Data Sheet

Cisco ONS 15454 SONET 56-Port DS-1/E1 Card

The Cisco® ONS 15454 SONET 56-port DS-1/E1 Card provides a cost-effective, high-density DS-1/E1 interface solution for hand-offs and aggregation of large numbers of DS-1 and E1 circuits between networks. The card's high-density design frees up shelf-assembly slots for additional service-interface types.

Product Overview

The Cisco ONS 15454 SONET 56-port DS-1/E1 Card (Figure 1) provides 56 DS-1 interfaces operating at 1.544 Mbps received over 100-ohm nominal twisted-pair cable or 56 E1 interfaces operating at 2.048 Mbps over 120-ohm nominal twisted-pair cable. The DS-1 and E1 interfaces are used for terminating transport signals within a central office or customer premises.

Figure 1
Cisco ONS 15454 56-Port DS-1/E1 Electrical Interface

The 56-port DS-1/E1 card supports manual-mode or auto-mode frame-format provisioning, simplifying the activation of services. The DS-1s support asynchronous and byte-synchronous options for the mapping to VT-1.5. The E1s supports asynchronous mapping to VC-12 SDH. The following port usage options are available:

- DS-1 only: All 56 ports are configured for DS-1s (first 28 ports support retiming)
- E1 only: All 56 ports are configured for E1s (first 21 ports support retiming)

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The DS-1/E1 signals are terminated on one of the Cisco ONS 15454 shelf assembly's high-density universal backplane interface connector (UBIC) electrical interface adapter (EIA) panels.

The 56-port DS-1/E1 card is provisionable for either transport over SONET or SDH payloads. When provisioned in SONET-mapping mode, the output payload are STS-1s whereby the DS-1s are mapped to VT-1.5 payloads (following Telcordia Technologies GR-253-CORE or Cisco mapping structures). Provisioned in SDH-mapping mode, the output is an STS-3/VC-4 whereby the E1s are mapped to VC-12 containers. The output STS-1 or STS-3c/AU-4 payloads are connected to the Cisco ONS 15454 system's cross-connect matrix, allowing the signal to be groomed with other services for transport over a SONET network. The E1 to AU-4 payload mapping structure allows interoperability with a payload generated by a 42-port E1 card on the Cisco ONS 15454 ETSI/SDH platform (Figure 3).

The first 21 E1 or 28 DS-1 ports can be provisioned for retiming. Retiming a port means the transmit DS-1/E1 clock is retimed to the clock reference of the network element (Cisco ONS 15454), removing the asynchronous relationship between the electrical line and SONET transport domains. When retiming is not selected, the DS-1/E1 transmission is through-timed, allowing the timing domains to be separate between the SONET and electrical signal. All DS-1 and E1 ports are provisionable to be used as a source of node timing, except when already provisioned in retiming mode or looped back.

The 56-port DS-1/E1 cards are deployable in six multiservice interface card slots (1, 2, 3, 15, 16, and 17) of the Cisco ONS 15454 Multiservice Provisioning Platform (MSSP) high-density shelf assembly (SA-HD). Printed on the faceplate is a blue hexagon icon, which indicates the shelf slot where the card can be physically installed. The 56-port DS-1/E1 card supports two card-protection options, including 1:0 (unprotected) and 1:N, N•2. The card can be provisioned to operate as either a working or a protection card, reducing spares inventories and their associated cost.

The 56-port DS-1/E1 card supports circuit-level interoperability with the existing Cisco ONS 15454 SONET 14-port DS-1 and SDH 42-port E1 cards. The system supports in-service upgrades from the 14-port DS-1 card, with compatible shelf configurations, using the card upgrade wizard. This allows the user to increase the number of interfaces supported on a shelf assembly or reduce the number of shelf slots required to terminate a given quantity of DS-1 interfaces.

To aid with system troubleshooting and fault isolation, the 56-port DS-1/E1 card supports near-end and far-end performance-monitoring capabilities at the SONET, DS-1, and E1 levels. Loopback support, including near-end and far-end facility (line) and terminal configurations along with far-end activation code (FEAC) support, further simplifies fault-isolation procedures. The card provides three faceplate-mounted status indicators: a red FAIL LED for hardware–level problems; dual color, green/yellow ACTIVE/STANDBY LED to indicate when the card is being used as the active card or a protection card, and a yellow SIGNAL FAIL LED for problems being received on incoming ports. The condition of the card's individual interface ports can be queried using the shelf's liquid crystal display (LCD) panel as well as the browser-based Cisco Transport Controller craft interface. The LEDs will be exercised during a user requested lamp test operation.

