MOBILE RADIO

LBI-31263D

DELTA-S/SX

PROGRAMMING INSTRUCTIONS FOR DELTA-S/SX USING TQ2310 PROGRAMMER

GENERAL ELECTRIC

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1.0 Introduction

This document describes operating instructions and procedures for programming the DELTA-S and DELTA-SX Mobile Radio with the Universal Radio Programmer.

This software release and LBI provide for DELTA narrow band radios with DELTA wideband microprocessors. Changes from LBI31263-B dated 9/28/84 are marked with vertical bars at the margins.

The software associated Universal Radio Program is V06.14 or a later release.

The Universal Radio Programmer is a suitcase containing a standard Panasonic 8K 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 DELTA Radio. 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 Radio and an EEPROM socket for out-of-the-radio EEPROM programming.

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 an item causes a new menu to be displayed until the operation to be performed has been defined.

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

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 Delta Radio program-data in three media: The Radio (actually an EEPROM in the Radio), an EEPROM external to the Radio, and a data

file internal in the Programmer's battery sustained ram memory. Delta Radio program-data may be retrieved (i.e.READ), modified or created, and stored (i.e.WRITEN) back to any of the three media. COPY utility operations enable data transfer among these media.

Access to these media are via:

1. EEPROM Socket on the GE I/O module.

2. Delta Radio (via special cable to the Data I/O module).

3. Delta File in the system's Computer memory.

The Programmer asks the operator for the INPUT device (i.e. "READ FROM") and OUTPUT device (i.e. "WRITE TO") at appropriate stages in the various programming functions.

2.1 Direct Radio Programming.

The usual sequence for field programming the Delta Radio is via direct connection to the Radio. If the radio has been previously programmed, the normal sequence is to READ the current contents from the DELTA RADIO, PROGRAM/REVIEW the data, then WRITE the updated data back into the radio. If a radio has not been previously programmed the normal sequence is to program all new data, then write it to the radio.

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 Delta Radios, or they may be copied via the COPY operations into the Radio, or saved for future use/reference. EEPROM may be read and previewed, printed, reprogrammed, etc in the EEPROM SOCKET the same as EEPROMs in the Delta Radios.

2.3 Delta File

The Programmer file system can store a single copy of a Delta radio's data in an internal file that remains intact as long as the Hand Held Computer 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 : Delta,Phoenix, etc.).

Data may be read and previewed, printed, reprogrammed, etc in the Delta File the same as EEPROMs in the Delta Radios. Data may be copied from the File to Delta Radios or to EEPROMs in the external EEPROM SOCKET, and vice versa.

The Programmer's File allows convient programming outside the radio 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 powered "on", the PRIMARY menu usually will be displayed one line at a time, such as:

```
 ---------------------------
| 1=Caculator               |
 ---------------------------
 ---------------------------
| 2=Clock/Controller        |
 ---------------------------
 ---------------------------
| 3=File System             |
 ---------------------------
 ---------------------------
| 4=Run Snap Programs       |
 ---------------------------
 ---------------------------
| 5=PHOENIX-MOBILE          |
 ---------------------------
 ---------------------------
| 6=DELTA-S/SX MOBILE       |
 ---------------------------
 ---------------------------
| 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.

"DELTA-S/SX MOBILE" is the selection for programming Delta Mobile Radios. Entry into the DELTA-MOBILE program is via depressing the number (or letter) key displayed in front of the menu item: "DELTA-S/SX MOBILE". (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. Note that all Yes/no prompts have defaults (Y or N) that the user may select via typing the "enter" key or the "down Arrow" or the "N" or the "Y" keys. The user may overide the default by typing the opposite (i.e. Y or N) of the default shown.

3. typing codes such as "N" for "NONE", "D" for DEFAULT, 2:30, etc.

The LEFT and Right Arrow keys on the system keyboard can be used to move the flashing cursor indicator 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 DELTA-MOBILE program. The "HELP" key for use in defining the function keys f1, f2, f3 (if desired) should be done prior to selecting the DELTA-MOBILE program.

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

The ROTATE key has no definition during execution of the DELTA-MOBILE program.

4.0 DELTA-Mobile Functions Descriptions.

When the user selects the DELTA-MOBILE program via the PRIMARY system menu the following message is briefly displayed:

```
-----------------------------
| SELECT DELTA-S OR DELTA-SX|
-----------------------------
```

followed by cycling a new menu:

```
-----------------------------
| SELECT 1=DELTA-S          |
-----------------------------
-----------------------------
| SELECT 2=DELTA-SX         |
-----------------------------
```

This selection distinguishes between the NARROW BAND DELTA (DELTAS) and the WIDE BAND DELTA (DELTASX). It is very important to select the proper radio because of programming and data format differences.

If DELTA-S is selected, the program further prompts for the type of processor in the DELTA-S mobile radio. Newer radios may have the DELTA-SX microprocessor (UCPU) to include non EIA Standard tone channel guard frequencies. This selection is made from the cycling menu:

```
-----------------------------
| 1=DELTA-S WITH 'S' MICRO  |
-----------------------------
```

```
 ---------------------------
| 2=DELTA-S WITH 'SX' MICRO |
 ---------------------------

 ---------------------------
| 3=DON'T KNOW WHICH MICRO  |
 ---------------------------
```

If "3" is typed, the unit briefly displays the message:

```
 ---------------------------
| DELTA-S DEFAULTED         |
 ---------------------------
```

Followed by the prompt:

```
 ---------------------------
| RADIO CONNECTED ?(Y/N)N   |
 ---------------------------
```

which remains until user types "Y" or types "CLEAR" key. If connected to the radio, the "ID" will be checked by the program and reported to the user. (If normal DELTA-S UCPU as defaulted, the program continues properly).

If Radio ID is unknown when read from supposedly attached radio, the program responds with the usual radio ID error message prompt:

```
 ---------------------------
| ID ER(13 1 )CONTC ? (Y/N)N|
 ---------------------------
```

If user types "N" the entire sequence is repeated.

If the user types "Y" the program will assume the Delta-s UCPU as defaulted and continue.

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

followed by cycling a new menu showing the selections. To provide feedback to the user on which radio was selected (DELTA-S or DELTA-SX) each of the entries for this menu are preceeded by DELTA-S or DELTA-SX. The samples below assume that DELTA-SX was selected.

```
 ---------------------------
| DELTA-SX 1=PRIMARY MENU   |
 ---------------------------

 ---------------------------
| DELTA-SX 2=PROGRAM/REVIEW |
 ---------------------------
```

```
 ---------------------------
| DELTA-SX 3=PRINTOUT       |
 ---------------------------
 ---------------------------
| DELTA-SX 4=COPY -SINGLE   |
 ---------------------------
 ---------------------------
| DELTA-SX 5=COPY -MULTIPLE |
 ---------------------------
 ---------------------------
| DELTA-SX 6=SELECT RADIO   |
 ---------------------------
```

These are all of the operational functions of the Universal Radio Programmer associated with programming the Delta Mobile radio.

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 Delta Radio- including frequency selection, channel guard, CCT, etc. Section 5 of this document will describe 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 DELTA-File. Whenever PRINTOUT is selected a "READ FROM" prompt asks the operator for the INPUT device via cycling the following menu:

```
 ---------------------------
| READ FROM: 1=EEPROM SOCKET |
 ---------------------------
 ---------------------------
| READ FROM: 2=DELTA RADIO   |
 ---------------------------
 ---------------------------
| READ FROM: 3=DELTA FILE    |
 ---------------------------
```

If the user selects either the EEPROM Socket or Radio, the system further asks if this Radio has 16 or 32 channels via the B-MODE ? prompt:

```
-----------------------------
| B-MODE ? (Y/N)N           |
-----------------^-----------
```

A response of "N" indicates 16-channels (i.e. no B-Mode). A response of "Y" indicates 32 channels.

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

```
-----------------------------
| READ FROM: EEPROM SOCKET  |
-----------------------------
-----------------------------
| B-MODE ? (Y/N)N           |
-----------------^-----------
```

The user must select Y or N which is followed by:

```
-----------------------------
| A-MODE READING            |
-----------------------------
```

and if B-MODE was selected the system waits for the user to switch EEPROMs via:

```
-----------------------------
| B-MODE EEPROM READY (Y/N)Y|
-------------------------------^-
```

After the user switches to the B-MODE EEPROM , type "Y". (NOTE, the B-MODE EEPROM requires a special adapter not furnished with or as an option for the Programmer). The "Y" is followed by:

```
-----------------------------
| B-MODE READING            |
-----------------------------
```

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

If the user selects either the EEPROM SOCKET or the DELTA RADIO 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

NOTE

If DELTASX was selected above, only the first two selections for high band and UHF are available for this selection.

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.

4.3.1 LOW BAND splits (Low Band is only for DELTA-S):

1=29.7 - 36.0 MHZ

2=36.0 - 42.0 MHZ

3=42.0 - 50.0 MHZ

4.3.2 HIGH BAND splits (DELTA-S):

1=136.0 - 153.0 MHZ

2=150.8 - 174.0 MHZ

4.3.3 HIGH BAND splits (DELTA-SX):

1=136.0 - 153.0 MHZ
2=150.0 - 174.0 MHZ

4.3.4 UHF splits (DELTA-S):

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

4.3.5 UHF splits (DELTA-SX):

1=403.0 - 440.0 MHZ
2=440.0 - 470.0 MHZ

If the user selects the DELTA-FILE as input, the Range information may have already been stored with the file hence the system would not prompt for it. (The DELTA FILE input may require Range selection if not previously edited. The system knows when to prompt for these data).

4.4 Next the user is prompted for a label via the prompt: b1

ENTER LABEL:

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

Each printout has a header consisting of:

1. 40 Character label, or blank line.

2. V06.13 DELTA-S or V06.13 DELTA-SX If DELTA-S RADIO has DELTA-SX microprocessor, the following will be appended to the line: "[WITH 'SX' MICRO]"

3. Range and split , for example: UHF (403-440 MHZ)

4. (ALT 13.8MHZ OSC SELECTED -if appropriate).

5. "PRINTOUT FROM: dddddddd". Where "dddddddd" specifies a device: EEPROM SOCKET, DELTA RADIO, or DELTA FILE.

6. Time/Date line.

Sample PRINTOUT

Channel Number is along left side under the "A" or "B" mode designators. Note that due to printer width limitations, channels 10 thru 16 are shown as 0 thu 6 after line stating "CHANNELS 10 - 16".

TX-FREQ =transmit frequency (in MHZ)

TX-CG = the transmit channel guard digital code or tone frequency. If the channel is 16A, and if the user selected 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.

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

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

The HEX dump is of little value for most users. The format of the printout is a matrix of nibble values with the nibble addresses shown across the top and along the left side of the printout. The most significent hex character of the nibble address is indicated by the Vertical string (0 ... F) along the left of the sheet. The least significent character of the nibble address is printed horizontally (0 ... F) across the top of the hex data (above the dotted line).

The channle numbers are printed to the right of the sheet preceeded by the "#" symbol.

4.5 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=DELTA RADIO   |
 ---------------------------
 ---------------------------
| READ FROM: 3=DELTA FILE    |
 ---------------------------
```

