

# TCP-AM

## Airborne Time Code Processor



Brandywine's Airborne Time Code Processor (TCP-AS). This extremely accurate and robust instrument can be synchronized to a variety of external time sources and is a source of IRIG-B, GPS-Have Quick, NTP or IEEE 1588 time code.

A multi-format precision time source in a small form factor with low power consumption.

Can operate as a time code format translator: eg IEEE-1588 (PTP) to IRIG-B

### FEATURES

- **Flight Qualified**
- **Support for IEEE-1588 and GPS Havequick II I/O**
- **Input IEEE-1588 and Convert to IRIG A/B**
- **Tested to MIL-STD 810F and 461E CE102 and RE 102**

|                          |                                                                                           |
|--------------------------|-------------------------------------------------------------------------------------------|
| Time Code Source         | IRIG and GPS Have Quick II time code generator<br>NTP Server and IEEE-1588 Master options |
| Time Mark Output         | UTC / GPS                                                                                 |
| Jam-sync                 | Jam-sync to IRIG-B, GPS HQ, GPS receiver                                                  |
| Power                    | 9 to 36 V DC, 1.5 W                                                                       |
| Power Backup             | Internal clock backed up by Super-Cap                                                     |
| RS-232 Port              | NMEA message output                                                                       |
| USB Interface            | Configuration using a PC                                                                  |
| Time Offset              | +/-12 hours with 1 second resolution                                                      |
| Digital I/O              | 5 configurable digital input output pins                                                  |
| GPS Receiver [option]    | 16 channel internal GPS receiver with external active antenna                             |
| GPS Lock Indicator       | GPS lock output                                                                           |
| Galileo                  | Galileo capable with firmware upgrade                                                     |
| Video Insertion [option] | 2 and 4 channel Video Inserter [PAL and NTSC]                                             |
| Battery [options]        | Li-Ion Battery Power option<br>Super Capacitor Power option                               |

### Applications

- Flight Test
- Aircraft Data Collection
- Flight Instrumentation
- UAV Applications

### Key Benefits

- Low Phase Noise 10 MHz Outputs
- Multiple Output signal formats for maximum flexibility
- Flight Qualified to 60,000 ft.
- MIL-STD-810F
- MIL-STD-461G (RE/CE101 & RE/CE102)

# Specifications

## Time Code Output

|                  |                                                |
|------------------|------------------------------------------------|
| Connector        | BNC                                            |
| Time Formats     | IRIG-B121...127                                |
| Output Amplitude | 3.0 Vp-p (no load)<br>2.0 Vp-p (into 600 ohms) |

## Ancillary Signals

Five Configurable Digital Signals, can be:

|                     |                                                                                                                                                                                                                                                      |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Output              | Programmable Pulse 1<br>Programmable Pulse 2<br>Programmable Pulse 3<br>Programmable Pulse 4<br>One_PPS<br>GPS On Time Mark<br>GPS_Have Quick II<br>GPS Lock<br>IRIG-DC                                                                              |
| Input               | Event 1 to Event 4<br>Debounced switch closure input<br>Logic level input (accuracy +/- 100 ns)<br>NMEA messages (Time/Location)<br>Manufacturer: Glenair Part Number:<br>801-011-07M7-10SA<br>Mates with: Glenair Part Number:<br>801-008-16M7-10PA |
| RS-232<br>Connector |                                                                                                                                                                                                                                                      |

## Power

|       |                                  |
|-------|----------------------------------|
| Input | 9 to 36 V DC, 1.5 W (no options) |
|-------|----------------------------------|

## Internal Time Base

|                            |                                                                  |
|----------------------------|------------------------------------------------------------------|
| 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 |

## Synchronization

|               |                                                                     |
|---------------|---------------------------------------------------------------------|
| IRIG-B        | Within +/- 10 $\mu$ s of external source at initial synchronization |
| GPS-HQII, GPS | Within +/- 200 ns of external source                                |

## Environmental

|             |                                                                                               |
|-------------|-----------------------------------------------------------------------------------------------|
| Temperature | Operational: -40 to +60 deg C<br>[without Li-Ion battery]<br>Non-operational: -50 to +70deg C |
| Humidity    | Non-condensing: 95%                                                                           |

## Physical

|        |                                                       |
|--------|-------------------------------------------------------|
| Size   | 15.0 cm x 10.8 cm x 5.9 cm<br>(5.9" x 4.3" x 2.3")    |
| Weight | 0.7 to 1.4 kg (1.5 to 3 lb)<br>[depending on options] |

# Options

|                           |                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GPS Receiver              | 16 channel GPS receiver                                                                                                                                                                                                                                                                                                                                                                             |
| LCD Display               | Display of Time on front panel                                                                                                                                                                                                                                                                                                                                                                      |
| Video Inserter            | PAL and NTSC video Input / Output<br>Auto detect video signal<br>Programmable overlay position and content<br>Event markers (from event inputs)<br>2 channels (front) + 2 channels (rear)                                                                                                                                                                                                           |
| IRIG Distribution         | 4 additional buffered IRIG code outputs                                                                                                                                                                                                                                                                                                                                                             |
| Li-Ion Battery            | High capacity backup power source                                                                                                                                                                                                                                                                                                                                                                   |
| Super Capacitor Power     | Wide environmental specification<br>Charge and discharge over full temperature range                                                                                                                                                                                                                                                                                                                |
| OCXO                      | Hybrid OC/TCXO time base                                                                                                                                                                                                                                                                                                                                                                            |
| Ethernet                  | 10/100 Mbps<br>IEEE-1588 (PTP) hardware support<br>RJ-45 connector on rear panel<br>[Requires Ethernet option]<br>Operate as GPS synchronized NTP Source<br>[Requires Ethernet option]<br>Operate as GPS synchronized IEEE-1588 Master<br>[Requires Ethernet option]<br>Generate time (eg. IRIG-B) from IEEE-1588 Master<br>[Requires Ethernet option]<br>Remote network configuration / monitoring |
| NTP Server                |                                                                                                                                                                                                                                                                                                                                                                                                     |
| IEEE-1588 Master          |                                                                                                                                                                                                                                                                                                                                                                                                     |
| IEEE-1588 Slave           |                                                                                                                                                                                                                                                                                                                                                                                                     |
| SNMP Control / Monitoring |                                                                                                                                                                                                                                                                                                                                                                                                     |
| IRIG Code options:        | IRIG-A In/Out<br>IRIG-E In/Out<br>IRIG-H In/Out                                                                                                                                                                                                                                                                                                                                                     |

## GPS Antenna Input

|                                                             |                                                                    |
|-------------------------------------------------------------|--------------------------------------------------------------------|
| Power                                                       | 5V active antenna power output<br>Short circuit and open detection |
| Connector                                                   | TNC (standard)                                                     |
| Custom front/rear panel connector configurations available. | eg. Special connector requirements                                 |