

Hardware Specifications

This appendix contains hardware and software specifications of the NCS 2002, NCS 2006, NCS 2015 shelves.

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NCS 2002 Shelf Specifications

This section provides specifications for shelf bandwidth; a list of topologies; Cisco Transport Controller (CTC) specifications; the LAN, Transaction Language One (TL1), modem, and alarm specifications; timing, power, and environmental specifications; and shelf dimensions.

Bandwidth

The NCS 2002 has these bandwidth specifications (depending on the applications):

- Total bandwidth: 200 Gbps
- Data plane bandwidth: 100 Gbps per slot

Configurations

The NCS 2002 can be configured for these dense wavelength division multiplexing (DWDM) topologies:

- Hubbed rings
- Multihubbed rings
- Point-to-point
- Linear
- Linear with optical add/drop multiplexing (OADM)
- Line amplifier node
- Transponder Shelf
- Layer 2 aggregation shelf

Cisco Transport Controller

CTC, the NCS 2002 craft interface software, has these specifications:

- 10/100BaseT Ethernet
- TNC/TNCE/TSC/TSCE card access: RJ-45 LAN connector on the controller front plate

External LAN Interface for EMS

The NCS 2002 external LAN interface has these specifications:

- 10/100BaseT Ethernet located on the power module

TL1 Craft Interface

The NCS 2002 TL1 craft interface has these specifications:

- TNC/TNCE/TSC/TSCE access: EIA/TIA-232 DB-9 type connector

Modem Interface

The NCS 2002 modem interface has these specifications:

- Hardware flow control
- TNC/TNCE/TSC/TSCE: EIA/TIA-232 DB-9 type connector

Alarm Interface

The NCS 2002 does not support alarm interface.

Passive Unit Remote Inventory

The NCS 2002 provides 1 standard USB port located on the power module to retrieve the passive units inventory data.

BITS Interface

The NCS 2002 building integrated timing supply (BITS) interface has these specifications:

- 1 DS-1 BITS inputs wire wrap for ANSI applications
- 1 derived DS-1 outputs wire wrap for ANSI applications
- 1 E1 BITS input DIN-1.0/2.3 for ETSI applications
- 1 E1 BITS output DIN-1.0/2.3 for ETSI applications

System Timing

The NCS 2002 for ANSI has these timing specifications:

- Stratum 3 per Telcordia GR-253-CORE

- Free running accuracy: +/- 4.6 ppm
- Holdover stability: 3.7 x 10-7 per day, including temperature (< 255 slips in first 24 hours)
- Reference: External BITS, line, internal

The NCS 2002 for ETSI has the following system timing specifications:

- Stratum 3, per ITU-T G.813
- Free running accuracy: +/- 4.6 ppm
- Holdover stability: 3.7 exp -7 per day, including temperature (< 255 slips in first 24 hours)
- Reference: External BITS, line, internal

System Power

The NCS 2002 has these AC power specifications:

- Input Voltage: 100V - 240V AC (+/- 10%)
- Power consumption: Configuration dependent; 35 W (Fan Tray and LCD)
- Power terminals standard 3 pole AC connector
- For an AC power supply, the fuse rating must not exceed 10A, 15A, or 20A depending on the standard in various countries. For North America, the branch circuit protection must be rated 20A
- Total maximum power consumption of 350W with ancillaries, controllers and linecards

The NCS 2002 has these DC power specifications:

- Nominal Input Voltage: –48 VDC
- Power consumption: Configuration dependent; 35 W (Fan Tray and LCD)
- Power requirements:
  - Nominal: –48 VDC
  - Input Voltage Range: -40.5 to -57.6 VDC
- Power terminals: DSUB 2 poles for ETSI applications and terminal block double pole for applications
- External fuse must not exceed 15A
- Total maximum power consumption of 450W with ancillaries, controllers and linecards

Fan Tray

The following table lists power requirements for the fan-tray assembly.

Table 1: Fan-Tray Assembly Power Requirements

Fan Tray Assembly	Watts	Amps	BTU/Hr
NCS2002-FTA	35	1	120

System Environmental Specifications

The NCS 2002 for ANSI environment has these specifications:

- Operating temperature: 23 to +131 degrees Farenheit (-5 to +55 degrees Celsius)
- Operating humidity: 5 to 95 percent, noncondensing

The NCS 2002 for ETSI environment has the following specifications:

- Operating temperature: 23 to 131 degrees Fahrenheit (-5 to +55 degrees Celsius)
- Operating humidity: 5 to 95 percent, noncondensing

Dimensions

The NCS 2002 shelf assembly has these dimensions:

- Height: 3.5 inches (88.9 mm)
- Width: 19 or 23 inches (482.6 or 584.2 mm) with mounting ears attached
- Depth: 11.1 inches (281.94 mm)
- Weight:
  - 11.02 pounds (5 kg) with preinstalled air filter and no cards installed
  - 15.40 pounds (6.82 kg) with the power module, fan-tray assembly and air filter installed but with no cards.

