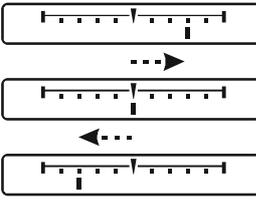The **FT-2000D** includes an unmatched array of RF selectivity-enhancing features. Please study the material below carefully, so as to understand the various features completely.

USING THE VRF (VARIABLE RF FRONT-END FILTER)

The VRF system is a high-performance RF front-end preselector that has high Q factor and low insertion loss. VRF provides outstanding rejection of out-of-band signals, and can significantly improve reception in tough co-location operations such as a contest or DX-pedition. The **FT-2000D**'s VRF system affects the 1.8 - 28 MHz amateur bands only.

1. Press the [**VRF**] button momentarily. The "VRF" icon will appear at the FLT column of the Receiver Configuration Indicator on the display, and the VRF system will be engaged, centered on your current Amateur band.
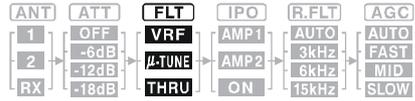
2. You may rotate the [**VRF**] knob to skew the position of the VRF system relative to your operating frequency. Because the VRF system is relatively broad, although still much narrower than the fixed bandpass filter), you may not hear much difference in the background noise or signal quality when you make minor adjustments. However, if you have receiving problems associated by a very strong signal, rotation of the [**VRF**] knob may help reduce the strength of the interfering station, allowing improved reception of the desired signal if overload was degrading reception.

   ADVICE:
   - ❒ You may observe the relative skew of the VRF system in the Tuning Offset Indicator on the display while turning the [**VRF**] knob.
   - ❒ After moving the passband of the VRF system manually, you may re-center it on the current Amateur band by pressing and holding in the [**VRF**] button for two seconds.

3. To switch VRF off, press the [**VRF**] button until the "VRF" icon shows "THRU" in the FLT column of the Receiver Configuration Indicator on the display; this confirms that the VRF circuit has been removed from the incoming received signal path.
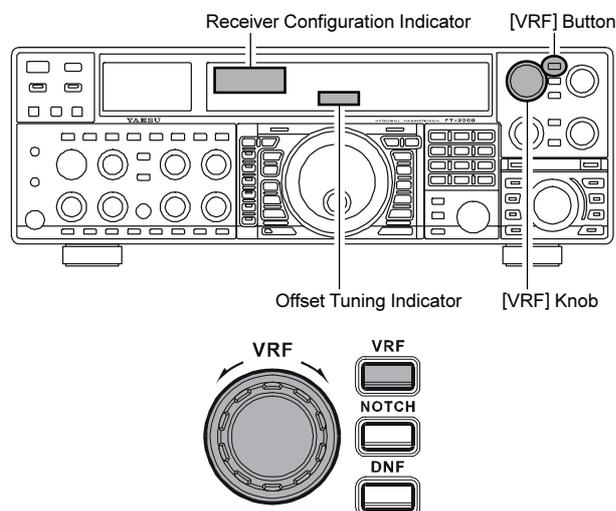
ADVICE:
- ❒ The VRF filter affects both the Main (VFO-A) and Sub (VFO-B) bands.
- ❒ The VRF Filter operational status will be memorized independently on each VFO in the VFO stack.

QUICK POINT:
The VRF filter, utilizing high-quality coils and capacitors that provide high Q, yields a passband that is approximately 20% to 30% the width of a traditional, fixed bandpass filter. As a result, significantly more "unwanted" signal rejection is provided. Within each Amateur band, the following adjustment steps are provided, if you wish to skew the response in a particular direction so as to enhance interference rejection even more. The actual "sound" of the signal you are listening to will remain unchanged, however.

AMATEUR BAND	VRF ADJUSTMENT STEPS
1.8 MHz	62 steps
3.5 MHz	62 steps
5 MHz	62 steps
7 MHz	62 steps
10 MHz	30 steps
14 MHz	30 steps
18 MHz	20 steps
21 MHz	20 steps
24.5 MHz	20 steps
28 MHz	20 steps

R.FLT (ROOFING FILTERS)

Narrow-band Roofing Filters of 15 kHz, 6 kHz, and 3 kHz bandwidths are provided in the first IF, right after the first mixer. These filters provide protection fort the 2nd mixer, DSP, and other circuitry that follow and can dramatically improve reception on a very crowded band (during a contest, etc.). Typically, the AUTO selection mode is satisfactory for most operating situations, but in an extremely crowded phone band you may wish to select, for example, the 3 kHz roofing filter for SSB operation.

Press the [**R.FLT**] button to toggle the Roofing Filter selection.

AUTO → 15 kHz → 6 kHz → 3 kHz → AUTO

Receiver Configuration Indicator

[R.FLT] Button

ADVICE:

❑ The Roofing filter selection affects the Main band (VFO-A) only. The Sub band's (VFO-B) Roofing filter is fixed at a bandwidth of 15 kHz.

❑ As you repeatedly press the [**R.FLT**] button, you will observe changes in the notation in the R.FLT column of the Receiver Configuration Indicator on the display, denoting the Roofing Filter currently in use.

❑ Typically, this selection will be set to "AUTO."

❑ The Roofing Filter selection will be memorized independently on each VFO in the VFO stack.
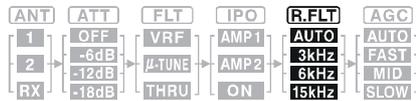
QUICK POINT:

❑ The "AUTO" selection of the Roofing Filter is based on the operating mode. However, you may override the automatic selection, if band conditions warrant a different (usually, a tighter) selection.

❑ The AUTO mode Roofing Filter selections are shown below:

AM/FM/FM-PKT:	15 kHz
LSB/USB/PKT:	6 kHz
CW/RTTY:	3 kHz

❑ When the Roofing filter mode is set to "AUTO" and the Noise Blanker is turned On, the Roofing Filter bandwidth will automatically be set to 15 kHz, as this setting provides the most effective noise blanking. However, you still may override the automatic setting, and select a more narrow Roofing Filter. Noise blanking may be compromised, however, with a tighter Roofing Filter in the line.

TERMINOLOGY:

A "Roofing Filter," as its name implies, places a "Roof" over the receiver's IF system bandwidth. This "Roof" protects the circuitry downstream from the first mixer from interference, just as a roof on a house protects the contents from rain and snow.
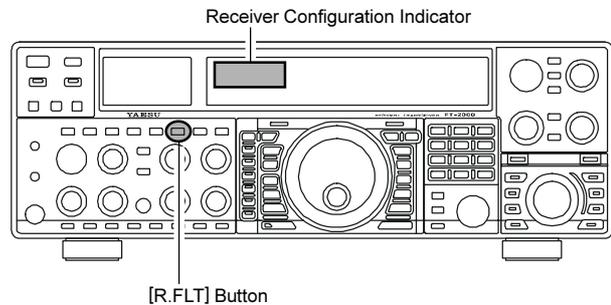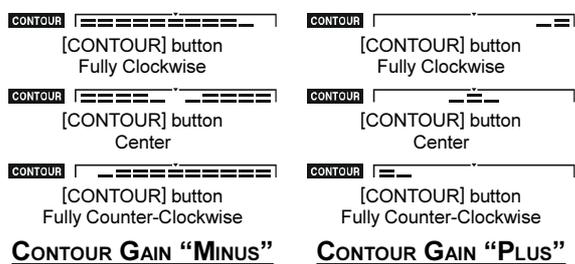
CONTOUR CONTROL OPERATION

The Contour filtering system provides a gentle perturbation of the IF filter passband, so as to suppress or enhance certain frequency components, thus enhancing the sound and/or readability of a received signal.

1. Press the [**CONTOUR**] button. The Contour notation will appear in the display to confirm that the Contour filter is engaged.
2. Rotate the [**CONTOUR**] knob to achieve the most natural-sounding audio reproduction on the incoming signal.
3. To cancel Contour tuning, press the [**CONTOUR**] button once more.
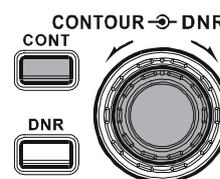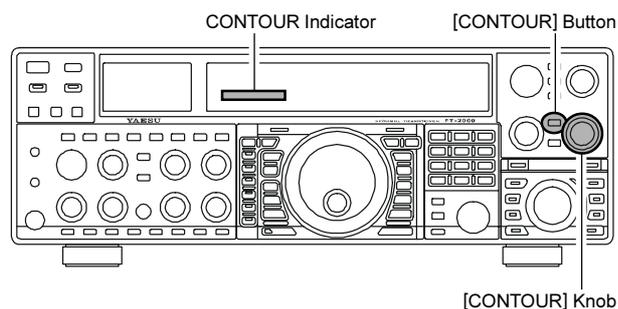
ADVICE:

❒ The Contour filter affects the Main band (VFO-A) only.
❒ You may observe the graphically-depicted peak position of the CONTOUR Filter in the CONTOUR indicator on the display.

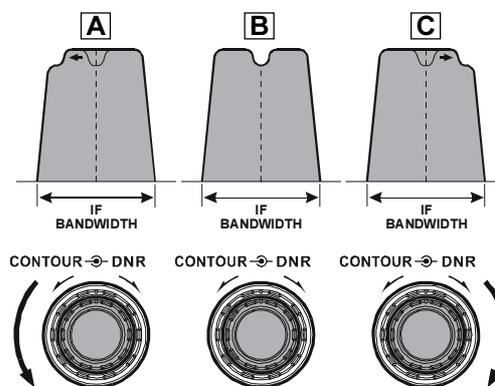| CONTOUR	CONTOUR
[CONTOUR] button Fully Clockwise	[CONTOUR] button Fully Clockwise
[CONTOUR] button Center	[CONTOUR] button Center
[CONTOUR] button Fully Counter-Clockwise	[CONTOUR] button Fully Counter-Clockwise
CONTOUR GAIN "MINUS"	**CONTOUR GAIN "PLUS"**

❒ The Contour filter's level (either nulling or peaking) may be adjusted using Menu item "090 rdSP CNTR LV." The factory default setting is for a null of "–15" (dB).
❒ The bandwidth over which the Contour filter effect is applied may be adjusted using Menu item "091 rdSP CNTR WI." The factory default setting is "10."
❒ When the optional **DMU-2000** Data Management Unit is connected, the Audio Scope (on the "Oscilloscope" page) is particularly useful when adjusting the Contour control. Not only can you see the effect of the null/peak of the Contour system, but you also can see the position of the null/peak with respect to frequency components of interest on the incoming signal. You may then observe (on the Audio Scope) the effect of the Contour control while listening to the effect on the signal, and this will help build your intuition on how best to use Contour tuning in the future.

CONTOUR Indicator   [CONTOUR] Button

[CONTOUR] Knob

With reference to Figure "**B**," note the initial position (12 o'clock) of the [**CONTOUR**] knob when the [**CONTOUR**] button is pushed. You may observe the "indentation" in the receiver passband where the Contour filter is placing a low-Q "notch" (per the setting of Menu item "090," referenced above). Counter-clockwise rotation (to the left) of the [**CONTOUR**] knob causes the indentation to move towered a lower frequency within the passband, while clockwise rotation (to the right) causes the indentation to move toward a higher frequency within the passband. By removing interference or unwanted frequency components on the incoming signal, it is possible to make the desired signal rise out of the background noise/interference, enhancing intelligibility.

QUICK POINT:

The steep slopes of the DSP filtering can, when adjusted aggressively, impart an unnatural sound to an incoming signal. Oftentimes, though, a narrow bandwidth is not the key to improving copy; the incoming signal itself may have undesirable or excessive frequency components, especially in the low-frequency range around 100-400 Hz. By judicious use of the Contour filter, the "shoulder" of the passband response may be altered, or components removed from within the passband, allowing the desired signal to rise above the background noise and interference in a manner not obtainable with other filtering systems.

IF SHIFT OPERATION (SSB/CW/RTTY/PKT/AM MODES)

IF Shift allows you to vary the DSP filter passband higher or lower, without changing the pitch of the incoming signal, so as to reduce or eliminate interference. Because the carrier tuning frequency is not varied, there is no need to re-tune the operating frequency when eliminating the interference. The total passband tuning range for the IF Shift system is ±1 kHz.

Rotate the [**SHIFT**] knob to the left or right to reduce the interference.

ADVICE:

❒ The [**SHIFT**] knob affects the Main band (VFO-A) only. However, you may shift the Sub band (VFO-B) filter passband via Menu items "042 S-iF LSB SET" through "049 S-iF PKT-USB."

❒ The position of the passband set by the IF Shift can be observed on the display.
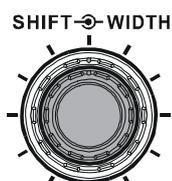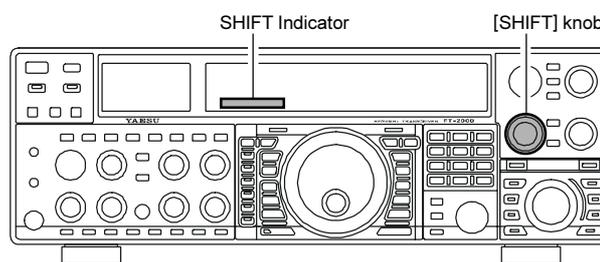
Referring to Figure "**A**," note the depiction of the IF DSP filter as the thick line, with the [**SHIFT**] knob in the 12 o'clock position. In Figure "**B**," an interfering signal has appeared inside the original passband. In Figure "**C**," you can see the effect of rotating the [**SHIFT**] knob so as to reduce the interference level by moving the filter passband so that the interference is outside of the passband.
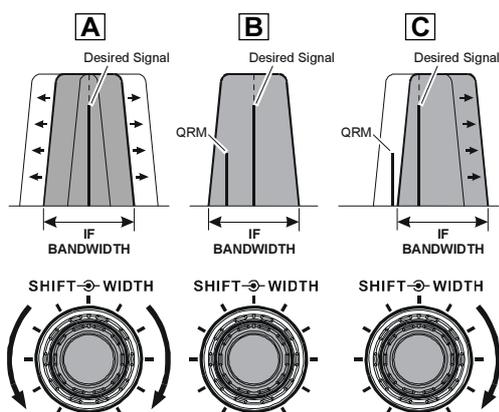
WIDTH (IF DSP BANDWIDTH) TUNING (SSB/CW/RTTY/PKT MODES)

The IF Width tuning system allows you to vary the width of the DSP IF passband, so as to eliminate interference. Moreover, the bandwidth may actually be *expanded* from its default setting, should you wish to enhance incoming signal fidelity when interference on the band is low.
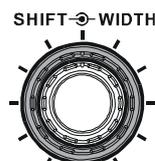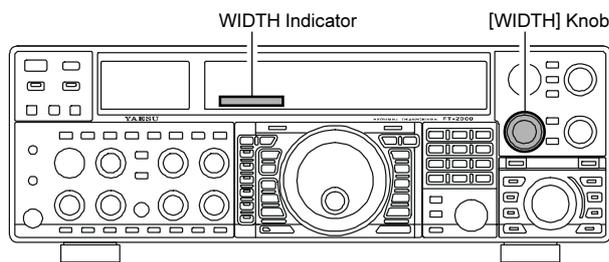
Rotate the [**WIDTH**] knob to adjust the bandwidth. Counter-clockwise rotation reduces the bandwidth, while clockwise rotation increases the bandwidth.

ADVICE:
❒ The IF Width affects the Main band (VFO-A) only.
❒ The bandwidth of the IF can be observed on the display.

CAUTION:

When rotating the [**WIDTH**] control fully counter-clockwise, the transition between 50 Hz and 25 Hz bandwidth may be accompanied by a "ping" sound, depending on the amount of noise present. This is a normal condition, and you should turn down the volume, when wearing headphones, to minimize the amplitude of this momentary sound.

WIDTH Indicator   [WIDTH] Knob

SHIFT—◉—WIDTH

Referring to Figure B, you can see the default bandwidth with the [**WIDTH**] knob set to the 12 o'clock position.

By rotating the [**WIDTH**] knob to the left, the bandwidth will narrow (see Figure "**A**"), while rotation of the [**WIDTH**] knob to the right, as depicted in Figure "**C**," will widen the bandwidth.
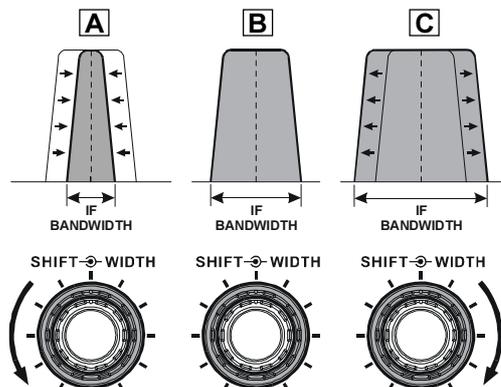
The default bandwidths※, and total bandwidth adjustment range, will vary according to the operating mode:

SSB Mode: 200 Hz ~ 4.0 kHz (2.4 kHz※)
CW Mode: 25 Hz ~ 2.4 kHz (2.4 kHz※)
**RTTY/PKT Modes:** 25 Hz ~ 2.4 kHz (500 Hz※)
　　※: bandwidth at 12 o'clock position of [**WIDTH**] knob.

Using IF Shift and Width Together

The IF Shift and Variable IF Width features together form a very effective interference-fighting filtering system.

For example, in Figure "**A**" you can see how interference has appeared both on the high and low sides of the desired signal. By rotating the [**WIDTH**] knob, as shown in Figure "**B**," the interference from one side can be eliminated, and by re-positioning the [**SHIFT**] knob (Figure "**C**"), the interference on the opposite side can be removed, without re-introducing the interference previously eliminated in Figure "**B**."

Advice: For best interference reduction, the Width and Shift features are the primary tools you should use. After narrowing the bandwidth (Width) and/or adjusting the center of the passband (Shift), the Contour control may also yield additional signal-enhancement benefits on the net residual bandwidth. What's more, the IF Notch Filter (see the next section) may also be utilized, in conjunction with the three other filter systems, to significant advantage.
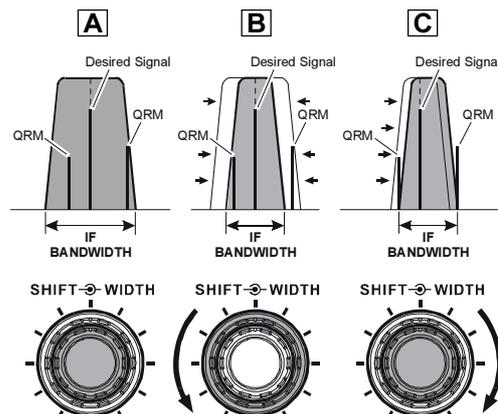
IF NOTCH FILTER OPERATION (SSB/CW/RTTY/PKT/AM MODES)

The IF Notch filter is a highly-effective system that allows you to slice out an interfering beat note or other carrier signal from inside the receiver passband.

1. Press the [**NOTCH**] button. The Notch characteristic will appear in the display to confirm that the Notch filter is engaged.

2. Initially, rough adjustment of the center frequency of the IF Notch Filter is adjusted using the outer [**COARSE**] knob; thereafter, fine tuning of the Notch frequency is adjusted using the inner [**FINE**] knob.

3. To switch the IF Notch filter off, press the [**NOTCH**] button once more. The Notch notation will turn off, confirming that the IF Notch filter is no longer operating.

ADVICE:

❒ The IF Notch filter affects the Main band (VFO-A) only.

❒ You may observe the graphically-depicted peak (maximum null) position of the IF Notch Filter in the NOTCH indicator on the display.

❒ The width of the IF Notch null may be adjusted using Menu item "092 rdSP NOTCH W." Both "Wide" and "Narrow" selections are available, with "Narrow" providing the least disruption of the "desired" signal.

❒ When the optional **DMU-2000** Data Management Unit is connected, the effect of the IF Notch filter may be observed on the Audio Scope (on the "Oscilloscope" page). The Notch will be observed as a "dip" in the noise platform observed. What's more, the "Waterfall" display may be used to observe the effect of the IF Notch filter, which will appear as a white area in the colored background area. The tuning rate for the IF Notch is somewhat slow while you adjust the [**FINE**] knob, so the use of the Waterfall display to confirm proper adjustment is highly recommended.
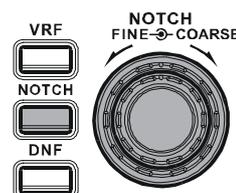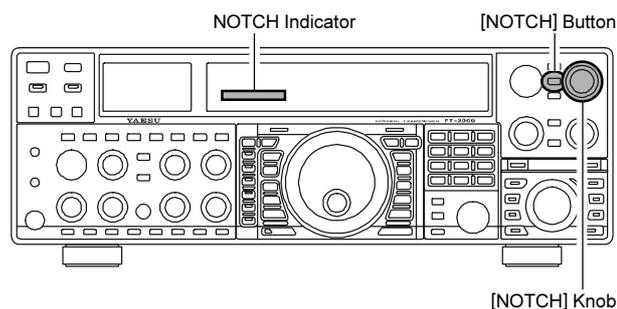
The performance of the IF Notch filter is shown in Figure "**A**," where the effect of rotation of the [**NOTCH**] knobs is depicted. In Figure "**B**," you can see the notching effect of the IF Notch filter as you rotate the [**NOTCH**] knobs to eliminate the incoming interference.
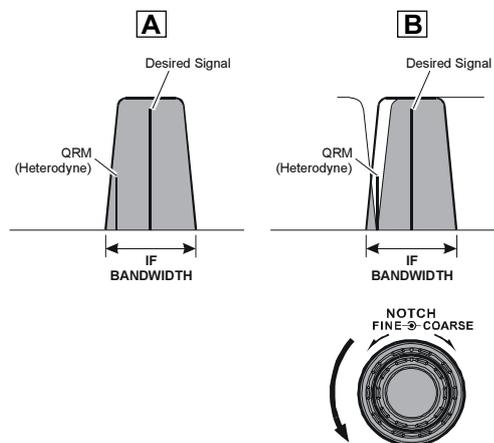
DIGITAL NOISE REDUCTION (DNR) OPERATION

The Digital Noise Reduction (DNR) system is designed to reduce the level of random noise found on the HF and 50 MHz bands, and it is especially effective during SSB operation. By rotating the [**DNR**] knob, any of sixteen different noise-reduction algorithms can be selected; each of these algorithms was created for dealing with a different noise profile, and you will want to experiment with the DNR system to find the best setting according to the noise currently being experienced.

1. Press the [**DNR**] button. The "![DNR]" icon will appear in the display, confirming that the DNR system is engaged.
2. Rotate the [**DNR**] knob to select the setting that most effectively reduces the noise level.
3. To disable the DNR system, press the [**DNR**] button once more. The "![DNR]" icon will turn off, confirming that the DNR system is not active.

ADVICE:
The Digital Noise Reduction affects the Main band (VFO-A) only.
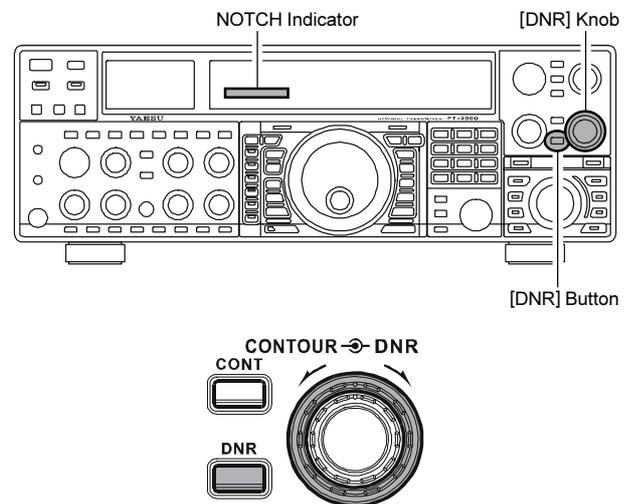
DIGITAL NOTCH FILTER (DNF) OPERATION

The Digital Notch Filter (DNF) is an effective beat-cancelling filter that can null out a number of interfering beat notes inside the receiver passband. Because this is an Auto-Notch feature, there is no adjustment knob associated with this filter.

ADVICE:
If a very strong interfering carrier is encountered, we recommend you first use the IF Notch filter, as it is the most effective notching tool in the receiver section.

1. Press the [**DNF**] button. The "![DNF]" icon will appear in the display, confirming that the DNF system is engaged.
2. To cancel DNF operation, press the [**DNF**] button once more. The "![DNF]" icon will turn off, confirming that the Digital Notch Filter is no longer in operation.

ADVICE:
The Digital Notch Filter affects the Main (VFO-A) band only.
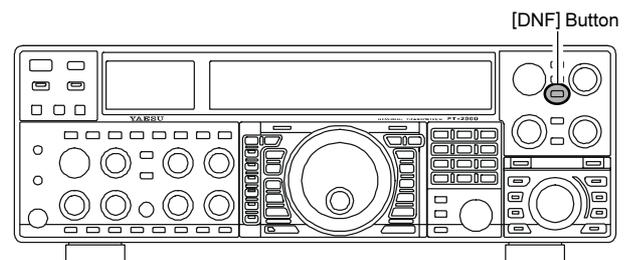
NARROW (NAR) ONE-TOUCH IF FILTER SELECTION

Main band (VFO-A) "One-Touch Narrow" Operation

Pressing the [**NAR**] button provides one-touch, mode-specific selection of a narrow IF DSP filter setting that does not depend on the setting of the [**WIDTH**] knob. Pressing the [**NAR**] button once more returns the bandwidth control to the Width/Shift system. The factory default bandwidths are:

OPERATING MODE	[NAR] SWITCH	
	"ON"	"OFF"
SSB	1.8 kHz	※
CW	500 Hz	※
RTTY/PKT-L/PKT-U	300 Hz	※
PKT-FM	9 kHz	16 kHz
AM	6 kHz	9 kHz
FM (28/50 MHz Bands)	9 kHz	16 kHz

※: Depends on the [WIDTH] knob

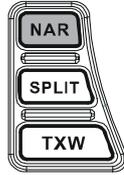**ADVICE:**
❐ When the narrow bandwidth is selected, the "NAR" icon will appear in the display and the bandwidth on the WIDTH indicator in the display will be reduced.
❐ The bandwidth applied when the [**NAR**] button is pressed may be adjusted using the Menu. This allows you to customize a quick-switch "Narrow" bandwidth matching your operating needs. The default values for each mode below are underlined.
   SSB mode: Menu item "104 rdsP SSB NAR"
      200/400/600/850/1100/1350/1500/1650/
      1800/1950/2100/2250 Hz
   CW mode: Menu item "095 rdsP CW NARR"
      25/50/100/200/300/400/**500**/800/1200/1400/
   1700/2000 Hz
   PSK mode: Menu item "098 rdsP PSK NAR"
      25/50/100/200/**300**/400 Hz
   RTTY mode: Menu item "101 rdsP RTY NAR"
      25/50/100/200/**300**/400 Hz
❐ When the [**NAR**] button has been pushed so as to engage the narrow filter, the [**WIDTH**] knob will be disabled, but IF Shift still is operational. For many applications, you may find that simple adjustment of the [**WIDTH**] knob, instead of engaging the Narrow filter, may be satisfactory for interference reduction.
❐ You may adjust the CW bandwidth using the [**WIDTH**] knob, even if the narrow filter is engaged. In this case, available bandwidth selections are 25 Hz ~ 2 kHz.
❐ When you press the [**NAR**] button in the FM mode, both the transmit and receive bandwidths are narrowed.

NOTE:
When the [**NAR**] button is pressed, the [**WIDTH**] knob no longer functions.

WIDTH Indicator   [WIDTH] Knob
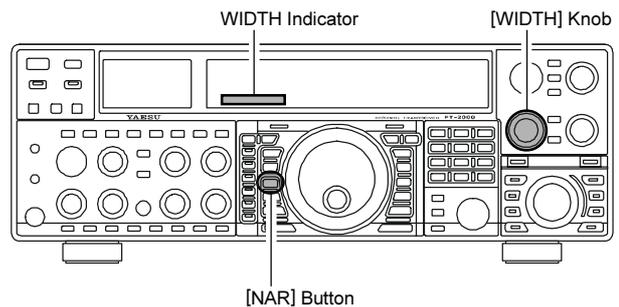
[NAR] Button

Sub band (VFO-B) "One-Touch Narrow" Operation

1. Press the [**B**] button.
2. Within five seconds of pressing the [**B**] button (while the imbedded orange LED is blinking), press the [**NAR**] button to toggle the bandwidth between "wide" and "narrow." When the narrow bandwidth is selected, the "NAR" icon will appear in the display.

[B] Button

[NAR] Button
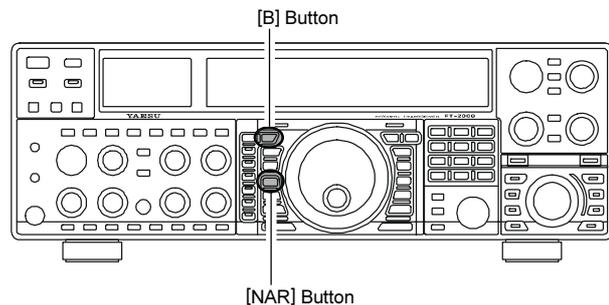
OPERATING MODE	[NAR] SWITCH	
	"ON"	"OFF"
SSB	1.1 kHz	2.25 kHz
CW	1.2 kHz (300 Hz/500 Hz)※	2.0 kHz
RTTY/PKT-L/PKT-U	1.2 kHz	1.2 kHz
PKT-FM	9 kHz	16 kHz
AM	6 kHz	9 kHz
FM (28/50 MHz bands)	9 kHz	16 kHz

※: Requires the optional CW Narrow Filter
300 Hz: **YF-122CN**, 500 Hz: **YF-122C**

IF NOISE BLANKER (NB) OPERATION

The **FT-2000D** includes an effective IF Noise Blanker, which can significantly reduce noise caused by automotive ignition systems.

Main band (VFO-A) NB Operation

1. Press the [**NB**] button momentarily to reduce short-duration pulse noise such as from switching transients, automobile ignitions and power lines. The " NB " icon will appear in the display to confirm that the Narrow-NB is operating. 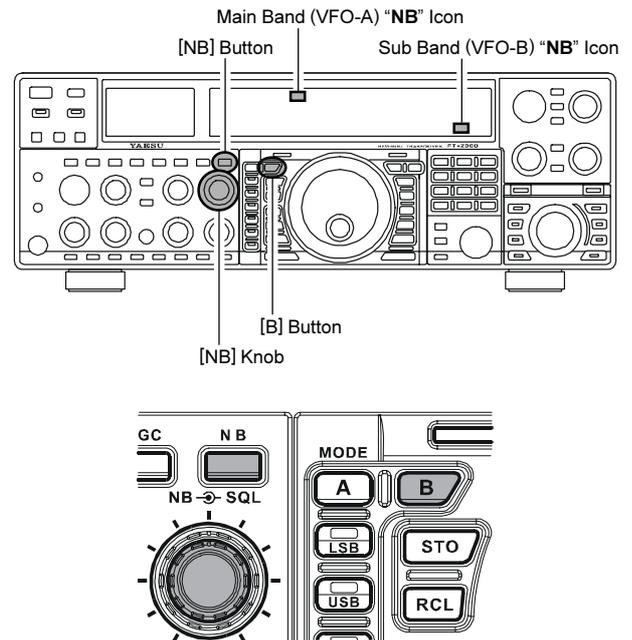Press and hold in the [**NB**] button for two seconds to reduce longer-duration man-made pulse noise. The " NB " icon will blink for five seconds, and thereafter will appear continuously, to confirm that the Wide-NB is operating.
2. Advance the [**NB**] knob to the point where the offending noise is best reduced or eliminated.
3. To end Noise Blanker operation, press the [**NB**] button once more. The " NB " icon will turn off, confirming that the Noise Blanker is no longer in operation.

ADVICE:

❒ When the Roofing filter mode is set to "AUTO" and the Noise Blanker is turned On, the Roofing Filter bandwidth will automatically be set to 15 kHz. The Roofing Filter may be changed to a narrower selection, as described previously, although Noise Blanker operation may be compromised somewhat when using a narrower Roofing Filter.

❒ When you change the Noise Blanker level on the Main (VFO-A) side, the Sub (VFO-B) band's Noise Blanker level will automatically change to be the same as that for VFO-A, if the Sub (VFO-B) band's Noise Blanker is engaged.

Main Band (VFO-A) "**NB**" Icon
[NB] Button
Sub Band (VFO-B) "**NB**" Icon

[B] Button
[NB] Knob

Sub band (VFO-B) NB Operation

1. Press the [**B**] button.
2. Within five seconds of pressing the [**B**] button (while the imbedded orange LED is blinking), press the [**NB**] button momentarily to reduce short-duration pulse noise such as from switching transients, automobile ignitions and power lines. The " NB " icon will appear in the display to confirm that the Narrow-NB is operating.
3. Within five seconds of pressing the [**B**] button (while the imbedded orange LED is blinking), press and hold in the [**NB**] button for two seconds to reduce longer-duration man-made pulse noise. The " NB " icon will blink for five seconds, then appear continuously, to confirm that the Wide-NB is operating.
4. To end Noise Blanker operation, press the [**B**] button, then press the [**NB**] button. The " NB " icon will turn off, confirming that the Noise Blanker is no longer in operation.

ADVICE:

When you change the Noise Blanker level on the Sub (VFO-B) side, the Main (VFO-A) band's Noise Blanker level will automatically change to be the same as that for VFO-B, if the Main (VFO-A) band's Noise Blanker is engaged.

TOOLS FOR COMFORTABLE AND EFFECTIVE RECEPTION

AGC (AUTOMATIC GAIN CONTROL)

The AGC system is designed to help compensate for fading and other propagation effects, with characteristics that can be of particular value on each operating mode. The basic objective of AGC is to maintain a constant audio output level once a certain minimum threshold of signal strength is achieved.

Main Band (VFO-A) AGC Selection

Press the [**AGC**] button repeatedly to select the desired receiver-recovery time constant. You will observe the AGC status notation in the AGC column of the Receiver Configuration Indicator on the display, denoting the AGC receiver-recovery time currently in use. For most operation, we recommend the "AUTO" mode. Additionally, you may disable the AGC by pressing and holding in the [**AGC**] button for two seconds.

Sub Band (VFO-B) AGC Selection

1. Press the [**B**] button.
2. Within five seconds of pressing the [**B**] button (while the imbedded orange LED is blinking), press the [**AGC**] button repeatedly to select the desired receiver-recovery time constant. You will observe the AGC notation below the Sub frequency on the display, denoting the Sub receiver's current AGC receiver-recovery time. For most operation, we recommend the "AUTO" mode. Additionally, you may disable the AGC by pressing and holding in the [**AGC**] button for two seconds.

