

# QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 590B

## USB SERIAL CONTROLLER FOR LINEAR TECHNOLOGY QUICK EVAL™ DEMO BOARDS

### DESCRIPTION

Demonstration circuit 590B is a USB-based controller with generic Serial Peripheral Interface (SPI) and Inter Integrated Circuit (I<sup>2</sup>C™) ports. It is designed to mate with Linear Technology's family of QuickEval™ demonstration boards. The demo board is fully isolated from the host PC's ground, and in many cases no external power source is required. The evaluation software automatically detects which demo board is connected and loads the appropriate control screen.

The QuickEval system provides a quick and easy way to evaluate the performance of a wide variety of Linear Technology's products, including ADCs, DACs, SMBus power control products, and many others.

QuickEval is a trademark of Linear Technology Corporation; I<sup>2</sup>C is a trademark of Philips Electronics N.V.; Adobe is a trademark of Adobe Systems, Inc.

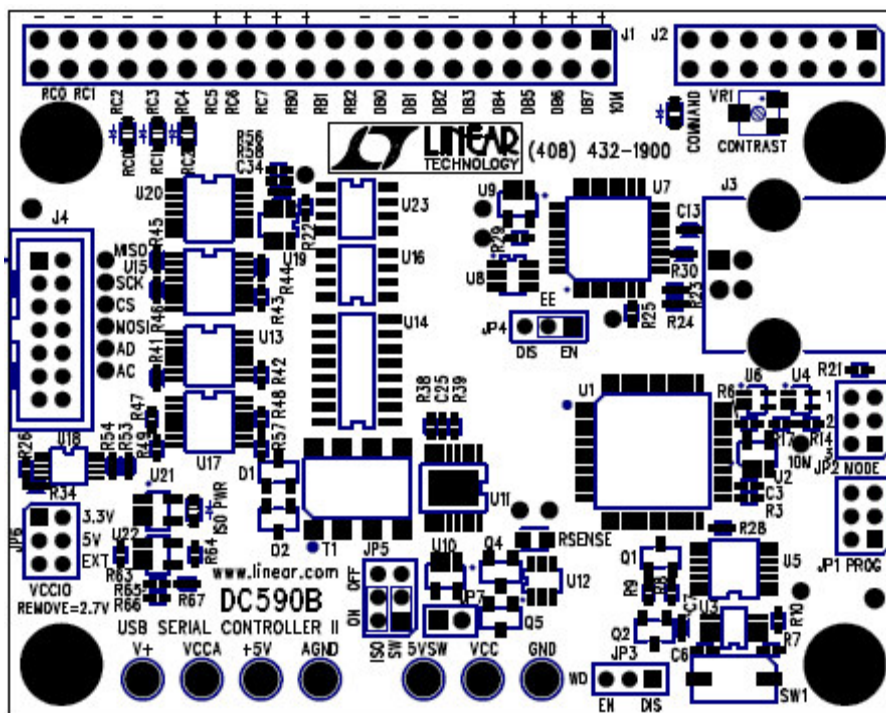
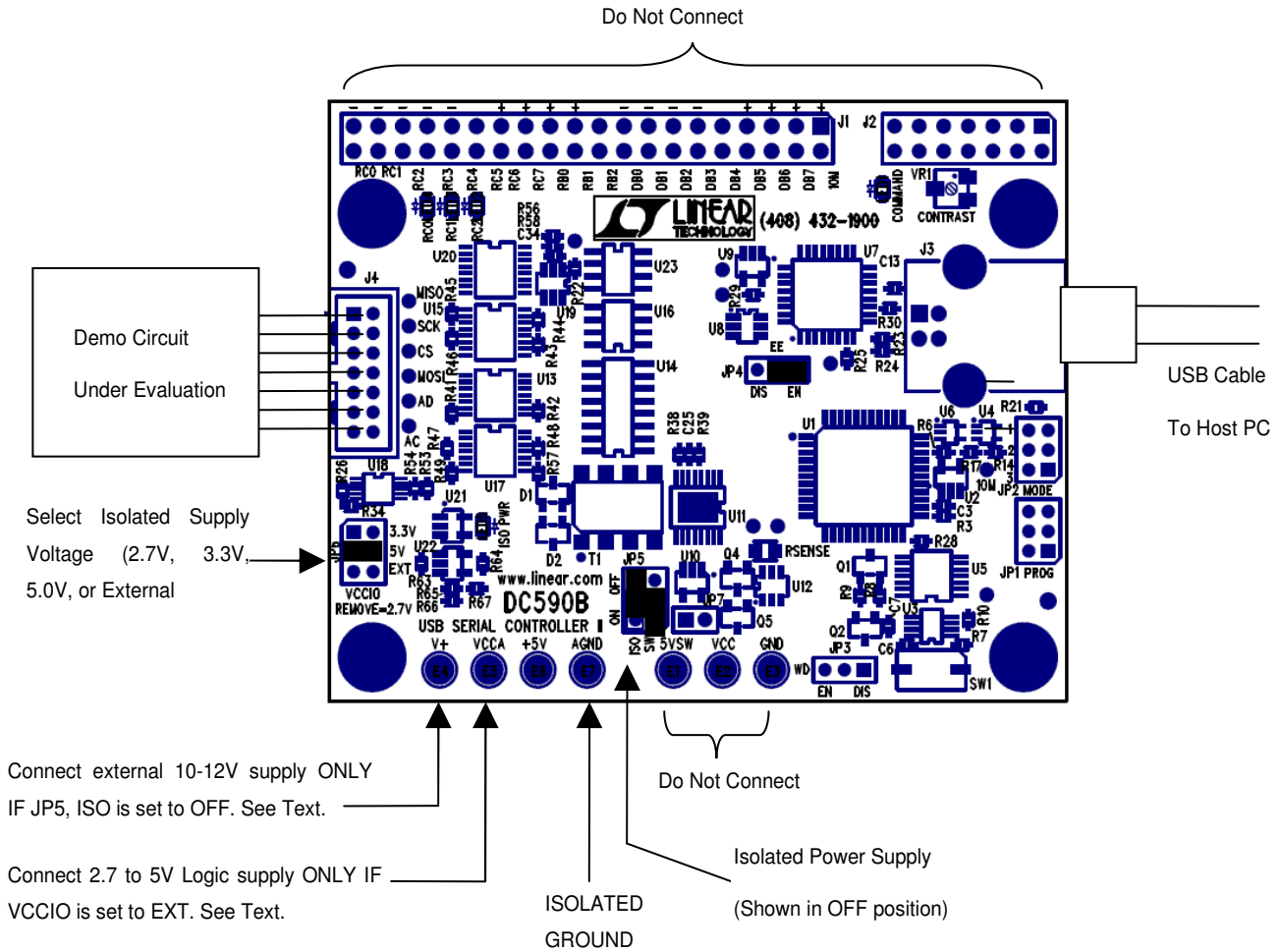


