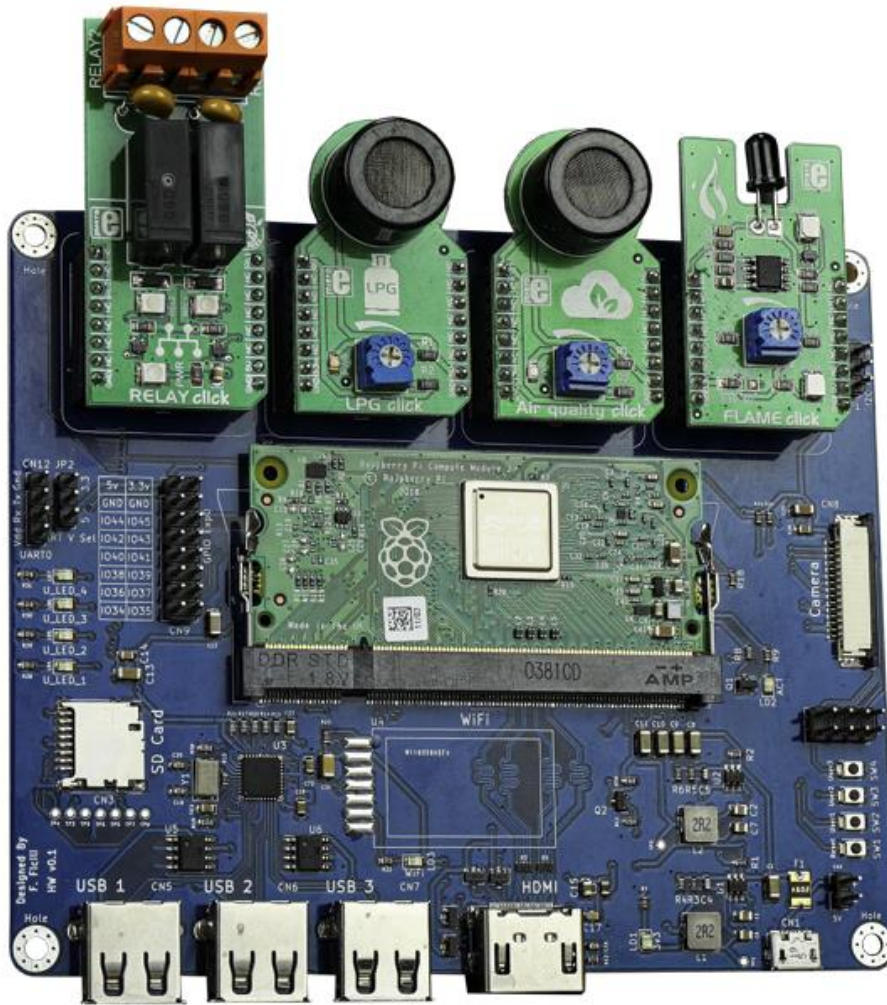


Jupiter System



Jupiter Model A - Product Datasheet

Revision History			
Version	Date	Author	Changes
1.0	21/07/2020	Francesco Ficili	Initial Release.

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1. Introduction

The Jupiter System is a system developed to leverage SW capabilities of computational platform like Raspberry Pi and ESP8266/32, by designing a system with an high level of HW configurability and scalability. This allows to use the power of the existing SW ecosystem in conjunction with a modular and scalable HW system, so that the user can take benefits from both of them. This HW configurability and expandability is given by adopting built-in sockets for some common peripheral add-on's standard. The selected standards are the Mikroelettronika MikroBUS, the SeedStudio Grove and the Sparkfun QWIIC, which are widely used and open standards for HW expandability. The adherence to those standards allows the Jupiter System boards to be able to connect to the various expansion and breakout boards currently available on the market. These boards contain various types of sensor, actuators and interfaces, allowing for a very high level of HW scalability and modularity.

