



Appendix

Certain troubleshooting aids of the Cisco NCS 540 enable you to perform these tasks that assist the troubleshooting process:

- [LEDs, on page 1](#)
- [System Specifications, on page 6](#)

LEDs



Note The Cisco NCS 540 Router LEDs are similar for most of the variants, and any differences between the routers are specifically called out.

Router LEDs

All the data port LEDs in the Cisco NCS 540 Router is at the front panel. There are 5 LEDs that reflect the different statuses of the system.



Note The following table is applicable only for Cisco N540-24Z8Q2C-SYS, N540X-ACC-SYS, and N540-ACC-SYS variants.

Table 1: Router LED Descriptions

LED	Color	Status
STATUS	Green	The module is operational and has no active major or critical alarms.
	Amber	Host kernel is booted and is ready to start SysAdmin VM.
	Red	Power-up failure is preventing the CPU from booting (set by hardware).
	Flashing Amber (Slow)	The module is booting up (set by IOFPGA).
	Flashing Amber (Fast)	The module is booting up (set by BIOS), shutting down, or the SysAdmin VM is being reloaded.
	Flashing Red	RP0 has active major or critical alarms.
	Off	The module is powered-off (set by hardware).
ALARM	Red	Critical alarm - system-scope (including RP0).
	Flashing Red	Critical alarm - Relating to voltage rail failures.
	Amber	Major alarm - system-scope (including RP0).
	Flashing Amber	Minor alarm - system-scope (including RP0).
	Off	No alarm.
SYNC	Green	Time core is synchronized to an external source including IEEE1588.
	Flashing Green	System is in Synchronous Ethernet mode.
	Amber	Acquiring state or Holdover: Time core is in acquiring state or holdover mode.
	Off	Time core clock synchronization is disabled or in free-running state.
STATUS + ALARM (Both LEDs)	Flashing Red	Secure Boot boot flash contents validation failed. (set by IOFPGA). This case is only applicable immediately after power-on.
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.

LED	Color	Status
GNSS	Off	GNSS is not configured.
	Green	GNSS Normal State. Self-survey is complete.
	Red	Power up. GNSS is not tracking any satellite.
	Amber	Auto holdover.
	Flashing Green	Learning state-normal. Self-survey is not completed.



Note The following table is applicable only for Cisco N540-28Z4C-SYS-A/D, N540-12Z20G-SYS-A/D, N540X-16Z4G8Q2C-A/D, N540X-16Z8Q2C-D and N540-12Z20G-SYS-A/D variants.

Table 2: Router LED Descriptions

LED	Color	Status
Alarm	Red	Critical alarm - system-scope (including RP0).
	Amber	Major alarm - system-scope (including RP0).
	Flashing Amber	Minor alarm - system-scope (including RP0).
	Off	No alarm.
Status	Green	The module is operational but has no active major or critical alarms.
	Amber	Host kernel booted and XR is booting.
	Flashing Red	Not Applicable.

Fan Assembly LEDs

Cisco NCS 540 has 4 fans at the back panel. There is an LED on each fan assembly and they reflect the different status of the fans.



Note The following table is applicable only for Cisco N540-24Z8Q2C-SYS, N540X-16Z8Q2C-D, N540X-ACC-SYS, and N540-ACC-SYS variants.

Table 3: Fan Assembly LED Descriptions

LED	Color	Status
STATUS	Green	Fans are operating normally.
	Amber	Single fan failure.
	Red	More than one fan failure or a single PSU fan failure.
	Off	Fan tray is not receiving power.



Note The following table is applicable only for Cisco N540-28Z4C-SYS-A/D, N540-12Z20G-SYS-A/D, N540X-12Z16G-SYS-A/D, and N540X-16Z4G8Q2C-A/D variants.

Table 4: Fan Assembly LED Descriptions

LED	Color	Status
FAN	Green	Fans are operating normally.
	Amber	Single fan failure.
	Red	More than one or single fan failure or single PSU fan failure (only on N540-28Z4C-SYS-A/D and N540-12Z20G-SYS-A/D variants) and missing fan tray (only on N540X-16Z4G8Q2C-A/D variant).

