LTC3675EUFF
7-Channel Configurable High Power PMIC

DESCRIPTION

WARNING!

Do not look directly at operating LED

This circuit produces light that can damage eyes

Demonstration circuit 1607 is a multioutput power supply with a pushbutton controller and a dual string LED driver featuring the LTC®3675. The LTC3675 has four synchronous buck regulators, a buck-boost regulator, a boost regulator, plus an always-on LDO regulator. The buck regulators may be combined together to create a higher power buck regulator with a single inductor. The LED boost driver can drive two strings of up to 10 LEDs at up to 25mA each, two strings of 5 LEDs at up to 50mA each, or be configured as a fixed high voltage boost regulator. The input range of the LTC3675 is ideal for single cell Li-Ion/Polymer battery applications.

The switching regulator settings such as enables, feedback voltages, operating modes and other functions, plus the LED current and LED current gradation can be controlled via I^2C. The buck regulators and buck-boost regulator can also be enabled via external enable pins. After the first regulator is enabled, the remaining enable pins use a precision threshold to allow hardwired power up sequences.

The LTC3675 also has some unique features such as programmable input undervoltage (UV) and overtemperature (OT) warnings to allow the user to better manage power and thermal budgets during critical circumstances. The LTC3675 has two outputs which may be programmed to alert the user when certain events have occurred such as a low regulator output, input UV or an OT event. Two status registers can be read via I^2C that indicate which regulators are in regulation and if a UV or OT warning occurred. The command registers which are used to control the switching regulators and program the special functions can also be read back via I^2C to assure the correct data was received.

Refer to the LTC3675 data sheet for more details on the electrical and timing specifications.

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

PERFORMANCE SUMMARY

Specifications are at T_A = 25°C.

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Input Supply Range (V_{IN})		2.7		5.5	V
DV_{CC} Operating Voltage		1.6		5.5	V
DV_{CC} UVLO ($V_{DVCC,UVLO}$)			1.0		V
LDO_OUT	0mA to 25mA		1.2		V
V_{OUT1}	0A to 1A		1.2		V
V_{OUT2}	0A to 1A (V_{IN} = >3.0V)		2.5		V
V_{OUT3}	0mA to 500mA		1.8		V
V_{OUT4}	0mA to 500mA		1.6		V
V_{OUT5}	0A to 1A (V_{IN} = >3.0V)		5.0		V
V_{OUT6}	0A to 1A (V_{IN} > 3.1V)		3.3		V
Full-Scale LED Current	2 × Full-Scale Mode 1 × Full-Scale Mode		50 25		mA mA

QUICK START PROCEDURE

Demo Circuit 1607 is designed to be used for single cell Li-Ion/Polymer battery applications. Demo Circuit 1607 utilizes the DC590B, USB to I^2C interface board, to control the switching regulators and the LED boost driver functions, program the undervoltage (UV) and overtemperature (OT) warnings, and to read back the contents of the command and status registers.

The DC1607 is easy to set up to evaluate the performance of the LTC3675. Refer to Figure 3 and Figure 4 for proper measurement equipment setup and follow the evaluation procedure below using the DC590B board.

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 input or output voltage ripple by touching the probe tip directly across the V_{IN} or V_{OUT} and GND terminals. See Figure 4 for proper scope probe technique.

1. Refer to the DC590B Quick Start Guide for QuikEval™ setup and software installation details.
2. Set the VCCIO jumper, JP6, on the DC590B board to the 3.3V position.

   NOTE: The DVCC voltage level may be selected on the DC590B. This is done by setting the VCCIO jumper, JP6, on the DC590B board to one of the following settings: 3.3V, 5V, removed for 2.7V or set to external if an external supply is desired to be used.
3. Make sure the USB cable is connected between the computer and the DC590B controller board.
4. Set the JP1-JP5 jumpers on the DC1607 board to the "OFF" position.
5. Connect DC1607 to the DC590B USB Serial Controller using the supplied 14-conductor ribbon cable as shown in Figure 3.
6. With power off, connect a 5V, 5A power supply to VIN and GND with a series ammeter and a voltmeter as shown in Figure 3.
7. Turn on and set the VIN input power supply to 3.6V. The DC590B board gets its power from the USB cable.

   NOTE: Make sure that the input voltage does not exceed 6V.
8. Run the QuikEval.exe program. The LTC3675 control window (shown in Figure 7) pops up.

   NOTE: If the READ text boxes do not match the WRITE text boxes then the command registers were not read correctly. This occurs when the power is not present, when DV_{CC} is missing, or when the DC590B board is not responding. Verify that the input power and DV_{CC} are applied. If the DC590B board is not responding, close the QuikEval.exe program, momentarily unplug the USB cable from the DC590B board, then run the QuikEval.exe program. The following pop-up warning may also appear at this time. This box appears when the regulators and LED driver are disabled and the READ text boxes do not match the WRITE text boxes.

Figure 1. Power-On Reset (POR) Warning

9. On the LTC3675 control window, select the BUCK1 Enable/Disable button. "EN" is displayed and the button background color changes to yellow, but the BUCK1 regulator is not enabled yet. The BUCK1 WRITE text box indicates the new value to be written to the register and the background color of the WRITE and READ text boxes turn yellow indicating that the controls have changed but the part has not been written to or read from.
10. Select the Write without Stop button on the LTC3675 control window. The BUCK1 register is updated via the I^2C but the BUCK1 regulator has not been enabled yet. The WRITE text box background color changes orange indicating that the BUCK1 holding register has been updated but a stop bit was not received. The data in the command registers will not be latched or acted upon until a stop bit is received.
11. Select the Read Selected button on the LTC3675 control window. The BUCK1 READ text box is updated with the data in the BUCK1 command register.
12. Select the Write with Stop button on the LTC3675 control window. A stop bit is sent latching the BUCK1 data and enabling the regulator. If the status register's Auto Readback Enabled button is selected then "HI" is displayed in the PG1 bit in the Real Time and Latch status register indicators.

QUICK START PROCEDURE

NOTE: If a fault was latched in the Status Latch register, then the Clear Interrupt button on the LTC3675 control window needs to be selected in order to update the Status Latch register.

13. Select the LED 2x/1x full-scale button. The button changes from "2 X FS" to "1 X FS" and the background color changes to yellow.

14. Set the LED GRAD slider to a middle position. The Grad Time text box indicates the time it will take to gradate each LSB step.

