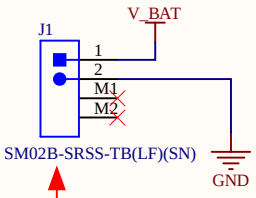
Low Power MCU to Cloud

Battery connector



(On-Board)

(Not On-Board)

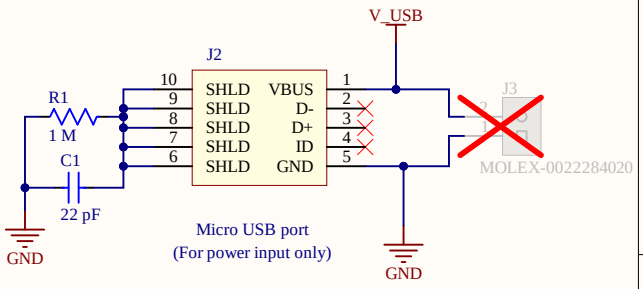
JST

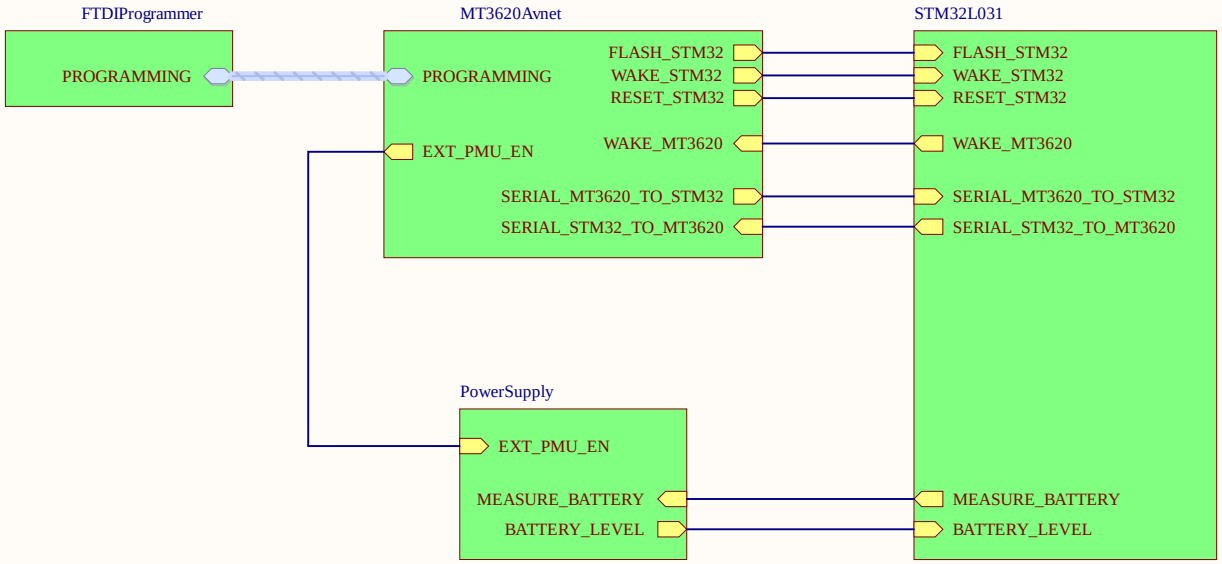
A02SR02SR30K51B

Keystone electronics (2465)

3x - AA battery holder
(Non rechargeable batteries)

