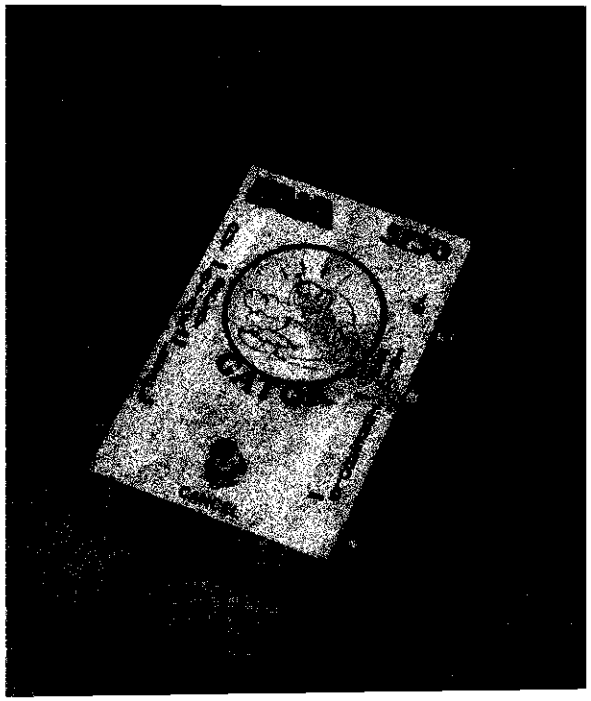
GATOR
Attack Delay/Noise Gate
5730



PAIA Electronics, Inc.

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www.paia.com

!IMPORTANT!

Prior to beginning assembly of your new kit, check the supplied parts with the following parts list. BE DILIGENT.

5730
MASTER PARTS LIST

QNTY	VALUE	DESC. (alternate markings)
		FIXED RESISTORS
2	1K	brown-black-red
7	10K	brown-black-orange
2	30K	orange-brown-orange
3	1 Megohm	brown-black-green
2	4.7 Megohm	yellow-violet-green
2	10 Megohm	brown-black-blue
		CERAMIC DISK CAPACITORS
		(ALTERNATE MARKINGS)
2	33pf	33
1	100pf	100
		POLYSTYRENE CAPACITORS
2	.1 MFD.	104
		ELECTROLYTIC CAPACITORS
2	1 MFD./10V.	Greater voltage ratings acceptable.
2	10 MFD./10V.	
1	100 MFD./10V.	
		SEMICONDUCTORS
3	1N4148 or 1N914 SIGNAL DIODE	
1	LM308 OP-AMP IC	
1	4136 QUAD OP-AMP IC	
1	CA3080 TRANSCONDUCTANCE OP-AMP IC	

		POTENTIOMETERS
3	250K AUDIO TAPER CONTROL POT	
		MISCELLANEOUS PARTS
1	PUSH ON/PUSH OFF SWITCH (with 3 nuts)	
1	OPEN CIRCUIT 1/4 INCH PHONE JACK	
1	CLOSED CIRCUIT 1/4 INCH PHONE JACK	
1	STEREO 1/4 INCH PHONE JACK (all jacks with 2 nuts)	
2	8 PIN IC SOCKET	
1	14 PIN IC SOCKET	
1	BATTERY CONNECTOR	
1	BATTERY HOLDER	
4	POT NUT	
4	"J" NUT	
4	#8 X 3/8" MACHINE SCREW	
4	STICK-ON RUBBER FEET	
3	PUSH-ON KNOBS	
1	5730 GATOR PC BOARD	
4"	DOUBLE STICK FOAM TAPE	
2"	BARE WIRE	
40"	INSULATED WIRE	

KIT ALSO CONTAINS:

1	5730 GATOR CASE (top & bottom)

NOTE: If any parts appear to be missing or damaged, DO NOT begin assembly. Contact PAIA Electronics, Inc., 1020 W. Wilshire Blvd., Oklahoma City, OK. 73116, (405) 843-9626.

