INTRODUCTION

Congratulations on purchasing the MFJ-664 Voice Mail. This compact unit has everything needed to turn hand-held (HT), mobile, or fixed-station radios into a Voice Mail, Simplex Repeater, or Beacon system. The MFJ-664 is loaded with many hi-tech features. To get the most from this product read this manual thoroughly!

The MFJ-664 features:

120-Second Memory: Store up to two minutes of messages.

PIC Controller: Reliable PIC technology manages all functions.

Adjustable Audio Output: Internally programmable output-level for the clearest audio possible.

Selectable PTT: Compatible with radios having microphone closure-sensing or conventional push-to-talk systems.

Small and rugged: Compact 4 x 3.5 x 1.5 inch metal case.

Internal or External Power: Uses single 9V battery or external 9-15 Vdc source.

Versatile Interface: Open-ended patch cable adapts to virtually any radio.

Courtesy tones: Morse code verification of functions and over-beep at end of message.

Zero Power Memory Storage: Internal memory does not require power. Even if a battery or power supply fails, all memories and messages remain intact.

Programmable Access Codes: Select and program your own custom access code numbers.

Separate User and Master Access Codes: Security control code can be different from general access codes used to leave voice mail.

Remote Operation: Standard DTMF (touch-tone) keypad control for all functions.

The MFJ-664 will store messages from your friends. The MFJ-664 also functions as a Simplex-Repeater and repeating voice beacon. This unit is controlled by any standard DTMF keypad on a radio. **This requires use of radios with DTMF keypad or touch-tone encoders**. In some cases, regulations require back-up control functions through a separate control receiver. Regulations may also restrict the frequency bands of use. **The end-user is responsible for understanding and complying with all applicable regulations, some of which are subject to various interpretations.**
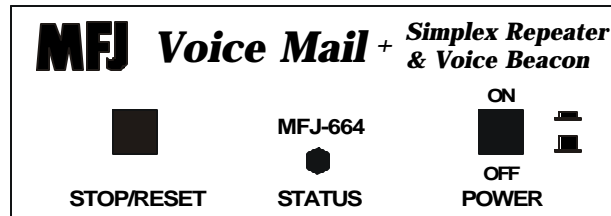
The MFJ-664 has four modes:

- Voice Mail
- Simplex Repeater
- Combined Voice Mail and Simplex Repeater Modes
- Voice Beacon

These modes are selected through the Security Menu (pages xx).

JACKS AND CONTROLS

Front Panel

STOP/RESET Button: Stops playback, pauses beacon on first press and release. Restores operation when pressed and released a second time. This button also resets the unit when held in during power-up.

STATUS/New Message Indicator: This LED illuminates when recording. It flashes when new messages are waiting to be checked.

POWER On/Off: Applies power to unit. Battery drain is 4mA when this switch is on, and the unit is "standing ready". Maximum current draw, when functions are being used, is approximately 30mA.

Back Panel
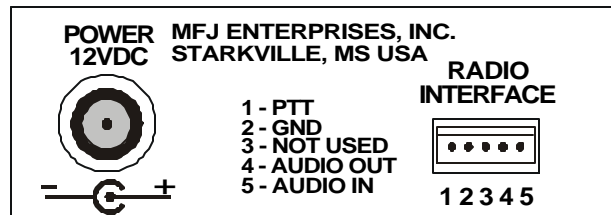
POWER: Accepts 2.1-mm plug (9-15 Vdc source), disconnects internal battery.

> **Important Note:** Never store for extended periods of time with the battery installed. Never use on external power for extended periods with battery installed. Never leave a dead or weak battery in this unit. Leakage and corrosion could damage your unit.

RADIO INTERFACE: Accepts 5 pin IDC plug for Mic, Record Audio, PTT lines and ground. Matching plug and unterminated wire supplied.

SPECIFICATIONS

Power Source	Internal 9V battery or 9-15 Vdc external supply
Current Drain	4 mA standby, 30 mA active
PTT Mode	Selectable (normal PTT ground or mic-sensing)
Message Memory	120 Seconds total storage
Dimensions	4" x 3.5" x 1.5"
Weight	≈5 oz.

POWER SOURCES

1. **Internal Power:** Use a fresh premium-grade 9-volt battery. To install, remove the two screws holding the cover. Locate the battery connector inside the unit. Slide the plastic insulating sleeve down the battery connector wires so it will not be lost. Press the connector on the battery terminals and place the battery in the battery clip mounted inside the cover. Be sure the wires are tucked neatly out of the way, and the battery does not hit anything. Replace the cover and screws.

> **Important Note:** Never store for extended periods of time with the battery installed. Never use on external power for extended periods with battery installed. Never leave a dead or weak battery in this unit. Leakage and corrosion could damage your unit. A fresh premium-quality alkaline battery should last approximately 80 hours of standby time or 10 hours of actual recording or playing time. With a 50% duty cycle, battery life will be around 45 hours.

2. **External Supply:** Power from any well-filtered source capable of supplying 9-15 Vdc @100 mA. Minimum operating voltage is 8 Vdc under full load. Sources exceeding 16 Vdc may permanently damage this device. The external power jack accepts a standard 2.1mm coaxial power plug. *The power plug's center pin must be positive (+) and ground-isolated.* The outer shell is negative (-), and may be grounded or floated at the supply. When connecting to a high current source (such as your transceiver's power supply) we strongly recommend protecting both + and - supply leads with 1/2 ampere fast-blow fuses.

