Troubleshooting

The sections provide information for troubleshooting problems on the Cisco NCS 4216.

Pinouts

The sections describe the pinouts for the Cisco NCS 4216 interfaces.

BITS Port Pinout

The following table summarizes the BITS port pinout of the Front Panel “Building Integrated Timing Supply” RJ48 port.

Table 1: BITS Port Pinout

Pin	Signal Name	Direction	Description
1	RX Ring	Input	Receive Ring
2	RX Tip	Input	Receive Tip
3			Not used
4	TX Ring	Output	TX Ring
5	TX Tip	Output	TX Tip
6			Not used
7			Not used
8			Not used

Wire Wrap Adapter Pinouts

The wire wrap adapter is used to support the wire wrap interface for the BITS port on the RSP3 module. This adapter is plugged into the existing RJ-45 connector on the RSP3 module.

Figure 1: Wire Wrap Adapter

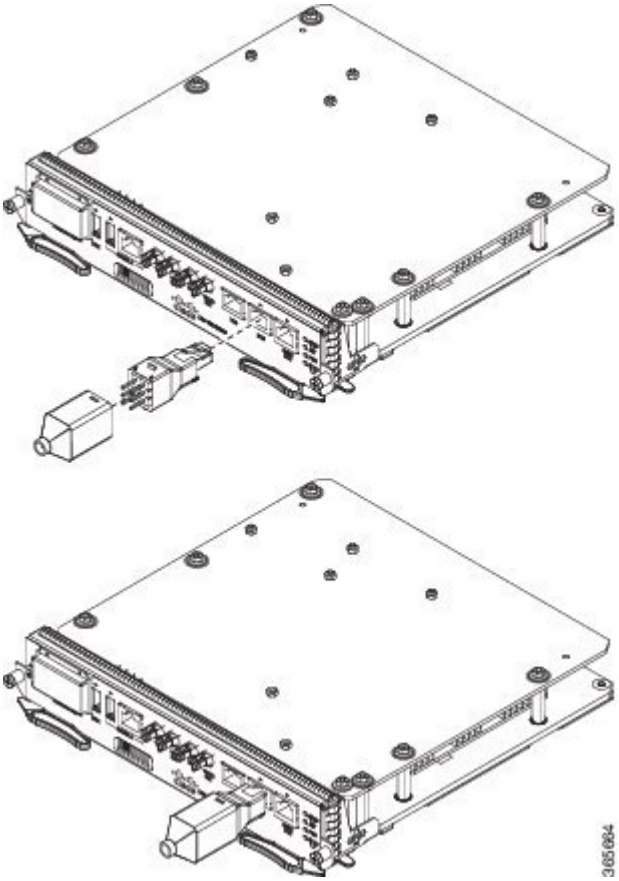


Table 2: Wire Wrap Adapter Pinouts

Wire Wrap Pin Numbers	Signals
1	RX_RING
2	RX_TIP
3	GND
4	GND

Wire Wrap Pin Numbers	Signals
5	TX_RING
6	TX_TIP

GPS Port Pinout

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.

The table below summarizes the GPS port pinouts.

Table 3: GPS Port Pinout

	10 Mhz (input and output)	1PPS (input and output)
Waveform	Input—Sine wave Output—Square wave	Input—Pulse shape Output—Pulse shape
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

Alarm Port Pinout

The table below summarizes the external alarm input pinout.

Table 4: External Alarm Input Pinout

Pin	Signal Name	Description
1	ALARM0_IN	Alarm input 0
2	ALARM1_IN	Alarm input 1

Pin	Signal Name	Description
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

Console/Aux RJ45 RS232 Serial Port Pinout

The following table summarizes the console/aux RJ45 RS232 serial port pinout.

Table 5: Console/Aux RJ45 RS232 serial port

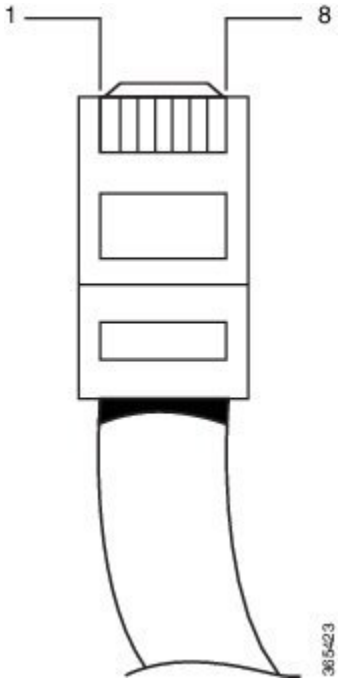
Pin	Signal Name	Direction	Description
1	RTS	Not Used	—
2	DTR	Not Used	—
3	TXD	Output	Transmit data
4	RI	Not Used	—
5	GND		
6	RXD	Input	Receive data
7	DSR/DCD	Not Used	—
8	CTS	Not Used	—

