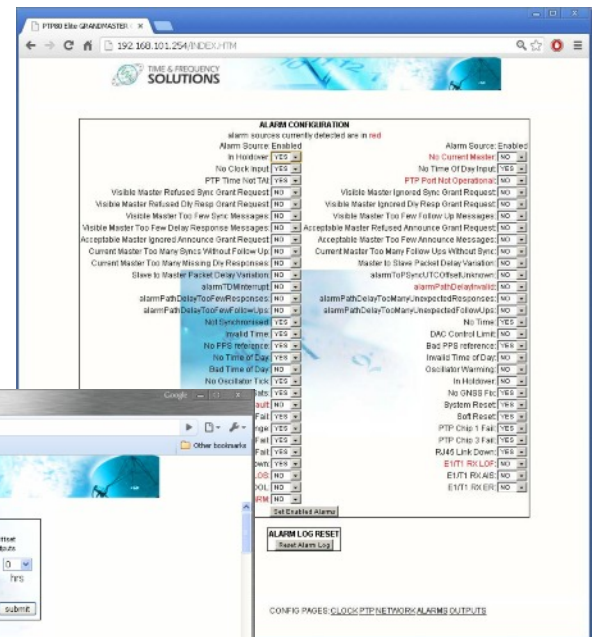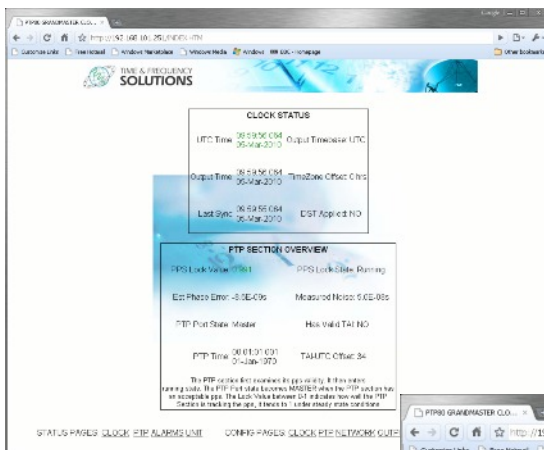# PTP80 ELITE - GRANDMASTER & BOUNDARY CLOCK

A GPS based Stratum 1

PTP Grandmaster and Boundary Clock

Network Time Server Unit

AS9100D Certificate Number : C0210021-AS3

PTP80 ELITE - GRANDMASTER & BOUNDARY CLOCK

Product Overview

This Stratum 1 GNSS/GPS based PTP GrandMaster and Boundary time clock system is an advanced, cyber secure, high precision master clock timing platform that generates and distributes precisely synchronised time to PTP clients and slaves across packet networks using the PTP (Precision Time Protocol) in accordance with IEEE-1588v2.

The platform delivers excellent time and frequency accuracy using a tried and tested hardware based time stamping system which operates in combination with a choice of high precision disciplined oscillators serving to ensure precise time information is available even in the event of GPS signal loss.

Units can be configured as GrandMaster, Boundary Clock or PTP slave while providing multiple output formats including 1PPS, 10MHz, E1/T1, IRIG-B and NTP (RFC1305). Multiple PTP80 Elites can be configured for load sharing resilience and increased network support.

Built to demanding AS9100D aerospace quality standards, these units are commonly specified for use in critical network timing applications that depend upon a reliable, quality time standard. The robust design and unrivalled build quality delivers exceptional performance and trouble free product field longevity.

Options include a choice of Oven Controlled or Rubidium oscillators together with a choice of standard or long distance antennae.

Constellation options are user selectable via the 12 channel C/A GNSS/GPS antenna covering GPS, GPS/GLONASS & GPS/BEIDOU combinations.

Typical Applications

The PTP80 Elite is commonly specified where precision, reliability and cyber security are key considerations in the network application. These high integrity units are common place and thoroughly proven worldwide in PTP network timing applications where traceable, precision time stamping and time distribution is required.

