MAINTENANCE MANUAL
PROM PROGRAMMING
FOR
GE-MARC V™ TRUNKED RADIO SYSTEMS

TABLE OF CONTENTS

DESCRIPTION

Two PROMs (RF Frequency and Personality) are used in the General Electric GE-MARC V Trunked Radio System. Optionally an Area Expander PROM may be included which when present, replaces the RF Frequency PROM. These PROMs control the transmit/receive frequencies and system control functions.

The 32X8 RF Frequency PROM contains 32 8-bit locations in which reside the binary frequency code for up to 29 user frequencies and three test frequencies. RF Frequencies are selected from one of four frequency plans, USA-1, USA-2, Australia and USA-1,ZT, each plan providing 200 different channel frequencies. USA-1 and USA-1,ZT contain the same RF frequencies, however, they are offset, to provide alternate programming codes to avoid possible interference resulting from use of the IF offset frequency on the USA-1 channel plan. A total of 600 different channel frequencies are available.

If the Area Expander option is provided, the RF PROM/Interface board is replaced by the Area Expander board. The Area Expander permits operation in 7 areas with up to 20 channels per area or 100 channels maximum. To accomodate the additional areas the RF Frequency PROM for the Area Expander option contains 512 8-bit locations.

The 32X8 personality PROM contains 32 eight bit locations in which are stored information that identify the system operating parameters, tones, options, etc., present in the radio. Information stored in the personality PROM includes:

- Tone Signaling Frequencies
- Main System Timing
- Fade Margin Timing
- External Alarm Option (all Tones Called or Individual Call)
- Call Light Option
- Alert Tone Format Option
- Group Selection Option Format
- Area Select Option Format
- Call Monitor Option
- RF Channel Addresses
- Carrier Control Timer
- Model Identification
- Voter Compatibility Option
- Control Station Operation

PERSONALITY PROM ORDERING INFORMATION

The personality PROM may be ordered by two different part numbers. Part number 19A134331P4 is a blank PROM which must be blown by the customer. PROM part numbers 19A701923G3-G5 are factory blown PROMs. **When ordering a factory blown PROM, include the part number of the microcomputer in the radio, the complete radio combination number, structured options, and a completed Per-sonality PROM Worksheet.**

One of three microcomputers may be used on the logic board, each requiring the use of a custom programmed personality PROM. The GE MARC V Duplex RM radio uses microcomputer 19A703935G1.

NOTE

Always be sure the personality PROM/Microcomputer combination is correct. The 19J700206P4 microcomputer must be used with the 19A701923G3 personality PROM. If the wrong personality PROM is used with the P4 microcomputer, the radio will not function correctly.

The chart below identifies the valid microcomputer/personality PROM combinations. Notice that the G3 personality PROM may be used with either microcomputer.

MICROCOMPUTER	PERSONALITY PROM
19J706206P4	19A701923G3
19J706206P5	19A701923G3, G4
19A703935G1**	19A701923G5**

PERSONALITY PROM PROGRAMMING

The following describes the bit map and procedure for programming the personality PROM. Table 1 is the personality PROM map identifying the 32 PROM locations and the data/option contained in each location. In control station applications Groups 2-5 are encode tones only and GROUP TONE 1 is All Call (encode/decode). Special Call is the fifth selective call (encode). Table 2 identifies the single bit options and PROM locations for both personality PROMS. Tables 3-5 list the tone frequencies and associated hex codes that may be used with the tone encoder/decoder for GE-MARC V tones.

* Earlier Models
** GE MARC V Duplex RM

CAUTION

The personality PROM contains information controlling critical system operating parameters. Therefore, extreme caution must be exercised to ensure that replacement PROMS are properly programmed. The General Electric Company assumes no responsibility for improper operation of equipment in which incorrect data is programmed into the personality PROM.

TONE AND SINGLE BIT OPTIONS

Locations 1-20 specify the system operating tones and also contain single bit options. The single bit options and the address locations are given in Table 2.

All single bit options are selected by setting their respective locations equal to a logic 1.

When loading group and individual tones (locations 1-11), be sure the Call Light bit is correctly programmed as indicated in Table 4. When programming the collect, acquisition, busy, and special call (base/tel)* tones (locations 12-20), be sure they are properly programmed from Table 3.

AREA PROGRAMMING

The basic GE-MARC V system will contain up to 5 areas. Program these areas as instructed below.

If the radio is equipped with the Area Expander option (F6 or F7, CLASSIC radio only), refer to "AREA EXPANDER PROGRAMMING" and proceed as directed.

Tone frequency information stored in the personality PROM is assigned to specific areas and must be coordinated with the RF frequency PROM programming. Refer to RF Frequency PROM Programming.

Locations 21-23 contain data identifying the number of areas and the number of channels in each area. Each information block is four bits long. The maximum number of areas permitted in any given system is five (0101) and the maximum number of channels in each area is 15 (1111).

Specific programming for locations 21-23 is different for each personality PROM. These locations are programmed as indicated by Table 1 unless the conditions identified below exist.

PROM LOCATION	BIT NUMBER 7	6	5	4	3	2	1	0
1	1 GROUP TONE 1							C.L.*
2	2 ALL CALL							
3	1 GROUP TONE 2							C.L.*
4	2 INDIVIDUAL ENCODE TONE 1							
5	1 GROUP TONE 3							C.L.*
6	2 INDIVIDUAL ENCODE TONE 2							
7	1 GROUP TONE 4							C.L.*
8	2 INDIVIDUAL ENCODE TONE 3							
9	1 GROUP TONE 5							C.L.*
10	2 INDIVIDUAL ENCODE TONE 4							
11	INDIVIDUAL TONE							C.L.*
12								
13	COLLECT TONE							H*
14								
15	ACQUISITION TONE							E*
16								
17	BUSY TONE							K*
18								
19	1 BASE-TEL TONE (Earlier Models)							F*
20	2 SPECIAL CALL (INDIVIDUAL ENCODE TONE 5)**							
21	NUMBER OF AREAS				AREA 1			
22	AREA 2				AREA 3			
23	AREA 4				AREA 5			
24	CARRIER CONTROL TIMER							
25	F8(H) Simplex F9(H) Duplex							
26	29(H)							
27	D1(H)							
28	B2(H)							
29	DA(H)							
30	PERSONALITY PROM CHECKSUM							
31	A*	B*	C*	NUMBER OF RADIO CHANNELS (5 BITS)				
32	D*	L*	M*	NO. OF GROUP TONE (3 BITS)		ALERT OPTION (2 BITS)		

* Legend

A = Group or Area Option

B = Model Identification

C = Individual Tone Decode

D = External Alarm on Individual Call or All Tones Called

E = Area Select Receiver Scan

F = (Spare)

H = Call Monitor Option

K = Switchable Alternate Busy Tone

L = Control Station Option

M = Voter Option

CL = Call Lights

1 Applies to Mobiles & A.C. Mobiles Only

2 Applies to Control Stations Only

** Programmed same as group tone 1 when Special Call option is not present.

Table 1 - Personality PROM Map

TABLE 2 - SINGLE BIT OPTIONS

PROM LOCATION	IDENTI-FICATION	OPTION
1, 3, 5, 7, 9, 11	C.L.*	Call Light Selected to light on Tone X = 1 Not selected to light on Tone X = 0
15	E	Area Select Receiver Scan. Enabled = 1. Not enabled = 0.
13	H	Call Monitor Option Enabled = 1. Not enabled = 0. Duplex Radios Program = 0.
17	K	Alternate Busy Tone Enabled = 1. Not enabled = 0.
31	A	Group or Area Select Option.
31	B	Model Identification.
31	C	Individual Tone Decode. Enable = 1. Not Enabled = 0.
32	D	External Alarm on Individual Call Only = 1. External Alarm on All Calls Received = 0.
32	L	Control Station Option Selected = 1. Mobile Operation Selected = 0.
32	M	Voter Option Selected = 1. Voter Option Not Selected = 0.

* Call Light option identified by "X" in Table 4.

NOTE

If the GE-MARC V CLASSIC radio is equipped with the Area Expander option C digit 10 of combination number is W, Y, or Z, then locations 21-23 are set equal to "0". Location 31 is set equal to the maximum number of channels in any area.

Personality PROM 19A701923G3 - If the area option is not used (FO) and the number of channels present is more than 15, then the number of areas, as well as area 1 through area 5 locations must be set to 0 (locations 21-23).

If the number of channels is 15 or less, and the area option is not used, the "number of areas" (bits 4 through 7) is set to 1 and area 1 is set equal to the number of channels.

The chart below shows the programming for a radio equipped with 15 or fewer channels with the X's representing the number of channels used. The X's would be programmed with the appropriate binary code.

Location	Data
21	0001XXXX
22	00000000
23	00000000

Personality PROM 19A701923G4,5 - If the area option is not used (FO), then the "number of areas" and area 1 through area 5 locations must be set to 0. Locations 21, 22, and 23 are set equal to zero.

CARRIER CONTROL TIMER (CCT)

The carrier control timer, location 24, controls the length of time the transmitter can be keyed continuously. The timer is set, as specified, between 2.3 seconds and 4 minutes. This byte is programmed into PROM in its 2's complement form. The timer is calculated by dividing the time requested in seconds by 2.3 seconds. For example, the standard time is 2.5 minutes. Sixty times 2.5 minutes equals 150 seconds, divided by 2.3 seconds yields 65.22. Rounding this off to 65 and converting to hex yields 41(H), the 2's complement is BF(H) which is programmed into the PROM.

