

LTC3884 UK Package

Programming board for Dual Output PolyPhase DC/DC Controller with Digital Power Management

DESCRIPTION

Demonstration circuit 2298A contains the circuitry needed to program and verify the EEPROM of the [LTC3884](#) in the UK package and that is its only purpose. The DC2298A is shipped with a LTC3884 installed in the clamshell style programming socket and its EEPROM contains the factory default configuration. The LTpowerPlay® #.proj file that corresponds to the factory default can be found in the GUI.

In order to properly verify the contents of the EEPROM, download and install the LTpowerPlay software (GUI). The software can be downloaded from:

<http://www.linear.com/ltpowerplay>

You also need a Linear Technology USB to I²C/SMBus/PMBus dongle, DC1613A or DC1427A.

DEMO SYSTEM REQUIRED HARDWARE

- Windows PC
- USB to I²C/SMBus/PMBus Controller, DC1613A or DC1427A
- DC2298A

DEMO SYSTEM REQUIRED SOFTWARE

- LTpowerPlay

LTC3884 FEATURES

- PMBus/I²C compliant serial interface
- Sub-milliohm DCR current sensing
- Telemetry read back includes V_{IN} , I_{IN} , V_{OUT} , I_{OUT} , temperature and faults
- Programmable voltage, current limit, digital soft-start/stop, sequencing, margining, control loop compensation, OV/UV/OC and frequency synchronization (200kHz to 1MHz)
- $\pm 0.5\%$ output voltage accuracy over temperature
- Internal EEPROM and fault logging
- Integrated powerful N-channel MOSFET gate drivers
- Wide V_{IN} range: 4.5V to 38V
- V_{OUT} range: 0.5V to 3.5V (with low DCR setting); 0.5V to 5.5V (without low DCR setting)
- Accurate PolyPhase® current sharing for up to 6 phases
- Available in a 48-lead (7mm × 7mm) QFN Package

Design files for this circuit board are available at <http://www.linear.com/demo/DC2298A>

LT, LT, LTC, LTM, LTpowerPlay, PolyPhase, Linear Technology and the Linear logo are registered trademarks of Linear Technology Corporation. All other trademarks are the property of their respective owners.

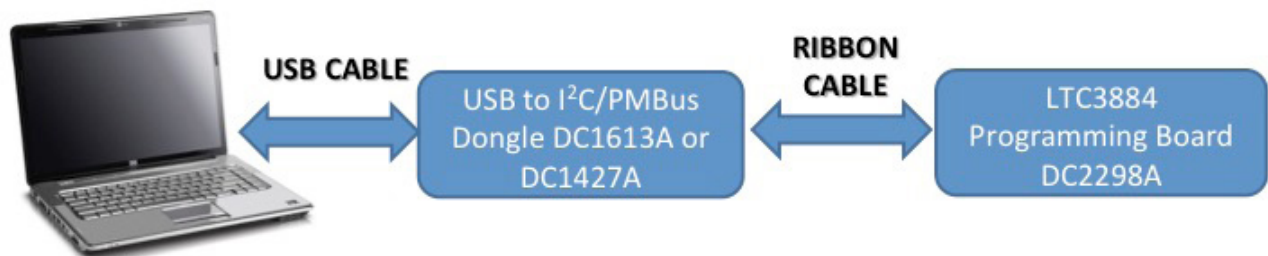


Figure 1. LTC3884 Programming Setup Using DC2298A

QUICK START PROCEDURE

Demonstration circuit 2298A makes it easy to program and verify the EEPROM contents of the LTC3884 in the UK package.

1. Make sure jumpers are in the following positions:

JUMPER	POSITION	FUNCTION
JP1	DISABLE	Write Protection of LTC3884
JP2	ENABLE	Write Protection of Identification EEPROM

2. Open the lid of the socket. Verify there is an IC inside. See Figure 2.

3. Close the lid. It will snap into place.


NOTE. Removal and insertion of the IC should be done with either a tweezers or a vacuum suction device.

