Bravo EVK
HW User Guide

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TELIT
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DOCUMENTATION

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APPLICABILITY TABLE

PRODUCTS

- BRAVO EVALUATION KIT

Contents

1. INTRODUCTION

1.1. Scope

Scope of this document is to describe the hardware components of the Bravo EVK board based on Telit ME910C1 module.

1.2. Audience

This document is intended for Telit customers, who are integrators, about to implement their applications using our Bravo EVK board.

1.3. Contact Information, Support

For general contact, technical support services, technical questions and report documentation errors contact Telit Technical Support at:

- TS-EMEA@telit.com
- TS-AMERICAS@telit.com
- TS-APAC@telit.com
- TS-SRD@telit.com

Alternatively, use:

http://www.telit.com/support

For detailed information about where you can buy the Telit modules or for recommendations on accessories and components visit:

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Our aim is to make this guide as helpful as possible. Keep us informed of your comments and suggestions for improvements.

Telit appreciates feedback from the users of our information.

1.4. Text Conventions

Danger – This information MUST be followed or catastrophic equipment failure or bodily injury may occur.

Caution or Warning – Alerts the user to important points about integrating the module, if these points are not followed, the module and end user equipment may fail or malfunction.

Tip or Information – Provides advice and suggestions that may be useful when integrating the module.

All dates are in ISO 8601 format, i.e. YYYY-MM-DD.

1.5. Related Documents

- ME910C1 HW User Guide, 1VV0301351
- xE910 Global Form Factor Application Note, 80000NT10060A

2. OVERVIEW

The aim of this document is to describe the “Bravo” EVK board based on Telit ME910C1-WW IoT module.

The Bravo board can be used in different configurations:

- Standalone, using ME910C1 programmed with AppZone IDE
- Connected to an external CPU (ie PC) controlling the module through the UART or USB port
- Connected to an Arduino standard form factor board, using the ME910C1 module connected through the UART port
- Connected to a Raspberry PI or Raspberry PI zero (or similar compatible board), using the ME910C1 module connected through the UART port

The ME910C1 module is powered either by an onboard 3.8V DC power supply or by a 3.7 V LIPO battery. All GPIO levels are set to 1.8 V.

Moreover, the board is fitted with the following sensors from Bosch Sensortec:

- BHI160B low-power smart-hub with integrated three axis gyroscope, three axis accelerometer plus a programmable microcontroller.
- BMM150 low power and low noise three-axis digital geomagnetic sensor
- BME680 integrated environmental sensor

Together, the above sensors provide:

- Accelerometer
- Gravity
- Linear acceleration
- Gyroscope
- Gyroscope uncalibrated
- Game rotation vector
- Step counter,
- Step detector
- Significant motion
- Tilt detector
- Pickup gesture
- Wake up gesture
- Glance gesture
- Activity recognition of standing, running, biking, in vehicle
- Geomagnetic field
- Magnetic field uncalibrated
- Orientation vector
- Rotation vector
- Geomagnetic rotation vector
- Temperature
- Humidity
- Pressure
- VOC (Volatile Organic Compounds)

This document lists and describes circuit building blocks and connectors.

