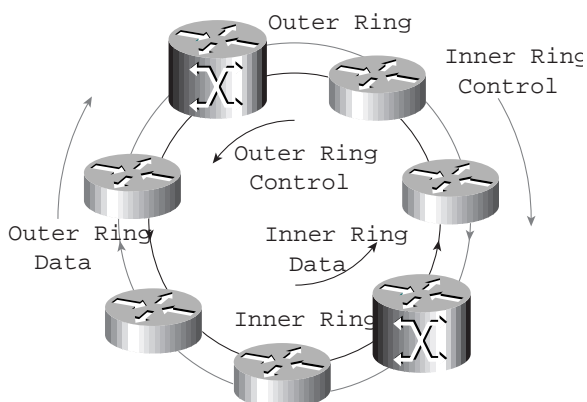


Dynamic Packet Transport Solutions Cisco 7500 OC-12c/STM-4c Packet Ring Interface Processor

THE CISCO DYNAMIC PACKET TRANSPORT (DPT) PRODUCTS DEFINE A NEW GENERATION OF TRANSPORT TECHNOLOGY—PACKET OPTIMIZED OPTICAL TRANSPORT SOLUTIONS. THESE SOLUTIONS COMBINE THE BANDWIDTH-EFFICIENT AND SERVICES-RICH CAPABILITIES OF IP ROUTING WITH THE BANDWIDTH-RICH, SELF-HEALING CAPABILITIES OF FIBER RINGS TO DELIVER FUNDAMENTAL COST AND FUNCTIONALITY ADVANTAGES OVER EXISTING SOLUTIONS.

DPT rings are dual, counter-rotating fiber rings. Both fibers are concurrently utilized to transport both data and control traffic as depicted in Figure 1.

Figure 1 Dynamic Packet Transport



Spatial Reuse Protocol

SRP is the media independent MAC layer protocol that enables DPT functionality in ring configurations. The SRP MAC provides the base functionality for addressing, packet stripping, bandwidth control, and control message propagation on the packet ring.

Transport Flexibility and Evolution

DPT rings run on a variety of transport technologies including SONET/SDH, wavelength division multiplexing (WDM) and dark fiber. DPT provides carriers with the flexibility to operate packet rings over their embedded fiber transport infrastructure and provides an evolution path to packet-optimized transport for high-bandwidth IP networks. The DPT interface processor also provides the choice of multimode, single-mode intermediate reach and single-mode long reach optics to meet application requirements.

Spatial Reuse

DPT ring packet processing procedures utilize destination stripping—packets are removed from the ring by the intended destination node instead of utilizing bandwidth around the entire ring. Thus, the DPT ring provides packet-by-packet spatial reuse wherein multiple segments can concurrently exchange traffic at full ring bandwidth without interference.

Ring Bandwidth Multiplication

DPT leverages optimal path selection spatial reuse, statistical multiplexing, and two working fibers to maximize the ring's traffic carrying capacity—and to minimize initial and growth costs. DPT rings also utilize the patent-pending SRP Fairness Algorithm (SRP-fa) to ensure that both global fairness and local bandwidth optimization are delivered on all segments of the ring.

Transparent IP Service Extension

DPT provides an extensive set of packet handling features including:

- Packet prioritization
- Multiple levels of queuing and scheduling
- Multicasting
- MAC-based address filtering to efficiently extend enhanced IP services over the metro area.

Proactive Monitoring and Robust Self-healing

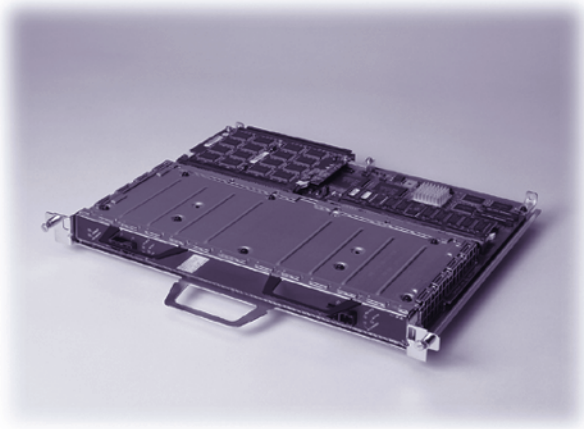
DPT combines powerful SONET/SDH overhead processing with Layer 2 management capabilities to deliver proactive, multilayer performance monitoring, fault detection, and fault isolation capabilities.

DPT provides sophisticated protection switching capabilities for responsive self-healing via the patent-pending Intelligent Protection Switching (IPS) algorithm. IPS enables sub-50-ms protection switching performance for rapid IP service restoration and protection hierarchy to handle cases of multiple, concurrent degrade, failure, or maintenance events.

Plug-and-Play Operation

DPT rings utilize automatic procedures for address assignment and resolution, ring topology and status discovery, and control message propagation to optimize ring traffic routing and management procedures. Service providers can rapidly put DPT rings into operation and add and remove nodes from the ring while minimizing expensive and time-consuming configuration and provisioning requirements.

