

DXC-8R/10A/30

Multiservice Access Nodes



A compact,
high-density
cross connect from
 $n \times 56/64$ kbps
up to STM-1

- Non-blocking digital cross-connect of up to 960 timeslots
- Traffic grooming
- E1/T1 conversion including A-law/ μ -law and signaling conversion
- Provide STM-1, E3, T3, E1, T1, $n \times 56/64$ kbps and ISDN services over copper, fiber, or xDSL media
- Optional common logic and power supply redundancy
- Inband, out-of-band and RADview SNMP management

The DXC family of modular Multiservice Access Nodes provides non-blocking cross connection of up to 960 timeslots, over up to 120 ports.

Plug-in interface modules enable $n \times 56/64$ kbps, E1, T1, E3, T3, or STM-1 transmission over copper, fiber, HDSL, IDSL, or SHDSL lines. A DIM module that provides inverse multiplexing capabilities of up to 15.7 Mbps is available.



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To support the needs of different applications, the DXC family features three chassis variants:

- DXC-8R (1U-high) chassis with 4 I/O module slots
- DXC-10A (1U-high) chassis with 5 I/O module slots
- DXC-30 (3U-high) chassis with 15 I/O module slots

All units can be mounted in 19-inch racks.

Typical applications for the DXC include:

- Local loop access with traffic grooming for redirecting voice and data to different trunks (see *Figure 1*)
- Concentrating multiple fractional E1/T1 lines from a cellular Base Transceiver Station (BTS) onto a full E1/T1 link to the Mobile Switch Center (MSC) (see *Figure 2*)
- Conversion/gateway between E1 and T1 networks for both data and voice (see *Figure 3*)
- Inverse multiplexing a single higher-rate logical channel over up to 8 E1/T1 links (see *Figure 4*).