Duplex radios do not have a CCT. Program location 24 equal to 0.

GROUP TONES

The number of group tones is programmed into location 32 (bits 3-5), and is limited to 5. In the standard configuration where only one group tone is present, these three bits are 001.

GROUP/AREA SELECT

Location 31A (bit 7) denotes whether radios contain the group option or the area option. Specific programming for location 31A depends on the personality PROM used.

TONE NO.	TONE FREQUENCY (Hz)	FIRST HEX BYTE WITH CALL LIGHT	FIRST HEX BYTE WITHOUT CALL LIGHT	SECOND HEX BYTE	BINARY X= OPTION H,E,K,F IN TABLE 1 =1 FOR OPTION ON =0 FOR OPTION OFF
1.	604.2	97	96	29	1001 011X 0010 1001
2.	631.5	57	56	2B	0101 011X 0010 1011
3.	662.3	97	96	2D	1001 011X 0010 1101
4.	693.0	97	96	2F	1001 011X 0010 1111
5.	727.1	17	16	32	0001 011X 0011 0010
6.	761.3	57	56	34	0101 011X 0011 0100
7.	795.4	D7	D6	36	1101 011X 0011 0110
8.	832.9	57	56	39	0101 011X 0011 1001
9.	870.5	D7	D6	3B	1101 011X 0011 1011
10.	911.5	97	96	3E	1001 011X 0011 1110
11.	952.4	97	96	41	1001 011X 0100 0001
12.	996.8	97	96	44	1001 011X 0100 0100
13.	1041.2	97	96	47	1001 011X 0100 0111
14.	1089.0	D7	D6	4A	1101 011X 0100 1010
15.	1140.2	57	56	4E	0101 011X 0100 1110
16.	1191.4	D7	D6	51	1101 011X 0101 0001
17.	1246.0	97	96	55	1001 011X 0101 0101
18.	1304.0	97	96	59	1001 011X 0101 1001
19.	1362.1	97	96	5D	1001 011X 0101 1101
20.	1423.5	D7	D6	61	1101 011X 0110 0001
21.	1488.4	57	56	66	0101 011X 0110 0110
22.	1556.7	17	16	6B	0001 011X 0110 1011
23.	1628.3	D7	D6	6F	1101 011X 0110 1111
24.	1717.1	17	16	76	0001 011X 0111 0110
25.	1795.6	57	56	7B	0101 011X 0111 1011
26.	1877.5	17	16	81	0001 011X 1000 0001
27.	2051.6	17	16	8D	0001 011X 1000 1101
28.	2143.8	57	56	93	0101 011X 1001 0011
29.	2239.4	D7	D6	99	1101 011X 1001 1001
30.	2341.8	D7	D6	A0	1101 011X 1010 0000
31.	2447.6	17	16	A8	0001 011X 1010 1000
32.	2556.9	97	96	AF	1001 011X 1010 1111
33.	2672.9	97	96	B7	1001 011X 1011 0111
34.	2792.4	D7	D6	BF	1101 011X 1011 1111

* Earlier Models

Table 3 - Tone Frequency Coding For Collect, Acquisition, Busy, and Spec Call (Base Tel*), Simplex Radios Only

Personality PROM 19A701923G3 - If used in a CLASSIC, CENTURA or (CENTURA TC)* radio then location 31A is set equal to 1.

If used in a CORONA model and the number of areas is 1 then location 31A is set equal to 1. If two or more areas are used, then set location 31A equal to 0.

Personality PROM 19A701923G4,5 - If used in a CLASSIC, CENTURA or CENTURA TC*, set location 31A equal to 1.

* Earlier Models

If used in CORONA models with group option, set location 31A equal to 1. If area option is used, set it equal to 0.

MODEL IDENTIFICATION

Location 31B identifies the radio as a CLASSIC or CENTURA/CENTURA TC*/CORONA. Specific programming is determined by the Personality PROM used.

Personality PROM 19A701923G3 - If used in the CLASSIC radio, or in a CORONA without area option, set location 31B to 0.

If used in a CENTURA, CENTURA TC* or CORONA with two or more areas, set location 31B to equal to 1.

Personality PROM 19A701923G4,5 - If used in a CLASSIC radio, set location 31B equal to 0. If used in a CENTURA, CENTURA TC* or CORONA, set location 31B equal to 1.

INDIVIDUAL TONE DECODE (Option J)

Location 31C enables (C=1), Option JD, or disables (C=0), Option JO, the individual tone decode function.

EXTERNAL ALARM SWITCH (Option K)

Location 32D selects external alarm on individual call only (D=1), Option KA, or external alarm on all calls (D=0), Option KB.

CHECKSUM

Personality PROM checksum (location 30) is a byte reserved to store the checksum of the PROM after everything has been coded. The radio itself does not check this but the PROM programming will. An error message will notify an operator checking a PROM's programming that the PROM has an error. This value is calculated by adding all the bytes in the PROM, throwing away any carry.

RADIO CHANNELS

The number of channels in the radio is stored in location 31 (bits 0-4) and is limited to a maximum of 29 channels and a mimimum of 5 channels. If less than 5 channels are used, then location 31 must be set equal to 5. Repeated frequencies are counted also.

If structured Option H (Collect Tone length) is present, then location 31, NUMBER OF CHANNELS, (bits 0-4) must be programmed to cover the total number of channels required by the option. Repeat frequencies as necessary until the H option requirement is satisfied.

When programming the repeat frequencies fill the highest numbered area used first, then proceed to the next lower numbered area.

If more than one frequency is programmed in an area that requires repeat frequencies, then program these frequencies in sequence. Repeat sequence as necessary until the H option requirement is satisfied.

The number of channels required by the H option are listed as follows.

HO = total number of channels in the radio
HA = 5 channels
HB = 10 channels
HC = 15 channels
HD = 20 channels

NOTE

For system compatability the collect tone must be long enough to cover the highest number of channels in any radio on the radio system.

If the Area Expander is present, each area must be programmed for the same number of RF channels. Locations 21-23 must be set equal to "0" and the number of channels in each are programmed into location 31.

ALERT TONE OPTION (Option M)

The alert tone option is selected by bits 0 and 1 in location 32, allowing four choices:

00 Seven note alert for call originate and receive (Option M3).

01 Seven note alert for call originate - two for receive (Option M2).

10 Two note alert for call originate and receive (standard). (Option MO).

11 Two note alert for call originate - none (silent) for receive (Option M1).

BUSY TONE

Busy tone loads 3051.9 Hz for standard and 2918.7 Hz for alternate busy tone. When switchable alternate busy tone is ordered, program 3051.9 Hz into the PROM.

CALL LIGHT

For mobile operation the CALL light is selected on each tone by setting the X in the tone sequence = to 1 in Table 4.

For Control station operation, if All Call (Group tone #1) has the Call light selected, then program bit 0 in bytes 0,2,4,6, and 8 = to 1. Individual call can be selected also.

Following are two examples to illustrate PROM programming. It is important to note that the structured options are set up so that all options become standard unless otherwise programmed. For example, if the alert tone option is not programmed, MO is automatically picked up. The second digit being equal to zero denotes it as a standard option.

TONE NO.	TONE FREQUENCY (Hz)	FIRST HEX BYTE WITH CALL LIGHT	FIRST HEX BYTE WITHOUT CALL LIGHT	SECOND HEX BYTE	BINARY X=CALL LIGHT OPTION =1 FOR TURN ON =0 FOR TURN OFF
1.	604.2	99	98	29	1001 100X 0010 1001
2.	631.5	59	58	2B	0101 100X 0010 1011
3.	662.3	99	98	2D	1001 100X 0010 1101
4.	693.0	99	98	2F	1001 100X 0010 1111
5.	727.1	19	18	32	0001 100X 0011 0010
6.	761.3	59	58	34	0101 100X 0011 0100
7.	795.4	D9	D8	36	1101 100X 0011 0110
8.	832.9	59	58	39	0101 100X 0011 1001
9.	870.5	D9	D8	3B	1101 100X 0011 1011
10.	911.5	99	98	3E	1001 100X 0011 1110
11.	952.4	99	98	41	1001 100X 0100 0001
12.	996.8	99	98	44	1001 100X 0100 0100
13.	1041.2	99	98	47	1001 100X 0100 0111
14.	1089.0	D9	D8	4A	1101 100X 0100 1010
15.	1140.2	59	58	4E	0101 100X 0100 1110
16.	1191.4	D9	D8	51	1101 100X 0101 0001
17.	1246.0	99	98	55	1001 100X 0101 0101
18.	1304.0	99	98	59	1001 100X 0101 1001
19.	1362.1	99	98	5D	1001 100X 0101 1101
20.	1423.5	D9	D8	61	1101 100X 0110 0001
21.	1488.4	59	58	66	0101 100X 0110 0110
22.	1556.7	19	18	6B	0001 100X 0110 1011
23.	1628.3	D9	D8	6F	1101 100X 0110 1111
24.	1717.1	19	18	76	0001 100X 0111 0110
25.	1795.6	59	58	7B	0101 100X 0111 1011
26.	1877.5	19	18	81	0001 100X 1000 0001
27.	2051.6	19	18	8D	0001 100X 1000 1101
28.	2143.8	59	58	93	0101 100X 1001 0011
29.	2239.4	D9	D8	99	1101 100X 1001 1001
30.	2341.8	D9	D8	A0	1101 100X 1010 0000
31.	2447.6	19	18	A8	0001 100X 1010 1000
32.	2556.9	99	98	AF	1001 100X 1010 1111
33.	2672.9	99	98	B7	1001 100X 1011 0111
34.	2792.4	D9	D8	BF	1101 100X 1011 1111

