

# QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 895

## PHOTOFLASH CHARGER WITH OUTPUT VOLTAGE MONITOR AND INTEGRATED IGBT DRIVE

### LT3485EDD-0/-1/-2/-3

## DESCRIPTION

Demonstration circuit 895 is a Photoflash Charger with Output Voltage Monitor and Integrated IGBT Drive, featuring the LT3485EDD-x family of products. It demonstrates a complete photoflash application, including the photoflash capacitor, flash tube and trigger circuit. An on-board microcontroller generates the necessary signals to produce an on-demand flash, red-eye sequence, and flash capacitor refresh.

The demonstration board comes in four variants. DC895A-A uses the LT3485EDD-0, while DC895A-B, DC895A-C and DC895A-D use the LT3485EDD-1, LT3485EDD-2, LT3485EDD-3, respectively.


The LT3485 family of photoflash capacitor ICs is designed for use in digital camera and mobile phone applications where space is a premium. The LT3485's patented control technique allows it to use extremely small transformers, and the improved NPN power switch requires no external Schottky diode clamp, reducing the solution size. The output voltage detection requires no

external circuitry as the transformer turns ratio determines the final charger voltage.

The device features a  $V_{BAT}$  pin, which allows the use of 2 alkaline cells to charge the capacitor. The CHARGE pin gives full control of the part to the user. Driving CHARGE low shuts the part down. The LT3485 also includes a output voltage monitor, which generates an analog signal proportional to the output, and an integrated IGBT drive.

**WARNING! Lethal voltages are present on the DC895 circuit board. Do not operate the assembly unless you are trained to handle high voltage circuits.**

**Design files for this circuit board are available. Call the LTC factory.**

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**Table 1. Performance Summary ( $T_A = 25^\circ\text{C}$ )**

| PARAMETER                 | CONDITION                                     | VALUE           |
|---------------------------|---|-----------------|
| Minimum $V_{BAT}$ Voltage | $V_{IN} = 2.8V - 4.2V$                        | 1.8VDC          |
| Maximum $V_{BAT}$ Voltage | $V_{IN} = 2.8V - 4.2V$                        | 4.2VDC          |
| Minimum $V_{IN}$ Voltage  | $V_{BAT} = 1.8V - 4.2V$                       | 2.8VDC          |
| Maximum $V_{IN}$ Voltage  | $V_{BAT} = 1.8V - 4.2V$                       | 4.2VDC          |
| Output Voltage            | $V_{IN} = 2.8V - 4.2V, V_{BAT} = 1.8V - 4.2V$ | 320VDC, typical |
| Average input current     | DC895A-D, LT3485EDD-3                         | 750mA, typical  |
|                           | DC895A-A, LT3485EDD-0                         | 500mA, typical  |
|                           | DC895A-C, LT3485EDD-2                         | 350mA, typical  |
|                           | DC895A-B, LT3485EDD-1                         | 225mA, typical  |

## OPERATING PRINCIPLES

The theory of operation of the LT3485 and xenon flash tube illumination has been discussed at length in the LT3485 data sheet and the Linear Technology Application Note AN95, respectively. The reader is referred to these documents, available online at <http://www.linear.com>.

## QUICK START PROCEDURE

**WARNING! Lethal voltages are present on the DC895 circuit board. Do not operate the assembly unless you are trained to handle high voltage circuits.**

Demonstration circuit 895 is easy to set up to evaluate the performance of the LT3485EDCB-x. Refer to Figure 1 for proper measurement equipment setup and follow the procedure below:

1. Set the jumper at JP1 across the DAT and MCLR pins.
2. With the power supply disconnected from DC895, set the VBAT voltage between 1.8V to 4.2V. Set the VIN voltage between 2.8V and 4.2V. Turn off the power supply.
3. Connect the power supply to DC895, referring to the connection diagram given in Figure 1.
4. Turn on the power supply, verifying that the VIN and VBAT voltages are correctly set.
5. Press the ON/OFF button once. The READY/CHARGE LED should glow red as the LT3485 charges the output capacitor and then glow green.
6. To flash the xenon tube, verify that the READY/CHARGE LED is green. Avoid looking directly at the xenon flash tube and press the FLASH button once. After the tube flashes, the READY/CHARGE LED should turn red as the LT3485 replenishes the charge in the flash capacitor.
7. To generate a red-eye sequence, verify that the READY/CHARGE LED is green. Avoid looking directly at the xenon flash tube and press the REDEYE button once. After the flash sequence is over, the READY/CHARGE LED should turn red as the LT3485 replenishes the charge in the flash capacitor.
8. When finished testing, press the ON/OFF switch once. This flashes the xenon tube, discharging the flash capacitor and shuts down the LT3485. The output capacitor is not completely discharged when this operation is complete. 50V or more may be left on the capacitor, so the user is cautioned to avoid physical contact with the flash tube circuitry at all times. The flash tube circuitry consists of D1, C2, R3, R10, C3, T2, FT1, and Q1.
9. Monitor the DONE, CHARGE, VOUTMONT and TRIGGER signals by using the provided test points. Do not make measurements from under the protective cover.
10. The on-board microcontroller may be disabled by removing the VIN and VBAT voltages and moving the JP1 jumper to short the GND and CLK pins. The user can charge the output capacitor and activate the flash tube by applying the appropriate signals to the CHARGE and TRIGGER test points. The timing can be validated by monitoring these and the DONE signal. Please refer to the LT3485 data sheet for detailed signal requirements.