15. Set the LED DAC slider to a middle position. The ILED and the Ramp Time text boxes update with the new LED current setting and the new current ramp time setting.

    NOTE: A warning pop-up window as shown in Figure 2 will appear whenever a current greater than 20mA is selected. This is to warn the user that the LEDs on the demo board should not run for extended periods of time above 20mA. See the LED section on how to connect external LEDs if other LEDs are to be used.

Figure 2. ILED Waring

16. Select the Write with Stop button and observe the LEDs ramp up in intensity to the set current.

17. Set the UVOT UV slider up to the maximum position. Verify that 3.4 is displayed in the UV voltage setting text box, then select the Write with Stop button.

18. Slowly reduce the input voltage until the IRQ LED, D12, on the DC1607 demo board illuminates and observe what the input voltage is when the LED illuminates.

19. Select the RESET ALL button under the UVOT register section on the LTC3675 control window, then select the Write with Stop button. The RESET_ALL bit is set in the UVOT register and the LTC3675 is reset to its default settings. The LTC3675 control window resets the controls to match what is read in the LTC3675 command registers.

    NOTE. If the RESET_ALL bit is set to "1" when all switching regulators and LED driver are disabled, the LTC3675 will not automatically reset to the default until either the RESET_ALL bit is set to "0", a power on reset occurs, or a hard reset occurs.

20. Select the Clear Interrupt button on the LTC3675 control window to clear and observe that the IRQ LED extinguishes.

21. Change the EN1 jumper, JP1, from the "OFF" to the "ON" position. Observe that V_{OUT1} is in regulation and "HI" is displayed in the PG1 bit in the Real Time and Latch status register indicators.

22. Momentarily short VOUT1 to ground with a clip lead and observe that the RST LED, D13, on the demo board illuminates and the PG1 indicators display "LOW" after a small delay. LED shuts off and PG1 displays "HI" when short is removed.

    NOTE. The delay in changing the status indicators on the LTC3675 control window is caused by the time intervals between reading the status indicators and the delays in the DC590B interface.

23. Select the RSTB Mask PG1 button, then select the Write with Stop button. The RSTB Mask PG1 button changes from "1" to "0".

24. Momentarily short VOUT1 to ground with a clip lead and observe that the RST and the IRQ LEDs on the demo board remain off, but the status PG1 indicators display "LOW" after a small delay.

25. Select the IRQB Mask PG1 button and then select the Write with Stop button on the LTC3675 control window. The IRQB Mask PG1 button changes from "0" to "1".

26. Momentarily short VOUT1 to ground with a clip lead and observe that the IRQ LED on the demo board illuminates and the status PG1 indicators display "LOW" after a small delay.

27. Remove the short on VOUT1. Observe that the IRQ LED remains illuminated but only the Real Time Status PG1 indicator displays "HI".

28. With EN1 set to the "ON" position, depress and hold the "ONB" pushbutton. Observe that the voltage on the PBSTAT terminal of the LTC3675 demo board goes low for up to five seconds while PB1 is depressed and the voltage on the WAKE terminal remains low.

QUICK START PROCEDURE

29. With EN1 set to the “ON” position, depress and hold the “ONB” pushbutton until the RST LED illuminates. Observe that the VOUT1 regulator shuts off. The regulator restarts when the pushbutton is released.

    NOTE: Holding the “ONB” pushbutton depressed for greater than 5 seconds creates a hard reset. The controls and indications on the LTC3675 control window may not match the state of the LTC3675. Select the desired settings then select the Update All button on the LTC3675 control window to sync the LTC3675 with the control window.

30. Change the EN1 jumper, JP1, from the “ON” to the “OFF” position then depress the “ONB” pushbutton, PB1 (minimum of 400ms). Observe that the voltage on the PBSTAT terminal remains high but the voltage on the WAKE terminal goes high for approximately five seconds.

    NOTE: If the pushbutton is released and depressed while WAKE is high, PBSTAT will go low while the pushbutton is depressed and WAKE remains high.

31. Refer to the Using the LTC3675 Software section for more information on how to control the device using the LTC3675 control window.

