

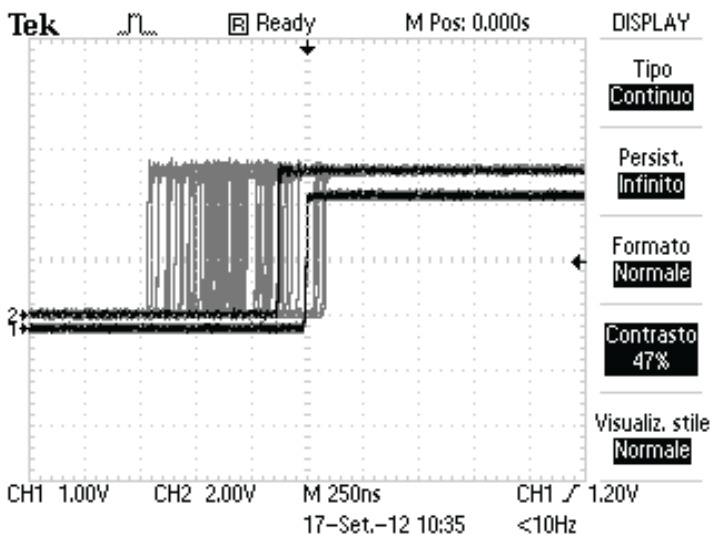
SWITCH-EVO is an IEEE 1588-2008 (PTP v2) and SyncE compliant 8-port Gigabit switch capable of acting as a Transparent Clock and, with aid of the Synchronous Ethernet protocol, to achieve synchronization in the nanosecond range.

It is equipped with the latest technology and may be operated via a comfortable web interface. It may be used as an industrial Ethernet switch for rough environments requiring carrier grade switching. The job of a Transparent Clock (TC from now) switch is very simple to understand. It just modifies PTP messages as they pass through the device. Timestamps in the messages are corrected for time spent traversing the network equipment.

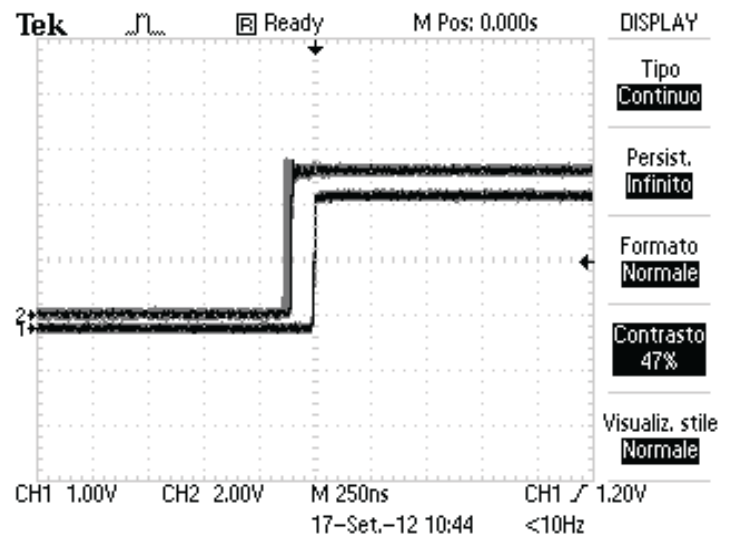
This approach improves distribution accuracy by compensating for delivery variability across the network (called Packet Delay Variation - PDV). The device does not alter any other message other than Sync and Delay_Req packets and is completely transparent both to the PTP Master and to the PTP slaves.



The following graphs show how a PTP TC may help improving the overall precision of the PPS reconstruction. They have been taken by just enabling or disabling the TC feature and by letting the devices run with an infinite persistence for a few minutes.



TC feature disabled



TC feature enabled

- ✓ IEEE 1588 v2 Precision Time Protocol Grandmaster (when equipped with GNSS receiver)
- ✓ 8 x Gigabit ports (1 Gbps)
- ✓ 2 x SFP ports (2.5 Gbps)
- ✓ 1 x 10MHz Low Phase Noise output
- ✓ 1 x PPS I/O
- ✓ External Frequency input
- ✓ End-to-End Transparent Clock (UDP/IPv4 and Layer 2)
- ✓ Synchronous Ethernet (SyncE) over copper and fiber
- ✓ Internal High-Stability OCXO (or Rubidium as option)
- ✓ Internal GNSS Receiver for Grandmaster role.

