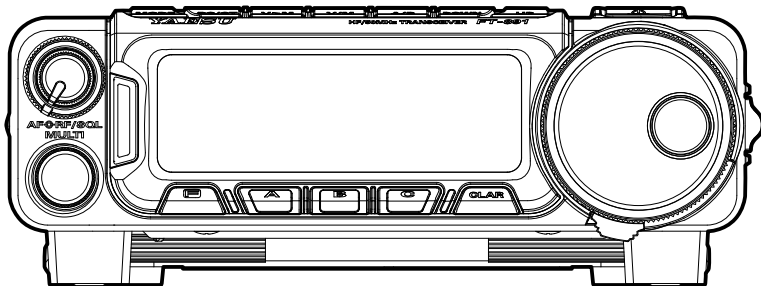


YAESU
The radio

FT-891

Operating Manual

HF/50 MHz TRANSCEIVER



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Introduction

The FT-891 is a rugged, innovative multiband, multimode mobile/portable transceiver for the amateur radio MF/HF/50 MHz bands. Providing coverage of the 160 - 6 meter bands, the FT-891 includes operation on the SSB, CW, AM and FM modes, yielding the most comprehensive performance package available for mobile and field operation.

Engineered for high performance, the FT-891 provides 100 watts power output on the 160 through 6 meter bands.

The multi-function Liquid-Crystal Display includes attractive backlighting. The display includes bar-graph indication of power output, ALC voltage, SWR, modulation level, and/or signal strength. Also included are a number of operating status icons, as well as the function displays for the three operating function keys ([A], [B], and [C]).

Among the advanced features of the FT-891 are many incorporated only in large base-station transceivers. These include Dual VFOs; Split-Frequency operation; Digital Signal Processing (Bandpass Filtering, Noise Reduction, Auto-Notch, and Microphone Equalizer);

IF Shift; Clarifier ("R.I.T."); IF Noise Blanker; AGC Fast/Middle/Slow/Auto selection; RF Gain and Squelch control; IPO (Intercept Point Optimization) and a receiver front-end Attenuator; AM Broadcast reception; VOX; Built-in Electronic Keyer with Memories and a Beacon mode; Adjustable CW Pitch; Automatic FM Repeater Shift (ARS); Built-in CTCSS Encoder/Decoders;

Spectrum Scope; 200 Memories plus Home Channels and Band-limiting Memories; Alpha-Numeric Labeling of Memories; Automatic Power-Off (APO) and Time-Out Timer (TOT) functions; Computer Interface capability; and Cloning capability.

We urge you to read this manual in its entirety, so as to gain a full understanding of the amazing capability of the exciting new FT-891 Transceiver.

Accessories & Options

Supplied Accessories

Microphone (MH-31A8J)
Mobile Mounting Bracket (Attachment screw set)
DC power cable w/Fuse
Spare fuse (25 A)
Operating Manual
Safty Guide
Warranty Card

Optional Accessories

MH-31A8J	Microphone
MH-36E8J	DTMF Microphone
MD-200A8X	Ultra-High-Fidelity Desktop Microphone
MD-100A8X	Desktop Microphone
YH-77STA	Lightweight Stereo Headphone
VL-1000/VP-1000	Linear Amplifire/AC Power Supply
FC-40	External Automatic Antenna Tuner
FC-50	External Automatic Antenna Tuner
ATAS-120A	Active Tuning Antenna (Automatic Type)
ATAS-25	Active Tuning Antenna (Manual Type)
ATBK-100	Antenna Base Kit
FH-2	Remote Control Keypad
MMB-98	Front Panel Bracket
CT-58	VL-1000 Linear Amplifire Connection Cable
CT-39A	Packet Interface Cable

Connecting the Microphone

1. Insert the microphone's plug into the recessed jack on the transceiver, as shown in the illustration.
Note: When disconnecting the microphone, pull the cable while pressing the connector latch.
2. You may position the microphone cable so as to cause it to exit from the side or the bottom of the transceiver. Just route the cable into the appropriate channel provided, as shown in the illustration.
3. Connect the Control cable between the Front Panel and Transceiver Body.
4. Install the Front Panel by sliding it into the position shown; you will hear a "click" when the panel locks into place.
5. To remove the Front Panel, use your left thumb to push rearward (slightly) the latch on the left-hand of the panel, then slide the Front Panel to the right and away from the transceiver.

Installation

Power connection

The DC power connector for the FT-891 must only be connected to a DC source providing 13.8 Volts DC ($\pm 15\%$), and capable of at least 25 Amperes of current. Always observe proper polarity when making DC connections:

The **Red** DC power lead connects to the **Positive** (+) DC terminal; and the **Black** DC power lead connects to the **Negative** (-) DC terminal.

In mobile installations, noise pickup may be minimized by connecting the DC cable directly to your vehicle's battery, rather than to the ignition switch or "accessory" circuitry.

Direct connection to the battery also provides the best voltage stability.

Warning!

Never apply AC power to the power cable of the FT-891, nor DC voltage greater than 15.8 Volts. When replacing the fuse, only use a 25-A fuse. Failure to observe these safety precautions will void the Limited Warranty on this product.

- Before connecting the transceiver, check the voltage at the battery terminals while revving the engine. If the voltage exceeds 15 Volts, adjust the vehicle's voltage regulator before proceeding with installation.
- Connect the **RED** power cable lead to the **POSITIVE** (+) battery terminal, and the **BLACK** power cable lead to the **NEGATIVE** (-) terminal. If you need to extend the power cable, use #12 AWG or larger insulated, stranded copper wire. Solder the splice connections carefully, and wrap the connections thoroughly with insulating electrical tape.
- Before connecting the cable to the transceiver, verify the voltage and polarity at the voltage at the transceiver end of the DC cable, using a DC voltmeter. Now connect the transceiver to the DC cable.

Warning!

- ***Do not use a DC power supply cable other than the one that is supplied or specified.***
- ***Do not place anything on the DC power supply cable or step on it.***
- ***Do not use the DC power supply cable with the fuse holder cut off.***
- ***Do not reverse the polarity (positive and negative) when connecting the battery.***

Installation

Grounding

The provision of an effective ground system is important in any successful communication station. 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 which may cause interference to nearby home entertainment devices or laboratory test equipment.
- It can minimize the possibility of erratic transceiver operation caused by RF feedback or improper current flow through logic devices.