32. Refer to the Combined Buck Setup section to set up the demo board with paralleled bucks.

33. Refer to the Optional LED/HV Boost section to set up the demo board as a high voltage boost driver.

34. Refer to the LTC3675 data sheet for more details on how the LTC3675 operates.

35. When done, turn off all loads and power supplies and close the LTC3675 control window.

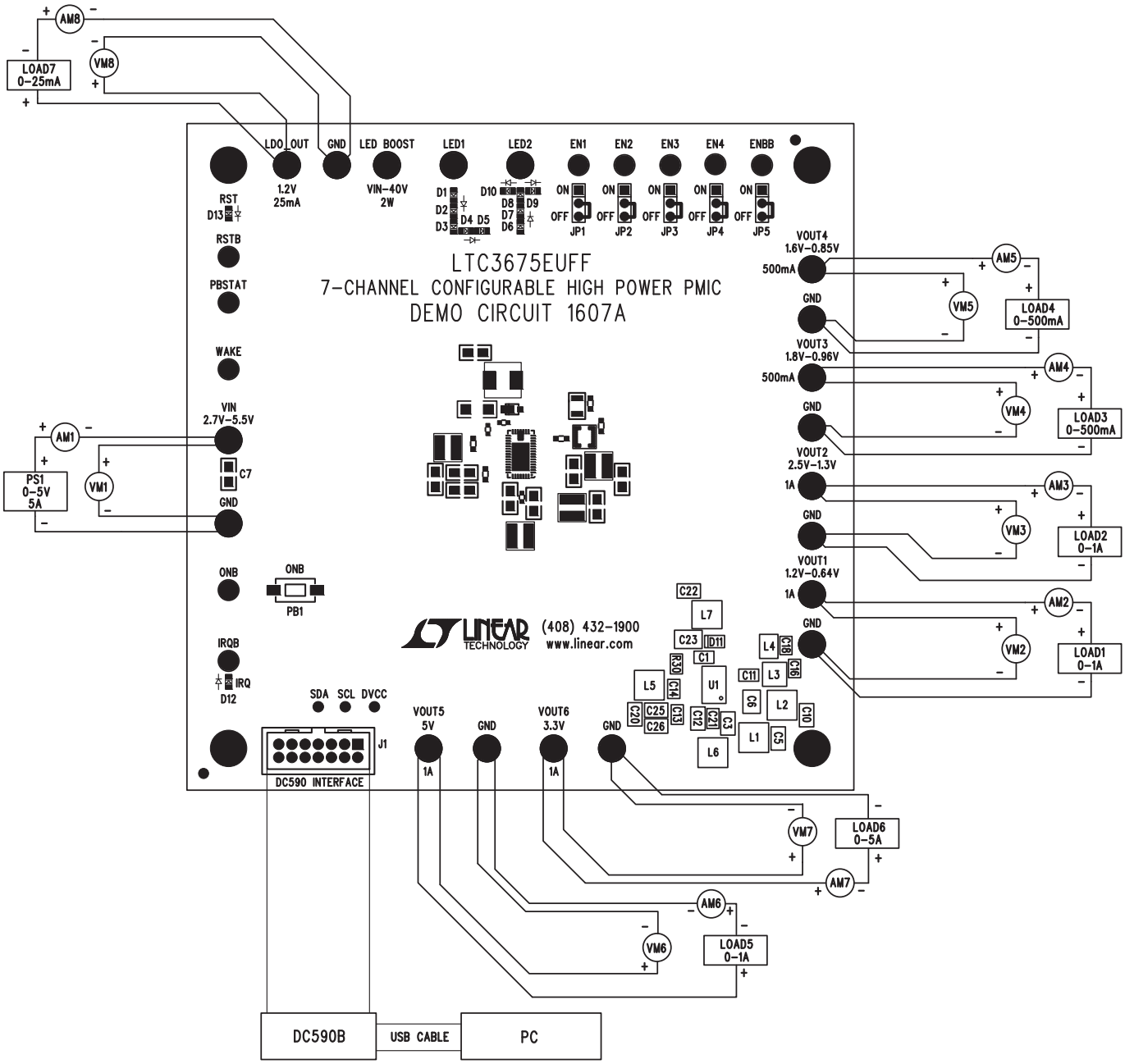


Figure 3. Proper Measurement Equipment Setup

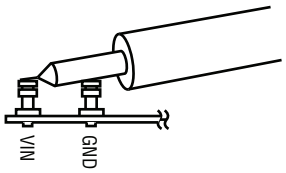
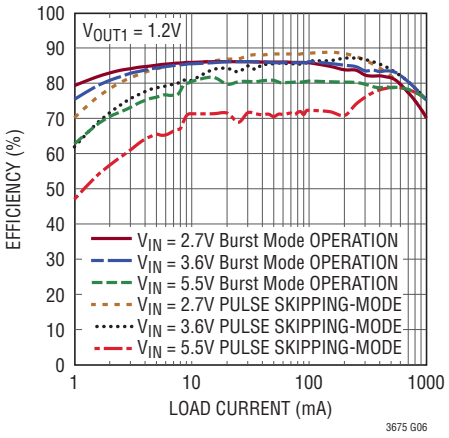


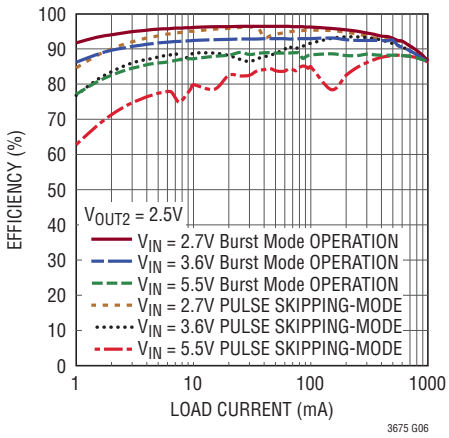
Figure 4. Measuring Input or Output Ripple

QUICK START PROCEDURE

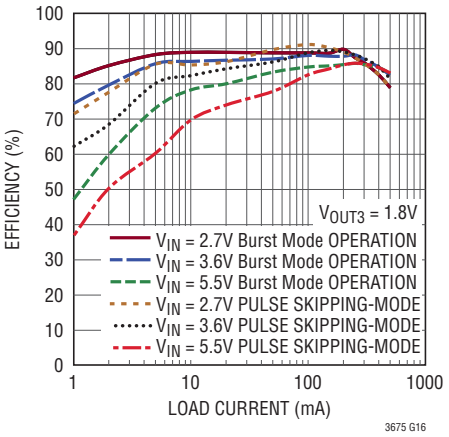
1A Buck Regulators, Efficiency vs Load



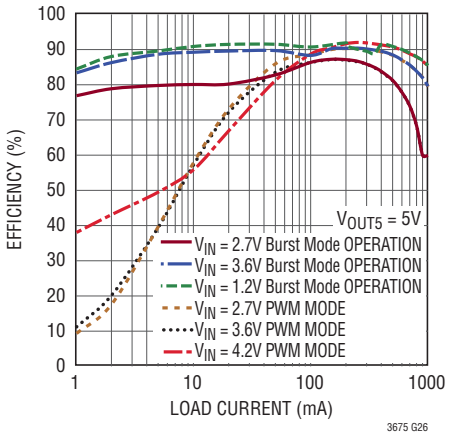
1A Buck Regulators, Efficiency vs Load



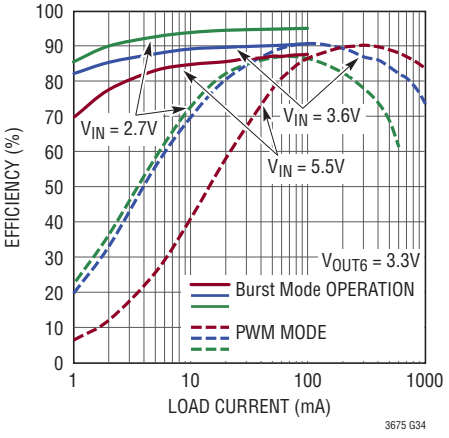
500mA Buck Regulators, Efficiency vs Load



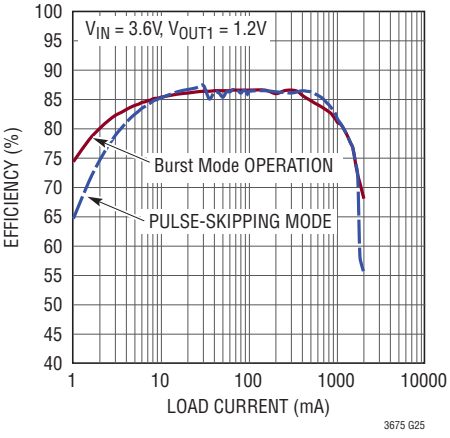
Boost Regulator, Efficiency vs Load



Buck-Boost Regulator, Efficiency vs Load



Combined Buck Regulators 1 and 2, Efficiency vs Load



USING THE LTC3675 SOFTWARE

The LTC3675 program provides control of the mode and slew rate of the buck regulators, plus it controls the intensity and slew rate of the LED boost controller. It also allows the user to view the contents of the status registers. Refer to Figure 7 for an illustration of the LTC3675 control window.

