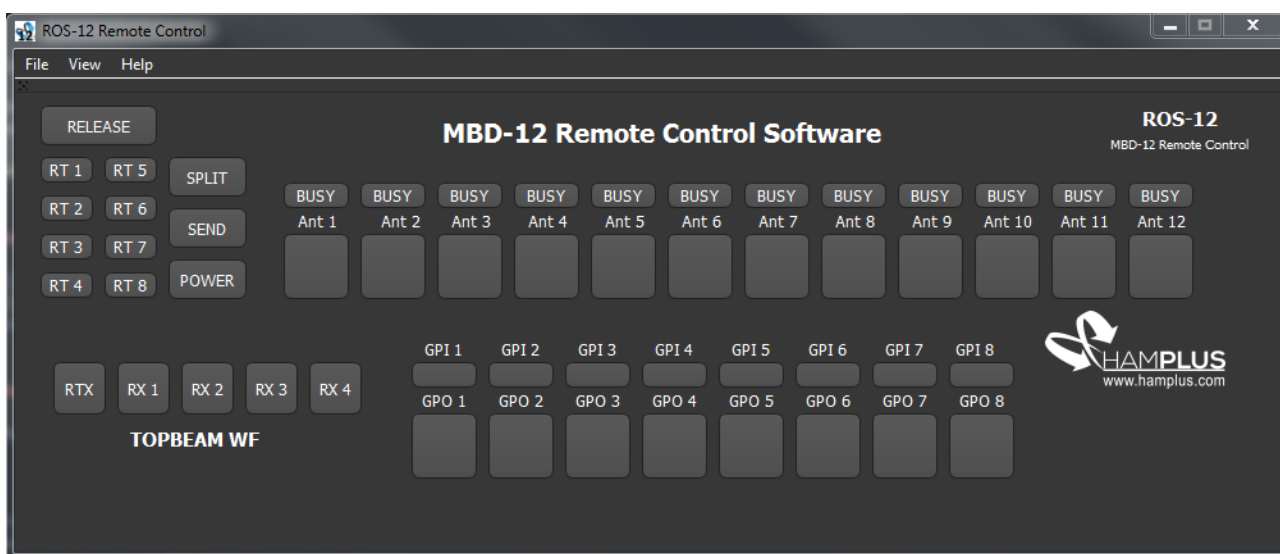


## MBD-12 / ROS-12 Operation Guide

This user operation guide is made of four parts and covers all important information in order to run the ROS-12 through LAN and Internet. The ROS-12 is the remote software controller for the MBD-12F. This first part of the guide will introduce the ROS-12 software, the second part is focused on configuring the MBD-12 device, third part covers the connection through local area network (LAN) between ROS-12 and MBD-12, and the last part covers the remote/internet connection.

### 1 - ROS-12 Remote Control Overview



ROS-12 User Interface at first run

Access the official [MBD-12 page](#) [1] and download the latest version of the ROS-12 software (currently available for Windows – macOS and Linux soon). Run the installer (setup\_ros12.exe) and make a clean install. If you are updating to a newer version, all the previous configs remain untouched.

After completing the setup installation, the program can be run directly on its directory ([C:\Program Files\(x86\)\Hamplus ROS-12](#)) or using the desktop icon. On the first run the user interface should look like the picture above.

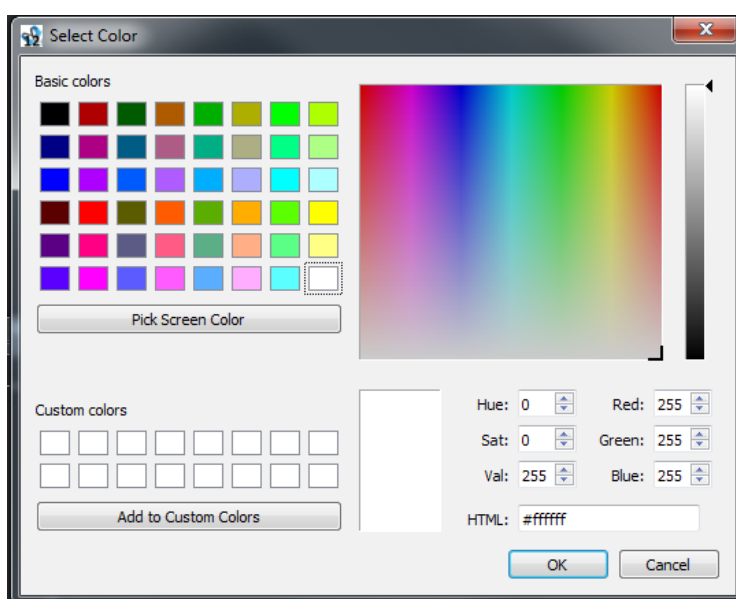
The ROS-12 controls and monitors the following MBD-12 operations:

- **Antenas switching;**
  - Switching occurs by clicking on the push-buttons;
  - Release button disassociates any antennas in use;
- **Split operation;**
  - Can be enabled/disabled directly on its push button;
- 8 general purpose outputs (**GPOs**);

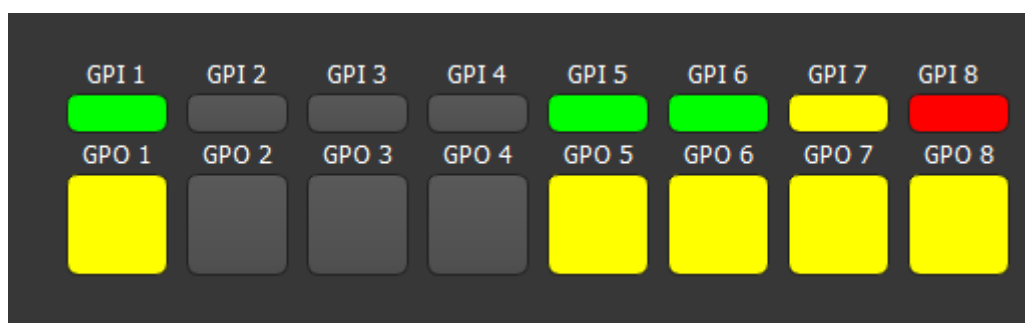
- 8 general purpose inputs (**GPIs**);
- **TopBeam Waller Flag** operation;
- **Busy line**: shows all antennas already in use by other Hamplus Devices;
- **Rotor status**;
- **PTT Status (SEND)**;

## Customizing the User Interface

- The topbeam WF and GPIOs panel can be added or removed (individually) from the UI by using the menu "View";
- All the GPI and GPO indicators can have different colors configured to it. This is done by using the mouse right-click on the desired GPIO button;

