## 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, TX only) |
| | 25 - 100 Ω, unbalanced (Tuner ON, 6 m, TX only) |
| Power Consumption: | Rx (no signal) 100 VA |
| | Rx (signal present) 120 VA |
| | Tx (200 W) 720 VA |
| Supply Voltage: | 90 V AC - 264 V AC (Universal Input) |
| Dimensions (WxHxD): | 20.4”x 6.5”x 17.3” (518 x 165 x 438.5 mm) |
| Weight (approx.): | 30 kg. (66 lbs) |

### Transmitter

| | |
|---|---|
| Power Output: | 5 - 200 watts |
| | (5 - 75 watts AM carrier), |
| | Class-A mode (SSB): 5 - 75 watts |
| 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: | –35 dB @ 200 watts PEP, |
| | –50 dB @ 75 watts PEP (Class-A mode) |
| Microphone Impedance: | 600 Ω (200 to 10 kΩ) |

**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 µV (160 - 10 m Amateur bands) | |
| | | 0.125 µV (6 m Amateur band) | |
| | | 2 µV (0.1 - 50 MHz) | |
| | AM (6 kHz, 10 dB S+N/N, 30 % MOD @400 Hz) | | |
| | | 32 µV (0.1 - 1.8 MHz) | |
| | | 2 µV (1.8 - 30 MHz) | |
| | | 1 µV (6 m Amateur band) | |
| | FM (12 dB SINAD) | | |
| | | 0.5 µV (10 m Amateur band) | |
| | | 0.35 µV (6 m Amateur band) | |

| Selectivity (–6/–66 dB): (WIDTH: Center, VRF/µ-TUNE: OFF) | 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 |

| | |
|---|---|
| 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) |

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

## Accessories & Options

### Supplied Accessories

| | |
|---|---|
| AC Power Cord | 1 |
| CF Card | 1 |
| RCA Plug | 6 |
| 1/4-inch 3-contact Plug | 2 |
| 3.5 mm 3-contact Plug | 1 |
| 3.5 mm 2-contact Plug | 2 |
| 4-pin DIN Plug | 1 |
| 5-pin DIN Plug | 1 |
| 8-pin DIN Plug | 1 |
| FH-2 Remote Control Keypad | 1 |

### Available Options

## Safety Precautions

Before initiating the installation of your FT DX 9000 Contest transceiver, please take the time to review the following safety guidelines.

### Power Connections

The advanced switching-regulator power supply of the FT DX 9000 Contest does not require any transformer re-wiring, nor any changing of a switch position; the FT DX 9000 Contest will operate from either 220 V or 117 Volt line voltages without configuration changes. DC power must not be used to provide power to the FT DX 9000 Contest.

### Ground Connections

The FT DX 9000 Contest HF transceiver, like any other HF communications apparatus, requires an effective ground system for maximum electrical safety and best communications effectiveness. A good ground system can contribute to station efficiency in a number of ways:

- ❒ It can minimize the possibility of electrical shock to the operator.
- ❒ It can minimize RF currents flowing on the shield of the coaxial cable and the chassis of the transceiver; such currents may lead to radiation which can cause interference to home entertainment devices or laboratory test equipment.
- ❒ It can minimize the possibility of erratic transceiver/accessory operation caused by RF feedback and/or improper current flow through logic devices.

An effective earth ground system make take several forms; for a more complete discussion,

see an appropriate RF engineering text. The information below is intended only as a guideline.

Typically, the ground connection consists of one or more copper-clad steel rods, driven into the ground. If multiple ground rods are used, they should be positioned in a “V” configuration, and bonded together at the apex of the “V” which is nearest the station location. Use a heavy, braided cable (such as the discarded shield from type RG-213 coaxial cable) and strong cable clamps to secure the braided cable(s) to the ground rods. Be sure to weatherproof the connections to ensure many years of reliable service. Use the same type of heavy, braided cable for the connections to the station ground bus (described below).

Inside the station, a common ground bus consisting of a copper pipe of at least 25 mm (1”) diameter should be used. An alternative station ground bus may consist of a wide copper plate (single-sided circuit board material is ideal) secured to the bottom of the operating desk. Grounding connections from individual devices such as transceivers, power supplies, and data communications devices (TNCs, etc.) should be made directly to the ground bus using a heavy, braided cable.

Do not make ground connections from one electrical device to another, and thence to the ground bus. This so-called “Daisy-Chain” grounding technique may nullify any attempt at effective radio frequency grounding. See the drawing below for examples of proper grounding techniques.

Inspect the ground system - inside the station as well as outside - on a regular basis so as to ensure maximum performance and safety.

Besides following the above guidelines carefully, note that household or industrial gas lines must never be used in an attempt to establish an electrical ground. Cold water pipes may, in some instances, help in the grounding effort, but gas lines represent a significant explosion hazard, and must never be used.

**Electrical Shock Prevention**

Be certain that all station wiring is properly insulated so as to prevent short-circuits which could damage this transceiver and/or accessories connected to it. Be sure to protect power cables from damage due to abrasion by ensuring that they cannot be walked upon nor crushed under rolling chairs, etc. Never route power cables near sharp metallic edges which might cut through protective insulation.

Never spill liquids into this transceiver, and do not drop sharp metallic objects into the transceiver enclosure. Electrical shock may result when you attempt to remove the object.

Unsupervised children must be kept away from any electrical apparatus such as the FT DX 9000 Contest transceiver and its accessories.

**Antenna Precautions**

Always install antennas such that they can never come in contact with outdoor power lines in the event of a catastrophic antenna support or power line support structure failure. An adequate safety margin is usually provided by separating power lines from the antenna and its support structure [1.5 times the height of the support] plus [the length of any antenna or guy wires attached to the support] plus [the height of the power line support pole].

Ground the antenna support structure adequately, so as to dissipate energy absorbed during a lightning strike. Install appropriate lightning arrestors in the antenna lead-in and rotator cable (if used) according to the arrestor's instructions.

In the event of an approaching electrical storm, disconnect all antenna lead-in, rotator control, and power cables completely from the station, but only if the storm is not immediately in your area. Do not allow disconnected cables to touch the case of your FT DX 9000 Contest transceiver or accessories, as lightning can easily jump from the cable to the circuitry of your transceiver via the case, causing irreparable damage. If a lightning storm is in progress in your immediate area, do not attempt to disconnect the cables, as you could be killed instantly should lightning strike your antenna, tower, or a nearby power line.

If a vertical antenna is used, be certain that humans and/or pets or farm animals are kept away both from the radiating element (to prevent electrical shock and RF exposure danger) and the ground system (in the event of an electrical storm). The buried radials of a ground-mounted vertical antenna can carry lethal voltages outward from the center of the antenna in the event of a direct lightning strike.

**RF Field Exposure Advisory & Electromagnetic Compatibility**

This transceiver is capable of power output in excess of 50 Watts, so customers in the United States may be required to demonstrate compliance with Federal Communications Commission (FCC) regulations concerning maximum permissible exposure to radio frequency energy. Compliance is based on the actual power output used, feedline loss, antenna type and height, and other factors which can only be evaluated as a system. Information regarding these regulations may be available from your Dealer, your local radio club, from the FCC directly (press releases and other information can be found on the FCC's site on the World Wide Web at <http://www.fcc.gov>), or from the American Radio Relay League, Inc. (225 Main St., Newington CT 06111 or <http://www.arrl.org>).

Remember to re-evaluate your station's compliance with these regulations during portable operations such as Field Day or special-event stations.

Regarding electromagnetic compatibility: if this transceiver is used with, or in the vicinity of, a

computer or computer-driven accessories, you may need to experiment with grounding and/or Radio Frequency Interference (RFI) suppression devices (such as ferrite cores) to minimize interference to your communications caused by energy from the computer. Computer-generated RFI is usually a result of inadequate shielding of the computer's cabinet or I/O and peripheral connections. While computer equipment may "comply" with RF emission standards, this does not ensure that sensitive amateur radio receivers will not experience interference from the device!

Be certain to use only shielded cables for TNC-to-Transceiver connections. You may need to install AC line filters on the power cord(s) of the suspected equipment, and decoupling ferrite toroidal chokes may be required on interconnecting patch/data cables. As a last resort, you can try installing additional shielding within the computer's case, using appropriate conductive mesh or conductive shielding tape. Especially check "RF holes" where plastic is used for cabinet front panels.

For further information, consult amateur radio reference guides and publications relating to RFI suppression techniques.

## General Setup

### Preliminary Inspection

Inspect the transceiver upon opening the packing carton. Check that all controls and switches work freely, and inspect the cabinet for any damage. Ensure the accessory fuses and plugs pictured on page ?? are included. If any damage is found, document it completely, and contact the shipping company (or dealer, if you purchased it over-the-counter) right away. Save the packing materials in case you need to return the set for service.

### Power Connections

The advanced switching-regulator power supply of the FT DX 9000 Contest does not require any transformer re-wiring, nor any changing of a switch position: the FT DX 9000 Contest will operate from either 220 V or 117 Volt line voltages without configuration changes.

Connect the supplied AC power cord between the 3-pin ~AC IN jack on the rear panel and the AC wall outlet.

### Transceiver Location

To assure long life of the components, a primary consideration in setting up the FT DX 9000 Contest is providing for adequate ventilation around the cabinet. The cooling system of the FT DX 9000 Contest must be free to draw cool air in around the transceiver body, and to

expel warm air out of the rear panel. Do not place the transceiver on top of another heat-generating device such as a linear amplifier, and do not place equipment, books or papers on top of the transceiver. Also, provide a few inches/centimeters of space on either side of the transceiver, if possible. Avoid heating vents and window locations that could expose the transceiver to excessive direct sunlight, especially in hot climates.

**Grounding**

For protection from electrical shock, and to ensure proper performance, connect the GND terminal on the rear panel to a good earth ground, using a heavy braided cable of the shortest length possible. All other station equipment should be connected to the same grounding cable, as close together as practical. If you use a computer with or near the FT DX 9000 Contest, you may need to experiment with ground wiring to suppress computer noise in the receiver, and ground loops during transmission.

**Adjusting the Front Feet**

The two front feet of the FT DX 9000 Contest can be set in either of two positions. To retract the foot, turn the foot clockwise then pull the foot outward, then turn the foot counter-clockwise to lock the foot. To retract the foot, reverse the above process.

**Main Tuning Knob Torque Adjustment**

If the Main Tuning knob is too tight or too loose for your preference, you can adjust the torque by rotating the Main Tuning knob with your right hand while holding the skirt part of the Main Tuning knob with your left hand. Turn the Main Tuning knob counter-clockwise to tighten the torque, and turn the Main Tuning knob clockwise to loosen the torque.

**Antenna Considerations**

The FT DX 9000 Contest is designed for use with any antenna system providing a 50 Ω resistive impedance at the desired operating frequency. While minor excursions from the 50 Ω specification are of no consequence, the transceiver's Automatic Antenna Tuner may not be able to reduce the impedance mismatch to an acceptable value if the Standing Wave Ratio (SWR) present at the Antenna jack is greater than 3:1. Among the undesirable consequences that high SWR may produce are:

- ❒ The transceiver's power amplifier protection circuitry will reduce power if the Automatic Antenna Tuner is unsuccessful in reducing the SWR.
- ❒ Even if the Automatic Antenna Tuner successfully normalizes the impedance presented to the radio, feed-line losses will escalate rapidly with increasing SWR at the higher

operating frequencies, especially 28 MHz.

- ❒ Although high SWR itself does not cause feed-line radiation, the sudden onset of high SWR may well indicate a mechanical failure in a matching device, leading to an electrical condition which may cause excessive feed-line radiation, which can cause interference to nearby home-entertainment devices.

Every effort should, therefore, be made to ensure that the impedance of the antenna system utilized with the FT DX 9000 Contest be as close as possible to the specified 50 W value.

Any antenna to be used with the FT DX 9000 Contest must, ultimately, be fed with 50 Ω coaxial cable. Therefore, when using a “balanced” antenna such as a dipole, remember that a balun or other matching/balancing device must be used so as to ensure proper antenna performance.

The same precautions apply to any additional (receive-only) antennas connected to the RX ANT jack; if your receive-only antennas do not have an impedance near 50 Ω at the operating frequency, you may need to install an external antenna tuner to obtain optimum performance.

Use high-quality 50 Ω coaxial cable for the lead-in to your FT DX 9000 Contest transceiver. All efforts at providing an efficient antenna system will be wasted if poor quality, lossy coaxial cable is used. Losses in coaxial lines increase as the frequency increases, so a coaxial line with only 0.5 dB of loss at 7 MHz may have 2 dB of loss at 28 MHz. For reference, the chart in the next column shows approximate loss figures for typically available coaxial cables frequently used in amateur radio installations.

## Accessory Installation

### Linear Amplifier Interfacing

The FT DX 9000 Contest can be used with the optional YAESU VL-1000 Linear Amplifier, providing automatic band switching via digital band data output from the BAND DATA 1 jack on the rear panel of the transceiver. Most other amplifiers can be adapted to operate with the FT DX 9000 Contest; however, the main points to be concerned with are the switching requirements of the amplifier, and if QSK (full break-in) operation is desired. The linear amplifier Tx/Rx switching capability of the FT DX 9000 Contest is described in the table below.

Operation with QSK Amplifiers

Connect the RF output from one of the four transceiver ANT jacks to the RF input jack of the linear. Connect the ALC output from the linear to the EXT ALC jack on the rear of the transceiver (see the “About ALC” chapter). After making the RF and Tx/Rx switching connections described below, you may need to adjust the ALC output level of the linear so

that it is not overdriven by the FT DX 9000 Contest. Your linear's manual should describe how to do this.

If using a VL-1000, connect the BAND DATA Cable (supplied with the VL-1000) from the transceiver BAND DATA 1 jack to the amplifier BAND-DATA 1 jack; this will provide automatic band selection for the linear, as well as QSK Tx/Rx switching control. You may also connect a user-constructed control cable (refer to VL-1000 manual for details) from the transceiver REMOTE jack to the amplifier BAND-DATA 2 jack to provide automatic amplifier tune-up for the linear using the FT DX 9000 Contest. Press the VL-1000's front panel ATT switch to enable the 3 dB input RF power attenuator.

If using another manufacturer's QSK linear, and if its switching circuitry consumes less than 150 mA of DC voltage and has a coil voltage below 40 V, you can connect the Tx/Rx switching line for the linear to pin 2 ("TX GND") of the BAND DATA 1 jack (use pin 3 for ground), and the linear's exciter-enable output to pin 8 ("TX INHIBIT") of the BAND DATA 1 jack. This line must be switched to ground to enable transmission once the linear is ready for excitation from the FT DX 9000 Contest. If your QSK linear sinks more than 150 mA or uses more than 40 V for T/R relay switching, you will have to provide a suitable external interface transistor, controlled by pin 2. Be certain to make provision for suitable reduction of the drive power from the FT DX 9000 Contest, so as not to damage your amplifier.

Operation with non-QSK Amplifiers

The TX GND jack on the transceiver rear panel is connected to an internal relay, for non-QSK T/R switching of linear amplifiers that use AC switching voltage, or DC voltage greater than +40 V, negative DC voltage of any kind (such as the Heath SB-220/SB-221 models), or if they are required to sink more than 150 mA for T/R switching. A schematic diagram of the relay circuit is provided below. If not using your linear amplifier in a full break-in environment, the use of this relay for amplifier switching is highly recommended.

In the factory default, this relay comes disabled to avoid the clicking sound when the transceiver is used alone or with a QSK linear. To enable the relay for non-QSK linears that exceed the above T/R switching requirements, you will need to change Menu Selection 118: EXT TX-GND to ENABLE. Then connect the center contact of the TX GND jack to the positive relay-control line to your linear, and the outer contact to the "common" line or the linear's chassis ground. Refer to the diagram at the below; in this example, an older non-QSK amplifier (FL-2100B) is shown.

With the relay now enabled, the FT DX 9000 Contest can support non-QSK linear T/R switching voltages up to 100 V AC @ 300 mA, or DC voltage up to 60 V @ 200 mA, or closed-circuit current up to 1 A with DC voltage up to 30 V.

Caution - Please Read!!

The FT DX 9000 Contest is designed for use with the YAESU VL-1000 when QSK operation with a linear amplifier is desired. If you are using a different amplifier, do not attempt QSK operation with the linear if its switching circuitry requires that the FT DX 9000 Contest's relay be enabled. Using pins 2 and 8 of the BAND DATA 1 jack for other amplifiers will not work unless the control line signals are carefully matched, and damage may result otherwise.

Your transceiver's warranty does not cover damage resulting from improper connections to this jack, so if you are not sure of the linear amplifier's break-in capabilities or switching requirements, the safest approach is to enable the relay; use the TX GND jack (after setting Menu Selection 118: EXT TX-GND to ENABLE) and resort to non-QSK operation. This will help prevent possible damage to the amplifier or transceiver.

About ALC

The FT DX 9000 Contest provides an external ALC jack on the rear panel (RCA-type jack) for input of Automatic Level Control voltage from a linear amplifier.

ALC voltage is used to provide dynamic control of the output of the transceiver, so as not to provide more drive than is needed for full amplifier output. The ALC control voltage range is 0 to -4 V DC, with the voltage going more negative as the amplifier's drive requirements are approaching fulfillment.

The FT DX 9000 Contests ALC system is very typical of designs in the amateur radio industry, and consequently is compatible with many manufactured and home-built amplifiers. However, ALC voltage may be generated by an amplifier in a manner incompatible with efficient ALC operation in the FT DX 9000 Contest, and it is important that you recognize the differences in amplifier ALC circuits before proceeding with ALC line connection.

- ALC circuits which detect Power Output from the amplifier, and generate negative-going ALC control voltage when maximum output power has been realized, will generally work properly with the FT DX 9000 Contest.
- The exact amount of ALC voltage fed to the FT DX 9000 Contest can usually be adjusted via a potentiometer on the rear panel of the amplifier.
- ALC circuits which detect Amplifier Tube Grid Current, and generate ALC voltage when excessive grid current is present, may not work well with the FT DX 9000 Contest and other similar transceivers, as the ALC voltage may be generated because of amplifier mis-tuning not related to an excessive-drive condition. With amplifiers deriving their ALC voltage in this manner, we recommend that you not connect the ALC line, and rather let the amplifier's protection circuitry manage its ALC requirements internally.

**Digital Modem (TNC, WeatherFax, etc.) Interfacing**

The FT DX 9000 Contest offers special features for digital modes, such as built-in digitally-synthesized AFSK generator for RTTY and AMTOR terminal units, IF bandwidth optimization and automatic display offsets, and an 18-ms transmit-to-receive turn-around time.

Low-level main (VFO-A) band audio output is provided from the rear-panel RTTY and PKT jacks, and is unaffected by front panel AF GAIN control settings. If you prefer to use sub (VFO-B) audio for TNC input, set Menu Selection 90: DATA OUT (AFDT) to Sub.

Audio level is 100 mV from both jacks. The RTTY level is fixed; however, PKT audio level can be adjusted by potentiometer VR3010. In many cases, it is easier to perform level adjustments at the TNC.

Digital Modes with a TNC or Computer Sound Card (PSK-31)

The explosion of new digital modes of amateur communication means that you will want to make connections to your TNC and/or computer as "standardized" as possible. Generally, this will mean that you will want to connect your transceiver in an "AFSK" environment. On the FT DX 9000 Contest, the PACKET jack is the "AFSK" connection port, while the RTTY jack is an "FSK" connection port. In the AFSK mode, the TNC or computer generates the data signal as a set of audio tones, while the FSK mode uses a closure to ground (in the TNC or terminal unit) to cause the transceiver to generate the "mark" and "space" tones.

Construct a patch cable or cables to make the necessary connections between your TNC and the appropriate rear panel jack(s) (RTTY for FSK, PACKET for AFSK). Refer to the pin-out diagram below, and the wiring instructions included with your TNC.

A description of the PACKET jack's individual pins follows:

Pin 1 (DATA IN) - Connect this pin to your TNC's "AFSK Out" or "Mic Audio" output line. The optimum input level is 30 mV rms, and the input impedance is 3 kΩ. Your TNC's audio output level potentiometer will allow you to set the level to the optimum value. This pin may be used either for 300 baud SSB-mode digital operation or for 1200-baud FM packet. The bandwidth and frequency response are not, however, suitable for 9600 baud operation.

Pin 2 (GND) - Connect this to the shield(s) of the cable(s) used for connections between the TNC and the FT DX 9000 Contest.

Pin 3 (PTT) - Connect this pin to the PTT line from the TNC. This pin, when grounded by the TNC, places the FT DX 9000 Contest into the Transmit condition.

Pin 4 (DATA OUT) - Connect this pin to your TNC's "TX Audio" input line. This is a

constant-level (100 mV rms @ 600 Ω) audio output line which is not affected by the position of the front panel AF GAIN control.
Pin 5 (BUSY) - This is a “Squelch Status” pin not generally required for digital mode operation. This pin is held at +5 V when the squelch is open, and is grounded when the receiver is muted by the squelch (“no-signal” condition).

For FSK operation using the RTTY jack, the following are the pin connections required:

Pin 1 (SHIFT) - Connect this pin to your TNC or terminal unit’s “FSK Key” port. Closing and opening of this line to ground causes mark/space keying.
Pin 2 (RX AF OUT) - Connect this pin to your TNC’s “TX Audio” input line. This is a constant-level (100 mV rms @ 600 Ω) audio output line which is not affected by the position of the front panel AF GAIN control.
Pin 3 (PTT) - Connect this pin to the PTT line from the TNC. This pin, when grounded by the TNC, places the FT DX 9000 Contest into the Transmit condition.
Pin 4 (GND) - Connect this to the shield(s) of the cable(s) used for connections between the TNC and the FT DX 9000 Contest.

For operation on PSK31, connect your computer's sound card to the PACKET jack (for “PKT” mode operation) or the MIC and EXT SP jacks (for “SSB” mode operation)

CAUTION!!
The FT DX 9000 Contest cooling system is designed to handle continuous duty transmission at 200 watts output. However, for continuous-duty digital modes like RTTY, we recommend limiting your transmissions to 3 minutes or less, with at least 3 minutes receive in between transmissions. Place your hand on the transceiver occasionally to ensure that it's not getting too hot, and try to keep power output at 100 watts or less.

Note: Computer-Generated RFI
When using a TNC connected to your transceiver, or even having a PC located in the shack, the possibility exists that you may experience computer-generated RFI (Radio Frequency Interference).
The CPU in a personal computer operates with a crystal-controlled oscillator (clock), which may generate harmonics or other spurious signals. In addition, high-speed digital data switching uses square waves, which produce odd-order harmonic frequencies.
Computer-generated RFI may appear at seemingly random frequencies (usually right where

a rare DX station is calling CQ!) throughout the range of your transceiver, and may sound like constant ticking or buzzing that may change as you type or work within a program. Severe RFI may have S-meter indications as much greater than S-9, making copy of voice signals difficult and data signals virtually impossible.

