Instruction Manual

TTP(N) Series
Tone Termination Panel
01/2013
Board Assembly TTP2N Rev. B

CPI Communications 941 Hensley Lane Wylie, Texas 75098
Phone (972)429-7160 (800)869-9128 Fax (972)429-7165 (888) 437-5360 www.cpicomm.com

TTP(N) Specifications

Specifications:	Subject to change without notice
Size:	5.5” wide 1.5” high 5.3” depth
Weight	.75 lbs (without case) 1.5 lbs (with enclosure -C option)
Connections:	modular to phone line (remote) screw terminal connector (radio)
Line impedence:	600 ohms
Input voltage:	+12 to +13.8 VDC @ 150 mA (18 mA idle)
Line output to phone line:	+10 dBm maximum. Preset to 0 dBm
Line ouput from phone line:	-40 dBm to +10 dBm (function tone referenced)
RX input from radio:	70 mVrms or greater
Notch filter:	2175 Hz down 50 dB from 1000 Hz reference
Control tones:	Guard tone = 2175 Hz for 40 mS Function tones F1 = 1950 Hz for 40 mS F2 = 1850 Hz for 40 mS Monitor = 2050 Hz for 40 mS Hold tone = 2175 Hz for duration of PTT
Control function outputs:	PTT and Monitor selection are form “C” relay contacts 1 amp @ 30 VDC F1/F2 are form “C” relay contact

Manual Contents

2.0 General Infomation

The CPI TTP(N) series termination panels provide a reliable means of interfacing a tone remote to a two way radio base station. The TTP series can be used with any tone remote that uses the industry standard EIA sequential tone format such as the CPI TR series remotes. The TTP(N) series panels are available in the following configurations.

MODEL	DESCRIPTION
TTP1(N)	Board only single frequency, PTT, and monitor
TTP2(N)	Board only two frequency, PTT, and monitor
-C(TTPN)	Case option for the TTP(N)

There are no other options available for the TTP(N) series panels. Jumper selectable -4W/FD is standard as well as automatic gain control and transmit and receive audio notch filters.

3.0 Installation

Connect the leased line, twisted pair 600 ohm line, or microwave link to the TTP(N) board via J2 (RJ-11 jack). Connect an external 12 to 16 volt semi-regulated DC power supply to J1 with the positive lead to J1-2 and the negative lead to J1-7.

Connect the receive audio from the radio to J1-6. Receive audio from the radio should be a source that is after the squelch circuit and not affected by the radio volume control adjustment. If such as point is not easily accessible you may use unsquelched audio and use the squelch circuit provided on the TTP(N).

Connect the radio microphone input to J1-1. If the microphone input is high impedence, shielded cable should be used and jumper JP3 on the TTP(N) board should be moved to the 2&3 position.

Connect the monitor circuit of the radio to the TTP(N) board using the form “C” relay contacts at J1-8, J1-9, and J1-10.

Connect the radio PTT line to the TTP using the contact provided at J1-4. Jumper JP7 allows you to select “key to ground” shorting pins 1&2 or “key to + voltage” shorting 2&3.

The TTP2(N) provides momentary or latched set of form “C” relay contacts for two frequency selection. Jumper JP14 in position 1&2 is for latching. Position 2&3 is momentary operation.

2 Wire/4 Wire Full Duplex operation

The TTP(N) termination panel is 2 wire/ 4 wire full duplex capable by selection of the JP1 jumper on the panel.
2 Wire - Jumper JP1 should be in the 1 & 2 position
4 Wire/ Full Duplex - Jumper JP1 should be in the 2 & 3 position

4.0 Tuning

The TTP(N) termination panels 2175 Hz notch and bandpass filters and line balance adjusters have been factory set. These adjustments have been "painted" and should not require readjustment in the field.

If it does become necessary to "retune" the panel, the procedure is as follows:

TX Audio notch filter

1) Connect: Signal generator (600 ohm) set at 2175 Hz. 0 dBm to phone line J2
+12 volt power to J1-2
Ground to J1-7
Scope probes to TP4 & TP5, set scope to X-Y mode

2) Adjust R21 until signal on scope is in phase (loop closes on scope).

3) Remove scope probe from test point 4 & 5. With scope in signal channel mode, connect 1 probe to TP6. Adjust R16 to obtain minimum signal on scope. Adjust R21 to further reduce signal level. Re-check R16 then R21. Notch will be approximately -58 dB.

4) Move scope probe to TP7. Adjust R46 to maximum signal on the scope. (This is the 2175 bandpass adjustment.)

