CG9101-nanoWiPOM
User Manual

Document Revision: 1.04
Document Date: 26 November 2014

WARRANTY:

Overview

CloudGate is an Intelligent M2M gateway and wireless Linux computer from Option. CloudGate provides cell modem, LAN to WWAN routing and GPS functionality in a single basic unit for remote monitoring and control applications.

On top of the basic functionality, CloudGate can be tailored to meet specific industrial requirements by adding additional software and peripheral boards. CG9101-nanoWiPOM is one such peripheral board for CloudGate.

CG9101-nanoWiPOM is a miniature wireless remote monitoring peripheral computer that uses cellular networks for remote monitoring of voltages, currents, frequencies and many other physical parameters.

CG9101-nanoWiPOM is BiPOM's popular nanoWiPOM board that is modified as a CloudGate peripheral form factor. CG9101-nanoWiPOM adds Programmable Logic Controller (PLC) capabilities to CloudGate.

The dual processor combination of CG9101-nanoWiPOM and CloudGate offers real-time data acquisition, logging, tag support, alarms, events, SMS and email notifications, MODBUS master and slave for remote monitoring applications.

Specifications

- Fast Cortex processor
- 32MB log memory, expandable to 32GB with microSD
- Status LED's (Red, Yellow, Green)
- Dual RS232 ports (one RS232 port overlapped with RS485 port)
- RS485 as MODBUS master or slave
- Full speed 12 MBits/sec. Device USB and USB On-The-Go
- 2 Analog Inputs, jumper selectable as 4-20mA, 0-6V or 0-10V
- 4 Digital Inputs, 2 Digital Outputs (High current)
- All I/O and serial ports on DSUB connector
- Powers from CloudGate
- Low power consumption: Under 100mA
- WRTU software simplifies setting up

WRTU Software Features:

- Connect to device over RS232 port, RS485 port or USB
- Read device configuration, including tag configuration
- Configure device, date/time, calibration, RS485 port
- Check hardware status and health information
- Add/edit/delete tags
- Configure alarm conditions individually for each tag
- Configure SMS and email for each tag
- Manage contact list for SMS and email support
- Configure conversion parameters for tag value
- Start / stop logger
- System Diagnostics

Expansion Connector

CG9101-nanoWiPOM DSUB25 female expansion connector has pins for:

- 2 configurable analog inputs
- 4 configurable digital inputs
- 2 high-current, high-voltage digital outputs
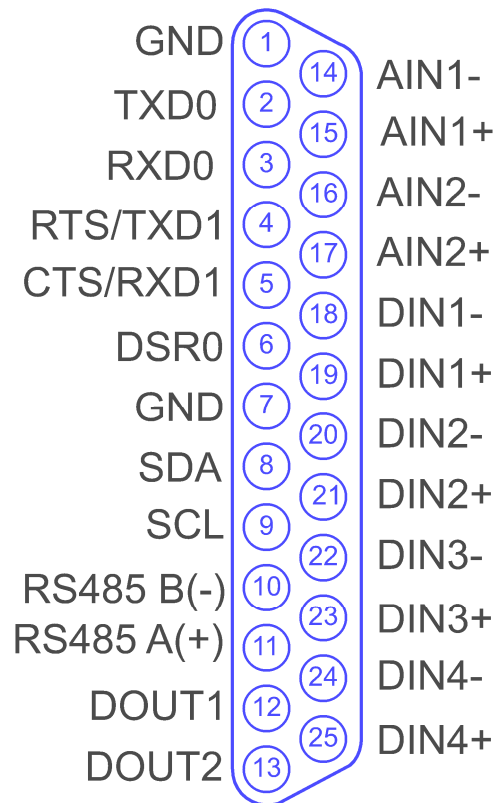- 2 RS-232 ports (one RS232 port overlapped with RS485 port)
- 1 RS-485 port

GND	1	
		14 AIN1-
TXD0	2	
		15 AIN1+
RXD0	3	
		16 AIN2-
RTS/TXD1	4	
		17 AIN2+
CTS/RXD1	5	
		18 DIN1-
DSR0	6	
		19 DIN1+
GND	7	
		20 DIN2-
SDA	8	
		21 DIN2+
SCL	9	
		22 DIN3-
RS485 B(-)	10	
		23 DIN3+
RS485 A(+)	11	
		24 DIN4-
DOUT1	12	
		25 DIN4+
DOUT2	13	

Figure 1

Analog Inputs

CG9101-nanoWiPOM has 2 analog inputs to measure 4-20mA loop current. Sensors are loop-powered by CG9101-nanoWiPOM. Loop current is electronically limited to 50mA.