NCS 2006 Shelf Specifications

This section provides specifications for shelf bandwidth; a list of topologies; Cisco Transport Controller (CTC) specifications; the LAN, Transaction Language One (TL1), modem, and alarm specifications; timing, power, and environmental specifications; and NCS 2006 shelf dimensions.

Bandwidth

The NCS 2006 has the following bandwidth specifications (depending on the applications):

- Total bandwidth: 600 Gbps
- Data plane bandwidth: 100 Gbps per slot

Configurations

The NCS 2006 can be configured for the following dense wavelength division multiplexing (DWDM) topologies:

- Hubbed rings
- Multihubbed rings
- Point-to-point
- Linear
- Linear with optical add/drop multiplexing (OADM)
- Hybrid terminal node
- Hybrid OADM node
- Hybrid line amplifier node
- Transponder Shelf
- Layer 2 aggregation shelf

Cisco Transport Controller

CTC, the NCS 2006 craft interface software, has the following specifications:

- 10/100BaseT Ethernet
- TNC/TNCE/TSC/TSCE card access: RJ-45 LAN connector on the controller front plate
- Shelf access: RJ-45 LAN Connector located on the ECU or ECU2

External LAN Interface for EMS

The NCS 2006 external LAN interface has the following specification:

- 10/100BaseT Ethernet located on the ECU or ECU2 and supports:

TL1 Craft Interface

The NCS 2006 TL1 craft interface has the following specifications:

- Speed: 9600 bps
- TNC/TNCE/TSC/TSCE access: EIA/TIA-232 DB-9 type connector
- An alternative RJ-45 LAN connector on TNC/TNCE/TSC/TSCE or ECU or ECU2

Modem Interface

The NCS 2006 modem interface has the following specifications:

- Hardware flow control
- TNC/TNCE/TSC/TSCE: EIA/TIA-232 DB-9 type connector

Alarm Interface

The NCS 2006 alarm interface has the following specifications:

- 2 SCSI Connectors located on the ECU or ECU2
- Visual: Critical, Major, Minor, Remote
- Audible: Critical, Major, Minor, Remote
- Alarm inputs: Common 32-VDC output for all alarm-inputs, closed contact limited to 2 mA
- Control outputs: Open contact maximum 60 VDC, closed contact maximum 100 mA

Passive Unit Remote Inventory

The NCS 2006 provide 12 standard USB ports located on the ECU or ECU2 to retrieve the inventory data from the passive units.

BITS Interface

The NCS 2006 building integrated timing supply (BITS) interface has the following specifications:

- 2 T1 BITS inputs wire wrap for applications

- 2 derived T1 outputs wire wrap for applications
- 2 E1 BITS input DIN-1.0/2.3 for ETSI applications
- 2 E1 BITS output DIN-1.0/2.3 for ETSI applications

System Timing

The NCS 2006 for ANSI has the following system timing specifications:

- Stratum 3 per Telcordia GR-253-CORE
- Free running accuracy: +/- 4.6 ppm
- Holdover stability: 3.7 x 10-7 per day, including temperature (< 255 slips in first 24 hours)
- Reference: External BITS, line, internal

The NCS 2006 for ETSI has the following system timing specifications:

- Stratum 3, per ITU-T G.813
- Free running accuracy: +/- 4.6 ppm
- Holdover stability: 3.7 exp -7 per day, including temperature (< 255 slips in first 24 hours)
- Reference: External BITS, line, internal

System Power

AC Power Specifications

The NCS 2006 has these AC power specifications:

- Shelf power consumption: Configuration dependent; 130 W (Fan Tray, LCD, and ECU module).
- Power terminals standard 3-pole AC connector.
- Fuse rating for an AC power supply must not exceed 10 A, 15 A, or 20 A depending on the standard in various countries. For North America, the branch circuit protection must be rated 20 A.

The following table lists power specifications of the AC power modules for the NCS 2006 shelf.

