

DXC-STM-1



STM-1 Synchronous Digital Multiplexer and Multiservice Access Node



FEATURES

- SDH transmission solution for access networks, expanding Local Loops to 60 km/37 miles
- Digital cross-connection for up to 960 timeslots on copper, fiber or HDSL links
- Programmable DS0 non-blocking cross-connection
- E1/T1 conversion supports A-law/ μ -law and signaling conversion
- Transmission of T1 traffic over E1. Complies with ITU-T G.802
- Broadcast support
- Flexible configuration as an STM-1 terminal or an add&drop multiplexer (ADM) with full cross-connectivity and PDH interfaces
- Supports centralized management, including configuration, service, performance, security and fault management
- Integrated management system supporting RAD's Multiservice Access Platform (MAP) equipment
- Telnet support (DXC subsystem only)
- Separate dial-in/dial-out port (DXC subsystem only)
- Accurate timing transfer to access equipment
- Optional redundancy for common logic and power supply
- 1:1 tributary protection switching
- Traffic grooming into E3/DS3 uplinks
- Inverse multiplexing module supports up to 8 E1/T1 trunks
- RADview management system on PC or UNIX (HP OpenView) platform
- Local Loop access solution with LTU or CSU options for extended range, built-in fiber optic or HDSL modems
- TFTP support for common logic software upgrade
- Test and monitoring at any port

