

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>

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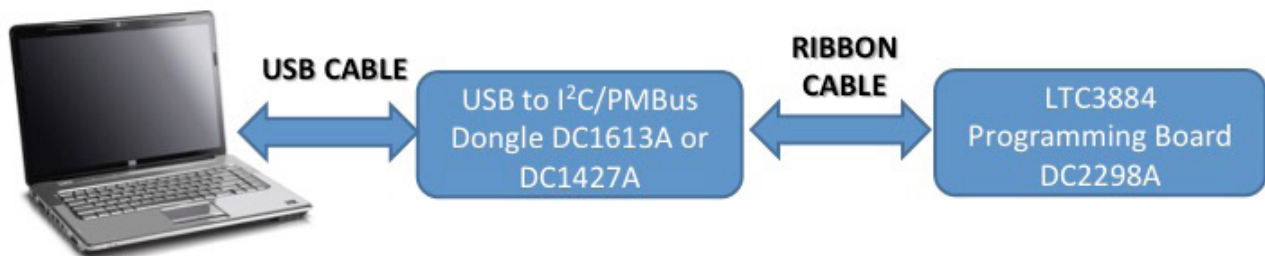


Figure 1. LTC3884 Programming Setup Using DC2298A

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.

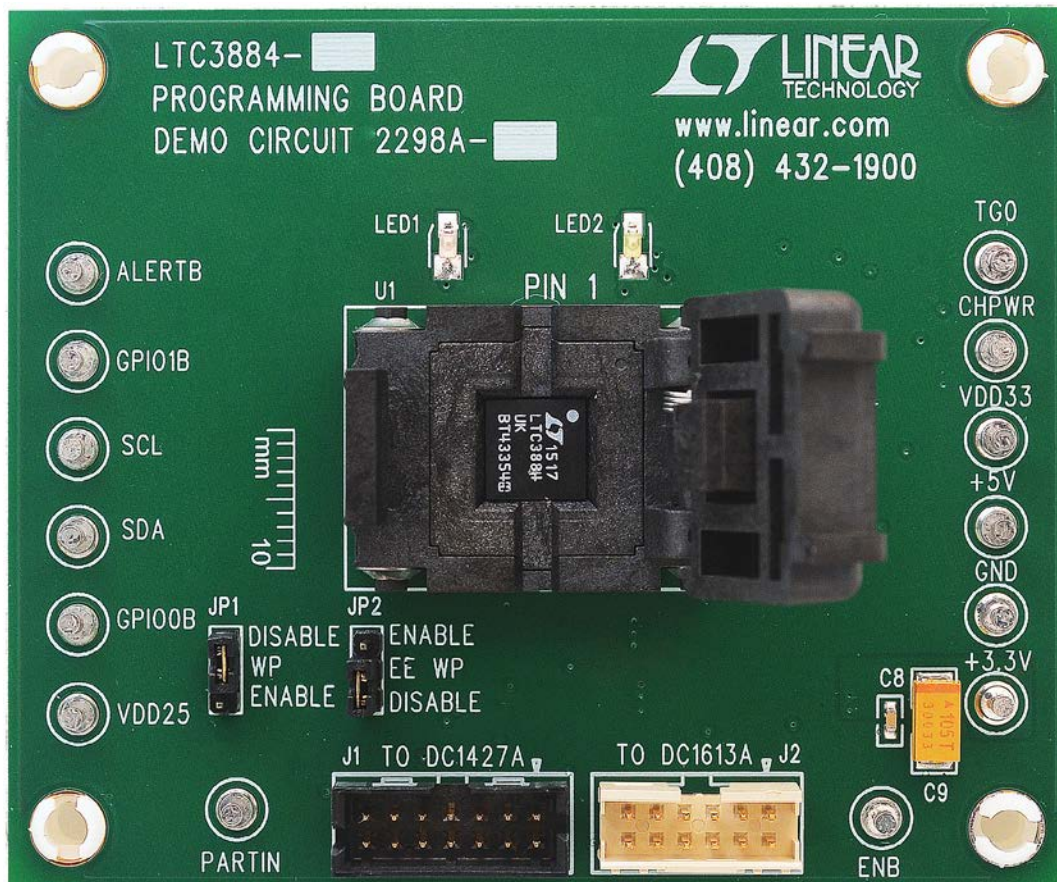


Figure 2. Proper Measurement Equipment Setup

QUICK START PROCEDURE

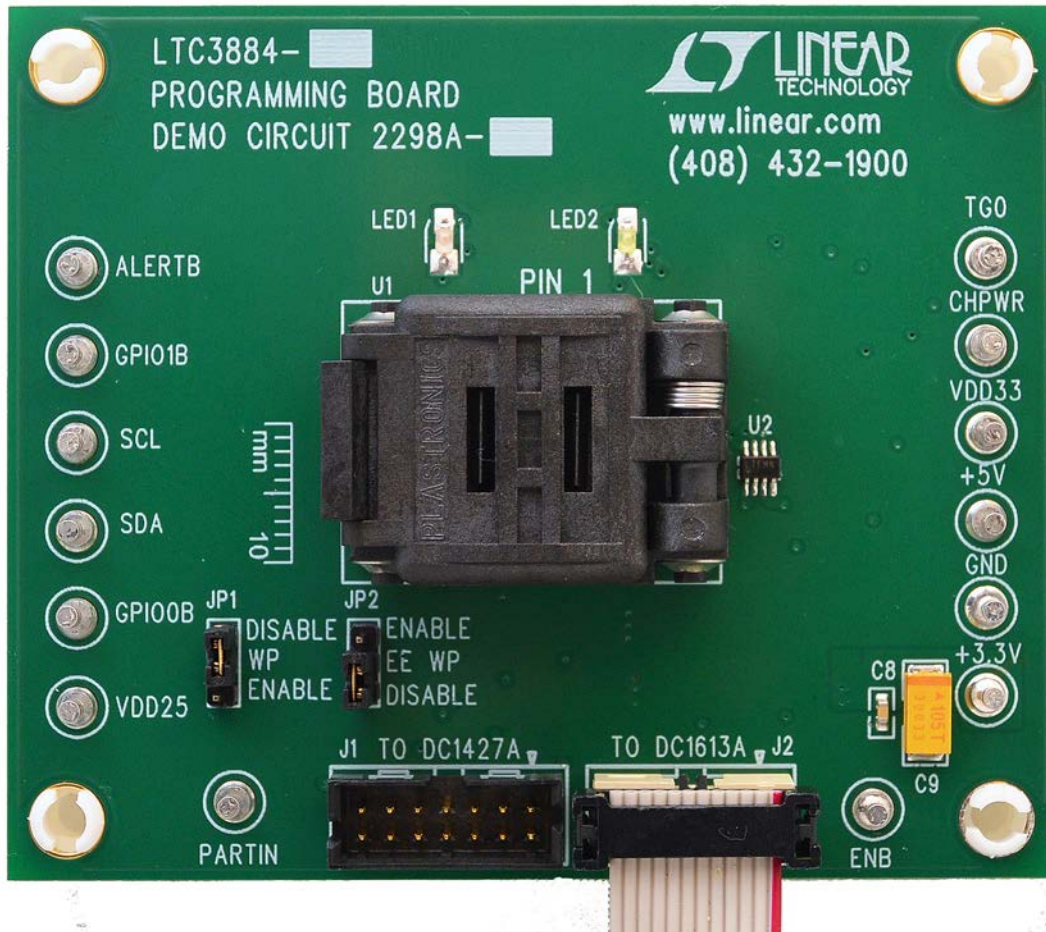


Figure 3. DC1613A Ribbon Cable Installation

QUICK START PROCEDURE

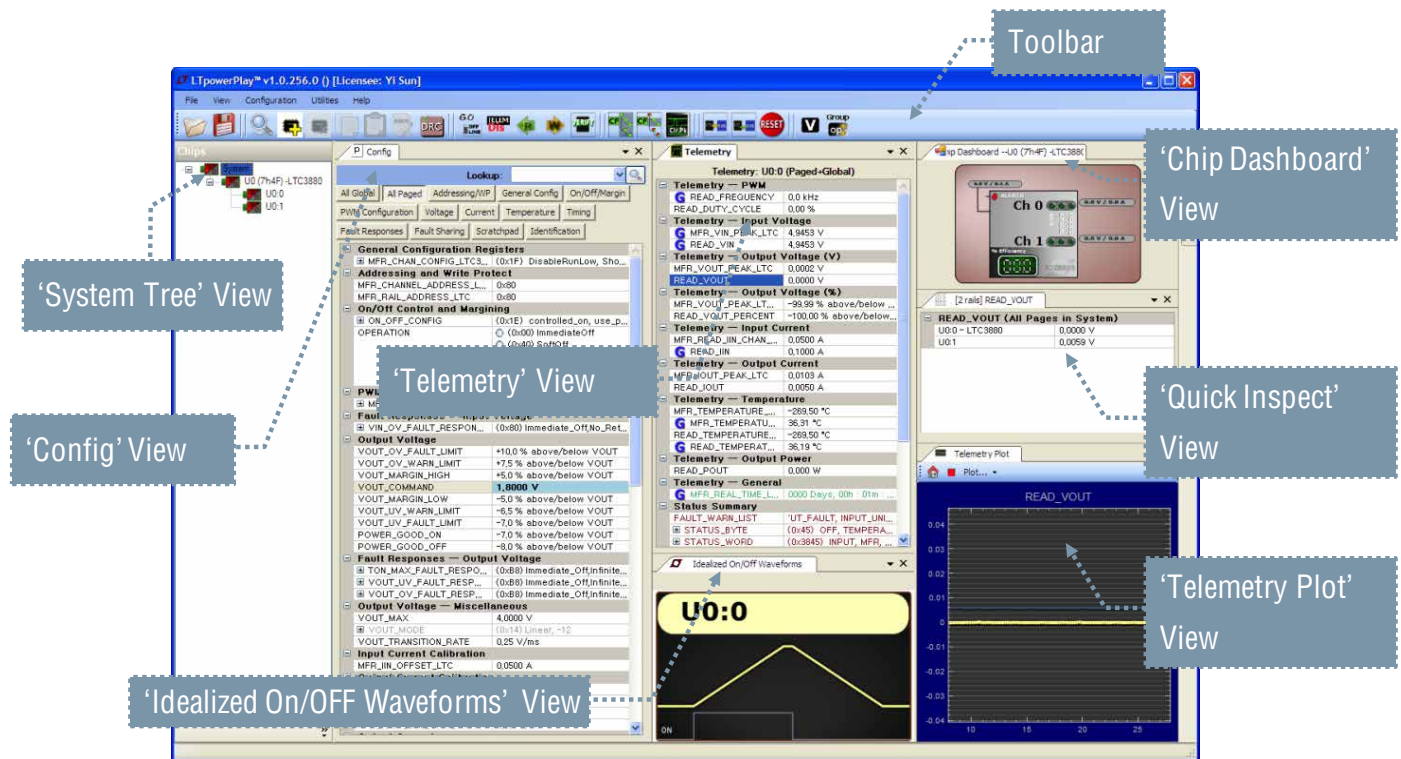


