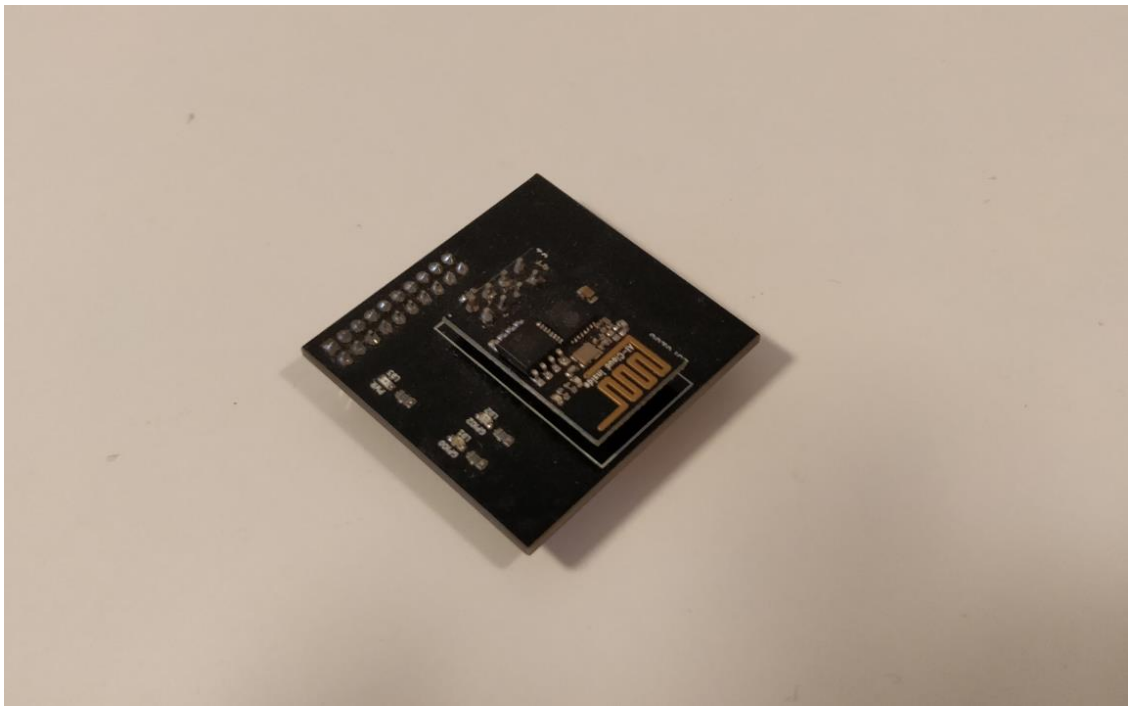
Mercury System

MB210



Wifi Modem Board - Product Datasheet

Author	Francesco Ficili
Date	01/11/2018
Status	Released

Revision History			
Version	Date	Author	Changes
1.0	01/11/2018	Francesco Ficili	Initial Release.

SUMMARY

1. Introduction

The Mercury System (MS in short) is a modular system for the development of connectivity and IoT applications. The system uses various type of electronic boards (logic unit, modems, slave board equipped with sensors and actuators, power boards...) and a complete SW framework to allow the realization of complex applications. Scalability, ease of use and modularity are key factors and are granted by the use of a heterogeneous set of components that allow to assemble the system like a construction made with LEGO© bricks.

The board set which composes the system is made up by the following "families":

- **Base Board (BB):** It's the "brain" of the system and contains the main logic unit as well as different communication buses and connector to interfaces the slaves. It also contains a simple power supply system and a recharge unit for a single LiPo cell (it can satisfy the power requirements of simpler systems). It can exist in different variants, depending on the employed microcontroller unit.
- **Modem Board (MB):** this one is the board that allow network connectivity. It can exist in different variant, depending on the network interface (GSM/GPRS, Wi-Fi, BT, Radio…). It's interfaced to the Base Board with a dedicated serial line.
- **Power Board (PB):** it's the board that allow to satisfy the particular power requirement of the system, when it's necessary. They can be vary depending on the particular power requirement to satisfy (high power, solar harvesting, piezo harvesting, etc.).
- **Slave Board (SB):** these are the system's peripherals, and they vary depending on the specific mounted sensor or actuator. Typical examples are SB with relay, temperature sensors, RGB LED controller, servo controller, accelerometer, etc. They communicate with the BB with I2C or UART and a dedicated command set.
- **Expansion Board (EB):** these are the board that allow planar connection of Mercury boards. There are variants which can contains Displays, battery socket, etc.
- **Brain-Less Board (BL):** these are the controller-less boards. They in general contain really simple sensor or actuators that don't need the bus interface. There are meant as an alternative to slave boards for cost-sensitive applications.