Figure 1. Demonstration Circuit 590B

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**Figure 2. Basic Connections**



## QUICK START PROCEDURE

For proper equipment setup, follow the procedure below:

1. Do NOT plug in DC590B before running the installation program.
2. Download the QuickEval installation program from <http://www.linear.com/software/>.
3. Run the QuickEval installation program and follow the on-screen instructions.

## SOFTWARE TOOLS

The QuickEval Demo software includes tools for automatic software updates and for quickly retrieving relevant documentation from the World Wide Web.

**NOTE:** Adobe Acrobat reader is required to view the documents and is available at <http://www.adobe.com>.

### To use the tools:

- Quit the demonstration circuit software or disconnect the USB cable so that The main control panel appears:

**NOTE:** The QuickEval demo software requires a PC that is running Windows 98 (or later), and has an available USB port.

4. Connect the demonstration circuit to be evaluated to DC590B using the supplied 14-conductor ribbon cable. The demo software detects the circuit and starts the appropriate control screen.

Each demonstration board also comes with a Quick Start guide similar to this one. For usage details relevant to a particular circuit refer to its Quick Start Guide.



### To update the software (requires internet connection):

- Choose Update from the Tools menu.

This automatically updates the main program and drivers for individual demo circuits.

### To view the Quick Start Guide (this document):

- Choose Quick Start Guide from the View menu.

## CONNECTIONS TO THE DC590B

Figure 2 shows the connections to the DC590B. In most cases DC590B and the demonstration circuit under evaluation can operate from available USB power, and thus require nothing more than a USB connection to the host PC and a ribbon connecting DC590B to the demo circuit under evaluation. DC590B offers several other power options, described below.

### Isolated Supply Options

An LT3439 low-noise switching power supply provides isolated power to the demonstration circuit under evaluation and to the isolation circuitry. This is adequate in many cases, however an external power supply is recommended to reduce the load on the host computer's USB port or to reduce power supply noise in the circuit under test.

The LT3439 switching power supply is enabled by default but may be disabled by moving jumper JP5 (ISO, to the left) to the OFF position. This allows the isolated side of the board and the demonstration circuit under evaluation to be powered separately. This is recommended when testing precision components such as high resolution ADCs and DACs. After moving JP5 ISO to the OFF position, apply a clean, regulated power supply from 7v to 10V to the V+ and AGND turret posts.

### Isolated Digital Supply

The signal levels on the digital interface are determined by the VCCA voltage. The onboard regulator can be set to 5V, 3.3V, 2.7V by installing JP6 in the appropriate position (remove jumper for 2.7V.) Selecting EXT shuts the regulator down,

and an external supply between 2.7 and 5V must be applied to the VCCA turret post.

The +5V turret is the digital supply for the isolated portion of DC590B. Do not draw current from this point

### LED Indicators

Two LED indicators are provided. The "ISO PWR" LED is lit when either the onboard switching power supply is running or external power is applied to the isolated side of the board.

