MOBILE RADIO

S-950
CONTROL UNIT
(FOR DELTA-S RADIOS)
PROGRAMMING INSTRUCTIONS USING TQ2310 PROGRAMMER

LBI31380

GENERAL ELECTRIC

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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 WHICH ARE PROGRAMMED INTO THE RADIO.

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1.0 Introduction

This document describes operating instructions and procedures for programming the S-950 Control Head with the Universal Radio Programmer. The Universal Radio Programmer is a suitcase containing a standard Panasonic Hand Held Computer, Panasonic I/O Adapter, Panasonic mini Printer, a General Electric Program Storage Module, a General Electric Data I/O Module, and special cable adapters for connection to the S-950 Control Head. The Program Storage Module has eight sockets for up to eight programs (4K, 8K, or 16K EPROMS) each of which may be a different type radio. The Data I/O module has a cable connector for direct connection to the Control Head and a zero insertion force DIP socket for programming EPROMs outside the Control Head.

Refer to the Panasonic Manuals and to the General Electric "Maintenance Manual Universal Radio Programmer", TQ2310 (19B234413G1) for general system instructions.

The Universal Radio Programmer uses a series of multiple choice menu prompts to guide the user through a programming session. Selection of a menu item causes a new menu to be displayed until the operation to be performed has been fully specified.

Menu-type prompts consist of a sequence of one line displays. Each line consists of a digit or a letter, followed by an equal sign, followed by a brief description of an available option, such as:

```
---------------------------
| 1=CALCULATOR            |
---------------------------
```

Successive lines of the display are numbered, then lettered, in order. The individual lines are displayed sequentially, over and over, until a selection is made by pressing a key corresponding to the number or letter of one of the options.

Immediately after a selection is typed in, the display acknowledges by showing the name of the selected option, without the number and equal sign.

When the operation has been specified, the Programmer switches from multiple choice menu prompts to fill-in-the-blanks type prompts guiding the user through the programming session.

Prompting displays of the fill-in-the-blanks contain text and a flashing cursor. (Menu prompts do not show any cursor.)

The cursor may sit on a blank, or it may be superimposed over a default value displayed initially.

The response to a prompt of the fill-in-the-blanks variety may either be a new data value typed in followed by ENTER, or it may be ENTER alone. Typing just ENTER tells the program that the default value is accepted.

The user may "freeze" (i.e. temperarily suspend) the current operation at any time by depressing the "STP/SPD" (stop/speed) key. Action may be resumed by depressing the "STP/SPD" key a second time.

The user may change the speed of display operations by depressing the "STP/SPD" key and typing a number from 1 thru 9 (1 is slowest). typing this number also resumes the operation in progress.

The user may abort the current operation at any time by depressing the CLEAR key.

2.0 Programmer I/O Options.

The Universal Radio Programmer provides the capability to store and access S-950 Control Head data in three media: The Control Head's internal EEPROM, an EEPROM external to the Control Head, and a data file in the Hand Held Computer's battery sustained ram memory. S-950 Control Head data may be retrieved from (i.e. READ), modified or created, and stored (i.e. WRITTEN) back to any of the three media. COPY utility operations enable data transfer among these media.

Access to these media are via:

1. Internal EEPROM via connecting cable between the Data I/O module and the Control Head.

2. External EEPROM Socket on the Data I/O module.

3. File named "S-950 CONTROL HEAD" in the Hand Held Computer memory.

The Programmer asks the operator for the input source and output destination at appropriate stages in the various programming functions.

2.1 Programming an Internal EEPROM

The easiest way to field program the S-950 Control Head is via the connecting cable, with the EEPROM left in place inside the Control Head. For a Control Head which has been previously programmed, the normal sequence is to select PROGRAM/REVIEW specifying OLD DATA and READ FROM: CONTROL HEAD, and then after editing data, specifying WRITE TO: CONTROL HEAD to put the updated data back

into the S-950. If the Control Head has not been previously programmed, the normal sequence is to program all new data, then write it to the Control Head.

2.2 EEPROM Socket

The user may elect to program EEPROMS using the EEPROM SOCKET on the Data I/O module. Programmed EEPROMS then could be installed in Control Heads, or copied via the COPY operation into the Control Head, or saved for future use. EEPROMs may be read and previewed, printed, reprogrammed, etc in the EEPROM SOCKET the same as described above for EEPROMs in the Control Head, by specifying EEPROM SOCKET instead of CONTROL HEAD.

2.3 S-950 File

The Programmer file system can store a single copy of a Control Head's data in a file in the Hand Held Computer's battery backed RAM. It will remain intact as long as the batteries are not completely discharged, the unit is not powered off with the ALL-OFF switch in the bottom of the unit, or until the file data is modified by the user.

Data may be read and previewed, printed, reprogrammed, etc using the file the same as an EEPROM in the Control Head. Data may be transferred between the file and Control Heads or EEPROMs in the external EEPROM SOCKET.

The use of the file allows convient programming outside the Control Head without additional hardware.

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

3.0 Getting Started

Refer to the Panasonic literature describing the Hand Held Computer system and system operations. These manuals provide excellent descriptions of the standard units, including the keyboard keys and display, and the "Primary Menu".

As indicated above, the system is "menu driven" where the user selects operations and options from menu items displayed on the LCD display. When the unit is initially turned on, the Primary menu usually will be displayed one line at a time, such as:

```
-------------------------
| 1=CALCULATOR          |
-------------------------
```

```
 ---------------------------
| 2=CLOCK/CONTROLLER        |
 ---------------------------
 ---------------------------
| 3=FILE SYSTEM             |
 ---------------------------
 ---------------------------
| 4=RUN SNAP PROGRAMS       |
 ---------------------------
 ---------------------------
| 5=PHOENIX-MOBILE          |
 ---------------------------
 ---------------------------
| 6=S-950 CONTROL HEAD      |
 ---------------------------
 ---------------------------
| 7=SELF TEST               |
 ---------------------------
 ---------------------------
| 8=(and so on ...)         |
 ---------------------------
```

If a menu other than the Primary menu is being displayed, depressing the CLEAR key two times should result in the Primary menu.

NOTE

A word of CAUTION is in order concerning the CLEAR key. The system is designed to be powered on/off without losing the "state" prior to power off. The unit further powers itself off after about a 10 minute period of no operator action. Therefore, DO NOT indiscrimately depress CLEAR a few times every time you power on the system as you may wipe out some of your work from an incomplete session.

S-950 CONTROL HEAD is the selection for programming the S-950 Control Head. The program is selected by pushing the key corresponding to the number or letter displayed in front of the S-950 CONTROL HEAD menu item, such as the number 6 key in the above example menu.

3.1 Data Entry

The Programmer in-so-far-as-possible uses multiple choice menu entries to minimize operator input errors. When a menu is displayed (one line at a time) the user must select only the number or letter shown at the start of the line before the "=". Any other key will cause the unit to "beep" and continue cycling thru the menu. (An exception is the CLEAR key that will terminate

that selection).

Normally, data entry other than menu selection consists of:

1. typing a number (such as 163.300) followed by the "ENTER" key.

2. typing a "Y" (for yes) or "N" (for no or none) to respond to "?(Y/N)" prompts.

3. typing codes such as "NONE" or 2:30, etc.

4. pressing the ENTER key, which means either accept the initially displayed default value (if there is one) or, in the case of channel selection, select the same channel again.

The Left and Right Arrow keys on the system keyboard can be used to move the flashing cursor on the display to assist with data entry. The system will restrict cursor movements to the specified or implied field positions. While entering purely numeric entries, such as frequency data, the system allows only the numerals 0...9 and the decimal point. (If a decimal point already exists, the system further prohibits another. In the unlikely event that the decimal point is in the wrong place, type a number, such as "0" over the existing decimal point, then move the cursor to the desired position and retype the decimal point).

Many of the special keys and functions described in the Panasonic literature are not applicable while programming a radio.

DO NOT attempt to use the HELP key as described in the Panasonic literature during execution of the program. If it is desired to use the HELP key to define the function keys f1, f2, or f3, it should be done prior to selecting the S-950 CONTROL HEAD program.

The control keys C1, C2 ,C3, C4 are not defined for this application.

The ROTATE key has no definition during execution of the S-950 CONTROL HEAD program.

4.0 S-950 CONTROL HEAD Functions Descriptions.

When the user selects the S-950 CONTROL HEAD program via the Primary system menu the following message is briefly displayed:

```
-------------------------
| SELECT DESIRED OPERATION |
-------------------------
```

followed by cycling a new menu:

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

These are all of the operational functions of the Universal Radio Programmer associated with programming the S-950 Control Head.

4.1 PRIMARY MENU

Typing key #1 returns the system to the PRIMARY menu discussed above. (This should be the last functional operation after completing a PROGRAM/REVIEW session).

