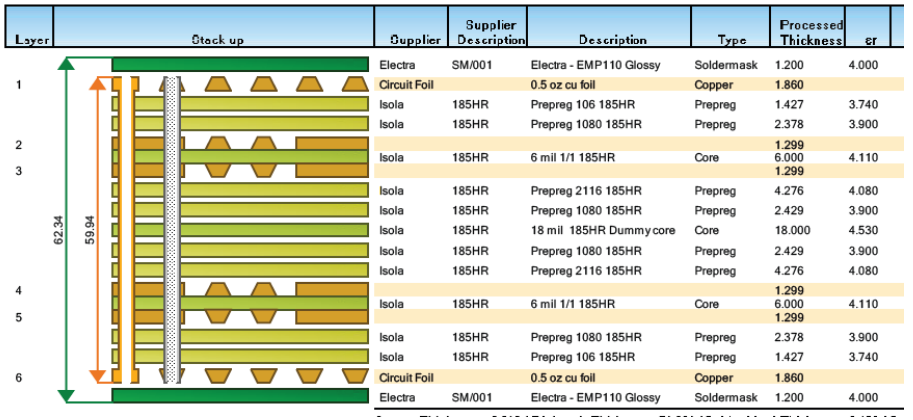
BMS MASTER BOARD

MAJOR REVISION HISTORY :

PCB REV.	SCH. REV.	DESCRIPTION	DATE
1.0	1.0	Schematic Baselined.	18-NOV-2021

PAGE DESCRIPTION

STACK UP DETAILS



Layer	Stack up	Supplier	Supplier Description	Description	Type	Processed Thickness	er
		Electra	SM/001	Electra - EMP110 Glossy	Soldermask	1.200	4.000
1		Circuit Foil		0.5 oz cu foil	Copper	1.860	
		Isola	185HR	Prepreg 106 185HR	Prepreg	1.427	3.740
		Isola	185HR	Prepreg 1080 185HR	Prepreg	2.378	3.900
2						1.299	
		Isola	185HR	6 mil 1/1 185HR	Core	6.000	4.110
3						1.299	
		Isola	185HR	Prepreg 2116 185HR	Prepreg	4.276	4.080
		Isola	185HR	Prepreg 1080 185HR	Prepreg	2.429	3.900
		Isola	185HR	18 mil 185HR Dummy core	Core	18.000	4.530
		Isola	185HR	Prepreg 1080 185HR	Prepreg	2.429	3.900
		Isola	185HR	Prepreg 2116 185HR	Prepreg	4.276	4.080
4						1.299	
		Isola	185HR	6 mil 1/1 185HR	Core	6.000	4.110
5						1.299	
		Isola	185HR	Prepreg 1080 185HR	Prepreg	2.378	3.900
		Isola	185HR	Prepreg 106 185HR	Prepreg	1.427	3.740
6		Circuit Foil		0.5 oz cu foil	Copper	1.860	
		Electra	SM/001	Electra - EMP110 Glossy	Soldermask	1.200	4.000

PCB MECHANICAL DETAILS :

1. PCB SIZE: 100mm X 90mm
2. PCB MATERIAL: FR4
3. NUMBER OF LAYERS: 6
4. PCB THICKNESS : 1.6mm
5. IMPEDANCE CONTROL: YES

NOTES, UNLESS OTHERWISE SPECIFIED :

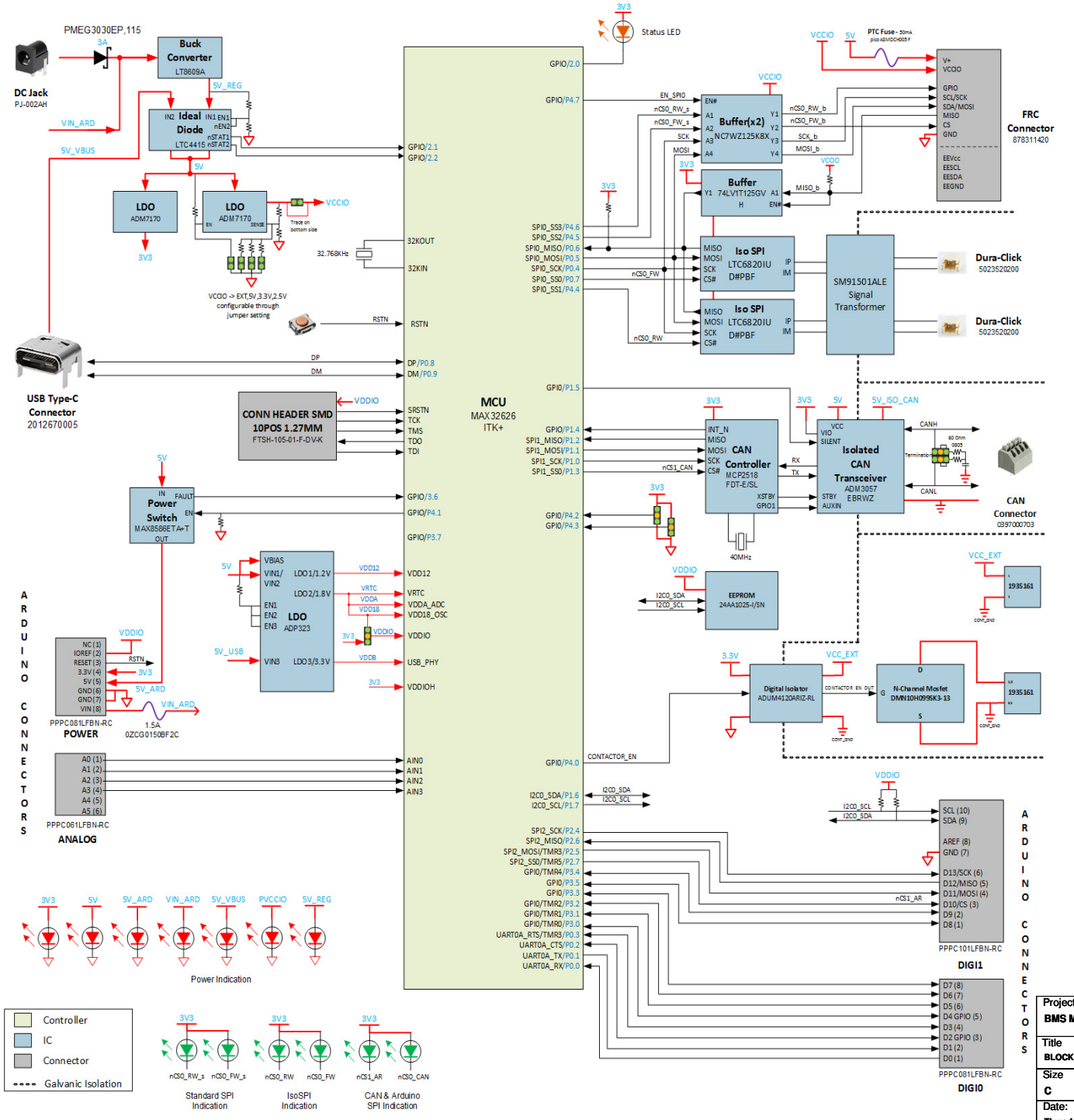
1. RESISTANCE VALUES ARE IN OHM.
2. PARTS NOT INSTALLED ARE INDICATED WITH 'DNP'.

