INTEGRATED STANDARD USER INTERFACE

Commercial Base model User Interface Board

Adapted from Volga Wet base model User Interface Board

Changelog:

Q26034-003
REV A -- Updates:
Based off Q26034-002 Design.
Added Accelerometer

1231461 No Telemetry (Variant = PopulateProd)

1232996 Telemetry (Variant = PopProdTelem)

1261079 Telemetry 4G NA

1261182 Telemetry 4G EMEA

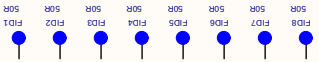
REFERENCE PART NUMBERS:
Referenced from - 1219795 Rhine UI

FW1
FIRMWARE

GET UPDATED FIRMWARE INFO FROM
LATEST DRAWING: 1231461

PCB1
PCB Q25082-003

SCHEMATIC1
SCHEMATIC Q26034-003



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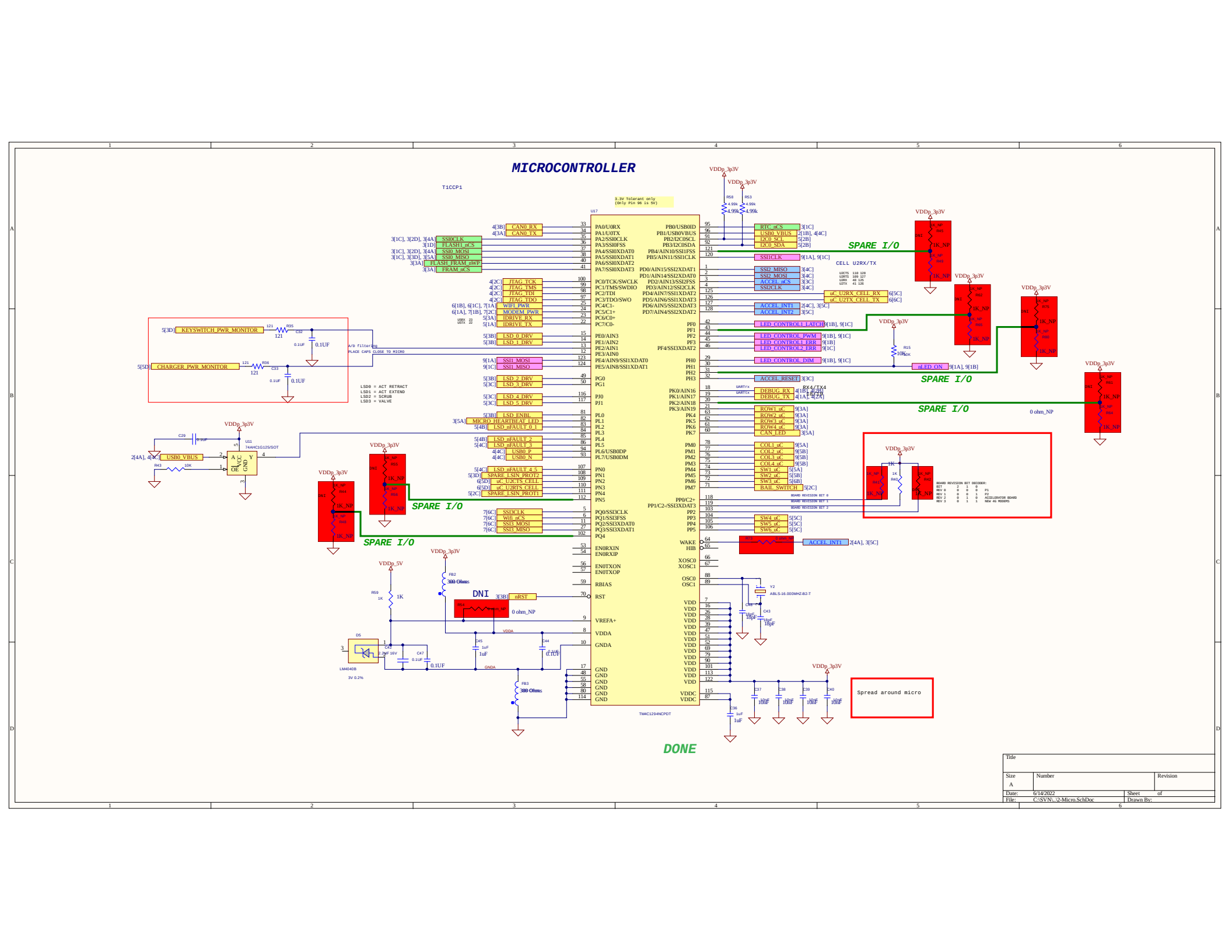
MICROCONTROLLER
T1CCP1
U17
TM4C1294NCPDT
3.3V Tolerant only
(only Pin 96 is 5V)
PA0/U0RX
PA1/U0TX
PA2/SSI0CLK
PA3/SSI0FSS
PA4/SSI0XDAT0
PA5/SSI0XDAT1
PA6/SSI0XDAT2
PA7/SSI0XDAT3
PC0/TCK/SWCLK
PC1/TMS/SWDIO
PC2/TDI
PC3/TDO/SWO
PC4/C1-
PC5/C1+
PC6/C0+
PC7/C0-
PE0/AIN3
PE1/AIN2
PE2/AIN1
PE3/AIN0
PE4/AIN9/SSI1XDAT0
PE5/AIN8/SSI1XDAT1
PG0
PG1
PJ0
PJ1
PL0
PL1
PL2
PL3
PL4
PL5
PL6/USB0DP
PL7/USB0DM
PN0
PN1
PN2
PN3
PN4
PN5
PQ0/SSI3CLK
PQ1/SSI3FSS
PQ2/SSI3XDAT0
PQ3/SSI3XDAT1
PQ4
EN0RXIN
EN0RXIP
EN0TXON
EN0TXOP
RBIAS
RST
VREFA+
VDDA
GNDA
PB0/USB0ID
PB1/USB0VBUS
PB2/I2C0SCL
PB3/I2C0SDA
PB4/AIN10/SSI1FSS
PB5/AIN11/SSI1CLK
PD0/AIN15/SSI2XDAT1
PD1/AIN14/SSI2XDAT0
PD2/AIN13/SSI2FSS
PD3/AIN12/SSI2CLK
PD4/AIN7/SSI1XDAT2
PD5/AIN6/SSI1XDAT3
PD6/AIN5/SSI2XDAT3
PD7/AIN4/SSI2XDAT2
PF0
PF1
PF2
PF3
PF4/SSI3XDAT2
PH0
PH1
PH2
PH3
PK0/AIN16
PK1/AIN17
PK2/AIN18
PK3/AIN19
PK4
