

# Using the Project Board LCD Display at 3.3 volts

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**Applicable part numbers:**  
MCUSLK (All Revisions)  
PBMCUSLK (Rev A & B)

## 1 Introduction

This document guides you through the steps necessary to use the LCD attached to the Freescale Project Board when power select is configured for 3.3V operation.

The hardware setup section will define the problem, address risks associated with implementing the solution, and walk you through the modification required to the project board.

Refer to the project board schematic available at [www.freescale.com/universityprograms](http://www.freescale.com/universityprograms) for additional resources.

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## 2 Naming Conventions

For the purposes of this document the following terminology will refer to these interchangeable parts numbers.

MCU Project Board	PBMCSULK, MCUSLK (identified by on-board labels such as MCU PROJECT BOARD – 2 and MCU PROJECT BOARD)
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## 3 Modifying the Project Board

### 3.1 Problem Statement

In the default configuration the Project Board is connected to Vdd. When using a microcontroller that operates at 3.3V, the user changes the VDD\_SEL header on the project board (5V or 3.3V) which sources Vdd. Therefore, when the project board is in the 3.3V configuration the LCD Display does not reach its operational voltage.

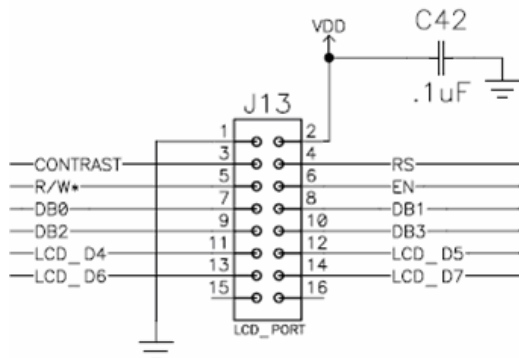


Figure 1. Schematic excerpt illustrating the LCD configuration

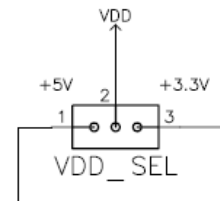


Figure 2. The root of the problem is that Vdd can change between 5V and 3.3V. The LCD only operates with 5V.



Figure 3. VDD\_SEL Jumper on Project Board

### 3.2 Risks associated with this solution implementation

**CAUTION: Please review this section prior to implementing the described solution.**

Connecting the +5V to the LCD Vdd (Pin 2 of J13) will also connect to Vdd pins of connector J9, J8 (both LCD ports), U3 (Octal Buffer) and U4 (UART for RS232). This will affect the COMM I/O signals in that they will be operating at +5V, not Vdd. Most devices should be tolerant of this condition, however, care and consideration should be accounted for before implementing. Refer to the hardware manual of any device(s) that will use the COMM signals prior to continuing.

### 3.3 Solution

At an overview, the solution is to disconnect the VDD supply to the LCD, and re-route it to a constant 5V supply. This will remain unchanged regardless of VDD\_SEL configuration. The sections below will walk you through the steps required in detail.

Step One: Insure that the project board is disconnected from all possible power sources. This includes the USB connection.

Step Two: Place the Project Board face down (Freescale logo down) on a solid flat surface. See Figure Figure 4.

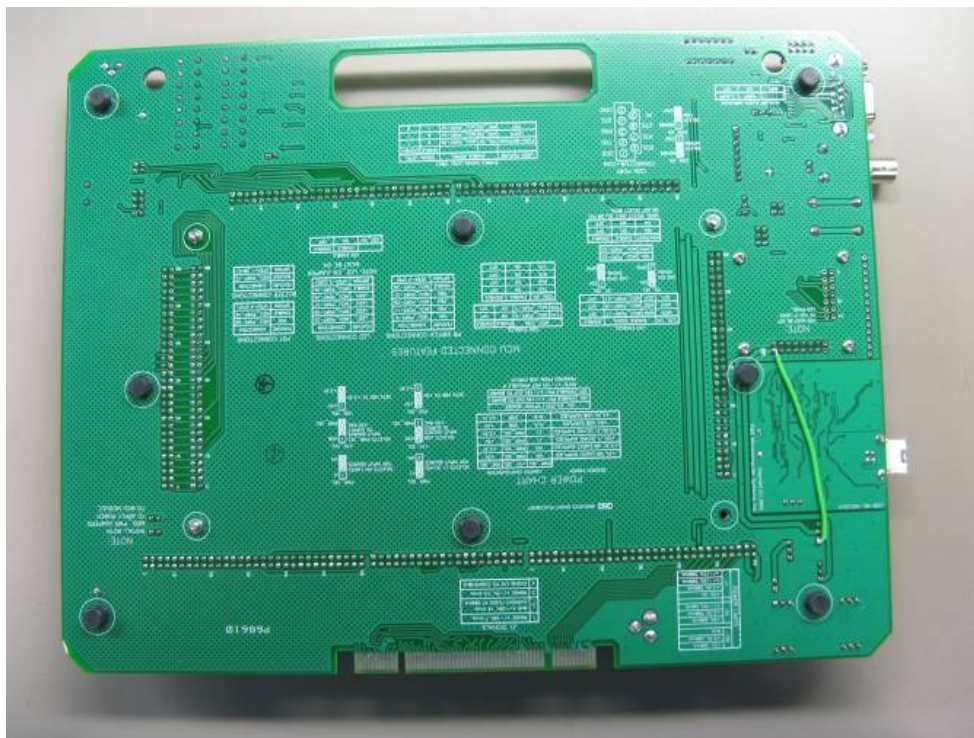


Figure 4. Project Board Face Down (Green Wire is the connection that this document covers)

