MOBILE RADIO

LBI-31551

PROGRAMMING INSTRUCTIONS
FOR YOUR
GENERAL ELECTRIC
MPI, MPR & MPX PERSONAL RADIO
WITH
THE FIELD PROGRAMMABLE
TYPE 99 CODE PLUG
USING THE
TQ2310 PROGRAMMER

GENERAL ELECTRIC

TABLE OF CONTENTS

GE UNIVERSAL RADIO PROGRAMMER
SOFTWARE LICENSE AGREEMENT

THE SOFTWARE PROGRAM PROVIDED WITH THIS DOCUMENT IS FURNISHED UNDER A LICENSE AND MAY BE USED ONLY IN ACCORDANCE WITH THE FOLLOWING LICENSE TERMS.

General Electric Company (GE) grants to you (the "User") a nonexclusive, paid up license to use the accompanying Software, the media on which it is recorded, and user's manual (referred to collectively herein as the "PRODUCT"), for your own use on a single, designated GE Universal Radio Programmer under the following terms and conditions:

1. User agrees that the techniques, algorithms, and processes contained in the PRODUCT constitute trade secrets of GE. User agrees to take all measures necessary to protect the confidentiality of the PRODUCT and GE's rights herein. User shall not disclose or divulge any information regarding the PRODUCT or permit anyone else to do so.

2. User shall not reproduce or copy the product, in whole or in part (in its original or any other language), or permit anyone else to do so for any purpose whatsoever, except as necessary for User to use it on the single Programmer for which it is licensed hereunder. User shall not make or permit any change or modification to the PRODUCT.

3. User shall not transfer the PRODUCT or any part thereof. This license does not include the right to sublicense and may not be assigned.

4. The Software and user's manual are copyrighted under United States and International laws by GE. User agrees not to remove any GE copyright, trademark or other notices or product identification.

5. If User does not comply with all of the terms and conditions of this license agreement, GE may terminate this license and require User to return the PRODUCT. User's liability shall include (but not be restricted to) all costs incurred by GE in recovering the PRODUCT and all damages arising from User's default. User acknowledges that unauthorized distributing, copyright, duplicating or otherwise reproducing all or any part of PRODUCT, or User's failure to protect its confidentiality, will materially damage GE.

6. User shall be solely responsible for determining the appropriate use to be made of the PRODUCT and establishing its limitations in User's own operations.

NOTE

It is the responsibility of the individual who installs any radio equipment to confirm that the operator of the equipment is legally licensed for the use of the frequencies programmed into the radio.

Figure 1 - TQ2310 Suitcase Programmer

INTRODUCTION

The Universal Radio Programmer (URP) may be used to program all GE field programmable products.

This manual presents the necessary programming instructions and procedures you must follow when programming the General Electric MPI, MPR or MPX Personal Radios (equipped with the field programmable Type 99 (T-99) Code Plug) using the Universal Radio Programmer TQ2310.

PROGRAMMING EQUIPMENT

The Universal Radio Programmer TQ2310, composed of several hardware and software modules (EPROMs), is required to program the radio. Figure 1 shows the TQ2310 layout. The various modules are described below. A unique software module also is required to program each different piece of equipment. The software module required to program the T-99 Code Plug is labeled TQ2345. Adapter TQ2341 is also required and plugs into the Data I/O Module. The HEX EDIT/PROM TQ2328 is recommended. The Code Plug Adapter TQ2341 provides the programming interface between the I/O Adapter in the TQ2310 and the EEPROM being programmed. The Code Plug Adapter plugs into the I/O Adapter and the EEPROM into the Code Plug Adapter. Figure 2 shows the Code Plug Adapter and pin orientation.

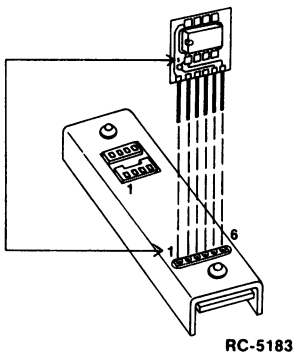


Figure 2 - T-99 Code Plug Adapter Installation

Hardware modules contained in the TQ2310 include:

- Panasonic Handheld Computer, RL-H1800
- Panasonic I/O Adapter, RL-P6001
- Panasonic Mini Printer, RL-P1004 or Printer Cassette Adapter RL-P1004A
- General Electric Program Storage Module
- General Electric Data I/O Module

The handheld computer offers a full keyboard to input data and provide a 26 character LCD display. It also contains 8K bytes of memory for data files. To familiarize yourself with the operation and capabilities of the microcomputer, refer to the Panasonic Instruction manual provided with the programmer.

The printer is a 40 column dot matrix printer and utilizes a thermal printer mechanism and drive electronics. Special heat sensitive paper must be used in the printer and as such is subject to fading over extended periods of time when exposed to excessive heat or certain types of adhesives. It is suggested that a photocopy be made when a permanent file is to be maintained.

The Program Storage Module houses the programmable EPROMs that contain the computer application programs to program the radio equipment. Eight sockets are provided for the application programs. To install EPROMs refer to Page 12 EPROM Installation.

COMMUNICATING WITH THE TQ2310

The software for the T-99 Code Plug communicates to the user through menus and forms within the menu. The user responds by answering multiple choice questions or entering data through the computer keyboard.

Menus are displayed one line at a time on the computer LCD display screen. The PRIMARY MENU contained in the TQ2310 software is an index of program and functions that are available in the Program Storage Module. These are identified by number. Enter the number of the program or function on the keyboard for the program you wish to run or modify. The name of the program will then be displayed followed by the menu of subprograms available to service the selected program.

Typically, the PRIMARY MENU in the TQ2310 displays the following - a line at a time:

1 = CALCULATOR

2 = CLOCK/CONTROLLER

3 = FILE SYSTEM

X = The last entry on the menu

"X" is used to symbolize the last entry displayed from the menu. Adding EPROMs (software modules) to the PROGRAM STORAGE Module will force "X" to a higher number and display the name of the EPROM.

The EPROMs identify the programming capabilities of the programmer as then configured. For example, when the T-99 software module is installed, one entry on the PRIMARY MENU will be T-99 Code Plug. The number corresponding to the T-99 software is selected and will provide a second T-99 Code Plug Program Menu from which the radio is programmed.

To select an item from the menu, enter the number of the item on the keyboard. For example, pressing the 2 key will select CLOCK/CONTROLLER.

FORMS/KEY DEFINITIONS

The speed of the menu display can be controlled or stopped by pressing the STP/SPD key. The following key sequences will help you test this capability.

Refer to sheet 1 of the Panasonic Instruction Manual for the keyboard display for the handheld computer.

STP/SPD STP/SPD - Stop/Restart the display.

STP/SPD 8,9,0 - Selects the faster speeds.

STP/SPD 1,2,3 - Selects the slower speeds.

Forms are also displayed one line at a time. However, you may control form modification or programming by using the arrow keys and the ENTER key. The up (↑) and down (↓) arrows select which line of the form is being displayed on the screen. The left (←—) and right (—→) arrows position the cursor over the character position that can be changed. The cursor is limited to specific fields on the LCD display. The computer will beep if you attempt to move the cursor to an illegal position. The computer will also beep if you use the up arrow to go past the first line or the down arrow to go past the last line. Each time upon completion of a form, press the ENTER key. This stores the information into computer memory and advances the program to the next step.

NOTE

DO NOT attempt to use the "HELP" key as described in the Panasonic literature during execution of the T-99 Code Plug program. The "HELP" key for use in defining the function keys f1, f2, f3 (if desired) should be done prior to selecting the T-99 Code Plug program.

The control keys c1, c2, c3, c4 and the rotate key are not defined for this application.

T-99 CODE PLUG FILE

The programmer's file system can store a single copy of the T-99 module's data in an internal file that remains intact as long as the Hand Held Computer (HHC) batteries are not completely discharged, the unit is not powered off with the slightly hidden "all-off" switch in the back of the unit, or until the file data is modified or "overwritten" by the user via a "copy" operation. (Of course, the Programmer system can simultaneously store single copies of Radio data for each different radio: CELLULAR, PHOENIX, DELTA, etc.)

