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LTC3886 UKG Package Programming Board for Dual Output Step Down DC/DC Controller with Digital Power System Management

DESCRIPTION

Demonstration circuit 2277A contains the circuitry needed to program and verify the EEPROM of the LTC®3886 in the UKG package and that is its only purpose. The DC2277A is shipped with a LTC3886 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 Controller, DC1613A or DC1427A.

DEMO SYSTEM REQUIRED HARDWARE

- Windows PC
- USB to I²C/SMBus/PMBus Controller, DC1613A or DC1427A
- DC2277A

DEMO SYSTEM REQUIRED SOFTWARE

- LTpowerPlay™

LTC3886 FEATURES

- PMBus/I²C compliant serial interface
- 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 and frequency synchronization (100kHz to 750kHz)
- ±0.5% output voltage accuracy over temperature
- Integrated 16-bit ADC and 12-bit DAC
- Internal EEPROM and fault logging
- Integrated powerful N-channel MOSFET gate drivers
- Wide V_{IN} range: 4.5V to 60V
- V_{OUT} range: 0.5V to 13.8V
- Supports power-up into pre-biased load
- Analog current mode control loop
- Accurate PolyPhase® current sharing for up to 6 phases
- Available in a 52-lead (7mm × 8mm) QFN package

Design files for this circuit board are available at http://www.linear.com/demo/DC2277A

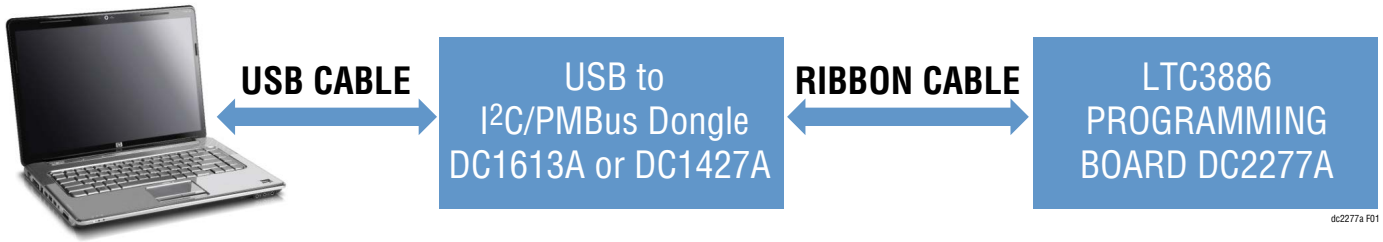


Figure 1. LTC3886 Programming Setup Using the DC2277A

QUICK START PROCEDURE

Demonstration circuit 2277A makes it easy to program and verify the EEPROM contents of the LTC3886 in the UKG package.

1. Make sure jumpers are in the following positions:

JUMPER	POSITION	FUNCTION
JP1	OFF	Write Protection of LTC3886
JP2	ON	Write Protection of Identification EEPROM

2. Open the lid of the socket. Verify there is an LTC3886 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 I^{2}C/SMBus/PMBus controller.
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 DC2277A 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

