

# LTC3886/LTC3870

## 60V Dual Output Step-Down DC/DC Controller with Digital Power System Management

### DESCRIPTION

Demonstration circuit 2155A is available in two configurations. The DC2155A-A is a dual output synchronous step-down converter featuring the [LTC®3886](#), a dual-phase current mode controller. The DC2155A-B is a single output synchronous step-down converter that operates with four phases: two from the LTC3886 and two from LTC3870, a phase extender. Both versions have a PMBus interface and digital power system management functions.

The DC2155A uses discrete MOSFETs in the power stage. The input range of this board is from 18V to 54V. The output voltage can be programmed from 5V to 12V with an output current of up to 12A per phase. For the DC2155A-A version, the factory default setting for the CH0 output is 12V and CH1 output is 5V. In addition, this demo board has an on-board dynamic load circuit, which makes it easy to evaluate the transient performances.

The DC2155A powers up to default settings and produces power based on configuration resistors or its program file loaded within its onboard EEPROM without the need for any serial bus communication. This allows easy evaluation

of the DC/DC converter aspects of the LTC3886. To fully explore the extensive power system management features of the parts, 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 in EEPROM, view telemetry of voltage, current, temperature and fault status.

### GUI Software Download

The software can be downloaded from:

[LTpowerPlay](#)

For more details and instructions of LTpowerPlay, please visit Help menu in LTpowerPlay.

[Design files for this circuit board are available.](#)

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### PERFORMANCE SUMMARY

Specifications are at  $T_A = 25^\circ\text{C}$

#### DC2155A-A Assembly (Dual Output, LTC3886 Only)

| SYMBOL     | PARAMETER                           | CONDITIONS                                                                               | MIN | TYP  | MAX | UNITS |
|------------|-------------------------------------|------------------------------------------------------------------------------------------|-----|------|-----|-------|
| $V_{IN}$   | Input Supply Range                  |                                                                                          | 18  | 32   | 54  | V     |
| FSW        | Factory Default Switching Frequency |                                                                                          |     | 150  |     | kHz   |
| $V_{OUT0}$ | CH0 Factory Default Output Voltage  | $I_{OUT0} = 0\text{A to }12\text{A}$ , $V_{IN} = 18\text{V to }54\text{V}$               |     | 12   |     | V     |
| $I_{OUT0}$ | CH0 Output Current Range            |                                                                                          | 0   |      | 12  | A     |
| EFF        | CH0 Efficiency                      | $V_{OUT0} = 12\text{V}$ , $V_{IN} = 32\text{V}$ , $I_{OUT} = 12\text{A}$ , See Figure 6a |     | 96.2 |     | %     |
| $V_{OUT1}$ | CH1 Factory Default Output Voltage  | $I_{OUT1} = 0\text{A to }12\text{A}$ , $V_{IN} = 18\text{V to }54\text{V}$               |     | 5    |     | V     |
| $I_{OUT1}$ | CH1 Output Current Range            |                                                                                          | 0   |      | 12  | A     |
| EFF        | CH1 Efficiency                      | $V_{OUT1} = 5\text{V}$ , $V_{IN} = 32\text{V}$ , $I_{OUT} = 12\text{A}$ , See Figure 6b  |     | 93.6 |     | %     |

# DEMO MANUAL

## DC2155A-A/DC2155A-B

### PERFORMANCE SUMMARY Specifications are at $T_A = 25^\circ\text{C}$

#### DC2155A-B Assembly (Four-Phase Single Output, LTC3886 and LTC3870)

| SYMBOL     | PARAMETER                           | CONDITIONS                                                                             | MIN | TYP  | MAX | UNITS |
|------------|-------------------------------------|----------------------------------------------------------------------------------------|-----|------|-----|-------|
| $V_{IN}$   | Input Supply Range                  |                                                                                        | 18  | 32   | 54  | V     |
| $V_{OUT0}$ | Factory Default Output Voltage      | $I_{OUT} = 0\text{A TO } 48\text{A}$ , $V_{IN} = 18\text{V to } 54\text{V}$            |     | 12   |     | V     |
| $I_{OUT0}$ | Output Current Range                |                                                                                        | 0   |      | 48  | A     |
| FSW        | Factory Default Switching Frequency |                                                                                        |     | 150  |     | kHz   |
| EFF        | Efficiency                          | $V_{IN} = 32\text{V}$ , $V_{OUT} = 12\text{V}$ , $I_{OUT} = 48\text{A}$ , See Figure 7 |     | 96.9 |     | %     |

### QUICK START PROCEDURE

Demonstration circuit 2155A makes it easy to set up to evaluate the performances of the LTC3886. Refer to Figure 1 and Figure 2 for 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 C10 for CH0 and C26 for CH1. See Figure 5 for proper scope probe technique.

1. Make sure jumpers are in the following positions:

| JUMPER | POSITION                             | FUNCTION                                                               |
|--------|--------------------------------------|------------------------------------------------------------------------|
| JP1    | ON                                   | EXT 5V (on-board bias supply) for $EXTV_{CC}$ and dynamic load circuit |
| JP2    | NC for DC2155A-A;<br>C for DC2155A-B | FAULT0 to FAULT1                                                       |
| JP3    | NC for DC2155A-A;<br>C for DC2155A-B | RUN0 to RUN1                                                           |
| JP5    | INT                                  | External or on-board pulse generator for transient circuit             |
| JP6    | OFF                                  | On-board pulse generator ON/OFF                                        |

2. With power off, connect the input power supply to  $V_{IN}$  and GND. Connect active load to output.

3. Make sure both RUN switches (SW1, SW2) are OFF.

4. Turn on the power at the input.

NOTE. Make sure that the input voltage does not exceed 54V.

5. Turn on both SW1 (for RUN0), and SW2 (for RUN1) switches, as desired.
6. Check for the correct output voltage from E5 to E6 for CH0, E7 to E8 for CH1. For DC2155A-A version,  $V_{OUT0} = 12.0\text{V} \pm 0.5\%$  (11.94V ~ 12.06V),  $V_{OUT1} = 5\text{V} \pm 0.5\%$  (4.975V ~ 5.025V). For DC2155A-B version,  $V_{OUT0} = 12.0\text{V} \pm 0.5\%$  (11.94V ~ 12.06V).

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 voltage from the GUI. See "LTpowerPlay QUICK START" session for details.

### QUICK START PROCEDURE

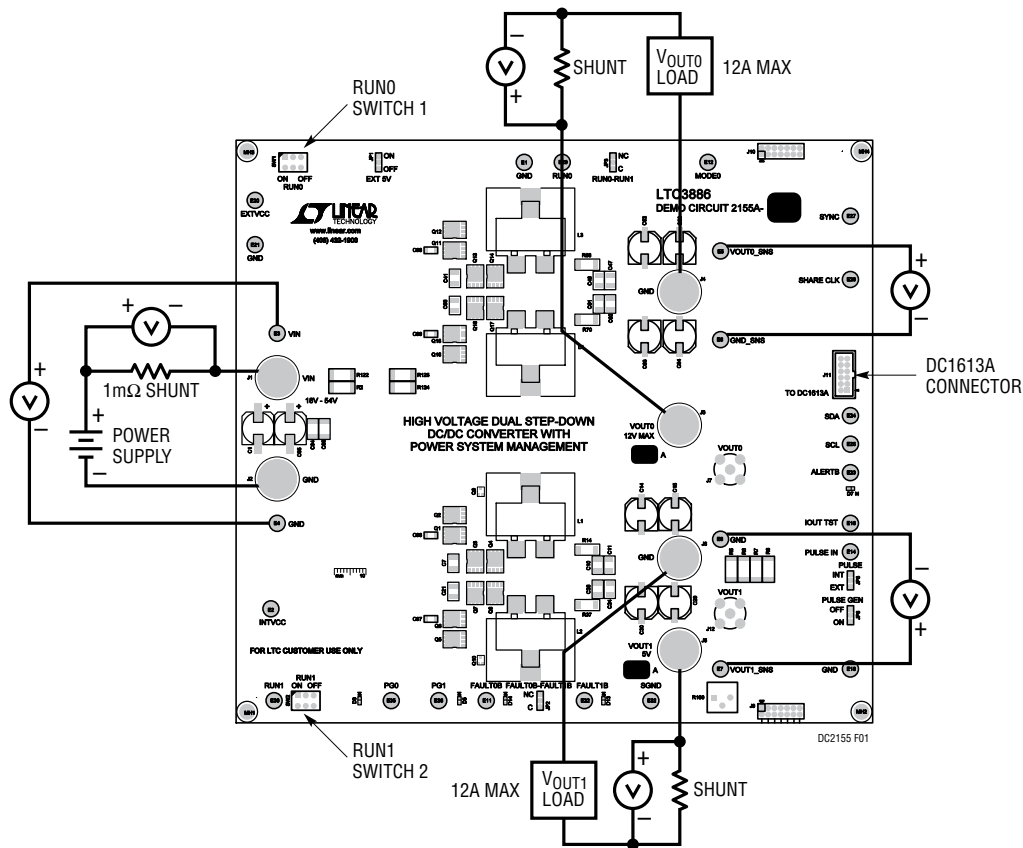


Figure 1. Test Setup for DC2155A-A

# DEMO MANUAL

## DC2155A-A/DC2155A-B

### QUICK START PROCEDURE

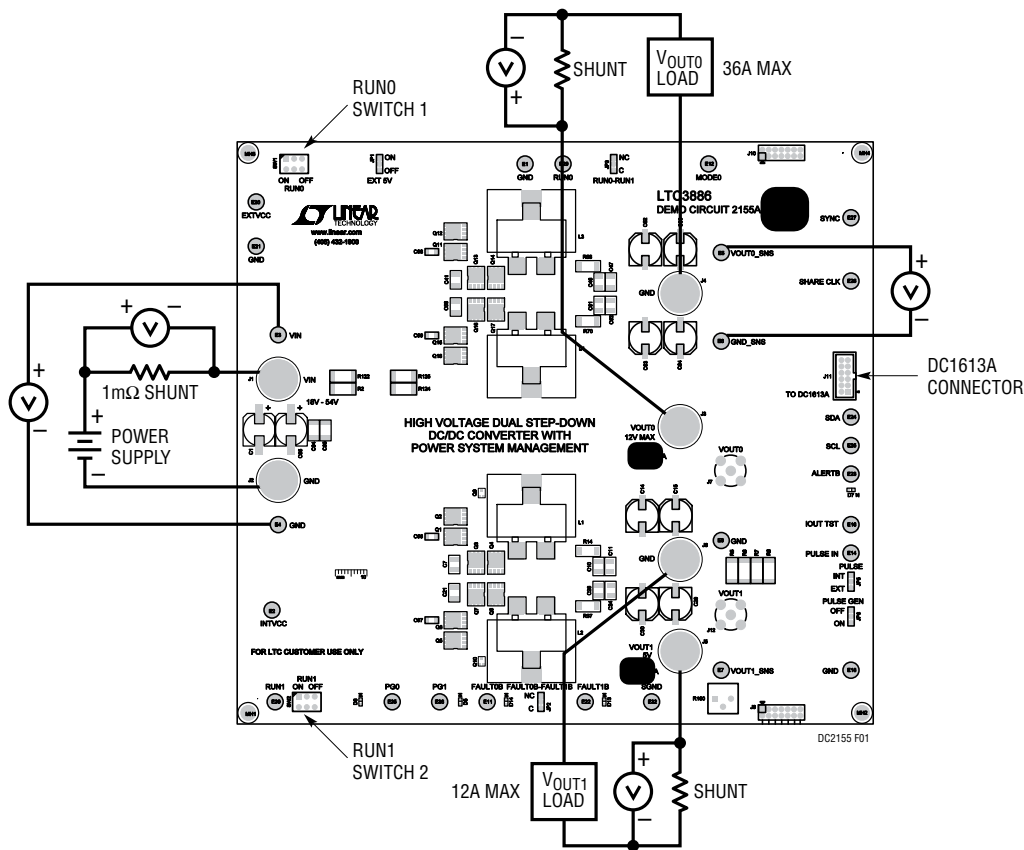


Figure 2. Test Setup for DC2155A-B

### QUICK START PROCEDURE

#### Connecting a PC to DC2155A

You can use a PC to reconfigure the power management features of the LTC3886 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. Dongle can be hot plugged.

