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RTL-4826C MSF 5000 STATION CONTROL CODEPLUG PROGRAMMING MANUAL

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1. INTRODUCTION

- 1.1 The application program kit described in this section is designed for use in the Motorola R-1800 Series Digital Analyzer/Controller (DA/C) in conjunction with the RTL-5817B codeplug adapter module. The kit consists of 7 Read-Only-Memory (ROM) integrated circuits that have been factory programmed expressly to provide the necessary instruction steps for the DA/C to read and/or program the station control codeplug or the multi-coded squelch codeplug as described herein.

WARNING

Version 6 software requires an RTL-5817B codeplug adapter module. An RTL-5817A must be upgraded to an RTL-5817B (see sec. 2.4) for use of version 6 software.

SOFTWARE REGISTRATION

Please complete and return the attached software registration card immediately. This will ensure you of being informed of the latest applications and enhancements. The software included in this application will perform only the functions described in this manual, which meet the requirements of the standard radio product current at the time of software publication. In the event that new product features, additions, or specialties (SPs) are made available they will not necessarily be field programmable or supported by this application program kit.

2. APPLICATION

- 2.1 The RTL-4826 Application Program kit is the software which provides the capability to read and/or program the station control codeplug (U803) and the multi-coded squelch (MCS) codeplug (U1405) used in the Motorola MSF 5000 Base Station/Repeater. The RTL-5817B Adapter Module provides the interface for the codeplug to the Digital Analyzer/Controller's Reader/Programmer module.

The RTK-4061 Serial Port Cable allows the DA/C to read the code-

plug contents without removing the EPROM from the station. An Epson Model MX-80 or RX-80 printer (used in conjunction with the RTK-4041 printer interface cable) can be used for printing labels and the customer parameter booklet in the field.

2.2 The RTL-4826 kit is capable of reading the contents of the codeplug included in the radio as supplied by the factory. [REDACTED]

[REDACTED]. Blank codeplugs must be used to reconfigure the channel assignments, change channel characteristics, add channels to the radio, or alter any other parameter which is controlled by the codeplug.

2.3 The codeplug is an EPROM (Eraseable Programmable Read-Only Memory) which is custom programmed with information to determine the operational characteristics of the radio. The codeplug EPROM is socketed rather than soldered to the p.c. board, and is easily replaced. Only Motorola supplied EPROMs can be used and cannot be substituted due to unique programming requirements and stringent performance specifications. The replacement codeplug is available from Motorola C & E Parts. Order kit number RPX-4438A (reference part number 51R90002B02).

2.4 RTL-5817B Adapter Module

Version 6 of the RTL-4826A software requires the RTL-5817B adapter module. Earlier versions used and RTL-5817A which can be converted to an RTL-5817B by the following procedure:

STEP 1: Remove adapter from R1801 Reader/Programmer.

STEP 2: Place it on its front and remove the four screws holding the circuit board in place. Remove the circuit board.

STEP 3: Place circuit board component side up with the EPROM socket at the bottom.

STEP 4: Locate the row of resistor and capacitor pads, the left most pair is for C5. The pair just to the right of that is for R5.

(Another capacitor will be just to the right of R5).

STEP 5: Insert a 681 ohm 1% resistor in the pads provided for R5. (One side connects to pin E* of the connector, the other to C5 and pin T of the connector). Solder R5 in place.

STEP 6: Insert a .01 microfarad capacitor in the pads provided for C5. (One side connects to C2, C3 and ground of the connector, the other side to R5 and pin T of the connector). Solder C5 in place.

STEP 7: Replace cover and screw down.

3. DESCRIPTION

3.1 MSF 5000 STATION CONTROL CODEPLUG

3.1.1 The microcomputer system of the MSF 5000 Base Station/Repeater makes it extremely adaptable. Information programmed in the codeplug defines to the microcomputer the desired operational characteristics, and is organized by channels.

3.1.2 The MSF 5000 offers the flexibility to configure each channel independently for the following features:

- o transmit rf frequency
- o receive rf frequency
- o transmit coded squelch (PL/DPL)
- o receive coded squelch (PL/DPL)
- o wireline PTT time-out-time
- o repeater PTT time-out-time
- o local PTT time-out-time
- o repeater drop-out-delay duration
- o push-to-talk priorities
- o repeater control
- o receiver audio control
- o transmitter audio mixing
- o automatic station identification

- o alarms reporting
- o Spectra - TAC information
- o MCS station information
- o RA station information
- o wireline duplex

3.1.3 In addition to the per-channel parameters listed above, the codeplug also defines the station's DC remote control current functions and power-up configuration.

3.1.4 This application program is oriented to the capabilities of the codeplug and the station parameters which it controls. It is the user's responsibility to be knowledgeable of the requirements, limitations, and functions of the parameters which he modifies using this program. Information on these subjects may be found in the following publications:

- o MSF 500 Station and Repeater Instruction Manual (68P81062E75)
- o Product Planner MSF 5000 Continuous Duty Base Station and Repeater (R-2-33)
- o Study Guide MSF 5000 Base Station and Repeater (8-1-71)
- o National Service Training Videotape

3.2 MSF 5000 MUTI-CODED SQUELCH CODEPLUG

3.2.1 The multi-coded squelch codeplug is typically a 51R90013B01 part (2816A) and requires a RTL-5817B Codeplug Adaptor Module to be programmed. The RTL-5817A must be updated to an RTL-5817B (see sec. 2.4). If an RTL-5817A is used, permanent damage may occur to the 51R90013B01 during reading or programming the part.

3.2.2 The version 6 software will allow the user to program or read the following parameters on the MCS codeplug:

- o User PL/DPL codes
- o Active MCS channels

4. R-1800 PROGRAM ROM INSTALLATION

- 4.1 The program ROMs used in this application kit are identified by labels on the I.C.s. They include the kit number and its suffix, followed by a software version number: (RTL-)4826C-.06. The individual part numbers of each ROM are also printed: 51-80364A46, 48, 56, 51-80364A72 and 73, and 51-80369B08 and B09.
- 4.2 Installation of the RTL-4826 Program ROMs requires opening the front panel of the R-1800 Digital Analyzer/Controller to access the program ROM socket area on the RTL-4079 Executive Circuit Board. A step-by-step procedure is included in the R-1800 instruction manual. If you require assistance contact your Motorola Test Equipment Service Representative. Domestic U.S. users can phone, toll free, 1-800-323-6967(1-312-576-7025 for Illinois customers).
- 4.3 The RTL-4826 ROMs are shipped in anti-static protective packages. Special handling precautions must be observed when installing the devices in the Digital Analyzer/Controller to avoid damage:

1. Prior to removing the ROMs from their packages, touch both hands to a bare metal earth grounded surface. This will discharge any static charge which may have accumulated.

NOTE

Wearing Conductive Wrist Strap (Motorola No. RSX-4015A) will minimize static buildup.

2. Avoid touching the leads on the I.C.s.
3. Avoid carpeted areas, dry environments, and certain types of clothing (silk, nylon, etc.) because they contribute to static buildup.

For additional information on this subject refer to SAFE HANDLING OF CMOS INTEGRATED CIRCUIT DEVICES, instruction section 68P81106E84, included in most Motorola equipment manuals.

- 4.4 Refer to the R-1800 Digital Analyzer/Controller Instruction

Manual no. 68P81069A90, Section 3.2 and follow the detailed instructions provided therein to install the application ROMs in any of the available sockets. The seven program ROMs do not have to be installed in any particular order.

- 4.5 When upgrading from version 5 to version 6 software, two changes to the program ROMs must be made. First ROM_1 (part #518036A47 must be removed and replaced by the new version of ROM_1 (part #5180364B08). Secondly, ROM_6 (part #5180364B09) must be installed in any of the available sockets. This will bring the total count of MSF software ROMs to seven.

5. EXPANSION RAM INSTALLATION

- 5.1 The standard 1K byte user RAM of the Digital Analyzer/Controller CANNOT accommodate operation of this application program. 4 K of user RAM is required to operate this program. R-1800 Series model numbers suffixed with "/M" already include a total of 4K byte factory-installed user RAM. Expansion RAM must be added in the field to all other models. The RPX-4257 RAM Expansion kit is available from Motorola C & E Parts for this purpose.
- 5.2 The RPX-4257 includes six 1K x 4 RAM integrated circuits which are to be installed in the provided sockets on the DA/C's I/O board. Installation instructions are included with the kit.
- 5.3 If the R1800 software is being upgraded from a version 5 to a version 6, there should be no need to install more RAM on the I/O board.

6. READER/PROGRAMMER SETUP

For the R-1801 DA/C Model only:

Step 1. Connect each of the two I/O cables provided from J1 and J2 on the RTL-1008 Reader/Programmer Module to I/O 1 and I/O 2, respectively on DA/C unit.

Step 2. Connect the power plug, located in the accessory compartment of the lid assembly, to the front panel connector labeled ACC PWR.

For all DA/C Models:

Step 3. Install the RTL-5817 Adapter Module in the Reader/Programmer front panel, engaging the 60-pin connector with card edge connector board recessed in the slot.

Step 4. Turn the main power switch on and proceed with the operating instructions in section 9.

7. PRINTER SETUP

Step 1. Connect the 36-pin connector of the RTK-4041 Printer Interface Cable to the Epson MX-80 Printer.

Step 2. Connect the 25-pin connector of the RTK-4041 Printer Interface Cable to the R-1800 Digital Analyzer/Controller at port I/O 5.

NOTE

Most other programs call for the printer at I/O 6. The MSF 5000 program must use I/O 5, since I/O 6 is used for the Serial Port Cable.

8. SERIAL PORT CABLE SETUP

When the R-1800 display prompts the user to "INSTALL SERIAL CABLE AT I/O 6", connect the 25-pin connector of the RTK-4061 Serial Port Cable to I/O 6 of the R-1800, and connect the telco connector of the cable into the CONTROL receptacle on the front of the station.

9. GENERAL OPERATING RULES

9.1 General Operation

The R-1800 creates a codeplug image in its 4K RAM that can be modi-

fied per specification by the user. The initial parameters for this image are obtained in one of 3 possible ways:

1. Via the model number and options entered
2. Via an existing codeplug that is downloaded from the adapter module
3. Via the serial port cable that is plugged into the control jack on the MSF station

The initial parameters can be manipulated via the R-1800 keyboard and a new codeplug can be programmed. A parameter booklet can also be printed to reflect the contents of the new codeplug.

NOTE

The R-1800 can read these station control codeplug versions:

Version #1
Version #2
Version #3

The R-1800 always converts the version #1 and version #2 into a version #3 codeplug. A version #3 codeplug is compatible with any MSF 5000 base station. The user can verify whether his existing codeplug is a Version #3 by using the "VERIFY CODE PLUG" dialogue after downloading his codeplug. If it verifies, then it is a Version #3 codeplug.

9.2 Keyboard Operation

The user will find 2 basic modes of user interface to the R-1800:
Data Entry Mode or Menu Entry Mode .

- o Data Entry Mode - The user can enter data using the R-1800 keyboard. It is characterized by non-flashing parenthesis and a flashing

cursor .

Examples of the Data Entry Mode include entering data for Model and Option numbers, RF frequency and Auto ID callsigns.

- o Menu Entry Mode - The user selects one of a limited number of available choices from a menu. This mode is characterized by flashing parenthesis and the absence of the cursor .

Examples of the Menu Entry Mode include choosing YES or NO, choosing PL or DPL or CSQ.

For the Menu Entry Mode, the LINE FEED and BACK SPACE keys are used to view the menu items.

Some keys whose functions depend on whether the user is in the Data or Menu Entry Mode are listed below:

<u>KEY</u>	<u>MENU ENTRY MODE</u>	<u>DATA ENTRY MODE</u>
RETURN(CR)	Menu Item Selected	Data Entered
ESC	See Note 1	See Note 1
BREAK	See Note 2	See Note 2
LINE FEED (LF)	Next higher menu item viewed	Cursor moved to the right
BACK SPACE (BS)	Next lower menu item viewed	Cursor moved to the left
SHIFT	Not allowed	Same as LINE FEED
SHIFT	Not allowed	Same as BACK SPACE
CTRL D	Not allowed	Deletes a character at cursor position and shifts in a zero or a blank
CTRL I	Not allowed	Inserts a zero or a space at cursor position
CTRL X	Not allowed	Blanks out or zeros out a string
SPACE BAR	Same as LINE FEED	See Note 3
RESET	See Note 4	See Note 4

Note 1: The ESC (Escape) key allows the user to escape from a sit-

uation where he is uncertain of what action needs to be taken. Hitting the ESC key normally moves control to the previous step (See the Tree Chart) so that the user can attempt that step again. In addition to moving control to a previous step, the ESCape key also assumes a decision by the user in some instances. For example, in the RF Frequency dialogue this question is displayed:

RANGE CHECKING DESIRED (YES)?

