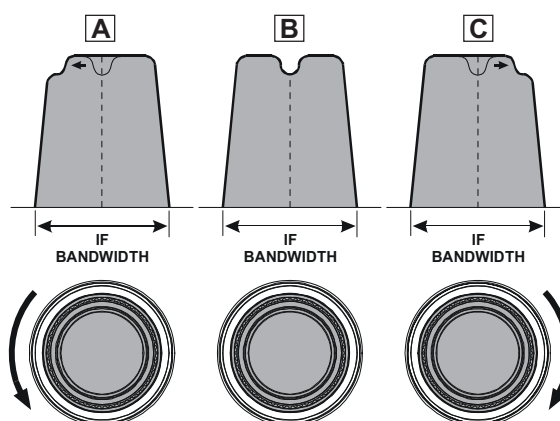


CONTOUR CONTROL OPERATION

With reference to Figure “B”, note the initial position of the contour when the [CONT] 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 “108 RDSP CNTR LV”, referenced previous page). Counter-clockwise rotation (to the left) of the [SELECT](contour) knob causes the indentation to move toward 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.



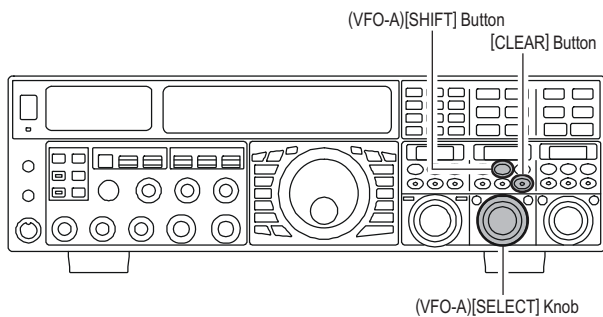
INTERFERENCE REJECTION (SIGNALS WITHIN 3 KHZ)

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.

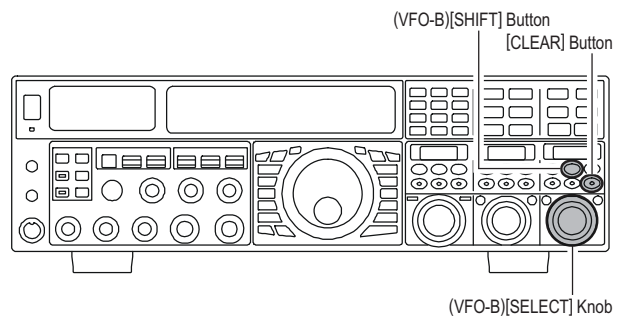
VFO-A IF SHIFT Operation

- ❑ Press the **(VFO-A)[SHIFT]** button. The center position of the IF passband will appear in the **SUB DISPLAY-II**. The **(VFO-A)[SELECT]** knob will now function as the IF SHIFT knob.
- ❑ Rotate the **(VFO-A)[SELECT]** knob to the left or right to reduce the interference.
- ❑ Press the **(VFO-A)[CLEAR]** button to move the filter passband to center. When the filter passband is set to band center, the imbedded LED in the **(VFO-A)[SHIFT]** button is glows red.

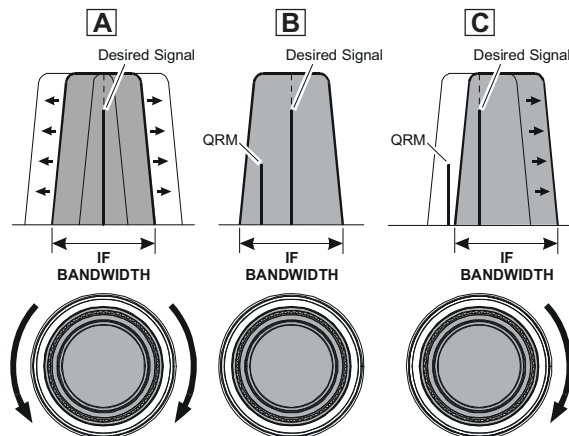


VFO-B IF SHIFT Operation

- ❑ Press the **(VFO-B)[SHIFT]** button. The center position of the IF passband will appear in the **SUB DISPLAY-III**. The **(VFO-B)[SELECT]** knob will now function as the IF SHIFT knob.
- ❑ Rotate the **(VFO-B)[SELECT]** knob to the left or right to reduce the interference.
- ❑ Press the **(VFO-B)[CLEAR]** button to move the filter passband to center. When the filter passband is set to band center, the imbedded LED in the **(VFO-B)[SHIFT]** button is glows red.



Referring to Figure “A”, note the depiction of the IF DSP filter as the thick line with the no shift (with the imbedded LED of the [SHIFT] button is glows red). In Figure “B”, an interfering signal has appeared inside the original passband. In Figure “C”, you can see the effect of rotating the [SELECT](shift) knob so as to reduce the interference level by moving the filter passband so that the interference is outside of the passband.

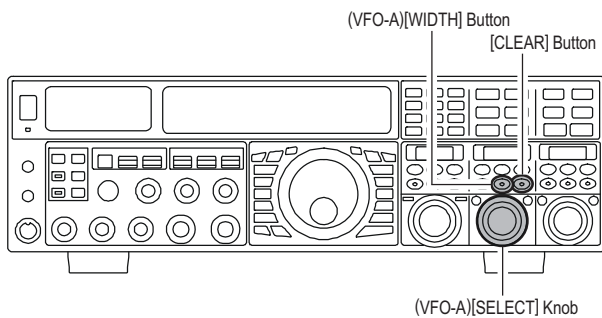


WIDTH (IF DSP BANDWIDTH) TUNING (SSB/CW/RTTY/PKT MODES)

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.

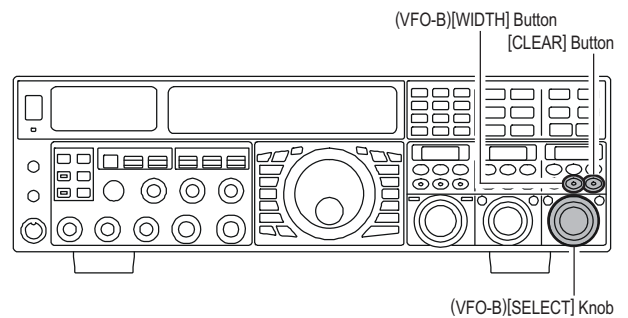
VFO-A WIDTH Operation

- Press the **(VFO-A)[WIDTH]** button. The current bandwidth will appear in the **SUB DISPLAY-II**. The **(VFO-A)[SELECT]** knob will now function as the **WIDTH** knob.
- Rotate the **(VFO-A)[SELECT]** knob to the left or right to reduce the interference.
- Press the **(VFO-A)[CLEAR]** button to set the bandwidth to default. When the bandwidth is set to default, the imbedded LED in the **(VFO-A)[WIDTH]** button is glows red.



VFO-B WIDTH Operation

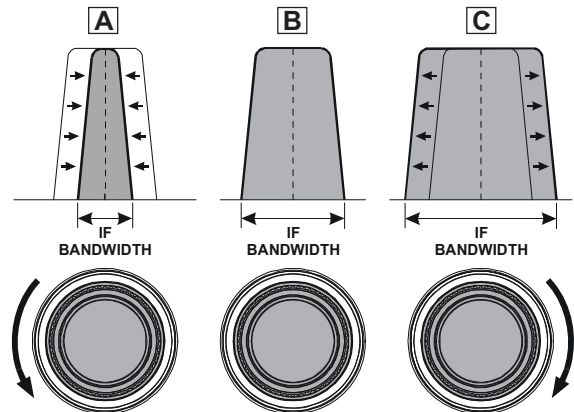
- Press the **(VFO-B)[WIDTH]** button. The current bandwidth will appear in the **SUB DISPLAY-III**. The **(VFO-B)[SELECT]** knob will now function as the **WIDTH** knob.
- Rotate the **(VFO-B)[SELECT]** knob to the left or right to reduce the interference.
- Press the **(VFO-B)[CLEAR]** button to set the bandwidth to default. When the bandwidth is set to default, the imbedded LED in the **(VFO-B)[WIDTH]** button is glows red.



Referring to Figure “B”, you can see the default bandwidth (with the imbedded LED of the **[WIDTH]** button is glows red).

By rotating the **[SELECT](width)** knob to the left, the bandwidth will narrow (see Figure “A”), while rotation of the **[SELECT](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 and **[NAR]** button setting:



MODE	NAR SWITCH	
	OFF	ON
LSB/USB	1.8 kHz - 4.0 kHz / 16 steps (2.4 kHz*)	200 Hz - 1.8 kHz / 9 steps (1.8 kHz*)
CW	500 Hz - 2.4 kHz / 7 steps (2.4 kHz*)	50 Hz - 500 Hz / 10 steps (500 Hz*)
RTTY(LSB)	500 Hz - 2.4 kHz / 7 steps (500 Hz*)	50 Hz - 500 Hz / 10 steps (300 Hz*)
PKT(LSB/USB)	500 Hz - 2.4 kHz / 7 steps (500 Hz*)	50 Hz - 500 Hz / 10 steps (300 Hz*)

*: Default (the imbedded LED of the **[WIDTH]** button is glows red)

NOTE:

When rotating the **[SELECT](WIDTH)** knob 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.

INTERFERENCE REJECTION (SIGNALS WITHIN 3 KHZ)

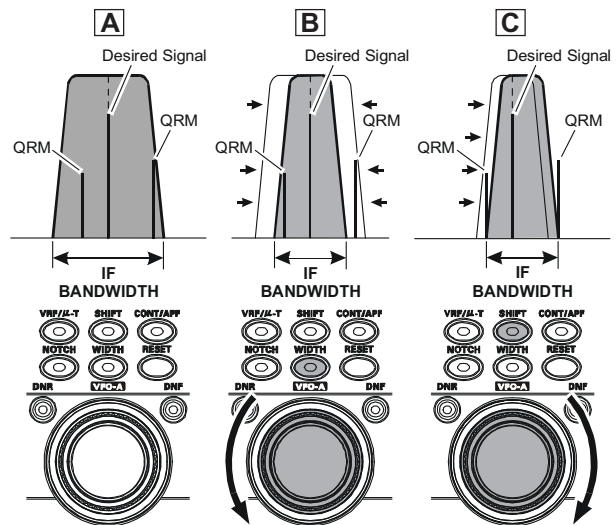
USING IF SHIFT AND WIDTH TOGETHER (SSB/CW/RTTY/PKT/AM MODES)

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 [SELECT](width) knob after pressing the [WIDTH] button (the imbedded LED of the [WIDTH] button is glows red), as shown in Figure “B”, the interference from one side can be eliminated, then press the by [SHIFT] button to change the function of the [SELECT] knob as the SHIFT knob (the imbedded LED of the [SHIFT] button is glows red). However, the IF Width function still works). Now, re-positioning the [SELECT](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.

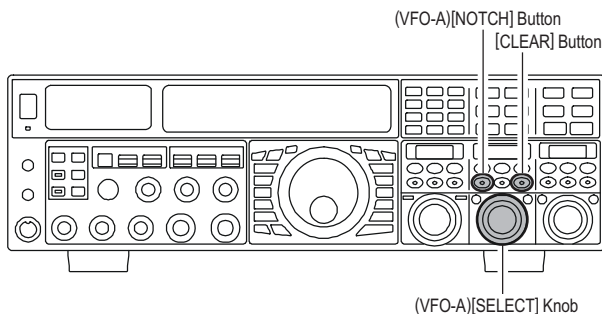


IF NOTCH FILTER OPERATION (SSB/CW/RTTY/PKT/AM MODES)

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.

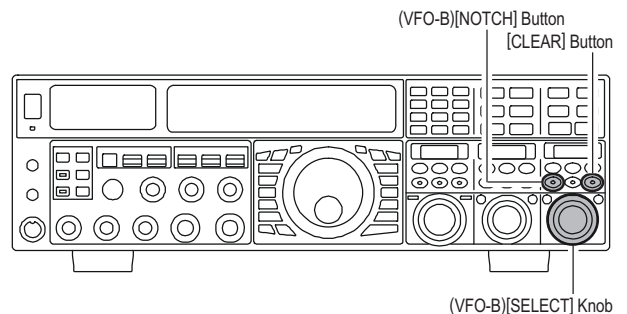
VFO-A IF Notch Operation

- Press the **(VFO-A)[NOTCH]** button. The imbedded LED in the **(VFO-A)[NOTCH]** button is glows red, and current “null” (or “Peak”) position of the IF notch filter will appears in the **SUB DISPLAY-II**. The **(VFO-A)[SELECT]** knob will now functions as the notch adjustment knob.
- Rotate the **(VFO-A)[SELECT]** knob to adjust the center frequency of the IF notch filter.
- Press the **(VFO-A)[CLEAR]** button to move the “null” position to center.
- To switch the IF notch filter off, press the **(VFO-A)[NOTCH]** button once more.



VFO-B IF Notch Operation

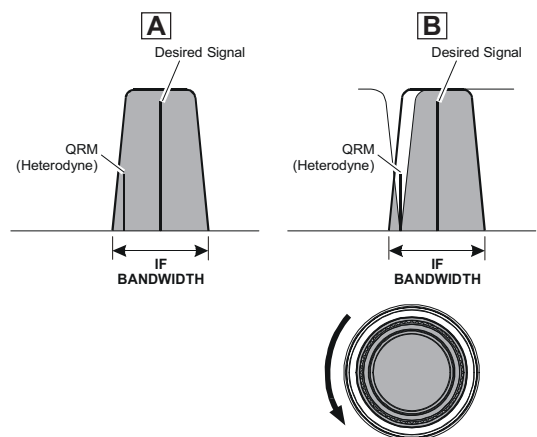
- Press the **(VFO-B)[NOTCH]** button. The imbedded LED in the **(VFO-B)[NOTCH]** button is glows red, and current “null” (or “Peak”) position of the IF notch filter will appears in the **SUB DISPLAY-III**. The **(VFO-B)[SELECT]** knob will now functions as the notch adjustment knob.
- Rotate the **(VFO-B)[SELECT]** knob to adjust the center frequency of the IF notch filter.
- Press the **(VFO-B)[CLEAR]** button to move the “null” position to center.
- To switch the IF notch filter off, press the **(VFO-B)[NOTCH]** button once more.



ADVICE:

- The width of the IF notch null may be adjusted using Menu item “**110 RDSP NOTCH WI**”. 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 **[SELECT](notch)** 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 **[SELECT](notch)** knob is depicted. In Figure “B”, you can see the notching effect of the IF notch filter as you rotate the **[SELECT](notch)** knob to eliminate the incoming interference.



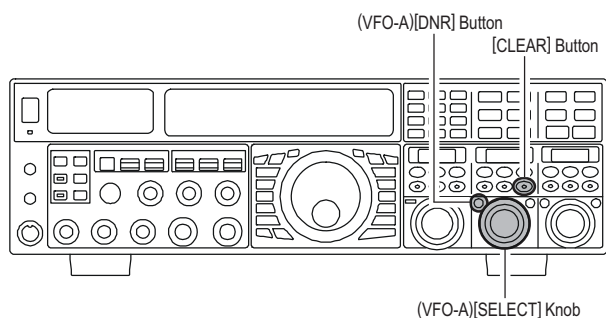
INTERFERENCE REJECTION (SIGNALS WITHIN 3 KHZ)

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 15 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.

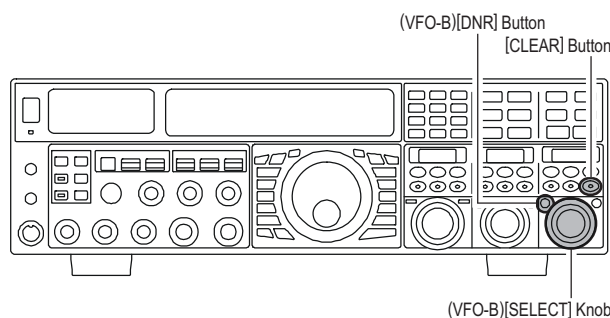
VFO-A DNR Operation

- Press the (VFO-A)[DNR] button. The imbedded LED in the (VFO-A)[DNR] button is glows red, and current noise-reduction algorithm will appears in the **SUB DISPLAY-II**. The (VFO-A)[SELECT] knob will now functions as the notch adjustment knob.
- Rotate the (VFO-A)[SELECT] knob to select the setting that most effectively reduces the noise level.
- Press the (VFO-A)[CLEAR] button to set the noise-reduction algorithm to default.
- To switch the DNR system off, press the (VFO-A)[NOTCH] button once more.



VFO-B DNR Operation

- Press the (VFO-B)[DNR] button. The imbedded LED in the (VFO-B)[DNR] button is glows red, and current noise-reduction algorithm will appears in the **SUB DISPLAY-II**. The (VFO-B)[SELECT] knob will now functions as the notch adjustment knob.
- Rotate the (VFO-B)[SELECT] knob to select the setting that most effectively reduces the noise level.
- Press the (VFO-B)[CLEAR] button to set the noise-reduction algorithm to default.
- To switch the DNR system off, press the (VFO-B)[NOTCH] button once more.



DIGITAL NOTCH FILTER (DNF) OPERATION

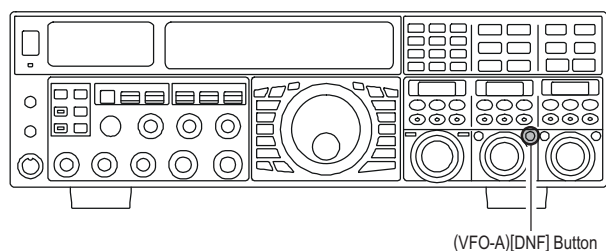
The Digital Notch Filter (DNF) is an effective beat-cancelling filter that can null out a number of interfering beat notes inside the receiver passband. Because this is an Auto-Notch feature, there is no adjustment knob associated with this filter.

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.

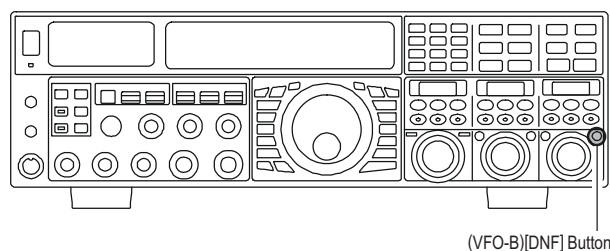
VFO-A DNF Operation

- Press the (VFO-A)[DNF] button. The imbedded LED in the (VFO-A)[DNF] button is glows red, confirming that the DNF system is engaged.
- To switch the DNF system off, press the (VFO-A)[DNF] button once more.