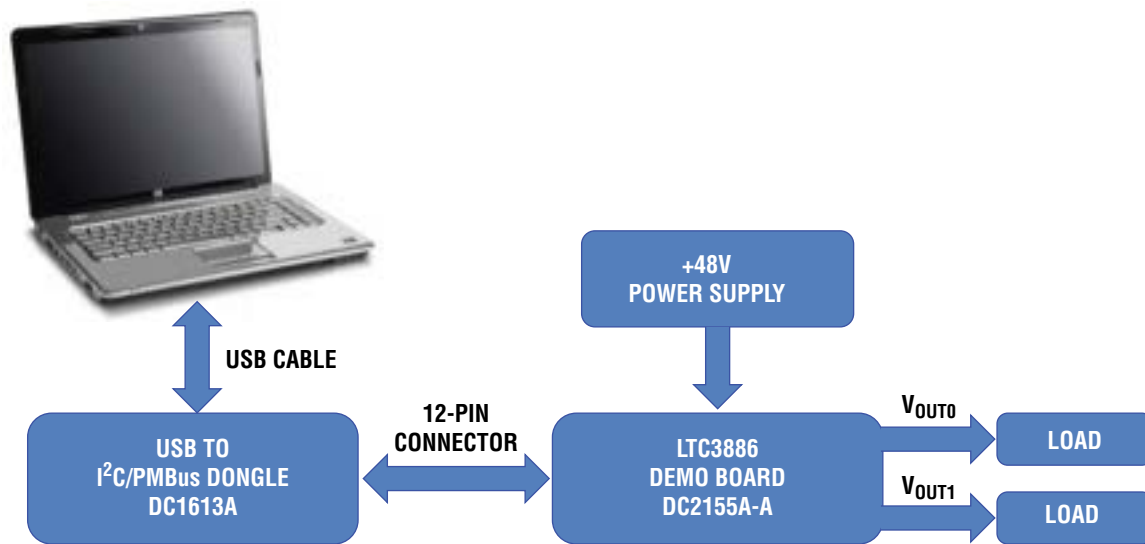


Figure 3. Demo Setup with PC for DC2155A-A

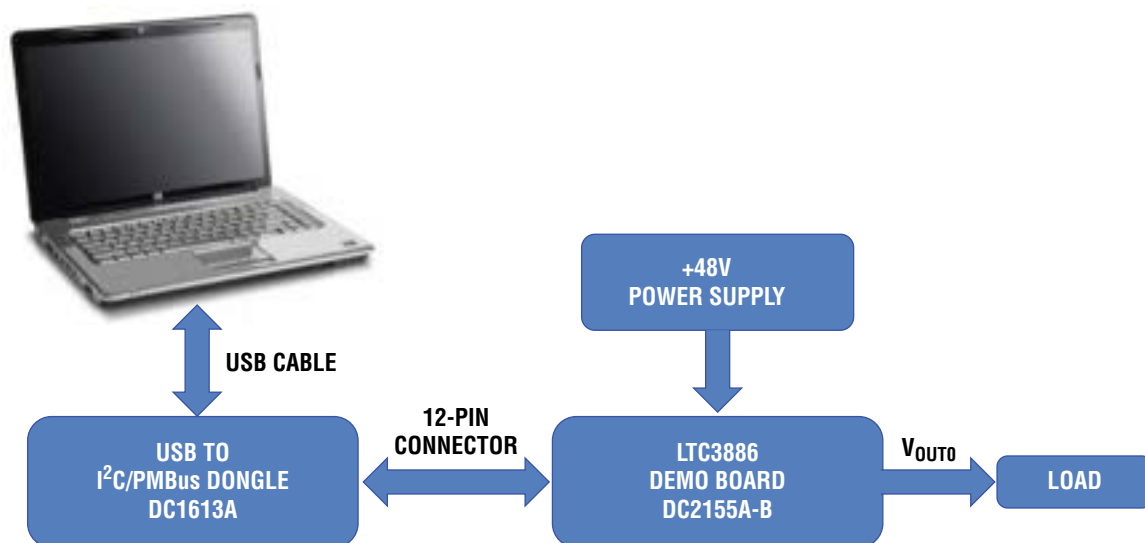


Figure 4. Demo Setup with PC for DC2155A-B

# DEMO MANUAL

## DC2155A-A/DC2155A-B

### QUICK START PROCEDURE

#### Measuring Efficiency

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

- Set JP6 to OFF position to disable the pulse generator circuits.
- DC2155A-A version. Measure  $V_{IN}$  across the input ceramic capacitor (C7 for CH0, C21 for CH1). Measure  $V_{OUT}$  across the output ceramic capacitor (C10 for CH0, C26 for CH1).

- DC2155A-B version. Measure  $V_{IN}$  across the input ceramic capacitor C7. Measure  $V_{OUT}$  across the output ceramic capacitor C10.

#### Measuring Output Ripple Voltage

An accurate ripple measurement may be performed by using the below configuration across C10/C26.

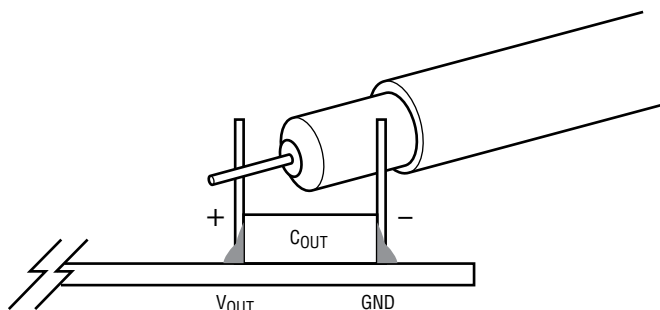
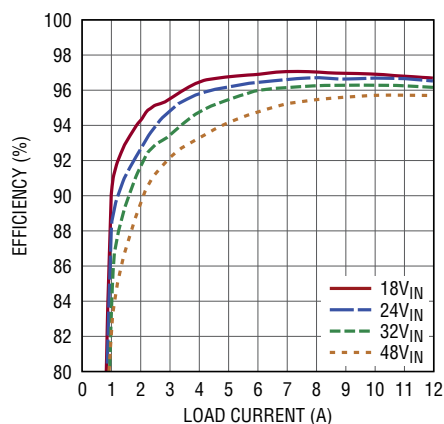


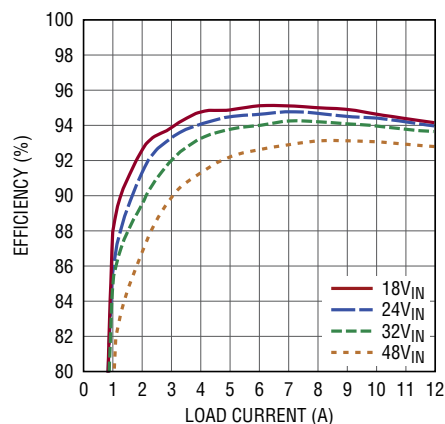
Figure 5. Measuring Output Voltage Ripple



$I_{LOAD} = 0A$  to  $12A$   
 $f_{SW} = 150kHz$   
 $EXTV_{CC} = 12V$  (TIED TO  $V_{OUT}$ )  
ONE OUTPUT RAIL IS  
ENABLED AT A TIME.

DC2155 F06a

(a) DC2155A-A: Efficiency at 12V<sub>OUT</sub>



$I_{LOAD} = 0A$  to  $12A$   
 $f_{SW} = 150kHz$   
 $EXTV_{CC} = 5V$  (TIED TO  $V_{OUT}$ )  
ONE OUTPUT RAIL IS  
ENABLED AT A TIME.

DC2155 F06b

(b) DC2155A-A: Efficiency at 5V<sub>OUT</sub>

Figure 6.

### QUICK START PROCEDURE

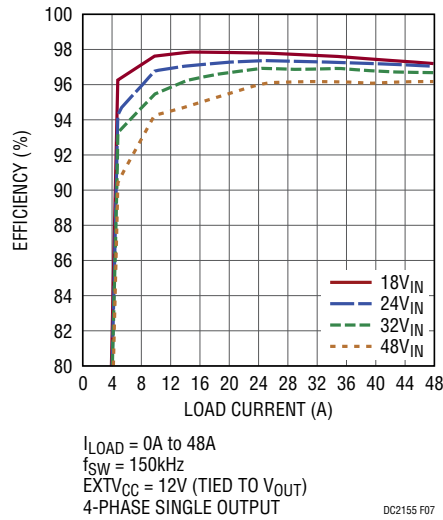
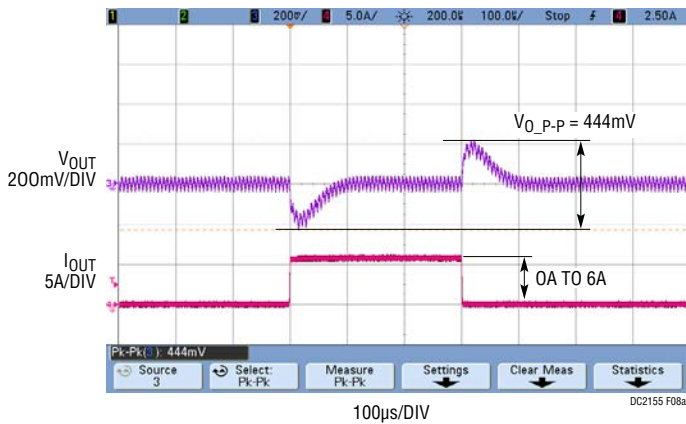
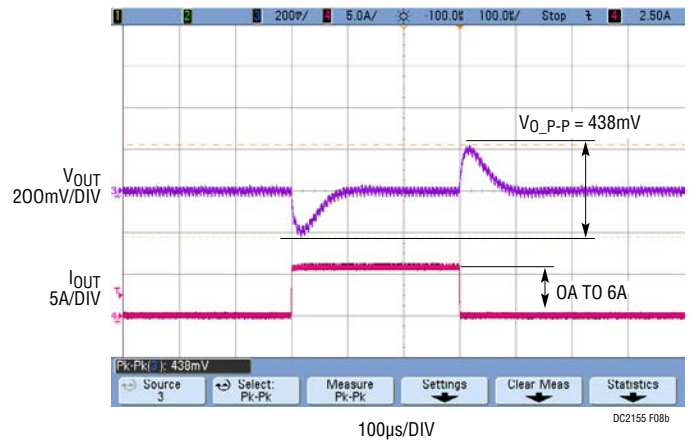


