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Revisions			
Rev	Description	Date	Approved
B	Production Release	14-JUN-12	J.H.
C	Update to support K21P100 including resistors to switch between MCU functions. Added USB 2:1 switch.	27-SEP-12	J.H.
C1	Update to new MCU pn	28-MAR-13	J.H.
C2	U6 MCU Part changed APN: 344-01577=>344-02051 (MK21DN512AVMC5 to MK21DN512AVMC5)	13-MAR-14	Ron Kim

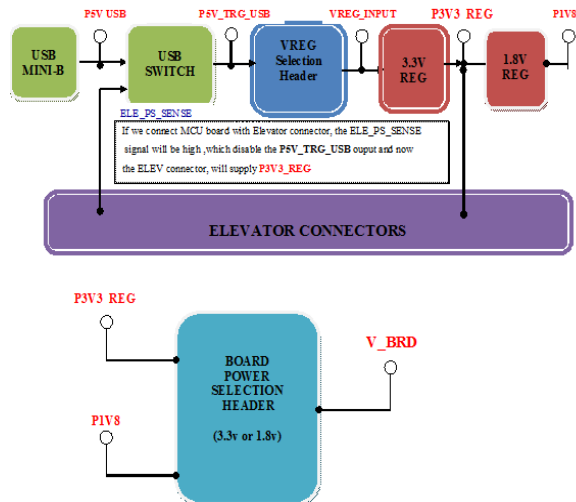
		<b>Microcontroller Product Group</b> 6501 William Cannon Drive West Austin, TX 78735-8598	
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ICAP Classification: FCP: _____ FBO: X PUBE: _____			
Designer: Jiy Hanjigsen	Drawing Title: <b>TWR-K21D50M</b>		
Drawn by: Jiy Hanjigsen	Page Title: <b>Table of Contents/Revisions</b>		
Approved: Marilyn Hubbard	Size C	Document Number SCH-27405 PDF: SPF-27405	Rev C2
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unless Otherwise Specified:  
 All resistors are in ohms  
 All capacitors are in uF  
 All voltages are DC  
 All polarized capacitors are aluminum electrolytic

- Interrupted lines coded with the same letter or letter combinations are electrically connected.
- Device type number is for reference only. The number varies with the manufacturer.
- Special signal usage:  
 \_B Denotes - Active-Low Signal  
 <> or [] Denotes - Vectored Signals
- Interpret diagram in accordance with American National Standards Institute specifications, current revision, with the exception of logic block symbology.

- Net function indications:  
 Some nets have functions indicated in addition to the net names. The net names are shown in red and the MCU functions associated with the net are shown in blue. If a net has no blue function shown the net name indicates the associated function.

Power Flow



Power & Ground Nets

NET	VOLTAGE	DESCRIPTION
P5V_USB	5V	Primary input power. Filtered from USB connector. Input to USB power switch.
P5V_SW	5V	Output of USB power switch controlled by the 5V_EN signal from the JM60 MCU. Used by OSBDM voltage translation circuits.
P5V_TRG_USB	5V	Output of USB power switch controlled by the VTRG_EN signal from the JM60 MCU and the ELE_PS_SENSE signal from the TWR elevator connectors. Goes to regulator input select header.
USB0_VBUS	5V	USB power from primary elevator Pin A57.
P5V_K21_USB	5V	Secondary input power. Filtered from K21 micro AB USB connector. Goes to regulator input select header
VOUT_3V3	3.3V	VDD power from the regulator internal to the MCU.
P5V_ELEV	5V	Power to the elevator boards.
P3V3	3.3V	Output of 3.3V regulator or from the Elevator connectors. May also be supplied externally by connecting to the board voltage select header at pins 1 and 4.
P1V8	1.8V	Output of the 1.8V regulator.
V_BRD	1.8-3.3V	Output of 1.8v or 3.3V regulators as selected by the board voltage select header. May also be supplied externally by connecting to the board voltage select header at pins 3 and 4.
VREG_IN	5V	Power into the on board voltage regulators.
K21_VREGIN	5V	Power into the K21 MCU voltage regulator. It is typically derived from the K21 USB connector or the elevator USB0_VBUS pin.
VBAT	1.8-3.3V	Voltage to the battery input of the MCU. The value depends on whether the board is powered and at what value and the setting of the shunt that selects the source of the battery voltage.
MCU_PWR	1.8-3.3V	MCU digital power. Filtered from V_BRD
VDDA	1.8-3.3V	VDDA power for MCU and analog circuits. Filtered from MCU_PWR.
GND	0V	Digital and Analog Ground.



