

900 MHz ISM/MAS Ethernet Software Defined Industrial Radio

The **Xeta9 Debian Ethernet radio** is an extremely capable and flexible industrial Frequency Hopping Spread Spectrum (FHSS) and Digital Transmission System (DTS) software defined radio (SDR) supporting the licensed and unlicensed 900 MHz frequency bands. Based on the Debian operating system, the Xeta9 Debian is XetaWave's latest generation of radios.

The Xeta9 utilizes a XetaWave patented **Dual Decode Digital Architecture™** which offers significant receiver performance. The **Xeta9** also supports multiple modulation schemes and features that selectively switch to achieve optimal data throughput given the available channel size and environmental noise. In addition, **MultiSpeed MultiPoint™** mode enables Endpoints operating at different over-the-air data rates to communicate with a single Access Point. The **Enhanced MultiPoint, XetaEMP**, mode provides an increase in throughput and decrease in latency over our standard modes and against competitive products.



All Xeta9 radios from the XetaWave uTasker, Linux, XetaEdge, and Debian series are over-the-air compatible, and the Xeta9 Debian also **supports compatibility with MDS 9710/9790, SD9, and TransNET™** master and repeater radios.

Key Features

High Speed Over-the-air data rates from 10 kbps to 5.3 Mbps plus higher throughput with payload compression and **XetaEMP**.

Bands 902 to 928 MHz ISM and 928 to 960 MHz MAS or ISM only.

Adjustable RF Output Power output up to 1 Watt (+30 dBm) for ISM and 4 Watts (+36 dBm) for MAS.

Network Types Point to Point, Point to Multipoint, Enhanced MultiPoint (**XetaEMP**), Peer to Peer, and **XetaMESH**.

Selective Modulation Multiple MSK, FSK, PSK, and QAM modulations.

Secure Over-the-air data encryption using 128-bit and 256-bit AES.

MultiSpeed Multipoint Access Point communicates with Endpoints operating at different RF data rates.

Diagnostics monitoring of TX and RX statistics (noise, RSSI, more), voltage, and temperature over SNMP and Modbus.

Xeta9 Debian Specifications

Transmitter	ISM FHSS	ISM DTS
Frequency Range	902 to 928 MHz	
Output Power	10 to 1000 mW (10 to 30 dBm)	
Modulation	MSK, 2FSK, BPSK, QPSK, 8PSK, 16PSK, 16QAM, 32QAM, 64QAM	
Data Rate	57 to 5303 kbps	530 to 5303 kbps
Channel Bandwidth	77, 154, 207, 310, 600, 900 & 1200 kHz	600, 900 & 1200 kHz
Frequency Stability	1.0 ppm	
Range	70+ miles	30 miles

Receive sensitivity numbers below are with FEC disabled. With FEC enabled, these typically improve by 3 dBm.

Receiver	ISM					
	77 kHz Channel		154 kHz Channel		207 kHz Channel	
Modulation	Sensitivity	Data Rate	Sensitivity	Data Rate	Sensitivity	Data Rate
MSK	-110 dBm	57 kbps	-107 dBm	114 kbps	-106 dBm	153 kbps
	310 kHz Channel		600 kHz Channel		1200 kHz Channel	
Modulation	Sensitivity	Data Rate	Sensitivity	Data Rate	Sensitivity	Data Rate
MSK	-105 dBm	229 kbps				
BPSK			-100 dBm	530 kbps	-99 dBm	884 kbps
QPSK			-98 dBm	1061 kbps	-97 dBm	1768 kbps
8PSK			-93 dBm	1591 kbps	-92 dBm	2651 kbps
16PSK					-85 dBm	3535 kbps
16QAM			-89 dBm	2121 kbps	-87 dBm	3535 kbps
32QAM			-86 dBm	2651 kbps	-83 dBm	4419 kbps
64 QAM			-76 dBm	3182 kbps	-76 dBm	5303 kbps
	900 kHz Channel					
Modulation	Sensitivity	Data Rate				
2FSK	-100 dBm	663 kbps				
RF Selectivity	50 dB					

** Frequency Range may vary by Country, for example*

Australia, Peru	916-928 MHz
Brazil	902-907 & 916-928 MHz

Xeta9 Debian Specifications

Transmitter

MAS

Frequency Range	928 to 960 MHz
Output Power	10 to 4000 mW (10 to 36 dBm)
Modulation	MSK, 4FSK, QSPK, 8PSK, 16QAM, 32QAM, 64QAM
Data Rate	10 to 1209 kbps
Channel Bandwidth	12.5, 25, and 50 kHz (100, 200, & 250 kHz available upon request)
Frequency Stability	1.0 ppm
Range	70+ miles

Receive sensitivity numbers below are with FEC disabled. With FEC enabled, these typically improve by 3 dBm.

Receiver

MAS

Modulation	12.5 kHz Channel		25 kHz Channel		50 kHz Channel	
	Sensitivity	Data Rate	Sensitivity	Data Rate	Sensitivity	Data Rate
MSK	-115 dBm	10 kbps	-114 dBm	19 kbps	-114 dBm	39 kbps
4FSK	-108 dBm	19 kbps	-111 dBm	39 kbps		
QPSK	-104 dBm	23 kbps	-107 dBm	36 kbps	-107 dBm	71 kbps
8PSK	-100 dBm	34 kbps	-101 dBm	52 kbps	-101 dBm	101 kbps
16QAM	-95 dBm	45 kbps	-98 dBm	70 kbps	-98 dBm	137 kbps
32QAM	-91 dBm	57 kbps	-95 dBm	87 kbps	-95 dBm	175 kbps
64 QAM	-90 dBm	68 kbps	-89 dBm	105 kbps	-89 dBm	210 kbps
RF Selectivity	33 dB		30 dB		30 dB	

