



Mobile Communications

PROGRAMMING INSTRUCTIONS FOR
PHOENIX-S, PHOENIX-SX
USING THE 4EX22A10 PROGRAMMER

TABLE OF CONTENTS

DESCRIPTION	1
TO PROGRAM PHOENIX-3/SX	
Preparation	1
Programming Procedures	1
Programming Number of Channels	1
Programming CCT Time Out	1
Programming Channel Guard	2
Sample Worksheets	3
Address (34) Programming	6

TABLES

1. Channel Address	2
2. Channel Guard Type	2
3a. Tone Channel Guard	2
3b. Digital Channel Guard	5
3c. Inverted Digital Channel Guard	5
4a. CCT Enable/Disable Code	6
4b. CCT Delay Code	6
5. Channel Code	6
6. Decimal - Hex Conversion	6
7. RF Frequencies	
7a. VHF Narrowband 150.8-162.5 MHz (5 kHz Divisor)	7
7b. VHF Narrowband 150-174 MHz (6.25 kHz Divisor)	23
7c. UHF Narrowband 450-470 MHz (12.5 kHz Divisor)	43
7d. VHF Wideband 136-153 MHz (5 kHz Divisor)	59
7e. VHF Wideband 150.8-174 MHz (5 kHz Divisor)	71
7f. VHF Wideband 136-174 MHz (6.25 kHz Divisor)	83
7g. UHF Wideband 403-470 MHz (12.5 kHz Divisor)	115
7h. UHF Wideband 470-512 MHz (12.5 kHz Divisor)	143

Extra Worksheets (4)

ECR 2994

DESCRIPTION

These instructions are to be used in conjunction with the instructions for the 4FX22A10 EEPROM Programmer (LBI31189). The worksheets, tables and examples in this manual are for programming Phoenix-S/SX field programmable radios. While much of the data may also pertain to other radios, there may be some differences. For this reason, the data and procedures should be used for programming ONLY Phoenix-S or SX radios.

TO PROGRAM PHOENIX-S/SX

Preparation

1. The radio must be turned OFF.
2. Remove the cover. Remove option board, if present.
3. Plug P1 (10-pin connector) and P2 (11-pin connector) onto the pins of J802 located on either side of EEPROM U805 and extending above it. Note the orientation notch on the plug labels and the notch on U805.
4. Turn the radio ON to provide power.
5. Set the Prom Switch S6 on the Programmer to PROM 1.

You may now begin programming the radio.

PROGRAMMING PROCEDURE
(See Example Worksheet)

1. Determine and record the Channel Guard Type, CG Frequency (Tone or Digital Code), RF, RX & TX Frequencies and CCT time for each channel to be programmed on the worksheet. NOTE: CCT timing is the same for all channels but CCT can be present or deleted on a channel by channel basis.
2. Look up Hex codes in tables and record on worksheet.

NOTE

The reference divisor (0.005 MHz, 0.00625 or 0.0125 MHz) listed at the top of Table 7 MUST be the same for Transmit and Receive for any given channel.

3. Set PROM Switch (S6) to 1.
4. Set Channel Address (S3).
5. Set Function Address (S4).
6. Set Data Hex Code in column below it with (S5).
7. Push (S1) to write Data in Memory.

8. Repeat steps 5 thru 7, digit by digit, as often as needed to write the data for that channel.
9. Move to next channel by advancing S3 and repeating the above procedure 4 thru 8 entering data.
10. When all channels have been written, push (S2) to store data permanently in radio.
11. Turn the radio off and remove programmer.
12. Test radio to assure proper programming.

Number of Channels

Program the number of channels in the radio to limit EEPROM search. If six channels or less, put the Hexadecimal code (Table 5) in the (0) position on the worksheet.

If there are more than six channels in Mode A or seven in Mode B, use the following procedure:

1. From Table 7-C select the Hex Code for 466-300 MHz. (Hex = 83283). The first transmit function code is the 8.
2. From Table 5 select the Hex Code for 8 channels. (Hex = 7).
3. Find the sum of the two and convert back to HEX.

1st function code		
for TX FREQ	8	(Table 7)
Code for 8 channels	7	(Table 5)
	15	
15 converted to HEX =	F	(Table 6)
4. Enter F on S5 for the (0) position.

The number of channels must be programmed in Mode A and Mode B.

