

APPENDIX 5
USERS MANUAL

THIRTY (30) PAGE USER INSTRUCTIONS FOLLOW THIS SHEET

USERS MANUAL
FCC ID: MGPFR-465P1

APPENDIX 5

Wireless Marketing Corporation

“FR-465 Plus”

FCC ID MGPFR-465P1

Family Radio Service

UHF TRANSCEIVER

USER'S MANUAL

TABLE OF CONTENTS

CONTENTS	PAGE
■ INTRODUCTION	3
■ TO RECEIVE	3
■ TO TRANSMIT	4
■ DESCRIPTION OF FEATURES	5
-DISPLAY PANEL FEATURES	5
-TOP PANEL FEATURES	6
-SIDE AND BACK PANEL FEATURES	8
-FRONT PANEL FEATURES	9
■ OPTION SETTING MODE	18
■ BELL/VIBRATOR FEATURE	21
■ MELODY CALL FEATURE	21
■ VITAL LINK FUNCTION.....	22
■ VOICE ALERT FUNCTION	25
■ PANIC ALARM FUNCTION	26
■ RADIO CLONING FUNCTION.....	27
■ SELF TEST FEATURES.....	27
■ FRS CHANNEL FREQUENCY TABLE	28
■ CTCSS TONE TABLE	28
■ BATTERY PACK INSTRUCTION	29
■ SPECIFICATION	30

■ INTRODUCTION

Congratulations on your purchase of the CHEROKEE™ FR-465Plus Advanced Family Radio Service (FRS) Portable Radio. Your CHEROKEE™ radio is designed to provide trouble-free service and advanced user features to make it the premier choice in radio communications.

■ THE FAMILY RADIO SERVICE (FRS)

The Federal Communications Commission (FCC) created 14 channels for the general public use. The output of the radio is limited 500mW Effective Radiated Power (ERP) to avoid interference and has a capability to communicate up to 2 miles (under best conditions).

■ GENERAL FEATURES OF FR-465 PLUS

- Compact size and light weight
- Easy viewing multi purpose back lit LCD display
- CPU controlled frequency synthesizer for reliable operation
- CTCSS Tone Squelch system to avoid listening to interference
- Advanced user features – Vital Link, Panic Alarm, Voice Alert, Scan, Memory Channel, Call Tones etc.
- Optional features – Vibrator to indicate incoming calls. Water Resistance.
- Operates on 5 AAA alkaline battery, Ni-Mh Rechargeable Pack or 7.2V DC Power Supply..
- Connector for external Microphone, Loudspeaker and DC power supply.
- Belt Clip and hand strap for easy carrying
- Choice of colors for the "rubberized" case

■ TO RECEIVE

If you have just transmitted, then release the "PTT" button. If you have not transmitted, just leave the radio on to receive on your selected channel.

The radio will unmute upon receiving a signal. The BUSY icon will appear on the LCD and the S-RF meter will show the received signal strength.

When the radio is operated with CTCSS Tone Squelch (TSQ), and the radio receives a signal with correct CTCSS code, the CALL icon will also appear on the LCD display.

■ TO TRANSMIT

Press and Hold the "PTT" button to transmit.

- A. If Busy Channel Lock Out Option is on and the radio is in the receiving mode, Busy Lock Error Message will appear on the LCD and the radio will stay in receiving mode and you will not be able to transmit.
- B. If Time-Out-Time option is on, the continuous transmitting time will be limited by the time set in this option.

NOTE: Please refer to the different sections in this manual for detail operation procedures for advanced features.

**This device complies with Part 15 of the FCC Rules.
Operation is subject to the following conditions:**

- 1) This device may not cause harmful interference
- 2) This device must accept any interference received, including interference that may cause undesired operation

!! WARNING !!

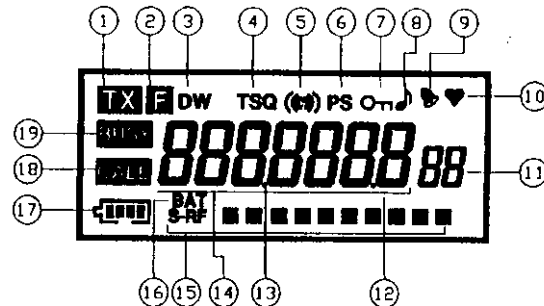
Replacement or substitution of antenna, transistors, regular diodes or other parts of a unique nature, with parts other than those recommended by Cherokee Electronics, may cause violation of the technical regulations of Part 95 of the FCC Rules, or violation of Type Acceptance requirements of Part 2 of the Rules.

LICENSING

FRS radio operators are not required to obtain a FCC license to operate their FRS equipment or provide station identification. Nevertheless, an operator of a FRS radio station is still required to comply with the communication act and with the rules of FRS Radio Operation.

■ DESCRIPTION OF FEATURES

● Display Panel Features



1. TX

Indicates that radio is in the "Transmit" mode.

2. Function Mode

Indicates the "FUNC" button has been selected.

3. DW

Indicates that the "Dual Watch" feature has been activated.

4. TSQ

Indicates that "Tone Squelch" feature has been activated.

5. " (Vibrator) "

Indicate that "Vibrator" feature has been activated.

6. PS

Indicates that the radio is in the "Power Save" mode.

7. " Lock "

Indicates the "Key lock" feature has been activated.

8. " (Beep) "

Indicates that "Beep" tone confirmation is on.

9. " (Bell) "

Indicates that "Bell" feature has been activated.

10. " Vital Link "

Indicates that "Vital Link" feature has been activated.

11. Channel Indicator

Display the channel number in which the radio is operating on.

12. d2 (Dot No. 2)

This dot is used when displaying the "CTCSS" Frequency. (Unit : Hz)

13. d1 (Dot No. 1)

This dot is used when displaying the "Frequency". (Unit : MHz)

14. Channel (Frequency) Indicator

Display the channel number or the frequency in which the radio is operating. When operating on channel 1, if you select channel number display, CH-01 will appear on the LCD. If you select frequency display, 7 digit frequency 462.5625 will be displayed.



15. Signal/RF output meter

The radio incorporates a ten segment received signal strength and transmit meter in the LCD. When receiving a signal, the meter will indicate how strong the signal is. One or two segments will indicate a weak signal, while a very strong signal will have 8 to 10 segments. When transmitting, the letter "TX" will appear on the LCD and all 10 segments will appear on the LCD.

16. Battery remainder level meter

You could view the battery level while loading the battery for transmit by pressing PTT while holding down the MO button. "BATT" icon will appear on the LCD and the 10 segment Signal Meter indicates the battery level from 1 (Low) to 10 (Full).

17. "  " (Battery Low Indicator)

Indicates batteries level. "  " icon indicates a full battery condition and when the battery level becomes low, the indicator will show "  " and flashing, indicating that the battery needs to be replaced or recharged.

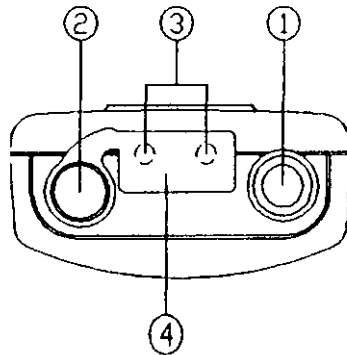
18. CALL

Indicates that a call is received with correct CTCSS code in the CTCSS Tone Squelch operation.

19. BUSY

Indicates that a RF signal is received.