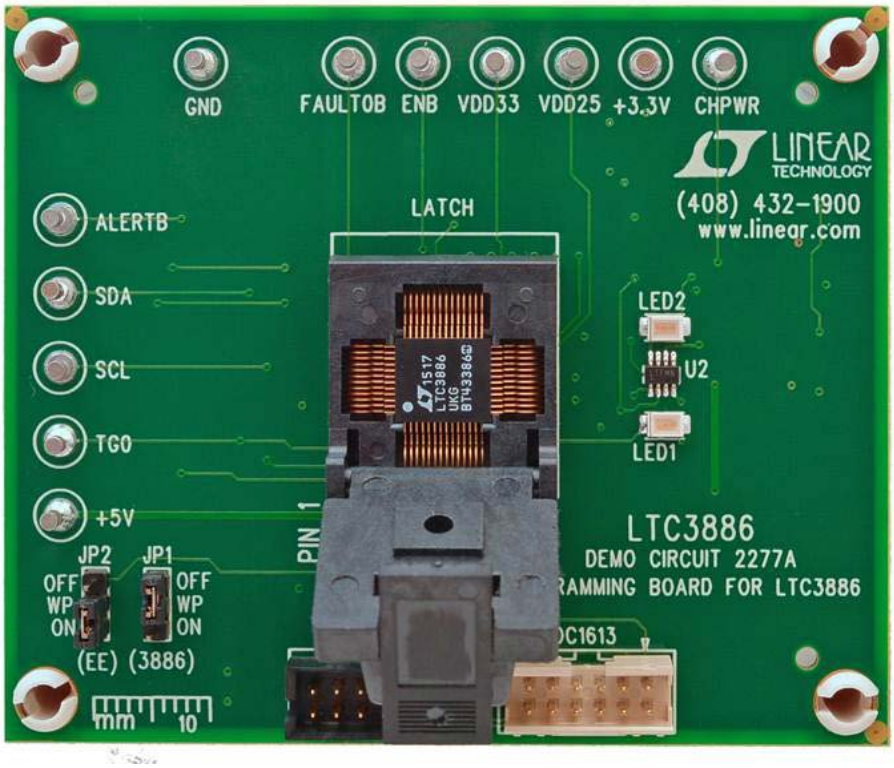


Figure 2. Open Shell. Verify IC Installed

QUICK START PROCEDURE

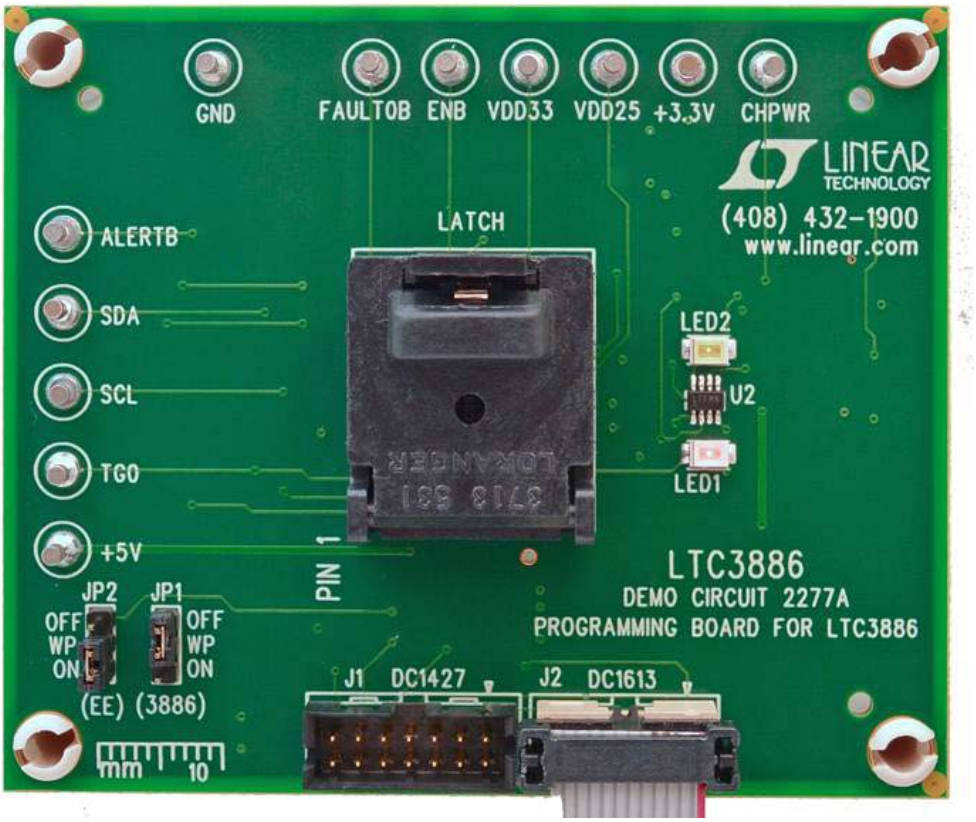


Figure 3. DC1613A Ribbon Cable Installation

QUICK START PROCEDURE

POWERING DOWN THE BOARD BETWEEN PROGRAMMING OPERATIONS

Disconnect the USB cable from the DC1427A/DC1613A before removing or inserting a LTC3886UKG into the programming socket.