Table 4 - Tone Frequency Coding For Group and Individual Tones (Simplex Radios Only)

Tone Number	Frequency (Hz)	1st Byte			2nd Byte
		Q=79.6 Collect, Acq., Busy & SPL Tone	Q=160.1 Group & Individual Tone w/o call light	Q=160.1 Group & Individual Tone with call light	
1.	604.2	56	58	59	2C
2.	631.5	56	58	59	2E
3.	662.3	96	98	99	30
4.	693.0	96	98	99	31
5.	727.1	56	58	59	35
6.	761.3	D6	D8	D9	37
7.	795.4	56	58	59	3A
8.	832.9	16	18	19	3D
9.	870.5	D6	D8	D9	3F
10.	911.5	D6	D8	D9	42
11.	952.4	D6	D8	D9	45
12.	996.8	16	18	19	49
13.	1041.2	56	58	59	4
14.	1089.0	D6	D8	D9	4F
15.	1140.2	96	98	99	53
16.	1191.4	56	58	59	57
17.	1246.0	56	58	59	5B
18.	1304.0	96	98	99	5F
19.	1362.1	D6	D8	D9	63
20.	1423.5	56	58	59	68
21.	1488.4	16	18	19	6D
22.	1556.7	16	18	19	72
23.	1628.3	56	58	59	77
24.	1717.1	D6	D8	D9	7D
25.	1795.6	96	98	99	83
26.	1877.5	96	98	99	89
Q=34ACQ. TONE	1962.9	D4	D6	D7	8F
27.	2051.6	56	58	59	96
28.	2143.8	16	18	19	9D
29.	2239.4	16	18	19	A4
30.	2341.8	96	98	99	AB
31.	2447.6	56	58	59	B3
32.	2556.9	56	58	59	BB
33.	2672.9	D6	D8	D9	C3
34.	2792.4	96	98	99	CC
ALT. BUSY	2918.7	D6	D8	D9	D5
BUSY	3051.9	96	98	99	DF

Table 5 - Tone Frequency Coding for Duplex Radios
(Personality PROM 19A701923G5)

EXAMPLE 1: M6YZ2B015S0UAS000

TONE ASSIGNMENT WORKSHEET INFORMATION

GROUP TONE #1	996.8 Hz With Call Light
BUSY TONE	3051.9 Hz
COLLECT TONE	662.3 Hz
ACQUISITION TONE	1962.9 Hz
NUMBER OF FREQUENCIES	5 CHANNELS

See Tables 6 and 7 for resulting bit maps for G3 and G4 personality PROMS

LOCATION	DATA								HEX CODE
	7	6	5	4	3	2	1	0	
1	1	0	0	1	1	0	0	1	99
2	0	1	0	0	0	1	0	0	44
3	0	0	0	0	0	0	0	0	00
4	0	0	0	0	0	0	0	0	00
5	0	0	0	0	0	0	0	0	00
6	0	0	0	0	0	0	0	0	00
7	0	0	0	0	0	0	0	0	00
8	0	0	0	0	0	0	0	0	00
9	0	0	0	0	0	0	0	0	00
10	0	0	0	0	0	0	0	0	00
11	0	0	0	0	0	0	0	0	00
12	0	0	0	0	0	0	0	0	00
13	1	0	0	1	0	1	1	0	96
14	0	0	1	0	1	1	0	1	2D
15	1	1	0	1	0	1	0	0	D4
16	1	0	0	0	0	1	1	0	86
17	1	0	0	1	0	1	1	0	96
18	1	1	0	1	0	0	0	1	D1
19	0	0	0	0	0	0	0	0	00
20	0	0	0	0	0	0	0	0	00
21	0	0	0	1	0	1	0	1	15
22	0	0	0	0	0	0	0	0	00
23	0	0	0	0	0	0	0	0	00
24	1	0	1	1	1	1	1	1	BF
25	1	1	1	1	1	0	1	1	FB
26	0	0	1	0	1	0	0	1	29
27	1	1	0	1	0	0	0	1	D1
28	1	0	1	1	0	0	1	0	B2
29	1	1	0	1	1	0	1	0	DA
30	0	1	0	0	0	0	0	1	41
31	1	0	0	0	0	1	0	1	85
32	0	0	0	0	0	1	1	0	06

Table 6 - Bit Map For Example 1 (Personality PROM 19A701923G3)

LOCATION	DATA								HEX CODE
	7	6	5	4	3	2	1	0	
1	1	0	0	1	1	0	0	1	99
2	0	1	0	0	0	1	0	0	44
3	0	0	0	0	0	0	0	0	00
4	0	0	0	0	0	0	0	0	00
5	0	0	0	0	0	0	0	0	00
6	0	0	0	0	0	0	0	0	00
7	0	0	0	0	0	0	0	0	00
8	0	0	0	0	0	0	0	0	00
9	0	0	0	0	0	0	0	0	00
10	0	0	0	0	0	0	0	0	00
11	0	0	0	0	0	0	0	0	00
12	0	0	0	0	0	0	0	0	00
13	1	0	0	1	0	1	1	0	96
14	0	0	1	0	1	1	0	1	2D
15	1	1	0	1	0	1	0	0	D4
16	1	0	0	0	0	1	1	0	86
17	1	0	0	1	0	1	1	0	96
18	1	1	0	1	0	0	0	1	D1
19	0	0	0	0	0	0	0	0	00
20	0	0	0	0	0	0	0	0	00
21	0	0	0	0	0	0	0	0	00
22	0	0	0	0	0	0	0	0	00
23	0	0	0	0	0	0	0	0	00
24	1	0	1	1	1	1	1	1	BF
25	1	1	1	1	1	0	1	1	FB
26	0	0	1	0	1	0	0	1	29
27	1	1	1	1	0	0	0	1	D1
28	1	0	1	1	0	0	1	0	B2
29	1	1	0	1	1	0	1	0	DA
30	0	1	0	0	0	0	0	1	6C
31	1	1	0	0	0	1	0	1	C5
32	0	0	0	0	0	1	1	0	06

Table 7 - Bit Map For Example 1 (Personality PROM 19A701923G4)

EXAMPLE 2: M7YZ2S015S0UAK000

OPTIONS

A5	KA
BB	LS
C2	M3
F5	U1
JD	W1

TONE ASSIGNMENT WORKSHEET INFORMATION

GROUP TONE #1	1556.7 Hz	NO CALL LIGHT
GROUP TONE #2	727.1	NO CALL LIGHT
GROUP TONE #3	1304.0	NO CALL LIGHT
GROUP TONE #4	2447.6	NO CALL LIGHT
GROUP TONE #5	795.4	NO CALL LIGHT
INDIVIDUAL TONE	1877.5	CALL LIGHT
BUSY TONE	3051.9	
COLLECT TONE	1628.3	
ACQUISITION TONE	1962.9	
BASE TONE	604.2	
AREA #1	5 CHANNELS	
AREA #2	5 CHANNELS	
AREA #3	9 CHANNELS	
AREA #4	5 CHANNELS	
AREA #5	5 CHANNELS	

See Tables 8 and 9 for resulting bit maps for G3 and G4 personality PROMS

LOCATION	DATA								HEX CODE
	7	6	5	4	3	2	1	0	
1	0	0	0	1	1	0	0	0	18
2	0	1	1	0	1	0	1	1	6B
3	0	0	0	1	1	0	0	0	18
4	0	0	1	1	0	0	1	0	32
5	1	0	0	1	0	0	0	0	98
6	0	1	0	1	1	0	0	1	59
7	0	0	0	1	1	0	0	0	18
8	1	0	1	0	1	0	0	0	A8
9	1	1	0	1	1	0	0	0	D8
10	0	0	1	1	0	1	1	0	36
11	0	0	0	1	1	0	0	1	19
12	1	0	0	0	0	0	0	1	81
13	1	1	0	1	0	1	1	0	D6
14	0	1	1	0	1	1	1	1	6F
15	1	1	0	1	0	1	0	1	D5
16	1	0	0	0	0	1	1	0	86
17	1	0	0	1	0	1	1	0	96
18	1	1	0	1	0	0	0	1	D1
19	1	0	0	1	0	1	1	0	96
20	0	0	1	0	1	0	0	1	29
21	0	1	0	1	0	1	0	1	55
22	0	1	0	1	1	0	0	1	59
23	0	1	0	1	0	1	0	1	55
24	1	1	0	0	1	1	0	0	CC
25	1	1	1	1	1	0	0	0	F8
26	0	0	1	0	1	0	0	1	29
27	1	1	0	1	0	0	0	1	D1
28	1	0	1	1	0	0	1	0	B2
29	1	1	0	1	1	0	1	0	DA
30	1	0	0	0	1	1	0	1	8D
31	1	0	1	1	1	1	0	1	BD
32	1	0	0	1	0	1	0	0	94

Table 8 - Bit Map For Example 2 (Personality PROM 19A701923G3)