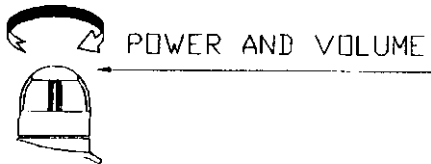
• Top Panel Features



1. Power On/Off, Volume Control

Turn the Volume control clockwise to switch power on and set volume to desired level. Turn the Volume control counter-clockwise to turn power off.

<Power Switch and Volume Control>



2. Antenna

The antenna is an integrated part of this FCC approved FRS radio for best performance on the FRS frequencies. The user shall not modify or connect any external device to the antenna to change its characteristics.

3. Microphone and Speaker Jack

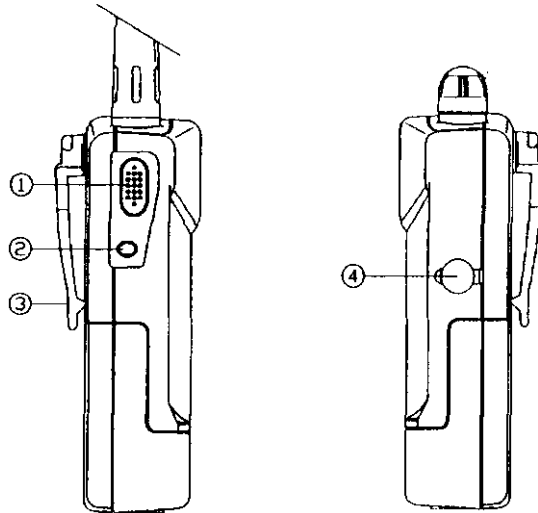
The jacks are for connection of optional speaker microphone accessories. Since BTL(Bridge Tied Load) Audio Amplifier is used in this radio, Authentic Cherokee Accessories with floated ground on the loudspeaker wires shall be used

NOTE : *If you use an External Speaker/MIC with ground circuits common for both microphone and loudspeaker with this radio, the radio's BTL Audio Circuit would be overloaded and becomes damaged over time. We therefore recommend you to use Cherokee's External Speaker/MIC. If you want to use External Speaker/MIC from other suppliers, make sure that you get one with correct wiring connections.*

4. Dust Cover

When External Speaker/MIC are not being used, this rubber cover prevents dirt and moisture from getting to the inside of the radio. For radios with WP option, the rubber cover must remain plugged in tight to avoid water ingression.

• **Side and Back Panel Features**



1. PTT(Push-To-Talk) Button

Press the "PTT" button to activate the transmitter : Talk in a normal voice about 2-3 inches from the internal microphone. When external microphone is connected, the external PTT control activates the external microphone and the PTT control on the radio activates the internal microphone. To receive, just release the "PTT" button.

2. Function(FUNC) button

The function button activates the secondary function of the front panel buttons. Press and hold the "FUNC" button and then press the front panel button to access the secondary function.

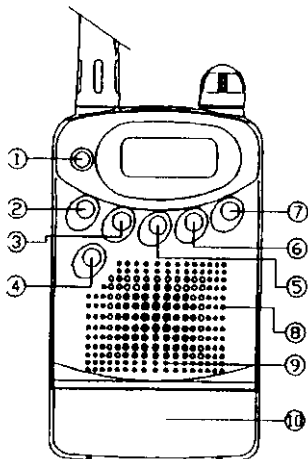
3. Belt Clip

Allows the user to attach the radio to the belt, shirt pocket, on the side window of the car... etc

4. DC Jack

For connection to optional AC Wall Charger, or Car Cigarette Lighter DC Power Supply Adapter. Do not connect charger or power supply to the radio if you are using Alkaline Batteries.

• **Front Panel Features**



1. "MO", "Fr/Ch" Button

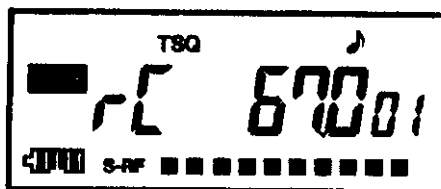
1) MO(Monitor)

Press and hold the "MO(Monitor)" button in the receiving mode, both carrier and tone squelch circuit will be temporarily disabled and the receiver noise will appear on the loudspeaker until the "MO" button will be released.

You can listen to a signal with incorrect CTCSS code is received during CTCSS operation by pressing and holding the "MO" button.

You can also check the status of the TX and RX CTCSS tone squelch setting and the Scan Skip setting of the radio by press and holding the "MO" button for more than one second. The settings will flash on the LCD one by one, each last for 1 second. The LCD will revert to display channel numbers after completing the sequence.

□ Display of RX Tone.



Both the small and big digit display indicate RX/TX channel number.



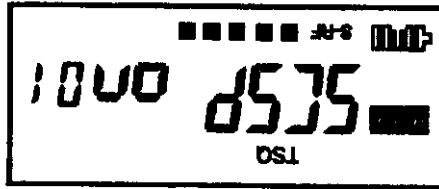
□ Display of Channel(RX/TX Channel)

The last 2 small digits indicate channel number, and the 7 big digits indicate RX/TX frequency



□ Display of Frequency(RX/TX Channel)

2) FrCh (Selection of Frequency or Channel Number Display)
If you press the "FUNC + MO(FrCh)" button when Frequency is displayed on the LCD, Channel No. will appear on the LCD. Press the "FUNC + MO(FrCh)" button once again and the Frequency will be displayed



□ Display of SCAN Skip Condition.



□ Display of TX Tone.

2. Channel Down(▼)/"PS" Button

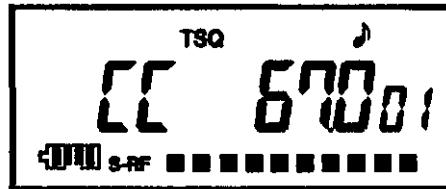
1) Channel Down(▼) button

Press the "▼" button to change the radio to operate on a lower Channel Number than is currently shown on the LCD.

2) PS(TONE Selection) Button

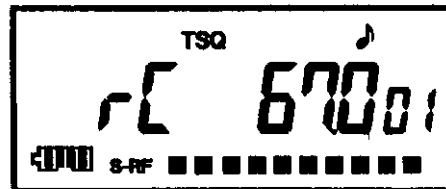
Press "FUNC + DOWN(PS)" button in the receiving to enter the Channel RX/TX Tone Squelch setting mode (Note: This selection is not available when the radio is in Scan or Dual Watch Mode)

Display of CTCSS RX/TX Common Tone setting mode



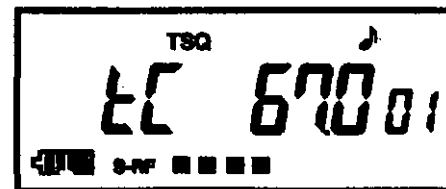
In the above condition, press the "FUNC + ▲ or ▼" button to change to display the RX Tone setting mode. (Note: the tone code number will replace The tone frequency displayed if channel number display is selected by operating the "FUNC" "MO" buttons while the radio is in receive mode)

Display of CTCSS RX Tone setting mode



In the above condition, press the "FUNC + ▲ or ▼" button to change to display the TX Tone setting mode.

Display of CTCSS TX Tone setting mode



In the above condition, press the "FUNC + ▲ or ▼" button to change back to display the Common Tone setting mode.

When Common Tone is selected, the radio will apply the selected CTCSS tone

on both TX and RX operation. Common Tone is the preferred and basic mode of operation.

