

1. Introduction

Thank you for using this Clare LITELINK III evaluation board. LITELINK III evaluation boards ship with CPC5621 full-wave ring detection LITELINK III parts and in one of two configurations; resistive AC termination circuit (CPC5621-EVAL-RDL) or reactive AC termination circuit (CPC5621-EVAL-CDL).

Figure 1. LITELINK III Evaluation Board, Primary (Top) View

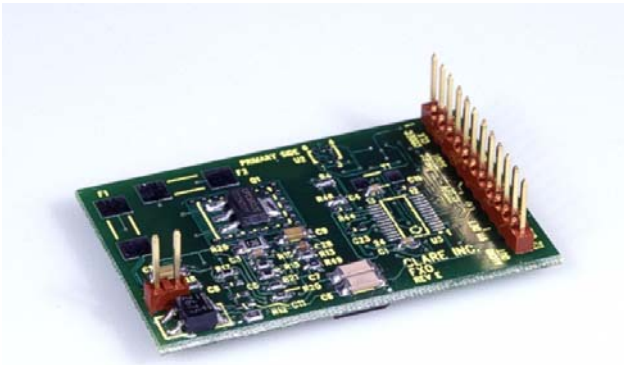


Figure 2. LITELINK III Evaluation Board, Secondary (Bottom) View



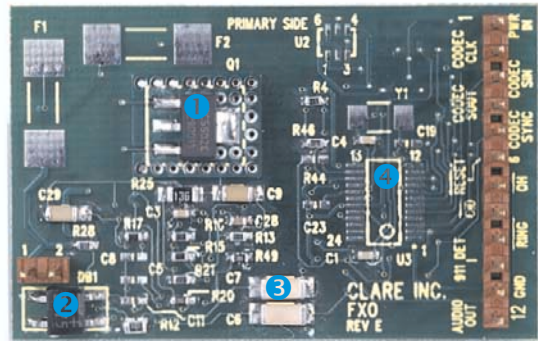
Use the three-letter code on the label on the printed-circuit board to determine the AC termination you have.

- CDL = reactive AC termination
- RDL = resistive AC termination

NOTE: The printed-circuit board used for LITELINK III evaluation boards is a multi-purpose board. It includes many stuff options and circuits not used when manufactured as a LITELINK III evaluation board. For more information, see [Stuffing Options](#) on page 2.

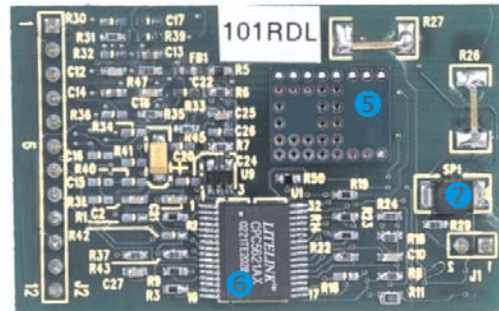
1.1 Component Locations

Figure 3. Primary (Top) Side Components



1. CPC5602C FET
2. Bridge Rectifier
3. Snoop Capacitors
4. CODEC area (not stuffed for evaluation board)

Figure 4. Secondary (Bottom) Side Components



5. FET Heatsink
6. LITELINK
7. Sidactor Circuit Protector



LITELINK III Evaluation Board Users Guide

2. Setup

This section describes setting up the LITELINK III evaluation board prior to use.

2.1 Connection

The LITELINK III evaluation board uses two 0.1 inch (2.54 mm) pin headers for input and output connections, J1 and J2. Clare recommends you construct header jumpers to bring the connections out to your circuit in development

Table 1: Connector J1 Connections

Pin	Silk Screen	Use
1	1	Tip. Connect to telephone network tip lead.
2	2	Ring. Connect to telephone network ring lead.

Table 2: Connector J2 Connections

Pin	Silk Screen	Use
1	PWR IN	Input power for the LITELINK III circuit. Connect to +5 or +3.3 Vdc
2	CODEC CLK	TX+ input to the LITELINK III.
3	CODEC SIN	TX- input to the LITELINK III.
4	CODEC SOUT	RX+ output of the LITELINK III.
5	CODEC SYNC	RX- output of the LITELINK III.
6	$\overline{\text{RESET}}$	Not used.
7	$\overline{\text{OH}}$	Off hook. Assert low to take the LITELINK III circuit off hook.
8	$\overline{\text{CID}}$	Caller ID. Assert low to engage the display signal routing features of LITELINK III.
9	$\overline{\text{RING}}$	The output of the LITELINK III ring circuit. See LITELINK datasheets for more information.
10	911 DET	Loop current detector output.
11	GND	Host side circuit ground
12	AUDIO OUT	Not used.