LOCATION	DATA 7	6	5	4	3	2	1	0	HEX CODE
1	0	0	0	1	1	0	0	0	18
2	0	1	1	0	1	0	1	1	6B
3	0	0	0	1	1	0	0	0	18
4	0	0	1	1	0	0	1	0	32
5	1	0	0	1	1	0	0	0	98
6	0	1	0	1	1	0	0	1	59
7	0	0	0	1	1	0	0	0	18
8	1	0	1	0	1	0	0	0	A8
9	1	1	0	1	0	0	0	0	D8
10	0	0	1	1	0	1	1	0	36
11	0	0	0	1	1	0	0	1	19
12	1	0	0	0	0	0	0	1	81
13	1	1	0	1	0	1	1	0	D6
14	0	1	1	0	1	1	1	1	6F
15	1	1	0	1	0	1	0	1	D5
16	1	0	0	0	0	1	1	0	86
17	1	0	0	1	0	1	1	0	96
18	1	1	0	1	0	0	0	1	D1
19	1	0	0	1	0	1	1	0	96
20	0	0	1	0	1	0	0	1	29
21	0	1	0	1	0	1	0	1	55
22	0	1	0	1	1	0	0	1	59
23	0	1	0	1	0	1	0	1	55
24	1	1	0	0	1	1	0	0	CC
25	1	1	1	1	1	0	1	1	FB
26	0	0	1	0	1	0	0	1	29
27	1	1	0	1	0	0	0	1	D1
28	1	0	1	1	0	0	1	0	B2
29	1	1	0	1	1	0	1	0	DA
30	1	0	0	0	1	1	0	1	8D
31	1	0	1	1	1	1	0	1	BD
32	1	0	0	1	0	1	0	0	94

Table 9 - Bit Map For Example 2 (Personality PROM 19A701923G4)

NOTE

In radios equipped with the Area Expander option (CLASSIC radios only with digit 10 of combination number equal to Z, Y, or W), refer to "AREA EXPANDER PROGRAMMING" and program the RF frequencies as instructed.

RF FREQUENCY PROM PROGRAMMING

The 32X8 RF frequency PROM contains 32 8-bit locations in which reside the binary frequency code for up to 29 user frequencies and three test frequencies. The three test frequencies are 816.0125 MHz, 818.5125 MHz, and 820.9875 MHz and are accessed through locations 30, 31 and 32 respectively on the Microprocessor Control Test Set TL5B. In five channel radios the test frequencies are located in addresses 6, 7, and 8 respectively. The 29 channels may be assigned and programmed to operate in up to five areas with a maximum of 15 channels assigned to each area. Channel overlapping is permitted with some channels being programmed for use in more than one area.

Tone frequencies assigned to each area are stored in the personality PROM. Therefore, the programming of the RF frequency PROM must agree with the programming of the area select option in the personality PROM. Figure 1 shows a typical relationship between the RF frequency PROM and the personanlity PROM.

RF FREQUENCY PROM ORDERING INFORMATION

The RF frequency PROM may be ordered by two different part numbers. Part number 19A134331P4 is a blank PROM and must be blown by the customer. Part numbers for factory programmed PROM's are identified in Figure 1A. When ordering a factory programmed PROM include the complete radio combination number including any structured options, and list RF frequencies by area.

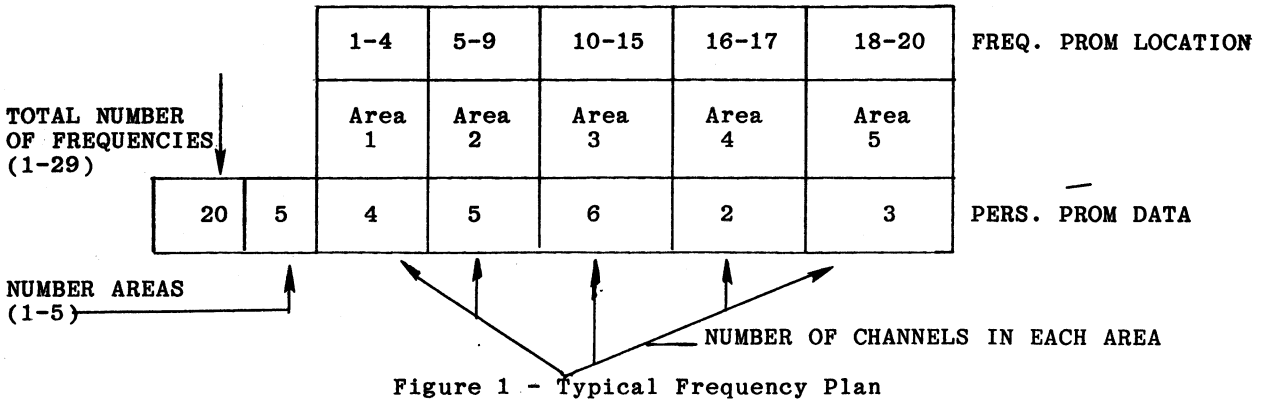

Figure 1 - Typical Frequency Plan

Example:

Combination Number - M7YZ2P015K0UAS000
Transmit Frequencies (MHz)

Area 1 - 820.7625
- 820.5125, etc.

Area 2 - 820.2125
- 819.3625, etc.

RADIO	STANDARD PROM	PROM WITH OPTION ZT
CORONA/CENTURA and 25 channel CLASSIC	19A701922G1	19A701922G2
100 channel CLASSIC	19A702785G1	19A702785G2

Figure 1A - RF Frequency PROM Identification

RF PROM PROGRAMMING

Before programming the PROM determine how many areas are used, then group all transmit frequencies according to area.

NOTE

Frequencies may be repeated in different areas; but the total number of channel frequencies can not exceed 29 and the number of channels in a given area cannot exceed 15.

One of two groups of RF Frequency PROM may be used with the Area Expander option. The PROM used must be compatable with the Frequency Plan. PROM 19A702785G1 must be used with Frequency Plan USA-1; PROM 19A702785G2 must be used with Frequency Plan USA-1(ZT). Either group may be used with the USA-2 and Australia Frequency Plans.

To reduce the possibility of two units originating a call simultaneously on the same repeater, the RF frequencies should be scattered or randomized. For example a 5 channel system may be programmed as shown below.

MHz in Channel Plan	LOWEST FREQUENCY IN PROM POSITION CH1	CH2	CH3	CH4	CH5
1st 100	F1	F2	F3	F4	F5
2nd 100	F2	F3	F4	F5	F1
3rd 100	F3	F4	F5	F1	F2
4th 100	F4	F5	F1	F2	F3
5th 100	F5	F1	F2	F3	F4

When programming RF Frequency PROMs for use in Frequency Plan USA-1, avoid using transmit frequencies 816.3875 and 819.5875 MHz if RF Frequency PROM 19A702785G1 is used. The use of the above identified frequencies with the G1 PROM will result in audible interference caused by an internally generated signal. If these frequencies are required use a 19A702785G2 RF Frequency PROM and Frequency Plan USA-1(ZT).

NOTE

If the radio was not previously equipped with a G2 PROM, refer to the Transmitter Alignment instructions to reset the Reference Oscillator.

Refer to Table 10-14 and determine the hexadecimal code for each transmit frequency.

Begin the loading sequence with location 1, area 1. After area 1 is completed proceed to each succeeding area.

NOTE

If Option H, collect tone length is present, the total number of channels in the last area must be repeated so the overall frequency count is equal to Option "H".

Load all unused locations with 00 for Channel Plan USA-1, USA-3 and Australia, 02(H) for USA-1(ZT), and 04(H) for USA-2 and Mexico.

NOTE

In 5 channel CENTURA model radios test frequencies are loaded in locations 06, 07, and 08. The hex codes for these locations are 00, 64 and C7 respectively.

In all other GE-MARC V radios the test frequencies are loaded in locations 30, 31, and 32. The hex codes for these locations are 00, 64, and C7 respectively.

Finally, record all programming data on the PROM label. The Part No. for PROM label is 19C850828P1.

TABLE 10 - TX FREQUENCY/CHANNEL/HEX CONVERSION CHART
(CHANNEL PLANS USA-1, AUSTRALIA)

USA -1 — AUSTRALIA — kHz	820 MHz — 824 MHz — CHAN. NO.	HEX CODE	819 MHz — 823 MHz — CHAN. NO.	HEX CODE	818 MHz — 822 MHz — CHAN. NO.	HEX CODE	817 MHz — 821 MHz — CHAN. NO.	HEX CODE	816 MHz — 820 MHz — CHAN. NO.	HEX CODE
9875	001	C7	041	9F	081	77	121	4F	161	27
9625	002	C6	042	9E	082	76	122	4E	162	26
9375	003	C5	043	9D	083	75	123	4D	163	25
9125	004	C4	044	9C	084	74	124	4C	164	24
8875	005	C3	045	9B	085	73	125	4B	165	23
8625	006	C2	046	9A	086	72	126	4A	166	22
8375	007	C1	047	99	087	71	127	49	167	21
8125	008	C0	048	98	088	70	128	48	168	20
7875	009	BF	049	97	089	6F	129	47	169	1F
7625	010	BE	050	96	090	6E	130	46	170	1E
7375	011	BD	051	95	091	6D	131	45	171	1D
7125	012	BC	052	94	092	6C	132	44	172	1C
6875	013	BB	053	93	093	6B	133	43	173	1B
6625	014	BA	054	92	094	6A	134	42	174	1A
6375	015	B9	055	91	095	69	135	41	175	19
6125	016	B8	056	90	096	68	136	40	176	18
5875	017	B7	057	8F	097	67	137	3F	177	17
5625	018	B6	058	8E	098	66	138	3E	178	16
5375	019	B5	059	8D	099	65	139	3D	179	15
5125	020	B4	060	8C	100	64	140	3C	180	14
4875	021	B3	061	8B	101	63	141	3B	181	13
4625	022	B2	062	8A	102	62	142	3A	182	12
4375	023	B1	063	89	103	61	143	39	183	11
4125	024	B0	064	88	104	60	144	38	184	10
3875	025	AF	065	87	105	5F	145	37	185	0F
3625	026	AE	066	86	106	5E	146	36	186	0E
3375	027	AD	067	85	107	5D	147	35	187	0D
3125	028	AC	068	84	108	5C	148	34	188	0C
2875	029	AB	069	83	109	5B	149	33	189	0B
2625	030	AA	070	82	110	5A	150	32	190	0A
2375	031	A9	071	81	111	59	151	31	191	09
2125	032	A8	072	80	112	58	152	30	192	08
1875	033	A7	073	7F	113	57	153	2F	193	07
1625	034	A6	074	7E	114	56	154	2E	194	06
1375	035	A5	075	7D	115	55	155	2D	195	05
1125	036	A4	076	7C	116	54	156	2C	196	04
0875	037	A3	077	7B	117	53	157	2B	197	03
0625	038	A2	078	7A	118	52	158	2A	198	02
0375	039	A1	079	79	119	51	159	29	199	01
0125	040	A0	080	78	120	50	160	28	200	00