An effective earth ground system may take several forms; for a more complete discussion, see an appropriate RF engineering text. The information presented below is intended only as a guideline.

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

Mobile Station Grounding

Although satisfactory grounding in most installations will be achieved via the DC cable's negative lead and the antenna system's coaxial cable shield, it is often recommended that you provide a direct ground connection to the vehicle chassis at the mounting location of the transceiver. Due to unexpected resonances which may naturally occur in any location, improper communication system performance may result from insufficient grounding. These symptoms may include:

- RF feedback (resulting in distortion on your transmitted signal);
- Unintended frequency change;
- Blinking or blanking of the frequency display;
- Noise pickup; and/or
- Loss of memory.

Note that these conditions may occur in any communications installation. The FT-891 includes extensive filtering designed to minimize the chance of such problems; however, random currents set up by insufficient RF grounding can nullify such filtering. Bonding the FT-891 transceiver to the vehicle or vessel's ground system should clear up any such difficulties.

Yaesu Musen does not recommend the use of "on glass" mobile antennas unless the shield of the coaxial cable is securely grounded near the feedpoint of the antenna. Such antennas frequently are responsible for the ground-related difficulties described above.

Installation

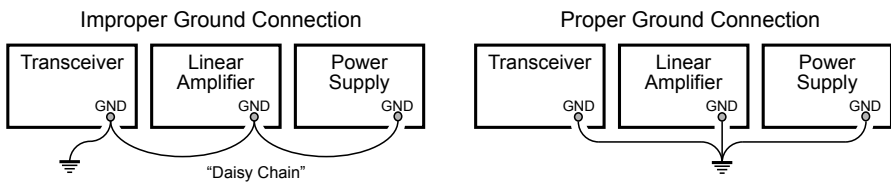
Base Station Earth Grounding

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 configured 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 cables to the ground rods. Be sure to weather-proof 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).

Do not use gas line pipes in an attempt to provide a ground connection! To do so creates a serious risk of explosion!!

Inside the station, a common ground bus consisting of a copper pipe of at least 1” (25 mm) diameter should be used. An alternative station ground bus may consist of a wide copperplate (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 should be made directly to the ground bus using a heavy, braided cable.

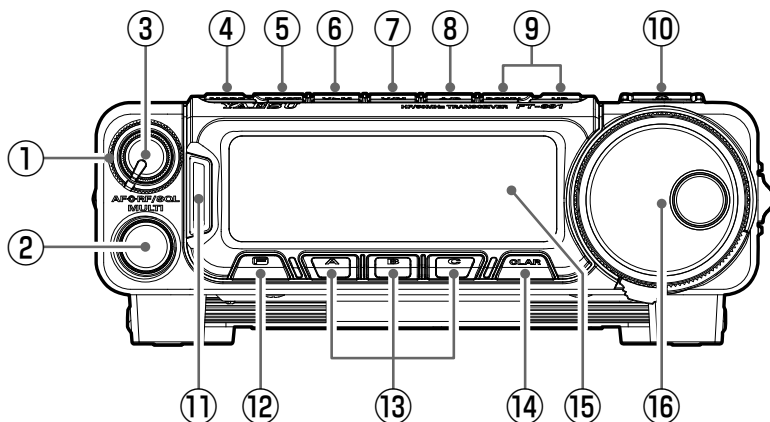
Do not make ground connections from one electrical device to another, and thence to the ground bus. This so-called “Daisy Chain” grounding technique may nullify any attempt at effective radio frequency grounding. See the drawings below for examples of proper and improper ground connections.



RF FIELD EXPOSURE

This transceiver is capable of power output in excess of 100 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>>). Although there is negligible radio frequency (RF) leakage from the FT-891 transceiver itself, its antenna system should be located as far away from humans and animals as practicable, so as to avoid the possibility of shock due to accidental contact with the antenna or excessive long-term exposure to RF energy. During mobile operation, do not transmit if someone is standing adjacent to your antenna, and use the lowest power possible.

Front Panel Controls & Switches



① RF/SQ/SQL knob

This (outer) **SQL/RF** knob adjusts the gain of the receiver's RF and IF stages. Using Menu Mode "**No 05-05 [RF/SQ/SQL VR]**", this control may be changed to function as a Squelch control.

② MULTI knob

This detented rotary switch is used for function selection for the **[A]**, **[B]**, **[C]** keys of the transceiver.

③ AF Knob

The (inner) VOL knob adjusts the receiver audio volume level presented to the internal or external speaker. Clockwise rotation increases the volume level.

④ MODE key

Pressing either of this key momentarily will change the operating mode. The selections available are:

▣ LSB ▣ CWL (CW LSB) ▣ R-L (RTTY LSB) ▣

▣ P-L (PACKET LSB) ▣ AM ▣ LSB ▣

Repeated presses of this key steps through the available selections. Pressing and holding this key will toggle to the alternate mode. For example, ***In the LSB or USB modes***, a long press of this key toggles between "LSB" and "USB" mode.

⑤ RC/ST key

Press and hold this key for more than one second to write the frequency and data currently set for VFO-A onto the quick memory bank (QMB)

○ 5 channels are available for QMB memories. Press the button briefly to recall the data written onto the quick memory banks (QMB) one by one.

⑥ [V▶M] key

Pressing and holding this key for one second (until the double beep) copies the current operating data into the currently selected memory channel, over-writing any previous

Basic Operation

data stored there.

Press this button briefly to display the memory check function screen, where the data saved in a memory channel may be reviewed.

Press this button again, to close the memory list screen.

⑦ [V/M] key

This key toggles frequency control between VFO and the memory system.

- Pressing this key alternately recalls the VFO frequency data and the frequency data saved in a memory channel by turns.

⑧ [A/B] key

Pressing this button momentarily, exchanges the frequency and memory channel data, of VFO-A and VFO-B.

