N210 Device Recovery

Contents

AN-325

Date	Author	Details
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This application note covers the details of recovering your N200/N210.

This application will provide insight into troubleshooting your N200/N210 and cover the process of recovering the device by flashing the FPGA image with an external JTAG programmer.

The User Manual page for the N200/N210 is at the link below.

http://files.ettus.com/manual/page_usrp2.html

The LEDs on the front panel can be useful in debugging hardware and software issues. The LEDs reveal the following about the state of the device:

- LED A: transmitting
- LED B: MIMO cable link
- LED C: receiving
- LED D: firmware loaded
- LED E: reference lock
- LED F: CPLD loaded

Its possible to put the device into an unusable state by loading bad images. Fortunately, the USRP-N Series can be booted into a safe (read-only) image. Once booted into the safe image, the user can once again load images onto the device.

The safe-mode button is a pushbutton switch (S2) located inside the enclosure. To boot into the safe image, hold-down the safe-mode button while power-cycling the device. Continue to hold-down the button until the front-panel LEDs blink and remain solid.

When in safe-mode, the USRP-N device will always have the IP address 192.168.10.2.

For more information on using external tools to unbrick your device when even this fails, see the section below Unbricking an N-Series Device.

- JTAG programmer: please connect it to the JTAG connector on the motherboard as shown in the attachment
- Xilinx 'iMPACT': launch and cancel the new project wizards. You should be left with the screen which shows a single FPGA chip in the main document (auto-detected by the programmer).

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Download the latest FPGA images, e.g. using:

```
$ uhd_images_downloader
```

There is a sub-directory in the archive below the `firmware/images` called '`bit`'. Use Impact to load `usrp_n210_r4_fpga.bit` via the programmer (the filename may be different depending on your device type and revision).

The USRP should now be able to communicate on the network (you'll see some LEDs light up and network link be established). The next step is to flash the device and program the serial number. Both these steps can be done with UHD (the JTAG step is complete).

To be sure, run `uhd_find_devices` and it should appear in the list - remember this IP address for the image loader utility (should be 192.168.10.2 - make sure your network settings enable to you communicate with that subnet!).

The first step is to flash the unit's safe-mode image, and then do a normal flash - both with the UHD Image Loader utility.

Make sure you have UHD installed, and the images from before, and follow the instructions in Load the Images onto the SD card (USRP2 only). You can combine the `--fw-path` and `--fpga-path` arguments into the single invocation of the image loader.

You will probably use "`usrp_n210_fw.bin`" for the firmware and "`usrp_n210_r4_fpga.bin`" for the FPGA image parameters (use the full/relative file path if your current directory is not that of the images).

```
$ uhd_image_loader --args="type=usrp2,addr=192.168.10.2,overwrite-safe" --fw-path=usrp_n210_fw.bin --fpga-path=usrp_n210_r4_fpga.bin
```

Use the overwrite-safe option the first time, and then repeat without it for the second time. Don't forget to power-cycle the device after it has been flashed.

You can change the normal IP address by following the instructions in Change the USRP2's IP address.

If you run `uhd_usrp_probe`, you can see the EEPROM keys at the top. Example:

```
Mboard: N210r4
 hardware: 2577
 mac-addr: a0:36:fa:25:34:a7
 ip-addr: 192.168.10.4
 subnet: 255.255.255.255
 gateway: 255.255.255.255
 gpsdo: none
 serial: EAR14U7UP
```

If you need to change any of there, you should then be able to run:

```
$ usrp_burn_mb_eeprom --key=<key> --val=<val>
```

to set the 'mac-addr', 'serial' and 'Mboard'.

Listed below are some specific things that you can check to verify whether or not your N200/N210 hardware is working correctly. If the answer to any of the questions listed below is "no", then there is probably a hardware problem.

- Does the fan spin?

- Do any of the LEDs on the front panel light up? Which ones? (http://files.ettus.com/manual/page_usrp2.html#usrp2_hw_leds)

- Are the lights on the Ethernet port flashing, when the N210 is connected to the host computer? Note that the N200/N210 must be connected to a 1 Gigabit Ethernet port. A 100 Mbps Ethernet port will not work.

- Check the voltages on these connectors on the motherboard: J105 (should be 2.5V); J104 (should be 3.3V); J107 (should be 1.2V). Do you see the correct voltages on those connectors?

- Does the LED at D203 on the motherboard light up? If you're holding the N210 such that the front panel is facing you, then D203 is located near the left connector for the daughterboard.

In this example, the Xilinx Platform Cable USB model DLC9G was used. This or a comparable JTAG programmer should enable device recovery.

- Xilinx Platform Cable USB Datasheet: https://www.xilinx.com/support/documentation/data_sheets/ds300.pdf