

FT DX 9000MP

Operation Manual



YAESU
Choice of the World's top DX'ers

GENERAL DESCRIPTION

We wish to take this opportunity to thank you for your purchase of the FT DX 9000MP Transceiver!

The FT DX 9000MP is the culmination of a four-year design project. But it also is the product of our company's fifty years of engineering, design, and manufacturing know how. As pioneers in the development of SSB, we have led the technological advances in Amateur Radio communications over the last half century. And now, with the introduction of the FT DX 9000MP, we again lead the way with a no-compromise 21st-century design that will make your operating dreams come true. More importantly, it is a radio that will let your skills and experience find expression, as you harness the excitement of HF operating like you've never done before!

ABOUT THIS MANUAL . . .

The FT DX 9000MP is a leading-edge transceiver with a number of new and exciting features, some of which may be unfamiliar to you. In order to gain the most enjoyment and operating efficiency from your FT DX 9000MP, we recommend that you read this manual in its entirety, and keep it handy for reference as you explore the many capabilities of your new transceiver.

Before using your FT DX 9000MP, be sure to read and follow the instructions in the "Before You Begin" section of this manual.

CONVENTIONS USED IN THIS MANUAL

Please note the conventions, described below, for operational commands and texts included in this manual.

[](#○) This refers to a switch or knob used for controlling a particular function. The name or number inside the brackets designate the name of the switch/knob, or its reference number within this manual

[] This is the name of a switch or knob.

[XX] In the texts, you may be advised to press a button momentarily, or press and hold it in for a time interval (such as two seconds). Please be sure to observe the proper procedure when pressing a button.

[OO] This indicates the pressing of a button when a "momentary" press is the only selection available.

『Note』 This is used for a note as to a particular point of interest.

『Advice』 This is used to amplify or expand on instructions, so as to recommend a way to gain maximum benefit from a feature or function.

『Example』 This is used to demonstrate an example of how a feature or function should work or be programmed.

『Quick Note』/『Quick Point』 This is used for a brief explanation of a particular aspect of operation.

『Terminology』 An explanation of a term or expression used in this manual.

This device is designed for Amateur Radio operation only. Operation on the Amateur Radio bands requires a license, in accordance with the telecommunications statutes in your country. The discussions in this manual presume that you possess the fundamental knowledge consistent with your status as a licensed Amateur Radio operator.

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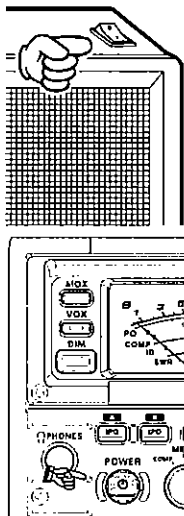
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Before You Begin...

1. Connecting AC Power

There are two power switches on this transceiver, one each on the rear and front panels. If the rear panel's Power switch is not turned on, the front panel Power switch will not function.

- Push the Power switch on the FPS-9000H to the [I] position to apply power from the power supply to the transceiver's OCXO (Reference Crystal Oven) and to enable the front panel power switch.
- Press and hold in the front panel Power switch for two seconds to turn the transceiver on.



『Note』

The self-check function of the CPU inside the radio will begin.

If the optional RF μ -Tuning Unit is installed, the μ -Tuning circuitry will receive the data from the CPU, and it will perform its own self-check, and will preset itself to the proper settings for the current operating frequency. While the μ -Tuning circuitry is obtaining the data, the drive mechanism will move from one end of its range to the other end (fast), and this will cause a temporary "motor" noise that can be heard; this, does not represent any trouble or problem.

When the radio is turned on for the first time, it takes about 50 seconds (from turning the radio on to completing the self-check) until the radio becomes ready to use; however, from the next time you turn it on, it will take around 10 seconds until the transceiver is ready for full operation.

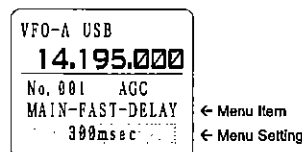
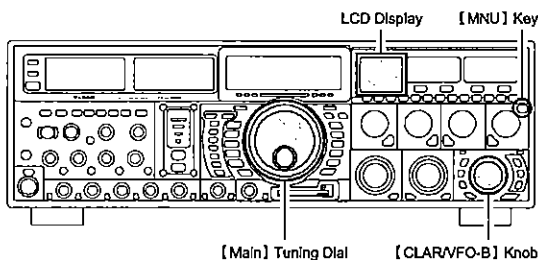
2. Configuring Your FT dx 9000MP Using the Menu

The FT dx 9000MP is configured, at the factory, with its various functions set up in a manner typical for most operation. Via the "Menu" system, you may change these settings to match the way you want your transceiver to operate.

Menu programming is enabled by pressing the [MNU] (Menu) key momentarily. You may then rotate the [Main] Tuning Dial to display the desired Menu item, in the menu list, on the LCD display. Each of the settings can be changed or customized via the [CLAR/VFO-B] knob, as you like, in this mode.

Once you have made a change to the configuration of a Menu item or items, you must press **and hold in** the [MNU] (Menu) key for **two seconds** to save the new settings and exit to normal operation.

If you wish to cancel a change to a Menu item or items, just press the [MNU] key momentarily. If you do not press and hold in the [MNU] key in for two seconds, any changes you have made will not be saved.



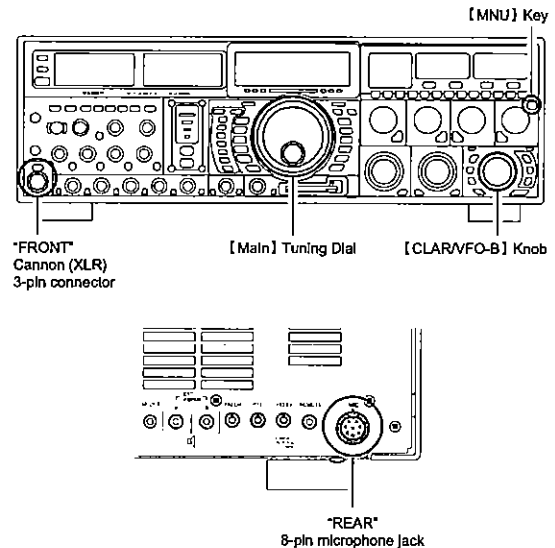
Before You Begin...

3. Connecting and Selecting the Microphone

The FT DX 9000MP comes equipped with two microphone connectors: the front panel includes a “Canon” (XLR) three-pin connector, while the rear panel provides an eight-pin (round) connector.

As shipped from the factory, the front panel XLR connector is engaged for operation, and the rear panel 8-pin microphone jack is not connected. If you wish to enable the 8-pin connector instead of the XLR connector, use the Menu to accomplish this. Note that you may leave microphones connected to both jacks, and may select the microphone you want for operation on a particular operating mode (SSB, AM, FM, etc.), as well!

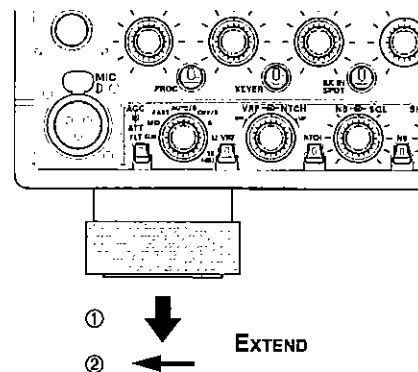
- Press the [MNU] (Menu) key momentarily to enter the Menu Mode.
- Rotate the [Main] Tuning Dial to select Menu Item #69, located within the “MODE SSB” group: SSB MIC SELECT.
- Rotate the [CLAR/VFO-B] knob to change the setting of Menu #69 from “FRONT” to “REAR.”
- Press *and hold in* the [MNU] (Menu) key for *two seconds* to save the new setting and exit to normal operation.
- In a similar manner, you may use Menu #40 (AM MIC SEL) in the MODE-AM Menu Group to select the microphone jack to be used during AM operation, and Menu #59 (FM MIC SEL) in the MODE-FM Menu Group to select the microphone to be used during FM transmission.



4. Extending the Front Feet

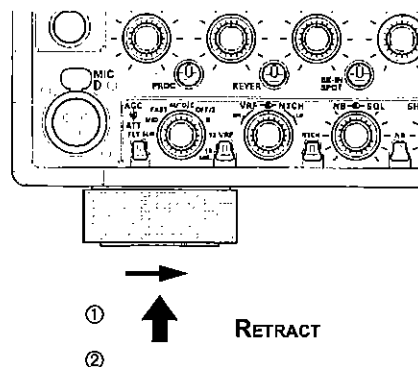
In order to elevate the front panel for easy viewing, the front left and right feet of the bottom case may be extended.

- Pull the front legs outward from the bottom panel.
- Rotate the legs counter-clockwise to lock them in the extended position. Be sure the legs have locked securely in place, because the transceiver is quite heavy and an unlocked leg could result in damage, should the transceiver move suddenly.



Retracting the Front Feet

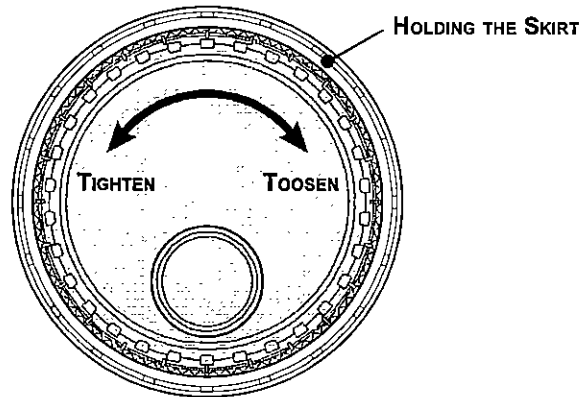
- Rotate the legs clockwise, and push them inward while rotating to the right.
- The front feet should now be locked in the retracted position.



Before You Begin. . .

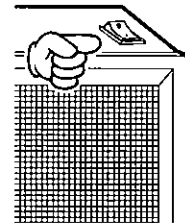
5. Adjusting the Main Dial Torque

The torque (drag) of the Main Tuning Dial may be adjusted according to your preferences. Simply hold down the rear skirt of the knob, and while holding it in place rotate the Main Dial itself to the right to reduce the drag, or to the left to increase the drag.



6. Restarting Power after a Voltage Fluctuation

If your AC mains power should suffer a significant fluctuation or interruption, we recommend that you go through a complete power-up cycle, in order to ensure that all circuits are properly initialized. To do this, be sure the front panel Power switch is turned off, then set the FPS-9000H's Power switch to the "O" position. Now unplug the AC cable from the rear panel of the FPS-9000H, and wait ten seconds. Plug the AC cable back in, set the FPS-9000H's Power switch to "O," and now press and hold in the front-panel Power switch for two seconds to turn the transceiver on. After about 50 seconds, all circuits will be initialized, and normal operation may resume.



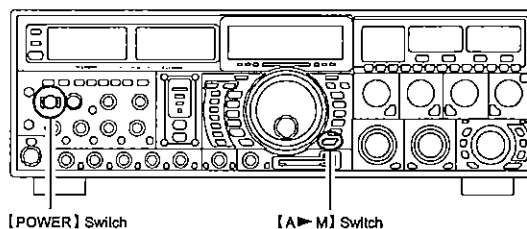
Before You Begin. . .

7. Resetting the Microprocessor

Resetting Memories (Only)

Use this procedure to reset (clear out) the Memory channels previously stored, without affecting any configuration changes you may have made to the Menu settings.

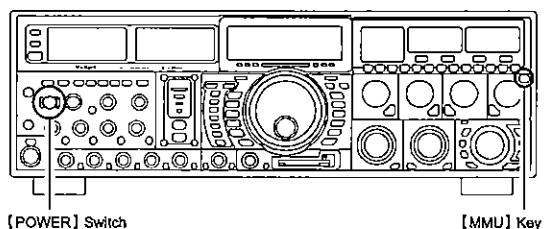
1. Press the front panel's **[POWER]** switch to turn the transceiver off.
2. Press and hold in the **[A▶M]** switch; while holding it in, press and hold in the front panel's **[POWER]** switch to turn the transceiver on. Once the transceiver comes on, you may release the **[A▶M]** switch.



Menu Resetting

Use this procedure to restore the Menu settings to their factory defaults, without affecting the memories you have programmed.

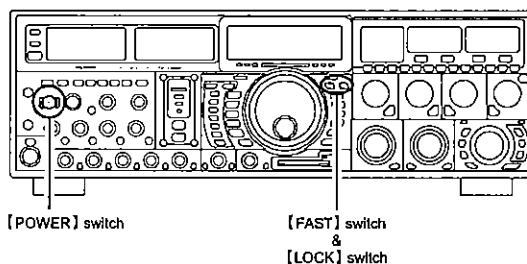
1. Press the front panel's **[POWER]** switch to turn the transceiver off.
2. Press and hold in the **[MNU]** (Menu) key; while holding it in, press and hold in the front panel's **[POWER]** switch to turn the transceiver on. Once the transceiver comes on, you may release the **[MNU]** (Menu) key.



Full Reset

Use this procedure to restore all Menu and Memory settings to their original factory defaults. All Memories will be cleared out by this procedure.

1. Press the front panel's **[POWER]** switch to turn the transceiver off.
2. Press and hold in the **[FAST]** and **[LOCK]** switches; while holding them in, press and hold in the front panel's **[POWER]** switch to turn the transceiver on. Once the transceiver comes on, you may release the other two switches.



FEATURES

Superior Visibility and Logical, Fatigue-reducing Panel Layout

The front panel layout is logically crafted, with the large-aperture main frequency display squarely in the middle of the front panel; the two large S-meters to the left providing instant recognition of signal strength. Just as in an aircraft cockpit, the panel meters and the LCD display are canted slightly toward the center for maximum visibility.

Large, Multi-colored VFD Fluorescent Display

A proprietary, high-brightness VFD (fluorescent) display is incorporated in the FT DX 9000MP, providing outstanding visibility and easy reading of the important frequency information, whether in dim or bright lighting environments.

Function-Indicating LEDs

The many function status indications on the front panel are clearly identified by the operator, thanks to the innovative multi-color LEDs incorporated in design. A Red LED indicates that a function is engaged on the Main Band, while an Orange LED shows that the function is engaged on the Sub Band.

Indirect Illumination

For ease of nighttime operation, the controls on the front panel are indirectly illuminated, thanks to carefully-positioned lamps in the frame underneath the meters and the Band switch.

Aluminum-Die-Cast Oversized Main Tuning Dial

The Main Tuning Dial is a large-diameter (3.2"/81 mm) dial directly coupled to the magnetic rotary encoder which drives the HRDDS via microprocessor control. Its heavy weight (7 oz./200 g) and quality mounting and construction provide a smooth "flywheel" effect during operation, ideal for quick cruising up and down a band.

Oversized Knobs for Most Important Functions

The concentric AF/RF Gain, SHIFT/WIDTH, and CLAR/VFO-B knobs are conveniently located right bottom of the Front Panel, for ease of access to these important controls.

World's First 400 MHz HRDDS Local Oscillator

So as to optimize spurious-free dynamic range in a multi-signal environment, Yaesu's engineers have introduced the world's first HRDDS (High Resolution Direct Digital Synthesizer) as the first local oscillator of the FT DX 9000MP. Dividing directly from this high frequency, this local oscillator design ensures extraordinarily low noise, resulting in improved weak-signal reception even on a crowded band during a weekend contest.

New-design Large-area OCXO Reference Oscillator

Serving as the master reference oscillator for the transceiver, the 10 MHz OCXO (Oven Controlled Crystal Oscillator) is a large-area (50 x 50 mm/2" x 2") oven-stabilized oscillator operating at high temperature, for industry-leading frequency stability rated at 0.03 ppm over the temperature range -10° to +60° C (-14° to +140° F).

Triple-conversion Design with Optimized Gain Distribution

Taking into account the most efficient transceiver design concept consistent with high performance we have adopted a triple-conversion IF structure, utilizing a first IF at 40 MHz, a second IF at 455 kHz, and the third IF at 30 kHz (for FM, the 3rd IF is at 24 kHz). Gain distribution through all stages is carefully optimized, for preservation of high system dynamic range.

Ultra-strong Receiver Front End

YAESU's outstanding RF-stage filtering establishes a clean performance that allows the rest of the receiver to perform at a high level. By reducing the ingress of energy from very strong sources like Shortwave Broadcast, local AM/FM/TV stations, and other signal sources, the overall purity of the spectrum delivered to the RF Amplifier first mixer, and subsequent stages is maintained, and the system Blocking Dynamic Range is also enhanced.

Compact Flash (CF) Card for Data Management

A Compact Flash card is supplied with every FT DX 9000MP, for preservation of transceiver configuration settings along with Log Book archival data.

Professional-Grade Cannon (XLR) Microphone Connector

The FT DX 9000MP incorporates, for the first time ever in an Amateur Radio transceiver, a balanced-input "Cannon" (XLR) microphone connector on the front panel, for use with studio-grade professional microphones. A round 8-pin microphone jack is also provided on the rear panel.

Two High-precision Analog Meters (Page 27)

The FT DX 9000MP incorporates two large (3.4"/86 mm) high-precision analog meters, for the utmost accuracy in measuring transceiver performance. Visibility is enhanced by the oversized meter scales, making the meters easy to read at all times.

Separated Clarifier Display (Pages 47, 97)

A clearly-separated display window within the main frequency display area contains receiver and/or transmitter frequency offset ("Clarifier") data, for quick comprehension by the operator.

YAESU Custom-designed 32-Bit Floating Point IF DSP (Page 62)

The new IF DSP system, utilizing a TI TMS320C6711 device, is a high-speed 32-bit floating point circuit designed with a unique objective: to do away with the "digital" sound of many DSP filtering systems, and emulate the "Analog Sound" so familiar and comfortable to HF DX and Contest operators. The result is a leading-edge receiver that has the "feel" of a traditional analog receiver, but with the flexibility and superb filtering capability of a modern digital filtering system.

FEATURES

VRF (Variable RF Filter) Preselector Filter (Page 66)

Yaesu's robust VRF (Variable RF Filter) preselector provides a relay-selected RF selectivity much tighter than that afforded by traditional bandpass filter networks. Sealed relays select heavy-duty inductors and capacitors, providing a tracking RF filter that protects the RF amplifier and following stages from strong out-of-band energy.

First IF 3 kHz Roofing Filter (Page 24, 67)

In the 40 MHz 1st IF, three selectable roofing filters are provided, in bandwidths of 3 kHz, 6 kHz, and 15 kHz, to protect the following stages from strong signals that could degrade dynamic range in the first IF amplifier and subsequent stages. The roofing filters are automatically assigned according to the operating mode, but the operator may override the automatic selections on the fly.

CONTOUR Filter Enhances "Analog Feeling" of DSP Filters (Page 29, 68)

The DSP-based Contour system is a unique five-band filter that may be used to roll off or peak the IF response. It is chiefly useful for modifying the response of the ultra-sharp DSP filters, allowing you to roll off (or emphasize) certain frequency components. Oftentimes, the result is that a difficult-to-understand signal suddenly will pop out of the background noise as solid copy.

SLOPED AGC Circuitry (Page 78)

In traditional AGC systems, all signals rising above a certain RF level are then clamped together at the same audio output, so as to prevent distortion throughout the IF and AF stages. In the FT dx 9000MP, however, you can engage the "Sloped" AGC capability to provide an AGC response whereby ever-increasing signal strength results in a slightly-louder audio response, still without accompanying distortion. This lets you use your brain to sort out weak signals from strong ones more effectively.

Receiver AF Limiter Circuit (Page 32, 79)

Occasionally a noise burst or a sudden transmission from a loud station may startle you if you have the AF Gain turned up, and may even damage your hearing temporarily. The FT dx 9000MP provides an AF Limiter (AFL) circuit which, once engaged, clamps an upper limit on the available audio output power, much like the AGC circuit does in the RF and IF stages.

"Adjacent Channel Encroachment" S-Meter Monitor (Page 33, 80)

When operating CW in a narrow bandwidth like 300 Hz, you may not be aware of the presence of strong stations that may be making it difficult for others to hear you. In these situations, the "ACM" (Adjacent Channel Monitor) will take over the Sub Receiver, center it on the Main Receiver frequency, and display ± 1.2 kHz of signal activity on the Sub Receiver's S-meter (without feeding the interfering audio through). This alerts you to the situation, and you can QSY or ask the other station to QSY.

Rugged, High-Output Final Amplifier Design (Page 93)

The final amplifier stage of the FT dx 9000MP utilizes parallel push-pull SD2931 MOS FET devices in a conservative, high-stability design. The large-area die-cast aluminum heat sink is monitored thermostatically, and a quiet cooling fan will engage when the heat sink temperature rises during long periods of high-power transmission.

Ultra-linear Class-A Operation Capability (Page 92)

The FT dx 9000MP's Class-A capability provides ultra-linear amplifier operation at 100 Watts of power output. Typically, 3rd-order IMD products are suppressed more than 50 dB, while 5th- and higher-order distortion products are at least 70 dB down during Class-A operation.

Parametric Microphone Equalizer Circuit (Page 90)

For unmatched flexibility in tailoring your microphone's audio to match your voice, Yaesu's engineers have incorporated the industry's first Three-Band Parametric Microphone Equalizer, which allows you to enhance or suppress frequency components in three different audio bands. Equalization may be applied independently to microphones attached to the front and rear panel microphone jacks.

Connecting Your After-market Computer Monitor for Multiple Function Displays (Refer to the separate Data Management Unit Operating Manual)

Connection of your after-market computer monitor (not supplied) allows display of a number of important and useful operating status and function displays. These include the Menu mode, World Clock, Spectrum Scope, Audio Scope and Oscilloscope, Logbook, Temperature/SWR monitoring, Rotator Control, and Memory Channel listings.

Customization of Your FT dx 9000MP

A wide range of custom configuration options (other than a better location or taller tower!) are available for your FT dx 9000MP, allowing you to build a Dream Station from the "MP" version foundation.

Because these options involve high-technology modules, please consult WDXC regarding factory installation of these items.

RF μ -Tuning Units (MTU-160, MTU-80/40, MTU-30/20)

On the 14 MHz and lower bands, the μ -Tuning Units provide extraordinarily high Q; the resulting steep shape factor is a powerful aid for reducing off-frequency interference. Separate modules are available for the 1.8 MHz, 3.5/7 MHz, and 10.1/14 MHz bands, and they may be installed on the Main Receiver only (not in the Sub Receiver).

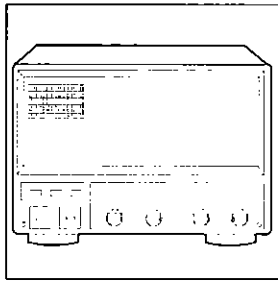
Thanks to the large (1.1"/28 mm) inductor through which a stack of ferrite cores is adjusted, the bandwidth of the μ -Tuning (± 12.5 kHz) provides unmatched protection for the receiver front end and following circuits.

TFT Display Unit (TFT-9000)

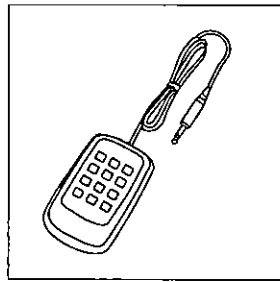
The TFT-9000 TFT Display Unit allows to display the enable the World Clock, Spectrum Scope, Audio Scope/Oscilloscope, Logbook, Rotator Control, and Temperature/SWR Status Display functions to the internal 6.5" TFT Display which provides 800 x 480 dot screen high resolution and easy viewing.

ACCESSORIES

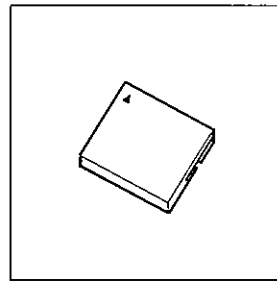
SUPPLIED ACCESSORIES



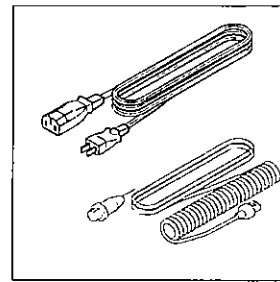
FPS-9000H
External Power Supply
with Dual Speakers and
Audio Filters



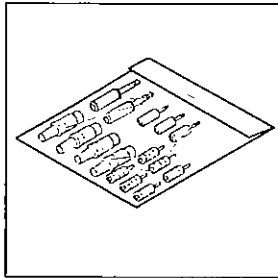
FH-2
Remote Control Keypad



CF Card
(64 MB: Q9000838)



AC Power Cord*1
Microphone Extend Cable
(8Pin to Modular)*2



Plugs

- Operating Manual
- Warranty Card

*1: AC Power Cord

USA: T9017882

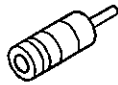
Europe: T9013285

Australia: T9013283A

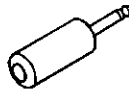
UK: T9013285

*2: The microphone cable is for use with the optional MD-200A8X, MD-100A8X, or MH-31B8 microphones.

The various plug details



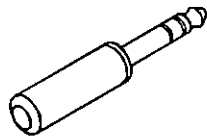
RCA Plug (P0091365)
6 pcs



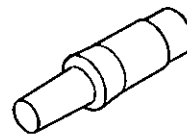
3.5 mm 2-contact Plug (P0090034)
2 pcs



3.5 mm 3-contact Plug (P0091046)
1 pc



1/4-inch 3-contact Plug (P0090008)
2 pcs

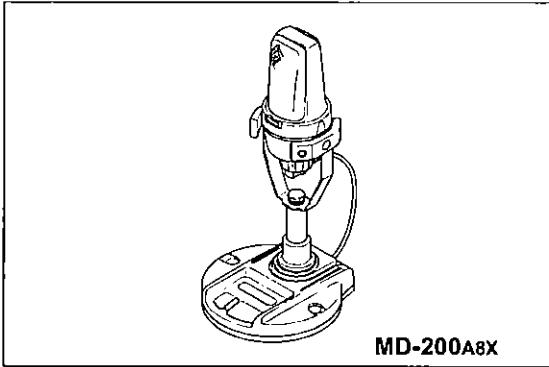


4-pin DIN Plug (P0091004) 1 pc
5-pin DIN Plug (P0091006) 1 pc
7-pin DIN Plug (P0091419) 1 pc
8-pin DIN Plug (P0090651) 1 pc

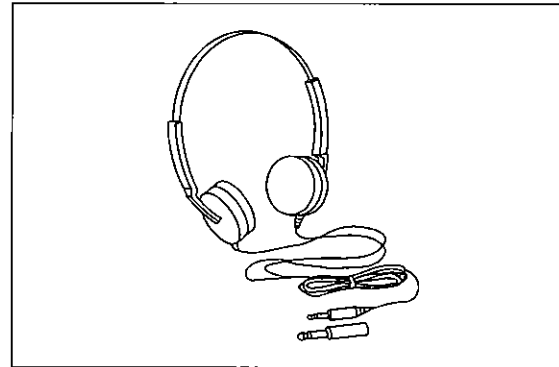
Items are shown for illustrative purposes only, and may vary slightly in appearance.

OPTIONS

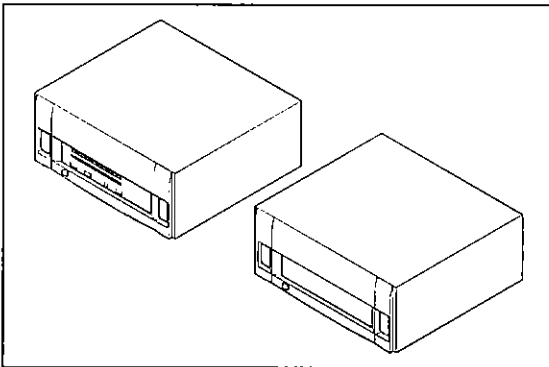
AVAILABLE OPTIONS

**MD-200A8X**

Ultra-High-Fidelity Desk-Top Microphone
MD-200A8X
Desk-Top Microphone
MD-100A8X



Lightweight Stereo Headphones
YH-77STA



Linear Amplifier / AC Power Supply
VL-1000 / VP-1000

Customization Options

- RF μ -Tuning Unit A MTU-160 (160 m Band)
- RF μ -Tuning Unit B MTU-80/40 (80/40 m Bands)
- RF μ -Tuning Unit C MTU-30/20 (30/20 m Bands)
- TFT Display Unit TFT-9000

CONVENIENT FEATURES

DUAL RECEIVE

Using Headphones for Dual Receive

To take advantage of dual reception, you will want to connect stereo headphones to the PHONES jack. Like the [AF GAIN] control, headphone audio mixing can also be configured as desired from Menu Selection: [RX AUDIO 076 HEADPHONE MIX]. Three audio mixing schemes are selectable as follows:

- OFF:** Audio from the Main (VFO-A) band receiver is heard only in the left ear, and Sub band (VFO-B) receiver audio solely in the right ear.
- MID:** Audio from both Main (VFO-A) band and Sub (VFO-B) band receivers can be heard in both ears, but Sub band (VFO-B) audio is attenuated in the left ear and Main (VFO-A) band audio is attenuated in the right ear.
- FULL:** Audio from both Main (VFO-A) band and Sub (VFO-B) band receivers is combined and heard equally in both ears “Monaural” mode).

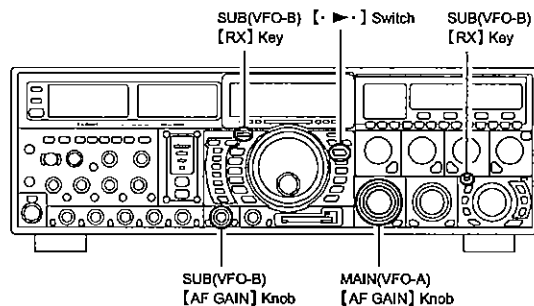
Sideband Diversity Reception

Here you receive a single AM signal through the two receivers, each receiving the opposite sideband. Skywave-propagated signals often show phase distortion in this mode, but it gives you a view of the entire passband, from which you can then select the best sideband for listening (or for SWL Dx'ing, you may want to listen to both sidebands at the same time, to get the best copy). On groundwave signals, where the phase of the sidebands is likely to be the same, there is an interesting sense of depth to the signal.

To tune in a signal using this mode, you should have stereo headphones connected to the front panel PHONES jack or an external stereo speaker connected to the rear panel EXT SP jacks.

- Set the Main (VFO-A) band to either LSB or USB mode, and tune for zero beat on the desired signal.
- Press the [A▶B] button (#29) to copy this mode and frequency into the Sub (VFO-B) band, then press the mode button to select the opposite sideband for the Main (VFO-A) band.
- If using headphones, set the headphone mixing scheme to the “MID” mode via the Menu Selection 15: Head Phone Mix (MIX, AMIX), and activate dual reception.
- Adjust the [AF GAIN] knob(s) (#85 and 64) to balance the volume of the two receivers.

If interference is present on one of the channels, you may have to turn its [AF GAIN] control to suppress that channel (or press the green [RX] LED/button to disable the receiver with the sideband experiencing interference). Otherwise, try changing the headphone audio mixing scheme to “FULL” or “OFF” in the Menu Selection: [RX AUDIO 076 HEADPHONE MIX] for different effects (or try settings with similar effects on your external amplifier). Although you don't get the “stereophonic” effect in the monaural mode, the two signals are still mixed, offering the potential for much better copy than in regular AM or even single-sideband ECSS modes.



CONVENIENT FEATURES

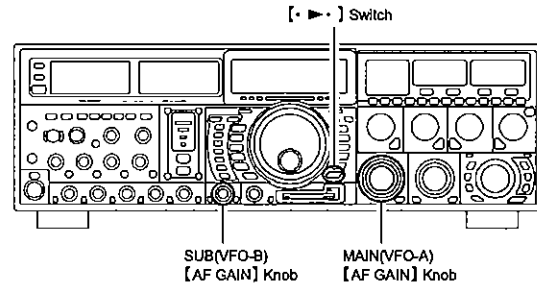
DUAL RECEIVE

Bandwidth Diversity Reception

This mode involves receiving the same signal through two different bandpass filters. The frequency and mode of both the Main (VFO-A) band and Sub band (VFO-B) band are the same. The Main (VFO-A) band can be set up for a narrow bandpass, and the Sub (VFO-B) band for a wide bandpass, using the [WIDTH] knobs, resulting in a spatial perception of the channel. Although any mode (except FM) can be used, CW offers the widest array of choices, and perhaps the most startling effects on crowded channels.

Stereo headphones or an external stereo speaker are recommended for this mode. To set up the transceiver for bandwidth diversity reception:

- Select the desired mode on the Main (VFO-A) band.
- Tune to the signal of interest.
- Press the [A▶M] button (#4) to copy this mode and frequency into the Sub (VFO-B) band.
- If using headphones, set the headphone mixing scheme to the "MID" mode via the Menu Selection: **RX AUDIO 076 HEADPHONE MIX** and activate dual reception.
- Adjust the [AF GAIN] knob(s) (#55 and 64) to balance the volume of the two receivers.
- Now try manipulating the [SHIFT] and [WIDTH] controls (on both Main (VFO-A) band (#69) and Sub (VFO-B) band (#59) receivers) to observe the interesting effects of bandwidth diversity.



Polarity Diversity

Similar in concept to the bandwidth diversity capability just described, another interesting capability of the FT DX 9000MP is the ability to use two different antennas on the same frequency, using dual reception. For example, you might have a horizontal Yagi on the main band, and a vertical antenna on the sub band, then lock the two frequencies together and engage dual reception.

Frequently, the fading observed on the HF bands is not so much a change in ionization level, but rather a shift in the polarization of the signal as it travels to and from the ionosphere. Having an opposite-polarization antenna available can fill in the signal during deep fades, and you may then transmit on whichever antenna is providing the strongest signal at the moment (see the discussion below on Split Frequency operation).

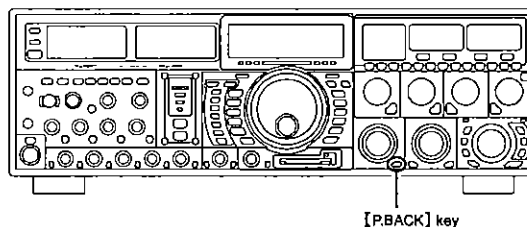
CONVENIENT FEATURES

P.BACK (AUDIO PLAYBACK) FROM MAIN (VFO-A) RECEIVER

Once engaged by the operator, the FT DX 9000MP begins the automatic recording of the last 30 seconds of incoming receiver audio on the Main (VFO-A) band. This capability is especially useful for confirming a call sign that may have been difficult to copy due to noise or QRM, etc.

Recording

Press and hold in the **[P.BACK]** key (#67) for two seconds to initiate recording; an LED imbedded in the switch will light up to confirm that recording is in progress. The recorder will store up to 30 seconds of the Main (VFO-A) band received audio, and will retain the most-recent 30 seconds of audio on a running basis.



[P.BACK] key

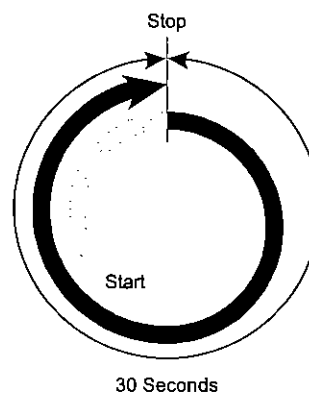
Pressing the **[P.BACK]** switch once more will halt the recording, and the LED imbedded in the switch will go out.

『Note』

When the transceiver is turned off, the contents of the recording memory are erased!

Playback

Press the **[P.BACK]** key momentarily, after recording has been halted, to begin playback of the recorded audio. The last 30 seconds of audio will be heard in the speaker or headphones. If you do not intervene, the entire 30 seconds will be played back, after which the playback will stop automatically. To halt playback at any time, just press the **[P.BACK]** key momentarily again. The next time you press the **[P.BACK]** key, it will pick up the playback where you left off.



The **[P/B]** key of the supplied FH-2 Keypad can also serve as a remote-control recording/playback switch. Operation is described below.

Recording

Press and hold in the FH-2's **[P/B]** key for two seconds to initiate recording. The front panel **[P.BACK]** switch's LED will light up to confirm that recording is in progress.

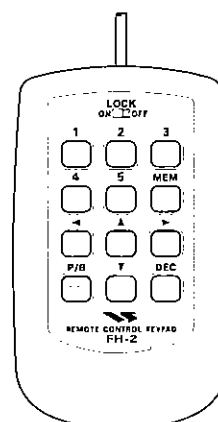
Press the FH-2's **[P/B]** key momentarily to halt recording; the front panel's LED will go out.

You may also press the front panel's **[P.BACK]** key (momentarily) to halt recording, as well.

When the transceiver is turned off, the contents of the recording memory are erased.

Playback

Press the FH-2's **[P/B]** key momentarily, after recording has been halted, to begin playback of the recorded audio. The last 30 seconds of audio will be heard in the speaker or headphones. If you do not intervene, the entire 30 seconds will be played back, after which the playback will stop automatically. To halt playback at any time, just press the **[P/B]** key momentarily again. The next time you press the **[P.BACK]** key, it will pick up the playback where you left off. You may also press the front panel's **[P.BACK]** key (momentarily) to play back the recorded audio, as well.



CONVENIENT FEATURES

“MY BANDS” OPERATION

When operating on an Amateur Band the Main (VFO-A) register, it is possible to use the [BAND/MHz] switch to engage the use of the [CLAR/VFO-B] knob for Amateur band selection. The “My Bands” feature allows you to select several Amateur bands, and make only those bands available for selection via the [CLAR/VFO-B] tuning knob.

This feature can be very useful in a contest, where the 10/18/24 MHz band are not used, or if you do not have antennas for some bands.

“My Bands” Setup

1. Press the [MNU] key (#85) to engage the Menu mode; the Menu list will appear on the LCD Display.
2. Rotate the [MAIN] Tuning Dial knob (#29) to select Menu item [TUNING 135 MY BAND].
3. Rotate the [CLAR/VFO-B] knob (#97) to choose a band that you wish to skip (omit) from the band-selection loop (when using the [CLAR/VFO-B] tuning knob for band selection). The available choices are 1.8/3.5/7/10/14/18/21/24/28/50/GEN/TRV, and the factory-default selection is TRV (only).
4. Press the [ENT] key (#65) to set the omission command to ON.
5. Repeat steps 3 and 4 to select/deselect as many bands as you like.

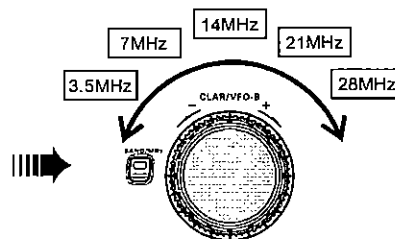
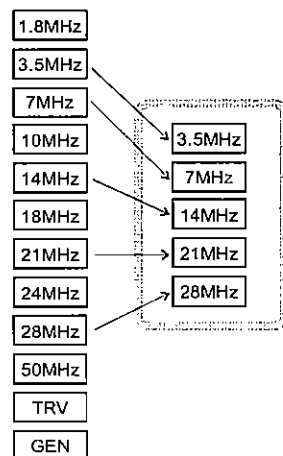
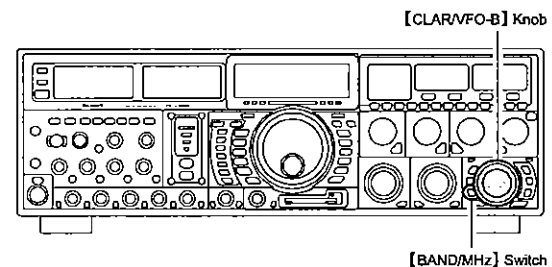
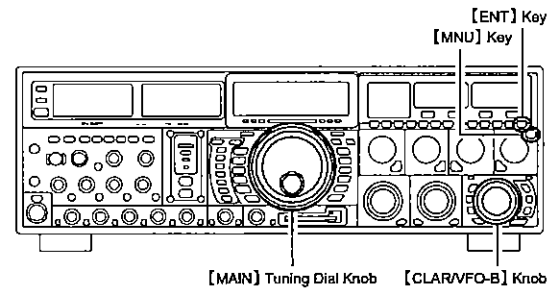
『Note』

The “ON” command sets the selected band to be skipped, while the “OFF” command sets the selected band to be included in the band-selection list.

6. Press and hold in the [MNU] key for two seconds to lock in the new configuration and exit to normal operation.

“My Bands” Operation

1. Press the [BAND/MHz] switch (#94); the imbedded LED will glow Red.
2. Rotate the [CLAR/VFO-B] knob (#97) to choose the Amateur band on which you wish to operate. Only those Amateur bands that have not been skipped will appear as you scroll through the bands.




CONVENIENT FEATURES

BAND STACK OPERATION

The FT DX 9000MP utilizes a triple band-stack VFO selection technique, that permits you to store up to three favorite frequencies and modes onto each band's VFO register. For example, you may store one frequency each on 14 MHz CW, RTTY, and USB, then recall these VFOs by successive, momentary presses of the [14] MHz band key. Each Amateur band key may similarly have up to three frequency/mode settings applied. Both the Main (VFO-A) and Sub (VFO-B) systems have their own, independent, band stacks.