> **Important Note:** If you use the same power supply to run your transceiver and this unit, or a power supply with a grounded negative lead with this unit, it is possible to create a "ground loop". A ground loop can cause unwanted hum, distortion, and noise to appear on the signal.

MFJ-1312 Power Supply: We recommend the MFJ-1312 wall adapter for external power. It comes with the correct power plug installed, and will prevent unwanted ground loops. The MFJ-1312 is available directly from MFJ, or through your local MFJ dealer.

INTERFACE CONNECTIONS

A 5-pin IDC jack on the rear panel of the unit provides access to the interface lines for your radio. Use the supplied IDC to open-ended cable to prepare an interface cable. A view of the IDC connector's pin-out is shown below:

Facing Back Panel

PTT Line **Ground** **Playback** **Record**
(Gnd-Sw Only) **(To Mic)** **(From Spkr)**
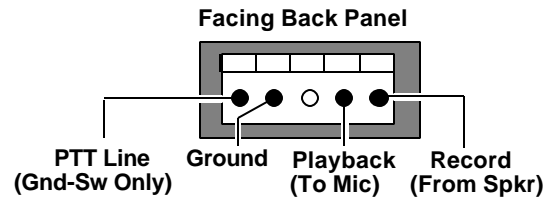
PTT Line: Internal jumpers, when set to "MBL" position, pull this line to ground.
Ground: Common return point for external PTT, microphone, and speaker connections.
Playback: Sends microphone-level audio to radio, provides a PTT mic-sense load in "**HT"** position of internal PTT line jumper.

Record: Terminates radio's speaker line, samples off-air audio for recording, also is used to supply tone-control signal inputs.

See your radio's instruction manual for pin-out connections at the transceiver end. Many popular connectors, including 8-pin mic plugs and mini-plugs, are available from Radio Shack, Ham stores, or MFJ. You may also purchase an interface cable terminated for Kenwood, Yaesu, Alinco, or Radio Shack transceivers directly from MFJ.

SET-UP TESTING AND OPERATION

For initial set-up, use a second "test" radio tuned to the desired operating frequency (a hand-held or portable set for low RF-output is a good choice). The test radio will be used to check this units operation, including playback level.

1.   Do not connect this unit to your radio yet.

2.   Turn on the radio you will use with this unit. You can either listen to a station with proper audio level, or open the squelch control on the radio until you hear noise.

3.   Set the radio's *Volume* control to a low but comfortable listening level, as heard through its speaker (this step establishes the receiver audio level). After adjust the radio's volume for a low but comfortable listening level. Set the *Squelch* to quiet FM background noise.

4.   Plug the patch cable into the proper radio jacks. The *Rec-Aud* line goes to the radio's *External Speaker* jack, and the *Mic-Audio/PTT line(s)* go to the radio's *Microphone* jack. Make sure the unit is set up for your radio's PTT circuit (see the **PTT-Interface** section on next page).

5.   Hold the *STOP/RESET* button in while you press in and lock the *POWER* button. This will reset the unit.

6.   You should hear a series of beeps. The beep sequence identifies the software revision number of the MFJ-664. After reset, the unit will be in Simplex Repeater Mode.   Key the test radio, and make a short test transmission by speaking normally into the microphone.

7.   The *Rec* LED should illuminate, indicating the controller is detecting the test signal and recording your message. When finished, unkey the test radio and listen for playback.   The *Rec* LED should go out and the radio connected to the unit should switch into transmit mode. It will then replay your message, closing the message with an end-of-transmission "over-beep".

8.   Speech should sound natural and modulation should match other off-air signals. If audio is "thin" and weak, or if it is "mushy" and distorted, refer to the *Transmit Level* section of this manual. You may need to adjust the controller's playback level, and/or the volume level on the radio connected to the unit.

9.   At the end of each message playback, the unit will insert an audible "beep" before unkeying the transmitter. This over-beep tone indicates the repeater has finished repeating the current message and is ready to receive the next message.   If this over-beep tone is loud and the recorded audio sounds weak, you probably do not have the volume set high enough on the radio connected to the MFJ-664. Another possibility is the speaker line from the radio is wired incorrectly.

> **Note:**   If both the "over-beep" **and** recorded audio are weak, the internal "audio output level" jumpers in the MFJ-664 probably need to be set to a higher position.
>
> Another possibility is audio lines to the radio's microphone connection could be wired wrong

If the unit functions properly and levels are set properly, then you are ready to continue. If it fails to perform normally, refer to the sections below--and to the *In case of Difficulty* section at the end of the manual.

SELECTING A PTT INTERFACE

The MFJ-664 works with transceivers using microphone load-sensing or ground contact PTT circuits. Internal jumper **JMP1** selects the switching mode. JMP1 is pre-set at the factory for microphone load-sensing radios (normally used in handi-talkies or "HT's").

