# Cisco Network Convergence System 2000

## Product Overview

The Cisco® Network Convergence System 2000 (NCS 2000) sets the industry benchmark for dense wavelength-division multiplexing (DWDM) solutions by delivering the touchless programmability, massive scale, multi-layer convergence, and ultra-long-haul performance necessary for tomorrow's network architectures.

**Figure 1.**   Cisco NCS 2006 and NCS 2002



## ROADM Leadership

A decade ago, the ONS 15454 MSTP brought reconfigurable optical add/drop multiplexer (ROADM) technology mainstream, enabling service providers, governments, and enterprises to deploy a simple yet intelligent DWDM network that could scale with operational ease. The NCS 2000 evolves Cisco's ROADM portfolio by introducing nLight ROADM technology. By supporting touchless re-configurability via colorless, omni-directional, and contentionless add/drop, networks built upon nLight ROADM can instantly respond to new bandwidth requests, route around network failures, and dynamically adjust their topology - all without manual intervention. Highly meshed networks will benefit from support of up to 16 degrees per card, 32 degrees total, while flex spectrum capability dramatically improves network efficiency by flexibly optimizing system capacity versus reach. Ultimately, per fiber pair capacities of up to 26 terabits per second can be achieved.

## Next Generation Amplification

The NCS 2000 introduces hybrid amplifiers that are an optimal combination of Raman and erbium doped fiber amplifier (EDFA) technology. These are known as erbium doped Raman amplifiers, or EDRA. EDRA's are compact, easy to deploy, and support an ultra-low noise figure critical for long distance, high bit-rate transmission. The platform supports a variety of optical amplifiers to meet varying network needs, including coherent-optimized EDFA's and high power counter and co-propagating Raman amplifiers.

## Optimizing 100G

Continuing Cisco's innovation in 100G technology, nLight Silicon now extends to the client-facing interface via the CPAK™ pluggable transceiver. CPAK's extremely compact dimensions and low power consumption enable a single-slot 100G coherent DWDM line card with a standards-based 100GBASE-LR4 client interface, resulting in a superb system density of one 100G transponder per rack unit. State-of-the-art coherent digital signal processing technology helps enable unregenerated distances of up to 3000 km in an EDFA-only network, or up to 4800 km in a network employing Raman amplification.

## Multi-Layer Network Intelligence

The NCS 2000's Wavelength Switched Optical Network (WSON) control plane architecture enhances GMPLS capabilities with awareness of wavelength properties and optical impairments, offering dynamic service provisioning and restoration over a touchless DWDM network. Leveraging Cisco's nLight Control Plane, the NCS 2000 intelligently interacts with packet layer devices, automating service provisioning, eliminating human error, and enabling advanced failure recovery.

## Seamless Platform Integration and Interoperability

As a key component of the Cisco Network Convergence System, the NCS 2000 seamlessly integrates with the NCS 4000 and NCS 6000 at the network element, network management, and control plane levels. The NCS 2000 also offers full support for ONS 15454 MSTP line cards, plus network level interoperability and unified management, ensuring a simple migration for customers with existing ONS 15454 MSTP networks.

## Chassis

The Cisco NCS 2000 offers two chassis variants. The Cisco NCS 2006 chassis is 6RU in height and has 6 slots for service cards (Figure 3), whereas the NCS 2002 is 2RU tall and has 2 slots for service cards (Figure 4). Table 1 compares the features.

**Table 1.**    Feature Comparison

| Feature | Cisco NCS 2006 | Cisco NCS 2002 |
|---|---|---|
| Service slots | 6 | 2 |
| Shelf or node controller slots | 2 | 1 |
| Power modules supported | 2 | 1 |
| Multishelf management | Yes, up to 50 shelves | NA |

You can configure the Cisco NCS 2000 Series chassis with DC or AC power inputs. The DC power module has connectors for both ANSI and ETSI style battery connections, making it universal. The AC power module has a single input and is universal in that it accepts a power input ranging from 110 to 240 VAC, 50 to 60 Hz.