A typical setup, for the 14 MHz band, might be arranged like this:

1. Program 14.0250 MHz, CW Mode, then press the [14] MHz **[BAND]** key (#76);

2. Program 14.080 MHz, RTTY Mode, then press the [14] MHz **[BAND]** key;
3. Program 14.195 MHz, SSB Mode, then press the [14] MHz **[BAND]** key.

With this configuration, successive momentary presses of the [14] MHz **[BAND]** key will allow you to toggle sequentially through these three VFOs.

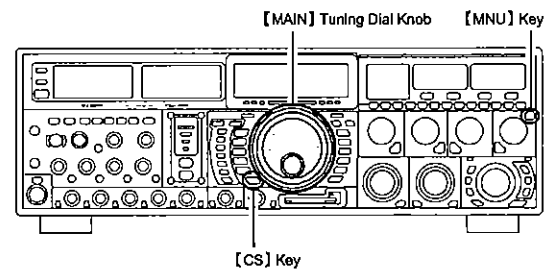
BAND Key	Band Stack1		Band Stack2		Band Stack3	
	frequency (MHz)	MODE	frequency (MHz)	MODE	frequency (MHz)	MODE
1.8	1.800000	CW	1.800000	CW	1.800000	CW
3.5	3.500000	LSB	3.500000	LSB	3.500000	LSB
5	5.000000	USB	5.000000	USB	5.000000	USB
7	7.000000	LSB	7.000000	LSB	7.000000	LSB
10	10.100000	CW	10.100000	CW	10.100000	CW
14	14.100000	USB	14.100000	USB	14.100000	USB
18	18.068000	USB	18.068000	USB	18.068000	USB
21	21.000000	USB	21.000000	USB	21.000000	USB
24	24.890000	USB	24.890000	USB	24.890000	USB
28	28.000000	USB	28.000000	USB	28.000000	USB
50	50.000000	USB	50.000000	USB	50.000000	USB
GEN	15.000000	USB	15.000000	USB	15.000000	USB

C.S (CUSTOM SWITCH)

An often-used Menu mode selection may be brought out to the front panel's [C.S] key

C.S Setup

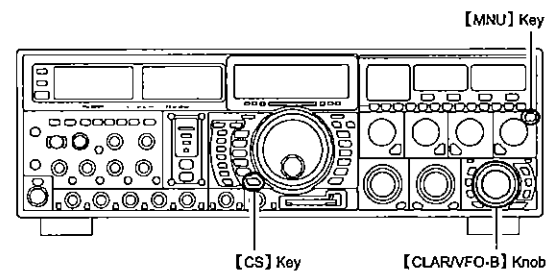
1. Press the **[MNU]** key (#85) to engage the Menu mode; the Menu list will appear on the LCD display.
2. Rotate the **[MAIN]** Tuning Dial knob (#29) to select the Menu item you want to be able to access via the **[C.S]** key.
3. Press and hold in the **[C.S]** key (#35) for two seconds to lock in your selection.
4. Press and hold in the **[MNU]** key for two seconds to save the new configuration and exit to normal operation.



Menu Selection Recall via [C.S] Switch

Press the **[C.S]** key (#35).

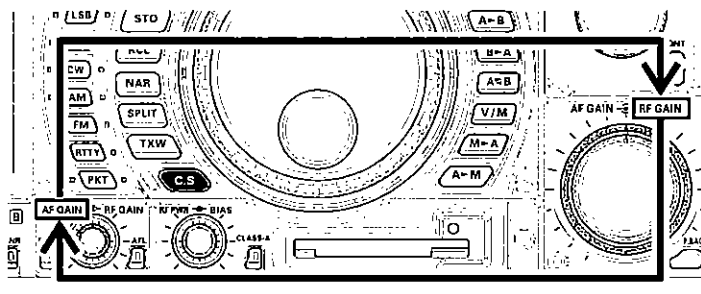
On the LCD display, the programmed Menu item will appear. You may now rotate the **[CLAR/VFO-B]** knob (#97) to change the setting of this menu item. Press the **[MNU]** key (#85) for two seconds, when you are done, to save the new configuration and exit to normal operation.



CONVENIENT FEATURES

DIAL SWAP CONFIGURATION (AF/RF GAIN CONTROLS)

Using the Menu, it is possible to change the [RF GAIN] control (for the Main (VFO-A) band) to serve as the Sub (VFO-B) [AF GAIN] control. In this case, the Menu Item [GENERAL 038 AF/RF DIAL SWAP] will move the Main (VFO-A) [RF GAIN] control function to the knob normally utilized for the Sub (VFO-B) receiver's [AF GAIN] control. In this way, both the Main and Sub receiver [AF GAIN] controls will be on the same shaft, as will the two receivers' [RF GAIN] controls, and this may be particularly useful during Dual Receive operation.

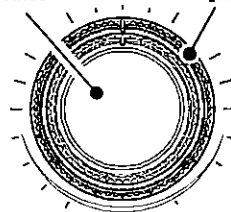


MAIN(VFO-A)
[RF GAIN] Knob



SUB(VFO-B)
[RF GAIN] Knob

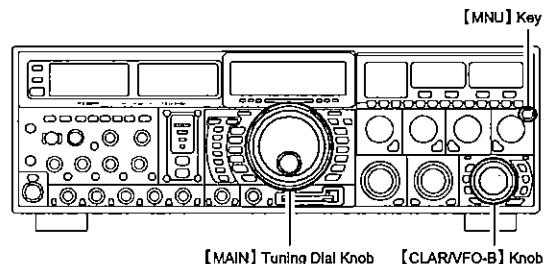
MAIN(VFO-A)
[AF GAIN] Knob



SUB(VFO-B)
[AF GAIN] Knob

Dial Swap Setup

1. Press the [MNU] key (#85) to engage the Menu mode; the Menu list will appear on the LCD display.
2. Rotate the [MAIN] Tuning Dial knob (#29) to select Menu item [GENERAL 038 AF/RF DIAL SWAP].
3. Rotate the [CLAR/VFO-B] knob (#97) so as to select "SWAP" instead of the factory-default "NORMAL" selection.
4. Press and hold in the [MNU] key for two seconds to save the new configuration and exit to normal operation.



『Quick Point』

If the Dial Swap function has been engaged, the Main (VFO-A) **AF GAIN** → **RF GAIN** control (#85) will be reconfigured so that it now operates as **AF GAIN (MAIN)** → **AF GAIN (SUB)**; the Sub (VFO-B) band's **AF GAIN** → **RF GAIN** control (#94) will now be configured as **RF GAIN (MAIN)** → **RF GAIN (SUB)**.

CONVENIENT FEATURES

DATA MANAGEMENT FEATURE

The Data Management Unit enables display, either on the internal TFT display (option) or an external monitor, of a number of useful features. These include the World Clock, Spectrum Scope, Audio Scope/Oscilloscope, Log Book, Temperature and SWR indication, Rotator Control and Great Circle Map, and the Memory and Menu list features. For details, please consult the separate Data Management Unit Operating Manual.

Function Key ON/OFF

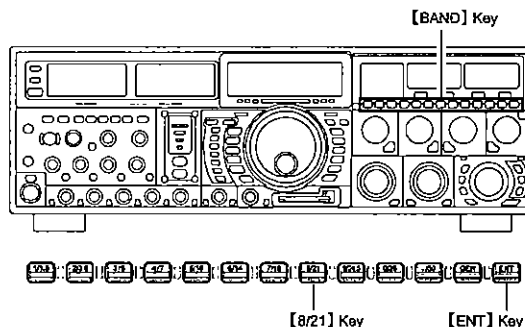
If you press and hold in the **[ENT]** key (#76): associated with the **[BAND]** keys) for two seconds, white function-indication tabs will appear along the bottom of the monitor screen, indicating the effects of pushing the various **[BAND]** keys (#76) so as to execute commands associated with the particular display page selected. Pressing and holding in the **[ENT]** key once more (for two seconds or more) will disable the command key tabs, and will restore band selection using these keys.

Function Selection

When the **[8/21]**(DISPLAY) key (#76): associated with the **[BAND]** keys) is pressed momentarily, the display page will change.

If you press and hold in the **[8/21]**(DISPLAY) key for at least two seconds, the page will revert to the previous page.

World Clock → Spectrum Scope →
 Audio Scope/Oscilloscope → Log Book →
 Temperature and SWR indication →
 Rotator Control and Great Circle Map →
 Memory Channel List → World Clock



『Advice』

- Without programming any changes on the current page, you can just press the **[8/21]**(DISPLAY) key momentarily at any time to move to the next page.
- The precise command that is engaged by each function key will depend on which display page is selected. Simply look at the optimal TFT or external monitor to determine the function for the currently-selected page.



Function Tabs

CONVENIENT FEATURES

ANTENNA SELECTION

Four main antenna jacks, available for both transmission and reception, are provided on the rear panel of the transceiver. What's more, a receive-only jack is provided, and the incoming signal path may also have a special after-market filter or preamplifier inserted, if desired, with one-touch access.

Selection of the desired TX/RX antenna is accomplished by pressing the appropriate [1] ~ [4] Antenna Selection switch (#9) on the front panel.

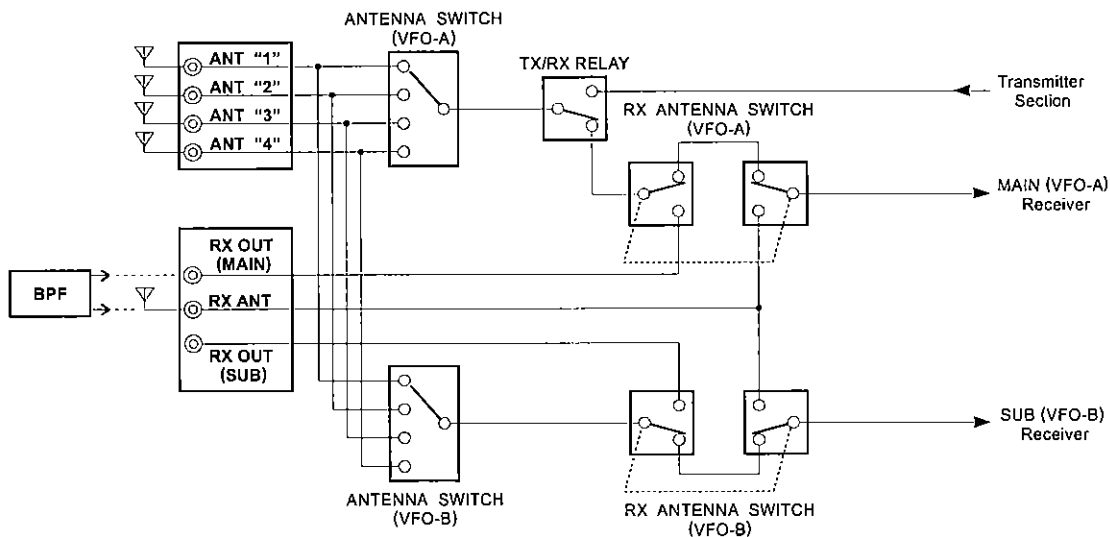
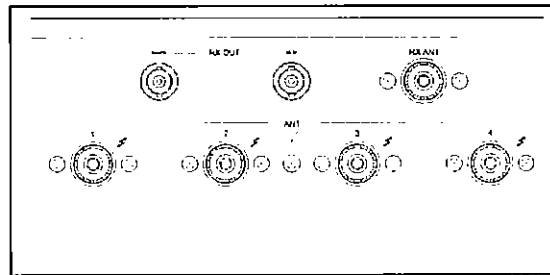
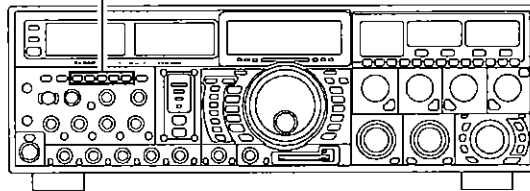
To engage the RX-only antenna, press the [RX] switch (#9) within the Antenna Selection switch group on the front panel. The RX-only antenna must be connected to the corresponding "RX ANT" antenna jack on the rear panel.

The antenna currently selected for use on the Main (VFO-A) band will be designated by a Red LED.

The antenna currently selected for use on the Sub (VFO-B) band will be designated by an Umber LED.

If both the Main (VFO-A) and Sub (VFO-B) bands are utilizing the same antenna, both the Red and Umber LEDs will light up on the same antenna location.

[ANTENNA SELECT] Switch



CONVENIENT FEATURES

CHANGING THE SPEAKER OUTPUT CONFIGURATION

If you use the FT DX 9000MP internal speaker without using the FPS-9000H's speaker, an internal switch and the menu allow you to configure the way audio is fed to the two internal speakers (either "stereo" or "monaural" modes are available).

『Advice』

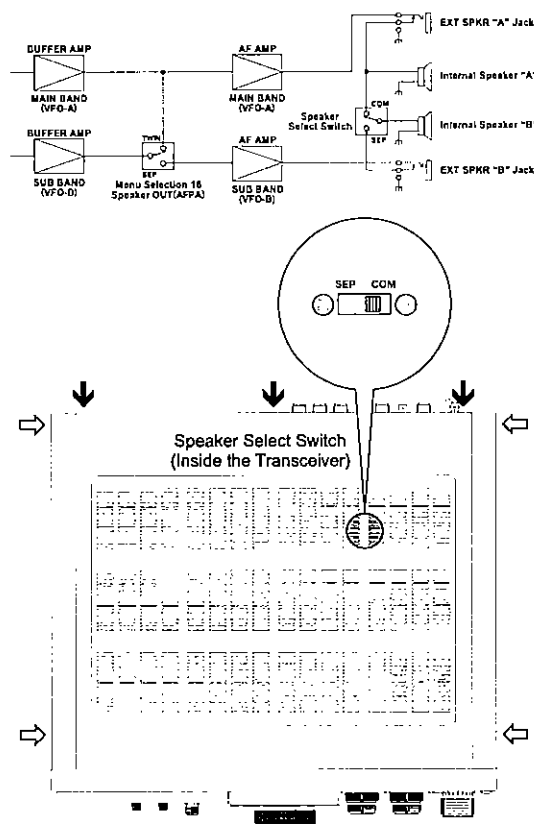
At the factory, the audio signals from both the Main and Sub receivers are combined, and the resulting monaural audio takes advantage of the combined aperture of the two speakers. For most operation, this configuration results in beautiful audio reproduction, and is to be preferred. If you wish to leave the speaker setup as is, you may skip the remainder of this section.

		SPEAKER SELECT SWITCH	
		COM	SEP
MENU SELECTION 77 SPEAKER MIX	COMBINE	Main (VFO-A) and Sub (VFO-B) audio will be mixed in the two internal speakers.	Main (VFO-A) and Sub (VFO-B) audio will be mixed but heard only from the "A" internal speaker.
	SEPARATE	Main (VFO-A) audio will be heard from internal speaker "A." For listening to audio from the Sub (VFO-B) receiver, connect an external speaker to rear-panel terminal "B."	Main (VFO-A) audio will be heard from internal speaker "A," and Sub (VFO-B) audio will be heard from internal speaker "B."

With respect to the switch on the Speaker Unit, the left position is [SEP] and the right position is [COM].

Speaker Selection Switch Configuration

1. Set the front panel's [POWER] switch (#5) to the off ("O") position to turn the radio off.
2. Turn the FPS-9000H's POWER switch off ("O"), and unplug the DC cable from the rear-panel [DC IN] jack.
3. Remove the eight screws from the left and right faces of the outer case, then remove the three remaining screws that are affixing the top case, and remove the top case from the transceiver.
4. Refer to the illustration, and change the position of the speaker selection switch (the default setting is "COM" which combines the audio; "SEP" separates the Main (VFO-A) and Sub (VFO-B) receiver audio into the Left and Right speakers).
5. Replace the three screws on the top case, then replace the eight screws previously removed from the left and right sides of the transceiver.
6. Speaker re-configuration is now complete. You may now plug in the DC cable, and turn the FPS-9000H and front panel [POWER] switches back on (in that order), to resume operation.



『Quick Point』

High-Quality Internal Speaker Details!

Two large-aperture, high quality speakers are incorporated into the FT DX 9000MP, for outstanding reproduction of the incoming audio signals. Sporting a combined aperture of 7" (184 mm), the twin 3-5/8" (92 mm) speakers are designed to enhance your operating experience with their rich tonal quality and ultra-low distortion characteristics.

CONVENIENT FEATURES

RECEIVER OPERATION (FRONT END BLOCK DIAGRAM)

The FT dx 9000MP includes a wide range of special features to suppress the many types of interference that may be encountered on the HF bands. However, real world interference conditions are constantly changing, so optimum setting of the controls is somewhat of an art, requiring familiarity with the types of interference and the subtle effects of some of the controls. Therefore, the following information is provided as a general guideline for typical situations, and a starting point for your own experimentation.

The FT dx 9000MP's interference-fighting circuitry begins in its "RF" stages, and continues throughout the entire receiver section. The FT dx 9000MP allows configuration of the features described below independently on the Main (VFO-A) band and Sub (VFO-B) band.

VRF (See page 66)

On the all Amateur bands on the Main (VFO-A) and Sub (VFO-B) receiver, Yaesu's powerful VRF (Variable RF Filter) preselector circuit provides excellent suppression of out-of-band interference, with a passband much narrower than that provided by traditional fixed bandpass filters.

R. FLT (IF Roofing Filters) (See page 67)

Three automatically-selected Roofing filters, in bandwidths of 15 kHz, 6 kHz, and 3 kHz, are provided in the 40 MHz First IF, right after the first mixer. These filters provide narrow-band selectivity to protect the following IF and DSP stages, and the filters' automatically-selected bandwidths may be manually changed by the operator, if desired, for special operating circumstances.

CONTOUR Filter (See page 68)

The Contour filter is a unique capability of the FT dx 9000MP, providing either nulling or peaking of tunable segments of the receiver passband, so as to suppress interference or excessive frequency components on an incoming signal, or to peak those tunable frequency segments. The amount of nulling/peaking, and the bandwidth over which it is applied, are adjustable via the Menu.

IF SHIFT (See page 69)

The passband center frequency response of the IF DSP filtering may be adjusted using this control.

IF WIDTH (See page 70)

The width of the IF DSP filtering may be carried using this control.

IF NOTCH (See page 72)

The IF Notch filter is a high-Q notch filter that can significantly reduce, if not eliminate an interfering carrier. The Q (sharpness) of the filter may be adjusted using the Menu, and the exact tuning of the filter may be monitored visually using the Audio Scope page (especially useful is the "Waterfall" display) on the External display (not supplied).

DNR (Digital Noise Reduction) (See page 73)

The DSP's Digital Noise Reduction (DNR) feature utilizes sixteen different mathematical algorithms to analyze and suppress different noise profiles encountered on the HF/50 MHz bands. Choose the selection that provides the best noise suppression, which concurrently will allow the signal to rise up out of the noise.

DNF (Digital Notch filter) (See page 75)

When multiple interfering carriers are encountered during reception, the Digital Notch Filter can significantly reduce the level of these signals.

AGC (See page 77)

The AGC system is highly adaptable to changing signal and fading characteristics, making reception possible under the most difficult conditions.

SLOPED AGC (See page 78)

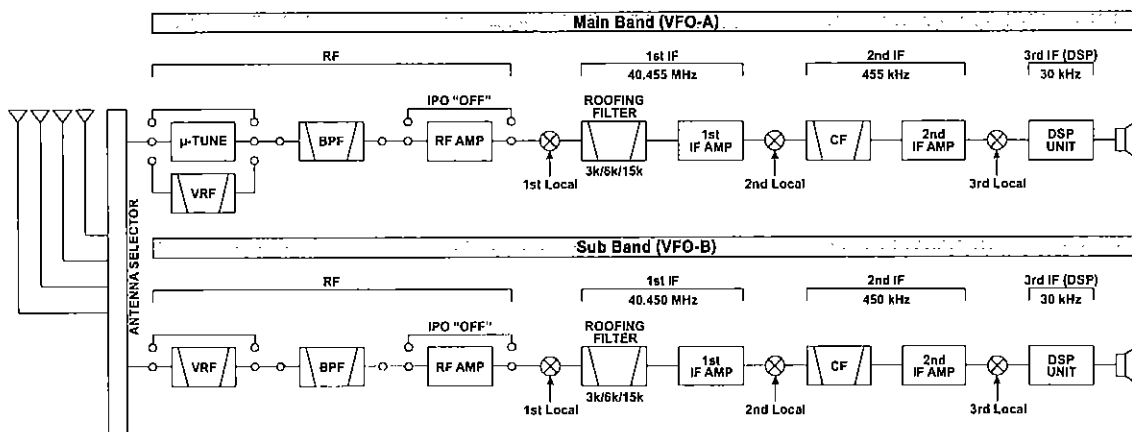
The Sloped AGC system, instead of clamping a fixed upper bound on audio output across a wide range of input signals, actually allows the audio output to rise, very gently, with ever-increasing signal strength. This capability allows you to separate signals, using your brain, according to signal strength in addition to slight frequency differences.

IF Filter Quality Adjustment (See page 142)

The "Q" (quality factor) of the IF DSP filters may be adjusted independently for the Main (VFO-A) and Sub (VFO-B) receiver IF DSP filters, using the Menu.

Variable IF Filter Shape Factor (See page 142)

You may adjust the shape factor of the Main (VFO-A) and Sub (VFO-B) receiver IF DSP filters, using the Menu.



CONVENIENT FEATURES

IPO (INTERCEPT POINT OPTIMIZATION)

Normally, the front-end FET RF amplifiers provide maximum sensitivity for weak signals. During typical conditions on lower frequencies (where strong signals and high noise are common), the RF amplifiers can be bypassed by pressing the **[IPO]** button so that the button's illumination is lit. This improves the IMD (intermodulation distortion) rejection characteristics of the receiver, with only a slight reduction of sensitivity. On frequencies below about 10 MHz, you generally will want to keep the **[IPO]** button engaged at all times, as the preamplifiers are usually not needed at these frequencies unless you are using a Beverage or other lossy receive antenna.

『Quick Note』

The FT dx 9000MP's first mixer is an active type, using four SST310 Junction FETs. This mixer design provides gain to the receiver chain, so the noise figure of the receiver is fundamentally lower than with some other designs. Therefore, it frequently is not necessary to utilize the RF preamplifier, and the receiver Intercept Point will be substantially increased by engaging IPO, so as to feed the incoming signals directly to the first (active) mixer. We recommend that IPO be switched on whenever possible.

Main (VFO-A) IPO Setup

Press the Main (VFO-A) side's **[A-IPO]** switch key (#**8**) to engage the IPO on the Main (VFO-A) band.

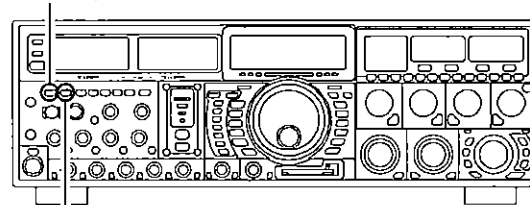
A Red LED imbedded in the switch will light up, and the preamplifier for the Main (VFO-A) receiver will be bypassed. The system gain and sensitivity will be reduced. To cancel IPO operation and restore full system gain and sensitivity, press the **[A-IPO]** switch key once more.

SUB(VFO-B) IPO Setup

Press the Sub (VFO-B) side's **[B-IPO]** switch key (#**8**) to engage the IPO on the Sub (VFO-B) band.

An Amber LED imbedded in the switch will light up, and the preamplifier for the Sub (VFO-B) receiver will be bypassed. The system gain and sensitivity will be reduced. To cancel IPO operation and restore full system gain and sensitivity, press the **[B-IPO]** switch key once more.

MAIN(VFO-A) [A-IPO] Switch



SUB(VFO-B) [B-IPO] Switch



CONVENIENT FEATURES

ATT

Even with the IPO function on, extremely strong local signals or high noise can still degrade reception. In such situations, you can use the [ATT] knob to insert 3, 6, 12, or 18-dB of RF attenuation in front of the RF amplifier.

Main (VFO-A) Attenuator Setup

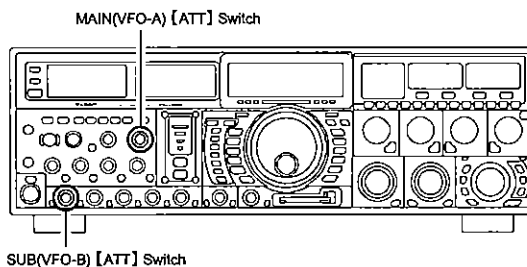
Rotate the Main (VFO-A) side's [ATT] switch (#12) to set the desired attenuation level, per the chart below.

To restore full signal strength through the Attenuator circuit area, set the [ATT] switch to the "0" position.

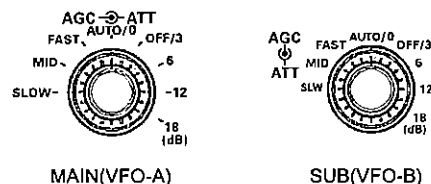
Sub (VFO-B) Attenuator Setup

Rotate the Sub (VFO-B) side's [ATT] switch (#53) to set the desired attenuation level, per the chart below.

To restore full signal strength through the Attenuator circuit area, set the [ATT] switch to the "0" position.



0 dB	Attenuator is Off
3 dB	The incoming signal power is reduced by 3 dB (signal voltage reduced by 1/1.4)
6 dB	The incoming signal power is reduced by 6 dB (signal voltage reduced by 1/2)
12 dB	The incoming signal power is reduced by 12 dB (signal voltage reduced by 1/4)
18 dB	The incoming signal power is reduced by 18 dB (signal voltage reduced by 1/8)



『Advice』

If background noise causes the S-meter to deflect on clear frequencies, turn the [ATT] knob clockwise until the S-meter drops to about "S-1." This setting optimizes the trade-offs between sensitivity, noise, and interference immunity. Also, once you have tuned in a station you want to work, you may want to reduce sensitivity further (or add more attenuation) by turning the [ATT] knob to a more clockwise setting. This reduces the strength of all signals (and noise) and can make reception more comfortable, important especially during long QSOs.

When looking for weak signals on a quiet band, you will want maximum sensitivity, so the IPO should be disabled and the [ATT] knob should be set to "0." This situation is typical during quiet times on frequencies above 21 MHz, and when using a small or negative-gain receiving antenna on other bands.

CONVENIENT FEATURES

RF GAIN (SSB/CW/AM MODES)

The RF Gain controls provide manual adjustment of the gain levels for the receiver RF and IF stages, to account for noise and/or signal strength conditions at the moment.

Main (VFO-A) RF Gain Adjustment

The Main (VFO-A) [RF GAIN] control (#66) should, initially, be rotated to the fully clockwise position. This is the point of maximum sensitivity, and counter-clockwise rotation will gradually reduce the system gain.

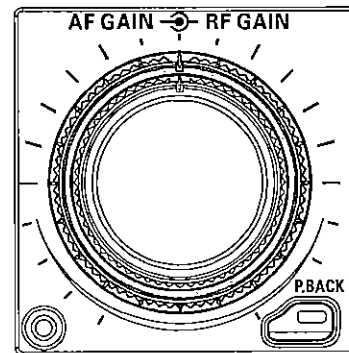
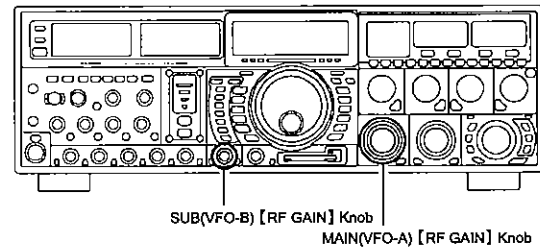
- As the [RF GAIN] control is rotated counter-clockwise to reduce the gain, the S-meter reading will rise. This indicates that the AGC voltage being applied to the receiver (to reduce the gain) is increasing.
- Rotating the [RF GAIN] control to the fully counter-clockwise position will essentially disable the receiver, as the gain will be greatly reduced. In this case, as well, the S-meter will appear to be “pegged” against the right edge of the analog S-meter scale.
- The Sub (VFO-B) receiver's [RF GAIN] control (#64) operates identically to the Main (VFO-A) band [RF GAIN] control. The effects of counter-clockwise rotation of the Sub receiver's [RF GAIN] control may be observed visually on the Sub (VFO-B) band S-meter.

Advice

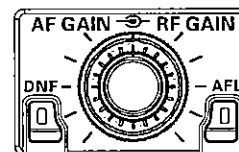
Reception frequently can be optimized by rotating the [RF GAIN] control slightly counter-clockwise to the point where the incoming noise level is just about the same as the “stationary” meter needle position as set by the adjustment of the [RF GAIN] control. This setting ensures that excessive gain is not being utilized, without so much gain reduction that incoming signals cannot be heard.

Quick Point

The RF Gain control, along with the IPO and Attenuator features, all affect the system receiver gain in different ways. As a first step in dealing with high noise or a crowded, high-level signal environment, the IPO generally should be the first feature engaged, if the frequency is low enough to allow the preamplifier to be bypassed. Thereafter, the RF Gain and Attenuator features may be employed to provide precise, delicate adjustment of the receiver gain so as to optimize performance fully.



MAIN (VFO-A)



SUB (VFO-B)

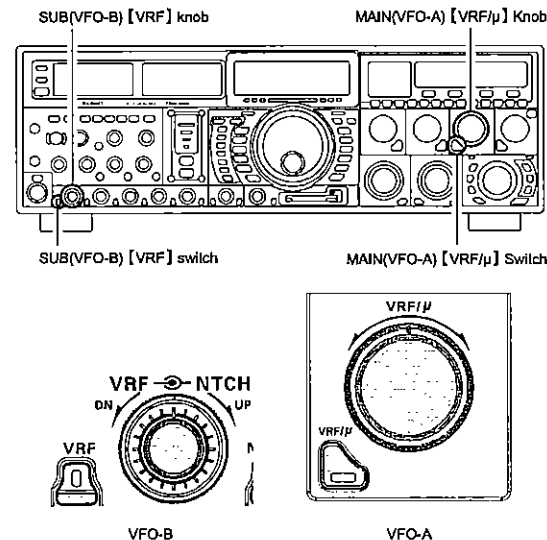
ADVANCED INTERFERENCE-SUPPRESSION FEATURES: RF FRONT END

USING THE VRF (VARIABLE RF FRONT-END FILTER)

The VRF system is a high-performance RF front-end preselector that provides outstanding rejection of out-of-band signals.

VRF on the Main (VFO-A) Band Frequency

1. Press the [VRF/ μ] switch (#8) momentarily. The LED inside the switch will become illuminated, and the VRF system will be engaged, centered on your current Amateur band.
2. You may rotate the [VRF/ μ] knob (#8) to skew the position of the VRF system relative to your operating frequency. Because the VRF system is relatively broad, although still much narrower than the fixed bandpass filter, you may not hear much difference in the background noise or signal quality when you make minor adjustments. However, if you have receiving problems associated by a very strong signal, rotation of the [VRF/ μ] knob may help reduce the strength of the interfering station, allowing improved reception of the desired signal.
 - After moving the passband of the VRF system manually, you may re-center it on the current Amateur band by pressing and holding in the [VRF/ μ] switch for two seconds.
 - To switch VRF off, press the [VRF/ μ] switch momentarily again. The LED imbedded in the switch will go out, and the VRF circuit will be removed from the incoming received signal path.



Using VRF on the Sub (VFO-B) Band Frequency

1. Press the Sub (VFO-B) [RX] switch (#9) to engage Dual Receive operation.
2. Press the Sub (VFO-B) band's [VRF] switch (#8) to engage the VRF. The LED imbedded in the switch will light up, confirming that VRF is now in the signal path for the Sub (VFO-B) receiver.
 - The settings of the VRF are set and held in memory independently for each Amateur band, so any custom settings will be maintained despite any band changes you perform.
3. Rotation of the [VRF] knob (#8) allows adjustment of the center frequency of the VRF circuit.
 - If you have made adjustments to the VRF circuit's center frequency, press and hold in the [VRF] switch for two seconds to re-center the VRF on the center of the Amateur band on which you currently are operating.
 - To switch VRF off, press the [VRF] switch momentarily again. The LED imbedded in the switch will go out, and the VRF circuit will be removed from the Sub (VFO-B) receiver's incoming signal path.

『Quick Point』

The VRF filter, utilizing high-quality coils and capacitors that provide high Q, yields a bassband that is approximately 20% to 30% the width of a traditional, fixed bandpass filter. As a result, significantly more unwanted signal rejection is provided. Within each Amateur band, 64 adjustment steps are provided (50 MHz: 8 steps), if you wish to skew the response in a particular direction so as to enhance interference rejection even more.

INTERFERENCE REJECTION (SIGNALS OFF FREQUENCY BY JUST A FEW KHz)

R.FLT (ROOFING FILTERS)

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

Main Band Roofing Filter Operation

Press the Main (VFO-A) band's **[ROOFING]** switch (#24) to toggle the Roofing Filter selection.

AUTO → 15kHz → 6kHz → 3kHz → AUTO

- As you repeatedly press this switch, you will observe different LEDs lighting up in the Roofing Filter area of the front panel, denoting the Roofing Filter currently in use. Also, the selected Roofing Filter bandwidth will be indicated on the LCD display.
- Typically, this selection will be set to "AUTO."
- The Roofing Filter selection will be memorized independently on each VFO in the VFO stack.

Sub (VFO-B) Band Roofing Filter Operation

1. Pressing the Sub (VFO-B) band's **[RX]** switch (#9) will engage Dual Receive operation.

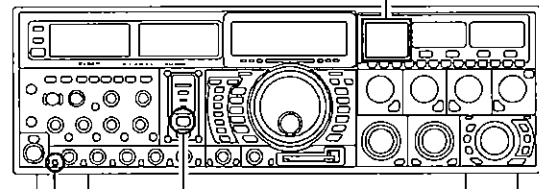
When the imbedded LED grows green, this is your confirmation that Dual Receive is in operation.

2. Press the Sub (VFO-B) band's **[FLT]** switch (#27) to toggle the Roofing Filter selection.

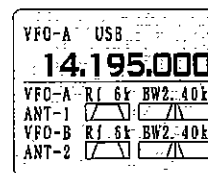
AUTO → 15kHz → 6kHz → 3kHz → AUTO

- As you repeatedly press the **[FLT]** switch, the selected bandwidth will appear on the LCD display.
- Typically, this selection will be set to "AUTO."
- When "AUTO" is selected, the LED imbedded in the switch will go out (there always is a roofing filter in the receiver path).
- The Roofing Filter selection will be memorized independently on each VFO in the VFO stack.

Roofing Filter bandwidth will be indicated on the LCD



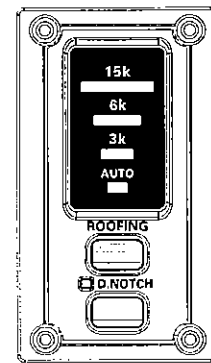
[R.FLT] Switch [ROOFING] Switch



Roofing Filter bandwidth will be indicated on the LCD



VFO-B



VFO-A

『Quick Point』

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

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

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

『Terminology』

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

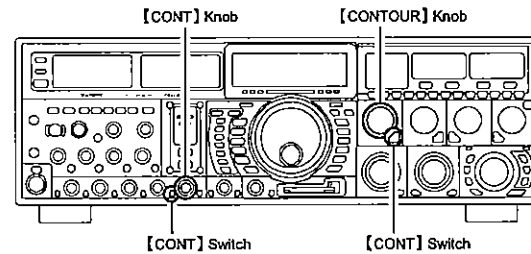
INTERFERENCE REJECTION (SIGNALS WITHIN 3 kHz)

CONT (CONTOUR) CONTROL OPERATION

The Contour filtering system provides a gentle perturbation of the IF filter passband, so as to suppress or enhance certain frequency components modestly, so as to enhance the natural-sounding received signal.

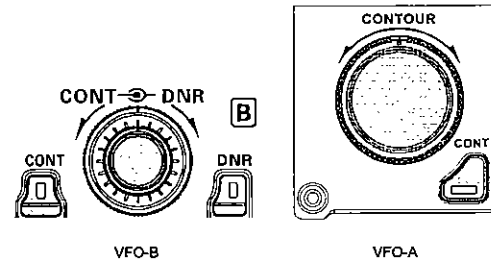
Using Contour on the Main (VFO-A) Receiver

1. Press the Main (VFO-A) **[CONT]** switch (#78). The LED imbedded in the switch will glow Red to confirm that the Contour filter is engaged.
2. Rotate the Main (VFO-A) **[CONTOUR]** knob (#79) to achieve the most natural-sounding audio reproduction on the incoming signal. To cancel Contour tuning, press the Main (VFO-A) **[CONT]** switch once more.



Using Contour on the Sub (VFO-B) Receiver

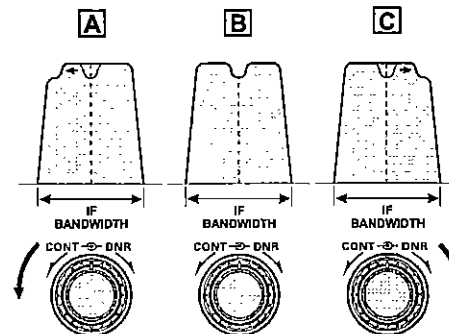
1. Pressing the Sub (VFO-B) band's **[RX]** switch (#91) will engage Dual Receive operation. When the imbedded LED grows green, this is your confirmation that Dual Receive is in operation.
2. Press the Sub (VFO-B) **[CONT]** switch (#60). The LED imbedded in the switch will glow Orange, confirming that the Contour filter is engaged.
3. Rotate the Sub (VFO-B) **[CONT]** knob (#61) to achieve the most natural-sounding audio reproduction on the incoming signal. To cancel Contour tuning, press the Sub (VFO-B) **[CONT]** switch once more.



『Advice』

- The TFT's Audio Scope (on the "Oscilloscope" page) is particularly useful when adjusting the Contour control. Not only can you see the effect of the notch/peak of the Contour system, but you also can see the position of the notch/peak with respect to frequency components of interest on the incoming signal. You may then observe (on the Audio Scope) the effect of the Contour control while listening to the effect on the signal, and this will help build your intuition on how best to use Contour tuning in the future.
- The Width of the Contour filter effect, and the degree of nulling or peaking, may be adjusted using the menu.
 - The Contour filter's level (either nulling or peaking) may be adjusted using Menu Item [RX DSP 078: MAIN-CONTOUR-LEVEL] for Main (VFO-A) band and [RX DSP 080: SUB-CONTOUR-LEVEL] for Sub (VFO-B) band. The factory default setting is 15.
 - The bandwidth over which the Contour filter effect is applied may be adjusted using Menu Item [RX DSP 079: MAIN-CONTOUR-WIDTH] for Main (VFO-A) band and [RX DSP 081: SUB-CONTOUR-WIDTH] for Sub (VFO-B) band. The factory default setting is 10.

With reference to Figure (B), note the initial position (12 o'clock) of the **[CONTOUR]** control when the **[CONT]** switch 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 #078 and 080, referenced above). Counter-clockwise rotation (to the left) of the 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.



『Quick Point』

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

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.

Main (VFO-A) Band IF Shift Operation

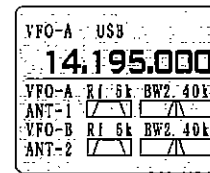
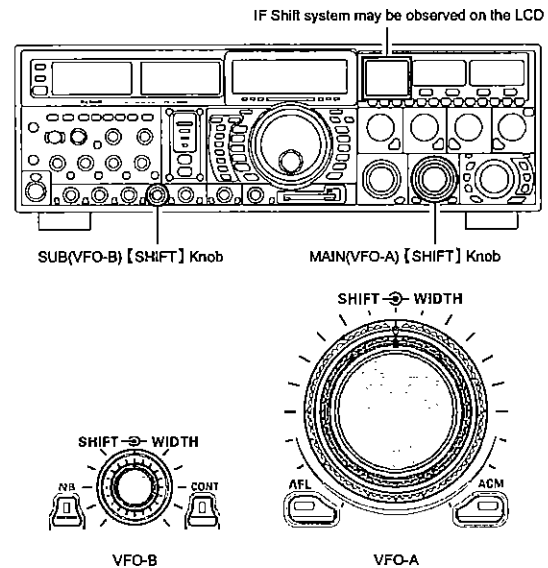
Rotate the Main (VFO-A) band's **[SHIFT]** (#89) control to the left or right to reduce the interference.

Sub (VFO-B) Band IF Shift Operation

1. Press the Sub (VFO-B) band's **[RX]** switch (#91) to engage Dual Receive operation.
2. Rotate the Sub (VFO-B) band's **[SHIFT]** (#89) control to the left or right to reduce the interference.