VIEW LTC3675 PRODUCT PAGE button opens an internet browser and searches the Linear Technology Corporation web site for information on the LTC3675 when an internet connection is available.

BUCK1-BUCK4, BOOST and **BUCKBOOST EN/DIS** buttons control the enable bit for each of the switching regulator registers.

NOTE: The Write with Stop button needs to be selected in order to write to and update the LTC3675 demo board.

BUCK1-BUCK4, BOOST, BUCKBOOST and **LED FAST/SLOW** buttons control the slew rate bit for the associated switching regulator registers.

BUCK1-BUCK4, BOOST and **BUCKBOOST DAC** sliders control the DAC bits which adjust the feedback reference from 0.8V to 0.425V for the associated switching regulators. When any of these sliders are changed, the associated VOUT and VRef text boxes are also updated.

VOUT1-VOUT6 text box windows display the calculated output voltages of the associated switching regulator based on the selected resistor divider network. See the Change Resistor Divider Networks button for more details.

VRef1-VRef6 text box windows display the feedback reference voltages of the associated switching regulator.

BUCK1-BUCK4 Hi-Z/10K buttons control the Out_Hi-Z bit for each of the buck regulators. This bit sets the output to high impedance or 10kΩ to ground when disabled.

BUCK1-BUCK4 Burst/PS buttons control the Mode bit for each of the buck regulator registers. This bit sets the associated buck regulator into burst or pulse skip mode.

BOOST-BUCKBOOST Burst/PWM buttons control the Mode bit for the boost and the buckboost registers. This bit sets the associated regulator into burst or PWM mode.

WRITE text box windows display the hexadecimal value that will be or has been written to the associated command register when the Write without Stop or Write with Stop button is selected. See the Selecting Command Registers to Write or Read section for more details.

READ text box windows display the hexadecimal value that has been last read from the LTC3675 status register. See the Selecting Command Registers to Write or Read section for more details.

2 X FS/1 X FS button controls the 2 X FS bit in the LED configuration register. In 2 X FS mode the LED full-scale current is 50mA and in 1 X FS mode the LED full-scale current is 25mA.

NOTE: A Warning pop-up window as shown in Figure 2 will appear whenever a current greater than 20mA is selected. This is to warn the user that the LEDs on the demo board should not run for extended periods of time above 20mA. It was determined that the LEDs on the demo board are sufficient to use above 20mA for demo purposes only.

GRAD slider controls the LED GRAD bits which adjust the LED current gradation rate per LSB step from 0.056ms/step to 58.368ms/step. When this slider is changed, the Grad Time and Ramp Time text boxes are also updated.

LED MODE option buttons are used to choose one of four modes using the LED configuration Mode bits. LED1/2 is used to control the current for both LED1 and LED2 by the LED DAC register. LED1 is used to control the current for only LED1 by the LED DAC register. LED2 should be disconnected to properly use this mode. HV Boost mode regulates the LED_OV pin to 0.8V to operate the Boost at a fixed voltage. HV Boost mode should not be enabled unless the demo circuit has been modified to support this mode of operation. Ext Source mode is used to control the current for both LED1 and LED2 by the LED DAC register, however the boost regulator is not powered. An external power source is needed to power the LED strings. See the Optional LED/HV Boost section for more information on the LED boost modes.

NOTE: The warning pop-up window will appear as shown in Figure 5 when HV Boost mode is selected. Select “Yes” to continue or “No” to return to the previous setting.

USING THE LTC3675 SOFTWARE

Figure 5. HV Boost Warning

LED DAC slider controls the DAC register which adjusts the feedback LED current from 0mA to 25mA per LED string in 1 X FS mode or 0mA to 50mA per LED string in 2 X FS mode. When this slider is changed, the ILED and Ramp Time text boxes are also updated.

UV slider controls the under voltage (UV) warning bits which adjust the UV warning threshold from 2.7V to 3.4V. The UV warning causes the IRQB pin to pull low and latches a fault in the Status Latch register.

NOTE: When the status register is latched, the interrupt must be cleared using the Clear Interrupt button in order to allow a new fault to be latched.

OT option buttons control the overtemperature (OT) warning bits which adjust the OT warning threshold from 10° below the die OT (150°C) to 40° below the die OT. The OT warning causes the IRQB pin to pull low and latches a fault in the Status Latch register.

RESET ALL button controls the RESET_ALL bit in the UVOT register. When the LTC3675 is in a WAKE or powered up state, the RESET_ALL bit resets the LTC3675 to its default settings.

RSTB Mask PG7-PG1 buttons control the PGOOD7-PGOOD1 bits in the RSTB Mask register. When a PG bit is set to a "1", an associated PG fault will cause the RSTB pin to pull low.

IRQB Mask PG7-PG1 buttons control the PGOOD7-PGOOD1 bits in the IRQB Mask register. When a PG bit is set to a "1", an associated PG fault will cause the IRQB pin to pull low and will cause the Status Latch register to latch.

Status Real Time indicators display the PGOOD status for switching regulators VOUT1-VOUT6. The contents of this register are displayed in a text box below the Status Real Time indicators in a hexadecimal format. If the status register's "Auto Readback Enabled" button is selected, the contents of this register will be periodically updated, otherwise the status register's "Readback" button will need to be selected.

Status Latch indicators display the UV and OT warnings plus the PGOOD status for switching regulators VOUT1-VOUT6. The contents of this register are displayed in a text box below the Status Latch indicators in a hexadecimal format. If the status register's "Auto Readback Enabled" button is selected, the contents of this register will be periodically updated, otherwise the status register's "Readback" button will need to be selected.

Clear Interrupt button clears any IRQ faults by writing the sub-address "0F" and then reads back the Status registers.

Auto Readback Enabled/Disabled button is used to automatically update the status register periodically when enabled. When disabled the status registers may be updated by selecting the "Readback" button.

Readback button is used to update the status register when selected.