4. Plug one end of the USB cable to your PC. Plug other end of USB cable into the I²C/SMBus/PMBus dongle.

5. If you have a DC1427A, plug the ribbon cable into J1. If you have a DC1613A, plug the ribbon cable into J2. See Figure 3.

6. On your PC, launch LTpowerPlay. LTpowerPlay will identify the DC2298A and launch the appropriate GUI. See Figure 4.

NOTE. You will see an Under Temperature (UT) Fault. This is normal since the temperature sensing pin is grounded. Ignore this fault at the moment.

7. Change the GUI parameters according to your system requirements. Or, you can click  button to open an existing project file.

8. After you finish the design, click  to save the project file.

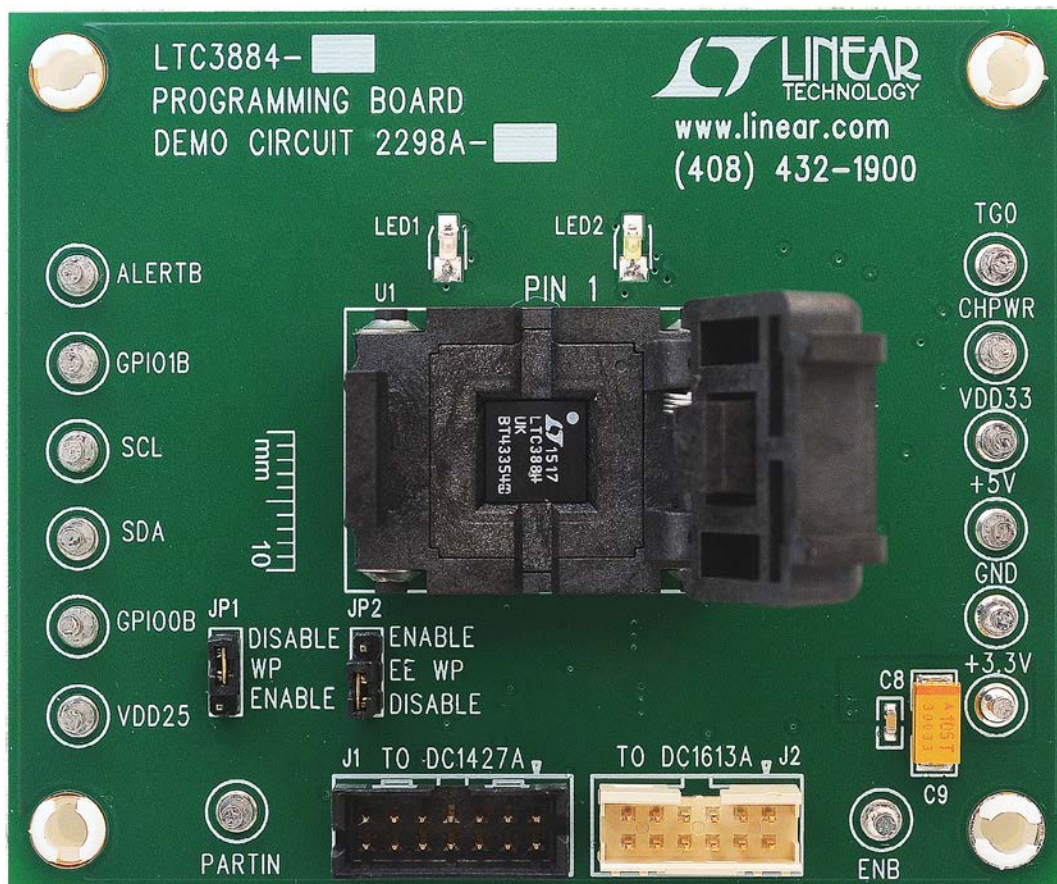


Figure 2. Proper Measurement Equipment Setup

QUICK START PROCEDURE