Arduino and Raspberry PI boards cannot be connected at the same time

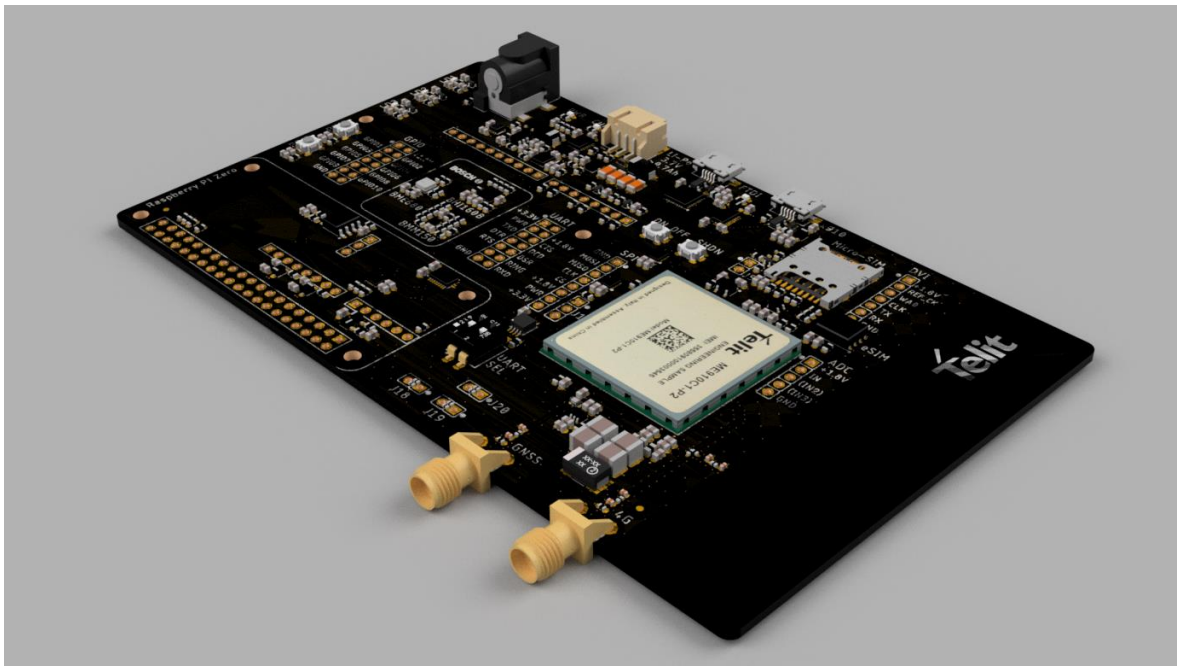

Figure 1 - Bravo EVK Board

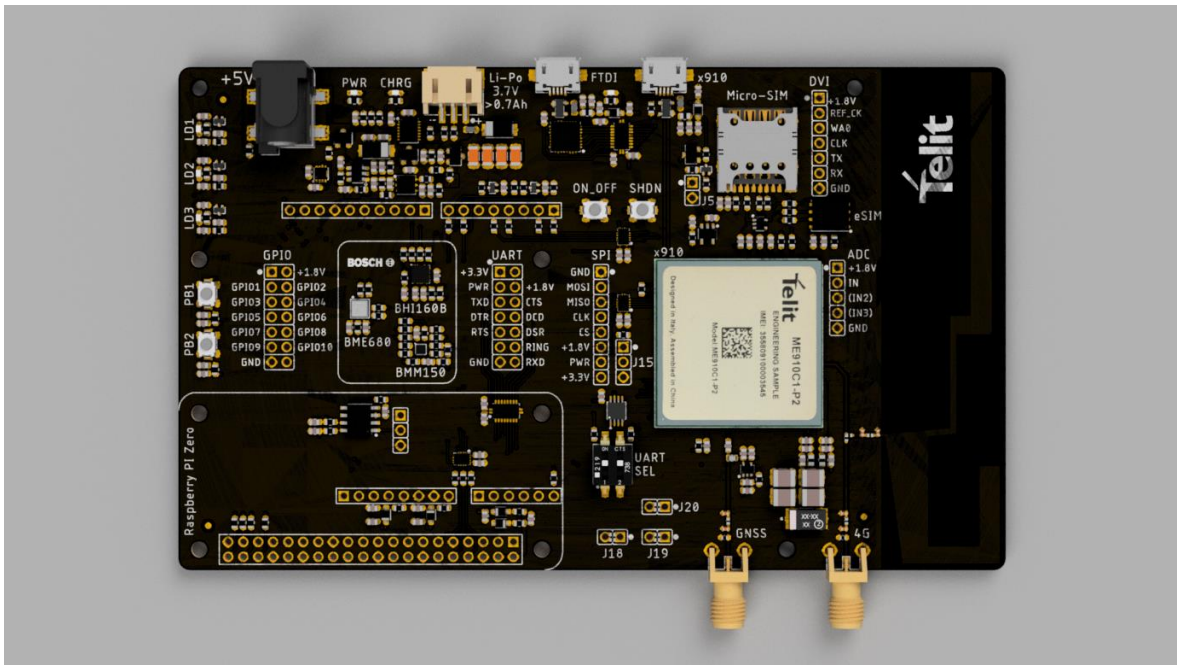

Figure 2 - Bravo EVK Board - Top View

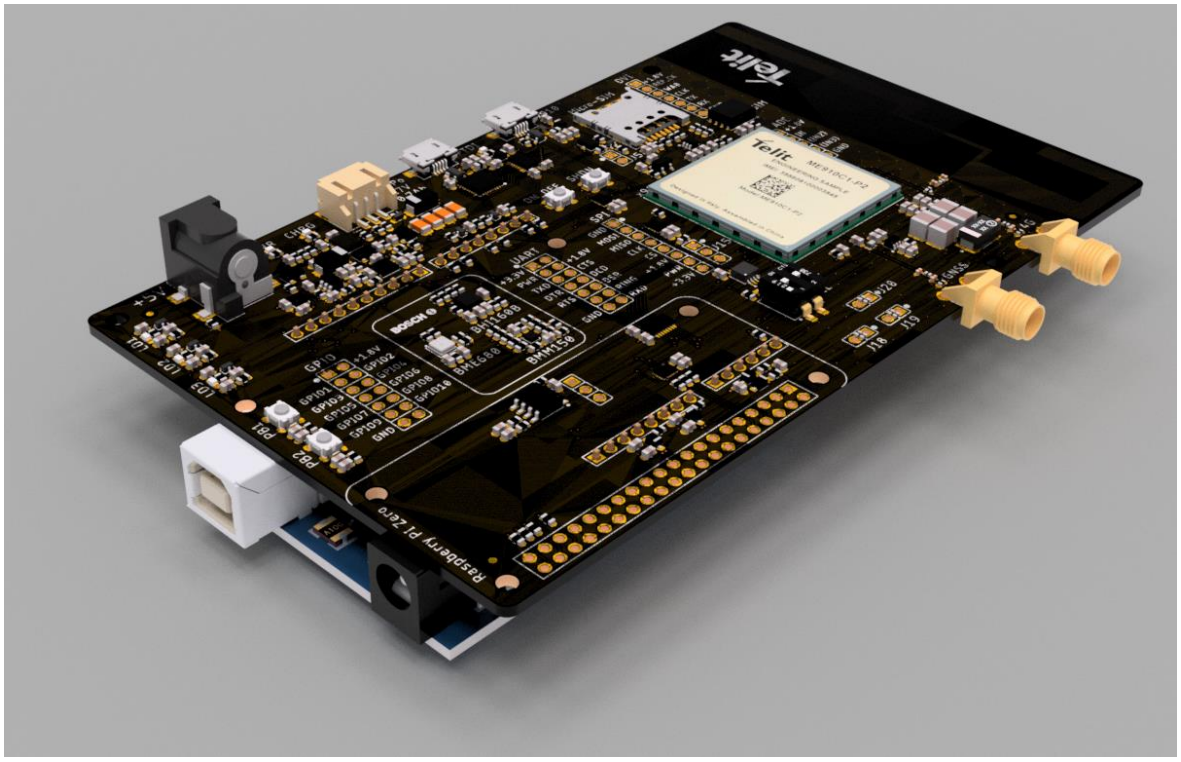

Figure 3 - Bravo EVK Board with Arduino format board

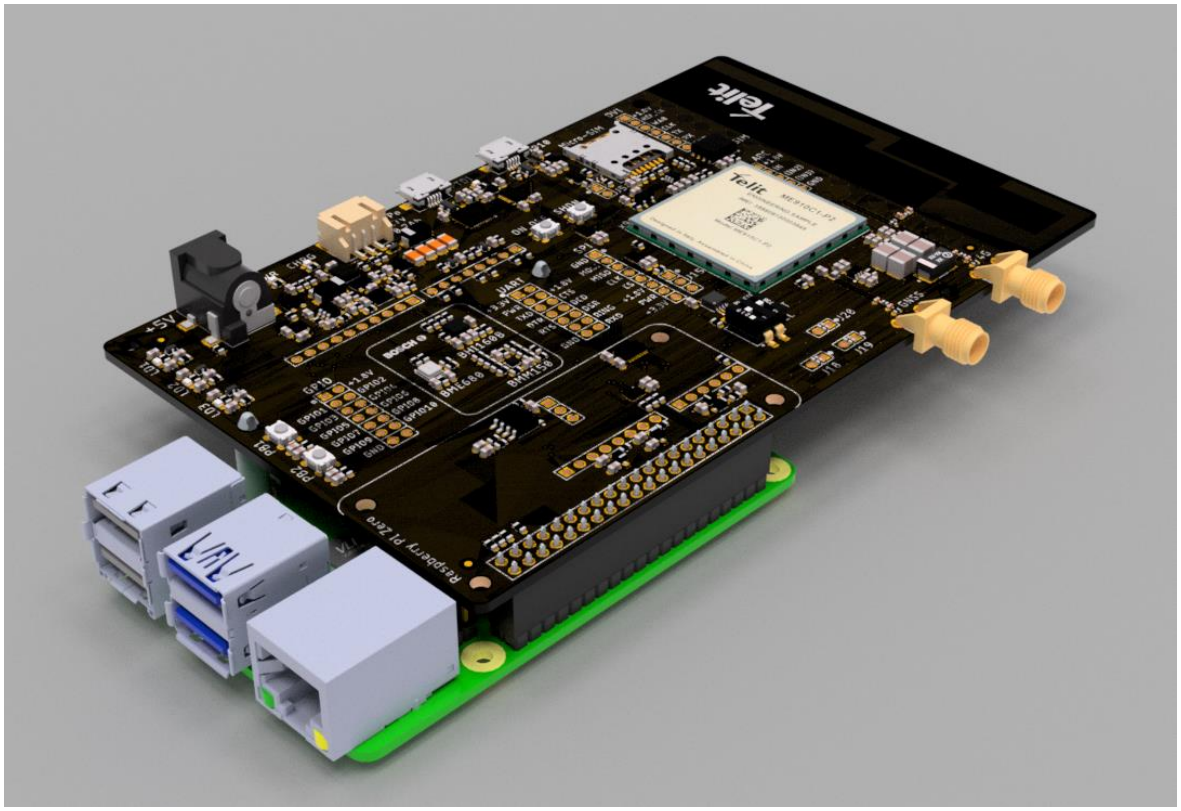

Figure 4 - Bravo EVK Board with Raspberry PI format board

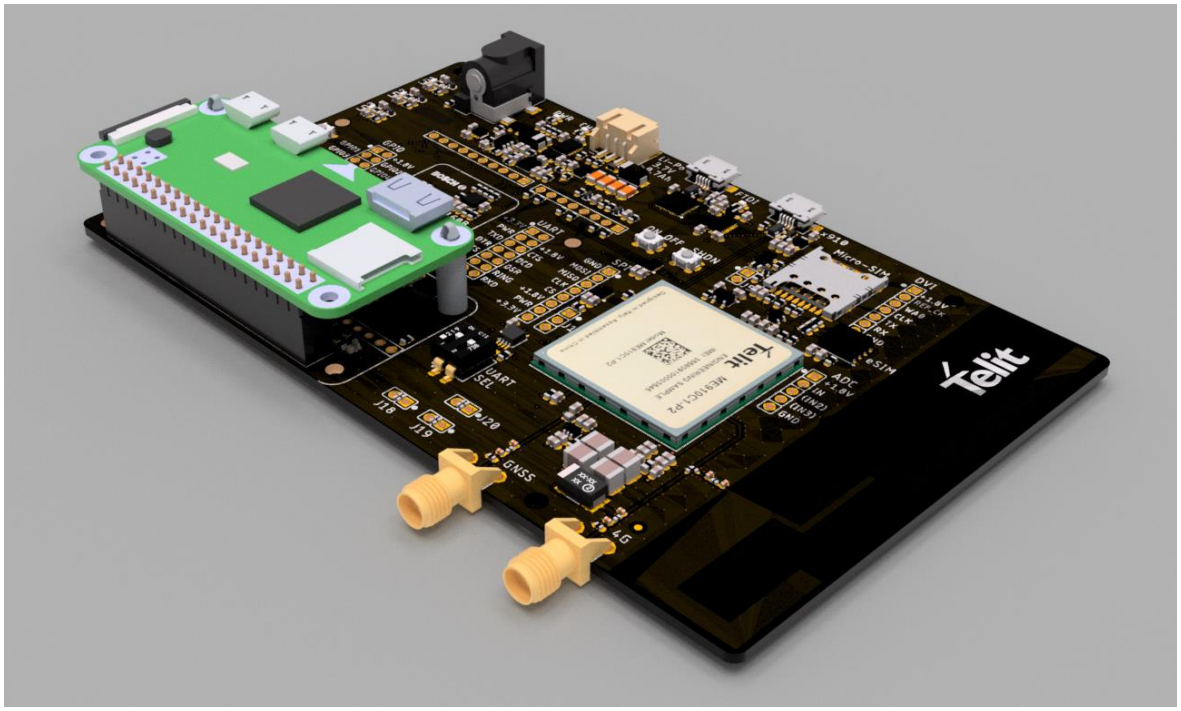

Figure 5 - Bravo EVK Board with Raspberry PI Zero format board

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3. CONNECTORS

3.1. Arduino Pin-out

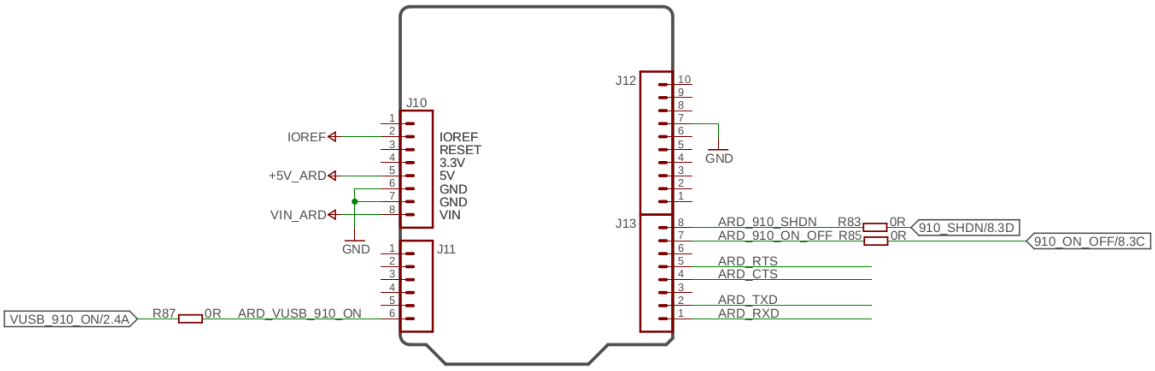


Figure 6 - Arduino Pinout

Pin	Signal	I/O	Function	Type	Comment
POWER SUPPLY					
J10,2	IOREF	I	I/O Level		
J10,5	5V	I	External Power		
J10,6	GND	-			
J10,7	GND	-			
J10,8	VIN	O	Power from BRAVO board		
J12,7	GND	-			
GPIO INTERFACE					
J10,7	ARD_VUSB_910_ON	I	USB Power on switch		
J13,8	ARD_910_SHDN	I	ME910 SHDN Pin		
J13,7	ARD_910_ON_OFF	I	ME910 ON_OFF Pin		
Asynchronous Serial Port					

J13,5	ARD_RTS	I	Input for Request to send signal (RTS) from DTE
J13,4	ARD_CTS	O	Output for Clear to Send signal (CTS) to DTE
J13,2	ARD_TXD	I	Serial data input from DTE
J13,1	ARD_RXD	O	Serial data output to DTE

An Arduino format board can be stacked on top of the Bravo board, connected to the J10, J11, J12 and J13 connectors.

