The Nifty! Mini-Manual ™

YAESU FT-891

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Mini-Manual Key			
①	An Informational Item	**Bold Text**	Indicates a LCD legend.
[V/M]	Press a function switch	[Key]2sec	Press Key 2 Seconds
Menu 02-03 DIMMER LCD Indicates a setup menu item. Press [F] 1 second to access the setup menus. See page 19 for accessing menus procedure.			

◆——— Front Panel Controls ———◆

PWR/LOCK Briefly press to lock the tuning dial. Toggles **LOCK** on and off. When enabled, **LOCK** icon appears at left side of the screen.

Pressing for 1-second toggles the power on and off.

FAST Pressing increases the dial's tuning rate. While fast is enabled the **FST** icon appears to the right of the VFO-B frequency.

BAND / MODE Briefly press to bring up the band selection screen where you can select the desired band by rotating the Dial knob. Note: The 5 MHz band is selected via recalling one of the ten 5 MHz channels in the memory channel list.

Pressing for 1-second brings up the mode selection screen where you can select the desired mode of operation.

A / B Briefly pressing exchanges the operating parameters (mode & freq.) of VFO's A and B. (swaps the VFOs)

V/M Toggles the receiver between VFO and Memory modes. If you tune off a memory channel, pressing [**V/M**] again restores the memory freq.

V ▶ M Momentarily pressing displays the memory channel list, highlighting the currently selected memory channel. Rotating [**MULTI**] allows you to scroll through the memory to find an empty channel or a channel you wish to overwrite. Pressing for 1 second (until double beep) copies VFO-A data to the selected memory channel.

M ▶ V Press the key to copy a memory channel's contents to the VFO. Pressing displays the memory channel list, highlighting the currently selected memory channel. Rotate [**MULTI**] to select the channel you wish to copy from. Pressing for 1 second (until double beep) copies the memory channel data to the VFO.

QMB Pressing for 1-second copies the current VFO operating parameters to the Quick Memory Bank. Older entries are pushed off the bottom of the 5 deep memory stack.

Repeated pressing cycles through the five frequencies and modes previously saved in the Quick Memory Bank, sequentially recalling them to the VFO.

RF/SQL RF Squelch knob. Rotating counterclockwise reduces the RF gain. Fully clockwise is maximum gain. Typically this control is used to reduce gain to a point where the background noise is slightly reduced, and perhaps a touch more. Can also operate as a squelch control by using **Menu 05-05** RF/SQL VR to select the squelch function.

MULTI The **MULTI** knob is used to select memory channels, menu items and adjust other settings.

F Pressing the function key rotates through several groups of adjustable parameters: **FUNCTION 1, FUNCTION 2, CW SETTING** in factory default mode. These are the settings that would normally be front panel controls on a base station with a large front panel.

Use the [**MULTI**] knob to point to ▶ a desired function, then press the [**MULTI**] knob to be able to change or adjust the setting. The individual functions are described later during their relevant procedures.

Pressing [**F**] for 1-second accesses the main menu system. Pressing [**F**] again exits the menu system.

A, B, C These are reprogrammable function keys. They can be left in the factory default condition, or be reassigned to any of functions accessible with the [**F**] key: **FUNCTION 1, FUNCTION 2, CW SETTING.**

See the procedure on facing page for re-assigning these functions.

CLAR Pressing [**CLAR**] for 1-second enables the [**MULTI**] knob to tune / offset the receive frequency up to ±9.99 kHz from the currently tuned frequency, allowing you to fine tune a received signal without altering the transmit frequency.

Momentarily pressing enables / disables clarifier operation.

Pressing the [**MULTI**] knob 1second clears any clarifier offset back to zero.

DIAL Rotating changes the frequency, and in certain cases selects functions. The drag lever below the knob can be used to set the amount of friction.

◆—— The A, B, C Soft Key Functions ——◆

ⓘ The three *soft keys* along the bottom of the screen can be reprogrammed to other functions if desired. The default functions presented in SSB or CW modes from left to right are:

- **A / SFT** In SSB and CW modes, I.F. Shift can be used to slide the DSP bandpass filter higher or lower. Sometimes useful in minimizing adjacent frequency interference.
- **B / SCP** Accesses the band scope. See page 19 for scope operation.
- **C / NB** Allows enabling / disabling the impulse noise blanker and adjusting the level of correction being applies.

Changing the Main Soft Key Button Functions at Bottom of the Screen

1. Press the **[F]** key one or more times to select the Function Group containing the function you want to assign to one of the *soft keys*.
2. Use the **[MULTI]** knob to point ▶ to the desired function.
3. Press the **A**, **B** or **C** key you want to assign the function to for 1 second.

Enabling additional Function Groups

ⓘ In addition to the three basic function groups: **FUNCTION 1**, **FUNCTION 2**, **CW SETTING**, up to three additional groups can be added depending upon your operating preferences:

- **FM SETTING** Contains FM repeater related settings. **Menu 05-10**.
- **REC SETTING** Voice message recording (CQ, etc) **Menu 05-11**.
- **ATAS SETTING** Adjustment of ATAS antenna SWR **Menu 05-12**.

1. Access the referenced menu to enable or disable any of the above function groups.

◆—— Setting the Band, VFO Frequency and Operating Mode ——◆

Selecting an Amateur Band

1. Press **[BAND/MODE]** to access the band selection screen.
2. Within 3 seconds rotate the DIAL to highlight the desired band. The operating mode and frequency last used on that band will be recalled.

A and B VFO Operation

ⓘ While the radio has two VFO's, A & B, it only has one receiver. When operating simplex, both receive and transmit are on VFO-A. When operating split, VFO-A is used for the receive frequency and VFO-B for transmit.

Selecting the Operating Mode

1. To select a desired mode of operation, press **[BAND/MODE]** 1 second to access the mode selection screen.
2. Within 3 seconds rotate the DIAL to highlight the desired mode.

Setting the VFO Frequency

ⓘ There are a variety of methods for setting a frequency into the VFO:

- Turning the Dial in either normal or **FAST** mode
- Using the microphone **[DWN]** / **[UP]** and **[FST]** (fast) keys.
- Recalling from a Memory Channel (see page 15)
- Recalling from the **QMB** memory stack, "scratch pad memory" (page 16)

VFO-A Dial Frequency Tuning

1. Rotate the Dial to tune the frequency.
ⓘ Pressing **[FAST]** increases the tuning rate.

Using the MULTI knob to Tune the VFO in Large Increments

ⓘ Depending upon the mode, the **MULTI** knob can be used in in step sizes that are in multiples of a kHz.

1. If necessary press **[MULTI]** to select either VFO-A or VFO-B.
2. Rotate **[MULTI]** to rapidly tune across the band.

ⓘ If the frequency is not changing when rotating **[MULTI]**, press **[MULTI]** one or more times to restore the VFO tuning function.

ⓘ If desired the default tuning rate (the step size, which is different for different operating modes) can be changed via the following menus:

- **14-01 QUICK DIAL** (sets the step size for SSB, CW, RTTY and DATA)
- **14-06 AM CH STEP** (sets AM mode step size)
- **14-07 FM CH STEP** (sets FM mode step size)

Using Microphone [DWN] / [UP] keys to Change the Frequency

ⓘ If your mic has [DWN] / [UP] keys, they can be used to adjust the frequency.

1. Momentarily press the keys to adjust the frequency, or hold them to start scanning. Press the keys again to halt scanning.

ⓘ Pressing [FST] on the Mic increases the tuning rate.

◆——— **Improving Reception: Filters, IPO, Atten, DNR, Contour** ———◆

IPO, Intercept Point Optimization, Background Noise Reduction

ⓘ **IPO** bypasses the RF preamplifier and when background noise levels are high when operating below 20 meters can be engaged to improve signal reception.

1. Press [F] as required to select the **FUNCTION-1** screen.
2. Rotate the [MULTI] knob to point to **IPO**.
3. Press the [MULTI] knob to enable IPO operation. (**IPO** background turns dark)
4. Press [F] 1-second to exit the function screen.

ⓘ With RF gain ([RF/SQL] knob) set for maximum (fully counter-clockwise) and you can still hear background band noise on a clear frequency when IPO is engaged, the RF preamplifier is typically not needed.