#	Device	Interface	Address
1	DEBUG	--	NA
2	ISOSPI	SPI0	NA
3	FRC Connector	SPI0	NA
4	CAN Controller	SPI1	NA
5	Arduino	SPI2	NA
6	Arduino	UART0	NA
7	Arduino	I2C0	NA
8	EEPROM	I2C0	R/W- 0xA1/0xA0

Project: BMS MASTER BOARD		einfochips An Arrow Company The Solutions People
Title: COVER PAGE		
Size: C	Document Name & No.: 16_01003_01	Rev: 1.0
Date: Thursday, November 18, 2021	Sheet 1 of 10	

BMS Master Board Hardware Architecture

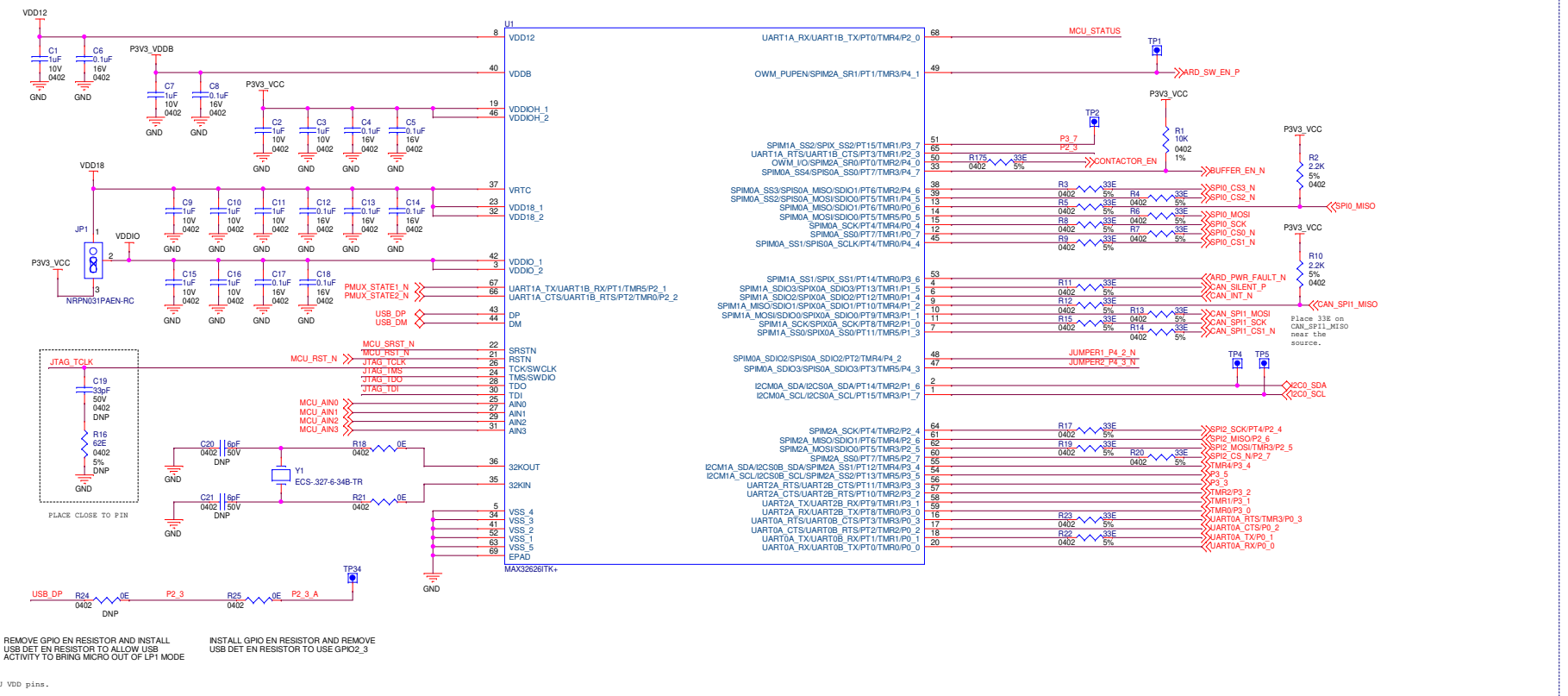
Version – 1.1
15-NOV-2021



Project: BMS MASTER BOARD		
Title: BLOCK DIAGRAM		
Size: C	Document Name & No.: 16_01003_01	Rev: 1.0
Date: Thursday, November 18, 2021	Sheet 2 of 10	

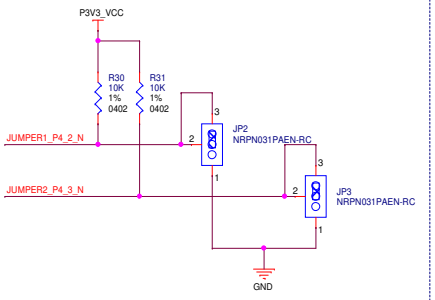
MCU SUBSYSTEM

MCU



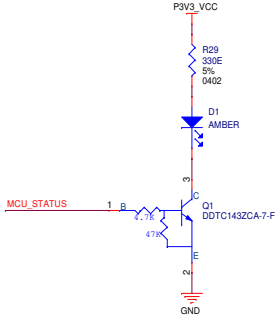
Note:
Place this decaps close to the MCU VDD pins.

FUNCTION JUMPERS



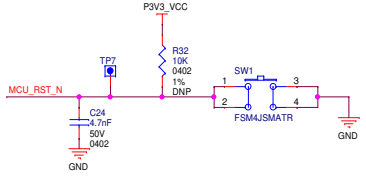
Note:
1. Default Jumper position Pin 2 - 3.
2. By default signal will be high.

MCU STATUS LED



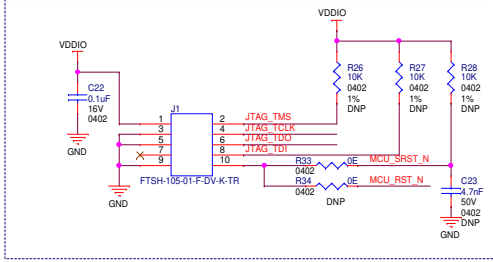
LED Current --> 4mA

MCU RESET SWITCH



Note:
Reset Switch timing set to 120uS as per the Pullup Resistor of 25K and 4.7nF Capacitor.