The Arduino board can be powered by the Bravo EVK board using the +5V from USBor J24 Power plug.

The IOREF signal from Arduino board is connected to the level translator VCCB and sets the interface B voltage level.

On the Arduino boards based on ATMEGA 8 bits MCU the IOREF level is +5V and the I/O pins operate at +5V.

On the Arduino boards based on ATSAMD21 32 bits ARM cpu the IOREF level is +3.3V, and all the I/O pins work at +3.3V.

To enable serial communication, configure J6 and J7 jumpers as described in the chapter “UART & FTDI USB”.

The ARD_VUSB_910_ON enables/disables power from native USB Connector to VUSB pin on ME910 module. For more details, please refer to the “Native USB Connector” chapter.

Arduino and the Raspberry PI boards cannot be connected at the same time.

3.2. Raspberry PI Pin-Out

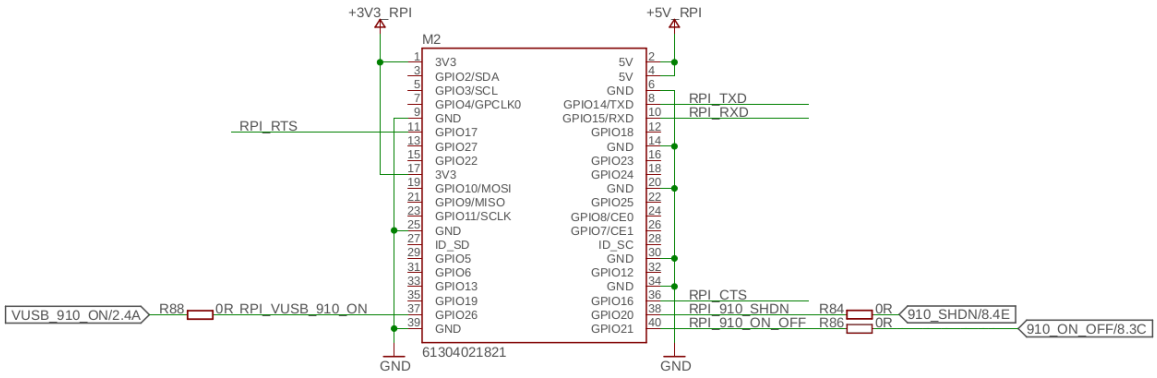


Figure 7 - Raspberry PI Pinout

Pin	Signal	I/O	Function	Type	Comment
POWER SUPPLY					
M2,1	+3V3_RPI	I		Power	
M2,17	+3V3_RPI	I		Power	
M2,2	+5V_RPI	I		Power	
M2,4	+5V_RPI	I		Power	
M2,6	GND	-		Power	
M2,11	GND	-		Power	
M2,14	GND	-		Power	
M2,20	GND	-		Power	
M2,25	GND	-		Power	
M2,30	GND	-		Power	
M2,34	GND	-		Power	
M2,39	GND	-			
GPIO INTERFACE					
M2,37	RPI_VUSB_910_ON	I	USB Power on switch	3V3	
M2,38	RPI_910_SHDN	I	ME910 SHDN Pin	3V3	
M2,40	RPI_910_ON_OFF	I	ME910 ON_OFF Pin	3V3	
Asynchronous Serial Port					

M2,11	RPI_RTS	I	Input for Request to send signal (RTS) from DTE	3V3
M2,36	RPI_CTS	O	Output for Clear to Send signal (CTS) to DTE	3V3
M2,8	RPI_TXD	I	Serial data input from DTE	3V3
M2,10	RPI_RXD	O	Serial data output to DTE	3V3

The Raspberry PI board can power the Bravo EVK board, but not viceversa. All GPIOs are set to +3.3 V level: the +3V3_RPI signal goes to the VCCB on level translator and sets the interface B voltage level.

To enable serial communication, please configure the J6, J7 Selector as described in the “UART & FTDI USB”.

The RPI_VUSB_910_ON enables/disables power from native USB Connector to VUSB pin on ME910 module. For more details, please refer to the “Native USB Connector” chapter.

The Arduino and Raspberry PI boards cannot be connected to Bravo at the same time.

3.3. Native USB Connector

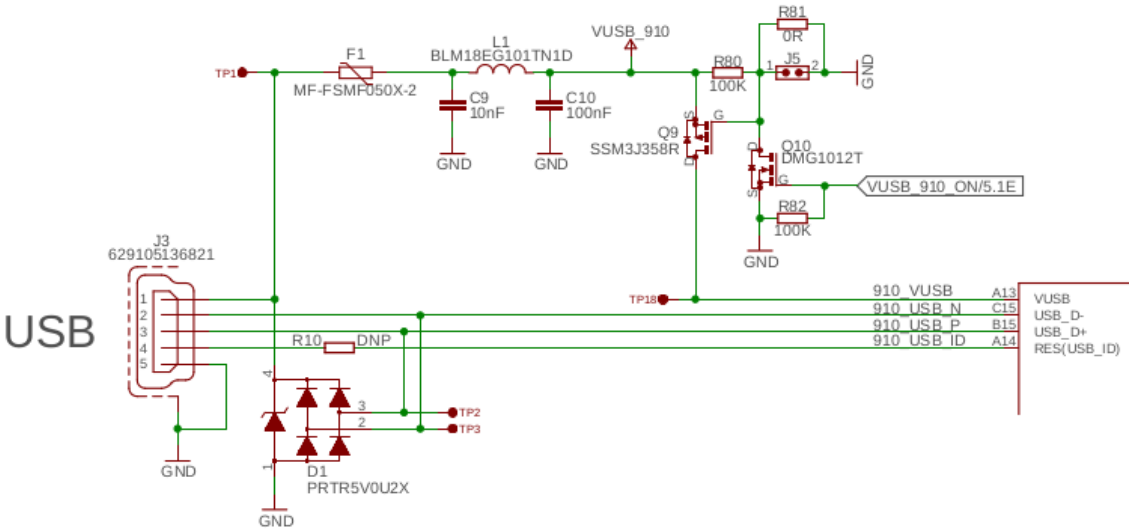


Figure 8 - Native USB

Pin	Signal	I/O	Function	Type	Comment
POWER SUPPLY					
J3,1	5V	I			
J3,5	GND	-			
USB HS 2.0 COMMUNICATION PORT (FW upgrade and Data)					
J3,2	USB_D-	I/O	USB differential Data (-)		
J3,3	USB_D+	I/O	USB differential Data (+)		
J3,4	USB OTG ID	I	RESERVED		NC

The J3 USB plug is connected to the ME910 native USB port. The Bravo board is protected by resettable fuse and ESD discharge.

The USB 5V signal is by default disconnected from the A13/VUSB port but can be forced by closing the J5 jumper: if this jumper is open, VUSB signal connection is driven by VUSB_910_ON signal.

Detaching VUSB from modem is mandatory to set the ME910 module into power saving mode.

VUSB_910_ON is connected to an output pin of Arduino/RaspberryPI. For more details, please refer to the “Arduino Pin-out” or “Raspberry PI Pin-Out” chapters.

Jumper Position	Function	Comment
J5 Jumper		
Open	VUSB_910 driven by VUSB_910_ON signal	
Close	Force VUSB_910 connected to A13/VUSB	

Signal Level	Function	Comment
VUSB_910_ON		
High	VUSB_910 connected to A13/VUSB	
Low	VUSB_910 not connected to A13/VUSB	

3.4. SPI Connector

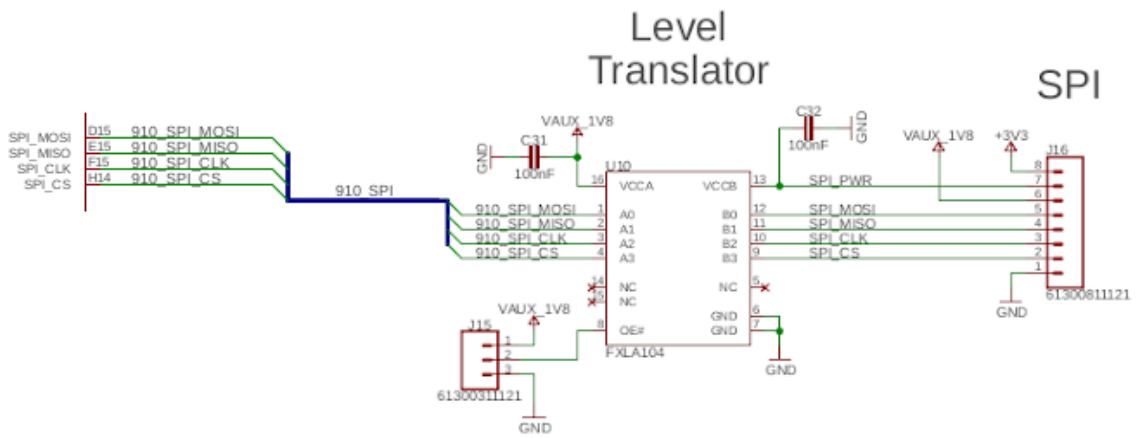


Figure 9 - SPI Circuit

The ME910 SPI interface pins are available on J16 connector, the U10 level translator port A is powered at the same voltage as the MCU IOs.

The SPI Level translator B port is powered by +3V3 or VAUX_1V8 by shortening the 8,7 or 7,6 pin of J16

Outputs Switch to 3-State if either VCC is at GND or OE is high.