Figure 7. DC2155A-B: Efficiency at 12V<sub>OUT</sub>



(a) DC2155A-A Load Step Response, 12V<sub>OUT</sub>



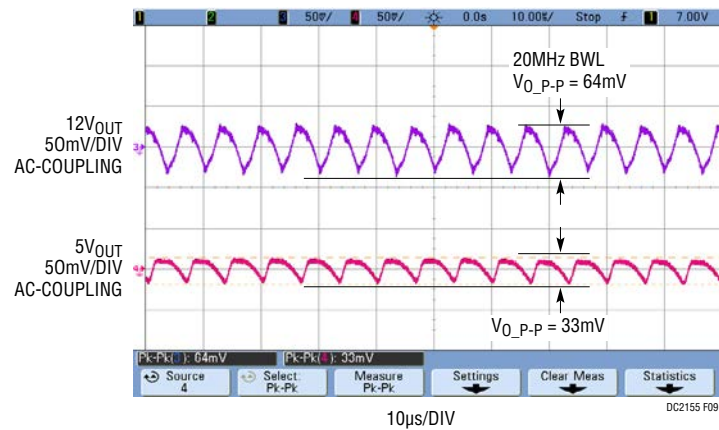
(b) DC2155A-A Load Step Response, 5V<sub>OUT</sub>

Figure 8. DC2155A-A Load Step Response

# DEMO MANUAL

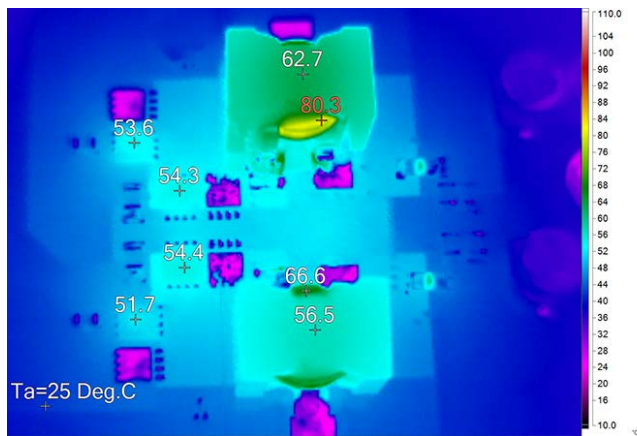
## DC2155A-A/DC2155A-B

### QUICK START PROCEDURE

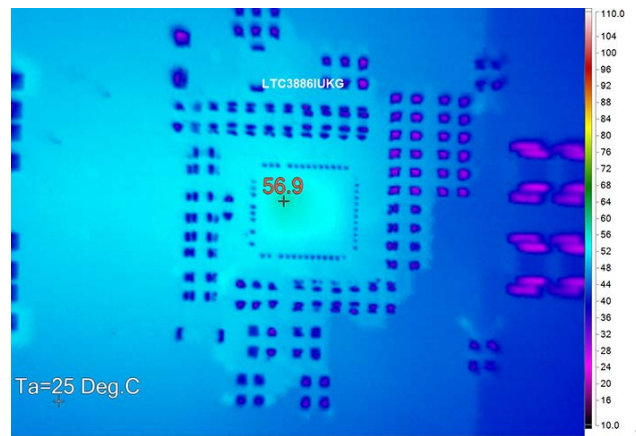


V<sub>IN</sub> = 32V  
V<sub>OUT0</sub> = 12V AT 12A  
V<sub>OUT1</sub> = 5V AT 12A  
f<sub>SW</sub> = 150kHz  
(DEFAULT SET-UP)

Figure 9. DC2155A-A Output Ripple Voltages



TOP VIEW



BOTTOM VIEW

V<sub>IN</sub> = 32V  
V<sub>OUT0</sub> = 12V AT 12A  
V<sub>OUT1</sub> = 5V AT 12A  
f<sub>SW</sub> = 150kHz

EXTV<sub>CC</sub> = 12V (TIED TO V<sub>OUT</sub>)  
T<sub>A</sub> = 25°C  
NO FORCED AIRFLOW  
(DEFAULT SET-UP)

Figure 10. DC2155A-A Thermal Performance

### QUICK START PROCEDURE

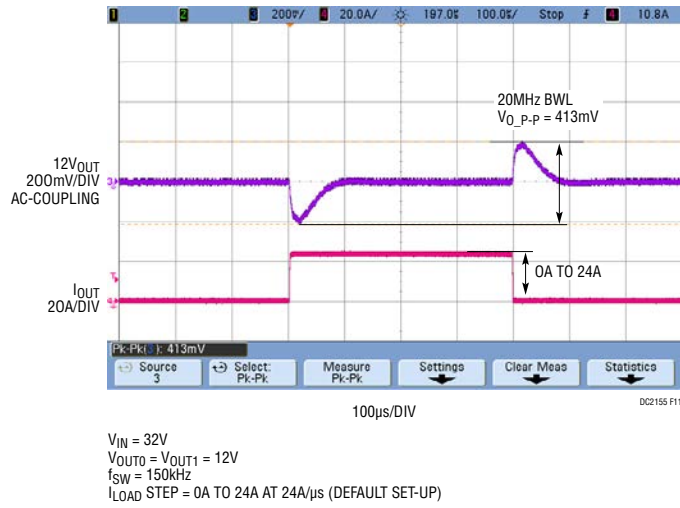


Figure 11. DC2155A-B Load Step Response  $V_{IN} = 32\text{V}$

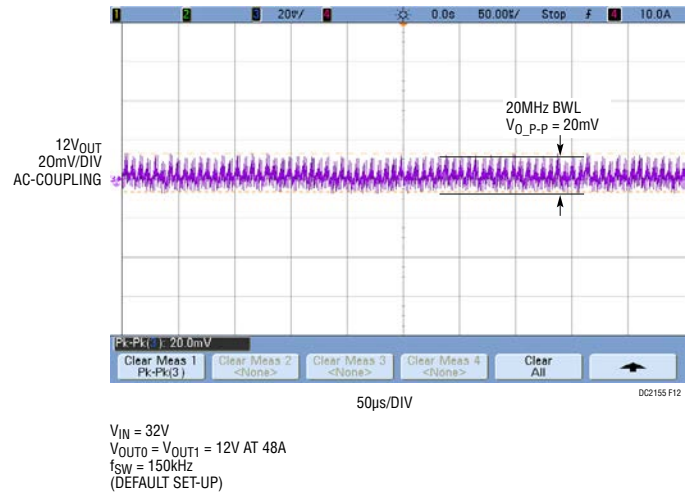
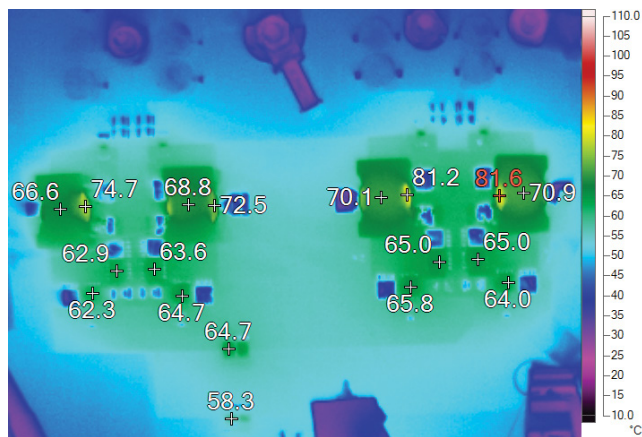
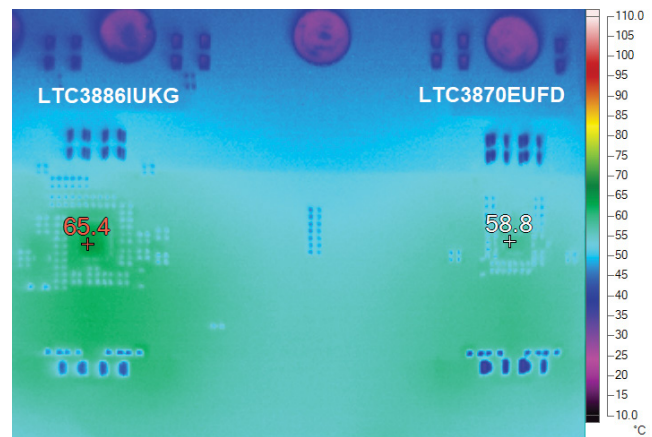


Figure 12. DC2155A-B Output Ripple Voltages



TOP VIEW

$V_{IN} = 32\text{V}$   
 $V_{OUT0} = V_{OUT1} = 12\text{V}$  AT 48A  
 $f_{SW} = 150\text{kHz}$   
 $\text{LTC3886 EXT}_{V_{CC}} = 12\text{V}$  (TIED TO  $V_{OUT0}$ )



BOTTOM VIEW

$\text{LTC3870 EXT}_{V_{CC}} = 5\text{V}$  (TIED TO 5V ON-BOARD  
 EXTERNAL BIAS SUPPLY VOLTAGE FROM U3)  
 $T_A = 25^\circ\text{C}$   
 NO FORCED AIRFLOW  
 (DEFAULT SET-UP)

Figure 13. DC2155A-B Thermal Performance

# DEMO MANUAL

## DC2155A-A/DC2155A-B

### LTpowerPlay SOFTWARE GUI

LTpowerPlay is a powerful Windows based development environment that supports Analog Devices power system management ICs, including the LTC3880, LTC3883, LTC3882, LTC3887 and LTC3886. The software supports a variety of different tasks. You can use LTpowerPlay to evaluate Analog Devices 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 LTC3886's DC2155A 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:

[LTpowerPlay](#)