NOTE:

Pressing the [**AGC**] button allows selection of the desired receiver-recovery time constant. Normally, the "AUTO" selection is satisfactory for most situations, but in the event of operation on a crowded band where you wish to receive a weak signal, you may wish to change the setting (to FAST, for example). The "AUTO" mode selections are:

OPERATING MODE	AUTO AGC SELECTION
LSB	SLOW
USB	SLOW
CW	FAST
AM	FAST
FM	FAST
RTTY	SLOW
PKT (FM)	FAST
PKT (LSB)	SLOW

[AGC] Button

[B] Button

AGC   N B   MODE
NB -⊙- SQL
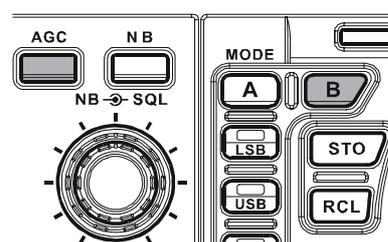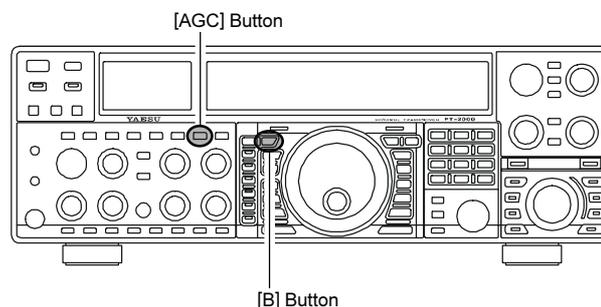
ADVICE:

If the AGC receiver-recovery time is set to "Off" by pressing and holding in the [**AGC**] button, the S-meter will no longer deflect. Additionally, you will likely encounter distortion on stronger signals, as the IF amplifiers and the following stages are probably being overloaded.

QUICK POINT

Several aspects of AGC performance may be configured via the Menu. However, because AGC can have such a profound impact on overall receiver performance, we generally do not recommend any changes to the AGC Menu selections until you are thoroughly familiar with the performance of the **FT-2000D**.

TERMINOLOGY:

Automatic Gain Control, or AGC, is a circuit that senses the incoming signal strength, and then limits the gains of the RF and IF stages so as to keep the output audio volume at a more-or-less constant level. AGC also protects the RF, IF, Audio, and DSP stages from overload, as it limits the signal strength that is allowed to flow, irrespective of the input signal level.

AGC (AUTOMATIC GAIN CONTROL)

SLOPED AGC Operation

In traditional AGC systems, the audio output from the transceiver becomes essentially fixed once the threshold for AGC action is reached (usually several dozen dB above the no-signal noise floor). The **FT-2000D**, however, includes an innovative Sloped AGC system on the Main band (VFO-A) receiver, that allows the audio volume to rise and fall slightly according to signal strength. Although the rise/fall slope is not dramatic, it is sufficient to allow you to use your ear to discern and separate signals according to signal strength, not just audio frequency.
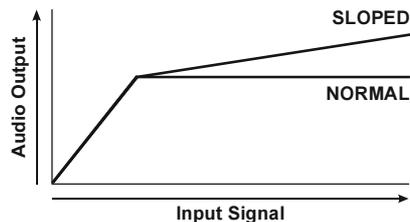
Using Sloped AGC

1. Press the [**MENU**] button momentarily to enter the Menu mode.
2. Use the Main Tuning Dial knob to select Menu item "088 rout AGC SLP."
3. Rotate the [**SUB VFO-B**] knob to change the setting to "SLP."
4. Press and hold in the [**MENU**] button for two seconds to save the new setting and exit to normal operation. You will now be using the Sloped AGC system.

[MENU] Button

Main Tuning Dial Knob   [SUB VFO-B] Knob
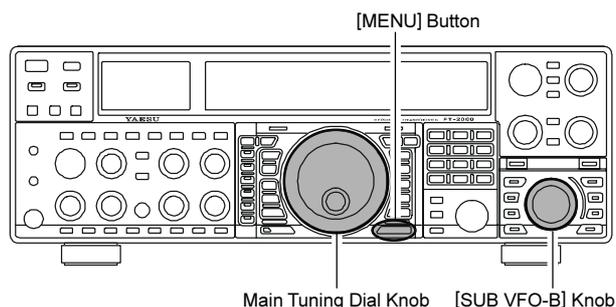
MUTE FEATURE (MAIN (VFO-A) BAND)

There may be occasions, during Dual Receive operation, when you want to silence the Main (VFO-A) receiver temporarily so as to concentrate on what's being received on the Sub (VFO-B) receiver. The Mute feature makes this simple to accomplish.

Press the Main [**RX**] LED/switch. The Main (VFO-A) receiver will be silenced, and the green LED in the [**RX**] switch will blink.

To restore reception on the Main (VFO-A) receiver, just press the blinking [**RX**] switch/LED once more.

Main [RX] Switch

ADVICE:

If you press the [**POWER**] switch momentarily while the transceiver is turned on, the transceiver's audio will be muted for three seconds.
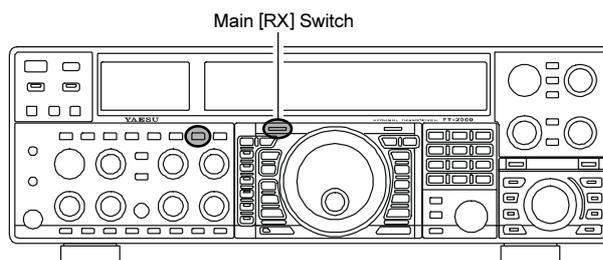
SSB/AM Mode Transmission

[MOX] Button

[METER] Switch

[MODE] Button

[MIC] Knob
[RF PWR] Knob

Main Tuning Dial knob

1. The operating mode is selected using the [**MODE**] buttons to the left of the Main Tuning Dial knob, and the VFO (A or B) to which the selection is applied is selected by the [**A**] or [**B**] button above the [**MODE**] buttons. Usually, the [**A**] button glows Red, signifying that the Main band (VFO-A) is being adjusted. Similarly, pressing the [**B**] button wi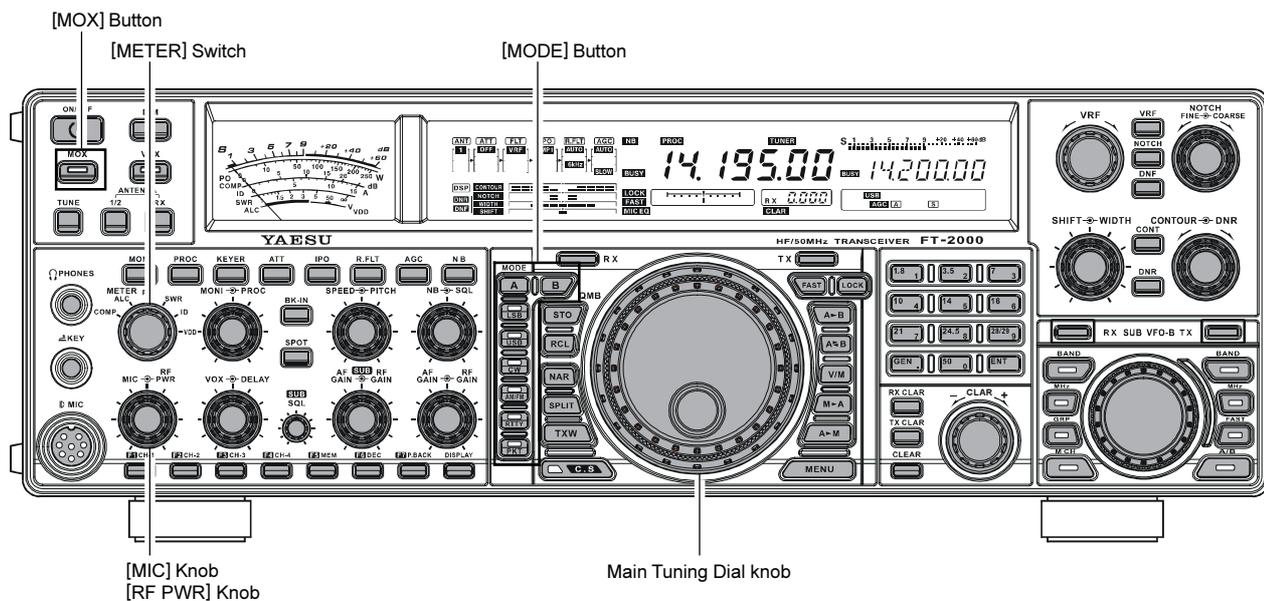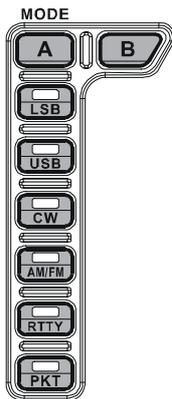ll cause its indicator to blink Orange for five seconds, signifying Sub band (VFO-B) adjustment. Therefore, press the [**A**] or [**B**] button to select the desired VFO, then press the [**LSB**] or [**USB**] button to select one of the SSB modes. For AM operation, press the [**AM/FM**] button repeatedly until the imbedded LED glows red.


QUICK POINT:
❒ By convention, LSB is used in the 7 MHz and lower Amateur bands for SSB communication, and USB is used on the 14 MHz and higher bands (the 10 MHz band is used for CW and data modes only).
❒ When the [**AM/FM**] button glows orange, it indicates that FM operation is engaged.

2. Rotate the Main Tuning Dial knob to adjust the operating frequency. Alternatively, you may use the [**UP**]/[**DWN**] scanning buttons on the **MH-31B8** Hand Microphone to sweep up or down the current band.

3. Press the microphone's **PTT** (Push To Talk) switch to begin transmission; speak into the microphone in a normal voice level.

ADVICE:
❒ The "**T X**" indicator will light up in the frequency display area, confirming that transmission is in progress.
❒ When transmitting in the AM mode, rotate the [**RF PWR**] knob so as to set a maximum (carrier) power output of 50 Watts.

4. In the SSB mode, adjust the microphone amplifier gain to match the microphone and your voice level, set the [**METER**] switch to the "ALC" position, close the **PTT** switch, speak into the microphone in a normal voice level, and adjust the [**MIC**] (gain) knob so that the ALC voltage (displayed on the right meter) stays within the ALC zone of the meter (up to 2/3 of full scale deflection) on voice peaks.
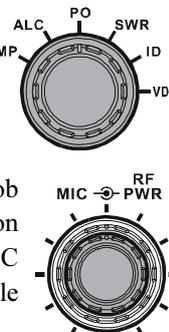
ADVICE:
The microphone gain of the AM mode has been programmed, at the factory, to a level that should be satisfactory for most situations. However, using Menu item "050 A3E MICGAIN," you may set a different fixed value, or choose the "Ur" option, which then lets you use the front panel [**MIC**] knob to set the microphone gain in the AM mode. In this case, the [**MIC**] knob should not be advanced to the point where the ALC meter deflects. In many cases, the same setting as used on SSB will be satisfactory.
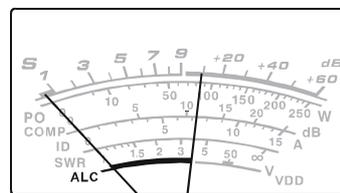
5. Release the **PTT** switch at the end of your transmission. The transceiver will return to the receive mode.

ADVICE:

❐ ALC meter deflection may be caused by excessive drive power, but also by reflected power detected in the antenna system. If the impedance presented to the transceiver is different from 50 Ohms, ALC meter action may be observed that is not related to the proper setting of the [**MIC**] (gain) knob. Therefore, we recommend that you make [**MIC**] knob adjustments into a dummy load or antenna system presenting an impedance very close to 50 Ohms.

❐ Rotate the [**RF PWR**] knob to set the desired power output. Clockwise rotation of the [**RF PWR**] knob will increase the power. The adjustment range is between 10 Watts and 200 Watts, and you should always use the minimum power necessary for maintaining reliable communications.
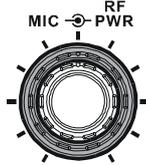
❐ When performing tests (such as the setup of the [**MIC**] or [**RF PWR**] knobs), be sure to check the frequency before transmitting, so as to avoid interference to others who may already be using the frequency.

❐ Four techniques for exercising Transmit/Receive control are provided on the **FT-2000D**, and you may choose the technique(s) that best suit your operating needs:

  ❍ Pressing the microphone's **PTT** switch will engage the transmitter.

  ❍ The rear panel **PTT** jack may be connected to a foot switch or other manual switching device in order to engage the transmitter.

  ❍ Pressing the front panel [**MOX**] button will lock the transmitter on. Press the [**MOX**] button again to return to receive.

  ❍ The VOX (Voice Operated Xmit) circuit will engage the transmitter automatically when you speak into the microphone. For details of VOX operation, see page 78.

USING THE AUTOMATIC ANTENNA TUNER

The Automatic Antenna Tuner (hereinafter referred to as the "ATU") built into each **FT-2000D** is crafted to ensure a 50-Ohm load for the final amplifier stage of the transmitter. We recommend that the ATU be used whenever you operate on the **FT-2000D**.

ADVICE:

❒ The ATU of the **FT-2000D**, being located inside the station, only adjusts the impedance presented to the transceiver at the station end of your coaxial cable feedline. It does not "tune" the SWR at the antenna feedpoint itself. When designing and building your antenna system, we recommend that every effort be made to ensure a low SWR at the antenna feedpoint.

❒ The ATU of the **FT-2000D** includes 100 memories for tuning data. Eleven of these memories are allocated, one per Amateur band, so that each band has at least one setting preset for use on that band. The remaining 89 memories are reserved for the 89 most-recent tuning points, for quick frequency change without the need to retune the ATU.

❒ The ATU in the **FT-2000D** is designed to match impedances within the range of 16.5 Ohms to 150 Ohms, corresponding to an SWR of 3:1 or less on the HF amateur bands (6 m amateur band: 25 Ohms to 100 Ohms, corresponding to an SWR of 2:1 or less). Accordingly, simple non-resonant whip antennas, along with random-length wires and the "G5RV" antenna (on most bands) may not be within the impedance matching range of the ATU.

ATU OPERATION

1. Rotate the [**RF PWR**] knob fully clockwise (to the right).
2. Use the Main Tuning Dial knob to set the radio to the desired operating frequency within the Amateur band.
3. Press the [**TUNE**] button momentarily to place the ATU in the transmit line (no adjustment/tuning will occur yet). The "TUNER" icon will appear in the display.

   QUICK POINT:
   The momentary press of the [**TUNE**] button will turn the tuner on, and the microprocessor will automatically select the tuning point closest to the current operating frequency.

4. Press and hold in the [**TUNE**] button for two seconds to begin automatic tuning. The transmitter will be engaged, and the "TUNER" icon will blink while tuning is in progress. When the optimum tuning point has been reached, the radio will return to receive, and the "TUNER" icon will again glow steadily (instead of blinking).

5. While tuning around the band using the Main Tuning Dial knob, you will observe that the "TUNER" icon blinks momentarily every 10 kHz. This momentary blinking indicates that a new tuning window has been entered. If you want to save tuning data associated with this 10 kHz window, repeat step 4 (above) for each such window. On bands like 1.8 MHz where the impedance may change rapidly, the storage of a number of tuning points is recommended.

6. To disconnect the ATU from the transmit line, press the [**TUNE**] button momentarily. The "TUNER" icon will turn off, confirming that the ATU has been turned off. In the "Off" mode, the transceiver will be directly connected to the coaxial cable connected to your antenna, and will operate based on whatever impedance is present at the station end of the coax.

NOTCH Indicator   [DNR] Knob

[DNR] Button
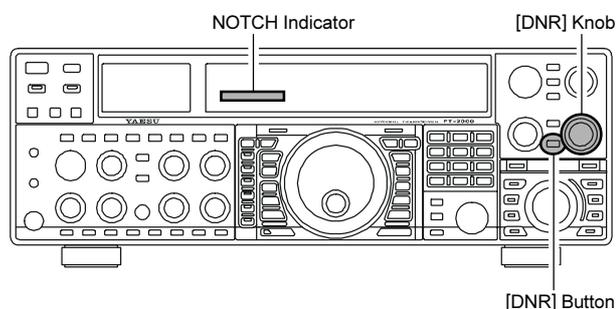
ADVICE:
The ATU circuit is located between the final amplifier and the rear-panel antenna jack; reception is not affected by the ATU.

QUICK POINT:
❒ As shipped from the factory, only one ATU alignment point is saved on each Amateur band. This was memorized during the final alignment and performance verification stages on the production line.
❒ The momentary flickering of the "TUNER" icon occurs whenever you cross over into a new 10 kHz ATU memory window.

NOTE:
Please check the operating frequency before beginning the tuning process, to be sure you are not interfering with others who may already be using the frequency.

TERMINOLOGY:
Antenna Tuner Memories: The microprocessor of the ATU makes a note of the positions of the tuning capacitors and the selected inductors, and stores the data for each 10 kHz window in which tuning has occurred. This eliminates the need to re-tune every time you return to a frequency on which you already have completed the tuning process.

ABOUT ATU OPERATION

Figure 1 depicts a situation where normal tuning via the ATU has been successfully completed, and the tuning data has been stored in the ATU memory. The antenna system as seen by the transmitter is shown.

In Figure 2, the operator has changed frequency, and the "HI-SWR" icon has become appeared. The operator presses and holds in the [**TUNE**] button for two seconds to begin impedance matching using the ATU.

If a high SWR conditions exists (above 3:1), corrective action must be taken in the antenna system to bring the impedance closer to 50 Ohms. Besides the fact that the ATU will refuse to memorize settings on frequencies where the SWR exceeds 3:1, the high SWR may indicate a mechanical failure in the feed system, and such failures can lead to the generation of spurious signals causing TVI, etc.
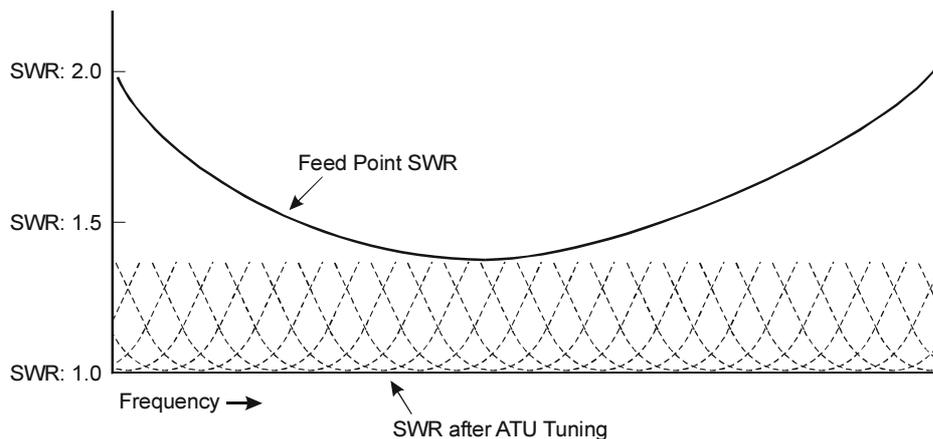
FIGURE 1
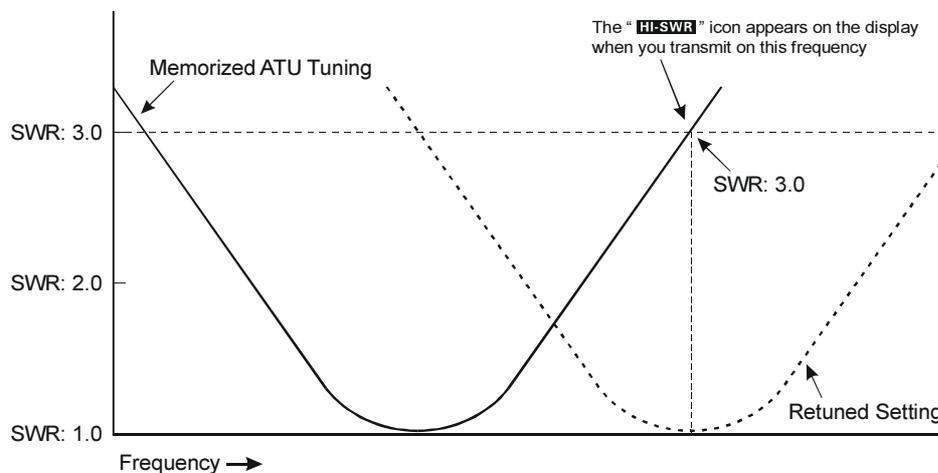
FIGURE 2

About ATU Memories

SWR (Post-tuning) Less than 1.5:1

The tuning settings are committed to the ATU memory.

SWR (Post-tuning) Greater than 1.5:1

Tuning data will not be retained in memory. If you return to the same frequency, the tuning process must be repeated.

SWR (Post-tuning) Greater than 3:1

The "HI-SWR" icon will light up, and tuning settings, if achieved, will not be memorized. Please investigate and resolve the high SWR condition before attempting further operation using this antenna.

USING THE AUTOMATIC ANTENNA TUNER

LITHIUM BATTERY REPLACEMENT

The memories for the ATU are backed up by a common Lithium backup battery (type CR2032 or equivalent). After two or more years of heavy use, you may notice that the tuner memories are not being maintained, and that you have to re-tune when returning to a frequency on which you had previously stored tuning data.

In this case, please replace the ATU Backup Battery using the following procedure:

1. Turn the **FT-2000D**'s [**POWER**] switch "off," then turn the **FP-2000**'s [**POWER**] switch "off."
2. Unplug the AC cable from the **AC** jack on the **FP-2000** rear panel, then disconnect the DC cable (having two connectors) from the **FT-2000D** rear panel.
3. Referring to Figure 1, remove the three screws from each side of the transceiver and three screws from the top edge of the rear panel. Slide the top case toward to the rear about 1/2 inch (1 cm), then remove the top case.
4. Turn the transceiver up side down.
5. Remove the seven screws affixing the bottom case, and then remove the bottom case (Figure 2).
6. Locate the Lithium battery on the left side of the Control Unit (Figure 3).
7. Turn the **BACKUP** switch "off."
8. Follow the guidelines in Figure 4, and remove the old battery, replacing it with a new one of the identical type.
9. Connect the DC cable (having two connectors) to the **FT-2000D** rear panel, then connect the AC cable to the **AC** jack on the **FP-2000** rear panel.
10. Turn the **FP-2000**'s [**POWER**] switch "on," then turn the **FT-2000D**'s [**POWER**] switch "on." Use extreme caution, as high voltages are present inside the transceiver!
11. Turn the **BACKUP** switch "on."
12. Turn the **FT-2000D**'s [**POWER**] switch "off," then turn the **FP-2000**'s [**POWER**] switch "off."
13. Unplug the AC cable from the **AC** jack on the **FP-2000** rear panel, then disconnect the DC cable (having two connectors) from the **FT-2000D** rear panel.
14. Replace bottom case and its seven screws removed in step 5, and then replace the top case and its nine screws removed in step 3.
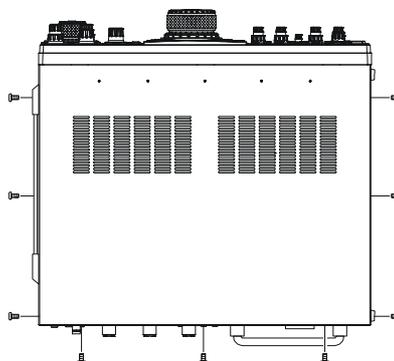15. The ATU Backup Battery replacement is now complete.
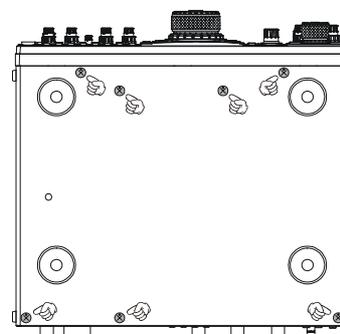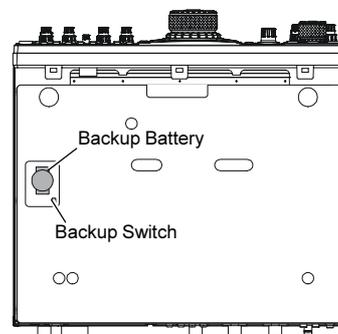
CAUTION:

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type.

QUICK POINT:

When the ATU Backup Battery is replaced, all tuner memories will be erased, and new sets of tuning data will have to be stored.

FIGURE 1

FIGURE 2

Backup Battery

Backup Switch

FIGURE 3

Removal of the Lithium Backup Battery
After pusing in the direction of the arrow, move your finger upward.

Installing the Lithium Backup Battery
Use your fingertip to push in the indicated direction

FIGURE 4

NOTES:

❒ Use care in the handling and storage of the Lithium battery. It is small, and presents a choking hazard to small children; therefore keep such batteries out of the reach of children at all times. Do not dispose of Lithium batteries in fire, and do not attempt to re-charge them under any circumstances.

❒ When opening/closing the case, take care with your screwdriver not to short out internal components, or touch them in a way that will cause them to short out against other components.

❒ The exhaustion of the ATU backup battery of the **FT-2000D** is a normal "wear and tear" situation, and the loss of the backup voltage is not a "defect" or other condition covered by the Limited Warranty on this product. Accordingly, if you do not feel capable of replacing the battery, and ask a service shop to do so on your behalf, a service fee may apply.

ADJUSTING THE SSB TRANSMITTED BANDWIDTH (SSB MODE)

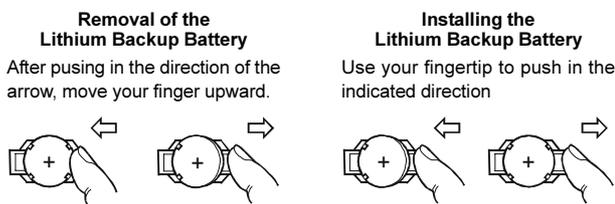For transmission on SSB, a default bandwidth of 2.4 kHz is provided. This bandwidth provides reasonable fidelity along with good talk power, and is typical of the bandwidth used for decades during SSB transmission. However, the bandwidth may be varied by the operator, so as to provide different levels of fidelity or talk power, according to your preferences.

Here's how to adjust the transmitted bandwidth on SSB:

1. Press the [**MENU**] button to engage the Menu.
2. Rotate the Main Tuning Dial knob so as to select Menu item "083 A3J TX BPF."
3. Rotate the [**SUB VFO-B**] knob to select the desired bandwidth. The available selections are 3000/50-3000/100-2900/200-2800/300-2700/400-2600, and the default is 300-2700 Hz. A wider bandwidth will provide greater fidelity, while a narrow bandwidth will compress the available transmitter power into less spectrum, resulting in more "talk power" for DX pile-ups.
4. Press and hold in the [**MENU**] button for two seconds to save the new setting and exit to normal operation.

[MENU] Button

Main Tuning Dial Knob   [SUB VFO-B] Knob

ADVICE:

❒ The Transmit Monitor is very helpful way of verifying the effects on fidelity of changing the bandwidth. Pressing the [**MONI**] button then adjusting the [**MONI**] knob for a comfortable listening level while you are transmitting, you will be able to hear the difference in sound quality as you make changes.

❒ When the optional **DMU-2000** Data Management Unit is connected, you may verify the effect of your adjustments of the transmitted bandwidth by observing the Audio Scope on the "Oscilloscope" page.
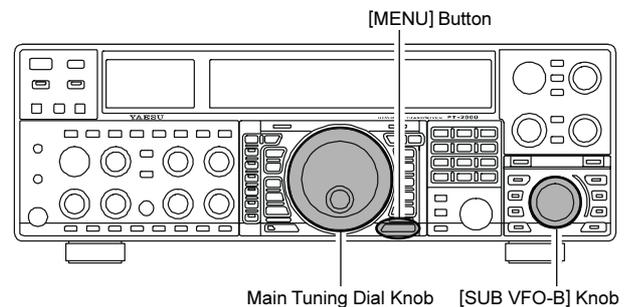
QUICK POINTS:

❒ The higher fidelity associated with wide bandwidth will be particularly enjoyable on the low bands, during local rag-chew QSOs.

❒ The "3000" setting is a special hi-fidelity setting, whereby the transmitted bandwidth is in excess of 3 kHz. This selection, in conjunction with judicious adjustment of the Parametric Microphone Equalizer (see next chapter) can provide truly outstanding fidelity and very natural-sounding audio.

❒ When using the wider bandwidth selections (especially "3000"), the apparent power output from the transmitter may seem lower. This is because the available power from the transmitter is being distributed over a wider bandwidth, and the power detection circuitry does not compensate for the effect of the bandwidth selection (it is calibrated in the default 2.4 kHz bandwidth).

ENHANCING TRANSMIT SIGNAL QUALITY

PARAMETRIC MICROPHONE EQUALIZER (SSB/AM MODES)

The **FT-2000D** includes a unique Three-Band Parametric Microphone Equalizer, that provides precise, independent control over the low-, mid-, and treble-ranges in your voice wave-form. You may utilize one group of settings for when the speech processor is off, and an independent group of settings for when the speech processor is on. The speech processor feature is described on next chapter.

QUICK POINT:

The Parametric Equalizer is a unique technique for adjusting the signal quality. Because the three ranges may be adjusted so precisely, it is possible to craft a response that provides a more natural and pleasant sound than you have ever experienced before. Effective "talk power" can also be significantly enhanced.

The aspects of configuration that you may adjust on the Parametric Equalizer are:

Center Frequency: The center frequency of each of the three bands may be adjusted.

Gain: The amount of enhancement (or suppression) within each band may be adjusted.

Q: The bandwidth over which the equalization is applied may be adjusted.

SETUP THE PARAMETRIC MICROPHONE EQUALIZER

1. Connect the microphone to the **MIC** jack.
2. Set the [**RF PWR**] knob to its minimum value, so as not to cause interference to other users during adjustment.
   ### ADVICE:
   ❏ We recommend you consider connecting a dummy load to one of the Antenna jacks, and monitor your signal on a separate receiver, so as to prevent interference to other users.
   ❏ You will have the best chance of hearing the effects of adjustments if you wear headphones (connected to the monitor receiver) while monitoring your transmitted signal.
3. If you adjust the Parametric Microphone Equalizer when the speech processor is disabled, press the [**PROC**] button until the "MIC EQ" icon will appear in the display. If you adjust the Parametric Microphone Equalizer when the speech processor is engaged, press the [**PROC**] button until the "MIC EQ" and "PROC" icons will appear in the display.
4. Press the [**MONI**] button, if you want to listen on the **FT-2000D**'s internal monitor.
5. Press the [**MENU**] button momentarily. The Menu list will appear in the display.
6. Rotate the Main Tuning Dial knob to find the "EQ" Menu area, containing Menu items "123" through "131;" these parameters apply to the adjustment of the Parametric Microphone Equalizer when the speech processor is disabled. Menu items "132" through "140" apply to the adjustment of the Parametric Microphone Equalizer when the speech processor is engaged.
7. Rotate the [**SUB VFO-B**] knob to perform adjustments to a particular Menu item.
8. Close the **PTT** switch, and speak into the microphone while listening to the effects of the changes you are making (in step 6). Because the overall effect on the sound will change with each adjustment you make, you should make several passes through each adjustment area, to be sure that you are achieving the optimum setting.

[MONI] Button   Main Tuning Dial Knob

[RF PWR] Knob   [MENU] Button
[SUB VFO-B] Knob
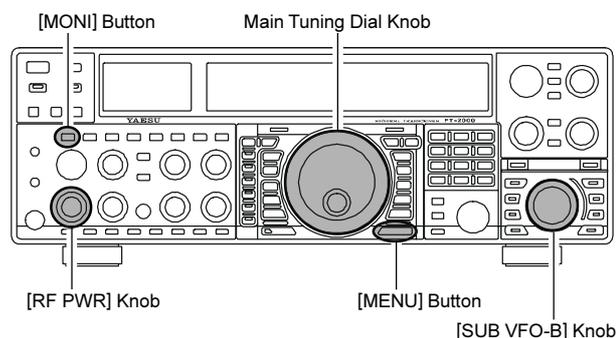
9. When you have completed all adjustments, press and hold in the [**MENU**] button for two seconds to save the new settings and exit to normal operation. If you only press the [**MENU**] button momentarily to exit, any changes you performed will not be stored.

ADVICE:

To roll off excessive bass response in a wide-range studio microphone, try putting a 10 dB null at 100 Hz with a bandwidth of "1" or "2," do about a 3 dB null centered on 800 Hz with a bandwidth of "3," and then put an 8 dB peak centered on 2100 Hz with a bandwidth of "1." These are starting recommendations; each microphone and user's voice will be different, often requiring different settings.

## PARAMETRIC MICROPHONE EQUALIZER (SSB/AM MODES)

ACTIVATES THE PARAMETRIC MICROPHONE EQUALIZER

1. Adjust the [**MIC**] (gain) knob for SSB use, as described on page 64.
2. Press the [**PROC**] button momentarily. The "MIC EQ" icon will appear in the display, confirming that the Parametric Microphone Equalizer is engaged.

   #### ADVICE
   When the "MIC EQ" icon blinks, the Parametric Microphone Equalizer setting is not performed.
3. Press the **PTT** switch on the microphone, and speak into the microphone in a normal voice level.
4. To switch the Parametric Microphone Equalizer off, press the [**PROC**] button several time to disappear the "MIC EQ" icon.

