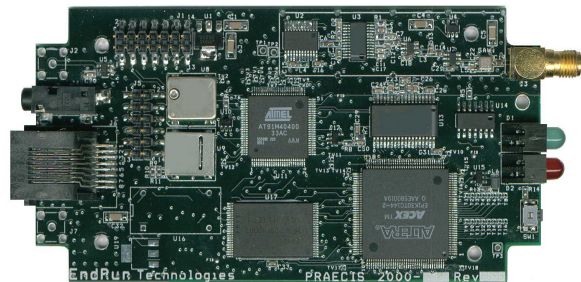


# Præcis Ce

## OEM Time & Frequency Engine

The Præcis Ce is a core engine that can be easily integrated with any host system that requires precision UTC time and frequency. Præcis Ce harnesses the reliability and accuracy of the GPS satellites via the CDMA cellular mobile telecommunications network used by many digital cellular telephones. For time and frequency applications, the CDMA base stations act as GPS repeaters, boosting the signal level and making indoor reception possible. No costly rooftop antenna installation is required and Præcis Ce can be used where installing a GPS antenna is a problem or satellite visibility is poor.



### **CDMA Time and Frequency**

Præcis Ce uses the existing CDMA wireless infrastructure to precisely synchronize itself to UTC. In order for the CDMA mobile telecommunications system to operate properly, the system time must be reliably and accurately maintained to within 10 microseconds of UTC. Præcis Ce precisely aligns its 1PPS and phase locks its optional 10 MHz oscillator to the PseudoNoise (PN) spreading code waveform that modulates the CDMA base station carrier transmissions.

Since the base stations are stationary and transmission distances typically are short, Præcis Ce does not need to know its position to establish UTC time to the 10-microsecond level of accuracy and to provide a frequency output that matches that of UTC to less than  $10^{-11}$ . There is no lengthy site survey required and transmissions from a single base station are all that is needed. Præcis Ce is up and running quickly and can be relocated without concern.

### **Reliability**

Præcis Ce is not susceptible to rooftop antenna failures caused by maintenance activities or rain, wind, snow, hot sun or lightning. In most locations there are several base stations that Præcis Ce can use. In the event that one station should go down, Præcis Ce will automatically switch to another.

### **Simple Installation**

Since CDMA signals at cellular frequencies can be received inside buildings, the Præcis Ce saves on installation, labor and leasing costs inherent with traditional GPS timing systems. No costly rooftop antenna, window-mount antenna, or cable installation is required. The unit's small size, coupled with an easily integrated antenna, allow the host system to be installed virtually anywhere that is convenient for the application. In deeply embedded applications, where the host system itself is mounted inside a closed metallic cabinet, a magnetic-mount antenna with 12-foot cable is available to allow convenient mounting to the cabinet exterior.

### **Features**

Præcis Ce provides a complete suite of time and frequency functionality. In addition to sourcing precision 1 PPS timing and optional 10 MPPS frequency signals, the Ce also provides an event timetagging input which may be captured with 30 ns resolution. The format of the ASCII time-of-day output string emulates several industry standard formats.

### **Low Cost**

Præcis Ce can satisfy your OEM time and frequency needs for less than the cost of a traditional GPS system. When you compare the unit price plus the installation savings, the advantages of the CDMA solution are clear.

**EndRun  
TECHNOLOGIES**

*"Smarter Timing Solutions"*

1360 N. Dutton Ave. Suite 200, Santa Rosa, CA 95401

TEL 1-877-749-3878 FAX (707) 573-8619

[www.endruntechnologies.com](http://www.endruntechnologies.com)

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# Præcis Ce

## Specifications

### Receiver:

AMPS Mobile Receive Band – 869-894 MHz  
TIA/EIA IS-95 CDMA Pilot and Sync channels

### Antenna:

SMA bulkhead jack, J3.  $Z_{in} = 50 \Omega$ . Ant Options:  
824-896 MHz  $\frac{1}{4}$  wave helical.  
Remote magnetic mount antenna/cable assembly.

**Local Oscillator:** Optional TCXO or OCXO  
**Time to Lock:** < 5 minutes, typical

### 1 PPS Timing Characteristics:

- **Accuracy:** < 10 microseconds to UTC typical when locked. Fringe area reception may degrade the absolute timing accuracy due to increased propagation delay.
- **Stability:** TDEV < 50 ns, for  $\tau < 10^4$  seconds

### 10 MPPS Frequency Characteristics (option):

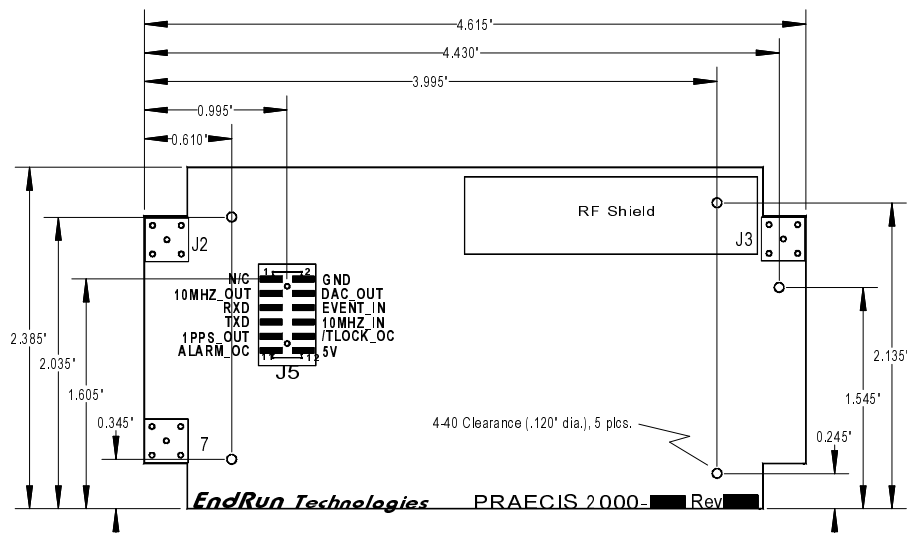
- **Accuracy:** <  $10^{-11}$  to UTC for 24-hour averaging times when locked
- **Stability:**  $\sigma_y(\tau) < 10^{-9}$  for  $\tau < 10^2$  seconds,  $\sigma_y(\tau) < 10^{-7}/\tau$  for  $\tau > 10^2$  seconds

### I/O Signals (on 12 pin dual row header):

- **1PPS\_OUT:** pulsewidth sel., TTL levels @ 50  $\Omega$
- **10MPPS\_OUT:** squarewave, TTL levels @ 50  $\Omega$
- **EVENT\_IN:** TTL levels,  $Z_{in} > 1M\Omega$ . Event capture resolution is 30 ns
- **DAC\_OUT:** 0 to 3.3VDC,  $Z_{out} = 110 \Omega$
- **10MHZ\_IN:** 1 to 3 VAC<sub>p-p</sub>,  $Z_{in} > 1M\Omega$
- **/TLOCK\_OC:** Open Collector Time Lock status
- **ALARM\_OC:** Open Collector Alarm status
- **5V:** Power input, 5V +/- .5V @ 400 mA
- **Serial I/O:** RXD, TXD at TTL Levels. 9600 to 57600 baud; 7 or 8 data bits; odd, even or no parity; 1 or 2 stop bits.
- **Time-of-Day:** ASCII string via Serial I/O port. Seconds through years in GPS, UTC or Local Time.

### Environmental:

- **Temperature:** 0° to +70° C
- **Humidity:** 0 to 95%, non-condensing



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