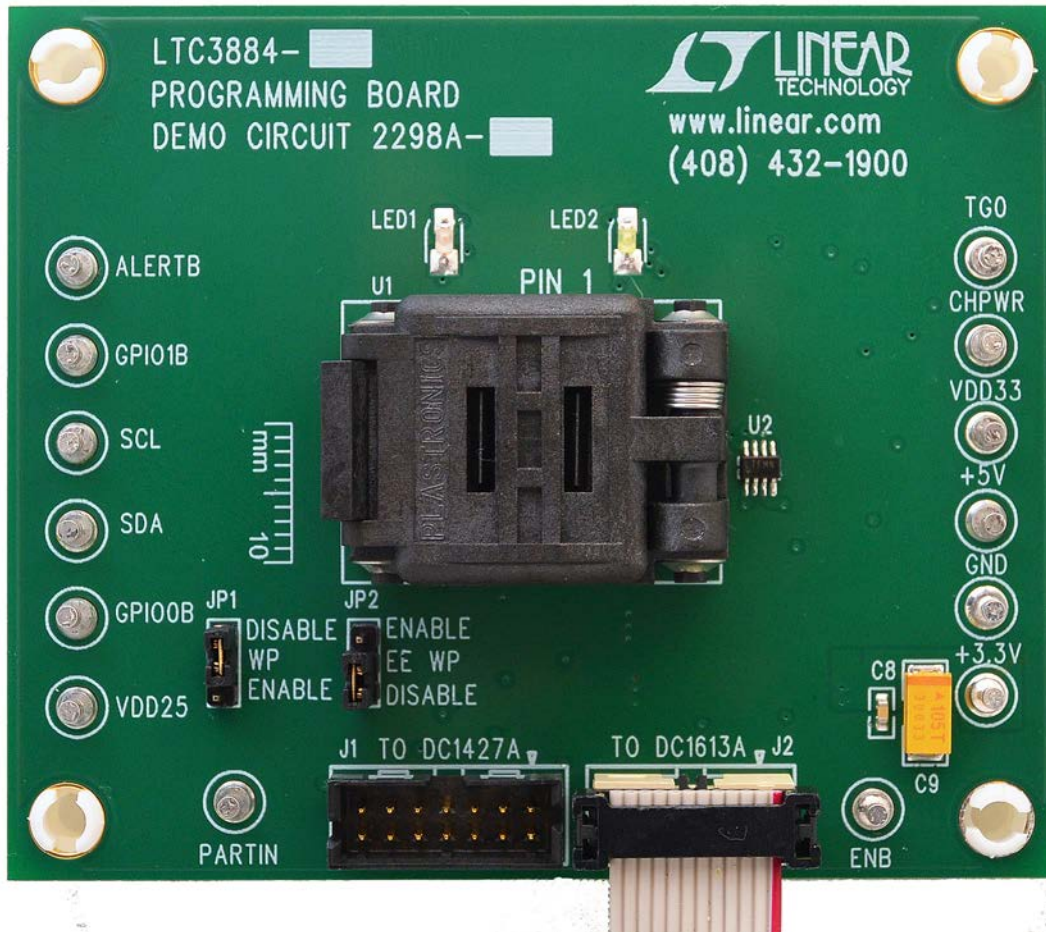


Figure 3. DC1613A Ribbon Cable Installation

QUICK START PROCEDURE

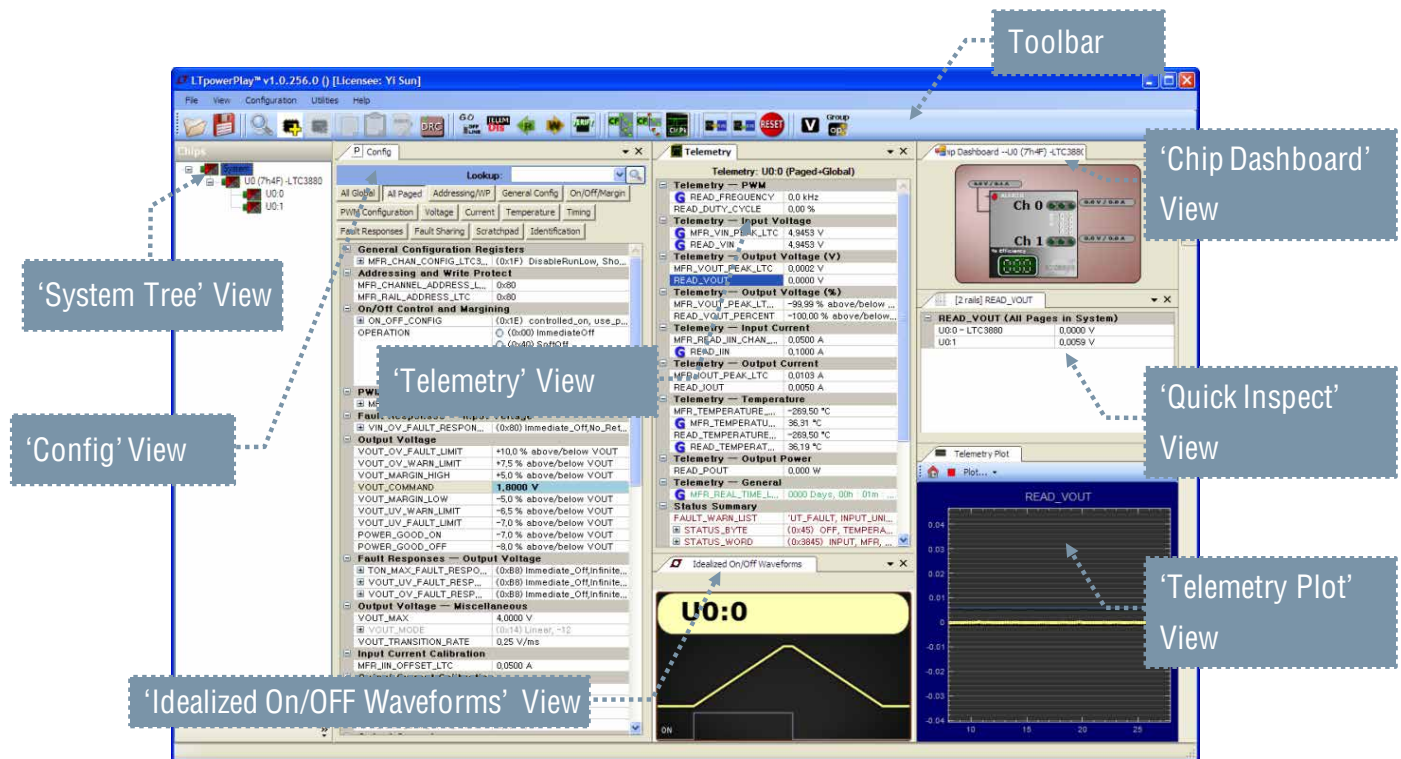


Figure 4. LTpowerPlay interface of programming the LTC3884

POWERING DOWN THE BOARD BETWEEN PROGRAMMING OPERATIONS

Disconnect the USB cable from the DC1427A/DC1613A before removing or inserting a LTC3884 into the programming socket.

