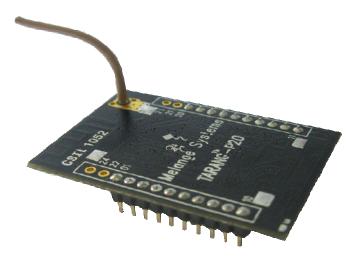


# Tarang P<sup>™</sup> Product Manual



Melange Systems Private Limited, #4/1, 7<sup>th</sup> Cross, Kumara Park West, Bangalore 560 020 P: +91 80 23561023, 23462175 info@melangesystems.com



# Table of Contents

1. Tarang-P20 FCC Compliance	3
2. Tarang-P series	5
2.1 Features	5
3. Tarang P20	6
<i>3.1 Specifications</i>	
4. Interface	8
4.1 Interfacing with microcontroller	9
5. Table of AT Commands	10
5.1 Table of General AT Commands	10
6. Updating Firmware	11
6.1 Software erase of code	11
6.2 To Hardware Erase of the module	11
6.3 Steps to load the firmware	12
7. Placement Guidelines	16
8. Contact Details	17



# 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<sup>®</sup> Pro Complaint platform.
- Direct Sequence Spread Spectrum.
- RF Data rate: 250 kbps.
- Acknowledgement mode communication with retries.



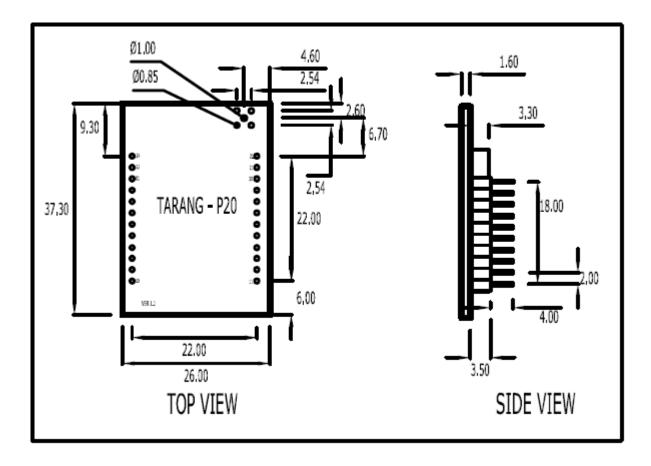
# 3. Tarang P20

#### 3.1 Specifications

Power				
Supply Voltage (V <sub>cc</sub> )	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			



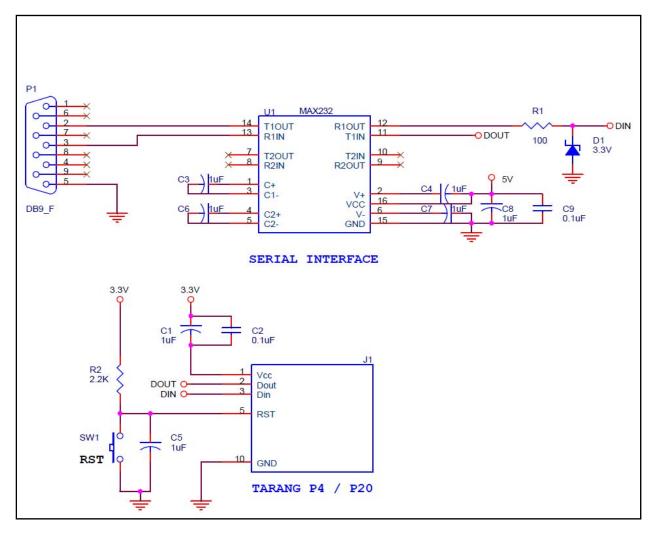
#### 3.2 Mechanical Drawings





### 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.



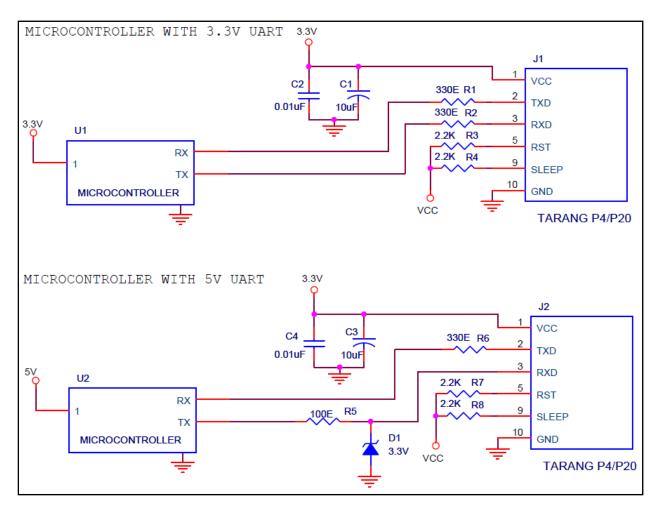
Tarang supports serial data with,

- 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'.







