MAINTENANCE MANUAL
FOR
CONVENTIONAL NETWORK INTERFACE

TABLE OF CONTENTS

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

Printed in U.S.A.

LBI-38549

SPECIFICATIONS*

Input Voltage	+13.8 ±20% Vdc
Current Drain with 9600 baud modem	1.5 A (typ), 2 A (max)
Operating Temperature	-22°F to +140°F (-30°C to +60°C)
Dimensions (H x W)	1.75 x 19 inches (4.5 x 48.3 cm)
Phone Line (3002 grade, duplex):	
Data Rate	9600 baud
Transmit Level	0.77 volts rms (0 dBm)
Receive Level	0.16 volts rms on J3-32A of GETC logic board
Repeater Audio	
Transmit Level	0 dBm, 0 Vdc offset
Receive Level	0 dBm, 0 Vdc offset
Valid Channel Guard Tones	67.0, 71.9, 74.4, 77.0, 79.7, 82.5, 85.4, 88.5, 91.5, 94.8, 100.0, 103.5, 107.2, 110.9, 114.8, 118.8, 123.0, 127.3, 131.8, 136.5, 141.3, 146.2, 151.4, 156.7, 162.2, 167.9, 173.8, 179.9, 186.2, 192.8.
CNI Group/Channel Guard pair	4

* These specifications are intended primarily for the use of the service technician. Refer to the appropriate Specification Sheet for the complete specifications.

INTRODUCTION

This manual describes the operation of Conventional Network Interface (CNI). The purpose of CNI is to provide a user, having a conventional radio system with Tone Channel Guard, with an interface to the EDACS Multisite system for mobile grouping.

SYSTEM CONFIGURATION

Each CNI channel requires a conventional repeater/base station with a CNI station option. The CNI station option consists of a CNI GETC. The CNI channel operates in a wide area network and interfaces with the MSC II. To interface to the MSC II, the MSC II must be configured with a CNI interface option. the MSC II CNI interface option consists of an UPLINK GETC, site interface board and a single audio board. The CNI channel connects to the MSC II through a full duplex audio link and a full duplex data link. Figure 1 shows a typical CNI connection to a Multisite system.

INSTALLATION

Install the Terminal Board provided as follows:

1. Using 4 screws and nuts provided, mount Terminal Block 19C301087P10 on the back of the GETC.
2. Disconnect 2 pairs of twisted wire which are connected to P26-6, P26-7 and P26-8, P26-9 (part of 19C320811G15/G16 cable harness). Connect pair that was connected to P26-6, P26-7 to Terminal Block 3 and 4 as GETC reserve data pair. Connect pair that was connected to P26-8, P26-9 to Terminal Block terminals 1 and 2 as GETC Transmit Data pair.

The GETC is installed in a station cabinet (EDACS). A slide mount supports the GETC shelf assembly, and also allows for easy access during setup and servicing. The GETC Logic Board may be removed from the shelf assembly by disconnecting the connecting cables and removing the board from the shelf slide. Installation of the GETC shelf assembly in a station is as follows:

1. Mount the GETC Shelf Assembly in the desired rack position, using the hardware provided. Extend the shelf to the servicing position.
2. Connect the harness assembly (19C320811) plug P26 to GETC Logic Board connector J6.
3. Connect the harness assembly (19C320811) plug 27 to GETC Logic Board connector J7.
4. Connect the harness assembly (19C320811) plug P10 to GETC Logic Board connector J10.
5. Connect the harness assembly (19C320811) plug P19 to GETC Logic Board connector J19.
6. Connect the harness assembly (19C336863) plug P8 to GETC Logic Board connector J8.
7. Connect the harness assembly (19C336863) plug P19 to GETC Logic Board connector J19.
8. Slide the GETC shelf back into the cabinet.