WHAT YOU CAN DO WITH THE DC2298A

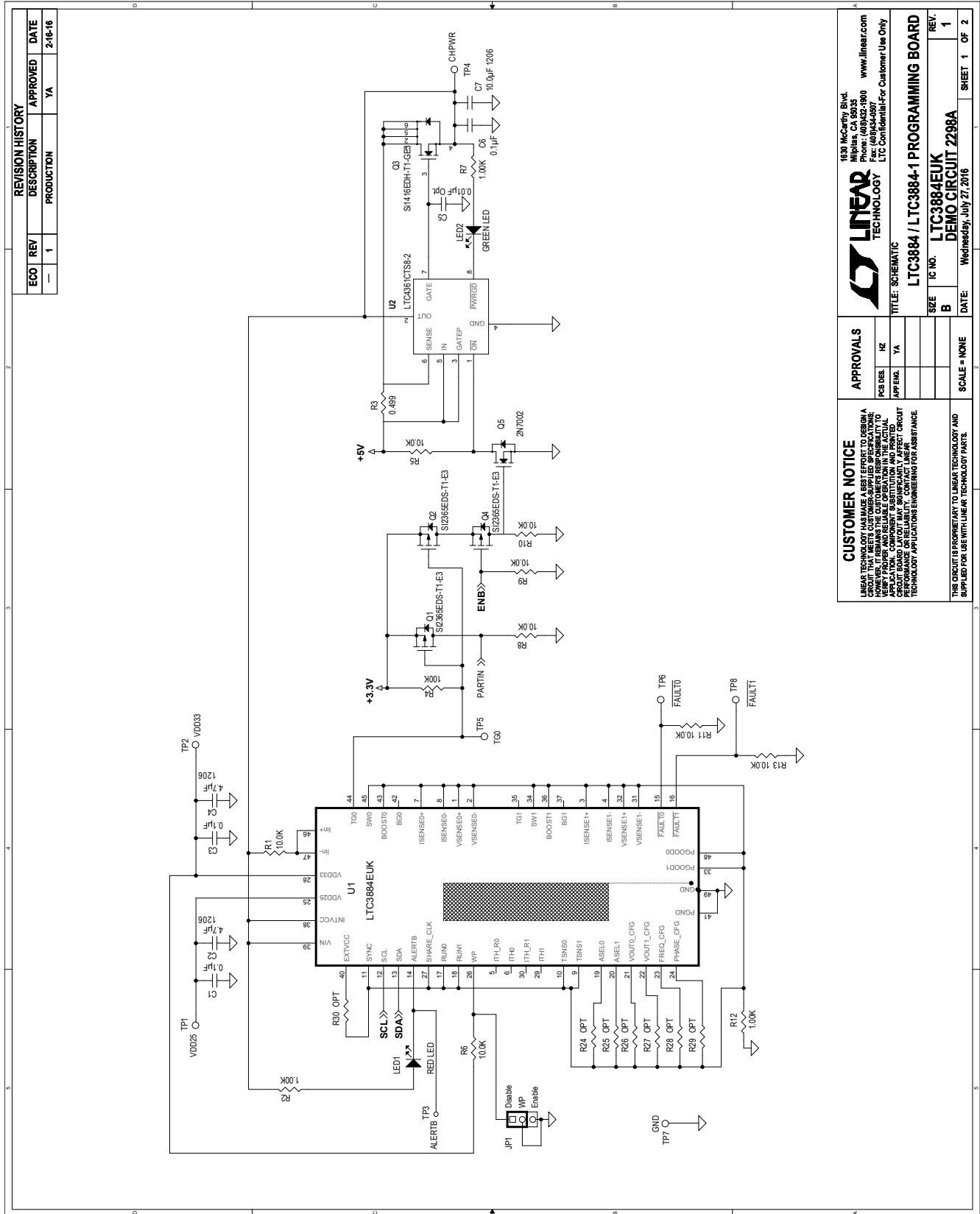
1. Compare the contents of the EEPROM in the LTC3884UK against your project or hex file.
2. Reprogram the contents of the EEPROM in the LTC3884UK using your project or hex File.
3. Verify the EEPROM within the DC2298A contains the factory defaults.
 - a. From the LTpowerPlay interface, load the factory defaults project file. This file is located at:
C:\Program Files\Linear Technology\LTpowerPlay\project files\ltc3884\datasheet_defaults.proj
 - b. Click the Verify button.

