MODEL 2000
NETSYNC NETWORK
TIME SERVER

The Model 2000 NETSYNC Network Time Server provides precise time information to local networks or over the Internet using the UDP Network Time Protocol. The NETSYNC operates over either a 10BASE-T or 100BASE-T network interface.

The time information distributed by the NETSYNC is obtained from one of two synchronizing sources. In its standard configuration, the unit synchronizes to Universal Time (UTC) via the IRIG B Time Code format. This time code is typically obtained from a central timing system. As an option, the NETSYNC can be equipped with either an internal or externally mounted Navstar Global Positioning System (GPS) receiver. When so equipped, the Model 2000 functions as a STRATUM 1 time source. If neither synchronizing source is available, the NETSYNC can still operate as a stand-alone unit; controlled by the front panel keypad or remote control interface.

When equipped with its GPS option, the unit operates on the Civilian L Band, C/A code transmitted by the Navstar Satellites. While the Model 2000 is designed primarily for timing applications, and requires only one satellite to be in view to perform this function, it will also provide precise position information. Four satellites in view are required to determine the precise location of the receiver.

With a satellite in view, the Model 2000 correlates to Coordinated Universal Time (UTC) to better than 500 nanoseconds. Synchronization to UTC via an IRIG B time code is to better than 5 microseconds. During presence of either synchronizing source, the NETSYNC disciplines its internal oscillator so as to achieve optimum correlation with UTC during those periods when satellite transmissions or IRIG B are not available.

The standard frequency source for the NETSYNC is a temperature compensated crystal oscillator (TCXO). Optional (more accurate) frequency sources are an ovenized oscillator (OCXO) and a Rubidium standard.

Time synchronization of hosts is achieved via either a 10BASE-T or 100BASE-T network interface or an IRIG B time code output. Via the network interface, the NETSYNC supports interchange of time data via the NTP, Time or Daytime protocols. If the IRIG B Time Code is used to synchronize a host, the host must be equipped with an IRIG B reader; which Datachron has available in several different bus configurations.

Programming of the unit is accomplished through either its front panel keypad or a serial input. An associated alphanumeric LCD display indicates such functions as programmed data, calculated position and satellite health.

The Model 2000 is available in both desktop and rack-mount configurations.

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SPECIFICATIONS

Frequency Standard

The Model 2000 accumulates time from either a temperature compensated crystal oscillator (TCXO; standard), an internal oven controlled crystal oscillator (OCXO; optional) or a Rubidium standard (optional). When satellites are in view or IRIG B is present, the unit's frequency standard is disciplined to keep it in phase and frequency correlation to UTC.

Specifications for the TCXO in a free running, undisciplined form are:

Stability:	$\pm 1 \times 10^{-6}$ from 0 to +50°C
Aging Rate:	3×10^{-9} per day

Specifications for the OCXO in a free running, undisciplined form are:

Stability:	$\pm 1 \times 10^{-9}$ from 0 to +50°C
Aging Rate:	1×10^{-10} per day

Specifications for the Rubidium frequency standard in a free running, undisciplined form are:

Stability:	$\pm 3 \times 10^{-10}$ from 0 to +50°C
Aging Rate:	2×10^{-9} per year

Synchronization

When IRIG B is available or at least one satellite is in view, the Model 2000 synchronizes to Universal Time in both real time and frequency. During these periods of synchronizing source availability, the unit also disciplines its internal oscillator. The result is better than 500-nanosecond correlation to UTC with satellite signals present, better than 5-microsecond correlation to IRIG B and better than 5-microsecond correlation during periods of synchronizing signal absence.

Outputs

IRIG B Serial Time Code

Amplitude:	Adjustable from 0 to 6 volts peak to peak
Modulation Ratio:	Adjustable from 2:1 to 6:1
Maximum External Load:	50 ohms

Pulse Rates

Two pulse rates, 1PPS and 10MPPS, synchronous with UTC, are provided at rear panel BNC connectors.

Amplitude:	Positive going pulses from a maximum 0.4 volt baseline to +4.5 volts, minimum
Rise and Fall Times:	15 nanoseconds
Drive Capability:	50 ohms

Network Interface

The NETSYNC distributes time via either a 10BASE-T or 100BASE-T network interface. The connector is an RJ45. The interface supports the SNMP Network Management Protocol, the DIX Ethernet and IEEE 802.3/802.2 Frame formats and Network Time (NTPu1/NTPu2), Time or Daytime protocols.

Remote Control

All parameters programmable through the front panel keypad are also programmable remotely via an RS232 interface or the Network Interface. If the Network Interface is used, the NETSYNC supports the TELNET and SNMP protocols.

Firmware resident in Flash memory is also updateable via the Remote Control interface.

Programmable Functions

The following functions are programmable or readable via a front panel keypad in conjunction with an alphanumeric LCD display.

Set Cable Delay
Set Elevation Angle Mask
Set GMT Offset
Set Network Parameters
Read GPS/UTC Difference
Read Oscillator Control Status
Read Position
Read Receiver Status
Read Satellite Status

Power Requirements

The Model 2000 operates from a primary power source of 95 to 265 volts AC, 50 to 70 Hz and consumes less than 30 watts of power. In the event of primary power failure, internal batteries maintain keypad programmed functions and GPS Receiver acquired information for over one year.

Environmental Characteristics

		Chassis	Antenna
Temperature:	Operating:	0°C to +50°C	-20°C to +95°C
	Storage:	-40°C to +100°C	-40°C to +100°C
Humidity:		0 to 95%, without condensation	0 to 100%,

Physical Characteristics

The Model 2000 is designed for either desktop (bench) or rack mounting.

In its desktop configuration the NETSYNC has the following dimensions:

Height:	1.75 inches (4.4 cm)
Width:	Chassis: 17 inches (43.2 cm)
Depth:	15 inches (38.1 cm), not including rear panel connectors
Weight:	10 pounds (4.5 kg), nominal

In the rack-mount configuration, the Model 2000 the following dimensions:

Height:	1.75 inches (4.4 cm)	
Width:	Chassis:	17 inches (43.2 cm)
	Front Panel:	19 inches (48.3 cm)
Depth:	15 inches (38.1 cm), not including rear panel connectors	
Weight:	10 pounds (4.5 kg), nominal	

Documentation

Each unit is delivered with an operation and maintenance manual which includes a complete description of the unit’s theory of operation along with all assembly and schematic drawings.