

EXTRAS: CONFIGURING THE HOKUYO UST 10LX

THE F1/10 TEAM

INTRODUCTION

This tutorial covers setting up the UST 10LX LIDAR in regard to its network configuration. (You will need access to a windows system with administrator rights for completing this tutorial)

LIDAR SETUP

The LIDAR communicates with the jetson through the Ethernet to USB converter and this connection shows up on the Jetson as a new ethernet connection. Use `'ifconfig'` in the terminal to verify this.

```
$ ifconfig
```

There are now two ethernet connections on the Jetson - one for the ubiquiti and the other for the LIDAR. To make sure we can communicate between these two we have to ensure that they are on the same subnet. Lets start with the default values of the IP for the LIDAR. View the datasheet for the particulars [1].

For this particular tutorial the following ip addresses are used

```
# gateway of ubiquiti network - 192.168.1.1  
# eth1 (ubiquiti network) on jetson - 192.168.1.5  
# eth2 (LIDAR connection) on jetson - 192.168.0.10 - Default values
```

- **STEP 1:** Lets first manually assign the correct IP address to the LIDAR. On the windows system download the URG data viewing tool and the IP changing tool - [2], [3].

Manually assign an ip address to the ethernet network connection of the Windows PC with these values:

```
IP Address 192.168.0.15  
Subnet Mask 255.255.255.0  
Default Gateway 192.168.0.1
```

Once you download these tools, connect the LIDAR to the Windows machine - Use the Benri data viewing tool to verify that your machine has detected the LIDAR and that you can see the data(Fig. 1).

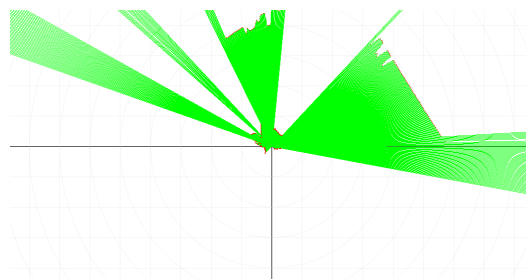


Figure 1: Data as seen on the UrgBenri Data viewing tool

Now, use the ip changing tool to assign the following values to the LIDAR.

```
IP Address 192.168.1.11  
Subnet Mask 255.255.255.0  
Gateway 192.168.1.1
```

Once the dialog box says the ip is 'Updated', disconnect the device from the machine. Change the ethernet ip of the

machine to

```
IP Address 192.168.1.15
Subnet Mask 255.255.255.0
Default Gateway 192.168.1.1
```

Plug in the LIDAR back into the system and make sure you can see visualize the data on the URGBenri tool.

- **STEP 2:** We will now configure the network setup on the Jetson. Create a new ethernet connection in linux4Tegra[4] with these values

```
Connection Name: Hokuyo
IP Address 192.168.1.15
Subnet Mask 255.255.255.0
Default Gateway 192.168.1.1
```

Once you make this new connection, you should be able to plug in the LIDAR and the ubiquiti and be able to connect to both these devices, i.e, ‘*ifconfig*’ should display two ethernet connections - *eth0* and *eth1* with the correct IPs’ for each. (If you were connected to the ubiquiti network through your own systems, you might notice that you get disconnected from the network the moment you connect the LIDAR to the Jetson. We will address this issue in the next step)

- **STEP 3:** We will now setup a bridge network that allows the 2 ethernet connections on the Jetson to coexist. First, install *bridge-utils* on the Jetson.

```
$ sudo apt-get install bridge-utils
```

Once installed follow the enter the listed commands into the terminal(on the Jetson)

```
1. sudo brctl addbr br0
2. sudo brctl addif br0 eth1
3. sudo brctl addif br0 eth2
4. sudo ifconfig br0 192.168.1.2 netmask 255.255.255.0 up
```

(*Note: make sure you already don’t have some existing connection on 192.168.1.2 - If thats the case, just set the bridge network to any other available IP on 192.168.1.xx) After this step, you should be able to see *br0* listed as a connection under when you do *ifconfig*.

- **STEP 4:** You should now be able to connect back to the ubiquiti network from your systems. Use *nmap*[5] to see the different devices connected on your network. In the terminal, type

```
$ nmap -sP 192.168.1.0/24
```

You should be able to view the host names with the IPs of all the devices sharing your network. You must be able to spot the LIDAR and the Jetson as separate devices on this list.

- **STEP 5:** Once you see the devices listed with *nmap*, you should be able to ssh into the Jetson and run

```
$ rosrun urg_node urg_node __ip_address:=192.168.1.11
```

(Note: You should have the urg node package installed when you need to run this node)

```
$ sudo apt-get install ros-indigo-urg-node
```

This should start broadcasting the */scan* topic. From your personal computer, make sure you can echo this topic.

You are all set now to use the LIDAR over network.

REFERENCES

[1] [UST 10LX datasheet](#)

[2] [URG DataViewing Tools](#)

[3] [URG IP changing tool](#)

[4] [Create new ethernet connection](#)

[5] [nmap Tool](#)