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

```
 ---------------------------
| READ FROM: EEPROM SOCKET   |
 ---------------------------
 ---------------------------
| B-MODE ? (Y/N)n            |
 ----------------^----------
```

The user must select Y or N which is followed by:

```
 ---------------------------
| A-MODE READING             |
 ---------------------------
```

and if B-MODE was selected the system waits for the user to switch EEPROMs via:

```
 ---------------------------
| B-MODE EEPROM READY (Y/N)y|
 ---------------------------^-
```

After the user switches to the B-MODE EEPROM , type "Y". (NOTE, the B-MODE EEPROM requires a special adapter not furnished with or as an option for the Programmer). The "Y" is followed by:

```
 ---------------------------
| B-MODE READING             |
 ---------------------------
```

If an I/O error of any type occurs in the "Read From" proceedure, 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=DELTA RADIO   |
-----------------------------
-----------------------------
| WRITE TO: 3=DELTA FILE    |
-----------------------------
```

Selecting for example the DELTA RADIO (key #2) results in a display of

```
-----------------------------
| WRITE TO: DELTA RADIO     |
-----------------------------
-----------------------------
| A-MODE WRITING            |
-----------------------------
```

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

```
-----------------------------
| A-MODE VERIFY --READING   |
-----------------------------
```

Similiarly if B-MODE is included:

```
-----------------------------
| B-MODE WRITING            |
-----------------------------
-----------------------------
| B-MODE 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).

4.6 COPY-MULTIPLE

Copy Multiple is much like copy-single except the WRITE operation is repeated as many times as the operator responds "Y" (or ENTER or DN Arrow) to the prompt:

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

4.7 SELECT RADIO

This sequence allows user to swicth between DELTA-S and DELTA-SX as desired via the sequence:

```
+---------------------------+
| SELECT DELTA-S OR DELTA-SX|
+---------------------------+
```

followed by cycling a new menu:

```
+---------------------------+
| SELECT 1=DELTA-S          |
+---------------------------+
+---------------------------+
| SELECT 2=DELTA-SX         |
+---------------------------+
```

This selection distinguishes between the NARROW BAND DELTA (DELTAS) and the WIDE BAND DELTA (DELTASX). It is very important to select the proper radio because of programming and data format differences.

If DELTA-S is selected, the program further prompts for the type of processor in the DELTA-S mobile radio. Newer radios may have the DELTA-SX microprocessor (UCPU) to include non EIA Standard tone channel guard frequencies. This selection is made from the cycling menu:

```
+---------------------------+
| 1=DELTA-S WITH 'S' MICRO  |
+---------------------------+
+---------------------------+
| 2=DELTA-S WITH 'SX' MICRO |
+---------------------------+

+---------------------------+
| 3=DON'T KNOW WHICH MICRO  |
+---------------------------+
```

If "3" is typed, the unit briefly displays the message:

```
+---------------------------+
| DELTA-S DEFAULTED         |
+---------------------------+
```

Followed by the prompt:

```
-----------------------------
| RADIO CONNECTED ?(Y/N)N   |
-----------------------------
```

which remains until user types "Y" or types "CLEAR" key. If connected to the radio, the "ID" will be checked by the program and reported to the user. (If normal DELTA-S UCPU as defaulted, the program continues properly).

If Radio ID is unknown when read from supposedly attached radio, the program responds with the usual radio ID error message prompt:

```
-----------------------------
| ID ER(13 1 )CONTC ? (Y/N)N|
-----------------------------
```

If user types "N" the entire sequence is repeated.

If the user types "Y" the program will assume the Delta-s UCPU as defaulted and continue.

5.0 PROGRAM/REVIEW

Program/review is the "editor" that allows the user to program or review the various options in a Delta Mobile radio. The user may review/modify data already existing in either of the three "devices" discussed previously, or select totally new data for a radio that is fresh from the factory and has never been programmed.

The PROGRAM/REVIEW function may be thought of as a fixed sequence of:

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. Selecting the Range for the target radio.
3. Selecting the setup options: Channel Guard, CCT, Specials.
4. Reviewing and /or entering desired data .
5. Selecting a WRITE TO device .

This sequence cannot be altered by the user except by depressing the CLEAR key which aborts the PROGRAM/REVIEW function and returns to the "SELECT OPERATIONS" menu. However, extreme caution should be used with the CLEAR key as it could destroy all the data of your edit session. Prior to actually entering the data, the CLEAR key is safe

to use at your option. Likewise if you only review data the CLEAR key is safe. If you determine that you selected undesired options as per step #3 above, the CLEAR key is the only way to restart.

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 CCT".