Shorted Pins	Function	Comment
Translator Enable J15		
1,2	Level Translator to 3-State	
6,7	Level Translator normal operation	

Shorted Pins	Function	Comment
B Port Level Selection J16		
7,8	+3V3 on SPI_POWER	
6,7	VAUX_1V8 on SPI_POWER	

Pin	Signal	I/O	Function	Type	Comment
POWER SUPPLY					
J16,8	+3V3				
J16,7	SPI_PWR		External Interface Voltage		

J16,6	VAUX_1V8		
J16,1	GND	-	
GPIO			
J16,5	SPI_MOSI	O	Master Output Slave Input
J16,4	SPI_MISO	I	Master Input Slave Output
J16,3	SPI_CLK	O	Clock
J16,2	SPI_CS	O	Chip Select

3.5. GPIO Connectors

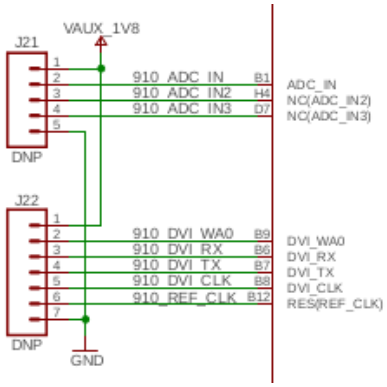


Figure 10 - GPIO Connectors

Unused GPIO ports available externally thorough J21 and J22 connectors as listed in the table below

Pin	Signal	I/O	Function	Type	Comment
POWER SUPPLY					
J21,1	VAUX_1V8	O			
J22,1	VAUX_1V8	O			
J21,5	GND	-			
J22,7	GND	-			
GPIO					
J21,2	ADC_IN	AI	ADC Input		
J21,3	ADC_IN2	I			
J21,4	ADC_IN3	I			
J22,2	DVI_WA0				
J22,3	DVI_RX				
J22,4	DVI_TX				
J22,5	DVI_CLK				
J22,6	REF_CLK		RESERVED		

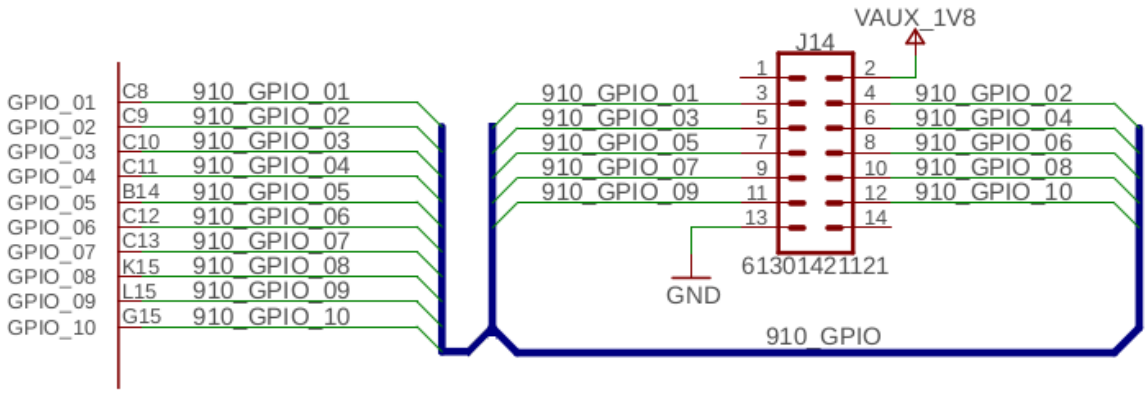


Figure 11 - GPIO Connectors

General Purpose IO pins are available at connector J14 and are shared with Sensors I2C, Buttons and Leds. For more details, please refer to “Sensors” and “Buttons and LEDs” chapters.

Pin	Signal	I/O	Function	Type	Comment
POWER SUPPLY					
J14,2	VAUX_1V8	O			
J14,13	GND	-			
GPIO					
J14,3	GPIO_01/C8	I/O	Yellow LED LD1		
J14,4	GPIO_02/C9	I/O	I2C SDA		
J14,5	GPIO_03/C10	I/O	I2C SCK		
J14,6	GPIO_04/C11	I/O	WDT_EN		
J14,7	GPIO_05/B14	I/O	WDT_RFSH		
J14,8	GPIO_06/C12	I/O	BHI160B INT		
J14,9	GPIO_07/C13	I/O	PB3		
J14,10	GPIO_08/K15	I/O	PB4		
J14,11	GPIO_09/L15	I/O	Yellow LED LD2		
J14,12	GPIO_10/G15	I/O	Yellow LED LD3		
OTHER					
J14,1	NC				
J14,14	NC				

3.6. SIM Connectors

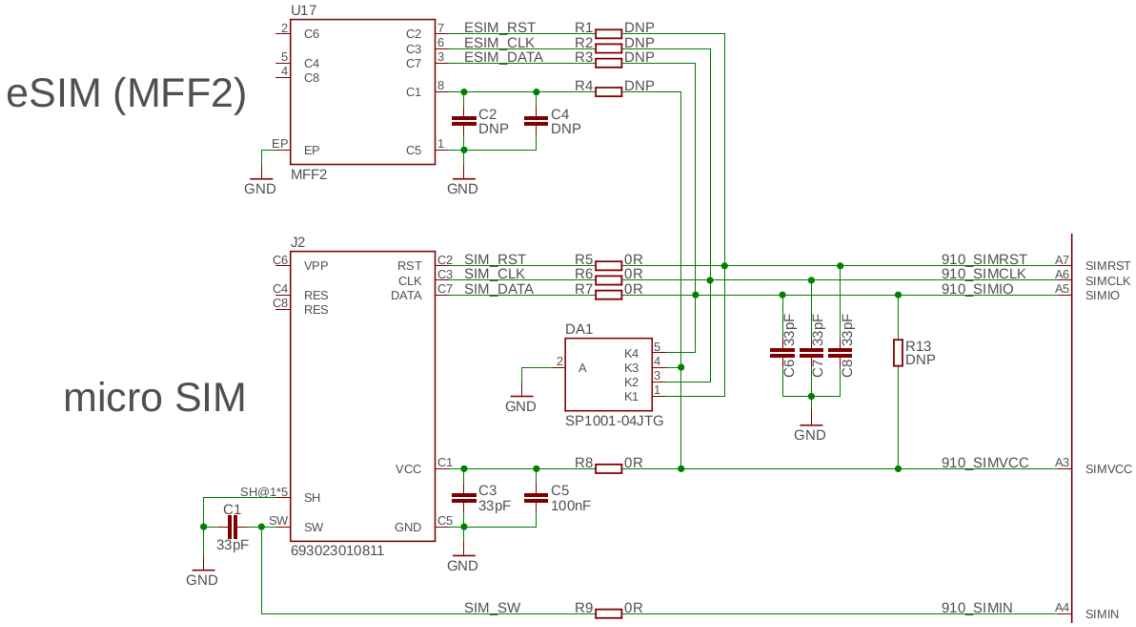


Figure 12 - SIM Sockets

The board can be fitted either with an eSIM in MFF2 format or a micro SIM socket: both inputs are ESD protected.

4. CIRCUIT BLOCKS

4.1. Antennas

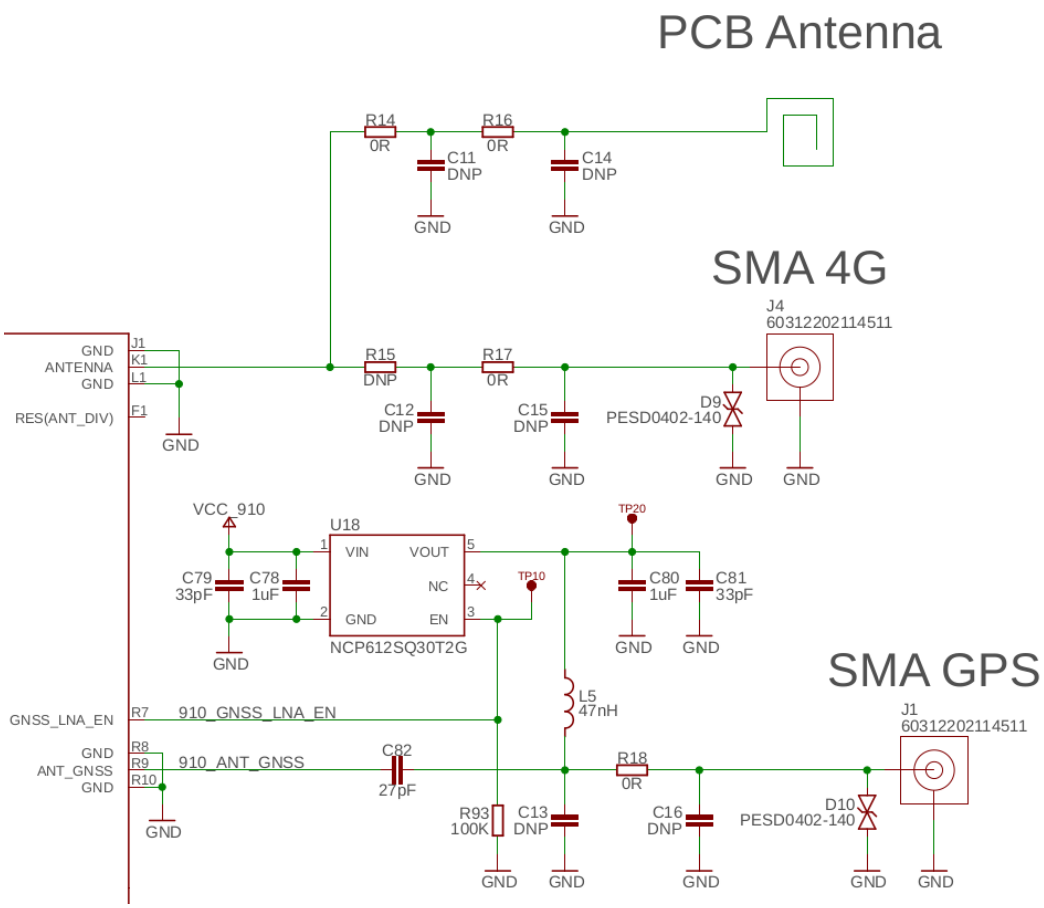


Figure 13 – Antennas

The ANTENNA Signal can be connected either to the PCB antenna or the SMA connector J4, which is disabled by default.

