Melange Systems Private Limited
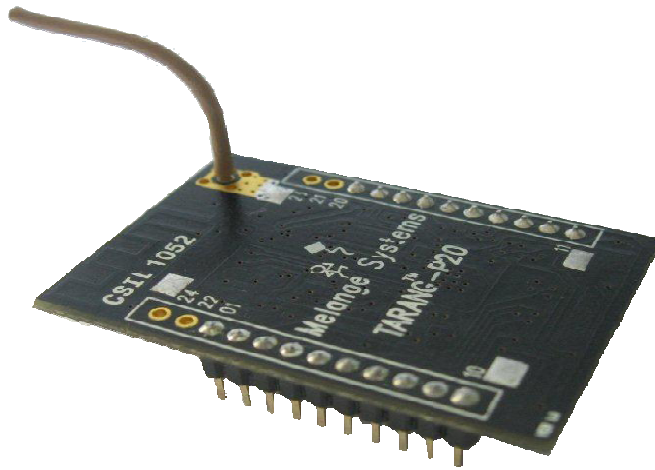
Wireless controls in action

Tarang P™

Product Manual

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Table of Contents

1. Tarang-P20 FCC Compliance

This device complies with Part 15 of the FCC rules. Operation is subject to following two conditions:

1. This device may not cause harmful interference and

2. This device must accept any interference received including interference that may cause undesired operation of this device.

The changes or modifications not expressly approved by the party responsible for Compliance could void the user's authority to operate the equipment.

To comply with the FCC RF exposure compliance requirements, this device and its antenna must not be co-located or operating to conjunction with any other antenna or transmitter, except if installed in compliance with FCC Multi Transmitter procedures.

To inherit the modular approval, the antennas for this transmitter must be installed to provide a separation distance of 20cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

To OEM Installer:

1. The Original Equipment Manufacturer (OEM) must ensure that FCC labeling requirements are met. This includes a clearly visible label on the outside of the OEM enclosure specifying "Contains FCC ID: N3Y-TARANG-P20" or "Contains transmitter Module FCC ID: N3Y-TARANG-P20".

2. In the user manual, final system integrator must ensure that there is no instruction provided to install or remove the transmitter module.

3. Transmitter module must be installed and used in strict accordance with the Manufacturer's instructions as described in the user documentation that comes with the product.

The user manual of the final host system must contain the following statements:

This device complies with Part 15 of the FCC rules. Operation is subject to following two conditions:

1. This device may not cause harmful interference and

2. This device must accept any interference received including interference that may cause undesired operation of this device.

The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

To comply with the FCC RF exposure compliance requirements, this device and its antenna must not be co-located or operating to conjunction with any other antenna or transmitter, except if installed in compliance with FCC Multi Transmitter procedures.

To inherit the modular approval, the antennas for this transmitter must be installed to provide a separation distance of at least 20cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

Note:

The buyer of the module who will incorporate this module into his host must submit the final product to the manufacturer of the module and the MANUFACTURER OF THE MODULE WILL VERIFY that the product is incorporated in host equipment in a way that is represented by the testing as shown in the test report.

2. Tarang-P series

Tarang-P series modules are designed with low to medium transmit power and for high reliability wireless networks. The modules require minimal power and provide reliable delivery of data between devices. The interfaces provided with the module help to directly fit into many industrial applications. The modules operate within the ISM 2.4-2.4835 GHz frequency band with IEEE 802.15.4 baseband.

2.1 Features

- ZigBee® Pro Complaint platform.

- Direct Sequence Spread Spectrum.

- RF Data rate: 250 kbps.

- Acknowledgement mode communication with retries.

3. Tarang P20

3.1 Specifications

| Power	
Supply Voltage (V_{CC})	3.3 to 3.6V
Transmit Current	165 mA (typical)
Idle/Receive Current	35mA
Power-down Current	<60µA
General	
Operating Frequency	ISM 2.4 GHz
Transmit Power Output	19dbm (typical)
RF Data Rate	250 Kbps
Receiver Sensitivity	-105 dBm
Serial Interface Data Rate	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 baud
Operating Temperature	-40 to 85 degree C
Antenna Options	Wire Antenna
Network	
Supported Network Topologies	Mesh/Star
Number of Channels	15 Direct Sequence Channels
Addressing Options	PAN ID, Channel and Address

