PSA-A Phase Shift Amplifier

Mark Connelly, WA1ION - 13 SEP 1999

The PSA-A Phase Shift Amplifier provides a high impedance to low impedance buffer amplifier function as well as the ability to yield a variable phase shift when used with an external 100K potentiometer. Typically two antennas would be presented to the input of a phasing unit comprised of two PSA-A's: one amplifier for each antenna input. The outputs of the two amplifiers are then combined to facilitate nulling of interfering signals. A dual potentiometer should be used. It should be configured such that the resistance to one of the amplifiers is at the maximum 100K value when a minimum (zero ohm) resistance is presented to the amplifier on the other antenna line. Each amplifier should provide at least 100 degrees of shift over the 150 kHz to 5 MHz frequency range. A 0 / 180 degree transformer-with-switch arrangement on one of the input lines will give additional flexibility and nulling range. Each input should have a level pot (1K typical) such that "pest" station amplitude may be matched; this is a necessary condition for nulling as well as the phase being adjusted for a +/- 180 degree difference of one PSA-A amplifier output relative to the other. Level pots will also be usable in strong-signal areas to prevent amplifier overloading and resulting distortion products.

PSA-A Phase Shift Amplifier Revised: Monday, 13 SEP 1999

PSA-A Revision: A

Bill Of Materials

Item	Quantity	Reference	Vendor: Stock Number	Part Description	Notes
1	3	C1, C3, C6	CS: CK05103K	Capacitor, 0.01 uF	
2	1	C2	CS: TAC008	Capacitor, Tantalum, 10 uF, 35 V	
3	1	C4, C7	CS: CK05104K	Capacitor, 0.1 uF	
4	1	C5	DK: P3151-ND	Capacitor, 150 pF	Panasonic ECQ-P1H151JZ
5	1	H_PB1	RS: 276-1396	Perfboard	cut size 0.9" * 2.0"
6	1	H_SC1	MOU: 5721-440-1/4	Screw, 4-40 * .25"	stock num.= 100 pieces
7	1	H_SL1	MOU: 534-7311	Solder lug, #4, internal tooth	
8	1	H_SO1	CS: CA-8	Socket, 8-pin DIP	for U1
9	1	H_SP1	MOU: 534-1450C	Spacer, 4-40 * .5"	
10	10	P1 - P10	CS: T42-1/100	Flea-clip Terminal Pin for .042" hole	
11	1	Q1	RS: 276-2035	FET, 2N3819	
12	1	R1	CS: RA4.7	Resistor, 4.7 ohm	
13	1	R2	MOU: 29SJ250-6.8M	Resistor, 6.8M	
14	1	R3	CS: 1M	Resistor, 1M	
15	2	R4, R5	CS: RA2.2K	Resistor, 2.2K	
16	2	R6, R7	CS: 560K	Resistor, 560K	
17	2	R8, R9	CS: RA39	Resistor, 39 ohm	
18	1	R10	CS: RA15	Resistor, 15 ohm	
19	1	U1	NEW: 06F5241 (or) ALD: 903-3056	Harris HA3-5002-5 Buffer Amplifier, 8-pin DIP	

Vendor Codes

ALD: Allied Electronics, Inc.: http://allied.avnet.com
CS: Circuit Specialists: http://www.cir.com
DK: Digi-Key: http://www.digikey.com
MOU: Mouser Electronics: http://www.mouser.com
NEW: Newark Electronics: http://www.newark.com
RS: Radio Shack: http://www.radioshack.com