USB POWER





GND pins

Fiducal

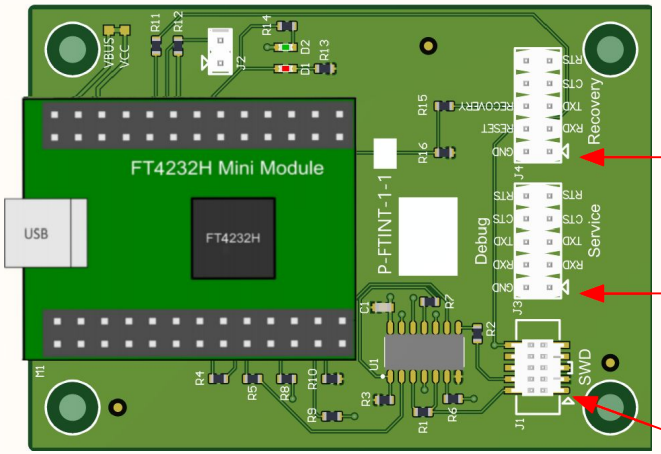
Microsoft Azure Sphere	NAME OF THIS PROJECT P-MT3620EXMSTLP-1-0.PrjPcb		TITLE OF THIS SHEET Low Power MCU to cloud reference	
FILE PATH TopLevelBlock.SchDoc	LAST MODIFIED 07/10/2020	PAGE 1 OF 5	DRAWN BY Dheeraj R	REVISION 1

MT3620 programming interface

(Non Board components)

(On-Board components)

FTINT programmer



https://github.com/Azure/azure-sphere-hardware-designs/tree/master/P-FTINT-1-1
(Uses an FT4232H Mini Module)

The UART Tx and Rx pins on the FTDI UART(s) for Service, Debug and Recovery have been crossed over in the P-FTINT PCB

