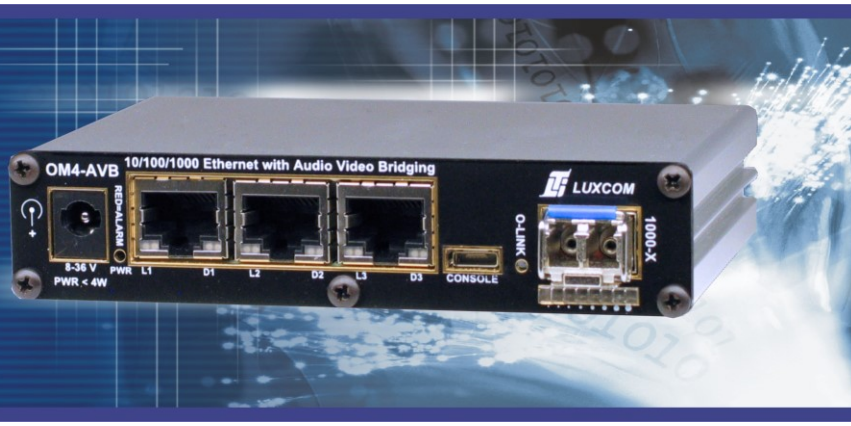
# OM4-AVB

## 4 port Ethernet Switch with Audio-Video-Bridging

# QUICK START GUIDE




## Description

- Ethernet Audio-Video Bridge (AVB)
- *Supports real-time, low-latency streaming of audio and video over Ethernet.*
- Simultaneously bridges both AVB and regular Ethernet traffic.
- Three 10/100/1000BASE-T electrical ports.
- One 1000BASE-X (or SGMII) optical SFP port.
- Compact rugged metal enclosure.

### Uses

- Professional audio/video.
- Ethernet audio and video networks.
- Fiber-optic connection of AVB networks without media converters.
- Inter-building connection of AVB networks.
- Layer 2 Ethernet switching.

### Features

- Precision Time Protocol (PTP) for AVB timing.
- Stream reservation protocol for directing and controlling AVB streams.
- USB console interface for status and configuration.
- Optical SFP modules support a variety of distances (up to 100 km), wavelengths and fibers.
- Bar graph shows received optical power in 2 dB increments.
- Embedded Linux operating system for management.
- Surge protection on RJ45 outputs for added lightning protection.
- 5 Year warranty as shown in the *OM4-AVB manual.*

## Plug and Play

- The OM4-AVB as shipped functions as a four-port AVB bridge.
- No configuration is needed and all necessary services start automatically.
- DHCP is used to obtain a local IP address for the unit.

# Indicators

| | |
|---|---|
| **PWR** | **Green** when the micro is running.<br>**Red** when initializing or there is a problem. |
| **RJ45** (L1-L3)<br>**LINK** | **Green** when Ethernet link has been established.<br>**Flashing** when data is transmitted or received. |
| **RJ45** (D1-D3) | **Unused** |
| **O-LINK** | **Green** when optical port has a link |

**Optical Bar Graph**

- This bar graph displays received optical power. The O-LINK LED provides link status.
- Each segment represents 2 dB of link margin above the low warning level.
- When only 1 dB of link margin remains, only the first segment remains on and it flashes.
- All segments flash when a receiver overload condition may be present.
- For 1000BASE-X SFPs, the link margin is typically 12 dB or six indicators.
- If all indicators are off, the optical signal is absent or weak, or an SFP without digital diagnostics is installed.

# Input/Outputs

## 10/100/1000BASE-T Ports

These are standard Ethernet ports with auto-negotiation. The port configuration can be changed with the Linux ethtool application. For AVB, the port speed must be 100 Mbps or greater.

## Optical SFP Port

The SFP port operates in 1000BASE-X mode and accepts SFPs designed to operate at 1 Gbps. A variety of suitable single and multimode SFPs are available from Luxcom. Digital diagnostics are required for the optical bar graph. PHY based SFPs are not recommended as they add additional latency and jitter. SFP module and diagnostic information can be displayed with the om4-avb-sfp application. See the SFP Ordering Guide in the Accessories section which follows.