Table 2: NCS 2006 AC Power Specifications

AC Power Module	Input Voltage Range	Output Voltage	Load
NCS2006-AC	100–120 V AC (US nominal range), 60Hz	-48.0 V DC	1200 W
	200–240 V AC (Europe nominal range), 50Hz	-48.0 V DC	1500 W

Note The NCS2006-AC supports the same specifications as the 15454-M6-AC2.

DC Power Specifications

The following table lists power specifications of the DC power modules for the NCS 2006 shelf.

Table 3: NCS 2006 DC Power Specifications

DC Power Module	Rating	Nominal Voltage	Current	External Fuse Rating	Input Voltage Range	Maximum Load
NCS 2006-DC	30 Amp	–48 VDC	30 Amp	40 Amp	–40.5 to –57.6 VDC	1440 W
		–60 VDC	24 Amp		–50 to –72 VDC	
NCS2006-DC20	20 Amp	–48 VDC	20 Amp	30 Amp	–40.5 to –57.6 VDC	960 W
		–60 VDC	16 Amp		–50 to –72 VDC	
NCS2006-DC40	40 Amp	-48 VDC	40 Amp	60 Amp	–40.5 to –57.6 VDC	1920 W
		-60 VDC	32 Amp		–50 to –72 VDC	

Note When the NCS 2006 shelf is powered at –60 VDC (nominal), only these cards can be installed: TNC, OPT-AMP-C, OPT-AMP-17-C, OPT-EDFA-17, OPT-EDFA-24, 17 SMR9 FS, 24 SMR9 FS, 34 SMR9 FS, SMR20 FS, SMR20 FS CV, 12-AD-FS, 16-AD-FS, 100GS-CK-LC, and MR-MXP cards, and the NCS2006-ECU-60 card.

- When you use the 60V DC power module for NCS 2006, you must go to CTC (shelf-view) **Provisioning > General > Power Monitor** and set the following threshold values:
  - ELWBATVG (Extreme Low Battery Voltage)=-50 Vdc
  - LWBATVG (Low Battery Voltage)=-50 Vdc
  - HIBATVG (High Battery Voltage)=-72 Vdc
  - EHIBATVG (Extreme High Battery Voltage)=-72 Vdc
- NCS2006-DC, NCS2006-DC20, and NCS 2006-DC40 shelf power consumption (configuration dependent):
  - 130 W with NCS2006-FTA Fan Tray, LCD, and ECU module
- Power terminals—DSUB 3 poles for ETSI applications and terminal block, double pole for applications.

Power Supply Modules Supported by NCS 2006 ECU-S

The following table lists the power supply modules Supported by NCS 2006 ECU-S.

Table 4: Power Supply Modules Supported by NCS 2006 ECU-S

Model	PID
NCS2006-DC	• NCS2006-DC= • NCS2006-DC20=
NCS2006-DC6-40A	NCS2006-DC40=
NCS2006-AC	NCS2006-AC=

Power Calculation

For the NCS 2006 shelf that is powered by the NCS2006-DC20 power module, the controller card calculates the total power consumption of the shelf, which is displayed in the Provisioning > General > Power Monitor tab in CTC. For the power calculation to function properly ensure that:

- There is no MEA alarm on any card.
- The LCD module is properly plugged-in.

The total power consumption value for the shelf is computed by aggregating the power consumption values of individual cards and ancillary units installed or pre-provisioned in the shelf. Refer to the Individual Card Power Requirements table for the power consumption values of the line cards that are considered for power calculation.

The Actual Power is the power consumed by a line card once it has boot-up. The Typical Power is the power consumed by a line card when it is physically present in the shelf but deleted in CTC, or when it has not boot-up due to PWR-CON-LMT alarm after installation or pre-provisioning.

During power calculation, certain wattage is always reserved for ancillary units like the ECU, fan tray, and standby controller card, irrespective of whether they are present in the shelf or not. The reserved power for the NCS 2006 shelf with a TNC or TNC-E controller card is 284 W, and for the TSC or TSC-E controller card it is 270 W.

Note Do not use 16WXC-FS, EDRA-1-xx, EDRA-2-xx cards in NCS 2006 having the 15454-M6-AC2 and 15454-M6-DC20 power modules.

Note In the shelf powered by the NCS2006-DC20 power module, a new line card will not boot if it causes the power consumption of the shelf to exceed 960 W. The PWR-CON-LMT alarm is raised in the Alarms tab in CTC when the installation or pre-provisioning of a card causes the power consumption to exceed 960 W. You must uninstall and deprovision the card that causes the PWR-CON-LMT alarm.