5) To set the balance, remove signal generator from phone line. Re-connect between ground and J1-6. Set generator for 1500 Hz, at 2 Vpp. Terminate J2 with a tone remote or other suitable 600 ohm load. Move scope probe to TP4 and adjust R100 for minimum.

RX Audio notch filter

1) Connect: Signal generator (600 ohm) set at 2175 Hz. 0 dBm to J1-6 & J1-7
+12 volt power to J1-2
Ground to J1-7
Scope probes to TP1 & TP2, set scope to X-Y mode

2) Adjust R8 until signal on scope is in phase. (loop closes on scope)

3) Remove scope probe from TP1 & TP2. With scope in signal channel mode, connect one probe to TP3. Adjust R13 to obtain minimum signal on scope. Adjust R8 to further reduce signal level. Re-check R13 then R8. Notch will be approximately -58 dB.

5.0 Level Adjustments

RX Audio Adjustment

R101 controls the RX audio level to the phone line. With the phone line connected at J2, connect a RMS volt meter to the leads of L1 and L2. Un-squelch the receiver so that continuous noise is present and adjust R101 for 0 dBm or 0.8 Vrms on the meter. If additional gain is needed to achieve 0 dBm, move jumper JP6 to short pins 2 & 3.

Line In Adjustment

Auto level adjustment:
The TTP(N) series has an AGC (automatic gain control circuit). This circuit eliminates the need to adjust the line input level from the tone remotes or consoles. Selection of automatic or manual gain control is selected by the JP2 jumper.

Automatic gain control - JP2 should be set in the 1&2 position.
Manual gain control - JP2 should be set in the 2&3 position.

The line input level is adjusted via R104. Adjustment should be made with the TTP(N) connected to the phone line and a tone remote connected at the far end.

Follow the procedure for your remote to generate a constant function tone. Ideally the function tone will measure 0 dBm on the phone line at the remote site. The function tone level measured across the phone line at the TTP(N) will usually be less than 0 dBm due to line loss.

With an RMS voltmeter measure the signal level from test point 4 (TP4) of the TTP(N) to ground. Adjust R104 for a reading of 460 mVrms (1.3Vpp)

Note: If you are using the hold tone (low level guard tone) to make the adjustment, set R104 so that 46 mVrms (130 mVpp) is measured at TP4. If you are using the high level guard tone to make the adjustment, set R104 so that 1.49 Vrms is measured at TP4.

TX Mod Adjustment

This section assumes that each remote in the system has been set to provide an average voice audio level of 0 dBm measured at the remote. Have someone at the remote console press and hold the PTT switch. With a voice coming from the remote, adjust R102 to provide proper transmitter deviation.

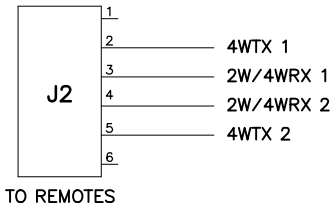
Monitor Adjustment

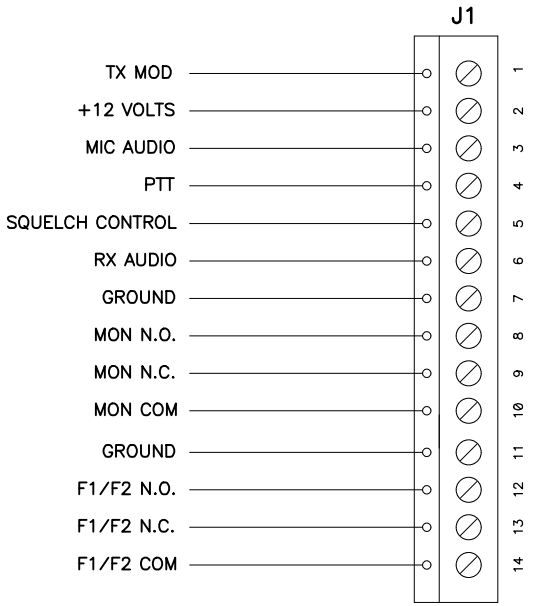
The monitor function can be used in one of two modes:

Momentary mode: (JP12 in position 2 &3) - The monitor relay energizes for approximately 6 seconds or until a PTT command is received.

Latched mode: (JP12 in position 1 & 2) - The monitor relay stays energized until a valid PTT command is decoded.

Note: Some radios require that the monitor circuit be activated while keying. This can be accomplished by shorting pins 2 &3 of JP11.





