

High Efficiency Step-Down DC/DC Converter with Power System Management

DESCRIPTION

Demonstration circuit 2174A is a high current, high efficiency, dual-phase synchronous buck converter featuring the LTC[®]3882EUJ, a dual output voltage mode controller. The LTC3882 has PMBus interface and power system management functions.

There are two versions of the board available:

- DC2174A-A: dual-phase dual-output configuration. Default output setting $V_{OUT0} = 1.5V/35A$, $V_{OUT1} = 1.0V/35A$
- DC2174A-B: dual-phase single-output configuration. Default output setting $V_{OUT0} = 1.0V/70A$

The DC2174A powers up to default settings and produces power based on configuration resistors or with its non-volatile memory without the need for any serial bus communication. This allows easy evaluation of the DC-DC converter. To fully explore the extensive power

system management features of the devices, download the GUI software LTpowerPlay[®] onto your PC and use LTC's I²C/SMBus/PMBus Dongle, DC1613A, to connect to the board. LTpowerPlay allows the user to reconfigure the part on-the-fly and store the configuration settings within its onboard EEPROM, along with viewing telemetry parameters that include voltage, current, temperature and fault status.

GUI Download

The software can be downloaded from:

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

Design files for this circuit board are available at
<http://www.linear.com/demo/DC2174A>

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PERFORMANCE SUMMARY

Specifications are at $T_A = 25^\circ C$

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
V_{IN}	Input Supply Range		7	12	14	V
V_{OUT0}	Output Voltage Range (-A version)	$I_{OUT0} = 0A$ TO $35A$, $V_{IN} = 7V$ to $14V$	0.5	1.5	2.0*	V
I_{OUT0}	Output Current Range (-A version)		0		35	A
V_{OUT1}	Output Voltage Range (-A version)	$I_{OUT0} = 0A$ TO $35A$, $V_{IN} = 7V$ to $14V$	0.5	1.0	2.0*	V
I_{OUT1}	Output Current Range (-A version)		0		35	A
V_{OUT0}	Output Voltage Range (-B version)	$I_{OUT1} = 0A$ TO $70A$, $V_{IN} = 7V$ to $14V$	0.5	1.0	2.0*	V
I_{OUT0}	Output Current Range (-B version)		0		70	A
F_{SW}	Factory Default Switching (-A version)			500		kHz
F_{SW}	Factory Default Switching (-B version)			450		kHz
EFFICIENCY	Full Load Efficiency (-A version)	$V_{OUT0} = 1.5V$, See Figure 4a		90.9		%
		$V_{OUT0} = 1.0V$, See Figure 4a		88.6		%
	Full Load Efficiency (-B version)	$V_{OUT0} = 1.0V$, See Figure 4b		88.6		%

*Note: The DC2174A uses 2.5V-rated low ESR PosCAP (Part No. 2R5TPE470M7) as output capacitors for optimized load transient performance. If $> 2.0V$ V_{OUT} is needed, 4V- or 6.3V-rated output capacitors should be used.

DEMO MANUAL

DC2174A-A/DC2174A-B

QUICK START PROCEDURE

Demonstration circuit 2174A makes it easy to set up to evaluate the performance of the LTC3882. Refer to Figure 2 for the proper measurement equipment setup and follow the procedure below:

NOTE. When measuring the input or output voltage ripple, care must be taken to avoid a long ground lead on the oscilloscope probe. Measure the output voltage ripple by touching the probe tip directly across the C13 or C39. See Figure 3 for the proper scope probe technique.

1. Make sure jumpers are in the following positions:

2174A-A Version

JUMPER	POSITION	FUNCTION
JP1	NC	Untie GPIO0B to GPIO1B
JP2	NC	Untie RUN0 to RUN1
JP4	ON	External 5V VDR for DrMOS
JP6	ON	External 5V V_{CC} for LTC3882

2174A-B Version

JUMPER	POSITION	FUNCTION
JP1	C	Tie GPIO0B to GPIO1B
JP2	C	Tie RUN0 to RUN1
JP4	ON	External 5V VDR for DrMOS
JP6	ON	External 5V V_{CC} for LTC3882

2. With power off, connect the input power supply to V_{IN} and GND. Connect active load to the output.
3. Make sure both RUN switches are OFF.
4. Turn on the power at the input.
NOTE. Make sure that the input voltage does not exceed 15V.
5. Turn on RUN switches as desired.
6. Check for the correct output voltage from V_{OUT1+} to V_{OUT0-} and from V_{OUT1+} to GND.
NOTE. If there is no output, temporarily disconnect the load to make sure that the load is not set too high.
7. Once the proper output voltage is established, adjust the loads within the operating range and observe the output voltage regulation, ripple voltage, efficiency and other parameters.
8. Connect the dongle and control the output voltages from the GUI. See "LTpowerPlay QUICK START" session for details.