T1/E1 Port Pinouts (RJ-48)

The figure below shows the RJ-48C connector wiring for the T1/E1 cable for the Cisco 2-port T1/E1-RAN interface card. The table shows the pinout configuration for the RJ-48C connectors on the Cisco 2-port T1/E1-RAN interface card for both the shielded and unshielded cables for either T1 or E1.

Note Cisco recommends using a shielded cable for your RJ-48C connectors.

Figure 2: Rj-48C Connector Wiring



Shielded		**Unshielded**	
Pin	Description	Pin	Description
1	Receive Ring	1	Receive Ring
2	Receive Tip	2	Receive Tip
3	Receive Shield	3	
4	Transmit Ring	4	Transmit Ring
5	Transmit Tip	5	Transmit Tip
6	Transmit Shield	6	
7	Not Used	7	
8	Not Used	8	

Management Ethernet Port Pinout

A single management copper ENET port supporting 10/100/1000Base-T operation exists on each RSP. There is no direct access to the CPU of the other RSP. It uses a standard RJ45 jack.

Note This is not a data plane port.

The table below summarizes the Management Ethernet port pinout.

Table 6: Management Ethernet Port Pinout

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

USB Console Port Pinout

Two individual Type-A USB connector are used for USB console and USB mass storage. One single USB 2.0 Type-A receptacle is provided on the RSP front panel for providing console access to ROMMON, IOS-XE and diagnostics. It operates as a USB peripheral only for connection to an external host PC. This requires the use of a Type-A to Type-A connector instead of a standard USB cable.

Note The use of the USB console is mutually exclusive with the RS232 console/Aux port. While a USB cable is inserted, access is automatically switched to this port.

The other single USB 2.0 Type-A receptacle is provided on the RSP front panel for inserting external USB mass storage devices such as standard USB flash drives. It is used to load images, store configurations, write logs, etc. It supports operation up to 12Mbps

The table below summarizes the USB console port pinout.

Table 7: Single USB Console Port

Pin	Signal Name	Direction	Description
A1	Vcc		+5VDC (500mA)
A2	D-		Data -
A3	D+		Data +
A4	Gnd		Ground

Note The USB Console port +5VDC is input and operates as an USB peripheral device.

USB Flash/MEM Port Pinout

The table below summarizes the USB flash/MEM port pinout.

Table 8: Single USB Flash/MEM Port

Pin	Signal Name	Direction	Description
A1	Vcc		+5VDC (500mA)
A2	D-		Data -
A3	D+		Data +
A4	Gnd		Ground

Note USB TYPE-A receptacle used.

Note The USB flash/MEM port +5VDC is output. We provide power for USB flash/MEM, and it operates as a USB host device.

Fiber-Optic Specifications

The specification for optical fiber transmission defines two types of fiber: single-mode and multimode. Within the single-mode category, three transmission types are defined: short reach, intermediate reach, and long

reach. Within the multimode category, only short reach is available. For information about optical SFP modules, see the documentation for the SFP module at

http://www.cisco.com/en/US/partner/products/hw/modules/ps5455/prod_installation_guides_list.html .

LED Summary

The sections describe the meanings of the LEDs on the Cisco NCS 4216.

RSP LEDs

The *RSP LEDs* table below summarizes the RSP LEDs.

Note A major alarm condition indicates the failure of a single fan in the fan tray; a critical alarm indicates the failure of multiple fans. In the event that a single fan fails, the Cisco NCS 4216 software adjusts the fan speed to prevent excessive heat within the chassis.

NCS4216-RSP LED

Table 9: RSP LEDs

LED	Color/State	Description (two LEDs for each port)
Power (PWR)	Off	Disabled/no power to RSP
	Green	Power rails on RSP in range
Status (STAT)	Off	Disabled/power down
	Red	Failure to boot (lit at reset)
	Yellow	Rommon booted
	Green	IOS booted and running
Active (ACT)	Off	Not available
	Yellow	Standby (indicates standby RSP)
	Green	Active (indicates active RSP)

LED	Color/State	Description (two LEDs for each port)
Management port (MGMT)	Off	No connection
	Green	Connected with no activity
	Flashing green	Connected with activity
Sync status (SYNC)	Off	Not enabled
	Yellow	Free run
	Flashing yellow	Holdover
	Green	Locked to source
USB flash (MEM)	Flashing green	USB activity
BITS	Off	Out of service/not configured
	Amber	Fault or loop condition
	Green	In frame/working properly

NCS4216-RSP LED Fault Condition

The PWR and STAT LEDs are available on the front panel. These LEDs provide power on the board (PWR) and overall router health (STAT) status. During power up state, these LEDs provide booting status and report errors.