The "COMMAND" LED indicates that a command has been sent to the board by the host PC and is waiting to be executed. The LED may not appear to be blinking in some cases, as the duty cycle may be very short.

### Jumper Summary

Some jumpers on the DC590 board are for future use and MUST be left in the default positions.

JP1 – PROG – Microcontroller in-circuit programming header, do NOT install jumper, make no connections.

JP2 – MODE – do NOT install jumper, make no connections.

JP3 – Watchdog enable - do NOT install jumper, make no connections.

JP4 – EE – Jumper MUST be in the EN position.

JP5 – SW (right-hand side) MUST be in the ON position. ISO (left-hand side) controls the isolated supply. See Connections section.

JP6 – VCCA control. See Connections section.

## TROUBLESHOOTING GUIDE

**Problem:** DC590B is plugged in, but QuickEval screen still says “USB Serial Controller Not Connected”

*Solution:* The most likely cause is improper installation of the USB drivers, which causes Windows to recognize DC590 as an “Unknown Device.” Open the Windows Control Panel, open “System” and click the “Device manager” tab. Open the “Other Devices” item and look for USB SERIAL CONTROLLER. Select this item and click the remove button. Unplug DC590, Re-install the QuickEval software, and follow the on-screen instructions.

**Problem:** Demo board software loads properly, but will not run or gives “Device Not accessible” errors.

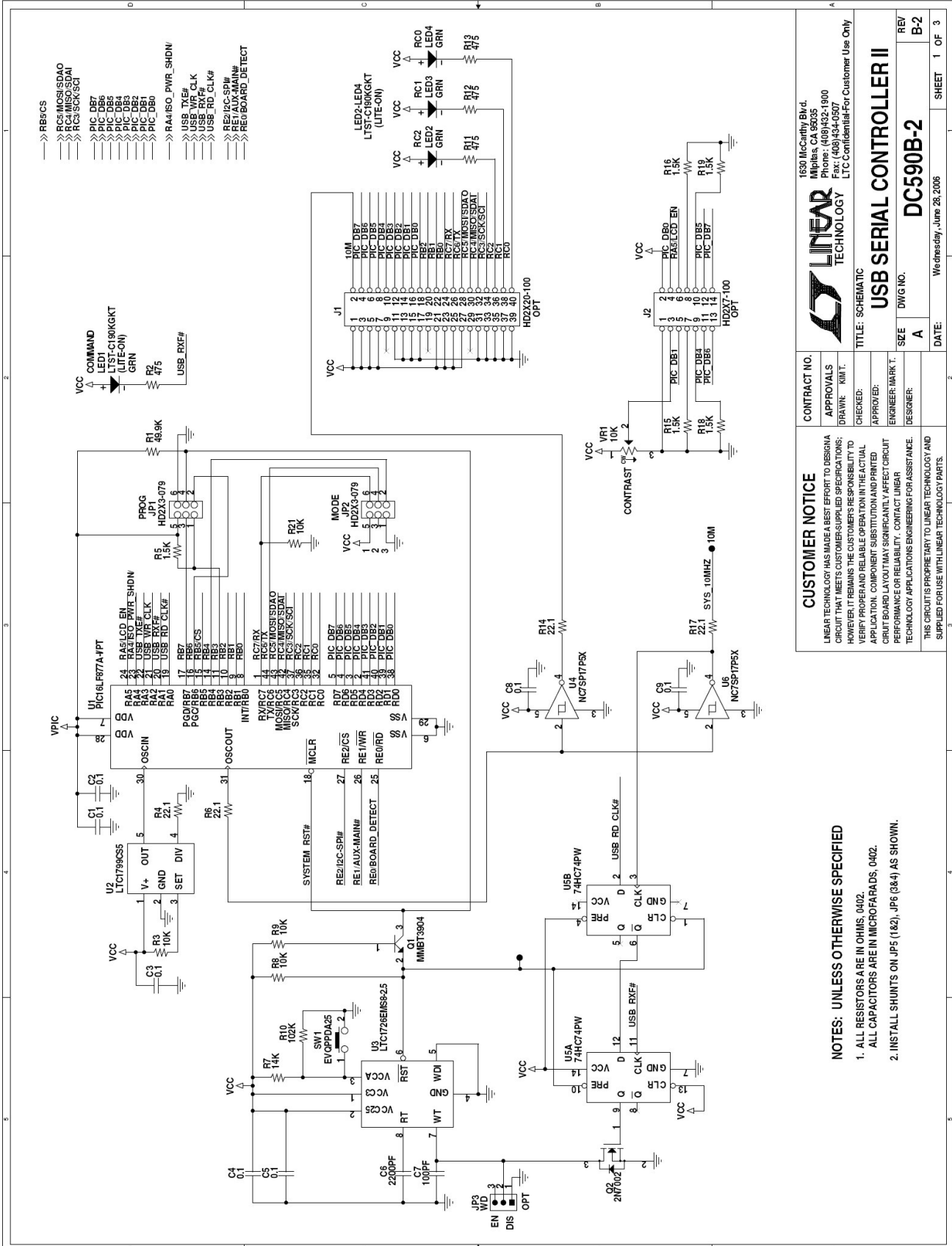
*Solution:* Verify that the demo board is properly powered up. This Quick Start Guide lists the basic power connections to DC590. Some demo boards may have additional requirements; refer to the demo board’s Quick Start guide for details.