5.1 Select Old (i.e. existing)or ALL New DATA.

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=REVISE EXISTING DATA  |
+-------------------------+
+-------------------------+
| 2=ERASE ALL, START ANEW |
+-------------------------+
```

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=DELTA RADIO |
+--------------------------+

+--------------------------+
| READ FROM: 3=DELTA FILE  |
+--------------------------+
```

Selecting for example the DELTA RADIO socket (key #2) results in a display of

```
+--------------------------+
| READ FROM: DELTA RADIO   |
+--------------------------+

+--------------------------+
| B-MODE ? (Y/N)n          |
+---------------^----------+
```

The user must respond with "Y" (or ENTER or DN Arrow) (for yes) or "N" (for no), which is followed by:

```
+--------------------------+
| A-MODE READING           |
+--------------------------+
```

If the user responded "Y" to B-mode prompt, this is followed by:

```
+--------------------------+
| B-MODE READING           |
+--------------------------+
```

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

The system will repeat the Read-From sequence until data are read without errors from the selected device.

5 2 Select Range

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.

5.2.1 LOW BAND splits:

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

5.2.2 HIGH BAND splits (DELTA-S):

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

5.2.3 UHF (Delta-S) 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       |
 ---------------------------
```

5.3 If "NEW DATA" was selected above, the system will prompt for B-mode via:

```
+-------------------------+
| B-MODE ? (Y/N)n         |
+-------------^-----------+
```

in order to establish buffer size, etc. If the DELTA FILE device was selected, and if the data in the file has been previously edited with PROGRAM/REVIEW, the RANGE information is stored in the file data.

5.4 After Range and Band have been selected, and if OLD DATA , the user has the option of selecting a printout via the prompt:

```
+-------------------------+
| PRINTOUT ? (Y/N)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 PRIOR TO EDITING

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).

5.5 Select Program/Review Options.

The user is presented with a number of options prior to data review/entry processes. These selections are extremely useful and should be done with care as will be described below. (Careless options selections also can be extremely costly in user programming time).

5.5.1 Channel Guard Option.

The following prompt enables/disables the channel guard option.

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

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 ditital).

2. block the option (during this session) to insert channel guard codes.

3. prevent unwanted CHANNEL GUARD prompts later in the Program/Review session.

A "Y" (or ENTER or DN Arrow) (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)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.

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

1. enter digital channel guard AND Inverted Digital Channel Guard during the edit/programming session.

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.

5.5.2 Alternate 13.8MHZ Reference Oscillator.

NOTICE -- ANSWER THE NEXT PROMPT WITH CARE.

After the Channel guard selection options, the following prompts for:

```
 ---------------------------
| ALT. 13.8MHZ OSC ? (Y/N)n |
 ---------------------------^-
```

SHOULD ALWAYS BE ANSWERED NO

except in the unlikely situation that GE has built especially for you a special Delta Mobile Radio with the 13.8 MHZ reference oscillator because of very unusual interference conditions that causes the NORMAL 13.2 MHZ reference osc. to be unusable.

NOTE

The alternate oscillator is a hardware crystal change, not a simple option selection. To date no Delta Radios are made with this alternate oscillator because to date no communication situation has

prevented satisfactory operation of the Delta Mobile using the standard 13.2 MHZ oscillator.

5.5.3 Select Carrier Control Timer (CCT).

The Delta Mobile 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)y |
-------------------------^
```

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" (or ENTER or DN Arrow) will enable the user to select a CCT on any channel. The user is further prompted for a DEFAULT CCT via the prompt:

```
---------------------------
| ENTER DEFAULT CCT        |
---------------------------
```

Followed by the prompt:

```
---------------------------
| 1 =1:00, 2 =2:00, 3 =3:00 |
---------------------------
```

The user types either a "1" or a "2" or a "3". Thereafter during programming the user need only type "D" to input the selected DEFAULT CCT. (The user must select a DEFAULT CCT, but need not ever use it).

5.6 Main Data Entry/Review Loop

Following selection of the setup options, the system begins the main loop sequence of:

1. Channel Number.
2. Transmit Frequency.
3. Transmit Channel Guard (if enabled).

4. Tx Carrier Control Timer (CCT) (if enabled).

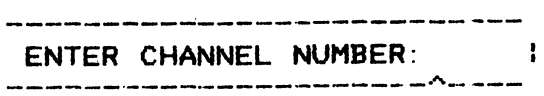
5. Receive Frequency.

6. Receive Channel Guard (if enabled).

7. The option to stop here (More ? (Y/N)).

5.6.1 Selecting Channel Number.

The user is prompted to input the channel number via :



with the BLINKING CURSOR positioned after the ":" as marked on the diagram above by the "^" on the bottom box line. 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 "1A".

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 the Delta Mobile Radio has an "A" mode and a "B" mode, each with channels 1 thru 16. Therefore valid entries may be such as:
   A1, 1A, A, B, 7, B4, 3B, 16, 28, 32, etc.

   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 A3 to A2, or from B1 to A16, etc).

4. The user may type the DOWN ARROW key to move to the next successive channel nunmber (e.g. moving from A4 to A5, or from 16A to 1B, etc).

5.6.2 Transmit Frequency entries.

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

```
-------------------------
| CH:  1A TX-FREQ: xxx.xxxxxMH|
-----------------^-----------
```

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

5.6.2.1 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").

5.6.2.2 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 FREQUENCY        |
-------------------------
```

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

NOTE

NOTICE- 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.

5.6.3 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: 1A 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: 1A 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 DIDITAL CG CODE precede the code with an "I", such as "I023", "I047", I172, etc. followed by ENTER or DN ARROW key.