ATT, RF Attenuator and Background Noise Reduction

ⓘ <u>If enabling IPO is insufficient</u> and the desired signal is sufficiently strong, the RF Attenuator can be used to minimize overloading and background noise.

ⓘ It can also be enabled when receiving extremely strong signals reading in excess of +20dB on the S-Meter.

1. Press [F] as required to select the **FUNCTION-1** screen.
2. Rotate the [MULTI] knob to point to **ATT**.
3. Press the [MULTI] knob to enable attenuation. (**ATT** background turns dark)
4. Press [F] 1-second to exit the function screen.

ⓘ If background noise is high and deflecting the S-meter, first set **IPO** on. If background noise is still high, then attenuation can be added to further reduce the level of background noise.

Setting RF Gain

ⓘ In addition to using IPO and Attenuation, the **RF GAIN** control can also be used to minimize background noise and low-level QRM. For maximum sensitivity, the control should be in the fully clockwise position.

1. Rotate the [RF GAIN] knob counter-clockwise until it holds the signal bar steady at a point about equal to or just a "touch above" the S-meter's reading of the background noise level.

AGC, Automatic Gain Response Selection

1. Press [F] as required to select the **FUNCTION-2** screen.
2. Rotate the [MULTI] knob to point to **AGC**.
3. Press the [MULTI] knob to enable AGC operation and then rotate the [MULTI] knob to select either: **AUTO, FAST, MID** or **SLOW** response times.

ⓘ Leaving the [AGC] function set to **AUTO** is adequate for most purposes.

ⓘ If the AGC "hangs" too long, blanking reception after strong pulses of interference, try switching to a faster AGC setting.

4. Press [F] 1-second to exit the function screen.

DNR, Digital Noise Reduction

ⓘ Digital noise reduction is designed to reduce background noise and hiss. DNR reduction is settable to one of fifteen different noise reduction settings.

1. Press [F] as required to select the **FUNCTION-2** screen.
2. Rotate the [MULTI] knob to point to **DNR**.
3. Press the [MULTI] knob to enable **DNR** operation and then rotate the [MULTI] knob to select a noise reduction level.

ⓘ Slowly change the setting. To fully assess how effective a setting is allow a couple of seconds for the DSP to fully "acclimate" at each setting.

ⓘ You might find it helpful to assign the DNR function to one of the function keys along the bottom of the screen (**A, B, C**). See page 3.

Digital Notch Filter, DNF, Automatically Minimizing Multiple Interfering tones

ⓘ The **DNF** digital notch filter can automatically null out a number of different tones at the same time. There are no adjustments required when using DNF.

1. Press [F] as required to select the **FUNCTION-2** screen.
2. Rotate the [MULTI] knob to point to **DNF**.

3. Press the [**MULTI**] knob to enable **DNF** operation.
4. Press [**F**] 1-second to exit the function screen.
   ① If necessary, **Menu 12-04 IF NOTCH WIDTH** can be used to select between **NARROW** and **WIDE** notch filter widths.

Using WIDTH control to combat adjacent signal interference
   ① The **WIDTH** function allows you to either <u>reduce or increase</u> the width of the IF passband. During low interference situations, increasing the passband width can enhance signal quality. The display graphically and numerically indicates width changes as they are made.

1. Press [**F**] as required to select the **FUNCTION-1** screen.
2. Rotate the [**MULTI**] knob to point to **WDH**.
3. Press the [**MULTI**] knob to enable **WDH** operation.
4. Narrower widths can be selected by selecting and enabling the [**NAR**] function and then going back to [**WDH**] to adjust the narrow bandwidth setting. (Widths as narrow as 50 Hz are possible in CW and digital modes.)
   ① The **WIDTH** control function can be used in all modes except AM and FM.
4. Press [**F**] 1-second to exit the function screen.

NAR, Narrow IF Filter Selection for reducing signal interference
   ① The [**NAR**] function provides a fast way of selecting a narrow IF bandwidth.

1. Press [**F**] as required to select the **FUNCTION-1** screen.
2. Rotate the [**MULTI**] knob to point to **NAR**.
3. Press the [**MULTI**] knob to enable **NAR** operation.
   ① The resulting bandwidth can be seen by activating the [**WDH**] function / graphic.
4. Press [**F**] 1-second to exit the function screen.

Using the SHIFT control to combat adjacent signal interference
   ① The **SHIFT** knob moves the position of the IF passband relative to the current frequency in an effort to avoid adjacent signal interference.

1. If the factory defaults are in effect for the *soft key* keys, press [**A/ SFFT**] and use the [**MULTI**] knob to find a point of optimum reception.
2. If the [**A/ SFFT**] key was reprogrammed to something else, press [**F**] as required to select the **FUNCTION-1** screen and enable the [**SFT**] function from there.
   ① The **SHIFT** control function can be used in all modes except AM and·FM.

Combining SHIFT and WIDTH functions
   ① Rather than relying on just one control, combining these two functions so they work together can dramatically reduce adjacent signal QRM and can be a significant help in pulling-in weak signals.

CONTOUR, Enhancing the sound and readability of a signal
   ① The Contour control is used to alter filter shaping within the passband to improve reception by suppressing or enhancing certain frequency components.

1. Press [**F**] as required to select the **FUNCTION-2** screen.
2. Rotate the [**MULTI**] knob to point to **CNT**.
3. Press the [**MULTI**] knob to enable **CNT** operation and then adjust the [**MULTI**] knob to optimize audio quality.
   ① The [**MULTI**] knob "slides" a low-Q (a relatively broad and shallow) notch filter along the passband response curve. Frequently the optimal effect will be obtained at one or the other shoulders of the passband.
      Menu 12-02 CONTOUR LEVEL can be used to adjust the amount of the effect and **Menu 12-03 CONTOUR WIDTH** can be used to adjust the bandwidth of the effect.
4. Press [**F**] 1-second to exit the function screen.

NB, IF Noise Blanker reduction of impulse / ignition noise
   ① The noise blanker is used to reduce short-duration noise impulses generally caused by switching transients, ignition systems and noisy power lines.

1. Press [**F**] as required to select the **FUNCTION-1** screen.
2. Rotate the [**MULTI**] knob to point to **NB**.
3. Press the [**MULTI**] knob to enable **NB** operation and then adjust the [**MULTI**] knob to set the noise blanker level.
4. Press [**F**] 1-second to exit the function screen.

APF, CW Mode Audio Peaking Filter

ⓘ In CW mode, a narrow bandwidth audio peaking filter can be used to improve the legibility of CW signals that are weak or suffering from interference.

1. Press [F] as required to select the **FUNCTION-3** screen.
2. Rotate the [MULTI] knob to point to **APF**.
3. Press the [MULTI] knob to enable **APF** operation and then if necessary adjust the [MULTI] knob to optimize signal peaking. (If signal was accurately centered, the optimum setting should be very close to zero Hz offset.)

ⓘ Normally it is adequate to leave the **APF** filter centered for a accurately spotted signal. However if **RX CLAR** offset has been applied to tune in a signal that is slightly off your transmit frequency, the APF filter may need to be adjusted to line up on the offset signal.

4. By using **Menu 12-01 APF WIDTH** the width of the peaking filter can be optimized between: **NARROW**, **MEDIUM** and **WIDE**.

◆── Adjusting Audio Passband Filtering ──◆

ⓘ The receiver's <u>audio</u> passband filter settings can be used to custom tailor audio frequency response to your liking. Separate sets of menu settings are provided for the AM, SSB, CW, DATA and RTTY operating modes.

ⓘ For each of the above operating modes four filter parameters can be set:
- **Low Cut**   Sets the low cutoff frequency of the audio passband.
- **Low Cut Slope**   Sets the slope (steepness) of the low cut filter
- **High Cut**   Sets the high cutoff frequency of the audio passband.
- **High Cut Slope**   Sets the slope (steepness) of the high cut filter

ⓘ The most important parameters are the low and high cut frequencies, which sets the overall audio passband width. The slope sets how steep the filter skirts are and can be set to **6db/oct** for a soft skirt, or to **16db/oct** for a sharp skirt.

ⓘ The default parameter settings are usually adequate, but they can be tuned to suit your preference to enhance audio quality or to improve noise reduction.

