DXC Module
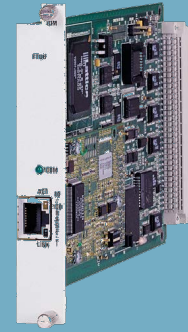
DIM

Digital Inverse Multiplexer Module

- X.21 and RS-530 sync interfaces

- High speed data rates of n × 1.920 Mbps (E1) or n × 1.472 Mbps (T1), with automatic fallback

- Optional high-speed 10/100BaseT Ethernet bridge data port with VLAN support according to ITU Rec. 802.1

- Optional E1 port for inverse multiplexing of a standard E1 frame over two T1 links

DIM is a digital inverse multiplexer module for the modular DXC units. The DIM module, working in conjunction with up to eight E1/T1 ports of DE1B, DT1B, D4E1, D8E1, D4T1, D8T1, D4SL, D8SL, DE3, DT3 or DFSTM-1 modules, enables DXC to function as an inverse multiplexer.

DIM transmits a single high-speed data stream of up to 15.36 Mbps over multiple E1/T1 lines. The inverse multiplexing technique breaks down the high-speed signals into multiple E1/T1 lines, and routes these signals over different paths or facilities while ensuring transmission integrity.

DIM bridges the bandwidth gap between E1/T1 and E3/T3 traffic, allowing bridges and routers to operate at their fastest rates. The module complies with ACCUNET Fractional T45 service (AT&T), providing a choice of four new transmission speeds that are intermediate between T1 and T3 rates. DIM can also transmit Ethernet traffic over D8SL module.

The module occupies a single slot in the DXC chassis. It can be installed in the DXC system together with other modules, to provide a combination of cross-connect and inverse multiplexing capabilities.

Differential delays of up to 64 msec between the E1/T1 lines are tolerated. DIM compensates for such delays, and the original stream is reconstructed.

RAD

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DIM is available with a number of options for the user data ports, including an 10/100BaseT Ethernet bridge with VLAN support, an E1 port, or a choice of sync data interfaces: RS-530 or X.21.

For E1 links, the total data rate is in multiples of 1.920 Mbps, up to 15.36 Mbps; for T1 links, the total data rate is in multiples of 1.472 Mbps, up to 11.776 Mbps.

The automatic rate fallback feature ensures that the logical channel remains open even if individual E1/T1 links fail, by automatically dropping to the next lower rate. When failed links are recovered, DIM automatically returns to the original rate.

Note: *Not relevant for E1 port version.*

The RS-530 channel interface terminates in a 25-pin D-type female connector. Pin assignment is compatible with RS-530 specifications.

The X.21 channel interface terminates in a 15-pin D-type female connector.

The E1 port option enables DIM, working in conjunction with a DT1B, D4T1, D8T1, or DT3 module, to function as an E1 to T1 rate converter. Each E1 frame (2.048 Mbps) received by the DIM E1 port, is converted into two T1 frames (2 × 1.544 Mbps), and then transmitted simultaneously over the two T1 links of the DXC T1 interface module. DIM with the E1 port complies with AT&T TR-54019 for E1 access over T1 facilities.

ETHERNET

When equipped with the 10/100BaseT Ethernet interface, DIM connects virtual LANs over n × 56 kbps, or n × 64 kbps lines. With the 10/100BaseT bridge DIM filters Ethernet/Fast Ethernet frames, forwarding only frames destined to the WAN. The 10/100BaseT module can also block broadcast and multicast messages.

TIMING AND SYNCHRONIZATION

DIM has four user-selectable clock modes for the user data port:

- **DCE**: DIM provides both TX and RX clocks to the user DTE
- **External-DCE**: DIM provides RX clock to the user while receiving TX clock from the user.

The above two modes provide a gapped clock signal.

- **Smooth**: same as DCE, but provides a smooth (constant rate) clock
- **External-Smooth**: same as External-DCE, but provides a smooth (constant rate) clock.

Note: *The E1 port operates in External-DCE mode only; the Ethernet port operates in DCE mode only.*

MONITORING AND DIAGNOSTICS

Diagnostic capabilities include local and remote DTE loopbacks, and a built-in BERT. When activated, the BERT replaces the DTE input and transmits a test pattern to all of the connected E1/T1 links.