4.2 PROGRAM/REVIEW

PROGRAM/REVIEW is the operation for programming, modifing, and/or reviewing the various data required in the S-950 Control Head. Section 5 of this document describes the PROGRAM/REVIEW operations.

4.3 PRINTOUT

The PRINTOUT function enables the user to make a hard copy listing of the data stored in the Radio, the EEPROM Socket, or the S-950 CONTROL HEAD file.

4.3.1 Whenever PRINTOUT is selected a READ FROM prompt asks the operator for the INPUT device by displaying the following menu:

```
 ---------------------------
| READ FROM:1=EEPROM SOCKET |
 ---------------------------
```

```
-----------------------------
| READ FROM:2=CONTROL HEAD  |
-----------------------------
-----------------------------
| READ FROM:3=S-950 FILE    |
-----------------------------
```

Reading the Control Head or an EEPROM in the external socket takes several minutes. While the Read operation is taking place, the display will say:

```
-----------------------------
| READING                   |
-----------------------------
```

If an I/O error of any type occurs in the "Read From" procedure, the entire sequence is repeated. Of course, the error (or normal) sequence may be stopped by depressing the CLEAR key (one time).

4.3.2 After reading either the EEPROM in the socket, or the Control Head, and sometimes after reading the file, the system will request frequency range information necessary to compute the correct frequencies from the radio formatted data.

The system will briefly display the message:

```
-----------------------------
| SELECT FREQ. RANGE        |
-----------------------------
```

and present a selection menu of the possible options:

```
-----------------------------
| 1=LOW BAND                |
-----------------------------
-----------------------------
| 2=HIGH BAND               |
-----------------------------
-----------------------------
| 3=UHF                     |
-----------------------------
```

After the band is selected by typing 1, 2 or 3, the user further is prompted for split via the message:

```
-----------------------------
| SELECT BAND SPLIT         |
-----------------------------
```

followed by the appropriate cycling menu.

4.3.2.1 LOW BAND splits:

```
+---------------------------+
| 1=29.7 - 36.0 MHZ         |
+---------------------------+
+---------------------------+
| 2=36.0 - 42.0 MHZ         |
+---------------------------+
+---------------------------+
| 3=42.0 - 50.0 MHZ         |
+---------------------------+
```

4.3.2.2 HIGH BAND splits:

```
+---------------------------+
| 1=136.0 - 153.0 MHZ       |
+---------------------------+
+---------------------------+
| 2=150.8 - 174.0 MHZ       |
+---------------------------+
```

4.3.2.3 UHF splits:

```
+---------------------------+
| 1=403.0 - 430.0 MHZ       |
+---------------------------+
+---------------------------+
| 2=430.0 - 470.0 MHZ       |
+---------------------------+
+---------------------------+
| 3=470.0 - 494.0 MHZ       |
+---------------------------+
+---------------------------+
| 4=494.0 - 512.0 MHZ       |
+---------------------------+
```

4.3.2.4 After asking for splits, the program asks whether the stored data relates to a Control Head for a radio with the standard oscillator frequency of 13.2 MHZ, rather then the optional alternative frequency of 13.8 MHZ. The cursor will be positioned over the letter Y, meaning that the default response is "yes", indicated by pressing the ENTER key, or typing Y. Otherwise, type N meaning that the standard frequency does not apply.

```
+---------------------------+
| STD 13.2MHZ OSC?(Y/N)Y    |
+---------------------------+
```

When the file is the data source, the Range and Oscillator information may have already been stored with the file, hence the system would not prompt for it. (The FILE input

may require Range and Oscillator selection if not previously edited. The system knows when to prompt for these data).

4.3.3 Next the user is prompted for a label via the prompt:

```
-----------------------------
| ENTER LABEL:              |
-----------------------------
```

The user may type up to 40 characters of label information followed by the ENTER key, or simply press the ENTER key (for no label). The text may be edited during input via the right and left arrow keys.

4.3.4 The user is prompted to specify which modes are to be printed out:

```
-----------------------------
| PRINT MODES:   ALL        |
-----------------------------
```

The default selection, ALL, will result from just pressing the ENTER key. Otherwise, the user may enter the number of each mode for which a printout is desired, as for example:

```
-----------------------------
| PRINT MODES:   123        |
-----------------------------
```

This selection would print modes 1, 2 and 3. Spacing or punctuation between numbers will be ignored.

4.3.5 Each printout has a header consisting of:

1. 40 Character label, or blank line.
2. "V01 S-950 CONTROL HEAD rrrrrr (NB)", where rrrrrr is "LOW BAND", "HIGH BAND", or "UHF".
3. "ALT 13.8MHZ OSC SELECTED" if appropriate).
4. "PRINTOUT FROM: dddddddd". Where "dddddddd" specifies a device: "EEPROM SOCKET", "CONTROL HEAD", or "S-950 FILE".
5. Time and date of the printout.

Sample PRINTOUT

```
Ace PLumbing
V01 S-950 CONTROL HEAD LOW BAND (NB)
PRINTOUT FROM: EDITING (AFTER)
TUE 12:10:14 2 OCT 02 1984
CAPACITY: 8 MODE/16 CHAN
DOWNLOADING: ON

EMERGENCY TONE SIGNALLING: T99
  TONE #1 =   832.5 HZ
  TONE #2 =   712.5 HZ
TONE #1 DURATION:   50 MS
TONE #2 DURATION:   50 MS
QUIET INTERVAL:      0 MS

GESTAR DELAY: 300 MS
SQUELCH: VARIABLE
CHANNEL ALERT: ON


    MODE# 1
HOME CHANNEL: 1
SCAN: FRONT PROGRAMMABLE
OFF-HOOK SCAN: ON
SCAN RESUME DELAY: 2 SECONDS

   TX-FREQ TX-CG   CCT   RX-FREQ RX-CG
1 31.1250  100.0   0:30 31.2500  67.00
2 31.1750  NONE    0:30 31.5000  NONE
3 OPEN     NONE    NONE OPEN     NONE
4 OPEN     NONE    NONE OPEN     NONE
5 OPEN     NONE    NONE OPEN     NONE
6 32.0000  100.0   NONE 32.1500  67.00
        CHANNEL 16
6 31.5600  TUNE    NONE 31.6950  TUNE
GESTAR CODES:
PTT ID: 351
PTT STATUS: 6
PTT MSG TYPE: 1
PTT TAG: 0
EMERGENCY ID: 351
EMERGENCY STATUS: 6
EMERGENCY MSG TYPE: 7
EMERGENCY TAG: 0

GESTAR SELECTED FOR THESE CHANNELS:
1 2 6
REPEAT EMERGENCY GESTAR: 10 TIMES
REPETITION INTERVAL: 10 SECONDS
SIGNALLING INITIATED BY:
  PUSH BUTTON
  PTT FIRST TIME ONLY
```

```
    MODE# 2
HOME CHANNEL: 1
SCAN: FRONT PROGRAMMABLE
OFF-HOOK SCAN: ON
SCAN RESUME DELAY: 2 SECONDS

   TX-FREQ TX-CG   CCT   RX-FREQ RX-CG
1 31.2500  023     0:30 32.2750  074
2 31.7500  136.5   0:30 31.0500  91.50
3 OPEN     NONE    NONE OPEN     NONE
4 OPEN     NONE    NONE OPEN     NONE
5 OPEN     NONE    NONE OPEN     NONE
6 OPEN     NONE    NONE OPEN     NONE
7 OPEN     NONE    NONE OPEN     NONE
8 32.3000  85.40   0:30 31.3750  152
        CHANNEL 16
6 31.7700  TUNE    NONE 31.6600  TUNE

SIGNALLING TONES BY CHANNEL:
CH: 1   832.5 HZ,  712.5 HZ  (T99)
CH: 2   607.5 HZ,  772.5 HZ  (T99)
CH: 8   652.5 HZ,  772.5 HZ  (T99)
SIGNALLING INITIATED BY:
  PUSH BUTTON
  PTT FIRST TIME ONLY
```

The least significant digit of the Channel Number is along the left side. After every eight channels, the next eight channels are introduced by a legend such as "CHANNELS 9 - 16". If the last several channels are not programmed, (i.e. they are open) then they will be omitted from the printout, except for Channel 16, which is always shown, since it may contain center tuning information.

TX-FREQ =transmit frequency (in MHZ)

TX-CG = the transmit channel guard digital code or tone frequency. If the channel is 16, and if the user elected to "center tune" during an edit session, the code "TUNE" will appear in CG position in the printout.

CCT = the Carrier Control Timer for that channel (min:secs)

RX-FREQ = Receive frequency (in MHZ)

RX-CG = receive channel guard digital code or tone frequency.

(A discussion of the format of channel guard is presented later in the PROGRAM/REVIEW section of this document).

If any entry is absent (i.e. not programmed) the printout shows "NONE".

