TIME & FREQUENCY SOLUTIONS
BY BRANDYWINE COMMUNICATIONS

RoHS COMPLIANT

NFS-220 PLUS

Network Ready GNSS Time & Frequency Standard

The NFS220 is a precision time and frequency standard that uses the Global Navigation Satellite System (GNSS). It is designed for use in WI-FI, Wi-Max, satellite communications, telecommunications and military communication applications.

Features

- 32 Channel GNSS Receiver or ICD-GPS-060 Have Quick/1PPS input references
- High Visibility Time of Year Display
- Choice of Disciplined Oscillator
- High Stability Time and Frequency outputs
- 1U 19" rack mount
- Network Interface for remote management and NTP server
- 3 x 1PPS outputs with propagation delay compensation
- Multiple time code outputs (IRIG B, A, E, G)
- 4 x 10 MHz Sinewave outputs
- Have Quick time code
- Advanced Oscillator Control Algorithm

Key Benefits

This GNSS frequency standard utilizes a high performance 32 channel GNSS receiver with a high visibility time of year display. An automatic position-averaging feature enables the best use of GPS when operating in a fixed location.

The NFS220 Plus is fitted with an internal back up oscillator that is continuously calibrated to GNSS using an advanced algorithm, providing optimal frequency control of the oscillator. This ensures that the highest time and frequency accuracy is maintained if no satellites can be tracked, and ensures an ultra stable, low noise frequency reference.

The basic NFS220 Plus includes a precision OCXO frequency standard, while TCXO and Rubidium oscillators are also available to giving a variety of price and performance options. An option with a low noise OCXO phase locked to a rubidium is also available, combining the low noise characteristic with the OCXO with the long term stability of a rubidium.

The NFS220 Plus provides "at a glance" status indication via front panel LED's as well as a large time, day and year display. This unit can be integrated with other management systems using Ethernet and serial ports.

The NFS220 Plus provides simple integration into military platforms by allowing synchronization from Have Quick time code, which is available on military SA-ASM GNSS receivers such as the DAGR or PLGR. The NFS220 PLUS also generates Have Quick and 1PPS signals compatible with ICD-GPS-060.

The integrated Ethernet interface provides Network Time Protocol (NTP) synchronization of other connected computers. In addition to NTP, the NFS220 Plus Ethernet interface contains a built in web server that allows the NFS220 PLUS to be controlled using a standard web browser such as Internet Explorer. Simple Network Management Protocol (SNMP) allows easy integration of the NFS220 PLUS with industry standard network management systems.

The NFS220 Plus provides three 1PPS time mark outputs. A unique feature 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 settable.

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.

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NFS-220 Plus Specifications

Satellite Signal:	GPS L1 1575.42 MHz
Satellite Code:	C/A 1.023 MHz
Receiver Type:	Parallel 32 Channel. All-in-view satellites tracked continuously and simultaneously
Warm Start:	<5 sec(Open Sky)
Autonomous Start:	<35 seconds Cold Start (Open Sky)
Cold Start:	Automatic: No input of time or position required
Position Accuracy:	2.4 m horizontal, 5 m altitude with respect to WGS84 after 24 hour position averaging

Timing Accuracy

Tracking satellites: ± 100 ns. absolute UTC;
Std Deviation 15ns (OCXO)

Holdover mode, ± 5ºC: < 15 µsec/day (OCXO);
<1 µsec /day (Rb2)

Frequency Stability
See table below

1PPS Output

Connector:	BNC (2) DB9 (1)
Level:	0-5V or 0-10V into 50Ω link selectable by user
On Time:	Rising Edge

Network Interface

Interface Type:	10BaseT
Protocols:	TCP/IP, UDP, NTPv3, HTTP, SNMP v1

Serial Interface

Type:	RS232 and RS422
Baud rate:	9600, N,8,1

Sine Wave Outputs

No of Outputs:	4
Connector:	BNC
Frequency:	10MHz
Level:	0 -13dBm into 50 ohm Software settable

Time Code 1 Output (Modulated)

Connector:	BNC
Code Type:	IRIG A135, B125, E115, G145 software selected
Control Functions:	IEEE 1344
Level:	3 V p-p into 600 ohm (DCLS)

Time Code 2 Output

Connector:	DB9
Code Type:	IRIG A005, B005, E005, G005
Selection:	same as modulated code
Levels:	DC Level Shift (0-5V)

Time Code 3,4 Output

Connector:	BNC (1) DB9 (1)
Code Type:	Have Quick per ICD-GPS-060
Levels:	0-5V
Alarm Status:	Voltage free relay changeover contacts
Status LED's:	Power Tracking Satellites Valid Time Holdover/12hr Holdover alarm Output Good/Fail (8 leds)

Environmental

Temperature:	Instrument: -10 to +50 °C Antenna: -40 to +85 °C
Humidity:	95% non condensing
Power:	85-265VAC 50/60Hz
Optional:	12VDC, 24VDC, -48VDC, 125VDC
Physical	
Dimensions:	19" rack mount 1.75" (1U) height, 71/2" depth 17"Width, 31/2lb Nom.
Weight:	11 lb. typical
EMC Emission:	To EN55022 as EN55024 FCC Part 15B, Class A
EMC Immunity:	To EN 50082-1 as EN61000-4-2 ESD, IEC 801-3 HF Field, IEC 801-4 Burst

Frequency Stability (tracking satellites)

Oscillator Option	Stability -10-60 °C	Allan Variance					
		1s	10s	100s	1000s	10000s	1 day
TCXO	$2.5x10^{-6}$	$1x10^{-7}$	$1x10^{-7}$	$1x10^{-7}$	$5x10^{-8}$	$2x10^{-9}$	$1x10^{-11}$
OCXO	$3x10^{-9}$	$2x10^{-11}$	$4x10^{-11}$	$8x10^{-11}$	$1x10^{-11}$	$5x10^{-12}$	$5x10^{-12}$
Rb1	$7x10^{-10}$	$3x10^{-11}$	$1.6x10^{-11}$	$8x10^{-12}$			$5x10^{-12}$
Rb2	$4x10^{-10}$	$1x10^{-11}$	$3x10^{-12}$	$1x10^{-12}$			$5x10^{-12}$
Rb/OCXO	$4x10^{-10}$	$8x10^{-12}$	$1x10^{-11}$	$3x10^{-12}$			$5x10^{-12}$

10MHz Phase Noise dBc					
1Hz		100Hz	1kHz	10kHz	100kHz
-90	-120	-140	-150	-150	-155
-67	-85	114	-130	-140	-140
-80	-100	-130	-140	-150	-150
-90	-120	-140	-150	-150	-155

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