Data may be read and previewed, printed, reprogrammed, etc. in the T-99 file. Data may be copied from the file to the T-99 Code Plug, and vice versa.

NOTE

Within the T-99 Code Plug Program, the data file is specified by "T-99 File", however when using the HHC File System the data file's name is "T-99 Code Plug".

See Appendix A for additional discussions of the file system and file manipulation.

PROGRAMMING THE T-99 CODE PLUG

PROGRAMMING PRELIMINARIES

Be sure the Type 99 Code Plug program module is installed in the PSM (Program Storage Module) and that Code Plug Adapter TQ2341 is plugged into the Data I/O Module.

To determine if the T-99 Code Plug Module is present.

- Turn the Universal Radio Programmer (URP) on and clear it. (Press ON and then CLEAR on the keyboard).
- Enter a 1 to display the PRIMARY MENU to see if the T-99 Code Plug module is present.

> **NOTE**
>
> **If the T-99 Code Plug module is not listed, turn the power off and refer to the EPROM Installation Instructions in the manual to install the correct EPROM.**

DATA ENTRY

Data entry for this program takes one of the following forms:

1. Entering a value to select a menu item.
2. Entering numbers to fill in a form.
3. Answering a question with Yes (Y) or No (N).
4. Entering program control commands (repositioning cursor by using arrows) on ENTER.

PROGRAM MENU FLOW

The program menu provides you with some insight as to what you can do in programming or reprogramming the T-99 Code Plug Unit. Figure 3 shows the Program Menu Flow. A review of these diagrams will help you to organize the programmable data before you actually begin to program the radio. An example program including step-by-step procedures is given on page 14.

Primary Menu - The Primary Menu displays the contents of the Program Storage Module. One of the lines displayed will read T-99 Code Plug along with an access number for the software module.

T-99 Code Plug Program Menu - Entering the access number for the software module on the keyboard displays the T-99 program menu shown below, a line at a time.

1 = PRIMARY MENU
2 = PROGRAM/REVIEW MENU
3 = PRINTOUT
4 = COPY-SINGLE
5 = COPY-MULTIPLE
6 = HEX PRINTOUT

Each of these lines identify a function or series of functions that can be accomplished.

PRIMARY MENU

Entering a 1 on the keyboard will return you to the Programmer's Primary Menu. i.e. 1 = CALCULATOR, 2 = CLOCK/CONTROLLER, etc. This is the only way you can return to the Primary Menu and should be the last operation you perform after completing a PROGRAM/REVIEW session. Typing the CLEAR key will return you to the T-99 Code Plug menu. It will not return you to the Primary Menu.

> **NOTE**
>
> **Exercise CAUTION when using the CLEAR key to return to the menu when programming or entering data. Use of the CLEAR key will erase all data that you have entered.**

PROGRAM/REVIEW MENU

Program/Review is the operation for programming, modifying, and/or reviewing data required by the T-99 Code Plug.

Entering a 2 from the T-99 Program Menu will select PROGRAM/REVIEW and display the PROGRAM/REVIEW Menu on the screen, a line at a time.

1 = REVISE EXISTING DATA
2 = (ERASE ALL) START ANEW

Revise Existing Data - Entering a 1 will select REVISE EXISTING DATA and display the REVISE DATA MENU, a line at a time. Data to be read or revised may be selected from:

1 = T-99 CODE PLUG
2 = T-99 FILE

After making your selection and entering the corresponding digit on the keyboard, the program will advance to the FORMS MENU where the Tones Options and Channel Guard frequencies are programmed.

If an I/O error is made, press the CLEAR key twice to return to the T-99 Code Plug Program Menu.

(Erase All) Start Anew - Entering a 2 will select (ERASE ALL) START ANEW. This allows you to program or reprogram the radio. The program automatically advances to the RADIO TYPE MENU.

RADIO TYPE MENU

The Radio Type Menu asks you to select the type of radio being programmed.

1 = MPR
2 = MPX
3 = MPI

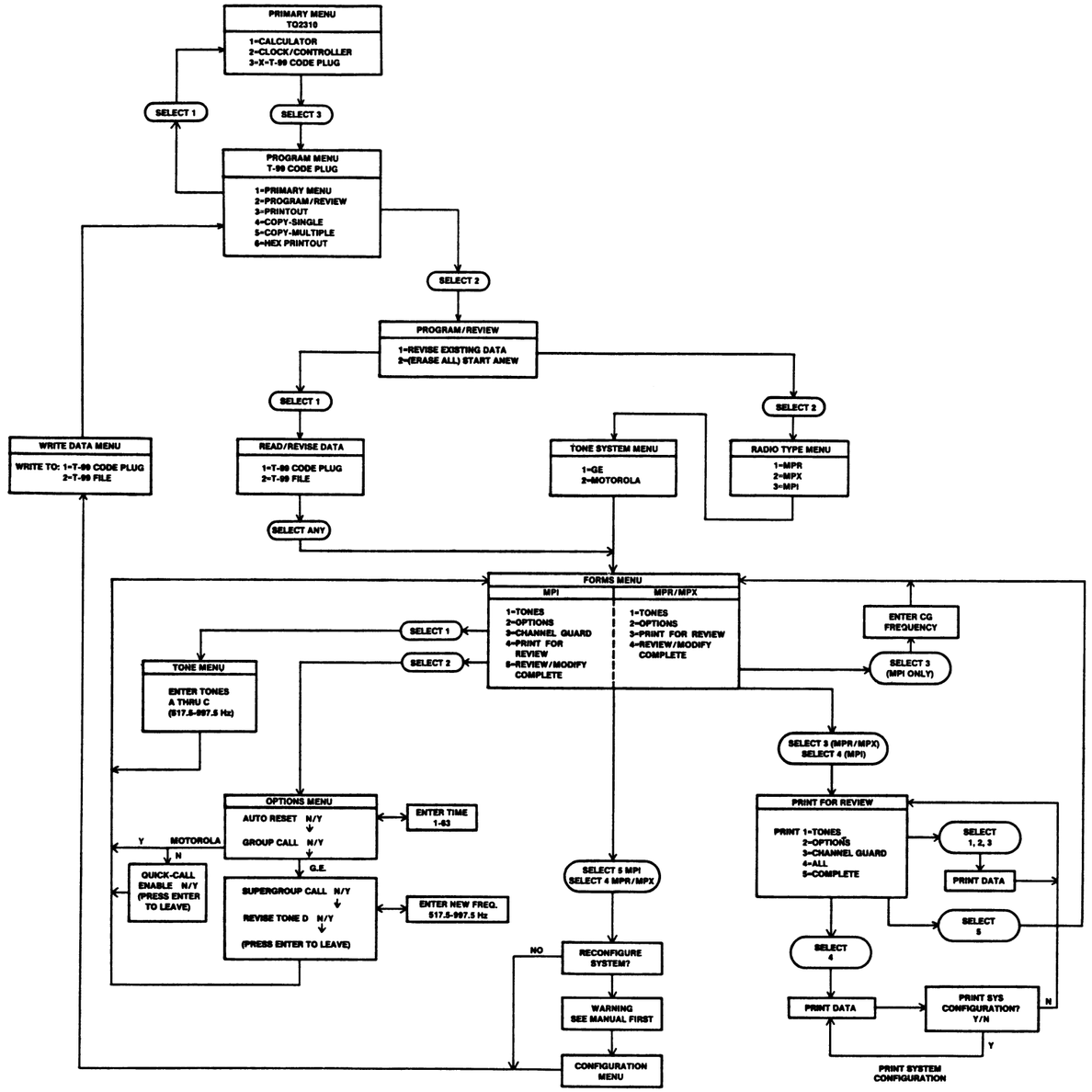


Figure 3 - T-99 Code Plug Menu

After making your selection and entering the corresponding digit on the keyboard the program will advance to the TONE SYSTEM Menu.