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components				
1	4	C1, C3, C6, C8	CAP .1 μ F, 16V, CERAMIC X7R 0603	AVX 0603YC104KAT2A
2	1	C7	CAP 10 μ F, 6.3V, CERAMIC X5R 1206	AVX, 12066D106KAT2A
3	2	C2, C4	CAP 4.7 μ F, 10V, CERAMIC X5R 1206	AVX, 1206ZD475KAT2A
4	2	C9, C10	CAP TANTALUM 1 μ F, 50V, 10% SMD	AVX TAJC105K050RNJ
5	1	LED1	LED RED S-TYPE GULL WING SMD	Panasonic - SSG LN1271RTR
6	1	LED2	LED GREEN S-GW TYPE SMD	Panasonic - SSG LN1371SGTRP
7	3	Q1, Q2, Q4	MOSFET P-CH 20V, 580MA, SOT23-3	Vishay/Siliconix Si2365EDS-T1-GE3
8	1	Q5	MOSFET N-CH 60V, 115MA, SOT-23	Fairchild Semiconductor 2N7002
9	1	Q3	MOSFET N-CH 30V, 5.1A, SOT-363	Vishay/Siliconix Si1416EDH-T1-GE3
10	3	R2, R7, R12	RES 1.00k Ω 1/8W 1% 0805 SMD	Panasonic - ECG ERJ-6ENF1001V
11	10	R1, R5, R6, R8, R9, R10, R11, R13, R16, R17	RES 10.0k Ω , 1/8W, 1%, 0805 SMD	Vishay CRCW0805100FKEA
12	1	R4	RES 100k Ω , 1/8W, 1%, 0805 SMD	Panasonic - ECG ERJ-6ENF1003V
13	1	R3	RES TF 1/8W, 0.499 Ω 1% 0805	Stackpole Elect Inc RMCF0805FTR499R
14	3	R15, R18, R22	RES 1.0 Ω , 1/8W, 1%, 0805 SMD	Panasonic - ECG ERJ-6RQF1R0V
15	3	R19, R20, R21	RES 4.99k Ω , 1/8W, 1%, 0805 SMD	Panasonic - ECG ERJ-6ENF4991V
16	1	SKT1	QFN (Quad Flat No-lead)	PLASTRONICS., 48QN50S17070-E
17	1	U3	IC, SERIAL EEPROM	MICROCHIP 24LC024-I/ST
18	1	U2	LTC4361 - Overvoltage/Overcurrent Protection Controller	Linear Technology LTC4361CTS8-2
Additional Demo Board Circuit Components				
1	0	C5	Capacitor, OPTION	OPTION
2	0	R14, R23	RES., OPTION, 0805	OPTION
3	0	R24-R30	RES., OPTION, 0603	OPTION
Hardware: For Demo Board Only				
1	2	JP1, JP2	HEADER, 3x1 PIN, 2mm	SAMTEC TMM-103-02-L-S
2	1	J1	CONN, HEADER 14POS 2mm VERT GOLD	MOLEX 87831-1420
3	1	J2	CONN, HEADER 12POS 2mm 2ROW GOLD	FCI CONNECTOR CORP. 98414-G06-12ULF
4	14	TP1- TP14	TERMINAL TURRET DBL .084"L	Keystone Electronics 1593-2
5	2	SHUNT1, SHUNT2	CONN SHUNT 2mm 2POS	SAMTEC 2SN-BK-G
6	4	STAND-OFF	STAND-OFF NYLON 1/4" SNAP IN	KEYSTONE 8831

DEMO MANUAL DC2298A

SCHEMATIC DIAGRAM



REVISION HISTORY			
ECO	REV	DESCRIPTION	DATE
—	1	PRODUCTION	2-16-16

LINEAR TECHNOLOGY
 1630 McCarthy Blvd.
 Milpitas, CA 95035
 Phone: (408)432-1900
 Fax: (408)432-3507
 www.linear.com
 LTC Confidential-For Customer Use Only

