REALM™
COMMUNICATIONS

RPV599APlus & RPU499APlus
Field Programming Manual

P/N FLDPRGMANRP99Plus
Ref. # 0301-30962-801

Rev. 01-04

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1 GENERAL INFORMATION

1 .1 Introduction

This manual contains information about field programming through the keypad of the RELM Wireless RP99APlus series handheld VHF and UHF radiis. This manual is intended for use by experienced technicians familiar with similar types of commercial grade communications equipment. It contains service information and data for the equipment.

The following precautions are recommended for personal safety:

- DO NOT transmit until all RF connectors are secure and properly terminated.
- SHUT OFF and DO NOT operate this equipment near electrical blasting caps or in an explosive atmosphere.
- Only qualified technicians should maintain this equipment.

1.2 Description

The RP99APlus series radios are self-contained VHF or UHF FM Radiis covering the frequency range of 148MHz to 174MHz for VHF and 450MHz to 470MHz for UHF. The radios are multi-channel and digitally synthesized using a single crystal for frequency control. The RP99APlus series incorporate an EEPROM for the storage of channel frequency, CTCSS Tone, DCS Code, Two-Tone, and Dual Tone Multiple Frequency/Automatic Numeric Identifier (DTMF/ANI) encode information. The RP99APlus series also include low-battery and busy-channel indicators. Soft key switches can be programmed to control channel scan, DTMF store and send, repeater talk-around, and hi transmit power, various display modes, adding and deleting channels from the scan list, key lock, and more. Status and channel information is displayed over an alphanumeric liquid crystal display (LCD). Connectors am provided on the side of the unit for an external antenna, microphone, speaker, and other optional accessories.

1.3 Accessories

A wide variety of optional accessories are available for the RP hand held radii. Contact your RELM Wireless dealer for complete information.

1.4 License Requirements

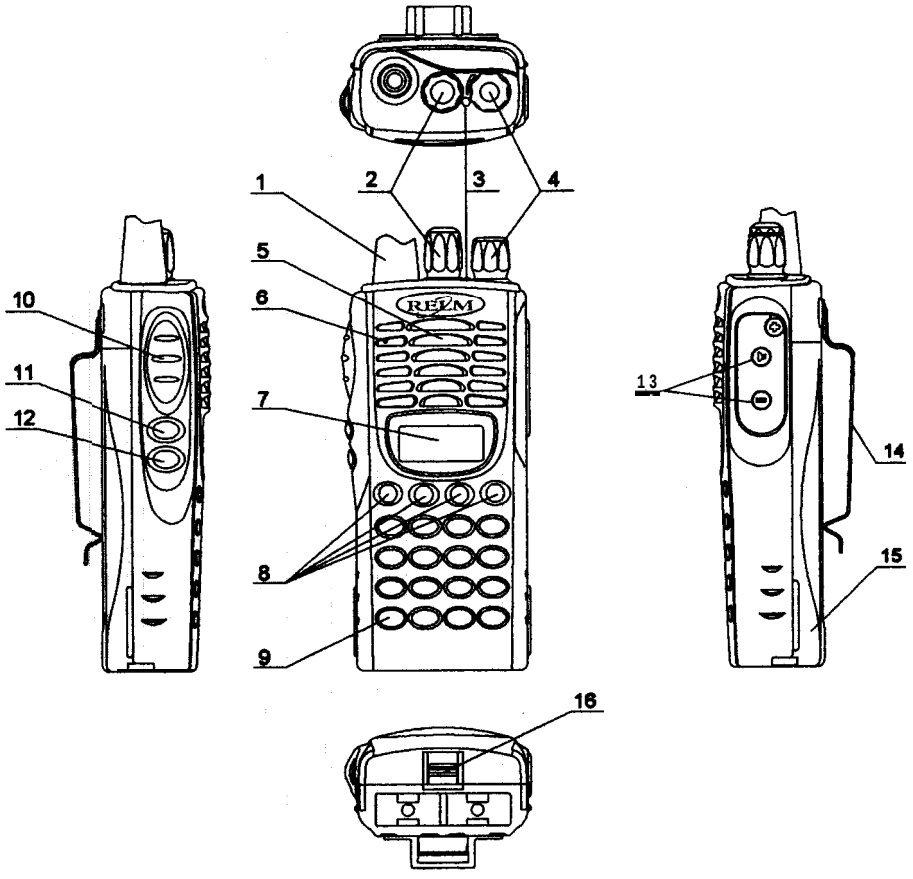
This equipment must be licensed by the Federal Communications Commission (FCC) before it may be used. Your RELM Wireless dealer can assist you in filing the appropriate application for the FCC, and will program each radio with your authorized frequencies and signaling codes.

1.5 Technical Assistance

If you need technical assistance, contact a RELM Communications service technician:

RELM Wireless Corporation
ATTN: Customer Service
7100 Technology Drive
West Melbourne, FL 32904
Phone: (800) 422-8281
FAX: (321) 953-7986

1.8 Controls and Indicators



(1) ANTENNA

(2) CHANNEL SELECTOR KNOB

Used to select channel and squelch level. In addition, it can be programmed by the dealer to delete undesired channels from scan list or to select a CTCSS frequency.

(3) LED **INDICATOR**

- **Is red when transmitting**
- **Is green when receiving**
- **Flashes red when the battery voltage is low and approaching the cut-off point**
- **Flashes orange when the radio receives proper DTMF or Two Tone decode signals**

(4) ON-OFF/VOLUME KNOB

Rotate the volume control knob clockwise to turn the unit 'on" and fully counter clockwise to turn the unit 'off. Increase or decrease the volume by adjusting the volume control accordingly.

(5) SPEAKER

(8) MICROPHONE

(7) LCD

Used to display channel and operation status.

(8) (●,○,■,□) PROGRAMMABLE SOFT KEYS

Used to enable or disable auxiliary functions. Press each key to enable its corresponding function.

(9) KEYPAD
Used to enter, store, or send DTMF codes.

(10)PTT BUTTON
Used to switch between transmit and receive mode.

(11)LAMP BUTTON,
Used to turn "on" or 'off the LCD backliiht. Press the [LAMP] button, the backlight will illuminate for about 5 seconds and then automatically turn off. During illuminating and pressing any key, except the [LAMP] button, the timer will re-start. To turn "off the backliiht, press the [LAMP] button again.

(12)MONI BUTTON
Used to monitor the selected channels.

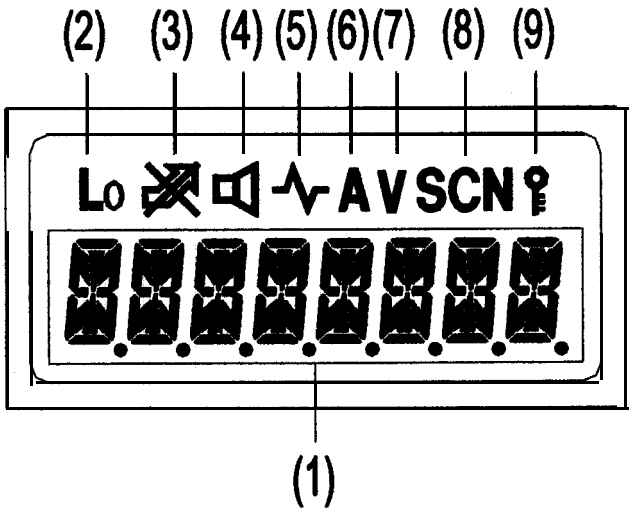
(13)EXTERNAL SPEAKER-MICROPHONE JACK
Used to connect with external the speaker-microphone, programming cable, or cloning cable.

