

1.5 Volt Offset Attenuator WA7NBF

revision 2

Notes:

- 1 When bending resistor and capacitor leads it is best to use needle nose pliers to reduce stress to the part.
- 2 all counts are based on the triangle in the corner
- 3 all components are mounted on plain side.
- 4 all component wiring, bending and soldering are on the copper pad side
- 5 all hookup wire should be in the 24 - 26 range. If possible you will need
- 6 if possible have as many as 11 different colors of hookup wire.
- 7 the schematic only shows a SPST switch. It has been replaced with a DPDT switch so our unit can use 2 crystals

IC Socket

- Place the IC Socket with the notch up.
- Insert (row 3) (column 4) to (row 3) (column 7) and (row 11) (column 4) to (row 11) (column 7)
- Solder (row 3) (column 4, (row 11) (column 7) these are pins 1 and 10 of the socket
- Bend pins (row 8) (column 4) thru (row 10) (column 4) over so they short to (column 3).
- You are bending the pins away from the socket

R5

- Get R5 an 8.2M resistor gray-red-green-gold
- Bend lead from gray end – so it will stand up
- Put gold banded end in (row 8) (column 3)
- Put other lead in (row 9) (column 3)
- Bend (row 8) (column 3) to (row 8) (column 4)
- Solder and cut excess
- Bend (row 9) (column 3) to (row 9) (column 4, Continue to bend lead to (row 8) (column 7)
- MAKE sure (row 8) (column 4) and (row 8) (column 5) are not shorted. If you have
- enough lead to also short (row 8) (column 8) that is OK. Leave (row 8) (column 8) open
- Solder (row 9) (column 3, (row 9) (column 4, (row 8) (column 7)

C5

- Get C5 a 20pf capacitor labeled 22J
- Insert into (row 8) (column 1) and (row 10) (column 1)
- Bend (row 8) (column 1) across to (row 8) (column 4)
- Solder (row 8) (column 1, (row 8) (column 3)
- Bend (row 10) (column 1) across to (row 10) (column 4) continue to short across to
- (row 10) (column 7) and (row 10) (column 8)
- Solder (row 10) (column 1, (row 10) (column 4, (row 10) (column 7)

C4

- Get C4 a 20pf capacitor labeled 22J
- Insert into (row 9) (column 2) and (row 11) (column 2)
- Bend (row 9) (column 2) up to wire in (row 9) (column 3)
- Solder (row 9) (column 2, (row 9) (column 3, and cut excess
- Bend (row 11) (column 2) across to (row 10) (column 2)
- Solder (row 11) (column 2, (row 10) (column 2)

C1

- Get C1 a .001uf capacitor labeled 102K
- Insert into (row 12) (column 2) and (row 12) (column 4)
- Bend (row 12) (column 2) out to (row 12) (column 1)
- Solder (row 12) (column 2)
- Cut excess past (row 12) (column 1)
- Solder (row 12) (column 4) and cut excess

R1

- Get R1 a 4.7K resistor yellow-violet-red-gold
- Bend leads – so it will lie down
- Put in (row 13) (column 2) and (row 13) (column 4)
- Bend (row 13) (column 2) out toward (row 13) (column 1)