VFO-B DNF Operation

- Press the (VFO-B)[DNF] button. The imbedded LED in the (VFO-B)[DNF] button is glows red, confirming that the DNF system is engaged.
- To switch the DNF system off, press the (VFO-B)[DNF] button once more.



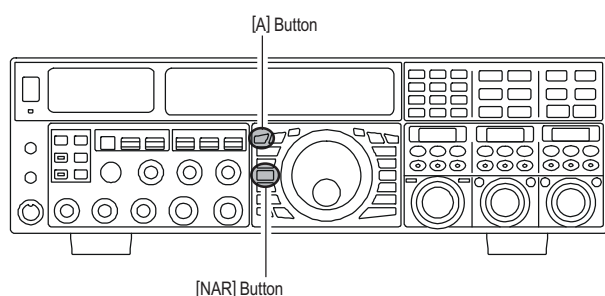
NARROW (NAR) ONE-TOUCH IF FILTER SELECTION

VFO-A “One-Touch Narrow” Operation

- Press the [A] button (the imbedded LED in the [A] button is glows red), if desired.
- 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 of the bandwidth is as shown below. **ADVICE:**

ADVICE:

When the narrow bandwidth is selected, the “**NAR**” icon will appear in the display, and the bandwidth on the **SUB DISPLAY-II** will be reduced if the **SUB DISPLAY-II** indicates the bandwidth.

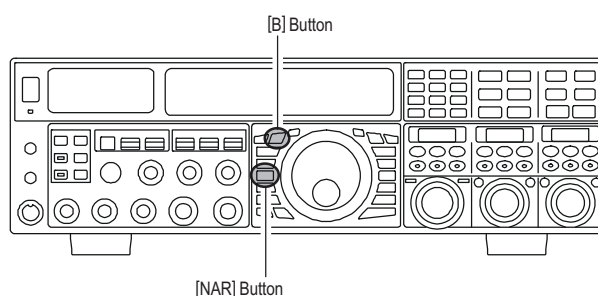


VFO-B “One-Touch Narrow” Operation

- Press the [B] button (the imbedded LED in the [B] button is glows orange).
- 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 of the bandwidth is as shown below. **ADVICE:**

ADVICE:

When the narrow bandwidth is selected, the “**NAR**” icon will appear in the display, and the bandwidth on the **SUB DISPLAY-III** will be reduced if the **SUB DISPLAY-III** indicates the bandwidth.



MODE	NAR BUTTON	
	OFF	ON
LSB/USB	2.4 kHz (1.8 kHz - 4.0 kHz / 16 steps*)	1.8 kHz (200 Hz - 1.8 kHz / 9 steps*)
CW	2.4 kHz (500 Hz - 2.4 kHz / 7 steps*)	500 Hz (50 Hz - 500 Hz / 10 steps*)
RTTY(LSB)	500 Hz (500 Hz - 2.4 kHz / 7 steps*)	300 Hz (50 Hz - 500 Hz / 10 steps*)
PKT(LSB/USB)	500 Hz (500 Hz - 2.4 kHz / 7 steps*)	300 Hz (50 Hz - 500 Hz / 10 steps*)
PKT(FM)	25 kHz (±5.0 kHz Deviation)	12.5 kHz (±2.5 kHz Deviation)
AM	9 kHz	6 kHz
FM	25 kHz (±5.0 kHz Deviation)	12.5 kHz (±2.5 kHz Deviation)

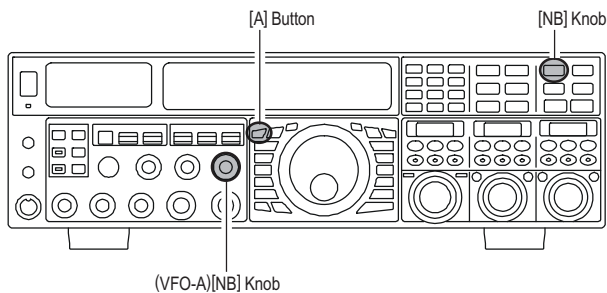
INTERFERENCE REJECTION (SIGNALS WITHIN 3 KHZ)

IF NOISE BLANKER (NB) OPERATION

The **FTdx5000** includes an effective IF Noise Blanker, which can significantly reduce noise caused by automotive ignition systems.

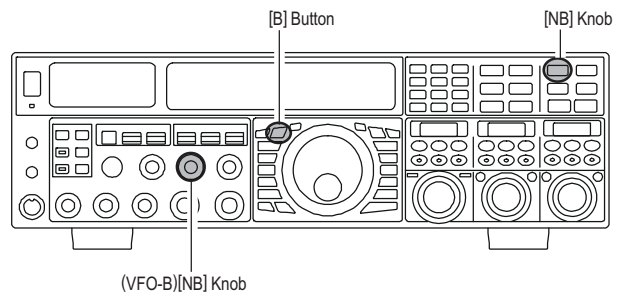
VFO-A NB Operation

- Press the **[A]** button (the imbedded LED in the **[A]** button is glows red), if desired.
- Press the **[NB]** button briefly 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 W**” icon will blink for three seconds, and thereafter will appear continuously, to confirm that the Wide-NB is operating.
- Rotate the **(VFO-A)[NB]** knob to the point where the offending noise is best reduced or eliminated.
- To end Noise Blanker operation, press the **[NB]** button once more. The “**NB**” (or “**NB W**”) icon will turn off, confirming that the Noise Blanker is no longer in operation.



VFO-B NB Operation

- Press the **[B]** button (the imbedded LED in the **[B]** button is glows orange).
- Press the **[NB]** button briefly 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 W**” icon will blink for three seconds, and thereafter will appear continuously, to confirm that the Wide-NB is operating.
- Rotate the **(VFO-B)[NB]** knob to the point where the offending noise is best reduced or eliminated.
- To end Noise Blanker operation, press the **[NB]** button once more. The “**NB**” (or “**NB W**”) icon will turn off, confirming that the Noise Blanker is no longer in operation.



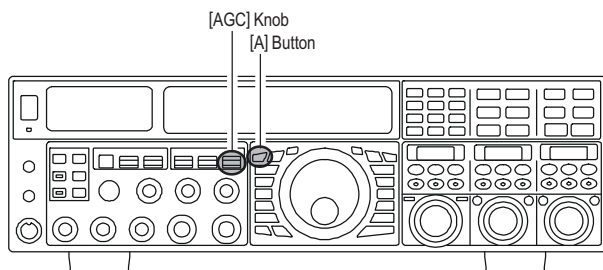
TOOLS FOR COMFORTABLE AND EFFECTIVE RECEPTION

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.

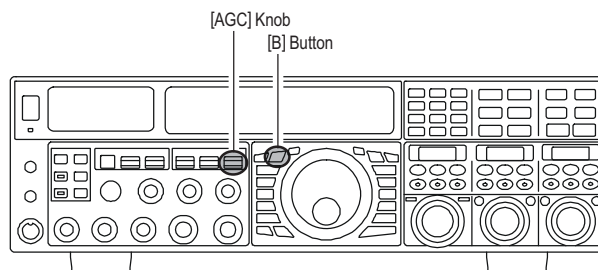
VFO-A AGC Selection

- Press the [A] button (the imbedded LED in the [A] button is glows red), if desired.
- Move the [AGC] knob up and down to set the desired receiver-recovery time constant of the VFO-A receiver. The selected receiver-recovery time will be indicated in the AGC column of the Block Diagram Display on the display.
- Hold up or hold down the [AGC] knob for two seconds to disable the AGC (for testing or weak-signal reception).
- For most operation, we recommend the “AUTO” mode by pressing the [AGC] knob briefly or move the [AGC] knob to select the ATT display to the “AUTO” position.



VFO-B AGC Selection

- Press the [B] button (the imbedded LED in the [A] button is glows orange).
- Move the [AGC] knob up and down to set the desired receiver-recovery time constant of the VFO-A receiver. The selected receiver-recovery time will be indicated in the AGC column of the Block Diagram Display on the display.
- Hold up or hold down the [AGC] knob for two seconds to disable the AGC (for testing or weak-signal reception).
- For most operation, we recommend the “AUTO” mode by pressing the [AGC] knob briefly or move the [AGC] knob to select the ATT display to the “AUTO” position.



NOTE:

- When the AGC receiver-recovery time is set to “OFF”, 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.
- 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

ADVICE:

When a received signal becomes degraded due to pulse type noise, you may improve signal readability by setting the Menu items “002 AGC FST HLD”, “004 AGC MID HLD”, and “006 AGC SLW HLD” to “0 msec”.

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 FTDX5000.

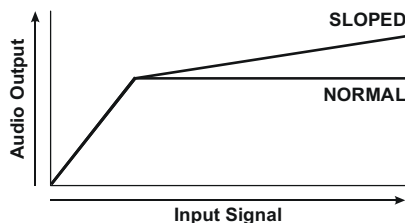
TERMINOLOGY:

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)

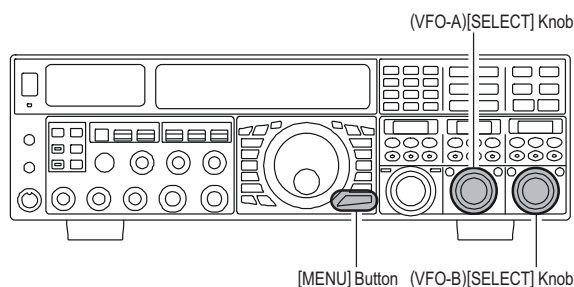
SLOPED AGC Operation

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 **FTdx5000**, however, includes an innovative Sloped AGC system on the 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 briefly to enter the Menu mode.
2. Use the **(VFO-A)[SELECT]** to select Menu item “**103 ROUT AGC SLP**”.
3. Rotate the **(VFO-B)[SELECT]** to change the setting to “**SLOPE**”.
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.



TOOLS FOR COMFORTABLE AND EFFECTIVE RECEPTION

MUTE FEATURE (MAIN (VFO-A) BAND)

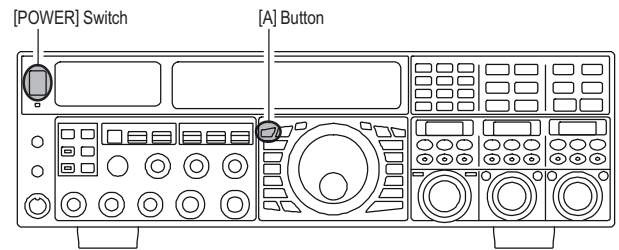
There may be occasions, during Dual Receive operation, when you want to silence the VFO-A receiver temporarily so as to concentrate on what's being received on the VFO-B receiver. The Mute feature makes this simple to accomplish.

Press the **(VFO-A)[RX]** button, located to the upper left of the Main Tuning Dial knob. The VFO-A receiver will be silenced, and the green LED in the **(VFO-A)[RX]** button will blink.

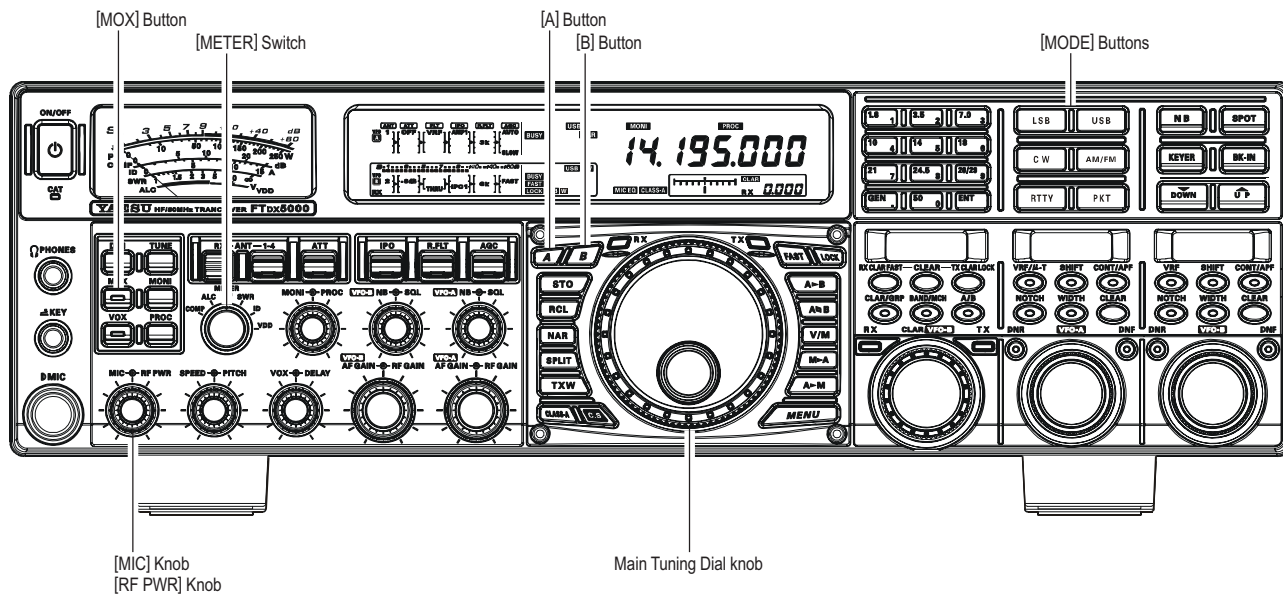
To restore reception on the VFO-A receiver, just press the blinking **(VFO-A)[RX]** button once more.

ADVICE:

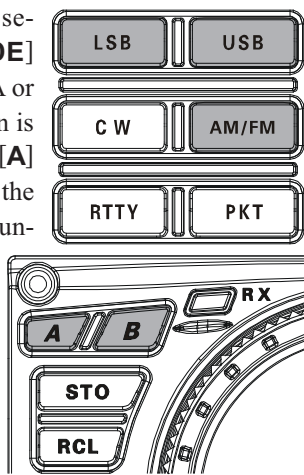
If you press the **[POWER]** switch momentarily while the transceiver is turned on, the transceiver's audio will be muted for three seconds.



SSB/AM MODE TRANSMISSION



1. The operating mode is selected using the **[MODE]** buttons, and the VFO (A or B) to which the selection is applied is selected by the **[A]** or **[B]** button, located to the upper left of the Main Tuning Dial knob. Usually, the **[A]** button glows red, signifying that the VFO-A is being adjusted. Similarly, pressing the **[B]** button will cause its indicator to glow orange, signifying 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 “**AM**” icon appears in the display.



QUICK POINT:

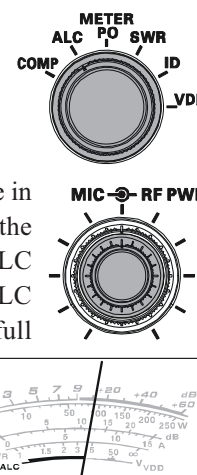
By convention, LSB is used in the 7 MHz and lower Amateur bands for SSB communication, and USB is used on the 14 MHz and higher bands (the 10 MHz band is used for CW and data modes only).

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 “**TX**” 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 25 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 stays within the blue ALC zone of the meter (up to 2/3 of full scale deflection) on voice peaks.

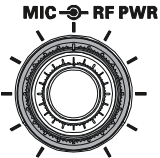


ADVICE:

- 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 “**047 A3E MICGAIN**,” you may set a different fixed value, or choose the “**MCVR**” 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.
 - The **SUB DISPLAY**s will show the relative Microphone Gain level for 3 seconds whenever the **[MIC]** knob is turned. You may disable this feature (displaying the relative Microphone Gain level) via Menu item “**015 DISP LVL IND**”. See page for details.
5. Release the **PTT** switch at the end of your transmission. The transceiver will return to the receive mode.

SSB/AM MODE TRANSMISSION

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.
The diagram shows a circular knob with a scale around its perimeter. A pointer is positioned at the top of the knob, pointing to a mark labeled 'MIC'. To the left of the knob is the label 'MIC' and to the right is 'RF PWR'.

The **SUB DISPLAYs** will show the RF Power Output for 3 seconds whenever the **[RF PWR]** knob is turned. You may disable this feature (displaying the RF Power Output) via Menu item “**015 DISP LVL IND**”. See page for details.
- ❑ The analog PO meter indicates the average power output level. SSB transmit average talk power is normally 10% to 50% of the peak power output. Voice characteristics, microphone qualities, parametric equalizer and compression settings affect actual talk power output.

- ❑ 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 **FTdx5000**, 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 74.

USING THE AUTOMATIC ANTENNA TUNER

The Automatic Antenna Tuner (hereinafter referred to as the “ATU”) built into each **FTDx5000** 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 **FTDx5000**.

ADVICE:

- ❑ The ATU of the **FTDx5000**, 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 **FTDx5000** 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 **FTDx5000** 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

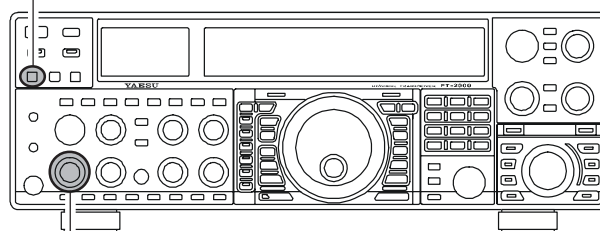
1. Rotate the **[RF PWR]** knob fully clockwise (to the right).
2. Use the Main Tuning Dial knob to set the radio to the desired operating frequency within the Amateur band.
3. Press the **[TUNE]** button briefly to place the ATU in the transmit line (no adjustment/tuning will occur yet). The “**TUNER**”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

QUICK POINT:

The momentarily 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 briefly. 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.

[TUNE] Button



[RF PWR] Knob

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.

USING THE AUTOMATIC ANTENNA TUNER

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.