PSA-A Phase Shift Amplifier
Drawing psa-a_f1: Schematic

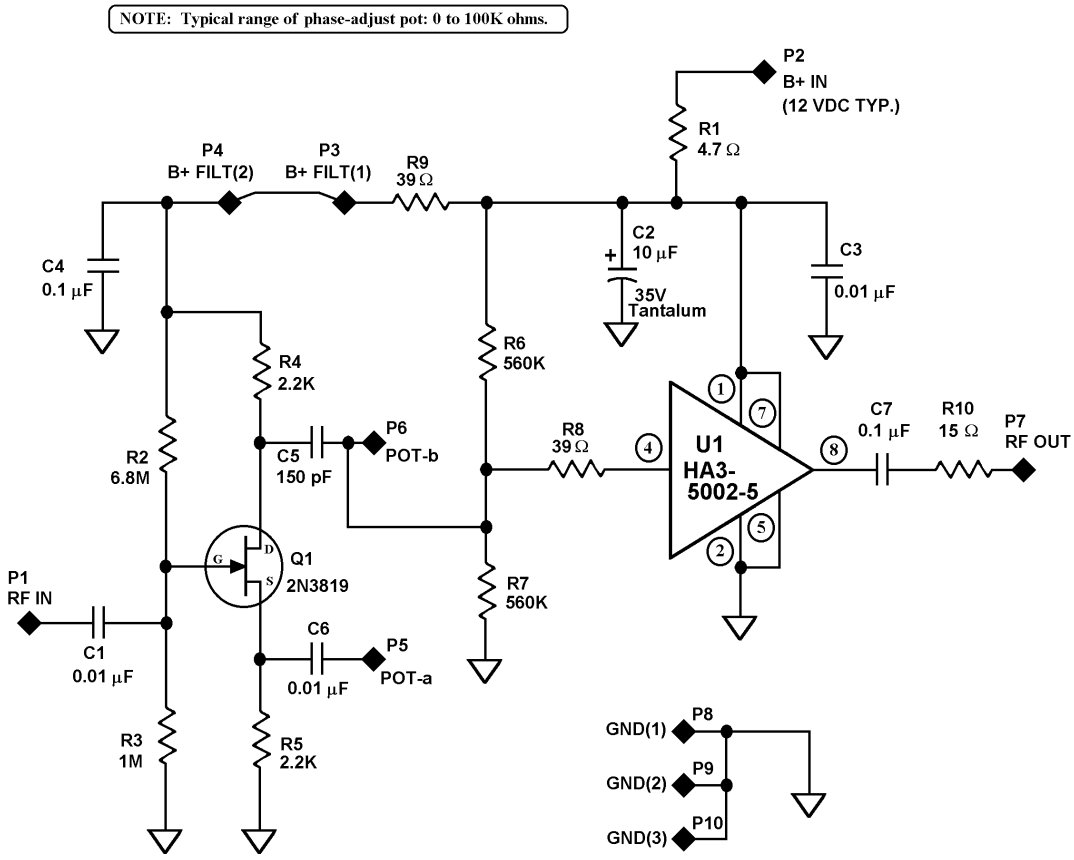
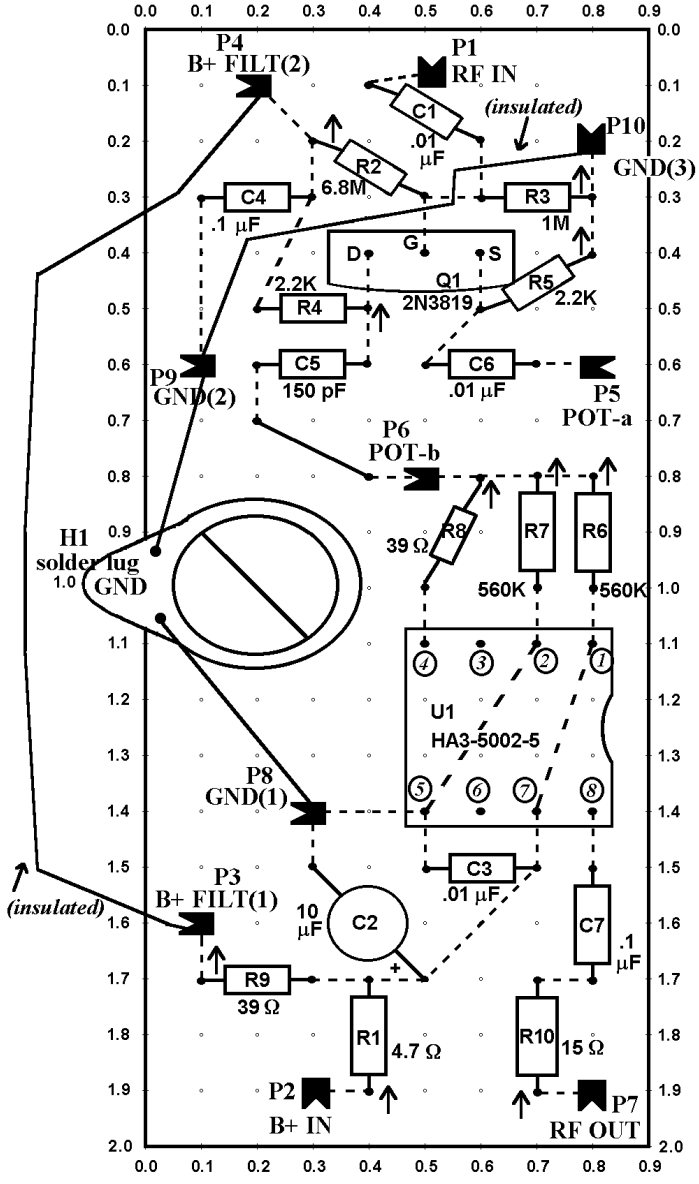