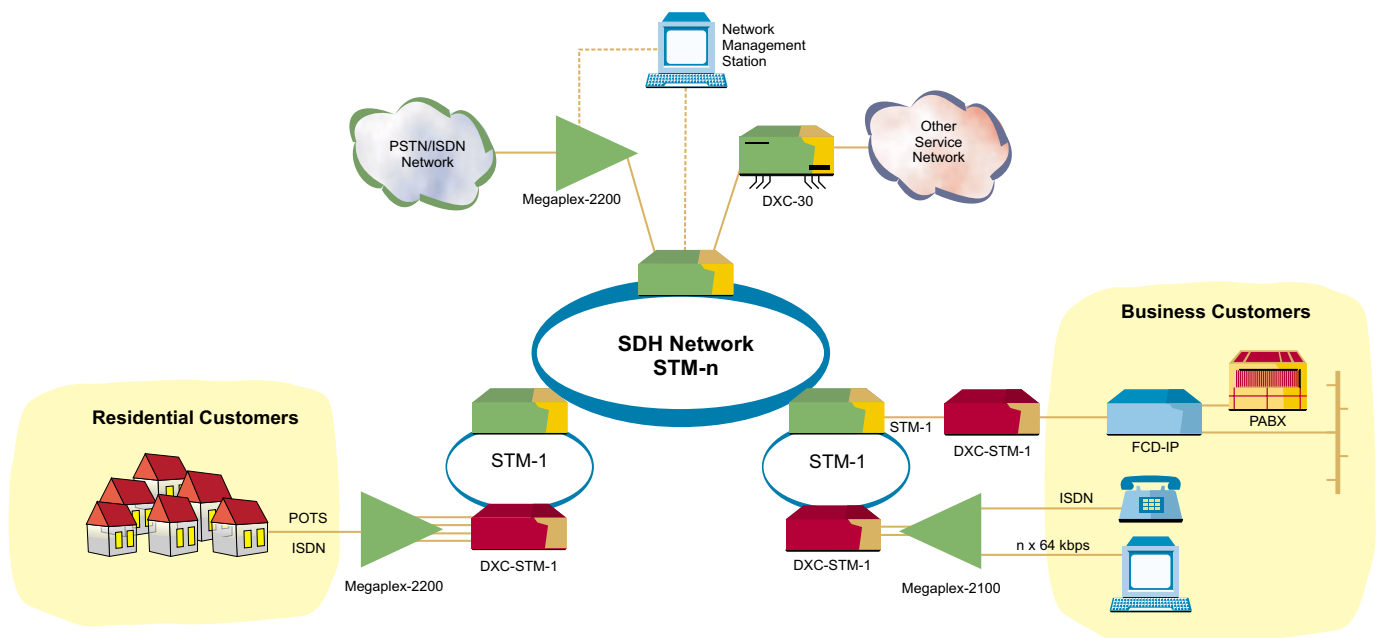
DXC-STM-1

DESCRIPTION

GENERAL

- DXC-STM-1 is a hybrid version of the R-STM-1E multiplexer and the DXC-30 digital cross-connect, assembled in a single integrated chassis. The system features both DXC 1/0 cross-connect and SDH ADM capabilities.
- DXC-STM-1 can be deployed in access nodes as a terminal multiplexer (TM) or add&drop multiplexer (ADM). It enables expansion of the Local Loop up to 60 km/37 miles, creating a transmission layer fully compatible with regional and national SDH networks.
- DXC-STM-1 is available with standard G.703 coaxial or optical short/long haul aggregates.
- SDH transmission supports a full range of access systems, including Remote Subscriber Units (RSUs), Digital Line Carriers (DLCs), Digital Cross-Connect (DACs) and service multiplexers.
- DXC-STM-1 is fully compatible with 34 Mbps and 45 Mbps PDH signals, SDH microwave radio relays and existing SDH infrastructure.
- DXC-STM-1 supports the whole range of SDH network topologies:
 - Point-to-Point
 - Chain
 - STM-1 ring / folded ring
 - STM-4/16 ring / STM-1 structured ring-star and ring-ring.
- DXC-STM-1 facilitates centralized management of the access network. Centralized management combines the powerful RADview network management application in the SDH transmission layer with the access equipment manager of a specific application. The access equipment manager uses embedded management channels for communication with remote access equipment. Centralized management enables the building of flexible, responsive and optimized SDH access networks to fit any customer needs.
- The 2 Mbps output signals of DXC-STM-1 can be resynchronized by the multiplexer clock. In addition, pointer justification events can be filtered out, eliminating phase hits. This creates an accurate signal, clear of phase hits and suitable for synchronization of access equipment. Since the SDH network is usually synchronized by the national synchronization network, this accurate timing is transferred to the access equipment.

APPLICATION



STM-1 Synchronous Digital Multiplexer and Multiservice Access Node

EXTENSION MODULES – ADM SECTION

The interface capacity of DXC-STM-1 can be expanded from its basic 21x2 Mbps configuration of the ADM section, by adding the following extension modules (ordering options):

- **R-STM-1E-EXT42** expands the ADM capacity from 21x2 Mbps (21 E1) to 63x2 Mbps (63 E1) tributary interfaces.
- **R-STM-1E-EXT34** provides three E3 (3x34 Mbps) tributary interfaces.
- **R-STM-1E-EXT45** provides three T3 (3x45 Mbps) tributary interfaces.

I/O MODULES – CROSS-CONNECT SECTION

DXC-STM-1 supports the following plug-in interface modules supporting n x 56/64 kbps, T1, E1, T3 or E3 transmission over copper, fiber or HDSL (see enclosed data sheets for detailed specifications):

- **DT1** and **DT1B**, the two-port T1 interface modules, support both D4 or ESF framing formats. For long-range applications, a CSU option is available. The DT1B version provides BERT, loopback per timeslot, and 1:1 redundancy. DT1 and DT1B are available with both copper and fiber optic interfaces.
- **DE1** and **DE1B**, the two-port E1 interface modules, support both 2 and 16 frames per multiframe with CRC-4 and HDB3 line code. For long range applications, a CSU option is available. The DE1B version provides BERT, loopback per timeslot, and 1:1 redundancy. DE1 and DE1B are available with both copper and fiber optic interfaces.
- **DT3**, the single-port T3 interface module, supports multiplexing of up to 28 T1 channels into a T3 frame with C-bit parity or M13. DT3 is available with either copper or fiber optic interface.