Sheet 4

MK21DN512 MCU  
 8 MHz XTAL  
 32.768 KHz XTAL  
 VDDA/VREFH filter  
 VREF\_OUT  
 VREGIN, VOUT33  
 VBAT Coin Cell Circuit  
 TAMPER Header  
 USB 2:1 Switch & Sel Hdr

Sheet 5

OSJTAG/USB Bridge Circuit  
 USB Micro B Connector  
 MC9S08JM60  
 Voltage Translation  
 USB Power Switch  
 OSJTAG AND EZPORT Header  
 Power Supply Circuits  
 Regulator Input Header  
 Regulator Output Header  
 3.3V and 1.8V Regulators

Sheet 6

SDHC Memory Socket  
 (not populated)  
 IRQ Push Buttons  
 K21 USB Micro AB  
 Connector with  
 Power Switch  
 GPIO Header

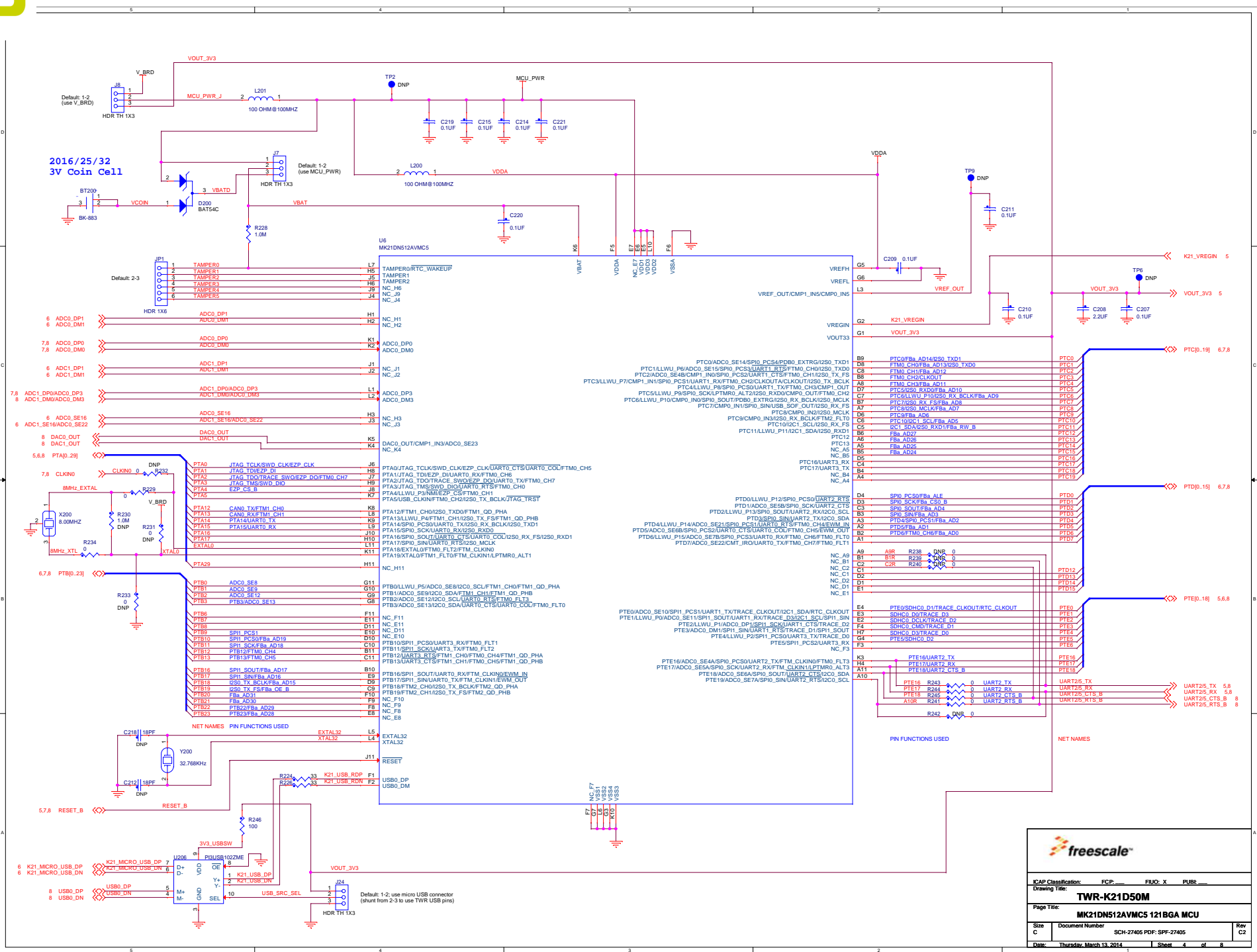
Sheet 7

TOWER PLUG-IN (TWRPI)  
 GENERAL PURPOSE HEADERS  
 ANALOG INPUTS  
 MMA7660 ACCELEROMETER  
 POTENTIOMETER  
 LEDs

Sheet 8

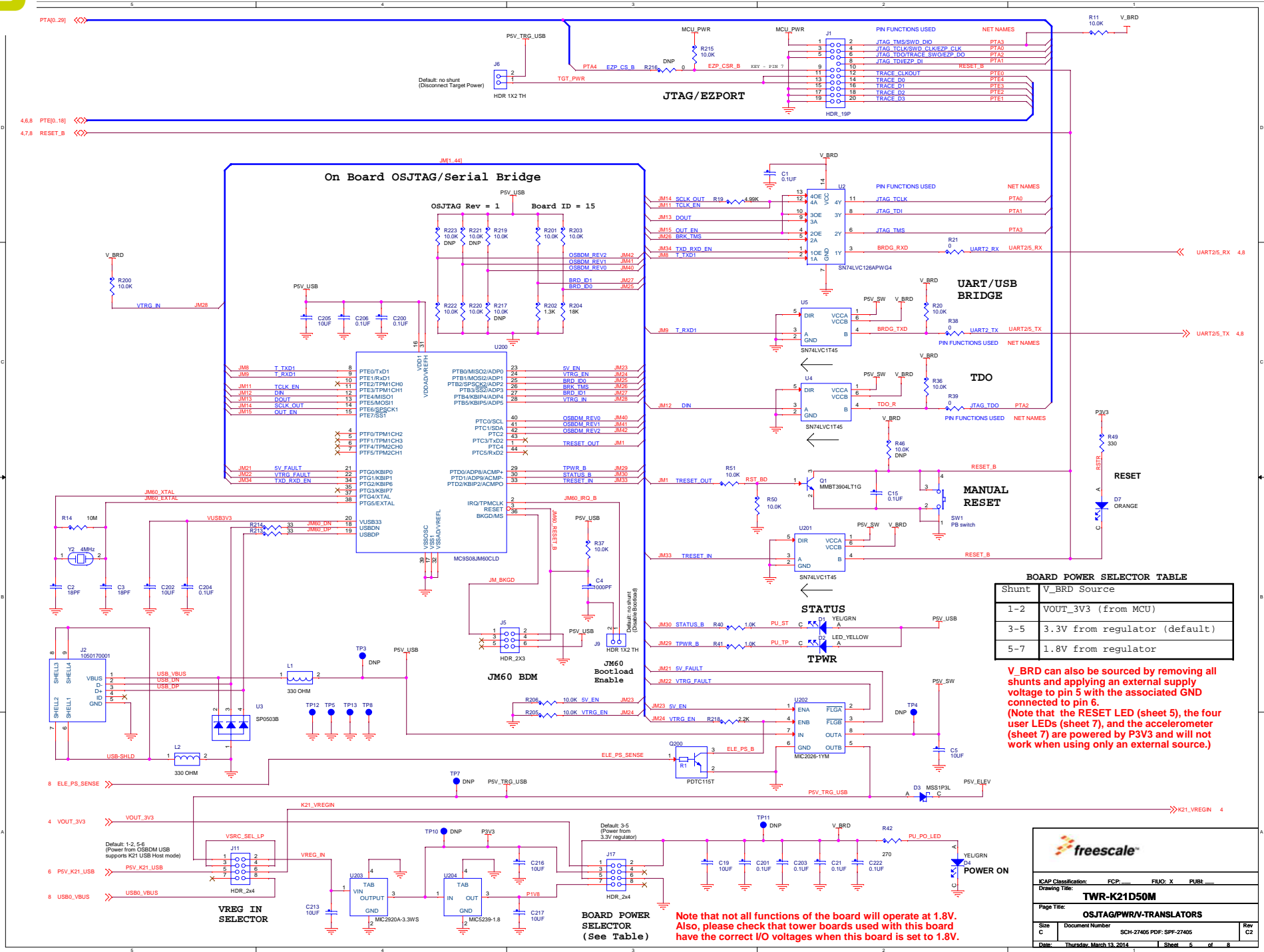
ELEVATOR CONNECTORS

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**BOARD POWER SELECTOR TABLE**

Shunt	V_BRD Source
1-2	VOUT_3V3 (from MCU)
3-5	3.3V from regulator (default)
5-7	1.8V from regulator

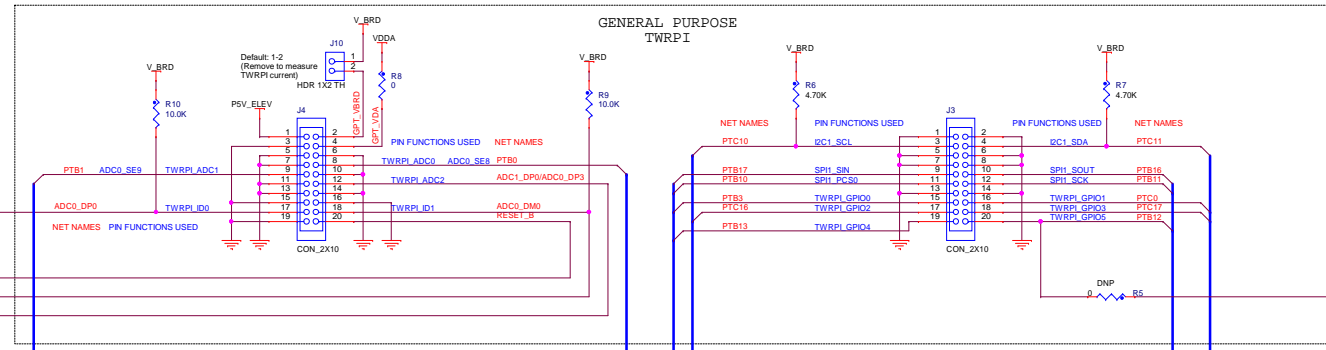
V\_BRD can also be sourced by removing all shunts and applying an external supply voltage to pin 5 with the associated GND connected to pin 6.  
 (Note that the RESET LED (sheet 5), the four user LEDs (sheet 7), and the accelerometer (sheet 7) are powered by P3V3 and will not work when using only an external source.)

Note that not all functions of the board will operate at 1.8V. Also, please check that tower boards used with this board have the correct I/O voltages when this board is set to 1.8V.