INTRODUCTION

Thank you for buying the PAIA 5730 GATOR kit. We realize that you are anxious to get on with the assembly, but before you start, please take the time to read the hints and suggestions that follow.

-- BEFORE YOU BEGIN --

Familiarize yourself with this manual. It's not necessary to read the whole thing in detail, but at least go through and look at the illustrations. Get a feel for the parts and how they fit together. It is particularly important to check the parts supplied against the parts list in the front of this manual.
This is a relatively simple kit and it will not take long to assemble. Nevertheless, please do us all a favor - TAKE YOUR TIME. Time invested in careful assembly now will pay great dividends in the time saved trouble-shooting for careless errors when you're done.

SOLDERING

Successful operation of your kit, as well as it's longevity, is probably more dependent on how the components are soldered in place than any other one thing that the assembly involves. There are three key rules to go by, these are as follows:

TYPE OF SOLDER: Use ONLY ROSIN CORE SOLDER. Acid core solder or paste flux should never be used to assemble electronic circuitry, and the use of either on this kit will VOID THE WARRANTY. Good 60/40 rosin core solder is expensive, but it may be considered a long term investment, and well worth it.

SOLDERING TOOL: Use a soldering iron with a power rating of about 25 watts to 35 watts, and a small pointed tip. Soldering guns are completely unacceptable for soldering solid state components, as the large magnetic fields they generate can easily damage some components.

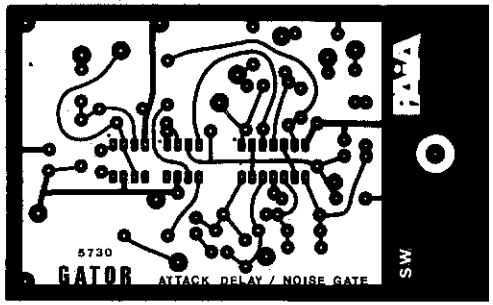
Be sure to keep your soldering iron tip clean. Before soldering a connection, wipe the tip on a damp sponge. This will aid in heat transfer and prolong tip life.

SOLDERING TECHNIQUE: We recommend looking at the solder connections on commercially avaiable amps and effects units and try to imitate them as closely as possible. A proper circuit board solder joint has just enough solder to cover the soldering pad and about 1/16" (2mm) of the component lead passing through it.

To solder, hold the tip of the iron against both the wire to be soldered and the circuit board trace (or jack lug, switch lug, or whatever). Hold it there for a second or two to let things heat up, then feed a small amount of solder onto the connection. Do not simply feed the solder onto the tip of the iron and expect it to run down onto the connection. Continue holding the iron against the connection until the solder melts fully and flows freely over the connection. Then remove the iron and let the joint cool. Do not move any of the wires while the solder is cooling; if this happens, re-heat the connection, feeding in a tiny bit more solder.

There are two types of improper connections to watch out for; using too little solder (or too little heat) will result in a connection which will appear to be soldered when actually there is a layer of flux or oxidation insulating the component lead. To cure this, re-heat the connection and flow a small additional amount of solder on the joint. Using too much solder can lead to excess solder flowing between adjacent terminals or traces of a circuit board, causing a short circuit. Unintentional solder bridges of this type can be cleaned off onto the tip of a CLEAN, hot soldering iron while holding the board upside down. Another problem with using too much solder is that it can flow over to an adjacent hole, blocking it with solder. If this happens, again hold the board upside down and flow solder away from the blocked hole and onto the tip of a clean hot iron. Use a pin to poke through any remaining solder left in the hole.

Finally, avoid using too much heat or leaving the iron on a connection for too long. Excessive heat can damage many types of electronic parts, and in extreme cases can cause the foil conductors to lift from the circuit board.