Cisco NCS 2000 Series chassis have a built-in memory module to back up the software package, IP address, and circuit database, making simplex mode more attractive in cost-sensitive applications. This built-in backup memory improves mean time to repair (MTTR) and increases operational simplicity. Also available on Cisco NCS 2000 Series chassis is the ability to connect up to 12 passive devices for inventory management via USB. Some Cisco ONS 15216 and all NCS 2000 Series passive devices include ROM containing device information. When connected to the chassis ECU (Figure 2), these devices appear within Cisco Transport Controller inventory management. Multishelf management allows multiple (up to 50) NCS 2006 shelves to be managed as a single network element, with a single target identifier (TID) and IP address, facilitating the construction of nodes with a very large number of ROADM degrees and/or service cards.

**Figure 2.**    Cisco NCS 2006 External Connection Unit
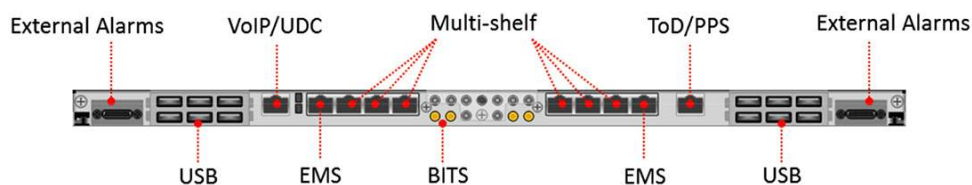
The Cisco NCS 2006 and NCS 2002 can be mounted into 19-, 21-, or 23-inch racks or cabinets. Brackets come with the shelf assembly and can also be ordered as spares. You can use optional air deflectors in 21- and 23-inch installations. Airflow is side-to-side, but you can add deflectors for front-to-back and front-to-front airflow. In the 21-inch configuration airflow could also be front-to-top. Additionally, an air plenum is available that can be used for front to back airflow in 19" rack configurations (Figures 3 and 4).
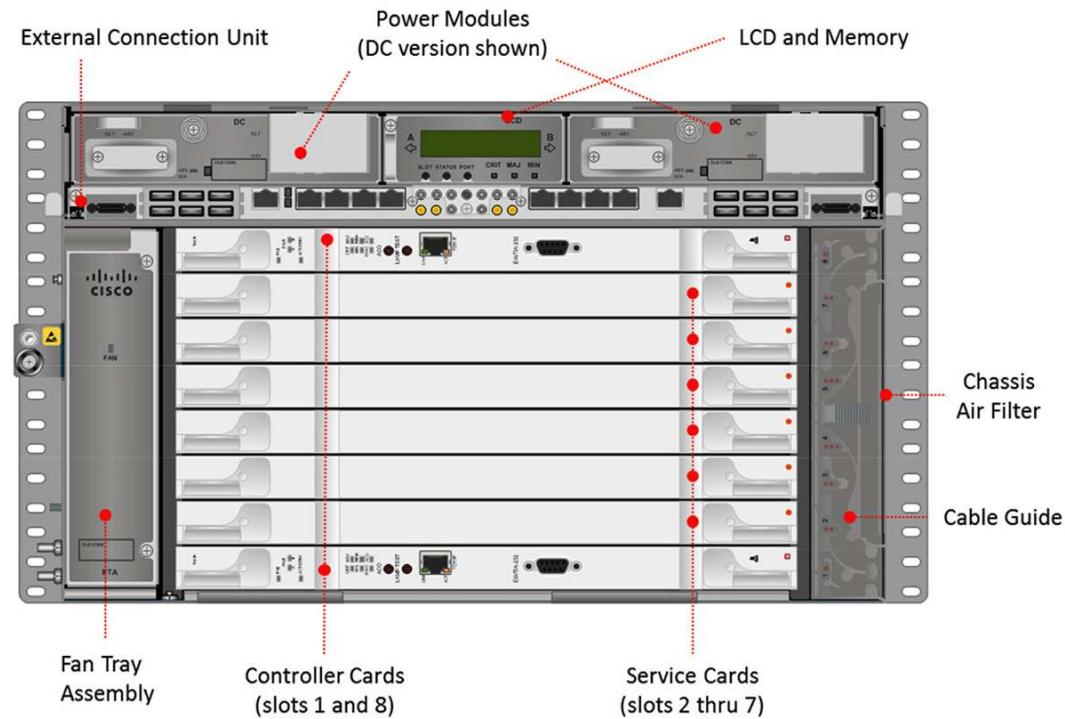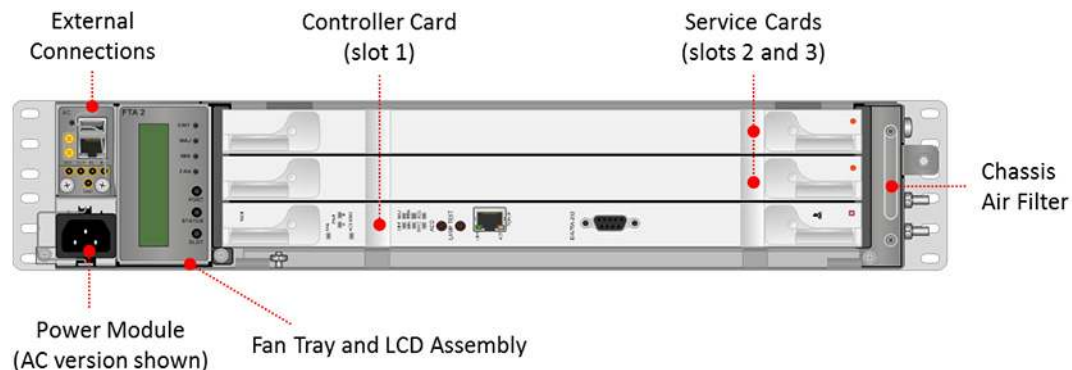
**Figure 3.**    Cisco NCS 2006



