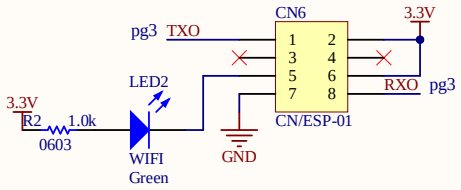
STM32-ROMI Rev A

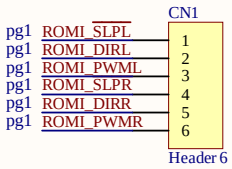
STM32-ROMI_Rev_A_0_Title.SchDoc
STM32-ROMI_Rev_A_1_STM32.SchDoc
STM32-ROMI_Rev_A_2_3V_5V.SchDoc
STM32-ROMI_Rev_A_2_Connectors.SchDoc
STM32-ROMI_Rev_A_3_OLED_Sensor.SchDoc
STM32-ROMI_Rev_A_4_3V_5V.SchDoc
STM32-ROMI_Rev_A_5_IMU_IO.SchDoc
STM32-ROMI_Rev_A_5_Sensors.SchDoc
STM32-ROMI_Rev_A_6_Notes.SchDoc
STM32-ROMI_Rev_A_7_Reworks.SchDoc

Title			*Altium Limited* *L3, 12a Rodborough Rd* *Frenchs Forest* *NSW* *Australia 2086*
Size: A4	Number:09252020	Revision:	
Date: 9/25/2020	Time: 12:23:49 PM	Sheet 0 of 7	
File: C:\github\STM32-ROMI\Altium\Reworks\STM32-ROMI_Rev_A-Reworks\STM32-ROMI_Rev_A_0_Title.SchDoc			

ESP-01

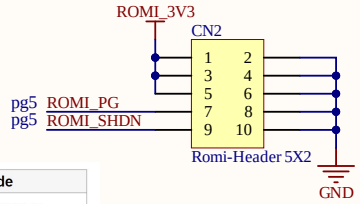


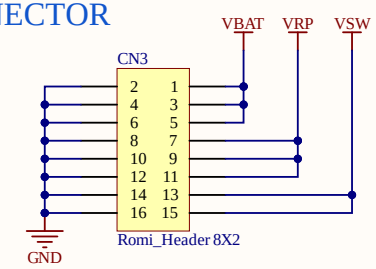
URXD: connect to TX of microcontroller
UTXD: connect to RX of microcontroller
GPIO0: connect to RESET of microcontroller
GPIO2: optionally connect green LED to 3.3V (indicates wifi status)



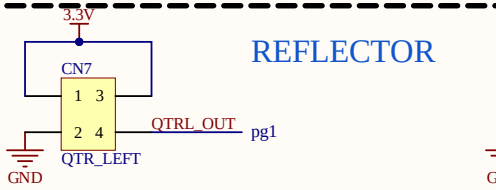
DIR	PWM	SLEEP	Motor +	Motor −	operating mode
0	PWM	1	PWM	L	forward/brake at speed *PWM %*
1	PWM	1	L	PWM	reverse/brake at speed *PWM %*
X	0	1	L	L	brake low (outputs shorted to ground)
X	X	0	Z	Z	coast (outputs floating/disconnected)