## Power inputs

The front panel power input is used with the supplied power supply.. The rear panel input supplies power when the OM4-AVB is mounted in RMF05 16 slot rack; it can also be powered from the rear using the optional *ADAPTER-05*. Both front and rear inputs may be powered if redundancy is desired. They both accept any voltage from 8V to 36Vdc; the supply with the highest voltage will deliver the power.

## USB Front Port (Console)

The OM4-AVB has a USB micro B console interface which connects to a USB UART. The port settings are 115200 bps, 8 data bits, no parity, 1 stop bit and no flow control. This port provides console access to U-Boot and the Linux operating system. See the OM4-AVB User Manual for a full description of management commands and configuration details.

The default password for the root user is ‘luxcom’. It can be changed with the passwd command.



### USB Rear Port (TTY/Gadget)

This USB port is used to update software. After Linux boots, it becomes a USB gadget port. It can be used as a second Linux tty port.

The slide switch to the left of this USB should be in the unlocked position.

### Micro SD Card Slot

The micro SD Card connector on the rear of the OM4-AVB can be used to expand internal storage or to update the OM4-AVB software. A micro SD card is not required for normal operation.

### Alarm Relay

The relay contact on the modem's rear auxiliary input closes when Linux is not running (i.e., when the PWR LED is red). It may be used to trigger an audible or visible alarm. The alarm relay contact is accessed using the *ADAPTER-05* or *RMF05* accessory.

## Setting up an AVB Network

Setting up an AVB network is similar to setting up a standard Ethernet local area network. However, only AVB-capable bridges are allowed in the network path between endpoints. Media converters can be used provided they have low jitter and latency. Typically, only PHY-based converters operating at 1 Gbps will work.

Connection management software is needed to associate AVB streams. This is not supplied by Luxcom. The OM4-AVB is mostly invisible to connection management software. However, an endpoint may display the MAC address of the OM4-AVB in its synchronization status.

### Network Size

The default *neighbor propagation delay* for PTP is set to 10,000 ns; this limits the maximum one-way fiber distance to approximately 2 km. This limitation may be extended using the console interface. The maximum latency should be less than 2 ms for class A networks and 50 ms for class B networks. There should be a maximum of 7 hops.

### Remote Access and Security

The OM4-AVB can be accessed remotely using telnet and ssh. It's IP address can be determined using the "ifconfig eth0" command from the console. Both telnet and ssh can be disabled if required. The default configuration for sshd does not allow password access for the root user.

### Precision Time Protocol (PTP)

Some PTP implementations use the correction field in the header of Pdelay_Resp messages and this may result in the nodes failing to synchronize with each other. If this occurs, refer to the OM4-AVB User Manual for instructions on how to modify the */ptp/avb/gPTP.cfg* file to work around this issue.

# Specifications

## Electrical

| | |
|---|---|
| Data I/O levels | IEEE 802.3 compatible |
| Data I/O connectors | RJ45 |
| Voltage input to case | 8V to 30V DC |
| Power consumption | < 4 Watts |
| Relay current continuous/peak | 125/350 mA |
| Relay voltage AC or DC | 60V peak |

## General

| | |
|---|---|
| Operating temperature | 0°C to 50°C |
| Humidity (RH) | 10% to 95% |
| MTBF | > 50,000 hours |
| Dimensions | 11 x 2.4 x 8 cm |

## Optical

See 1000Base optics in **SFP Ordering Guide**.

Specifications are subject to upgrade without notice.

# Certification

Luxcom Technologies Inc. certifies that this equipment met its published specification at the time of shipment from the factory.

# Modem part number:

**OM4-AVB** Shipped with a 100-240Vac in, 24Vdc out power supply

**OM4-AVBx** Shipped without a power supply.

# Accessories

**SFP Ordering Guide** is used to select and order SFP optics.

**ADAPTER-05** allows rear panel Power and Alarm access.

**DIN-CLIP-1** allows the modem to be snapped to a DIN rail.

**MB05** bracket mounts one OM4-AVB to a flat surface.

**MP05** panel holds three OM4-AVB modems in a 19” rack.

**RMF05** chassis holds 16 OM4-AVB modems in a 19” rack.

# Sales and Support:

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