



Proteus MX



Native DS1 and IP Hybrid Transport Radio
6 to 38 GHz (licensed bands)
6 to 350 Mbps

Intelligent Bandwidth for Evolving Networks

The convergence of voice, data, and video networks is rapidly changing the wireless telecommunications landscape. Network operators must protect existing infrastructure investments while quickly moving to provide ever increasing capacity and new IP based services. Microwave Networks is ready to extend your core infrastructure investments, reduce costs, and simplify operations with our unique point-to-point microwave radio products.

The Proteus MX is Microwave Networks' fourth generation Ethernet/TDM hybrid backhaul radio platform. With capacities up to 350 Mbps, it offers carrier-class Ethernet along with native TDM in a single, feature rich, and extremely flexible platform allowing easy and cost effective migration from legacy TDM networks to Gigabit Ethernet.

The unique combination of up to twelve GigE ports, an integrated add/drop native TDM mux, DS1 loop protection, Ethernet Rapid Ring Protection along with the use of Adaptive Code Modulation to increase throughput while protecting critical traffic, sets Proteus MX apart from other radios. Whether you're keeping pace with growing traffic demands or regularly reconfiguring radio-link payload for new services, the Proteus MX is designed to adapt to your needs at the lowest cost of ownership.

The Proteus MX is designed specifically for mission critical applications. It features 100% redundancy of all traffic and overhead channels with automatic switchover and the security of AES encryption and RADIUS user authentication. These features make it the perfect choice for Public Safety and Utility networks where critical traffic must be maintained and safeguarded, as well as for Mobile Carriers, Wireless Broadband, Railroad, and Enterprise LANs and WANS.





LTE Migration

With Proteus MX, migrating from existing TDM to new IP-based 4G/LTE networks is simple, convenient, and economical. Proteus MX's unmatched TDM traffic management combines carrier class Ethernet with software-based configuration and easy, in-field upgrades which give network providers full control over how and when to make the transition to IP, maximizing return on investment.

TDM and IP Convergence

- Options for up to twelve Gigabit Ethernet ports along with up to 32 native DS1 in the same hardware.
- Software-selected bandwidth, modulation, capacity, channel frequency and output power.
- Increase capacity through simple software license upgrade w/o hardware changes.
- The security of AES encryption of the payload.
- VLAN using IEEE 802.1p & 802.1Q for Traffic Class priorities (QoS), port-based and tag-based VLAN.
- Adaptive Code Modulation to maintain critical traffic during adverse path conditions.
- MPLS and LTE compatible.

Integrated Traffic Management

- Dynamic Payload Mapping™ suite of features:
 - Integrated add/drop mux from DS3.
 - Self-healing individual DS1 loop protection and Ethernet Rapid Ethernet Ring Protection for ring network topologies.
 - Detailed traffic routing and cross-connect across the hop and between co-located terminals.
- Microbus™ single cable TDM interface simplifies connections and reduces expense at repeater and nodal sites.
 - Only local DS1 tributaries need to be terminated.
 - The remaining TDM payload is passed among terminals using the Microbus™ high-speed serial interface on a Cat-5 cable.

Reliability and Management

- Errorless diversity switching protection.
- Complete hot-standby protection; 100% redundancy of all active components.
- Front panel removable license card retains terminal configuration and performance history during changeovers.
- Secure Network Management with SNMPv3.
- RADIUS user authentication.
- Built-in chart recorder, spectrum analyzer and constellation viewer for diagnostics and link performance monitoring.



System Specification

Operating Frequencies (GHz)	T/R Spacing (MHz)
5.925 - 7.125	All FCC, ETSI and ITU spacings
7.125 - 7.900	154, 160, 161, 196
7.900 - 8.500	119, 126, 208, 266, 311.32
10.70 - 11.70	490, 530
12.75 - 13.25	266
14.40 - 15.35	315, 420, 475, 490, 640, 644, 728
17.70 - 19.70	1008, 1010, 1560
21.20 - 23.60	1008, 1200, 1232
24.20 - 26.50	800, 1008
37.00 - 40.00	700, 1260
Frequency Stability	+/- 10 ppm (.001 %)
RX overload	- 20 dBm for < 10-6 BER
Residual BER	Better than 10-12
Altitude	15,000 ft.
Power Consumption (max.)	Split-mount: 80 W non-protected, 166 W protected All-indoor: 120 W non-protected, 250 W protected

