TimeMAX

Precision Frequency and Timing Subsystem

KEY FEATURES

- Provides 10 MHz & 1PPS
- Synchronized to GPS
- Available in Three Different Variations (with Varying Holdover and Phase Noise Specifications)
- Runs on 12 VDC Power Supply

APPLICATIONS

- WiMAX Mobile Base Station Timing
- Broadcast (DVB/DVB-H, DAB, and DTV)
- Cellular Base Station (CDMA, TDMA, and UMTS)
- Fixed Wireless (MMDS, LMDS, and Wireless Local Loop)
- Asset Location, E911

TimeMAX™ is a flexible GPS-disciplined time and frequency reference platform.

With its compact size, simple interface, and outstanding holdover performance, the TimeMAX offers breakthrough price-performance in an adaptable, high-performance system.

The TimeMAX synchronization platform enables rapid development of timing subsystems for OEM applications in base stations, transmission stations and similar equipment. This cost-effective system was designed for easy integration into existing communications and network equipment.

TimeMAX is optimized to support high levels of Quality of Service (QoS) and handoff performance in WiMAX and other multiple latency- and jitter-sensitive applications, such as voice, real time video and gaming.

WiMAX requires both frequency and time synchronization. Mobile WiMAX was specified to handle frequency re-use and full Quality of Service handoffs between base stations. GPS is the current recommended source for synchronization for WiMAX base stations. These applications and other advanced services are driving the need for end-to-end network synchronization, pushing precise timing and frequency into areas throughout the network. The TimeMAX platform provides different oscillator choices at different price-performance levels to support all of these requirements.
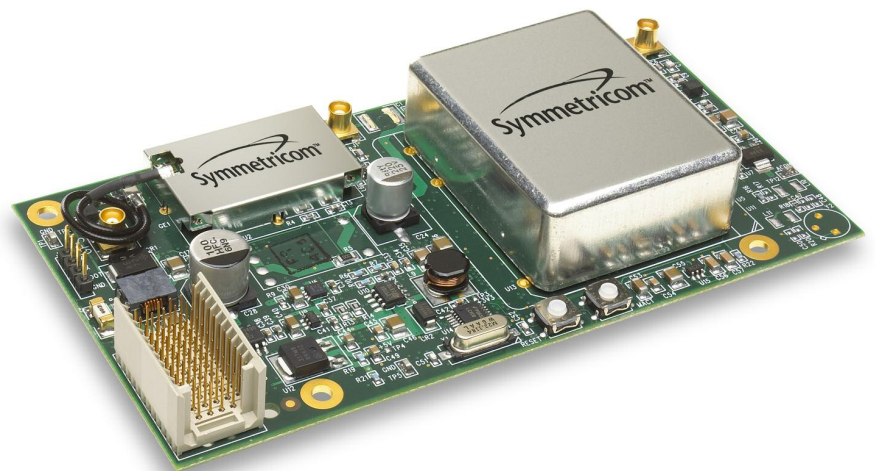
TimeMAX 400

WiMAX Network Architecture

BS: WiMAX Base Station
ACR: Access Control Router
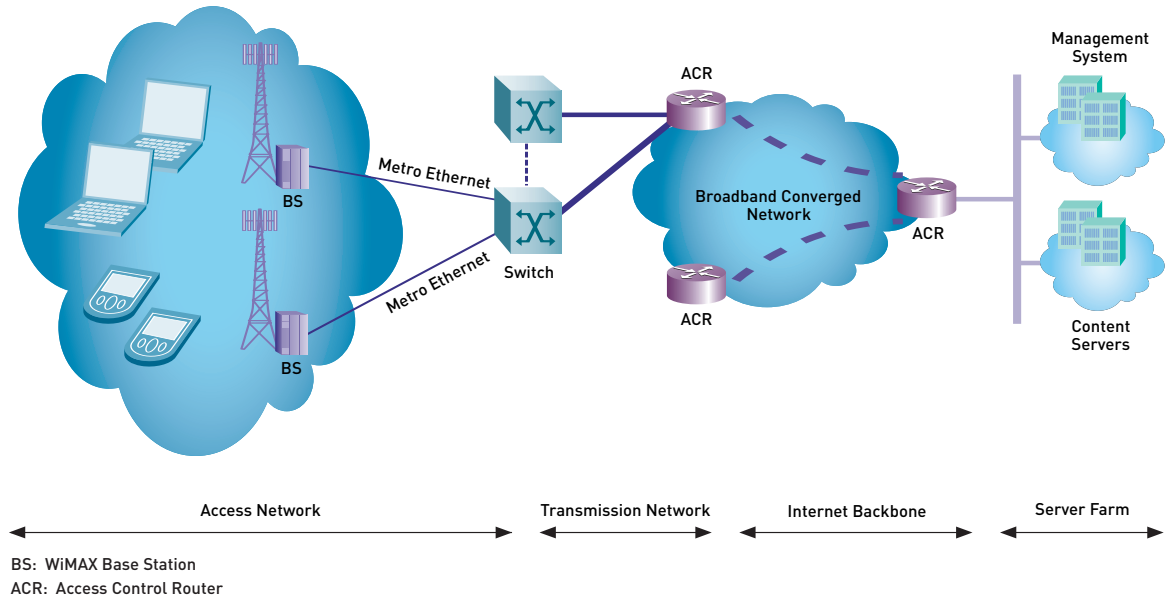
WiMAX Network Architecture

