blinking "**ALT**" above the **VOL** control,

*Main Frequency Display*



*Tuning Step & Scan Mode Display (press **REV**)*
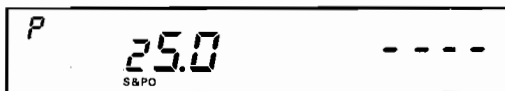


*Repeater Shift Display (press **RPT**)*
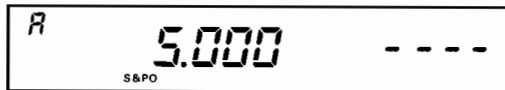


*CTCSS Tone/Beeper Display (press **TONE**)*
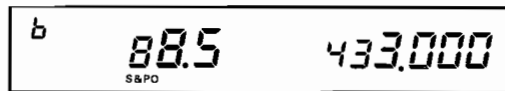


*DTMF Paging Setup Display (press **RPT**)*
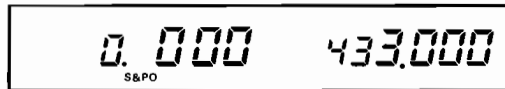


*Digital Voice Display (press **DVS**)*
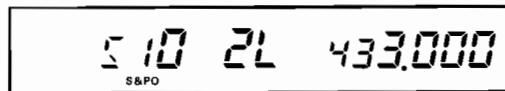
indicating that key operations are being applied to the secondary band (at the right), rather than the primary band. Press **SUB** to return control to the primary band. Otherwise, you can press the **D/MR** button, which will usually terminate any partially entered commands.

If the 100's-of-MHz digit is weird (0, 2, 3, 5 or 6) or behaves strangely when you try to tune, check for either "**PAG**" or "**C**" displayed at either the left side of the primary display, or the right of the secondary display, indicating that DTMF paging or code squelch is active. If so, press **F/W+PAGE**, several times if necessary, to clear these symbols and return the frequency display to normal.

If you still cannot enter data, check to see if the "**TX**" indicator near the upper left of the display is on, 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.

If the display is completely blank, or if it shows all segments at the same time, and you cannot turn the transceiver off, you may have inadvertently started memory cloning - see the *Caution* box on the next page.

As a last resort, if you are unable to gain sensible control of the transceiver, reset the CPU as described in the next section.

To avoid confusion resulting from inadvertent button presses, set the keypad lock on (press **F/W+LOCK**) if you leave the transceiver unattended while it is on. Remember to set the lock back off when you wish to enter data.

## Resetting the CPU

Resetting the CPU clears all memories, repeater shifts and other settings to their defaults, and leaves the transceiver cpu in the same state as when it left the factory. To reset the CPU, press and hold the **D/MR** button and **REV** key while turning the transceiver on ("soft" reset). If you still have a problem, poke a sharp tool in the RESET hole on the back of the control head ("hard reset"), and then unless you have an A1 version, press and hold both the **MHz** and **DVS** buttons while switching back on.

## Memory Backup

Normally, a lithium battery inside the transceiver retains all settings and memories while power is off or disconnected. If this battery ever needs replacing, the transceiver will be found to have lost its memories, although it will still operate properly.

The control head must be disassembled as described on page 37 to gain access to the battery. The photos on that page show the battery location inside the rear of the control head. It should be replaced only be an Yaesu-authorized technician to ensure that it is installed properly.

## *Memory Cloning*

All memory data stored in one transceiver can be moved to another by connecting the microphone jacks together as indicated in the diagram below.

☐ Turn both transceivers off, and then press and hold the **F/W** keys while turning the power switches on. All segments of the displays will be blinking.

☐ Press the **REV** key on the destination transceiver (the display will stop blinking, and either blank, or show all segments).