JUMPER SETTINGS

JUMPER	FUNCTION	1 TO 2	2 TO 3	
JP1	2 WIRE / 4 WIRE SELECT	2 WIRE	4 WIRE	
JP2	LINE LEVEL ADJUST	AUTO	MANUAL	
JP3	MOD OUT SOURCE Z	LOW	HIGH	
JP4	LOCAL MIC AUDIO GAIN	LOW GAIN	HIGH GAIN	
JP5	SQUELCH CONTROL MODE	LO MUTE	HI MUTE	
JP6	RX AUDIO GAIN	LOW GAIN	HIGH GAIN	
JP7	PTT KEYING	TO GROUND	TO +12 VOLTS	
JP8	LOCAL MIC AUDIO CONTROL	KEY TO GND	KEY TO + V	
JP9	F1 / F2 GROUND	DISABLED	ENABLED	
JP10	F1 / F2 RELAY	ENABLED	DISABLED	
JP11	MONITOR WITH PTT	DISABLED	ENABLED	
JP12	MONITOR MODE	LATCHED	MOMENTARY	
JP13	MONITOR GROUND	DISABLED	ENABLED	
JP14	F1/F2 OUTPUT	LATCHED	MOMENTARY	
JP15	LOCAL MIC TERMINATION	1 TO 3 NONE	1 TO 2 +12 VOLTS	3 TO 4 GROUND
E1	LOCAL MIC JACK JUMPERS	SEE MANUAL		
E2	RADIO JACK JUMPERS	SEE MANUAL		

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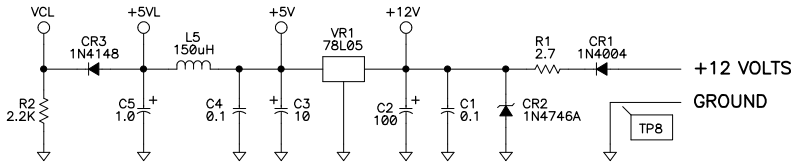
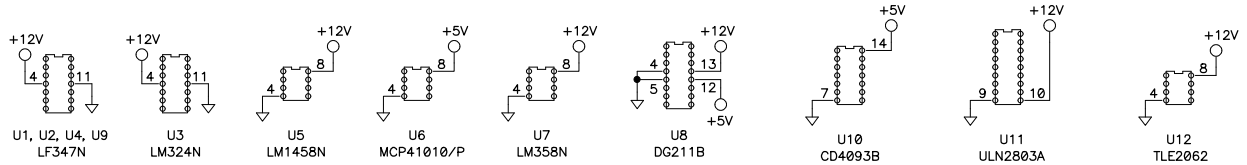
TTP2N TONE TERMINATION PANEL

A	200	MAIN BOARD
DATE: 02/12/03		SHEET 1 OF 7





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TTP2N Tone Termination Panel

A	200	MAIN BOARD
DATE: 01/30/03	SHEET 2 OF 7	

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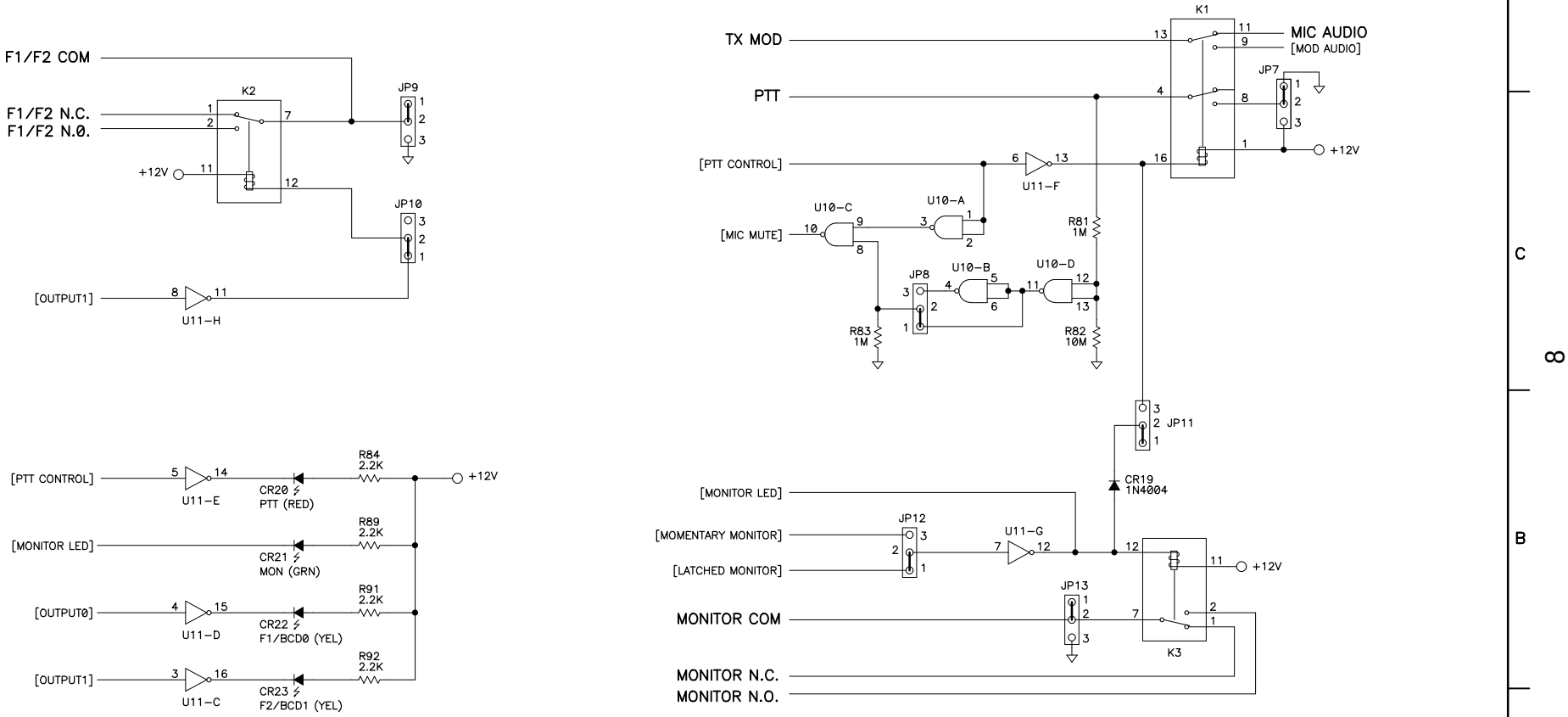

