

DESCRIPTION

Demonstration circuit 749 is a multi-display LED controller featuring the LTC3206.

The LTC3206 is a highly integrated multi-display LED controller. This device contains a high efficiency, low noise fractional step-up/step-down charge pump to provide power for a main and sub white LED display, plus an RGB color LED display. The LTC3206 requires only four small ceramic capacitors plus two resistors to form a complete 3-panel LED power supply and a current controller.

Maximum currents for the main/sub and RGB displays are set independently with a single resistor. Current for each LED is controlled with an internal current source. Dimming control for all displays is

achieved via a 2-wire I²C interface. The RGB or Sub panel may be disabled with the ENRGB/S pin. Sixteen dimming states exist for the main panel, sub panel, and the red, green, and blue LEDs resulting in up to 4096 color combinations.

The LTC3206 charge pump optimizes efficiency based on V_{IN} and LED forward voltage conditions. The part powers-up in step-down mode and automatically switches to step-up mode once the first LED current source begins to enter dropout. The charge pump can also be programmed to be in step-up mode using the I²C interface. Internal circuitry prevents inrush current and excess input noise during start-up and mode switching.

QUICK START PROCEDURE

Demonstration circuit 749 is easy to setup to evaluate the performance of the LTC3206. Refer to Figure 1 for the proper measurement equipment setup and follow the procedure below.

1. Connect DC749 to the DC590 USB Serial Controller using the supplied 14-conductor ribbon cable as shown in Figure 1. Refer to the DC590 Quick Start guide for software installation details.
2. Attach the supplied USB cable to your computer and then to the DC590 controller board.
3. Run the QuickEval™ program. The program detects the DC749 and displays the LTC3206 control window (shown in Figure 2).
4. Attach a 2.7 – 4.5V power source to the V_{IN} and GND turrets of the DC749 demo board. This is the V_{IN} power supply for the LTC3206 (see application schematic).