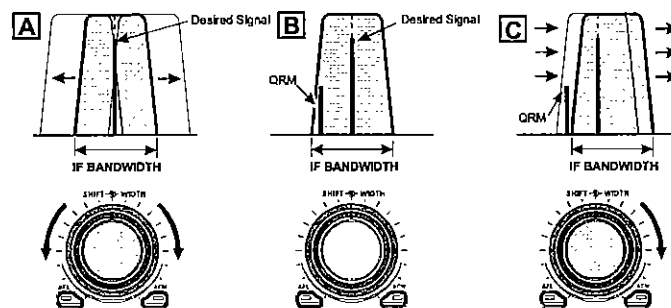
〔Advice〕

The position of the IF Shift system may be observed on the LCD display.



IF Shift system may be observed on the LCD

Referring to Figure (A), note the depiction of the IF DSP filter as the thick line, with the **[SHIFT]** control in the 12 o'clock position. In Figure (B), an interfering signal has appeared inside the original passband. In Figure (C), you can see the effect of rotating the **[SHIFT]** control so as to reduce the interference level by moving the filter passband so that the interference is outside of the passband.



INTERFERENCE REJECTION (SIGNALS WITHIN 3 kHz)

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.

Main (VFO-A) Band IF Width Operation

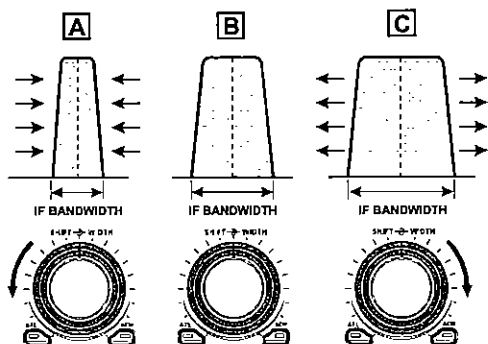
Rotate the Main (VFO-A) [WIDTH] knob (#89) to adjust the bandwidth. Counter-clockwise rotation reduces the bandwidth, while clockwise rotation increases the bandwidth.

Sub (VFO-B) Band IF Width Operation

1. Press the Sub (VFO-B) band's [RX] switch (#91) to engage Dual Receive operation.
2. Rotate the Sub (VFO-B) [WIDTH] knob (#89) to adjust the bandwidth. Counter-clockwise rotation reduces the bandwidth, while clockwise rotation increases the bandwidth.

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

By rotating the [WIDTH] knob to the left, the bandwidth will narrow (see Figure (A)), while rotation of the [WIDTH] knob to the right, as depicted in Figure (C), will widen the bandwidth.



The default bandwidths, and total bandwidth adjustment range, will vary according to the operating mode:

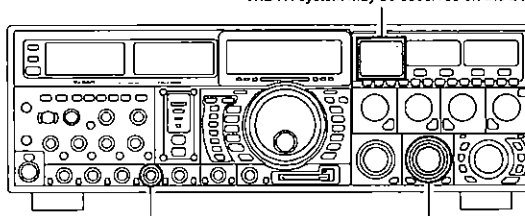
SSB Mode

200 Hz ~ 4 kHz (bandwidth at 12 o'clock position of [WIDTH]: 2.4 kHz).

CW/RTTY/PKT Modes

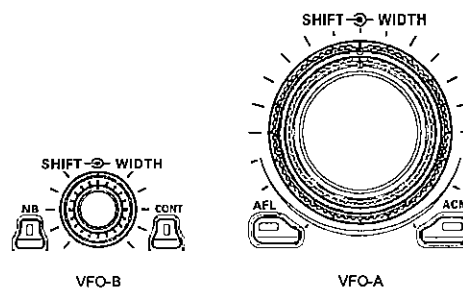
25 Hz ~ 2.4 kHz (bandwidth at 12 o'clock position of [WIDTH]: 500 Hz).

WIDTH system may be observed on the LCD



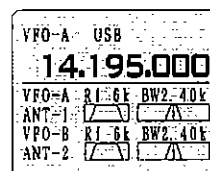
SUB(VFO-B) [WIDTH] Knob

MAIN(VFO-A) [WIDTH] Knob



VFO-B

VFO-A



WIDTH system may be observed on the LCD

『Advice』

You may observe the effects of adjustment of the [WIDTH] control on the LCD display.

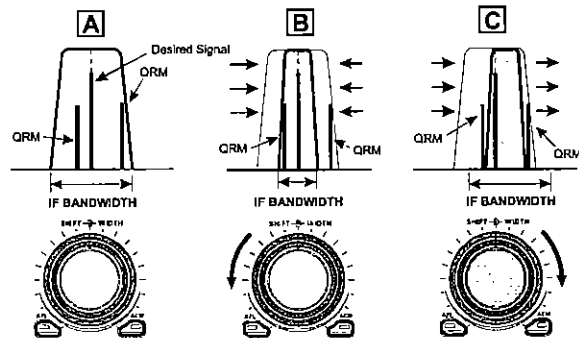
INTERFERENCE REJECTION (SIGNALS WITHIN 3 kHz)

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

Using IF Shift and Width Together

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

For example, in Figure (A) you can see how interference has appeared both on the high and low sides of the desired signal. By rotating the **WIDTH** control, as shown in Figure (B), the interference from one side can be eliminated, and by re-positioning the **SHIFT** control (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.

INTERFERENCE REJECTION (SIGNALS WITHIN 3 kHz)

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.

Main (VFO-A) Band IF Notch Operation

1. Press the Main (VFO-A) band **[NOTCH]** switch (#**64**). The LED imbedded in the switch will glow Red to confirm that the IF Notch filter has been engaged.
2. Rotate the Main (VFO-A) band's **[NOTCH]** knob (#**63**) to null out the interfering carrier.

To switch the IF Notch filter off, press the Main (VFO-A) band's **[NOTCH]** switch once more. The LED imbedded in the switch will turn off, confirming that the IF Notch filter is no longer operating.

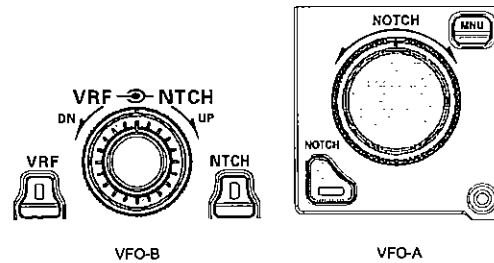
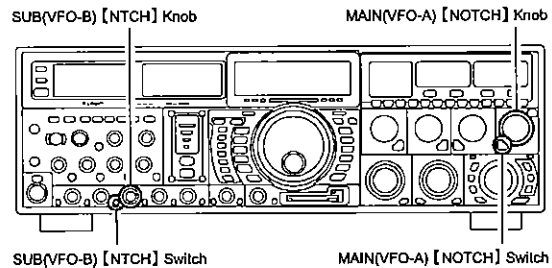
Sub (VFO-B) Band IF Notch Operation

1. Press the Sub (VFO-B) band's **[RX]** switch (#**11**) to engage Dual Receive operation.
2. Press the Sub (VFO-B) band **[NTCH]** switch (#**58**). The LED imbedded in the switch will glow Orange to confirm that the IF Notch filter has been engaged.
3. Rotate the Sub (VFO-B) band's **[NTCH]** knob (#**59**) to null out the interfering carrier.

To switch the IF Notch filter off, press the Sub (VFO-B) band's **[NTCH]** switch once more. The LED imbedded in the switch will turn off, confirming that the IF Notch filter is no longer operating.

『Advice』

- If you have an after-market monitor connected to the DISPLAY jack, you can use the Audio Scope display on the "Audio Scope/Oscilloscope" page to observe visually the position of the Notch. Rotation of the **[NOTCH]** control will produce a change in the notch frequency that you can see changing position. The "Waterfall" display capability of the Audio Scope may also be used for this purpose.
- The width of the IF Notch null may be adjusted using Menu Item [RX DSP 082: IF-NOTCH-WIDTH]. Both "Wide" and "Narrow" selections are available, with "Narrow" providing the least disruption of the "desired" signal.
- Under the frequency display, you may also use the Bar Display to show the position of the IF Notch. Use Menu Item [DISPLAY 016 BAR DISPLAY SELECT] to engage this function.

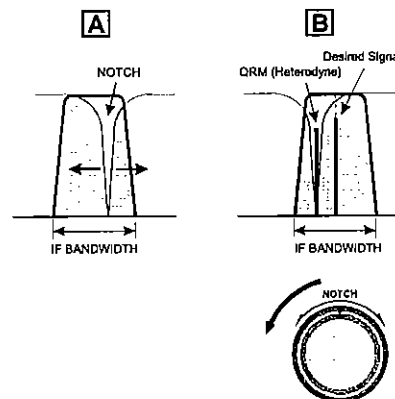


『Note』

When the **[NOTCH]** switch is pressed and held in for two seconds, the center of the notch action will be reset to the positions described below (mode-sensitive):

- SSB/AM: The Notch will center at 1.5 kHz (center of the receiver passband).
- CW: The Notch will center on the frequency programmed by the **[PITCH]** knob (#**13**).

The performance of the IF Notch filter is shown in Figure (A), where the effect of rotation of the **[NOTCH]** knob is depicted. In Figure (B) you can see the notching effect of the IF Notch filter as you rotate the **[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 band, and it is especially effective during SSB operation. By rotating the [NR] knob, any of sixteen different noise-reduction algorithms can be selected; each of these algorithms was created for dealing with a different noise profile, and you will want to experiment with the DNR system to find the best setting according to the noise currently being experienced.

Main (VFO-A) Band DNR Operation

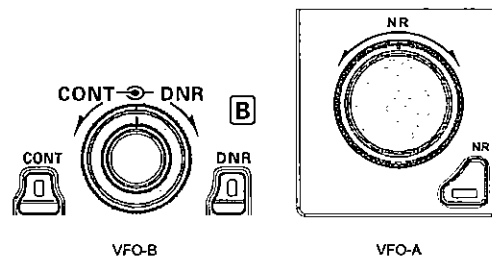
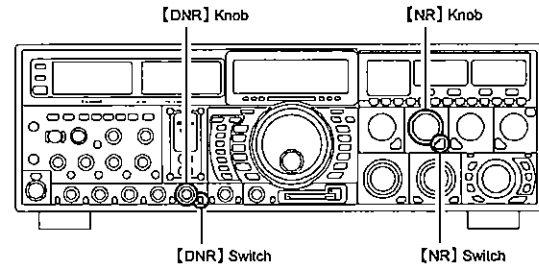
1. Press the Main (VFO-A) band's [NR] switch (#60). The LED imbedded in the switch will glow Red, confirming that the DNR system is engaged.
2. Rotate the Main (VFO-A) band's [NR] knob (#69) to select the setting that most effectively reduces the noise level.

To disable the DNR system, press the Main (VFO-A) band's [NR] switch once more. The imbedded LED will turn off, confirming that the DNR system is not active.

Sub (VFO-B) Band DNR Operation

1. Press the Sub (VFO-B) band's [RX] switch (#91) to engage Dual Receive operation.
2. Press the Sub (VFO-B) band's [DNR] switch (#62). The LED imbedded in the switch will glow Orange, confirming that the DNR system is engaged.
3. Rotate the Sub (VFO-B) band's [DNR] knob (#61) to select the setting that most effectively reduces the noise level.

To disable the DNR system, press the Sub (VFO-B) band's [DNR] switch once more. The imbedded LED will turn off, confirming that the DNR system is not active.



INTERFERENCE REJECTION (SIGNALS WITHIN 3 kHz)

NARROW (NAR) ONE-TOUCH IF FILTER SELECTION

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

SSB Mode

Pressing the [NAR] switch (#32) selects a bandwidth of 1.8 kHz.

CW/RTTY/PKT Modes

Pressing the [NAR] switch (#32) selects a bandwidth of 300 Hz.

AM Mode

Pressing the [NAR] switch (#32) selects a bandwidth of 6 kHz.

FM Mode (28/50 MHz Bands)

Pressing the [NAR] switch (#32) selects a bandwidth of 9 kHz.

『Advice』

- The bandwidth applied when the [NAR] switch is pressed may be adjusted using the Menu. This allows you to customize a quick-switch "Narrow" bandwidth matching your operating needs (_ : Default).

SSB

Main (VFO-A)

RX DSP 094 MAIN-SSB-NARROW
200/400/600/850/1100/1350/1500/
1650/1800/1950/2100/2250 Hz

Sub (VFO-B)

RX DSP 106 SUB-SSB-NARROW
200/400/600/850/1100/1350/1500/
1650/1800/1950/2100/2250 Hz

CW

Main (VFO-A)

RX DSP 085 MAIN-CW-NARROW
25/50/100/200/300/400 Hz

Sub (VFO-B)

RX DSP 097 SUB-CW-NARROW
25/50/100/200/300/400 Hz

PSK

Main (VFO-A)

RX DSP 088 MAIN-PSK-NARROW
25/50/100/200/300/400 Hz

Sub (VFO-B)

RX DSP 100 SUB-PSK-NARROW
25/50/100/200/300/400 Hz

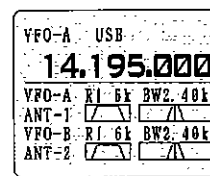
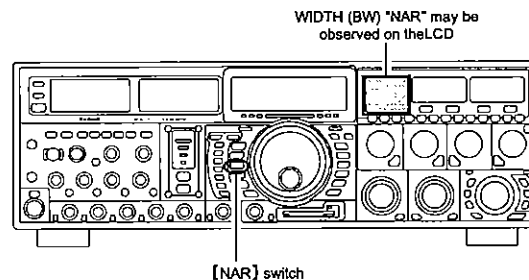
RTTY

Main (VFO-A)

RX DSP 91 MAIN-RTTY-NARROW
25/50/100/200/300/400 Hz

Sub (VFO-B)

RX DSP 103 SUB-RTTY-NARROW
25/50/100/200/300/400 Hz



WIDTH (BW) "NAR" may be observed on the LCD

『Advice』

- When the [NAR] button has been pushed so as to engaged the narrow filter, the Width control will be disabled, but IF Shift still is operational. For many applications, you may find that simple adjustment of the [WIDTH] control, instead of engaging the Narrow filter, may be satisfactory for interference reduction.
- When you press the [NAR] button in the FM mode, both the transmit and receive bandwidths are narrowed.

『Note』

When the [NAR] button is pressed, the [WIDTH] control no longer functions.

INTERFERENCE REJECTION (SIGNALS WITHIN 3 kHz)

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.

Main (VFO-A) Band DNF Operation

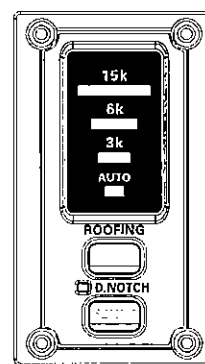
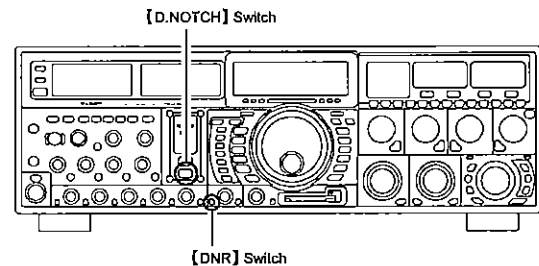
Press the Main (VFO-A) band's **[D.NOTCH]** switch (#**23**) to engage the Digital Notch filter. The LED imbedded in the switch will glow Red, to confirm that the DNF circuit is engaged.

To cancel DNF operation, press the Main (VFO-A) band's **[D.NOTCH]** switch once more. The imbedded LED will go out, confirming that the Digital Notch Filter is no longer in operation.

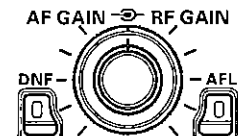
Sub (VFO-B) Band DNF Operation

1. Press the Sub (VFO-B) band's **[RX]** switch (#**9**) to engage Dual Receive operation.
2. Press the Sub (VFO-B) band's **[DNF]** switch (#**63**) to engage the Digital Notch filter. The LED imbedded in the switch will glow Umber, to confirm that the DNF circuit is engaged.

To cancel DNF operation, press the Sub (VFO-B) band's **[DNF]** switch once more. The imbedded LED will go out, confirming that the Digital Notch Filter is no longer in operation.



VFO-A



VFO-B

IF NOISE BLANKE (NB) OPERATION

The FT dx 9000MP includes an effective IF Noise Blanker, which can significantly reduce noise caused by automotive ignition systems.

Main (VFO-A) Band NB Operation

1. Press the VFO-A [NB] switch (#27) momentarily to reduce a short pulse noise such as from switching transients, automobile ignitions and poer lines. The LED imbedded in the switch will glow Red to confirm that the Narrow-NB is operating.
Press and hond the VFO-A [NB] switch for two seconds to reduce a longer duluration man-made pulse noise. The LED imbedded in the switch will glow Yellow to confirm that the Wide-NB is operating.
2. Advance the VFO-A [NB] control (#21) to the point where the offending ignition noise is best reduced or eliminated.

To end Noise Blanker operation, press the VFO-A [NB] switch once more. The LED imbedded in the switch will turn off, confirming that the Noise Blanker is no longer in operation.

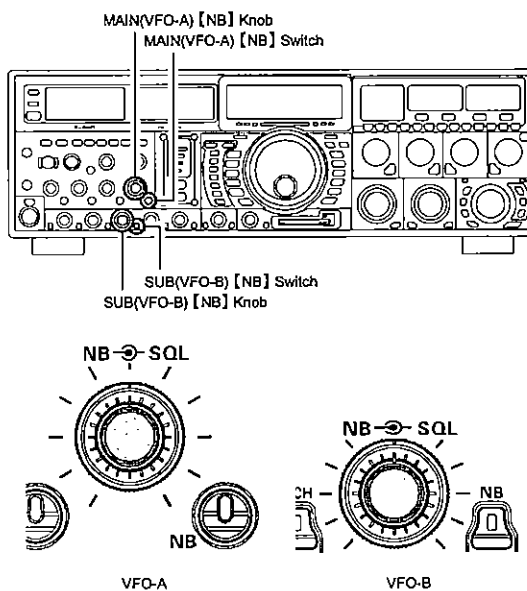
Sub (VFO-B) Band NB Operation

1. Pressing the Sub (VFO-B) band's [RX] switch (#91) will engage Dual Receive operation.
When the imbedded LED grows green, this is your confirmation that Dual Receive is in operation.
2. Press the VFO-B [NB] switch (#55) momentarily to reduce a short pulse noise such as from switching transients, automobile ignitions and poer lines. The LED imbedded in the switch will glow Umber to confirm that the Narrow-NB is operating.
Press and hond the VFO-B [NB] switch for two seconds to reduce a longer duluration man-made pulse noise. The LED imbedded in the switch will glow Yellow to confirm that the Wide-NB is operating.
3. Advance the VFO-B [NB] control (#57) to the point where the offending ignition noise is best reduced or eliminated.

To end Noise Blanker operation, press the VFO-B [NB] switch once more. The LED imbedded in the switch will turn off, confirming that the Noise Blanker is no longer in operation.

〔Advice〕

When the Roofing filter mode is set to "AUTO" and the Noise Blanker is turned On, the Roofing Filter bandwidth will automatically be set to 15 kHz.



Tools for Comfortable and Effective Reception

AGC (AUTOMATIC GAIN CONTROL)

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

Main (VFO-A) Band AGC Selection

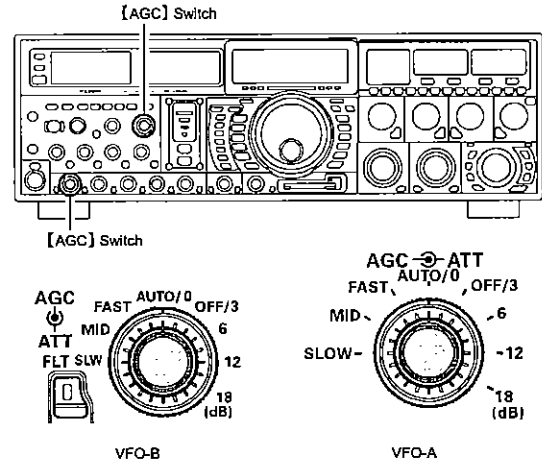
Rotate the Main (VFO-A) band's [AGC] switch (#13) to select the desired receiver-recovery time constant. For most operation, we recommend the "AUTO" mode.

Sub (VFO-B) Band AGC Selection

1. Press the Sub (VFO-B) band's [RX] switch (#9) to engage Dual Receive operation.
2. Rotate the Sub (VFO-B) band's [AGC] switch (#13) to select the desired receiver-recovery time constant.

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

Operation Mode	AUTO AGC Selection
LSB	SLOW
USB	SLOW
CW	FAST
AM	FAST
FM	FAST
RTTY	SLOW
PKT(FM)	FAST
PKT(LSB)	SLOW



Advice

If the [AGC] switch is set to the "Off" position, the S-meter will no longer deflect. Additionally, you will likely encounter distortion on stronger signals, as the IF amplifiers and the following stages are probably being overloaded.

Quick Point

Several aspects of AGC performance may be configured via the Menu. However, because AGC can have such a profound impact on overall receiver performance, we generally do not recommend any changes to the AGC Menu selections.

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.

TOOLS FOR COMFORTABLE AND EFFECTIVE RECEPTION

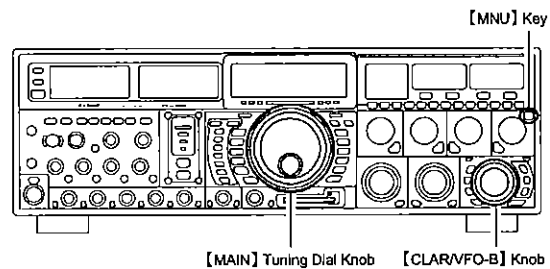
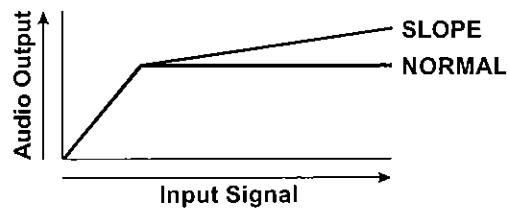
AGC (AUTOMATIC GAIN CONTROL)

SLOPED AGC Operation

In traditional AGC systems, the audio output from the transceiver becomes essentially fixed once the threshold for AGC action is reached (usually several dozen dB above the no-signal noise floor). The FT dx 9000MP, however, includes an innovative Sloped AGC system, that allows the audio volume to rise and fall slightly according to signal strength. Although the rise/fall are not dramatic, they are 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 **[MNU]** (Menu) key (#**85**) momentarily to enter the Menu mode; the Menu will appear on the LCD display.
2. Use the **[Main]** Tuning Dial knob (#**23**) to select Menu Item* [RX AUDIO 075 AGC-SLOPE].
3. Rotate the **[CLAR/VFO-B]** knob (#**97**) to change the setting to "SLOPE."
4. Press and hold in the **[MNU]** key for two seconds to save the new setting and exit to normal operation. You will now be using the Sloped AGC system.



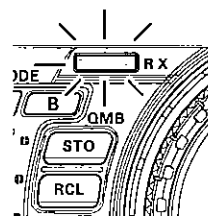
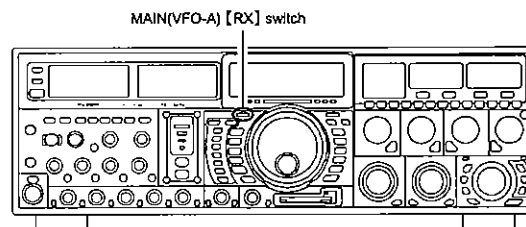
TOOLS FOR COMFORTABLE AND EFFECTIVE RECEPTION

MUTE FEATURE MAIN (VFO-A) BAND

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

Press the Main (VFO-A) band's **[RX]** LED/switch (#27).

The Main (VFO-A) receiver will be silenced, and the green LED in the **[RX]** switch will blink. To restore reception on the Main (VFO-A) receiver, just press the blinking **[RX]** switch/LED once more.



AUDIO LIMITER (AFL) FEATURE

Particularly when the AGC is off, you may desire to limit the level of audio output that is permitted to flow to the speaker or earphones. For these circumstances, the AFL (Audio Limiter) feature will provide the desired cap on the audio output.

Main (VFO-A) Band AFL Setup

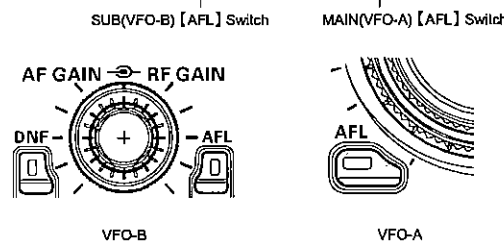
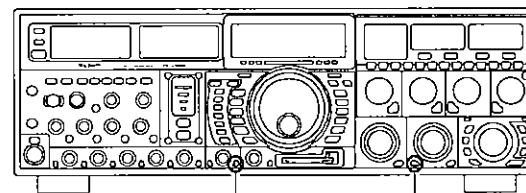
Press the Main (VFO-A) band's **[AFL]** switch (#65) to turn on the Audio Limiter. The imbedded LED in the button will glow red. To disable the Audio limiter, press the **[AFL]** switch once more; the imbedded LED will turn off.

『Advice』

Because the AFL feature will generally reduce the overall audio level, we recommend that it be left Off unless special operating conditions warrant its use.

Sub (VFO-B) Band AFL Setup

1. Press the Sub (VFO-B) band's **[RX]** switch (#91) to engage Dual Receive operation.
2. Press the Sub (VFO-B) band's **[AFL]** switch (#65) to turn on the Audio Limiter. The imbedded LED in the button will glow red. To disable the Audio limiter, press the **[AFL]** switch once more; the imbedded LED will turn off.



TOOLS FOR COMFORTABLE AND EFFECTIVE RECEPTION

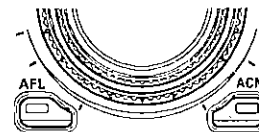
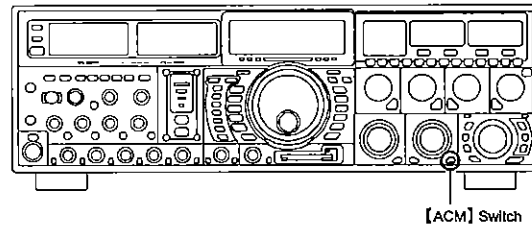
ADJACENT CHANNEL MONITOR (ACM) CW MODE ONLY

While operating on CW on the Main (VFO-A) band, the ACM feature provides a visual indicator of encroachment by another station (someone you may not be able to hear because of the tight DSP filter in your FT dx 9000MP). The presence of a nearby strong signal will be displayed on the Sub-receiver's S-meter. The Sub (VFO-B) receiver is taken over by the ACM, when engaged, and reception on the Sub (VFO-B) band is not possible while ACM is turned on.

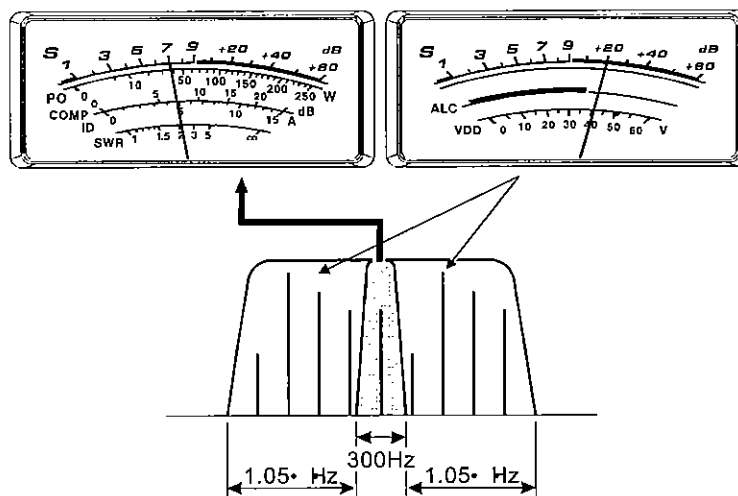
To activate the Adjacent Channel Monitor, press the **[ACM]** switch (#9). The LED imbedded in the switch will glow Red.

『Advice』

- If you do not have Dual Receive engaged, turning on the ACM feature will cause the **[RX]** LED associated with the Sub (VFO-B) receiver to become illuminated.
- When ACM is turned on, the frequency of the Sub (VFO-B) receiver will automatically be set to match that of the Main (VFO-A) receiver.
- When operating on Dual Receive, engaging the ACM feature automatically sets the Sub (VFO-B) receiver to the same frequency as the Main (VFO-A) receiver, and by inverting the DSP filter the Sub receiver is used for monitoring (visually) for activity outside your current receiver passband on the Main receiver.



When ACM is turned on during Dual Receive operation, the audio from the Sub (VFO-B) receiver will disappear. A typical operating circumstance where ACM can help is when you are running stations during a contest in a 250 Hz bandwidth. If stations suddenly stop calling you, it may be because another strong station has started calling CQ near your frequency. By engaging ACM, your Sub-receiver S-meter will display the strongest station on the area ± 1.2 kHz from your current operating frequency; if the encroaching station is sufficiently close, you might want to ask him or her kindly to QSY.



TOOLS FOR COMFORTABLE AND EFFECTIVE RECEPTION

AUDIO FILTER OPERATION

The left **[FILTER(A)]** switch on the FPS-9000H allows adjustment of the left speaker audio response, while the **[FILTER(B)]** switch on the FPS-9000H allows tailoring of the right side speaker's audio response.

The optimum filter setting will depend on the operating mode and band/noise conditions. For example:

SSB operation

Setting the HIGH CUT filter to 2.4 kHz will cause audio components above that frequency to be attenuated at a rate of -6 dB per octave. This will cut high-pitched noise, and give the audio a more mellow sound.

SSB operation

Setting LOW CUT to 500 Hz, and HIGH CUT to 700 Hz, will create a bandpass filter with its peak at 600 Hz.

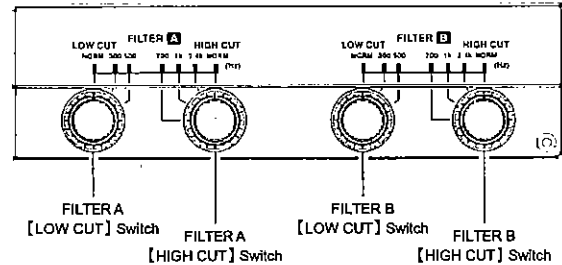
AM and FM operation

You will want to begin operation in the "NORM" (Normal) position, corresponding to the widest fidelity available. If specific noise or interference should arise, try engaging one or both of the filters.

See the charts for further information about the typical response curves for these highly useful filters, which oftentimes can significantly enhance reception.

【Note】

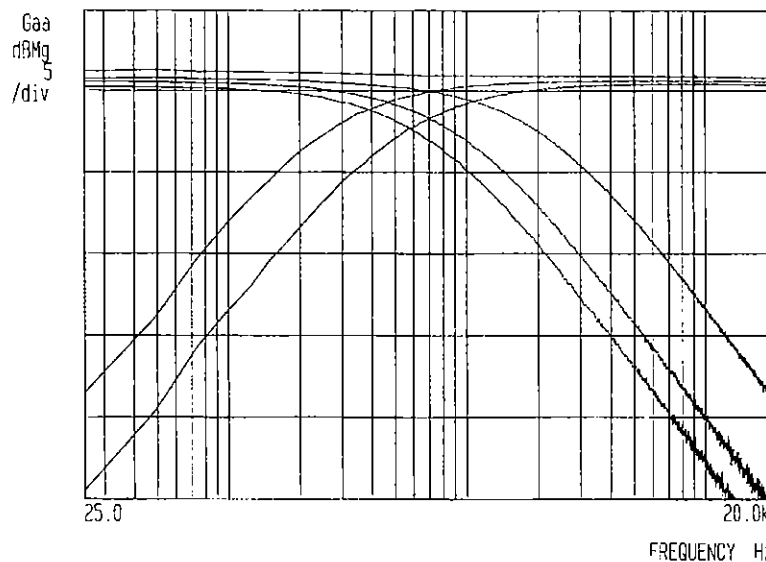
- It is possible to mute the audio from the speaker(s), if desired; see page 40.
- To mute the audio from the Main receiver (left speaker), press the **[MUTE(A)]** switch. To mute the audio from the Sub receiver (right speaker), press the **[MUTE(B)]** switch.



LOW CUT	
NORM	The audio filter is disabled.
300	Audio below 300 Hz is attenuated at a rate of -6 dB/octave.
500	Audio below 500 Hz is attenuated at a rate of -6 dB/octave.
HIGH CUT	
700	Audio above 700 Hz is attenuated at a rate of -6 dB/octave.
1k	Audio above 1000 Hz is attenuated at a rate of -6 dB/octave.
2.4k	Audio above 2400 Hz is attenuated at a rate of -6 dB/octave.
NORM	The audio filter is disabled.

【Advice】

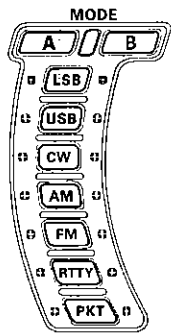
- It is possible to combine the speakers' audio outputs, so as to enhance the tonal fidelity from bass through treble; see page 40.
- Pressing the **[OUTPUT]** switch (once the "[A+B]" switch has been pressed) will combine the audio from the two speakers, effectively doubling the total speaker aperture.



Audio Filter Frequency Response

SSB/AM Mode Transmission (Let's Look at the Transmitter. . .)

1. The operating mode is selected using the **[MODE]** switches (#25) to the left of the **[MAIN]** Tuning Dial knob (#29), and the VFO (A or B) to which the selection is applied is selected by pressing the **[A]** or **[B]** switch above the Mode keys. Press the **[A]** or **[B]** key to select the desired VFO, then press the **[LSB]** or **[USB]** key to select one of the SSB modes. For AM operation, press the **[AM]** key.



『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, if using the optional MD-200A8X Desktop Microphone, you may use the Up/Down scanning buttons to sweep up or down the current band.

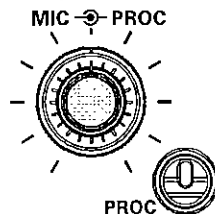
『Advice』

Be sure to verify that the microphone you are using is enabled for operation via the Menu. There are two microphone jacks (the front panel's three-pin XLR ("Canon") connector, and the rear panel's 8-pin round connector), and either jack may be chosen independently for SSB, AM, and FM operation. See the Menu list below for details of the associated Menu Item.

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

- 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]** control so as to set a maximum (carrier) power output of 50 Watts.
- Release the PTT switch at the end of your transmission. The transceiver will return to the receive mode.

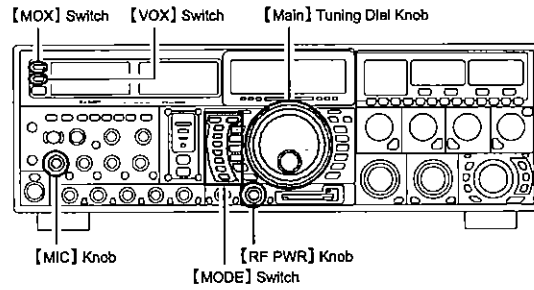
4. To adjust the microphone amplifier gain to match the microphone and your voice level, close the PTT switch, speak into the microphone in a normal voice level, and adjust the **[MIC]** (gain) control (#15) as follows:



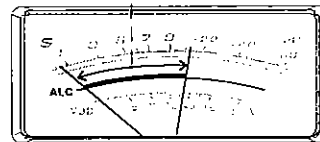
SSB Mode

Adjust the **[MIC]** control so that the ALC voltage (displayed on the right meter) stays within the ALC zone of the meter (up to 2/3 or full scale deflection) on voice peaks.

For AM, the **[MIC]** control 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.

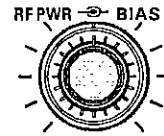


Please adjust the **[MIC]** gain control to set the ALC within this range.

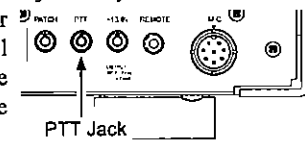


『Advice』

- 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 control. Therefore, we recommend that you make **[MIC]** gain adjustments into a dummy load or antenna system presenting an impedance very close to 50 Ohms.
- Rotate the **[RF PWR]** control (#66) to set the desired power output. Clockwise rotation of the **[RF PWR]** control will increase the power. The adjustment range is between 10 Watts and 400 Watts, and you should always use the minimum power necessary for maintaining reliable communications.
- When performing tests (such as the setup of the **[MIC]** or **[RF PWR]** controls), be sure to check the frequency before transmitting, so as to avoid interference to others who may already be using the frequency.
- Four techniques for exercising Transmit/Receive control are provided on the FT dx 9000MP, 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]** switch (#1) will lock the transmitter on. Press the **[MOX]** switch (a latching type) 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 96.



SSBIAM MODE TRANSMISSION (LET'S LOOK AT THE TRANSMITTER. . .)

PHANTOM VOLTAGE FOR CONDENSER MICROPHONES

For powering a studio-quality condenser microphone connected to the front panel's XLR ("Canon") connector, it is possible to enable a 48-volt DC line connected to that jack. Because the improper enabling of this voltage could cause damage to other microphone types, the simple process for enabling the voltage has been made somewhat complicated, so as to prevent the voltage from being enabled by accident.

1. Turn the front panel **[POWER]** switch (#5) Off, then Turn the FPS-9000H's **[POWER]** switch Off.
2. Unplug the DC power cable from the rear panel **[DC IN]** jack.
3. Referring to Figure 1, remove the eight screws from the sides of the transceiver case.
4. Now remove the six screws shown in Figure 1 from the bottom case.
5. Referring to Figure 2, locate jack J28 on the AF Unit, and remove the jumper plug which is connected across pins 2 and 3 of J28.
6. Connect the just-removed jumper plug so that it now is connected across pins 1 and 2 of J28 (instead of the original position across pins 2 and 3).
7. Replace the six screws from the bottom case, and replace the eight screws from the sides of the transceiver (these screws were removed in steps 3 and 4 above).
8. Connect the DC power cable to the rear panel's **[DC IN]** jack.
9. Turn the FPS-9000H's **[POWER]** switch on, then turn the front panel **[POWER]** switch on.
10. If the above process has been successfully completed, you will observe that a small red LED just above and to the right of the XLR connector is now illuminated. If this LED is not glowing red, please check the status of the jumper plug once more.
11. If the red LED is glowing properly, the modification to enable the phantom 48 Volt line is now complete.

〔Note〕

- *When opening/closing the case, take care with your screwdriver not to short out internal components, or touch them in a way that will cause them to short out against other components.*
- *Avoid touching internal components with your hand, as static electricity can cause damage to certain components if appropriate anti-static bench techniques are employed.*
- *Only engage the phantom power when you have no alternative but to use a condenser microphone requiring such voltage. The wide availability of studio-grade Dynamic microphones (that do not require the phantom voltage) generally makes the use of the phantom voltage unnecessary over the life of the transceiver. Because damage can occur if the phantom voltage is enabled on a microphone not requiring it, we strongly recommend that the jumper plug at J28 (AF Unit) be left in its original position across pins 2 and 3.*
- *The phantom voltage capability of the FT DX 9000MP is disabled at the factory, and the lack of this voltage is not a "defect" or other condition covered by the Limited Warranty on this product. Accordingly, if you do not feel capable of enabling the phantom voltage and ask a service shop to do so on your behalf, a service fee may apply.*

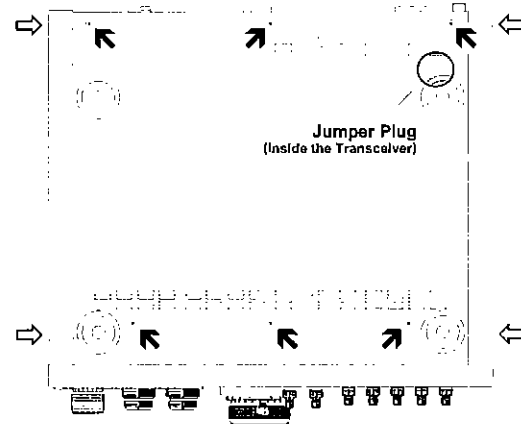


Figure 1

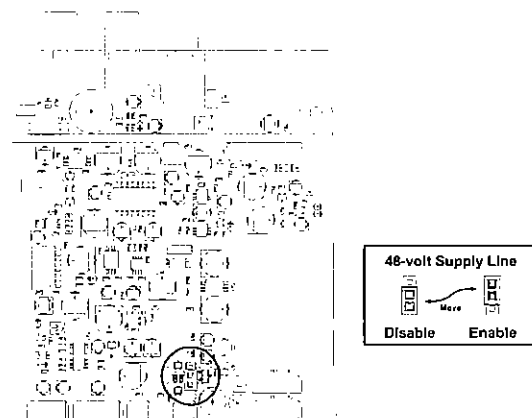


Figure 2

〔Terminology〕

Phantom Voltage

Phantom Voltage is a term describing the voltage (48 Volts at 10 mA max.) provided via the front panel's XLR ("Canon") microphone connector, for use with a studio-grade condenser microphone. Although disabled at the factory, enabling of the voltage only requires that the position of an internal jumper plug be moved.