ⓘ Use these sets of menus to make adjustments to the audio passband.
- **AM** mode   **Menu** items **06-01** through **06-04**
- **CW** mode   **Menu** items **07-01** through **07-04**
- **DATA** mode   **Menu** items **08-05** through **10-08**
- **RTTY** mode   **Menu** items **10-01** through **10-04**
- **SSB** mode   **Menu** items **11-01** through **11-04**

◆── Antenna Tuner and Checking SWR ──◆

ⓘ As the FT-891 does not have an internal tuner, an optional external tuner will need to be connected before tuning operations can be performed.

Tuner Type Selection

1. Access **Menu 16-15 TUNER SELECT** to select among the following options:
- **OFF**   Tuner operation is inhibited.
- **EXTERNAL**   Used with the Yaesu FC-40 and FC-50 external tuners.
- **ATAS**   Use when a Yaesu ATAS-120A external tuner is being used.
- **LAMP**   When an external linear amp is being used that requires the use of the **TUN/LIN** jack on the rear panel.

Tuner Operation

ⓘ An optional external tuner is required for tuner operation

1. Press [F] as required to select the **FUNCTION-1** screen.
2. Rotate the [MULTI] knob to point to **TNR**.
3. Press the [MULTI] knob 1-second to start the tuning operation.
4. If you need to terminate the tuning process before it has completed, press the [MULTI] knob again.

ATAS-120A Manual Tuner Operation

ⓘ Use the following procedure to manually tune the ATAS-120A tuner.

1. Access **Menu 05-12 ATAS SETTING** and set it to **ENABLE** to enable manual tuning.
2. To start tuning, press and hold the PTT switch to start transmitting.
3. Rotate the [MULTI] knob to select either [▲] or [▼] and then press and hold the [MULTI] knob to adjust the antenna for minimum SWR.

Setting the Power Output Level

1. As the FT-891 lacks a front panel power control knob, the menu system is used to separately set the power output for different bands and modes of operation using these six **Menus**:

   - **16-01 HF SSB PWR**   HF Band SSB mode, settable 5 to 100 watts
   - **16-02 HF AM PWR**   HF Band AM mode, settable 5 to 40 watts
   - **16-03 HF PWR**   HF Band CW, Data, FM modes, settable 5 to 100 watts
   - **16-04 50M SSB PWR**   50MHz Band SSB mode, settable 5 to 100 watts
   - **16-05 50M AM PWR**   50MHz Band AM mode, settable 5 to 40 watts
   - **16-06 50M PWR**   50MHz Band CW, Data, FM, settable 5 to 100 watts

2. While transmitting the power output level can be displayed by using the [**MTR**] function in **FUNCTION** group **2** and selecting the [**PO**] option.

Setting SSB Operation Microphone Gain

ⓘ There are independent microphone gain menu-settings for the SSB, AM and FM modes of operations.

1. Using the [**MTR**] function in **FUNCTION** group **2** enable the [**ALC**] metering option.

2. While monitoring the ALC meter, in SSB mode press the microphone's **PTT** switch and while speaking normally verify that the meter bar is deflecting within the ALC range, and not exceeding it. The distance the microphone is from your lips is critical.

3. If microphone gain is either too low or too high, access **Menu 16-07 SSB MIC GAIN** and make an adjustment in the right direction. Since you can't see the ALC meter while making the adjustment, you need to guess at the correction amount and then exit the menu system and repeat steps 2 and 3 until proper microphone gain is achieved.

Setting up for VOX, Voice Operated Transmit, (for SSB, AM, FM operation)

1. It's best to use headphones for VOX operation, but if using an external speaker, make sure it's adjusted for a normal volume level before starting the procedure.

2. Before continuing, set SSB microphone gain as described above.

3. Press [**F**] as required to select the **FUNCTION-1** screen.

4. Rotate the [**MULTI**] knob to point to **VOX**.

5. Press the [**MULTI**] knob 1-second to enable **VOX** operation.

6. Access **Menu 16-17 VOX GAIN** to be able to adjust VOX sensitivity.

7. Without using PTT, speak normally into the microphone.

8. Adjust the **VOX GAIN** so that transmission starts reliably when you begin speaking. To minimize false triggering by background noises, use as low a gain setting as possible.

9. Once VOX gain has been set, access **Menu 16-18 VOX DELAY** to set the hang time.

10. Speaking intermittently to create pauses, set **VOX DELAY** for a convenient amount of transmit hang time before transmission drops out

11. To prevent accidental transmissions caused by audio feedback from the speaker, the Anti-VOX trip level can be adjusted via **Menu 16-19 ANTI VOX GAIN**.

ⓘ Note: **Menu 16-16 VOX SELECT** selects the source of VOX activation: Mic. or AFSK Data.

◆——— Improving TX Audio Quality: Compressor, Equalizer & BW ———◆

Monitoring Your Transmitted Signal

ⓘ The RF Monitor allows you to hear the quality of your transmitted signal. The RF Monitor is helpful in verifying general audio quality and optimizing SSB Processor and TX Equalizer settings. Its best to use headphones to monitor.

1. Press [F] as required to select the **FUNCTION-1** screen.
2. Rotate the [MULTI] knob to point to **MON**.
3. Press the [MULTI] knob 1-second to enable the RF Monitor.
4. While transmitting use the [MULTI] knob to set a comfortable monitoring volume.

Microphone Tone Selection

ⓘ If your mic has a tone selection switch, set it as desired before making the following adjustments.

ⓘ You can use the RF Monitor to evaluate the effect of Tone Select settings.

Setting the SSB Speech Processor Compression Level

ⓘ Set SSB mic gain (procedure above) and Microphone Equalizer (procedure below) settings before adjusting SSB Speech Processor gain as there is some interaction with these adjustments.

1. Press [F] as required to select the **FUNCTION-2** screen and enable the [PRC] / speech processor function.
2. Press [F] as required to select the **FUNCTION-1** screen and use the [MTR] function in **FUNCTION** group **1** to enable the [COMP] / compression metering option.
3. Exit the **FUNCTION-1** screen, returning to the normal operating screen to monitor the compression level meter.
4. Press the microphone's **PTT** switch and while speaking normally watch the **CMP** meter taking note of compression level peaks. A compression level setting that keeps voice peaks within the 5 to 10dB level generally works well.
5. If the compression level needs to be adjusted, press [F] as required to select the **FUNCTION-2** screen and turnoff and re-enable the [PRC] /speech processor function to be able to use the [MULTI] knob to adjust the PROC level.
6. Repeat steps 3 through 5 as required to achieve the desired amount of speech compression.

ⓘ Its very helpful to use the RF Monitor (see above) to verify the effect of voice processor settings. While monitoring, switch [PRC] on and off to compare the difference between normal and compressed audio quality.

ⓘ Be careful not to use too much compression, only a few dB are required to boost intelligibility, beyond that the tendency is to pick up lots of background noise: fans, etc. which can easily be evaluated using the RF Monitor.

Enhancing Transmit Audio with the Microphone Equalizer (SSB, AM & FM)

ⓘ The FT-891 has a transmit audio equalizer which lets you adjust the gain / attenuation of your signal over the low, medium and high frequency ranges. The following parameters for each of these frequency ranges are user adjustable.

- **Center Frequency** Center frequency to which **Level** and **Gain** are applied.
- **Bandwidth** A bandwidth factor of 1~10 sets the range of frequencies that will be affected by the **Gain** setting.
- **Level** The gain or attenuation applied to each of the ranges. (-20 to +10 dB)

ⓘ If your mic has a tone selection switch, set it as desired before making adjustments.

ⓘ There are two sets of the above described microphone audio equalizer menus, one for use when the speech processor is off (i.e. normal operation), and one when the speech processor is on. Each set consists of nine menu settings.