Computer-generated RFI is usually a result of inadequate shielding of the PC's cabinet or I/O and peripheral connections. While computer equipment may comply with RF emission approval standards, this does not ensure that sensitive amateur radio receivers will not experience RFI from the device.

There are a few steps you can take to reduce or eliminate computer-generated RFI. The first step is to ensure that only shielded cables are used for TNC/sound card-to-transceiver connections, carefully check RF ground connections and re-orient your station equipment in relation to the computer. Try moving your PC and peripherals slightly and see if it has any affect on the RFI, in some cases, this alone may be enough to correct the problem.

If not, several additional steps to try include installing AC line filters on the power cord(s) of the suspected equipment and inserting decoupling ferrite toroidal chokes on interconnecting patch/data cables and smaller ferrite beads on single wires.

As a last resort, you can try installing additional shielding within the PC case, using appropriate conductive mesh/screening or conductive tape. Especially check RF "holes" where plastic is used for cabinet front panels. For further information, consult amateur radio reference guides and publications relating to RFI suppression techniques.

**Other Digital/Recording Device Interfacing**

AF OUT Jack

This is a 3.5 mm miniature stereo phone jack which provides constant-level (100 mV @ 600 Ω) for connection to a WeatherFax decoder, tape recorder, or other accessory. The audio output level is not affected by the setting of the front panel AF GAIN controls, so you can turn the volume down, if you like, without affecting the audio level being presented to your decoding device. The tip connection of this jack is main (VFO-A) receiver audio, while the ring connection is sub (VFO-B, when optional Dual Receive Unit is installed) receiver audio. The connections to the AF OUT jack are at the same level as the connection to Pin 4 of the PACKET jack. However, the two output ports use independent output buffer amplifiers, so you can freely connect and disconnect devices to/from these ports without concern over the impedances and levels.

PTT (Push To Talk) Jack

This RCA jack is wired in parallel with the rear panel's MIC jack, providing a handy connection

point for a footswitch for voice operation, allowing hands-free PTT operation or enabling the T/R switching when operate the FT DX 9000 Contest from the front's MIC jack.

PATCH Jack

For transmit audio input for SSTV (Slow-Scan Television) operation, you may connect the SSTV terminal's Tx Audio line to the PATCH jack. You will need to disconnect the microphone, however, during transmission, as the PATCH jack is connected in a "Y" configuration along with the microphone input (from pin 8 of the rear panel's MIC jack).

**CW Key/Paddle and Computer Keying Interface Suggestions**

Features

The FT DX 9000 Contest includes a host of features for the CW operator, the functions of which will be detailed in the "Operation" section later. Besides the built-in Electronic Keyer, three key jacks are provided, two each on the front and one on rear panels, for convenient connection to keying devices.

All KEY jacks on the FT DX 9000 Contest utilize "Positive" keying voltage. Key-up voltage is approximately +5V DC, and key-down current is approximately 0.5 mA. When connecting a key or other device to the KEY jacks, use only a 3-pin ("stereo") 1/4" phone plug; a 2-pin plug will place a short between the ring and (grounded) shaft of the plug, resulting in a constant "key-down" condition in some circumstances.

Configuration Suggestions

- ❒ For everyday operation using the internal electronic memory keyer, connect your paddle to the front panel KEY jack.
- ❒ If two operators are using the FT DX 9000 Contest simultaneously (for a contest, Field Day, etc.), a second or third keyer paddle may be connected to the rear panel KEY jack, and activate internal keyer for the keyer paddle which is connected to the rear panel's KEY jack by Menu Selection 85: KEYER REAR. Both operators paddles will have access to the internal keyer.
- ❒ If two operators are using the FT DX 9000 Contest simultaneously, but both wish to use a straight key, outboard electronic keyer, or computer-driven keying cables, the key plugs may be inserted into the front and rear panel KEY jacks, and disable the internal keyer by Menu Selection 84: KEYER FRONT and 85: KEYER REAR.

**Antenna Connections**

The FT DX 9000 Contest's five antenna connectors, plus innovative microprocessor-based

memory and switching circuits, provide excellent flexibility in setting up your antenna connections.
Typical antenna configurations are shown below. Remember that “ANT 1” through “ANT 4” jacks may be used for transmission and reception, while the RX ANT jack may only be used for reception.

NOTE REGARDING LARGE RECEIVE ANTENNAS
Although surge suppression is provided on all antenna ports, you may wish to consider building a simple external circuit which will disconnect, on TX, any antenna connected to the RX ANT IN jack, particularly if you are using a very long wire antenna such as a Beverage. Very long antennas can build up very high RF and static voltages on them, and the circuit below may provide better protection for your receiver's input circuitry.

**Personal Computer Interfacing for Contest Software, etc.**
The FT DX 9000 Contest features a built-in level converter, allowing direct connection from the rear-panel CAT jack to the serial port of your computer, without the need for any external converter box.
When your software requests serial port configuration information, set it for “4800,N,8,2” (4800 baud, No Parity, 8 Data Bits, and 2 Stop Bits). Be certain to configure and activate any required “TSR” (Terminate-and-Stay-Resident) utilities before beginning computer-controlled transceiver operation (your software’s instruction manual will describe any such requirement).
Details regarding the programming protocols for the CAT system may be found beginning on page ??.

## Front Panel Controls

1. MOX Button
   Pressing this button engages the PTT (Push to Talk) circuit, to activate the transmitter. It must be in the undepressed position for reception.
2. VOX Button
   This button enables automatic voice-actuated transmitter switching in the SSB, AM, and FM modes. While activated, the LED inside this button glows red. The controls affecting VOX operation are the front panel’s VOX and DELAY knobs. The front panel’s CW DELAY knob independently sets the receiver recovery time during semi-break-in CW operation.

3. DIM Button

   This button selects the display intensity between “High” and “Low.”

4. KEY Jack

   This 1/4-inch, 3-contact jack accepts a CW key or keyer paddles (for the built-in electronic keyer), or output from an external electronic keyer. You cannot use a 2-contact plug in this jack (to do so produces a constant “key down” condition). Pinout is shown on page ??. Key up voltage is 5 V, and key down current is 0.5 mA. This jack may be configured for keyer, “Bug,” “straight key,” or computer keying interface operation via Menu Selection 75: KEYER FRONT (see page ??).

5. POWER Button

   This button turns the transceiver on and off. Always turn this switch on *after* turning on the rear panel’s POWER switch.

6. PHONES Jack

   A 1/4-inch, 3-contact jack accepts either monaural or stereo headphones with 2- or 3-contact plugs. When a plug is inserted, the loudspeaker is disabled. With stereo headphones such as the optional YH-77STA, you can monitor both Main (VFO-A) and Sub (VFO-B, when optional Dual Receive Unit is installed) receiver channels at the same time during Dual Receive operation.

7. MIC Connector and Indicator

   This Cannon-type (XLR) connector accepts input from the Microphone. MIC connector pinout is shown on page ??. Proper microphone input impedance is 500 ~ 600 Ω.
   When the available 48-V DC power (Phantom Power Supply) has been enabled so as to appear on the microphone line, the LED glows red.
   To disconnect the microphone plug, draw out the microphone plug while pressing and holding in the silver PUSH button.

8. IPO (Intercept Point Optimization) Lamp-buttons

   The [IPO(A)] Lamp-button may be used to set the optimum receiver front end characteristics of the main receiver circuit for a very strong-signal environment. Selecting IPO bypasses the front end RF amplifier and feeds the received signals directly to the first mixer of the main band (VFO-A) receiver circuit. While the IPO feature is activated, this button will remain illuminated.
   The [IPO(B)] Lamp-button, similarly, allows direct feed of the received signals to the first mixer of the sub band (VFO-B) receiver circuit. While the IPO feature is activated on the sub receiver, this button will be lit.

9. ANTENNA SELECT Buttons

   These momentary buttons select the antenna jack on the rear panel, with the selection

indicated by the LED in each button. When an antenna has been selected for operation on main band (VFO-A), the LED in the button glows red. When an antenna has been selected for operation on sub band (VFO-B, when optional Dual Receive Unit is installed), the LED in the button glows umber.

10. TUNER Button

    This is the on/off switch for the FT DX 9000 Contest's Automatic Antenna Tuner. Pressing this button momentarily places the antenna tuner in line between the transmitter final amplifier and the antenna jack. Reception is not affected.
    Pressing and holding in this button for 1/2 second, while receiving in an amateur band, activates the transmitter for a few seconds while the automatic antenna tuner rematches the antenna system impedance for minimum SWR. The resulting setting is automatically stored in one of the antenna tuner's 99 memories, for instant automatic recall later when the receiver is tuned near the same frequency.

11. METER Knob

    This control switch determines the function of the Main Meter during transmission.
    COMP: Indicates the RF speech compressor level (SSB modes only).
    PO: Indicates the power output level.
    SWR: Indicates the Standing Wave Ratio (Forward: Reflected).
    IDD: Indicates the final amplifier drain current.
    MIC LVL: Indicates the relative microphone level.

12. MONI Button

    This button enables the transmit (RF) monitor in all modes (except CW, in which the monitor function is always on, to produce the sidetone). While activated, the LED in this button glows red.

13. MONI and PITCH Knob

    MONI Knob

    The inner MONI knob adjust the audio level of the transmit RF monitor during transmission (relative to the AF GAIN control), when activated by the MONI button (above).

    PITCH Knob

    The outer PITCH knob selects your preferred CW tone pitch (from 300 ~ 1000 Hz, in 50 Hz increments). The Tx sidetone, receiver IF passband, and display offset from the BFO (carrier) frequency are all affected simultaneously.

14. AGC and ATT Knob

    AGC Knob

    The inner AGC knob selects the main band (VFO-A) receiver's Automatic Gain Control

decay time for the most comfortable reception, or disables receiver AGC (off). Normally this switch is set to the “AUTO” position. Strong signals will cause distortion if this selector is set to “OFF,” unless you rotate the RF Gain control counterclockwise to apply AGC to the receiver manually.

ATT Knob

The outer ATT knob inserts 3, 6, 12, or 18 dB (1/2, 1, 2, or 3 S-units) of attenuation before the main band (VFO-A) mixer to suppress band noise and reduce the possibility of overload from very strong signals.

15. MIC and PROC Knob

    MIC Knob

    The inner MIC knob adjusts the microphone input level for (non-processed) SSB transmission.

    PROC Knob

    The outer PROC knob sets the compression (input) level of the transmitter RF speech processor in the SSB mode, when activated by the button with the same name.

16. PROC Button

    This button enables the RF speech processor for SSB transmission. Processing level is set by the outer control with the same name. While activated, the LED in this button glows red.

17. VOX and DELAY Knob

    VOX Knob

    The inner VOX knob sets the gain of the VOX circuit, to set the level of microphone audio needed to activate the transmitter during voice operation while the VOX button is engaged.

    DELAY Knob

    The outer DELAY knob sets the hang time of the VOX circuit, between the moment you stop speaking, and the automatic switch from transmit back to receive. Adjust this for smooth VOX operation, so the receiver is only activated when your transmission is ended and you wish to receive.

18. KEYER Button

    This button toggles the internal CW keyer on and off. While activated, the LED in this button glows red.

19. SPEED and CW DELAY Knob

    SPEED Knob

    The inner SPEED knob adjusts the keying speed of the internal CW keyer.

    CW DELAY Knob

This outer CW DELAY knob sets the hang time of the CW “VOX” circuit, between the moment you stop sending, and the automatic switch from transmit back to receive during “Semi-break-in” operation. Adjust this just long enough to prevent the receiver from being restored during word spaces at your preferred sending speed.

20. BK-IN/SPOT Button

    This button turns the full break-in (QSK) CW capability on and off. While QSK is activated, the LED in this button glows red.

    The SPOT button turns on the CW receiver spotting tone; by matching the SPOT tone to that of the incoming CW signal (precisely the same pitch), you will be “zero beating” your transmitted signal on to the frequency of the other station.

21. NB and SQL Knob

    NB Knob

    The inner NB knob adjusts the noise blanking level when the (analog) IF noise blanker is activated by pressing the NB button.

    SQL Knob

    The outer SQL knob sets the signal level threshold at which main (VFO-A) receiver audio is muted, in all modes. This control is normally kept fully counter-clockwise, except when scanning and during FM operation.

22. NB Button

    Pressing this button activates the (analog) IF Noise Blanker, which may help reduce many different types of man-made impulse noise (but not atmospherics). When the Noise Blanker is activated, the LED inside the button will glow red.

23. CONT Button

    This button turns the main band (VFO-A) CONTOUR filter on and off. When the CONTOUR filter is activated, the LED inside the button will glow red.

24. CONT and DNR Knob

    CONT Knob

    The inner CONT knob selects the desired main band (VFO-A) CONTOUR filter response.

    DNR Knob

    The outer DNR knob selects the optimum main band (VFO-A) Digital Noise Reducer response.

25. DNR Button

    This button turns the main band (VFO-A) Digital Noise Reduction circuit on and off. When the Digital Noise Reducer is activated, the LED inside the button will glow red.

26. VRF/µ-T Button

This button turns the main band (VFO-A) receiver's VRF filter or μ-TUNE filter on and off. While activated, the LED inside the button will glow red.

27. VRF/μ-T-0- NTCH Knob

    VRF/μ-T Knob

    The inner VRF/μ-T knob tunes the passband of the main band (VFO-A) receiver's RF filter (above the 18 MHz amateur bands) or μ-TUNE filter (Narrow-bandwidth High-Q RF Filter) (above the 14 MHz amateur bands) for maximum receiver sensitivity (and out-of-band interference rejection).

    NTCH Knob

    The outer NTCH knob adjusts the center frequency of the main band (VFO-A) IF notch filter.

28. NTCH Button

    This button turns the main band (VFO-A) IF notch filter on and off. When the IF notch filter is activated, the LED inside the button will glow red.

29. DNF Button

    This button turns the main band (VFO-A) Digital Notch Filter on and off. When the Digital Notch Filter is activated, the LED indicator will glow red.

30. R.FLT Button and Indicator

    This button selects the bandwidth for the main band (VFO-A) receiver's first IF Roofing Filter. Available selections are 3 kHz, 6 kHz, 15 kHz, or Auto, and the LED indicator will change according to the bandwidth selected.

31. Main Meter

    There are five functions on the main multi-meter.

    S: Indicates the received signal strength on the main band (VFO-A), from S-0 to S9 +60 dB.

    PO: Indicates the RF Power Output, from 0 to 250 Watts on transmit.

    COMP: Indicates the compression level of the speech processor, from 0 to 20 dB.

    IC: Indicates the final amplifier drain current (ID), from 0 to 15 A.

    SWR: Indicates the antenna system observed standing wave ratio (SWR), from 1.0 to 5.0.

32. Sub Meter

    S: Indicates the received signal strength on the sub band (VFO-B, when optional Dual Receive Unit is installed), from S-0 to S9 +60 dB.

    ALC: Indicates the ALC (Automatic Level Control) relative voltage on transmit.

    VDD: Indicates the final amplifier drain voltage. When the ACM (Adjacent Channel Monitor) function is activated, the meter indicates the relative signal strength of any

signals just outside the RX passband on the main band (VFO-A).

33. MODE Selection Buttons

    These momentary buttons allow selection of the operating mode of the main band (VFO-A) and sub band (VFO-B) independently.

    Pressing the [A] or [B] button will select either the main band (VFO-A) or sub band (VFO-B) for individual mode selection within that band.

    Pressing the [LSB], [USB], [CW], [AM], [FM], [RTTY], or [PKT] button will select the main band (VFO-A) and sub band (VFO-B) operating mode.

    Pressing the [CW], [AM], [RTTY], or [PKT] button multiple times will switch between the alternate operating features that can be used on these modes (covered later). Also, when you press and hold in the [PKT] button for one second, the user-programmed custom function setting mode will be activated.

34. A-BUSY Indicator

    This LED glows green whenever the main band (VFO-A) receiver squelch is open.

35. TX Indicator

    This LED glows red when transmission is occurring. If transmission is inhibited for some reason (for example, attempting to transmit outside an amateur band), this LED will *blink* red.

36. B-BUSY Indicator

    This LED glows green whenever the sub band (VFO-B) receiver squelch is open.

37. QMB Buttons

    STO (Store) Button

    Pressing this button copies operating information (frequency, mode, bandwidth, and also repeater direction/shift frequency and CTCSS functions on the FM mode) into consecutive QMB Memories.

    RCL (Recall) Button

    Pressing this button recalls one of up to five Quick Memory Bank memories for operation.

38. NAR Button

    In the SSB/CW mode, this button is used to set the bandwidth of the EDSP (digital) IF filters to the programmed bandwidth regardless the WIDTH knob setting (SSB: 1.8 kHz, CW/RTTY/PSK: 300 Hz).

    In the FM mode on the 28 MHz and 50 MHz band, this button is used to toggle the FM deviation/bandwidth between wide (±5.0 kHz Dev./25.0 kHz BW) and narrow (±2.5 kHz Dev./12.5 kHz BW).

    Pressing the [A] or [B] button (located above the MODE selection buttons) will select

either the main band (VFO-A) or sub band (VFO-B) for individual bandwidth.

39. SPLIT Button

    Pressing this button to activates split frequency operation between the main band (VFO-A), used for transmission and sub band (VFO-B), used for reception. The same name LED located at the right of the main tuning knob glows orange while this function is active.

40. TXW Button

    Pressing this key monitor the transmit frequency while working on the sprit frequency operation. When receiving the transmit frequency, the LED indicator will glow green. Press this key again to return to normal operation.

41. CS Button

    Pressing this button to recall the favorite Menu Selection directly.
    Press and hold in this button for 1/2 second to assign the current Menu Selection into this button while operating on the Menu Mode.

42. RF PWR and BIAS Knob

    RF PWR Knob

    This inner RF PWR knob adjusts the transmitter's output power in all modes. The adjustment range is from approximately 5 to 200 watts, except in the AM mode, where the permitted carrier level is about 5 to 50 watts. This knob also controls the carrier level for CW transmission. In setting the output power, the ALC function of the meter should always be monitored, to avoid overdriving the transmitter final amplifier.
    In the "Class-A" SSB operating mode, the adjustment range for power output will be between approximately 5 and 75 watts.

    BIAS Knob

    The outer BIAS knob, adjust the transmitter final amplifier between "Class-A" (fully clockwise) and "Class-AB" (fully counter clockwise). When turned to the fully clockwise position, the transmitter final amplifier operates the "Class-A" mode while operating in the "Class-A" mode.

43. CLASS-A Button

    This orange button changes the final amplifier operating mode to "Class-A". When operating the final amplifier in the "Class-A mode", the maximum output power will be reduced to approximately 75 watts, and the LED inside this button will glow red. Operating SSB in "Class-A" yields an ultra-clean signal waveform.

44. Main Tuning Knob

    This large knob adjusts the operating frequency of main band (VFO-A) or a recalled memory. Default tuning increments are 10 Hz (100 Hz in AM and FM modes). When the

FAST button (located at the right of the this knob) has been pressed, the increments are 10x these step sizes. See the table on page ?? for a listing of all available steps.

45. SMC Card Slot

    This slot accepts the Smart Memory Card, which allows storage, transfer, and recall of transceiver configuration data and operator preferences.

    To remove the card out from slot, press the small push-button at the right hand of the slot.

46. FAST Button

    Pressing this button will increase or decrease the tuning rate of the Main Tuning Knob by a factor of ten.

    When this function is activated, the LED inside the button will glow red.

47. VFO & Memory Control Buttons

    [A>B] Button

    Pressing and hold in this button for 1/2 second (until the double beep) transfers data from the main band (VFO-A) frequency (or a recalled memory channel) to sub band (VFO-B), overwriting any previous contents in the sub band (VFO-B). Use this key to set both main band (VFO-A) and sub band (VFO-B) receivers to the same frequency and mode.

    [B>A] Button

    Pressing and hold in this button for 1/2 second (until the double beep) transfers data from the sub band (VFO-B) frequency to main band (VFO-A), overwriting any previous contents in the main band (VFO-A). Use this key to set both main band (VFO-A) and sub band (VFO-B) receivers to the same frequency and mode.

    [A><B] Button

    Pressing this button momentarily exchanges the contents of main band (VFO-A) (or a recalled memory channel) and sub band (VFO-B).

    [V/M] Button

    This button toggles main band (VFO-A) receiver operation between the memory system and the VFO. Either “VFO,” “MEM,” or “M TUNE” will be displayed to the left of the main frequency display field to indicate the current selection. If you have tuned off of a Memory channel frequency, pressing this button returns the display to the original memory contents, and pressing it once more returns operation to the Main VFO.

    [M>A] Button

    Pressing this button momentarily displays the contents of the currently-selected memory channel for three seconds.

    Holding this button in for 1/2 second copies the data from the currently-selected memory

to the Main VFO (VFO-A), as two beeps sound. Previous data in the Main VFO will be overwritten.

[A>M] Button

Pressing and holding in this key for 1/2 second (until the double beep) copies the current operating data from main band (VFO-A) to the currently selected memory channel, overwriting any previous data stored there. Also, pressing and holding in this button after recalling a memory, without first retuning, causes the memory channel to be “masked,” and repeating the process restores the masked memory.

48. LOCK Button

    This button toggles locking of the main tuning knob, to prevent accidental frequency changes. When the button is active, the main tuning knob can still be turned, but the frequency will not change, and the LED inside the button will glow green.

49. RX & TX Button-LED (VFO-A)

    These combination lamp-buttons select and indicate the transmit/receive status of the main tuning knob and display. When the green “RX” lamp is lit, the receiving frequency is under control of the main knob and display (either VFO-A or a recalled memory channel). When the red “TX” lamp is lit, the transmitting frequency is under control of the main knob and display. Thus, for “normal” (non-split) operation, both the red and green lamps associated with the main tuning knob will be illuminated.

50. Tuning Offset Indicator

    Displays sub-resolution tuning steps, or clarifier offset, in LED increments.

51. Frequency Display

    The upper large display field indicates the current operating frequency on the main band (VFO-A), and its TX/RX status.

    The lower small display field indicates the current operating frequency on the sub band (VFO-B), and its TX/RX status.

52. Multi Display Window

    This window indicates either the Clarifier offset, Memory Channel number, split frequency offset, or CW pitch.

53. SPLIT Indicator

    This LED glows orange whenever “Quick Split” frequency operation is activated.