USING THE AUTOMATIC ANTENNA TUNER

The Automatic Antenna Tuner (hereinafter referred to as the “ATU”) built into each FT DX 9000 is crafted to ensure a 50-Ohm load for the final amplifier stage of the transmitter. We recommend that the ATU be used whenever you operate on the FT DX 9000MP.

『Advice』

- The ATU of the FT DX 9000MP, being located inside the station, only adjusts the impedance presented to the transceiver at the station end of your coaxial cable feedline. It does not “tune” the SWR at the antenna feedpoint itself. When designing and building your antenna system, we recommend that every effort be made to ensure a low SWR at the antenna feedpoint.
- The ATU of the FT DX 9000MP includes 100 memories for tuning data. Eleven of these memories are allocated, one per Amateur band, so that each band has at least one setting preset for use on that band. The remaining 89 memories are reserved for the 89 most-recent tuning points, for quick frequency change without the need to retune the ATU.
- The ATU in the FT DX 9000MP is designed to match impedances within the range of 16.5 Ohms to 150 Ohms, corresponding to an SWR of 3:1 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

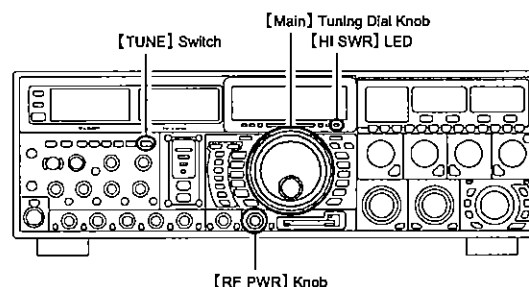
1. Rotate the **[RF PWR]** control (#68) fully clockwise (to the right).
2. Use the **[MAIN]** Tuning Dial knob (#29) to set the radio to desired operating frequency within the Amateur band.
3. Press the **[TUNE]** switch (#10) momentarily to place the ATU in the transmit line (no adjustment/tuning will occur yet). An LED inside the **[TUNE]** switch will glow red continuously.



『Quick Point』

The momentary press of the **[TUNE]** switch 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]** switch for two seconds to begin automatic tuning. The transmitter will be engaged, and the red LED imbedded in the **[TUNE]** switch will blink while tuning is in progress. When the optimum tuning point has been reached, the radio will return to receive, and the red LED will again glow steadily (instead of blinking).
5. While tuning around the band using the Main tuning dial, you will observe that the **[TUNE]** LED 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]** switch momentarily. The red LED imbedded in the **[TUNE]** switch will go out, 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.



『Advice』

The ATU is connected both to the transmitter and the receiver, and its natural RF selectivity has a beneficial effect in rejecting out-of-band energy during reception. Accordingly, we recommend that the ATU be left “On” at all times.

『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 **[TUNE]** switch's LED occurs whenever you cross over into a new 10 kHz ATU memory window.

『Note』

Although transmitter power is decreased to 200 Watts (maximum) during tuning, by all means 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 LED has become illuminated. The operator presses and holds in the [TUNE] switch (#10) for two seconds to begin impedance matching using the ATU.

If a high SWR condition 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.

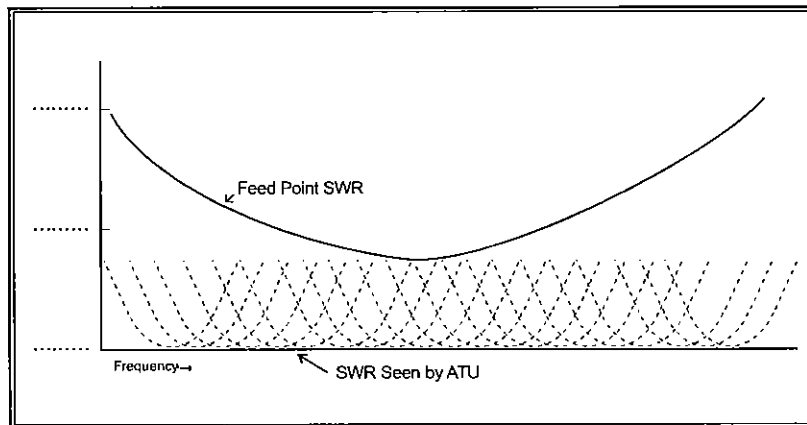


Figure 1

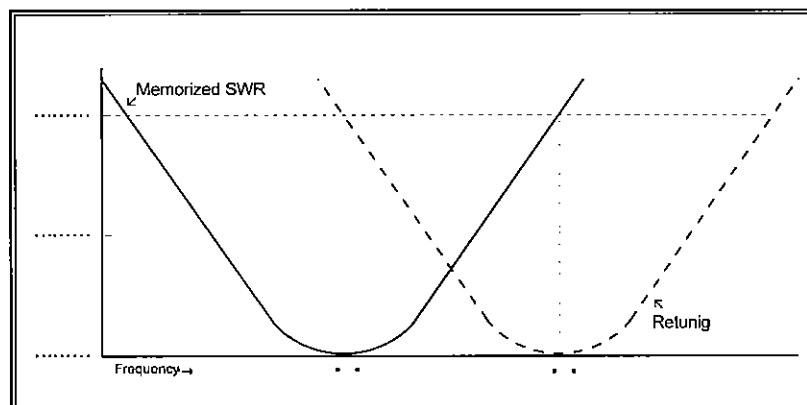


Figure 2

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 LED 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. 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.

USING THE AUTOMATIC ANTENNA TUNER

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

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

1. Turn the front panel **[POWER]** switch (#5) Off, then Turn the FPS-9000H's **[POWER]** switch Off.
2. Unplug the DC power cable from the rear panel **[DC IN]** jack.
3. Referring to Figure 1, remove the eight screws from the side of the transceiver, along with the six screws affixing the bottom case; remove the bottom case.
4. Now remove the three screws affixing the top case (Figure 2), and remove the top case.
5. Referring to Figure 3, remove the screws (←) at the top left and top right that hold the front panel assembly in place, and loosen the two screws (↔) at the bottom left and bottom right, so they can hold the front panel as it is folded forward.
6. Refer to Figure 4, and slide the front panel diagonally upward and outward, then fold the front panel forward to expose the Control Unit behind it.
7. Locate the Lithium battery on the left side of the Control Unit (Figure 5)
8. Follow the guidelines in Figure 6, and remove the old battery, replacing it with a new one of the identical type.
9. Restore the front panel to its original position, and replace the two screws (one from each side, near the top) and tighten the two lower screws that were loosened in step 5.
10. Replace the top and bottom covers, re-installing all the screws removed in steps 3 and 4.
11. ATU Backup Battery replacement is now complete.

『Quick Point』

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

『Note』

- Use care in the handling and storage of the Lithium battery. It is small, and presents a choking hazard to small children; therefore keep such batteries out of the reach of children at all times. Do not dispose of Lithium batteries in fire, and do not attempt to re-charge them under any circumstances.
- When opening/closing the case, take care with your screwdriver not to short out internal components, or touch them in a way that will cause them to short out against other components.
- The exhaustion of the ATU backup battery of the FT dx 9000MP is a normal "wear and tear" situation, and the loss of the backup voltage is not a "defect" or other condition covered by the Limited Warranty on this product. Accordingly, if you do not feel capable of replacing the battery, and ask a service shop to do so on your behalf, a service fee may apply.

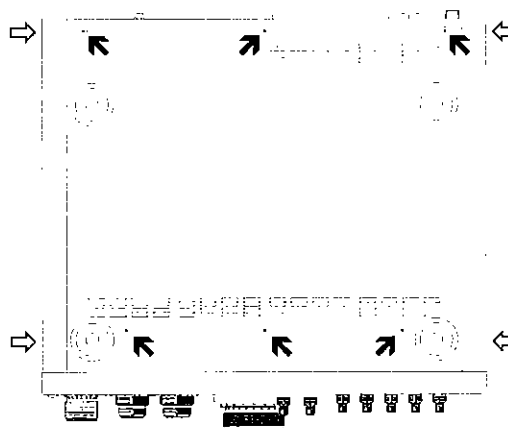


Figure 1

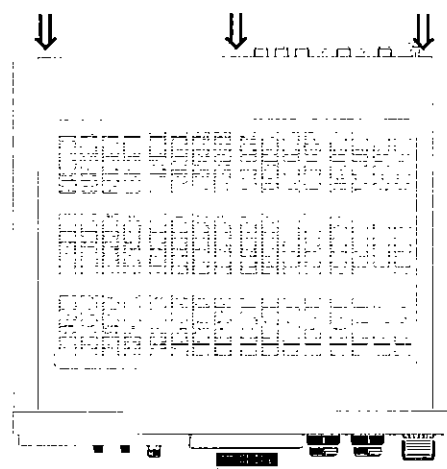


Figure 2

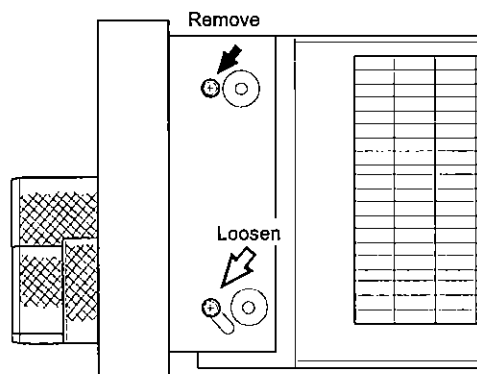


Figure 3

USING THE AUTOMATIC ANTENNA TUNER

Slide the front panel diagonally upward and outward.

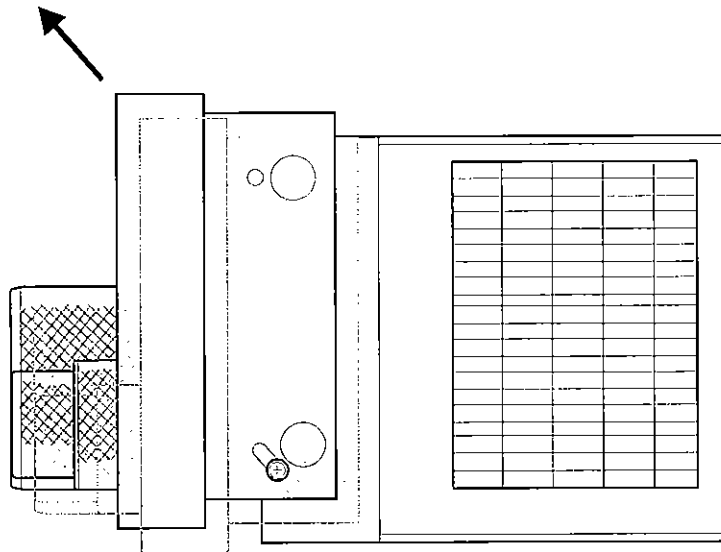


Figure 4

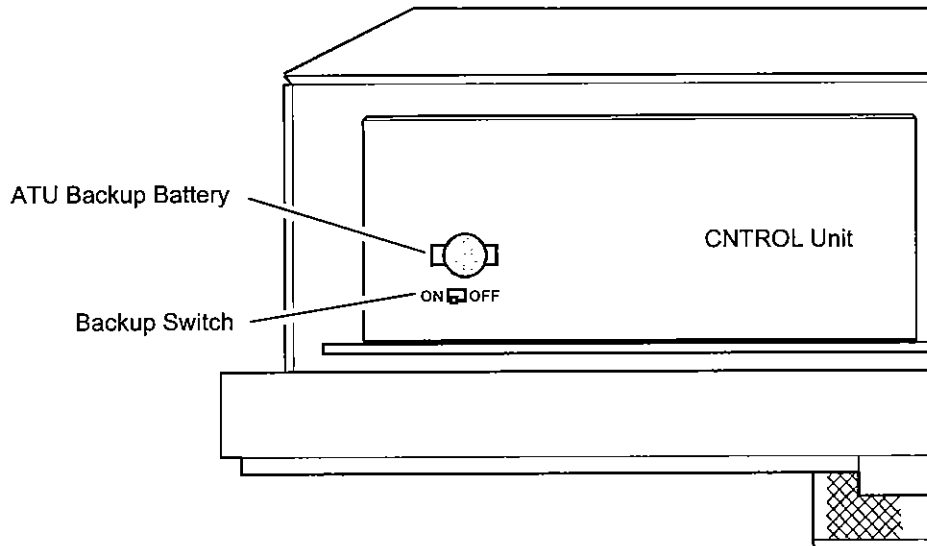
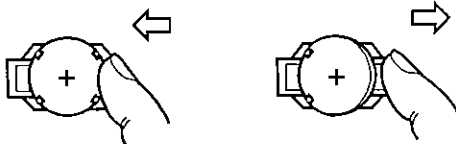


Figure 5

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



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

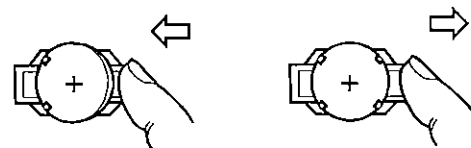


Figure 6

SSB/AM Mode Transmission (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.

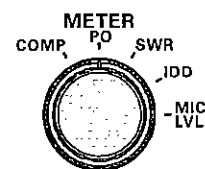
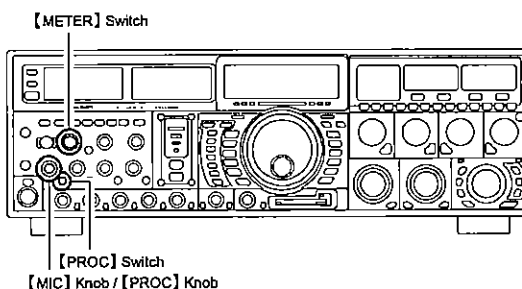
1. Adjust the **[MIC]** gain control (#15) for SSB use, as described on page 80.
2. Rotate the **[METER]** switch (#11) fully to the left, so as to select “COM” (Compression).
3. Press the **[PROC]** switch (#16) momentarily. The Red LED imbedded in the switch will light up, confirming that the Speech Processor is engaged.
4. Press the **[PTT]** switch on the microphone, and speak into the microphone in a normal voice level. Observe the deflection of the meter needle on the COMP meter scale.
5. Rotate the **[PROC]** control (#15) so that the meter needle deflects to not more than “10 dB” on the COMP scale.

To switch the Speech Processor off, press the **[PROC]** switch once more. The Red LED imbedded in the switch will go out, confirming that the Speech processor is turned off.

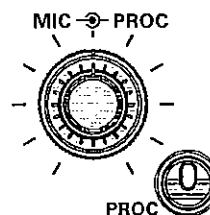
『Advice』

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

- If you have an after-market monitor connected to the DISPLAY jack, you can observe the effect of your COMP level adjustments by viewing the wave-form on the “Oscilloscope” page on the external monitor.
- The Transmit Monitor is another helpful way of verifying proper adjustment of the Compression level. By Pressing the **[MONI]** switch (#12) and adjusting the **[MONI]** control (#13) 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]** control (#65) still controls the RF power output, whether or not the Speech Processor is engaged.



[METER] switch



[MIC] knob / [PROC] knob

[PROC] switch

SSBIAM MODE TRANSMISSION (ENHANCING TRANSMIT SIGNAL QUALITY)

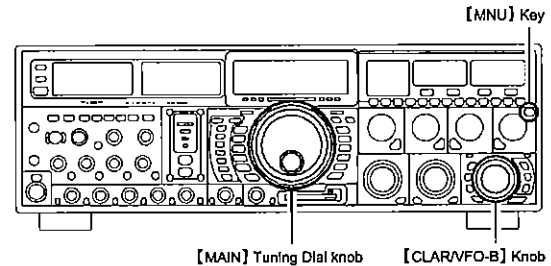
ADJUSTING THE SSB TRANSMITTED BANDWIDTH

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 **[MNU]** key (#89) to engage the Menu.
2. Rotate the **[MAIN]** Tuning Dial knob (#29) so as to select Menu Item **[MODE SSB 070 SSB-TX-BPF]**.
3. Rotate the **[CLAR/VFO-B]** knob (#97) to select the desired bandwidth. The available selections are:
3000WB/50-3000/100-2900/200-2800/
300-2700/400-2600,
and the default is 300-2700 Hz.
4. Press and hold in the **[MNU]** key for two seconds to save the new setting and exit to normal operation.

『Advice』

- If you have an after-market monitor connected to the **DISPLAY** jack, you can verify the effect of your adjustments of the transmitted bandwidth by observing the Audio Scope on the "Oscilloscope" page on the external monitor.
- The Transmit Monitor is another helpful way of verifying the effects on fidelity of changing the bandwidth. Press the **[MONI]** switch (#12), then adjusting the **[MONI]** control (#13) for a comfortable listening level while you are transmitting, you will be able to hear the difference in sound quality as you make changes.



『Quick Point』

- 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).

SSB/AM MODE TRANSMISSION (ENHANCING TRANSMIT SIGNAL QUALITY)

SIGNAL QUALITY ENHANCEMENT USING THE PARAMETRIC MICROPHONE EQUALIZER

The FT DX 9000MP 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.

『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.
- The Parametric Equalizer adjustments are applied independently to the front XLR (“Cannon”) and rear (8-pin) microphone jacks, so you can connect different microphones and customize the audio response that best suits each microphone.

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.

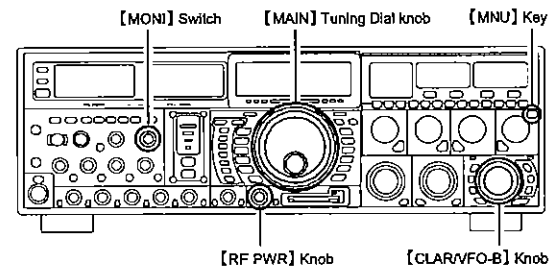
Gain: The amount of enhancement (or suppression) within each band may be adjusted.

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

1. Connect the microphone to the front or rear microphone jack.
2. Set the **[RF PWR]** control (#66) to its minimum value, so as not to cause interference to other users during adjustment.

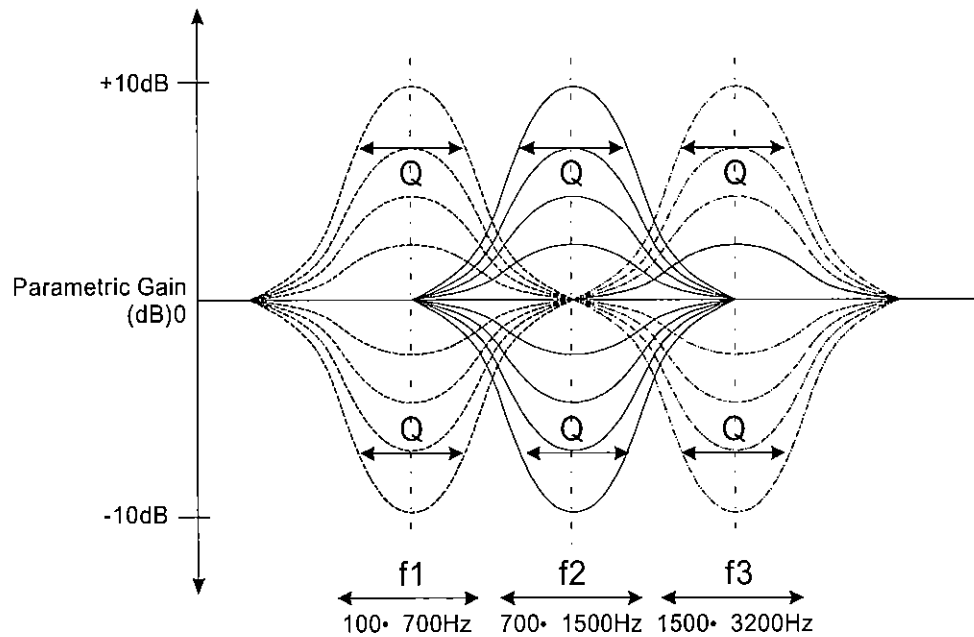
『Advice』

- Because the setup of the Parametric Equalizer for both front and rear microphone jacks may take some time, 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 while monitoring your transmitted signal.
3. Press the **[MONI]** switch (#12).
 4. Press the **[MNU]** key (#65) momentarily. The Menu list will appear on the LCD display.
 5. Rotate the **[Main]** Tuning Dial knob (#29) to find the “EQ” Menu area, containing Menu Items 136 through 153; these pertain to the adjustment of the Parametric Microphone Equalizer.
 6. Rotate the **[CLAR/VFO-B]** knob (#47) to perform adjustments to a particular Menu item.
 7. Close the PTT switch, and speak into the microphone while listening to the effects of the changes you are making (in step 6). Because the overall effect on the sound will change with each adjustment you make, you should make several passes through each adjustment area, to be sure that you are achieving the optimum setting.
 8. When you have completed all adjustments, press and hold in the **[MNU]** key for two seconds to save the new settings and exit to normal operation. If you only press the **[MNU]** key momentarily to exit, any changes you performed will not be stored.



SSB/AM MODE TRANSMISSION (ENHANCING TRANSMIT SIGNAL QUALITY)

SIGNAL QUALITY ENHANCEMENT USING THE PARAMETRIC MICROPHONE EQUALIZER



3-Stage Parametric Equalizer Adjustments: Front Panel Microphone Jack

Center Frequency	TX AUDIO 136 F-PRMTRC EQ1-FREQ	"100" (Hz) ~ "700" (Hz)
	TX AUDIO 139 F-PRMTRC EQ2-FREQ	"700" (Hz) ~ "1500" (Hz)
	TX AUDIO 142 F-PRMTRC EQ3-FREQ	"1500" (Hz) ~ "3200" (Hz)
Parametric Gain	TX AUDIO 137 F-PRMTRC EQ1-LEVEL	(Low) "-10" (-10dB) ~ "+10" (+10dB)
	TX AUDIO 140 F-PRMTRC EQ2-LEVEL	(Mid) "-10" (-10dB) ~ "+10" (+10dB)
	TX AUDIO 143 F-PRMTRC EQ3-LEVEL	(High) "-10" (-10dB) ~ "+10" (+10dB)
Q (Bandwidth)	TX AUDIO 138 F-PRMTRC EQ1-BWTH	(Low) "1" ~ "10"
	TX AUDIO 141 F-PRMTRC EQ2-BWTH	(Mid) "1" ~ "10"
	TX AUDIO 144 F-PRMTRC EQ3-BWTH	(High) "1" ~ "10"

3-Stage Parametric Equalizer Adjustments: Rear Panel Microphone Jack

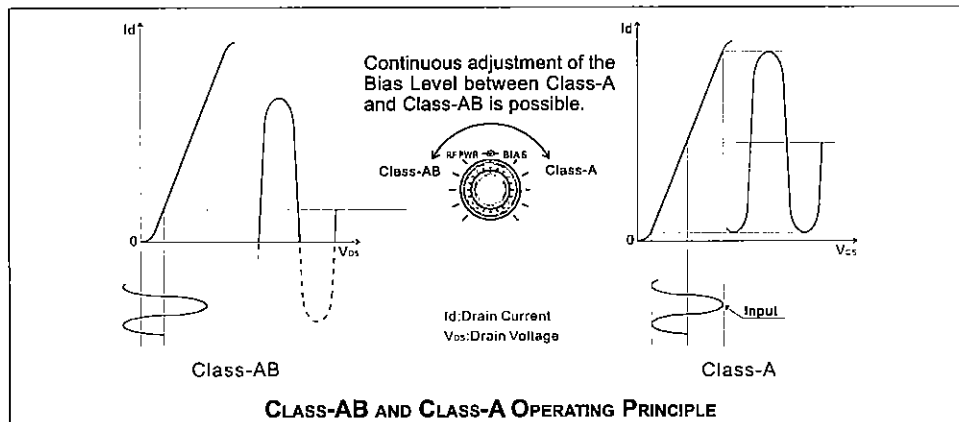
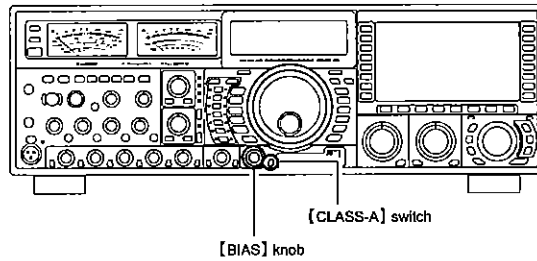
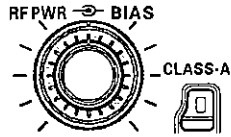
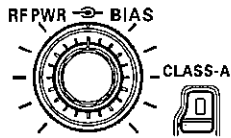
Center Frequency	TX AUDIO 145 R-PRMTRC EQ1-FREQ	"100" (Hz) ~ "700" (Hz)
	TX AUDIO 148 R-PRMTRC EQ2-FREQ	"700" (Hz) ~ "1500" (Hz)
	TX AUDIO 151 R-PRMTRC EQ3-FREQ	"1500" (Hz) ~ "3200" (Hz)
Parametric Gain	TX AUDIO 146 R-PRMTRC EQ1-LEVEL	(Low) "-10" (-10dB) ~ "+10" (+10dB)
	TX AUDIO 149 R-PRMTRC EQ2-LEVEL	(Mid) "-10" (-10dB) ~ "+10" (+10dB)
	TX AUDIO 152 R-PRMTRC EQ3-LEVEL	(High) "-10" (-10dB) ~ "+10" (+10dB)
Q (Bandwidth)	TX AUDIO 147 R-PRMTRC EQ1-BWTH	(Low) "1" ~ "10"
	TX AUDIO 150 R-PRMTRC EQ2-BWTH	(Mid) "1" ~ "10"
	TX AUDIO 153 R-PRMTRC EQ3-BWTH	(High) "1" ~ "10"

SSB/AM MODE TRANSMISSION (LOW-DISTORTION CLASS-A OPERATION)

LOW-DISTORTION CLASS-A OPERATION

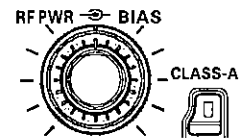
Class-A operation of the FT DX 9000MP transmitter is provided, yielding ultra-low distortion products during SSB operation. Power output during Class-A operation is 100 Watts.

- To engage Class-A operation, press the **[CLASS-A]** switch (#57). The imbedded Red LED will light up, confirming that Class-A operation has been selected.
- Engaging the "Class-A" mode actually places the transceiver in a condition whereby the Bias level may be adjusted, using the **[BIAS]** control (#66), to set the transceiver for operation anywhere between Class A and Class AB (which has lower heat dissipation but higher distortion products). Clockwise rotation of the **[BIAS]** control increases the Bias, and fully clockwise rotation of the **[BIAS]** control will place the transmitter in fully Class-A operation. Counter-clockwise rotation of the **[BIAS]** control will move the transmitter toward Class AB operation.
- To exit from the CLASS-A mode, press the **[CLASS-A]** switch once more. The Red LED imbedded in the switch will go out, confirming that the CLASS-A mode has been disengaged.



『Advice』

- During Class-A operation, ten Amps of Bias current will be flowing, regardless of the modulation level that leads to actual power output. Therefore, if the ambient temperature in your operation location is high, the transceiver temperature may rise as well, due to the high bias level (which must be dissipated as heat). Depending on the temperature, you may wish to reduce the setting of the **[BIAS]** control (#66), so as to reduce the amount of heat being generated.
- During Class A operation, we recommend that you monitor the heat sink temperature by pressing the **[TEMP]** switch (#74) so as to engage the temperature monitoring mode of the **[TEMP/SWR]** meter (#13). Usually, the temperature will be well below the 80 °C "Red Zone," because the fan speed will increase to control a rise in temperature. If you are operating in a hot environment, though, and the increasing fan speed does not maintain the temperature below 80 °C, try adjusting the Bias Level temporarily in the direction of Class AB operation; this will reduce the amount of heat being dissipated in the heat sink.
- The Bias Level is displayed on the **[VDD/BIAS]** meter (#70) when the **[BIAS]** switch (#72) is pushed. On the "Bias" scale, "0%" represents Class AB operation, while "100%" represents Class A operation.
- An innovative aspect of the "Class-A" mode is that the actual power output is always limited to 100 Watts. So even though you might adjust the **[BIAS]** control in the direction of Class-AB operation, the power output will not rise; this eliminates the need, for example, to re-tune your linear amplifier, if used.

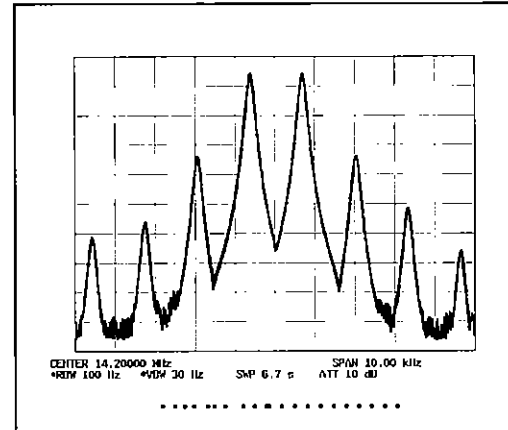
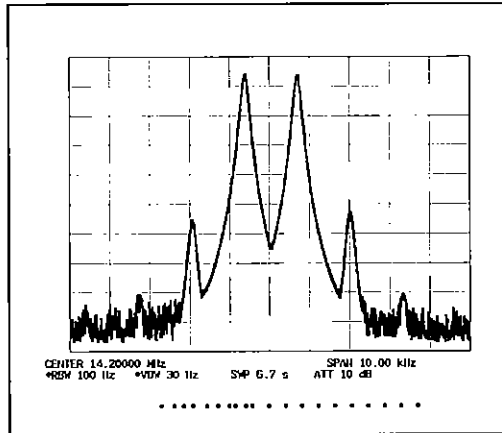


SSB/AM Mode TRANSMISSION (LOW-DISTORTION CLASS-A OPERATION)

LOW-DISTORTION CLASS-A OPERATION

『Quick Point』

- Class-A operation provides a significant improvement in transmitter distortion suppression. During Class-A, the 3rd-order IMD products are typically suppressed 50 dB, while the 5th- and higher-order IMD products (that can cause “splatter” that interferes with others) will typically be suppressed 70 dB or more.
- If you are using a linear amplifier such as the VL-1000, the low distortion produced by the FT dx 9000MP's transmitter means that these intermodulation distortion products will not exist to be amplified by your linear.



○ High-Power 400-Watt Final Amplifier Stage

The final amplifier stage of the FT dx 9000MP utilizes a parallel pair of ST Micro Electronics Corp. SD2931 MOSFET devices operating at 50 Volts. This parallel push-pull configuration provides low distortion along with high power output. The 120 mm thermostatically-controlled cooling fan directs forced air across the heat sink, should the heat sink temperature exceed the temperature that will trigger the thermostat.

SSBIAM MODE TRANSMISSION

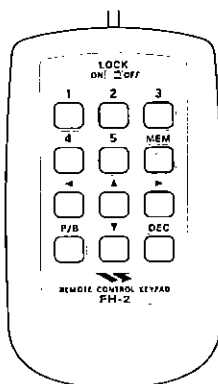
VOICE MEMORY

You may utilize the Voice Memory capability of the FT dx 9000MP by plugging in the supplied FH-2 Remote Control Keypad into the rear panel's [REMOTE] jack.

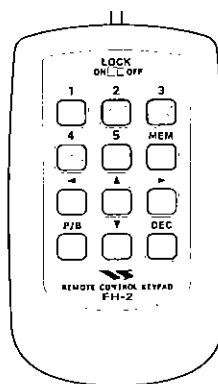
The Voice Memory system includes five memories capable of storing up to 20 seconds of voice audio each. The maximum that any memory can hold is 20 seconds. Please see the diagram depicting connection of the FH-2 Remote Control Keypad on page 15.

Recording Your Own Voice in Memory

1. Select the LSB, USB, AM, or FM mode using the front panel Mode selector switches.
2. Press the [MEM] key on the FH-2.



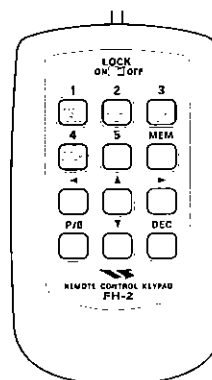
3. Press any of the keys numbered [1] through [5] to select that memory storage register. If you do not press the PTT key (see next step) within five seconds, the memory storage process will be cancelled.



4. Press the microphone's PTT switch, and 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.
5. Press the FH-2 [MEM] key to terminate the message storage process.

Checking Your Recording

1. Be sure that the front panel [MOX] switch (#①) is Off (not pushed in).
2. Press the [1] ~ [5] key (whichever one you just recorded in), and you will hear the contents of the voice memory you just recorded.

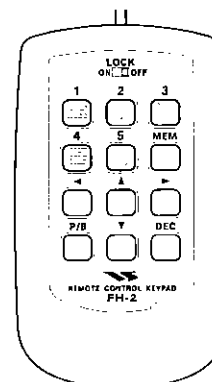


『Advice』

You may rotate the Main (VFO-A) [AF GAIN] control (#⑳) to adjust the playback level of the recording.

Transmitting the Recorded Message

1. Select the LSB, USB, AM, or FM mode using the front panel [MODE] selector switches (#⑳).
2. Press the front panel's [BK-IN/SPOT] switch (#㉔).
3. Press the FH-2 [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.



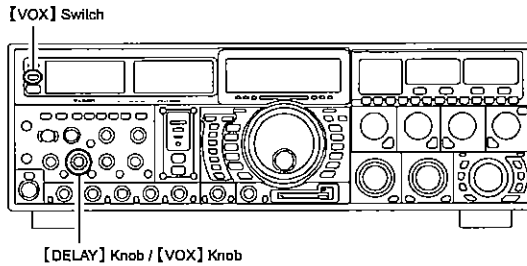
NOTE

CONVENIENT TRANSMITTER ACCESSORIES

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.

- To start, set the [DELAY] and [VOX] controls (#17) fully counter-clockwise (to the left).
- Press the [VOX] switch (#2) to engage VOX operation.
- 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.
 - Do not advance the setting of the [VOX] control too much, because to do so will make the transmitter respond to minor background noises in your station.
- Now stop speaking, and note the amount of time it takes for the receiver to recover. If the hang time is too long or too short; rotate the [DELAY] knob, while speaking briefly into the microphone and then pausing, so as to set the desired hang time. Clockwise rotation of the [DELAY] control will increase the hang time.
- To exit from VOX operation, press the [VOX] switch 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.



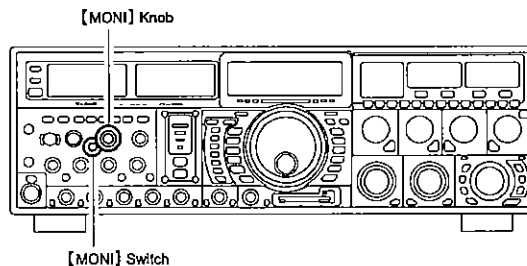
[[Advice]]

VOX operation may be engaged on either Voice modes (SSB/AM/FM) and on AFSK-based Data modes. Use Menu item [TX GNRL 159 VOX SELECT] (the selections are "MIC" and "DATA").

USING THE MONITOR

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

- Press the [MONI] switch (#12). The imbedded Red LED will light up, indicating that the Monitor is turned on.
- During transmission, rotate the [MONI] knob (#13) to adjust the audio level from the Monitor. Clockwise rotation of this knob will increase the volume level.
- To switch the Monitor off again, press the [MONI] switch once more. The Red LED will go out, confirming that the Monitor is now disengaged.



[[Advice]]

- If you are using the speaker for monitoring, instead of headphones, excessive advancement of the [MONI] control 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] control, 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.

CONVENIENT TRANSMITTER ACCESSORIES

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 **[CLAR]** switch (#91). The Red LED imbedded in the switch will light up, and “CLAR” will appear in the Multi Panel Window on the Frequency Display (#53). The **[CLAR/VFO-B]** knob (#97) will now be enabled for offset tuning of the transmitter.

『Advice』

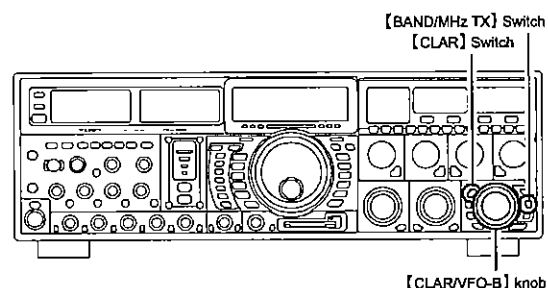
- Please verify that the lamp to the right of the **[CLAR/VFO-B]** knob is not lit up in Umber. If so, this indicates that this knob is currently engaged for Sub (VFO-B) band tuning. If the Umber lamp is lit, press the **[A/B]** switch (#93), then press the **[CLAR]** switch, to engage Clarifier operation.

『Quick Point』

- The Clarifier is frequently used for receiver offset tuning. However, for DX pile-ups where the DX station is using a split of less than 10 kHz, the TX Clarifier function is usually the quickest way to set the transmitter to the desired offset frequency.
2. Press the **[BAND/MHz TX]** switch (#98), located above and to the right of the **[CLAR/VFO-B]** knob. The “TX” notation will appear in the Multi Panel Window on the Frequency Display.
 3. Rotate the **[CLAR/VFO-B]** knob to set the desired transmitter offset. A maximum split of ± 9.99 kHz may be set.

To disengage the transmit Clarifier temporarily, press the **[BAND/MHz TX]** switch once more. The “TX” indication will disappear from the Frequency Display.

To exit from Clarifier operation, press the **[CLAR]** switch once more. The “CLAR” indication will disappear from the Frequency Display.



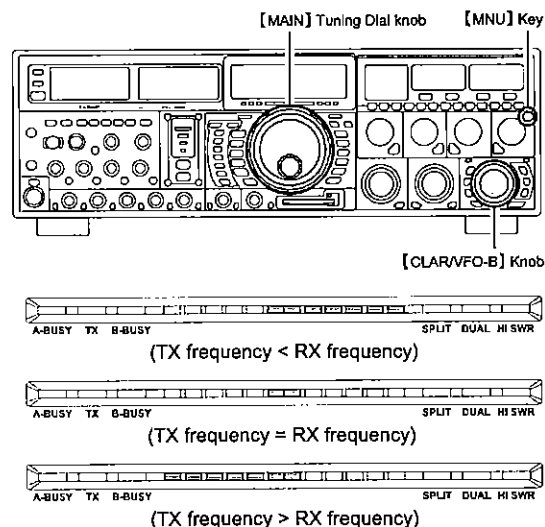
『Advice』

- To listen to the pile-up calling the DX station, so as to find the station currently being worked, you may press the Sub (VFO-B) band's **[RX]** switch (#91): above and to the left of the **[CLAR/VFO-B]** knob. 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 Sub (VFO-B) band's **[RX]** switch 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 Multi Panel window on the Frequency Display.
- 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 **[CLAR]** switch.

Clarifier Offset Bar Indicator

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

1. Press the **[MNU]** key (#85) momentarily. The Menu list will appear on the LCD display.
2. Rotate the **[Main]** Tuning Dial knob (#29) to select Menu item [DISPLAY 016 BAR DISPLAY SELECT].
3. Rotate the **[CLAR/VFO-B]** knob (#97) to select “CLAR” from the available choices; the factory default is “CW-TUNE.”
4. Press and hold in the **[MNU]** key for two seconds to save the new setting and exit to normal operation.



CONVENIENT TRANSMITTER ACCESSORIES

SPLIT-FREQUENCY OPERATION

A powerful capability of the FT DX 9000MP is its flexibility in Split Frequency operation, using the Main (VFO-A) and Sub (VFO-B) frequency registers. This makes the FT DX 9000MP especially useful for high-level DX-pedition use, as the Split operation capability is very advanced and easy to use.

1. Set the Main (VFO-A) frequency as desired.
2. Set the Sub (VFO-B) frequency.
3. Now press the **[SPLIT]** switch (#33). The "Split" mode will be engaged, and the front panel switch/LEDs will look like this:

MAIN(VFO-A)

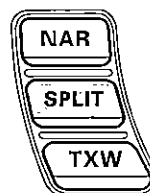
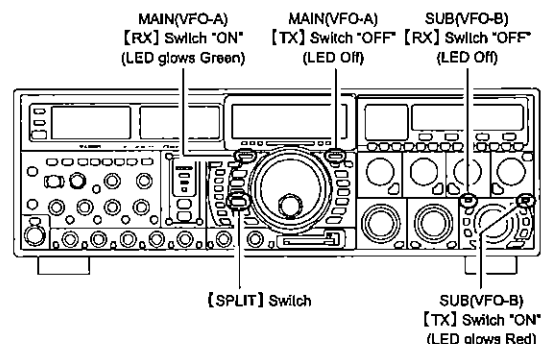
[RX] switch (#27) "ON" (LED glows Green)

[TX] switch (#28) "OFF" (LED Off)

SUB(VFO-B)

[RX] switch (#9) "OFF" (LED Off)

[TX] switch (#92) "ON" (LED glows Red)



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

You may also press the Main (VFO-A) Band's **[TX]** switch located above and to the left of the **[Main]** Tuning Dial knob (#22) to return transmit frequency control to the Main (VFO-A) side, and thereby cancel Split operation.