Applications

The 56-Port DS-1/E-1 card enables a number of service provider applications including the aggregation of DS-1 services to the central office and E-1 terminations of international traffic.

DS-1 Aggregation

The Cisco ONS 15454 MSPP, using both low-density and high-density DS-1 cards, supports service provider hub applications requiring the aggregation of large quantities of DS-1 services, and transports them to a large central office for hand-off to core-network switches, voice switches, add/drop multiplexers (ADMs), routers, digital cross-connect systems (DCSs), or other networking equipment (Figure 2).

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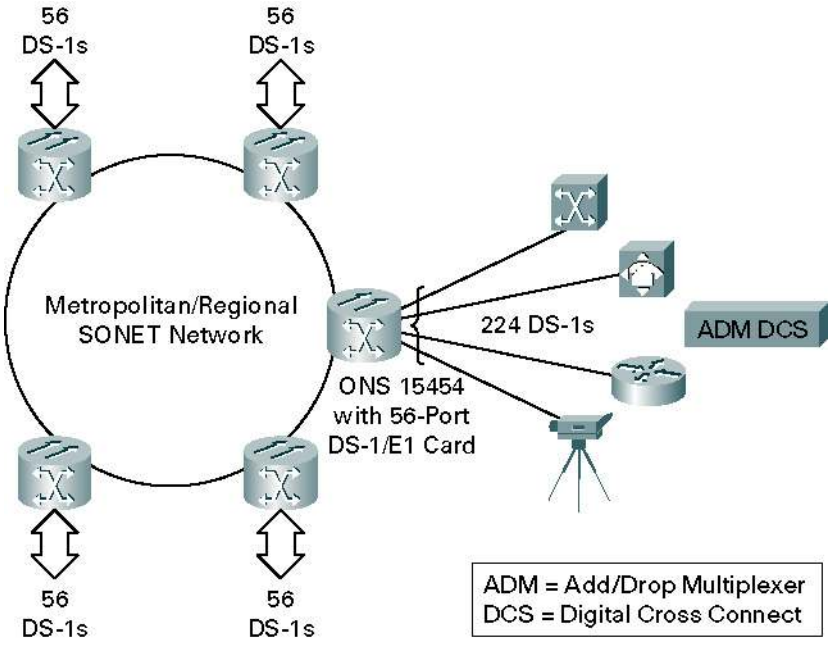
Figure 2
Service Provider DS-1 Aggregation



E-1 Termination of International Traffic

The 56-port DS-1/E-1 card enables the termination of internationally sourced E1 service traffic on the Cisco ONS 15454 SONET Multiservice Provisioning Platform (MSPP). The Cisco ONS 15454 SONET MSPP supports optical interfaces that are provisionable for SDH termination, simplifying the E-1 interconnections to the SDH transport equipment (Figure 3).

