MAINTENANCE MANUAL FOR PROGRAMMING MPR CONTROLLER PROMS

1.0 FORWARD

The purpose of this instruction is to describe the programming of the 19A134331P4 PROM used as a system controller in MPP. The PROM has 32 addressable 8 bit words. Only 20 addresses are used. The first four bits (3,2,1,0) of the 8 output bits are used to program the desired oscillator. The second four bits (7,6,5,4) are used to program the options and offset oscillators. The chart below is a tabular description of the PROM and its programming. PROM addresses are given in decimal. Throughout this instruction a "0" indicates a low voltage ($\leq$0.5 VDC) and a "1" indicates a high voltage ($\geq$5.0 VDC).

It would be convenient to make up a programming chart similar to the one in paragraph 4.0. Testing and label marking would be much easier.

Some symbols used in this instruction are:

DCG	Digital Channel Guard
CG	Channel Guard
MTCG	Multiple Tone Channel Guard
T99	Type 99
G*	GE-STAR
Hi/Lo	Hi/Lo Power
Offset 1	Offset Oscillator Number 1
Offset 2	Offset Oscillator Number 2
Rx	Receiver
Tx	Transmitter
MCDCG	Multiple Code Digital Channel Guard

-------PROM OUTPUT BITS--------

7	6	5	4	3	2	1	0
Option Bits				Oscillator Bits			

Channel		PROM Address
Rx	1	0
Rx	2	1
Rx	3	2
Rx	4	3
Rx	5	4
Rx	6	5
Rx	7	6
Rx	8	7
Rx	9	8
Rx	10	9
Tx	1	16
Tx	2	17
Tx	3	18
Tx	4	19
Tx	5	20
Tx	6	21
Tx	7	22
Tx	8	23
Tx	9	24
Tx	10	25

2.0 OSCILLATOR PROGRAMMING

PROM output bits 3,2,1 and 0 are used to program the oscillators. On each channel these bits are programmed with the BCD equivalent of the desired oscillator number less one (osc #-1) $\rightarrow$BCD. For example, if the requirement for channel 5 is:

Rx osc #5 (5-1)=4 0100_2 into output bits 3,2,1,0 of PROM address 4

Tx osc #4 (4-1)=3 0011_2 into output bits 3,2,1,0 of PROM address 20

If Rx and Tx oscillators are not specified on a channel, program that channel for an oscillator whose number is the same as the channel number. For example, if channel 10 is not specified, bits 3,2,1 and 0 of PROM adresses 9 and 25 should be programmed to (10-1)=9 1001_2.

3.0 OPTION PROGRAMMING

PROM output bits 7,6,5, and 4 are used to program the options. The option and output bit correlation is shown in the table below. Bit 4 is used for Control Board Disables. Bit 7 is used for System Board Disables.

PROM Output Bits	OPTION
4	T99, MTCG,CG, DCG, OR MCDCG
5	G*, OFFSET 1
6	Hi/Lo, OFFSET 2
7	CG, DCG, G*, OR HI/LO

Programming for each option is:

	Program Inputs	
Option	"0"	"1"
DCG	Disable	On
CG	Disable	On
MTCG	Disable	On
T99	Disable	On
G*	Disable	On
Hi/Lo	Low Power	High Power
Offset 1	On	Off
Offset 2	On	Off
MCDCG	Disable	On

NOTES

(1) The disable line on CG and MTCG disables both encode and decode. The encode and decode disables can be programmed independently by using the appropriate Tx and Rx addresses.

(2) If no option is called for in an option bit, that bit must be made a "1". In unused channels, all four option bits will will be "1". The only exception to this is the offset oscillators. If the offsets are not specified, program offset 1 to "0" and offset 2 to "1".

(3) In cases where option programming is irrelevant (such as T99 in Tx addresses or Hi/Lo in Rx addresses) program the Tx and Rx addresses the same.