3.2 Mechanical Drawings
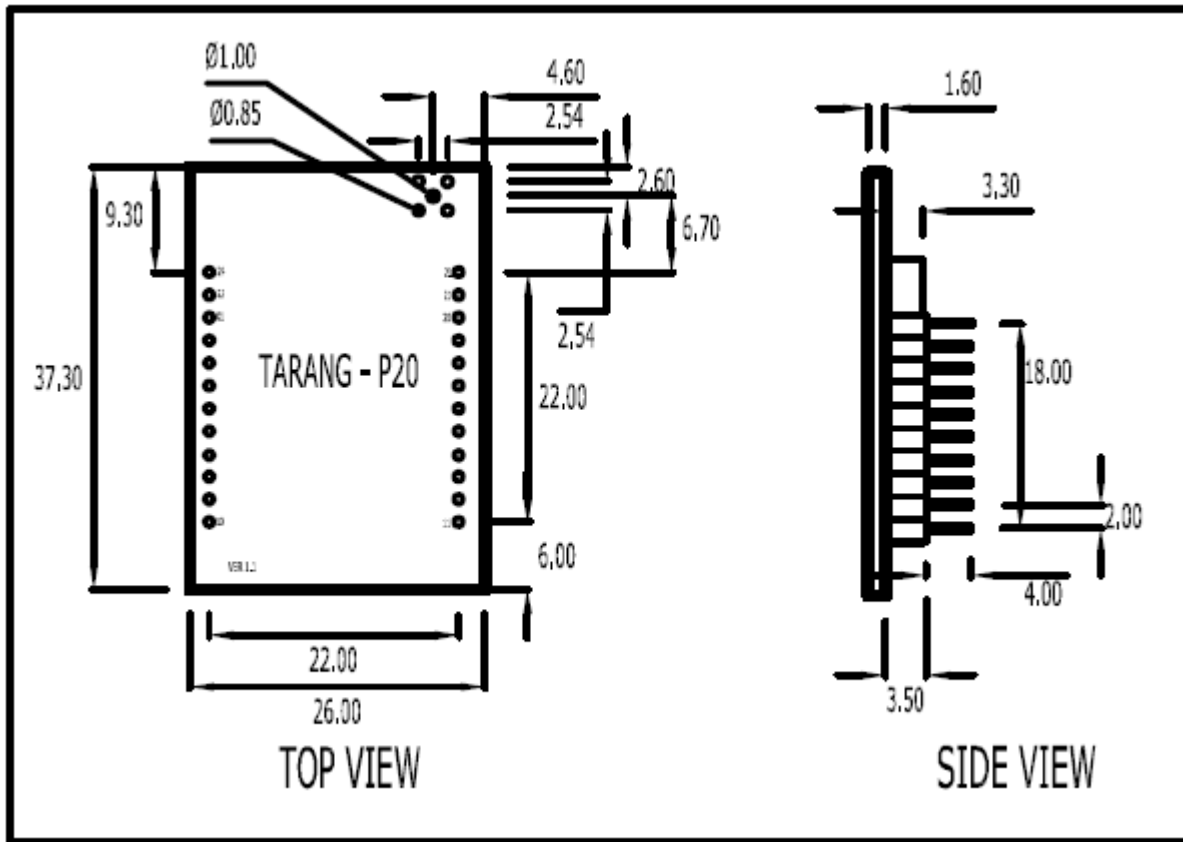
4. Interface

The Tarang modules interface to a host device through a logic-level asynchronous serial port. Through its serial port, the module can communicate with any logic and voltage compatible UART or through a level translator to any serial device (For example: RS-232 or USB interface board). Tarang can be interface with a micro controller or a PC using serial port with the help of appropriate level conversion.