⑨ [DOWN]/[UP] key

Pressing either of these keys momentarily will cause the frequency to be moved up or down by one frequency band. The selections available are:

..... 1.0 MHz ⇔ 1.8 MHz ⇔ 3.5 MHz ⇔ 5.0 MHz ⇔ 7.0 MHz ⇔ 10 MHz ⇔ 14 MHz
⇔ 15 MHz ⇔ 18 MHz ⇔ 21 MHz ⇔ 24 MHz ⇔ 28 MHz ⇔ 50 MHz ⇔ 1.0 MHz

⑩ [Power/Lock] key

Press and hold in the Power key for one second to turn to the transceiver on or off.

Briefly pressing the key while the transceiver is turned ON engages or releases the key lock.

⑪ TX/BUSY Indicator

This indicator glows green when the squelch opens, and turns red during transmit.

⑫ [F] key

Press and hold in this key for one second to activate the “Menu” mode.

⑬ Multi Function keys

These three keys select many of the most important operating features of the transceiver.

⑭ [CLAR] key

During reception, press this key, then press the **MULTI** knob then rotate the **MULTI** knob to adjust the VFO RX clarifier offset value.

- The clarifier offset value (frequency) can be re-stored to “0 (zero)” by pressing the [CLAR] key for more than 1 second.

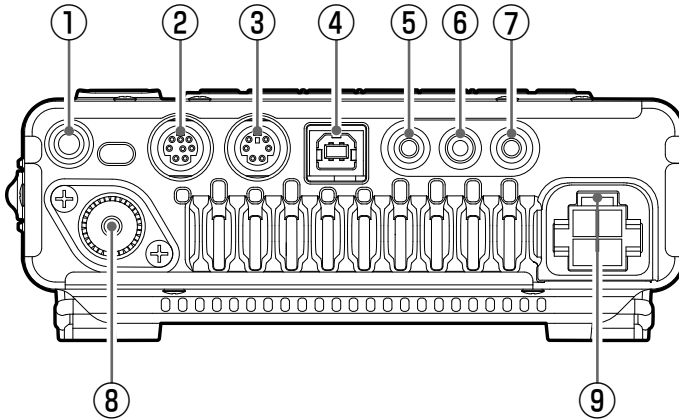
⑮ LCD Display

The LCD (Liquid Crystal Display) provides indication of the operating frequency and other aspects of transceiver status.

⑯ MAIN DIAL

This is the main tuning dial for the transceiver. It is used both for frequency tuning as well as “Menu” setting in the transceiver.

Rear Panel Connectors



① GND

Use this terminal to connect the transceiver to a good earth ground, for safety and optimum performance. Use a large diameter, short braided cable to make the ground connections. For details on grounding the transceiver, see “Grounding” on page 7.

② TUN/LIN Jack

Connect the optional external antenna tuner “FC-50” or the linear amplifier VL-1000”.

③ RTTY/DATA Jack

This is the input/output jack to connect a terminal unit for RTTY and TNC for packet communications.

④ USB Jack

Connect a computer with a commercially available USB cable to control the transceiver remotely from the computer using the CAT command. Inputting/Outputting audio signals and transmission control can also be done from the computer.

⑤ ACC Jack

This 3.5-mm 3-pin jack accepts external ALC (Automatic Level Control) voltage from a linear amplifier on the tip connection, and accepts a “Transmit Request” command on the ring connection. The main shaft is the ground return.

The “TX Request” connection, when shorted to ground, puts the FT-891 into the transmit mode, and sends out a steady CW carrier, for linear amplifier or manual antenna tuner adjustment.

⑥ KEY Jack

This 3.5-mm, 3-pin jack is used for connection to a CW keyer paddle or a straight key.

Rear Panel Connectors

⑦ **EXT SPKR** Jack

This 3.5-mm, 2-pin jack provides variable audio output for an external speaker. The audio output impedance at this jack is $4\ \Omega \sim 16\ \Omega$ and the level varies according to the setting of the front panel's AF control.

⑧ **ANT** Antenna Jack

Connect your HF and/or 50 MHz antenna's $50\ \Omega$ coaxial cable to this M-type ("SO-239") connector.

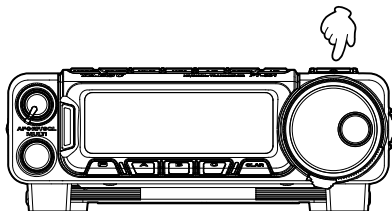
⑨ **DC IN** Jack

This is the DC power supply connection for the transceiver. Use the supplied DC cable to connect directly to a DC power supply, which must be capable of supplying at least 25 A @13.8 VDC.

Basic Operation

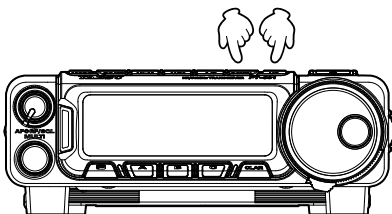
Turning the Transceiver ON and OFF

1. To turn the transceiver ON, press and hold the **PWR/LOCK** key for one second.
2. To turn the transceiver OFF, again press and hold the **PWR/LOCK** key for one second.



Operating Band Selection

This transceiver covers an incredibly wide frequency range, over which a number of different operating modes are used. Therefore, this transceiver's frequency coverage has been divided into different operating bands, each of which has its own preset frequency steps and operating modes. You can change the channel steps and operating mode once you get started, of course, per the next section. To change the frequency band, press either the **[DOWN]** or **[UP]** key to move to the next lower or higher operating band, respectively.

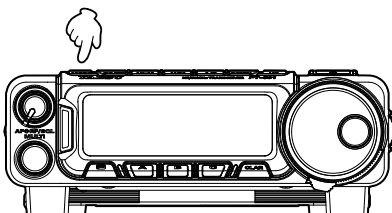


Mode Selection

Pressing either of the **[MODE]** key momentarily will change the operating mode. The selections available are:

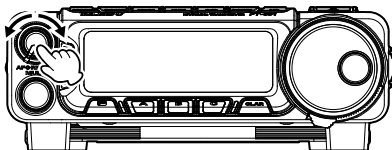
- ▶ LSB ■▶ CWL (CW LSB) ■▶ R-L (RTTY LSB) ■▶
 ■▶ P-L (PACKET LSB) ■▶ AM ■▶ LSB ■▶

Repeated presses of the **[MODE]** key steps through the available selections. Pressing and holding the **[MODE]** key will toggle to the alternate mode. For example, *In the LSB or USB modes*, a long press of the **[MODE]** key toggles between "LSB" and "USB" mode.