PK5
PK6
PK7
PM0
PM1
PM2
PM3
PM4
PM5
PM6
PM7
PP0/C2+
PP1/C2-/SSI3XDAT3
PP2
PP3
PP4
PP5
WAKE
HIB
XOSC0
XOSC1
OSC0
OSC1
VDD
VDDC
GND
CAN0_RX
CAN0_TX
SSI0CLK
FLASH1_nCS
SSI0_MOSI
SSI0_MISO
FLASH_FRAM_nWP
FRAM_nCS
JTAG_TCK
JTAG_TMS
JTAG_TDI
JTAG_TDO
WIFI_PWR
MODEM_PWR
IDRIVE_RX
IDRIVE_TX
LSD_0_DRV
LSD_1_DRV
SSI1_MOSI
SSI1_MISO
LSD_2_DRV
LSD_3_DRV
LSD_4_DRV
LSD_5_DRV
LSD_ENBL
MICRO_HEARTBEAT_LED
LSD_nFAULT_0_1
LSD_nFAULT_2
LSD_nFAULT_3
USB0_P
USB0_N
LSD_nFAULT_4_5
SPARE_LSIN_PROT2
uC_U2CTS_CELL
SPARE_LSIN_PROT1
SSI3CLK
Wifi_nCS
SSI3_MOSI
SSI3_MISO
nRST
RTC_nCS
USB0_VBUS
I2C0_SCL
I2C0_SDA
SSI1CLK
SSI2_MISO
SSI2_MOSI
ACCEL_nCS
SSI2CLK
uC_U2RX_CELL_RX
uC_U2TX_CELL_TX
ACCEL_INT1
ACCEL_INT2
LED_CONTROL1_LATCH
LED_CONTROL_PWM
LED_CONTROL1_ERR
LED_CONTROL2_ERR
LED_CONTROL_DIM
nLED_ON
ACCEL_RESET
DEBUG_RX
DEBUG_TX
ROW1_uC
ROW2_uC
ROW3_uC
ROW4_uC
CAN_LED
COL1_uC
COL2_uC
COL3_uC
COL4_uC
SW1_uC
SW2_uC
SW3_uC
BAIL_SWITCH
SW4_uC
SW5_uC
SW6_uC
CELL U2RX/TX
BOARD REVISION BIT DECODER:
REV 0 0 0 0 P1
REV 1 0 0 1 P2
REV 2 0 1 0 ACCELERATOR BOARD
REV 3 0 1 1 NEW 4G MODEMS
KEYSWITCH_PWR_MONITOR
CHARGER_PWR_MONITOR
A/D filtering
PLACE CAPS CLOSE TO MICRO
LSD0 = ACT RETRACT
LSD1 = ACT EXTEND
LSD2 = SCRUB
LSD3 = VALVE
USB0_VBUS
74AHC1G125/SOT
LM4040B
3V 0.2%
SPARE I/O
DNI
0 ohm_NP
1K_NP
Spread around micro
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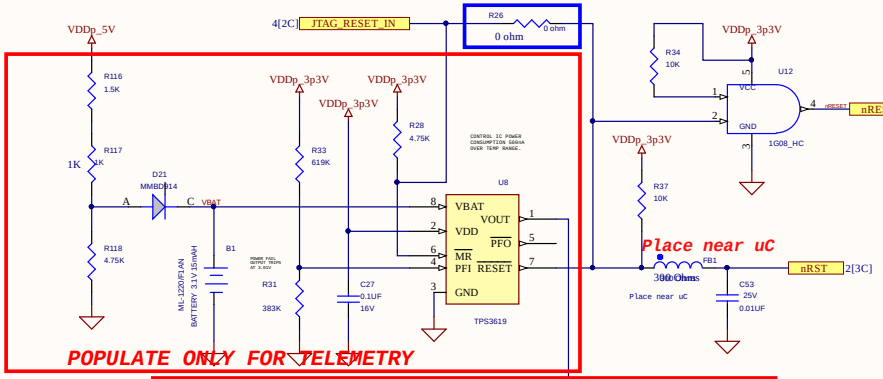
MICROCONTROLLER HARDWARE

ONLY CHARGES BATTERY
WHEN MACHINE IS
RUNNING.
ONLY USES BATTERY
WHEN MAIN BATTERY IS
DISCONNECTED.

PLACE NEAR MICROCONTROLLER!