Note In the shelf powered by the NCS2006-DC40 power module, a new line card will not boot if it causes the power consumption of the shelf to exceed 1920 W. The PWR-CON-LMT alarm is raised in the Alarms tab in CTC when the installation or pre-provisioning of a card causes the power consumption to exceed 1920W. You must uninstall and deprovision the card that causes the PWR-CON-LMT alarm.

Note When the node is upgraded to R11.1 with specific cards, the total power consumption value changes. Refer to the Individual Card Power Requirements table for the power consumption values of the line cards that are considered for power calculation.

Fan Tray

The following table lists power requirements for the fan-tray assembly.

Table 5: Fan-Tray Assembly Power Requirements

Fan Tray Assembly	Watts	Amps	BTU/Hr
NCS2006-FTA	120	3	410

System Environmental Specifications

The NCS 2006 for ANSI environment has these specifications:

- Operating temperature: 23 to +131 degrees Farenheit (-5 to +55 degrees Celsius)
- Operating humidity: 5 to 95 percent, noncondensing

The NCS 2006 for ETSI environment has these specifications:

- Operating temperature: 23 to 131 degrees Fahrenheit (-5 to +55 degrees Celsius)
- Operating humidity: 5 to 95 percent, noncondensing

Dimensions

The NCS 2006 shelf assembly has these dimensions:

- Height: 10.4 inches (264.16 mm)
- Width: 19 or 23 inches (482.6 or 584.2 mm) with mounting ears attached
- Depth: 11.1 inches (281.94 mm)
- Weight:
  - 23.55 pounds (10.680 kg) with preinstalled air filter and no cards installed
  - 40.12 pounds (18.2 kg) with all the ancillary units (2 DC power modules, ECU or ECU2, fan-tray assembly and air filter) installed but with no cards.

NCS 2015 Shelf Specifications

This section provides specifications for shelf bandwidth; Cisco Transport Controller (CTC) specifications; the LAN, Transaction Language One (TL1), modem, and alarm specifications; timing, power, and environmental specifications; and NCS 2015 shelf dimensions.

The NCS 2015 shelf is compliant with the ETS 300-119-4 standard.

Bandwidth

The per slot interconnection on NCS 2015 can be 250Gbps or 500 Gbps.

Cisco Transport Controller

CTC, the NCS 2015 craft interface software, has the following specifications:

- 10/100BaseT Ethernet
- TNCS/TNCS-O card access: RJ-45 LAN connector on the controller front plate
- Shelf access: RJ-45 LAN connector and optical EMS port located on the ECU. The CT/EMS copper port functions as the craft port only in the secure mode.

External LAN Interface for EMS

The NCS 2015 external LAN interface has the following specification:

- 10/100BaseT Ethernet located on the ECU and supports:
  - 10/100 Mbps full duplex
  - Auto detection
- 100 Mbps (FX) optical port located on the ECU and supports:
  - 100 Mbps full duplex
  - Auto detection

TL1 Craft Interface

The NCS 2015 TL1 craft interface has the following specifications:

- Speed: 9600 bps
- TNCS/TNCS-O access: EIA/TIA-232 DB-9 type connector
- An alternative RJ-45 LAN connector on TNCS/TNCS-O or ECU
- An alternative EMS optical connector on ECU

Modem Interface

The NCS 2015 modem interface has the following specifications:

- Hardware flow control

- TNCS/TNCS-O: EIA/TIA-232 DB-9 type connector

Alarm Interface

The NCS 2015 alarm interface has the following specifications:

- 2 SCSI Connectors located on the power input panel
- Visual: Critical, Major, Minor, Remote
- Audible: Critical, Major, Minor, Remote
- Alarm inputs: Common 32-VDC output for all alarm-inputs, closed contact limited to 2 mA
- Control outputs: Open contact maximum 60 VDC, closed contact maximum 100 mA

Passive Unit Remote Inventory

The NCS 2015 provides 12 USB 2.0 ports and two USB 3.0 ports located on the ECU to retrieve the inventory data from the passive units.

BITS Interface

The NCS 2015 building integrated timing supply (BITS) interface has the following specifications:

- 2 T1 BITS inputs wire wrap for applications
- 2 derived T1 outputs wire wrap for applications
- 2 E1 BITS input DIN-1.0/2.3 for ETSI applications
- 2 E1 BITS output DIN-1.0/2.3 for ETSI applications

System Timing

The NCS 2015 for ANSI has the following system timing specifications:

- Stratum 3 per Telcordia GR-253-CORE
- Free running accuracy: +/- 4.6 ppm
- Holdover stability: 3.7 x 10-7 per day, including temperature (< 255 slips in first 24 hours)
- Reference: External BITS, line, internal

The NCS 2015 for ETSI has the following system timing specifications:

- Stratum 3, per ITU-T G.813
- Free running accuracy: +/- 4.6 ppm
- Holdover stability: 3.7 exp -7 per day, including temperature (< 255 slips in first 24 hours)
- Reference: External BITS, line, internal

System Power

The following table lists power specifications for the NCS 2015 shelf.