CCT Time Out

The CCT time out may be enabled or disabled on a per channel basis. The time out delay that is selected will be the same for all channels.

CCT Enable/Disable Bit Code (Table 4-A)

The CCT enable/disable bit code is entered under Transmit Functions (CCT) on the worksheet.

CCT Bit Delay Code (Table 4-B)

The CCT delay code must be programmed in the channel 8 (*) position on the worksheet. Get CCT code from Table 4-B.

If channel 8 is used, the codes must be summed.

EXAMPLE

- From Table 7-C select the Hex Code for 466-425 MHz (Hex = 83228). The first Transmit function code is the 8.
- From Table 4-B select the Hex Code for 3:00 minutes. (Hex = 5)
- Find the sum of the two and convert back to HEX.

1st function code
for TX FREQ 8 (Table 7-C)
CCT Code for 3:00 Min 7 (Table 4-B)
13

13 Converted to HEX = D (Table 6)

- Enter D on S5 for the (*) position.

Channel Guard

The Channel Guard may be selected on a channel by channel basis in several possible configurations, such as:

- o No Channel Guard
- o Tone CG only
- o Digital Code CG - RX & Tx
- o RX DCG & TX Tone CG or no TX CG
- o TX DCG & RX Tone CG or no RX CG

See Table 2 for Hex codes for the type of Channel GUARD SELECTION. THE HEX CODES FOR CG TONES OR DIGITAL CODE ARE FOUND IN TABLE 3.

NOTE

- ON WIDEBAND RADIOS USING DCG, AN INVERTED DIGITAL CODE MUST BE USED (TX & RX). REFER TO TABLE 3-C.
- PHOENIX-SX UHF Mobile radios using the 19D901205G1-G3 Synthesizer/Interconnect Board must use INVERTED DIGITAL CHANNEL GUARD (hex codes from Table 3-C). Check the 19D901205 board and verify that jumper W701 is removed and jumper between HL65 and HL66 is installed.
- On narrowband, VHF, hi-split radios (combination number digit 4 and 8 = K and N) with DCG, the Inverted Digital code MUST be used for the Receive CG ONLY. The TX DCG is NOT inverted.

Disable Transmitter

"Open" transmit or receive channels may be programmed. When a receive channel is blank, the receiver will stay muted. When a transmit channel is blank, the transmitter is disabled. To program an open channel the data address (under the 'Mode A' function 5 or 'Mode B' function D) is set to F. The remaining four data addresses no longer have any effect.

TABLE 1
CHANNEL ADDRESS MODE A OR B

Channel	RX Address	TX Address
1	2	3
2	4	5
3	6	7
4	8	9
5	A	B
6	C	D
7	E	F
8	0	1

TABLE 2
CHANNEL GUARD TYPE

FUNCTION	W/O STE HEX CODE	WITH STE HEX CODE
NO CG or TONE CG ONLY	0	2
RX & TX DCG	E	C
RX DCG & TX TONE CG or NO TX CG/DCG	A	8
TX DCG & RX TONE CG or NO RX CG/DCG	6	4

TABLE 3-A
TONE CG DATA

TONE FREQ (A) (B)	HEX CODE 6 E	7 F
NO CG	0	0
67.0	1	0
71.9	2	0
74.4	3	0
77.0	4	0
79.7	5	0
82.5	6	0
85.4	7	0
88.5	8	0
91.5	9	0
94.8	A	0
97.4	1	2
100.0	B	0
103.5	C	0
107.2	D	0
110.9	E	0
114.8	F	0
118.8	0	1
123.0	1	1
127.3	2	1
131.8	3	1
136.5	4	1
141.3	5	1
146.2	6	1
151.4	7	1
156.7	8	1
162.2	9	1
167.9	A	1
173.8	B	1
179.9	C	1
186.2	D	1
192.8	E	1
203.5	F	1
210.7	0	2

