LB480A Pulse Profiling USB PowerSensor+™
Data Sheet

Lady Bug®
TECHNOLOGIES LLC

Key PowerSensor+™ Specifications

100 MHz to 8 GHz (functional to 10 GHz)

-60 dBm to +20 dBm

1.95% Total Error*

1.09:1 VSWR (-27 dB Return Loss)

 * Measuring a well matched DUT (-20 dBm @ 1 GHz)

Measurement Capability

Time Gated Measurements: *Pulse, Peak and Average Power, Overshoot, Crest Factor; Rise and Fall Time, Pulse Width; Pulse Repetition Frequency, Duty Cycle*

Pulse (Modulation) Power Measurements: *Duty Cycle, Measured Pulse Power, Peak Power, Crest Factor*

Statistical Measurements: *CDF, CCDF, PDF*

CW and Average Measurements: *Average Power, Duty Cycle-Corrected Pulse Power, Data Logging*

Description

The LB480A is an easy to use high performance pulse profiling, pulse (modulation), and CW power meter and sensor in one. It features a 10 MHz video bandwidth at -60 dBm input compared to others that only measure down to -35 dBm. It provides superior in-class performance with high speed measurements and temperature compensated accuracy.
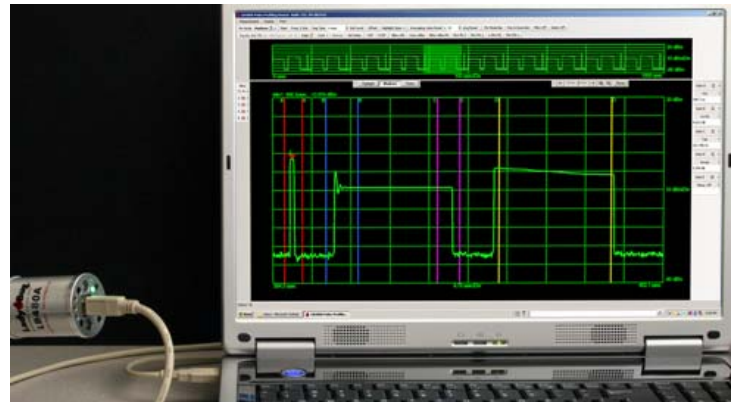
Get up and running quickly with the Pulse Profiling power panel. Use the supplied drivers and programming examples for ATE applications. Easily integrate the power sensor(s) into Lab View, C, VB and other environments.

Integration and usability are further simplified because calibration and zeroing are not required before use and, you have the flexibility of selecting from a variety of connector types including SMA, N, and TNC (male or female).
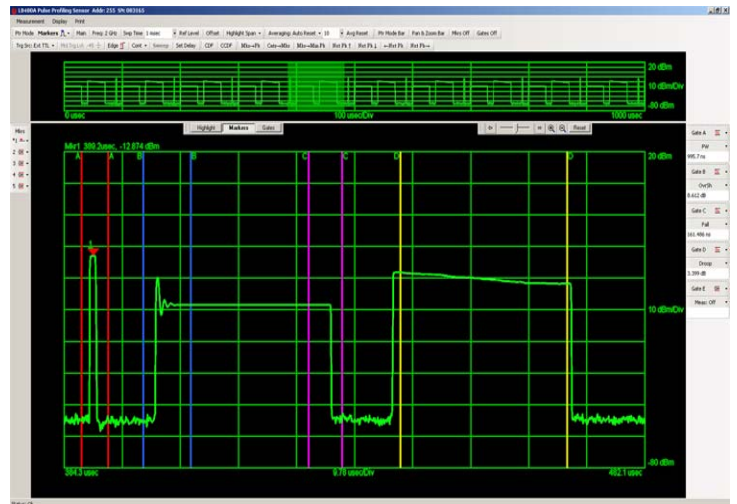
Order Option 004 for the 10 MHz video bandwidth filter. Order Option 001 for the <3 Hz analog recorder output.