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TTP2N Tone Termination Panel

A	200	MAIN BOARD
DATE: 04/29/03		SHEET 3 OF 7

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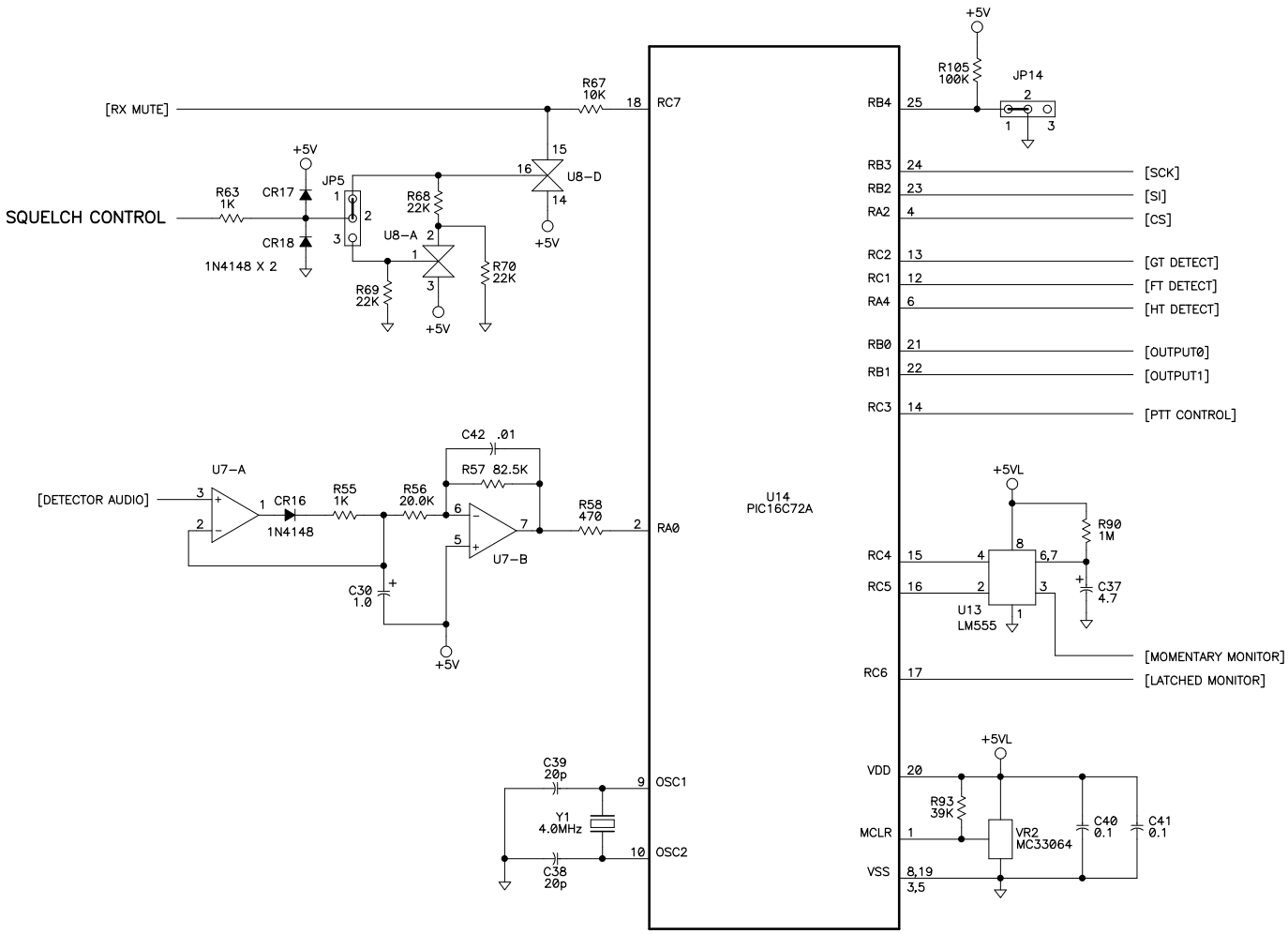