	Bend (row 13) (column 4) up toward (row 11) (column 4, short with (row 12) (column 4)
	Solder (row 13) (column 2, (row 13) (column 4, (row 12) (column 4, (row 11) (column 4)
	cut excess
C2	
	Get C2 a .001uf capacitor labeled 102K
	Insert into (row 11) (column 8) and (row 13) (column 8)
	Bend (row 11) (column 8) in towards IC socket (row 11) (column 7)
	Solder (row 11) (column 8, (row 11) (column 7)
	Cut excess
	Bend (row 13) (column 8) towards center (row 13) (column 7)
	Solder (row 13) (column 8) and cut excess past (row 13) (column 7)
R3	
	Get R3 a Blue body 220 ohm resister red-red-black-black-brown
	Bend lead from red end – so it will stand up
	Put brown banded end in (row 11) (column 9)
	Put top lead in (row 11) (column 10)
	Bend (row 11) (column 9) toward center (row 11) (column 8) continuing to (row 11) (column 7)
	Solder (row 11) (column 9, (row 11) (column 8, (row 11) (column 7)
	Bend (row 11) (column 10 up toward (row 7) (column 10)
	Solder (row 11) (column 10)
C3	
	Get C3 a .001uf capacitor labeled 102K
	Insert into (row 10) (column 8) and (row 10) (column 10)
	Bend (row 10) (column 8) to (row 10) (column 7) towards IC socket
	Solder (row 10) (column 8, (row 10) (column 7)
	Cut excess
	Bend (row 10) (column 10) over lead from (row 11) (column 10) away from IC socket
	Solder (row 10) (column 10) to wire
	cut excess
R4	
	Get R4 a 4.7K resister yellow-violet-red-gold
	Bend leads – so it will lay down
	Put in (row 8) (column 8) and (row 8) (column 10) away from IC socket
	Bend (row 8) (column 8) to (row 8) (column 7) towards IC socket
	Bend (row 8) (column 10) over lead from (row 11) (column 10) out
	Solder (row 8) (column 8, (row 8) (column 7, (row 8) (column 10, (row 8) (column 11)
	cut excess
R1	
	see photo R1 for a better understanding
	mark the back of the pot like in R1 photo. With the 1st lug about 1 pm label it CCW. Then at 3 pm
	label it W. the last lug about 5 pm label it CW
	make 3 of these - cut a 2 1/2 inch piece of hookup wire. Strip appox 1/4 inch from each end and tin it.
	cut a 2 inch piece of hookup wire. Strip appox 1/4 inch from each end and tin it.
	bend one end of the 2 inch around the CCW lug
	bend one end of one of the 2 1/2 inch wires around the CCW lug
	solder these two wires on the lug
	bend one end of one of the 2 1/2 inch wires around the W lug
	solder the wire on the lug
	bend one end of one of the 2 1/2 inch wires around the CW lug
	solder the wire on the lug
SW	
	see photo SW for a better understanding
	rotate the switch so you see the lugs line up in two (rows of 3 ones "1 1 1" and another row
	just below them "1 1 1". The lugs on the switch will be referred to as (row 1) (column 1) in the upper right corner
	the top (row will be (row 1) (column 1, (row 1) (column 2) and (row 1) (column 3) from right to left.
	the bottom (row will be (row 2) (column 1), (row 2) (column 2) and (row 2) (column 4) from right to left.