ROMI CONNECTOR

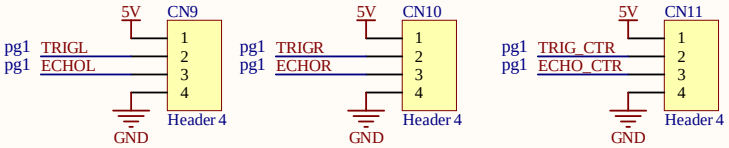




REFLECTOR

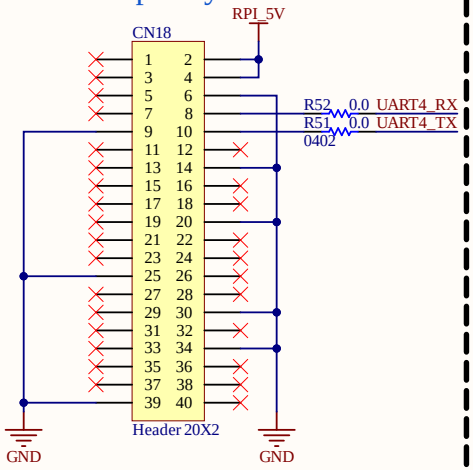


SONAR

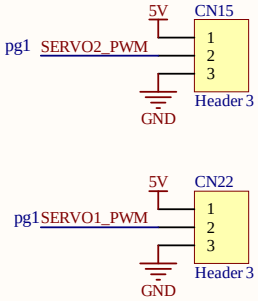


ENCODERS

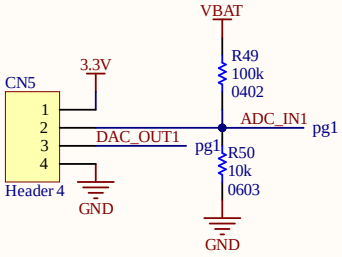
Raspberry Pi



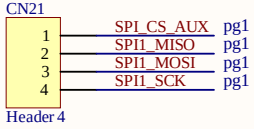
SERVOS



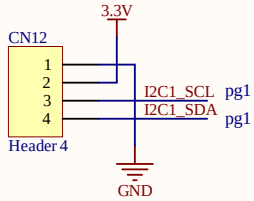
ADC/DAC



SPI1



I2C1



Title	**Connectors**		
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Date: 9/25/2020	Time: 12:23:49 PM	Sheet 2 of 7	
File: C:\github\STM32-ROMI\Altium\Reworks\STM32-ROMI_Rev_A-Reworks\STM32-ROMI_Rev_A_2_Connectors.SchDoc			