3. Using the Evaluation Board

Follow these guidelines for productive use of the LITELINK evaluation board:

- Make all connections to the board before applying power.
- LITELINK III evaluation board circuit components are sensitive to electro-static discharge (ESD). Use normal ESD precautions when working with the LITELINK III evaluation board.

4. Design Notes

1. The default gain setting at the factory is 0 dB.
2. $\overline{\text{OH}}$ must be de-asserted (set logic high) once at power-up for 50 ms to transfer internal gain trim values within LITELINK III. This would be normal operation in many applications.

5. Worldwide Operation

LITELINK III evaluation board AC termination characteristics may be changed by changing stuffing options. See [Stuffing Options on page 2](#), [CPC5621-EVAL-CDL Schematic on page 5](#), and [CPC5621-EVAL-RDL Schematic on page 6](#) for more information.

5.1 Stuffing Options

LITELINK III Evaluation Boards can be used to evaluate LITELINK III circuits connected to several types of host equipment and several types of telephone networks. This flexibility will often require changes to the components in the circuit.

Select and implement a stuffing option as described below:

Table 3: Stuffing Options

Option	Place	Do Not Place
Resistive Termination (North America), CPC5621-EVAL-RDL	R14 = 499 k Ω R17 301 Ω , R18 = 0 Ω , R22 = 8.2 Ω , R23 = 150 Ω , R24 = 0 Ω ,	C5, C8, C11, R1

Table 3: Stuffing Options (Continued)

Option	Place	Do Not Place
Reactive Termination (TBR-21), CPC5621-EVAL-CDL	C8 = 0.68 μ F, C11 = 1.5 μ F, R1 = 0 Ω , R14 = 221 k Ω , R17 = 59 Ω , R18 = 169 Ω , R22 = 22.1 or 8.2 Ω , R23 = 29.4 Ω , R24 = 84.5 Ω	C5
Single-ended TX+/TX- input	C26	C25
Differential TX+/TX- input	C25	C26
LITELINK Used With ADI 1803 Codec (Soft Modem)	U3, C12, C15, C16, C18, C19, C22, C23, Y1, R30, R34, R36, R38, R40, R42, R43, R44, R45, R46	R31, R33, R35, R37
Without Codec	R31, R33, R35, R37	U3, C12, C15, C16, C18, C19, C22, C23, Y1, R30, R34, R36, R38, R40, R42, R43, R44, R45, R46
For Power Cross Protection	F1, F2, R26, R27	R28, R29
Without Power Cross Protection	R28, R29	F1, F2, R26, R27
3.3 V External Power Supply	R47	U2, C17, R39
5.0 V External Power Supply	U2, C17, R39	R47