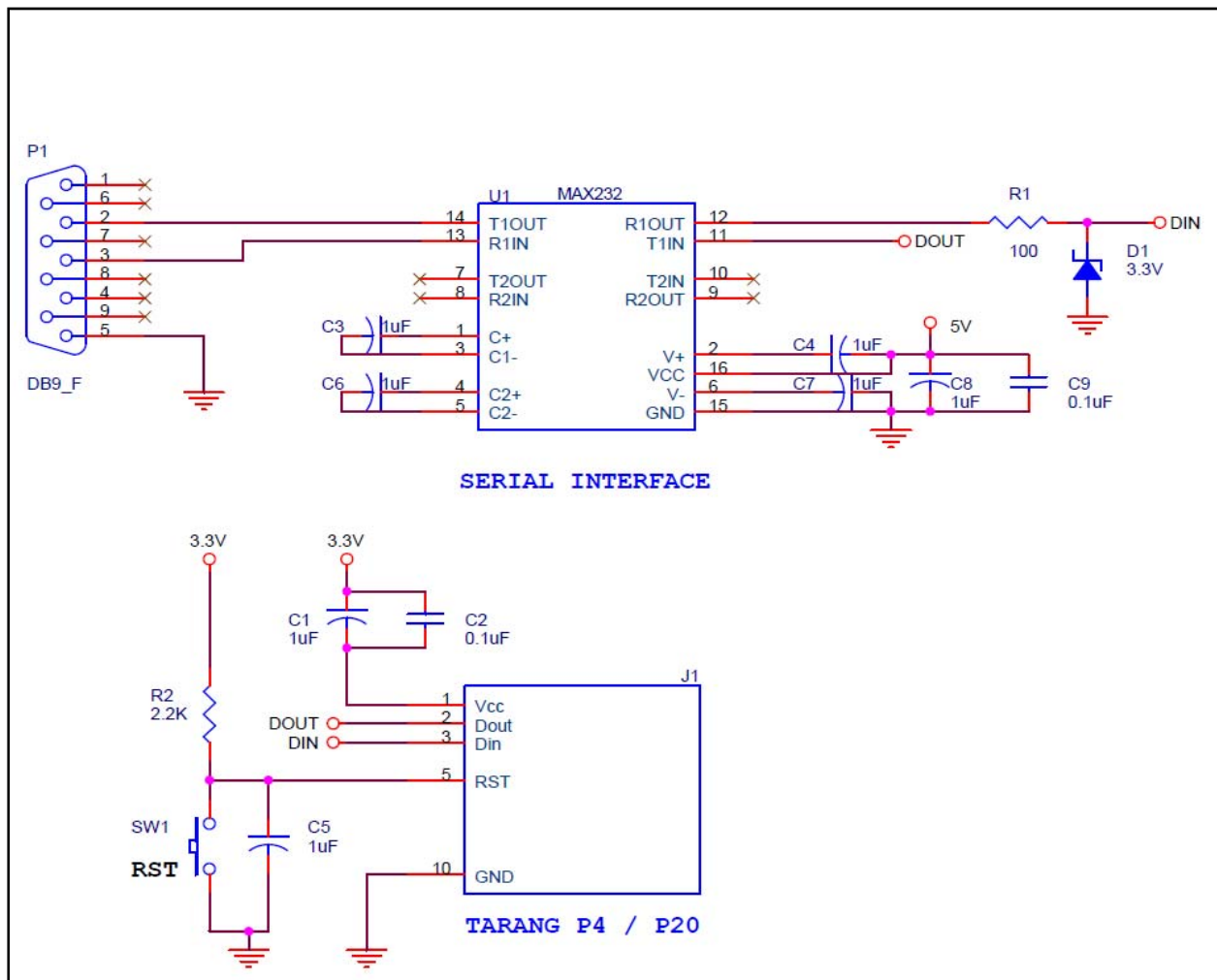

Tarang supports serial data with,

- Flow Control   : None
- Parity   : None
- Baud Rates   : 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
- Data Bits   : 8

To establish a successful serial communication with the module, serial parameters need to be configured properly in the module and host side. Both the module and PC settings can be viewed and set using AT command set through popular terminal applications like 'HyperTerminal'.