To Change PTT Switching Mode

1. Remove the cover screws and the cover.
2. Locate **JMP1.** It is at the rear of the unit, next to the radio interface jack.
3. When shipped, this jumper is normally placed in the "HT" position. Move the jumper plug to select the correct PTT (push-to-talk) switching. Note the labels "HT" and "MBL" on the circuit board.

HT: Normally used for HT's or other radios that use microphone-closure-sensing PTT switching.

MBL: Normally used for mobile or fixed-station radios that use conventional ground-contact PTT switching.

> **Attention:** Ground-contact switching requires the separate PTT line output on the MFJ-664 be connected to the radio's microphone jack. Microphone-closure switching combines the microphone and PTT lines together on the audio line. If you aren't sure which PTT line activation system your radio requires, consult the radio's manual. This information is often found under RTTY/Packet set-up instructions, or on the microphone connector wiring diagram.

RECEIVER AUDIO LEVEL

Adjust the MFJ 664's off-air audio input level by adjusting the radio's *Volume* control for a comfortable listening level. Do this with a properly deviated off-air signal, or by opening the radio's *Squelch* control and listening to noise on a clear channel. When adjusting the volume for a comfortable level, listen through the radio's built-in speaker in a quiet room.

Note: The MFJ-664 detects receiver audio to determine if a valid signal is present. If the receiver audio level is adjusted too low, the MFJ-664 might stop recording prematurely. You may not be able to record a full message.

It also might not produce acceptable volume on playback, or produce excessive noise or hiss on playback. The touch-tone functions may become be unreliable, or not work at all.

The receiver's squelch control must be set correctly. The squelch must fully mute the receiver(s) connected to the MFJ-664 when valid signals are not present. If the squelch continually "pops open" on noise or unwanted signals, the MFJ-664 will consider the noise bursts a valid signal and try to record and play those signals.

If receiver audio level is too high, recorded audio will sound bassy, muffled, or distorted. The touch-tone decoder could work unreliably or improperly. If the audio is loud enough but sounds distorted or muffled, and if the "over-beep" sounds clear with reasonable level, try reducing the volume control of the radio connected to the MFJ-664.

In rare cases, where the radio has a powerful output stage and is operated at high volume for extended periods of time, an excessively strong input signal could damage the audio load resistor or other components inside the MFJ-664. Never leave the volume wide open, or near wide open, on the radio.

Each time you use your MFJ-664, remember to return the volume control to the same approximate setting. This is important because a change in the volume setting will be reflected in the voice-recorder's playback level. This, in turn, could upset the audio level and audio quality of the re-transmitted signal.

If you have an AC voltmeter that works properly with audio signals, you can adjust the receiver volume with that meter. Either connect the MFJ-664 or a 5 to 10 ohm load resistor to the receiver audio output. Place the radio on a clear channel and open the squelch control. Adjust the receiver volume control until the meter reads around ½ volt RMS. This is much more accurate than adjusting volume "by ear".

TRANSMIT LEVEL

Before attempting to set the unit's transmit level, make certain the transceiver's *Volume* control is set correctly (see section above). The "over-beep" is a good indictor of level adjustments. The "over-beep" should be clear and sharp, and about the level of the recorded audio. If the "over-beep" is much stronger than recorded audio, the radio connected to the MFJ-664 probably has its *Volume* set too low. Be sure you have followed guidelines in the preceding section, "Receiver Audio Level", and also have the connection properly made.

To adjust transmit level, use a second test-radio to monitor this unit's on-air signal quality. For a more precise signal evaluation, a FM deviation meter could be used.

The MFJ-664 has five (5) transmit-level settings available on jumper pins. This allows the MFJ-664 to interface with a wide range of transceivers. Levels are selected by positioning jumper-plugs on header **JMP2** and **JMP3** (illustrated below). If transmitted audio is too weak, increase audio by moving jumpers to higher audio-output level settings. If audio level is too strong (mushy or bassy), set the jumpers for less audio-output level.

<u>Note:</u>	It may be necessary to slightly adjust the *Volume* on the transceiver connected to the MFJ-664 to obtain the clearest sounding playback. Your objective should be to obtain the most natural playback quality possible for normal on-air signals. Be careful not to "overdrive" your unit. Grossly excessive input levels (which will also sound very mushy or bassy) could damage components in the MFJ-664 (see ***Receiver Audio Level*** section).
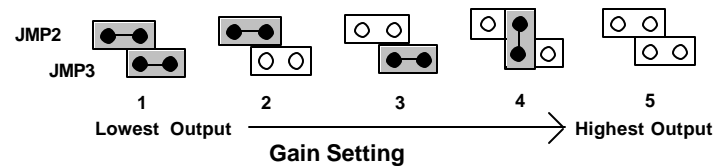
If there's an unused jumper plug, install it on any free header pin to prevent it from becoming misplaced. *Be sure the unused jumper is hanging only on one header pin, and not placed between two undesired header pins!*

OPERATING TIPS

Pick-Up Time: Each time you transmit, speak right away. Avoid saying anything critical for the first second or so, since it may take the squelch activation circuit ≈1 second to activate. The squelch system, on occasion, might "clip" the leading edge of the first word of a transmission. Remember that the squelch in this unit activates with audio, and requires audio to hold it open!