Adjusting the Audio Volume Level

Rotate the AF knob to set a comfortable listening level.

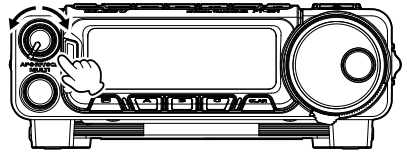


Basic Operation

Adjusting the RF Gain and Squelch

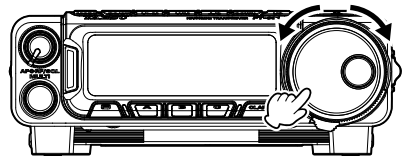
The RF/SQL Gain control is configured differently, depending on the country to which the FT-891 has been exported. In the U.S. version, the default function of this control is “RF Gain.” The configuration of the RF/SQL Gain control is set via Menu Mode “**No**

05-05 [RF/SQL VR]”. If your transceiver is configured for “RF Gain” use, rotating this control fully clockwise in the SSB/CW modes will provide best sensitivity. To reduce the receiver’s RF Gain somewhat, rotate this control counter-clockwise slightly. You will observe an increasing number of bars on the S-meter as you rotate the RF Gain control counter-clockwise; this indicates increasing AGC voltage, which is causing the front-end gain to be reduced. In the FM mode, with “RF Gain” selected, the FT-891 goes into an “Auto Squelch” mode, with the Squelch level being preset at the factory. If this control is configured for “SQL” operation, the FT-891’s RF Gain will be set for maximum sensitivity in all modes, and the RF/SQL Gain control will function solely as a Squelch control. In this case, rotate the RF/SQL Gain control to the point where the back-ground noise is just silenced; this will provide the best sensitivity to weak signals, while keeping the receiver quiet when no signal is received. The LED just left side the display will glow Green when the squelch is opened by an incoming signal or noise.



Setting the Operating Frequency

Rotate the **DIAL** knob to set the frequency. Clockwise rotation of the **DIAL** increases the operating frequency.

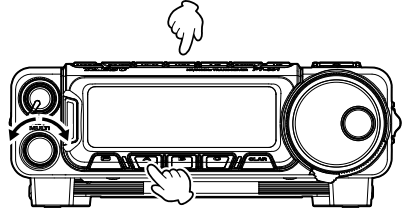


Basic Operation

Operation on 60-Meter (5 MHz) Band (U.S. Version Only)

The recently-released 60-meter band is covered, in the FT-891, by fixed memory channels. These channels are set to USB or CW, and they appear between the “last” PMS channel (“P-9U”) and the first “regular” memory channel (01ch):

1. Press the **[V/M]** key once to enter the “Memory” mode.
2. Rotate the **MULTI** knob, as needed, until Multi Function Row “**F-13 [MCH] [GRP] [MLIST]**” appears on the display.
3. Press the **[A](MCH)** key, then rotate the **MULTI** knob.
4. The memory channel number will appear on the display to signify that rotation of the **MULTI** knob will allow selection of the memory channel.
5. Memory channels (“5-01” through “5-10”) are preprogrammed, at the factory, with the permitted frequencies in the 5 MHz band, and the USB or CW mode is automatically selected on these channels.
6. To exit from 60-meter (5 MHz) operation and return to the VFO mode, just press the **[V/M]** key.

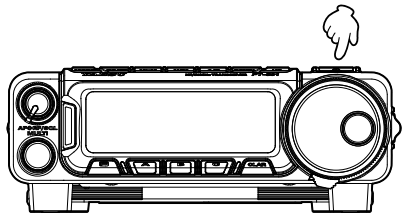


Channel Number	Frequency
5-01	5.332000 MHz (SSB)
5-02	5.348000 MHz (SSB)
5-03	5.358500 MHz (SSB)
5-04	5.373000 MHz (SSB)
5-05	5.405000 MHz (SSB)
5-06	5.332000 MHz (CW)
5-07	5.348000 MHz (CW)
5-08	5.358500 MHz (CW)
5-09	5.373000 MHz (CW)
5-10	5.405000 MHz (CW)

Lock Feature

To activate the key-lock feature, press the **[Power/Lock]** key. The “LOCK” icon will appear on the LCD.

To cancel key-lock, press the **[Power/Lock]** key again.



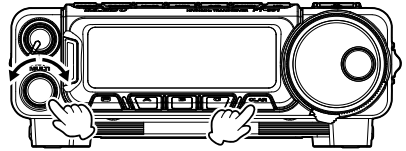
Basic Operation

Clarifier (Receiver Incremental Tuning)

The **[CLAR]** key and **MULTI** knob are used to offset the receive frequency, the transmit frequency, or both, from their settings on the VFO-A frequency. Four small numbers on the Display show the current Clarifier offset. The Clarifier controls on the FT-891 are designed to allow setting a preset offset (up to ± 9.99 kHz) without actually re-tuning, and then to activate it via the Clarifier **[CLAR]** key. This feature is ideal for following a drifting station, or for setting the small frequency offsets sometimes utilized in DX “Split” work.

Here is the technique for utilizing the Clarifier:

1. Press the **[CLAR]** key. The programmed offset will be applied to the receive frequency.
2. Press the **MULTI** knob, then rotation of the **MULTI** knob will allow you to modify your initial offset on the fly. Offsets of up to ± 9.99 kHz may be set using the Clarifier.
3. To cancel Clarifier operation, press the **[CLAR]** key.



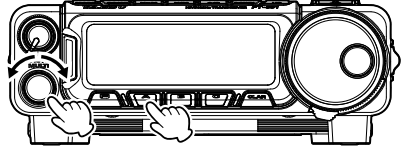
Note: Turning the Clarifier off merely cancels the application of the programmed offset from the receive and/or the transmit frequencies. To clear the Clarifier offset, and reset it to “zero,” press and hold the **[CLAR]** key.

Advanced Operation

IF SHIFT

The receiver's IF SHIFT feature is an effective interference-reduction tool, which allows you to shift the passband response higher or lower without changing the pitch of the incoming signal.

