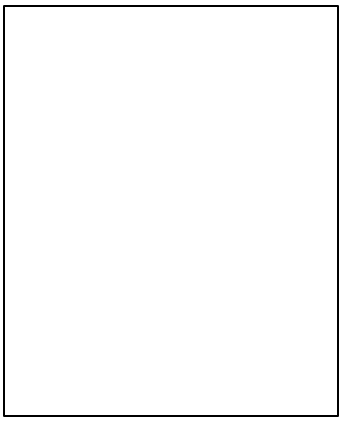
Instruction Manual

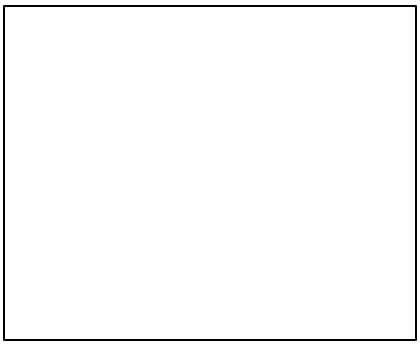
LE Series

Local Extensions

Rev. C



LE10



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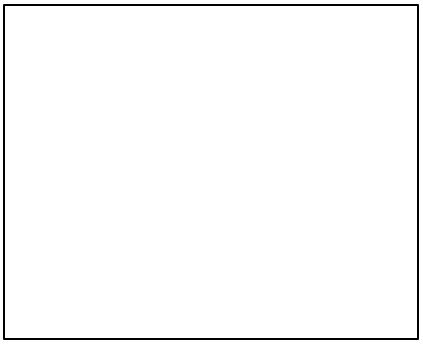

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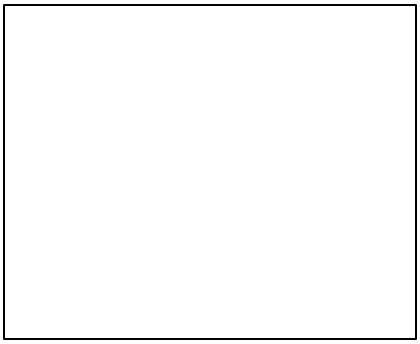

LE40

CPI Communications, Inc. • 941 Hensley Lane • Wylie, TX 75098-4909
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1.0 SPECIFICATIONS Subject to change without notice.

Power Requirements	12 VDC to 16 VDC @ 35 mA idle, 175 mA maximum. Fused on circuit board.
Receive Audio Input Level	88 mVRMS to 880 mVRMS to provide full speaker output.
Audio Output to Speaker	1 Watt into 8 ohms with 13.8 VDC supply or using -WP option.
Transmit Audio Output	2 mVRMS to 565 mVRMS into 600 ohms.
Frequency Response	+/- 3dB from 300 to 3000 Hz. 1000 Hz reference.
Dimensions	9" x 4" x 7" inches
Weight	LE10 - 3 lbs, LE20 - 4 lbs, LE30 - 3 lbs, LE40 - 4 lbs. WP Option - 1 lb.
Connections	Screw terminal block for radio connections. 4 pin modular jack for handset. 6 pin modular jack for desk microphone.
PTT Output	Solid state to ground, can sink up to 2.5 amps. Keying to plus voltage available as an option.
Monitor Output	Normally closed or normally open relay contacts activated by hook switch or optional push button.
F1/F2 Select (Optional)	Latched or momentary, N.O. or N.C. relay contacts.
Intercom (Optional)	Optional momentary push button activated circuit that allows audio transmissions between local extensions with out keying the radio. May be used on or off-hook.

2.0 General Description

The LE series local extensions are designed to provide remote control of an in-house conventional or trunked two way radio base station or repeater from a distance of up to 1000 feet.

The LE series is available in four different housing configurations. They are: the LE10 telephone style unit with handset, the LE20 desktop console with desk microphone, the LE30 desktop console with built in electret condenser microphone and the LE40 desktop console with goose neck microphone.

Standard features on all LE models include front panel PTT switch, LED transmit indicator, one watt amplified speaker with volume control and adjustable amplified modulation output.

