NH7020 EXPANSION USERS MANUAL

Version	Time	Description	Notes
1.0	2020/4/20	First Release	

1. Attention.

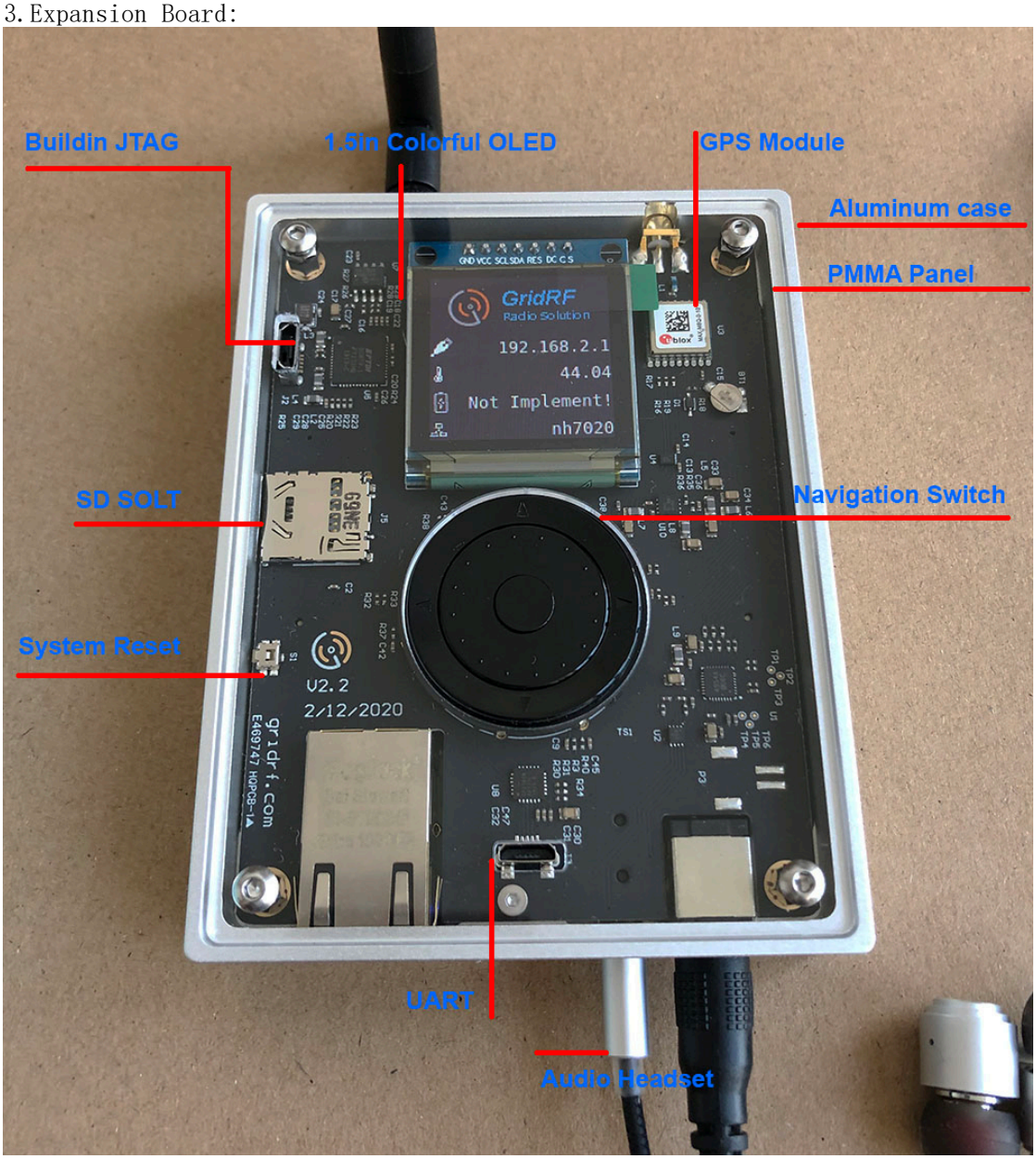
The circuit board for this product is ESD sensitive. Be mindfull of electro static discharge. Maintain adequate grounding if handeling the PCB of this product.