**Problem:** After connecting the demo board to DC590 with the supplied 14 pin ribbon cable, QuickEval software still displays “Evaluation Board is not Connected.”

*Solution:* Contact Linear Technology Applications Engineering.

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## USB SERIAL CONTROLLER FOR LINEAR TECHNOLOGY QUICKEVAL™ DEMO BOARDS

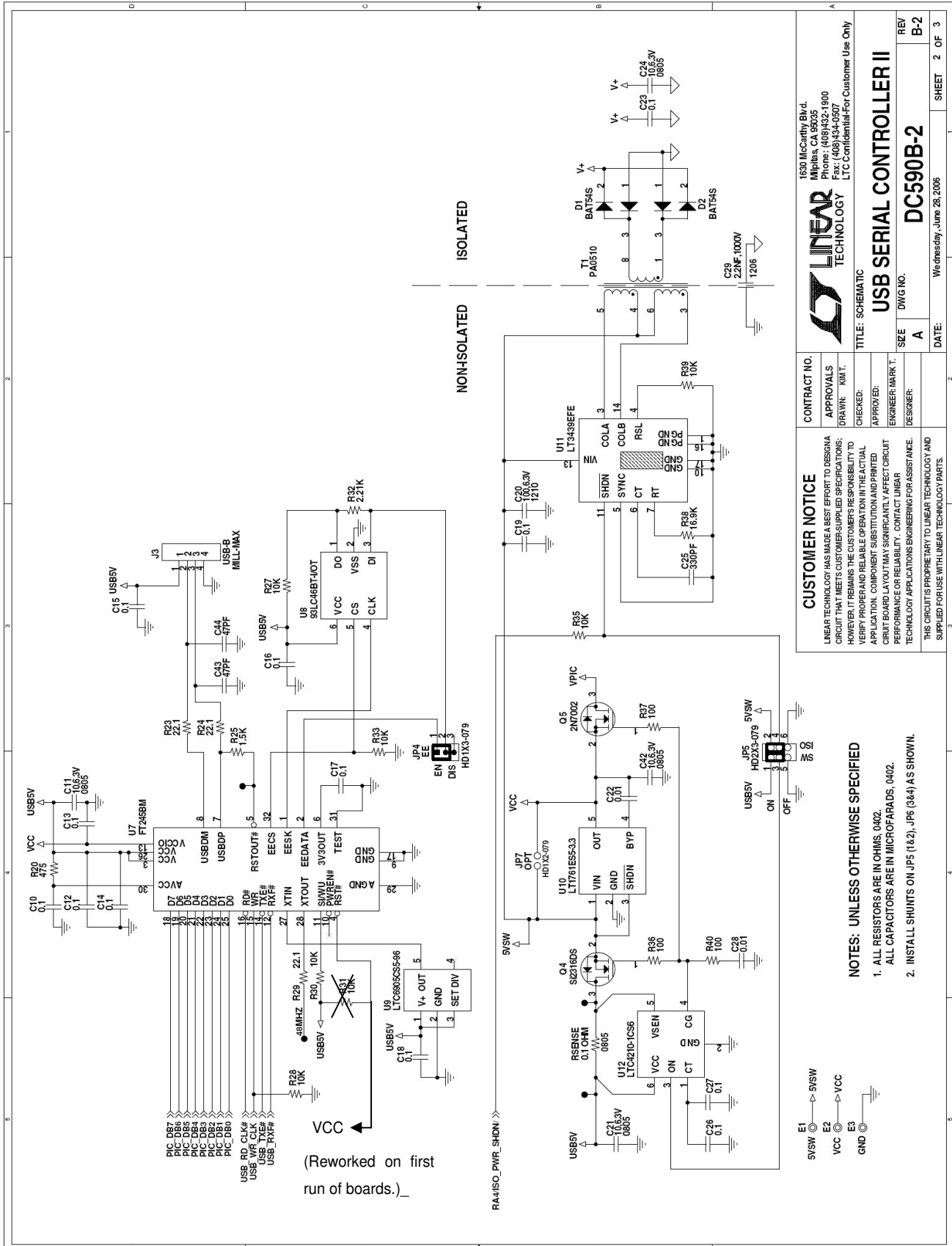


<b>CUSTOMER NOTICE</b>		<b>CONTRACT NO.</b>	
LINEAR TECHNOLOGY HAS MADE A BEST EFFORT TO DESIGN A CIRCUIT THAT MEETS CUSTOMER-SUPPLIED SPECIFICATIONS; HOWEVER, IT REMAINS THE CUSTOMER'S RESPONSIBILITY TO VERIFY PROPER AND RELIABLE OPERATION IN THE ACTUAL APPLICATION. COMPONENT SUBSTITUTION AND PRINTED CIRCUIT BOARD LAYOUT MAY SIGNIFICANTLY AFFECT CIRCUIT PERFORMANCE OR RELIABILITY. CONTACT LINEAR TECHNOLOGY APPLICATIONS ENGINEERING FOR ASSISTANCE.		APPROVALS	
		DRAWN: KMT	
		CHECKED:	
		APPROVED:	
		ENGINEER: MARK T.	
		DESIGNER:	
		TITLE: SCHEMATIC	
		USB SERIAL CONTROLLER II	
		DC590B-2	
		DATE: Wednesday, June 28, 2006	
		SHEET 1 OF 3	

**NOTES: UNLESS OTHERWISE SPECIFIED**

- ALL RESISTORS ARE IN OHMS, 0402.
- ALL CAPACITORS ARE IN MICROFARADS, 0402.
- INSTALL SHUNTS ON JP5 (1&2), JP6 (3&4) AS SHOWN.

# QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 590B USB SERIAL CONTROLLER FOR LINEAR TECHNOLOGY QUICKEVAL™ DEMO BOARDS