Write without Stop button is used to write to all of the selected command registers without sending a stop bit. This will allow the user to read back the contents of the command register prior to sending a stop bit and causing the LTC3675 to take action on the new commands. A selected register to write will be displayed by the color of the WRITE text box on the control window. A WRITE text box with a white background color is not selected. See the Selecting the Command Registers to Write or Read section for more details on selecting and deselecting registers to write.

Write with Stop button is used to write to all of the selected command registers followed by a stop bit. The stop bit will latch the data in the command registers and cause the LTC3675 to act upon the new commands. A WRITE text box with a white background color is not selected. See the Selecting the Command Registers to Write or Read section for more details on selecting and deselecting registers to write.

USING THE LTC3675 SOFTWARE

Update All button is used to update all of the LTC3675 command registers to the current LTC3675 control window configuration.

NOTE: When power is turned off or removed, the I2C registers are reset to the LTC3675 default settings and the LTC3675 control window will not match the actual condition of the evaluation board. Use the "Update All" button to set the device to the current settings selected on the LTC3675 control window.

Read Selected button is used to read all of the selected command registers. A selected register to read will be distinguished by the color of the READ text box on the control window. A READ text box with a white background color is not selected. See the Selecting the Command Registers to Write or Read section for more details on selecting and deselecting registers to write.

Read All button is used to read all of the command registers.

Change Resistor Divider Networks button opens up a pop-up window as shown in Figure 6 with six tabs allowing the user to change the resistor divider network for each switching regulator. These resistor values will be used to calculate the values displayed in the VOUT1-VOUT6 text boxes on the LTC3675 control window. These values are stored in the LTC3675.ini file when the LTC3675 control window is closed so the user will not have to enter the new values each time the program is run.