Drop Time: This unit will wait ≈2 seconds after audio stops before recording also stops. This "hang-time" allows an intermittent signal to be recorded. It also prevents normal pauses between words from causing the unit to drop. It may add a second or two of dead air at the end of a recorded transmission.

Caution: *If you pause more than a few seconds between words, and if your radio has no background noise, this unit will consider the transmission finished and "drop out".*

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Message Overflow: Maximum message storage time is two minutes.   Voice memory is sub-divided in Voicemail and Voicemail/ Simplex Repeater modes. An allocation table is presented on page 22.

When memory space is completely filled, this unit will not transmit until what it considers a valid input signal also stops. When the input signal finally stops, normal operation will resume.

Message Over-write: The internal memory lasts until new external data overwrites the stored information. Removal of batteries and/or reset of the unit will not erase messages. You can retrieve messages more than once.

Identification: Regulations generally require a valid identification or callsign (ID) at certain maximum periods of time after a transmission or series of transmissions begins. Users of this system are responsible for meeting legal requirements.   This might include recording a valid callsign or ID in the Voicemail announcement and Beacon. Anyone leaving a message should also provide their callsign or ID as required by the rules governing the radio system used with this device.

ACCESS CODES

There are two access codes: *Security* and *User*. The *Security Code* allows access to the *Security Menu*. The *Security Menu* contains the operating mode controls and other control functions. The *Security Code* can be changed to any code sequence.   The *User Code* accesses only Voicemail record functions, allowing people to store a message that only the *Security Code* holder(s) can retrieve.   Both codes are five digit codes.   The first two numbers are always fixed; the last three are owner programmable.

The *Security Code* starts with "*#2*" followed by three owner selectable keypad characters.

The *User Code* starts with "#1", followed by three owner selectable keypad characters. Valid characters are numbers 0-9, letters A-D, and * and # (found on 16 button DTMF keypads). Not all DTMF keypads have four rows, some only have three rows. Be sure all users have four-column pads before programming a *User Code* with buttons labeled A-D.

If a custom-programmed *Security Code* is lost, the MFJ-664 will have to be manually reset. Removing power and holding the *Stop/Reset* button in while applying power does this. When reset, the Security Code reverts to "#2111" and the User Code reverts to "#1000".

ENTERING ACCESS AND CONTROL CODES

When entering a Security Code or User Code, all system users should be aware of how the code they are given works.

Whenever a DTMF tone (touch-tone signal) is entered, this unit waits 10 seconds for another tone. If a second DTMF tone does not appear within 10 seconds, the unit resets to normal operation.

1.) If time goes beyond 10 seconds when entering the next digit of a control or user code, the sequence must be started over again.

2.) If a wrong code character is entered, the operator must wait 10 seconds for a unit resets. The unit will be ready to receive a new sequence after the 10-second wait expires.

3.) While this unit receives and decodes tones at fast entry speeds, it's still a good idea to use a modest keypad entry speed. If you enter an incorrect digit, you will have to wait at least ten seconds before starting over.

HARD RESET

To reset your MFJ-664, hold the *STOP/RESET* button in while you turn the power switch on. After the power switch is on, release the *STOP/RESET* button.

When this unit resets properly, it transmits a series of beeps. These beeps are arranged in a sequence that indicates the software revision number. This revision number is not designed to be user readable.

The MFJ-664 reverts to the following default settings after a hard reset:

Security Code:	*#2111*
User Code:	*#1000*
Mode:	*Simplex Repeater*
Message Count:	*0*
Beacon Delay time	*5 seconds*

WARNING: Resetting your MFJ-664 will cause all user programmable parameters to default to the above settings.

Note: Resetting your MFJ-664 will cause the Voicemail Message Count to default to 0. However, messages stored in the Voice Chip are not altered. If messages are checked after a hard reset, the entire message memory is still available and can be played back. Messages are only destroyed when written over.

SECURITY MENU

The *Security Menu* provides access to MFJ-664 control functions. The *Security Menu* is accessed when the correct Security Code is entered. The *Security Menu* sets up the operational mode of this unit, and allows access to user and security codes, Voicemail messages, beacon data, and other important functions.

Since all primary control functions and security numbers can be accessed and changed through the *Security Menu*, knowledge of the Security Code is generally restricted to one person or a small group of special control operators.

> **Important Note:** The person with physical possession of this unit has ultimate control. That person can perform a "hard reset", and reset all security and user codes to default values. That person will have the ability to create new control and access numbers, that only he (or she) knows.

Each control function has a single digit control number. Each control function also has its own verification code (sent in Morse code). When *Security Menu* controls are executed, the MFJ-664 responds with verification. This verification is transmitted using standard Morse code characters. The Morse code response is used to verify a control function was successfully executed.

Once the *Security Menu* is entered, the control operator has 10 seconds to enter an operation control number. If the control operator fails to enter the correct response within ten seconds, the MFJ-664 control access process stops. At this point the MFJ-664 sends the Morse characters "**XS**", which stands for e**X**it **S**ecurity. The same holds true any time the MFJ-664 is waiting for an operator to enter a response. If the control operator fails to enter a response within a ten-second window, the Morse characters **"XS"** are sent and the unit withdraws from *Security Menu* access.