TimeMAX Specifications

ELECTRICAL SPECIFICATIONS

- Inputs:
  L1 GPS (1575.42 MHz) C/A code (MCX)
  +5V @ 80 ma for antenna current;
  12 VDC (55-pin connector);
  12W Max 7.5W Steady State

- Outputs:
  1PPS TTL @ 50W (MCX)
  1PPS LVDS (55-pin connector);
  10 MHz Sine @ 50Ω, 7 dBm ±2 (MCX)
  10 MHz LVDS (55-pin connector);
  Serial Port RS232 (4 pin header)
  Serial Port RS422 (55-pin connector)
  Lock Indicator Signal (LVTTL)

- Timing accuracy:
  ≤20 nsec RMS between units over any 20
  minute interval (under limited temperature
  variations); Programmable offset from GPS
  in 1 nsec steps

- Frequency accuracy:
  <1E-12 (24 hour average);
  <2E-10 (Instantaneous)

- Phase noise (Analog, TimeMAX 400):
  -125 dBc/Hz max. at 100 Hz offset
  -145 dBc/Hz max. at 1 kHz offset
  -145 dBc/Hz max. at 10 kHz offset
  -145 dBc/Hz max. at 100 kHz offset

- Phase noise (Analog, TimeMAX 400LN &
  TimeMAX 100LN):
  -82 dBc/Hz max. at 1 Hz offset
  -120 dBc/Hz max. at 10 Hz offset
  -140 dBc/Hz max. at 100 Hz offset
  -145 dBc/Hz max. at 1 kHz offset
  -150 dBc/Hz max. at 10 kHz offset
  -150 dBc/Hz max. at 100 kHz offset

- Phase noise (LVDS):
  -120 dBc/Hz from 100 Hz to 100kHz

- Holdover (TimeMAX 400 & 400LN)[1]:
  <8 micro sec over 24 hours with
  50°C temperature change (typical)

- Holdover (TimeMAX 100LN):
  <1 micro sec over 2 hours,
  1°C temperature change (typical);

- Spurious (TimeMAX 400):
  Non-Harmonic: <-70 dBc (up to 5MHz offset)

- Spurious (TimeMAX 100LN &
  TimeMAX 400LN):
  Non-Harmonic: <-80 dBc

- Communication protocol:
  SCPI: Standard Command for Programmable
  Instrumentation and NMEA-0183: National
  Marine Electronics Association
  (RS-232 or RS422 Levels)

ENVIRONMENTAL SPECIFICATIONS

- Operating temperature: -10°C to +70°C
- Storage temperature: -40°C to +85°C
- Operating altitude: -200 ft to 40,000 ft (12,200 meters)
- Operating humidity: ≤90%, Non-condensing

PHYSICAL SPECIFICATIONS

- Board size: 135mm L X 70mm W X 23mm H
- Antenna input: MCX
- 1PPS TTL output: MCX
- 10MHz TTL output: MCX
- Motherboard connector: 55-pin 2mm Hard Metric

[1]Holdover refers to operation without GPS signals after an initial period of 48
hours of proper GPS reception.

Maximum operating temperature rated above 5,000 feet (1,525 meter)