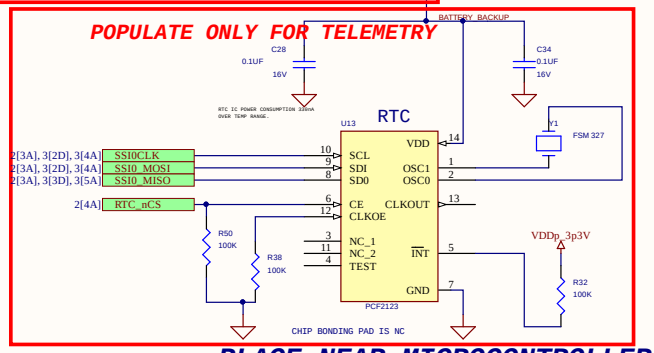
BATTERY AND RESET

POPULATE ONLY FOR NO-TELEMETRY



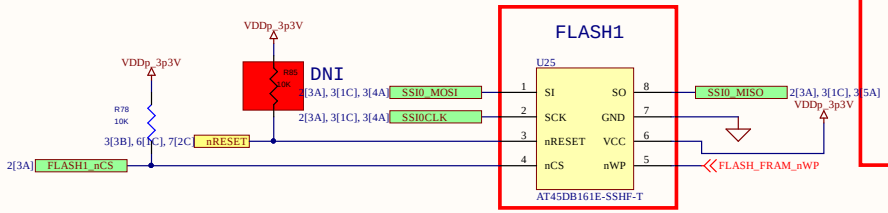
POPULATE ONLY FOR TELEMETRY

POPULATE ONLY FOR TELEMETRY



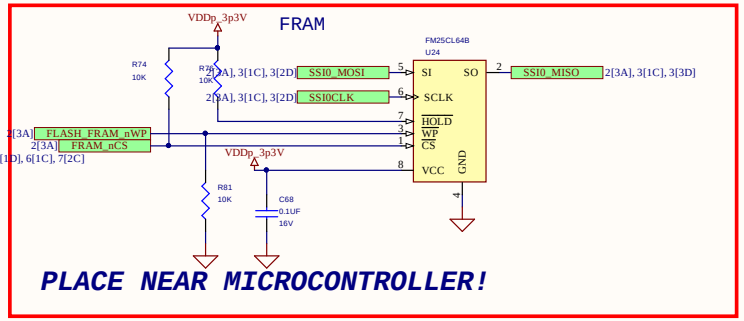
PLACE NEAR MICROCONTROLLER!

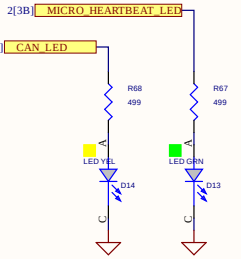
CHANGED: From MT25QL128ABA1ESE



DONE

FM25CL64B





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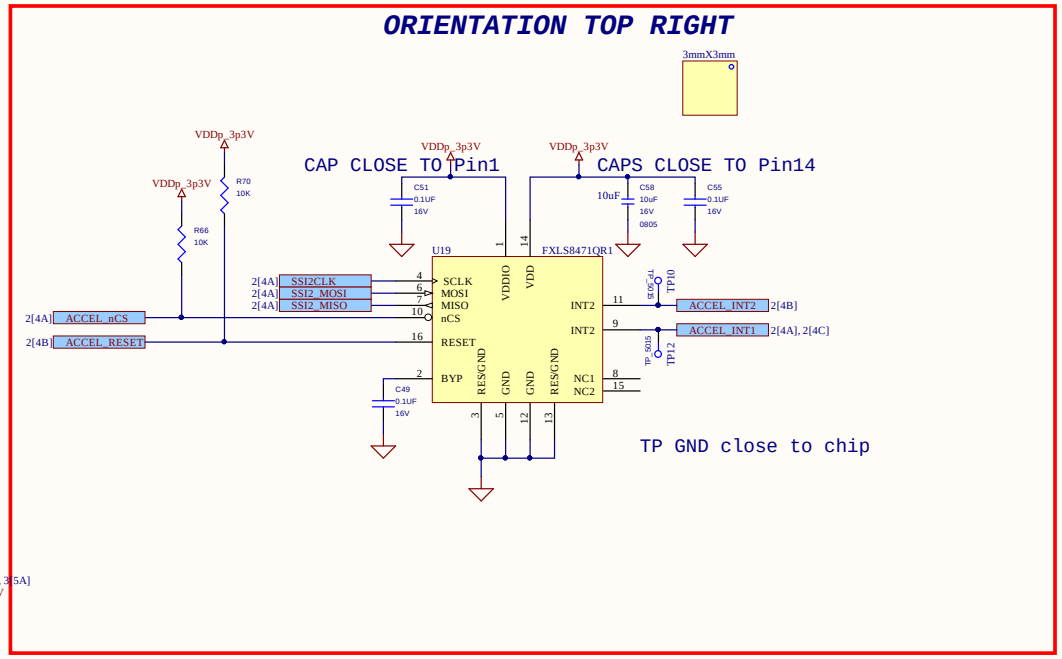
ACCELEROMETER