Multiple functions can be accessed after one security code entry into the *Security Menu*. After the first control change is completed, the MFJ-664 allows the operator to access another control function. If the control operator fails to perform another *Security Menu* operation within the allocated time, and if "XS" is sent, the security code will have to be re-entered.

Security Menu Function List

This is a list of functions, execution numbers, and verification codes. The control operator can perform as many operations as needed while in the *Security Menu*. It is not necessary to re-enter the *Security Menu* when changing multiple functions. After completing all desired changes, exit the *Security Menu*.

Access code:	Function changed	MorseVerification
Security Code	enter (Roger) Secure Menu	RS
1	Check Mail messages	CM
2	Delete Messages	DM
3	Record Announcement voicemail	RA
4	Change User access code	CU
5	Change Security access code	CS
6	Change Delay time (beacon)	CD
7	(voice) Mail Mode	MM
8	(simplex) Repeater Mode	RM
9	Mail + (simplex) Repeater Mode	MRM
0	eXit Security menu	XS
*	Beacon Mode	BM
# A B C D	Not Used	

BASIC SECURITY MENU DESCRIPTIONS IN TABLE ABOVE

Security code (# plus 4 digits)

This five-symbol code allows control operator access to all functions in the table above and text below. The factory default security code is #2111. It should be reprogrammed to a new number. Also see the section on, Security Codes.

1.)   Enter the *Security Code* to access the Security Menu.

2.)   The MFJ-664 sends the verification code "**RS**" (Roger Security).

3.)   From the Security Menu, perform any function in the table above or text below.

Note: There is a ten-second window for entering codes. If time expires, the MFJ-664 will send the Morse characters **"XS"** (eXit Security).

Check Voice-Mail Messages (1)

Note: When the MFJ-664 front panel *Rec* LED is flashing, new messages are waiting to be checked.

This function permits the control operator to listen to messages. You can also re-check existing messages. After each message, there will be an end of transmission beep, and then you have the choice of replaying the message, continuing to the next message, or going back to the *Security Menu*. If you wait more than 10 seconds without entering a tone, the next message will automatically play.

To Check Messages:

1. Enter the *Security Menu* by entering the current security code. When you listen, you should hear **"RS"** (Roger Security).

2. Press "1" and listen. The first message will play followed by a beep.

3. After the beep enter 0, 1, or 2 (see table below). If one of these numbers isn't entered within ten seconds, the next message will play.

4. After the last message plays, the verification code "**CM**" (Check Message) will be sent. The MFJ-664 will return to the Security Menu.

5. Press "0" to exit the *Security Menu* and restore normal operation. If you wish to change or check more secure functions, press the appropriate digit instead of "0". When you exit the security menu, the MFJ-664 will send "XS" (eXit Security).

Execution code	Function
0	Exit and return to Security Menu
1	Play Next Message
2	Replay Previous Message

Delete Messages (2)

Deleting will not completely erase messages from memory. "Deleting" simply removes message protection, allowing the message to be overwritten.

If messages are deleted and then checked, the MFJ-664 will play through the entire memory. Some messages might be partially overwritten, and there may even be complete messages from past recordings. When security code menu "2" is entered, all messages are deleted at once. There isn't any option available that allows select messages to be deleted while others are retained.

The messages for the voicemail announcement message are not affected by the "***Delete Messages***" function.

To Delete Messages:

1. Enter the *Security Menu* by entering the current security code.

2. Enter "2" and listen. You should hear verification code "**DM**".

3. All messages are now unflagged, and can be written over.

4. If you wish to perform additional security tasks, enter that security menu digit. You should hear a confirmation response for that digit. Xx check this

5. Press "0" to exit the *Security Menu* if you are done. If the exit is successful, you should hear **"XS"**.

Record Announcement Voicemail (3)

The first 10 seconds of Message Memory is reserved for a Voicemail announcement (see *Memory*, page 22). This announcement plays whenever the user code Voicemail function is activated. Voicemail announcements typically should contain legal station identification and a "leave message" request. The announcement remains in memory until a new announcement is recorded.
To Record a Voicemail Announcement

Enter the *Security Menu* by entering a valid security code.

1.) Enter "3". You should hear a beep when you quit transmitting.

2.) After the beep, transmit your 10-second or less message. Remember to identify your station, if required.

3.) A moment after you start to listen, the recorded announcement will play back for review.

4.) If the announcement is acceptable, go to step 5. If the announcement is unacceptable, return to step 2. The verification code "RA" will be sent.

5.) Enter a new security code function number if desired.

6.) Press "0" to exit the *Security Menu* if you are done. If the exit is successful, you should hear **"XS"**.

Change User Access Code (4)

The User Access Code consists of five DTMF digits/characters. The first two digits are preset in the software to be "#1". The next three digits will be "000" by default, but you can change them to be any valid number/character you want (see *Access Codes*).

To Change User Access Code

1. Enter the *Security Menu* by entering a valid security code.

2. Press "4" and listen. You should hear a beep when you quit transmitting.

3. Enter **three** valid tones. If tones are invalid or entered incorrectly you will be "kicked out" of the Security Menu, which is signaled by "**XS**".

