JOYNED
AUDIO.
NETWORK.
TECHNOLOGY.

AS2-OEM AVB Switch Board - Datasheet

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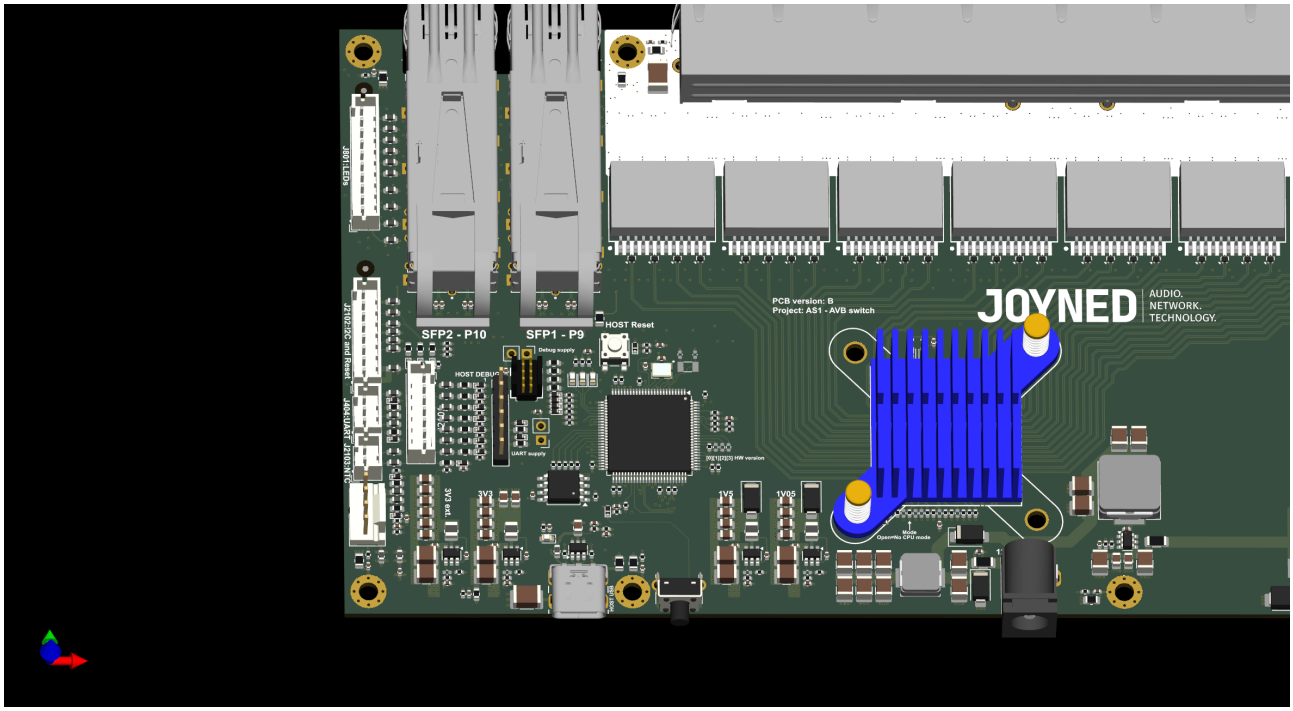
Brief

The AS1-OEM is a 10-port Ethernet switch optimized for audio and video networking. Featuring AVB and TSN standards, it includes eight RJ45 ports (100 Mbit/s and 1 Gbit/s PoE+) and two SFP cages for fiber or copper connections. Powered by JOYNED's AVB software stack, it ensures seamless integration, Avnu certification support, and robust performance for live sound, studio production, and commercial AV installations. This board is ready to be integrated into a product with either internal or external PSU. It includes connectors for adding GUI elements, temperature monitoring, FAN control etc.