1a. For <u>Processor Off</u> equalization, in **FUNCTION-2** enable [MEQ] function.
1b. For <u>Processor On</u> equalization, in **FUNCTION-2** enable [MEQ] and in **FUNCTION-1** the [PRC] function.
2. Use the Monitor function as described above to evaluate your settings.
3. Make equalizer adjustments using the following sets of menus:
   - **Processor Off** Menu 121 PRMTRC EQ3 FREQ thru Menu 129 PRMTRC EQ3 BWTH
   - **Processor On** Menu 130 P-PRMTRC EQ1 FREQ thru Menu 138 P-PRMTRC EQ1 BWTH

ⓘ In Summary: There are **9** menus each for Processor On and Off. Three menus (**EQ1, EQ2, EQ3 FREQ**) adjust the center frequency for each of the 3 ranges. The (**EQ1, EQ2, EQ3 LEVEL**) menus adjust the gain / attenuation, and the (**EQ1, EQ2, EQ3 BWTH**) menus set the bandwidth factor for each of the 3 ranges.

① For simplicity in optimizing audio equalizer settings for your voice, leave the three bandwidth settings (**EQ1**, **EQ2**, **EQ3 BWTH**) at their default values, only adjusting the center frequencies and gain levels. For greater simplification, only adjust the gain levels, leaving center frequencies and bandwidths alone.

① Either use the RF Monitor function (see above), or use a second receiver to verify the effect of voice processor settings. A second receiver can easily be used by placing a dummy load on the FT-891, which will keep the transmitted signal from overloading the second receiver.

Adjusting SSB Transmit Bandwidth

① By use of DSP filtering, the bandwidth of your <u>transmitted</u> SSB signal is normally limited to 2.4 kHz . However, by using **Menu 11-09** SSB TX BPF you can select one of the following alternative bandwidth settings.

- 100 to 3,000 Hz   (2.95 kHz BW) -- Max Width - highest fidelity
- 100 to 2,900 Hz   (2.80 kHz BW)
- 200 to 2,800 Hz   (2.60 kHz BW)
- 300 to 2,700 Hz   (2.40 kHz BW) -- The default / normal setting
- 400 to 2,600 Hz   (2.20 kHz BW) -- Min Width - may help DX "punch"

① Note: Using the RF Monitor can help evaluate the effect of these adjustments. Settings that allow a broader range of low-end frequencies may increase susceptibility to low frequency rumble problems. (Fans, 60 Hz pickup, etc.)

① If your mic has a tone selection switch, set it as desired before making adjustments. If you are using the microphone equalizer, as described above, engage it as well before making your final adjustments.

◆—— **Using the Voice Message Memories** ——◆

① The FT-891 has five voice memories capable of holding a maximum of 20 seconds of audio each. These are used for calling CQ, giving reports, etc..

① Voice memories can be accessed and controlled via buttons in the **REC SETTING** Function Group, or with the optional FH-2 remote keypad.

Enabling the REC SETTING Function Group

1. If the **REC SETTING** function group is not accessible by pressing [**F**] one or more times, use **Menu 05-11** REC SETTING to **ENABLE** it.

Making a Voice Message Recording

1. Select either a LSB, USB or AM mode of operation. (Not FM)
2. Using the **REC SETTING** function group, use the [**MULTI**] knob to point to [**MEM**].
3. Press [**MULTI**] and a blinking **REC** indicator will appear.
4. Rotate [**MULTI**] to select a desired memory channel location: [**CH1**] to [**CH5**] and press [**MULTI**].
5. Within 5 seconds, momentarily press PTT and start making your recording. The **REC** indicator will stop blinking and stay on.
6. When finished, press [**MULTI**] to terminate the recording and play it back.

Checking / Playback of Your Recording

1. Using the **REC SETTING** function group, rotate [**MULTI**] to select the same channel number key you used for recording: [**CH1**] to [**CH5**] and press [**MULTI**], or if using the *FH-2 Remote Keypad* press [**1**] to [**5**].
2. Use **Menu 03-01** DVS RX OUT LEVEL to adjust the <u>playback audio level</u>.

Making a Voice Message Recording using the Optional FH-2 Keypad

1. Select either a LSB, USB or AM mode of operation.
2. Using the *FH-2 Remote Keypad*, press [**MEM**] and then select a desired memory channel location: [**1**] to [**5**]. (A blinking **REC** indicator will appear)
3. Within 5 seconds, momentarily press PTT and start making your recording.
4. When finished, press [**MEM**] again to terminate your recording.

Transmitting a Recorded Voice Message

1. Select either a LSB, USB or AM mode of operation. (Not FM)
2. Using the **REC SETTING** function group, use the [**MULTI**] knob to point to [**PB**], playback, then press [**MULTI**].
3. Rotate [**MULTI**] to select a memory channel location: [**CH1**] to [**CH5**] and press [**MULTI**] to start transmitting the message. (or using the *FH-2 Remote Keypad* press [**1**] to [**5**]).
4. Transmission can be truncated by pressing the [**MULTI**] knob.

Adjusting the Transmit Level for use with Recorded Voice Messages

1. Using the [MTR] function in FUNCTION group 2 enable the [ALC] metering option.
2. Return to the REC SETTING function group and start transmitting the voice message as described above.
3. Quickly press [CLAR] and verify that the meter bar is deflecting within the ALC range, and not exceeding it.
4. If voice level adjustment is necessary, access Menu 03-02 DVS TX OUT LEVEL and make an adjustment in the right direction. Since you can't see the ALC meter while making the adjustment, you need to guess at the correction amount and then exit the menu system and repeat steps 2 and 3 until proper ALC operation is achieved.

◆── **CW Operation and Keyer Setup** ──◆

Paddle or Straight Key Selection

1. To enable CW mode press [BAND/ MODE] 1 second and then rotate the DIAL to select [CW] operation.
2. To enable the internal electronic keyer, in the CW SETTING function group enable the [KEYER] function.
ⓘ When KEYER is turned off, straight key operation is enabled.
ⓘ To correct a paddle operating "opposite" of what you want, do the following:
3. To set paddle wiring normal or reverse use Menu 04-02 KEYER DOT/DASH.

Enabling the CW Sidetone and setting the Pitch & Volume

1. In FUNCTION group 1 enable the [MONI] function and while MONITOR is being displayed rotate the [MULTI] knob to adjust the audio level while keying.
2. The CW sidetone frequency can be adjusted in the CW SETTING function group by selecting [PITCH] and rotating the [MULTI] knob.

Selecting Electronic Keyer Operating Mode

1. To set the keying type use Menu 04-01 KEYER TYPE to select one of these options.

Option	Key Type Menu Options Description
OFF	Use this option when a "straight key" is connected.
BUG	Electrical simulation of a mechanical Bug. Manual dashes, auto dots
ELEKEY-A	Depressing both paddles produces alternating dots & dashes
ELEKEY-B	Same as Mode A, except one more element is sent on releasing paddles
ELEKEY-Y	Same as Mode B, except after completing a dash the auto dot is not sent
ACS	Same as Mode-B — With ACS

ⓘ **ACS**, Automatic Character Spacing ensures that the spacing between characters will be at least the same length as a dash.

Enabling CW Transmit

1. To enable CW mode press [BAND/ MODE] 1 second and then rotate the DIAL to select [CW] operation.
2. To enable transmission, in the CW SETTING function group enable the [BK-IN] function.

Adjusting CW Settings or Practicing CW Without Transmitting

1. To make keying adjustments without transmitting, leave [BK-IN] turned off.

Setting the Keyer Speed

1. Set the CW keying rate in the CW SETTING function group using the [SPEED] function.

Selecting Semi or Full Break-in

1. Use Menu 07-08 CW BK-IN to select either SEMI or FULL break-in operation.
ⓘ Full break-in allows you to hear signals in the spaces between dots and dashes.

Setting the Semi Break-in Keyer Delay

1. Use Menu 07-09 CW BK-IN DELAY to adjust the transmit "hang time".

Selecting Keyer Dot and Dash Weighting

1. Use Menu 04-03 CW WEIGHT to set the dot to dash weighting, adjustable from 2.5 to 4.5. The default is 3.0, which is the "normal" CW dot to dash ratio.

Automatic CW Signal Tuning / Zero Beating

1. After tuning to a CW signal, while it's still active access the **CW SETTING** function group, selecting the [**ZIN**] function and pressing the [**MULTI**] knob.

ⓘ You might find it helpful to assign the [**ZIN**] function to one of the function keys along the bottom of the screen (**A**, **B**, **C**). See page 3.