『Advice』

- During normal (non-split) VFO-A operation, you may simply press the Sub (VFO-B) band's **[TX]** switch (located above and to the right of the **[CLAR/VFO-B]** knob (#67)) to engage Split operation. The **[TX]** indicator will glow Red when you press the switch.
- During Split operation, pressing the **[A ↔ B]** switch (#38) will reverse the contents of the Main and Sub VFOs. Press the **[A ↔ B]** switch once more to return to the original frequency alignment.
- During Split operation, if you press the **[RX]** switch above and to the right of the **[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 Sub (VFO-B) frequency. This is very useful for maintaining the timing of your calls, while also monitoring both sides of the pile-up.
- During Split operation, you may also press the **[TXW]** switch (#34): below and to the left of the Main Tuning Dial) to listen to the TX frequency temporarily.
- It is possible to set different operating modes (for example, LSB and USB) on the two VFOs used during Split operation.
- During Split operation, it also is possible to set the Main and Sub VFOs to different Amateur bands, and it also is possible to engage Crossband Full Duplex operation for multiplier hunting while calling CQ on the "TX" band. See page 100 for a discussion of full duplex operation.

CONVENIENT TRANSMITTER ACCESSORIES

SPLIT-FREQUENCY OPERATION

Quick Split Operation

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

1. Start with regular transceiver operation on the Main (VFO-A) band.

MAIN(VFO-A)

【RX】 switch (#27) "ON" (LED glows Green)

【TX】 switch (#28) "ON" (LED glows Red)

SUB(VFO-B)

【RX】 switch (#91) "OFF" (LED Off)

【TX】 switch (#92) "OFF" (LED Off)

2. Press and hold in the 【SPLIT】 switch (#33) for two seconds to engage the Quick Split feature, and apply a frequency 5 kHz above the Main (VFO-A) frequency to the Sub (VFO-B) frequency register. Press and hold in the 【SPLIT】 switch for two seconds to increment the Main (VFO-A) frequency to +5 kHz.

The VFO configuration will then be:

MAIN(VFO-A)

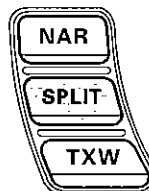
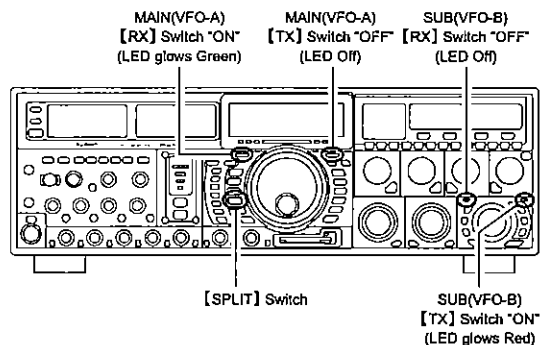
【RX】 switch "ON" (LED glows Green)

【TX】 switch "OFF" (LED Off)

SUB(VFO-B)

【RX】 switch "OFF" (LED Off)

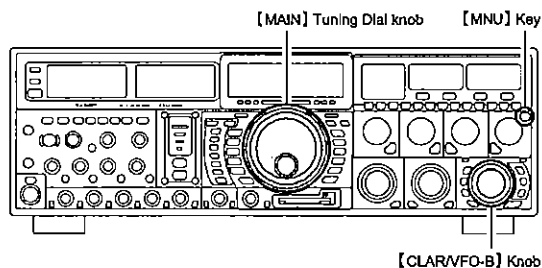
【TX】 switch "ON" (LED glows Red)



『Quick Point』

- The operating mode applied to the Sub (VFO-B) register will be the same as that in use on the Main (VFO-A) register.
- The offset of the Sub VFO from the Main VFO 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 【MNU】 key (#85) momentarily. The Menu list will appear on the LCD display.
2. Rotate the 【MAIN】 Tuning Dial knob (#29) to select Menu item [GENERAL 032 QUICK SPLIT FREQ].
3. Rotate the 【CLAR/VFO-B】 knob (#97) to select the desired offset.
The available selections are
-20kHz ~ 0kHz ~ +20kHz
(factory default: +5 kHz).
4. When you have completed all adjustments, press and hold in the 【MNU】 switch for two seconds to save the new setting and exit to normal operation. If you only press the 【MNU】 key momentarily to exit, any changes you performed will not be stored.



CONVENIENT TRANSMITTER ACCESSORIES

FULL DUPLEX OPERATION

The FT DX 9000MP includes a unique capability among HF transceivers: the ability to operate in a full duplex environment, where by you can transmit on the Main (VFO-A) band while simultaneously tuning around, on a different band, on the Sub (VFO-B) band. This affords the contest operator extra tuning time in search of new contacts and multipliers while calling CQ on the “run” band. This yields “SO2R” (Single Operator, Two Radio) operating capability while using only one transceiver!

To engage Full Duplex crossband operation, set Menu item [TX GNRL 158 FULL DUP] to “DUP” instead of the default “SIMP” selection. To return to normal (non-duplex) operation, return Menu #117 to SIMP.

When Full duplex operation is engaged, you may receive on the Sub (VFO-B) band frequency while transmitting, during dual receive operation, on a different band on the Main (VFO-A) band. This allows you to tune for contacts on 15 meters, for example, while calling CQ on 20 meters during a slow time in a contest. Press the Sub (VFO-B) band [TX] Button/LED (# $\text{\textcircled{2}}$) to switch transmit control to that VFO to call a station, then press the Main (VFO-A) band [TX] Button/LED to return to the “run” band and continue your “CQ” process.

This capability within a single transceiver is a unique feature of the FT DX 9000MP. It relieves you of the need to run separate key, PTT, and other control lines to two different radios from your logging computer.

『 Note 』

Full Duplex operation within the same band (e.g. both Main and Sub VFOs on 20 meters) is not possible.

Important Guidelines for Full Duplex Operation

Remember that, at your station location, the capability exists for damaging RF voltage to be conducted from your transmitting antenna into your receiving antenna during full duplex operation. The exact amplitude will depend on the operating frequency, proximity and polarization alignment of the antennas, and the transmitting power level (including your linear amplifier, if used).

Accordingly, you should take some time, in assembling your station, to ensure that proper isolation exists between your station antenna systems. One way to do this is to connect the “receive” antenna coaxial cable to the “Transmitter” jack of low-power Wattmeter, and connect the “Antenna” jack of the Wattmeter to a 50-Ohm Dummy load. Now transmit on the “TX” antenna you will be using, and observe the deflection (if any) on the low-power Wattmeter connected to the “receive” antenna. For safe operation of the FT DX 9000MP, you should observe “10 mW” or less on the Wattmeter.

Repeat this test for each band and antenna combination that exists at your station. The low bands like 160 and 80 meters should be checked with particular care, as the physical sizes of antennas used on these bands can present very high RF voltages to the front end of a receiver. Remember to rotate directional antennas, and engage all “Upper” and “Lower” combinations in Yagi stacks, so as to account for different possibilities of mutual coupling between antennas.

If excessive power is being induced onto the “Receive” antenna, you will need to investigate and install suitable bandpass filters and/or stubs in order to reduce the induced power to a safe level. Suitable information may be found in radio handbooks, and an excellent treatise is available in the book “Managing Interstation Interference - Coaxial Stubs and Filters” by George Cutsogeorge, W2VJN; information may be found at www.qth.com/inrad/book.htm.

The powerful CW operating capabilities of the FT DX 9000MP include operation using both an electronic keyer paddle and a “straight key” or emulation thereof, as is provided by a computer-based keying device.

NOTE

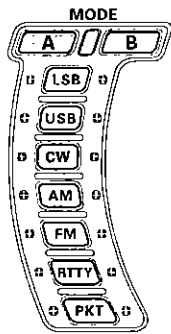
CW MODE OPERATION

SETUP FOR STRAIGHT KEY (AND STRAIGHT KEY EMULATION) OPERATION

Before start, connect your key line to the front and/or rear panel [KEY] jack, and be sure the [KEYER] switch on the left side of the front panel is turned off for now.

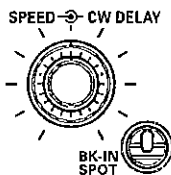
1. Press the [CW] mode switch (#25) to engage CW operation.

- The operating mode is selected using the Mode switches to the left of the tuning dial, and the VFO (A or B) to which the selection is applied is selected by pressing the [A] or [B] switch above the Mode keys (#25). Please be sure you are engaging CW on the right VFO.
- The LED associated with your VFO and CW Mode selection will light up.
- If you press the [CW] key once more, after initially selecting CW, you will engage the “CW Reverse” mode (see page 104), whereby the “opposite” sideband injection is used, compared to the “normal” sideband. The CW LED will blink for three seconds if you select CW Reverse.



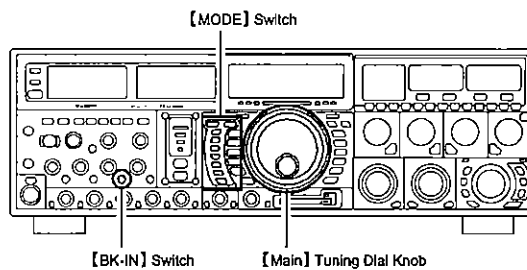
2. Rotate the [MAIN] Tuning Dial knob (#26) to select the desired operating frequency.

3. Press the [BK-IN/SPOT] key (#20) momentarily to engage automatic activation of the transmitter when you close the CW key. The LED imbedded in the [BK-IN/SPOT] switch will light up.



- 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 105.
- As shipped from the factory, the FT DX 9000MP TX/RX system for CW is configured for “Semi-break-in” operation. However, using Menu item [MODE-CW 047 CW BK-IN], you may change this setup for full break-in (QSK) operation, whereby the switching is quick enough to hear incoming signals in the spaces between the dots and dashes of your transmission. This may prove very useful during contest and traffic-handling operations.

4. Operation using your CW key may now proceed.



『Advice』

- You can monitor your sending by pressing the [MONI] key (#12), and adjust the [MONI] control (#13) for a comfortable listening level on the CW sidetone.
- If you set the [VOX] (#2) and [BK-IN/SPOT] key (#20) to Off, you may practice your sending without having the signal go out over the air (sidetone only).

『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 receive 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.

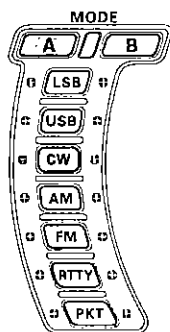
CW MODE OPERATION

USING THE BUILT-IN ELECTRONIC KEYS

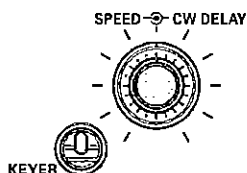
Connect the cable from your keyer paddle to the front or rear panel [KEY] jack.

1. Press the [CW] mode switch (#25) to engage CW operation.

If you press the [CW] key once more, after initially selecting CW, you will engage the “CW Reverse” mode (see page 106), whereby the “opposite” sideband injection is used, compared to the “normal” sideband. The CW LED will blink for three seconds if you select CW Reverse.



2. Rotate the [MAIN] Tuning Dial knob (#29) to select the desired operating frequency.



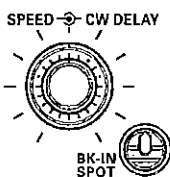
3. Press the [KEYER] switch (#18).

The LED imbedded in the switch will light up, confirming that the built-in Electronic Keyer is now active.

4. Rotate the [SPEED] control (#19) to set the desired sending speed. Clockwise rotation of the [SPEED] control will increase the keying speed.

○ When you press either the “Dot” or “Dash” side of your paddle, the transmitter will automatically be activated.

5. If you press the [BK-IN/SPOT] key (#20) momentarily, “semi-break-in” operation (discussed previously) will be engaged.

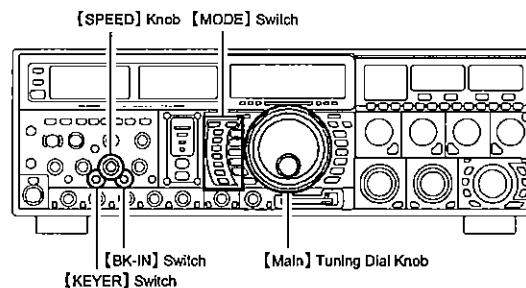


6. CW operation utilizing your paddle may now commence.

○ 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 105.

【Advice】

If you reduce power using the [RF PWR] (#66) control, 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 DX 9000MP TX/RX system for CW is configured for “Semi-break-in” operation. However, using Menu item **MODE-CW 047 CW 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 [MNU] key (#85) to open the Menu.
2. Rotate the [MAIN] Tuning Dial knob (#29) to select Menu item [MODE-CW 047 CW BK-IN].
3. Rotate the [CLAR/VFO-B] knob (#97) to set this Menu item to “FULL.”
4. Press and hold in the [MNU] key for two seconds to save the new setting and exit.

CW MODE OPERATION

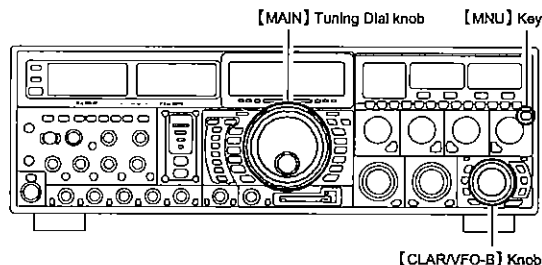
USING THE BUILT-IN ELECTRONIC KEYS

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

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

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

1. Press the **[MNU]** key (#**65**) to enter the Menu mode.
2. Rotate the **[MAIN]** Tuning Dial knob (#**29**) to select Menu item **[MODE-CW 049 CW WEIGHT]**.
3. Rotate the **[CLAR/VFO-B]** key (#**97**) 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 **[MNU]** key for two seconds to save the new setting and exit to normal operation.



Selecting the Keyer Operating Mode

The configuration of the Electronic Keyer may be customized independently for the front and rear **[KEY]** jacks of the FT DX 9000MP. 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 **[MNU]** key (#**65**) to enter the Menu mode.
2. Rotate the **[MAIN]** Tuning Dial knob (#**29**) to select Menu item **[MODE-CW 041 F-KEYER TYPE]** (for the front **[KEY]** jack) or **[MODE-CW 043 R-KEYER TYPE]** (for the rear-panel's **[KEY]** jack).
3. Rotate the **[CLAR/VFO-B]** knob (#**97**) to set the keyer to the desired mode. The available selections are:

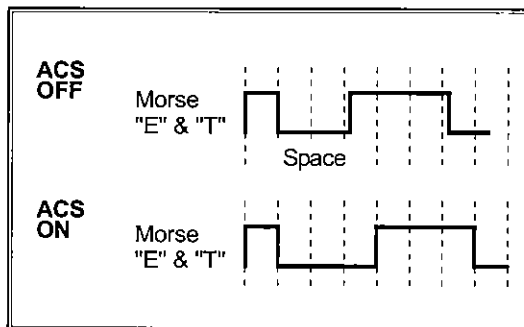
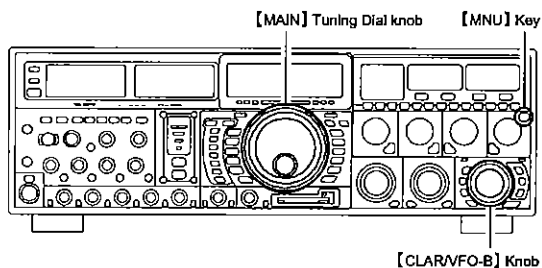
OFF: The built-in Electronic Keyer is turned off ("straight key" mode.)

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 **[MNU]** key 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]** control (#13) 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.

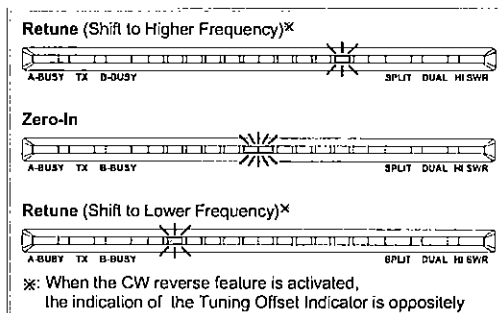
The front panel's Tuning Meter may also be moved so you can adjust your receiver frequency to center the incoming station on the pitch corresponding to that of your transmitted signal.

Using the SPOT System

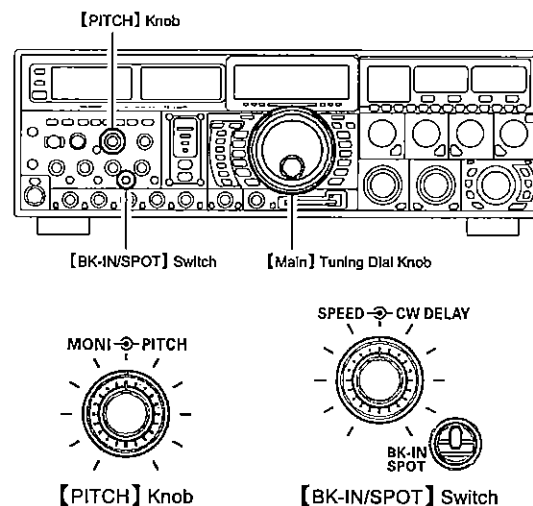
If you press and hold in the front panel's **[BK-IN/SPOT]** key (#20), the Spot tone will be heard. This tone corresponds to the pitch of your transmitted signal, and if you adjust the receiver frequency to match the pitch of the received CW signal to that of the Spot tone, your transmitted signal will be precisely matched to that of the other station.

『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 bar indicator on the front panel may be utilized for CW frequency adjustment, as well. Its configuration is set via Menu item **[DISPLAY 016 BAR DISPLAY SELECT]**; at the factory, the bar indicator is already set up for the “CW TUNE” selection.



- The LED Bar Display can be utilized for a graphical representation of the operation of the CW-TUNE, Clarifier, VRF/ μ -TUNE, or IF Notch function. Use Menu **[DISPLAY 016 BAR DISPLAY SELECT]** to engage the desired display function.



『Quick Point』

- The CW Spotting process utilizes the Spot tone or the bar indicator, with the actual offset pitch being set by the (CW) **[PITCH]** control 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 **[BK-IN/SPOT]** key) or align the receiver frequency so that the central LED on the bar indicator lights up. Note that there are 51 “dots” on the bar indicator, and depending on the resolution selected, the incoming CW signal may fall outside the visible range of the bar indicator, if you are not reasonably close to the proper alignment of tones.
- The displayed frequency, on CW, normally reflects the “zero beat” frequency of your offset carrier. That is, if you were to listen on USB on 14.100.00 MHz to a signal with a 700 Hz offset, the “zero beat” frequency of that CW carrier would be 14.000.70 MHz; the latter frequency is what the FT dx 9000MP displays, by default. However, you can change the display to be identical to that of what you would see on SSB by using Menu item **[MODE-CW 050 CW-FREQ DISPLAY]** and setting it to “FREQ” instead of its default “PITCH” setting.

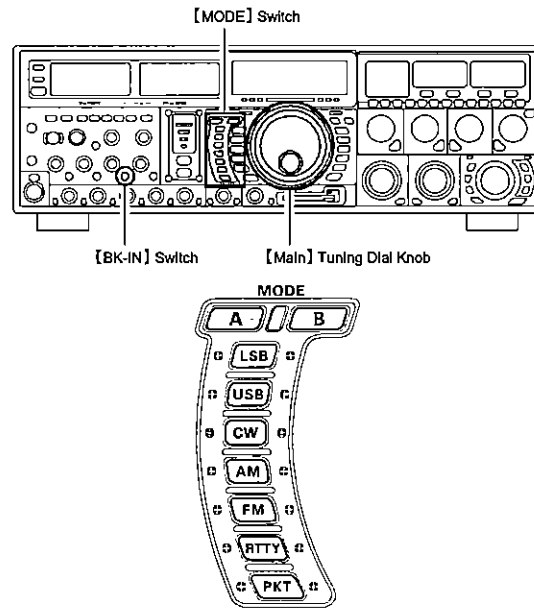
CW CONVENIENCE FEATURES

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.

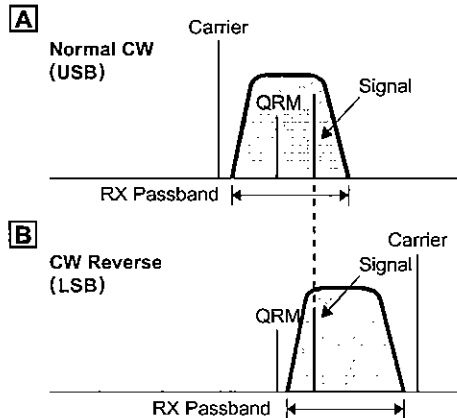
1. To start, let's use a typical example where you have set the CW mode (using the default "USB" injection) onto the Main (VFO-A) receiver.
2. Now be sure your mode selection is still set for the Main (VFO-A) register, and press the **[CW]** mode key (#**25**) once more. The "LSB" LED will blink for three seconds, indicating that the "LSB" injection side has now been selected.
3. When using Dual Receive, just press the **[B]** Mode key (#**25**), then press the **[CW]** key to engage CW Reverse on the Sub (VFO-B) receiver, in exactly the same way as for the Main receiver.

Press the **[CW]** mode key once more to return to the normal (USB) injection side and cancel CW Reverse operation.



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.

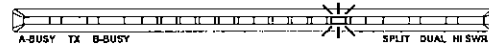


『Note』

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

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

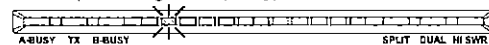
Retune (Shift to Lower Frequency)



Zero-In



Retune (Shift to Higher Frequency)



CW CONVENIENCE FEATURES

CW DELAY TIME SETTING

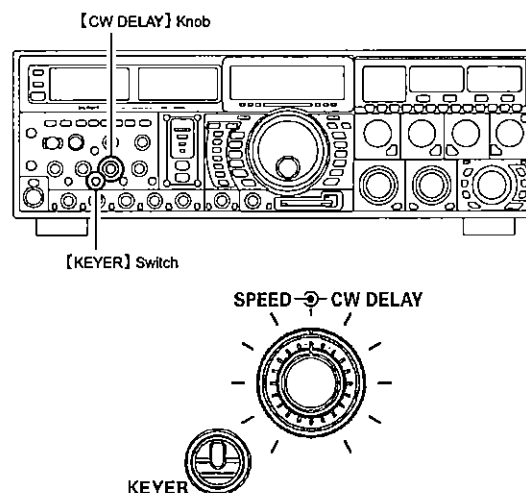
During semi-break-in (not QSK) operation, the hang time of the transmitter, after you have finished sending, may be adjusted to a comfortable value consistent with your sending speed. This is the functional equivalent to the “VOX Delay” adjustment used on voice modes; however, this is an independent adjustment used on CW, so you don’t have to change the delay when changing from Voice to CW.

The delay may be varied anywhere between 0 seconds ([CW DELAY] knob set fully counter-clockwise) to 5 seconds (fully clockwise).

1. Press the **[BK-IN/SPOT]** key (#20) momentarily to enable CW transmission (Menu item [MODE-CW 047 CW BK-IN] must be set to “SEMI”).
2. Start sending, and adjust the **[CW DELAY]** knob (#19) so that the hang time is as you prefer for comfortable operation.

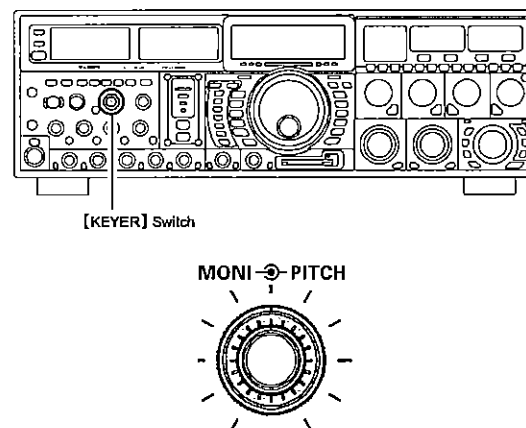
『Quick Point』

The CW Delay feature is the functional equivalent to the “VOX Delay” adjustment used on voice modes; however, this is an independent adjustment used on CW, so you don’t have to change the delay when changing from Voice to CW.



CW PITCH ADJUSTMENT

Rotation of the front panel’s **[CW PITCH]** control (#13) will allow adjustment of the center frequency of the receiver passband, as well as the pitch of your offset CW carrier, to the tone you prefer. The tone may be varied between 300 Hz and 1050 Hz, in 50 Hz steps.



『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 KEYER

The rise and fall times of the CW envelope may be adjusted using the Menu. The default setting of 4 ms. is ideal for most operation, as it produces a nicely “rounded” shape to the CW character. However, the rise and fall times may be adjusted to 1/2/4/6 ms, as desired, using Menu item [MODE-CW 048 CW WAVE SHAPE]. We generally do not recommend adjustment of this parameter, but if you are using a linear amplifier that is causing some sharpening of the CW character, you may wish to try the 6 ms setting. Too fast a rise/fall time can produce “hard” keying that borders on the creation of key clicks.

Contest Memory Keyer

The supplied FH-2 Remote Control Keypad may be used as a control keypad for the automatic sending of CW messages (as you might do in a contest).

Two techniques for message storage are available: you may either send the desired message contents using your keyer paddle (“Message Memory”), or you may input the text characters using the LCD display (“Text Memory”).

See page 15 for details regarding interconnection of the FH-2.

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 (14 characters)

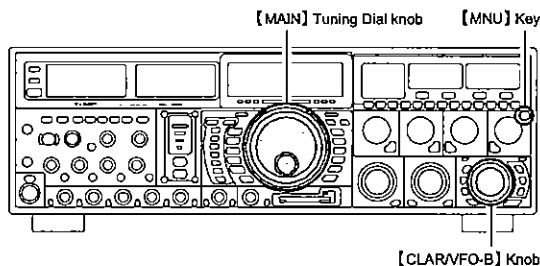
-. . - . - . - . . . - . . . - . . . - . . . - . . . - . . . - . . . - . . . - . . . - . . . - . . .
(C) (Q) (C) (Q) (C) (Q) (D) (E) (W) (6) (D) (X) (C) (K)

Storing a Message into Memory

1. Press the [MNU] key (#25) to enter the Menu mode.
2. Rotate the [MAIN] Tuning Dial knob (#23) 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 or Text entry).

FH-2SET 023 CW MEMORY 1
FH-2SET 024 CW MEMORY 2
FH-2SET 025 CW MEMORY 3
FH-2SET 026 CW MEMORY 4
FH-2SET 027 CW MEMORY 5

3. Rotate the [CLAR/VFO-B] knob (#97) 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 (#023 ~ 027) to “MESSAGE.”
4. Press and hold in the [MNU] key to save the new settings and exit.



『Terminology』

PARIS Word Length

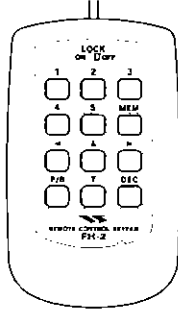
By convention in the Amateur industry (utilized by ARRL and others), the length of one “word” of CW is defined as the length of the Morse Code characters spelling the word “PARIS.” This character (dot/dash/space) length is used for the rigorous definition of code speed in “words per minute.”

CW CONVENIENCE FEATURES

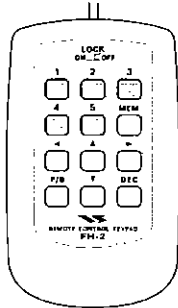
CONTEST MEMORY KEYER

Message Memory Programming (Using Your Paddle)

1. Press the **[CW]** Mode key (#25) to set the operating mode to CW.
2. Set the **[BK-IN/SPOT]** switch (#20) to Off.
3. Turn the internal Electronic Keyer On by pressing the **[KEYER]** switch (#18), 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.

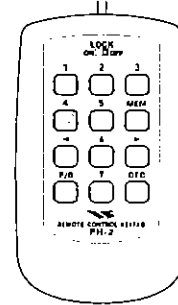
【Note】

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 [MODE-CW 041 F-KEYER TYPE] (KEYER FRONT) and/or [MODE-CW 043 R-KEYER TYPE] (KEYER REAR) to "ACS" (Automatic Character Spacing) while you are programming the keyer memories.

Checking the CW Memory Contents

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

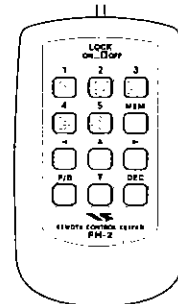


On-The-Air CW Message Playback

1. Press the **[BK-IN/SPOT]** key (#20) to enable transmission. Either Full- or Semi-break-in will be engaged, depending on the setting of Menu item [MODE-CW 047 CW 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" 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" on a particular memory register.



Transmitting in the Beacon Mode

It is possible to transmit, repetitively in a "Beacon" mode, any message programmed either via paddle input or via the "Text" input method. The time delay between message repeats may be set anywhere between 0 and 255 seconds via Menu item [FH-2 SET 021 BEACON TIME]. If you do not wish the message to repeat in a "Beacon" mode, please set this Menu item to "Off."

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

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

Now we will utilize another powerful feature of the CW Memory Keyer, the sequential contest number (“Countup”) feature.

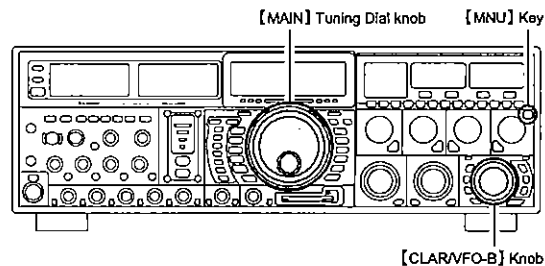
『Example 2』: 599 10 200 # K} (15 characters)

Text Memory Storage

1. Press the [MNU] key (#85) to enter the Menu mode.
2. Rotate the [MAIN] Tuning Dial knob (#79) to select the CW Memory Register into which you wish to store the message; for now, we are just selecting the message entry technique (Text entry).
 - FH-2SET 023 CW MEMORY 1
 - FH-2SET 024 CW MEMORY 2
 - FH-2SET 025 CW MEMORY 3
 - FH-2SET 026 CW MEMORY 4
 - FH-2SET 027 CW MEMORY 5
3. Rotate the [CLAR/VFO-B] knob (#97) to set the selected Memory Register to “TEXT.” For the second example, to be applied to Memory Register 5, select “COUNTUP” instead of “TEXT.”
4. Press and hold in the [MNU] key for two seconds to save the new settings and exit.

『Advice』

By referring to the chart, you may view the characters available for message entry (both capital and small letters, plus numbers and a few punctuation marks, are available).



TEXT	CW	TEXT	CW
!	SN	.	AAA
"	AF	/	DN
\$	SX	:	OS
%	KA	:	KR
&	AS	=	BT
'	WG		SK
(KN	?	IMI
)	KK	\	HH
+	AR	*	AL
,	MIM	-	IQ
-	DU		

Note that some punctuation and other marks (• ^) are listed, but they are displayed only and cannot be transmitted.

Contest Number Programming

Use this process if you are starting a contest, or of you somehow get out of sync with the proper number in the middle of a contest.

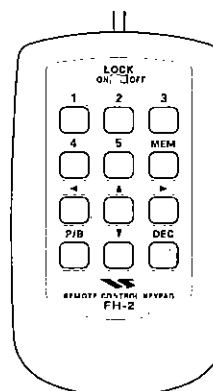
1. Press the FH-2's [DEC] key. The current Contest Number will be displayed on the Frequency Display.
2. Rotate the Main Tuning Dial to set the Contest Number to the desired value.
3. Press the [DEC] key once more to store the new number.

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] key as many times as necessary to reach the desired number. If you go too far, use the “Contest Number Programming” technique described above.

0001
ContEst

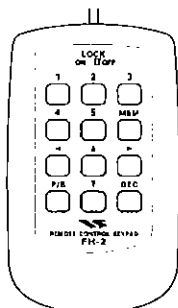


CW CONVENIENCE FEATURES

CONTEST MEMORY KEYS

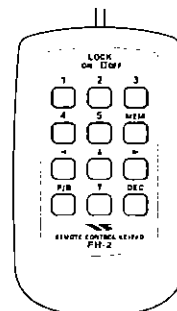
Text Message Programming

1. Press the **[CW]** Mode key (#25) to set the operating mode to CW.
2. Be sure that Break-in is Off by pressing the **[BK-IN/SPOT]** key (#20), if necessary.
3. Press the FH-2's **[MEM]** key.

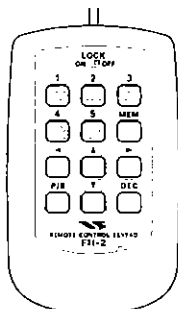


Checking the CW Memory Contents

1. Be sure that Break-in is still turned Off.
2. 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.

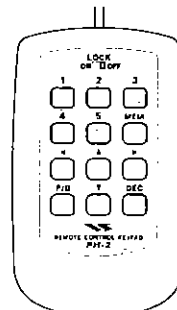


4. Press the FH-2's **[1] ~ [5]** key to select the desired Message Memory Register into which you wish to program the text.

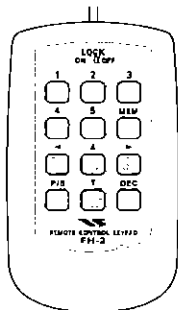


On-The-Air CW Message Playback

1. Press the **[BK-IN/SPOT]** key (#20) to enable transmission. Either Full- or Semi-break-in will be engaged, depending on the setting of Menu item **[MODE-CW 047 CW BK-IN]**.
2. Press the FH-2's **[1] ~ [5]** key to transmit the programmed message.



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



『Advice』

You may also use the **[MAIN]** Tuning Dial knob (#29) and the **[CLAR/VFO-B]** knobs (#27) to program the message characters.

6. Press the FH-2's **[MEM]** key again once all characters have been programmed.

『Note』

If you subsequently decide to use the “MESSAGE” 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” on a particular memory register.

Correcting/Editing Previously-Stored Characters

Use the Main tuning dial to select the letter/number to be corrected, then rotate the **[CLAR/VFO-B]** knob (#27) to choose the revised letter/number to be utilized in this slot.

Deleting Previously-stored Characters

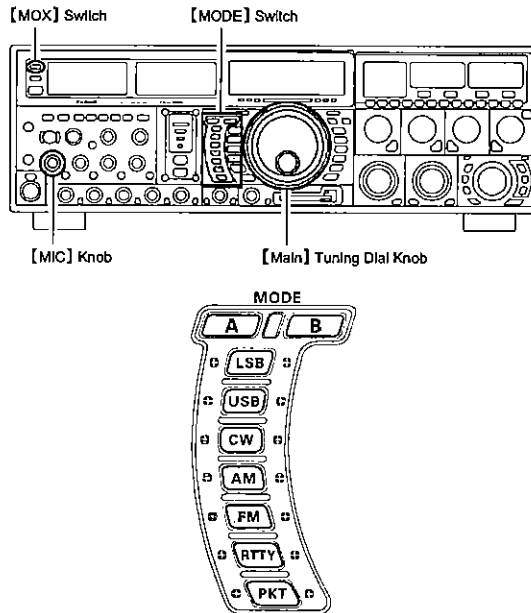
Use the **[MAIN]** Tuning Dial knob (#29) to select the last correct letter in the message. Now rotate the **[CLAR/VFO-B]** knob to select the “}” character; everything after the “}” character will be deleted.

FM MODE OPERATION

1. Press the **[FM]** mode key (#25) to select the FM operating mode.
 - Be sure that the FM mode is being selected on the proper VFO; check the status of the **[A]** and **[B]** switches (#23) above the mode selection keys before making your mode selection.
 - The LED (Red or Orange) corresponding to the VFO on which you selected FM (Main or Sub, respectively), will light up.
2. Rotate the **[MAIN]** Tuning Dial knob (#29) (in the case of Main (VFO-A) operation) to select the desired operating frequency. If using the optional MD-200A8X Desk Microphone, pressing the **[UP]** or **[DOWN]** button will cause frequency change in 5 kHz steps.
3. Press the microphone's PTT switch (or press the front panel **[MOX]** switch (#1)) 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 **[MODE-FM 058 FM MIC GAIN]**, you may set a different fixed value, or choose the "MCVR" option, which then lets you use the front panel **[MIC]** control (#15) to set the microphone gain in the FM mode. The microphone gain should be set such that deflection of the ALC meter goes all the way to the right side of the ALC meter scale.

『Advice』

- The FH-2 may be used, in the FM mode, for storage of voice memory messages. See page 94.
- FM is only used in the 28 MHz and 50 MHz Amateur bands covered in the FT DX 9000MP. Please do not use FM on any other bands.
- Reduction of the setting of the **[RF PWR.]** knob (#66) will cause the deflection of the ALC meter to increase; this is normal.



FM MODE OPERATION

REPEATER OPERATION

The FT DX 9000MP may be utilized on 29 MHz and 50 MHz repeaters.

1. Rotate the **[MAIN]** Tuning Dial knob (#29) to the output frequency (downlink) from the repeater.
2. If CTCSS Tone operation is desired/needed, press and hold in the **[FM]** Mode key (#25) for two seconds to engage the CTCSS mode.
3. Rotate the **[MAIN]** Tuning Dial knob to select the desired CTCSS mode. If you just need to send the uplink encoding tone, select "tn." For encode/decode operation, choose "ts" instead.

The available choices are

"OFF" → "tn" → "ts" → "OFF."

4. Rotate the **[CLAR/VFO-B]** knob (#67) to select the desired CTCSS Tone to be used. A total of 50 standard CTCSS tones are provided (see the CTCSS Tone Chart).

5. Press the **[FM]** Mode key to select the desired repeater shift direction. The selections are:

"S" → "+" → "-" → "S"

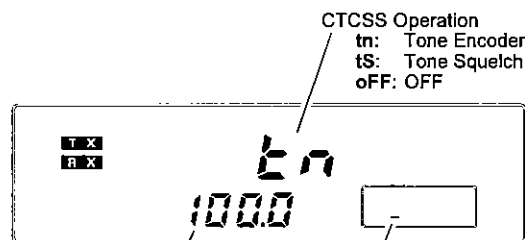
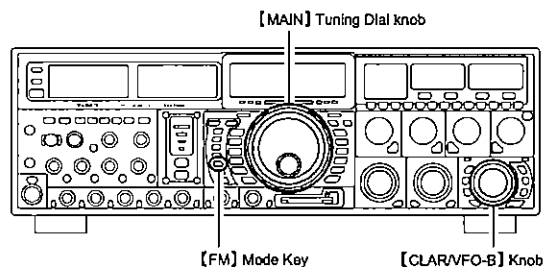
where "S" represents "Simplex" operation (not used on a repeater).

6. Press and hold in the **[FM]** Mode key for two seconds to exit from the repeater setup mode.

7. Close the microphone's PTT switch (or press the **[MOX]** switch (#1)) 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 or **[MOX]** switch to return to the receive mode.

『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 kHz (or more). To program the proper repeater shift, use Menu items **[MODE-FM 060 RPT SHIFT (28 MHz)]** and **[MODE-FM 061 RPT SHIFT (50 MHz)]**, as appropriate.



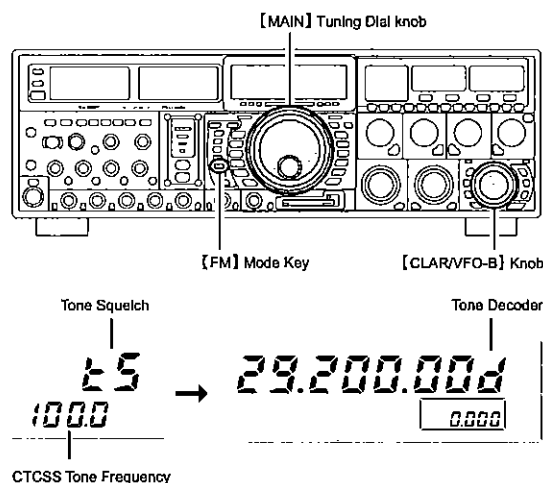
CTCSS Operation
tn: Tone Encoder
ts: Tone Squelch
oFF: OFF

CTCSS Tone Frequency Repeater Shift Direction
S: Simplex
-: Minus Shift
+: Plus Shift

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	254.1	••	••	••	••	••	••

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

1. Rotate the **[MAIN]** Tuning Dial knob (#29) to the output frequency (downlink) from the repeater.
2. Press and hold in the **[FM]** Mode key (#25) for two seconds to engage the CTCSS mode.
3. Rotate the **[MAIN]** Tuning Dial knob to choose "ts." The available choices are "OFF" → "tn" → "ts" → "OFF."
4. Rotate the **[CLAR/VFO-B]** knob (#67) to select the desired CTCSS Tone to be used. A total of 50 standard CTCSS tones are provided (see the CTCSS Tone Chart).
5. Press and hold in the **[FM]** Mode key for two seconds. On the display, just below the "1 Hz" frequency digit, a small "d" will indicate that the Tone Decoder is engaged.