Overview

The AS1-OEM is a 10-port Ethernet switch engineered for audio and video networking. It integrates Audio Video Bridging (AVB) and Time-Sensitive Networking (TSN) standards for deterministic, low-latency data transmission. Eight ports feature RJ45 connectors supporting 100 Mbit/s and 1 Gbit/s Ethernet with Power over Ethernet (PoE), while two additional ports are equipped with SFP cages for modular fiber or copper connections.

This switch is ideal for time-critical AV installations, such as live sound, studio production, and commercial AV installations.

Powered by JOYNED Software

JOYNED AS1-AVB switch software for Marvell, designed for platform independent use, integrates seamlessly with AVB/TSN and Milan networks. Supported platforms include Marvell switch silicon and ARM microcontrollers, as well as a variety of operating systems including Linux. Whether for live sound, studio production, or commercial installations, JOYNED software simplifies development, bringing network technology to more places.

JOYNED AS1-OEM switch software for Marvell can be customized as part of an OEM agreement. ..... Learn more at JOYNED's website[1].

Dimensions

W/H 200.00mm/105.00mm

The board is designed to fit into a 9.5" / 1RU enclosure.

Product Details

- **Switch Silicon:**
  - **Marvell 88E6390**: A high-performance Ethernet switch IC with advanced features:
    - 11-port non-blocking architecture with eight 10/100/1000 Mbps Ethernet PHYs.
    - Two SFP ports supporting 2.5 Gbps, 1 Gbps, or 10 Gbps uplinks.
    - IEEE 802.1 AVB and TSN standards support, including precise timing protocols, low-latency traffic shaping, and stream reservation (SRP).
- **Host Microcontroller:**
  - **STM32H742**: A high-performance microcontroller based on a dual-core Arm Cortex-M7 and M4 architecture with key features:
    - Up to 550 MHz CPU speed for real-time data processing.
    - Integrated peripherals for networking, debugging, and power management.
    - High memory capacity and advanced security features.
      More details available on the STM32H742 product page[2].
- **JOYNED AS1-AVB switch software for Marvell:**
  - **Comprehensive Protocol Support:** Includes IEEE 802.1BA (AVB), IEEE 802.1AS (gPTP), IEEE 802.1Q (MVRP, MSRP, VLAN), and IEEE 802.1D/s/w (RSTP).
  - **Platform Independence:** Runs on Linux using pthreads/sockets or bare-metal systems with RTOS such as FreeRTOS or uC/OS.
  - **Switch Fabric Independence:** Compatible with Marvell switch ICs, including the 88E6390, via an adaptation layer.
  - **Optimized for Performance:** Efficient memory allocation, CPU traffic protection, and compliance with Avnu/Milan standards.
  - **Application Interface:** Enables runtime configuration, advanced logging, and clock relationship management between the system clock, fabric clock, and grandmaster (GM) clock.
- **PoE+**
  - Texas Instrument TPS23880 PoE controller.
  - Up to 30W PoE+ on each of the 8 RJ45 ports.
  - Power budget management through Joyned software driver.
- **Option connectors**
  - LED expansion header with LED mux signals for 2 LED's for each of the 10 ports.
  - Fan expansion header, standard 4 pin, 12V with PWM and Taco support.
  - NTC expansion header allowing for temperature measurements anywhere in the chassis, on the PSU etc.
  - OEM Defined expansion header with UART, I2C, ADC, GPIO to interface to OEM specific UI.
- **Power connectors**
  - Internal power connector for connection to internal PSU.

1. https://www.joyned.at/milan-switch-for-arm
2. https://www.st.com/en/microcontrollers-microprocessors/stm32h742.html

    - Barrel style DC connector for systems with an external supply.
- **USB**
    - USB-C style connector connected to STM USB2 controller. This interface is optional and can be used for OEM specific requirements.

