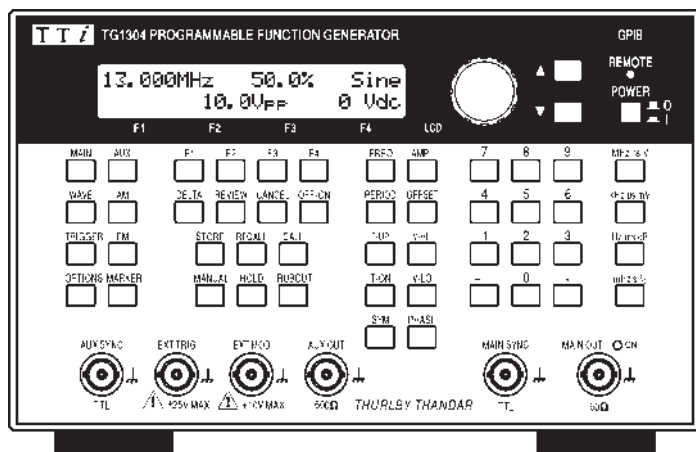


TG1304 13MHz Programmable Function Generator



- Traditional analogue generator with digital control
- Frequency stabilisation to high accuracy
- GPIB interface fitted as standard (IEEE-488.2)
- 10mHz to 13MHz range, 20V pk-pk output
- Dual generator architecture, independent operation
- Comprehensive amplitude/frequency modulation
- Full triggering and gating capabilities
- Keyboard or rotary control of major parameters
- All functions controllable from GPIB

The TG1304 is a classic analogue function generator with all the versatility that this implies including the generation of complex waveshapes right up to the maximum generator frequency of 13MHz.

Unlike other analogue generators, however, it harnesses the power of a digital control system to provide an unrivalled range of features.

Frequency stabilisation

The TG1304 uses digital "measure and correct" techniques to stabilise the main generator frequency to an accuracy of up to 0.01%. That provides not only precision setting but also negligible drift with time.

Complex waveform generation

In addition to the normal sine, square and triangle waveforms the TG1304 can generate uni-polar pulse waveforms and DC levels. Variable symmetry, variable start/stop phase and variable frequency trigger gating also enable complex waveshapes such as haversines, variable transition time pulses and sine-edged pulses to be obtained.

The TG1304 contains two full specification function generators. The main generator covers a frequency range of 10mHz to 13MHz from a 50 Ohms output impedance while the auxiliary generator covers 5mHz to 50kHz from a 600 Ohms output impedance. Both generators can provide output levels between 2mV and 20V pk-pk.

Although the auxiliary generator is intended primarily for providing sweep and modulation facilities for the main generator, it can also be used completely independently as a source of sine, triangle or square waves with variable symmetry.

A third internal generator provides a variable frequency source for the gated and triggered burst modes.

Frequency modulation and sweep

Full FM and sweep modes are provided via the auxiliary generator. Internal frequency modulation is specified by setting a carrier frequency and a peak deviation. Internal sweep provides repetitive or triggered sweep between specified start and stop frequencies. External voltage controlled frequency is also available.

In sweep mode both the sweep ramp and the retrace can be externally triggered. Up to 8 markers can be set (plus start and stop).

Full amplitude modulation

Comprehensive amplitude modulation modes are provided including normal AM, linear VCA, and log VCA either internally via the auxiliary generator or externally. A Sum mode for the two generator outputs is also available.

In normal AM mode the modulation depth is proportional to the modulating signal amplitude regardless of carrier level. In voltage controlled amplitude (VCA) mode the output amplitude is linearly or logarithmically proportional to the instantaneous modulating signal voltage. In Sum mode the main signal and the modulating signal are added to produce a two tone output.

MAIN GENERATOR

Frequency

Total Range: 10 mHz to 13 MHz in 8 ranges (x1 Hz to x10 MHz)
Data Entry: May be specified as frequency or period (with symmetry), or as up time and down time.

