

Manta A200

User's Manual

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Revision History

Number	Date	Description
1	2011-02-14	First edition
2	2011-02-28	Added toolchain information and upgrade instructions

Table of Contents

1 - Overview.....	5
1.1 - Main Features.....	5
2 - Package Contents.....	6
3 - External Views.....	7
3.1 - Panel View.....	7
3.2 - Lateral View.....	8
4 - Charging.....	9
5 - Turning On and Off.....	9
6 - Installing a SIM Card.....	9
7 - Installing Ubiquiti Radios.....	10
8 - Installing the Acoustic Modem Transducer.....	10
9 - Connecting to the Ethernet Ports.....	10
10 - Panel Interface.....	10
11 - Service Port.....	11
12 - Network Settings.....	11
13 - SSH Server.....	11
14 - Control Center.....	11
15 - Handling the Battery.....	12
16 - Communications Interference and Safety.....	12
17 - Software repository.....	12
18 - Upgrading Firmware.....	13
18.1 - GLUED.....	13
18.2 - DUNE.....	13
19 - Customer Support.....	14

1 - Overview

The Manta Gateway is a portable centralized communication hub supporting several types of wireless networks. The system is capable of transparently route data between heterogeneous network links, balancing bandwidth and range.

Additionally the device is capable of providing information about the localization of underwater vehicles and narrow band acoustic transponders.

1.1 - Main Features

- Portable;
- Can be mounted on top of a buoy;
- Supports up to three 12V P.O.E. radios connected at the same time;
- Powered by an internal battery or 220V AC (in which case the battery is charged at the same time);
- 10 hours of autonomy (with two radios);
- Open-source GLUED Linux distribution and SDK;
- DUNE SDK for easier interaction with the hardware (optional);

2 - Package Contents



1. 1x **Manta A200**
2. 1x **IP67 Power Cord**
3. 1x **Ethernet cable RJ45 <-> RJ45 without P.O.E (2m)**
4. 2x **Ethernet cable RJ45 <-> IP67 RJ45 (2m)**
5. 1x **Ubiquiti Bullet M2-HP**
6. 1x **Ubiquiti Bullet M5-HP**
7. 1x **USB A-B cable (2m)**
8. 1x **BTech Acoustic transducer cable (10m)**
9. 1x **BTech 2RCL acoustic transducer**
10. 2x **Antenna mounting kit**

3 - External Views

3.1 - Panel View



1. **LED: Battery Charged**
2. **Power Switch**
3. **LED: Status / Power On**
4. **LED: Battery Charging**
5. **Button: System Selection**
6. **Button: Ping Selected System**
7. **Button: Abort Selected System**
8. **Service Port**
9. **LCD**
10. **GPS Antenna**

3.2 - Lateral View



1. **IP67 Transducer Connector**
2. **IP67 Power Cord Connector**
3. **SIM Card Slot**
4. **IP67 P.O.E.#1 RJ45 Connector (12V DC)**
5. **IP67 P.O.E.#2 RJ45 Connector (12V DC)**
6. **IP67 P.O.E.#3 RJ45 Connector (12V DC)**

4 - Charging

Before connecting the device to the power outlet make sure the top lid is open. This will allow hydrogen gas that may form during charging to escape.

Connect the **Power Cord** to the **IP67 Power Cord Connector** and to an external power source (100V-240V@1A AC). The **Charging LED** will turn on. It will take approximately 8 hours to fully charge the device. After the battery is fully charged, the **Charging LED** will turn off, and the **Charged LED** will turn on. You can use your Manta Gateway while charging.

Charge your device in a well-ventilated area. Avoid charging when the environmental temperature is higher than 40°C. Do not operate the device if the environmental temperature is higher than 60°C, as battery leakage or expansion may occur.

5 - Turning On and Off

To turn on the Gateway, switch the **Power Switch** to the **ON** position. The **Status LED** and **LCD** will lit. The boot process will take approximately 10 seconds to complete. After that the **LCD** text will change to the **System Selection Menu** and the **Status LED** will blink in a heartbeat pattern.

To turn off the device, switch the **Power Switch** to the **OFF** position. The shutdown procedure will start and takes at most 30 seconds to complete. The actual duration of the procedure depends on the amount of time the CPU needs to place the file system in a safe state. Usually this can be achieved in around 10 seconds.

6 - Installing a SIM Card

To use the internal 3G modem you must install a SIM Card in the **SIM Card Slot**. To do so insert the SIM Card into the slot until it clicks.