- Telecommunications : LTE & Ethernet/IP Backhaul
- WiMAX
- DAB/DVB broadcast transmitter synchronisation
- Research Institutions, Test and measurement facilities
- HFT High Frequency Trading : Financial transaction time stamping
- Power Utilities - Time of day information

Key Feature Summary

- 12 Channel GNSS/GPS receiver synchronised - Standard and long Distance Antenna options
- Constellation selections : GPS, GPS/GLONASS, GPS/BEIDOU
- High stability OCXO and Rubidium disciplined oscillator options safeguarding GPS loss/ holdover periods
- IEEE 1588v2 Compliant : 2 x Ethernet 10/100/1000 BaseT ports (RJ45 & SFP)
- PTP Grandmaster element with configuration capability for up to 128 PTP clients
- PTP Client element with configuration capability for PTP synchronisation from a GrandMaster clock
- Time of Day Serial Message via RJ45 @ RS232 & RS422 levels
- Multiple output signals and formats that include 10MHz, E1/T1, IRIG-B and NTP
- 1pps output - +/- 50ns accuracy to UTC On Time Sync Signal (30ns RMS)
- Timing Accuracy with PTP better than 1us
- Frequency Accuracy with PTP better than 10 parts per billion
- Comprehensive web browser for remote configuration and control
- Multiple Alarm configuration and monitoring via SNMP, web browser, front panel display and volt free changeover relay.
- PTPv2 (IEEE 1588), NTP (RFC 1305), SNMP (RFC 1769),SNMP v1 (RFC 1157),Telnet (RFC 854), FTP (RFC 959)

PTP80 ELITE - GRANDMASTER & BOUNDARY CLOCK

Product Features

Combining a Linux operating system with a high performance embedded single board controller and custom hardware based time stamping engine, the PTP80 Elite delivers exceptional levels of cyber security and operational accuracy and reliability.

A 12 channel C/A GPS receiver delivers high coverage and rapid GNSS sync lock (GPS/GLONASS/BEIDOU) while physical 1PPS, 10MHz, IRIG-B and E1/T1 timing signal outputs are made available at rear panel BNCs, allowing other equipment to be readily synchronised.

A high contrast 40 x 2 LCD display and 5 button menu navigation console provides real time system information about the GNSS - GPS/GLONASS/BEIDOU satellite status, network status, system sync status and fault conditions.

Two 10/100/1000 BaseT Ethernet ports provide network connectivity supporting PTP, NTP and remote system management which is made available via an intuitive built in web browser configuration and management suite. Multiple network protocols are supported and selectable as is an RS232/RS422 port that provides a Time of Day NMEA GPRMC message.
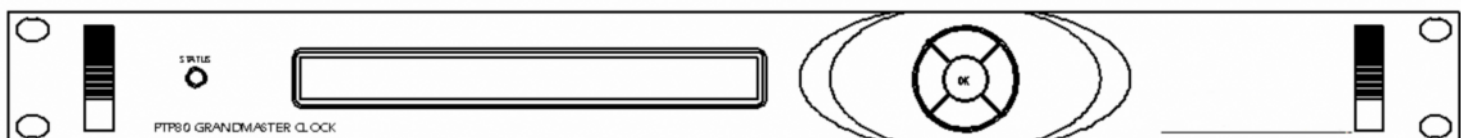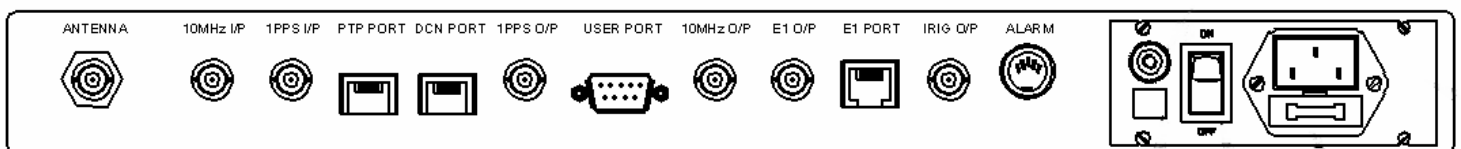
Standard antenna options provide for unit to antenna distances of up to 150m (500ft), while a proprietary "head-end" antenna option allows operation up to distances of 500m (1600ft).

Oscillator Options

When synchronised to GNSS/GPS, PTP80 Elite units provide an accuracy of < 50ns to UTC at the On time 1 pulse per second (1PPS) output. Precision Time Protocol (PTP) client/slave reception accuracy is typically better than 1 µs to UTC depending on network.

If the timing signal e.g. GPS is lost for any reason, then the PTP80 plus continues to provide high accuracy timing based upon the disciplined oscillator configuration during this holdover period. The units are offered with a choice of disciplined oscillator module to suit the Holdover time and frequency demands of the application and can be selected using the following chart.

