

# BARIX

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## BARIONET 500

### Quick Install Guide

### Version V1.3 (FW B500-2.1.1.0)

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#### **IP & Wi-Fi Automation Controller**

##### **Package contents**

- a Barionet 500
- b 3 Female Terminal Blocks
- c Sticker with Wi-Fi and LAN MAC Address

##### **Mounting on a DIN Rail**

Slide the device upwards onto the DIN rail. Push it up and towards the rail until it snaps onto the upper rail edge. Before powering the device please read this quick install guide and mind the polarity of the power supply (see picture on page 2).

##### **Firmware**

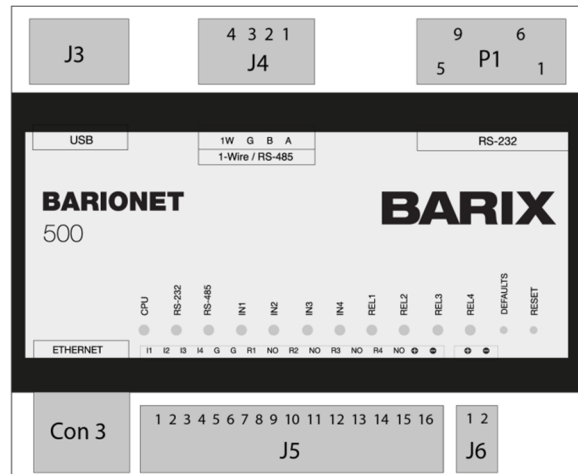
This device comes preloaded with a default OpenWrt image with drivers for the Barionet Hardware. A Python and Lua Interpreter are pre-installed.

Newer or alternative Firmware can be downloaded from [www.barix.com/downloads](http://www.barix.com/downloads)

##### **Support**

For support please contact your local dealer or visit [www.barix.com](http://www.barix.com)

## Top View



### J3 (1x USB Host)

Pin	Description
1	VCC (+5V)
2	D <sup>-</sup> (Data -)
3	D <sup>+</sup> (Data +)
4	GND

### J5 Digital Inputs, Relay outputs (30VDC, 0.5A)

Pin	Description
1..4	Digital Input 1..4
5,6	GND (Ground)
7	Relay 1 common
8	Relay 1 normally open
9	Relay 2 common
10	Relay 2 normally open
11	Relay 3 common
12	Relay 3 normally open
13	Relay 4 common
14	Relay 4 normally open
15	Power In + 9..30VDC
16	Power In -

### J6 Power Supply

Pin	Description
1	Power In + 9..30VDC
2	Power In -

### P1 RS-232 serial port

Pin	Description
2	RxD (Receive data)
3	TxD (Transmit data)
4	+5VDC (500mA max, fused)
5	GND (Ground)
7	RTS (Ready to send)
8	CTS (Clear to send)
1,6,9	not connected

### CON3 Ethernet (RJ45)

Pin	Description
1	TX + (Transmit data)
2	TX - (Transmit data)
3	RX + (Receive data)
4	NC
5	NC
6	RX - (Receive data)
7	NC
8	NC
Left LED Yellow - Activity	
Left LED Green - Link / Speed (Blinking)	

### J4 RS-485 serial port, Dallas 1-wire® bus

Pin	Description
1	RS485 A
2	RS485 B
3	Ground (GND)
4	1-wire data

## 1. Connecting to power and initialization

### Power Supply

The Barionet 500 needs a DC supply voltage of 9V to 30V, 4W max. Please mind the polarity. When powered up, the Status LEDs of the CPUs will start blinking, indicating that the device is starting up.

Blue CPU LED: Main CPU  
Red CPU LED: IO CPU

When the device is initialized, the Status LEDs turn solid, all other LEDs will turn off (assuming no active IO is connected).

### Power over Ethernet (PoE)

The Barionet 500 also offers the possibility to be powered by PoE. Simply connect a PoE supplied network cable into the network port and the device is starting up.

## 2. Connecting via Ethernet

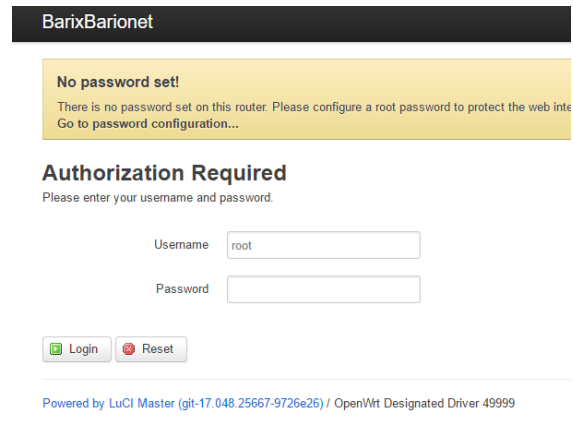
Plug an Ethernet cable from the Barionet 500 to an Ethernet network.