**Figure 4.**    Cisco NCS 2002

## Transport Shelf Controller and Transport Node Controller

The NCS 2000 leverages the enhanced transport shelf controller (TSCE) and enhanced transport node controller (TNCE) of the ONS 15454 MSTP. The TSCE provides timing, communication, multi-shelf management, support for alarms, and the ability to connect to select passive devices for inventory management and control of the node. The TNCE optionally provides OSC termination, with support for Fast Ethernet and Gigabit Ethernet connections, in addition to OC-3/STM-1.

## Management

The Cisco NCS 2000 is managed by Cisco Transport Controller and carries forward its existing features, including:

- Multilayer graphical network, node, and card visibility
- A-to-Z network-based service provisioning
- Graphical software wizards to simplify and speed user operations for such tasks as:
  - Initial network turn-up
  - Service provisioning
  - Network, node, and bandwidth upgrades

In addition to the integrated software features, the Cisco NCS 2000 is supported by an easy-to-use but powerful network design tool, Cisco Transport Planner. This tool is a user-friendly, Java-based application, fully developed and tested by Cisco for modeling and optimizing DWDM networks based on your network parameters.

## Product Specifications

Tables 2 through 7 give specifications and other information about the Cisco NCS 2006 and 2002 Modules.

**Table 2.**  Specifications for Cisco NCS 2006 Modules

| Module | Part Number |
|---|---|
| **Common Equipment for the Cisco NCS 2006** | |
| **Shelf Assembly with brackets**<br>Chassis door (optional), and Deep Door (optional) | NCS2006-SA<br>NCS2006-DR, NCS2006-DDR |
| **Fan-Tray Assembly**<br>Chassis air filter | NCS2006-FTA<br>NCS2006-FTF |
| **External Connection Unit**<br>Integrated multishelf connection<br>Cisco Element Management System connection<br>UDC connection<br>Voice-over-IP (VoIP) connection<br>Alarms connection<br>USB connection to passive Cisco ONS devices for inventory management<br>Building Integrated Timing Supply (BITS) 1 and BITS 2 input and output (ANSI and ETSI)<br>Time of Day (ToD)/Pulse Per Second (PPS) | NCS2006-ECU |
| **LCD Status and Backup Memory** | NCS2006-LCD |
| **Power Options**<br>DC power module with ANSI and ETSI connectors<br>AC power module with universal IEC power connector | NCS2006-DC, NCS2006-DC20<br>NCS2006-AC |
| **Brackets and Air Deflectors (Optional spares)**<br>19-in., 21-in., and 23-in. brackets<br>21-in. air deflectors<br>23-in. air deflectors<br>NCS2006/M6 Front-to-Back air defl, 19, 21, 23 cabinets, 23 rack | 15454-M6-BRKT<br>15454-M6-DEFL21<br>15454-M6-DEFL23<br>NCS2006-CAB-DEFL |