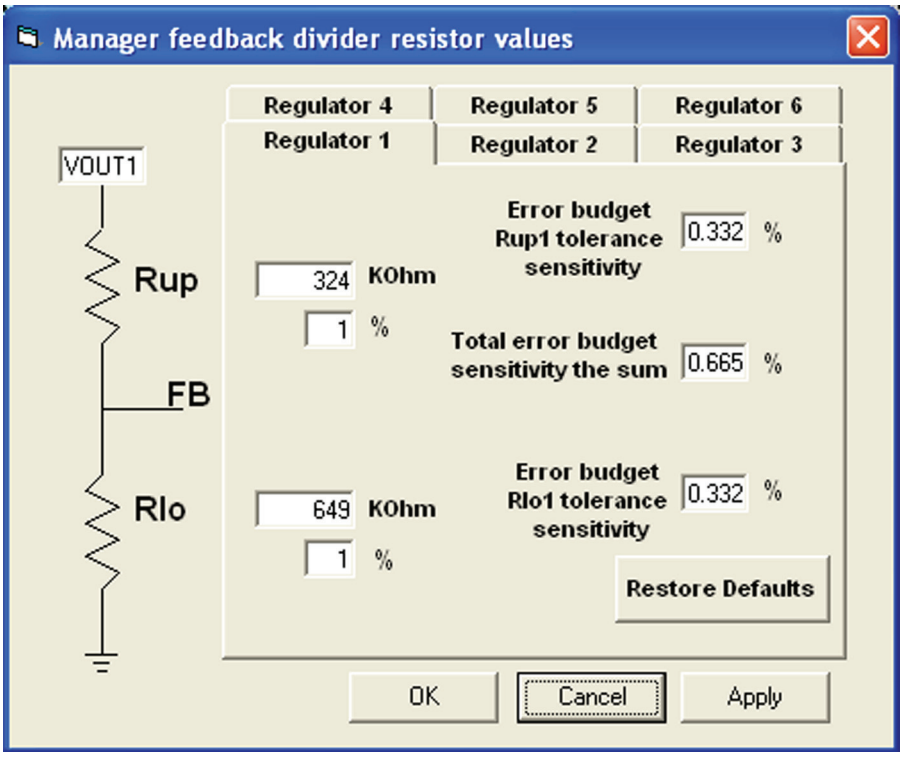


Figure 6. Change Resistor Divider Networks Window

USING THE LTC3675 SOFTWARE

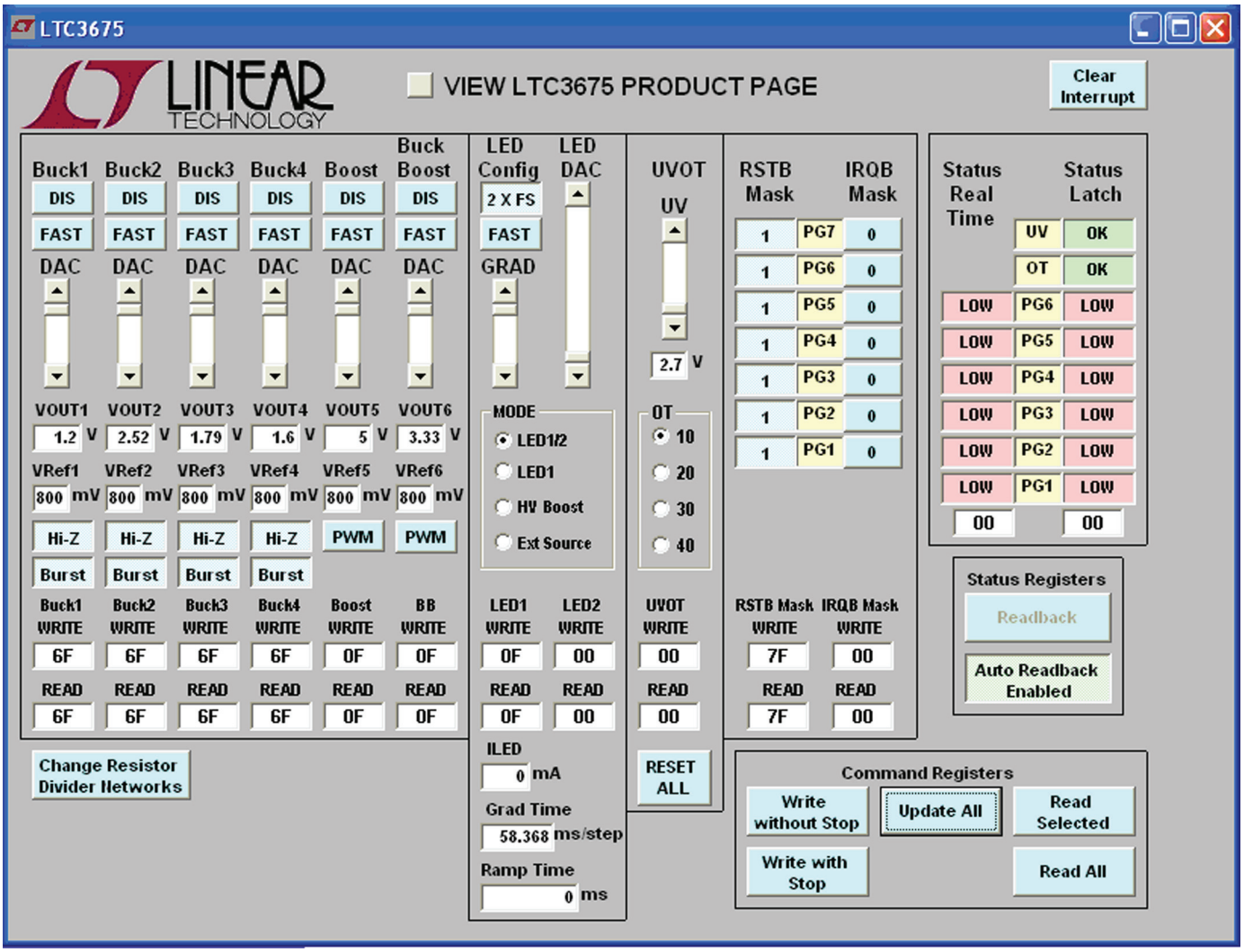


Figure 7. LTC3675 Control Window

COMBINED BUCK SETUP

The LTC3675 has the ability to combine Buck1 and Buck2 to form a 2A buck output; Buck2 and Buck3 to form a 1.5A output; and Buck3 and Buck4 to form a 1A output, each combination with a single inductor.

Follow the below procedure to combine Buck1 and Buck2.

1. Remove L2, R10 and R11.
2. Move C10 to the C19 placement on the bottom side of the demo board.
3. Install a 0Ω jumper for R45 on the bottom side of the demo board.
4. Short SW1 to SW2 with a solid 24 AWG or larger bus wire on the exposed pads near C6 as shown in Figure 8.

NOTE: The pads for L1 are designed to accommodate the CoilCraft XFL4020 and the TOKO FDV0530 inductors.

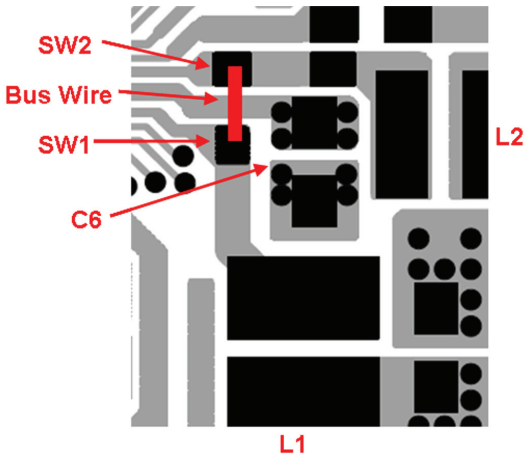


Figure 8. Buck1 and Buck2 Combined Setup

Follow the below procedure to combine Buck2 and Buck3.

1. Remove L3, R13 and R15.
2. Install a 22µF, X5R, 6.3V capacitor for C27 on the bottom side of the demo board.
3. Install a 0Ω jumper for R46 on the bottom side of the demo board.
4. Short SW2 to SW3 with a solid 24 AWG or larger bus wire between the exposed pad and the SW pad on L3 as shown in Figure 9.

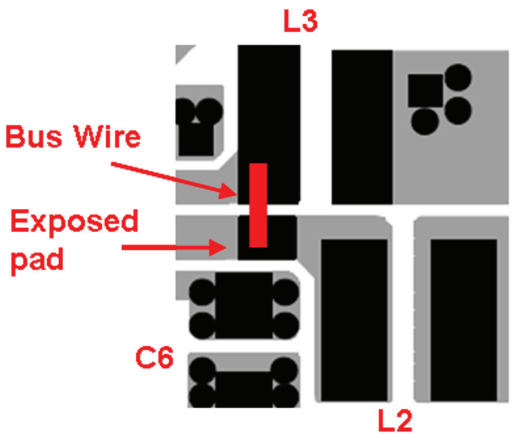


Figure 9. Buck2 and Buck3 Combined Setup

Follow the below procedure to combine Buck3 and Buck4.

1. Remove L4, R18, R20 and C16.
2. Install a 22µF, X5R, 6.3V capacitor for C28 on the bottom side of the demo board.
3. Install a 0Ω jumper for R47 on the bottom side of the demo board.
4. Short SW3 to SW4 with a solid 24 AWG or larger bus wire between the exposed portion of the L3 SW pad and the SW pad on L4 as shown in Figure 10.

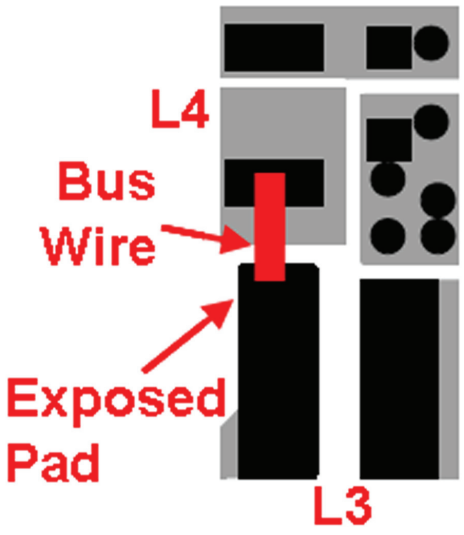


Figure 10. Buck3 and Buck4 Combined Setup

OPTIONAL LED/HV BOOST

The DC1607 standard demo board is set up to operate two strings of five LEDs. The DC1607 can be modified to power up to two strings of up to ten external LEDs and operate the LED driver in any of the following operating modes.

Using External LED Strings: The demo board is easily modified to drive external LED strings. To drive external LED stings, first remove the two 0Ω resistors, R28 and R29. Connect the anode of the LED string(s) to the LED BOOST terminal. Connect the cathode of one LED string to the LED1 terminal. If two LED strings are used, connect the second LED string to the LED2 terminal.