☐ Press the **RPT** key on the source transceiver. When the data transfer is complete, the displays should return to normal. If "**Err**" appears on the display, turn both transceivers off and try again. If the dis-
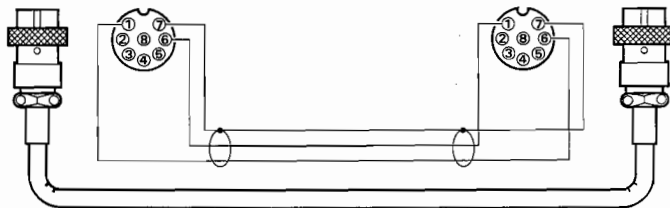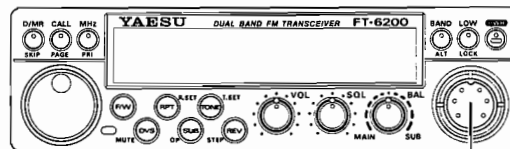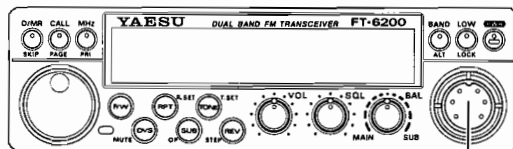
### *Caution!*

Do not attempt any of these steps without having a proper cable connected between the microphone jacks. If you do not have a cable, or if the connections are incorrect, the transceiver microprocessors may freeze up, preventing the set from being turned off. In this case, you will need to disconnect the power cable to restart the microprocessors.

play of the destination transceiver remains all blank or all on, and you cannot turn the transceiver off, see the Caution box, and recheck your cable.

☐ Turn both transceivers off and remove the cloning cable.

## Packet Radio TNC Interconnections

Most popular packet radio tncs can be connected to the microphone jack of the FT-6200 as follows:

| "RADIO" Jack on TNC | FT-6200 Mic Jack | Comment |
|---|---|---|
| Receiver Audio in | pin 4 | 8 ohms, de-emphasized |
| Squelch Status in | pin 5 | open=8V, closed=0V 1 mA: may require modification - see below |
| PTT out | pin 6 | ground to transmit |
| Transmit Audio out | pin 8 | 400 ohms, pre-emphasized |

Use shielded cable for the audio lines, and keep it as short as possible to avoid RF pickup. You do not need to connect Squlech Status (pin 5 of the mic jack) if your tnc uses a PLL-type DCD circuit. Otherwise, you will need to modify the transceiver to get the squelch signal on pin 5 of the mic jack, and this will only function on the primary band (at the left side of the display).

## Modification for Squelch Status

Open the control head as described in the following section, then change the solder bridge jumpers as
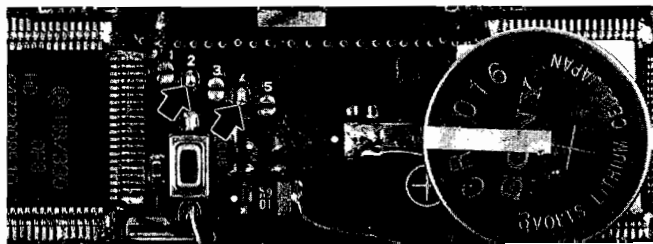


## Control Head Disassembly

☐ Remove the control head from the chassis, if connected, by lifting the catch on the left side of the head and unhooking the right side.

☐ Pull the knobs off the panel, and unscrew the ring nuts affixing the mic jack and the tuning shaft (you may be able to do this with long-nose pliers, or have your dealer do it with a special wrench).

☐ Remove the front panel cover (it clips at the top and bottom edges) and two white plastic shields, and with a jeweler's screwdriver, remove the tiny screw on the circuit board just left of the mic jack.



☐ Remove the two screws from the back side of the control head, and carefully separate the back cover from the circuit board, noting the positions of the brackets on either side as you do so.
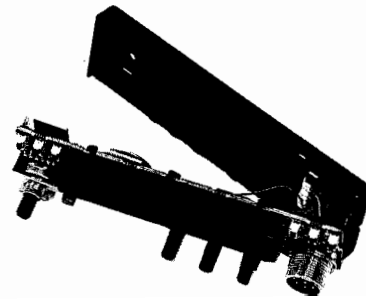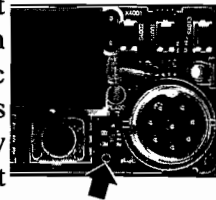
This section describes the installation procedures for the DVS-3 Digital Voice Recorder/DTMF Pager, FRC-4 DTMF Pager, FTS-22 Tone Squelch Unit and the YSK-1/1L Trunk Mounting Kits. These options are available from your Yaesu dealer. If installing both the FTS-22 and either the FRC-4 or DVS-3, install the FTS-22 last.

