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Find the *Cobham / Aeroflex / Wavetek 278* at our website: *Click HERE*

12 MHz Synthesized Function Generator

- **0.01 Hz to 12 MHz Frequency Range**
- **0.0005% Synthesized Accuracy**
- **Pulse Capability**
- **GPIB (IEEE 488) Standard**
- **200V Output Protection**

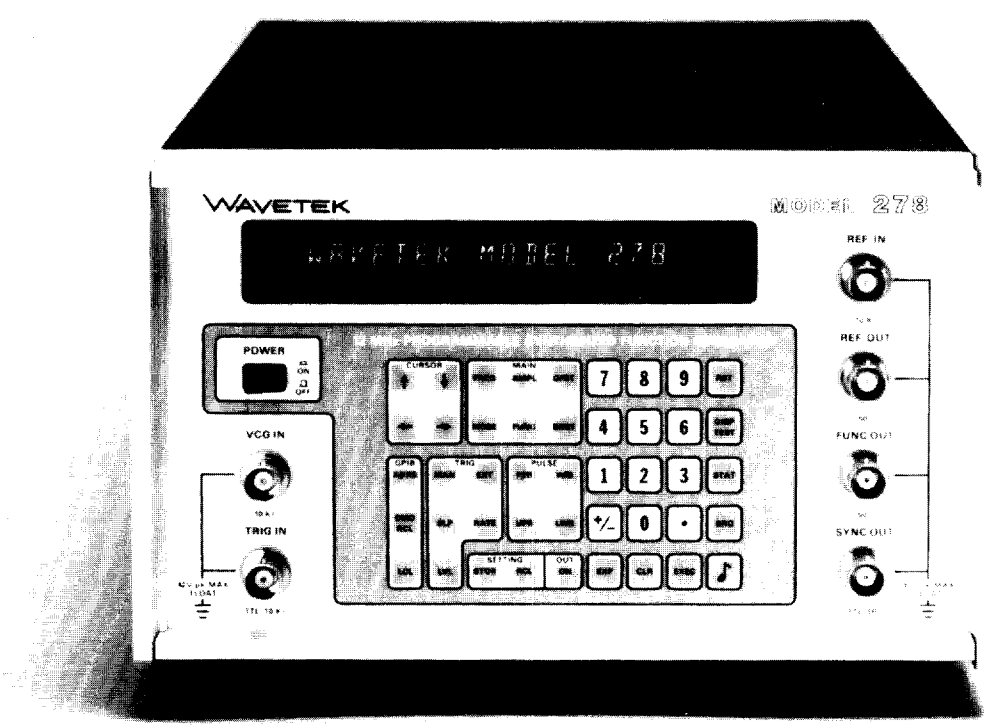
Compact and Versatile
Model 278 Programmable Synthesized Function Generator is a light-weight, half-rack instrument for bench or ATE use. The 278 can generate precise sine, triangle, square, pulse, and external width controlled waveforms from 0.01 to 10 Vp-p, and dc offsets within a −5 to +5V range into 50Ω. Waveforms can be continuous, gated, or triggered.

Synthesized Accuracy
The 278's synthesized mode has 5 digit frequency resoution with 0.0005% accuracy, or it can be locked to an external 10 MHz frequency standard for even greater accuracy and stability. Other 278 features include phase locking to an external frequency and use of the synthesizer circuit as a highly accurate internal trigger.

Programmable Pulse Widths
The 278 can function as a pulse generator with pulse widths programmable from 45 ns to 500 ms with 2 digits of resolution. To make its use as a pulse generator more versatile, the 278 can also program upper and lower levels rather than amplitude and offset, and periods from 90 ns to 1 sec with 3 digits of resolution.

Ease of Programming
The GPIB entry sequence is identical to front panel entry and the ASCII character for GPIB programming appears with each key on the front-panel. This makes it easy to transfer a manual setup to a controller program or vice versa. To help the operator even more, "command recall" can display up to 40 previous characters entered either at the front panel or by GPIB. The 278 also features free-format numeric entry, parameter independence until a final execute command, and front panel GPIB address selection (which can, however, be locked out for security).

Protected Outputs
All 278 outputs are protected against short circuits and excessive voltages between ±15V. The main output is further protected against voltage inputs of up to 140 Vac or ±200 Vdc. If a voltage greater than ±15V is applied to the main output, the 278 generates a audible alarm, a front panel error message, and a GPIB service request. Inputs are protected from voltages up to ±50V.



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VERSATILITY

Waveforms
Programmable sine ∿, triangle △, square ⊓, square complement ⊔, pulse ⊓, pulse complement ⊔, external width, or dc.

Operational Modes
Continuous: Nonsynthesized.
Triggered: One cycle triggered by external signal, GPIB, manual, or internal 1 Hz to 12 MHz rate (to 24 MHz in external width).
Gated: As Triggered except output continuous for duration of gate signal. Internal gate signal produces 50% duty cycle gate.
Burst: As Triggered for programmed number of cycles (1 - 1,048,200).
Synthesizer: As Continuous with increased freq accuracy and stability.
External Reference: As Synth plus locked to external 10 MHz ref.
External Phase Lock: As Continuous with output signal locked to external 10 Hz to 12 MHz signal.

Frequency Range
10 mHz to 12 MHz except 10 Hz minimum in Synth, Ext Ref and Ext Lock modes.