4.1 Interfacing with microcontroller
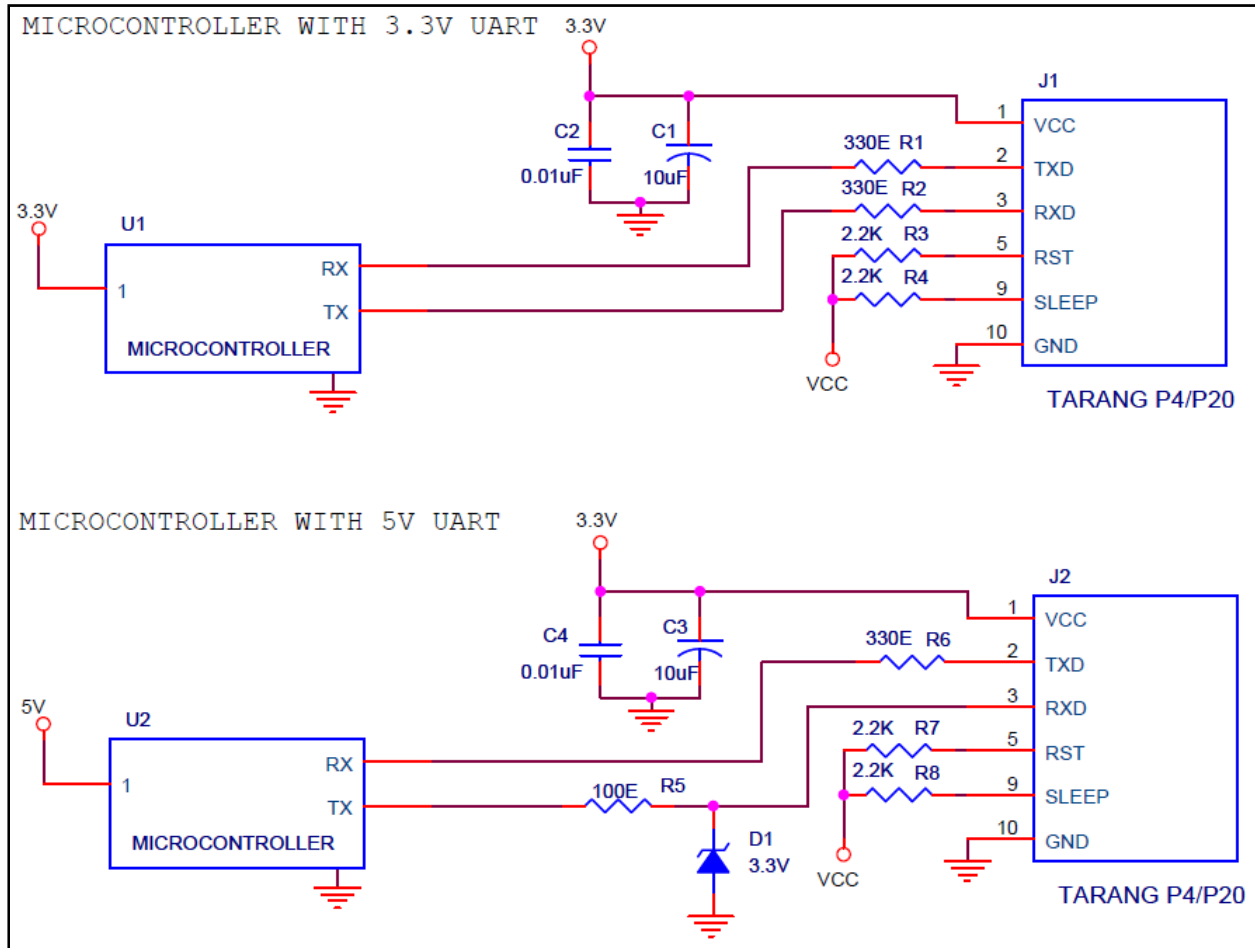
5. Table of AT Commands

Tarang module expects numerical values in Hexadecimal. All AT commands used by Tarang modules are sorted by category. Tarang modules can be configured back to factory settings with a single command 'ATGRD'.

5.1 Table of General AT Commands

AT Command	Description	Parameter and Range		Default Value
GRD	Restore Defaults: Module will be configured to factory settings	-		-
GWR	Write: Stores the set parameters to flash	-		-
GER	Erase: Software flash erase of the module	-		-
GEX	Exit: Exit from command mode	-		-
NCH	Channel: Read the channel number used for communication	0x00 - 0x0E		-
SBD	Interface data rate: Read / Set the serial interface data rate for the module	0x00 - 0x07	0 - 1200	0x03
			1 - 2400	
			2 - 4800	
			3 - 9600	
			4 - 19200	
			5 - 38400	
			6 - 57600	
			7 - 115200	

6. Updating Firmware

6.1 Software erase of code

```
+++
OK
ATGER
OK
ATGEX
EXIT
```

6.2 To Hardware Erase of the module

1. Connect the pad below the pin 11 (on the shield side) of the module to 3.3V (preferably on the LM117 output).
2. Plug the module into the interface board and power it ON for few seconds. The RX LED on the interface board should light ON continuously.
3. Power OFF the module.
4. Remove the wire connection between the pad and the 3.3v source. The module is now ready to be loaded with new code.

