



## Technical Note: GPS/GNSS Simulators

### Simulate Now Aids Testing Without a Cold Reset

#### Background

When testing a receiver with a GPS/GNSS simulator, it is necessary to perform a reset on the receiver. Normally, a cold reset is required in order to fully clear the data that may be retained from its last use: date/time, position, and constellation information (almanac and ephemeris). This allows the simulation scenario to have different date/time and position, and the corresponding constellation information, as would be expected when testing different scenarios. A cold reset normally requires a specific command or button-press-combination to be performed. Resetting the power on a receiver usually does not perform a cold reset. Power cycling normally performs a warm reset.

Reset	Date/Time	Position	Ephemeris	Almanac
Cold	Cleared	Cleared	Cleared	Cleared
Warm	Retained	Cleared	Cleared	Retained
Hot	Retained	Retained	Retained	Retained

When a GNSS receiver is embedded in a product or is being tested on an assembly line, cold resetting a receiver is not always easy or practical. Pendulum GPS/GNSS simulators have the ability to “Simulate Now”. In most cases this eliminates the need to perform a cold reset and allows the receiver to operate with simulated signals with a warm reset. The simulation will use the current date/time to match the receiver. It will also match its almanac data. It will generate satellite data based on the simulated position to test a receiver without requiring a cold reset.

#### Simulate Now Requirements

Simulate Now is available in firmware version 5.5.1 or higher. It requires a continuous internet connection. When a simulator is configured to use Simulate Now, it automatically downloads hourly ephemeris data and will synchronize the scenario date/time to an NTP server. Simulate Now is currently only available for GPS satellite simulation. Contact us if you are interested in this feature for other GNSS constellations.

#### Configuring Simulate Now

```
System Information
  Model: G5G-62 Multiband 80010000
  Serial num: 200082
  Firmware: 05.5.4
  Oscillator: OCXO
  Options: 48 16 32 SBAS L2 L2C TRA...
  Free storage: 70 MB
```

Verify Simulate Now is installed. In the Options > Show System Information menu, verify the firmware is 5.5.1 or greater. With Options highlighted, press enter. Verify that OPT-NOW is listed as installed.

```
Options
OPT-L2, GPS L2, installed
OPT-L2C, GPS L2C, installed
OPT-MP, Multipath, installed
OPT-NOW, Simulate Now, installed
OPT-PPS, PPS Output, installed
OPT-SBAS, SBAS, installed
```

If you feel you should have the feature installed but you do not, please contact technical support.

Set the Network IP address. In the Options menu navigate to – Interface and Reference > Network and press enter. Set Obtain IP autom. to Yes if you want to obtain an address via a DHCP server, and No to set the address information manually. The simulator will use this address and access the internet. If a proxy server is needed to allow the unit to access the internet, navigate to Interface and Reference > Proxy and enter the information for the proxy server.

```

Network configuration
Obtain IP autom. : Yes  ↕
IP address : 010.002.100.050/16
IP gateway : 010.002.001.001
DNS address : 010.001.001.020
NTP server : Not set
    
```

Set the NTP server. In the Options menu navigate to Interface and Reference > Network > NTP server and press enter. Set the NTP server address. If no NTP server is available on the local network, it is possible to use an Internet time server instead. time.nist.gov allows access to multiple NIST time servers. Also verify the current GPS to NTP (UTC) offset is 16 seconds and there has not been a leap second since June 2012.

```

NTP configuration
NTP server address :
GPS to NTP Offset : 16 sec
    
```

## Using Simulate Now in a Scenario

In order to use Simulate Now simply configure the scenario to set the time to NTP and the Ephemeris to download:

1. Select the scenario to edit.
2. On View 1 of the scenario edit screen, use the right arrow to highlight the word Set in the Start time: line. Press the down arrow to change Set to NTP. Press Enter. Note: if an NTP server has not been properly configured, or is unreachable, an error message will be shown and Set will be selected again.

```

Configure:GPSStatic

Start time : 16 / 05 / 2013 14:00 NTP ↕
Duration : 07d 00h 00min ↕
Latitude : N43° 4.9876'
Longitude : W077° 35.3445'
Altitude : 169.9m
View 1/8
    
```

3. Press the view button until the view to configure Trajectory, Ephemeris, Antenna model, Event data, and Leap Seconds is shown. (varies by model and installed options)
4. Highlight Ephemeris and press Enter. Select Download and press enter so the x is next to Download. Press Exit. Download now appears next to Ephemeris.

```

Configure:GPSStatic

Trajectory : Static  ↕ ✕ ↕
Ephemeris : Download
Antenna model : Zero model  ↕
Event data : None  ↕
Leap Seconds : 0
View 7/8
    
```

5. Configure the rest of the scenario as desired and run the simulation while the unit is connected to the internet.