

RF Bridge User Manual

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1 Important Note

- Do not use this product outside the country of purchase as it may violate the wireless telecommunication and power regulations of that country.

2 Device Overview

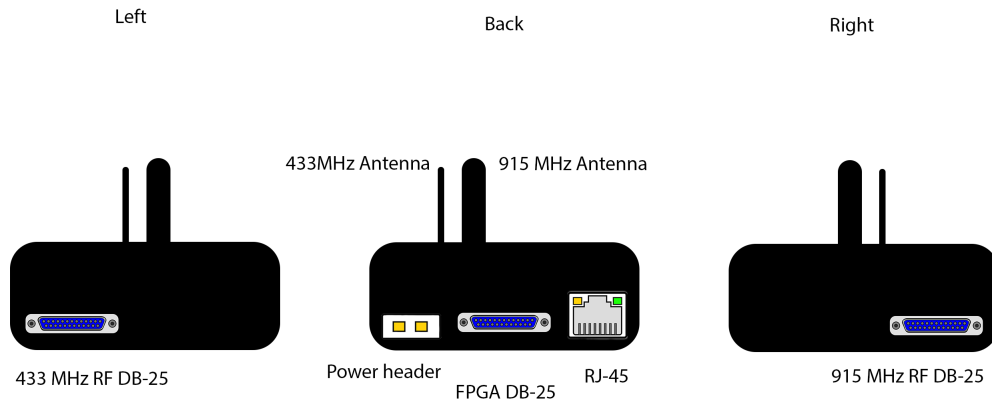


Figure 1: An overview of the RF device

3 Configuring the Device to a Network

The network interface is driven by a Lantronix xPort module. Configuring of the device can be done through the web configuration. To access the web configuration, take the following steps.

1. Power the device and connect it via a CAT cable to a computer or network.
2. Run the `getDeviceIP.sh` script.
3. Enter the MAC address found on the device separating the pairs by colons (:). If the first character of a pair is 0, only enter the non-zero character. If both are zero, enter '0'.
4. When prompted to open the web configuration, type "Y".
5. Leave the username and password credentials blank and press "Log In".
6. You will now be able to access the device settings. Select "Network" from the left menu to configure IP settings. The page will look as shown in Figure 2.
7. In order to configure a static IP address on the device, select the "Use the following IP configuration" radio button.
8. Type the desired IP, Subnet mask in the text boxes below. It is advised to leave the Default Gateway and DNS Server blank.
9. Click the "OK" button at the bottom of the screen, and then the "Apply Settings" button in the left menu. The system will reboot with the newly assigned IP address.

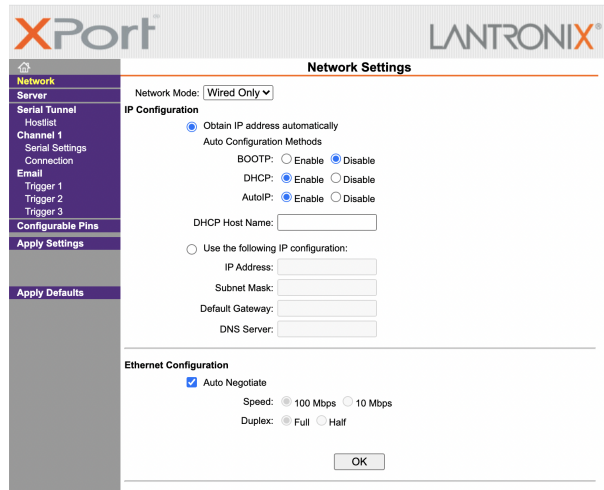


Figure 2: Network settings of the Device

3.1 Identification Troubleshooting

If the `getDeviceIP.sh` script fails, please try the following troubleshooting methods.

1. Ensure the device is powered on and green status LED is lit.
2. If the device was connected directly to a computer, the computer IP address address may need to be changed to the following static IP format:

IP 169.254.X.X

Subnet Mask 255.255.0.0

Where an 'X' can be any number between 1-254. When the devices auto IP is enabled and it is connected directly to a computer it may take some time for a self assigned IP to resolve and show on the network.

3. Check your devices firewall settings.

Full instructions on configuration of the xPort module and further troubleshooting can be found at the Lantronix Website. Please note changing of settings not mentioned in this manual may cause unexpected behaviour of the device.