# 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		-	
	Interface data rate: Read / Set the serial interface data rate for the module		0 - 1200		
		2 - 0x00 - 0x07 4 -	1 - 2400	0x03	
			2 - 4800		
SBD			3 - 9600		
300			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.

😔 CodeLoader				
-Port Settings-				
Comm Port	Communications Port (COM1)			
Baud Rate	9600 🔻			
Settings				
Module Type	Tarang - F Series			
Path	Browse			
	Run (F4)			
1/12/2012 11:59:53 AM				

2. Choose the proper com port, where the module is connected.

😵 CodeLoader				
Port Settings				
Comm Port	Communications Port (COM1)	•		
Baud Rate	Communications Port (COM1) Communications Port (COM2) MosChip PCI Serial Port (COM3)			
Settings	MosChip PCI Serial Port (COM4) PCI_COM (COM8) PCI_COM (COM9)			
Module Type	Tarang - F Series	]		
Path		Browse		
		Run (F4)		
1/12/2012 12:00:27 PM				



3. Choose the proper com port, where the module is connected.

🚱 CodeLoader				
- Port Settings				
Comm Port	Communications Port (COM1)			
Baud Rate	9600 🗸			
Settings				
Module Type	Tarang - F Series			
Path	Tarang - F Series Tarang - FL Series Tarang - P Series Browse			
	Run (F4)			
1/12/2012 12:00:54 PM				

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

Open	AND IN ALL AND	-	×	1111
🕽 🕞 🔻 📙 « Mydrive (	E:) I Shared Documents I 🗸 😽 Sei	arch Shared Document:	ρ	
Organize 🔻 New folde	er -	<b>≣</b> ▼ [	1 0	
Videos 🔦	Name	Date modified	Туре	
	鷆 manual	1/10/2012 5:45 PM	File folder	
🔞 Homegroup	퉬 P4 Testing Tool	1/11/2012 12:20 PM	File folder	
	P4 Testing Tool -No Retry _7attributes read	12/19/2011 7:04 PM	File folder	
Computer	퉬 Simulator	1/11/2012 11:45 AM	File folder	
Local Disk (C:)	26 P4 Meter side_Nwkage_test_1.bin	1/11/2012 8:14 PM	BIN File	
software (D:)	26 P20 Meter side_Nwkage_test_1.bin	1/11/2012 8:13 PM	BIN File Brov	US6
→ Mydrive (E:)				
MSPL Website			54)	
My Documents			4)	
PROJECTS				
Shared Docum				-
software2 (F:)			8. L. M.	The second se
	<	17	1 1 1 1 1 1 1 1	4
File n	ame: 26 P20 Meter side_Nwkage_test_1. 👻 Bina	ry Files(*.bin)	-	Į.
		Open Car		y
		Open Car		Ų

5. Locate the firmware to be loaded using browse option



🚱 CodeLoader				
Port Settings				
Comm Port	Communications Port (COM1)			
Baud Rate	9600 🔹			
Settings				
Module Type	Tarang - P Series 🔹			
Path	E:\Shared Documents\26 P20 Meter side_Nwkage_test_1.bin Browse			
	Run (F4)			
1/12/2012 12:02:53 PM				

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

	S CodeLoader
1	Port Settings
	Comm Port PCI_COM (COM9)
Constant of the second	Baud Rate 9600
C:\Users	\Kalaivanan\Desktop\Release\BootLoaders\Tarang_P.exe
Opened CO Press the	OM port. Connecting to the MC1322x.
Connected Download mage to I	d to the MC1322x. Sending the SSL binary. ing the E:\Shared Documents\26 P20 Meter side_Nwkage_test_1.bin binary i FLASH
	-



	3 CodeLoader		- • ×
al al	Port Settings	an an an the second and a second	
	Comm Port	PCI_COM (COM9)	- <b>·</b>
	Baud Rate	9600 🔻	
	Settings		
N.	Module Type	Tarang - P Series	and the state of t
C:\Use	ers\Kalaivanan\Desk	top\Release\BootLoaders\Tarang_P.exe	
Opened Press t	COM port. Con he reset swit	necting to the MC1322x. ch on the board.	
Connect Downloa mage to	ed to the MC1 ding the E:\S FLASH.	322x. Sending the SSL binary. hared Documents\26 P20 Meter side_M	Wwkage_test_1.bin binary i
			<b>*</b>

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

Melange Systems Private Limited, #4/1, 7th Cross, Kumara Park West, Bangalore- 560 020, India.

Ph: +91-80-23462175/23561023 Email: info@melangesystems.com Web: <u>http://www.melangesystems.com</u> Copyright Melange Systems Pvt. Ltd. 2011.