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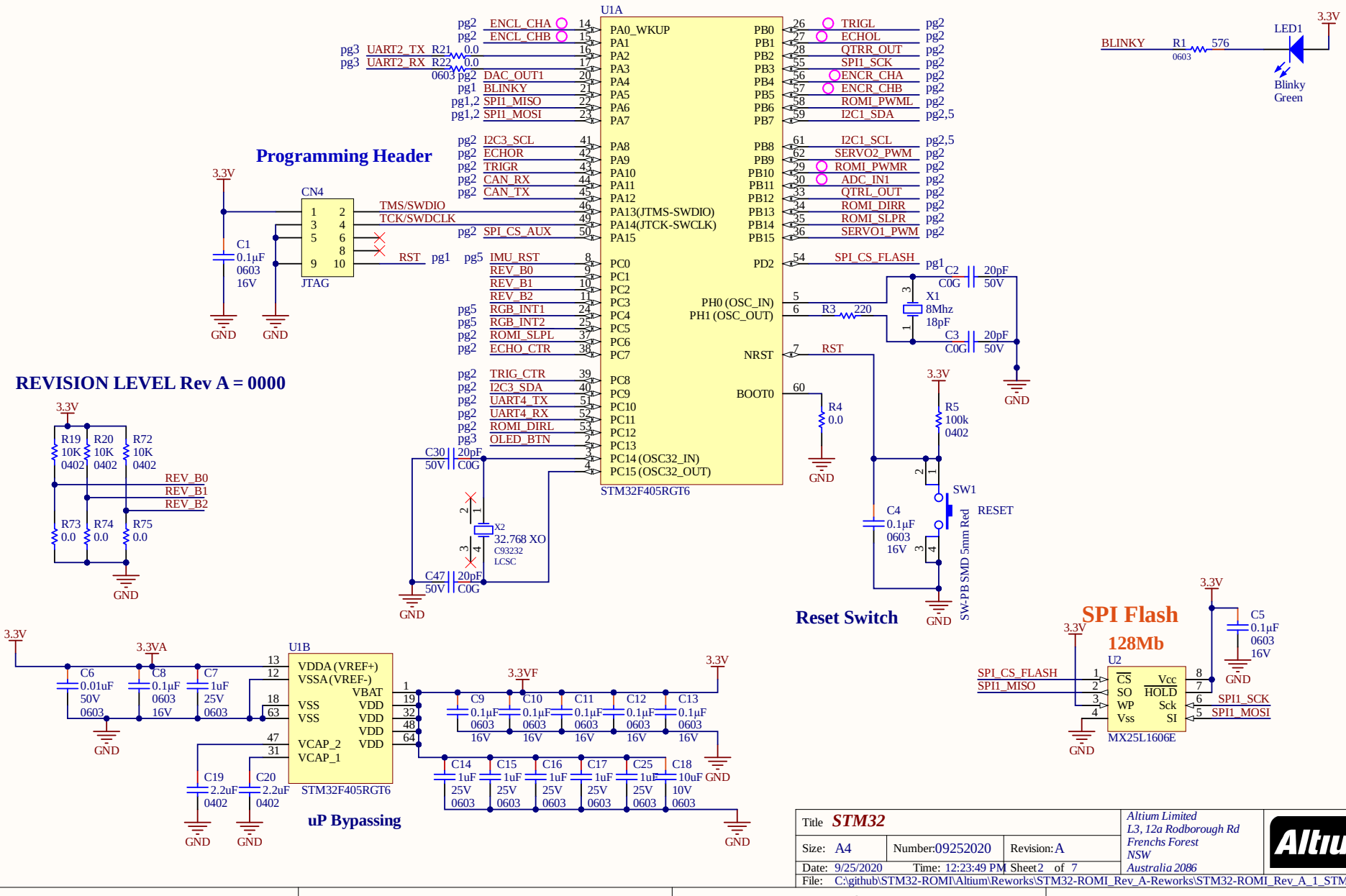
U1A
STM32F405RGT6
Programming Header
CN4
JTAG
REVISION LEVEL Rev A = 0000
R19 10K 0402
R20 10K 0402
R72 10K 0402
R73 0.0
R74 0.0
R75 0.0
REV_B0
REV_B1
REV_B2
X2
32.768 XO
C93232
LCSC
X1
8Mhz
18pF
R3 220
R4 0.0
R5 100k 0402
SW1
RESET
SW-PB SMD 5mm Red
Reset Switch
LED1
Blinky Green
BLINKY
R1 576 0603
SPI Flash
128Mb
U2
MX25L1606E
SPI_CS_FLASH
SPI1_MISO
SPI1_SCK
SPI1_MOSI
U1B
STM32F405RGT6
uP Bypassing
3.3V
3.3VA
3.3VF
GND
Title STM32
Size: A4
Number:09252020
Revision: A
Date: 9/25/2020
Time: 12:23:49 PM
Sheet 2 of 7
File: C:\github\STM32-ROMI\Altium\Reworks\STM32-ROMI_Rev_A-Reworks\STM32-ROMI_Rev_A_1_STM32.SchDoc
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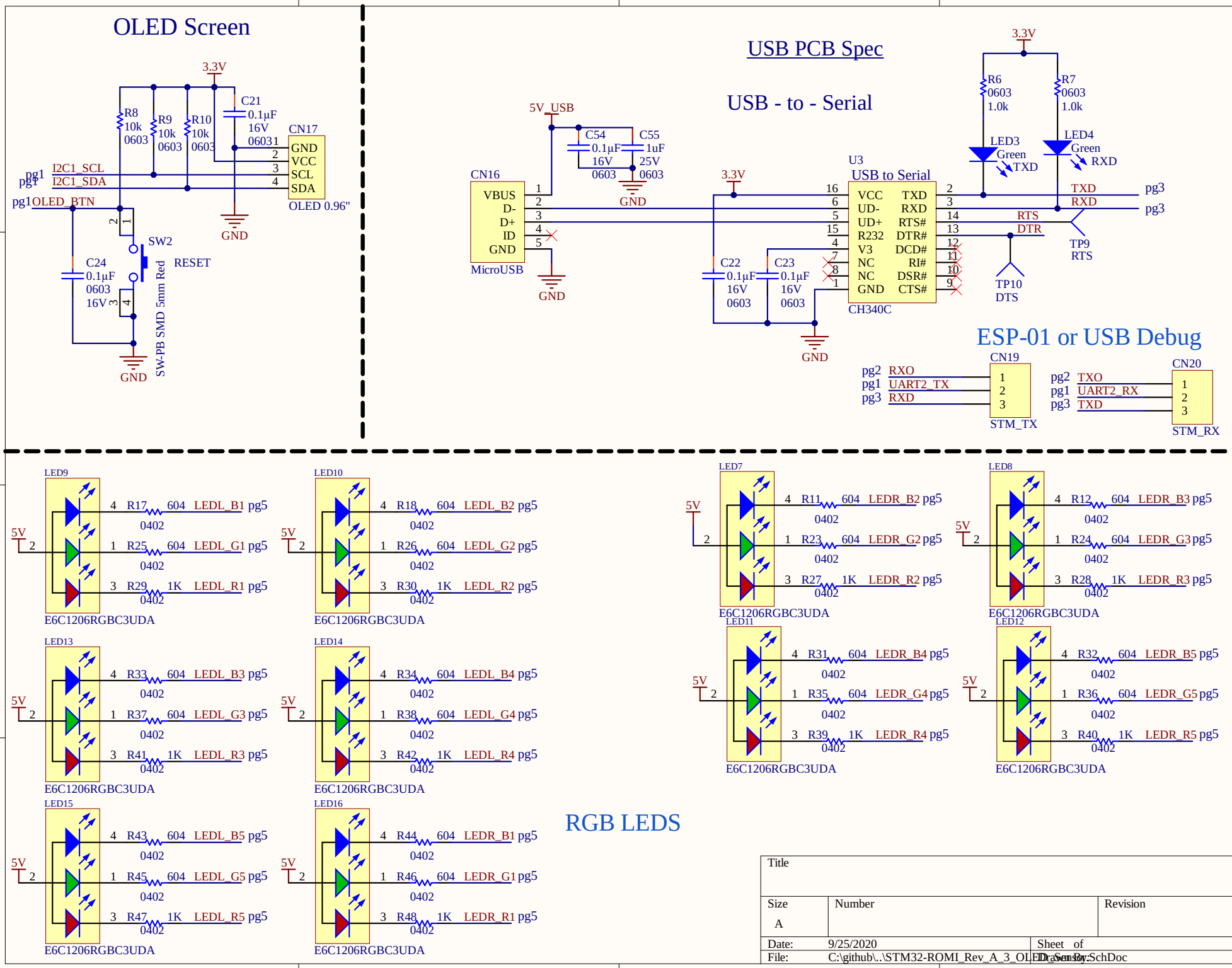