ORIENTATION TOP RIGHT



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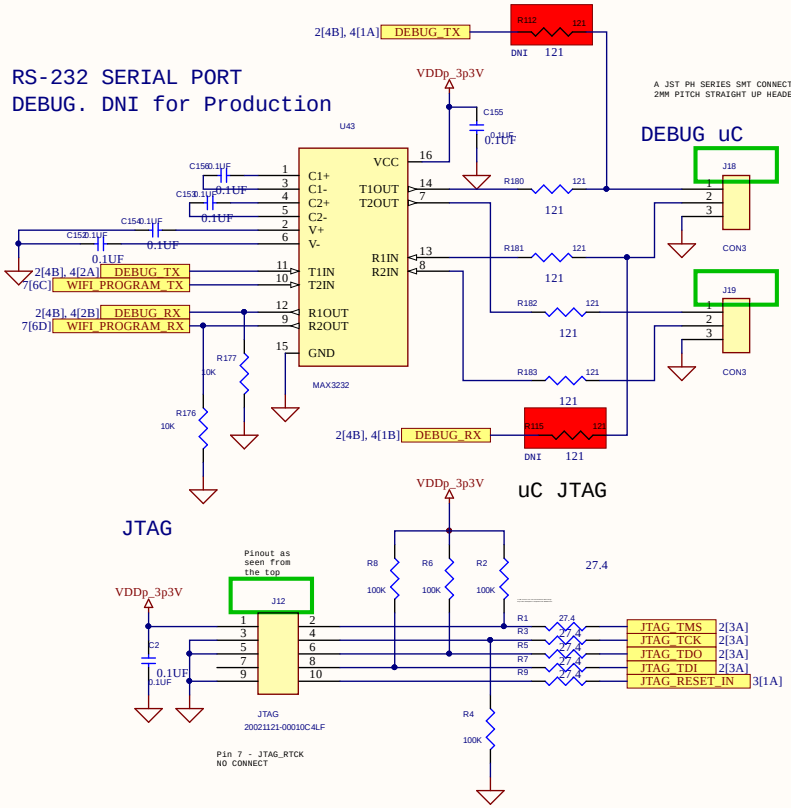
INTERFACES
CONNECTORS

RS-232 SERIAL PORT
DEBUG. DNI for Production



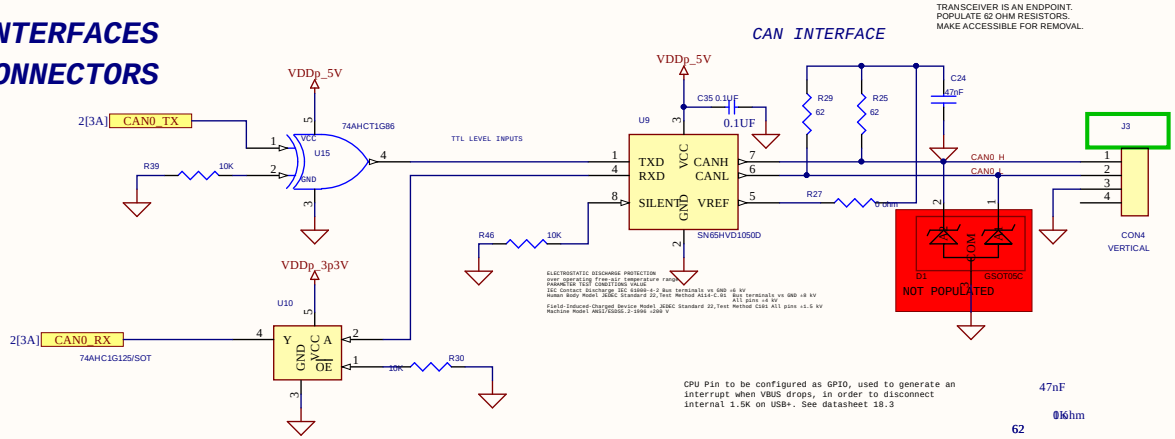
A JST PH SERIES SMT CONNECTOR
2MM PITCH STRAIGHT UP HEADER

DEBUG uC

uC JTAG

JTAG

CAN INTERFACE



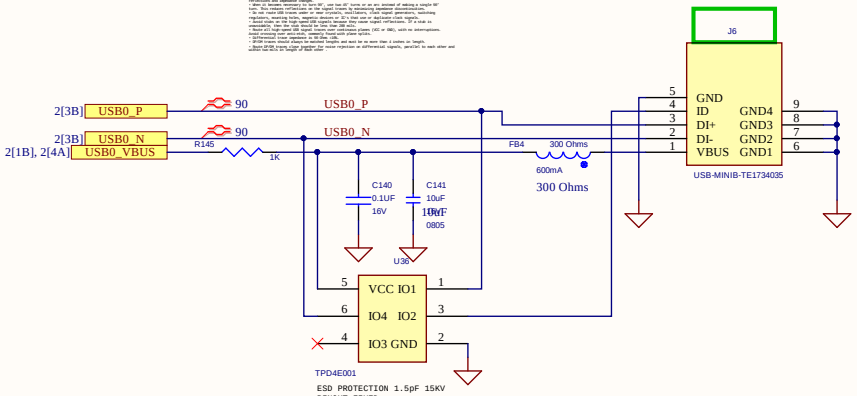
TRANSCEIVER IS AN ENDPOINT.
POPULATE 62 OHM RESISTORS.
MAKE ACCESSIBLE FOR REMOVAL.

CPU Pin to be configured as GPIO, used to generate an interrupt when VBUS drops, in order to disconnect internal 1.5K on USB+. See datasheet 18.3

47nF

62

CURRENT REQUIREMENTS OF MULTI TECH USB MODEM:
IN USE 81mA AT 5V
IDLE 54mA
PEAK 350mA



ESD PROTECTION 1.5pF 15KV
PINOUT FIXED.