*Note!* The FRC-4 and DVS-3 cannot be installed together. The DVS-3 includes all functions of the FRC-4.

### FRC-4 DTMF Pager or DVS-3 Digital Voice Recorder/DTMF Pager Installation

The FRC-4 provides DTMF paging/selcall features using 3-digit DTMF station ID codes. Six code memories store your ID code plus those of five frequently-called stations. Control is provided through the front panel of the transceiver. The DVS-3 includes all features of the FRC-4, plus recording and playback of received signals and messages for transmission. See the *"Operation"* chapter for operational details.

The FRC-4 and DVS-3 install in the same location, and cannot both be installed together. If also installing the FTS-22 Tone Squelch Unit, save it until after the FRC-4 or DVS-3 is installed.

❏ Disconnect the DC power cable, and set the transceiver upside-down. Referring to Figure 1, remove the six screws affixing the bottom cover, and remove the cover.

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❏ Lift the speaker out of its bracket, and set the bracket and speaker aside for now. Referring to Figure 2, note the accessory mounting location. If the FTS-22 is already installed, you will need to remove it temporarily: just lift the FTS-22 board gently, allowing the double-sided tape underneath to come unstuck. Keep the tape with the FTS-22 board, and fold it aside for the moment (you need not disconnect it).

❏ If the FRC-4 is installed and you are installing a DVS-3 (or vice-versa), remove the screw holding the installed board, and unplug its three cables.

❏ Refer to Figure 3 for the location of the three connectors used by the FRC-4 and DVS-3 (just in front of the loudspeaker's position). Connect the cables from the FRC-4 or DVS-3 to these connectors carefully, so as not to install the plugs upside down.

❏ Position the FRC-4 or DVS-3 as shown in Figure 4, and use the supplied screw to fix it in place.

❏ If the FTS-22 was already installed, reuse the double-sided tape to stick it on top of the newly installed board, in the same way it was before (that is, with the cable running over the top of the FTS-22).

❏ If installing an FTS-22 in this transceiver for the first time, proceed to the FTS-22 procedure below. Otherwise, replace the loudspeaker and its bracket, the top cover, and its six screws.
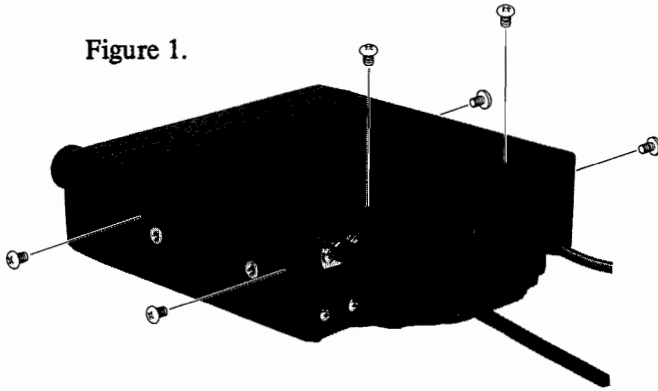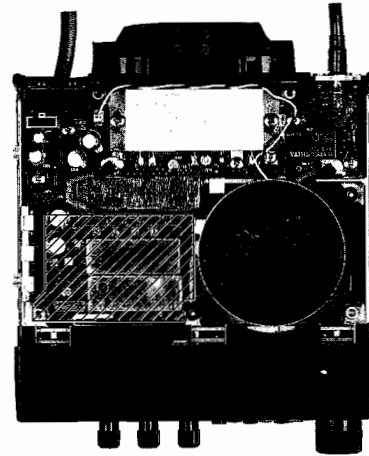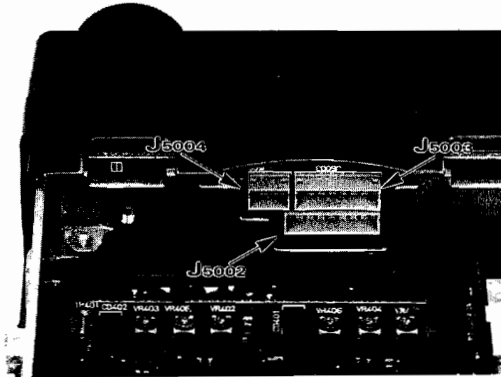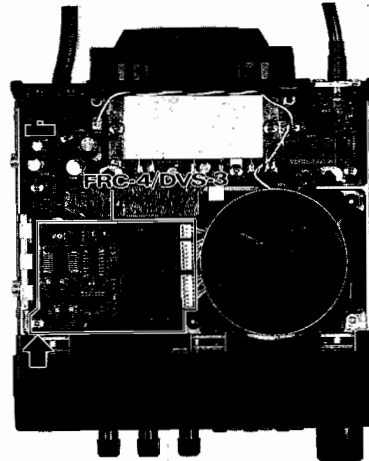
Figure 1.