- ✓ Carrier grade switching capabilities
- ✓ Multiple spanning tree for efficient load sharing and redundancy
- ✓ Strong security features for authentication, authorization, and accounting
- ✓ QoS
- ✓ Link aggregation
- ✓ Loop protection
- ✓ VLAN.

Interfaces

SNMP protocol and integrated Web Server
GbE - PTP/SyncE I/O combo port
8x shielded RJ45, 10/100/1000 BaseT Ethernet (also used for management)
2x SFP 1000 BaseX (also used for management)
each port is configured as either as an input port (client) or an output port (master)
1 Time of Day (ToD) output via RS232 (optional)
1 PPS I/O via BNC connector
1 10MHz I/O via BNC connector
1 IRIG-X output (00x) via BNC connector

NTP

Protocol: NTPv4
Role: Master Clock Stratum 1 (GNSS Controlled) – Slave Clock Stratum 2
Packet rate: 20.000 transactions per second

IEEE 1588 v2 PTP Input

Boundary Clock function (optional)
Multi-sync function uses PTP or frequency input (SyncE)
IPV4 / UDP, Layer 2, Multicast, Unicast
1-step and 2-step
PTP Profiles
- ITU-T G.8265.1 Frequency Profile (IPV4)
- Telecom Profile (ITU-T G.8265.1)
- Power Profile (IEC C37.238)
- Default Profile (IEEE 1588 v2)
VLAN (802.1Q, 802.1p)
Best Master Clock Algorithm (BMCA), with Default Profile

IEEE 1588 v2 PTP Output

PTP output client capacity: up to 500 clients
Up to 128 messages per second per client
IPV4 / UDP, Layer 2, Multicast, Unicast
1-step
PTP Profiles
- ITU-T G.8265.1 Frequency Profile (IPV4)
- Telecom Profile (ITU-T G.8265.1)
- Power Profile (IEC C37.238)
- Default Profile (IEEE 1588 v2)
VLAN (802.1Q, 802.1p)

Synchronous Ethernet

SyncE can be used as a frequency input and can be generated as an output (as Master)
Conforms to relevant sections: ITU-T G.8261, G.8262 and G.8264 ESMC

GNSS section

Receiver:	72 Channels L1 GPS/GLONASS/GALILEO/BEIDOU Concurrent.
Acquisition Time:	< 30 sec (Cold Start)
Time Accuracy:	< 10ns (Optimal view)
Time Pulse Jitter:	+/- 11ns (Receiver side)
Integrity report:	Phase uncertainty, inter-costellaion biases, T-RAIM active
Antenna connector:	TNC

Local Oscillator

Stability:	< 1x10 ⁻¹² daily average OCXO locked at GNSS in SA.
OCXO Standard :	< 1x10 ⁻¹⁰ daily average OCXO in free run < 2x10 ⁻⁹ daily average OCXO in free run 0 ° C - 50 °C
OCXO SC:	< 2x10 ⁻¹¹ daily average OCXO on free run. < 3x10 ⁻¹³ Short Term Stability @ 1sec
Rubidium:	Ageing in holdover ±1e-11 / sec ¹

Power

Double PSU Unith AC and/or DC

AC Power option, 110-220 VAC (IEC 60320 C14 socket)
DC Power option, 36-72 VDC (terminal block)

Network Support

DHCP (RFC2131)	IPV4
DSCP	NTP
HTTP	SNMP
ICMP (RFC 792)	SYSLOG
IEEE 802.1Q, 802.1p VLAN	TIME
IEEE 1588 v2 PTP	

Status Info

15 status LEDs, RS232, SNMP, Web interface

Mechanical

Size:	Height:	44 mm
	Width:	438 mm
	Depth:	295 mm
Rack mounts:	19"/1U.	