WHAT YOU CAN DO WITH THE DC2277A

1. Compare the contents of the EEPROM in the LTC3886UKG against your project or hex file.
2. Reprogram the contents of the EEPROM in the LTC3886UKG using your project or hex file.
3. Verify the EEPROM within the DC2277A contains the factory defaults.
   - From the LTpowerPlay interface, load the factory defaults project file. This file is located at:

     C:\Program Files\Linear Technology\LTpowerPlay\project files\ltc3886\datasheet_defaults.proj
   - Click the Verify button.

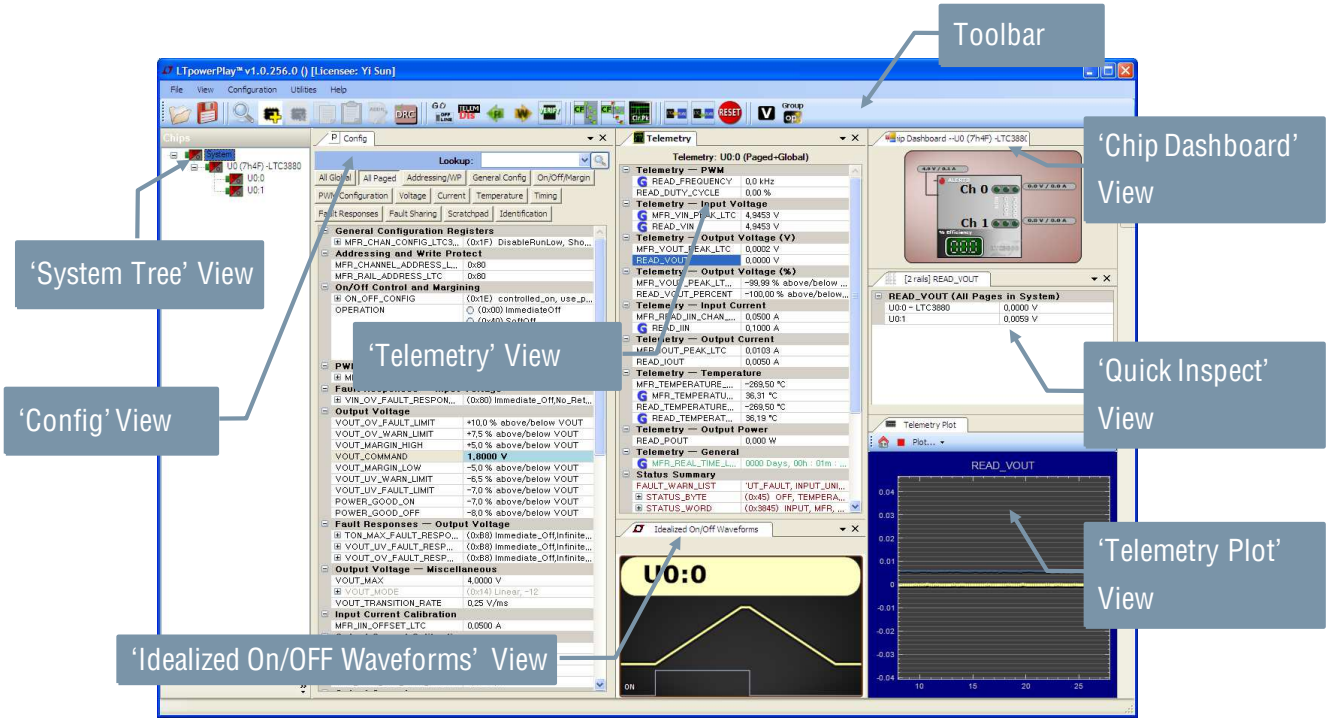
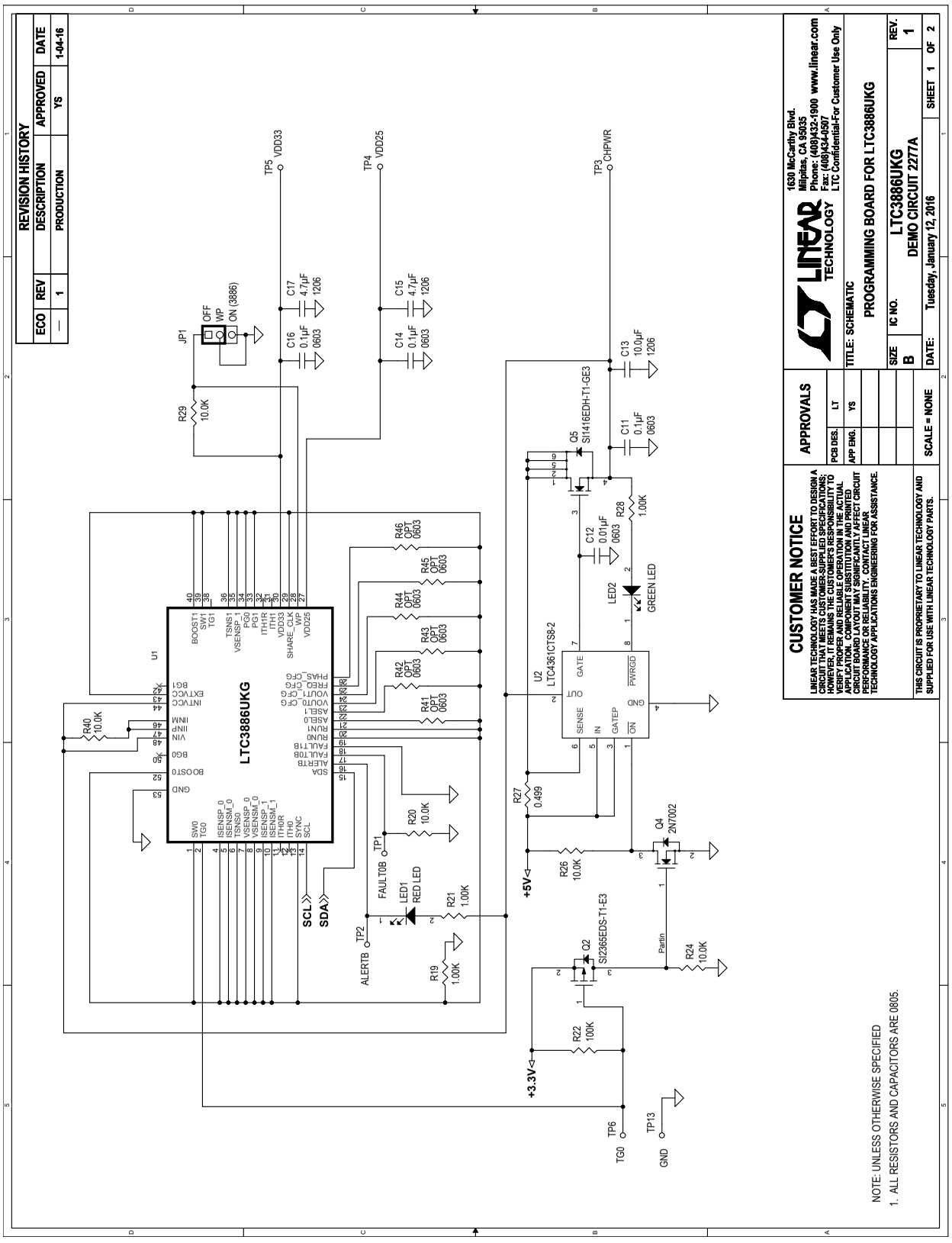