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

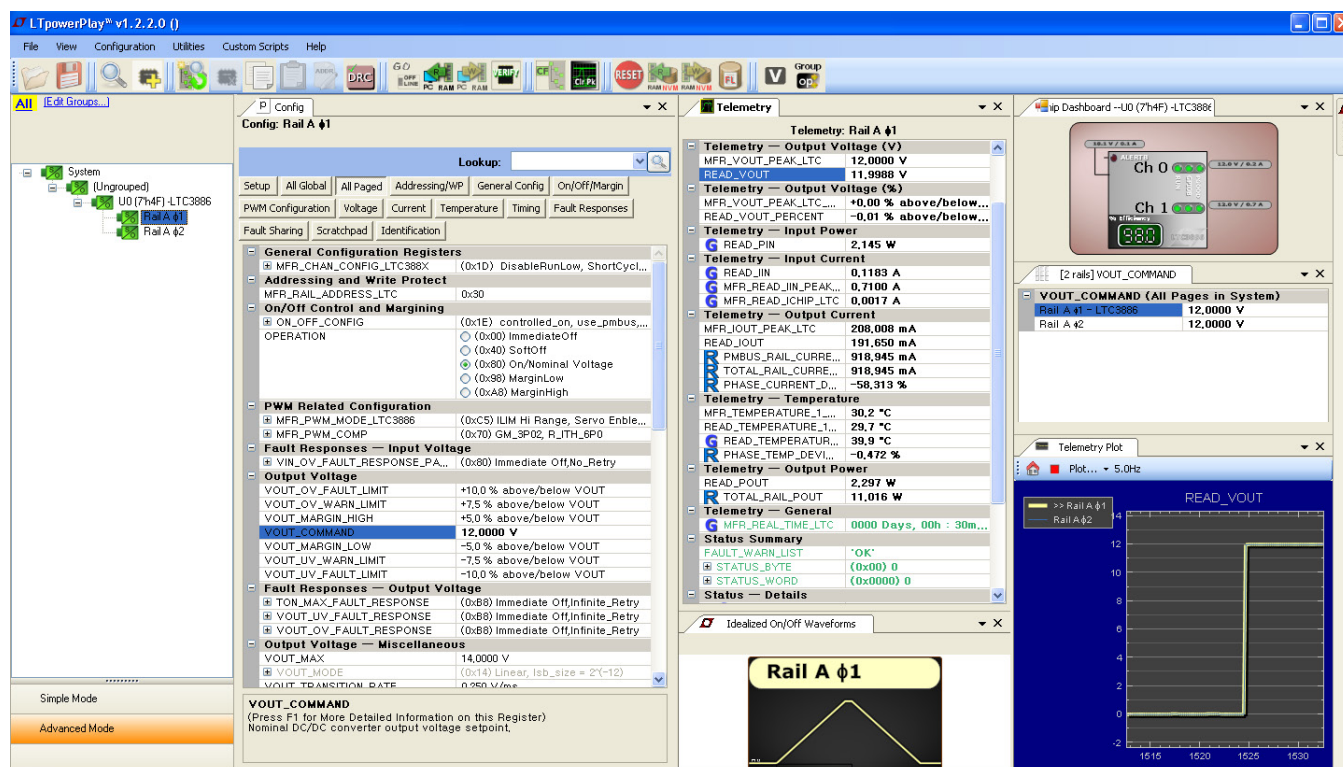


Figure 14. LTpowerPlay Main Interface

### LTpowerPlay QUICK START PROCEDURE

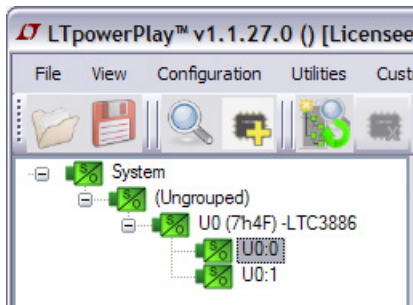
The following procedure describes how to use LTpowerPlay to monitor and change the settings of LTC3886.

1. Download and install the LTpowerPlay GUI:

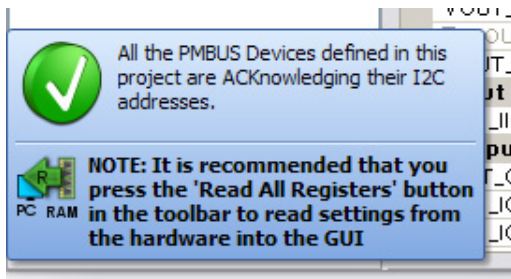
[LTpowerPlay](#)

2. Launch the LTpowerPlay GUI.

- a. The GUI should automatically identify the DC2155A. The system tree on the left hand side should look like this:



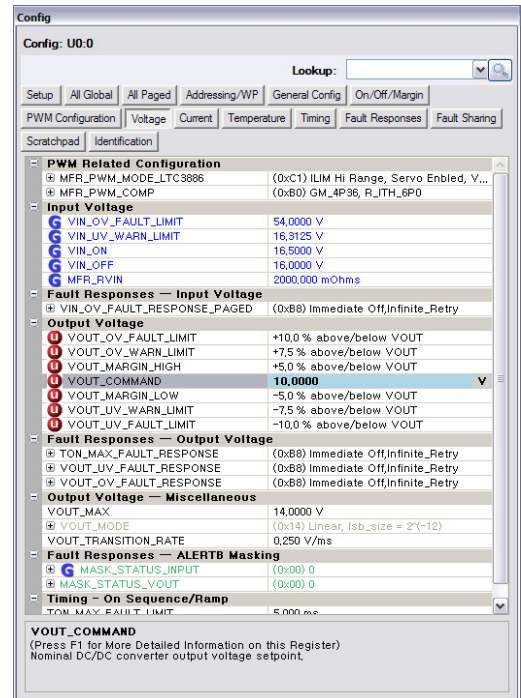
- b. A blue message box shows for a few seconds in the lower left hand corner, confirming that the LTC3886 is communicating:



- c. In the Toolbar, click the “R” (RAM to PC) icon to read the RAM from the LTC3886. This reads the configuration from the RAM of LTC3886 and loads it into the GUI.



- d. If you want to change the output voltage to a different value, like 10V: in the Config tab, type in 10 in the VOUT\_COMMAND box, like this:



Then, click the “W” (PC to RAM) icon to write these register values to the LTC3886. After finishing this step, you will see the output voltage will change to 10V.



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



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



- f. Save the demo board configuration to a (\*.proj) file. Click the Save icon and save the file with a new file name.

# DEMO MANUAL

## DC2155A-A/DC2155A-B

### PARTS LIST DC2155A-A

| ITEM                               | QTY | REFERENCE                                                                                                                | PART DESCRIPTION                            | MANUFACTURER/PART NUMBER         |
|------------------------------------|-----|--------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|----------------------------------|
| <b>Required Circuit Components</b> |     |                                                                                                                          |                                             |                                  |
| 1                                  | 2   | C1, C85                                                                                                                  | CAP, 56μF 20% 63V ELEC                      | SUNCON 63HVP56M                  |
| 2                                  | 3   | C3, C9, C23                                                                                                              | CAP, 0603 0.1μF 10% 100V X7R                | MURATA GRM188R72A104KA35D        |
| 3                                  | 4   | C4, C5, C27, C33                                                                                                         | CAP, 0603 10nF 10% 100V X7R                 | MURATA GRM188R72A103KA01D        |
| 4                                  | 3   | C6, C13, C28                                                                                                             | CAP, 0603 1nF 10% 100V X7R                  | AVX 06031C102KAT2A               |
| 5                                  | 5   | C7, C8, C21, C22, C74                                                                                                    | CAP, 1210 2.2μF 10% 100V X7R                | MURATA GRM32ER72A225KA35L        |
| 6                                  | 8   | C10, C11, C12, C24, C25, C26, C88, C93                                                                                   | CAP, 1210 22μF 20% 16V X7R                  | AVX 1210YC226MAT2A               |
| 7                                  | 4   | C14, C15, C29, C30                                                                                                       | CAP, 150μF 16V ELEC. OS-CON                 | PANASONIC 16SVP150M              |
| 8                                  | 2   | C18, C34                                                                                                                 | CAP, 0603 4.7nF 10% 50V X7R                 | AVX 06035C472KAT2A               |
| 9                                  | 2   | C20, C36                                                                                                                 | CAP, 0603 100pF 5% 50V C0G                  | AVX 06035A101JAT2A               |
| 10                                 | 2   | C37, C38                                                                                                                 | CAP, 0603 2.2μF 10% 16V X5R                 | AVX 0603YD225KAT2A               |
| 11                                 | 1   | C39                                                                                                                      | CAP, 0603 4.7μF 10% 10V X5R                 | AVX 0603ZD475KAT2A               |
| 12                                 | 1   | C40                                                                                                                      | CAP, 0603 4.7μF 10% 16V X5R                 | MURATA GRM188R61C475KAAJD        |
| 13                                 | 2   | C70, C103                                                                                                                | CAP, 0805 2.2μF 10% 16V X7R                 | AVX 0805YC225KAT2A               |
| 14                                 | 1   | C72                                                                                                                      | CAP, 0603 47nF 10% 25V X7R                  | AVX 06033C473KAT2A               |
| 15                                 | 1   | C76                                                                                                                      | CAP, 0603 0.1μF 10% 25V X7R                 | AVX 06033C104KAT2A               |
| 16                                 | 1   | C78                                                                                                                      | CAP, 0805 220nF 10% 100V X7R                | MURATA GRM21AR72A224KAC5L        |
| 17                                 | 2   | C79, C80                                                                                                                 | CAP, 1210 100μF 20% 10V X5R                 | MURATA GRM32ER61A107ME20L        |
| 18                                 | 1   | C81                                                                                                                      | CAP, 0603 220pF 10% 50V X7R                 | AVX 06035C221KAT2A               |
| 19                                 | 2   | C82, C83                                                                                                                 | CAP, 0603 10nF 10% 25V X7R                  | AVX 06033C103KAT2A               |
| 20                                 | 2   | C84, C101                                                                                                                | CAP, 0603 100nF 20% 16V X7R                 | AVX 0603YC104MAT2A               |
| 21                                 | 2   | C94, C95                                                                                                                 | CAP, 1812 10μF 20% 100V X7S                 | TDK CKG45NX7S2A106M500JH         |
| 22                                 | 2   | C96, C97                                                                                                                 | CAP, 1206 2.2μF 10% 100V X7R                | MURATA GRM31CR72A225KA73L        |
| 23                                 | 1   | C100                                                                                                                     | CAP, 0603 150pF 5% 50V NPO                  | AVX 06035A151JAT2A               |
| 24                                 | 1   | C102                                                                                                                     | CAP, 0603 1μF 20% 25V X5R                   | AVX 06033D105MAT2A               |
| 25                                 | 2   | D1, D2                                                                                                                   | DIODE, SCHOTTKY 100V, 1A                    | DIODES/ZETEX, DFLS1100-7         |
| 26                                 | 4   | D5, D6, D13, D14                                                                                                         | LED, 0603 GREEN                             | OSRAM LG L29K-G2J1-24-Z          |
| 27                                 | 1   | D7                                                                                                                       | LED, 0603 RED                               | OSRAM LS L29K-H1J2-1-Z           |
| 28                                 | 1   | D15                                                                                                                      | DIODE, SCHOTTKY, 30V, 250mW, 100mA, SOD-323 | CENTRAL SEMI. CMDSH-3 TR         |
| 29                                 | 26  | E1, E2, E3, E4, E5, E6, E7, E8, E11, E12, E14, E16, E18, E20, E21, E22, E23, E24, E25, E26, E27, E29, E30, E32, E35, E36 | TURRET                                      | MILL-MAX 2501-2-00-80-00-00-07-0 |
| 30                                 | 2   | L1, L2                                                                                                                   | IND, 8.6μH                                  | WURTH ELEKTRONIK 7443630860      |
| 31                                 | 1   | L5                                                                                                                       | IND, 68μH                                   | SUMIDA CDRH105RNP-680NC          |
| 32                                 | 2   | Q1, Q6                                                                                                                   | XSTR, MOSFET N-CH 60V 47A 8 PIN PG-TDSON-8  | INFINEON BSC094N06LS5            |
| 33                                 | 2   | Q3, Q7                                                                                                                   | XSTR, MOSFET N-CH 60V 100A 8 PIN PG-TDSON-8 | INFINEON BSC027N06LS5            |
| 34                                 | 2   | Q9, Q10                                                                                                                  | XSTR, PNP GENERAL PURPOSE SOT-323           | DIODES INC. MMST3906-7-F         |
| 35                                 | 1   | Q19                                                                                                                      | XSTR., MOSFET, N-CH, 40V, TO-252 (DPAK)     | VISHAY SUD50N04-8M8P-4GE3        |
| 36                                 | 1   | Q20                                                                                                                      | XSTR, MOSFET P-CH 20V 5.2A SOT-23           | VISHAY SI2365EDS-T1-GE3          |
| 37                                 | 4   | Q22, Q23, Q28, Q29                                                                                                       | XSTR, MOSFET N-CH 60V 115mA SOT23           | FAIRCHILD 2N7002A                |