In order to enable J4 and connect an external cellular antenna, remove R14 resistor and solder a 0-ohm resistor on R15 pads: this will disable the onboard cellular antenna.

The GNSS antenna signal is connected to the J1 SMA connector.

4.2. UART & FTDI USB

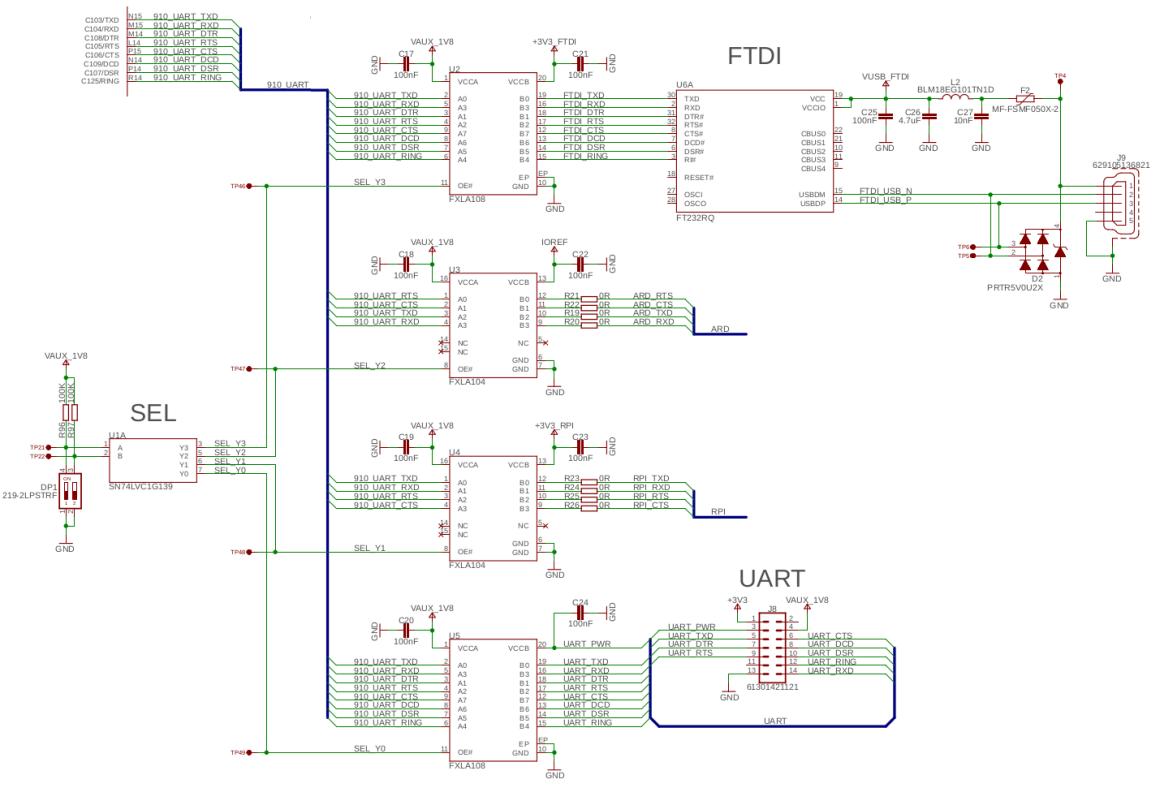


Figure 14 - UART & FTDI USB

The ME910 main UART is available for use with:

- FTDI Serial to USB converter on port J9
- Arduino UART
- Raspberry PI UART
- Generic UART with full hardware handshake

Only one interface can be selected at a time using J6/J7 dip switches as described in the table below:

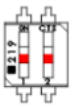
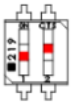
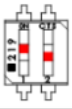
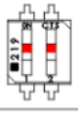
	FTDI USB to Serial converter
	Raspberry PI
	Arduino
	UART Connector

Figure 15 - DIP Switch settings

Pin	Signal	I/O	Function	Type	Comment
FTDI POWER SUPPLY					
J9,1	5V	I	FTDI Power		
J9,5	GND	-			
FTDI COMMUNICATION PORT					
J9,2	USB_D-	I/O	USB differential Data (-)		
J9,3	USB_D+	I/O	USB differential Data (+)		
J9,4	USB OTG ID	I			NC

Pin	Signal	I/O	Function	Type	Comment
UART POWER SUPPLY					
J8,1	+3V3	O			
J8,3	UART_PWR	I	Power to Level Transaltor		
J8,3	VAUX_1V8	O			
J8,13	GND	-			
UART Signals					
J8,5	UART_TXD	I	Serial data input from DTE		
J8,6	UART_CTD	O	Output for Clear to Send signal (CTS) to DTE		
J8,7	UART_DTR	I	Input for (DTR) from DTE		
J8,8	UART_DCD	O	Output for (DCD) to DTE		
J8,9	UART_RTS	I	Input for Request to Send signal (RTS) from DTE		
J8,10	UART_DSR	O	Output for (DSR) to DTE		
J8,12	UART_RING	O	Output for Ring (RI) to DTE		
J8,14	UART_RXD	O	Serial data output to DTE		
OTHER					
J8,4	NC				

J8,11	NC

Shorted Pins	Function	Comment
UART Level Translator Voltage Selection J8		
1,2	VAUX_1V8 to UART_PWR	
1,3	+3V3 to UART_PWR	

The +5V from the FTDI USB connector J9 can power the Bravo board. The FTDI serial to USB converter is powered only by the +5V signal from the J9 connector.

The level translator connecting the Arduino UART to the ME910 UART is powered by IOREF signal from Arduino board: when the Arduino is not connected the level translator is in 3-state.

The level translator connecting the Raspberry PI UART to the ME910 UART is powered by +3.3 V signal from Raspberry PI board: when the Arduino is not connected the level translator is in 3-state.

Full UART level can be selected shorting pins 1-2 or 1-3 in J8

Each level translator is powered only if both power supplies are present, 3-state otherwise.

Each translator is in 3-state if OE signal is high.

SW1	SW2	Function	Comment
Device Selection DP1			
ON	**ON**	Enables UART level translator	
OFF	**ON**	Enables RPI level translator	
ON	**OFF**	Enables ARDUINO level translator	
OFF	**OFF**	Enables FTDI level translator	hw handshake

Signal	Type	Direction	Function
UART Signals			
DCD	Control	DCE to DTE	Determines whether the DCE is connected to a working phone line or not (only used in connection with modem).
TXD	Data	DTE to DCE	Computer (DTE) sends information to the DCE.
RXD	Data	DCE to DTE	Computer (DTE) receives information sent from the DCE.

DTR	Control	DTE to DCE	Computer (DTE) tells the DCE that it is ready to communicate. Raised by DTE when powered on. In auto-answer mode raised only when RI arrives from DCE
DSR	Control	DCE to DTE	Modem (DCE) tells the computer that it is ready to talk. Raised by DCE to indicate ready.
RTS	Control	DTE to DCE	Computer (DTE) asks the modem if it can send information. Raised by DTE when it wishes to send. Expects CTS from DCE.
CTS	Control	DCE to DTE	Modem (DCE) tells the computer (DTE) that it can send information. Raised by DCE in response to RTS from DTE.
RI	Control	DCE to DTE	Set when incoming ring detected, used for auto-answer application. DTE raises DTR to answer (only used in connection with modem).

4.3. Sensors

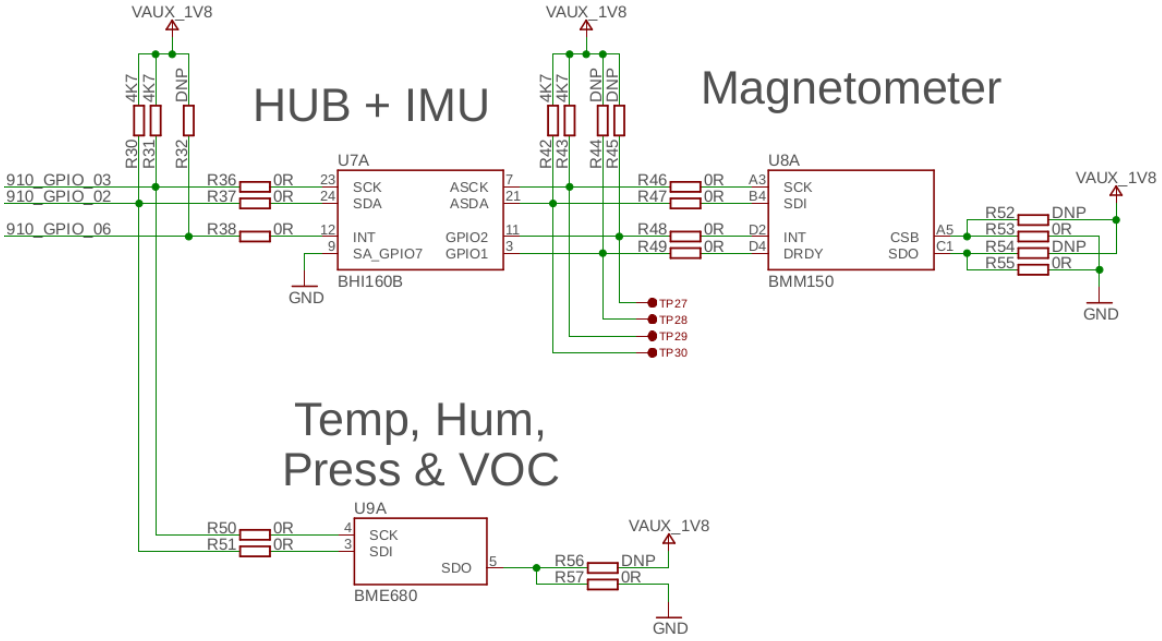


Figure 16 - Bosch Sensors

The Bravo board includes the following Bosch Sensortec sensors:

- BHI160B low-power smart-hub with an integrated three axis gyroscope plus an integrated three axis accelerometer plus a programmable microcontroller.
- BMM150 low power and low noise 3-axis digital geomagnetic sensor
- BME680 integrated environmental sensor

The BHI160B huband BME680 environmental sensor are connected to the ME910 module using I2C communication, the BMM150 magnetometer is connected to the BHI160B smart hub auxiliary I2C port.