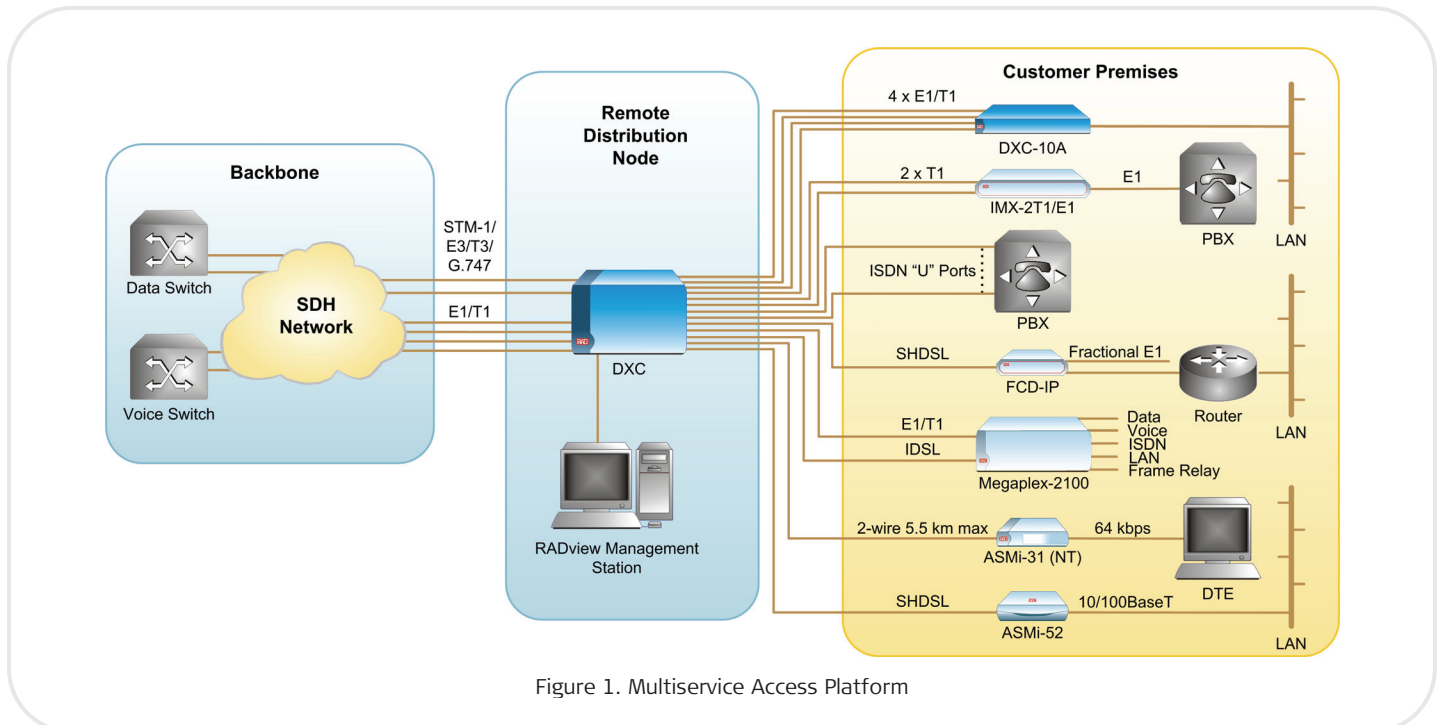


Figure 1. Multiservice Access Platform

CROSS CONNECT

DXC-30 supports up to 120 ports. DXC-10A supports up to 40 ports, while the smaller DXC-8R supports up to 32 ports. A user-defined connection table routes any incoming 56/64 kbps timeslot to any outgoing 56/64 kbps timeslot. Support is provided for drop-and-insert and broadcast applications.

Cross-connection of $n \times 56$ kbps or $n \times 64$ kbps channels is done by placing the data onto E1 or T1 frames, using only the required number of timeslots. This provides fractional CSU/DSU functionality.

E1/T1 CONVERTER

DXC can function as a converter between 16 E1 ports and 16 T1 ports.

A-law/ μ -law companding and signaling conversion are performed according to the E1 and T1 standards.

BASIC UNITS

The basic DXC-30 includes one power supply, one common logic module, and fifteen I/O slots for the plug-in interface modules.

Optional redundancy for the common logic and power supply is available.

The basic DXC-10A unit includes one power supply, one common logic module, and five I/O slots for the plug-in interface modules.

The basic DXC-8R unit includes two power supplies and two common logic modules for system redundancy. The DC power supplies are hot-swappable. DXC-8R has four I/O slots for plug-in interface modules.

COMMON LOGIC

The DCL.3 common logic module stores the matrix configuration and event information, as well as the configuration for alarm masking. It communicates with the management station using a SLIP/PPP/Ethernet connection (by means of an SNMP agent). DCL.3 can pass management information received from 30 different remote sites, over TS 0 or any single dedicated timeslot, to the central management site. Flash for software download, Telnet and ASCII terminal management are also supported.

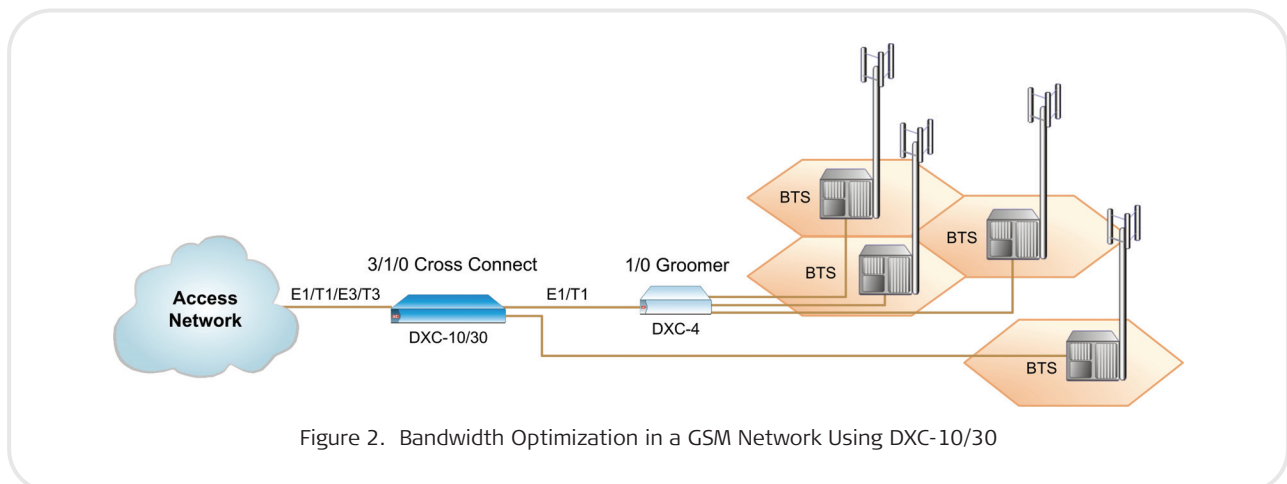


Figure 2. Bandwidth Optimization in a GSM Network Using DXC-10/30

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I/O MODULES

Note: See enclosed data sheets for detailed specifications.