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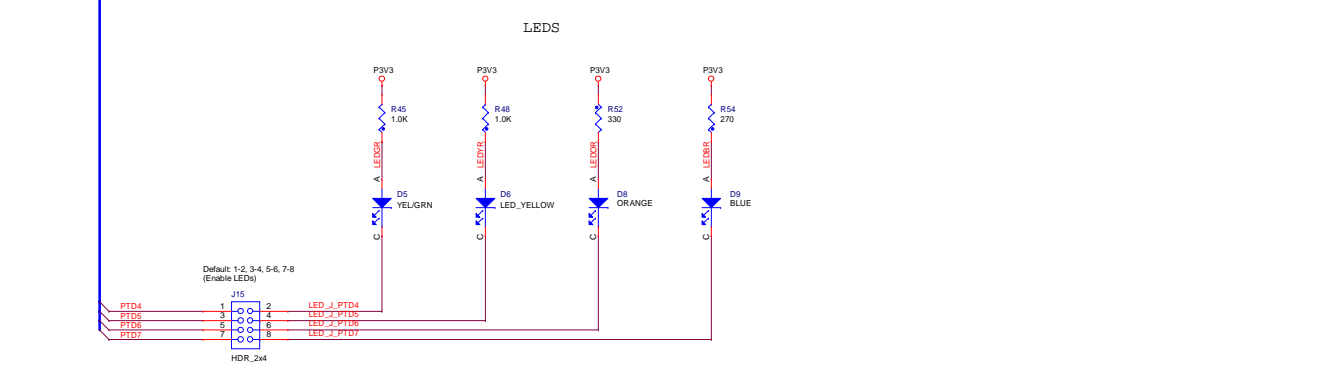
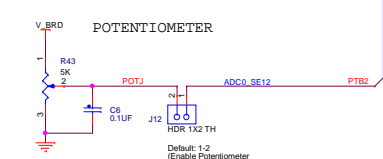
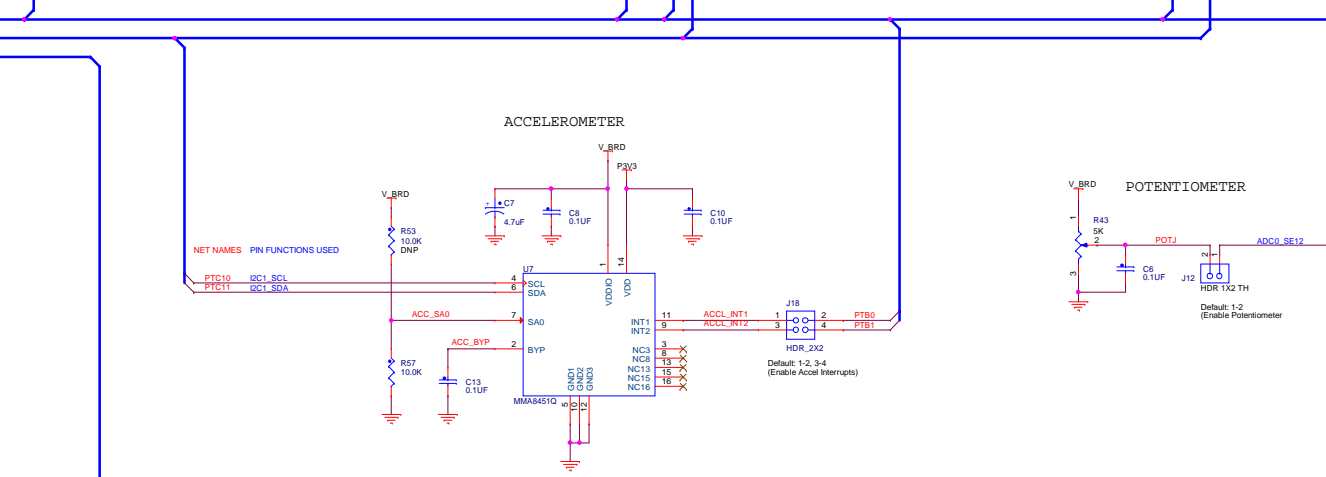




Note: The TWRPI connectors are powered by V\_BRD which may be 1.8V or 3.3V.

Not all TWRPI boards will work at 1.8V.

Check that TWRPI boards will work at 1.8V before using them with this board when V\_BRD is jumpered for 1.8V.



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