54. DUAL Indicator

    This LED glows green when Dual Receive operation is activated.

55. HI-SWR Indicator

    This LED glows red when an abnormally high SWR condition exists that can not be matched below 3.0:1.

56. BAND Buttons

These buttons provides one-touch band selection, or digital frequency entry. Normally, pressing one of the eleven white numbered keys selects the corresponding (MHz) amateur band for operation (pressing the V-B button first, followed by a BAND key, selects that band for the sub band (VFO-B)). If you press the white numbered key for the band you are already on, you will select the alternate subband VFO on that band. See the “Operation” chapter for details.

If the ENT key is pressed first, the orange labels on the buttons become effective, for manually entering any frequency one digit at a time; press V-B then ENT to enter sub band (VFOB) frequencies directly.

57. AF GAIN and RF GAIN Knob

AF GAIN Knob

The inner AF GAIN knob adjusts the audio volume level of the main band (VFO-A) receiver in the speaker or headphones.

RF GAIN Knob

The outer RF GAIN knob adjusts the receiver signal input level in the front end of the main band (VFO-A) receiver, ahead of the 1st mixer (via PIN diodes), and also the gain of the main receiver’s IF amplifiers.

This control is normally set fully clockwise for maximum sensitivity. When rotated counter-clockwise, the main band (VFO-A) S-meter minimum deflection point will move up the scale. The peak deflection for a particular signal will remain the same if it is greater than the level set by this control, but the main band (VFO-A) receiver will be less sensitive to weaker signals.

58. P.BACK Button

Press and hold this button for 1/2 second to activates the recording feature of the internal Voice Recorder. The Voice Recorder allows to record the main band (VFO-A) receiver audio for the most-recent 30 seconds. While recording the receiver audio, the LED in this button glows red.

Press this button momentarily to stop the recording, then press this button momentarily again playing back the receiver audio for the most-recent 30 seconds before stopping the recording.

While playing back the receiver audio, the LED inside button will glow umber.

Press and hold this button for 1/2 second again, resume the recording future.

59. AFL Button

Pressing this button activates the Audio (AF) Limiter circuit of the main band (VFO-A)

receiver. This will protect the audio amplifier from distortion, and protect your ears from high audio levels, caused by sudden peaks in audio input when the AGC is set to “OFF.” When the Audio Limiter circuit is activated, the LED inside the button will glow red.

60. SHIFT and WIDTH Knob

    SHIFT Knob

    The inner SHIFT knob offsets the center frequency of the main band (VFO-A) IF passband when rotated from its “normal” (center) position. This control functions in all modes except FM.

    WIDTH Knob

    The outer WIDTH knob, when turned to the fully clockwise position, the overall IF bandwidth of the main band (VFO-A) receiver is maximum bandwidth. Turn the WIDTH knob to counter clockwise, reduces the overall IF bandwidth of the main band (VFO-A) receiver.

61. ACM Button

    Pressing this button activates the ACM (Adjacent Channel Monitor) function while operating on the CW mode. When the ACM (Adjacent Channel Monitor) function is activated, Sub Meter indicates the relative signal strength of any incoming signals which are just outside of the receiver (CW filter) passband on the main VFO. When ACM is activated, the LED inside the button will glow red.

62. CLAR Button

    Pressing this button activates the TX/RX Clarifier (offset tuning) function.
    When the clarifier function is activated, the LED inside the button will glow green.

63. BAND/MHz Button

    Pressing this button momentarily allows you to select the main (VFO-A) operating band using the CLAR/VFO-B knob.

    Pressing and holding in this button for one second allows you to tune the main band (VFO-A) frequency down or up in 100 kHz increments, using the CLAR/VFO-B knob.

64. B.DISP OFF Button

    Pressing this button causes the sub band (VFO-B) frequency to be blanked out.
    When this function is activated, the LED inside the button will glow green.

65. MCH/GRP Button

    Pressing this button momentarily allows you to select the memory channel using the CLAR/VFO-B knob.

    Pressing and holding in this button for one second allows you to select the memory group using the CLAR/VFO-B knob.

66. CLAR/VFO-B Knob

Usually, this knob adjusts (offsets) the operating frequency of the main band (VFO-A) during Clarifier operation, or adjusts the frequency of the sub band (VFO-B). Alternate uses for this knob are described above.

67. RX & TX Button-LED (VFO-B)
    These combination lamp-buttons select and indicate the transmit/receive status of the CLAR/VFO-B knob and display. When the green “RX” lamp is lit, the receiving frequency is under control of the CLAR/VFO-B knob and display (VFO-B). When the red “TX” lamp is lit, the transmitting frequency is under control of the CLAR/VFO-B knob and display (VFO-B). Thus, for “normal” (non-split) operation, both the red and green lamps associated with the CLAR/VFO-B tuning knob will be turned off.
68. FAST/RX Button
    Pressing this button increases/decreases the tuning rate of the CLAR/VFO-B knob by a factor of ten.
    When the Clarifier function is engaged, pressing this button allows offsetting of the main band (VFO-A) receive frequency temporarily using the CLAR/VFO-B knob.
69. BAND/MHz TX Button
    Pressing this button momentarily allows you to select the sub (VFO-B) operating band, using the CLAR/VFO-B knob.
    When the Clarifier function is engaged, pressing this button allows offsetting of the main band (VFO-A) transmit frequency temporarily using the CLAR/VFO-B Knob.
70. B. MODE CLEAR Button
    Pressing this button momentarily allows you to select the operating mode of the sub band (VFO-B) using the CLAR/VFO-B knob.
    When the clarifier function is engaged, pressing this button zeroes any (Clarifier) offset tuned via the CLAR/VFO-B knob.
71. A/B Button
    Pressing this button toggle the CLAR/VFO-B knob function to be work between main band (VFO-A) frequency and sub band (VFO-B) frequency.
    When the LED inside this button glows red, the CLAR/VFO-B knob works to the main band (VFO-A). When the LED inside this button glows umber, the CLAR/VFO-B knob works to the sub band (VFO-B).

**Rear Panel Connections**

1. ANT Jacks
    Connect your main antenna(s) here, using a type-M (PL-259) plug and coaxial feedline

for each. These antenna ports are always used for transmission, and also are used for reception unless a separate receive antenna is also used for the main receiver. The internal antenna tuner affects only the antenna(s) connected here, and only during transmission.

2. RX OUT (MAIN) Jack
   This BNC jack provides output of the receiver signal line from the Antenna jack which is connected to the main band (VFO-A) front end.
3. RX OUT (SUB) Jack
   This BNC jack provides output of the receiver signal line from the Antenna jack which is connected to the sub band (VFO-B) front end.
4. RX ANT Jack
   This type-M jack is for a separate receive-only antenna. An antenna connected here can be used by both the main (VFO-A) and sub (VFO-B) receiver when the RX ANT button the front panel is pressed.
5. GND Terminal Post
   Use this terminal to connect the transceiver to a good earth ground, for safety and optimum performance. Use a large diameter, short braided cable.
6. CAT Serial DP-9 Jack
   This 9-pin serial DB-9 jack allows external computer control of the FT DX 9000 Contest. Connect a serial cable here and to the RS-232C COM port on your personal computer (no external interface is required). CAT command protocol and data formats are described in the CAT chapter, starting on page ??.
7. KEY Jack
   This 1/4-inch phone jack accepts a CW key or keyer paddle. It is connected in parallel with the jack with the same name on front panel (either or both may be used). A 2-contact plug cannot be used in this jack. Key-up voltage is +5 V, and key-down current is 0.5 mA. Plug wiring is shown on page 4, and this jack may be configured for keyer, “Bug,” “straight key,” or computer keying interface operation via Menu Selection 76: KEYER REAR (see page ??).
8. ROTATOR 5-pin MINI-DIN Jack
   This 5-pin MINI-DIN Jack accepts a cable connected to a YAESU G-800DXA/-1000DXA/-2300DXA/-2800DXA Antenna Rotator. You may control the antenna azimuth rotation from the Function buttons on the front panel.
9. EXT ALC RCA Jack
   This input jack accepts negative-going external ALC (Automatic Level Control) voltage from a linear amplifier, to prevent over-excitation by the transceiver. Acceptable input

voltage range is 0 to –4 VDC.

10. BAND DATA DIN Jacks (1/2)

    BAND DATA 1

    This 8-pin output jack provides band selection data which may be used for control of optional VL-1000 Solid-state Linear Amplifier.

    BAND DATA 2

    This 7-pin output jack provides band selection data for future products.

11. TX GND

    This output jack connects, inside the FT DX 9000 Contest, to a set of relay contacts which short together (to chassis ground) whenever the transmitter is active. This allows transmit/receive switching of an external device such as a linear amplifier. Maximum ratings for these relay contacts are 500 mA @ 100 V AC, 200 mA @ 60 V DC or 1 A @ 30 V DC. Before connecting an external device, make sure its switching requirements will not exceed these limits. If your amplifier requires higher current, or has higher voltage switching requirements, an external switching device must be used.

12. ACC

    This is an accessory jack which is used at the factory for adjustment of the radio.

13. TRV

    This jack provides a low level RF output for use with a transverter. Maximum output is approximately 100 mV rms at 50 Ω (–6 dBm).

14. PACKET DIN Jack

    This 5-pin input/output jack provides receiver audio and squelch signals, and accepts transmit (AFSK) audio and PTT control, from an external Packet TNC. Pinout is shown on page ??. The receiver audio level at this jack is approximately 100 mV (@600 Ω).

15. RTTY

    This 4-pin input/output jack provides connections for an RTTY terminal unit. Pinout is shown on page ??. The receiver audio level at this jack is at a constant 100 mV (@600 Ω) level. FSK keying at this jack is accomplished by a closure of the SHIFT line to ground by the terminal unit.

16. AF OUT

    This 3-contact jack provides dual-channel low-level receiver output, for recording or external amplification. Peak signal level is 100 mV rms at 600 Ω. Main band (VFO-A) receiver audio is on the left channel (tip), and sub band (VFO-B) receiver audio is on the right channel (ring). A stereo amplifier or recorder is recommended, to record each receiver's audio separately when dual reception is enabled. The front panel AF GAIN knobs do not affect the signals at this jack.

17. EXT SPKR (1/2)

    The EXT SPKR 1 two-contact output jack provides main band (VFO-A) receiver audio for an external loudspeaker, such as the SP-8. Inserting a plug into this jack disables the internal main band (VFO-A) loudspeaker. Impedance is 4 ~ 8 Ω.

    The EXT SPKR 2 two-contact output jack provides sub band (VFO-B) receiver audio for an external loudspeaker. Inserting a plug into this jack disables the internal sub band (VFO-B) loudspeaker. Impedance is 4 ~ 8 Ω.

18. PATCH Jack

    This input jack accepts transmitter audio - either AFSK or voice - for transmission. This line is mixed with the microphone audio input line, so the microphone should be disconnected if using this jack and mixing is not desired. Impedance is 500 ~ 600 Ω.

19. PTT RCA Jack

    This input jack may be used to provide manual transmitter activation using a footswitch or other switching device. Its function is identical to the MOX button on the front panel. The same line is available at the PACKET and RTTY jacks for TNC control. Open-circuit voltage is +13.5 VDC, and closed-circuit current is 1.5 mA.

20. +13.8 V RCA Jack

    This output jack provides regulated, separately fused 13.8 V DC at up to 200 mA, to power an external device such as a packet TNC. Make sure your device does not require more current (if it does, use a separate power source).

21. REMOTE Phone Jack

    By plugging in the supplied FH-2 Remote Control Keypad here, direct access to the FT DX 9000 Contest CPU is provided for control functions such as contest memory keying, frequency and function control. This jack may also be also used for remote control of the VL-1000 Linear Amplifier, if used.

22. MIC Jack

    This 8-pin jack accepts input from a microphone utilizing a traditional YAESU HF-transceiver pinout.

23. AC IN Socket

    Connect the supplied AC line cord to this socket after ensuring that your AC mains voltage matches that on the label.

24. Circuit Breaker

    This circuit breaker shut off when over current occurred.

25. MAIN POWER Switch

    This is main power switch of the FT DX 9000 Contest. Always turn this switch on before turning on the front panel's POWER button.

## Operation (Receiving)

Before plugging in the transceiver, check your installation to make sure your AC voltage is correct, and that your ground and antenna are connected as described in the Installation chapter. Then preset the following controls as indicated:

- ❒ MOX button to Off.
- ❒ METER knob to PO.
- ❒ ATT knob to 0.
- ❒ AGC knob to AUTO.
- ❒ AF GAIN knobs matched at approximately 9 o'clock.
- ❒ RF GAIN knobs fully clockwise.
- ❒ MIC, PROC, RF PWR, MONI, SQL, and NB knobs all counterclockwise.
- ❒ SHIFT, WIDTH, and NOTCH knobs at 12 o'clock.
- ❒ [LOCK], [FAST], [SPOT], [BK-IN], and [KEYER] switches all Off.

Connect your microphone and CW key/paddle, then plug the AC cord into the wall outlet.
Turn on the rear panel's main POWER switch.

### Turning the FT DX 9000 Contest On and Off

- ❒ To turn the FT DX 9000 Contest on, press the front panel's POWER button.
- ❒ Take a moment to study the display. You should see upper large frequency field, which displays the main band (VFO-A) frequency, and the (lower) small frequency field, which displays the sub band (VFO-B) frequency. The Clarifier offset ("0.000") appears in the small box on the display.
- ❒ To turn the FT DX 9000 Contest off, just press the POWER button again. Usually, you do not turn off the rear panel's main POWER switch.

Key Beeper

Pressing a front-panel button normally produces a beep. Its volume is independent of receiver volume, and can be set via menu selection 108: BEEP LEVEL.

### FT DX 9000 Contest Menu Programming

The FT DX 9000 Contest incorporates a wealth of operating functions and features. For flexibility in configuring these capabilities, and to keep the front panel controls to a minimum, an internal Menu Programming routine is used. This allows customizing the functions via menu selections that allow you to "set and forget" a number of features and configurations, without the clutter of additional front and rear panel controls/switches. This permits each rig

to have a custom “personality” that specifically matches your operating requirements, with the capability for easy modification as your requirements change.
Menu programming is enabled by pressing the MNU button. You may then rotate the Main Tuning knob to display the desired setting. Each of the settings can be changed or customized by the CLAR/VFO-B knob, as you like, in this mode. For clarity’s sake, transceiver functions that have several settings or options are referenced to the Menu Programming chapter separately, where details of programming are covered. Descriptions for most transceiver functions in this chapter assume default (factory-configured) transceiver settings.

**VFO Selection & Receiver Muting**

Above the Main Tuning knob and CLAR/VFO-B knob are a pair of button/LEDs labeled RX and TX. An illuminated green “RX” LED indicates the VFO(s) controlling the receiver, while the red “TX” LED shows the VFO controlling the transmit frequency. As we will see later on in dual and split operation, these buttons can configure split and/or dual receive operation as you choose.
You can mute the main band (VFO-A) at any time by pressing the RX button/LED above the Main Tuning knob. The LED blinks while the receiver remains muted; simply press the button again to unmute.

**Amateur Band Selection**

Press a BAND button (lining below the LCD display) to select the amateur band of the main band (VFO-A) on which you wish to operate. Press the one of the eleven BAND buttons after pressing the [B] button, select the amateur band of sub band (VFO-B) on which you wish to operate. Refer to the white “MHz” labels, and press the appropriate one.
You may also select the amateur band by rotating the CLAR/VFO-B knob.
To select the amateur band of main band (VFO-A), rotate the CLAR/VFO-B knob after pressing the BAND/MHz button which located at the left side of the CLAR/VFO-B knob.
To select the amateur band of sub band (VFO-B), press the [A]/[B] button first (illuminate the orange at the right side of the CLAR/VFO-B knob), then rotate the CLAR/VFO-B knob after pressing the BAND/MHz button which located at the right side of the CLAR/VFO-B knob.

Customization: You may programs a amateur band to be skipped while selecting bands using the CLAR/VFO-B knob via menu selection 127: SKIP BAND.

**Antenna Selection**

Press the one of the four ANTENNA SELECT buttons (under the Main Meter), set a rear-panel antenna port which is same number to the main band (VFO-A). Press the one of the four ANTENNA SELECT buttons after pressing the [B] buttons, set a rear-panel antenna port which is same number to the sub band (VFO-B).

When an antenna has been selected for operation on main band (VFO-A), the LED in the button glows red. When an antenna has been selected for operation on sub band (VFO-B), the LED in the button glows umber.

Customization: The FT DX 9000 Contest, in the factory-default configuration, selects the antenna in accordance with the current operating band. That is, if you choose Antenna “2” when operating on 14 MHz on the main band (VFO-A), Antenna “2” will be selected any time you choose 14 MHz on the main band (VFO-A). However, you may change the antenna selection method to assign antennas in accordance with the band stack (different antennas may be utilized on the same band, if so selected in the band stack) via menu selection 106: ANT Select.

**Audio Volume Setting**

Adjust the “large” AF GAIN knob for comfortable volume on main band (VFO-A) signals or noise in the loudspeaker or headphones. The “small” AF GAIN knob (to the left of and below the Main Tuning knob) adjusts the volume on sub band (VFO-B) signals or noise in the loudspeaker or headphones.

**MODE Selection**

Press the MODE button (to the left of the Main Tuning knob) corresponding to the mode on which you wish to operate -- for now, we suggest an SSB mode: USB if you have selected a band above 10 MHz, or LSB otherwise. The red LED at the left of the button indicates the selected mode on the main band (VFO-A), and the umber LED at the right of the button indicates the selected mode on the sub band (VFO-B).

CW and RTTY have “reverse” modes that are selected by pressing their button twice (see the box at the right). Also, Packet operation can be toggled between LSB and FM (for 29 MHz operation) by pressing the PKT button in the same way. These special features are covered later.

**- Special Note for CW Mode - (Reverse CW Sideband)**

When you switch modes between CW and USB, you may notice that the frequency of the received signal stays the same (even though the panel frequency may change slightly). Also

notice that the pitch of a received signal decreases as you increase the dial frequency.
However, switching to LSB from CW normally requires retuning the desired station. This can be especially inconvenient if you enjoy working the lower HF bands (40 meters and below) where LSB mode is used.
To eliminate the need for retuning in this situation, you may switch the receiver CW carrier oscillator injection to the reverse side (LSB). When you press the CW button, you should notice that the green LED in the USB button blinks for a second or two. This informs you of the default carrier offset (upper) for CW. To switch to the LSB injection side, simply press the CW button again; you will see the displayed frequency shift, and the LSB LED will blink.
When using the reverse sideband (LSB) for CW reception, you can freely switch between LSB and CW without having to retune a station. Note that, in the LSB and CW modes, the received signal pitch now increases as you increase the dial frequency.
To return the receiver to the default (upper) sideband, simply press the CW button again.
Operating Hint - An added benefit from this feature is QRM rejection. If you have interference on a CW station that the IF SHIFT does not easily eliminate, you can try switching to the reverse sideband, retuning the signal, and trying the IF SHIFT again.

**Tuning the FT DX 9000 Contest**

Tuning is accomplished in several ways, with each method having its own advantages.

Main Tuning Knob

Rotating the Main Tuning knob tunes the main band (VFO-A) frequency according to the selected tuning step size. The table below shows the available tuning step sizes, and their default settings.

CLAR/VFO-B Knob

Rotating the CLAR/VFO-B knob tunes the main band (VFO-A) and sub band (VFO-B) frequencies according to the settings of the button which is located around the CLAR/VFO-B knob and selected tuning step size. The table below shows the available tuning step sizes and their default settings.

Microphone Up/Dwn Buttons

If your microphone has UP and DWN buttons (such as the MD-200A8X), you can press them momentarily to tune the main band (VFO-A) frequency according to the selected tuning step size, or hold them down to start VFO scanning. The table below shows the available tuning step sizes, and their default settings.

Note: Regarding CW Reception

In the CW mode on the main band (VFO-A), when you tune a signal near the center of the receiver passband, the Tuning Offset Indicator (located above the Main Tuning Knob), and the S-meter increase, as you slowly tune the Main Tuning Knob. The idea is to tune for maximum indication, and so that a lone center marker illuminates in the Tuning Offset Indicator. If you detune, the center marker shift to left or right, indicating that you need to re-center the marker.

**Keypad Frequency Entry**

Frequencies can be entered directly using the BAND buttons (below the display), if desired, as follows:

Press the ENT button at the lower right of the LCD display (the leftmost operating frequency digit will blink). Then, referring to the orange numbers on the BAND buttons, enter the digits of the new frequency, from left to right ([1] - [4] - [.] - [2] - [5] - [0] - [0] - [0] - [0]), followed by ENT button again. As you enter the numbers, the next digit to be entered will blink on the display.

To enter the Frequencies into the sub band (VFO-B), press the [B] button, then enter the digits of the new frequency, from left to right ([2] - [1] - [.] - [3] - [5] - [0] - [0] - [0] - [0]), followed by ENT button.

Note: Regarding AM Broadcast Reception

In many countries, broadcast stations in the Standard AM Broadcast Band are separated by a spacing of 9 kHz. The microphone's UP/DWN buttons can be highly useful in this case, as you can set the UP/DWN button's step size to 9 kHz via menu selection 121: AM CH STEP. If "9 kHz" has been set via menu selection 121, you can now use microphone's UP/DWN buttons to tune through the broadcast band in the desired 9 kHz steps.

**Stacked VFO System ("Front, Middle, & Rear" VFOs)**

If you press the BAND button for the same band that you are already operating on, the display will shift to a different frequency in the same band. Pressing the same BAND button again will shift to another different frequency in the same band. Pressing the same BAND button once again switches you back to the frequency you were on before. What you have here are three completely independent VFO selections for each (main and sub) band, selectable by each band's keypad key. You can think of the VFO for every band having a "Front," "Middle," and "Rear" division that can be swapped for operation by toggling the

BAND button. You can tune, and select a mode for each of these three VFO division in each band, and they will be remembered until you return to this particular VFO selection.
A practical use of this feature is to configure the top VFO for phone operation, the middle division for CW operation, and the bottom division for RTTY operation on the same band (see the illustration above).
For example, if one of your VFOs is set to the SSB portion of the band (and in an SSB mode), press the keypad key for that same band, tune to the low end of the band, and press the CW (mode) button. You can consider this your CW VFO. Press the keypad key for that same band again, tune to the low end of the band, and press the RTTY (mode) button. You can consider this your RTTY VFO. Now press the band key again several times, and notice that operation toggles the SSB, CW, and RTTY VFO division.
The Front, Middle, and Rear VFOs are preset to bottom of the band when you turn on the FT DX 9000 Contest for the first time.