(14)BELT CUP

(15)BATTERY

(16)BATTERY LATCH

1.7 LCD kons



① Displays the selected channel number, channel frequency, channel label, squelch level or DTMF code. When selective call is enabled, messages received are also displayed here.
Note: The "soft keys" can be programmed to toggle between display modes.
Channel Number- Displays channel number. Factory default
Channel Frequency- Displays the channel frequency.
Channel Label– Displays characters of the channel label. Up to 16 alphanumeric characters can be programmed. Any label over 8 characters will scroll across the display.

② Appears when "low' power is selected.

③ Appears when the selected channel is busy.

④ Appears when the **[MONI]** button is pressed to **disable** CTCSS, COCSS, OTMF, or Z-Tone.

⑤ **Appears** when the [MONI] button is pressed to switch the speaker on.

⑥ Appears when the selected channel is **in** the scan list. The radio only scans channels in the scan list.

⑦ Appears while in the numeric entry mode when entering the channel labels through the keypad.

⑧ Appears in scan mode.

⑨ Appears when the keypad **lock** is "on".

2 FIELD (KEYPAD) PROGRAMMING

21 Programming

You can program the RP99A Plus series in four different ways.

A. Using the unit's keypad. See section 2.1.2.

B. Cloning from unit to unit using a CCRP cloning cable. See section 2.1.2.5.1.

C. Wireless cloning from unit to unit. See section 2.1.2.5.2.

D. With a computer, RESRP99 programming software, and a PCRP programming interface cable. Contact RELM Communications for the software and cable. See section 2.1.5.

21.1 Programming Modes

Using the unit's keypad, soft keys, and control knobs, the unit can be placed into one of several different programming modes. It is important to note that only RELM authorized dealers with qualified technicians am allowed to operate the RPV99Plus series radios in the programming
mode and to change any programming content. Figure 2.1 shows the different programming modes.

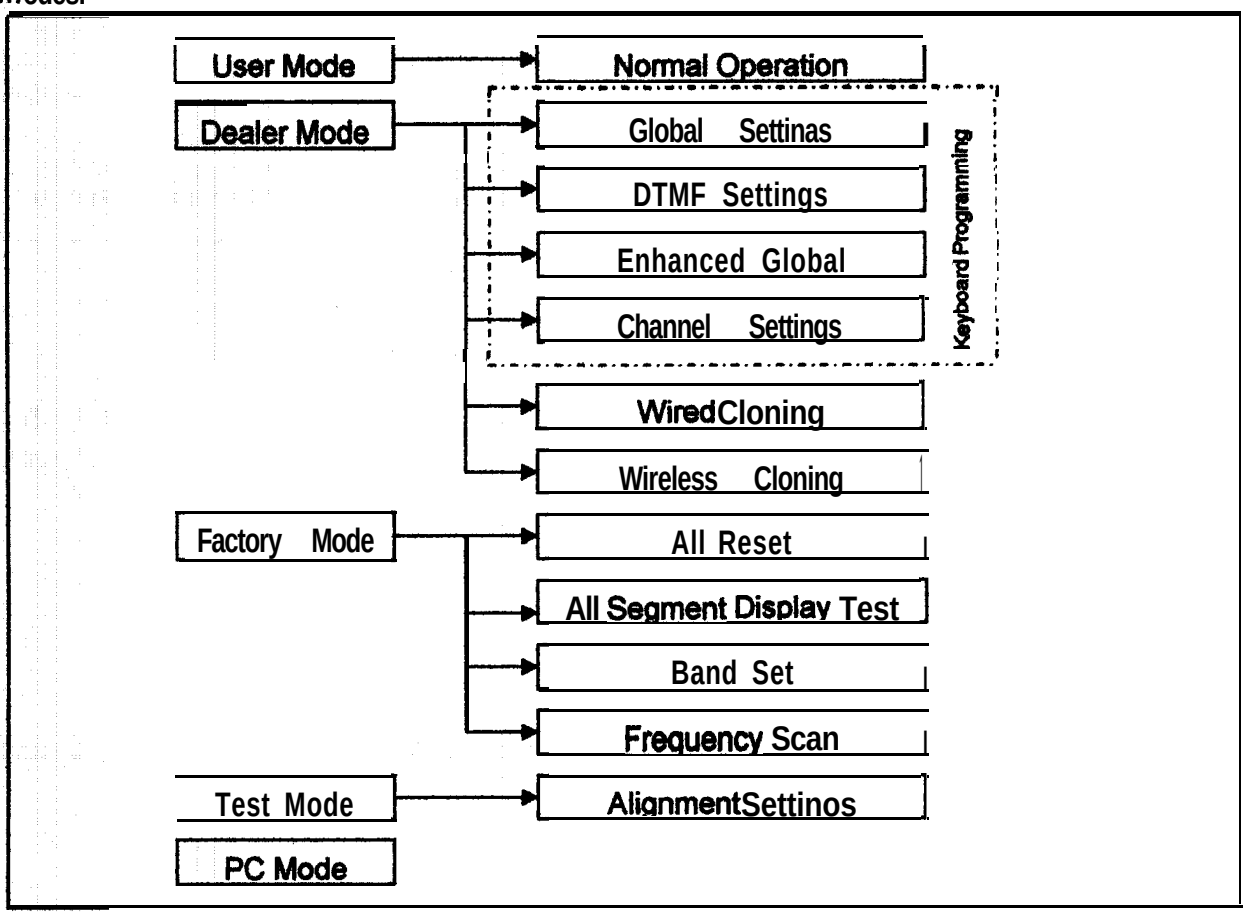


Figure 2.1 – Programming Modes

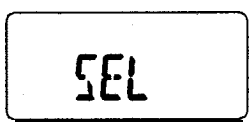
Table 2.1 shows the functions that can be sat for each of the "Dealer Modes". The dealer sets the operations functions, channel frequencies, signal modes in accordance to the customer's needs. The 'Dealer Mode" must be enabled "ON" in the radio by the RESRP99Plus editing software before the dealer programming mode can be accessed.