CNI OPERATION

There are two basic operations of CNI. The first operation is to convert the Tone Channel Guard in Conventional transmissions to a Group Call Assignment message which is then sent to the UPLINK GETC (MSC). The second operation is to convert the Group Channel Request Message coming from the UPLINK GETC (MSC) to a Conventional transmission with Tone Channel Guard. The conversations between Tone Channel Guards and Group ID's are done based on the Tone Channel Guard/Group ID mapping. This mapping is stored in the CNI GETC Personality EEPROM.

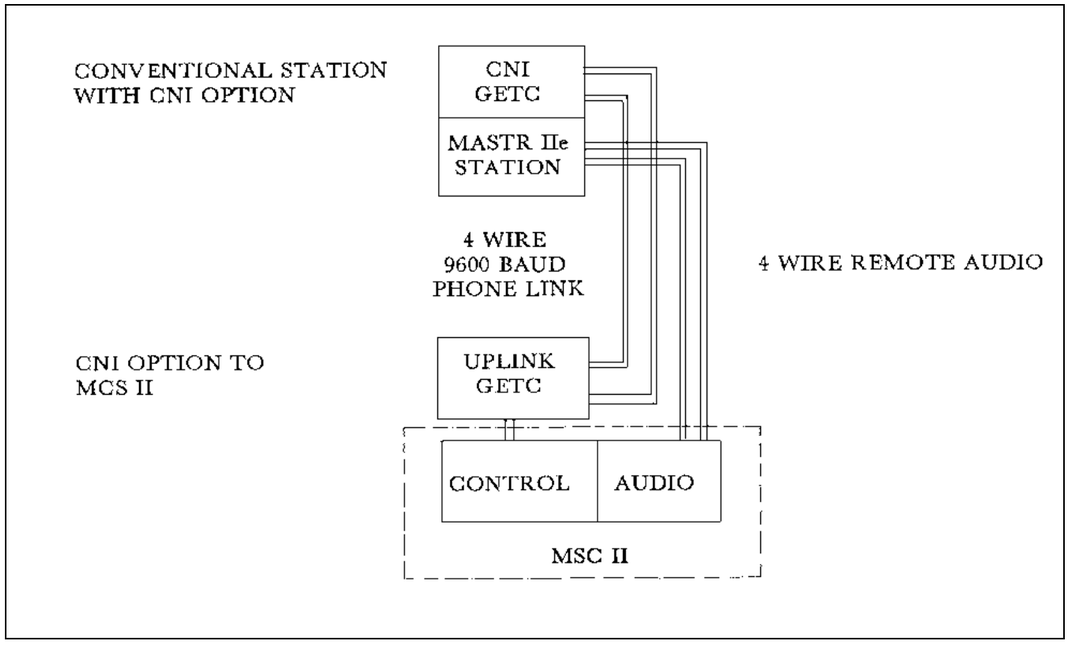


Figure 1 - CNI Connection To A Multisite System

Copyright© March 1991, Ericsson GE Mobile Communications Inc.

LBI-38549

CONVENTIONAL TO TRUNKED

When a Conventional Transmission is received by the CNI GETC, CNI will decode the incoming Channel Guard. If the detected Channel Guard is selected in the Channel Guard/Group mapping, it will then generate a Standard Group Call Assignment Message for the Group ID associated with the detected Channel Guard. This Group Call Assignment Message is then sent to the UPLINK GETC. CNI Logical ID which is also stored in the CNI GETC Personality is used in this Group Call Message. At this time the CNI GETC will also regenerate the decoded Channel Guard Tone frequency to be transmitted by the repeater.

Any Channel Guard Tone Frequencies defined in EIA RS-220A between 67.0 Hz and 192.8 Hz may be used in the CNI Channel Guard/Group Mapping. CNI only supports 4 different Channel Guard Tone/Group mappings.

TRUNKED TO CONVENTIONAL

When a Group Channel Request Message is received from the UPLINK GETC, CNI will check in the Channel Guard/Group mapping if the Group ID received is valid. If the Group ID is valid, CNI will send a secondary assignment back to the UPLINK GETC and at the same time key the base station with the associated Channel Guard Tone defined in the Channel Guard/Group mapping.