# DEMO MANUAL

## DC2155A-A/DC2155A-B

### PARTS LIST DC2155A-A

| ITEM | QTY | REFERENCE                                                                 | PART DESCRIPTION                                                              | MANUFACTURER/PART NUMBER                       |
|------|-----|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------|
| 38   | 2   | R2, R122                                                                  | RES, 2512 0.006Ω 1% 1W                                                        | PANASONIC ERJ-M1WSF6MU                         |
| 39   | 2   | R3, R4                                                                    | RES, 0603 1k 5% 1/10W                                                         | VISHAY CRCW06031K00JNEA                        |
| 40   | 4   | R9, R12, R30, R38                                                         | RES, 0603 2Ω 5% 1/10W                                                         | VISHAY CRCW06032R00JNEA                        |
| 41   | 12  | R10, R11, R13, R15, R16, R18, R23, R25, R28, R89, R112, R113              | RES, 0603 10k 5% 1/10W                                                        | VISHAY CRCW060310K0JNEA                        |
| 42   | 2   | R14, R37                                                                  | RES, 2010 3mΩ 1% 1W                                                           | VISHAY WSL20103L000FEA18                       |
| 43   | 14  | R17, R21, R22, R27, R43, R44, R45, R96, R98, R106, R109, R128, R129, R132 | RES, 0603 0Ω JUMPER                                                           | VISHAY CRCW06030000Z0EA                        |
| 44   | 5   | R24, R26, R50, R51, R155                                                  | RES, 0603 100Ω 5% 1/10W                                                       | VISHAY CRCW0603100RJNEA                        |
| 45   | 4   | R87, R88, R171, R172                                                      | RES, 0603 200Ω 5% 1/10W                                                       | VISHAY CRCW0603200RJNEA                        |
| 46   | 1   | R91                                                                       | RES, 2010 0.01Ω 1% 2W                                                         | VISHAY WSL2010R0100FEK                         |
| 47   | 1   | R93                                                                       | RES, 0603 127Ω 1% 1/10W                                                       | VISHAY CRCW0603127RFKEA                        |
| 48   | 1   | R99                                                                       | RES, 0603 220k 5% 1/10W                                                       | VISHAY CRCW0603220KJNEA                        |
| 49   | 2   | R114, R115                                                                | RES, 0603 10Ω 5% 1/10W                                                        | VISHAY CRCW060310R0JNEA                        |
| 50   | 2   | R119, R120                                                                | RES, 0603 4.99k 1% 1/10W                                                      | VISHAY CRCW06034K99FKEA                        |
| 51   | 2   | R124, R125                                                                | RES, 2512 0Ω JUMPER                                                           | VISHAY CRCW25120000Z0EG                        |
| 52   | 1   | R146                                                                      | RES, 0805 4.7Ω 1% 0.125W                                                      | VISHAY CRCW08054R70FKEA                        |
| 53   | 1   | R151                                                                      | RES, 0603 1MΩ 5% 1/10W                                                        | VISHAY CRCW06031M00JNEA                        |
| 54   | 1   | R152                                                                      | RES, 0603 681k 1% 1/10W                                                       | VISHAY CRCW0603681KFKEA                        |
| 55   | 1   | R153                                                                      | RES, 0603 3.3Ω 1% 1/10W                                                       | VISHAY CRCW06033R30FKEA                        |
| 56   | 1   | R154                                                                      | RES, 0603 82.5Ω 1% 1/10W                                                      | VISHAY CRCW060382R5FKEA                        |
| 57   | 1   | R157                                                                      | RES, 0603 2Ω 5% 1/10W                                                         | VISHAY CRCW06032R00JNEA                        |
| 58   | 1   | R158                                                                      | RES, 0603 27.4k 1% 1/10W                                                      | VISHAY CRCW060327K4FKEA                        |
| 59   | 1   | R159                                                                      | RES, 0603 226K 1% 1/10W                                                       | VISHAY CRCW0603226KFKEA                        |
| 60   | 1   | R160                                                                      | RES, VARIABLE 5k                                                              | BOURNS 3386P-1-502-LF                          |
| 61   | 1   | R161                                                                      | RES, 0603 20k 5% 1/10W                                                        | VISHAY CRCW060320K0JNEA                        |
| 62   | 1   | R162                                                                      | RES, 1206 0Ω JUMPER                                                           | VISHAY CRCW12060000Z0EA                        |
| 63   | 1   | R168                                                                      | RES., 4.7Ω, 1%, 1/10W, 0603, AEC-Q200                                         | VISHAY CRCW06034R70FKEA                        |
| 64   | 1   | R170                                                                      | RES, 0603 340Ω 1% 1/10W                                                       | VISHAY CRCW0603340RFKEA                        |
| 65   | 1   | U1                                                                        | IC, 60V DUAL OUTPUT STEP-DOWN CONTROLLER WITH DIGITAL POWER SYSTEM MANAGEMENT | ANALOG DEVICES, INC., LTC3886IUKG#10E2-1PBF-ES |
| 66   | 1   | U3                                                                        | IC, SYNCHRONOUS STEP-DOWN CONVERTER                                           | ANALOG DEVICES, INC. LTC3630EMSE#PBF           |
| 67   | 1   | U4                                                                        | IC, 24LC025/ST                                                                | MICROCHIP 24LC025-I/ST                         |

#### Additional Demo Board Circuit Components

|   |   |                                                                      |                       |        |
|---|---|----------------------------------------------------------------------|-----------------------|--------|
| 1 | 0 | C16, C17, C31, C32, C51, C53, C65, C66                               | CAP, 7343 OPTION      | OPTION |
| 2 | 0 | C19, C35, C43, C44, C45, C49, C54, C55, C56, C57, C60, C68, C69, C73 | CAP, 0603 OPTION      | OPTION |
| 3 | 0 | C41, C42, C46, C47, C48, C58, C59, C61, C62, C67, C75, C89, C90      | CAP, 1210 OPTION      | OPTION |
| 4 | 0 | C50, C52, C63, C64                                                   | CAP, 16V ELEC. OPTION | OPTION |

# DEMO MANUAL

## DC2155A-A/DC2155A-B

### PARTS LIST DC2155A-A

| ITEM | QTY | REFERENCE                                                                                                                                                                                                                                                                                                                                                                          | PART DESCRIPTION                                | MANUFACTURER/PART NUMBER                     |
|------|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|----------------------------------------------|
| 5    | 0   | C71, C77, C91, C92                                                                                                                                                                                                                                                                                                                                                                 | CAP, 0805 OPTION                                | OPTION                                       |
| 6    | 0   | C86, C87                                                                                                                                                                                                                                                                                                                                                                           | CAP, ELEC OPTION                                | OPTION                                       |
| 7    | 0   | C98, C99                                                                                                                                                                                                                                                                                                                                                                           | CAP, 1206 OPTION                                | OPTION                                       |
| 8    | 0   | D3, D4, D9, D12                                                                                                                                                                                                                                                                                                                                                                    | DIODE, OPTION                                   | OPTION                                       |
| 9    | 0   | D8                                                                                                                                                                                                                                                                                                                                                                                 | DIODE, ZENER OPTION                             | OPTION                                       |
| 10   | 0   | L3, L4                                                                                                                                                                                                                                                                                                                                                                             | IND, OPTION                                     | OPTION                                       |
| 11   | 0   | L7, L9                                                                                                                                                                                                                                                                                                                                                                             | IND, 6.8μH OPTION                               | COILCRAFT SER2915H-682KL OPTION              |
| 12   | 0   | Q27                                                                                                                                                                                                                                                                                                                                                                                | XSTR, N-CHANNEL DMOS FET OPTION                 | OPTION                                       |
| 13   | 0   | R5, R6, R7, R8                                                                                                                                                                                                                                                                                                                                                                     | RES, 2512 0Ω JUMPER OPTION                      | RN5326 2512 TEPRO NAKOMA OPTION              |
| 14   | 0   | Q2, Q4, Q5, Q8, Q11, Q12, Q13, Q14, Q15, Q16, Q17, Q18                                                                                                                                                                                                                                                                                                                             | XSTR, OPTION                                    | OPTION                                       |
| 15   | 0   | R19, R20, R29, R31, R32, R33, R34, R35, R36, R39, R40, R41, R42, R46, R47, R48, R49, R52, R53, R54, R55, R56, R57, R59, R60, R61, R62, R63, R64, R65, R66, R67, R68, R69, R71, R72, R73, R74, R75, R76, R77, R78, R79, R80, R81, R82, R83, R97, R100, R101, R102, R103, R104, R105, R108, R110, R111, R116, R117, R118, R121, R130, R131, R144, R145, R147, R148, R169, R173, R174 | RES, 0603 OPTION                                | OPTION                                       |
| 16   | 0   | R58, R70                                                                                                                                                                                                                                                                                                                                                                           | RES, 2010 OPTION                                | OPTION                                       |
| 17   | 0   | R90, R92, R94, R95                                                                                                                                                                                                                                                                                                                                                                 | RES, 0805 OPTION                                | OPTION                                       |
| 18   | 0   | R107                                                                                                                                                                                                                                                                                                                                                                               | RES, 1206 OPTION                                | OPTION                                       |
| 19   | 0   | R163                                                                                                                                                                                                                                                                                                                                                                               | RES, 1206 0Ω JUMPER OPTION                      | VISHAY CRCW12060000Z0EA OPTION               |
| 20   | 0   | U2                                                                                                                                                                                                                                                                                                                                                                                 | IC, POLYPHASE STEP-DOWN SLAVE CONTROLLER OPTION | ANALOG DEVICES, INC., LTC3870EUFD#PBF OPTION |

#### Hardware:

|    |    |                              |                                 |                            |
|----|----|------------------------------|---------------------------------|----------------------------|
| 1  | 5  | JP1, JP2, JP3, JP5, JP6      | HEADER, 3 PIN 2mm               | SULLINS NRPN031PAEN-RC     |
| 2  | 6  | J1, J2, J3, J4, J5, J6       | STUD, TESTPIN                   | PEM KFH-032-10             |
| 3  | 2  | J7, J12                      | CONN, BNC, 5 PINS               | CONNEX 112404              |
| 4  | 1  | J9                           | HEADER, 14PIN DUAL ROW R/A      | MOLEX 87760-1416           |
| 5  | 1  | J10                          | CONN, SOCKET 14PIN DUAL ROW R/A | SULLINSINC. NPPN072FJFN-RC |
| 6  | 1  | J11                          | HEADER, 12PIN 2mm STR DL        | FCI 98414-G06-12ULF        |
| 7  | 6  | J1, J2, J3, J4, J5, J6       | LUG RING, #10                   | KEYSTONE 8205              |
| 8  | 4  | MH1, MH2, MH3, MH4           | STANDOFF, SNAP ON               | KEYSTONE_8831              |
| 9  | 12 | J1, J2, J3, J4, J5, J6       | NUT, BRASS 10-32                | ANY #10-32                 |
| 10 | 2  | SW1, SW2                     | SWITCH, SUBMINATURE SLIDE       | C&K JS202011CQN            |
| 11 | 6  | J1, J2, J3, J4, J5, J6       | WASHER, #10 TIN PLATED BRASS    | ANY #10 EXT BZ TN          |
| 12 | 5  | XJP1, XJP2, XJP3, XJP5, XJP6 | SHUNT                           | SAMTEC 2SN-BK-G            |