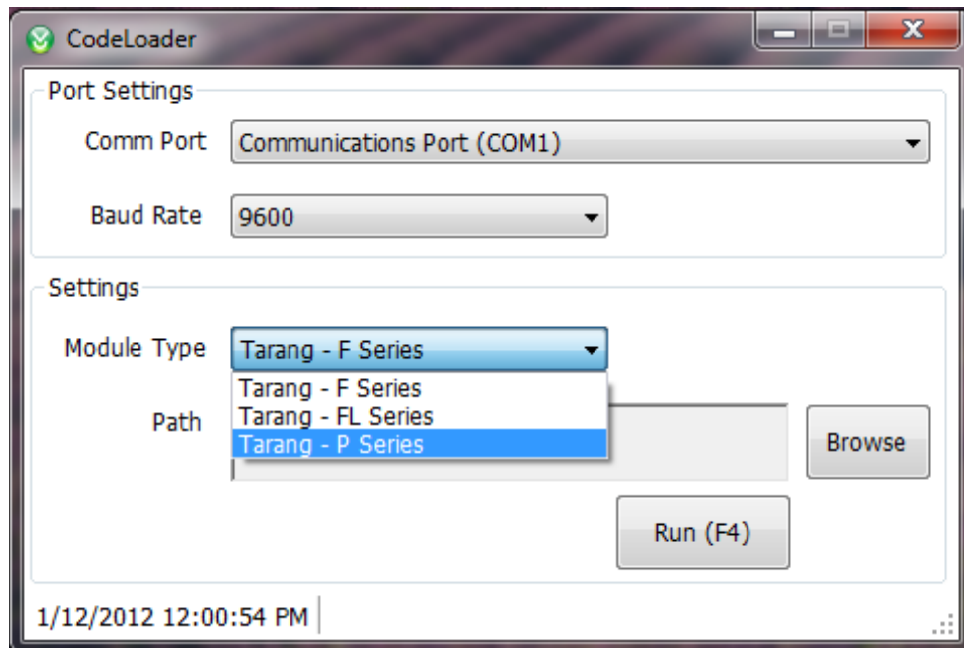**6.3 Steps to load the firmware**

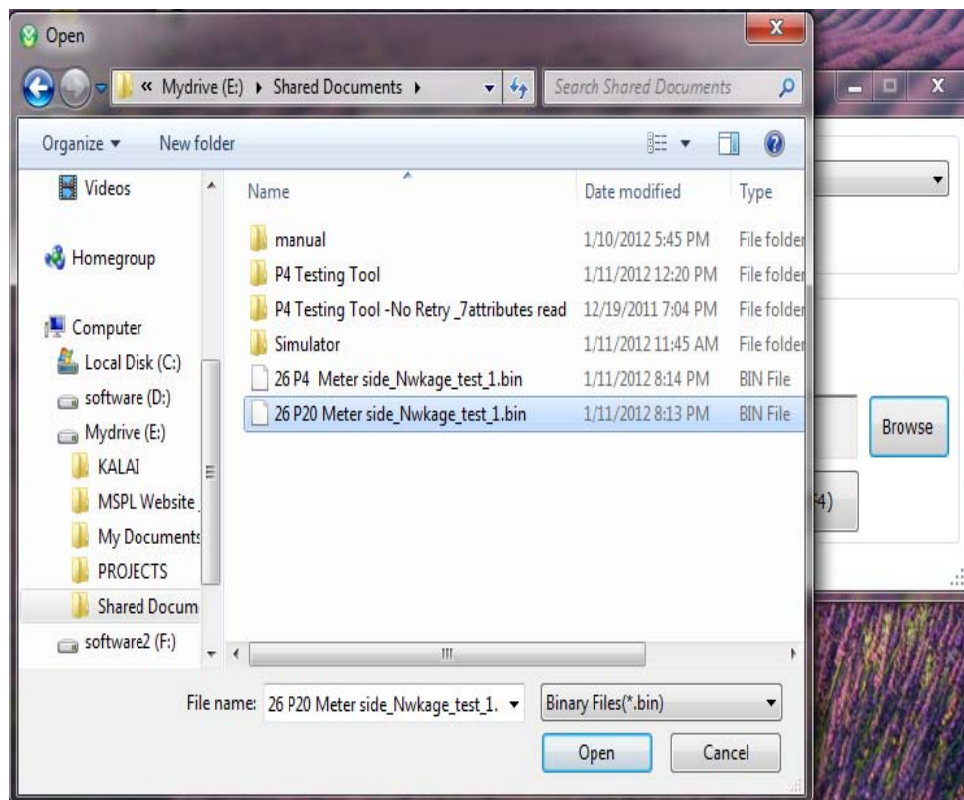1. Open the MTM Codeloader application