**Table 3.** Specifications for Cisco NCS2002 Modules

| Module | Part Number |
|---|---|
| **Common Equipment for the Cisco NCS2002** | |
| **Shelf Assembly with brackets** <br> Chassis door (optional), and deep door version | NCS2002-SA <br> NCS2002-DR, NCS2002-DDR |
| **Fan-Tray Assembly with LCD Status and Backup Memory** <br> Chassis air filter | NCS2002-FTA <br> NCS2002-FTF |
| **Power Options** <br> DC power module with ANSI power connector <br> With element management solution connection <br> With USB connection to passive Cisco device for inventory management <br> With Building Integrated Timing Supply (BITS) 1 input and output <br> DC power module with ETSI power connector <br> With element management solution connection <br> With USB connection to passive Cisco device for inventory management <br> With BITS 1 input and output <br> AC power module with universal IEC power connector <br> With element management solution connection <br> With USB connection to passive Cisco device for inventory management <br> With BITS 1 input and output | NCS2002-DC <br><br><br><br> NCS2002-DC-E <br><br><br><br> NCS2002-AC |
| **Brackets and Air Deflectors (Optional spares)** <br> 19-in., 21-in., and 23-in. brackets <br> 21-in. air deflectors <br> 23-in. air deflectors <br> NCS2002/M2 Front-to-Back air defl, 19, 21, 23 cabinets, 23 rack | 15454-M2-BRKT <br> 15454-M2-DEFL21 <br> 15454-M2-DEFL23 <br> NCS2002-CAB-DEFL |
| Wall-mount bracket | 15454-M2-WM |

**Table 4.** Common Equipment for the NCS 2006 and NCS 2002

| | |
|---|---|
| **Enhanced TNC card** <br> **Enhanced TSC card** | 15454-M-TNCE <br> 15454-M-TSCE |
| **Line-card blank** <br> **Line-card slot-detectable filler** <br> **Control-card slot-detectable filler** <br> **Cisco NCS 2006 Power Module blank filler** | 15454-BLANK <br> 15454-M-FILLER <br> 15454-M-T-FILLER <br> NCS2006-PWRFLR |

**Table 5.** Cisco NCS 2000 Cables

| Product Number | Description | Length | Gauge | Connector 1 | Connector 2 |
|---|---|---|---|---|---|
| **15454-M-120TMGCBL(=)** | BITS IN/OUT cable for ANSI | 0.6 m | COAX 23 AWG | DIN 1.0/2.3 | 2 WIRE WRAP PINS |
| **15454-M2-DCCBL-LE(=)** | DC power cable for ETSI left exit | 10 m | 12 AWG | Power D-Sub 2 poles | none |
| **NCS2006-DCCBL-LE(=)** | DC power cable for ETSI left exit | 10 m | 8 AWG | Power D-Sub 3 poles | none |
| **NCS2006-DCCBL-RE(=)** | DC power cable for ETSI right exit | 10 m | 8 AWG | Power D-Sub 3 poles | none |
| **15454-M-ACCBL2-L(=)** | AC power cable ANSI 110Vac left exit | 3 m | 15A - 125V | C19 | NEMA 5-15P |
| **15454-M-ACCBL2-L2(=)** | AC power cable ANSI 220Vac left exit | 3 m | 15A - 250V | C19 | NEMA 6-15P |
| **15454-M-ACCBL2-R(=)** | AC power cable ANSI 110Vac right exit | 3 m | 15A - 125V | C19 | NEMA 5-15P |
| **15454-M-ACCBL2-R2(=)** | AC power cable ANSI 220Vac right exit | 3 m | 15A - 250V | C19 | NEMA 6-15P |
| **15454-M-ACL6-L(=)** | AC power cable for Data Center | 3 m | 15A - 250V | C19 | NEMA WD 6 L6-20P |