TONE SYSTEM MENU

The Tone System Menu allows you to select the GE or Motorola tone system. The tone system is selected from the following:

1 = G.E.

2 = MOTOROLA

If neither of these systems is desired, pick the system that most closely matches your need and then customize it with the RECONFIGURE option.

It is assumed that almost all radios will be configured in the General Electric or Motorola formats shown later in this section. This program is set-up to facilitate programming of these formats by providing default values for all necessary variables.

It is unknown how many other system configurations exist but, due to the versatility of this T-99 option, many configurations can be accomodated. This program allows you to access all of this flexibility by using the RECONFIGURE option. Unfortunately, with flexibility comes complexity. Using the RECONFIGURE option for anything other than simple changes, such as adjustments to Alert Tone ON time, OFF time, or frequency will require some study.

NOTE

Remember, the RECONFIGURE option needn't be used when programming a Code Plug for a standard G.E. or Motorola system.

If the tone system is to be reconfigured and problems arise contact your local GE service representative or the Customer Response Center in Lynchburg, Virginia, for assistance.

After entering the digits corresponding to your radio the program will advance to the FORMS Menus.

FORMS MENU

NOTE

One of two Forms Menus will be displayed a line at a time. One is applicable to the MPR and MPX radios while the other applies to the MPI. The difference being that Channel Guard programming applies to MPI radios only.

The Forms Menu allows you to establish the operating characteristics of the radio by assigning the tone signalling and Channel Guard frequencies for selective calling and setting the options. A table of tone signalling frequencies, tone designators and standard Channel Guard frequencies are given in the Maintenance Manual. Various options such as Auto Reset, Group/Super Group Call Enable and changing the Diagonal Tone are accessable. QUICK CALL enable may also be set if a Motorola format is used. The Forms Menu shown below is displayed one line at a time.

MPR/MPX

1 = TONES

2 = OPTIONS

3 = PRINT FOR REVIEW

4 = REVIEW/MODIFY COMPLETE

MPI

1 = TONES

2 = OPTIONS

3 = CHANNEL GUARD

4 = PRINT FOR REVIEW

5 = REVIEW/MODIFY COMPLETE

Keying the digit corresponding to the option desired will advance the program to that option.

Tones

Enter a 1 on the keyboard to select tones. The General Electric Type 99 Tone system can selectively call up to 900 different decoders. Thirty tones in three groups of ten tones each (called tone groups A, B, and C) are combined to form 900 tone pairs. A thirty first tone, called the "Diagonal Tone", (Tone D) replaces the first tone in a tone pair that would otherwise consist of duplicate tones. TONE D is used only in GE Tone Systems and has a default frequency of 742.5 Hz. This frequency can be changed only in the Options mode.

Tone frequencies in the GE tone System fall within the range of 517.5 - 997.5 Hz. In Motorola Tone Systems the tone frequencies are within the range of 0 - 2046.9 Hz. A "0" is a valid entry in either system.

NOTE

If the Tone System is G.E. and a tone frequency outside the 517.5 - 997.5 range is desired, a tone of up to 2046.9 Hz may be input by use of the INSERT key. After entering the tone, press the INSERT key (instead of the Up or Down Arrow or ENTER key). The tone will then be accepted. Tones greater than 2046.9 Hz will not be accepted.

Valid tone frequencies and their designators are identified in the Maintenance Manual.

After entering a 1 on the keyboard the following is displayed.

TONE A 0 000.0

Enter the tone A frequency and press the ↓ arrow to advance to Tone B. The following is displayed:

TONE B 0 000.0

Enter the Tone B frequency and press the ↓ arrow to advance to Tone C. The following is displayed.

TONE C 0 000.0

NOTE

If a wrong frequency has been entered, simply press the ↑ arrow to display the tone. Reposition the cursor to the left and reenter the frequency.

Press ENTER to store the tone frequencies and return to the FORMS Menu.

Options

NOTE

To advance the program through the OPTIONS Form press the ↓ arrow.

Press "2" to select the "OPTIONS" Form. OPTIONS will immediately flash on the display followed by the AUTO RESET option. The Auto Reset function allows you to establish the time between decodes. Any value from 1 - 63 seconds may be entered. The default value is 15 seconds. The display is shown below:

AUTO RESET N

If AUTO RESET is desired, enter Y and press the ↓ arrow. If a decode time of 15 seconds is satisfactory press the ↓ arrow and advance to GROUP CALL ENABLE.

If a value other than 15 seconds is desired, enter the new value and press the ↓ arrow.

NOTE

If a mistake is made the URP will beep and display the legal values. You may then press the ↑ arrow to return to the Auto Reset display and reenter the correct value.

The program will now advance to the Group Call Enable Form.

GROUP CALL ENABLE N

This mode allows communication with all radios within a single group. You can enable the option by pressing Y followed by the ↓ arrow to advance to the next display. Press the ↓ arrow only if Group Call is not to be enabled.

NOTE

Group Call and Quick Call cannot both be enabled in a Motorola system. If Group Call is enabled the display will advance to the FORMS Menu.

The program will advance to the Super Group Call (GE Tone Systems) or QUICK CALL (Motorola Tone Systems) if group call was not selected.

The Super Group Call or QUICK-CALL function allows two-way communication between all radios in a system.

QUICK-CALL ENABLE N

or

SUPER GROUP CALL ENABLE N

If the option is not to be enabled, press the ↓ arrow if GE Tone System. The program will advance to the Revise Tone D form. If Motorola Tone system press ENTER to store the data and return to the FORMS Menu.

Enter a Y to enable the option and press the ↓ arrow to advance to the next display - Revise Tone D.

Tone D (GF Tone Systems only) is the diagonal tone used in the GE Tone System when adjacent tone frequencies (Tones 1 and 2) are the same. Since two tones of the same frequency would appear as one extended tone, Tone D must be used. The standard frequency for Tone D is 742.5 Hz and is the default frequency. Legal frequencies for the Diagonal Tone are 0 or frequencies within the range of 517.5 - 997.5 Hz.

NOTE

If a tone frequency outside the range of 517.5 - 997.5 Hz is desired for Tone D, a tone of up to 2046.9 Hz may be input by use of the INSERT key. After entering the tone, press the INSERT key (instead of the Up or Down Arrow or ENTER key). The tone will then be accepted. Tones greater than 2046.9 Hz will not be accepted.

REVISE TONE D N

If Tone D is not to be altered press ENTER to store the options data and return to the Forms Menu.

Enter a Y and press the ↓ arrow to revise Tone D. The following will be displayed.

TONE D 0 742.5

Enter the new frequency on the keyboard.

NOTE

Before storing the Options data in memory you may review the Forms Menu by using the ↑ and ↓ arrows to step through the form.

Press ENTER to store the data and return to the FORMS Menu.

NOTE

At this point when programming the MPI radio you may program the Channel Guard frequency, if desired.

Channel Guard:

Enter 3 from the FORMS Menu to select Channel Guard. Standard Channel Guard frequencies are listed in the Maintenance Manual. Non standard Channel Guard frequencies must fall within 0 - 255.75 Hz.

The following is displayed:

CHANNEL GUARD 0 00.00 Hz

Enter the desired Channel Guard frequency and press ENTER to store the data and return to the FORMS Menu.

NOTE

At this point in the program you will normally select Print For Review or Review/Modify Complete. Print For Review will return to the FORMS Menu for any additional changes.

Print For Review

If item 3 (or 4 for MPI radio) PRINT FOR REVIEW is selected from the FORMS menu the following PRINT MENU will be cycled. Individual items may be selected for printing.

The menu will be cycled until 4, (or 5 for MPI radio), COMPLETE is selected, after which the FORMS Menu is displayed.

PRINT: 1=TONES

PRINT: 2=OPTIONS

PRINT: 3=CHANNEL GUARD

PRINT: 4=ALL

PRINT: 5=COMPLETE

If 3 (or 4 MPI radio) ALL is selected, all data except the configuration data will be printed. Then the following will be displayed.