Connectors
Molex - 0901420010

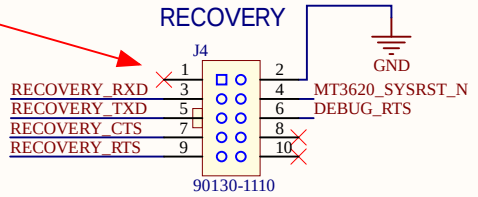
Cables
Molex - 0797582022

Connectors
Molex - 0901420010

Samtec
FFSD-05-D-06.00-01-N

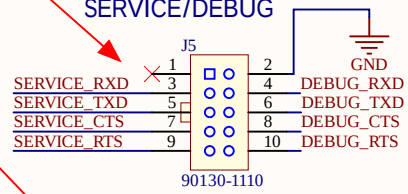
MT3620 programming headers

RECOVERY

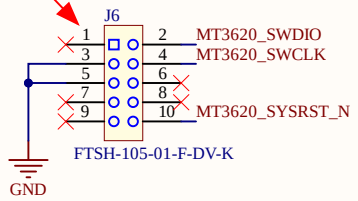


DEBUG_RTS is used for bootstrapping as RECOVERY

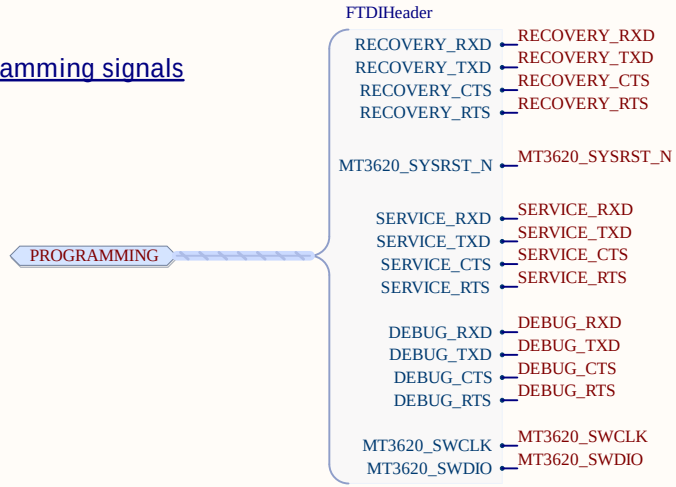
SERVICE/DEBUG



SWD



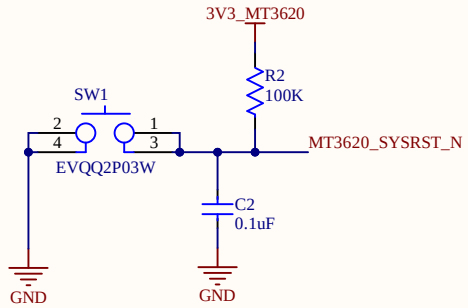
MT3620 programming signals



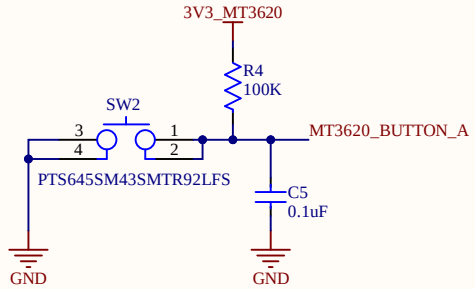
Microsoft Azure Sphere	NAME OF THIS PROJECT P-MT3620EXMSTLP-1-0.PrjPcb		TITLE OF THIS SHEET FTDI Programming for MT3620	
FILE PATH FTDIProgrammer.SchDoc	LAST MODIFIED 07/10/2020	PAGE 2 OF 5	DRAWN BY Dheeraj R	REVISION 1