- **DT3/747**, the single-port T3 interface module (DCL.2 only) supports submultiplexing of 21 E1s into a single DS3 data stream. Mixed (E1 and T1) traffic applications are also available. The DT3/747 module is available with either copper or fiber optic interface.
- **DE3**, the single-port E3 interface module, supports multiplexing of up to 16 E1 channels into an E3 frame. DE3 is available with either copper or fiber optic interface.
- **DHS**, the two-port n x 56/64 kbps data module, provides two high speed synchronous data channels. Each channel can be independently ordered as V.35, V.11/RS-422 or X.21 interface. ETH bridge and IP router versions are also available. Synchronous channels support data rates of n x 56 kbps, or n x 64 kbps, where n is 1 to 24 for T1 and 1 to 31 for E1.
- **DIM**, the Digital Inverse Multiplexer module, working in conjunction with DE1, DE1B, DT1, DT1B, DE3, DT3, D8E1, D8T1 or DFSTM-1 interface modules, enables transmission of high speed signals over up to eight E1/T1 lines. This is achieved by breaking down the high speed (RS-530, V.35, X.21, HSSI, E1 and ETH) signals over the multiple E1/T1 lines and routing these signals over different paths or facilities, while ensuring transmission integrity.
- **DHL/E1**, the two-port HDSL module, uses HDSL technology to extend the range of DXC up to 4.0 km (2.5 miles) over 24 AWG (0.5 mm), 4-wire copper cables. It works opposite other RAD products with HDSL technology.
- **DHL/E1/2W**, the two-port HDSL module, uses HDSL technology to extend the range of DXC up to 3.0 km (1.9 miles) over 24 AWG (0.5 mm), 2-wire copper cables. It can work in conjunction with HCD-E1/2W, to extend the range of the traditional subscriber loop while saving on the copper infrastructure.

- **DHL/T1**, the two-port HDSL module, uses HDSL technology to extend the range of DXC up to 4.0 km (2.5 miles) over 24 AWG (0.5 mm), 4-wire copper cables. It works opposite other RAD products with HDSL technology.
- **D4E1** and **D8E1**, the 4- or 8-port E1 interface modules, provide 4 or 8 E1 links over copper cables, supporting E1 or Fractional E1 rates.
- **D4T1** and **D8T1**, the 4- or 8-port T1 interface modules, provide 4 or 8 T1 links over copper cables, supporting T1 or Fractional T1 rates.
- **D8U**, the eight-port ISDN "U" interface module, provides independent ISDN "U" ports, each supporting 2B + D channels, for total payload data rate up to 128 kbps per port.
- **DFSTM-1**, the fractional STM-1 module, provides direct access to the Synchronous Digital Hierarchy (SDH) transmission cores, at the STM-1 level (155.520 Mbps).

SPECIFICATIONS

- **SDH Level**
STM-1 (155.520 Mbps)
- **Multiplexing Structure**
Complies with Figure 1.1 in G.709 standard
- **Cross-Connect Level**
VC-12 or multiples (ADM) 960 TS (1/0)
- **Error Performance**
Complies with G.826 High grade
- **Jitter**
Aggregate line: complies with G.783, G.823, G.958
Tributary line: complies with G.783, G.823

Table 1. DXC I/O Modules

Module	Technology	Description
DE1	Copper / Fiber optic	Two-port E1 interface module
DE1B	Copper / Fiber optic	Two-port E1 interface module with BERT
DT1	Copper / Fiber optic	Two-port T1 interface module
DT1B	Copper / Fiber optic	Two-port T1 interface module with BERT
DE3	Copper / Fiber optic	One-port E3 interface module
DT3	Copper / Fiber optic	One-port T3 interface module
DT3/747	Copper / Fiber optic	One-port T3 interface module with G.747 submultiplexing (DCL.2 only)
DHS	Copper	Two-port n x 56/64 kbps data module
DIM	–	Digital inverse multiplexer module
DHL/E1	HDSL 4-wire	Two-port link 2.048 Mbps HDSL module, extended range
DHL/T1	HDSL 4-wire	Two-port link 1.544 Mbps HDSL module, extended range
DHL/E1/2W	HDSL 2-wire	Two-port link 2.048 Mbps 2-wire HDSL module, for up to 3.0 km
D4E1, D8E1	Copper	Four- or eight-port E1 interface modules
D4T1, D8T1	Copper	Four- or eight-port T1 interface modules
D8U	Copper	Eight-port ISDN "U" interface module
DFSTM-1	Copper / Fiber optic	Fractional STM-1 module (DCL.3 only)



DXC-STM-1 Rear View



STM-1 Synchronous Digital Multiplexer and Multiservice Access Node

• Indicators

ADM subsystem:

- ACT – normal operation
- FLT – malfunction detected or software downloading
- PRG – management accesses NVM card
- ALM – transmission alarm
- ACK – current alarms acknowledged
- LASER ON – optical aggregate is transmitting

DXC subsystem:

- MAJOR ALARM
- MINOR ALARM
- TEST – test activated
- ON-LINE on the power supply and common logic modules
- DXC I/O module indicators (see *separate data sheets*)

• Power Supply

ADM subsystem:

Input voltage:

-35 VDC to -75 VDC

Nominal power source:

-48 VDC to -60 VDC

Typical power consumption:

See *Table 1*.