Enhancing the Signal using Contour and the Audio Peaking Filter, APF

ⓘ Refer to page 5 for instructions on using Contour and the APF filter.

Enabling CW while in SSB Mode

1. To enable keying while operating in SSB mode, access **Menu 07-06 CW WEIGHT** and set it **ON**, which is the factory default setting.

◆—— CW Memory Keyer Operation ——◆

Setting CW Memory Storage Type

ⓘ Five CW Memories with a capacity of 50 characters each are available.

ⓘ There are two different methods for programming the memories: using a paddle, or by selecting text characters via the [**MULTI**] knob. Using a paddle is fast, however, to insert an auto incrementing contest number you must use the text method.

ⓘ To be able to program the CW keyer memories, they must be pre-configured to accept either paddle entry, or text entry via the [**MULTI**] knob.

1. Access the following keyer memories, setting them either to **TEXT** for text entry with the [**MULTI**] knob; or to **MESSAGE** to use the paddle entry method.
   - **Menu 04-07 CW MEMORY 1**
   - **Menu 04-08 CW MEMORY 2**
   - **Menu 04-09 CW MEMORY 3**
   - **Menu 04-10 CW MEMORY 4**
   - **Menu 04-11 CW MEMORY 5**

Using a Paddle to Program a Message Into Memory

1. Set CW memory type to **MESSAGE** to specify paddle entry, as described above.
2. Enable CW mode by pressing [**BAND/ MODE**] 1 second and then rotate the **DIAL** to select [**CW**] operation.
3. In the **CW SETTING** function group disable the [**BK-IN**] function to prevent transmission.
4a. Using the **REC SETTING** function group, enable [**MEM**] and then select a desired memory channel location: [**CH1**] to [**CH5**]. (A blinking **REC** indicator will appear) Then press [**MULTI**] to start recording.
4b. Using the optional *FH-2 Keypad*, press [**MEM**] and then press a desired memory channel key: [**1**] to [**5**]. (A blinking **REC** indicator will appear)
5. Record the message with your CW paddle.
6. To terminate the recording, press [**MULTI**], (or using the *FH-2*, press [**MEM**] 1sec) to save the message.
7. To check the message, with the same channel still selected, press [**MULTI**], or if using the *FH-2 Remote Keypad* press [**1**] to [**5**].

Using the MULTI knob to Program a Text Message Into Memory

1. Set CW memory type to **TEXT** to specify paddle entry, as described above.
2. Enable CW mode by pressing [**BAND/ MODE**] 1 second and then rotate the **DIAL** to select [**CW**] operation.
3a. Using the **REC SETTING** function group, enable [**MEM**] and then select a desired memory channel location: [**CH1**] to [**CH5**] and the CW memory list will appear. Then press [**B/ EDT**] to start entering text.
3b. Using the *FH-2 Keypad*, press [**MEM**] and then select a desired memory channel location: [**1**] to [**5**].
4. Rotate the [**MULTI**] knob to select a text character, press [**MULTI**] to enter the character.
5. Rotate the [**MULTI**] knob to the next position and press [**MULTI**] again.
6. Repeat steps 4 and 5 until the entire message is entered.

ⓘ To clear a character once it has been selected press [**B/ CE**].

ⓘ Prosigns are entered using letters: $\overline{AS}$= **&**, $\overline{KN}$= **(**, $\overline{AR}$= **+**, $\underline{BT}$= **"="**

7. After your text is entered, enter the **}** character to mark the end of the message.
8. Press [**C/ ENT**] (or using the *FH 2* press [**MEM**]1sec) to save the message.
9. Press [**BCK**] to return to the CW message list.
10. To check the message while in the CW message list, press [**PLY**].

Audibly checking a programmed message without transmitting

1. To enable CW mode press [BAND/ MODE] 1 second and then rotate the DIAL to select [CW] operation.
2. To disable transmission, in the CW SETTING function group disable the [BK-IN] function.
3a. In the REC SETTING function group select a desired memory channel location: [CH1] to [CH5] and then press [MULTI] to play the message.
3b. Using the *FH-2 Keypad*, press the memory channel: [1] to [5].

Transmitting a pre-programmed Keyer message

1. If necessary, enable CW transmission by enabling the [BK-IN] function in the CW SETTING function group.
2a. In the REC SETTING function group select a desired memory channel location: [CH1] to [CH5] and then press [MULTI] to play the message.
2b. Using the *FH-2 Keypad*, press the memory channel: [1] to [5].

Programming a Contest Number into a CW Memory Message

ⓘ When programming the memory using the [MULTI] knob text entry method, place the **#** character at the point you wish to insert the contest number. Initially the number starts out as **000** and increments by one each time the memory is played.

Setting an arbitrary contest number (or Viewing the contest number)

ⓘ Useful for either viewing, setting or adjusting the contest number.
1. Access Menu 04-06 CONTEST NUMBER to set a contest number.
ⓘ The number showing is the next one to be transmitted.
2. The [MULTI] knob can be used to change the number.

Incrementing the Contest Number

ⓘ Each time the Contest Number Memory is sent, the number is automatically incremented, including, if the number message is checked without transmitting.

Decrementing the Contest Number

1a. If the contest number gets ahead, using the *FH-2 keypad* press [DEC].
1b. Without the *FH-2 keypad*, access the REC SETTING function group, point to [DEC] and then press [MULTI] to decrement the count one or more times.

Selecting the contest number short cut style and length

ⓘ Short cuts can be configured for the contest number (e.g. T for 0, and N for 9).
1. Access Menu 04-05 NUMBER STYLE to select your preferred settings.
   - **1290** is the default setting and selects normal numbers, no short cuts.
   - **12NT** selects "N" for nine and "T" for zero.
   - Other settings are possible, refer to the Yaesu manual.

◆—— AM Mode Transmission ——◆

Selecting AM Mode Operation

1. Enable AM mode by pressing [BAND/ MODE] 1 second and then rotate the DIAL to select [AM] operation.

Setting the AM Power Level

ⓘ To prevent overheating of the final amplifier AM mode output power is limited 40 watts.
1. To set the power level access Menu 04-06 HF AM PWR and use the [MULTI] knob to set the desired power output level: **5** to **40** watts.

Setting AM MIC Gain

ⓘ Proper setting of the MIC Gain is essential for avoiding AM over modulation. Unfortunately, Yaesu does not provide any guidance on how to do it with the FT-891. If you have a way of measuring AM modulation you might want to check it.
1. To set AM mode microphone gain, access Menu 16-08 AM MIC GAIN and use the [MULTI] knob to adjust the gain setting.

Checking Transmit Audio Quality

ⓘ You can use the RF Monitor to evaluate your transmitted signal. See page 8.
ⓘ The MIC EQ function can also be used with AM operation. Refer to page 8 for the equalizer adjustment procedure.

Modifying AM Mode Received Audio Passband Filtering

ⓘ Refer to page 6 for the audio passband filter adjustment procedure and the menus to use.

◆—— 60-Meter Band Operation ——◆

ⓘ Operation on the 60-Meter band is limited to 5 specific frequencies. The FT-891 uses two sets of 5 factory-programmed memory channels for operating on this band. One set is preset for USB operation (**501 ~ 505**) and another set of five is preset for CW operation (**506 ~ 510**).

Selecting a 60-Meter Operating Frequency (U.S. and UK versions only)

1. Press [**V/M**] to enter memory mode. (**Mxx** is displayed at upper left.)
2. Rotate [**MULTI**] knob to select one of the pre-programmed 60-meter memory channels: **501 ~ 505** for USB, or **506 ~ 510** for CW. (These channels are located just before memory channel **M01**.)

ⓘ By regulation, operation is limited to no more than 100 Watts PEP of effective radiated power - ERP. (You need to account for antenna gain in the calculation.)

◆—— Operating Split ——◆

Enabling Split and Copying VFO-A settings to VFO-B

1. Enabling [**SPL**] in **FUNCTION** group 1, enables split operation where VFO-B is used as the transmit frequency.

ⓘ Note that the VFO-A frequency is shown at the top of the display and VFO-B is shown below VFO-A. The tuning dial only affects VFO-A.

ⓘ Note: Since the FT-891 does not have a [**A = B**] key (normally used to set VFO-B equal to VFO-A), we can use the QMB memory to accomplish the same thing.