OLED Screen
3.3V
R8 10k 0603
R9 10k 0603
R10 10k 0603
C21 0.1µF 16V 0603
CN17
GND
VCC
SCL
SDA
OLED 0.96"
pg1 I2C1_SCL
pg1 I2C1_SDA
pg1 OLED_BTN
SW2
RESET
SW-PB SMD 5mm Red
C24 0.1µF 0603 16V
GND
USB PCB Spec
USB - to - Serial
5V_USB
C54 0.1µF 16V 0603
C55 1uF 25V 0603
CN16
VBUS
D-
D+
ID
GND
MicroUSB
3.3V
U3
USB to Serial
VCC
UD-
UD+
R232
V3
NC
NC
GND
TXD
RXD
RTS#
DTR#
DCD#
RI#
DSR#
CTS#
CH340C
C22 0.1µF 16V 0603
C23 0.1µF 16V 0603
R6 0603 1.0k
R7 0603 1.0k
LED3 Green TXD
LED4 Green RXD
TXD
RXD
RTS
DTR
TP9 RTS
TP10 DTS
pg3 TXD
pg3 RXD
ESP-01 or USB Debug
CN19
pg2 RXO
pg1 UART2_TX
pg3 RXD
STM_TX
CN20
pg2 TXO
pg1 UART2_RX
pg3 TXD
STM_RX
LED9
LED10
LED7
LED8
LED13
LED14
LED11
LED12
LED15
LED16
5V
R17 604 LEDL_B1 pg5
R25 604 LEDL_G1 pg5
R29 1K LEDL_R1 pg5
R18 604 LEDL_B2 pg5
R26 604 LEDL_G2 pg5
R30 1K LEDL_R2 pg5
R11 604 LEDR_B2 pg5
R23 604 LEDR_G2 pg5
R27 1K LEDR_R2 pg5
R12 604 LEDR_B3 pg5
R24 604 LEDR_G3 pg5
R28 1K LEDR_R3 pg5
R33 604 LEDL_B3 pg5
R37 604 LEDL_G3 pg5
R41 1K LEDL_R3 pg5
R34 604 LEDL_B4 pg5
R38 604 LEDL_G4 pg5
R42 1K LEDL_R4 pg5
R31 604 LEDR_B4 pg5
R35 604 LEDR_G4 pg5
R39 1K LEDR_R4 pg5
R32 604 LEDR_B5 pg5
R36 604 LEDR_G5 pg5
R40 1K LEDR_R5 pg5
R43 604 LEDL_B5 pg5
R45 604 LEDL_G5 pg5
R47 1K LEDL_R5 pg5
R44 604 LEDR_B1 pg5
R46 604 LEDR_G1 pg5
R48 1K LEDR_R1 pg5
0402
E6C1206RGBC3UDA
RGB LEDS
Title
Size A
Number
Revision
Date: 9/25/2020
Sheet of
File: C:\github\..\STM32-ROMI_Rev_A_3_OLED_Dra...SchDoc
Drawn By:

5V Power Usage:

10 RGB * 0.015A = 0.15A
3.3V LDO = 0.80A

CN25
2
1
GND
GND

TP3
GND
GND

TP4
GND
GND

TP5
VBAT
VBAT
47uF
C35 10uF 16V 1206
C36 10uF 16V 1206
GND

Use ROMI pushbutton (VSW) to enable

CN24
2
1
PWR Switch

VSW
R71 0402 0.0
R70 100k 0402

U14
VIN EN SW VBST GND VFB
TPS563209DDCR
TPS563209DDCR
3A
TPS561208DDCR
TPS561208DDCR

VIN <17V
VOUT 5V, <3A

C41 0.1µF 16V 0603

Rework 1 - 4.7nH
L1
3.3uH 5.5A

R13 56.2K 0603
R15 10k 0603
GND

47uF 47uF 47uF 47uF
C37 10uF 16V 1206
C38 10uF 16V 1206
C39 10uF 16V 1206
C40 10uF 16V 1206
GND