**Clarifier (Rx/Tx Offset Tuning)**

The CLAR button and CLAR/VFO-B knob are used to offset either the receive, transmit, or both frequencies from their settings on the main band (VFO-A) frequency (the Clarifier does not affect the sub band (VFO-B), however). The four small numbers on the Multi Display Window show the current Clarifier offset. The Clarifier controls on the FT DX 9000 Contest are designed to allow you to preset an offset (up to ±9.999 kHz) without actually retuning, and then to activate it via the Clarifier's RX (FAST RX) and TX (BAND/MHz TX) buttons.
Perform the following steps, if you like, to familiarize yourself with the Clarifier controls:

- ❒ Press the CLAR button, then rotate the CLAR/VFO-B knob back and forth while watching on the Multi Display Window. Notice that the small digits change, indicating the preset Clarifier offset (which hasn't been applied to the Tx or Rx frequency yet) while the main display remains unchanged.
- ❒ If you press the BAND/MHz TX button, the LED inside the button will glow green, and if you press the PTT you will see the Tx frequency shift by the amount of Clarifier offset.
- ❒ If you press the FAST RX button instead, the LED inside the button will glow green, the frequency offset will be applied, and the display will shift to the offset receive frequency. Press the PTT switch, and notice that the transmit frequency remains the same as the original frequency display when the receive Clarifier is on. You can reset the offset to 0.000 kHz at any time by simply pressing B.MODE CLEAR button.
- ❒ With the RX Clarifier active, the Tuning Offset Indicator (just above the Main Tuning Knob) moves to the right or left as you change the offset by rotating the CLAR/VFO-B knob. Also notice that the main frequency and the Clarifier offset displays change

together.

- ❒ To exit from Clarifier operation, press the CLEAR button. The main band (VFO-A) frequency will return to what it was originally, but the microprocessor will remember the clarifier offset, in case you want to return to it.

The Clarifier is commonly used when you are in contact with a station whose transmitter drifts (or perhaps you didn't have him quite tuned in when you called him). You don't want to change your transmitting frequency, as that would force him to retune - you just want to adjust your receiver.

Another application for the Clarifier is in a casual DX pile-up situation, where the DX station is listening in a "Split" mode (but listening "UP 5" or a similar split of less than 10 kHz). In this case, you leave the main receiver on the DX station's frequency, then use the RX Clarifier to tune the pile-up area, listening for the station currently in QSO with the DX station. When you find that station, you can switch the TX Clarifier On and the RX Clarifier Off; you will now be receiving back on the DX station's frequency, but you will be transmitting on the frequency where the DX station probably is still listening. See the discussion on page ?? regarding the use of the SPOT control for CW spotting; it speeds up the above process significantly.

When you finish your QSO, remember to press the Clarifier RX button again to turn off the Clarifier. You might also want to clear the offset when done.

The FT DX 9000 Contest has an independent Clarifier for "Stacked" VFO-A, on every band, plus one on each of the 99 memories. This means that Clarifier TX/RX and offset settings are not (improperly) carried over when you change bands or memory channels, but rather are stored in the same condition you last set them until you return to that VFO ,band, sub receiver, or memory again.

Customization: 1) You may change the Tuning Offset Indicator (located above the Main Tuning knob) indication to the Clarifier offset via the menu selection 111: BAR GRAPH.

2) You may select the resolution of the Tuning Offset Indicator via the menu selection 133: CLAR-DISP.

**Voice Recording**

The internal Voice Recorder allows to record the main band (VFO-A) receiver audio for the most-recent 30 seconds.

Press and hold this button for 1/2 second to activates the recording feature of the internal Voice Recorder. While recording the receiver audio, the LED in this button glows red.

Press this button momentarily to stop the recording, then press this button momentarily again to plays back the receiver audio, the LED inside button will glow umber.

Press and hold this button for 1/2 second again, resume the recording feature.

**CW Pitch Setting and Spot Tone**

In the CW mode (only), you can activate a “spotting” oscillator by pressing and holding in the BK-IN/SPOT button. The frequency of this tone is also (exactly) the frequency at which your transmitted signal will appear relative to that of the incoming signal.

Therefore, if you match the pitch of the SPOT oscillator’s tone to the pitch of an incoming signal, you will be exactly “zero beat” with that station’s CW signal. In a DX pile-up situation, you can match your transceiver’s SPOT tone with that of the station being worked by the DX station, so as to be “next in line” on the same frequency. This SPOT signal is centered in the receiver section’s IF passband, as well, which ensures that you will not lose track of his signal when switching to a narrower filter. Of course, release the BK-IN/SPOT button to turn off the spotting oscillator once frequency alignment has been completed.

The CW Pitch can be set from 300 ~ 1050 Hz (in 50-Hz increments) to match your personal operating preference. The CW Pitch feature adjusts the amount of offset from “zero beat” of your CW carrier, as well as the corresponding pitch of the CW SPOT tone; it also adjusts the center frequency of the receiver’s IF passband, so as to be aligned with the other offset parameters just mentioned. The CW Pitch may also be adjusted to match that used by popular TNC (Terminal Node Controller) units and other CW decoders.

To adjust the CW pitch (and SPOT tone along with it), press and hold in the BK-IN/SPOT knob, then rotate the PITCH control to set the tone to the pitch you prefer, or that used by your TNC or CW decoder. The SPOT tone volume can be adjusted using the MONI knob.

**Adjacent Channel Monitor**

In the CW mode (only), you may activate the ACM (Adjacent Channel Monitor) function by pressing the ACM button.

When the ACM (Adjacent Channel Monitor) function is activated, the Sub Meter indicates the relative signal strength of any incoming signals which are just *outside* of the receiver (CW filter) passband on the main band (VFO-A). This will alert you to “encroachment” on your operating frequency by a station or stations you can’t hear, due to the tremendous selectivity of your FT DX 9000 Contest.

When the ACM function is activated, the LED inside the button will glow red.

Important Note: When the ACM function is activated, Dual Reception (described later) is disabled automatically.

**Operation (Dealing with Interference)**

The FT DX 9000 Contest 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 9000 Contest's interference-fighting circuitry begins in its "RF" stages, and continues throughout the entire receiver section. The FT DX 9000 Contest allows configuration of the features described below independently on the main band (VFO-A) and sub band (VFO-B), except for the µ-TUNE (Narrow-bandwidth High-Q RF Filter) feature; the sub band (VFO-B) receiver does not have provision for a µ-TUNE module or modules.

**VRF/µ-TUNE**

The FT DX 9000 Contest's receiver front ends utilize advanced RF filtering, to protect the stages to follow from the effects of extremely strong signals which may be in your operating band, or a number of MHz away, far outside the current operating band. These include:

(1) The VRF (Variable RF Front-end Filter) feature allows you to insert a narrow band-pass "preselector" filter into the receiver's RF circuit path.

(2) The µ-TUNE (permeability-tuned, high-Q RF filter) feature (main band (VFO-A) receiver only) alternative is a ***very***-narrow-bandwidth, high-Q RF filter in the receiver's RF circuit path.

Either the VRF and µ-TUNE feature will add selectivity that can be a tremendous help in minimizing potential interference from strong close-in (µ-TUNE) or out-of-band (VRF) signals, especially in a multi-transmitter operating environment. The µ-TUNE modules are optional on some FT DX 9000 Contest versions.

The µ-TUNE feature only works on the 14 MHz and lower amateur bands, and only on the main band (VFO-A). The VRF feature will take over on and above 18 MHz on the main band (VFO-A), and on all amateur bands on the sub band (VFO-B).

In the default configuration of the Menu, the µ-TUNE system tracks the current operating frequency automatically, and can be adjustment the peak ±5 kHz. The VRF circuit is a manually-peaked system.

To activate the VRF/µ-TUNE feature, press the VRF/µ-T button. If using the VRF, turn the VRF/µ-T knob to peak the signal or background noise level. When the VRF/µ-TUNE feature is engaged, the LED in the VRF/µ-T button will be illuminated.

Note: Menu selection 127: µ-TUNE allows you to tune the µ-TUNE system manually or turn it OFF, if you prefer. When set to manual, operation will be identical to the VRF process just

described, and you may set the peak position of the μ-TUNE filter to be centered on the receiving frequency by pressing and holding in the VRF/μ-T button for 1/2 second. When μ-TUNE is turned OFF, the VRF feature takes over as the RF preselector on the 14 MHz and lower amateur bands.
Customization: You may display the peak position of the VRF or μ-TUNE filter (main band only) on the Tuning Offset Indicator via menu selection 111: BAR GRAPH.

**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.

**ATT (RF Attenuator)**
Even with the IPO function on, extremely strong local signals can still degrade reception. So if you still notice the effects of overloading, or if the signals you want to listen to are very strong, you can use the ATT knob to insert 3, 6, 12, or 18-dB of RF attenuation in front of the RF amplifier. 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.

**AGC (Automatic Gain Control)**
When tuning around the band looking for signals, the AGC knob is usually best kept in the "AUTO" position, where AGC decay is automatically selected according to the operating

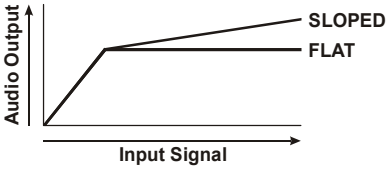
mode. You can manually select receiver AGC; however, a few points about AGC and receiver recovery time need to be pointed out.

For SSB reception, the “FAST” position allows the receiver gain to recover quickly after tuning past strong signals or when fast fading occurs. However, once you have a station tuned in, reception will usually be more comfortable if you switch to the “MID” position (keeping the receiver from picking up low-level noise during pauses in speech).

For CW reception, when several signals are present in the passband, the “FAST” position can avoid AGC “pumping” (gain fluctuations) caused by strong undesired signals.

For AM reception, the “SLOW” position is usually better, and for digital modes the “FAST” or “OFF” positions will usually give the fewest errors/retries.

Customization: You may change the gain curves of the AGC amplifier via menu selection 1: AGC-MAG, and set the delay and hang times independently for the AGC FAST, MID, and SLOW on the main band (VFO-A) and sub band (VFO-B) via the menu selection 2: MAIN-AGC-FAST DELAY through 13: SUB-AGC-SLOW HOLD. See page ??87?? for more details regarding these Menu settings.




**RF Gain**

When tuned to a moderate strength signal, if low level background noise is still present after setting the ATT knob, try reducing the RF GAIN knob from the fully clockwise position. This reduces the signal input to the first mixer via a PIN diode attenuator, and causes the minimum S-meter reading to move up the scale, often clearing up the background noise and putting the desired signal more “in the clear.” Remember, however, to return this control fully clockwise when you want to receive weak signals, or read low levels on the S-meter. Also read the box on this page.

Note: The AGC “OFF” position disables the overload-protection normally provided by the AGC circuitry. If the RF GAIN knob is left fully clockwise in this condition, the RF and IF amplifiers can be easily overloaded (causing distortion) when a strong signal is received. Correct the overload either by setting the AGC selector to another position, or by turning the RF GAIN knob counterclockwise to set receiver gain to a comfortable level.

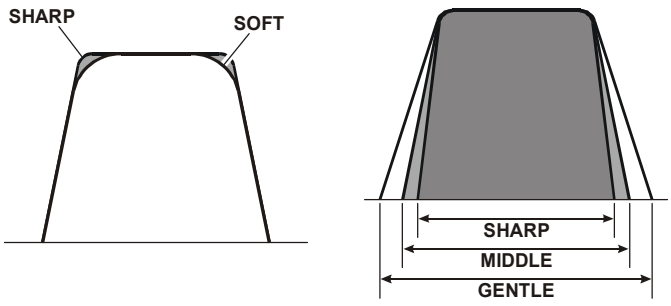
**Roofing Filter Setting**

The FT DX 9000 Contest provides three selectable roofing filters (in the receiver’s VHF first IF) 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 Filter is usually best kept in the “AUTO” position; the red “AUTO” LED will be lit for the main band (VFO-A), and the LED inside the FLT button will glow umber for the sub band (VFO-B).
You can manually select the bandwidth, in response to current interference conditions, by pressing the R.FLT button for main band (VFO-A) or the FLT button for the sub band (VFO-B). On the main band (VFO-A), the “3k,” “6k,” or “15k” LEDs above the R.FLT button change according to the bandwidth selected. On the sub band (VFO-B), the LED inside the FLT button only indicates the difference between AUTO (where it glows umber) or manual selection (the LED will be off); however, you may confirm the current sub-receiver’s roofing filter bandwidth in the TFT monitor.
Important Note: When the Noise Blanker is engaged (described later), the Roofing Filter’s Bandwidth is set to “15 kHz” automatically, and the “AUTO” LED will be illuminated.

**DSP Filter (Bandwidth) Selection**

The FT DX 9000 Contest provides digital IF filters which have suitable pre-set bandwidths for each of the operating modes on both the main band (VFO-A) and sub band (VFO-B). You do not need to select a filter, therefore, when changing the operating mode. If you wish to adjust the width or center frequency of the DSP filter, use the WIDTH and SHIFT controls (see next chapter), which have been crafted so as to emulate the characteristics of earlier analog cascaded-filter systems, only with the superior stopband rejection characteristics of a digital filtering system.
Customization: These mode-optimized DSP filters may be customized as to their passband characteristics and shape factors independently via Menu Selection 42: MAIN-CW-FIL-PASSBAND through 49: MAIN-SSB-FIL-SHAPE (for main band’s (VFO-A) filters) and Menu Selection 51: SUB-CW-FIL-PASSBAND through 58: SUB-SSB-FIL-SHAPE (for main band’s (VFO-A) filters).



**WIDTH Control**

In a crowded band, you ideally want to narrow the bandwidth just to the point where unwanted signals are attenuated, while still retaining enough bandpass to recover the desired station. In earlier crystal filter receiver designs, however, this ideal bandwidth often was somewhere “in-between” the several selectable filter bandwidths available. In the FT DX 9000 Contest, the DSP filtering provides continuous adjustment capability for the filter bandwidth, shape factor, and passband characteristics of the filter’s response.

The WIDTH control can be used in all modes (except FM) continuously to narrow or broaden the bandpass skirt for the optimum cutoff and interference rejection during each QRM situation. Unlike older types of width controls that adjust both sides of the filter slope at the same time, the FT DX 9000 Contest’s WIDTH control narrows the passband from either the upper or lower side (see illustration below). Thus, you only narrow the side of the bandpass where the QRM is located.

The fully 12 o’clock position on the outer WIDTH knob provides maximum bandwidth; rotation in either direction from the 12 o’clock position will reduce the bandwidth. If a QRM condition occurs after tuning in a station, slowly rotate the WIDTH knob to the position where the interference is reduced while the station is still workable. As you rotate the WIDTH knob you will hear the audio response change as the passband is narrowed. If the QRM is very close, the amount of bandwidth reduction necessary to cut the QRM may leave the desired station’s audio unrecoverable, or it may not be possible to entirely eliminate the QRM.

When the QRM is only above or below the desired signal the SHIFT knob (covered next) will also work for reducing the interference.

You will be able to see the effects of your changes in the TFT monitor.

Note: The WIDTH control is disabled when the [NAR] button is activated.

**SHIFT Control**

The SHIFT knob tunes the relative position of the receiver DSP passband with respect to the displayed frequency in all modes (except FM). The control is detented in the center position, which represents the passband center frequency, which is also the displayed frequency. Turning the SHIFT knob clockwise raises the passband center frequency, while turning the SHIFT knob counter-clockwise lowers it.

When QRM is present on both sides of the tuned station, first adjust the SHIFT knob just to the point where the interference from one side is eliminated, and then rotate the WIDTH knob in the opposite direction to eliminate interference from the other side. The optimum settings of these controls depend on the relative signal strengths of the desired station and the QRM, and practice will develop your intuition about how these controls may be most optimally

utilized.

You will be able to see the effects of your changes in the LCD monitor.

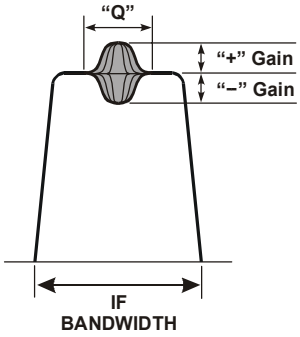
**DSP Contour Control**

QRM reduction may be enhanced by utilization of the variable DSP Contour control.

The Contour system is a pseudo-Parametric Equalization filter technique that allows emphasis or de-emphasis of the audio frequency ranges within the main passband (although it is the digital IF that is actually being adjusted). And the main and sub receivers have independent Contour filters, so each may be optimized separately.

Press the main band (VFO-A) receiver CONT button (located just below the S-meter) to activate the DSP Contour filter system; for the sub band (VFO-B) receiver, press the CONT button along the bottom edge of the front panel, directly below the main receiver CONT control. The LED inside the corresponding CONT button will become illuminated when the Contour filter system is engaged. Slowly adjust the CONT knob to peak the passband response of the filter passband.

Customization: The Q and gain of the response may be adjusted via Menu Selections 17: MAIN-CONT-GAIN and 18: MAIN CONT-Q for the main band (VFO-A) receiver, and Menu Selections 19: SUB-CONT-GAIN and 20: SUB CONT-Q for the sub band (VFO-B) receiver.




**Noise Blanker (Analog IF)**

Press the NB button to activate the IF Noise Blanker; the LED inside the NB button will appear. Rotate the NB knob to the point where the interfering noise is eliminated.

If the blanker seems to distort a signal you're listening to, reduce the setting for optimum readability, or turn it off. During periods of extreme signal density (such as a contest), the noise blanker is best left off.

The analog IF Noise Blanker may be used in tandem with the Digital IF Noise Reduction (see the next section), providing two methods of reducing or eliminating noise that is interfering with effective communication.

Important Note: When the Noise Blanker is activated, the Roofing Filter's Bandwidth will be

set to “15 kHz” automatically, and the “AUTO” LED will be engaged.

**EDSP Noise Reduction**

Noise reduction is accomplished by utilization of the DSP Noise Reduction filter, which utilizes sixteen different mathematical algorithms for reduction of the noise profiles observed on the HF and 50 MHz bands.

Press the DNR button to activate the EDSP Noise Reduction; the LED inside the DNR button will become illuminated. Slowly adjusting the DNR knob will cause the incoming noise to be reduced, and you should try different settings for different noise types, as changing noise conditions may call for a different noise reduction algorithm for maximum effect.

The EDSP Noise Reduction system may be used in tandem with the Analog IF Noise Blanker (see the previous section), providing two methods of reducing or eliminating noise that is interfering with effective communication.

**IF DSP Notch Filter (Manual)**

If “heterodyne” interference such as from a carrier or CW signal occurs, activate the DSP Notch filter by pressing the NTCH button and slowly adjusting the NTCH knob to null the offending carrier. Note that if the interfering carrier is more than about ±1.2 kHz away from the center of the passband, the notch filter may be unable to null it. In this case, switch the notch filter off, and readjust the WIDTH and SHIFT controls so that the undesired carrier is outside of the passband.

Customization: You may change the bandwidth of the IF DSP Notch via menu selection 41: IF-NOTCH.

**DSP Auto-Notch Filter**

The DNF button serves as an On/Off switch for the DSP auto-notch filter, which automatically locates incoming heterodynes and notches them out. Any additional heterodynes are also notched as they appear.

The DNF system is most typically used in a voice operating environment, where incoming carriers are, most likely, interfering with communication. The DSP manual Notch Filter, by comparison, may be used on a mode like CW, where one carrier is interfering with another (desired) carrier (a CW station). If the auto-notch filter were used on CW, all the (desired) CW signals could be notched out!

**Audio (AF) Limiter**

The AFL button serves as an On/Off switch for the Audio (AF) Limiter circuit, which protects

the audio amplifier from distortion, and protects your ears from high audio levels caused by sudden peaks in audio input. When the Audio Limiter circuit is activated, the LED inside the AFL button will become illuminated.

## Operation (Transmitting)

The transmitter can be activated within the 500-kHz segment of any of the HF, 28 MHz, and 50 MHz amateur bands. When tuned to any other frequency, the transmitter is disabled. However, you are responsible to restrict your transmissions to those frequencies on which you are authorized to operate, per the terms of your amateur license. You should also restrict transmissions to the frequencies for which your antenna is designed.

Attempting to transmit outside of an amateur band segment will cause the red “TRANSMIT” indicator to the right of the meter to blink. The transmitter is also temporarily inhibited when stopped during memory scanning (described later), as pressing the PTT switch while scanning just causes the scanner to stop.

Whenever the transmitter is activated, the FT DX 9000 Contest automatically detects any reflected power that might appear at the main antenna jack (as a result of an impedance mismatch), and disables the transmitter if too much reflected power is found (in which case the red “HI SWR” indicator at the right side of the Main Tuning Knob will be lit). Although this protection system should prevent any damage to the transceiver, we still recommend that you never activate the transmitter without having a proper antenna connected to the ANT jack.

### Preparation

Selecting Antennas

You can assign any of the four rear-panel antenna connectors for transceive operation via the front panel, perhaps eliminating the need to utilize an external coaxial switch.

Press the Antenna Select keys [1] through [4] button to select the rear-panel jack you wish to use. The antenna connected to this jack is used for receive (and always for transmit). If a separate receive-only antenna is connected to the RX ANT jack, and the front panel’s [RX] switch is pressed, the antenna connected to the RX ANT jack will be used by the receiver. A relay engages during transmit, and the last-selected antenna (“1” through “4”) will be used for transmit.

Antenna selections are automatically copied along with other operating parameters during memory programming (covered later), and will take effect when memories are recalled later.

Customization: The FT DX 9000 Contest selects the antenna in accordance with the

operating band in the factory default configuration. However, you may change the antenna selection method to assign the antennas according to the band stack (different antennas may be utilized on the same band, if so selected in the band stack) via menu selection 110: ANT Select.

Automatic Antenna Matching

The built-in automatic antenna tuner unit is capable of matching antennas with impedances from 16.7 ~ 150 Ohms (160-10 m; 25 ~ 100 Ohms on 6 m), which corresponds to a maximum SWR of approximately 3.0:1. If the antenna you are using exceeds this SWR as configured, it must be adjusted (mechanically or electrically) until a feedpoint impedance closer to 50 Ohms can be obtained.

The FT DX 9000 Contest provides 100 tuner memories, which store the exact positions of the tuning capacitors and corresponding inductance values, for outstanding operating convenience.

When you use the tuner the first time on an antenna, set the RF PWR knob to around the 9 o'clock position, to minimize interference you might cause others, and also to minimize stress on the tuner, feedline, and antenna (in case there is a high SWR). Ensure beforehand that the frequency you will transmit on is clear of other signals. Also, if you want to monitor the tuner's action visually, set the METER knob to the "SWR" position.

