

# Wide Bank™ 28/NEBS



**The Wide Bank 28/NEBS**

**DS3 Access Multiplexer**

**from Carrier Access**

**Corporation cost-**

**effectively connects T1**

**equipment to high-speed**

**T3 digital services.**

**In only one rack unit**

**of space it delivers**

**enhanced M1-3**

**multiplexing functionality**

**with advanced features:**

**DS3 electronic and network**

**protection, built-in Network**

**Interface Units (NIUs),**

**Bit-Error Rate Testing**

**(BERT), Simple Network**

**Management Protocol**

**(SNMP), TL1 automated**

**outbound alarming, and**

**local and remote Command**

**Line Interface (CLI) via**

**RS-232 and Telnet. All this**

**with full NEBS compliance**

**and the highest service**

**availability in the industry.**

## Operational Description

CAC's Wide Bank™ 28 DS3 multiplexer brings standards-based M1-3 multiplexing up to date. The Wide Bank 28 replaces a rack full of bulky, old generation equipment in a one rack unit space. Software-based, hitless DS3 network protection, T-1 Network Interface Units (NIUs), and Bit Error Rate Testing (BERT) are built in. In fact, the Wide Bank 28 can isolate and test 28 individual T-1 circuits, DS3 connections, and internal electronics quickly and dependably, and monitor them through SNMP/Ethernet or RS-232 management.

## Advanced Remote Management

The Wide Bank 28 is the first M1-3 multiplexer to offer Simple Network Management Protocol (SNMP). The standards-based embedded SNMP agent enables users to integrate control of the unit with popular SNMP management systems, using a direct Ethernet connection. A Command Line Interface (CLI) provides remote management via Telnet or local management using RS-232.

The Wide Bank 28's integrated Bit Error Rate Testing (BERT) capabilities automatically self-test internal data paths. Loopback and BERT functions provide DS3 and DSX-1 line testing. DS3 and DSX-1 statistics monitor network and drop connections. Individual DSX-1 interfaces may be electronically replaced through remote terminal management. Built-in tests differentiate electronic vs. network errors. The need to physically replace cards or set switches in order to isolate equipment versus line problems is a thing of the past.

## Modular Design Matches Growing Access Requirements

The Wide Bank 28 accommodates up to seven Quad Digital Signal Cross Connect Level 1 (DSX-1) interface cards, for a maximum of 28 T1 connections. Cards can be quickly added to meet bandwidth requirements. An identical spare Quad DSX-1 card provides software-controlled electronic redundancy.

## NEBS - Certified

The Wide Bank 28 is certified for Network Equipment Building Standards (NEBS) criteria, which qualifies it for installation in the central office, co-locations and installations requiring NEBS-approved equipment according to:

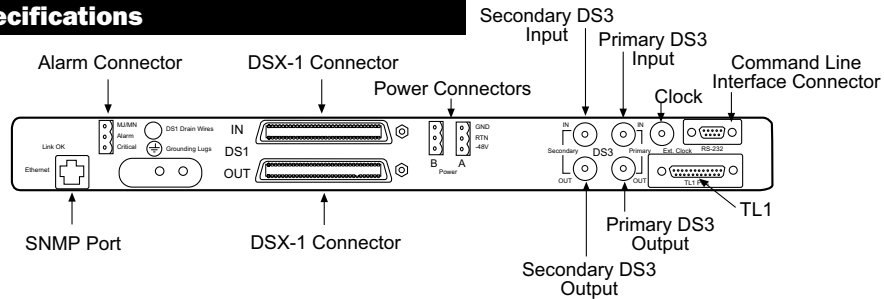
- Bellcore® GR-63, NEBS Requirements: Physical Protection-Level 3 (earthquake for Zone 4)
- Bellcore® GR-1089, Electromagnetic Compatibility and Electric Safety-Generic Criteria for Network Telecommunications Equipment- Equipment Type 2 or 4

## Wide Bank 28/NEBS Features and Advantages

- |                               |  |
|-------------------------------|--|
| • Modular design              | Maximum of 8 quad DSX-1 cards supporting from 4 to 28 DSX-1 connections and 4 spare DSX-1 interfaces |
| • DS3 path protection option  | Electronics and DS3 path protection, or electronic protection only                                   |
| • DSX-1 electronic redundancy | Protects DSX-1 channels and allows individual T1 circuit fault isolation                             |
| • Advanced diagnostics        | Built-in automatic self-test for internal circuitry  |
| • Built-in BERT & Loopbacks   | Line versus equipment fault isolation reduces the need for external test equipment                   |
| • T1 NIU functionality        | Eliminates additional equipment costs and installation labor   |