7 - Installing Ubiquiti Radios

Using one **Ethernet cable RJ45 <-> IP67 RJ45**, connect the RJ45 part to the radio and the IP67 RJ45 part to the gateway and screw it until it's locked. It is safe to hot-plug radios. LSTS ships all Ubiquiti radios with the default configuration. The manual for these devices is available at:

- http://www.ubnt.com/wiki/AirOS_5.2

8 - Installing the Acoustic Modem Transducer

1. Connect the **BTech 2RCL acoustic transducer** to the **BTech Acoustic transducer cable**
2. Connect the **BTech Acoustic transducer cable** to the gateway's **IP67 Transducer Connector**.

9 - Connecting to the Ethernet Ports

To connect your gateway to another computer via Ethernet you should use the **Ethernet cable RJ45 <-> RJ45 without P.O.E**.

10 - Panel Interface

The device is factory configured to communicate acoustically with other LSTS products. If you wish to add support for your own assets contact LSTS for instructions.

- **System Button:** Selects the target system/device for subsequent operations.
- **Ping Button:** Pings the currently selected system/device. If the ping is successful, the distance to the device is displayed on the **LCD**, or else a message "Ping Time Out" is presented.
- **Abort Button:** Aborts the current plan being executed by the target system (usually an AUV).

11 - Service Port

The service port allows direct connection to the CPU console. This port uses an FTDI RS232 to USB converter. Drivers for this hardware are available at:

- <http://www.ftdichip.com/Drivers/VCP.htm>

To connect to the CPU console, use the **USB A-B cable** and open a terminal emulator, such as HyperTerminal on Microsoft Windows or GTKTerm on GNU/Linux, using the following settings:

Baud Rate: 57600

Parity: None

Data Bits: 8

Stop Bits: 1

12 - Network Settings

The following table contains the factory IP addresses of the gateways. You must use this IP address to connect to the SSH Server and use the Control Center.

Manta-4	192.168.2.1
Manta-5	192.168.2.1

13 - SSH Server

To login to the internal computer via SSH use the following credentials:

User Name: root

Password: root

14 - Control Center

The HTTP Control Center allows you to monitor the state of several internal sensors and control which devices are turned on. To use the control center direct your browser to the device's IP Address, port 8080 (eg. Manta-4: <http://192.168.2.1:8080>)

15 - Handling the Battery

This product contains a Lead-acid battery. There is a risk of fire and burns if the battery pack is handled improperly. Do not attempt to open the battery pack. Do not disassemble, crush, puncture, short external contacts, dispose of in fire or water, or expose a battery pack to temperatures higher than 60°C. Close the lid and all unused connectors when operating near water. The battery has a lifetime of approximately two years. Contact LSTS to replace the battery

16 - Communications Interference and Safety

Do not use the device near places where wireless communication devices are prohibited, such as airports, gas stations, fuel depots, chemical plants or where blasting operations are in progress, or in potentially explosive atmospheres such as fueling areas, fuel storehouses, below deck on boats, chemical plants, fuel or chemical transfer or storage facilities, and areas where the air contains chemicals or particles, such as grain, dust, or metal powders. Please be aware that sparks in such areas could cause an explosion or fire.

17 - Software repository

To download SDKs, firmware upgrades and documentation use the URL <http://whale.fe.up.pt/manta> and browse the folder with the model of your gateway (eg. a200).

The repository is organized as follows:

- **dune:** DUNE is the software that controls the main functions of the gateway (Panel, LEDs, Power Lines, etc). In this folder you can find documentation, compiled binaries to upload to the gateway and a library that can be used to extend DUNE.
- **glued:** GLUED is a GNU/Linux distribution. In this folder you can find the source code of the distribution, compiled binaries to upload to the gateway, cross-compilers and system libraries.

- **imc:** IMC is the communication protocol used by DUNE. The user can use this protocol to communicate with DUNE and control its activity.
- **u-boot:** U-Boot is the second stage bootloader used by the internal computer. In this folder we make available firmware and environment images.
- **ubiquiti:** In this folder we make available firmware images used by the Ubiquiti Bullet devices.

18 - Upgrading Firmware

18.1 - GLUED

To upgrade GLUED copy the file `glued-<version>-<device>-rootfs.tar.bz2` to the folder `/opt/lsts` of your Manta Gateway using SSH/SCP. When the upload is complete power down your device, wait a few seconds and turn it back on. The upgrade process will start. Do not turn off the gateway during the upgrade process. Once the upgrade is complete the **STATUS LED** will blink in a heartbeat pattern.

18.2 - DUNE

To upgrade DUNE copy the file `dune-armv7-32bit-linux-glibc-gcc<gcc-version>-<version>-full.tar.bz2` to the folder `/opt/lsts` of the device using SSH/SCP. When the upload is complete power down your device, wait a few seconds and turn it back on. The upgrade process will start. Do not turn off the gateway during the upgrade process. Once the upgrade is complete the **STATUS LED** will blink in a heartbeat pattern.

19 - Customer Support

Please direct all support inquiries to:

LSTS

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