Oscillator type	Stability per °C	Performance while disciplined — Averaging Time Error						Holdover accuracy at constant temperature after loss of reference		
								Time	Frequency	
		1s	10s	100s	1000s	10000s	1 Day	1 Day	1 Day	3 Days
OCXO	1.0×10^{-11}	5×10^{-12}	3×10^{-12}	1×10^{-11}	1×10^{-11}	3×10^{-12}	1×10^{-12}	<8 µs	$<2 \times 10^{-9}$	$<4 \times 10^{-9}$
Rubidium	7×10^{-12}	3×10^{-11}	8×10^{-12}	3×10^{-12}	3×10^{-12}	2×10^{-12}	8×10^{-13}	<1 µs	$<1.0 \times 10^{-11}$	$<1.5 \times 10^{-11}$

PTP80 ELITE - GRANDMASTER & BOUNDARY CLOCK

SPECIFICATIONS	
FEATURE	**SPECIFICATIONS**
GNSS - Synchronisation	
Receiver	C/A Code L1-1575MHz - 12 parallel channels with TRAIM Acquisition time from cold < 5 minutes typical
GNSS Constellation Selection	GPS, GPS+GLONASS, GPS+BEIDOU
Timing Accuracy	+/- 50ns On Time to UTC : 1 PPS PTP Slaves : < 1µs to UTC
IEEE 1588v2 (PTP) - Synchronisation	
PTP Slave	Capable of precision synchronisation to received PTP packets. Unicast / Multicast Operation : One step / two step operation
Alternate Source Synchronisation	
IRIG-B	50 Ohm BNC
E1/T1	75 Ohm BNC Unbalanced
10MHz / 1PPS	50 Ohm BNC
Time of Day Serial Message	RS232/RS422 (RJ45) Programmable Setup
Outputs	
1PPS	2.5Vpp +/- 0.1V into 50 Ohm load - BNC
10 MHz sinusoidal phase aligned +/- 100ns to 1PPS	1.0Vrms into 50 Ohm load - BNC
E1/T1 Frequency Output - E1 Standard T1 as option	2.048 Mbps - Line encoding : HDB3 : 75 Ohm Unbalanced BNC RJ45 - 120 Ohm Option
Time of Day Serial Message	NMEA GPRMC message format RS232/RS422 (RJ45)
NTP (Network Time Protocol) - Up to 1ms accuracy	NTP v3 RFC 1305 : RJ45 10/100BaseT (via DCN port)
IRIG-B	Range of selectable outputs including IEEE1344 extension - 50 Ohm BNC
Timing / Frequency Holdover Accuracy	
1PPS	+/- 50ns (30ns RMS) when locked to GPS
PTP Timing	Better than 1us possible (network dependant)
PTP Frequency	Better than 1 part per billion possible (network dependant)
Management	
Configurable via 5 button Keypad and LCD or via remote management suite.	Web browser, accessible via 10/100Base-T, DCN port (RJ45), SNMPv1 (RFC 1157), Time & Frequency Solutions' Universal Clock Management System
Alarms	Alarms are notified via the following: SNMP, Web Browser, Front panel display, Voltage Free Single Pole Changeover Relay
Security	Protection from unauthorized access available via System Administrator Password Protection
Protocols	ANSI T1.101, DHCP, GR-1244, HTTP (RFC 2616), IEEE 802.3, IPv4, ITU-T G.703, G.704, G.812,G.813, G.823, G.824, G8261, PTPv2 (IEEE 1588), SNMPv1 (RFC 1157),Telnet (RFC 854), FTP (RFC 959), VLAN, NTP (RFC 1305), SNMP (RFC 1769)
AC UNIVERSAL POWER SUPPLY	
Input voltage range	90-132 / 180-264 VAC 50/60Hz 60W - Fused 3A anti surge
Connection	3 pin IEC Mains Lead
Approvals	VDE, UL - IEC950, EN60950, UL1950
MTBF	> 100,000 hrs
MECHANICAL	
Size	19-inch rack mounting 1U high 200mm deep ETSI Rack fixings
Weight	3 kg
Display	2 rows by 40 character LCD. Character height 5mm
Keyboard	5 button keyboard for equipment configuration & control.
Environment (Operation & Storage)	
Temperature:	0°C to +50°C (Please consult factory if outside this range) - Storage -5°C- +60°C
Humidity	up to 95% RH (non-condensing)
Approvals - CE Compliant	Emissions to EN55022 as EN55024 FCC Part 15B, Class A Immunity to To EN 50082-1 as EN61000-4-2 ESD, IEC 801-3 HF Field, IEC 801-4 Burst

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