2. First set VFO-A to the desired mode and frequency, including any filtering etc.
3. Now copy VFO-A to the QMB memory bank by pressing [**QMB**] 1 second.
4. Press [A/B] to swap contents of the VFO's.
5. Press [**QMB**] to copy the previously saved VFO-A contents to VFO-B.

ⓘ Both VFOs now have the same frequency and mode set.

Tuning VFO-B, the Split mode Transmit Frequency

1a. VFO-B can be tuned by pressing [**A / B**] to swap the VFOs and then using the tuning dial to set the frequency. When complete, press [**A / B**] again to restore the receive frequency to VFO-A.

1b. VFO-B can also be tuned by pressing the [**MULTI**] knob to select VFO-B (the **B** icon is highlighted when VFO-B is selected.). Rotating the [**MULTI**] knob now tunes VFO-B. For faster tuning press [**FST**].

2. If [**TXW**] is assigned to one of the A,B,C function keys, VFO-B can also be tuned by pressing and holding [**TXW**] while using the tuning dial to set the frequency. (While [**TXW**] is held, the VFOs are swapped and you can also monitor the frequency.)

ⓘ The procedure for assigning functions to the lower group of A,B,C keys is found on page 3.

ⓘ Note: Pressing [**TXW**] allows you to hear signals on VFO-B's frequency, which is the transmit frequency when operating split.

Operating Split (the Quick Split Method)

ⓘ Split operation involves receiving on VFO-A and transmitting with VFO-B.

ⓘ The following procedure assumes you have already tuned to a DX's transmit frequency using VFO-A. The procedure is a bit different if you are the one initiating split frequency operation —the frequencies of VFO-A and VFO-B will be reversed.

1. Press [**F**] as required to access **FUNCTION** group 1, and use the [**MULTI**] knob to point to [**SPL**].
2. Once [**SPL**] is being pointed to (*but is not yet highlighted*), press [**SPL**] 1second to enable *quick split* operation, copying VFO-A's frequency and mode to VFO-B. VFO-B is initially set to transmit on a split offset 5 kHz up from the receive frequency on VFO-A. (Yaesu calls this *Quick Split.*)

ⓘ Note: If you press [**SPL**] 1second again before terminating split operation, VFO-B will be offset an additional 5 kHz each time you press [**SPL**] 1second. If you later want to activate split on a different frequency, first terminate split operation by momentarily pressing [**SPL**] to un-highlight it, tune to the new frequency and then repeat step 2 to re-enable spit operation.

- ① Menu 05-13 QUICK SPLIT FREQ specifies the initial split offset to be applied. The factory default of 5 kHz can be changed to anything within the range of ±20 kHz, in 1kHz increments.
3. To tune the split TX offset (VFO-B) to where the DX is listening, press and hold [TXW] and use the dial to tune VFO-B to where you want to make your call, provided the [TXW] function was assigned to one of the A,B,C keys.
- ① The procedure for assigning functions to the lower group of A,B,C keys is found on page 3.
- ① To monitor your transmit frequency (the pileup of calling stations), and help time your calls, hold [TXW].
4. To terminate split operation, in FUNCTION group 1, point to [SPL] and press [MULTI], which un-highlights [SPL].

◆── FM Mode and Repeater Operation ──◆

Setting up for FM Mode Operation
1. To enable FM mode press [BAND/ MODE] 1 second and then rotate the DIAL to select [FM] operation.
2a. Use the tuning dial to set the VFO frequency. ([FST] can be enabled for faster tuning.)
2b. A frequency can also be tuned in discrete steps using the [MULTI] knob.
- ① Menu 14-07 FM CH STEP can be used to select either 5, 6.25, 10, 12.5, 15, or 20 kHz step sizes. But the default settings are normally adequate.
3. Use the [RF/SQL] knob to set the squelch level.
4. Use menus Menu 16-03 HF PWR or Menu 16-04 50M PWR to set the desired output power level. (FM is only used in the 28MHz or 50MHz bands.)
- ① FM microphone gain is factory set at 50, however, if you consistently get reports of low deviation/audio you may want to access Menu 16-09 FM MIC GAIN to adjust the setting.

Setting a Repeater or Simplex FM Frequency
1. If necessary enable the FM SETTING function group by accessing Menu 05-10 FM SETTING and setting it to ENABLE.
2. Set the repeater' output frequency into VFO-A as described above.
- ① The most convenient way of performing fixed frequency FM operations is to program the repeater and simplex frequencies into memory. (see next page)
3. In FUNCTION group 1 make sure [SPL] *split operation* is not enabled. The radio uses menus to set repeater offset transmit frequencies.
- ① If the SPL icon is being displayed in the VFO-B area you are operating split.

Selecting the Repeater Shift / Offset and CTCSS Repeater Access Tone
1. Repeater offset frequencies are set per-band using the following menus:
   - Menu 09-04 RPT SHIFT 28MHz with a default setting of 100kHz.
   - Menu 09-05 RPT SHIFT 50MHz with a default setting of 1000kHz.
2. To set the offset direction, in the FM SETTING group point to [RPT], press [MULTI] and use the [MULTI] knob to select: +, - or SIMP.
3. If a CTCSS tone is required, in the FM SETTING group point to [T/ DCS], and depending upon what is needed set: CTCSS ENC, CTCSS ENC/DEC, or DCS.
4. To set the CTCSS tone frequency, in the FM SETTING group point to [TONE] and use the [MULTI] knob to make the setting. (If DCS is required, select [DCS] and set the code.)
- ① Note: The shift direction (+, - or SIMP) and ENC / DEC / DCS status are not indicated on the LCD. To check the settings, access the FM SETTING group.
- ① Note: When programming memory channels, the tone settings and shift offset direction are saved in the memory channel, but the offset frequency and set power level are not. The offset frequency is determined by the above menus.

◆── Programming and Using Memory Channels ──◆

Memory Channels
- ① The FT-891 has 99 Regular memory channels labeled 01~99, and 9 pairs of Scan Edge memory channels labeled P-1L / P-1U to P-9L / P-9U.
- ① Memory channels are tunable. When in memory mode you can tune off of the programmed frequency and change other settings without affecting memory contents.
- ① Memory channels save the frequency, mode, clarifier settings, attenuator, DSP filter settings, and repeater shift and tone settings, **but not** the power level setting, which is set using menus.

Programming a Memory Channel
1. Set the desired frequency, operating mode, filtering, etc. into VFO-A.
2. Momentarily press [V ▶ M] and then use the [MULTI] knob to select a memory channel to be used for storage.
3. Press [V ▶ M] again to program the selected memory location.

Labeling Memory Channels
1. Press [V ▶ M] to display the list of memory channels.
2. Use [MULTI] knob to select the memory channel to be labeled.
3. Press [B/ EDT] to enable entering text.
4. Rotate the [MULTI] knob to select a text character, press [MULTI] to enter the character. (A maximum of 12 characters can be used for the label.)
5. Rotate the [MULTI] knob to the next position and press [MULTI] again.
6. Repeat steps 4 and 5 until the entire message is entered.
ⓘ To clear a character once it has been selected press [B/ CE].
7. If you wish the label to be displayed instead of the frequency, press [B/TAG], highlighting it. Label will be displayed instead of the VFO-A frequency.
8. When label is completed, press [C/ ENT] to save the setting.
9. If done labeling memory channels, press [A/ BCK] to return to normal operation.
ⓘ When a labeled channel is <u>recalled</u>, the label appears at the top of the screen.

Checking Memory Channel Contents in VFO Mode
ⓘ This method allows you to examine all memory locations, programmed or not.
1. Press [V ▶ M] and the channel list is displayed, centered on current mem chan.
2. Rotate the [MULTI] knob to view other memory channels as desired.
3. Press [V ▶ M] again to exit the memory check mode.

Recalling Programmed Memory Channels in Memory Mode
1. Press [V/M] to enter Memory Mode. (Mxx is displayed at upper left of display)
2. Use [MULTI] knob to select programmed memory channels.
ⓘ VFO's are updated as channels are selected and you can operate on the frequency.
3. To prevent accidentally tuning off of a memory frequency (especially if it's a repeater) momentarily press [PWR/ LOCK] to disable the tuning dial.