5V
TP6

5V
5V Out

R14 0603 1.0k
LED5
5V Green
2V 20mA
GND

5V
CN26
1
2
AUX 5V
GND

This will allow the system to be powered off usb debug or ROMI

5V
U15
VIN VOUT CE ST GND NC
LM66100DCKT
GND

ORing Controllers
+/- 6V Max
1.5A CC Max

pg1 5V_USB
U17
VIN VOUT CE ST GND NC
LM66100DCKT
GND

FB1
600 Ohm @ 100MHz

TP7
5V_OR

C42 0.1µF 16V 0603
C43 1uF 25V 0603

VOUT 3.3V, <800mA
U16 3.3V
VIN VOUT GND TAB

C44 0.1µF 16V 0603
C45 1uF 25V 0603
C46 10uF 16V 1206
GND

TP8
3.3V

3.3V
3.3V Out

R16 100 0402
LED6
3.3V
Green
2V 20mA
GND

3.3V
CN27
1
2
AUX 3.3V
GND

Raspberry Pi Power

Ideal Diodes are usued to power the pi off od the board voltages. This will prevent issues if the pi tries to backpower the board

5V
U7
VIN VOUT CE ST GND NC
LM66100DCKT
GND

C52 0.1µF 16V 0603
C53 1uF 25V 0603
RPI_5V
GND

Title: Power		
Size: A	Number: *	Revision: A
Date: 9/25/2020	Sheet 4 of 7	
File: C:\github\..\STM32-ROMI_Rev_A_4_3V_5V.SchDoc	Drawn By: *	

RGB LEDS DRIVERS

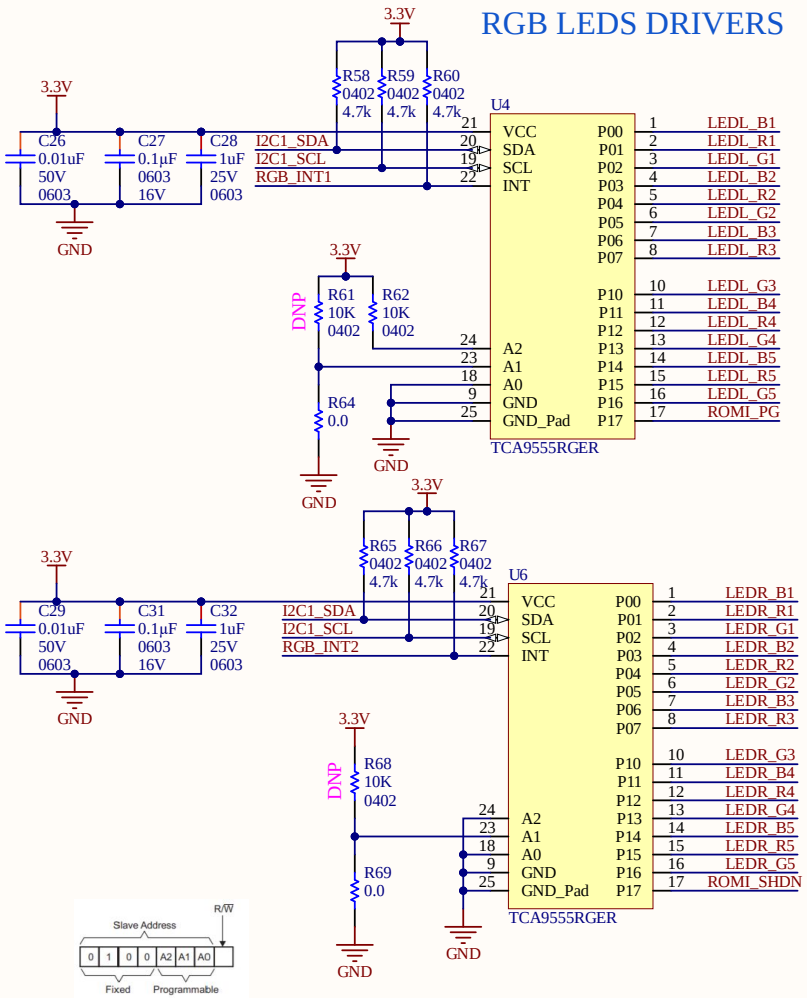
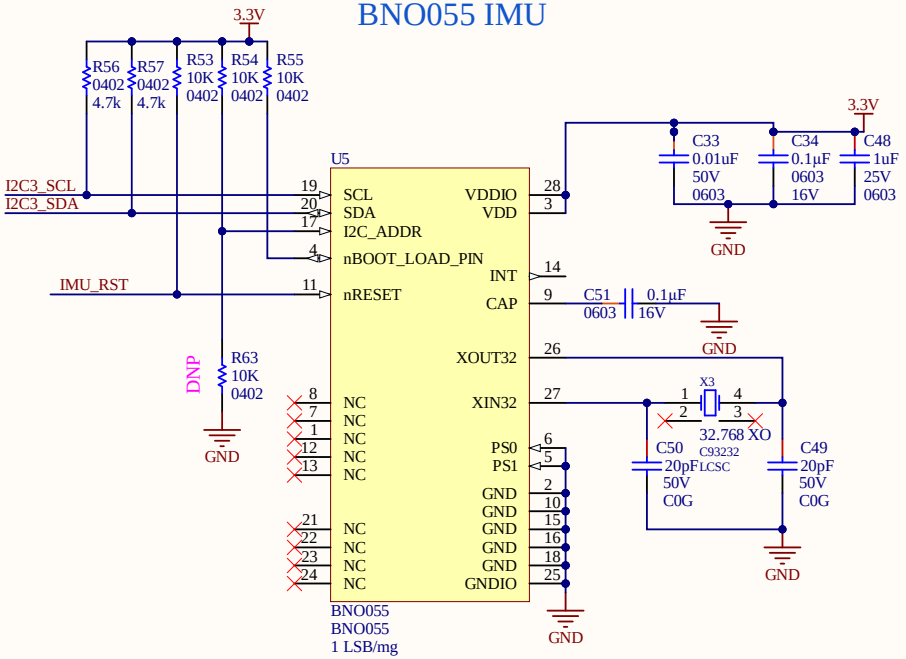