CONVENIENT MEMORY FUNCTIONS

The FT dx 9000MP contains ninety-nine regular memories, labeled "01" through "99," nine special programmed limit memory pairs, labeled "P-1L/1U" through "P-9L/9U," and five QMB (Quick Memory Bank) memories, labeled "C1" ~ "C5." Each stores various settings, not only the main band's (VFO-A) frequency and mode (See below). By default, the 99 regular memories are contained in one group; however, they can be arranged in up to six separate groups, if desired.

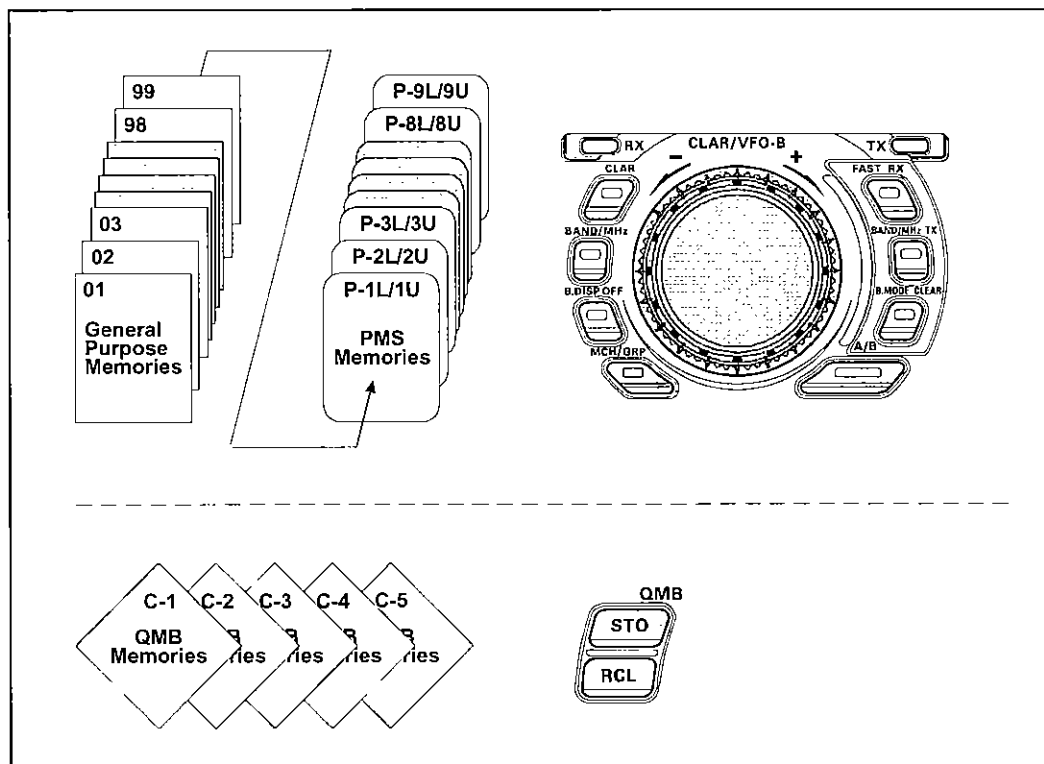
【Quick Point】

The FT dx 9000MP's memory channels store the following data (not just the operating frequency):

- Frequency
- Mode
- Clarifier status and its Offset Frequency
- ANT status
- IPO 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 (NTCH) status
- NAR bandwidth status
- DSP Auto Notch filter (DNF) status
- Repeater Shift Direction and Shift Frequency
- CTCSS status and Tone Frequency

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

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



QMB (QUICK MEMORY BANK)

The Quick Memory Bank is comprised of five memories (labeled "C1" ~ "C5") independent from the regular and PMS memories. These can quickly store operating parameters for later recall.

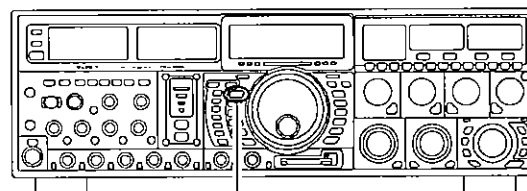
QMB CHANNEL STORAGE

1. Tune to the desired frequency on the Main (VFO-A) band.
2. Press the blue (QMB) **[STO]** key (#**26**). The "beep" will confirm that the contents of the Main (VFO-A) band have been written to the currently-available QMB memory.

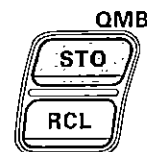
If you repeatedly press the (QMB) **[STO]** key, the QMB memories will be written in the following order:

C-2 → C-3 → C-4 → C-5 → C-1

Once all five QMB memories have data on them, previous data (starting with channel C1) will be over-written on a first-in, first-out basis.



[QMB STO] key



QMB CHANNEL RECALL

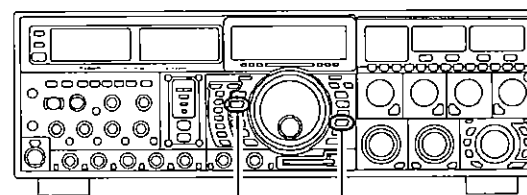
1. Press the (QMB) **[RCL]** key (#**25**). The display will indicate "QMB" and the current QMB channel's data will be shown on the main frequency display field.
2. Repeatedly pressing the (QMB) **[RCL]** key will toggle you through the QMB channels:

C-2 → C-3 → C-4 → C-5 → C-1

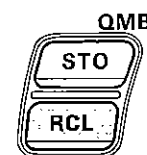
Press the **[V/M]** key (#**45**) to return to the VFO or Memory mode.

『Advice』

Rotating the **[MAIN]** Tuning Dial knob (#**29**), or changing the operating mode, will place the transceiver in the "Memory Tune" mode, which is a temporary "pseudo-VFO" method of tuning off of a stored memory channel. If you do not over-write the contents of the current memory channel, the original contents will not be disturbed by the initiation of Memory Tune operation.



[QMB RCL] key [V/M] key



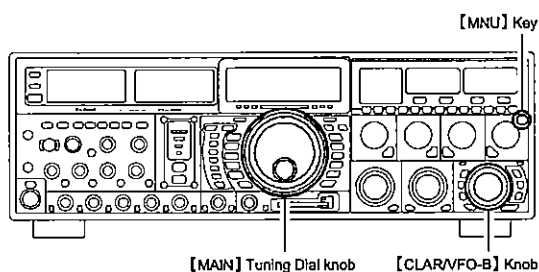
MEMORY GROUPS

MEMORY GROUP ASSIGNMENT

1. Press the **[MNU]** key (#**65**) to enter the Menu mode.
2. Rotate the **[MAIN]** Tuning Dial knob (#**25**) to select Menu item **[GENERAL 031 MEM GROUP]**.
Rotate the **[CLAR/VFO-B]** knob (#**97**) to set this Menu item to "ENABLE" (the default setting is "DISABLE").
3. Press and hold in the **[MNU]** key 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 (3) above, choosing "DISABLE" in step (2).

『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	
Groups Memory "OFF"	Groups 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

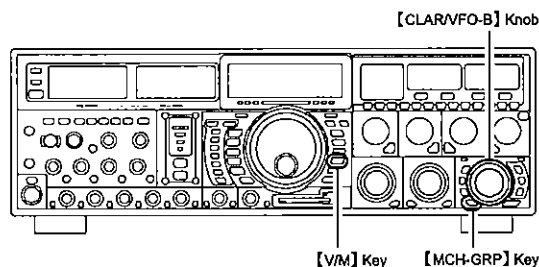
You may recall memories just within a particular Memory Group, if desired.

1. Press the **[V/M]** key (#**45**), if necessary, to enter the Memory mode.
2. Press and hold in the **[MCH/GRP]** key (#**66**) (below and to the left of the **[CLAR/VFO-B]** knob (#**97**)) for two seconds. The imbedded LED inside the switch will light up.
3. Rotate the **[CLAR/VFO-B]** knob to select the desired Memory Group.

To exit from Memory Group operation, press and hold in the **[MCH/GRP]** key for two seconds once more.

『Advice』

- You will now be operating using memories only within the selected Memory Group.
- If no channels have been assigned to a particular Memory Group, you will not have access to that Group.

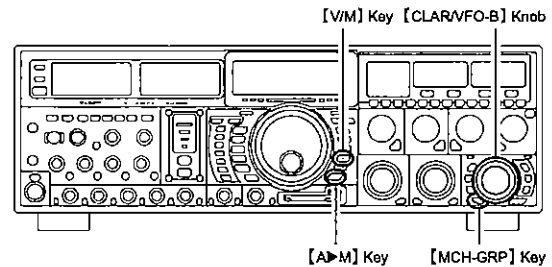


MEMORY OPERATION

The memory system of the FT DX 9000MP allows storage and recall of up to 99 memories, each storing frequency, mode, and a wide variety of status information detailed previously. Memories may be grouped into as many as six Memory Groups, and additionally you get nine pairs of band-limit (PMS) memories along with five QMB (Quick Memory Bank) memories.

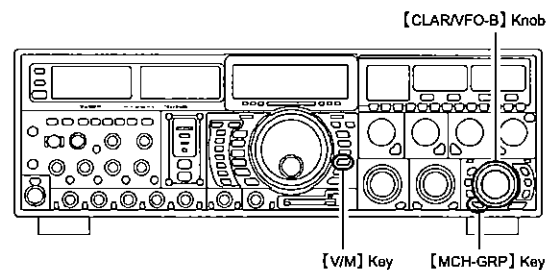
MEMORY STORAGE

1. Set the Main (VFO-A) band up with all frequency, mode, and status the way you want to have it stored.
2. Press the **[A▶M]** button (#41) momentarily (the current channel number will start blinking); the contents of the current memory channel will be shown on the Sub (VFO-B) display field.
3. Press the **[MCH/GRP]** key (#55) momentarily. When you press the **[MCH/GRP]** key, the Red LED imbedded within the switch should light up, indicating that you are ready to choose a channel into which to store the data.
『Advice』
 If the Red LED imbedded in the **[MCH/GRP]** key does not light up, check to be sure that the orange lamp to the right of the **[CLAR/VFO-B]** knob (#97) is not illuminated. If it is, press the **[A/B]** switch (#131) to make it go out, then press the **[MCH/GRP]** key again.
4. 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 (VFO-B) band's frequency display field.
5. Press and hold in the **[A▶M]** key 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]** key in long enough.



MEMORY CHANNEL RECALL

1. Press the **[V/M]** key (#39), if necessary, to enter the Memory mode. A memory channel number will appear in the multi-panel window.
2. Press the **[MCH/GRP]** key (#55) momentarily. The Red LED inside the switch will light up, indicating that you are ready to recall a memory channel.
『Advice』
 If the Red LED imbedded in the **[MCH/GRP]** key does not light up, check to be sure that the orange lamp to the right of the **[CLAR/VFO-B]** knob (#97) is not illuminated. If it is, press the **[A/B]** switch (#131) to make it go out, then press the **[MCH/GRP]** key again.
3. After pressing the **[MCH/GRP]** key, you may rotate the **[CLAR/VFO-B]** knob to select the desired memory channel.



『Advice』

To work within a particular Memory Group, press and hold in the **[MCH/GRP]** key for two seconds. The imbedded LED will glow Orange; now press the **[MCH/GRP]** key momentarily, and the LED will change to Red; you may now choose the channel within the selected Memory Group.

MEMORY OPERATION

MEMORY CHANNEL RECALL

Checking a Memory Channel's Status

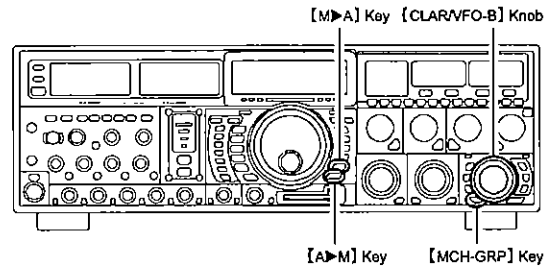
Before programming a channel into memory, you can check the current contents of that channel without the danger of over-writing the data accidentally.

1. Press the **[MCH/GRP]** key (#**66**) momentarily. The imbedded LED will glow Red, indicating that you are now ready to view memory channel contents.

『Advice』

If the Red LED imbedded in the **[MCH/GRP]** switch does not light up, check to be sure that the orange lamp to the right of the **[CLAR/VFO-B]** knob (#**67**) is not illuminated. If it is, press the **[A/B]** switch (#**31**) to make it go out, then press the **[MCH/GRP]** key again.

2. Press the **[A▶M]** key (#**41**). The data stored in the currently-selected memory channel will be displayed in the Sub (VFO-B) band frequency field. However, since you are only checking the contents of the memory channel, your radio will not have moved to the memory channel's frequency.
3. Rotate the **[CLAR/VFO-B]** knob to select other memory channels. To exit from the Memory Check mode, press the **[A▶M]** key once more.



『Advice』

- While the Memory Check function is engaged, the memory channel number will blink.
- While operating in the VFO mode, using Memory Check, you may store the current contents of the VFO into the selected memory by pressing and holding in the **[A▶M]** key for two seconds (until the double beep). Conversely, if you wish to write the contents of the current memory into the Main (VFO-A) register, press and hold in the **[M▶A]** key (#**49**) for two seconds.

ERASING MEMORY CHANNEL DATA

1. Press the **[MCH/GRP]** key (#**66**) momentarily. The imbedded LED will glow Red, indicating that you are now ready to view memory channel contents.

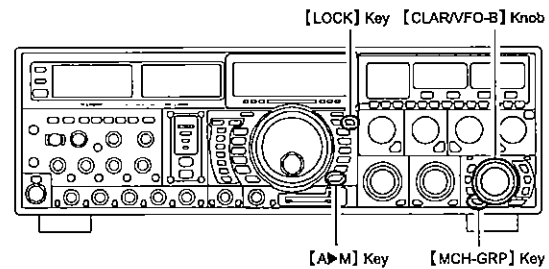
『Advice』

If the Red LED imbedded in the **[MCH/GRP]** switch does not light up, check to be sure that the orange lamp to the right of the **[CLAR/VFO-B]** knob (#**67**) is not illuminated. If it is, press the **[A/B]** switch (#**31**) to make it go out, then press the **[MCH/GRP]** key again.

2. Press the **[A▶M]** key (#**41**). The data stored in the currently-selected memory channel will be displayed in the Sub (VFO-B) band frequency field.
3. Rotate the **[CLAR/VFO-B]** knob to select the memory channel that you would like to erase.
4. Press the **[LOCK]** switch (#**31**) 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.

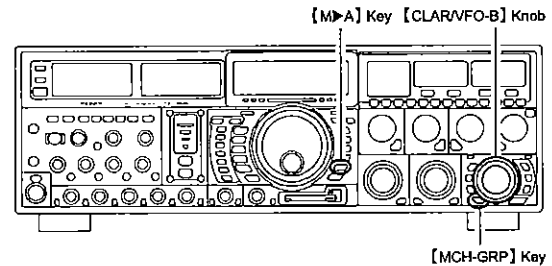


MEMORY OPERATION

MOVING MEMORY DATA TO THE MAIN (VFO-A) BAND

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

1. Press the **[V/M]** switch (#43), as necessary, to go to the Memory mode. The memory channel number will appear in the multi-panel window.
2. Press the **[MCH/GRP]** key (#46) momentarily. The Red LED inside the switch will light up, indicating that you are ready to recall a memory channel.
『Advice』
 If the Red LED imbedded in the **[MCH/GRP]** switch does not light up, check to be sure that the orange lamp to the right of the **[CLAR/VFO-B]** knob (#37) is not illuminated. If it is, press the **[A/B]** switch (#33) to make it go out, then press the **[MCH/GRP]** key again.
3. Rotate the **[CLAR/VFO-B]** knob to select the memory channel the contents of which you wish to transfer to the Main (VFO-A) band.
4. Press and hold in the **[M▶A]** key (#40) for two seconds, until you hear the double beep. The data in the selected memory channel will now be transferred to the Main (VFO-A) band.



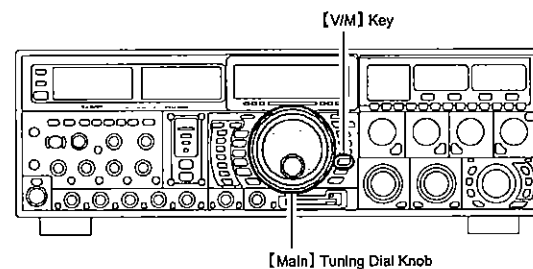
『Advice』

This transfer of data to the Main (VFO-A) band 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]** switch (#43) to recall any memory channel.
2. Rotate the **[MAIN]** Tuning Dial knob (#23); you will now observe that the memory channel’s frequency is changing.
 - “**MT**” will replace “**MR**” in the multi-panel window, indicating you are in the “Memory Tune” mode.
 - During Memory Tune operation, you may change operating modes, and engage and offset the Clarifier, if desired.
 Press the **[V/M]** switch momentarily to return to the originally-memorized frequency of the current memory channel. One more press of the **[V/M]** key will return you to VFO operation.



『Note』

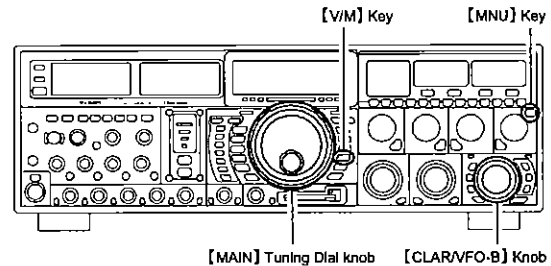
Computer software programs utilizing the CAT system interface port may presume that the transceiver is operating in the VFO mode for certain features like “band mapping” and/or frequency logging. Because the “Memory Tune” mode so closely resembles the VFO mode, be sure that you have the FT DX 9000MP operating in a control mode compatible with your software’s requirements. Use the VFO mode if you’re not sure.

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 FT dx 9000MP 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 **[MNU]** key (#85) to enter the Menu mode.
2. Rotate the **[MAIN]** Tuning Dial knob (#39) to select **[TX GNRL 160 EMERGENCY FREQ TX]**.
3. Rotate the **[CLAR/VFO-B]** knob (#97) select "ENABLE."
4. Press and hold in the **[MNU]** key for 2 second to save the new setting and exit to normal operation. Emergency communication on this spot frequency is now possible.
5. Press the **[V/M]** key (#39), as necessary, to enter the Memory mode, then rotate the **[CLAR/VFO-B]** knob to select the emergency channel (M-EMG), which is found between channels "P-9U" and "01."



Note that the receive-mode CLARIFIER functions normally while using this frequency, but variation of the transmit frequency is not possible. Activation of **[TX GNRL 160 EMERGENCY FREQ TX]** does not enable any other out-of-amateur-band capability on the transceiver. The full specifications of the FT dx 9000MP 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 **[TX GNRL 160 EMERGENCY FREQ TX]** to "OFF" in step 3.

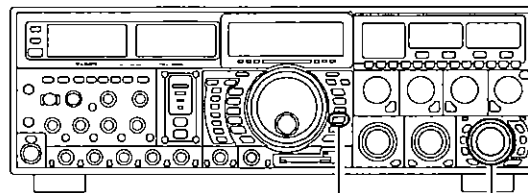
In an emergency, note that a half-wave dipole cut for this frequency should be approximately 45'3" on each leg (90'6" total length). Emergency operation on 5167.5 kHz is shared with the Alaska-Fixed Service. This transceiver is not authorized for operation, under the FCC's Part 87, for aeronautical communications.

OPERATION ON THE 60-METER BAND (U.S. VERSION)

The recently-released 60-meter band is covered, in the FT DX 9000D, by five special, fixed memory channels. These channels are set to USB, and they appear between the "last" PMS channel ("P9U") and the first "regular" memory channel (Channel 1).

The five channels are:

Channel Number	Frequency
US1	5.332.000 MHz
US2	5.348.000 MHz
US3	5.368.000 MHz
US4	5.373.000 MHz
US5	5.405.000 MHz



[V/M] Key [CLAR/VFO-B] Knob

To operate on the 60-meter band channels, press the **[V/M]** key (#39), if necessary, to enter the Memory mode, then rotate **[CLAR/VFO-B]** knob (#97) to select the desired channel from the above selections.

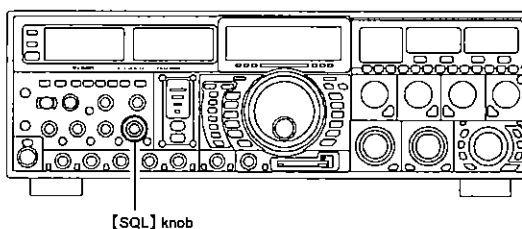
Be sure to observe all current regulations regarding Effective Radiated Power (E.R.P.) while operating on the 60-meter band.

VFO AND MEMORY SCANNING

You may scan with the VFO or the memories of the FT DX 9000MP, and the radio will halt the scan on any station with a signal strong enough to open the receiver's squelch.

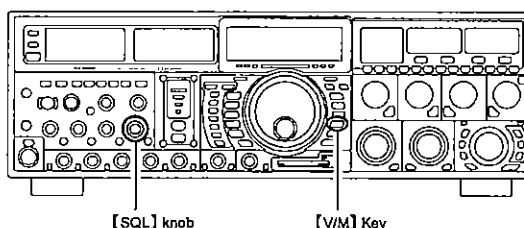
VFO SCANNING

1. Set the Main (VFO-A) band VFO to the frequency on which you would like to begin scanning.
2. Rotate the Main (VFO-A) receiver's **[SQL]** control (#2) so that the background noise is just silenced.
3. Press and hold in the microphone's **[UP]** or **[DOWN]** key for 2 second to start scanning in the specified direction.
 - If the scanner halts on an incoming signal, the decimal point between the "MHz" and "kHz" digits of the frequency display will blink.
 - If the incoming signal disappears, scanning will resume in about five seconds.
 - On the SSB/CW and SSB-based Data modes, the scanner will pause on a received signal, then will step across the signal very slowly, giving you time to stop the scan, if you like. In these modes on the VFO, the scanner does not stop, however.



MEMORY SCAN

1. Set the transceiver up in the memory mode by pressing the **[VM]** key (#19), if necessary.
2. Rotate the Main (VFO-A) receiver's **[SQL]** control (#2) so that the background noise is just silenced.
3. Press and hold in the microphone's **[UP]** or **[DOWN]** key for 2 second to start scanning in the specified direction.
 - If the scanner halts on an incoming signal, the decimal point between the "MHz" and "kHz" digits of the frequency display will blink.
 - If the incoming signal disappears, scanning will resume in about five seconds.



『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 **[DOWN]** 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 **[GENERAL 037 MIC SCAN RESUME]**. During memory scanning, 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 136.

『Quick Point』

If you have no interest in scanning, and wish to prohibit the microphone's **[UP]**/**[DOWN]** keys from initiating scanning, you may disable scanning control from the microphone using Menu Item **[GENERAL 036 MIC SCAN]** (set it to "DISABLE").

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

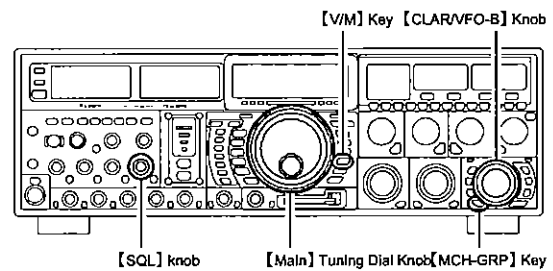
1. Store the Lower and Upper tuning/scanning limit frequencies into the memory pair “P1L” and “P1U,” respectively, or any other “L/U” pair of memories in the special PMS memory area. See page 115 for details regarding memory storage.
2. Press the **[V/M]** key (#19) to enter the Memory mode.
3. Press the **[MCH/GRP]** key (#58) momentarily. When you press the **[MCH/GRP]** key, the Red LED imbedded within the switch should light up, indicating that you are ready to choose a channel into which to store the data.

『Advice』

If the Red LED imbedded in the **[MCH/GRP]** key does not light up, check to be sure that the orange lamp to the right of the **[CLAR/VFO-B]** knob (#57) is not illuminated. If it is, press the **[A/B]** switch (#9) to make it go out, then press the **[MCH/GRP]** key again.

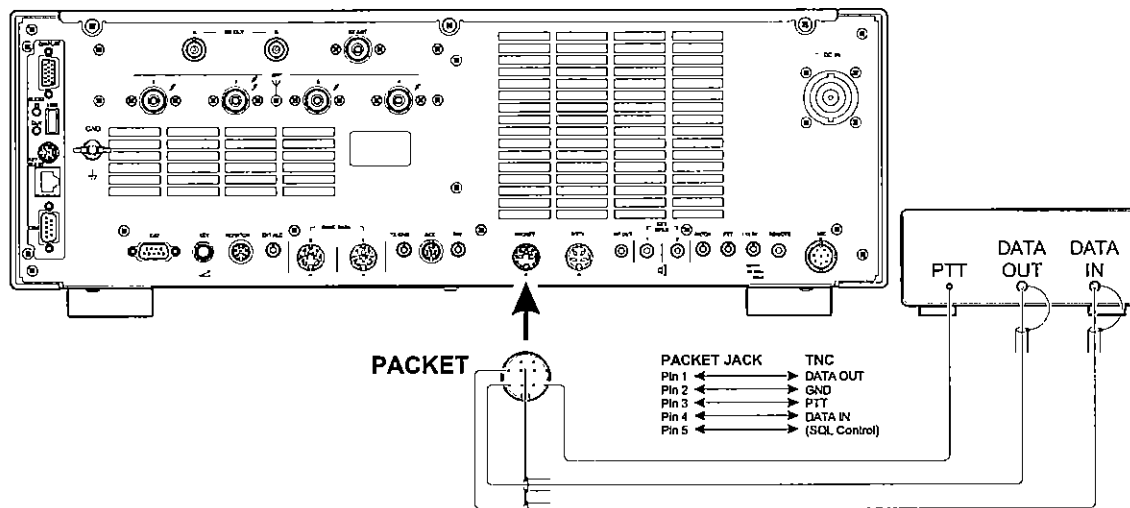
4. Rotate the **[CLAR/VFO-B]** knob to select memory channel “P1L” or “P1U.”
5. Rotate the Main (VFO-A) receiver’s **[SQL]** control (#21) so that the background noise is just silenced.
6. Turn the **[MAIN]** Tuning Dial knob (#29) slightly (to activate memory tuning). Tuning and scanning are now limited to the range within the P1L/P1U limits until you press the **[V/M]** key to return to memory channel or Main band (VFO-A) operation.
7. Press and hold in the microphone’s **[UP]** or **[DOWN]** key for 2 second to start scanning in the specified direction.
 - If the scanner halts on an incoming signal, the decimal point between the “MHz” and “kHz” digits of the frequency display will blink.
 - If the incoming signal disappears, scanning will resume in about five seconds.
 - On the SSB/CW and SSB-based Data modes, the scanner will pause on a received signal, then will step across the signal very slowly, giving you time to stop the scan, if you like. In these modes on the VFO, the scanner does not stop, however.
 - If the scan has paused on a signal, pressing the microphone’s **[UP]** or **[DOWN]** key will cause scanning to resume instantly.
 - 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.

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 FT DX 9000MP 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 Mode	Setup
MODE-PKT 062 PKT DISP	0Hz
MODE-PKT 063 PKT GAIN	128
MODE-PKT 064 PKT SHIFT	1000Hz

BASIC SETUP

- Press the **[PKT]** Mode switch (#25).
 - For HF operation, SSB-based Data operation is generally used. One press of the **[PKT]** switch will engage Packet operation in the "LSB" mode (by default). Both the "PKT" and "LSB" LEDs will become illuminated.
 - If you need to do FM-based 1200-baud packet on the 29/50 MHz bands, press the **[PKT]** switch once more to engage the "PKT-FM" mode. the "PKT" and "FM" LEDs will both become illuminated.
- When the "trans it" command is received from the TNC, the transmitter of the FT DX 9000MP will automatically be engaged. Likewise, the command to return to receive will cause the radio to revert to the receive mode.
 - If you need to adjust the output level from the radio from the "DATA OUT" pin of the **[PACKET]** jack (pin 4), please do so at the TNC side. For the input level from the TNC, as applied to the DATA IN pin of the **[PACKET]** jack (pin 1), please use Menu item [MODE-PKT 063 PKT GAIN].
 - During Packet operation via the rear panel's **[PACKET]** jack, the front and rear panel MIC jacks are both 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]** control (#66) to reduce the transmitter power to 1/2 ~ 1/3 of its normal maximum.

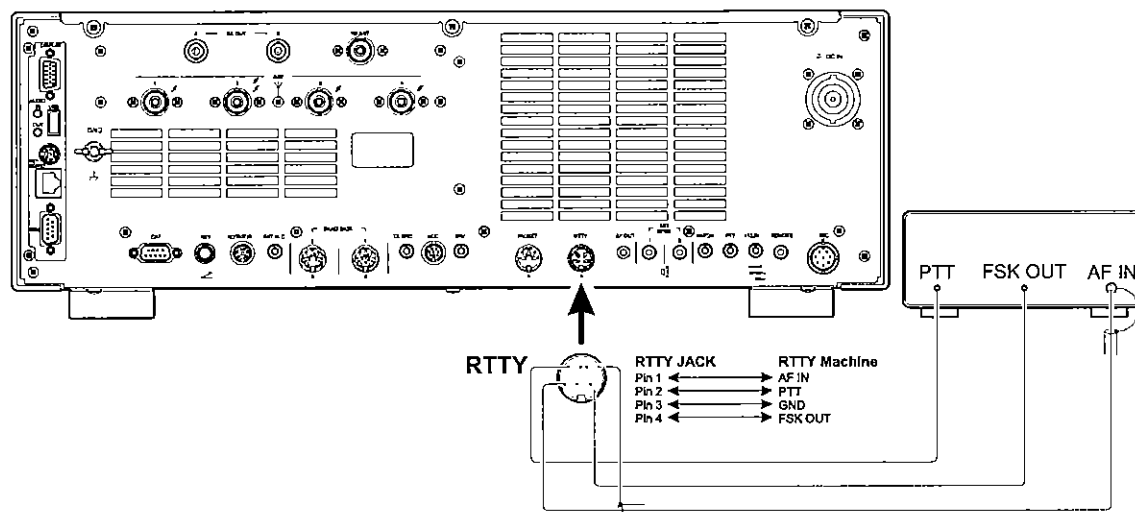
〔Quick Point〕

PACKET Jack Specifications

- DATA IN (Pin 1)**
Input Level: 17mVrms
Input Impedance: 10 k-Ohms
- DATA OUT (Pin 4)**
(Pin 4: Fixed level, does not respond to setting of **[AF GAIN]** or **[SQL]** control.)
Output Level: 700 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 below.

Menu Mode	Setup
MODE-RTY 065 POLARITY-R	NOR/REV
MODE-RTY 066 POLARITY-T	NOR/REV
MODE-RTY 067 RTTY SHIFT	170Hz
MODE-RTY 068 RTTY TONE	2125Hz

BASIC SETUP

- Press the [RTTY] Mode switch (#23) to enter the RTTY mode.
 - One press of the [RTTY] Mode switch will engage RTTY operation using "LSB" injection, which is generally used in the Amateur service. In this mode, both the "RTTY" and "LSB" LEDs will light up.
 - To switch to USB-side injection in RTTY, press the [RTTY] Mode switch once more. Both the "RTTY" and "USB" LEDs will now be illuminated. Repeatedly pressing the [RTTY] Mode switch 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.
 - The Mark/Space Shift utilized in most Amateur RTTY operation is 170 Hz. Other shifts may be configured, however, using Menu item [MODE-RTY 067 RTTY SHIFT].
 - The FT dx 9000MP 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 [MODE-RTY 068 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 [MODE-RTY 065 POLARITY-R] to "REV" ("Reverse") to see if that permits copy. A separate Menu item permits reversal of your transmitter's Mark/Space polarity: [MODE-RTY 066 POLARITY-T].

【Note】

If you anticipate making data transmissions of longer than a few minutes, we recommend that you use the [RF PWR] control (#26) to reduce the transmitter power to 1/2 ~ 1/3 of its normal maximum.

【Advice】

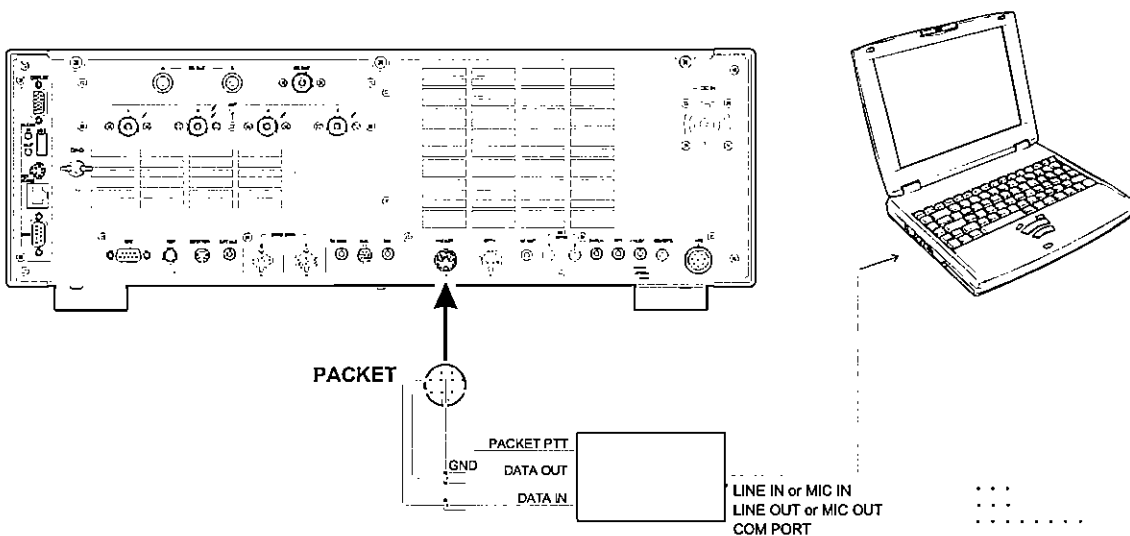
- There is no adjustment of the receiver output level from Pin 2 ("RX OUT") of the [RTTY] jack on the rear panel; please make any needed level adjustments at the TU side.

【Quick Point】

In the FT dx 9000MP, "RTTY" is a mode defined as being an "FSK" mode, whereby the closing and opening of a keying line (to ground) causes the Mark/Space tones to alternate. The RTTY mode is not an AFSK based mode in this transceiver, and the AFSK output tones from a TNC will not cause Mark/Space shifting to occur. Use the "Packet" mode for AFSK-based Baudot and other data modes.

MISCELLANEOUS AFSK-BASED DATA MODES

The FT DX 9000MP 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 [TX GNRL 159 VOX SELECT] 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.

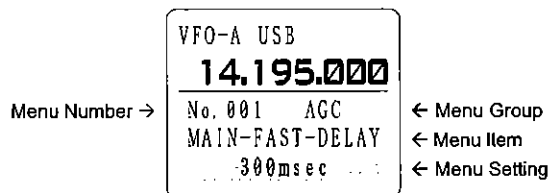
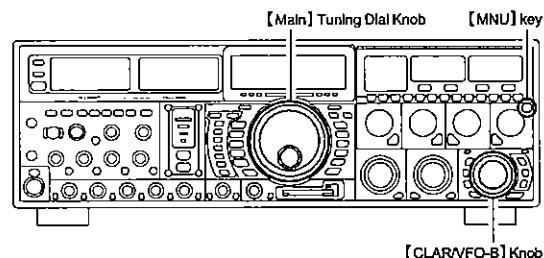
NOTE

MENU MODE

The Menu system of the FT DX 9000MP provides extensive customization capability, so you can set up your transceiver just the way you want to operate it. The Menu items are grouped by general utilization category, and are numbered from “AGC 1” to “TX GNRL 160.”

USING THE MENU

1. Press the **[MNU]** key (#65) momentarily. The Menu list will appear on the LCD display, and you will see the Menu Number, Menu Groups, Menu Items, and the current settings for each item displayed on the LCD display.
2. Rotate the **[MAIN]** Tuning Dial knob (#29) to select the Menu item you wish to work on.
3. Rotate the **[CLAR/VFO-B]** knob (#97) to change the current setting of the selected Menu item.
4. When you have finished making your adjustments, press and hold in the **[MNU]** key for two seconds to save the new setting and exit to normal operation. If you only momentarily press the **[MNU]** key, the new settings will not be retained.



Menu Mode Reset

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

1. Turn the front panel **[POWER]** switch (#5) off.
2. Press and hold in the **[MNU]** key (#65), and while holding it in, press the **[POWER]** switch (#5) to turn the transceiver back on. Now release the **[MNU]** key.

