

## CTDI Products

### Features

- Seamless voice and high-speed data integration over T1/E1
- Channelized and unchannelized T1/E1
- Compatible with WAN transports including ATM and Frame Relay
- Supports VoIP specifications (SIP, MGCP) - "S" version only
- 8, 16, or 24 Port POTS interface with Loop Start or Ground Start
- Dynamic and Static IP Routing and Bridging capabilities
- DHCP and NAT to support IP address management
- Firewall support - IP filtering
- Dynamic bandwidth allocation and prioritization for voice and data traffic
- Management capabilities including Telnet, SNMP and TFTP

## Verilink 8200 Series VoIP IAD (T1/E1)

### Extend the Power of Convergence Across Your Networks

The Verilink 8200 enables a provider to integrate legacy networks with next generation network (NGN) infrastructures. Service providers can now enable small and medium-sized enterprises (SMEs) with the power of Wide Area Network communications (WAN) to create a superior competitive advantage. The Verilink 8200 creates a cost effective service platform specifically for SMEs. Via the Verilink 8200, SMEs can now cost effectively leverage high quality voice services as well as high speed data connections which previously had only been profitable and available to larger business enterprises.



### A Future-Proof Investment

The flexibility of the Verilink 8200, combined with support for protocols such as MGCP and SIP, provides a cost effective solution while providing a migration path to packet based applications. Because the Verilink 8200 can grow with your business, no costly truck rolls or forklift upgrades are required, providing a future-proof investment.

### Flexible and Scalable

The Verilink 8200 is available in two models, the Verilink 8200 base model which supports VoATM only and the Verilink 8200S which supports VoATM/VoIP via one device. Both the base and "S" versions are available and equipped with 8, 16, or 24 voice ports and an Ethernet interface capable of dynamic and static IP routing and bridging.

### Subscriber Value

The Verilink 8200 prioritizes voice packets and dynamically allocates bandwidth between voice and data services. This ensures that end users continue to experience the audio quality they have come to expect while maintaining access to high speed data connections. Local telephone service through the Verilink 8200 is identical in quality and features to those available through the conventional circuit switch voice network. Subscribers will continue to experience the voice quality they have come to expect, along with IP Centrex and Class features including Caller ID and Call Waiting.

### Interoperability

CTDI's IADs have been extensively tested to ensure support of existing modems and telephones including key systems, fax machines, and analog telephones. The Verilink 8200 Series is designed for simple installation and easy remote network management. Through Telnet, SNMP, and TFTP, the Verilink 8200 can be remotely monitored, provisioned, tested, and upgraded without the expense of a costly on-site visit.

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## Verilink 8200 Series Technical Specifications

### Voice Features

#### Analog

- Voice Ports: 8 POTS ports (RJ-11); 16 or 24 POTS ports FXS (RJ-21X)
- Failover: Analog input fail over to Line 1 (RJ-11)
- Signaling: Loop start, ground start
- Dialing: DTMF (tone), Pulse
- Ring Source: Internal
- Impedance: 600, 900, Complex (country specific)
- REN: 5 REN per port, 16 REN total
- Loop Current: 20, 24 mA typical (country-specific)
- Idle State Voltage: 48 V typical
- Ring Voltage: Balanced 65 V rms  $\pm 5\%$  at 5 REN load
- Ring Frequency: 20, 25, 50 Hz (country-specific)
- Gain/System Loss: Programmable, +3 to -9 dB

#### Digital

- Compression for VoIP Units: G.711 (64 kbps PCM), G.726 (32 kbps ADPCM), G.729a (8 kbps CS-ACELP) "S" version only

#### Encoding: A-law, $\mu$ -law

- Echo Cancellation: G.168 compliant (single reflector)
- Protocol Support: CopperCom, ELCP (af - vmoa = 0145), Jetstream, LES (af-vmoa-0145), MGCP/ SIP ("S" version only)
- DID/DOD Support
- Fax Support: V.17, V.29 support
- Modem Support: V.34, V.90 support
- Calling Features: Caller ID, flash hook, distinctive ring, stutter dial tone, call forwarding, call waiting

### Data Features

- LAN Interface: 10/100Base-T (RJ-45)
- Bridging: IEEE 802.1d including spanning tree
- Routing: Default, Static, RIP1 (RFC 1058), RIP2 (RFC 2453), ICMP for IP Packet Processing
- DHCP: Server, Client (RFC 2131), Relay Agent (RFC 1542)
- PPP: PPOA, PPOE, PAP, CHAP, IPCP (RFC 1332) HCLC support
- Management: SNMP via IP or EOC, MIB1, MIB2 (RFC 1213), Enterprise MIB, LES MIB
- Configuration: Console, Telnet (local, remote)

### WAN Features

- Transport: ATM and Frame Relay
- Voice Gateways Supported: Verso, CopperCom, JetStream, TdSoft, Broadsoft, MetaSwitch, CirPack, NuERA Tollbridge, General Bandwidth, Nortel CS2K MGCP, Accelerated, AAL2/LES and ELCP and any afvmoa-0145 compliant gateway
- SoftSwitches: NCS, LCS, MGCP 1.0, (RFC 2705.bis), SIP
- T1