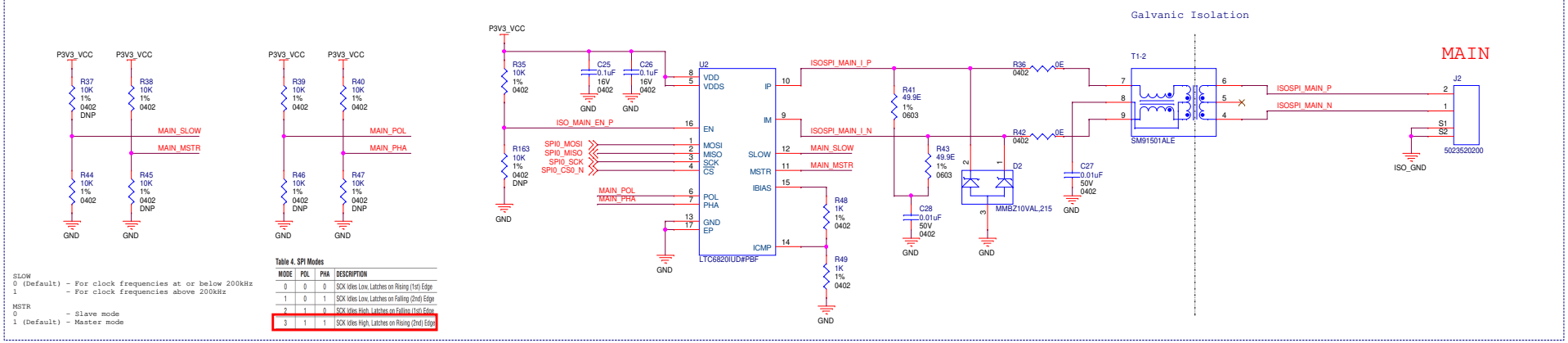
JTAG SECTION



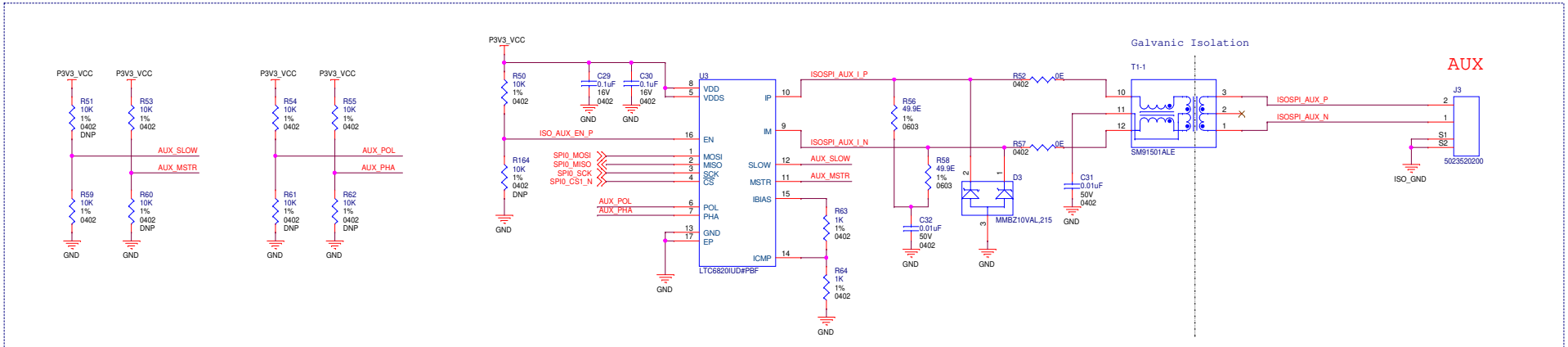
Project: BMS MASTER BOARD		eInfochips An Arrow Company — The Solutions People
Title: MCU		
Size: C	Document Name & No.: 16_01003_01	Rev: 1.0
Date: Thursday, November 18, 2021	Sheet 3 of 10	

ISO SPI INTERFACE

ISO SPI MAIN/Forward Channel



ISO SPI AUX/Reverse Channel



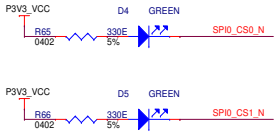
Layout Note:

1. The transformer should be placed as close to the iso-SPI cable connector as possible. The distance should be kept less than 2cm. The LTC6820 should be placed at least 1cm to 2cm away from the transformer to help isolate the IC from the magnetic coupling fields.

2. On the top layer, no ground plane should be placed under the magnetic, the isoSPI connector, or in between the transformer and the connector.

3. The IP and IM traces should be isolated from surrounding circuits. No traces should cross the IP and IM lines, unless separated by a ground plane within the printed circuit board.