Figure 2 Cisco 7500 Port Adapter



DPT Ring Applications

DPT rings enable a key set of applications for service providers and large enterprises including:

- Robust, high bandwidth intra PoP connectivity
- Regional PoP interconnectivity
- Cable data access and distribution
- Metropolitan area packet transport for business and residential access services
- Regional backbone rings
- Distributed enterprise campus rings

DPT IP: Overview

DPT ring Interface Processor for Cisco 7500 series routers occupies one full router chassis slot and provides one interface port. DPT IP is based on Versatile Interface Processor (VIP) technology.

Just like the DPT line card in Cisco 12000 GSR, the Interface Processor is also available in a choice of multimode or single-mode optics.

The DPT Interface Processor provides powerful hardware-based speed mismatch and adaptation features such as receive side payload buffering and priority-based queuing. Deficit Round Robin (DRR) algorithm is adopted for preferential handling of high-priority packets. The DPT Interface Processor also provides hardware-based random Early Detection (RED)

capabilities as a means for proactive congestion management.

These powerful features enable lower-speed devices to participate on higher speed rings such as DPT-OC-12c/STM-4c and DPT-OC-48c/STM-16c.

Table 1 DPT IP Features and Benefits

Feature	Benefit
SRP Fairness and Spatial Reuse	Maximizes ring packet carrying capacity, cost effectiveness, and service stability via spatial reuse, statistical multiplexing, and distributed, internodal fairness
Intelligent Protection Switching	Maximize ring robustness via self-healing around ring node or fiber failures and intelligent handling of multiple concurrent trouble events Provides fast IP service restoration without Layer 3 reconvergence to minimize impact on revenue-producing traffic
Multicast Support	Provides efficient support for new revenue-producing multicasting applications in LAN, MAN, and WAN environments
Packet Prioritization	Provides expedited handling of packets generated by mission-critical applications as well as delay-sensitive, real-time applications such as voice and video over IP
Dual Working Fiber Rings	Maximize ring robustness and bandwidth-carrying capability
Topology Discovery and Routing Procedures	Plug-and-Play capabilities minimize configuration requirements, optimize routing decisions for ring bandwidth maximization, and aid in network monitoring and management
Network Monitoring and Management	Maximize ring robustness and operational efficiency by providing SONET/SDH MIB support and MAC layer counters for proactive monitoring and recovery and effective traffic-engineering capabilities
Pass-through Mode Support	Maximize ring robustness and bandwidth availability by avoiding ring wraps caused by soft, recoverable failures in router hardware or software
Transport Flexibility	Maximize deployment flexibility by operating via dedicated fiber, WDM wavelength or as SONET/SDH tributary, thus matching both embedded and evolving infrastructure
Optics Options	Maximize application versatility and deployment flexibility by supporting multimode, and single-mode intermediate-reach and long-reach optics

Cisco 7500 SRPIP Part Numbers

Product	Part Number
Multimode Ring Interface Processor	SRPIP-OC12MM
Single-Mode, Intermediate Reach Ring Interface Processor	SRPIP-OC12SI
Single-Mode, Long-Reach Ring Interface Processor	SRPIP-OC12SL
Single-mode extended reach IP for Cisco 7500 Routers	SRPIP-OC12SMX

Cisco IOS® Software Release

- 12.0(4)XE or later

Optics Specifications

	Multimode	Single-Mode Intermediate-Reach	Single-Mode Long-Reach
Connector Type	SC duplex	SC duplex	SC duplex
Operating Wavelength	1310 nm	1310 nm	1310 nm
Transmit Power	-14 dBm (max.) -20 dBm (min.)	-8 dBm (max.) -15 dBm (min.)	+2 dBm (max.) -3 dBm (min.)
Receive Power	-14 dBm (max.) -26 dBm (min.)	-8 dBm (max.) -28 dBm (min.)	-8 dBm (max.) -28 dBm (min.)
Worst Case Reach	2 km	15 km	40 km

Transmit Buffer Memory

- 512 KB

Memory

- 32MB program memory ships standard
- 8MB packet memory ships standard
- 64–124MB program memory is recommended

LED

- Active, Enabled, Pass Through, Receive Carrier, Receive Packet

Physical Specifications

- Occupies single slot
- Weight: 6 lb. (2.7 kg)

Environmental Specifications

- Operating temp: 32 to 104 F (0 to 40 C)
- Storage temp: -4 to 149 F (-20 to 65 C)
- Relative humidity: 10 to 90% noncondensing



Corporate Headquarters

Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
<http://www.cisco.com>
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 526-4100

European Headquarters

Cisco Systems Europe
11, Rue Camille Desmoulins
92782 Issy Les Moulineaux
Cedex 9
France
<http://www-europe.cisco.com>
Tel: 33 1 58 04 60 00
Fax: 33 1 58 04 61 00

Americas

Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
<http://www.cisco.com>
Tel: 408 526-7660
Fax: 408 527-0883

Asia Headquarters

Nihon Cisco Systems K.K.
Fuji Building, 9th Floor
3-2-3 Marunouchi
Chiyoda-ku, Tokyo 100
Japan
<http://www.cisco.com>
Tel: 81 3 5219 6250
Fax: 81 3 5219 6001

Cisco Systems has more than 200 offices in the following countries. Addresses, phone numbers, and fax numbers are listed on the Cisco Connection Online Web site at <http://www.cisco.com/go/offices>.

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