Connect the loop-powered sensors to expansion connector as shown in Figure 2:
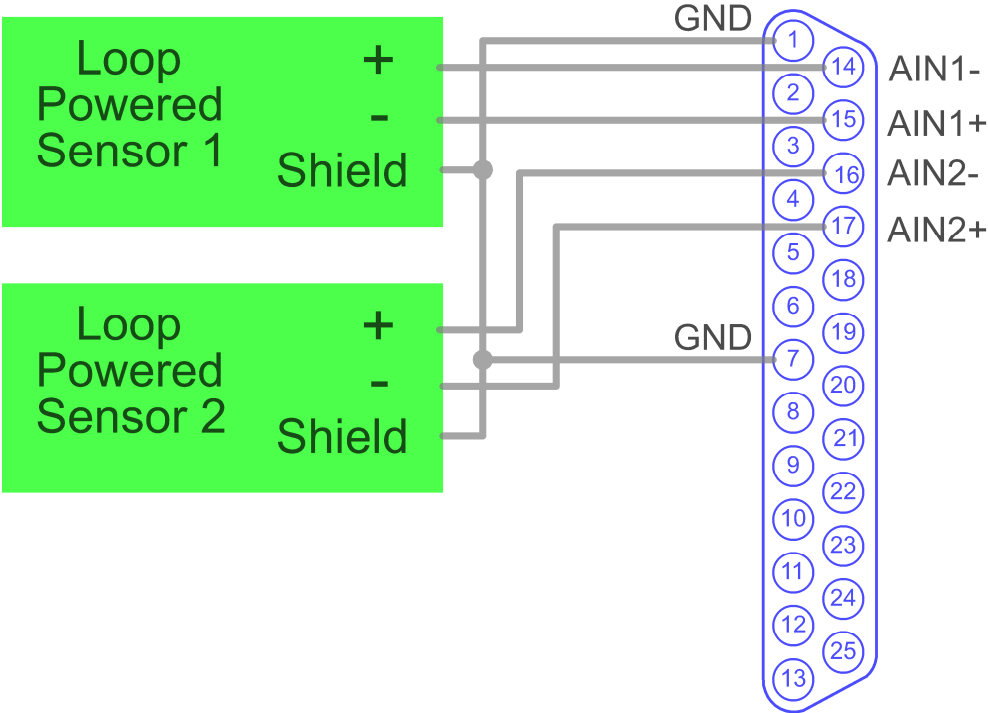

Figure 2

If the sensor cable does not provide SHIELD, leave these terminals unconnected.
If an analog input is not used, leave its terminals unconnected.

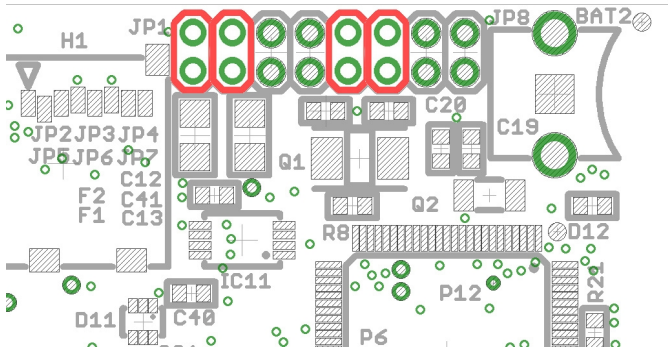Analog Input jumpers configured for 4-20mA range are shown in Figure 3:

Figure 3

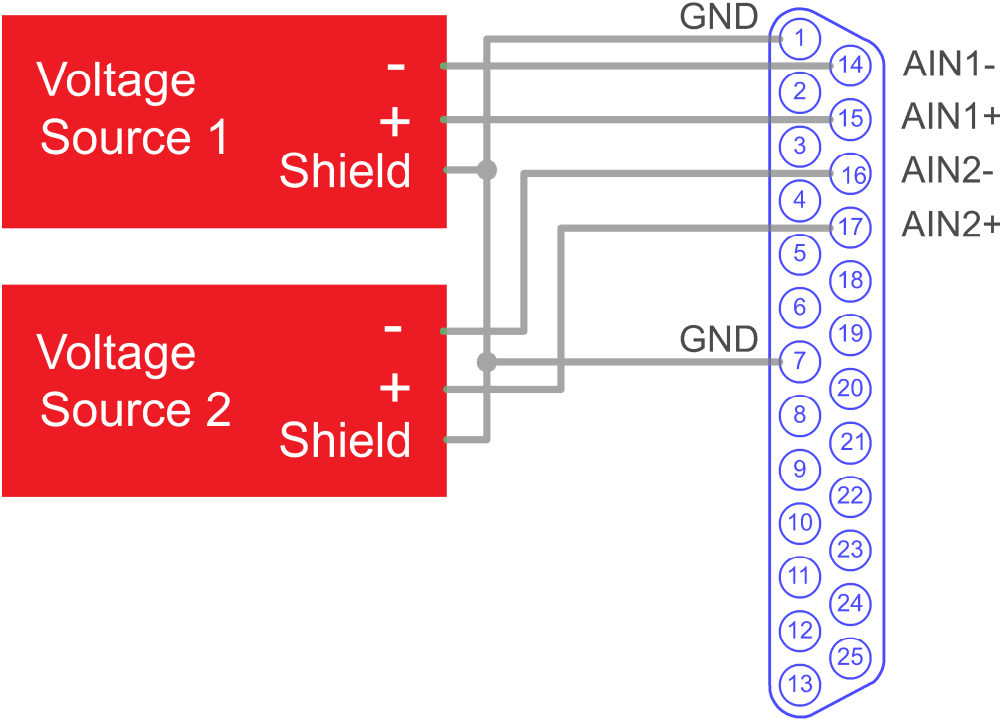Connect the analog voltage sources to expansion connector as shown in Figure 3:

Figure 3

If the sensor cable does not provide SHIELD, leave these terminals unconnected.
If an analog input is not used, leave its terminals unconnected.
Analog Input jumpers configured for 0-6V range are shown in Figure 4.
Analog Input jumpers configured for 0-10V range are shown in Figure 5.
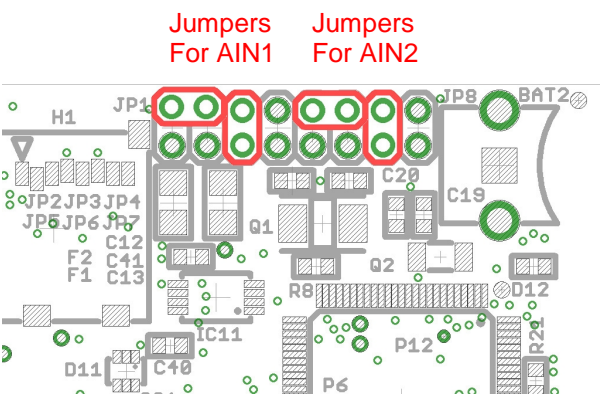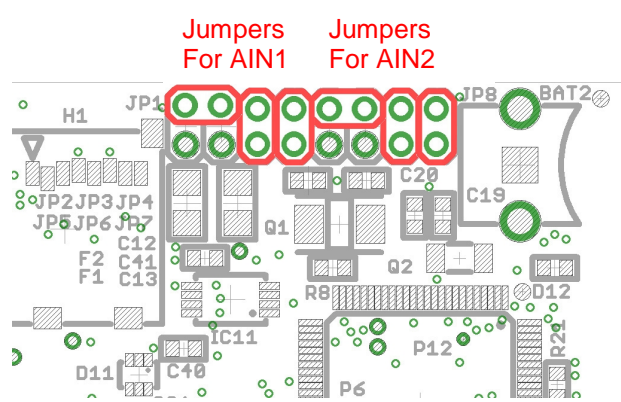

Figure 4 (0-6V range)

Figure 5 (0-10V range)

Digital Inputs

CG9101-nanoWiPOM has 4 digital inputs that can be configured either as dry-contact inputs or voltage inputs.