Figure 4. LTpowerPlay Interface of Programming the LTC3886

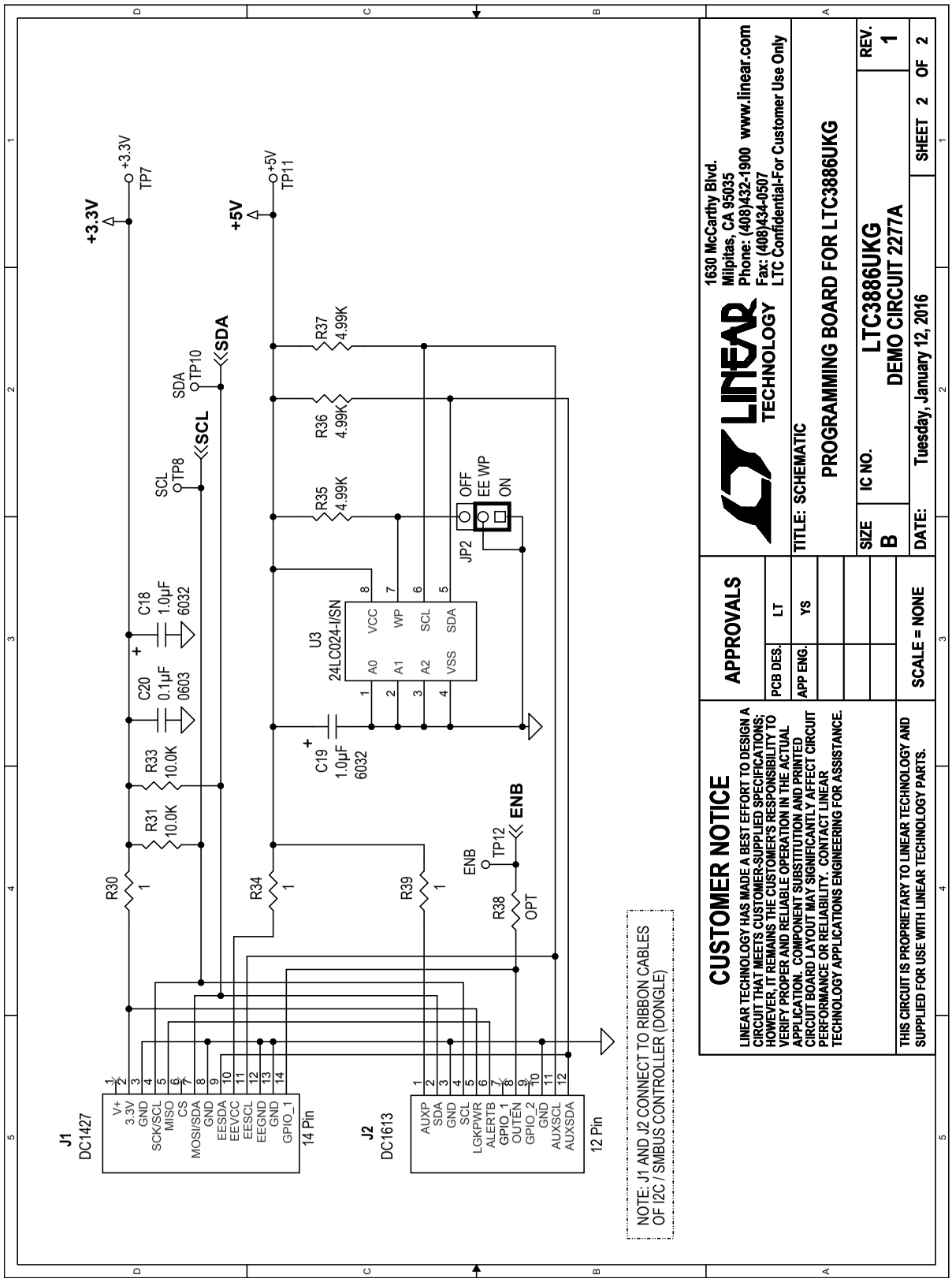
PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components				
1	4	C11, C14, C16, C20	CAP., 0.1µF, X7R, 16V, 10%, 0603	NIC, NMC0603X7R104K16TRF
2	1	C12	CAP., 0.01µF, X7R, 25V, 10%, 0603	AVX, 06033C103KAT2A
3	1	C13	CAP., 10µF, X5R, 6.3V, 10%, 1206	AVX, 12066D106KAT2A
4	2	C15, C17	CAP., 4.7µF, X5R, 6.3V, 10%, 1206	AVX, 1206ZD475KAT2A
5	2	C18, C19	CAP., TANTALUM, 1µF, 10%, 50V	AVX, TAJC105K050RNJ
6	1	LED1	LED 3X2mm 650nm RED WTR CLR SMD	RΩ, SML-012V8TT86
7	1	LED2	LED 3X2mm 560nm GRN WTR CLR SMD	RΩ, SML-012P8TT86
8	1	Q2	MOSFET P-CH 20V 5.2A SOT-23-3	VISHAY, SI2365EDS-T1-GE3
9	1	Q4	MOSFET N-CH 60V 115mA SOT-23	FAIRCHILD SEMI, 2N7002
10	1	Q5	MOSFET N-CH 30V 3.9A SC-70-6	VISHAY, SI1416EDH-T1-GE3
11	3	R19, R21, R28	RES., 1k, 1/8W, 1%, 0805	PANASONIC, ERJ-6ENF1001V
12	7	R20, R24, R26, R29, R31, R33, R40	RES., 10k, 1/8W, 1%, 0805	PANASONIC, ERJ-6ENF1002V
13	1	R22	RES., 100k, 1/8W, 1%, 0805	PANASONIC, ERJ-6ENF1003V
14	1	R27	RES., 0.499Ω, 1/8W, 1%, 0805	STACKPOLE ELEC. RMCF0805FTR499