	cut a 1 1/2 inch piece of hookup wire. Strip approx 1/4 inch from each end and tin it.		
	bend one end around the (row 1) (column 1) and (row 1) (column 3) lugs		
	solder the (row 1) (column 3) lug		
	cut a 1 3/4 inch piece of hookup wire. Strip approx 1/4 inch from each end and tin it.		
	cut three pieces of 2 1/2 inch hookup wire. Strip approx 1/4 inch from each end and tin it.		
	bend one end of the 1 3/4 inch wire around the (row 1) (column 2) lug and solder		
	bend one end of the 2 1/2 inch wire around the (row 2) (column 1) lug and solder		
	bend one end of the 2 1/2 inch wire around the (row 2) (column 2) lug and solder		
	bend one end of the 2 1/2 inch wire around the (row 2) (column 3) lug and solder		
	take the 2 inch wire from R1 and wrap around the (row 1) (column 1) lug.		
	Make sure it is not shorted to (row 1) (column 2) lug. Solder the two wires.		
	take the 1 3/4 inch wire from (row 1) (column 2) lug and connect it to the PLUS terminal of the Battery holder. Solder.		
B1			
	cut a 1 3/4 inch piece of hookup wire. Strip approx 1/4 inch from each end and tin it.		
	connect it to the NEGATIVE terminal of the Battery holder. Solder it.		
	set assembly aside		
Perf Board			
	cut two 1 3/4 inch pieces of hookup wire. Strip approx 1/4 inch from each end and tin it.		
	take one of them and insert into (row 3) (column 3) and (row 5) (column 3). Solder		
	take the other one and insert into (row 5) (column 2) and (row 7) (column 2).		
	Bend over the (row 8) (column 1) jumper and solder		
R1			
	take the wire from the W and insert it in to (row 13) (column 1) and solder BUT DO NOT cut		
	bend the wire toward (row 13) (column 2) and short it. Solder and cut any excess		
	take the wire from the CW and insert it in to (row 9) (column 8) and solder BUT DO NOT cut		
	bend the wire toward (row 9) (column 7) and short it. Solder and cut any excess		
	take the wire from the CCW and insert it in to (row 6) (column 10) and solder BUT DO NOT cut		
	bend the wire toward (row 7) (column 10) and short it. Solder and cut any excess		
SW			
	take the wire from (row 2) (column 1) lug and insert it in to (row 5) (column 8) and solder BUT DO NOT cut		
	bend the wire toward (row 5) (column 7) and short it. Solder and cut any excess		
	take the wire from (row 2) (column 2) lug and insert it in to (row 7) (column 8) and solder BUT DO NOT cut		
	bend the wire toward (row 8) (column 8) and short it. Solder and cut any excess		
	take the wire from (row 2) (column 3) lug and insert it in to (row 3) (column 8) and solder BUT DO NOT cut		
	bend the wire toward (row 3) (column 7) and short it. Solder and cut any excess		
B1			
	take the wire from the NEGATIVE terminal of the Battery holder.		
	insert it in to (row 11) (column 1) and solder BUT DO NOT cut		
	bend the wire toward (row 10) (column 1) and short it. Solder and cut any excess		
CHECK OUT THE BOARD			
	now do the following resistance checks to verify your wiring.		
	Rotate R1 to about the 50% and put SW in one of the ON position.		
	Connect the NEG from your VOM to the NEG battery clip put meter on OHMS. Check all 18 pins of the socket.		
	All should be open except pins 8 and 11 they will show zero or shorted		
	Now connect the PLUS lead from your VOM to the PLUS battery clip.		
pin 1	open	X2 (2 MHz)	pin 18 4.7k *
pin 2	open		pin 17 open
pin 3	open	X1 (4 MHz)	pin 16 4.7k *
pin 4	open		pin 15 open
pin 5	open	(pin 1) (pin 8)	pin 14 open
pin 6	open	(pin 2) (pin 7)	pin 13 4.7k
pin 7	4.7k	(pin 3) (pin 6)	pin 12 5.2k
pin 8	open	(pin 4) (pin 5)	pin 11 open
pin 9	5.4k *	(cathode) D1 (anode)	pin 10 220 ohm
			NOTES
			pin 5 - value depends on position of pot. You can turn it and the resistance value will change
			pin 16 and 18 - one of them will be 4.7k while the other one is open. Change the SW to verify

X2 is not on the current schematic	
	it is a 2MHz chystal. The problem is it is larger than X1. so it needs to be mounted directly on the perf board.
	Insert X2 into (row 1) (column 5) and (row 1) (column 7). Solder BUT DO NOT cut the leads.
	take the lead in (row 1) (column 5) and bend the wire toward (row 3) (column 4) and solder
	take the lead in (row 1) (column 7) and bend the wire toward (row 3) (column 7) and solder
Install Componets	
	Be very careful when bending the leads of the crystals
	put the X1 next to the socket to determine the length the cut length. REMEMBER it is easier to cut twice than to length them
	cut X1 leads and plug in to pins 3 and 16. I found it easier to plug crystal into the 'back' of socket.
	install the ALD110900 - refer to the pinout chart in the CHECK OUT THE BOARD instructions above
	NOTE it is VERY STATIC sensitive - pin one of the package goes into pin 5 of the socket
	install D1 in pins 9 & 10 of the socket
IN	
	cut a 3 inch piece of hookup wire. Strip appox 1/4 inch from each end and tin it.
	insert it in to (row 12) (column 1) and solder BUT DO NOT cut
	bend the wire toward (row 12) (column 2) and short it. Solder and cut any excess
OUT	
	cut a 1 3/4 inch piece of hookup wire. Strip appox 1/4 inch from each end and tin it.
	insert it in to (row 13) (column 7) and solder BUT DO NOT cut
	bend the wire toward (row 13) (column 8) and short it. Solder and cut any excess