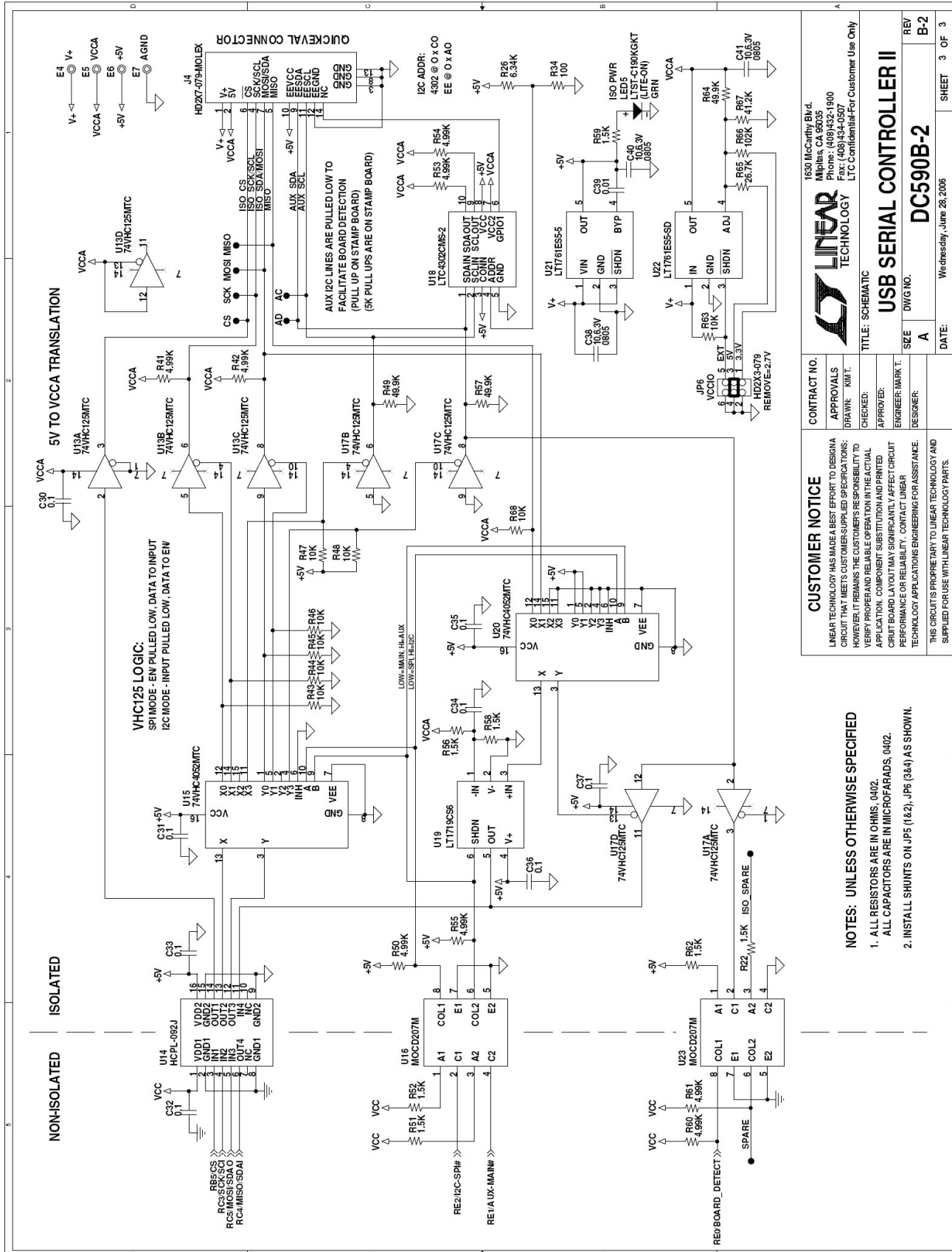


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THIS CIRCUIT IS PROPRIETARY TO LINEAR TECHNOLOGY AND SUPPLIED FOR USE WITH LINEAR TECHNOLOGY PARTS.		TITLE: SCHEMATIC	
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		<b>LINEAR TECHNOLOGY</b>	
		<b>USB SERIAL CONTROLLER II</b>	
		REV B-2	
		DWG NO. DC590B-2	
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		SHEET 2 OF 3	

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## APPENDIX A: DC590A CONNECTIONS AND SCHEMATIC

This section shows the schematic and connections to DC590A, which DC590B replaces. The only functional difference between DC590A and DC590B is that the digital signals on DC590B can be adjusted from 2.7 to 5V, where the DC590A is 5V only.

DC590B also offers improved isolation, as all 14 conductors on the 14 pin interface header are isolated from the PC's ground.