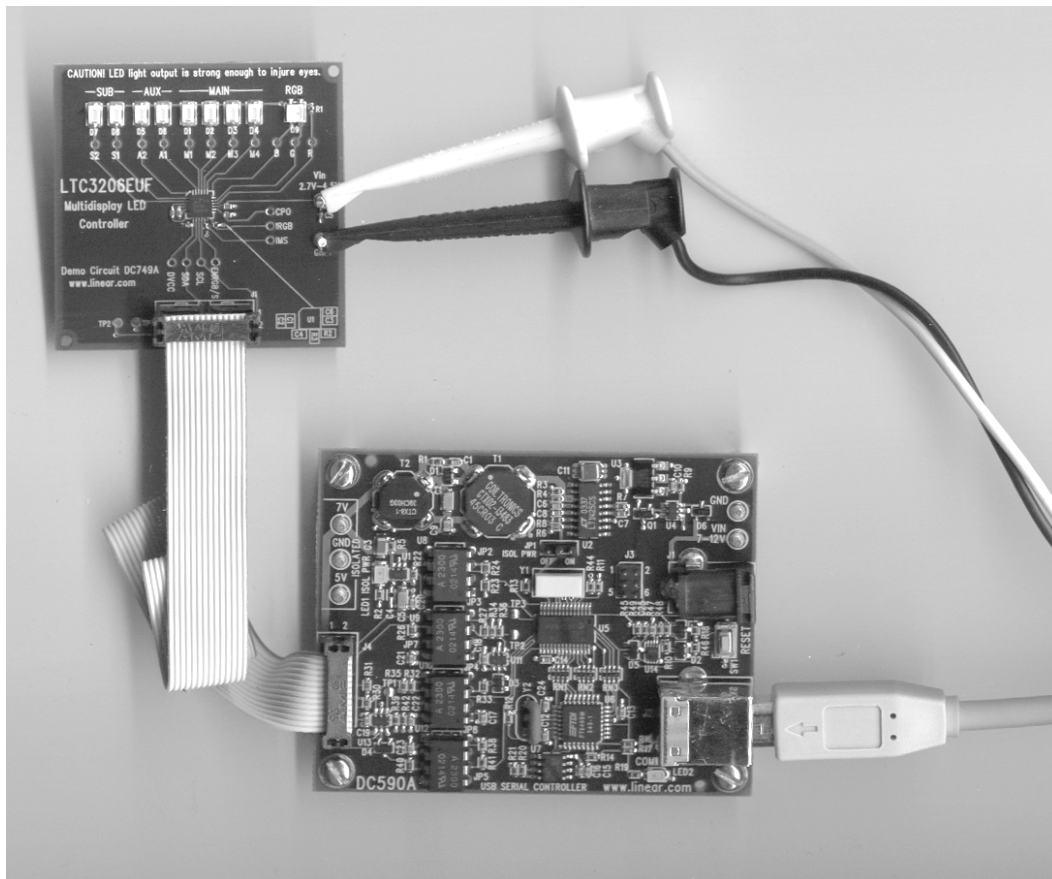


Figure 1. Proper Measurement Equipment Setup

USING THE LTC3206 QUICKVAL SOFTWARE

The program provides brightness controls for the Main, Sub, and RGB LEDs. The two check boxes allow the Charge Pump to be forced on and the ENRGB/S pin to be toggled. The three pairs of radio buttons allow the selection of either the RGB or Sub panel to be disabled with the ENRGB/S pin, AUX1 and/or AUX2 to be either Main or Sub LEDs. There are four demo buttons and a CIE Chromaticity diagram which allows direct selection of colors. The LEDS OFF button resets all LEDs to zero, stops and resets any demonstration in progress. An address select button allows the I²C address to be

changed from 00 to FF, however the I²C address of the LTC3206 is preset to a hexadecimal address of 36.

MAIN and SUB control – These are vertical slide controls which adjust the main and sub LEDs output from 0% to 100% by clicking on the up and down arrows, a higher or lower tick, or by clicking and dragging the slide pointer.

RED, GREEN, and BLUE controls – These are vertical slide controls which allow individual adjustment of the red, green, and blue LEDs to make any of the

4096 colors available. The hex code and color are displayed in small boxes below each of the sliders. They too are adjusted by clicking on the up and down arrows, a higher or lower tick, or by clicking and dragging the slide pointer.

CIE Chromaticity diagram – Colors can be selected by clicking on a specific color in the diagram. The Gammut box, when checked, displays the Chromaticity coordinates of the Nichia NSCM315C RGB diode forming a triangle or *gammut* of all the colors which can be produced by that diode.

Force Charge Pump On check box – When this box is selected the charge pump is forced on. The charge pump is automatically selected while the Rainbow and Light Cycle demos are activated, but returns to its original state when the demos are deselected.

ENRGB/S check box – When this box is selected, the ENRGB/S pin is high. When it is deselected the pin is low and either the RGB or the Sub panel is disabled depending on the selection of the ENRGB/S radio buttons.

ENRGB/S option buttons – If RGB Control is selected, the RGB display will be disabled when the ENRGB/S box is deselected. If the Sub Control is selected, the Sub panel will be disabled when the ENRGB/S box is deselected.

AUX1 & AUX2 Main/Sub option buttons – If the Main button is selected, the applicable LED will change illumination with the Main brightness control. If the Sub button is selected, the applicable LED will change illumination with the Sub brightness control. The LTC3206's maximum current set-

tings for the Main, Sub, and RGB panels are set by R2 and R3 (see the attached DC749 schematic.) $R2 = R3 = 15.8K$, which set the maximum current to 15mA.

Demo Buttons – These buttons can be selected to run 4 different demonstrations. Demo 1 and Demo 2 cycle through the brightness levels of the LEDs using a feathering technique. Demo 4 randomly changes colors also using the feathering technique. The feathering technique is done by alternating between adjacent brightness levels at high speeds with a duty cycle to produce a certain intensity level between the two brightness levels (virtual step). These demos use 7 virtual steps between each brightness level giving it a total of 120 brightness levels (8 X 15).

LEDS OFF button – This button will turn the brightness levels to zero on all of the LEDs and will turn off and reset any active demo.

Select I2C Address button – Typically, the LTC3206 is preprogrammed with the hexadecimal I²C address of 36, however, a different I²C address may be special ordered. In this event the appropriate I²C address will need to be selected. To do this, select the Select I2C Address button. This button will display UPDATE ADDRESS and the address selection box will become active. Select the appropriate hexadecimal address in the address selection box. Then select the Select I2C Address button to activate the new address.

QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 749

MULTIDISPLAY LED CONTROLLER

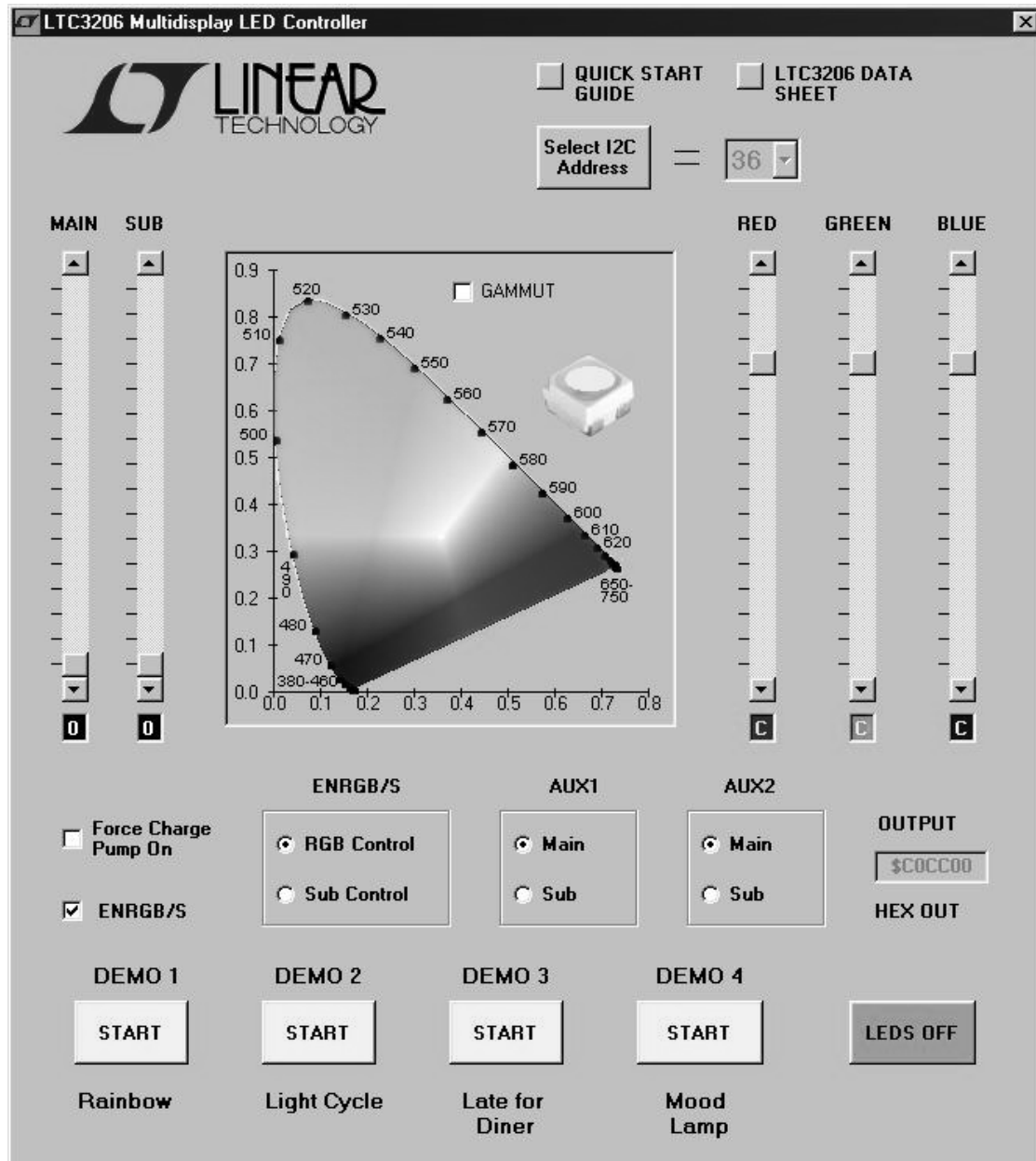
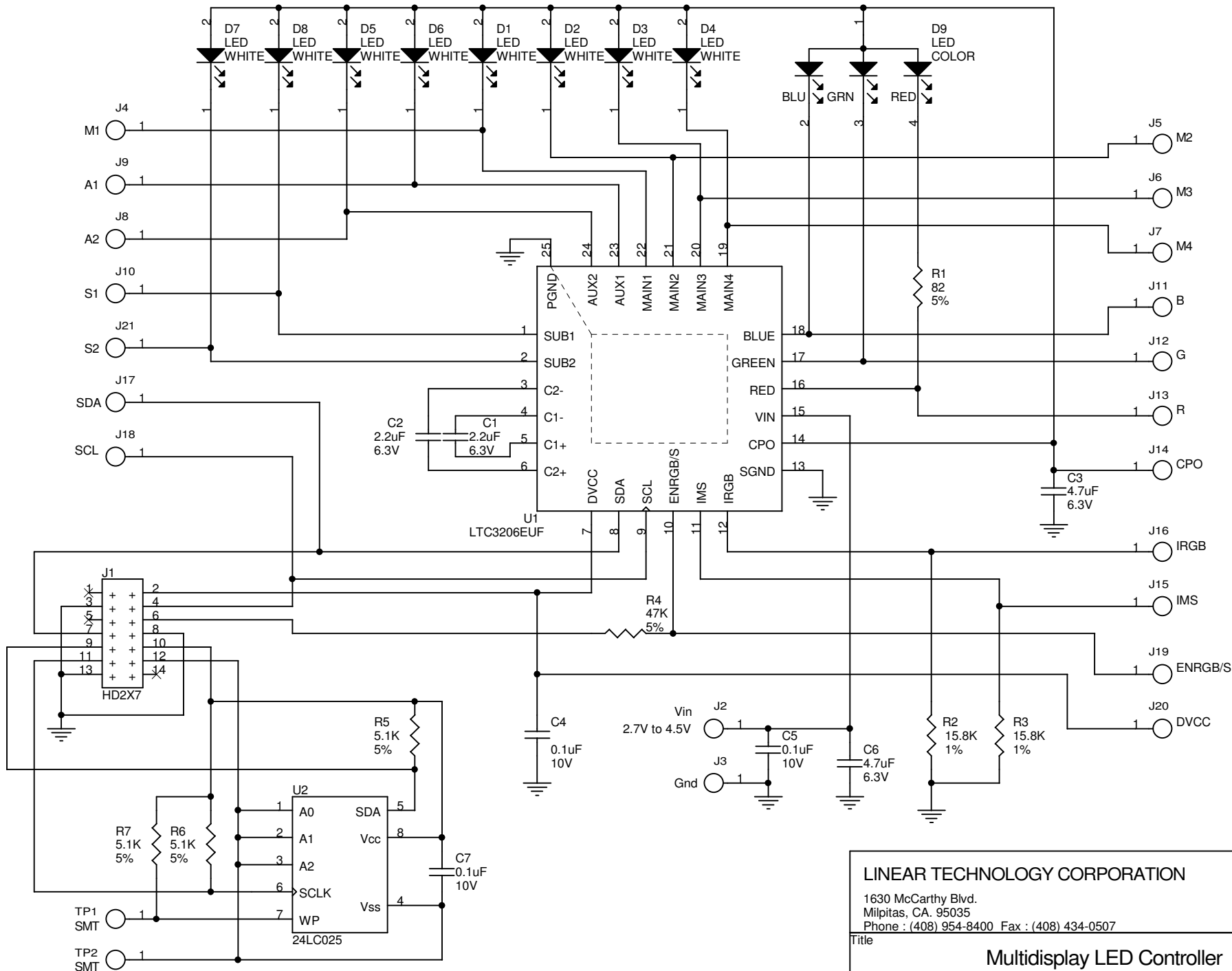