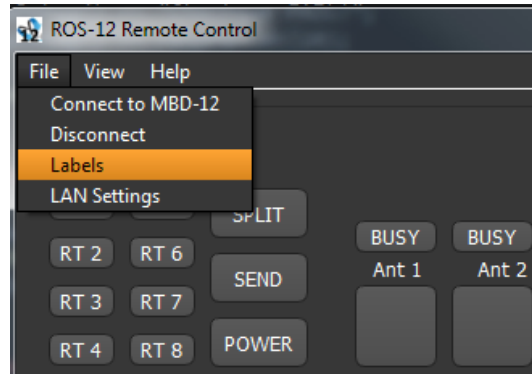


GPIO color selection window

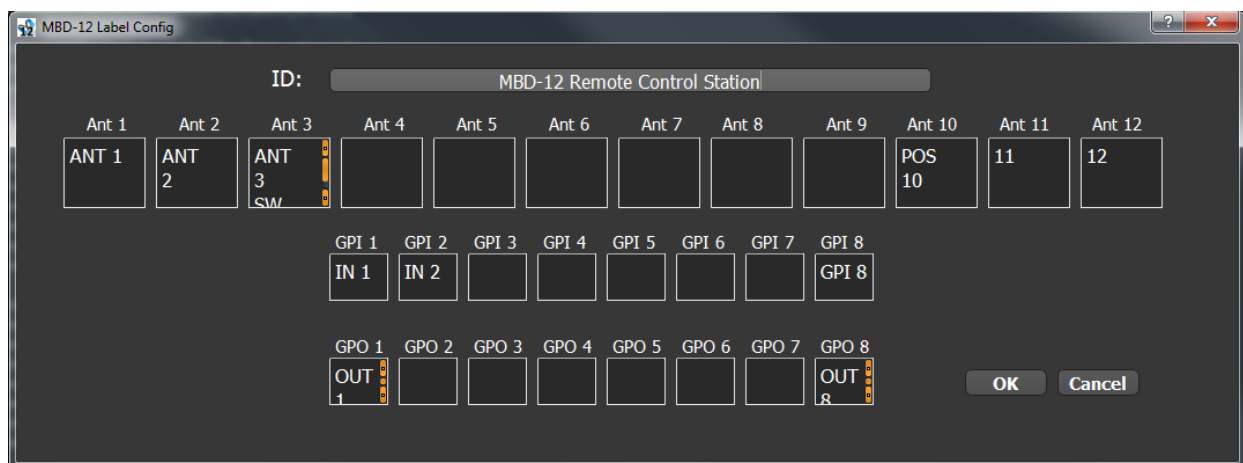


GPIO keys with custom colors

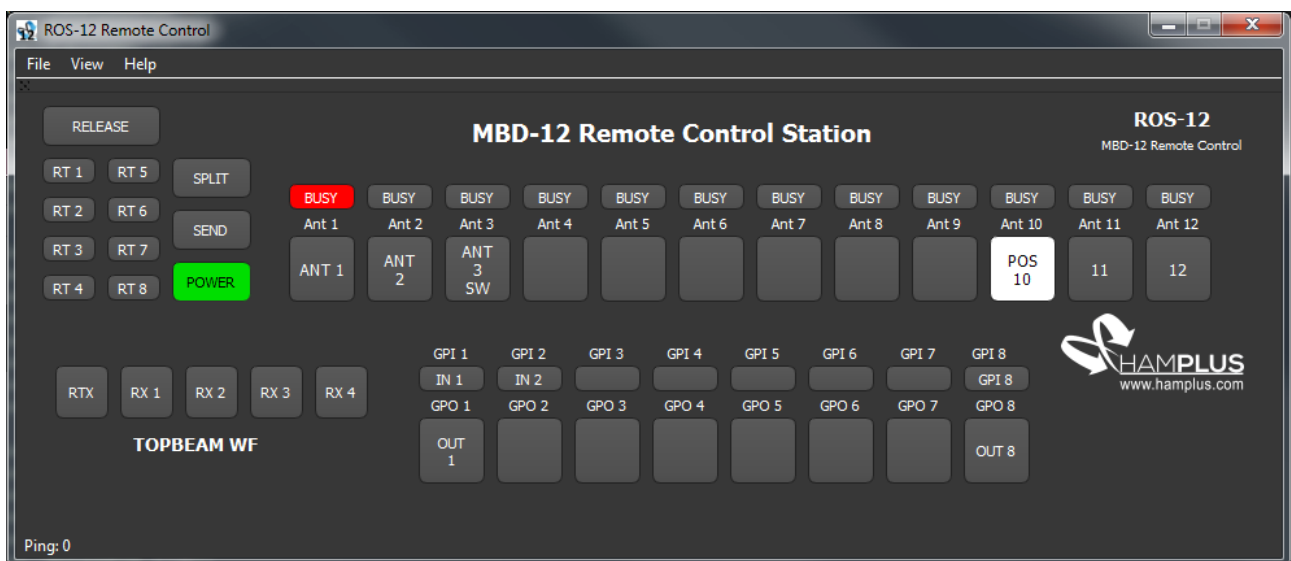
- The user interface (UI) can be customized with text labels using the menu File -->Labels, where can be added texts to all Antenna push-buttons, GPIs, GPOs and an ID text at the superior part. The following two pictures shows the Label Config screen and the UI after applying settings;