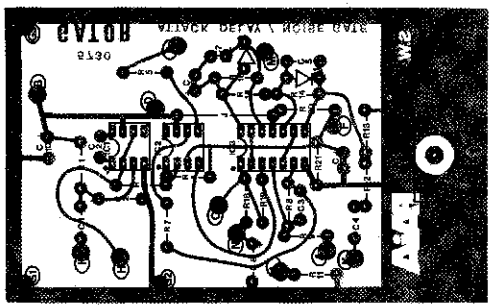


Figure 1 : Parts Placement and Printed Circuit

CIRCUIT BOARD ASSEMBLY

CIRCUIT BOARD PREPARATION

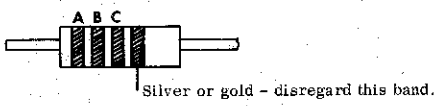
() **Prepare** the 5730 circuit board for assembly by thoroughly cleaning the conductor side with a scouring cleanser (rinse completely with clean water and allow to dry) or Scotch Bright (R) or a clean steel wool pad. DO NOT USE PRE-SOAPED PADS. The board must be bright and shiny to accept the solder and failure to clean the board will result in poor solder joints and will VOID THE WARRANTY on the kit.

JUMPER WIRE INSTALLATION

() **Using** the BARE wire provided, form and install the wire jumper on the circuit board. The designator for the jumper is the solid line broken with the letter "J" printed on the component side of the board and in the parts placement drawing figure 1. Note that the wire supplied can be straightened by pulling it between your pinched thumb and forefinger several times.

RESISTOR INSTALLATION

Solder each of the fixed resistors in place following the parts placement designators printed on the circuit board and shown in the assembly drawing figure 1. Note that the fixed resistors are non-polarized and may be mounted with either of their leads in either of the holes provided. Insert both leads in the mounting holes and push the resistor FULLY against the board. On the conductor side of the board, bend the leads outward to about a 45 degree angle to help hold the component in place while soldering. AFTER SOLDERING, clip off each lead end flush with the top of the solder joint.



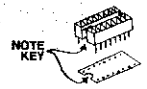
DESIGNATION	VALUE	COLOR CODE
() R4	1K	brown-black-red
() R9	1K	brown-black-red
() R5	10K	brown-black-orange
() R7	10K	brown-black-orange
() R11	10K	brown-black-orange

() R12	10K	brown-black-orange
() R15	10K	brown-black-orange
() R20	10K	brown-black-orange
() R21	10K	brown-black-orange
() R3	30K	orange-black-orange
() R8	30K	orange-black-orange
() R16	1 Megohm	brown-black-green
() R18	1 Megohm	brown-black-green
() R19	1 Megohm	brown-black-green
() R13	4.7 Megohm	yellow-violet-green
() R14	4.7 Megohm	yellow-violet-green
() R1	10 Megohm	brown-black-blue
() R2	10 Megohm	brown-black-blue

SOCKET INSTALLATION

Install each IC socket by inserting its pins into the holes provided from the COMPONENT side of the board and then soldering each pin to its respective pad on the CONDUCTOR (foil) side of the board. BE SURE THE SOCKET IS PRESSED FIRMLY DOWN ON THE BOARD AND THAT ALL THE PINS ARE PROTRUDING THROUGH TO THE CONDUCTOR SIDE. Some sockets may bear orientation markings on one end. While there is no electrical significance to the orientation of the socket, it is good practice to acknowledge these markings and orient the socket accordingly. Normally the marked end will correspond to the semi-circle notch at one end of the parts placement designator drawn on the circuit board.

DESIGNATION	TYPE
() IC SOCKET 1	8 PIN
() IC SOCKET 2	8 PIN
() IC SOCKET 3	14 PIN



CAPACITOR INSTALLATION

Install the CERAMIC DISK capacitors. Like the resistors, these components are non-polarized. The value of the capacitor will be marked on the body of the part. Solder in place and clip the excess leads.