Mode	Function
DEALER	Global Settings, DTMF Settings, Enhanced Global Settings, Channel Settings, Wired Cloning, Wireless Cloning
GLOBAL SETTINGS The dealer sets the following functions ON/OFF according to the user's operating needs.	1. Monitor 2. Scan 3. Dial 4. Talk Around 5. Low Power 6. Priority 7.Priority Channel 8. Look Back A 0. Look Back B 10. Revert Channel 11 .TX Scan Delay Time 12. Dropout Delay Time 13.Time Out Timer 14. Transmit Waning 15. TOT Resume Time 18. TOT Reset Time 17. Squelch Level 18. Beep 19.Signalling 20. Battery Save 21. Selectable CTCSS 22. Delete/Add Enable 23.. Test Mode Enable
DTMF SETTINGS The dealer set the following functions ON/OFF according to the user's operating needs.	24. Digit Time 25. Inter Digit Time 26. First Digit Time 27. Rise Time 28. Rise Time Wii CTCSS 20. PTT ID 30. Dial ID 31. Connect ID 32. Disconnect ID 33. No. Of DTMF Keys 34. DTMF Hold Time 35. Store 8 Send 38.D Key Assignment 37, DTMF Signaling 38. Intermediate Code 30. Group Code 40. SQ. Auto Reset Time 41.Call Alert/Transpond
ENHANCED GLOBAL SETTINGS	45. Tone 48. Tone Duration 47. Channel Label Size 48. Soft Key 1 [•] Assignment Group 40. Soft Group Key 2 [0] Assignment 50. Soft Key 3 [a] Assignment 51. Soft Key 4 [□] Assignment
CHANNEL SETTINGS The dealers use this mode to set channel frequencies and signaling according to the user's operating needs.	I. Channel Selection 2. RX Frequency 3. RX Tone Signaling 4. TX Frequency 5. TX Tone Signaling 8. DTMF/2-Tone Signaling 7. ANI ID Enable 8.Scan Delete/Add 0. Busy Channel Lockout IO. Clock Frequency Shift 11 .TX Power 12.. Bandwidth 13. DTMF ID Code/RX 2-Tone 14. TX 2-Tone 15. Channel Label
WIRED CLONE MODE	In this mode, data is copied from one radio to another through a cable..
WIRELESSCLONE MODE	In this mode, data is copied from one radio to another without cable by means of the DTMF signaling.

Table 2.1 - Dealer Modes

2.1.2 Dealer Modes - Quick Reference

Place the unit in the programming mode by pressing and holding the [LAMP] and [O] buttons, switch the power "on". After 2 seconds the radio enters the dealer mode and "SEL" appears on



the display.

While in dealer mode, press the respective soft function key for the mode to be programmed. See Table 2.2.

Mode		Key
Dealer Mode	Global Settings	Press the [●] key to enter the "Global Settings Mode. See Section 2.1.3.1
	DTMF Settings	Press the [○] key to enter the "DTMF Settings Mode. See Section 2.1.3.2
	Enhanced Global Settings	Press the [□] key to enter the "DTMF Settings Mode. See Section 2.1.3.3
	Channel Settings	Press the [■] key to enter the "DTMF Settings Mode. See Section 2.1.3.4
	Wired Clone	Press the [LAMP] key to enter the "Wired Clone Mode. See Section 2.1.4.1
	Wireless Clone	Press the [LAMP] key to enter the "Wired Clone Mode. See Section 2.1.4.2

Table 2.2 - Dealer Modes Quick **Reference**

2.1.3 Dealer Mode Programming

2.1.3.1 Global Settings

To place the unit into the "Dealer Mode" for editing the global settings, do the following:

1. While pressing and holding the [LAMP] and [0] buttons, switch the power 'on". After 2 seconds the radio enters the dealer mode and "SEL" appears on the display.

[S E - :]

2. While in dealer mode, press [●] to enter the Global Settings mode.

Table 2.3 shows the function number and function options that can be selected while in this mode. While in this mode, the Channel Selector knob is used to set functions "ON" or "OFF" or to select the setting. After a function is sat, pressing the [PTT] button stores the setting and increments the menu to the next function option. Also, when the [PTT] button is pushed, a beep will sound to confirm the setting.

Pressing the [●] button at any time while reviewing the function options will pause the unit to exit the selection mode and revert back to the dealer mode screen. The current function option will not be stored if it was changed. After the complete option list has been cycled through, "End" will appear on the display. To exit dealer mode, cycle the power "off' and then back "on".

To review or confirm the function settings while in the Global Settings mode, press and hold the [MONI] buttun and turn the channel select knob.

Function No.	Function Name	Option (Defaults are highlighted)	Display	Remarks
1	MONITOR	OFF	MONI OFF	Disables the [MONI] button.
		Monitor Momentary	MONI 1	Signaling squelch (CTCSS, CDCSS, 2-Tone, or DTMF) is temporarily disabled when the MONI button is pressed.
		Monitor Lock	MONI 2	Toggles between signal squelch and monitor when the [MONI] button is momentarily pressed.
		SQ OFF Momentary	MONI 3	Unsquelches the receiver while the [MONI] button is pressed.
2	SCAN	OFF	SCAN OFF	Disables SCAN mode.

Function No.	Function Name	Option (Defaults are highlighted)	Display	Remarks
		CO	SCAN CO	"Carrier Operated" SCAN.
		TO	SCAN TO	'Time Operated" SCAN.
3	DIAL	Disable	DIAL OFF	Disables the [DIAL] key.
		Enable	DIAL ON	Enables the [DIAL] key.
4	TALK AROUND	Disable	TARE OFF	Disables the Talk Around feature
		Talk Around	TARE TA	Enables the Talk Around feature. When selected in the user mode, the transmit frequency becomes the same as the receive frequency of the selected channel.
		Reverse	TARE RE	Enables the Talk Around feature. When selected in the user mode, the transmit frequency becomes the same as the receive frequency and the receive frequency becomes the same as the transmit frequency of the selected channel.
5	LOW POWER	Disable	LO OFF	Disables the [LO] button so the user cannot select the low power mode.
		Enable	LO ON	Enables the [LO] button so the user can toggle between the low and high transmit power modes.
6	PRIORITY	OFF	PRIO OFF	Disables the Priority feature.
		Fixed	PRIO FIX	The Priority channel is a fixed channel selected by the dealer. The user cannot change it.
		Selected	PRIO SEL	The priority channel can be selected by the user while in the user mode.
7	PRIORITY CHANNEL	1-99	PRICH 1 PRICH 99	The fixed priority channel number. Note: "Fixed" must be selected under Priority to enable this feature.
8	LOOK BACK A	300ms ~ 1500ms (100ms steps)	LBA 300 LBA 500	Conditions: 1. The priority feature is enabled. 2. The Scan feature is enabled. 3. The radio is in the scan mode. 4. The radio stops on an active channel that is not the priority channel. Look Back A is the time intervals that the priority is checked for activity while receiving on a non-priority channel.