MT3620 Avnet module

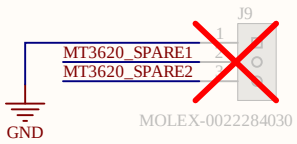
MT3620 RESET BUTTON



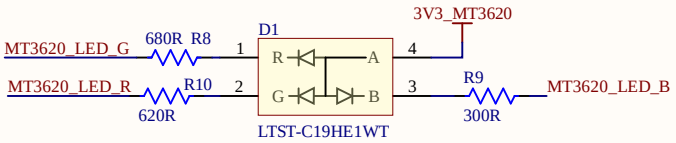
MT3620 USER BUTTON A

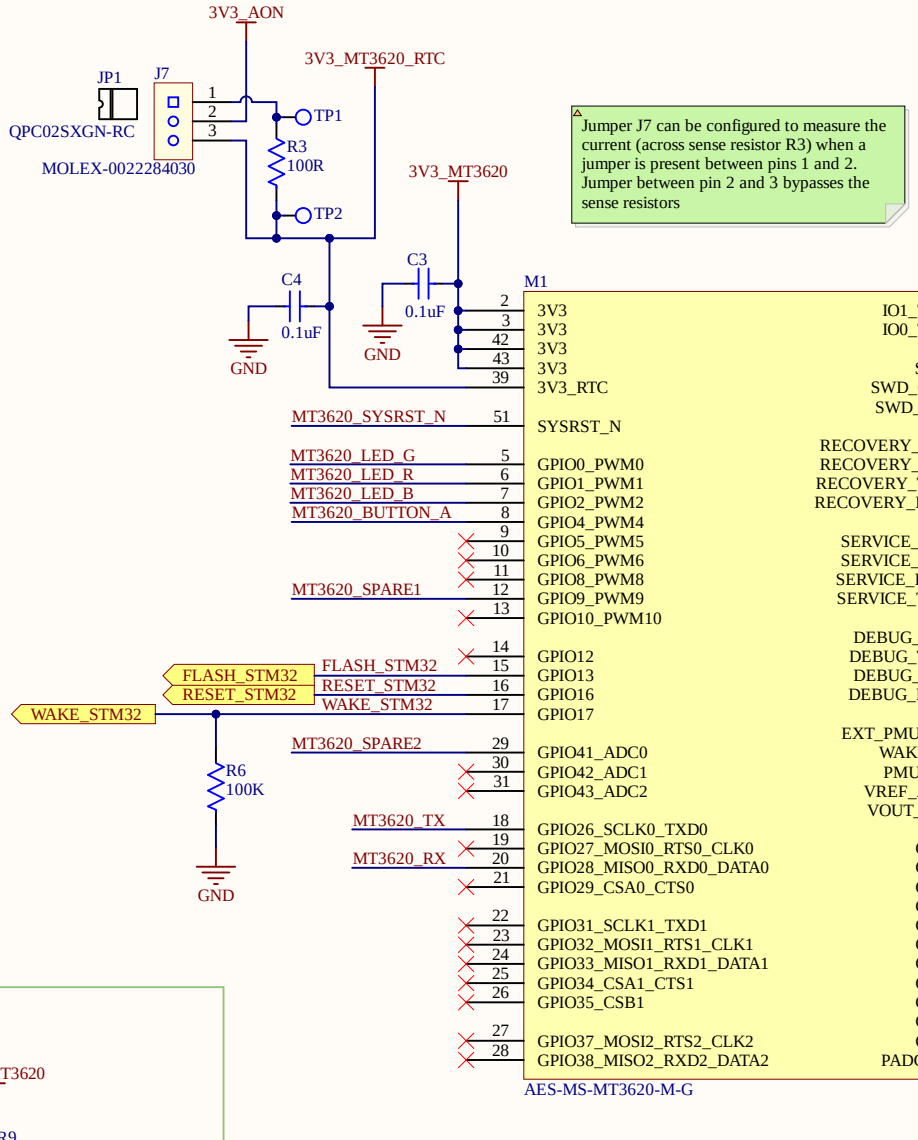


MT3620 SPARE GPIO(s)



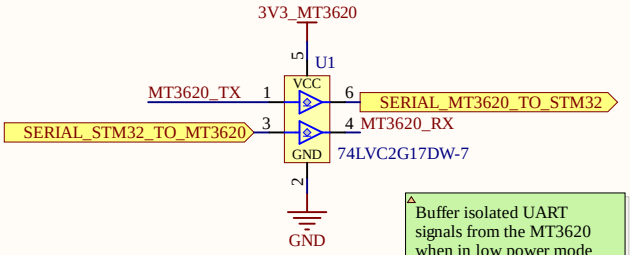
MT3620 USER LEDS





Jumper J7 can be configured to measure the current (across sense resistor R3) when a jumper is present between pins 1 and 2. Jumper between pin 2 and 3 bypasses the sense resistors

BUFFER FOR UART



Buffer isolated UART signals from the MT3620 when in low power mode

Low power mode was enabled in version 20.01 of the OS.
In order to enable AzSphere OS Low Power mode, the PMU_EN pin needs to be pulled low.

On some modules the PMU_EN is pulled up via a 4.7k resistor. A 620R resistor is used in this design to externally pull down the PMU_EN pin to 0.38V, enabling low power mode.
This causes increased loading of the 3V_MT3620 supply when it is active

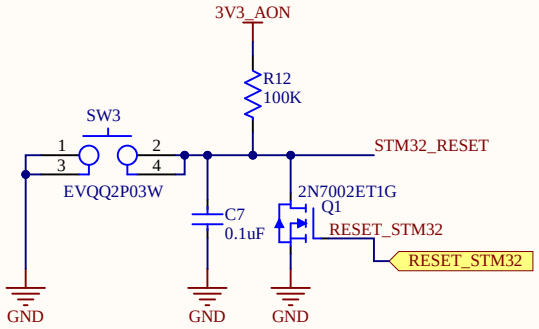
Microsoft Azure Sphere	NAME OF THIS PROJECT P-MT3620EXMSTLP-1-0.PrjPcb	TITLE OF THIS SHEET Avnet module for MT3620	
FILE PATH MT3620AvnetModule.SchDoc	LAST MODIFIED 07/10/2020	PAGE 3 OF 5	DRAWN BY Dheeraj R	REVISION 1

STM32L031 Microcontroller

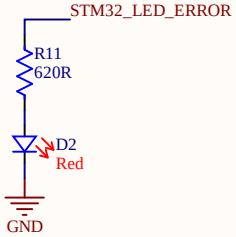
(On-Board components)

(Non Board components)

