Wireless Metro Ethernet Networks

Connecting fixed and mobile services to your network – fast.

- Cost effective, native Gigabit Ethernet platform
- Increased reach – link reach up to 50 kms
- Scalability – software configurable from 10 to 500 Mbps CIR
- Interference free, guaranteed SLAs
- Versatile - available in full outdoor or indoor/outdoor configurations
- Mesh Networking for increased network availability
- Ultra low latency – < 0.2 ms, for triple play applications
New high capacity IP applications are driving existing networks to capacity. Yet, wiring buildings to a fiber backbone is slow and expensive. To meet the growing need for more services and capacity, today’s networks need to be:

• **reliable and survivable**—customers depend on the quality and availability of network services;

• **scalable**—to provide new and existing services today and more tomorrow, without rolling new equipment into the network or running new fiber;

• **low latency**—enabling applications to be delivered in today’s rapidly changing and highly competitive marketplace

• **efficient**—to realize the operating efficiencies of a converged IP network

Energize your network and realize the cost advantages of true broadband Ethernet. A simple and scalable wireless solution—fast.
PRODUCT FEATURES

High Capacity Native IP Wireless Ethernet
Designed from the ground up, AirPair meets the critical needs demanded by carrier class customers delivering a wireless GigE/100bT connection of up to 500 Mbps full duplex over licensed or unlicensed frequency allocations. With a native IP design and ultra-low latency, AirPair is optimized for next generation services.

TDM and Ethernet Interface
The APX-104E/108E delivers a standards compliant N x T1/E1 port extension capability to the AirPair Ethernet platform. This service adaptation seamlessly transports T1/E1 traffic over a low latency, wireless link enabling customers to easily migrate to native IP networks while still supporting legacy TDM services. The APX is able to meet the stringent timing needs of cellular backhaul applications.

Configuration Options
AirPair is available in both full outdoor and indoor/outdoor configurations and can be installed to match customer requirements. The outdoor unit (ODU) is compact, weatherproof and requires no indoor space. The indoor option, (IDU) is mountable on a standard 19” rack, 1U high. Also, there are a variety of shroud option to provide antenna concealment and multi-antenna installations.

Enhanced Network Management
Designed with flexible, carrier grade management requirements in mind, AirPair integrates directly into any SNMP management environment using industry standard MIBs with RF extension to monitor radio and network parameters. Management traffic can be carried in-band over an 802.1q VLAN accessed via a serial port or a 10BaseT console port. The user interface is via CLI or a web based GUI.

Fixed and Scalable Bandwidth Operations
AirPair is a flexible bandwidth radio platform designed specifically for customers with rapid scalability requirements. AirPair can scale from 10 to > 200 Mbps in 10 Mbps increments via a simple software configuration. For applications with small frame sizes such as VOIP it delivers > 250 Mbps user bandwidth. For higher bandwidth needs, two radios can be polarization multiplexed on a single antenna using Dual Pole Radio Mount (DPRM) to provide 400-500 Mbps of capacity in a single link.

Improved Reach
AirPair enables bandwidth extension over extended distances by providing up to 98 dB system gain in its base configuration or up to 108dB in a High Power configuration using a standard AirPair modem with a high powered radio that can support antennas sized up to six feet. This feature combination enables link lengths up to 50 km/30 mi. In addition, AirPair’s dynamic modulation allows a link to be engineered to the highest availability, while maximizing throughput in good weather conditions.

Network Protection
Using AirPair’s Rapid Link Shutdown (RLS), AirPair supports mesh and ring configurations with ~50 ms switching time, enabling 99.999% available carrier class services. AirPair also supports 0:1 or 1+1 fully redundant configuration. For radio redundancy, an upmast switch provides radio protection using a single modem.