TABLE 11 - TX FREQUENCY/CHANNEL/HEX CONVERSION CHART
(CHANNEL PLAN USA-2)

USA-2 kHz	815 MHz CHAN. NO.	815 MHz HEX CODE	814 MHz CHAN. NO.	814 MHz HEX CODE	813 MHz CHAN. NO.	813 MHz HEX CODE	812 MHz CHAN. NO.	812 MHz HEX CODE	811 MHz CHAN. NO.	811 MHz HEX CODE
9875	001	CB	041	A3	081	7B	121	53	161	2B
9625	002	CA	042	A2	082	7A	122	52	162	2A
9375	003	C9	043	A1	083	79	123	51	163	29
9125	004	C8	044	A0	084	78	124	50	164	28
8875	005	C7	045	9F	085	77	125	4F	165	27
8625	006	C6	046	9E	086	76	126	4E	166	26
8375	007	C5	047	9D	087	75	127	4D	167	25
8125	008	C4	048	9C	088	74	128	4C	168	24
7875	009	C3	049	9B	089	73	129	4B	169	23
7625	010	C2	050	9A	090	72	130	4A	170	22
7375	011	C1	051	99	091	71	131	49	171	21
7125	012	C0	052	98	092	70	132	48	172	20
6875	013	BF	053	97	093	6F	133	47	173	1F
6625	014	BE	054	96	094	6E	134	46	174	1E
6375	015	BD	055	95	095	6D	135	45	175	1D
6125	016	BC	056	94	096	6C	136	44	176	1C
5875	017	BB	057	93	097	6B	137	43	177	1B
5625	018	BA	058	92	098	6A	138	42	178	1A
5375	019	B9	059	91	099	69	139	41	179	19
5125	020	B8	060	90	100	68	140	40	180	18
4875	021	B7	061	8F	101	67	141	3F	181	17
4625	022	B6	062	8E	102	66	142	3E	182	16
4375	023	B5	063	8D	103	65	143	3D	183	15
4125	024	B4	064	8C	104	64	144	3C	184	14
3875	025	B3	065	8B	105	63	145	3B	185	13
3625	026	B2	066	8A	106	62	146	3A	186	12
3375	027	B1	067	89	107	61	147	39	187	11
3125	028	B0	068	88	108	60	148	38	188	10
2875	029	AF	069	87	109	5F	149	37	189	0F
2625	030	AE	070	86	110	5E	150	36	190	0E
2375	031	AD	071	85	111	5D	151	35	191	0D
2125	032	AC	072	84	112	5C	152	34	192	0C
1875	033	AB	073	83	113	5B	153	33	193	0B
1625	034	AA	074	82	114	5A	154	32	194	0A
1375	035	A9	075	81	115	59	155	31	195	09
1125	036	A8	076	80	116	58	156	30	196	08
0875	037	A7	077	7F	117	57	157	2F	197	07
0625	038	A6	078	7E	118	56	158	2E	198	06
0375	039	A5	079	7D	119	55	159	2D	199	05
0125	040	A4	080	7C	120	54	160	2C	200	04

TABLE 12 - TX FREQUENCY/CHANNEL/HEX CONVERSION CHART
(CHANNEL PLAN (USA-1,ZT)

USA-1 (ZT) kHz	820 MHz CHAN. NO.	820 MHz HEX CODE	819 MHz CHAN. NO.	819 MHz HEX CODE	818 MHz CHAN. NO.	818 MHz HEX CODE	817 MHz CHAN. NO.	817 MHz HEX CODE	816 MHz CHAN. NO.	816 MHz HEX CODE
9875	001	C9	041	A1	081	79	121	51	161	29
9625	002	C8	042	A0	082	78	122	50	162	28
9375	003	C7	043	9F	083	77	123	4F	163	27
9125	004	C6	044	9E	084	76	124	4E	164	26
8875	005	C5	045	9D	085	75	125	4D	165	25
8625	006	C4	046	9C	086	74	126	4C	166	24
8375	007	C3	047	9B	087	73	127	4B	167	23
8125	008	C2	048	9A	088	72	128	4A	168	22
7875	009	C1	049	99	089	71	129	49	169	21
7625	010	C0	050	98	090	70	130	48	170	20
7375	011	BF	051	97	091	6F	131	47	171	1F
7125	012	BE	052	96	092	6E	132	46	172	1E
6875	013	BD	053	95	093	6D	133	45	173	1D
6625	014	BC	054	94	094	6C	134	44	174	1C
6375	015	BD	055	93	095	6B	135	43	175	1B
6125	016	BA	056	92	096	6A	136	42	176	1A
5875	017	B9	057	91	097	69	137	41	177	19
5625	018	B8	058	90	66	68	3E	40	178	18
5375	019	B7	059	8F	099	67	139	3F	179	17
5125	020	B6	060	8E	100	66	140	3E	180	16
4875	021	B5	061	8D	101	65	141	3D	181	15
4625	022	B4	062	8C	102	64	142	3C	182	14
4375	023	B3	063	8B	103	63	143	3B	183	13
4125	024	B2	064	8A	104	62	144	3A	184	12
3875	025	B1	065	89	105	61	145	39	185	11
3625	026	BO	066	88	106	60	146	38	186	10
3375	027	AF	067	87	107	5F	147	37	187	OF
3125	028	AE	068	86	108	5E	148	36	188	OE
2875	029	AD	069	85	109	5D	149	35	189	OD
2625	030	AC	070	84	110	5C	150	34	190	OC
2375	031	AB	071	83	111	5B	151	33	191	0B
2125	032	AA	072	82	112	5A	152	32	192	0A
1875	033	A9	073	81	113	59	153	31	193	09
1625	034	A8	074	80	114	58	154	30	194	08
1375	035	A7	075	7F	115	57	155	2F	195	07
1125	036	A6	076	7E	116	56	156	2E	196	06
0875	037	A5	077	7D	117	55	157	2D	197	05
0625	038	A4	078	7C	118	54	158	2C	198	04
0375	039	A3	079	7B	119	53	159	2B	199	03
0125	040	A2	080	7A	120	52	160	2A	200	02

TABLE 13 - TX FREQUENCY/CHANNEL HEX CONVERSION CHART (CHANNEL PLAN - USA-3)

kHz	← 810 MHz →		← 809 MHz →		← 808 MHz →		← 807 MHz →		← 806 MHz →	
	CHAN. NO.	HEX CODE	CHAN. NO.	HEX CODE	CHAN. NO.	HEX CODE	CHAN. NO.	HEX CODE	CHAN. NO.	HEX CODE
9875	001	C7	041	9F	081	77	121	4F	161	27
9625	002	C6	042	9E	082	76	122	4E	162	26
9375	003	C5	043	9D	083	75	123	4D	163	25
9125	004	C4	044	9C	084	74	124	4C	164	24
8875	005	C3	045	9B	085	73	125	4B	165	23
8625	006	C2	046	9A	086	72	126	4A	166	22
8375	007	C1	047	99	087	71	127	49	167	21
8125	008	C0	048	98	088	70	128	48	168	20
7875	009	BF	049	97	089	6F	129	47	169	1F
7625	010	BE	050	96	090	6E	130	46	170	1E
7375	011	BD	051	95	091	6D	131	45	171	1D
7125	012	BC	052	94	092	6C	132	44	172	1C
6875	013	BB	053	93	093	6B	133	43	173	1B
6625	014	BA	054	92	094	6A	134	42	174	1A
6375	015	B9	055	91	095	69	135	41	175	19
6125	016	B8	056	90	096	68	136	40	176	18
5875	017	B7	057	8F	097	67	137	3F	177	17
5625	018	B6	058	8E	098	66	138	3E	178	16
5375	019	B5	059	8D	099	65	139	3D	179	15
5125	020	B4	060	8C	100	64	140	3C	180	14
4875	021	B3	061	8B	101	63	141	3B	181	13
4625	022	B2	062	8A	102	62	142	3A	182	12
4375	023	B1	063	89	103	61	143	39	183	11
4125	024	B0	064	88	104	60	144	38	184	10
3875	025	AF	065	87	105	5F	145	37	185	0F
3625	026	AE	066	86	106	5E	146	36	186	0E
3375	027	AD	067	85	107	5D	147	35	187	0D
3125	028	AC	068	84	108	5C	148	34	188	0C
2875	029	AB	069	83	109	5B	149	33	189	0B
2625	030	AA	070	82	110	5A	150	32	190	0A
2375	031	A9	071	81	111	59	151	31	191	09
2125	032	A8	072	80	112	58	152	30	192	08
1875	033	A7	073	7F	113	57	153	2F	193	07
1625	034	A6	074	7E	114	56	154	2E	194	06
1375	035	A5	075	7D	115	55	155	2D	195	05
1125	036	A4	076	7C	116	54	156	2C	196	04
0875	037	A3	077	7B	117	53	157	2B	197	03
0625	038	A2	078	7A	118	52	158	2A	198	02
0375	039	A1	079	79	119	51	159	29	199	01
0125	040	A0	080	78	120	50	160	28	200	00