4. If the tones were accepted, you will hear "**CU**", write your new User Code on the ***Quick Reference Card***.

5. Enter a new security control digit if desired, otherwise proceed to the next step.

6. Press "0" to exit the *Security Menu* if you are done. If the exit is successful, you should hear **"XS"**.

Change Security Access Code (5)

The Security Access Code consists of five DTMF digits/characters. The first two digits are preset in the software to be "#2". The next three digits will be "111" by default, but you can change them to be any valid number/character you want (see ***Access Codes***).

To Change Security Access Code

1. Enter the *Security Menu* by entering the current security code.

2. Press "5", and listen. You should hear a beep when you quit transmitting.

3. Enter **three** valid security digits or letters. If the characters are invalid or entered incorrectly you will be "kicked out" of the Security Menu, which is signaled by "**XS**".

4. If the tones were accepted, you will hear "**CS**", write your new Security Code on the ***Quick Reference Card***.

5. Enter a new security control function number if another function change is required. Otherwise proceed to the next step.

6. Press "0" to exit the *Security Menu* if you are done. If the exit is successful, you should hear **"XS"**.

Change Beacon Delay Time (6)

Changing the Beacon Delay time is also much like changing Access Tones; however, only the numbers 0-9 are valid. The default delay time is 5 seconds. The delay time ranges from 1-256 seconds (1 second to 4 minutes 16 seconds). The delay time must be specified in seconds.

To Change Beacon Delay Time (6)

1. Enter the *Security Menu* by entering a valid security access code.

2. Press "6" and then listen. You should hear a beep when you quit transmitting.

3. Enter **three** numbers, including any leading or tailing zeros. The delay time is specified in seconds. If tones are invalid or entered incorrectly you will be "kicked out" of the Security Menu, which is signaled by "**XS**".

4. If the tones were accepted, you will hear the verification code "**CD**" (Change Delay).

5. Press a new code number to change another control function. Otherwise proceed to the next step.

6. Press "0" to exit the *Security Menu* if you are done. If the exit is successful, you should hear **"XS"**.

Voicemail Mode (7)

Note: Voicemail Mode exclusively enables the Voicemail mode. No other operation will be allowed. Please refer to the *Voicemail* section for complete details on Voicemail operation.

To Enter Voicemail Mode

1. Enter the *Security Menu* by entering a valid security access code.

2. Press "7", you should hear the verification code "**MM**" (Mail Mode).

3. Press another digit to perform another security code function. Otherwise, proceed to the next step.

4. Press "0" to exit the *Security Menu* if you are done. If the exit is successful, you should hear **"XS"**.

Simplex Repeater Mode (8)

Simplex Repeater mode enables the Simplex Repeater only. Please refer to the *Simplex Repeater* section for complete details on the Simplex Repeater operation.

To Enter Simplex Repeater Mode

1. Enter the *Security Menu* by entering a valid security code.
2. Press "8", when you listen you should hear the verification code "**RM**" (Repeater Mode).
3. Enter another security function digit to perform a different security task, otherwise proceed to the next step.
4. Press "0" to exit the *Security Menu* if you are done. If the exit is successful, you should hear **"XS"**.

Voicemail and Simplex Repeater Mode (9)

This mode combines the Voicemail and Simplex Repeater operation. Please refer to the *Voicemail and Simplex Repeater* section for complete details.

To Enter Voicemail and Simplex Repeater Mode

1.) Enter the *Security Menu* by entering a valid security code.

2.) Press "9", when you listen you should hear the verification code "**MRM**" (Mail and Repeater Mode).

3.) Press another security function selection number if another change is desired, otherwise proceed to the next step.

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4.)   Press "0" to exit the *Security Menu* if you are done. If the exit is successful, you should hear **"XS"**.

Exit Security Menu (0)

After you have selected and/or completed the desired mode and operations you should always exit the Security Menu by pressing "0". The MFJ-664 will respond with Morse code verification "**XS**" (eXit Security). Upon exiting the *Security Menu* the MFJ-664 resumes operation in the selected mode(s).

Voice Beacon Mode (*)

Beacon mode repeats a recorded message with a specified amount of time in between each repeat. Refer to *Voice Beacon Mode* under the **Modes** section.

To Enter Voice Beacon Mode

1.   Enter the *Security Menu* by entering a valid security code.
2.   Press "*". You will hear a "beep" when you listen.
3.   After the beep, transmit the desired beacon voice message.
4.   When you listen, after you have recorded your message, the message will play. Be prepared to listen and review the message for errors.
5.   After the recorded message playback is played, you will hear the verification code "**BM**" (Beacon Mode).
6.   If you are *NOT* satisfied with your message, return to step 2 and record a new beacon message. Otherwise, continue to the next step.
7.   If you wish to change another security function, enter that code. Otherwise continue.
8.   Press "0" to exit the *Security Menu*. If the exit is successful, you should hear **"XS"** (eXit Security).

MODES

Voicemail Mode

Voicemail mode enables you to receive messages while you are not monitoring your radio. You must first record an announcement, refer to *Record New Voicemail Announcement* under the **Security Menu** section of this manual. Your announcement will remain the same until you re-record it. Make sure to include an **ID** in your announcement, so that you will comply will with FCC guidelines.