Test Setup for One Sensor Measurements

Pulse Profiling Panel

Features

- Superior in-class price
- Superior in-class performance - Measure 10 MHz signals below -60 dBm (25 dB lower than others)
- Fast - 10 to 100 times faster than competitive sensors
- Compact - 1/10 the volume of competitive sensors
- Ruggedized USB connector - does not fatigue or break like competitive sensors
- Trigger on the RF input level
- Fully calibrated over temperature
- Offered with 30 day return policy

Applications

- General purpose scalar measurements
- General average and pulse RF and microwave power measurements requiring leading edge accuracy:
  - CW & pulsed signals
  - Narrow and wide band signals: CDMA, W-CDMA, QAM, OFDM, GSM, TDMA, QPSK, FSK, AM, FM, etc.
  - Recorders, power monitoring, and ALC loops
- Research & development, and manufacturing
- Maintenance, repair, installation, and service
- Radar, wireless, satellite, radio links, etc.

LB480A PowerSensor+™ Specifications

Parameter	LB480A
Frequency Range	100 MHz to 8 GHz (functional to 10 GHz)
Dynamic Range	
100 MHz to 6 GHz	-60 dBm to +20 dBm
6 GHz to 8 GHz	-50 dBm to +20 dBm
Accuracy	Total Error (RSS) = $\sqrt{(Mm^2 + CF^2 + L^2 + N^2 + T^2 + Z^2)}$ *Note 1*
Calibration Factor	NIST traceable
(Type N)	
100 MHz to 500 MHz	4.0%
500 MHz to 8 GHz	1.7%
(SMA)	
100 MHz to 500 MHz	4.0%
500 MHz to 8 GHz	2.5%
(TNC)	
100 MHz to 500 MHz	4.0%
500 MHz to 8 GHz	4.0%
Linearity *Note 3*	
(100 MHz to 2 GHz)	
+15 to +20 dBm	7.00%
+5 to +15 dBm	5.00%
-60 to +5 dBm	3.00%
(2 GHz to 8 GHz)	
+15 to +20 dBm	5.00%
+5 to +15 dBm	3.00%
-60 to +5 dBm	2.00%
Noise	1 second integration
(-30 to +20 dBm)	
100 MHz - 6 GHz	0.02%
6 GHz - 8 GHz	0.04%
(-50 to -30 dBm)	
100 MHz - 6 GHz	0.04%
6 GHz - 8 GHz	0.15%
(-60 to -50 dBm)	
100 MHz - 6 GHz	0.11%
Zero Offset *Note 3*	{[(0.35 nW @ 25°C) + |ΔT| x (0.025 nW / °C)] ± 0.005 nW / month} *Note 2*

[1] Error term definitions: Mm (Mismatch); CF (Cal Factor); N (Noise); L (Linearity); T (Temperature); Z (Zero Offset). All error terms are converted to percentages for RSS calculation.

[2] Use the following formula to determine Zero Offset error (%): Z = (Zero Offset Power / Measured Power)100.

[3] Linearity and Zero Offset are measured as a combined specification as LadyBug sensors require no meter zeroing or reference calibration before use.

LB480A PowerSensor+™ Specifications (continued)