4 Configuring Other Network Interface Options

This design uses TCP protocol to communicate with other devices. UDP protocol can be used at the users own risk and configuration instructions can be found at the Lantronix Website.

4.1 Changing the TCP Port

To change the TCP port take the following steps

1. Follow steps 1 to 5 in Section 3 to open the network configuration options.
2. Select "Connection" under "Channel 1" in the left menu.
3. Find the "Port" option and change to the number of your choice.
4. Click the "OK" button at the bottom of the screen, and then the "Apply Settings" button in the left menu. The system will reboot with the new settings.

5 Configuring the FPGA Through JTAG

To flash the FPGA configuration permanently to the module the following steps should be taken.

1. Power the device and connect the DB-25 end of the DB-25 cable to the FPGA DB-25 connector on the device (see Figure 1) and the other end to the computer.
2. Follow the instructions to download and install Quartus Prime Lite [here](#)
3. Run the Quartus Programmer software. You will be presented with the screen shown in Figure 3.

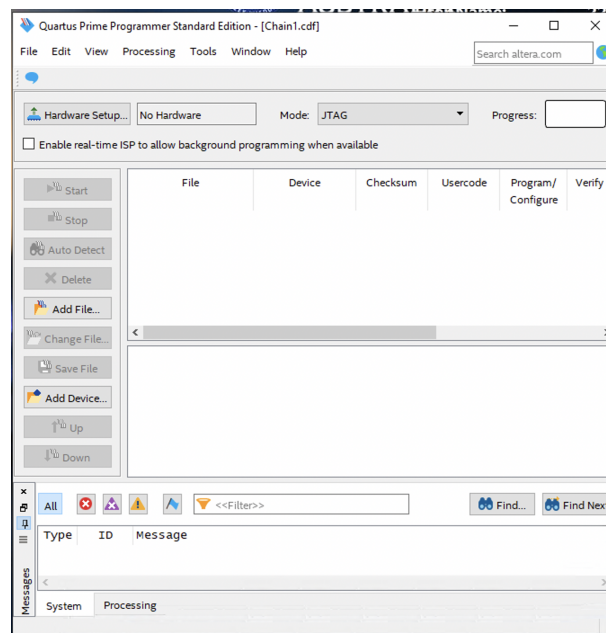


Figure 3: Programmer Interface Upon Launching

4. Click the “Add File...” button on the left menu and navigate to the .pof file and click “Open”.
5. Tick the checkbox under the “Program/Configure” heading in the table.
6. Click “Hardware Setup” in the top left corner and select the available device.
7. Ensure the mode is set to “JTAG”.
8. Click the “Start” button on the left and wait until the progress bar in the top right reaches 100 and reads “Success”.
9. Disconnect the DB-25 connector.

6 Configuring the CC1310

To flash the CC1310 configuration to the chip:

1. Follow the instructions to download and install Code Composer Studio [here](#).
2. Import the transmit or receive CC1310 project files into CCS as shown in Figure 4.