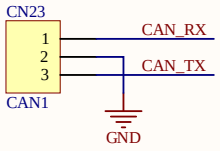
Table 2. Address Reference

INPUTS			I²C BUS SLAVE ADDRESS
A2	A1	A0	
L	L	L	32 (decimal), 20 (hexadecimal)
L	L	H	33 (decimal), 21 (hexadecimal)
L	H	L	34 (decimal), 22 (hexadecimal)
L	H	H	35 (decimal), 23 (hexadecimal)
H	L	L	36 (decimal), 24 (hexadecimal)
H	L	H	37 (decimal), 25 (hexadecimal)
H	H	L	38 (decimal), 26 (hexadecimal)
H	H	H	39 (decimal), 27 (hexadecimal)

BNO055 IMU



CAN BUS



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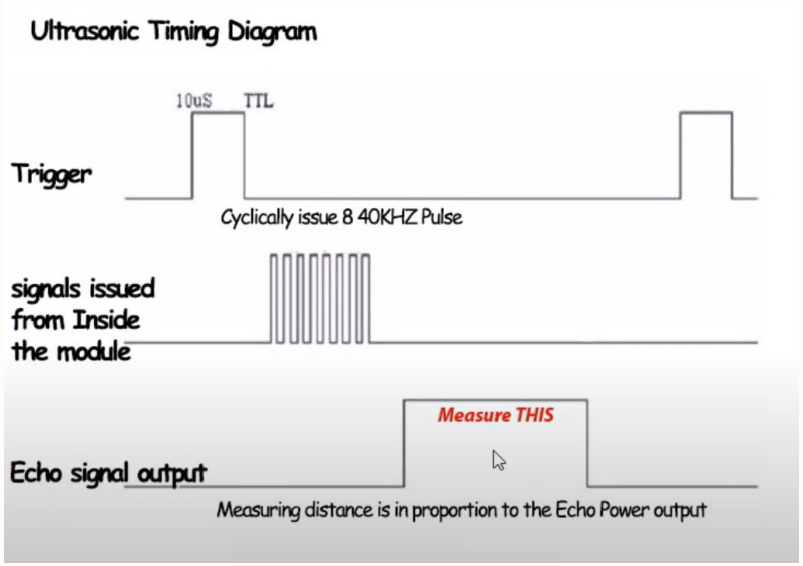
Size: A4	Number: 9152020	Revision: A	*L3, 12a Rodborough Rd*
Date: 9/25/2020	Time: 12:23:50 PM	Sheet 5 of 7	*Frenchs Forest*
File: C:\github\STM32-ROMI\Altium\Reworks\STM32-ROMI_Rev_A-Reworks\STM32-ROMI_Rev_A_5_IMU_IO.SchDoc			*NSW*
			Australia 2086

