Iono Pi Max
Raspberry Pi OS image

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Introduction

This document describes the configuration of a Iono Pi Max with Raspberry Pi OS pre-installed when purchased directly from Sfera Labs. Moreover it provides for a quick start guide to promptly use your device.

OS Configuration

Raspberry Pi OS version

Raspberry Pi OS Lite

Release date: December 5th 2023

System: 64-bit

Kernel version: 6.1

Debian version: 12 (bookworm)

User

Username: pi

Password: raspberry

Networking

The network configuration is unchanged from its defaults: DHCP is enabled on the Ethernet interface (eth0) and the hostname is set to “raspberrypi”.

On most networks with a DHCP server available you should be able to reach the unit as “raspberrypi.local”.

SSH

SSH access with password authentication is enabled on the standard port 22.

Iono Pi Max Configuration

Kernel module

The latest version (at the time of provisioning) of the Iono Pi Max Kernel module is installed, configured to load at boot and its sysfs files accessible to the user pi.

All details available at:

https://github.com/sfera-labs/iono-pi-max-kernel-module

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RTC

The I²C bus is enabled and the “i2c-tools” package as well as the RTC driver, configuration services, and scripts are installed.

The OS is therefore setup to update and use the RTC-stored date and time.

For more details refer to the product User Guide.

Dual SD card

The “sdio” overlay is enabled, which is required to access the SD card on the secondary bus.

To this end, the following line is added to /boot/config.txt:

```
dtoverlay=sdio,bus_width=4,poll_once=off
```

CAN controller

The “mcp251xfd” overlay is enabled to set up SocketCAN support for the CAN FD/CAN 2.0 controller (MCP2518FD).

To this end, the following line is added to /boot/config.txt:

```
dtoverlay=mcp251xfd,spi0-0,interrupt=28
```

Serial console

The Linux serial console is enabled by default on the *ttyAMA0* device, which is connected to Iono Pi Max’s RS-232 interface. The baud rate is set to 115200.

You can therefore access the console connecting a host computer to the RS-232 interface using, for instance, a USB adapter and any serial communication application.

To disable the console to use the RS-232 interface for other purposes, refer to the product User Guide.

Quick Start

Power on

Connect the +/- terminal block pins to a suitable power supply, with Vdc output within the 10-50 V range, able to supply at least 8 W, or more if you have USB connected devices or other peripherals powered by Iono Pi Max.

Refer to the product User Guide for detailed power supply requirements.

Switch on the power supply and wait for the unit to boot up.

You should see all LEDs blink once simultaneously, then only the PWR LED steady green. The 232 LED will blink blue a few times during the boot process, indicating serial console TX activity, and after approximately 30 seconds from power on the boot will be complete.

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System access

The simplest way to access the system is to connect it to a network with DHCP service and login via SSH.

Connect the Ethernet cable and make sure you see the LEDs of the Ethernet port active.

Use your favourite SSH client application from your host computer connected to the same network and use “raspberrypi.local” as address. For instance, from a Linux terminal:

```
$ ssh pi@raspberrypi.local
```

If the connection is successful, enter the password (“raspberry”) and you are ready to use Iono Pi Max.

If the connection does not succeed, try to ping “raspberrypi.local”. If the unit responds, you should be able to see its IP address in the ping responses, so you can try to use this IP for the SSH connection, e.g.:

```
$ ssh pi@192.168.1.13
```

If you were not able to retrieve the IP address of the unit, access your router, modem, or DHCP server control panel and find the IP address that has been assigned to Iono Pi Max.

Alternatively use a network scanner application to list all the devices connected to the network and search for Iono Pi Max.

In any case, it should appear on the network as a standard Raspberry Pi board.

If all of the above fails or you don’t have a DHCP-enabled network to work on, you can attempt connecting Iono Pi Max with an Ethernet cable directly to your host computer’s Ethernet port. Depending on your computer's OS and network configuration you might be able to reach the unit as described above.

A final option is to access the console through the RS-232 serial interface as described above. From here you can login typing username (pi) and password (raspberry) and check the IP address of the unit using the “ifconfig” command.

You could even use the system directly through RS-232 serial console; it is not very user-friendly, but possible.

Usage

Once you are connected to the unit you can use it as a standard Raspberry Pi OS installation to configure your required network settings and install your application stack.

As a quick test, make the buzzer beep:

```
$ echo 500 > /sys/class/ionopimax/buzzer/beep
```


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