The user could also choose different TX and RX CTCSS tones to perform special and advanced operation – Such as group calls and enhanced scanning ..etc. Just remember to enter the correct CTCSS code on both TX and RX CTCSS Tone setting menus respectively.

When the radio is displaying the CTCSS code, pressing the "▲ or ▼" button will increase or decrease the Tone Frequency or Tone Channel No. If you press and hold the "▲ or ▼" button for more than one second, Tone Frequency or Tone Channel No. will scroll at a fast rate.

When the radio displays the CTCSS code you desired to use, you could change to display another CTCSS Tone setting menu by pressing "FUNC" and "PS/PO" buttons. After all the settings are completed, press PTT button to confirm your selections. The selected contents will then be stored and the radio will revert to normal operation. You could then activate Tone Squelch operation by pressing "FUNC" and "PO" buttons.

3. Channel Up(▲), "PO" Button

1) Channel Up(▲) button

Press the "▲" button to arrow to move to a higher Channel than is currently shown on the LCD.

2) PO(TONE ON/OFF) Button

Press the "FUNC + ▲(PO)" button while in the receiving mode to toggle the Tone Squelch ON and OFF (not available in Scan/Dual Watch Mode). "TSQ" icon will appear on the LCD when Tone Squelch is switched ON.

NOTE: In Tone Squelch operation, the loudspeaker of the receiver will only become active while the received signal has the same CTCSS code as the one selected in the RX CTCSS Tone setting menu. Although you could not hear interference or transmissions from other users, they could still exist and may reduce your communication range. It is always a good practice to monitor the channel using the "MO" button, to ensure that it is free of interference before you choose it for communications. Also, transmission in CTCSS is not protected and is subject to monitoring by other users using the same radio channel.

4. ☼ (Lamp), "BP"(Beep) Button

1) ☼ (Lamp) Button

Press the "☼" button, the lamp will stay on for four seconds, after which it will turn itself off automatically. If you press another button on the front cabinet when the lamp is on, the lamp will stay on for four more seconds. If you press the "☼" button for more than one second, the lamp will stay on until you press the "☼" button once again.

2) Vital Link

To Activate : Turn the power off. Turn on the radio while pressing the "☼" button. Please refer to the section of Vital Link Function for detailed operation.

3) BP(Beep) Button

This feature gives the user an audible test tone sequence while turning the radio on, and short confirmation or error tones when the user presses a button on the radio (Except for PTT and "MO" buttons).

Press "FUNC + LAMP(BP)" button to switch the "Beep" on and off.

The confirmation tone is a high pitch tone indicating that the button selection is accepted. The error tone is a low pitch tone indicating that the button selection is rejected due to incorrect key entry sequences or the feature requested is not compatible with currently selected operating mode.

5. MEMORY READING, WRITING AND DELETING

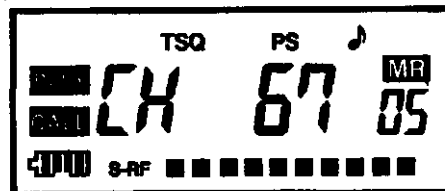
1) MEMORY CHANNEL READING

This feature allows the user to check the contents of the 10 memory channel locations, and stay on any of the memory channels for operation. To enter the memory channel reading mode, press the "MR" button. The last used Memory channel will appear on the LCD together with the "MR" icon. You can then scroll through other memory channels by using "▲" or "▼" buttons. Empty memory channels will not be displayed when "▲" or "▼" button is operating.

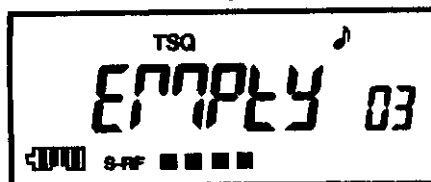
When a memory channel is displayed, the radio will operate on that channel with all the parameters stored (Frequency, TSQ... etc.). Press the "MR" button again to exit the memory reading mode. The "MR" icon will disappear and the channel display is reverting to show the normal channel last used.

When all memory channels locations are empty, "EMPTY" message will be displayed and the unit will return to normal channel display mode automatically.

□ Display of Memory channel



□ Display of the "EMPTY" message

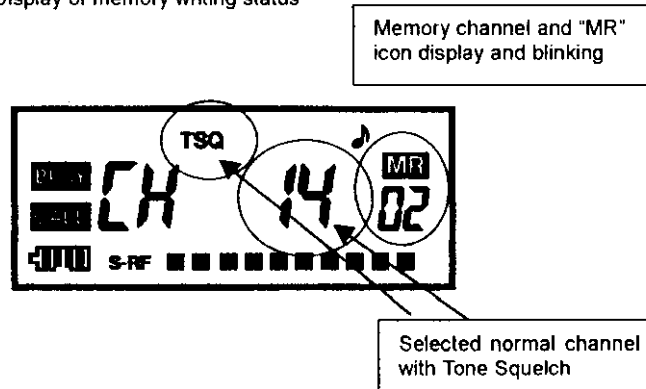


2) MEMORY CHANNEL WRITING

This feature allows the user to store a normal operating channel to a memory channel.

Select the channel by using "▲" or "▼" button in normal receive mode, select tone squelch settings if needed, then press the "FUNC + MR(MW)" buttons to scroll through all the empty memory channel displayed on the small channel indicators. Note that the "MR" icon and the small channel display flashes. Stop scrolling when you have reached the desired memory channel location and press PTT to store the channel settings into the memory channel. After the memory store operation, the radio will revert to memory channel reading mode on the memory channel that you have just entered. Press "MR" button again if you want to exit to normal operation

() Display of memory writing status



3) MEMORY CHANNEL DELETING

Memory channel deleting is possible only in the memory channel reading mode ("MR" icon display status not blinking status).

To delete the memory channel,

First, select the memory channel to be deleted by using "▲" or "▼" button.

Second, press the "FUNC + MR" button more than 1.5 second.

The "DELETE" message will be displayed on the LCD and the memory channel is erased.

When all memory channels are deleted, the "EMPTY" message will be displayed and the "MR" icon will disappear. The radio will then revert to normal channel display mode.

Display of memory channels deleting – when a memory channel is deleted



6. "SC", "DW" Button

1) SC(SCAN) Button

This feature allow the user to scan all the 14 FRS channels for activities. Tone squelch preset on each channel by the user will be utilized during scan operation. Scan will not work when the radio is in the Tone Frequency Setting or Dual Watch modes.

Press the "SC" button to start scanning. The radio will stop on any busy channel. It will remain on that busy channel until the preset Scan Delay Timer expires, it will revert to scanning after then. D1 (dot1) on the LCD will blink every 0.5 seconds when the Scan Delay Timer is active. The user could cancel scanning by pressing the PTT while the radio stops at a busy channel, and communicate with other users using that channel.

Other Scan associated features:

-Pressing the "▼(▲)" button while the radio is scanning will change the direction of scan between ascending and descending.

-During Tone Squelch operation, the radio will not stop on the busy channel if the received signal does not have a matched CTCSS code.

Scan Skip feature:

-When the user presses the "FUNC" button while the radio stopped scanning on a busy channel, the channel will be deleted from its future scans. The deleted channel will be recovered after the radio is turned off and back on.

□ Display of SCAN SKIP message



During normal operation, the user could check on any channel to see whether they were deleted from the scan during previous scanning operation by press and hold the "MO" button. The Scan Skip message will appear following the Tone Squelch status display. SCSP ON meaning the channel has already been deleted from the last scanning operation. The deleted channel will be recovered after the radio is turned off and back on.

