QuickSpot®

Walter - WiFi/BLE/NB-IoT/LTE-M/GNSS module

Preliminary Datasheet

Revision 0.1 - December 30, 2022

1 General information

Walter is an ESP32-S3 based development board that offers WiFi, Bluetooth 5 (LE), cellular CAT M1/NB1/NB2 and GNSS connectivity.

2 Features

Walter is based on an ESP32-S3-WROOM-1-N16R2 module with an on-board Sequans GM02SP modem. This combination makes Walter a unique development board that offers a rich feature-set which include but is not limited to:

- CPU: Xtensa Dual-core 32-bit LX7 CPU (ESP32-S3 SoC)
- RAM: 2MB (Quad SPI) PSRAM
- Flash: 16MB (Quad SPI) Flash memory
- WiFi: 150Mbps(n) 802.11 WiFi b/g/n with on-board antenna
- LTE: CAT M1/NB1/NB2 (GM02SP module)
- GPS: GPS, GNSS Constellation support (GM02SP module)
- Bluetooth: 2Mbps Bluetooth 5 (LE), Bluetooth Mesh
- 24 physical GPIO pins

3 Absolute maximum ratings

For the most reliable use and stability of the module we advice to use the typical ratings. We do not guarantee the correct functioning of the device outsite the minimum and maxium range of the module.

Parameter	Units	Minimum rating	Typical rating	Maxium rating
DC Supply Voltage	V	3.0	5.0	5.5
Digital I/O Voltage	V	2.64	3.3	3.6

4 Interfaces

Walter provides a total of 28 physical pins (3 power, 1 strapping and 24 IO) to interface with external parts. This chapter provides information about these pins as well as internally connected pins and the testpoints located at the bottom of the board.

Power supply pins and their details are available in section 5.1 about the power characteristics.

For more information about specific pins regarding the ESP32-S3 Wroom module or the Sequans GM02SP module, please refer to the datasheet of the corresponding module.

4.1 Pin Assignment

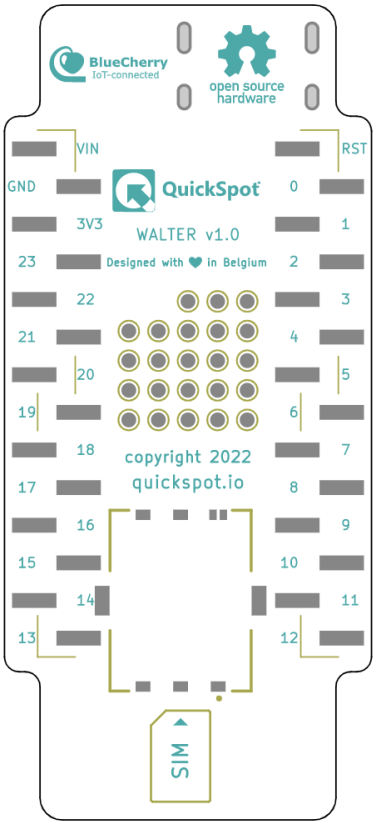

Figure 1: Walter Board Pin Assigment

4.1.1 External Pins

Table 1 contains the description of the physical pins on Walter available on the underside of the board. The order of this table, in reference to the board, is left to right, top to bottom.

Pin	ESP pin	Name	Input/Output	Description
1	N/A	VIN	power input	DC Power Input (Characteristics 5.1)
2	N/A	GND	power input	GND Connection
3	N/A	3V3	power output	Switchable +3.3VDC output (Characteristics 5.1)
4	IO10	P23	bidirectional	General purpose I/O
5	IO9	P22	bidirectional	General purpose I/O
6	IO8	P21	bidirectional	General purpose I/O
7	IO18	P20	bidirectional	General purpose I/O
8	IO17	P19	bidirectional	General purpose I/O
9	IO16	P18	bidirectional	General purpose I/O
10	IO15	P17	bidirectional	General purpose I/O
11	IO7	P16	bidirectional	General purpose I/O
12	IO6	P15	bidirectional	General purpose I/O
13	IO5	P14	bidirectional	General purpose I/O
14	IO4	P13	bidirectional	General purpose I/O
15	EN	RESET	input	ESP32 reset with 10k pullup
16	RXD0	P0	bidirectional	ESP32 UART0 Receive
17	TXD0	P1	bidirectional	ESP32 UART0 Transmit
18	IO0	P2	bidirectional	Bootloader and 3.3VDC switch after boot
19	IO12	P3	bidirectional	General purpose I/O
20	IO11	P4	bidirectional	General purpose I/O
21	IO13	P5	bidirectional	General purpose I/O
22	IO38	P6	bidirectional	General purpose I/O
23	IO39	P7	bidirectional	General purpose I/O
24	IO40	P8	bidirectional	General purpose I/O
25	IO41	P9	bidirectional	General purpose I/O
26	IO42	P10	bidirectional	General purpose I/O
27	IO2	P11	bidirectional	General purpose I/O
28	IO1	P12	bidirectional	General purpose I/O

Table 1: Walter External Pin Definitions

4.1.2 Internal Pins

Table 2 contains the pin descriptions of the internally connected GPIO pins on Walter. These are necessary for either communication between components on the board or reserved for other purposes and thus not available for external use.