Tuning off of a Memory Channel's Stored Frequency
ⓘ After a Memory Channel has been selected in memory mode, rotating the dial changes the frequency, causing the radio to enter the memory tuning mode.
ⓘ If you have made any frequency or mode or changes and wish to return to the original Memory Channel settings, they can be restored to the VFO by pressing [V/M].
1. To be able to select another memory channel after tuning off the channel's frequency, press [V/M] to restore the channel select mode.

Erasing Memory Channels
1. Press [M ▶ V] and the memory channel list is displayed.
2. Rotate the [MULTI] knob to select the channel to be deleted.
3. Press [C/ ERS] to clear contents of the selected memory.

Enabling Memory Group Operation
ⓘ It may be useful to use memory in partitions of up to 20 channels each, called groups. Five regular-memory groups are available, each holding up to 20 memory channels in numerical sequence: 01~19, 20~39, 40~59, 60~79, 80~99. Note: The size of the first group, 01~19, is limited to 19.
ⓘ Memory Groups are a way of organizing your memory channels by usage, for instance: AM Broadcast, Short Wave, Nets, Repeaters, etc. -- all can be arranged into specific groups. Can also be handy for scanning channels in a group.
1. To enable memory group operation, access Menu 05-09 MEM GROUP and set it to ENABLE. (The default is DISABLE)

Recalling Memory Channels from a Specific Group
ⓘ Menu 05-09 must be set to ENABLE to operate in memory group mode.
1. If necessary, press [V/M] to enter MEM memory mode operation.
2. Press [M ▶ V] to display the memory channel list.
3. Use the [MULTI] knob to select the desired group.
ⓘ The first programmed channel in a group is displayed. Groups with no channels programmed are skipped.
4. Press [MULTI] to return to the normal operating screen

5. Rotating the [MULTI] knob now only selects channels from within the group.

ⓘ To select a different group, repeat the procedure starting with step 2.

6. When you wish to return to normal memory channel operation, set **Menu 05-09** back to **DISABLE**.

◆—— Using the Scratch Pad Quick Memory Bank ——◆

Quick Memory Bank (QMB)
ⓘ The Quick Memory Bank, is a 5 deep scratchpad memory which can be used to temporarily store frequencies and mode settings you may wish to return to.

Saving a frequency to the Quick Memory Bank
1. Press [QMB]1sec to add a frequency to the memory bank. New entries are added to the top of the stack, older ones are pushed down one location. Prior entries, beyond the maximum of 5 are lost — pushed off bottom of the stack.

Recalling a frequency from the Quick Memory Bank
1. Press [QMB] to recall the most recent frequency placed in the Quick Memory.
2. Additional pressing of [QMB] will recall memories further down in the stack. The **QMB** icon is displayed when in Quick Memory mode. Additional presses beyond the last memory will return back to the first memory and go back through the list again.

ⓘ You can use the dial to tune off of a QMB memory frequency without altering the QMB memory contents, which can be handy for repeatedly tuning across the same band segment.

◆—— Scanning Operations ——◆

Types of Scanning Operations
ⓘ The FT-891 can perform four types of scanning operations:

Name of Scan	Scanning Method	Mode
All Memory Ch. Scan	Scans all Memory Channels that have been programmed	MEM
Group MemCh. Scan	Scans only Memory Channels that are in a group	MEM
Manual VFO Scanning	VFO scans band under control of Mic. [UP] / [DWN] keys	VFO
Programmed Mem. Scan	VFO scans between a pair of Scan Edge frequencies	VFO

Setting Scan Resume Mode
ⓘ Scanning can be set to either *Stop/Stay* on a busy frequency or to *Halt* for 5 seconds when a carrier is detected. Operation first requires setting the squelch level so that only active frequencies open the squelch.

1. Use **Menu 05-16** MIC SCAN RESUME to select the Scan Resume mode:
   - **PAUSE** Scanning pauses on activity, then resumes when no longer busy.
   - **TIME** Scanning pauses on activity, then resumes after 5 seconds.

Scanning Memory Channels
ⓘ Scanning can be performed on all programmed memory channels, or can be limited to those in a specific group —depending upon if **GROUP** has been enabled or not. If you wish to set up group mode operation, refer to page 15.

1. If required, press [V/M] to select **MEM** memory mode operation.
2. To set the squelch level, first access **Menu 05-05** RF/SQL VR and set the [RF/ SQL] knob to operate as a squelch control.
3. With the above menu set, rotate the [RF/ SQL] knob and set the squelch level to silence background noise. Once set, press [MULTI] to exit the setting window.
4. To start scanning press the microphone's [UP] or [DWN] key 1second.

ⓘ To reverse the scan direction you can press the opposite [UP] or [DWN] key or rotate the Dial.

5. To halt scanning press the microphone's [PTT].

ⓘ When returning to normal tuning operation remember to, access **Menu 05-05** RF/ SQL VR and set the [RF/ SQL] knob back to operating as a RF Gain control.

VFO Band Scanning
1. If required, press [V/M] to select VFO mode operation.
2. To set the squelch level, first access **Menu 05-05** RF/SQL VR and set the [RF/ SQL] knob to operate as a squelch control.
3. With the above menu set, rotate the [RF/ SQL] knob and set the squelch level to silence background noise. Once set, press [MULTI] to exit the setting window.

- ① When in SSB / CW modes, scanning only slows down when the squelch opens, requiring you to manually stop the scan, but in AM / FM modes scanning pauses.
4. To start scanning press the microphone's [UP] or [DWN] key 1second.
- ① To reverse the scan direction you can press the opposite [UP] or [DWN] key or rotate the Dial.
5. To halt scanning press the microphone's [PTT].
- ① When returning to normal tuning operation remember to, access Menu 05-05 RF/SQL VR and set the [RF/ SQL] knob back to operating as a RF Gain control.

Disabling Microphone Initiated Scanning
1. If desired, the ability to start scanning using the microphone's [UP] / [DWN] keys can be disabled by setting Menu 05-15 MIC SCAN to DISABLE.

Programming Scan Limit Memories for Programmed Memory Scanning
- ① VFO scanning can be limited to specific ranges by storing upper and lower scan limits in a <u>consecutive pair</u> of scan limit memories P1L / P1U ~ P9L / P9U.
- ① The operating mode, IF filter settings, etc. should all be set as you want the scanning operation to be performed—these will be saved to the memory.
1. In VFO mode, tune VFO-A to the lower limit of the range you wish to scan.
2. Press [V ▶ M] and use the [MULTI] knob to select one of the lower scan limit memories: P-1L ~ P-9L.
3. Press [V ▶ M] to program the selected memory location.
4. Now tune VFO-A to the upper limit of the band segment you wish to scan.
5. Repeat Steps 2 & 3, but programming the frequency into the <u>upper</u> scan limit memory (using same channel number as used above): P-1U ~ P-9U.

Activating Programmed Memory VFO Scanning
- ① Upper and Lower Scan Limits must first be programmed as described above.
1. Press [V/M] to enter Memory Mode. (**Mxx** is displayed)
2. To set the squelch level, first access Menu 05-05 RF/SQL VR and set the [RF/ SQL] knob to operate as a squelch control.
3. With the above menu set, rotate the [RF/ SQL] knob and set the squelch level to silence background noise. Once set, press [MULTI] to exit the setting window.
- ① When in SSB / CW modes scanning only slows down when the squelch opens, requiring you to manually stop the scan, but in AM / FM modes scanning pauses.
4. Now use the [MULTI] knob to select either a upper or lower programmed scan limit memory: P1L / P1U ~ P9L / P9U.
5. To start scanning press the microphone's [UP] or [DWN] key 1second.
- ① To reverse the scan direction you can press the opposite [UP] or [DWN] key or rotate the Dial.
6. To halt scanning press the microphone's [PTT].
- ① Both scanning and <u>VFO tuning</u> are now limited to the scan limit range you selected.
7. To halt scanning press the microphone's [PTT].
8. To exit the **PMS** limited tuning range mode, press [V/M] twice.
- ① When returning to normal tuning operation remember to, access Menu 05-05 RF/SQL VR and set the [RF/ SQL] knob back to operating as a RF Gain control.

