

NFS-220 - PRECISION TIME & FREQUENCY STANDARD



GPS Referenced Network Capable Time and Frequency Standards NFS-220 & NFS-220 Plus



AS9100D Certificate Number : C0210021-AS3



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Product Overview

The NFS-220 / NFS-220 PLUS units are precision time and frequency standards that use a high performance 16 channel GPS receiver to define a precise time standard and hence means to discipline a precision oscillator from which industry standard time and frequency signals are derived. This is supplemented by an automatic position-averaging feature that enables the best use of GPS when operating in a fixed location.

The units are designed for use in WI-FI, Wi-Max, satellite communications, telecommunications and military communication applications requiring exceptional stability and low phase noise. Both units provide an array of front panel real-time status indicators with the NFS-220 Plus version also incorporating a high visibility, Time of Year Display in the front panel.

An internal back up oscillator is continuously calibrated to GPS using an advanced algorithm, providing optimal frequency control of the oscillator, ensuring that the highest time and frequency accuracy is maintained if satellite tracking is lost.

Base level units provide a precision OCXO frequency standard, while TCXO and Rubidium oscillators are available to deliver a variety of price and performance options. A combination option employing a low noise OCXO phase locked to a rubidium is also available, offering the low noise characteristic of an OCXO with the long term stability of a rubidium.

Real time “at a glance” status indication is available via the front panel LED’s together with a large time, day and year display on the NFS-200 Plus variant. System configuration and status is readily integrated with other time management systems using the Ethernet and serial ports.

The units are designed for simple integration into military platforms by allowing synchronization from Have Quick time codes, available on military SA-ASM GPS receivers such as the DAGR or PLGR. They also generate Have Quick and 1PPS signals compatible with ICD-GPS-060.

The integrated Ethernet interface provides Network Time Protocol (NTP) synchronization over a network with a built in web server that facilitates setup, control and logging using a standard web browser such as Internet Explorer. Simple Network Management Protocol (SNMP) allows straight forward integration with industry standard network management systems.

Three 1PPS time mark outputs are provided together with a unique feature that allows precisely controlled delays to be inserted into these outputs to compensate for cable and other propagation delays. Compensation delay is independent for each output and has <1ns resolution.

Serial time code outputs are provided to allow time synchronization to be distributed to computers, displays, and other equipment requiring precision time. Two outputs are dedicated to Have Quick time code.

Two outputs (one modulated, one DC level shift) may be user selected from IRIG A, IRIG B, IRIG E, IRIG G.

Four low phase noise 10 MHz sine wave outputs from the disciplined oscillator are provided. Signal amplitude is software programmable.

All outputs are provided with activity detectors. Loss of any output is indicated by means of a individual front panel alarm LED as well as through the network interface or a discrete alarm output.

Key Feature Summary	
Timing & Interfaces	
<ul style="list-style-type: none"> • 16 Channel GPS Receiver or ICD-GPS-060 Have Quick/1PPS input references • 20 Real-time Front Panel Status LEDs and optional high visibility Time of Year Display (NFS-220 Plus) • Choice of five disciplined oscillators : TCXO, OCXO, Rubidium, High Stability Rubidium, Rubidium & OCXO • High Stability Time and Frequency outputs - Advanced proprietary oscillator control algorithm • 1U 19” rack mount • Network Interface for remote management and NTP server 	
Outputs	
<ul style="list-style-type: none"> • 3 x 1PPS outputs with propagation delay compensation • Multiple time code outputs (IRIG B, A, E, G) DCLS & Modulated • 4 x 10 MHz Sine wave outputs • Have Quick time code • NTP Time (NTP v3 with SNMP v1) 	