Using a Single LED String: To operate a single LED string, disconnect the LED2 sting by removing the 0Ω resistor, R29. This is recommended because the LED pins are clamped at 8V. If R29 is not removed the LED string will be driven above 8V creating a current flow into LED2. Select the LED1 mode button then select the Write with Stop button on the LTC3675 control window.

Operating in HV Boost Mode: To operate in HV Boost mode, remove the 0Ω resistors, R28 and R29. Change the top feedback resistor(s), R26 and R27, to the values needed to produce the desired output voltage. In HV Boost mode the LED_OV pin becomes a 0.8V feedback pin, therefore VOUT is calculated by the formula below:

$$VOUT = 0.8V\left(\frac{R26}{R27}+1\right)$$

Select the HV Boost mode button then select the Write with Stop button on the LTC3675 control window.

Operating LED Strings with an External Power Source: To drive external LED strings using an external power source remove the two 0Ω resistors, R28 and R29. Connect the anode of the external LED strings to a power source. Connect the cathode of the LED strings to the LED1 and LED2 terminals. Select the Ext Source mode button then select the Write with Stop button on the LTC3675 control window. Turn on the external supply and set the desired LED current on the LTC3675 control window.

NOTE: The LED pins are clamped to 8V. Pulling the LED pins above 8V will cause some current flow into the LED pins.

SELECTING COMMAND REGISTERS TO WRITE OR READ

The command registers are automatically selected to write to or read from when the controls on the LTC3675 control window are changed by changing the background color in the associated WRITE text box to yellow. Any command register can be selected or deselected to write by clicking in the desired WRITE text box.

When a command register has been written to without a stop bit, the WRITE text box background color changes to orange to indicate that the data was not latched into the command register.

When all switching regulators and the LED driver are disabled via the LTC3675 control window, the LTC3675 program checks if the contents read from the command register matches what was last written to the command register. If they do not match, the POR warning as shown in Figure 1 pops up and the WRITE text box background color changes to red. At this point the user can select the WRITE text box then the value in the text box and the LTC3675 control window will update to what was read in the command register. If the user wishes to update the part with what was last written to the command register, then the Write with Stop or Update All buttons may be selected.