If STE has been disabled for a channel that is programmed with tone channel guard the printout appends "*" to the TX-CG and/or RX-CG data. If any such "*"'s appear in the tabular data, a line is added at the bottom
:"* INDICATES STE DISABLED".

Note- If the DATE/TIME data are incorrect, see the Panasonic instructions and follow the routine in "CLOCK/CONTROLLER" (menu item 2 in the PRIMARY menu) to reset the date and time.

4.3.6 At the completion of the above described printout the user may obtain a Hex dump of the data by responding "Y" to the prompt:

```
-------------------------
| HEX DUMP?(Y/N)        |
-------------------------
```

The HEX dump is of little value for most users.

The dump is formatted as a sequence of eight matrices, one for each 256 byte page of the EEPROM. Within the matrix for each page the bytes are listed in 32 rows of eight bytes each, perhaps better thought of as 16 sets of 16 bytes each, where each set of sixteen consecutive bytes is printed as a folded row of eight followed by eight. Across the top of each matrix

the least significant hex digit of the byte address is given as a folded row. On the left edge the 2 leading digits are given for each folded row. Often the data contains sequences of folded rows which repeat the contents of previous folded rows; in this case the repetitious data is merely indicated by showing the beginning and end of the range, with the legend "SAME AS TWO ROWS ABOVE".

4.4 COPY -SINGLE

This is a utility function providing the capability to copy Radio formatted data among the above mentioned media (including from and to the same device).

Selecting the COPY -SINGLE key (key#4) prompts the operator to select an input or COPY-FROM device via the following cycling menu:

```
-----------------------------
| READ FROM:1=EEPROM SOCKET |
-----------------------------
-----------------------------
| READ FROM:2=CONTROL HEAD  |
-----------------------------
-----------------------------
| READ FROM:3=S-950 FILE    |
-----------------------------
```

Selecting for example the EEPROM socket (key #1) results in a display of

```
-----------------------------
| READ FROM: EEPROM SOCKET  |
-----------------------------
```

While the read is taking place (several minutes for the Control Head, a few seconds for the EEPROM Socket), the display shows:

```
-----------------------------
| READING                   |
-----------------------------
```

If an I/O error of any type occurs in the "Read From" procedure, the entire sequence is repeated. Of course, the error (or normal) sequence may be stopped by depressing the CLEAR key (one time).

Following a successful "read-from" operation the system prompts the operator for a copy-TO device with :

```
-----------------------------
| WRITE TO: 1=EEPROM SOCKET |
-----------------------------
```

```
+---------------------------+
| WRITE TO: 2=CONTROL HEAD  |
+---------------------------+
+---------------------------+
| WRITE TO: 3=S-950 FILE    |
+---------------------------+
```

Selecting for example the CONTROL HEAD (option #2) results in a display of

```
+---------------------------+
| WRITE TO: CONTROL HEAD    |
+---------------------------+
```

If either of the actual hardware devices is selected the write operation is verified as indicated by the display of the following sequence:

```
+---------------------------+
| VERIFY                    |
+---------------------------+

+---------------------------+
| READING                   |
+---------------------------+
```

If an I/O error of any type occurs in the "WRITE TO" proceedure, the entire sequence is repeated. Of course, the error (or normal) sequence may be stopped by depressing the CLEAR key (one time).

4.5 COPY-MULTIPLE

Copy Multiple is much like copy-single except the WRITE operation is repeated as many times as the operator responds "Y" to the prompt:

```
+---------------------------+
| AGAIN?(Y/N)               |
+---------------------------+
```

5.0 PROGRAM/REVIEW

Program/review is the "editor" that allows the user to program or review the various options in an S-950 Control Head. The user may review/modify data already existing in either of the three "devices" discussed previously, or originate totally new data.

The PROGRAM/REVIEW function consists of a preliminary sequence of operations, followed by a sequence which be repeated several times for different options, followed by a final sequence:

1. PRELIMINARY SEQUENCE

    1. Selecting OLD data (existing in the File, EEPROM, or Radio) or NEW data (that does not exist in any of the "devices").

        1. Selecting the READ FROM device if OLD data is specified.

        2. Optional printout, for OLD data.

    2. Specifying whether frequency and Channel Guard data will be downloaded from the Control Head to the radio.

    3. Entering the mode/channel configuration (8 modes/16 channels or 4 modes/32 channels).

    4. Entering the total number of modes which will be used.

2. MODE DATA ENTRY/REVIEW LOOP

    1. Selection of data types to be programmed for a mode or group of modes:

        1. Selecting whether frequency and CCT will be programmed.

            1. Selecting the frequency range, split, and standard vs alternate oscilator for the target radio, if frequency will be programmed. These selections are only made the first time that frequency information is printed or programmed.

        2. Selecting whether Channel Guard will be programmed.

        3. Selecting whether Home Channel will be programmed.

        4. Selecting the number of channels.

        5. Selecting whether scan will be programmed.

        6. Selecting whether signalling will be programmed.

    2. Mode selection: Selecting one or several modes which will be programmed with data of the selected types, in the following data entry operation; several modes may thus be given the same information all at once.

    3. Entry of selected-type data for selected modes:

Reviewing and/or entering desired data for the selected modes, according to the selections that were made in preceding steps.

4. Choosing whether to repeat programming of the same or different data for more modes. If so, repeat this sequence.

3. FINAL SEQUENCE

1. Entering Emergency Signalling options, Variable Squelch Option, and Channel Alert option.

2. Printing the editted data (if desired).

3. Selecting a WRITE TO device.

Several keys have Special meanings for the PROGRAM/REVIEW operations.

1. The UP-ARROW is the same as the "ENTER" key except when selecting a channel number, where the current number is decremented by 1 and entered.

2. The DOWN-ARROW is:

1. same as the "ENTER" key, except in channel selection where the current channel is incremented by 1 and entered.

2. the same as typing "Y" for yes .

Thus the DOWN-ARROW may be used for all entries after setup for reviewing existing data.

3. As previously described "Y" is for yes to a "(Y/N)" prompt.

4. Also as already discussed "N" is for no for a "(Y/N)" prompt. "N" also may be used as an abreviation for "NONE" for entering (no) channel guard or selecting "no Radio LCT".

5.1 Select Old/New

The first choice is to elect to read OLD data from one of the three "devices", or to start from scratch and create all NEW data. The following menu is displayed as soon as PROGRAM/REVIEW is selected.

```
 ---------------------------
| 1=OLD DATA                |
 ---------------------------
 ---------------------------
| 2=NEW DATA                |
 ---------------------------
```

If NEW data are selected the system data buffer is zeroed and initialized.

If OLD DATA is selected, the system prompts for the user to select a READ FROM device via the following menu sequence:

```
 ---------------------------
| READ FROM:1=EEPROM SOCKET |
 ---------------------------
 ---------------------------
| READ FROM:2=CONTROL HEAD  |
 ---------------------------
 ---------------------------
| READ FROM:3=S-950 FILE    |
 ---------------------------
```

Selecting, for example, the CONTROL HEAD (option #2) results in a display of

```
 ---------------------------
| READING                   |
 ---------------------------
```

If an I/O error of any type occurs in the "Read From" proceedure, repeat the Read-From sequence until data are read without errors from the selected device.

5.2 After a successful Read operation, the user has the option of selecting a printout via the prompt:

```
 ---------------------------
| PRINTOUT?(Y/N)            |
 ---------------------------
```

If selected, the radio data will be printed as per the format described in Section 4.3 above for the PRINTOUT menu item.

The 3rd line of the printout header will read as follows if the user elects a printout here:

PRINTOUT FROM: EDITING (BEFORE)

If the operator is not really sure of the Range information he should request a PRINTOUT to verify reasonable looking RX-Freq. (The TX-Freq will most likely be ok. However, the RX-Freq data will be out of range and incorrect if the incorrect Range

information are input by the operator).

5.3 Next the user is asked if the Control Head will be downloading data to the radio (if not, the Control Head will probably not be programmed with frequency, CCT or Channel Guard data). The prompt is:

```
+---------------------------+
| DOWNLOAD TO RADIO?(Y/N)Y  |
+---------------------------+
```

If the Control Head is being programmed with all new data, then the default response will be N. If the data is old, than the default will be whatever it was in the old data.

5.4 Next the user is asked to specify the mode/channel configuration. This should agree with the attached Delta/S radio, so that if the radio has 32 channels (ie. a B-mode as well as an A-mode) then the Control head will have a capacity of 4 modes/32 channels; otherwise it will have 3 modes/16 channels. The prompt is a menu-type, with two possible choices:

```
+---------------------------+
| 1=8 MODE/16 CHAN          |
+---------------------------+


+---------------------------+
| 2=4 MODE/32 CHAN          |
+---------------------------+
```

Respond either 1 or 2 to register a selection.

