



FlexPort®80

80 GHz High-Capacity Wireless Carrier Backhaul

80 GHz WIRELESS LINKS FOR FUTURE-PROOF HIGH BANDWIDTH APPLICATIONS

The FlexPort® family of high capacity millimeter wave radios offers carriers, service providers, government, and enterprise users the ultimate flexibility in an access and aggregation/backhaul solution for today's legacy SDH/SONET-based networks, while seamlessly providing a future-proof transition to enable tomorrow's Ethernet-based applications. The FlexPort80 is the first carrier-class millimeter wave solution to enable simultaneous transmission of native SDH/SONET and Ethernet protocols, efficient network planning and spectrum utilization, and Carrier Ethernet capabilities designed specifically to enable cost-effective, scalable backhaul migration for 4G network deployments.

Carrier Ethernet services are provided via FlexPort through the use of full-rate gigabit transmission coupled with carrier-grade features such as Quality of Service (QoS), VLAN support, and integrating Ethernet OAM network management into a compact, all-outdoor package.

BridgeWave is the market leader in providing highly reliable gigabit wireless solutions. The FlexPort family of products leverages our expertise in designing and bringing to market carrier-class millimeter wave solutions that have been accepted and used in thousands of installations worldwide.



FlexPort80 with 12" (30 cm) Antenna

WIRELESS VIRTUAL FIBER SOLUTIONS FOR:



Mobile Backhaul

Future-proof full-rate gigabit backhaul for next generation 4G/LTE/WiMAX networks.



Service Provider

High-capacity business services, fiber extensions, cellular/Wi-Fi/WiMAX backhaul, redundant fiber overlays, mesh.



Enterprise

Server centralization, remote data storage and backup, leased line replacement.



Healthcare

Secure, HIPAA-compliant connectivity, medical office, lab network access, real-time imaging & records, application connectivity.



Education

High-performance campus connectivity, Wi-Fi and security camera backbone.



Government/Municipalities

Video surveillance systems, traffic control and monitoring, Wi-Fi/4.9GHz backhaul.

FEATURES

Performance:

- Multi-protocol support in native mode: Up to 4 SDH/SONET + 5 Gigabit Ethernet Interfaces
- Up to 1500 Mbps over-the-air data rates, delivering the equivalent of full gigabit Ethernet plus 200 Mbps end user throughput
- Efficient spectrum utilization using QPSK modulation with Adaptive Rate & Modulation
- Effective network planning via RF channel tuning across the entire 70/80 GHz band
- Compact and lightweight all-outdoor solution

Security:

- Highly secure narrow beamwidth antennas
- FIPS-certified AES Encryption option provides the ultimate in data protection at full line rate gigabit speeds

Carrier-Grade:

- Carrier Ethernet services enabled through built-in GigE Layer 2 switch
- Quality of Service (802.1p) traffic prioritization and VLAN (802.1p)
- Synchronous Ethernet per G.8261 and G.8262
- Ethernet OAM support per 802.3ah, 802.1ag and Y.1731
- 1+1 MHSB or 2+0 dual link configurations

Proven Reliability:

- Based on proven design – thousands of GigE terminals installed
- Rigorous HASS testing
- Up to 99.999% carrier-grade availability



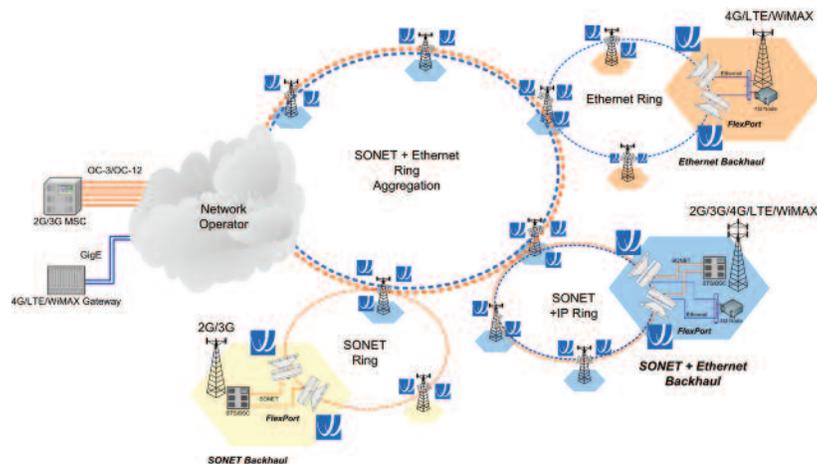


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OPTIMIZE NEXT GENERATION NETWORK CONNECTIVITY WITH FLEXPOR

SDH/SONET + Ethernet Connectivity

With the advances in mobile networks from 2G to 3G to 4G, network operators are faced with the challenge of providing more backhaul capacity while migrating technologies from circuit-based SDH/SONET networks to packet-based IP networks. BridgeWave's FlexPort80 provides simultaneous native SDH/SONET and native Ethernet connectivity in a single, all-outdoor solution with user transmission rates up to 1200 Mbps. With FlexPort80, network operators have the ability to supply multiple STM-1/OC-3 (155.52 Mbps), connections and/or a single STM-4/OC-12 (622.08 Mbps) connection to base stations. Furthermore, as requirements change, network operators can enable additional SDH or Ethernet interfaces remotely from the Network Operations Center. The capability of providing multiple simultaneous SDH/SONET and Ethernet streams at gigabit speeds is unmatched by any other millimeter wave radio on the market.