[PROC] Button

[MIC] Knob
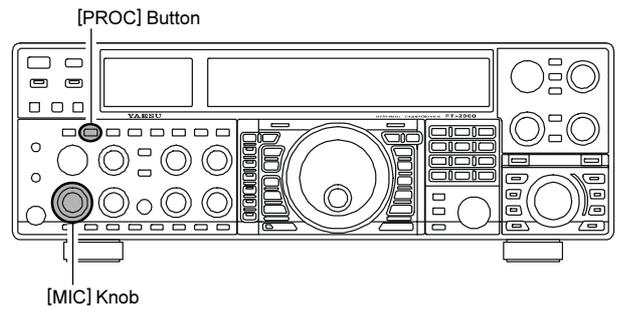
3-STAGE PARAMETRIC EQUALIZER ADJUSTMENTS (SPEECH PROCESSOR: "OFF")

Center Frequency	"123 tAUd EQ1-FREQ"	"100" (Hz) ~ "700" (Hz)
	"126 tAUd EQ2-FREQ"	"700" (Hz) ~ "1500" (Hz)
	"129 tAUd EQ3-FREQ"	"1500" (Hz) ~ "3200" (Hz)
Parametric Gain	"124 AUd EQ1-LVL"	(Low) "–10" (dB) ~ "+10" (dB)
	"127 tAUd EQ2-LVL"	(Mid) "–10" (dB) ~ "+10" (dB)
	"130 tAUd EQ3-LVL"	(High) "–10" (dB) ~ "+10" (dB)
Q (Bandwidth)	"125 tAUd EQ1-BW"	(Low) "1" ~ "10"
	"128 tAUd EQ2-BW"	(Mid) "1" ~ "10"
	"131 tAUd EQ3-BW"	(High) "1" ~ "10"

3-STAGE PARAMETRIC EQUALIZER ADJUSTMENTS (SPEECH PROCESSOR: "ON")

Center Frequency	"132 tAUd PE1-FREQ"	"100" (Hz) ~ "700" (Hz)
	"135 tAUd PE2-FREQ"	"700" (Hz) ~ "1500" (Hz)
	"138 tAUd PE3-FREQ"	"1500" (Hz) ~ "3200" (Hz)
Parametric Gain	"133 tAUd PE1-LVL"	(Low) "–10" (dB) ~ "+10" (dB)
	"136 tAUd PE2-LVL"	(Mid) "–10" (dB) ~ "+10" (dB)
	"139 tAUd PE3-LVL"	(High) "–10" (dB) ~ "+10" (dB)
Q (Bandwidth)	"134 tAUd PE1-BW"	(Low) "1" ~ "10"
	"137 tAUd PE2-BW"	(Mid) "1" ~ "10"
	"140 tAUd PE3-BW"	(High) "1" ~ "10"
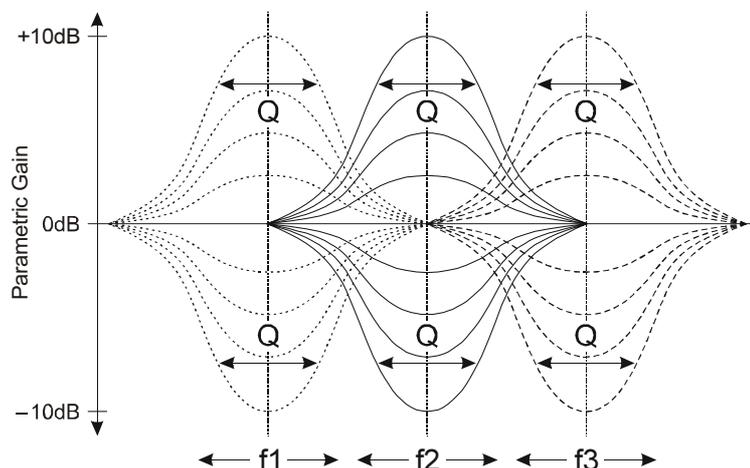
USING THE SPEECH PROCESSOR (SSB/AM MODES)

The **FT-2000D**'s Speech Processor is designed to increase "talk power" by increasing the average power output via a sophisticated compression technique, and also adjusting the signal quality to fit the Speech Processor. The result is improved intelligibility when conditions are difficult.

1. Adjust the [**MIC**] (gain) knob for SSB use, as described on page 64.
2. Rotate the [**METER**] switch fully to the left, so as to select "**COMP**" (Compression).
3. Press the [**PROC**] button until the "MIC EQ" and "PROC" icons will appear in the display; this is the Speech Processor is engaged.
4. Press the **PTT** switch on the microphone, and speak into the microphone in a normal voice level. Observe the deflection of the meter needle on the COMP meter scale.
5. Rotate the [**PROC**] knob so that the meter needle deflects to not more than "**10 dB**" on the COMP scale.
6. To switch the Speech Processor off, press the [**PROC**] button once more. The "MIC EQ" and "PROC" icons will turn off, confirming that the Speech processor is turned off.
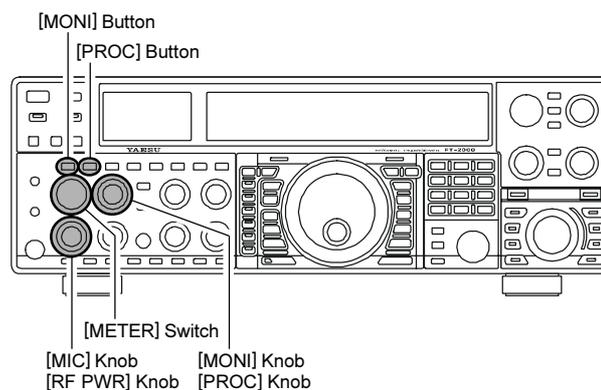
ADVICE:

❒ Excessive advancement of the [**PROC**] knob will result in a degradation of the transmitted signal's signal-to-noise ratio, thereby reducing intelligibility at the other end of the circuit.

❒ The Transmit Monitor is very helpful way of verifying proper adjustment of the compression level. Pressing the [**MONI**] button then adjusting the [**MONI**] knob for a comfortable listening level while you are transmitting, you will be able to hear the difference in sound quality as you make adjustments.

❒ The [**RF PWR**] knob still controls the RF power output, whether or not the Speech Processor is engaged.

❒ You may adjust the Parametric Microphone Equalizer when the speech processor is engaged, using Menu items "132" through "140." See page 70 for details.

❒ When the optional **DMU-2000** Data Management Unit is connected, you may observe the effect of your compression level adjustments by viewing the wave-form on the "Oscilloscope" page.

[MONI] Button
[PROC] Button

[METER] Switch
[MIC] Knob   [MONI] Knob
[RF PWR] Knob   [PROC] Knob

NOTE

LOW- DISTORTION CLASS-A OPERATION

Class-A operation of the **FT-2000D** transmitter is provided, yielding ultra-low distortion products during SSB operation. Power output during Class-A operation is 75 Watts.

To engage Class-A operation as following:

1. Press the [**MENU**] button; the Menu list will appear in the display.
2. Rotate the Main Tuning Dial knob to select Menu item "141 tGEn BIAS."
3. Rotate the [**SUB VFO-B**] knob to select the desired BIAS level "0 - 100" to set the transceiver for operation anywhere between Class-A and Class-AB (which has lower heat dissipation but higher distortion products).

   Clockwise rotation of the [**SUB VFO-B**] knob increases the BIAS, and menu setting "100" will place the transmitter in fully Class-A operation. Counterclockwise rotation of the [**SUB VFO-B**] knob will move the transmitter toward Class-AB operation, and menu setting "Ab" will place the transmitter in fully Class-AB operation.
4. Press and hold in the [**MENU**] button for two seconds to save the new setting and exit to normal operation.

To exit from the Class-A mode, repeat the above procedure, rotating the [**SUB VFO-B**] knob to select "Ab" in step 3 above.

[MENU] Button

Main Tuning Dial Knob   [SUB VFO-B] Knob
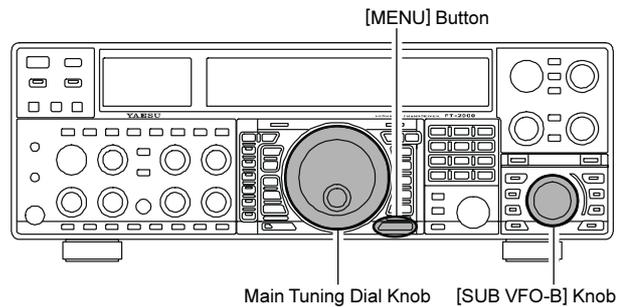
ADVICE

We recommend that menu item "141 tGEn BIAS" is programmed to [**C.S**] button for easy class-A operation.

Id: Drain Current
VDS: Drain Voltage
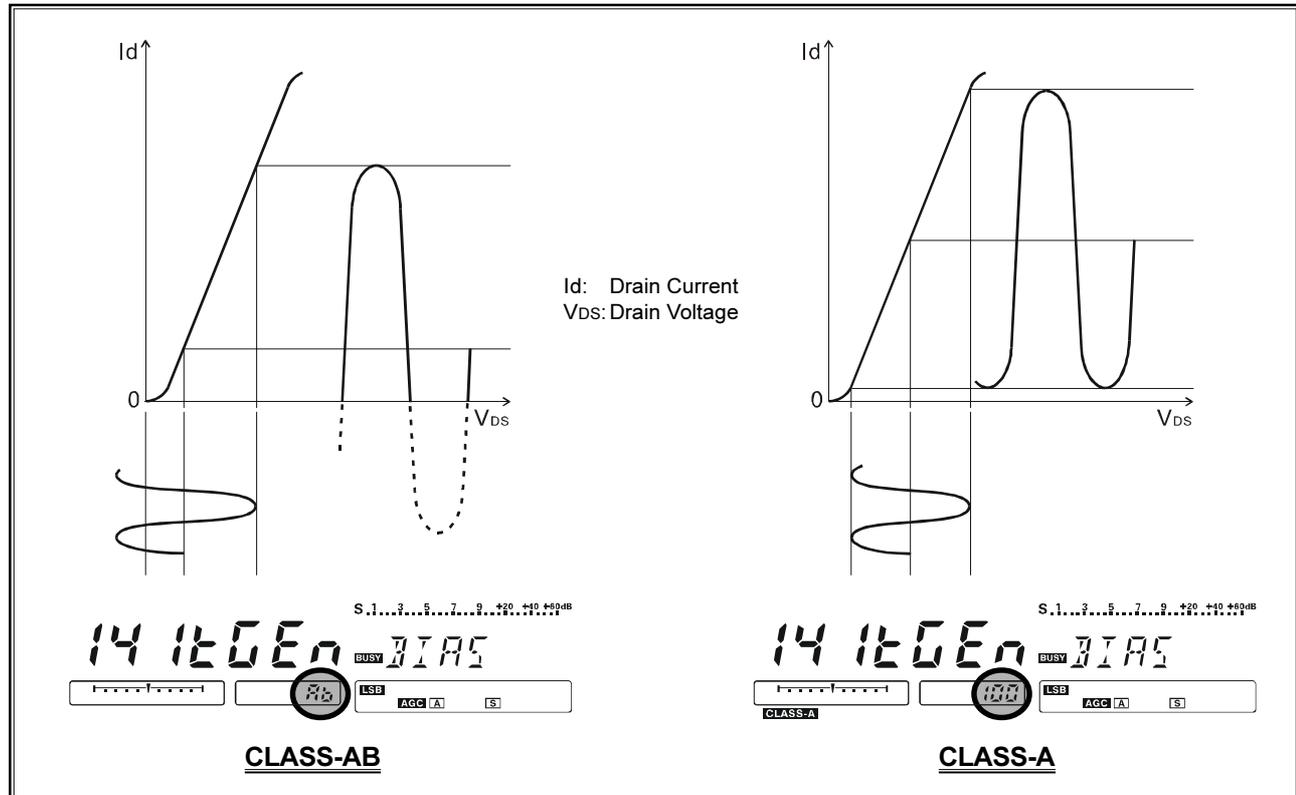
CLASS-AB   **CLASS-A**

ENHANCING TRANSMIT SIGNAL QUALITY

LOW- DISTORTION CLASS-A OPERATION

ADVICE

❒ During Class-A operation, ten Amps of Bias current will be flowing, regardless of the modulation level that leads to actual power output. Therefore, if the ambient temperature in your operation location is high, the transceiver temperature may rise as well, due to the high bias level (which must be dissipated as heat). Depending on the temperature, you may wish to reduce the BIAS level using menu item "141 tGEn BIAS," so as to reduce the amount of heat being generated.

❒ When the optional **DMU-2000** Data Management Unit is connected, you can monitor the heat sink temperature on the after-maket monitor, you can always be aware of a rise in temperature during Class-A operation. Normally, the temperature is below 80 °C; if it rises to near or above this value, however, we recommend you adjust the BIAS level toward Class-AB (decrease the numerical value) via menu item "141 tGEn BIAS," so as to reduce the heat being dissipated.

❒ An innovative aspect of the "Class-A" mode is that the actual power output is always limited to 75 Watts. So even though you might adjust the BIAS lebel in the direction of Class-AB operation, the power output will not rise; this eliminates the need, for example, to re-tune your linear amplifier, if used.

QUICK POINT

❒ Class-A operation provides a significant improvement in transmitter distortion suppression. During Class-A, the 3rd-order IMD products are typically suppressed 50 dB, while the 5th- and higher-order IMD products (that can cause "splatter" that interferes with others) will typically be suppressed 70 dB or more.

❒ If you are using a linear amplifier such as the **VL-1000**, the low distortion produced by the **FT-2000D**'s transmitter means that these intermodulation distortion products will not exist to be amplified by your linear.

Class-A 75W PEP IMD

Class-AB 200W PEP IMD
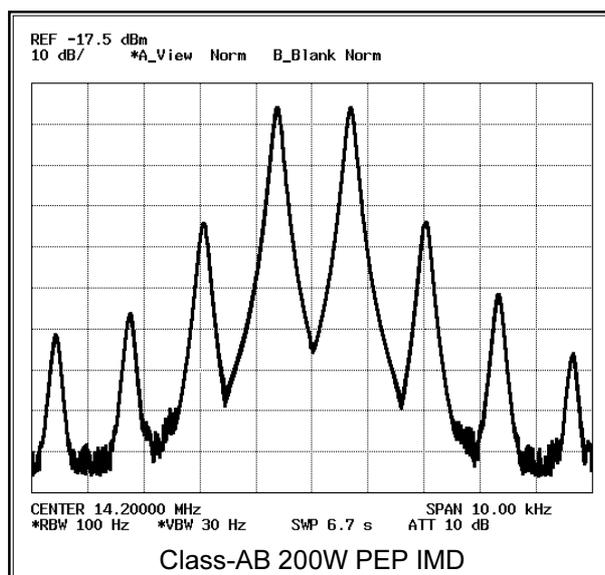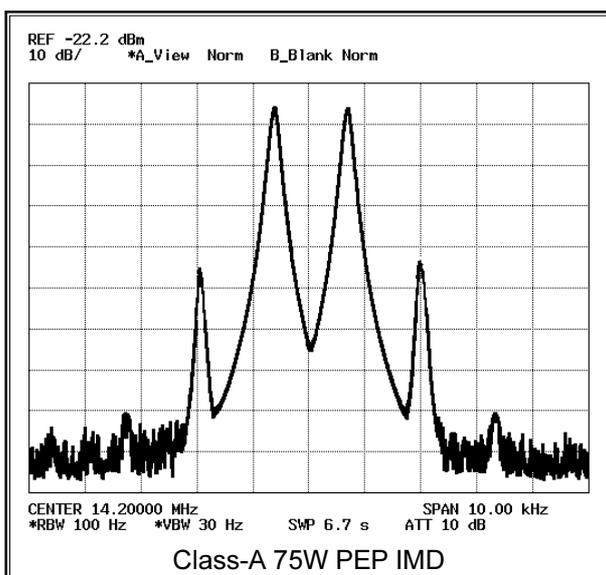
❒ **High-Power 200-Watt Final Amplifier Stage**
The final amplifier stage of the **FT-2000D** utilizes a pair of ST Micro Electronics Corp. SD2931 MOSFET devices operating at 50 Volts. The push-pull configuration provides low distortion along with high power output. The 120 mm thermostatically-controlled cooling fan directs forced air across the heat sink, should the heat sink temperature exceed the temperature that will trigger the thermostat.

TRANSMITTER CONVENIENCE FEATURES

VOICE MEMORY (SSB/AM/FM MODES)

You may utilize the Voice Memory capability of the **FT-2000D** for repetitive messages. The Voice Memory system includes four memories capable of storing up to 20 seconds of voice audio each. The maximum that any memory can hold is 20 seconds.

Recording Your Own Voice in Memory

1. Select the LSB, USB, AM, or FM mode using the front panel [**MODE**] buttons.
2. Press the [**F5**(**MEM**)] button. A blinking "█REC" icon will appear in the display.
3. Within five seconds of pressing the [**F5**(**MEM**)] button, press any of the buttons numbered [**F1**(**CH-1**)] through [**F4**(**CH-4**)] to select that memory storage register. If you do not press the **PTT** switch (see next step) within five seconds, the memory storage process will be cancelled.
4. Press the microphone's **PTT** switch momentarily, the "█REC" icon will glow steadily, and recording will begin.
5. Speak into the microphone in a normal voice level to record the message (such as "CQ DX, CQ DX, this is W 6 Delta X-Ray Charlie, W 6 Delta X-Ray Charlie, Over"). Remember that the time limit for recording any message is 20 seconds.
6. Press the [**F5**(**MEM**)] button to terminate the message storage process.

Checking Your Recording

1. Be sure that the front panel [**MOX**] button is "Off" (the LED imbedded in the switch is must be off).
2. Press the [**F1**(**CH-1**)] ~ [**F4**(**CH-4**)] button (whichever one you just recorded in), and you will hear the contents of the voice memory you just recorded.

ADVICE:

You may adjust the playback level of the recording via Menu item "015 dUS RX LVL."

Transmitting the Recorded Message

1. Select the LSB, USB, AM, or FM mode using the front panel [**MODE**] buttons.
2. Press the front panel's [**BK-IN**] button.
3. Press the [**F1**(**CH-1**)] ~ [**F4**(**CH-4**)] button, depending on which memory register's message you wish to transmit. If you hit the key again during playback, the message will be terminated.

ADVICE:

You may adjust the transmit (audio) level of the recording via Menu item "016 dUS TX LVL."

[MOX] Button [BK-IN] Button

[F5(MEM)] Button

[F1(CH-1)] ~ [F4(CH-4)] Button
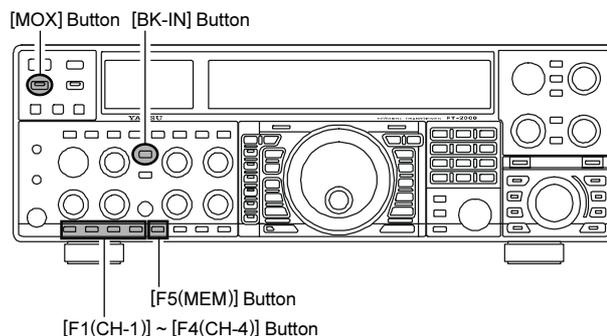
VOICE MEMORY (SSB/AM/FM MODES)

Voice Memory Operation from the optional FH-2 Remote Control Keypad

You may also utilize the Voice Memory capability of the **FT-2000D** from the optional **FH-2** Remote Control Keypad which plugs into the rear panel's **REM** jack.

When using the **FH-2** Remote Control Keypad, you may record five memories with up to 20 seconds of voice audio each.

Recording Your Own Voice in Memory

1. Select the LSB, USB, AM, or FM mode using the front panel [**MODE**] selector buttons.
2. Press the [**MEM**] key on the **FH-2**.
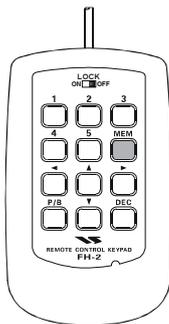
3. Press any of the **FH-2**'s keys numbered [**1**] through [**5**] to select that memory storage register. If you do not press the **PTT** key (see next step) within five seconds, the memory storage process will be cancelled.
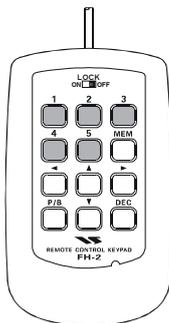
4. Press the microphone's **PTT** switch momentarily, the "▊REC▊" icon will glow steadily, and recording will begin.
5. Speak into the microphone in a normal voice level to record the message (such as "CQ DX, CQ DX, this is W 6 Delta X-Ray Charlie, W 6 Delta X-Ray Charlie, Over"). Remember that the time limit for recording any message is 20 seconds.
6. Press the **FH-2**'s [**MEM**] key to terminate the message storage process.

Checking Your Recording

1. Be sure that the front panel [**MOX**] button is "Off" (the LED imbedded in the button must be off).
2. Press the **FH-2**'s [**1**] ~ [**5**] key (whichever one you just recorded in), and you will hear the contents of the voice memory you just recorded.
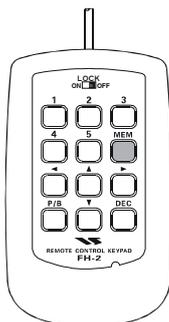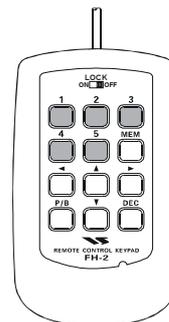

ADVICE:

You may adjust the playback level of the recording via Menu item "015 dUS RX LVL."

Transmitting the Recorded Message

1. Select the LSB, USB, AM, or FM mode using the front panel [**MODE**] selector buttons.
2. Press the front panel's [**BK-IN**] button.
3. Press the **FH-2**'s [**1**] ~ [**5**] key, depending on which memory register's message you wish to transmit. If you hit the key again during playback, the message will be terminated.
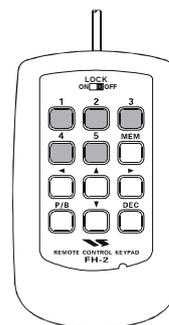
ADVICE:

You may adjust the transmit (audio) level of the recording via Menu item "016 dUS TX LVL."

TRANSMITTER CONVENIENCE FEATURES

VOX (AUTOMATIC TX/RX SWITCHING USING VOICE CONTROL: SSB/AM/FM MODES)

Instead of using the microphone's **PTT** switch or the front panel [**MOX**] switch to activate the transmitter, the VOX (Voice Operated TX/RX Control) system provides hands-free, automatic activation of the transmitter, based on voice input into the microphone. Setup of the VOX system takes only a few seconds.

1. To start, set the [**VOX**] and [**DELAY**] knobs fully counter-clockwise (to the left).
2. Press the [**VOX**] button to engage VOX operation.
3. Speak into the microphone in a normal voice level, and rotate the [**VOX**] knob clockwise (to the right) until the point where your voice input activates the transmitter.

    ADVICE:
    Do not advance the setting of the [**VOX**] knob too much, because to do so will make the transmitter respond to minor background noises in your station.

4. Now stop speaking, and note the amount of time it takes for the receiver to recover. If the hang time is too long or too short; rotate the [**DELAY**] knob, while speaking briefly into the microphone and then pausing, so as to set the desired hang time. Clockwise rotation of the [**DELAY**] control will increase the hang time.
5. To exit from VOX operation, press the [**VOX**] button once more. We recommend doing this if you are going to leave your station, to prevent inadvertent activation of the VOX system by a ringing nearby telephone, speaker audio from a TV, etc.

[VOX] Button

[VOX] Knob
[DELAY] Knob
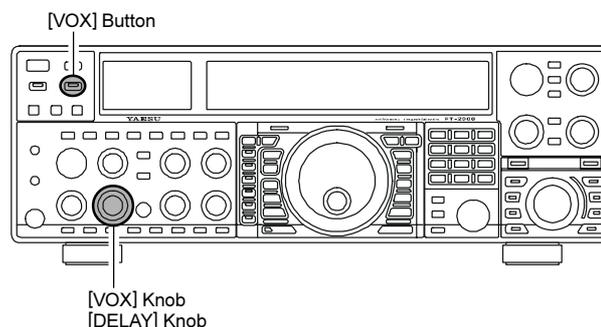
ADVICE:
❒ The Anti-Trip setting sets the negative feedback of receiver audio to the microphone, to prevent receiver audio from activating the transmitter (via the microphone) can be adjusts via Menu item "040 GEnE ANTIVOX."
❒ VOX operation may be engaged on either Voice modes (SSB/AM/FM) and on AFSK-based Data modes. Use Menu item "137 tGEn VOX SEL" (the selections are "niC (MIC)" and "dAtA (DATA)").

MONITOR (SSB/AM/FM MODES)

You may listen to the quality of your transmitted signal using the Monitor feature.

1. Press the [**MONI**] button. The "MONI" icon will appear in the display, indicating that the Monitor is turned on.
2. During transmission, rotate the [**MONI**] knob to adjust the audio level from the Monitor. Clockwise rotation of this knob will increase the volume level.
3. To switch the Monitor off again, press the [**MONI**] button once more. The "MONI" icon will turn off, confirming that the Monitor is now disengaged.

[MONI] Button

[MONI] Knob

ADVICE:
❒ If you are using the speaker for monitoring, instead of headphones, excessive advancement of the [**MONI**] knob can cause feedback to occur. Additionally, this feedback can cause the VOX system to hang up in a loop, making it impossible to return to receive. Therefore, we recommend the use of headphones, if at all possible, or the minimum usable setting of the [**MONI**] knob, if the speaker must be used.
❒ Because the Monitor feature utilizes a sampling of the transmitter's IF signal, it can be very useful for checking the adjustment of the Speech Processor or Parametric Equalizer on SSB, and for checking the general signal quality on AM and FM.
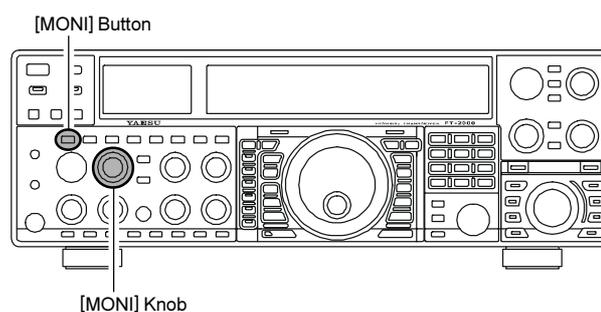
SPLIT OPERATION USING THE TX CLARIFIER (VFO-A OPERATION)

For split TX/RX operation in "casual" pile-ups, where the split is less than 10 kHz, the TX Clarifier (Offset Tuning) feature may be utilized.

1. Press the [**TX CLAR**] button. The "TX" icon will appear in the Multi-Display Window in the display.

   QUICK POINT:
   The Clarifier is frequently used for receiver offset tuning. However, for DX pile-ups where the DX station is using a split of less than 10 kHz, the TX Clarifier function is usually the quickest way to set the transmitter to the desired offset frequency.

2. Rotate the [**CLAR**] knob to set the desired transmitter offset. A maximum split of ±9.99 kHz may be set.

3. To exit from TX Clarifier operation, press the [**TX CLAR**] button once more. The "TX" icon will disappear from the Multi-Display Window.

ADVICE:

❐ To listen to the pile-up calling the DX station, so as to find the station currently being worked, you may press the [**RX CLAR**] button. Once you have zeroed in on the station calling the DX (use the SPOT function on CW for precise alignment of your frequency), you may then press the [**RX CLAR**] button again to cancel the RX Clarifier, and return to reception on the DX station's frequency.

❐ Just as with receiver Clarifier operation, the amount of offset from the original VFO frequency will appear in the small display window.

❐ As with receiver Clarifier operation, when you turn the TX Clarifier off the last-used offset is not lost, and will be available if you turn the TX Clarifier back on. To clear the Clarifier offset, press the [**CLEAR**] button.

[CLAR] Knob

[RX CLAR] Button
[TX CLAR] Button
[CLEAR] Button
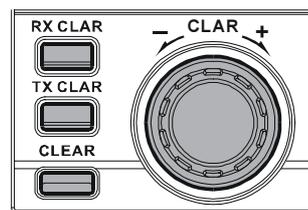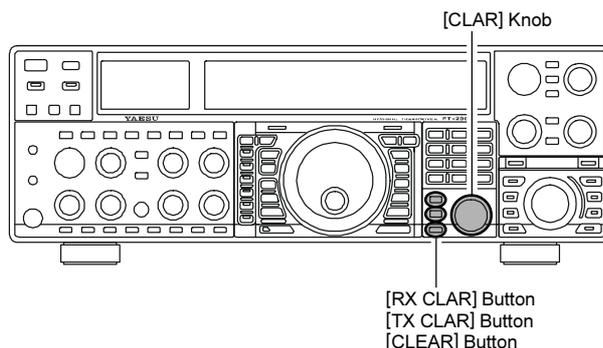
QUICK POINT:

When attempting to work a DX station on CW, in a split-frequency pile-up, remember that a large number of other stations may also be using Yaesu transceivers with capability similar to that of your **FT-2000D**. On the DX side of the pile-up, everyone calling precisely on the same CW frequency will sound like a single tone! So you may have more success if you use the RX Clarifier to find a hole in the pile-up, instead of trying to zero-beat the last station worked by the DX station.

Clarifier Offset Bar Indicator

A visual depiction of the relative offset of the Clarifier may be displayed, using the Bar Indicator.

1. Press the [**MENU**] button; the Menu list will appear in the display.
2. Rotate the Main Tuning Dial knob to select Menu item "010 diSP BAR SEL."
3. Rotate the [**SUB VFO-B**] knob to select "CLAr" from the available choices; the factory default is "C-tn."
4. Press and hold in the [**MENU**] button for two seconds to save the new setting and exit to normal operation.

[MENU] button

Main Tuning Dial knob   [SUB VFO-B] knob

(TX Frequency < RX Frequency)
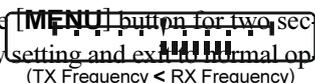
(TX Frequency = RX Frequency)
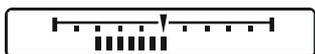
(TX Frequency > RX Frequency)
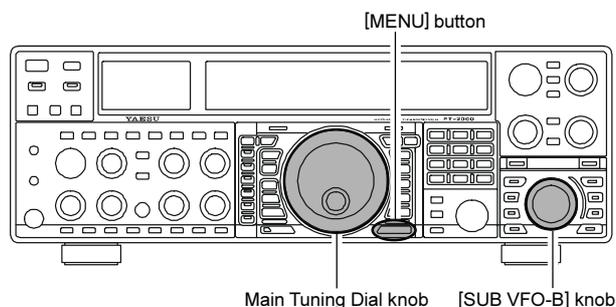
TRANSMITTER CONVENIENCE FEATURES

SPLIT-FREQUENCY OPERATION

A powerful capability of the **FT-2000D** is its flexibility in Split Frequency operation, using the Main (VFO-A) and Sub (VFO-B) frequency registers. This makes the **FT-2000D** especially useful for high-level DX-pedition use, as the Split operation capability is very advanced and easy to use.

1. Set the Main (VFO-A) frequency as desired.
2. Set the Sub (VFO-B) frequency.
3. Now press the [**SPLIT**] button. The front panel switch/LEDs will look like this:

    Main (VFO-A)

    [**RX**] switch "ON" (LED glows Green)

    [**TX**] switch "OFF" (LED Off)

    Sub (VFO-B)

    [**RX**] switch "OFF" (LED Off)

    [**TX**] switch "ON" (LED glows Red)
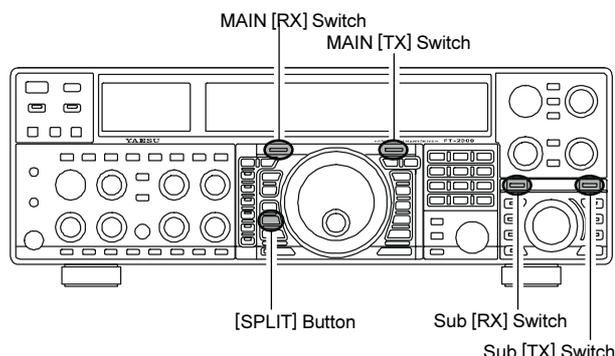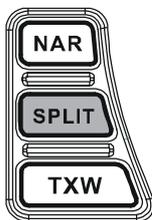
During Split operation, the Main (VFO-A) register will be used for reception, while the Sub (VFO-B) register will be used for transmission. If you press the [**SPLIT**] button once more, Split operation will be cancelled.

You may also press the Main [**TX**] switch located above and to the right of the Main Tuning Dial knob to return transmit frequency control to the Main (VFO-A) side, thereby cancelling Split operation.

ADVICE:

❏ During normal (non-split) VFO-A operation, you may simply press the Sub (VFO-B) [**TX**] switch (located above and to the right of the [**SUB VFO-B**] knob) to engage Split operation. The Sub [**TX**] indicator will glow Red when you press the switch.

❏ During Split operation, pressing the [**A⇌B**] button will reverse the contents of the Main and Sub VFOs. Press the [**A⇌B**] button once more to return to the original frequency alignment.

❏ During Split operation, if you press the [**RX**] switch above and to the right of the [**SUB VFO-B**] knob, you will engage Dual Receive operation, and now can listen to both sides of the DX pile-up, while transmitting on the Sub (VFO-B) frequency. This is very useful for maintaining the timing of your calls, while also monitoring both sides of the pile-up.

❏ During Split operation, you may also listen the TX frequency temporarily while pressing the [**TXW**] button (below and to the left of the Main Tuning Dial knob).

❏ It is possible to set different operating modes (for example, LSB and USB) on the two VFOs used during Split operation.

❏ During Split operation, it also is possible to set the Main and Sub VFOs to different Amateur bands. But remember that Dual Reception must be within the same band.

MAIN [RX] Switch
MAIN [TX] Switch
[SPLIT] Button
Sub [RX] Switch
Sub [TX] Switch

VFO Tracking Feature

In the default setting, the Main Band (VFO-A) frequency and Sub Band (VFO-B) frequency are changed individually using the Main Tuning Dial knob and the [**SUB VFO-B**] knob.

If you want to tune the Main Band (VFO-A) frequency and Sub Band (VFO-B) frequency together, the VFO Tracking feature is very useful.

Here is the procedure for activating the VFO Tracking feature:

1. Press the [**MENU**] button to engage the Menu mode.
2. Rotate the Main Tuning Dial knob to select Menu item "032 GEnE TRACK."
3. Rotate the [**SUB VFO-B**] knob to select the desired Tracking mode.

    OFF: Disables the VFO Tracking feature.

    bAND: When you change bands on the Main (VFO-A) side, the Sub (VFO-B) band's VFO will automatically change to be the same as that of VFO-A.

    FrEq: This function is the almost same as "bAND," however, furthermore, the Sub band's (VFO-B) frequency changes together with the Main Band's (VFO-A) frequency when turning the Main Dial Tuning knob.

4. Press and hold in the [**MENU**] button for two seconds to lock in the new configuration and exit to normal operation.

[MENU] Button
Main Tuning Dial Knob
[SUB VFO-B] Knob
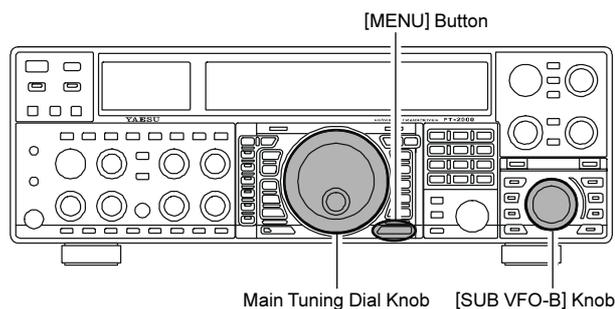
SPLIT-FREQUENCY OPERATION

Quick Split Operation

The Quick Split feature allows you to set a one-touch offset of +5 kHz to be applied to your radio's transmit frequency on the Sub (VFO-B), compared to the Main (VFO-A) frequency.