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Specifications

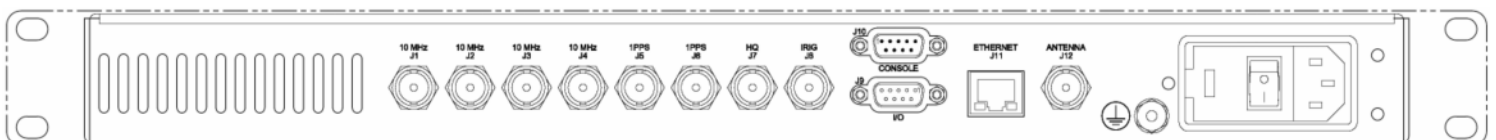


Specifications - NFS-220 / NFS-220 Plus

GPS	Details
Satellite Signal	GPS L1 1575.42 MHz
Satellite Code	C/A 1.023 MHz
Receiver Type	Parallel 16 Channel : All in view satellites tracked continuously and simultaneously
Warm Start	< 10 seconds (Open Sky)
Autonomous Start	< 60 Seconds Cold Start (Open Sky)
Cold Start Requirement	Automatic : No input of time or position required
Positional Accuracy	2.4m Horizontal, 5m altitude with respect to WGS84 after 24 hour position averaging
Timing Accuracy	
Tracking satellites	+/- 100ns absolute UTC Std deviation 15ns (OCXO)
Holdover Mode	+/- 5°C : < 15µsec/day (OCXO) / < 1µsec/day (Rb2)
Frequency Stability	See table below
1 PPS Output	2 x BNC + 1 x 9 Way D Type socket
Level / On Time	0 - 5V or 0 - 10V into 50 ohms, link selectable by user / On Time - Rising Edge
Network Interface	10 Base T - RJ45 connector - Protocols : TCP/IP, UDP, NTPv3, HTTP, SNMPv1
Serial Interface	1 x 9 way D type Socket : RS232/RS422 Time code output and configuration port - 9600,N,8,1
Sine Wave Outputs	4 x BNC connectors : 10 MHz : 0 - 13dBm into 50 ohms, Software programmable
Time Code 1 Output (Modulated)	1 x BNC : IRIG A135, B125, E115, G145 software selectable
Control functions / Levels	IEEE 1344 / 3 V pk-pk into 600 ohm (DCLS)
Time Code 2 Output (DC)	1 x D type Socket : IRIG A005, B005, E005, G005, Software programmable as modulated codes. DCLS (0 - 5V)
Time Code 3,4 Output	1 x D type Socket + 1 x BNC : Have Quick per ICD-GPS-060 (0 - 5V)
Alarm Status	Voltage free relay changeover contacts
Status LEDs	Power, Tracking satellites, Valid Time, Holdover, Outputs Good/Fail (8 LEDs)
Environmental	
Temperature	Instrument : -10°C + 50°C / Antenna -40°C to + 85°C
Humidity	95 % non condensing
Power	85VAC - 265VAC 50/60Hz
Power Options	12VDC, 24VDC, - 48VDC, 125VDC
Physical	19" Rack 1U 1.75" (H) x 7.5" (D) x 17" (W) [4.4 cm(H) x 19 cm (D) x 43.2 cm (W)] : Weight : 3.5 lb (1.6 Kg)
Compliance	CE Approved - EMC Emissions to EN55022 as EN55024 - FCC Part 15B, Class A EMC Immunity to EN50082-1 as EN61000-4-2 ESD, IEC801-3 HF Field & IEC 801-4

Oscillator Options

Oscillator Option	Stability -10 - 60 °C	Allan Variance						10MHz Phase Noise dBc						
		1s	10s	100s	1000s	10000s	1 Day	1Hz	10Hz	100Hz	1KHz	10KHz	100Hz	
TCXO	2.5x10 ⁻⁶	1x10 ⁻⁷	1x10 ⁻⁷	1x10 ⁻⁷	5x10 ⁻⁸	2x10 ⁻⁹	1x10 ⁻¹¹							
OCXO	3x10 ⁻⁹	2x10 ⁻¹¹	4x10 ⁻¹¹	8x10 ⁻¹¹	1x10 ⁻¹¹	5x10 ⁻¹²	5x10 ⁻¹²	-90	-120	-140	-150	-150	-155	
Rubidium Rb1	7x10 ⁻¹⁰	3x10 ⁻¹¹	1.6x10 ⁻¹¹	8x10 ⁻¹²			5x10 ⁻¹²	-67	-85	-114	-130	-140	-140	
Rubidium Rb2	4x10 ⁻¹⁰	1x10 ⁻¹¹	3x10 ⁻¹²	1x10 ⁻¹²			5x10 ⁻¹²	-80	-100	-130	-140	-150	-150	
Rb/OCXO	4x10 ⁻¹⁰	8x10 ⁻¹²	1x10 ⁻¹¹	3x10 ⁻¹²			5x10 ⁻¹²	-90	-120	-140	-150	-150	-155	



Satisfied customers include..

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