In addition to the above listed features, the console models LE20, 30 and 40, offer as standard features a panel mounted CTCSS (monitor) disable and intercom capability between units.

The LE10, 20, 30 and 40 may be wall mounted by ordering the -WM option. When wall mounting the LE20 please note, no provisions are made for mounting the desk microphone.

LE series units may be powered by the radio power supply or by ordering the optional wall plug-in transformer, -WP option.

3.0 Installation Considerations

The LE series local extension will work with any radio system that will accept a 2 mVRMS to 565 mVRMS microphone audio input level and provides an 88 mVRMS to 880 mVRMS receive audio output level.

If the radio is going to be used as a control point, the receive audio should be taken from a point after the squelch circuit that is unaffected by the radio's volume control.

If the radio is not going to be used as a control point, speaker output may be used by setting the radio's volume control for a level that falls into the above range.

The LE series requires 12 to 16 VDC @ 175 mA. This may be supplied from a central source at the radio site using a conductor in the hook-up cable or by using the -WP option.

18 to 22 gauge multi-conductor cabling is recommended with the number of conductors determined by the application and options installed.

A minimum configuration will use 4 conductors, a maximum will use 14.

3.1 Connections

Remove the top half of the housing by removing the four housing screws. The multi-conductor hook-up cable should be threaded through the opening provided in the lower left corner on the rear of the unit. Proceed by making the necessary connections to terminal blocks TB1 and TB2 (when included). The terminal blocks are detachable from the circuit board to allow easier access to the screw terminals. Table 1 describes the pin-out of TB1. Table 2 describe the pin-out of TB2.

Table 1

Terminal #	Description	Function
1	RX HI	Receive audio from radio.
2	RX LO	Recieve audio return for non-ground referenced receive audio sources.
3	PTT HI	Available option. Connect to +V for radios that key to plus voltage.
4	PTT	PTT line from radio.
5	GND	Ground from radio.
6	MOD OUT	Microphone input to radio.
7	MON C	Common contact of the form "C" monitor relay.
8	MON NC	Normally closed contact of the form "C" monitor relay.
9	MON NO	Normally open contact of the form "C" monitor relay.
10	+12 VDC	Power supply voltage from radio. Not used if LE unit was ordered with -WP option.

Table 2

Terminal #	Function	Description
1	Parallel F1/F2	Allows Local Extensions to track parallel local extension or the channel display on a two channel radio. If tracking parallel local extensions, TB2-1 of all units should be connected together. If tracking the radio display, connect to a point in the radio that is greater than 3 VDC when the radio is on channel two.
2	Common	Common connection of the SPDT F1/F2 relay.
3	F1	N.C. connection of the SPDT F1/F2 relay.
4	F2	N.O. connection of the SPDT F1/F2 relay.

Before closing the unit make any "solder ball" jumper changes that may be necessary for your application.

3.2 Jumper Settings

The LE series circuit board has 15 "Dot" jumpers. These jumpers are "in" if there is a solder short across it and "out" if there is not. Table 3 lists the jumpers by number and explains their function. Factory settings are underlined.

Table 3

JP#	IN	OUT
1	For radios that key to plus voltage.	For radios that key to ground.
2	Allows volume to be turned down completely.	Prevents volume from being turned completely down.
3	Allows reception of parallel TX audio.	Prevents reception of parallel TX audio.
4	Speaker always on.	Speaker mute when handset off-hook.
5	For LE20	For LE10,LE30 and LE40.
6	For radios that key to ground.	For radios that key to plus voltage.
7	For radios that key to plus voltage.	For radios that key to ground.
8	For radios that key to ground.	For radios that key to plus voltage.
9	For radios that key to plus voltage.	For radios that key to ground.
10	For radios that key to ground.	For radios that key to plus voltage.
11	F1/F2 tracks radio channel indication.	F1/F2 tracks parallel local extension.
12	F1/F2 tracks parallel local extension.	F1/F2 tracks radio channel indication.
13	F1/F2 tracks parallel local extension.	F1/F2 tracks radio channel indication.
14	F1/F2 tracks parallel local extension.	F1/F2 tracks radio channel indication.
15	Mute speaker when this unit PTTs.	Do not mute speaker when this unit PTTs.