DE1B is a two-port E1 interface module that supports both 2 and 16 frames per multiframe formats, TS 0 multiframe with CRC-4 and HDB3 line code, and unframed operation. For long-range applications, an LTU option is available. DE1B provides BERT, loopback per timeslot, and 1:1 redundancy. DE1B is available with either copper or fiber optic interfaces.

DT1B is a two-port T1 interface module that supports D4, ESF framing formats, or unframed operation. For long-range applications, a CSU option is available. DT1B provides BERT, loopback per timeslot, and 1:1 redundancy. DT1B is available with either copper or fiber optic interfaces.

D4SL and **D8SL** are four- and eight-port I/O modules that use SHDSL technology to extend the range of DXC up to 8 km (5 mi) on 24 AWG (0.5 mm) 2-wire copper cables. Combined with RAD's ASMi-52, FCD-IP, or standard SHDSL CPE, they extend the range of the traditional subscriber loop while saving on copper infrastructure.

D4E1 and **D8E1** are 4- or 8-port E1 interface modules that provide 4 or 8 E1 links over copper cables, with built-in LTU, and support E1 or fractional E1 rates.

D4T1 and **D8T1** are 4- or 8-port T1 interface modules that provide 4 or 8 T1 links over copper cables, with built-in CSU, and support T1 or fractional T1 rates.

DHS is a two-port $n \times 56/64$ kbps data module that provides two high-speed synchronous data channels. Each channel can be ordered independently with a V.35, V.11/RS-422, V.24, or X.21 interface. Ethernet 10/100 Mbps bridge and IP router versions are also available. Synchronous channels support data rates of $n \times 56/64$ kbps, (where n is 1 to 24 for T1, and 1 to 31 for E1).

D8HS is an eight-port $n \times 56/64$ kbps data module that provides eight high-speed synchronous data channels. Each data channel can support data rates of $n \times 56/64$ kbps (where $n = 1$ to 24 for T1 and 1 to 32 for E1 links).

DIM is a digital inverse multiplexer module that transmits a single higher-rate RS-530, V.35, X.21, HSSI, E1, or ETH signal over up to 8 separate E1/T1 lines. DIM splits and transmits the individual signals through DE1B, DT1B, DE3, DT3, D4E1, D8E1, D4T1, D8T1, or DFSTM-1 interface modules, using different paths or facilities, to ensure transmission integrity

DE3 is a single-port E3 interface module that multiplexes up to 16 E1 channels into an E3 frame. DE3 is available with either copper or fiber optic interfaces.

DT3 is a single-port T3 interface module that multiplexes up to 28 T1 channels into a T3 frame with either C-bit parity or M13. DT3 is available with either copper or fiber optic interfaces.

DHL/E1 is a two-port HDSL module that uses HDSL technology to extend the range of DXC up to 4.0 km (2.5 mi) on 24 AWG 4-wire copper cables. It works together with other RAD products using HDSL technology.

DFSTM-1 is a fractional STM-1 module that provides direct access to Synchronous Digital Hierarchy (SDH) transmission cores, at STM-1 data rates (155.520 Mbps). An optional second interface is available for redundancy or linear ADM (daisy-chain) configurations.

D8U is an 8-port ISDN "U" interface module that provides independent ISDN "U" ports, each supporting 2B + D channels, for a total payload data rate of up to 128 kbps per port. D8U can be configured either to extend ISDN lines over non-ISDN facilities, or as a dedicated LTU (Line Termination Unit) for RAD's ASM-31 or ASMi-31 short-range modems.

MANAGEMENT

Status and diagnostic information is defined, configured, and monitored over a V.24 supervisory port or optional Ethernet management port, using an ASCII terminal with SLIP or PPP protocols. A built-in SNMP agent enables remote management for configuration and diagnostics of remote devices (up to 30 remote locations) using TS 0, a dedicated timeslot on the E1/T1 trunk, or Telnet.

A separate dial-in/dial-out port supports remote configuration (dial-in) and automatic alarm indication (dial-out). For dial-out operation, an external modem is activated to automatically dial a pre-programmed number whenever an alarm event occurs.

The network management system provides centralized control of all network nodes, including interface configuration, connection setup, and alarm management. Alarm status and system configurations are available at all times.