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:

```
-----------------------------
| CG CODE NOT ALLOWED       |
-----------------------------
```

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

5.6.4 Non-standard Tone Channel Guard Codes.

With limitations, DELTA-SX allows tone channele guard codes between 67.0 and 210.7 that are not EIA standard tones. If the system rejects the selected code, it will beep beep and insert the nearest acceptable code on the display for the operator to "enter" or change as desired. For example:

If the user types in 67.2 as:

```
-----------------------------
| CH: 1A TX-CG:67.2         |
--------------^--------------
```

The system responds with:

BEEP de BEEP

```
 ---------------------------
| CH:  1A TX-CG: 67.1       |
 -------------^-------------
```

The user can select this value of 67.1 by typing "enter".

5.6.5 Carrier Control Timer (CCT) Entry

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

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

where x:xx is "NONE" or any valid CCT from 0:30 to 4:00 in 15 sec increments for DELTA-S or from 0:30 to 3:00 in 30 second increments for DELTA-SX.

NOTE

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

5.7 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:  1A RX-FREQ: xxx.xxxxxMH|
 -----------------^---------
```

5.8 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:  1A RX-CG: xxxxx      |
 -------------^-------------
```

5.9 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.

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

```
-----------------------------
| CH: 1A STE ENABLED?(Y/N)y |
-----------------------------^-
```

A "Y" (or ENTER or DN Arrow) for YES will leave STE ENABLED for this channel.
A "N" for NO will DISABLE STE for this channel.

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

```
-----------------------------
| CH: 1A STE DSABLED?(Y/N)y |
-----------------------------^-
```

A "Y" (or ENTER or DN Arrow) for YES will leave STE DISABLED for this channel.
A "N" for NO will ENABLE STE for this channel.

5.10 Stop Option.

After processing both TX and RX options, the system prompts the operator to COMPLETE this session, or to continue with another channel via the prompt:

```
-----------------------------
| MORE ? (Y/N)y             |
-------------^---------------
```

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. Automatically 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. For DELTA-S, determine if user desires center tuning automatically (i.e if channel 16A has not been programmed) via the prompt:

```
+--------------------------+
| CENTER TUNE ? (Y/N)y      |
+--------------------^-----+
```

The user has the option to elect not to center tune, and/or select any desired 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: 16A 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: 16A 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.

3. Prompt for a PRINTOUT via:

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

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)

4. Ask the user to select the output "device" with:

```
-------------------------
| WRITE TO: 1=EEPROM SOCKET |
-------------------------
-------------------------
| WRITE TO: 2=DELTA RADIO   |
-------------------------
-------------------------
| WRITE TO: 3=DELTA FILE    |
-------------------------
```