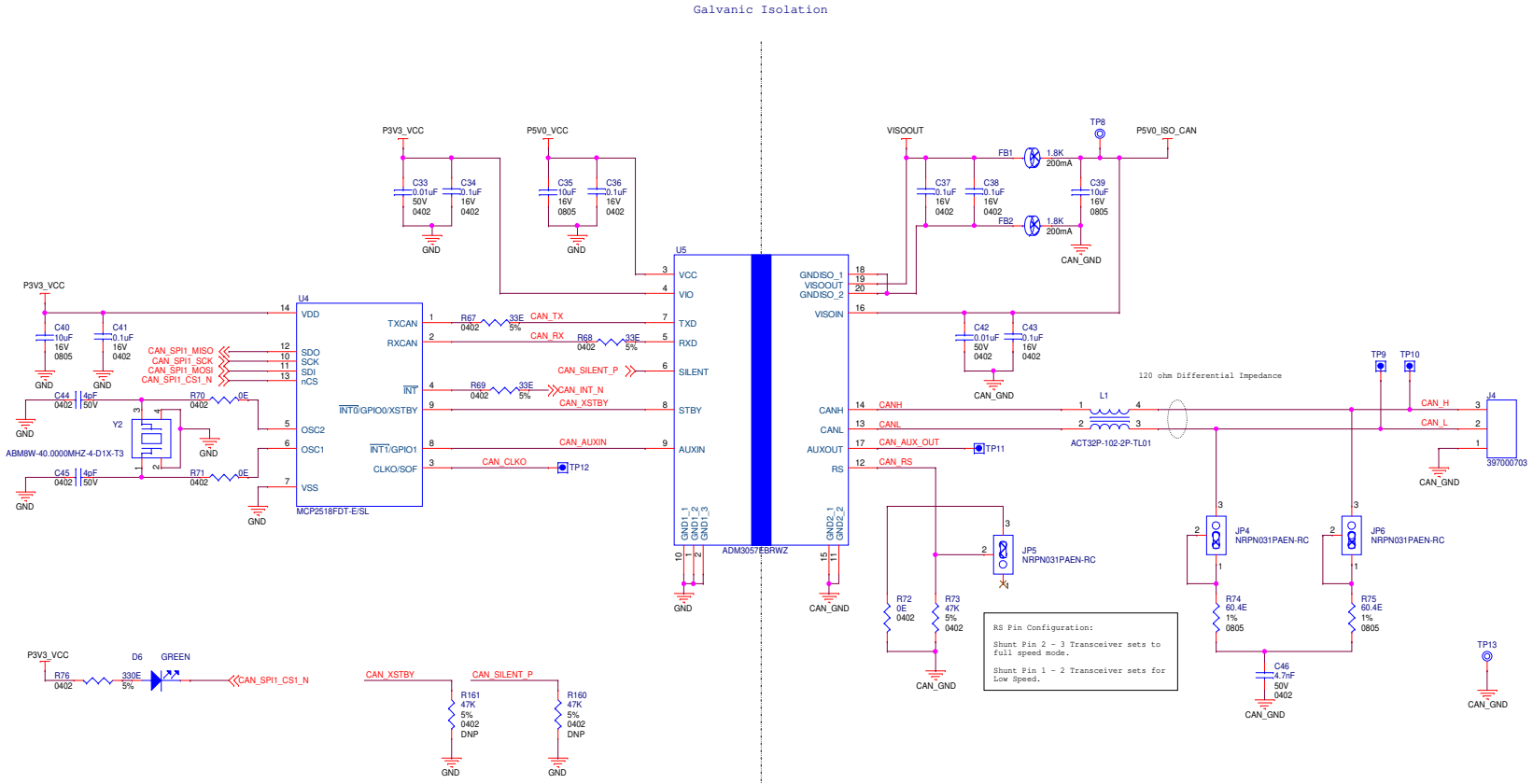
Chip Select Indication LEDs



Project: BMS MASTER BOARD		
Title: ISOSPI INTERFACE		
Size: C	Document Name & No.: 16_01003_01	Rev: 1.0
Date: Thursday, November 18, 2021	Sheet 4 of 10	

CAN INTERFACE

CAN CONTROLLER & ISOLATED CAN TRANSCEIVER