Figure 4. LTpowerPlay interface of programming the LTC3884

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

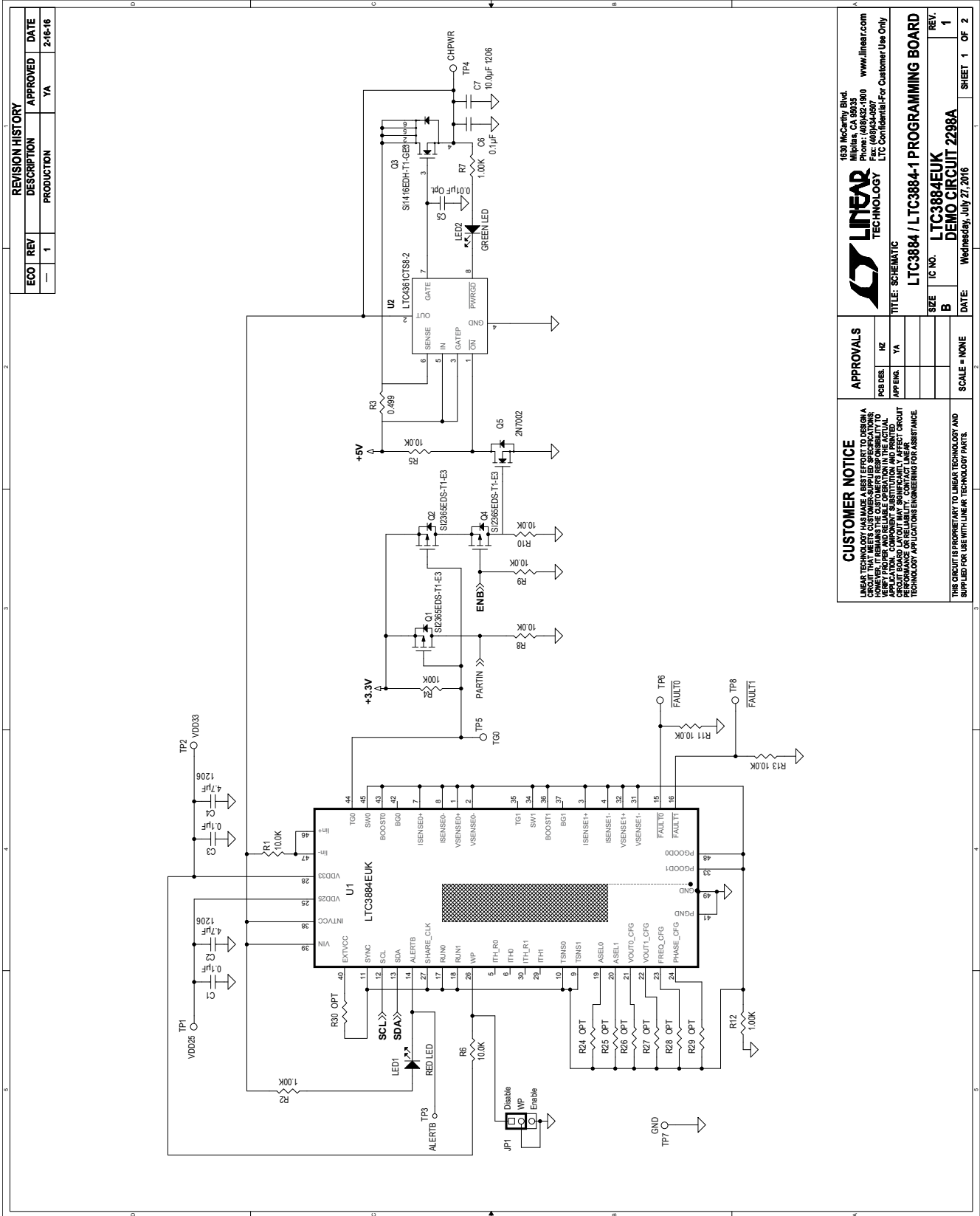
1. Compare the contents of the EEPROM in the LTC3884UK against your project or hex file.
2. Reprogram the contents of the EEPROM in the LTC3884UK using your project or hex File.
3. Verify the EEPROM within the DC2298A contains the factory defaults.
 - a. From the LTpowerPlay interface, load the factory 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 | APPROVED | DATE |
| — | 1 | PRODUCTION | YA | 2-16-16 |

