

brandywine communications

TimeAcc Precision Time Measurement Instrument

Introducing the latest addition to the Brandywine Communications' range of precision timing instruments.

TimeAcc precisely measures the time accuracy of A wide range of inputs against an internal precision GPS-controlled oscillator.

The difference is clearly displayed on the large, Full color Windows-based touch-screen.



Applications



TimeAcc is invaluable where time of day information is distributed from a central master clock to sub-master clocks or user systems over large distances via serial data links or packet networks. Substantial delays can occur due to high levels of network traffic or even due to the long distance between the master clock and the user.

Some commercially available software algorithms can reduce these errors but, unless the errors are accurately and independently measured at the point of use, the user cannot be certain of the accuracy of his time source in this type of application.

Additionally, the high accuracy of the TimeAcc means that it can also precisely measure the time error of free-running clocks and timing systems which are synchronized from the untraceable sources, such as television and radio broadcasts, electrical power lines and via the internet.

Ease of Use

As the unit is portable and battery powered, it is simple to synchronize the unit to GPS outside by using the integral GPS antenna. Alternatively, synchronization can take place inside if connected to an external GPS antenna with the additional flexibility to use AC mains power.

Features

- Measures and displays the difference between input time signal and UTC
- Capable of measuring a wide variety of time signal inputs
- Full color touch-screen with user-friendly Windows-based operating system
- Timing resolution of better than 1 nanosecond
- Absolute accuracy of up to 50 nanoseconds to UTC
- Automatic identification and analysis of Modulated Carrier Timecodes
- USB port situated on the front of the instrument for easy access for downloading data to printer and/or removable memory for subsequent analysis
- Robust, portable design for all industrial applications

Signal Inputs

Selectable via the front panel touch-screen

- 1 Pulse per Second (1PPS)
- 1 Pulse per Minute (1PPM)
- 1 Pulse per Hour (1PPH)
- IRIG-B modulated onto a 1kHz carrier
- IRIG-B DC level shift
- ASCII Serial time message at RS232, RS422, or RS485 levels
- Network Time Protocol (NTP) to RFC 1305
- DCF-77 timecode
- Have-Quick, Extended Have-Quick

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Specifications

Measurement Reference Source

- Internal C/A Code GPS Receiver with case-mounted antenna
- Time Accuracy (1σ) 30ns over 24 hours
- Internal Time Interval Measurement: 0.2ns resolution with built-in self-calibration
- Optional connection to external GPS Antenna
- Internal Disciplined Rubidium Oscillator
- Frequency Reference stability: 3×10^{-12} over 100s
- Frequency aging without GPS: 3×10^{-9} per month
- Loss of Time accuracy without GPS: ± 700 ns per hour

Interfaces & Outputs

- 2 x USB Ports for printer/ data logger/ removable memory
- Network Connection 100Base-T Ethernet [RJ-45 connector]
- 1pps: 0V to 5V pulse from 50ohms [BNC connector]
- 10MHz: 0V to 5V square wave from 50ohms [BNC connector]
- IRIG-B AC, IRIG-B DC [BNC connector]
- NTP [RJ-45 connector]
- Have-Quick, Extended Have-Quick

Input Measurement Accuracy Against GPS

	Time	Resolution
1pps [TTL;ST Fibre*;Differential (RS422); relay input]:	± 50 ns	0.2ns
1ppm [TTL;ST Fibre*;Differential (RS422); relay input]:	± 50 ns	0.2ns
1pph [TTL;ST Fibre*;Differential (RS422); relay input]:	± 50 ns	0.2ns
IRIG-B AC & 1kHz carrier based codes [TTL;Diff]:	$\pm 1\mu$ s	100ns
IRIG-b & DC Timecodes:	± 50 ns	0.2ns
ASCII Serial time message RS232:	$\pm 1\mu$ s	0.2ns
ASCII Serial time message RS422:	± 100 ns	0.2ns
ASCII Serial time message RS485:	± 100 ns	0.2ns
NTP/ SNTP:	± 70 ns	20ns
DCF-77 Timecode [TTL]:	± 50 ns	0.2ns
Have-Quick Time Code [TTL]:	± 50 ns	0.2ns

Input Specifications

AC Timecodes:	Nominal Input:	10Vpp		
	Peak to Peak Min/Max:	2.5Vpp/ 12Vpp		
	Input Impedance:	60kohm		
Pulse Input:	Nominal Input:	0V to 2.5V	DC Level Shift	RS232
	Input Low Max:	0.9V	0V to 2.5V	± 9 V
	Input High Max:	1.4V	0.9V	+ 0.8V
	Input Impedance	1.2kohm	1.4V	+ 2.4V
		1.2kohm	1.2kohm	5kohm
RS422 Input:	Common Mode:	-7V to + 12V		
	Differential Threshold Min/Max:	-0.2V/ + 0.2V		
	Input Impedance:	12kohm		

*ST Fibre Connector: ST housed 820nm Fibre Receiver

Power: 110/230V AC + 6% - 10% 48-62 Hz Load 50VA
Internal rechargeable battery, nominal 3-hr battery life with 4-hr time to recharge

Mechanical: Portable Instrument Case

Dimensions: 350mm(W) x 150mm(H) x 260mm(D)

Weight: 9kg

Environmental: Temperature: 0°C to + 40°C
(Operation & Storage) Humidity: Up to 95% RH (non-condensing)
EMC: CE Compliant