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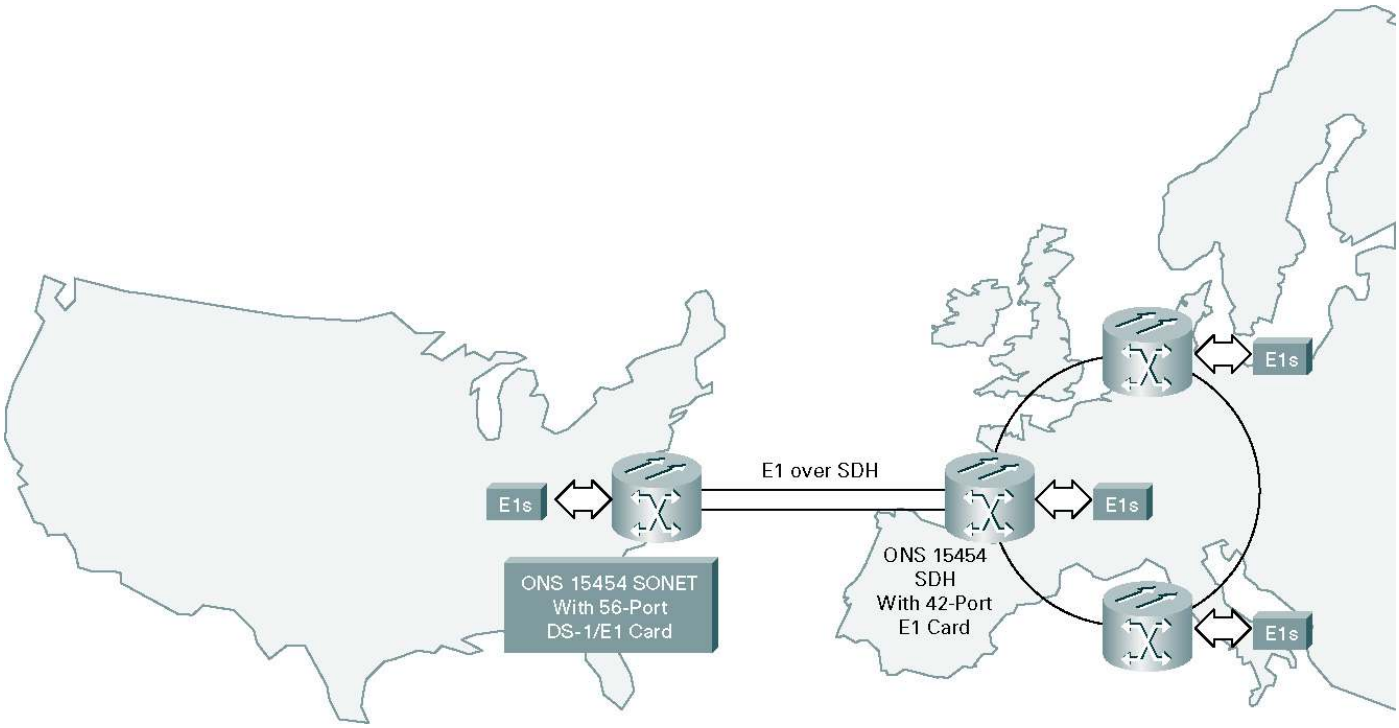
Figure 3

E-1 Terminations from International Sources



Key Features and Benefits

Table 1 outlines some of the key features and benefits of the 56-port DS-1/E1 card.

Table 1. Features and Benefits

Feature	Benefits
Provisionable port retiming	Transmit ports can be retimed by the node clock or through-timed from the received client interface signal.
Multiprotocol support	Allows a single card type to support either DS-1 or E1 signals (not at the same time) reducing the number of card variations in spares inventory and the associated cost.
Selectable node timing source	DS-1 and E1 ports can be selected as an input timing source for the network element, providing another option for network timing.
Multiple DS-1 mapping options	Ports can be provisioned for asynchronous or byte-synchronous mapping to VT-1.5s to support the various requirements of terminal equipment.
Support for facility data-link performance monitoring statistics	Capable of receiving status messages from remote equipment supporting FDL per T1.403 and AT&T specifications.
Provisionable J0 section, J1 STS-1 path, and J2 VT path trace support	Enhances network maintenance and troubleshooting activities.
User-defined automatic in-service (AINS) of ports	Allows service port and path to be created awaiting valid signal without creating invalid system alarms.

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The 56-port DS-1/E1 card significantly reduces the number of systems required and their associated footprint, power, and cabling to terminate the DS-1 services. The card also helps reduce the number of service cards, opening up shelf slots for other services. Figure 4 depicts a Cisco ONS 15454 OC-12-based network element delivering 112 DS-1 service ports, using the 14-port DS-1 card. Figure 5 depicts the additional services and capabilities that can be delivered over the same footprint by using the 56-port DS-1/E1 card.