Features

- **Port Configuration:**
    - **8 x RJ45 Ports:** Supporting 100 Mbit/s and 1 Gbit/s speeds with PoE capability.
    - **2 x SFP Ports:** For high-speed modular connections.
- **Power Supply Requirements:**
    - The unit operates on a 54V DC input.
- **Standards Compliance:** Full support for IEEE 802.1 AVB/TSN for time-sensitive traffic and conformant to Avnu Milan/AVB bridge certification.
- **Performance:** High-speed, non-blocking architecture ensures low-latency data delivery.
- **Compact Design:** Suitable for rack-mounted installations with minimal footprint. Form Factor designed to fit into 9.5” / 1RU enclosure.

Interfaces

The AS1-ODM product features a number of connectors for internal or external access.

External connectors

The connectors that are intended for external access are placed with proper stand-off to allow integration into most mechanical designs.

- 8 x RJ45 with integrated link and activity LED’s. **(J801)**
- DC barrel connector PJ-102AH **(J2402)**
- 2 x SFP cage assembly, Molex 744410001, 747370010, 747540011 **(J1901, J1902, J1903, J2001, J2002, J2003)**
- USB-C connector. Molex 2137160001 **(J501)**

Internal connectors

The internal connectors are intended for connecting circuits internal to the chassis such as an internal PSU, UI boards etc.

PSU input J2401

Power supply input when using internal supply.

Type: JST B2P-VH(LF)(SN)

Pin	Signal	Description
1	VEXT_IN	54-57 Volt, up to 5A
2	GND_IN	GND before common mode filter. (not PCB GND)

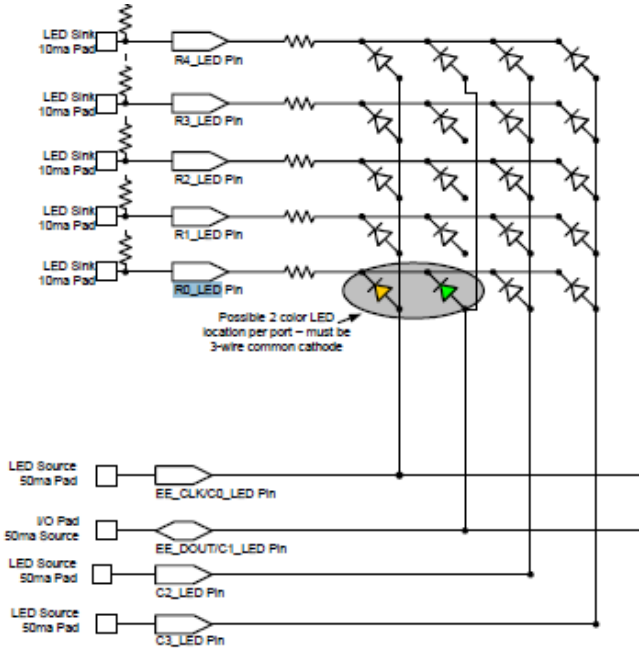
Activity LED connector J802

This connector provides the link and activity LED's. The signals are provided as 5 row signals and 4 column signals. The row signal should drive all the cathodes of the LED's in that row through a single 150R resistor. The column signals drive the anodes directly. The resistor can be adjusted for brightness. The column signals can source 50mA and the row signals can sink 10mA and the voltage is 3.3V. This should allow for 10mA per LED a quarter of the time.

Type: JST B10B-PH-K-S(LF)(SN)

Pin	Signal	Description
1	R4_LED	Row 4 cathode output, 10mA
2	R3_LED	Row 3 cathode output, 10mA
3	R2_LED	Row 2 cathode output, 10mA
4	R1_LED	Row 1 cathode output, 10mA
5	R0_LED	Row 0 cathode output, 10mA
6	C3_LED	Column 3 anode output, 50mA
7	C2_LED	Column 2 anode output, 50mA
8	C1_LED	Column 1 anode output, 50mA
9	C0_LED	Column 0 anode output, 50mA
10	GND	Ground

The LED's are connected as shown below.



