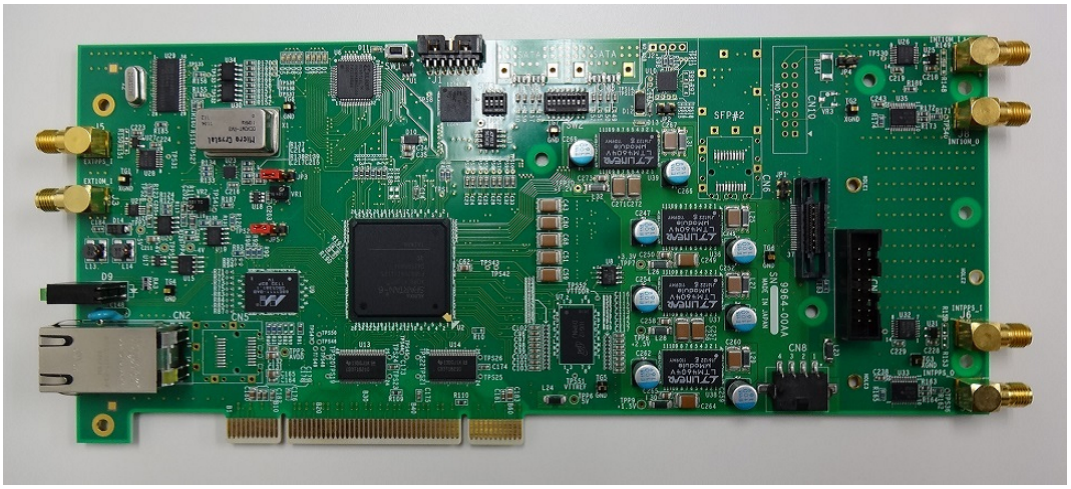
# EB9964

**— High Performance Hardware NTP Server—**

**E3 Design, Inc.**



# Introduction

With the spread of PCs, smart-phones and mobile devices, demand for accurate time information is rapidly increasing. A Network Time Protocol (NTP) is commonly used to transfer accurate time from the time source to devices. EB9964, a high-precision and high-throughput hardware NTP server was developed for this purpose. It was designed as PCI add-on card suit for EW9955A/AR (GPS common-view network time server).



# Features

- IPv4 and IPv6 unicast NTP server request and response
- 8ns time stamp accuracy - Low jitter see fig-1 below
- 1Gbps wire-speed throughput - Upto 1 million requests per seconds
- Intrusion tolerant - all requests are processed by hardware which is built in a FPGA[1]
- Access rate limitation - suppress vast requests in short time using the hash table of source IP addresses
- Built-in self check/supervisor function - Stops NTP function safely on error

The measured results in comparison an ordinary ntpd with the hardware server are shown below [2].

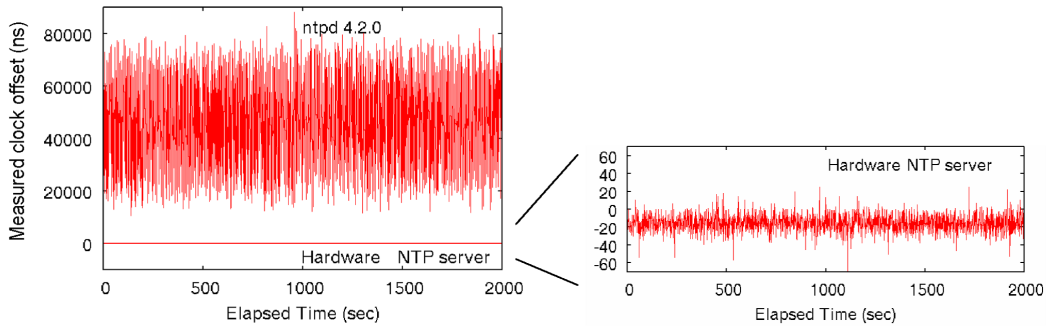



図 1: Software ntpd vs EB9964 Hardware NTP comarison

[1] Field Programmable Gate Array
[2] http://www2.nict.go.jp/aeri/sts/tsp/publication/PDF/f-poster2-ptb-bipm.pdf

**EB9964 specification**

| Section | Parameter | Description |
|---|---|---|
| **NTP server function** | | |
| | Engine | Xilinx Spartan-6 FPGA |
| | NTP version | ver1,2,3,4 (RFC-5906) |
| | Performance | 1,000,000 requests/s (1Gbps wire-rate) |
| | Port | RJ45/1000Base-T |
| **On-board OCXO time source** | | |
| | Short term stability | $5 \times 10^{-11}/sec(Typical)$ |
| | Long term aging | $\pm 0.7ppm$(1st year)、 $\pm 4.0ppm$(10years) |
| | Warm-up time | 60sec |
| | Phase noise | $-100dBc/Hz$ at $10Hz$, $-130dBc/Hz$ at $100Hz$, $-140dBc/Hz$ at $1kHz$ |
| **Input/Output** | | |
| | 1PPS IN | SMA × 1 / 5V-TTL, 50Ω (50Ω with/without termination) |
| | 10MHz IN | SMA × 1 / 5V-TTL, 50Ω |
| **Power** | | |
| | Power supply | 5.0V/2A |
| **Operating environmental** | | |
| | Temperature | $+10..+40$ °C |
| | Humidity | 10%..80% |
| **Physical** | | |
| | Size | $107mm(H) \times 240mm(W)$ PCI form factor |
| | Weight | $250g$ |

図 2: EW9955A/AR with EB9964 rear view

図 3: EW9955A/AR with EB9964 top view

# Contuct Information

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