Access to the Labels Config



Labels Config Screen

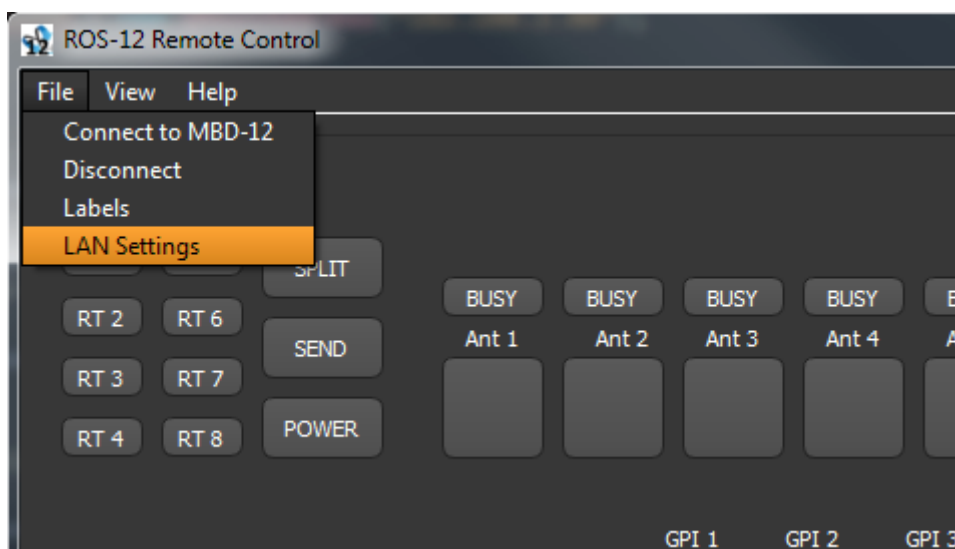


User Interface after customizations

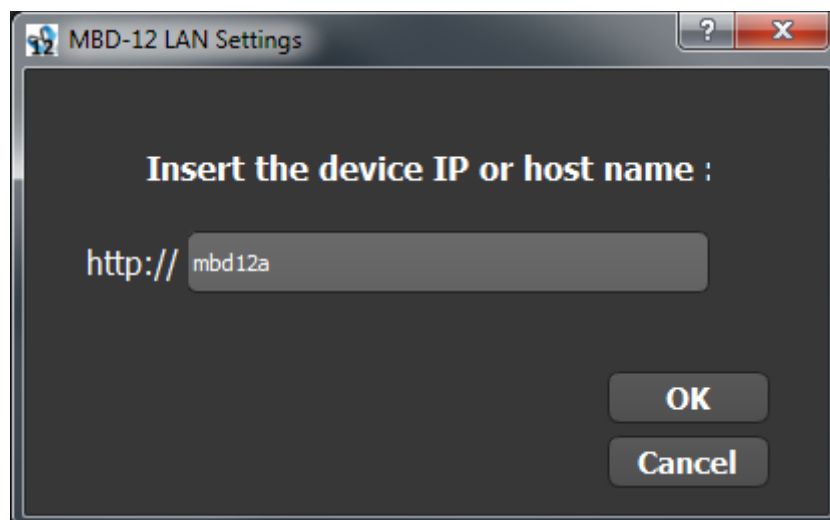


## LAN Settings

On the LAN settings menu (File --> Lan Settings) it's configured the address of the MBD-12 device that will be connected. If you are running it on LAN, it can be accessed via host name directly or IP address (IE: mbd12 or 192.168.2.125).



Access to the LAN Settings Menu



LAN settings set up

If the device will be connected through the internet, the IP must be the external IP or DDNS address plus ":" and the port used for the connection. Check the later section of this document for more information.

## 2 - MBD-12 LAN Configuration Instructions

This section covers the configuration of the MBD-12 for proper operation with the ROS-12 controller. The first step to start to setup LAN connection is to configure the MBD-12.

- 1) Press push-button 1 on the front panel and keep it pressed for 5 seconds;
- 2) Enter in LAN Config by clicking push-button 8 on the blinking panel. The busy position 8 will remain on to indicate that you are currently at LAN config. Key 12 remains blinking and can be used to exit the config mode (all alterations are saved when exit).