Figure 4
Cisco ONS 15454 Configuration with 14-Port DS-1 Card

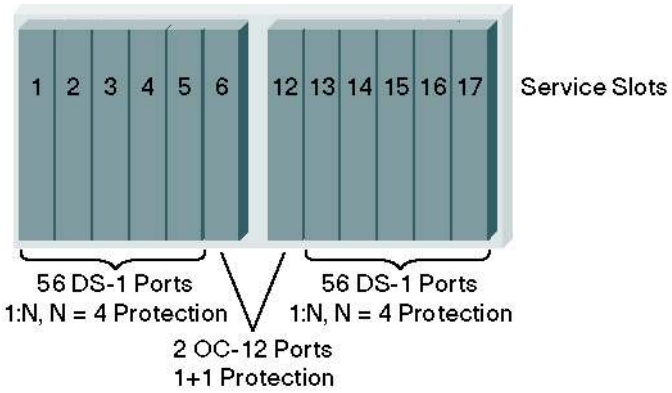
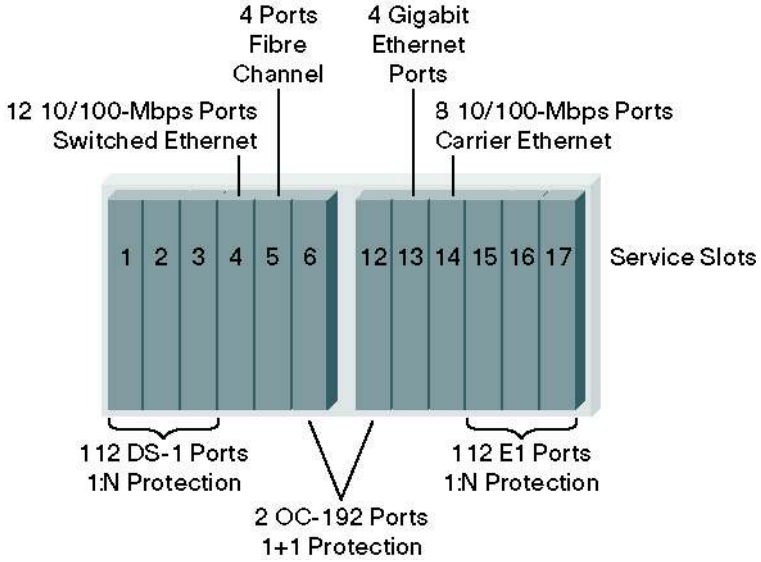


Figure 5
Cisco ONS 15454 Configuration with 56-port DS-1/E1 Card



The high-density DS-1/E1 card dramatically increases the overall system flexibility to support the many service types found in the metro networks.

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Product Specifications

Table 2, Table 3, and Table 4 outline the regulatory and product specifications for the Cisco ONS 15454 SONET 56-Port DS-1/E1 Electrical Card.

Table 2. Regulatory Compliance

Regulatory Compliance
Homologation
SONET/ANSI System
Canada
European Union (EU)
Japan
Korea
Mexico
United States
Hong Kong
Taiwan
Electromagnetic Compliance
EN300-386-TC
NEBS Telcordia Technologies GR-1089-CORE, Issue 3 (Level 3, Type 2 and Type 4)
IEC CISPR 22, IEC CISPR 24
IC ICES-003, Issue 3, 1997
FCC 47CFR15
EN55022, EN55024
EN61000-6-1
VCCI: V-3/2000.04 (Japan)
Resolution 237 (Brazil)
Product Safety
NEBS Telcordia Technologies GR-1089-CORE, Issue 3 (Level 3, Type 2 and Type 4)
IEC 60950-1 /EN 60950-1, 1st Ed. (CB Report / Certificate with all country deviations)
UL and cUL / CSA 60950-1 1st Ed.
Environmental
NEBS Telcordia Technologies GR-63-CORE, Level 3
ETS 300 019-2-1 (Storage, Class 1.1)
ETS 300 019-2-2 (Transportation, Class 2.3)
ETS 300 019-2-3 (Operational, Class 3.1E extended to –40 to 65°C)
Telecom
DS-1: Canada (CS-03, Hong Kong (HKTA 2028), Japan (JATE Green Book), Taiwan (ID 0002), US (TIA-968), Malaysia (TIA-968)
E1: Australia (S016), EU (TBR 12, TBR 13), EU (G.703:2001)

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Regulatory Compliance
Other
AT&T Network Equipment Development Standards (NEDS) Generic Requirements
SBC TP76200MP
Verizon TCG Checklist
WorldCom ESD