Group Channel Request Messages are ignored by the CNI if the Group ID is not defined in the Channel Guard/Group Mapping or if CNI is already in the active mode.

GETC Jumper

CNI GETC jumpers should be configured as a normal EDACS Control Channel/Working Channel. Refer to GETC Shelf LBI-38174.

CONTROLS AND INDICATORS

FRONT PANEL LED INDICATORS

The front panel LED indicators show the state of operation of the CNI. Upon power up, only L1 should be on in the Wide Band while both L1 and L3 are on in the Narrow Band. L2 and L6 are turned on when the CNI is brought up by the MSC; that is, when the valid Group ID is detected. Only L6 is turned on when the CNI is brought up by the station; that is, when the valid channel guard is detected.

Table 1 - Front Panel LED State Indications

WIDE BAND	L1	L2	L3	L4	L5	L6	L7
Idle State	●	❍	❍	❍	❍	❍	❍
Station Originated Call	●	❍	❍	❍	❍	●	❍
MSC Originated Call	●	●	❍	❍	❍	●	❍
NARROW BAND	**L1**	**L2**	**L3**	**L4**	**L5**	**L6**	**L7**
Idle State	●	❍	●	❍	❍	❍	❍
Station Originated Call	●	❍	●	❍	❍	●	❍
MSC Originated Call	●	●	●	❍	❍	●	❍

● = LED On
❍ = LED Off

DIP SWITCHES

There are three DIP switches on the GETC Board that must be configured for proper CNI operation. S1-1 thru 7 and S2-1 thru 4 are used to set the operating frequency if the operating frequency is not defined in the CNI GETC Personality EEPROM. Switches S3-1 thru 5 are used for channel number selection. Refer to GETC Service Manual LBI-38176 for Wide Band EDACS or LBI-38210 for Narrow Band Systems for proper frequency and channel number settings. Switches S2-8 and S3-8 should be closed. Set switches S1-8, S2-5 thru 7 and S3-6 thru 7 in the closed position.

Table 2 - GETC Board Switch Settings For CNI Operation

S1								S2								S3							
1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
F	F	F	F	F	F	F	C	F	F	F	F	C	C	C	C	A	A	A	A	A	C	C	C

F = Frequency Setting
Refer to LBI-38174 if frequency is not programmed in CNI Personality EEPROM.
A = Channel Number. Refer to LBI-38174. Set to channel 1.
C = Closed.
O = Open.

PROGRAMMING

CNI PERSONALITY EEPROM

All CNI variables such as CNI LID, Tone Channel Guard/Group mapping and Channel Frequency are stored in the CNI GETC Personality EEPROM by using the GETC PC Programming Software TQ-3357. The PC Programming mode is entered by setting switches S2-8, S3-3, S3-6 in open positions while the other S3 switches are in closed positions, and followed by a reset. Programming cable TQ-3360 (19B235027P4) should be connected from the PC ComPort to J100 at the back of the GETC shelf. Refer to the GETC PC Programming manual for programming information.

MSC PERSONALITY/CONFIGURATION

To maximize the availability of the CNI channel for usage, CNI site should be configured as a TRACKED site. As a TRACKED site, the MSC will only route to the CNI site, Multisite calls that have been previously made on the CNI site by the conventional radios. Other multisite calls will not bring up CNI site, therefore making the CNI site available for users that are already on the CNI site.

USER OPERATION

The fact that CNI is a one-channel site implies that only one conversation can occur at any time through CNI. The following describes how CNI works under different situations.

TRUNKED ORIGINATED CALL

While CNI is active, both multisite group call request and conventional transmission will be ignored by the CNI except for Console Pre-empt. When the current call is pre-empted by the Console, voice audio will be routed from the Console to the receiving Conventional radio. Originator radio unkey will not drop the call as long as the Console is still keyed. Console unkey; however, will drip the call regardless of the status of the originator radio.