	Chan Addr	Receive Functions						Chan Addr	Transmit Functions						Set			
	(S3)	CG Type	(Frequency)			(CG)	(S3)	(CCT)	(Frequency)			(CG)						
			0	1	2 3 4 5				6 7	0	1		2 3 4 5	6 7				
Channel 1 Mode A	2	0	9	0	2	2	8	0	0	0	8	3	2	2	2	0	0	→ S4
		NONE		461.025			NONE		DIS		466.025					NONE	→ S5	
Channel 2 Mode A	4	0	9	0	2	4	8	8	1	8	8	3	2	4	2	8	1	→ S5
		T		461.050			156.7		EN		466.050				156.7			
Channel 3 Mode A	6	C	9	0	2	6	8	0	3	8	8	3	2	6	2	0	3	→ S5
		D		461.075			116		EN		466.075				116			
Channel 4 Mode A	8	8	9	0	2	8	8	0	3	8	8	3	2	8	2	8	1	→ S5
		D/T		461.100			116		EN		466.100				156.7			
Channel 5 Mode A	A					F				B					F			→ S5
						OPEN									OPEN			
Channel 6 Mode A	C	4	9	0	2	A	8	8	1	8	8	3	2	A	2	0	3	→ S5
		T/D		461.125			156.7		EN		466.125				116			
Channel 7 Mode A	E	0	9	0	2	8	9	0	0	8	8	3	2	8	3	0	0	→ S5
		NONE		461.300			NONE		EN		466.300				NONE			
Channel 8 Mode A	0	0	9	0	2	2	A	0	0	8	8	3	2	2	8	0	0	→ S5
		NONE		461.425			NONE		EN		466.425				NONE			

Channel Address - Table 1 CG Type - Table 2 CG - Table 3
CCT - Table 4 Frequency (RX & TX) - Table 7

0 SPECIAL - To set number of channels in Mode A (see instructions)
* SPECIAL - CCT time set (see instructions)

1. Determine and record the Channel Guard Type, CG Frequency (Tone or Digital Code), RF, RX & TX Frequencies and CCT time for each channel to be programmed on the worksheet. NOTE - CCT timing is the same for all channels but CCT can be enabled or disabled on a channel by channel basis.
2. Look up data in tables and record on worksheet.
3. Set PROM Switch (S6) to 1.
4. Set Channel Address (S3).
5. Set Function Address (S4) and Data Address in column below it with (S5). Push (S1) to write Data in Memory.

	Chan Addr	Receive Functions						Chan Addr	Transmit Functions						Set				
	(S3)	CG Type	(Frequency)				(CG)	(S3)	(CCT)				(Frequency)	(CG)					
		8	9	A	B	C	D	E	F		8	9	A	B	C	D	E	F	
Channel 1 Mode B	2	0	9	D	2	2	8	00		3	0	8	0	2	2	1	00		← S4
		NONE						461.025	NONE			DIS						461.025	NONE
Channel 2 Mode B	4	0	9	D	2	4	8			5	8	8	0	2	4	1	81		← S5
		T						461.050	156.7			EN						461.050	156.7
Channel 3 Mode B	6	C	9	D	2	6	8	03		7	8	8	0	2	6	1	03		← S5
		D						461.075	116			EN						461.075	116
Channel 4 Mode B	8	4	9	D	2	8	8	81		9	8	8	0	2	8	1	03		← S5
		T/D						461.100	156.7			EN						461.100	116
Channel 5 Mode B	A	0	9	D	2	0	9	00		B	8	8	0	2	0	2	11		← S5
		TX TONE						461.200	NONE			EN						461.200	123.0
Channel 6 Mode B	C									D									← S5
Channel 7 Mode B	E									F									← S5
Channel 8 Mode B	0									1									← S5

Channel Address - Table 1 CG Type - Table 2 CG - Table 3

CCT - Table 4 Frequency (RX & TX) - Table 7

⊗ SPECIAL - To set number of channels in Mode B (see instructions)

- Repeat step (5) digit by digit as often as needed to write the data for the channel. Move to next channel and enter data.
- When all channels have been written, push (S2) to store data permanently in radio.
- Test radio to assure proper programming.