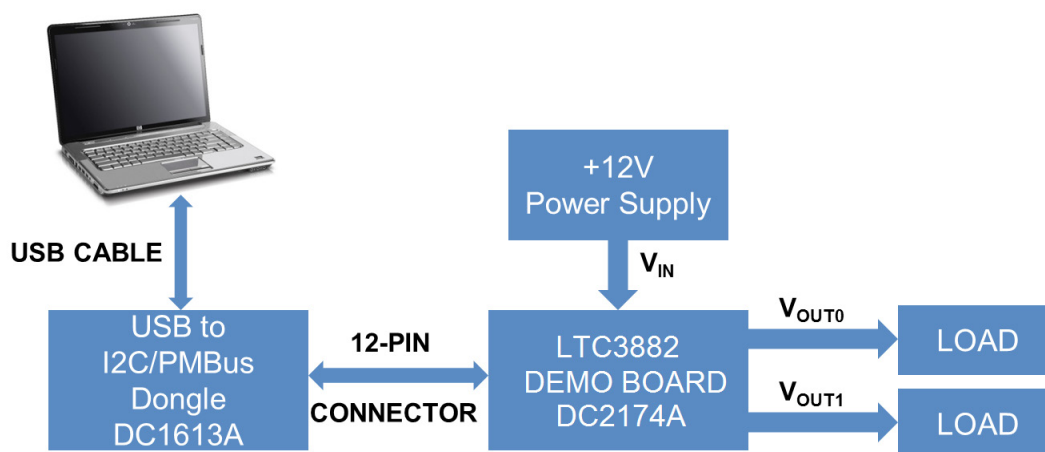


Figure 1. Demo Setup with PC

QUICK START PROCEDURE

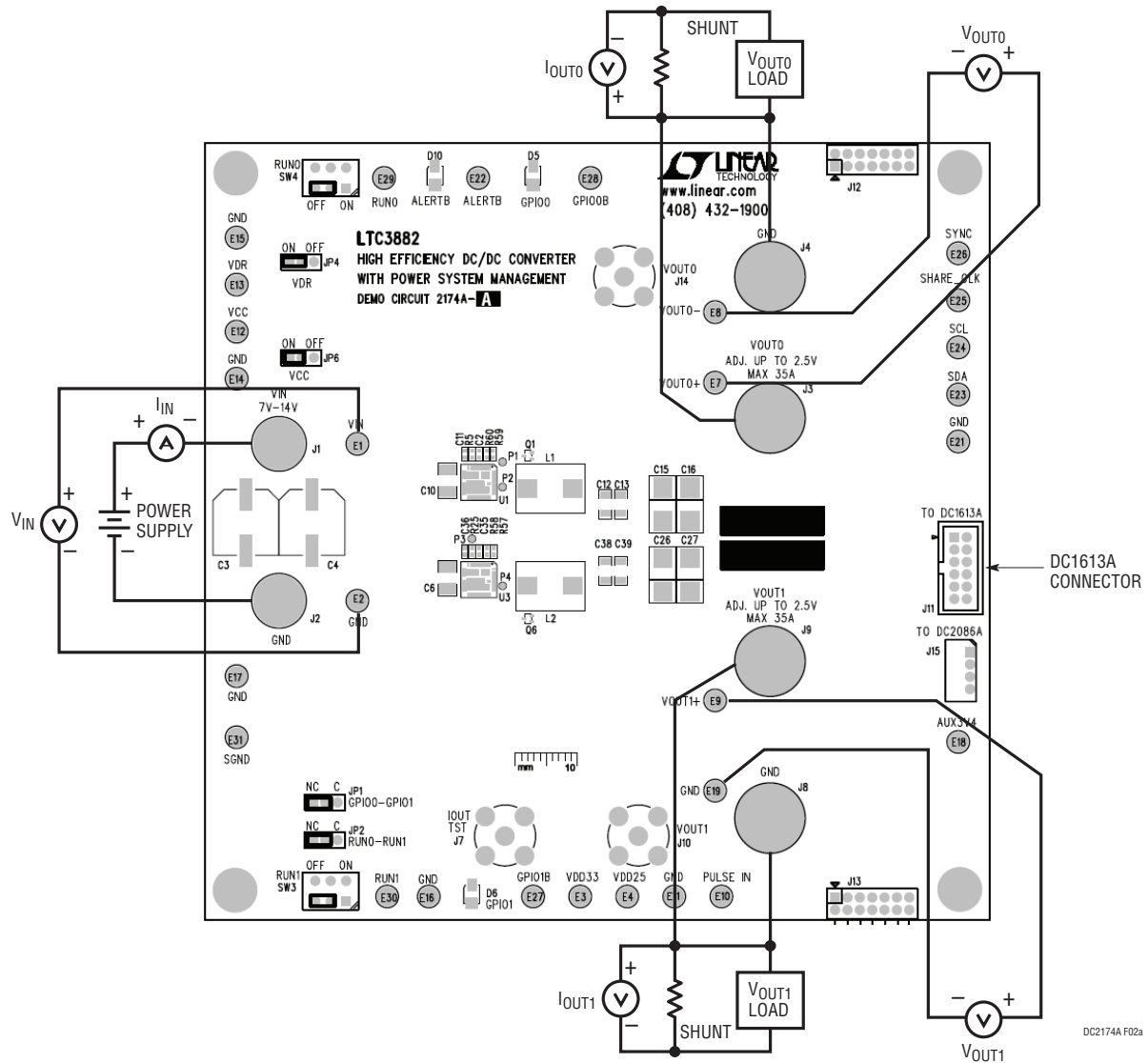


Figure 2a. Power Test Setup for DC2174A-A

DEMO MANUAL

DC2174A-A/DC2174A-B

QUICK START PROCEDURE

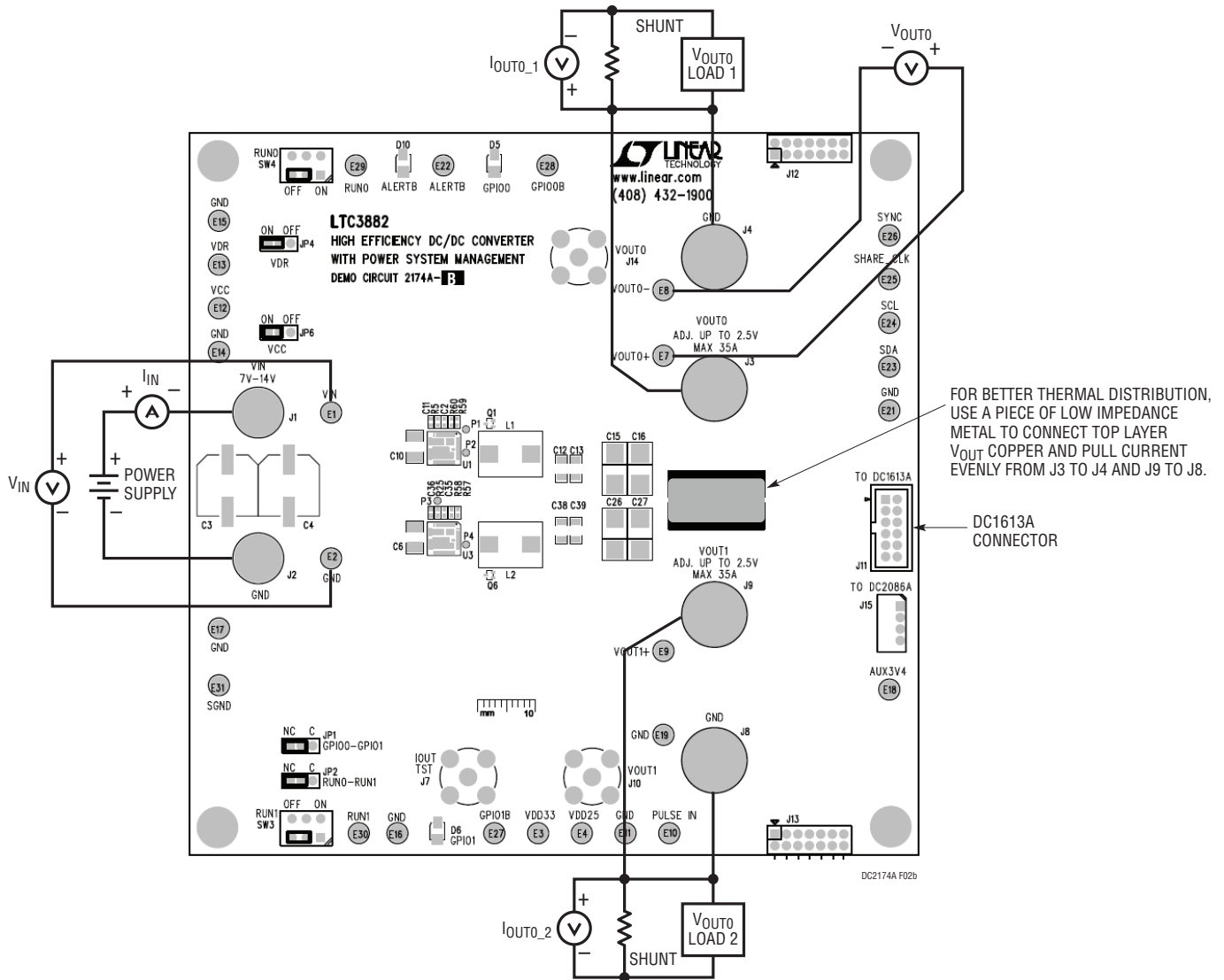


Figure 2b. Power Test Setup for DC2174A-B

QUICK START PROCEDURE

Connecting a PC TO DC2174A

You can use a PC to reconfigure the power management features of the LTC3882 such as: nominal V_{OUT} , margin set points, OV/UV limits, temperature fault limits, sequencing parameters, the fault log, fault responses, GPIO and other functionality. The DC1613A dongle may be plugged in regardless of whether or not V_{IN} is present. The dongle can be hot plugged.

Combining DC2174A with Other Digital Power Demo Boards

The DC2174A may be plugged together in a multi-board array with other LTC power system management boards using J12 and J13.

MEASURING EFFICIENCY (SEE FIGURE 4)

To accurately measure efficiency of any configuration, do the following:

- Set JP4 and JP6 on the “OFF” position;
- Connect external 5V supply to VDR and VCC turrets and measure its input current;