TABLE 14 - TX FREQUENCY/CHANNEL/HEX CONVERSION CHART (CHANNEL PLAN - MEXICO)

kHz	← 815 MHz →		← 814 MHz →		← 813 MHz →		← 812 MHz →		← 811 MHz →	
	CHAN. NO.	HEX CODE	CHAN. NO.	HEX CODE	CHAN. NO.	HEX CODE	CHAN. NO.	HEX CODE	CHAN. NO.	HEX CODE
975	001	CB	041	A3	081	7B	121	53	161	2B
950	002	CA	042	A2	082	7A	122	52	162	2A
925	003	C9	043	A1	083	79	123	51	163	29
900	004	C8	044	A0	084	78	124	50	164	28
875	005	C7	045	9F	085	77	125	4F	165	27
850	006	C6	046	9E	086	76	126	4E	166	26
825	007	C5	047	9D	087	75	127	4D	167	25
800	008	C4	048	9C	088	74	128	4C	168	24
775	009	C3	049	9B	089	73	129	4B	169	23
750	010	C2	050	9A	090	72	130	4A	170	22
725	011	C1	051	99	091	71	131	49	171	21
700	012	C0	052	98	092	70	132	48	172	20
675	013	BF	053	97	093	6F	133	47	173	1F
650	014	BE	054	96	094	6E	134	46	174	1E
625	015	BD	055	95	095	6D	135	45	175	1D
600	016	BC	056	94	096	6C	136	44	176	1C
575	017	BB	057	93	097	6B	137	43	177	1B
550	018	BA	058	92	098	6A	138	42	178	1A
525	019	B9	059	91	099	69	139	41	179	19
500	020	B8	060	90	100	68	140	40	180	18
475	021	B7	061	8F	101	67	141	3F	181	17
450	022	B6	062	8E	102	66	142	3E	182	16
425	023	B5	063	8D	103	65	143	3D	183	15
400	024	B4	064	8C	104	64	144	3C	184	14
375	025	B3	065	8B	105	63	145	3B	185	13
350	026	B2	066	8A	106	62	146	3A	186	12
325	027	B1	067	89	107	61	147	39	187	11
300	028	B0	068	88	108	60	148	38	188	10
275	029	AF	069	87	109	5F	149	37	189	0F
250	030	AE	070	86	110	5E	150	36	190	0E
225	031	AD	071	85	111	5D	151	35	191	0D
200	032	AC	072	84	112	5C	152	34	192	0C
175	033	AB	073	83	113	5B	153	33	193	0B
150	034	AA	074	82	114	5A	154	32	194	0A
125	035	A9	075	81	115	59	155	31	195	09
100	036	A8	076	80	116	58	156	30	196	08
075	037	A7	077	7F	117	57	157	2F	197	07
050	038	A6	078	7E	118	56	158	2E	198	06
025	039	A5	079	7D	119	55	159	2D	199	05
000	040	A4	080	7C	120	54	160	2C	200	04

AREA EXPANDER PROGRAMMING

The Area Expander option allows the GE-MARC V CLASSIC radio to operate in seven different areas with up to 20 channels in each area or 100 channels maximum. Two hundred different frequencies are available in each channel plan. Receive frequencies are always exactly 45 MHz above the transmit frequency and are not programmed or stored in the PROM.

The area expander board replaces the RF PROM/Interface board in the GE-MARC V Classic Radio, and is included in radios when digit 10 of the combination number is W, Y, or Z.

The RF frequency PROM contains 512 8-bit locations in which are stored the binary codes for up to 100 channels in a maximum of 7 areas along with three test frequencies for each area.

PROM ORDERING INFORMATION

The area expander PROM may be ordered by two different part numbers. Part number 19A700117P1 is a blank PROM which must be programmed by the user. Part number 19A702785G1 is a pre-programmed PROM. When ordering a pre-programmed PROM always include:

(1) the number of areas

(2) the number of channels in each area along with the assigned frequency for each channel

(3) the complete combination number of your radio including the structured options

RF PROM PROGRAMMING

Before programming the PROM determime how many areas are used, then group all transmit frequencies according to area. Areas should be assigned in sequence from 1 thru 7 with any unused areas being the higher numbered area. All areas must contain the same number of frequencies. If they do not repeat the frequencies in those areas that are short until all areas contain the same number of channels. A minimum of 5 channels must be programmed in each area. Each of the seven areas is assigned specific HEX addresses in the PROM. They are:

AREA	HEX ADDRESS	AREA	HEX ADDRESS
1	20-33	5	A0-B3
2	40-53	6	C0-D3
3	60-73	7	E0-F3
4	80-93		

If Option "H" is ordered, then RF frequencies must be repeated in all areas to equal the number required by the "H" option ordered.

NOTE

In radios with digit 10 being W, Y, or Z personality PROM locations 21-23 are set equal to 0 and location 31 is set equal to the number of channels required by Option H.

Refer to Tables 10-14 to determine the hexadecimal code for each transmit frequency.

Program locations 0-1F = to 0. Begin the loading sequence for Area 1 at location 20 (HEX). After Area 1 is loaded proceed to each succeeding area. All unused locations within each area must be programmed 00, 02 or 04. For Channel Plans USA-1, USA-1(ZT) (816-821 MHz) and Australia (820-825 MHz) program 00(H). For Channel Plan USA-2 (811-816 MHz) program 04(H). For USA-1,ZT (816-821 MHz) program 02(H).

NOTE

Frequencies may be repeated in different areas; but the total number of different channel frequencies cannot exceed 100 and the number of channels in a given area cannot exceed 20.

All locations above the last area ordered must be programmed to FF (HEX) for reset codes.

Each area is assigned three test frequencies. These frequencies are programmed in the locations identified in Table 15.

Finally, record all programming data on the PROM label. The Part No. for PROM label is 19C850828P1.

TABLE 15 - Test Frequency Locations

DIGIT TO CHANNEL PLAN	AREA	HEX ADDRESS/AREAS 1 2 3 4 5 6 7	FREQUENCY MHz	HEX	PROM GROUP No.
Z USA-1 816-821 MHz Tx	1 thru 7	3D,5D,7D,9D,BD,DD,FD 3E,5E,7E,9E,BE,DE,FE 3F,5F,7F,9F,BF,DF,FF	816.0125 818.5125 820.9875	00 64 C7	1
Z USA-1,ZT 816-821 MHz Tx	1 thru 7	3D,5D,7D,9D,BD,DD,FD 3E,5E,7E,9E,BE,DE,FE 3F,5F,7F,9F,BF,DF,FF	816.0125 818.5125 820.9875	02 66 C9	2
Y AUSTRALIA 820-825 MHz Tx	1 thru 7	3D,5D,7D,9D,BD,DD,FD 3E,5E,7E,9E,BE,DE,FE 3F,5F,7F,9F,BF,DF,FF	820.0125 822.5125 824.9875	00 64 C7	1,2
W USA-2 811-816 MHz Tx	1 thru 7	3D,5D,7D,9D,BD,DD,FD 3E,5E,7E,9E,BE,DE,FE 3F,5F,7F,9F,BF,DF,FF	811.0125 813.5125 815.9875	04 68 CB	1,2

The example below illustrates the PROM programming for a typical radio combination using the area expander option and with structured option F5 (5-areas).

Example:

Radio combination - M7YZ2P030Z0UAS000 USA-1

Structured option F5

WORK SHEET INFORMATION

820.6875	AREA 1	820.8875	AREA 2	820.4875	AREA 3
819.6875	AREA 1	819.8875	AREA 2	819.4875	AREA 3
818.6875	AREA 1	818.8875	AREA 2	818.4875	AREA 3
817.6875	AREA 1	817.8875	AREA 2	817.4875	AREA 3
		816.8875	AREA 2	816.4875	AREA 3

820.9875	AREA 4	820.3875	AREA 5
819.9875	AREA 4	819.3875	AREA 5
818.9875	AREA 4	818.3875	AREA 5
817.9875	AREA 4	817.3875	AREA 5
816.9875	AREA 4	816.3875	AREA 5

See Table 16 for the resulting bit map.

TABLE 16 - Bit Map For Area Expander Option For Group 1 PROM

AREA	ADDRESS (HEX)	FREQUENCY (MHz)	HEX CODES	REMARKS
1	0-1F		00	Initialization to first address used
	20	820.6875	BB	
	21	819.6875	93	
	22	818.6875	6B	
	23	817.6875	43	
	24	820.6875	BB	Repeat frequency
	25-3C		00	Unused locations
	3D	816.0125	00	Test frequencies
	3E	818.5125	64	
	3F	820.9875	C7	
2	40	820.8875	C3	
	41	819.8875	9B	
	42	818.8875	73	
	43	817.8875	4B	
	44	816.8875	23	
	45-5C		00	Unused locations
	5D	816.0125	00	Test frequencies
	5E	818.5125	64	
	5F	820.9875	C7	
3	60	820.4875	B3	
	61	819.4875	8B	
	62	818.4875	63	
	63	817.4875	3B	
	64	816.4875	13	
	65-7C		00	Unused locations
	7D	816.0125	00	Test frequencies
	7E	818.5125	64	
	7F	820.9875	C7	
4	80	820.9875	C7	
	81	819.9875	9F	
	82	818.9875	77	
	83	817.9875	4F	
	84	816.9875	27	
	85-9C		00	Unused locations
	9D	816.0125	00	Test frequencies
	9E	818.5125	64	
	9F	820.9875	C7	
5	A0	820.3875	AF	
	A1	819.3875	87	
	A2	818.3875	5F	
	A3	817.3875	37	
	A4	816.3875	0F	
	A5-BC		00	Unused locations
	BD	816.0125	00	Test frequencies
	BE	818.5125	64	
	BF	820.9875	C7	
6,7	C0-IF	(Rest of PROM)	FF	Area 6,7 not used.