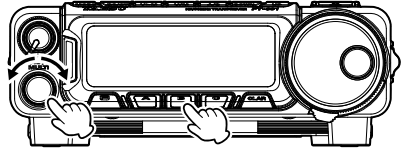
1. Rotate the **MULTI** knob, as needed, until Multi Function Row "**F-05 [SHIFT] [WIDTH] [NOTCH]**" appears on the display.
2. Press the **[A](SHIFT)** key to activate the IF SHIFT feature.
3. Rotate the **MULTI** knob, as needed, to reduce or eliminate the interference.
4. To turn the IF SHIFT feature off, press the **[F]** key. The last setting of the IF SHIFT control will be retained until you change it again.



AGC (Automatic Gain Control)

The receiver recovery time constant of the AGC system may be modified to match your operating needs.

1. Rotate the **MULTI** knob, as needed, until Multi Function Row "**F-04 [NB] [AGC] [MONI]**" appears on the display.
2. Press the **[B](AGC)** key to toggle the AGC recovery time constant among the following selections:



AUTO ⇨ FAST ⇨ MID ⇨ SLOW ⇨ AUTO ⇨

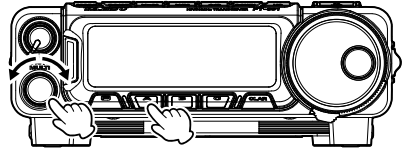
Where "AUTO" represents "FAST" on CW and DIG (AFSK), and "SLOW" on the voice modes. If you disable the AGC by press and hold the **[B](AGC)** key, the S-meter (which monitors AGC voltage) will cease to function. Depending on the setting of the RF Gain control, incoming signals will probably be distorted if the AGC is turned off.

Advanced Operation

Noise Blanker

The IF Noise Blanker may be useful in reducing or eliminating some types of impulse noise, especially noise generated by automotive ignition systems.

1. Rotate the **MULTI** knob, as needed, until Multi Function Row “**F-04 [NB] [AGC] [MONI]**” appears on the display.
2. Press the **[A](NB)** key to activate the Noise Blanker. The “N” icon will appear on the display, indicating that the Noise Blanker is now on.
3. To adjust the blanking level, rotate the **MULTI** knob to set a higher or lower blanking level (on a scale of 0 to 10).
4. Press the **[A](NB)** key again to turn the Noise Blanker off.

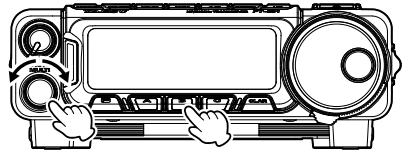


Note: During very crowded band conditions, you may wish to turn the Noise Blanker off, as its use will degrade the strong-signal-handling capability of the receiver somewhat.

IPO (Intercept Point Optimization)

The IPO feature bypasses the receiver RF preamplifier, thereby eliminating the preamp's gain.

1. Rotate the **MULTI** knob, as needed, until Multi Function Row “**F-03 [ATT] [IPO] [NAR]**” appears on the display.
2. Press the **[B](IPO)** key repeatedly, to set the desired characteristic of the receiver front end, according to the chart below.
AMP1: Amplify the incoming signals, using a low distortion RF preamplifier.
IPO: Bypasses the RF preamplifier, yielding direct feed to the first mixer.
3. The selected receiver RF preamplifier will be indicated in the IPO column of the Key Function Display on the display.

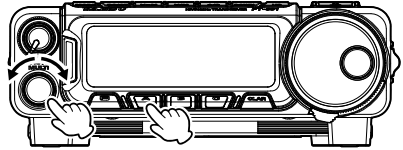


Advanced Operation

ATT (Attenuator)

The Attenuator will reduce all signals (and noise) by 10 dB, and it may be used to make reception more pleasant under extremely noisy conditions.

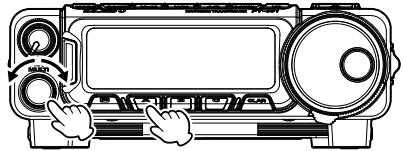
1. Rotate the **MULTI** knob, as needed, until Multi Function Row “**F-03 [ATT] [IPO] [NAR]**” appears on the display.
2. Press the **[A](ATT)** key. The “ATT” indicator will appear in the display.
3. To restore full signal strength through the Attenuator circuit, press the **[A](ATT)** key to return the ATT display to the “OFF” position.



DSP Noise Reduction (DNR)

The Noise Reduction feature of the DSP system may be used to enhance signal-to-noise ratio on weak signals.

1. Rotate the **MULTI** knob, as needed, until Multi Function Row “**F-06 [DNR] [MOX] [CONT]**”.
2. Press the **[A](DNR)** key to activate the DSP Noise Reduction feature.
3. Rotate the **MULTI** knob to find the point where best signal-to-noise ratio is obtained under the current noise conditions.
4. Press the **[F]** key to save the new setting and exit to normal operation.
5. To turn off the DSP Noise Reduction feature, press the **[A](DNR)** key again.
6. If noise is present at a level which causes indication on the S-meter, the performance of the Noise Reduction filter may be enhanced by rotating the SQL/RF (RF Gain) control in a counter-clockwise direction so as to set the (fixed) S-meter reading at the same level as the noise peaks. This adjustment raises the AGC threshold of the receiver.

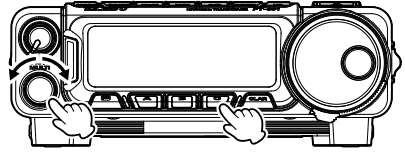


Advanced Operation

Notch Filter

The DSP system's Notch Filter may be helpful in removing one or more offending carrier or heterodyne signals from the audio passband.

1. Rotate the **MULTI** knob, as needed, until Multi Function Row "**F-05 [SHIFT] [WIDTH] [NOTCH]**".
2. Press the **[C](NOTCH)** key to activate the Notch Filter. The "N" icon will appear at the left side of the "DNF" indication, and the "N" notation will appear at the top on the display. You will notice that the audio level of the carrier signal is now being reduced.
3. Rotate the **MULTI** knob to adjust the "null" position of the Notch filter.
4. Press the **[C](DNF)** key once more to turn the Notch Filter off.