If the user hits the ESC key, a YES answer is assumed and control moves to the next step just as if a YES was chosen.

Note 2: When the user hits the BREAK key, he will see this display:

DO YOU WANT TO BREAK (Y OR N)?

If the user hit the BREAK key by mistake, he can choose "N" and thus preserve his work. Control will then return to the area the user was working in. If the user wants to start from scratch he can choose "Y".

Note 3: On an alphanumeric data entry (such as Model # and Auto ID call sign), the Space Bar writes a space at the cursor position. On a numeric-only data entry (such as Option # and RF Frequency), the Space Bar moves the cursor to the right without altering the existing contents of the display.

Note 4: Hitting the RESET key causes the R-1800 to be re-initialized. All previously entered data is destroyed. The RESET key should not be hit unless the user wishes to start from scratch.

10. USER DIALOGUES

When going through this application program, depending on choices picked by the user, the program may branch off onto one of many different paths in the routine. The flow of the programming, along with the possible

paths taken at each user choice, are shown in the tree diagram of Section 11. The numbers assigned to each box on the diagram correspond to the descriptions, below, of what is happening at each step.

While proceeding through the various dialogues of the application program, the user should be aware of some general rules for using this program:

- o In general, pressing the ESC key moves control backwards in the program tree structure. Pressing the RETURN key moves control forward in the program tree structure.
- o When data are enclosed by blinking parenthesis, alternate values are viewed by pressing the LINE FEED (LF) or the BACK SPACE (BS) key in a menu selection manner.

When data are enclosed by non-blinking parenthesis, alternate values are entered via the keyboard at the indicated cursor position.

10. SPECIFIC OPERATING RULES - USER DIALOGUES

Section 10.1 deals with specific operating rules corresponding to the Station Control Codeplug and section 10.2 deals with those corresponding to the Multi-Coded Squelch codeplug. Both sections correlate to the tree diagram in section 11.

10.1 STATION CONTROL CODEPLUG PROGRAMMING

LVL 1.0 When the R-1800 Digital Analyzer/Programmer is powered up, the prompt

ENTER PROGRAM NAME

is shown. To access the MSF 5000 application program, the user enters MSF followed by RETURN, and will be shown

MSF 5000 BASE STATION

pause 1 second or hit any key to advance

CODE PLUG PROGRAMMING-VER. XX

(where XX=software version # of main MSF ROM)

pause 1 second or hit any key to advance

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pause 1 second or hit any key to advance

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pause 1 second or hit any key to advance

If 4K RAM is not installed in the R1800 the following message will be shown at this time:

****4K RAM MUST BE INSTALLED****

If 4K RAM is installed, proceed to Level 2.

LVL 2.0 At this point the user will be asked to enter the station's model number with the following prompt:

STATION MODEL=(XXXXXXXXXX)

where XXXXXXXXX is the current model #. The user can now accept this model # or EDIT it to the desired number.

The version 6 MSF software will now accept the new 896 and PURC 5000 station model numbers. Therefore, it is important to enter the correct model number so that the proper default codeplug image can be generated along with the proper Tuning channel frequencies for each station.

The entered model # is now checked for validity; if an error is found it is reported to the user as:

MODEL NUMBER NOT FOUND

and control is returned back to the prompt to allow further editing.

LVL 3.0 At this point the user will get the following prompt:

ENTER/EDIT OPTIONS: C(XXXX)

where XXXX is the first option in the option table (initially 0000).

If the user wishes to accept the displayed option, press 'RETURN' and the option will be entered into the table and the next option will be shown for review.

If the user wishes to delete the option, edit the option number to 0000 and press 'RETURN'.

To change an option, simply change the XXXX to the desired option number. This value will be checked for validity and one of the following responses will follow.

If the option is unrecognized, then it will still be accepted, but this message will be displayed for about 1 second:

UNRECOGNIZED -- ACCEPTED

Then the next option that exists will be displayed.

If the option is recognized but is incompatible with the particular model, then it will be rejected and this message will appear for about 1 second:

INCOMPATIBLE -- REJECTED

Then the same bad option will be displayed so the user can edit it. If the user hits the ESCape key instead, then that option will be deleted and the option table will be scanned to check for other incompatible options.

If the option is good then it will be added to the list of entered Options.

The above is repeated until the end of the Options list is reached, or the user hits the Escape key, at which point he is given the prompt

ALL OPTIONS ENTERED? (YES)

If "YES" is entered the options are entered into the option table and CONTROL goes to level 4. If "NO" is entered, the user is returned to the bottom of the option list where he may add more options. (For a list of options and a model compatibility Table, see section 17).

LVL 4.0 In this level, if the user desires, he can print out the model number and options which were previously entered, along with a description of the characteristics of that model number and the functions of the options.

If during printing the user wants to abort the print function "ESC" can be pushed. The printer will advance to top of form, the prompt

PRINTING ABORTED

is shown, and control goes back to 4.0.

LVL 5.0 In this level, the user chooses which codeplug in the MSF 5000 station is to be worked with. He is given the prompt
CODEPLUG (STATION CONTROL/U803)

If the user hits the RETURN key, then the station control code plug is chosen. If the user wishes instead to look for other codeplug types, he should press LINE FEED. When all codeplug choices have been exhausted, this message will appear:

ALL CODEPLUGS HAVE BEEN SCANNED

LVL 6.0 The user is given the choice of how he wants to setup the initial codeplug image in the R-1800 RAM. He is given the choices:

SETUP (USING PREVIOUS CONTENTS)

(This choice only appears if a codeplug image already exists in the R-1800 RAM).

If this choice is picked, go to 6.1

SETUP (USING MODEL /OPT DEFAULTS)

If this choice is picked, go to 6.2

SETUP (FROM SERIAL PORT CABLE)

If this choice is picked, go to 6.3

SETUP (FROM R1801 READER SOCKET)

If this choice is picked, go to 6.4

LVL 6.1 If the codeplug image in the R-1800 RAM is to be setup from the previous contents, the RAM image in the R-1800 is left alone and control moves to Level 7.

LVL 6.2 If the codeplug image in the R-1800 RAM is to be set up from the Model/Option defaults, the application software will set up a codeplug image based on the model number and options entered

by the user. Control proceeds to Level 7.

LVL 6.3 If the user chooses to setup the codeplug image from an existing codeplug via the serial port cable at Level 6, these steps will be followed:

LVL 6.3a The user is shown the prompt

INSTALL SERIAL CABLE AT I/O 6

If he installs the cable correctly and then hits RETURN, go on to 6.3b. If the cable is not installed correctly and RETURN is hit, the user is shown

SERIAL PORT CABLE NOT INSTALLED

and we return to 6.3.

LVL 6.3b The user is now shown the choice:

READ WITH STATION (KNOCKED DOWN)
or (OPERATIONAL)

The KNOCKED DOWN choice will disable the station during the codeplug read operation, but the read operation will take less time with this choice (about 25 seconds).

The OPERATIONAL choice allows the station to continue operating normally during the codeplug read operation, however, it takes longer for the codeplug to be read (about 90 seconds).

LVL 6.3c Once the choice above is made, the reading of the codeplug begins and the user is shown:

READING CODEPLUG-STANDBY X

where X counts from 0 to 9 to show the user that the program is active. If the full read operation is carried out successfully, proceed to 6.3d. However, if during the codeplug read operation either a data fault on the line occurs or the user hits the ESC key, the read operation will stop and the user is shown the display

READ ERROR (TRY AGAIN)
or (ABORT)

If the user chooses TRY AGAIN, the read operation will

LVL 7.4 ACTION: (PRINT PARAMETER BOOKLET)

If the user hits the RETURN key, then he will get a printout of the channel-mapped parameters and the DC Remote functions (if applicable).

1. The user is asked if he wants a printout of the parameter booklet:

PRINT PARAMETER BOOKLET? (YES)

If the user chooses YES, then this prompt will follow:

2. PREPARE PRINTER AT TOP OF FORM

Now the program pauses until any key is pressed. If the ESCape key is hit, then Step 1 will be accessed again. Hitting any other key will allow the printer to be initialized. If the printer is not ready, or if the cable is not connected, then an error will be indicated via this display:

PRINTER NOT ON LINE AT I/O 5

Now, if the user hits any key (except ESCape) then Step 2 will be repeated.

3. Now that the printer is set up, the following prompts will appear:

SERIAL NO=()

The user can enter the serial number or he could skip it by hitting the RETURN key immediately.

NOTES=()

Any entry will be accepted.

At this point, the Serial # and the comments line are printed. If the ESCape Key is hit during the printing, then the printing is aborted and Step 1 is accessed again; otherwise, Step 4 is accessed.

While the printer is printing this message is being displayed:

PRINTING

If the ESCape key is hit while the printer was printing, then this message will appear for about 1 second, and then Step 1 will be accessed again:

PRINTING ABORTED

4. Now the printer prints the data for the parameter booklet. After all the printing is done, the printer is automatically set at Top of Form.

5. When the printing is done, this prompt is shown again:

ACTION: (PRINT PARAMETER BOOKLET)

At this point, the user can elect to repeat above process by pushing the RETURN key, or he can view other ACTION possibilities by pushing the LINE FEED and/or BACK SPACE keys.

LVL 7.5 If the user is done with a code plug and wants to work on another one, he can choose the "DONE WITH CODE PLUG" action. This will return him to this prompt:

CODEPLUG (STATION CONTROL/U803)

which is at Level 5.

LVL 8.0 The user will be prompted initially with this:

[VIEW/EDIT: (NUMBER OF CHANNELS)]

The user can look for other parameters to view/edit by hitting the LINE FEED or BACK SPACE keys as often as necessary.

When the user wishes to view/edit a particular parameter, he hits the RETURN key. The parameters are:

- | | |
|-------------------------|--------------------------------|
| 1) Number of Channels | 10) Auto ID callsigns |
| 2) RF Frequency Info | 11) Alarm Tones Routing |
| 3) Coded Squelch Info | 12) DC Remote Currents |
| 4) P-T-T Time-out Timer | 13) MUXBUS Power-Up |
| 5) Rptr Drop-Out Delay | 14) Spectra -- TAC Information |
| 6) P-T-T Priority Info | 15) MCS Station Information |
| 7) Repeater Control | 16) RA Station Information |
| 8) Receiver Control | 17) Wireline Duplex |
| 9) TX Audio/Data Mixing | |

LVL 8.1 VIEW/EDIT: (NUMBER OF CHANNELS)

If the user hits the RETURN key, he can View/Edit the number of channels in the following manner:

The user will get a prompt with the following format:

NUMBER OF CHANNELS (0 04)

Where is the cursor location. In this example, the user can View/Edit up to 4 channels.

The user can now enter a different value if he wishes to alter the number of existing channels. It is possible to have up to 14 user channels.

If the entry is illegal (number of channels too large for codeplug) then this message will be displayed:

ILLEGAL DATA ENTERED

Then the same prompt will occur so that the user can fix his mistake.

NOTE:

When the entered number of channels is greater than the existing number, the contents of the new channels will be duplicates of the contents of the last channel that existed.

For example, going from 2 to 4 channels:

Channels 2, 3 and 4 are identical.

This is very useful for the case when it is desired to generate a codeplug whose parameters are identical or similar for each channel.

LVL 8.2 VIEW/EDIT: (RF FREQUENCY INFO)

If the user hits the RETURN key, he can View/Edit the transmit

and receive RF frequencies in the following manner:

The user is asked whether he wants range checking via this display:

RANGE CHECKING DESIRED? (YES)

If the user enters YES then only the frequencies that are within the specified band range will be accepted. If user enters NO then the user can enter frequencies that are out of the band's range. If the user hits the ESCape key, then YES will be assumed.

1. The user is asked which channel of info is to be viewed first. Channel number 1 is shown to the user initially:

CHAN(00 X)

where the indicates cursor location and where X=1 initially.

2. The user will now be asked for Receive RF frequency information.

If a PURC model number was entered in LVL 2.0, then the Receive frequency will automatically be set to 000000.00 KHZ; skip to step 4.

The display contains the frequency value that is contained in the codeplug RAM image:

CHAN-00X RX-FREQ (000000.00) KHZ

Once the value is entered, then:

- a. If the data is zero, then a blank frequency will be programmed into the codeplug RAM image and this warning message will appear:

NO DATA ENTERED

Then the user can proceed as usual.

- b. If the data is illegal, then this error message will appear:

ILLEGAL DATA ENTERED

Then the user will be forced to correct the error since Step 2 will be repeated.