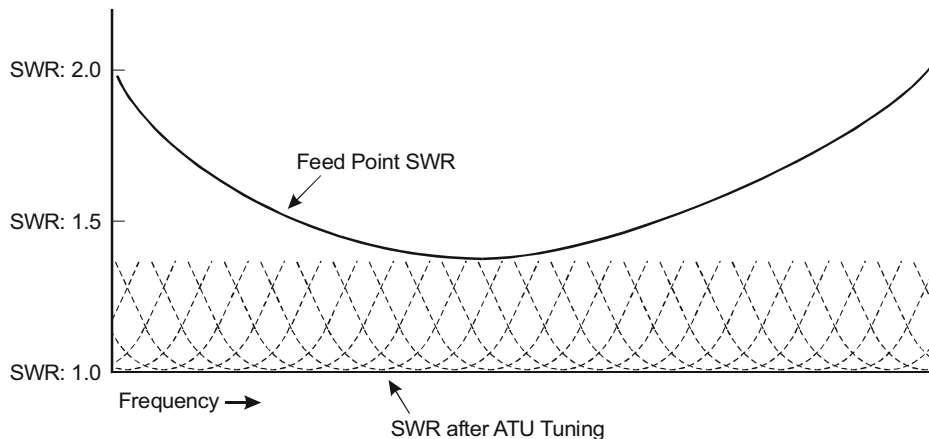


FIGURE 1

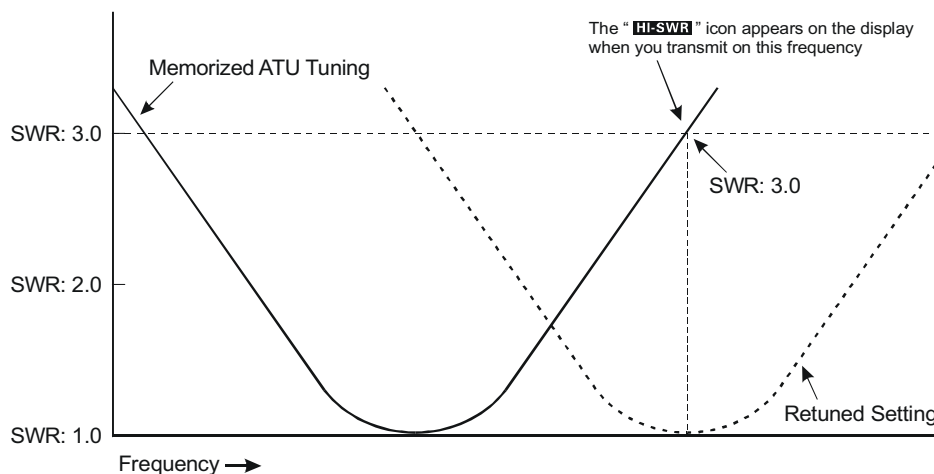


FIGURE 2

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.

ENHANCING TRANSMIT SIGNAL QUALITY

PARAMETRIC MICROPHONE EQUALIZER (SSB/AM/FM MODES)

The **FTdx5000** 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.

Setup of 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.

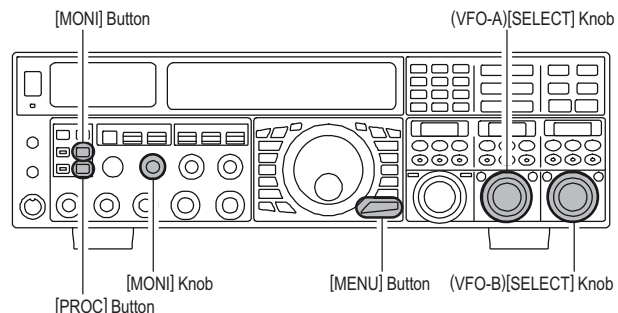
ADVICE:

- 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. To adjust the Parametric Microphone Equalizer while the speech processor is disabled, press the **[PROC]** button until the “**MICEQ**” icon appears (or blinks) in the display. To adjust the Parametric Microphone Equalizer with the speech processor engaged, press the **[PROC]** button until the “**MICEQ**” and “**PROC**” icon appears in the display.

ADVICE:

A blinking “**MICEQ**” icon indicates the Parametric Microphone Equalizer menu setting have all been set to “OFF”, described later.

4. Press the **[MONI]** button, if you want to listen on the **FTdx5000**'s internal monitor. Adjust the monitor level by the **[MONI]** knob.
5. Press the **[MENU]** button briefly. The Menu list will appear in the display.
6. Rotate the **(VFO-A)[SELECT]** knob to find the “**TAUD**” Menu area, containing Menu items “**145**” through “**153**”; these parameters apply to the adjustment of the Parametric Microphone Equalizer when the speech processor is disabled. Menu items “**154**” through “**162**” apply to the adjustment of the Parametric Microphone Equalizer when the speech processor is engaged.
7. Rotate the **(VFO-B)[SELECT]** knob to perform adjustments to a particular Menu item.



8. Press 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.
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.

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.

ENHANCING TRANSMIT SIGNAL QUALITY

PARAMETRIC MICROPHONE EQUALIZER (SSB/AM/FM MODES)

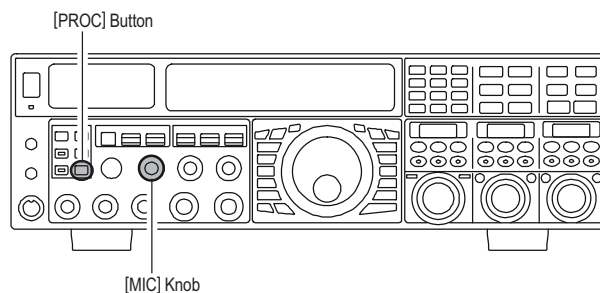
Activating the Parametric Microphone Equalizer

1. Adjust the [MIC] (gain) knob for SSB use, as described on page 20.
2. Press the [PROC] button briefly. The “**MICEQ**” icon will appear in the display, confirming that the Parametric Microphone Equalizer is engaged.

ADVICE:

A blinking “**MICEQ**” icon indicates the Parametric Microphone Equalizer menu setting have all been set to “OFF” (“145 TAUD EQ1 FRQ”, “148 TAUD EQ2 FRQ”, and “151 TAUD EQ3 FRQ”).

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 repeatedly until the “**MICEQ**” icon disappears.

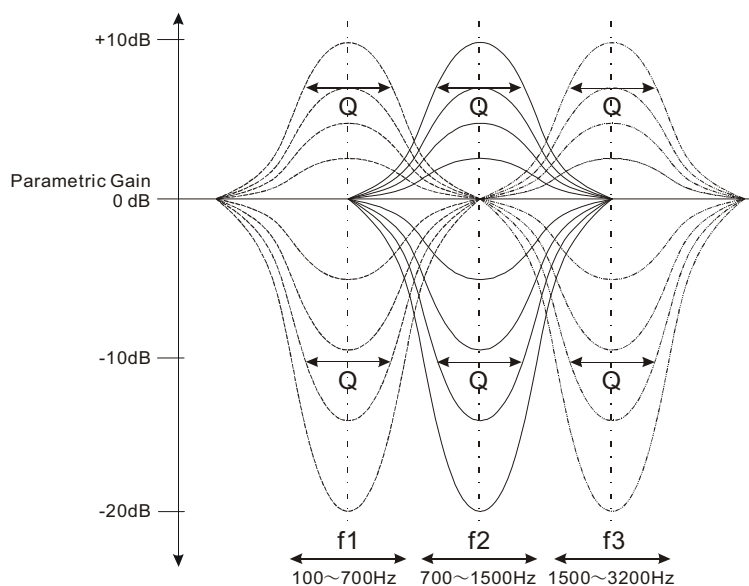


3-STAGE PARAMETRIC EQUALIZER ADJUSTMENTS (SPEECH PROCESSOR: “OFF”)

Center Frequency	“145 TAUD EQ1-FREQ”	(Low) “100” (Hz) ~ “700” (Hz)
	“148 TAUD EQ2-FREQ”	(Mid) “700” (Hz) ~ “1500” (Hz)
	“151 TAUD EQ3-FREQ”	(High) “1500” (Hz) ~ “3200” (Hz)
Parametric Gain	“146 TAUD EQ1-LVL”	(Low) “-20” (dB) ~ “+10” (dB)
	“149 TAUD EQ2-LVL”	(Mid) “-20” (dB) ~ “+10” (dB)
	“152 TAUD EQ3-LVL”	(High) “-20” (dB) ~ “+10” (dB)
Q (Bandwidth)	“147 TAUD EQ1-BW”	(Low) “1” ~ “10”
	“150 TAUD EQ2-BW”	(Mid) “1” ~ “10”
	“153 TAUD EQ3-BW”	(High) “1” ~ “10”

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

Center Frequency	“154 TAUD PE1-FREQ”	(Low) “100” (Hz) ~ “700” (Hz)
	“157 TAUD PE2-FREQ”	(Mid) “700” (Hz) ~ “1500” (Hz)
	“160 TAUD PE3-FREQ”	(High) “1500” (Hz) ~ “3200” (Hz)
Parametric Gain	“155 TAUD PE1-LVL”	(Low) “-20” (dB) ~ “+10” (dB)
	“158 TAUD PE2-LVL”	(Mid) “-20” (dB) ~ “+10” (dB)
	“161 TAUD PE3-LVL”	(High) “-20” (dB) ~ “+10” (dB)
Q (Bandwidth)	“156 TAUD PE1-BW”	(Low) “1” ~ “10”
	“159 TAUD PE2-BW”	(Mid) “1” ~ “10”
	“162 TAUD PE3-BW”	(High) “1” ~ “10”



ENHANCING TRANSMIT SIGNAL QUALITY

USING THE SPEECH PROCESSOR (SSB/AM MODES)

The Speech Processor is designed to increase “talk power” by increasing the average power output via a sophisticated compression technique. The result is improved intelligibility when conditions are difficult.

1. Adjust the **[MIC]** (gain) knob for SSB use, as described on page ??.
2. Press the **[PROC]** button repeatedly until the “**MICEQ**” and “**PROC**” icons appear in the display, confirming that the Speech Processor is engaged.

ADVICE:

A blinking “**MICEQ**” icon indicates the Parametric Microphone Equalizer menu setting have all been set to “OFF” (“**154 TAUD PE1 FRQ**”, “**157 TAUD PE2 FRQ**”, and “**160 TAUD PE3 FRQ**”).

3. Adjust the **[PROC]** knob between 9:00 to 12:00 o’clock position.

ADVICE:

The **SUB DISPLAY**s will show the relative compression level of the Speech Processor for 3 seconds whenever the **[PROC]** knob is turned.

You may disable this feature (displaying the relative compression level) via Menu item “**015 DISP LVL IND**”. See page ??? for details.

4. Rotate the **[METER]** switch fully to the left, so as to select “COMP” (Compression).
5. Press the **PTT** switch on the microphone, and speak into the microphone in a normal voice level. Confirm that the compression level is within the 5 dB to 10 dB range.

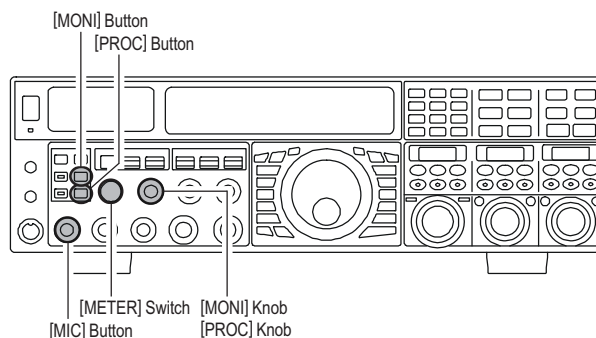
ADVICE:

We recommend that adjust the **[PROC]** knob between 9:00 to 12:00 o’clock position as described previously.

5. To switch the Speech Processor off, press the **[PROC]** button repeatedly until the “**MICEQ**” and “**PROC**” icons disappears.

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.
- 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.



ENHANCING TRANSMIT SIGNAL QUALITY

ADJUSTING THE SSB TRANSMITTED BANDWIDTH (SSB MODE)

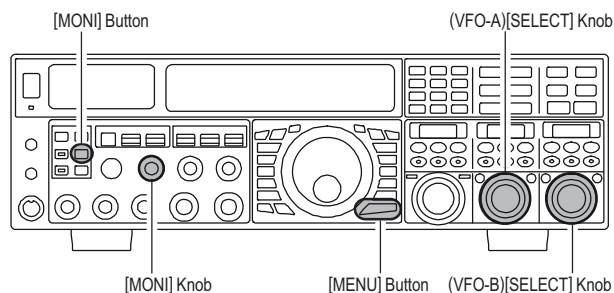
For transmission on SSB, a default bandwidth of 2.4 kHz is provided. This bandwidth provides reasonable fidelity along with good talk power, and is typical of the bandwidth used for decades during SSB transmission. However, the bandwidth may be varied by the operator, so as to provide different levels 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 **(VFO-A)[SELECT]** knob so as to select Menu item "100 A3J TX BPF".
3. Rotate the **(VFO-B)[SELECT]** knob to select the desired bandwidth. The available selections are 50-3000, 100-2900, 200-2800, 300-2700, 400-2600, and 3000WB. 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.

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 "3000WB" 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 "3000WB"), 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).

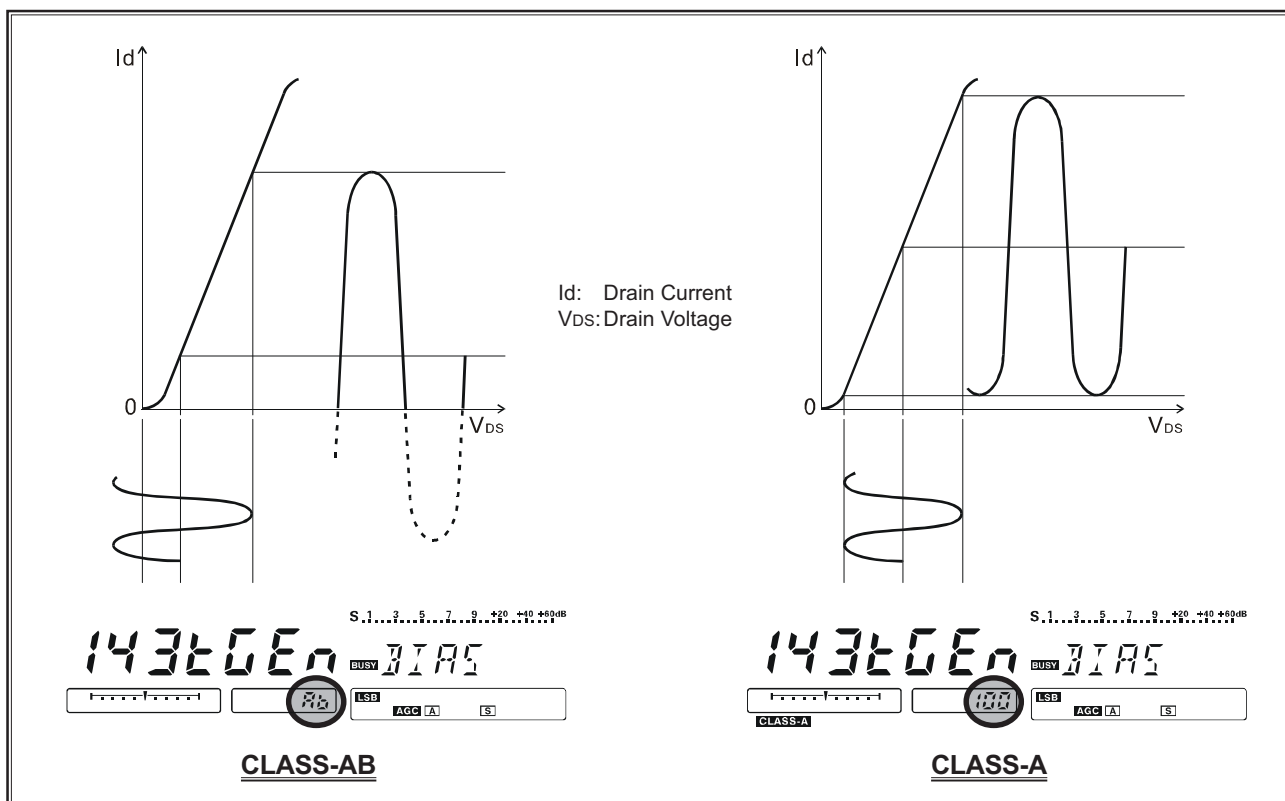
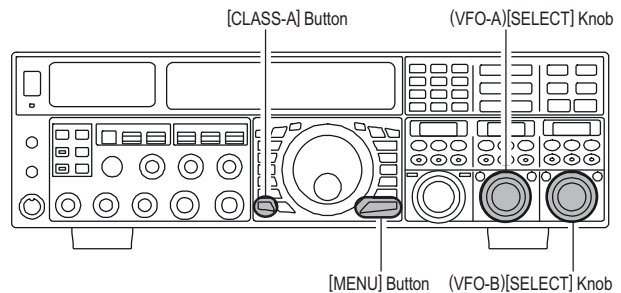
ENHANCING TRANSMIT SIGNAL QUALITY

LOW-DISTORTION CLASS-A OPERATION (SSB MODE)

Class-A operation of the FTdx5000 transmitter is provided, yielding ultra-low distortion products during SSB operation. Power output during Class-A operation is 75 Watts.

1. To engage Class-A operation, press the **[CLASS-A]** button. The “**CLASS-A**” icon will appear in the display, confirming that Class-A operation has been selected.
2. Engaging the “Class-A” mode actually places the transceiver in a condition whereby the Bias level may be adjusted, via the Menu mode.
 - 1) Press the **[MENU]** button to engage the Menu.
 - 2) Rotate the **(VFO-A)[SELECT]** knob so as to select Menu item “**163 TGEN BIAS**”.
 - 3) Rotate the **(VFO-B)[SELECT]** knob to select the desired BIAS level “**1 - 100**” to set the transceiver for operation anywhere between Class-A and Class-AB (Class-AB has lower heat dissipation but higher distortion products).

A menu setting of “**100**” will place the transmitter fully in Class-A operation. Counter-clockwise rotation of the **(VFO-B)[SELECT]** knob will move the transmitter toward Class-AB operation. The menu setting “**1**” will place the transmitter fully in Class-AB operation.
 - 4) Press and hold in the **[MENU]** button for two seconds to save the new setting and exit to normal operation.
3. To exit from the CLASS-A mode, press the **[CLASS-A]** switch once more. The “**CLASS-A**” icon disappears, confirming that the CLASS-A mode has been disengaged.



