



# DRAGONWAVE FUSION A1

## PSEUDOWIRE ACCESS GATEWAY

FOR VOICE AND DATA INTEGRATION OVER PACKET-BASED ACCESS NETWORKS

**THE DRAGONWAVE FUSION A1 IS A CUSTOMER-LOCATED PSEUDOWIRE ACCESS DEVICE DESIGNED TO ENABLE COST-EFFECTIVE VOICE AND DATA INTEGRATION OVER PACKET-BASED ACCESS NETWORKS, SUCH AS CARRIER ETHERNET, CABLE HFC, XDSL, EPON/GPON, WIMAX, AND IP.**

The A1 allows service providers to rapidly open up new revenue opportunities by enabling profitable legacy voice and data services, such as T1/E1 private line, as well as advanced Ethernet capabilities over next-generation packet-based access networks using a single, standards-based, pseudowire access device.

By offering the full range of voice and data services over a single, unified, packet-based infrastructure, providers can cut costs, increase revenues and expand their market, while preserving investments in existing equipment, thereby ensuring a non-disruptive migration path to packet-based networks.

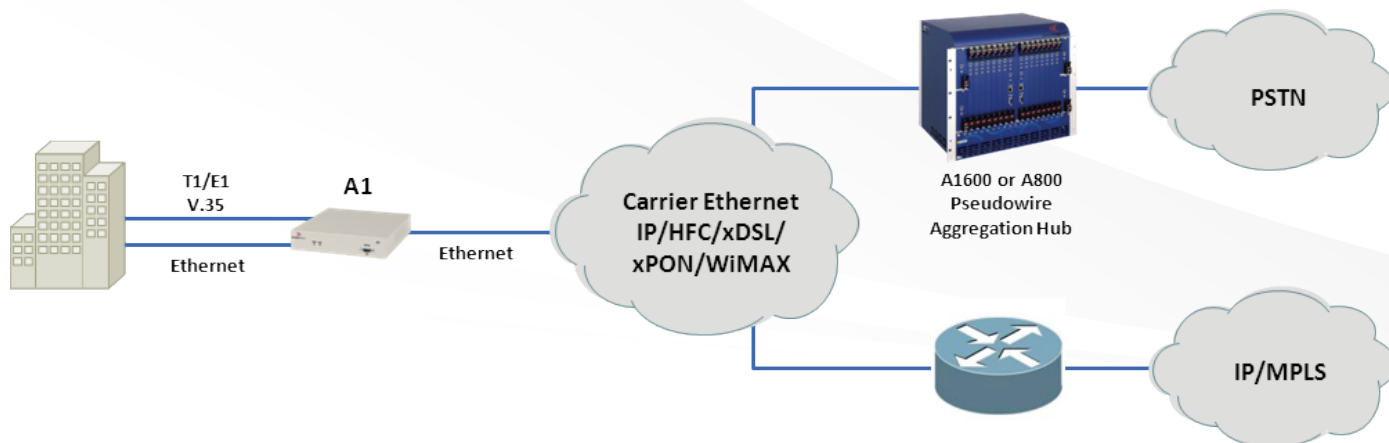
The A1 is based on DragonWave's field-proven Multiservice over Packet (MSoP) technology and is fully interoperable with all other DragonWave Fusion and Horizon products.

### KEY BENEFITS AND FEATURES

- IETF PWE3-based capabilities – Circuit Emulation Service (CES), FR and HDLC
- Industry-leading CES with enhanced jitter management
- High Precision Clock Recovery (HPCR®) – the industry's most robust adaptive clock recovery technology
- VLAN tagging and switching
- Advanced QoS mechanisms – port-based rate limiting, DiffServ and Ethernet VLAN 802.1q/p
- Seamless interoperability with all existing CPEs, including PABXs, FRADs, IADs, switches, and routers
- Remote management capabilities through DragonWave's CLI and DragonVision NMS

### KEY APPLICATIONS

- GSM/UMTS and CDMAone/CDMA2000 backhaul over packet-based RAN
- T1/E1 circuit emulation for TDM leased-line replacement
- PBX-to-PSTN backhaul and PBX-to-PBX (tie-line) connectivity
- Frame Relay service delivery and interworking
- HDLC virtual leased lines for X.25/SNA/IPX/FR



# DRAGONWAVE FUSION A1

## Product specifications

### PHYSICAL INTERFACES

#### E1

- Number of Ports: 1
- Bit Rate
  - 2.048 Mbps  $\pm$  50 ppm
- Standards Compliancy
  - ITU G.703, G.704, G.706, G.732
- Framing
  - Unframed, FAS, FAS with CRC4
  - MFAS with CAS, MFAS with CAS and CRC4
- Line Code: AMI
- Zero Suppression: HDB3
- Jitter and Wander Performance
  - ITU G.823, G.8261
- Connectors
  - Balanced RJ-45, 120  $\Omega$
  - Unbalanced BNC 75  $\Omega$  connectors via an optional adapter cable