DONE

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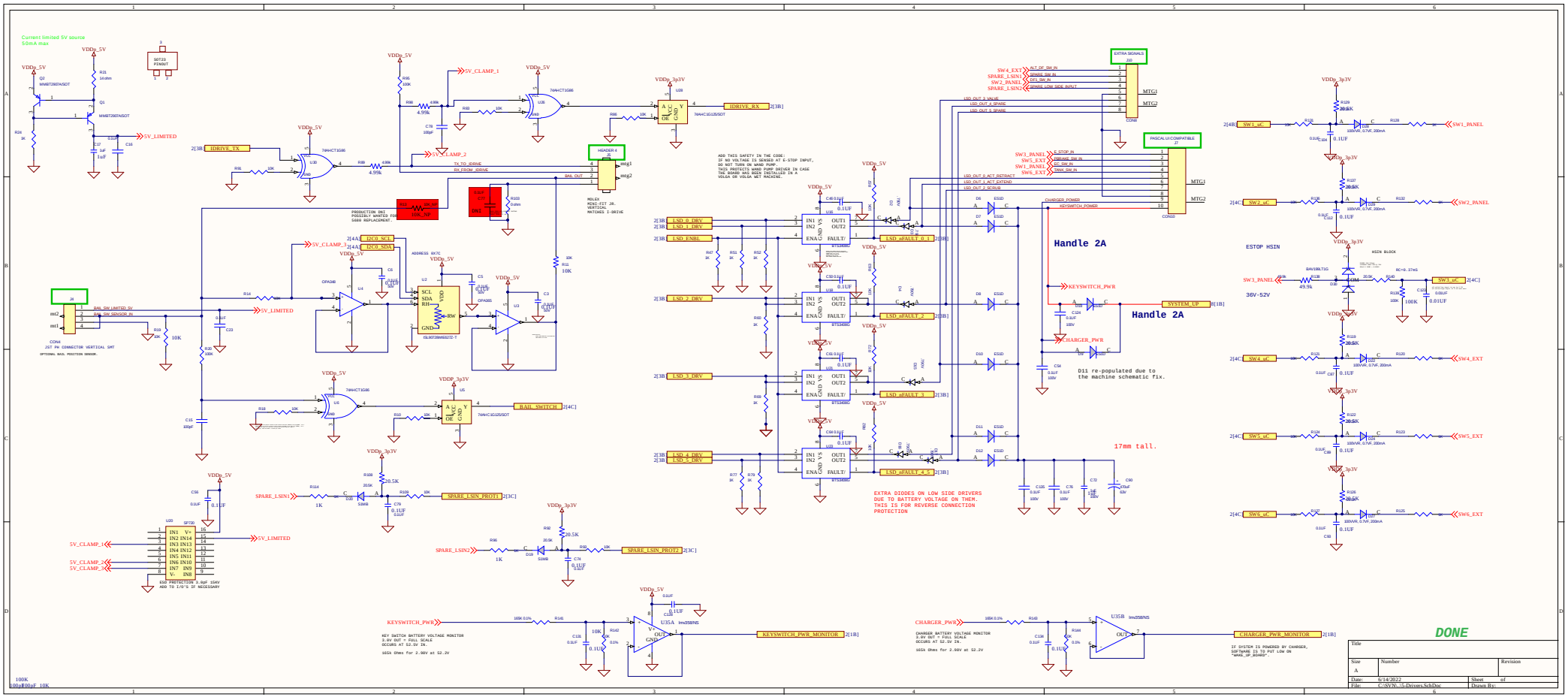
Current limited 5V source
50mA max
VDDo_5V
VDDo_3p3V
5V_LIMITED
5V_CLAMP_1
5V_CLAMP_2
5V_CLAMP_3
IDRIVE_TX
IDRIVE_RX
TX_TO_IDRIVE
RX_FROM_IDRIVE
BAIL_OUT
BAIL_SWITCH
I2C0_SCL
I2C0_SDA
LSD_0_DRV
LSD_1_DRV
LSD_ENBL
LSD_2_DRV
LSD_3_DRV
LSD_4_DRV
LSD_5_DRV
LSD_nFAULT_0_1
LSD_nFAULT_2
LSD_nFAULT_3
LSD_nFAULT_4_5
SPARE_LSIN1
SPARE_LSIN2
SPARE_LSIN_PROT1
SPARE_LSIN_PROT2
KEYSWITCH_PWR
KEYSWITCH_PWR_MONITOR
CHARGER_PWR
CHARGER_PWR_MONITOR
SYSTEM_UP
CHARGER_POWER
KEYSWITCH_POWER
SW1_PANEL
SW2_PANEL
SW3_PANEL
SW4_EXT
SW5_EXT
SW6_EXT
ESTOP HSIN
36V-52V
Handle 2A
Handle 2A
17mm tall.
D11 re-populated due to the machine schematic fix.
