

# TCP-Ax - RUGGED TIME CODE PROCESSORS - FLIGHT QUALIFIED



**GPS / HaveQuick / IRIG-B / PTP Referenced**

**Time Code Processors with Programmable**

**HaveQuick / 1 PPS / IRIG-B and Video Insertion Output Capability**



AS9100D Certificate Number : C0210021-AS3



# TCP-Ax - RUGGED TIME CODE PROCESSORS - FLIGHT QUALIFIED

## Product Overview

The TCP-Ax range of advanced rugged Time Code Processors are extremely accurate and robust instruments that are easily configured with a PC via USB to synchronize with a wide variety of external time sources, including GPS, IRIG-B, IRIG-DCLS, 1PPS, Have Quick, and PTP (IEEE 1588).



Two size variants are offered, the TCP-AS (Standard - Top Right) and the TCP-AM (Miniature version - Bottom Right). The TCP-AS provides additional connectivity, backup power options (Li-Ion or super capacitor), and video insertion options (PAL & NTSC).

Ethernet options are provided with a built in SNTP web-server that provides a secure user friendly interface for configuring the unit and I/O functionality along with PTP & NTP functions. GPS options also provide an RS232 interface port with NMEA message output.

Each unit provides an IRIG-B (121-127) output along with five configurable and programmable digital output signal generators for 1PPS, GPS Have Quick, IRIG-DC, GPS Lock. In addition, four digital event capture inputs are provided that are accurate to within 100ns, making the TCP-Ax the ideal instrument for on board data capture, UTC referenced time stamping and timecode signal distribution.



All units are flight qualified and tested to MIL-STD 810F and 461E, CE102 and RE 102.

## Key Feature Summary

### Timing & Interfaces

- Time reference inputs - 16 Channel GPS, IRIG-B, Have Quick, PTP (IEEE 1588) Slave
- Simple setup using PC via USB port
- +/-12 hour time offset programmability with 1 second resolution
- Galileo capable option, with firmware change
- 4 User Selectable Event Capture Input accurate to 100ns
- Ethernet 10/100BaseT option : PTP (IEEE-1588) Master / Slave options + NTP Network Interface
- High stability disciplined hybrid OC/TCXO as standard
- Backup power options - Lithium Ion Battery or SuperCap
- Internal Real Time Clock Battery Backup
- Rugged compact design - meets MILSTD 810F / 461E, CE102 & RE 102
- Video Signal Time Stamp Insertion Option (TCP-AS)
- 9 - 36V DC Input - 1.5 watts consumption

### Input Options

- 16 Channel GPS RF (50 Ohm Active or Passive antenna)
- Ethernet 10/100BaseT PTP IEEE 1588-2002/2008 (PTPv1/v2) Slave
- 5 Programmable Inputs (PPS, IRIG-DC, Have Quick, etc.)
- 4 channel event capture
- IRIG-B

### Output Options

- IRIG-B
- 5 programmable outputs as 1PPS, IRIG-DC, Have Quick
- Ethernet 10/100BaseT IEEE 1588-2002/2008 (PTP v1/v2) Master (hardware support) or NTP Server
- RS232 NMEA Messages (Time & Location) with GPS option
- Video Overlay