PRINT SYS CONFIGURATION N

Enter Y to print system configuration data.

Review/Modify Complete

If item 4 (or 5 for MPI radio) REVIEW/MODIFY COMPLETE is selected from the FORMS MENU, then you will be asked if you wish to reconfigure any of the system variables.

RECONFIGURE SYSTEM Y/N? N

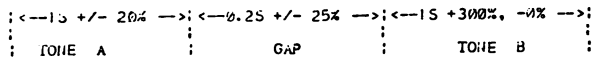
If this question is answered No (N), which should normally be the case, the program continues as described in the "WRITE TO: Menu" section. If the answer is Yes (Y) the program advises you to refer to the manual and allows access to the system variables via displays that follow. Reasonable entries for these variables are shown in Appendix B.

As mentioned earlier, a change to Alert tone OFF time, ON time, or frequency is relatively easy because these variables don't interelate with any other functions. The Alert tone, used in MPR/MPX only, is an interrupted tone. The frequency as well as the ON and OFF times are user selectable. IND (GRP, S.GRP, QCK-CALL) ALM FREQ, are the variables to change the Alert frequencies. To change the ON time or OFF time use the IND (GRP, S.GRP, QCK-CALL) ON TIME and IND (GRP, S.GRP, QCK-CALL) OFF TIME variables. The range of these variables is contained in Appendices B and E respectively.

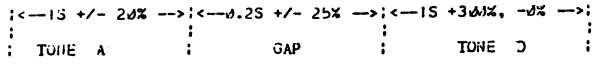
If reconfiguration is desired to adapt to a different type of signalling format, such as new tone or gap duration formats, an in depth understanding of the T-99 circuit's operation is necessary. To gain this understanding it is helpful to study the operation of the system during standard GE and Motorola formated decode sequences. System Part references in the following text are explained in the Maintenance Manual.

GENERAL ELECTRIC FORMAT

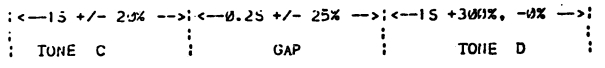
INDIVIDUAL CALL FORMAT



GROUP CALL FORMAT



SUPER GROUP CALL FORMAT



In the GE tone format, it can be seen that both the first tone or second tone may each be one of two tones. The first may be A for Individual calls or C for Group calls. The second may be B for Individual calls or D for either Group or Super Group calls.

To detect one of two possible frequencies, the DTD is first programmed to the first frequency at LOW Q, and if no detect occurs in an allotted time (this time is established by the Maximum LO Q Decode time), is reprogrammed to the second frequency at LO Q, and again checked for decode in an allotted time. If no decode occurs at either frequency the process is repeated infinitely.

If a possible first tone is detected, then the DTD is reprogrammed for the same tone at HI Q, and a final more precise test is made where the allotted time (established by the Maximum HI Q Decode time) is considerably longer. Likewise if a C tone is found at LO Q, then it is also re-tested at HI Q.

When one of the two possible first tone decodes has been established, then the two possible second tones are checked, but in the case of second tones, two differences are important. First in the event neither tone is found the search must be terminated, and the first tones again looked for. This must be done in time to find the earliest possible occurance of another valid first tone. Secondly, the search must not be abandoned too early, since there is an intentional gap between the two tones which is large enough to allow several LO Q tests. The retry count during the gap is a customer programmable value (established by the LO Q Retries In Gap variable, since not all paging systems use the same gap size. In other words, the user can select how many LO Q retries to repeat to get over the gap.

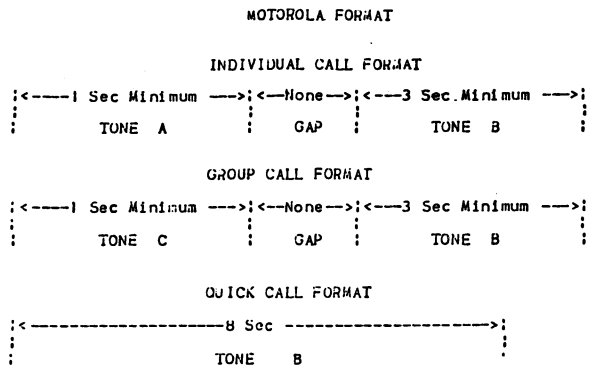
If one of the two second tones is found in the allotted number of retries, then a HI Q test for the same tone is made. On determining that a good second tone exists, the radio is enabled, and the alarm is sounded. For MPI radios, the alarm will be simply the second tone passing through the audio amplifier. For MPR/MPX, the alarm may be generated by the processor and may be different for each of the three possible combinations of tones that finally resulted in a decode. In either case, the alarm will be ended when the second tone is no longer detected by the DTD.

Before continuing on with a similar Motorola sequence, a short description will be given of how the DTD and microcomputer (uC) of the circuit work together.

The DTD input acts as a filter with it's Q and acceptance threshold programmed by the uC. Once programmed, these variables determine the response time and bandwidth of the filter. If the combination of Q and threshold are too low then falsing can occur, too high and the response time may be so long that valid tones will be missed while looking at invalid nearby tones.

When the DTD has detected a valid tone, the uC introduces a user adjustable "integration time" or waiting period before it actually accepts the decode as successful. For a LO Q decode the minimum time for this is set by the MIN LO Q DEC time. For HI Q decodes this is set by the MIN HI Q DEC time. The maximum time that the DTD looks for a valid tone is determined by the MAX LO Q DEC and MAX HI Q DEC times which are user selectable. For example, if Individual, Group and Super Group modes are selected there will be 2 first tones and 2 second tones that the DTD must be programmed to look for. The time that the unit hesitates in the presence of a strong tone and the time that it looks in the absence of a tone are determined by these variables. QCK-CALL MIN DEC and QCK-CALL MAX DEC are similar variables that pertain to Motorola's Quick-Call format.

Motorola's Quick-Call format relies on a relatively long burst of a single tone. Single tone systems are prone to falsing so it is necessary to decode for a long time. Instead of making the maximum time for a HI Q decode extremely long we allow the user to vary the number of HI Q decodes required to accept a Quick-Call tone in the HI Q DECODES, QCK-CALL variable.



In the Motorola tone format, it can be seen that the first tone may be one of three tones. It may be A for Individual Call, B for Quick-Call, or C for Group Call. The second or final tone is B in all cases.

It is not feasible to detect one of three tones, so a choice must be made between Group Call and Quick-Call. If Quick-Call is selected, the first tone will be tested for A or B. If Group Call is selected, then the first tone will be checked for A or C. If both Quick-Call and Group Call are selected, then Group Call will be ignored and the system will default to Quick-Call. The rest of the decode sequence is similar to GE.

Reconfiguration Displays. (For possible variable entries, see Appendix B)

(1) DTD HI Q setting for tones A-D

TONE n HI Q x xxx.x

n rotates from A thru D. The possible entries for Q, "xxxx.x", are contained in Appendix D. This sets the filter Q on the DTD input during a HI Q decode.

(2) DTD LO Q setting for tones A-D

TONE n LO Q x xxx.x

n rotates from A thru D. The possible entries for Q, "xxxx.x", are contained in Appendix D. This sets the filter Q on the DTD input during a LO Q decode.

(3) DTD HI Q THRESHOLD setting for tones A-D

TONE n HI Q THRESHOLD x x.x

n rotates from A thru D. The possible entries for Threshold, "xxxx", are contained in Appendix B. This sets the filter threshold on the DTD input during a HI Q decode.

(4) DTD LO Q THRESHOLD setting for tones A-D

TONE n LO Q THRESHOLD x x.x

n rotates from A thru D. the possible entries for Threshold, "xxxx", are contained in Appendix B. This sets the filter threshold on the DTD input during a LO Q decode.

(5) All tones Minimum LO Q decode time

MIN LO Q DEC	x xx	X10MS

The possible entries for "xxx" are contained in Appendix B. This sets the minimum integration time during a LO Q decode.