Outputs
Function Output: Waveforms from 0.01 to 10 Vp-p into 50Ω (0.02 to 20 Vp-p into ≥50 kΩ). DC or offset from −5V to +5V into 50Ω (−10V to +10V into ≥50 kΩ). Absolute peak amplitude plus offset may not exceed 5V into 50Ω (10V into ≥50 kΩ).
Source Impedance: 50Ω
Programmable Control Provides:
Output On, (50Ω source impedance);
Ouput Off, High Z (>500kΩ)
Output Off, Low Z (approx 50Ω termination).
Sync Output: TTL level square wave into 50Ω. 50Ω source impedance. Concurrent with main output in square; lags sine and triangle by 90°.
Over/Undershoot: <10% into 50Ω.
Ref Out: TTL level pulse. Frequency of internal trigger when in Trig, Gate, Burst or Pulse modes; 10 MHz in Ext Ref or Synth modes.
Protection: Sync and Ref outputs protected against ±15V input minimum. Function output protected to 140 Vac or ±200 Vdc without replacement of internal fuse.

Inputs
VCG In: 0.01 to 12V into 10 kΩ for up to 1200:1 frequency change. 10V gives range max. 12V gives 20% over range. Slew Rate: 1V/μs.
Trig In: Level programmable: −10 to +10V, 20 mV resolution, ±500 mV accuracy. Programmable to trigger on + or − signal slope.
Max Rate: 12 MHz (15 MHz in external width). Min Width: 20 ns. Min. Ampl: 500 mVp-p to 1 MHz, 1 Vp-p to 24 MHz. Impedance: 10 kΩ.
Ref In: TTL or 1 Vp-p min (select TTL or zero crossing). 10 MHz for Ext Ref mode; 10 Hz to 12 MHz for Phase Lock mode (capture and lock range >5% of programmed frequency).
Protection: Inputs protected against ±50V input minimum.

PRECISION

Frequency
Resolution: Synth and Ext Ref Modes: 5 digits.
All Other Modes: 3 digits.
Accuracy: Synthesizer Mode: 5 ppm ±1 mHz.
Ext Ref and Lock Modes: Accuracy of external ref signal ±1 mHz.
All Other Modes: ±2%.
Noise Floor: >−50 dBc.
Spurious: >−45 dBc.

Amplitude
Resolution: 3 digits or 10 mV when absolute peak amplitude plus offset >0.5V; 3 digits or 1 mV when absolute peak amplitude plus offset ≤0.5V.
Accuracy: ±2% of programmed value and: ±5 mV to 0.1 for 1V (pk ampl + ofst <0.5V), ±20 mV for 1.01 to 10V, ±50 mV for all other.
Repeatability (24 hr): ±1% ±10 mV.
Flatness: 0.1 dB to 100 kHz, 1.5 dB to 12 MHz for output at 5 Vp-p.

Offset
Resolution: 3 digits or 10 mV when absolute peak amplitude plus offset >0.5V, 3 digits or 1 mV when absolute peak amplitude plus offset ≤0.5V.
Accuracy: ±40 mV in DC function.
Repeatability (24 hr): ±1% ±20 mV.

Waveform Quality
Sine Distortion (at 5 Vp-p): THD <0.5%, 10 mHz to 99.9 kHz.
No Harmonics Above:
−40 dBc, 100 kHz to 999 kHz.
−30 dBc, 1 MHz to 12 MHz.
Time Symmetry: ±1% ±5 ns.
Square Transition Time: <15 ns.
Square Over/Undershoot: <5% of pk-pk amplitude ±20 mV.
Triangle Linearity: 99% to 100 kHz.

Internal Trigger Rate
Resolution: 5 digits.
Accuracy: 5 ppm + 1 mHz.
Range: 1 Hz to 12 MHz (24 MHz in external width).

Pulse Period
Resolution: 3 cigits.
Accuracy: 0.1%.
Range: 90 ns to 1 sec.

Pulse Width
Duty Cycle: ≤50%.
Resolution: 2 digits.
Accuracy: 3% from 500 ns to 500 ms, 5% from 45 ns to 490 ns.
Range: 45 ns to 500 ms.

GENERAL

Stored Settings
Nonvolatile memory for 100 stored settings. Battery back-up with minimum 6 mo. retention (typ. 5 yr.), battery check and status display.

GPIB Programming
IEEE 488-1978 compatible. Non-isolated. Double buffered.
Address: 0-30 keyboard or internal switch selectable. Internal switch can lockout keyboard selection. Power-up address is internal setting.
Subsets: SH1, TE0, RL1, AH1, L4, PP0, C0, T6, SR1, DC1 and E2.

Interface Timing

Parameter	Time
Frequency	11 ms
Amplitude	14 ms
Offset	14 ms
Mode	4 ms
Waveform	5 ms
Execute	8 ms
Other	4 ms

Environment
Temperature Range: 25°C ± 10°C for spec operation, operates 0°C to 50°C, −50°C to +75°C for storage.
Warm-up Time: 20 minutes for specified operation.
Altitude: Operates 0 to 10,000 ft, 0 to 40,000 ft for storage.
Relative Humidity: 95% at 25°C and sea level (non-condensing).

Dimensions
21.7 cm (8.54 in.) wide (half-rack); 13.3 cm (5.25 in.) high; 39.4 cm (15.5 in.) deep.

Weight
5.9 kg (12.9 lb) net; 7.3 kg (16 lb) shipping.

Power
90 to 105, 108 to 126, 198 to 231, or 216 to 252 Vrms; 48 to 66 Hz; 1 phase; <50 watts.

OPTIONS

002: Rear Panel Connectors
BNCs relocated to rear panel.

FACTORY/FOB

San Diego, CA

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