PROM LABELS

A PROM Label is provided for the Personality RF Frequency and Area Expander PROMs. These labels describe the radios personality and are located inside the top cover of the radio. When the Area Expander option is provided the additional RF Frequency PROM labels are located inside the bottom cover. A review of the information contained on these labels will provide the service technician with a quick reference to the operating characteristics of the radio. The part number for the personality PROM blank label is 19C850828P1 and may be ordered from General Electric Service Parts.

PERSONALITY PROM LABEL

Information included on the Personality PROM label includes:

- Radio Serial Number
- PROM Addresses and Associated Hex (H) Code
- Personality PROM Group Number Identification
- Group Tones & Frequencies
- Call Light Indicators
- Operational Tones
- Alert Tone Type
- Call Monitor Indicator
- Area Select/Rx Scan Indicator
- Number of Channels/Area
- Carrier Control Timer (minutes and seconds
- External Alarm Indicator
- Base Station Option Indicator
- Voter Compatability Option Indicator

Always note the group number of the personality PROM used. Programming AREA locations (21-23) are different for different PROM groups. These differences are noted in the Programming instructions.

If the personality of the radio is changed (a new PROM blown), all information relating to the radio's new personality should be recorded either on the old label (if space is available) or on a new blank label. The blank label may be used to record program, information. A blank label is shown in Figure 2. A label for a typically programmed radio is shown in Figures 3 and 4. This radio requires option BO - No special call tone, F3-3 Areas, 1 channel per area, and HD - collect tone length equal to 20 channels.

RF FREQUENCY PROM LABEL

Information included on the RF Frequency PROM label consists of the radio serial number, the frequency PROM part number, (including group identification), PROM addresses, RF frequencies and associated hex codes and the Area numbers associated with the RF frequencies. The test frequencies are also identified. These are located in PROM addresses 30-32.

A blank label is shown in Figure 2. A label for a typically programmed label is shown in Figures 3 and 4. Figure 3 shows a radio programmed using Frequency Plan USA-1 with RF Frequency PROM 19A701922G1. Figure 4 shows a radio programmed using Frequency Plan USA-1,ZT with RF Frequency PROM 19A701922G2.

AREA EXPANDER PROM LABEL

Information included on the Area Expander PROM label consists of the radio serial number, part number of frequency PROM, PROM Addresses with Hex code, RF Frequency and area number for each channel used, and test frequencies and their location. Also, data that must be duplicated to satisfy the H option (when specified) requirement is shown. Figure 5 shows the programming for a typical Area Expander PROM using a group 2 frequency PROM.

NOTE

The HEX code assigned to the test frequencies differ depending on the group number of the frequency PROM used. The frequencies, however, remain the same. Refer to the coding for the frequency plan used.

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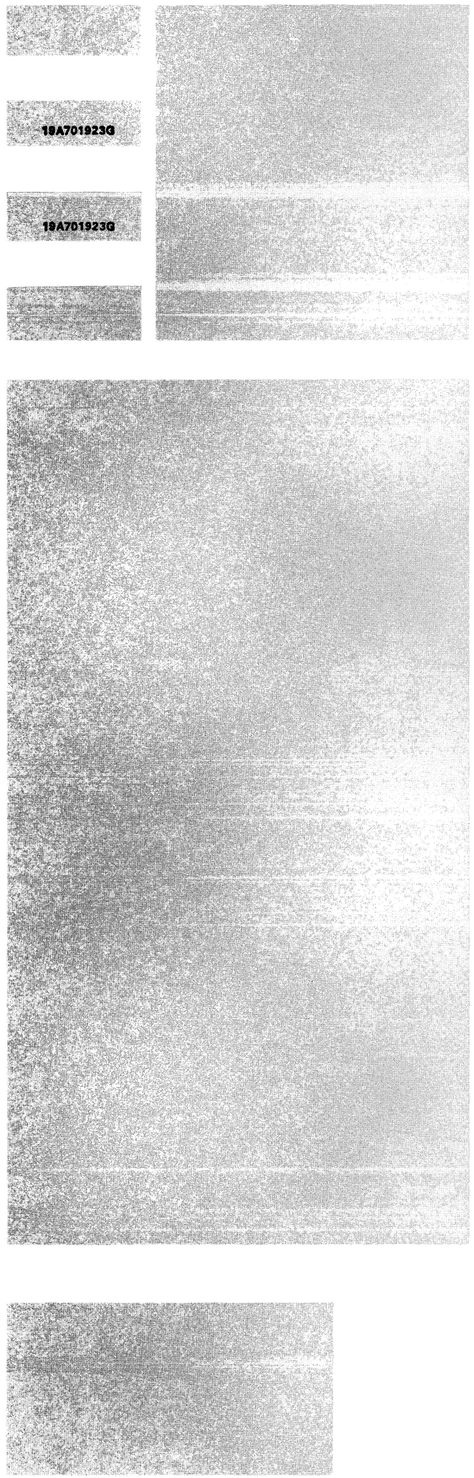

Figure 2 Blank PROM Label

FREQUENCY PLAN USA-1

FREQ. PROM LABEL FOR 19A701922G1

PROM ADDRESS	DATA (HEX)	FREQUENCY (MHZ)	AREA
1	C5	820.9375	1
2	1A	816.6625	2
3	1A	816.6625	2
4	1A	816.6625	2
5	1A	816.6625	2
6	70	818.8125	3
7	70	818.8125	3
8	70	818.8125	3
9	70	818.8125	3
10	70	818.8125	3
11	70	818.8125	3
12	70	818.8125	3
13	70	818.8125	3
14	70	818.8125	3
15	70	818.8125	3
16	70	818.8125	3
17	70	818.8125	3
18	70	818.8125	3
19	70	818.8125	3
20	70	818.8125	3
21	00		
22	00		
23	00		
24	00		
25	00		
26	00		
27	00		
28	00		
29	00		
30	00		
31	00		
32	00		

NOTE 2

NOTE 1

RADIO SERIAL NO. 3260103

PERSONALITY PROM LABEL FOR 19A701923G4

GROUP TONES	FREQUENCY(HZ)	CALL LT.	PROM ADDR	DATA HEX
#1	911.5	X	1	99
#2	1877.5		2	3E
#3			3	19
#4			4	81
#5			5	01
INDIVIDUAL			6	00
COLLECT	1304.0		7	01
ACQUISITION	1962.9		8	00
BUSY	3051.9		9	01
NO BAS/TEL	GPTN#1		10	00
			11	00
CARRIER CNTR TMR: 2 MINS. 30 SECS.			12	00
			13	96
ALERT TONES: ORIGINATE	RECEIVE		14	59
			15	D4
STANDARD	STANDARD	X	16	86
STANDARD	SILENT		17	96
FANCY	STANDARD		18	D1
FANCY	FANCY		19	96
			20	3E
CALL MONITOR			21	31
AREA SELECT RECEIVER SCAN			22	4F
			23	00
AREA	NUMBER OF CHANNELS		24	BF
			25	FB
1 6	1 IF AREA-EXP,		26	29
2 7	4 EACH AREA IS		27	D1
3	15 FILLED TO =		28	B2
4	H-OPTN VAL OR		29	DA
5	MAX AREA SIZE		30	96
			31	94
EXTERNAL ALARM			32	4A
BASE STATION OPTION		X		
VOTER COMPATABILITY OPTION				

Group Tone 1 911.5 Hz

Group Tone 2 1877.5 Hz

OPTION BO Repeat Group Tone 1

F3 - 3 Areas used

HD Option - 20 channels

RADIO SERIAL NO. 3260103

FREQUENCY PROM KIT
19A701922G1
RADIO SERIAL NUMBER
3260103
RELEASE NO. MFG. DATE CDE
07-SEP-83

PERSONALITY PROM KIT
19A701923G4
RADIO SERIAL NUMBER
3260103
RELEASE NO. MFG. DATE CDE
07-SEP-83

NOTES

1. Repeat Frequencies programmed in highest numbered area used. (15 Maximum per area)
2. Repeat Frequencies as necessary to equal requirements of H Option. (In sequence when multiple frequencies are used)

Figure 3. Personality PROM Label, Typical.