When the channel is clear, press and hold in the TUNE button for 1/2 second. The LED in the button will blink red, while the tuner seeks the proper matching settings (and, if monitoring SWR on the meter, you should see the tuner adjust for the lowest possible reading). When the red LED in the button stops blinking, you are ready to transmit (so long as the "HI SWR" indicator didn't light). Note that pressing and holding in the TUNE button is the action which causes ATU settings to be stored into the tuner's memory system.

If the SWR presented to the transceiver is above 3:1, the tuner will generally not complete the tuning process (although in certain borderline cases, it may actually be able to lower the SWR below 1.5:1). If the pre-tuning SWR is above 3:1, the auto-tuner will not store the tuning settings, under the presumption that corrective antenna work is required.

After using the antenna tuner (unless you press the TUNE button to turn it off), the TUNE button will blink when you change frequency, indicating that the main microprocessor is reporting the frequency change to the tuner coprocessor (reception is unaffected). If you have tuned far enough possibly to require rematching, it will reset itself to the new range (if it has any previously stored settings for the new range). However, when you first connect a new antenna, the tuner will not have the correct settings stored in these memories, so you will need to "train" the tuner, by pressing and holding in the TUNE button for 1/2 second

whenever you change to a new band or frequency range (for this antenna).
To disable the automatic antenna tuner unit, just press the TUNE button momentarily, so that its red LED turns off.
Note: The “G5RV” multiband antenna does not present an SWR below 3:1 on all HF amateur bands, despite its reputation as an “all-band” antenna. You will need to perform additional impedance matching with respect to the basic G5RV design, especially on 30, 17, and 12 meters.

## Operation (SSB Transmission)

### General

To transmit in LSB or USB mode:

- ❒ In the factory default, the microphone to be used on the SSB mode is set to the microphone which is connected to the ***front panel's*** XLR microphone jack. If you use a traditional YAESU-compatible microphone with a round 8-pin connector, switch the microphone input to the rear panel's microphone jack via the Menu Mode (see box below).
- ❒ Make sure the appropriate (LSB/USB) mode indicator is lit, and set the METER knob to the “PO” position.
- ❒ If this is the first time you are transmitting on SSB with the FT DX 9000 Contest, preset the MIC and RF PWR knobs to about the 12 o'clock position, and make sure the VOX is off (the LED in the button will be off).
- ❒ Check the “RX” and “TX” LEDs above the tuning knobs to determine which frequency you're going to transmit on, and make sure the frequency is set within the proper (voice) segment of the amateur band.
- ❒ To transmit, just press the front panel's MOX button or a PTT (push-to-talk) switch which is connected to the rear panel's PTT Jack, and speak into the microphone.
- ❒ To determine the optimum setting of the MIC knob for your microphone, adjust it while speaking into the microphone (at a normal level) so that the Sub Meter deflects to about midrange on voice peaks (red ALC range). Once found, this setting can be left as-is unless you change microphones. The proper adjustment point for most commonly-available amateur microphones is a setting between about 9 o'clock and 10 o'clock.
- ❒ You can adjust the RF PWR knob for more or less output, from about 5 to 200 watts (on the PO meter scale of the Main Meter), as desired. However, you should always use the lowest possible power output to maintain reliable communications - not only as a courtesy to other stations, but to minimize the possibility of causing overload to nearby

home-entertainment devices, and to reduce heat generation and maximize the life of the equipment.

SSB Microphone Selection (Front/Rear MIC Jacks)

- ❒ Press the MNU key, located at the bottom right of the TFT display, to enter the Menu Mode.
- ❒ Rotate the Main Tuning Knob to select Menu Selection 107: SSB MIC SEL.
- ❒ Rotate the CLAR/VFO-B knob to select “FRONT.”
- ❒ After completing your adjustment, press and hold in the MNU key for 1/2 second to save the new setting and exit to normal operation.

**Transmitter Monitor**

The transmitter monitor picks up a sample of your transmitted RF signal, allowing you to hear accurately how the signal sounds. This feature is very helpful for setting up the speech processor controls, among other things.

- ❒ Activate the monitor by pressing the MONI button so that its red LED lights up, and adjust the MONI knob for a comfortable volume while transmitting.
- ❒ Audio feedback of your signal from the loudspeaker to the microphone may occur if the MONI knob is not properly set, so you may want to use the monitor with headphones; if so you should plug them in now.
- ❒ To disable the monitor function, just press the MONI button momentarily, so that its red LED turns off.

**RF Speech Processor**

Once the proper MIC knob setting has been determined, you can activate the RF speech processor to increase the average power of your transmitted signal.

- ❒ Set the METER knob to the “COMP” (speech processor compression) position, and press the PROC button so that its red LED lights up.
- ❒ Now, while speaking into the microphone, adjust the PROC knob for a compression level of 5 to 10 dB on the COMP scale of the Main Meter. If you have the monitor activated, you will be able to hear the effect of the compression on your signal. In any case, we do not recommend higher compression settings, as your signal will actually become less readable. For the purposes of making accurate adjustments, the long utterance of the word “four” usually provides a stable, full voice waveform, ideal for setup of the RF speech processor.
- ❒ Finally, move the METER knob to the “PO” position, and (without touching the MIC knob

setting) adjust the RF PWR knob for the desired power output on voice peaks.

❒ To disable the RF speech processor, just press the PROC button momentarily, so that its red LED turns off.

Note: This feature also works on the AM mode, not just SSB.

**VOX Operation**

VOX (Voice-Actuated T/R Switching) operation allows you to activate the transmitter in any voice mode merely by speaking into the microphone, without having to press the MOX button or PTT switch.

❒ First make sure the receiver is set for normal volume on a clear frequency, and preset the VOX knob fully counterclockwise. Also preset the DELAY (VOX Delay) knob to the 12 o'clock position.

❒ Set the RF PWR knob fully counterclockwise (to avoid creating interference while you set up the VOX controls). Now press the VOX button so that its red LED lights up.

❒ Without pressing the MOX button or PTT switch, speak continuously into the microphone while slowly adjusting the VOX knob, looking for the point where your voice just activates the transmitter. Advancing the VOX knob beyond this point will make the VOX excessively sensitive to random background noise in your operating room.

❒ Now speak intermittently into the microphone, and note the "hang time" between the moment you stop speaking and when the receiver is reactivated. This period should be just long enough so that the transmitter remains keyed between words, but drops back to receive during pauses. Adjust the DELAY knob, if necessary, for a comfortable hang time.

❒ To disable VOX operation, just press the VOX button momentarily, so that its red LED turns off.

Note: This feature works on all voice modes, and VOX may also be engaged for Digital mode operation via Menu #139: VOX SEL.

**Class-A Operation**

A unique feature of the FT DX 9000 Contest is the capability to operate SSB in Class-AB or Class-A, with continuous adjustment of the operating class. Switching to Class-A yields an ultra-linear transmitted signal, with intermodulation distortion products significantly better than possible with a typical Class-AB transmitter design.

Because Class-A involves a total current dissipation much greater than utilized for Class-AB, to which you're probably accustomed, maximum power output during Class-A is limited to 75 Watts as indicated on the PO meter.

❒ To enable this feature, press the orange CLASS-A button (located below and to the left of

the Main Tuning Knob) while operating either in USB or LSB, then adjust the bias current by the BIAS knob. When the BIAS knob is set fully counterclockwise, the FT DX 9000 Contest operates SSB in Class-AB. When the BIAS knob is set fully clockwise, the FT DX 9000 Contest will operate SSB in Class-A. Intermediate settings will result in intermediate operating conditions and power output, and you may monitor the heat sink temperature on the TFT to ensure that you are always operating in a safe temperature range. Rotate the BIAS knob more counterclockwise to reduce the bias level and the heat sink temperature.

- ❒ During Class-A operation, the PO meter will indicate up to 75 Watts of power output, while the ID meter will show a no-modulation (constant) current of approximately 10 Amps.
- ❒ Although the full advantage of Class-A operation will be compromised somewhat when a (non-Class-A) linear amplifier is used, the very clean drive power from the FT DX 9000 Contest will, nonetheless, provide a significant improvement in overall signal quality.
- ❒ To disable Class-A operation, just press the orange CLASS-A button momentarily, so that its red LED turns off.

Note: The Class-A feature also operates on the AM mode, not only SSB. However, the maximum Class-A transmitter carrier power will be 18.5 Watts in the AM mode

**SSB Mode Customization**

TX EDSP Filter Bandwidth

You may choose your preferred total SSB transmit bandwidth (defined in the Enhanced DSP modulator) via Menu Selection 54: SSB-TX-BPF. Available selections are 10-3000 Hz, 100-2900 Hz, 200-2800 Hz, 300-2700 Hz (factory default), and 400-2600 Hz.

Microphone Equalizer

The FT DX 9000 Contest includes a unique Parametric Microphone Equalizer, which divides the SSB transmitted passband into three segments, each of which may then be adjusted individually for center frequency, equalizer gain, and Q (bandwidth) of the particular segment. And the front and rear microphone input may be adjusted independently, allowing you to account for different frequency responses between “studio” and “DX” microphones, for example:

Menu Selection 21: MICF-EQ-FREQ1 through Menu Selection 29: MICF-EQ-Q3 adjust the front panel’s microphone.

Menu Selection 30: MICR-EQ-FREQ1 through Menu Selection 38: MICR-EQ-Q3 adjust the front panel’s microphone.

Note: This feature affects the SSB, AM, and FM modes.

Carrier Point Offset

This feature allows shifting the carrier point IF passband (and hence the RF passband as well) of your transmitted signal in the SSB mode, to customize your signal for your own voice characteristics.

Four individual carrier settings can be user-adjusted via the Menu.

Menu Selection105: LSB RXCAR (Carrier)

- adjustable from –200 ~ +100 Hz.

Menu Selection106: LSB TXCAR (Carrier)

- adjustable from –200 ~ +100 Hz.

Menu Selection108: USB RXCAR (Carrier)

- adjustable from –200 ~ +100 Hz.

Menu Selection109: USB TXCAR (Carrier)

- adjustable from –200 ~ +100 Hz.

You can adjust the carrier setting throughout the ranges shown above. A minus sign indicates the offset is closer to the carrier (low-frequency speech emphasized). You can transmit during carrier display and adjustment.

Of course, you can adjust the offset by trial-and-error on the air, but it is better to use the built-in monitor circuit or a monitor receiver, in which you can hear the effect yourself. Otherwise, we recommend starting with +0.10 (+100 Hz) offset initially, to add some “crispness” to your processed speech.

## Operation (CW Transmission)

### General

There are several techniques of CW transmission available with the FT DX 9000 Contest. All require that you have a CW key or keyer paddles connected to either of the KEY jacks on the front or rear panel (with a 3-contact plug). You simply use the RF PWR knob to set your output power.

The built-in electronic keyer offers two iambic modes and a mechanical “bug” keyer emulation. You will need to connect keyer paddles to one of the KEY jacks to use the keyer. At the factory default, the front panel’s keyer is set for iambic keying, in which one keyer paddle produces dots, and the other dashes. Squeezing both produces alternating dits and dahs. The rear panel’s keyer is set for “straight key” use (typically used for input from a computer-driven keying line.

The configurations of the front and rear jacks may be changed, using the Menu. Menu

Selection 80: KEYER FRONT sets up the front panel's key jack, while Menu Selection 81: KEYER REAR sets up the rear panel's key jack. Available selections for both jacks are OFF, BUG, EL, and ACS.

OFF: Disables the electronic 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."

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

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

ACS (Auto Character Spacing)

This feature improves your CW sending quality by ensuring the inter-character spacing of dots and dashes remains constant. Although dot/dash weighting is automatically maintained at the desired ratio, the inter-character spacing can sometimes vary from operator to operator, and proportional spacing is sometimes not maintained. This does not present much of a problem during slow CW sending, but at higher speeds, the effect is more pronounced and sometimes makes copy difficult.

ACS works on the principle that the spacing between characters should be 3x the duration of the "dot." If you utilize the standard 3:1 dash:dot ratio, this also happens to be the same duration of a "dash." Maintaining this inter-character spacing is what prevents the sent characters "E" and "T," for example, from merging into what sounds like the character "A" (see illustration).

**Straight-Key Operation**

- ❒ First preset the RF PWR knob to about 12 o'clock. Select the CW mode, if you haven't already, and for now, make sure the KEYER and BK-IN/SPOT buttons are both off (their red LEDs must be off). Connect your key to either the front or rear panel Key jack.
- ❒ Press the BK-IN/SPOT button, so that its red LED lights up, to turn on the "semi break-in" circuit which provides automatic transmitter activation when you close your key. If you want to practice CW with the sidetone, you can leave the semi break-in off.
- ❒ Adjust the MONI knob for a comfortable volume on the sidetone.
- ❒ To transmit, simply close your key and advance the RF PWR knob for the desired power output level.
- ❒ Release the key to return to receive.
- ❒ You are now using semi break-in, in which the transmitter remains activated except during pauses in your sending. You can set the delay, during which the transmitter

remains on after you stop sending, by adjusting the CW DELAY knob.

- ❒ If you prefer full break-in (QSK) operation, in which the receiver is activated between each dot and dash, switch the CW break-in mode to full break-in via the Menu Selection 69: CW BK-IN.

**Electronic Keyer Operation**

- ❒ First preset the RF PWR knob to about 12 o'clock. Select the CW mode, and plug your keyer paddle cable into the front panel's Key jack (unless you have configured the rear panel Key jack for Electronic Keyer operation via Menu #81.
- ❒ Press the KEYER button, so that its red LED lights up, to activate the built-in electronic keyer.
- ❒ Squeeze your paddle to practice CW with the sidetone, and adjust the SPEED knob for the desired sending speed (if you are using the bug simulator mode, don't squeeze both paddles; just press the "dot" paddle).
- ❒ Adjust the MONI knob for a comfortable volume on sidetone.
- ❒ Press the BK-IN/SPOT button, so that its red LED lights up, to turn on the semi break-in circuit which provides automatic transmitter activation when you squeeze your paddle.
- ❒ Squeeze your paddle to transmit, and advance the RF PWR knob for the desired power output level.
- ❒ When you stop sending, the transceiver will return to receive.
- ❒ You are now using semi break-in, in which the transmitter remains activated except during pauses in your sending. You can set the delay during, which the transmitter remains on after you stop sending, by adjusting the CW DELAY knob.
- ❒ If you prefer full break-in (QSK) operation, in which the receiver is activated between each dot and dash, switch the CW break-in mode to full break-in via Menu Selection 78: CW BK-IN.

**Keyer Customization**

Keyer Weight

You may select the Dot:Dash ratio for the built-in electronic keyer via Menu Selection 83: CW WEIGHT. Available selections are (1:) 2.5 ~ 4.5. The factory default is 1:3.0.

CW Break-In

The switching time of the CW carrier waveform can be adjusted from 10 to 40 milliseconds (in 5-millisecond steps), for use with linear amplifiers with T/R switching circuits not designed for full-QSK operation, via the Menu Selection 87: QSK. This feature provides a programmable

delay in the total CW envelope character string, not a simple truncation of the first character.

Paddle Wiring Configuration

You may select the keyer paddle's wiring configuration of the KEY jack on the front panel via Menu Selection 80: CW KEY F, and the rear panel via Menu Selection 81: CW KEY R, independently. The Factory default is NOR (Tip = Dot, Ring = Dash, Shaft = Ground).

**CW Mode Customization**

CW Carrier Injection

You may select the CW carrier oscillator injection side via Menu Selection 77: CW BFO. Available selections are USB (factory default), LSB, and AUTO.

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.

CW SHAPE

You may select the CW carrier wave-form shape (rise/fall times) via Menu Selection 82: CW SHAPE. Available Selections are 1, 2, 4 (factory default), and 6 msec.

CW Frequency Display

You may select the frequency display format between the actual receiver carrier frequency (FREQ), or display reflecting the added BFO offset (PITCH), via Menu Selection 79: CW FREQ. The factory default is PITCH (reflecting the added BFO offset).

Enabling CW Keying while Operating on SSB

You may enable CW keying *while operating on SSB* via Menu Selection 76: CW AUTO MODE, which allows you to move someone from SSB to CW without having to change modes on the front panel. Available selections are OFF (factory default), 50M, and ON.

OFF: Disables CW keying while operating on SSB.

50M: Enables CW keying only while operating SSB on 50 MHz.

ON: Enables CW keying while operating on SSB.

## Operation (AM Transmission)

**General**

Transmitter setup for the AM mode is essentially the same as for LSB or USB, except that

you must avoid overmodulating, and you must limit carrier power to 50 watts. This carrier level ensures that sufficient power is available for the voice sideband envelopes. Microphone gain for AM is set via the Menu Mode separately, and normally needs no adjustment after leaving the factory. If you receive signals reports of low audio with a strong carrier, you may want to increase the AM MIC gain. If you notice distortion in the transmit monitor, you may want to decrease the AM MIC gain (see box at the bottom).

- ❒ In the factory default, the microphone to be used on the AM mode is the microphone which is connected to the front panel's microphone jack. If you use a traditional YAESU-compatible microphone, you can switch the microphone input to the rear panel's microphone jack via the Menu Mode (see box at the bottom).
- ❒ VOX can be used in the AM mode, but for now, make sure the VOX button is off (its red LED is turned off), so as not to complicate adjustments.
- ❒ Set the METER knob to the "PO" position.
- ❒ Press the MOX button or PTT switch, and rotate the RF PWR knob for the desired power output (remember to limit transmitter carrier power to 50 watts in the AM mode).
- ❒ While keeping the MOX button or PTT switch depressed, speak into the microphone in a normal voice level.

Note that the speech processor and VOX circuit can be activated in the AM mode, if desired.

**AM MIC Gain Setting**

- ❒ Set the METER knob to the "MIC LEL" position, which monitors the microphone input level.
- ❒ Press the MNU key, located at the bottom right of the TFT display, to enter the Menu Mode.
- ❒ Rotate the Main Tuning Knob to select Menu Selection 74: AM MIC GAIN.
- ❒ Rotate the CLAR/VFO-B knob, while speaking into the microphone (at a normal level), so that the Main Meter ("MIC LEL" meter) deflects to about midrange on voice peaks (S9 on the S-meter scale). If this parameter is set to "MCVR" which is found below level "0," you may adjust the AM MIC Gain using the front panel's MIC knob (instead of adjusting it in the Menu itself).
- ❒ After completing your adjustment, press and hold in the MNU key for 1/2 second to save the new setting and exit to normal operation.

AM Microphone Selection

- ❒ Press the MNU key located at the bottom right of the TFT display to enter the Menu Mode.

- ❒ Rotate the Main Tuning Knob to select Menu Selection 75: AM MIC SEL.
- ❒ Rotating the CLAR/VFO-B knob to select “FRONT” or “REAR,” as desired.
- ❒ After completing your adjustment, press and hold the MNU key for 1/2 second to save the new setting and exit to normal operation.

**AM Mode Customization**

TX EDSP Filter Bandwidth

You may select the AM audio passband of the Enhanced DSP modulator via Menu Selection 39: AM-TX-BPF. Available selections are 10-3000 Hz, 100-2900 Hz, 200-2800 Hz (factory default), 300-2700 Hz, and 400-2600 Hz.

## Operation (Digital Mode Transmission)

**General**

Information regarding connection of your FT DX 9000 Contest to commonly-available digital-mode modem devices is presented beginning on page ??.

Operating practices generally are governed by details provided in the operating manual for the TNC or modem you are using. However, a few guidelines are presented below, to help you get on the air quickly.

**RTTY Operation**

To operate, just press the RTTY mode button once or twice to select the desired sideband for operation. LSB is the default, and is used by normal convention (USB can be selected for MARS or other applications). Should you need reverse tone polarity or non-standard shift (other than 170 Hz), configure Menu Selections 101: POLARITY-R, 102: POLARITY-T, and 103: SHIFT, as desired.

Note that for AMTOR operation, you must have the VOX button off, and may need to set the AGC knob to “FAST” or “OFF” (and reduce the setting of the RF Gain control) for Mode A (ARQ). Engaging VOX for AMTOR causes excessive transition delay, leading to a breakdown in the link.

**300-Baud Packet**

Construct a patch cable as required, and connect your TNC to the rear-panel PACKET jack. Do not connect the squelch line (pin 5) for 300-baud packet operation.

Tuning is very critical for F1 packet: you should tune the transmitter and receiver within 10 Hz of a signal to minimize repeats. The FT DX 9000 Contest includes a few custom features to

make packet operation more convenient.

Packet Tone Pair - This offsets the center of the IF bandpass according to the packet tone pair you are using. If set correctly, the receiver passband will remain centered on a properly-tuned packet station when switching between wide and narrow IF filters, minimizing the need for re-tuning or use of the SHIFT knob for re-centering.

You may choose the Packet Tone Center Frequency using Menu Selection 100: PKT SHIFT (SSB); set the Packet Tone Center Frequency to match the center frequency of the tones generated by your TNC (these are usually set via terminal software or DIP switches - check in your TNC documentation).

Packet Frequency Display Offset - You can display the center frequency of the two transmitted carriers, (that is, the packet tone pair used), without any offset, instead of the actual carrier frequency. Recall Menu Selection 98: PKT DISP (SSB) and turn the CLAR/VFO-B knob to select the preferred offset (±3.000 kHz).

Note: The default display offset is 0.000 kHz (to match the default tone pair in Menu Selection 95: TONE above, and assuming LSB operation). Ideally, the display offset should match the actual carrier frequency (without offset) displayed. If you would rather have the center frequency of the tone paid displayed, which in turn should match those used by your TNC, set the display offset to –2.125 kHz.

**Packet Operation**

- ❒ Press the PKT button on the front panel once or twice, so that the red LSB LED indicator lights along with the red PKT LED, indicating the “LSB” Packet mode.
- ❒ Preset the RF PWR knob counterclockwise, and set the METER knob to “PO.”
- ❒ Now set your TNC to its “calibrate” mode, preferably with both tones alternating, and adjust the DATA input level using the following procedures;
    1. Press the MNU key, located at the bottom right of the TFT display, to enter the Menu Mode.
    2. Rotate the Main Tuning Knob to select Menu Selection 99: PACKET GAIN.
    3. Rotate the CLAR/VFO-B knob so that the Sub Meter deflects to about midrange (red ALC range).
    4. After completing your adjustment, press and hold in the MNU key for 1/2 second to save the new setting and exit to normal operation.
       Your TNC’s “TX Audio” output may also be capable of level adjustment via a potentiometer inside the TNC.
- ❒ Advance the RF PWR knob for the desired power output.

