

deterministic
flexible
reliable
80 ns

MetaMux 48

The hybrid ultra low-latency switch and FPGA platform. Applications include 80 ns packet aggregation, high resolution timestamping, fast filtering or 5 ns packet-aware layer 1 switching.



MetaMux 48 is a hybrid multi-layer switch designed for the most latency critical networks such as trading environments.

It is multiple switches in one – performing layer 1 switching in only 5 ns, multiplexing/aggregation in 80 ns, and layer 3 routing protocols, making it extremely useful for connecting trading machines directly to exchanges, or tapping and aggregating timestamped packets¹.

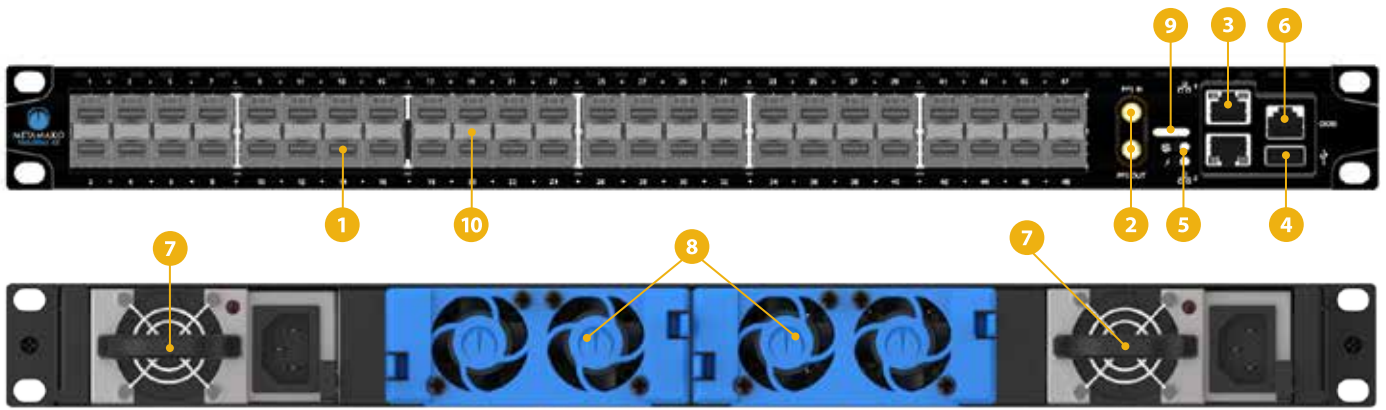
MetaMux is built on the same foundation as MetaConnect, so its layer 1 features include dynamic patching, tapping, one-to-many replication,

media conversion, packet stats and precise timestamping. That means that the delay on downstream packets is barely detectable.

When using aggregation, packets can be multiplexed from many to one in 80 ns assuming no congestion, otherwise the packets are queued. That is less than half the latency and much more deterministic, compared with the best conventional switches.

MetaMux's hybrid approach allows for high performance layer 1 switching in addition to the flexibility of an applications platform with 80 ns packet aggregation, high resolution timestamping or fast filtering.

FEATURE	BENEFIT
Fast 48:1 multiplexing	Aggregate streams from multiple sources into a single stream for hand-off to exchanges, microwave links, or WAN links. Also configurable as multiple many-to-one multiplexers.
Integrated layer 1 switching	Patching, media conversion, tapping, replication and packet statistics. Wire-once to reduce visits to the data centre. Use Layer 1 broadcast to implement a return path with a latency of just 5 ns and virtually no jitter.
Deterministic	Know and rely upon your system's latency for fairness, or to get the best execution environment for your orders. Without contention, the MetaMux aggregation latency varies by +/- 7 ns.
Precision timestamping with synchronisation	Precisely timestamps packets on ingress using PPS or PTP synchronisation.
Flexible SFP/SFP+ support	Allows the use of less expensive modules, including direct attached copper cables, that are boosted by MetaMux's high performance signal recovery and regeneration.
Protocol flexibility	Protocol agnostic at layer 1 while layer 2 packet features support 1GbE and 10GbE with 100M. 100M Ethernet and rate conversion are planned for a future software release.
Fast filtering	Cut-through filtering based on specific ACLs.
Packet statistics	Advanced monitoring. Captures high-level packet statistics across all ports. Supports detailed switch statistics via SNMP or CLI. Provides tcpdump and LLDP on every port.
FPGA Development	Flexible platform with all 48 ports connected to the onboard FPGA for custom applications.
x86-64 Linux management	Uses open standards platform and MOS operating software to provide user extensible solutions.



