



# TimeSource 2700

## Stratum 1 PRS for the Network Edge

### KEY FEATURES

- Network PRS GR2830 MTIE and TDEV Compliance
- Superior Performance in Network Edge Environments
- Extends Precision Timing to New Locations, Even Inside Buildings
- Turnkey Solution for Internet Service Providers, Competitive Local Exchange Carriers, Wireless Local Loop, and Wireless Base Stations
- Innovative BesTime Ensembling and Extended Holdover
- Sync Status Messaging
- Built-in Performance Monitoring
- Economical Alternative to Cesium and GPS PRS Systems

### INTRODUCTION

Symmetricom's TimeSource™ 2700 is a stand alone Stratum 1 Primary Reference Source (PRS) which works by using CDMA reference signals. TimeSource 2700 meets Bellcore GR2830 network PRS performance requirements using a CDMA cellular antenna mounted on the shelf installed within a building.

The type of facilities available at the network edge typically don't include easy access to the roof or a view of the sky, as required for GPS-based synchronization systems. CDMA signals, traceable to GPS, provide the needed Stratum 1 reference.

Timing outputs with Stratum 1 performance are achieved using advanced BesTime™ technology. BesTime is a flexible clock engine which can use all commonly available sources of timing including CDMA, GPS and T1 signals. BesTime continues to predict CDMA timing information during the loss of CDMA signals thereby guaranteeing Stratum 1 performance for up to 72 hours during long term CDMA outages. TimeSource 2700 can be installed anywhere a CDMA signal can be received without the need for antenna cabling, making it an inexpensive alternative to cesium and GPS PRS systems.

### FUNCTIONAL DESCRIPTION

TimeSource 2700 is a fourth generation clock that incorporates unique direct digital synthesis (DDS) and BesTime ensembling to produce precise frequency outputs.

Through its patented multiple input frequency locked loop approach, the TimeSource 2700 BesTime system continuously evaluates frequency performance derived from its

inputs and seamlessly switches to the most stable and least noisy ones. Prediction software continues to drive control loops during input outages. The result is undisturbed Stratum 1 synchronization for up to 72 hours upon complete loss of CDMA signals.

CDMA is one of the most widely-used digital wireless services in the United States. Most metropolitan areas are served by at least one wireless carrier using CDMA. By its nature, CDMA is a source of very precise time and frequency references. Each CDMA base station is equipped with a GPS-based timing system.

System configuration, alarms and diagnostic capabilities are provided through the BTMON (BesTime monitoring) Windows 95/98/NT compatible craft software provided with each system. The TimeSource 2700 ensures PRS performance is maintained through self-auditing the inputs and measuring and reporting performance against one another. MTIE and TDEV statistics are also provided. Inputs are easily provisioned for use in the ensemble output or for monitoring purposes only.



TimeSource 2700

## TimeSource 2700 Specifications

### GENERAL

- Timing performance: Network PRS GR2830 MTIE and TDEV compliant
- Power: Redundant -48 VDC
- Comm port: RS-232 (2)
- Management: BTMON Windows 95/98/NT compatible craft interface
- Status LEDs: Major and minor alarm, status, holdover
- Alarms: Major, minor relay contact closure
- Mechanical: 3"(H) x 15"(W) x 10"(D)

### SYSTEM INPUTS

- CDMA PCS 1900 MHz signal
- 1-2 T1 (optional)
- 1-2 5 MHz remote oscillator (optional)

### SYSTEM OUTPUTS

- Two T1s (D4 or ESF with sync status messaging)
- 10 MHz
- 1 PPS

### T1 OUTPUT PERFORMANCE

- Locked to CDMA reference:  $1 \times 10^{-12}$
- Holdover<sup>1</sup>:  $1 \times 10^{-11}$  for 72 hours (0° C to 50° C  $\pm 5^\circ$  C)

### 1PPS OUTPUT PERFORMANCE

- <500 ns to GPS

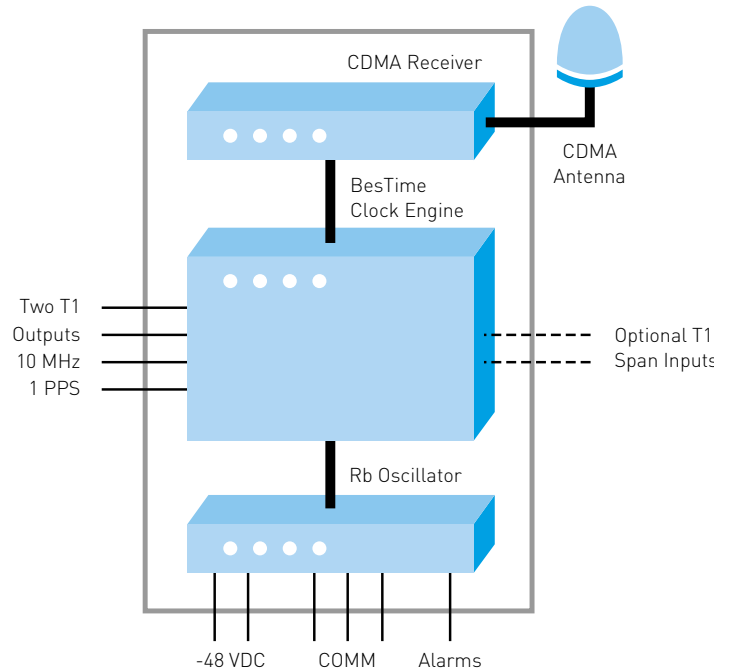
### 10 MHZ OUTPUT SPECIFICATION

- Amplitude: 13  $\pm$ 2 dBm
- Port impedance: 50 $\Omega$
- Harmonic spurious: <-70 dBc

### ENVIRONMENT

- Operating temperature: 0° C to 50° C
- Storage temperature: -50° C to +100° C
- Humidity: 5% to 95% non-condensing

<sup>1</sup>Performance meets  $1 \times 10^{-10}$  under certain CDMA frequency drift conditions



TimeSource 2700 Block Diagram



**SYMMETRICOM, INC.**  
 2300 Orchard Parkway  
 San Jose, California  
 95131-1017  
 tel: 408.433.0910  
 fax: 408.428.7896  
 info@symmetricom.com  
 www.symmetricom.com