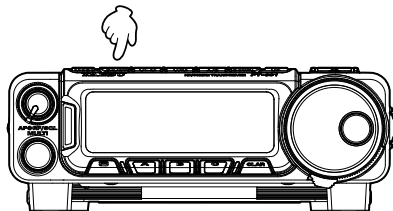
Memory Operation

QMB (Quick Memory Bank) Channels

The “Quick Memory” Bank provides one-touch access to frequencies you want to store and recall in a hurry. You may store a “QMB” channel into a “regular” memory later, if you like; use of the “regular” memories will be described later.

QMB Channel Storage

1. Tune in the desired frequency and set the operating mode and bandwidth. If this is an FM channel, set up any required CTCSS/DCS and repeater shift configurations.
2. Press and hold in the [RC/ST] key until two “beeps” are heard. The second beep (heard one second after the initial beep) provides audible confirmation that the data has been stored into the QMB memory.



QMB Channel Recall

1. Press the [RC/ST] key momentarily to recall the QMB memory. “QMB” will appear in the upper of the display.
2. Press the [V/M] key to return to the previous frequency (either a VFO frequency or a Memory channel).

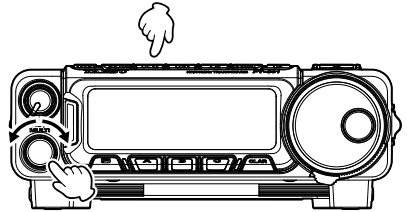
Memory Operation

Memory Operation on “Regular” Memory Channels

Most Memory operation will be conducted in the “regular” memory registers. There are 99 memory channels available for storage and recall of important frequencies.

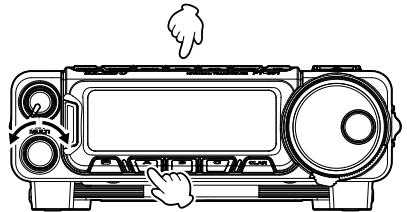
Normal Memory Storage

1. In the VFO mode, select the desired frequency, repeater shift, CTCSS/DCS tone, and TX power level.
2. Press the [V▶M] key momentarily to enter the “Memory Check” mode, which is used to find an unused memory channel. Rotate the **MULTI** knob to select the channel number on which you wish to store the current frequency data.
3. If you just want to program in the frequency data, press and hold in the [V▶M] key for one second until you hear two beeps, a second apart; the second beep confirms that the frequency information was successfully stored.



Memory Channel Recall

1. Press the [V/M] key once to enter the “Memory” mode.
2. Rotate the **MULTI** knob, as needed, until Multi Function Row “F-13 [MCH] [GRP] [MLIST]” appears on the display.
3. Press the [A](MCH) key, then rotate the **MULTI** knob.
4. Press the [A](MCH) key and then rotate the **MULTI** knob to select the desired memory channel.

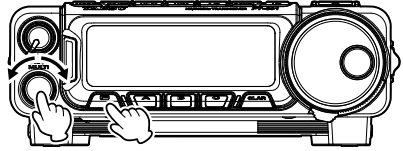


Miscellaneous Settings

Display Contrast

The LCD's contrast may be adjusted using the Menu Mode, as well.

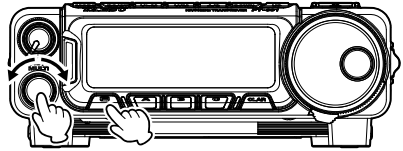
1. Press and hold in the **[F]** key for one second to activate the Menu mode.
2. Rotate the **MULTI** knob to select Menu Mode Menu Mode “**No 02-03 [LCD CONTRAST]**”.
3. Press the **MULTI** knob, and then rotate the **MULTI** knob to adjust the contrast. As you make the adjustment, you will be able to see the effects of your changes.
4. When you have completed the adjustment, press the **[F]** key exit the Menu mode.



Display Dimmer

The LCD illumination level may also be adjusted using the Menu Mode.

1. Press and hold in the **[F]** key for one second to activate the Menu mode.
2. Rotate the **MULTI** knob to select Menu Mode Menu Mode “**No 02-05 [DIMMER LCD]**”.
3. Press the **MULTI** knob, and then rotate the **MULTI** knob to adjust the display illumination for a comfortable brightness level. As you make the adjustment, you will be able to see the effects of your changes.
4. When you have completed the adjustment, press the **[F]** key exit the Menu mode.



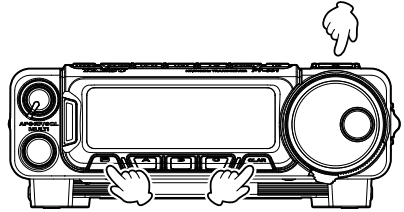
Reset Procedure

In some instances of erratic or unpredictable operation, the cause may be corruption of data in the microprocessor (due to static electricity, etc.). If this happens, resetting the microprocessor may restore normal operation. Note that all memories will be erased if you do a complete microprocessor reset, as described below.

Microprocessor Resetting

To clear all memories and other settings to factory defaults:

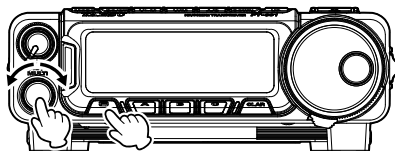
1. Turn the radio OFF.
2. Press and hold the **[F]** and **[CLAR]** keys while turning the radio ON. Once the transceiver comes on, release the buttons.



Setup (Menu) Mode

The FT-891 Setup (Menu) mode, already described in parts of many previous chapters, is easy to activate and setup. The Menus may be used to configure many of transceiver parameters, some of which have not been detailed previously. Use the following procedure to activate the Setup (Menu) mode:

1. Press and hold in the **[F]** key for one second to activate the Menu mode.
2. Rotate the **MULTI** knob to select the Menu Item to be adjusted.
3. Press the **MULTI** knob momentarily to enable adjustment of the selected Menu item, and then rotate the **MULTI** knob to perform the actual adjustment.
4. After completing the selection and adjustment, press the **[F]** key to exit the Setup menu and resume normal operation.