1. Start with regular transceiver operation on the Main (VFO-A) band.
    MAIN (VFO-A)
        [**RX**] switch "ON" (LED glows Green)
        [**TX**] switch "ON" (LED glows Red)
    SUB (VFO-B)
        [**RX**] switch "OFF" (LED Off)
        [**TX**] switch "OFF" (LED Off)

2. Press and hold in the [**SPLIT**] button for two seconds to engage the Quick Split feature, and apply a frequency 5 kHz above the Main (VFO-A) frequency to the Sub (VFO-B) frequency register. Press and hold in the [**SPLIT**] button for two seconds to increment the Main (VFO-A) frequency to +5 kHz.
    The VFO configuration will then be:
    MAIN (VFO-A)
        [**RX**] switch "ON" (LED glows Green)
        [**TX**] switch "OFF" (LED Off)
    SUB (VFO-B)
        [**RX**] switch "OFF" (LED Off)
        [**TX**] switch "ON" (LED glows Red)

QUICK POINTS:
❒ The operating mode applied to the Sub (VFO-B) register will be the same as that in use on the Main (VFO-A) register.
❒ The offset of the Sub (VFO-B) from the Main VFO (VFO-A) is programmed via the Menu, and is set to +5 kHz at the factory. Other offsets may be selected, however, using the following procedure:

1. Press the [**MENU**] button to enter the Menu mode.
2. Rotate the Main Tuning Dial knob to select Menu item "031 gene Q SPLIT."
3. Rotate the [**SUB VFO-B**] knob to select the desired offset.
    The available selections are −20kHz ~ +20kHz (factory default: +5 kHz).
4. When you have completed all adjustments, press and hold in the [**MENU**] button for two seconds to save the new setting and exit to normal operation. If you only press the [**MENU**] button momentarily to exit, any changes you performed will not be stored.

MAIN [RX] Switch
MAIN [TX] Switch

[SPLIT] Button   Sub [RX] Switch
Sub [TX] Switch

[MENU] Button

Main Tuning Dial Knob   [SUB VFO-B] Knob
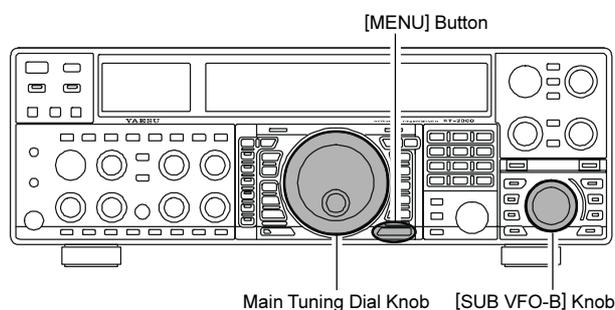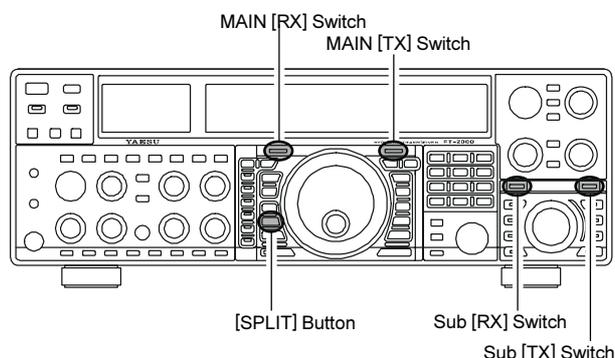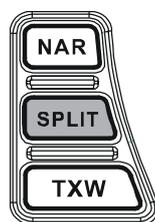
CW MODE OPERATION

The powerful CW operating capabilities of the **FT-2000D** include operation using both an electronic keyer paddle and a "straight key" or emulation thereof, as is provided by a computer-based keying device.

SETUP FOR STRAIGHT KEY (AND STRAIGHT KEY EMULATION) OPERATION

Before starting, connect your key line(s) to the front and/or rear panel **KEY** jack(s), and be sure the [**KEYER**] button on the front panel is turned off for now.

1. Press the [**CW**] mode button to engage CW operation.

   ADVICE:
   ❏ The operating mode is selected using the [**MODE**] buttons to the left of the Main Tuning Dial knob, and the VFO (A or B) to which the selection is applied is selected by the [**A**] or [**B**] button above the [**MODE**] buttons. Usually, the [**A**] button glow Red, signifying Main band (VFO-A) is being adjusted. Similarly, pressing the [**B**] button will cause its indicator to blink Orange for five seconds, signifying Sub band (VFO-B) adjustment. Therefore, press the [**A**] or [**B**] button to select the desired VFO, then press the [**CW**] button to select the CW mode.
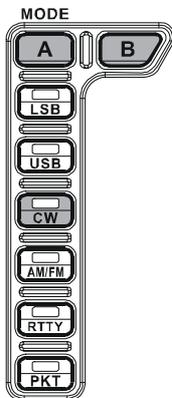   ❏ If you press the [**CW**] button once more, after initially selecting CW, you will engage the "CW Reverse" mode (see page 86), whereby the "opposite" sideband injection is used, compared to the "normal" sideband. The CW LED will blink for three seconds if you select CW Reverse.

2. Rotate the Main Tuning Dial knob to select the desired operating frequency.

3. Press the [**BK-IN**] button to engage automatic activation of the transmitter when you close the CW key. The "▓BK-IN▓" icon will appear in the display.

   ADVICE:
   ❏ When you close your CW key, the transmitter will automatically be activated, and the CW carrier will be transmitted. When you release the key, transmission will cease after a brief delay; the delay time is user-programmable, per the discussion on page 83.
   ❏ As shipped from the factory, the **FT-2000D** TX/RX system for CW is configured for "Semi-break-in" operation. However, using Menu item "058 A1A BK-IN," you may change this setup for full break-in (QSK) operation, whereby the switching is quick enough to hear incoming signals in the spaces between the dots and dashes of your transmission. This may prove very useful during contest and traffic-handling operations.

4. Operation using your CW key may now proceed.
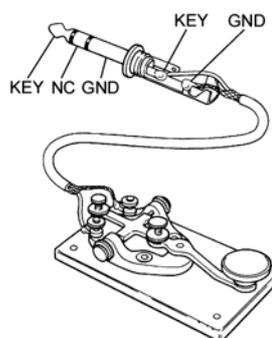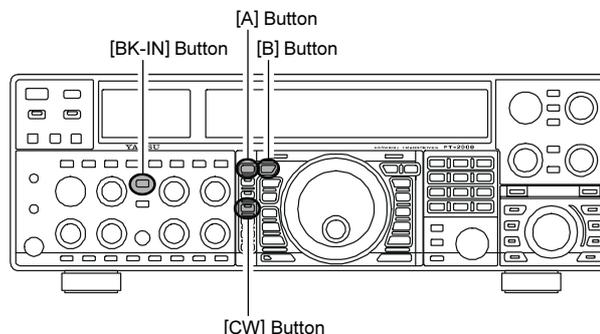
ADVICE:
❏ You can monitor your sending by pressing the [**MONI**] button, and adjusting the [**MONI**] knob for a comfortable listening level on the CW sidetone.
❏ If you set the [**VOX**] and [**BK-IN**] buttons to Off, you may practice your sending without having the signal go out over the air (sidetone only).
❏ If you reduce power using the [**RF PWR**] knob, the ALC meter reading will increase; this is normal and does not indicate any problem whatsoever (because increased ALC voltage is being used to lower the power).

TERMINOLOGY:

Semi-break-in
This is a pseudo- "VOX" mode used on CW, whereby the closure of the CW key will engage the transmitter, and release of the key will allow the receiver to recover after a short delay. No signals will be heard between the spaces between dots and dashes (unless the sending speed is extremely slow).

Full break-in
Full break-in (Also known as "Full QSK") involves very fast switching between transmit and receive, such that incoming signals may be heard between the dots and dashes as you send them. This allows you to hear a station that suddenly starts transmitting on your frequency, while you are in the midst of a transmission.

USING THE BUILT-IN ELECTRONIC KEYER

Connect the cable from your keyer paddle to the front or rear panel **KEY** jack.

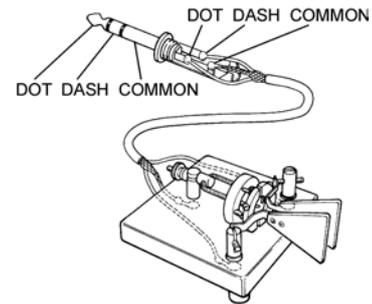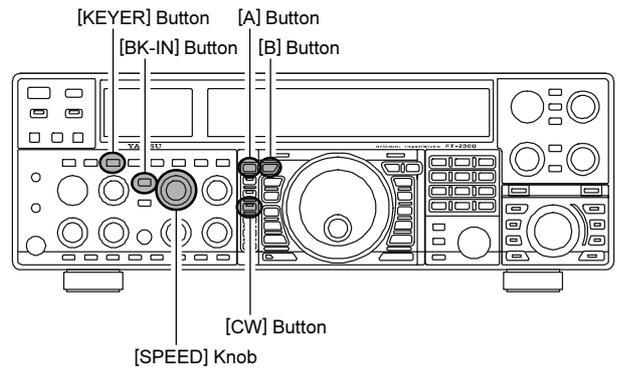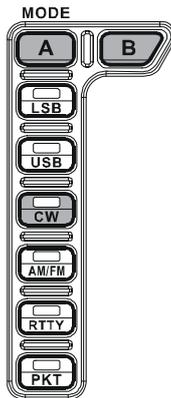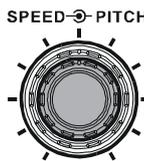1. Press the [**CW**] mode button to engage CW operation.
   ADVICE:
   ❒ The operating mode is selected using the [**MODE**] buttons to the left of the Main Tuning Dial knob, and the VFO (A or B) to which the selection is applied is selected by the [**A**] or [**B**] button above the [**MODE**] buttons. Usually, the [**A**] button glow Red, signifying Main band (VFO-A) is being adjusted. Similarly, pressing the [**B**] button will cause its indicator to blinks Orange for five second, signifying Sub band (VFO-B) adjustment. Therefore, press the [**A**] or [**B**] button to select the desired VFO, then press the [**CW**] button to select the CW mode.
   ❒ If you press the [**CW**] button once more, after initially selecting CW, you will engage the "CW Reverse" mode (see page 86), whereby the "opposite" sideband injection is used, compared to the "normal" sideband. The CW LED will blink for three seconds if you select CW Reverse.
2. Rotate the Main Tuning Dial knob to select the desired operating frequency.
3. Press the [**KEYER**] button. The "KEYER" icon will appear in the display, confirming that the built-in Electronic Keyer is now active.
4. Rotate the [**SPEED**] knob to set the desired sending speed (4 ~ 60 WPM). Clockwise rotation of the [**SPEED**] knob will increase the keying speed.
   ADVICE:
   ❒ You may confirm the keying speed when turning the [**SPEED**] knob while pressing the [**KEYER**] button. The Sub (VFO-B) frequency display shows the keying speed.
   ❒ When you press either the "Dot" or "Dash" side of your paddle, the transmitter will automatically be activated.
5. If you press the [**BK-IN**] button, "semi-break-in" operation (discussed previously) will be engaged.
6. CW operation utilizing your paddle may now commence.
   ADVICE:
   When you utilize your keyer paddle, the transmitter will automatically be activated, and the CW characters (or a strong of dots and dashes) will be transmitted. When you release the keyer paddle contacts, transmission will cease after a brief delay; the delay time is user-programmable, per the discussion on page 83.

ADVICE:
If you reduce power using the [**RF PWR**] knob, the ALC meter reading will increase; this is normal and does not indicate any problem whatsoever (because increased ALC voltage is being used to lower the power).

Full Break-in (QSK) Operation

As shipped from the factory, the **FT-2000D** TX/RX system for CW is configured for "Semi-break-in" operation. However, using Menu item "058 A1A BK-IN," you may change this setup for full break-in (QSK) operation, whereby the switching is quick enough to hear incoming signals in the spaces between the dots and dashes of your transmission.

1. Press the [**MENU**] button to enter the Menu mode.
2. Rotate the Main Tuning Dial knob to select Menu item "058 A1A BK-IN."
3. Rotate the [**SUB VFO-B**] knob to set this Menu item to "FuLL."
4. Press and hold in the [**MENU**] button for two seconds to save the new setting and exit.

CW MODE OPERATION

USING THE BUILT-IN ELECTRONIC KEYER

A number of interesting and useful features are available during Electronic Keyer operation.

Setting the Keyer Weight (Dot/Space:Dash) Ratio

The Menu may be used to adjust the Weight for the built-in Electronic Keyer. The default weighting is 3:1 (a dash is three times longer than a dot or space).

1. Press the [**MENU**] button to enter the Menu mode.
2. Rotate the Main Tuning Dial knob to select Menu item "060 A1A WEIGHT."
3. Rotate the [**SUB VFO-B**] knob to set the weight to the desired value. The available adjustment range is for a Dot/Space:Dash ratio of "2.5" ~ "4.5" (default value: "3.0").
4. When you are finished, press and hold in the [**MENU**] button for two seconds to save the new setting and exit to normal operation.

[MENU] Button

Main Tuning Dial Knob   [SUB VFO-B] Knob
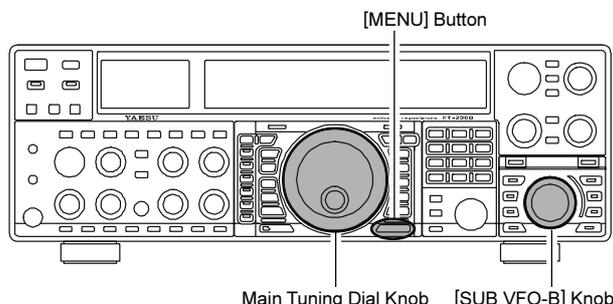
Selecting the Keyer Operating Mode

The configuration of the Electronic Keyer may be customized independently for the front and rear **KEY** jacks of the **FT-2000**. This permits utilization of Automatic Character Spacing (ACS), if desired, as well as the use of the electronic keyer via the front jack and a straight key or computer-driven keying line via the rear panel.

1. Press the [**MENU**] button to enter the Menu mode.
2. Rotate the Main Tuning Dial knob to select Menu item "052 A1A F-TYPE" (for the front **KEY** jack) or "054 A1A R-TYPE" (for the rear-panel's **KEY** jack).
3. Rotate the [**SUB VFO-B**] knob to set the keyer to the desired mode. The available selections are:
   OFF: The built-in Electronic Keyer is turned off ("straight key" mode).
   buG: Dots will be generated automatically by the keyer, but dashes must be sent manually.
   ELE: Both dots and dashes will be generated automatically when you use your paddle.
   ACS: Same as "ELE" except that the spacing between characters is precisely set by the keyer to be the same length as a dash (three dots in length)
4. When you are finished, press and hold in the [**MENU**] button for two seconds to save the new setting and exit to normal operation.

[MENU] Button

Main Tuning Dial Knob   [SUB VFO-B] Knob

ACS "OFF"   Morse "E" & "T"

Inter-character spacing to short

ACS "ON"   Morse "E" & "T"
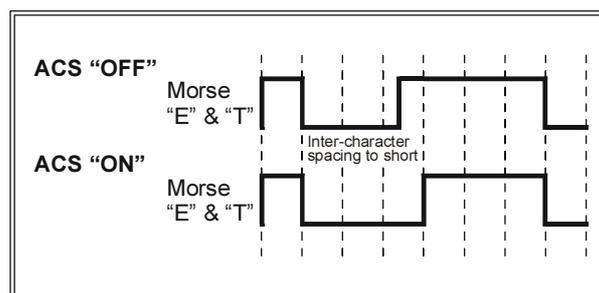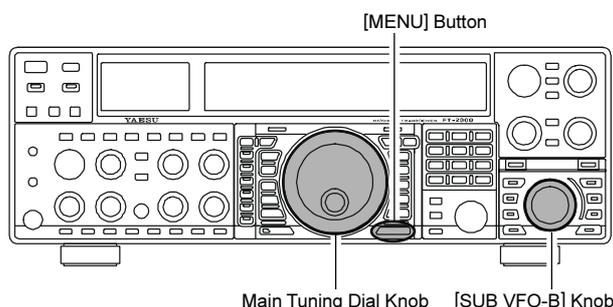
CW SPOTTING (ZERO-BEATING)

"Spotting" (zeroing in on another CW station) is a handy technique for ensuring that you and the other station are precisely on the same frequency.

For everyday operation, the (CW) [**PITCH**] knob allows you to set the center of the receiver passband, as well as the offset pitch of your CW carrier signal, to the tone pitch you prefer to listen to.

The Tuning Offset Indicator in the display may also be moved so you can adjust your receiver frequency to center the incoming station on the pitch corresponding to that of your transmitted signal.

Using the SPOT System

While pressing the front panel's [**SPOT**] button, the Spot tone will be heard and the Sub (VFO-B) frequency display will show the Spot tone frequency. This tone corresponds to the pitch of your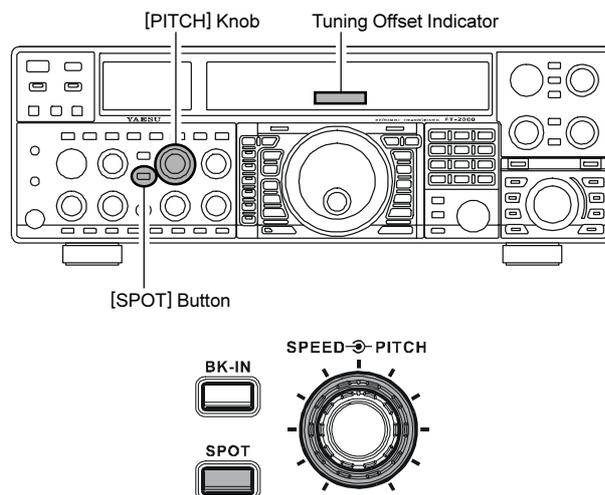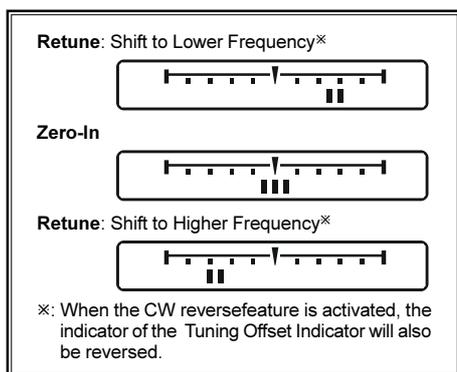 transmitted signal, and if you adjust the receiver frequency to match the pitch of the received CW signal to that of the Spot tone, your transmitted signal will be precisely matched to that of the other station.

Release the [**SPOT**] button to turn the Spot tone off.

ADVICE:

❐ In a tough DX pile-up, you may actually want to use the SPOT system to find a "gap" in the spread of calling stations, instead of zeroing in precisely on the last station being worked by the DX station. From the DX side, if a dozen or more operators (also using Yaesu's SPOT system) all call precisely on the same frequency, their dots and dashes merge into a single, long tone that the DX station cannot decipher. In such situations, calling slightly higher or lower may get your call through.

❐ The Tuning Offset Indicator in the display may be utilized for CW frequency adjustment, as well. Its configuration is set via Menu item "010 diSP BAR SEL" at the factory, and the Tuning Offset Indicator is already set to the "CW TUNE" selection.

[PITCH] Knob   Tuning Offset Indicator

[SPOT] Button

BK-IN

SPEED ◉ PITCH

SPOT

Retune: Shift to Lower Frequency※

Zero-In

Retune: Shift to Higher Frequency※

※: When the CW reversefeature is activated, the indicator of the Tuning Offset Indicator will also be reversed.

QUICK POINTS:

❐ The CW Spotting process utilizes the Spot tone or the Tuning Offset Indicator, with the actual offset pitch being set by the [**PITCH**] knob on the front panel. The offset pitch may be set to any frequency between 300 Hz and 1050 Hz, in 50 Hz steps, and you can either match tones audibly (using the [**SPOT**] button) or align the receiver frequency so that the central red LED on the Tuning Offset Indicator lights up. Note that there are 21 "dots" on the Tuning Offset Indicator, and depending on the resolution selected, the incoming CW signal may fall outside the visible range of the bar indicator, if you are not reasonably close to the proper alignment of tones.

❐ The displayed frequency, on CW, normally reflects the "zero beat" frequency of your offset carrier. That is, if you were to listen on USB on 14.100.00 MHz to a signal with a 700 Hz offset, the "zero beat" frequency of that CW carrier would be 14.000.70 MHz; the latter frequency is what the **FT-2000D** displays, by default. However, you can change the display to be identical to what you would see on SSB by using Menu item "061 A1A FRQDISP" and setting it to "dlr" instead of its default "OFSt" setting.

CW Convenience Features

Using CW Reverse

If you experience a difficult interference situation, where an interfering station cannot readily be eliminated, you may wish to try receiving using the opposite sideband. This may throw the interfering station's frequency in a direction that may lend itself more readily to rejection.

1. To start, let's use a typical example where you have set the CW mode (using the default "USB" injection) onto the Main (VFO-A) receiver.

2. Now be sure your mode selection is still set for the Main (VFO-A) register, and press the [**CW**] mode button once more. The "LSB" LED will blink for three seconds, indicating that the "LSB" injection side has now been selected.

3. When using Dual Receive, press the [**B**] button, then (within five seconds of pressing the [**B**] button) press the [**CW**] button to engage CW Reverse on the Sub (VFO-B) receiver, in exactly the same way as for the Main (VFO-A) receiver.

4. Press the [**CW**] mode button once more to return to the normal (USB) injection side and cancel CW Reverse operation (the "USB" LED will blink for three seconds).

MODE

[B] Button

[CW] Button
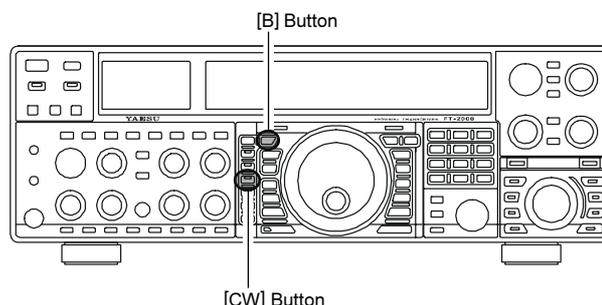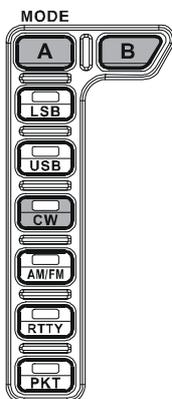
NOTES:

❒ When CW Reverse is engaged, the Tuning Offset Indicator action will concurrently be reversed as to its indication.

❒ When the incoming signal pitch tone is properly aligned, the central red marker lights up whether or not CW Reverse is engaged.

Retune: Shift to Lower Frequency

Zero-In

Retune: Shift to Higher Frequency
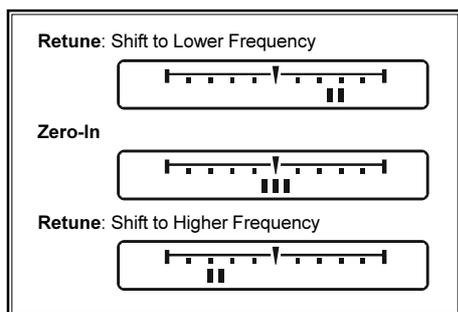
In the illustration, Figure A demonstrates the normal CW injection setup, using the USB side. In Figure B, CW Reverse has been engaged, so as to receive using LSB-side injection to eliminate interference.

The beneficial effect of switching sidebands can clearly be seen in this example.

A Normal CW (USB)   Carrier   Signal   QRM   RX Passband

B CW Reverse (LSB)   Carrier   Signal   QRM   RX Passband
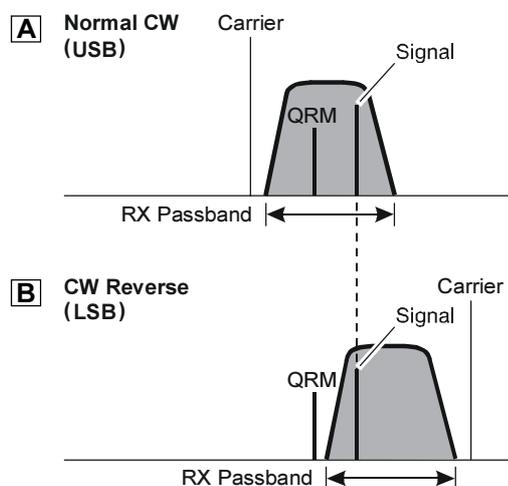
CW DELAY TIME SETTING

During semi-break-in (not QSK) operation, the hang time of the transmitter, after you have finished sending, may be adjusted to a comfortable value consistent with your sending speed. This is the functional equivalent to the "VOX Delay" adjustment used on voice modes, and the delay may be varied anywhere between 20 milli-seconds ([**DELAY**] knob set fully counter-clockwise) and 5 seconds (fully clockwise).

1. Press the [**BK-IN**] button to enable CW transmission (Menu item "058 A1A BK-IN" must be set to "SEni").
2. Start sending, and adjust the [**DELAY**] knob so that the hang time is as you prefer for comfortable operation.

[BK-IN] Button

[DELAY] Knob
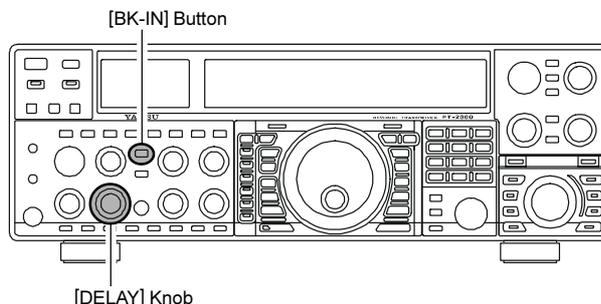
CW PITCH ADJUSTMENT

Rotation of the front panel's [**PITCH**] knob will allow adjustment of the center frequency of the receiver passband, as well as the pitch of your offset CW carrier, to the tone you prefer. The tone may be varied between 300 Hz and 1050 Hz, in 50 Hz steps.

ADVICE:

You may confirm the Spot tone frequency when turning the [**PITCH**] knob while pressing the [**SPOT**] button. Sub (VFO-B) frequency display will shows the Spot tone frequency.

TERMINOLOGY:

CW Pitch: If you tuned to an exact "zero beat" on an incoming CW signal, you could not copy it ("Zero beat" implies a 0 Hz tone). Therefore, the receiver is offset several hundreds of Hz (typically), so as to allow your ear to detect the tone. The BFO offset associated with this tuning (that produces the comfortable audio tone) is called the CW Pitch.

[PITCH] Knob   Sub (VFO-B) frequency display

[SPOT] Button

SPEED - PITCH
BK-IN
SPOT
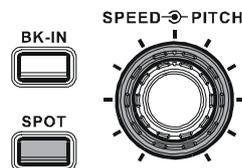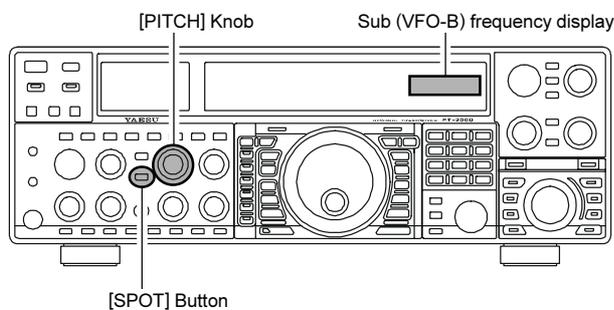
CW Convenience Features

Contest Memory Keyer

The **FT-2000D** in capable of the automatic sending of CW messages (as you might do in a contest). Two techniques for message storage are available: you may either send the desired message contents using your keyer paddle ("*Message Memory*"), or you may input the text characters using the Main Dial Tuning knob and [**SUB VFO-B**] knobs ("*Text Memory*").

Message Memory

Five memory channels capable of retaining 50 characters total are provided (using the PARIS standard for characters and word length).

Example: CQ CQ CQ DE W6DXC K (19 characters)

▬·▬· ▬▬·▬ ▬·▬· ▬▬·▬ ▬·▬· ▬▬·▬ ▬·· · ·▬▬ ▬···· ▬·· ▬·▬· ▬·▬· ▬·▬

(C)   (Q)   (C)   (Q)   (C)   (Q)   (D) (E) (W)   (6)   (D)   (X)   (C)   (K)

Storing a Message into Memory

1. Press the [**MENU**] button to enter the Menu mode.
2. Rotate the Main Tuning Dial knob to select the CW Memory Register into which you wish to store the message; for now, we are just selecting the message entry technique (Keyer entry).
   020 tEy CW MEM1
   021 tEy CW MEM2
   022 tEy CW MEM3
   023 tEy CW MEM4
   024 tEy CW MEM5
3. Rotate the [**SUB VFO-B**] knob to set the selected Memory Register to "tyP2." If you want to use your keyer paddle for message entry on all memories, set all five Menu items (#020 ~ 024) to "tyP2."
4. Press and hold in the [**MENU**] button for two seconds to save the new settings and exit.

Message Memory Programming (Using your Paddle)

1. Set the operating mode to CW.
2. Set the [**BK-IN**] button to Off.
3. Turn the internal Electronic Keyer On by pressing the [**KEYER**] button, if necessary.
4. Press the [**F5**(**MEM**)] button on the front panel.
5. Press the [**F1**(**CH1**)] ~ [**F4**(**CH-4**)] button to begin the memory storage process.
6. Send the desired message using your keyer paddle.
7. Press the [**F5**(**MEM**)] button once more at the end of your message. Up to 50 characters may be stored among the five memories.
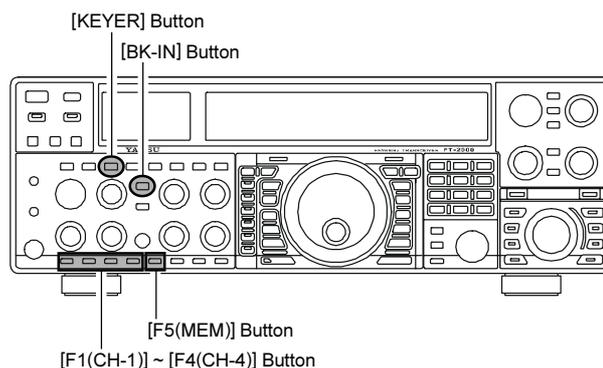
Note:

You must exercise care in sending to ensure that the spaces between letters and words are accurately done; if your timing is off, the spacing may not come out right in the stored message.

For ease in setting up the keyer memories, we recommend you set Menu item "051 A1A F-TYPE" and/or "053 A1A R-TYPE" to "ACS" (Automatic Character Spacing) while you are programming the keyer memories.

[MENU] Button

Main Tuning Dial Knob   [SUB VFO-B] Knob

[KEYER] Button
[BK-IN] Button

[F5(MEM)] Button
[F1(CH-1)] ~ [F4(CH-4)] Button

Terminology:

PARIS Word Length: By convention in the Amateur industry (utilized by ARRL and others), the length of one "word" of CW is defined as the length of the Morse Code characters spelling the word "PARIS." This character (dot/dash/space) length is used for the rigorous definition of code speed in "words per minute."

Contest Memory Keyer

Checking the CW Memory Contents

1. Be sure that Break-in is still turned Off by the [**BK-IN**] button.
2. Press the [**MONI**] button to enable the CW monitor.
3. Press the [**F1**(**CH1**)] ~ [**F4**(**CH-4**)] button to check your work. You will hear the results in the sidetone, but no RF energy will be transmitted.

Note:
Adjust the monitor level using the [**MONI**] knob.

On-The-Air CW Message Playback

1. Press the [**BK-IN**] button to enable transmission. Either Full- or Semi-break-in will be engaged, depending on the setting of Menu item "058 A1A BK-IN."
2. Press the [**F1**(**CH1**)] ~ [**F4**(**CH-4**)] button to transmit the programmed message.

Note:
If you subsequently decide to use the "Text Memory" technique for memory storage, please note that the contents of a message stored using keyer paddle input will not be transferred over when you select "Text Memory technique" on a particular memory register (the Menu Mode Setting is set to "typ1").

[BK-IN] Button

[F1(CH-1)] ~ [F4(CH-4)] Button

[BK-IN] Button

[F1(CH-1)] ~ [F4(CH-4)] Button

Transmitting in the Beacon Mode

It is possible to transmit, repetitively in a "Beacon" mode, any message programmed either via paddle input or via the "Text" input method. The time delay between message repeats may be set anywhere between 0 and 255 seconds via Menu item "017 tEy BEACON." If you do not wish the message to repeat in a "Beacon" mode, please set this Menu item to "off." Press the [**F1**(**CH1**)] ~ [**F4**(**CH-4**)] button, depending on the register into which the Beacon message is stored. Repetitive transmission of the Beacon message will begin. Press one of these keys once more to halt the Beacon transmissions.

Contest Memory Keyer

TEXT Memory

The four channels of CW message memory (up to 50 characters total) may also be programmed using a text-entry technique. This technique is somewhat slower than when you send the message directly from your keyer paddle, but accuracy of character spacing is ensured.

Example 1: CQ CQ CQ DE W6DXC K} (20 characters)

And we will utilize another powerful feature of the CW Memory Keyer, the sequential Contest Number ("Countup") feature.

Example 2: 599 10 200 # K} (15 characters)

Storing a Message into Memory

1. Press the [**MENU**] button to enter the Menu mode.
2. Rotate the Main Tuning Dial knob to select the CW Memory Register into which you wish to store the message; for now, we are just selecting the message entry technique (Keyer entry).

   020 tEy CW MEM1
   021 tEy CW MEM2
   022 tEy CW MEM3
   023 tEy CW MEM4
   024 tEy CW MEM5

3. Rotate the [**SUB VFO-B**] knob to set the selected Memory Register to "tyP1." If you want to text message entry on all memories, set all five Menu items (#020 ~ 024) to "tyP1."
4. Press and hold in the [**MENU**] button to save the new settings and exit.
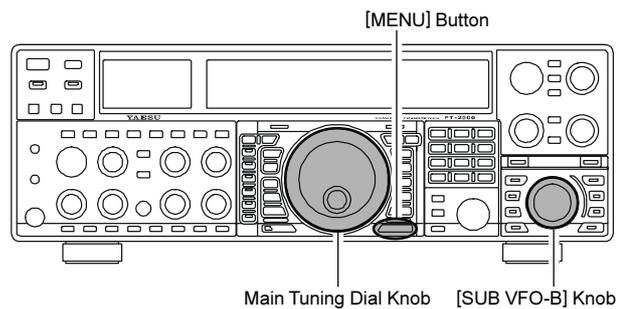
[MENU] Button

Main Tuning Dial Knob   [SUB VFO-B] Knob

Text Message Programming

1. Press the [**CW**] mode button to set the operating mode to CW.
2. Be sure that Break-in is Off by pressing the [**BK-IN**] button, if necessary.
3. Press the [**F5**(**MEM**)] button on the front panel.
4. Press the [**F1**(**CH1**)] ~ [**F4**(**CH-4**)] button to select the desired Message Memory Register into which you wish to program the text.
5. Use the Main Tuning Dial knob to set the cursor position and use the [**SUB VFO-B**] knob to choose the letter/number to be programmed in each slot of the memory. In the case of the second example above, the "#" character designates the slot where the Contest Number will appear.
6. When the message is complete, add the "**}**" character at the end to signify the termination of the message.
7. Press and hold in the [**F5**(**MEM**)] button for 2 seconds to exit, once all characters (including "**}**") have been programmed.