Figure 1 shows the main system concept:

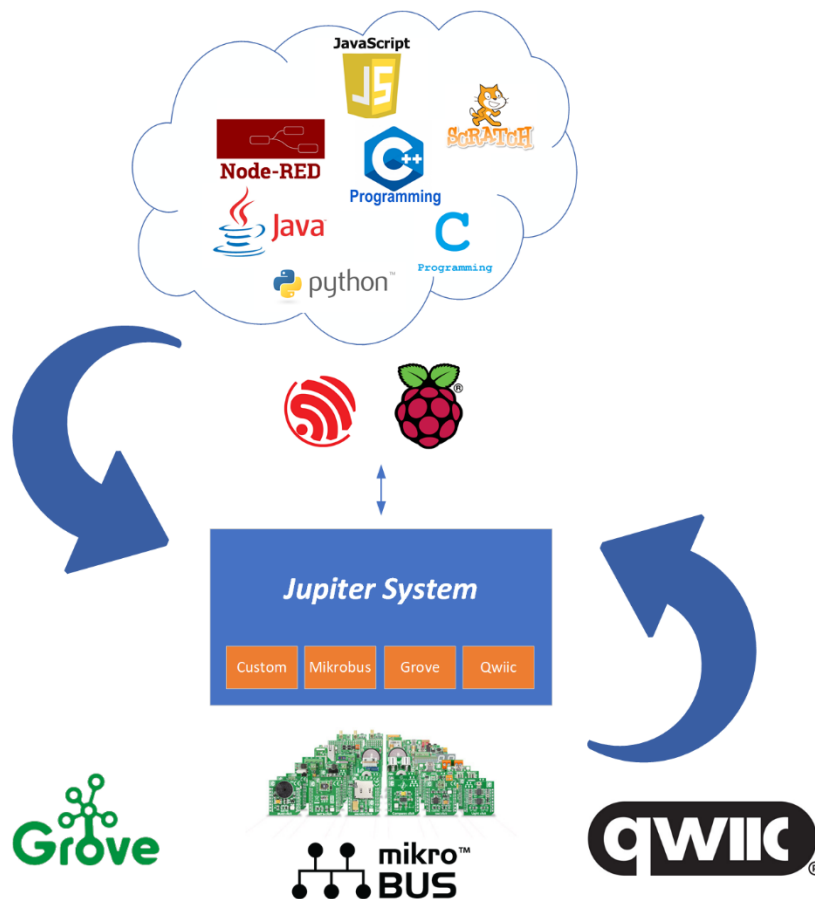


Figure 1 - Concept

In this perspective the Jupiter System acts like a bridge between the Raspberry Pi and ESP8266/32 SW and the HW world, allowing to take benefit from both the ecosystems.

Examples of application fields of Jupiter System are:

- Home automation System,
- IoT applications,
- Connectivity Applications,
- Monitoring and control Systems,
- Remote Control,
- Industrial Process control,
- Robotics applications,
- Test benches,
- Etc...

2. Block Diagram

The Jupiter Model A is based on a CM3 or CM3+ SoM (Lite version) and adds all the classic interfaces that can be found on a classic RPi, plus 4 MikroBUS sockets and additional GPIOs.

Figure 2 depicts the board block diagram.