LTC3884-1 PROGRAMMING BOARD
 DEMO CIRCUIT 2298A
 TITLE: SCHEMATIC
 DATE: Wednesday, July 27, 2016

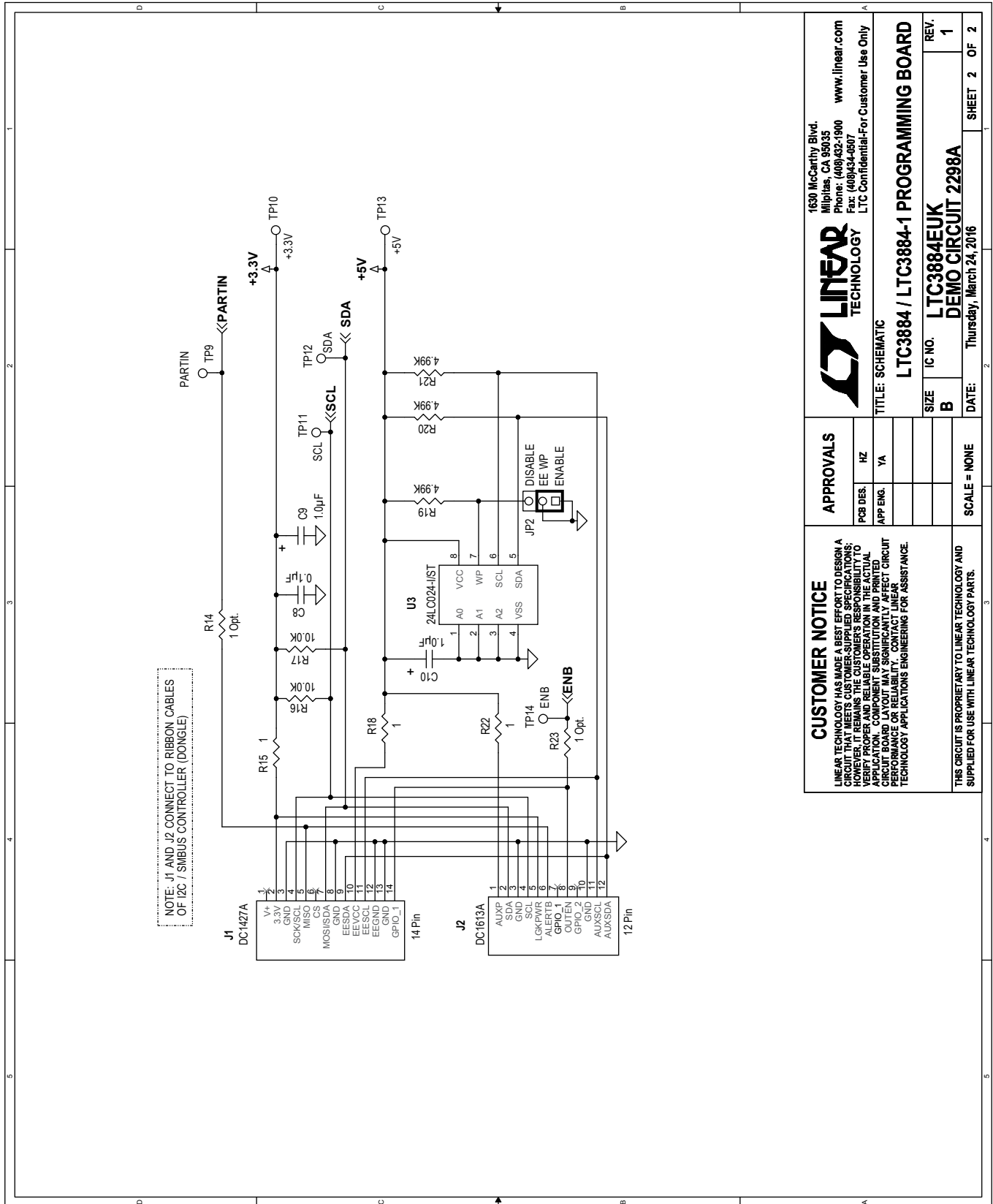
APPROVALS	REV.
DESIGN: /EZ	1
APP: /YA	1

SIZE: B
 SCALE: NONE
 SHEET 1 OF 2

CUSTOMER NOTICE
 LINEAR TECHNOLOGY HAS MADE A BEST EFFORT TO DESIGN A BOARD THAT IS EASY TO USE AND UNDERSTAND. HOWEVER, IT REMAINS THE CUSTOMER'S RESPONSIBILITY TO VERIFY THE BOARD AND RELIABLE OPERATION AND THE ACTUAL CIRCUIT BOARD LAYOUT MAY, SOMEWHAT, AFFECT CIRCUIT PERFORMANCE. LINEAR TECHNOLOGY PROVIDES ENGINEERING ASSISTANCE FOR TECHNOLOGY APPLICATIONS ENGINEERING FOR ASSISTANCE.