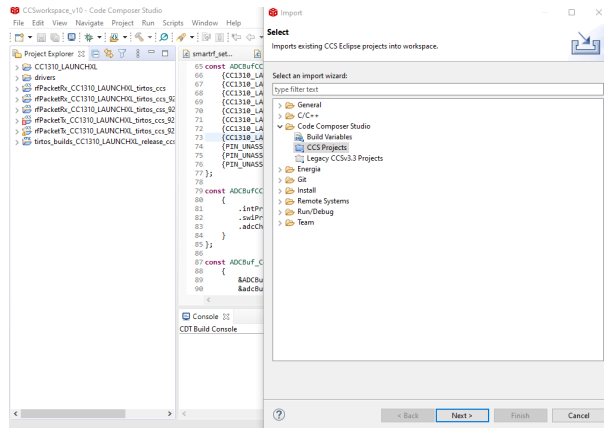


Figure 4: Importing the Project Files

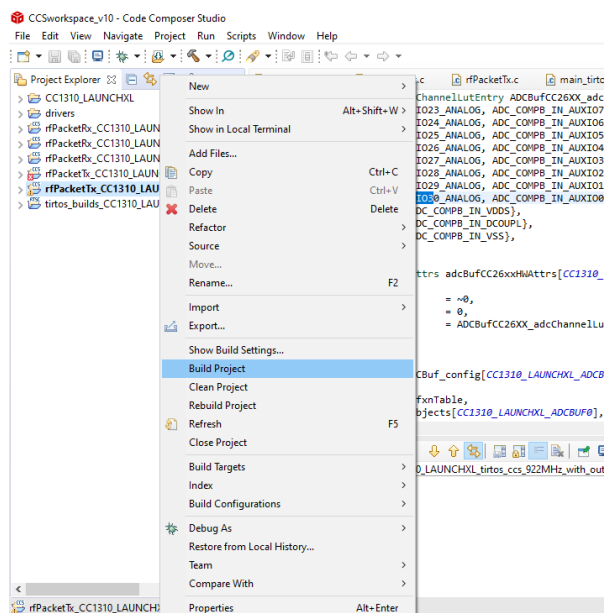


Figure 5: Building Project

3. Build or rebuild project to compile as shown in Figure 5.
4. If the build is successful a notification such as the one shown in Figure 6 will be displayed.

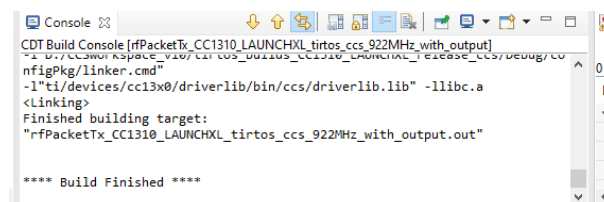


Figure 6: Successful build notification

5. Finally, start debug session to flash the program into CC1310 as in Figure 7.

These steps will need to be repeated for the transmitter and the receiver. The device utilises two distinct radio frequency bands, in the 433 MHz range and the 915 MHz range. The design

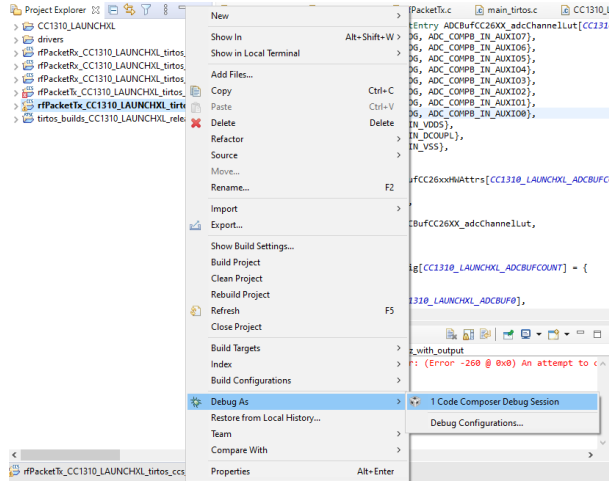


Figure 7: Begin debugging session

team suggests the following configuration in Table 1. Ports to load these configs are found in Figure 1

Table 1: Suggested RF configuration

	Server Device	Remote Device
433 MHz	Transmit	Receive
915 MHz	Receive	Transmit

7 Installing the Device

7.1 Installing the Remote Device

7.1.1 Powering the device

In order to power the device, connect a 10V to 36V DC power supply available from the equipment to the power and ground headers on the device PCB.

7.1.2 Connecting the device to equipment

Connection to the equipment can be made using a CAT cable connecting one end to the RJ-45 port on the device and the other to the RJ-45 port on the equipment.

7.1.3 Securing the device on the equipment

Mounting the device will depend on the nature of equipment. Please consider the following when finding a mounting point on mobile equipment.

- Do not mount the device on a surface which may rotate or extend beyond the length of the attached cables as this may cause damage to the device or equipment.
- Do not mount the device in an area which may be exposed to impacts.
- Do not mount the device in a metal enclosure as this may reduce the communication range of the device.

7.2 Installing the Static Device

In order to power the device, connect a 10 V to 36 V AC/DC power converter to the power and ground headers on the device PCB and connect to the mains power.

7.2.1 Connecting the device to equipment

Connection to the network can be made using a CAT cable connecting one end to the RJ-45 port on the device and the other to a network switch or computer.

8 Troubleshooting

The device is equipped with a reset button which will reset all the sub-systems of the device. If prior troubleshooting methods have been tried use this reset button to reset the device.

9 Conclusion

After following the above steps, the device will be fully configured. TCP connections can be established on both the mobile equipment and server side to pass data between the two devices over wireless radio transmission.