ENHANCING TRANSMIT SIGNAL QUALITY

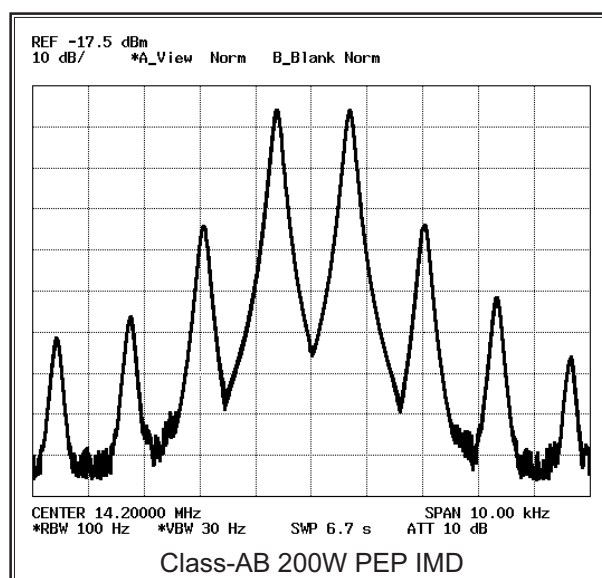
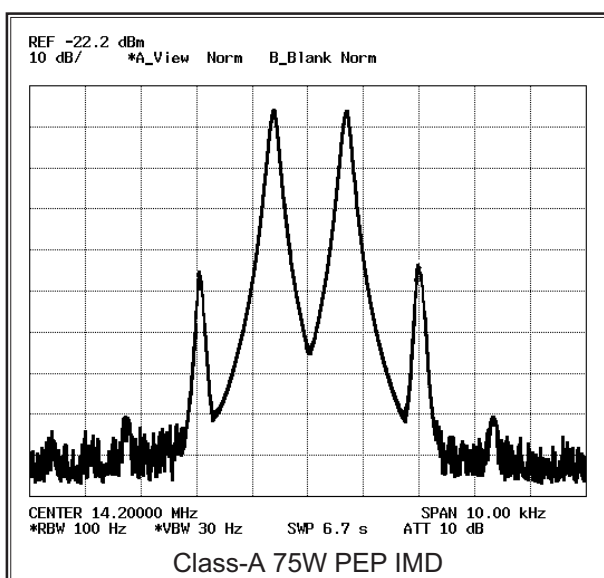
LOW-DISTORTION CLASS-A OPERATION (SSB MODE)

ADVICE

- ❑ During Class-A operation, 10-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 “163 TGEN BIAS”, to reduce the amount of heat being generated.
- ❑ When the optional **DMU-2000** Data Management Unit and a video monitor are connected, you can monitor the heat sink temperature on the video monitor; thus, you can always be aware of a rise in temperature during Class-A operation. Normally, the temperature is below 80 °C. If the temperature rises to near or above this value, however, we recommend you adjust the BIAS level toward Class-AB via menu item “163 TGEN BIAS” (decrease the numerical value 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 in the direction of Class-AB operation, the power output will not rise; this eliminates the need to re-tune your linear amplifier, if used.

QUICK POINT

- ❑ Class-A operation provides a significant improvement in transmitter distortion suppression. During Class-A operation, the 3rd-order IMD products are typically suppressed 45 dB. The 5th- and higher-order IMD products that can cause “splatter” and interfere 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 **FTdx5000**'s transmitter means these intermodulation distortion products will not exist to be amplified by your linear.



- ❑ The High-Power 200-Watt Final Amplifier Stage of the **FTdx5000** 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 92 mm thermostatically-controlled cooling fan directs forced air across the heat sink, when triggered by a rise in heat sink temperature.

TRANSMITTER CONVENIENCE FEATURES

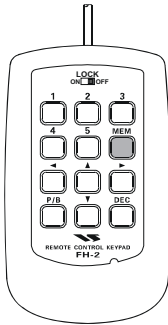
VOICE MEMORY (SSB/AM/FM MODES)

You may utilize the Voice Memory capability of the **FTdx5000** by plugging in the supplied **FH-2** Remote Control Keypad into the rear panel's **REMOTE** jack.

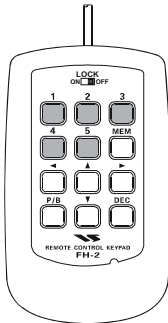
The Voice Memory system includes five memories capable of storing up to 20 seconds of voice audio each. The maximum that any memory can hold is 20 seconds.

Recording Your Own Voice in Memory

1. Select the LSB, USB, AM, or FM mode using the front panel **[MODE]** buttons.
2. Press the **[MEM]** key on the **FH-2**. A blinking "**REC**" icon will appear in the display



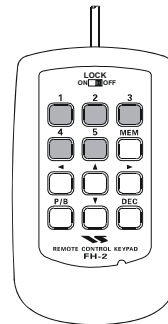
3. Press any of the **FH-2**'s keys numbered **[1]** through **[5]** to select that memory storage register. If you do not press the **PTT** key (see next step) within five seconds, the memory storage process will be cancelled.



4. Press the microphone's **PTT** switch briefly, 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]** and **[VOX]** buttons are both "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.

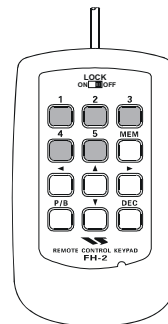


ADVICE:

You may adjust the playback level of the recording via Menu item "**016 DVS 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 **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 "**017 DVS 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. Adjust the **[MIC]** (gain) knob for SSB use, as described on page ??.
2. Set the **[VOX]** and **[DELAY]** knobs fully counter-clockwise (to the left).
3. Press the **[VOX]** button to engage VOX operation. The imbedded LED in the **[VOX]** button is glows red.
4. 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:

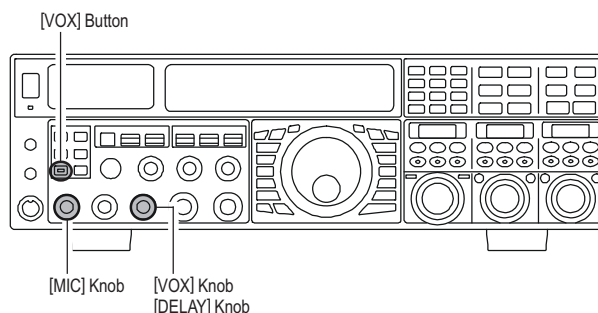
Do not advance the setting of the **[VOX]** knob too much, because to do so will make the transmitter respond to minor background noises in your station.

5. 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]** knob will increase the hang time.

ADVICE:

The **SUB DISPLAY**s will show the hang time of the VOX circuit for 3 seconds whenever the **[DELAY]** knob is turned.

You may disable this feature (displaying the hang time of the VOX circuit) via Menu item "015 DISP LVL IND". See page ??? for details.



6. 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.

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 "168 TGEN ANTI VOX".
- VOX operation may be engaged on either voice modes (SSB/AM/FM) and on AFSK-based data modes. Use Menu item "168 TGEN VOX SEL" (the selections are "MIC" and "DATA").

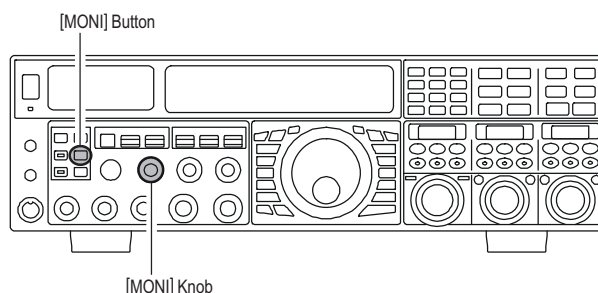
MONITOR (SSB/AM/FM MODES)

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.

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.



TRANSMITTER CONVENIENCE FEATURES

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/LOCK] button. The “**CLAR**” and “**TX**” icon will appear in the display, and the programmed offset will be applied to the receive frequency.

CLAR TX 0.000

ADVICE:

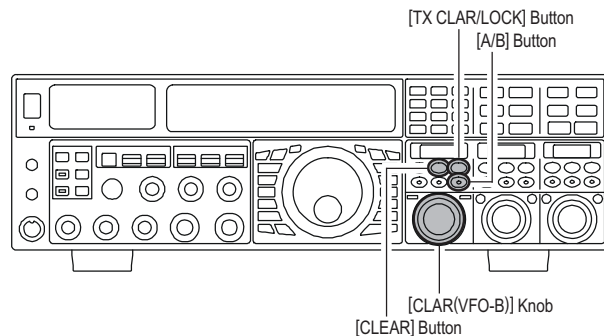
If the “**CLAR**” and “**TX**” icon does not appear, check to see if the LED imbedded in the [A/B] button glows orange. If so, pressing the [A/B] button will cause the LED imbedded in the [A/B] button to go out. Now, press the [TX CLAR/LOCK] button to begin clarifier operation.

2. Rotate the [CLAR(VFO-B)] knob to set the desired transmitter offset. A maximum split of ± 9.999 kHz may be set.
3. To exit from TX Clarifier operation, press the [TX CLAR/LOCK] button once more. The “**TX**” icon will disappear from the display.

CLAR TX + 9.999

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 FTdx5000. 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.



ADVICE:

- The frequency step of the TX clarifier depends on the Main Tuning Dial knob.
- 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/FAST] 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/FAST] 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.

Clarifier Offset Bar Indicator

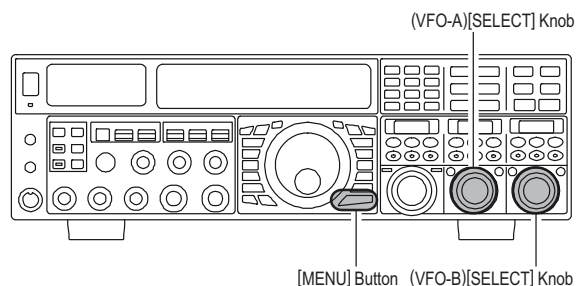
A visual depiction of the relative offset of the Clarifier may be displayed, using the Bar Indicator.

1. Press the [MENU] button to enter the Menu mode.
2. Rotate the (VFO-A)[SELECT] knob to select Menu item “010 DISP BAR SEL”.
3. Rotate the (VFO-B)[SELECT] knob to select “CLAR (Clarifier)” (replacing the default “CW TUNE (CW TUNING)” selection).
4. Press and hold in the [MENU] button for two seconds to save the new setting and exit to normal operation.

CLAR TX + 1.234
[Plus (+) Offset]

CLAR TX 0.000
[Zero Offset]

CLAR TX - 1.234
[Minus (-) Offset]



TRANSMITTER CONVENIENCE FEATURES

SPLIT-FREQUENCY OPERATION

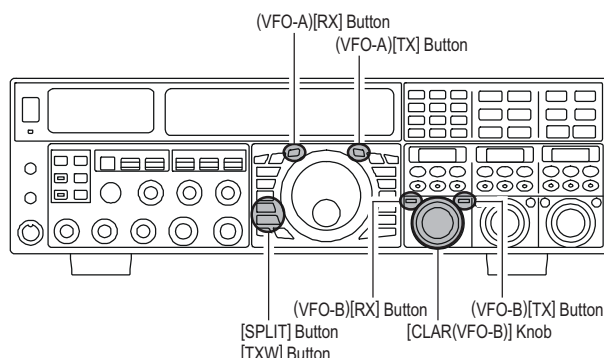
A powerful capability of the **FTdx5000** is its flexibility in Split Frequency operation, using the Main (VFO-A) and Sub (VFO-B) frequency registers. This makes the **FTdx5000** especially useful for high-level DX-pedition use, as the Split operation capability is very advanced and easy to use.

1. Set the VFO-A frequency as desired.
2. Set the VFO-B frequency.
3. Now press the **[SPLIT]** button briefly. The front panel switch/LEDs will look like this:
 - (VFO-A)[RX] button: LED glows green
 - (VFO-A)[TX] button: LED off
 - (VFO-B)[RX] button: LED off
 - (VFO-B)[TX] button: LED glows red
3. During Split operation, the VFO-A register will be used for reception, while the VFO-B register will be used for transmission. If you press the **[SPLIT]** button once more, Split operation will be cancelled.
 - (VFO-A)[RX] button: LED glows green
 - (VFO-A)[TX] button: LED glows red
 - (VFO-B)[RX] button: LED off
 - (VFO-B)[TX] button: LED off
4. You may also press the (VFO-A)[TX] button to return transmit frequency control to the VFO-A side, thereby cancelling split operation.

ADVICE:

- During normal (non-split) VFO-A operation, you may simply press the (VFO-B)[TX] button (located above and to the right of the [CLAR(VFO-B)] knob) to engage Split operation. The imbedded LED in the (VFO-B)[TX] button will glow red when you press the button.
- During Split operation, pressing the [A↔B] button will reverse the contents of the VFO-A and VFO-B. Press the [A↔B] button once more to return to the original frequency alignment.
- During Split operation, if you press the (VFO-B)[RX] button above and to the right of the [CLAR(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 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 (just below the [SPLIT] button).
- 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 VFO-A and VFO-B to different amateur bands. But remember that Dual Reception must be within the same band.

, located to the upper left of the Main Tuning Dial knob



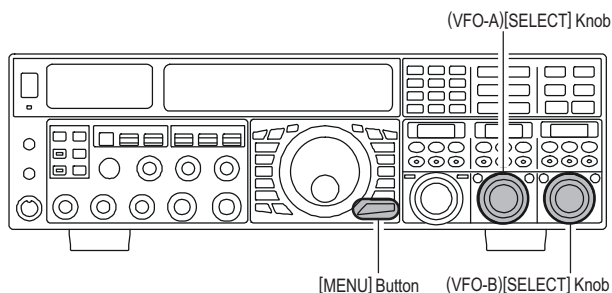
VFO Tracking Feature

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

If you want to tune the VFO-A frequency and 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 (VFO-A)[SELECT] knob to select Menu item "034 GENE TRACK."
3. Rotate the (VFO-B)[SELECT] knob to select the desired Tracking mode.
 - OFF:** Disables the VFO Tracking feature.
 - BAND:** When you change the band on the VFO-A side, the VFO-B band will automatically change to be the same as that of VFO-A.
 - FREQ:** This function is the almost same as "BAND", however, furthermore, the VFO-B frequency changes together with the 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.



TRANSMITTER CONVENIENCE FEATURES

SPLIT-FREQUENCY OPERATION

Quick Split Operation

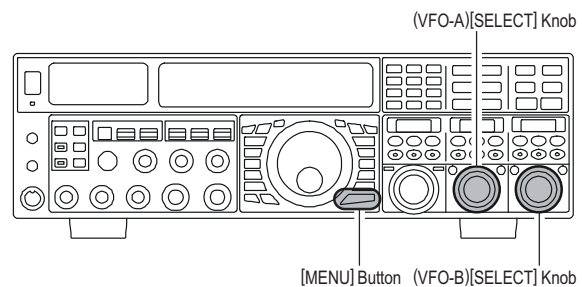
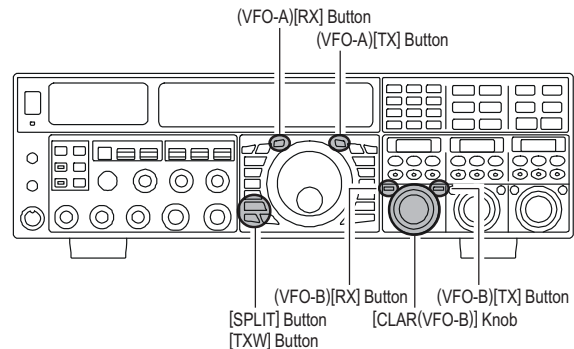
The Quick Split feature allows you to set a one-touch offset of +5 kHz to be applied to your radio's transmit frequency on the VFO-B, compared to the VFO-A frequency.

1. Start with regular transceiver operation on the VFO-A.
(VFO-A)[RX] button: LED glows green
(VFO-A)[TX] button: LED glows red
(VFO-B)[RX] button: LED off
(VFO-B)[TX] button: 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 VFO-A frequency to the VFO-B frequency register.
The VFO configuration will then be:
(VFO-A)[RX] button: LED glows green
(VFO-A)[TX] button: LED off
(VFO-B)[RX] button: LED off
(VFO-B)[TX] button: LED glows red
3. Press and hold in the [SPLIT] switch for two seconds to increment the VFO-B frequency another +5 kHz.

QUICK POINTS:

- ❑ The operating mode applied to the VFO-B register will be the same as that in use on the VFO-A register.
- ❑ The offset of the VFO-B from the 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 (VFO-A)[SELECT] knob to select Menu item "033 GENE Q SPLIT".
3. Rotate the (VFO-B)[SELECT] 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 briefly to exit, any changes you performed will not be stored.

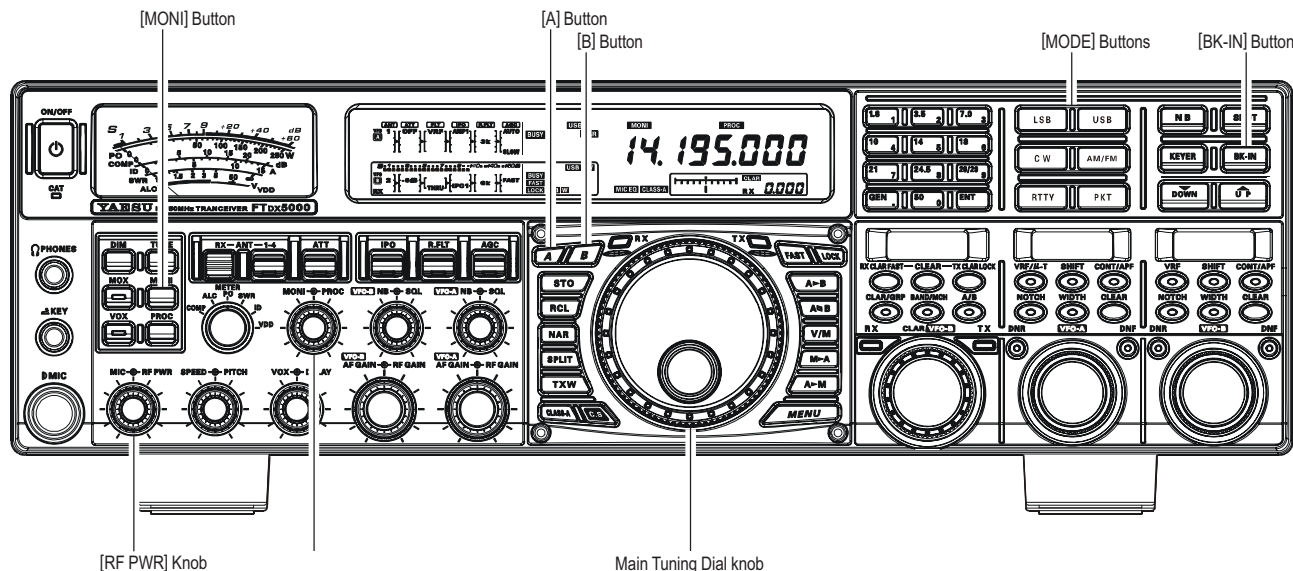


CW MODE OPERATION

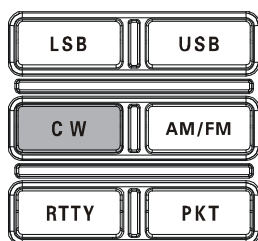
The powerful CW operating capabilities of the **FTdx5000** include operation using both an electronic keyer paddle and a “straight key” or emulation thereof, as is provided by a computer-based keying device.