Slave Boards and Modem Board are provided pre-programmed with a FW which implements a dedicated command set for a high-level management of the boards, while the Base Boards are provided with a SW framework which provides all the low-level services (operative system, device drivers, system services, etc.), leaving to the user only the development of application level logic. Moreover, the Base Board comes with an USB bootloader, so it can be programmed without the need of a flashing device.

Figure 1 shows a typical system connection:

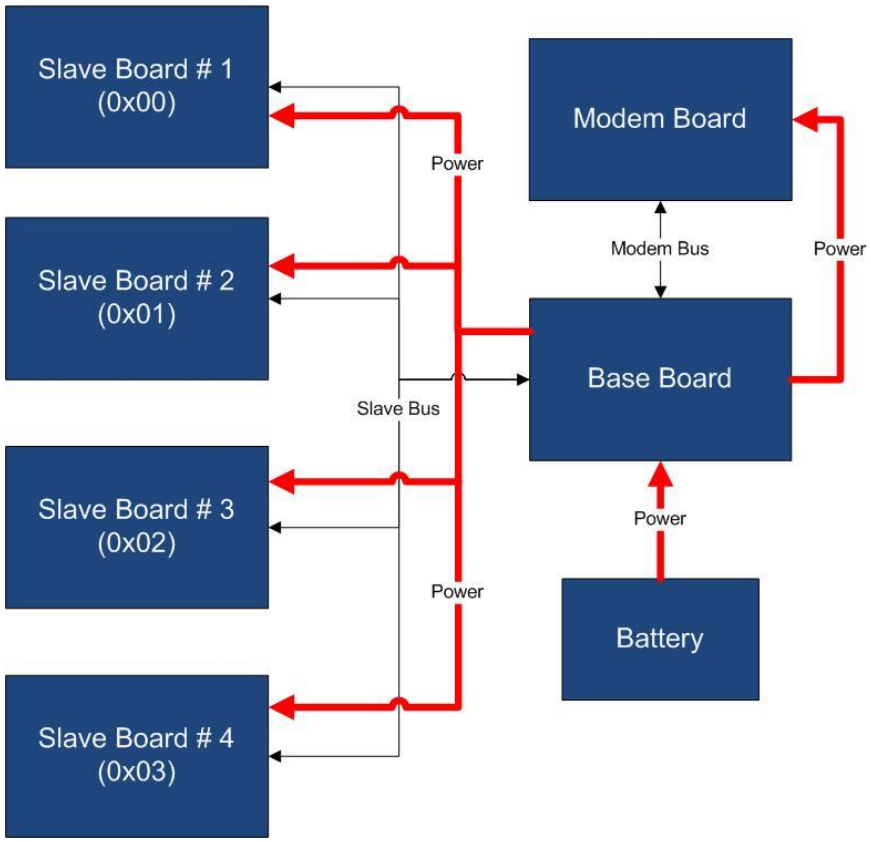


Figure 1 - Typical System Connection

Examples of application fields of MS 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 MB210 is a WiFi Modem Board, able to add WiFi functionalities to a MS Base Board (BB). Figure 2 shows the MB210 block diagram. The heart of the system is an ESP8266 module, produced by Expressif Systems.

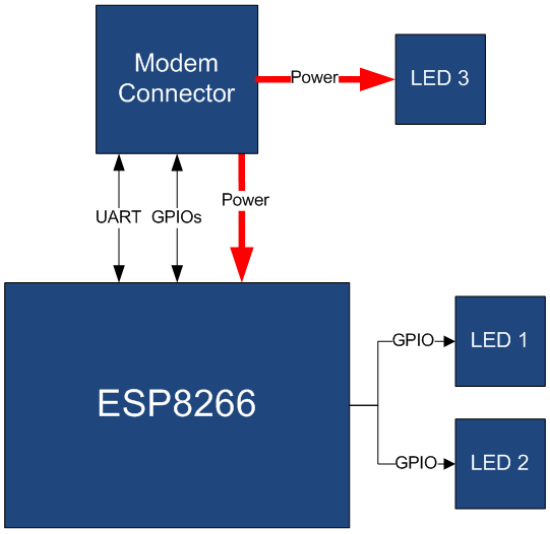


Figure 2 - Block Diagram

The main characteristics of the employed Module are resumed in Table 1:

Table 1 – WiFi Module characteristics

Parameter Name	Description
Processor	L106 32-bit RISC microprocessor core
Clock	80 MHz
RAM	64KB instruction + 80KB user data + 16KB System
Flash	512 KiB to 4 MiB external QSPI FLASH typically included
Link	IEEE 802.11 b/g/n Wi-Fi
Interface	UART
Other	External Reset Pin

The MB210 is connected to the BB by means of an UART link, so the connection between the BB and the MB is dedicated and no address is required. Table 2 resumes the MB210 board main characteristics:

Table 2 – Board Characteristics

Parameter	Description	Notes
Board Type	Modem Board (MB)	
Supported Bus	UART	
Peripheral Description	WiFi modem	ESP8266

3. Hardware

This section goes deeper in the HW details of MB210. Figure 3 depicts the most important components of the board:

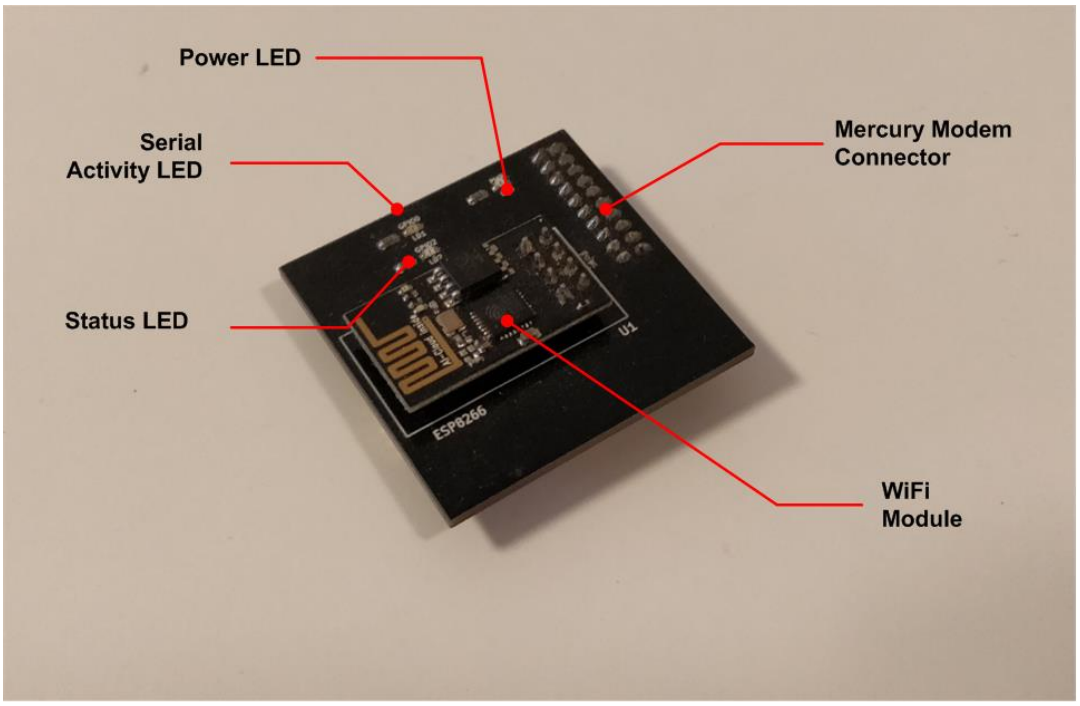


Figure 3 - Hardware Highlight

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

Table 3 – Hardware characteristics

Name	Description
Power LED	LED that indicates the power status of the board.
Serial Activity LED	LED that indicates the serial line activity of the board.
Status LED	LED that indicates the status of the board.
WiFi Module	ESP8266 WiFi module.
Mercury Modem Connector	Mercury connector used to interface the board with Mercury System's Base Board.

4. Pinouts

This section highlights the pinouts of MB210 connector.

Mercury Modem Connector

The Mercury Modem Connector is the connector which interfaces the MB210 with the Mercury System's Base Board. The connector's pinout is depicted in Figure 4 and Table 4 explains the meaning of each single pin (NC stands for "Not Connected").