Xeta9 Debian Specifications

Processing

CPU	ARM Cortex-A8
OS	Debian
RAM / Flash	256 MB / 4 GB

Interfaces

Power Connector	2-pin Phoenix / +10 to +32 Vdc
Ethernet	2 x RJ45 / 10/100 Mbps Base-T
Serial	2 x RJ45 / up to 1Mbps / RS232/422/485
Micro USB	On-the-Go; +5 Vdc @ 500 mA
RF Connector	TNC / 50 Ohms

Power

Transmit	235 mA (ISM) & 395 mA (MAS) @ +12 Vdc
Receive	190 mA (ISM) & 280 mA (MAS) @ +12 Vdc
Idle	176 mA @ +12 Vdc

Environmental/Physical

Op. Temperature	-40°C to +75°C (ISM) & +60°C (MAS)
Humidity	95% @ +40°C non-condensing
Safety	UL Class 1 Div 2
Dimensions (LxWxH)	6.62" x 3.45" x 1.83" (metal) 5.5" x 3.5" x 1.5" (plastic)
Weight	700 grams (metal) / 182 grams (plastic)

Functionality

Operating Modes	Point to Point, Point to MultiPoint, Enhanced MultiPoint, Peer to Peer, Mesh
Roles	Access Point, Endpoint, Repeater
Compatibility Modes	As an Endpoint compatible with MDS 9710/9790, SD9, and TransNET
Networking	Static IP Routing, Net Filtering, Port Forwarding, Network Address Translation, Modbus Bridging
Protocols	IEEE 802.3, TCP, UDP, ARP, DHCP, NTP, FTP, ICMP, HTTP, HTTPS, SSH, Telnet, Multicast SNMP
Management	Web GUI, SNMP v1, v2, & v3
VLANs	802.1q VLANs and Trunks, QoS
Quality of Service	Four Levels of VLAN QoS
Serial Services	TCP/UDP Terminal Server, TCP Terminal Client
Error Handling	CRC, FEC, Retransmit on error
Error Correction	Golay, Reed-Solomon
Data Encryption	128 & 256-bit AES Payload Data Encryption
RF Encryption	128-bit AES RF Overhead Encryption
Hop Patterns	10 Pseudo Random, 1 Pseudo Random Based on Network ID, & 1 Secure
Secure Hop Pattern	128-bit AES Hop Pattern Determination
Compression	Low, High, Decompress Only
Repeater	Store-and-forward
MultiMaster	Synchronization of Collocated Access Points or Multiple Access Points within a Network
MultiSpeed	Up to 4 Data Rates within the Same Channel Bandwidth
Diagnostics	Neighbor List, RF Ping, RF Throughput, RF Statistics, IP Ping, Traceroute, IPERF, TCP Dump, DNS Lookup, Network Statistics, Serial Statistics, Modbus Bridging Statistics
Programmable I/O	Option for 8 programmable input/output signals (4 independently programmed analog inputs, analog outputs, or digital inputs and 4 independently programmed digital inputs or digital outputs)
Dual Radio	Option for dual radio that has the same or different frequency band

Xeta9 Debian Specifications

Ordering

XETA9-22DMDFC	Metal Enclosed, 2 Ethernet & 2 Serial, ISM & MAS
XETA9-22DMDFC-IO	Metal Enclosed, 2 Ethernet & 2 Serial with 8 Programmable I/O, ISM & MAS
XETA9X9-22DMDFC	Metal Enclosed, Dual Radio, 2 Ethernet & 2 Serial, ISM & MAS
XETA9X9-22DMDFC-IO	Metal Enclosed, Dual Radio, 2 Ethernet & 2 Serial with 8 Programmable I/O, ISM & MAS
XETA9-11IMDFC	Metal Enclosed, 1 Ethernet & 1 Serial, ISM Only
XETA9-11IPDFC	Plastic Enclosed, 1 Ethernet & 1 Serial, ISM Only
XETA9-22IMDFC	Metal Enclosed, 2 Ethernet & 2 Serial, ISM Only
XETA9-22IMDFC-IO	Metal Enclosed, 2 Ethernet & 2 Serial with 8 Programmable I/O, ISM Only
XETA9X9-22IMDFC	Metal Enclosed, Dual Radio, 2 Ethernet & 2 Serial, ISM Only
XETA9X9-22IMDFC-IO	Metal Enclosed, Dual Radio, 2 Ethernet & 2 Serial with 8 Programmable I/O, ISM Only
XETA9-22IPDFC	Plastic Enclosed, 2 Ethernet & 2 Serial, ISM Only
XETA9-22IPDFC-IO	Plastic Enclosed, 2 Ethernet & 2 Serial with 8 Programmable I/O, ISM Only

Mixed Band Dual Radios

XETA9X1-22DMDFC	902-960 MHz & 150-174 MHz Dual Radio, Metal Enclosed, 2 Ethernet & 2 Serial
XETA9X4-22DMDFC	902-960 MHz & 406-430/450-470 MHz Dual Radio, Metal Enclosed, 2 Ethernet & 2 Serial
XETA9X4-22DMDFC-IO	902-960 MHz & 406-430/450-470 MHz Dual Radio, Metal Enclosed, 2 Ethernet & 2 Serial with 8 Programmable I/O
XETA9X4B-22DMDFC	902-960 MHz & 450-470 MHz Dual Radio, Metal Enclosed, 2 Ethernet & 2 Serial
XETA9X24-22DMDFC	902-960 MHz & 2.4 GHz Dual Radio, Metal Enclosed, 2 Ethernet & 2 Serial
XETA9X24-22DMDFC-IO	902-960 MHz & 2.4 GHz Dual Radio, Metal Enclosed, 2 Ethernet & 2 Serial with 8 Programmable I/O