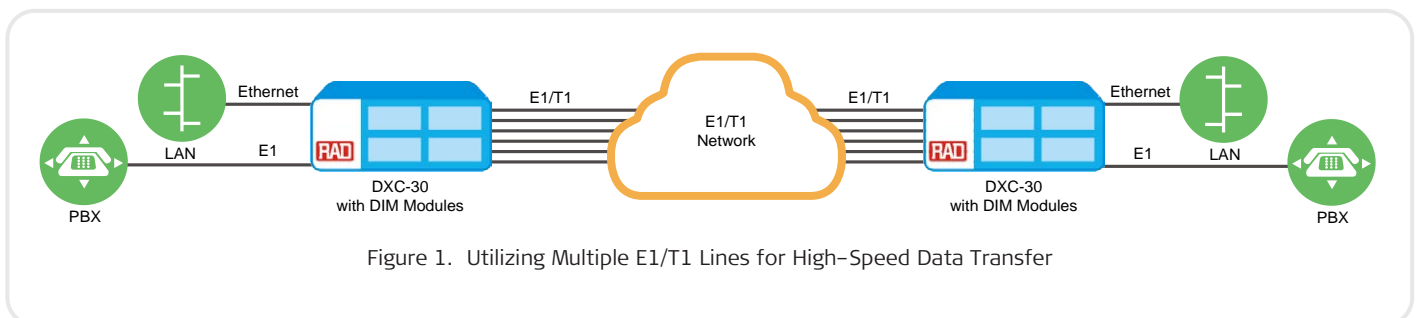The module occupies one I/O slot in the DXC chassis.

Figure 1. Utilizing Multiple E1/T1 Lines for High–Speed Data Transfer

Specifications

CAPACITY

Inverse Multiplexing
Up to 8 E1/T1 links

Data Rate (for user data port)
E1: any multiple of 1.920 Mbps, up to
    15.360 Mbps
T1: any multiple of 1.472 Mbps, up to
    11.776 Mbps

RESILIENCY

Automatic Rate Fallback
Upon failure of an individual E1/T1 link, DIM automatically falls back to the next lower data rate

SERIAL INTERFACES

Connectors
RS-530: 25-pin D-type female
X.21: 15-pin D-type female

E1 INTERFACE

Data Rate
2.048 Mbps

Connectors
Balanced: one RJ-45
Unbalanced: two BNC coaxial

Framing
E1 unframed

E1/T1 Differential Delay
Up to 64 msec

Timing (for user data port)
DCE, External-DCE, Smooth, External-Smooth

Note: *The E1 port operates in External-DCE mode only.*

Compliance
AT&T TR-54019 for E1 access over T1 facilities

FAST ETHERNET INTERFACE

LAN Table
512 MAC addresses with 5-minute automatic aging

Filtering and Forwarding
150,000 frames per second

Frame Size
1535 bytes maximum

Buffer
85 frames (average)

Line Code
10BaseT: Manchester
100BaseT: MLT3

Data Rate
10BaseT: 10 Mbps
100BaseT: 100 Mbps

Connector
RJ-45

WAN Protocol
HDLC

Indicators
LINK, ACT, 100M

Compliance
Conforms to IEEE 802.3/Ethernet, IEEE 802.1p

TIMING (DXC SYSTEM)

System clock source:
    Internal (± 32 ppm)
    Station clock
    Receive clock (from any link)

DIAGNOSTICS

Local and remote DTE loopbacks
BERT

GENERAL

Physical
Occupies a single slot in a DXC-8R, DXC-10A or DXC-30 chassis

For comparison of DXC chassis, see *Table 2*. For the list of DXC I/O modules, refer to the DXC-8R/10A/30 folder.

Power Consumption
ETUB: 7.5W
Other interfaces: 5.5W

Environment
Temperature: 0°-40°C (32°-104°F)
Humidity: Up to 90%, non-condensing

DIM

Digital Inverse Multiplexer Module

Ordering

DXC-M-DIM/^

Legend

^   User port interface:

    530   RS-530

    X21   X.21

    E1   E1 interface (E1 over two T1 links)

    ETUB Ethernet bridge port with 10/100BaseT (UTP) interface

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