CONVENTIONAL ORIGINATED CALL

While CNI is active, any multisite group call request, except for Console Pre-empt, will be ignored by the CNI. When the current call is pre-empted by the Console, voice audio will be routed from the Console to the receiving Conventional radio. Originator radio unkey will not drop the call as long as the Console is still keyed. Console unkey, however, will drop the call regardless of the status of the originator radio. On the other hand, other Conventional transmission on the same frequency with different Channel Guard will most likely interfere with the current call. As a result of this interference, the current Trunked call may be inadvertently dropped. Therefore, care should be taken to avoid any overlapping conventional transmissions. Conventional Transmit Busy Lockout should be programmed into all conventional radios to prevent interference.

MAINTENANCE

TROUBLESHOOTING PROCEDURE

1. Check GETC/CNI Personality. See if:

   Channel frequency is correct.
   Group ID/Channel Guard pairs are correct.
   System Type is correct.

2. Check Conventional Base Station. See that:

   Limited Channel Guard signal appears at TP 102.
   Channel Guard encode signal appears at J19-5.

3. Check MSC Data connections:

   MSC Data connections consist of 2 pairs of 9600 BAUD links. Make sure that they are correctly connected. Refer to Multisite Coordinator manual.

4. Check MSC Switch Audio connections:

   This refers to audio connections between the MSC Switch and the CNI GETC or Base Station.

Refer to Troubleshooting Chart on page 3.

LBI-38549

CNI INTERFACE TO REPEATER STATION

The following describes the required connections for CNI GETC when used with repeater stations other than EGE MASTR IIe or MASTR III stations. Use cable 19C320811G15 for MASTR II station or 19C320811G16 for MASTR IIe or MASTR III stations.

Signals required by CNI:

Power	—	+13.8 Vdc, 2 A
Volume Squelch High	—	1 Vrms at 1000 Hz 3 kHz deviation
Carrier Activated Squelch	—	Active high (5 Vdc)
ENM Signaling voltage OR Secure-it tone hold detect	—	Active low

Signals provided by CNI:

Channel Guard Tone (J19-5)	—	3 Vpp, EIA RS-220A (67 Hz to 192.8 Hz)
PTT (J6-1)	—	Active low 4 mA O/C output
RUS out (J7-15)	—	Active high (8 Vdc)
REP/REM (J6-16)	—	High (5 Vdc) Repeat Audio
	—	Low (0 Vdc) Remote Audio

MSC Switch signals:

Remote Audio level (TX & RX)	—	0 dBm, 0 Vdc offset
Impedance	—	600 ohms
ENM Signaling voltage OR 2175 Hz Tone	—	-20 dBm

MSC Data signals:

Data Rate	—	9600 baud
Transmit level	—	0.77 Vrms
Receive level	—	0.16 Vrms on J3-A of GETC logic board

Station configurations:

Four Wire Tone Remote (transmit pair and receive pair).

The station should be configured in such a way that:

- allows CNI GETC to key the transmitter
- transmits Channel Guard Tone generated by CNI GETC.
- always routes the received audio to its remote receive pair.
- allows local or remote audio to be transmitted depending on the REM PTT line.

See Interface Example page 4.