5.5 Next, the user specifies the actual number of modes which will be used. The prompt is a fill-in type, which initially will display a default value equal to the maximum number of modes selected in the previous action, as for example with 4 Modes/32 Channels:

```
+---------------------------+
| ENTER NUMBER OF MODES: 4  |
+---------------------------+
```

6.0 Mode Data Entry/Review Loop

The Mode Data Entry/Review Loop may be repeated as many times as necessary to specify all data for all modes. On each pass through, the user specifiies the types of data and the modes to be programmed on that pass. Several modes may be selected at the same time, causing the same data to be stored for each of them. By combining the data type selection and the mode selection appropriately, it is easy to avoid repetitive data entry operations for modes that contain some identical data and some unique data.

6.1 The first data-type selection prompt, for frequency and CCT, is:

```
-----------------------------
| PROGRAM FREQ _CCT?(Y/N)Y  |
-----------------------------
```

If downloading is on, the default will be Y(es), otherwise N(o).

6.2 If frequency programming was selected, then frequency range, splits and oscillator will be selected, unless they were seelcted previously. See Section 4.3.2 for a detailed description.

6.3 Next, the user will be asked to select whether Channel Guard will be programmed:

```
-----------------------------
| PROGRAM CG?(Y/N)Y         |
-----------------------------
```

The default is Y(es) if downloading was selected, and N(o) otherwise.

6.4 Next, the user will be asked to select whether Home Channel will be programmed:

```
-----------------------------
| PROGRAM HOME CH'S?(Y/N)Y  |
-----------------------------
```

The default response is always Y(es).

6.5 If downloading is off, then the user will be asked to select whether the number of channels will be programmed explicitly. The prompt is:

```
-----------------------------
| PROGRAM MAX   CH'S?(Y/N)Y |
-----------------------------
```

6.6 Next, the user is asked whether scan is to be programmed:

```
-----------------------------
| PROGRAM SCAN?(Y/N)Y       |
-----------------------------
```

6.7 Finally, the user is asked to select whether signalling is to be programmed:

```
| PROGRAM SIGNALLING?(Y/N)Y |
```

6.8 After the data types to be programmed have been selected, the user is asked to specify the mode or modes which will receive the data to be entered. Each selected mode will receive all data entered during the following steps of the loop. The mode prompt is:

```
| ENTER MODE(S): 1          |
```

The default response is 1, but allowable responses are the word "ALL" or the numbers of one or modes which it is desired to program together; spaces or punctuation between mode numbers are ignored. Mode numbers outside the range which was specified as the "NUMBER OF MODES" will be ignored or cause an error message.

6.9 Main Loop Data Entry and Review

After the data types and modes have been selected, the actual data values are elicited, according to the type selection which was made. In the following paragraphs describing data entry, it should be understood that the prompts will only appear for those data types which were selected for programming. Those data which apply to the entire mode are elicited first, after which the user is asked to specify particular channels, and then asked for data for those channels.

6.9.1 Home Channel

The prompt is:

```
| ENTER HOME CHANNEL: 1     |
```

6.9.2 Scanning Options

The first prompt regarding scan is a menu-type, as follows:

```
| 1=FRONT PROGRAMMABLE      |
```

```
| 2=FIXED PRIORITY          |
```

```
| 3=SELECTED CHANNEL          |
```

```
| 4=NON-PRIORITY SCAN         |
```

```
| 5=NO SCAN                   |
```

6.9.2.1 The following question is asked, unless NO SCAN was chosen:

```
| OFF-HOOK SCAN?(Y/N)N        |
```

6.9.2.2 The following is asked if FIXED PRIORITY scanning was selected:

```
| ENTER PRIORITY 1 CHAN: 1    |
```

6.9.2.3 The following question is asked, unless NO SCAN was chosen:

```
| SCAN RESUME DELAY?(Y/N)Y    |
```

6.9.3 Signalling Options

The type of signalling is asked through a menu-type prompt:

```
| 1=GESTAR ENCODE             |
```

```
| 2=T90/T99 ENCODE            |
```

```
 ---------------------------
| 3=T90 ENCODE              |
 ---------------------------

 ---------------------------
| 4=T99 ENCODE              |
 ---------------------------

 ---------------------------
| 5=SPECIAL ENCODE          |
 ---------------------------

 ---------------------------
| 6=NONE                    |
 ---------------------------
```

6.9.3.1 Unless no signalling is specified, the user will be asked to specify what initiates the signalling, by a series of questions, as follows:

```
 ---------------------------
| PUSH BUTTON?(Y/N)N        |
 ---------------------------

 ---------------------------
| HOOK SWITCH?(Y/N)N        |
 ---------------------------

 ---------------------------
| PTT: FIRST ONLY?(Y/N)     |
 ---------------------------

 ---------------------------
| PTT: EVERY TIME?(Y/N)N    |
 ---------------------------
```

The question PTT: EVERY TIME? will only be asked if the answer to PTT: FIRST TIME? is No.

6.9.3.2 If GESTAR was selected, then the contents of the GESTAR message will be elicited, for both the PTT message, and the emergency message, as follows:

```
+-----------------------------+
| PTT MSG TYPE:1              |
+-----------------------------+

+-----------------------------+
| EMERGENCY MSG TYPE:7        |
+-----------------------------+

+-----------------------------+
| PTT ID:0                    |
+-----------------------------+
```

The normal maximum value for ID is 2047. However, values from 2048 to 4095 may be entered. If one of the higher values is entered, the user will be asked to verify that the entry is correct, by a question which will appear in the same display frame, after the ID value, as for example:

```
+-----------------------------+
| PTT ID:4011 CORRECT?(Y/N)   |
+-----------------------------+
```

The default value of EMERGENCY ID is copied from the value supplied by the user for PTT ID.

```
+-----------------------------+
| EMERGENCY ID:               |
+-----------------------------+

+-----------------------------+
| PTT TAG:0                   |
+-----------------------------+

+-----------------------------+
| EMERGENCY TAG:0             |
+-----------------------------+

+-----------------------------+
| PTT STATUS:15               |
+-----------------------------+

+-----------------------------+
| EMERGENCY STATUS:15         |
+-----------------------------+
```

After the message contents has been entered, the user is

asked to indicate whether the Emergency Message will be automatically repeated, and if so, how many repetitions, and how often:

```
-----------------------------
| EMERGENCY REPEAT?(Y/N)    |
-----------------------------

-----------------------------
| NUMBER OF REPEATS: 1      |
-----------------------------

-----------------------------
| INTERVAL: 10   SECONDS    |
-----------------------------
```

The number of repeats may be any number from 0 to 255, and the interval may be 1 to 256 seconds.

6.9.4 Channel Guard Enable/Disable

If Channel Guard programming is selected, then the following prompt is used to optionally disable the channel guard option for all channels in all selected nodes:

```
-----------------------------
| CHANNEL GUARD DESIRED (Y/N)|
-----------------------------
```

Responding with "N" (for NO) will:

1. cause the system to automatically scan thru all channels and delete all existing channel guard codes (tone and digital).

2. block the option (during this pass through the Main Programming Loop) to insert Channel Guard codes, by causing Channel Guard prompts to be omitted.

A "Y" (for YES) response enables (tone) channel guard and promotes further prompts for Digital channel guard and STE options:

1. Digital CG prompt is:

```
-----------------------------
| DIGITAL CG?(Y/N)          |
-----------------------------
```

A "N" (for NO) will:

1. cause the system to automatically scan thru all channels and delete all existing DIGITAL channel guard codes.

2. prevent the user from entering any type digital channel guard during the edit/programming session.

3. block the option of selecting Inverted Digital Channel Guard and Restricted Digital Channel Guard.

A "Y" (for YES) is more or less the opposite of a "N" as described above in that it allows the user to:

1. enter digital channel guard during the edit/programming session.

2. select Inverted Digital Channel Guard and Restricted Digital Channel Guard.

2. STE Option prompt: The system briefly displays the message:

```
| SELECT STE OPTION |
```

followed by the cycling menu:

```
| 1=DISABLE STE-ALL CHAN'S |
| 2=ENABLE STE-ALL CHAN'S |
| 3=SELECT STE FOR EACH CHAN|
```

Option 1 searches thru entire data base and sets the STE DISABLE bit for all channels already programmed with Tone CG, and all channels programmed with tone CG during this session.

Option 2 searches thru the entire data base and enables STE for all channels already programmed with Tone CG, and all channels programmed with tone CG during this session.

Option 3 allows/requires the user to ENABLE/DSABLE STE on a per channel basis as such are processed. Only the channels actually PROGRAM/REVIEWed are effected by option 3.

The user is not prompted further about STE if option 1 or 2 is selected.