EXTRA DIODES ON LOW SIDE DRIVERS DUE TO BATTERY VOLTAGE ON THEM. THIS IS FOR REVERSE CONNECTION PROTECTION
ADD THIS SAFETY IN THE CODE: IF NO VOLTAGE IS SENSED AT E-STOP INPUT, DO NOT TURN ON WAND PUMP. THIS PROTECTS WAND PUMP DRIVER IN CASE THE E-STOP SWITCH IS NOT WIRED IN A VOLGA OR VOLGA WET MACHINES
PRODUCTION ONLY POSSIBLY WANTED FOR 5600 REPLACEMENT
MOLEX MINI-FIT JR. VERTICAL MATCHES I-DRIVE
KEY SWITCH BATTERY VOLTAGE MONITOR 1.0V OUT = FULL SCALE OCCURS AT 52.5V IN.
165K Ohms for 2.90V at 52.2V
CHARGER BATTERY VOLTAGE MONITOR 1.0V OUT = FULL SCALE OCCURS AT 52.5V IN.
165K Ohms for 2.90V at 52.2V
IF SYSTEM IS POWERED BY CHARGER, SOFTWARE IS TO PUT LOW ON "WAKE_UP_BOARD".
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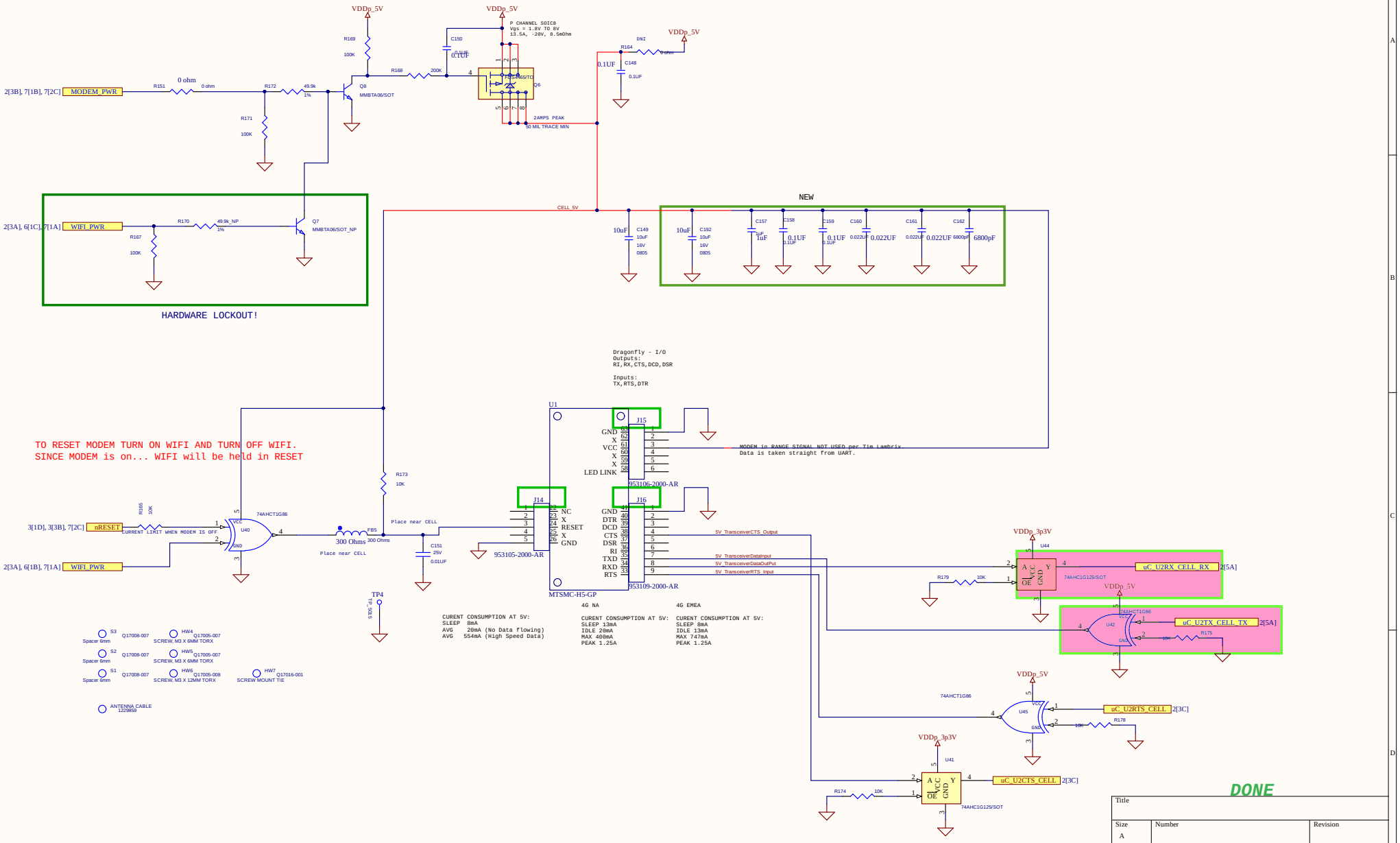
CELL MODEM