Figure 3 shows how to connect an external supply to the isolated side of the controller and the board under evaluation. *After disabling the switching supply by placing JP1 in the OFF position*, apply 7V–9V between the GND and V+ posts. These posts are the in, out, and ground terminals of an LT1761 LDO regulator. The demonstration circuit under evaluation may draw up to 100mA from  $V_{CC}$ .

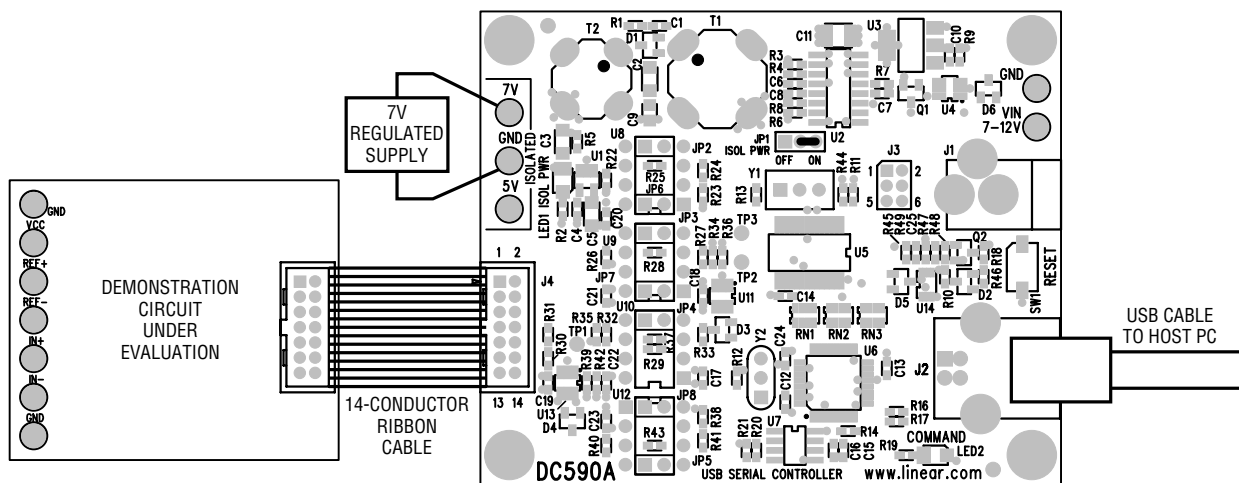


Figure 3. Connecting an external supply to the isolated side of the controller

Another option is to supply power to the isolated side of the controller (see Figure 4) back through the board under evaluation. The LT1761 regulator is reverse-current protected. This allows any convenient 5V  $\pm$ 10%

regulated supply to be used. In this case, the isolation circuitry on DC590 is also powered from this source. worst-case current draw by DC590 is 50mA.