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.

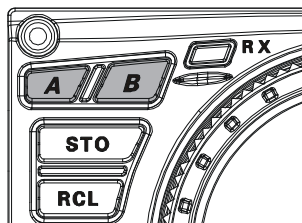


1. Press the **[CW]** mode button to engage CW operation. The “**CW**” and “**USB**” icons will appear in the display. The “**MONI**” icon will also appear in the display; and the CW monitor is activated.

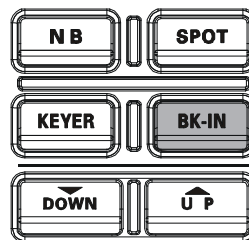


ADVICE:

- The operating mode is selected using the **[MODE]** button, and the VFO (A or B) to which the selection is applied is selected by the **[A]** or **[B]** button, located to the upper left of the Main Tuning Dial knob. Usually, the **[A]** button glow red, signifying VFO-A is being adjusted. Similarly, pressing the **[B]** button will cause its indicator to glow orange, signifying 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 whereby the “opposite” sideband injection is used, compared to the “normal” sideband. The “**CW**” and “**LSB**” icons will appear if you select CW Reverse.
2. Rotate the Main Tuning Dial knob to select the desired operating frequency.

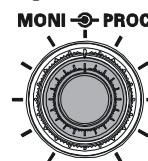


3. Press the **[BK-IN]** button to engage automatic activation of the transmitter when you close the CW key. The “**BK-IN**” icon will appear in the display.



ADVICE:

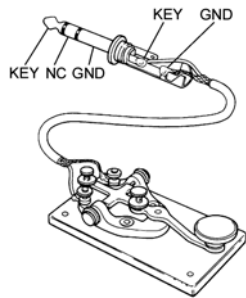
- When you close your CW key, the transmitter will automatically be activated, and the CW carrier will be transmitted. When you release the key, transmission will cease after a brief delay; the delay time is user-programmable, per the discussion on page
 - As shipped from the factory, the **FTdx5000** TX/RX system for CW is configured for “Semi-break-in” operation. However, using Menu item “**059 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. A CW sidetone sounds from a speaker in accordance with your keying. Adjusts the **[MONI]** knob for a comfortable listening level on the CW sidetone.



SETUP FOR STRAIGHT KEY (AND STRAIGHT KEY EMULATION) OPERATION

ADVICE:

- ❑ You may disable the CW sidetone by pressing the [MONI] button. The “MONI” icon will turn off, confirming that the Monitor is now disengaged.
- ❑ If you set the [BK-IN] button 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

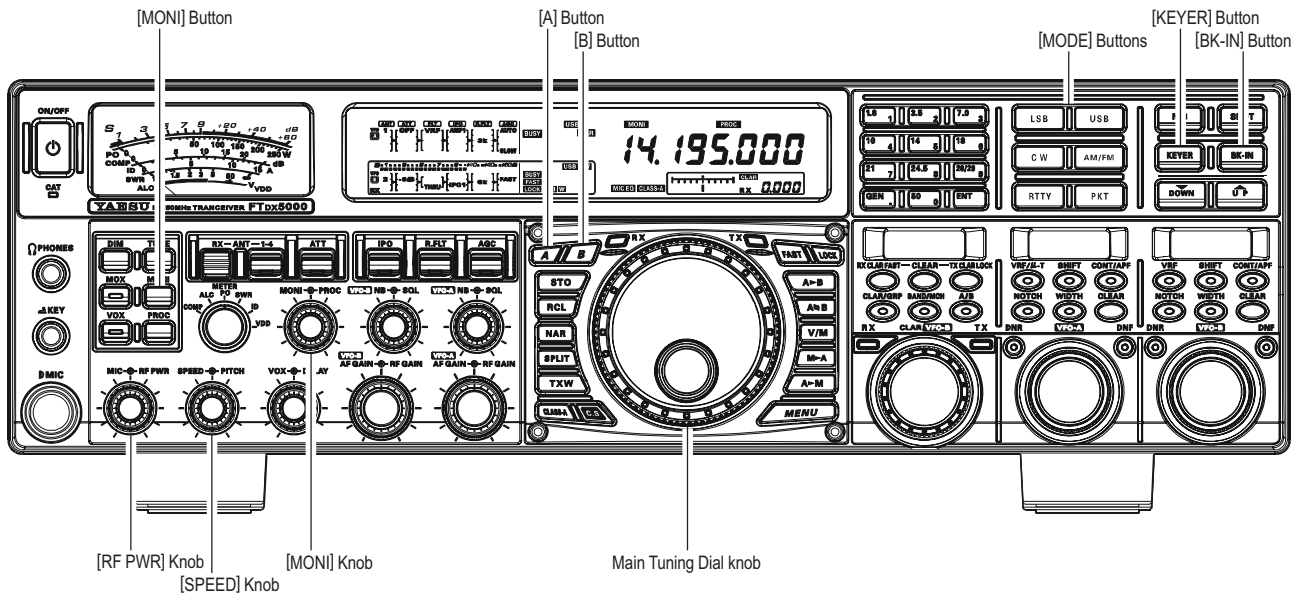
This is a pseudo- “VOX” mode used on CW, whereby the closure of the CW key will engage the transmitter, and release of the key will allow the receiver to recover after a short delay. No signals will be heard between the spaces between dots and dashes (unless the sending speed is extremely slow).

Full break-in

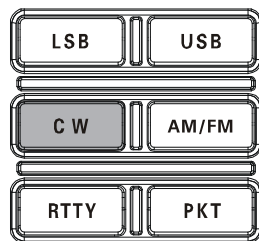
Full break-in (Also known as “Full QSK”) involves very fast switching between transmit and receive, such that incoming signals may be heard between the dots and dashes as you send them. This allows you to hear a station that suddenly starts transmitting on your frequency, while you are in the midst of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

USING THE BUILT-IN ELECTRONIC KEYS

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

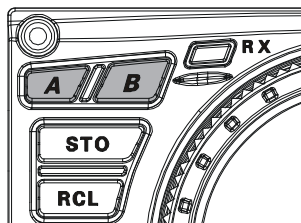


1. Press the **[CW]** mode button to engage CW operation. The “**CW**” and “**USB**” icons will appear in the display. The “**MONI**” icon will also appear in the display; and the CW monitor is activated.

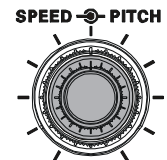
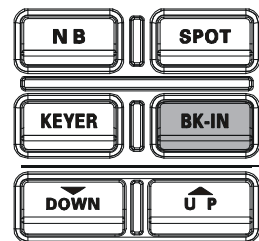


ADVICE:

- The operating mode is selected using the **[MODE]** button, and the VFO (A or B) to which the selection is applied is selected by the **[A]** or **[B]** button, located to the upper left of the Main Tuning Dial knob. Usually, the **[A]** button glow red, signifying VFO-A is being adjusted. Similarly, pressing the **[B]** button will cause its indicator to glow orange, signifying 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 ??), whereby the “opposite” sideband injection is used, compared to the “normal” sideband. The “**CW**” and “**LSB**” icons will appear if you select CW Reverse.
2. Rotate the Main Tuning Dial knob to select the desired operating frequency.

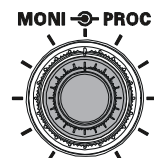


3. Press the **[KEYER]** button. The “**KEYER**” icon will appear in the display, confirming that the built-in Electronic Keyer is now active.
4. Rotate the **[SPEED]** knob to set the desired sending speed (4 ~ 60 wpm). Clockwise rotation of the **[SPEED]** knob will increase the keying speed.



ADVICE:

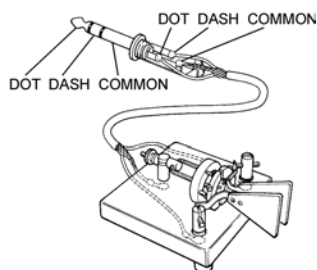
- The **SUB DISPLAY**s will show the keying speed for 3 seconds whenever the **[SPEED]** knob is turned. You may disable this feature (displaying the keying speed) via Menu item “**015 DISP LVL IND**”. See page ??? for details.
 - When you press either the “Dot” or “Dash” side of your paddle, the transmitter 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. A CW sidetone sounds from a speaker in accordance with your keying. Adjusts the **[MONI]** knob for a comfortable listening level on the CW sidetone.



USING THE BUILT-IN ELECTRONIC KEYS

ADVICE:

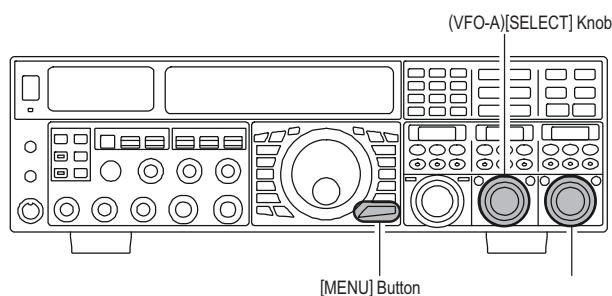
- ❑ You may disable the CW sidetone by pressing the [MONI] button. The “**MONI**” icon will turn off, confirming that the Monitor is now disengaged.
- ❑ When you utilize your keyer paddle, the transmitter will automatically be activated, and the CW characters (or a string of dots and dashes) will be 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.
- ❑ 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-2000 TX/RX system for CW is configured for “Semi-break-in” operation. However, using Menu item “060 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 (VFO-A)[SELECT] knob to select Menu item “059 A1A BK-IN”.
3. Rotate the (VFO-B)[SELECT] 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.



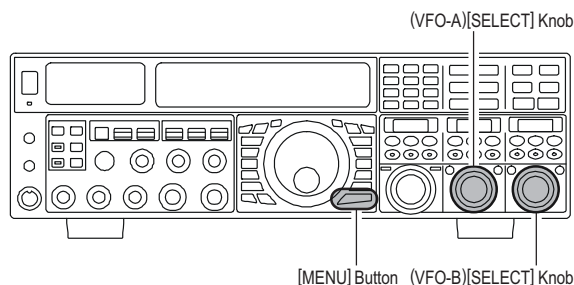
USING THE BUILT-IN ELECTRONIC KEYS

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

SETTING THE KEYS 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 **(VFO-A)[SELECT]** knob to select Menu item “**062 A1A WEIGHT.**”
3. Rotate the **(VFO-B)[SELECT]** 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.



SELECTING THE KEYS OPERATING MODE

The configuration of the Electronic Keyer may be customized independently for the front and rear **KEY** jacks of the **FTDX5000**. 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 **(VFO-A)[SELECT]** knob to select Menu item “**053 A1A F-TYPE**” (for the front **KEY** jack) or “**054 A1A R-TYPE**” (for the rear-panel’s **KEY** jack).

3. Rotate the **(VFO-B)[SELECT]** knob to set the keyer to the desired mode. The available selections are:

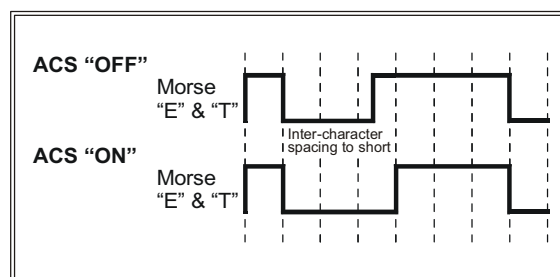
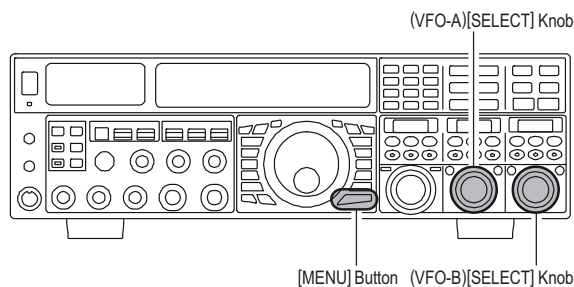
OFF: The built-in Electronic Keyer is turned off (“straight key” mode).

BUG: Dots will be generated automatically by the keyer, but dashes must be sent manually.

ELEKEY: Both dots and dashes will be generated automatically when you use your paddle.

ACS: Same as “**ELEKEY**” 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.



CW CONVENIENCE FEATURES

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.

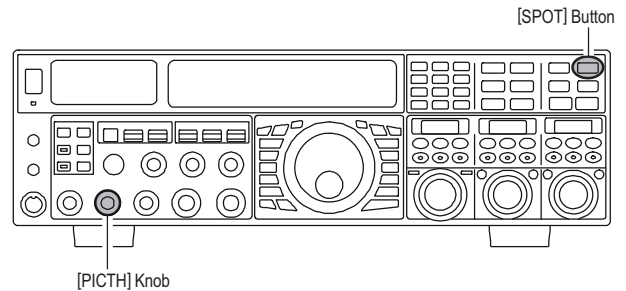
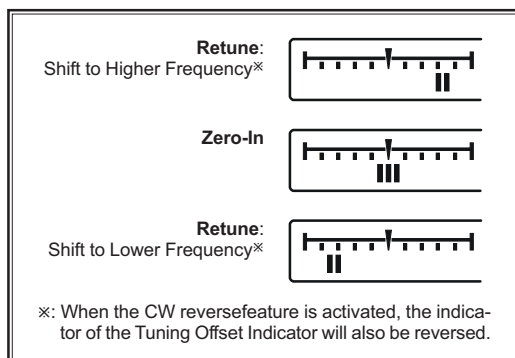
Using the SPOT System

While pressing the front panel’s [SPOT] button, the spot tone will be heard and the **SUB DISPLAY**s 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.



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 bar 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 **FTdx5000** displays, by default. However, you can change the display to be identical to what you would see on SSB by using Menu item “063 A1A FRQ DISP” and setting it to “FREQ” instead of its default “PITCH” setting.

CW CONVENIENCE FEATURES

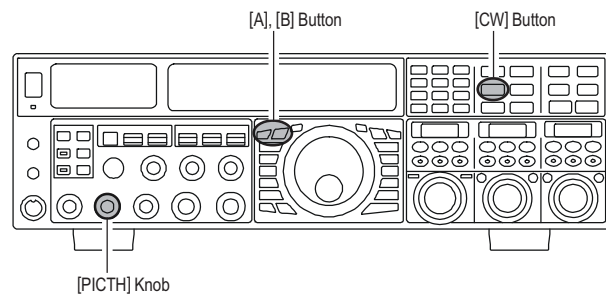
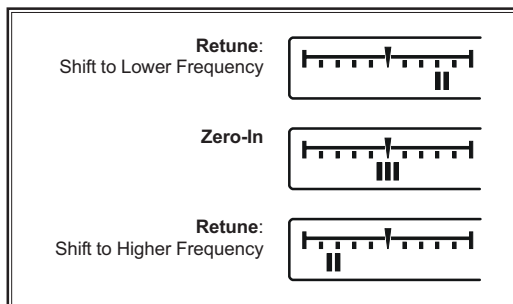
USING CW REVERSE

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 VFO-A receiver.
2. Now be sure your mode selection is still set for the VFO-A register, and press the **[CW]** mode button once more. The **"CW"** and **"LSB"** icons will appear in the display, indicating that the "LSB" injection side has now been selected.
3. When using Dual Receive, press the **[B]** button, located to the upper left of the Main Tuning Dial knob, then press the **[CW]** button to engage CW Reverse on the VFO-B receiver, in exactly the same way as for the 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 **"CW"** and **"USB"** icons will appear in the display).

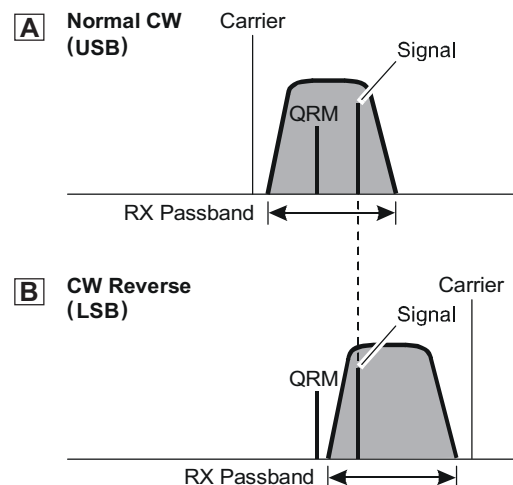
NOTES:

- 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.



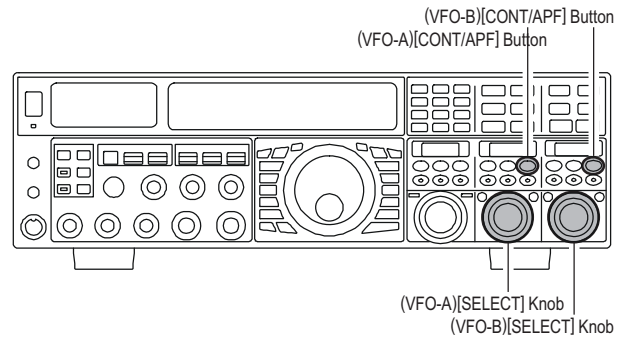
In the illustration, Figure A demonstrates the normal CW injection setup, using the USB side. In Figure B, CW Reverse has been engaged, so as to receive using LSB-side injection to eliminate interference.