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0 ohm

To use the FCC certification of the Booster pack board, the antenna used should be of the same gain or lesser. In addition, the Antenna design should be exactly copied including the Antenna traces.

TELEMETRY

HARDWARE LOCKOUT!

NEW

uFL Connector

Chip Antenna

USE uFL OR CHIP ANTENNA

6.5 cm distance from Antenna or Transmitter (2.6 inches)

3.3V	IVBATT	IVDDIO
WIFI-TX	450mA	5mA
WIFI-RX	95mA	5mA

Short the antenna to GND

AH316M245001-T

FOLLOW LAYOUT GUILDLINES IN: CC3100MOD.pdf section 6.3

WIFI TI

CC3100MOD
WiFi Chip

U39
CC3100MODR11MAMOBT

TO RESET WIFI TURN ON MODEM AND TURN OFF MODEM.
SINCE WIFI is on... MODEM will be held in RESET

LOGGING DEBUG

Changed from Tie to GND to Tie to VDDp_3p3V

PROGRAMMING

WIFI PROGRAMING THROUGH UART

1) WIFI_PWR goes from LOW to HIGH
2) CHIP ENABLE (WIFI_ENABLE)
3) 5ms delay
4) Wifi_nRESET goes from LOW to HIGH

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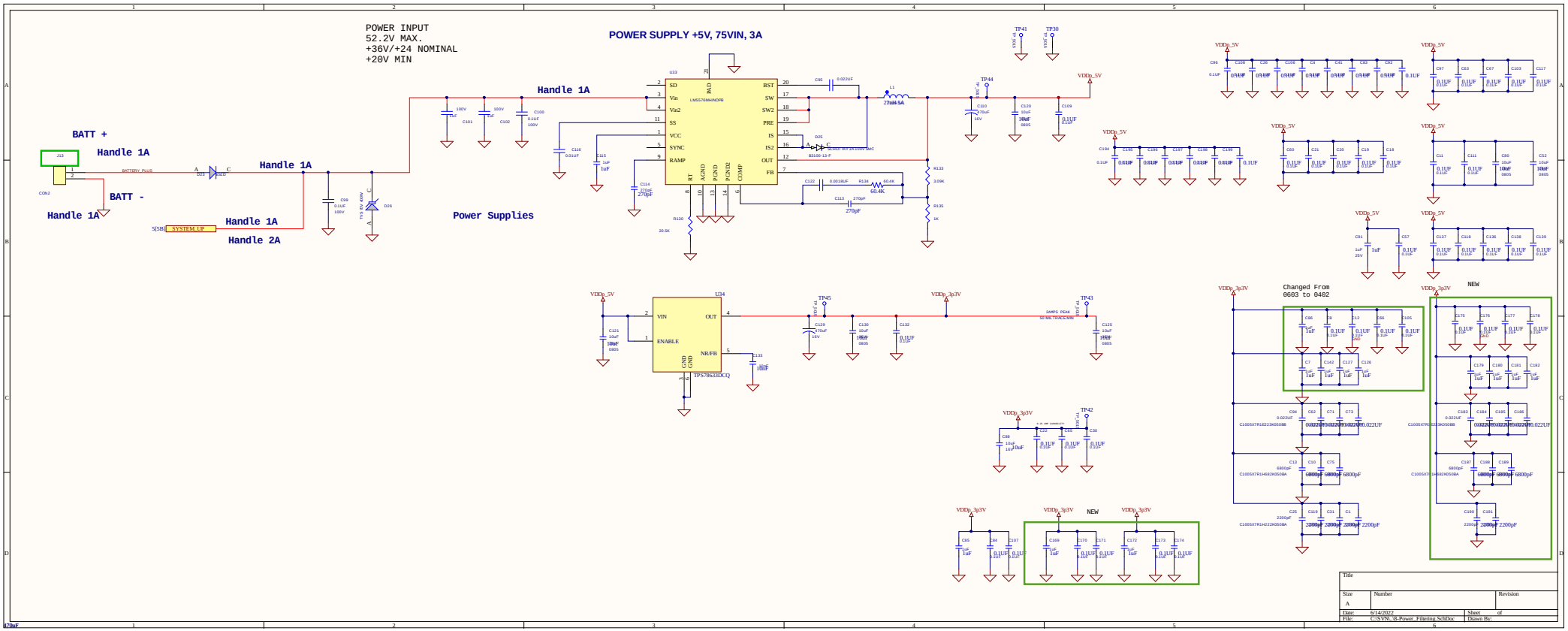
POWER INPUT
52.2V MAX.
+36V/+24 NOMINAL
+20V MIN
POWER SUPPLY +5V, 75VIN, 3A
BATT +
BATT -
Handle 1A
Handle 1A
Handle 1A
Handle 1A
Handle 2A
Power Supplies
LMS576MHNOPB
TPS7B633DCQ
Changed From
0603 to 0402
NEW
NEW
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BLANK LEDS:
High keep LEDS off. Low allows LEDs to be turned on. ACTIVE LOW.

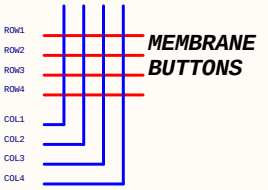
nGS/DC:
HIGH gives constant CURRENT. LOW allows DIMMING based on DUTY CYCLE on GSCLK. LOWER DUTY CYCLE = MORE DIMMING

XERR:
Open Drain ERROR indicator. LOW back to micro if there is a problem.

XLAT:
Functions as a latch for data coming in. Clock data in then Toggle HIGH.

Keypad & LED interfaces

Conventional 4 x 4 scanned keyboard. CPU will output a logic "1" to the Rows one at a time, and scan the returning Cols for a key press. Pull-downs on the Cols insure a logic "0" if a key in that column is not pressed. 244 isolates the CPU from the keypad. Series resistors and ESD devices will protect the buffer.



SINGLE POINT (RED)
19-217-R6C-P1Q2-3T
7mA 2.0Vf
(412 ohms)

SIDE SHOT (RED)
99-213-R6C-AR252B-2C
10mA 2.05Vf
(287 ohms)

SINGLE POINT (GREEN)
19-217/67C-BK2L2VV/3T
5mA 1.95Vf TYP
(590 ohms)

SIDE SHOT (BLUE)
99-113/BHC-AS1T1U/3T
20mA MAX 3.5Vf TYP
(69.8 ohms)

SINGLE POINT (YELLOW)
19-217UYC-S119-TR8
10mA 1.9Vf TYP
(287 ohms)

SIDE SHOT (YELLOW)
19-213/Y2C-AS1T1B/3T
10mA 2.05Vf TYP
(301 ohms)

60mA curve
640mA 0.35V
14mWatts
60mA curve
@20mA 0.2V
4.0mW
60mA curve
@20mA 0.2V
4.0mW
60mA curve
@7mA 0.11V
.77mW
60mA curve
@5mA 0.1V
500uW