Table 6: Cisco NCS 2015 Power Specifications

Power Redundancy (N+N)	
AC	Up to four power modules can be installed. This allows support for 1+0, 1+1, 2+0, and 2+2 power redundancy.
DC	Up to four power modules can be installed. This allows support for 3+1, 2+2, 2+1, and 1+1 power redundancy and A and B battery plant dual feeds redundancy.
AC Input	
Nominal input voltage	200 to 240 VAC (range 180 to 264 VAC)
Nominal line frequency	50/60 Hz (range 47 to 63 Hz)
Recommended AC service	30-A (North America) dedicated branch circuit 30-A (International) dedicated branch circuit
DC Input	
Nominal input voltage	–48 VDC or –60 VDC(tolerance range: –40.5 to –72 VDC)
Input current	36 A max at –48 VDC28.8 A max per feed at –60 VDC42.7 A at –40 VDC (maximum)

You can configure the power redundancy mode of an NCS 2015 chassis using CTC or TL1 commands. For more information, see the section, “Power Redundancy” in the chapter, “Maintaining the Node” in the *Cisco NCS 2000 Series Network Configuration Guide, Release 10.x.x* .

Power Calculation

For the NCS 2015 shelf that is powered by the NCS4K-DC-PSU-V1 power module, the controller card calculates the total power consumption of the shelf, which is displayed in the Provisioning > General > Power Monitor tab in CTC. For the power calculation to function properly ensure that there is no MEA alarm on any card.

The total power consumption value for the shelf is computed by aggregating the power consumption values of individual cards and ancillary units installed or pre-provisioned in the shelf. During power calculation, certain wattage is always reserved for ancillary units like the ECU, fan tray, and standby controller card, irrespective of whether they are present in the shelf or not. The reserved power for the NCS 2015 DC shelf with a TNCS controller card is 720 W.

Note When the node is upgraded to R11.1 with specific cards, the total power consumption value changes. Refer to the Individual Card Power Requirements table for the power consumption values of the line cards that are considered for power calculation.

Fan Tray

The following table lists power requirements for the fan-tray assembly.

Table 7: Fan-Tray Assembly Power Requirements

Fan Tray Assembly	Watts	Amps	BTU/Hr
NCS2015-FTA	560	10.4	1910.72

System Environmental Specifications

The following table describes the environmental specifications for the NCS 2015 shelf:

Table 8: Cisco NCS 2015 Environmental Specifications

Temperature	Operating, nominal: 41 to 104°F (5° to 40°C)Operating, short-term: 23 to 131°F (-5° to 55°C)Non operating: -40 to 158°F (-40° to 70°C)
Humidity	Normal: 5 to 85%, noncondensingShort-term: 5 to 90% but not to exceed 0.024 kg water/kg of dry air
Chassis airflow	Up to 27,609 liters per minute
Power system airflow	Up to 6800 liters per minute
Air exhaust temperature	106°F (41°C)-at room temperatures of 77 to 84°F (25 to 29°C)118°F (48°C)-at room temperatures of 95 to 102°F (35 to 39°C)153°F (67°C)-maximum exhaust temperature on a fully loaded system during worst-case operating conditions (55°C and 6000 ft altitude) **Note** Air temperature rise is 54°F (12°C) on a fully loaded system with fans running at maximum speed.
Air velocity	2000 ft/min (10 m/s) under typical conditions 27°C4000 ft/min (20 m/s) at maximum speed. **Note** Software controls the speed of the fans based on measurements from the chassis thermal sensors.
Sound power level (DC power)	Fan speed 6300 RPM, temperature 80°F (27°C):70.7 dB-modular configuration power

Dimensions

The NCS 2015 shelf assembly has these dimensions:

- Height: 24.44 inches (620.776 mm)
- Width: 17.67 inches (448.81 mm)
- Depth: 11.10 inches (281.94 mm)
- Weight:
  - Empty chassis: 69.225 pounds (31.4 kg)
  - Chassis with ancillary units and line cards: 99.20 pounds (45 kg)