which has been provided to you.
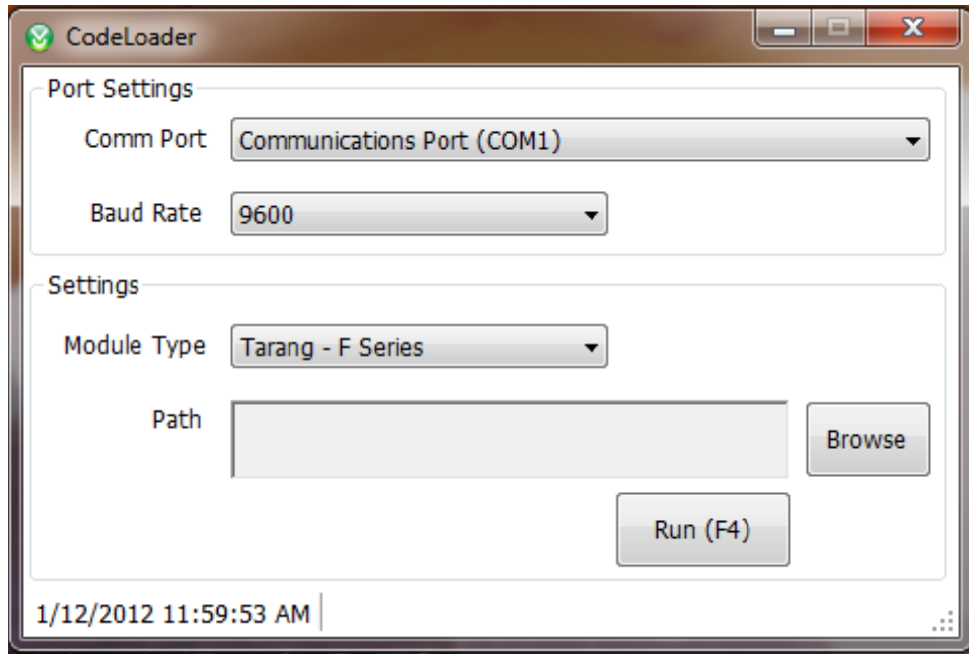
2. Choose the proper com port, where the module is connected.
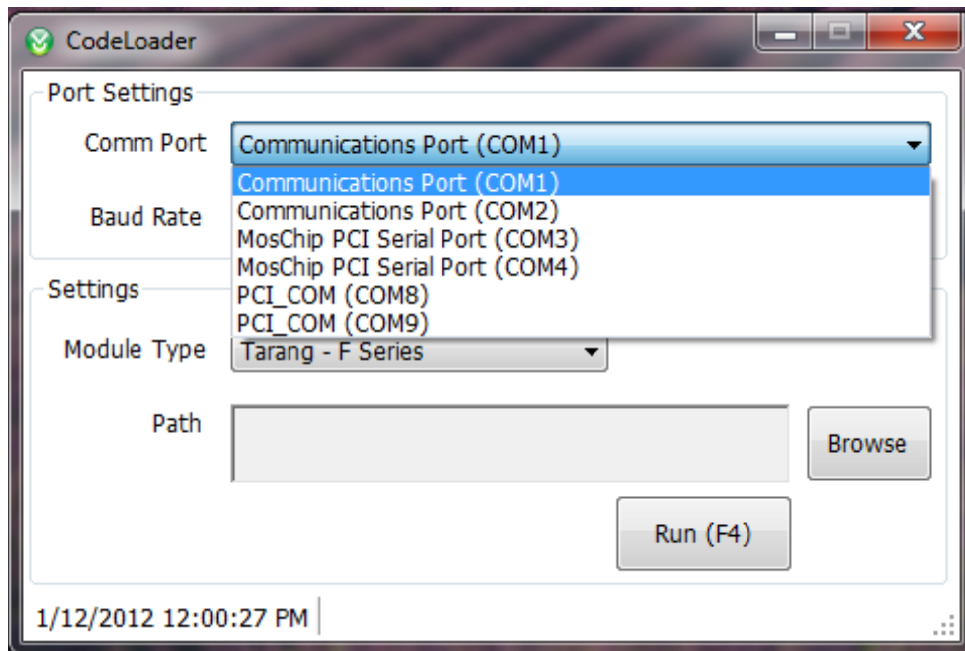