Power Supply LEDs



Note The following table is applicable only for Cisco N540-24Z8Q2C-SYS, N540X-16Z8Q2C-D, N540X-ACC-SYS, and N540-ACC-SYS variants.

Table 5: Power Supply LED Descriptions

POWER LED	FAIL LED	Power Supply Condition
Green	Off	Power Supply ON; valid input/output.

POWER LED	FAIL LED	Power Supply Condition
Amber 1Hz flashing	Red 1Hz flashing	PSU Warning due to: <ul style="list-style-type: none"> • Over current • Over temperature • Under voltage • Over voltage • Over power • Fan failure
Off	On	PSU failure due to: <ul style="list-style-type: none"> • Over current • Over temperature • Under voltage • Over voltage • Over power • Fan failure
Green 1Hz flashing	Off	Power supply is not plugged in to the chassis or shutdown by the system.
Off	Off	No valid power input.
Amber	Off	Low input voltage.



Note The following table is applicable only for Cisco N540-28Z4C-SYS-A/D, N540-12Z20G-SYS-A/D, N540X-12Z16G-SYS-A/D, and N540X-16Z4G8Q2C-A/D variants.

Table 6: Power Supply LED Descriptions

LED	Color	Status
PWR	Green	Power Supply ON and operating normally.
	Off	Not receiving power or PSU-12V fail or 3V3 STDBY failure.
	Red	Power failure with one of the input power feeds failed or one of the on-board voltage rails has failed.
	Amber	STDBY FPGA upgrade is in progress due to post Reload/Power cycle after HW FPD upgrade All. Note Upgrade of the STDBY FPGA takes 3–5 minutes.

Fan Assembly and Power Supply LED Combination



Note The following table is applicable only for Cisco N540-28Z4C-SYS-A/D, N540-12Z20G-SYS-A/D, N540X-12Z16G-SYS-A/D, and N540X-16Z4G8Q2C-A/D variants.

Table 7: Fan Assembly and Power Supply LED Combination Descriptions

Fan LED	Power LED	Status
Off	Red	Power failure with one of the input power feeds failed or one of the on-board voltage rails has failed.
—	Amber	STDBY FPGA upgrade is in progress due to post Reload/Power cycle after HW FPD upgrade All. Note Upgrade of the STDBY FPGA takes 3–5 minutes.
Green	Flashing Amber	Thermal shutdown with no fan
Flashing Red	Flashing Red	Thermal shutdown
Flashing Red	Flashing Amber	MSS Ready=0
Flashing Amber	Flashing Green	TAM init fail
Flashing Amber	Flashing Red	TAM Not Ready
Flashing Amber	Flashing Amber	SECURE JTAG Fail
Flashing Green	Flashing Green	BIOS Validation Failure
Off	Green	Power Supply ON and operating normally.

System Specifications

Certain troubleshooting aids of the Cisco NCS 540 enable you to perform these tasks that assist the troubleshooting process:

Weight and Power Consumption

For information on physical specifications and power consumption, see table *Cisco NCS 540 chassis specification* on the [Cisco Network Convergence System 540 Router Data Sheet](#).

Environmental Specifications

For information on environmental specifications, see table *Environmental properties for NCS 540 fixed systems* on the [Cisco Network Convergence System 540 Router Data Sheet](#).

Transceiver and Cable Specifications

To determine which transceivers and cables are supported by this router, see [Cisco Transceiver Modules Compatibility Information](#).

To see the transceiver specifications and installation information, see [Cisco Transceiver Modules Install and Upgrade Guides](#).