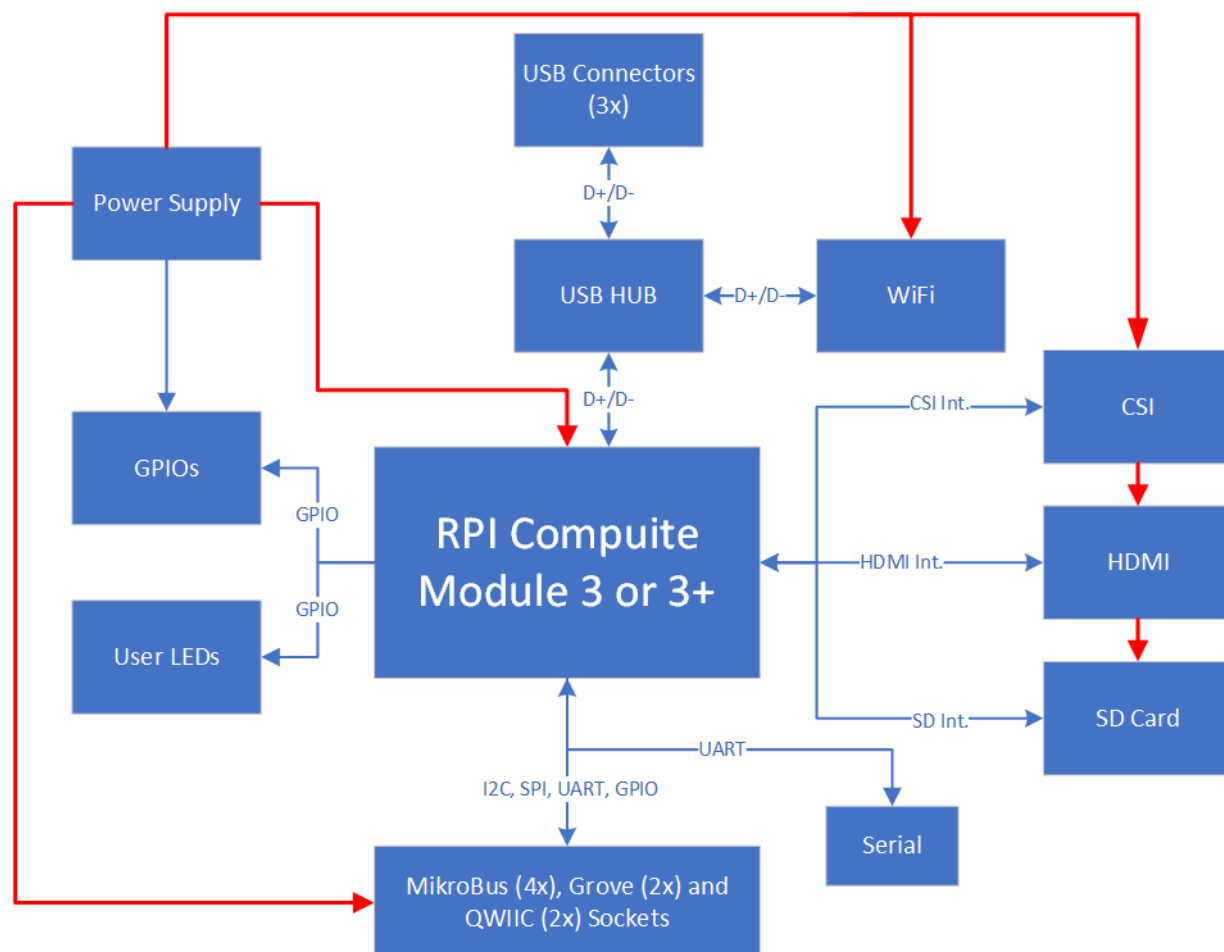


Figure 2 - Block Diagram

The main characteristics of the CM3/CM3+ Lite SoM are resumed in Table 1:

Table 1 – CM3/CM3+ characteristics

Parameter Name	CM3	CM3+
Processor Type	BCM2835	BCM2837B0
RAM	512MByte LPDDR2	1GByte LPDDR2
GPIO Number	48x	
SPI Port	2x	
I2C Port	2x	
UART	2x	
SD Interface	2x	
HDMI	1x HDMI 1.3a	

USB	1x USB 2.0 HOST/OTG
CSI	2x
DSI	2x
DPI	1x

Table 2 resumes the Jupiter Model A board main characteristics:

Table 2 – Board Characteristics

Parameter	Description
SoM used	CM3 or CM3+
Number of MikroBUS sockets	4
Number of Grove Sockets	2
Number of QWIIC Sockets	2
Number of USB	3
Wireless Connectivity	WiFi
SD Card Socket	Yes
HDMI	Yes
CSI	Yes (1x)
Serial Console Port	Yes
GPIO	16
User LEDs	4

3. Hardware

This section goes deeper in the HW details of Jupiter Model A. Figure 3 depicts the most important components of the board:

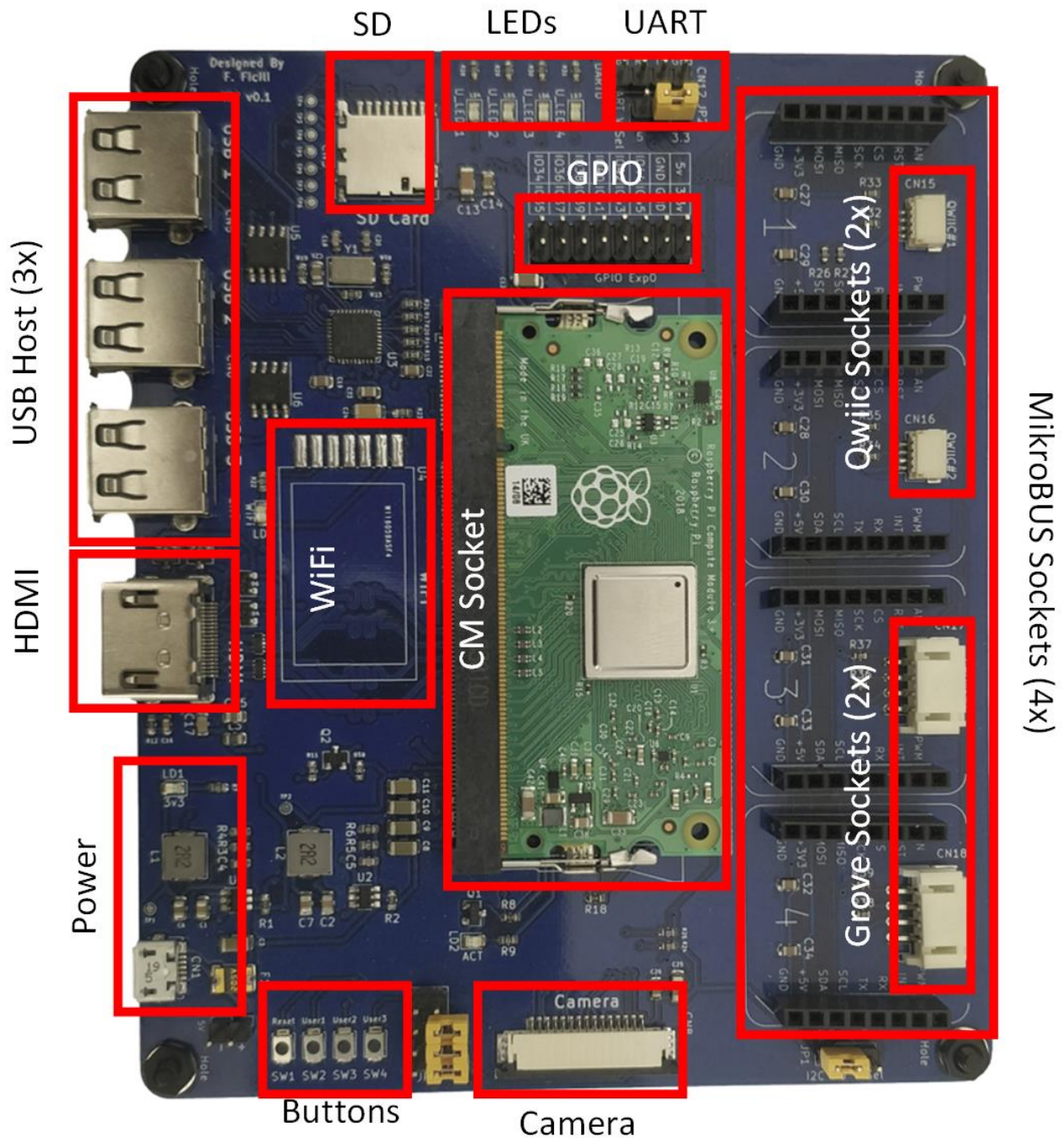


Figure 3 - Hardware Highlight

Table 3 provides a description of board's main components:

Table 3 – Hardware characteristics

Name	Description
CM Socket	The socket for the Raspberry PI compute module. It is compatible with CM3 and CM3+. As RPi foundation does, we also recommend to use CM3+ instead CM3 for new design.
USB Host	3x USB 2.0 HOST/OTG capable interface, equipped with USB Type A connectors. They are connected to the CM via an integrated USB Hub. All the port are short circuit and overcurrent protected.
HDMI	HDMI 1.3a capable interface. It used an HDMI Standard A connector.
Power	Connector for the board power supply. It employs an USB mini connector. The board can be powered using any standard RPi or mobile power supply.
WiFi	USB 2.0 compliant IEEE802.11 b/g/n WiFi module.
SD	MicroSD card Socket.
LEDs	4x user LEDs.
Buttons	3x user button + reset button
UART	UART console port with GND and Val pins.
GPIO	Expansion connectors with up to 16 additional GPIO.
Camera	Camera interface.
MikroBUS Sockets	4x Mikroelectronika MikroBUS expansion sockets. The MikroBUS socket follows the Mikrobus specification and allow to connect to the more than 1000 click boards available on the market. You can find the click board full list here: https://www.mikroe.com/click
Grove Sockets	2x Grove expansion sockets. You can find a list of Grove boards here: https://www.seeedstudio.com/category/Grove-c-1003.html
Qwiic Sockets	2x Qwiic expansion sockets. You can find a list of Qwiic boards here: https://www.sparkfun.com/qwiic#products

4. Pinouts

This section highlights the pinouts of Jupiter Model A connectors.

MikroBUS Socket

The Jupiter model A is equipped with 4 Mikrobus sockets. The MikroBUS sockets follow the MikroBUS specification. You can find a complete description of the MikroBUS standard here:

<https://download.mikroe.com/documents/standards/mikrobus/mikrobus-standard-specification-v200.pdf>

The connector's pinout is depicted in Figure 4.

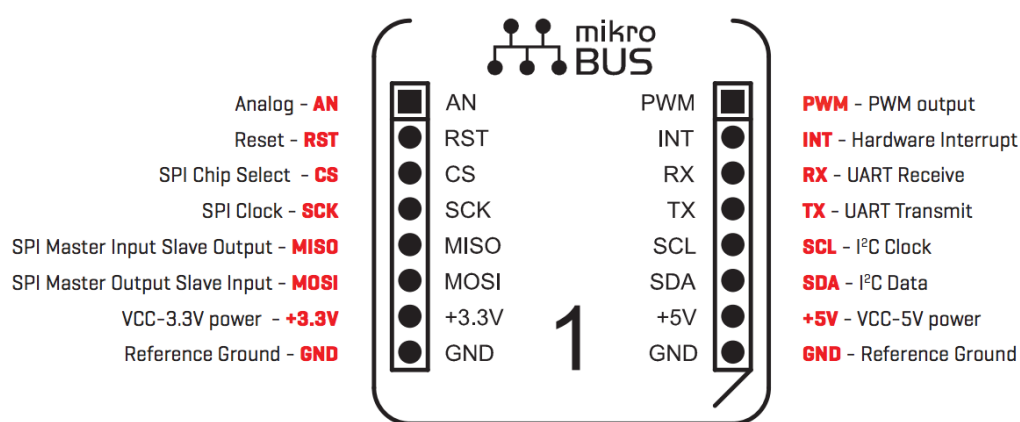


Figure 4 - MikroBUS Pinout

Table 4 illustrates the association between the MikroBUS socket signals and the RPI Compute module Pinout.

Table 4 - MikroBUS – CM Pin cross reference table

MikroBUS Signal	MikroBUS Socket 1 CM Pin	MikroBUS Socket 2 CM Pin	MikroBUS Socket 3 CM Pin	MikroBUS Socket 4 CM Pin
AN	GPIO18	GPIO22	GPIO26	GPIO30
RST	GPIO17	GPIO21	GPIO25	GPIO29
CS	GPIO16	GPIO20	GPIO24	GPIO28
SCK	GPIO11			
MISO	GPIO9			
MOSI	GPIO10			
PWM	GPIO12	GPIO13	GPIO3	GPIO5
INT	GPIO19	GPIO23	GPIO27	GPIO31
RX	GPIO33			
TX	GPIO32			
SCL	GPIO3			
SDA	GPIO2			