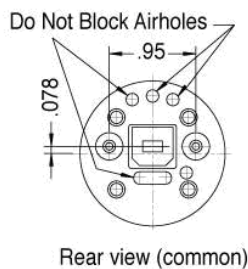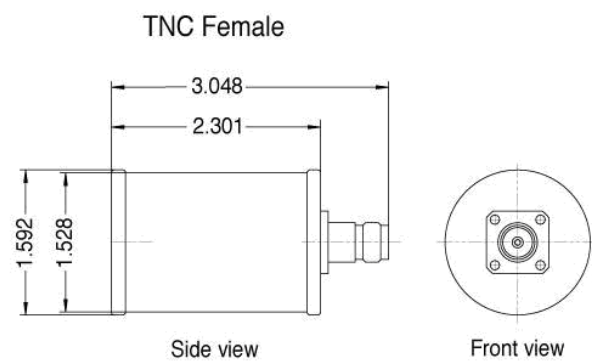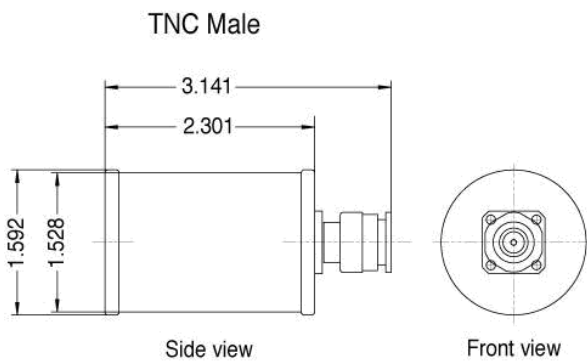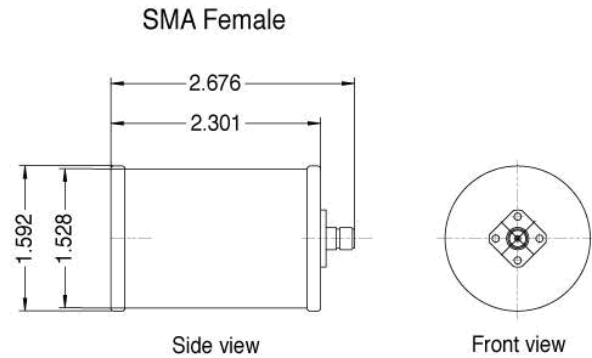| Parameter	LB480A
Accuracy (continued)	
Match	
(Type N)	
100 MHz to 250 MHz	1.18:1 VSWR (21.7 dB Return Loss)
250 MHz to 500 MHz	1.15:1 VSWR (23 dB Return Loss)
500 MHz to 8 GHz	1.15:1 VSWR (23 dB Return Loss)
(SMA)	
100 MHz to 250 MHz	1.18:1 VSWR (21.7 dB Return Loss)
250 MHz to 500 MHz	1.09:1 VSWR (27 dB Return Loss)
500 MHz to 8 GHz	1.09:1 VSWR (27 dB Return Loss)
(TNC)	
100 MHz to 250 MHz	1.25:1 VSWR (19 dB Return Loss)
250 MHz to 500 MHz	1.25:1 VSWR (19 dB Return Loss)
500 MHz to 8 GHz	1.25:1 VSWR (19 dB Return Loss)
Temperature (ºC)	
40 - 50	1.00% (plus 1%, 0 dBm to 10 dBm; plus 3%, 10 dBm to 20 dBm)
30 - 40	0.75% (plus 1%, 0 dBm to 10 dBm; plus 3%, 10 dBm to 20 dBm)
20 - 30	0.00%
10 - 20	0.75% (plus 1%, 0 dBm to 10 dBm; plus 3%, 10 dBm to 20 dBm)
0 - 10	1.00% (plus 1%, 0 dBm to 10 dBm; plus 3%, 10 dBm to 20 dBm)
Maximum Average Power	+20 dBm (100 mW)
Damage Level	+23 dBm (200 mW)
Maximum Pulse Power	+20 dBm (100 mW)
Damage Level	+23 dBm (200 mW)
Maximum Peak-to-Average Ratio	
100 MHz to 6 GHz	80 dB
6 GHz to 8 GHz	70 dB
Video Bandwidth	
Power Measurements	10 MHz
Pulse Profiling (standard)	100 kHz
Pulse Profiling (option 004)	100 kHz, 200 kHz, 300 kHz, 500 kHz, 1 MHz, 2 MHz, 3 MHz , 5 MHz, 10 MHz
10 % to 90% Rise Time (option 004)	54 ns (-70 to -20 dBm pulse measured @ 4 GHz)
10 % to 90% Fall Time (option 004)	44 ns (-70 to -20 dBm pulse measured @ 4 GHz)
Time Base	+/- 50 ppm
Effective Sample Rate	48 MS/second
Measurements	2000/second
Pulse Profiling Power Measurements (Time Gating to Analyze Pulse Parameters)	Pulse Power, Peak Power, Average Power, Droop, Rise Time, Fall Time, Overshoot, Pulse Width, Pulse Repetition Frequency, Duty Cycle, Crest Factor (Peak-to-Average Ratio)
Pulse (Modulation) Power Measurements	Duty Cycle, Measured Pulse Power, Peak Power, Crest Factor (Peak-to-Average Ratio)
Statistical Measurements	CDF, CCDF, PDF
Average Power Measurements	Average Power, Duty Cycle-Corrected Pulse Power, Data Logging

LB480A PowerSensor+™ Specifications (continued)