Figure 2.

Figure 3.

Figure 4.

## *FTS-22 Tone Squelch Unit Installation*

The FTS-22 includes an encoder and decoder for 38 EIA standard subaudible CTCSS tones, programmable from the front panel of the FT-6200. It provides silent monitoring of busy channels when activated by the ENCode/DECode Tone Squelch function. Tone squelch operation on both bands requires only one FTS-22, and it may be installed after installing either the DVS-3 or FRC-4. See the *"Operation"* chapter for operational details.

☐ Disconnect the power cable, and turn the set upside-down. Referring to Figure 1 on the previous page, remove the six screws affixing the bottom cover, and remove the cover.

☐ Referring to Figure 2, locate unused 12-pin connector J5005 inside the front panel.

☐ Peel the covering from one side of the double-sided tape provided with the FTS-22. If the FRC-4 or DVS-3 is installed in front of J5005, stick the tape on top of that board. Otherwise, stick it on the top of the VCO housing just behind J5005.

☐ Note in Figure 3 how the FTS-22 cable routes over the top of the board. Plug the FTS-22 cable into J5005. Then peel the covering from the exposed side of the tape, and press the FTS-22 onto it.

☐ The factory adjusts the output tone level (VR1 on the FTS-22) for the proper deviation, so it should require no further adjustment.

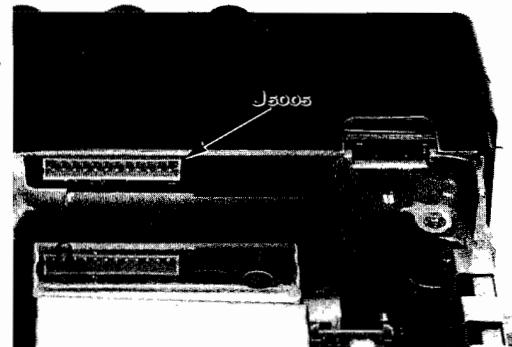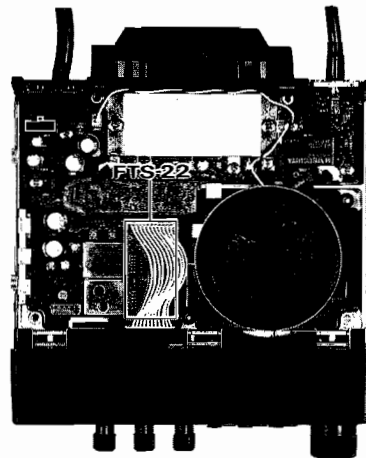☐ Replace the bottom cover removed in the first step.

Figure 2.



Figure 3.

## YSK-1/1L Trunk Mounting Kit Installation

The YSK-1/1L kits consist of a 3-m (YSK-1) or 6-m (YSK-1L) interconnecting cable for the Controller, and Controller mounting hardware. This allows the main body of the transceiver to be installed under a seat, in the trunk, or anywhere else out of the way, while the Controller is mounted on the dashboard. A choice of Controller mounting methods allows it to be easily removed and taken with you when leaving the vehicle.