9	LOOK BACK B	500ms ~ 5000ms (500ms steps)	LBB 500 LBB 2000 LBB 5000	Conditions: 1. The priority feature is enabled. 2. The Scan feature is enabled. 3. The radio is in the scan mode. 4. The radio stops on an active channel that is not the priority channel. 5. A signal is detected on the priority channel, but the signaling squelch (CTCSS, CDCSS, 2-Tone, or DTMF) is not the same as the priority channel. Look Back B is the time intervals that the priority is checked for activity while receiving on the non-priority channel.
10	REVERT CHANNEL	Selected	REV SEL	Starts scanning or resumes scanning from the selected channel. When scanning and the PTT button is pressed, it will transmit on the last channel to be selected by the channel selector even if a call is being received on another channel.
		Last Call	REV LSTC	Starts scanning or resumes scanning from the last channel that received a call. When scanning and the PTT button is pressed, it will transmit on the last channel that received a call.
		Last used	REV LSTU	Starts scanning or resumes scanning from the last channel that was transmitted on. When scanning and the PTT button is pressed, it will transmit on the last channel that was transmitted on even if a call is being received on another channel.
		Selected + Talk Back	SEL TALK	Starts scanning or resumes scan from the selected channel. When scanning and the PTT button is pressed, it will transmit on the last channel to be selected by the channel selector; or if a call is received and the PTT button is pressed, it will transmit on the received channel (the PTT must be pressed before the Drop Out Delay Time ends, otherwise it will transmit on the last channel selected).
		Priority	REV PRIO	Starts scanning or resumes scanning from the priority channel. When scanning and the PTT button is pressed, it will only transmit on the priority channel. When in the manual mode, the radio will transmit on the selected channel.
		Priority + Talk Back	PRI TALK	Starts scanning or resumes scanning from the priority channel. When scanning and the PTT button is pressed, it will transmit on the priority channel; or if a call is received on a non-priority channel and the PTT button is pressed, it will transmit on the received channel (the PTT must be pressed before the Drop Out Delay Time ends, otherwise it will transmit on the priority channel).
11	TX-SCAN DELAY TIME	0.5s ~ 5.0s (0.5s steps)	TSDT 0.5 TSDT 3.0 TSDT 5.0	The period of time that the radio stays on a channel after a transmission has been made before it resumes scanning.
12	DROP OUT DELAY TIME	0.5s ~ 5.0s (0.5s steps)	DODT 0.5 DODT 3.0 DODT 5.0	The period of time before the radio resumes scanning after a received channel becomes inactive.

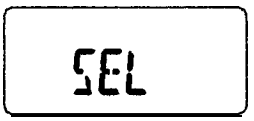
13	TIME OUT TIMER	OFF 30s~300s (30s steps)	TOT OFF	
			TOT 30	The period of time that a user can transmit before it stops transmitting. The unit beeps until the user releases the PTT button to reset the TOT.
			TOT. 60	
			TOT 300	
14	TOT ALERT TIME	OFF 1s ~ 60s (1s steps)	TOTA OFF	No warning tone
			TOTA 1	The period of time that a user can transmit before it starts beeping. The unit beeps until the user releases the PTT button to reset the timer.
			TOTA 60	
15	TOT RESUME TIME	OFF 1s ~ 60s (1s steps)	TOTK OFF	Disabled
			TOTK 1	After the TOT period, this is the period of time the radio must be in the receive mode before the PTT button is active.
			TOTK 60	
16	TOT RESET TIME	OFF 1s ~15S (1s/1STRP)	TOTS OFF	Disabled -The PTT button can be pressed immediately after released upon TX TOT timing out
			TOTS 1	After the TOT period, this is the period of time the radio must be un-keyed before the PTT button is active.
			TOTS 15	
17	SQUELCH LEVEL	0-0 (1 step increment)	SQL 0	Squelch level adjustment - Zero is minimum squelch adjust and 0 is maximum squelch adjust.
			SQL 5	
			SQL 9	
18	BEEP	NO	BEEP OFF	No beeps will be heard when the keypad is pressed or the channel selector passes channel one.
		YES	BEEP ON	All beeps are enabled.
19	SIGNALING	AND	SGNL AND	Requires all programmed signaling squelch (CTCSS, CDCSS, 2tone, or DTMF) to be decoded before the receiver opens.
		OR	SGNL OR	Requires only one form of signaling squelch (CTCSS, CDCSS, 2tone, or DTMF) to be decoded before the receiver opens.
20	BATTERY SAVE	Disable	BATT OFF	Disables the battery saver feature.
		Enable	BATT ON	Enables the battery saver feature
21	SELECTABLE CTCSS	Disable	VQT OFF	Disabled
		Enable	VQT ON	Enables the user to toggle through all CTCSS tones when on a specific channel - affects RX and TX
22	DELETE/ ADD ENABLE (User)	Disable	SADD OFF	Disabled. Prohibii the user to add or delete channels to or from the list of channels to be scanned.
		Enable	SADD ON	Permits the user to add or delete channels to or from the list of channels to be scanned.
23	DEALER MODE/ TEST MODE ENABLE	Disable	MODE OFF	Prohibii Dealer and Test modes
		Enable	MODE ON	Permits Dealer and Test modes

Table 2.3 – Dealer Mode Global Settings

2.1.3.2. DTMF Settings

To place the **unit** into the 'Dealer Mode' for ediing the **DTMF** settings, do the following:

1. **While** pressing and holding the **[LAMP]** and **[O]** buttons, switch the power "on". After 2



seconds the radio enters the dealer mode and **"SEL"** appears on the display.

2. While in dealer mode, press **[O] to** enter the DTMF **Settings** mode.

Table 2.4 shows the function number and function options that can be selected while in this mode. while in this mode, the Channel **Selector knob and keypad (O-9, *, #, A-D)** are used to set DTMF functions **"ON"** or **"OFF"** or to select the setting. After a function is set, pressing the **[PTT]**[1] button stores the setting and increments the menu to the next function option. Also, whsn the **[PTT]** button is pushed, a beep will sound to confirm the setting.

Pressing the **[O]** button at any time while reviewing the function options will cause the unit to **exit** the **selection** mode and revert back to the dealer mode screen. The current function option will not be **stored if** it was changed. After **the complete** option list has been cycled through, **"End"** will appear on the display. To **exit** dealer mode, cycle **the** power **"off"** and than back **"on".**

To **review** or confirm the function settings while in the **DTMF** Settings mode, press and hold the **[MONI]** button and turn the channel select knob.

Function No.	Function Name	Option (Defaults are highlighted)	Display	Remarks
24	DIGIT TIME	50ms ~ 200ms (1 Oms steps)	DIGT 50 DIGT 200	The period of time that each of the programmed DTMF ANI digits are transmitted.
25	INTER DIGIT TIME	50ms ~ 200ms (10ms steps)	IDT 50 IDT 200	The period of time between each of the programmed DTMF ANI digits
26	FIRST DIGIT TIME	50ms ~ 200ms (10ms steps)	FDT 50 FDT 200	The period of time that the first digit of the programmed DTMF ANI is transmitted.
27	RISE TIME[2]	100ms~1000ms (50ms steps)	RISE 100 RISE 300 RISE 1000	The period of time between un-modulated TX carrier and when the programmed DTMF ANI is transmitted.
28	RISE TIME WITH CTCSS[2]	100ms~1000ms (50ms steps)	RTQT 100 RTQT 300 RTQT 1000	The period of time between un-modulated TX carrier and when the programmed CTCSS is transmitted.

[1] Except for functions 31 and 32 that am set with the keypad.
[2] When DTMF function is enabled together with the Battery Save mode, and when CTCSS is used, the transmit delay time should be set > 300 ms.