6.9.5 Select Carrier Control Timer (CCT).

The Delta/S has the option for selecting a CCT on any channel on a channel by channel basis. All CCT's may be disallowed if desired.

The following prompt allows the user to allow/disallow CCT:

```
-------------------------
| ANY CCT DESIRED?(Y/N)  |
-------------------------
```

A "N" (for no) will disable CCT and not allow the user to enable/select a CCT for any channel during this session, and will delete any CCT values set in the entire radio.

A "Y" will enable the user to select a CCT on any channel.

6.10 Channel Data Entry/Review Loop

Following entry of data which applies overall to the selected mode or modes, channel data is prompted for. The sequence is as follows:

1. Enter Channel Number.
2. Transmit Frequency (if selected).
3. Transmit Channel Guard (if selected and enabled).
4. Tx Carrier Control Timer (CCT) (if selected and enabled).
5. Receive Frequency (if selected).
6. Receive Channel Guard (if selected and enabled).
7. STE (if enabled, and tone Channel Guard is selected for Tx or Rx).
8. GESTAR enable/disable (if selected).
9. T90, T99 or special tone (if selected).
10. The option to program more channels.

6.10.1 Selecting Channel Number.

The user is prompted to input the channel number via :

```
-------------------------
| ENTER CHANNEL NUMBER:  |
-------------------------
```

The user has a number of options to enter channel numbers:

1. Simply type the "ENTER" key to leave the channel number unchanged (e.g. to rework the current channel data) . If this is the first time thru the loop typing the "ENTER" key defaults to channel 1.

2. The user may enter any valid channel number by typing in one or two digits in any combination or order followed by the "ENTER" key. Recall that some Delta/S Radios have an "A" mode and a "B" mode, each with channels 1 thru 16. A S-950 Control Head used with such a radio would be set-up for 32 channels per mode, and valid channel entries would include, for example,
   A1, 1A, A, B, 7, B4, 3B, 16, 28, 32,etc.

   When the channel number is entered with an "A" or "B", the data display will show the correct channel number, but without the "A" or "B".

   If the channel number data are not acceptable, the system will repeat the prompt for channel number.

3. The user may type UP ARROW key to select the channel previous to the current channel (e.g. moving from 3 to 2, or from 17 to 16, etc).

4. The user may type the DOWN ARROW key to move to the next successive channel nunmber (e.g. moving from 4 to 5, or from 16 to 17, etc).

6.10.2 Transmit Frequency entries.

The following is a sample prompt for TX-Freq input:

```
-------------------------
| CH: 1  TX-FREQ:xxx.xxxxxMH|
-----------------↑---------
```

where :
- "1" shows channel number 1.
- "TX-FREQ" indicates transmit frequency.

- "xxx.xxxxMH" designates current TX frequency for the channel.

The flashing cursor is positioned over the 1st "x" as marked on the above diagram with the "↑" on the bottom box line.
The user has a number of input options. He may:

1. simply type the "ENTER" or DOWN ARROW key to leave the entry unchanged.

2. use RT and LEFT ARROWS to position the cursor to modify any digit shown and then type "ENTER" or DOWN ARROW key.

3. he may retype the entire xxx.xxxx frequency followed by the "ENTER" or DOWN ARROW key.

4. type "000.0000" to blank (i.e. not program or "unprogram") this Tx frequency on this channel.

Note that a blank channel frequency always shows up on the LCD as "000.0000MHZ".

The system checks all entries, even those already apparently programmed, for range violations and invalid frequencies.

6.10.2.1 If the entry is out of range for the specified radio Range the system will "BEEP" and the specified Range is briefly displayed, such as:

```
-----------------------------
| RANGE:450.000- 470.000    |
-----------------------------
```

Then, the input entry (containing the out-of-range value) will be repeated.
(See also section #6 on "Special Frequency Input Features").

6.10.2.2 If the entry is an invalid frequency (i.e. does not convert to an integer when divided by a reference code, etc.) the system "BEEPS" and briefly displays the following message:

```
-----------------------------
| INVALID                   |
-----------------------------
```

and the input entry display (with the "invalid" data) is repeated.

NOTE

WARNING- The programmer system's rules for invalid frequencies may not agree at all with the FCC or other regulatory agency rules for invalid or illegal frequencies. FREQUENCY SELECTION IS THE USERS RESPONSIBILITY.

6.10.3 Transmit Channel Guard Entry.

Following entry of the TX Freq (if nonblank) and if the channel guard option was selected, a prompt similiar to the following is displayed showing the current channel guard for this TX channel:

```
-----------------------------
| CH: 1  TX-CG:xxxxx        |
---------------↑-------------
```

where "xxxxx" is symbolic of the current CG and may be:

1. "NONE" = currently no TX CG

2. tone CG such as 67.0, 210.7, etc.

3. Digital CG code such as 023, 703, etc.

4. If INVERTED Digital Channel Guard was enabled during setup (option selections), the display for digital CG also always shows the corresponding INVERTED digital CG equivalent code to the right of the "/" in the display. Note that for every normal digital channel guard input code there exist a corresponding INVERTED digital CG input code. The Hex codes are idential in the programmer and in the Delta Radio. The following is a sample display with INVERTED digital CG enabled:

```
-----------------------------
| CH: 1  TX-CG:023  / 047   |
---------------↑-------------
```

where "023" is the normal DCG and "047" is the corresponding INVERTED DCG equivalent.

The flashing cursor is initially pointing to the first digit of the code. Note that the "current" value always disappears when the user types anything. The user has several data entry options:

1. to leave the entry unchanged, type the ENTER or

DOWN ARROW key.

2. to select a tone CG simply type the thing followed by the ENTER or DN ARROW key. A sample input might be 67.0, 210.7, etc.

3. to enter a normal Digital CG, simply type the three digit code, such as 023, 654, etc. followed by the ENTER or DN ARROW key.

4. to enter an INVERTED DIGITAL CG CODE precede the code with an "I", such as "I023", "I047", I172, etc. followed by ENTER or DN ARROW key.

5. the restricted codes are entered the same as other digital CG codes. Note that the system "BEEPS" and briefly issues the following WARNING message on every entry of Restricted DCG. However, the data are accepted by the system after this warning sequence.

```
-----------------------------
| RESTRICTED-BUT ACCEPTED   |
-----------------------------
```

If the user types a code unknown to the system (i.e. not on the attached list) or if the user attempts to enter a type code not selected during setup (option selections) the system "beeps" and briefly displays the message:

```
-----------------------------
| BAD CODE                  |
-----------------------------
```

then repeats the initial CG prompt with the INITIAL (old) data.

6.10.4 Carrier Control Timer (CCT) Entry

The current value of the CCT for the current channel is displayed in the following prompt.

```
-----------------------------
| CH: 1  TX-CCT=x:xx        |
-----------------------------
```

where x:xx is "NONE" or any valid CCT from 0:30 to 4:00 in 15 sec increments.

NOTE

The "2ND SFT" (second shift) key must be typed prior to typing the ":" (colon) character that is required for all CCT entries except "NONE". (Of course the user may use the RT and LEFT ARROW Keys to move the cursor to change only selected digits as desired).

6.11 Receive Frequency Entry

Receive Frequency data entry follows the same rules/procedures as for Transmit Frequency. The prompts are almost the same except "RX" replaces "TX" as shown is a sample below:

```
-------------------------
| CH: 1  RX-FREQ:xxx.xxxxxMH|
-----------------+---------
```

6.12 Receive Channel Guard Entry

Receive CG data entry follows same rules/procedures as for Transmit CG. The prompts are almost the same except "RX" replaces "TX" as shown is a sample below:

```
-------------------------
| CH: 1  RX-CG:xxxxx      |
-----------------+---------
```

6.13 STE Option.

If the user selected to ENABLE/DSABLE STE on a per channel mode, and if TONE CG is programmed for either TX or RX channel, then the user is prompted to ENABLE or DISABLE STE.

6.13.1 If STE is already enabled (default) the user is presented with:

```
-------------------------
| CH: 1  STE ENABLED OK?(Y/N|
-----------------+---------
```

A "Y" for YES will leave STE ENABLED for this channel.
A "N" for NO will DISABLE STE for this channel.

6.13.2 If STE is already DISABLED the user is presented with:

```
| CH: 1  STE DSABLED OK?(Y/N|
```

A "Y" for YES will leave STE DISABLED for this channel.
A "N" for NO will ENABLE STE for this channel.

6.14 GESTAR Enable

If GESTAR has been selected for the mode or modes being programmed, then the system will prompt for each channel to allow the GESTAR message to be enabled or disabled for the channel. The prompt is:

```
| CH: 1  GESTAR MSG?(Y/N)N  |
```

The default value, Y or N, is taken from the value initially in storage.