[BK-IN] Button   Main Tuning Dial Knob

[F5(MEM)] Button   [SUB VFO-B] Knob
[F1(CH-1)] ~ [F4(CH-4)] Button

Current Cursor Position   Cursor

CW Memory Register Number   Message
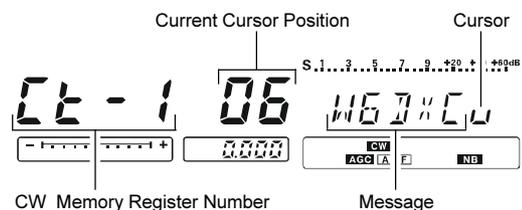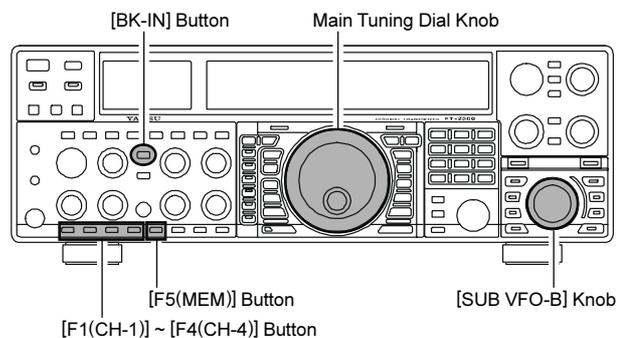
ADVICE:

Deleting Previously-stored Characters

Use the Main Tuning Dial knob to select the last correct letter in the message. Now rotate the [**SUB VFO-B**] knob to select the "**}**" character; everything after the "**}**" character will be deleted.
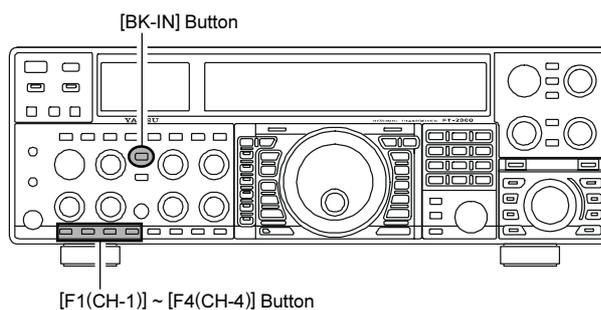
CONTEST MEMORY KEYER

CHECKING THE CW MEMORY CONTENTS

1. Be sure that Break-in is still turned Off by the [**BK-IN**] button.
2. Press the [**MONI**] button to enable the CW monitor.
3. Press the [**F1**(**CH1**)] ~ [**F4**(**CH-4**)] button to check your work. You will hear the results in the sidetone, but no RF energy will be transmitted.

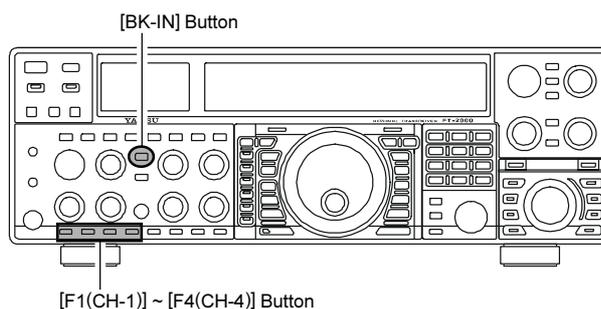**NOTE:**
Adjust the monitor level using the [**MONI**] knob.

[BK-IN] Button

[F1(CH-1)] ~ [F4(CH-4)] Button

ON-THE-AIR CW MESSAGE PLAYBACK

1. Press the [**BK-IN**] button to enable transmission. Either Full- or Semi-break-in will be engaged, depending on the setting of Menu item "058 A1A BK-IN."
2. Press the [**F1**(**CH1**)] ~ [**F4**(**CH-4**)] button to transmit the programmed message.

NOTE:
If you subsequently decide to use the "Message Memory" technique for memory storage, please note that the contents of a message stored using text input will not be transferred over when you select "Message Memory technique" on a particular memory register (the Menu Mode Setting is set to "tyP2").

[BK-IN] Button

[F1(CH-1)] ~ [F4(CH-4)] Button

Contest Number Programming

Use this process if you are starting a contest, or if you somehow get out of sync with the proper number in the middle of a contest.
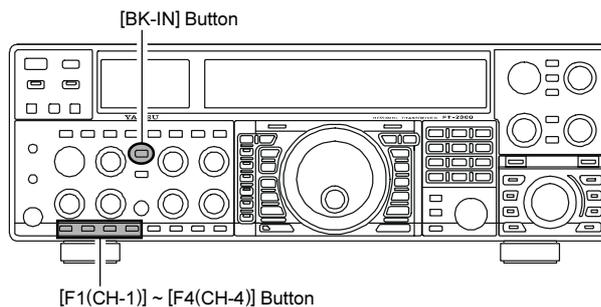
1. Press the [**MENU**] button to enter the Menu mode.
2. Rotate the Main Tuning Dial knob to select Menu item "019 tEy CONTEST."
3. Rotate the [**SUB VFO-B**] knob to set the Contest Number to the desired value.
   Advice:
   Press the [**CLEAR**] button (located below and to the left of the [**CLAR**] knob) to reset the Contest Number to "1."
4. Press and hold in the [**MENU**] button for two seconds to store the new number and exit to normal operation.

Decrementing the Contest Number

Use this process if the current contest number gets slightly ahead of the actual number you want to send (in case of a duplicate QSO, for example).

Press the [**F6**(**DEC**)] button on the front panel. The current Contest Number will be reduced by one. Press the [**F6**(**DEC**)] button as many times as necessary to reach the desired number. If you go too far, use the "Contest Number Programming" technique desired above.

TEXT	DISPLAY	CW CODE	TEXT	DISPLAY	CW CODE	TEXT	DISPLAY	CW CODE	TEXT	DISPLAY	CW CODE
!		$\overline{SN}$	(		$\overline{KN}$	/		$\overline{DN}$	@		@
"		$\overline{AF}$	)		$\overline{KK}$	:		$\overline{OS}$	[		–
#		–	*		–	;		$\overline{KR}$	\		$\overline{AL}$
$		$\overline{SX}$	+		$\overline{AR}$	<		–	]		–
%		$\overline{KA}$	,		$\overline{MIM}$	=		$\overline{BT}$	^		–
&		$\overline{AS}$	–		$\overline{DU}$	>		–	_		$\overline{IQ}$
'		$\overline{WG}$	.		$\overline{AAA}$	?		$\overline{IMI}$	}		–

CW Convenience Features

Contest Memory Keyer (Using the optional FH-2 Remote Control Keypad)

You may also utilize the CW message capability of the **FT-2000D** from the optional **FH-2** Remote Control Keypad, which plugs into the rear panel's **REM** jack.

Message Memory

Five memory channels capable of retaining 50 characters total are provided (using the PARIS standard for characters and word length).

Example: CQ CQ CQ DE W6DXC K (19 characters)

Storing a Message into Memory

1. Press the [**MENU**] button to enter the Menu mode.
2. Rotate the Main Tuning Dial knob to select the CW Memory Register into which you wish to store the message; for now, we are just selecting the message entry technique (Keyer entry).

   020 tEy CW MEM1
   021 tEy CW MEM2
   022 tEy CW MEM3
   023 tEy CW MEM4
   024 tEy CW MEM5
3. Rotate the [**SUB VFO-B**] knob to set the selected Memory Register to "tyP2." If you want to use your keyer paddle for message entry on all memories, set all five Menu items (#020 ~ 024) to "tyP2."
4. Press and hold in the [**MENU**] button to save the new settings and exit.

[MENU] Button

Main Tuning Dial Knob   [SUB VFO-B] Knob

CONTEST MEMORY KEYER (USING THE OPTIONAL FH-2 REMOTE CONTROL KEYPAD)

MESSAGE MEMORY PROGRAMMING (USING YOUR PADDLE)

1. Set the operating mode to CW.
2. Set the [**BK-IN**] button to Off.
3. Turn the internal Electronic Keyer On by pressing the [**KEYER**] button, if necessary.
4. Press the **FH-2**'s [**MEM**] key.
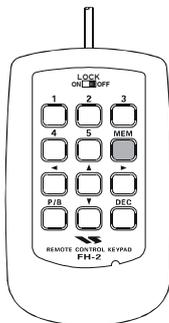
5. Press the [**1**] ~ [**5**] key on the **FH-2** to begin the memory storage process.
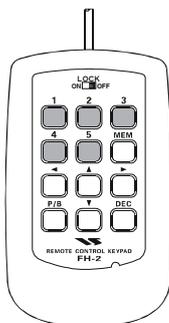
6. Send the desired message using your keyer paddle.
7. Press the [**MEM**] key on the **FH-2** once more at the end of your message. Up to 50 characters may be stored among the five memories.
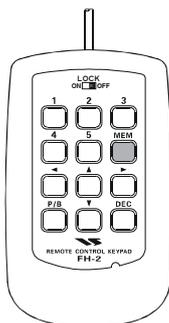
NOTE:

You must exercise care in sending to ensure that the spaces between letters and words are accurately done; if your timing is off, the spacing may not come out right in the stored message.

For ease in setting up the keyer memories, we recommend you set Menu item "052 A1A F-TYPE" and/or "054 A1A R-TYPE" to "ACS" (Automatic Character Spacing) while you are programming the keyer memories.

CHECKING THE CW MEMORY CONTENTS

1. Be sure that Break-in is still turned Off.
2. Press the [**MONI**] button to enable the CW monitor.
3. Press the **FH-2**'s [**1**] ~ [**5**] key to check your work. You will hear the results in the sidetone, but no RF energy will be transmitted.

NOTE:

You may adjust the monitor level using the [**MONI**] knob.

ON-THE-AIR CW MESSAGE PLAYBACK

1. Press the [**BK-IN**] button to enable transmission. Either Full- or Semi-break-in will be engaged, depending on the setting of Menu item "058 A1A BK-IN."
2. Press the **FH-2**'s [**1**] ~ [**5**] key to transmit the programmed message.

NOTE:

If you subsequently decide to use the "Text Memory" technique for memory storage, please note that the contents of a message stored using keyer paddle input will not be transferred over when you select "Text Memory technique" on a particular memory register (the Menu Mode Setting is set to "typ1").

CW CONVENIENCE FEATURES

CONTEST MEMORY KEYER (USING THE OPTIONAL FH-2 REMOTE CONTROL KEYPAD)

TEXT Memory

The five channels of CW message memory (up to 50 characters total) may also be programmed using a text-entry technique. This technique is somewhat slower than when you send the message directly from your keyer paddle, but accuracy of character spacing is ensured.

Example 1: CQ CQ CQ DE W6DXC K} (20 characters)

And we will utilize another powerful feature of the CW Memory Keyer, the sequential Contest Number ("Countup") feature.

Example 2: 599 10 200 # K} (15 characters)

TEXT MEMORY STORAGE

1. Press the [**MENU**] button to enter the Menu mode.
2. Rotate the Main Tuning Dial knob to select the CW Memory Register into which you wish to store the message; we are now selecting the message entry technique (Text entry).

   020 tEy CW MEM1
   021 tEy CW MEM2
   022 tEy CW MEM3
   023 tEy CW MEM4
   024 tEy CW MEM5

3. Rotate the [**SUB VFO-B**] knob to set the selected Memory Register to "tyP1."
4. Press and hold in the [**MENU**] button for two seconds to save the new settings and exit.
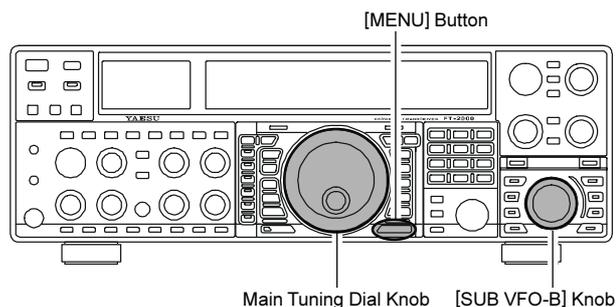
[MENU] Button

Main Tuning Dial Knob   [SUB VFO-B] Knob

TEXT MESSAGE PROGRAMMING

1. Press the [**CW**] mode button to set the operating mode to CW.
2. Be sure that Break-in is Off by pressing the [**BK-IN**] button, if necessary.
3. Press the **FH-2**'s [**MEM**] key.

4. Press the **FH-2**'s [**1**] ~ [**5**] key to select the desired Message Memory Register into which you wish to program the text.
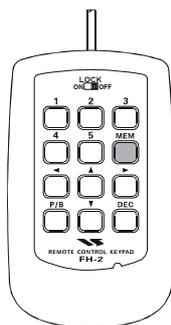
5. Use the **FH-2**'s [◄] and [►] keys to set the cursor position and use the [▲] and [▼] keys to choose the letter/number to be programmed in each slot of the memory. In the case of the second example above, the "#" character designates the slot where the Contest Number will appear.

Current Cursor Position   Cursor

CW Memory Register Number   Message
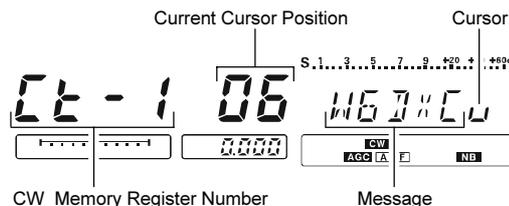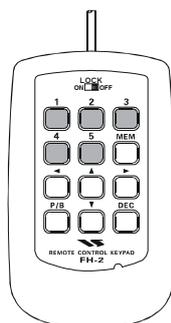
ADVICE:

You may also use the Main Tuning Dial knob and the [**SUB VFO-B**] knobs to program the message characters.

CONTEST MEMORY KEYER (USING THE OPTIONAL FH-2 REMOTE CONTROL KEYPAD)

6. When the message is complete, add the "**}**" character at the end to signify the termination of the message.

7. Press and hold in the **FH-2**'s [**MEM**] key for 2 seconds to exit, once all characters (including "**}**") have been programmed.
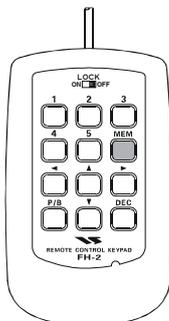
ADVICE:

Deleting Previously-stored Characters

Use the **FH-2**'s [◄] and [►] keys or Main Tuning Dial knob to select the last correct letter in the message. Now use the [▲] and [▼] keys or [**SUB VFO-B**] knob to select the "**}**" character; everything after the "**}**" character will be deleted.

Decrementing the Contest Number

By pressing the **FH-2**'s [**DEC**] key momentarily, you may reduce the current Contest Number by one.

CHECKING THE CW MEMORY CONTENTS

1. Be sure that Break-in is still turned Off.

2. Press the [**MONI**] button to enable CW monitor.

3. Press the **FH-2**'s [**1**] ~ [**5**] key to check your work. You will hear the results in the sidetone, but no RF energy will be transmitted.

NOTE:

You may adjust the monitor level using the [**MONI**] knob.

ON-THE-AIR CW MESSAGE PLAYBACK

1. Press the [**BK-IN**] button to enable transmission. Either Full- or Semi-break-in will be engaged, depending on the setting of Menu item "058 A1A BK-IN."

2. Press the **FH-2**'s [**1**] ~ [**5**] key to transmit the programmed message.

NOTE:

If you subsequently decide to use the "Message Memory" technique for memory storage, please note that the contents of a message stored using text input will not be transferred over when you select "Message Memory technique" on a particular memory register (the Menu Mode Setting is set to "tyP2").

FM MODE OPERATION

BASIC OPERATION

1. Press the [**AM/FM**] button several times, until the imbedded LED glows orange, to select the FM operating mode.

   QUICK POINT:

   When the [**AM/FM**] button glows red, it indicates AM operation.

2. Rotate the Main Tuning Dial knob (in the case of Main (VFO-A) operation) to select the desired operating frequency. Pressing the microphone's [**UP**] or [**DWN**] button will cause frequency change in 5 kHz steps.

3. Press the microphone's **PTT** switch (or press the front panel [**MOX**] button) to transmit. Speak into the microphone in a normal voice level. Release the **PTT** or [**MOX**] switch to return to receive.

4. Adjustment of the microphone gain may be accomplished in two ways. At the factory, a default level has been programmed that should be satisfactory for most situations. However, using Menu item "072 F3E MICGAIN," you may set a different fixed value, or choose the "ur" option, which then lets you use the front panel [**MIC**] knob to set the microphone gain in the FM mode.

ADVICE:

❐ The Transmit Monitor is another helpful way of verifying proper adjustment of the FM MIC Gain. By pressing the [**MONI**] button then adjusting the [**MONI**] knob for a comfortable listening level while you are transmitting, you will be able to hear the difference in deviation as you make adjustments.

❐ FM is only used in the 28 MHz and 50 MHz Amateur bands covered in the **FT-2000D**. Please do not use FM on any other bands.
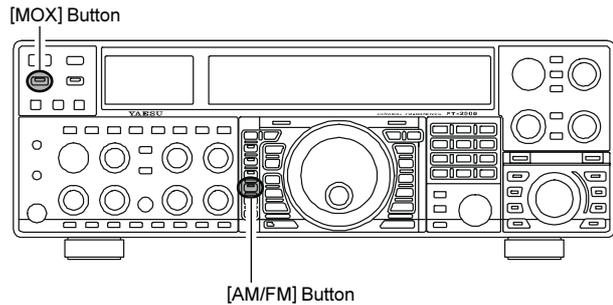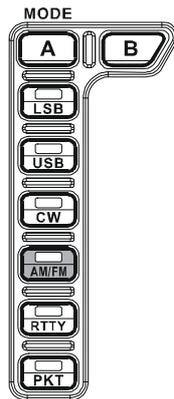
REPEATER OPERATION

The **FT-2000D** may be utilized on 29 MHz and 50 MHz repeaters.

1. Rotate the Main Tuning Dial knob to the output frequency (downlink) from the repeater.
2. If CTCSS Tone operation is desired/needed, press and hold in the [**AM/FM**] button for two seconds to engage the CTCSS mode.
3. Rotate the Main Tuning Dial knob to select the desired CTCSS mode. If you just need to send the uplink encoding tone, select "tn." For encode/decode operation, choose "ts" instead. The available choices are
    "oFF" → "tn" → "ts" → "oFF."
4. Rotate the [**SUB VFO-B**] knob to select the desired CTCSS Tone to be used. A total of 50 standard CTCSS tones are provided (see the CTCSS Tone Chart).
5. Press the [**AM/FM**] Mode button to select the desired repeater shift direction. The selections are
    "S" → "+" → "–" → "S"
    where "S" represents "Simplex" operation (not used on a repeater).
6. Press and hold in the [**AM/FM**] button for two seconds to exit from the repeater setup mode.
7. Close the microphone's **PTT** switch (or press the [**MOX**] button) to begin transmission. You will observe that the frequency has shifted to correspond to the programming you set up in the previous steps. Speak into the microphone in a normal voice level, and release the **PTT** switch or [**MOX**] button to return to the receive mode.

[MOX] Button   [AM/FM] Button

Main Tuning Dial Knob   [SUB VFO-B] Knob
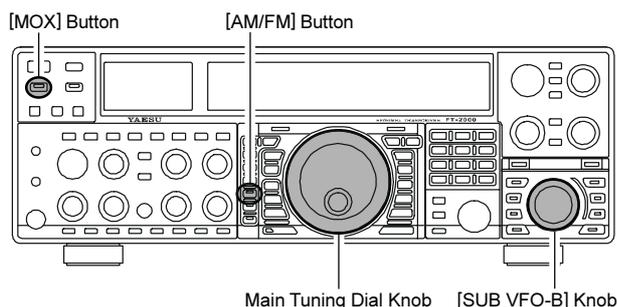
CTCSS Operation
tn: Tone Encoder
tS: Tone Squelch
oFF: OFF

Repeater Shift Direction
–: Minus Shift
+: Plus Shift
S: Simplex

CTCSS Tone Frequency
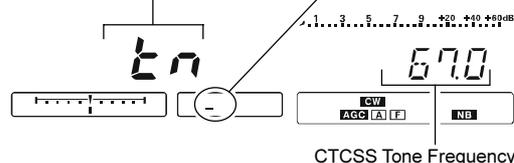
CTCSS TONE FREQUENCY (Hz)							
67.0	69.3	71.9	74.4	77.0	79.7	82.5	85.4
88.5	91.5	94.8	97.4	100.0	103.5	107.2	110.9
114.8	118.8	123.0	127.3	131.8	136.5	141.3	146.2
151.4	156.7	159.8	162.2	165.5	167.9	171.3	173.8
177.3	179.9	183.5	186.2	189.9	192.8	196.6	199.5
203.5	206.5	210.7	218.1	225.7	229.1	233.6	241.8
250.3	251.4	–	–	–	–	–	–

ADVICE:

The conventional repeater shift used on 29 MHz is 100 kHz, while on the 50 MHz band the shift may vary between 500 kHz and 1.7 MHz (or more). To program the proper repeater shift, use Menu items "073 F3E 28 RPT" (28 MHz) and "074 F3E 50 RPT" (50 MHz), as appropriate.

You may also use "Tone Squelch" whereby your receiver will be kept silent until an incoming signal bearing a matching CTCSS tone is receiver. Your receiver's squelch will then open in response to the reception of the required tone.

1. Rotate the Main tuning Dial to the output frequency (downlink) from the repeater.
2. Press and hold in the [**AM/FM**] button for two seconds to engage the CTCSS mode.
3. Rotate the Main Tuning Dial to choose "ts" from the available choices of
    "oFF" → "tn" → "ts" → "oFF."
4. Rotate the [**SUB VFO-B**] knob to select the desired CTCSS Tone to be used. A total of 50 standard CTCSS tones are provided (see the CTCSS Tone Chart).
5. Press and hold in the [**AM/FM**] button for two seconds. On the display, just below the "10 Hz" frequency digit, a small "**d**" will indicate that the Tone Decoder is engaged.

[AM/FM] Button

Main Tuning Dial Knob   [SUB VFO-B] Knob

Tone Decoder "ON"
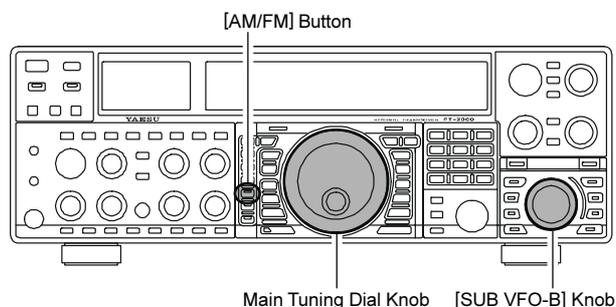
MEMORY OPERATION

CONVENIENT MEMORY FUNCTIONS

The **FT-2000D** contains ninety-nine regular memories, labeled "01" through "99," nine special programmed limit memory pairs, labeled "P-1L/1U" through "P-9L/9U," and five QMB (Quick Memory Bank) memories, labeled "C-1" through "C-5." Each stores various settings, not only the Main band's (VFO-A) frequency and mode (See below). By default, the 99 regular memories are contained in one group; however, they can be arranged in up to six separate groups, if desired.

QUICK POINT:

The **FT-2000D**'s memory channels store the following data (not just the operating frequency):

- ❏ Frequency
- ❏ Mode
- ❏ Clarifier status and its Offset Frequency
- ❏ ANT status
- ❏ ATT status
- ❏ IPO status
- ❏ VRF status
- ❏ Roofing filter status and its Bandwidth
- ❏ Noise Blanker status
- ❏ CONTOUR status and its Peak Frequency
- ❏ DSP Noise Reduction (DNR) status and its Reduction algorithm selection.
- ❏ DSP Notch filter (NOTCH) status
- ❏ NAR bandwidth status
- ❏ DSP Auto Notch filter (DNF) status
- ❏ Repeater Shift Direction and Shift Frequency
- ❏ CTCSS status and Tone Frequency
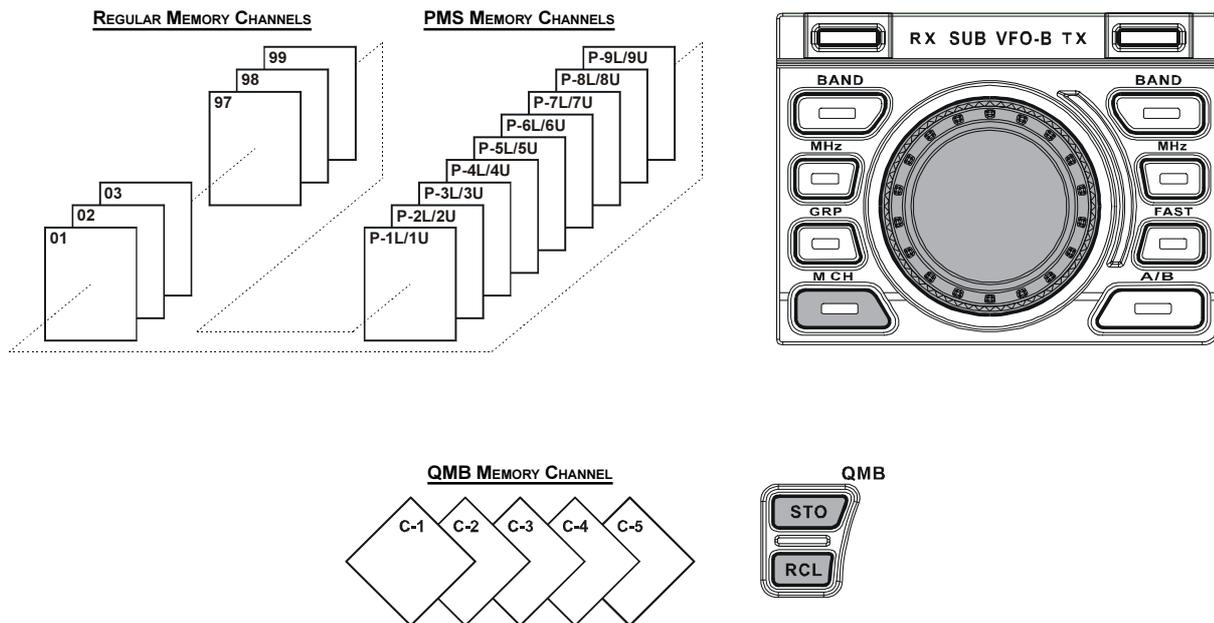
QMB (QUICK MEMORY BANK)

The Quick Memory Bank consists of five memories (labeled "C-1" through "C-5.") independent from the regular and PMS memories. These can quickly store operating parameters for later recall.

QMB Channel Storage

1. Tune to the desired frequency on the Main (VFO-A) band.
2. Press the blue [**QMB**(**STO**)] button. The "beep" will confirm that the contents of the Main (VFO-A) band have been written to the currently-available QMB memory.

If you repeatedly press the [**QMB**(**STO**)] button, the QMB memories will be written in the following order:

    C-2 → C-3 → C-4 → C-5 → C-1 ······

Once all five QMB memories have data on them, previous data (starting with channel "C-1") will be over-written on a first-in, first-out basis.

QMB Channel Recall

1. Press the [**QMB**(**RCL**)] button. The current QMB channel's data will be shown on the Main (VFO-A) frequency display field and the QMB memory channel number will be shown in the Multi-Display Window.
2. Repeatedly pressing the [**QMB**(**RCL**)] button will toggle you through the QMB channels:

    C-2 → C-3 → C-4 → C-5 → C-1 ······

3. Press the [**V/M**] button to return to the VFO or Memory mode.
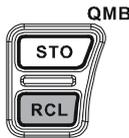
ADVICE:

Rotating the Main Tuning Dial knob, or changing the operating mode, will place the transceiver in the "Memory Tune" mode, which is a temporary "pseudo-VFO" method of tuning off of a stored memory channel. If you do not over-write the contents of the current memory channel, the original contents will not be disturbed by the initiation of Memory Tune operation.

[QMB(STO)] Button

[QMB(RCL)] Button

[V/M] Button
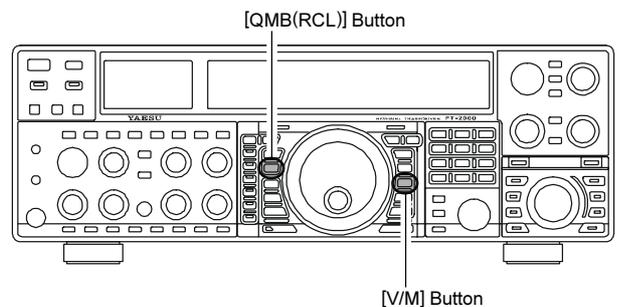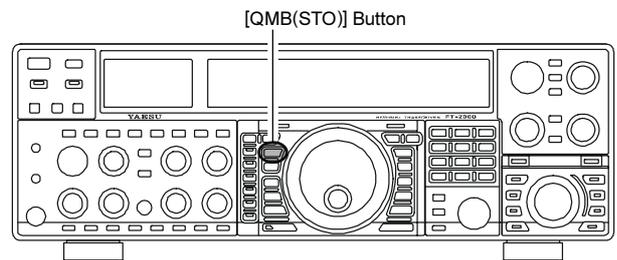
MEMORY OPERATION

STANDARD MEMORY OPERATION

The Standard Memory of the **FT-2000D** allows storage and recall of up to 99 memories, each storing frequency, mode, and a wide variety of status information detailed previously. Memories may be grouped into as many as six Memory Groups, and additionally you get nine pairs of band-limit (PMS) memories along with five QMB (Quick Memory Bank) memories.

Memory Storage

1. Set the Main band (VFO-A) up with all frequency, mode, and status the way you want to have it stored.
2. Press the [**A▶M**] button momentarily (the current channel number will start blinking in the multi-panel window); the contents of the current memory channel will be shown on the Sub band (VFO-B) display field.
3. Rotate the [**SUB VFO-B**] knob to select the memory channel onto which you wish to store the data. If you have selected a channel on which data is already stored, that frequency will appear on the Sub band's (VFO-B) frequency display field.
4. Press and hold in the [**A▶M**] button for two seconds to store the frequency and other data into the selected memory channel. A double beep will confirm that you have held the [**A▶M**] button in long enough.

[A▶M] Button

[SUB VFO-B] Knob
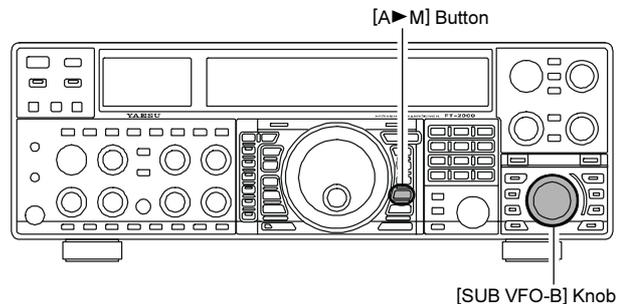
Memory Channel Recall

1. Press the [**V/M**] button, if necessary, to enter the Memory mode. A memory channel number will appear in the multi-panel window.
2. Press the [**M CH**] button. The Red LED inside the button will light up, indicating that you are ready to recall a memory channel.

   ADVICE:

   If the Red LED imbedded in the [**M CH**] button does not light up, check to be sure that the orange lamp to the right of the [**SUB VFO-B**] knob is not illuminated. If it is, press the [**A/B**] switch to make it go out, then press the [**M CH**] button again.
3. After pressing the [**M CH**] button, you may rotate the [**M CH**] knob to select the desired memory channel.

[V/M] Button   [A/B] Button
[SUB VFO-B] Knob

[GRP] Button
[M CH] Button

ADVICE:

To work within a particular Memory Group, press the [**GRP**] button (the imbedded LED will glow Red), then rotate the [**SUB VFO-B**] knob to select the desired Memory Group. Now press the [**M CH**] button (the imbedded LED will glow Red); you may now choose the memory channel within the selected Memory Group.
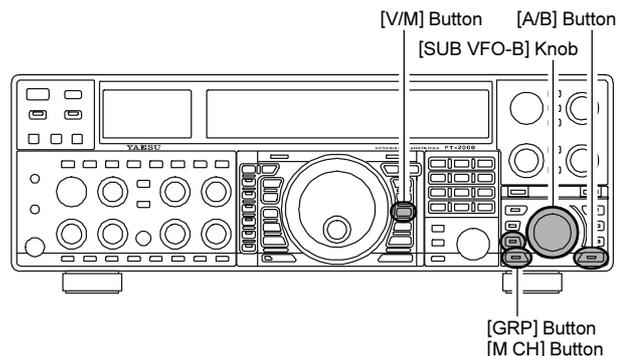
STANDARD MEMORY OPERATION

Checking a Memory Channel's Status

Before programming a channel into memory, you can check the current contents of that channel without the danger of overwriting the channel accidentally.

1. Press the [A▶M] button momentarily.
   The data stored in the currently-selected memory channel will be displayed in the Sub band (VFO-B) frequency field. However, since you are only checking the contents of the memory channel, your radio will not have moved to the memory channel's frequency.

2. Rotate the [SUB VFO-B] knob to select a different memory channel. To exit from the Memory Check mode, press the [A▶M] button momentarily once more.

ADVICE:

❒ While the Memory Check function is engaged, the memory channel number will blink in the multi-panel window.

❒ While operating in the VFO mode, using Memory Check, you may store the current contents of the Main (VFO-A) register into the selected memory by pressing and holding in the [A▶M] button for two seconds (until the double beep). Conversely, if you wish to write the contents of the current memory into the Main (VFO-A) register, press and hold in the [M▶A] button for two seconds.

Erasing Memory Channel Data

1. Press the [A▶M] button.
   The data stored in the currently-selected memory channel will be displayed in the Sub (VFO-B) band frequency field.

2. Rotate the [SUB VFO-B] knob to select the memory channel that you would like to erase.

3. Press the [LOCK] button to erase the contents of the selected memory channel.

ADVICE:

❒ After erasure, only the memory channel number will remain; the frequency data will disappear from the display.

❒ If you make a mistake and wish to restore the memory's contents, just repeat steps (1) through (3) above.