When the user tries to skip the last remaining channel after all other channels are deleted, the scanning process will stop and "EMPTY" message will appear on the LCD. Further pressing the "SC" button will result in error tone and the frequency last scanned or last selected will stay on the LCD display.

□ Display of EMPTY message



2) Dual Watch Operation

Dual Watch allows the user to monitor another channel (A) while standing by on its normal operating channel (B). Dual Watch cannot operate while the radio is under Tone Frequency Setting, Memory or Scan Mode.

-First select the channel in which you want to monitor, which we will refer to as Channel (A). Press the "FUNC + SC/DW" button, "DW" will appear on the LCD. Select the Channel B using the "▼(▲)" button. Once Channel B has been selected, the radio will enter the Dual Watch mode.

□ Display of Dual Watch Feature.



To turn off the "Dual Watch" Channel, simply press the 'FUNC + SC/DW' or press the "PTT" button. Note that the radio will return to the "B" channel for normal operation.

If you press the "FUNC + SC/DW" button or press the "PTT" button when a signal is receiving on the channel "A" or "B", the Dual Watch feature will be turn off on the "A" or "B".

The use could use the "▲ or ▼" buttons to change its normal operating channel while remain monitoring Channel A in Dual Watch. The radio will always transmit on Channel B while PTT is depressed.

7. "C", "LOCK" Button

1) C (Call) Button

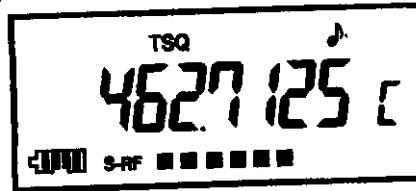
The Call button allows the user to access to a preset channel by touching only one button.

Preset – Select the channel the call button operates. Press "FUNC" and "MR" button to enter memory write mode, then press "C" button for 1.5 seconds to store the channel into the call memory. Touch "C" button again to revert to

normal operation.

Use - Press the "C" button to go directly to the call channel while the radio is in the receiving mode, including Memory channel mode, Scan Mode and Dual Watch operations. Press "C" button again to go back to normal operation.

- Display of Call channel No.(Frequency)



2) LOCK

This feature allows the user to lock the operation of "Channel Up/Dn", "MR", "SC" and "C" button selections. An error tone will be heard and the operation is denied when the user press those buttons after the radio is being locked.

To Activate : Press the "FUNC + C(LOCK)" button. The "On" icon will appear on the LCD to indicate that this feature is currently activated.

To De-Activate : Press the "FUNC + C(LOCK)" button again to unlock. The "On" icon will disappear from the LCD.

8. Internal Microphone

Front mounted, electrostatic condenser microphone to provide clear high quality audio transmission. For best results, hold the radio 2-4 inches from your mouth and speak in a normal voice.

9. Loudspeaker

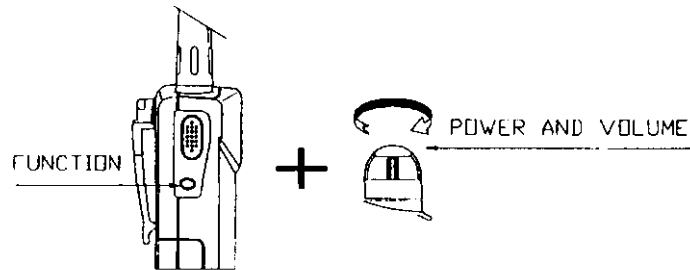
High quality, impact resistant output loudspeaker, to provide clear and high volume reception.

10. Battery Case

See "Battery Installation Instruction" for details.(Page 18)

■ OPTION SETTING MODE

The following procedure allows the user to access option feature settings. To enter option setting mode, first turn off the radio, then press and hold "FUNC" button while turning on the radio. Press "FUNC + ▲ or ▼" button to scroll through all the options.



NOTE : While you are in the option setting mode,

- A. If you hold "FUNC" button and then press "▲ or ▼" button, the next(previous) option setting mode will appear on the LCD.
- B. If you press the "PTT" button, all changed contents will be stored and the radio will return for normal operation.
- C. Other buttons located on the front of the radio will not operate. If you press these buttons, error beep tone will sound.

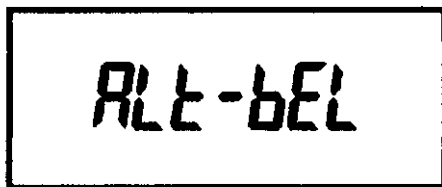
1. Select of Melody (Bell) or Vibrator Alert for Incoming Calls

The first selection displayed in the option setting menu is Melody (Bell) or Vibrator Alert.

□ Display of Vibrator Alert setting Mode.



□ Display of Melody (Bell) Alert setting Mode.



Press "▲" or "▼" button to change between Vibrator and Melody Alert.

Note: Vibrator is only available in the radios fitted with vibrator option.

2. Setting of Power Save mode

This feature enables power save circuit in the radio to reduce battery power consumption and increase the useful life of your battery significantly when no signal is received during normal receive standby mode.

- Display of Power save On/Off setting Mode.

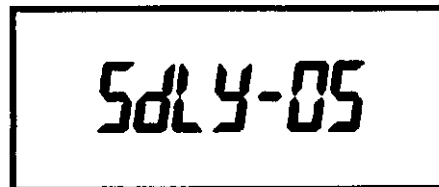


Press "▲" or "▼" button to toggle power save On and Off. The "PS" icon on the LCD will appear when power save option is On. The icon will flash when the power save circuit is in operation during normal receive standby mode.

3. SCAN Delay Time

This feature allows the radio to stop on a busy channel during scanning operation for a preset period of time of 1 to 30 seconds (The default setting is 5 seconds), scanning will resume after the time expires.

- Display of SCAN Delay Time Mode

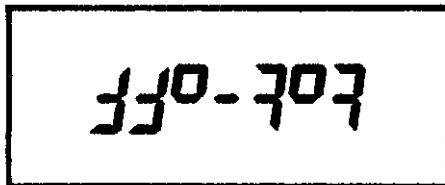


Press the "▲" or "▼" button to change the scan delay timer between 1 to 30 seconds in 1 second steps.

4. Setting of Time-Out-Timer

This feature allows the user to limit the maximum talk time for each transmission. If the PTT is depressed for a period exceeding the Timer out Timer, the transmitter will be cut off and the user has to release and press the PTT again to transmit.

Display of Time-Out-Time setting mode.

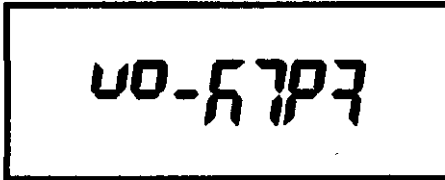


To change the timer setting, press the "▲" or "▼" button.

5. Setting of TX Delay Option

In CTCSS Tone Squelch operation, this feature prevents "Squelch tail" being received by other users when the "PTT" button is released.

Display of TX Delay Option Setting Mode.



Press "▲" or "▼" button to toggle TX Delay option between On and Off.

6. Setting of Busy Channel Lock Out

This allows the user to disable the transmitter while receiving a message from others. This will avoid interference on the radio channel.

Display of Busy Channel Lock Out Setting Mode.



Press "▲" or "▼" button to toggle Busy Channel Lock Out option between On and Off.