7. Schematic Diagrams

Figure 7. CPC5621-EVAL-CDL Schematic

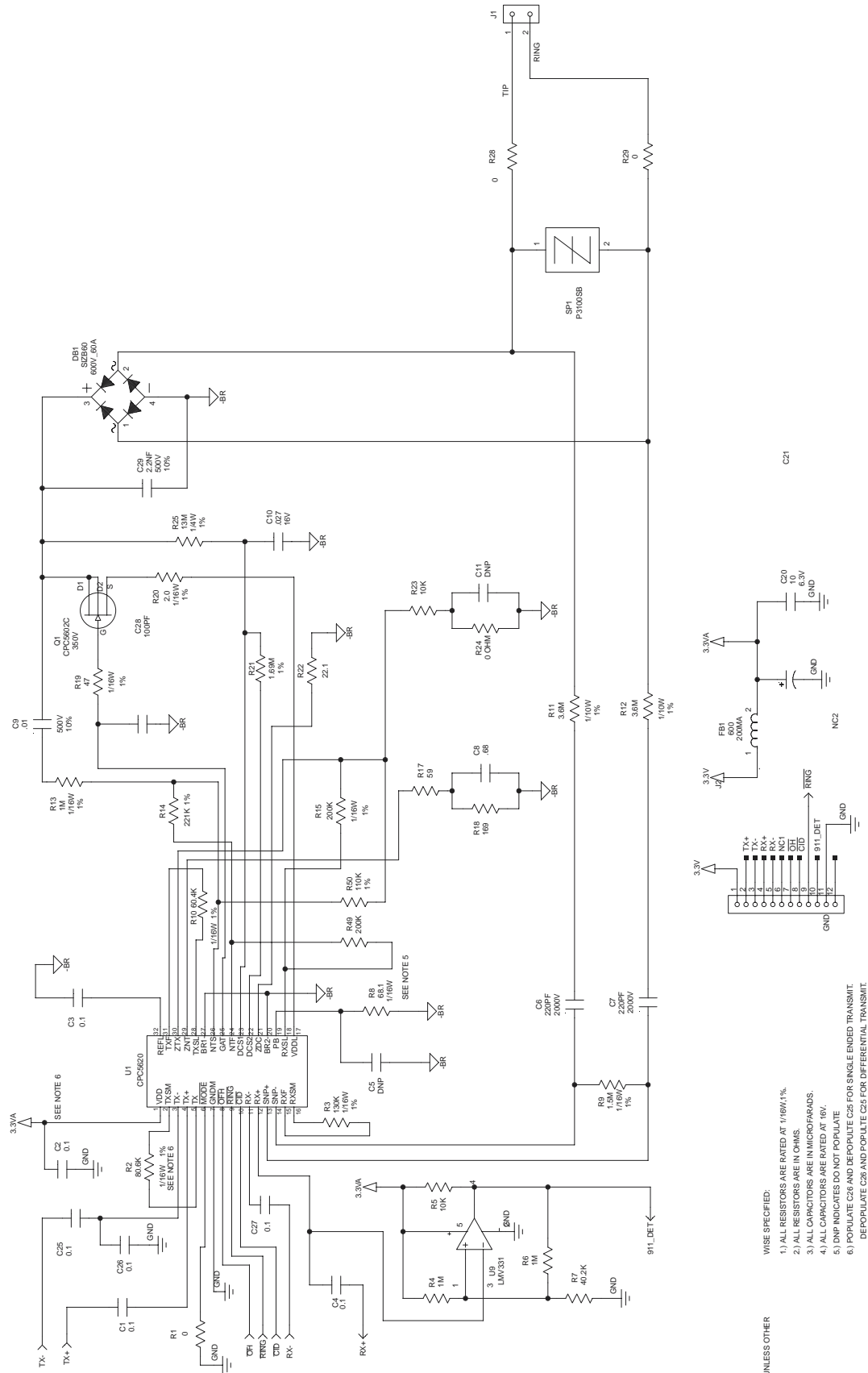
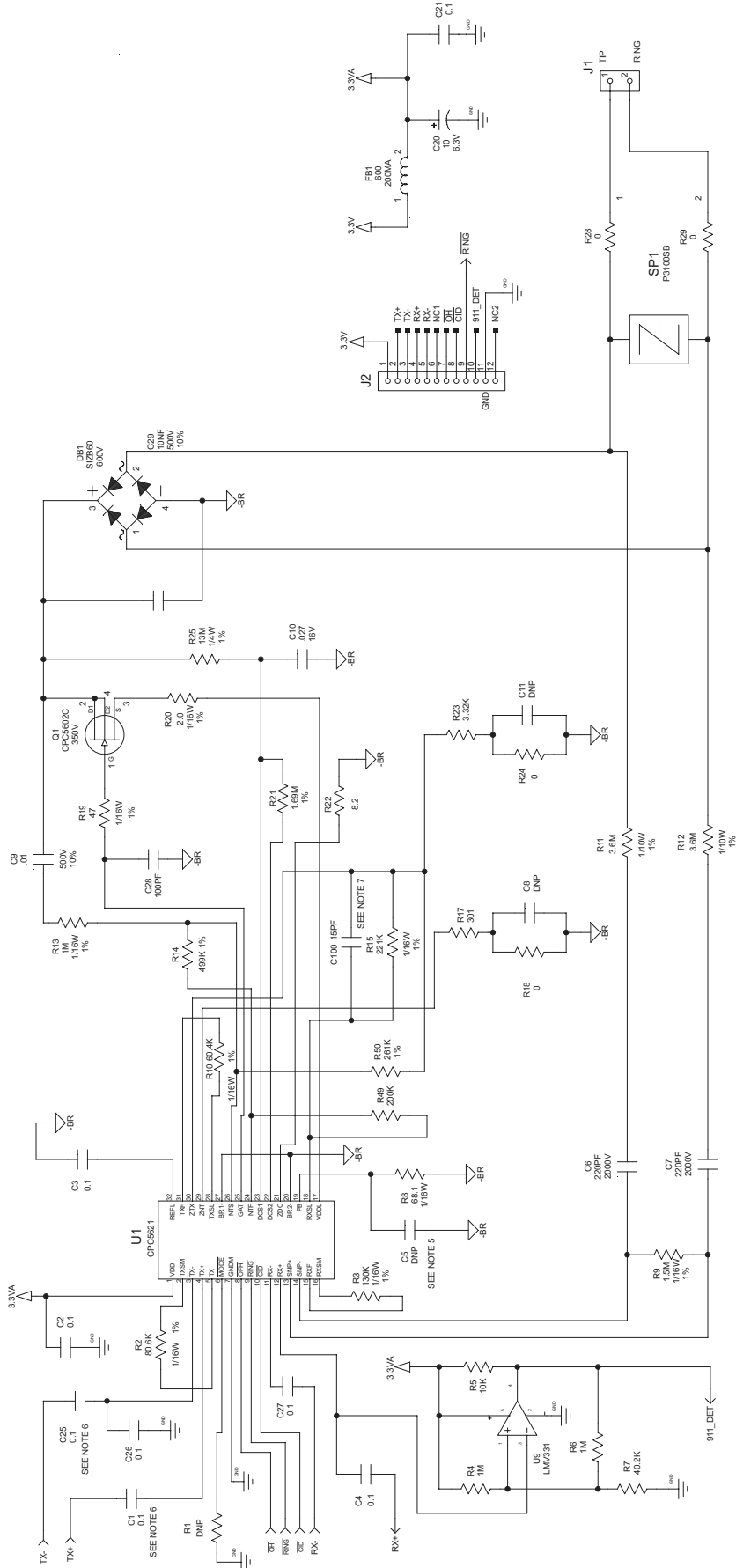