THIS CIRCUIT IS PROPRIETARY TO LINEAR TECHNOLOGY AND SUPPLIED FOR USE WITH LINEAR TECHNOLOGY PARTS.

SCHEMATIC DIAGRAM



LINEAR TECHNOLOGY

1630 McCarthy Blvd.
Milpitas, CA 95035
Phone: (408)622-1900 www.linear.com
Fax: (408)634-4807
LTC Confidential-For-Customer-Use Only

TITLE: SCHEMATIC

LTC3884 / LTC3884-1 PROGRAMMING BOARD

REV. 1

IC NO. LTC3884EUK

DEMO CIRCUIT 2298A

DATE: Thursday, March 24, 2016

SHEET 2 OF 2

APPROVALS		
PCB DES.	HZ	
APP ENG.	YA	
SCALE = NONE		

CUSTOMER NOTICE

LINEAR TECHNOLOGY HAS MADE A BEST EFFORT TO DESIGN A CIRCUIT THAT MEETS CUSTOMER-SUPPLIED SPECIFICATIONS; HOWEVER, IT REMAINS THE CUSTOMER'S RESPONSIBILITY TO VERIFY PROPER AND RELIABLE OPERATION IN THE ACTUAL APPLICATION. COMPONENT SUBSTITUTION AND PRINTED CIRCUIT BOARD MANUFACTURING VARIATIONS MAY AFFECT CIRCUIT PERFORMANCE OR RELIABILITY. CONTACT LINEAR TECHNOLOGY APPLICATIONS ENGINEERING FOR ASSISTANCE.

THIS CIRCUIT IS PROPRIETARY TO LINEAR TECHNOLOGY AND SUPPLIED FOR USE WITH LINEAR TECHNOLOGY PARTS.

DEMO MANUAL DC2298A

DEMONSTRATION BOARD IMPORTANT NOTICE

Linear Technology Corporation (LTC) provides the enclosed product(s) under the following **AS IS** conditions:

This demonstration board (DEMO BOARD) kit being sold or provided by Linear Technology is intended for use for **ENGINEERING DEVELOPMENT OR EVALUATION PURPOSES ONLY** and is not provided by LTC for commercial use. As such, the DEMO BOARD herein may not be complete in terms of required design-, marketing-, and/or manufacturing-related protective considerations, including but not limited to product safety measures typically found in finished commercial goods. As a prototype, this product does not fall within the scope of the European Union directive on electromagnetic compatibility and therefore may or may not meet the technical requirements of the directive, or other regulations.

If this evaluation kit does not meet the specifications recited in the DEMO BOARD manual the kit may be returned within 30 days from the date of delivery for a full refund. **THE FOREGOING WARRANTY IS THE EXCLUSIVE WARRANTY MADE BY THE SELLER TO BUYER AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. EXCEPT TO THE EXTENT OF THIS INDEMNITY, NEITHER PARTY SHALL BE LIABLE TO THE OTHER FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.**

The user assumes all responsibility and liability for proper and safe handling of the goods. Further, the user releases LTC from all claims arising from the handling or use of the goods. Due to the open construction of the product, it is the user's responsibility to take any and all appropriate precautions with regard to electrostatic discharge. Also be aware that the products herein may not be regulatory compliant or agency certified (FCC, UL, CE, etc.).

No License is granted under any patent right or other intellectual property whatsoever. **LTC assumes no liability for applications assistance, customer product design, software performance, or infringement of patents or any other intellectual property rights of any kind.**

LTC currently services a variety of customers for products around the world, and therefore this transaction **is not exclusive**.

Please read the DEMO BOARD manual prior to handling the product. Persons handling this product must have electronics training and observe good laboratory practice standards. **Common sense is encouraged.**

This notice contains important safety information about temperatures and voltages. For further safety concerns, please contact a LTC application engineer.

Mailing Address:

Linear Technology
1630 McCarthy Blvd.
Milpitas, CA 95035

Copyright © 2004, Linear Technology Corporation