## ADDITIONAL NOTES

It is assumed that DC895A will be tested with power provided from an external source, such as a lab bench

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supply. Under such an operating condition, the wire length between the DC895A board and the power supply terminals can be several feet and the line loss may be excessive. For this reason, CIN has been added to the board at the input terminals to attenuate the ground shifting associated with pulling the main switch current through the wires connecting to the power supply. This capacitor would generally not be required in a battery powered portable application, where the battery would be physically located close to the LT3485 and the impedance of the connection is low.

The flashtube for this reference design is a FTA160709, manufactured by Perkin-Elmer. They can be contacted at:

PerkinElmer Optoelectronics  
Lithography and Lighting  
1300 Optical Drive  
Azusa, CA. 91702

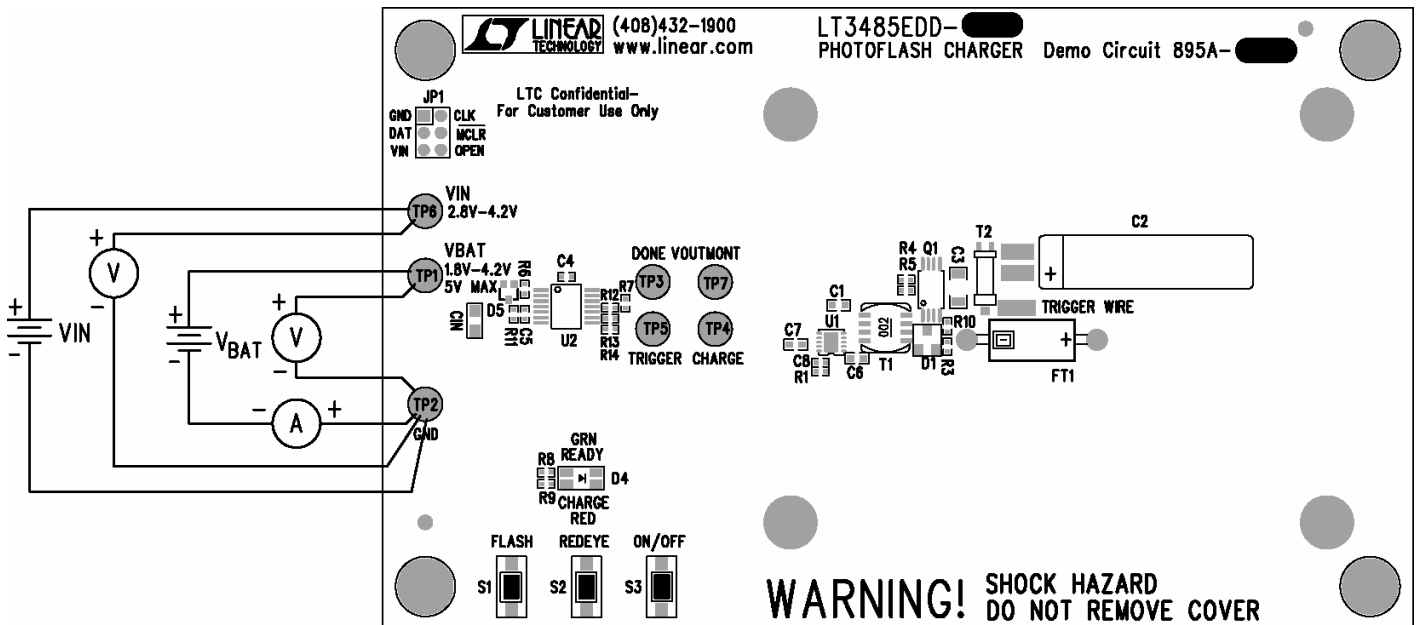
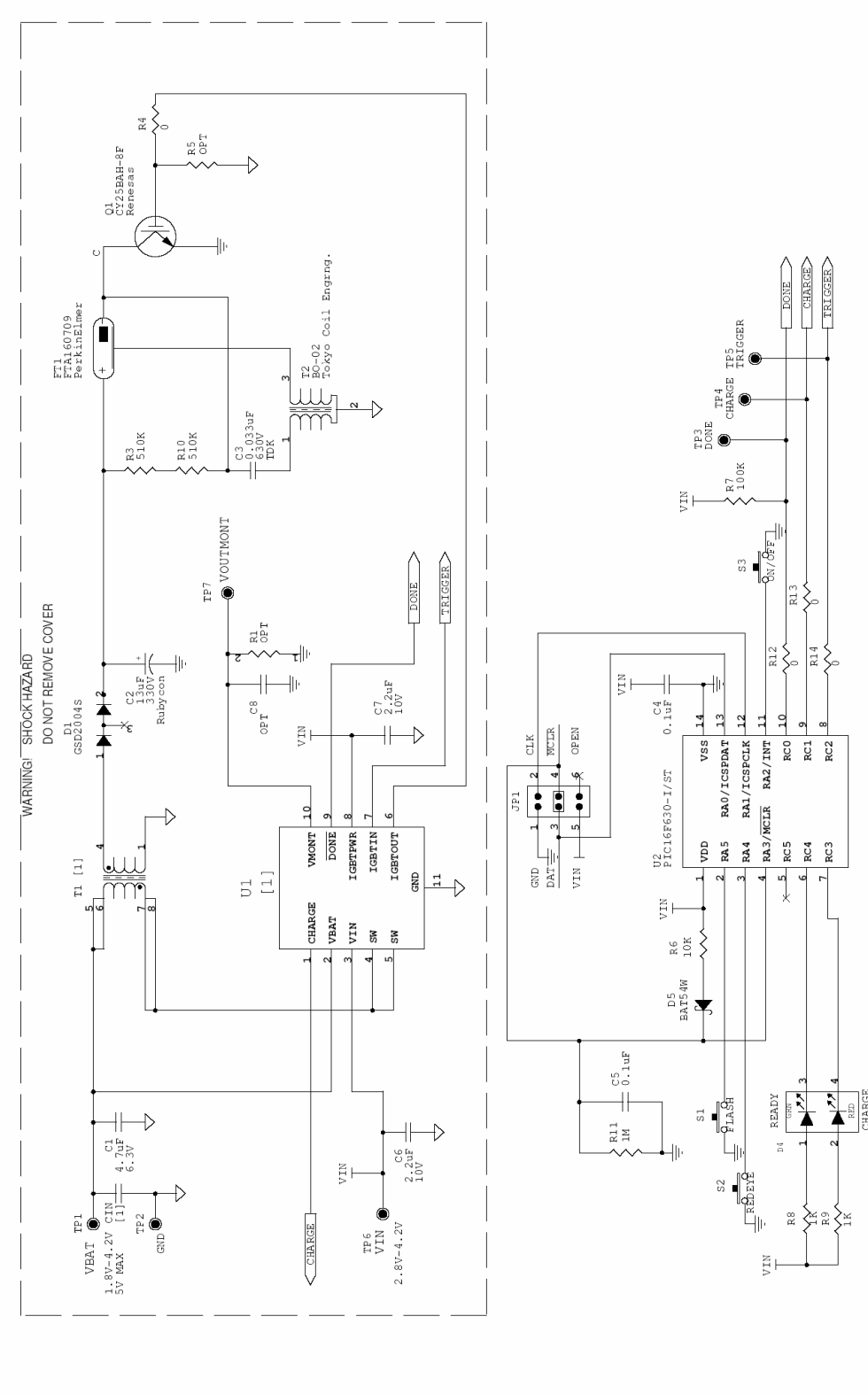


