



ARCHITECTURAL AND ENGINEERING SPECIFICATION

PRODUCT: MX2M-FR24R-F

FUNCTIONAL OVERVIEW

The MX2M-FR24R-F is a modular, non-blocking 24×24 hybrid multimedia matrix switcher frame designed to route uncompressed 4K UHD video (up to 4K@60Hz, 4:4:4) and associated audio with zero frame delay. It supports multiple media layers (video, audio, Ethernet/control) enabling independent video and audio routing, audio embedding/de-embedding, and flexible I/O customization via hot-swappable plug-in boards. The system supports HDCP 1.x and 2.3, advanced EDID management, and multiple control methods including front panel, Ethernet, USB, RS-232, built-in web, and LW3 protocol.

I/O BOARD SPECIFICATIONS

- Frame switching capacity: 24 video inputs × 24 video outputs (implemented via six 4-port input boards and six 4-port output boards, as installed)
- Board slots (rear):
 - 4× AUX (low-speed) slots: accept AUX boards only
 - 6× IB (input) slots: accept high-speed IB boards and also low-speed boards
 - 6× OB (output) slots: accept high-speed OB boards and also low-speed boards
- Supported AUX boards:
 - MX2M-AUX-DANTE-32CH (Dante®/AES67 audio over Ethernet)
 - MX2M-AUX-8AUDIO (8× configurable analog audio ports)
- Supported IB (input) boards:
- MX2M-4HDMI20-IB (4× HDMI 2.0 inputs)
 - MX2M-4OPTJ-IB (4× SC simplex fiber-optic inputs, HDMI 2.0 over single fiber)
 - MX2M-4TPX-IB (4× RJ45 TPX/SDVoE inputs)
 - MX2M-DH-4DP12-IB (4× DisplayPort 1.2 inputs converted to HDMI internally)
- Supported OB (output) boards:
 - MX2M-4HDMI20-OB (4× HDMI 2.0 outputs)
 - MX2M-4OPTJ-OB (4× SC simplex fiber-optic outputs, HDMI 2.0 over single fiber)
 - MX2M-4TPX-OB (4× RJ45 TPX/SDVoE outputs)

- Hot-swappable design: I/O boards and power drawers are field-exchangeable without powering off the frame

VIDEO INPUT AND OUTPUT SPECIFICATIONS

- Maximum video performance (frame/system):
 - Uncompressed HDMI 2.0-class switching up to 18 Gbit/s (600 MHz pixel clock)
 - Up to 4K@60Hz, 4:4:4
 - Zero frame delay switching architecture ("no signal latency with zero frame delay")
 - Non-blocking matrix architecture (any input to any output(s))
- Standards / content support:
 - HDCP 1.x and HDCP 2.3
 - 3D
 - Dolby TrueHD and DTS-HD Master Audio
- Video processing (by interface):
 - HDMI / OPTJ / TPX outputs: optional sampling pattern conversion 4:4:4 → 4:2:2 (conversion performed in 8-bit on HDMI/OPTJ output boards)
 - DP input board: supports conversion to reduce bandwidth (e.g., RGB 4:4:4 → YCbCr 4:2:2 or 4:2:0; and color-depth conversion to 8-bit when needed)
- Signal integrity features:
 - Pixel Accurate Reclocking
 - Frame Detector and signal analysis (timing, HDCP, color space/range, audio presence, etc.)
- Video interfaces available via installed boards:
 - HDMI 2.0, DisplayPort 1.2, single-fiber optical (OPTJ), TPX (SDVoE)

AUDIO CAPABILITIES

- Independent audio layer: audio routing is independent from video routing (separate audio crosspoint)
- Digital audio sources (copied to audio layer):
 - Embedded HDMI audio (via HDMI/OPTJ/TPX input boards)
 - Embedded DisplayPort audio (via DP input board)

- Audio embedding/de-embedding:
 - De-embedding from incoming AV streams to the audio layer
 - Embedding from the audio layer into output AV streams (HDMI/OPTJ/TPX outputs)
- Embedding limitations:
 - Outputs support LPCM and compressed (<6.144 Mbit/s) audio for embedding
 - For LPCM embedding, maximum two channels can be embedded into an output HDMI stream
- Analog audio (requires MX2M-AUX-8AUDIO):
 - 8× 5-pole Phoenix ports, each configurable as input or output by jumper
 - ADC/DAC conversion between analog and the audio layer
 - Analog input converted to LPCM, 48 kHz
 - Adjustable volume, balance, gain (input); volume, balance (output)
- Dante® / AES67 (requires MX2M-AUX-DANTE-32CH):
 - Up to 2×16 uncompressed mono channels to/from the audio layer (32ch total)
 - Supports Dante and AES67, with redundant network capability (Primary/Secondary)
 - Supported sample rates: 44.1, 48, 88.2, 96 kHz
 - Notes/limitations included in manual (QoS requirements; multichannel/encoded de-embed limitations)

POWERING

- Model: MX2M-FR24R-F is supplied with 1× MX2M-PSU-500-F power drawer
- Power drawer slots in frame: 2 hot-swappable PSU drawer slots are present on the frame
- AC input (power drawers):
 - Standard IEC power connector
 - Operates from 100–240 V AC, 50/60 Hz
- Power drawer features (MX2M-PSU-500-F):
 - Nominal power: 500 W
 - Hot-swappable
- Redundancy note (frame concept):
 - The platform supports redundant power drawers; the -F model is the non-redundant (single-drawer) configuration

CONTROL

- Front panel control:
 - Source/Destination button matrix with Take/Autotake modes
 - Preset load/save, output lock, control lock
 - LCD menu with jog dial navigation
- Ethernet control:
 - 3× 1 GbE Neutrik etherCON RJ45 ports (Secure Control, Uplink, Uplink/Secure Control)
 - Built-in web interface (browser-based control/configuration)
 - Lightware Device Controller (LDC) software via network
 - LW3 protocol over TCP port 6107
- USB control: front panel USB mini-B for LDC and firmware update
- RS-232 control: DE-9 serial port for device control (ASCII-based; supports LW3 per settings)

GENERAL

- Dimensions / enclosure (MX2M-FR24R):
 - Frame dimensions: 441 W × 400 D × 354.8 H mm
 - With rack ears and PSU drawers: 483 W × 473 D × 354.8 H mm
 - Rack format: 8U high, 19" rack width (rack mountable: Yes)
 - Material: 1.5 mm steel
 - Weight (frame only): 15.9 kg
- Mounting options:
 - Standard rack installation using supplied rack ears
 - Optional handle installation (handles mount to rack ears)
 - Ventilation clearance required; do not block vents/fans
- Compliance / electrical safety (LVD-related):
 - Electrical safety standard: EN 62368-1:2020
 - Compliance: CE, UKCA
 - RoHS: EN 63000:2018



- Cooling:
 - Frame cooling: 5× built-in cooling fans
- Supplied accessories:
 - Matrix switcher frame with rack mounting ears
 - IEC power cable (1×)
 - UTP patch cable (3 m)
 - Handle pair with 4× M5 flat head screws
 - Safety & Warranty Info and Quick Start Guide
- Warranty period: 3 years

DOCUMENT REVISION HISTORY

Document	Release Date	Changes	Checked by
Rev. 1.0	2026-06-22	Initial version	Tamas Forgacs