

TW4803 DSP Lock-In Amplifier



Order Code

TW4803

Features:

- 1 mHz to 102 kHz frequency range
- 1 nV to 1 V full-scale sensitivity
- Time constants from 10 μ s to 3 ks
- > 120 dB dynamic reserve
- Automatic adjustment
- Multiple-harmonic measurement
- FFT spectral analysis
- 5.6 inch color TFT-LCD screen, single or dual display
- Support remote control, embedded a free LabVIEW program

Maxwellon TW4803 Digital Lock-in Amplifier provides an excellent performance within its bandwidth from 1 mHz to 102 kHz. With the advantage of the latest digital signal processing technology and high-precision 24-bit ADC, TW4803 can easily detect the phase and the magnitude of weak signals overwhelmed by various large noises. The performance of TW4803 is as good as other lock-in amplifiers brands, even better in some certain parameters, such as measurement accuracy, SNR, dynamic reserve. Otherwise, TW4803 integrates some special functions like multiple harmonic measurement and FFT, which meets the needs of scientific research and industrial application well.

Specifications

Signal Channel	
Voltage Input Mode	Single-ended or Differential
Full-scale Sensitivity	1 nV to 1 V in a 1-2-5 sequence 1 fA to 1 μ A
Current Input	106 or 108 V/A
Impedance	<ul style="list-style-type: none"> • Voltage: 10 MΩ // 25 pF, AC or DC coupled • Current: 1 kΩ to virtual ground
C.M.R.R	> 100 dB to 10 kHz, decreasing by 6 dB/oct
Dynamic Reserve	> 120 dB
Gain Accuracy	0.2% typ, 1% max
Voltage Noise	5 nV/ $\sqrt{\text{Hz}}$ at 997 Hz
Current Noise	<ul style="list-style-type: none"> • 15 fA/$\sqrt{\text{Hz}}$ at 97 Hz • 13 fA/$\sqrt{\text{Hz}}$ at 997 Hz
Line Filters	50/60 Hz and 100/120 Hz
Grounding	BNC shield can be grounded or floated via 10 k Ω to ground
Reference Channel	

Input	<ul style="list-style-type: none"> • Frequency range: 1 mHz to 102 kHz • Reference input: TTL or Sine • Input impedance: 1 MΩ//25 pF
Phase	<ul style="list-style-type: none"> • Resolution: 0.01$^{\circ}$ • Absolute phase error: < 1$^{\circ}$ • Relative phase error: < 0.01$^{\circ}$ • Orthogonality: 90$^{\circ}$ \pm 0.001$^{\circ}$ • Phase noise: (Internal ref.) Synthesized, <0.0001$^{\circ}$rms at 1 kHz; (External ref.) 0.001$^{\circ}$rms at 1 kHz (100 ms time constant, 12 dB/oct) • Drift: <0.01$^{\circ}$/$^{\circ}$C below 10 kHz, <0.1$^{\circ}$/$^{\circ}$C above 10 kHz
Harmonic Detection	2F, 3F, ...nF to 102 kHz (n<32767)
Acquisition Time	<ul style="list-style-type: none"> • Internal ref.: instantaneous acquisition • External ref.: (2 cycles + 5 ms) or 40 ms, whichever is larger
Demodulator	
Stability	<ul style="list-style-type: none"> • Digital output: no zero drift on all setting • Display: no zero drift on all setting • Analog output: <5 ppm/$^{\circ}$C for all dynamic reserve settings
Harmonic Rejection	-90 dB
Time Constant	<ul style="list-style-type: none"> • 10 μs to 3 ks (<200 Hz) • 10 μs to 30 s (>200 Hz) (6, 12, 18, 24 dB/oct rolloff)
Synchronous Filters	Available below 200 Hz (18, 24 dB/oct rolloff)
Internal Oscillator	
Frequency	<ul style="list-style-type: none"> • Range: 1 mHz to 102 kHz • Accuracy: 2 ppm + 10 μHz • Resolution: 1 mHz
Distortion	<ul style="list-style-type: none"> • -80 dBc (f < 10 kHz) • -70 dBc (f > 10 kHz)
Amplitude	0.001 to 5 Vrms
Accuracy	1%
Stability	50 ppm/ $^{\circ}$ C
Output	Sine output on front panel, and TTL sync output on rear panel
General Specifications	
Interface	RS-232 to USB interface, and IEEE-488 interface (optional).
CH1 and CH2 Outputs	<ul style="list-style-type: none"> • Function: output X, Y, R, θ • Output voltage: \pm10 V full scale, 30 mA max output current • Update rate: 312.5 kHz
Screen	5.6 inch, 640 \times 480 TFT
Screen Format	Single or dual display
Display Quantities	Each display shows one trace, traces can be defined as X,Y,R, θ
Display Types	Numerical form, bar graph, polar plot and strip chart
Power Requirement	<ul style="list-style-type: none"> • Voltage: 220 – 240 VAC, 100 – 120 VAC (optional)

	<ul style="list-style-type: none">• Frequency: 50/60 Hz• Power: 30 W
Dimension	448 (W) × 148 (H) × 513 (D) mm (with feet)
Weight	11 kg

Ordering Information

Part No.	Name	Description
TW4803	Digital Lock-in Amplifier	1 mHz to 102 kHz, 1 nV to 1 V full-scale sensitivity

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