

This is the build manual for the AHC AUDIO Syntom. The Syntom is based off of a Electronics & Music Maker, April 1983 article and modified. It's a real lo-fi, el-cheapo drum machine sound.

This kit is for a more advanced builder. If you're new to DIY kits, you may want to skip this one. If you're advanced, you can go straight to the schematic at the end of this document. I make the assumption that you know how to solder, and that you know when to trim the leads from a soldered component, etc. etc.

You will need a 12V 20ma power supply for this kit, as well as a +5V 5ms pulse to trigger the synth.

The controls, as indicated by their part numbers, are as follows:

RV2: This is the roll rate

RV3: This is the envelop decay

RV4: This is the amount that the envelope modulates the pitch of the "tom" sound

RV5: This is control for the BP-filter on the noise generator

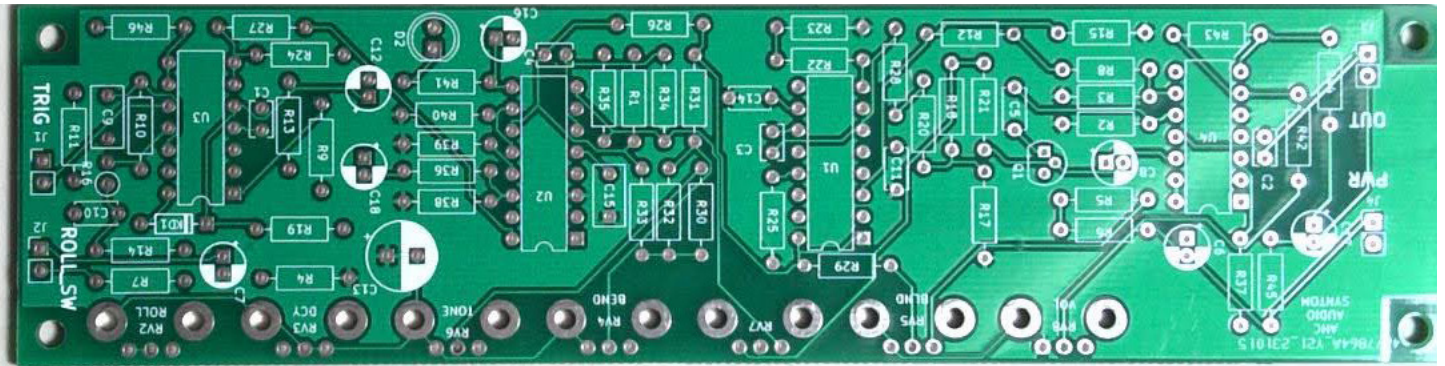
RV6: This is the pitch of the "tom"

RV7: This is the blend control between noise/"tom"

RV8: This is volume.

The output is line level. The input wants a 5ms +5V Pulse. The roll switch is closed to generate a roll.