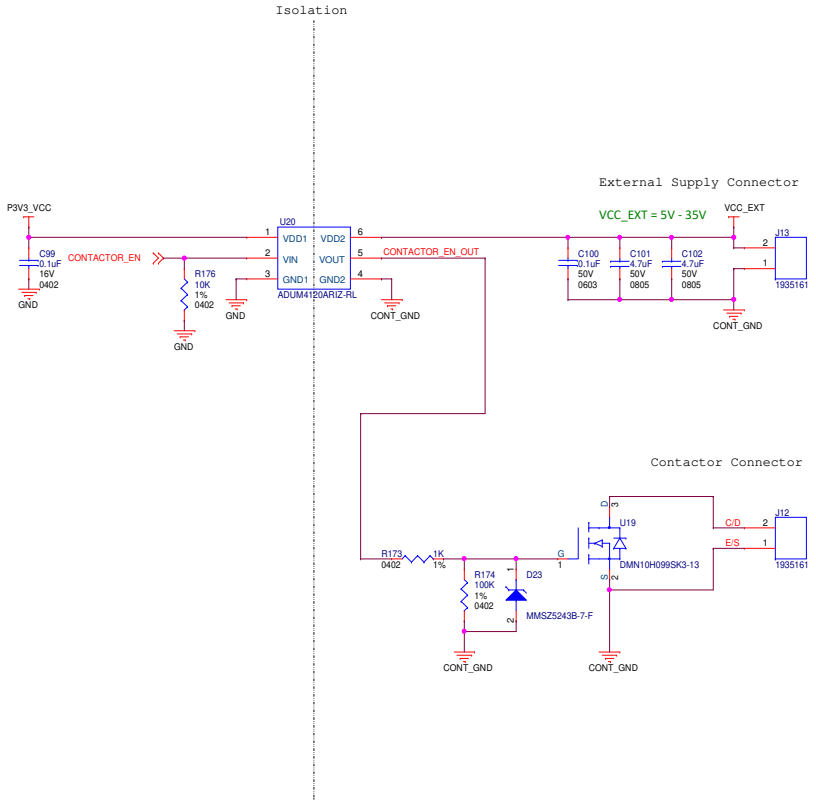


Note:
Internal Pull-down resistor on Silent and STBY pin.

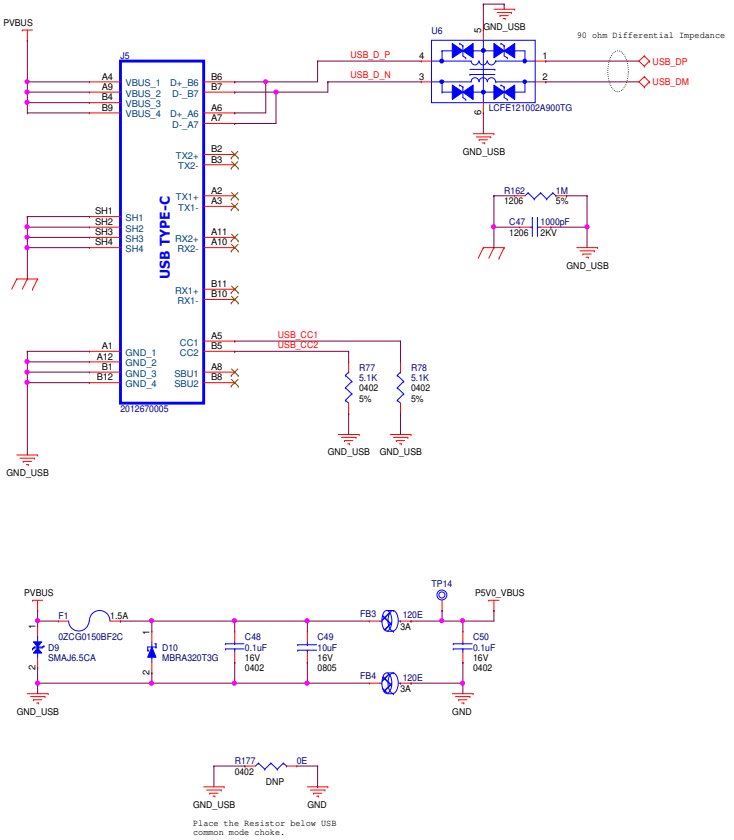
Project: BMS MASTER BOARD		
Title: CAN INTERFACE		
Size: C	Document Name & No.: 16_01003_01	Rev: 1.0
Date: Wednesday, December 01, 2021	Sheet 5 of 10	