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| <ul style="list-style-type: none"> 1 48 SFP Ports Works with any SFP/SFP+¹ 2 SMA Connector Pulse-per-second input and output 3 Ethernet Management 100/1000 4 USB Upgrades, storage 5 Indicator LEDs Fan, power, status | <ul style="list-style-type: none"> 6 Industry-standard console port 7 Dual redundant power supplies 8 Dual redundant fan modules 9 Tri-color status LED for system-wide status 10 Per-port link and activity LEDs |
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Core Features

- 48 SFP/SFP+ front-panel ports from 100M to 11.3Gbps
- Full signal recovery, regeneration and conditioning
- Integrated, 160-port, layer 1 switch connects front panel ports, multiplexing module and management platform
- Configurable as multiple many-to-one multiplexers
- 10GbE and 1GbE¹ supported
- Programmable FPGA for user customisation
- Altera Arria 10 FPGA
- Upgradable with GPS and OCXO or Rubidium clocks

Ultra low latency

- 5 ns layer 1 switching, tapping, replication
- 80 ns layer 2 aggregation
- 100 ps jitter for layer 1, 7 ns jitter for layer 2

Cable Compatibility

- Compatible with SR, LR, ZR, and LRM SFP+ modules and direct attach cables from 0.5 m to 7 m
- Drive any MSA compliant SFP/SFP+ module
- Works with most SFP/SFP+ modules
- 100M, 1GbE, 10GbE and many others at layer 1
- 1GbE and 10GbE at layer 2
- SMA connector for PPS input and output at 5 V TTL

Redundancy and data center

- 1 rack unit (1RU)
- Dual management network connections can be configured for redundancy
- Dual redundant, hot-swappable power supplies (DS460S)
- Dual redundant, hot-swappable fans
- Fan and power supply replacement kits are available
- DC option available
- Front-to-back or back-to-front airflow

Monitoring

- Packet statistics captured on every port (valid packets, invalid packets, link state)
- Eye diagram for monitoring and troubleshooting signal quality
- Front panel LEDs for port activity and status
- Tcpdump can be used on any port to determine connectivity
- LLDP can be used for discovering network topology
- Precise timestamping without latency via separate port or on egress port for non-latency critical paths
- Fully managed SFP+ interface diagnostics including light levels, temperature and voltages

Management platform

- Quad-core 2.4GHz x86-64 CPU
- 4G RAM
- Industry standard command line interface (serial/SSH/telnet)
- Web-based GUI
- API to interact with the switch subsystems
- Linux based (shells, scripting, python, C++)
- Binary compatibility with other x86-64 based systems
- Firmware restore and update via USB, serial and network

Management protocols

- HTTPS, SSH, telnet
- Serial console
- BGP, PIM¹
- PTP, NTP
- SNMP v1, v2, v3, Netconf
- DHCP
- Local and remote syslog
- LLDP
- RADIUS, TACACS+ and LDAP¹ authentication

Operating environment

- Temperature 0C to 40C
- Humidity: 10% to 85% non-condensing
- Maximum altitude: 3000 m (9800 ft)

Physical and electrical

- Dimensions (h x w x d): 4.3 x 44.8 x 37.9 cm (1.7 x 17.6 x 14.9 in)
- Weight: 8kg (17.6 lbs), depending on configuration
- Maximum power: 290 W
- AC voltage range: 100-240 V, AC frequency: 50/60 Hz
- DC voltage range: 40-72 V



METAMAKO

Contact us today to evaluate MetaMux:
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1. Planned for a future software release.