For dry-contact configuration, connect external switches to digital input terminals as shown in Figure 6 and install all the jumpers:
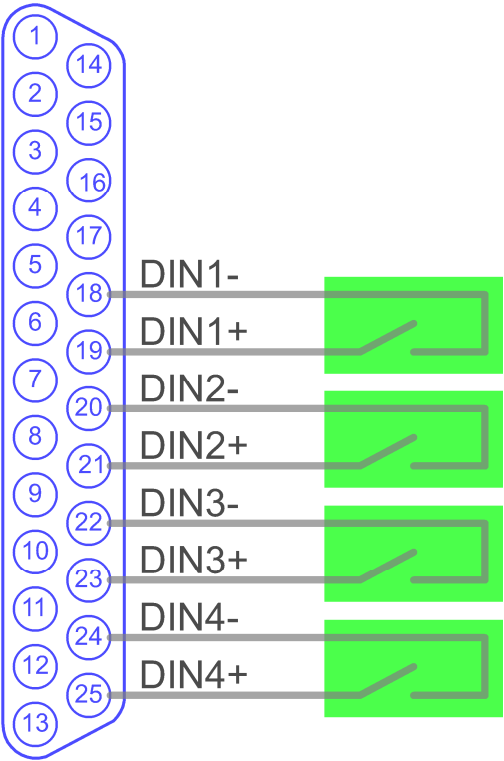

Figure 6

Figure 7 shows the jumpers settings for dry-contact configuration.
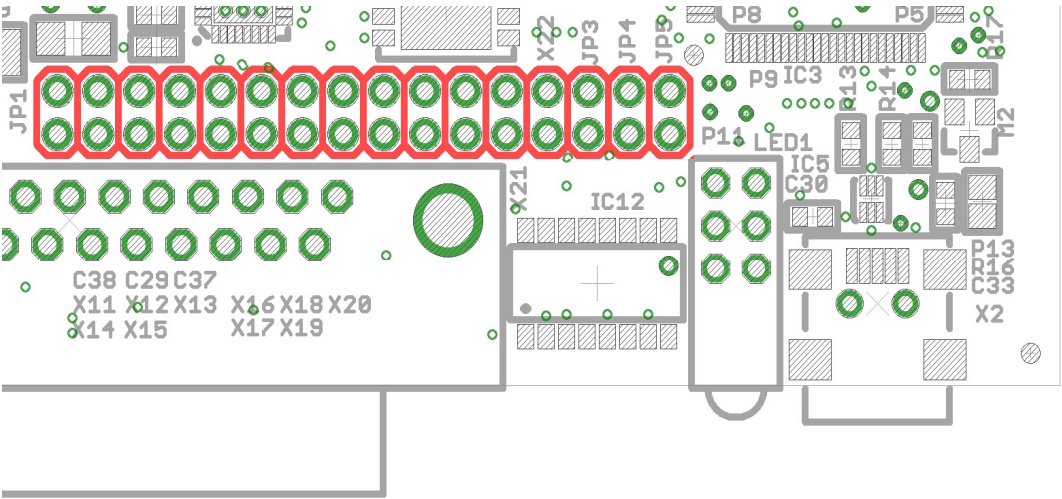

Figure 7

If a digital input is not used leave its terminals unconnected.
CG9101-nanoWiPOM has an internal series resistor (1800 Ohms) on digital inputs.
If the supply voltage is 30 Volts, the input current is approximately 16 mA through the dry contact.
If the supply voltage is 12 Volts, the input current is approximately 6 mA through the dry contact.

Figure 8 shows the connections when the digital inputs are configured as voltage inputs:
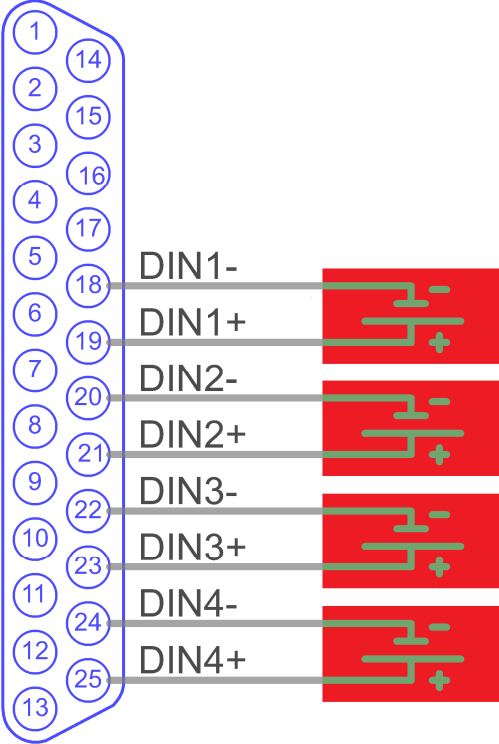

