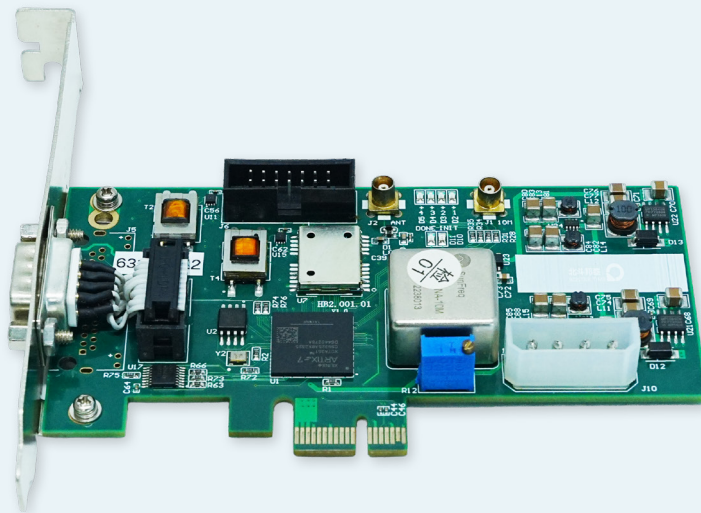


T220-B PCIe Time-Stamping Card

Half-height PCIe card, B-code timing, optional satellite receiver, PPS / B-DC output, timing interrupt

In computer-controlled, data acquisition, communication, and industrial automation systems, many hosts require direct access to stable and reliable time information, and must synchronize with external B-code time systems or satellite time-keeping systems. The T220-B PCIe Time-keeping Card is a basic high-precision time-keeping expansion card designed for computer systems. It can be directly inserted into a standard PCIe slot and, using either a receiver or a B-code signal as its time reference, provides time information and timing interrupt signals to the host, thereby achieving synchronization between the computer software time and the card's time reference.

The T220-B PCIe timing card supports B-DC time information input, 1PPS pulse output, and B-DC output; GPS/BD receivers can be optionally configured as needed. The card supports failover between primary and backup reference time sources, allowing automatic or manual selection of the valid reference source; in the event of an external reference source failure, the internal frequency source can still enter a hold state, continuing to provide a continuous time reference for the system. Via the PCIe bus, applications can utilize the card's interfaces to implement periodic interrupts and timing alarm interrupts, making it suitable for applications in scientific research and metrology, communications, power systems, transportation, and industrial automation.



our advantages

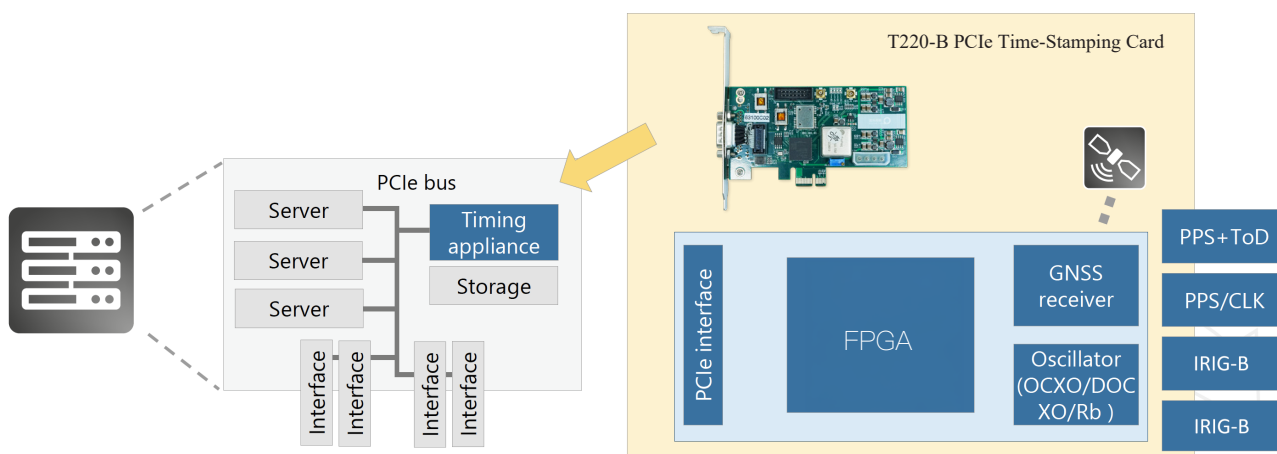
- ✓ **Standard PCIe timing platform**
PCIe X1 half-height mounting bracket, compatible with X 4 / 8 / 16 slots, suitable for computers, industrial PCs, and servers
- ✓ **B Code Time-Synchronization Access**
Supports B-DC time information input, allowing external B-code time systems to serve as the time reference; this feature is ideal for time synchronization extensions of computers already equipped with B-code systems.
- ✓ **GPS/BD receiver optional**
An optional GPS/BD dual-mode receiver is available, supporting L1 and B1 frequency bands, providing users with flexible configurations for satellite time synchronization and B-code time synchronization.
- ✓ **High-reliability primary-to-standby failover**
The reference time source supports automatic or manual switching; in the event of an external reference failure, the system can enter a hold state, thereby enhancing operational reliability.
- ✓ **Open software interfaces**
Supports Windows (32-bit/64-bit) and Linux operating systems, providing drivers, API interfaces, and test utilities to facilitate system integration and secondary development.
- ✓ **Multiple timer interrupt functions**
The API provides multiple software periodic interrupts and timed alarm interrupts, making it suitable for application scenarios such as data acquisition, control scheduling, event triggering, and time marking.