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## Specifications



Specifications - TCP-Ax	
<b>Input Sync Options</b>	<b>Details</b>
Std : IRIG-B	Accuracy within +/- 10 $\mu$ s of external source at initial synchronization
Std : GPS-HQII	Accuracy within +/- 200 ns of external source
<b>Optional : GPS</b>	16 Channel GPS Receiver Option - Galileo option available
<b>Optional : PTP (IEEE-1588)</b>	Slave option from PTP source - <i>See Network Interface Options below</i>
<b>Inputs - Event Capture</b>	
Std : Four Programmable Inputs	Event 1 to Event 4, De-bounced switch closure input, Logic level input (accuracy +/- 100 ns)
<b>Outputs</b>	
Std : IRIG Outputs	IRIG-B121...127 via BNC : 3.0 Vp-p (no load), 2.0 Vp-p (into 600 ohms)
Std : Five Programmable Outputs	Programmable Pulses 1 to 4, 1PPS, GPS On Time Mark, GPS Have Quick II, GPS Lock, IRIG-DC
<b>Optional : IRIG Output Options</b>	IRIG-A, IRIG-E, IRIG-H
<b>Optional : NTP</b>	NTP Server Master Clock from GPS reference option - <i>See Network Interface Options below</i>
<b>Optional : PTP (IEEE-1588)</b>	PTP Master Clock Mode from GPS reference option - <i>See Network Interface Options below</i>
<b>Optional : RS-232 (with GPS)</b>	NMEA messages (Time/Location) with GPS option Connector : Glenair - Pt No 801-011-07M7-10SA Mates with: Glenair Pt No: 801-008-16M7-10PA
<b>Internal Time Base Accuracy</b>	
Stability	1 ppm (@ 25 deg C)
Stability over temperature	1 ppm (-40 to +40 deg C)
Long Term Stability	1 ppm (1 year @ 25 deg C)
Calibration Range	+/- 8 ppm
Calibration Accuracy	+/- 15 ppb of external time source (@ 25 deg C) when disciplined
<b>Time Offset</b>	Programmable + / - 12 Hours - 1 second resolution
<b>Network Interface Options</b>	
Standard Physical Option	1 port : 10/100 Base T via RJ45 connector
Protocols	NTP Version 3 [RFC 1305] , IEEE-1588, SNTP compatible (RFC 2030) SNMP, IEEE802.3, UDP/IP, ICMP
<b>Optional : Network Interfaces</b>	4 options available : NTP Time Server, NTP Client, PTP Grandmaster, PTP Slave
<b>Status LEDs</b>	Power, IRIG-B, GPS status
<b>Environmental</b>	
Temperature	Operating : -40°C + 85°C Storage : -50°C + 95°C - (Non Li-Ion option)
Humidity	95 % non condensing
Power	9 - 36 V DC 1.5 Watts Connector : Glenair - Pt No 801-011-07M5-5SA Mates with: Glenair Pt No: 801-008-16M5-5PA
<b>Physical</b>	TCP-AS - 15.0 cm x 10.8 cm x 5.9 cm (5.9" x 4.3" x 2.3") Weight : 0.7 to 1.4 kg (1.5 to 3 lb) depending upon options  TCP-AM - 14.9 cm x 10.3 cm x 3.7 cm (5.9" x 4.0" x 1.5") Weight : 0.5 kg (1 lb)
<b>Compliance</b>	Tested to MIL-STD 810F and 461E CE102 and RE 102
<b>Options for TCP-AS only</b>	<b>TCP-AS only (Larger Variant)</b>
<b>Optional : Time Display</b>	Optional time of day display LCD
<b>Optional : Ruggedised 10/100BaseT Network Port</b>	Optional Ruggedised 10/100BaseT Interface
<b>Optional Clock Backup</b>	Option 1 : Super Cap option (See temperature specs) Option 2 : Lithium Ion Battery Pack
<b>Optional : Video Insertion</b>	Features : PAL and NTSC video Input / Output - Auto detect video signal Programmable overlay position and content - Event markers (from event inputs) Options for 2 channels (front) + option for additional 2 channels (rear)

# Satisfied customers include..

ABB Singapore Airbus Defence & Space ASM Technologies Ltd Atkins Babcock International BAE Systems BBC BP CMC Engineering Malaysia	EDF Energy Indian Navy Jakarta Metro Leonardo Electronics Defence And Security London Stock Exchange London Underground MBDA Ltd MTRC Hong Kong National Air Traffic Services	NASA NEC Network Rail Northrop Grumman Park Air Systems Ltd Qinetiq Ltd Raytheon Systems Ltd Rockwell Automation SBS Transit Singapore Siemens Transportation	Singapore Stock Exchange Telent Technology Services Limited Teligent Thales UK Transport For London Viacom
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