NOTE : If you press "PTT" button while operating in Busy Channel Lock Out mode (When receiving a signal), error message (BSY LOC) will appear on the LCD and the radio will stay in the receiving mode.



■ BELL / VIBRATOR FEATURE

Function : The user is alerted of incoming calls by Bell Indicator and an audible tone, or by a Vibrator unit installed inside the radio.

To Activate :

After selecting the Bell or the Vibrator as the device for alert operation in the option setting mode, press the "FUNC+PTT" buttons to activate the feature. The Bell icon "🔔" or Vibrator icon "🔊" will appear on the LCD.

Upon receiving an incoming call, the selected alert function (Bell or Vibrator) will be activated for about 8 seconds and then stopped for 15 seconds. Any incoming calls received during the 15 seconds will not trigger the alert device. The Bell or Vibrator icon on the LCD will blink, indicating that a call has been received. The radio will automatically re-armed and ready for another alert after the 15 second timer expires.

The user could restore the flashing Bell/Vibrator icons by pressing the "FUNC+PTT" buttons, ready to register for another incoming call.

To De-activate :

Press the PTT button, and the Bell or Vibrator feature is de-activated. The Bell or Vibrator icon will disappear from the LCD.

■ MELODY CALL FEATURE

The user could transmit one of the six melody tones provided in the radio to indicate its identity, or to test the audio performance of the radio.

To operate, simply press "▲, ▼, MR, SC, C" or "🔊" button while holding down the PTT.

NOTE: FCC restricts the transmission of audible tones on the FRS to less than 15 seconds.

■ VITAL LINK FUNCTION

VITAL LINK is an advanced feature to keep people in touch in two different types of operation:

Linked PTT Alert Operation
Linked Voice Alert Operation

LINKED OPERATION

In this operation, the users are linked together by an invisible radio connection. One radio shall be programmed as "Master" Unit and one or more other radios shall be programmed as "Slave" units.

The master unit will send a 1-second polling transmission every minute. The user could also initiate a polling call by pushing the PTT any time. Upon receiving the polling call, the slave unit(s) will respond with a transponding call for 1 second. If the master unit does not receive ANY transponding call 4 seconds after polling, an out-of-range indication will appear on the LCD of the master unit with an alert tone. The master unit will continue to poll every minute to search for slave unit response. The out-of-range status will be removed if a valid transponding call is received from a slave unit.

The transmission will be conducted on the FRS channel with or without CTCSS tone squelch, which the user last selected before changing the radio from normal operation into the Vital Link Mode.

LINKED PTT ALERT OPERATION

On the top of the Linked Operation, the users could choose PTT Alert, which allows them to use the radio as usual and with the added capability of sending a panic alarm. The user initiates the panic alarm on the slave unit by pressing the "C" button for 1.5 seconds. A panic alarm tone will then be transmitted and the unit will revert to VOX operation. The user could then transmit and receive without pressing any button on the radio. Linked PTT Alert Operation could be cancelled by turning the radio off.

LINKED VOICE ALERT OPERATION

On the top of the Linked Operation, the user could choose Voice Alert which allows an alert tone to be transmitted when an acoustic signal is captured around an active slave unit programmed for Linked Voice Alert Operation. The microphone is active during the transmission and other user(s) would be able to hear the acoustic signal around the slave unit before the transmission drops out. Linked Voice Alert Operation could be cancelled by turning the radio off.

VOICE SENSITIVITY LEVELS AND PTT DROP OUT DELAY

There are 3 voice sensitivity levels (High-Normal-Low) the user could choose

for both Voice Alert Operation and VOX in PTT Alert Operation. PTT drop out delay time during alert operation is fixed at 5 seconds and is not programmable by the user.

To Activate the Vital Link feature and select different parameters :

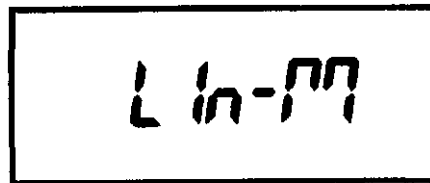
- 1) Turn the power off.
- 2) Turn on the power while pressing down the " ✖ " button. The Vital Link Selection Menu will be displayed on the LCD.

Display showing a Vital Link Slave Unit

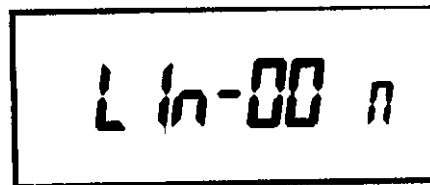


- 3) Press the "FUNC + ▲ (▼)" button to change between "Master (or Slave)" function selection

Display of Vital Link Master Unit



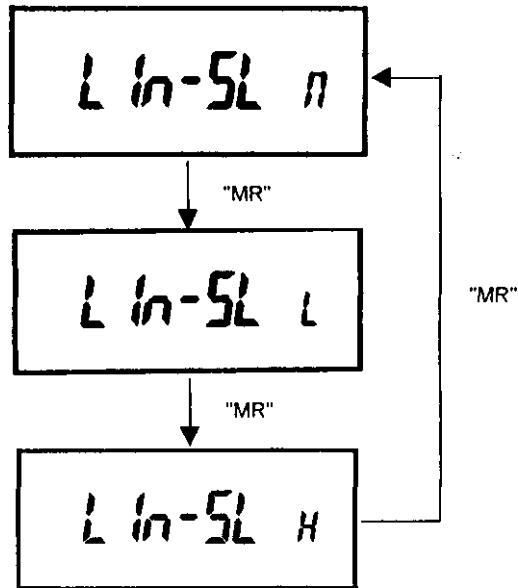
Display of Vital Link Slave Unit



- 4) At the Slave Unit, select PTT Alert or Voice Alert by pressing ▲ (▼) button

- Lln - 00 : Set radio for PTT Alert Operation
- Lln - 05 : Set radio for Voice Alert Operation

- 5) Select the Microphone Sensitivity
There are 3 sensitivity levels (H:High, n:Normal and L:Low Sensitivity).
Pressing the "MR" button cycles the selection of different sensitivity level,

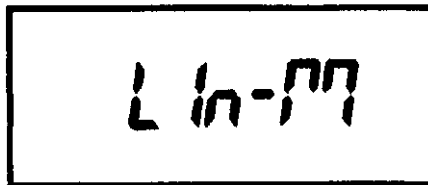


6) Press the "PTT" button to confirm your Vital Link parameter selection. VITAL LINK WILL NOT WORK IF THE SELECTION IS NOT CONFIRMED.

1. OPERATION OF THE MASTER UNIT

Master Unit will send out a 1 second polling transmission to check the Slave Unit every one (1) minute. The user could also trigger polling by pressing PTT.

Display of Master Unit operation

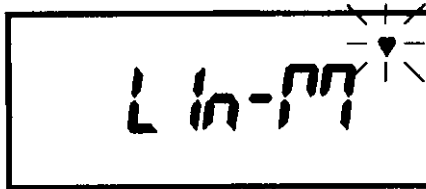


If there is no answer (Transponding transmission) from Slave Unit, the Master Unit will give out an alert tone and display an out-of-range message on the LCD display.

Display showing no answer from the Slave Unit upon polling



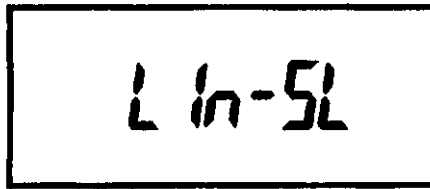
When there is an alert situation of the slave unit, the master unit will receive the alert tone transmission and the "♥" icon will blink at the Master Unit.