TABLE 3-B
DIGITAL CHANNEL GUARD DATA

DIG CG (A) (B)	HEX CODE 6 7 E F	DIG CG (A) (B)	HEX CODE 6 7 E F	DIG CG (A) (B)	HEX CODE 6 7 E F
023	3 1	261	7 9	654	3 7
025	5 1	263	B 8	662	3 F
026	6 1	265	9 7	664	4 E
031	9 1	271	9 8	703	8 6
032	A 1	306	7 6	712	E 5
043	3 2	311	9 C	723	D 9
047	7 2	315	D C	731	4 0
051	9 2	331	9 D	732	4 7
054	C 2	343	4 D	734	6 3
065	5 3	346	6 E	743	A C
071	9 3	351	9 E	754	E 3
072	A 3	364	8 5	036*	E 1
073	B 3	365	7 4	053*	B 2
074	C 3	371	F 8	122*	2 5
114	C 4	411	F 4	145*	5 6
115	D 4	412	7 5		
116	0 3	413	B 5	212*	A 8
125	5 5	423	C 9	225*	5 9
131	9 5	431	2 B	246*	6 A
132	A 5	432	E B	252*	A A
134	C 5	445	2 9	255*	D A
143	3 6	464	F 9	266*	6 B
152	A 6	465	E 2	274*	C B
155	D 6	466	4 6	325*	5 D
156	E 6	503	F 6	332*	A D
162	2 7	506	4 9	356*	E E
165	5 7	516	3 7	446*	3 0
172	A 7	532	1 7	452*	5 0
174	2 6	546	F C	454*	6 0
205	D 5	565	7 C	455*	7 0
223	3 9	606	B 6	462*	8 0
226	4 4	612	C A	523*	9 0
243	3 A	624	D 3	526*	A 0
244	E 7	627	P 1		
245	5 A	631	9 9		
251	E 9	632	3 5		

*Exclusive GE Codes

This Digital CG table is used with Phoenix-S/SX as follows:

1. VHF, Narrow band, TX.
2. VHF, Narrowband, RX, 150-162 MHz
3. UHF, Narrowband, TX & Rx.

TABLE 3-C
INVERTED DIGITAL CHANNEL GUARD DATA

DIG CG (A) (B)	HEX CODE 6 7 E F	DIG CG (A) (B)	HEX CODE 6 7 E F	DIG CG (A) (B)	HEX CODE 6 7 E F
023	7 2	261	4 7	654	A C
025	E 7	263	D 5	662	4 6
026	F 9	265	E 6	664	9 C
031	F 1	271	5 3	703	7 C
032	9 2	306	9 3	712	C 4
043	2 9	311	4 E	723	2 B
047	3 1	315	C 9	731	D 6
051	A 1	331	E 2	732	7 9
054	B 5	343	1 7	734	F 8
065	9 B	346	C A	743	3 7
071	7 6	351	3 A	754	0 3
072	5 A	364	9 5	036*	A 7
073	4 9	365	5 5	053*	5 0
074	2 6	371	6 3	122*	5 9
114	E 5	411	4 4	145*	C B
115	A 6	412	3 6		
116	E 3	413	C 2	212*	E E
125	7 4	423	D C	225*	2 5
131	8 5	431	D 9	246*	9 0
132	F C	432	7 3	252*	8 0
134	3 9	445	3 2	255*	3 0
143	7 5	464	6 1	266*	6 0
152	D 4	465	9 D	274*	5 6
155	4 0	466	3 F	325*	A 0
156	9 7	503	2 7	332*	7 0
162	F 6	506	B 3	356*	A 8
165	E 9	516	E B	446*	D A
172	E 1	532	4 D	452*	B 2
174	C 3	546	A 5	454*	6 B
205	B 8	565	8 6	455*	A D
223	C 5	606	9 9	462*	A A
226	F 4	612	6 E	523*	6 A
243	9 E	624	3 5	526*	5 D
244	5 1	627	9 1		
245	A 3	631	B 6		
251	5 7	632	D 3		

*Exclusive GE Codes

This Inverted Digital CG table is used with Phoenix-S/SX as follows:

1. VHF, Narrowband, RX, 162-174 MHz
2. VHF & UHF, Wideband, TX & Rx.

TABLE 4-A
CARRIER CONTROLLED TIMER (CCT)

	HEX
CCT Enabled	8
CCT Disabled	0

TABLE 4-B
CARRIER CONTROLLED TIMER (CCT)

CCT TIME OUT DELAY (MINUTES:SECONDS)	HEX CODE
0:30	0
1:00	1
1:30	2
2:00	3
2:30	4
3:00	5
3:30	6
4:00	7

TABLE 5
CHANNEL CODE

NUMBER OF CHANNELS	HEX CODE
1	0
2	1
3	2
4	3
5	4
6	5
7	6
8	7

TABLE 6
DECIMAL - HEX EQUIVALENTS

DECIMAL	HEX
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	A
11	B
12	C
13	D
14	E
15	F

Address (S4) Programming

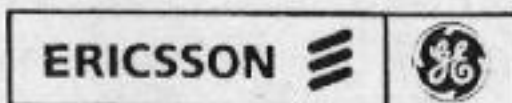
If the transmit and receive frequencies are not shown in the applicable frequency tables, the radio can still be programmed using the correct reference division and hex code determination.