Pin	GPIO	Signal	Type	Direction	Function
I2C Signals					
C10	**03**	**SCK**	Clock	O	I2C clock signal from ME910
C9	**02**	**SDA**	Data	I/O	I2C Data
C12	**06**	**INT**	Control	I	Interrupt from BHI160B

4.4. Buttons and LEDs

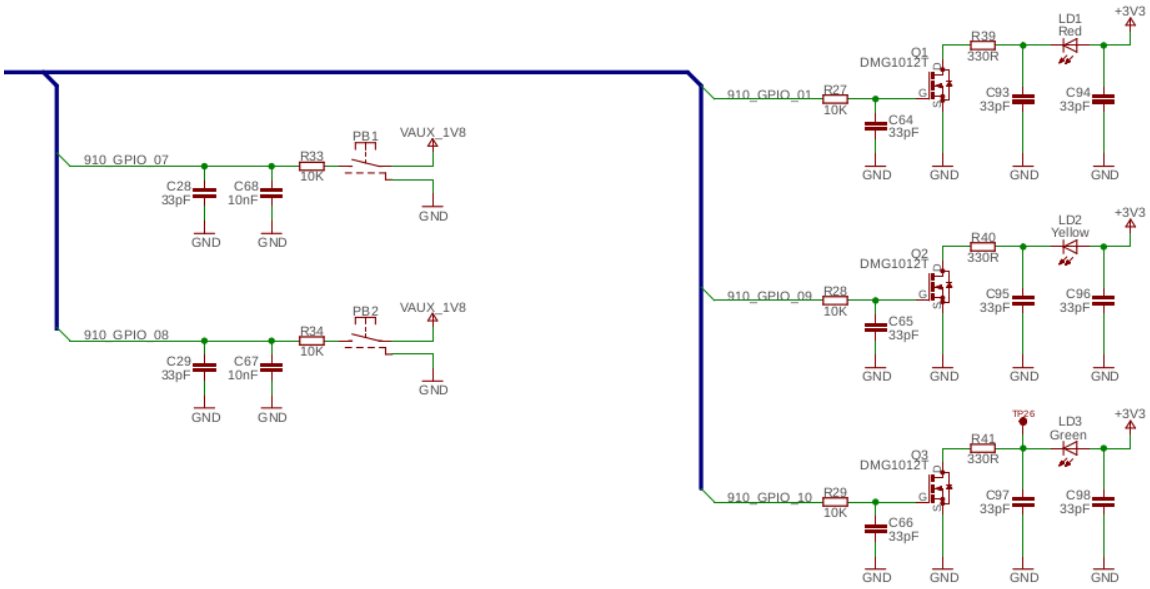


Figure 17 - Pushbuttons and Leds

The Bravo board has two user-available pushbuttons: PB3 and PB4 and three LEDs, LD1, LD2 and LD3. The leds are ON when the MCU pin is high.

These signals are available at GPIO connector J14: please refer to chapter “GPIO Connectors” for further details.

Pin	GPIO	Direction	Function
C13	**07**	I	User Pushbutton
K15	**08**	I	User Pushbutton
C8	**01**	O	User Yellow LED
L15	**09**	O	User YellowLED
G15	**10**	O	User Yellow LED

4.5. External Power Supply

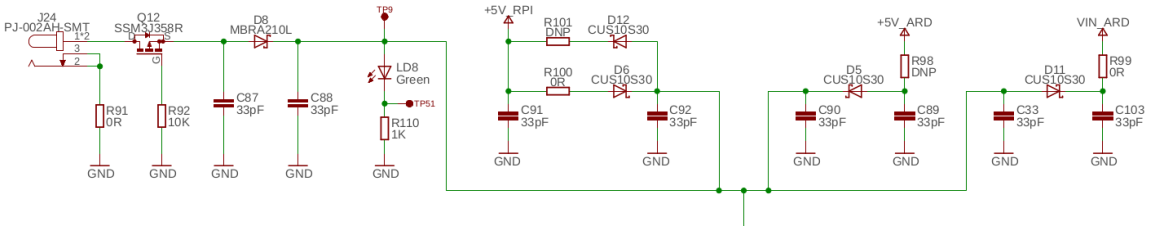


Figure 18 - Power Supply

The + 5V voltage level that powers the 3.8 V power supply can be supplied by different external sources:

- USB ports (FTDI or ME910 native USB port)
- +5V on Raspberry PI Connector
- J24 External Power Connector

J24 External Power Connector must be connected to a 5V DC power supply. The connection is protected against polarity inversion.

J24 is a center positive coaxial connector with 2.0 mm diameter center pin, see picture below

Figure 19 - J24 Power Connector

The Raspberry PI board can power the Bravo board as long as an adequate power supply is connected to the Raspberry.

If the Bravo board is powered by J24 connector then the Arduino board is powered by the Bravo board (default).

4.6. Battery Charger

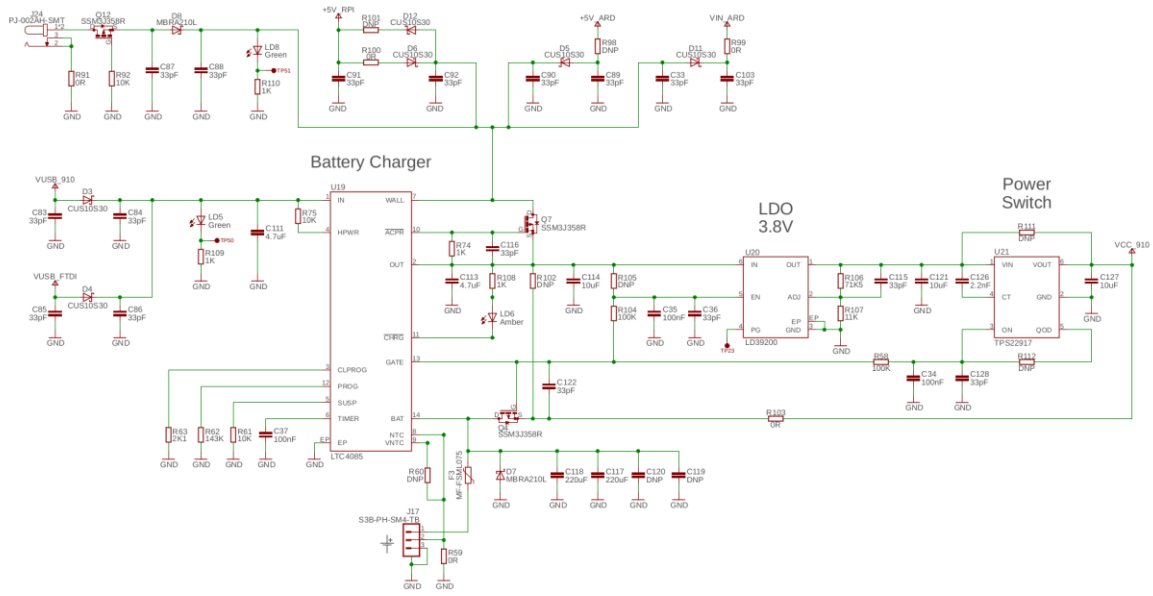


Figure 20 - Battery Charger

A +3.7 V Lipo battery (not included) connected to J17 can power the Bravo board and can be charged by the onboard charger: the circuit receives +5V from the external power supply. For more details, please refer to the “External Power Supply” chapter.

The battery charger is powered by an external +5V power supply thorough the J24 connector or by the USB ports.

When an external power source is present and the battery is connected, the battery is charging. The VCC_910 voltage is supplied by the 3.8V LDO.

When the external power source on J24 is disconnected, the Bravo board is battery powered. In this case VCC_910 is supplied directly by the battery, by-passing the LDO.

While charging the battery the amber led is turned on.

To power the Bravo board, Telit suggests either using an external 5V DC power supply through J24 power connector or an external battery pack: this in order not to rely on the maximum current that can be supplied by the USB port.

Battery connector J17 is S3B-PH-SM4-TB.

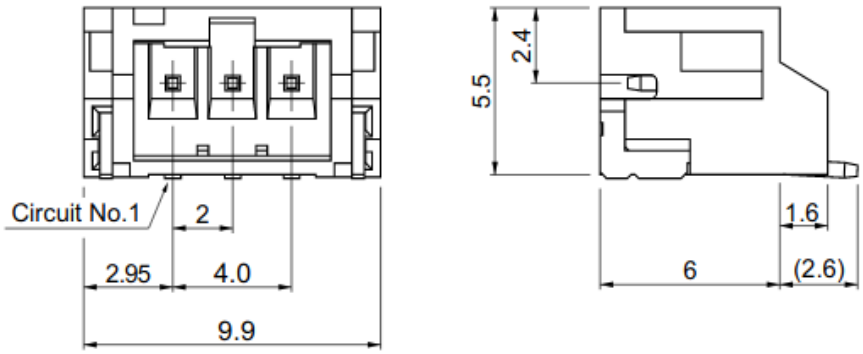


Figure 21 - Battery Connector

PIN	Function	Comment
Battery		
1	+	
2	Temperature sensor	
3	-	

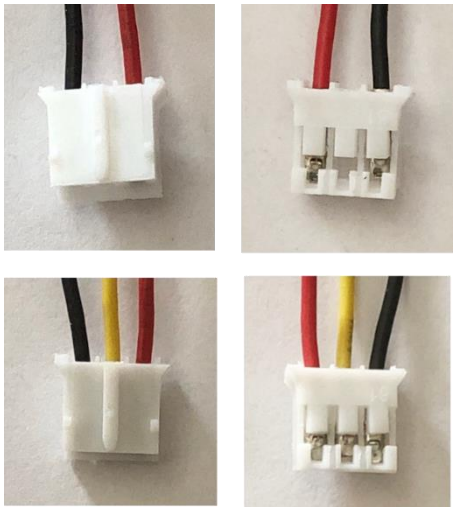


Figure 22 Connector without temperature sensor (top) and with temperature sensor (bottom)

By default, the BRAVO board is configured for batteries without NTC temperature sensor.