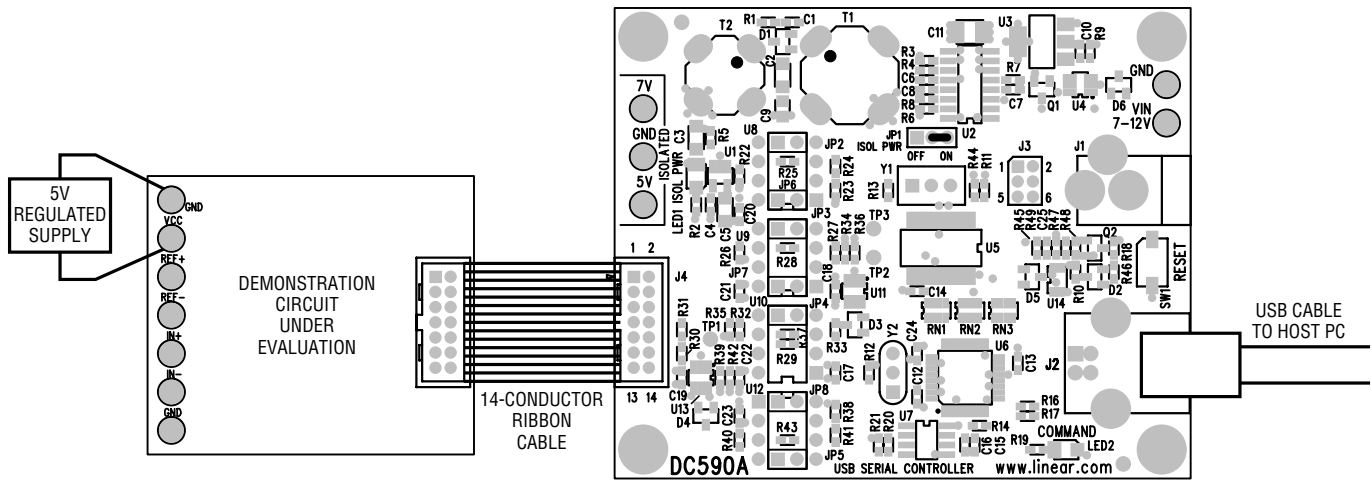
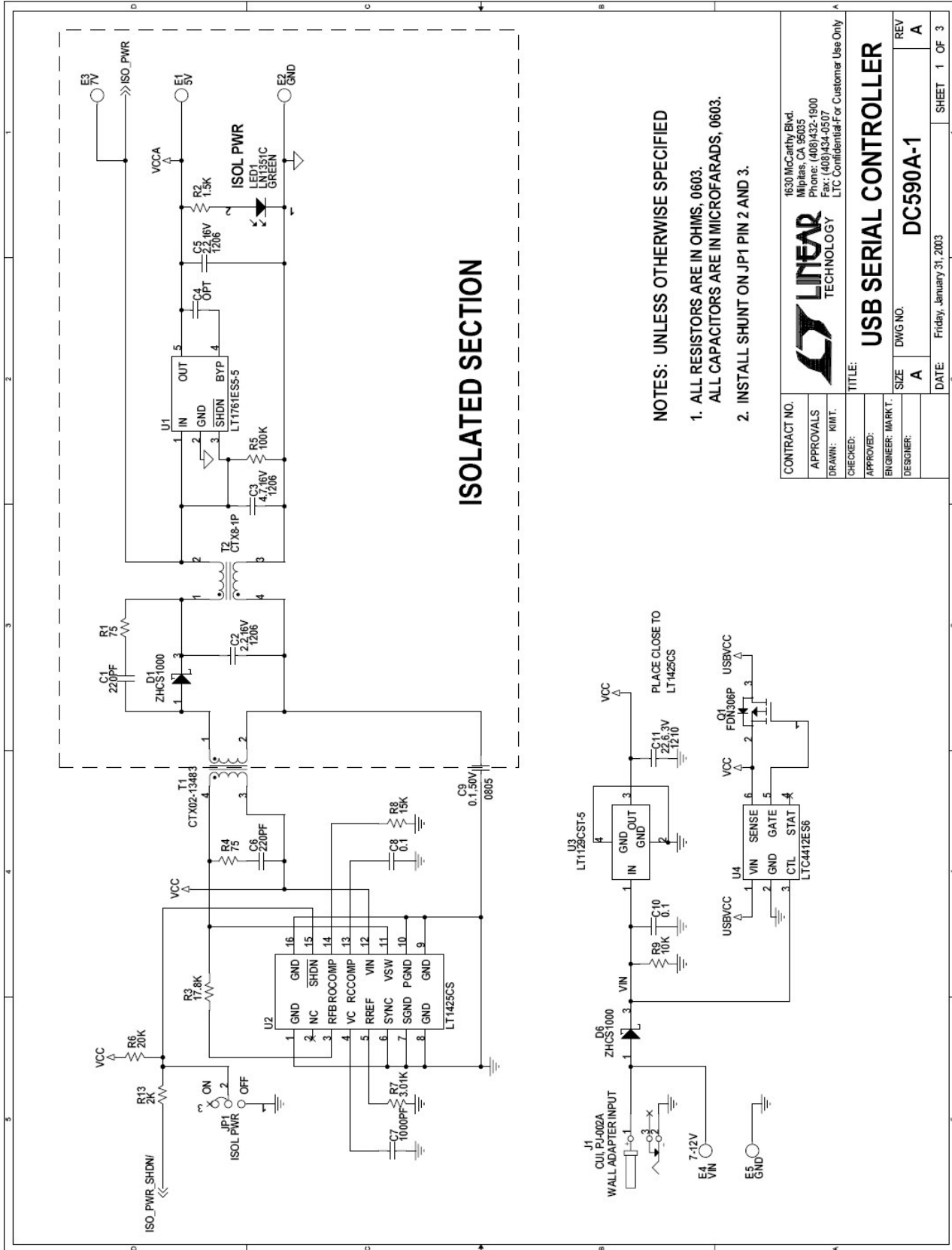
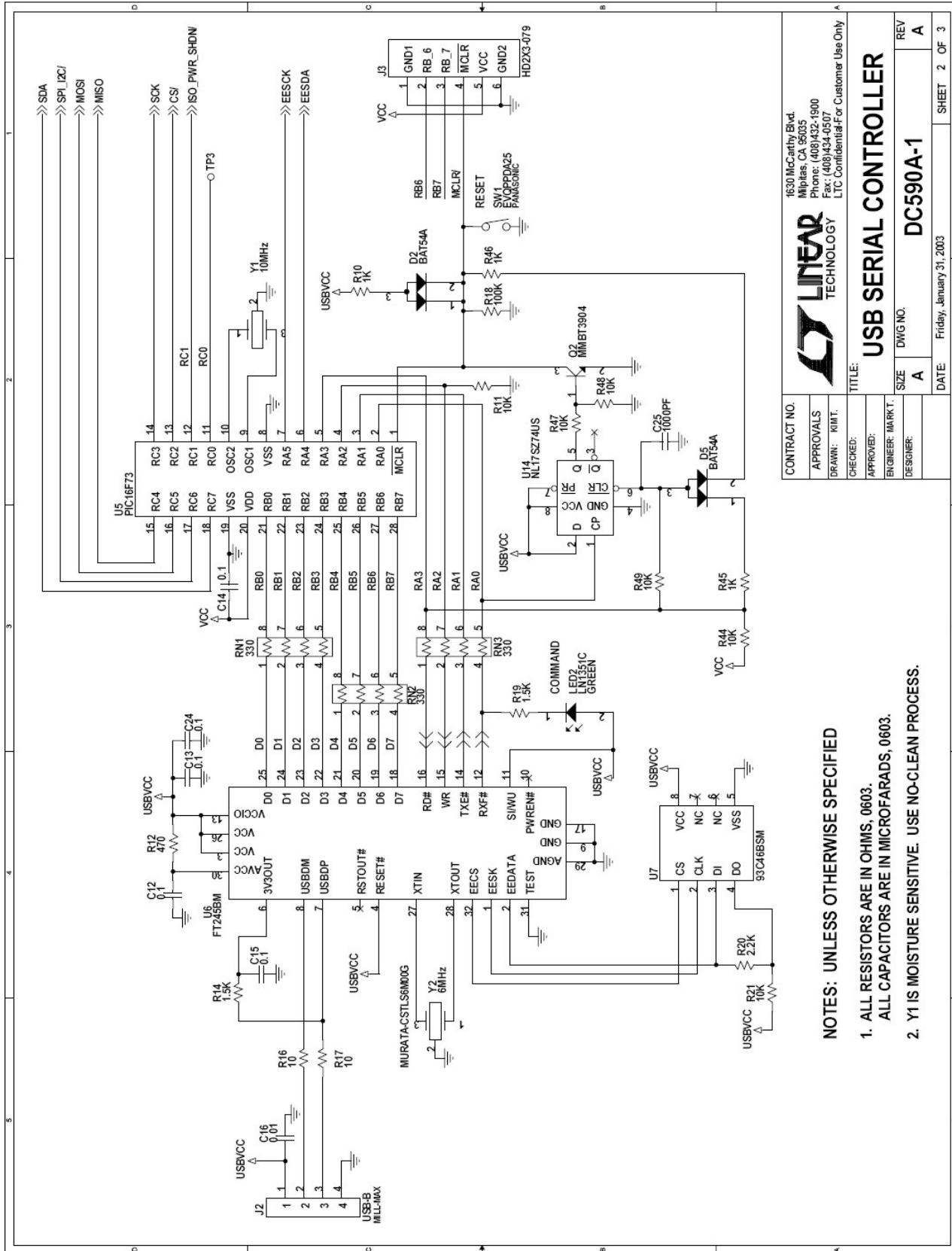


Figure 4. Supplying power to the controller through the board under evaluation





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APPROVALS	DRAWN: RIMT.	TITLE: <b>USB SERIAL CONTROLLER</b>	
CHECKED:	APPROVED:	SIZE	DWG NO.
ENGINEER: IMARKT.	DESIGNER:	A	DC590A-1
		REV	A
		DATE	Friday, January 31, 2003
		SHEET 2 OF 3	

**NOTES: UNLESS OTHERWISE SPECIFIED**

1. ALL RESISTORS ARE IN OHMS, 0603.  
ALL CAPACITORS ARE IN MICROFARADS, 0603.
2. Y1 IS MOISTURE SENSITIVE. USE NO-CLEAN PROCESS.