15	3	R30, R34, R39	RES., 1Ω, 1/8W, 1%, 0805	PANASONIC, ERJ-6RQF1R0V
16	3	R35, R36, R37	RES., 4.99k, 1/8W, 1%, 0805	PANASONIC, ERJ-6ENF4991V
17	1	U1	I.C., LTC3886UKG, 60V DUAL OUTPUT STEP-DOWN CONTROLLER	LINEAR TECH., LTC3886UKG#PBF
18	1	U2	I.C., OVERVOLTAGE/OVERCURRENT PROTECTION CONTROLLER	LINEAR TECH., LTC4361CTS8-2#PBF
19	1	U3	I.C., 2k I^2C SERIAL EEPROM SOIC-8	MICROCHIP, 24LC024-I/SN
20	1	SKT1	SOCKET	LORANGER, 03713 531 6217
Additional Demo Board Circuit Components:				
1	0	R38	RES., OPTION, 0805	OPTION
2	0	R41, R42, R43, R44, R45, R46	RES., OPTION, 0603	OPTION
Hardware: For Demo Board Only				
1	2	JP1, JP2	CONN., HEADER, 1X3, 2mm	WURTH ELEKTRONIK, 62000311121
2	2	XJP1, XJP2	SHUNT, 2mm	WURTH ELEKTRONIK, 60800213421
3	1	J1	CONN, HEADER 14POS 2mm VERT GOLD	MOLEX, 87831-1420
4	1	J2	CONN, HEADER 12POS 2mm 2ROW GOLD	FCI CONNECTOR, 98414-G06-12ULF
5	12	TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP10, TP11, TP12, TP13	TERMINAL TURRET DBL .084"L	KEYSTONE, 1593-2
6	4	(STAND-OFF)	STANDOFF, NYLON, SNAP-ON, 0.500"	KEYSTONE, 8833

SCHEMATIC DIAGRAM



SCHEMATIC DIAGRAM



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