USB & CONTACTOR INTERFACE

CONTACTOR CIRCUIT



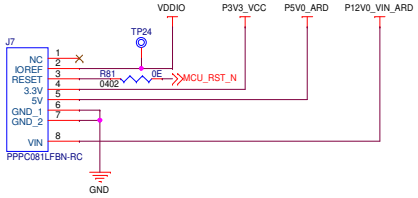
USB TYPE-C CONNECTOR



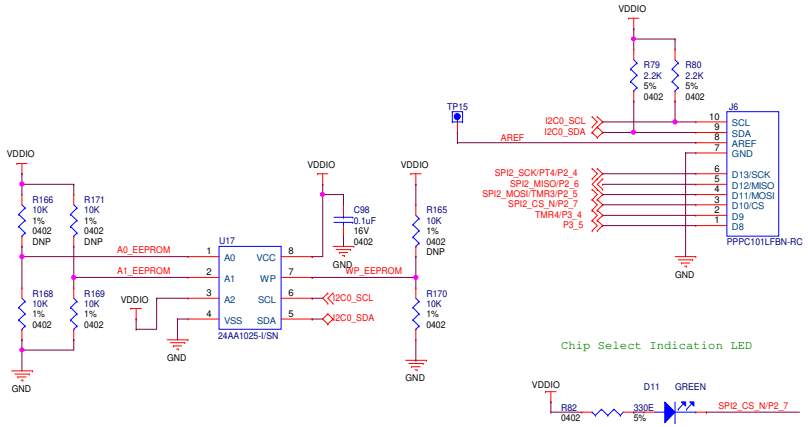
Project: BMS MASTER BOARD		
Title: USB & CONTACTOR INTERFACE		
Size: C	Document Name & No.: 16_01003_01	Rev: 1.0
Date: Thursday, November 18, 2021	Sheet 6 of 10	

ARDUINO CONNECTOR

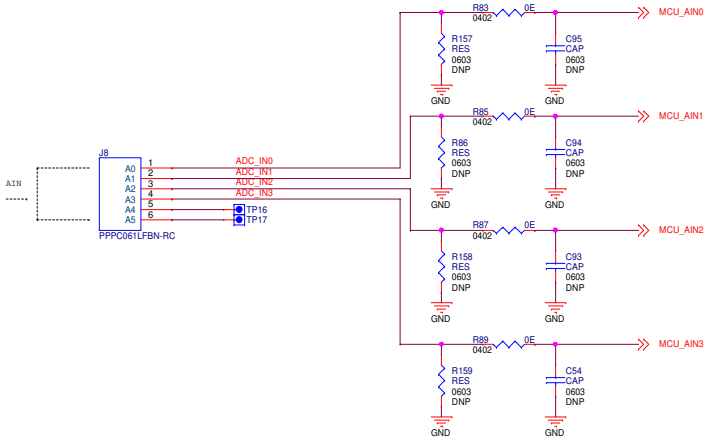
POWER



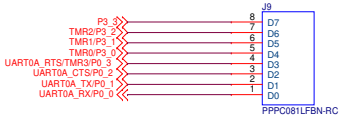
DIGI1 & EEPROM



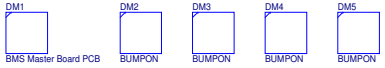
ANALOG CONNECTOR & INPUT PI FILTER



DIGI0



DUMMY PARTS



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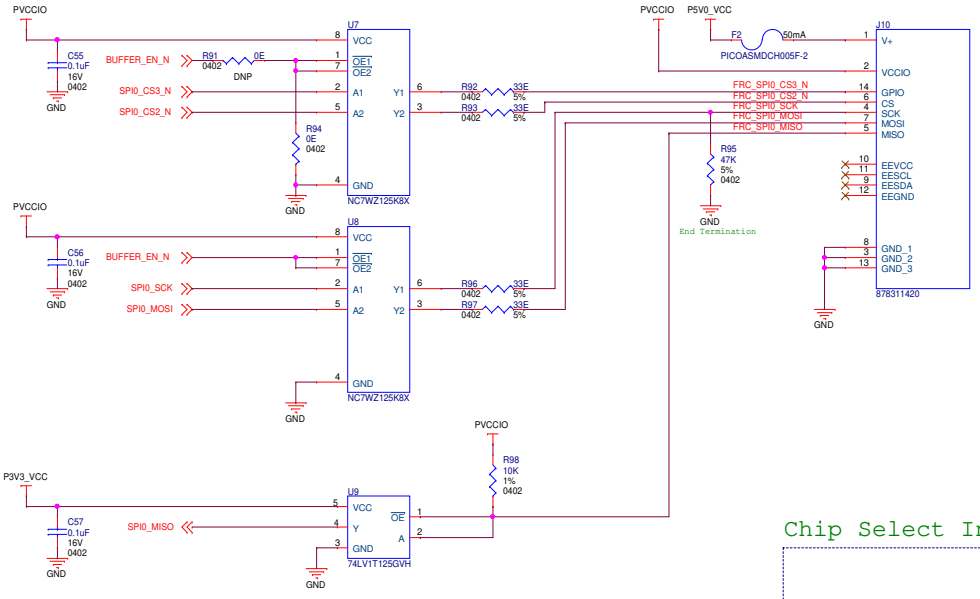
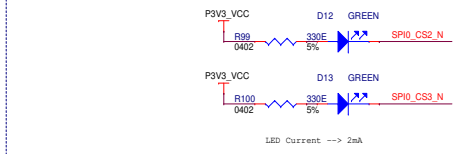
Title: ARDUINO CONNECTOR		
Size: C	Document Name & No.: 16_01003_01	Rev: 1.0
Date: Thursday, November 18, 2021	Sheet 7 of 10	

