



MODEL 3650 GPS SYNCHRONIZED TIME CODE GENERATOR

The Model 3650 GPS Synchronized Time Code Generator provides the user with the normal selection of generator outputs; time codes, pulse rates, sine waves, parallel data and computer compatible outputs such as IEEE 488 and RS232C. Its main feature, however is that it automatically synchronizes to universal time via the Navstar Global Positioning System (GPS).

The Model 3650 houses a GPS Receiver and is furnished with an antenna and interconnecting cable. The unit operates on the Civilian L Band, C/A code transmitted by the Navstar Satellites. While the Model 3650 is designed primarily for timing applications, and requires only one satellite to be in view to perform this function, it will also provide precise position information. Four satellites in view are required to determine the precise location of the receiver.

With a satellite in view, the Model 3650 correlates to Coordinated Universal Time (UTC) to better than 100 nanoseconds. During this period it also disciplines its internal oscillator so as to achieve optimum correlation with UTC during those periods when satellite transmissions are not available.

Programming of the unit is accomplished through its front panel keypad. An associated alphanumeric LCD display indicates such functions as programmed data, calculated position and satellite health. A second display, comprised of high intensity LED's, continuously indicates time of year information.

The Model 3650 is available in both desktop and rack mounting configurations.

SPECIFICATIONS

Frequency Standard

The Model 3650 accumulates time from an internal oven controlled crystal oscillator. When satellites are in view, this oscillator is disciplined to keep it in phase and frequency correlation to UTC.

Specifications for the oscillator in a free running, undisciplined form are:

Stability: $\pm 1 \times 10^{-9}$ from 0 to +50 °C
Aging Rate: 1×10^{-10} per day

Synchronization

When at least one satellite is in view the Model 3650 synchronizes to Universal Time in both real time and frequency. During these periods of GPS signal availability, the unit also disciplines its internal oscillator. The result is better than 100 nanosecond correlation to UTC with satellite signals present and better than 5 microsecond correlation during periods of signal absence.

Once the antenna is installed and the unit turned on no further operator interaction with the Model 3650 is required. Synchronization is automatic.

Outputs

The basic Model 3650 provides the following outputs:

IRIG B Serial Time Code

Amplitude: Adjustable from 0 to 6 volts peak to peak
Modulation Ratio: Adjustable from 2:1 to 6:1
Maximum External Load: 50 ohms

1PPS Pulse Rate

A 1PPS pulse rate, synchronous with UTC, is provided at a rear panel BNC connector.

On Time Point: Positive going edge
Duty Cycle: 80 percent
Amplitude: Positive going pulses from a maximum 0.4 volt baseline to +4.5 volts, minimum
Rise and Fall Times: 15 nanoseconds
Drive Capability: 10 LSTTL unit loads

Optional Outputs

Other available outputs and control inputs are listed below. Detailed specifications for these options are available upon request.

Parallel BCD (tenths of milliseconds through days)
Parallel Binary (several ranges and resolutions available)
Computer Interfaces
IEEE 488 In/Out
RS232C In/Out
Pulse Rates
Sine Waves
Modem Rates
Other Time Codes: IRIG A, E, G, H
NASA 36 Bit
XR3/2137

Display

Generated time is continuously displayed by nine front panel mounted LED's with 1.0 inch character height.

Programmable Functions

The following functions are programmable or readable via a front panel keyboard in conjunction with a 16 digit alphanumeric LCD display.

Set Cable Delay
Set Elevation Angle Mask
Set GMT Offset
Set Network Parameters
Read GPS/UTC Difference
Read Oscillator Control Status
Read Position
Read Receiver Status
Read Satellite Status

Power Requirements

The Model 3650 operates from a primary power source of 115 volts AC $\pm 10\%$, 50 to 70 Hz and consumes less than 30 watts of power. In the event of primary power failure, internal batteries maintain keyboard programmed functions and GPS Receiver acquired information for over one year.

Environmental Characteristics

	<u>Chassis</u>	<u>Antenna</u>
Temperature:	Operating: 0°C to +50°C Storage: -40°C to +100°C	-20°C to +95°C -40°C to +100°C
Humidity:	0 to 95%, Without condensation	0 to 100%, Without condensation

Physical Characteristics

The Model 3650 is designed for either desk (bench) top or rack mounting.

In its desktop configuration the Model 3650 has the following dimensions:

Height: 1.75 or 3.5 inches (4.4 or 8.9 cm)
Width: Chassis: 17 inches (43.2 cm)
Depth: 12.5 inches (31.8 cm), not including rear panel connectors
Weight: 10 pounds, (4.5 kg), nominal

Ears can be added to the desktop chassis to make it rack mountable. Or, for units requiring extensive option capacity, an extended rack mount chassis can be furnished, with the following dimensions:

Height: 1.75, 3.5 or 5.25 inches (4.4, 8.9 or 13.3 cm)
Width: Chassis: 17 inches (43.2 cm)
Front Panel: 19 inches (48.3 cm)
Depth: 19.5 inches (49.5 cm), not including rear panel connectors
Weight: 20 pounds (9.1 kg), nominal

To assist in equipment maintenance all integrated circuits are mounted in sockets.

Documentation

Each unit is delivered with an operation and maintenance manual which includes a complete description of the unit's theory of operation along with all assembly and schematic drawings.