- Measure V_{IN} across the input ceramic capacitor (C10, C6). Measure V_{OUT} across the output ceramic capacitor (C13, C39);
- Add the loss from the external 5V supply into the efficiency calculation.

MEASURING OUTPUT RIPPLE VOLTAGE

An accurate ripple measurement may be performed by using the below configuration across C13 or C39.

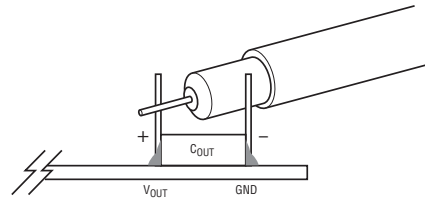
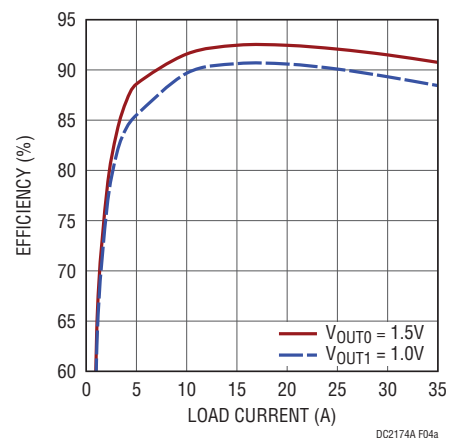
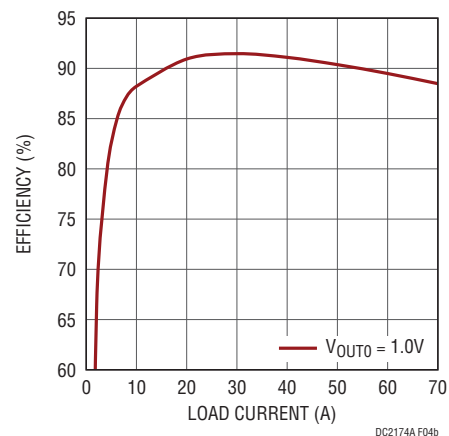


Figure 3. Measuring Output Voltage Ripple



a) DC2174A-A, $V_{IN} = 12V$, $F_{SW} = 500kHz$, CCM



b) DC2174A-B, $V_{IN} = 12V$, $F_{SW} = 450kHz$, CCM

Figure 4. Typical Efficiency Curves of DC2174A

QUICK START PROCEDURE

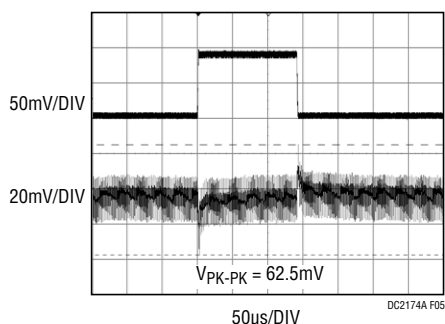


Figure 5. Load Transient Waveform DC2174A-A, $V_{IN} = 12V$, $V_{OUT0} = 1.5V$, $F_{SW} = 500kHz$, 0 to 25% (8.75A) Load Step

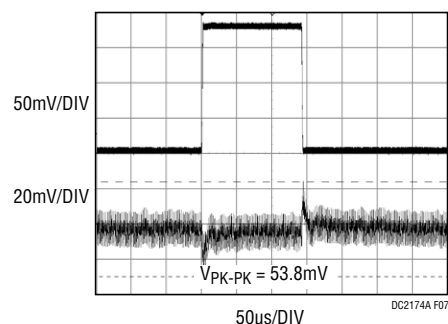


Figure 7. Load Transient Waveform DC2174A-B, $V_{IN} = 12V$, $V_{OUT0} = 1.0V$, $F_{SW} = 450kHz$, 0% to 25% (17.5A) Load Step

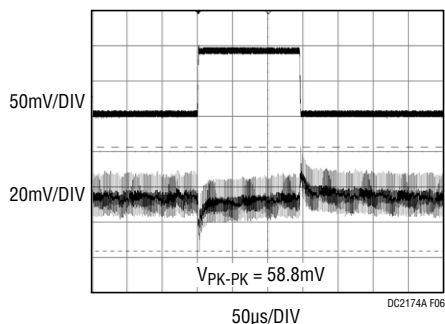


Figure 6. Load Transient Waveform DC2174A-A, $V_{IN} = 12V$, $V_{OUT1} = 1.0V$, $F_{SW} = 500kHz$, 0% to 25% (8.75A) Load Step