- Network Interface: RJ-48
- Line Interface: Balanced -
- Line Rate: 1.544 Mbps
- Clock Source: Line/local (software selectable)
- Line Coding: B8ZS or AM1 per T1.401
- Framing: D4 (SF)/ESF, TR-08, AT&T 54016 or ANSI T1.403
- Line Build Out: 0, .75, .15, or .22.5 dB
- Receive Sensitivity: Automatic
- Input Jitter Tolerance: Per ATT TR62411
- Protection: Over voltage/over current

### E1

- Network Interface: RJ-48
- Line Rate: 2.048 Mbps ( $\pm 50$  bps) unframed
- Line Framing: CAS, CCS, or 2 Mbits unframed
- Line Code: AMI or HDB3
- Input Signal: E1, +1 to .27 dB
- Connection: RJ-48 jack at 120 ohm ( $\pm 10\%$ ) or (75 ohm ( $\pm 10\%$ ) via converter balun)
- Output Signal: 3.0 V ( $\pm 10\%$ ) base-peak into 75 or 120 with protection
- Transient Voltage: 1000 V protection, fused input/output
- Jitter Control: per G.823 Sections 2.1 and 3.0
- Density: HDB3, alternate fill; complies with G.701 and G.703
- T1 Provisioning ("S" version only)
  - Provisioning: Fractionally multiplexed voice and data
  - Programming: On a DS0 basis
- ATM
  - Adaption Layers: AAL2 (voice), AAL5 (data), AAL5 (for layer 3 voice)
  - Encapsulation: RFC 1483 multiprotocol encapsulation over ATM; RFC 2364 (PPP over ATM); ITU 366.2 (AAL2)
  - AAL2 Profiles: ATM: 9,10, 11, and ITU: 1; "S" versions also support ATM Profiles 7, 8, 12, and ITU 2
  - Voice: Single AAL2 PVC
  - Data: Up to 8 AAL5 PVCs
- Security: Software configurable payload scrambling
- Voice QoS: CBR; VBR-rt (16 and 24 port model only)
- Data QoS: CBR, UBR
- Cell Delay Variation Buffer: Configurable 0-30 ms
- OAM Cell Handling: F4/F5 segment and end-to-end loopbacks
- Frame Relay
  - Encapsulation: RFC 1490 multiprotocol encapsulation
  - Voice: Single PVC
  - Data: 8 Data Link Identifiers (DLCI)
  - Data Link Format: Q.922
  - Data Link Control: FRF.12 support, adjustable jitter buffer
  - Framing: HDLC support

### Configuration and Management

#### 10/100 Ethernet (Management or IP Gateway)

- Connection: 8-pin modular
- Network Protocol: TCP/IP based networks
- Data Rate: 10/100 Mbps
- Compatibility: 10/100Base-T

#### Supervisory Port

- Connection: DB-9 female
- Data Rates: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps (default: 19.2 kbps)
- Upgrades: Trivial File Transfer Protocol (TFTP) server and client for software upgrades and configuration
- Software download via gateway (wherever supported)
- Telnet (local and remote)
- Management: SNMP 1.0, SNMP 3.0, Telnet, Console

### Security Features

- Firewall: IP filtering (in and out)
- NAT: RFC 1631, Port translation, exported services, multi-NAT (up to 8 public IP addresses)
- Security: Multilevel password protection
- Other: Radius client support (RFC 2865)

### Management Interfaces

#### Alarms

- Activation: Programmable thresholds on all interfaces
- Reporting: SNMP traps, e-mail notification

#### Diagnostics

- Network Loops: Line loopback, payload loopback, or maintenance loopback
- Fractional Loop: Generates and responds to in-band V.54 loop code
- DTE Port Loops: V.54 and Local
- BERT: Multiple test patterns toward network or DTE ports with error inject

### Physical Characteristics

- Dimensions: 4 or 8 port models: 11.8" W x 8.3" D x 1.8" H (30cm W x 21cm D x 4.6cm H) 16 or 24 port models: 17.5" W x 10.25" D x 1.75" H (44.5cm W x 26cm D x 4.5cm H)
- Weight: 4 or 8 port models: 1.8 lbs (1.35 kg); 16 or 24 port models: 4.75 lbs (3.50 kg)
- Mounting: Stand alone or wall mountable
- LEDs: Power, LAN link, LAN act, WAN link, Voice

### Power

#### Power Supply

- 4 or 8 port models: External 90-240 VAC, 50- 60 HZ
- 16 or 24 port models: Internal 90-240 VAC, 50- 60 HZ

#### Power

- 4 or 8 port models: 20 watt nominal, 50 watt max
- 16 or 24 port models: 40 watt nominal, 76/110 watt max

### Environmental Tolerances

- Operating Temp: 0° C to 40° C
- Storage Temp: -10° C to 70° C
- Operating Humidity: 5%-90% non-condensing

### Regulatory – Compliance and Agency Approval

- This product complies with or has obtained Regulatory Agency approval at least against the following standards:
  - EMC - Emission - Class A : FCC Part 15, EN 55022:1998 + A1 + A2, AS/NZS 3548
  - EMC - Immunity: EN 55024:1998 + A1 + A2
  - Safety: UL 1950, CSA C22.2 No 950:95, IEC 60950-1, EN 60950-1, AS/NZS 3260
  - Telecom: FCC Part 68, IC CS-03 Issue 8, TBR12, TBR13, ACA TS016

### Warranty and Support

- One (1) year warranty