This mode allows the user set the device to static or dynamic IP (DHCP), change the host name and also reset the IP to default address.

### 1) DHCP Mode;

By clicking on push-button 1, the LED remains ON, indicating that the device will acquire the IP address using DHCP after boot;

### 2) Static IP Mode;

By clicking on push-button 2, the LED remains on indicating that the device will use a static IP. On this mode, the device will always use a configured IP address. By default, the static IP is 192.168.2.125. It can be changed to any IP, only by sending a request via web-browser. In the example below, the static IP of the device is changed to 192.168.2.126.

**<http://192.168.2.125/?ip=192.168.2.126>**

Note that the request can also be send using the device host name instead of the IP:

**<http://mbd12/?ip=192.168.2.126>**

### 3) Host Name:

On this mode, device's host name can be configured to one of six presets:

- 1) "mbd12"
- 2) "mbd12a"
- 3) "mbd12b"
- 4) "mbd12c"
- 5) "mbd12d"
- 6) "mbd12e"

Once configured, the device can be accessed using it's host name through a web-browser (IE: **<http://mbd12b/>**)

### 6) Reset Static IP.

By pressing push-button 6 during LAN config make the device return to it's default IP address (192.168.2.125). If you have DHCP enabled this change makes no effect at all.



## **FIRMWARE UPDATE**

It's strongly recommended to have MBD-12's firmware up to date in order to proper use of all functionalities of the ROS-12 controller. ROS-12 is supported by firmware version 1.2 or higher.

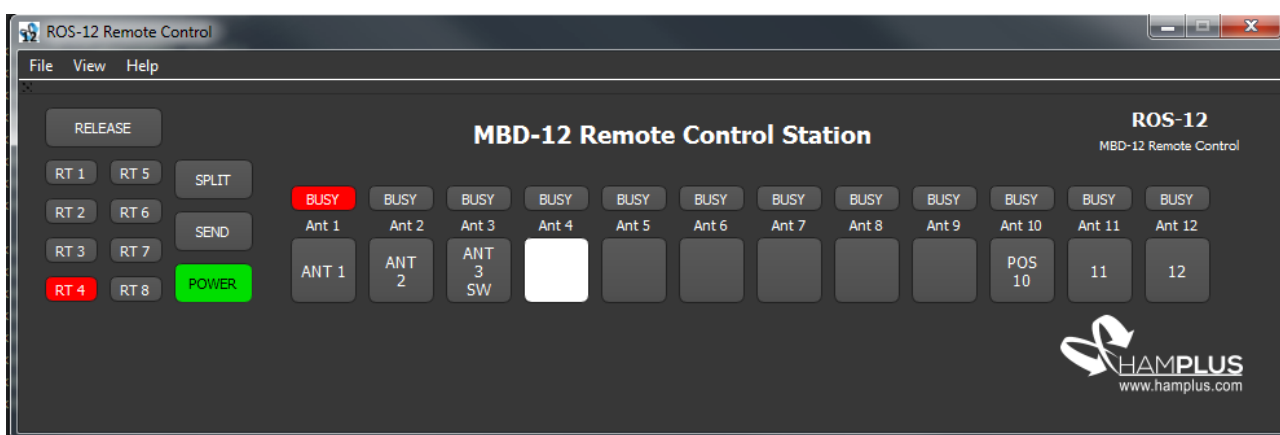
1. Obtain the latest firmware version from [MBD-12's official page](#) [1];
2. Copy the file to the root folder of an usb flash disk. The archive should be named FIRMWARE.BIN
3. Insert the flash disk in the USB Connector at MBD-12 rear panel and press consecutively (and keep pressed) push buttons (9 – 10 – 11 – 12).
4. If the process is done correct, LEDs will turn on and the MBD-12 will reboot after a few seconds and blink the busy LEDs indicating that the firmware update occurred successfully.
5. If the busy LEDs did not blink after the reboot indicates that a problem occurred on the update process. Check if the flash disk is using FAT16 or FAT32 (only works with this 2 file systems) and check if the file named FIRMWARE.BIN is in it's root directory.