PRODUCT FEATURES

• Software Scalable Bandwidth control from 10-500 Mbps CIR [10 Mbps increments]
• Peak Rate of 1000 Mbps
• 99.999% availability through mesh and ring support
• Extended reach with High option and up to 6’(182cm) antenna
• Native GigE connectivity
• Ultra-Low latency for multimedia applications
• Rapid installation and commissioning using PDA and PC-based tools
• T1/E1 support through service adaptation to native Ethernet
• 802.1p and 802.1q support
• In or-out-of band remote SNMP management, CLI, SSL HTTP, Web Management
• Licensed frequency bands from 11 to 38 GHz
• License-exempt ETSI & FCC 24 GHz frequency band
• Rack Mountable Indoor (IDU), or all-outdoor (ODU) option
**Private Networks**

With DragonWave, your business can eliminate the monthly expense of leased lines and build a carrier-grade private network easily and cost-effectively—all with in-year payback. With software scalable GigE wireless mesh connectivity, there is no need to worry about capacity constraints and because it is licensed, interference is not an issue.

**Solution Features:**
- Eliminate costly leased line expenses
- Bridge the digital divide
- Offer superior service availability
- Control your network
- Evolve painlessly to IP

**Next Generation Service Providers**

If cost and performance of IP and WIMAX backhaul is a priority, can help your business extend the reach of your network for IP services. Software scalability means Next Generation providers can obtain the capacity they need when they need it. DragonWave’s cost effective wireless backhaul enables access technologies to be plugged into your network fast.

**Solution Features:**
- Native Ethernet platform supporting Ethernet services, IP Services, VOIP, Video, and Voice
- Mesh Networking to provide increased network availability and survivability
- Expansion of footprint easily and cost-effectively
- Licensed radio frequencies to ensure interference free performance
- License exempt (24GHz) radio frequencies for rapid deployment with virtually interference free operation

**Network Evolution**

Offer your customers more services easily and effectively. DragonWave enables progressive telecom companies to fill the fiber gap fast with licensed wireless, carrier grade, network ready equipment. High capacity customers can be reached with new IP services. Connectivity can be brought to your whole network and leased lines eliminated with full operational systems support.

**Solution Features:**
- Be part of the Ethernet evolution
- TDM support T1/E1
- Seamless integration

**APPLICATIONS**

**Mobile Convergence**

AirPair is the ideal backhaul solution to connect access technologies to the rest of the network, providing native Ethernet transport for IP-based solutions while enabling rapid bandwidth expansion for network growth.

**3G Cellular Backhaul**

To meet the growing demand for increased capacity and data transport resulting from 3G/4G cellular deployments, AirPair provides cost-effective, low capacity TDM services for existing basestations. AirPair offers software controlled upgradeability to high-capacity native Ethernet services with ultra-low latency.

**Leased Line Replacement**

For many businesses, their only option for last mile access is the ILEC, provided on an aging copper infrastructure with poor MTTR. AirPair can replace leased services and eliminate recurring and expensive telecom costs while at the same time improve service availability and enable future growth and options for services with a scalable IP-ready network.

**Last Mile Fiber Extension**

The greatest demand for broadband services is within the core metro markets. AirPair provides a superior complementary networking solution to rapidly extend high speed IP services from locations already attached to the service provider’s network. AirPair is ideal for network hardening, disaster recovery and applications that require legacy TDM services and carrier grade, high capacity native Ethernet.
### Frequencies

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### Mechanical

- **Radio (without antenna)**: 12 cm x 19 cm (diameter); 3.2 kg
- **Modem (ODU - Post/Mast Mount)**: 40 cm x 19.6 cm x 8.1 cm; 5.4 kg
- **Modem (IDU - Rack Mountable)**: 4.3 cm x 25.4 cm x 42.5 cm; 4.1 Kg
- **Antenna Wind Loading**: 110 kph (70 mph) Operational; 200 kph (125 mph) Survival
- **Antenna Mount Adjustment**: +/- 45° Az; +/- 22° El

### Payloads

- **Capacity**: Variable from 10 to 500 Mbps full duplex CIR (64 Byte Packet); 400 Mbps (1522 Byte Packet)
- **Max Capacity (1522 Byte Packet)**: 50 Mbps (14MHz) 50 Mbps; 150 Mbps (28 MHz-27.5 MHz); 170 Mbps (40 MHz); 200 Mbps (50/55/56 MHz)
- **Interface**: 1000/10/10 BaseT
- **Latency 100 BT**: < 400 µs, Typical < 200 µs FastE
- **Latency GigE**: < 200 µs, typical 120 µs GigE
- **Packet Size**: 64 to 1600 Bytes, up 9600 (GigE Mode)
- **Flow Control**: Yes (GigE mode only)
- **Modulation Shifting**: Current to Lowest – 5 sec