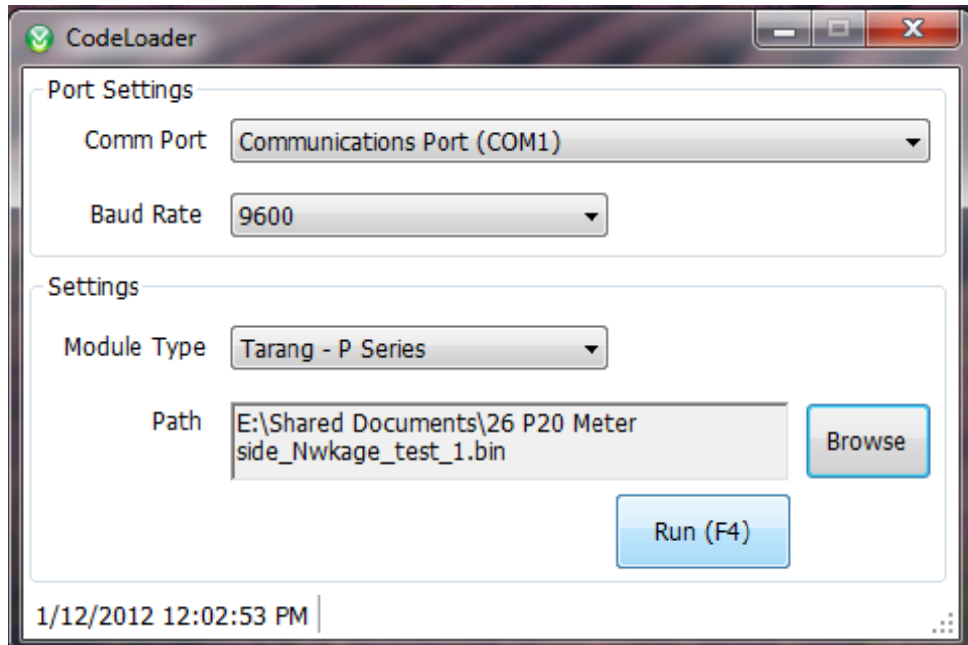
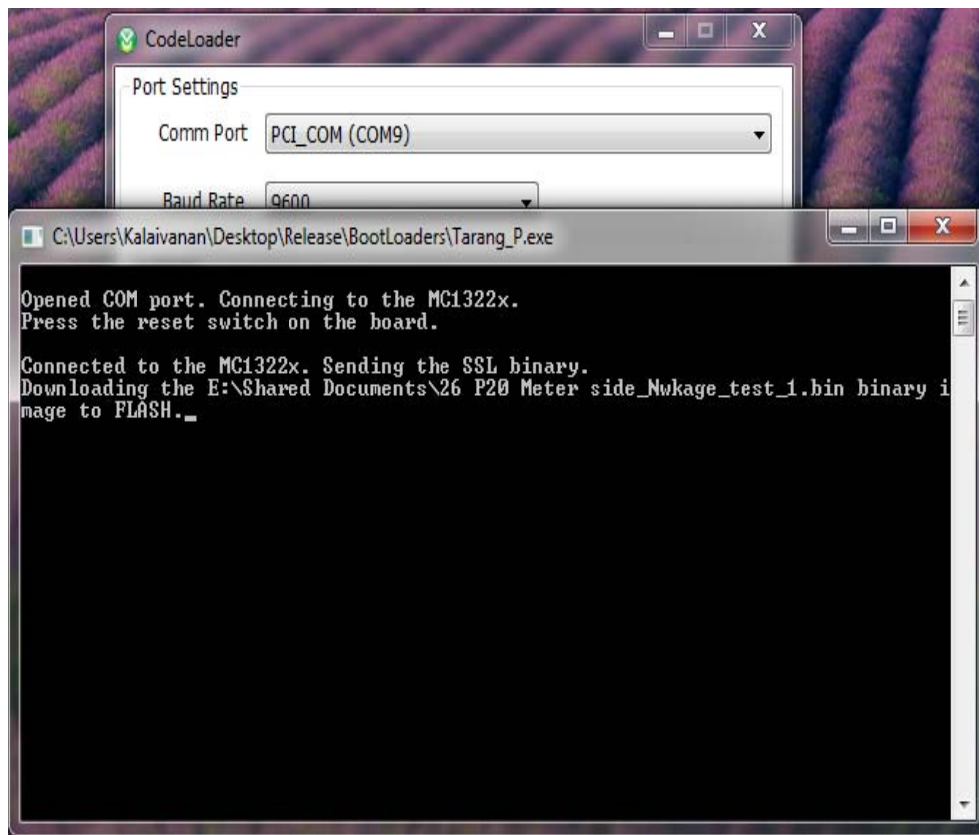3. Choose the proper com port, where the module is connected.