When tuning, be aware that some common HF packet channels, such as “14.103” MHz, were

originally determined to correspond with an actual IF center frequency 1700 Hz lower (in accordance with an old TAPR convention). Therefore, if you have the Packet Frequency Display Offset (Menu Selection 94: PKT DISP (SSB)) set to match your TNC's actual tones, the display shows 14.101.30 when tuned to the above frequency - which is the actual center of your receiver passband, and it is the frequency mid-way between the two AFSK carriers you will transmit.

Initially, you may need to adjust the receiver IF shift slightly right or left to get the 500-Hz IF filter perfectly centered over incoming signals. Start with the SHIFT knob centered, and try to establish a connection with a moderately strong signal on a clear channel. If the connection is poor (many repeats), move the SHIFT knob slightly to the right, and see if the repeats decline. Continue in this manner until you find the best SHIFT knob setting (with minimal repeats), and use this same setting for all future HF packet operation.

**1200-Baud FM Packet**

The equipment setup for 1200-baud FM packet (above 29 MHz) is the same as for 300-baud packet, except that you may want to connect the squelch line of the TNC to pin 5 of the PACKET jack if you plan to use the squelch.

- ❒ Press the PKT button on the front panel once or twice, so that the red FM LED indicator lights along with the red PKT LED, indicating the FM Packet mode.
- ❒ Switch the METER selector to "PO" and set the RF PWR control for the desired power output.
- ❒ Tuning is much less critical in this mode, requiring no special adjustments. Also, the FM MIC GAIN has been preset at the factory for proper deviation with typical signal levels, so you should not need to readjust it (you should adjust the Tx audio output level of your TNC, though, if your signal sounds distorted in the monitor).

## Operation (FM Transmission)

**General**

The FT DX 9000 Contest allows you to operate both on 29 MHz FM and 50 MHz FM. For FM transmission, the only controls on the front panel you need be concerned about are the RF PWR knob and the NAR button, which toggles operation between FM and narrow-FM. Microphone gain for FM is set via the separate FM MIC control via the Menu Mode, and normally needs no adjustment after leaving the factory. If you receive signals reports of low audio with a strong carrier, you may want to increase the gain. If you notice distortion in the transmit monitor, you may want to decrease the FM MIC gain (see box at the right).

Otherwise, we suggest leaving it alone.

In the factory default configuration, the microphone to be used on FM is set to be the one which is connected to the front panel's microphone jack. If you use a traditional YAESU-compatible microphone with a round 8-pin connector, switch the microphone input to the rear panel's microphone jack via the Menu Mode (see box at the bottom).

All you need to do for most operation is to set the METER selector to the "PO" position, and adjust the RF PWR knob for the desired output while transmitting. If you need full power, keep your transmissions to three minutes or less, with the same time for reception. Otherwise, set the power output to 100 Watts or less, and you should never encounter any duty cycle limitations.

You can use the VOX circuit for TX/RX switching, if desired, and the transmit monitor to listen to your signal. See also the FM Repeater Operation in the next column.

**FM MIC Gain Setting**

- ❒ Set the METER knob to the MIC LVL position, which monitors the microphone input level.
- ❒ Press the MNU key, located at the bottom right of the TFT display, to enter the Menu Mode.
- ❒ Rotate the Main Tuning Knob to select Menu Selection 94: FM MIC GAIN.
- ❒ Rotate the CLAR/VFO-B knob while speaking into the microphone (at a normal level) so that the Main Meter ("MIC LVL" meter) deflects to about midrange on voice peaks (S9 on the S-meter scale).
- ❒ If this parameter is set to "MCVR," which is found below level "0," you may adjust the FM MIC Gain using the front panel's MIC knob )instead of using the Menu for this).
- ❒ After completing your adjustment, press and hold in the MNU key for 1/2 second to save the new setting and exit to normal operation.

FM Microphone Selection

- ❒ Press the MNU key, located at the bottom right of the TFT display, to enter the Menu Mode.
- ❒ Rotate the Main Tuning Knob to select Menu Selection 95: FM MIC SEL.
- ❒ Rotating the CLAR/VFO-B knob to select "FRONT" or "REAR," as desired.
- ❒ After completing your adjustment, press and hold in the MNU key for 1/2 second to save the new setting and exit to normal operation.

**FM Repeater Operation**

To access an FM repeater, you must be set the Repeater Shift Direction, Shift Frequency,

and CTCSS Encoder (if needed) and its frequency. To do this:

- ❒ Press and hold in the [FM] key for 1/2 second to enter the FM Setup Mode.
- ❒ Press the [FM] key to select the Repeater Shift Direction. One press of the [FM] key will have set the transceiver for “Minus Shift” operation. In this situation, you will observe the “–” indicator in the Multi Display Window. The transmit frequency will be shifted down by the default value so as to access the repeater input frequency. If your repeater uses a positive shift (instead of negative), press the [FM] key again; the “+” indicator will replace the “–” indicator on the display. One additional press will set the transceiver for “Simplex” operation; an “S” indicator will replace the “+” notation on the display.
- ❒ If your repeater uses tone-controlled access (using CTCSS), rotate the Main Tuning knob to activate the CTCSS tone encoder. In this situation, you will observe the “tn” notation on the display. If you rotate the Main Tuning knob still more, you will observe “tS” (CTCSS Encoder/Decoder) and “oFF” (disabling the CTCSS Encoder/Decoder). See the next section for a discussion of CTCSS Tone Squelch Operation.
- ❒ Rotate the CLAR/VFO-B knob to select the desired CTCSS Encoder frequency.
- ❒ Press and hold in the [FM] key for 1/2 second to save the new setting and exit to normal operation.
- ❒ If the default repeater shift is not appropriate for the majority of the repeaters your area, it may be set independently for both the 28 MHz and 50 MHz bands. To change the default repeater shift:
  - ❍ Press the [MNU] key, located at the bottom right of the TFT display, to enter the Menu Mode.
  - ❍ Rotate the Main Tuning Knob to select Menu Selection 96: RPT SHIFT (28 MHz) or 97: RPT SHIFT (50 MHz) which will change the Shift Frequency on those respective bands.
  - ❍ Rotate the CLAR/VFO-B knob to set the desired offset frequency.
  - ❍ After completing your change, press and hold in the [MNU] key for 1/2 second to save the new setting and exit to normal operation.
- ❒ Set the transceiver’s receiver to the repeater output (downlink) frequency. Close the MOX or PTT switch and speak into the microphone. You will observe that the transmit frequency has shifted according to the programmed shift. Release the MOX or PTT switch to return to the receive mode.

We recommend that these settings be stored into memory channels for easy operation (individual shift magnitudes will be retained in memory). Refer to the Memory chapter for information regarding memory storage.

Note: Do not forget to set the Repeater Shift Direction to “Simplex” and the CTCSS

Encoder/Decoder to “off” when you’re finished with Repeater operation.

**CTCSS Operation**

The CTCSS feature is a selective calling system which uses a continuous, very-low-frequency tone that is filtered out so as not to be heard. If many stations are using the same channel frequency, CTCSS will keep your radio’s receiver squelched until a CTCSS tone is received matching the CTCSS tone you have selected for your radio.

To activate the CTCSS feature, you must set up the CTCSS Encoder/Decoder and its frequency via the Menu Mode. To do this:

- ❒ Press and hold in the [FM] key for 1/2 second to enter the FM Setup Mode.
- ❒ Rotate the Main Tuning knob to activate the CTCSS CTCSS Encoder/Decoder. You will observe “tS” (CTCSS Encoder/Decoder) on the display.
- ❒ Rotate the CLAR/VFO-B knob to select the desired CTCSS frequency.
- ❒ After completing your adjustment, press and hold in the [FM] key for 1/2 second to save the new setting and exit to normal operation (with CTCSS now engaged).

We recommend that these settings be stored into memory channels for easy operation. Refer to the Memory chapter for information regarding memory storage.

Note: Do not forget to turn the CTCSS Encoder/Decoder “off” when not using CTCSS. If the Tone Squelch system is active, it will prevent you from hearing random FM stations unless they coincidentally are transmitting a matching CTCSS tone.

**FM Mode Customization**

TX EDSP Filter Bandwidth

You may select the audio passband of the Enhanced DSP modulator via Menu Selection 40: FM-TX-BPF. Available selections are 10-3000 Hz, 100-2900 Hz, 200-2800 Hz (factory default), 300-2700 Hz, and 400-2600 Hz.

## Operation (Using SUB BAND “VFO-B”)

**General**

The sub band (VFO-B) works in a similar manner to the main band (VFO-A), with which you should be familiar by now. The sub band (VFO-B) provides simple split (transmit/receive) frequency operation via the combination of the main band’s (VFO-A) RX and TX LED/Buttons and the sub band’s (VFO-B) RX and TX LED/Buttons, and, more importantly, dual-channel reception. We’ll get into those in a minute, but first let’s look at how to control the sub band (VFO-B).

Frequency and operating mode selections can be transferred from the main band (VFO-A) to the sub band (VFO-B) by pressing the [A□B] button, but don't forget that this will overwrite any settings that were in the sub band (VFO-B) previously. Also, the contents of the two VFOs can be swapped (with no loss of data) by pressing the [A□□B] button.

Most selections for the main band (VFO-A) can also be made for the sub band (VFO-B) independently by the exclusive switches and knobs for the sub band (VFO-B). About the only things you cannot do with the sub band (VFO-B) (that you can with the main band (VFO-A)), are store it directly into a memory, and set the Clarifier. For these functions you need to swap it with the main band (VFO-A) by pressing the [A□□B] button, then hold in the [A□M] button for 1/2-second to store it in a memory, or set the Clarifier, and then press [A□□B] again to return the data to the respective VFOs.

**Dual Reception (when optional Dual Receive Unit is installed)**

Pressing the sub band's (VFO-B) RX LED/Button, so that the green LED is lit, activates the sub band (VFO-B) receiver; the "DUAL" indicator will glow green.

Dual receive operation opens up exciting operating possibilities for split operation, contesting, and chasing elusive DX stations. For split-frequency DX pile-ups, the ability to listen to both "sides" of the pile-up allows very precise timing of your calls. For contesting, dual receive allows you to continue a "run" on your "main" frequency while keeping an ear on a DX "multiplier" that might not be listening for your call area, for example. The FT DX 9000 Contest also has the unique capability of full duplex operation, allowing you to be tuning on the sub band (VFO-B) on one band while calling CQ simultaneously on another band. More about the full duplex capability later.

The FT DX 9000 Contest provides identical receiver circuits, from the RF stage through the AF stage and on to the speaker, on both the main band (VFO-A) and sub band (VFO-B), so system performance is essentially unchanged when listing to either receiver. The only difference is that the μ-TUNE circuit only functions on the main (VFO-A) receiver.

Main Band and Sub Band Audio

The huge AF GAIN knob controls the main band's (VFO-A) volume level, and the smaller AF GAIN knob controls the sub band's (VFO-B) volume.

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 15: Head Phone Mix (MIX, AMIX). Three audio mixing schemes

are selectable as follows:

OFF: 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.

MID: 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.

FULL: Audio from both main (VFO-A) and sub (VFO-B) 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 band (VFO-A) to either LSB or USB mode, and tune for zero beat on the desired signal.
- ❒ Press the [A□B] button to copy this mode and frequency into the sub band (VFO-B), then press the mode button to select the opposite sideband for the main band (VFO-A).
- ❒ 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) 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 15: Head Phone Mix (MIX, AMIX) 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.

Bandwidth Diversity Reception

This mode involves receiving the same signal through two different bandpass filters. The frequency and mode of both the main band (VFO-A) and sub band (VFO-B) are the same. The main band (VFO-A) can be set up for a narrow bandpass, and the sub band (VFO-B) 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 band (VFO-A).
- ❒ Tune to the signal of interest.
- ❒ Press the [A□M] button to copy this mode and frequency into the sub band (VFO-B).
- ❒ 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) to balance the volume of the two receivers.
- ❒ Now try manipulating the SHIFT and WIDTH controls (on both main band (VFO-A) and sub band (VFO-B) 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 9000 Contest 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).

**Split Frequency Operation**

Typical split operation involves receiving on the main band (VFO-A) or a memory channel, and transmitting on the sub band (VFO-B). The special case of FM repeater operation uses some features of its own, and is described on page ??.

Rare DX stations often announce that they will “listen up” or “listen down” a few kHz (from

their Tx frequency) when calling CQ or during contests to avoid being covered by the DX pileup from responding stations.

Split operation

Press the TX LED/Button above the Main Tuning Knob so that this TX LED/Button turns off; the TX LED/Button above the CLAR/VFO-B knob will now glow red. Then press the RX LED/Button above the Main Tuning knob (if necessary) so that the RX LED/Button is illuminated, and the “SPLIT” LED at the upper right of the Main Tuning Knob will glow orange. <<Isn’t this correct? The original text seemed hen>>

Quick Split Operation

The “Quick Split” feature is handy when you know the offset a DX station will be listening on beforehand. The offset is applied instantly by just pressing the SPLIT button, or the TX LED/Button above the CLAR/VFO-B knob, so that this TX LED/Button glows red, saving time and mental arithmetic. It also ensures that you will not be transmitting on the DX station’s TX frequency! A Quick Split offset (factory default: +5 kHz) can be selected in Menu Selection 122: QUICK SPLIT.

**Operation (Full Duplex Operation)**

The FT DX 9000 Contest (all versions configured for Dual Receive) includes a unique capability among HF transceivers: the ability to operate in a full diplex environment, where by you can transmit on the main band (VFO-A) while *simultaneously* tuning around, on a different band, on the sub band (VFO-B). 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 #118 (FULL DUP) to “DUP” instead of the default “SIMP” selection. To return to normal (non-duplex) operation, return Menu #118 to SIMP.

When Full duplex operation is engaged, 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). 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 band (VFO-B) “TX” Button/LED to switch transmit control to that VFO to call a station, then press the main band (VFO-A) “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 9000 Contest. 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.

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.

## Operation (Using the FH-2 Remote Control Keypad)

### General

The supplied Remote Control Keypad “FH-2” can be used to control the voice memory capability for the SSB/AM/FM modes, and the contest memory keyer for the CW mode.
<<Supplied! Because this transceiver $9000 more!>>
<<FB; I changed the earlier area, too.>>

FH-2 Controls

1. LOCK Switch
   Sliding this switch to the “ON” position will lock the FH-2 Keypad.

2. [1] - [5] Memory Slot Keys
   These keys select which message slot to record or playback over the air. Each slot enables recording or playback of up to a 30-second message (for SSB/AM/FM modes) or up to 50 CW characters.

3. [MEMO] Key
   Press this key (followed by a message number key) to record a message via the microphone (for SSB/AM/FM) or the keyer paddle or arrow keys of the FH-2 (for CW).

4. [□] Key
   Pressing this key selects the CW message digit (moving you to the previous digit) while recording the CW message from the FH-2.

5. [□] Key
   Pressing this key selects the desired character of the CW message while recording the CW message from the FH-2.

6. [□] Key
   Pressing this key selects the CW message digit (moving you on to the next digit) while recording the CW message from the FH-2.

7. [P/B] Key
   This key function in the same way as the P.BACK button on the FT DX 9000 Contest

front panel.

8. [□] Key
   Pressing this key selects the character of the CW message while recording the CW message from the FH-2.

9. [DEC] Key
   Press this key to decrement the contest number manually.

**Voice Memory feature**

This feature can be used to record your voice from the microphone and play it back over the air (during transmission). Up to for??-second messages may be stored.

Message Recording

- ❒ Set the operating mode to a voice mode (SSB, AM, or FM).
- ❒ Get your microphone ready, then press the [MEMO] button.
- ❒ Now, press one of the numbered buttons ([1] - [5]) to record a message in that memory register, and start talking (do not press the PTT switch unless you want to transmit at the same time you are recording).

Message Monitor (Playback without Transmitting)

When the VOX circuit is disabled, you can check the contents of a voice memory register without playing it back over the air, just by pressing the appropriate numbered button. We recommend always using this to check the results immediately after making a recording and before playing it back on the air.

Message Transmission (“on The Air” Playback)

To transmit a message on the air, activate the VOX circuit by pressing the VOX button (so that its red LED lights up), then press the appropriate numbered button.

**Contest Memory Keyer**

Message Recording (From the Keyer Paddle)

Programming of the five available message storage locations is accomplished by a simple keystroke and keyer paddle input sequence. Only Iambic (not “bug” keying can be used for storage of CW messages, and we recommend that Menu Selection 84: KEYER FRONT (when programming from the front panel’s keyer) or Menu Selection 85: KEYER REAR

(when programming from the rear panel's keyer) be set to "ACS" during message storage, although you may prefer to use "EL" during manual sending once the desired messages are stored.

- ❒ Choose a Menu Selection (69: CW MEMORY 1 through 73: CW MEMORY 5) which corresponds to the message number to be programmed.
- ❒ Press the [MEMO] key, followed by the desired message number key.
- ❒ Using your keyer paddle, send a CW message. Be careful to pause slightly after each word so as to leave a word space in the message string (do not activate the CW break-in circuit unless you want to transmit at the same time you are programming)

Each message memory ([1] - [5] key) is programmed, played back, and transmitted in the same manner; you can enter up to 50 characters in each of these memory registers.

Note that if you want to send a message multiple times, you can press the playback key more than once; at the end of the first message segment, the message will restart and be sent again.

Message Recording (Text using the FH-2's Keypad)

- ❒ Choose a Menu Selection (60: CW MEMORY 1 through 64: CW MEMORY 5) corresponding to the message number to be programmed as a text entry.
- ❒ Press the [MEMO] key, followed by the desired message number key.
- ❒ Press the [□]/[□] keys to select the first digit of the CW message to be programmed. The character selections will appear on the LCD display.
- ❒ Press the [□] key move the next digit.
- ❒ If you make a mistake, press the [□] key to back-space the cursor, then re-enter the correct letter, number, or symbol.
- ❒ Repeat steps 3 through 5 to program the remaining letters, numbers, or symbols of the CW message (up to 50 characters).
- ❒ If you program four digits number imbedded inside "#" characters (such as #0001#) into the CW message, this four digit number will serve as an initial contest serial number, automatically incrementing each time you play back or transmit the message memory.

Message Monitor (Playback without Transmitting)

- ❒ To play back the message memory without transmitting, be sure that the BK-IN/SPOT switch is off, then press the appropriate numbered button.
- ❒ When you play back a message memory containing an imbedded contest number, the contest number will automatically increment. Press the [DEC] key to return to the previous number. Remember that the number will have incremented automatically each

time you play it back, whether you are on the air or not.

Note: The FT DX 9000 Contest CW memory system can be set up to abbreviate ("cut") the digits of the contest number: according to convention, you can change "One" to "A," "Two" to "U," "Nine" to "N," and "Zero" to "T" when the contest number is sent inside the message memory. You may change the Contest Number "Cut" format via menu selection 68: CONTEST NUMBER.

Message Transmission ("On The Air" Playback)

- ❒ To transmit a message on the air, activate the CW break-in circuit by pressing the BK-IN/SPOT button (so that its red LED lights up) first, then press the appropriate numbered button.
- ❒ When you transmit a message memory which includes an imbedded contest number, the contest number will automatically increment.
- ❒ If the other station asks for a repeat of your contest exchange, remember that the number will have incremented automatically after you sent it. Press the [DEC] key to return to the previous number.

## Memory Operation

### Memory Structure

The FT DX 9000 Contest 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 5 separate groups, if desired.

As during VFO operation, you can freely tune off from a stored memory channel, and change the mode or Clarifier settings; you can also copy settings from one memory to another. In fact, you can do nearly anything with a memory that you can with the VFOs, except for the special PMS memory pairs (P-1L/1U ~ P-9L/9U), described later.

The FT DX 9000 Contest allows you to edit each memory (such as assignment of an Alpha/Numeric tag, etc.) using the TFT Status/Information Display. See page ?? for details of editing memory channel information.

The FT DX 9000 Contest's memory channels store the following data:

- ❍ Frequency
- ❍ Mode
- ❍ Clarifier status and its Offset Frequency

- ANT status
- IPO status
- μ-TUNE/VRF status
- Roofing filter status and its Bandwidth
- Noise Blanker status
- CONTOUR status and its Peak Frequency
- EDSP Noise Reduction (DNR) status and its Reduction algorithm selection.
- EDSP Notch filter (NTCH) status
- NAR bandwidth status
- EDSP Auto Notch filter (DNF) status
- Repeater Shift Direction and Shift Frequency
- CTCSS status and Tone Frequency

**QMB (Quick Memory Bank) Operation**

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. You might find this handy to use when you have tuned a station of interest that you want to save, but don't want to overwrite your regular or PMS memories, especially if you have them organized a specific way.

You can use the QMB memories the same way you would a notepad in your shack - for jotting down (saving) frequencies and modes to come back to later.

- To store a frequency into the first Quick Memory (C-1), simply press the blue STO button.
- Stored Quick Memories are recalled by pressing the blue RCL button repeatedly to select the desired memory (Quick Memory channel number ("C1" ~ "C5") will be displayed in the Multi Display Window).
- Additional settings will be entered directly into C-1, with previously-stored entries then being shifted to the next available Quick Memory. This "stacking" system keeps the most recent entry in the first memory, and automatically shifts older entries into the next consecutive memory. After all Quick memories have been filled, additional entries overwrite previous ones on a "first-in, first-out" basis (as shown inside the box below).
- To revert from QMB operation back to the main band VFO, simply press the V/M button once.

**Regular Memory Operation**

The [V/M], [A□M], and [M□A] buttons and Main Tuning Knob are used to control various memory operations, as follows:

[V/M] button

This toggles control between memory or VFO operation. If a displayed memory has been re-tuned (M-TUNE), pressing the [V/M] button once returns to the originally-memorized frequency (MEM), and pressing it again returns to the last-used VFO.

[A□M] button

When receiving on a VFO or re-tuned memory, pressing and holding in this key for 1/2 second stores the current operating data on the main band (VFO-A) into the currently selected memory. Two beeps sound, and any previous data in that memory register will be overwritten. Momentarily pressing this button activates memory checking ("channel number" will blink) for 3 seconds. This is described in the next section on memory storage and recall.

[M□A] button

Pressing and holding in this button for 1/2 second copies the frequency and operating data stored in a selected memory into the main band (VFO-A). Momentarily pressing this button activates memory checking (the channel number will blink) for 3 seconds. This is described in the next section on memory storage and recall.

CLAR/VFO-B Knob

This knob selects the memory channel during memory operation.

Notice

Regarding the CLAR/VFO-B Knob

Under certain circumstances, the CLAR/VFO-B knob does not select the memory channel (such as during Clarifier offset tuning). To enable memory channel selection via the CLAR/VFO-B knob, just press the MCH/GRP button momentarily; rotation of the CLAR/VFO-B knob will now allow you to select other memories.