RJ-45 Connectors

The RJ-45 connector connects Category 3, Category 5, Category 5e, Category 6, or Category 6A foil twisted-pair or unshielded twisted-pair cable from the external network to the following module interface connectors:

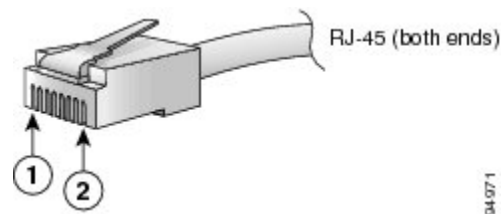
- Router chassis
 - CONSOLE port
 - MGMT ETH port



Caution To comply with GR-1089 intrabuilding, lightning immunity requirements, you must use a foil twisted-pair (FTP) cable that is properly grounded at both ends.

The following figure shows the RJ-45 connector.

Figure 1: RJ-45 Connector



1	Pin 1	2	Pin 2
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GPS Port Pinouts

The platform is capable of receiving or sourcing GPS signals of 1 PPS & 10 MHz. These interfaces are provided by two mini-coax 50-Ohm, 1.0/2.3 DIN series connector on the front panel. Similarly there are two mini-coax 50-Ohm connectors provided in the front panel to output this 1PPS and 10MHz.

This table below summarizes the GPS port pinouts:

Table 8: GPS Port Pinouts

	10 MHz (Input and Output)	1PPS (Input and Output)
Waveform	Input—Sine wave Output—Square wave	Input—Rectangular pulse Output—Rectangular pulse
Amplitude	Input— > 1.7 volt p-p(+8 to +10 dBm) Output— > 2.4 volts TTL compatible	Input— > 2.4 volts TTL compatible Output— > 2.4 volts TTL compatible
Impedance	50 ohms	50 ohms
Pulse Width	50% duty cycle	26 microseconds
Rise Time	Input—AC coupled Output—5 nanoseconds	40 nanoseconds

Time-of-Day Port Pinouts

This table summarizes the ToD/1-PPS port pinouts:

Table 9: RJ-45 ToD/1-PPS Port Pinouts

Pin	Signal Name	Direction	Description
1	–	–	–
2	–	–	–
3	1PPS_N	Output or Input	1PPS RS422 signal
4	GND	–	–
5	GND	–	–
6	1PPS_P	Output or Input	1PPS RS422 signal
7	TOD_N	Output or Input	Time-of-Day character
8	TOD_P	Output or Input	Time-of-Day character

BITS Interface

This table summarizes the BITS interface RJ48 port pinouts:

Table 10: BITS Interface RJ48 Port Pinouts

Pin	Signal Name	Direction	Description
1	RX Ring	Input	Receive Ring
2	RX TIP	Input	Receive TIP (T1/E1)
3, 6, 7, 8	—	NC	—
4	TX Ring	Output	Transmit Ring
5	TX TIP	Output	Transmit TIP (T1/E1)

Management and PTP Ethernet Port Pinouts

The following table summarizes the Management and Precision Time Protocol (PTP) Ethernet port pinouts:

Table 11: Management and PTP Ethernet Port Pinouts

Pin	Signal Name
1	TRP0+
2	TRP0-
3	TRP1+
4	TRP1-
5	TRP2+
6	TRP2-
7	TRP3+
8	TRP3-

USB Port Pinouts

The following table summarizes the USB port pinouts:

Table 12: USB Port Pinouts

Pin	Signal Name	Description
A1	Vcc	+5 VDC
A2	D-	Data -

Pin	Signal Name	Description
A3	D+	Data +
A4	Gnd	Ground

Alarm Port Pinouts

The following table summarizes the external alarm input pinouts for the following NCS 540 router variants:

- N540-ACC-SYS
- N540X-ACC-SYS
- N540-24Z8Q2C-SYS
- N540X-16Z8Q2C-D
- N540-28Z4C-SYS

Table 13: External Alarm Input Pinouts

Pin	Signal Name	Description
1	ALARM0_IN	Alarm input 0
2	ALARM1_IN	Alarm input 1
3	—	No connect
4	ALARM2_IN	Alarm input 2
5	ALARM3_IN	Alarm input 3
6	—	No connect
7	—	No connect
8	COMMON	Alarm common