3. If the model number entered in LVL 2.0 is not recognized as one of the following stations, skip to step 4.

Station model: 896 Conventional, 75W or 150W TX-RX = 39MHz
896 Trunked, 75W or 150W TX-RX = 39MHz

The user is asked whether he wants the Transmit frequency calculated via this display:

CALCULATE TX FREQUENCY ? (YES)

- a. If the user enters YES then the appropriate TX-RX channel spacing will be added to the Receive frequency entered in step 2. The result will be displayed in step 4.
 - b. If NO is selected then the frequency value that is contained in the codeplug RAM image will be displayed in step 4.
4. The user is asked what Transmit RF Frequency is desired. The frequency value contained in the display is either the codeplug RAM image or a result of the action performed in step 3.

CHAN-00X TX-FREQ (000000.00) KHZ

Once the value is entered, then:

- a. If the data is zero, then a blank frequency will be programmed into the codeplug RAM image and this warning message will appear:

NO DATA ENTERED

- b. If the data is illegal, then this error message will appear:

ILLEGAL DATA ENTERED

Then the user will be forced to correct the error since step 4 will be repeated.

5. Steps 2 through 4 are repeated for all channel numbers. It is possible to break this cycle by pushing the ESC key. The resulting display will look like the one in Step 1 with X=current channel no.
6. Once the last channel of data has been entered, the user is asked if he wishes to update the Tuning Channel via this dialogue:

UPDATE TUNING CHANNEL ? (YES)

If YES, then the Tuning Channel Rx and Tx frequencies will be generated and stored, but will not be displayed. If NO, then existing Tuning Channel values will not be altered.

The Tuning channel frequencies are determined by the model number entered in LVL 2.0 as follows:

UHF Stations	Rx = average of Receive channel frequencies
	Tx = average of Transmit channel frequencies
896 Stations	Rx = 898700.00 KHz
	Tx = 937700.00 KHz

PURC Stations Rx = 000000.00 KHz

Tx = 932000.00 KHz

While the Tuning channel is being updated the display will read:

UPDATING TUNING CHANNEL

For unrecognized models the user will be alerted of a Tuning channel problem as follows:

(TUNING CHAN MAY NOT BE CORRECT)

In this case, hit RETURN and use manual entry for the Tuning channel as described in "13. Helpful Hints" part 7.

****NOTE:** After manually entering Tuning channel frequencies, always respond with a '(NO)' when asked to 'UPDATE TUNING CHANNEL'.

Then all the channels will be automatically scanned to see if any channel has a Tx=Rx condition. During that time this will be displayed:

DOING TX=RX CHANNEL CHECK

Then this prompt is shown again:

VIEW/EDIT: (RF FREQUENCY INFO)

This allows the user to review the data he just entered (if RETURN key hit) or he can proceed to another section (if LINE FEED key hit).

NOTE:

A frequency is considered illegal if any one of the following occurs:

- The frequency is out of the designated band for the particular model number.

For UHF: Range is 403-520 MHZ inclusive.

For 800: Range is 806-950 MHZ inclusive.

- The frequency is not an exact multiple of the designated reference frequency for the particular model number.
- Wrong format: Spaces exist before or between the entered digits. Also more than one decimal point is encountered.

NOTE:

If no frequency exists in the codeplug for a particular channel, then the display will show the value 000000.00 KHz. If the user wishes to enter a blank frequency for a particular channel, then he enters 0. He will get a warning message to indicate that a blank channel was programmed in.

LVL 8.3 VIEW/EDIT: (CODED SQUELCH INFO)

If the user selects this choice, he can view and/or edit the PL/DPL/CSQ data in the codeplug. The user can pick which channel of information to view first. Then he can pick whether the

encoded data is to be PL, DPL or CSQ. Next, the PL or DPL code can be selected. Then he can make his decode choices.

The abbreviations carry the meanings:

PL = Private Line Code

DPL = Digital Private Line Code

CSQ = Carrier Squelch Only

Step 1. The user is asked which channel of information is to be viewed first with this prompt:

CHAN(0 01)

Step 2. The user, can decide whether the TX data is PL, DPL, or CSQ (carrier squelch). The user will be shown what currently exists in the codeplug.

The display appears like this:

CHAN-001 TX (PL)

- Step 3. Then the user can decide which code he wants encoded. He is shown whatever is in the image to begin with. This step is bypassed if CSQ was entered.

Now the Display looks like this:

CHAN-001 TX-PL (7 A)

Once a code is entered, then:

- 1) If the data are zeros, the Error message:
NO DATA ENTERED
is shown, or
- 2) If an illegal code is in the data field,
ILLEGAL DATA ENTERED
will be displayed. If a Warning message is given, the User will be forced to correct the error. That means that Step 3 will be repeated.

- Step 4. Next the user can decide whether his decode data is PL, DPL, or CSQ. He is shown first whatever is already in the codeplug image.

The display now appears as such:

CHAN-001 TX-PL-7A RX (DPL)

- Step 5. Finally, the user can pick the code to be decoded. He is shown whatever is initially in the image. Now the display looks like this:

CHAN-001 TX-PL-7A RX-DPL (0 31)

The RX code is tested just as the TX code was. Steps 2, 3, 4, and 5 are repeated over and over until all channels are viewed.

Once the last channel of data has been entered, control is passed to Level 8.3.

LVL 8.4 VIEW/EDIT: (P-T-T TIME-OUT TIMER)

If the user hits the RETURN key, he can view/edit the Push-To-Talk Time-Out timers for Wireline, Local and Repeater.

The user can pick which channel number to view/edit if he desires. Then the user will be prompted for the Wireline, Local, and Repeater P-T-T TOT's, in that order.

The user will have a number of TOT values for Wireline, Local and Repeater PTT's to choose from. In order for the user to view the available TOT value choices, he can push the LINE FEED key or the BACK SPACE key. The LF key will cause the next higher TOT value to be displayed. The BS key will cause the next lower TOT value to be displayed. When the desired TOT value is displayed, he can push the RETURN key which will allow the displayed value to be programmed into the Codeplug RAM Image.

There are 32 possible TOT values to choose from. For the typical Base Time of 15 seconds, the 32 choices are: 0, 15, 30, 45, 60, 75, . . . 450, and 465 seconds.

1. Now the user will be shown this display:

```
CHAN ( 0 0X)
```

where x=1 initially.

The user can choose to view/edit channel 1 or any other channel.

2. Then the user will get this prompt:

```
CHAN-XXX LIN-TOT (30.0) SECONDS
```

3. After the user selects the desired wireline TOT value, this prompt will be shown:

```
CHAN-XXX LOC-TOT (465.0) SECONDS
```

4. After the user selects the desired Local TOT value, this prompt will be shown:

```
CHAN-XXX RPT-TOT (0.0) SECONDS
```

The user selects the desired Repeater TOT value.

5. Steps 2, 3, and 4 are repeated for all existing channel numbers. It is possible to break this cycle by pushing the ESC key once if you are in Step 2, or twice if you are in Step 3, or three times if you are in Step 4. The resulting display will look like the one in Step 1 with X=current channel no. At that point the channel number of interest can be changed as desired, or if the ESCape key is hit again then Step 6 will be encountered.
6. Once the last channel of data has been entered, this prompt is shown again:

VIEW/EDIT: (P-T-T TIME-OUT TIMER)

This allows the user to review the data he just entered (if RETURN key hit) or he can proceed to another section (if LF key hit).

NOTE:

If 0.0 choice is entered, this means that that particular TOT is disabled (i.e. infinite TOT)

LVL 8.5 VIEW/EDIT=(RPTR DROP-OUT DELAY)

If the user hits the RETURN key, he can view/edit the Repeater Drop-Out Delay (DOD) values.

The user can pick which channel number to view/edit if he desires.

The user will have a number of Repeater DOD values to choose from. In order for the user to view the DOD value choices, he can push the LINE FEED key or the BACK SPACE key. The LF key will cause the next higher DOD value to be displayed. The BS key will cause the next lower DOD value to be displayed. When the desired DOD value is displayed, he can push the RETURN key which will allow the displayed value

to be programmed into the codeplug image.

There are 8 possible DOD values to choose from. For the typical Base Time of 1 second, the 8 choices are: 0, 1, 2, 3, 4, 5, 6, and 7 seconds.

1. The user is asked which channel of information is to be viewed first. Channel Number 1 is shown initially:

CHAN(XXX)

where XXX=001 initially.

2. Now the user is shown the existing value:

CHAN-XXX RPT-DOD (4.0) SECONDS

Then the user selects the desired Repeater Drop-Out Delay Value for that channel.

3. Step 2 is repeated for all existing channel numbers; when the last channel of data has been entered, Step 4 will be encountered. It is possible to break this cycle by pushing the ESC key. This will cause Step 1 to be encountered with XXX = current channel number. At that point, if the ESC key is hit again then Step 4 will be encountered.

4. This display will appear again:

VIEW/EDIT=(RPTR DROP-OUT DELAY)

This allows the user to review the data he just entered (if RETURN key hit) or he can proceed to another section (if LINE FEED key hit).

LVL 8.6 VIEW/EDIT: (P-T-T PRIORITY INFO)

If the user picks this choice, he can view and/or edit the Push-To-Talk Priority information in the codeplug. The user can pick the Channel to view first and then select the Priority desired.

Step 1. The user is asked which channel is to be viewed first with this prompt:

CHAN(0 01)

Step 2. Then the user is shown the current PTT Priority information and allowed to change it via this prompt:

CHAN-001 PTT PRIORITY(WRL)

By using the LINE FEED and BACK SPACE, the user can scroll thru all the possible Priority choices. Then a RETURN will select the current choice. The possible choices are:

WRL, WLR, RWL, RLW, LWR, LRW, WL, LW, RW, WR, RL, LR, W, R,
L, OFF, ---

where

W stands for Wire-Line PTT.

L stands for Local PTT.

R stands for Repeater PTT.

OFF means no PTTs are allowed.

---means an unrecognized combination is in the codeplug.

Entering this choice will not change the contents of the codeplug image.

If a letter is not shown, then that PTT isn't allowed. The left-most letter indicates 1st priority.

After making a choice, the channel number is incremented and Step 2 is repeated for the new channel. Once all channels have been viewed, control passes back to Level 8.6.

LVL 8.7 VIEW/EDIT: (REPEATER CONTROL)

If the user selects viewing and editing the repeater control information in the codeplug, the user can pick the channel to view first. Then he can select the conditions needed to activate and hold a repeater PTT.

Step 1. The user is asked which channel is to be viewed first with this prompt:

CHAN(0 01)

Step 2. Then the user is shown the current repeater control information for activating a PTT and allowed to change it.

This prompt is shown:

CHAN-001 RPT ACT(SCAD)

By using the LINE FEED or BACK SPACE, the user can scroll thru all the possible control choices. Then a RETURN will select the current choice that determines what is needed to activate a Repeater PTT. The 16 possible choices are:

SCAD, SCD, SAD, CAD, CD, AD, SCA, SC, SA, CA, S,C,A, OFF, ON,---

where

S stands for Repeater (Carrier) Squelch needed

C stands for Coded Squelch needed

A stands for Auxiliary Detect needed

D stands for RX PL DS switch causes the PTT to revert to Carrier Squelch operation

OFF means ~~RPT not allowed~~ (to Activate or Hold depending on the field)

ON means Repeater is ~~ON~~ always

---means that the codeplug contains an unrecognized combination. If this choice is entered, it will not change the contents of the codeplug image.

Step 3. Then the user is shown the current Repeater Control information for holding a PTT, and allowed to change it thru this prompt:

CHAN-001 RPT ACT-SCAD HOLD (SCAD)

This data is entered in the same manner as is ACT.

After the user makes a choice, the channel number is incremented and Step 3 is repeated for the new channel. Once all channels have been viewed, control passes to Level 8.7.

LVL 8.8 VIEW/EDIT: (RCVR AUDIO CONTROL)

If the user selects this choice, he can edit the receiver control information in the codeplug. The user can pick the channel to view first. Then he can select the conditions needed to open the receiver audio gate.

Step 1. The user can pick which channel is to be viewed first with this prompt:

CHAN(0 01)

Step 2. Then the user is shown the current receiver control information for gating RX1 audio, and is allowed to change it. This prompt is shown:

CHAN-001 RCVS AUDIO(SCA)

By using the LINE FEED or BACK SPACE, the user can scroll thru all the possible control choices. Then a RETURN will select the current choice that determines what is needed to gate Receiver Audio. The 10 possible choices are:

SCA, SC, SA, CA, S, C, A OFF, ON, ---

S stands for RX1 Audio (Carrier) Squelch needed

C stands for Coded Squelch needed

A stands for Auxiliary Detect needed

OFF means receiver audio not allowed to be gated

ON means that receiver audio is always gated

--- means that an unrecognized combination is in the codeplug. If this choice is entered, it will not alter the codeplug image.

After making a choice, the channel number is incremented and Step 2 is repeated for the new channel. Once all channels have been viewed, control passes to Level 8.8.

