

## Rugged Miniature Time Code Processor

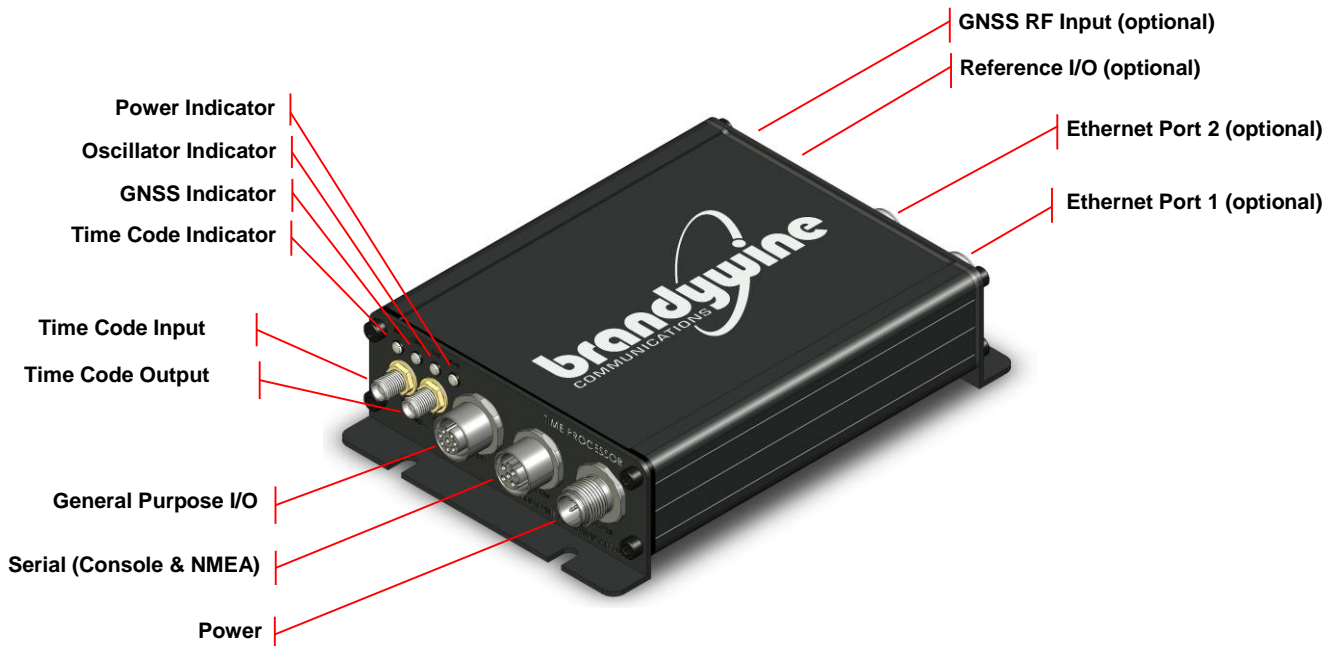
Brandywine Communications' Miniature Airborne-Qualified Time Code Processor (TCP-AM), is an extremely accurate and robust instrument that can be synchronized to a variety of external time sources and is a source of IRIG-AM, IRIG-DCLS, GPS HQ, NTPv4 (RC 5905) or PTPv2 (IEEE 1588-2008) time codes.

### Key Features

A multi-format, reduced Size, Weight and Power (SWaP) precision time server.

Can operate as a time code format translator: e.g. PTPv2 to IRIG-AM (B)

Input References	<ul style="list-style-type: none"> <li>❑ GNSS RF</li> <li>❑ NTP and PTP clients</li> <li>❑ IRIG-AM, IRIG-DCLS, BCD, NMEA, GPS HQ and PPS</li> </ul>
Output Sources	<ul style="list-style-type: none"> <li>❑ NTP and PTP servers</li> <li>❑ IRIG-AM, IRIG-DCLS, BCD, NMEA, GPS HQ, and PPS</li> </ul>
User Interface	❑ Console or optional web server
Time Offset	❑ Local, UTC, TAI, GPS
Resolution	❑ $\pm 10$ nanoseconds
Discrete I/O	❑ 5 configurable digital input/output pins (PPS, IRIG-DCLS, events, etc.)
GNSS [optional]	❑ 72-channel internal receiver with external active or passive antenna
GNSS Bands [optional]	❑ GPS/QZSS, GLONASS, BeiDou, SBAS, Galileo
Secure GPS [optional]	❑ internal M-code receiver
Holdover [optional]	❑ TCVCXO, OVCXO, or CSAC