Grove Sockets

The Jupiter model A is equipped with 2 Grove sockets. The Grove sockets follow the Grove specification. You can find a complete description of the Grove standard here:

https://wiki.seeedstudio.com/Grove_System

The allocation of CM pins on Grove connectors is depicted in Table 5:

Table 5 - Allocation of pins on the Grove connectors

Grove Signal	Grove Socket 1 CM Pin	MikroBUS Socket 2 CM Pin
Pin1	GPIO40	GPIO38
Pin2	GPIO41	GPIO39
Pin3	Vcc	Vcc
Pin4	GND	GND

Qwiic Sockets

The Jupiter model A is equipped with 2 Qwiic sockets. The Qwiic sockets follow the Grove specification. You can find a complete description of the Qwiic standard here:

<https://www.sparkfun.com/qwiic>

The allocation of CM pins on Qwiic connectors is depicted in Table 6:

Table 6 - Allocation of pins on the Qwiic connectors

Grove Signal	Grove Socket 1 CM Pin	MikroBUS Socket 2 CM Pin
Pin1	GPIO40	GPIO38
Pin2	GPIO41	GPIO39
Pin3	Vcc	Vcc
Pin4	GND	GND

Expansion Connector

The Jupiter model A is equipped with an additional expansion connector. This connector contains additional spare GPIOs from the RPI CM, plus power supply lines.

The connector's pinout is depicted in Table 7:

Table 7 – Expansion Connector Pinout

Pin Number	Pin Name	Description
1	5v	5V power supply.
2	3.3v	3.3V power supply.
3	GND	Ground

4	GND	Ground
5	GPIO44	Connected to CM GPIO44.
6	GPIO45	Connected to CM GPIO45.
7	GPIO42	Connected to CM GPIO42.
8	GPIO43	Connected to CM GPIO43.
9	GPIO40	Connected to CM GPIO40.
10	GPIO41	Connected to CM GPIO41.
11	GPIO38	Connected to CM GPIO38.
12	GPIO39	Connected to CM GPIO39.
13	GPIO36	Connected to CM GPIO36.
14	GPIO37	Connected to CM GPIO37.
15	GPIO34	Connected to CM GPIO34.
16	GPIO35	Connected to CM GPIO35.

Serial Connector

The Jupiter model A is equipped with a serial port interface, directly connected to the CM PL011 primary UART device. This interface is by default configured to output the Linux console.

The connector's pinout is depicted in Table 8:

Table 8 - Serial Connectors pinout

Pin Name	Pin Number	Description
GND	1	UART Ground
TX	2	Serial Transmit
RX	3	Serial Receive
V_UART	4	UART Positive Voltage reference (if you want to power the connected UART device).

5. Additional Features

This section shows some additional features of Jupiter Model A.

User LEDs

The Jupiter Model A is equipped with 4 User LEDs, connected to the following GPIO channels: GPIO0, GPIO1, GPIO6 and GPIO7.

User Buttons

The Jupiter Model A is equipped with 4 user buttons. SW1 is connected to the RUN pin of CM3, so acting like a reset button. SW2, SW3 and SW4 are connected to GPIO8, GPIO2 and GPIO3 respectively.

Jumpers

The Jupiter Model A is equipped with 3 jumpers blocks, one for selecting the Voltage level of UART interface, one for selecting the voltage level of MikroBUS I2C interface and one for connect or separate the CAM interface from the standard I2C line (they can't work together).

JP1: MikroBUS I2C voltage level (3.3V or 5V)

JP3: UART port voltage level (3.3V or 5V)

JP3: Connect or separate the CAM control interface.

6. Technical Specifications

Table 9 resumes the board technical specifications:

Table 9 - Board Technical Specifications

Parameter	Max	Typ	Min	Unit	Notes
Supply Voltage	5.5	5.0	4.5	V	
Current Cons. (Normal)		400		mA	
Current Cons. (Peak)	2			A	