LI5501 & LI5502 Specifications

- Nominal, Typical, Supplementary and Approximate imply the supplemental data and do not guarantee the instrument performance.
- Performance guarantee :23 ± 5 °C

General

Power supply	Recommended Voltage ±15 VDC ±2% (Operating range ±14 to 16 VDC) Linear power supply (with dual tracking) recommended
	Current consumption **LI5501** : approximately +400 mA / -110 mA **LI5502** : approximately +480 mA / -120 mA (Factory default, no input signals, no loads)
Configuration memory	16 sets (switching possible without a host computer). One is for resume function and another for factory default settings.
Resume function	Return to the last settings at power-on state.
USB	USB 2.0 full speed, device class CDC
LAN	10BASE-T, 100BASE-TX, TCP/IP (socket communication)
Operation	0 to +50°C, 5 to 85%RH (absolute humidity 1 to 25 g/m^3, no condensation) Altitude of 2000 m or less
Storage	−10 to +60°C, 5 to 95%RH (absolute humidity 1 to 29 g/m^3, no condensation)
Pollution degree	2 (indoor use)
Warm-up time	20 minutes
RoHS	Directive 2011/65/EU
External dimensions	200 mm (W) × 25 mm (H) × 150 mm (D) excluding metal fittings and protruding parts
Weight	Approx.700 g excluding metal fittings and protruding parts

Input section

Signal inputs

Connector	BNC
No. of channels	**LI5501** : 1 **LI5502** : 2
Input type	Single-ended
Input impedance	1 MΩ (nominal), 20 pF in parallel (supplementary)
Frequency range	DC to 1.05 MHz
Voltage gain	0.2x / 1x / 10x / 100x (AC GAIN)
Input-referred noise	25 nV/$\sqrt{\text{Hz}}$ (supplementary) (1 kHz, 100x voltage gain, input shorted)
Harmonic distortion	−70 dBc or less (supplementary)
Maximum input (for linear operation)	±5 V
Non-destructive maximum input	±10 V

Reference signal input

Connector	BNC, 1 channel
Input impedance	1 MΩ (nominal), 20 pF in parallel (supplementary)
Frequency range	DC to 1.05 MHz
Input voltage range	Sine (SIN): 0.4 Vp-p to 6 Vp-p Square (TTL): 0 to 5 V, high level 2.6 V or more,low level 0.8 V or less
Pulse width (square)	100 ns or more (both high and low levels)
Non-destructive maximum input	±10 V

External reference frequency input

Connector	BNC, 1 channel
Frequency range	10 MHz±0.2%
Waveform	Sine or square (45 to 55% duty cycle)
Input impedance	500 Ω (approximate)
Withstand voltage	±42 Vpeak max (DC + AC) (allowable voltage to enclosure)
Reference frequency source	Internal or external

Output section

Oscillator output

Connector	BNC, 1 channel
Frequency	Synchronization frequency or internal oscillator frequency
Waveform	Sine or square
Amplitude	Sine : 1 Vrms, 1 mVrms resolution Square : TTL level
DC bias voltage	±5 V (only with sine,5 mV resolution, nominal)
Maximum output	±15 mA or more
Recommended load	500 Ω or more (resistor connected to signal ground)
Output impedance	53 Ω (nominal)

Analog data outputs

Connector	BNC, 2 channel
Maximum update rate	312.5 k Samples/s
Output range	±12 V (no load), 16-bit resolution
Maximum output current	±10 mA or more
Output impedance	440 Ω (nominal)
Output voltage accuracy	± (0.5% + 10 mV), relative to measured value

Analysis function

Measurement signal	
Frequency range	9.5 mHz to 1.05 MHz
No. of channels	**LI5501** : 1 **LI5502** : 2
Phase detector	
Phase detector	Dual-phase (R cosθ, R sinθ)
Orthogonality	±0.001° (supplementary)
Dynamic reserve	100 dB or more (supplementary)
Time constant filter	Time constant (TC) : 1 µs to 10 ks (1-2-5 sequence) Attenuation slope (SLOPE) : 6 , 12 , 18 , 24 dB/oct
Voltage sensitivity	DR setting : LOW1 / LOW2 / MED / HIGH

DR	AC GAIN	Voltage sensitivity
LOW1	100x	10 nVrms to 10 mVrms
LOW2	10x	100 nVrms to 100 mVrms
MED	1x	1 µVrms to 1 Vrms
HIGH	0.2x	5 µVrms to 1 Vrms

Voltage measurement accuracy	±0.5% (1 kHz, 1 Vrms input signal, DR MED and 1 Vrms sensitivity)
Moving average filter	Averaging time : OFF (0.4 µs), 1 µs to 100 s (1-2-5 sequence), AUTO
Phase noise	0.001° rms (1 kHz, 18 dB/oct or more attenuation slope, supplementary)
Phase temperature drift	±0.02° / °C (supplementary)
Phase measurement accuracy	±1° (supplementary)
Phase shift amount	Range : −180.000° to +179.999°, 0.001° resolution
PSD adjustment	Capable of removing a DC component of ±25% of full-scale
Reference signal	
Signal source	REF IN (external reference) / INT OSC (internal oscillator)
Waveform	SINE、TTL POS、TTL NEG
Frequency range	9.5 mHz to 1.05 MHz, 0.3 mHz resolution
Synchronization time	2 periods + 50 ms (supplementary)
Frequency measurement accuracy	± 40 ppm (1 Hz or more, TTL)
Harmonic measurement	A reference frequency given to the detector can be set to n/m times range of n (harmonic): 1 to 63 range of m (sub-harmonic): 1 to 64
Internal oscillator	
Frequency range	9.5 mHz to 1.05 MHz
Accuracy	±30 ppm (supplementary)
Measurement output	
Parameters	**LI5501** : X_A, Y_A, R_A, θ_A **LI5502** : X_A, Y_A, R_A, θ_A, X_B, Y_B, R_B, θ_B, RATIO, PHASE
Measurement range	X, Y : ±0 to 120% of sensitivity, resolution : 18 bits R : 0 to 120% of sensitivity, resolution: 19 bits RATIO : 0 to 200%, resolution: 19 bits θ, PHSAE : −180.000° to +179.999°, Resolution: 0.001°
Analog output range	X, Y : ±10 VDC (sensitivity ±100%) R : 10 VDC (sensitivity ±100%) RATIO : 10 VDC (amplitude ratio 200%) θ,PHASE : ±10 VDC (-180.000°or +179.999°)
Offset	±120.00% voltage sensitivity for X and Y, 0.01% resolution

Digital data output

Mode	Querying (ASCII, responds to the query command) Streaming (Binary data continuously)
Sampling interval	0.4 µs × (1 to 65536)
Output parameters	**LI5501** : X_A, Y_A, R_A, θ_A **LI5502** : X_A, Y_A, R_A, θ_A, X_B, Y_B, R_B, θ_B, RATIO, PHASE Reference signal frequency, status

The contents of this catalog are current as of May 31, 2023.
- External view and specifications are subject to change without prior notice.
- Please check the latest specifications, prices, and lead time for purchase.

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