[A▶M] Button

[SUB VFO-B] Knob

[LOCK] Button

[SUB VFO-B] Knob
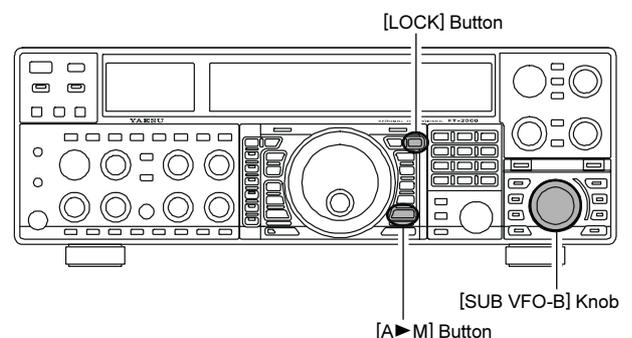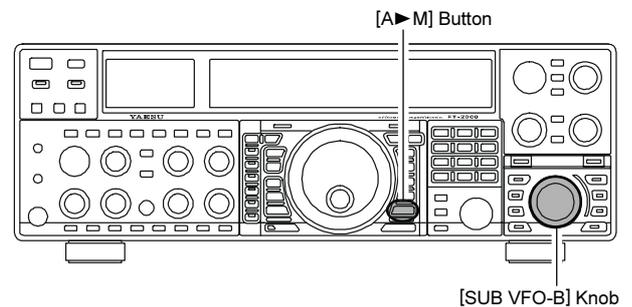
[A▶M] Button

MEMORY OPERATION

STANDARD MEMORY OPERATION

Moving Memory Data to the Main Band (VFO-A)

You may transfer the contents of the currently-selected memory channel into the Main band (VFO-A) register, if you like.

1. Press the [**V/M**] button, as necessary, to go to the Memory mode. The memory channel number will appear in the multi-panel window.

2. Press the [**M CH**] button. The Red LED inside the switch will light up, indicating that you are ready to recall a memory channel.
   **ADVICE:**
   If the Red LED imbedded in the [**M CH**] button does not light up, check to be sure that the orange lamp to the right of the [**SUB VFO-B**] knob is not illuminated. If it is, press the [**A/B**] switch to make it go out, then press the [**M CH**] button again.

3. Rotate the [**SUB VFO-B**] knob to select the memory channel the contents of which you wish to transfer to the Main band (VFO-A).

4. Press and hold in the [**A▶M**] button for two seconds, until you hear the double beep. The data in the selected memory channel will now be transferred to the Main band (VFO-A).

ADVICE:

This transfer of data to the Main band (VFO-A) does not affect the original contents of the memory channel; this is a "copy" function that leaves the memory contents unchanged.

[V/M] Button
[SUB VFO-B] Knob
[A▶M] Button   [M CH] Button

Memory Tune Operation

You may freely tune off of any memory channel in a "Memory Tune" mode that is similar to VFO operation. So long as you do not over-write the contents of the current memory, Memory Tune operation will not alter the contents of the memory channel.

1. Press the [**V/M**] button to recall any memory channel.

2. Rotate the Main Tuning Dial knob; you will now observe that the memory channel's frequency is changing.
   ADVICE:
   ❐ The "**MT**" icon will replace the "**MR**" icon in the multi-panel window, indicating you are in the "Memory Tune" mode.
   ❐ During Memory Tune operation, you may change operating modes, and engage the Clarifier, if desired.

3. Press the [**V/M**] button momentarily to return to the originally-memorized frequency of the current memory channel. One more press of the [**V/M**] button will return you to VFO operation.

[V/M] Button

Main Tuning Dial Knob
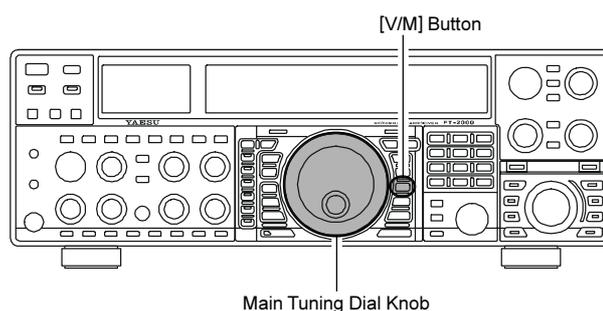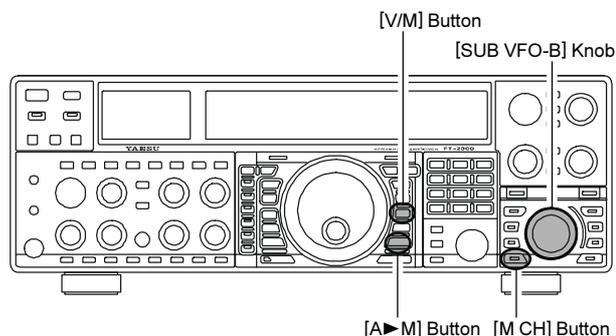
NOTE:

Computer software programs utilizing the CAT system interface port may presume that the transceiver is operating in the VFO mode for certain features like "band mapping" and/or frequency logging. Because the "Memory Tune" mode so closely resembles the VFO mode, be sure that you have the **FT-2000D** operating in a control mode compatible with your software's requirements. Use the VFO mode if you're not sure.

MEMORY GROUPS

Memory channels may be grouped into as many as six convenient batches, for easy identification and selection. For example, you might want to set aside memory groups for AM BC stations, shortwave broadcast stations, contest frequencies, repeater frequencies, and PMS limits, or any other groupings you like.

Each memory group is capable of holding up to 22 memory channels (the Group size is fixed). When a memory channel is grouped, the channel numbers change to correspond to the chart below:

Memory Group Assignment

1. Press the [**MENU**] button to enter the Menu mode.
2. Rotate the Main Tuning Dial knob to select Menu item "030 GEnE MEM GRP."
3. Rotate the [**SUB VFO-B**] knob to set this Menu item to "On" (the default setting is "OFF").
4. Press and hold in the [**MENU**] button for two seconds to save the new setting and exit. Operation will now be restricted to the six Memory Groups.

To cancel Memory Group operation, repeat steps (1) through (4) above, choosing "OFF" in step (3).

ADVICE

Note that for the PMS memory group, the PMS memories "P-1L" through "P-9U" will be so designated, so as to avoid confusion.

[MENU] Button

Main Tuning Dial Knob   [SUB VFO-B] Knob
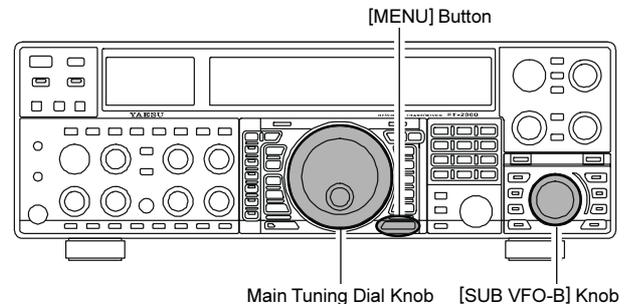
MEMORY CHANNEL NUMBER	
GROUP MEMORY "OFF"	GROUP MEMORY "ON"
01 ~ 19	1-01 ~ 1-19
20 ~ 39	2-01 ~ 2-20
40 ~ 59	3-01 ~ 3-20
60 ~ 79	4-01 ~ 4-20
80 ~ 99	5-01 ~ 5-20
P-1L/1U ~ P-9L/9U	P-1L/1U ~ P-9L/9U

Choosing the Desired Memory Group

You may recall memories just within a particular Memory Group, if desired.

1. Press the [**V/M**] button, if necessary, to enter the Memory mode.
2. Press the [**GRP**] button (below and to the left of the [**SUB VFO-B**] knob). The imbedded LED inside the switch will light up.
3. Rotate the [**SUB VFO-B**] knob to select the desired Memory Group.
4. Press the [**M CH**] button (just below the [**GRP**] button). The imbedded LED inside the switch will light up.
5. Rotate the [**SUB VFO-B**] knob to select the desired Memory Channel within the Selected Memory Group.

ADVICE:

❒ If the Red LED imbedded in the [**GRP**] and [**M CH**] buttons does not light up, check to be sure that the orange lamp to the right of the [**SUB VFO-B**] knob is not illuminated. If it is, press the [**A/B**] button to make it go out, then press the [**GRP**] or [**M CH**] button again.
❒ If no channels have been assigned to a particular Memory Group, you will not have access to that Group.

[V/M] Button   [A/B] Button
[SUB VFO-B] Knob

[GRP] Button
[M CH] Button
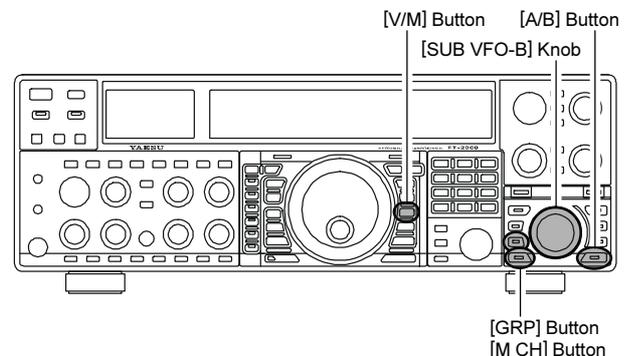
Section 97.401(d) of the regulations governing amateur radio in the United States permit emergency amateur communications on the spot frequency of 5167.5 kHz by stations in (or within 92.6 km of) the state of Alaska. This frequency is only to be used when the immediate safety of human life and/or property are threatened, and is never to be used for routine communications.

The **FT-2000D** includes the capability for transmission and reception on 5167.5 kHz under such emergency conditions via the Menu system. To activate this feature:

1. Press the [**MENU**] button to enter the Menu mode.
2. Rotate the Main Tuning Dial knob to select "147 tGEn EMERGENCY."
3. Rotate the [**SUB VFO-B**] knob to select "EnA (Enable)."
4. Press and hold in the [**MENU**] button for 2 seconds to save the new setting and exit to normal operation. Emergency communication on this spot frequency is now possible.
5. Press the [**V/M**] button, as necessary, to enter the Memory mode. Press the [**M CH**] button, then rotate the [**SUB VFO-B**] knob to select the emergency channel ("EUS"), which is found between channels "P-9U" and "01."

    ADVICE:
    If the Red LED imbedded in the [**M CH**] button does not light up, check to be sure that the orange lamp to the right of the [**SUB VFO-B**] knob is not illuminated. If it is, press the [**A/B**] switch to make it go out, then press the [**M CH**] button again.

NOTE:

❐ The receive-mode CLARIFIER functions normally while using this frequency, but variation of the transmit frequency is not possible. Activation of "147 tGEn EMERGENCY" does not enable any other out-of-amateur-band capability on the transceiver. The full specifications of the **FT-2000D** are not necessarily guaranteed on this frequency, but power output and receiver sensitivity should be fully satisfactory for the purpose of emergency communication.

❐ If you wish to disable operation capability on the Alaska Emergency Frequency, repeat the above procedures, but set "147 tGEn EMERGENCY" to "diS" in step 3.

❐ In an emergency, note that a half-wave dipole cut for this frequency should be approximately 45'3" on each leg (90'6" total length). Emergency operation on 5167.5 kHz is shared with the Alaska-Fixed Service. This transceiver is not authorized for operation, under the FCC's Part 87, for aeronautical communications.

[MENU] Button

Main Tuning Dial Knob   [SUB VFO-B] Knob

[V/M] Button   [A/B] Button
[SUB VFO-B] Knob

[M CH] Button
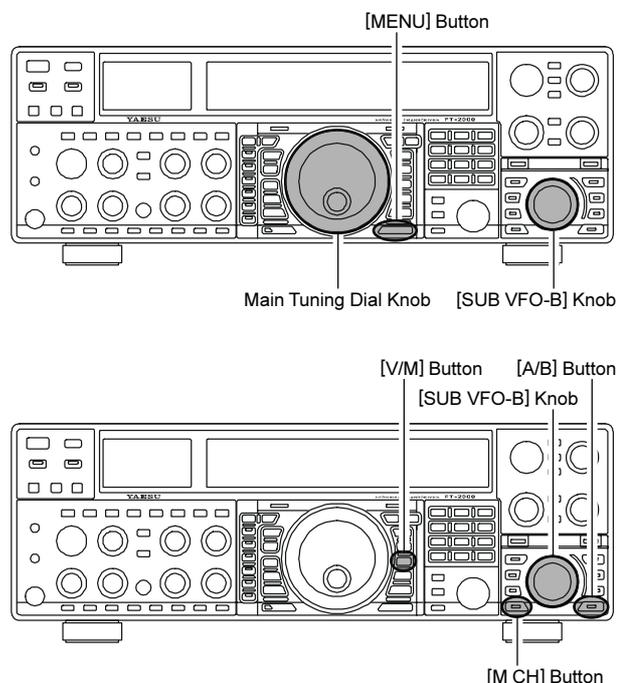
VFO and Memory Scanning

You may scan wither the VFO or the memories of the **FT-2000D**, and the radio will halt the scan on any station with a signal strong enough to open the receiver's squelch.

VFO Scanning

1. Set the VFO to the frequency on which you would like to begin scanning.
2. Rotate the Main [**SQL**] knob so that the background noise is just silenced.
   Advice:
   Rotate the Sub [**SQL**] knob so that the background noise is just silenced, if you would like to begin scanning on the Sub band (VFO-B).
3. Press and hold in the microphone's [**UP**] or [**DWN**] key for 1/2 second to start scanning in the specified direction on the Main (VFO-A) band.
   Advice:
   If you would like to begin scanning on the Sub band (VFO-B), press the [**B**] button first, then (within five seconds of pressing the [**B**] button, while the orange imbedded LED is blinking), press and hold in the microphone's [**UP**] or [**DWN**] key for 1/2 second.
4. If the scanner halts on an incoming signal, the decimal point between the "MHz" and "kHz" digits of the frequency display will blink.
   Advice:
   ❐ If the incoming signal disappears, scanning will resume in about five seconds.
   ❐ On the SSB/CW and SSB-based Data modes, the scanner will pause on a received signal, then will step across the signal very slowly, giving you time to stop the scan, if you like. In these modes on the VFO, the scanner does not stop, however.
5. To cancel the scanning, press the microphone's [**UP**] or [**DWN**] key momentarily.

Advice:
You may select the manner in which the scanner resumes while it has paused on a signal, using Menu item "039 GEnE SCN RSM." The default "5Sec" setting will cause the scanner to resume scanning after five seconds; you may change it, however, to resume only after the carrier has dropped out, if you like See page 119.
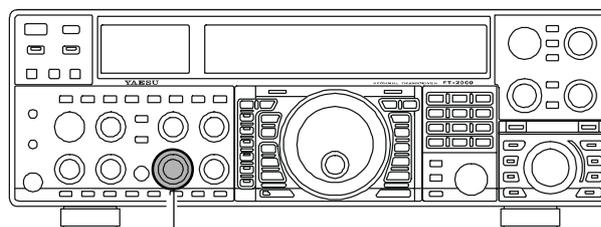
Main [SQL] Knob

Main Band (VFO-A) Scanning
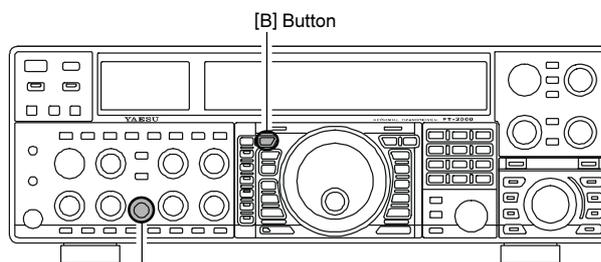
[B] Button

SUB [SQL] Knob

Sub Band (VFO-B) Scanning

VFO and Memory Scanning

Memory Scan

1. Set the transceiver up in the memory mode by pressing the [**V/M**] button, if necessary.
2. Rotate the Main [**SQL**] knob so that the background noise is just silenced.
3. Press the [**M CH**] button momentarily.
   When you press the [**M CH**] button, the Red LED imbedded within the switch should light up, indicating that you are ready to choose a channel into which to store the data.
   ADVICE:
   If the Red LED imbedded in the [**M CH**] button does not light up, check to be sure that the orange lamp to the right of the [**SUB VFO-B**] knob is not illuminated. If it is, press the [**A/B**] button to make it go out, then press the [**M CH**] button again.
4. Press and hold in the microphone's [**UP**] or [**DWN**] key for 1/2 second to start scanning in the specified direction.
   ADVICE:
   ❒ If the scanner halts on an incoming signal, the decimal point between the "MHz" and "kHz" digits of the frequency display will blink.
   ❒ If the incoming signal disappears, scanning will resume in about five seconds.
5. To cancel the scanning, press the microphone's [**UP**] or [**DWN**] key momentarily.

[V/M] Button   [A/B] Button
[SUB VFO-B] Knob

Main [SQL] Knob   [M CH] Button

ADVICE:
❒ During Memory Group operation, only the channels within the current Memory Group will be scanned.
❒ If the scan has paused on a signal, pressing the microphone's [**UP**] or [**DWN**] key will cause scanning to resume instantly.
❒ If you press the microphone's **PTT** switch during scanning, the scanner will halt at once. Pressing the **PTT** switch during scanning will not cause transmission, however.
❒ You may select the manner in which the scanner resumes while it has paused on a signal, using Menu item "039 GEnE SCN RSM." The default "5Sec" setting will cause the scanner to resume scanning after five seconds; you may change it, however, to resume only after the carrier has dropped out, if you like See page 119.
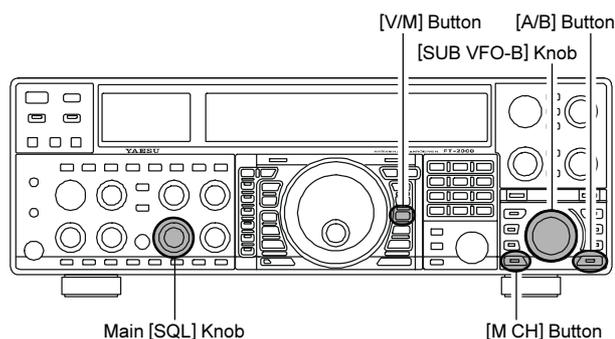
QUICK POINT:
If you have no interest in scanning, and wish to prohibit the microphone's [**UP**]/[**DWN**] keys from initiating scanning, you may disable scanning control from the microphone using Menu item "038 GEnE MIC SCN" (set it to "Off").

PMS (PROGRAMMABLE MEMORY SCANNING)

To limit scanning (and manual tuning) within a particular frequency range, you can use the Programmable Memory Scanning (PMS) feature, which utilizes nine special-purpose memory pairs ("P-1L/P-1U" through "P-9L/P-9U"). The PMS feature is especially useful in helping you to observe any operating sub-band limits which apply to your Amateur license class.

1. Store the Lower and Upper tuning/scanning limit frequencies into the memory pair "P-1L" and "P-1U," respectively, or any other "L/U" pair of memories in the special PMS memory area. See page 97 for details regarding memory storage.
2. Press the [**V/M**] button to enter the Memory mode.
3. Press the [**M CH**] button momentarily.
   When you press the [**M CH**] button, the Red LED imbedded within the switch should light up, indicating that you are ready to choose a channel into which to store the data.
   ADVICE:
   If the Red LED imbedded in the [**M CH**] button does not light up, check to be sure that the orange lamp to the right of the [**SUB VFO-B**] knob is not illuminated. If it is, press the [**A/B**] button to make it go out, then press the [**M CH**] button again.
4. Rotate the [**SUB VFO-B**] knob to select memory channel "P-1L" or "P-1U."
5. Rotate the Main [**SQL**] knob so that the background noise is just silenced.
6. Turn the Main Tuning Dial knob slightly (to activate memory tuning). Tuning and scanning are now limited to the range within the P-1L/P-1U limits until you press the [**V/M**] button to return to memory channel or Main band (VFO-A) operation.
7. Press and hold in the microphone's [**UP**] or [**DWN**] key for 1/2 second to start scanning in the specified direction.
   ADVICE:
   ❒ If the scanner halts on an incoming signal, the decimal point between the "MHz" and "kHz" digits of the frequency display will blink.
   ❒ If the incoming signal disappears, scanning will resume in about five seconds.
   ❒ On the SSB/CW and SSB-based Data modes, the scanner will pause on a received signal, then will step across the signal very slowly, giving you time to stop the scan, if you like. In these modes on the VFO, the scanner does not stop, however.
   ❒ If the scan has paused on a signal, pressing the microphone's [**UP**] or [**DWN**] key will cause scanning to resume instantly.
8. If you rotate the Main Tuning Dial knob in the opposite direction from the current scanning direction (in other words, you rotate the dial to the left when scanning toward a higher frequency), the direction of the scan will reverse.
9. If you press the microphone's **PTT** switch during scanning, the scanner will halt at once. Pressing the **PTT** switch during scanning will not cause transmission, however.

[V/M] Button   [A/B] Button
[SUB VFO-B] Knob

Main [SQL] Knob   [M CH] Button
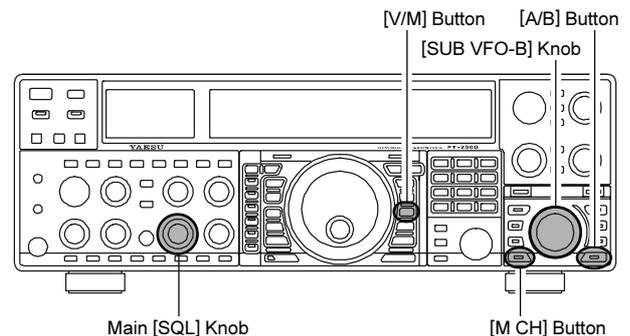
PACKET OPERATION

Packet operation is easily accomplished on the **FT-2000D** by connecting your TNC (Terminal Node Controller) to the transceiver, per the illustration. "Packet" operation also applies to SSB-based AFSK data modes, such as PSK31, etc.
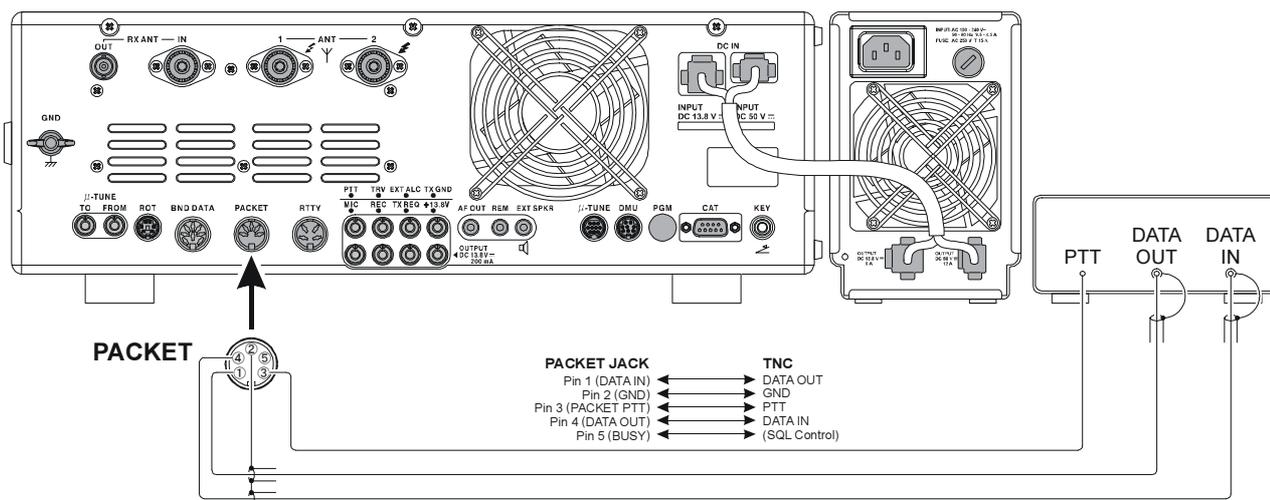
PACKET SETUP (INCLUDING SUBCARRIER FREQUENCY)

Before operation can commence, some basic setup procedures must be performed, using the Menu, to configure your radio for the data mode to be used.

MENU ITEM	AVAILABLE VALUES	MENU ITEM	AVAILABLE VALUES
064 dAtA DATA IN	dAtA (DATA) / PC (PC)	068 dAtA VOX DLY	30 ~ 3000 msec
065 dAtA DT GAIN	0 ~ 100	069 dAtA V GAIN	0 ~ 100
066 dAtA DT OUT	nAin (Main) / Sub (Sub)	070 dAtA PKTDISP	–3000 ~ +3000 Hz
067 dAtA OUT LVL	0 ~ 100	071 dAtA PKT SFT	–3000 ~ +3000 Hz

BASIC SETUP

1. Press the [**PKT**] button.

   ADVICE:
   - For HF operation, SSB-based Data operation is generally used. One press of the [**PKT**] button will engage Packet operation in the "LSB" mode (by default). Both the "PKT" and "LSB" LEDs will become illuminated.
   - If you need to do FM-based 1200-baud packet on the 29/50 MHz bands, press the [**PKT**] button repeatedly to illuminate the "PKT" LED to orange, to engage the "PKT-FM" mode.
   - When both the "PKT" and "USB" LEDs are illuminated, the **FT-2000D** has engaged Packet operation in the "USB" mode.

2. When the "transmit" command is received from the TNC, the transmitter of the **FT-2000D** will automatically be engaged. Likewise, the command to return to receive will cause the radio to revert to the receive mode.

ADVICE:
- If you need to adjust the output level from the "DATA OUT" pin of the **PACKET** jack (pin 4) on the radio, please use Menu item "067 dAtA OUT LVL." For the input level from the TNC, as applied to the DATA IN pin of the **PACKET** jack (pin 1), please do so at the TNC side.

- During Packet operation via the rear panel's **PACKET** jack, the front panel **MIC** jack is cut off, so you won't have a "live microphone" problem during data operation.

NOTE:
If you anticipate making data transmissions of longer than a few minutes, we recommend that you use the [**RF PWR**] knob to reduce the transmitter power to 1/3 ~ 1/2 of its normal maximum.

QUICK POINT:
PACKET Jack Specifications
- DATA IN (Pin 1)
  Input Level: 50 mVp-p
  Input Impedance: 10 k-Ohms
- DATA OUT (Pin 4)
  Fixed level, does not respond to setting of [**AF GAIN**] or [**SQL**] knob.
  Output Level: 100 mVp-p max.
  Output Impedance: 10 k-Ohms

RTTY (RADIO TELETYPE) OPERATION

Most RTTY operation today is accomplished using a TNC or other computer-based system that utilizes AFSK tones. As such, the previous discussion on LSB-mode "Packet" operation will apply for Baudot operation, as well. For RTTY operation using a Terminal Unit (TU) or the "FSK" output from a TNC, please see the discussion below. See also the illustration for details regarding connection to your TU.

RTTY JACK	RTTY Machine
Pin 1 (SHIFT)	FSK OUT
Pin 2 (RX OUT)	AF IN
Pin 3 (PTT)	PTT
Pin 4 (GND)	GND
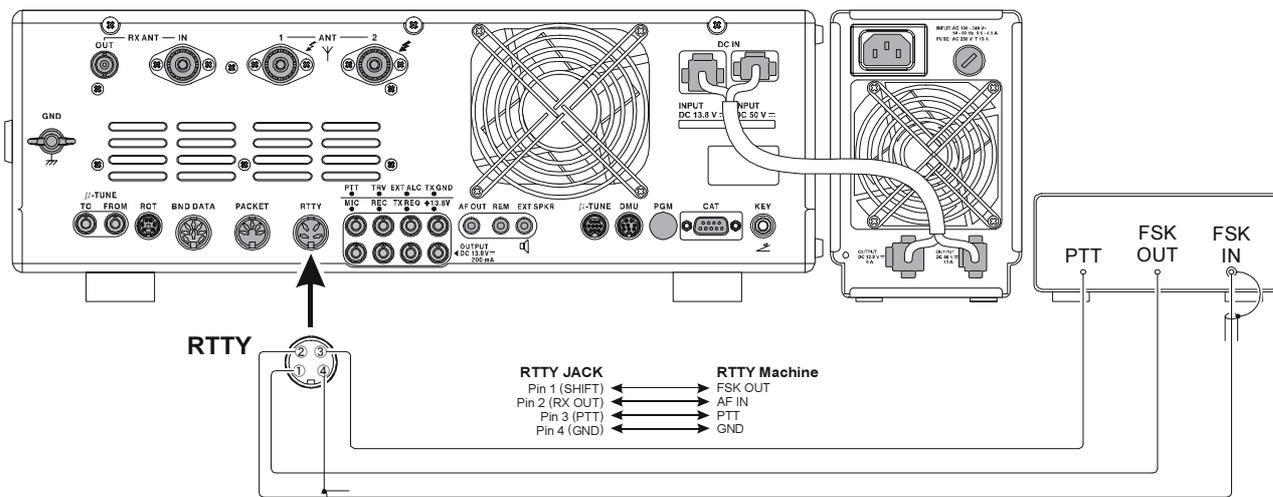
SETTING UP FOR RTTY OPERATION

Before commencing RTTY operation, please direct your attention to the setup steps shown in the chart to the right.

MENU ITEM	AVAILABLE VALUES
076 rtty R PLRTY	nor (normal) / rEU (reverse)
077 rtty T PLRTY	nor (normal) / rEU (reverse)
078 rtty RTY OUT	nAin (Main) / Sub (Sub)
079 rtty OUT LEL	0 ~ 100
080 rtty SHIFT	170/200/425/850 Hz
081 rtty TONE	1275/2125 Hz

BASIC SETUP

1. Press the [**RTTY**] button to enter the RTTY mode. One press of the [**RTTY**] button will engage RTTY operation using "LSB" injection, which is generally used in the Amateur service. In this mode, both the "RTTY" and "LSB" LEDs will light up.
   To switch to USB-side injection in RTTY, press the [**RTTY**] button once more. Both the "RTTY" and "USB" LEDs will now be illuminated. Repeatedly pressing the [**RTTY**] button will toggle between LSB and USB injection on RTTY.

2. When you begin typing on your TU or computer keyboard, the command to transmit should automatically be sent to the transceiver, causing it to enter the transmit mode.

NOTE:
If you anticipate making data transmissions of longer than a few minutes, we recommend that you use the [**RF PWR**] knob to reduce the transmitter power to 1/2 ~ 1/3 of its normal maximum.

ADVICE:
❒ There is no adjustment of the DATA input level (Pin 1 ("DATA IN") of the RTTY jack) on the rear panel; please make any needed level adjustments at the TU side.

❒ The Mark/Space Shift utilized in most Amateur RTTY operation is 170 Hz. Other shifts may be configured, however, using Menu item "080 rtty SHIFT."
   The **FT-2000D** is set up for "high tone" operation (centered on 2125 Hz) by default, but you may configure it for low tone (1275 Hz) operation using Menu item "081 rtty TONE."

❒ You may find that you are unable to decode some RTTY stations, even if they are of sufficient signal strength. If this is observed, there may be a Mark/Space polarity problem between your station and the other station. If so, try setting Menu item "076 rtty R PLRTY" to "rEU" ("Reverse") to see if that permits copy. A separate Menu item permits reversal of your transmitter's Mark/Space polarity: "077 rtty T PLRTY."

QUICK POINT:
In the **FT-2000D**, "RTTY" is a mode defined as being an "FSK" mode, whereby the closing and opening of a keying line (to ground) causes the Mark/Space tones to alternate. The RTTY mode is not an AFSK based mode in this transceiver, and the AFSK output tones from a TNC will not cause Mark/Space shifting to occur. Use the "Packet" mode for AFSK-based Baudot and other data modes.

MISCELLANEOUS AFSK-BASED DATA MODES

The **FT-2000D** may also be used for a host of other SSB-based Data modes. Please set up your system using the illustration as a guideline.
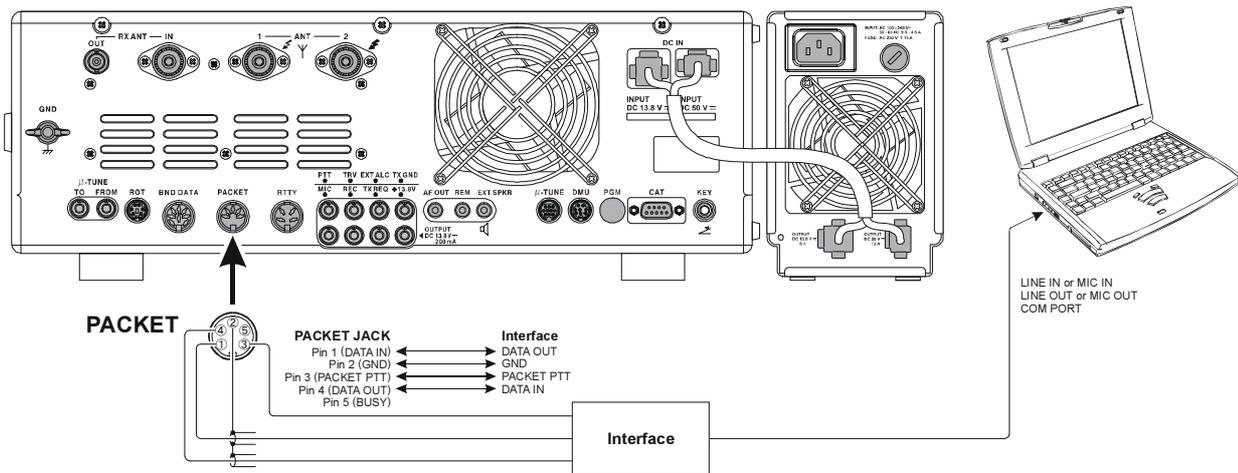
QUICK POINT:

When you have configured Menu item "146 tGEn VOX SEL" to "dAtA," the transceiver will operate in a "VOX" mode, and it is not necessary to connect a **PTT** line. This makes for very convenient interfacing to computer Sound Cards, etc.

ABOUT THE TRANSVERTER OUTPUT TERMINAL

You may connect an after-market transverter to the rear panel's TRV (Transverter) jack. The output, at 28 MHz, is approximately –10 dBm (0.1 mW) at 50 Ohms.

SETUP

1. Press the [**MENU**] button to enter the Menu mode.
2. Rotate the Main Tuning Dial knob to select Menu item "122 tun MY BAND."
3. Rotate the [**SUB VFO-B**] knob to find the Menu parameter "AU d" (this is the factory default setting).
4. Press the [**ENT**] button to change the parameter to "ON" (a "d" notation will replace the "E" notation).
5. Rotate the Main Tuning Dial knob to select Menu item "144 tGEn ETX-GND."
6. Rotate the [**SUB VFO-B**] knob to set this Menu item to "EnA" to enabling the rear panel's **TX GND** jack
7. Press and hold in the [**MENU**] button for at least two seconds to save the new setting and exit to normal operation.