3.3 Dip Switch Settings

Table 4 describes the functions provided by the dip switch on the bottom of the unit. The factory setting are underlined.

Table 4

Switch #	ON	OFF
1	Low impedance load to radio RX out.	High impedance load to radio RX out.
2	OPTION - Latched F1/F2 output.	OPTION - Momentary F1/F2 output.
3	Monitor on front panel PTT.	Do not monitor on front panel PTT.
4	Speaker mute on any PTT.	Depends on setting of JP15.
5	Boosts level of parallel TX audio received.	Normal
6	Low impedance radio mic input.	High impedance radio mic input.
7	High level RX audio from radio.	Low level RX audio from radio.
8	For ground referenced RX audio from radio.	For non-ground reference RX audio from radio.

3.4 Setting Levels

Receive audio is controlled via the front panel volume control. Handset audio for the LE10 is set via R28 on the circuit board. It is factory set at mid range.

The transmit audio level is set via R44 on the circuit board. It should be set to provide the appropriate deviation on the radio.

4.0 Parts List

LE series Bottom PCB #700-LEBB-200 revision C

Reference	Description	CPI Part #
CAPACITORS		
C1,7,8,9,10,11,13,14,25	.1uF	208-0212-104
C2	22uF Electrolytic	208-4022-266
C4	47pF Mono Cer Dip	208-0071-470
C5	2200pF Mono Cer Dip	208-0071-222
C6,16	100uF Electrolytic	208-2021-107
C12	1uF Electrolytic Non-polar	208-2000-001
C15	10uF Electrolytic	208-2021-106
C17,18,20,23	220uF Electrolytic	208-2021-227
C19	4.7uF Electrolytic	208-4042-475
C22,29	.001uF Mylar	208-0212-102
C24	1000uF Electrolytic	208-1021-108
C27	100pF Mono Cer Dip	208-0071-101
C28	1uF Electrolytic	208-4052-105
C3,21	.01uF	208-0000-103
DIODES		
D1,2,3,4,5,6,7,8,9	1N4148	212-0001-001
D10	1N4746	212-0100-019
D11,12,13,14	1N4004	212-0002-004

Reference	Description	CPI Part #
TRANSISTORS		
Q1,4,6	2N2907 PNP Transistor	240-2907-000
Q5,8	MJE520 NPN Transistor	212-0001-002
Q7	2N2222 NPN Transistor	240-2222-000
Q9	2N7000	240-7000-000
RESISTORS		
R1,13,20,22,26,31,36, 68,69,85	10K 5% 1/4 Watt	242-0001-103
R2,4,23,24,34,35,37,38, 39,40,41,43,47,49,51, 53,54,64	47K 5% 1/4 Watt	242-0001-473
R3,11,	100 5% 1/4 Watt	242-0001-101
R5,16,33,50,73,75,79 80,81	100K 5% 1/4 Watt	242-0001-104
R6	51K 5% 1/4 Watt	242-0001-513
R9	390 5% 1/4 Watt	242-0001-391
R10	5.1K 5% 1/4 Watt	242-0001-512
R12,15	3.9K 5% 1/4 Watt	242-0001-392
R64	24K 5% 1/4 Watt	242-0001-243
R18,30	12K 5% 1/4 Watt	242-0001-123
R19,21,61	22K 5% 1/4 Watt	242-0001-223
R25,66	470K 5% 1/4 Watt	242-0001-474
R27	1.3Meg 5% 1/4 Watt	242-0001-135
R29	220 5% 1/4 Watt	242-0001-221
R32	1.2K 5% 1/4 Watt	242-0001-122
R42,45,46,56,78	1.8K 5% 1/4 Watt	242-0001-182
R48	620 5% 1/4 Watt	242-0001-621
R58	4.7K 5% 1/4 Watt	242-0001-472
R59	33K 5% 1/4 Watt	242-0001-333
R62,63	8.2K 5% 1/4 Watt	242-0001-822
R67	120K 5% 1/4 Watt	242-0001-124
R70	1K 5% 1/4 Watt	242-0001-102
R71,72	2.7 5% 1/4 Watt	242-0001-027
R74	15K 5% 1/4 Watt	242-0001-153
R76	1Meg 5% 1/4 Watt	242-0001-105
R82,84	10 Meg 5% 1/4 Watt	242-0001-106
POTENTIOMETERS		
R28	25K Pot	242-0101-253
R44	5K Pot	242-0101-502
R77	250K Pot	242-0101-254
INTEGRATED CIRCUITS		
U1,8	Quad Op Amp	420-L347-000
U2	Dual Flip-Flop	412-4013-000
U3,6	Quad Analog Gate	420-4066-000
U4,5	Hex Inverter	402-0014-000
U7	Audio Amp	420-0380-000
MISC.		
K1,K2	SPDT Relay	230-0001-002
J1 (LE10)	Handset Jack	228-0041-010
J1 (LE20)	Desk Mic Jack	228-0041-186
J2	26 Pin Header	228-0101-001