29	PTT ID	Disable	P.ID OFF	When transmitting, the programmed Connect or Disconnect DTMF ANI will not be sent when [DIAL] and the respective "*" or "#" key is pressed.
		Connect	P.IDBEGIN	When transmitting, the programmed Connect DTMF ANI will be sent when [DIAL] and "*" key is pressed.
		Disconnect	P.ID END	When transmitting, the programmed Disconnect DTMF ANI will be sent when [DIAL] and "#" key is pressed.
		Both	P.ID BOTH	When transmitting, the programmed Connect or Disconnect DTMF ANI will be sent when [DIAL] and respective "*" or "#" key is pressed.
30	DIAL ID	Disable	D.ID OFF	Disabled
		ON	D.ID ON	When transmitting, a stored DTMF ANI code will be sent when [DIAL] and a memory location key is pushed. An ANI number must be programmed in the user mode. Up to 10 memory locations can be used (keys 0 through 9).
31	CONNECT ID[3]	Blank		No Connect ID is programmed.
		0 x 1 ~ # x 16	0 FFFFFFFF	At least 1 digit and up to 16 digits can be programmed to be sent when [DIAL] and "*" key is pressed. Note: Only the last five digits of the ANI number will be displayed.
32	DISCONNECT ID[4]	Blank		No Disconnect ID is programmed.
		0 x 1 ~ # x 16	0 FFFFFFFF	At least 1 digit and up to 16 digits can be programmed to be sent when [DIAL] and "#" key is pressed. Note: Only the last five digits of the ANI number will be displayed.
33	NO. of DTMF KEYs	12keys (0 ~ 9,*,#)	DTMFK 12	Activates keys 0 through 9, plus * and #
		16keys (0 ~ 9,*,#,A ~ D)	DTMFK 16	Activates keys 0 through 9, plus A, B, C, D, * and #.
34	DTMF HOLD TIME	Disable	DHT OFF	No Hold Time
		Enable	DHT ON	Continues to key for 2 seconds after the last number on the DTMF key is manually selected, but only if the PTT button is released after the last number.
35	STORE & SEND	OFF	STSD OFF	Does not allow Auto ID numbers to be stored.
		ON	STSD ON	Allows Auto ID numbers to be stored.
36	D KEY	D Code	DKEYA D	Functions as a D key only

[3] "P.IDBEGIN" is momentarily displayed when entering this setting.
[4] "P.ID END" is momentarily displayed when entering this setting.

	ASSIGNMENT	1s ~ 16s (1s steps)	DKEYA 1 DKEYA 16	When transmitting, the radio transmits an w-modulated signal for the programmed time when [DIAL] and the D key is pressed.
37[5]	DTMF SIGNAL .ING	Disabled	DTMF OFF	Disabled
		Code SQ	DTMF CSQ	When the respective DTMF code is received on a channel, the radio will ring for approximately 10 seconds and receiver audio will open. The ringing can be terminated by the user responding with a transmission or by pressing the MONI button.
		SEL CALL	DTMF SEL	Conditions: 1. The receiving radio must have a three digit DTMF ID Code programmed. 2. The transmitting radio must be programmed with a 3-digit DTMF ID code, a ldigit Intermediate Code, and a l-5 digit Message code. (i.e. 123 # 4567). The whole message string is sent when the [DIAL] key is pressed.
38	INTERMEDIATE CODE	O - 9	IMC 0 IMC 9	The digit that separates the 3 digit DTMF ANI code to be decode and the 1 to 5 digit message (Ex. 123 # 4567)
		A - D	IMC A IMC D	
		*	IMC E	
		#	IMC F	
39	GROUP CODE	Disabled	GRPC OFF	Disabled
		A - D	GRPC A GRPC D	Identifies that a DTMF Select call is for a group, not for an individual.
		*	GRPC E	
		#	GRPC F	
40	SQ AUTO RESET TIME	OFF	40 OFF	Disabled
		Is ~ 15s (1s steps)	SART 1 SART 10 SART 15	After a DTMF signal is decoded, it is the period of time before the squelch is reset to the ready state of decoding another DTMF signal.

[5] When changing and storing a "DTMF SIGNALING" option, the ID CODE setting in channel mode will be met to "000"; and the 2-Tone settings will be reset to "1".

41	CALL ALERT/ TRANSPOND	Disabled	CAT OFF	Disabled
		Call Alert	CAT RING	The radio flashes the LED indicator and rings when it decodes a two-tone or DTMF signal.
			CAT BEEP	The radio flashes the LED indicator and beeps when it decodes a two-tone or DTMF signal.
		TRANSPOND (Call Alert).	CAT CALT	The radio flashes the LED indicator and rings when it decodes a two-tone or DTMF signal; and it transmits the alert back to the sending radio.
		TRANSPOND (ID Code)	CAT IDCD	The radio flashes the LED indicator when it decodes a two-tone or DTMF signal. If DTMF is used, the receiving radio also transmits the DTMF ID code (listed in the Channel programming) back to the sending radio.
		TRANSPOND (Transpond Code)	CAT TRCD	The radio flashes the LED indicator when It decodes a two-tone or DTMF signal. If DTMF is used, the receiving radio also transmits the DTMF ID code (listed In the DTMF Auto ID that is stored in location 0) back to the sending radio. If no DTMF Auto ID is stored in location 0, the receiving radio will not transpond.

able 2.4 – Dealer Mode DTMF Settings

If any of the functions in Table 2.3 and Table 2.4 are set to "Off", the related setting shown in table 2.5 can be set, but the setting will not be recognized.

Function Name	Setting	Disable Condition
2-TONE/ DTMF	DTMF	37. DTMF sianalina is OFF
2. [SCN]	T O	7. Prioritv is fixed or selected.
6. Priority	Fiied, Selected	2. [SCN] is OFF
7. Priority CH		6. Priority is OFF or fixed.
8. Look Back A		6. Priority is OFF
9. Look Back B		6. Priority is OFF
10. Revert CH	Priority, Priority + Selected	6. Priority is OFF
Il. Dwell Time		2. [SCN] is OFF
12. Dropout Delay Time		2. [SCN] is OFF
14. TOT Pre-Alert		13. Time Out Time is OFF
15. TOT Rekey Time		13. Time Out Time is OFF
16. TOT Reset Time		13. Time Out Time is OFF
31. Connect ID		29. PTT ID is OFF or disconnected and 30. Dial ID is OFF
32. Disconnect ID		29. PTT ID is OFF or connected and 30. Dial ID is
38. Intermediate Code		37. DTMF signaling is OFF or is code SQ.
40. Unsquelch Time		37. DTMF signaling is OFF.
41. Call Alert/Transpond		37. DTMF signaling is OFF.

Table 2.6 – Disabled Function Conditions

2.1.3.3 Enhanced Global Settings

To place the unit into the "Deafer Mode" for editing the enhanced global settings, do the following:

1. While pressing and holding the (LAMP] and [O] buttons, switch the power "on". After 2 seconds the radio enters the dealer mode and "SEL" appears on the display.