Item	Qty	Reference(s)	Value	LibPart	Footprint
1	4	C1, C2, C3, C4	.1u	Device:C	Capacitor_THT:C_Rect_L4.0mm_W2.5mm_P2.50mm
2	1	C5	10n	Device:C	Capacitor_THT:C_Disc_D4.7mm_W2.5mm_P5.00mm
3	1	C6	100u	Device:C_Polarized_US	Capacitor_THT:CP_Radial_D5.0mm_P2.00mm
4	5	C7, C12, C16, C17, C18	1u	Device:C_Polarized_US	Capacitor_THT:CP_Radial_D5.0mm_P2.00mm
5	1	C8	4u7	Device:C_Polarized_US	Capacitor_THT:CP_Radial_D5.0mm_P2.00mm
6	1	C9	47n	Device:C	Capacitor_THT:C_Rect_L7.0mm_W3.5mm_P5.00mm
7	1	C10	22n	Device:C	Capacitor_THT:C_Disc_D4.7mm_W2.5mm_P5.00mm
8	2	C11, C14	1n	Device:C	Capacitor_THT:C_Disc_D4.7mm_W2.5mm_P5.00mm
9	1	C13	220u	Device:C_Polarized_US	Capacitor_THT:CP_Radial_D8.0mm_P3.50mm
10	1	C15	100n	Device:C	Capacitor_THT:C_Rect_L7.0mm_W3.5mm_P5.00mm
11	1	D1	IN4148	Device:D	Diode_THT:D_DO-35_SOD27_P7.62mm_Horizontal
12	1	D2	LED	Device:LED	LED_THT:LED_D5.0mm
13	4	H1, H3, H5, H6	MountingHole	Mechanical:MountingHole	MountingHole:MountingHole_3.2mm_M3_DIN965
14	1	J1	TRIG_IN	Connector:Conn_01x02_Female	Connector_PinHeader_2.54mm:PinHeader_1x02_P2.54mm_Vertical
15	1	J2	ROLL_SW	Connector:Conn_01x02_Female	Connector_PinHeader_2.54mm:PinHeader_1x02_P2.54mm_Vertical
16	1	J3	out	Connector:Conn_01x02_Female	Connector_PinHeader_2.54mm:PinHeader_1x02_P2.54mm_Vertical
17	1	J4	POWER	Connector:Conn_01x02_Female	Connector_PinHeader_2.54mm:PinHeader_1x02_P2.54mm_Vertical
18	1	Q1	BC108	Transistor_BJT:BC108	Package_TO_SOT_THT:TO-92
19	3	R1, R26, R33	150k	Device:R	Resistor_THT:R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal
20	13	R2, R5, R6, R10, R11, R12, R31, R32, R36, R40, R42, R43, R46	47k	Device:R	Resistor_THT:R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal
21	6	R3, R19, R21, R28, R34, R41	4k7	Device:R	Resistor_THT:R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal
22	2	R4, R35	10k	Device:R	Resistor_THT:R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal
23	4	R7, R9, R37, R45	100k	Device:R	Resistor_THT:R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal
24	2	R8, R13	2M2	Device:R	Resistor_THT:R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal
25	2	R14, R18	470k	Device:R	Resistor_THT:R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal
26	7	R15, R17, R23, R25, R38, R39, R44	1k	Device:R	Resistor_THT:R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal
27	1	R16	47k	Device:R	Resistor_THT:R_Axial_DIN0207_L6.3mm_D2.5mm_P2.54mm_Vertical
28	4	R20, R22, R29, R30	22k	Device:R	Resistor_THT:R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal
29	1	R24	680R	Device:R	Resistor_THT:R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal
30	1	R27	15k	Device:R	Resistor_THT:R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal
31	1	RV2	470k	Device:R_Potentiometer	Potentiometer_THT:Potentiometer_Bourns_PTV09A-2_Single_Horizontal
32	1	RV3	220k	Device:R_Potentiometer	Potentiometer_THT:Potentiometer_Bourns_PTV09A-2_Single_Horizontal
33	4	RV4, RV5, RV6, RV7	100k	Device:R_Potentiometer	Potentiometer_THT:Potentiometer_Bourns_PTV09A-2_Single_Horizontal
34	1	RV8	47k	Device:R_Potentiometer	Potentiometer_THT:Potentiometer_Bourns_PTV09A-2_Single_Horizontal
35	2	U1, U2	LM13700	Amplifier_Operational:LM13700	Package_DIP:DIP-16_W7.62mm
36	2	U3, U4	LM324	Amplifier_Operational:LM324	Package_DIP:DIP-14_W7.62mm



This is the circuit board. You'll want to install all of the resistors first - EXCEPT for R16. They're labeled and taped to the component cards - You can start with R1, R26, and R33. They're 150k resistors. The chart on the previous page shows the remaining resistors by their identification on the PCB, and their value. You can just tear off the resistors in order off of the component sheets and place them. It gets easier as you place more resistors.

Install D1, after you have installed all of the resistors except for R16.

Next, install the IC sockets. You can skip, and solder the ICs directly, but you'll make troubleshooting more difficult. MATCH THE NOTCH. The notch is notated on the ICs, and on the IC sockets, and on the circuit board. Make sure pin one is at the end with the notch.

Next, install C1-4; C5; C9; C10; C11; C14; and C15. C1-4 and C15 are the same value, but different capacitor types. You can mix em up, but the results are not optimal. These are NON-polar capacitors. They can be placed in either direction.

Install the rest of the capacitors. These are all POLARIZED Capcapacitors. They have a positive and a negative side. The negative side goes to the white half of the silkscreen circle on the PCB.

Next, install the transistor. It may be a different one than specified in the bill of materials, but it will work. Some folks are obsessed with the transistor in these kind of circuit. You're getting a cheap as dirt 2n2222 or BC108. They both make pretty good noise.