Multiple DXC hubs can be managed with RAD's user-friendly, UNIX-based, SNMP management systems RADview-EMS or RADview-HPOV/TDM.

A remote DXC can be programmed and setup either:

Out-of-band: using the Ethernet management port, the supervisory port of the remote unit, over a modem link, or over a FRAD

Inband: via either TS 0/F-bit, or over a single dedicated timeslot, supporting FR, PPP and RIP2 standard protocols.

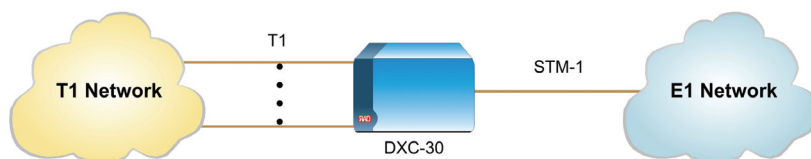


Figure 3. Bandwidth Optimization in a GSM Network Using DXC-10/30

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DIAGNOSTICS

DXC provides diagnostic loopbacks for each E1/T1 or $n \times 56/64$ kbps module. E1 and T1 interface modules support loopbacks by timeslot, including an internal BERT, and loopbacks toward the local or remote DTE. T1 interface modules also support PLB or LLB code injection per ANSI T1.403. Any port can be configured to test and monitor data on any given port of the enclosure.

Enhanced statistics include T1 ESF diagnostics according to ANSI T1.403 and RFC 3895; E1 CRC-4 diagnostics per ITU-T Rec. G.706; T3 diagnostics per RFC 3896, ANSI T1 107/107a; E3 diagnostics per RFC 3896, and STM-1 diagnostics per RFC 2258.

TIMING

System timing options include: internal clock, external station (master) clock, or loopback timing from any selected external port.

REDUNDANCY

System hardware redundancy is provided through optional redundant power supply and common logic (all chassis versions except DXC-10A).

DXC I/O modules support three types of redundancy:

Line redundancy (single-slot, 1:1) ensures protective switching within less than 50 msec, between ports on the same module.

Hardware (Y-cable) redundancy between modules protects the service from hardware failure. This type of redundancy is supported by copper interfaces only.

E3/T3 line and dual-slot hardware redundancy is achieved by installing two DE3/DT3 modules in a chassis, where only one module is active.

Specifications

TIMESLOT MAPPING

Any timeslot to any timeslot, with/without A-law/ μ -law and/or signaling conversion per timeslot

Unused Timeslot Code

Any user-defined code

TIMING

System clock source:

- Internal clock (± 32 ppm)
- External clock (G.703, RS-422)
- Receive clock (from any port)

STATION CLOCK INTERFACE

Data rate:

- 1.544/2.048 Mbps (selectable)

Compliance:

- ITU-T Rec. G.703 or
- V.11/RS-422

Connectors:

- RJ-45, balanced
- BNC coaxial, unbalanced

ELASTIC BUFFER

Buffer length: ± 1 E1/T1 frame
Underflow: 1 frame repeated
Overflow: 1 frame skipped
(No frame sync loss for buffer overflow or underflow)
Data delay: up to 375 μ sec
Signaling buffer: ± 1 E1/T1 multiframe

DIAGNOSTICS

Local loopbacks on all external and internal ports (apart from VC-4)
Remote loopbacks on all external and internal ports (apart from VC-4, VC-12)
Code activated network loopbacks per ANSI T1.403 on T1 interface modules
Loopback for any timeslot per ANSI 403 RDL on E1 and T1 interface modules
Built-in BERT on all external E1, T1, DHS, and DIM ports
Alarm mask (user-defined)

STATISTICS

E1 CRC-4 diagnostics:

Per ITU-T Rec. G.706; RFC 3895, 3896
Local support equivalent to AT&T 54016

T1, ESF diagnostics:

Full support according to ANSI T1.403
Local support according to AT&T 54016 and RFC 3895

Transparent FDL between ports

E3 diagnostics:

RFC 3896

T3 diagnostics:

RFC 3896, ANSI T1 107, ANSI T1 107a

STM-1 diagnostics:

RFC 2258

Table 1. DXC I/O Modules

Module	Technology	Description
DHS	Copper	Two-port $n \times 56/64$ kbps data module
D8HS	Copper	Eight-port $n \times 56/64$ kbps data module
DE1B	Copper/Fiber optic	Two-port E1 interface module with BERT
DT1B	Copper/Fiber optic	Two-port T1 interface module with BERT
D4E1, D8E1	Copper	Four- or eight-port E1 interface modules
D4T1, D8T1	Copper	Four- or eight-port T1 interface modules
DE3	Copper/Fiber optic	One-port E3 interface module
DT3	Copper/Fiber optic	One-port T3 interface module
DFSTM-1	Copper/Fiber optic	One- or two-port STM-1 module
D8U	Copper	Eight-port ISDN "U" interface module
DHL/E1	HDSL 4-wire	Two-port E1 over 4-wire HDSL module
D4SL, D8SL	SHDSL 2-wire	Four- or eight-port E1 over 2-wire SHDSL module
DIM	Copper	Digital inverse multiplexer module

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MANAGEMENT PORT

Dial Port (SP-MODEM) with V.24/RS-232, async interface
Data rate: 0.3–57.6 kbps, or autobaud
Connector: D-9 female, DTE
Ethernet: 10/100BaseT

INDICATORS

Front panel:
Major alarm, minor alarm, test, on-line (per power supply)
on-line (per common logic)
Rear panel: module indicators (see separate data sheets)

PHYSICAL

DXC-30
Height: 13.2 cm (5.25 in (3U))
Width: 43.8 cm (17 in)
Depth: 25.4 cm (10 in)
Weight: Less than 8 kg (17 lb)

DXC-10A and DXC-8R

Height: 4.4 cm (1.75 in (1U))
Width: 44.0 cm (17.3 in)
Depth: 25.4 cm (10 in)
Weight: Less than 2.5 kg (5.5 lb)

Note: All weights are given for fully equipped chassis.

Power Supply

100–240 VAC, 47 to 63 Hz
–48 VDC nominal

Power Consumption (max)

DXC-8R: 72W (DC), 60W (AC)
DXC-10A: 75W (DC), 60W (AC)
DXC-30: 120W (DC), 250W (DC), 120W (AC)

Temperature

DXC-8R, 10A: 0° to 50°C (32° to 122°F)
DXC-30: 0° to 45°C (32° to 113°F)

Note: For extended temperature ranges, contact your local RAD distributor.

Humidity

Up to 90%, non-condensing

Table 2. DXC Family Comparison Table

Features	DXC-8R	DXC-10A	DXC-30	DXC-100
Height	1U	1U	3U	6U per nest
Maximum number of ports	32	40	120	688 (8 nests)
Number of I/O slots	4	5	15	86 (8 nests)
System redundancy	Built-in	None	Optional	Optional
E1, T1, E3, T3, STM-1 modules	✓	✓	✓	✓
XDSL, inverse multiplexing modules	✓	✓	✓	–
n x 56/64 kbps modules	✓	✓	✓	✓
Router, OC-3 modules	–	–	–	✓
ASCII, SNMP, RADview management	✓	✓	✓	✓

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Ordering

Basic units, additional system modules, and I/O modules are ordered separately. When ordering I/O modules, see module data sheets.

BASIC UNITS

DXC-30-3/?/*/~

3U-high chassis with 15 I/O slots, one power supply, and one common logic module

DXC-10A-3/?/~

1U-high chassis with 5 I/O slots, one power supply, and common logic module

DXC-8R-3/?/~

1U-high chassis with 4 I/O slots, two power supplies, and two common logic modules

SYSTEM MODULES

DXC-30M-CL.3/?

Common Logic modules for DXC-8R, DXC-10A, or DXC-30

DXC-30M-PS/~

Power supply module for DXC-30

DXC-8RM-PS/48

DC power supply module for DXC-8R

Legend

? Management port interface:

UTP Ethernet 10/100BaseT

V24 V.24/RS-232 dial port

* Redundancy:

R Power supply and common logic redundancy

~ Power supply:

AC 100 to 240 VAC

48 48 VDC

48HP DXC-30 high-power chassis only (A fan tray must be used for this unit.)

SUPPLIED ACCESSORIES

Rack mounts are supplied according to the device ordered.

RM-DXC8R

19-inch rack mount kit for DXC-8R

RM-DXC10A

19-inch rack mount kit for DXC-10A

RM-DXC30

19-inch rack mount kit for DXC-30

AC power cord (supplied when AC power supply is ordered)

DC adapter plug (supplied when DC power supply is ordered)

OPTIONAL ACCESSORIES

CBL-DB9F-DB9M-STR

Control port cable

DXC-30M-FT/#

Fan tray for DXC-30

Legend

Power supply for fan tray:

AC 100 to 240 VAC

48 48 VDC

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