Reference	Description	CPI Part #
F1	.5 Amp Fuse	218-0001-005
TB1	10 Position Terminal Block	248-0020-010
TB2	4 Position Terminal Block	248-0020-004
S1 (LE10)	Hook Switch	244-0100-009**
	Cap for S1	244-0100-008**
S2	8 Position Dip Switch	244-0002-008
Handset	Handset	234-0005-013
Ash coil cord	Ash coil cord	600-0013-007

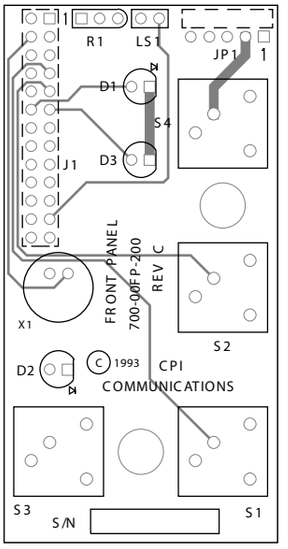
LE series Top PCB #700-00FP-200 revision C

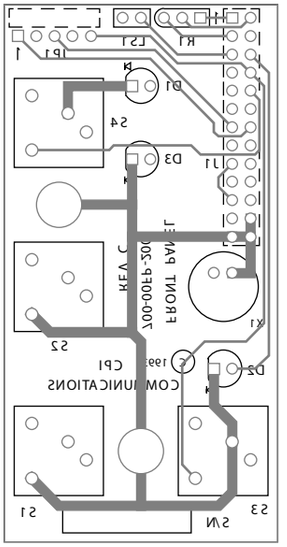
Reference	Description	CPI Part #
D1,D3	LED Green Dot	214-0005-002
D2	LED Red Dot	214-0003-001
R1	10K Volume Pot	242-0115-103
LS1	8 Ohm Oval	234-0001-004
S1,S2,S4	Push Button Switch, Black	244-0030-000
S3	Push Button Switch, Red	244-0030-002
X1 (LE10 & LE30)	Electret Microphone	234-0002-004
X1 (LE40)	Gooseneck Microphone	234-0003-003
	26 position cable assembly	600-0TSR-025