DESIGNATION	VALUE	ALTERNATE MARKING
() C2	33pf	33
() C5	33pf	33
() C3	100pf	100

Install the polystyrene capacitors in the same manner as above. These capacitors are also non-polarized and the value will be marked on the body of the part. Solder in place and clip the excess leads.

DESIGNATION	VALUE	ALTERNATE MARKING
() C1	.1 MFD.	104
() C4	.1 MFD.	104

Up to this point, all components have been non-polarized, (i.e. either lead can go into either hole). Elecrtrolytic capacitors are polarized; just like a battery they have a (+) and a (-) end; and like a battery, if installed incorrectly the circuit won't work. The capacitors supplied will have either the (+) or the (-) lead marked on the boddy of the part. The (+) lead must go through the circuit board hole which has been labeled positive (+). In the event that the capacitors have their negative (-) leads marked, this lead should go through the unmarked hole in the circuit board.
NOTE THAT THE SPECIFIED VOLTAGE RATING IS A MINIMUM RATING. CAPACITORS SUPPLIED WITH CERTAIN KITS MAY HAVE A HIGHER VOLTAGE RATING THAN THAT SPECIFIED.

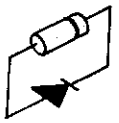
DESIGNATION	VALUE	ALTERNATE MARKING
() C6	1 MFD./10V.	Greater voltage ratings acceptable.
() C7	1 MFD./10V.	
() C8	10 MFD./10V.	
() C9	10 MFD./10V.	
() C10	100 MFD./10V.	

DIODE INSTALLATION

Install the diodes on the circuit board. Like all semiconductors, the diodes are heat sensitive. To be on the safe side, heat sink each diode lead by grasping the lead with a pair of needlenose pliers or a small copper alligator-type clip at a point between the body of the component and the circuit board. Be sure to orient the diodes as shown in the adjacent drawing.

DESIGNATION TYPE

() D1 1N4148 or 1N914
() D2 1N4148 or 1N914



NOTE: D3 will be installed in a later step.

FOOT SWITCH INSTALLATION

() Install the foot switch S1 by inserting the mounting shaft into the large hole in the circuit board from the COMPONENT side. Thread one of the hex nuts provided onto the shaft of the switch and tighten it against the conductor side of the board. Orient as shown in figure 2.

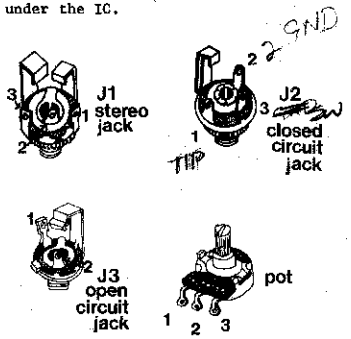
IC INSTALLATION

() Install the integrated circuits. Note that the orientation of the IC is keyed by a circular indentation or notch at one end of the component. This aligns with the semicircular key drawn on the circiut board graphics. Carefully insert the pins of each IC into the receptacles of the sockets installed earlier and press the device firmly into place. Be sure all the pins go into the sockets and do not get bent up under the IC.

POINT TO POINT WIRING

Locate the three control potentiometers and the three 1/4 inch phone jacks. Before beginning the following wiring steps, be sure you can identify each of the three jacks as one of the types shown in the adjacent drawings. Note the lug numbers.

Also note that all 3 potentiometers are the same value so that any one pot can be used as any of the 3 controls R6, R10 or R17. Again notice the way the lugs are numbered.



It is good practice to tin the solder lugs on the jacks and controls before soldering the wire to it since the heat required to tin the lug may well be enough to melt the insulation on the stranded wire. Hold the component in a small vise during this operation. If no vise is available, a pair of needlenose pliers held closed with a rubber band will help.