Figure 8

Figure 9 shows jumpers settings when the digital inputs are configured as voltage inputs:
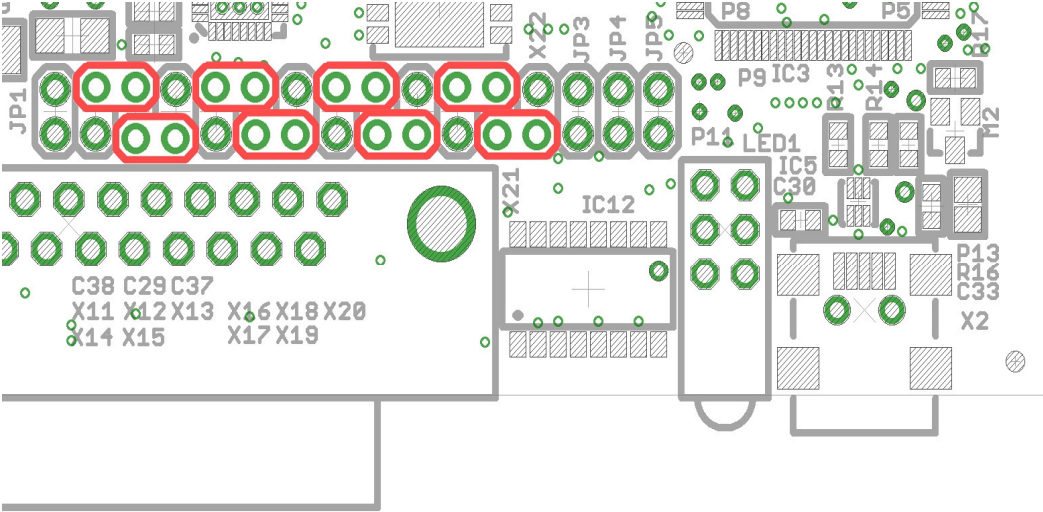

Figure 9

In voltage input mode, a channel can detect a voltage range from 4 Volts to 30 Volts as active.

It is also possible to have some digital inputs as dry-contact and others as voltage inputs by properly configuring the jumpers for each individual channel.

Digital Outputs

CG9101-nanoWiPOM provides 2 high-current, high-voltage outputs. Each output can drive up to 400 mA. If an output is activated, the supply voltage will appear on output terminals.

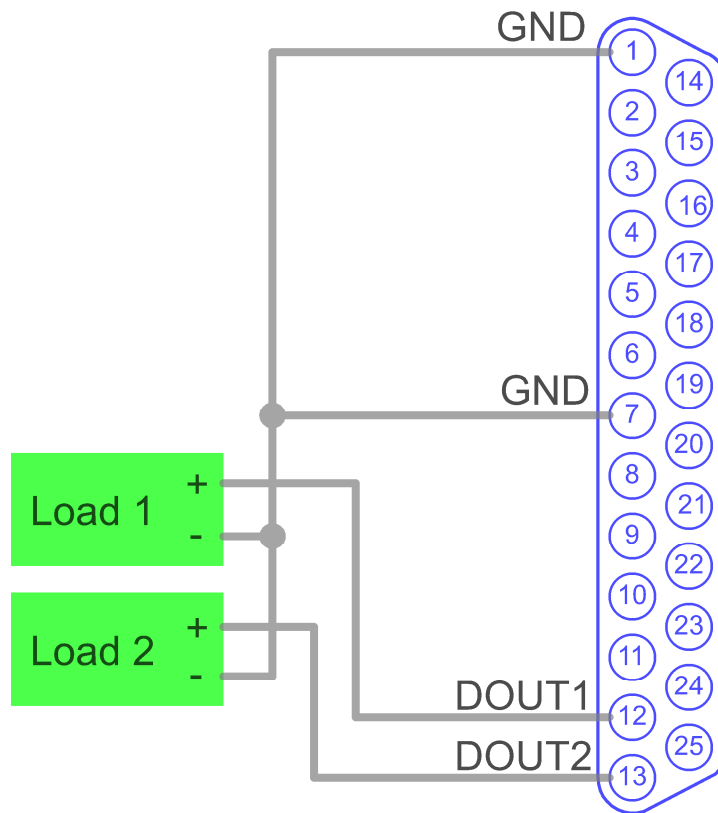Connect external loads to digital output terminals as shown in Figure 10:

Figure 10

Digital outputs are NOT CMOS/TTL level. They are power supply level. Do NOT connect the digital outputs to TTL/CMOS level circuitry !!!