Your friends can leave you a message by entering the user code from a radio on the same frequency. After entering the code, they will hear your announcement and then a beep. At this time they can leave a message. After they leave their message and unkey their radio, their message will be replayed so that they can verify that their message was recorded correctly. While their message is being recorded, the *Rec* LED on the unit will illuminate, and will then flash to let you know that their is a new message. Once the LED is flashing the unit is ready to receive another message.

To check your messages refer to *Check Voicemail Messages* under the **Security Menu** section of this manual. To delete messages refer *Delete Messages* section of this manual. Deleting messages does not erase the memory; it only allows you to record over it. Single messages cannot be marked for deletion; it is either all or none. If you erase messages and then check your mail, you will be able to play through the entire memory. If you do not delete your messages, the next messages recorded will be placed after the end of the last message. When the memory is full, the unit will send a "**FULL**" when a user tries to access the Voicemail. New messages will not be able to be left until you delete the old ones.

Your MFJ-664 has 120 seconds of audio memory (see *Memory*). The first 10 seconds is always dedicated to your announcement. The last 110 seconds is partitioned depending on which mode you are in. In Mail Mode, the entire 110 seconds is available for Voicemail messages.

Simplex Repeater Mode

The Simplex Repeater Controller will extend the range of your radio by allowing you to use another radio as a "relay". The Simplex Repeater is different than the Duplex Repeater systems that most hams are probably familiar with. Duplex repeaters occupy two channels, one for listening and one for simultaneously re-transmitting. Duplexing offers the convenience of real-time conversation, but the hardware is generally too large and complex to move around for portable use. The Simplex Repeater mode is the default mode after reset. When a signal is received by the radio connected to the MFJ-664, while it is in Simplex Repeater mode, the unit will record the audio. While the audio is being recorded, the red *Rec* LED will illuminate. When the transmission has been recorded, the unit will play it back. This playback will pass along your transmission. Everyone in the range of the "repeater radio" will hear the signal, including you.

The message length may be up to 110 seconds. If the transmission exceeds 110 seconds, the unit will **wait** until the transmission is over before it is played back. If a constant signal is fed to the Simplex Repeater, the unit will be "locked up".

The Simplex Repeater has ≈1 second of pick-up time. This means that it will take up to 1 second for the unit to evaluate the signal, and decide that if it is valid. This evaluation keeps the unit from repeating unwanted interference. Therefore, for the best results, wait ≈1 second after keying up the radio before speaking.

The Simplex Repeater also has a drop time before a record cycle is terminated, this allows intermittent or weak signals to be recorded (refer to ***Operating Tips***).

Note: The different modes must share the same memory space. Therefore, when you use the Simplex Repeater or the Voice Beacon, your Voicemail messages will be recorded over and the message count will be reset to zero.

Voicemail and Simplex Repeater Mode

This mode enables the Voicemail and the Simplex Repeater to be active at the same time. If DTMF tones are present, they will be tested for a valid code. Otherwise, the incoming audio will be recorded. In this "dual" mode, the Voicemail has a memory of 80 seconds to hold messages, and the Simplex Repeater has 25 seconds of memory available. Other than the memory reallocation, the modes function the same as when they are separate.
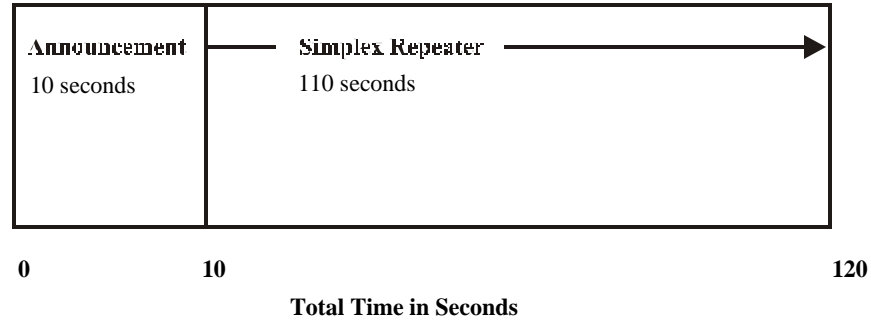
Voice Beacon Mode

The Voice beacon repeats a recorded message with a user specified amount of time in between each repeat. The delay time ranges from 1 to 256 seconds (1 second to 4 minutes 16 seconds). The message may be a maximum of 110 seconds long. Each time Beacon Mode is selected from the Security Menu, you will hear a beep and the unit will expect you to leave the message that you want the beacon to repeat. After the beep, start recording the message that you want repeated. When you are through, unkey your radio and the unit will playback the message that you just recorded terminated with the verification code "**BM**". If you are not satisfied with this message, you may record a new one by same means as the first one. When you exit the Security Menu the first playback will begin. Pressing the *STOP/RESET* button will pause the beacon playback until the *STOP/RESET* button is pressed again or until any DTMF tone is present. When you wish to stop the Beacon Mode, you must access the Security Menu while the unit is not on a playback cycle (your radio cannot transmit and receive at the same time). Once you are in the Security Menu you must select another mode to quit the Beacon mode. Your Beacon message is lost each time you exit the Beacon Mode, but the delay time will remain the same until you change it or reset the device.
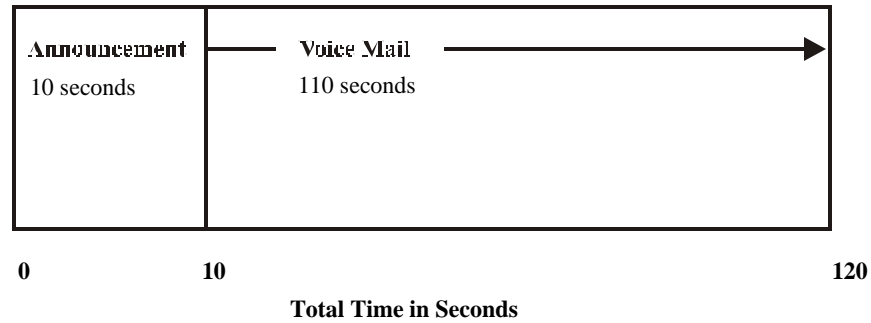
MEMORY ORGANIZATION