Tin the lugs by holding your soldering iron against them for a few moments to allow the lugs to heat up. After a few seconds, feed solder to the point where the lug and iron meet. If the solder does not flow out onto the lug, it is an indication that oxidation is interfering with the solder bond. Break down the oxidation by rubbing the soldering iron around while applying firm pressure until the solder adheres smoothly to the lug. Tin all the metal surface you can near the hole, but leave the hole open. should the hole fill with solder, reheat the solder to melting and then "rap" the component on the work surface to knock the excess solder off the lug. Use a pair of pliers to hold the HOT component. After the lugs have been correctly tinned and cooled, choose one of the pots to be R17 and continue with the next step.

() Install diode D3 on the lugs of potentiometer R17. Insert the leads of the diode into the holes in the pot lugs as shown in the adjacent drawing. Bend each lead around the lug just enough to hold the diode in place. Connect the banded (cathode) end of the diode to lug 3, and the other end to lug 2. DO NOT SOLDER YET.

In the following steps the insulated wire provided with this kit will be used to make the connections between the controls and jacks, and the circuit board. At each step, prepare the wire by cutting it to the specified length and stripping 1/4 inch (.7cm) of insulation from each end. "Tin" each end of the wire by twisting the strands together and melting just enough solder into the wire to hold the strands together. To be sure you will have sufficient wire for all steps, "rotate" through the strands available. At each step solder both ends of the wire. Refer to figure 2.

LENGTH	FROM	TO
() 3 1/2" (8.9cm)	S1 lug 1	C
() 3 1/2" (8.9cm)	S1 lug 2	D
() 6" (15.3cm)	J3 lug 1	A
() 3" (7.7cm)	R6 lug 1	E
() 2 1/4" (5.8cm)	R6 lug 2	F

()	1 1/2" (3.9cm)	J1 lug 2	G1
()	1 1/2" (3.9cm)	J2 lug 2	G2
()	1 1/2" (3.9cm)	J3 lug 2	G3
()	1 1/2" (3.9cm)	J2 lug 3	H
()	1 1/2" (3.9cm)	J1 lug 1	I
()	1 1/2" (3.9cm)	R10 lug 2	K
()	1 1/2" (3.9cm)	R10 lug 3	L
()	1 1/2" (3.9cm)	R17 lug 3	M
()	3 1/2" (9cm)	R17 lug 2	N
()	2 3/4" (7cm)	J2 lug 1	R10 lug 1

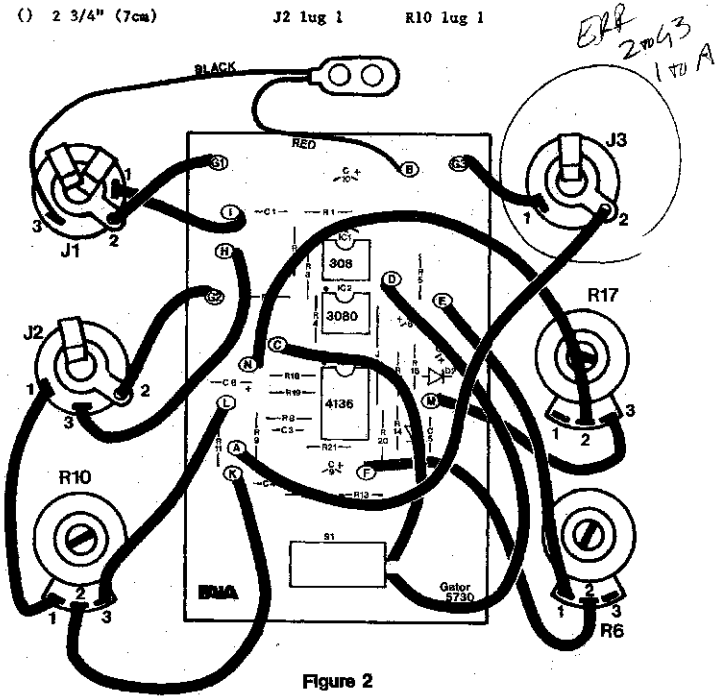


Figure 2
Wiring Diagram

() Install the battery connector. Connect the RED wire to the circuit board hole labeled "B" and connect the BLACK wire to lug 3 of the input jack J1. Solder both connections.