FREQUENCY PLAN USA-1, 2T

FREQ. PROM LABEL FOR 19A701922G2

PROM ADDRESS	DATA (HEX)	FREQUENCY (MHZ)	AREA
1	C7	820.9375	1
2	1C	816.6625	2
3	1C	816.6625	2
4	1C	816.6625	2
5	1C	816.6625	2
6	72	818.8125	3
7	72	818.8125	3
8	72	818.8125	3
9	72	818.8125	3
10	72	818.8125	3
11	72	818.8125	3
12	72	818.8125	3
13	72	818.8125	3
14	72	818.8125	3
15	72	818.8125	3
16	72	818.8125	3
17	72	818.8125	3
18	72	818.8125	3
19	72	818.8125	3
20	72	818.8125	3
21	02		
22	02		
23	02		
24	02		
25	02		
26	02		
27	02		
28	02		
29	02		
30	02	816.0125	
31	66	818.5125	
32	C9	820.9875	

RADIO SERIAL NO. 3260103

PERSONALITY PROM LABEL FOR 19A701923G4

GROUP TONES	FREQUENCY(HZ)	CALL LT.	PROM ADDR	DATA HEX
#1	911.5	X	1	99
#2	1877.5		2	3E
#3			3	19
#4			4	81
#5			5	01
INDIVIDUAL			6	00
COLLECT	1304.0		7	01
ACQUISITION	1962.9		8	00
BUSY	3051.9		9	01
NO BAS/TEL	GPTN#1		10	00
			11	00
CARRIER CNTR TMR: 2 MINS. 30 SECS.			12	00
			13	96
ALERT TONES: ORIGINATE	RECEIVE		14	59
			15	D4
STANDARD	STANDARD	X	16	86
STANDARD	SILENT		17	96
FANCY	STANDARD		18	D1
FANCY	FANCY		19	96
			20	3E
CALL MONITOR			21	31
AREA SELECT RECEIVER SCAN			22	4F
			23	00
AREA	NUMBER OF CHANNELS		24	BF
			25	FB
1 6	1 IF AREA-EXP,		26	29
2 7	4 EACH AREA IS		27	D1
3	15 FILLED TO =		28	B2
4	H-OPTN VAL OR		29	DA
5	MAX AREA SIZE		30	96
			31	94
EXTERNAL ALARM			32	4A
BASE STATION OPTION		X		
VOTER COMPATABILITY OPTION				

RADIO SERIAL NO. 3260103

FREQUENCY PROM KIT
19A701922G2
RADIO SERIAL NUMBER
3260103
RELEASE NO. MFG. DATE CDE
13-JUL-83

PERSONALITY PROM KIT
19A701923G4
RADIO SERIAL NUMBER
3260103
RELEASE NO. MFG. DATE CDE
13-JUL-83

Figure 4. RF Frequency (Group 2) and Personality PROM Labels.

19A701922G

19A702785G2

TEST FREQS: ALL AREAS

ADR	HEX(G2)	FREQS
ND	02	816.0125
NE	66	818.5125
NF	C9	820.9875

N = 3,5,7,9,B,D,F

FREQ. PROM LABEL FOR 19A702785G2

PROM ADDRESS	DATA (HEX)	FREQ(MHZ) OR PRM ADRS	AREA
--	00	00 TO 1F	
20	C6	820.9125	1
21	9E	819.9125	1
22	76	818.9125	1
23	4E	817.9125	1
24	26	816.9125	1
25	T0	33: DUPL	1
		OF 20-24	1
--	02	34 - 3C	
3D	T0	3F: TEST	
40	A8	820.1625	2
41	80	819.1625	2
42	58	818.1625	2
43	30	817.1625	2
44	08	816.1625	2
45	C3	820.8375	2
46	9B	819.8375	2
47	73	818.8375	2
48	4B	817.8375	2
49	23	816.8375	2
4A	T0	53: DUPL	2
		OF 40-49	2
--	02	54 - 5C	
5D	T0	5F: TEST	
60	AE	820.3125	3
61	86	819.3125	3
62	5E	818.3125	3
63	36	817.3125	3
64	0E	816.3125	3
65	T0	73: DUPL	3
		OF 60-64	3
--	02	74 - 7C	
7D	T0	7F: TEST	
80	BD	820.6875	4
81	95	819.6875	4

Locations to first Address used filled with zeros.

Locations between areas filled with "02".

DATA duplicated to equal channels specified by H OPTION

TEST frequencies programmed for each area.

RADIO SERIAL NO. 2480001

FREQ. PROM LABEL FOR 19A702785G2

PROM ADDRESS	DATA (HEX)	FREQ(MHZ) OR PRM ADRS	AREA
82	6D	818.6875	4
83	45	817.6875	4
84	1D	816.6875	4
85	A8	820.1625	4
86	80	819.1625	4
87	58	818.1625	4
88	30	817.1625	4
89	08	816.1625	4
8A	AE	820.3125	4
8B	86	819.3125	4
8C	5E	818.3125	4
8D	36	817.3125	4
8E	0E	816.3125	4
8F	T0	93: DUPL	4
		OF 80-8E	4
--	02	94 - 9C	
9D	T0	9F: TEST	
A0	AC	820.2625	5
A1	84	819.2625	5
A2	5C	818.2625	5
A3	34	817.2625	5
A4	0C	816.2625	5
A5	B1	820.3875	5
A6	89	819.3875	5
A7	61	818.3875	5
A8	39	817.3875	5
A9	11	816.3875	5
AA	B6	820.5125	5
AB	8E	819.5125	5
AC	66	818.5125	5
AD	3E	817.5125	5
AE	16	816.5125	5
AF	A2	820.0125	5
B0	7A	819.0125	5
B1	52	818.0125	5

RADIO SERIAL NO. 2480001

FREQ. PROM LABEL FOR 19A702785G2

PROM ADDRESS	DATA (HEX)	FREQ(MHZ) OR PRM ADRS	AREA
B2	2A	817.0125	5
B3	02	816.0125	5
		MAX SIZE	
		NO DUPL	
--	02	B4 - BC	
BD	T0	BF: TEST	
C0	A8	820.1625	6
C1	80	819.1625	6
C2	58	818.1625	6
C3	30	817.1625	6
C4	08	816.1625	6
C5	AE	820.3125	6
C6	86	819.3125	6
C7	5E	818.3125	6
C8	36	817.3125	6
C9	0E	816.3125	6
CA	T0	D3: DUPL	6
		OF C0-C9	6
--	02	D4 - DC	
DD	T0	DF: TEST	
E0	BD	820.6875	7
E1	95	819.6875	7
E2	T0	F3: DUPL	7
		OF E0-E1	7
--	02	F4 - FC	
FD	T0	FF: TEST	
--	FF	100- 1FF	
		TST FRQS	
-D	02	816.0125	
-E	66	818.5125	
-F	C9	820.9875	

All remaining unused locations filled with zeros (FF)

RADIO SERIAL NO. 2480001

FREQ. PROM KIT(AREA EXPANDER)
19A702785G2
RADIO SERIAL NUMBER
2480001

RELEASE NO.	MFG.	DATE CODE
150002	45T081	08-SEP-83

Figure 5. Area Expander PROM Label Programming, typical (PROM 19A702785G2)

ADDENDUM NO. 1 TO LBI31161B
PC N7

This addendum corrects Table 5 "Tone Frequency Coding of Duplex Radios" on page 8 of LBI31161B.
The corrections are indicated on the table below.

Tone Number	Frequency (Hz)	1st Byte			2nd Byte
		Q=79.6 Collect, Acq., Busy & SPL Tone	Q=160.1 Group & Individual Tone w/o call light	Q=160.1 Group & Individual Tone with call light	
1.	604.2	56	58	59	2C
2.	631.5	56	58	59	2E
3.	662.3	96	98	99	30
4.	693.0	~~96~~ D6	~~98~~ D8	~~99~~ D9	~~31~~ 32
5.	727.1	56	58	59	35
6.	761.3	D6	D8	D9	37
7.	795.4	56	58	59	3A
8.	832.9	16	18	19	3D
9.	870.5	D6	D8	D9	3F
10.	911.5	D6	D8	D9	42
11.	952.4	D6	D8	D9	45
12.	996.8	16	18	19	49
13.	1041.2	56	58	59	~~4~~ 4C
14.	1089.0	D6	D8	D9	4F
15.	1140.2	96	98	99	53
16.	1191.4	56	58	59	57
17.	1246.0	56	58	59	5B
18.	1304.0	96	98	99	5F
19.	1362.1	D6	D8	D9	63
20.	1423.5	56	58	59	68
21.	1488.4	16	18	19	6D
22.	1556.7	16	18	19	72
23.	1628.3	56	58	59	77
24.	1717.1	D6	D8	D9	7D
25.	1795.6	96	98	99	83
26.	1877.5	96	98	99	89
Q=34ACQ. TONE	1962.9	D4	D6	D7	8F
27.	2051.6	56	58	59	96
28.	2143.8	16	18	19	9D
29.	2239.4	16	18	19	A4
30.	2341.8	96	98	99	AB
31.	2447.6	56	58	59	B3
32.	2556.9	56	58	59	BB
33.	2672.9	D6	D8	D9	C3
34.	2792.4	96	98	99	CC
ALT. BUSY	2918.7	D6	D8	D9	D5
BUSY	3051.9	96	98	99	DF

Table 5 - Tone Frequency Coding for Duplex Radios
(Personality PROM 19A701923G5)

This addendum updates the PROM programming instructions by correcting the Bit Maps on Pages 9, 10, and 12. It also adds the acquisition, busy, and alternate busy tones Tables 3 and 4.

- Acquisition and busy tone data are added to Tables 3 and 4 as follows:

Acquisition Tone:	1962.9 (Q = 34.9)	D5	D4	86	1101	010X	1000	0110
Busy Tone:	3051.9	97	96	D1	1001	011X	1101	0001
ALT. Busy Tone:	2918.7	97	96	C8	1001	011X	1100	1000

- Correct the HEX code for location 25 on Bit Maps on Pages 9, 10, and 12 as follows:

  Location 25 HEX code should be F8.