(6) All tones Maximum LO Q decode time

MAX LO Q DEC	x xx	X10MS

The possible entries for "xxx" are contained in Appendix B. This sets the maximum integration time during a LO Q decode.

(7) First tone Minimum HI Q decode time

1ST MIN HI Q DEC	x xx	X20MS

The possible entries for "xxx" are contained in Appendix B. This sets the maximum integration time during a HI Q decode of the first tone.

(8) First tone Maximim HI Q decode time

1ST MAX HI Q DEC	x xx	X20MS

The possible entries for "xxx" are contained in Appendix B. This sets the maximum integration time during a HI Q decode of the first tone.

(9) Second tone Minimum HI Q decode time

2ND MIN HI Q DEC	x xx	X20MS

The possible entries for "xxx" are contained in Appendix B. This sets the minimum integration time during a HI Q decode of the second tone.

(10) Second tone Maximum HI Q decode time

2ND MAX HI Q DEC	x xx	X20MS

The possible entries for "xxx" are contained in Appendix B. This sets the maximum integration time during a LO Q decode of the second tone.

NOTE

Steps 11 and 12 apply to Motorola Tone Formats only.

(11) Quick-Call Minimum Decode time

QCK-CALL MIN DEC	x xx	X40MS

The possible entries for "xxx" are contained in Appendix B. This sets the minimum integration time during a HI Q decode of Quick Call.

(12) Quick-Call Maximum Decode time

QCK-CALL MAX DEC	x xx	X40MS

The possible entries for "xxx" are contained in Appendix B. This sets the minimum integration time during a HI Q decode of Quick Call.

NOTE

Steps 13 thru 15 apply to MPR/ MPX radios only.

(13) Individual Alarm Frequency

IND ALARM FREQ	x xxx	Hz

The possible entries for "xxxx" are contained in Appendix E. This screen will not be shown if MPI radio was selected.

(14) Individual Alarm On Time

IND ALARM ON TIME	x x	X40MS

The possible entries for "xx" are contained in Appendix B. This screen will not be shown if MPI radio was selected.

(15) Individual Alarm Off Time

IND ALARM OFF TIME	x x	X20MS

The possible entries for "xx" are contained in Appendix B. This screen will not be shown if MPI radio was selected.

NOTE

Repeat steps 13, 14, and 15 for GROUP, SUPER GROUP, and QUICK-CALL.

(16) Number of HI Q Decodes for Quick-Call

HI Q DECODES, QCK-CALL [x] x

The possible entries for "xx" are contained in Appendix B.

(17) Number of LO Q Retries During Gap

LO Q RETRIES IN GAP [x]

The possible entries for "xx" are contained in Appendix B.

(18) Press enter to store new data in file and advance to the WRITE TO Menu.

Write To Menu: The following menu will be displayed a line at a time.

WRITE TO: 1=T-99 CODE PLUG

WRITE TO: 2=T-99 FILE

If an I/O error of any type occurs in the "Write To" procedure the entire "Write To" sequence is repeated.

Following a successful "Write To" operation the program will return to the T-99 Code Plug Program menu.

PRINTOUT

If PRINTOUT is selected from the T-99 Code Plug Program menu the system further prompts you for the media from which the printout is to be taken via the following menu:

READ FROM: 1=T-99 CODE PLUG

READ FROM: 2=T-99 FILE

If an I/O error occurs in the "READ FROM" sequence the entire "READ FROM" sequence will be repeated.

After a successful read, the radio data will be printed out in the following format.

```
THU 12:29:50 P. DEC 12 1985
T-99 CODE PLUG V0.3
RADIO TYPE: MPI
TONE SYSTEM: GE

TONE A  0520.0
TONE B  0610.0
TONE C  0705.0

AUTO RESET                Y
AUTO RESET TIME          20
GROUP CALL ENABLE         N
SUPER GROUP CALL ENABLE   Y
TONE D  0741.5

CHANNEL GUARD 230.50 HZ
```

Following this printout you will be asked:

PRINT SYS CONFIGURATTION [N]

If Yes (Y) then System Configuration will be printed out in the following format:

```
TONE A HI Q 0160.1
TONE B HI Q 0160.1
TONE C HI Q 0200.3
TONE D HI Q 0160.1

TONE A LO Q 0049.5
TONE B LO Q 0049.5
TONE C LO Q 0049.5
TONE D LO Q 0049.5

TONE A HI Q THRSHLD -8.5
TONE B HI Q THRSHLD -8.5
TONE C HI Q THRSHLD -8.5
TONE D HI Q THRSHLD -8.5

TONE A LO Q THRSHLD -8.5
TONE B LO Q THRSHLD -8.5
TONE C LO Q THRSHLD -8.5
TONE D LO Q THRSHLD -8.5

ALL TONES MIN LO Q DECODE 002 X 10 MS
ALL TONES MAX LO Q DECODE 010 X 10 MS

1ST TONE  MIN HI Q DECODE 004 X 20 MS
1ST TONE  MAX HI Q DECODE 010 X 20 MS

2ND TONE  MIN HI Q DECODE 008 X 20 MS
2ND TONE  MAX HI Q DECODE 015 X 20 MS

LO Q RETRIES IN GAP 4
```

COPY-SINGLE

COPY-SINGLE is a utility function providing the capability to copy the T-99 data between the T-99 CODE PLUG and the T-99 FILE. Selecting COPY-SINGLE prompts you to select the input or "copy from" device from the following menu:

READ FROM: 1=T-99 CODE PLUG

READ FROM: 2=T-99 FILE

If an I/O error occurs in the "READ FROM" procedure, the entire "READ FROM" sequence is repeated.

Following a successful "READ FROM" operation the system prompts the user to select a "copy-to" device from the following menu:

WRITE TO: 1=T-99 CODE PLUG

WRITE TO: 2=T-99 FILE

If an I/O error occurs in the "WRITE TO" procedure, the entire "WRITE TO" sequence is repeated.

COPY-MULTIPLE

COPY-MULTIPLE is much like COPY-SINGLE except that the write operation is repeated as many times as the operator responds "Y" to the following prompt:

AGAIN Y

HEX PRINTOUT

HEX PRINTOUT gives you a hexadecimal dump of either the T-99 FILE or T-99 CODE PLUG. After selecting HEX PRINTOUT from the T-99 main menu, you are presented with the following menu:

READ FROM: 1=T-99 CODE PLUG

READ FROM: 2=T-99 FILE

SAMPLE HEX PRINTOUT

```
TYPE-99 MODULE
0000 01 04 01 31 81 61 C9 73
0008 53 9A 8A 32 0A 32 8A 12
0010 8A 32 0A 02 0A 04 0F 08
0018 00 05 00 00 00 00 D0 04
```

After selecting any printout or copy mode (3-6) the data is printed or copied and you will be returned to the T-99 Code Plug Program Menu.

EPROM INSTALLATION

Programmed EPROMs for the various General Electric programmable mobile radios are required in the Program Storage Module before radio programming can be accomplished. These EPROMs are provided separately, as ordered, and are not initially installed in the Program Storage Module. The following installation procedure is suggested (refer to Figure 4):

CAUTION

The EPROM devices can be destroyed by static discharges. Before handling one of these, the installer should be discharged by touching the test bench ground bus. The PW board and EPROM should also be at ground potential. EPROMs should be stored in conductive material.

1. Remove the Program Storage Module from the system I/O Module. Turn off the handheld computer before disconnecting.
2. Remove the four screws from bottom cover and open. Do not remove boards.
3. Install the first EPROM in socket 1, the second in socket 2, etc. (Note socket designations and numerical sequence. Programs will be displayed according to socket number).
4. Close the cover and replace the four screws in bottom.
5. Reinstall the Program Storage Module in the programmer.

PRINTER PAPER REPLACEMENT

(Refer to vendor instruction manual)

1. Remove paper cover by sliding in direction of arrow (away from printer head).

2. Insert new roll of thermal paper with leading edge going into feed mechanism. Leading edge must come from bottom of roll.