Selecting for example the Delta File (key #3) results in a display of

```
-------------------------
| WRITE TO: DELTA 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 Delta File should always be an option for an error free WRITE TO device, but you must realize that previous file data will be overwritten.

6.0 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).

7.0 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 DELTA MOBILE 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.

OPEN FAILED
ATTACH FAILED
I/O FAILURE

These messages result if the GE I/O module is not connected properly into the system. The DELTA MOBILE program will continue after "beeps" and error messages. However, you will not be able to write/read the Radio or EEPROM socket until the error condition is fixed.

3. ID ERR

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

This message occurs only when attempting to read/write the RADIO. This may be because:

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

2. The Radio is NOT POWERED ON.

3. The Radio is not working properly.

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

5. The Radio is not compatible with this version of the DELTA MOBILE software (e.g. if you are actually connected to a some type radio other than a Delta Mobile, or perhaps because the radio is an incompatible "special").

typing N (for no) terminates the RADIO I/O sequence. (The system will continue prompting for an output device).

typing Y (for yes) instructs the system to attempt to READ/WRITE the radio.

The user must assume responsibility for over-riding the ID check such as READING/WRITING an incompatible RADIO.

4. VERIFY ERROR Indicates data written to or read from the radio 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. If no data has been written to the Delta File, this message results from an attempt to READ the file data.

8.0 Helpful Suggestions.

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

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

2. NEW DELTA Radios 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 radios 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 DELTA MOBILE 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 DELTA MOBILE, 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 DELTA MOBILE was designed for use only with the basic 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 DELTA MOBILE.

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 (PRIOR TO SELECTING DELTA MOBILE) 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.

APPENDIX A

EPROM INSTALLATION AND SYSTEM CONNECTIONS

9.0 EPROM INSTALLATION AND SYSTEM CONNECTIONS

9.1 EPROM INSTALLATION

The TQ 2317 EPROM containing DELTA-S/SX software 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).