The audio is recorded onto an ISD25120 recorder IC. The IC has 120 seconds of storage space. The same memory is shared by the different modes to achieve the longest record times possible for each mode. This "sharing" means that Voicemail messages will be recorded over when other modes are used. Below are diagrams of the memory allocation for the different modes. The first 10 seconds is always reserved for your Voicemail announcement.
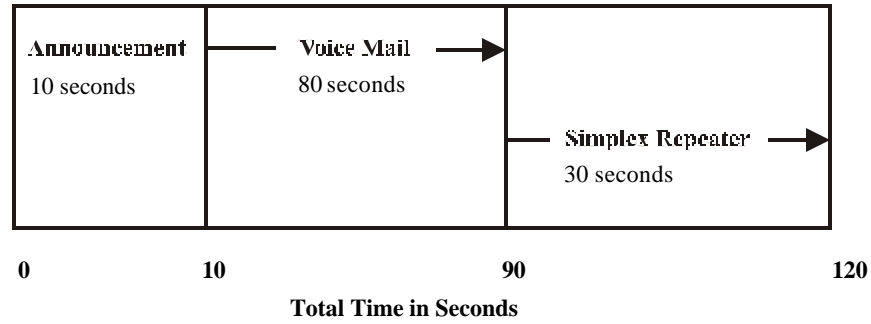
Simplex Repeater Mode

Announcement	Simplex Repeater ⟶
10 seconds	110 seconds

0   **10**   **120**

Total Time in Seconds

Voicemail Mode

Announcement	Voice Mail ⟶
10 seconds	110 seconds

0   **10**   **120**

Total Time in Seconds

Voicemail and Repeater Mode

Announcement	Voice Mail	
10 seconds	80 seconds	
		Simplex Repeater
		30 seconds

0   10   90   120

Total Time in Seconds

Voice Beacon Mode

Announcement	Foxhunt Beacon	
10 seconds	First Message	
	Up to 110 seconds	

0   10   120

Total Time in Seconds
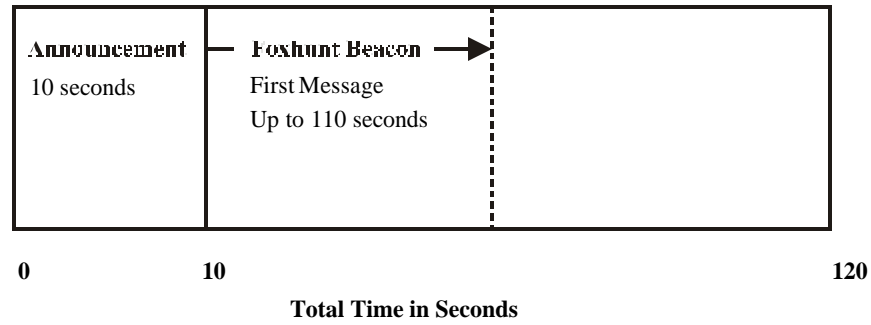
WARNING:	The same memory is shared between the different modes. Switching out of Voicemail Mode can corrupt Voicemail messages.

TROUBLESHOOTING

Won't Activate Transmitter: Check the cable (PTT wiring) and PTT jumper JMP1, see *Selecting A PTT Interface*.

Weak Transmit Audio: Check volume setting and/or adjust Transmit Level JMP2/3, see *Transmit Level*.

Won't Record Entire Transmission: Check volume and squelch on radio connected to MFJ-664, see *Receiver audio level.*

Mushy Transmit Audio: Make sure the MFJ-664 is not too close to the radio, use the entire length of the patch cable.

TECHNICAL ASSISTANCE

If you have any problem with this unit first check the appropriate section of this manual. If the manual does not reference your problem or your problem is not solved by reading the manual you may call *MFJ Technical Service* at **662-323-0549** or the *MFJ Factory* at **662-323-5869**. You will be best helped if you have your unit, manual and all information on your station handy so you can answer any questions the technicians may ask.

You can also send questions by mail to MFJ Enterprises, Inc., 300 Industrial Park Road, Starkville, MS 39759; by Facsimile to 662-323-6551; or by email to techinfo@mfjenterprises.com. Send a complete description of your problem, an explanation of exactly how you are using your unit, and a complete description of your station.

SCHEMATIC