For example: 159.320 MHz Transmit and 159.920 MHz Receive for a Phoenix-SX with 5 kHz divisor.

From the applicable table we find that 159.320 MHz transmit falls between the listed frequencies of 159.315 and 159.330 MHz. Address location (S4) 4 or C for the 5 kHz divisor for these two frequencies are hex codes 7 and A. There are also two hex codes that fall between the listed codes and these hex codes are 8 and 9. With 5 kHz divisor, two

frequencies fall between these listings -- 159.320 and 159.325. Therefore, the correct hex code for a transmit frequency of 159.320 MHz, the Address Location (S4) 4 or C should be set for hex code 8.

From the applicable table we find that 159.920 MHz receive falls between the listed frequencies of 159.915 and 159.930 MHz. Address Location (S4) 4 or C for the 5 kHz divisor for these two frequencies are hex codes 7 and A. There are also two hex codes that fall between the listed codes and the hex codes are 8 and 9. With 5 kHz divisor, two frequencies fall between these listing -- 159.920 and 159.925. Therefore, the correct hex code for a receive frequency of 159.920 MHz, the Address Location (S4) 4 or C should be set for hex code 8.



Ericsson GE Mobile Communications Inc.
Mountain View Road - Lynchburg, Virginia 24502

WIDEBAND ☐																			
	Chan Addr (S3)	Receive Functions (Frequency) (CG)								Chan Addr (S3)	Transmit Functions (CCT) (Frequency) (CG)								Set ← S4 ← S5 ← S5 ← S5 ← S5 ← S5 ← S5 ← S5
		CG Type																	
		0	1	2	3	4	5	6	7		0	1	2	3	4	5	6	7	
Channel 1 Mode A	2									3									
Channel 2 Mode A	4									5									
Channel 3 Mode A	6									7									
Channel 4 Mode A	8									9									
Channel 5 Mode A	A									B									
Channel 6 Mode A	C									D									
Channel 7 Mode A	E									F									
Channel 8 Mode A	0									1									

Channel Address - Table 1 CG Type - Table 2 CG - Table 3
CCT - Table 4 Frequency (RX & TX) - Table 7

@ SPECIAL - To set number of channels in Mode A (see instructions)
* SPECIAL - CCT time set (see instructions)

1. Determine and record the Channel Guard Type, CG Frequency (Tone or Digital Code), RF, RX & TX Frequencies and CCT time for each channel to be programmed on the worksheet. NOTE - CCT timing is the same for all channels but CCT can be enabled or disabled on a channel by channel basis.
2. Look up data in tables and record on worksheet.
3. Set PROM Switch (S6) to 1.
4. Set Channel Address (S3).
5. Set Function Address (S4) and Data Address in column below it with (S5). Push (S1) to write Data in Memory.

	Chan Addr (S3)	CG Type (Frequency) (CG) 8 9 A B C D E F	Chan Addr (S3)	Transmit Functions (CCT) (Frequency) (CG) 8 9 A B C D E F	Set ← S4 ← S5 ← S5 ← S5 ← S5 ← S5 ← S5 ← S5
Channel 1 Mode B	2		3		
Channel 2 Mode B	4		5		
Channel 3 Mode B	6		7		
Channel 4 Mode B	8		9		
Channel 5 Mode B	A		B		
Channel 6 Mode B	C		D		
Channel 7 Mode B	E		F		
Channel 8 Mode B	0		1		

Channel Address - Table 1 CG Type - Table 2 CG - Table 3

CCT - Table 4 Frequency (RX & TX) - Table 7

@ SPECIAL - To set number of channels in Mode B (see instructions)

- Repeat step (5) digit by digit as often as needed to write the data for the channel. Move to next channel and enter data.
- When all channels have been written, push (S2) to store data permanently in radio.
- Test radio to assure proper programming.