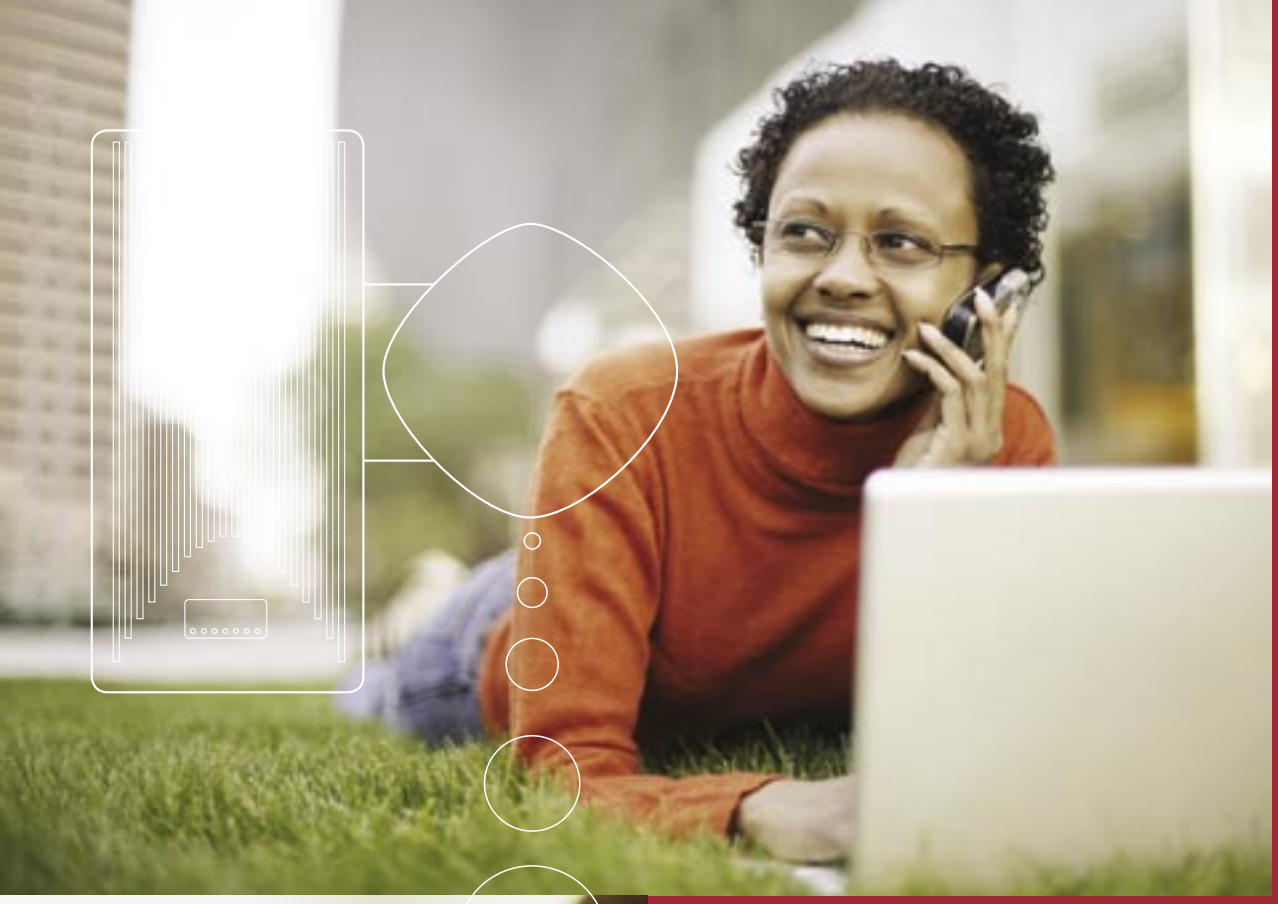

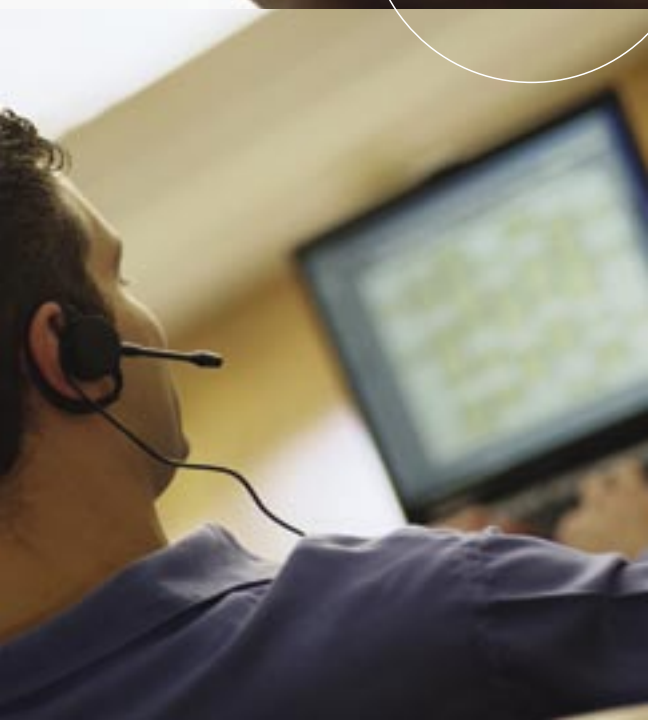

Wireless Metro Ethernet Networks

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

key features

MARKET OVERVIEW

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.

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.

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 any 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.

Improved Reach

AirPair enables bandwidth extension over extended distances by providing up to 98 dB system gain in it 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

MARKET HIGHLIGHTS

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.

AIRPAIR

Frequencies

11 GHz	FCC/IC/ETSI
13 GHz	ETSI/AUS/NZ
15 GHz	IC/ETSI/AUS/NZ/MX
18 GHz	FCC/IC /ETSI/AUS/NZ
23 GHz	FCC/IC/ETSI/AUS/NZ
24 GHz UL	FCC/IC/ETSI
24 GHz DEMS	FCC/IC
26 GHz	ETSI
28 GHz	FCC
38 GHz	ETSI/FCC

Mechanical

Radio (without antenna)	12 cm x 19 cm (diameter); 3.2 kg 4.7 in x 7.5 in (diameter); 7 lbs
Modem (ODU) - Post/Mast Mount	40 cm x 19.6 cm x 8.1 cm; 5.4 kg 15.7 in x 7.7 in x 3.2 in; 12 lbs
Modem (IDU) - Rack Mountable	4.3 cm x 25.4 cm x 42.5 cm; 4.1 Kg 1.7 in x 10 in x 16.7 in; 9 lbs
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)	(14MHz) 50 Mbps (28 MHz-27.5 MHz) 150 Mbps (40 MHz) 170 Mbps (50/55/56 MHz) 200 Mbps
Interface	1000/100/10 BaseT