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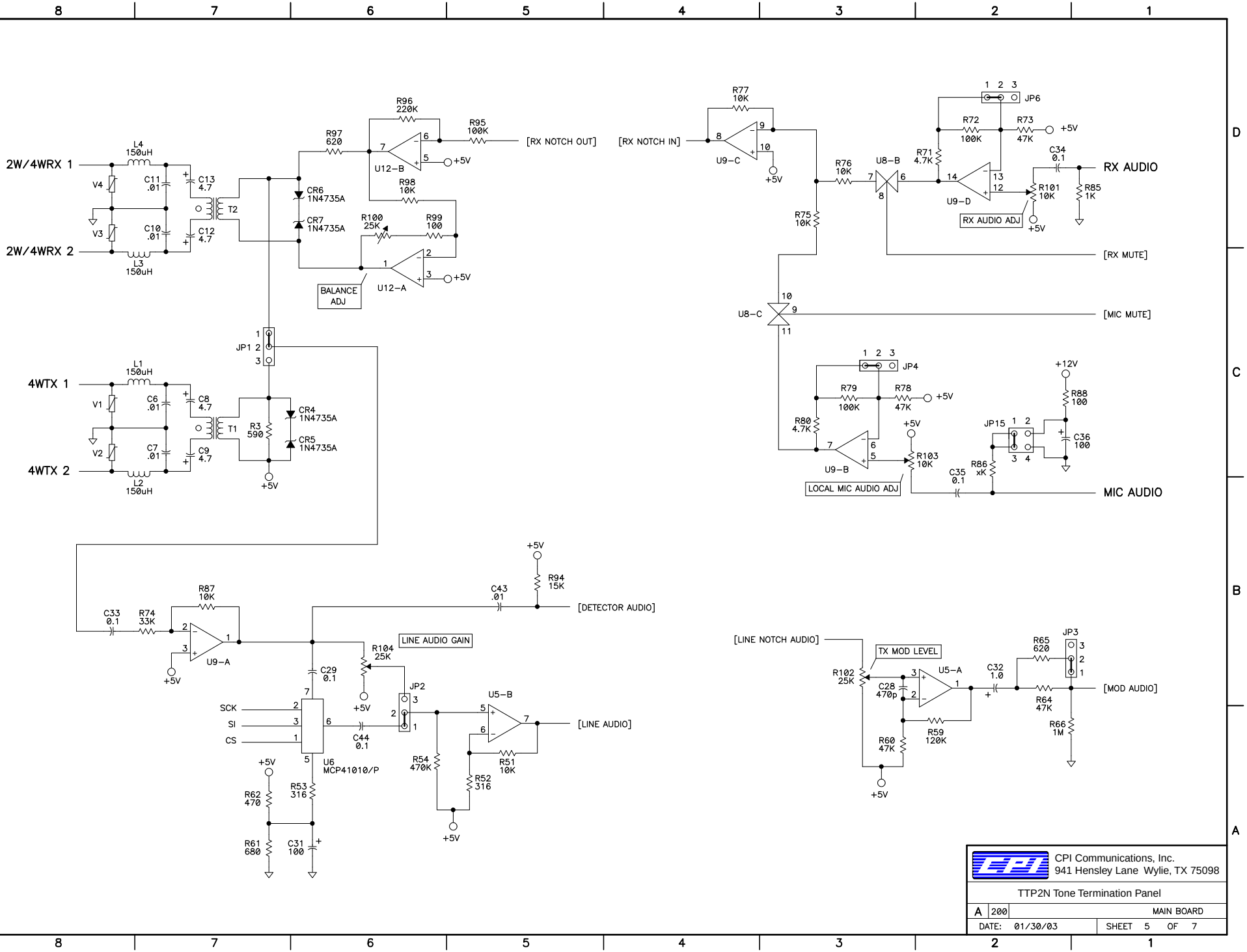
TTP2N Tone Termination Panel