RF Unit and Antenna

	Split Mount Outdoor Unit (ODU)	All Indoor RF Unit
Frequencies	6, 7, 8, 11, 13, 15, 18, 23, 26 and 38 GHz	6, 7, 8, and 11 GHz
Configuration	Split-mount; SPU inside / ODU outside	All indoor rack mounted
Dimensions	10.2 in. diameter; 5.9 in. deep	7.0 in. x 19 in. x 11.5 in. (4RU)
Weight	11 lbs.	27 lbs.
Temperature		
Full Performance	-27°F to 131°F (-33° C to +55° C)	+23° F to +122° F (-5° C to +50° C)
Operational	-67°F to 131°F (-55° C to +55° C)	
Humidity	Up to 100%	95% (no condensation)
Output Power Control	-4 dBm to Max	+8 dBm to Max
SPU to ODU Interface	TNC female (SPU); N-type female (ODU)	
Recommended Cable	LMR-400 or RG-8A/U equivalent; 50 Ohms	
Max. SPU to ODU distance	850 feet using LMR-400	
Intermediate Frequencies	SPU to ODU - 350 MHz; ODU to SPU - 140 MHz	
Antenna Diameter (ft.)	1, 2, 3, 4 & 6 - Integrated	Remote mount with elliptical waveguide;
Antenna Connection Options	Integrated push-fit or remote mounting	6 GHz: CMR-137F, CPR-137F; 7/8 GHz: UG-51/U; 11 GHz: CPR-90, UG-39/U

Signal Processing Unit (SPU)

Data Line Interface	32xDS1 (2 x 64-pin Telco) ; 4xDS3 (8 x 75-ohm BNC) ; 155 Mbps (optical LC; SM or MM)
Gigabit Ethernet	MX: 4 x 10/100/1000 BaseT Gigabit Ethernet ports or 3 x 10/100/1000BaseT + 1 x 1000BaseT Optical MX12: 12 x 10/100/1000 BaseT Gigabit Ethernet ports
FEC & Coding	Low Density Parity Check (LDPC) coding
Auxiliary Interfaces	
Digital Engineering Orderwire	Integrated Digital or External RS-422 Digital O/W; 2 x RJ-45 jacks for daisy chain/external connection
Auxiliary Data Channels	2 x RS-232 up to 19.2 kbps async; 1 x RS-422 at 64 kbps async (not available if EOW configured)
Relay Alarm Outputs	4 x Form-C relays, NO & NC contacts, (software mapped)
External Inputs	6 x TTL floating inputs
Configuration Memory	Removable SD FLASH memory card (store link/terminal data & performance history)
Dimensions (h x w x d)	Dimensions (h x w x d) 3.5 in. x 19 in. x 11.2 in. (2RU)
Weight	18 lbs.
Temperature	+23° F to +122° F (-5° C to +50° C)
Humidity	Up to 95% non-condensing
Input Power	+/- 19 to +/- 60 volts DC

Management

Protocol	SNMPv3 (supports SNMP v1 and v2)
Authentication	RADIUS (client)
Element Manager (EM)	Java based management software from MNI; access radio through any local/remote management
NMS Interface	2 x RJ-45; 10/100/1000 BaseT; for access and bridging, configurable for in-band or out-of-band operation
Command Line Interface	RS-232 serial DB-9; for local VT-100 type interface or TELNET access
Modem (PPP)	RS-232 serial DB9; for dial-up access
Management IP Routing	RIP2 dynamic routing or static route maps
NMS Compatibility	OpenView™, NetView™, SNMPc™ or other SNMP-based NMS; Motorola MOSCAD

Standards Compliance

Safety	EN 60950
EMI/EMC	EN 301 489; EN 300 385
RF	EN 302 217-2
MAC QoS	IEEE P802.1p
VLAN	IEEE 802.1Q
Substation Environment	IEEE 1613 (Class 1)
Power Supply	EN 300 132-2
Storage	ETS 300 019-1-1 (Class 1.1E)
Transport	ETS 300 019-1-2 (Class 2.1E)
Environmental - SPU	ETS 300 019-1-3 (Class 3.1E)