#### T1

- Number of Ports: 1
- Bit Rate
  - 1.544 Mbps  $\pm$  32 ppm
- Standards Compliancy
  - ANSI T1.403, Telcordia TR-62411
- Framing: Unframed, D4, ESF
- Line Code: AMI
- Zero Suppression: B8ZS
- Jitter and Wander Performance
  - Telcordia TR-62411, ITU G.824, G.8261
- Connectors: Balanced RJ-45, 100  $\Omega$

#### SERIAL

- Number of Ports: 1
- Bit Rate
  - n x 64 kbps up to 2.048 Mbps
- Connectors
  - DB-25 female (DCE)
- Electrical Interfaces (software selectable)
  - EIA-530, V.35, X.21

#### ETHERNET

- Number of Ports: 3
  - 2x 10/100BaseTx
  - 1x 100BaseFx
- Standards Compliancy
  - 802.3 (Fixed settings, auto-negotiation)
  - 802.1Q/P
- Connectors
  - 10/100BaseTx – RJ-45
  - 100BaseFx – LC duplex (SFP)
  - SFP transceivers should be ordered separately

#### MANAGEMENT INTERFACE

- Type: RS-232
- Connector: DB-9, female

#### INDICATORS

- Power: Green - Active
- Alarm
  - Off – No alarms
  - Orange – Minor alarm
  - Red – Major alarm
- Ethernet
  - Link: Green - On
  - Activity: Amber - On
- T1/E1
  - LOS (Red)
  - RAI (Orange)

### POWER OPTIONS

- DC Power:  $\pm$ 18 to  $\pm$ 72 VDC
  - Nominal:  $\pm$ 24,  $\pm$ 48,  $\pm$ 60 VDC
- AC Power: 90 to 264 VAC
  - Nominal: 100 - 240 VAC

### POWER CONSUMPTION

- DC: 7W to 11W
- AC: 8W to 13W

### PHYSICAL DIMENSIONS

- Inches: 1 RU (h) x 9.1" (d) x 8.2" (1/2 19") (w)
- Cm: 4.45 (h) x 23 (d) x 20.8 (w)

### PSEUDOWIRE SERVICES

#### TDM - CES

- Framed (CESoPSN)
  - n x DS0 (1= $\leq$  n  $\leq$  31)
- Unframed (SATO P)
- Jitter buffer – programmable up to 256 msec

#### FRAME RELAY

- One-to-One mode
- Port mode

#### HDLC/PPP

- Port mode

### IP SERVICE INTERWORKING

- HDLC IP Service Interworking
- Frame Relay IP Service Interworking
- PPP IP Service Interworking

### ETHERNET SERVICES

- Bridging/Forwarding between Ethernet interfaces
- Port-based VLAN tagging
- Rate limiting (per port)
  - Up to 1 Mbps – 512 kbps steps
  - 1 Mbps up to 100 Mbps – 1 Mbps steps

### OAM

#### ETHERNET OAM

- Ethernet Link OAM (IEEE 802.3ah)
- Ethernet service OAM (IEEE 802.1ag / ITU-T Y.1731)

#### TDM OAM & PM

#### Diagnostics

- Terminal (Local) loopback
- Facility (Remote) loopback
- In-band loopback

#### PERFORMANCE MONITORING

- T1 / E1 (G.826)
  - 5 x 24 hour interval
  - 96 x 15 minute interval
  - ES, SES, UAS

#### ALARMS

- T1
  - Alarm Indications Signal (AIS)
  - Remote Alarm Indication (RAI)
  - Loss of Signal (LOS)
  - Loss of Framing (LOF)
- E1
  - Alarm Indications Signal (AIS)
  - Remote Alarm Indication (RAI)
  - Loss of Signal (LOS)
  - Loss of Framing (LOF)
  - Loss of Multiframe (LOM)
  - Remote Loss of Frame Indication (RAIM)

### TIMING

- Adaptive Clock Recovery (ACR)
- High Precision Clock Recovery (HPCR<sup>®</sup>) - ordering option
- Internal:  $\pm$ 25 ppm (non-HPCR)
- Loopback timing

### QOS MANAGEMENT

- 4 Levels of Prioritized Queuing (SP)
- Layer 3 Marking – DiffServ
- Layer 2 Marking – VLAN 802.1Q/P

### MANAGEMENT SPECIFICATIONS

- In-band or out-of-band
- SNMP v1/v2
- Syslog
- Command Line Interface (RS-232 / Telnet / SSHv2)
- DragonVision NMS
- Remote software upgrade

### SECURITY

- RADIUS authentication
- Management access list (ACL)

### ENVIRONMENTAL SPECIFICATIONS

- Operating temp: 0 – 50° C / -32 – 122° F
- Humidity: Up to 90% non-condensing

### REGULATORY SPECIFICATIONS<sup>1</sup>

- Safety: UL60950-1 CAN/CSA-C22.2, EN60950-1
- EMC: FCC part 15-class B, EN55022 Class B, ETSI 300-386-2 Class B, VCCI Class B

<sup>1</sup> Please contact DragonWave for current approval list