Table 4 - Mercury Connector Pinout

Pin Name	Pin Number	Description
VddMcu	10	This pin is connected to Module positive voltage (3,3V).
GND	18, 20	This pin is connected to the board reference voltage.
MdmRst	16	This pin is connected to Modem Reset line.
MdmTx	12	This pin is connected to Modem UART Tx line.
MdmRx	14	This pin is connected to Modem UART Rx line.

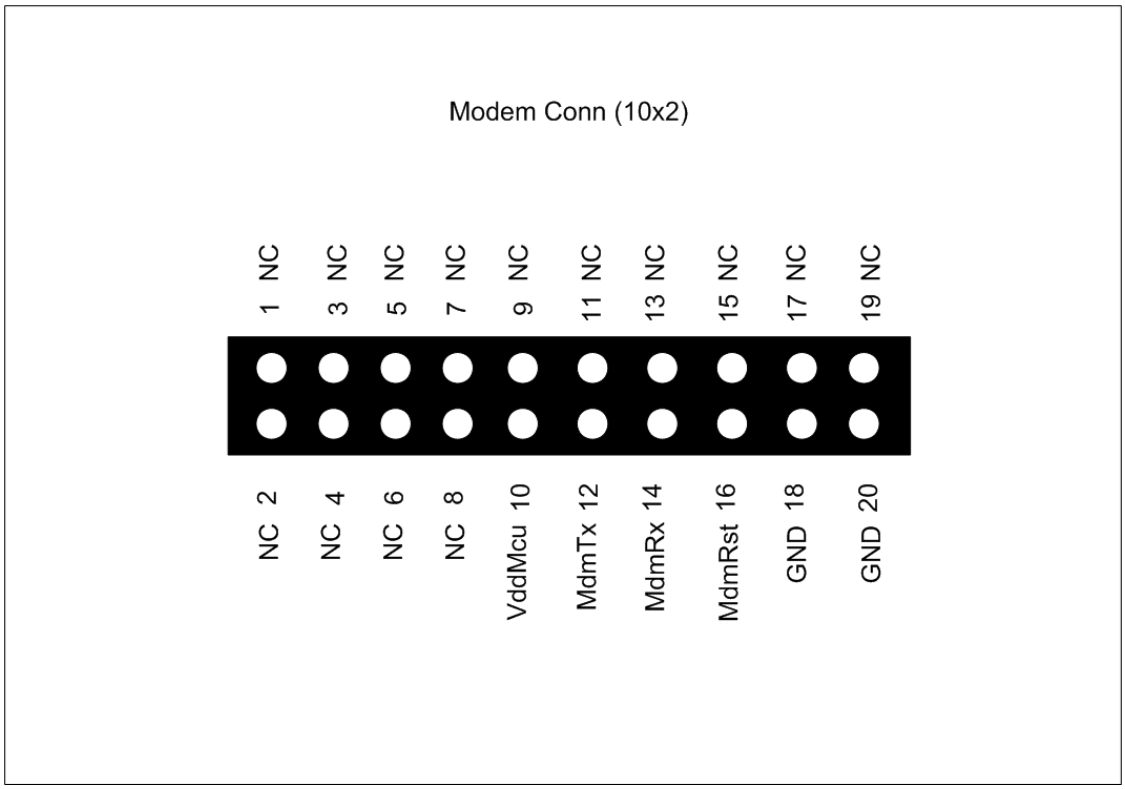


Figure 4 - MB210 Mercury Modem Connector Pinout

5. Command Set

Modem Command Set

The MB210 supports the ESP8266 full command set. Nevertheless, in order to streamline the development of connected and IoT application, a specific WiFi stack has been integrated in the Mercury Framework. Please refer to the Mercury System Framework documentation for a specific description of this stack.

6. uPanel Option

The MB210 is also available with a uPanel Option that allows to use the board with uPanel firmware and cloud functionalities. This allows more advanced IoT and connectivity features.

For more information please visit uPanel webpage:

http://www.miupanel.com/?lang=it

7. Technical Specifications

Table 5 resumes the board technical specifications:

Table 5 - Board Technical Specifications

Parameter	Max	Typ	Min	Unit	Notes
Supply Voltage	3.6	3.3	3.0	V	
Current Cons. (Normal)		80		mA	
Current Cons. (Peak)		200		mA	
Current Cons. (Low Power)		10		uA	
Startup Time		2		mS	