A	200	MAIN BOARD
DATE: 01/30/03		SHEET 4 OF 7


2W/4WRX 1
2W/4WRX 2
L4 150uH
L3 150uH
V4
V3
C11 .01
C10 .01
C13 4.7
C12 4.7
T2
CR6 1N4735A
CR7 1N4735A
R97 620
R96 220K
R95 100K
R98 10K
R100 25K
R99 100
U12-B
U12-A
+5V
[RX NOTCH OUT]
BALANCE ADJ
JP1
4WTX 1
4WTX 2
L1 150uH
L2 150uH
V1
V2
C6 .01
C7 .01
C8 4.7
C9 4.7
T1
R3 590
CR4 1N4735A
CR5 1N4735A
[RX NOTCH IN]
R77 10K
U9-C
R76 10K
U8-B
R71 4.7K
R72 100K
R73 47K
JP6
C34 0.1
RX AUDIO
R101 10K
R85 1K
U9-D
RX AUDIO ADJ
R75 10K
[RX MUTE]
U8-C
[MIC MUTE]
JP4
R79 100K
R78 47K
R80 4.7K
U9-B
R103 10K
LOCAL MIC AUDIO ADJ
JP15
R88 100
C36 100
R86 xK
C35 0.1
MIC AUDIO
C33 0.1
R74 33K
R87 10K
U9-A
C43 .01
R94 15K
[DETECTOR AUDIO]
LINE AUDIO GAIN
R104 25K
C29 0.1
C44 0.1
SCK
SI
CS
U6 MCP41010/P
JP2
U5-B
[LINE AUDIO]
R62 470
R53 316
R61 680
C31 100
R54 470K
R52 316
R51 10K
[LINE NOTCH AUDIO]
TX MOD LEVEL
R102 25K
C28 470p
U5-A
C32 1.0
JP3
R65 620
R64 47K
R66 1M
R60 47K
R59 120K
[MOD AUDIO]
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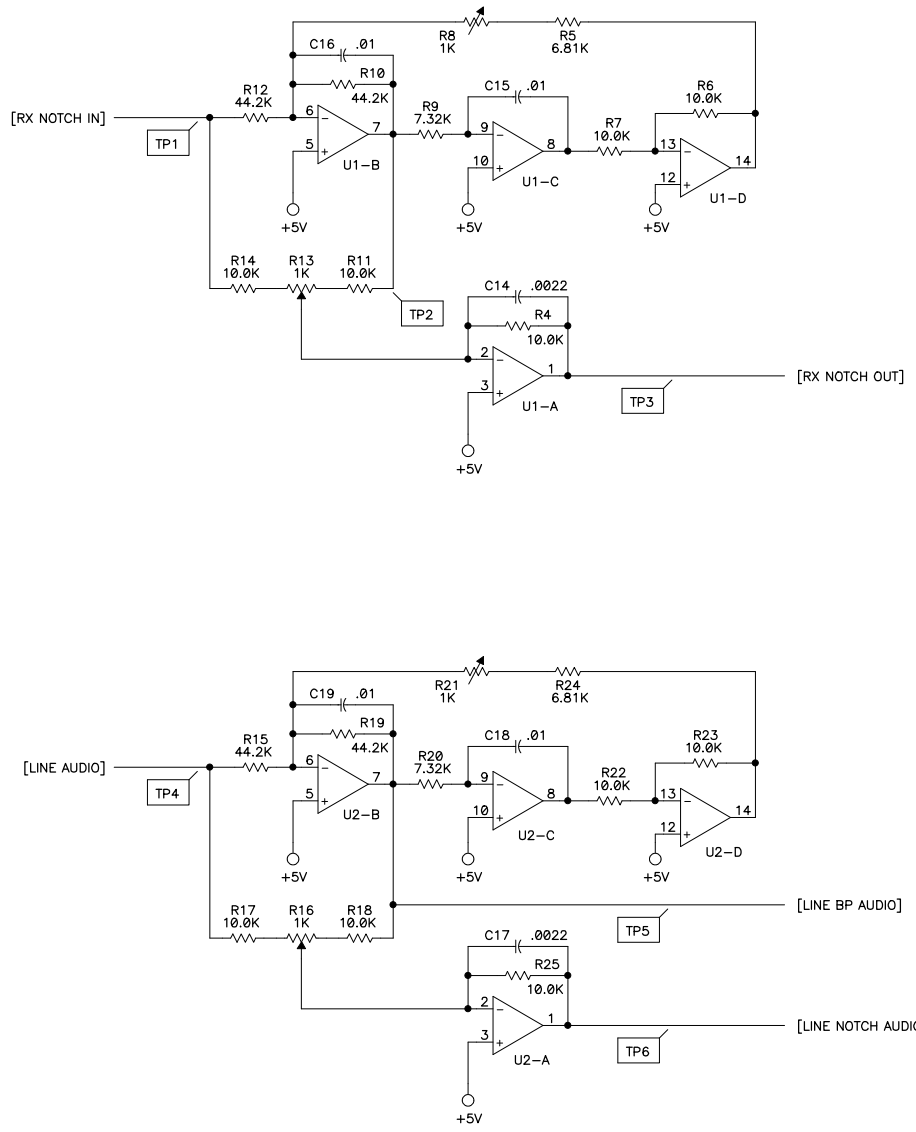
TTP2N Tone Termination Panel
A 200 MAIN BOARD
DATE: 01/30/03
SHEET 5 OF 7