BUFFERS & FRC CONNECTOR



Chip Select Indication LEDs



Project: **BMS MASTER BOARD**		
Title: **FRC CONNECTOR**		
Size: **C**	Document Name & No.: **16_01003_01**	Rev: **1.0**
Date: **Thursday, November 18, 2021**	Sheet **8** of **10**	

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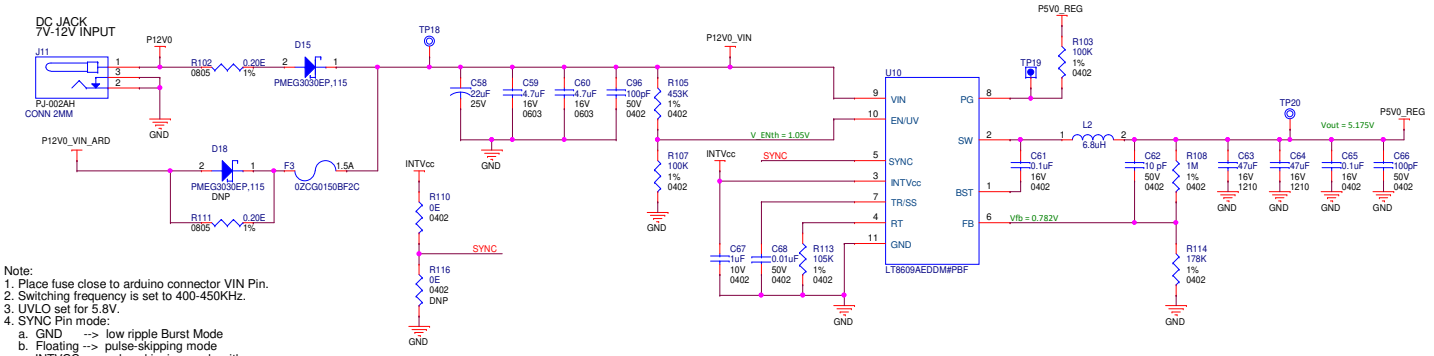
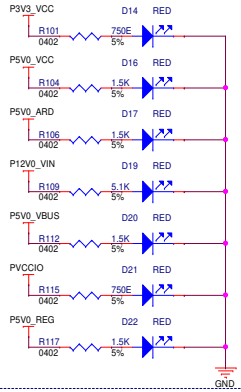
POWER SUPPLY SECTION

DC-DC CONVERTER



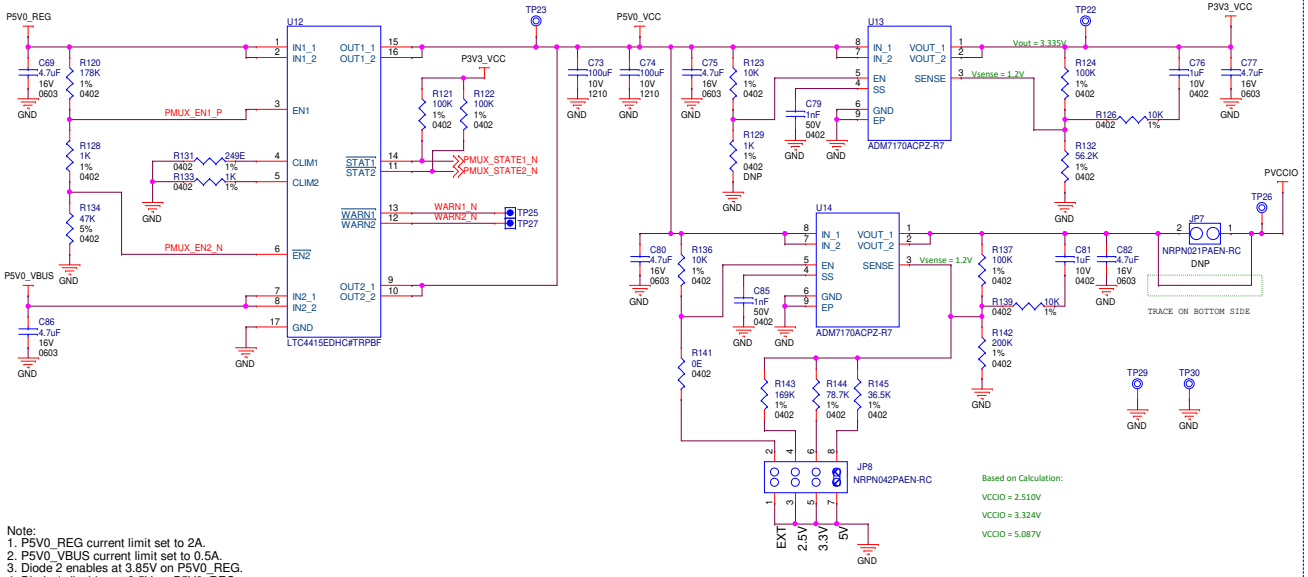
Note:
1. Place fuse close to arduino connector VIN Pin.
2. Switching frequency is set to 400-450KHz.
3. UVLO set for 5.8V.
4. SYNC Pin mode:
   a. GND --> low ripple Burst Mode
   b. Floating --> pulse-skipping mode
   c. INTVCC --> pulse-skipping mode with spread spectrum modulation.