LVL 8.9 VIEW/EDIT: (TX AUDIO/DATA MIXING)

If the user selects this choice, he can view and/or edit the data

in the codeplug that determines which transmit audio sources can mix with external data.

Step 1. The user can decide which channel of information is to be viewed first. Channel 1 is shown to the user initially:

CHAN (0 01)

Step 2. The user can then decide whether line audio can mix with external data. The user will be shown what currently exists in the codeplug.

The display appears like this:

CHAN-001 MIX LIN WITH DATA?(YES)

Step 3. The user can decide whether local audio can mix with external data.

CHAN-001 MIX LOC WITH DATA? (YES)

Step 4. The user can decide whether repeater audio can mix with external data.

CHAN-001 MIX RPT WITH DATA?(NO)

Steps 2, 3 and 4 are repeated over and over until all channels are viewed.

Once the last channel of data has been entered, control passes to Level 8.9.

LVL 8.10 VIEW/EDIT: (AUTO ID CALLSIGNS)

If the user selects this choice he can view and/or edit the Auto ID Call sign data in the codeplug.

The user can pick which channel of info to view first. Then he can type in the Call Sign for that channel.

Step 1. The user can decide which channel of information is to be viewed first.

CHAN(0 01)

- Step 2. The user can decide what Call Sign should be signalled for this channel. The user will be shown what currently exits in the codeplug.

The display appears like this:

CHAN-001 CALLSIGN(X YZ123)

To disable the ID for a specific channel, the user would enter a blank call sign. This could be done by using Control-X to erase the displayed Call Sign, and then hitting RETURN to enter the blank field. If a channel is disabled already, a blank Call Sign field would appear on the display.

The user, in effect, remains in Step 2 until the remaining Call Signs have been entered, then control is passed back to Level 8.10.

LVL 8.11 VIEW/EDIT: (ALARM TONES ROUTING)

If the user selects this choice, he can view and/or edit the Alarm Tone Routing information in the codeplug.

The user can pick which channel of information to view first. Then he can select where Alarm Tones are to be sent for that channel.

- Step 1. The user can decided which channel of information is to be viewed first. The display appears like this:

CHAN(0 01)

- Step 2. The user can select whether Alarms can be sent Over-The-Air for this channel. The user will be shown what currently exits in the codeplug. The display appears like this:

CHAN-001 OVER-THE-AIR (DISABLED)

The alternate choice is "ENABLED". The user can cycle between the two choices and then select the desired choice.

Step 3. The user selects whether alarms can be sent Over-The-Wireline for this channel. The user will be shown what currently exists in the codeplug. The display appears like this:

CHAN-001 OVER-WIRELINE(ENABLED)

The alternate choice is "DISABLED".

Steps 2 and 3 are repeated until the information for the remaining channels has been entered. Then control passes back to Level 8.11.

LVL 8.12 VIEW/EDIT: (DC REMOTE CURRENTS)

If the user hits the RETURN key, he can view/edit the number of DC consoles that are connected to the base station, and the functions of the 6 DC currents for the detect and undetect states.

This prompt is displayed:

1. NUMBER OF DC CONSOLES (1)

The initial displayed value is the value that exists in the codeplug RAM image. The user is allowed to choose up to 6 consoles.

The user can change the existing value by doing the following:

- Push the LF or BS key as many times as needed to get the desired value on the display.
- Then push the RETURN key to register the desired value in the codeplug RAM image.

This message is then displayed while the DC Remote Table in the codeplug RAM image is being scanned:

SCANNING DC REMOTE TABLE

The user is then given a choice for the DC current functions that need to be viewed or edited. Twelve possible choices exist (6 currents with each current having a detect state and an undetect state). Initially the user will be prompted with the +12.5 DET state. The user can view the other available choices by pushing the LINE FEED key or the BACK SPACE key. The LF key will cause the next current to be displayed. When the desired current level is displayed, push the RETURN key to program the desired functions for that current into the codeplug RAM image. For that current, the user can enter up to 8 commands (or functions). After the user enters the eighth command, the next current will be prompted and the same process can be repeated for that current. The user can also exit that current by typing NULL (or NUL) or by hitting the ESC key. The NULL entry will allow the next current to be prompted without having to type in all eight commands. The ESC key will allow access to the same current. At that point, the LF and BS keys can be used again.

Now the user is asked which DC current needs to be viewed/edited:

2. (+12.5 MA DET)

The user can change the existing value by doing the following:

- Push the LF or BS key as many times as needed to get the desired value on the display.
- Then push the RETURN key to register the desired value in the codeplug RAM image.

The resultant display now looks like:

3. +12.5 MA DET CMD-X(HN 2)

where is the cursor location.

and where x=1, initially. Range is 1 to 8 commands.

The user can now enter, thru a data entry, a different

function for that command number if he wishes to alter the existing function.

REFER TO STIC 386 FORM FOR LIST OF COMMANDS AVAILABLE. THESE COMMANDS ARE EXPLAINED IN DETAIL IN THE MSF5000 PRODUCT PLANNER.

Then when the user pushes the RETURN key, the following could happen:

- o If the entry is illegal, then this message will be displayed:

ILLEGAL DATA ENTERED

Then the same prompt will occur so that the user can fix his mistake.

- o If the entry is legal, then it will be programmed into the codeplug RAM image, and this will be displayed:

+12.5 MA DET CMD-X(K EY ON)

where now X=X+1

Now the user can repeat Step 3 until all 8 commands have been entered, or he can exit the loop by doing one of the following:

- o Enter NULL or NUL as a command (Step 5 is next)
- o Press the RETURN key when a blank command exists (Step 5 is next)
- o Press the ESC key (Step 2 is next)

5. Now the next current choice will be displayed. There are 12 current choices in all:

+12.5 MA DET and +12.5 MA UND

+ 5.5 MA DET and + 5.5 MA UND

+ 2.5 MA DET and + 2.5 MA UND

- 2.5 MA DET and - 2.5 MA UND

- 5.5 MA DET and - 5.5 MA UND

-12.5 MA DET and -12.5 MA UND

The user can now repeat Steps 3 & 4 for all 12 choices if he wishes to. When the choices are expired, Step 6 is accessed.

6. This display will be shown again:
SCANNING DC REMOTE TABLE

Then this display will be shown again:
VIEW/EDIT: (DC REMOTE CURRENTS)

This display is also shown when the ESCape key is hit once (if in Step 2) or twice (if in Step 4).

NOTE:

When the NULL function is entered for a command number, that command number and all subsequent command numbers become null. Therefore, NULL should only be used when no more commands are to be entered after that point for that particular current.

When the user is viewing the commands of a particular current and a blank field is encountered, then that indicates that the commands for that current have expired.

LVL 8.13 VIEW/EDIT: (MUXBUS POWER-UP)

If the user hits the RETURN key, he can view/edit the commands for the MUXBUS power-up state. The user can enter up to 16 commands.

This prompt will be displayed:

RESET COMMAND-XX(C HN 1)

where - is the cursor location.

and XX=1 initially. Range is 1 to 16 commands.

The user can now enter a different function for that command number if he wishes to alter the existing function.

Then when the user pushes the RETURN key, the following could

happen:

- If the entry is illegal, then this message will be displayed:
ILLEGAL DATA ENTERED

Then the same prompt will occur so that the user can fix his mistake.

If the entry is legal, then it will be programmed into the codeplug RAM image, and this will be displayed:

RESET COMMAND-XX(RPT OFF)

where now $XX=XX+1$

Now the user can repeat the above process until all 16 commands have been entered or he can exit the loop by doing any one of the following:

- Type in NULL or NUL as a command
- Hit the RETURN key when a blank command is shown
- Hit the ESC key

NOTE:

When the NULL function is entered for a command number, that command number and all subsequent command numbers become null. Therefore, NULL should only be used when no more commands are to be entered after that point.

LVL 8.14 VIEW/EDIT: (SPECTRA-TAC INFO)

If the user hits the RETURN key, he can View/Edit the Spectra-TAC station type in the following manner:

The user is first shown the current station type for Spectra-TAC operation, (this will normally not require change from default). This prompt is shown:

SPECTRA-TAC STATION TYPE (RPTR)

By using the LINE FEED or BACK SPACE, the user can scroll thru

the two possible choices. Then a RETURN will select the current choice. The two choices are:

RPTR - For Spectra-TAC Repeater Stations

BASE - For Spectra-TAC Base Stations

Note: For stations without Spectra-TAC the default station type will always be RPTR.

LVL 8.15 VIEW/EDIT: (MCS STATION INFO)

If the user hits the RETURN key, he can View/Edit the MCS (Multi-Coded Squelch) station data in the codeplug that determines if MCS is present in the station. This is done in the following manner:

The user is first shown the current status of the MCS data, (this will normally not require change from default). This prompt is shown:

MCS STATION OPERATION? (YES)

By using the LINE FEED OR BACK SPACE, the user can scroll thru the two possible choices. Then a RETURN will select the current choice. The two choices are:

YES - For MCS present in the station.

NO - For MCS not present in the station.

LVL 8.16 VIEW/EDIT: (RA STATION INFO)

If the user hits the RETURN key, he can View/Edit the status of the RA in-cabinet repeat data in the following manner:

The user is first shown the current status of the in-cabinet repeat data (this will normally not require change from default). This prompt is shown:

RA: IN-CABINET REPEAT? (YES)

By using the LINE FEED or BACK SPACE, the user can scroll thru the two possible choices. Then a RETURN will select the current choice. The two choices are:

YES - For Full Duplex wireline operation

NO - For Half Duplex wireline operation

10.2 MULTI-CODED SQUELCH CODEPLUG PROGRAMMING

Version 6 of the MSF 5000 codeplug programming adds the capability of completely programming the codeplug for the Multi-Coded Squelch (MCS) module. This includes setting up the codeplug from model/options defaults and programming the codeplug thru either the codeplug adapter module or the serial port interface of the module.

WARNING

The RTL-5817B codeplug adapter must be used when programming the 51R90013B01 codeplug for MCS. If the RTL-5817B is not used, permanent damage to the MCS codeplug may result.

To access the MCS codeplug programming, the MCS option C0369 must be entered as an option for the station. This is done at LVL 3.0 of the original release. (See the instruction 10.1 section for the original release). This follows the entry of the station model number, with the following prompt:

ENTER/EDIT OPTIONS: C(0000)

At this point the C0369 option is entered:

ENTER/EDIT OPTIONS: C(0369)

Followed by a RETURN to complete the entry. After entering all other options, level 3 is left and level 4 for printing the options is entered. The procedure for level 4 is the same as in earlier

versions. NOTE: For the Station Control and MCS codeplugs to be setup correctly, all options which affect the codeplugs must be entered. This includes, in particular, the options which specify the number of channels for the station.

LVL 5.0 In this level, the user chooses which codeplug in the MSF 5000 station is to be worked with. He is first given the prompt

CODEPLUG (STATION CONTROL/U803)

If the user hits the RETURN key, then the station control codeplug is chosen. If the user hits the LINE FEED key, the other codeplugs which can be worked with are displayed. For MCS codeplugs hit RETURN at the following prompt:

CODEPLUG (MCS / U1405)

LVL 6.0 The user is given the choice of how he wants to setup the initial codeplug image in the R-1800 RAM. He is given the choices:

SETUP (USING PREVIOUS CONTENTS)

(This choice only appears if a codeplug image already exists in the R-1800 RAM).

If this choice is picked, go to 6.1

SETUP (USING MODEL / OPT DEFAULTS)

If this choice is picked, go to 6.2

SETUP (FROM SERIAL PORT CABLE)

If this choice is picked, go to 6.3

SETUP (FROM R-1801 READER SOCKET)

If this choice is picked, go to 6.4

LVL 6.1 If the codeplug image in the R-1800 RAM is to be set up from the previous contents, the RAM image in the R-1800 is left unmodified. Control proceeds to Level 7.

LVL 6.2 If the codeplug image is to be set up from the Model/Option defaults, the application software will set up a codeplug image based on the model number and options entered by the user. Control proceeds to Level 7.

LVL 6.3 If the user chooses to setup the codeplug image from an existing codeplug via the serial port cable at Level 6, these steps will be followed:

LVL 6.3a The user is shown the prompt:

INSTALL SERIAL CABLE AT I/O 6

Once the cable is installed correctly, hit RETURN, and go on to 6.3b. If the cable is not installed correctly and RETURN is hit, the user is shown:

SERIAL PORT CABLE NOT INSTALLED

and we return to 6.3.

LVL 6.3b The user is now shown the choice:

READ WITH STATION (KNOCKED DOWN)
or (OPERATIONAL)

The KNOCKED DOWN choice will disable the station during the codeplug read operation, but the read operation will take less time with this choice.

The OPERATIONAL choice allows the station to continue operating normally during the codeplug read operation. However, it takes longer for the codeplug to be read.