Upgradeable Capacity

FlexPort80 provides true future-proof "pay-as-you grow" capabilities in a single all-outdoor compact solution. Start off with an STM-1/OC-3 or sub-gigabit Ethernet connection and expand as your network needs grow. FlexPort80 supports up to four STM-1/OC-3 (155 Mbps) connections and/or one STM-4 (OC-12) TDM interface while simultaneously providing gigabit Ethernet capacity through its built-in Layer 2 gigabit Ethernet switch.

Frequency Agile RF Tuning

FlexPort80 is the only millimeter wave radio that can be tuned across the entire 80 GHz spectrum. Unlike other 80 GHz radios on the market that operate at a single channel, FlexPort80 conforms to ECC 05/07 recommendations and provides the ultimate in frequency agility. As next generation networks require greater cell density along with higher capacities, the ability to reuse frequencies and tune to separate channels is paramount to successful network implementation. Network planning is simplified with FlexPort80's RF tuning capability.

Spectrum Efficiency

FlexPort80 utilizes Quadrature Phase Shift Keying (QPSK) modulation, enabling more efficient use of the 80 GHz spectrum. With FlexPort80, full-rate gigabit Ethernet transmissions (or a combination of Ethernet + SDH/SONET up to 1200 Mbps) are made utilizing 1 GHz of spectrum. This translates into lower licensing costs, better frequency reuse, and greater conservation of the 80 GHz resource.

Ethernet OAM

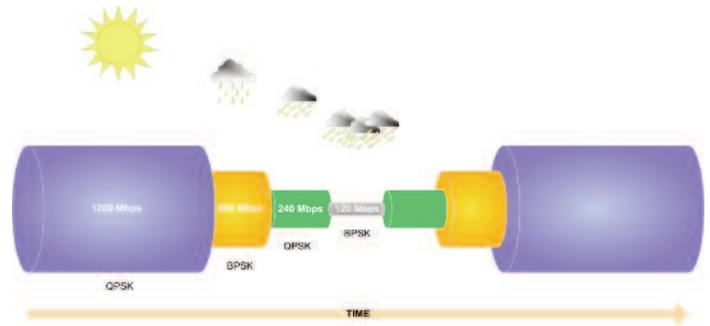
As next generation networks migrate to Ethernet based systems, the ability to fully manage these Ethernet services will play a critical role in allowing operators to offer service level agreements (SLAs) and generate new revenues. FlexPort80 incorporates Ethernet Operation, Administration, and Maintenance (OAM) functionality in the form of Link OAM (802.3ah), Service OAM (802.1ag) and Performance Monitoring (Y.1731). This provides network operators automated end-to-end management and monitoring of their network with the ability to validate connections, detect faults and alarms, perform loopbacks, and monitor link performance. Further, FlexPort80's advanced Ethernet OAM capabilities enable service providers to measure QoS parameters and make decisions proactively, before the network is affected. FlexPort80's Ethernet OAM facilitates efficient fault isolation and circuit restoral, reducing expensive truck rolls and lowering maintenance costs.



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Adaptive Rate Modulation

FlexPort80's Adaptive Rate Modulation (ARM) feature provides gradual adaptive data rate and modulation changes to the transmission that alters the modulation type and/or changes the signal bandwidth, allowing the link to maintain high availability connections during rain fades. As anomalies in the path reduce signal levels, FlexPort80 shifts modulation from QPSK to BPSK, and capacity decreases in incremental steps. The internal engine provides the necessary prioritization of Ethernet and SONET/SDH traffic to maintain quality of service at the new data rate. Once the anomaly subsides, FlexPort80 automatically restores transmission capacity.



Synchronous Ethernet Support

With Ethernet gradually replacing SONET and SDH equipment in the backhaul portion of the network, consideration for synchronization is necessary to provide accurate timing over all Ethernet ports. Synchronous Ethernet (Sync-E) provides the required synchronization at the physical level (layer 1), using high-quality, Stratum-1-traceable clock signals. FlexPort80 provides Synchronous Ethernet (Sync-E) functionality, compliant with ITU-T G.8261 and G.8262, and the Do Not Use (DNU) section of G.8264.

Automatic Transmit Power Control

FlexPort80 utilizes Automatic Transmit Power Control (ATPC), enabling links to maintain carrier-grade high availability during periods of inclement weather.