MENU MODE

Group	No.	MenuFunction	Available Values	Default Setting
AGC	001	MAIN-FAST-DELAY	20 ~ 4000 msec (20 msec Step)	300 msec
AGC	002	MAIN-FAST-HOLD	0 ~ 2000 msec (20 msec Step)	0 msec
AGC	003	MAIN-MID-DELAY	20 ~ 4000 msec (20 msec Step)	700 msec
AGC	004	MAIN-MID-HOLD	0 ~ 2000 msec (20 msec Step)	0 msec
AGC	005	MAIN-SLOW-DELAY	20 ~ 4000 msec (20 msec Step)	2000 msec
AGC	006	MAIN-SLOW-HOLD	0 ~ 2000 msec (20 msec Step)	0 msec
AGC	007	SUB-FAST-DELAY	20 ~ 4000 msec (20 msec Step)	300 msec
AGC	008	SUB-FAST-HOLD	0 ~ 2000 msec (20 msec Step)	0 msec
AGC	009	SUB-MID-DELAY	20 ~ 4000 msec (20 msec Step)	700 msec
AGC	010	SUB-MID-HOLD	0 ~ 2000 msec (20 msec Step)	0 msec
AGC	011	SUB-SLOW-DELAY	20 ~ 4000 msec (20 msec Step)	2000 msec
AGC	012	SUB-SLOW-HOLD	0 ~ 2000 msec (20 msec Step)	0 msec
DISPLAY	013	TFT COLOR	COOL BLUE / CONTRAST BLUE / FLASH WHITE / CONTRAST UMBER / UMBER	*
DISPLAY	014	DIMMER-METER	0 ~ 15	4
DISPLAY	015	DIMMER-VFD	0 ~ 15	8
DISPLAY	016	BAR DISPLAY SELECT	CLAR / CW TUNE / VRF- μ TUNE / NOTCH	CW TUNE
DISPLAY	017	ROTATOR START UP	0 / 90 / 180 / 270 (°)	0 (°)
DISPLAY	018	ROTATOR OFFSET ADJ	-30 ~ 0	0
DISPLAY	019	RIGHT TX METER	ALC / VDD	ALC
DISPLAY	020	EXT DISPLAY	ENABLE / DISABLE	DISABLE
FH-2 SET	021	BEACON TIME	OFF / 1 ~ 255 sec	OFF
FH-2 SET	022	CONTEST NUMBER	1290 / AUNO / AUNT / A2NO / A2NT / 12NO / 12NT	1290
FH-2 SET	023	CW MEMORY 1	TEXT / MESSAGE	MESSAGE
FH-2 SET	024	CW MEMORY 2	TEXT / MESSAGE	MESSAGE
FH-2 SET	025	CW MEMORY 3	TEXT / MESSAGE	MESSAGE
FH-2 SET	026	CW MEMORY 4	TEXT / MESSAGE	MESSAGE
FH-2 SET	027	CW MEMORY 5	TEXT / MESSAGE	MESSAGE
GENERAL	028	ANT SELECT	BAND / STACK	BAND
GENERAL	029	BEEP LEVEL	0 ~ 255	50
GENERAL	030	CAT RATE	4800 / 9600 / 38400 bps	4800 bps
GENERAL	031	MEM GROUP	ENABLE / DISABLE	DISABLE
GENERAL	032	QUICK SPLIT FREQ	-20 ~ 0 ~ 20 kHz (1kHz Step)	5 kHz
GENERAL	033	TIME OUT TIMER	OFF / 5 / 10 / 15 / 20 / 25 / 30 min	OFF
GENERAL	034	TRV OFFSET	30 ~ 49 MHz	44 MHz
GENERAL	035	μ TUNE DIAL STEP	DIAL STEP-2 / DIAL STEP-1 / OFF	DIAL STEP-1
GENERAL	036	MIC SCAN	ENABLE / DISABLE	ENABLE
GENERAL	037	MIC SCAN RESUME	PAUSE / TIME	TIME
GENERAL	038	AF/RF DIAL SWAP	NORMAL / SWAP	NORMAL
MODE-AM	039	AM MIC GAIN	MCVR / 0 ~ 255	160
MODE-AM	040	AM MIC SELECT	FRONT / REAR / DATA / PC	FRONT
MODE-CW	041	F-KEYER TYPE	OFF / BUG / ELEKEY / ACS	ELEKEY
MODE-CW	042	F-CW KEYER	NOR / REV	NOR
MODE-CW	043	R-KEYER TYPE	OFF / BUG / ELEKEY / ACS	ELEKEY
MODE-CW	044	R-CW KEYER	NOR / REV	NOR
MODE-CW	045	CW AUTO MODE	OFF / 50M / ON	OFF
MODE-CW	046	CW BFO	USB / LSB / AUTO	USB
MODE-CW	047	CW BK-IN	SEMI / FULL	SEMI
MODE-CW	048	CW WAVE SHAPE	1 / 2 / 4 / 6 msec	4 msec
MODE-CW	049	CW WEIGHT	2.5 ~ 4.5	3.0
MODE-CW	050	CW FREQ DISPLAY	DIRECT FREQ / PITCH OFFSET	PITCH OFFSET
MODE-CW	051	PC KEYING	ENABLE / DISABLE	DISABLE
MODE-CW	052	QSK	15 / 20 / 25 / 30 msec	15 msec

*: Unmber Display Color: UNMBER, Light Blue Display Color: COOL BLUE

MENU MODE

Group	No.	Menu Function	Available Values	Default Setting
MODE-DAT	053	DATA IN SELECT	DATA / PC	DATA
MODE-DAT	054	DATA GAIN	0 ~ 255	128
MODE-DAT	055	DATA OUT	VFO-a / VFO-b	VFO-a
MODE-DAT	056	DATA VOX DELAY	30 ~ 3000 msec	300 msec
MODE-DAT	057	DATA VOX GAIN	0 ~ 255	128
MODE-FM	058	FM MIC GAIN	MCVR / 0 ~ 255	128
MODE-FM	059	FM MIC SELECT	FRONT / REAR / DATA / PC	FRONT
MODE-FM	060	RPT SHIFT(28MHz)	0 ~ 1000 kHz (10 kHz Step)	100 kHz
MODE-FM	061	RPT SHIFT(50MHz)	0 ~ 4000 kHz (10 kHz Step)	1000 kHz
MODE-PKT	062	PKT DISP	-3000 ~ 0 ~ 3000Hz (10 Hz Step)	0 Hz
MODE-PKT	063	PKT GAIN	0 ~ 255	128
MODE-PKT	064	PKT SHIFT	-3000 ~ 0 ~ 3000Hz (10 Hz Step)	1000 Hz
MODE-RTY	065	POLARITY-R	NOR / REV	NOR
MODE-RTY	066	POLARITY-T	NOR / REV	NOR
MODE-RTY	067	RTTY SHIFT	170 / 200 / 425 / 850 Hz	170 Hz
MODE-RTY	068	RTTY TONE	1275 / 2125 Hz	2125 Hz
MODE-SSB	069	SSB MIC SELECT	FRONT / REAR / DATA / PC	FRONT
MODE SSB	070	SSB-TX-BPF	50-3000 / 100-2900 / 200-2800 / 300-2700 / 400-2600 (Hz) / 3000WB	300-2700 (Hz)
MODE-SSB	071	LSB RX-CARRIER	-200 ~ 0 ~ 200 Hz (10Hz Step)	0Hz
MODE-SSB	072	LSB TX-CARRIER	-200 ~ 0 ~ 200 Hz (10Hz Step)	0Hz
MODE-SSB	073	USB RX-CARRIER	-200 ~ 0 ~ 200 Hz (10Hz Step)	0Hz
MODE-SSB	074	USB TX-CARRIER	-200 ~ 0 ~ 200 Hz (10Hz Step)	0Hz
RXAUDIO	075	AGC-SLOPE	NORMAL / SLOPE	NORMAL
RXAUDIO	076	HEADPHONE MIX	SEPARATE / COMBINE-1 / COMBINE-2	SEPARATE
RXAUDIO	077	SPEAKER OUT	SEPARATE / COMBINE	COMBINE
RX DSP	078	MAIN-CONTOUR-LEVEL	-40 ~ 0 ~ 20	-15
RX DSP	079	MAIN-CONTOUR-WIDTH	1 ~ 11	10
RX DSP	080	SUB-CONTOUR-LEVEL	-40 ~ 0 ~ 20	-15
RX DSP	081	SUB-CONTOUR-WIDTH	1 ~ 11	10
RX DSP	082	IF-NOTCH-WIDTH	NARROW / WIDE	WIDE
RX DSP	083	MAIN-CW-SHAPE	SOFT / SHARP	SHARP
RX DSP	084	MAIN-CW-SLOPE	STEEP / MEDIUM / GENTLE	MEDIUM
RX DSP	085	MAIN-CW-NARROW	25 / 50 / 100 / 200 / 300 / 400 (Hz)	300 (Hz)
RX DSP	086	MAIN-PSK-SHAPE	SOFT / SHARP	SHARP
RX DSP	087	MAIN-PSK-SLOPE	STEEP / MEDIUM / GENTLE	MEDIUM
RX DSP	088	MAIN-PSK-NARROW	25 / 50 / 100 / 200 / 300 / 400 (Hz)	300 (Hz)
RX DSP	089	MAIN-RTTY-SHAPE	SOFT / SHARP	SHARP
RX DSP	090	MAIN-RTTY-SLOPE	STEEP / MEDIUM / GENTLE	MEDIUM
RX DSP	091	MAIN-RTTY-NARROW	25 / 50 / 100 / 200 / 300 / 400 (Hz)	300 (Hz)
RX DSP	092	MAIN-SSB-SHAPE	SOFT / SHARP	SHARP
RX DSP	093	MAIN-SSB-SLOPE	STEEP / MEDIUM / GENTLE	MEDIUM
RX DSP	094	MAIN-SSB-NARROW	200 / 400 / 600 / 850 / 1100 / 1350 / 1500 / 1650 / 1800 / 1950 / 2100 / 2250 (Hz)	1800 (Hz)
RX DSP	095	SUB-CW-SHAPE	SOFT / SHARP	SHARP
RX DSP	096	SUB-CW-SLOPE	STEEP / MEDIUM / GENTLE	MEDIUM
RX DSP	097	SUB-CW-NARROW	25 / 50 / 100 / 200 / 300 / 400 (Hz)	300 (Hz)
RX DSP	098	SUB-PSK-SHAPE	SOFT / SHARP	SHARP
RX DSP	099	SUB-PSK-SLOPE	STEEP / MEDIUM / GENTLE	MEDIUM
RX DSP	100	SUB-PSK-NARROW	25 / 50 / 100 / 200 / 300 / 400 (Hz)	300 (Hz)
RX DSP	101	SUB-RTTY-SHAPE	SOFT / SHARP	SHARP
RX DSP	102	SUB-RTTY-SLOPE	STEEP / MEDIUM / GENTLE	MEDIUM
RX DSP	103	SUB-RTTY-NARROW	25 / 50 / 100 / 200 / 300 / 400 (Hz)	300 (Hz)
RX DSP	104	SUB-SSB-SHAPE	SOFT / SHARP	SHARP
RX DSP	105	SUB-SSB-SLOPE	STEEP / MEDIUM / GENTLE	MEDIUM

MENU MODE

Group	No.	Menu Function	Available Values	Default Setting
RX DSP	106	SUB-SSB-NARROW	200 / 400 / 600 / 850 / 1100 / 1350 / 1500 / 1650 / 1800 / 1950 / 2100 / 2250 (Hz)	1800 (Hz)
SCOPE	107	MAIN FIX 1.8MHz	1800 ~ 1999 kHz	1800kHz
SCOPE	108	MAIN FIX 3.5MHz	3500 ~ 3999 kHz	3500kHz
SCOPE	109	MAIN FIX 5.0MHz	5250 ~ 5499 kHz	5250kHz
SCOPE	110	MAIN FIX 7.0MHz	7000 ~ 7299 kHz	7000kHz
SCOPE	111	MAIN FIX 10MHz	10100 ~ 10149 kHz	10100kHz
SCOPE	112	MAIN FIX 14MHz	14000 ~ 14349 kHz	14000kHz
SCOPE	113	MAIN FIX 18MHz	18000 ~ 18199 kHz	18068kHz
SCOPE	114	MAIN FIX 21MHz	21000 ~ 21449 kHz	21000kHz
SCOPE	115	MAIN FIX 24MHz	24800 ~ 24989 kHz	24890 kHz
SCOPE	116	MAIN FIX 28MHz	28000 ~ 28699 kHz	28000 kHz
SCOPE	117	MAIN FIX 50MHz	50000 ~ 53999 kHz	50000 kHz
SCOPE	118	SUB FIX 1.8MHz	1800 ~ 1999 kHz	1800 kHz
SCOPE	119	SUB FIX 3.5MHz	3500 ~ 3999 kHz	3500 kHz
SCOPE	120	SUB FIX 5.0MHz	5250 ~ 5499 kHz	5250 kHz
SCOPE	121	SUB FIX 7.0MHz	7000 ~ 7299 kHz	7000 kHz
SCOPE	122	SUB FIX 10MHz	10100 ~ 10149 kHz	10100 kHz
SCOPE	123	SUB FIX 14MHz	14000 ~ 14349kHz	14000 kHz
SCOPE	124	SUB FIX 18MHz	18000 ~ 18199 kHz	18068 kHz
SCOPE	125	SUB FIX 21MHz	21000 ~ 21449 kHz	21000 kHz
SCOPE	126	SUB FIX 24MHz	24800 ~ 24989 kHz	24890 kHz
SCOPE	127	SUB FIX 28MHz	28000 ~ 28699kHz	28000 kHz
SCOPE	128	SUB FIX 50MHz	50000 ~ 53999 kHz	50000 kHz
TUNING	129	MAIN DIAL STEP	1 / 10 Hz	10 Hz
TUNING	130	MAIN DIAL CW FINE	DISABLE / ENABLE	DISABLE
TUNING	131	1MHz/100kHz SELECT	1MHz / 100kHz	1 MHz
TUNING	132	AM CH STEP	2.5 / 5 / 9 / 10 / 12.5 kHz	5 kHz
TUNING	133	FM CH STEP	5 / 6.25 / 10 / 12.5 / 25 kHz	5 kHz
TUNING	134	FM DIAL STEP	10Hz / 100 Hz	100 Hz
TUNING	135	MY BAND	1.8 ~ 50 (MHz) / GEN / TRV	---
TXAUDIO	136	F-PRMTRC EQ1-FREQ	OFF / 100 / 200 / 300 / 400 / 500 / 600 / 700 (Hz)	OFF
TXAUDIO	137	F-PRMTRC EQ1-LEVEL	-10 ~ 0 ~ 10	5
TXAUDIO	138	F-PRMTRC EQ1-BWTH	1 ~ 10	10
TXAUDIO	139	F-PRMTRC EQ2-FREQ	OFF / 700 / 800 / 900 / 1000 / 1100 / 1200 / 1300 / 1400 / 1500 (Hz)	OFF
TXAUDIO	140	F-PRMTRC EQ2-LEVEL	-10 ~ 0 ~ 10	5
TXAUDIO	141	F-PRMTRC EQ2-BWTH	1 ~ 10	10
TXAUDIO	142	F-PRMTRC EQ3-FREQ	OFF/1500 ~ 3200 (100Hz Step)	OFF
TXAUDIO	143	F-PRMTRC EQ3-LEVEL	-10 ~ 0 ~ 10	5
TXAUDIO	144	F-PRMTRC EQ3-BWTH	1 ~ 10	10
TXAUDIO	145	R-PRMTRC EQ1-FREQ	OFF / 100 / 200 / 300 / 400 / 500 / 600 / 700 (Hz)	OFF
TXAUDIO	146	R-PRMTRC EQ1-LEVEL	-10 ~ 0 ~ 10	5
TXAUDIO	147	R-PRMTRC EQ1-BWTH	1 ~ 10	10
TXAUDIO	148	R-PRMTRC EQ2-FREQ	OFF / 700 / 800 / 900 / 1000 / 1100 / 1200 / 1300 / 1400 / 1500 (Hz)	OFF
TXAUDIO	149	R-PRMTRC EQ2-LEVEL	-10 ~ 0 ~ 10	5
TXAUDIO	150	R-PRMTRC EQ2-BWTH	1 ~ 10	10
TXAUDIO	151	R-PRMTRC EQ3-FREQ	OFF / 1500 ~ 3200 (Hz) (100Hz Step)	OFF
TXAUDIO	152	R-PRMTRC EQ3-LEVEL	-10 ~ 0 ~ 10	5
TXAUDIO	153	R-PRMTRC EQ3-BWTH	1 ~ 10	10
TXGNRL	154	TX MAX POWER	50 / 100 / 200 / 400 (W)	400 (W)

MENU MODE

Group	No.	MenuFunction	Available Values	Default Setting
TXGNRL	155	TX PWR CONTROL	ALL MODE / CARRIER	ALL MODE
TXGNRL	156	EXT AMP TX-GND	ENABLE / DISABLE	DISABLE
TXGNRL	157	EXT AMP TUNING PWR	50 / 100 / 200 / 400 (W)	200 (W)
TXGNRL	158	FULL DUPLEX	SIMP / DUP	SIMP
TXGNRL	159	VOX SELECT	MIC / DATA	MIC
TXGNRL	160	EMERGENCY FREQ TX	DISABLE / ENABLE	DISABLE

MENU MODE

AGC GROUP

001. MAIN-FAST-DELAY

Function: Sets the delay time for the AGC FAST mode of the main band (VFO-A) receiver.

Available Values: 20 ~ 4000 msec (20 msec/step)

Default Setting: 300 msec

002. MAIN-FAST-HOLD

Function: Sets the hang time of the AGC peak voltage for the AGC FAST mode of the main band (VFO-A) receiver.

Available Values: 0 ~ 2000 msec (20 msec/step)

Default Setting: 0 msec

003. MAIN-MID-DELAY

Function: Sets the delay time for the AGC MID mode of the main band (VFO-A) receiver.

Available Values: 20 ~ 4000 msec (20 msec/step)

Default Setting: 700 msec

004. MAIN-MID-HOLD

Function: Sets the hang time of the AGC peak voltage for the AGC MID mode of the main band (VFO-A) receiver.

Available Values: 0 ~ 2000 msec (20 msec/step)

Default Setting: 0 msec

005. MAIN-SLOW-DELAY

Function: Sets the delay time for the AGC SLOW mode of the main band (VFO-A) receiver.

Available Values: 20 ~ 4000 msec (20 msec/step)

Default Setting: 2000 msec

006. MAIN-SLOW-HOLD

Function: Sets the hang time of the AGC peak voltage for the AGC SLOW mode of the main band (VFO-A) receiver.

Available Values: 0 ~ 2000 msec (20 msec/step)

Default Setting: 0 msec

007. SUB-FAST-DELAY

Function: Sets the delay time for the AGC FAST mode of the sub band (VFO-B) receiver.

Available Values: 20 ~ 4000 msec (20 msec/step)

Default Setting: 300 msec

008. SUB-FAST-HOLD

Function: Sets the hang time of the AGC peak voltage for the AGC FAST mode of the sub band (VFO-B) receiver.

Available Values: 0 ~ 2000 msec (20 msec/step)

Default Setting: 0 msec

009. SUB-MID-DELAY

Function: Function: Sets the delay time for the AGC MID mode of the sub band (VFO-B) receiver.

Available Values: 20 ~ 4000 msec (20 msec/step)

Default Setting: 700 msec

010. SUB-MID-HOLD

Function: Sets the hang time of the AGC peak voltage for the AGC MID mode of the sub band (VFO-B) receiver.

Available Values: 0 ~ 2000 msec (20 msec/step)

Default Setting: 0 msec

011. SUB-SLOW-DELAY

Function: Function: Sets the delay time for the AGC SLOW mode of the sub band (VFO-B) receiver.

Available Values: 20 ~ 4000 msec (20 msec/step)

Default Setting: 2000 msec

012. SUB-SLOW-HOLD

Function: Sets the hang time of the AGC peak voltage for the AGC SLOW mode of the sub band (VFO-B) receiver.

Available Values: 0 ~ 2000 msec (20 msec/step)

Default Setting: 0 msec

MENU MODE

DISPLAY GROUP

013. TFT COLOR

Function: Selects the TFT color.

Available Values: COOL BLUE/CONTRAST BLUE/
FLASH WHITE/CONTRAST UMBER/UMBER

Default Setting: COOL BLUE

014. DIMMER-METER

Function: Setting of the meter brightness level when "DIM" is selected.

Available Values: 0 ~ 15

Default Setting: 4

015. DIMMER-VFD

Function: Setting of the frequency and TFT display brightness level when "DIM" is selected.

Available Values: 0 ~ 15

Default Setting: 8

016. BAR DISPLAY SELECT

Function: Selects one of three parameters to be viewed on the Tuning Offset Indicator.

Available Values: CLAR/CW TUNE/VRF- μ TUNE/
NOTCH

Default Setting: CW TUNE

CLAR: Displays relative clarifier offset.

CW TUNE: Displays relative tuning offset between the incoming signal and transmitted frequency.

VRF- μ TUNE: Displays the peak position of the VRF or μ TUNE filter.

NOTCH: While you rotate the [NOTCH] knob, the center frequency of the IF NOTCH feature will be indicated.

017. ROTATOR START UP

Function: Selects the starting point of your controller's indicator needle.

Available Values: 0/90/180/270°

Default Setting: 0°

018. ROTATOR OFFSET ADJ

Function: Adjusts the indicator needle precisely to the starting point set in menu selection 123.

Available Values: -30 - 0

Default Setting: 0

019. RIGHT TX METER

Function: Selects the Sub meter function

Available Values: ALC/VDD

Default Setting: ALC

ALC: Indicates incoming signal strength on the sub band (VFO-B) while receiving, and indicates the ALC (Automatic Level Control) operating range while transmitting.

VDD: Indicates the Vdd (final amplifier drain voltage) at all times.

020. EXT DISPLAY

Function: This menu should always be set to "DISABLE."

Available Values: ENABLE/DISABLE

Default Setting: DISABLE

MENU MODE

FH-2 SETUP GROUP

021. BEACON TIME

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

Available Values: OFF/1 ~ 255 sec

Default Setting: OFF

022. CONTEST NUMBER

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

Available Values: 1290/AUNO/AUNT/A2NO/A2NT/12NO/12NT

Default Setting: 1290

1290: Does not abbreviated the Contest Number

AUNO: Abbreviate to "A" for "One," "U" for "Two," "N" for "Nine," and "O" for "Zero."

AUNT: Abbreviate to "A" for "One," "U" for "Two," "N" for "Nine," and "T" for "Zero."

A2NO: Abbreviate to "A" for "One," "N" for "Nine," and "O" for "Zero."

A2NT: Abbreviate to "A" for "One," "N" for "Nine," and "T" for "Zero."

12NO: Abbreviate to "N" for "Nine" and "O" for "Zero."

12NT: Abbreviate to "N" for "Nine" and "T" for "Zero."

023. CW MEMORY 1

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

Available Values: TEXT/MESSAGE

Default Setting: MESSAGE

TEXT: You may enter the CW message from a supplied FH-2 Remote Control Keypad.

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

024. CW MEMORY 2

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

Available Values: TEXT/MESSAGE

Default Setting: MESSAGE

TEXT: You may enter the CW message from a supplied FH-2 Remote Control Keypad.

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

025. CW MEMORY 3

Function: Permits entry of the CW message for message register 3.

Available Values: TEXT/MESSAGE

Default Setting: MESSAGE

TEXT: You may enter the CW message from a supplied FH-2 Remote Control Keypad.

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

026. CW MEMORY 4

Function: Permits entry of the CW message for message register 4.

Available Values: TEXT/MESSAGE

Default Setting: MESSAGE

TEXT: You may enter the CW message from a supplied FH-2 Remote Control Keypad.

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

027. CW MEMORY 5

Function: Permits entry of the CW message for message register 5.

Available Values: TEXT/MESSAGE/COUNTUP

Default Setting: MESSAGE

TEXT: You may enter the CW message from a supplied FH-2 Remote Control Keypad.

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

MENU MODE

GENERAL GROUP

028. ANT SELECT

Function: Sets the method of antenna selection.

Available Values: BAND/STACK

Default Setting: BAND

BAND: The antenna is selected in accordance with the operating band.

STACK: The antenna is selected in accordance with the band stack (different antennas may be utilized on the same band, if so selected in the band stack).

029. BEEP LEVEL

Function: Sets the beep level.

Available Values: 0 ~ 255

Default Setting: 50

030. CAT RATE

Function: Sets the transceiver's computer-interface circuitry for the CAT baud rate to be used.

Available Values: 4800/9600/38400 bps

Default Setting: 4800 bps

031. MEM GROUP

Function: Enables/Disables Memory Group Operation.

Available Values: DISABLE/ENABLE

Default Setting: DISABLE

032. QUICK SPLIT FREQ

Function: Selects the tuning offset for the Quick Split feature.

Available Values: -20 ~ 0 ~ +20 kHz (1 kHz Step)

Default Setting: +5 kHz

033. TIME OUT TIMER

Function: Sets the Time-Out Timer countdown time.

Available Values: OFF/5/10/15/20/25/30 min

Default Setting: OFF

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

034. TRV OFFSET

Function: Set the 10's and 1's of the MHz digits display for operation with a transverter.

Available Values: 30 ~ 49 MHz

Default Setting: 44 MHz

If you connect a 430 MHz transverter to the radio, set this menu to "30" (the "100 MHz" digits are hidden on this radio).

035. μ TUNE DIAL STEP

Function: Select the μ -TUNE mode.

Available Values: DIAL STEP-1/DIAL STEP-2/OFF

Default Setting: DIAL STEP-1

Function: Select the μ -TUNE mode.

Available Values: DIAL STEP-1/DIAL STEP-2/OFF

Default Setting: DIAL STEP-1

Explanation: If the RF μ -Tuning Unit is installed, the installation may change the setting of this Menu item.

DIAL STEP-1: Activates the μ -TUNE system in the Auto mode using "**FINE**" steps of the μ -TUNE knob (1 step/click) on the 14 MHz and lower amateur bands on the Main (VFO-A) band.

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

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

Advice: If none of the RF μ -Tuning Units is installed, changing this Menu setting will have no effect.

036. MIC SCAN

Function: Enables/disables scanning access via the microphone's [UP]/[DWN] keys (only available at the rear panel's MIC Jack).

Available Values: ENABLE/DISABLE

Default Setting: ENABLE

037. MIC SCAN RESUME

Function: Selects the Scan Resume mode.

Available Values: PAUSE/TIME

Default Setting: TIME

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

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

038. AF/RF DIAL SWAP

Function: Reverses the functions of the **AF GAIN** (VFO-B) and **RF GAIN** (VFO-A) knobs.

Available Values: NORMAL/SWAP

Default Setting: NORMAL

When this menu is set to "SWAP," you may adjust the sub (VFO-B) receiver audio using the large **RF GAIN** (VFO-A) knob and adjust the main (VFO-A) receiver RF gain using the small **AF GAIN** (VFO-B) knob. This puts both "Volume" controls on the same shaft.

MENU MODE

MODE-AM GROUP

039. AM MIC GAIN

Function: Sets the microphone gain for the AM mode.

Available Values: MCVR/0 ~ 255 (FIX)

Default Setting: 160

When this menu is set to "MCVR," you may adjust the microphone gain using the front panel's **MIC** knob.

040. AM MIC SELECT

Function: Selects the microphone to be used on the AM mode.

Available Values: FRONT/REAR/DATA/PC

Default Setting: FRONT

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

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

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

PC: Selects the microphone connected to the rear panel's **AUDIO IN** 3.5-mm jack while using the AM mode.

MODE-CW GROUP

041. F-KEYER TYPE

Function: Selects the desired keyer operation mode for the device connected to the front panel's **KEY** jack.

Available Values: OFF/BUG/ELEKEY/ACS

Default Setting: ELEKEY

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

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

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

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

042. F-CW KEYER

Function: Selects the keyer paddle's wiring configuration of the **KEY** jack on the front panel.

Available Values: NOR/REV

Default Setting: NOR

NOR: Tip = Dot, Ring = Dash, Shaft = Ground

REV: Tip = Dash, Ring = Dot, Shaft = Ground

043. R-KEYER TYPE

Function: Select the desired keyer operation mode for the device connected to the rear panel's **KEY** jack.

Available Values: OFF/BUG/ELEKEY/ACS

Default Setting: ELEKEY

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

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

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

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

044. R-CW KEYER

Function: Selects the keyer paddle's wiring configuration of the **KEY** jack on the rear panel.

Available Values: NOR/REV

Default Setting: NOR

NOR: Tip = Dot, Ring = Dash, Shaft = Ground

REV: Tip = Dash, Ring = Dot, Shaft = Ground

MENU MODE

MODE-CW GROUP

045. CW AUTO MODE

Function: Enables/disables CW keying while operating on SSB.

Available Values: OFF/50MHz/ON

Default Setting: OFF

OFF: Disables CW keying while operating on SSB.

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

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

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

046. CW BFO

Function: Sets the CW carrier oscillator injection side for the CW mode.

Available Values: USB/LSB/AUTO

Default Setting: USB

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

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

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

047. CW BK-IN

Function: Sets the CW "break-in" mode.

Available Values: SEMI/FULL

Default Setting: SEMI

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

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

048. CW WAVE SHAPE

Function: Selects the CW carrier wave-form shape (rise/fall times).

Available Values: 1/2/4/6 msec

Default Setting: 4 msec

049. CW WEIGHT

Function: Sets the Dot:Dash ratio for the built-in electronic keyer.

Available Values: (1:) 2.5 ~ 4.5

Default Setting: 3.0

050. CW FREQ DISPLAY

Function: Frequency Display Format for the CW mode.

Available Values: DIRECT FREQ/PITCH OFFSET

Default Setting: PITCH OFFSET

DIRECT FREQ: Displays the receiver carrier frequency, without any offset added. When changing modes between SSB and CW, the frequency display remains constant.

PITCH OFFSET: This frequency display reflects the added BFO offset.

051. PC KEYING

Function: Enables/disables CW keying from the "DATA IN" terminal on the rear panel's **PACKET** jack while operating on the CW mode.

Available Values: DISABLE/ENABLE

Default Setting: DISABLE

052. QSK

Function: Selects the time delay between when the PTT is keyed and the carrier is transmitted during QSK operation when using the internal keyer.

Available Values: 15/20/25/30 msec

Default Setting: 15 msec

MENU MODE

MODE-DAT GROUP

053. DATA IN SELECT

Function: Selects the data input to be used on the PKT mode.

Available Values: DATA/PC

Default Setting: DATA

DATA: Uses the data input line which is connected to the rear panel's **PACKET** jack while using the PKT mode.

PC: Uses the data input line which is connected to the rear panel's **AUDIO IN** jack while using the PKT mode.

054. DATA GAIN

Function: Sets the data input level from the TNC to the AFSK modulator.

Available Values: 0 ~ 255

Default Setting: 128

055. DATA OUT

Function: Selects the receiver to be connected to the data output port (pin 4) of the **PACKET** jack.

Available Values: VFO-a/VFO-b

Default Setting: VFO-a

056. DATA VOX DELAY

Function: Adjusts the "VOX" delay (receiver recovery) time on the PKT mode.

Available Values: 30 ~ 3000 msec

Default Setting: 300 msec

057. DATA VOX GAIN

Function: Adjusts the "VOX" gain on the PKT mode.

Available Values: 0 ~ 255

Default Setting: 128

MODE-FM GROUP

058. FM MIC GAIN

Function: Sets the microphone gain for the FM mode.

Available Values: MCVR/0 ~ 255 (FIX)

Default Setting: 128

When this menu is set to "MCVR," you may adjust the microphone gain using the front panel's **MIC** knob.

059. FM MIC SELECT

Function: Selects the microphone to be used on the FM mode.

Available Values: FRONT/REAR/DATA/PC

Default Setting: FRONT

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

REAR: Selects the microphone connected to the rear panel's **MIC** jack while using the FM mode.

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

PC: Selects the microphone connected to the rear panel's **AUDIO IN** 3.5-mm jack while using the FM mode.

060. RPT SHIFT (28MHz)

Function: Sets the magnitude of the repeater shift on the 28 MHz band.

Available Values: 0 ~ 1000 kHz

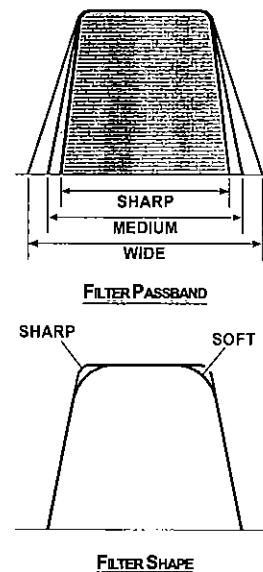
Default Setting: 100 kHz

061. RPT SHIFT (50MHz)

Function: Sets the magnitude of the repeater shift on the 50 MHz band.

Available Values: 0 ~ 4000 kHz

Default Setting: 1000 kHz



MENU MODE

MODE-PKT GROUP

062. PKT DISP

Function: Sets the packet frequency display offset.

Available Values: -3000 ~ +3000 Hz (10 Hz/step)

Default Setting: 0 Hz

063. PKT GAIN

Function: Adjusts the audio input level from the TNC to the AFSK modulator.

Available Values: 0 ~ 255

Default Setting: 128

064. PKT SHIFT (SSB)

Function: Sets the carrier point during the SSB Packet operation

Available Values: -3000 ~ +3000 Hz (10 Hz/step)

Default Setting: +1000 Hz (Typical center frequency for PSK31, etc.)

MODE-RTY GROUP

065. POLARITY-R

Function: Selects normal or reverse Mark/Space polarity for RTTY receive operation.

Available Values: NOR/REV

Default Setting: NOR

066. POLARITY-T

Function: Selects normal or reverse Mark/Space polarity for RTTY transmit operation.

Available Values: NOR/REV

Default Setting: NOR

067. RTTY SHIFT

Function: Selects the frequency shift for the FSK RTTY operation.

Available Values: 170/200/425/850 Hz

Default Setting: 170 Hz

068. RTTY TONE

Function: Selects the mark tone for RTTY operation.

Available Values: 1275/2125 Hz

Default Setting: 2125 Hz

MENU MODE

MODE-SSB GROUP

069. SSB MIC SELECT

Function: Selects the microphone to be used on the SSB mode.

Available Values: FRONT/REAR/DATA/PC

Default Setting: FRONT

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

REAR: Selects the microphone connected to the rear panel's **MIC** jack while using the SSB modes.

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

PC: Selects the microphone connected to the rear panel's **AUDIO IN** 3.5-mm jack while using the SSB modes.

070. SSB-TX-BPF

Function: Selects the audio passband of the Enhanced DSP modulator on the SSB mode.

Available Values: 50-3000(Hz)/100-2900(Hz)/200-2800(Hz)/300-2700(Hz)/400-2600(Hz)/3000WB

Default Setting: 300-2700 Hz

071. LSB RX-CARRIER

Function: Adjusts the receiver carrier point for LSB mode.

Available Values: -200 Hz ~ +200 Hz (10 Hz steps)

Default Setting: 0 Hz

072. LSB TX-CARRIER

Function: Adjusts the transmitter carrier point for LSB mode.

Available Values: -200 Hz ~ +200 Hz (10 Hz steps)

Default Setting: 0 Hz

073. USB RX-CARRIER

Function: Adjusts the receiver carrier point for USB mode.

Available Values: -200 Hz ~ +200 Hz (10 Hz steps)

Default Setting: 0 Hz

074. USB TX-CARRIER

Function: Adjusts the transmitter carrier point for USB mode.

Available Values: -200 Hz ~ +200 Hz (10 Hz steps)

Default Setting: 0 Hz

RX AUDIO GROUP

075. AGC-SLOPE

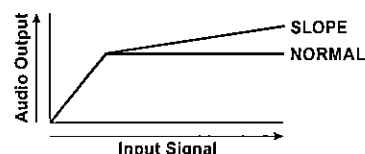
Function: Selects the gain curve of the AGC amplifier.

Available Values: NORMAL/SLOPE

Default Setting: NORMAL

NORMAL: The AGC output level will follow a linear response to the antenna input level, while AGC is activated.

SLOPE: The AGC output level will increase at 1/10 the rate of the antenna input level, while AGC is activated.



076. HEADPHONE MIX

Function: Selects one of three audio mixing modes when using headphones during Dual Receive operation.

Available Values: SEPARATE/COMBINE-1/COMBINE-2

Default Setting: SEPARATE

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

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

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

077. SPEAKER OUT

Function: Selects audio mixing modes for the "sub" (secondary) speaker during Dual Receive operation.

Available Values: SEPARATE/COMBINE

Default Setting: COMBINE

SEPARATE: Audio from the main (VFO-A) receiver is fed to the main speaker, and sub (VFO-B) receiver audio is fed to the "sub" speaker.

COMBINE: Audio from both main (VFO-A) and sub (VFO-B) receivers is combined and split equally between the main and sub speakers.

MENU MODE

RX DSP GROUP

078. MAIN-CONTOUR-LEVEL

Function: Adjusts the parametric equalizer gain of the main band (VFO-A) receiver Contour filter.

Available Values: -40 ~ +20 dB

Default Setting: -15 dB

079. MAIN-CONTOUR-WIDTH

Function: Adjusts the Q-factor of the main band (VFO-A) receiver Contour filter.

Available Values: 1 - 11

Default Setting: 10

080. SUB-CONTOUR-LEVEL

Function: Adjusts the parametric equalizer gain of the sub band (VFO-B) receiver Contour filter.

Available Values: -40 ~ +20 dB

Default Setting: -15 dB

081. SUB-CONTOUR-WIDTH

Function: Adjusts the Q-factor of the sub band (VFO-B) receiver Contour filter.

Available Values: 1 ~ 11

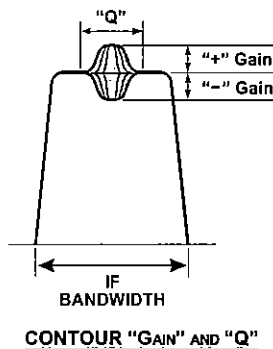
Default Setting: 10

082. IF-NOTCH-WIDTH

Function: Selects the bandwidth of the DSP NOTCH filter

Available Values: NARROW/WIDE

Default Setting: WIDE



083. MAIN-CW-SHAPE

Function: Selects the passband characteristics of the main band (VFO-A) DSP filter for the CW mode.

Available Values: SOFT/SHARP

Default Setting: SHARP

SOFT: Primary importance attached to amplitude of the filter factor.

SHARP: Primary importance attached to phase of the filter factor.

084. MAIN-CW-SLOPE

Function: Selects the shape factor of the main band (VFO-A) DSP filter for the CW mode.

Available Values: GENTLE/MEDIUM/STEEP

Default Setting: MEDIUM

085. MAIN-CW-NARROW

Function: Selects the passband of the main band (VFO-A) DSP filter for the CW "narrow" mode.

Available Values: 25/50/100/200/300/400 Hz

Default Setting: 300 Hz

086. MAIN-PSK-SHAPE

Function: Selects the passband characteristics of the main band (VFO-A) DSP filter for the PSK mode.

Available Values: SOFT/SHARP

Default Setting: SHARP

SOFT: Primary importance attached to amplitude of the filter factor.

SHARP: Primary importance attached to phase of the filter factor.

087. MAIN-PSK-SLOPE

Function: Selects the shape factor of the main band (VFO-A) DSP filter for the PSK mode.

Available Values: GENTLE/MEDIUM/STEEP

Default Setting: MEDIUM

088. MAIN-PSK-NARROW

Function: Selects the passband of the main band (VFO-A) DSP filter for the PSK "narrow" mode.

Available Values: 25/50/100/200/300/400 Hz

Default Setting: 300 Hz

089. MAIN-RTTY-SHAPE

Function: Selects the passband characteristics of the main band (VFO-A) DSP filter for the RTTY mode.

Available Values: SOFT/SHARP

Default Setting: SHARP

SOFT: Primary importance attached to amplitude of the filter factor.

SHARP: Primary importance attached to phase of the filter factor.

MENU MODE

RX DSP GROUP

090. MAIN-RTTY-SLOPE

Function: Selects the shape factor of the main band (VFO-A) DSP filter for the RTTY mode.

Available Values: GENTLE/MEDIUM/STEEP

Default Setting: MEDIUM

091. MAIN-RTTY-NARROW

Function: Selects the passband of the main band (VFO-A) DSP filter for the RTTY "narrow" mode.

Available Values: 25/50/100/200/300/400 Hz

Default Setting: 300 Hz

092. MAIN-SSB-SHAPE

Function: Selects the passband characteristics of the main band (VFO-A) DSP filter for the SSB mode.

Available Values: SOFT/SHARP

Default Setting: SHARP

SOFT: Primary importance attached to amplitude of the filter factor.

SHARP: Primary importance attached to phase of the filter factor.

093. MAIN-SSB-SLOPE

Function: Selects the shape factor of the main band (VFO-A) DSP filter for the SSB mode.

Available Values: GENTLE/MEDIUM/STEEP

Default Setting: MEDIUM

094. MAIN-SSB-NARROW

Function: Selects the passband of the main band (VFO-A) DSP filter for the "narrow" SSB mode.

Available Values: 200/400/600/850/1100/1350/1500/1650/1800/1950/2100/2250 Hz

Default Setting: 1800 Hz

095. SUB-CW-SHAPE

Function: Selects the passband characteristics of the sub band (VFO-B) DSP filter for the CW mode.

Available Values: SOFT/SHARP

Default Setting: SHARP

SOFT: Primary importance attached to amplitude of the filter factor.

SHARP: Primary importance attached to phase of the filter factor.

096. SUB-CW-FIL-SLOPE

Function: Selects the shape factor of the sub band (VFO-B) DSP filter for the CW mode.

Available Values: GENTLE/MEDIUM/STEEP

Default Setting: MEDIUM

097. SUB-CW-NARROW

Function: Selects the passband of the sub band (VFO-B) DSP filter for the CW "narrow" mode.

Available Values: 25/50/100/200/300/400 Hz

Default Setting: 300 Hz

098. SUB-PSK-SHAPE

Function: Selects the passband characteristics of the sub band (VFO-B) DSP filter for the PSK mode.

Available Values: SOFT/SHARP

Default Setting: SHARP

SOFT: Primary importance attached to amplitude of the filter factor.

SHARP: Primary importance attached to phase of the filter factor.

099. SUB-PSK-SLOPE

Function: Selects the shape factor of the sub band (VFO-B) DSP filter for the PSK mode.

Available Values: GENTLE/MEDIUM/STEEP

Default Setting: MEDIUM

100. SUB-PSK-NARROW

Function: Selects the passband of the sub band (VFO-B) DSP filter for the PSK "narrow" mode.

Available Values: 25/50/100/200/300/400 Hz

Default Setting: 300 Hz

101. SUB-RTTY-SHAPE

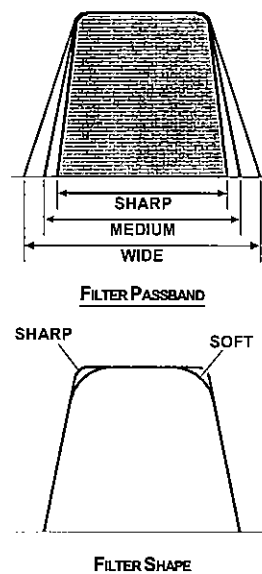
Function: Selects the passband characteristics of the sub band (VFO-B) DSP filter for the RTTY mode.

Available Values: SOFT/SHARP

Default Setting: SHARP

SOFT: Primary importance attached to amplitude of the filter factor.

SHARP: Primary importance attached to phase of the filter factor.



MENU MODE

RX DSP GROUP

102. SUB-RTTY-SLOPE

Function: Selects the shape factor of the sub band (VFO-B) DSP filter for the RTTY mode.

Available Values: GENTLE/MEDIUM/STEEP

Default Setting: MEDIUM

103. SUB-RTTY-NARROW

Function: Selects the passband of the sub band (VFO-B) DSP filter for the RTTY "narrow" mode.

Available Values: 25/50/100/200/300/400 Hz

Default Setting: 300 Hz

104. SUB-SSB-SHAPE

Function: Selects the passband characteristics of the sub band (VFO-B) DSP filter for the SSB mode.

Available Values: SOFT/SHARP

Default Setting: SHARP

SOFT: Primary importance attached to amplitude of the filter factor.

SHARP: Primary importance attached to phase of the filter factor.

105. SUB-SSB-SLOPE

Function: Selects the shape factor of the sub band (VFO-B) DSP filter for the SSB mode.

Available Values: GENTLE/MEDIUM/STEEP

Default Setting: MEDIUM

106. SUB-SSB-NARROW

Function: Selects the passband of the main band (VFO-A) DSP filter for the "narrow" SSB mode.