Altium



Title	**Notes**		*Altium Limited* *L3, 12a Rodborough Rd* *Frenchs Forest* *NSW* *Australia 2086*
Size: A4	Number: 9252020	Revision: A	
Date: 9/25/2020	Time: 12:23:50 PM	Sheet 6 of 7	
File: C:\github\STM32-ROMI\Altium\Reworks\STM32-ROMI_Rev_A-Reworks\STM32-ROMI_Rev_A_6_Notes.SchDoc			

STM32-ROMI

Rework 1 - 3.3uH changed to 4.7uH
Rework 2 - 5V buck is wrong version
Rework 3 - CN20 silk flipped

Title	***Reworks***		
Size: A4	Number: 9252020	Revision: A	
Date: 9/25/2020	Time: 12:23:50 PM	Sheet 7 of 7	
File: C:\github\STM32-ROMI\Altium\Reworks\STM32-ROMI_Rev_A-Reworks\STM32-ROMI_Rev_A_7_Reworks.SchDoc			

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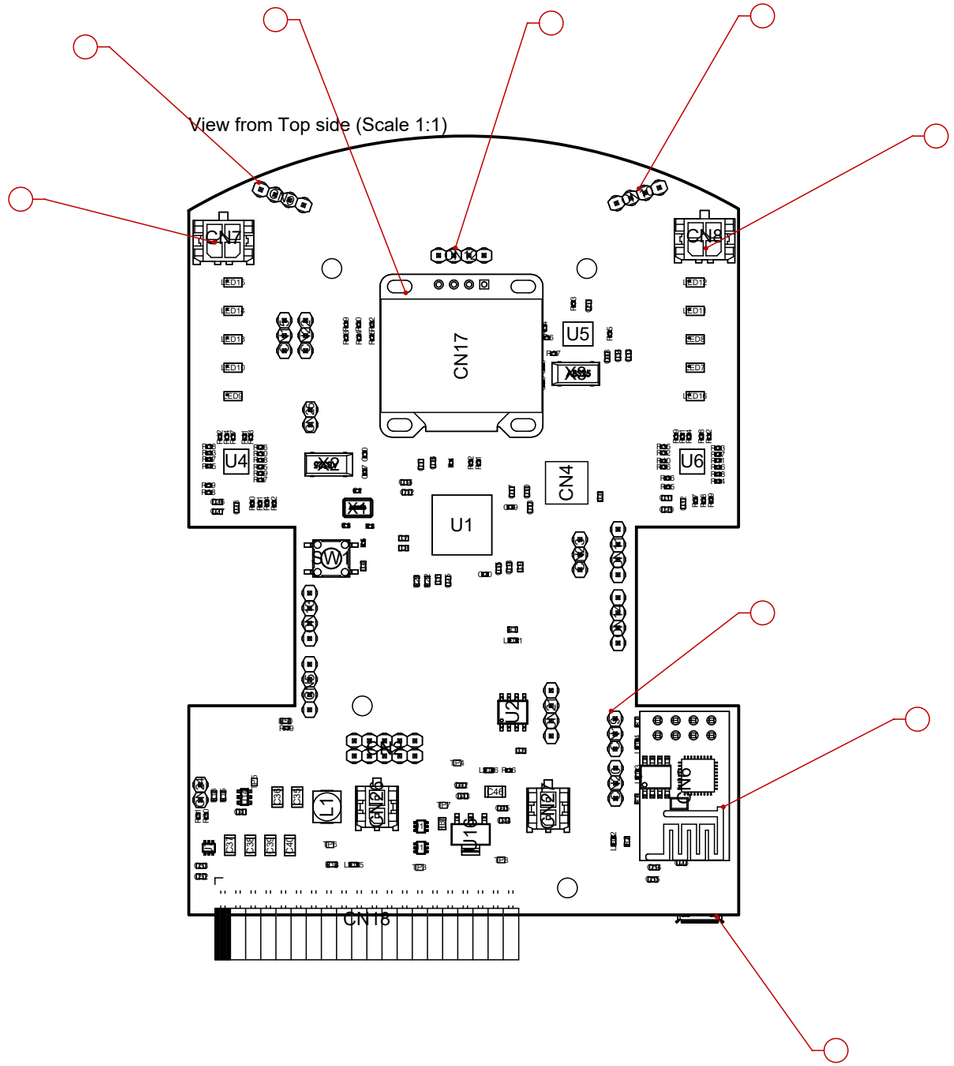
Frenchs Forest
NSW
Australia 2086