To disable battery temperature monitoring, the 0 ohm resistor R59 is mounted.

If a battery with NTC temperature sensor is connected to the board WITHOUT removing R59 resistor, the battery charger will function properly but battery temperature is not monitored.

To enable temperature monitoring, please remove R59 resistor from the board.

WARNING

Use Li-Ion battery V_{nom} = 3.7V, V_{chrg} = 4.2V Capacity >= 700 mAh

Li-Po batteries are charged at 4.2V with a current that is usually half the nominal capacity (C/2). This board has a dedicated IC that has a preset charging current of 350mAh: this means that the MINIMUM capacity of the Li-Po battery shall be 700 mAh.

It is strongly recommended that a Li-Po battery of **at least 700mAh** capacity is selected. Smaller cells will be damaged by this current and may overheat, release gasses, catch fire and explode.

A larger cell will take more time to charge, but won't overheat or cause any harm.

4.7. 3V3 Power Supply

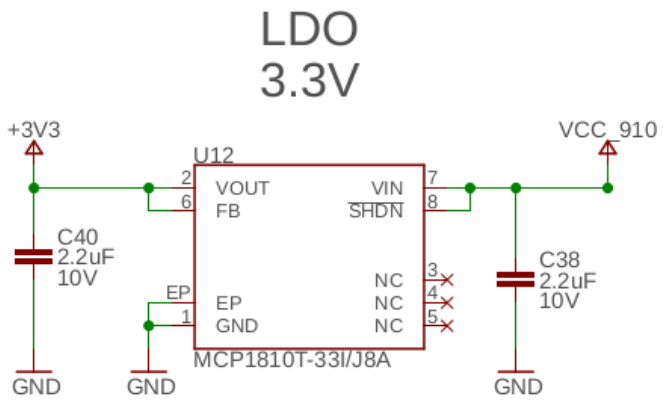


Figure 23 - 3V3 Power Supply

The Bravo board also provides a +3.3 V power source to power LEDs and Level Translator for UART connection.

4.8. ME910 Power Supply

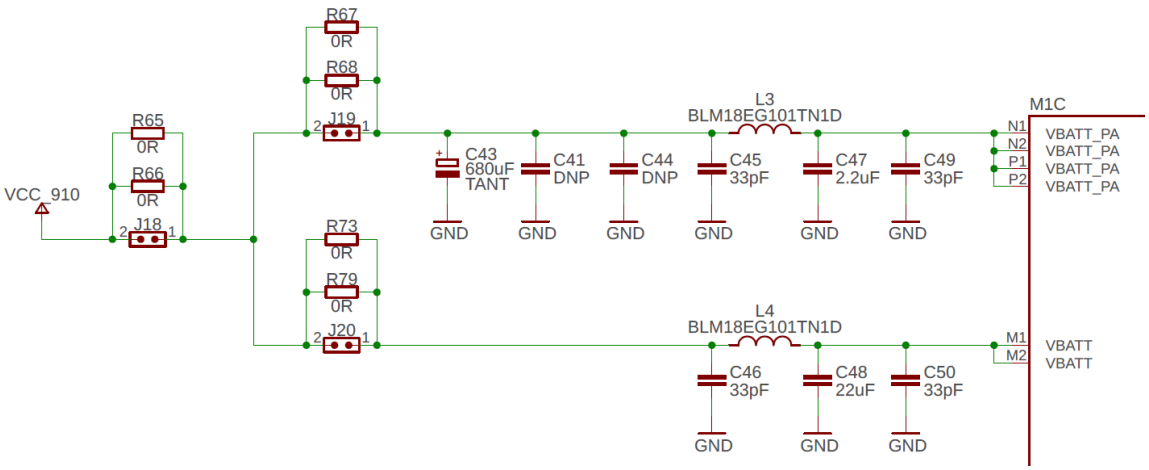


Figure 24 - ME910 Power Supply Circuit

Power is delivered from VCC_910 to the ME910 module using the above pictured circuit.

R66, R67 and R68 resistors can be removed and connectors J18, J19 and J20 can be used to measure current consumption.

Connector	Function	Comment
Current Sense		
J18	Total current to ME910 module	
J19	Current on VBATT_PA	
J20	Current on VBATT	

4.9. RTC Battery

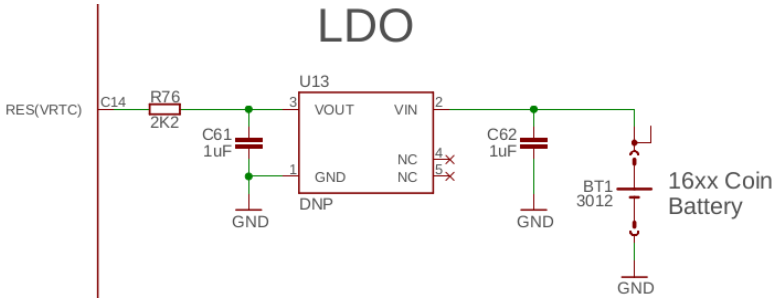


Figure 25 - RTC battery power supply

The VRTC pin available on some ME910 variants can be connected to a coin battery by means of a LDO power supply.

This circuit is actually not mounted on the Bravo board, but is described here for future use.

4.10. 1V8 Power Supply

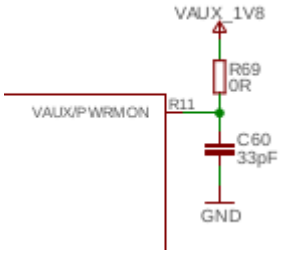


Figure 26 - ME910C1 internal power supply

The ME910C1 module is powered at 3.8 V, but all I/O operate at 1.8 V: the VAUX/PWRMON provides the 1.8 V level to be used by level translators and onboard Bosch sensors. For additional details, please refer to “Sensors” chapter.

4.11. Wake Switch

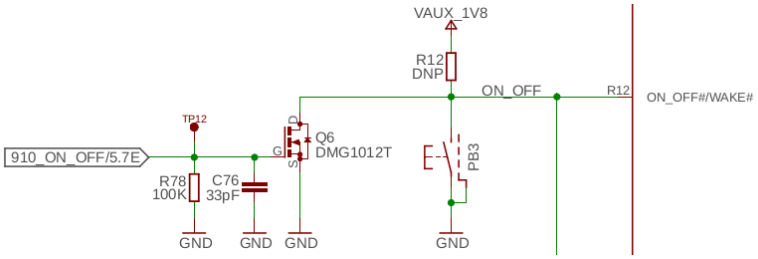


Figure 27 - ON/OFF Switch Circuit

The ON_OFF#/WAKE# pin can be controlled by the PB3 bush-button or by the 910_ON_OFF signal that is connected to ARD_910_ON_OFF or RPI_910_ON_OFF signal coming from Arduino or Raspberry PI connected boards respectively.

For additional details, please refer to chapter “Arduino Pin-outArduino Pin-out”or “Raspberry PI Pin-Out”.

4.12. Shutdown Switch

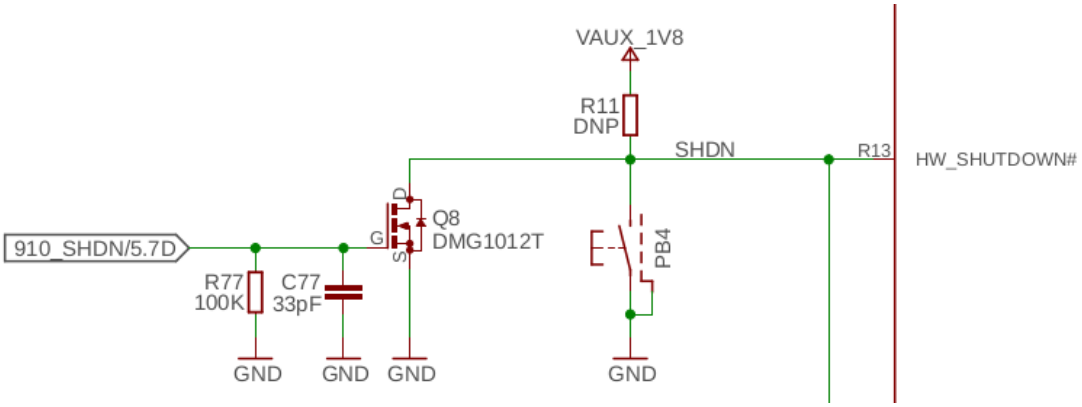


Figure 287 - SHUTDOWN Switch Circuit

The HW_SHUTDOWN# pin can be controlled by the PB4 bush-button or by the 910_SHDN signal that is connected to ARD_910_SHDN or RPI_910_SHDN signal coming from Arduino or Raspberry PI connected boards respectively. For additional details, please refer to chapter “Arduino Pin-outArduino Pin-out”or “Raspberry PI Pin-Out”.