LTpowerPlay SOFTWARE GUI

LTpowerPlay is a powerful Windows based development environment that supports Linear Technology power system management ICs, including the LTC3880, LTC3882, LTC3883, LTM4676, LTC2974, LTC2978 etc. The software supports a variety of different tasks. You can use LTpowerPlay to evaluate Linear Technology ICs by connecting to a demo board system. LTpowerPlay can also be used in an offline mode (with no hardware present) in order to build a multichip configuration file that can be saved and reloaded at a later time. LTpowerPlay provides unprecedented diagnostic and debug features. It becomes a valuable diagnostic tool during board bring-up to program or tweak the power management scheme in

a system, or to diagnose power issues when bringing up rails. LTpowerPlay utilizes the DC1613A USB-to-SMBus controller to communicate with one of many potential targets, including the LTC3882's DC2174A demo system, or a customer board. The software also provides an automatic update feature to keep the software current with the latest set of device drivers and documentation. The LTpowerPlay software can be downloaded from:

<http://linear.com/LTpowerPlay>

To access technical support documents for LTC Digital Power Products visit Help. View online help on the LTpowerPlay menu.

LTpowerPlay SOFTWARE GUI

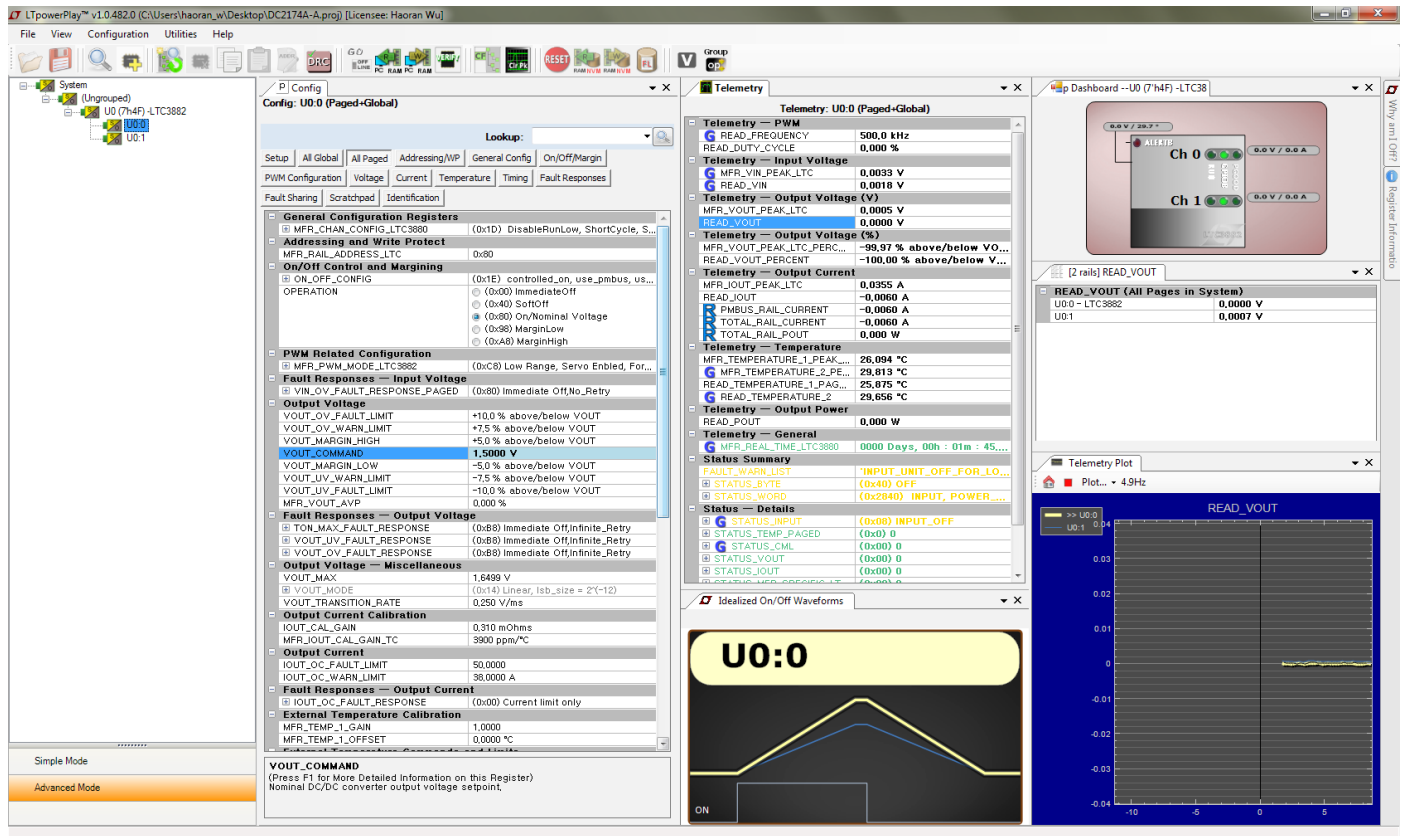
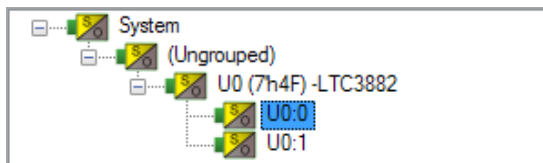


Figure 8. LTpowerPlay Main Interface

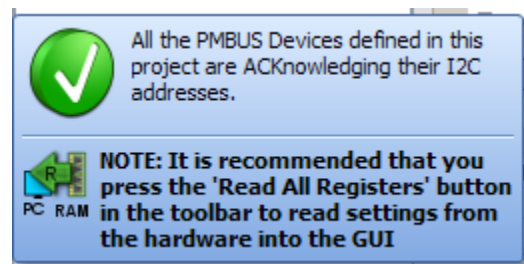
LTpowerPlay QUICK START PROCEDURE

The following procedure describes how to use LTpowerPlay to monitor and change the settings of LTC3882 (taking DC2174A-A as an example).