### Power

- **Input**: -36 VDC to -60 VDC
- **Optional Adapter**: 110/240 VAC
- **Consumption**: 50 Watts (per link end); 70 watts High Power (per end)

### Environmental

- **ODU Operating Temperature (Modern + Radio)**: -40°C to + 50°C [-40°F to +122°F]
- **Standard Power (18-26 GHz)**: -40°C to +5°C [-40°F to -5°F]
- **High Power + Standard Power (11, 13, 15 GHz)**: -40°C to +45°C [-40°F to +113°F]
- **Standard Power + Solar Shield (24 GHz)**: -40°C to +65°C [-40°F to +149°F]
- **IDU Operating Temperature (Modern Only)**: 0°C to + 50°C (0°F to +122°F)
- **Humidity**: 100 % Condensing
- **Altitude**: 4500 m (14,760 ft)

### Connections ODU

- **Power**: -48V, Cable Supplied
- **Payload + In-band NMS**: MIL Circular (outdoor) RJ45 or optical LC (indoor)
- **Craft Terminal**: RS 232
- **IF Cable**: N-Type Connector
- **NMS (when out-of-band)**: MIL Circular (outdoor) RJ45 (indoor)

### Connections IDU

- **Power**: Dual 48V
- **Payload + In-band NMS**: RJ45 (1000/100 BaseT) or SFP with LC optical connector
- **Craft Terminal**: RS 232
- **IF Cable**: N-Type Connector
- **NMS (when out-of-band)**: RJ45 (10 BaseT)

### Network Management [NMS]

- **Alarm Management**: SNMP Traps, Enterprise MIB
- **NMS Compatibility**: OpenView, or any SNMP based network manager
- **Security**: 3 Level Authentication
- **EMS**: Web Based Management System, SSL HTTP

### System Gain

- **AirPair 50**: Up to 98 dB
- **AirPair 50 High Power**: Up to 108 dB
- **AirPair 100**: Up to 90 dB
- **AirPair 100 High Power**: Up to 100 dB
- **AirPair 200**: Up to 82 dB
- **AirPair 200 High Power**: Up to 92 dB

### General

- **Receiver Range**: 0 to 36 dB loss
- **Clock Mode**: Configurable as Loopback, internal, external, adaptive, differential
- **Loopback**: Supports per channel local analog remote digital dual loopback modes
- **Encoding/Decoding**: B8ZS, AMI or HDB3
- **Line Buildout**: 0-133 ft, 133-266 ft, 266-399 ft, 399-533 ft, 533-655 ft
- **Delay Tolerance**: +/- 2 Frames 100 mbps
- **Buffer Size**: User Programmable (2-30 msec)
- **Timing Performance**: H.823 compliant stratum 3 performance option for 50 ppm frequency stability

### Management/System

- **Type**: Command Line Interface, Web GUI, SNMP 1/2/3
- **Interfaces**: RS 232 Craft Port, In-Band 100 BaseT port
- **Loopback**: T1/E1 Port Loopback
- **Statistics**: T1/E1 Stats and logging
- **System**: Software upgrade through Craft Port
- **Management**: RJ-45 Console Port

### Connections

- **Primary Power**: 100-240 VAC
- **TDM**: 4 x T1/E1 Ports or 8 x T1/E1 ports
- **Ethernet (In/Out)**: APX-108E 2 x 100 BaseT Wirespeed full duplex [IEEE 802.3 compliant]
- **APX-104E**: 6 x 100 BaseT
- **Timing**: External Clock

### Mechanical

- **Dimensions APX-104E**: 28 cm x 21 cm x 4 cm [11 in x 8.3 in x 1.5 in]
- **Dimensions APX-108E**: 44 cm x 25 cm x 4 cm [17.3 in x 9.8 in x 1.5 in]
- **Weight APX-104E**: 1.9Kg (4.2 lbs)
- **Weight APX-108E**: 3.1Kg (6.8 lbs)