LVL 6.3c Once the choice above is made, the reading of the codeplug begins and the user is shown:

READING CODEPLUG - STANDBY X

Where X counts from 0 to 9 to show the user that the program is active. If the full read operation is carried out successfully, proceed to 6.3d. However, if during the codeplug read operation either a data fault on the line occurs or the user hits the ESC key, the read operation will stop and the user is shown the display

READ ERROR (TRY AGAIN)
OR (ABORT)

If the user chooses TRY AGAIN, the read operation will resume at the point where the error occurred.

If the ABORT choice is chosen, we return to Level 6.

LVL 6.3d A test is now done to make sure that the codeplug being read was programmed properly. If it's OK, proceed to 6.3e.

If it was not, the user is given the display
CHECKSUM IS BAD (TRY AGAIN)
or (CONTINUE)
or (ABORT)

If TRY AGAIN is chosen, return to 6.3a.

If ABORT is chosen, return to Level 6.

If CONTINUE is chosen, proceed to 7.0.

Note: If CONTINUE is chosen the operation of the program may not be predictable, and the user should proceed with caution.

LVL 6.4 If the user chooses to set up the codeplug image from an existing codeplug via the adapter module at level 6 he will go through these steps:

LVL 6.4a The user is shown the prompt:

INSTALL CODEPLUG IN SOCKET

he should do so and then hit RETURN.

A test is now done to make sure that all the hardware is set up correctly. If it is, proceed to 6.4b.

If there is something wrong with the setup, the user is told.

READER OR ADAPTER NOT INSTALLED

At this time the user should check to see that the reader/programmer module is installed with connections made from J1 and J2 on the reader/programmer module to I/01 and I/02 on the R-1800, respectively, and that the accessory power cord in the top case is connected to the "Acc. Pwr." connector on the R-1800. Also, the RTL-5817B adapter module must be installed on the reader/programmer. Once these hardware connections are corrected, press RETURN and proceed to 6.4b.

LVL 6.4.b User indicates type of codeplug to be used via this dialogue:

CODEPLUG TYPE (51R90012B01-2816A)

OR

CODEPLUG TYPE (51R90002B02-2732A)

OR

CODEPLUG TYPE (51R90002B01-2732)

IMPORTANT NOTE

Permanent damage to the codeplug may result if the incorrect selection is made. Initially the 2816A is the choice displayed. If the user wishes to setup from a 2732A or 2732 instead, he can select it by pressing the LF or BS key and then pressing the Return key.

LVL 6.4C The codeplug in the socket will be downloaded into R-1800 RAM. This occurs very quickly and no prompt is shown during this operation.

LVL 6.4d A test is now done to make sure that the codeplug being read was programmed properly.

If it was, proceed to 6.4e

If it was not, the user is given the display

CHECKSUM IS BAD (TRY AGAIN)

or (CONTINUE)

or (ABORT)

If TRY AGAIN is chosen go to 6.4a.

If CONTINUE is chosen, go to 6.4e.

If ABORT is chosen, go to Level 6.

(Note: If CONTINUE is chosen the operation of the program may not be predictable, and should be used with caution).

LVL 6.4e A test is now done to make sure that the codeplug read is the same type as the codeplug selected (i.e. station control or other).

If it is, continue to 7.0

If it is not, the prompt given is:

WRONG CODEPLUG (TRY AGAIN)

or (ABORT)

If TRY AGAIN is chosen, go to 6.4a

If ABORT is chosen, go to Level 6.

LVL 7.0 The user selects what action is to be taken on the current codeplug. Five actions are allowed; these are;

1. View and edit the codeplug image contents.
2. Program the codeplug image into an EPROM.
3. Verify codeplug image to EPROM.
4. Print a parameter booklet page for this codeplug.

5. Do nothing else with this codeplug (go to another).

The above actions are prompted as shown in the menu format below. A LINE FEED or BACK SPACE cycles the program through these prompts. When the desired action is displayed, press RETURN.

LVL 7.1) ACTION: (VIEW/EDIT CONTENTS)

LVL 7.2) ACTION: (PROGRAM CODE PLUG)

LVL 7.3) ACTION: (VERIFY CODE PLUG)

LVL 7.4) ACTION: (PRINT PARAMETER BOOKLET)

LVL 7.5 ACTION: (DONE WITH CODE PLUG)

LVL 7.1 If the user wants to view and/or edit the contents of the codeplug RAM image, he does so by choosing the VIEW/EDIT action which brings him here. He is then sent into Level 8.

LVL 7.2 ACTION: (PROGRAM CODE PLUG)

If the user hits the RETURN key, then he will be able to program a codeplug. The user is offered two methods of programming the codeplug, via the R-1801 socket via the serial port cable. The first choice is:

PROGRAM METHOD (R-1801 SOCKET)

If a return is pressed at this point, the user will program via the R-1801 socket, LVL 7.2.1. If a Line Feed is pressed the serial port choice will be displayed:

PROGRAM METHOD (SERIAL PORT)

If a return is pressed at this point the user will program via the serial port, LVL 7.2.2.

LVL 7.2.1 Program via R-1801 Socket

WARNING

The RTL-5817B Adapter must be used when programming the 51R900013B01.

Only the 51R90002B01 or 51R90002B02 (Motorola Part numbers) 4K X 8 EPROMS can be programmed via the RTL-5817A adapter module.

The hardware is checked to make sure that the adapter module and the cables are installed. If not, then this prompt is given:

SET UP HARDWARE

The user will not be able to proceed until the hardware is completely setup.

Now the user is told to insert the code plug in its socket via this prompt:

INSERT CODE PLUG IN ADAPTER

User indicates type of codeplug to be used via this dialogue:

CODEPLUG TYPE (51R90013B01-2816A)

OR

CODEPLUG TYPE (51R90002B02-2732A)

OR

CODEPLUG TYPE (51R90002B01-2732)

IMPORTANT NOTE

Permanent damage to the codeplug may result if the incorrect selection is made. Initially the 2816A choice is displayed. If the user wishes to program a 2732A or 2732 instead, he can select it by pressing the LF or BS key and then pressing the RETURN key.

Next, a blank test is done on the 2732A and 2732.

If not blank, this prompt is displayed:

NOT BLANK - PROCEED? (YES)
or (NO)

A YES will allow the user to proceed. This means that the EPROM can possibly still be programmed even if not erased (this has practical application). A NO answer or an ESCape will allow user to put in another codeplug.

NOTE: There is no need to verify the programmed codeplug via the VERIFY dialouge. The codeplug is verified automatically after it is programmed.

LVL 7.2.2 If the user chooses to program the codeplug via the serial port this prompt is shown:

INSTALL SERIAL CABLE AT I/O 6

If he installs the cable correctly and then hits RETURN go on to 7.2.2A. If the cable is not installed correctly and RETURN is hit, the user is shown:

SERIAL PORT CABLE NOT INSTALLED

and we return to 7.2.2.

LVL 7.2.2A The programming of the codeplug begins (the station is not operational during programming) and the following is displayed:

PROGRAMMING CODEPLUG STANDBY X

Where X counts from 0 to 9 to show the user that the program is active. If the full programming operation is carried out successfully, proceed to 6.3d. However, if during the codeplug programming operation either a data fault on the line occurs or the user hits the ESC key. The programming will stop and the user is shown the display:

PROGRAMMING ERROR (TRY AGAIN)
or (ABORT)

If the user chooses TRY AGAIN, the programming will resume at the point where the error occurred.

If the ABORT choice is chosen, we return to Level 7.2

ACTION: (VERIFY CODE PLUG)

If the user hits the RETURN key, he will be able to verify that the codeplug RAM image matches the contents of the codeplug in the adapter module, or via the serial port.

The user may select the method of verify the codeplug; two choices are allowed: via the R-1801 socket or via the the serial port cable. The first choice is:

VERIFY METHOD (R-1801 SOCKET)

If a RETURN is pressed at this point, the user will verify via the R-1801 socket, LVL 7.3.1. If a LINE FEED is pressed the serial port choice is displayed:

VERIFY METHOD (SERIAL PORT)

If a RETURN is pressed at this point the user will verify

via the serial port LVL 7.3.2.

LVL 7.3.1

If the user chooses to verify the codeplug via the R-1801 socket, a hardware check is made to make sure that the Adapter module is in and the cables are installed. If not, then this prompt is given:

1. SET UP HARDWARE

The user will not be able to proceed until the hardware is completely set up.

The user is told to insert the programmed codeplug in its proper socket via this prompt:

2. INSERT CODEPLUG ADAPTER

Next, the user must indicate the type of codeplug to be used via this dialogue:

3. CODEPLUG TYPE (5190013B01-2816A)

OR

CODEPLUG TYPE (5190002B02-2732A)

OR

CODEPLUG TYPE (5190002B01-2732)

IMPORTANT NOTE

Permanent damage to the codeplug may result if the incorrect selection is made. Initially, the 2816A choice is displayed. If the user wishes to verify a 2732A or 2732 instead, he can select it by pressing the LF or BS key and then pressing the RETURN key.

4. CODE PLUG BEING VERIFIED

5. When the verification is complete, the user will

get a message indicating whether or not the codeplug was programmed correctly via these messages:

VERIFY COMPLETE

OR

DOES NOT VERIFY

The first message will only appear for one second and then step 6 will be accessed.

The second message is accompanied by a momentary bell to alert the user that the codeplug did not verify correctly. It will stay on the screen until the user pushes another key. This will take him to step 6.

6. This prompt is shown again:

ACTION: (VERIFY CODE PLUG)

At this point, the user can elect to repeat the above process by pushing the RETURN key, or he can view other ACTION possibilities by pushing the LINE FEED and/or BACK SPACE keys.

LVL 7.3.2 If the user chooses to verify the codeplug via the serial port this prompt is shown:

INSTALL SERIAL CABLE AT I/O 6

If he installs the cable correctly and then hits RETURN go on to 7.3.2A. If the cable is not installed correctly, and RETURN is hit, the user is shown:

SERIAL PORT CABLE NOT INSTALLED

LVL 7.3.2.A The user is now shown the choices:

READ WITH STATION (KNOCKED DOWN)
or (OPERATIONAL)

The KNOCKED DOWN choice will disable the station during the codeplug read operation, but the read operation will take less time with this choice.

The OPERATIONAL choice allows the station to continue operating normally during the codeplug read operation, however, it takes longer for the codeplug to be read.

LVL 7.3.2.B Once the choice above is made, the reading of the codeplug begins and the user is shown:

VERIFYING CODEPLUG-STANDBY X

Where X counts from 0 to 9 to show the user that the program is active. If the full read operation is carried out successfully, proceed to 7.7.2.C.

LVL 7.3.2.C When verification is complete, the user will get a message indicating whether or not the codeplug was programmed correctly via these messages:

VERIFY COMPLETE
OR
DOES NOT VERIFY

The first message will only appear for one second and then step 7.3.2.D will be accessed.

The second message is accompanied by a momentary bell to alert the user that the codeplug did not verify correctly. It will stay on the screen until the user pushes another key.

LVL 7.3.2.D This prompt is shown again.

ACTION: (VERIFY CODE PLUG)

At this point, the user can elect to repeat the above process by pushing the RETURN key, or he can view other ACTION possibilities by pushing the LINE FEED and/or BACK SPACE keys.

LVL 7.4 ACTION: (PRINT PARAMETER BOOKLET)

If the user hits the RETURN key, then he will get a printout of the MCS parameters.

1. The user is asked if he wants a printout of the parameter booklet:

PRINT PARAMETER BOOKLET? (YES)
or (NO)

If the user chooses NO, then return to LVL 7.4.
If the user chooses YES, then this prompt will follow:

2. PREPARE PRINTER AT TOP OF FORM

Now the program pauses until any key is pressed. If the ESCape key is hit, then Setp 1 will be accessed again. Hitting any other key will allow the printer to initialized. If the printer is not ready, or if the cable is not connected, then an error will be indicated via this display:

PRINTER NOT ON LINE AT I/O 5

Now, if the user hits any key (except ESCape) then Step 2 will be repeated.

3. Now that the printer is set up, the following prompts will appear:

SERIAL NUMBER = ()

The user can enter the serial number or he could skip it by hitting the RETURN key immediately.

NOTES = ()

Any entry will be accepted.

At this point, the Serial # and the comments line are printed. If the ESCape key is hit during the printing, then the printing is aborted and Step 1 is accessed again; other wise, Step 4 is accessed.

While the printer is printing this message is being displayed.

PRINTING

If the ESCape key is hit while the printer was printing, then this message will appear for about 1 seond, and then Step 1 will be accessed again:

PRINTING ABORTED

4. Now the printer prints the data for the parameter booklet. After all the printing is done, the printer is automatically set up at Top of Form.
5. When the printing is done, this prompt is shown again:

ACTION: (PRINTER PARAMETER BOOKLET)

At this point, the user can elect to repeat above process by pushing the RETURN key, or he can view other

ACTION possibilities by pushing the LINE FEED and/or BACK SPACE keys.