Flexible Deployment Configurations

FlexPort80 provides the ability to configure the link in non-protected (1+0), monitored hot standby (MHSB 1+1) and dual-transmission (2+0) configurations. 1+1 and 2+0 configurations can be made available with dual antennas, or utilizing an equal split (4dB/4dB) or unequal loss coupler (2dB/9dB) for the ultimate flexibility in link planning.

Carrier-Class Ethernet Performance

FlexPort80 unleashes the power of advanced Quality of Service (per 802.1p) using a carrier grade integrated Ethernet switch. FlexPort80 evolves into a Service Aware platform that allows different end-user-services data flows to be treated according to their QoS requirements. Classification is managed in a highly flexible portfolio of Ethernet criteria, and an advanced eight queue scheduling mechanism supporting Strict Priority and Shaped Deficit Weighted Round Robin allows the network manager to plan ahead for high priority services and jitter sensitive applications. FlexPort80 supports today's legacy networks, while allowing seamless migration to tomorrow's Carrier Ethernet networks providing advanced Layer-2 functionality.

Carrier-Class Ethernet Management

FlexPort80 supports advanced network management and remote diagnostics features required for next generation networks. The network management functionality of FlexPort80 is designed to help reduce OPEX costs by providing comprehensive, proactive status and maintenance information of the system.

- HTTP/HTTPS Web Browser Interface, SNMP V1, V2 Support with BridgeWave Enterprise MIB, MIB-II
- SysLog supports local storage of events
- Remote Monitoring (RMON)
- RADIUS authentication



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	FlexPort80
Frequency	Range: 71 – 76 GHz / 81 – 86 GHz T/R Spacing: 10 GHz Channelization: Software selectable channels in 250 MHz increments per ECC/REC/(05)/07 Recommendation Stability: ±25ppm
Configurations	1+0 Non-Protected; 2+0 Non-Protected Dual Path Transmission 1+1 Monitored Hot Standby (dual antenna, equal loss splitter 4 dB/7 dB, or unequal loss coupler 3 dB/11 dB)
Data Rate	SDH/SONET only, Ethernet only, or a combination of SDH/SONET plus Ethernet over a single RF channel up to an equivalent of 1200 Mbps SDH/SONET: Four separate STM-1/OC-3, 155.52 Mbps, independent per-port clock synchronization; One STM-4/OC-12, 622.08 Mbps Ethernet: Four pluggable slots plus one RJ45 10/100/1000 Base-T supports line rate speeds up to Gigabit Ethernet
Modulation	QPSK or BPSK with Reed-Solomon Forward Error Correction RS (204,188)
Link Budget for 1x10 ⁻⁶ B.E.R. (with 2', 60 cm antennas)	240 Mbps: 192 dB 600 Mbps: 188 dB 1200 Mbps: 185 dB
Interfaces	SDH/SONET: STM-1/OC-3 (155.52 Mbps) and STM-4/OC-12 (622.08 Mbps): SFP, single mode fiber Ethernet: Physical layer: SFP, 1000Base-X, single mode or multi-mode fiber, 10/100/1000 Base-T with RJ45 connector - CAT5e or CAT6 cable
Latency	Dependent on configuration, as low as 65µSec
Security	Inherently secure ultra-narrow beamwidth antennas for low probability of detection and interception Option: FIPS certified 256-bit AES Encryption (export controlled)
Management	Web based (HTTP/HTTPS) embedded management agent, HTTPS secure management option SNMP support: MIB-II and BridgeWave enterprise MIB SysLog (RFC 3164, RFC 3195) event support, RADIUS client support Ethernet OAM per 802.3ah (Link OAM), 802.1ag (Configuration Fault Management), Y.1731 (Performance Monitoring)
Power	48 VDC input, -37.5v to -70v range, 45 watts (depending on number and type of SFPs). Supports redundant "A" and "B" power feeds
Size & Weight	10.75" w x 10.75" h x 4" d (27.3 cm x 27.3 cm x 10.2 cm); 10 lbs (4.5 kg)
Environmental	Operating temperature: -33°C to +55°C (-27°F to +131°F) per EN 300 019 Class 4.1 Operating Altitude: 4,500 m (14,764 ft) Water Ingress: IP66
Antenna	External 30 cm (12") directional cassegrain, 44 dBi gain, 0.9° beamwidth, EN 302 217-4-2, class 3, FCC Category A External 60 cm (24") directional cassegrain, 51 dBi gain, 0.4° beamwidth, EN 302 217-4-2, class 2, FCC Category A Mount: Fine adjust pole mount, 8.9 - 11.4 cm (3.5" - 4.5") diameter - SCH40 or higher
Regulatory	Safety: UL Listed, CE Mark, EN60950, meets FCC 1.310 general population RF MPE limits EMC/EMI: EN 301 489-4, v1.4.1 RF Certifications: U.S. FCC Part 101, EN 302 217 (2008-11) Environmental: EN 300 019