# DEMO MANUAL

## DC2155A-A/DC2155A-B

### PARTS LIST DC2155A-B

| ITEM                               | QTY | REFERENCE                                                                      | PART DESCRIPTION                            | MANUFACTURER/PART NUMBER                 |
|------------------------------------|-----|--------------------------------------------------------------------------------|---------------------------------------------|------------------------------------------|
| <b>Required Circuit Components</b> |     |                                                                                |                                             |                                          |
| 1                                  | 2   | C1, C85                                                                        | CAP, 56μF, ALUM. ELECT., 63V, 20%, SMD      | SUN ELECTRONIC INDUSTRIES CORP. 63HVP56M |
| 2                                  | 6   | C3, C9, C23, C44, C54, C60                                                     | CAP, 0603 0.1μF 10% 100V X7R                | MURATA GRM188R72A104KA35J                |
| 3                                  | 2   | C4, C5                                                                         | CAP, 0603 10nF 10% 100V X7R                 | AVX 06031C103KAT2A                       |
| 4                                  | 5   | C6, C13, C28, C55, C68                                                         | CAP., 1000pF, X7R, 100V, 10%, 0603          | AVX 06031C102KAT2A                       |
| 5                                  | 9   | C7, C8, C21, C22, C41, C42, C58, C59, C74                                      | CAP, 1210 2.2μF 10% 100V X7R                | MURATA GRM32ER72A225KA35L                |
| 6                                  | 16  | C10, C11, C12, C24, C25, C26, C46, C47, C48, C61, C62, C67, C88, C89, C90, C93 | CAP, 1210 22μF 20% 16V X7R                  | MURATA GRM32ER71C226MEA8L                |
| 7                                  | 8   | C14, C15, C29, C30, C50, C52, C63, C64                                         | CAP, 150μF 16V ELEC. OS-CON                 | PANASONIC 16SVP150M                      |
| 8                                  | 1   | C18                                                                            | CAP, 0603 8.2nF 10% 50V X7R                 | AVX 06035C822KAT2A                       |
| 9                                  | 2   | C20, C36                                                                       | CAP, 0603 100pF 5% 50V C0G                  | AVX 06035A101JAT2A                       |
| 10                                 | 4   | C27, C33, C82, C83                                                             | CAP, 0603 10nF 10% 25V X7R                  | AVX 06033C103KAT2A                       |
| 11                                 | 2   | C37, C38                                                                       | CAP, 0603 2.2μF 10% 16V X5R                 | AVX 0603YD225KAT2A                       |
| 12                                 | 2   | C39, C45                                                                       | CAP, 0603 4.7μF 10% 10V X5R                 | AVX 0603ZD475KAT2A                       |
| 13                                 | 2   | C40, C43                                                                       | CAP, 0603 4.7μF 10% 16V X5R                 | MURATA GRM188R61C475KAAJD                |
| 14                                 | 2   | C49, C57                                                                       | CAP, 0603 10pF 5% 50V C0G                   | AVX 06035A100JAT2A                       |
| 15                                 | 2   | C70, C103                                                                      | CAP, 0805 2.2μF 10% 16V X7R                 | AVX 0805YC225KAT2A                       |
| 16                                 | 1   | C72                                                                            | CAP, 0603 47nF 10% 25V X7R                  | AVX 06033C473KAT2A                       |
| 17                                 | 1   | C76                                                                            | CAP, 0603 0.1μF 10% 25V X7R                 | AVX 06033C104KAT2A                       |
| 18                                 | 1   | C78                                                                            | CAP, 0805 220nF 10% 100V X7R                | MURATA GRM21AR72A224KAC5L                |
| 19                                 | 2   | C79, C80                                                                       | CAP, 1210 100μF 20% 10V X5R                 | MURATA GRM32ER61A107ME20L                |
| 20                                 | 1   | C81                                                                            | CAP, 0603 220pF 10% 50V X7R                 | AVX 06035C221KAT2A                       |
| 21                                 | 2   | C84, C101                                                                      | CAP, 0603 100nF 20% 16V X7R                 | AVX 0603YC104MAT2A                       |
| 22                                 | 2   | C94, C95                                                                       | CAP, 1812 10μF 20% 100V X7S                 | TDK CKG45NX7S2A106M500JH                 |
| 23                                 | 4   | C96, C97, C98, C99                                                             | CAP, 1206 2.2μF 10% 100V X7R                | MURATA GRM31CR72A225KA73L                |
| 24                                 | 1   | C100                                                                           | CAP, 0603 150pF 5% 50V NPO                  | AVX 06035A151JAT2A                       |
| 25                                 | 1   | C102                                                                           | CAP, 0603 1μF 20% 25V X5R                   | AVX 06033D105MAT2A                       |
| 26                                 | 4   | D1, D2, D3, D4                                                                 | DIODE, SCHOTTKY 100V, 1A                    | DIODES/ZETEX, DFLS1100-7                 |
| 27                                 | 4   | D5, D6, D13, D14                                                               | LED, 0603 GREEN                             | OSRAM LG L29K-G2J1-24-Z                  |
| 28                                 | 1   | D7                                                                             | LED, 0603 RED                               | OSRAM LS L29K-H1J2-1-Z                   |
| 29                                 | 1   | D15                                                                            | DIODE, SCHOTTKY, 30V, 250mW, 100mA, SOD-323 | CENTRAL SEMI. CMDSH-3 TR                 |
| 30                                 | 4   | L1, L2, L3, L4                                                                 | IND, 8.6μH                                  | WURTH ELEKTRONIK 7443630860              |
| 31                                 | 1   | L5                                                                             | IND, 68μH                                   | SUMIDA CDRH105RNP-680NC                  |
| 32                                 | 4   | Q1, Q6, Q11, Q15                                                               | XSTR, MOSFET N-CH 60V 47A 8 PIN PG-TDSON-8  | INFINEON BSC094N06LS5                    |
| 33                                 | 4   | Q3, Q7, Q13, Q18                                                               | XSTR, MOSFET N-CH 60V 100A 8 PIN PG-TDSON-8 | INFINEON BSC027N06LS5                    |
| 34                                 | 2   | Q9, Q10                                                                        | XSTR, PNP GENERAL PURPOSE SOT-323           | DIODES INC. MMST3906-7-F                 |
| 35                                 | 1   | Q19                                                                            | XSTR, MOSFET, N-CH, 40V, TO-252 (DPAK)      | VISHAY SUD50N04-8M8P-4GE3                |

# DEMO MANUAL

## DC2155A-A/DC2155A-B

### PARTS LIST DC2155A-B

| ITEM | QTY | REFERENCE                                                                                                                                                                                 | PART DESCRIPTION                                                              | MANUFACTURER/PART NUMBER                       |
|------|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------|
| 36   | 1   | Q20                                                                                                                                                                                       | XSTR, MOSFET P-CH 20V 5.2A SOT-23                                             | VISHAY SI2365EDS-T1-GE3                        |
| 37   | 4   | Q22, Q23, Q28, Q29                                                                                                                                                                        | XSTR, MOSFET N-CH 60V 115mA SOT23                                             | FAIRCHILD 2N7002A                              |
| 38   | 2   | R2, R122                                                                                                                                                                                  | RES, 2512 0.003Ω 1% 1W                                                        | PANASONIC ERJ-M1WTF3M0U                        |
| 39   | 2   | R3, R4                                                                                                                                                                                    | RES, 0603 1k 5% 1/10W                                                         | VISHAY CRCW06031K00JNEA                        |
| 40   | 6   | R5, R6, R7, R8, R124, R125                                                                                                                                                                | RES, 2512 0Ω JUMPER                                                           | VISHAY CRCW25120000Z0EG                        |
| 41   | 7   | R9, R12, R30, R38, R52, R53, R67                                                                                                                                                          | RES, 0603 2Ω 5% 1/10W                                                         | VISHAY CRCW06032R00JNEA                        |
| 42   | 12  | R10, R11, R13, R15, R16, R18, R23, R25, R28, R89, R112, R113                                                                                                                              | RES, 0603 10k 5% 1/10W                                                        | VISHAY CRCW060310K0JNEA                        |
| 43   | 4   | R14, R37, R58, R70                                                                                                                                                                        | RES, 2010 3mΩ 1% 1W                                                           | VISHAY WSL20103L000FEA18                       |
| 44   | 35  | R17, R21, R22, R27, R43, R44, R45, R56, R57, R59, R60, R61, R62, R64, R66, R69, R73, R74, R78, R80, R81, R96, R98, R106, R109, R118, R121, R128, R129, R130, R131, R132, R148, R173, R174 | RES, 0603 0Ω JUMPER                                                           | VISHAY CRCW06030000Z0EA                        |
| 45   | 9   | R24, R26, R50, R51, R63, R65, R75, R76, R155                                                                                                                                              | RES, 0603 100Ω 5% 1/10W                                                       | VISHAY CRCW0603100RJNEA                        |
| 46   | 1   | R68                                                                                                                                                                                       | RES, 0603 49.9k 1% 1/10W                                                      | VISHAY CRCW060349K9FKEA                        |
| 47   | 4   | R87, R88, R171, R172                                                                                                                                                                      | RES, 0603 200Ω 5% 1/10W                                                       | VISHAY CRCW0603200RJNEA                        |
| 48   | 1   | R91                                                                                                                                                                                       | RES, 2010 0.01Ω 1% 2W                                                         | VISHAY WSLP2010R0100FEA                        |
| 49   | 1   | R93                                                                                                                                                                                       | RES, 0603 127Ω 1% 1/10W                                                       | VISHAY CRCW0603127RFKEA                        |
| 50   | 1   | R99                                                                                                                                                                                       | RES, 0603 220k 5% 1/10W                                                       | VISHAY CRCW0603220KJNEA                        |
| 51   | 2   | R114, R115                                                                                                                                                                                | RES, 0603 10Ω 5% 1/10W                                                        | VISHAY CRCW060310R0JNEA                        |
| 52   | 2   | R119, R120                                                                                                                                                                                | RES, 0603 4.99k 1% 1/10W                                                      | VISHAY CRCW06034K99FKEA                        |
| 53   | 1   | R146                                                                                                                                                                                      | RES, 0805 4.7Ω 1% 0.125W                                                      | VISHAY CRCW08054R70FKEA                        |
| 54   | 1   | R151                                                                                                                                                                                      | RES, 0603 1MΩ 5% 1/10W                                                        | VISHAY CRCW06031M00JNEA                        |
| 55   | 1   | R152                                                                                                                                                                                      | RES, 0603 681k 1% 1/10W                                                       | VISHAY CRCW0603681KFKEA                        |
| 56   | 1   | R153                                                                                                                                                                                      | RES, 0603 3.3Ω 1% 1/10W                                                       | VISHAY CRCW06033R30FKEA                        |
| 57   | 1   | R154                                                                                                                                                                                      | RES, 0603 82.5Ω 1% 1/10W                                                      | VISHAY CRCW060382R5FKEA                        |
| 58   | 1   | R157                                                                                                                                                                                      | RES, 0603 2Ω 5% 1/10W                                                         | VISHAY CRCW06032R00JNEA                        |
| 59   | 1   | R158                                                                                                                                                                                      | RES, 0603 27.4k 1% 1/10W                                                      | VISHAY CRCW060327K4FKEA                        |
| 60   | 1   | R159                                                                                                                                                                                      | RES, 0603 226k 1% 1/10W                                                       | VISHAY CRCW0603226KFKEA                        |
| 61   | 1   | R160                                                                                                                                                                                      | RES, VARIABLE 5k                                                              | BOURNS 3386P-1-502-LF                          |
| 62   | 1   | R161                                                                                                                                                                                      | RES, 0603 20K 5% 1/10W                                                        | VISHAY CRCW060320K0JNEA                        |
| 63   | 2   | R162, R163                                                                                                                                                                                | RES, 1206 0Ω JUMPER                                                           | VISHAY CRCW12060000Z0EA                        |
| 64   | 1   | R168                                                                                                                                                                                      | RES., 4.7Ω, 1%, 1/10W, 0603, AEC-Q200                                         | VISHAY CRCW06034R70FKEA                        |
| 65   | 1   | R170                                                                                                                                                                                      | RES, 0603 340Ω 5% 1/10W                                                       | VISHAY CRCW0603340RJNEA                        |
| 66   | 1   | U1                                                                                                                                                                                        | IC, 60V DUAL OUTPUT STEP-DOWN CONTROLLER WITH DIGITAL POWER SYSTEM MANAGEMENT | ANALOG DEVICES, INC., LTC3886IUKG#10E3-1PBF-ES |
| 67   | 1   | U2                                                                                                                                                                                        | IC, POLYPHASE STEP-DOWN SLAVE CONTROLLER                                      | ANALOG DEVICES, INC., LTC3870EUFDPBF           |
| 68   | 1   | U3                                                                                                                                                                                        | IC, SYNCHRONOUS STEP-DOWN CONVERTER                                           | ANALOG DEVICES, INC., LTC3630EMSE#PBF          |
| 69   | 1   | U4                                                                                                                                                                                        | IC, 24LC025-I/ST                                                              | MICROCHIP 24LC025-I/ST                         |
| 70   | 1   | U5                                                                                                                                                                                        | IC, LTC6992IS6-1                                                              | ANALOG DEVICES, INC. LTC6992IS6-1              |