### 3 - CONNECTING THROUGH LOCAL NETWORK

The connection via LAN can be done using directly the host name assigned to the device or directly by its IP address. If you are running DHCP mode, it's recommended to access using host name since the IP address can change after a reboot.

After setting up the IP address or host name on the menu LAN Settings (File --> LAN Settings), click on the option "Connect to MBD-12" to start the communication.

If the communication works, power indicator on ROS-12 UI should turn ON and all the indicator status should replicate the MBD-12 front panel.



On the picture above, the ROS-12 UI shows that the MBD-12 is commuted at Antenna 4, shows that Antenna 1 is currently busy (cannot commute to busy positions) and also shows that Rotor 4 is ON.

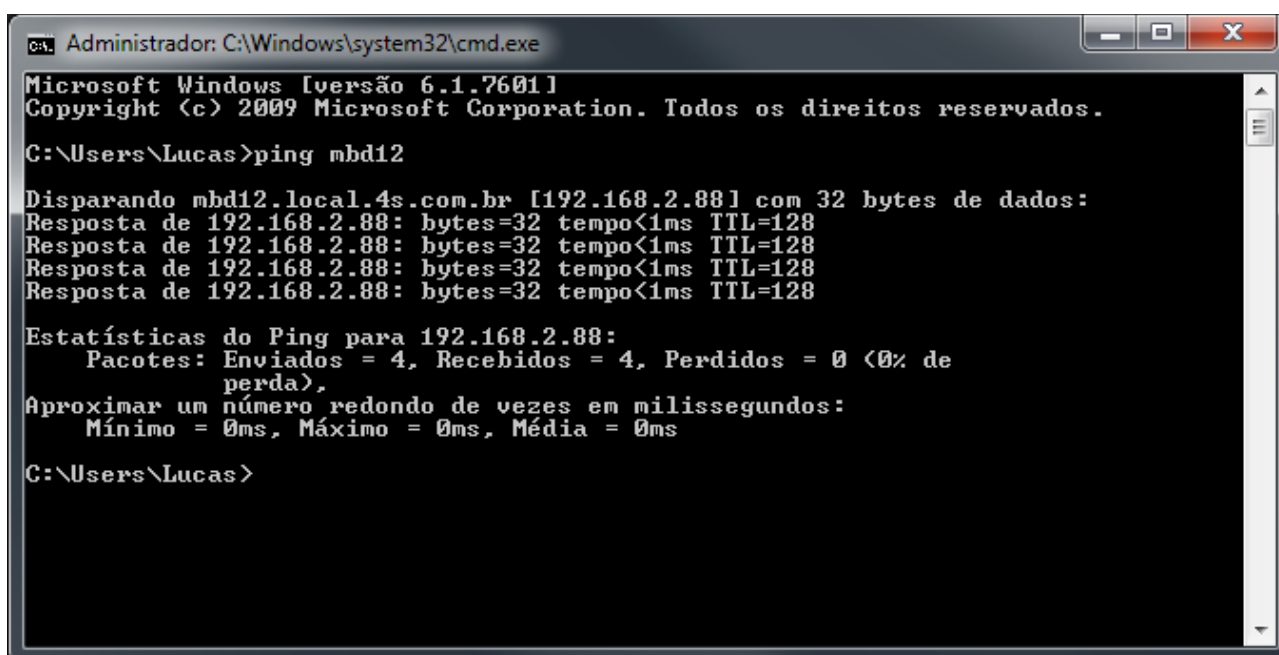


## 4 - CONNECTING THROUGH THE INTERNET

This guide is going to explain all the steps necessary to allow a remote internet connection between the MBD-12 and the Smart Control software. This is done by redirecting (port forwarding) a port in your router directly to the MBD-12 IP address.

We will describe our examples below using port 8090 redirected to MBD-12 port (http - 80).