2. While in dealer mode, press [□] to enter the Enhanced Global Settings mode.

Table 2.6 shows the function options that can be selected while in this mode. While in this mode, the Channel Selector knob is used to set functions "ON" or 'OFF" or to select the setting. After a function is set, pressing the [PTT] button stores the setting and increments the menu to the next function option. Also, when the [PTT] button is pushed, a beep will sound to confirm the setting.

Pressing the [□] button at any time while reviewing the function options will cause the unit to exit the selection mode and revert back to the dealer mode screen. The current function option will not be stored if it was changed. After the complete option list has been cycled through, "End" will appear on the display. To exit dealer mode, cycle the power "off" and then back 'on".

To review or confirm the function settings while in the Enhanced Global Set mode, press and hold the [MONI] button and turn the channel select knob.

Function No.	Function Name	Option (Defaults are highlighted)	Display	Remark
45	GROUP TONE	Off, 1="A" Tone, 2="B" Tone	GRPT OFF	Group Tone set to "OFF
			GRPT A	Group code set to the 'A' Tone.
			GRPT B	Group code set to the "B" Tone.
46	GROUP TONE DURATION	0.5 ~ 10s (0.1s steps)	GTDUR 0.5	Group Tone duration.
			GTDUR 10.0	
47	CHANNEL LABEL SIZE	Off, 1 ~ 16 (1 step)	SIZE OFF	The channel label display mode is disabled.
			SIZE 1	The number of channel label characters that can be displayed.
			SIZE 16	
48	KEY1	No Function	K1 OFF	The function key is disabled.
		Scan	K1 SCAN	The function selected will be assigned to this soft key.
		Dial	K1 DIAL	
		Talk Around	K1 TARE	
		Low Power	KI LO	
		Display Label	K1 DCHAR	
		Display Frequency	K1 DFREQ	
		Display Mode	K1DMODE	
		Scan Add/Del	K1 SADD	
		Key Lock	K1 KLOCK	
		Variable QT	K1 VQT	
		SQL	K1 SQL	
49	KEY2	No Function	K2 OFF	The function key is disabled.
		Scan	K2 SCAN	The function selected will be assigned to this soft key.
		Dial	K2 DIAL	
		Talk Around	K2 TARE	
		Low Power	K2 LO	
		Display Label	K2 DCHAR	
		Display Frequency	K2 DFREQ	
		Display Mode	K2DMODE	
		Scan Add/Del	K2 SADD	
		Key Lock	K2 KLOCK	
		Variable QT	K2 VQT	
		SQL	K2 SQL	
50	KEY3	No Function	K3 OFF	The function key is disabled.
		Scan	K3 SCAN	The function selected will be assigned to this soft key.
		Dial	K3 DIAL	
		Talk Around	K3 TARE	
		Low Power	K3 LO	
		Display Label	K3 DCHAR	
		Display Frequency	K3 DFREQ	
		Display Mode	K3DMODE	
		Scan Add/Del	K3 SADD	
		Kev Lock	K3 KLOCK	
		Variable QT	K3 VQT	
		SQL	K3 SQL	
51	KEY4	No Function	K4 OFF	The function key is disabled.
		Scan	K4 SCAN	The function selected will be assigned to this

		Dial	K4 DIAL	soft key.
		Talk Around	K4 TARE	
		Low Power	K4 LO	
		Display Label	K4 DCHAR	
		Display Frequency	K4 DFREQ	
		Display Mode	K4DMODE	
		Scan Add/Del	K4 SADD	
		Key Lock	K4 KLOCK	
		Variable QT	K4 VQT	
		SQL	K4 SQL	

Table 2.6- Dealer Mods Enhanced Global Settings

2.1.3.4 Channel Settings

To place the unit into the "Dealer Mode" for editing the channel settings, do the following:

1. While pressing and holding the [LAMP] and [O] buttons, switch the power "on'. After 2

seconds the radio enters the dealer mode and "SEL" appears on the display.

2. While in dealer mode, press [■] to enter the Channel Setting mode.

Table 2.7 shows the function options that can be selected while in this mode. While in this mode, the Channel Selector knob is used to set functions "ON" or "OFF" or to select the setting. After a function is set, pressing the [PTT] button stores the setting and increments the menu to the next function option. Also, when the [PTT] button is pushed, a beep will sound to confirm the setting.

Pressing the [■] button at any time while reviewing the function options will cause the unit to exit the selection mode and revert back to the dealer mode screen. The current function option will not be stored if it was changed. After the complete option list has been cycled through, 'End" will appear on the display, To exit dealer mode, cycle the power "off" and then back "on".

Function Name	Option	Display	Remark
CHANNEL SELECT	1CH ~ 99CH	CH 1 CH 99	Channel to be programmed.
RX FREQUENCY	Blank		No receive or transmit frequency
		160.00000.	Pressing the [□] button toggles no frequency to the start of the receive frequency if the channel is blank
		160.00625. 160.00250	Rotating the channel selector will raise or lower the frequency by 2.5kHz or 6.25KHz increments. If a decimal point is shown next to the last digit of the frequency, then the increment is 6.25KHz; if there isn't a decimal point shown next to the last digit of the frequency, then the increment is 2.5KHz. Pressing the [•] key will toggle the increment size between 2.5kHz and 6.25KHz.
		161.00000	Holding in the lamp key and rotating the channel selector will raise or lower the frequency by 1MHz increments.
RX TONE	Disable	OFF	Disables CTCSS or DCS
	CTCSS 67.0 Hz – 250.3Hz	QT 67.0 QT 67.1*	Selecting the [□] key switches it from OFF to the first CTCSS tone. Rotate the channel selector to move the tone frequency up or down in 1 Hz increments until the desired tone frequency is reached. If there isn't an asterisk shown next to the last digit of the frequency, then the increment change is 1Hz; if there is an asterisk shown next to the last digit of the frequency, then the increment change Is 0.1 Hz. Pressing the [•] key will toggle the increment size between 1 Hz and 0.1 Hz.
	CDCSS	DQT023N DQT023I DQT024N*	Selecting the [□] key again switches it from CTCSS to the first DCS tone. Rotate the channel selector to move the DCS code up or down until the desired code is reached. The last alpha character will be an "N" (non-inverting) or 'I" (inverting). Pressing the [○] key toggles the "N" and "I". Pressing the [•] key will toggle the DCS selection between 'standard' and *non-standard' DCS codes. If there isn't an asterisk shown next to the last digit of the DCS code, then the DCS tone selection is 'standard'; if there is an asterisk shown next to the last digit of the DCS code, then the DCS tone selection is 'non-standard". Selecting the [□] key again switches it from DCS to OFF.
TX FREQUENCY	Blank		No transmit frequency. Receive only.
		160.00000.	Pressing the [□] button toggles no frequency to the start of the transmit frequency if the channel is blank
		160.00625. 160.00250	Rotating the channel selector will raise or lower the frequency by 2.5kHz or 6.25KHz increments. If a decimal point is shown next to the last digit of the frequency, then the increment is 6.25KHz; if there isn't a decimal point shown next to the last digit of the frequency, then the increment is 2.5KHz. Pressing the [•] key will toggle the increment size between 2.5kHz and 6.25KHz.