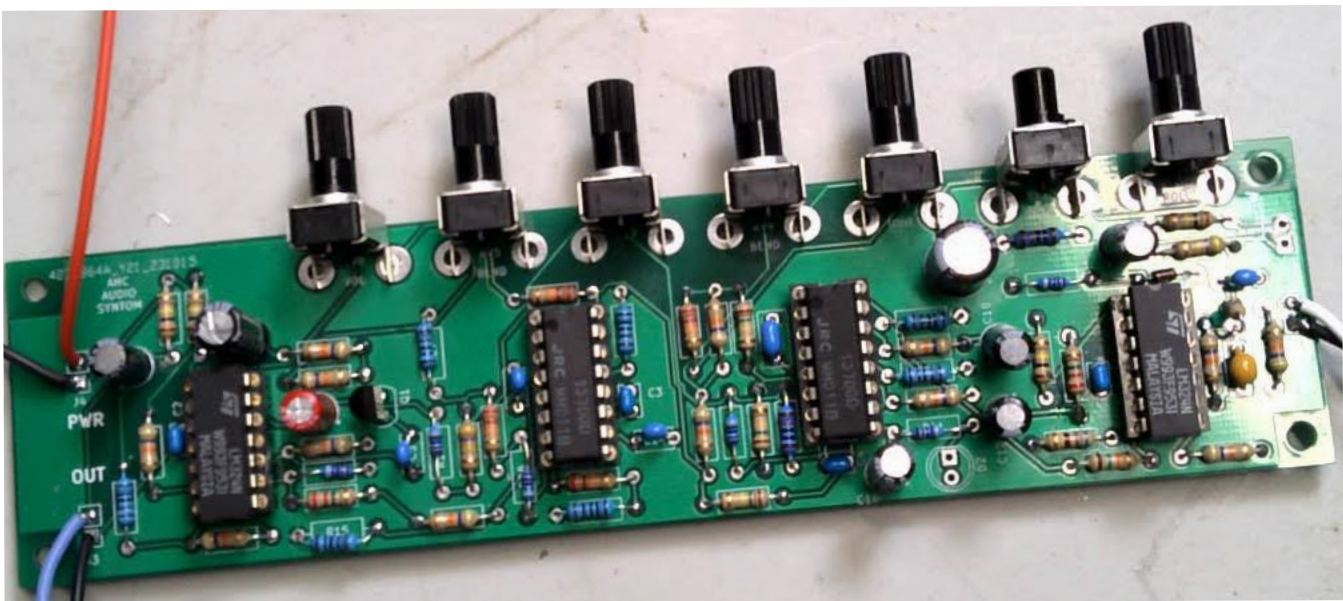
Finally, install R16. This is a vertical resistor, and has to have only one lead bent to fit. You'll see what I mean when you look at the board.

Next, you will install the potentiometers. These snap into the board, so it makes it easy to place them all, and then solder them. Solder the three pins on the potentiometer, and then one of the two ground snap pins.

RV4-7 are 100k (104). RV2 is 470k or 500k (504). RV3 is 220k or 200k (204), and finally RV8 is 47k or 50k (503).

Install the wires for the power, input, roll switch, and output. The power cord is in J4 - and the ground goes to the square pad. The output is J3, and again, the ground goes to the square pad. The trigger goes to J1 and the ground goes to the square pad. Finally, you can attach a NO switch to J2 (polarity doesn't matter) and use that to trigger the roll function. You can connect the input, roll switch, and output to the included 1/8" jacks, or you can adapt for your own system.

One final component D2 - that's an optional LED that pulses with the envelope. That will add 10 or so ma to the power consumption. Match the flat spot on the diode to the flat spot on silkscreen on the board.