Parameter	LB480A
Display & Data Processing Capability	Multiple sensors, displays, and traces
Markers	5 pairs
Gating	5 pairs
Scaling	Linear, dB
Trace	Averaging, offset, scaling, statistics
Trigger	Standard
Resolution	20.8 ns
Delay	10 ms
Hold off	250 ms
Modes	Single, Continuous
Source	Internal, External
Trigger Rate	1 Hz to 750 KHz
Trigger Off Time	1 us minimum
Internal Trigger	
Level Mode	Manual, Auto
Signal Level Trigger Range	
100 MHz to 6 GHz	-45 dBm to 20 dBm
6 GHz to 8 GHz	-40 dBm to 20 dBm
Input	TTL compatible, rising or falling edge
V_{IH}, minimum high-level input	2.0 V at +/- 10 uA
V_{IL}, maximum low-level input	0.8 V at +/- 10 uA
Connector type	SMB male (shared with recorder output)
Absolute maximum levels	5.5 V maximum, -0.5 V minimum
Output	TTL compatible, rising or falling edge
V_{OH}, minimum high-level output	4.6 V at 1 mA
V_{OL}, maximum low-level output	0.8 V at -1 mA
Connector type	SMB male
Absolute maximum levels	5.5 V maximum, -0.5 V minimum
Recorder Out	Option 001
Range	
Operating	0 to 1 V typical
Maximum output	5 V, if in trigger mode (option 003)
Output impedance	1 K ohm typical
Sensitivity	
Scale	Linear or dB, factory default to Linear
Full Scale Value	User settable, factory default to Linear
Connector type	SMB male (shared with trigger input)
Recommended Calibration Cycle	1 year
Environment, operating	
Temperature	0 ºC to 55 ºC
Humidity	15% - 95% non-condensing
Altitude	10,000 feet (3,000 meters)
Environment, storage	
Temperature	-25 ºC to 85 ºC
Humidity	15% to 95% non-condensing
Altitude	50,000 feet (15,000 meters)
Physical	
Weight	2.75 oz (78 g), plus connector weight
Size	1.6" (40 mm) diameter by 2.25" (57 mm) long plus connector length

LB4XXA PowerSensor+ Outline Drawings
(dimensions are inches +/- 0.01)

Type N Male

Side view   Front view

Type N Female

Side view   Front view

SMA Male

Side view   Front view

SMA Female

Side view   Front view

TNC Male

Side view   Front view

TNC Female

Side view   Front view

Do Not Block Airholes

Rear view (common)
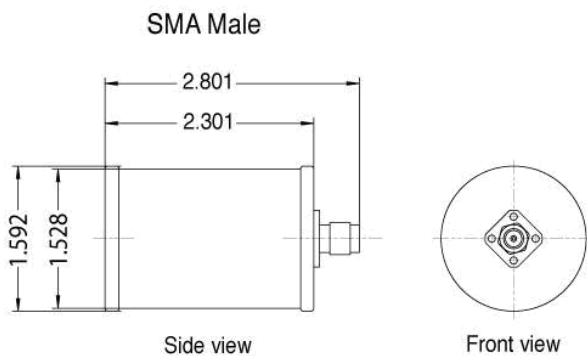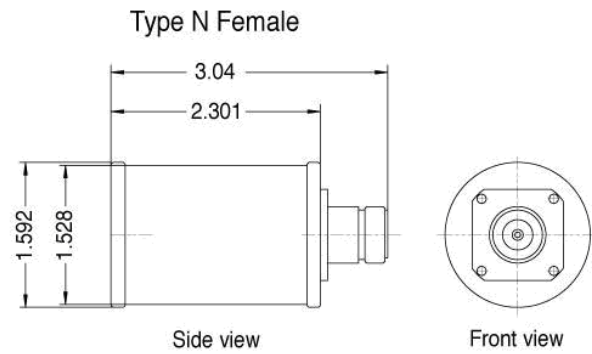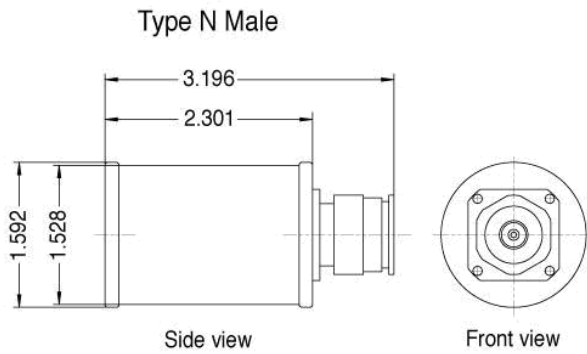
Revisions to data sheet by date:

03/25/09:
1. Add mechanical outline drawings.
2. Add revision page.
3. Accuracy updates: temperature; add Zero Offset.