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APPROVALS

| | |
|----------|----|
| PCB DES. | RE |
| APP ENH. | YA |

LTC3884 / LTC3884-1 PROGRAMMING BOARD

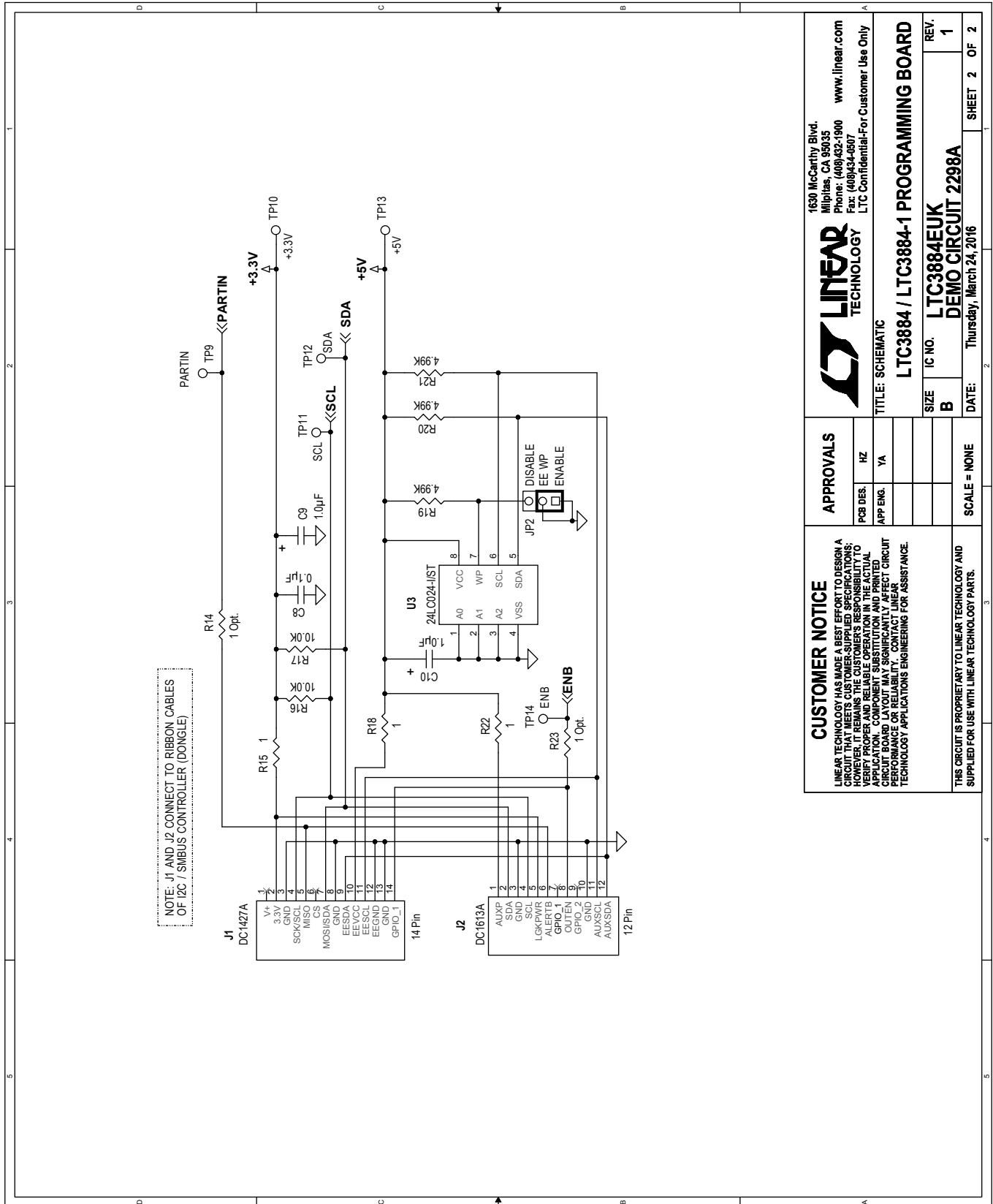
| | | |
|------|--------|------|
| SIZE | TC NO. | REV. |
| B | | 1 |

DATE: Wednesday, July 27, 2016

SHEET 1 OF 2

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SCHEMATIC DIAGRAM



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TITLE: SCHEMATIC

LTC3884 / LTC3884-1 PROGRAMMING BOARD

IC NO. **LTC3884EUK** REV. **1**
DEMO CIRCUIT 2298A

DATE: **Thursday, March 24, 2016** SHEET **2** OF **2**

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

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DEMO MANUAL DC2298A

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

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