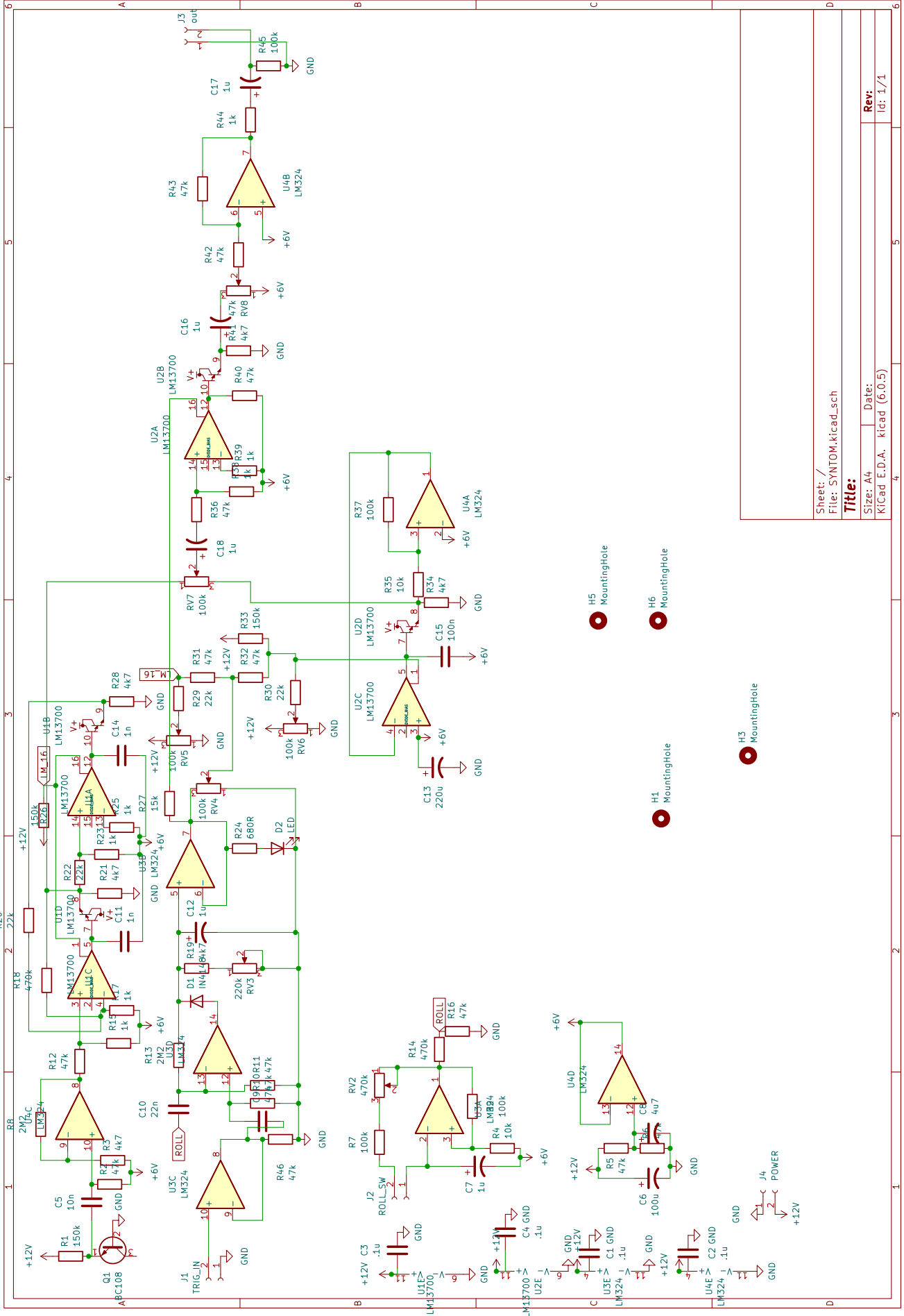
Testing it out:

Before you put the ICs in the socket - and before you hook up the power, *\*look\** at the board. Are there any “bridges” where there shouldn’t be? A bridge is when solder glops over from one connection to another. Are the joints neat? Do they look shiny? And like Hershey’s kisses? If they’re dull and blobular, reheat and try again.

Now, apply power. Is anything getting hot? Nothing should be hot.

Once you’ve made sure that nothing is hot, no bridges, good solder joints, etc. etc. put the ICs in the socket - Make *\*sure\** that you are matching the notch on the PCB! NOT THE SOCKET. You *\*may\** have soldered the socket in backwards. Probably not, but you can still use the board if the sockets are in backwards. Make sure the notch matches the IC and the PCB.

Put in 5ms +5V pulses. Give it Clean 12VDC. Listen to the groovy beats. Maybe dance around a little bit.



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 KiCad E.D.A.    kicad (6.0.5)  
 Rev: 1/1