The Barionet 500 is configured to be a DHCP Client by default. Use a Network Scanning Program in order to determine the IP Address according to the given MAC Address.

## 3. Changing Settings via Luci Web Interface

### Opening the LuCi Interface

To use the LuCi web interface please type the IP address of the Device of into your web browser: e.g. 192.168.1.123



The default username and password is:  
Username: root  
Password: (blank)

The root user has NO password set, so make sure you set one !

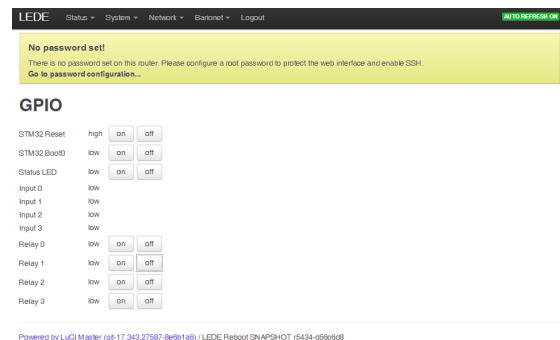
### Changing Network Settings

In the LuCI web interface -> <Network> you will find all relevant settings, so you can set other IP addresses, enable/disable DHCP for each network port (Wi-Fi or Ethernet), and also enable the Wi-Fi interface.

Make sure you don't lock yourself out if you change the settings !

### Control IOs

In the LuCI web interface -> <Barionet> you will find a Control Interface to control and monitor the GPIOs of the Barionet.



Simply click on the Control Buttons to change the state of Relays and IOs.

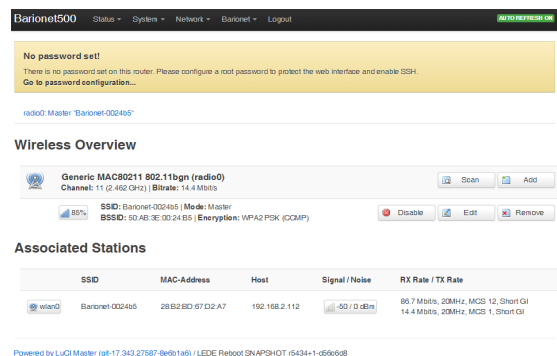
## 4. Connecting via Wi-Fi and SSH

### Connecting via Wi-Fi

The Wi-Fi Interface is turned on by default offering an SSID which is called “Barionet\_” and the four last digits of its MAC address (for example, Barionet\_0024B5). The security key/passphrase “barionet” is used to protect the WLAN.

Connect your PC to this Wi-Fi network. For this network, the Barionet works as a DHCP server and uses the IP Address 192.168.166.1 itself. For your PC, an IP address in the 192.168.166.x range will be assigned.

For security reason, we recommend to turn off the WLAN interface if it is not needed in the Application. Use the LuCI Webinterface -> <Network> -> <Wireless> in order to turn the Interface off.



### Establishing an SSH Connection

Use ssh or a similar client (for example, PuTTY, port 22, SSH option) and establish a connection as user “root” to the IP address of the Barionet (given DHCP Address if connecting via Ethernet or 192.168.166.1 if connected via Wi-Fi).

The root user has NO password set, so make sure you set one !

## 5. Installing OpenWRT Packages

OpenWRT Packages can be installed by the standard OpenWRT/LeDe Package installer by using “opkg” command

“opkg list” -> lists all the available packages

“opkg list-installed” -> lists the installed packages

“opkg update” -> updates the installed packages

“opkg install <file>” -> installes a specific package

## 6. IO Access from Scripts or programs

The IO ports are accessible through the standard OpenWrt IO device files.

The Device Files can be found in the folder /dev/gpio.

### Relay Outputs

Relay Outputs: bio1 – bio4

Use the following shell command in order to control the relay outputs:

“echo 1 > bio1/value” -> set Relay 1

“echo 0 > bio1/value” -> reset Relay 1

### Digital Inputs

Digital Inputs: bio201 – bio204

Use the following shell command in order to read the digital input values:

“cat bio201/value” -> reads Input 1

## 7. Use of Serial Ports from Scripts or programs

The Serial Ports (RS232 and RS485) are accessible through the standard OpenWrt USB device files.