DXC subsystem:

100 to 240 VAC, 47 to 63 Hz

-48 VDC nominal

• Diagnostics

Performance monitoring

according to G.826, G.784

External alarms

• Physical

Compatible with ETSI rack

Height: 32 cm/12.2 in (7U)

Width: 43.8 cm/17 in

Depth: 25.5 cm/10 in

Weight: less than 18.0 kg/40 lb

ELECTRICAL AGGREGATE

- **Physical Level**
G.703, paragraph 12
- **Line Code**
CMI
- **Bit Rate**
155.520 Mbps
- **Connectors**
BNC

OPTICAL AGGREGATE

- **Physical Level**
G.957, Table 2 – optical aggregate
- **Transmission Line**
Dual fiber optic cable
- **Operating Wavelength**
As per G.707, G.958, see *Table 2*.
- **Bit Rate**
155.520 Mbps ± 4.6 ppm
- **Connectors**
FC/PC

TRIBUTARIES

2 Mbps

- **Physical Level**
G.703, paragraph 6
- **Bit Rate**
2.048 Mbps
- **Line Code**
HDB3
- **Frame**
Unframed
- **Connectors**
DB-25
- **Optical Transmit/Receive Characteristics**
See *Table 2*.

34 Mbps

- **Physical Level**
G.703, paragraph 8
- **Bit Rate**
34.368 Mbps
- **Line Code**
HDB3
- **Frame**
Complies with G.751
- **Connectors**
DIN 1.6

45 Mbps

- **Physical Level**
ANSI T1.105.03-1994
- **Bit Rate**
44.736 Mbps
- **Line Code**
B3ZS
- **Connectors**
DIN 1.6

MANAGEMENT CONFIGURATIONS

- **Integrated Network Management**
RADview software on dedicated SUN workstation
- **Network Element Monitoring**
Element Manager software on PC or laptop for ADM subsystem configuration and RADview element management on PC or UNIX for DXC subsystem configuration (UNIX only for DCL.3)

Note: For both UNIX and PC management a minimum of the RV-EEM-SW/1 is required for initial IP address assignment.

Table 1. Power Consumption of Aggregates and Extension Modules

R-STM-1/1E Aggregate/Extension Module	Typical Power Consumption	Typical Power Dissipation
Optical modular ADM with 21x2 Mbps Channels	38W	35W
Electrical modular ADM with 21x2 Mbps Channels	42W	39W
Extension module 42x2 Mbps	14W	20W
Extension module 3x34 Mbps	11W	20W
Extension module 3x45 Mbps	16W	20W
Optical non-modular ADM with 21x2 Mbps Channels	38W	35W

Table 2. Optical Transmit/Receive Characteristics

Optical Interface	Wave-length [nm]	Receiver Sensitivity [dBm]	Output Power [dBm]
FC13L	1310	-30.0	-14.0 to -9.0
FC15L	1550	-35.0	-4.5 to -0.5

DXC-STM-1

STM-1 Synchronous Digital Multiplexer and Multiservice Access Node

ORDERING

DXC-STM-1/?/*/~/+

Basic unit includes DXC-30 chassis, one power supply, one DCL.2 common logic module and R-STM-1E (no DXC I/O modules and no R-STM-1 extension modules)

DXC-STM-1-3/?/*/~/+

Basic unit same as above, but with DCL.3 common logic module

R-STM-1E-EXT/42

42 x E1 extension module

R-STM-1E-EXT/34

3 x E3 extension module

R-STM-1E-EXT/45

3 x T3 extension module

CBL-R-STM-1

R-STM-1E splitter cable (splits the DB-25 tributaries connector into 11 x RJ-45). Cable length is 2m (6 ft).

Note: One cable is included with each R-STM-1E unit. Two cables are included with each EXT/42 module.