1. Download and install the LTpowerPlay GUI:
<http://linear.com/LTpowerPlay>
2. Launch the LTpowerPlay GUI.
 - a. The GUI should automatically identify the DC2174A-A. The system tree on the left hand side should look like this:



- b. A green message box shows for a few seconds in the lower left hand corner, confirming that the LTC3882 is communicating:



DEMO MANUAL

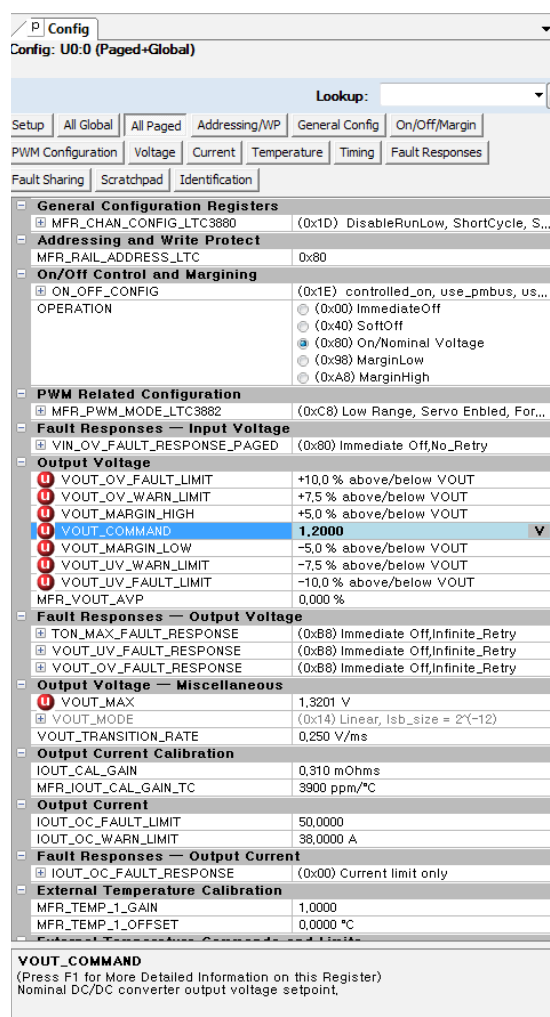
DC2174A-A/DC2174A-B

LTpowerPlay QUICK START PROCEDURE

- c. In the Toolbar, click the “R” (RAM to PC) icon to read the RAM from the LTC3882. This reads the configuration from the RAM of LTC3882 and loads it into the GUI.



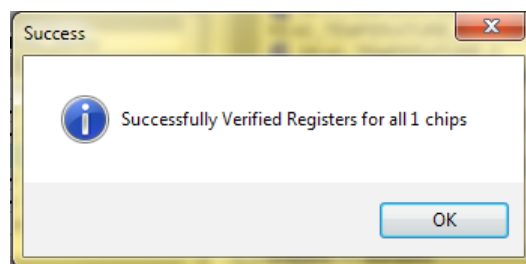
- d. If you want to change the output voltage to a different value, like 1.2V. In the Config tab, type in 1.2 in the VOUT_COMMAND box, like this:



Then, click the “W” (PC to RAM) icon to write these register values to the LTC3882. After finishing this step, you will see the output voltage will change to 1.2V.



If the write is successful, you will see the following message:



- e. You can save the changes into the NVM. In the toolbar, click “RAM to NVM” button, as the following:



- f. Save the demo board configuration to a (*.proj) file. Click the Save icon and save the file. Name it whatever you want.

DEMO MANUAL

DC2174A-A/DC2174A-B

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
DC2174A-A				
DC2174A-A Required Circuit Components				
1	5	C5, C11, C36, C52, C53,	CAP., X7R, 0.1µF, 16V, 10%, 0402	AVX, 0402YC104KAT2A
2	2	C45, C59	CAP., X7R, 0.1µF, 16V, 10%, 0603	AVX, 0603YC104KAT2A
3	2	CBYP1, CBYP2	CAP., X7R 0.01µF 50V 10% 0603	AVX, 06035C103KAT2A
4	1	CIN1	CAP., X7R 1µF 16V 10% 1206	AVX, 1206YC105KAT2A
5	2	COUT3, COUT7	CAP., X5R 10µF 35V 1206	TAIYO YUDEN GMK316BJ106ML
6	1	D9	DIODE, SCHOTTKY, SOD-323	CENTRAL CMDSH-3TR
7	4	C6, C10, C33, C34	CAP., X5R, 22µF, 25V, 10%, 1210	MURATA, GRM32ER61E226KE15L
8	6	C1, C2, C9, C8, C31, C35	CAP., X5R, 1µF, 10V, 20%, 0402	MURATA, GRM155R61A105ME15D
9	1	C47	CAP., X5R, 1µF, 16V, .10%, 0805	AVX, 0805YD105KAT2A
10	2	C3, C4	CAP., OS-CON, 330µF, 16V, 20%, F12	PANASONIC, 16SVP330M
11	1	C7	CAP., X5R 0402 4.7µF 6.3V 20%	SAMSUNG, CL05A475MQ5NRNC
12	8	C12, C13, C14, C23, C38, C39, C40, C43	CAP., X5R, 100µF, 6.3V, 20%, 1206	MURATA, GRM31CR60J107ME39L
13	6	C15, C16, C26, C27, C17, C19	CAP., POSCAP, 470µF, 2.5V, D2E SIZE	PANASONIC, 2R5TPE470M7
14	0	C18, C28 (OPT)	OPTIONAL	
15	0	D4, D7 (OPT)	OPTIONAL	
16	2	C20, C42	CAP., X5R, 0.22µF, 16V, 10%, 0402	TDK, C1005X5R1C224K
17	1	C21	CAP., X7R, 1.5nF, 50V, 10%, 0402	MURATA, GRM155R71H152KA01D
18	1	C22	CAP., X7R, 220pF, 50V, 10%, 0402	MURATA, GRM155R71H221KA01D
19	2	C29, C44	CAP., X7R, 0.01µF, 16V, 10%, 0603	AVX, 0603YC103KAT2A
20	2	C32, C48	CAP., X7R, 0.01µF, 16V, 10%, 0402	AVX, 0402YC103KAT2A
21	1	C30	CAP., NP0, 10pF, 25V, 10%, 0402	AVX, 04023A100KAT2A
22	2	C57, C58	CAP., X7R, 0.1µF, 16V, 20%, 0805	AVX, 0805YC104MAT2A
23	1	D8	DIODE, ULTRA LOW SCHOTTKY RECTIFIER	NXP SEMI. PMEG2005AEL,315
24	2	L1, L2	IND., 0.17µH	COOPER., FP1007R3-R17-R
25	2	U1, U3	IC, HIGH FREQUENCY DrMOS MODULE	FAIRCHILD, FDMF5820DC
26	1	U2	IC, LTC3882EUJ, QFN 6mm x 6mm	LINEAR TECH., LTC3882EUJ#10BP-1PBF-ES
27	1	U5	IC EEPROM 2KBIT 400KHZ 8TSSOP	MICROCHIP, 24LC025-I/ST
28	1	U6	IC, LT3029IMSE, MSOP, 16PIN	LTC., LT3029IMSE#PBF
DC2174A-A Additional Demo Board Circuit Components				
1	2	D5, D6	LED, GREEN RECT CLEAR 0603	LITE ON, LTST-C193KGKT-5A
2	1	D10	LED, RED RECT CLEAR 0603	LITE ON, LTST-C193KRKT-5A
3	2	Q1, Q6	TRANS, PNP GP 40V 200MA SC75-3	ON SEMI, MMBT3906TT1G
4	1	Q3	MOSFET, SPEED SRS 30V 30A LFPK	RENESAS, RJK0305DPB-00#J0
5	2	Q19, Q20	MOSFET, P-CH 20V 0.58A SOT-23	VISHAY, TP0101K-T1-E3
6	2	Q21, Q22	MOSFET, N-CH 60V 115MA SOT23	DIODES INC., 2N7002-7-F
7	2	RSD1, RSD2	RES., CHIP, 10k, 5%, 0603	VISHAY, CRCW060310K0JKEA
8	1	R1	RES., CHIP, 1Ω, 1%, 0402	VISHAY, CRCW04021R00FKED
9	2	R2, R15	RES., CHIP, 24.9k, 1%, 0402	VISHAY, CRCW040224K9FKED
10	2	R5, R25	RES., CHIP, 0Ω, 0402	VISHAY, CRCW04020000Z0ED
11	5	R16, R24, R71, R73, R83,	RES., CHIP, 0Ω, 0603	VISHAY, CRCW06030000Z0EA
12	1	R45	SENSE RES., 0.010Ω, 1W, 1%, 2512	PANASONIC, ERJ-M1WSF10MU