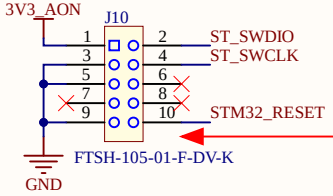
STM32 RESET BUTTON



STM32 ERROR LED



STM32 SWD HEADER



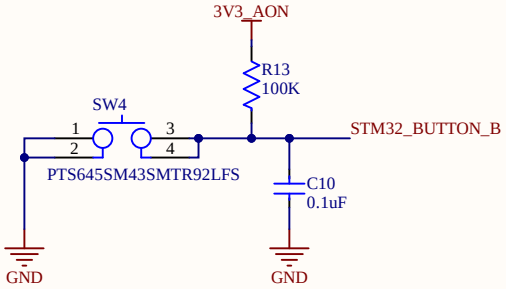
Olimex

ARM-JTAG-20-10

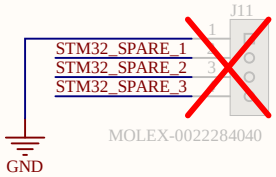
ST Link

PC

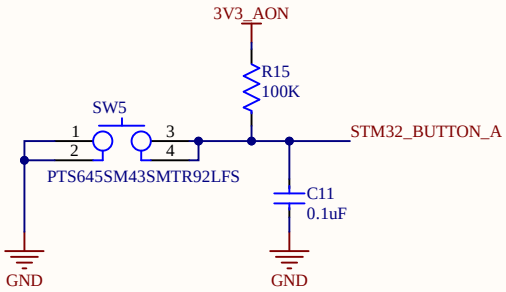
STM32 BUTTON B



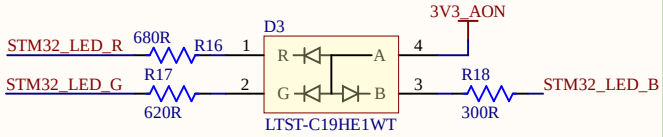
STM32 SPARE GPIO(s)



STM32 BUTTON A



STM32 LED(s)



Refer to ST Application Notes:

1) AN4467 - Getting started with STM32L0xx hardware development

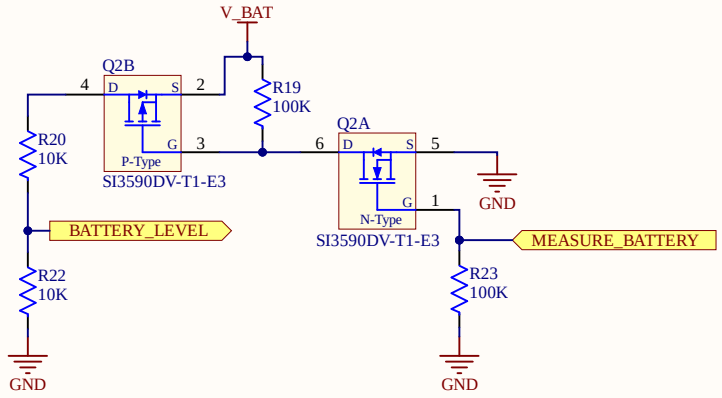
2) AN3155 - USART protocol used in STM32 bootloader

3) AN2606 - STM32 microcontroller system memory boot mode

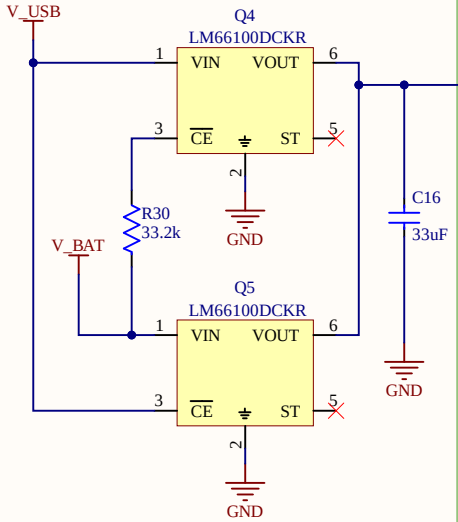
Microsoft Azure Sphere	NAME OF THIS PROJECT P-MT3620EXMSTLP-1-0.PrjPcb	TITLE OF THIS SHEET STM32L031 MCU	
FILE PATH STM32L031.SchDoc	LAST MODIFIED 07/10/2020	PAGE 4 OF 5	DRAWN BY Dheeraj R	REVISION 1