Available Values: 200/400/600/850/1100/1350/1500/1650/1800/1950/2100/2250 Hz

Default Setting: 1800 Hz

SCOPE GROUP

107. MAIN FIX 1.8 MHz

Function: Selects the scan start frequency of the FIX mode Spectrum Scope while monitoring on the main band (VFO-A) 160 m amateur band.

Available Values: 1.800 - 1.999 MHz (1 kHz steps)

Default Setting: 1.800 MHz

108. MAIN FIX 3.5 MHz

Function: Selects the scan start frequency of the FIX mode Spectrum Scope while monitoring on the 80 m amateur band.

Available Values: 3.500 - 3.999 MHz (1 kHz steps)

Default Setting: 3.500 MHz

109. MAIN FIX 5.0 MHz

Function: Selects the scan start frequency of the FIX mode Spectrum Scope while monitoring on the 60 m amateur band.

Available Values: 5.250 - 5.499 MHz (1 kHz steps)

Default Setting: 5.250 MHz

110. MAIN FIX 7.0 MHz

Function: Selects the scan start frequency of the FIX mode Spectrum Scope while monitoring on the 40 m amateur band.

Available Values: 7.000 - 7.299 MHz (1 kHz steps)

Default Setting: 7.000 MHz

111. MAIN FIX 10 MHz

Function: Selects the scan start frequency of the FIX mode Spectrum Scope while monitoring on the 30 m amateur band.

Available Values: 10.100 - 10.149 MHz (1 kHz steps)

Default Setting: 10.100 MHz

112. MAIN FIX 14 MHz

Function: Selects the scan start frequency of the FIX mode Spectrum Scope while monitoring on the 20 m amateur band.

Available Values: 14.000 - 14.349 MHz (1 kHz steps)

Default Setting: 14.000 MHz

113. MAIN FIX 18 MHz

Function: Selects the scan start frequency of the FIX mode Spectrum Scope while monitoring on the 17 m amateur band.

Available Values: 18.000 - 18.199 MHz (1 kHz steps)

Default Setting: 18.068 MHz

114. MAIN FIX 21 MHz

Function: Selects the scan start frequency of the FIX mode Spectrum Scope while monitoring on the 15 m amateur band.

Available Values: 21.000 - 21.449 MHz (1 kHz steps)

Default Setting: 21.000 MHz

MENU MODE

SCOPE GROUP

115. MAIN FIX 24 MHz

Function: Selects the scan start frequency of the FIX mode Spectrum Scope while monitoring on the 12 m amateur band.

Available Values: 24.800 - 24.989 MHz (1 kHz steps)

Default Setting: 24.890 MHz

116. MAIN FIX 28 MHz

Function: Selects the scan start frequency of the FIX mode Spectrum Scope while monitoring on the 10 m amateur band.

Available Values: 28.000 - 28.699 MHz (1 kHz steps)

Default Setting: 28.000 MHz

117. MAIN FIX 50 MHz

Function: Selects the scan start frequency of the FIX mode Spectrum Scope while monitoring on the 6 m amateur band.

Available Values: 50.000 - 53.999 MHz (1 kHz steps)

Default Setting: 50.000 MHz

118. SUB FIX 1.8 MHz

Function: Selects the scan start frequency of the FIX mode Spectrum Scope while monitoring on the main band (VFO-A) 160 m amateur band.

Available Values: 1.800 - 1.999 MHz (1 kHz steps)

Default Setting: 1.800 MHz

119. SUB FIX 3.5 MHz

Function: Selects the scan start frequency of the FIX mode Spectrum Scope while monitoring on the 80 m amateur band.

Available Values: 3.500 - 3.999 MHz (1 kHz steps)

Default Setting: 3.500 MHz

120. SUB FIX 5.0 MHz

Function: Selects the scan start frequency of the FIX mode Spectrum Scope while monitoring on the 60 m amateur band.

Available Values: 5.250 - 5.499 MHz (1 kHz steps)

Default Setting: 5.250 MHz

121. SUB FIX 7.0 MHz

Function: Selects the scan start frequency of the FIX mode Spectrum Scope while monitoring on the 40 m amateur band.

Available Values: 7.000 - 7.299 MHz (1 kHz steps)

Default Setting: 7.000 MHz

122. SUB FIX 10 MHz

Function: Selects the scan start frequency of the FIX mode Spectrum Scope while monitoring on the 30 m amateur band.

Available Values: 10.100 - 10.149 MHz (1 kHz steps)

Default Setting: 10.100 MHz

123. SUB FIX 14 MHz

Function: Selects the scan start frequency of the FIX mode Spectrum Scope while monitoring on the 20 m amateur band.

Available Values: 14.000 - 14.349 MHz (1 kHz steps)

Default Setting: 14.000 MHz

124. SUB FIX 18 MHz

Function: Selects the scan start frequency of the FIX mode Spectrum Scope while monitoring on the 17 m amateur band.

Available Values: 18.000 - 18.199 MHz (1 kHz steps)

Default Setting: 18.068 MHz

125. SUB FIX 21 MHz

Function: Selects the scan start frequency of the FIX mode Spectrum Scope while monitoring on the 15 m amateur band.

Available Values: 21.000 - 21.449 MHz (1 kHz steps)

Default Setting: 21.000 MHz

126. SUB FIX 24 MHz

Function: Selects the scan start frequency of the FIX mode Spectrum Scope while monitoring on the 12 m amateur band.

Available Values: 24.800 - 24.989 MHz (1 kHz steps)

Default Setting: 24.890 MHz

127. SUB FIX 28 MHz

Function: Selects the scan start frequency of the FIX mode Spectrum Scope while monitoring on the 10 m amateur band.

Available Values: 28.000 - 28.699 MHz (1 kHz steps)

Default Setting: 28.000 MHz

128. SUB FIX 50 MHz

Function: Selects the scan start frequency of the FIX mode Spectrum Scope while monitoring on the 6 m amateur band.

Available Values: 50.000 - 53.999 MHz (1 kHz steps)

Default Setting: 50.000 MHz

MENU MODE



TUNING GROUP

129. MAIN DIAL STEP

Function: Setting of the Main Tuning Knob's tuning speed on the SSB, CW, and AM modes.

Available Values: 1 or 10 Hz

Default Setting: 10 Hz

130. MAIN DIAL CW FINE

Function: Setting of the Main Tuning Knob's tuning speed in the CW mode.

Available Values: ENABLE/DISABLE

Default Setting: DISABLE

ENABLE: Tuning in 1 Hz steps on the CW mode.

DISABLE: Tuning according to the steps determined via menu item 129: DIAL STEP.

131. 1MHz/100kHz SELECT

Function: Selects the tuning steps for the CLAR/VFO-B knob when the BAND/MHz button is pressed.

Available Values: 1 MHz/100 kHz

Default Setting: 1 MHz

132. AM CH STEP

Function: Selects the tuning steps for the microphone's [UP]/[DWN] keys in the AM mode.

Available Values: 2.5/5/9/10/12.5 kHz

Default Setting: 5 kHz

133. FM CH STEP

Function: Selects the tuning steps for the microphone's [UP]/[DWN] keys in the FM mode.

Available Values: 5/6.25/10/12.5/25 kHz

Default Setting: 5 kHz

134. FM DIAL STEP

Function: Setting of the Main Tuning Knob's tuning speed in the FM mode.

Available Values: 10/100 Hz

Default Setting: 100 Hz

135. MY BAND

Function: Programs a band to be skipped while selecting bands using the CLAR/VFO-B knob.

Available Values: 1.8 ~ 50/GEN/TRV

Default Setting: TRV

To program the band to be skipped, rotate the CLAR/VFO-B knob to recall the band to be skipped while selecting bands via the CLAR/VFO-B knob, then press the [ENT] key to change this setting to "ON." Repeat the same procedures to cancel the setting (skipped "off"). The skipped band will be high-lighted on the TFT display.

TX AUDIO GROUP

136. F-PRMTRC EQ1-FREQ

Function: Selects the center frequency of the lower range for the front panel's parametric microphone equalizer.

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

Default Setting: OFF

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

100 ~ 700: You may adjust the equalizer gain and Q-factor at this selected audio frequency via menu items 138: F-PRMTRC EQ1-LEVEL and 139: F-PRMTRC EQ1-BWTH.

137. F-PRMTRC EQ1-LEVEL

Function: Adjusts the equalizer gain of the low range of the front panel's parametric microphone equalizer.

Available Values: -10 ~ +10

Default Setting: +5

138. F-PRMTRC EQ1-BWTH

Function: Adjusts the Q-factor of the low range of the front panel's parametric microphone equalizer.

Available Values: 1 ~ 10

Default Setting: 10

139. F-PRMTRC EQ2-FREQ

Function: Selects the center frequency of the middle range for the front panel's parametric microphone equalizer.

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

Default Setting: OFF

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

700 ~ 1500: You may adjust the equalizer gain and Q-factor at this selected audio frequency via menu items 141: F-PRMTRC EQ2-LEVEL and 142: F-PRMTRC EQ2-BWTH.

140. F-PRMTRC EQ2-LEVEL

Function: Adjusts the equalizer gain of the middle range of the front panel's parametric microphone equalizer.

Available Values: -10 ~ +10

Default Setting: +5

141. F-PRMTRC EQ2-BWTH

Function: Adjusts the Q-factor of the middle range of the front panel's parametric microphone equalizer.

Available Values: 1 ~ 10

Default Setting: 10

MENU MODE

TX AUDIO GROUP

142. F-PRMTRC EQ3-FREQ

Function: Selects the center frequency of the high range for the front panel's parametric microphone equalizer.

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

Default Setting: OFF

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

15 ~ 32: You may adjust the equalizer gain and Q-factor in this selected audio frequency via menu items 144: F-PRMTRC EQ3-LEVEL and 145: F-PRMTRC EQ3-BWTH.

143. F-PRMTRC EQ3-LEVEL

Function: Adjusts the equalizer gain of the high range of the front panel's parametric microphone equalizer.

Available Values: -10 ~ +10

Default Setting: +5

144. F-PRMTRC EQ3-BWTH

Function: Adjusts the Q-factor of the high range of the front panel's parametric microphone equalizer.

Available Values: 1 ~ 10

Default Setting: 10

145. R-PRMTRC EQ1-FREQ

Function: Selects the center frequency of the low range for the rear panel's parametric microphone equalizer.

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

Default Setting: OFF

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

100 ~ 700: You may adjust the equalizer gain and Q-factor in this selected audio frequency via menu items 147: R-PRMTRC EQ1-LEVEL and 148: R-PRMTRC EQ1-BWTH.

146. R-PRMTRC EQ1-LEVEL

Function: Adjusts the equalizer gain of the low range of the rear panel's parametric microphone equalizer.

Available Values: -10 ~ +10

Default Setting: +5

147. R-PRMTRC EQ1-BWTH

Function: Adjusts the Q-factor of the low range of the rear panel's parametric microphone equalizer.

Available Values: 1 ~ 10

Default Setting: 10

148. R-PRMTRC EQ2-FREQ

Function: Selects the center frequency of the middle range for the rear panel's parametric microphone equalizer.

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

Default Setting: OFF

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

700 ~ 1500: You may adjust the equalizer gain and Q-factor at this selected audio frequency via menu items 150: R-PRMTRC EQ2-LEVEL and 151: R-PRMTRC EQ2-BWTH.

149. R-PRMTRC EQ2-LEVEL

Function: Adjusts the equalizer gain of the middle range of the rear panel's parametric microphone equalizer.

Available Values: -10 ~ +10

Default Setting: +5

150. R-PRMTRC EQ2-BWTH

Function: Adjusts the Q-factor of the middle range of the rear panel's parametric microphone equalizer.

Available Values: 1 ~ 10

Default Setting: 10

151. R-PRMTRC EQ3-FREQ

Function: Selects the center frequency of the high range for the rear panel's parametric microphone equalizer.

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

Default Setting: OFF

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

1500 ~ 3200: You may adjust the equalizer gain and Q-factor at this selected audio frequency via menu items 153: R-PRMTRC EQ3-LEVEL and 154: R-PRMTRC EQ3-BWTH.

152. R-PRMTRC EQ3-LEVEL

Function: Adjusts the equalizer gain of the high range of the rear panel's parametric microphone equalizer.

Available Values: -10 ~ +10

Default Setting: +5

153. R-PRMTRC EQ3-BWTH

Function: Adjusts the Q-factor of the high range of the rear panel's parametric microphone equalizer.

Available Values: 1 ~ 10

Default Setting: 10

MENU MODE

TX GNRL GROUP

154. TX MAX POWER

Function: Selects a maximum output power limit.

Available Values: 400/200/100/50 W

Default Setting: 400 W

155. TX PWR CONTROL

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

Available Values: ALL MODE/CARRIER

Default Setting: ALL MODE

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

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

156. EXT AMP TX-GND

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

Available Values: ENABLE/DISABLE

Default Setting: DISABLE

157. EXT AMP TUNING PWR

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

Available Values: 400/200/100/50 W

Default Setting: 200 W

158. FULL DUPLEX

Function: Enables/Disables Full Duplex operation.

Available Values: SIMP/DUP

Default Setting: SIMP

When this menu is set to "DUP," you may receive on the sub band (VFO-B) frequency while transmitting, during dual receive operation, on a different band on the main band (VFO-A).

159. VOX SELECT

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

Available Values: MIC/DATA

Default Setting: MIC

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

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

160. EMERGENCY FREQ TX

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

Available Values: DISABLE/ENABLE

Default Setting: DISABLE

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

CUSTOMIZED OPTION

ABOUT CUSTOMIZATION OPTIONS

With regard to the FT DX 9000MP, the addition of one or more of the customization options can elevate performance of the basic transceiver to a higher level. Additionally, you may configure the level of performance that fits the requirements of your station, as well as your personal tastes and preferences. Because these options are delicate, high-technology devices, please contact WDXC regarding the latest information regarding installation of any options inside your FT DX 9000MP.

RF μ -Tuning Units

(MTU-160, MTU-80/40, MTU-30/20)

On the 14 MHz and lower bands, the μ -Tuning Units provide extraordinarily high Q; the resulting steep shape factor is a powerful aid for reducing off-frequency interference. Separate modules are available for the 1.8 MHz, 3.5/7 MHz, and 10.1/14 MHz bands, and they may be installed on the Main Receiver only (not in the RXU-9000).

Thanks to the large (1.1"/28 mm) inductor through which a stack of ferrite cores is adjusted, the bandwidth of the μ -Tuning (± 12.5 kHz) provides unmatched protection for the receiver front end and following circuits.

TFT Display Unit (TFT-9000)

The TFT-9000 TFT Display Unit allows to display the enable the "World Clock," "Spectrum Scope," "Audio Scope/Oscilloscope," "Logbook," "Rotator Control," and "Temperature/SWR Status Display" functions to the internal 6.5" TFT Display which provides 800 x 480 dot screen high resolution and easy viewing.

RF μ -TUNING UNITS (MTU-160, MTU-80/40, MTU-30/20)

The optional RF μ -Tuning Units provide ultra-sharp RF selectivity for the Main (VFO-A) band. The high Q is made possible by the narrow-band design; one μ -Tune module is required for the 1.8 MHz band (**MTU-160**), while the 3.5 and 7 MHz bands are covered by the **MTU-80/40**, and the 10.1 and 14 MHz bands are covered by the **MTU-30/20**.

When one of three optional units is installed, it will automatically be adjusted so as to center on your operating frequency. The narrow bandwidth is especially useful on the low bands, where many strong signals being received via NVIS propagation (Near Vertical-Incidence Signals) within a narrow bandwidth, and the added protection at the RF stage is especially helpful in preventing IMD and blocking.

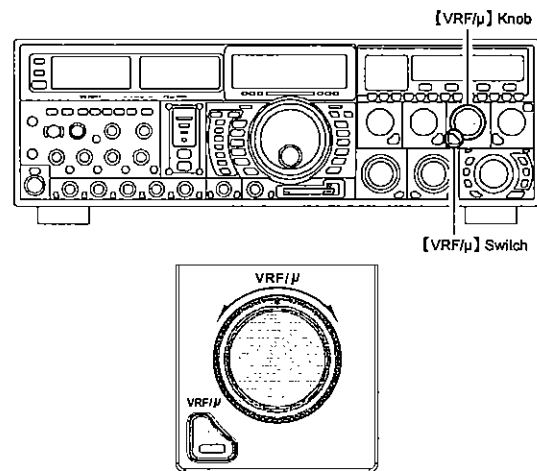
The μ -Tuning circuitry, with a Q and shape factor much higher than that afforded even by VRF, can also be manually adjusted to provide relief against interference as close as 10 kHz away. The insertion loss of the μ -Tune filters is higher than that of the VRF circuit, so if Noise Figure is a concern you may select the VRF circuit, instead of μ -Tuning, via the Menu.

『Note』

The μ -Tuning modules are available only for the Main (VFO-A) band, and only function up through the 14 MHz band. On the 18 MHz and higher Amateur bands, the VRF circuitry is utilized.

μ -Tune Operation on the Main (VFO-A) band Receiver

- Press the **[VRF/ μ]** switch (#**8**). The imbedded Red LED will light up.
 - The μ -Tune circuit will automatically align itself onto your operating frequency.
 - Remember that μ -Tune only operates on the VFO-A band on the 14 MHz and lower bands.
- Now rotate the **[VRF/ μ]** knob (#**2**) to peak the response (background noise) or reduce interference.
 - The amount of change in the center frequency of the μ -Tune filter, when rotating the **[VRF/ μ]** knob by one click, can be configured using Menu item **“No. 035 GENERAL μ TUNE DIAL STEP.”**
- Press the **[VRF/ μ]** switch (momentarily) once more to disengage the μ -Tune filter; the imbedded Red LED will switch off. In this mode, only the fixed bandpass filter for the current band will be engaged.



『Advice』

- The μ -Tune filters are the most advanced, selective RF preselector filters ever incorporated into an Amateur Radio transceiver. The RF selectivity provided by μ -Tune can be of tremendous value in ensuring quiet, intermod-free reception even in the most crowded bands on a contest weekend. The μ -Tune filters provide RF selectivity on the order of a few dozen kHz at -6 dB, at the expense of a few dB of system gain on bands where noise figure is seldom an issue. You will notice that the S-meter deflection, when μ -Tune is engaged, is slightly less than when it is out of the circuit; this is normal. If your antenna system gain is so low as to make it impossible to hear band noise when μ -Tune is engaged (highly unlikely), just switch it out or revert to the VRF system, which has slightly less insertion loss.
- As you tune around on an amateur band with μ -Tune engaged, the microprocessor automatically commands the stepper motor driving the toroid core stack to center the filter on your current operating frequency (the tuning resolution is 5 kHz). You may, however, use the **[VRF/ μ]** knob (#**2**) to skew the filter response to one side or the other from your operating frequency, to deal with heavy interference on one side. To re-center the μ -Tune filter on your operating frequency, and eliminate any offset, press and hold in the **[VRF/ μ]** switch (#**8**) for two seconds.
- While μ -Tune is a superior RF preselection circuit, it may be disabled via the Menu; if this is done, the VRF circuit will engage when the **[VRF/ μ]** switch is pressed. To disable μ -Tune, go to Menu item **“No. 035 GENERAL μ TUNE DIAL STEP”** and set the selection to “OFF.”

『Quick Note』

The permeability-tuning concept utilized in the μ -Tune circuit dates back many decades, as it was incorporated in such classic transceivers as the FT-101 and FT-901 series, in addition to the FT dx 400 and similar models. The μ -Tune circuit in the FT dx 9000MP is the highest development of this circuit concept ever employed in an Amateur transceiver.

RF μ -TUNING UNITS (MTU-160, MTU-80/40, MTU-30/20)

μ -Tune and VRF: Comparisons to Fixed Bandpass Filters

μ -Tune

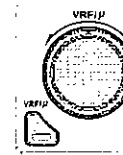
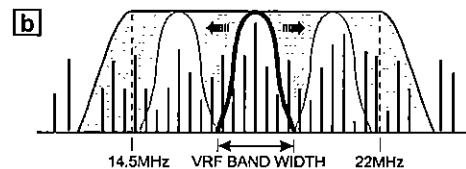
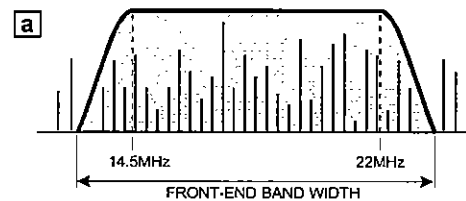
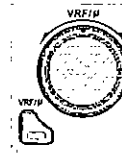
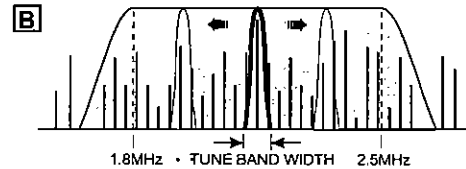
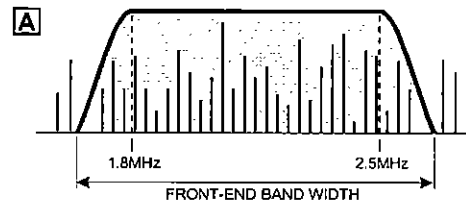
Inspection of the illustrations to the right will demonstrate the profound advantage of the μ -Tune circuit. In illustration [A], the gray area represents the passband of a typical fixed bandpass filter covering the 1.8 ~ 3 MHz range; this is typical of the kind of bandpass filter found in many high-quality HF receivers today. Note also the hypothetical distribution of signals across the 160-meter band.

In illustration [B], note the narrow white segment within the gray passband of the fixed BPF. These narrow segments represent the typical bandwidth of the μ -Tune filter, and one can see that the passband has been reduced from about 750 kHz (in the case of the fixed BPF) to a few dozen kHz when μ -Tune is engaged. The vast majority of the incoming signals are outside the passband of the high-Q μ -Tune filter, and they will not impinge on any of the RF/IF amplifiers, the mixers, or the DSP. Very strong out-of-band signals like this can cause Intermodulation, blinking, and an elevated noise floor for a receiver.

VRF

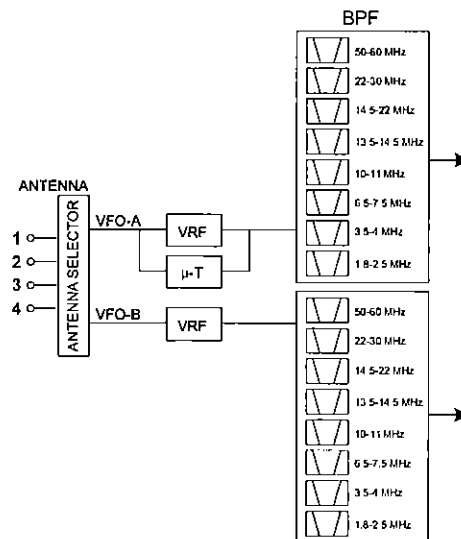
In this example, illustration [a] depicts a typical fixed bandpass filter covering 14.5 to 22 MHz, and once again the gray shaded area depicts the fixed bandpass filter's frequency coverage. The vertical lines in the illustration, once again, represent hypothetical signals throughout this frequency range.

Figure [b] shows the same fixed BPF, with the white area representing the typical passband of the VRF filter operating in the same frequency range. Although the selectivity of the VRF is not as tight as that of the μ -Tune filter, the RF selectivity of the VRF preselector is still magnitudes better than that of the usual fixed bandpass filter, affording significant protection against the ingress of high signal voltage from strong out-of-band signals.



『Advice』

With μ -Tuning, the center frequency of the filter is continuously adjustable throughout its operating range, and the quality L/C components ensure a tight passband due to the high Q of the circuit. The RF preselection design task involves not only the selection of quality L/C components, but the crafting of a tuning mechanism and tuning concept that preserves system Q (thus assuring a tight bandwidth) while providing a wide operating frequency range and consistent, automated tuning. The smooth tuning is achieved by varying the inductance over a wide range; this is accomplished by motor-driving a large 1.1" (28 mm) ferrite core stack through a 2" high (50 mm) coil structure. Three μ -Tune modules provide coverage of the 160, 80/40, and 30/20 meter bands on the FT DX 9000MP, and the Q of this circuit, being over 300, yields unmatched RF selectivity for outstanding rejection of undesired signals.



TFT DISPLAY UNIT (TFT-9000)

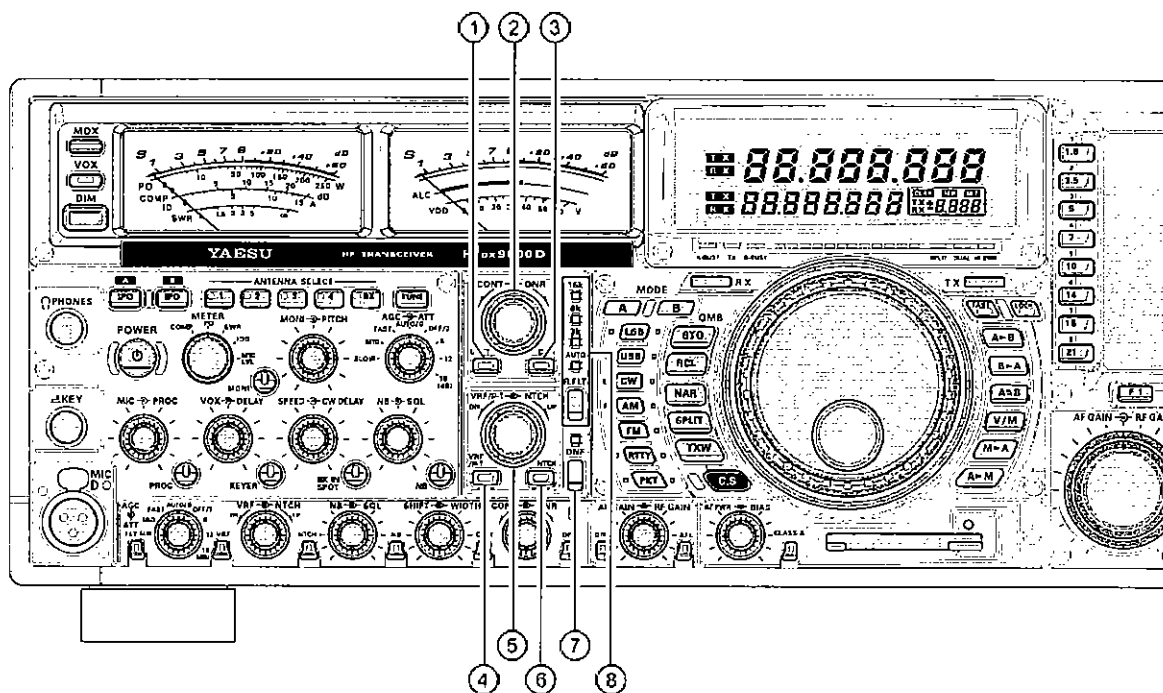
When the optional TFT Display Unit (TFT-9000) is installed, a wide range of informational displays are available on the various pages of the TFT:

- World Clock Page
- Spectrum Scope Page
- Audio Scope/Oscilloscope Page
- Log Book Page
- Temperature and SWR Status Page
- Rotator Control Page
- Memory Channel list Page

For details of the operation with respect to the TFT Display Unit, please refer to the "TFT Operating Manual."

When the TFT Display Unit is installed, the layout of the front panel of the transceiver changes to conform to the illustration below.

FRONT PANEL CONTROLS



① CONT Button

This button turns the Main (VFO-A) band's CONTOUR filter on and off.

② CONT \rightarrow DNR Knob CONT Knob

The inner [CONT] knob selects the desired Main (VFO-A) band's CONTOUR filter response.

DNR Knob

The outer [DNR] knob selects the optimum Main (VFO-A) band's Digital Noise Reduction response.

③ DNF Switch

This button turns the Main (VFO-A) band's Digital Notch Filter on and off.

④ VRF/ μ -T Switch

This button turns the Main (VFO-A) band receiver's VRF filter on and off.

『Advice』

When the μ -Tune Unit is installed, this switch serves as the On/Off switch for the μ -Tune feature.

⑤ VRF/ μ -T \rightarrow NTCH Knobs

VRF/ μ -T Knob

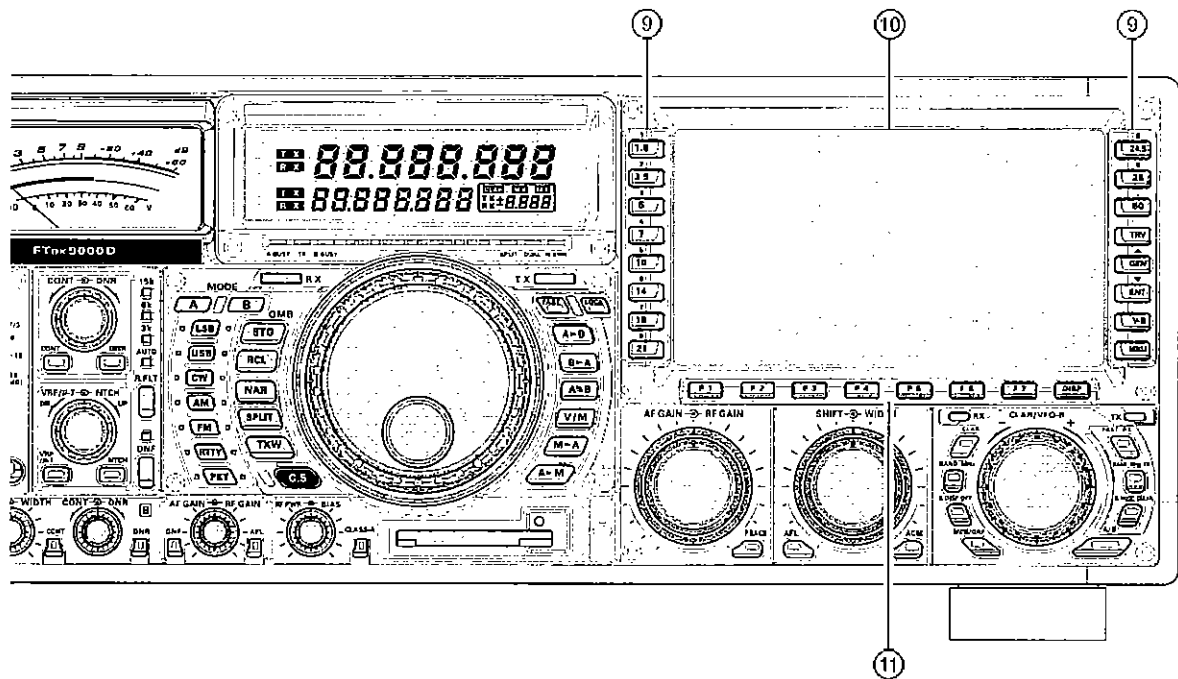
The inner [VRF/ μ -T] knob provides adjustment of the Main (VFO-A) band's VRF (Variable RF Filter) preselector circuit.

NTCH Knob

The outer [NTCH] knob adjusts the center frequency of the Main (VFO-A) band's IF notch filter.

TFT DISPLAY UNIT (TFT-9000)

FRONT PANEL CONTROLS



⑥ NTCH Switch

This button turns the Main (VFO-A) band's IF notch filter on and off.

⑦ DNF Switch

This button turns the Main (VFO-A) band's Digital Notch Filter on and off.

⑧ R.FLT Switch

This button selects the bandwidth for the Main (VFO-A) band receiver's first IF Roofing Filter.

⑨ BAND Key

These keys allow one-touch selection of the desired Amateur band (1.8 ~ 50 MHz).

What's more, the [0] ~ [9] keys may be used for direct entry of a desired operating frequency during VFO operation.

⑩ TFT Display (see page 40)

This 6.5-inch TFT display is used for viewing and control of a variety of features, and it includes pages including a World Map, World Clock, Spectrum Scope, SWR and Transmitter Status, Log Book, Audio Scope and Oscilloscope, Memory Channel listing, and Menu listings, plus much more.

⑪ [F1] ~ [F7] / [DISP] Keys

[F1] ~ [F7] Key

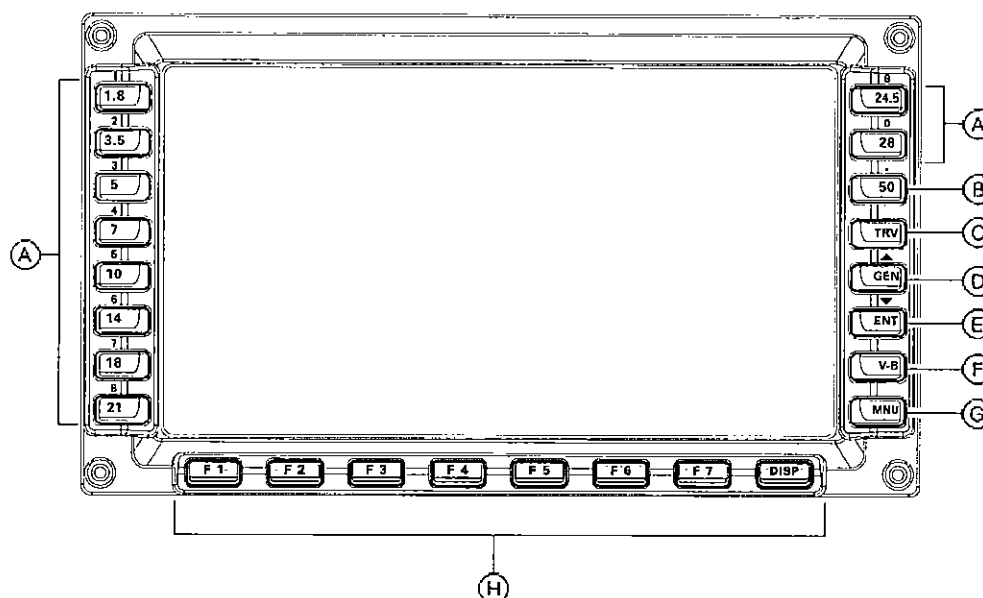
These keys are used for selection of a variety of functions, depending on the TFT operation page selected. The actual selection available at any given time is shown on the TFT, just above the function key.

[DISP] (Display) Key

This key is used for selection of the desired TFT operation page.

TFT DISPLAY UNIT (TFT-9000)

TFT FEATURE / CONTROL DETAILS



- (A) Pressing any of these keys provides one-touch access to the Amateur bands from 1.8 ~ 28 MHz. When the [ENT] key has been pressed first, these keys then serve as the frequency entry digits (“1” ~ “0”) during direct frequency entry.
- (B) Pressing this key provides one-touch access to the 50 MHz Amateur band. When the [ENT] key has been pushed first, to engage direct frequency entry, pressing this key sets the decimal point after the “MHz” portion of the frequency.
- (C) This key turns the 28 MHz low-level (0 dBm) output from the rear-panel’s TRV jack ON or OFF. When the Transverter function is turned on, both the TFT and the main frequency display will show the converted frequency’s last two digits of the “MHz” field, according to the band programmed via Menu #034 (for example, if your transverted frequency is 144.200.00 MHz, the display will show “44.200.00” as the operating frequency).
- (D) Pressing this key selects the “General Coverage” VFO register, for reception outside the Amateur bands.
- (E) Pressing this key momentarily engages the “direct frequency entry” mode of operation, whereby the keys described in the (A) and (B) sections above are used for directly programming the operating frequency. Once the frequency has been successfully entered, press the [ENT] key once more to exit to the newly-selected frequency.
- (F) For entering a frequency directly into the Sub (VFO-B) band register, press this key. Then use the keys described in sections (A) and (B) above for entering the digits of the desired frequency; when done, press the [V-B] key once more to lock the newly-selected frequency into the Sub (VFO-B) band register.
- (G) This key is used for gaining access to the Menu system, for configuring various transceiver characteristics. menu operation is described in detail, in this manual, beginning on page 128.
- Important note:**
pressing this key momentarily activates the Menu, and the Menu selections will appear on the TFT screen; once you are finished, you must press and hold in the [MNU] key for two seconds to save any configuration changes (momentarily pressing [MNU] key to exit will not save the changes).
- (H) These are the “Function” keys for the various functions associated with each page of the TFT’s operational capability. The exact function of each key will depend on the page selected.

NOTE

SPECIFICATIONS

General

Rx Frequency Range:	30 kHz - 60 MHz (Operating) 160 - 6 m (Amateur bands only)
Tx Frequency Ranges:	160 - 6 m (Amateur bands only)
Frequency Stability:	±0.03 ppm (after 5 min. @ -10 °C ~ +60 °C [+14 °F ~ +140 °F])
Operating Temperature Range:	-10 °C ~ +60 °C [+14 °F ~ +140 °F]
Emission Modes:	A1A (CW), A3E (AM), J3E (LSB, USB), F3E (FM), F1B (RTTY), F1D (PACKET), F2D (PACKET)
Frequency Steps:	1/10 Hz (SSB, CW, & AM), 100 Hz (FM)
Antenna Impedance:	50 Ω, unbalanced 16.7 - 150 Ω, unbalanced (Tuner ON, 160 - 10 m Amateur bands, TX only) 25 - 100 Ω, unbalanced (Tuner ON, 6 m Amateur band, TX only)
Dimensions (WxHxD):	20.4" x 6.5" x 17.3" (518 x 165 x 438.5 mm)
Weight (approx.):	64 lbs (29 kg)

Transmitter

Power Output:	10 - 400 watts (10 - 100 watts AM carrier), Class A mode (SSB): 10 - 100 watts maximum
Modulation Types:	J3E (SSB): Balanced, A3E (AM): Low-Level (Early Stage), F3E (FM): Variable Reactance
Maximum FM Deviation:	± 5.0 kHz/± 2.5 kHz
Harmonic Radiation:	Better than -60 dB (160 - 10m Amateur bands) Better than -70 dB (6m Amateur band)
SSB Carrier Suppression:	At least 70 dB below peak output
Undesired Sideband Suppression:	At least 80 dB below peak output
Audio Response (SSB):	Not more than -6 dB from 400 to 2600 Hz
3rd-order IMD:	-31 dB @ 400 watts PEP, -50 dB @ 100 watts PEP (Class A mode)
Microphone Impedance:	600 Ω (200 to 10 kΩ)

SPECIFICATIONS

Receiver

Circuit Type:	Triple-conversion superheterodyne		
Intermediate Frequencies:	VFO-A; 40.455 MHz/455 kHz/30 kHz (24 kHz for FM), VFO-B; 40.455 MHz/450 kHz/30 kHz (24 kHz for FM)		
Sensitivity (IPO "OFF"):	SSB (2.4 kHz, 10 dB S+N/N) 0.2 μ V (160 - 10 m Amateur bands) 0.125 μ V (6 m Amateur band) 2 μ V (0.1 - 50 MHz) AM (6 kHz, 10 dB S+N/N, 30 % modulation@400 Hz) 3.2 μ V (0.1 - 1.8 MHz) 2 μ V (1.8 - 30 MHz) 1 μ V (6 m Amateur band) FM (12 dB SINAD) 0.5 μ V (10 m Amateur band) 0.35 μ V (6 m Amateur band)		
Selectivity (-6/-66 dB):	Mode	-6 dB	-66 dB
	CW/RTTY/PKT	0.5 kHz or better	750 Hz or less
	SSB	2.4 kHz or better	3.6 kHz or less
	AM	9 kHz or better	18 kHz or less
	FM	15 kHz or better	25 kHz or less
	(WIDTH: Center, VRF/ μ -TUNE: OFF)		
Image Rejection:	70 dB or better (160 - 10m Amateur bands)		
Maximum Audio Output:	2.5 W into 4 Ω with 10% THD		
Audio Output Impedance:	4 to 8 Ω (4 Ω : nominal)		

Power Supply Unit (FPS-9000H)

Power Supply Section

Input Voltage:	90 VAC - 264 VAC (Universal)		
Output Voltage:	50 VDC , 13.8 VDC, 5 VDC		
Power Consumption:	Rx (no signal)		100 VA
(@117 V Input)	Rx (signal present)	120 VA	
	Tx (400 W)		1500 VA
Maximum Output Current:	50 V: 24 A, 13.8 V: 5 A, 5 V: 7 A		
Ripple Voltage:	500 mV or less (50 V Line @ 6 A) 150 mV or less (13.8 V Line @ 5 A) 100 mV or less (5 V Line @ 7 A)		

Speaker Section

Speaker Aperture:	4" (100 mm); Left and right speakers are identical.
Maximum Input:	7 Watts
Input Audio Impedance:	8 Ω
Audio Frequency Response:	100 ~ 12,000 Hz

Filter Characteristics (Cutoff Frequencies: Independent Left and Right Filters are built in)

LOW1:	Approx. 300 Hz (-6 dB/Oct)
LOW2:	Approx. 500 Hz (-6 dB/Oct)
HIGH1:	Approx. 2.4 kHz (-6 dB/Oct)
HIGH2:	Approx. 1 kHz (-6 dB/Oct)
HIGH3:	Approx. 700 Hz (-6 dB/Oct)

Misc.

Case Size (WxHxD):	9.7" x 7.2" x 17.2" (246 x 182 x 438 mm) (without knobs/jacks)
Weight (approx.):	23.1 lb (10.5 kg)

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

NOTE

NOTE

NOTE

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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