LVL 7.5 If the user is done with a code plug and wants to work on another one, he can choose the "DONE WITH CODE PLUG" action. This will return him to this prompt:

CODE PLUG (MCS/U1405)

Which is a Level 5.

LVL 8.0 The user will initially be prompted with this:

VIEW/EDIT: (USER PL/DPL CODES)

The user can look for other parameters to view edit by hitting the LINE FEED or BACK SPACE keys as often as necessary. When the user wishes to view/edit a particular parameter, he hits the RETURN key. When all choices have been displayed the display will return to the ACTION LVL 7.1. The parameters which can be view/edited are:

- 1) User PL/DPL codes
- 2) Active MCS channels

LVL 8.1 VIEW/EDIT: (USER PL/DPL CODES)

If the user hits the RETURN key, he enters LVL 9.0 which allows him to view/edit the current PL/DPL codes or add a new set of PL/DPL codes.

LVL 8.2 VIEW/EDIT: (MCS ACTIVE CHANNELS)

If the user hit the RETURN key, he can view/edit the active channels for MCS. The user can pick which channel number to view/edit if he desires. Then the current status for that channel will be displayed, normally this data will not need to be changed from default. The following prompt is

displayed:

CHAN (001)

At this point a new channel may be selected by entering that channel. Once the channel is entered a RETURN is pressed and the data for the channel will be displayed as follows:

CHAN (XXX) MCS ACTIVE? (YES)

Where XXX is the channel selected. By pressing the LINE FEED or BACK SPACE the user may scroll between the two choices:

YES - MCS active for this channel

NO - MCS inactive on this channel

To select the choice the RETURN key is pressed. After all possible channels have been displayed, the initial view/edit prompt will be displayed. For default, codeplugs channels 1-15 will be displayed.

LVL 9.0

DO: (REVIEW/EDIT ALL CODES)

If the user hits the RETURN key, he can view/edit the codes currently present within the codeplug. If there are no codes present, the display will not be changed. The user can then select whether the RX decode data is to be PL, or DPL. Next the PL, DPL or CSQ encode can be selected. Followed by whether the RX code is enabled or disabled. A user can be deleted from the list by entering DPL (000) as RX code. The data for each set of codes is displayed as follows:

At each step a carriage return will select the current display, selection may be thru LINE FEED or BACK SPACE or data entered.

Step 1: The current PL or DPL RX data is displayed and may be changed.

RX (PL)

Step 2: The current RX code is displayed and may be changed.

RX-PL (7A)

Once a code is entered, then;

- 1) If the data are zeros, that set of codes is deleted from the list of RX codes.
- 2) If a previously defined RX code is entered then,

DUPLICATE RX CODE

will be displayed.

- 3) If an illegal code is in the data field,

ILLEGAL DATA ENTERED

will be displayed. If a warning message is given the user will be forced to correct the error.

Step 3: The current TX PL, DPL or CSQ type is displayed and may be changed.

RX-PL-7A TX (PL)

Step 4: The current TX code is displayed and may be changed. (CSQ will skip this step)

RX-PL-7A TX-PL (7A)

Step 5: The current enable/disable status of the code will displayed and may be changed.

RX-PL-7A TX-PL-7A (ENABLED)

Step 6: When RETURN is pressed this pair of codes is completed for the remaining pairs of codes. After all pairs of codes have been viewed/edited then return to LVL 8.1.

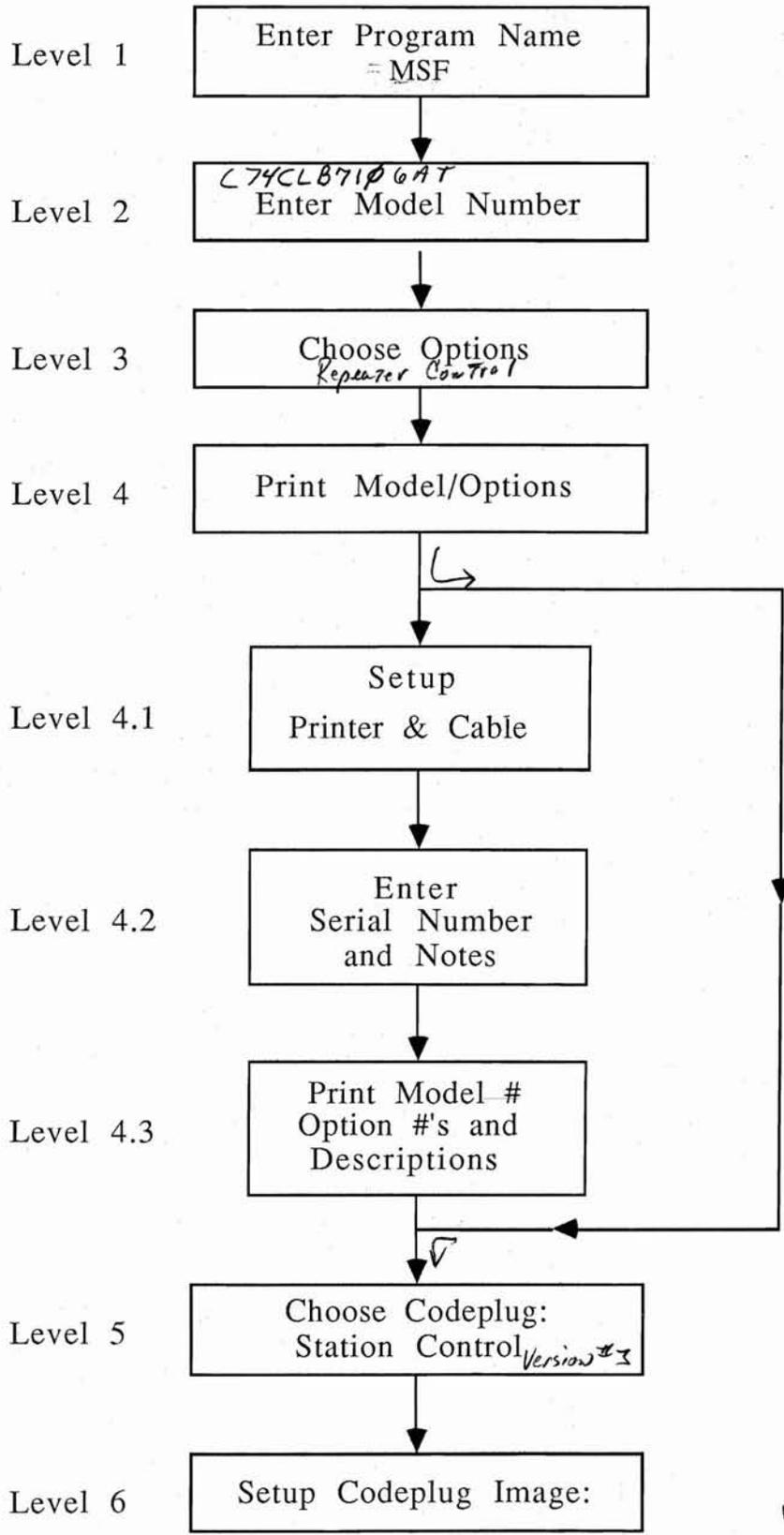
LVL 9.1 DO: (ADD ANOTHER CODE)

This allows another code to be added to the list and operates the same as Steps 1-5 above of LVL 9.0. After the data is entered return to LVL 9.1.

LVL 9.2 DO: (RETURN TO UPPER MENU)

If this selection is chosen the user will be returned to LVL LVL 8.0.

Tree Diagram



Setup using parson controls (LINE) ^{HIT} → setup (LINE) ^{HIT} Serial _{Feed} _{Feed}

Level 6

Setup Code Plug Image:

*R1801 reads Sub
Adaptive Socket*

6.1

From The Previous Codeplug Image

6.2

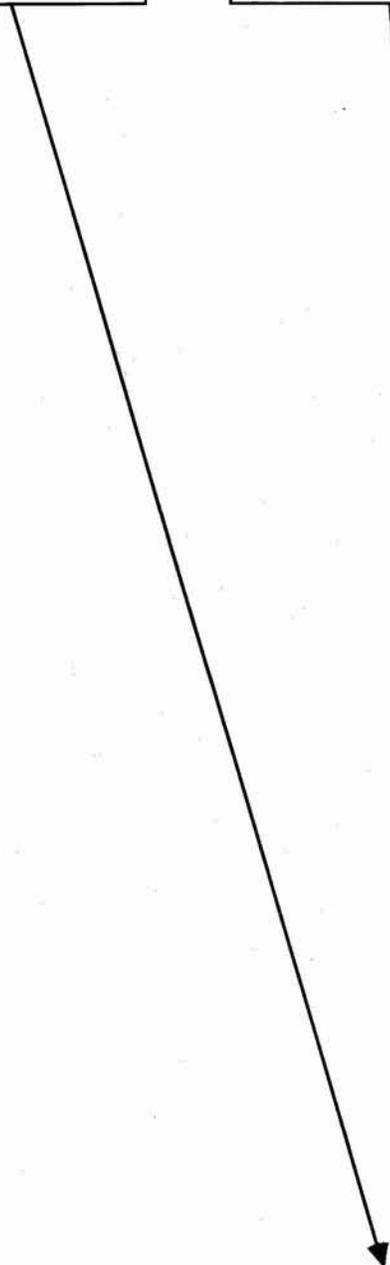
From the Default Values Based on Model # and Options entered