** item not used on units produced after 9/1998

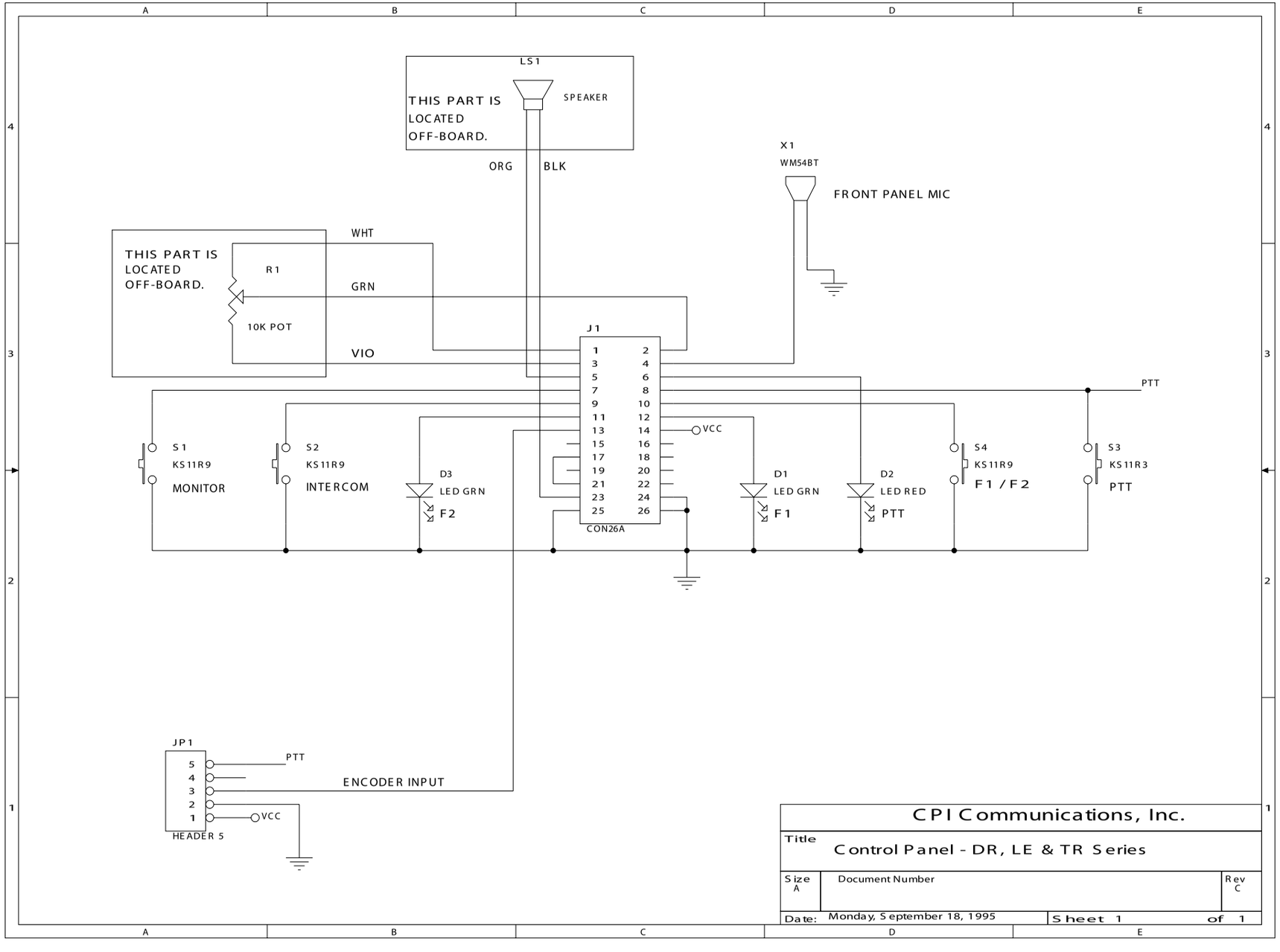
PCB View - Control Panel #700-00FP-200

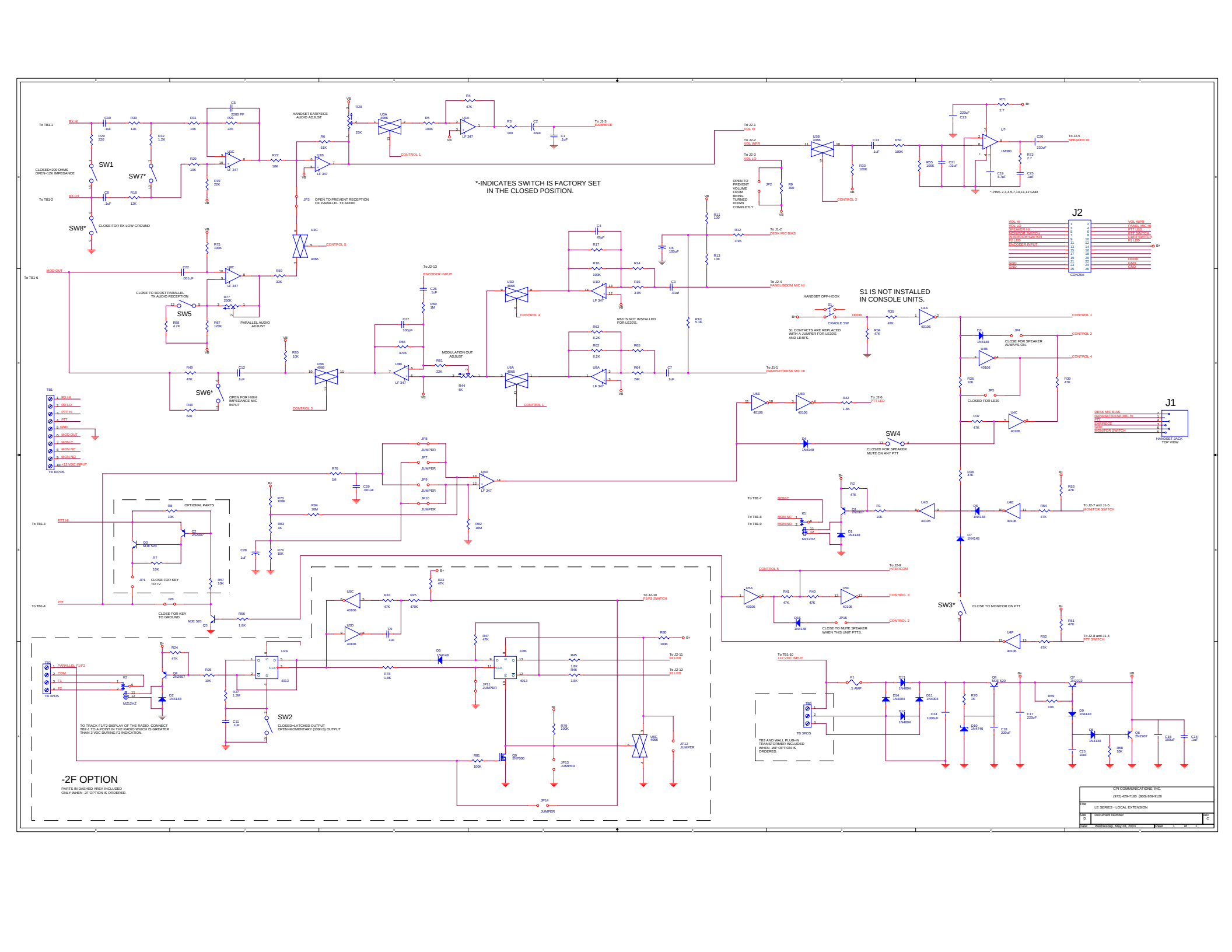
Component Side

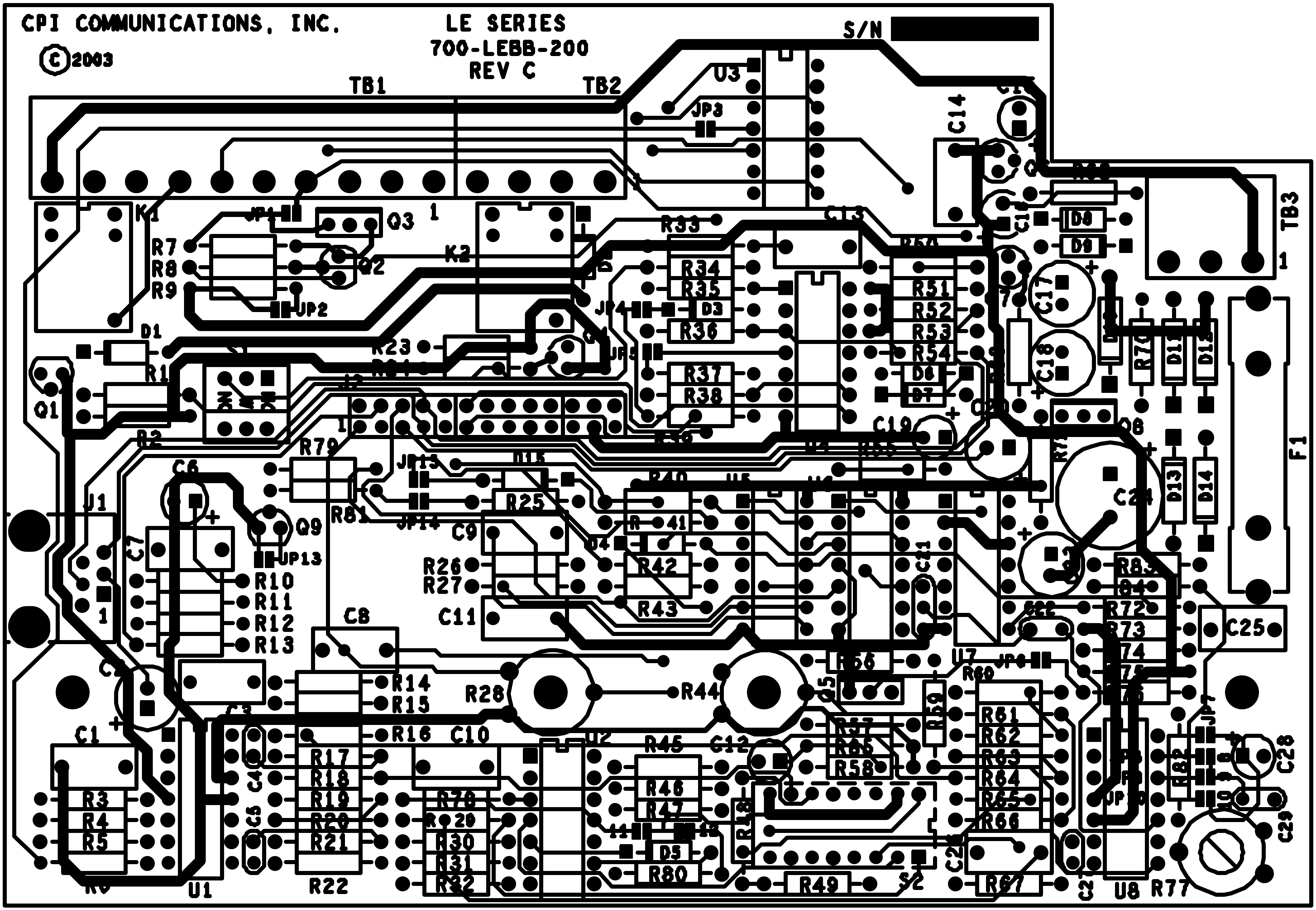




Solder Side


LS1
SPEAKER
THIS PART IS LOCATED OFF-BOARD.
ORG
BLK
X1
WM54BT
FRONT PANEL MIC
WHT
THIS PART IS LOCATED OFF-BOARD.
R1
GRN
10K POT
VIO
J1
1 2
3 4
5 6
7 8
9 10
11 12
13 14
15 16
17 18
19 20
21 22
23 24
25 26
CON26A
VCC
PTT
S1
KS11R9
MONITOR
S2
KS11R9
INTERCOM
D3
LED GRN
F2
D1
LED GRN
F1
D2
LED RED
PTT
S4
KS11R9
F1 / F2
S3
KS11R3
PTT
JP1
5
4
3
2
1
HEADER 5
PTT
ENCODER INPUT
VCC
CPI Communications, Inc.
Title
Control Panel - DR, LE & TR Series
Size
A
Document Number
Rev
C
Date: Monday, September 18, 1995
Sheet 1 of 1


