Shaping the Future: TSN Hardware & TSN Software

TSN Switch

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Overview

Highly flexible AVB/TSN capable secure automotive switch intended for use in the lab, car or HIL



The Q50 Switch offers solid and predictable gPTP and AVB/TSN functionalities, including 1PPS output and a wide range of management capabilities. This provides easy access and configuration of the device via a custom switch editor for Windows with integrated automatic discovery.

Key Features

- 8-port Ethernet switch
- Wide range of 100/1000 Mb/s and BASE-T/T1 connectivity
- All ports are fully compliant to IEEE802.3 automotive standards
- Automotive gPTP support, including 1PPS output
- AVB (Qav shaping)
- MAC address blacklisting and whitelisting available on all ports

Features

The Q50 Automotive Ethernet Switch is flexible and highly optimized for precise and demanding applications in the lab, in HIL and in test vehicles.

- 5x IEEE 100BASE-T1 ports
- 2x IEEE 1000BASE-T1 ports
- 1x configurable port: 1000BASE-T1 or 1000BASE-T
- gPTP due to IEEE 802.1AS, fully configurable with editor
- Fully configurable independent port matrix with PTP filter and injector
- VLAN, fully configurable with editor
- Credit-based shaper (e.g. IEEE802.1Qav), fully configurable with editor
- Editable ATU, fully configurable with editor
- Onboard diagnostics (link status, data throughput, packet statistics)
- Instantaneous boot for in-vehicle usage
- Wide 12-42VDC input power range for use in practically any application
- 1PPS output via SMA, 50Ω
- Compact dimensions, robust metal chassis
- Wide range of LEDs and buttons for standalone control and feedback
- Underlying AUTOSAR OS
- AVNU Alliance Ethernet Functional Specification v1.4, certified
- PTP IEEE 802.1 AS, conformant to AutoCDS v.1.4
- Firmware update via Ethernet with editor, base firmware with USB



All parameters are fully configurable and storable via the custom switch editor for Windows.

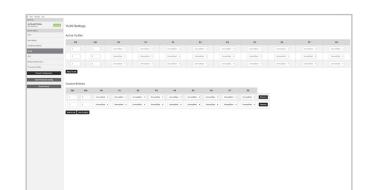
Port Status

0x70b3d572208a selected	Port St	tatus					
Switch Menu	Port	Link Status	Link Role	FE in	FE out	GB in	GB out
ртр							
Port Status	1	Down	Slave	450	225	450	225
VLAN Port Matrix	2	Down	Slave	450	225	450	225
VLAN	3	Down	Slave	450	225	450	225
ATU							
Stream Reservation	4	Down	Slave	450	225	450	225
Firmware Config	5	Down	Slave	450	225	450	225
Persist Configuration	6	Down	Slave	990	1130	3000	400
Clear Persistent Config	7	Down	Slave	450	225	450	225
Reset Switch	8	Up	N/A	460	730	260	170
	9	Down	Slave	1138	1300	4945	460

PTP Settings

Devices							
0x70b3d572208a HW: 59 SW: 6	PTP Set	ttings					
Switch Menu	Port	PTP Role		Init Sync Interval	PDelay Reg. Interval	Sync Interval	
	FOIL	TTT NOIC		intervar	r being neq. interval	office interval	
Port Status	1	Master	٠	125 ms 🔻	1 sec 🔹	125 ms •	
VLAN Port Matrix	2	Master	•	125 ms •	1 sec •	125 ms 🔹	
VLAN							
ATU	3	Master	•	125 ms •	1 sec •	125 ms •	
Stream Reservation	4	Master	•	125 ms 🔹	1 sec 🔹	125 ms 🔹	
Firmware Config	5	Master	•	125 ms •	1 sec 🔹	125 ms 🔹	
Persist Configuration	6	Disabled	•	125 ms •	1 sec •	125 ms •	
Clear Persistent Config							
Reset Switch	7	Disabled	٠	125 ms •	1 sec 🔹	125 ms •	
	8 •	Disabled	٠	125 ms 🔹	1 sec •	125 ms •	
	Read Config		onfigur				