Step Three: Locate pin 2 of the LCD header J13. You should notice a thick trace going to the VDD\_SEL header center pin. (Refer to Figure 5)

Step Four: Near the LCD display Jumper, use a sharp object to carefully cut the trace leading from pin 2 of J13 (LCD header) to the VDD\_SEL jumpers. (Refer to Figure 5)

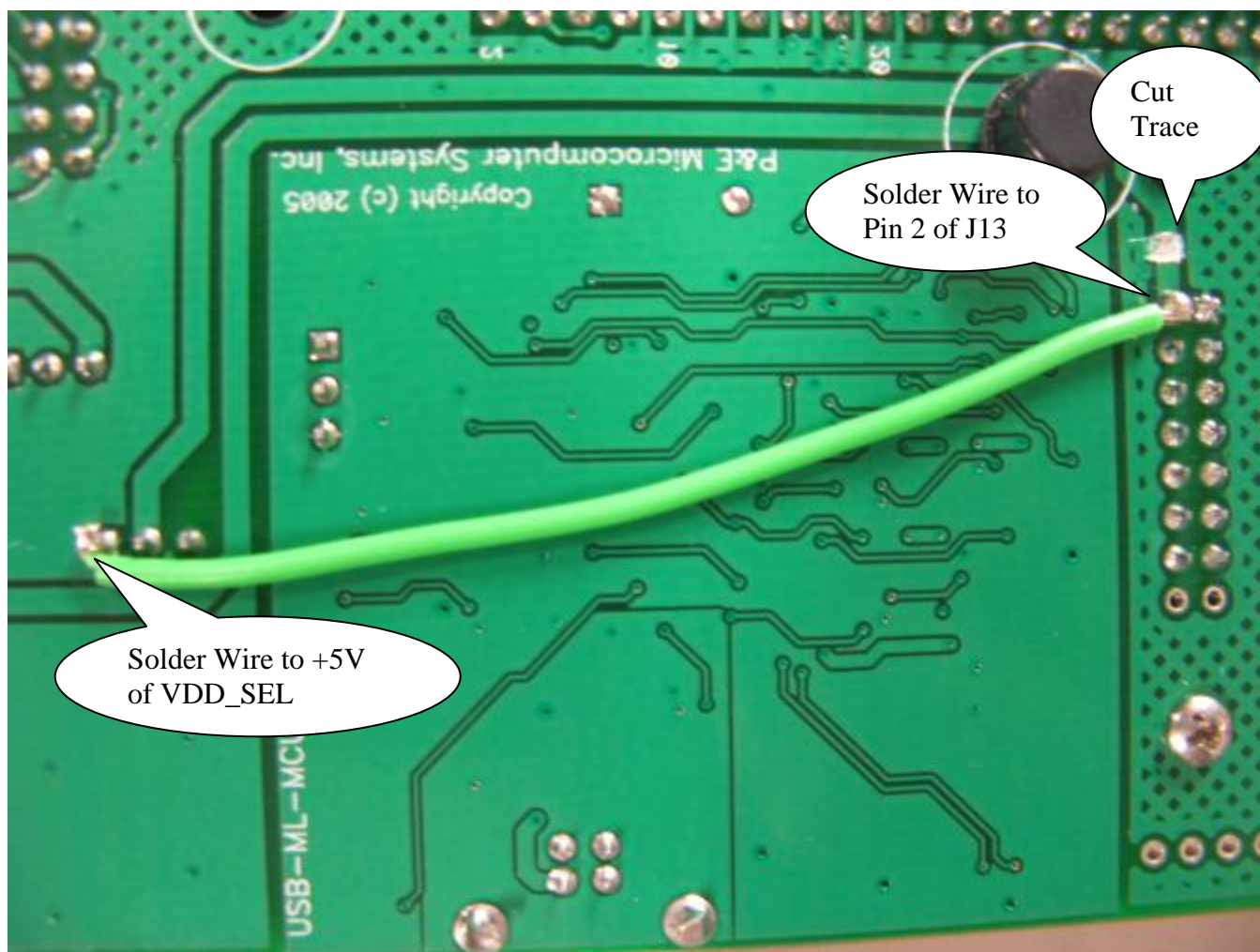
**NOTE:**

We recommend cutting the trace close to the J13 pin 2 due to the relative isolation of other nearby signals. Accidentally, cutting into the nearby ground plane should not pose any significant issues.

Step Five: Perform a continuity check from pin 2 of J13 to the VDD\_SEL to verify the trace is cut.

Step Six: Solder a insulated wire from J13 pin 2, to the 5V supply line coming out of VDD\_SEL header on the project board. (Refer to Figure 5)

Step Seven: Perform a continuity check to validate your solder connections, and that no nearby connections have accidentally been bridged.



**Figure 5. Zoomed View of Work Area**

## 4 Revision History

Version	Date	Revised By	Description of Changes
0	2/2007	R2AAKL	ORIGINAL

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