The following table summarizes the external alarm input pinouts for the following NCS 540 router variants:

- N540-28Z4C-SYS-A/D
- N540X-16Z4G8Q2C-A/D
- N540-12Z20G-SYS-A/D
- N540X-12Z16G-SYS-A/D

Table 14: External Alarm Input Pinouts

Pin	Signal Name	Description
1	ALARM0_IN	Alarm input 0
2	ALARM1_IN	Alarm input 1
3	—	Alarm output closed
4	ALARM2_IN	Alarm input 2
5	ALARM3_IN	Alarm input 3
6	—	Alarm output open
7	—	Alarm output COM
8	—	Alarm input COM

Effective Cisco IOS XR Release 7.3.1, you can enable external alarms for external doors, voltage, fire, thermal, and water sensors on the following variants of Cisco NCS 540:

- N540-24Z8Q2C-SYS
- N540X-ACC-SYS
- N540-ACC-SYS

To set the description:

```
sysadmin-vm:0_RP0 (config) # alarm-contact contact-number description description
```

To set the severity of the alarm:

```
sysadmin-vm:0_RP0 (config) # alarm-contact contact-number severity [critical | major | minor]
```

Effective Cisco IOS XR Release 7.4.1, you can enable external alarms for external doors, voltage, fire, thermal, and water sensors on the following variants of Cisco NCS 540:

- N540-28Z4C-SYS-A/D
- N540-12Z20G-SYS-A/D
- N540X-16Z4G8Q2C-A/D
- N540X-12Z16G-SYS-A/D

To set the description:

```
RP/0/RP0/CPU0:ios (config) # environment alarm-contact contact-number description description
```

To set the severity of the alarm:

```
RP/0/RP0/CPU0:ios (config) # environment alarm-contact contact-number severity [critical | major | minor]
```

To set the trigger for the alarm:

```
RP/0/RP0/CPU0:ios(config)# environment alarm-contact contact-number trigger [open
| closed]
```



Note You can configure up to four external alarms.

The *contact-number* is the pin number of the connected alarm port, that is Alarm input 0 to Alarm input 3.

The **description** string can be up to 80 alphanumeric characters in length and is included in any generated system messages.

For **severity**, enter any one of: **critical**, **major**, or **minor**.

Description and severity are both mandatory values.

Use the **show alarms** command in admin mode to view the alarm details. Use the **show logging** command to view the displays the state of syslog error and event logging.

An SNMP trap is sent for every external alarm that is raised or cleared on the system.

Console Port Pinouts

The following table summarizes the Console port pinouts.



Note The following table is applicable only for Cisco N540-24Z8Q2C-SYS, N540X-ACC-SYS, and N540-ACC-SYS variants.

Table 15: Console Port Pinouts

Pin	Signal Name	Direction	Description
1	Loop1	NA	Loopback 1
2	Loop2	NA	Loopback 2
3	TxD	Output	Console RS232 transmit
4	Gnd	NA	Ground
5	Gnd	NA	Ground
6	RxD	Input	Console RS232 receive
7	Loop2	NA	Loopback 2
8	Loop1	NA	Loopback 1



Note The following table is applicable only for Cisco N540-28Z4C-SYS-A/D, N540-12Z20G-SYS-A/D, N540X-12Z16G-SYS-A/D, and N540X-16Z4G8Q2C-A/D variants.

Table 16: Console Port Pinouts

Pin	Signal Name	Direction	Description
1	ACONS-TX	Output	Aux Consoles transmit output, RS232
2	NC	NA	Receive TIP (T1/E1)
3	CONS-TX	Output	Console RS232 transmit
4	Gnd	NA	Ground
5	Gnd	NA	Ground
6	CONS-RX	Input	Console RS232 receive
7	ACONS-RTX	Input	Aux Consoles receive input, RS232
8	NC	NA	NA

AC Power Cord Specifications

For more information on the supported power cables, see *Ordering information for power cables supported on NCS 540* on the [Cisco Network Convergence System 540 Small Density Router Data Sheet](#).