TROUBLESHOOTING CHART

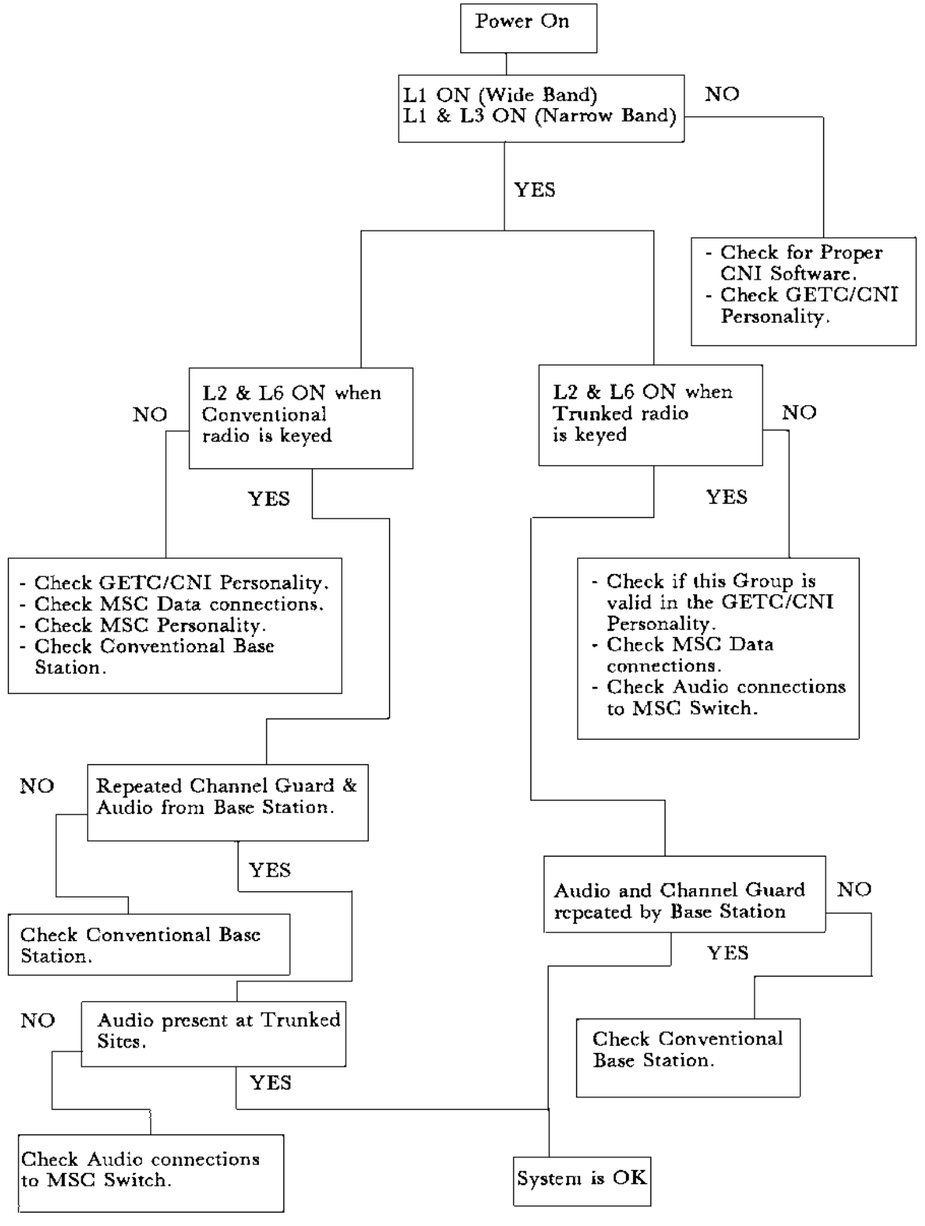


Figure 2 - Troubleshooting Chart

LBI-38549

EXAMPLE OF CNI TO STATION INTERFACE

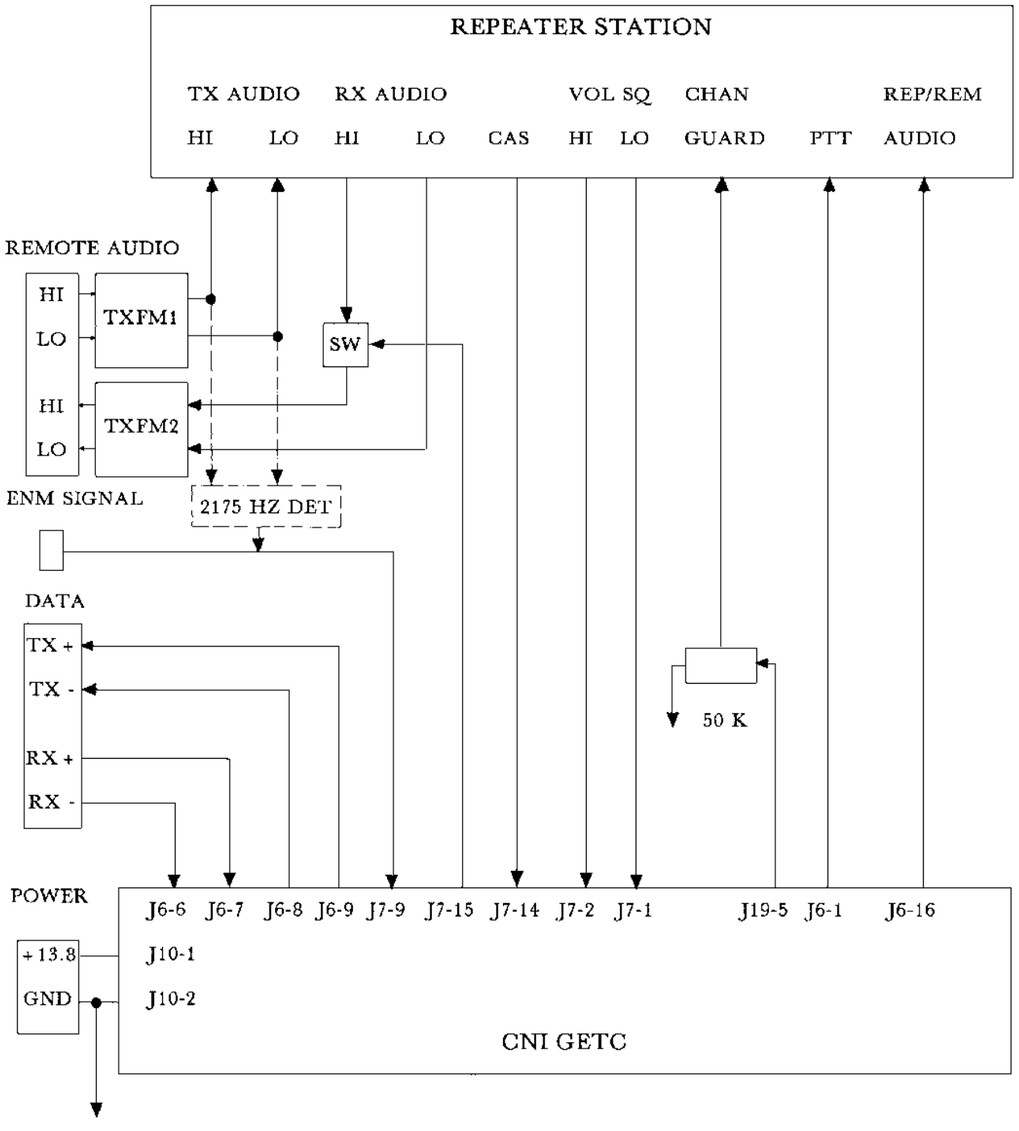


Figure 3 - Example

Personality: C:\PC_PROG\GETC\CNI_JNK.GTC
Personality: C:\PC_PROG/GETC/CNI_JNK.GTC
Radio Text
This is a sample of CNI GETC Personality.

Channel Allocations	1	2	3	
Channel Number	1234567890	1234567890	1234567890	12
Control Channel	••••••••••	••••••••••	••••••••••	••
Clear Voice	••••••••••	••••••••••	••••••••••	••
Voice Guard	••••••••••	••••••••••	••••••••••	••
Data	••••••••••	••••••••••	••••••••••	••
Pager	••••••••••	••••••••••	••••••••••	••
Interconnect	••••••••••	••••••••••	••••••••••	••
Downlink	••••••••••	••••••••••	••••••••••	••
Multisite Downlink	••••••••••	••••••••••	••••••••••	••
External CIU	••••••••••	••••••••••	••••••••••	••

