



## Configuring GPS

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This chapter describes the GPS input and how to configure it.

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## About GPS

The router can receive 1PPS, 10 MHz, and ToD signals from an external clocking and timing source. The three inputs are combined as a Sync-2 interface to form the external timing source or the GPS input.

The GPS front panel connector details are:

- ToD—RS422 format as input
- 1PPS—RS422 or DIN connector as input
- 10MHz—DIN connector as input

GPS input starts only when all the three signals – 1PPS, 10MHz, and ToD are UP.



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**Note** Unlike the Ethernet interface, the Sync-2 interface cannot receive or transmit QL. Ensure that you assign a QL value to the Sync-2 interface.

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By default, 1PPS and 10MHz are in output mode. ToD output mode is not configurable.

## Guidelines and Limitations for GPS

GPS has the following guidelines and limitations:

- Beginning with Cisco NX-OS Release 10.3(2)F, the GPS input is supported only on the Cisco Nexus 93180YC-FX3 switch with following limitations:

- The ToD output is not supported.
- RS422 ToD input is not supported.
  - GPS without RS422 TOD input can be used only for frequency and phase synchronization.

## Configuring GPS Settings for the Grandmaster Clock

Use this procedure to enable the GPS as input.

### Procedure

|                    | Command or Action  | Purpose  |                    |        |       |              |      |                  |                    |        |       |              |     |            |
|--------------------|--|--|--------------------|--------|-------|--------------|------|------------------|--------------------|--------|-------|--------------|-----|------------|
| Step 1             | <b>configure terminal</b><br><br><b>Example:</b><br><pre>switch# configure terminal<br/>switch(config)#</pre>  | Enters global configuration mode.  |                    |        |       |              |      |                  |                    |        |       |              |     |            |
| Step 2             | <b>clock-interface sync 1/1</b><br><br><b>Example:</b><br><pre>switch(config)# clock-interface sync 1/1<br/>switch(config-clk-if)# port-parameters<br/>switch(config-clk-params)#</pre>                                      | Enter the GPS clock configuration mode.  |                    |        |       |              |      |                  |                    |        |       |              |     |            |
| Step 3             | <b>gps-input tod-format value pps-input value</b><br><br><b>Example:</b><br><pre>switch(config-clk-params)# gps-input<br/>tod-format ntp4 pps-input ttl<br/>switch(config-clk-params)# exit<br/>switch(config-clk-if)#</pre> | <p>Enables the GPS as input and configures the source for PPS input and format for the ToD input.</p> <p>Supported ToD formats are:</p> <table><tr><th>Incoming ToD Input</th><th>Format</th></tr><tr><td>cisco</td><td>ASCII format</td></tr><tr><td>ntp4</td><td>NTP Type4 format</td></tr></table> <p>Supported PPS input formats are:</p> <table><tr><th>Incoming PPS Input</th><th>Format</th></tr><tr><td>RS422</td><td>RS422 format</td></tr><tr><td>TTL</td><td>TTL format</td></tr></table> | Incoming ToD Input | Format | cisco | ASCII format | ntp4 | NTP Type4 format | Incoming PPS Input | Format | RS422 | RS422 format | TTL | TTL format |
| Incoming ToD Input | Format   |  |                    |        |       |              |      |                  |                    |        |       |              |     |            |
| cisco              | ASCII format   |  |                    |        |       |              |      |                  |                    |        |       |              |     |            |
| ntp4               | NTP Type4 format   |  |                    |        |       |              |      |                  |                    |        |       |              |     |            |
| Incoming PPS Input | Format   |  |                    |        |       |              |      |                  |                    |        |       |              |     |            |
| RS422              | RS422 format   |  |                    |        |       |              |      |                  |                    |        |       |              |     |            |
| TTL                | TTL format   |  |                    |        |       |              |      |                  |                    |        |       |              |     |            |

|               | Command or Action   | Purpose  |
|---------------|---|--|
| <b>Step 4</b> | <b>frequency synchronization</b><br><b>Example:</b><br><pre>switch(config-clk-if)# frequency synchronization switch(config-clk-freqsync)# selection input switch(config-clk-freqsync)# wait-to-restore 0 switch(config-clk-freqsync)# exit switch(config-clock-if)#</pre> | Configures the frequency synchronization on GPS. |

## Verifying the GPS Configuration

After performing the GPS configuration tasks, use this reference to check for configuration errors and to verify the configuration.

### **show clock-interface**

The output of this command displays details of the GPS clock configuration.

The following is an example of the output of the **show frequency synchronization** selection command:

```
switch(config-clk-if)# sh frequency synchronization selection
=====
Selection point: System Clock (T0) Selector (2 inputs, 1 selected)
Last programmed 00:53:56 ago, and selection made 00:53:35 ago
Next selection points
Node scoped :
Uses frequency selection
Used for local line interface output
S Input Last Selection Point QL Pri Status
== =====
Internal0[1] n/a SEC 255 Available
11 Sync1[1] n/a PRC 100 Locked
=====
Selection point: IEEE 1588 Clock Selector (2 inputs, 1 selected)
Last programmed 00:53:56 ago, and selection made 00:53:55 ago
Next selection points
Node scoped :
Uses frequency selection
S Input Last Selection Point QL Pri Status
== =====
21 Internal0[1] n/a SEC 255 Holdover
Sync1[1] n/a PRC 100 Unmonitored
=====
switch(config-clk-if)#
```

When the front panel timing LED is Green, it indicates that the GPS is configured and 1PPS, ToD, and 10M inputs are valid.

Following is the default LED status for GPS Timing based on the input to the device:

|        |       |   |
|--------|-------|---|
| TIMING | Off   | GPS config and GPS port is down. Time-of-day (ToD), 1PPS, and 10-MHz ports are not provisioned or disabled. |
|        | Amber | ToD, 1PPS, and 10-MHz signals are not valid.  |
|        | Green | GPS port is up. ToD, 1PPS, and 10-MHz signals are valid.  |