View from Top side (Scale 1:1)



NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL±
ANGULAR: MACH± BEND ±
TWO PLACE DECIMAL ±
THREE PLACE DECIMAL ±

INTERPRET GEOMETRIC TOLERANCING PER:

MATERIAL

FINISH

DO NOT SCALE DRAWING

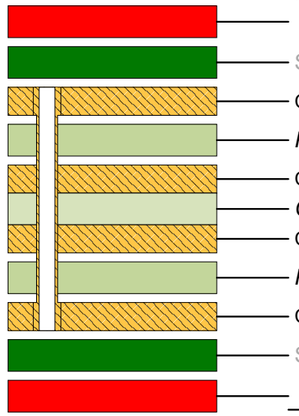
	NAME	DATE
DRAWN		9/25/2020
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		

COMMENTS:

TITLE

SIZE	DWG. NO.	
SCALE: 1:1	WEIGHT:	SHEET 1 OF 3

Layer Stack Legend



Material	Layer	Thickness	Dielectric Material	Type	Gerber
	Top Overlay			Legend	GTO
Surface Material	Top Mask	0.02mm	Solder Resist	Solder Mask	GTS
Copper	Top Copper	0.04mm		Signal	GTL
Prepreg		*0.10mm*	*2313*	*Dielectric*	
Copper	GND1	0.02mm		Signal	G1
Core		*1.26mm*	*FR-4*	*Dielectric*	
Copper	Power1	0.02mm		Signal	G2
Prepreg		*0.10mm*	*2313*	*Dielectric*	
Copper	Bottom Copper	0.04mm		Signal	GBL
Surface Material	Bottom Mask	0.02mm	Solder Resist	Solder Mask	GBS
	Bottom Overlay			Legend	GBO

Total thickness: 1.60mm

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL±
ANGULAR: MACH± BEND ±
TWO PLACE DECIMAL ±
THREE PLACE DECIMAL ±
INTERPRET GEOMETRIC TOLERANCING PER:
MATERIAL
FINISH
DO NOT SCALE DRAWING

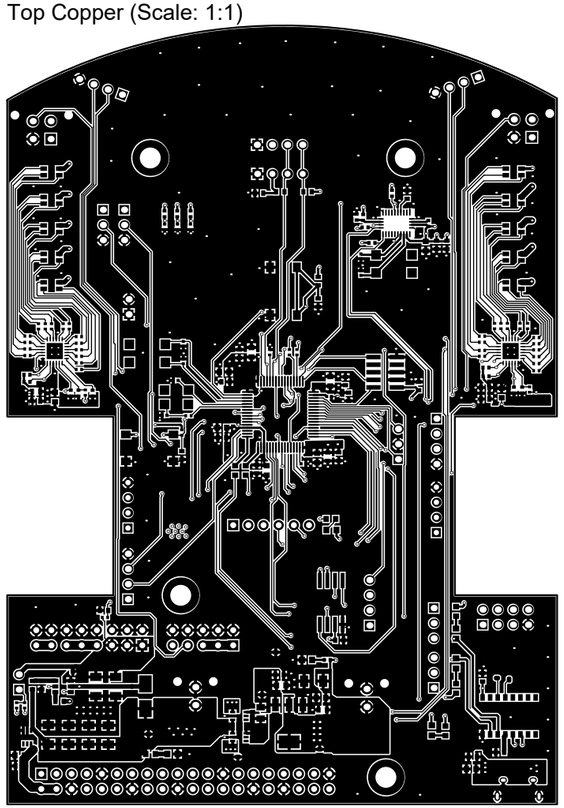
	NAME	DATE
DRAWN		9/25/2020
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		

COMMENTS:

TITLE

SIZE	DWG. NO.	
SCALE: 1:1	WEIGHT:	SHEET 2 OF 3

Top Copper (Scale: 1:1)



NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL±
ANGULAR: MACH± BEND ±
TWO PLACE DECIMAL ±
THREE PLACE DECIMAL ±

INTERPRET GEOMETRIC TOLERANCING PER:

MATERIAL

FINISH

DO NOT SCALE DRAWING

	NAME	DATE
DRAWN		9/25/2020
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		

COMMENTS:

TITLE

SIZE	DWG. NO.	
SCALE: 1:1	WEIGHT:	SHEET 3 OF 3