		161.00000	Holding in the lamp key and rotating the channel selector will raise or lower the frequency by 1 MHz increments.
TX TONE	Disable	OFF	Disables CTCSS or DCS
	CTCSS 67.0 Hz – 250.3Hz	QT 67.0 QT 67.1*	Selecting the [o] key switches it from OFF to the first CTCSS tone. Rotate the channel selector to move the tone frequency up or down in 1 Hz increments until the desired tone frequency is reached. If there isn't an asterisk shown next to the last digit of the frequency, then the increment change is 1 Hz; if there is an asterisk shown next to the last digit of the frequency, then the increment change is 0.1Hz. Pressing the [•] key will toggle the increment size between 1 Hz and 0.1 Hz.
	CDCSS	DQT023N DQT023I DQT024N*	Selecting the [o] key again switches it from CTCSS to the first DCS tone. Rotate the channel selector to move the DCS code up or down until the desired code is reached. The last alpha character will be an "N" (non-inverting) or 'I" (inverting). Pressing the [o] key toggles the "N" and 'I". Pressing the [•] key will toggle the DCS selection between 'standard' and "non-standard' DCS codes. If there isn't an asterisk shown next to the last digIt of the DCS code, then the DCS tone selection is 'standard"; if there is an asterisk shown next to the last dlgit of the DCS code, then the DCS tone selection is 'non-standard". Selecting the [□] key again switches it from DCS to OFF.
DTMF or TWO TONE SIGNALING	Disable	SIG OFF	No DTMF or Two Tone signaling on selected channel.
	DTMF	SIG DTMF	Allows DTMF signaling on selected channel.
	Two Tone	SIG TTS	Allows Two Tone signaling on selected channel.
ANI	Disable	ANI OFF	Disables this feature.
	Enable	ANI ON	Allows the DTMF ANI to be transmitted every time the PTT switch is pressed.
SCAN	Delete	SCAN DEL	Deletes the channel from the permanent scan list.
	Add	SCAN ADD	Adds the channel to the permanent scan list.
BUSY CHANNEL LOCKOUT	Disabled	B.C.L.O OFF	Busy Channel Lockout is disabled.
	Enabled	B.C.L.O ON	Busy Channel Lockout is enabled.
CLOCK SHIFT	Disabled	SHIFT OFF	Disabled
	Enabled	SHIFT On	Used to shift the synthesizer clock frequency in order to reduce or resolve interference when a channel is experiencing a "self-quieting spur "or a "birdie frequency".
TX POWER	High	TXPWR H	High power is 5 watts. When set to Hi, pressing the [Lo] button toggles the power from 5 watts to 1 watt or from 1 watt to 5 watts.
	Low	TXPWR L	Low power is 1 watt. The [Lo] button will not toggle the channel to high power. Always set to low power.
BANDWIDTH	Wide Band	WIDE	Receiver bandwidth is +/-25KHz and transmit deviation is less than +/-5KHz.

	Narrow Band	NARROW	Receiver bandwidth is +/-12.5KHz and transmit deviation is less than +/-2.5KHz.
DTMF ID CODE[6]		123	'ID' will flash one time if DTMF signaling has been selected. The DTMF code must have a minimum of 3 digits, but no more than 10 digits. If more than 8 digits are used, the display will scroll.
TWO TONE SIGNALING[7]	RX 2-Tone 1 -16 Memory Locations	TTS_R 1 TTS_R 16	A tone from 280 Hz to 3500 Hz in 1 Hz increments can be used for 2-Tone signaling. The tone sets in the TTS table (l-16 tone sets) can be edited by using the PC editor (RESRP99Plus) and PC cable (PCRP). If no change has been made to the TTS table, then only defaults can be selected from Table 2.10.
	TX 2-Tone 1 -16 Memory Locations	TTS_T 1 TTS_T 16	A tone from 280 Hz to 3500 Hz in 1 Hz increments can be used for 2-Tone signaling. The tone sets in the TTS table (l-16 tone sets) can be edited by using the PC editor (RESRP99Plus) and PC cable (PCRP). If no change has been made to the TTS table, then only defaults can be selected from Table 2.10.
CHANNEL LABEL	Label (1 to 16 alpha numeric characters can be used)	123ABC@#	'CH LABEL' will flash once prior to label entry mode. See Table 2.11 for all the possible characters and character key assignment.

Table 2.7 - Dealer Mode Channel Settings

Any tone frequency between 67.0 Hz and 250.3Hz can be programmed into theRP599APlus Series radios. However, it is recommended to use the standard TIA/EIA-603-A CTCSS Tone Frequencies shown in table 2.8.

No.	Frequency (Hz)	No.	Frequency (Hz)	No.	Frequency (Hz)	No.	Frequency (Hz)
1	67.0	11	94.8	21	131.8	31	186.2
2	69.3	12	97.4	22	136.5	32	192.8
3	71.9	13	100.0	23	141.3	33	203.5
4	74.4	14	103.5	24	146.2	34	210.7
5	77.0	15	107.2	25	151.4	35	218.1
6	79.7	16	110.9	26	156.7	36	225.7
7	82.5	17	114.8	27	162.2	37	233.6
8	85.4	18	118.8	28	167.9	38	241.8
9	88.5	19	123.0	29	173.8	39	250.3
10	91.5	20	127.3	30	179.9		

Table 2.8 - CTCSS Frequencies

[6] DTMF ID Code will not show unless DTMF is selected in step 1 of this section. DTMF and TTS cannot be enabled simultaneously. Also, the

[7] Two Tone Signaling code will not show unless TTS is selected in step 1 of this section.

Any CDCSS coda between 000 and 777 can be programmed into the **RP599APlus** Series radios. However, it is recommended to use the standard **TIA/EIA-603-A** CDCSS Codes shown in **table** 2.9.

023	071	134	223	306	411	503	631	734
025	072	143	226	311	412	506	632	743
026	073	152	243	315	413	516	654	754
031	074	155	244	331	423	532	662	
032	114	156	245	343	431	546	664	
043	115	162	251	346	432	565	703	
047	116	165	261	351	445	606	712	
051	125	172	263	364	464	612	723	
054	131	174	265	365	465	624	731	
065	132	205	271	371	466	627	732	

Table 2.9 -- Standard TIA/EIA-603-A CDCSS Codes

A tone **from** 260 **Hz** to **3500 Hz** in 1 Hz **increments** can be used for P-Tone signaling. **Only** the frequencies in the **TTS** table can be selected when programming through the front keypad. The tone sets In the TTS table (l-16 tone sets) can **be** edited by **using** the PC **editor (RESRP99Plus)** and PC cable (PCRP). If no changes are made to the TTS table, then only defaults can be selected from Table 2.10.