6.15 Tone Signal

If tone signalling -- T90, T99, or Special Tone -- has been selected, then the user will be asked for tone frequencies for each channel. If T90 was selected, then only a single tone will be expected, and the prompt will be:

```
| CH:1  T90 TONE=0.0     HZ |
```

Acceptable responses are N, or 0.0 -- meaning no T90 signalling for this channel -- or any of the values listed in Table 6.15.1. If an illegal value is entered, then the following error message will be displayed with a beep, followed by the original prompt:

```
| UNEXPECTED SPECIAL TONE   |
```

If the T99 was selected, then the following prompt will be displayed:

```
| CH: 1  1ST TONE=0.0     HZ |
```

If the response is N or 0.0, then signalling will be disabled for the channel; otherwise, the system will check that the entered value was one of those listed in Table 6.15.2. If an erroneous value is entered, the system will diplay "UNEXPECTED SPECIAL TONE" as above, and repeat the prompt. When a legal first tone is

entered, the user will be asked for a second tone, which will also be checked against Table 6.15.2:

```
-----------------------------
| CH: 1  2ND TONE=0.0    HZ |
-----------------------------
```

1050	1500	1950	2400	2850
1125	1575	2025	2475	2925
1200	1650	2100	2550	3000
1275	1725	2175	2625	
1350	1800	2250	2700	
1425	1875	2325	2775	

Table 6.15.1 -- Legal T90 Frequencies (Hertz)

517.5	607.5	697.5	787.5	877.5
532.5	622.5	712.5	802.5	892.5
547.5	637.5	727.5	817.5	907.5
562.5	652.5	742.5	832.5	922.5
577.5	667.5	757.5	847.5	937.5
592.5	682.5	772.5	862.5	952.5
				967.5

Table 6.15.2 -- Legal T99 Frequencies (Hertz)

6.16 Stop/Repeat Channel Loop.

After processing data entry for a channel, the system asks whether the user wishes to enter a similiar sequence of data for another channel:

```
| MORE CHANNELS?(Y/N)      |
```

A "Y" or DN ARROW response causes the system to repeat the loop beginning with the ENTER CHANNEL NUMBER prompt described above.

A "N" (for NO) directs the system to:

1. Check programmed bandwidth; first TX then RX channels. The following message is displayed while computing TX bandwidth:

```
| CHECKING TX BANDWIDTH    |
```

If the frequency spread (minimum to maximum) is greater than specified for that particular range and split, an error message such as the following is displayed. This brief message is the only indication that the TX bandwidth exceeds specified radio capabilities.

```
| EXCEEDS 5.5 MHZ BANDWIDTH |
```

The following message is displayed while computing RX bandwidth:

```
| CHECKING RX BANDWIDTH    |
```

If the frequency spread (minimum to maximum) is greater than such as the following is displayed. This brief message is the only indication that the TX bandwidth exceeds specified radio capabilities.

```
| EXCEEDS 2.0 MHZ BANDWIDTH |
```

2. Determine if user desires center tuning automatically (i.e. if channel 16 has not been programmed) via the prompt:

```
| CENTER TUNE?(Y/N)        |
```

The user may elect not to center tune, or may accept the computed frequency, or may enter a different frequency. The system automatically computes the center tune TX and RX frequencies and presents same much as normal TX/Rx frequency data entry.

While sorting and computing the average of the maximum and minimum programmed frequencies FOR TX SIDE, the system displays the following message:

```
-----------------------------
| COMPUTING CENTER TUNE FREQ|
-----------------------------
```

When computing is completed, the center tune frequency is shown as:

```
-----------------------------
| CH:16  TX-FREQ:xxx.xxxxxMH|
-----------------------------
```

While sorting and computing the average of the maximum and minimum programmed frequencies FOR RX SIDE, the system displays the following message:

```
-----------------------------
| COMPUTING CENTER TUNE FREQ|
-----------------------------
```

When computing is completed, the center tune frequency is shown as:

```
-----------------------------
| CH:16  RX-FREQ:xxx.xxxxxMH|
-----------------------------
```

The user may simply type the enter or down arrow key to leave the entries as computed, or may modify as desired just like a normal frequency.

6.17 Stop/Repeat Mode Loop

After processing data entry for a mode or modes, the system asks whether the user wishes to enter a similiar sequence of data for another mode or modes:

```
-----------------------------
| MORE MODES?(Y/N)          |
-----------------------------
```

A "Y" or DN ARROW response causes the system to repeat the loop beginning with the ENTER MODE(S) prompt described above.

A "N" (for NO) ends the loop for the current mode or modes.

6.18 Stop/Repeat Programming Loop

After processing data entry with a given set of data types enabled, the user chooses whether to enter more data for a mode or modes, with different types enabled:

```
| MORE PROGRAMMING?(Y/N)    |
```

A "Y" or DN ARROW response causes the system to repeat the loop beginning with the PROGRAM FREQ SELECT prompt described above.

A "N" (for NO) ends the loop.

6.19 FINAL SEQUENCE

The Final Sequence consists of the programming steps that take place after the modes are programmed.

6.19.1 Emergency Tone Signalling

Emergency Tone Signalling may be enabled and selected from among T90, T99 or Special Encode types, by responding to the following menu-prompt:

```
| 1=T90 ENCODE              |

| 2=T99 ENCODE              |

| 3=SPECIAL ENCODE          |

| 4=NONE                    |
```

If signalling is enabled, by choosing options 1, 2 or 3 then the user will be asked to supply tone frequencies, as described in Section --- above.

6.19.2 Tone Signalling Durations

If any Tone Signalling has been specified, either for one or more modes, or for Emergency Tone Signalling, then at this point the user will be asked to specify tone duration and, if two tone signalling has been programmed, the user will also be asked for a silent interval duration. The series of prompts will be as follows:

```
| 1ST TONE:0     MS          |
```

Allowable values are 0 to 12700 MS.

```
| 2ND TONE:0     MS          |
```

Allowable values are 0 to 3000 MS.

```
| INTERVAL:0     MS          |
```

Allowable values are 0 to 300 MS.

6.19.3 Next the user will be asked whether Variable Squelch is desired:

```
| VARIABLE SQUELCH?(Y/N)     |
```

6.19.4 Next the user will be asked whether Channel Alert is desired:

```
| CHANNEL ALERT?(Y/N)        |
```

6.19.5 PRINTOUT

The user will be prompted for a PRINTOUT via:

```
| PRINTOUT?(Y/N)             |
```

If "Y" or DN ARROW key is typed the system prints the channel data as discussed in the PRINTOUT, section 4 above. The 3rd line of the printout header will read as follows if the user elects a printout here:

PRINTOUT FROM: EDITING (AFTER)

6.19.6 Data Storage

The user will be asked to select the output destination with:

```
-----------------------------
| WRITE TO: 1=EEPROM SOCKET |
-----------------------------

-----------------------------
| WRITE TO: 2=CONTROL HEAD  |
-----------------------------

-----------------------------
| WRITE TO: 3=S-950 FILE    |
-----------------------------
```

Selecting for example the S-950 File (key #3) results in a display of

```
-----------------------------
| WRITE TO: S-950 FILE      |
-----------------------------
```

Note that system will not exit this loop until the data has been WRITTEN without errors. If an error occurs the system will prompt for the "WRITE TO" device again and again.

NOTE

DO NOT depress the CLEAR key at this point in the PROGRAM/REVIEW session to clear an error condition else you will loose all the input just completed. Of course, if you were only REVIEWing the data, the CLEAR key will do no harm.

The S-950 File should always be an option for an error free WRITE TO device, but you must realize that previous file data will be overwritten.

7.0 Special Frequency Input Features.

In the event the user wishes to stretch the Delta slightly outside of the normal allowable frequency range, the user can force the programmer to accept a VALID frequency of any value by using the "Insert" key in lieu of the ENTER or DN ARROW keys. The system will still violently "beep" and show you the proper range, but will accept any VALID value. Of course the Radio may not operate properly or even at all on any out-of-range frequency so programmed. (A "VALID" frequency is one that does not result in the "INVALID" message during frequency selections).

8.0 Error Codes/Messages/Conditions.

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

1. NO 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 S-950 CONTROL HEAD Program will not 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 and ON again.

2.

   OPEN FAILED
   ATTACH FAILED
   I/O FAILURE

   These messages result if the GE I/O module is not connected properly into the system. The S-950 CONTROL HEAD Program will continue after "beeps" and error messages. However, you will not be able to write/read the Control Head or EEPROM socket until the error condition is fixed.

3. ID ERR

```
---------------------------
| ID ER (XX XX) CONT?(Y/N ) |
---------------------------
```

   This message occurs only when attempting to read from or write to the Control Head. This may be because:

   1. The Cable is not attached properly to the I/O module or Control Head.

   2. The Control Head is not powered ON.

   3. The Control Head is not working properly.

   4. Someone is messing with the PTT, channel select, etc. during a programming operation.

   5. The Control Head is not compatible with this version of the S-950 Control Head Program (e.g. if you are actually connected to a product other than an S-950 Control Head, or perhaps because the Control Head is an incompatible "special").

   typing N (for no) terminates the Control Head Read or Write sequence. The system will continue prompting for an output device.

   typing Y (for yes) instructs the system to attempt again to READ

from or WRITE to the Control Head.