OPERATION

1. Set up the frequency offset for transverter use, as described previously.
2. Choose the "Transverter" Band by the "MY Bands" operation, as described on page 46.
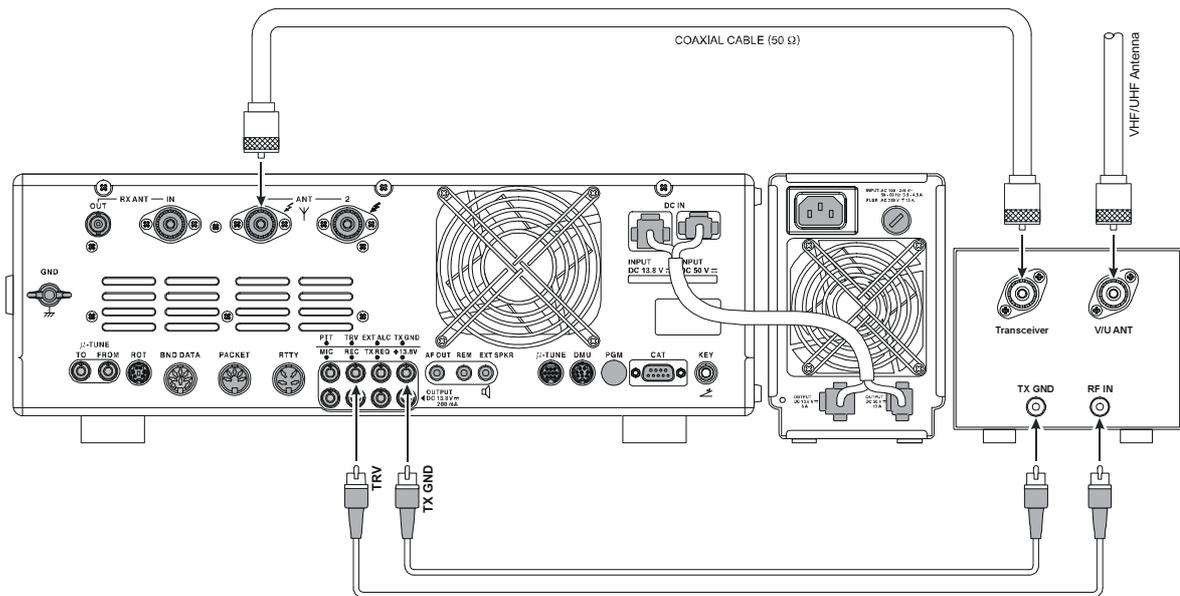3. Rotate the Main Tuning Dial knob to set the desired operating frequency. Operation is basically unchanged from normal transceiver operation.

ADVICE:

When the "TRV" mode is turned on, power output will not be allowed to pass to the "ANT 1" or "ANT 2" main antenna jacks. So one of these may be connected to your transverter's "RX" jack. Just be certain to disconnect the transverter when returning to HF operation, as the selected Antenna jack will now be capable of passing RF power.

Setting the Transverter Frequency Offset

You may set up the frequency display so that it shows the actual band on which your transverter is operating (instead of the "IF" used by the transverter, which is the 28 MHz band on your **FT-2000D**).

Example: Setting up the **FT-2000D** display for use with a 144 MHz Transverter

1. Connect the 144 MHz transverter to the **FT-2000D**.
2. Press the [**MENU**] button to enter the Menu mode.
3. Rotate the Main Tuning Dial knob to select Menu item "034 GEnE TRV SET" is set to "44" (the factory default setting).
4. Rotate the [**SUB VFO-B**] knob so as to select "44" on the display.
5. Press and hold in the [**MENU**] button for at least two seconds to save the new setting and exit.

The "100 MHz" digit of the frequency is not displayed, so when you are operating on 2 meters and see "45 MHz" on the frequency readout, this indicates "145 MHz" instead.

Advice:

With the setup described above, tuning the operating range 28-29 MHz will correspond to an actual operating frequency of 144-145 MHz, with "44-45" being displayed on the front panel of the transceiver.

MENU MODE

The Menu system of the **FT-2000D** provides extensive customization capability, so you can set up your transceiver just the way you want to operate it. The Menu items are grouped by general utilization category, and are numbered from "001 AGc FST DLY" to "147 tGEn EMRGNCY."

USING THE MENU

1. Press the [**MENU**] button momentarily, to engage the Menu mode.
   The Main (VFO-A) frequency display will show the Menu Number and Menu Group name, while the Sub (VFO-B) frequency display will show the Menu item; the Multi-Display window shows the current setting of the currently-selected Menu item.
2. Rotate the Main Tuning Dial knob to select the Menu item you wish to work on.
3. Rotate the [**SUB VFO-B**] knob to change the current setting of the selected Menu item.
4. When you have finished making your adjustments, press and hold in the [**MENU**] button for two seconds to save the new setting and exit to normal operation. If you only *momentarily* press the [**MENU**] button, the new settings will *__not__* be retained.

[MENU] Button
Main Tuning Dial Knob   [SUB VFO-B] Knob

Menu Number   Menu Group Name   Menu Item
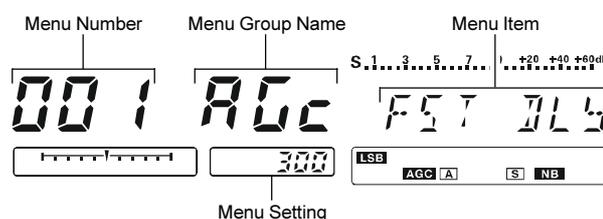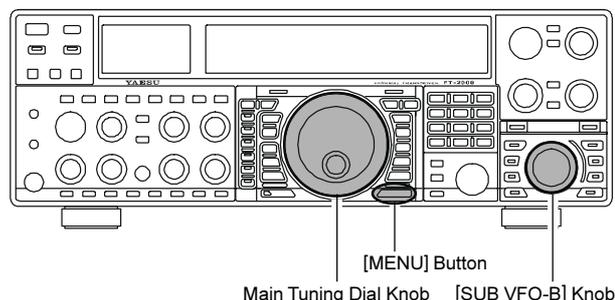
Menu Setting

Menu Mode Reset

You may reset all the Menu settings to their original factory defaults, if desired.

1. Turn the front panel [**POWER**] switch off.
2. Press and hold in the [**MENU**] button, and while holding it in, press the [**POWER**] switch to turn the transceiver back on. Now release the [**MENU**] button.

GROUP	NO.	MENU FUNCTION	AVAILABLE VALUES	DEFAULT SETTING
AGC	001	AGc FST DLY	20 ~ 4000 msec (20 msec/step)	300 msec
AGC	002	AGc FST HLD	0 ~ 2000 msec (20 msec/step)	0 msec
AGC	003	AGc MID DLY	20 ~ 4000 msec (20 msec/step)	700 msec
AGC	004	AGc MID HLD	0 ~ 2000 msec (20 msec/step)	0 msec
AGC	005	AGc SLW DLY	20 ~ 4000 msec (20 msec/step)	2000 msec
AGC	006	AGc SLW HLD	0 ~ 2000 msec (20 msec/step)	0 msec
DISPLAY	007	diSP COLOR	bL1/bL2/bL3/ub1/ub2	bL1※
DISPLAY	008	diSP DIM MTR	0 ~ 15	7
DISPLAY	009	diSP DIM VFD	0 ~ 7	4
DISPLAY	010	diSP BAR SEL	CLAr/C-tn/u-tn	C-tn
DISPLAY	011	diSP PK HLD	OFF/0.5/1.0/2.0 sec	OFF
DISPLAY	012	diSP RTR STU	0/90/180/270 °	0 °
DISPLAY	013	diSP RTR ADJ	−30 ~ 0	0
DISPLAY	014	diSP QMB MKR	On/OFF	On※1
DVS	015	dUS RX LVL	0 ~ 100	50
DVS	016	dUS TX LVL	0 ~ 100	50
KEYER	017	tEy BEACON	OFF/1 ~ 255 sec	OFF
KEYER	018	tEy NUM STL	1290/AunO/Aunt/A2nO/A2nt/12nO/12nt	1290
KEYER	019	tEy CONTEST	1 ~ 9999	1
KEYER	020	tEy CW MEM1	tyP1/tyP2	tyP2
KEYER	021	tEy CW MEM2	tyP1/tyP2	tyP2
KEYER	022	tEy CW MEM3	tyP1/tyP2	tyP2
KEYER	023	tEy CW MEM4	tyP1/tyP2	tyP2
KEYER	024	tEy CW MEM5	tyP1/tyP2	tyP2※
GENERAL	025	GEnE ANT SEL	bAnd/rEG	bAnd
GENERAL	026	GEnE BEP LVL	0 ~ 255	50
GENERAL	027	GEnE CAT BPS	4800/9600/192H(19200)/384H (38400) bps	4800 bps
GENERAL	028	GEnE CAT TOT	10/100/1000/3000 msec	10 msec
GENERAL	029	GEnE CAT RTS	On/OFF	On
GENERAL	030	GEnE MEM GRP	On/OFF	OFF
GENERAL	031	GEnE Q SPLIT	−20 ~ 0 ~ +20 kHz (1 kHz Step)	+5 kHz
GENERAL	032	GEnE TRACK	OFF/bAnd/FrEq	OFF
GENERAL	033	GEnE TX TOT	OFF/5/10/15/20/25/30 min	OFF
GENERAL	034	GEnE TRV SET	30 ~ 49 MHz	44 MHz
GENERAL	035	GEnE µT DIAL	StP1/ StP2/OFF	StP1
GENERAL	036	GEnE SNB LVL	nAin(MAIN)/0~100	nAin(MAIN)
GENERAL	037	GEnE SUB FIL	1200/300/500 Hz	1200 Hz
GENERAL	038	GEnE MIC SCN	On/OFF	On
GENERAL	039	GEnE SCN RSM	CAr/5Sec	5SEc
GENERAL	040	GEnE ANTIVOX	0 ~ 100	50
GENERAL	041	GEnE FRQ ADJ	−25 ~ 0 ~ +25	0
S IF SFT	042	S-iF LSB SFT	−1000 ~ +1000 Hz	0 Hz
S IF SFT	043	S-iF USB SFT	−1000 ~ +1000 Hz	0 Hz
S IF SFT	044	S-iF CWL SFT	−1000 ~ +1000 Hz	0 Hz
S IF SFT	045	S-iF CWU SFT	−1000 ~ +1000 Hz	0 Hz
S IF SFT	046	S-iF RTTY	−1000 ~ +1000 Hz	0 Hz
S IF SFT	047	S-iF RTTY-R	−1000 ~ +1000 Hz	0 Hz
S IF SFT	048	S-iF PKT-LSB	−1000 ~ +1000 Hz	0 Hz
S IF SFT	049	S-iF PKT-USB	−1000 ~ +1000 Hz	0 Hz
MODE-AM	050	A3E MICGAIN	Ur/0 ~ 100	30
MODE-AM	051	A3E MIC SEL	Frnt/dAtA/PC	Frnt
MODE-CW	052	A1A F-TYPE	OFF/buG/ELE/ACS	ELE
MODE-CW	053	A1A F-REV	nor/rEU	nor
MODE-CW	054	A1A R-TYPE	OFF/buG/ELE/ACS	ELE

※: Requires optional **DMU-2000** Data Management Unit.

GROUP	No.	MENU FUNCTION	AVAILABLE VALUES	DEFAULT SETTING
MODE-CW	055	A1A R-REV	nor/rEU	nor
MODE-CW	056	A1A CW AUTO	OFF/50/On	OFF
MODE-CW	057	A1A BFO	USb/LSb/Auto	USb
MODE-CW	058	A1A BK-IN	SEni/FuLL	SEni
MODE-CW	059	A1A SHAPE	1/2/4/6 msec	4 msec
MODE-CW	060	A1A WEIGHT	(1:) 2.5 ~ 4.5	3.0
MODE-CW	061	A1A FRQDISP	dir/OFSt	OFSt
MODE-CW	062	A1A PC KYNG	EnA (Enable)/diS (Disable)	diS (Disable)
MODE-CW	063	A1A QSKTIME	15/20/25/30 msec	15 msec
MODE-DAT	064	dAtA DATA IN	dAtA/PC	dAtA
MODE-DAT	065	dAtA DT GAIN	0 ~ 100	50
MODE-DAT	066	dAtA DT OUT	nAin (Main)/Sub (Sub)	nAin (Main)
MODE-DAT	067	dAtA OUT LVL	0 ~ 100	50
MODE-DAT	068	dAtA VOX DLY	30 ~ 3000 msec	300 msec
MODE-DAT	069	dAtA V GAIN	0 ~ 100	50
MODE-DAT	070	dAtA PKTDISP	–3000 ~ +3000 Hz (10 Hz/step)	0 Hz
MODE-DAT	071	dAtA PKT SFT	–3000 ~ +3000 Hz (10 Hz/step)	1000 Hz
MODE-FM	072	F3E MICGAIN	Ur/0 ~ 100	50
MODE-FM	073	F3E MIC SEL	Frnt/dAtA/PC	Frnt
MODE-FM	074	F3E 28 RPT	0 ~ 1000 kHz (10 kHz/step)	100 kHz
MODE-FM	075	F3E 50 RPT	0 ~ 4000 kHz (10 kHz/step)	1000 kHz
MODE-RTY	076	rtty R PLRTY	nor/rEU	nor
MODE-RTY	077	rtty T PLRTY	nor/rEU	nor
MODE-RTY	078	rtty RTY OUT	nAin (Main)/Sub (Sub)	nAin (Main)
MODE-RTY	079	rtty OUT LEL	0 ~ 100	50
MODE-RTY	080	rtty SHIFT	170/200/425/850 Hz	170 Hz
MODE-RTY	081	rtty TONE	1275/2125 Hz	2125 Hz
MODE-SSB	082	J3E MIC SEL	Frnt/dAtA/PC	Frnt
MODE-SSB	083	J3E TX BPF	1-30/1-29/2-28/3-27/4-26/3000	3-27
MODE-SSB	084	J3E LSB CAR	–200 Hz ~ +200 Hz (10 Hz/step)	0 Hz
MODE-SSB	085	J3E USB CAR	–200 Hz ~ +200 Hz (10 Hz/step)	0 Hz
MODE-SSB	086	J3E SLSB CR	–200 Hz ~ +200 Hz (10 Hz/step)	0 Hz
MODE-SSB	087	J3E SUSB CR	–200 Hz ~ +200 Hz (10 Hz/step)	0 Hz
RX AUDIO	088	rout AGC SLP	nor/SLP	nor
RX AUDIO	089	rout HEADPHN	SEP/Con1/Con2	SEP
RX DSP	090	rdSP CNTR LV	–40 ~ +20 dB	–15 dB
RX DSP	091	rdSP CNTR WI	1 – 11	10
RX DSP	092	rdSP NOTCH W	nArr (Narrow)/uuid (Wide)	uuid (Wide)
RX DSP	093	rdSP CW SHAP	SOFt/ShAP	ShAP
RX DSP	094	rdSP CW SLP	StP(STEEP)/nEd(MEDIUM)/GEnt(GENTLE)	nEd (MEDIUM)
RX DSP	095	rdSP CW NARR	25/50/100/200/300/400/500/800/1200/1400/ 1700/2000 Hz	500 Hz
RX DSP	096	rdSP PKT SHP	SOFt/ShAP	ShAP
RX DSP	097	rdSP PKT SLP	StP(STEEP)/nEd(MEDIUM)/GEnt(GENTLE)	nEd (MEDIUM)
RX DSP	098	rdSP PKT NAR	25/50/100/200/300/400 Hz	300 Hz
RX DSP	099	rdSP RTY SHP	SOFt/ShAP	ShAP
RX DSP	100	rdSP RTY SLP	StP(STEEP)/nEd(MEDIUM)/GEnt(GENTLE)	nEd (MEDIUM)
RX DSP	101	rdSP RTY NAR	25/50/100/200/300/400 Hz	300 Hz
RX DSP	102	rdSP SSB SHP	SOFt/ShAP	ShAP
RX DSP	103	rdSP SSB SLP	StP(STEEP)/nEd(MEDIUM)/GEnt(GENTLE)	nEd (MEDIUM)
RX DSP	104	rdSP SSB NAR	200/400/600/850/1100/1350/1500/1650/1800/ 950/2100/2250 Hz	1800 Hz
SCOPE	105	SCP 1.8 FI	1.800 - 1.999 MHz (1 kHz/step)	1.800 MHz※
SCOPE	106	SCP 3.5 FI	3.500 - 3.999 MHz (1 kHz/step)	3.500 MHz※

※: Requires optional **DMU-2000** Data Management Unit.

GROUP	NO.	MENU FUNCTION	AVAILABLE VALUES	DEFAULT SETTING
SCOPE	107	SCP 5.0 FI	5.250 - 5.499 MHz (1 kHz/step)	5.250 MHz※
SCOPE	108	SCP 7.0 FI	7.000 - 7.299 MHz (1 kHz/step)	7.000 MHz※
SCOPE	109	SCP 10.1 FI	(1)0.100 - (1)0.149 MHz (1 kHz/step)	(1)0.100 MHz※
SCOPE	110	SCP 14.0 FI	(1)4.000 - (1)4.349 MHz (1 kHz/step)	(1)4.000 MHz※
SCOPE	111	SCP 18.0 FI	(1)8.000 - (1)8.199 MHz (1 kHz/step)	(1)8.068 MHz※
SCOPE	112	SCP 21.0 FI	(2)1.000 - (2)1.449 MHz (1 kHz/step)	(2)1.000 MHz※
SCOPE	113	SCP 24.8 FI	(2)4.800 - (2)4.989 MHz (1 kHz/step)	(2)4.890 MHz※
SCOPE	114	SCP 28.0 FI	(2)8.000 - (2)9.699 MHz (1 kHz/step)	(2)8.000 MHz※
SCOPE	115	SCP 50.0 FI	(5)0.000 - (5)3.999 MHz (1 kHz/step)	(5)0.000 MHz※
TUNING	116	tun DIALSTEP	1 or 10 Hz	10 Hz
TUNING	117	tun CW FINE	EnA/diS	diS
TUNING	118	tun MHz SEL	1/0.1 MHz	1 MHz
TUNING	119	tun AM STEP	2.5/5/9/10/12.5 kHz	5 kHz
TUNING	120	tun FM STEP	5/6.25/10/12.5/25 kHz	5 kHz
TUNING	121	tun FM DIAL	10/100 Hz	100 Hz
TUNING	122	tun MY BAND	1.8 ~ 50/GE/AU	—
TX AUDIO	123	tAUd EQ1 FRQ	OFF/100 ~ 700 Hz (100 Hz/step)	OFF
TX AUDIO	124	tAUd EQ1 LVL	−10 ~ +10	+5
TX AUDIO	125	tAUd EQ1 BW	1 ~ 10	10
TX AUDIO	126	tAUd EQ2 FRQ	OFF/700 ~ 1500 Hz (100 Hz/step)	OFF
TX AUDIO	127	tAUd EQ2 LVL	−10 ~ +10	+5
TX AUDIO	128	tAUd EQ2 BW	1 ~ 10	10
TX AUDIO	129	tUAd EQ3 FRQ	OFF/1500 ~ 3200 Hz (100 Hz/step)	OFF
TX AUDIO	130	tUAd EQ3 LVL	−10 ~ +10	+5
TX AUDIO	131	tUAd EQ3 BW	1 ~ 10	10
TX AUDIO	132	tAUd PE1 FRQ	OFF/100 ~ 700 Hz (100 Hz/step)	200 Hz
TX AUDIO	133	tAUd PE1 LVL	−10 ~ +10	−10
TX AUDIO	134	tAUd PE1 BW	1 ~ 10	2
TX AUDIO	135	tAUd PE2 FRQ	OFF/700 ~ 1500 Hz (100 Hz/step)	800 Hz
TX AUDIO	136	tAUd PE2 LVL	−10 ~ +10	−3
TX AUDIO	137	tAUd PE2 BW	1 ~ 10	1
TX AUDIO	138	tUAd PE3 FRQ	OFF/1500 ~ 3200 Hz (100 Hz/step)	2100 Hz
TX AUDIO	139	tUAd PE3 LVL	−10 ~ +10	+6
TX AUDIO	140	tUAd PE3 BW	1 ~ 10	1
TX GNRL	141	tGEn BIAS	Ab/0 ~ 100	Ab
TX GNRL	142	tGEn MAX PWR	20/50/100/200 W	200 W
TX GNRL	143	tGEn PWRCTRL	ALL/Car	ALL
TX GNRL	144	tGEn ETX-GND	EnA(ENABLE)/diS(DISABLE)	diS(DISABLE)
TX GNRL	145	tGEn TUN PWR	20/50/100/200 W	100 W
TX GNRL	146	tGEn VOX SEL	nic/dAtA	nic
TX GNRL	147	tGEn EMRGNCY	EnA(ENABLE)/diS(DISABLE)	diS(DISABLE)

※: Requires optional **DMU-2000** Data Management Unit.

Menu Mode

AGC Group

001 AGc FST DLY

Function: Sets the delay time for the AGC FAST mode of the Main band (VFO-A) receiver.
Available Values: 20 ~ 4000 msec (20 msec/step)
Default Setting: 300 msec

002 AGc FST HLD

Function: Sets the hang time of the AGC peak voltage for the AGC FAST mode of the Main band (VFO-A) receiver.
Available Values: 0 ~ 2000 msec (20 msec/step)
Default Setting: 0 msec

003 AGc MID DLY

Function: Sets the delay time for the AGC MID mode of the Main band (VFO-A) receiver.
Available Values: 20 ~ 4000 msec (20 msec/step)
Default Setting: 700 msec

004 AGc MID HLD

Function: Sets the hang time of the AGC peak voltage for the AGC MID mode of the Main band (VFO-A) receiver.
Available Values: 0 ~ 2000 msec (20 msec/step)
Default Setting: 0 msec

005 AGc SLW DLY

Function: Sets the delay time for the AGC SLOW mode of the Main band (VFO-A) receiver.
Available Values: 20 ~ 4000 msec (20 msec/step)
Default Setting: 2000 msec

006 AGc SLW HLD

Function: Sets the hang time of the AGC peak voltage for the AGC SLOW mode of the Main band (VFO-A) receiver.
Available Values: 0 ~ 2000 msec (20 msec/step)
Default Setting: 0 msec

Display Group

007 diSP COLOR

Function: Selects the Display color when the optional Data Management Unit (**DMU-2000**) is connected.
Available Values: bL1/bL2/bL3/ub1/ub2
    bL1: COOL BLUE
    bL2: CONTRAST BLUE
    bL3: FLASH WHITE
    ub1: CONTRAST UMBER
    ub2: UMBER
Default Setting: bL1 (COOL BLUE)

Advice:
If the optional **DMU-2000** Data Management Unit is not connected, this adjustment has no effect.

008 diSP DIM MTR

Function: Setting of the meter brightness level when "DIM" is selected.
Available Values: 0 ~ 15
Default Setting: 4

009 diSP DIM VFD

Function: Setting of the frequency display brightness level when "DIM" is selected.
Available Values: 0 ~ 15
Default Setting: 8

010 diSP BAR SEL

Function: Selects one of three parameters to be viewed on the Tuning Offset Indicator.
Available Values: CLAr/C-tn/u-tn
Default Setting: C-tn
    CLAr: Displays relative clarifier offset.
    C-tu: Displays relative tuning offset between the incoming signal and transmitted frequency.
    u-tn: Displays the peak position of the VRF or μ-TUNE filter.

Note:
The μ-TUNE filter is an option.

011 diSP PK HLD

Function: Selects the peak hold time of the Sub (VFO-B) receiver's S-meter.
Available Values: OFF/0.5/1.0/2.0 sec
Default Setting: OFF

012 diSP RTR STU

Function: Selects the starting point of your rotator controller's indicator needle.
Available Values: 0/90/180/270 °
Default Setting: 0 °

013 diSP RTR ADJ

Function: Adjusts the indicator needle precisely to the starting point set in menu item "012 diSP RTR STU."
Available Values: –30 ~ 0
Default Setting: 0

DISPLAY GROUP

014 diSP QMB MKR

Function: Enables/Disables the QMB Marker (White arrow "▽") to display on the Spectrum Band Scope when the optional **DMU-2000** Data Management Unit is connected.

Available Values: On/OFF

Default Setting: On

ADVICE:

If the optional **DMU-2000** Data Management Unit is not connected, this adjustment has no effect.

DVS GROUP

015 dUS RX LVL

Function: Sets the audio output level from the voice memory.

Available Values: 0 ~ 100

Default: 50

016 dUS TX LVL

Function: Sets the microphone input level to the voice memory

Available Values: 0 ~ 100

Default: 50

KEYER GROUP

017 tEy BEACON

Function: Sets the interval time between repeats of the beacon message.

Available Values: OFF/1 ~ 255 sec

Default Setting: OFF

018 tEy NUM STL

Function: Selects the Contest Number "Cut" format for an imbedded contest number.

Available Values: 1290/AunO/Aunt/A2nO/A2nt/12nO/12nt

Default Setting: 1290

    1290: Does not abbreviate the Contest Number

    AunO: Abbreviates to "A" for "One," "U" for "Two," "N" for "Nine," and "O" for "Zero."

    Aunt: Abbreviates to "A" for "One," "U" for "Two," "N" for "Nine," and "T" for "Zero."

    A2nO: Abbreviates to "A" for "One," "N" for "Nine," and "O" for "Zero."

    A2nt: Abbreviates to "A" for "One," "N" for "Nine," and "T" for "Zero."

    12nO: Abbreviates to "N" for "Nine," and "O" for "Zero."

    12nt: Abbreviates to "N" for "Nine," and "T" for "Zero."

019 tEy CONTEST

Function: Enters the initial contest number that will increment/decrement after sending during contest QSOs.

Available Values: 1 ~ 9999

Default Setting: 1

ADVICE:

Press the [**CLEAR**] button to reset the contest number to "1."

020 tEy CW MEM1

Function: Permits entry of the CW message for message register 1.

Available Values: tyP1/tyP2

Default Setting: tyP2

    tyP1: You may enter the CW message from the front panel's Function Keys.

    tyP2: You may enter the CW message from the CW keyer.

021 tEy CW MEM2

Function: Permits entry of the CW message for message register 2.

Available Values: tyP1/tyP2

Default Setting: tyP2

    tyP1: You may enter the CW message from the front panel's Function Keys.

    tyP2: You may enter the CW message from the CW keyer.

MENU MODE

KEYER GROUP

022 tEy CW MEM3

Function: Permits entry of the CW message for message register 3.
Available Values: tyP1/tyP2
Default Setting: tyP2
  tyP1: You may enter the CW message from the front panel's Function Keys.
  tyP2: You may enter the CW message from the CW keyer.

023 tEy CW MEM4

Function: Permits entry of the CW message for message register 4.
Available Values: tyP1/tyP2
Default Setting: tyP2
  tyP1: You may enter the CW message from the front panel's Function Keys.
  tyP2: You may enter the CW message from the CW keyer.

024 tEy CW MEM5

Function: Permits entry of the CW message for message register 5.
Available Values: tyP1/tyP2
Default Setting: tyP2
  tyP1: You may enter the CW message from the front panel's Function Keys.
  tyP2: You may enter the CW message from the CW keyer.

ADVICE:

If the optional **FH-2** Remote Control Keypad is not connected, this adjustment has no effect.

GENERAL GROUP

025 GEnE ANT SEL

Function: Sets the method of antenna selection.
Available Values: bAnd/rEG
Default Setting: bAnd
  bAnd: The antenna is selected in accordance with the operating band.
  rEG: The antenna is selected in accordance with the band stack (different antennas may be utilized on the same band, if so selected in the band stack).

026 GEnE BEP LVL

Function: Sets the beep level.
Available Values: 0 ~ 255
Default Setting: 50

027 GEnE CAT BPS

Function: Sets the transceiver's computer-interface circuitry for the CAT baud rate to be used.
Available Values: 4800/9600/192H(19200)/384H (38400) bps
Default Setting: 4800 bps

028 GEnE CAT TOT

Function: Sets the Time-Out Timer countdown time for a CAT command input.
Available Values: 10/100/1000/3000 msec
Default Setting: 10 msec
The Time-Out Timer shuts off the CAT data input after the continuous transmission of the programmed time.

029 GEnE CAT RTS

Function: Enables/Disables the RTS port of the CAT jack.
Available Values: On/OFF
Default Setting: On

030 GEnE MEM GRP

Function: Enables/Disables Memory Group Operation.
Available Values: On/OFF
Default Setting: OFF

031 GEnE Q SPLIT

Function: Selects the tuning offset for the Quick Split feature.
Available Values: –20 ~ 0 ~ +20 kHz (1 kHz Step)
Default Setting: +5 kHz

GENERAL GROUP

032 GEnE TRACK

Function: Sets the VFO Tracking feature.
Available Values: OFF/bAND/FrEq
Default Setting: OFF

OFF: Disables the VFO Tracking feature.

bAND: When you change bands on the Main (VFO-A) side, the Sub (VFO-B) band's VFO will automatically change to be the same as that of VFO-A.

FrEq: This function is the almost same as "bAND," however, furthermore, the Sub band's (VFO-B) frequency changes together with the Main Band's (VFO-A) frequency when turning the Main Dial Tuning knob.

033 GEnE TX TOT

Function: Sets the Time-Out Timer countdown time.
Available Values: OFF/5/10/15/20/25/30 min
Default Setting: OFF

The Time-Out Timer shuts off the transmitter after continuous transmission of the programmed time.

034 GEnE TRV SET

Function: Sets the 10's and 1's of the MHz digits display for operation with a transverter.
Available Values: 30 ~ 49 MHz
Default Setting: 44 MHz

The default setting would be used with a 144 MHz transverter. If you connect a 430 MHz transverter to the radio, set this menu to "30" (the "100 MHz" digits are hidden on this radio).

035 GEnE μT DIAL

Function: Selects the μ-TUNE mode.
Available Values: StP1/ StP2/OFF
Default Setting: StP1

StP-1: Activates the μ-TUNE system using "COARSE" steps of the [**VRF**] knob (2 steps/click) on the 7 MHz and lower amateur bands. On the 10/14 MHz bands, "FINE" [**VRF**] knob steps (1 step/click) will be used.

StP2: Activates the μ-TUNE system using "FINE" steps of the [**VRF**] knob (1 step/click) on the 14 MHz and lower amateur bands on the Main band (VFO-A).

OFF: Disables the μ-TUNE system. Activates the VRF feature on the 14 MHz and lower amateur bands on the main band (VFO-A).

ADVICE:
If the optional RF μTuning Kit is not connected, this adjustment has no effect.

036 GEnE SNB LVL

Function: Adjusts the Sub band (VFO-B) receiver's IF Noise Blanker level, when the Noise Blanker is engaged.
Available Values: nAin(MAIN)/0~100
Default Setting: nAin(MAIN)

When this menu is set to "nAin(MAIN)," you may adjust the Noise Blanker level using the front panel's [**NB**] knob.

037 GEnE SUB FIL

Function: Defines the Sub band (VFO-B) receiver's CW narrow filter.
Available Values: 1200/300/500 Hz
Default Setting: 1200 Hz

ADVICE:
This Menu item tells the microprocessor which (if any) optional filter has been installed.

038 GEnE MIC SCN

Function: Enables/disables scanning access via the microphone's [**UP**]/[**DWN**] keys.
Available Values: On/OFF
Default Setting: On

039 GEnE SCN RSM

Function: Selects the Scan Resume mode.
Available Values: CAr/5SEc
Default Setting: 5SEc

CAr: The scanner will hold until the signal disappears, then will resume after one second.

5SEc: The scanner will hold for five seconds, then resume whether or not the other station is still transmitting.

040 GEnE ANTIVOX

Function: Adjusts the Anti-VOX Trip Gain which is the level of negative feedback of receiver audio to the microphone, to prevent receiver audio from activating the transmitter (via the microphone) during VOX operation.
Available Values: 0 ~ 100
Default Setting: 50

041 GEnE FRQ ADJ

Function: Adjusts the reference oscillator.
Available Values: −25 ~ 0 ~ +25
Default Setting: 0

Connect a 50-Ohm dummy load and frequency counter to the antenna jack; adjust the [**SUB VFO-B**] knob so that the frequency counter reading is same as the VFO frequency while pressing the **PTT** switch.

ADVICE:
Do not perform this Menu item unless you have a high-performance frequency counter. Perform this Menu item after aging the transceiver and frequency counter sufficiently (at least 30 minutes).

MENU MODE

S IF SFT (SUB BAND IF SHIFT) GROUP

042 S-iF LSB SFT
Function: Sets the center frequency of the Sub band (VFO-B) receiver's IF filter in the LSB mode.
Available Values: –1000 ~ +1000 Hz
Default Setting: 0 Hz

043 S-iF USB SFT
Function: Sets the center frequency of the Sub band (VFO-B) receiver's IF filter in the USB mode.
Available Values: –1000 ~ +1000 Hz
Default Setting: 0 Hz

044 S-iF CWL SFT
Function: Sets the center frequency of the Sub band (VFO-B) receiver's IF filter in the CW (LSB) mode.
Available Values: –1000 ~ +1000 Hz
Default Setting: 0 Hz

045 S-iF CWU SFT
Function: Sets the center frequency of the Sub band (VFO-B) receiver's IF filter in the CW (USB) mode.
Available Values: –1000 ~ +1000 Hz
Default Setting: 0 Hz

046 S-iF RTTY
Function: Sets the center frequency of the Sub band (VFO-B) receiver's IF filter in the RTTY mode.
Available Values: –1000 ~ +1000 Hz
Default Setting: 0 Hz

047 S-iF RTTY-R
Function: Sets the center frequency of the Sub band (VFO-B) receiver's IF filter in the RTTY reverse mode.
Available Values: –1000 ~ +1000 Hz
Default Setting: 0 Hz

048 S-iF PKT-LSB
Function: Sets the center frequency of the Sub band (VFO-B) receiver's IF filter in the Packet (LSB) mode.
Available Values: –1000 ~ +1000 Hz
Default Setting: 0 Hz

049 S-iF PKT-USB
Function: Sets the center frequency of the Sub band (VFO-B) receiver's IF filter in the Packet (USB) mode.
Available Values: –1000 ~ +1000 Hz
Default Setting: 0 Hz

MODE-AM GROUP

050 A3E MICGAIN
Function: Sets the microphone gain for the AM mode.
Available Values: Ur/0 ~ 100
Default Setting: 30
When this menu is set to "Ur," you may adjust the microphone gain using the front panel's [**MIC**] knob.

051 A3E MIC SEL
Function: Selects the microphone to be used on the AM mode.
Available Values: Frnt/dAtA/PC
Default Setting: Frnt

Frnt: Selects the microphone connected to the front panel's **MIC** jack while using the AM mode.

dAtA: Selects the microphone connected to pin 1 of the **PACKET** Jack while using the AM mode.

PC: This parameter is for future expansion of this transceiver's capabilities, but at this time is not supported.

MODE-CW GROUP

052 A1A F-TYPE

Function: Selects the desired keyer operation mode for the device connected to the front panel's **KEY** jack.
Available Values: OFF/buG/ELE/ACS
Default Setting: ELE

OFF: Disables the front panel's keyer ("straight key" mode for use with external keyer or computer-driven keying interface).

buG: Mechanical "bug" keyer emulation. One paddle produces "dits" automatically, while the other paddle manually produces "dahs."