ESP pin	Description
IO19	USB D-
IO20	USB D+
IO46	LTE_WAKE0
IO45	LTE_UART0_TX (See 4.2)
IO14	LTE_UART0_RX (See 4.2)
IO21	LTE_UART0_RTS (See 4.2)
IO47	LTE_UART0_CTS (See 4.2)
IO48	LTE_RESET

Table 2: Walter Internal Pin Definitions

4.1.3 Testpoints

Walter contains 23 testpoints on the bottom of the board that serve multiple purposes. You can use these pins for debugging, interfacing and/or flashing of the Sequans GM02SP and the ESP32-S3-WROOM Modules.

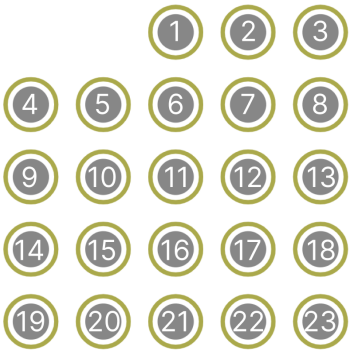

Figure 2: Walter Testpoints Layout

Table 3 contains the description of the testpoints as depicted in Figure 2.

Number	Description
1	LTE_JTAG_TRSTN
2	LTE_JTAG_TCK
3	LTE_JTAG_TDO
4	LTE_UART2_RTS
5	LTE_UART2_CTS
6	LTE_PS_STATUS
7	LTE_JTAG_TDI
8	LTE_JTAG_TMS
9	LTE_UART2_RX
10	LTE_UART1_RX
11	LTE_UART1_TX
12	LTE_UART0_TX (Connected to ESP32 GPIO45)
13	LTE_UART0_RX (Connected to ESP32 GPIO14)
14	LTE_UART2_TX
15	LTE_UART1_RTS (Pull-up R4 not fitted)
16	LTE_UART1_CTS (Pull-up R6 not fitted)
17	LTE_UART0_RTS (100k pull-up)
18	LTE_UART0_CTS (100k pull-up)

Number	Description
19	ESP_GPIO3 (Strapping pin)
20	GND
21	+1.8VDC REF from GM02SP
22	+3.3VDC
23	VBUS

Table 3: Walter Testpoints Description

4.1.4 Others

Not all pins of the ESP32-S3 and Sequans GM02SP on Walter are internally connected, available through physical pins or testpoints. These pins are either reserved for use by the component itself or deemed not necessary to be available externally.

4.2 LTE UART

The Sequans GM02SP module has 3 UART interfaces available by default. Only UART0 is connected to the ESP32-S3 Wroom Module on Walter as described in Figure 2. Communication between modules is possible with AT-commands. Please refer to the corresponding datasheet of the Sequans GM02SP for all possible AT-commands.

5 Electrical and RF Characteristics

5.1 Power

5.1.1 Power Input

Walter can be powered either by connecting a USB-C cable (see USB_SECTION_HERE) or via the VIN pin (see pinout 4.1.1).

DO NOT power Walter with both the USB-C connection and the VIN-pin! This can lead to seriously damaging the board and external peripherals connected to it!

5.1.2 Power Output

Walter contains a Texas Instruments LM3281YFQR DC-DC Converter which takes power from either the USB-C port or the VIN-pin and converts it to a regulated +3.3VDC supply.

5.1.3 Power Consumption

5.2 GPIO

All GPIO pins exposed via the physical pin headers on Walter are 3.3V resistant. If you want to connect 5V or other forms of logic, please use a suitable logic level converter or voltage divider.

Please reference the corresponding datasheets for all minimum, maximum and typical ratings of I/O pins of the ESP32-S3-WROOM or Sequans GM02SP Modules that may or may not be exposed on the Walter Development Board.