No.	Tone A Freq [Hz]	Tone B Freq [Hz]	Tone A Dur. (s)	Tone B Dur. (s)	Gap Time (s)
1	400	1141	0.5	0.5	0.5
2	456	1301	0.5	0.5	0.5
3	520	1463	0.5	0.5	0.5
4	593	1690	0.5	0.5	0.5
5	675	1927	0.5	0.5	0.5
6	770	2197	0.5	0.5	0.5
7	878	2504	0.5	0.5	0.5
8	1001	2855	0.5	0.5	0.5
9	1141	400	0.5	0.5	0.5
10	1301	456	0.5	0.5	0.5
11	1483	520	0.5	0.5	0.5
12	1690	593	0.5	0.5	0.5
13	1927	675	0.5	0.5	0.5
14	2197	770	0.5	0.5	0.5
15	2504	878	0.5	0.5	0.5
16	2855	1001	0.5	0.5	0.5

Table 2.10 – Two-Tone Frequencies

Table 2.11 shows all possible characters and key assignment to the characters that can be used for entering the channel label.

KEY	LABEL CHARACTER INPUT Number of times the key is pressed.					
	1	2	3	4	5	6
1	*Space* or 1					
2	A or 2	B	C			
3	D or 3	E	F			
4	G or 4	H	I			
5	J or 5	K	L			
6	M or 6	N	O			
7	P or 7	Q	R	S		
8	T or 8	U	V			
9	W or 9	X	Y	Z		
0	A ~ Z or 0					
A	@ or A	#	$	%	^	*
B	. or B	.	'	"	?	:
C	+ or C	-	\	/	=	_
D	< or D	>	(	)	[	]
*/T9	This is used to toggle between "character" and "numeric" input modes. A "V" icon shown on the display indicates "numeric" input mode.					
#	Shifts the cursor to the next character location, →					
PTT	To store and complete the entry.					
Channel Selector Knob	Used to move the cursor back and forth, ←_→					

2. Table **2.11 – Label Characters**

2.1.4 Cloning

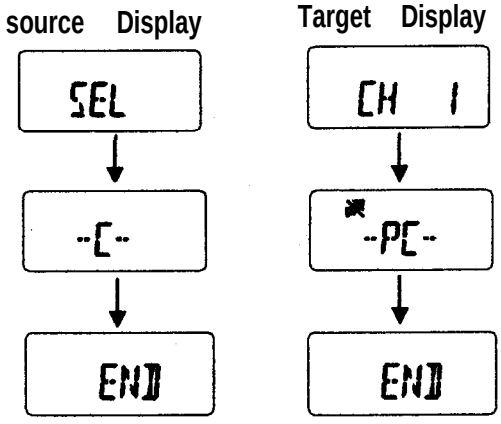
Cloning allows the memory contents of one unit (source) to be transferred to another unit (target). There are two methods that can be used for cloning the RPV599 series radio.

- Wired – Cloning using the CCRP cloning cable.
- Wireless – Over the air cloning.

2.1.4.1 Wired Cloning

1. Turn both the source and target units "off".
2. Connect each end of the CCRP cable into the respective microphone jacks of the radii.
3. Turn the target unit 'on".

Do the following with the source radii:



4. While pressing and holding the [LAMP] and [O] buttons, switch the power "on". After 2 seconds the radio enters the dealer mode and "SEL" appears on the display.
5. Press the [LAMP] button to enter the done mode. "-C-" will appear in the display.
6. Press the [MONI] button to transmit the data to the target unit. While the data is being transferred, the red LED will light on the target unit and the busy icon on the display will flash. When the transfer is complete. Both displays will show "END".
7. To done another target unit turn off the target unit, remove the CCRP cable from the target unit, connect the CCRP to another target unit, and switch the unit on.
8. Press the [LAMP] button on the source unit, "SEL" appears on the display.
9. Repeat steps 5 and 6 to done more units.

2.1.4.2 Wireless Cloning

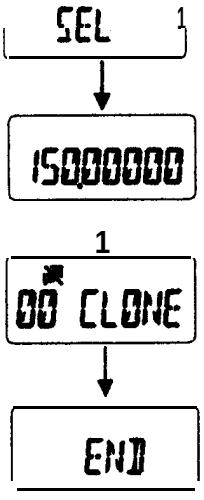
Due to the length of the transmission for the transfer, the wireless doning process is performed with two separate data transfers (first 0% - 50% and second 50% - 100%)

.

Do the following with the target radio:

1. Remove the antenna.
2. While prassing and holding the [LAMP] and [O] buttons, switch the power "on". After 2 seconds the radio enters the dealer mode and "SEL" appears on the display.

Target Display



3. Press the [MONI] button to enter the wireless clone mode. A frequency will appear in the display. Adjust the channel select knob to adjust the frequency to the desired frequency to receive data on. Note: Pressing the [LAMP] button while turning the channel selector will change the frequency in 1 MHz steps.

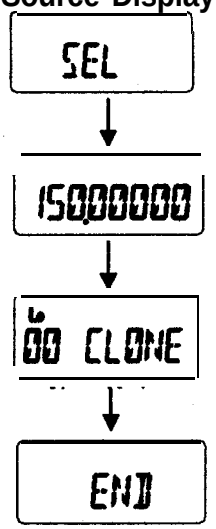
Do the following with the source radii:

4. While pressing and holding the [LAMP] and [O] buttons, switch the power "on". After 2 seconds the radio enters the dealer mode and "SEL" appears on the display.

5. Press the [MONI] button to enter the wireless clone mode. A frequency will appear in the display. Adjust the channel selectknob to adjust the frequency to the desired frequency to transmit data on. Note: Pressing the [LAMP] button while turning the channel selector will change the frequency in 1 MHz steps.

8. Press the PTT button to start cloning the first half (0% - 50%) of the data. "00 CLONE" will appear in the displays of both the source and target units. Also, the "Lo" power icon will be displayed on the source unit and the receiver icon will be displayed on the target unit. The source's LED indicator will be red (inditing transmitting) and the target's LED indicator will be green (indicating receiving). During cloning, the two-digit counter will increment one digit at a time on each of the displays.

Source Display



When cloning is successful, "END" will be shown on the displays. If "ERROR" is shown on the target's display, start the cloning process over. Make sure the batteries are fully charged and that the source and target units are in close proximity to each other.

7. Allow the transmitter to rest (cool down) for approximately 1 – 3 minutes before starting the second half (50% – 100%) of the data transfer.

8. Pressthe [LAMP] button to continue cloning the second half (50% – 100%) of the data. "50 CLONE" will appear in the displays of both the source and target units. Also, the "Lo" power icon will be displayed on the source unit and the receiver icon will be displayed on the target unit The source's LED indicator will be red (indicating transmitti ing) and the target's LED indicator will be green (indicating receiving). During cloning, the two-digit counter will increment one diiit at a time on each of the displays.

When cloning is successful, "END" will be shown on the displays. If 'ERROR" is shown on the target's display, start the cloning process over. Make sure the batteries are fully charged and that the source and target units are in close proximity to each other.

2.1.5 Programming by Computer

Programming a radio from a computer is not covered in this manual. Contact RELM Communications for the programming cable (PCRP) and software (RESRP99).

RELM Wireless Corporation
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West Melbourne, FL 32904
(800) 422-6281
(321) 953-7986
service@RELM.com