The Device Files can be found in the folder /dev.

RS232 Interface:   ttyUSB0  
RS485 Interface:   ttyUSB1

Use the following shell command in order to write to the Serial Port:

```
“echo hello world > ttyUSB0” -> writes to RS232
```

Use the following shell command in order to read from the Serial Port:

```
“cat ttyUSB0” -> reads from RS232
```

## 8. Use of 1-wire ® Temperature Sensors from Scripts

The 1-wire interface can be accessed using an OpenWrt device driver.

The Device Driver maps the 1-wire devices into the folder /sys/bus/w1/devices/.

Use the following shell command in order to read data from the 1-wire devices:

```
cat /sys/bus/w1/devices/yy-yyyy/w1_slave
```

yy-yyyy represents the corresponding 1-wire device address.

The read data are represented in hex using ASCII character, the read temperature is shown as a string t=xyyy (°C with 3 decimal places).

## 9. Mounting a USB Stick

In order to mount a USB stick to the OpenWRT File System, the following packages need to be installed:

-> kmod-usb-storage (Kernel support for USB Mass Storage devices)

-> kmod-fs-vfat (support of the right file system, vfat for fat32)

The USB Stick can now be plugged in and mounted with mount command as following:

```
“mount -t vfat /dev/sda1 /mnt/usb” -> mounts the sda1 (first USB stick)
```

Note that “sda1” is eventually replaced by another interface. Use dmesg in order to determine the right interface.

Note that the /mnt/usb directory needs to be created before mounting.

## 10. Use of Modbus

The Barionet 1100 is supporting Modbus TCP Protocol in order to be controlled.

Modbus Interface:   TCP Port 502

All IOs as well as a lot of more functions are accessible via Modbus IO Registers according to Appendix 1) IO Mapping.

## **11. Reboot the Device**

### **With LuCI Web Interface**

On the LuCI web interface go to the System -> <Reboot>

Select "Perform Reboot".

### **By Hardware Button**

The Reset/Reboot can also be performed by the RESET Button on the Device. Use a needle to perform Reset by pressing the Button.

Make sure the "Keep Settings" option is not selected, this ensures that the Device is correctly set back to Factory Defaults after the Firmware Update.

Please note that all Settings, user programs etc. are deleted after a Firmware Update.

Be patient during the Software update and do not disconnect the Power Supply. The Software Update can Take up to 5 Minutes.

## **12. Reset to factory defaults**

### **With LuCI Web Interface**

On the LuCI web interface go to <System> -> <Backup/Flash Firmware>

Under Backup/Restore select "Reset to defaults" and perform the factory reset.

At this point, the device will reboot and apply default settings.

### **By Hardware Button**

The Factory defaults can also be set by the DEFAULTS Button on the Device. Use a needle to perform Factory Defaults by pressing the Button for at least 10s.

At this point, the device will reboot and apply default settings.

## **13. Upload Firmware Image**

For Software updates a complete OpenWRT/LEDE Image is provided by Barix. For new updates see [www.barix.com/downloads](http://www.barix.com/downloads).

The easiest way is to update the Firmware using the LuCI Webinterface: <System> -> <Backup / Flash Firmware>.

## Appendix 1) IO Mapping

The following Table shows the IO Mapping for the Barionet 500 with its associated IO addresses and functions:

IO Addr	Read/Write	Size	Description	Driver Alias	Driver Link
1	R / W	1 bit	Relay 1	rel1	bio1
2	R / W	1 bit	Relay 2	rel2	bio2
3	R / W	1 bit	Relay 3	rel3	bio3
4	R / W	1 bit	Relay 4	rel4	bio4
10..100	R / W	1 bit	Virtual IO Bits		
100..200	R / W	1 bit	Virtual IO Bits		
201	R only	1 bit	Digital Input 1	in1	bio201
202	R only	1 bit	Digital Input 2	in2	bio202
203	R only	1 bit	Digital Input 3	in3	bio203
204	R only	1 bit	Digital Input 4	in4	bio204
205..400	R / W	1 bit	Virtual IO Bits		
500..600	R / W	16 bits	Virtual IO Registers		
701..1000	R / W	16 bits	Virtual IO Registers		
60101	R / W	1 bit	Pull-Up Digital Input 1	pullup1	bio60101
60102	R / W	1 bit	Pull-Up Digital Input 2	pullup2	bio60102
60103	R / W	1 bit	Pull-Up Digital Input 3	pullup3	bio60103
60104	R / W	1 bit	Pull-Up Digital Input 4	pullup4	bio60104