Rev. C

# DEMO MANUAL

## DC2155A-A/DC2155A-B

### PARTS LIST DC2155A-B

| ITEM | QTY | REFERENCE | PART DESCRIPTION  | MANUFACTURER/PART NUMBER        |
|------|-----|-----------|-------------------|---------------------------------|
| 71   | 1   | U6        | IC, SINGLE OP AMP | ANALOG DEVICES, INC., LT1803IS5 |

#### Additional Demo Board Circuit Components

|    |   |                                                                                                                                                                                                                            |                                 |                                                                  |
|----|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|------------------------------------------------------------------|
| 1  | 0 | C16, C17, C31, C32, C51, C53, C65, C66                                                                                                                                                                                     | CAP, 7343 OPTION                | OPTION                                                           |
| 2  | 0 | C19, C34, C35, C56, C69, C73                                                                                                                                                                                               | CAP, 0603 OPTION                | OPTION                                                           |
| 3  | 0 | C71, C77, C91, C92                                                                                                                                                                                                         | CAP, 0805 OPTION                | OPTION                                                           |
| 4  | 0 | C75                                                                                                                                                                                                                        | CAP, 1210 OPTION                | OPTION                                                           |
| 5  | 0 | C86, C87                                                                                                                                                                                                                   | CAP, ELEC OPTION                | OPTION                                                           |
| 6  | 0 | D8                                                                                                                                                                                                                         | DIODE, ZENER OPTION             | OPTION                                                           |
| 7  | 0 | D9, D12                                                                                                                                                                                                                    | DIODE, OPTION                   | OPTION                                                           |
| 8  | 0 | L7, L9, L10, L11                                                                                                                                                                                                           | IND, 6.8 $\mu$ H OPTION         | COILCRAFT SER2915H-682KLOPTION<br>COILCRAFTSER2918H-682KL OPTION |
| 9  | 0 | Q2, Q4, Q5, Q8, Q12, Q14, Q16, Q17                                                                                                                                                                                         | XSTR, OPTION                    | OPTION                                                           |
| 10 | 0 | Q27                                                                                                                                                                                                                        | XSTR, N-CHANNEL DMOS FET OPTION | OPTION                                                           |
| 11 | 0 | R19, R20, R29, R31, R32, R33, R34, R35, R36, R39, R40, R41, R42, R46, R47, R48, R49, R54, R55, R71, R72, R77, R79, R82, R83, R97, R100, R101, R102, R103, R104, R105, R108, R110, R111, R116, R117, R144, R145, R147, R169 | RES, 0603 OPTION                | OPTION                                                           |
| 12 | 0 | R90, R92, R94, R95                                                                                                                                                                                                         | RES, 0805 OPTION                | OPTION                                                           |
| 13 | 0 | R107                                                                                                                                                                                                                       | RES, 1206 OPTION                | OPTION                                                           |

#### Hardware:

|    |    |                                                                                                                          |                                 |                                  |
|----|----|--------------------------------------------------------------------------------------------------------------------------|---------------------------------|----------------------------------|
| 1  | 26 | E1, E2, E3, E4, E5, E6, E7, E8, E11, E12, E14, E16, E18, E20, E21, E22, E23, E24, E25, E26, E27, E29, E30, E32, E35, E36 | TURRET                          | MILL-MAX 2501-2-00-80-00-00-07-0 |
| 2  | 4  | MH1, MH2, MH3, MH4                                                                                                       | STANDOFF, SNAP ON               | KEYSTONE_8831                    |
| 3  | 12 | J1, J2, J3, J4, J5, J6                                                                                                   | NUT, BRASS 10-32                | ANY #10-32                       |
| 4  | 6  | J1, J2, J3, J4, J5, J6                                                                                                   | WASHER, #10 TIN PLATED BRASS    | ANY #10 EXT BZ TN                |
| 5  | 5  | JP1, JP2, JP3, JP5, JP6                                                                                                  | HEADER, 3 PIN 2mm               | SULLINS NRPN031PAEN-RC           |
| 6  | 6  | J1, J2, J3, J4, J5, J6                                                                                                   | STUD, TESTPIN                   | PEM KFH-032-10                   |
| 7  | 2  | J7, J12                                                                                                                  | CONN, BNC, 5 PINS               | CONNEX 112404                    |
| 8  | 1  | J9                                                                                                                       | HEADER, 14PIN DUAL ROW R/A      | MOLEX 87760-1416                 |
| 9  | 1  | J10                                                                                                                      | CONN, SOCKET 14PIN DUAL ROW R/A | SULLINS INC. NPPN072FJFN-RC      |
| 10 | 1  | J11                                                                                                                      | HEADER, 12PIN 2mm STR DL        | FCI 98414-G06-12ULF              |
| 11 | 6  | J1, J2, J3, J4, J5, J6                                                                                                   | LUG RING, #10                   | KEYSTONE 8205                    |
| 12 | 2  | SW1, SW2                                                                                                                 | SWITCH, SUBMINATURE SLIDE       | C&K JS202011CQN                  |
| 13 | 5  | XJP1, XJP2, XJP3, XJP5, XJP6                                                                                             | SHUNT                           | SAMTEC 2SN-BK-G                  |