The user must assume responsibility for possible ill effects of over-riding the ID check, such as, perhaps, reading from or writing to an incompatible product.

4. VERIFY ERROR Indicates data written to or read from the Control Head or EEPROM socket did not check during the VERIFY READ operation.

5. 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.

6. NO FILE or WRONG TYPE

NO FILE is not actually an error. This message results from an attempt to READ the file when no data has been written to the S-950 File.

9.0 Helpful Suggestions.

The following could prevent some frustrations with the Hand Held Computer and Universal Radio Programmer system.

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

2. New Control Heads may contain factory test data for all the possible combinations of High Band, UHF, Low Band options. As such the RX frequencies will appear incorrect (i.e.out of range). Therefore always assume that fresh-from-the-factory Control Heads need all new data.

3. To set Date/Time in your system you may have to remove the Hand Held Computer from the suitcase.

4. If the S-950 CONTROL HEAD Program does not show up in the Primary menu, try removing the Hand held Computer from the suitcase; 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 menu legend for S-950 CONTROL HEAD repeat this procedure again before assuming that your unit is defective.

5. 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.

6. 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 Cpmputer.

7. The user may purchase a variety of peripherals and software capsules for the Hand Held Computer from Panasonic. However, the S-950 CONTROL HEAD Program was designed for use only with the computer, the Panasonic Mini-Printer Model RL P1004, the GE Program Storage Module and GE I/O Module. As such, inclusion of other devices or other Capsule programs may cause problems. If a problem arises, simply unplug the problem Peripheral/Capsule when executing the S-950 CONTROL HEAD Program.

8. If the user is programming repetitive data such as frequencies, channel guard, etc use of the function keys may facilitate data entry. The function keys f1, f2, f3 may be programmed (before selecting the S-950 CONTROL HEAD Program) by the following for each desired function key:

   1. Depress "HELP" key on keyboard.

      The systems responds with the prompt:

      ```
      ---------------------------
      | PRESS KEY FOR DEFINITION |
      ---------------------------
      ```

   2. Depress function key (f1, f2, or f3).

      The system briefly displays the message:

      ```
      ---------------------------
      | DEFINE FUNCTION          |
      ---------------------------
      ```

   3. Following this system directive type the desired data, such as 467.8750 for a frequency, or 100.0 for channel guard, etc.

   4. Depress "ENTER" key on keyboard

   5. Depress "CLEAR" key.

   Thereafter, the user may simply depress the appropriate function key in lieu of typing out the freq, channel guard, etc. defined for that function key.

10.0 EPROM INSTALLATION AND SYSTEM CONNECTIONS

10.1 EPROM INSTALLATION

The TQ 2329 EPROM containing the S-950 CONTROL HEAD Program must be installed in the Program Storage Module before programming can be accomplished. This EPROM is provided separately, as ordered, and must be installed by the user. The following installation procedure is suggested (refer to the following Figure).

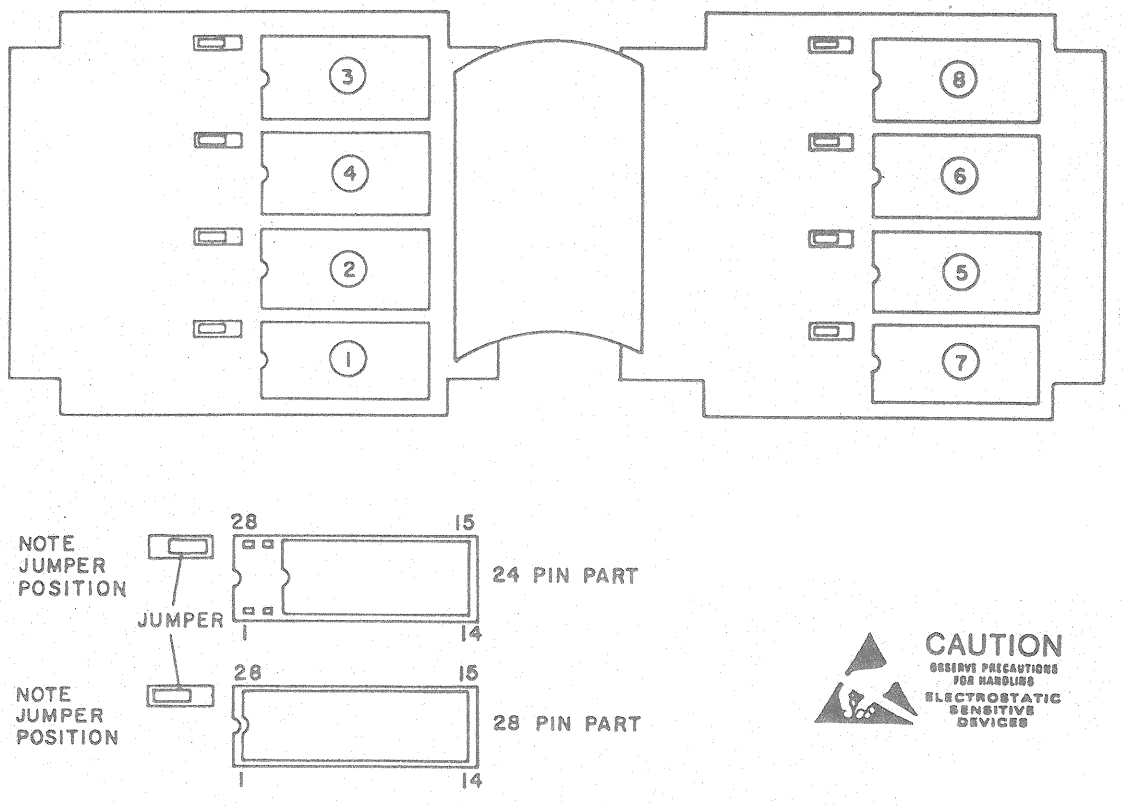


Figure 10.1 EPROM INSTALLATION

NOTE

The EPROM device can be destroyed by static discharges. Before handling, 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 Adaptor by sliding it to the right approximately two inches.

2. Remove the four screws from bottom cover and open. Do not remove boards.

3. Install the EPROM in the lowest-numbered empty socket as shown on the attached figure. (Note socket designations and numerical sequence. Programs will be displayed in the Programmer primary menu according to the socket number.) Check location of the jumper adjacent to the socket.

4. Close the cover and replace the four screws in the bottom.

5. Reinstall the Program Storage module in the programmer.

10.2 PROGRAMMING THE S-950 CONTROL HEAD

The TQ2322 S-950 Cable, provided separately as ordered, is used for connecting the S-950 Control Head to the Universal Radio Programmer during programming. The following procedure is recommended:

10.2.1 Bench Programming Without Radio

1. Turn off the Control Head; PWR switch out.

2. Connect 13.8 VDC bench supply A+ to J1-11 and A- to J1-3 on back of the Control Head. Connect J2-2 (Control A-) to ground.

3. Connect the 9-pin connector P2 of the programming cable to mating connector J2 of the Programmer's Data I/O Module. Press the locking lever on the cable connector to facilitate installation and removal.

4. Connect the 6-pin connector P7 of the cable to mating connector J6 on back of the Control Head.

5. Press in PWR switch to turn on Control Head and begin programming procedure.

10.2.2 Programming With Radio Installed

With the S-950 Control Head and associated radio installed in a vehicle, the following procedure is recommended:

1. Turn off the Control Head and radio; PWR switch out.

2. Connect programming cable TQ2322 to J2 on Programmer's Data I/O Module and to J6 on back of Control Head. (All power and ground connections are made through the normal Power/Control cable installation.)

3. Turn on Control Head and radio by pressing PWR switch in and begin programming procedures.

10.3 PROGRAMMING EEPROMS OUTSIDE THE S-950 CONTROL HEAD

EEPROMS can be programmed outside the Contro Head using the TQ2313 Socket Adaptor. Install the socket adaptor on top of the Data I/O Module, making certain that the connector pins are properly aligned.

The socket adaptor is equipped with a zero insertion force (ZIF) socket. Raise the lever on the socket before installing the EEPROM. Press the lever forward to lock the EEPROM in the socket.