dc2174afb

DEMO MANUAL

DC2174A-A/DC2174A-B

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
13	0	R23, R29, R30, R31, R32, R33, R34, R35, R36, R37, R38, R39, R40, R68, R72, R74, R75, R78, R82, R90, R91, R92	OPTIONAL	
14	2	R7, R27	RES., CHIP, 2.67k, 1%, 0402	VISHAY, CRCW04022K67FKED
15	1	R9	RES., CHIP, 499Ω, 1%, 0402	VISHAY, CRCW0402499RFKED
16	11	R10, R11, R13, R17, R19, R21, R26, R28, R41, R42, R86	RES., CHIP, 10k, 1%, 0603	VISHAY, CRCW060310K0FKEA
17	1	R12	RES., CHIP, 7.32k, 1%, 0402	VISHAY, CRCW04027K32FKED
18	4	R57, R58, R59, R60	RES., CHIP, 1k, 1%, 0402	VISHAY, CRCW04021K00FKED
19	3	R14, R63, R65	RES., CHIP, 2k, 1%, 0603	VISHAY, CRCW06032K00FKEA
20	2	R64, R66	RES., CHIP, 6.19k, 1%, 0603	VISHAY, CRCW06036K19FKEA
21	2	R69, R70	RES., CHIP, 10Ω, 1%, 0603	VISHAY, CRCW060310R0FKEA
22	2	R76, R77	RES., CHIP, 4.99k, 1%, 0603	VISHAY, CRCW06034K99FKEA
23	2	R80, R81	RES., CHIP, 200Ω, 1%, 0603	VISHAY, CRCW0603200RFKED
24	1	R84	RES., CHIP, 127Ω, 1%, 0603	VISHAY, CRCW0603127RFKEA
25	1	R87	RES., CHIP, 15.8k, 1%, 0603	VISHAY, CRCW060315K8FKEA
22	0	R62, R67, R98, R101	OPTIONAL	
23	0	R61, R100	OPTIONAL	
24	1	R22	RES., CHIP, 0Ω, 0603	VISHAY, CRCW06030000Z0EA
25	0	C37, C41	OPTIONAL	
26	1	R18	RES., CHIP, 499Ω, 1%, 0402	VISHAY, CRCW0402499RFKED
27	1	R20	RES., CHIP, 7.32k, 1%, 0402	VISHAY, CRCW04027K32FKED
28	1	C50	CAP., NP0, 10pF, 25V, 10%, 0402	AVX, 04023A100KAT2A
29	1	C54	CAP., X7R, 220pF, 50V, 10%, 0402	MURATA, GRM155R71H221KA01D
30	1	C55	CAP., X7R, 1.5nF, 50V, 10%, 0402	MURATA, GRM155R71H152KA01D
31	1	R48	SENSE RES., 0.001Ω, 1W, 1%, 2512	PANASONIC, ERJ-M1WTF1MOU
32	0	R53	OPTIONAL	

DC2174A-A Hardware: For Demo Board Only

1	28	E1 TO E4, E7-E19, E21-E31	TESTPOINT, TURRET, .094"	MILL-MAX, 2503-2-00-80-00-00-07-0
2	2	J1, J2	BANANA SMALL	KEYSTONE, 575-4
3	4	J3, J4, J8, J9	STUD, TESTPIN	PEM, KFH-032-10
4	8	J3, J4, J8, J9 (X2)	NUT, BRASS 10-32	ANY #10-32M/S BR PL
5	4	J3, J4, J8, J9	RING, LUG #10	KEYSTONE, 8205
6	4	J3, J4, J8, J9	WASHER, TIN PLATED BRASS	ANY #10 EXT BZ TN
7	4	JP1, JP2, JP4, JP6	HEADER, 3 PIN 0.079 SINGLE ROW	WURTH, 620 003 111 21
8	4	JP1, JP2, JP4, JP6	SHUNT	SAMTEC, 2SN-BK-G
9	2	SW3, SW4	CONNECTOR, SUB MINIATURE SLIDE SWITCHES	C&K.,JS202011CQN
10	3	J7, J10, J14	CONN, BNC, 5PINS	CONNEX, 112404
11	1	J11	HEADER 12POS 2mm STR DL PCB	FCI, 98414-G06-12ULF
12	1	J12	CONN RECEPT 2mm DUAL R/A 14POS (F)	SULLINS, NPPN072FJFN-RC
13	1	J13	HEADER 14POS 2mm R/A GOLD (M)	MOLEX, 87760-1416
14	1	J15	HEADER, 4 PINS, SHROUDED	HIROSE, DF3A-4P-2DSA