3. Advance paper using paper feed knob. Note: Knob rotates in direction of arrow only.

4. Replace paper cover.

NOTE

Damage may result to thermal head if printer is activated without paper being set correctly.

IN CASE OF DIFFICULTY

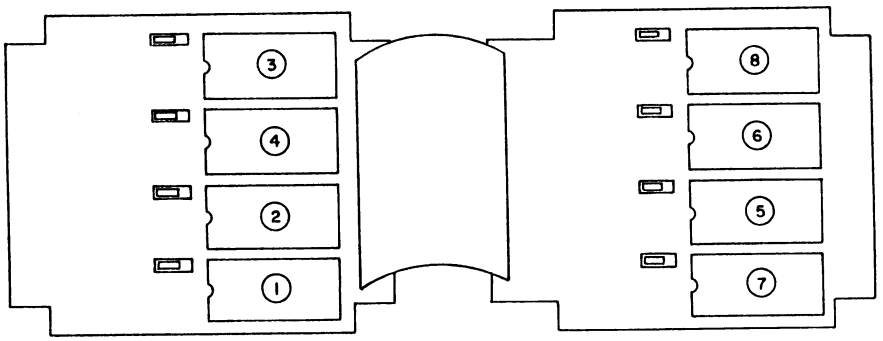
It is possible that on occasion, unexplained problems will occur which may be caused by static electricity, jostling the unit, etc. The programmer may fail to operate as described or the word "RESET" may appear in the display. If this occurs, press CLEAR once to return to the start of the program being run. The data previously entered will be lost, but no data stored in files will be affected.

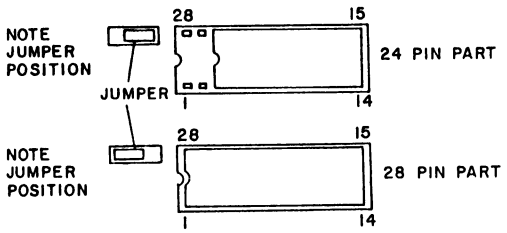
If "RESTART" appears, press CLEAR twice. This should return you to the primary menu.

If you cannot reach the primary menu by pressing CLEAR twice, turn the computer off by means of the ALL-OFF switch in the back of the unit. You will have to remove the I/O Adaptor from the case and the computer from the I/O adaptor to reach the switch. Wait about two minutes and turn the ALL-OFF switch on. Then using the AC Adaptor as a power source, press ON and then CLEAR. The word "RESTART" should appear in the display and pressing CLEAR again should display the primary menu. Otherwise the computer needs servicing. This procedure results in the loss of all internally stored files, including time and date.

HELPFUL SUGGESTIONS

The following suggestion may facilitate programming with the Universal Radio Programmer.





CAUTION

OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES

Figure 4 - Installation Instructions

1. Select a display speed not greater than 6 or 7 for most convenient data entry.

2. If the T-99 Code Plug program does not show up in the Primary menu, try removing the Hand Held Computer from the programmer turning it "ON" (with "ON KEY"); type the CLEAR key a few times; turn the unit "OFF" with the normal "OFF KEY"; then re-insert into the suitcase and try again. If this fails to reveal the T-99 Code Plug remove the GE Program Storage Module, open it and extract the T-99 EPROM. Examine the EPROM for any physical damage (e.g. broken or bent pins). If the EPROM appears to be undamaged return it to the Program Storage Module, but be sure to insert it in a different socket than the one it was just extracted from. Replace the Program Storage Module and try again to gain access to the program.

3. DO NOT Plug/Unplug peripherals when the system is executing an application program. To be sure of the state of the unit depress CLEAR a few times until you see the PRIMARY menu being displayed. Then turn the unit off via the normal "OFF KEY" prior to inserting or removing modules or capsule programs.

4. The Panasonic BASIC Capsule program options (purchase from Panasonic) has special exiting procedures that one should carefully observe else one may have to play the "ALL OFF" game with the ALL OFF switch in the back of the Hand Held Computer.

5. You may purchase a variety of peripherals and software capsules for the Hand Held Computer from Panasonic. However, this T-99 Code Plug software is designed for use only with the basic computer, the T-99 Code Plug Adapter TQ2341, GE Program Storage Module and GE I/O Module. As such, inclusion of other devices or other Capsules programs may cause problems. If a problem arises, simply unplug the problem Peripheral/Capsule when programming T-99 Code Plug.

PROGRAMMING EXAMPLE

The following is a step-by-step example of how to program the T-99 Code Plug using the Universal Radio Programmer. In this summary, the following sample data will be used.

```
Radio Type      =   MPI
Tone System     =   G.E.

Tone A          =   520.0
Tone B          =   610.0
Tone C          =   705.0

Auto Reset                      Y
Auto Reset Time                 20
Group Call Enable               N
Super Group Call Enable         Y
Channel Guard =                 230.5
```

Asumming the HHC is turned on and the Primary Menu is being displayed.

1. Press the number or letter that appears beside "T-99 Code Plug".

   "SELECT DESIRED OPERATION" will be displayed on the screen, followed by the T-99 Code Plug Main Menu.

2. Press 2 for "PROGRAM/REVIEW".

   The following two choices will then appear.

   1 = REVISE EXISTING DATA
   2 = ERASE ALL(START ANEW)

3. Press 2 for "ERASE ALL(START ANEW).

   "RADIO TYPE" will then be displayed at the left of the screen while the choices for Radio Type will be shown at the right.

4. Press 3 for "MPI".

   "TONE SYSTEM" will then be displayed at the left of the screen while the choices for Tone System will be shown at the right.

5. Press 1 for "G.E.".

   The T-99 Program/Review Menu will then be displayed.

6. Press 1 for "TONES".

   "TONE A 0000.0" will then be shown on the screen.

7. Type in 0520.

8. Press the DOWN ARROW key.

   "TONE B 0000.0" will then be shown on the screen.

9. Type in 0610.

10. Press the DOWN ARROW key.

    "TONE C 0000.0" will then be shown on the screen.

11. Type in 0705.

12. Press the ENTER key.

    The Program/Review Menu will then be displayed.

13. Press 2 for "OPTIONS"

    "AUTO RESET N" will then be shown.

14. Press Y to answer "YES".

15. Press the DOWN ARROW key.

    "AUTO RESET TIME 15" will then be shown on the screen.

16. Type in 20.

17. Press the DOWN ARROW key.

    "GROUP CALL ENABLE N" will then be shown on the screen.

18. Press the DOWN ARROW key to answer "NO".

    "SUPER GROUP CALL ENABLE N" will then be shown on the screen.

19. Press Y to answer "YES".

20. Press ENTER.

    The Program/Review Menu will then be cycled.

21. Press 3 for "CHANNEL GUARD".

    "CHANNEL GUARD 000.00 Hz" will then be displayed.

22. Type in the 230.50.

23. Press the ENTER key.

    The Program/Review Menu will then be cycled.

24. Press 5 for "REVIEW/MODIFY COMPLETE".

    You will be asked if you want to reconfigure the system by the following display:

    "Reconfigure System Y/N? N"

25. Press the ENTER key to enter N.

    The following two choices will then appear.

    WRITE TO: 1=T-99 CODE PLUG
    WRITE TO: 2=T-99 FILE

26. Insert the T-99 Code Plug in the Adaptor.

27. Press 1 for T-99 Code Plug.

    The following two displays will appear momentarily.

    -----WAIT 10 SECONDS-----
    VERIFY

    After these are displayed, the T-99 Code Plug Program Menu will then be cycled.

28. Press 1 for Primary Menu.

    The HHC's Primary Menu will be displayed.