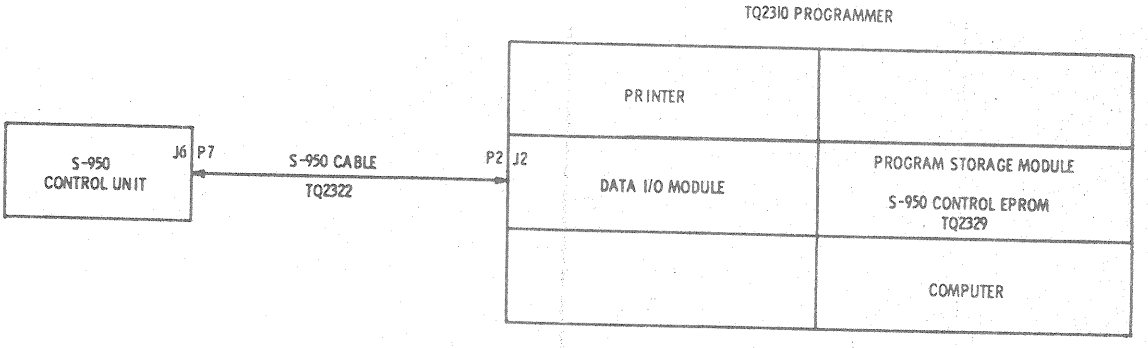
NOTE

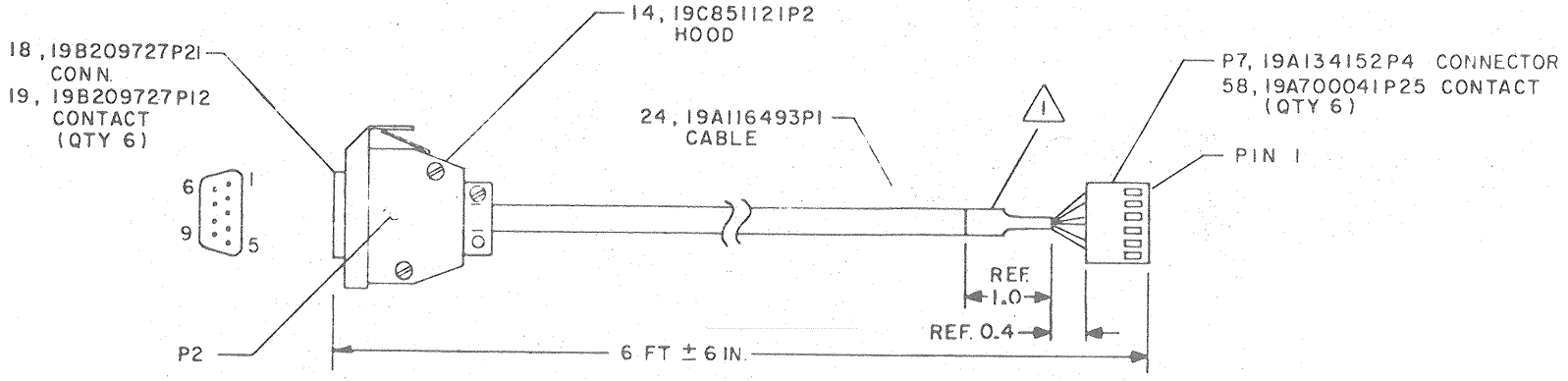
Check orientation of the EEPROM. The EEPROM can be damaged if reading or programming is attempted with the part installed backwards.

NOTE

The EEPROM can be damaged by static discharges. Observe handling precautions for electrostatic sensitive devices.

PROGRAMMING S-950 CONTROL UNIT





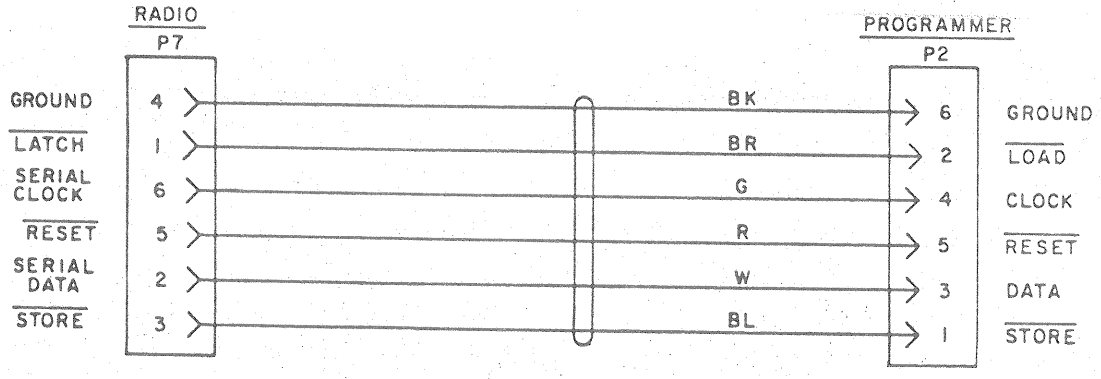


Figure 10-3 S-950 PROGRAMMING CABLE, TQ3222

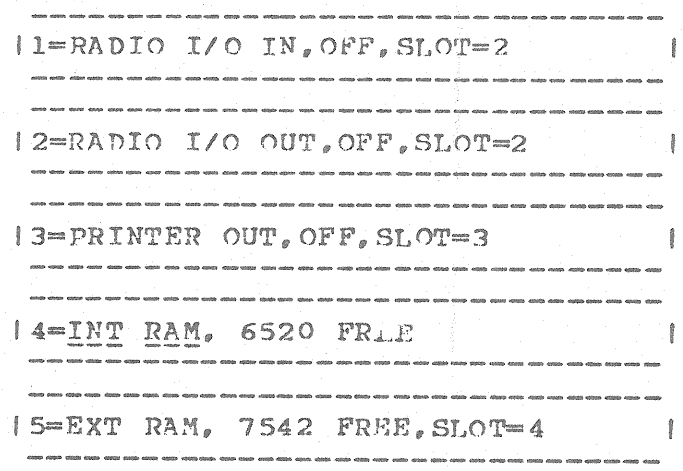
11.0 FILE OPERATIONS.

The programmer offers several facilities for managing radio data saved in files, which are summarized in this section. 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". Control Head data written to (and read from) the S-950 CONTROL HEAD FILE is written to (and read from) a file named S-950 CONTROL HEAD, which is automatically created when file data is written. The file can be deleted, renamed, or copied as required.

11.1 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 S-950 CONTROL HEAD 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:



NOTE

Underline is used to indicate reverse image in this preliminary manual.

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

11.2 Deleting a File

It may be desireable to delete the S-950 CONTROL HEAD 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.

```
 ---------------------------
| 1=NEW FILE                |
 ---------------------------
 ---------------------------
| 2=COPY FILE               |
 ---------------------------
 ---------------------------
| 3=DELTA-MOBILE            | (for example)
 ---------------------------
 ---------------------------
| 4=S-950 CONTROL HEAD      | (for example)
 ---------------------------
 ---------------------------
| 5=etc.                    |
 ---------------------------
```

3. Choose the S-950 CONTROL HEAD file by pressing the number displayed with it (4 in this example). "S-950 CONTROL HEAD" 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.

11.3 Renaming a File

Any file in the current memory area can be renamed.

1. First make certain that the desired data has been written to the S-950 CONTROL HEAD 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 S-950 CONTROL HEAD 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 filename.

```
 ---------------------------
|S-950 CONTROL HEAD         |
 ---------------------------
```

5. Use the RIGHTARROW and LEFTARROW 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 RIGHTARROW or LEFTARROW keys, to delete the character at the cursor.

NOTE

It is better to add characters to the filename than to replace the filename. 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.

ace plumbing
or
S-950 ace plumbing

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 filename should appear in the menu.

11.4 Restoring the Renamed File

The file must be renamed back to S-950 CONTROL HEAD (must be uppercase) for the S-950 CONTROL HEAD Program to use it. Use the renaming procedure described above. Be careful to rename or delete any S-950 CONTROL HEAD file that already exists, to avoid confusing the computer with two identically-named files.

NOTE

S-950 CONTROL HEAD is not a text file and cannot be edited by the editing commands described in the Panasonic literature. In addition, the S-950 CONTROL HEAD Program will reject text files, or files created by other programs, that have been renamed S-950 CONTROL HEAD.

11.5 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. Press CLEAR twice if it is not.

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:

```
1=RADIO I/O IN,OFF,SLOT=2
2=RADIO I/O OUT,OFF,SLOT=2
3=PRINTER OUT,OFF,SLOT=3
4=INT RAM,6860 FREE
```

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.

11.6 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:

```
-------------------------------------
|SELECT FILE                        |
-------------------------------------
```

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 promt appears:

```
-------------------------------------
|SELECT DESTINATION RAM             |
-------------------------------------
```

followed by a menu of destination memory areas. The current memory is displayed in reverse image. For example:

```
-------------------------------------
|1=INT RAM,2625 FREE                |
-------------------------------------
-------------------------------------
|2=EXT RAM,6520 FREE,SLOT=4         |
-------------------------------------
```

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

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