VLAN Settings



ATU

e Mindee Me M						
AMETIZORA	ATU					
- Menu						
	Active ATU					
halas	MAG Address	Entry Base	Puri Vector	M&G Queue Princip	MAC Prame Priority	10
Port Maria	0-765305722364					
_	INVESTIGATION.	bi7-aprilling7 +				
- Anarostica						
ex config	Datably Networks	2x1-aprillary1 +				
	Oustom Entries					
Cear/Invirant Config						
Read Division	Custom Eithes					
Read Switch	Custom Entries MAC Address	Entry Part Vestor State	M&C Queen	a Priority	MAC Exame Priority	no
Read Switch		Entry Part Vestar State	MAC Quest	a Priority	MAC Prame Printly	no
Road Dwitch	MAC Address	Entry Pert Vester State	MAC Come	a Priority	M&C Frame Priority	no
Sent Suith	MAC Address	fatty Part Vester Nate	MãO Quera	a Priority	MAC Prane Privally	na
Read (with	MAC Address	fany Port Vador Ban	MAC Quan	a Niwity	MAC Frame Printly	15
Bad (with	MAC Address	Entry Part Value State	MAC Guess	a Privaty	MAC Frank Printly	10
Bar (ved)	MAC Address	lating Part Walter	MAC (serv	a bhuaby	MAC Prove Privally	105
Bad (un)	MAC Address	lang Part Value	MAC Contr	n Proving	MAC Frank Privily	ns
325 (AL)	MAC Address	fory PartVenter	MAC Gener	a Pronty	Mat Prove Private	ns
ion (103)	MAC Address	dong Part/Main	MiC fore	a theory	MAC Prome Privally	10
2010	MAC Address	fany PartValar	MiC beer	a Proving	KUC from Promy	110
bal bal	MAC Address	dang Part/Main	MiC Row	a filosofi	Mic how Prony	na

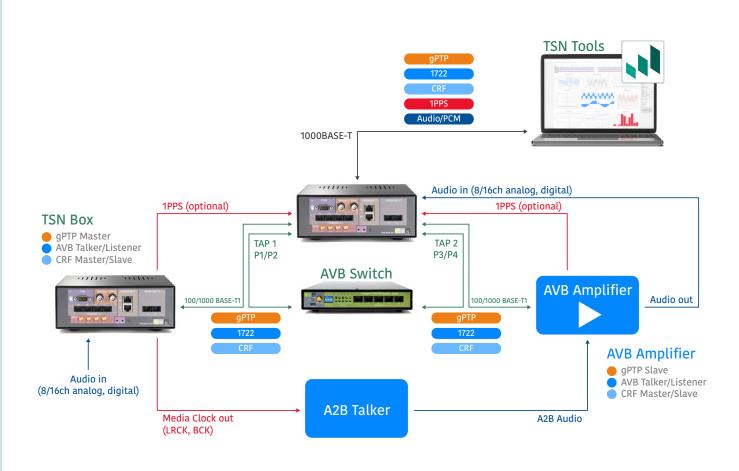
Port Matrix

0x70b3d572208a selected	VLAN P	ort Matri	x						
Switch Menu	Ingress	P1	P2	P3	P4	P5	P6	P7	P8
PTP	Port	Egress	Egress	Egress	Egress	Egress	Egress	Egress	Egress
Port Status	1	No *	Yes •						
VLAN	2	Yes •	No *	Yes 🔹	Yes 🔻	Yes 🔹	Yes 🔻	Yes •	Yes 🔹
ATU	3	Yes •	Yes •	No *	Yes 🔹	Yes •	Yes 🔹	Yes 🔹	Yes •
Stream Reservation	4	Yes •	Yes •	Yes •	No *	Yes •	Yes •	Yes •	Yes •
Firmware Config									
Persist Configuration	5	Yes •	Yes •	Yes •	Yes 🔹	No *	Yes •	Yes •	Yes •
Clear Persistent Config	6	Yes 🔻	Yes 🔻	Yes 🔻	Yes 🔻	Yes 🔻	No *	Yes 🔻	Yes 🔻
Reset Switch	7	Yes 🔹	Yes •	Yes 🔹	Yes •	Yes 🔹	Yes 🔹	No *	Yes •
	8/9	Yes •	Yes 🔹	Yes •	No *				

Use Case

Use Case AVB

The Q50 Switch can serve in many test scenarios in the lab to simulate in-ECU switches with gPTP and time-sensitive capabilities. A further typical application is providing stable gPTP grand master synchronisation in test vehicles.



Products

Our product range covers a variety of precision measurement and analysis tools. To find the right solutions for your special use cases, please have a look at our additional product flyers.



TSN Tools

TSN Tools is a platform-independent software environment specifically designed to capture complex measurements and analyse tasks at a glance.



TSN Box

The TSN Box 3.1 is designed to assist with automotive network development, particularly in the context of next generation zonal architectures, as well as with planning and analysis of modern industrial automation systems based on TSN and OPC-UA.

TSN Media Converter



The Media Converter M10 is a simple, small and highly flexible tool that can be used in different scenarios. For convenience, all settings are intuitively hardware adjustable without a tethered configuration PC.

Time Matters.

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