DEMO MANUAL

DC2174A-A/DC2174A-B

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
DC2174A-B				
DC2174A-B Required Circuit Components				
1	5	C5, C11, C36, C52, C53,	CAP., X7R, 0.1µF, 16V, 10%, 0402	AVX, 0402YC104KAT2A
2	2	C45, C59	CAP., X7R, 0.1µF, 16V, 10%, 0603	AVX, 0603YC104KAT2A
3	2	CBYP1, CBYP2	CAP., X7R 0.01µF 50V 10% 0603	AVX, 06035C103KAT2A
4	1	CIN1	CAP., X7R 1µF 16V 10% 1206	AVX, 1206YC105KAT2A
5	2	COUT3, COUT7	CAP., X5R 10µF 35V 1206	TAIYO YUDEN GMK316BJ106ML
6	1	D9	DIODE, SCHOTTKY, SOD-323	CENTRAL CMDSH-3TR
7	4	C6, C10, C33, C34	CAP., X5R, 22µF, 25V, 10%, 1210	MURATA, GRM32ER61E226KE15L
8	6	C1, C2, C9, C8, C31, C35	CAP., X5R, 1µF, 10V, 20%, 0402	MURATA, GRM155R61A105ME15D
9	1	C47	CAP., X5R, 1µF, 16V, .10%, 0805	AVX, 0805YD105KAT2A
10	2	C3, C4	CAP., OS-CON, 330µF, 16V, 20%, F12	PANASONIC, 16SVP330M
11	1	C7	CAP., X5R 0402 4.7µF 6.3V 20%	SAMSUNG, CL05A475MQ5NRNC
12	8	C12, C13, C14, C23, C38, C39, C40, C43	CAP., X5R, 100µF, 6.3V, 20%, 1206	MURATA, GRM31CR60J107ME39L
13	6	C15, C16, C26, C27, C17, C19	CAP., POSCAP, 470µF, 2.5V, D2E SIZE	PANASONIC, 2R5TPE470M7
14	0	C18, C28 (OPT)	OPTIONAL	
15	0	D4, D7 (OPT)	OPTIONAL	
16	2	C20, C42	CAP., X5R, 0.22µF, 16V, 10%, 0402	TDK, C1005X5R1C224K
17	1	C21	CAP., X7R, 1.5nF, 50V, 10%, 0402	MURATA, GRM155R71H152KA01D
18	1	C22	CAP., X7R, 220pF, 50V, 10%, 0402	MURATA, GRM155R71H221KA01D
19	2	C29, C44	CAP., X7R, 0.01µF, 16V, 10%, 0603	AVX, 0603YC103KAT2A
20	2	C32, C48	CAP., X7R, 0.01µF, 16V, 10%, 0402	AVX, 0402YC103KAT2A
21	1	C30	CAP., NPO, 10pF, 25V, 10%, 0402	AVX, 04023A100KAT2A
22	2	C57, C58	CAP., X7R, 0.1µF, 16V, 20%, 0805	AVX, 0805YC104MAT2A
23	1	D8	DIODE, ULTRA LOW SCHOTTKY RECTIFIER	NXP SEMI. PMEG2005AEL,315
24	2	L1, L2	IND., 0.17µH	COOPER., FP1007R3-R17-R
25	2	U1, U3	IC, HIGH FREQUENCY DrMOS MODULE	FAIRCHILD, FDMF5820DC
26	1	U2	IC, LTC3882EUJ, QFN 6mm x 6mm	LINEAR TECH., LTC3882EUJ#10BR-1PBF-ES
27	1	U5	IC EEPROM 2KBIT 400KHZ 8TSSOP	MICROCHIP, 24LC025-I/ST
28	1	U6	IC, LT3029IMSE, MSOP, 16PIN	LTC., LT3029IMSE#PBF
DC2174A-B Additional Demo Board Circuit Components				
1	2	D5, D6	LED, GREEN RECT CLEAR 0603	LITE ON, LTST-C193KGKT-5A
2	1	D10	LED, RED RECT CLEAR 0603	LITE ON, LTST-C193KRKT-5A
3	2	Q1, Q6	TRANS, PNP GP 40V 200MA SC75-3	ON SEMI, MMBT3906TT1G
4	1	Q3	MOSFET, SPEED SRS 30V 30A LPAK	RENESAS, RJK0305DPB-00#J0
5	2	Q19, Q20	MOSFET, P-CH 20V 0.58A SOT-23	VISHAY, TP0101K-T1-E3
6	2	Q21, Q22	MOSFET, N-CH 60V 115MA SOT23	DIODES INC., 2N7002-7-F
7	2	RSD1, RSD2	RES., CHIP, 10k, 5%, 0603	VISHAY, CRCW060310K0JKEA
8	1	R1	RES., CHIP, 1Ω, 1%, 0402	VISHAY, CRCW04021R00FKED
9	2	R2, R15	RES., CHIP, 24.9k, 1%, 0402	VISHAY, CRCW040224K9FKED
10	2	R5, R25	RES., CHIP, 0Ω, 0402	VISHAY, CRCW04020000Z0ED
11	5	R16, R24, R71, R73, R83,	RES., CHIP, 0Ω, 0603	VISHAY, CRCW06030000Z0EA

DEMO MANUAL

DC2174A-A/DC2174A-B

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
12	1	R45	SENSE RES., 0.010 Ω 1W 1% 2512	PANASONIC, ERJ-M1WSF10MU
13	0	R23, R29, R30, R31, R32, R33, R34, R35, R36, R37, R38, R39, R40, R68, R72, R74, R75, R78, R82, R90, R91, R92	OPTIONAL	
14	2	R7, R27	RES., CHIP, 2.67k, 1%, 0402	VISHAY, CRCW04022K67FKED
15	1	R9	RES., CHIP, 499 Ω , 1%, 0402	VISHAY, CRCW0402499RFKED
16	11	R10, R11, R13, R17, R19, R21, R26, R28, R41, R42, R86	RES., CHIP, 10k, 1%, 0603	VISHAY, CRCW060310K0FKEA
17	1	R12	RES., CHIP, 7.32k, 1%, 0402	VISHAY, CRCW04027K32FKED
18	4	R57, R58, R59, R60	RES., CHIP, 1k, 1%, 0402	VISHAY, CRCW04021K00FKED
19	2	R14, R63, R65	RES., CHIP, 2k, 1%, 0603	VISHAY, CRCW06032K00FKEA
20	2	R64, R66	RES., CHIP, 6.19k, 1%, 0603	VISHAY, CRCW06036K19FKEA
21	2	R69, R70	RES., CHIP, 10 Ω , 1%, 0603	VISHAY, CRCW060310R0FKEA
22	2	R76, R77	RES., CHIP, 4.99k, 1%, 0603	VISHAY, CRCW06034K99FKEA
23	2	R80, R81	RES., CHIP, 200 Ω , 1%, 0603	VISHAY, CRCW0603200RFKED
24	1	R84	RES., CHIP, 127 Ω , 1%, 0603	VISHAY, CRCW0603127RFKEA
25	1	R87	RES., CHIP, 15.8k, 1%, 0603	VISHAY, CRCW060315K8FKEA
22	4	R62, R67, R98, R101	RES., CHIP, 0 Ω , 0402	VISHAY, CRCW04020000Z0ED
23	2	R61, R100	RES., CHIP, 0 Ω , 0603	VISHAY, CRCW06030000Z0EA
24	0	R22	OPTIONAL	
25	2	C37, C41	CAP., NPO, 56pF, 25V, 10%, 0402	AVX, 04025A560GAT2A
26	0	R18	OPTIONAL	
27	0	R20	OPTIONAL	
28	0	C50	OPTIONAL	
29	0	C54	OPTIONAL	
30	0	C55	OPTIONAL	
31	2	R48, R53	SENSE RES., 0.001 Ω , 1W, 1%, 2512	PANASONIC, ERJ-M1WTF1MOU