POWER INDICATION LEDs



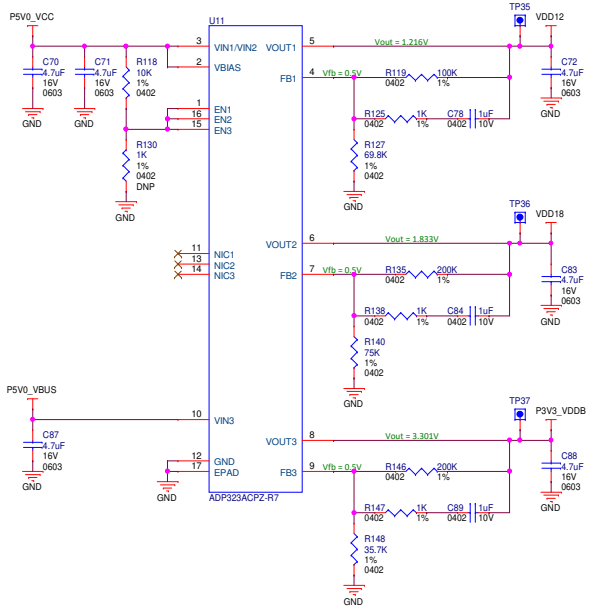
Note:
LED Current set to 2mA.

POWER MUX & LDO SECTION FOR 3.3V AND CONFIGURABLE VCCIO

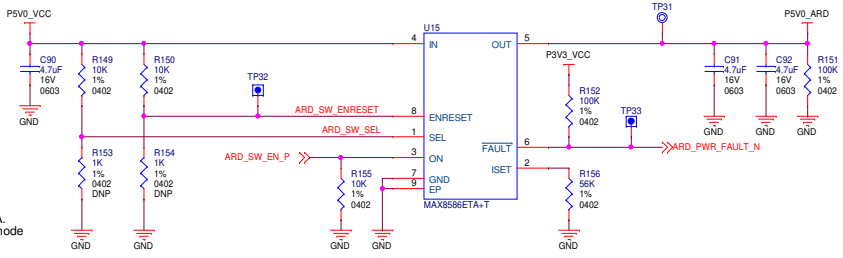


Note:
1. P5V0_REG current limit set to 2A.
2. P5V0_VBUS current limit set to 0.5A.
3. Diode 2 enables at 3.85V on P5V0_REG.
4. Diode 1 disables at 3.5V on P5V0_REG.

MCU SUPPLY LDO (5V TO 1.2V, 1.8V & 3.3V)



ARDUINO POWER SWITCH



Note:
1. P5V0_ARD current limit set to 0.65A.
2. Power Switch is set to auto restart mode by default.

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Title: POWER SUPPLY		
Size: C	Document Name & No.: 16_01003_01	Rev: 1.0
Date: Thursday, November 18, 2021	Sheet 9 of 10	

REVISION HISTORY

PCB REV	SCH REV	CHANGE DESCRIPTION	DATE	AUTHOR
1.0	0.1	Create initial draft schematic.	20 SEP 2021	eInfochips
	0.2	Internal review comments implemented.	06 OCT 2021	eInfochips
	0.3	Replaced all 2.54mm Header with 2mm Header	07 OCT 2021	eInfochips
	0.4	1. Added 33 Ohm resistors on UART_TX, UART_RTS and removed from UART_RX and UART_CTS on Page 3, MCU section. 2. Corrected net name mismatch for SPI2_CS_N/P2_7 on Page 7, DIGI1 section	12 OCT 2021	eInfochips
	0.5	1. Replaced R129, R130, R153 and R154 Enable pin 10K pull down provision to 1K in power supply section. 2. Added 10K Enable pin pull down to ISOSPI LTC6820 IC. 3. Changed the LTC4415 state pull-up to 3.3V. 4. Removed Test Probe on VDD12, VDD18 and 3V3_VDDB and added Test Point. 5. Added Test Probe on VDDIO. 6. Added EEPROM on arduino I2C.	25 OCT 2021	eInfochips
	0.6	1. Added Contactor circuit. 2. Swapped isoSPI tranformer channels as per the placement. 3. Removed isolated DC-DC power supply and added 2-pin ternimal block for external power supply connections. 4. Added zener diode across MOSFET Gate to source.	11 NOV 2021	eInfochips
	1.0	1. Changed R2 and R10 value to 2.2K. 2. Updated U10 part number. 3. R177 added between GND and GND_USB. 4. Baselined schematic as per customer approval.	18 NOV 2021	eInfochips

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Title: REVISION HISTORY		
Size: C	Document Name & No.: 16_01003_01	Rev: 1.0
Date: Thursday, November 18, 2021	Sheet 10 of 10	