| Product Number | Description | Length | Gauge | Connector 1 | Connector 2 |
|---|---|---|---|---|---|
| 15454-M-ACL6-R(=) | AC power cable for Data Center | 3 m | 15A - 250V | C19 | NEMA WD 6 L6-20P |
| 15454-M-ALMCBL(=) | SCSI Alarm cable | 20 m | 28 AWG | Mini SCSI | None |
| 15454-M-ALMCBL2(=) | SCSI Alarm cable limited to 8 inputs | 20 m | 24 AWG | Mini SCSI | None |
| 15454-M-CBL2-LARG(=) | AC power cable - ARG left exit | 3 m | 10A - 250V | C19 | IRAM 2073 - IEC 60884-1 |
| 15454-M-CBL2-LAUS(=) | AC power cable - AUS left exit | 3 m | 10A - 250V | C19 | AS/NZS 3112: 2000 |
| 15454-M-CBL2-L-CHI(=) | AC power cable - China left exit | 3 m | 10A - 250V | C19 | GB2099.1/GB1002 |
| 15454-M-CBL2-L-EU(=) | AC power cable - EU left exit | 3 m | 10A - 250V | C19 | CEE 7 STANDARD SHEET VII |
| 15454-M-CBL2-L-IND(=) | AC power cable - India left exit | 3 m | 10A - 250V | C19 | IS 1293 |
| 15454-M-CBL2-L-JPN(=) | AC power cable - Japan left exit | 3 m | 15A - 125V | C19 | JIS C8303 & JIS C8306 |
| 15454-M-CBL2-LKOR(=) | AC power cable - KOR left exit | 3 m | 10A - 250V | C19 | K60884-01 |
| 15454-M-CBL2-L-UK(=) | AC power cable - UK left exit | 3 m | 10A - 250V | C19 | BS 1363/A & SS145/A |
| 15454-M-CBL2-RARG(=) | AC power cable - ARG right exit | 3 m | 10A - 250V | C19 | IRAM 2073 - IEC 60884-1 |
| 15454-M-CBL2-RAUS(=) | AC power cable - AUS right exit | 3 m | 10A - 250V | C19 | AS/NZS 3112: 2000 |
| 15454-M-CBL2-R-CHI(=) | AC power cable - China right exit | 3 m | 10A - 250V | C19 | GB2099.1/GB1002 |
| 15454-M-CBL2-R-EU(=) | AC power cable - EU right exit | 3 m | 10A - 250V | C19 | CEE 7 STANDARD SHEET VII |
| 15454-M-CBL2-R-IND(=) | AC power cable - India right exit | 3 m | 10A - 250V | C19 | IS 1293 |
| 15454-M-CBL2-R-JPN(=) | AC power cable - Japan right exit | 3 m | 15A - 125V | C19 | JIS C8303 & JIS C8306 |
| 15454-M-CBL2-RKOR(=) | AC power cable - KOR right exit | 3 m | 10A - 250V | C19 | K60884-01 |
| 15454-M-CBL2-R-UK(=) | AC power cable - UK right exit | 3 m | 10A - 250V | C19 | BS 1363/A & SS145/A |
| 15454-M-TMGCBL(=) | BITS IN/OUT cable for ETSI | 20 m | COAX 23 AWG | DIN 1.0/2.3 | none |
| 15454-M-USBCBL(=) | USB cable for passive devices | 3 m | 28#/1P + 24#/2C + AEB | USB "A" MALE | USB "A" MALE |

**Table 6.**     NCS 2006 Product Specifications

| Item | Specification |
|---|---|
| **Power Requirements** | **Maximum** |
| AC power configuration | 900W |
| DC power configuration | 1400W |
| **Power Consumption** | |
| Fan-tray assemblies | 120W |
| AC power module | 135W |
| DC power modules | 40W |
| **Physical Dimensions** | |
| Rack-mounting | 19- or 23-in. (483- or 584-mm) EIA rack mounting 19-in. (483-mm) rack mounting or 21-in. (533-mm) cabinet mounting |
| **Shelf Assembly** | |
| Cisco NCS 2006 shelf assembly | (H x W x D): 10.45 x 17.45 x 11.02 in. (265.4 x 443.3 x 280 mm) |

| Item | Specification |
|---|---|
| **Environmental Conditions** | |
| Storage temperature | -40 to 158ºF (-40 to 70ºC) |
| Operating temperature<br>&bull; Normal<br>&bull; Short-term[1] | <br>32 to 131ºF (0 to 55ºC)<br>23 to 131ºF (-5 to 55ºC) |
| Relative humidity<br>&bull; Normal<br>&bull; Short-term[2] | <br>5 to 85%, noncondensing<br>5 to 90% but not to exceed 0.024 kg water/kg of dry air |

[1]. Refers to a period of not more than 96 consecutive hours and a total of not more than 15 days in 1 year.

[2]. Refers to a total of 360 hours in any given year, but no more than 15 occurrences during that 1-year period.