Latency 100 BT	< 400µs, Typical < 200µs FastE
Latency GigE	< 200µs, typical 120µs GigE
Packet Size	64 to 1600 Bytes, up 9600 (GigE Mode)
Flow Control	Yes (GigE mode only)
802.1p	Yes – 8 levels served by 4 queues
802.1q	Yes
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 (Modem + Radio)	
Standard Power (18-26 GHz)	-40°C to + 50°C (-40°F to +122° F)
High Power + Standard Power (11,13,15 GHz)	-40°C to + 45°C (-40°F to +113° F)
Standard Power + Solar Shield	-40°C to + 60°C (-40°F to +140° F
IDU Operating Temperature (Modem 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 (+ Inband 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 (+ Inband 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

APX104/108E

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
Latency	< 3 mSec
Delay Tolerance	+/- 2 Frames @ 100 mbps
Buffer Size	User Programmable (2-30 msec)
Timing Performance	H.823 compliant stratum 3 performance option for 50 ppB frequency stability

Environmental

Operating Temp	0°C to +50°C (32°F to +122°F)
Humidity	95 % Non Condensing
Altitude	4500 m (14,760 ft)

Management/System

Type	Command Line Interface, Web GUI, SNMP 1/2/3 (CLI) – In-band Management
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- 6X 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

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