	Menu / Item	Available Values	Default
AGC			
	01-01	AGC FAST DELAY	20 - 4000 msec
	01-02	AGC MID DELAY	20 - 4000 msec
	01-03	AGC SLOW DELAY	20 - 4000 msec
DISPLAY			
	02-01	MY CALL	---
	02-02	MY CALL INDI	0 - 5
	02-03	LCD CONTRAST	1 - 15
	02-04	DIMMER BACKLIT	1 - 4
	02-05	DIMMER LCD	1 - 15
	02-06	DIMMER TX/BUSY	1 - 4
	02-07	PEAK HOLD	OFF/0.5/1.0/2.0 sec
	02-08	ZIN LED	ENABLE/DISABLE
DVS			
	03-01	DVS RX OUT LEVEL	0 - 100
	03-02	DVS TX OUT LEVEL	0 - 100
KEYER			
	04-01	KEYER TYPE	OFF/BUG/ELEKEY-A/ ELEKEY-B/ELEKEY-Y/ACS
	04-02	KEYER DOT/DASH	NOR/REV
	04-03	CW WEIGHT	2.5 - 4.5
	04-04	BEACON INTERVAL	OFF/1 - 690 sec
	04-05	NUMBER STYLE	1290/AUNO/AUNT/A2NO/ A2NT/12NO/12NT
	04-06	CONTEST NUMBER	0 - 9999
	04-07	CW MEMORY 1	TEXT/MESSAGE
	04-08	CW MEMORY 2	TEXT/MESSAGE
	04-09	CW MEMORY 3	TEXT/MESSAGE
	04-10	CW MEMORY 4	TEXT/MESSAGE
	04-11	CW MEMORY 5	TEXT/MESSAGE

Setup (Menu) Mode

Menu / Item		Available Values	Default
GENERAL			
05-01	NB WIDTH	1/3/10msec	1(3msec)
05-02	NB REJECTION	10/30/50dB	1(30dB)
05-03	NB LEVEL	0 - 10	5
05-04	BEEP LEVEL	0 - 100	50
05-05	RF/SQL VR	RF/SQL	RF
05-06	CAT RATE	4800/9600/19200/38400 bps	4800
05-07	CAT TOT	10/100/1000/3000 msec	10
05-08	CAT RTS	ENABLE/DISABLE	ENABLE
05-09	MEM GROUP	ENABLE/DISABLE	DISABLE
05-10	QUICK SPLIT FRE	-20 - 0 - 20 kHz	+5
05-11	TX TOT	OFF/1 - 30 min	OFF
05-12	MIC SCAN	ENABLE/DISABLE	ENABLE
05-13	MIC SCAN RESUME	CAR/5Sec	TIME
05-14	REF FREQ ADJ	-25 - 0 - 25	0
05-15	CLAR MODE SELECT	RX/TX/TRX	RX
05-16	APO	OFF/1h/2h/4h/6h/8h/10h/12h	OFF
05-17	FAN CONTROL	NORMAL/CONTEST	NORMAL
MODE AM			
06-01	AM LCUT FREQ	OFF /100 - 1000	OFF
06-02	AM LCUT SLOPE	-6 / -18	6
06-03	AM HCUR FREQ	700 - 4000 / OFF	OFF
06-04	AM HCUR SLOPE	-6 / -18	6
06-05	AM MIC SELECT	MIC/REAR	MIC
06-06	AM OUT LEVEL	0 - 100	50
06-07	AM PTT SELECT	DAKY/RTS/DTR	DAKY
06-08	AM DATA GAIN	0 - 100	50
MODE CW			
07-01	CW LCUT FREQ	OFF /100 - 1000	250
07-02	CW LCUT SLOPE	-6 / -18	18
07-03	CW HCUR FREQ	700 - 4000 / OFF	1200
07-04	CW HCUR SLOPE	-6 / -18	18
07-05	CW OUT LEVEL	0 - 100	50
07-06	CW AUTO MODE	OFF/50M/On	OFF
07-07	CW BFO	USB/LSB/AUTO	USB
07-08	CW BK-IN TYPE	SEMI/FULL	SEMI
07-09	CW BK-IN DELAY	30 - 3000msec	200msec
07-10	CW WAVE SHAPE	1/2/4/6 msec	4
07-11	CW FREQ DISPLAY	DIRECT F/P OFFSET	PITCH OFFSET
07-12	PC KEYING	OFF/DAKY/RTS/DTR	OFF
07-13	QSK DELAY TIME	15/20/25/30 msec	15
MODE DAT			
08-01	DATA MODE	PSK/OTHERS	PSK
08-02	PSK TONE	1000/1500/2000Hz	1000
08-03	OTHER DISP	-3000 - 0 - 3000 Hz	0
08-04	OTHER SHIFT	-3000 - 0 - 3000 Hz	0
08-05	DATA LCUT FREQ	OFF /100 - 1000	300
08-06	DATA LCUT SLOPE	-6 / -18	18

Setup (Menu) Mode

	Menu / Item	Available Values	Default	
	08-07	DATA HCUT FREQ	700 - 4000 / OFF	3000
	08-08	DATA HCUT SLOPE	-6 / -18	18
	08-09	DATA IN SELECT	MIC/REAR	REAR
	08-10	DATA PTT SELECT	DAKY/RTS/DTR	DAKY
	08-11	DATA OUT LEVEL	0 - 100	50
MODE FM				
	09-01	FM MIC SEL	MIC/REAR	MIC
	09-02	FM OUT LEVEL	0 - 100	50
	09-03	PKT PTT SELECT	DAKY/RTS/DTR	DAKY
	09-04	FM PKT TX GAIN	0 - 100	50
	09-05	RPT SHIFT 28MHz	0 - 1.0MHz	100
	09-06	RPT SHIFT 50MHz	0 - 4.0MHz	1000
	09-07	DCS POLARITY	Tn-Rn/Tn-Riv/Tiv-Rn/Tiv-Riv	Tn-Rn
MODE RTY				
	10-01	RTTY LCUT FREQ	OFF /100 - 1000	300
	10-02	RTTY LCUT SLOPE	-6 / -18	18
	10-03	RTTY HCUT FREQ	700 - 4000 / OFF	3000
	10-04	RTTY HCUT SLOPE	-6 / -18	18
	10-05	RTTY SHIFT PORT	SHIFT/DTR/RTS	SHIFT
	10-06	RTTY POLARITY-R	NOR/REV	NOR
	10-07	RTTY POLARITY-T	NOR/REV	NOR
	10-08	RTTY OUT LEVEL	0 - 100	50
	10-09	RTTY SHIFT FREQ	170/200/425/850 Hz	170
	10-10	RTTY MARK FREQ	1275/2125 Hz	2125
MODE SSB				
	11-01	SSB LCUT FREQ	OFF /100 - 1000	100
	11-02	SSB LCUT SLOPE	-6 / -18	6
	11-03	SSB HCUT FREQ	700 - 4000 / OFF	3000
	11-04	SSB HCUT SLOPE	-6 / -18	6
	11-05	SSB MIC SELECT	MIC/REAR	MIC
	11-06	SSB OUT LEVEL	0 - 100	50
	11-07	SSB PTT SELECT	DAKY/RTS/DTR	DAKY
	11-08	SSB-TX-BPF	1-30/1-29/2-28/3-27/4-26	300-2700
RX DSP				
	12-01	APF-WIDTH	APF-N/APF-M/APF-W	MEDIUM
	12-02	CONTOUR LEVEL	-40 - 0 - 20	-15
	12-03	CONTOUR WIDTH	1 - 11	10
	12-04	IF-NOTCH-WIDTH	NARROW/WIDE	WIDE
SCOPE				
	13-01	SCP START CYCLE	OFF/3/5/10sec	OFF
	13-02	ASC DIAL SPEED	1/2/3/4/5/DISABLE	4
	13-03	SCP SPAN FREQ.	37.5k/75k/150k/375k/750kHz	150kHz
TX AUDIO				
	14-01	EQ1 FREQ	OFF/100 - 700	OFF
	14-02	EQ1 LEVEL	-20 - 0 - 10	+5
	14-03	EQ1 BWTH	1 - 10	10
	14-04	EQ2 FREQ	OFF/700 - 1500	OFF
	14-05	EQ2 LEVEL	-20 - 0 - 10	+5