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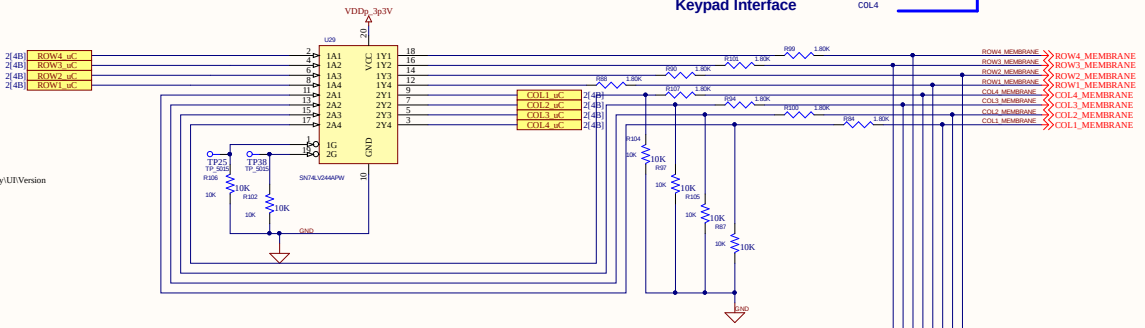
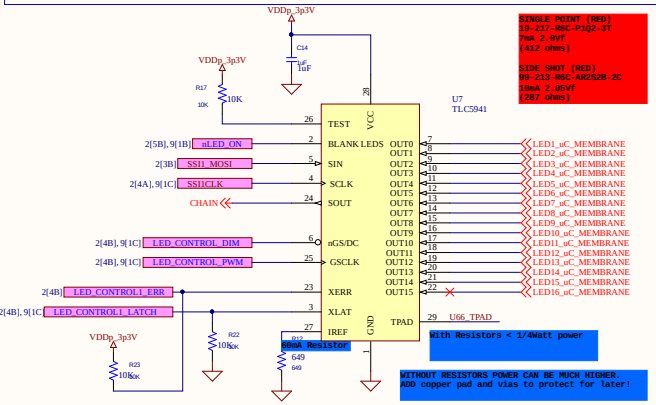
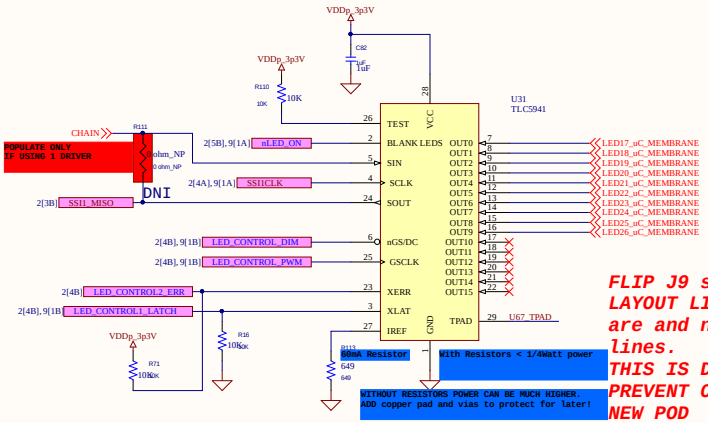
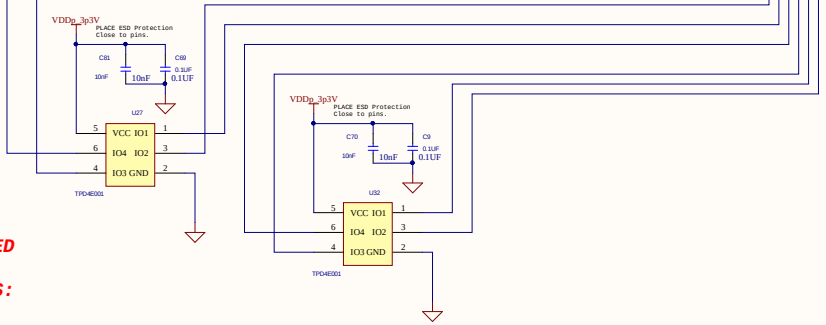
Keypad Interface

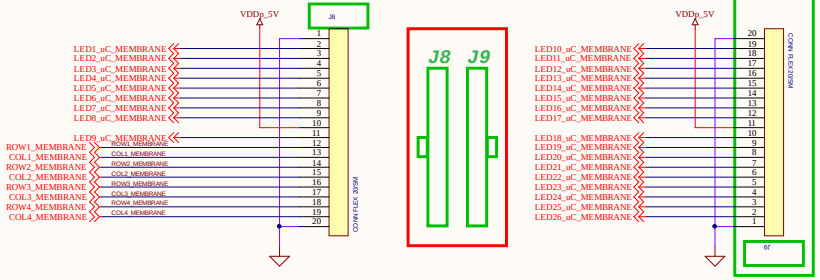


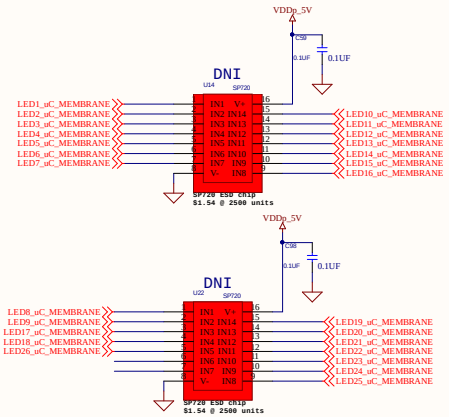






FLIP J9 so part has NOTCH OUTWARD. LAYOUT LINES can be left as they are and no changes to layout of LED lines.
THIS IS DONE FOR POKE YOKE REASONS: PREVENT OLD MEMBRANES FROM USING NEW POD





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