Note The digital code signing functionality validates the integrity and authenticity of the ROMMON image before booting it.

Table 10: NCS4216-RSP LED

PWR LED State	STAT LED State	Indication	Comment
Light Green	Red	Power is OK and the field-programmable gate array (FPGA) is nfigured successfully, but FPGA image validation failed.	Image validation failed. System is in hung state.

PWR LED State	STAT LED State	Indication	Comment
Flashing Light Green and Green alternatively	Off	FPGA configured and core validated successfully. FPGA image passed the control to micro-loader to boot ROMMON.	System is up with ROMMON. Both the FPGA image is validated successfully, but the booted ROMMON (primary or secondary) is undetermined.
	Amber	The digital code signing functionality reported upgrade FPGA image validation error and is continuing with the FPGA image.	System is up with ROMMON. FPGA image is validated successfully, but the booted ROMMON (primary or secondary) is undetermined.
	Red	The digital code signing functionality reported failure in the ROMMON image validation.	FPGA is up but both primary and secondary ROMMON failed. System is in hung state.
Green	Off	IOS is successfully booted	IOS writes into FPGA register to indicate that it has booted, FPGA stops flashing PWR LED and turns Green. Software now controls the STAT LED.

Interface Module LEDs

This LED summary applies to the following interface modules:

- 8x1 Gigabit Ethernet SFP + 1x10 Gigabit Ethernet SFP+ Interface Module
- OC-192 Interface Module with 8-port Low Rate CEM Interface Module (10G HO / 10G LO)
- 2-port 40 Gigabit Ethernet Interface Module (2X40GE)
- 1-port 100 Gigabit Ethernet Interface Module (1X100GE)
- 8-port 10 Gigabit Ethernet Interface Module (8X10GE))
- 48 T1/E1 TDM Interface Module (48XT1/E1)
- 48 T3/E3 TDM Interface Module (48XT3/E3)

The Status LED is Amber for the 10 Gigabit Ethernet ports when operating in WAN mode for the following IMS:

• 8x1 Gigabit Ethernet SFP + 1x10 Gigabit Ethernet SFP+ Interface Module

OC-192 Interface Module with 8-port Low Rate CEM Interface Module (10G HO / 10G LO) Interface Module LEDs

The table below summarizes the LEDs for the OC-192 Interface Module with 8-port Low Rate CEM Interface Module (10G HO / 10G LO) interface module.

Table 11: OC-192 Interface Module with 8-port Low Rate CEM Interface Module (10G HO / 10G LO) Interface Module LEDs

LED	Color/State	Meaning (Default=off)
Power (PWR)	Green	All power rails are within spec
	Red	Disabled
	Off	No power to IM
Operating Status (STAT)	Green	Operational
	Red	Failure
	Off	Disabled or power-down
SFP Link (Left LED)	Solid Green	Link Up
	FLASH Green	Link Activity
	Solid Yellow	Fault or Error or Alarm
	FLASH Yellow	RFU
	Off	Disabled or No Link
SFP Link (Right LED)	Solid Green	Ethernet (LAN or WAN)
	FLASH Green	OTN
	Solid Yellow	Sonet or SDH
	FLASH Yellow	RFU
	Off	No Link

LED	Color/State	Meaning (Default=off)
10G SFP+ Link (Left LED)	Solid Green	Link Up
	FLASH Green	Link Activity
	Solid Yellow	Fault or Error or Alarm
	FLASH Yellow	RFU
	Off	Disabled or No Link
10G SFP+ Speed Mode (Right LED)	Solid Green	Ethernet (LAN or WAN)
	FLASH Green	OTN
	Solid Yellow	Sonet or SDH
	FLASH Yellow	RFU
	Off	No Link

48 T1/E1 and 48 T3/E3 Interface Module LEDs

The table below summarizes the LEDs for the 48 T1/E1 and 48 T3/E3 interface module.