◆—— RTTY Mode Operation ——◆

Connecting TNC's or PC Sound Cards
- ① The FT-891 has a dedicated RTTY / DATA connector on the rear panel for use with TNCs or similar equipment. It is also possible to use the USB port to operate RTTY from a PC or some other device. Refer to the FT-891 advanced operating manual page 62 for connection and configuration information.

FSK RTTY Operation
1. Press [MODE] 1 second to select [RTTY] operation.
2. Access Menu 10-11 RTTY BFO to select LSB or USB side band operation as may be required for the band you are operating on. LSB is normally used.
3. Enable the monitor function in FUNCTION group 1 by enabling [MON] if you wish to hear your transmitted signal. The audio level is set using the [MULTI] knob.
4. The [NAR] function in FUNCTION group 1 can be used to narrow the received bandwidth to help minimize adjacent signal interference.
- ① The actual steps / procedure for operating RTTY depend on the type of equipment being used and the RTTY software you may be running.

Following is a checklist of items that may need to be configured:

- **Menu 10-05** RTTY SHIFT PORT is used to select the FSK keying source: **RTTY/DATA** connector pin 4, or either **DTR** or **RTS** when using the USB virtual COM port.

- **Menu 10-06** RTTY POLARITY-R selects either the **NOR** or **REV** <u>receive</u> frequency shift direction. **NOR** = the space frequency is lower than mark frequency.

- **Menu 10-07** RTTY POLARITY-TX selects either the **NOR** or **REV** <u>transmit</u> frequency shift direction. **NOR** = the space frequency is lower than mark frequency.

- **Menu 10-08** RTTY OUT LEVEL sets the RTTY AFSK audio data output level on pin-5 of the **RTTY/DATA** connector. This is a transmit level setting.

- **Menu 10-09** RTTY SHIFT FREQUENCY selects the FSK shift frequency: **170**, **200**, **425** or **850** Hz. 170 Hz is more commonly used.

- **Menu 10-10** RTTY MARK FREQUENCY selects the FSK mark frequency: **1275** or **2125** Hz. The default setting of 2125 Hz is more commonly used.

- While the default RTTY *receive audio filter settings* should be fine, if you are an experienced operator and have a specific need, **Menus 10-01** thru **10-04** can be used to modify the default settings.

RTTY Operation, Final Amplifier Duty Cycle Caution

🅞 CAUTION: Because RTTY can have long transmit duty cycles, you should limit power output to avoid overheating. On prior model radios, Yaesu recommended using no more than 40 watts output.

◆—— PSK or Other AFSK Data Mode Operation ——◆

Using Computer Interfaces or the USB Port for AFSK PSK / DATA Operation

ⓘ The FT-891 has a dedicated **RTTY / DATA** connector available at the rear panel for use with PC interfacing equipment. It is also possible to use the USB port to operate PSK and other Data modes from a PC. Refer to the FT-891 advanced operating manual page 64 for connection and configuration information.

AFSK Data Mode Operation: PSK, OLIVIA, AFSK RTTY, etc.

1. Press **[MODE]** 1 second and enable **[DATA]** mode operation.

2. Access **Menu 10-11** RTTY BFO to select **LSB** or **USB** side band operation as may be required for the band you are operating on. LSB is normally used.

3. Enable the monitor function in **FUNCTION** group **1** by enabling **[MON]** if you wish to hear your transmitted signal. The audio level is set using the **[MULTI]** knob.

4. The **[NAR]** function in **FUNCTION** group **1** can be used to narrow the received bandwidth to help minimize adjacent signal interference.

ⓘ The actual steps / procedure for operating PSK and other data modes depend on the type of computer interface you are using and the particular software you may be running.

Consider the following as a checklist of items that may need to be configured:

- **Menu 11-08** SSB PTT SELEC selects a keying source from the PC if operating *in SSB band mode*: **OFF** disables keying from **RTTY/DATA** jack pin 3, **DAKY** enables keying from pin 3, or the **RTS / DTR** settings enable keying from the USB virtual COM port.

- **Menu 08-10** DATA PTT SELEC selects a keying source from the PC if operating *in Data mode:* **OFF** disables keying from **RTTY/DATA** jack pin 3, **DAKY** enables keying from pin 3, or the **RTS / DTR** settings enable keying from the USB virtual COM port.

- **Menu 08-01** DATA MODE selects either **PSK** or **OTHERS** as the data operating mode.

- **Menu 08-02** PSK TONE selects either **1000**, **1500** or **2000** Hz as the PSK center frequency.

- **Menu 08-03** OTHER DISP can be used to offset the frequency display in data mode.

- **Menu 08-09** DATA IN SELECT selects either the **MIC** or **REAR** as inputs for data mode. **REAR** is selected to use either the **RTTY/DATA** jack or USB port as the source.

- **Menu 08-11** DATA OUT LEVEL sets the data output drive level to the PC interface.

- **Menu 08-12** DATA BFO to select **LSB** or **USB** side band operation as may be required for the band you are operating on. USB is normally used.

- While the default DATA mode *receive audio filter settings* should be fine, if you are an experienced operator and have a specific need, **Menus 08-05** thru **08-08** can be used to modify the default settings.

Connecting to a Computer Using a USB Cable

ⓘ Before you can use the radio's USB interface you must first download Yaesu's SCU-17 USB Driver. USB drivers are found by clicking on the FT-891 *Files* tab on the Yaesu web FT-891 product page found at **www.yaesu.com**

◆—— Spectrum Scope ——◆

Spectrum Scope Display

ⓘ The scope display provides a typical frequency spectrum display, showing a range of frequencies and relative signal amplitudes.

Operating the Spectrum Scope

1. Press [B/ SCP] to activate the scope display. If the [B] function key has been reassigned, access **FUNCTION** group 2 and enable [SCP] operation there.
2. Press [B/ SWP] to manually trigger a new scope sweep.
3. To change the vertical gain (signal height), press [C/ LVL] one or more times.
4. To change the range of frequencies being scanned, press [A/ SPN] one or more times.
5. By using Menu 13-01 SCP START CYCLE you can have sweeps automatically trigger every 3, 5 or 10 seconds, of if set to OFF, timed sweeps are disabled.

◆—— Miscellaneous Settings & Procedures ——◆

Changing the Appearance of the Display and other Settings

ⓘ Display appearance and other items can be modified using these menus:
* Sets the beep audio level: 0~100,   Menu 05-04 BEEP LEVEL
* Maximum transmit time before being cut off,   Menu 05-14 TX TOT
* Auto power off after period of inactivity,   Menu 05-19 APO
* Fan start cooling temperature, norm & contest   Menu 05-20 FAN CONTROL
* Enables and sets the meter's peak hold time,   Menu 02-05 PEAK HOLD
* Sets position of pop-up display, high or low   Menu 02-07 POP-UP MENU
* Adjust key backlight intensity,   Menu 02-02 DIMMER BACKLIGHT
* Adjust TX / Busy indicator brightness   Menu 02-04 DIMMER TX/BUSY

Verifying the Radio's Firmware Revision

ⓘ Periodically Yaesu may provide firmware updates (bug fixes and improvements) on their FT-891 files download page.

1. Access the following menus to verify the firmware versions currently installed in your radio:
* Menu 18-01 MAIN VERSION
* Menu 18-02 DSP VERSION
* Menu 18-03 LCD VERSION

◆—— Accessing the Setup Menus ——◆

Changing Menu Settings

1. Press and hold [F] 1 second to enter the menu system.
2. Rotate the [MULTI] knob to select / highlight a menu item.
3. Press [MULTI] then use the [MULTI] knob to change settings.
4. To save your settings, press the [MULTI] knob.
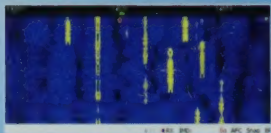5. To exit the menu system press [F].

◆—— Transceiver Reset Functions ——◆

ⓘ The menus and memories can independently be reset to the original factory settings.

1. To reset the radio access Menu 17-01 RESET and then select either:
* ALL   Resets all settings and memories to factory default conditions
* DATA   Resets only the memories
* FUNC   Resets all meus and function settings to factory default conditions
2. After making the above selection, hold the [MULTI] knob 1 second to complete the operation.

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