The relationship between the muxed LED's and the ports are described below

	C0_LED	C1_LED	C2_LED	C3_LED
R0_LED	Port 1 Link LED	Port 1 Act. LED	Port 2 Link LED	Port 2 Act. LED
R1_LED	Port 3 Link LED	Port 3 Act. LED	Port 4 Link LED	Port 4 Act. LED
R2_LED	Port 5 Link LED	Port 5 Act. LED	Port 6 Link LED	Port 6 Act. LED
R3_LED	Port 7 Link LED	Port 7 Act. LED	Port 8 Link LED	Port 8 Act. LED
R4_LED	Port 9 Link LED	Port 9 Act. LED	Port 10 Link LED	Port 10 Act. LED

UART Connector J402

This connector provides a simple 3.3V bidirectional UART interface which can be used for OEM specific functionality.

Type: JST B3B-PH-K-S(LF)(SN)

Pin	Signal	Description
1	RX	UART Rx signal (input)
2	TX	UART Tx signal (output)

Pin	Signal	Description
3	GND	Ground.

NTC connector J2101

This connector provides a simple interface to an NTC for measuring temperature inside the chassis. The board has an onboard NTC as well so this is an option for measuring the temperature in other places inside the chassis.

Type: JST B2B-PH-K-S(LF)(SN)

Pin	Signal	Description
1	NTC	Board has 10k pull-up, ADC range 0-3.3V
2	GND	Ground

This interface is compatible with an NTC such as https://www.vishay.com/docs/29056/ntcs0603e3t.pdf

Extension-1 connector J2104

This connector provides a number of signals which can be defined by the OEM.

Type: JST B8B-PH-K-S(LF)(SN)

Pin	Signal	Description
1	VDD	3.3V <TBD power budget, 1A ???>
2	VDD	3.3V
3	PC8	OEM specific, GPIO, 3.3V, default GPIO input.
4	nRESET	Board reset pin, OEM use for watch-dog etc. Leave floating if not used.
5	GND	Ground
6	PD13	OEM specific, GPIO or I2C Data, 3.3V, default GPIO input.
7	PD12	OEM specific, GPIO or I2C Clk, 3.3V, default GPIO input.
8	GND	Ground

Extension-2 connector J2103

This connector provides extra signals but should be used together with Extension-1 as this interface.

Type: JST B9B-PH-K-S(LF)(SN)

Pin	Signal	Description
1	GND	Ground
2	PE11	OEM specific, GPIO, 3.3V, default GPIO input.
3	PE12	OEM specific, GPIO, 3.3V, default GPIO input.
4	PE13	OEM specific, GPIO, 3.3V, default GPIO input.
5	PE14	OEM specific, GPIO, 3.3V, default GPIO input.
6	PC6	OEM specific, GPIO, 3.3V, default GPIO input.
7	PB10	OEM specific, GPIO, 3.3V, default GPIO input.
8	PC7	OEM specific, GPIO, 3.3V, default GPIO input.
9	GND	Ground

Fan connector J2102

This connector can be used for connecting a standard 12V fan.

Type: Molex 0470533000

Pin	Signal	Description
1	GND	Ground
2	VDD_FAN	12V, 250mA
3	TACHO	optional tacho feedback
4	PWM	Optional PWM control

Debug and production connectors

The board features connectors for in-circuit programming and serialization. These connectors can also be used for development by the OEM.

ARM SWD Connector J403

This is a standard ARM Serial Wire Debug connector using the small pitch 10 pin dual row header.

Type: Samtec FTSH-105-01-L-D

Pin	Signal	Description
1	VDD Sense	Floating or connected to VDD through JP401
2	SWDIO	Bidirectional data pin
3	GND	Ground
4	SWCLK	Clock pin
5	GND	Ground
6	SWO	Trace output
7	N/C	
8	N/C	
9	GND	Ground
10	nJRESET	SWD Reset

Debug UART J401

This UART is used for debugging and console operatios and is not intended for the end-user.

Type: Amphenol G800LZ302010THR

Pin	Signal	Description
1	GND	Ground
2	N/C	
3	N/C	

Pin	Signal	Description
4	RX	Input
5	TX	Output
6	N/C	

Mechanical Details