CBL-R-STM-1/ALM

Alarm cable for R-STM-1E.

Note: One CBL-R-STM-1/ALM cable is included in R-BASIC-INST-KIT.

CBL-R-STM-1E/DIN/10

Open-ended coaxial cable with DIN 1.6/5.6 MS connector. Cable length is 10m (33 ft)

CBL-R-STM-1E/DIN/20

Open-ended coaxial cable with DIN 1.6/5.6 MS connector. Cable length is 20m (66 ft)

Note: Two CBL-R-STM-1E/DIN cables are required per port on EXT/34 and EXT/45 expansion modules.

R-BASIC-INST-KIT

Includes RAP, circuit breakers, alarm and power cables and mounting kit for rack and subracks

R-STM-1/a/b

Adapter shelf for up to three AC-DC converters

RV-EEM-SW/c

Element Manager for Win 95/98 PC and small networks of up to 10 network elements

RV-EINM-SW/d

Integrated Network & Element Manager for UNIX platform, supporting MAP products and unlimited network elements.

Note: When ordering RV-EINM-SW, please note that you must also purchase the adequate RV-IN-HW, RV-EEM-SW/1 for IP address configuration and HPOV license.

RV-IN-HW/\$

UNIX workstation (mandatory for RV-EINM-SW)

I/O MODULES

See separate data sheets

SYSTEM MODULES

DXC-30M-CL.2/?

DCL.2 Common Logic No.2 Module with enhanced management, FLASH EPROM for upgrade

DXC-30M-CL.3/?

DCL.3 Common Logic No.3 Module with enhanced management, FLASH EPROM for upgrade

DXC-30M-PS/~

Power supply module

ORDERING OPTIONS

? Specify management port interface:
UTP for Ethernet 10BaseT (DCL.2) or Ethernet 10/100BaseT (DCL.3)
BNC for Ethernet 10Base2 (DCL.2)
V24 for V.24/RS-232 dial port

* Specify **R** for power supply and common logic redundancy

~ Specify DXC section power supply:
AC for 100 to 240 VAC operation
48 for -48 VDC operation

+ Specify ADM section interface
CX for electrical interface with coaxial BNC connectors
FC13L for 1310 nm, single mode, laser diode with FC/PC connectors
FC15L for 1550 nm, single mode, laser diode with FC/PC connectors

a Specify ADM section power supply
115 for 100 VAC to 120 VAC operation
230 for 200 VAC to 240 VAC operation

b Specify number of power supplies on shelf: b=1, 2, or 3.

c Specify number of network elements for RV-EEM to be managed: **1,2, ..., 10**

d Specify number of network elements for RV-EINM to be managed: **1,2, ...**

e Specify Integrated Network Workstation configuration
1 for Ultra 5, 256MB, 1 CPU, 2 ETH cards, RAID, UPS, modem, 21" monitor (up to 50 NEs)

2 for Ultra 2/60, 512MB, 1 CPU, 1 ETH card, RAID, UPS, modem, 21" monitor (up to 100 NEs)

21 for Ultra 80, 1GB, 1 CPU, 1 ETH card, RAID, UPS, modem, 21" monitor (up to 100 NEs)

3 for Ultra 60, 1GB, 2 CPU, 1 ETH card, RAID, UPS, modem, 21" monitor (up to 250 NEs)

31 for Ultra 80, 1GB, 2 CPU, 1 ETH card, RAID, UPS, modem, 21" monitor (up to 250 NEs)

4 for Ultra 80, 1GB, 4 CPU, 1 ETH card, RAID, UPS, modem, 21" monitor (up to 500 NEs)

41 for Enterprise 3500, 2GB, 4 CPU, 5 ETH cards, RAID, UPS, modem, 21" monitor (up to 500 NEs)



data communications

www.rad.com

● **International Headquarters**
24 Raoul Wallenberg Street
Tel Aviv 69719, Israel
Tel: (972) 3-6458181
Fax: (972) 3-6498250, 6474436
Email: rad@rad.co.il

● **U.S. Headquarters**
900 Corporate Drive
Mahwah, NJ 07430
Tel: (201) 529-1100
Toll free: 1-800-444-7234
Fax: (201) 529-5777
Email: market@radusa.com

772-112-02/02