

# TimeCesium 4400

## Cesium Primary Reference Source



### Key Features

- State-of-the-art Cesium III beam tube technology
- Autonomous Stratum 1 primary reference source
- No antenna installation required
- Front-access ETSI shelf
- DS1, E1, 2048 kHz G.703/13, 10 MHz, 5 MHz, 1.544 MHz, and composite clock outputs

### Key Benefits

- Maintenance-free (8-year warranty on Cesium tube)
- Plug & play; less than 45 minutes of installation
- Flattens the sync distribution hierarchy
- Lowers the overall operation, administration, maintenance, and provisioning (OAMP) costs
- Enhances network performance and provides total control of your network synchronization source
- Prevents upstream clock errors from propagating across the network

The TimeCesium® 4400 is an autonomous Primary Reference Source based on the latest Cesium III technology from Symmetricom®. It is designed for telecom network operators to generate superior and highly reliable Stratum 1 synchronization signals for advanced network services.

### Plug & Play in Less Than 45 Minutes

The TimeCesium 4400's architecture uses the latest digital technology to provide superior performance and maintenance-free operation. The TimeCesium 4400 is easy to install and is fully operational in less than 45 minutes. Its plug & play architecture provides highly reliable operation over the lifetime of the system.

### Network Applications

The TimeCesium 4400 is used to equip core network offices with Stratum 1 synchronization.

The deployment of TimeCesium 4400 sources across the network provides the following benefits:

- Flattens the sync distribution hierarchy
- Lowers the overall OAM&P (Operation, Administration, Maintenance & Provisioning) costs
- Reduces the number of network recovery clocks (TSG/SSU) operating in tandem
- Minimizes pointer adjustments caused by "frequency errors" in the SONET/SDH payload
- Prevents up-stream network clock errors to propagate across the network
- Enhances overall network performance
- Provides total control of your network synchronization source

### Standards Compliance

The TimeCesium 4400 meets industry standards, including ITU-T, ETSI, ANSI, Telcordia, NEBS, and RoHS 5/6 compliant. This includes the requirements contained in the new ITU-T G.811.1 ePRC standard.

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### Specifications

#### Performance

- Accuracy (over environment):  $\leq \pm 1 \times 10^{-12}$

#### Stability

- Average time

1 s	$1.2 \times 10^{-11}$
10 s	$8.5 \times 10^{-12}$
100 s	$2.7 \times 10^{-12}$
1,000 s	$8.5 \times 10^{-13}$
10,000 s	$2.7 \times 10^{-13}$
- Warm-up time (typical): 30 minutes

#### Outputs

- Telecom signals: Two framed or unframed
- Framed (AMI)
  - 1544 kbps: ANSI T1.102 DS1 selectable framing: SF(D4) or ESF, with Stratum 1 Sync Status Message (SSM)
  - Format: Framed all ones, B8ZS
  - 2048 kbps: ITU-T Rec.G.703/9 (E1) with G.704 framing and with Stratum 1 Sync Status Message (SSM)
  - Format: Framed all ones, HDB3
- Unframed
  - 1544 kHz G.703/13
  - 2048 kHz G.703/13
  - Composite clock G.703/4
- Connectors
  - DB9 for balanced signal
  - CC, 133  $\Omega$
  - T1, 100  $\Omega$
  - E1, 120  $\Omega$
  - BNC for unbalanced signals, 75  $\Omega$
- Sinusoidal signals
  - 1 at 5 MHz, 10 MHz
  - 0.5 V<sub>RMS</sub>/50  $\Omega$ , BNC

#### General

- Power requirements: Dual redundant DC inputs
- Operating voltage: -48 V<sub>DC</sub> nominal (-36 V<sub>DC</sub> to -62 V<sub>DC</sub>)
- Power
  - Operating: 40 W
  - Warm-up: 55 W
- Interface connections
  - External DC inputs, A and B: #6 screw terminal block
  - RS232: 9-pin male D-connector
  - Chassis ground, A and B: #6 screw terminal block
  - Alarm (critical and minor): #6 screw terminal block
- Fuses: External DC input 2 A, 250 V, slow acting
- Dimensions
  - Width: 18.2" (46.2 cm)
  - Depth: 10.2" (25.7 cm)
  - Height: 10.5" (26.67 cm)
  - Weight: 36.5 lb (16.6 kg)
  - Mounting: Mounting ears provided for 19" (48 cm) or 23" (58 cm) racks

#### Environment

- Temperature
  - Operating: 0 °C to 50 °C
  - Non-operating: -40 °C to 75 °C
- Humidity: 95%, non-condensing



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