RS232 Serial Ports

CG9101-nanoWiPOM has two RS232 ports. Both **COM0** and **COM1** interface are present on the expansion connector. **COM0** is used for communicating with external RS232 devices. **COM0** is independent, and **COM1** is overlapped with RS485 interface. So RS485 and **COM1** can not be used at the same time. **COM0** can also be used for downloading the WRTU firmware by using CTS and DSR_0 signals to put the board into BOOT mode. The MINI-MAX/STM32 Loader in the STM Development System software package can be used to upgrade the on-board firmware. Note that this option is normally used at the factory to download the boot loader to CG9101-nanoWiPOM and normally not needed by the user. The preferred method of firmware upgrade is over the USB interface or over the air using CloudGate.

GND 1
TXD0 2
RXD0 3
RTS/TXD1 4
CTS/RXD1 5
DSR0 6
GND 7
8
9
10
11
12
13
14
15
16
17
18
19
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23
24
25

Figure 11

RS485 Serial Port

CG9101-nanoWiPOM provides one RS485 serial port on the Expansion Connector to communicate with external devices using standard protocols such as MODBUS:
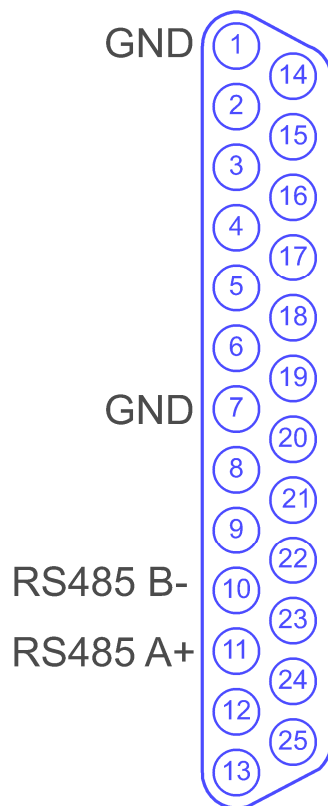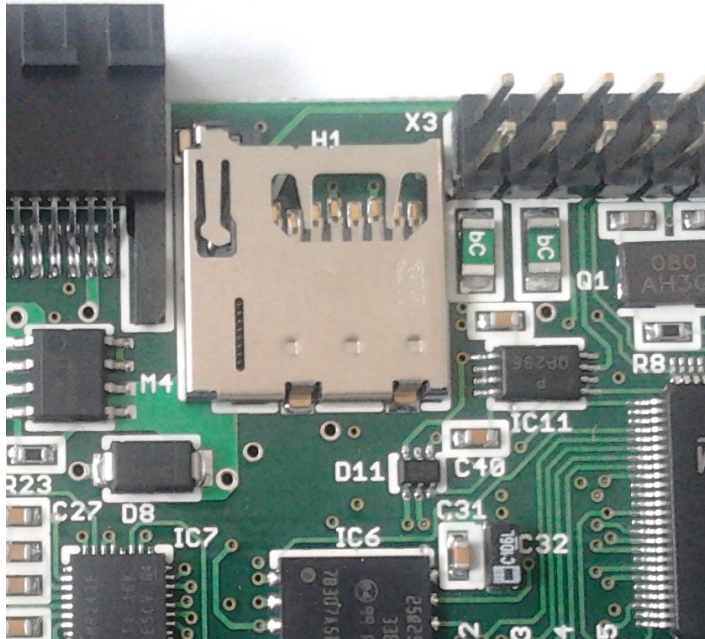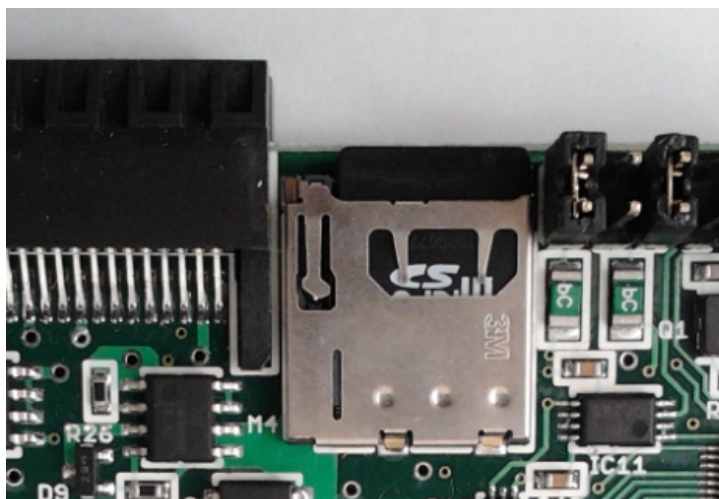