## SCHEMATIC DIAGRAM



### SCHEMATIC DIAGRAM

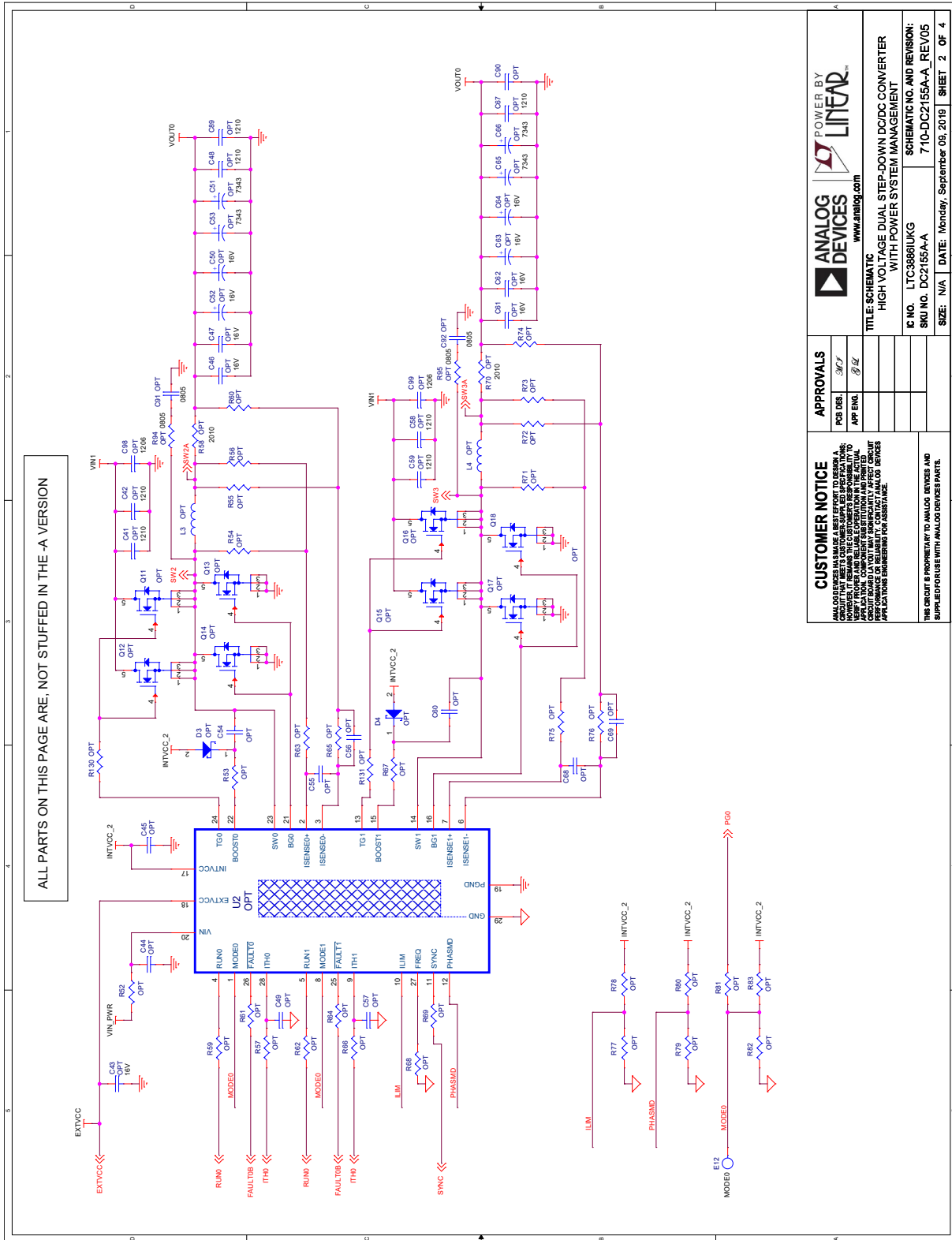


Figure 15b. DC2155A-A Demo Circuit Schematic, Sheet 2

## SCHEMATIC DIAGRAM





# DEMO MANUAL

## DC2155A-A/DC2155A-B

### SCHEMATIC DIAGRAM

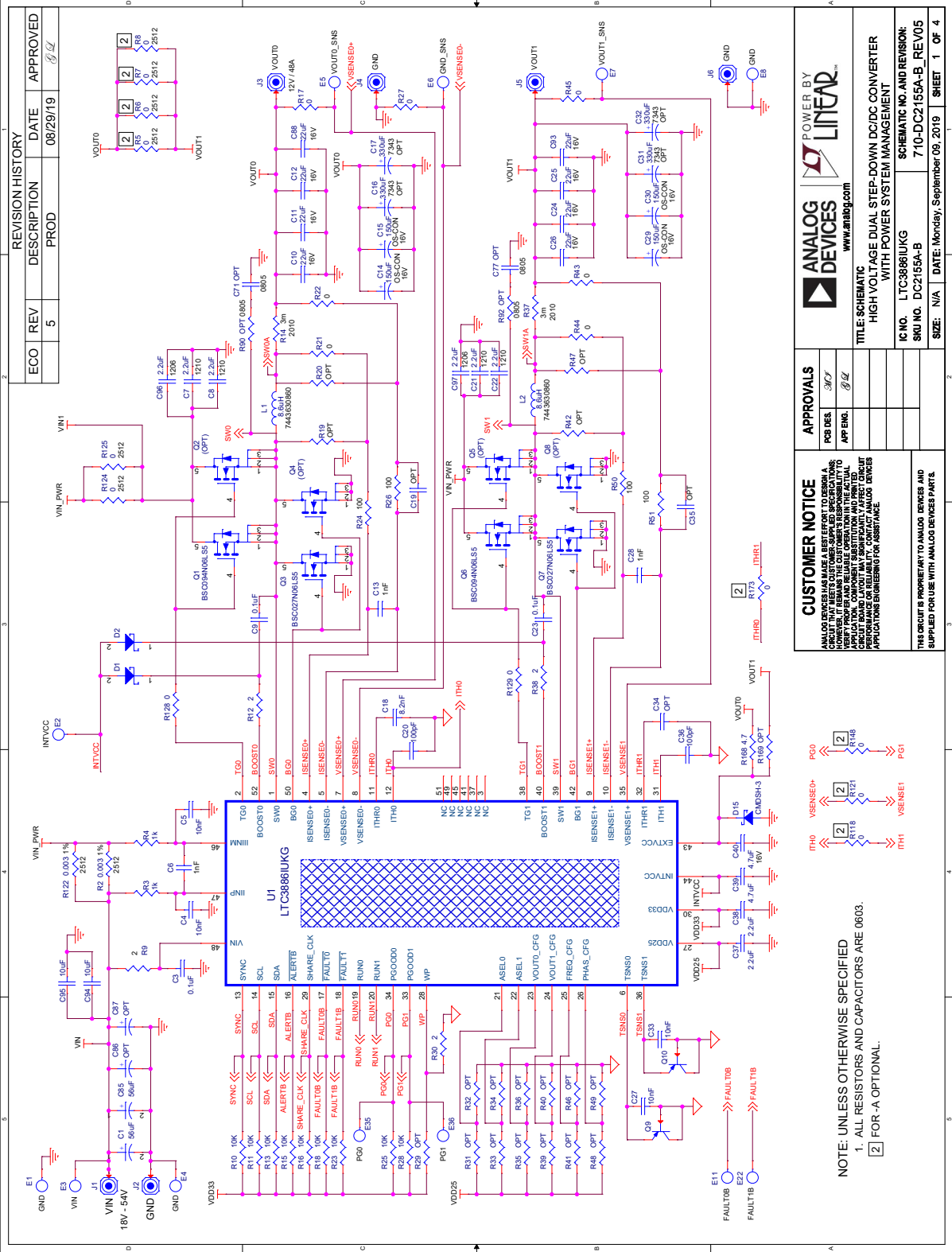


Figure 16a. DC2155A-B Demo Circuit Schematic, Sheet 1

### SCHEMATIC DIAGRAM

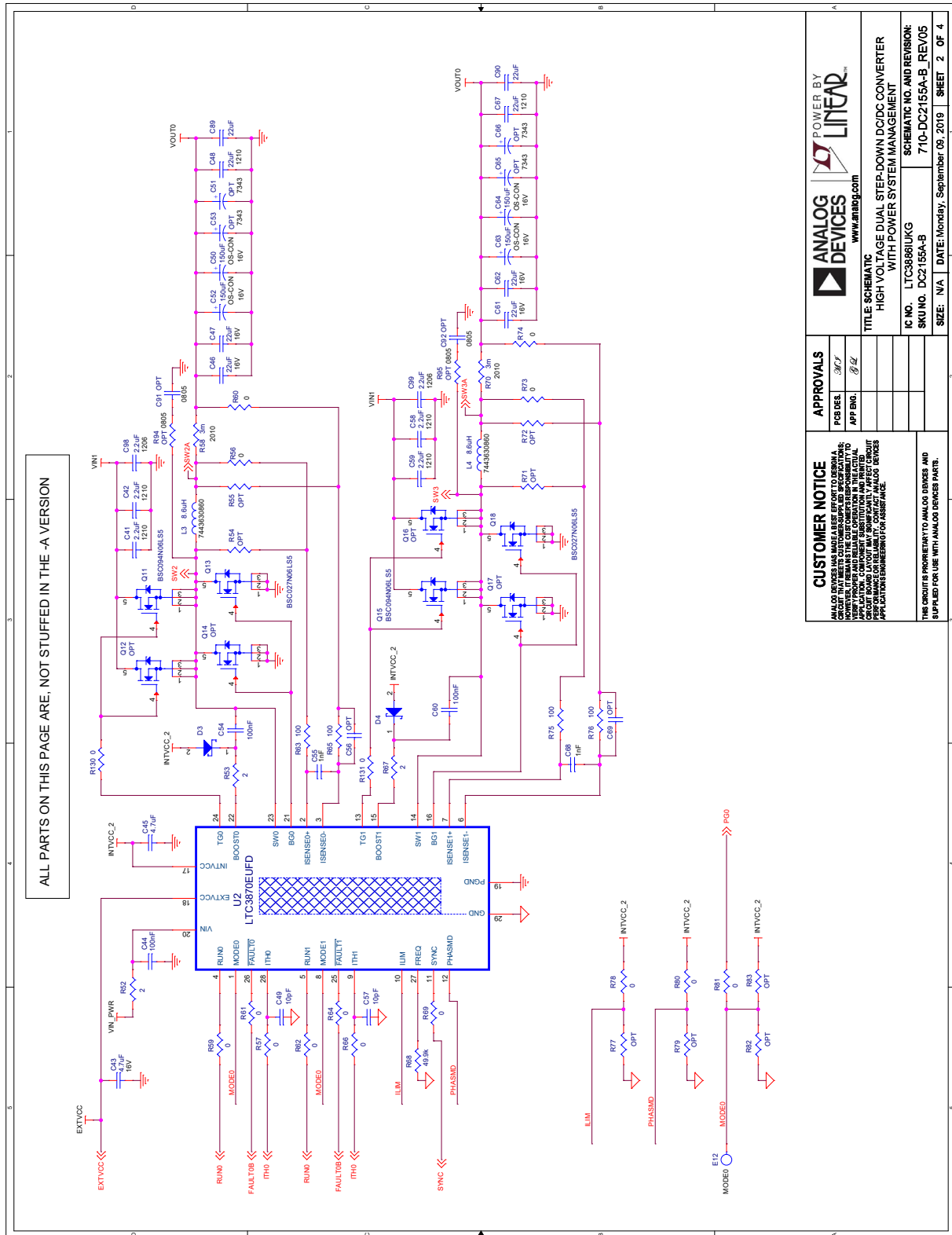


Figure 16b. DC2155A-B Demo Circuit Schematic, Sheet 2

## SCHEMATIC DIAGRAM



### SCHEMATIC DIAGRAM

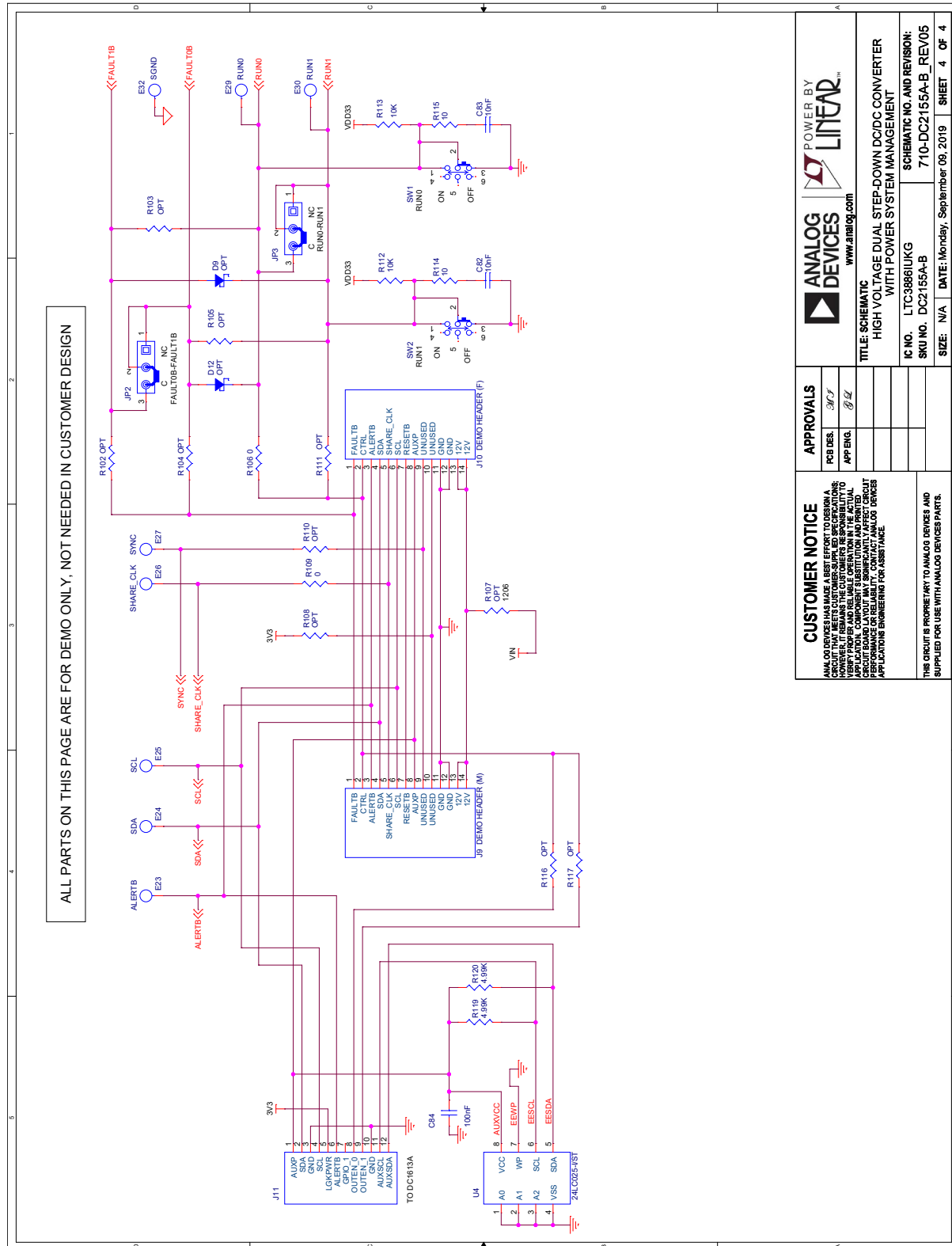


Figure 16d. DC2155A-B Demo Circuit Schematic, Sheet 4

# DEMO MANUAL

## DC2155A-A/DC2155A-B

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### ESD Caution

**ESD (electrostatic discharge) sensitive device.** Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

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Rev. C