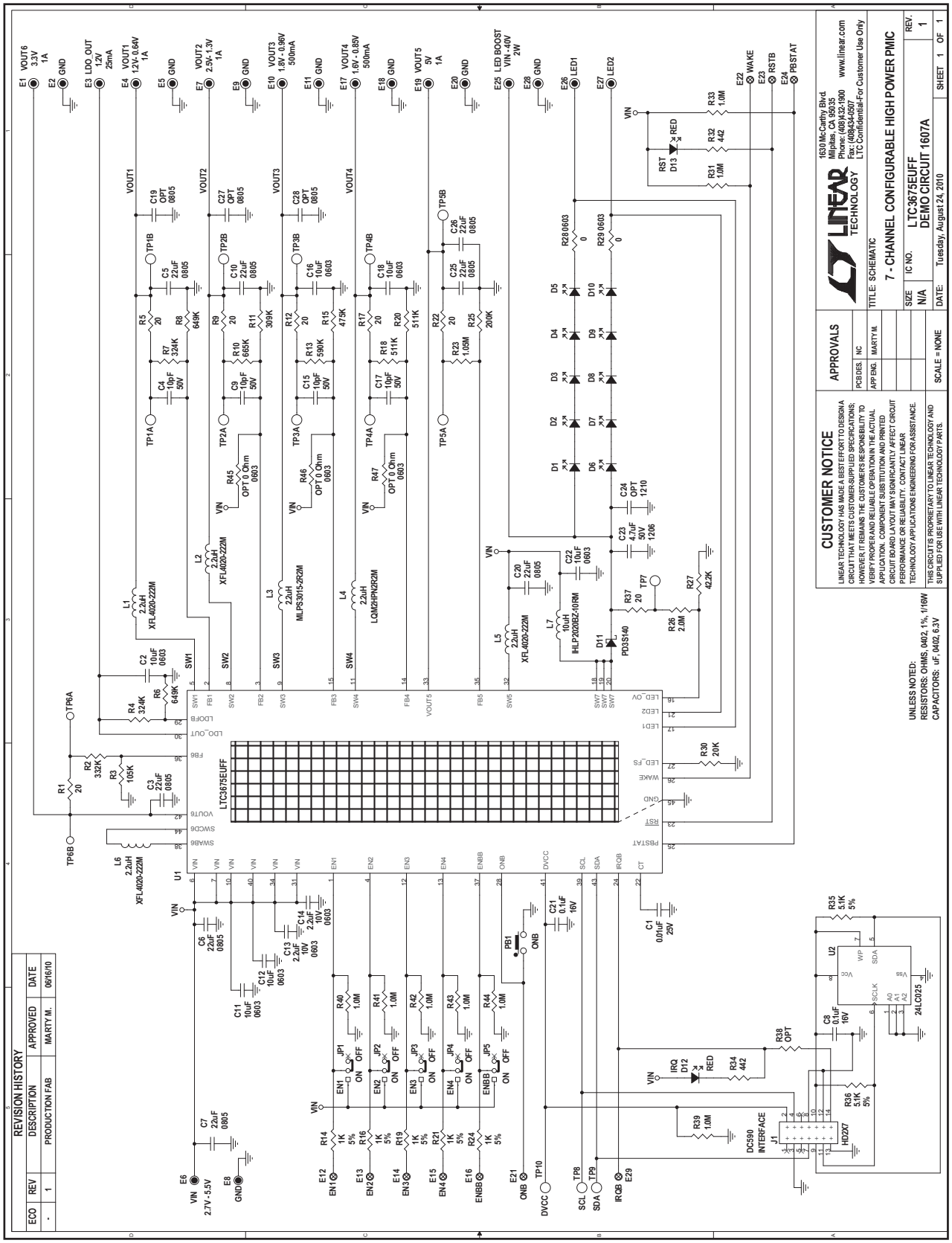
PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
			REQUIRED CIRCUIT COMPONENTS:	
1	1	C1	CAP, CHIP, X7R, 0.01µF, ±10%, 25V, 0402	MURATA, GRM155R71E103KA01D
2	6	C2, C11, C12, C16, C18, C22	CAP, CHIP, X5R, 10µF, ±20%, 6.3V, 0603	TDK, C1608X5R0J106M
3	7	C3, C5, C6, C10, C20, C25, C26	CAP, CHIP, X5R, 22µF, ±20%, 6.3V, 0805	TAIYO YUDEN, JMK212ABJ226MG
4	1	C21	CAP, CHIP, X5R, 0.1µF, ±10%, 16V, 0402	MURATA, GRM155R71C104KA88
5	2	C13, C14	CAP, CHIP, X5R, 2.2µF, ±10%, 10V, 0603	MURATA, GRM188R61A22K
6	1	C23	CAP, CHIP, X7R, 4.7µF, ±10%, 50V, 1210	MURATA, GRM32ER71H475KA88
7	10	D1-D10	DIODE, LED, WHITE, SMT, 0603	LITEON, LTW-C191TS5
8	1	D11	DIODE, SCHOTTKY, 40V, 1A, PowerDI 323	DIODES INC, PD3S140
9	4	L1, L2, L5, L6	IND, SMT, 2.2µH, 21mΩ, ±20%, 3.7A, 4.0mm × 4.0mm	COILCRAFT, XFL4020-222M
10	1	L3	IND, SMT, 2.2µH, 110mΩ, ±20%, 1.4A, 3.0mm × 3.0mm	MagLayers, MLPS3015-2R2N-LT
11	1	L4	IND, CHIP, 2.2µH, 0.8mΩ, ±20%, 1.3A, 2.5mm × 2.0mm	MURATA, LQM2HPN2R2MG0
12	1	L7	IND, SMT, 10µH, 184mΩ, ±20%, 4A, 5.2mm × 5.5mm	VISHAY, IHLP2020BZER-10RM01
13	1	R2	RES, CHIP, 332k, ±1%, 1/16W, 0402	VISHAY, CRCW0402332KFKED
14	1	R3	RES, CHIP, 105k, ±1%, 1/16W, 0402	VISHAY, CRCW0402105KFKED
15	2	R4, R7	RES, CHIP, 324k, ±1%, 1/16W, 0402	VISHAY, CRCW0402324KFKED
16	2	R6, R8	RES, CHIP, 649k, ±1%, 1/16W, 0402	VISHAY, CRCW0402649KFKED
17	1	R10	RES, CHIP, 665k, ±1%, 1/10W, 0402	VISHAY, CRCW0402665KFKED
18	1	R11	RES, CHIP, 309k, ±1%, 1/10W, 0402	VISHAY, CRCW0402309KFKED
19	1	R13	RES, CHIP, 590k, ±1%, 1/10W, 0402	VISHAY, CRCW0402590KFKED
20	5	R14, R16, R19, R21, R24	RES, CHIP, 1k, ±5%, 1/16W, 0402	VISHAY, CRCW04021K00JNED
21	1	R15	RES, CHIP, 475k, ±1%, 1/10W, 0402	VISHAY, CRCW0402475KFKED
22	2	R18, R20	RES, CHIP, 511k, ±1%, 1/10W, 0402	VISHAY, CRCW0402511KFKED
23	1	R23	RES, CHIP, 1.05M, ±1%, 1/16W, 0402	VISHAY, CRCW04021M05FKED
24	1	R25	RES, CHIP, 200k, ±1%, 1/16W, 0402	VISHAY, CRCW0402200KFKED
25	1	R26	RES, CHIP, 2.00M, ±1%, 1/16W, 0402	VISHAY, CRCW0402200MFKED
26	1	R27	RES, CHIP, 42.2k, ±1%, 1/16W, 0402	VISHAY, CRCW040242K2FKED
27	1	R30	RES, CHIP, 20k, ±1%, 1/16W, 0402	VISHAY, CRCW040220K0FKED
28	2	R32, R34	RES, CHIP, 442Ω, ±1%, 1/16W, 0402	VISHAY, CRCW0402442RFKED
29	1	U1	7-CHANNEL CONFIGURABLE HIGH POWER PMIC	LINEAR TECH., LTC3675EUFF
			ADDITIONAL DEMO BOARD CIRCUIT COMPONENTS:	
1	1	C7	CAP, CHIP, X5R, 22µF, ±20%, 6.3V, 0805	TAIYO YUDEN, JMK212BJ226MG
2	4	C4, C9, C15, C17	CAP, CHIP, NPO, 10pF, ±5%, 50V, 0402	AVX, 04025A100JAT
3	1	C8	CAP, CHIP, X5R, 0.1µF, ±10%, 16V, 0402	MURATA, GRM155R71C104KA88
4	0	C19, C24, C27, C28 (OPT)	CAP, CHIP	
5	2	D12, D13	DIODE, LED, RED, SMT, 0603	PANASONIC, LNJ208R8ARA
6	7	R1, R5, R9, R12, R17, R22, R37	RES, CHIP, 20Ω, ±1%, 1/16W, 0402	VISHAY, CRCW040220R0FKED
7	2	R28, R29	RES, CHIP, 0Ω JUMPER, 1/16W, 0603	VISHAY, CRCW06030000Z0ED
8	2	R35, R36	RES, CHIP, 5.1k, ±5%, 1/16W, 0402	VISHAY, CRCW04025K10JNED
9	8	R31, R33, R39-R44	RES, CHIP, 1.00M, ±1%, 1/16W, 0402	VISHAY, CRCW04021M00FKED
10	0	R38, R45-R47 (OPT)		
11	1	U2	I^2C EEPROM	MICROCHIP, 24LC025-I/ST

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
			HARDWARE-FOR DEMO BOARD ONLY:	
1	19	E1-E11, E17-20, E25-E28	TURRET, 0.09 DIA	MILL-MAX, 2501-2-00-80-00-00-07-0
2	10	E12-E16, E21-E24, E29	TURRET, 0.061 DIA	MILL-MAX, 2308-2-00-80-00-00-07-0
3	1	J1	CONN, I^2C HEADER	MOLEX, 87831-1420
4	5	JP1-JP5	3-PIN JUMPER, 2mm	SAMTEC, TMM-103-02-L-S
5	5	JP1-JP5	SHUNT, 2mm	SAMTEC, 2SN-KB-G
6	1	PB1	SWITCH, PUSHBUTTON, SMT	C & K, PTS635SL25SMTRLFS
7	4		STAND-OFF, NYLON, 0.375" TALL (SNAP-ON)	KEYSTONE, 8832 (SNAP-ON)
8	1		FAB, PRINTED CIRCUIT BOARD	DEMO CIRCUIT 1607A
9	2		STENCIL-TOP and BOTTOM	STENCIL #1607A-TOP and BOTTOM

SCHEMATIC DIAGRAM



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