1. Plug in the Time Card to your Linux machine PCIe slot and turn on the system
2. Once the PC is booted up, open a terminal

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1. Run lspci | grep Meta , verify you see a device listed like this

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1. Run modprobe ptp\_ocp , then dmesg | grep ptp\_ocp . Verify you see messages from ptp\_ocp in the output

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1. To verify the GPS module, run sudo tio -b 115200 /dev/ttyS5 , using the /dev/ttyS device listed as GNSS: in the dmesg output, as shown here

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1. You should see messages scrolling , this is the binary output from the GPS receiver which is good

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1. Use ctrl+t then q to quit out of tio

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1. Verify the GPS fully
   1. If this is the first time doing this, run these commands to install
      1. sudo yum install python3
      2. sudo yum install python3-tkinter
      3. sudo python3 -m pip install --upgrade pip
      4. sudo python3 -m pip install --upgrade Pillow
      5. sudo python3 -m pip install pygpsclient
2. Run su to enter root, enter your root password

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1. Run pygpsclient , a GUI will pop up

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1. Select the GNSS /dev/ttyS device used earlier in TIO , in my example it is /dev/ttyS5 , and change the Rate bps to 115200

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1. Press the USB/UART button to connect

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1. If you have a GPS antenna connected, you should see full GPS information from the device, like this example. If no GPS antenna is connected, you should at least see some <UBX messages in the text box. This will fully verify the GPS operation

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1. Close out of the PyGPSClient
2. To verify all the SMAs are working properly , run the following commands
   1. sudo echo OUT: PHC >> /sys/class/timecard/ocp0/sma1
   2. sudo echo OUT: PHC >> /sys/class/timecard/ocp0/sma2
   3. sudo echo OUT: PHC >> /sys/class/timecard/ocp0/sma3
   4. sudo echo OUT: PHC >> /sys/class/timecard/ocp0/sma4
3. Measure the four SMA outputs on an oscilloscope. You should see a 1Hz signal coming out of every SMA
4. To verify the frequency signal, run the following commands
   1. sudo echo OUT: 10Mhz >> /sys/class/timecard/ocp0/sma1
   2. sudo echo OUT: 10Mhz >> /sys/class/timecard/ocp0/sma2
   3. sudo echo OUT: 10Mhz >> /sys/class/timecard/ocp0/sma3
   4. sudo echo OUT: 10Mhz >> /sys/class/timecard/ocp0/sma4
5. Measure the four SMA outputs on an oscilloscope. You should see a 10MHz signal coming out of every SMA

This verifies the FPGA, the oscillator, and the GPS, verifying the time card is fully operational.