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TIMESPY

Network Time Analyzer with Precision Time Measurement

Key Features

- Measures and displays the difference between input time signal and UTC
- Capable of measuring a wide variety of time signal inputs
- Laboratory standard 1PPS & 10MHz inputs can be used as time reference
- Timing resolution of better than 1 nanosecond
- Absolute accuracy of up to 50 nanoseconds to UTC
- Automatic identification and analysis of Modulated Carrier Timecodes
- Full color touch-screen with user-friendly Windows-based operating system
- USB port on front panel for easy access downloads for subsequent analysis of data
- Robust, portable design for all industrial applications
- User-selectable threshold for alarm generation
- Robust, portable design for all industrial applications
- Choice of clock accuracy: see selector table overleaf

1153 Warner Avenue • Tustin, CA 92780 • 714-755-1050 Phone • 714-755-0175 Fax • Toll Free 877-FOR-SYNC
www.brandywinecomm.com info@brandywinecomm.com

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Applications

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TimeSpy 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 TimeSpy means that it can also precisely measure the time error of freerunning clocks and timing systems which are synchronised from untraceable sources, such as television and radio broadcasts, electrical power lines and via the internet.

Signal Inputs

Selectable via the front panel touch screen:

- 1 Pulse per Second (1PPS)
- 1 Pulse per Minute (1PPM)
- 1 Pulse per Hour (1PPH)
- Modulated timecode onto a 1kHz carrier
- Timecode DC level shift
- ASCII Serial time message at
- RS232, RS422 or RS485 levels
- Network Time Protocol (NTP) to RFC 1305
  Precise Time Protocol (PTP) IEEE 1588 v2
- DCF77 timecode

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 further flexibility to use AC mains power.

TimeSpy Model Selector

Model	Oscillator	Frequency Reference stability	Frequency ageing without GPS	Loss of Time accuracy without GPS
Elan-Q	Quartz OCXO	1x10-12 over 100s	3x10-9 per month	±700ns per hour
Elan-R	Rubidium	3x10-12 over 100s	3x10-11 per month	±30ns per hour

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Specifications

Measurement Reference Source

- Internal C/A Code GPS Receiver with case-mounted antenna
- Time Accuracy (1σ) 30ns over 24hrs with GPS reception
- Internal Time Interval Measurement: 0.2ns resolution with built-in self-calibration
- Optional connection to external GPS Antenna

Measurement Interfaces		Connector	Input Measurement Accuracy Against GPS		Input Specifications
			Time (1σ)	Resolution	
Pulse (1pps / 1ppm / 1pph)	Fibre	ST	25ns	0.2ns	820nm -7.6dBm max (or 1300nm -11dBm max - to special order)
	Differential	Twin BNC	25ns	0.2ns	Common mode -7V+12V Differential threshold -0.3V min +0.3V max Input Impedance 22k min
	TTL	50ohm BNC	25ns	0.2ns	Nominal Input 0V to 2.5V Low: 0- 0.9V; High: Min 1.4V-5V Input Impedance 1.2kohm
Relay / optoisolator		Twin BNC	25ns	0.2ns	Isolated inputs. TimeSpy connects 1.2kohm from +5V to contacts from isolated supply
1kHz AC Timecode		50ohm BNC	1 µs	100ns	Nominal Input: 10Vpp Peak to Peak Min / Max: 2.5Vpp /12Vpp Input Impedance: 60kohm
DC Timecode	Fibre	ST	25ns	0.2ns	820nm -7.6dBm max (or 1300nm -11dBm max - to special order)
	Differential	Twin BNC	25ns	0.2ns	Common mode -7V+12V Differential threshold -0.3V min +0.3V max Input Impedance 22k min
	TTL	50ohm BNC	25ns	0.2ns	Nominal Input 0V to 2.5V Low: 0- 0.9V; High: Min 1.4V-5V Input Impedance 1.2kohm
Network Connection	NTP / SNTP / PTP V1/V2	RJ-45	±70ns	20ns	100Base-T Ethernet
RS422/RS485 Serial		9-pin D-type	100ns	0.2ns	Common mode -7V+12V Differential threshold -0.3V min +0.3V max. Input Impedance 22k min
RS232 Serial		9-pin D-type	1 µs	0.2ns	Input Voltage Range ±30V max Low threshold 0.8V max; High threshold 2.4V Input impedance 3kohm min 7kohm max

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Laboratory Reference Signal	Connector	Input Specification
1pps	50ohm BNC	Nominal Input 0V to 2.5V Low: 0- 0.9V; High: Min 1.4V-5V Input Impedance 1.2kohm
10MHz	50ohm BNC	Min 1.4V. Input Impedance 1.2kohm)

Output Interface	Connector	Output Specification
Alarm relay output	9-pin D-type	NO/NC/COM Voltage Free Contacts 0.3A at 125VAC; 1A at 30VDC
RS232 User port	9-pin D-type	RS232 Port for diagnostics
1pps output	50ohm BNC	0V to 5V pulse from 50ohms
1pps output RS422	Twin BNC	0V to 5V RS422 pulse output
1ppm output	50ohm BNC	V to 5V pulse from 50ohms
10MHz output	50ohm BNC	0V to 5V square wave from 50ohms
Timecode AC	50ohm BNC	1kHz modulated Timecode output; 6V peak to peak from 50ohms
Timecode DCLS; TTL	50ohm BNC	0V to 5V DCLS Timecode output from 50ohms

Additional Service connections

- USB Port for printer /data logger/removable memory
- Internal and external antenna [BNC connector]

Power: 90V-264V AC; Internal rechargeable battery, nominal 3-hr battery life with 4-hr time to recharge; A Ground Stud is also provided

Mechanical: Portable Instrument Case:

Dimensions: 350mm(W) x 180(H) x 305(D)

Weight: 9kg

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

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