6.3

From Existing Codeplug via Serial Port Cable

6.4

From Existing Codeplug via Adapter Module



6.3a

Install Serial Port Cable

6.4a

Install Adapter Module and Place Codeplug into Module

6.3b

Select Station ~~Knocked-down~~ or Operational

6.4b

Codeplug is Read

6.3c

Codeplug is Read

6.4c

Codeplug's Checksum is Checked

6.3d

Codeplug's Checksum is Checked

6.4d

Codeplug Type is Checked

6.3e

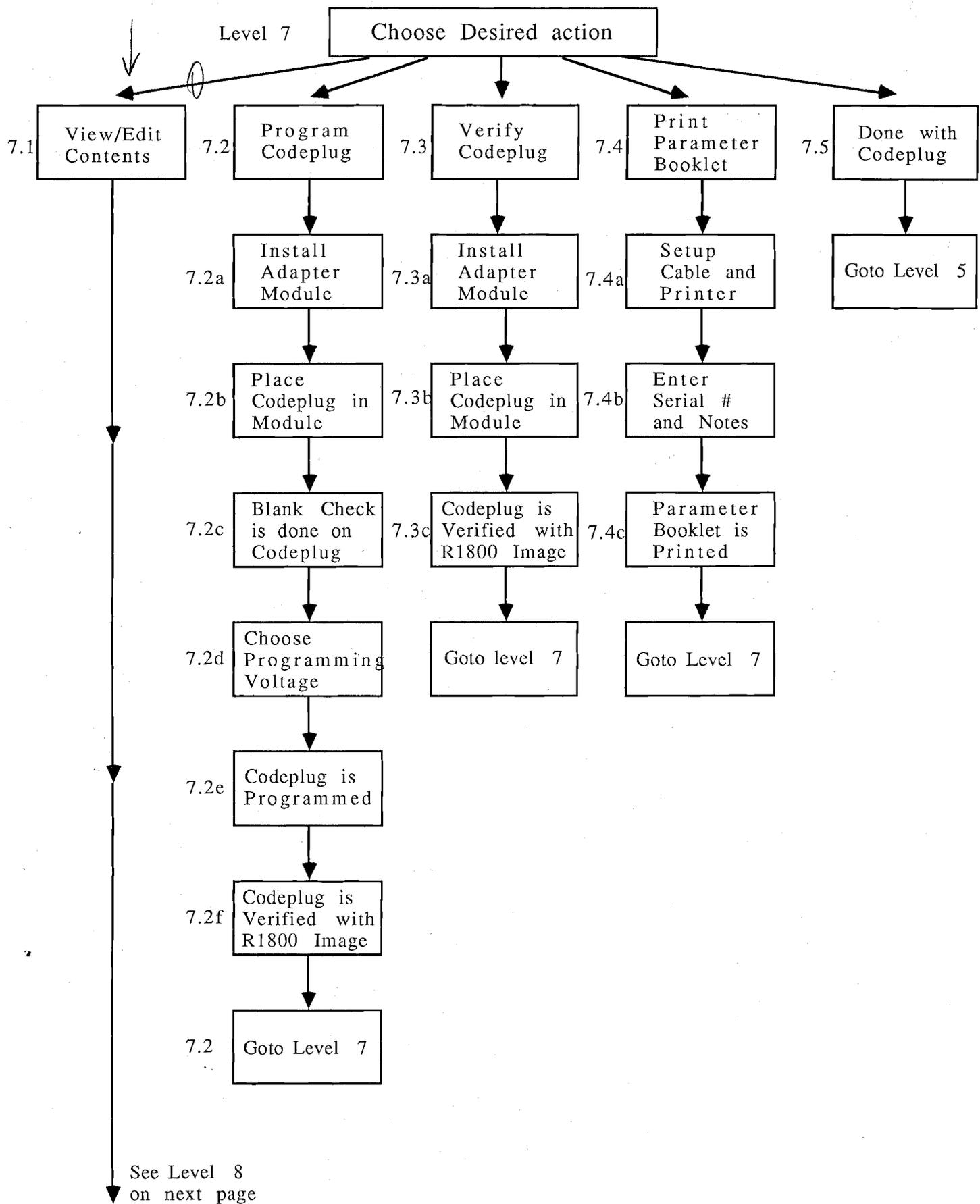
Codeplug's Version # is Checked

6.4e

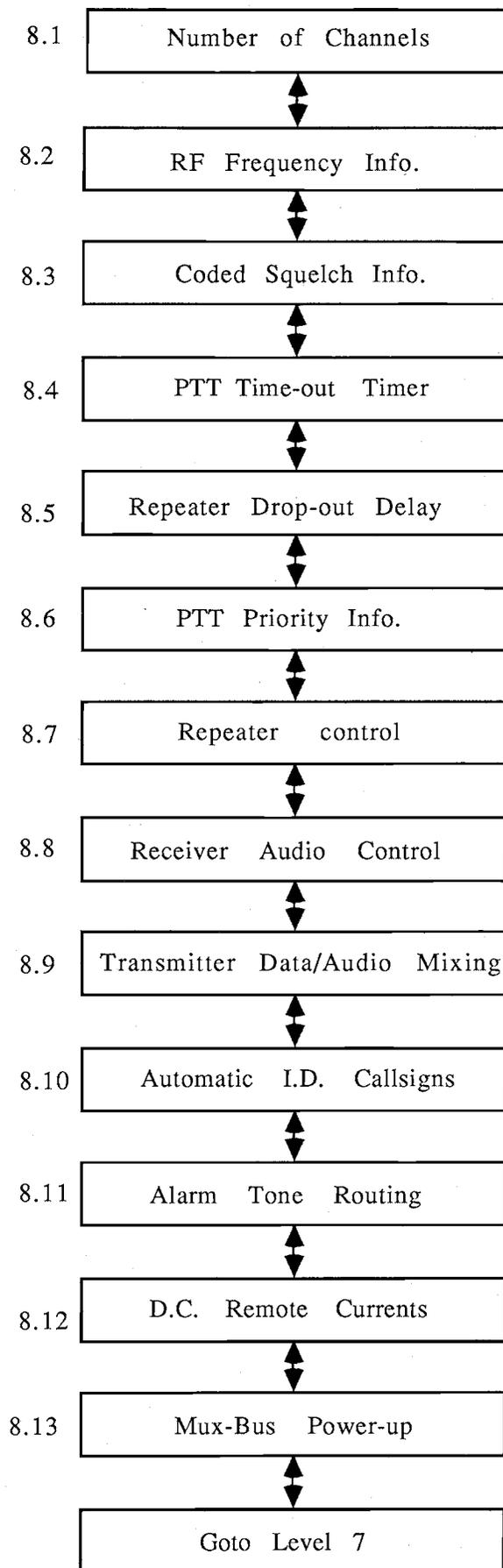
Codeplug's Version # is Checked

Level 7

Choose Desired Action



Level 8



12.

E R R O R M E S S A G E S

<u>MESSAGE</u>	<u>CAUSE</u>
4K RAM MUST BE INSTALLED	The 4K of user RAM required by this application software is not present.
ILLEGAL DATA ENTERED	The data entered is not recognized or supported by the R-1800 software and/or the MSF 5000 station control module.
NO DATA ENTERED	If displayed while viewing coded squelch, the user will be required to enter data. If displayed while viewing frequency data, it is a warning message only-no frequency is programmed.
READER OR ADAPTER NOT INSTALLED	The adapter module is missing or the wrong one is installed - occurs when attempted to download a codeplug.
ROM(S) MISSING HARDWARE ERROR	One or more R-1800 ROMs are missing and thus the user cannot proceed until all necessary ROMs are installed.

CODE PLUG XXX ROM IS MISSING

The R-1800 ROM(s) for a particular codeplug is missing.

UNRECOGNIZED -- ACCEPTED

That option number does not affect the codeplug RAM image since it is not recognized; however, it is still added to the options list.

INCOMPATIBLE -- REJECTED

That option number is not compatible with the existing model # and must be removed.

PRINTER NOT ON LINE AT I/O 5

Either the printer is not turned on, not on line, or cable is not connected to I/O 5.

PRINTING ABORTED

This is displayed momentarily whenever the printer is interrupted via the ESC key.

CHECKSUM IS BAD

This occurs when the downloaded codeplug's checksum value is not what it should be. This indicates that the to EPROM has been corrupted.

WRONG CODE PLUG

This occurs when the codeplug to be downloaded is not the correct type, e.g. attempting to download a TRC codeplug while working on station control.

SERIAL PORT CABLE NOT INSTALLED

The cable for the serial port link is not installed at I/O 6.

READ ERROR

A data collision occurred on the serial port line.

SET UP HARDWARE

All hardware is not completely setup: cable not connected to I/O 1, or cable not connected to I/O 2, or cable not connected to ACC. PWR, or correct adapter module missing.

PROGRAMMING ERROR

The EPROM did not get programmed correctly. Possibly faulty EPROM.

DOES NOT VERIFY

Downloaded codeplug does not verify with codeplug RAM image. Will not verify if codeplug is Version #1 or Version #2.

WARNING=UNKNOWN VERSION NO.

This application program is only set up to work on codeplug versions 1,2,3. The codeplug being read is not one of these versions.

13. HELPFUL HINTS

1. It is possible to duplicate channels by changing the number of user channels via the "NUMBER OF CHANNELS" dialogue. For example, by changing

the number of channels from 2 to 4, the resultant will be that channels 2, 3, and 4 are identical. Channel #2 was duplicated into channels 3 and 4.

2. When programming a number of similar codeplugs, use the following procedure to simplify the task:
 - A. Program the first codeplug via USING MODEL/OPT DEFAULTS.
 - B. Use the contents of that codeplug for the next codeplug via USING PREVIOUS CONTENTS
 - C. View/Edit the codeplug image as necessary via the VIEW/EDIT CONTENTS dialogue and then program that codeplug.
 - D. Repeat procedures B and C as necessary
3. When programming a codeplug, the "PROGRAM CODEPLUG" routine automatically checks that the codeplug is blank and also verifies that the codeplug got programmed correctly.
4. When entering the station Model #, if more than 4 digits are invalid, then the default model # is displayed as a convenience to the user.
5. The parameter booklet reflects the exact contents of the codeplug regardless of Model or option compatibility.
6. When entering options, if two or more conflicting options (i.e., C0066 and C0679) are entered, the option number that is entered last is the one that is actually used.

Only a Model vs. Options compatibility check is done. Options vs. Options compatibility is not done and therefore the user should be aware of conflicting options.
7. An extra channel is always included over and above the number of channels specified by the user and is called the "TUNING CHANNEL".

i.e., for a 4-channel station, the Tuning Channel is channel #5.

The Tuning Channel is usually used by a serviceman to test/adjust certain station functions.

Normally, the Tuning Channel is not user changeable; however, when in the "VIEW/EDIT CONTENTS" dialogue, the user can access and view/edit the Tuning Channel by directly choosing the appropriate channel number.

8. When entering RF frequency values, it is necessary that the entered value be an exact multiple of 6.25KHz or 5.00 KHz.

14. PL & DPL TABLES

14.1 VALID PL CODES

Frequency (Hz)	Code	Frequency (Hz)	Code
67.0	XZ	114.8	2A
69.3	WZ	118.8	2B
71.9	XA	123.0	3Z
74.4	WA	127.3	3A
77.0	XB	131.8	3B
79.7	WB	136.5	4Z
82.5	YZ	141.3	4A
85.4	YA	146.2	4B
88.5	YB	151.4	5Z
91.5	ZZ	156.7	5A
94.8	ZA	162.2	5B
97.4	ZB	167.9	6Z
100.0	1Z	173.8	6A
103.5	1A	179.9	6B
107.2	1B	186.2	7Z
100.9	2B	192.8	7A

These PL codes are not recommended since they are higher than the PL LPF is designed for.

Frequency (Hz)	Code
203.5	M1
206.5	8Z
210.7	M2
218.1	M3
225.7	M4
229.1	9Z
233.6	M5
241.8	M6

14.2 STANDARD DPL CODES

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

RESERVED CODES

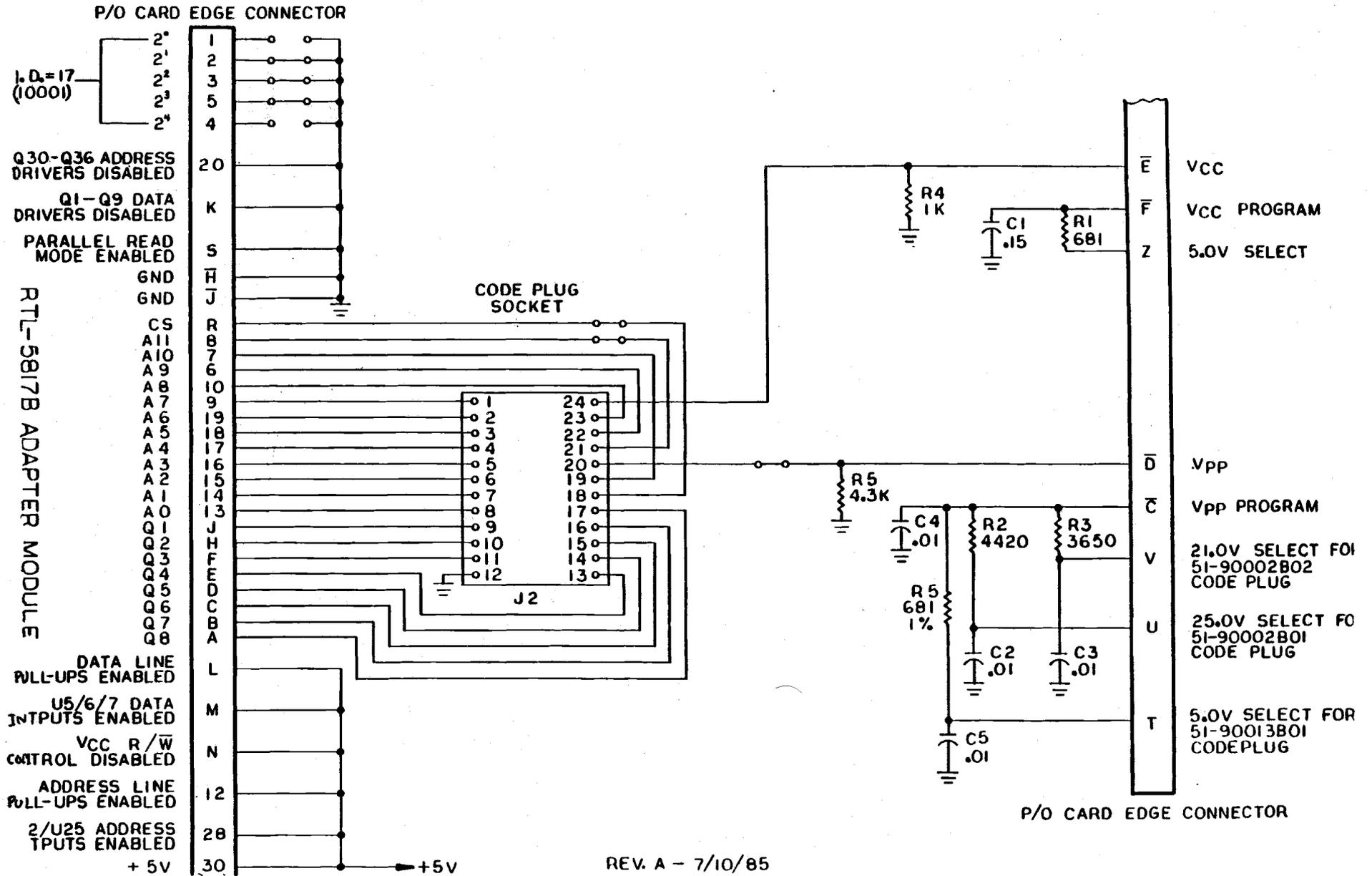
NOTE: These codes have poor quieting and falsing characteristics. Therefore, they are not normally recommended.

