



Dual Input AD8307 SWR Bridge

For QST Antenna Analyzer

K9IVB

Rev 2.0

5/22/2018

Page # or name

Dual Input AD8307 BOM

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REF Des	Value	Description	Mfg	Mfg #	Pkg	Mouser	Qty
The following are surface mount components							
C1, 4	15pF 50volts C0G 5%	Multilayer Ceramic Capacitors MLCC - SMD/SMT .01UF 50V C0G	TDK	CGA4C2C0G1H103J060AA [COG/NPO]	[0805]	810- CGA4C2C0G1H103J	2
C2, 5	.01UF 50V C0G	Multilayer Ceramic Capacitors MLCC - SMD/SMT 25volts 0.1uF X7R 10%	Kemet	C0805C104K3RACTU	[0805]	80-C0805C104K3R	6
C3, 6, 7, 9, 10, 15	25volts 0.1uF	Multilayer Ceramic Capacitors MLCC - SMD/SMT 50volts 1000pF C0G [0.001uF]	Kemet	C0805C102J5GACTU	[0805]	80-C0805C102J5G	4
C13, 14, 16, 17	0.001uF	Tantalum Capacitors - Solid SMD 10uF 16volts 10% A case Molded	Vishay	593D106X9016A2TE3	1206	74- 593D106X9016A2TE3	1
C8	10uF 16volts 10% A case	Multilayer Ceramic Capacitors MLCC - SMD/SMT 50volts 0.22uF X7R 10%] Thick Film	Kemet	C0805C224K5RACTU	[0805]	80-C0805C224K5R	2
C11, 12	.22uF	Resistors 51ohms 1%1/8 W			[0805]		2
R1, 4	51ohms 1%	470ohms 1%1/8 W			[0805]		2
R2, 5	470ohms 1%	47Kohms 1%1/8 W			[0805]		1
R8	47K ohms 1%						
L4	MPZ2012S221A	FERRITE CHIP 220 OHM 3A	TDK	MPZ2012S221A	[0805]	810-MPZ2012S221A	1
U1, 2	AD8307	AD8307 log amp RF power detector	Analog Devices	AD8307	SOIC-8	584-AD8307AR	2

The following are conventional leaded, through-hole components

J1, 2		3 pin, 0.1" spaced female header, cut from breakaway strip					2
J3		6 pin, 0.1" spaced male header, cut from breakaway strip					1
L1, 2		1 turn 3/16" inside diameter using discarded resistor lead			n/a		1
L3	10uH 5%	Fixed Inductors 10uH 5%	J W Miller		542-78F100-RC		1
R3, 6	6.8 ohm 1% 1/8 W	Metal Film Resistor - Through Hole 6.8ohms 1% 1/8 W					2
R7	50k Trimpot	50k Trimpot multi-turn	Bourns	3296W-503			1
R9	2.7 ohm 5% 1/4 W	Carbon Film Resistors - Through Hole	Xicon	291-6.8-RC			
R10	3.9 ohm 5% 1/4 W	Carbon Film Resistors - Through Hole	Xicon	291-6.8-RC			1
U3	78L05	Linear Voltage Regulators 0.1A Pos Volt Reg	Fairchild	LM78L05ACZ	TO-92	512-LM78L05ACZ	1
PCB		Dual Input AD8307					1

PCB Gerbers are available as "Dual Input AD8307_03162018.zip" on this web page

NOTES:

This design was previously done with 1206 SMT parts which have become more expensive and harder to source. The 0805 parts are now more readily available especially on ebay where they may be less than domestic shipping costs. As an example:

<https://www.ebay.com/itm/2300pcs-50-Value-0-10M-SMD-0805-Resistor-40Value-2-2pf-1uf-Capacitor-Kit-Set/191973456224>

This design was intended to be used with a Directional Coupler in conjunction with the Antenna Analyzer hardware from November 2017 issue of QST. It can also be used with various other bridge circuits or as an RF power meter.

Calibration of the two circuits may be accomplished by several different methods. VK3PE added the trimming circuit on pin 5 of the AD8307 to match the two outputs, for the same input, as the QST AA primarily measures the difference to compute the SWR. So;

- For the QST AA the simplest method is to short the two inputs together and attach a 25 Ohm resistor from the connection to a 50 Ohm signal generator supplying less than +10dBm. Check the outputs with two DVMs and make sure that the output voltages track each other identically. Adjust R7 to make both equal. This may be done stand alone on the bench, without the AA connected. As long as the DMM is floating you can also just measure the difference between the two outputs.
- If it is desired to calibrate with a Directional Coupler [with out any pads] apply an RF signal on the output, with a 50 Ohm dummy load attached to the input and note the output voltage on the reflected detector. Reverse the input and outputs on the Coupler and adjust the Forward detector R7 to have the same reading.
- If you want to calibrate as an accurate broadband RF Power meter I suggest that you read "*A Simple RF Power Calibrator, QEX Jan/Feb 2004, by Bob Kopski (K3NHI)*" and QEX May/June 2010 Tech Notes Pgs 44-45 also by Bob Kopski, before you construct the simple calibrator. It is also possible to make a calibration chart for each detector and load the curves into the software of an Ardunio similar to what is done in the PSHNA project on Yahoo groups [now PSHNA@groups.io]
- Another source for the info in the QEX Tech Note in addition to a sine wave source, refer to the link below.
<http://www.rudiswiki.de/wiki9/RFCalibratorSineSquareWave>