# Rugged Miniature Airborne Time Code Processor

## Specifications

### Time Code Input & Output

Connector	<input type="checkbox"/>	SMA
Time Formats	<input type="checkbox"/>	IRIG X12X, BCD, GPS HQ
Output Amplitude	<input type="checkbox"/>	3.0 V <sub>PP</sub> (Hi-Z)
	<input type="checkbox"/>	2.0 V <sub>PP</sub> (600Ω)

### Ancillary Signals

Five (5) Discrete digital signals can be configured as:

Output	<input type="checkbox"/>	IRIG-DCLS
	<input type="checkbox"/>	PPS
	<input type="checkbox"/>	10MHz Reference
	<input type="checkbox"/>	Programmable Pulse Generators (4)
	<input type="checkbox"/>	GPS_HQ
	<input type="checkbox"/>	Status

Input	<input type="checkbox"/>	IRIG-DCLS
	<input type="checkbox"/>	PPS
	<input type="checkbox"/>	Debounced Events (4)
	<input type="checkbox"/>	Logic level input (accuracy ±10 ns)

Ethernet [optional]	<input type="checkbox"/>	100/1000BASE-T (2-ports)
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RS-232	<input type="checkbox"/>	Console
	<input type="checkbox"/>	NMEA 0183

### Power

Input	<input type="checkbox"/>	9 to 36 V <sub>DC</sub> , 3 W
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### Synchronization Accuracy

PPS	<input type="checkbox"/>	±10 ns
Time Code	<input type="checkbox"/>	±100 ns
GNSS	<input type="checkbox"/>	±30 ns
NTP	<input type="checkbox"/>	±1 ms
PTP	<input type="checkbox"/>	±100 ns

### Holdover

Long Term Stability, TCVCXO	<input type="checkbox"/>	±160 ppb
Long Term Stability, OVCXO	<input type="checkbox"/>	±6.4 ppb
Long Term Stability, CSAC	<input type="checkbox"/>	±0.4 ppb

### MIL-STD-810G

Altitude	<input type="checkbox"/>	60,000 feet
Temperature, Operational	<input type="checkbox"/>	-40 to +85 °C
Temperature, Operational (GNSS)	<input type="checkbox"/>	-40 to +75 °C
Temperature, Storage	<input type="checkbox"/>	-50 to +95 °C
Humidity, Non-condensing	<input type="checkbox"/>	95%
Shock	<input type="checkbox"/>	Typical
Vibration	<input type="checkbox"/>	Typical
Acceleration, Functional	<input type="checkbox"/>	16g, all directions

### MIL-STD-461G

Conducted Emissions, Audio	<input type="checkbox"/>	CE101-4 Curve 2
Conducted Emissions, RF	<input type="checkbox"/>	CE102-1 Basic Curve
Radiated Emissions, Audio	<input type="checkbox"/>	RE101-1/2 Basic Curves
Radiated Emissions, RF	<input type="checkbox"/>	RE102-3 Fixed-Wing Curve

### Physical

Size	<input type="checkbox"/>	15.4 x 10.4 x 3.7 cm (6.1 x 4.1 x 1.5 in)
Weight	<input type="checkbox"/>	0.5 kg (1 lb)

### Options

#### GNSS Receiver

- 72-channel multi-band GNSS receiver
- M-code Secure-GPS receiver

#### Holdover

- OVCXO
- CSAC

#### Ethernet

- 100/1000BASE-T
- IEEE 1588-2008 (PTPv2) hardware support
- M12 connectors on rear panel

#### RFC 5905 Server [Requires Ethernet option]

- Synchronize many external NTP clients

#### RFC 5905 Client [Requires Ethernet option]

- Synchronize to external NTP servers

#### IEEE 1588-2008 Server [Requires Ethernet option]

- Synchronize many external PTP clients

#### IEEE 1588-2008 Client [Requires Ethernet option]

- Synchronize to external PTP servers

#### IRIG Time Code:

- IRIG-AM / DCLS (A)
- IRIG-AM / DCLS (B)
- IRIG-AM / DCLS (E)
- IRIG-AM / DCLS (G)

#### GNSS Antenna Input (GNSS Receiver option)

Power	<input type="checkbox"/>	3V/5V active antenna power output
	<input type="checkbox"/>	Short circuit and open detection
Connector	<input type="checkbox"/>	SMA

#### Customization

Custom application module options available.

- e.g. Input Power Backup
- e.g. Data Acquisition
- e.g. IRIG Distribution
- e.g. Secure M-code Key-fill
- e.g. Video Stream Annotation