Figure 1 above

PSA-A Phase Shift Amplifier
Drawing psa-a_f2: Assembly



NOTES

↑ = Long lead side of vertically-mounted component

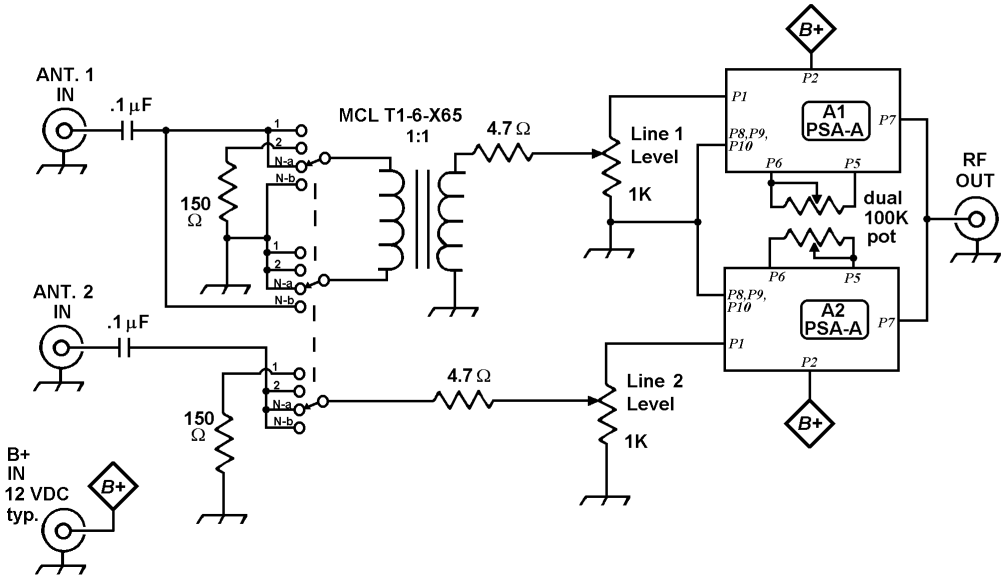
- - - = Buss wire on solder side of board

—— = Buss wire on component side of board

= "Flea clip" terminal pin
OPEN SIDE

Figure 2 above

PSA-A Phase Shift Amplifier
Drawing psa-a_f3: Application Schematic



IF TUNED OPERATION IS DESIRED FOR BETTER DYNAMIC RANGE, USE A CIRCUIT LIKE THAT BELOW AHEAD OF EACH PSA-A AMPLIFIER

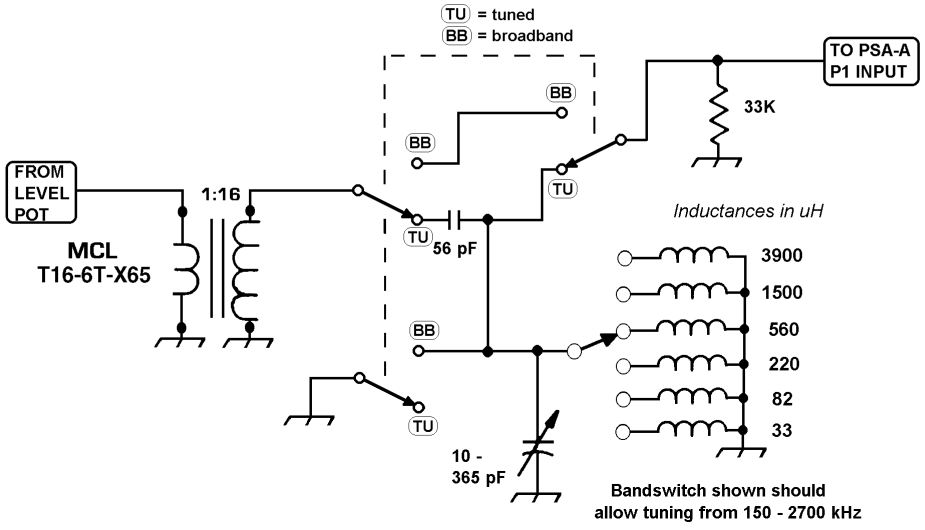


Figure 3 above