Table 3. Product Specifications: Card

Parameter	Value
Payload Mapping	
DS-1 to VT-1.5	Asynchronous and byte synchronous
E1 to VC-12	Asynchronous
Payload Mapping Modes	
SONET	DS-1 –> VT-1.5 –> STS-1
SDH	E1 –> VC-12 –> TU12 –> TUG2 –> TUG3 –> VC-4
Performance Monitoring	DS-1, E-1, and SONET
Path Trace	
STS	J1-byte
VT	J2-byte
Section Trace	J0-byte
Card-Level Indicators	
Red “FAIL” LED	Hardware problem or reset indication during boot sequence
Green/amber “ACT/STBY” LED	Green: Card is ready to carry traffic
	Amber: Card is in standby mode, not carrying traffic, in a protection group
Yellow “SF” LED	Signal failure including Loss of Signal (LOS), Loss of Frame (LOF), or high Bit Error Rate (BER)
BER Measurements	10-3
Physical Dimensions	Single-slot width
	12.65 H x 0.716 W x 9 D in.
	321.3 H x 18.2 W x 228.6 D mm
Weight	2.0 lbs./0.9kg
Maximum Power	36W
Temperature and Humidity	
Operating	–40 to 149°F (–40 to 65°C), 5 to 95%, noncondensing humidity
Storage	–40 to 185°F (–40 to 85°C), 5 to 95%, noncondensing humidity

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Table 4. Product Specifications: Interface Ports

Parameter	DS-1	E1
Facilities Per Card	56	56
Compliance	GR-499-CORE, GR-253-CORE, ANSI T1.403-1999	GR-499-CORE, GR-253-CORE, ITU-T G.703
Bit Rate	1.544 Mbps ±20ppm	2.048 Mbps ±50ppm
Frame Format	D4, Extended Super Frame (ESF), unframed	E1 multiframe, E1 CRC multiframe, and unframed (ITU)
Line Coding	Alternate Mark Inversion (AMI) and Bipolar with 8 Zero Substitution (B8ZS)	High Density Bipolar of order 3 code (HDB3)
Facility Protection	Protected (1:N, N•2) Unprotected (0:1)	Protected (1:N, N•2) Unprotected (0:1)
Working Facilities Per Shelf	224 maximum, protected or unprotected	224 maximum, protected or unprotected
Loopback Modes	Terminal and facility	Terminal and facility
Termination	Balanced twisted pair, 22/24 AWG	Balanced twisted pair, 22/24 AWG
Input Impedance	100 ohms =/–5%	120 ohms =/–5%
Cable Loss	655 feet maximum, compliant to GR-499-CORE	Compliant per ITU-T G.703
Output Power Level	12.6 to 17.9 dBm	13.7 to 17.5 dBm
Pulse Shape	GR-499-CORE, Figure 9.5	ITU-T G.703, Figure 15
Pulse Amplitude	2.4 to 3.6 volts peak amplitude	2.7 to 3.3 volts peak amplitude
Line Build-Out	0 to 131 ft 132 to 262 ft 163 to 393 ft 394 to 524 ft 525 to 655 ft	–

System Requirements

The Cisco ONS 15454 system requirements for operation of the 56-port DS-1/E1 card are outlined in Table 5.

Table 5. System Requirements

System Parameter	Value
Shelf Assembly	15454-SA-HD
Electrical Interface Assembly (EIA) Panels	Universal Backplane Interface Connector (UBIC)
Processor	TCC2 or TCC2P
Cross-Connect	XC-VT XC-10G XC-VXC-10G
System Software	Release 6.0 or later (SONET)
Slot Compatibility	Slots 1 to 3, 15 to 17

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Ordering Information

To place an order, visit the Cisco Ordering Home Page. Table 6 outlines the ordering code for the Cisco ONS 15454 SONET 56-Port DS-1/E1 Card.

Table 6. Ordering Information

Product Description	Part Number
56-port DS-1/E1 interface card, 56 circuits, industrial temperature, SONET system	15454-DS1E1-56

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For More Information

For more information about the Cisco ONS 15454, visit: http://cisco.com/en/US/products/hw/optical/ps2006/ps2010/index.html or contact your local account representative.

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