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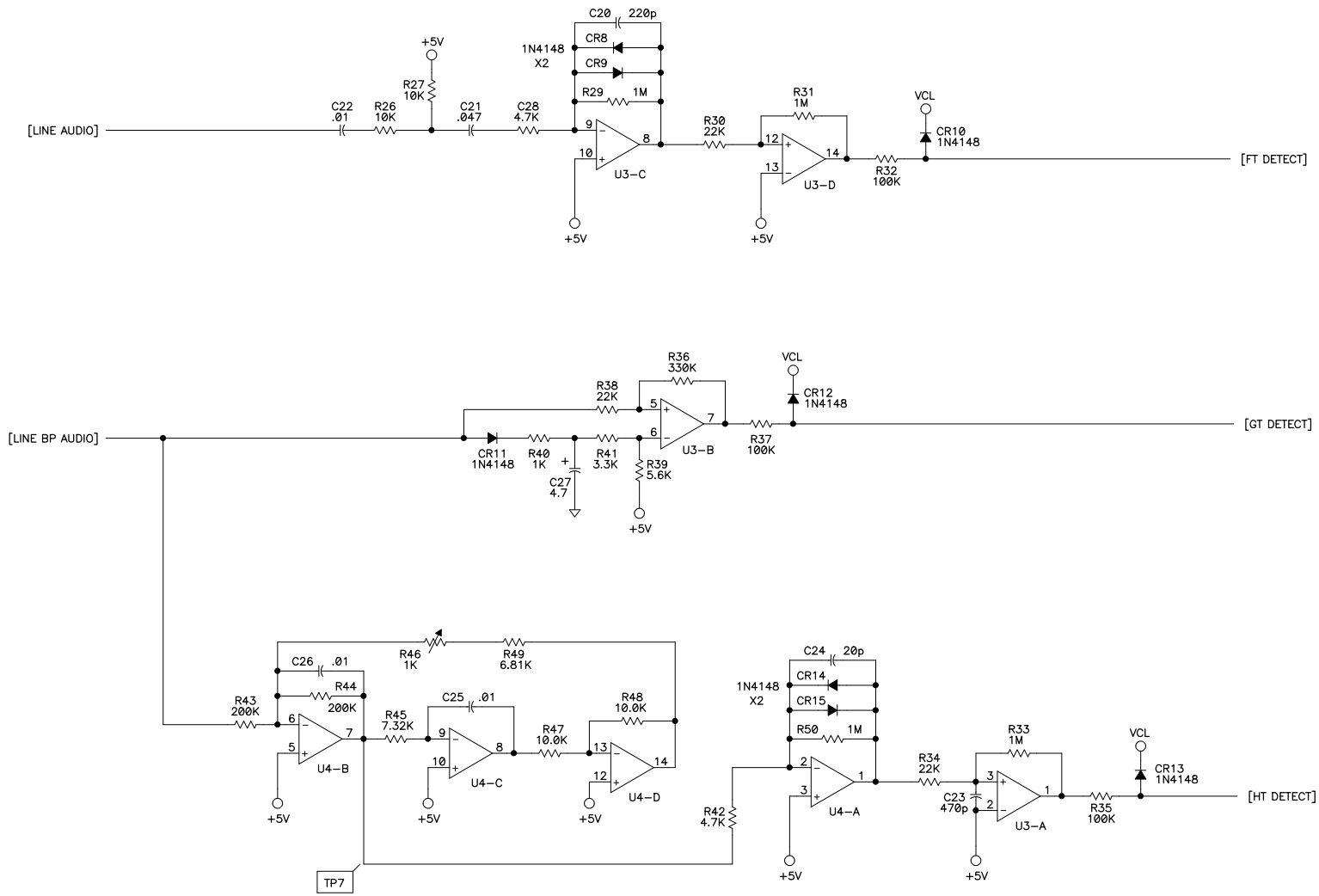
TTP2N Tone Termination Panel