2. OPERATION OF SLAVE UNIT

■ VOICE ALERT FUNCTION

Display of Slave Unit operation



The Slave Unit will respond to the Master Unit's polling by giving out a 1 second transponding transmission immediately after polling.

When the Slave Unit is set for Voice Alert, the radio will standby for 20 seconds and the microphone sensor will operate. The "♥" icon on the LCD will blink indicating the unit is ready to pick up any voice or noise around it.

The PTT circuit will be disabled during Voice Alert Operation.

When a voice or noise with acoustic level higher than the preset sensitivity level (H-N-L), the Slave Unit will transmit an alert tone for 8 seconds. The microphone will be active during the whole period plus the 5 seconds PTT delay time such that the voice or noise could be heard by the Master Unit.

Upon completion of the alert tone transmission, the Slave Unit will de-keyed and become idle for 20 seconds. The radio will not respond to surrounding noise during the idle period and the "♥" icon stops blinking.

When the idle time expires, the radio will return to monitoring the surrounding acoustic activities and the "♥" icon blinks again.

■ PANIC ALARM FUNCTION

The users could use the radio to communicate normally when in Linked PTT Alert Operation. A beep tone at the end of each transmission indicates the units are operating on PTT Alert Mode.

When a Slave Unit is set to operate on PTT Alert, the user could activate the Panic alarm by pressing the "C" button for over 1.5 second. The radio will transmit a Panic Alarm tone for 14 seconds and then revert to Voice Activated Transmit. The word "HELP" will appear on the LCD during the whole operation.



The user could transmit by just speaking into the internal microphone of the Slave Unit. There is a 5 second transmission delay timer to ensure that there is no breaking of transmission during short pauses within the call. When the transmission ends, the radio will revert to receive mode for listening to the master unit, or to wait for another voice activated transmission from the user.

The "♥" icon on the LCD will blink when the unit is on VOX operation. The VOX sensitivity can be adjusted between H-N-L by pressing the MR button. VOX will be temporarily disabled when the radio is receiving transmission from others.

The PTT button will be disabled during VOX operation. Pressing the "C" button for over 1.5 seconds will stop the VOX operation and the radio will then revert to PTT Alert mode.

■ RADIO CLONING FUNCTION

The user could use this function to copy the user defined option settings, tone squelch settings and memory channel settings from one FR465+ radio to another using the option Cloning Cables.

Insert the two cloning cables to the Ext. Mic and Speaker Jacks of the Master Unit (the one which provides the setting data) and the Slave Unit (the one which accepts the setting data)

To enter cloning mode –

Master Unit - Turn off the radio, turn the radio on while holding "FUNC+ ▲" buttons. The LCD will display "Clone" for 1 second and then "MASTER"

Slave Unit – Turn off the radio, turn the radio on while holding "FUNC + ▼" buttons. The LCD will display "Clone" for 1 second and then "Slave"

Press the "MO" button on the Master unit to start data transfer. Observe that the LCD display will change to "Send" in Master Unit and "Receive" in Slave Unit. The transfer will take about 20-30 seconds.

When the transfer is completed, both radio will display "good" on the LCD. The display of master unit will revert to "Master" and the slave unit will reset and revert to normal operation.

The user could then remove the Cloning Cable from the slave unit, and prepare another slave unit for cloning using the procedure above. When the Slave Unit is ready (showing "Slave" on the LCD). Press "MO" button of the Master unit to start data transfer.

The Master Unit can be reset by turning off the power.

■ SPECIAL TEST FEATURES

POWER ON SELF TEST

Press and hold the "MO" button while turning the power on will put the radio into self checking mode. It will display all the icons and digits on the display and turn on the vibrator (if fitted) momentarily.

Press PTT button will put the radio back to normal operation. Press any other button will put the radio into buttons checking mode, it will display "PRESS Dn" to instruct you to press the "▼" button. Follow the instructions until you have pressed all the buttons (except PTT). The radio will then display "good" and revert to normal operation.

INITIALIZATION

Press and hold the "FUNC" and "MO" buttons while turning the power on will put the radio into initialization mode. The radio will display "Initial" and then "Pass" to indicate that all the user settings in the memory are reset to original factory settings. This feature is useful when you have mis-programmed

the radio and the radio is not operating normally, or when there is an error in the memory which needs to be erased and corrected.

■ FRS CHANNEL FREQUENCY TABLE

Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)
1	462.5625	8	467.5625
2	462.5875	9	467.5875
3	462.6125	10	467.6125
4	462.6375	11	467.6375
5	462.6625	12	467.6625
6	462.6875	13	467.6875
7	462.7125	14	467.7125

■ CTCSS TONE TABLE

NO.	FREQ(Hz)	NO.	FREQ(Hz)	NO.	FREQ(Hz)
1	67.0	17	114.8	33	186.2
2	69.3	18	118.8	34	189.9
3	71.9	19	123.0	35	192.8
4	74.4	20	127.3	36	196.6
5	77.0	21	131.8	37	199.5
6	79.7	22	136.5	38	203.5
7	82.5	23	141.3	39	206.5
8	85.4	24	146.2	40	210.7
9	88.5	25	151.4	41	218.1
10	91.5	26	156.7	42	225.7
11	94.8	27	159.8	43	229.1
12	97.4	28	162.2	44	233.6
13	100.0	29	167.9	45	241.8
14	103.5	30	173.8	46	250.3
15	107.2	31	179.9	47	254.1
16	110.9	32	183.5	48	NO TONE

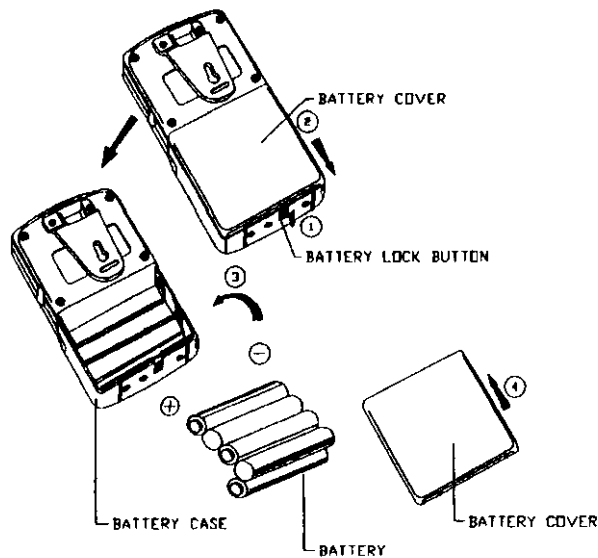
■ BATTERY INSTALLATION INSTRUCTIONS

1. Press down the battery lock button on the bottom side of the radio to unlatch the lock. (1)
2. Slide open the battery cover on the back side of the radio towards the indicated direction. (2)
3. Install the battery as the indicated arrangement (3) Please note the polarity of the batteries.
4. Put the battery cover back on the radio. Press and slide to close (4).
5. Press the battery lock button upward to lock the battery case.

If you have installed rechargeable "AAA" size batteries, or used the Cherokee NiMh rechargeable pack. You could use the optional DC wall charge adapter, desktop charger or car cigarette lighter DC adapter to charge the batteries.

NOTE: Alkaline RENEWABLE batteries are NOT regular rechargeable batteries. It require special battery charger to recharge.