Channel Data
System Type : WIDE BAND

Ch #	Freq (MHz)	Ch #	Freq (MHz)	Ch #	Freq (MHz)
1	0.0000	11	0.0000	21	0.0000
2	0.0000	12	0.0000	22	0.0000
3	0.0000	13	0.0000	23	0.0000
4	0.0000	14	0.0000	24	0.0000
5	0.0000	15	0.0000	25	0.0000
6	0.0000	16	0.0000		
7	0.0000	17	0.0000		
8	0.0000	18	0.0000		
9	0.0000	19	0.0000		
10	0.0000	20	0.0000		

Site Data

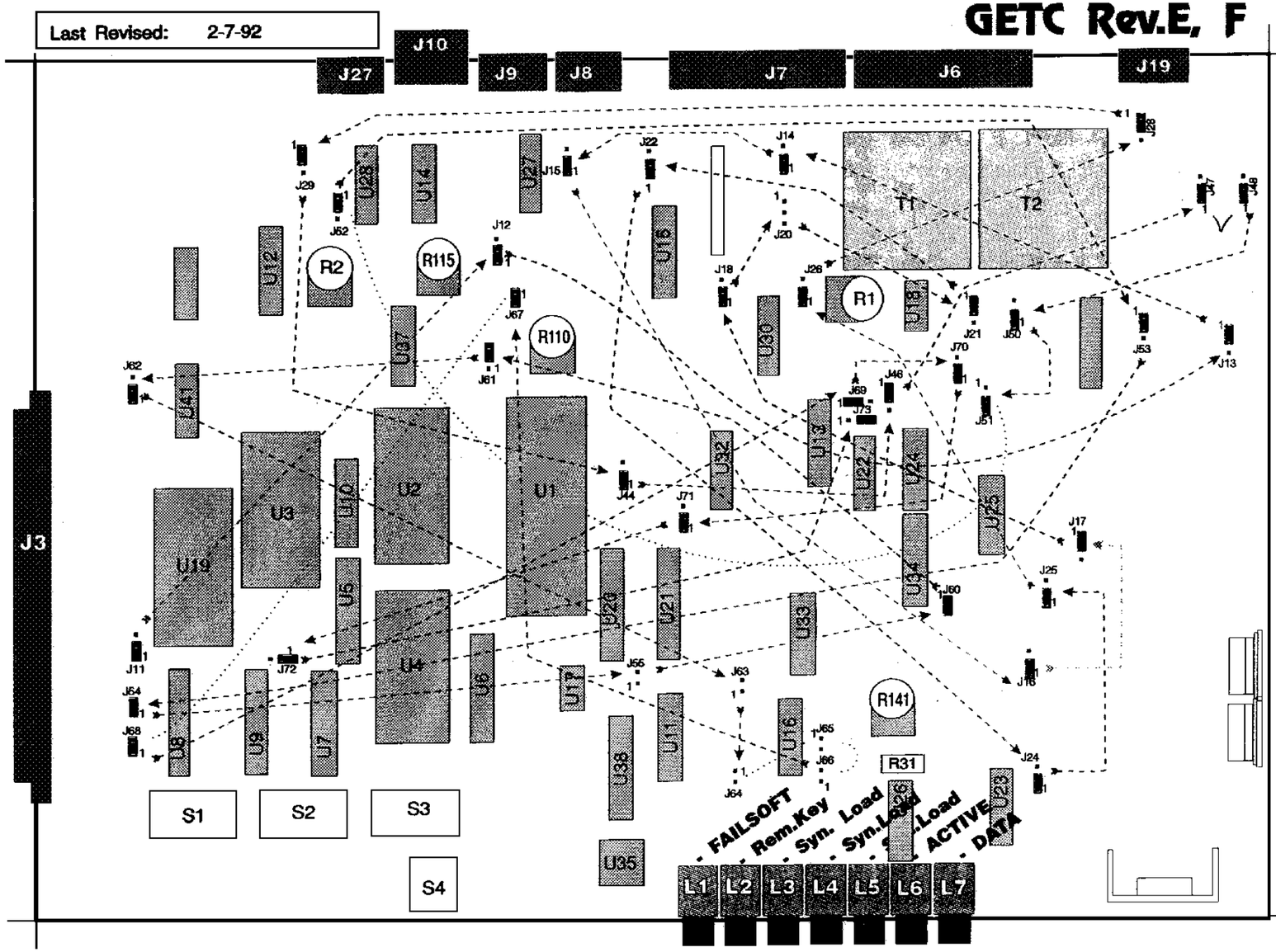
Site Name :		Site ID :	6
Date :	08/12/92	Morse ID :	
Channel Assignment :	Descending	Individual Call Hang :	0
Rotating Assignment :	No Group Call Hang	: 0	
Site Ch/Frq Notification :	No	Special Call Hang :	0
Individual Call Update :	One Slot	Voice Guard Hang :	0
Logical IDs above 8192 :	Yes	Emergency Call Hang :	0
SCAT :	No	System All Call Hang :	0
Multisite System :	No	Transmission Trunked Timer :	0
Simulcast System :	No	Message Trunked timer :	0
Voter System :	No	Morse Interval Timer :	0
CTIS :	No	Test Call Timer :	0
		Max Interconnect Calls :	0