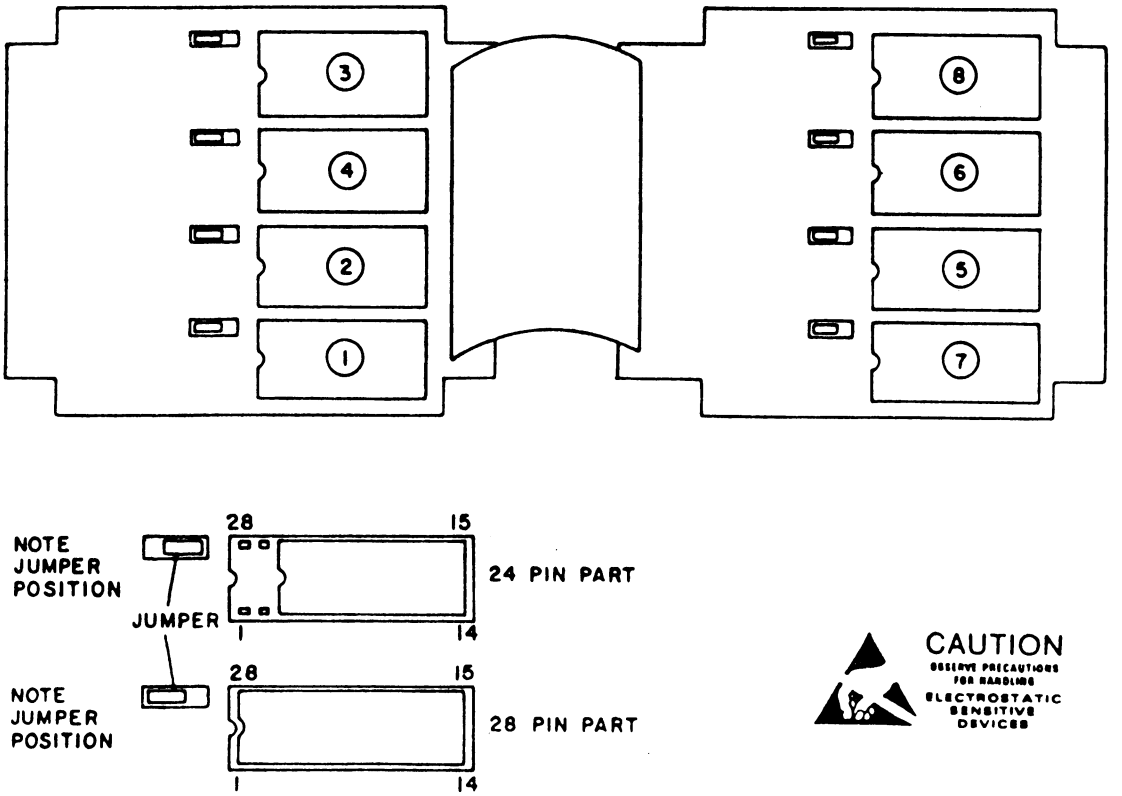


Figure 9-1 EPROM INSTALLATION

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 bottom.

5. Reinstall the Program Storage Module in the programmer.

9.2 PROGRAMMING THE DELTA-S/DELTA-SX RADIO.

The TQ2312 DELTA-S/DELTA-SX Cable, provided separately as ordered, is used for connecting the DELTA-S/SX radio to the programmer during programming. The following procedure is recommended.

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

2. DISCONNECT the CONTROL HEAD cable from the front of the DELTA radio.

3. Connect the T-adapter end of the TQ 2312 cable into the front of the DELTA radio.

4. Connect the CONTROL HEAD cable connector into the T-adapter of the TQ 2312 cable now plugged into the radio.

5. The radio must be powered by a 13.8 VDC bench supply or vehicle battery during programming. Power on the radio at the control head.

9.3 PROGRAMMING EEPROMS OUTSIDE THE RADIO

EEPROMS can be programmed outside the radio 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.

APPENDIX B

FILE OPERATIONS.

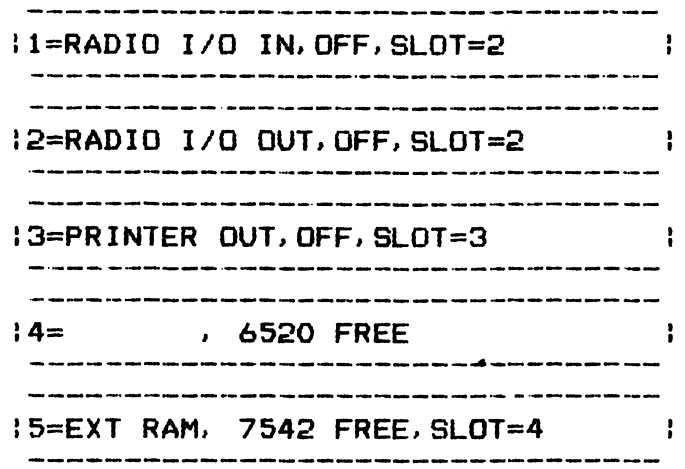
10.0 FILE OPERATIONS.

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". DELTA radio data written to (and read from) the DELTA FILE is written to (and read from) a file named DELTA-S/SX MOBILE, which is automatically created the first time radio data is written. The file can be deleted, renamed, or copied as required.

10.1 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 DELTA-S/SX Mobile 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.

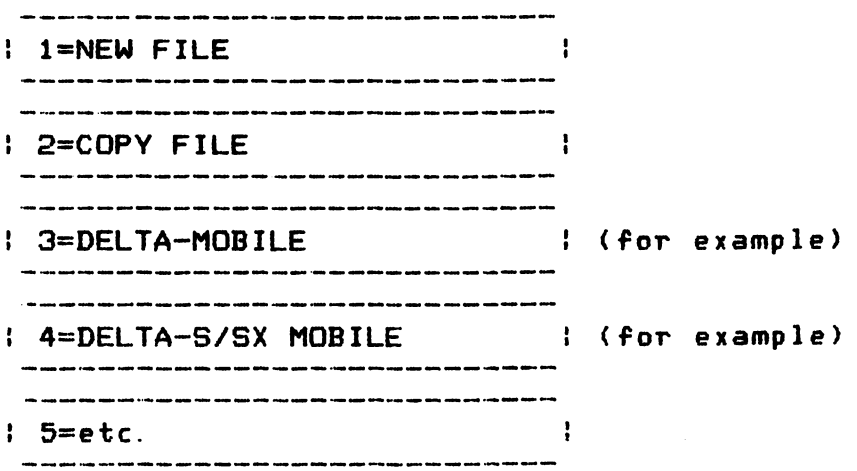
Change the current memory by pressing the number displayed with the desired memory area.

10.2 Deleting a File

It may be desireable to delete the DELTA-S/SX MOBILE 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.



3. Choose the DELTA-S/SX MOBILE file by pressing the number displayed with it (4 in this example). "DELTA-S/SX MOBILE" 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.

10.3 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 DELTA-S/SX FILE.

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

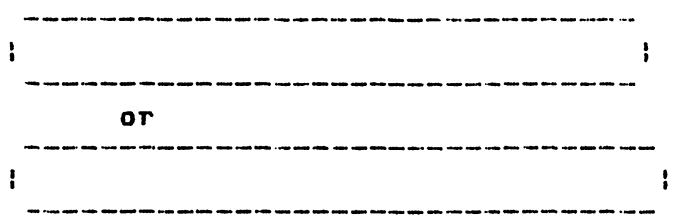
3. Select the file system by pressing "3" (3=FILE SYSTEM). The computer will display a menu listing all (visible) files, as described above.

4. Choose the DELTA-S/SX MOBILE 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.

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.



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.

10.4 Restoring the Renamed File

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

NOTE

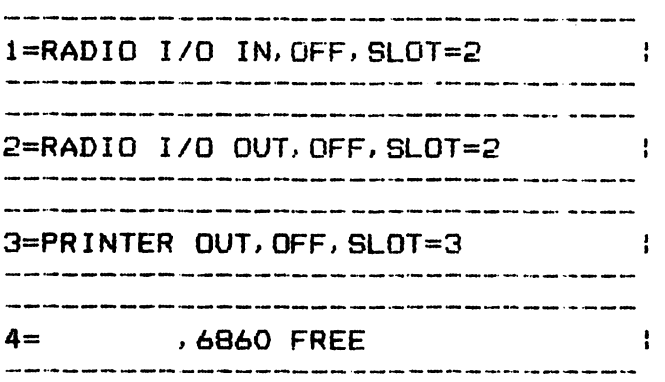