WARNING: DO NOT CHARGE ANY BATTERIES OTHER THAN NiCd OR NiMh RECHARGEABLE TYPES IN THE RADIO. CHARGING BATTERIES INCORRECTLY WILL RESULT IN EXPLOSION AND CAUSE SERIOUS DAMAGE TO THE RADIO AND ITS OPERATOR.



■ SPECIFICATIONS

1. GENERAL

CHANNEL ----- 14 FCC APPROVED FRS CHANNELS
TONE SQUELCH (CTCSS) ----- 47 CTCSS CODES
FREQUENCY ----- 462.5625MHz TO 467.7125MHz
467.5625MHz TO 467.7125MHz
FREQUENCY GENERATION --- PLL SYNTHESIZER
FREQUENCY STABILITY ----- +/- 2.5ppm
OPERATING TEMPERATURE ---20°C TO +50°C
POWER SOURCE ----- DC POWER SUPPLY / BATTERIES
STANDARD - 5 x "AAA" ALKALINE CELLS
OPTION -DC7.2V WALL CHARGER OR CAR PLUG
OPTION -6x"AAA" NiMh 500mAh RECHARGEABLE
OPTION -6x"AA" NiMh 1200mAh RECHARGEABLE
MODULATION ----- FREQUENCY MODULATION (F3E)
ANTENNA IMPEDANCE -----50 ohms
DIMENSIONS ----- 58(W) x 103(H) x 26.5(D)mm
WEIGHT ----- 118g WITH OUT BATTERY

2. RECEIVER SECTION

CIRCUIT TYPE ----- DUAL CONVERSION
SUPERHETERODYNE FM
IF FREQUENCY ----- 1st IF:21.4MHz 2nd IF:455KHz
SENSITIVITY ----- 0.25uV FOR 12dB SINAD
CHANNEL BANDWIDTH----- 12.5KHz
SELECTIVITY ----- 50dB Min.
SPURIOUS & IMAGE REJECTION ----- 40dB Min
INTER MODULATION DISTORTION----- 50dB Min
S/N RATIO (WITH CCITT) ----- 40dB Min
AUDIO OUTPUT @10%THD ---- 500mW 16Ω, BTL

3. TRANSMITTER SECTION

POWER OUTPUT ----- 500mW (ERP)
DISTORTION ----- 3%
DEVIATION ----- +/- 2.5KHz
S/N RATIO (WITH CCITT) ----- 40dB
CURRENT DRAIN ----- 600mA Max

APPENDIX 6
TRANSMITTER ALIGNMENT

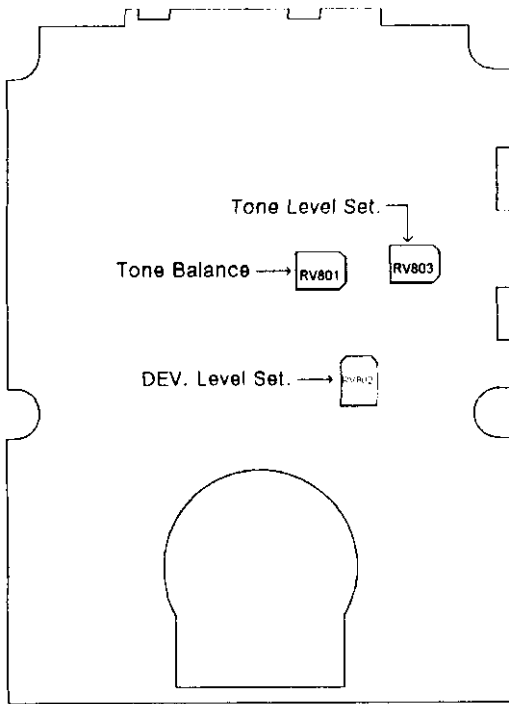
THREE (3) PAGE ALIGNMENT PROCEDURE FOLLOWS THIS SHEET

TRANSMITTER TUNE-UP PROCEDURE
FCC ID: MGPFR-465P1

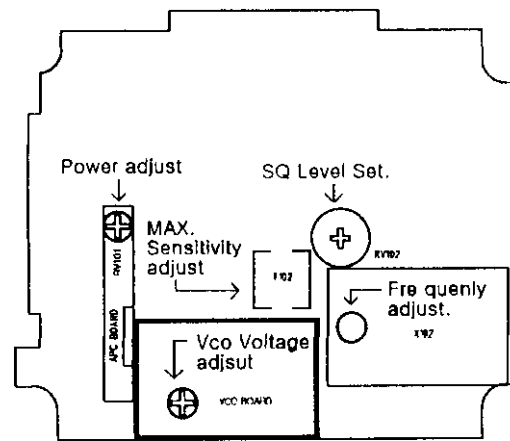
APPENDIX 6

3 ALIGNMENT INSTRUCTIONS

3.1. ALIGNMENT LAYOUT



[CPU SECTION]



[RF SECTION]

3.2. TEST EQUIPMENT REQUIRED

1) CPU and Phase Locked Loop Section

- Frequency Counter
- DC Power Supply
- DC Volt Meter
- Oscilloscope

2) Transmitter Section

- RF Power Meter(RF SSVM)
- 50Ω Load(non-inductive)
- RF Attenuator
- Oscilloscope

- Audio Generator
- DC Power Supply
- Spectrum Analyzer
- Frequency Counter
- Modulation Meter

3) Receiver Section

- RF Signal Generator
- AF Level Meter
- Distortion Meter
- DC Power Supply
- Sinadder Meter
- Oscilloscope
- 16 Ohm 1w Dummy Load

3.3. ALIGNMENT PROCEDURE

1) PHASE LOOKED LOOP AND CPU SECTION

STEP	SETTING	CONNECTION	ADJUST	ADJUST FOR
1	Frequency adjustment ; Mode : Receive Volume : Optional CH Selector : 1	Frequency counter To output pin_16 of IC103 (Figure-1)	TC101	12.80MHz \pm 100Hz
2	CPU Voltage check ; Mode : Receive Volume : Optional CH Selector : Optional	Connect DC volt. Meter to P40 Of IC801 On Cpu Board. (Aligment Layout CPU Section)		Indication on DC voltmeter must be $4.5 \pm 0.5V$.

2) TRANSMITTER SECTION

STEP	SETTING	CONNECTION	ADJUST	ADJUST FOR
1	RF Power stage ; Mode : Transmit Volume : Optional CH Selector : 3	Connect dummy load and RF power meter to the external ANT-jack on the Set (Figure-2)	RV-101	Adjust for max. indication on the power meter($1.0 \pm 0.2W$) for 500mW ERP.