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



AUDIO PEAK FILTER

1. Where you have set the CW mode onto the VFO-A receiver, press the **(VFO-A)[CONT/APF]** button to activate the APF (Audio Peak Filter) which provides a very narrow audio bandwidth. The peak position of the APF will appear in the **SUB DISPLAY-II**, and the **(VFO-A)[SELECT]** knob will now function as the APF knob.
2. Rotate the **(VFO-A)[SELECT]** knob to the left or right to reduce the interference.
3. To disable the APF, press the **(VFO-A)[CONT/APF]** button again.
4. To activate the APF (Audio Peak Filter) on the VFO-B, press the **(VFO-B)[CONT/APF]** button and adjust the **(VFO-B)[SELECT]** knob to reduce the interference. Indicate the peak position of the APF in the **SUB DISPLAY-III**.



CW DELAY TIME SETTING

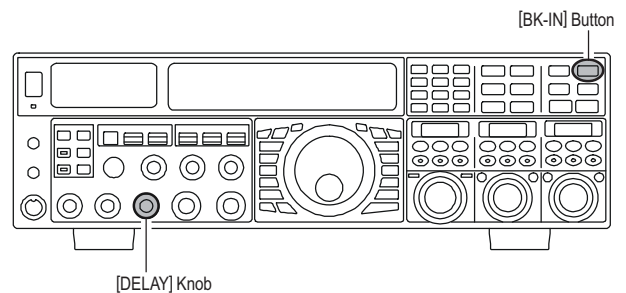
During semi-break-in (not QSK) operation, the hang time of the transmitter, after you have finished sending, may be adjusted to a comfortable value consistent with your sending speed. This is the functional equivalent to the “VOX Delay” adjustment used on voice modes, and the delay may be varied anywhere 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 “**059 A1A BK-IN**” must be set to “**SEMI**”).
2. Start sending, and adjust the [**DELAY**] knob so that the hang time is as you prefer for comfortable operation.

ADVICE:

The **SUB DISPLAYs** will show the delay time for 3 seconds whenever the [**DELAY**] knob is turned.

You may disable this feature (displaying the delay time) via Menu item “**015 DISP LVL IND**”. See page ??? for details.



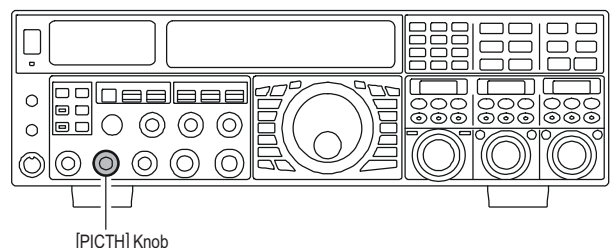
CW PITCH ADJUSTMENT

Rotation of the front panel’s [**PITCH**] knob will allow adjustment of the center frequency of the receiver pass-band, 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:

The **SUB DISPLAYs** will show the spot tone frequency for 3 seconds whenever the [**PITCH**] knob is turned.

You may disable this feature (displaying the spot tone frequency) via Menu item “**015 DISP LVL IND**”. See page ??? for details.



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.

CW CONVENIENCE FEATURES

CONTEST MEMORY KEYS

The **FTDX5000** is capable of the automatic sending of CW messages (as you might do in a contest) by plugging in the supplied **FH-2** Remote Control Keypad into the rear panel's **REMOTE** jack. 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 **(VFO-A)[SELECT]** knob and **(VFO-B)[SELECT]** 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)

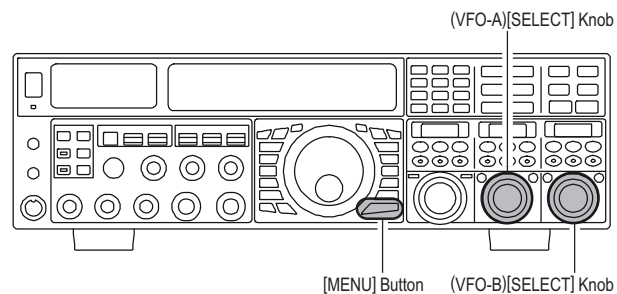
· · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · ·
 (C) (Q) (C) (Q) (C) (Q) (D) (E) (W) (6) (D) (X) (C) (K)

STORING A MESSAGE INTO MEMORY

1. Press the **[MENU]** button to enter the Menu mode.
2. Rotate the **(VFO-A)[SELECT]** 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).

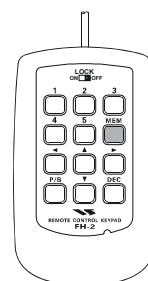
- 021 KEY CW MEM1
- 022 KEY CW MEM2
- 023 KEY CW MEM3
- 024 KEY CW MEM4
- 025 KEY CW MEM5

3. Rotate the **(VFO-B)[SELECT]** knob to set the selected Memory Register to "**MESSAGE**". If you want to use your keyer paddle for message entry on all memories, set all five Menu items (#021 ~ 025) to "**MESSAGE**".
4. Press and hold in the **[MENU]** button for two seconds to save the new settings and exit.

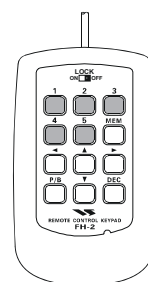


MESSAGE MEMORY PROGRAMMING (USING YOUR PADDLE)

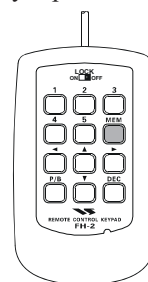
1. Set the operating mode to CW.
2. Set the **[BK-IN]** button to Off.
3. Turn the internal Electronic Keyer "on" by pressing the **[KEYER]** button, if necessary.
4. Press the **FH-2's [MEM]** key.



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 "**053 A1A F-TYPE**" and/or "**055 A1A R-TYPE**" to "**ACS**" (Automatic Character Spacing) while you are programming the keyer memories.

TERMINOLOGY:

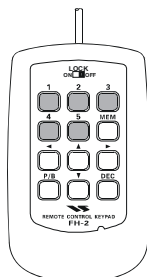
PARIS Word Length: By convention in the Amateur industry (utilized by ARRL and others), the length of one "word" of CW is defined as the length of the Morse Code characters spelling the word "PARIS." This character (dot/dash/space) length is used for the rigorous definition of code speed in "words per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

CW CONVENIENCE FEATURES

CONTEST MEMORY KEYS

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 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.

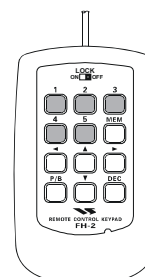


NOTE:

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 “061 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 “TEXT”).

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 1 ~ 255 seconds via Menu item “018 KEY BEACON”. If you do not wish the message to repeat in a “Beacon” mode, please set this Menu item to “OFF”. Press the FH-2’s [1] ~ [5] key, 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.

CW CONVENIENCE FEATURES

CONTEST MEMORY KEYS

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)

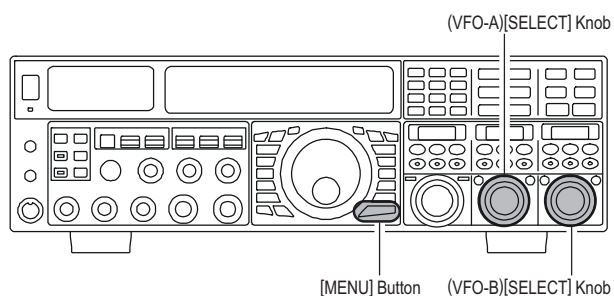
And we will utilize another powerful feature of the CW Memory Keyer, the sequential Contest Number (“Countup”) feature. **Example 2:** 599 10 200 # K} (15 characters)

STORING A TEXT INTO MEMORY

1. Press the [MENU] button to enter the Menu mode.
2. Rotate the (VFO-A)[SELECT] 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).

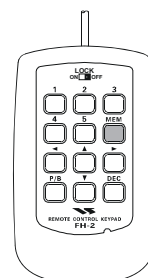
- 021 KEY CW MEM1
- 022 KEY CW MEM2
- 023 KEY CW MEM3
- 024 KEY CW MEM4
- 025 KEY CW MEM5

3. Rotate the (VFO-B)[SELECT] knob to set the selected Memory Register to “TEXT”. If you want to use your keyer paddle for message entry on all memories, set all five Menu items (#021 ~ 025) to “TEXT”.
4. Press and hold in the [MENU] button for two seconds to save the new settings and exit.

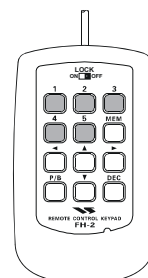


TEXT MESSAGE PROGRAMMING

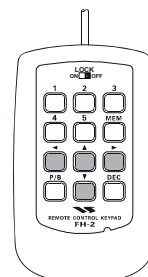
1. Set the operating mode to CW.
2. Set the [BK-IN] button to “off”.
3. Turn the internal Electronic Keyer “on” by pressing the [KEYER] button, if necessary.
4. Press the FH-2’s [MEM] key.



5. Press the [1] ~ [5] key on the FH-2 to begin the memory storage process.

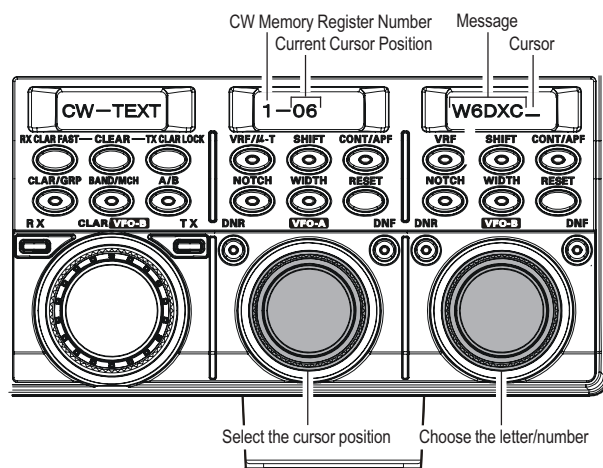


6. Use the FH-2’s [◀] and [▶] keys to set the cursor position and use the [▲] and [▼] keys to choose the letter/number to be programmed in each slot of the memory. In the case of the second example above, the “#” character designates the slot where the Contest Number will appear.



ADVICE:

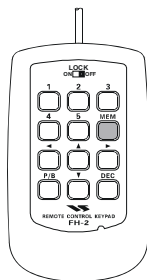
You may set the cursor position by the (VFO-A)[SELECT] knob, and choose the letter/number by the (VFO-B)[SELECT] knob.



CW CONVENIENCE FEATURES

CONTEST MEMORY KEYER

- When the message is complete, add the “}” character at the end to signify the termination of the message.
- Press and hold in the **FH-2**'s **[MEM]** key for 2 seconds to exit, once all characters (including “}”) have been programmed.



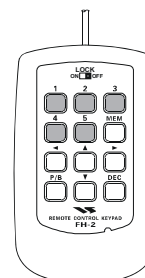
NOTE:

- 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 “053 A1A F-TYPE” and/or “055 A1A R-TYPE” to “ACS” (Automatic Character Spacing) while you are programming the keyer memories.

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

CHECKING THE CW MEMORY CONTENTS

- Be sure that Break-in is still turned “off” by the **[BK-IN]** button.
- Press the **[MONI]** button to enable the CW monitor.
- 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.

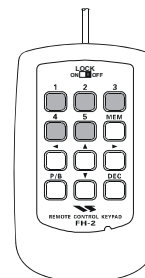


NOTE:

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

ON-THE-AIR CW MESSAGE PLAYBACK

- Press the **[BK-IN]** button to enable transmission. Either Full- or Semi-break-in will be engaged, depending on the setting of Menu item “060 A1A BK-IN.”
- 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 “MESSAGE”).

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.

- Press the **[MENU]** button to enter the Menu mode.
- Rotate the **(VFO-A)[SELECT]** knob to select Menu item “020 KEY CONTEST”.
- Rotate the **(VFO-B)[SELECT]** knob to set the Contest Number to the desired value.

Advice:

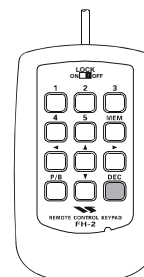
Press the **[CLEAR]** button (located above the **[CLAR(VFO-B)]** knob) to reset the Contest Number to “1”.

- Press and hold in the **[MENU]** button for two seconds to store the new number and exit to normal operation.

Decrementing the Contest Number

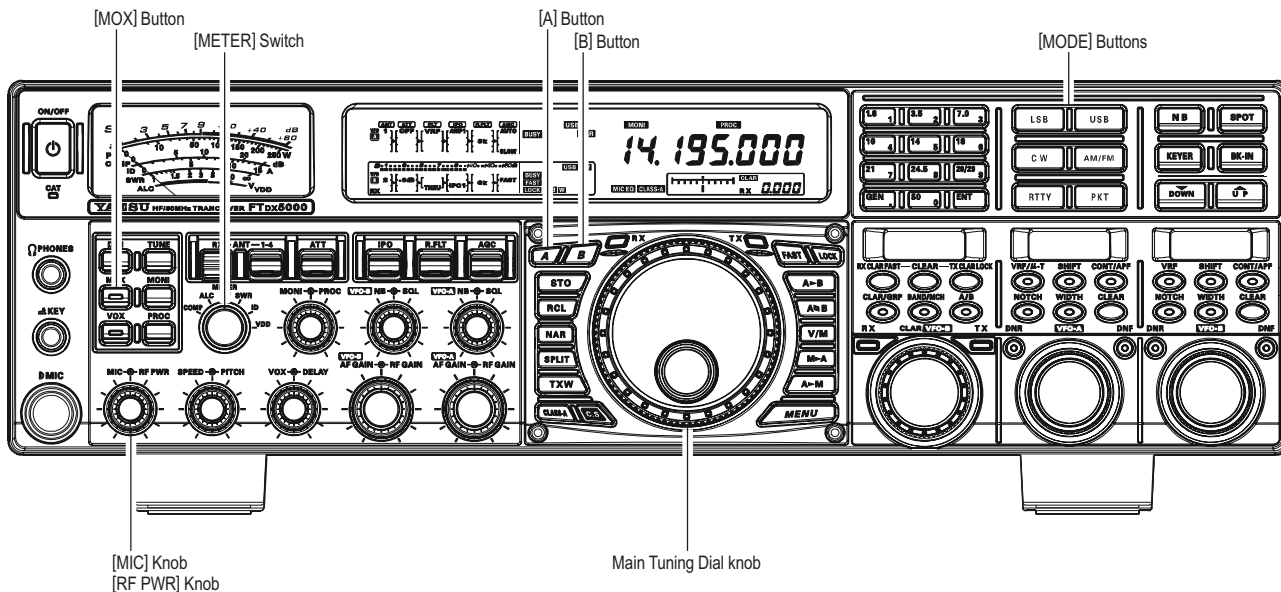
Use this process if the current contest number gets slightly ahead of the actual number you want to send (in case of a duplicate QSO, for example).

Press the **FH-2**'s **[DEC]** key. The current Contest Number will be reduced by one. Press the **[DEC]** button as many times as necessary to reach the desired number. If you go too far, use the “Contest Number Programming” technique desired at the left.



FM MODE OPERATION

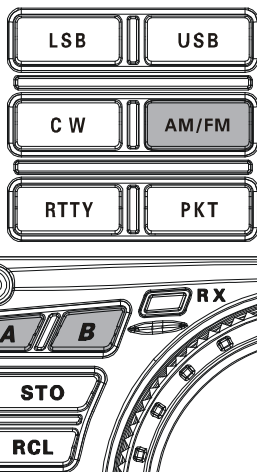
BASIC OPERATION



1. Press the **[AM/FM]** button several times, until the “**FM**” icon will appear in the display, to select the FM operating mode.

ADVICE:

- The operating mode is selected using the **[MODE]** button, and the VFO (A or B) to which the selection is applied is selected by the **[A]** or **[B]** button, located to the upper left of the Main Tuning Dial knob. Usually, the **[A]** button glow red, signifying VFO-A is being adjusted. Similarly, pressing the **[B]** button will cause its indicator to glow orange, signifying VFO-B adjustment. Therefore, press the **[A]** or **[B]** button to select the desired VFO, then press the **[AM/FM]** button to select the AM mode.



2. Rotate the Main Tuning Dial knob (in the case of 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 “**075 F3E MICGAIN**”, you may set a different fixed value, or choose the “**MCVR**” option, which then lets you use the front panel **[MIC]** knob to set the microphone gain in the FM mode.

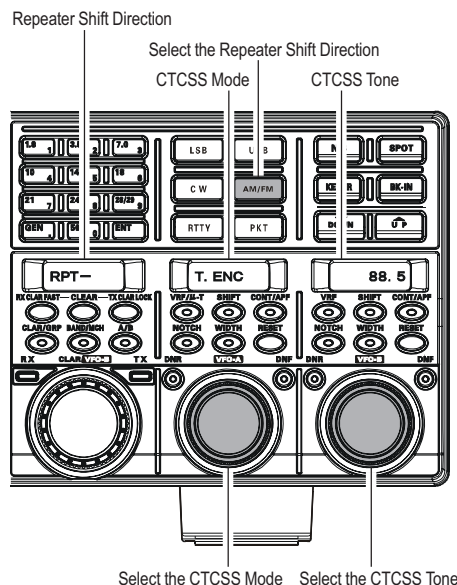
ADVICE:

- 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 **FTDX5000**. Please do not use FM on any other bands.

REPEATER OPERATION

The **FTDx5000** 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. Within 5 seconds of pressing of the **[AM/FM]** button:
 - Rotate the **(VFO-A)[SELECT]** knob to select the desired CTCSS mode. If you just need to send the uplink encoding tone, select **"T.ENC"**. For encode/decode operation, choose **"T.SQL"** instead. The available choices are **"OFF" → "T.ENC" → "T.SQL" → "OFF"**.
 - Rotate the **(VFO-B)[SELECT]** knob to select the desired CTCSS Tone to be used. A total of 50 standard CTCSS tones are provided (see the CTCSS Tone Chart).
 - Press the **[AM/FM]** button to select the desired repeater shift direction. The selections are **"RPT SIMP (not used on a repeater)" → "RPT +" → "RPT -" → "RPT SIMP (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.