1. First step is to discover your MBD-12 **device IP address** (in case of running with DHCP enabled). Open the command prompt on Windows and then type ping and then your host name (IE: ping mbd12, ping mbd12a, ping mbd12b, etc). The device ip will be shown right after the command inside brackets;



```
Administrator: C:\Windows\system32\cmd.exe
Microsoft Windows [versão 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. Todos os direitos reservados.

C:\Users\Lucas>ping mbd12

Disparando mbd12.local.4s.com.br [192.168.2.88] com 32 bytes de dados:
Resposta de 192.168.2.88: bytes=32 tempo<1ms TTL=128
Resposta de 192.168.2.88: bytes=32 tempo<1ms TTL=128
Resposta de 192.168.2.88: bytes=32 tempo<1ms TTL=128
Resposta de 192.168.2.88: bytes=32 tempo<1ms TTL=128

Estatísticas do Ping para 192.168.2.88:
    Pacotes: Enviados = 4, Recebidos = 4, Perdidos = 0 (0% de
    perda),
Aproximar um número redondo de vezes em milissegundos:
    Mínimo = 0ms, Máximo = 0ms, Média = 0ms

C:\Users\Lucas>
```

In our case, the device IP address is 192.168.2.88 as shown on the image above.

2. After getting the device IP, next step is to access the router config page to setup the **port forwarding** to the MBD-12 IP address. If you are running more than one MBD-12, each device will need a port. On our examples, we use port 8090 redirected to MBD-12 http port (80). There are several different models of routers in the market, and each has it's way to port forwarding. On the [this link](#) there is a step-by-step guide to make port forwarding on a TP-Link router [2].

The default IP address on TP-Link routers is 192.168.1.1. If you are using a different router, on [this link](#) there is a list containing default IP addresses of most popular brands [3].

3. After the port forwarding settings are finished, the system should already be able to connect through internet.

You can checkout if the port forwarding worked by trying to access the device over the internet:

- Check what is your external IP address by accessing [www.whatismyip.com](http://www.whatismyip.com)
- The address to access your device through the internet will be your external IP address followed by ":" and then the port that you forwarded. If you configured the port 8090 for the

MBD-12 and your external IP is 200.155.1.100, you must connect to the address **200.155.1.100:8090**. The connection can be tested with any web-browser or directly using the MBD-12 Smart Control software.



Insert your address on the ROS-12 Lan Settings (File --> LAN Settings) and click on Connect to start communicating.

**PS:** in case you are testing on the same LAN that the MBD-12 is connected, this will probably not work. On this case, the MBD-12 must be accessed directly with it's host name or local IP address.

## DDNS operation

In order to keep simple and stable to access your device through the internet, it's strongly recommended the use of a dynamic dns (DDNS) service. If you have static IP address, there is no need for DDNS use, except if you want to use for the ease of accessing remotely using a domain name instead of an IP address.

Every time you connect to the internet, your external IP is chosen from a pool of available IP addresses. When a DDNS is configured on a router, the router assumes the responsibility of constantly informing your external IP to the DDNS server, which guarantees that when you connect using a DDNS server it will always know your current IP address. On [this link](#) there is a complete guide for configuring a DDNS server on a TP-Link router [4].

If you are not experienced with DDNS, we suggest using [No-IP](#) [5] since it offers a free service and has a very intuitive setup configuration and a stable operation as well. On [this link](#) there is a configuration guide for most of the popular routers of the market [6]. After setting up the DDNS configuration, from now on you can access your device remotely. For example, if your DDNS address is **user.ddns.net**, you can connect remotely using this address instead of your IP address, and only complementing with ":" and the device port (I.E. **user.ddns.net:8090**).

## REFERENCES:

[1] **Hamplus MBD-12F Official Page:**

<http://hamplus.com/mbd12f.htm>

[2] **TP-Link Port-Forwarding:**

<https://www.noip.com/support/knowledgebase/tp-link-router-port-forwarding/>

[3] **Default Router IP Addresses:**

<https://www.techspot.com/guides/287-default-router-ip-addresses/>

[4] **TP-LINK Wireless Router DDNS Setup:**

<https://www.tp-link.com/en/support/faq/419/>

[5] **No-IP DDNS:**

<https://www.noip.com/>

[6] **No-IP DDNS Router Config:**

<https://www.noip.com/support/knowledgebase/how-to-configure-ddns-in-router/>