Memory Programming

You can store the frequency and all operational settings for the displayed main band (VFO-A) into a memory channel by following this simple procedure:

- ❒ Set up all operating parameters and frequency, as desired, on the main band (VFO-A).
- ❒ Press the [A□M] button momentarily (the current channel number will start blinking), then rotate the CLAR/VFO-B knob to select the memory channel to be used for storage.
- ❒ When you have chosen a channel into which to store the frequency data, press and hold in the [A□M] button for 1/2 second so that two beeps sound. The main band (VFO-A) contents are now stored in the selected memory channel; at this point, you remain in the

main band (VFO-A), so you can continue tuning around and/or storing additional memories.

Recalling & Operating on Memory Channels

- ❒ Press the [V/M] button to recall a memory stored. The last-utilized memory's contents will appear in the main frequency display field.
- ❒ While operating in the memory mode (if you haven't yet re-tuned it - see below), the "MR" notation and memory channel number is displayed in the Multi Display Window, and you can now rotate the CLAR/VFO-B knob or press the microphone UP/DWN buttons (if you are used the traditional YAESU microphone) to select any previously-stored memories for operation.
- ❒ To return to main band (VFO-A) operation, just press the [V/M] button once more; the VFO's contents will have remained undisturbed.

Memory Tuning

In this mode, you can emulate VFO tuning and operation on a memory channel and yet retain the memory's original contents: if you change frequency, mode, or Clarifier settings, the "MR" notation will be replaced with "MT" in the Multi Display Window. During memory tuning, the microphone UP/DWN buttons (if you use) now duplicate Main Tuning Knob functions, as during VFO operation (rather than select memory channels as before). Pressing the [V/M] button once cancels any re-tuning changes to the memory and reverts to the original memory contents ("MR" will be displayed again). Pressing the [V/M] button once more returns the transceiver to VFO operation.

Memory Tuning makes operation on memories 1 to 99 just as flexible as the VFOs (memories P1 ~ P9 have special additional features, described later). If you want to save changes to a re-tuned memory channel, use the same procedure you use to store the VFOs to memory: Press the [V/M] button momentarily, and rotate the CLAR/VFO-B knob to select another memory (if desired), or just hold the [A□M] button for 1/2 second until the double beep sounds (to overwrite the current memory with the re-tuned data).

The labeling and function of the [A□M] button during memory tuning is somewhat deceptive because the VFO settings, which are hidden at this point, are not involved in this operation at all, since those of the recalled memory have taken their place.

Important 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 9000 Contest operating in a control mode

compatible with your software's requirements. Use the VFO mode if you're not sure.

Memory Checking

Before storing or recalling a memory, you will usually want to check its contents. Momentarily pressing either [A□M] or [M□A] also activates memory checking. As mentioned before, the frequency indicators change to show the contents of the last-selected memory, while blinking. If you touch nothing else, the display reverts to your current operating parameters automatically after 3 seconds. By turning the front panel CLAR/VFO-B knob before the 3 seconds expires, you can select for display each of the general purpose and PMS memories. If the memory is vacant, nothing is displayed except two decimal points. Pressing these buttons restarts the 3-second timer, so as long as you are changing channels, the memory checking mode persists.

Note: When checking memories, both vacant and filled memories are displayed. If you would like to skip over vacant memories, press the FAST button before memory checking.

Copying a Selected Memory to the Main Band (VFO-A)

If desired, you can store the frequency and all operational settings from the selected memory channel into the main band (VFO-A). While operating in the Memory mode:

- ❒ Select the memory channel to be copied into the main band (VFO-A).
- ❒ Pressing and holding in the [M□A] button for 1/2 second copies the current memory channel data into the main band (VFO-A). You can now tune around on the main band (VFO-A), having used the memory channel's frequency as a starting point. When you press and hold in the [M□A] button, you lose the previous contents of the main band (VFO-A), and if you were receiving on the main band (VFO-A), operation shifts to the frequency and mode just copied from the memory.
- ❒ Pressing the [M□A] key momentarily shows you the contents of the memory, without overwriting main band (VFO-A) data.

Copying Between Memories

The same procedure for copying main band (VFO-A) into memories is also used to copy one memory to another. Like the main band (VFO-A), one memory can be selectively copied; however, there are a few differences.

To copy from one memory to another (including the PMS memories), first activate memory tuning by simply turning the Main Tuning Knob so that "MT" appears; now tune back to the original frequency). Rotate the CLAR/VFO-B knob to select a memory to fill, then (within 3 seconds) press [A□M] to copy the contents from the re-tuned (source) memory to the

destination memory.

Grouping Memories

The 99 regular memories and PMS memories P-1L/1U ~ P-9L/9U can be grouped into five memory groups via Menu Selection 120: MEM GRP, if desired. Each memory group is capable of holding up to 22 memory channels (the Group size is fixed). When a memory channel is grouped, the channel numbers change to correspond to the chart below:

| Memory Channel Number | |
|---|---|
| Groups Memory "OFF" | Groups Memory "ON" |
| 01 ~ 20 | 1-01 ~ 1-20 |
| 21 ~ 40 | 2-01 ~ 2-20 |
| 41 ~ 60 | 3-01 ~ 3-20 |
| 61 ~ 80 | 4-01 ~ 4-20 |
| 81 ~ 99 | 5-01 ~ 5-19 |
| P-1L/1U ~ P-9L/9U | P-1L/1U ~ P-9L/9U |

*Limiting Memory Group Operation*

If you have grouped the memory channels using Menu Selection 120: MEM GRP, you can enable a particular group and limit memory recall and scanning operation (covered later) only to those memories in that selected group, if so desired.

To do this, press and hold in the MCH/GRP button for 1/2 second. The LED inside the MCH/GRP button will glow yellow and you may now select the desired memory group using the CLAR/VFO-B knob. Then press the MCH/GRP button momentarily. The LED inside the MCH/GRP button change to red, and you will find that only memories within that group are now available.

Notice

Regarding the CLAR/VFO-B Knob

Under certain circumstances, the CLAR/VFO-B knob does not select memories. To enable memory channel selection via the CLAR/VFO-B knob, just press the MCH/GRP button momentarily; the LED inside the MCH/GRP button will glow red, and rotation of the CLAR/VFO-B knob will now allow you to select other memories.

**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 9000 Contest 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, located at the bottom right side of the TFT display.
2. Rotate the Main Tuning Knob, or press the [□(GEN)]/[□(ENT)] keys, to select menu selection 115: EMERGENCY.
3. Rotate the CLAR/VFO-B knob select “ON.”
4. Press and hold in the [MNU] key for 1/2 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, as necessary, to enter the Memory mode, then rotate the MEM/VFO CH 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 menu selection 115: EMERGENCY does not enable any other out-of-amateur-band capability on the transceiver. The full specifications of the FT DX 9000 Contest 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 menu selection 115: EMERGENCY 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.

## Scanning Feature

### VFO Scanning

The FT DX 9000 Contest’s scanner operates solely on the main band (VFO-A).

- ❒ Set the main band (VFO-A) SQL knob to the point where background noise silenced.
- ❒ Press and hold in the microphone’s UP or DWN button for 1/2 second to initiate upward or downward scanning.
- ❒ The scanner will now cause the transceiver to increment in the chosen direction until a signal is detected. When a signal is encountered which opens the Squelch, it will do different things, depending on the operating mode:

- ❍ In the SSB/CW modes, the scanner will slow down (but won't stop).
- ❍ In the FM/AM modes, the transceiver pauses on the signal and stays locked on its frequency for five seconds. Thereafter, scanning will resume whether or not the other station's transmission has ended. While the transceiver is in the "Pause" condition, the decimal points in the frequency display area will blink. See "Scan Resume Mode" on page ?? for details of how to customize the resumption of scanning.

❒ Press the PTT switch on the microphone to cancel scanning.

Information: The scan steps are the same as the tuning steps of the Main Tuning Knob, and the scan speed is 200 steps/sec in the SSB/CW modes, 20 steps/sec in the AM/FM modes.

**Memory Scanning**

The 99 memories in the FT DX 9000 Contest offer some choices regarding how they are scanned, and, after the following brief description, you can decide how to tailor scanning for your operating needs.

❒ Select the Memory mode by pressing the V/M button, if necessary, to enter the memory mode.

❒ Press and hold in the microphone's UP or DWN button for 1/2 second to initiate upward or downward scanning.

❒ If and when the scanner encounters a signal strong enough to open the squelch, the transceiver pauses on the signal and stays locked on its frequency for five seconds. Thereafter, scanning will resume whether or not the other station's transmission has ended. While the transceiver is in the "Pause" condition, the decimal points in the frequency display area will blink. See "Scan Resume Mode" on page ?? for details of how to customize the resumption of scanning.

❒ Press the PTT switch on the microphone to cancel scanning.

Note: When the Memory Group feature is engaged, the scanner will sweep only through memory channels in the current memory group.

**Scan Resume Mode**

There are two choices that determine how scanning will respond when activity is detected. Scan resume operation is configured by recalling Menu Selection 129: SCAN RESUME, and selecting the desired mode. Below is an outline of each scan resume mode and how it operates.

TIME (default action): In this mode, the transceiver pauses on the signal and stays locked on its frequency for five seconds. Thereafter, scanning will resume whether or not the other station's transmission has ended.

PAUSE: In this mode, the scanner will halt until the other station's transmission ceases (at which point the squelch will close). One second after the squelch closes, scanning resumes automatically.

**Programmed Memory Scanning PMS Memories P-1L/1U ~ P-9L/-9U**

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.

Example: Limit tuning and scanning to the 17-m amateur band's limits.

- ❒ Press the [V/M] button as necessary, to display main band (VFO-A) frequency.
- ❒ Tune to the low edge of the 17-m band: 18.068 MHz, and select the desired mode (here, USB or CW).
- ❒ Press the [A□M] button momentarily ("frequency display" will start blinking), then rotate the CLAR/VFO-B knob to set the memory channel to P-1L.
- ❒ Now (while the frequency display is still blinking), press and hold in the [A□M] button for 1/2 second to write the VFO's frequency into P-1L.
- ❒ Tune to the high edge of the 17-m band (18.168 MHz). Be sure that the operating mode has not changed.
- ❒ Press the [A□M] button momentarily (the frequency display will start blinking), then rotate the CLAR/VFO-B knob to set the memory channel to P-1U.
- ❒ Now (while the frequency display is still blinking), press and hold in the [A□M] button for 1/2 second to write the VFO's frequency into P-1U.
- ❒ Press the [V/M] key momentarily to switch to the memory mode, then rotate the CLAR/VFO-B knob to select memory channel P-1L.
- ❒ Turn the Main Tuning Knob slightly (to activate memory tuning). Tuning and scanning are now limited to the 18.068- to 18.168-MHz range until you press the [V/M] button to return to memory channel or main band (VFO-A) operation.

Notice

Regarding the CLAR/VFO-B Knob

Under certain circumstances, the CLAR/VFO-B knob does not select memories. To enable memory channel selection via the CLAR/VFO-B knob, just press the MCH/GRP button momentarily; the LED inside the MCH/GRP button will glow red, and rotation of the CLAR/VFO-B knob will now allow you to select other memories.

Customization: You may disable scanning via the microphone's UP and DWN buttons to accidental scanning; use menu selection 128: MIC SCAN.

## Menu ("Set") Mode

The programming menu allows precise configuration of many aspects of transceiver performance, so you may set up the FT DX 9000 Contest just the way you like. A total of 139 transceiver settings are contained in the programming menu.

### Menu Operation

1. To enter the "Menu" mode, just press the [MNU] key, located at the bottom right side of the TFT display.
2. Rotating the Main Tuning Knob, or pressing the [□(GEN)]/[□(ENT)] keys, will permit display of the various menu selections.
3. Rotating the CLAR/VFO-B knob, once you have selected a menu item, lets you choose between the various settings available for that particular menu selection.
4. If you decide to exit to normal operation without saving the new setting, just press the [MNU] key momentarily.
5. After completing your selection and adjustment, press and hold in the [MNU] key for 1/2 second to save the new setting and exit to normal operation.

AGC Group

1. AGC-MAG

Function: Selects the gain curve of the AGC amplifier.

Available Values: FLAT/LOG(SLOPED)

Default Setting: FLAT

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

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

(We will change to "LOG" to "SLOPED." Do you agree?) OK

2. MAIN-AGC-FAST DELAY

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

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

Default Setting: 100 msec

3. MAIN-AGC-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: 20 ~ 2000 msec (20 msec/step)
Default Setting: 20 msec

4. MAIN-AGC-MID DELAY
Function: Sets the delay time for the AGC MID mode of the main band (VFO-A) receiver.
Available Values: 20 ~ 2000 msec (20 msec/step)
Default Setting: 500 msec

5. MAIN-AGC-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: 20 ~ 2000 msec (20 msec/step)
Default Setting: 100 msec

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

7. MAIN-AGC-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: 20 ~ 2000 msec (20 msec/step)
Default Setting: 300 msec

8. SUB-AGC-FAST DELAY
Function: Sets the delay time for the AGC FAST mode of the sub band (VFO-B) receiver.
Available Values: 20 ~ 2000 msec (20 msec/step)
Default Setting: 100 msec

9. SUB-AGC-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: 20 ~ 2000 msec (20 msec/step)
Default Setting: 20 msec

10. SUB-AGC-MID DELAY
Function: Function: Sets the delay time for the AGC MID mode of the sub band (VFO-B) receiver.
Available Values: 20 ~ 2000 msec (20 msec/step)
Default Setting: 500 msec

11. SUB-AGC-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: 20 ~ 2000 msec (20 msec/step)
Default Setting: 100 msec

12. SUB-AGC-SLOW DELAY
Function: Function: Sets the delay time for the AGC SLOW mode of the sub band (VFO-B) receiver.
Available Values: 20 ~ 2000 msec (20 msec/step)
Default Setting: 2000 msec

13. SUB-AGC-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: 20 ~ 2000 msec (20 msec/step)
Default Setting: 300 msec

AUDIO Group
14. Audio REV
Function: Reverses the functions of the AF GAIN (VFO-A) and AF GAIN (VFO-B) knobs.
Available Values: OFF/ON
Default Setting: OFF
When this menu is set to “ON,” it reverses the paths of the main (VFO-A)/sub (VFO-B) receiver audio, which normally are adjusted using the AF GAIN knob and the AF GAIN

(VFO-B) knob, respectively.

15. Headphone Mix (MIX,AMIX)
Function: Selects one of three audio mixing modes when using headphones during Dual Receive operation.
Available Values: OFF/MID/FULL
Default Setting: MID
OFF: 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.
MID: 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.
FULL: Audio from both main (VFO-A) and sub (VFO-B) receivers is combined and heard equally in both ears.

16. Speaker OUT (AFPA)
Function: Selects audio mixing modes for the “Sub” (secondary) speaker during Dual Receive operation.
Available Values: SEP/MAIN
Default Setting: SEP
SEP: 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.
MAIN: Audio from both main (VFO-A) and sub (VFO-B) receivers is combined and split equally between the main and sub speakers.
EQ Group

17. MAIN-CONT-GAIN
Function: Adjusts the parametric equalizer gain of the main band (VFO-A) receiver Contour filter.
Available Values: –15 ~ +10 dB
Default Setting: –5 dB

18. MAIN-CONT-Q
Function: Adjusts the Q-factor of the main band (VFO-A) receiver Contour filter.
Available Values: 0 - 10
Default Setting: 1

19.SUB-CONT-GAIN

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

Available Values: –15 ~ +10 dB

Default Setting: –5 dB

20. SUB-CONT-Q

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

Available Values: 0 ~ 10

Default Setting: 1

21. MICF-EQ-FREQ1

Function: Selects the center frequency of the lower range for the front panel's parametric microphone equalizer.

Available Values: OFF/1 ~ 7 (x100 Hz)

Default Setting: OFF

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

1 ~ 7: You may adjust the equalizer gain and Q-factor at this selected audio frequency via menu items 22: MICF-EQ-GAIN1 and 23: MICF-EQ-Q1.

22. MICF-EQ-GAIN1

Function: Adjusts the equalizer gain of the low range of the front panel's parametric microphone equalizer.

Available Values: –10 ~ +10 dB

Default Setting: +5 dB

23. MICF-EQ-Q1

Function: Adjusts the Q-factor of the low range of the front panel's parametric microphone equalizer.

Available Values: 0 ~ 10

Default Setting: 1

24. MICF-EQ-FREQ2

Function: Selects the center frequency of the middle range for the front panel's parametric microphone equalizer.

Available Values: OFF/7 ~ 15 (x100 Hz)
Default Setting: OFF
OFF: The equalizer gain and Q-factor are set to factory defaults (flat).
7 ~ 15: You may adjust the equalizer gain and Q-factor at this selected audio frequency via menu items 25: MICF-EQ-GAIN2 and 26: MICF-EQ-Q2.

25. MICF-EQ-GAIN2
Function: Adjusts the equalizer gain of the middle range of the front panel's parametric microphone equalizer.
Available Values: –10 ~ +10 dB
Default Setting: +5 dB

26. MICF-EQ-Q2
Function: Adjusts the Q-factor of the middle range of the front panel's parametric microphone equalizer.
Available Values: 0 ~ 10
Default Setting: 1

27. MICF-EQ-FREQ3
Function: Selects the center frequency of the high range for the front panel's parametric microphone equalizer.
Available Values: OFF/15 ~ 32 (x100 Hz)
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 28: MICF-EQ-GAIN3 and 29: MICF-EQ-Q3.

28. MICF-EQ-GAIN3
Function: Adjusts the equalizer gain of the high range of the front panel's parametric microphone equalizer.
Available Values: –10 ~ +10 dB
Default Setting: +5 dB

29. MICF-EQ-Q3
Function: Adjusts the Q-factor of the high range of the front panel's parametric microphone equalizer.

Available Values: 0 ~ 10
Default Setting: 1

30. MICR-EQ-FREQ1
Function: Selects the center frequency of the low range for the rear panel's parametric microphone equalizer.
Available Values: OFF/1 ~ 7 (x100 Hz)
Default Setting: OFF
OFF: The equalizer gain and Q-factor are set to factory defaults (flat).
1 ~ 7: You may adjust the equalizer gain and Q-factor in this selected audio frequency via menu items 31: MICR-EQ-GAIN1 and 32: MICR-EQ-Q1.

31. MICR-EQ-GAIN1
Function: Adjusts the equalizer gain of the low range of the rear panel's parametric microphone equalizer.
Available Values: –10 ~ +10 dB
Default Setting: +5 dB

32. MICR-EQ-Q1
Function: Adjusts the Q-factor of the low range of the rear panel's parametric microphone equalizer.
Available Values: 0 ~ 10
Default Setting: 1

33. MICR-EQ-FREQ2
Function: Selects the center frequency of the middle range for the rear panel's parametric microphone equalizer.
Available Values: OFF/7 ~ 15 (x100 Hz)
Default Setting: OFF
OFF: The equalizer gain and Q-factor are set to factory defaults (flat).
7 ~ 15: You may adjust the equalizer gain and Q-factor at this selected audio frequency via menu items 34: MICR-EQ-GAIN2 and 35: MICR-EQ-Q2.

34. MICR-EQ-GAIN2

Function: Adjusts the equalizer gain of the middle range of the rear panel 痴 parametric

microphone equalizer.
Available Values: –10 ~ +10 dB
Default Setting: +5 dB

35. MICR-EQ-Q2
Function: Adjusts the Q-factor of the middle range of the rear panel's parametric microphone equalizer.
Available Values: 0 ~ 10
Default Setting: 1

36. MICR-EQ-FREQ3
Function: Selects the center frequency of the high range for the rear panel's parametric microphone equalizer.
Available Values: OFF/15 ~ 32 (x100 Hz)
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 at this selected audio frequency via menu items 37: MICR-EQ-GAIN3 and 38: MICR-EQ-Q3.

37. MICR-EQ-GAIN3
Function: Adjusts the equalizer gain of the high range of the rear panel's parametric microphone equalizer.
Available Values: –10 ~ +10 dB
Default Setting: +5 dB

38. MICR-EQ-Q3
Function: Adjusts the Q-factor of the high range of the rear panel's parametric microphone equalizer.
Available Values: 0 ~ 10
Default Setting: 1

FILTER Group
39. AM-TX-BPF
Function: Selects the audio bandwidth of the Enhanced DSP modulator on the AM mode.
Available Values: 10-3000/100-2900/200-2800/300-2700/400-2600 Hz
Default Setting: 200-2800 Hz

40. FM-TX-BPF
Function: Selects the audio bandwidth of the Enhanced DSP modulator on the FM mode.
Available Values: 10-3000/100-2900/200-2800/300-2700/400-2600 Hz
Default Setting: 200-2800 Hz

41. IF-NOTCH
Function: Selects the bandwidth of the DSP NOTCH filter
Available Values: NARROW/WIDE
Default Setting: WIDE

42. MAIN-CW-FIL-PASSBAND
Function: Selects the passband characteristics of the main band (VFO-A) DSP filter for the CW mode.
Available Values: MAG/PHA (SOFT/SHARP)
Default Setting: PHA (SHARP)
MAG: Primary importance attached to amplitude of the filter factor.
PHA(SHARP): Primary importance attached to phase of the filter factor.

43. MAIN-CW-FIL-SHAPE
Function: Selects the shape factor of the main band (VFO-A) DSP filter for the CW mode.
Available Values: 1.3/1.5/1.8(SHARP/MIDDLE/GENTLE)
Default Setting: 1.5(MIDDLE)

44. MAIN-CW-FIL-NARROW
Function: Selects the passband of the main band (VFO-A) DSP filter for the CW “Narrow” mode.
Available Values: 25/50/100/200/300/400/500/1000/2400 Hz
Default Setting: 300 Hz

45. MAIN-PSK-FIL-PASSBAND
Function: Selects the passband characteristics of the main band (VFO-A) DSP filter for the PSK mode.
Available Values: MAG/PHA (SOFT/SHARP)
Default Setting: PHA (SHARP)
MAG: Primary importance attached to amplitude of the filter factor.

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

46. MAIN-PSK-FIL-SHAPE
Function: Selects the shape factor of the main band (VFO-A) DSP filter for the PSK mode.
Available Values: 1.3/1.5/1.8 (SHARP/MIDDLE/GENTLE)
Default Setting: 1.5(MIDDLE)

47. MAIN-PSK-FIL-NARROW
Function: Selects the passband of the main band (VFO-A) DSP filter for the PSK “Narrow” mode.
Available Values: 25/50/100/200/300/400/500/1000/2400 Hz
Default Setting: 300 Hz

48. MAIN-RTTY-FIL-PASSBAND
Function: Selects the passband characteristics of the main band (VFO-A) DSP filter for the RTTY mode.
Available Values: MAG/PHA (SOFT/SHARP)
Default Setting: PHA (SHARP)
MAG: Primary importance attached to amplitude of the filter factor.
PHA(SHARP): Primary importance attached to phase of the filter factor.