29. At this point you may turn off the programmer by pressing the OFF key on the HHC.

APPENDIX A

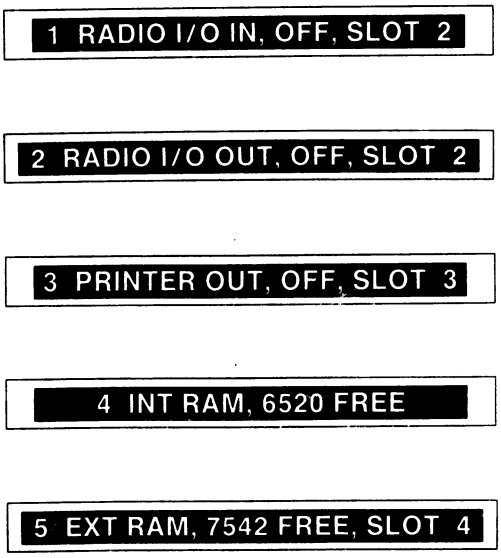
FILE OPERATIONS

The programmer offers several facilities for managing radio data saved in files. For more detailed information, consult the sections of the Panasonic Hand Held Computer - Instructions for Use titled "File System" and "Beyond the Primary Unit with the I/O Key". T-99 Code Plug module data written to (and read from) the T-99 file is written to (and read from) a file named T-99 Code Plug, which is created automatically the first time radio data is written. The file can be deleted, renamed, or copied as required.

EXPANDING FILE STORAGE WITH PROGRAMMABLE MEMORY PERIPHERALS

Optional Panasonic Programmable Memory (RAM) Peripherals can be added to increase file storage capacity. Peripherals are available in several capacities, and one peripheral can be installed in each unused I/O adaptor slot.

Each Programmable Memory Peripheral, and internal RAM, are separate memory areas. Only one area can be active at a time, and only files stored in that area are available to the T-99 Code Plug program, or other programs. To find the current area, or change the current area designation, press the I/O key to enter the I/O menu. Each peripheral, and each memory area is displayed, with the space remaining, and the current area is in reverse image. For example:

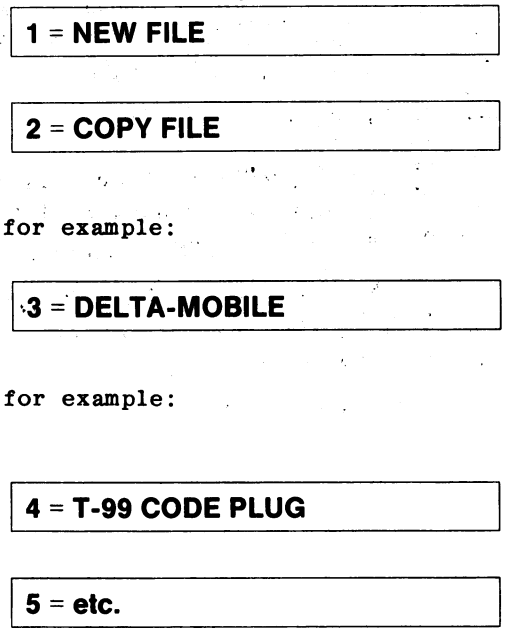


Change the current memory by pressing the number displayed with the desired memory area.

DELETING A FILE

It may be desirable to delete the T-99 file if the memory space occupied by it is required for other files.

1. Return to the PRIMARY menu if not already there.
2. Select the file system by pressing "3" (3 = FILE SYSTEM). The computer will display a menu listing all (visible) files. Items 1 and 2 are special functions used to copy and create files.



for example:

for example:

3. Choose the T-99 file by pressing the number displayed with it (4 in this example). T-99 CODE PLUG will appear in reverse image.
4. Delete the file by depressing the "DELETE" and "DN ARROW" keys. The programmer will begin displaying the menu of files (less the deleted file).
5. Return to the primary menu by pressing the "CLEAR" key twice.

RENAMING A FILE

Any file in the current memory area can be renamed.

1. First make certain that the desired radio data has been written to T-99 CODE PLUG file.

2. Return to the PRIMARY menu if not already there.

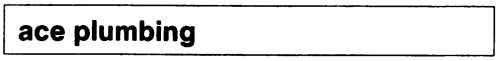
3. Select the file system by pressing "3" (3 = FILE SYSTEM). The computer will display a menu listing all (visible) files, as described above.

4. Choose the T-99 Code Plug file, or any other desired file, by pressing the number displayed with it (4 in the example). The file name will appear in reverse image and the blinking cursor will be left after the last character of the file name.

5. Use the → ARROW and ← ARROW keys to reposition the cursor and type in the new name. The new name can be longer than the original name, up to 24 characters. Delete excess characters by pressing the DELETE key and then the RIGHT ARROW or LEFT ARROW keys, to delete the character at the cursor.

NOTE

It is better to add characters to the file name than to replace the file name. The added characters can simply be deleted if it is necessary to program another radio from the file, and the type of radio is not forgotten.



or

6. Press the ENTER key when the name is correct. The programmer will beep, flash "CAN'T EDIT", and begin displaying the file menu again. The modified file name should appear in the menu.

RESTORING THE RENAMED FILE

The file must be renamed back to T-99 CODE PLUG (must be uppercase) for the T-99 CODE PLUG program to use it. Use the renaming procedure described above. Be careful to rename or delete any T-99 CODE PLUG file that already exists, to avoid confusing the computer with two identically-named files.

NOTE

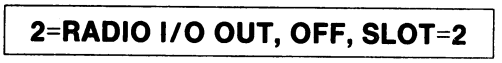
T-99 CODE PLUG is not a text file and cannot be edited by the editing commands described in the Panasonic literature. In addition, the T-99 CODE PLUG program will reject text files, or files created by other programs, that have been renamed T-99 CODE PLUG. DO NOT name non-T-99 CODE PLUG files.

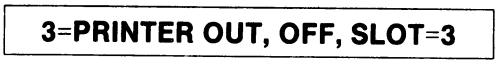
PRINTING THE FILE LIST

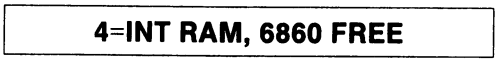
A list of all (visible) files in the current memory can be printed using the following procedure.

1. First make certain the computer is in the PRIMARY menu.

2. Press the I/O key to display the I/O menu. The computer will display a menu of I/O devices and RAM. A typical I/O menu is displayed below:







3. If the printer is off (PRINTER OUT, OFF,SLOT=x), press the number displayed with the printer (3 in the example).

4. Press the I/O key to return to the PRIMARY menu.

5. Press the "3" key to enter the file system. The printer will print everything that appears on the display.

6. When a complete list of files has been printed, press the CLEAR key twice to return to the PRIMARY menu.

7. Press the I/O key to display the I/O menu. Then press the key corresponding to the printer to turn the printer off. Press the I/O key again to return to the PRIMARY menu.

COPYING A FILE

You may wish to copy a file from one memory area to another or to create a duplicate copy of a file. First make sure that the file to be copied is in the current memory area. If not, change the current memory designation as required, using the I/O menu.

1. If not in the PRIMARY menu, press CLEAR twice to return to the PRIMARY menu.

2. Press the "3" key to enter the file system.

3. Press the "2" key for COPY FILE; this prompt appears:

A menu of all the file names in the current memory will be displayed. Press the number of the file to be copied and the following prompt appears followed by a menu of destination memory areas. The current memory is displayed in reverse image.

For example:

Press the number corresponding to the desired destination memory area. When the copying is complete, the original file system menu will return.