*-INDICATES SWITCH IS FACTORY SET IN THE CLOSED POSITION.
S1 IS NOT INSTALLED IN CONSOLE UNITS.
-2F OPTION
PARTS IN DASHED AREA INCLUDED ONLY WHEN -2F OPTION IS ORDERED.
J1
J2
SW1
SW2
SW3*
SW4
SW5
SW6*
SW7*
SW8*
CPI COMMUNICATIONS, INC.
(972) 429-7160 (800) 869-9128
LE SERIES - LOCAL EXTENSION
Wednesday, May 28, 2003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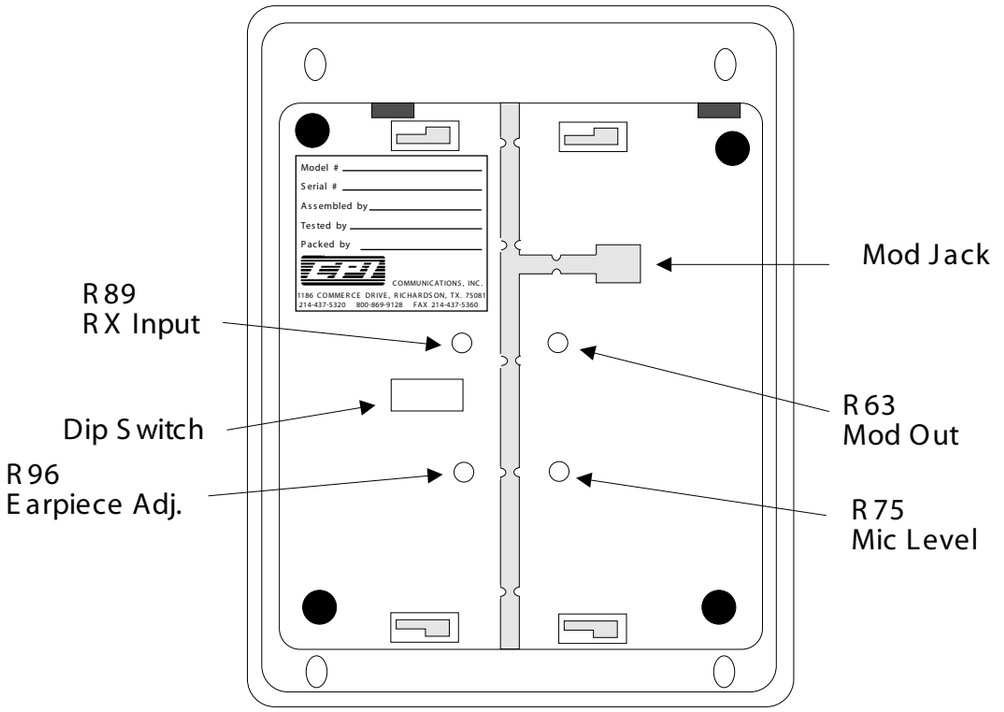
LE SERIES
700-LEBB-200
REV C
S/N
TB1
TB2
TB3
F1

CPI COMMUNICATIONS, INC.
700-LEBB-500
REV C
LE SERIES
SVM

Location of externally adjustable controls.



6.0 Warranty

CPI Communications, Inc. warrants each product manufactured by it to be free from defective material and workmanship and agrees to remedy any such defects or to furnish a new part in exchange for any part of any unit of its manufacture which under normal installation use or service discloses such defects, provided the unit is delivered by the customer to our authorized service center intact, with all transportation charges pre paid within two years from date of shipment to the original purchaser. Exceptions are semiconductors which carry only the manufacturer's standard warranty and lamp indicators and fuses which are warranted to be operational when shipped from the factory. No credit will be given for unauthorized repair.

This warranty does not extend to any of our products which have been subjected to misuse, neglect, accident, incorrect wiring not our own, improper installation, or to use in violation of instructions furnished by us nor extended to units which have been repaired or altered outside of our factory or authorized service center, nor to cases where the serial number thereof has been removed, defaced, or changed, nor to accessories used therewith not of our own manufacture, nor to finish or appearance items.

This warranty is in lieu of all other warranties expressed or implied and no person is authorized to assume for us any other liability in connection with the sale of our products.

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