Figure 12

MicroSD interface

CG9101-nanoWiPOM has a MicroSD Card socket to install (optional) MicroSD or MicroSDHC cards. The firmware supports both types of cards:

Empty MicroSD socket

MicroSD card installed

Figure 13

LED's

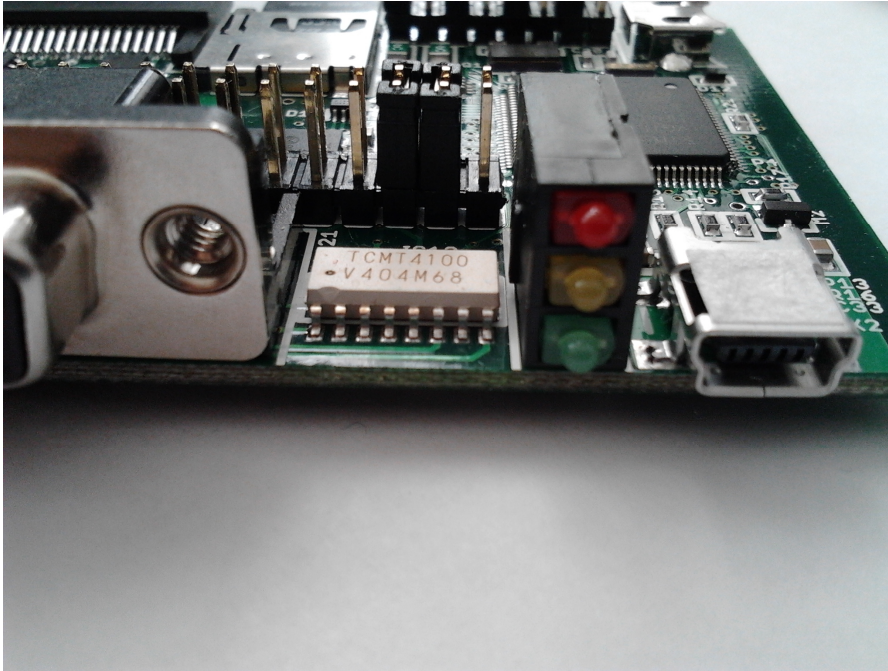CG9101-nanoWiPOM has 3 LED indicators – **RED**, **YELLOW** and **GREEN**:

Figure 14

Green LED indicates that Power is ON
Yellow LED indicates that board is in COMMUNICATION mode.
Red LED indicates FAULT.

Software Setup

CG9101-nanoWiPOM is shipped with a pre-programmed WRTU firmware. WRTU firmware has the following features:

- Reading the Analog inputs
- Reading the Digital inputs
- Controlling the Digital Outputs
- Tag management
- Logging data to DataFlash and/or microSD card
- MODBUS RTU through RS485, RS232 and USB ports
- MODBUS Master through RS485 port
- LCD display update through I2C port
- Event and alarm management
- USB device port support
- Wireless data transmission using the cell modem

WRTU can be used over the cell phone network using BiPOM's Web Portal or locally through the USB cable using BiPOM WRTU Client.

Please see **WRTU Client User Manual** and **WRTU Web Portal User Manual** for more details.

Collecting Data

For wireless monitoring, a CDMA data plan (without a SIM card) and/or a GSM data plan (with a SIM card) is required. Either data plan can be obtained from BiPOM Electronics by opening an account.

When the account is established, a membership is created on WiPOM Web Portal. You can access your account as well as your CG9101-nanoWiPOM devices through the WiPOM Web Portal. The portal will show the minute usage, number of minutes left, overage as well as the data from nanoWiPOM.

Data can be collected in real-time by the web portal and recorded to a database. Alternatively, data can be logged on nanoWiPOM and accessed as historical data at a later date through the web portal.