E	200	MAIN BOARD
DATE: 01/30/03		SHEET 6 OF 7



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TTP2N Tone Termination Panel

E	200	MAIN BOARD
DATE: 01/30/03		SHEET 7 OF 7

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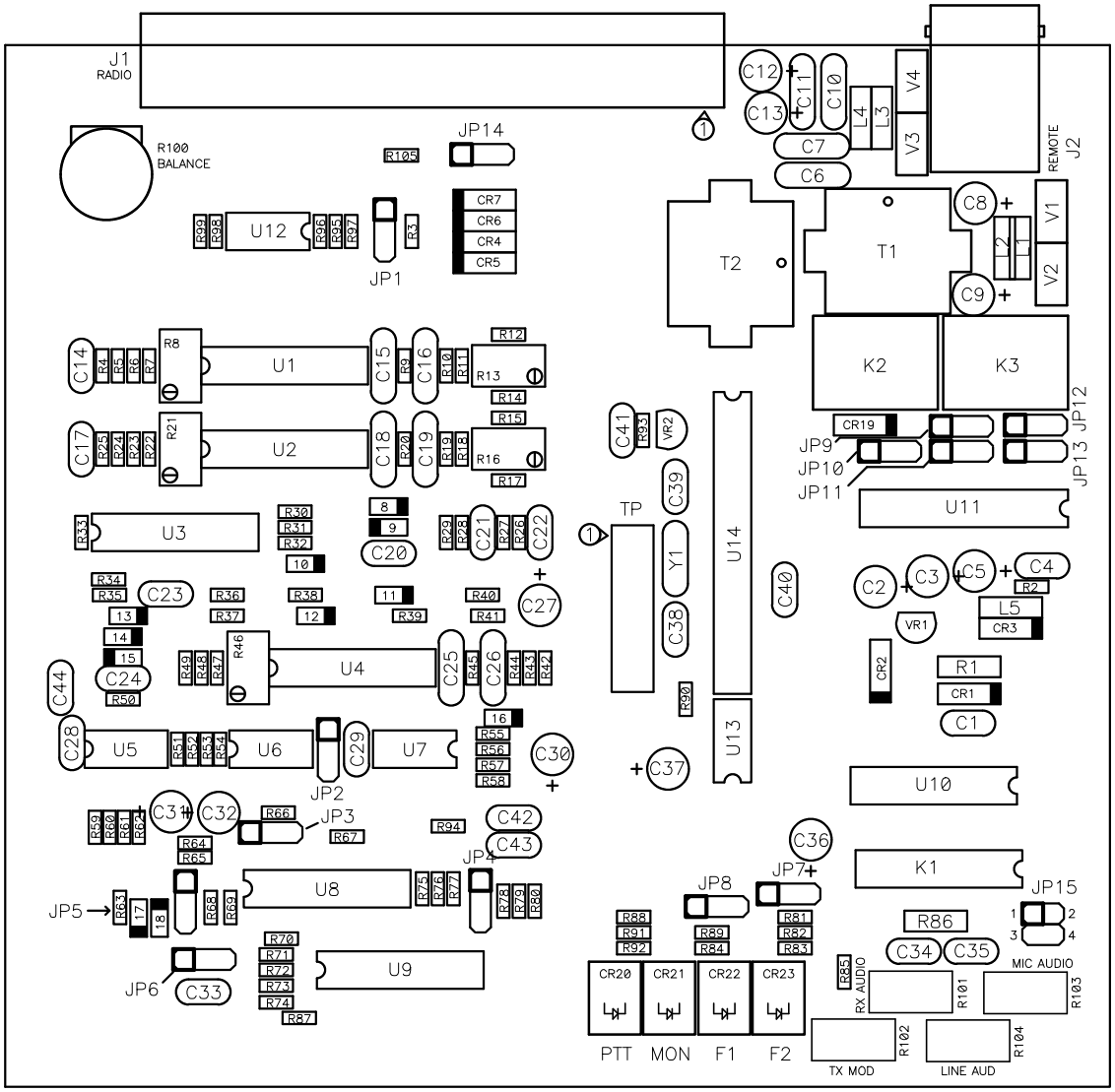

TTP2N TERMINATION PANEL

TTP2N.PCB

REV B

04–29–03

COMPONENT LOCATIONS