4.13. Watchdog

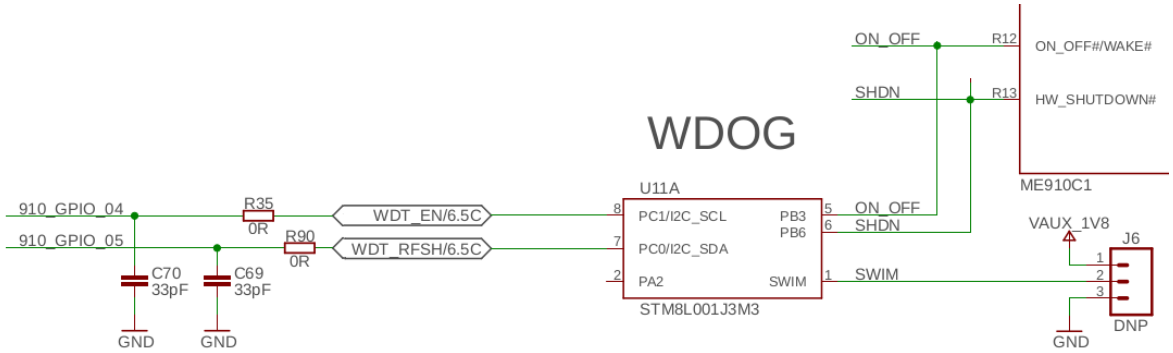


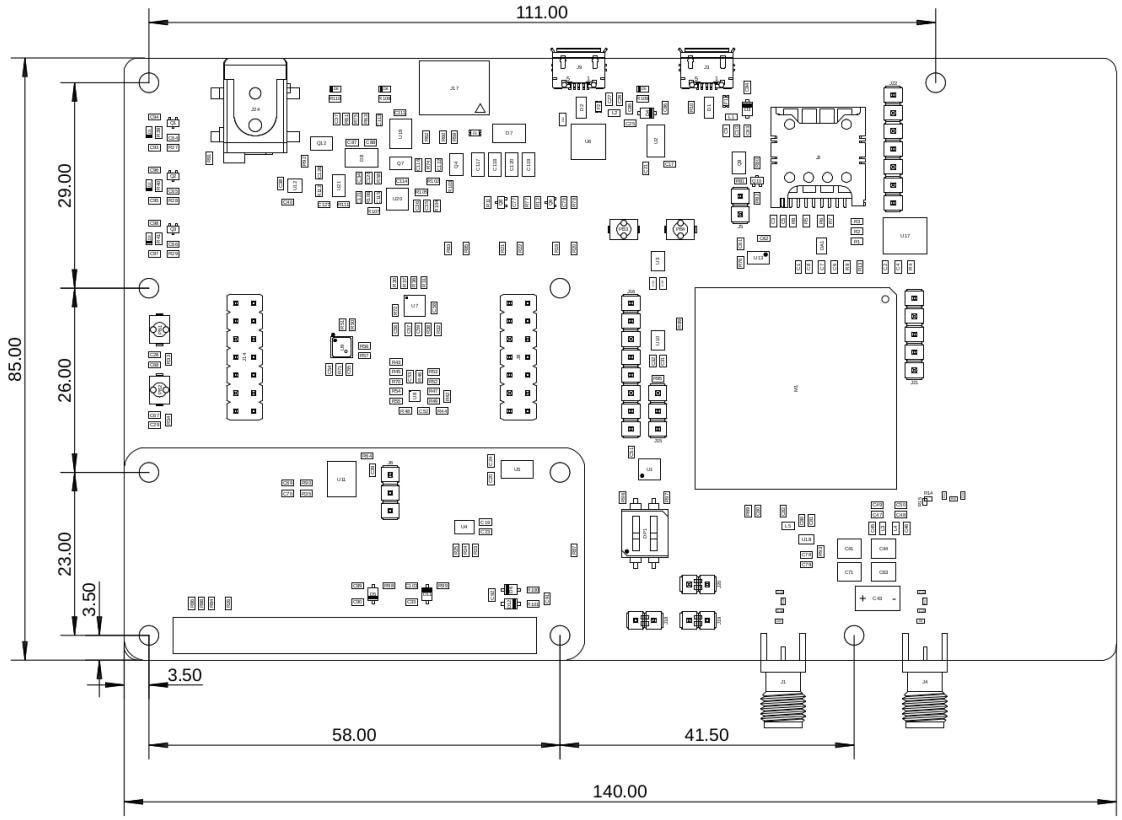
Figure 298 - Watchdog Circuit

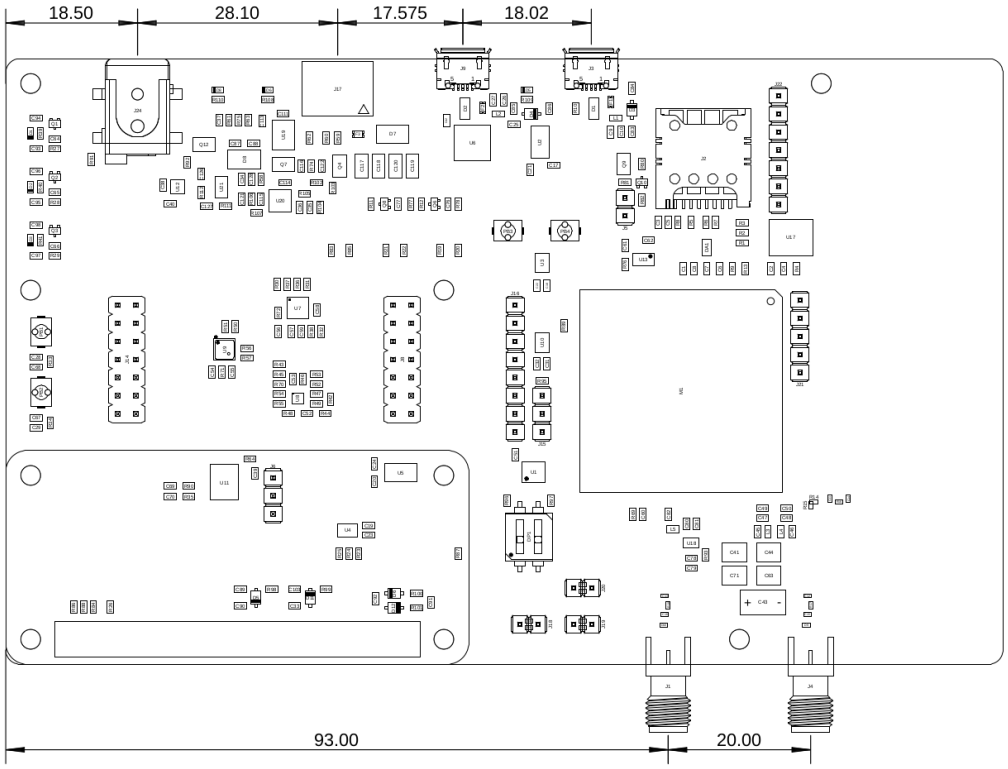
The HW_SHUTDOWN# and ON_OFF#/WAKE# pins can be controlled the U11A STM8L microcontroller to enable whatchdog functionality.

The WDT chip is not mounted by default.

5. MECHANICAL DESIGN

5.1. Drawing





6. SAFETY RECOMMENDATIONS

6.1. READ CAREFULLY

Be sure the use of this product is allowed in the country and in the environment required. The use of this product may be dangerous and has to be avoided in the following areas:

- Where it can interfere with other electronic devices in environments such as hospitals, airports, aircrafts, etc.
- Where there is risk of explosion such as gasoline stations, oil refineries, etc. It is the responsibility of the user to enforce the country regulation and the specific environment regulation.

Do not disassemble the product; any mark of tampering will compromise the warranty validity. We recommend following the instructions of the hardware user guides for correct wiring of the product. The product has to be supplied with a stabilized voltage source and the wiring has to be conformed to the security and fire prevention regulations. The product has to be handled with care, avoiding any contact with the pins because electrostatic discharges may damage the product itself. Same cautions have to be taken for the SIM, checking carefully the instruction for its use. Do not insert or remove the SIM when the product is in power saving mode.

The system integrator is responsible for the functioning of the final product; therefore, care has to be taken to the external components of the module, as well as any project or installation issue, because the risk of disturbing the GSM network or external devices or having impact on the security. Should there be any doubt, please refer to the technical documentation and the regulations in force. Every module has to be equipped with a proper antenna with specific characteristics. The antenna has to be installed with care in order to avoid any interference with other electronic devices and has to guarantee a minimum distance from the body (20 cm). In case this requirement cannot be satisfied, the system integrator has to assess the final product against the SAR regulation.

The European Community provides some Directives for the electronic equipment introduced on the market. All of the relevant information is available on the European Community website:

http://ec.europa.eu/enterprise/sectors/rtte/documents/

The text of the Directive 99/05 regarding telecommunication equipment is available,

while the applicable Directives (Low Voltage and EMC) are available at:

http://ec.europa.eu/enterprise/sectors/electrical/

7. ACRONYMS

TTSC	Telit Technical Support Centre
USB	Universal Serial Bus
HS	High Speed
DTE	Data Terminal Equipment
UMTS	Universal Mobile Telecommunication System
WCDMA	Wideband Code Division Multiple Access
HSDPA	High Speed Downlink Packet Access
HSUPA	High Speed Uplink Packet Access
UART	Universal Asynchronous Receiver Transmitter
HSIC	High Speed Inter Chip
SIM	Subscriber Identification Module
SPI	Serial Peripheral Interface
ADC	Analog – Digital Converter
DAC	Digital – Analog Converter
I/O	Input Output
GPIO	General Purpose Input Output
CMOS	Complementary Metal – Oxide Semiconductor
MOSI	Master Output – Slave Input
MISO	Master Input – Slave Output
CLK	Clock
MRDY	Master Ready
SRDY	Slave Ready

CS	Chip Select
RTC	Real Time Clock
PCB	Printed Circuit Board
ESR	Equivalent Series Resistance
VSWR	Voltage Standing Wave Radio
VNA	Vector Network Analyzer

8. DOCUMENT HISTORY

Revision	Date	Changes
0	2020-02-21	Initial revision
1	2020-03-23	DIP Switch table added
2	2020-09-02	Battery NTC information added
3	2021-02-16	J8 table pinout updated
4	2021-03-10	J8 and J9 pinout tables updated

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Link to **www.telit.com** and contact our technical support team for any questions related to technical issues.

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