Table 12: 48 T1/E1 and 48 T3/E3 Interface Module LEDs

LED	Color/State	Meaning (Default=off)
Power (PWR)	Green	All power rails are within spec
	Red	Disabled
	Off	No power to Interface Module
Operating Status (STATUS)	Green	Operational
	FLASH green	Booting
	Red	Failure
	Off	Disabled or power-down

LED	Color/State	Meaning (Default=off)
Port Status (PORT)	Solid Green	All ports are UP
	FLASH Green	All ports are UP and one or more ports are in loopback
	Solid Amber	All least one port is down
	FLASH Amber	One or more ports are down and one or more ports are in Loopback
	Off	All ports are disabled or shut down
Activity Status (ACT)	Solid Green	Interface Module is Active
	FLASH Green	Interface Module is Standby
	Off	No link, interface module is down, disabled or shut down

8-port 10 Gigabit Ethernet Interface Module LEDs

The table below summarizes the 8-port 10 Gigabit ethernet interface module.

Table 13: 8-port 10 Gigabit ethernet Interface Module LEDs

LED	Color/State	Description
Power (PWR)	Green	All power rails are within spec
	Red	Disabled
	Off	No power to Interface Module
Operating Status (STAT)	Red	Failure
	Off	Disabled or Power-Down
	Green	Operational
10G SFP+ Link (Left LED)	Off	Disabled or No link
	Yellow	Fault or Error
	Green	Link with no activity
	Green	Link with activity

LED	Color/State	Description
10G SFP+ Speed/Mode (Right LED)	Yellow	10Gbps WAN
	Green	10 Gbps LAN
	Alternating Yellow or Green	10 Gbps OTN
	Off	Disabled

1-port 100 Gigabit Ethernet Interface Module LEDs

The table below summarizes the 1-port 100 Gigabit ethernet interface module.

Table 14: 1-port 100 Gigabit Ethernet Interface Module LEDs

LED	Color/State	Description
Power (PWR)	Green	All power rails are within spec
	Red	Disabled
	Off	No power to Interface Module
Operating Status (STAT)	Red	Failure
	Off	Disabled or Power-Down
	Green	Operational
100G CPAK Link LED	Off	Disabled or No link
	Yellow	Fault or Error
	Green	Link with activity
	Green	Link with no activity

2-port 40 Gigabit Ethernet Interface Module LEDs

The table below summarizes the 2-port 40 Gigabit ethernet interface module.

Table 15: 2-port 40 Gigabit Ethernet Interface Module LEDs

LED	Color/State	Description
Power (PWR)	Green	All power rails are within spec
	Red	Disabled
	Off	No power to Interface Module
Operating Status (STAT)	Red	Failure
	Off	Disabled or Power-Down
	Green	Operational
40G QSFP+ Link LED	Off	Disabled or No link
	Yellow	Fault or Error
	Green	Link with activity
	Green	Link with no activity

Power Supply LEDs

The table below summarizes the power supply LEDs for both the AC and DC power supplies.

Table 16: Power Supply LEDs

LED	Color/State	Description
Input OK	Off	No Input Voltage
	Amber	Input voltage out of range
	Green	Input voltage within acceptable operating range
Output Fail	Off	Disabled/Forced Shut down/No input power
	Red	Power supply fault (internal failure such as over temperature)
	Green	Operational
	Blinking Red	Output ORING FET Failed

Table 17: Power Supply LEDs

LED	Color/State	Description
Input Power (PWR)	Off	No input voltage
	Amber	Input voltage out of range
	Green	Input voltage within acceptable operating range
Status (STAT)	Off	Disabled/power-down/no power
	Red	Power supply fault (internal failure)
	Green	Operational

Fan Tray LEDs

The table below summarizes the fan tray LEDs.

Table 18: Fan Tray LEDs

LED	Color/State	Description
Status (TEMP)	Off	Disabled/power down
	Amber	Over temperature
	Green	OK
Fan (FAN)	Green	Fan rotation in range
	Amber	Fan fault
	Red	Two or more fan faults
Minor (MIN)	Off	No minor alarm
	Amber	Minor alarm
Major (MAJ)	Off	No major alarm
	Red	Major alarm

LED	Color/State	Description
Critical (CRIT)	Off	No critical alarm
	Red	Critical alarm (defaults to ON upon RSP reset)

Alarm Conditions

The table below summarizes the meaning of alarm conditions on the Cisco NCS 4216.

Table 19: Alarm Condition Summary

Alarm Type	Alarm Meaning
Critical	RSP OIR
	Power supply OIR
	Port in down state
	Environmental sensor threshold exceeded (voltage, temperature)
	IM OIR
	IM crash
Major	Standby RSP in ROMmon mode
	RSP removed
	RSP failure
Info	Port administratively shut down