**Table 7.**     NCS 2002 Product Specifications

| Item | Specification |
|---|---|
| **Power Requirements** | **Maximum** |
| AC power configuration | 350W |
| DC power configuration | 450W |
| **Power Consumption** | |
| Fan-tray assemblies | 40W |
| AC power module | 52W |
| DC power modules | 30W |
| **Physical Dimensions** | |
| Rack mounting | 19- or 23-in.(483- or 584-mm, respectively) EIA rack-mounting<br>19-in. (83-mm) rack-mounting or 21-in. (533-mm) cabinet mounting |
| **Shelf Assembly** | |
| Cisco NCS 2002 shelf assembly | (H x W x D): 3.46 x 17.18 x 11.02 in. (87.9 x 436.4 x 280 mm) |
| **Environmental Conditions** | |
| Storage temperature | -40 to 158ºF (-40 to 70ºC) |
| Operating temperature | Normal: 32 to 131ºF (0 to 55ºC)<br>Short-term[1]: 23 to 131ºF (-5 to 55ºC) |
| Relative humidity | Normal: 5 to 85%, noncondensing<br>Short-term[2]: 5 to 90% but not to exceed 0.024 kg water/kg of dry air |

## Regulatory Standards Compliance

Table 8 summarizes regulatory standard compliance and agency approvals.

**Table 8.**     Regulatory Standard Compliance and Agency Approvals

| ANSI (Cisco NCS 2002) System | ETSI (Cisco NCS 2002) System |
|---|---|
| **Supported Countries** | |
| &bull; Canada<br>&bull; United States<br>&bull; Korea | &bull; Europe<br>&bull; Latin America<br>&bull; Japan<br>&bull; Asia Pacific<br>&bull; Middle East and Africa |

| ANSI (Cisco NCS 2002) System | ETSI (Cisco NCS 2002) System |
|---|---|
| **EMC (Class A)** | |
| <ul><li>ICES-003 Issue 4(2004)</li><li>GR-1089-CORE, Issue 4 (Type 2 and Type 4 equipment)</li><li>GR-1089-CORE - Issue 03 (Oct 2002) (Objective O3-2 - Section 3.2.1 - Radiated Emissions requirements with all doors open)</li><li>FCC 47CFR15, Class A subpart B (2006)</li></ul> | <ul><li>EN 300 386 v1.3.3 (2005) and v1.4.1 (2007)</li><li>CISPR 22 - Fifth edition (2005-04) Class A and the amendment 1 (2005-07)</li><li>CISPR 24 - First edition (1997-09) and amendment 1 (2001-07) and amendment 2 (2002-10)</li><li>EN 55022:1998 Class A - CENELEC Amendment A2:2003</li><li>EN 55024:1998 - CENELEC Amendment A1:2001 and Amendment A2:2003</li><li>Resolution 237 (Brazil)</li><li>VCCI V-3/2006.04</li><li>EN 61000-6-1:2001</li><li>EN 61000-6-2:1999</li></ul> |
| **Safety** | |
| <ul><li>UL/CSA 60950 -1 First Edition (2003)</li><li>GR-1089-CORE, Issue 4 (Type 2 and Type 4 equipment)</li></ul> | <ul><li>UL/CSA 60950 -1 First Edition (2003)</li><li>IEC 60950-1 (2001/10)/Amendment 11:2004 to EN 60950-1:2001, 1$^{st}$ Edition (with all country deviations)</li></ul> |
| **Environmental** | |
| <ul><li>GR-63-CORE, Issue 3 (2006)</li></ul> | <ul><li>ETS 300-019-2-1 V2.1.2 (Storage, Class 1.1)</li><li>ETS 300-019-2-2 V2.1.2 (Transportation, Class 2.3)</li><li>ETS 300-019-2-3 V2.1.2 (Operational, Class 3.1E)</li><li>EU WEEE regulation</li><li>EU RoHS regulation</li></ul> |
| **Power and Grounding** | |
| <ul><li>GR-1089-CORE, Issue 4</li></ul> | <ul><li>ETS 300 132-2</li></ul> |
| **Optical Safety** | |
| <ul><li>EN or IEC-60825-2 Third edition (2004-06)</li><li>EN or IEC 60825-1 Consol. Ed. 1.2 - incl. am1+am2 (2001-08)</li><li>21CFR1040 (2004/04) (Accession Letter and CDRH Report)</li><li>IEC-60825-2 Third edition (2004-06)</li><li>ITU-T G.664 (2006)</li></ul> | |
| **Miscellaneous** | |
| <ul><li>Acoustic noise<ul><li>GR-63-CORE, Issue 3 (2006)</li><li>ETS 300 753 ed.1 (1997-10)</li></ul></li><li>Mechanical shock and bumps<ul><li>AS1099- 2.27</li></ul></li><li>Customer-specific requirements<ul><li>AT&T Network Equipment Development Standards (NEDS) Generic Requirements, AT&T 802-900-260</li><li>SBC TP76200MP</li><li>Verizon SIT.NEBS.NPI.2002.010</li></ul></li></ul> | |