Figure 1. Proper Measurement Equipment Setup

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This circuit is proprietary to Linear Technology and supplied for use with Linear Technology parts.  
**Customer Notice:** Linear Technology has made a best effort to design a circuit that meets customer-supplied specifications; however, it remains the customer's responsibility to verify proper operation of the circuit. Changes to the circuit, such as component substitution and printed circuit board layout may significantly affect circuit performance or reliability. Contact Linear Applications Engineering for assistance.



REVISION HISTORY

| ECC | REV | DESCRIPTION | DATE     | APPROVED |
|-----|-----|-------------|----------|----------|
|     | 2   | PROTO       | 06/27/05 |          |

CONTRACT NO. \_\_\_\_\_

APPROVALS

| DATE     | DESCRIPTION |
|----------|-------------|
| 04/12/05 | DRAWN (ME)  |
|          | CHECKED     |
|          | APPROVED    |
|          | ENGINEER    |
|          | DESIGNER    |

Friday, July 15, 2005

TITLE SCH. LT3485EDD-01/23, PHOTOFLASH CHARGER

SIZE Custom

DWG NO DC886A

SCALE

FLENAME: 886A-2.DSN

SHEET 1 OF 1

[1]

| VERSION | U1          | T1 (TDK)      | CIN                          |
|---------|-------------|---------------|------------------------------|
| -A      | LT3485EDD-0 | LD756630T-001 | CAP, 0805 10µF 20% 6.3V X5R  |
| -B      | LT3485EDD-1 | LD756630T-002 | CAP, 0805 4.7µF 10% 6.3V X5R |
| -C      | LT3485EDD-2 | LD756630T-003 | CAP, 0805 10µF 20% 6.3V X5R  |
| -D      | LT3485EDD-3 | LD756630T-041 | CAP, 0805 22µF 20% 6.3V X5R  |

