

MX-88A IP Mesh Unit Specifications

System Hardware

Computer:

- **Processor:** 1.8 GHz NXP i.MX 8M Plus Quad-Core
- **Memory:** 1GB RAM
- **Storage:** 64GB eMMC
- **Security:** TPM 2.0 crypto processor
- **Sensors:** 3-axis accelerometer
- **Temperature:** -40°C to +85°C
- **Expansion Interface:** USB 3.0 / mPCIe 3.0

Graphics Processing Unit:

- GC7000UL (3D) / GC520L(2D)
- ~16 GFLOPS (FP32)
- OpenGL® ES 3.1/3.0
- Open CL™ 1.2 FP
- OpenVG™ 1.1
- Vulkan®

Video Processing Unit:

- 1080p60 H.264 / H.265 Decoder
- 1080p60 H.264 / H.265 Encoder

GNSS:

- U-BLOX NEO-M10
- GPS, GLONASS, Galileo, BeiDou
- External GNSS and network-distributed positional support

Network / Mesh

Mesh Architecture:

- **Type:** MANET (Mobile Ad Hoc Network)
- **Topology:** Fully decentralized (no master node)
- **Node Role:** Each node functions as both a router & endpoint
- **Self-Forming:** Automatic peer discovery and connection
- **Self-Healing:** Dynamic routing under node movement or RF degradation

Routing & Networking:

- **Routing:** Layer 2 / Layer 3 Mesh
- **Multi-Hop:** Extends range via intermediate nodes
- **Dynamic Routing:** Adapts to link quality & network conditions
- **Low-Latency Forwarding:** Optimized for real-time traffic

Backhaul Integration (Layer 3):

- Supports external WAN backhaul via Ethernet bridging
- Compatible with Starlink and LTE/GSM gateways
- Enables LAN-to-WAN extension for internet access

Security & Encryption:

- WPA / WPA2 / WPA3
- AES-CCMP / AES-GCMP (128/256-bit)
- Supports integration w/ external encryption systems

Firmware:

- MOROSX OpenWRT-based mesh stack
- Supports integration with third-party software and network systems

IP Support:

- IPv4 / IPv6
- TCP / UDP / RTP
- Unicast / Multicast / Broadcast

Data Performance:

- **Hard Wired Throughput:** Up to ~1 Gbps
- **Wireless Throughput:** Up to ~40 Mbps (environment dependent)
- Optimized for low-latency multi-hop communication

Wireless / RF

Primary Radio:

- 2.4 GHz 2x2 MU-MIMO
 - S Band 2412-2484 MHz
 - Multi User – Multi Input Multi Output
 - 802.11ax / Wi-Fi 6 / HE OFDM
- Channel Widths:
 - 20 MHz / 40 MHz
 - 5 MHz / 10 MHz (planned)
- Transmission Power:
 - Conducted: ~30-31.5 dBm (EIRP Compliant)
 - EIRP:
 - Standard Gain: ≤ 4 Watts ~ 33-35.5 dBm EIRP
 - High Gain: ≤ 14 Watts ~ 42.5 dBm EIRP
- Modulation:
 - OFDMA
 - 1024-QAM

Secondary Radio:

- LoRa (902–928 MHz / 868 MHz configurable)
 - Parallel low-bandwidth network for PLI / fallback
 - Meshtastic / MeshCore Compatible

Interface / Connectors

RF (Radio Frequency):

- 2x TNC F (2.4 GHz 2X2 MIMO)
- 2x SMA F (LoRa / GPS)

Data:

- 8-Pin M12 Ethernet
- Supports Gigabit Ethernet w/ M12 RJ45 Cable
 - Supports WAN backhaul / gateway
 - Supports Starlink, LTE/GSM
 - Supports IP-based devices (e.g., cameras, sensors, nodes)

Audio / Push To Talk:

- **Interface:** 6-pin Hirose
- **Codec:** Opus (low latency, high efficiency)
- **Function:** Digital PTT optimized for MANET environments

Power / Mechanical

Input Power:

- 8-21V DC Input

Battery Interface:

- Twist-Lock Connector Compatibility
 - MOROSX Power Management Battery
 - AN/PRC-152 / PRC-148 batteries

External Power (via battery eliminators):

- MOROSX Battery Eliminator
- AN/PRC-152 / PRC-148 battery eliminators

External Power Sources:

- MOROSX Power Management Charger
- USB-C PD power sources (≥65W recommended)
- AC/DC power adapters

Mechanical

- Material: Anodized Machined Aluminium
- Dimensions: (x)mm / in
- Weight: (x) grams / oz
- Mounting: (x)mm holes

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Wireless / RF

Primary Radio:

- 900 MHz Wi-Fi HaLow 1x1 SISO
 - Sub GHz Operation (863-928 MHz region configurable)
 - Single User – Single Input Single Output
 - 802.11ah / OFDM

Channel Widths:

- 1/2/4/8 MHz

Transmission Power:

- Conducted: ~26 dBm (EIRP Compliant)
- EIRP: Standard Gain: ≤ 1 Watt ~ 30 dBm EIRP

Modulation:

- BPSK / QPSK
- 16 / 64-QAM

Secondary Radio:

- LoRa (902–928 MHz / 868 MHz configurable)
 - Parallel low-bandwidth network for PLI / fallback
 - Meshtastic / MeshCore Compatible

Interface / Connectors

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- 2x TNC F (1x HaLow / 1x reserved for 2.4 GHz conversion)
- 2x SMA F (LoRa / GPS)

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