



# 12 MHz Synthesized Function Generator

- 10 mHz to 12 MHz Function Generator  $\pm 0.005\%$  Accuracy
- TTL, ECL Out to 32 MHz  $\pm 0.005\%$  Accuracy
- Trigger, Gate, AM, FM, SCM
- 4 $\frac{1}{4}$  Digit Display
- Optionally Programmable via GPIB or RS232

## Wide Frequency Range

Model 23 Function Generator operates from 0.01 Hz to 12 MHz in synthesized, continuous, triggered and gated modes with output levels of 10 mV to 20 Volts peak-to-peak. Frequencies as low as 100  $\mu$ Hz are obtainable in the VCG mode. The synthesizer circuit extends frequency range at the ECL and TTL outputs to 32 MHz. In addition, the synthesized mode has 4 digits of frequency resolution with 0.005% (50 ppm) accuracy.

## FM, AM and SCM

Inputs are provided for external frequency and amplitude modulation. Suppressed carrier modulation (SCM) is also obtainable by programming zero amplitude. Carrier suppression is initially at least 40 dB, and may be improved to typically 70 dB (to 1 MHz) by using the NULL control.

## Low-Frequency Waveform Synthesis

Waveforms below 1 kHz are synthesized digitally to extend the frequency range down to 0.01 Hz while maintaining high speed phase locking in the frequency synthesized mode. The waveform synthesizer also provides the additional features of up and down ramps and triggered and gated haverswaves.

## Friendly Controls

Parameters are selected by front panel keys, and the numeric values are incremented or decremented with the rotary encoder knob. All parameters are displayed on a 16-character by 2 line LCD display. Microprocessor control makes possible frequency and amplitude units conversion, internal calibration and test procedures, and optional remote programming.

## Non-Volatile Memory

Instrument set up parameters are stored in memory for return to exact set-up after power down. Memory is maintained with a long-life lithium battery.

## VERSATILITY

**Waveforms:** Sine, triangle, square and DC; additionally, below 1000 Hz, ramp up and ramp down, and, in triggered or gated modes, haverswaves.

**Operational Modes:** Continuous, Triggered, Gated, Continuous Synthesized and Clock.

**Frequency Range:** 0.01 Hz to 12 MHz at Function Output, 0.01 Hz to 32 MHz at TTL and ECL outputs. Down to 100  $\mu$ Hz with VCG.

**Frequency Control:** Programmed value or VCG. **Value:** Frequency value is manually or bus programmable with automatic range selection.

**VCG (Voltage Controlled Generator):** AC or DC input controls frequency. Input disabled in synthesized mode. 0 to  $\pm 12$ V into 10 k $\Omega$  for up to 1200:1 frequency change in each of 9 frequency ranges (ranges must be programmed). Slew rate is limited to 0.1 V/ $\mu$ s.

**Frequency Zero:** In non-synthesized modes, front panel key or bus command sets frequency to bottom of current range for 1000:1, VCG change (1200:1 for 12 MHz range).

**Amplitude Range:** 0.01 to 10.2 V<sub>p-p</sub> into termination matching output impedance (0.02 to