

## TW4803D DSP Lock-In Amplifier (Dual Channel)



Order Code

**TW4803D**

### Features:

- 2 independent input channels and 2 signal generators
- 1 mHz to 102 kHz frequency range
- 1 nV to 1 V full-scale sensitivity
- Time constants from 10  $\mu$ s to 3 ks
- > 100 dB dynamic reserve
- Automatic adjustment
- Multiple-harmonic measurement
- 5.6 inch color TFT-LCD screen, single or dual display
- Support remote control, embedded a free LabVIEW program
- Adopt high-precision 24-bit ADC and FPGA+ARM digital platform architecture, better than DSP architecture

**Maxwellon TW4803D Digital Lock-in Amplifier** provides an excellent performance within its bandwidth from 1 mHz to 102 kHz. More importantly, TW4803D has dual independent input channels and dual independent high precision signal generators. Each input channel and signal generator can be used independently which means that the TW4803D is equivalent to two traditional lock-in amplifiers. Moreover, due to the twin symmetrical design, the two independent input channels and signal generators have ultra-high synchronicity, which meets the measurement requirements demanding extremely high synchronization.

### 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 $\mu$ A
Current Input	106 or 108 V/A
Impedance	<ul style="list-style-type: none"> <li>• Voltage: 10 M<math>\Omega</math> // 25 pF, AC or DC coupled</li> <li>• Current: 1 k<math>\Omega</math> to virtual ground</li> </ul>
C.M.R.R	> 100 dB to 10 kHz, decreasing by 6 dB/oct
Dynamic Reserve	> 100 dB
Gain Accuracy	0.2% typ, 1% max
Voltage Noise	6 nV/ $\sqrt$ Hz at 997 Hz
Current Noise	<ul style="list-style-type: none"> <li>• 15 fA/<math>\sqrt</math>Hz at 97 Hz</li> <li>• 13 fA/<math>\sqrt</math>Hz at 997 Hz</li> </ul>
Line Filters	50/60 Hz and 100/120 Hz

Grounding	BNC shield can be grounded or floated via 10 kΩ to ground
<b>Reference Channel</b>	
Input	<ul style="list-style-type: none"> <li>• Frequency range: 1 MHz to 102 kHz</li> <li>• Reference input: TTL or Sine</li> <li>• Input impedance: 1 MΩ//25 pF</li> </ul>
Phase	<ul style="list-style-type: none"> <li>• Resolution: 0.01°</li> <li>• Absolute phase error: &lt; 1°</li> <li>• Relative phase error: &lt; 0.01°</li> <li>• Orthogonality: 90° ± 0.001°</li> <li>• Phase noise: (Internal ref.) Synthesized, &lt;0.0001°rms at 1 kHz; (External ref.) 0.001°rms at 1 kHz (100 ms time constant, 12 dB/oct)</li> <li>• Drift: &lt;0.01°/°C below 10 kHz, &lt;0.1°/°C above 10 kHz</li> </ul>
Harmonic Detection	2F, 3F, ...nF to 102 kHz (n<32767)
Acquisition Time	<ul style="list-style-type: none"> <li>• Internal ref.: instantaneous acquisition</li> <li>• External ref.: (2 cycles + 5 ms) or 40 ms, whichever is larger</li> </ul>
<b>Demodulator</b>	
Stability	<ul style="list-style-type: none"> <li>• Digital output: no zero drift on all setting</li> <li>• Display: no zero drift on all setting</li> <li>• Analog output: &lt;5 ppm/°C for all dynamic reserve settings</li> </ul>
Harmonic Rejection	-90 dB
Time Constant	<ul style="list-style-type: none"> <li>• 10 μs to 3 ks (&lt;200 Hz)</li> <li>• 10 μs to 30 s (&gt;200 Hz)</li> <li>(6, 12, 18, 24 dB/oct rolloff)</li> </ul>
Synchronous Filters	Available below 200 Hz (18, 24 dB/oct rolloff)
<b>Internal Oscillator</b>	
Frequency	<ul style="list-style-type: none"> <li>• Range: 1 MHz to 102 kHz</li> <li>• Accuracy: 2 ppm + 10 μHz</li> <li>• Resolution: 1 mHz</li> </ul>
Distortion	<ul style="list-style-type: none"> <li>• -80 dBc (f &lt; 10 kHz)</li> <li>• -70 dBc (f &gt; 10 kHz)</li> </ul>
Amplitude	0.001 to 5 Vrms
Accuracy	1%
Stability	50 ppm/°C
Output	Sine output on rear panel, and TTL sync output on rear panel
<b>General Specifications</b>	
Interface	USB2.0 and RS-232 interface
CH1 and CH2 Outputs	<ul style="list-style-type: none"> <li>• Function: output X, Y, R, θ</li> <li>• Output voltage: ±10 V full scale, 30 mA max output current</li> </ul>
Screen	5.6 inch, 640×480 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 and strip chart

Power Requirement	<ul style="list-style-type: none"><li>• Voltage: 220 – 240 VAC, 100 – 120 VAC (optional)</li><li>• Frequency: 50/60 Hz</li><li>• Power: 50 W</li></ul>
Dimension	<ul style="list-style-type: none"><li>• 473 (W) × 160 (H) × 490 (D) mm (with feet)</li><li>• 473 (W) × 147 (H) × 490 (D) mm (without feet)</li></ul>
Weight	11 kg

## Ordering Information

Part No.	Name	Description
TW4803D	Digital Lock-in Amplifier	1 mHz to 102 kHz, 1 nV to 1 V full-scale sensitivity, dual independent input channels and signal generators

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