System Power Supply

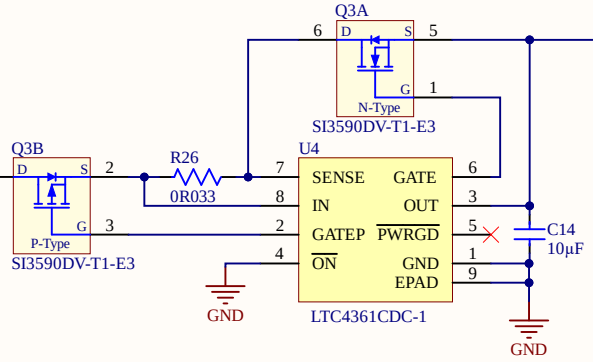
Battery measurement



Source Selection



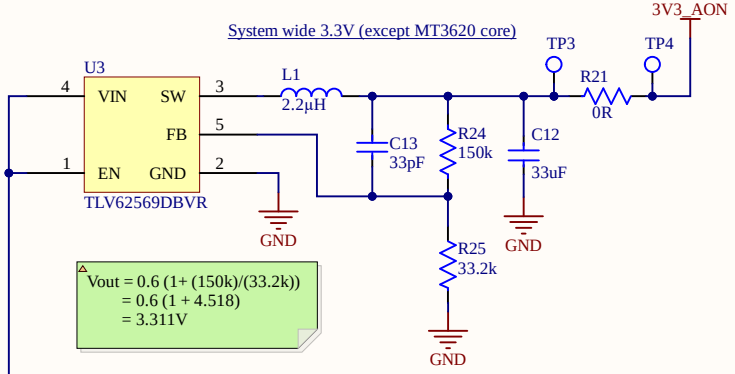
Negative-Voltage / Over-Voltage / Over-Current Protection



LTC4361CDC-1 is a reverse voltage, over-voltage and over-current protection chip. R3 set to give trip current of 1.5A. If trip current exceeded, input power must be removed to reset the device. If the voltage at the IN pin exceeds 5.8V, GATE is pulled low, switching off the load. When input voltage returns below 5.7V, GATE is pulled high restoring power to load.

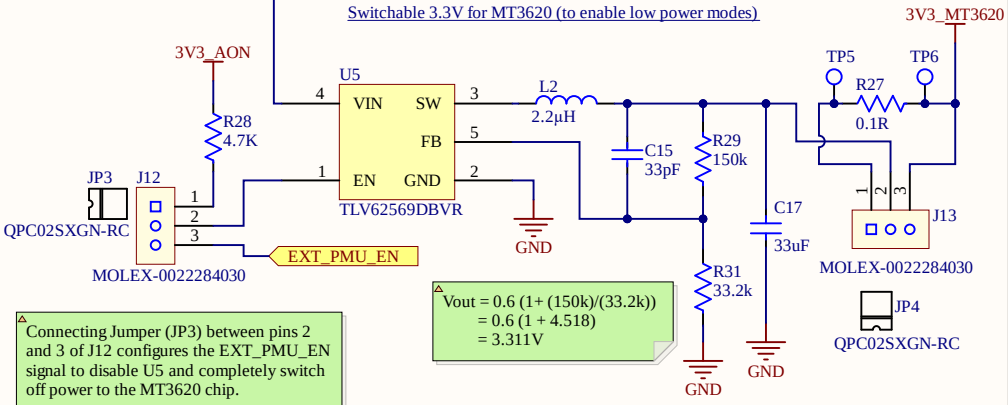
3V3 Buck Converter(s)

System wide 3.3V (except MT3620 core)



Vout = 0.6 (1+ (150k)/(33.2k))
= 0.6 (1 + 4.518)
= 3.311V

Switchable 3.3V for MT3620 (to enable low power modes)