Figure 2. LTC3206 Control Window

NOTES: UNLESS OTHERWISE SPECIFIED



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Title

Multidisplay LED Controller

Size

Custom

Document Number

DC749A

LTC3206EUF

Rev

Date:

Friday, July 30, 2004

Sheet

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of

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Item	Qty	Reference	Part Description	Manufacture / Part #
1	3	C4,C5,C7	CAP., CHIP X5R 0.1uF 10V 10%	AVX, 0402ZD104K 0402
2	2	C1,C2	CAP., CHIP X5R 2.2uF 6.3V 20%	TAIYO YUDEN, JMK107BJ225MA 0603
3	2	C3,C6	CAP., CHIP X5R 4.7uF 6.3V	TDK C1608X5R0J475M
4	2	J2,J3	TURRET TESTPOINT .064"	MILL-MAX, 2308-02
5	8	D1-D8	LED, SMT WHITE	NICHIA, NSCW100
6	1	D9	LED, SMT COLOR RGB	NICHIA, NSCM315C
7	1	J1	SOCKET, 2X7 2MM STRAIGHT	MOLEX/WALDOM 87331-1420
8	1	R1	RES., CHIP 82 OHM 5%	AAC CR05-820JM 0402
9	3	R5,R6,R7	RES., CHIP 5.1K 5%	AAC CR05-512JM 0402
10	2	R2,R3	RES., CHIP 15.8K 1%	PANASONIC, ERJ-2RKF1582X 0402
11	1	R4	Res., CHIP 47K 5%	AAC CR05-473JM 0402
12	1	U2	IC., SERIAL EEPROM	MICROCHIP 24LC025 TSSOP8
13	1	U1	IC., MULTIDISPLAY LED CONTROLLER	LINEAR TECHNOLOGY, LTC3206EUF
14	0	TP1,TP2	OPT	