Resolution: 5 digits or 0.1mHz
Accuracy: $\pm 0.01\%$ of range stabilised, $\pm 3\%$ unstabilised (50% Sym)
Symmetry Range: 5% to 95% (1:19 to 19:1)
Start/Stop Phase: Settable at any point on the waveform except within ± 20 ns of the triangle peaks.

Waveforms:

Sine, Triangle, Square (Bipolar pulse), Positive pulse, Negative pulse, DC offset only, DC at positive peak, DC at negative peak.
Sine Distortion: $< 0.5\%$ 20Hz to 50kHz, $< 1\%$ below 20Hz & 50kHz to 500kHz. Each harmonic > 30 dB down 500kHz to 10MHz.

Triangle Aberrations: $< 1\%$ below 50kHz.
Pulse Transition Time: < 30 ns, 18ns typical.
Pulse aberrations: $< 5\% + 20$ mV.

Amplitude:

2mVpp to 20Vpp emf for sine, square and triangle.
1mVpp to 10Vpp emf for unipolar pulse waveforms.

Offset Range: -10V to +10V emf
Resolution: 3 digits or 1 mV
Basic Accuracy: $\pm 3\% \pm 1$ mV (f = 1kHz, no DC, loaded with 50 Ohms).
Amplitude Flatness: ± 0.1 dB typical, up to 5MHz.
Offset Accuracy: $\pm 2\%$ of attenuator range ± 2 mV (loaded with 50 Ohms).
Output Impedance: 50 Ohms nominal.
Fixed Attenuators: 10dB, 20dB, 30dB sections; giving 0-60 dB total.
Variable Attenuator: > 40 dB below 500kHz, reducing to 20dB at 13 MHz.

AUXILLIARY GENERATOR

Frequency:

5mHz to 50 kHz
Data Entry: Frequency or period
Accuracy: $\pm 3\%$ (at 50% symmetry)
Symmetry Range: 5% to 95%

Waveforms:

Sine, Square, Triangle, Ramp

Output Signals:

Sine, Square, Triangle, Ramp (from Auxiliary generator)
Main generator Frequency control voltage (FCV)
Main generator Amplitude control voltage (ACV)
600 Ohms
Output Impedance: 2mV to 20V pk-pk emf (sine, square, triangle),
Output Amplitude: 1V to 10V full scale (FCV, ACV)

Trigger Modes

Continuous: Generator runs continuously with frequency stabilisation applied.
Gated: Generator gated on by trigger signal. Waveform starts and stops at the defined start/stop phase. The last cycle is completed.

Burst: Generator produces a burst of a counted number of cycles following each trigger. Waveform starts and stops at the defined start/stop phase.

Trigger Sources: External, Internal, Sweep, Manual or GPIB command

MODULATION AND SWEEP

Internal FM: Normal Frequency modulation, specified by carrier frequency and peak deviation.

Internal Sweep: Repetitive or triggered sweep between specified start and stop frequencies.

External VCF: Voltage Controlled Frequency: the frequency is determined by the sum of the applied external voltage and an internal value (equivalent to the dial of a conventional generator). The main display shows the actual frequency of the generator measured by the counter.

Normal AM: The modulation depth is proportional to the modulating signal amplitude regardless of carrier level.

Linear VCA: Voltage Controlled Amplitude: the output signal amplitude is directly proportional to the instantaneous modulating signal voltage.

Log VCA: The output signal amplitude is logarithmically proportional to the instantaneous modulating signal voltage.

Sum: The main and modulating signals are added to produce a two tone output.

REMOTE CONTROL

The TG1304 has full remote control facilities through the GPIB interface which is fitted as standard.

Interface: IEEE-488 compatible, not isolated.
Command Set: IEEE-488.2 compliant.
Capabilities: All facilities are remotely programmable.

Thurlby Thandar Instruments Ltd. operates a policy of continuous development and reserves the right to alter specifications without prior notice.

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