## Ordering Information

To place an order, visit the Cisco Ordering homepage and refer to Tables 9 and 10. To download software, visit the Cisco Software Center: http://www.cisco.com/cisco/software/type.html?mdfid=278281788&i=rm.

**Table 9.**   Cisco NCS 2006 Ordering Information

| Product ID | Description |
|------------|-------------|
| **Common Equipment** | |
| **NCS2006-SA=** <br> **NCS2006-DR=** <br> **NCS2006-DDR=** | Shelf assembly with brackets, Cisco NCS 2006 <br> Chassis Door, Cisco NCS 2006 <br> Chassis Deep Door, Cisco NCS 2006 |
| **NCS2006-FTA=** <br> **NCS2006-FTF=** | Fran Tray assembly, Cisco NCS 2006 <br> Chassis Air Filter, Cisco NCS 2006 |
| **NCS2006-DC=** <br> **NCS2006-DC20=** <br> **NCS2006-AC=** <br> **NCS2006-PWRFLR=** | 40A DC Power Supply Module, Cisco NCS2006 <br> 20A DC Power Supply Module, Cisco NCS2006 <br> AC Power Supply Module, Cisco NCS2006 <br> Power Module blank filler, Cisco NCS 2006 |
| **NCS2006-ECU=** | External Connection Unit, Cisco NCS 2006 |
| **NCS2006-LCD=** | LCD and Memory, Cisco NCS 2006 |
| **15454-M6-BRKT=** <br> **15454-M6-DEF21=** <br> **15454-M6-DEF23=** <br> **NCS2006-CAB-DEFL=** | 19-in./23-in. and 21-in. Brackets, Cisco NCS 2006 <br> 21-in. Air deflector, Cisco NCS 2006 <br> 23-in. Air deflector, Cisco NCS 2006 <br> NCS2006/M6 Front-to-Back air defl, 19, 21, 23 cabinets, 23 rack |
| **15454-M-SHIPKIT=** | Shipkit, Cisco NCS 2006 and Cisco NCS2002 |
| **15454-M-TNCE-K9=** <br> **15454-M-TSCE-K9=** | Enhanced Transport Node Controller <br> Enhanced Transport Shelf Controller |
| **15454-BLANK=** <br> **15454-M-FILLER=** <br> **15454-M-T-FILLER=** | Shelf slot-filler panel, fits any slot in NCS 2000 or Cisco ONS 15454 ANSI shelf assembly <br> Shelf line-slot filler card, fits line-card slots in NCS 2006 and NCS 2002 chassis <br> Shelf control-slot filler card, fits control-card slots in NCS 2006 and NCS 2002 chassis |

**Table 10.**   Cisco NCS 2002 Ordering Information

| Product ID | Description |
|------------|-------------|
| **Common Equipment** | |
| **NCS2002-SA=** <br> **NCS2002-DR=** <br> **NCS2002-DDR=** | Shelf assembly, Cisco NCS2002 <br> Chassis Door, Cisco NCS2002 <br> Chassis Deep Door, Cisco NCS2002 |
| **NCS2002-FTA=** <br> **NCS2002-FTA2=** <br> **NCS2002-FTF=** | Fran Tray assembly, Cisco NCS2002 <br> 2$^{nd}$gen Fan Tray assembly, Cisco NCS2002 <br> Chassis Air Filter, Cisco NCS2002 |
| **NCS2002-DC=** <br> **NCS2002-DC-E=** <br> **NCS2002-AC=** | DC Power Supply Module, Cisco NCS2002 <br> DC ETSI Power Supply Module, Cisco NCS2002 <br> AC Power Supply Module, Cisco NCS2002 |
| **15454-M2-BRKT=** <br> **15454-M2-DEF21=** <br> **15454-M2-DEF23=** <br> **15454-M2-WM=** | 19"/23" and 21" Brackets, Cisco NCS2002 <br> 21" Air deflector, Cisco NCS2002 <br> 23" Air deflector, Cisco NCS2002 <br> Wall mount bracket, Cisco NCS2002 |
| **15454-M-SHIPKIT=** | Shipkit, Cisco NCS2006 and Cisco NCS2002 |
| **15454-M-TNCE-K9=** <br> **15454-M-TSCE-K9=** | Enhanced Transport Node Controller <br> Enhanced Transport Shelf Controller |