Conventional Network Interface Data
Conventional Network Logical ID : 16100

C.N.I. Group ID	C.N.I. Channel Guard Tone
271	67.0
273	100.0
570	123.0
573	156.7

Voice Guard Group ID

Group	ID	Group	ID	Group	ID	Group	ID	Group	ID	Group	ID
1	0	10	0	19	0	28	0	37	0	46	0
2	0	11	0	20	0	29	0	38	0	47	0
3	0	12	0	21	0	30	0	39	0	48	0
4	0	13	0	22	0	31	0	40	0	49	0
5	0	14	0	23	0	32	0	41	0	50	0
6	0	15	0	24	0	33	0	42	0	51	0
7	0	16	0	25	0	34	0	43	0	52	0
8	0	17	0	26	0	35	0	44	0	53	0
9	0	18	0	27	0	36	0	45	0	54	0



P11	1-2	RxD R-M (2-3 for RS-232)
P12	1-2	CTS R-M (2-3 for RS-232)
P13	1-2	BSL Tx Rx Common
P14	1-2	Master Site Cont."ON"
P15	1-2	Backup "OFF"
P16	1-2	BSL "SW Control"
P17	1-2	LSD Encode Enable
P18	1-2	LSD Decode Enable
P20	OMIT	"Hard Inhibit" OFF
P21	1-2	Data Acquisition Control
P22	1-2	4800 Notch (2-3 - 400MHz)
P24	1-2	BSL Select
P25	1-2	LSD Encode Enable
P26	1-2	Synth. Lock Detect
P28	1-2	FSL Path
P29	1-2	
P44	1-2	EPROM >=256K
P46	1-2	
P47	1-2	BSL
P48	1-2	BSL
P50	1-2	
P51	2-3	MORSE ID
P52	1-2	TxD Polarity
P53	1-2	RxD Polarity
P54	1-2	A/D Control - Local
P55	OMIT	LSD - Local
P60	1-2	9.6 Tx. Data - Local
P61	2-3	EPROM -512K
P62	1-2	11 MHz Clk Select
P63	OMIT	Tx.Data Filt.BW
P64	OMIT	Tx.Data Filt.BW
P65	OMIT	Tx.Data Filt.BW
P66	OMIT	Tx.Data Filt.BW
P67	1-2	Phone / 600-ohm Term.
P68	1-2	PTT - Local
P69	1-2	"Inhibit" vs "Comp" Sel.
P70	1-2	"Inhibit" vs "Comp" Sel.
P71	1-2	RTS Select
P72	1-2	Local 11 MHz ON
P73	2-3	Decouple PTT & Inhibit

NOTE:
For 400-MHz: P22 is 2-3
For Voted w/o R-M: P11 & P12 are 2-3

Figure 4 - GETC, Rev. E, F