DC2174A-B Hardware: For Demo Board Only

1	28	E1-E4, E7-E19, E21-E31	TESTPOINT, TURRET, .094"	MILL-MAX, 2503-2-00-80-00-00-07-0
2	2	J1, J2	BANANA SMALL	KEYSTONE, 575-4
3	4	J3, J4, J8, J9	STUD, TESTPIN	PEM, KFH-032-10
4	8	J3, J4, J8, J9 (X2)	NUT, BRASS 10-32	ANY #10-32M/S BR PL
5	4	J3, J4, J8, J9	RING, LUG #10	KEYSTONE, 8205
6	4	J3, J4, J8, J9	WASHER, TIN PLATED BRASS	ANY #10 EXT BZ TN
7	4	JP1, JP2, JP4, JP6	HEADER, 3 PIN 0.079 SINGLE ROW	WURTH, 620 003 111 21
8	4	JP1, JP2, JP4, JP6	SHUNT	SAMTEC, 2SN-BK-G
9	2	SW3, SW4	CONNECTOR, SUB MINIATURE SLIDE SWITCHES	C&K, JS202011CQN
10	3	J7, J10, J14	CONN, BNC, 5PINS	CONNEX, 112404
11	1	J11	HEADER 12POS 2mm STR DL PCB	FCI, 98414-G06-12ULF
12	1	J12	CONN RECEPT 2mm DUAL R/A 14POS (F)	SULLINS, NPPN072FJFN-RC
13	1	J13	HEADER 14POS 2mm R/A GOLD (M)	MOLEX, 87760-1416
14	1	J15	HEADER, 4 PINS, SHROUDED	HIROSE, DF3A-4P-2DSA

SCHEMATIC DIAGRAM

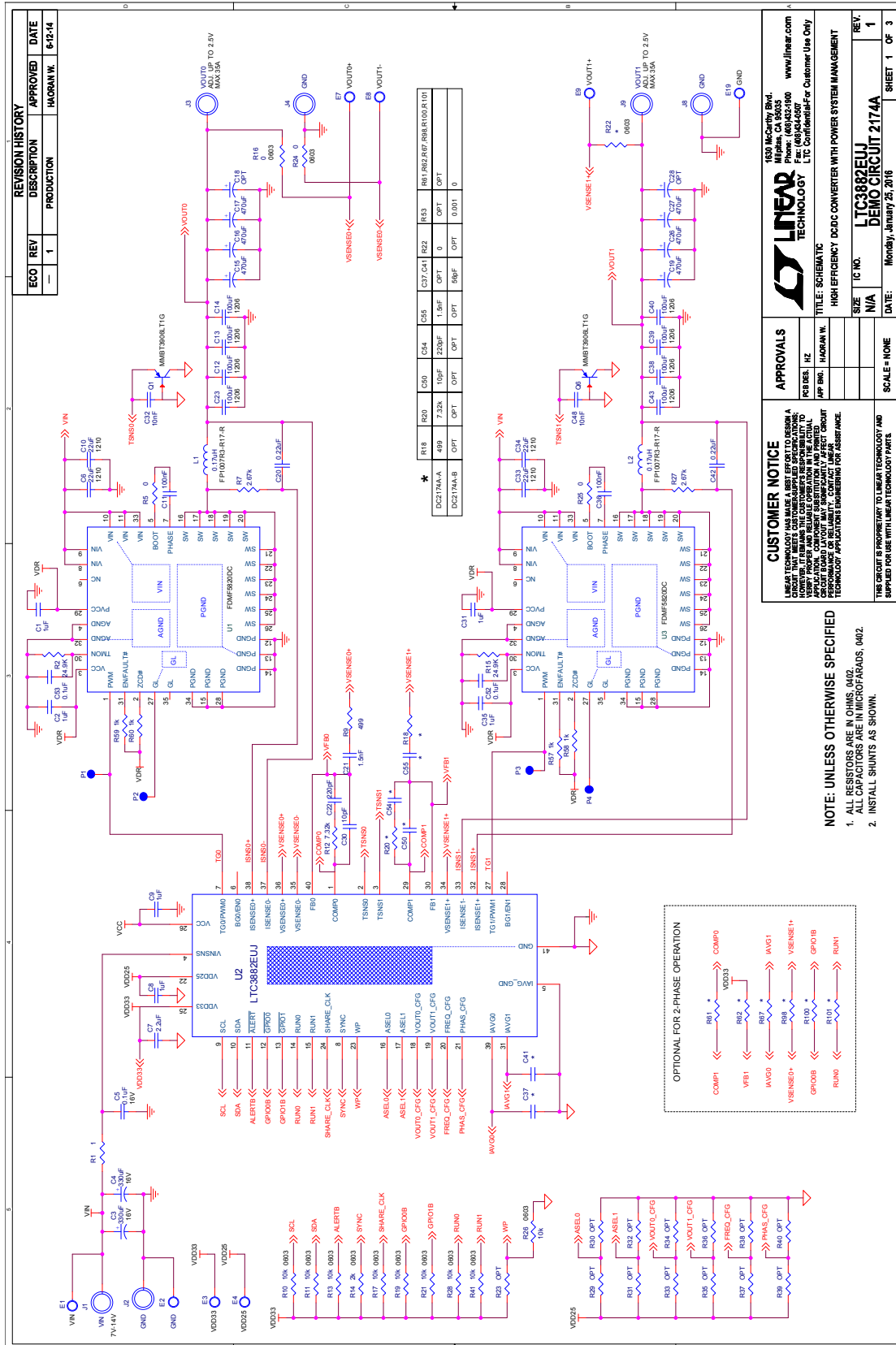


Figure 9. DC2174A Demo Circuit Schematic, Page 1

SCHEMATIC DIAGRAM





DEMO MANUAL

DC2174A-A/DC2174A-B

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