To install the YSK-1/1L:

☐ Disconnect the DC power cable, and carefully lift the latch on the left side of the Front Panel/Controller while pulling the panel forward.
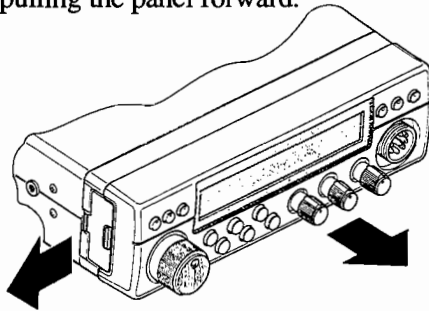
☐ Use two of the supplied 12-mm (½-inch) machine screws to connect the mating end of the extension cable (the end with flat contacts) over the contacts on the front of the transceiver body, so that the cable exits the connector toward the center of the transceiver body.

> ## Caution!
>
> *Do not install the main body of the transceiver near a heating vent, nor in a tightly closed compartment - the heatsink needs ventilation!*
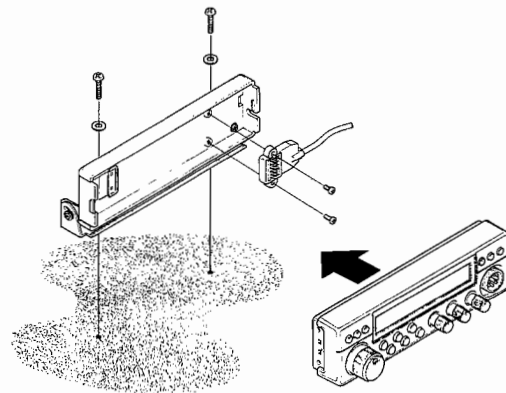
☐ Mount the main body of the transceiver in the trunk or other out-of-the-way location using the MMB-37 Mounting Bracket supplied with the transceiver, as described on pages 7 and 8. Remember: DC power must be supplied to the main body, and at least one external speaker (page 9) should be connected.

☐ Route the external speaker cable and Controller interconnecting cable to the desired locations.

☐ Referring to the diagram on the next page, decide where to install the Front Panel/Controller, and which parts of the Controller mounting hardware you will need. The Controller Nest may be screwed directly to a flat surface, or installed with the hinged angle bracket. If you will not need the hinged bracket, remove the two short machine screws affixing it to the Nest.

✗ *Do not mount the Controller Unit where it will be exposed to direct sunlight for long periods, nor where temperatures might exceed 60 °C (140 °F).*

☐ Use the two supplied self-tapping screws and flat washers to mount the Nest (with or without the metal bracket) to the car.

☐ Using the two supplied 7-mm (¼-inch) machine screws, mount the free end of the cable inside the Controller Nest so that the contacts face outward.
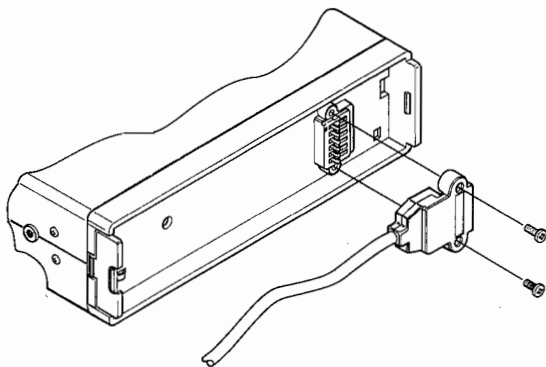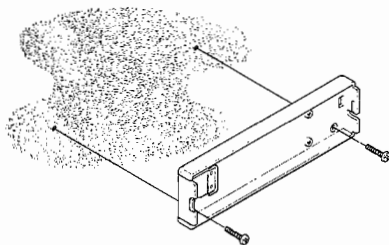


☐ Clip the Front Panel/Controller into the Nest, right side first.

Note: In cold climates the display on the Controller Unit may fail to operate in temperatures below –20 °C (–4 °F).



or

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