Figure 8. CPC5621-EVAL-RDL Schematic



- UNLESS OTHERWISE SPECIFIED:
- 1.) ALL RESISTORS ARE RATED AT 1/16W, 1%.
 - 2.) ALL RESISTORS ARE IN OHMS.
 - 3.) ALL CAPACITORS ARE IN MICROFARADS.
 - 4.) ALL CAPACITORS ARE RATED AT 16V.
 - 5.) DNP INDICATES DO NOT POPULATE
 - 6.) POPULATE C26 AND DEPOPULATE C25 FOR SINGLE ENDED TRANSMIT. DEPOPULATE C26 AND POPULATE C25 FOR DIFFERENTIAL TRANSMIT.
 - 7.) CAPACITOR C100 IS AN ADDED COMPONENT. THERE ARE NO PADS FOR MOUNTING. INSTALL C100 PER SCHEMATIC UTILIZING SHORTEST MOUNTING DISTANCE.

8. Part Lists

8.1 CPC5621-EVAL-CDL Part List

Quantity	Reference Designators	Description	Supplier	Part Number	
8	C1, C2, C3, C4, C21, C25, C26, C27	0.1 μ F, 16 V, 10%, 0603 Capacitor	Tecate	CMC016103ZY0603T	
2	C6, C7	220 pF, 2 kV, 10%, 1808 Capacitor	AVX	1808GA221JAT1A	
1	C8	0.68 μ F, 10 V, 10%, 0603 Capacitor	Tecate	CMC01684KY0603T	
1	C9	0.01 μ F, 500 V, 10%, 1206 Capacitor		12067C103KAT1A	
1	C10	0.027 μ F, 16 V, 10%, 0603 Capacitor		CMC016273KY0603T	
1	C20	10 μ F, 6.3 V, 10%, 3216 Capacitor	Panasonic	ECS-T0JY106R	
1	C28	100 pF, 16 V, 10%, 0603 Capacitor	Tecate	CMC016101JN0603T	
1	C29	0.0022 μ F, 500 V, 10%, 1206 Capacitor	AVX	12067C222JAT1A	
1	DB1	Bridge rectifier, 600 V, 0.8 A	Shindengen	SIZB60	
1	FB1	Ferrite bead, 200 mA, 600 Ω	Murata	BLM18AG601SN1J	
1	J1	Header, 2 circuits, 2.54 mm	Molex	22-03-2021	
1	J2	Header, 12 circuits, 2.54 mm		22-10-2121	
1	Q1	FET	Clare	CPC5602C	
4	R1, R24, R28, R29	0 k Ω , 1/16 W, 1% 0603 Resistor	IMS	RCI-0603-0000F	
1	R2	80.6 k Ω , 1/16 W, 1% 0603 Resistor		RCI-0603-8062F	
1	R3	130 k Ω , 1/16 W, 1% 0603 Resistor		RCI-0603-130F	
3	R4, R6, R13	1 M Ω , 1/16 W, 1% 0603 Resistor		RCI-0603-1004F	
2	R5, R23	10 k Ω , 1/16 W, 1% 0603 Resistor		RCI-0603-1002F	
1	R7	40.2 k Ω , 1/16 W, 1% 0603 Resistor		RCI-0603-4022F	
1	R8	68.1 Ω , 1/16 W, 1% 0603 Resistor		RCI-0603-68R1F	
1	R9	1.5 M Ω , 1/16 W, 1% 0603 Resistor		RCI-0603-1504J	
1	R10	60.4 k Ω , 1/16 W, 1% 0603 Resistor		RCI-0603-6043F	
2	R11, R12	3.6 M Ω , 1/10 W, 1% 0805 Resistor		RC-0805-3604F	
1	R14	221 k Ω , 1/16 W, 1% 0603 Resistor		RCI-0603-2213F	
2	R15, R49	200 k Ω , 1/16 W, 1% 0603 Resistor		RCI-0603-2003F	
1	R17	59 Ω , 1/16 W, 1% 0603 Resistor		RCI-0603-5900F	
1	R18	169 Ω , 1/16 W, 1% 0603 Resistor		RCI-0603-1690F	
1	R19	47 Ω , 1/16 W, 1% 0603 Resistor		RCI-0603-4700F	
1	R20	2 Ω , 1/16 W, 1% 0603 Resistor		AVX	CR10002JT
1	R21	1.69 M Ω , 1/16 W, 1% 0603 Resistor		IMS	RCI-0603-1694F
1	R22	22.1 Ω , 1/16 W, 1% 0603 Resistor			RCI-0603-22R1F
1	R25	13 M Ω , 1/4 W, 1% 1206 Resistor			RCI-1206-1305F
1	R50	110 k Ω , 1/16 W, 1% 0603 Resistor			RCI-0603-1103F
1	SP1	P3100SB Sidactor, DO-214AA	Teccor	P3100SB	
1	U1	CPC5621 LITELINK	Clare	CPC5621A	
1	U9	LMV331 Comparator, SOT23-5	Nat. Semi.	LMV331	

