JOYNED
AUDIO.
NETWORK.
TECHNOLOGY.

AVB Switch Software

JOYNED GmbH ©2025
Nockhofweg 26c
6162 Mutters - Austria

www.joyned.at

Reg. Number: 575238p
Reg. Court: Landesgericht Innsbruck
Managing Director: Fabian Braun

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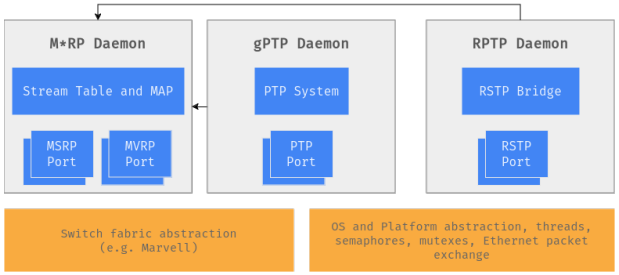
Brief

JOYNED AVB switch software, 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.

Architecture Diagram



Overview

The AVB Switch Software is a versatile implementation of the IEEE 801.1BA bridge. The number of ports is only limited by the selected switch fabric. Depending on the fabric support, multiple instances can run on the same fabric, emulating multiple disjoint switches, for example, for a primary/secondary network configuration.

The gPTP timing module retains information about the relationship between the current GM and the fabric local clock. An optional interface allows the stack to calculate the relationship to a system clock such as the CPU system timer or any other timer in the system.

An application interface allows for runtime configuration and monitoring, as well as access to an advanced logging system and clock relationships.

Features

- **Complete AVB .1BA bridge stack**
  - VLAN-aware Bridge component (IEEE 802.1Q)
  - IEEE 802.1AS - gPTP
  - IEEE 802.1Q - MVRP, MSRP, RSTP
  - IEEE 802.1 BA - Avnu .1BA bridge
- **Software platform independent using simple adaptation layer:**
  - Linux implementation using *pthreads* and *sockets*
  - Bare-metal GNU/ARM using FreeRTOS, UCOS etc.
  - Vendor developed
- **Switch fabric independent using adaptation layer:**
  - Marvell 88E6352, Marvell 88E632c, Marvell 88E6190(X), Marvell 88E6320, Marvell 88E6390(X)
  - Vendor developed
- **Efficient implementation optimized for memory/speed.** Configurable dynamic or static memory allocation, protection of CPU from traffic storms.
- **Used in Milan/Avnu conforming devices**
- **Application interface**
  - Configuration, logging, and status
  - Clock relationship – system clock, fabric clock, and GM clock

- **Stable validated implementation** consisting of more than 40,000 lines of code.

Hardware Integration

MPU Requirements

(example for 8 port switch usage)

RAM

MSRP per port and stream MAP:	134 kB
Thread stacks, 3 threads	~ 12kB
Various	~ 20kB
Total	**~ 166kBFlash <512kB**

Clock

150MHz Cortex-M (or similar)

Ethernet MAC

100Mb, GigE preferred

Reference Designs

- AVB Switch Reference Design with Marvell 88E6390 and STM32H742

Use cases

- AVB switch with any number of external ports
- Endstation with daisy chaining, two external ports, and one or more internal ports, selectable redundancy mode.