2	Second harmonic check ; Mode : Transmit Volume : Optional CH Selector : 3	Connect RF power meter with dummy load to spectrum analyzer through coupler/-40dB atten. to EXT-ANT. Jack on the set (Figure-3).		At no modulation, compare the level of fundamental freq-spectrum to the level of harmonic freq-spectrum. Suppression of the 2nd harmonic Freq. level must be lower than 60dB. Check for the other channel's
3	Frequency check ; Mode : Transmit Volume : Optional CH Selector : 1	Connect dummy load and frequency counter through coupler to RF power meter. Also connect power meter to EXT-ANT. jack on the set. (Figure-4)	CRYSTAL	Make sure that the indication of the transmitter freq. is $462.5625\text{MHz} \pm 2.5\text{PPM}$ on the frequency counter.
4	MAX deviation check ; Mode : Transmit Volume : Optional CTCSS : OFF CH Selector : 1 Modulation: 1KHz -20dBm audio	Connect dummy load and modulation meter through coupler to RF power meter. Also connect power meter to EXT-ANT. jack on the set. (Figure-6)	RV-401	adjust RV-802 so that the indication of the modulation analyzer is $2.0 \pm 0.2\text{KHz}$.
5	Tone Level set ; Mode : Transmit Volume : Optional CTCSS : ON - Code 10 CH Selector : 1 Modulation: 1KHz -20dBm audio	Connect dummy load and modulation meter through coupler to RF power meter. Also connect power Meter to EXT-ANT. jack on the set. (Figure-6)	RV-803	adjust RV-803 so that the indication of the modulation analyzer is $2.3 \pm 0.2\text{KHz}$.
6	Tone Balance set ; Mode : Transmit Volume : Optional CTCSS : ON - Code 10 CH Selector : 1 Modulation: NO Modulation	Connect dummy load and modulation meter through coupler to RF power meter. Also connect power Meter to EXT-ANT. jack on the set. (Figure-6)	RV-801	adjust RV-801 for max level and lowest distortion CTCSS signal in square wave - as observed in the modulation scope

APPENDIX 7

CIRCUITS AND DEVICES TO STABILIZE FREQUENCY

FOLLOWS THIS SHEET

CIRCUITS AND DEVICES TO
STABILIZE FREQUENCY
FCC ID: MGPFR-465P1

APPENDIX 7

CIRCUITS AND DEVICES TO STABILIZE FREQUENCY

The operating frequency of the radio is generated by a Voltage Controlled Oscillator (VCO) controlled by a Phase Locked Loop (PLL) circuit. The reference frequency of the PLL comes from a 12.8MHz Temperature Compensated Crystal Oscillator TCXO and locks the VCO output to a frequency stability of +/-2.5ppm within the operating temperature range.

Text from the Technical Manual:

(1) INTRODUCTION

THE SYNTHESIZER CIRCUIT CONSISTS OF THE FOLLOWING COMPONENTS : PLL IC (IC103), VCTCXO (X102), VCO, VARICAP DIODE (D302)

IC103 IS A CMOS LSI THAT INCLUDES A PRESCALLER.

Q304, D302, C322, 318, 317, 319, L304 FORMED A CLAPP OSCILLATOR CIRCUIT TO OPERATE AS THE VCO FOR IC103.

Q305 IS A SWITCHING TRANSISTOR TO CONNECT OR DISCONNECT THE TUNING CAPACITOR IN THE VCO OSCILLATOR TANK CIRCUIT FOR TRANSMIT OR RECEIVE OPERATION.

Q303 WORKS AS A BUFFER AMP FOR RX LOCAL OSCILLATOR FREQUENCIES AND TX CARRIER FREQUENCIES.

(2) REFERENCE FREQUENCY

THE VOLTAGE CONTROLLED TEMPERATURE COMPENSATED CRYSTAL OSCILLATOR, VCTCXO X102(12.80 [MHz]) AND OTHER COMPONENTS AT PIN.1 AND 16 OF IC103 PROVIDES THE REFERENCE FREQUENCY FOR THE PLL.

(3) VCO

Q304 AND SURROUNDING PARTS FORM A CLAPP OSCILLATOR VCO FOR IC103. WITH APPROPRIATE CONTROL VOLTAGE ON D302, THE VCO CAN OPERATE OVER THE REQUIRED RANGE OF 441.1625 [MHz] TO 467.7125 [MHz].

(4) PROGRAMMABLE DIVIDER AND ITS CONTROL

THE CHANNEL INFORMATION ARE MASK PROGRAMMED INTO THE CPU IC801. WHEN THE FRONT PANEL CHANNEL UP/DOWN KEYS ARE OPERATED, KEY MATRIX INPUT PINS 25 AND 28 ARE ASSERTED, THE CPU WOULD CONVERT THE SELECTION INTO APPROPRIATE DIVISION RATIO CODES. THE CODES ARE SENT SERIALLY TO THE PROGRAMMABLE DIVIDER OF THE PLL IC301 FOR GENERATION OF THE CORRECT CHANNEL FREQUENCIES.

AS THE PLL/VCO OUTPUT FREQUENCIES ARE DIFFERENT BETWEEN TRANSMIT AND RECEIVE OPERATION, THE CPU SENSES PTT STATUS THROUGH PIN 42. A DIGITAL HIGH AT PIN 4 INDICATES THE RADIO IS IN TRANSMIT MODE.

THE VCO FREQUENCY IS DIVIDED WITH THE CPU CONTROLLED DIVISION RATIO IN IC103. IT IS THEN FED TO THE PHASE DETECTOR FOR COMPARING AND PHASE LOCK WITH THE 6.25 KHz SIGNAL DEVRIVED FROM THE 12.8MHz REFERENCE FREQUENCY.

(5) PHASE DETECTOR AND VCO CONTROL

THE PHASE DETECTOR IS A DIGITAL PHASE COMPARATOR WHICH COMPARES THE PHASE OF THE REFERENCE SIGNAL WITH PROGRAMMABLE DIVIDER. THE DETECTOR OUTPUT IS A SERIES OF PULSES WHOSE WIDTH DEPENDS ON THE PHASE ERROR BETWEEN THE TWO SIGNALS. THE PHASE DETECTOR PULSE OUTPUT IS FED TO AN ACTIVE LOW PASS FILTER TO CONVERT THE PULSES INTO DC VOLTAGE LEVELS WHICH DRIVES THE VARICAP DIODE D302 TO CONTROL THE VCO FREQUENCY.

APPENDIX 8

CIRCUITS TO SUPPRESS SPURIOUS RADIATION
AND LIMIT MODULATION

FOLLOWS THIS SHEET

CIRCUITS TO SUPPRESS SPURIOUS
RADIATION AND LIMIT MODULATION

FCC ID: MGPFR-465P1
APPENDIX 8

CIRCUITS TO SUPPRESS SPURIOUS RADIATION AND LIMIT MODULATION

1) Circuits to suppress spurious radiation and harmonics

Text from the Service Manual:

THE TUNING CIRCUIT BETWEEN THE OUTPUT OF FINAL AMP Q101 AND ANTENNA, 4-STAGE "PI - TYPE" NETWORK L101, L102, L103, L106, C101, C102, C104, C111 SERVES AS A SPURIOUS RADIATION SUPPRESSOR. THIS NETWORK ALSO SERVES TO MATCH THE IMPEDANCE BETWEEN TX FINAL POWER AMP Q101 AND THE ANTENNA.

2) Circuits to Limit Modulation

Text from the Service Manual:

AUDIO SIGNALS FROM MICROPHONE AND ALERT TONES GENERATED BY THE CPU ARE AMPLIFIED BY IC806D. AFTER PREAMPHASIS EQUALIZING CIRCUIT IC806C, THE OUTPUT GOES THROUGH TWO STAGES OF SPLATTER FILTERS IC806A-B TO LIMIT THE AUDIO BANDWIDTH. THE SIGNAL IS THEN MIXED WITH CTCSS SIGNALS GENERATED BY IC805, AND THEN ROUTED TO THE FM MODULATOR IN THE VCO.

MAXIMUM CTCSS DEVIATION IS SET BY RV803 FOR +/-300Hz, AND MAXIMUM AUDIO DEVIATION IS SET BY RC802 AT +/-2.5KHZ WITH 1KHZ SIGNAL AT 20dB INPUT FROM THE MICROPHONE JACK, AND CTCSS IS ACTIVE.

+++