DELTA-S/SX MOBILE is not a text file and cannot be edited by the editing commands described in the Panasonic literature. In addition, the DELTA-S/SX mobile program will reject text files, or files created by other programs, that have been renamed DELTA-S/SX MOBILE. Do not name non-DELTA-S/SX files DELTA-S/SX MOBILE.

10.5 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:



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.

10.6 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=       ,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.

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

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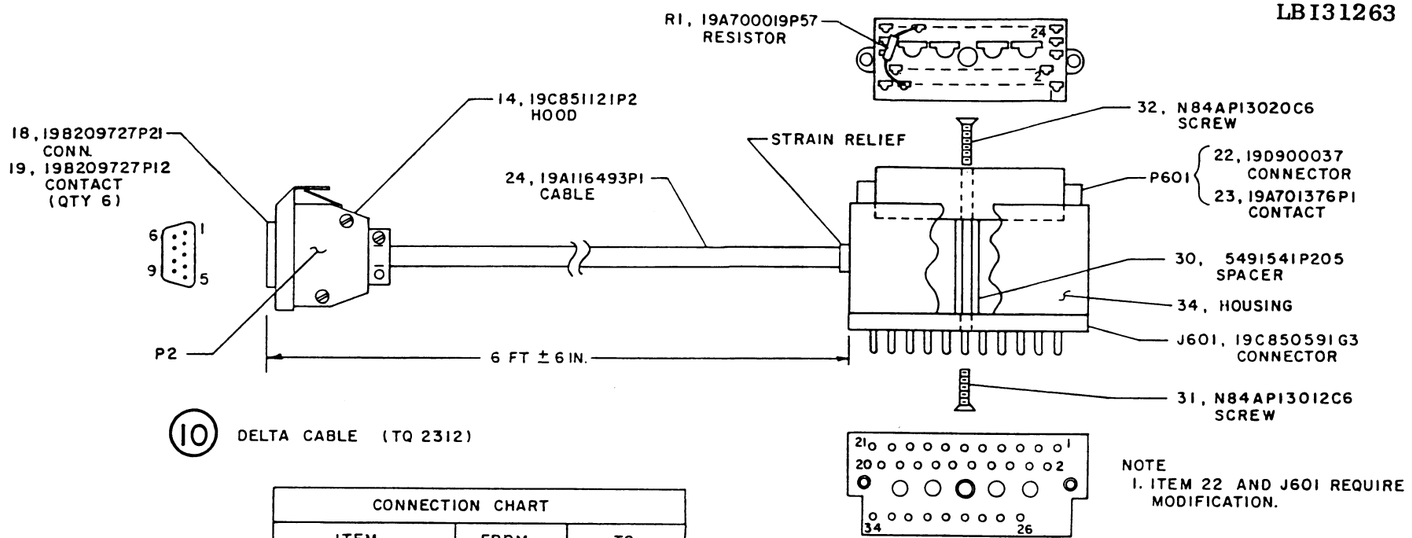
PARTS LIST

DELTA CABLE AND ADAPTER KIT
19B234413G3 DELTA CABLE KIT
19B234413G13 DELTA ADAPTER KIT
ISSUE 1

SYMBOL	GE PART NO.	DESCRIPTION
		DELTA CABLE KIT 19B234413G3
		- - - - - - - - - - - JACKS - - - - - - - - - - -
J601	19C850591G3	Connector, system: 30 contacts.
		- - - - - - - - - - - PLUGS - - - - - - - - - - -
P2		Connector. Includes:
	19B209727P21	Shell.
	19B209727P12	Contact. (Quantity 6).
	19C851121P2	Hood.
P601		Connector. Includes:
	19D900037P1	Shell.
	19A701376P1	Contact, electrical rated @ 4 amps; sim to AMP 350657-1. (Quantity 8).
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	19A700019P57	Deposited carbon: 47K ohms ±5%, 1/4 w.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	5491541P205	Spacer, threaded. (Located in housing between J601 & P601).
	N84AP13012C6	Screw. (Secures J601 to housing).
	N84AP13020C6	Screw. (Secures P601 to housing).
		DELTA ADAPTER B MODE KIT 19B234413G13
		- - - - - - - - - - - JACKS - - - - - - - - - - -
J601	19C850591G3	Connector, system: 30 contacts.
J711		Connector. Includes:
	19A700072P9	Printed wire: 10 contacts; sim to Molex 22-03-2101.
	19A700072P10	Printed wire: 11 contacts; sim to Molex 22-03-2111.
		- - - - - - - - - - - PLUGS - - - - - - - - - - -
P1	19A700072P8	Printed wire: 9 contacts; sim to Molex 22-03-2091. (Quantity 2).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

LBI31263



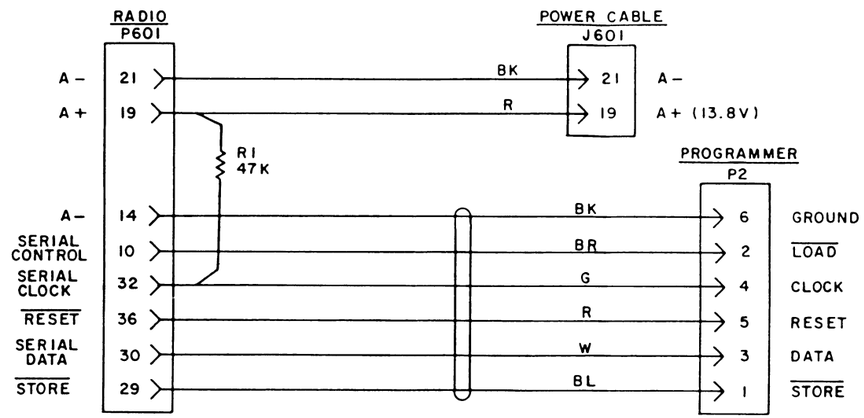
(10) DELTA CABLE (TQ 2312)

NOTE
1. ITEM 22 AND J601 REQUIRE MODIFICATION.

CONNECTION CHART		
ITEM	FROM	TO
ITEM 24 - BLUE	P2 - 1	P601 - 29
- BROWN	P2 - 2	P601 - 10
- WHITE	P2 - 3	P601 - 30
- GREEN	P2 - 4	P601 - 32
- RED	P2 - 5	P601 - 36
ITEM 24 - BLACK	P2 - 6	P601 - 14
22 AWG - BLACK	J601 - 21	P601 - 21
22 AWG - RED	J601 - 19	P601 - 19
R1	P601-32 *	P601 - 19 *

* PINS DUPLICATED

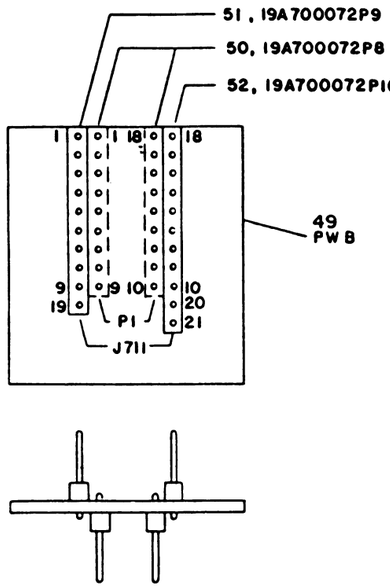
(19B234413, Sh. 3, Rev. 1)



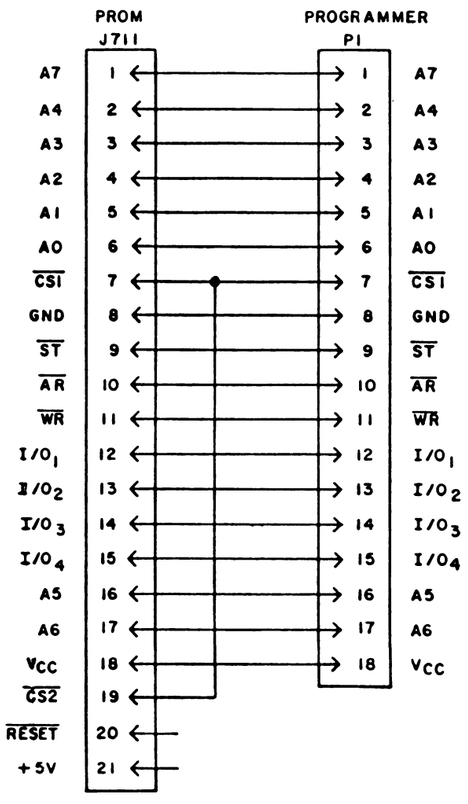
(19B234425, Rev. 1)

OUTLINE DIAGRAM
SCHEMATIC DIAGRAM

DELTA CABLE
19B234413G3



(19B234413, Sh. 6, Rev. 0)



(19B234522, Rev. 0)

OUTLINE DIAGRAM
SCHEMATIC DIAGRAM

DELTA B-MODE ADAPTER
19B234413G13