Unit ships with a protective film over its clear front panel; see below how to remove it

2. Product Introduction.

The NH7020 expansion board provides the NH7020 a wealth of usefull enhancements. This expansion board comes equipt with a JTAG debugging port, UART port, 32-bit sound card, Series 8 U-BLOX GPS module, 1.5 inch OLED screen SD Slot and round button interface.

3. Expansion Board:

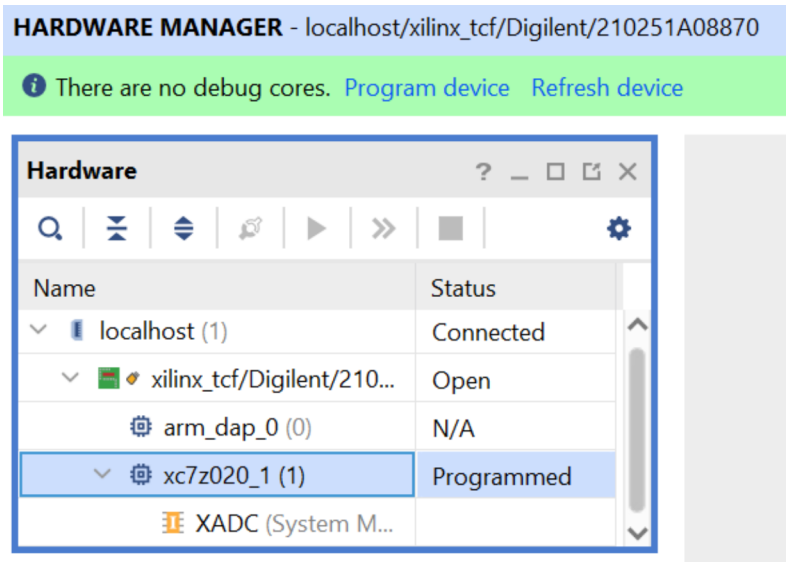


4. Function and use.

1. JTAG debugging:

Connect USB cable to the JTAG port, select JTAG port from within VIVADO hardware manager

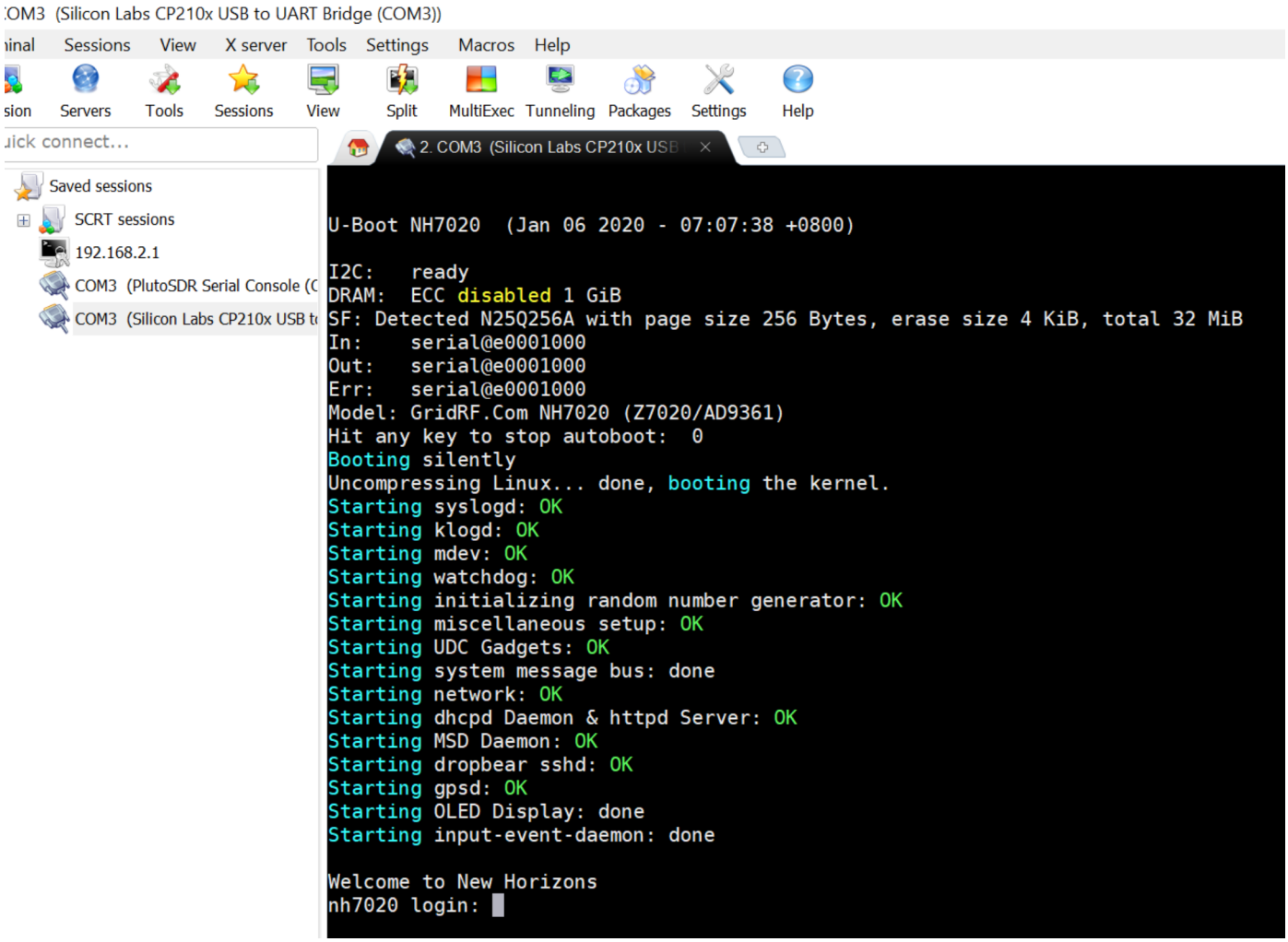
See image below:



In this window users can select to program the non-volatile FLASH or FPGA.

2. UART serial port debugging:
   Connect a USB cable to the UART port.

   The NH7020 will output information after powering on; This interface is connected to the internal ttyPS0, and has SHELL (Equivelent to LINUX Command line), see below:



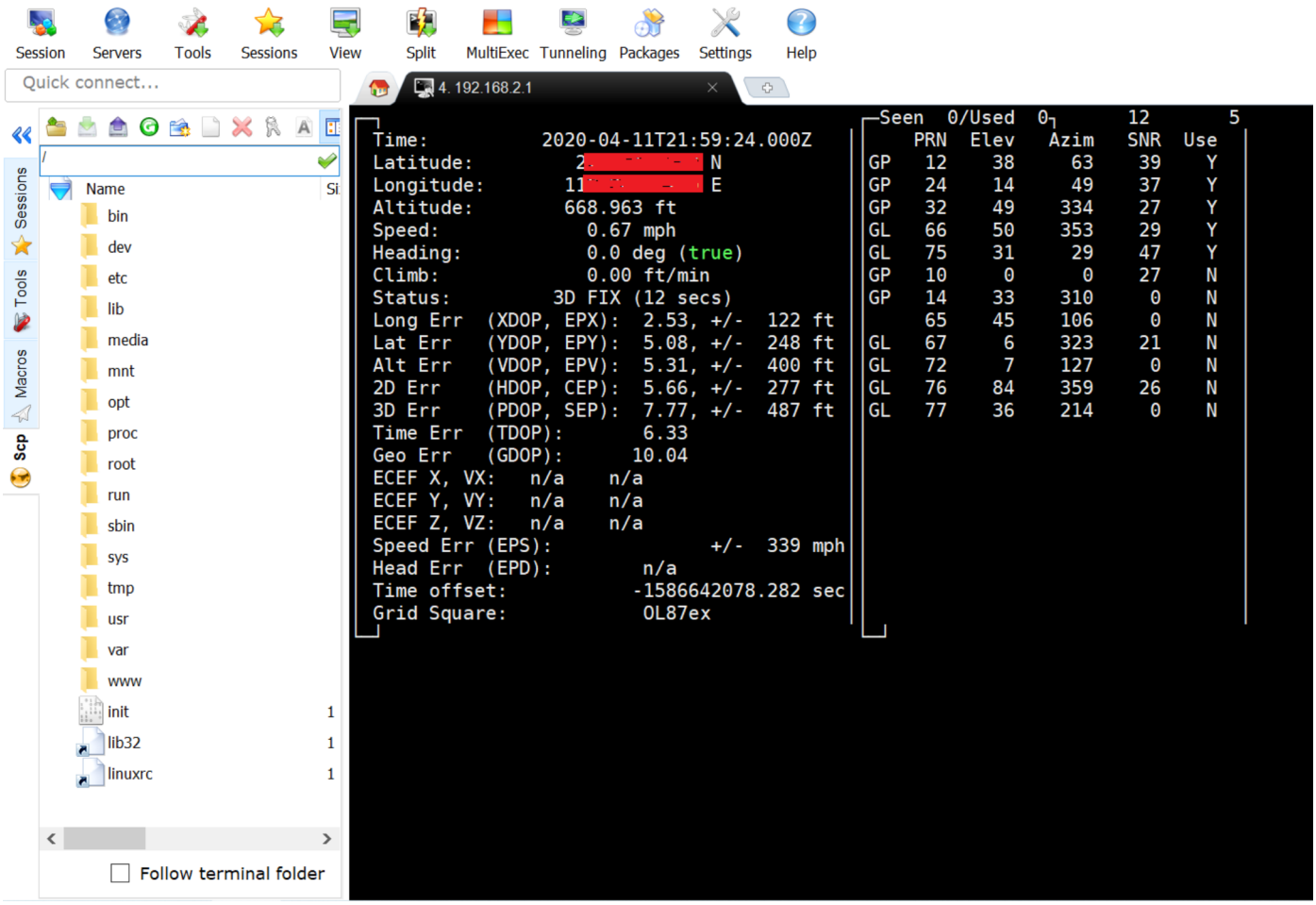
3. Sound Card Output:

   Insert the headphone cable into the AUDIO Headset port,
   enter the following commands into the command line:

speaker-test -c 2
The built in ALSA application will test both headphone output channels.

The built in FM application can be used to demodulate stereo FM.
Enter at the command line: softfm -f 105.4e6 -s 521000
The FM application will demodulate FM and output to the AUDIO Headset port.
Note: The FM application only uses the RX1 input port, be sure to have an antenna installed on RX1 before using the application.
Use the command: softfm –h for a detailed list of available parameters.

4. GPS Application:
Insert the GPS antenna into the GPS antenna port, Wait for the PPS LED to begin flashing, enter this at the command line: cgps -s
The systems gpsd application will display current GPS location insformation, see below:



5. User Interface:
   1. The RESET button on the expansion board soft resets the system.
      the unit will power on and be configured.
   2. The four arrow directional buttons and center button is used as general pourpose input.
      Unit has four directional buttons and a center ENTER button,
      The center button is an encoder that could be rotated clockwise or couter clockwise,
      it is configured as gpio-key rotary.
   3. Color OLED screen:
      This screen can be configured as you would a standard FrameBuffer, the driver fb0 was built in QT5 as was the user interface.

5. How to develop for this platform.
   1. OLED interface:
      The following sample implements an inteface using QT5:

https://github.com/gridrf/rfsom-box-gui/tree/master/fft-plot

2. Sound Card:
   The built in ALSA driver is the standard LINUX ALSA driver,
   A Sample program could be found in buildroot/package/softfm.
   Source Code：https://github.com/gridrf/softfm_nh7020/tree/nh7020
   Binaries could be generated in UBUNTU or WINDOWS using cmake.

   The NH7020 provides a cross platform wireless solution.

3. GPS:
   Please refer to：http://savannah.nongnu.org/projects/gpsd/

4. Break free from cookie cutter source code:
   Configure the unit to take full advantage of the provided hardware schematics.

6. Product Service.
   Technical Email：tech@gridrf.com | QQ：120986679

7. Documentation.
   Standardized to align with CC BY 3.0（https://creativecommons.org/licenses/by/3.0），
   Any and all modification must credit the original source.

   The original source for this project is gridrf.com and the world famous gridrf team，
   Any and all documents are also applicable to this agereement.