ELE: Iambic keyer with ACS (Automatic Character Spacing) disabled.

ACS: Iambic keyer with ACS (Automatic Character Spacing) enabled.

053 A1A F-REV

Function: Selects the keyer paddle's wiring configuration for the **KEY** jack on the front panel.
Available Values: nor/rEU
Default Setting: nor

nor: Tip = Dot, Ring = Dash, Shaft = Ground
rEU: Tip = Dash, Ring = Dot, Shaft = Ground

054 A1A R-TYPE

Function: Selects the desired keyer operation mode for the device connected to the rear panel's **KEY** jack.
Available Values: OFF/buG/ELE/ACS
Default Setting: ELE

OFF: Disables the rear panel's keyer ("straight key" mode for use with external keyer or computer-driven keying interface).

buG: Mechanical "bug" keyer emulation. One paddle produces "dits" automatically, while the other paddle manually produces "dahs."

ELE: Iambic keyer with ACS (Automatic Character Spacing) disabled.

ACS: Iambic keyer with ACS (Automatic Character Spacing) enabled.

055 A1A R-REV

Function: Selects the keyer paddle's wiring configuration for the **KEY** jack on the rear panel.
Available Values: nor/rEU
Default Setting: nor

nor: Tip = Dot, Ring = Dash, Shaft = Ground
rEU: Tip = Dash, Ring = Dot, Shaft = Ground

056 A1A CW AUTO

Function: Enables/disables CW keying while operating on SSB.
Available Values: OFF/50/On
Default Setting: OFF

OFF: Disables CW keying while operating on SSB.

50: Enables CW keying only while operating SSB on 50 MHz (but not HF).

On: Enables CW keying while operating on SSB (all TX bands).

NOTE:

This feature allows you to move someone from SSB to CW without having to change modes on the front panel.

057 A1A BFO

Function: Sets the CW carrier oscillator injection side for the CW mode.
Available Values: USb/LSb/Auto
Default Setting: USb

USb: Injects the CW carrier oscillator on the USB side.

LSb: Injects the CW carrier oscillator on the LSB side.

Auto: Injects the CW carrier oscillator on the LSB side while operating on the 7 MHz band and below, and the USB side while operating on the 10 MHz band and up.

058 A1A BK-IN

Function: Sets the CW "break-in" mode.
Available Values: SEni/FuLL
Default Setting: SEni

SEni (SEMI): The transceiver will operate in the semi break-in mode. The delay (receiver recovery) time is set by the front panel's [**DELAY**] knob.

FuLL: The transceiver will operate in the full break-in (QSK) mode.

059 A1A SHAPE

Function: Selects the CW carrier wave-form shape (rise/fall times).
Available Values: 1/2/4/6 msec
Default Setting: 4 msec

060 A1A WEIGHT

Function: Sets the Dot:Dash ratio for the built-in electronic keyer.
Available Values: (1:) 2.5 ~ 4.5
Default Setting: 3.0

MENU MODE

MODE-CW GROUP

061 A1A FRQDISP
Function: Selects the frequency Display Format for the CW mode.
Available Values: dir/OFSt
Default Setting: OFSt

dir (Direct Frequency):	Displays the receiver carrier frequency, without any offset added. When changing modes between SSB and CW, the frequency display remains constant.
OFSt (Pitch Offset):	This frequency display reflects the added BFO offset.

062 A1A PC KYNG
Function: Enables/disables CW keying from the "DATA IN" terminal on the rear panel's **PACKET** jack while operating on the CW mode.
Available Values: EnA (Enable)/diS (Disable)
Default Setting: diS (Disable)

063 A1A QSKTIME
Function: Selects the time delay between when the **PTT** is keyed and the carrier is transmitted during QSK operation when using the internal keyer.
Available Values: 15/20/25/30 msec
Default Setting: 15 msec

MODE-DAT GROUP

064 dAtA DATA IN
Function: Selects the data input path to be used on the PKT mode.
Available Values: dAtA/PC
Default Setting: dAtA

dAtA:	Uses the data input line connected to pin 1 of the **PACKET** jack while using the PKT mode.
PC:	This parameter is for future expansion of this transceiver's capabilities, but at this time is not supported.

065 dAtA DT GAIN
Function: Sets the data input level from the TNC to the AFSK modulator.
Available Values: 0 ~ 100
Default Setting: 50

066 dAtA DT OUT
Function: Selects the receiver to be connected to the data output port (pin 4) of the **PACKET** jack.
Available Values: nAin (Main)/Sub (Sub)
Default Setting: nAin (Main)

067 dAtA OUT LVL
Function: Sets the AFSK data output level at the output port (pin 4) of the **PACKET** jack.
Available Values: 0 ~ 100
Default Setting: 50

068 dAtA VOX DLY
Function: Adjusts the "VOX" delay (receiver recovery) time on the PKT mode.
Available Values: 30 ~ 3000 msec
Default Setting: 300 msec

069 dAtA V GAIN
Function: Adjusts the "VOX" gain on the PKT mode.
Available Values: 0 ~ 100
Default Setting: 50

070 dAtA PKTDISP
Function: Sets the packet frequency display offset.
Available: –3000 ~ +3000 Hz (10 Hz/step)
Default: 0 Hz

071 dAtA PKT SFT
Function: Sets the carrier point during the SSB packet operation.
Available: –3000 ~ +3000 Hz (10 Hz/step)
Default: 1000 Hz (typical center frequency for PSK31, etc.)

MODE-FM GROUP

072 F3E MICGAIN
Function: Sets the microphone gain for the FM mode.
Available Values: Ur/0 ~ 100
Default Setting: 50
When this menu is set to "Ur," you may adjust the microphone gain using the front panel's [**MIC**] knob.

073 F3E MIC SEL
Function: Selects the microphone to be used on the FM mode.
Available Values: Frnt/dAtA/PC
Default Setting: Frnt

    Frnt (FRONT): Selects the microphone connected to the front panel's **MIC** jack while using the FM mode.
    dAtA: Selects the microphone connected to pin 1 of the **PACKET** Jack while using the FM mode.
    PC: This parameter is for future expansion of this transceiver's capabilities, but at this time is not supported.

074 F3E 28 RPT
Function: Sets the magnitude of the repeater shift on the 28 MHz band.
Available Values: 0 ~ 1000 kHz (10 kHz/step)
Default Setting: 100 kHz

075 F3E 50 RPT
Function: Sets the magnitude of the repeater shift on the 50 MHz band.
Available Values: 0 ~ 4000 kHz (10 kHz/step)
Default Setting: 1000 kHz

MODE-RTY GROUP

076 rtty R PLRTY
Function: Selects normal or reverse Mark/Space polarity for RTTY receive operation.
Available Values: nor/rEU
Default Setting: nor

077 rtty T PLRTY
Function: Selects normal or reverse Mark/Space polarity for RTTY transmit operation.
Available Values: nor/rEU
Default Setting: nor

078 rtty RTY OUT
Function: Selects the receiver to be connected to the data output port (pin 1) of the **RTTY** jack.
Available Values: nAin (Main)/Sub (Sub)
Default Setting: nAin (Main)

079 rtty OUT LEL
Function: Sets the FSK RTTY data output level at the output port (pin 1) of the **RTTY** jack.
Available Values: 0 ~ 100
Default Setting: 50

080 rtty SHIFT
Function: Selects the frequency shift for FSK RTTY operation.
Available Values: 170/200/425/850 Hz
Default Setting: 170 Hz

081 rtty TONE
Function: Selects the Mark tone for RTTY operation.
Available Values: 1275/2125 Hz
Default Setting: 2125 Hz

MENU MODE

MODE-SSB GROUP

082 J3E MIC SEL
Function: Selects the microphone to be used on the SSB modes (LSB and USB).
Available Values: Frnt/dAtA/PC
Default Setting: Frnt

Frnt (FRONT): Selects the microphone connected to the front panel's **MIC** jack while using the SSB modes.

dAtA: Selects the microphone connected to pin 1 of the **PACKET** Jack while using the SSB modes.

PC: This parameter is for future expansion of this transceiver's capabilities, but at this time is not supported.

083 J3E TX BPF
Function: Selects the audio passband of the DSP modulator on the SSB mode.
Available Values: 1-30/1-29/2-28/3-27/4-26/3000

1-30: 50-3000(Hz)
1-29: 100-2900(Hz)
2-28: 200-2800(Hz)
3-27: 300-2700(Hz)
4-26: 400-2600(Hz)
3000: 3000WB

Default Setting: 3-27 (300-2700 Hz)
NOTE:

The apparent power output, when using the widest bandwidths, may seem lower. This is normal, and it occurs because the available transmitter power is distributed over a wider bandwidth. The greatest compression of power output, conversely, occurs when using the "4-26" setting (400-2600 Hz), and this setting is highly recommended for contest or DX pile-up work.

084 J3E LSB CAR
Function: Adjusts the receiver carrier point for the Main band's (VFO-A) LSB mode.
Available Values: –200 Hz ~ +200 Hz (10 Hz steps)
Default Setting: 0 Hz

085 J3E USB CAR
Function: Adjusts the receiver carrier point for Main band's (VFO-A) USB mode.
Available Values: –200 Hz ~ +200 Hz (10 Hz/step)
Default Setting: 0 Hz

086 J3E SLSB CR
Function: Adjusts the receiver carrier point for the Sub band's (VFO-B) LSB mode.
Available Values: –200 Hz ~ +200 Hz (10 Hz/step)
Default Setting: 0 Hz

087 J3E SUSB CR
Function: Adjusts the receiver carrier point for Sub band's (VFO-B) USB mode.
Available Values: –200 Hz ~ +200 Hz (10 Hz/step)
Default Setting: 0 Hz

RX AUDIO GROUP

088 rout AGC SLP
Function: Selects the gain curve of the AGC amplifier.
Available Values: nor/SLP
Default Setting: nor

nor (NORMAL): The AGC output level will follow a linear response to the antenna input level, while AGC is activated.

SLP (SLOPED): The AGC output level will increase at 1/10 the rate of the antenna input level, while AGC is activated.
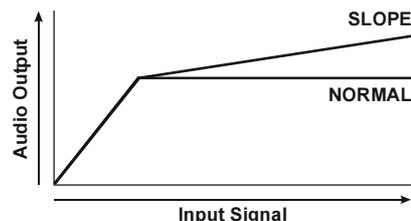
089 rout HEADPHN
Function: Selects one of three audio mixing modes when using headphones during Dual Receive operation.
Available Values: SEP/Con1/Con2
Default Setting: SEP

SEP (SEPARATE): Audio from the Main (VFO-A) receiver is heard only in the left ear, and Sub (VFO-B) receiver audio solely in the right ear.

Con1 (COMBINE 1): Audio from both Main (VFO-A) and Sub (VFO-B) receivers can be heard in both ears, but Sub (VFO-B) audio is attenuated in the left ear and Main (VFO-A) audio is attenuated in the right ear.

Con2 (COMBINE 2): Audio from both Main (VFO-A) and Sub (VFO-B) receivers is combined and heard equally in both ears.

RX DSP GROUP

090 rdSP CNTR LV

Function: Adjusts the parametric equalizer gain of the Contour filter.
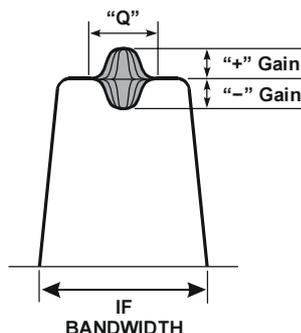**Available Values**: –40 ~ +20 dB
Default Setting: –15 dB

091 rdSP CNTR WI

Function: Adjusts the Q-factor of the Contour filter.
Available Values: 1 - 11
Default Setting: 10

CONTOUR "GAIN" AND "Q"

092 rdSP NOTCH W

Function: Selects the bandwidth of the DSP NOTCH filter
Available Values: nArr (Narrow)/uuid (Wide)
Default Setting: uuid (Wide)

093 rdSP CW SHAP

Function: Selects the passband characteristics of the DSP filter for the CW mode.
Available Values: SOFt/ShAP
Default Setting: ShAP
　　SOFt (SOFT):　Primary importance is attached to the amplitude of the filter factor.
　　ShAP (SHARP): Primary importance is attached to the phase of the filter factor.

094 rdSP CW SLP

Function: Selects the shape factor of the DSP filter for the CW mode.
**Available Values**: StP(STEEP)/nEd(MEDIUM)/ GEnt(GENTLE)
Default Setting: nEd (MEDIUM)

095 rdSP CW NARR

Function: Selects the passband of the DSP filter for the CW "Narrow" mode.
Available Values: 25/50/100/200/300/400/500/800/1200/ 1400/1700/2000 Hz
Default Setting: 500 Hz

096 rdSP PKT SHP

Function: Selects the passband characteristics of the DSP filter for the PKT mode.
Available Values: SOFt/ShAP
Default Setting: ShAP
　　SOFt (SOFT):　Primary importance is attached to the amplitude of the filter factor.
　　ShAP (SHARP): Primary importance is attached to the phase of the filter factor.

097 rdSP PKT SLP

Function: Selects the shape factor of the DSP filter for the PKT mode.
Available Values: StP(STEEP)/nEd(MEDIUM)/ GEnt(GENTLE)
Default Setting: nEd (MEDIUM)

098 rdSP PKT NAR

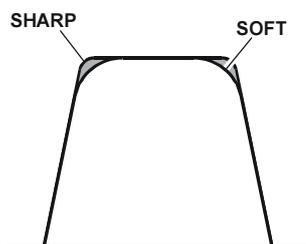**Function**: Selects the passband of the DSP filter for the PKT "Narrow" mode.
Available Values: 25/50/100/200/300/400 Hz
Default Setting: 300 Hz

099 rdSP RTY SHP

Function: Selects the passband characteristics of the DSP filter for the RTTY mode.
Available Values: SOFt/ShAP
Default Setting: ShAP
　　SOFt (SOFT):　Primary importance is attached to the amplitude of the filter factor.
　　ShAP (SHARP): Primary importance is attached to the phase of the filter factor.

100 rdSP RTY SLP

Function: Selects the shape factor of the DSP filter for the RTTY mode.
Available Values: StP(STEEP)/nEd(MEDIUM)/ GEnt(GENTLE)
Default Setting: nEd (MEDIUM)

101 rdSP RTY NAR

Function: Selects the passband of the DSP filter for the RTTY "Narrow" mode.
Available Values: 25/50/100/200/300/400 Hz
Default Setting: 300 Hz

MENU MODE

RX DSP GROUP

102 rdSP SSB SHP

Function: Selects the passband characteristics of the DSP filter for the SSB modes (LSB and USB).
Available Values: SOFt/ShAP
Default Setting: ShAP

    SOFt (SOFT):   Primary importance is attached to the amplitude of the filter factor.
    ShAP (SHARP): Primary importance is attached to the phase of the filter factor.

103 rdSP SSB SLP

Function: Selects the shape factor of the DSP filter for the SSB modes (LSB and USB).
Available Values: StP(STEEP)/nEd(MEDIUM)/GEnt(GENTLE)
Default Setting: nEd (MEDIUM)

104 rdSP SSB NAR

Function: Selects the passband of the DSP filter for the "Narrow" SSB mode.
Available Values: 200/400/600/850/1100/1350/1500/1650/1800/1950/2100/2250 Hz
Default Setting: 1800 Hz
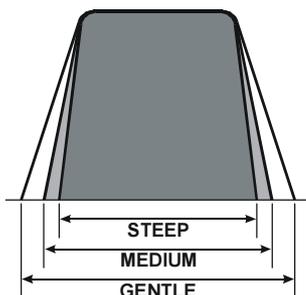
DSP FILTER PASSBAND

DSP FILTER SHAPE

SCOPE GROUP

ADVICE:

This group's adjustment has no effect, if the optional DMU-2000 Data Management Unit is not connected.

105 SCP 1.8 FI

Function: Selects the scan start frequency of the FIX mode Spectrum Scope while monitoring on the 160 m amateur band.
Available Values: 1.800 - 1.999 MHz (1 kHz/step)
Default Setting: 1.800 MHz

106 SCP 3.5 FI

Function: Selects the scan start frequency of the FIX mode Spectrum Scope while monitoring on the 80 m amateur band.
Available Values: 3.500 - 3.999 MHz (1 kHz/step)
Default Setting: 3.500 MHz

107 SCP 5.0 FI

Function: Selects the scan start frequency of the FIX mode Spectrum Scope while monitoring on the 60 m amateur band.
Available Values: 5.250 - 5.499 MHz (1 kHz/step)
Default Setting: 5.250 MHz

108 SCP 7.0 FI

Function: Selects the scan start frequency of the FIX mode Spectrum Scope while monitoring on the 40 m amateur band.
Available Values: 7.000 - 7.299 MHz (1 kHz/step)
Default Setting: 7.000 MHz

109 SCP 10.1 FI

Function: Selects the scan start frequency of the FIX mode Spectrum Scope while monitoring on the 30 m amateur band.
Available Values: (1)0.100 - (1)0.149 MHz (1 kHz steps)
Default Setting: (1)0.100 MHz

SCOPE GROUP

110 SCP 14.0 FI
Function: Selects the scan start frequency of the FIX mode Spectrum Scope while monitoring on the 20 m amateur band.
Available Values: (1)4.000 - (1)4.349 MHz (1 kHz/step)
Default Setting: (1)4.000 MHz

111 SCP 18.0 FI
Function: Selects the scan start frequency of the FIX mode Spectrum Scope while monitoring on the 17 m amateur band.
Available Values: (1)8.000 - (1)8.199 MHz (1 kHz/step)
Default Setting: (1)8.068 MHz

112 SCP 21.0 FI
Function: Selects the scan start frequency of the FIX mode Spectrum Scope while monitoring on the 15 m amateur band.
Available Values: (2)1.000 - (2)1.449 MHz (1 kHz/step)
Default Setting: (2)1.000 MHz

113 SCP 24.8 FI
Function: Selects the scan start frequency of the FIX mode Spectrum Scope while monitoring on the 12 m amateur band.
Available Values: (2)4.800 - (2)4.989 MHz (1 kHz/step)
Default Setting: (2)4.890 MHz

114 SCP 28.0 FI
Function: Selects the scan start frequency of the FIX mode Spectrum Scope while monitoring on the 10 m amateur band.
Available Values: (2)8.000 - (2)9.699 MHz (1 kHz/step)
Default Setting: (2)8.000 MHz

115 SCP 50.0 FI
Function: Selects the scan start frequency of the FIX mode Spectrum Scope while monitoring on the 6 m amateur band.
Available Values: (5)0.000 - (5)3.999 MHz (1 kHz/step)
Default Setting: (5)0.000 MHz

TUNING GROUP

116 tun DIALSTEP
Function: Setting of the Main Tuning Dial knob's tuning speed on the SSB, CW, and AM modes.
Available Values: 1 or 10 Hz
Default Setting: 10 Hz

117 tun CW FINE
Function: Enabling/disabling of the "Fine" tuning speed in the CW mode.
Available Values: EnA (ENABLE) / diS (DISABLE)
Default Setting: diS (DISABLE)
    EnA (ENABLE): Tuning in 1 Hz steps on the CW mode.
    diS (DISABLE): Tuning according to the steps determined via menu item "116 tun DIALSTEP."

118 tun MHz SEL
Function: Selects the tuning steps for the [**SUB VFO-B**] knob when the [**MHz**] button is pressed.
Available Values: 1/0.1 MHz
Default Setting: 1 MHz

119 tun AM STEP
Function: Selects the tuning steps for the microphone's [**UP**]/[**DWN**] keys in the AM mode.
Available Values: 2.5/5/9/10/12.5 kHz
Default Setting: 5 kHz

120 tun FM STEP
Function: Selects the tuning steps for the microphone's [**UP**]/[**DWN**] keys in the FM mode.
Available Values: 5/6.25/10/12.5/25 kHz
Default Setting: 5 kHz

121 tun FM DIAL
Function: Setting of the Main Tuning Dial knob's tuning speed in the FM mode.
Available Values: 10/100 Hz per step
Default Setting: 100 Hz per step

122 tun MY BAND
Function: Programs a band to be skipped while selecting bands using the [**SUB VFO-B**] knob.
Available Values: 1.8 ~ 50/GE/AU
Default Setting: —
To program the band to be skipped, rotate the [**SUB VFO-B**] knob to recall the band to be skipped while selecting bands via the [**SUB VFO-B**] knob, then press the [**ENT**] button to change this setting to "ON" (a "d" notation will replace the "E" notation). Repeat the same procedures to cancel the setting (skipped "Off": "d" notation appears).

MENU MODE

123 tAUd EQ1 FRQ

Function: Selects the center frequency of the lower range for the parametric microphone equalizer.
Available Values: OFF/100 ~ 700 Hz (100 Hz/step)
Default Setting: OFF

OFF: The equalizer gain and Q-factor are set to factory defaults (flat).

100 ~ 700: Center frequencies of 100 Hz ~ 700 Hz. You may adjust the equalizer gain and Q-factor at this selected audio frequency via menu items "124 tAUd EQ1 LVL" and "125 tAUd EQ1 BW."

124 tAUd EQ1 LVL

Function: Adjusts the equalizer gain of the low range of the parametric microphone equalizer.
Available Values: –10 ~ +10
Default Setting: +5

125 tAUd EQ1 BW

Function: Adjusts the Q-factor of the low range of the parametric microphone equalizer.
Available Values: 1 ~ 10
Default Setting: 10

126 tAUd EQ2 FRQ

Function: Selects the center frequency of the middle range for the parametric microphone equalizer.
Available Values: OFF/700 ~ 1500 Hz (100 Hz/step)
Default Setting: OFF

OFF: The equalizer gain and Q-factor are set to factory defaults (flat).

700 ~ 1500: Center frequencies of 700 Hz ~ 1500 Hz. You may adjust the equalizer gain and Q-factor at this selected audio frequency via menu items "127 tAUd EQ2 LVL" and "128 EQ2 BW."

127 tAUd EQ2 LVL

Function: Adjusts the equalizer gain of the middle range of the parametric microphone equalizer.
Available Values: –10 ~ +10
Default Setting: +5

128 tAUd EQ2 BW

Function: Adjusts the Q-factor of the middle range of the parametric microphone equalizer.
Available Values: 1 ~ 10
Default Setting: 10

129 tUAd EQ3 FRQ

Function: Selects the center frequency of the high range for the parametric microphone equalizer.
Available Values: OFF/1500 ~ 3200 Hz (100 Hz/step)
Default Setting: OFF

OFF: The equalizer gain and Q-factor are set to factory defaults (flat).

1500 ~ 3200: Center frequencies of 1500 Hz ~ 3200 Hz. You may adjust the equalizer gain and Q-factor in this selected audio frequency via menu items "130 tUAd EQ3 LVL" and "131 tUAd EQ3 BW."

130 tUAd EQ3 LVL

Function: Adjusts the equalizer gain of the high range of the parametric microphone equalizer.
Available Values: –10 ~ +10
Default Setting: +5

131 tUAd EQ3 BW

Function: Adjusts the Q-factor of the high range of the parametric microphone equalizer.
Available Values: 1 ~ 10
Default Setting: 10

132 tAUd PE1 FRQ

Function: Selects the center frequency of the lower range for the parametric microphone equalizer when the speech processor is activated.
Available Values: OFF/100 ~ 700 Hz (100 Hz/step)
Default Setting: 200 Hz

OFF: The equalizer gain and Q-factor are set to factory defaults (flat).

100 ~ 700: Center frequencies of 100 Hz ~ 700 Hz. You may adjust the equalizer gain and Q-factor at this selected audio frequency via menu items "133 tAUd PE1 LVL" and "134 tAUd PE1 BW."

133 tAUd PE1 LVL

Function: Adjusts the equalizer gain of the low range of the parametric microphone equalizer when the speech processor is activated.
Available Values: –10 ~ +10
Default Setting: –10

134 tAUd PE1 BW

Function: Adjusts the Q-factor of the low range of the parametric microphone equalizer when the speech processor is activated.
Available Values: 1 ~ 10
Default Setting: 2

TX AUDIO GROUP

135 tAUd PE2 FRQ

Function: Selects the center frequency of the middle range for the parametric microphone equalizer when the speech processor is activated.

Available Values: OFF/700 ~ 1500 Hz (100 Hz/step)

Default Setting: 800 Hz

    OFF: The equalizer gain and Q-factor are set to factory defaults (flat).

    700 ~ 1500: Center frequencies of 700 Hz ~ 1500 Hz. You may adjust the equalizer gain and Q-factor at this selected audio frequency via menu items "136 tAUd PE2 LVL" and "137 PE2 BW."

136 tAUd PE2 LVL

Function: Adjusts the equalizer gain of the middle range of the parametric microphone equalizer when the speech processor is activated.

Available Values: –10 ~ +10

Default Setting: –3

137 tAUd PE2 BW

Function: Adjusts the Q-factor of the middle range of the parametric microphone equalizer when the speech processor is activated.

Available Values: 1 ~ 10

Default Setting: 1

138 tUAd PE3 FRQ

Function: Selects the center frequency of the high range for the parametric microphone equalizer when the speech processor is activated.

Available Values: OFF/1500 ~ 3200 Hz (100 Hz/step)

Default Setting: 2100 Hz

    OFF: The equalizer gain and Q-factor are set to factory defaults (flat).

    1500 ~ 3200: Center frequencies of 1500 Hz ~ 3200 Hz. You may adjust the equalizer gain and Q-factor in this selected audio frequency via menu items "139 tUAd PE3 LVL" and "140 tUAd PE3 BW."

139 tUAd PE3 LVL

Function: Adjusts the equalizer gain of the high range of the parametric microphone equalizer when the speech processor is activated.

Available Values: –10 ~ +10

Default Setting: +6

140 tUAd PE3 BW

Function: Adjusts the Q-factor of the high range of the parametric microphone equalizer when the speech processor is activated.

Available Values: 1 ~ 10

Default Setting: 1

TX GNRL GROUP

141 tGEn BIAS

Function: Selects the Final Amplifier's operation mode between the "**Class-A**" and "**Class-AB**," and adjust the Bias level while "Class-A" operation.

Available Values: Ab "Class-AB"/0 ~ 100 "Class-A"

Default Setting: Ab

142 tGEn MAX PWR

Function: Selects a maximum output power limit.

Available Values: 20/50/100/200 W

Default Setting: 200 W

143 tGEn PWRCTRL

Function: Configures the [**RF PWR**] knob.

Available Values: ALL/CAr

Default Setting: ALL

    ALL: The [**RF PWR**] knob is enabled on all modes.

    CAr: The [**RF PWR**] knob is enabled in all modes except SSB. In this configuration, the SSB output power will be set to maximum, regardless of the [**RF PWR**] knob's position.

144 tGEn ETX-GND

Function: Enables/Disables the **TX GND** jack on the rear panel.

Available Values: EnA(ENABLE)/diS(DISABLE)

Default Setting: diS(DISABLE)

145 tGEn TUN PWR

Function: Selects a maximum output power limit for driving the input circuit of an external linear RF amplifier while tuning (while using the Remote Control function of the linear RF amplifier).

Available Values: 20/50/100/200 W

Default Setting: 100 W

146 tGEn VOX SEL

Function: Selects the audio input source for triggering TX during VOX operation.

Available Values: nic/dAtA

Default Setting: nic

    nic(MIC):   The VOX function will be activated by microphone audio input.

    dAtA(DATA): The VOX function will be activated by data audio input.

TX GNRL GROUP

147 tGEn EMRGNCY

Function: Enables Tx/Rx operation on the Alaska Emergency Channel, 5167.5 kHz.

Available Values: EnA(ENABLE)/diS(DISABLE)

Default Setting: diS(DISABLE)

When this Menu Item is set to "EnA(ENABLE)," the spot frequency of 5167.5 kHz will be enabled. The Alaska Emergency Channel will be found between the Memory channels "P-1" and "01 (or 1-01)."

IMPORTANT:

The use of this frequency is restricted to stations operating in or near Alaska, and only for emergency purposes (never for routine operations). See §97.401(c) of the FCC's regulations for details.

NOTE

SPECIFICATIONS

General

Rx Frequency Range:	30 kHz - 60 MHz (operating)
	160 - 6 m (specified performance, Amateur bands only)
Tx Frequency Ranges:	160 - 6 m (Amateur bands only)
Frequency Stability:	±0.5 ppm (after 1 minute @+77 °F [+25 °C])
	±1.0 ppm (after 1 minute @+14 °F ~ +122 °F [–10 °C ~ +50 °C])
Operating Temperature Range:	14 °F ~ +122 °F (–10 °C ~ +50 °C)
Emission Modes:	A1A (CW), A3E (AM), J3E (LSB, USB), F3E (FM),
	F1B (RTTY), F1D (PACKET), F2D (PACKET)
Frequency Steps:	1/10 Hz (SSB,CW, & AM), 100 Hz (FM)
Antenna Impedance:	50 Ohms, unbalanced
	16.7 - 150 Ohms, unbalanced (Tuner ON, 160 - 10 m Amateur bands)
	25 - 100 Ohms, unbalanced (Tuner ON, 6 m Amateur band)
Power Consumption:	Rx (no signal) 70 VA
	Rx (signal present) 80 VA
	Tx (200 W) 720 VA
Supply Voltage:	AC: 90 VAC - 132 VAC or 180 VAC- 264 VAC
Dimensions (WxHxD):	16.1" x 5.3" x 13.8" (410 x 135 x 350 mm)
Weight (approx.):	38.6 lbs (17.5 kg)

Transmitter

Power Output:	10 - 200 watts
	10 - 75 watts (Class-A, SSB)
	5 - 50 watts (AM carrier)
Modulation Types:	J3E (SSB): Balanced,
	A3E (AM): Low-Level (Early Stage),
	F3E (FM): Variable Reactance
Maximum FM Deviation:	±5.0 kHz/±2.5 kHz
Harmonic Radiation:	Better than –60 dB
SSB Carrier Suppression:	At least 60 dB below peak output
Undesired Sideband Suppression:	At least 60 dB below peak output
Audio Response (SSB):	Not more than –6 dB from 300 to 2700 Hz
3rd-order IMD:	–31 dB @14 MHz, 200 watts PEP
	–45 dB @14 MHz, 75 watts Class-A
Microphone Impedance:	600 Ohms (200 to 10 kOhms)

FP-2000 Power Supply

Input Voltage:	90 VAC - 264 VAC, 50/60 Hz (Universal)
Output Voltage:	50 VDC , 13.8 VDC
Maximum Power Consumption (approx.):	720 VA
Maximum Output Current:	50 V: 12 A, 13.8 V: 6 A
Case Size (WxHxD):	3.9" x 5.3" x 13.8" (100 x 135 x 350 mm)
Weight (approx.):	8.8 lb (4 kg)

Receiver

Circuit Type: Main (VFO-A); Triple-conversion superheterodyne
Sub (VFO-B); Double-conversion superheterodyne

Intermediate Frequencies: Main (VFO-A); 69.450 MHz/450 kHz/30 kHz (24 kHz for AM/FM),
Sub (VFO-B); 40.455 MHz/455 kHz

Sensitivity (RF AMP 2 "ON"): SSB (2.4 kHz, 10 dB S+N/N)
      6 μV (0.1 - 1.8 MHz)
      0.2 μV (1.8 - 30 MHz)
      0.125 μV (50 - 54 MHz)
AM (6 kHz, 10 dB S+N/N, 30 % modulation @400 Hz)
      3.2 μV (0.1 - 1.8 MHz)
      2 μV (1.8 - 30 MHz)
      1 μV (50 - 54 MHz)
FM (BW: 15 kHz, 12 dB SINAD)
      0.5 μV (28 - 30 MHz)
      0.35 μV (50 - 54 MHz)
There is no specification in frequency ranges not listed.

Squelch Sensitivity: SSB/CW/AM
(RF AMP 2 "ON")   2 μV (0.1 - 30 MHz)
      2 μV (50 - 54 MHz)
FM
      1 μV (28 - 30 MHz)
      1 μV (50 - 54 MHz)
There is no specification in frequency ranges not listed.

Selectivity (–6/–60 dB): Main (VFO-A)

Mode	–6 dB	–60 dB
CW/RTTY/PKT	0.5 kHz or better	750 Hz or less
SSB	2.4 kHz or better	3.6 kHz or less
AM	6 kHz or better	15 kHz or less
FM	15 kHz or better	25 kHz or less

(WIDTH: Center, VRF: OFF)
Sub (VFO-B)

Mode	–6 dB	–60 dB
CW/RTTY/PKT	1.1 kHz or better	3.0 kHz or less
SSB	2.2 kHz or better	4.5 kHz or less
AM	6 kHz or better	25 kHz or less
FM	12 kHz or better	30 kHz or less

Image Rejection: 70 dB or better (160 - 10m Amateur bands)
60 dB or better (6m Amateur band)

Maximum Audio Output: 2.5 W into 4 Ohms with 10% THD

Audio Output Impedance: 4 to 8 Ohms (4 Ohms: nominal)

Conducted Radiation: Less than 4000 μμW

Specifications are subject to change, in the interest of technical improvement, without notice or obligation, and are guaranteed only within the amateur bands.

INSTALLATION OF THE OPTIONAL FILTER (YF-122C OR YF-122CN)

1. Turn the **FT-2000D**'s [**POWER**] switch "off," then turn the **FP-2000**'s [**POWER**] switch "off."

2. Unplug the AC cable from the **AC** jack on the **FP-2000** rear panel.

3. Disconnect the all cables from the transceiver.

4. Referring to Figure 1, remove the three screws from each side of the transceiver, and three screws from the top edge of the rear panel. Slide the top cover toward to the rear about 1/2 inch (1 cm), then remove the top cover.

5. Refer to Figure 2 for the mounting location for the optional filter. Position the filter so that its connectors are aligned with the mounting pins on the board, and push it into place.

6. Replace the top cover and its nine screws.

7. Filter installation is now complete. Now you must enable the newly-installed filter, using the Menu.

8. Connect the two DC cables to the **FT-2000D** rear panel, then connect the AC cable to the **AC** jack on the **FP-2000** rear panel.

9. Turn the **FP-2000**'s [**POWER**] switch "on," then turn the **FT-2000D**'s [**POWER**] switch "on."

10. Press the [**MENU**] button momentarily to engage the Menu mode.

11. Rotate the Main Tuning Dial knob to select the Menu item "037 GEnE SUB FIL."

12. Rotate the [**SUB VFO-B**] knob to choose the selection appropriate for the filter you have just installed ("300" for **YF-122CN**, "500" for **YF-122C**).

13. Press and hold in the [**MENU**] button for two seconds to save the new setting and exit to normal operation.

FIGURE 1

FIGURE 2

NOTE

YAESU

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