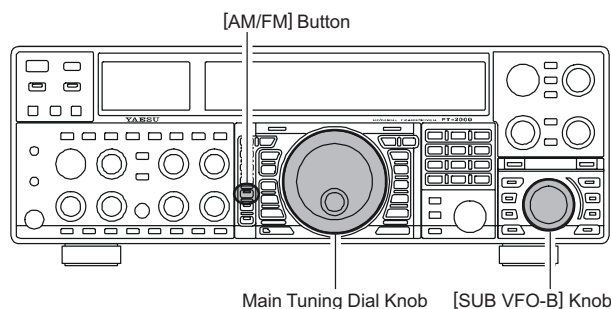


Select the CTCSS Mode Select the CTCSS Tone

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 **"076 F3E 28 RPT"** (28 MHz) and **"077 F3E 50 RPT"** (50 MHz), as appropriate.



MEMORY OPERATION

CONVENIENT MEMORY FUNCTIONS

The **FTDx5000** contains ninety-nine regular memories, labeled “01” through “99”, nine special programmed limit memory pairs, labeled “P1L/P1U” through “P9L/P9U”, and five QMB (Quick Memory Bank) memories, labeled “C-1” through “C-5”. Each stores various settings, not only the 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 **FTDx5000**'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 CTCSS 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.

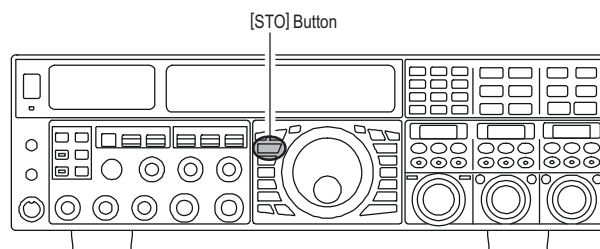
QMB Channel Storage

1. Tune to the desired frequency on the VFO-A.
2. Press the blue **[STO]** button. The “beep” will confirm that the contents of the VFO-A have been written to the currently-available QMB memory.
3. If you repeatedly press the **[STO]** button, the QMB memories will be written in the following order:



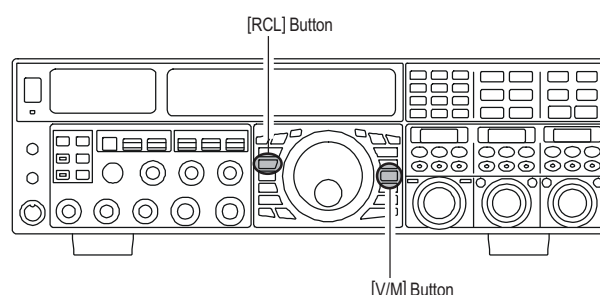
C-2 → C-3 → C-4 → C-5 → C-1

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 blue **[RCL]** button. The current QMB channel's data will be shown on the VFO-A frequency display field and the QMB memory channel number will appear in the small window at the lower right corner of the display.
2. Repeatedly pressing the **[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.

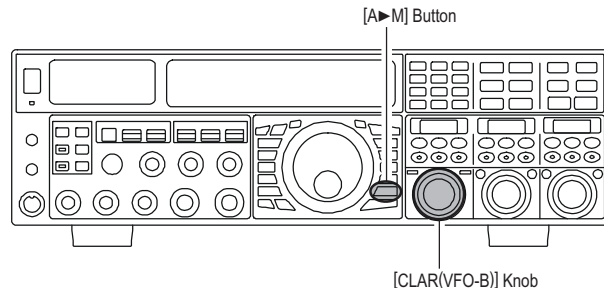
MEMORY OPERATION

REGULAR MEMORY OPERATION

The Regular Memory of the **FTdx5000** 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.

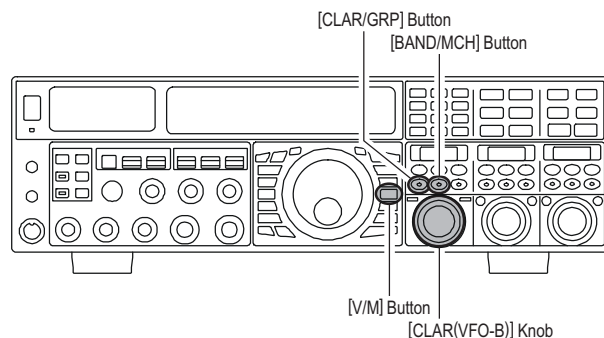
Memory Storage

1. Set the VFO-A up with all frequency, mode, and status the way you want to have it stored.
2. Press the **[A▶M]** button briefly (the current channel number will start blinking in the small window at the lower right corner of the display); the contents of the current memory channel will be shown on the **SUB DISPLAY-I**.
3. Rotate the **[CLAR(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 DISPLAY-I**.
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.



Memory Channel Recall

1. Press the **[V/M]** button, if necessary, to enter the Memory mode. The memory channel's data will be shown on the VFO-A frequency display field, and a "**MR**" icon and memory channel number will appear in the small window at the lower right corner of the display.
2. Press and hold the **[BAND/MCH]** button for two seconds, the imbedded LED of the **[BAND/MCH]** button glows yellow, indicating that you are ready to select a memory channel by the **[CLAR(VFO-B)]** knob.
3. After pressing the **[BAND/MCH]** button, you may rotate the **[CLAR(VFO-B)]** knob to select the desired memory channel.



ADVICE:

To work within a particular Memory Group (described on page ???), press and hold the **[CLAR/GRP]** button for two second (the imbedded LED will glow yellow), then rotate the **[CLAR(VFO-B)]** knob to select the desired Memory Group. Now press and hold the **[BAND/MCH]** button for two seconds (the imbedded LED will glow yellow); you may now choose the memory channel within the selected Memory Group.

REGULAR 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 briefly.
The data stored in the currently-selected memory channel will be displayed in the **SUB DISPLAY-I**. 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 [**CLAR(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:

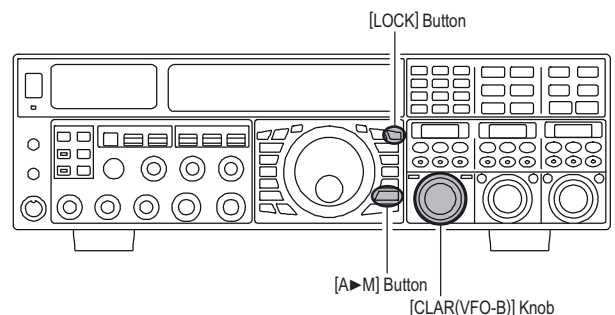
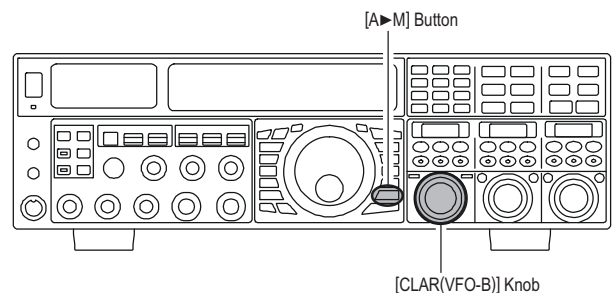
- While the Memory Check function is engaged, the memory channel number will blink in the multi-panel window.
- While operating in the VFO mode, using Memory Check, you may store the current contents of the VFO-A register into the selected memory by pressing and holding in the [**A►M**] button for two seconds (until the double beep). Conversely, if you wish to write the contents of the current memory into the 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 DISPLAY-I**.
2. Rotate the [**CLAR(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.



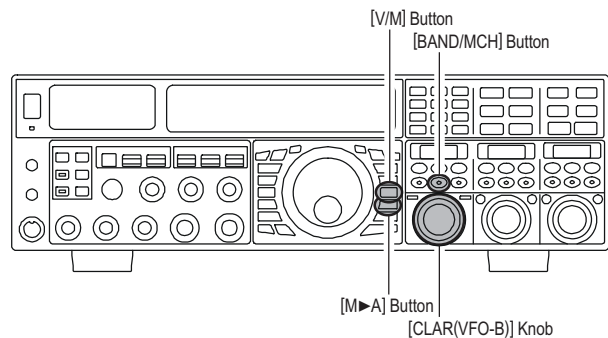
MEMORY OPERATION

REGULAR MEMORY OPERATION

Moving Memory Data to the 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 small window at the lower right corner of the display.
2. Press and hold the **[BAND/MCH]** button for two seconds, the imbedded LED of the **[BAND/MCH]** button glows yellow, indicating that you are ready to select a memory channel by the **[CLAR(VFO-B)]** knob.
3. Rotate the **[CLAR(VFO-B)]** knob to select the memory channel the contents of which you wish to transfer to the VFO-A.
4. Press and hold in the **[M▶A]** button for two seconds, until you hear the double beep. The data in the selected memory channel will now be transferred to the VFO-A.



ADVICE:

This transfer of data to the VFO-A does not affect the original contents of the memory channel; this is a “copy” function that leaves the memory contents unchanged.

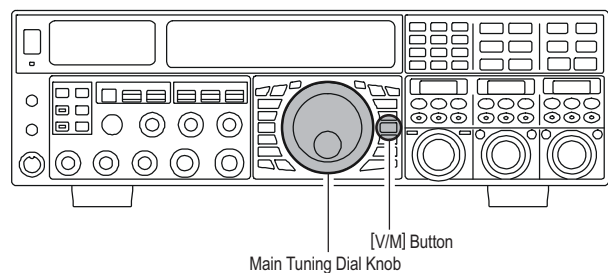
Memory Tune Operation

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 small window at the lower right corner of the display, 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 briefly 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.



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 **FTDX5000** 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 19 or 20 memory channels (the Group size is fixed). When a memory channel is grouped, the channel numbers change to correspond to the chart below:

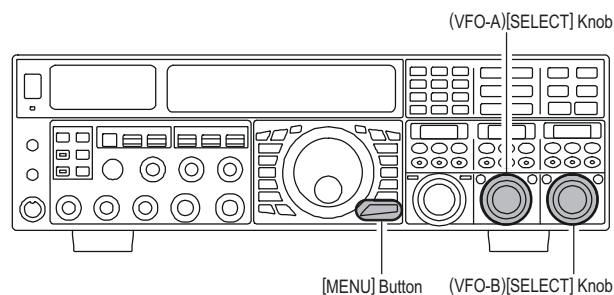
Memory Group Assignment

1. Press the **[MENU]** button to enter the Menu mode.
2. Rotate the **(VFO-A)[SELECT]** knob to select Menu item “032 GENE MEM GRP”.
3. Rotate the **(VFO-B)[SELECT]** knob to set this Menu item to “ENABLE” (the default setting is “DISABLE”).
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 “DISABLE” in step (3).

ADVICE

Note that for the PMS memory group, the PMS memories “P1L” through “P9U” will be so designated, so as to avoid confusion.



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

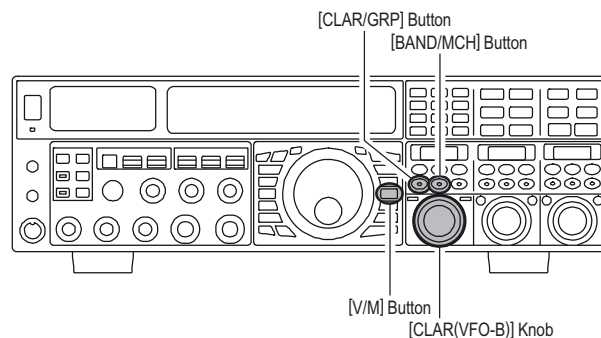
Choosing the Desired Memory Group

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 and hold the **[CLAR/GRP]** button for two seconds. The imbedded LED of the **[CLAR/GRP]** button glows yellow.
3. Rotate the **[CLAR(VFO-B)]** knob to select the desired Memory Group.
4. Press and hold the **[BAND/MCH]** button. The imbedded LED of the **[BAND/MCH]** button glows yellow.
5. Rotate the **[CLAR(VFO-B)]** knob to select the desired Memory Channel within the Selected Memory Group.

ADVICE:

If no channels have been assigned to a particular Memory Group, you will not have access to that Group.



OPERATION ON ALASKA EMERGENCY FREQUENCY: 5167.5 KHz (U.S. VERSION ONLY)

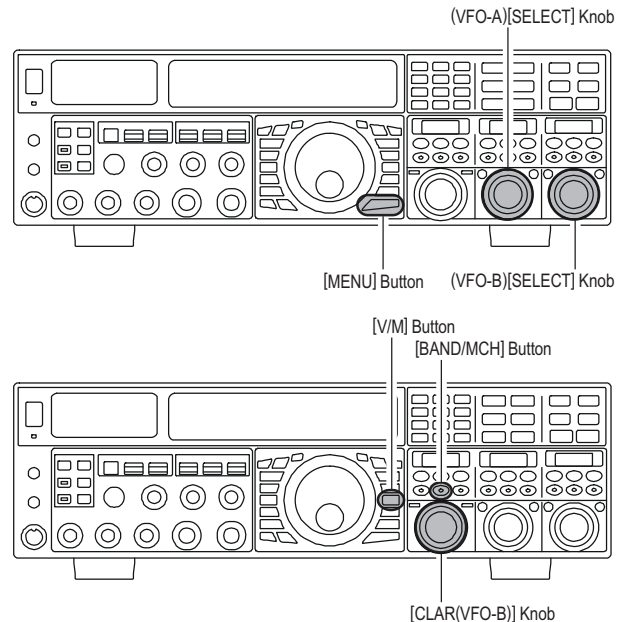
Section 97.401(d) of the regulations governing amateur radio in the United States permit emergency amateur communications on the spot frequency of 5167.5 kHz by stations in (or within 92.6 km of) the state of Alaska. This frequency is only to be used when the immediate safety of human life and/or property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

The **FTdx5000** 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 **(VFO-A)[SELECT]** knob to select “**170 TGEN EMRGNCY**”.
3. Rotate the **(VFO-B)[SELECT]** knob to select “**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 and hold the **[BAND/MCH]** button (the imbedded LED glows yellow), then rotate the **[CLAR(VFO-B)]** knob to select the emergency channel (“**E-US**”), which is found between channels “**P-9U**” and “**01.**”

NOTE:

- The receive-mode CLARIFIER functions normally while using this frequency, but variation of the transmit frequency is not possible. Activation of “**170 TGEN EMRGNCY**” does not enable any other out-of-amateur-band capability on the transceiver. The full specifications of the **FTdx5000** 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 “**170 TGEN EMRGNCY**” to “**DISABLE**” 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.



VFO AND MEMORY SCANNING

You may scan with the VFO or the memories of the **FTDx5000**, 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 **(VFO-A)[SQL]** knob so that the background noise is just silenced.

ADVICE:

Rotate the **(VFO-B)[SQL]** knob so that the background noise is just silenced, if you would like to begin scanning on the 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 VFO-A.

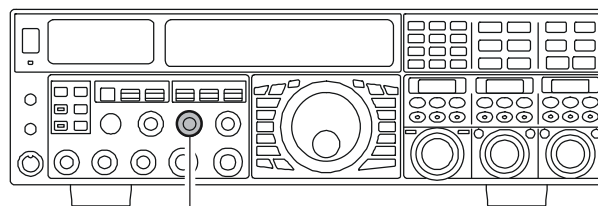
ADVICE:

If you would like to begin scanning on the VFO-B, press the **[B]** button first (located to the upper left of the Main Tuning Dial knob), then press and hold in the microphone's **[UP]** or **[DWN]** key for 1/2 second.

4. The scanner will now cause the transceiver to increment in the chosen direction until a signal is detected. When a signal is encountered which opens the squelch, it will do different things, depending on the operating mode:

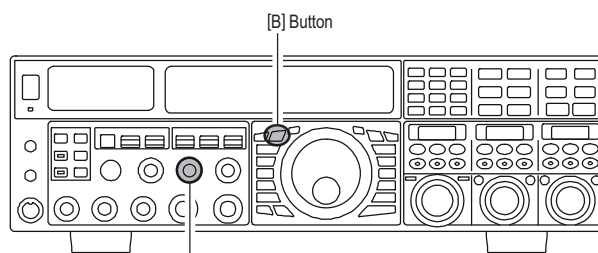
- In the SSB/CW modes**, the decimal points in the frequency display area will blink and the scanner will slow down (but does not stop).
- In the FM/AM modes**, the transceiver pauses on the signal and stays locked on its frequency for five seconds. Thereafter, scanning will resume whether or not the other station's transmission has ended. While the transceiver is in the "pause" condition, the decimal points in the frequency display area will blink. If the incoming signal disappears, scanning will resume.

5. To cancel the scanning, press the microphone's **[UP]** or **[DWN]** key briefly.



(VFO-B)[PICTH] Knob

MAIN BAND (VFO-A) SCANNING



[B] Button

(VFO-B)[PICTH] Knob

SUB BAND (VFO-B) SCANNING

ADVICE:

You may select the manner in which the scanner resumes while it has paused on a signal in the FM/AM modes, using Menu item "041 GENE SCN RSM". The default "TIME" 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 ???.

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 "040 GENE MIC SCN" (set it to "DISABLE").

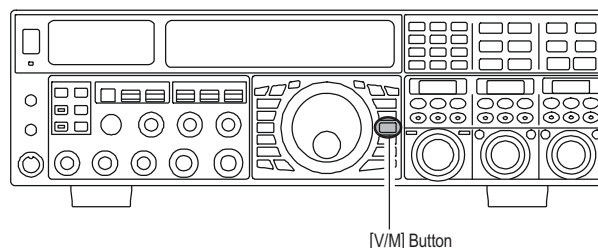
VFO AND MEMORY SCANNING

MEMORY SCAN

1. Set the transceiver up in the memory mode by pressing the [V/M] button, if necessary.
2. Rotate the (VFO-A)[SQL] knob so that the background noise is just silenced.
3. Press and hold in the microphone's [UP] or [DWN] key for 1/2 second to start scanning in the specified direction.
4. The scanner will now cause the transceiver to increment in the chosen direction until a signal is detected. When a signal is encountered which opens the squelch, the transceiver pauses on the signal and stays locked on its frequency for five seconds. Thereafter, scanning will resume whether or not the other station's transmission has ended. While the transceiver is in the "pause" condition, the decimal points in the frequency display area will blink.
5. If the incoming signal disappears, scanning will resume.
6. To cancel the scanning, press the microphone's [UP] or [DWN] key briefly.

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 "041 GENE SCN RSM". The default "TIME" 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 ???.