053	452
122	455
212	521
225	525
246	552
252	564
266	645
325	652
425	725
446	726

15. CODEPLUG ADAPTER MODULE

The adapter module provides the hardware interface between the Codeplug and the Reader/Programmer module. The adapter module consists of a printed circuit board mounted in a plastic housing, secured by four self-tapping screws. A 60-pin female connector on the bottom of the board mates with the card edge recessed in the slot of the Reader/Programmer front panel. The 24-pin Codeplug socket is lever operated for ease of insertion and extraction.

The components on the circuit board select specific programming parameters for the Codeplug. A 5-bit I.D. jumper field provides the adapter module with a unique identification of the adapter. Recognition of the I.D. by the DA/C precludes inadvertent use of another module. A schematic of the adapter module and a parts list are included on the following pages.



REV. A - 7/10/85

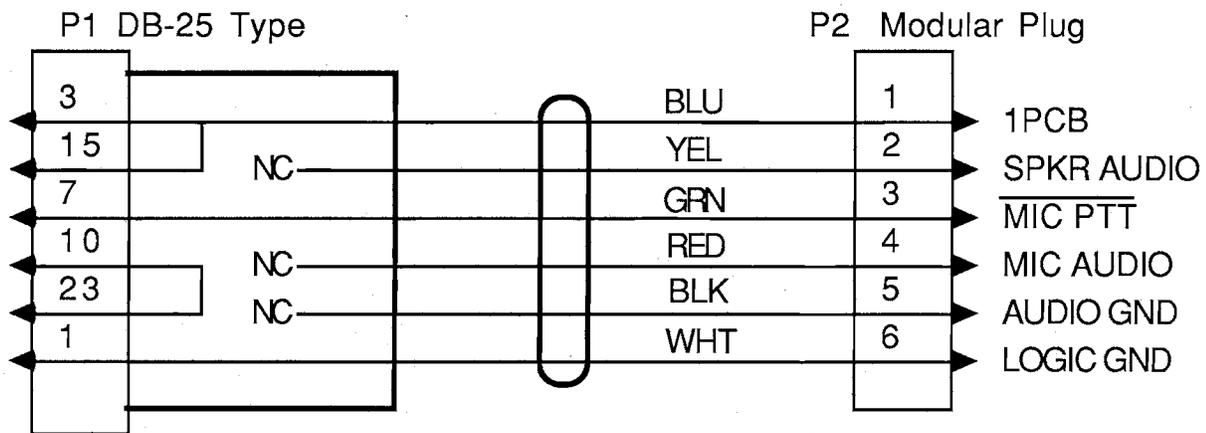
15. Parts List RTL-5817B Adapter Module

Reference Symbol	Motorola Part No.	Description
R1,R5	06-10621B78	Resistor 680 Ω FMF 1% 1/4 W
R2	06-10621C57	Resistor 4420 Ω FMF 1% 1/4 W
R3	06-10621C49	Resistor 3650 Ω FMF 1% 1/4 W
R4	06-10621C49	Resistor 1K FMF 5% 1/4 W
R5	06-00124A64	Resistor 4.3 K FC 5% 1/4 W
C1	21-84008H03	Capacitor .15uF +80/-20% 50V
C2,C3,C4,C5	21-00832501	Capacitor .01uF
Mechanical Parts		
J1	09-80347A57	Connector, Female; 60 contact
J2	09-80347A59	Socket; 24 contact
	28-80349A99	Shield (for socket)
	03-00139987	Screw, Tapping; 4-20 X 5/16 4 used
	15-80367A20	Housing
	46-80348A47	Plug, insert polarizing

RTK-4061A SERIAL PORT CABLE SCHEMATIC

DIGITAL ANALYZER/CONTROLLER
I/O PORT NO. 6

MSF 5000 STATION CONTROL
PANEL METERING SOCKET



RTK-4061A PARTS LIST

Reference Symbol	Motorola Part No.	Description
P1	28-80379A78 15-80374A87	Connector, 25-pin 'D' Type Housing, Strain Relief
W1	01-80356A23	Cable Assembly, includes P2 Modular Plug

SERIAL #:0113 060009

0113 06009
STB CL 1983
0113 06009
STB CL 1983

NOTES: SAMPLE PARAMETER BOOKLET

MODEL : C74CLB710SAT: 8PT NO COMPA 110-20 WATTS UNF
12V AC TIRI DC REM RPTR

OPTIONS : C0677 DUPLEX FLTR & TRIPLE CIRC
C0066 4 CHAN
C0393 VAR TOT
C0671 VAR DOD
C0672 CHNG PTT PRI
C0673 VAR RPTR CTRL
C0674 VAR RCVR CTRL

SERIAL #:0113 060009

0113 06009
STB CL 1983
0113 06009
STB CL 1983

NOTES: SAMPLE PARAMETER BOOKLET

PARAMETER TABLE

	CHAN 001	CHAN 002	CHAN 003	CHAN 004	TUNE CHAN
TX. FREQ.	464600.00	464600.00	464600.00	464500.00	464530.00
RX. FREQ.	469600.00	469600.00	469600.00	469500.00	469530.00
TX. CODE	1A	464	2B	1A	031
RX. CODE	1A	464	2B	1A	031
LIN. TOT	0.0	0.0	0.0	0.0	0.0
LOC. TOT	0.0	0.0	0.0	0.0	0.0
RPT. TOT	30.0	60.0	0.0	60.0	0.0
RPT. DOD	1.0	2.0	3.0	3.0	0.0
PTT PRIOR.	NRL	NRL	NRL	NRL	L
RPT. ACT.	SC	SC	SCD	SC	OFF
RPT. HOLD	C	SC	SCD	C	OFF
RX. AUDIO	C	SC	S	C	ON
TX. AUD/DA	NO	NO	NO	NO	NO
LOC. AUD/DA	NO	NO	NO	NO	NO
RPT. AUD/DA	NO	NO	NO	NO	NO
AUTO I.D.	K86420	K86420	K86420	KEZ972	
ALN. AIR	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
ALN. WIRE	ENABLED	ENABLED	ENABLED	ENABLED	DISABLED

SERIAL #:0113 060009

0113 06009
STB CL 1983
0113 06009
STB CL 1983

DC REMOTE TABLE

	COMMAND 01	COMMAND 02	COMMAND 03	COMMAND 04
+12.5 MA DET	CHN 2	KEY ON		
+12.5 MA UND	KEY OFF			
+ 5.5 MA DET	CHN 1	KEY ON		
+ 5.5 MA UND	KEY OFF			
+ 2.5 MA DET				
+ 2.5 MA UND				
- 2.5 MA DET	MON			
- 2.5 MA UND				
- 5.5 MA DET	CHN 3	KEY ON		
- 5.5 MA UND	KEY OFF			
-12.5 MA DET	CHN 4	KEY ON		
-12.5 MA UND	KEY OFF			
RESET	CHN 1			

**F. MODEL/OPTIONS COMPATIBILITY MATRIX
FOR THE MSF 5000**

OPTIONS	C74CLB7105A T1R1,DC,BASE	C7CLB7105AT T1R1,DC,RPTR.	C74CLB7106A T1R1,TONE,BASE	C74CLB7106AT T1R1,TONE,RPTR.
Multiple Channel Options:				
C679 2 Channel	X	X	X	X
C66 4 Channel	X	X	X	X
C680 8 Channel			X	X
Communication Channel Options:				
C395 Var TOT	X	X	X	X
C671 Var DOD		X		X
C672 PTT Priority	X	X	X	X
C672 Var Rptr. Control		X		X
C674 Rcvr. Audio Control	X	X	X	X
C678 Mult. Input Tx Control	X	X	X	X
C685 Omit Auto Station ID	X	X	X	X
Remote Control Options:				
C86 Omit DC	X	X		
C84 Omit Tone			X	X
C144 Half Duplex 4 Wire Audio	X	X	X	X
C332 Full Duplex 4 Wire Audio	X	X	X	X
C63 Xmit PL On/Off	X	X	X	X
C13 Remote Squelch	X	X	X	X
C14 Rcvr. PL On/Off	X	X	X	X
<i>Disable</i> → C143 Rptr. On/Off		X		X
C670 Phone Line Loop Test			X	X
C683 Expanded Rem. Cntrl Function	X	X	X	X
Miscellaneous Options:				
C268 Omit Coded Squelch	X	X	X	X
C578 Xmit Alarms	X	X	X	X
C669 Omit Remote Station Alarms	X	X	X	X
C170 Guard Tone Keying			X	X
C682 Omit Antenna Relay	X		X	
C687 Austrian Specs.	X	X	X	X

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Disable →

TITLE = OPTION COMPATIBILITY MATRIX
FOR THE MSF 5000

	5AR	5AT	6AR	6A
	DC,Base	DC,Rptr.	Tone,Base	Tone,Rptr.
C150 RA Base with Tone Control			X	
C160 RA Repeater		X		
C232 Four Forw/Four Rev	X	X	X	X
C233 Interface to MUXbus	X	X	X	X
C269 Spectra-TAC Encode	X	X	X	X
C369 Multicoded Squelch	X	X	X	X
C565 RS 232 Interface	X	X	X	X
C597 Duplex Filtering	X	X	X	X
C598 Duplex Filtering And Triple Circulator	X	X	X	X
C600 Eight Channels Standard Keying			X	X
C649 40, 15, 6 Watt Models	X	X	X	X
C658 Cable	X	X	X	X
C691 Power Cord	X	X	X	X
C692 Power Cord	X	X	X	X
C784 RA/RT Repeater	X	X		
C785 PL Code WZ	X	X	X	X
C786 PL Code ZB	X	X	X	X
C787 PL Code 8Z	X	X	X	X
C788 PL Code 9Z	X	X	X	X



MOTOROLA
Communications and Electronics Inc.

DC REMOTE CONTROL		Sales order #			Page ____ of ____		Date		
		Item #	Qty.	Model #					
EXPANDED REMOTE CONTROL FUNCTIONS		EXPANDED DC CURRENT FUNCTION DEFINITIONS							
		Enter up to 8 commands from list at right to be performed when the current is detected (DET) and up to 8 more commands to be performed when that current is removed (UND).							
		COMMAND #1	COMMAND #2	COMMAND #3	COMMAND #4	COMMAND #5	COMMAND #6	COMMAND #7	COMMAND #8
+ 12.5 ma	DET:								
	UND:								
+ 5.5 ma	DET:								
	UND:								
+ 2.5 ma	DET:								
	UND:								
- 2.5 ma	DET:								
	UND:								
- 5.5 ma	DET:								
	UND:								
- 12.5 ma	DET:								
	UND:								
		ALTERNATE POWER-UP CONFIGURATION							
		Specify up to 16 commands from the list to be performed upon station reset or power-up							
		COMMAND #1	COMMAND #2	COMMAND #3	COMMAND #4	COMMAND #5	COMMAND #6	COMMAND #7	COMMAND #8
RESET:									
		COMMAND #9	COMMAND #10	COMMAND #11	COMMAND #12	COMMAND #13	COMMAND #14	COMMAND #15	COMMAND #16
RESET (cont'd)									

COMMAND NAMES LIST for use with option C683

COMMAND	ACTION
NULL	Signifies that this current will be disabled
DEF (or blank)	Keep default assignments (from standard options)
MON	MONitor channel. Disables receiver PL until next KEY.
KEY [ON/OFF]	Key/Dekey station
CHN xx	Select Channel xx (xx = 15 max.)
AUX x.t	Select Aux. channel xx (xx = 15 max.)
TPL [ON/OFF]	Enable/Disable transmitter PL
RPL [ON/OFF]	Enable/Disable receiver PL
SPT [ON/OFF]	Enable/Disable special PTT operation
SQ1 [ON/OFF]	Enable/Disable receiver #1 remote squelch
SQ2 [ON/OFF]	Enable/Disable receiver #2 remote squelch
RPT [ON/OFF]	Setup/knockdown repeater operation
R2M [ON/OFF]	Auxiliary receiver audio mute On/Off
ALM [ON/OFF]	Enable/Disable station alarms
SAL [ON/OFF]	Turn On/Off Selective Alarm feature
SCAN [ON/OFF] ..	Enable/Disable channel scan feature
DVPS [0/1]	Select DVP code 0 or 1
DVP [ON/OFF]	Enable/Disable DVP operation
WCx [ON/OFF]	Turn On/Off Wild Card function #x (x = 1 to 8)
FNCON x, y	Activate a FuNction bit on MUXBUS address x, bit y. Range x: 0 to 15, Range y: 0 to 3
FNCOFF x, y	Deactivate a FuNction bit (see above)
NIB x, y	Set data NIBble on MUXBUS address x to value y. Range x & y: 0 to 15

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19. The model number digits carry information about the station as shown below