Key Features • Supports B-DC time information input • Supports GPS/BD receiver option • Supports B-DC timestamp output • Supports failover between primary and backup time sources • Supports multiple timer interrupt features • Automatically enter hold mode when no reference is available.	PCIe card form factor • PCIe X1 compatible with X4 / 8 / 16 slots • Supports Gen2, while also supporting Gen1/Gen3 bus speeds • Half-height, half-length configuration, compatible with servers, industrial PCs, and embedded hosts.	B Code Time-synchronization Function • Supports B-DC DC-B code input • The B-code input level is RS422. • Complies with IEEE Std 1344-1995 • Complies with GJB 2991A-2008 • Support using Code B as the time reference • The B-DC output supports ± 1000 ns phase shift.
Synchronization accuracy • GNSS satellite timing accuracy ≤ 30 ns • The B-DC input synchronization accuracy exceeds 100 ns. • 1PPS output precision ≤ 30 ns • Supports ± 1000 ns phase adjustment	Management and Software Interface • Provide drivers, API functions, and test programs • Support for API to read board time • Supports automatic synchronization of computer system time • 4-channel periodic interrupt; 4-channel alarm interrupt • Supports web-based configuration and online firmware updates.	Built-in GNSS and output interface • GPS/BD dual-mode receiver available • Supports L1 and B1 frequency bands • 1PPS outputs one TTL-level signal • B-DC output: 1 RS422 level line

Application in networks

PCIe timing card

- It supports integration with external B-DC DC-B codes as a time reference, and allows optional integration of GPS/BD receivers, making it suitable for field deployment in environments where B-code time systems or satellite time-keeping systems are already in place.
- Via the 1PPS pulse and B-DC output, it provides fundamental time synchronization signals to external terminal devices, acquisition modules, control devices, and time-frequency systems.
- By transmitting timing information and timing interrupt signals to the computer via the PCIe bus, software-based computer timing is synchronized with the hardware card timing.
- Provides drivers, API interfaces, and test utilities, supports periodic interrupts and timed alarm interrupts, facilitating integration with host computer software, control programs, and business systems.



For more information, please visit WWW.BDPNT.COM.
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Should there be any changes to the product specifications, Nu will not provide separate notice.

timekeeping performance

	Clock	Aging / Day 30	Temperature stability
StandardOCXO	Standard punctual type	$\pm 5 \times 10^{-10}$	$\pm 50 \times 10^{-10}$
Ultra-high stability DO-CXO	High-stability environment type	$\pm 5 \times 10^{-11}$	$\pm 1 \times 10^{-11}$
Rubidium atomic clock	Punctual type	$\pm 8 \times 10^{-12}$	$\pm 5 \times 10^{-10}$

* Note: Effective daily aging is conducted one month after the equipment is energized.

	200nsec	400nsec	1.1usec	1.5usec	5usec	10usec	16ppb
StandardOCXO	1 hours	2 hours	4 hours	5 hours	8 hours	1 days	1 month
Ultra-high stability DO-CXO	5.5 hours	8.5hours	15 hours	18 hours	1.4 days	2 days	10 month
Ruthenium atomic clock	12 hours	1days	3days	4days	8days	10days	5 years

* Note: The above values represent typical values (1 σ confidence level) assuming a controlled temperature environment after the device has been powered on and the GNSS72 has been locked for 72 hours. Due to the superior temperature stability of the High-Stability Environment Model, when significant temperature fluctuations occur, the retention rate of the High-Stability Environment Model will exceed that of the rubidium clock.

IRIG-B Input/Output

- Route: Route 1 (DC);
- Interface: RS422;
- Standard: IEEE Std 1344-1995/GJB 2991A-2008;
- Phase shift: ± 1000 (ns);
- Synchronization accuracy: better than 100 ns;
- Connection method: Remo interface.

GNSS receiver (optional)

- Supports single-mode, dual-mode, and multi-mode operation for BDS/GPS (including QZSS), GLONASS, and GALILEO; defaults to dual-mode operation using BDS+GPS.
- Supports BDS B1I+B1C+B2a, GPS/QZSS L1+L5, GLO L1, and GAL E1+E5 frequency bands.
- Supports AGNSS-assisted positioning
- Features interference detection and alert functionality.
- Positioning accuracy: horizontal <2 m; vertical <3 m; Cold start: 30s; Hot start: 2s; Re-capture: 1s
Timekeeping accuracy: <20 ns

1PPS output

- Route: Route 1
- electrical level:TTL
- Connection type: RJ45

cycle interrupt

- Number of channels: 4, independently configurable
- Period: 100 μ s – 10,000s
- Step: 1 μ s

Scheduled alarm interruption

- Number of channels: 4 channels, independently configurable;
- Sampling rate: 1 μ s.

Physical and environmental parameters

- Power supply: Powered via PCIe slot;
- Humidity: 95%, no condensation;
- Dimensions: PCIe $\times$ 1 half-height mounting bracket; compatible with computers.
- Industrial PCs, servers;
- Operating temperature: -40 $^{\circ}$ C to +60 $^{\circ}$ C;
- Storage temperature: -40 $^{\circ}$ C to +80 $^{\circ}$ C.