| Product ID | Description |
|---|---|
| **15454-BLANK=** | Shelf slot-filler panel, fits any slot in Cisco ONS 15454 ANSI shelf assembly |
| **15454-M-FILLER=** | Shelf line-slot filler card, fits line-card slots in Cisco ONS 15454 M6 and NCS2002 chassis |
| **15454-M-T-FILLER=** | Shelf control-slot filler card, fits control-card slots in Cisco ONS 15454 M6 and NCS2002 chassis |

**Table 11.**   Cisco NCS 2000 Line Cards and Components

| Product ID | Description |
|---|---|
| **ROADM** | |
| **NCS2K-16-WXC-FS=** | 16-ports Wavelength X-Connect and Mux/Demux - Flex Spectrum |
| **NCS2K-MF-1RU=** | Mechanical Frame - 4 slots - 1 RU |
| **NCS2K-MF-DEG-5=** | Mesh Interconnection MF Unit - Up to 5 Degrees |
| **NCS2K-MF-UPG-4=** | Mesh Interconnection MF Unit - Upgrade - 4 Degrees |
| **NCS2K-MF-16AD-CFS=** | 16-Ports Add/Drop MF Unit - Colorless and FlexSpectrum |
| **NCS2K-MF-4X4-COFS=** | 4-Degree and 4-Ports Add/Drop MF Unit - CO and FlexSpectrum |
| **NCS2K-MF-MPO-8LC=** | MPO to 8x LC Fan-Out MF Unit - With Integrated Monitoring |
| **EDRA** | |
| **NCS2K-EDRA1-26C=** | 21dBm Erbium Doped Raman Amplifier 26dB Span - C-Band |
| **NCS2K-EDRA1-35C=** | 21dBm Erbium Doped Raman Amplifier 35dB Span - C-Band |
| **NCS2K-EDRA2-26C=** | 21dBm Erbium Doped Raman Amplifier + Bst 26dB Span - C-Band |
| **NCS2K-EDRA2-35C=** | 21dBm Erbium Doped Raman Amplifier + Bst 35dB Span - C-Band |
| **Transponder** | |
| **NCS2K-100G-CK-C=** | 100G CPAK Multi-Rate Line Card - CP-DQPSK - C-Band |
| **NCS2K-100G-CK-C** | 100G CPAK Multi-Rate Line Card - CP-DQPSK - C-Band |
| **NCS2K-100ME-CKC=** | 100G CPAK Multi-Rate Line Card - CP-DQPSK - Metro - C-Band |
| **NCS2K-100ME-CKC** | 100G CPAK Multi-Rate Line Card - CP-DQPSK - Metro - C-Band |
| **L-NCS2K-100G-FFU=** | NCS 2K/MSTP License 100G LC - Full Feature Upg e-Delivery |
| **L-NCS2K-100G-10G=** | NCS 2K/MSTP License 100G MXP - 1x 10G MR Port e-Delivery |

## Warranty

The following warranty terms apply to the Cisco NCS 2006 as well as services you may use during the warranty period. Your formal warranty statement appears in the Cisco Information Packet that accompanies your Cisco product.

- Hardware warranty duration: Five years
- Software warranty duration: One year
- Hardware replacement, repair, or refund procedure: Cisco or our service center will use commercially reasonable efforts to ship a replacement part for delivery within 15 working days after receipt of the defective product at Cisco's site. Actual delivery times of replacement products may vary depending on customer location.

Product warranty terms and other information applicable to Cisco products are available at: http://www.cisco.com/go/warranty.

## Cisco Services for Migrating Converged IP+Optical Solutions

Services from Cisco and our partners help you get the most value from your investments in Cisco's converged IP+Optical solution, quickly and cost effectively. We can help you design, implement, and validate your solution to speed migration and cutover. Coordinate every step through to interworking. Strengthen your team. And make the most of tomorrow's opportunities. Learn more at http://www.cisco.com/go/spservices.

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