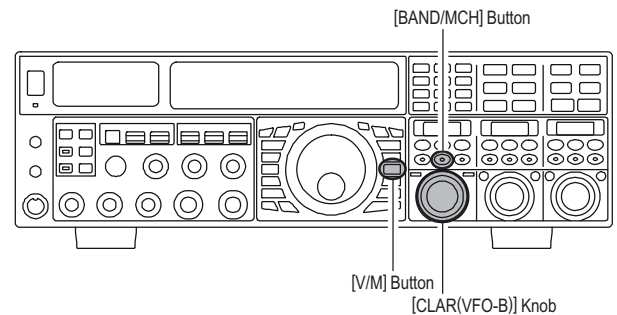
QUICK POINT:

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 "040 GENE MIC SCN" (set it to "DISABLE").

PMS (PROGRAMMABLE MEMORY SCANNING)

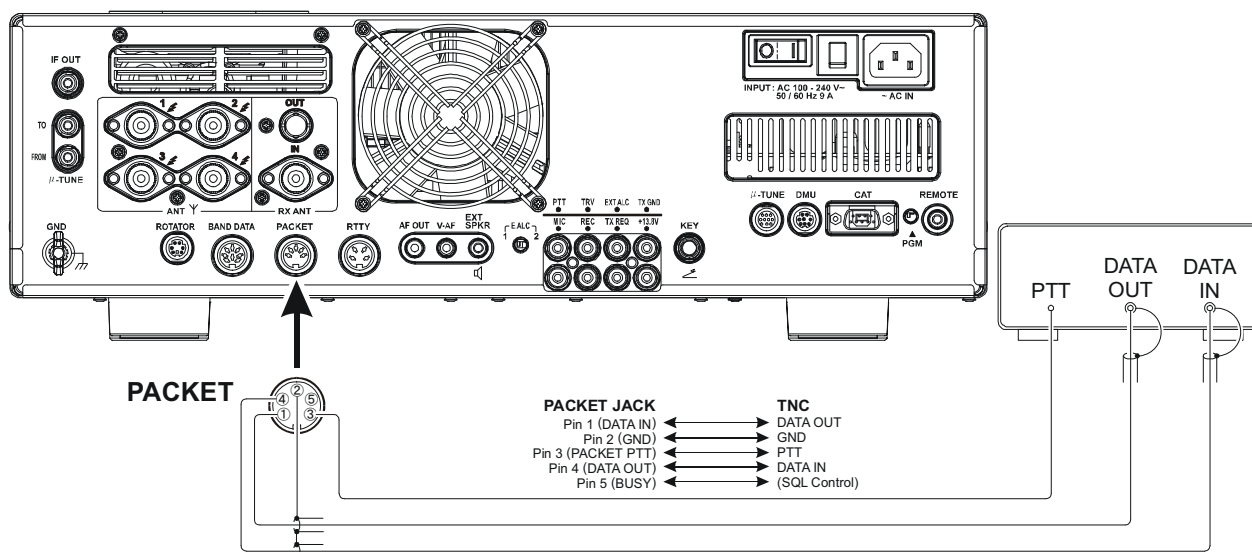
To limit scanning (and manual tuning) within a particular frequency range, you can use the Programmable Memory Scanning (PMS) feature, which utilizes nine special-purpose memory pairs (“P1L/P1U” through “P9L/P9U”). The PMS feature is especially useful in helping you to observe any operating sub-band limits which apply to your Amateur license class.

1. Store the Lower and Upper tuning/scanning limit frequencies into the memory pair “P1L” and “P1U,” respectively, or any other “L/U” pair of memories in the special PMS memory area. See page ??? for details regarding memory storage.
2. Press the [V/M] button to enter the Memory mode.
3. Press and hold the [BAND/MCH] button for two seconds, the imbedded LED of the [BAND/MCH] button glows yellow, indicating that you are ready to select a memory channel by the [CLAR(VFO-B)] knob.
4. Rotate the [CLAR(VFO-B)] knob to select memory channel “P1L” or “P1U.”
5. Rotate the (VFO-A)[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 P1L/P1U limits until you press the [V/M] button to return to memory channel or 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.
8. The scanner will now cause the transceiver to increment in the chosen direction until a signal is detected. When a signal is encountered which opens the squelch, it will do different things, depending on the operating mode:
 - In the SSB/CW modes**, the decimal points in the frequency display area will blink and the scanner will slow down (but does not stop).
 - In the FM/AM modes**, the transceiver pauses on the signal and stays locked on its frequency for five seconds. Thereafter, scanning will resume whether or not the other station’s transmission has ended. While the transceiver is in the “pause” condition, the decimal points in the frequency display area will blink. If the incoming signal disappears, scanning will resume.
9. 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.
10. 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.



PACKET OPERATION

Packet operation is easily accomplished on the **FTdx5000** 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
065 DATA DATA IN	DATA or PC	079 PKT LCUT FRQ	OFF/100 ~ 1000 Hz
066 DATA DT GAIN	0 ~ 100	080 PKT LCUT SLP	18dB/oct or 6dB/oct
067 DATA DT OUT	VFO-A or VFO-B	081 PKT HCUT FRQ	OFF/700 ~ 4000 Hz
068 DATA OUT LVL	0 ~ 100	082 PKT HCUT SLP	18dB/oct or 6dB/oct
069 DATA VOX DLY	30 ~ 3000 ms	083 PKT PKT DISP	-3000 ~ +3000 Hz
070 DATA VOX GAIN	0 ~ 100	084 PKT 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**” icons will appear in the display.
 - If you need to do FM-based 1200-baud packet on the 29/50 MHz bands, press the **[PKT]** button repeatedly to appear the “**PKT**” and “**FM**” icons, to engage the “PKT-FM” mode.
 - When both the “**PKT**” and “**USB**” icons are appeared, the **FTdx5000** has engaged Packet operation in the “USB” mode.
2. When the “transmit” command is received from the TNC, the transmitter of the **FTdx5000** 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 “**068 DATA OUT LVL**”. For the input level from the TNC, as applied to the DATA IN pin of the **PACKET** jack (pin 1), please use Menu item “**066 DATA DT GAIN**”.
- 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.

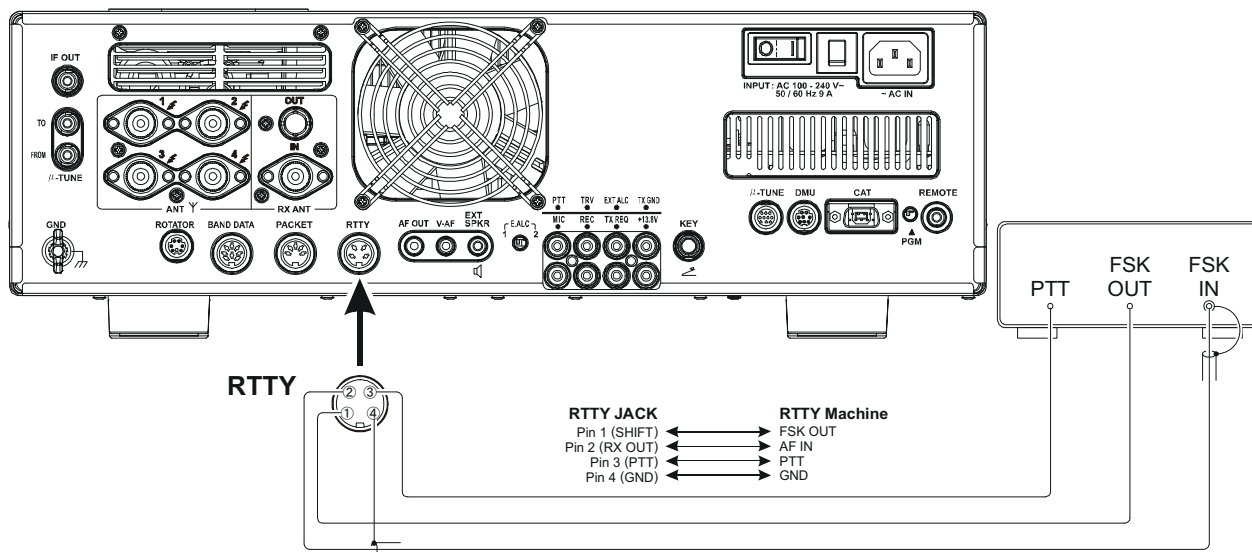
QUICK POINT:

PACKET Jack Specifications

- DATA IN (Pin 1)
 - Input Level: 50 mVp-p
 - Input Impedance: 10 k-Ohms
- DATA OUT (Pin 4)
 - 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.



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	MENU ITEM	AVAILABLE VALUES
065 RTTY LCUT FRQ	OFF/100 ~ 1000 Hz	070 RTTY T PLRTY	NOR or REV
066 RTTY LCUT SLP	18dB/oct or 6dB/oct	071 RTTY RTTY OUT	VFO-A or VFO-B
067 RTTY HCUT FRQ	OFF/700 ~ 4000 Hz	072 RTTY OUT LEVEL	0 ~ 100
068 RTTY HCUT SLP	18dB/oct or 6dB/oct	073 RTTY SHIFT	170/200/425/850 Hz
069 RTTY R PLRTY	NOR or REV	074 RTTY TONE	1275/2125 Hz

BASIC SETUP

- 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” icons will appear in the display. To switch to USB-side injection in RTTY, press the [RTTY] button once more. Both the “RTTY” and “USB” icons are appeared. Repeatedly pressing the [RTTY] button will toggle between LSB and USB injection on RTTY.
- 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:

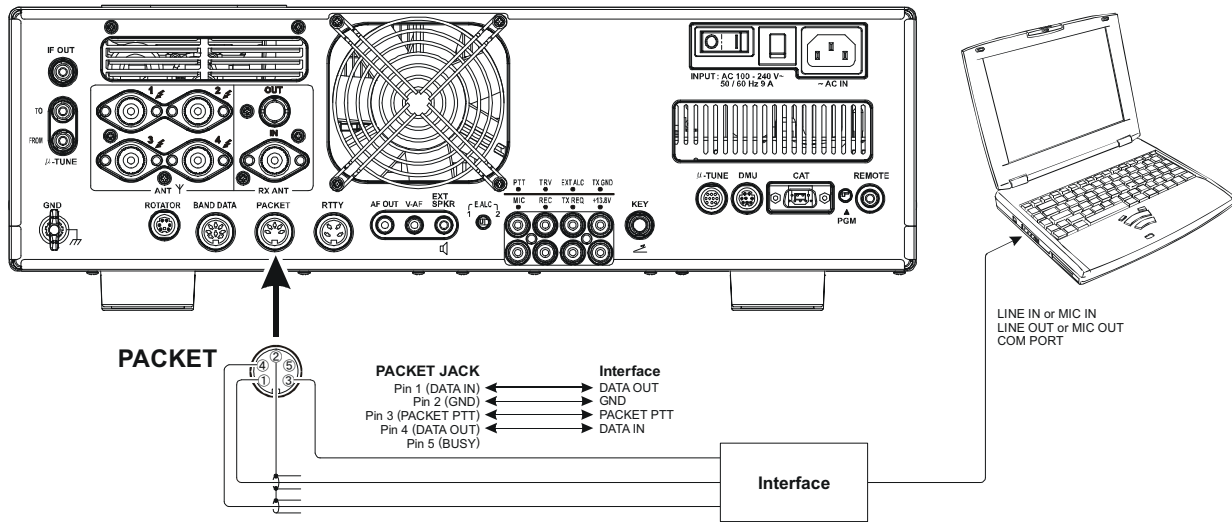
- The Mark/Space Shift utilized in most Amateur RTTY operation is 170 Hz. Other shifts may be configured, however, using Menu item “073 RTTY SHIFT”. The FTdx5000 is set up for “high tone” operation (centered on 2125 Hz) by default, but you may configure it for low tone (1275 Hz) operation using Menu item “074 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 “069 RTTY R PLRTY” to “REV” (“Reverse”) to see if that permits copy. A separate Menu item permits reversal of your transmitter’s Mark/Space polarity: “070 RTTY T PLRTY”.

QUICK POINT:

In the FTdx5000, “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 **FTDx5000** 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:

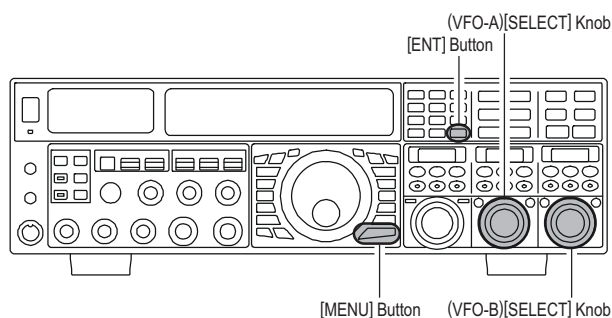
When you have configured Menu item “**168 TGEN VOX SEL**” to “**DATA**”, the transceiver will operate in a “**VOX**” mode, and it is not necessary to connect a **PTT** line. This makes for very convenient interfacing to computer Sound Cards, etc.

ABOUT THE TRANSVERTER OUTPUT TERMINAL

You may connect an after-market transverter to the rear panel's **TRV** jack. The output frequency is selectable from the 14, 28, and 50 MHz, and the output is approximately -10 dBm (0.1 mW) at 50 Ohms.

SETUP

1. Press the **[MENU]** button to enter the Menu mode.
2. Rotate the **(VFO-A)[SELECT]** knob to select Menu item "144 TUNE MY BAND".
3. Rotate the **(VFO-B)[SELECT]** knob to select the desiring input frequency band of the transverter in menu item (T14M OFF, T28M OFF, or T50M OFF).
4. Press the **[ENT]** button (one of the **[BAND]** button) to change the parameter to "ON" (a "OFF" notation will replace the "ON" notation).
5. Rotate the **(VFO-A)[SELECT]** knob to select Menu item "166 TGEN ETX-GND".
6. Rotate the **(VFO-B)[SELECT]** knob to set this Menu item to "ENABLE" 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.



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 **FTdx5000**).

Example: Setting up the **FTdx5000** display for use with a 144 MHz Transverter

1. Connect the 144 MHz transverter to the **FTdx5000**.
2. Press the **[MENU]** button to enter the Menu mode.
3. Rotate the **(VFO-B)[SELECT]** knob to select the Menu item which deserve the input frequency band of the transverter (**036 GENE TRV 14M**, **036 GENE TRV 28M**, or **036 GENE TRV 50M**).
4. Rotate the **(VFO-B)[SELECT]** knob so as to select "44MHz" 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 actual operating range of the **FTdx5000** will correspond to transverter's operating frequency of 144-145 MHz, with "44-45" being displayed on the front panel of the transceiver.

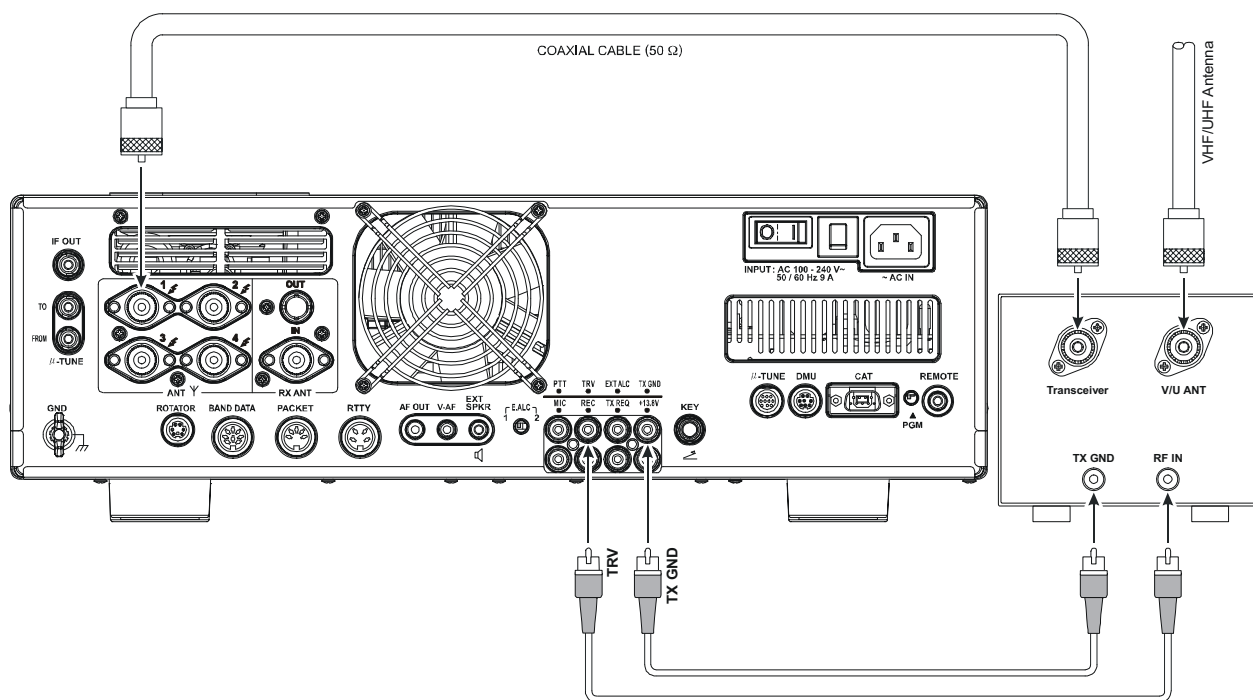
ABOUT THE TRANSVERTER OUTPUT TERMINAL

OPERATION

1. Set up the **FTdx5000** for transverter use, as described previously.
2. Choose the “Transverter” band with the “MY Bands” procedures, as described on page ????. You may find the “Transverter” band between bands “1.8 MHz” and “50 MHz.”
3. Rotate the Main Tuning Dial knob to set the desired operating frequency. Operation is basically unchanged from normal transceiver operation.

ADVICE:

When the “Transverter” mode is turned on, power output will not be allowed to pass to the “ANT 1” through “ANT 4” 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.



This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

1. Changes or modifications to this device not expressly approved by VERTEX STANDARD could void the user's authorization to operate this device.
2. This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions; (1) this device may not cause harmful interference, and (2) this device must accept any interference including interference that may cause undesired operation.
3. The scanning receiver in this equipment is incapable of tuning, or readily being altered, by the User to operate within the frequency bands allocated to the Domestic public Cellular Telecommunications Service in Part 22.

DECLARATION BY MANUFACTURER

The scanner receiver is not a digital scanner and is incapable of being converted or modified a digital scanner receiver by any user.

WARNING: MODIFICATION OF THIS DEVICE TO RECEIVE CELLULAR RADIOTELEPHONE SERVICE SIGNALS IS PROHIBITED UNDER FCC RULES AND FEDERAL LAW.



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