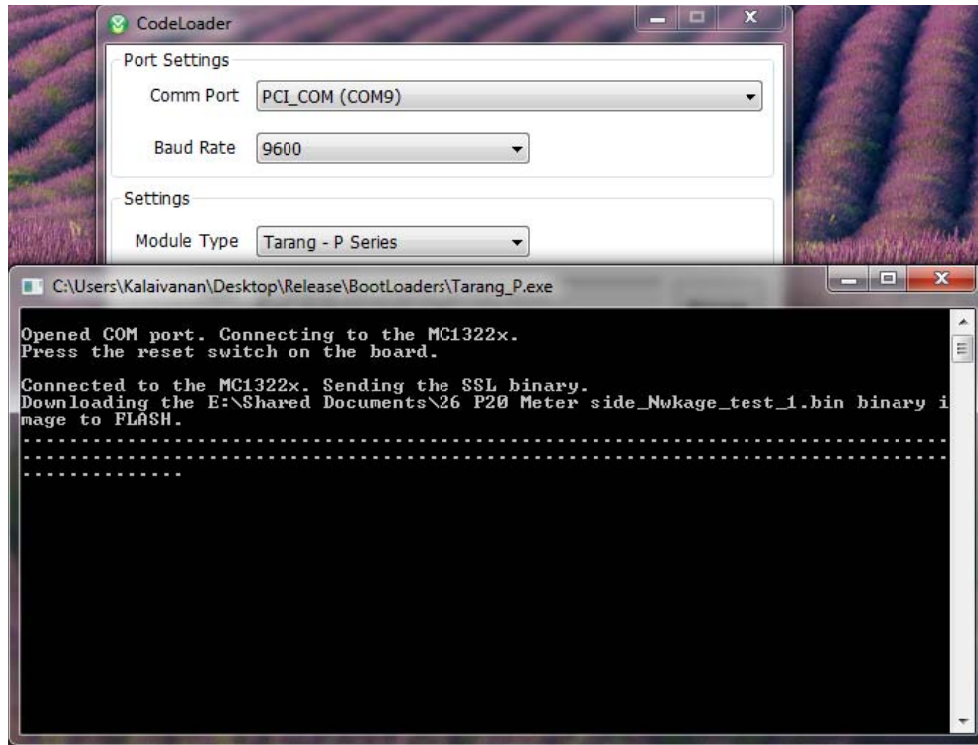4. Choose "Tarang-P Series" in the Module Type.

5. Locate the firmware to be loaded using browse option

6. Press F4 or click on the Run button, you should see a console window as shown below.

After loading the windows gets closed automatically, and give a reset to the module to start working.

7. Placement Guidelines

For obtaining the best possible range, the following guidelines must be adhered to while using Tarang modules.

1. It is important to ensure that the antennas (chip or wire) on the modules "see" open space around them. Hence the modules must be mounted in such a way that there are no blocking obstacles immediately next to the antennas. The modules must never be put inside a metallic enclosure unless an external antenna is being connected to the module. The modules must not be placed too close to a wall, table or metallic surfaces.

2. The modules must be placed as high as possible from the ground.

3. Polarization of the antennas must be the same at both sides of the link. For modules with chip antennas, the mounting should be such that the axes of the modules are parallel to each other. For wire antenna modules, the modules must be mounted such that the wires are parallel.

4. As far as possible, obstacles should be avoided in the communication path between the modules. Metallic objects and concrete walls produce a lot of attenuation and these must be avoided to the extent possible.

8. Contact Details

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