5.3 RF

6 Mechanical information

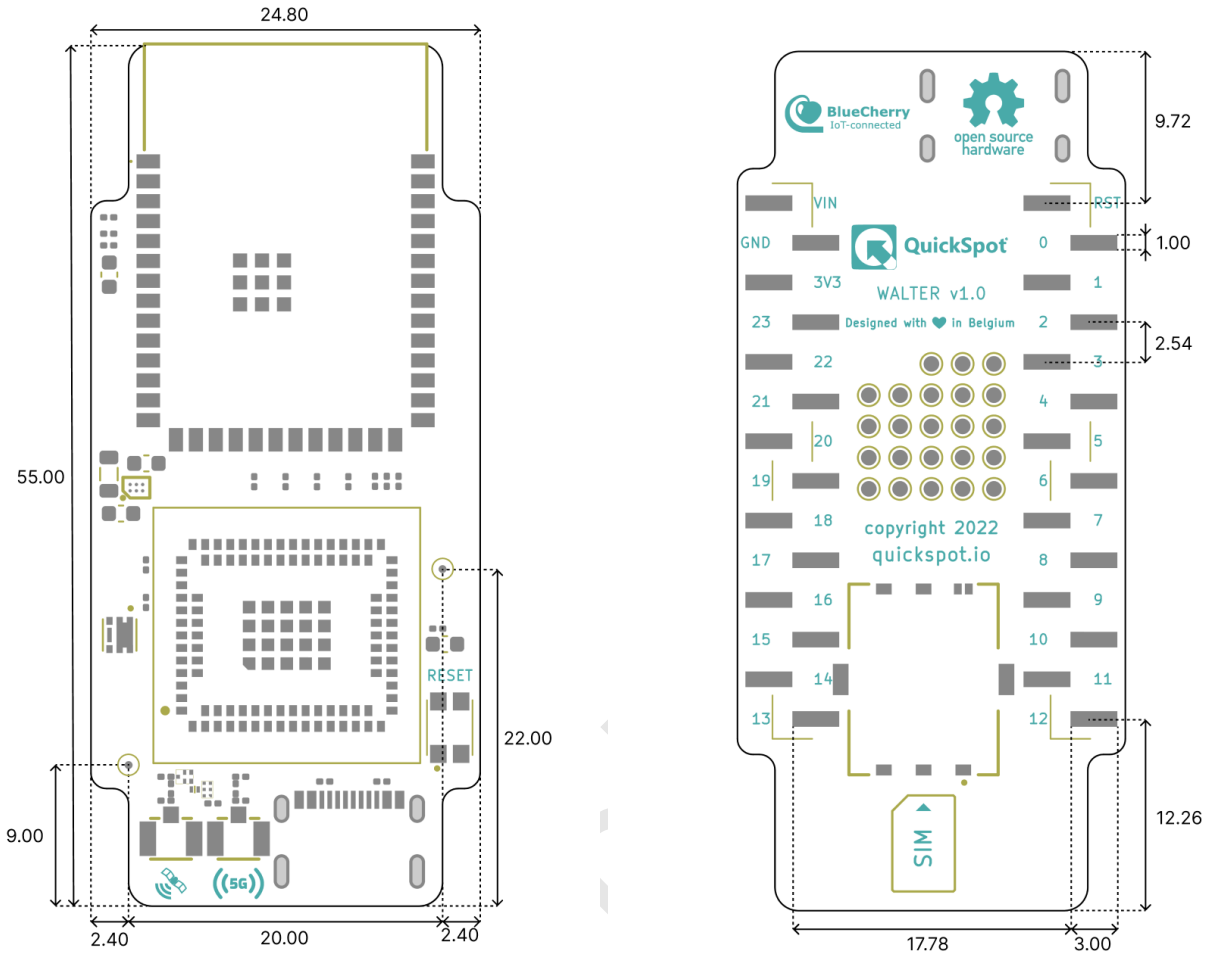

Figure 3: Mechanical Drawing Front and Rear View - Unit in mm

7 Software

Walter comes without firmware out of the box. You can easily program and upload your own firmware for Walter using MicroPython, Arduino, ESP-IDF... Please refer to the "Getting Started with Walter" available on our GitHub to get you up and running fast.

8 Operating conditions

The module can operate in a wide range of temperatures and conditions. The following are guidelines in which the module is guaranteed to work correctly.

Parameter	Units	Minimum rating	Typical rating	Maxium rating
Working temperature	°C	-40		85
Storage temperature	°C	-40		100
Humidity	%RH	10		90
Storage humidity	%RH	5		90

Please note that no condensation may occur on the PCB and components.

9 Legal information

This module is distributed worldwide by DPTechnics bv. We are not responsible for any product this module is part of. This datasheet is made with great care for detail but it can be possible the datasheet will be updated with more accurate data in te future. Users of DPTechnics bv products can contact us by letter, telephone or email.

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