8.2 CPC5621-EVAL-RDL Part List

Quantity	Reference Designators	Description	Supplier	Part Number	
8	C1, C2, C3, C4, C21, C25, C26, C27	0.1 μ F, 16 V, 10%, 0603 Capacitor	Tecate	CMC016103ZY0603T	
2	C6, C7	220 pF, 2 kV, 10%, 1808 Capacitor	AVX	1808GA221JAT1A	
1	C9	0.01 μ F, 500 V, 10%, 1206 Capacitor	Tecate	12067C103KAT1A	
1	C10	0.027 μ F, 16 V, 10%, 0603 Capacitor		CMC016273KY0603T	
1	C20	10 μ F, 6.3 V, 10%, 3216 Capacitor	Panasonic	ECS-T0JY106R	
1	C28	100 pF, 16 V, 10%, 0603 Capacitor	Tecate	CMC016101JN0603T	
1	C29	0.0022 μ F, 500 V, 10%, 1206 Capacitor	AVX	12067C222JAT1A	
1	C100	15 pF, 16 V, 10%, 0603 Capacitor	Tecate	CMC025150JN0603T	
1	DB1	Bridge rectifier, 600 V, 0.8 A	Shindengen	SIZB60	
1	FB1	Ferrite bead, 200 mA, 600 Ω	Murata	BLM18AG601SN1J	
1	J1	Header, 2 circuits, 2.54 mm	Molex	22-03-2021	
1	J2	Header, 12 circuits, 2.54 mm		22-10-2121	
1	Q1	FET	Clare	CPC5602C	
1	R2	80.6 k Ω , 1/16 W, 1% 0603 Resistor	IMS	RCI-0603-8062F	
1	R3	130 k Ω , 1/16 W, 1% 0603 Resistor		RCI-0603-130F	
3	R4, R6, R13	1 M Ω , 1/16 W, 1% 0603 Resistor		RCI-0603-1004F	
1	R5	10 k Ω , 1/16 W, 1% 0603 Resistor		RCI-0603-1002F	
1	R7	40.2 k Ω , 1/16 W, 1% 0603 Resistor		RCI-0603-4022F	
1	R8	68.1 Ω , 1/16 W, 1% 0603 Resistor		RCI-0603-68R1F	
1	R9	1.5 M Ω , 1/16 W, 1% 0603 Resistor		RCI-0603-1504J	
1	R10	60.4 k Ω , 1/16 W, 1% 0603 Resistor		RCI-0603-6043F	
2	R11, R12	3.6 M Ω , 1/10 W, 1% 0805 Resistor		RC-0805-3604F	
1	R14	499 k Ω , 1/16 W, 1% 0603 Resistor		RCI-0603-4993F	
1	R15	221 k Ω , 1/16 W, 1% 0603 Resistor		RCI-0603-2213F	
1	R17	301 Ω , 1/16 W, 1% 0603 Resistor		RCI-0603-3010F	
2	R18, R24	0 Ω		-	
1	R19	47 Ω , 1/16 W, 1% 0603 Resistor		RCI-0603-4700F	
1	R20	2 Ω , 1/16 W, 1% 0603 Resistor		AVX	CR10002JT
1	R21	1.69 M Ω , 1/16 W, 1% 0603 Resistor		IMS	RCI-0603-1694F
1	R22	8.2 Ω , 1/16 W, 1% 0603 Resistor			RCI-0603-8R20F
1	R23	3.32 k Ω , 1/16 W, 1% 0603 Resistor	RCI-0603-3321F		
1	R25	13 M Ω , 1/4 W, 1% 1206 Resistor	RCI-1206-1305F		
1	R49	200 k Ω , 1/16 W, 1% 0603 Resistor	RCI-0603-2003F		
1	R50	261 k Ω , 1/16 W, 1% 0603 Resistor	RCI-0603-1103F		
1	SP1	P3100SB Sidactor, DO-214AA	Teccor	P3100SB	
1	U1	CPC5621 LITELINK	Clare	CPC5621A	
1	U9	LMV331 Comparator, SOT23-5	Nat. Semi.	LMV331	

9. LITELINK Design Resources

9.1 Clare, Inc. Design Resources

The Clare, Inc. web site has a wealth of information useful for designing with LITELINK, including application notes and reference designs that already meet all applicable regulatory requirements. LITELINK data sheets also contains additional application and design information. See the following links:

Application note AN-107 [LOCxx Series - Isolated Amplifier Design Principles](#)

Application note AN-114 [ITC117P](#)

Application note AN-117 [Customize Caller-ID Gain and Ring Detect Voltage Threshold for CPC5610/11](#)

Application note AN-140, [Understanding LITELINK](#)

Application note AN-141, [Enhanced Pulse Dialing with LITELINK](#)

Application note AN-143, [Loop Reversal Detection with LITELINK](#)

Application note AN-147, [Worldwide Application of LITELINK](#)

Application note AN-149, [Increased LITELINK II Transmit Power](#)

Application note AN-150, [Ground-start Supervision Circuit Using IAA110](#)

Application Note AN-152, [LITELINK II to LITELINK III Design Conversion](#)

9.2 Third Party Design Resources

The following also contain information useful for DAA designs. All of the books are available on amazon.com.

Understanding Telephone Electronics, Stephen J. Bigelow, et. al., Butterworth-Heinemann; ISBN: 0750671750

For additional information please visit www.clare.com

Newton's Telecom Dictionary, Harry Newton, CMP Books; ISBN: 1578200695

Photodiode Amplifiers: Op Amp Solutions, Jerald Graeme, McGraw-Hill Professional Publishing; ISBN: 007024247X

Teccor, Inc. Surge Protection Products

United States Code of Federal Regulations, CFR 47 Part 68.3

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