## Technical Specifications



### System Parameters

- Channel Capacity: Up to 28 DSX-1 connections
- 3 Sources of Timing: DS3 line recovered, internal Stratum 4E or externally supplied
- Maximum Average Reframe time: Less than 1.5 ms for DS3 level
- Multiplexed Data Rate: 44.736 Mb/s  $\pm 20$  ppm
- Operational Mode: Full duplex
- Redundancy:
  - Controller, DS3 1:1 and power conversion redundancy with second controller card
  - QDSX 1:7 or 4:28 DSX-1 electronics redundancy with spare Quad DSX-1 card
- Path Protection: DS3 path protected for "Hitless" 1+1 protection (requires second DS3 network)
- DS3 Inputs:
  - Two primary BNC TX/RX for 728A coax
  - Two secondary BNC TX/RX provided for path protected DS3 networks
- Management:
  - Command Line Interface (CLI) on RS-232
  - SNMP or Telnet on Ethernet
- Connectors:
  - Four DS3 BNC for 728A coax
  - Two locking DS1 64-pin Champ, one for input and one for output
  - Two locking for independent East/West -48Volt power feeds
  - One locking 9-pin DTE RS-232 for CLI/modem
  - One locking 25-pin RS-232 TL1
  - One IEEE 802.3 10Base-T RJ45 Ethernet
  - One 4-pin alarm contact
- Status LEDs: Full primary and secondary controller, alarm, DS3 and DSX-1 line condition indicators

### DSX-1 (1.544 Mb/s) Interface

- Line Rate: 1.544 Mb/s  $\pm 32$  ppm
- Line Code: Bipolar with at least 12.5% average density of ones and no more than 15 consecutive zeros. AMI or B8ZS selectable
- Transparent to DSX-1 framing or lack of framing
- Impedance: 100 $\Omega$   $\pm 5\%$  resistive, balanced
- Transmit Jitter Attenuation: Meets ANSI T1.403, T1.102 and AT&T 62411
- Transmit Amplitude: Pulse curve amplitude, 2.7 to 3.3 Vp per ANSI T1.102 and T1.403
- Transmit Length (cable) 655 ft. ABAM or equivalent to cross connect

### DS3 (44.736 Mb/s) Interface

- Line Rate: 44.736 Mb/s  $\pm 20$  ppm
- Line Code: Bipolar with three-zero substitution (B3ZS)
- Transmit Impedance: 75 $\Omega$   $\pm 5\%$  resistive, unbalanced
- Framing: M23 or C-bit framing formats
- Transmit Jitter Attenuation: Meets ANSI T1.102
- Transmit Amplitude: Meets ANSI T1.102 pulse mask with 0.36 to 0.85 Vp
- Receive Sensitivity: -10 dB w/r DSX-3 120 mVp to 900 mVp input range with automatic gain control circuit
- Transmit Length (cable) 500 ft. to cross connect

### Cable Compensation

- DSX-1 Output Port:  $\pm 3.0$  volts peak adjustable from 0 to 660' in increments of 110'
- DSX-1 Input Receive Sensitivity: -15 dB
- DS3 Output Port:  $\pm 0.85$  volts peak Adjustable for 0 to 50' or 50' to 450'
- DS3 Input Receive Sensitivity: at least -10 dB

### Management

- RS-232 port for command line management
- Ethernet port for SNMP and Telnet sessions
- RS-232 port for TLI transport services

### Alarms

- Crit, MJ, MN severity category alarm
- External alarm contacts for visible or audible alarms
- Output Signal: Relay contact closure and LED indication
- Maximum Current: 200 mA
- Maximum Voltage: -56 VDC
- Input Signal: Relay contact closure
- Control Inputs: CPU reset or alarm disable (cutoff)

### Clock Source

- Line: recovered from DS3 network receive signal
- Local: on-board stratum 4E clock source
- External: external 44.736 MHz  $\pm 20$  ppm BNC input

### Environmental

- Altitude: 0 to 15,000 ft. (0 to 4,572 m)
- Humidity: 0 to 98% (noncondensing)
- Operational Temperature: -5° to +55°C (23° to 131°F)
- Thermal Protection: Automatic cut-off at 75°C (161°F)

### Power

- Input Voltage: -42 to -60VDC at 1 Amp max
- Dual Independent -48V power input terminals
- Optional Power Converter/Battery Charger 115 VAC to -48 VDC Converter (CAC P/N 730-0116)
- Optional Battery Unit: (CAC P/N 730-0114)
- Power Dissipation:
  - 30 Watts Max, fully redundant system (103 BTUs)
  - 22 Watts Max, non-redundant (72 BTUs)
- Input current: 0.5 Amp Max, fully redundant system. 0.4 Amp Max, non-redundant
- Internal Solid-state (fuseless) overvoltage and overcurrent protection
- Recommended Battery Input Fuse: 3 Amp Slow Blow

### Cables

- Two (2) DSX-1 cables per Wide Bank (CAC P/N 005-0025)

### Physical Dimensions

- Height: 1.75 inches (4.45 cm)
- Depth: 10 inches (25.4 cm)
- Width: 17 inches (43.2 cm)
- Weight: 10 lb. (4.5 kg) Fully loaded

### NEBS Certifications

- The Wide Bank 28/NEBS is certified to meet Network Equipment Building Specifications (NEBS) Level 3 (Earthquake Zone 4), Type 2 and 4 requirements for central office products including electrical safety, emissions and immunity requirements for intra-building use. Refer to Bellcore specifications GR-63 and GR-1089 for more details.

### Regulatory Approvals

#### North American Regulatory Standards

- FCC Part 15 Class A Digital Devices Radiated Emissions Control Part 68 Connections to the Telephone Network
- Industry Canada CS-03
- UL 1459 Standard for Telephone Equipment compliant to current (1996) National Electrical Code
- CSA Canadian Safety Association Compliant

### Network Standards

- ANSI T1.102-1993, T1.107-1995, T1.403-1996, T1.404-1994, T1.404a-1996, T1.105
- CCITT Recommendation V.11



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