4.0 PROGRAM EXAMPLE

High Band requirements:

Channel #	Rx Osc	Tx Osc	CG	Hi/Lo	T99
1	1	1	Disable	Hi	517.5/832.5
2	2	2	71.9	Hi	Disable
3	3	Repeat 1	71.9	Hi	Disable
4	4	3	71.9	Lo	Disable
5	Repeat 3	4	71.9	Lo	517.5/832.5
6	5	Repeat 4	Dec Dis	Hi	Disable

Channel #		PROM Address	7	6	5	4	3	2	1	0
Rx	1	0	0	1	1	1	0	0	0	0
	2	1	1	1	1	0	0	0	0	1
	3	2	1	1	1	0	0	0	1	0
	4	3	1	0	1	0	0	0	1	1
	5	4	1	0	1	1	0	0	1	0
	6	5	0	1	1	0	0	1	0	0
	7	6	1	1	1	1	0	1	1	0
	8	7	1	1	1	1	0	1	1	1
	9	8	1	1	1	1	1	0	0	0
	10	9	1	1	1	1	1	0	0	1
Tx	1	16	0	1	1	1	0	0	0	0
	2	17	1	1	1	0	0	0	0	1
	3	18	1	1	1	0	0	0	0	0
	4	19	1	0	1	0	0	0	1	1
	5	20	1	0	1	1	0	1	0	1
	6	21	1	1	1	0	0	1	0	1
	7	22	1	1	1	1	0	1	1	0
	8	23	1	1	1	1	0	1	1	1
	9	24	1	1	1	1	1	0	0	0
	10	25	1	1	1	1	1	0	0	1

5.0 TESTS

After programming, test the PROM to be sure it is programmed and functioning correctly. The programming chart would be useful here. If many PROMS are to be programmed alike, be sure to test the first one programmed before programming the remaining PROMS.

6.0 LABEL MARKING

After the PROM has been programmed and tested, mark label (NP280598) according to the programming. The Tx and Rx oscillators are to be marked in the appropriate channel positions. Mark the option space using a hexidecimal number to indicate the condition of each bit as shown in below.

PROM OUTPUT BITS 7 6 5 4	MARKING
0 0 0 0	0
0 0 0 1	1
0 0 1 0	2
0 0 1 1	3
0 1 0 0	4
0 1 0 1	5
0 1 1 0	6
0 1 1 1	7
1 0 0 0	8
1 0 0 1	9
1 0 1 0	A
1 0 1 1	B
1 1 0 0	C
1 1 0 1	D
1 1 1 0	E
1 1 1 1	F

The chart and label below is from the example in paragraph 4. All spaces on the label should be marked. Package the marked label and programmed PROM together.

Channel #		Address	7 6 5 4	3 2 1 0
Rx	1	0	7	1
	2	1	E	2
	3	2	E	3
	4	3	A	4
	5	4	B	3
	6	5	6	5
	7	6	F	6
	8	7	F	7
	9	8	F	8
	10	9	F	9
Tx	1	16	7	1
	2	17	E	2
	3	18	E	1
	4	19	A	3
	5	20	B	4
	6	21	D	4
	7	22	F	5
	8	23	F	6
	9	24	F	7
	10	25	F	8

Channel	1	2	3	4	5	6	7	8	9	10
Rx Osc	1	2	3	4	3	5	6	7	8	9
Rx Opt	7	E	E	A	B	6	F	F	F	F
Tx Osc	1	2	1	3	4	4	5	6	7	8
Tx Opt	7	E	E	A	B	D	F	F	F	F

7.0 PROM OPTION PROGRAMMING IDENTIFICATION

PROM bytes 30 and 31 are used to indicate what options were programmed in option bits 4,5,6 & 7. All CG, DCG, MTCG, T99, and G* programming are disables (Open).

Use the table below to program bytes 30 & 31.

ADDRESS 30	7	Option Bit 7: 6	5	4	3	Option Bit 4: 2	1	0
No Option	0	0	0	0	0	0	0	0
CG (System Board)		0	0	1				
CG (Control Board)						0	0	1
DCG (System Board)		0	1	0				
DCB (Control Board)						0	1	0
MTCG						0	1	1
MCDCG						1	0	0
T99						1	0	1
G*		0	1	1				
Hi/Lo		1	0	0				

ADDRESS 31	7	6	Option Bit 6: 5	4	3	2	Option Bit 5: 1	0
No Option	0	0	0	0	0	0	0	0
Offset 1							0	1
G*							1	0
Hi/Lo			0	1				
Offset 2			1	0				

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

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