49. MAIN-RTTY-FIL-SHAPE
Function: Selects the shape factor of the main band (VFO-A) DSP filter for the RTTY mode.
Available Values: 1.3/1.5/1.8(SHARP/MIDDLE/GENTLE)
Default Setting: 1.5(MIDDLE)

50. MAIN-RTTY-FIL-NARROW
Function: Selects the passband of the main band (VFO-A) DSP filter for the RTTY “Narrow” mode.
Available Values: 25/50/100/200/300/400/500/1000/2400 Hz
Default Setting: 300 Hz

51. MAIN-SSB-FIL-PASSBAND
Function: Selects the passband characteristics of the main band (VFO-A) DSP filter for the SSB mode.
Available Values: MAG/PHA (SOFT/SHARP)

Default Setting: PHA(SHARP)
MAG: Primary importance attached to amplitude of the filter factor.
PHA(SHARP): Primary importance attached to phase of the filter factor.

52. MAIN-SSB-FIL-SHAPE
Function: Selects the shape factor of the main band (VFO-A) DSP filter for the SSB mode.
Available Values: 1.3/1.5/1.8 (SHARP/MIDDLE/GENTLE)
Default Setting: 1.5(MIDDLE)

53. MAIN-SSB-FIL-NARROW
Function: Selects the passband of the main band (VFO-A) DSP filter for the “Narrow” SSB mode.
Available Values:
200/400/600/850/1100/1350/1500/1650/1800/1950/2100/2250/2400/2550/2700/2850/2900/2950 Hz
Default Setting: 1800 Hz

54. SSB-TX-BPF
Function: Selects the audio passband of the Enhanced DSP modulator on the SSB mode.
Available Values: 10-3000/100-2900/200-2800/300-2700/400-2600 Hz
Default Setting: 300-2700 Hz

55. SUB-CW-FIL-PASSBAND
Function: Selects the passband characteristics of the sub band (VFO-B) DSP filter for the CW mode.
Available Values: MAG/PHA (SOFT/SHARP)
Default Setting: PHA (SHARP)
MAG: Primary importance attached to amplitude of the filter factor.
PHA(SHARP): Primary importance attached to phase of the filter factor.

56. SUB-CW-FIL-SHAPE
Function: Selects the shape factor of the sub band (VFO-B) DSP filter for the CW mode.
Available Values: 1.3/1.5/1.8 (SHARP/MIDDLE/GENTLE)
Default Setting: 1.5 (MIDDLE)

57. SUB-CW-FIL-NARROW

Function: Selects the passband of the sub band (VFO-B) DSP filter for the CW “Narrow” mode.
Available Values: 25/50/100/200/300/400/500/1000/2400 Hz
Default Setting: 300 Hz

58. SUB-PSK-FIL-PASSBAND
Function: Selects the passband characteristics of the sub band (VFO-B) DSP filter for the PSK mode.
Available Values: MAG/PHA (SOFT/SHARP)
Default Setting: PHA (SHARP)
MAG: Primary importance attached to amplitude of the filter factor.
PHA (SHARP): Primary importance attached to phase of the filter factor.

59. SUB-PSK-FIL-SHAPE
Function: Selects the shape factor of the sub band (VFO-B) DSP filter for the PSK mode.
Available Values: 1.3/1.5/1.8 (SHARP/MIDDLE/GENTLE)
Default Setting: 1.5 (MIDDLE)

60. SUB-PSK-FIL-NARROW
Function: Selects the passband of the sub band (VFO-B) DSP filter for the PSK “Narrow” mode.
Available Values: 25/50/100/200/300/400/500/1000/2400 Hz
Default Setting: 300 Hz

61. SUB-RTTY-FIL-PASSBAND
Function: Selects the passband characteristics of the sub band (VFO-B) DSP filter for the RTTY mode.
Available Values: MAG/PHA (SOFT/SHARP)
Default Setting: PHA (SHARP)
MAG: Primary importance attached to amplitude of the filter factor.
PHA (SHARP): Primary importance attached to phase of the filter factor.

62. SUB-RTTY-FIL-SHAPE
Function: Selects the shape factor of the sub band (VFO-B) DSP filter for the RTTY mode.
Available Values: 1.3/1.5/1.8 (SHARP/MIDDLE/GENTLE)
Default Setting: 1.5 (MIDDLE)

63. SUB-RTTY-FIL-NARROW
Function: Selects the passband of the sub band (VFO-B) DSP filter for the RTTY “Narrow” mode.
Available Values: 25/50/100/200/300/400/500/1000/2400 Hz
Default Setting: 300 Hz

64. SUB-SSB-FIL-PASSBAND
Function: Selects the passband characteristics of the sub band (VFO-B) DSP filter for the SSB mode.
Available Values: MAG/PHA (SOFT/SHARP)
Default Setting: PHA (SHARP)
MAG: Primary importance attached to amplitude of the filter factor.
PHA (SHARP): Primary importance attached to phase of the filter factor.

65. SUB-SSB-FIL-SHAPE
Function: Selects the shape factor of the sub band (VFO-B) DSP filter for the SSB mode.
Available Values: 1.3/1.5/1.8 (SHARP/MIDDLE/GENTLE)
Default Setting: 1.5 (MIDDLE)

66. SUB-SSB-FIL-NARROW
Function: Selects the passband of the main band (VFO-A) DSP filter for the “Narrow” SSB mode.
Available Values:
200/400/600/850/1100/1350/1500/1650/1800/1950/2100/2250/2400/2550/2700/2850/2900/2950 Hz
Default Setting: 1800 Hz

MESSAGE Group
67. BEACON TIME
Function: Sets the interval time between repeats of the beacon message.
Available Values: OFF/1 ~ 255 sec
Default Setting: OFF

68. CONTEST NUMBER
Function: Selects the Contest Number “Cut” format for the imbedded contest number.

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

Default Setting: AUNT

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.”

69. 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 keyboard connected to the rear-panel Keyboard jack (keyboard not supplied).

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

70. 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 keyboard connected to the rear-panel Keyboard jack (keyboard not supplied).

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

71. 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 keyboard connected to the rear-panel Keyboard jack (keyboard not supplied).

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

72. 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 keyboard connected to the rear-panel Keyboard jack (keyboard not supplied).

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

73. CW MEMORY 5

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

Available Values: TEXT/MESSAGE

Default Setting: MESSAGE

TEXT: You may enter the CW message from a keyboard connected to the rear-panel Keyboard jack (keyboard not supplied).

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

MODE-AM Group

74. AM MIC GAIN

Function: Sets the microphone gain for the AM mode.

Available Values: MCVR/FIX (0 ~ 255)

Default Setting: 128

When this menu is set to “MCVR,” you may adjust the microphone gain using the front panel’s MIC knob.

75. AM MIC SEL

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

76. CW AUTO MODE

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

Available Values: OFF/50M/ON

Default Setting: OFF

OFF: Disables CW keying while operating on SSB.

50M: Enables CW keying 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.

77. 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.

78. 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.

79. CW FREQ

Function: Frequency Display Format for the CW mode.

Available Values: FREQ/PITCH

Default Setting: PITCH

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

PITCH: The frequency display reflects the added BFO offset.

80. CW KEY F

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

81. CW KEY R
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

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

83. 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

84. KEYER FRONT
Function: Selects the desired keyer operation mode for the device connected to the front panel's KEY jack.
Available Values: OFF/BUG/EL/ACS
Default Setting: EL
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."
EL: Iambic keyer with ACS (Automatic Character Spacing) disabled.
ACS: Iambic keyer with ACS (Automatic Character Spacing) enabled.

85. KEYER REAR

Function: Select the desired keyer operation mode for the device connected to the rear panel's KEY jack.
Available Values: OFF/BUG/EL/ACS
Default Setting: EL
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."
EL: Iambic keyer with ACS (Automatic Character Spacing) disabled.
ACS: Iambic keyer with ACS (Automatic Character Spacing) enabled.

86. 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: OFF/ON
Default Setting: OFF

87. 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: 10/15/20/25/30/35/40 msec
Default Setting: 10 msec

MODE-DATA Group
88. DATA IN SEL
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.

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

Available Values: 0 ~ 255
Default Setting: 128

90. DATA OUT (AFDT)
Function: Selects the receiver to be connected to the data output port (pin 4) of the PACKET jack.
Available Values: Main/Sub
Default Setting: Main

91. DATA VOX DELAY
Function: Adjusts the “VOX” delay (receiver recovery) time on the PKT mode.
Available Values: 30 ~ 3000 msec
Default Setting: 300 msec

92. DATA VOX GAIN
Function: Adjusts the “VOX” gain on the PKT mode.
Available Values: 0 ~ 255
Default Setting: 128

MODE-FM Group
93. FM MIC GAIN
Function: Sets the microphone gain for the FM mode.
Available Values: MCVR/FIX (0 ~ 255)
Default Setting: 128
When this menu is set to “MCVR,” you may adjust the microphone gain using the front panel’s MIC knob.

94. FM MIC SEL
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.

95. 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

96. 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

MODE-PKT Group

97. PKT DISP (SSB)

Function: Sets the packet frequency display offset.

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

Default Setting: 0 Hz

98. PKT GAIN

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

Available Values: 0 ~ 255

Default Setting: 128

99. 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-RTTY Group

100. POLARITY-R

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

Available Values: NOR/REV

Default Setting: NOR

101. POLARITY-T
Function: Selects normal or reverse Mark/Space polarity for RTTY transmit operation.
Available Values: NOR/REV
Default Setting: NOR

102. SHIFT
Function: Selects the frequency shift for the FSK RTTY operation.
Available Values:170/200/425/800 Hz
Default Setting: 170 Hz

103. TONE
Function: Selects the mark tone for RTTY operation.
Available Values: 1275/2125 Hz
Default Setting: 2125 Hz

MODE-SSB Group
104. LSB RXCAR
Function: Adjusts the receiver carrier point for LSB mode.
Available Values: –200 Hz ~ +200 Hz (10 Hz steps)
Default Setting: 0 Hz

105. LSB TXCAR
Function: Adjusts the transmitter carrier point for LSB mode.
Available Values: –200 Hz ~ +200 Hz (10 Hz steps)
Default Setting: 0 Hz

106. SSB MIC SEL
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.

107. USB RXCAR
Function: Adjusts the receiver carrier point for USB mode.
Available Values: –200 Hz ~ +200 Hz (10 Hz steps)
Default Setting: 0 Hz

108. USB TXCAR
Function: Adjusts the transmitter carrier point for USB mode.
Available Values: –200 Hz ~ +200 Hz (10 Hz steps)
Default Setting: 0 Hz

OPERATE Group
109. 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).

110. BAR GRAPH
Function: Selects one of three parameters to be viewed on the Tuning Offset Indicator.
Available Values: CLAR/CW TUNE/VRF-μTUNE
Default Setting:
CLAR: Displays relative clarifier offset.
CW TUNE: Displays relative tuning offset between the incoming signal and transmitted frequency.
VRF-μTUNE: Displays the peak position of the VRF or μ-TUNE filter.

111. BEEP LEVEL
Function: Sets the beep level.
Available Values: 0 ~ 255
Default Setting: 128

112. 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

113. DIM-MTR

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

Available Values: 0 ~ 15

Default Setting: 8

114. DIM-VFD

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

Available Values: 0 ~ 15

Default Setting: 8

115. EMERGENCY

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

Available Values: OFF/ON

Default Setting: OFF

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

116. EXT DISP

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

Available Values: OFF/ON

Default Setting: ON

117. EXT TX-GND

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

Available Values: ENABLE/DISABLE

Default Setting: DISABLE

118. FULL DUP

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).

119. MEM GROUP
Function: Enables/Disables Memory Group Operation.
Available Values: OFF/ON
Default Setting: OFF

120. PWR CONT
Function: Configures the RF PWR knob.
Available Values: ALL/CW
Default Setting: ALL
ALL: The RF PWR knob is enabled on all modes.
CW: 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.

121. QUICK SPLIT
Function: Selects the tuning offset for the Quick Split feature.
Available Values: –10/–5/0/+5/+10 kHz
Default Setting: +5 kHz

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

123. ROTATOR Offset ADJ
Function: Adjusts the indicator needle precisely to the starting point set in Menu #123.
Available Values: –30 - 0
Default Setting: 0

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

Default Setting: OFF

125. TUNING POWER
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: 200/100/50/10 W
Default Setting: 100 W

126. 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).

127. TX POWER
Function: Selects a maximum output power limit.
Available Values: 200/100/50/10 W
Default Setting: 200 W

128. μTUNE
Function: Select the μ-TUNE mode.
Available Values: AUTO/MAN
Default Setting: AUTO

SCAN Group
129. 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: ON/OFF
Default Setting: ON

130. 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.

TUNING Group
131. 1MHz/100kHz
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. CW FINE
Function: Setting of the Main Tuning Knob's tuning speed in the CW mode.
Available Values: ON/OFF
Default Setting: OFF
ON : Tuning in 1 Hz steps on the CW mode.
OFF: Tuning according to the steps determined via menu item 134: DIAL STEP.

134. CLAR-DISP
Function: Selects the frequency step per segment of the Tuning Offset Meter.
Available Values: 100/250/500 Hz
Default Setting: 100 Hz

135. 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: 1 Hz

136. 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

137. FM DIAL STEP
Function: Setting of the Main Tuning Knob's tuning speed in the FM mode.
Available Values: 10/100/1000 Hz
Default Setting: 100 Hz

138. SKIP BAND
Function: Programs a band to be skipped while selecting bands using the CLAR/VFO-B knob.
Available Values: None/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, then press the [ENT] key to change this setting to "ON." Repeat the same procedure to cancel the setting (skip "Off"). The skipped band will be high-lighted on the TFT display.

S-SCOPE Group
139. FIX START FREQ. 1.8 MHz
Function: Selects the scan start frequency of the FIX mode Spectrum Scope while monitoring on the 160 m amateur band.
Available Values: 1.800 - 1.999 MHz (1 kHz steps)
Default Setting: 1.800 MHz

140. FIX SPAN 1.8 MHz
Function: Selects the scan sweep band width of the FIX mode Spectrum Scope while monitoring on the 160 m amateur band.
Available Values: 25/50/100/125/500/1000/2500 kHz
Default Setting: 250 kHz

141. FIX START FREQ. 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 - 9.999 MHz (1 kHz steps)
Default Setting: 3.500 MHz

142. FIX SPAN 3.5 MHz

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

Available Values: 25/50/100/125/500/1000/2500 kHz

Default Setting: 500 kHz

143. FIX START FREQ. 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

144. FIX SPAN 5.0 MHz

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

Available Values: 25/50/100/125/500/1000/2500 kHz

Default Setting: 250 kHz

145. FIX START FREQ. 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

146. FIX SPAN 7.0 MHz

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

Available Values: 25/50/100/125/500/1000/2500 kHz

Default Setting: 500 kHz

147. FIX START FREQ. 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 - 10.145 MHz (1 kHz steps)

Default Setting: 10.100 MHz

148. FIX SPAN 10 MHz

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

Available Values: 25/50/100/125/500/1000/2500 kHz

Default Setting: 500kHz

149. FIX START FREQ. 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

150. FIX SPAN 14 MHz

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

Available Values: 25/50/100/125/500/1000/2500 kHz

Default Setting: 500 kHz

151. FIX START FREQ. 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

152. FIX SPAN 18 MHz

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

Available Values: 25/50/100/125/500/1000/2500 kHz

Default Setting: 100 kHz

153. FIX START FREQ. 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 - 41.499 MHz (1 kHz steps)

Default Setting: 21.000 MHz

154. FIX SPAN 21 MHz

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

Available Values: 25/50/100/125/500/1000/2500 kHz

Default Setting: 500 kHz

155. FIX START FREQ. 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

156. FIX SPAN 24 MHz

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

Available Values: 25/50/100/125/500/1000/2500 kHz

Default Setting: 100 kHz

157. FIX START FREQ. 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

158. FIX SPAN 28 MHz

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

Available Values: 25/50/100/125/500/1000/2500 kHz

Default Setting: 1000 kHz

159. FIX START FREQ. 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

160. FIX SPAN 50 MHz

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

Available Values: 25/50/100/125/500/1000/2500 kHz

Default Setting: 1000 kHz

MISC Group

161. COLOR

Function: Selects the TFT color.

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

Default Setting: COOL BLUE

162. Vdd MTR

Function: Selects the Sub meter function

Available Values: NOR/Vdd

Default Setting: NOR

NOR: 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.

163. VOX SEL

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.

164. AF VR SELECT

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

Available Values: OFF/ON

Default Setting: OFF

When this menu is set to “ON,” 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.

Front Panel Controls (when optional Dual Receive Unit is installed)

FLT Button (VFO-B)

This button selects the bandwidth for the sub band (VFO-B) receiver's first IF Roofing Filter. Available selections are 3 kHz, 6 kHz, 15 kHz, or Auto.

AGC -0- ATT Knob (VFO-B)

AGC Knob

The inner AGC knob selects the sub band (VFO-B) receiver's Automatic Gain Control decay time for the most comfortable reception, or disables the receiver AGC (off). Normally this switch is set to the "AUTO" position. Strong signals will cause distortion if this selector is set to "OFF," unless you rotate the RF Gain control counterclockwise to apply AGC to the receiver manually.

ATT Knob

The outer ATT knob inserts 3, 6, 12, or 18 dB (1/2, 1, 2, or 3 S-units) of attenuation before the sub band (VFO-B) mixer to suppress band noise and reduce the possibility of overload from very strong signals.

VRF Button (VFO-B)

This button turns the sub band (VFO-B) receiver's VRF (preselector) filter on and off. While activated, the LED inside the button will glow umber.

VRF -0- NTCH Knob (VFO-B)

VRF Knob

The inner VRF knob tunes the passband of the sub band (VFO-B) receiver's VRF filter for maximum receiver sensitivity (and out-of-band interference rejection).

NTCH knob

The outer NTCH knob adjusts the IF notch frequency of the sub band (VFO-B) IF notch filter.

NTCH Button (VFO-B)

This button turns the sub band (VFO-B) IF notch filter on and off. When the sub band (VFO-B) IF notch filter is activated, the LED inside the button will glow umber.

NB -0- SQL Knob (VFO-B)

NB Knob

The inner NB knob adjusts the noise blanking level when the sub band (VFO-B) (analog) IF noise blanker is activated by pressing the NB button.

SQL Knob

The outer SQL knob sets the signal level threshold at which sub band (VFO-B) receiver audio is muted, in all modes. This control is normally kept fully counter-clockwise, except when scanning and during FM operation.

NB Button (VFO-B)

Pressing this button activates the sub band (VFO-B) IF Noise Blanker, which may help reduce many different types of man-made impulse noise (but not atmospherics). When the Noise Blanker is activated, the LED inside the button will glow umber.

SHIFT -0- WIDTH Knob (VFO-B)

SHIFT Knob

The inner SHIFT knob offsets the center frequency of the sub band (VFO-B) IF passband ±1.0 kHz when rotated from its “Normal” (center) position. This control functions in all modes except FM.

WIDTH Knob

The outer WIDTH knob, when turned to the 12 o’clock position, sets the overall IF bandwidth of the sub band (VFO-B) receiver to its maximum bandwidth. Turning the WIDTH knob either direction reduces the overall IF bandwidth of the sub band (VFO-B) receiver.

CONT Button (VFO-B)

This button turns the sub band (VFO-B) CONTOUR filter on and off. When the CONTOUR filter is activated, the LED inside the button will glow umber.

CONT -0- DNR Knob (VFO-B)

CONT Knob

The inner CONT knob selects the desired sub band (VFO-B) CONTOUR filter response.

DNR Knob

The outer DNR knob selects the optimum sub band (VFO-B) Digital Noise Reduction response.

DNR Button (VFO-B)

This button turns the sub band (VFO-B) Digital Noise Reduction circuit on and off. When the Digital Noise Reduction is activated, the LED inside the button will glow umber.

DNF Button (VFO B)

This button turns the sub band (VFO-B) Digital Notch Filter on and off. When the sub band (VFO-B) Digital Notch Filter is activated, the LED indicator will glow umber.

AF GAIN -0- RF GAIN Knob (VFO-B)

AF GAIN Knob

The inner AF GAIN knob adjusts the audio volume level of the sub band (VFO-B) receiver in the speaker or headphones.

RF GAIN Knob

The outer RF GAIN knob adjusts the receiver signal input level in the front end of the sub band (VFO-B) receiver, ahead of the 1st mixer (via PIN diodes), and also the gain of the sub receiver's IF amplifiers.

This control is normally set fully clockwise for maximum sensitivity. When rotated counter-clockwise, the sub band (VFO-B) S-meter minimum deflection point will move up the scale. The peak deflection for a particular signal will remain the same if it is greater than the level set by this control, but the sub band (VFO-B) receiver will be less sensitive to weaker signals.

AFL Button (VFO-B)

Pressing this button activates the Audio (AF) Limiter circuit of the sub band (VFO-B) receiver. This will protect the audio amplifier from distortion, and protect your ears from high audio levels, caused by sudden peaks in audio input.

When the Audio Limiter circuit is activated, the LED inside the button will glow umber.

(When optional TFT Unit and/or Data Management Unit is installed)

TFT Status/Information Display

This 6.5" 800 x 400 dot TFT display indicates the main (VFO-A) and sub (VFO-B) status and displays a multi-function World Clock. A wide variety of information may be displayed on the TFT; see the "TFT Monitor Operation" chapter, beginning on page ??, for details.

FUNCTION Buttons

These buttons select the operating and/or display functions for the TFT Status/Information

Display. See the “TFT Monitor Operation” chapter for details.

DISPLAY Jack
Connect an external monitor (not supplied) to this jack.

AUDIO Phone Jacks (IN/OUT)
These jacks provide input/output of audio signals for future products. These jacks are disabled in this product release.

KEYBOARD Jacks
Connect your keyboard (not supplied) to one of these jacks in accordance with your keyboard type (“USB” or “PS/2”) to use the Smart Memory Card for storage of logbook data.

This jack is for use future products, and is disabled in this product release.

COM Jack
Connect a GPS receiver capable of supplying NMEA data (not supplied) to this jack. When you connect the GPS receiver to this jack, the FT DX 9000 Contest will automatically set your current location automatically into the “World Map” page of the TFT monitor.