APPENDIX B

DEFAULTS AND ACCEPTABLE VALUES

SUBJECT	ACCEPTABLE VALUES	DEFAULTS
Tones A,B,C	0 or 517.5 - 997.5 GE	0000.0
	0 - 2046.9 Motorola	0000.0
Auto Reset	Y or N	N
Auto Reset Time	1 - 63 Seconds	15
Group Call Enable	Y or N	N
Super Group Call Enable	Y or N	N
Quick-Call Enable	Y or N	N
Channel Guard	0 - 255.75	000.00
Tone A-D Hi Q	See Q Table - Appendix D	See Default Table at end of Appendix B
Tone A-D Lo Q	See Q Table - Appendix D	49.5
Tone A-D Hi Q Thrshld	-6, -9.5, -10.1, -12	-8.5
Tone A-D Lo Q Thrshld	-6, -8.5, -10.1, -12	-8.5
Min Lo Q Decode	0 - 255	2
Max Lo Q Decode	0 - 255	10
1st Min Hi Q Decode	0 - 255	4
1st Max Hi Q Decode	0 - 255	10

2nd Min Hi Q Decode	0 - 255	8
2nd Max Hi Q Decode	0 - 255	15
Quick-Call Min Decode	0 - 255	8
Quick-Call Max Decode	0 - 255	50
Individual Alarm Freq	See Alarm Freq Table - Appendix E	708
Ind Alarm On Time	1 - 16	5
Ind Alarm Off Time	1 - 16	14
Group Alarm Freq	See Alarm Freq Table - Appendix E	1298
Group Alarm On Time	1 - 16	9 GE 6 Motor
Group Alarm Off Time	1 - 16	8 GE 10 Motor
Super Group Alarm Freq	See Alarm Freq Table - Appendix E	1579
Super Group Alarm On Time	1 - 16	10
Super Group Alarm Off Time	1 - 16	8
Quick-Call Alarm Freq	See Alarm Freq Table - Appendix E	1000
Quick-Call On Time	1 - 16	9
Quick-Call Off Time	1 - 16	8
Hi Q Decodes, Quick-Call	0 - 31	15
Lo Q Retries During Gap	0 - 7	4

Q DEFAULT TABLE

G.E.

TONE RANGE	Q DEFAULT VALUE
0 - 517.4	160.1
517.5 - 622.4	160.1
622.5 - 757.4	200.3
757.5 - 877.4	229.0
877.5 - 997.5	267.3
997.6 - 2046.9	160.1

MOTOROLA

0 - 288.4	1607.7
288.5 - 422.0	133.3
422.1 - 651.8	160.1
651.9 - 2046.9	200.3

APPENDIX C

ERROR CODES/MESSAGES/CONDITIONS

The Programmer will display a number of error messages when certain error conditions are encountered.

1. NO RAM SPACE

   This message may occur if somehow there is not enough unused RAM memory to execute this program. This could result from other uses of the Hand Held Computer such as with the FILE system, or perhaps with BASIC. The T-99 CODE PLUG program will not attempt to execute until you provide enough RAM. The ultimate "fix" to a RAM problem (i.e. the last resort) is to turn the "ALL OFF" switch OFF for a few minutes.

2. CANNOT ATTACH BOX

   These messages result if the GE I/O module is not connected properly into the system. The T-99 CODE PLUG program will continue after "beeps" and error messages. However, you will not be able to write/read the T-99 CODE PLUG until the error condition is fixed.

3. OPEN PRINTER FAILED
   CANNOT ATTACH PRINTER

   These messages result if the PANASONIC Mini Printer is not connected properly into the system. You will not be able to produce a printout until the error condition is fixed.

4. I/O ERROR xxx

   Where "xxx" is an I/O error resulting from invalid I/O of some sort and will cause the system to repeat the I/O sequences until the error condition is cleared.

5. NO FILE or WRONG TYPE

   NO FILE is not actually an error. If no data has been written to the T-99 CODE PLUG file, this message results from an attempt to READ the file data.

6. NO ROOM FOR FILE-CONT Y/N?

   This is also not actually an error. This message appears when there is insufficient file space to store a T-99 CODE PLUG file. If you do not need to make a file copy, but rather want to write to the Module you can still get full access to the program by answering yes (Y). Answering no (N) returns the system to the HHC's main menu. If a file is desired it will be necessary to enter the HHC's file system and delete a file or files until enough space in RAM is created to hold the T-99 CODE PLUG file.

7. NO RAM SPACE FOR PRINTER

   This message appears when there is insufficient RAM space for the printer to operate. If a printout is desired it will be necessary to enter the HHC's file system and delete a file or files until enough space in RAM is available to operate the printer.

8. LEGAL VALUES ARE

   This message, followed by either a range or a list of numbers, is given when an attempt has been made to enter an unacceptable value. The message will remain on the screen until the ENTER key is hit. The program will then return to the screen containing the invalid data which you can then correct.

9. Y OR N FOR YES OR NO

   This message will be shown when any key other than Y or N was entered where Y or N are the only acceptable values. This message will remain on the screen until the ENTER key is hit.

10. LAST ENTRY, ENTER TO LEAVE

    This message is flashed when you try to go past the last screen available in the current menu item. After flashing, the program automatically returns to the last screen.

11. INVALID HI Q
INVALID LO Q

This message will result when attempting to input a Hi or Lo Q value other than those listed in the Q table (Appendix D). This message will remain on the screen until the ENTER key is hit.

12. INVALID ALARM FREQUENCY

This message will result when attempting to input an Individual, Group, Super Group, or Quick-Call Alarm Frequency that is not listed in the Alarm Frequency Table (Appendix E). This message will remain on the screen until the ENTER key is hit.

13. MUST ENTER TONE A

This message will result when attempting to leave the TONES section of the menu with GE formatted data and Tone B has been entered but Tone A remains zero. This message will remain on the screen until the ENTER key is hit.

14. MUST ENTER TONE B

This message will result when attempting to exit the TONES section of the menu with Motorola formatted data and TONE A has been entered but Tone B remains zero. This message will remain on the screen until the ENTER key is hit.

APPENDIX D

TABLE OF VALID Q'S

Q
6.4
7.6
9.3
11.8
13.6
16.0
19.3
24.4
27.9
32.7
39.4
49.5
56.7
66.2
79.6
99.7
114.1
133.3
160.1
200.3
229.0
267.3
320.9
401.3
458.8
535.4
642.6
803.5
918.4
1071.5
1286.0
1607.7

APPENDIX E

TABLE OF VALID ALARM FREQUENCIES

FREQ (Hz)
2473
2221
2016
1846
1702
1579
1472
1379
1298
1224
1159
1101
1048
1000
956
916
879
845
814
785
758
732
708
686
665
646
627
609
593
577
563
548

GENERAL ELECTRIC COMPANY • MOBILE COMMUNICATIONS DIVISION
WORLD HEADQUARTERS • LYNCHBURG, VIRGINIA 24502 U.S.A.

GENERAL ELECTRIC*
U.S.A.

Printed in U.S.A.

1.) In this publication we have incorrectly shown Tone D as the Diagonal Tone on pages 5, 6, and 7.

In a G.E. tone system (as seen in the G.E. format on page 8), Tone C is to be assigned as the Diagonal Tone.

Although the suitcase software works correctly, this manual still refers to Tone D as the Diagonal Tone and it should be corrected as follows:

- When G.E. format has been selected all references to Tone D and Tone C on pages 6 and 7 should be reversed.

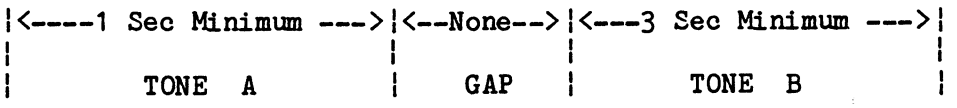
- In the flowchart on page 4, the box labeled "OPTIONS MENU" should read "REVISE TONE C (DIAGONAL) N/Y".

- The last three sentences of the last section on page 5 labeled "TONES" should read as follows: "A thirty-first tone, called the "diagonal tone", replaces the first tone in a tone pair that would otherwise consist of duplicate tones. The diagonal tone (G.E. Tone C for Super Group) is used only in G.E. tone systems and has a default frequency of 742.5Hz . This frequency can be changed only in the Options mode".

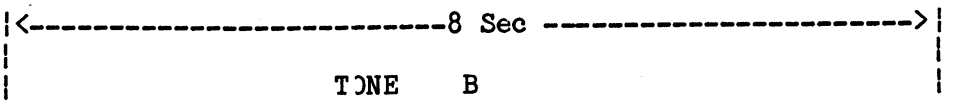
2.) On page 9, the Motorola format should be shown as follows:

MOTOROLA FORMAT

INDIVIDUAL CALL FORMAT



GROUP CALL FORMAT



ALTERNATE GROUP CALL FORMAT