Configuring GPS

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

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Global Positioning System

The router can receive 1PPS, 10 MHz, and ToD signals from an external clocking and timing source.

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 Global Positioning System (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.

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.

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

Guidelines and limitations for GPS

The guidelines and limitations for GPS are:

- Beginning with NX-OS Release 10.3(2)F, the GPS input is supported only on the Nexus 93180YC-FX3 switch with these limitations:
  - The Time of Day (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.

Configure GPS settings

Use this procedure to configure GPS settings for the grandmaster clock and enable GPS as input.

Procedure

Step 1 Enter global configuration mode using the **configure terminal** command.

Example:

```
switch# configure terminal
switch(config)#
```

Step 2 Enter the GPS clock configuration mode using the **clock-interface sync 1/1** command.

Example:

```
switch(config)# clock-interface sync 1/1
switch(config-clk-if)# port-parameters
switch(config-clk-params)#
```

Step 3 Enable the GPS as input and configure the source for PPS input and format for the Time of Day (ToD) input using the **gps-input tod-format** *value* **pps-input** *value* command.

Example:

```
switch(config-clk-params)# gps-input tod-format ntp4 pps-input ttl
switch(config-clk-params)# exit
switch(config-clk-if)#
```

Supported ToD formats are:

Incoming ToD Input	Format
`cisco`	ASCII format
`ntp4`	NTP Type4 format

Supported PPS input formats are:

Incoming PPS Input	Format
RS422	RS422 format
TTL	TTL format

Step 4 Configure the frequency synchronization on GPS using the **frequency synchronization** command.

Example:

```
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)#
```

Commands for verifying 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.

This is an example 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.

This table shows 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.