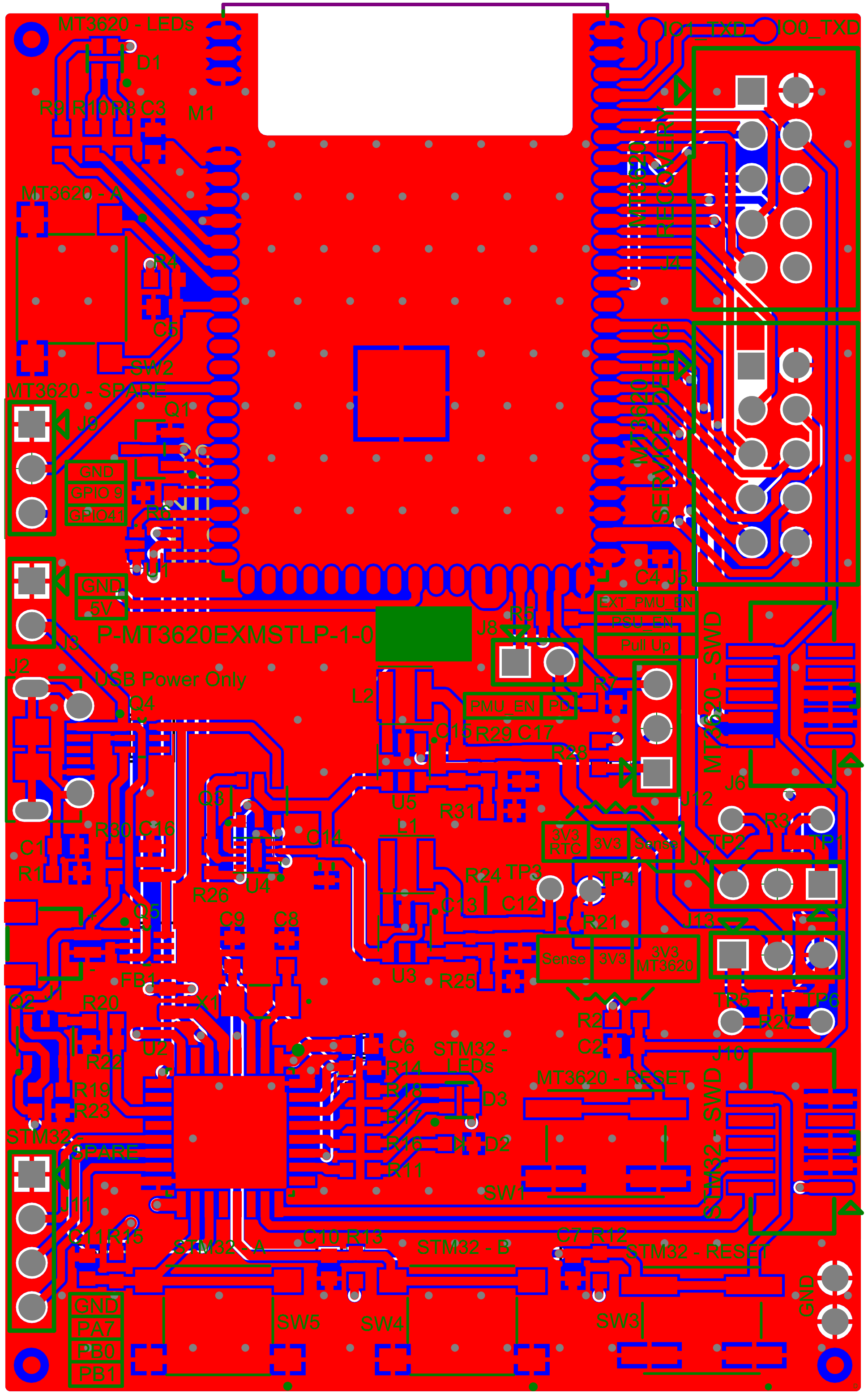
Vout = 0.6 (1+ (150k)/(33.2k))
= 0.6 (1 + 4.518)
= 3.311V

Connecting Jumper (JP3) between pins 2 and 3 of J12 configures the EXT_PMU_EN signal to disable U5 and completely switch off power to the MT3620 chip.

Jumper between pins 1 and 2 leaves U5 turned ON.

Jumper J13 can be configured to measure the current (across sense resistor R27) when a jumper is present between pins 1 and 2. Jumper between pin 2 and 3 bypasses the sense resistors

Microsoft Azure Sphere	NAME OF THIS PROJECT P-MT3620EXMSTLP-1-0.PrjPcb		TITLE OF THIS SHEET Power Supply	
FILE PATH PowerSupply.SchDoc	LAST MODIFIED 07/10/2020	PAGE 5 OF 5	DRAWN BY Dheeraj R	REVISION 1



MT3620 - LEDs
IO0_TXD
MT3620 - A
SW2
MT3620 - SPARE
P-MT3620EXMSTLP-1-0
USB Power Only
MT3620 - SWD
Pull Up
MT3620 - RESET
STM32 - LEDs
STM32 - SPARE
STM32 - A
STM32 - B
STM32 - RESET
SW1
SW3
SW4
SW5
GND