

# TSC UTCG

Multiplexes Frequencies, Time Codes, and Pulses on One Optical Fiber

## KEY BENEFITS

- Transmits a Digital Signal Containing Both Time and Frequency Information
- Auto-detects the 5-, 10-, or 100-MHz Input Reference
- Simple User Interface Enables Easy Configuration and Monitoring
- Redundant Power Supplies Can Be Hotswapped to Maintain Continuous Operation
- Holdover Capability in Case of Loss of Input Reference
- A Single UTCG Supports at Least 400 Remote Users

The Universal Time & Frequency System (UTFS) from Symmetricom is designed to achieve precise time and frequency signal distribution and synchronization via optical fiber to local areas as well as to widely dispersed locations. At the front end of the UTFS is the Universal Time Code Generator (UTCG), a state-of-the-art multiplexer that receives multiple inputs, including a frequency reference (required), 1PPS Sync signal (optional), and IRIG-B time code (optional). In turn, the UTCG simultaneously outputs all timing, RF, and time code on a single fiber to one or more Time Code Translators (TCTs) at remote locations.

## HIGH-QUALITY SIGNALS

Because fiberoptic cable carries the time code to the TCT, the signal is of extremely high quality. There are no ground loops, crosstalk, or attenuation. No matter how many or what type of timing signals are

needed at a remote location, only a single fiber pair is ever required. One fiber carries all timing signals to the TCT and the other optional fiber returns status information to the UTCG.

An optional Ethernet connection enables remote monitoring of system status and configuration. Electrical and visual alarm outputs are also available to allow continuous status monitoring.

In addition, the UTCG has the ability to compare its internal time to an external 1PPS signal. When this feature is enabled and the two signals are offset by more than 20 ns, the system automatically triggers an alarm. The UTCG is housed in a 4U 19-inch rack-mount modular chassis. The system includes dual redundant power supplies that can be hot-swapped to keep the system running if one fails.



TSC UTCG Universal Time Code Generator

## OPERATION

The UTCG synchronizes its internal time to an external reference. The internal 100-MHz time base phase locks to a 5-, 10-, or 100-MHz reference input connected to the unit. If a 1PPS is also connected, it is used to define the start of second. IRIG-B time code can be utilized to set the internal epoch. Alternatively, the user can set the time from the front-panel interface.

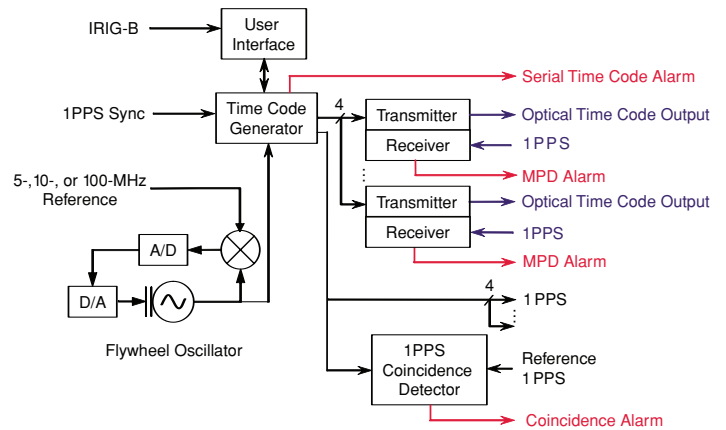
After initialization, the UTCG starts to produce a 100-Mb/s serial time code. The unique feature of the UTCG is that the serial time code carries the start of second, the identification of the second, and the reference frequency, all in a single signal. This information is decoded at the receiver and used to produce the output signals. Once the fiberoptic output is enabled, the serial time code is modulated onto either a single-mode laser or a light emitting diode and transmitted via the appropriate optical fiber to the receiver.

The UTCG front panel allows the user to monitor and control operation of the unit. The time can be slewed relative to the initial time in increments of 10 ns. In addition, leap seconds can be programmed to occur according to their schedule. Front panel LEDs and optically isolated contact closures announce alarms for failure of a downstream device, loss of phase lock, clock slip relative to an external 1PPS, approaching the end of the VCXO control range, and power supply failure. An Ethernet port for control and monitoring is an optional feature. All modules, including the redundant power supplies, are hot-swappable.

## TSC UTCG Specifications

### GENERAL SPECIFICATIONS

- Frequency Reference Input (required)
  - Frequency: 5, 10, or 100 MHz
  - Holdover: Maximum shift  $3.5 \times 10^{-9}$  on loss of input signal
  - Long term drift:  $\pm 3.7 \times 10^{-7}$  over 24 hours
  - Impedance:  $50 \pm 5W$
- Time code input: IRIG-B 123
- Synchronization input: 1PPS TTL
- Fiberoptic output (to TCT Module)
  - Quantity: Four
  - Output connector: LC
  - Optical fiber
    - Multi-mode: up to 2km
    - Single-mode: up to 30km
- Temperature range: 0-50 C (operating)
- Humidity: 0-90% non-condensing (operating)
- Settability: 5ns
- Input power (Redundant power supply standard)
  - Voltage range: 90-240 V-
  - Frequency: 45-65 Hz
  - Current (max): 0.20 A (90 V)
- Alarm output
  - Quantity: Two
  - Connector: SMA female
  - Type: Opto-isolated switch
- Physical
  - Size: 19-inch EIA rack-mount chassis, 4U high x 9" (22.9 cm) deep
  - Weight: <30 lb
- Control and status port (optional)
  - Physical layer: 10/100 Ethernet
  - Protocol: TCP/IP
  - Connector: RJ-45



TSC UTCG Block Diagram



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