Setup (Menu) Mode

Menu / Item		Available Values	Default
14-06	EQ2 BWTH	1 - 10	10
14-07	EQ3 FREQ	OFF/1500 - 2000/3200	OFF
14-08	EQ3 LEVEL	-20 - 0 - 10	+5
14-09	EQ3 BWTH	1 - 10	10
14-10	P-EQ1 FREQ	OFF/100 - 700	200
14-11	P-EQ1 LEVEL	-20 - 0 - 10	0
14-12	P-EQ1 BWTH	1 - 10	2
14-13	P-EQ2 FREQ	OFF/700 - 1500	800
14-14	P-EQ2 LEVEL	-20 - 0 - 10	0
14-15	P-EQ2 BWTH	1 - 10	1
14-16	P-EQ3 FREQ	OFF/1500 - 2000/3200	2100
14-17	P-EQ3 LEVEL	-20 - 0 - 10	0
14-18	P-EQ3 BWTH	1 - 10	1
TX GNRL			
15-01	HF TX MAX POWER	5 - 100W	100
15-02	50M TX MAX POWER	5 - 100W	100
15-03	TUNER SELECT	OFF/EXT1/EXT2/ATAS/L.AMP	OFF
15-04	VOX SELECT	MIC/DVOX	MIC
15-05	VOX GAIN	0 - 100	50
15-06	VOX DELAY	30 - 300 - 3000 msec	500msec
15-07	ANTI VOX GAIN	0 - 100	50
15-08	DATA VOX GAIN	0 - 100	50
15-09	DATA VOX DELAY	30 - 300 - 3000 msec	100msec
15-10	ANTI DVOX GAIN	0 - 100	0
15-11	EMERGENCY FREQ	ENABLE/DISALE	DISABLE

Specifications

General

Frequency Range:	Tx 1.8 - 54 MHz (Amateur bands only) Rx 0.03 - 55.999995 MHz
Channel Step:	2/5/10 Hz (SSB, CW) 10/100 Hz (AM, FM)
Frequency Stability:	±0.5 ppm [-4 °F to +140 °F (-20 °C to +50 °C)]
Modes of Emission:	A1A (CW), A3E (AM), J3E (LSB, USB), F3E (FM)
Antenna Impedance:	50 Ohms, unbalanced
Supply voltage:	13.8 V DC ±15%, negative ground
Current Consumption (typical):	Rx: 2.0 A (signal present) Tx: 23 A
Operating Temperature Range:	-14° F to +122° F (-10° C to +50° C)
Case Size (WxHxD):	6.1" x 2.0" x 8.6" (155 x 52 x 218 mm) (w/o knobs)
Weight (Approx.):	4.18 lb (1.9 kg)

Transmitter

Output Power:	100 W
Modulation Type:	J3E (SSB): Balanced, A3E (AM): Low-Level, F3E (FM): Variable Reactance
Maximum Deviation:	±5 kHz (Wide) ±2.5 kHz (Narrow)
Spurious Radiation:	Better than -50 dB (1.8 MHz - 30 MHz Amateur bands) Better than -63 dB (50 MHz Amateur bands)
Microphone Impedance:	600 Ohms (200 to 10 kOhms)

Receiver

Circuit Type:	SSB/CW/AM: Triple-conversion Superheterodyne FM: Double Conversion Superheterodyne
I _{fs} :	SSB/CW/AM: 69.450 MHz/450 kHz/24 kHz FM: 69.450 MHz/450 kHz
Sensitivity:	SSB/CW (S/N 10 dB) 0.158 µV (1.8 - 30 MHz) 0.125 µV (50 - 54 MHz) AM (S/N 10 dB) 5 µV (0.5 - 1.8 MHz) 1.6 µV (1.8 - 30 MHz) 1.25 µV (50 - 54 MHz) FM (SINAD 12 dB) 0.35 µV (29 MHz, 50 - 54 MHz)

Specifications

Selectivity	Mode	-6dB	-60dB
	SSB/CW	2.4 kHz or better	3.6 kHz or less
	CW-N	500 Hz or better	750 Hz or less
	AM	6 kHz or better	15 kHz or less
	FM	12 kHz or better	30 kHz or less
	FM-N	9 kHz or better	25 kHz or less
Maximum AF Output:	2.5 W into 4 ohms with 10% THD		
Audio Output Impedance:	4 to 16 Ohms (8 Ohms: nominal)		
Conducted Radiation:	Less than 4 nW		

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

Note

Note

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

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

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

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

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

DECLARATION BY MANUFACTURER

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

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

CAN ICES-3 (B) / NMB-3 (B)

YAESU

The radio

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