This completes assembly of the 5730 PC board. Set the board aside momentarily and prepare the case.

NOTES

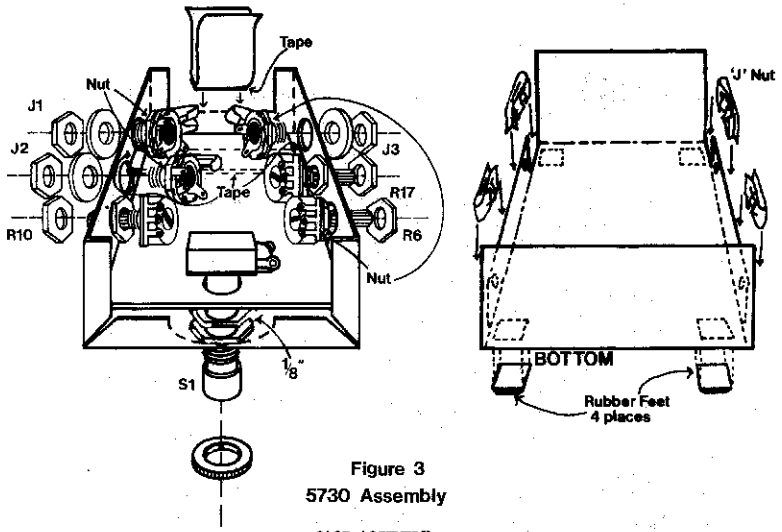


Figure 3
5730 Assembly

CASE ASSEMBLY

() Locate the foam tape and cut off 1/2" (1.3cm) from the length provided.

Of these two pieces of tape, the shorter will be used to attach the battery holder to the case top and the longer will be used as an insulater to prevent the unsupported end of the circuit board from touching the case top.

To get a feel for the location of the small tape section and the battery holder, trial fit the circuit board by passing the shaft of the foot switch through the hole while dropping the board in place. Notice that a small space must be allowed between the holder and the folded lip of the case to provide clearance for the case bottom when it is installed.

Remove the circuit board and proceed.

() Install the longest piece of tape on the inside TOP of the case as shown in figure 3. REMOVE THE PROTECTIVE PAPER FROM ONLY ONE SIDE OF THE TAPE.

() Locate the "U" shaped battery holder and stick the small piece of tape to the bottom of it. Remove the paper from the other side of the tape and position it to the inside of the case top as shown in figure 3.

() Install the extra hex nut on the shaft of S1 and run it down to about 1/8" to 1/4 inch from the body of the switch.

() Install the circuit board in the case by inserting the threaded shank of S1 up through the CANCEL hole from the inside of the case top. From the outside thread the knurled finish nut onto the shank of S1 and tighten firmly against the case top.

In the following steps, when the jacks and pots are installed, one of each of the pair of nuts supplied should be threaded onto it's shaft and used as a spacer. Adjust this nut so that when the part is installed as little of the shaft as posible extends outside the case. Refer to figure 3.

() Install J1 (with one nut in place) in the hole marked "IN" by inserting the threaded shank of the jack into the hole from the inside and threading the other nut onto it from the outside. If a washer is included, install it with the outer nut. Tighten securely.

() In the same manner, install J2 in the hole marked "EXT. TRIG".

() In the same manner, install J3 in the hole marked "OUT".

() In a similar manner, install control potentiometer R6 (with one nut in place) in the hole marked "LEVEL". Orient the control pots so that the lugs point toward the front of the case where the foot switch mounts.

() In a similar manner, install control pot R10 in the hole marked "THRESHOLD".

() In a similar manner, install control pot R17 in the hole marked "ATTACK DELAY".

() Locate the four "J" clips and install them on the case bottom as shown in figure 3. The dome side should be toward the inside of the case.

() Locate the four rubber feet and install them on the outside of the case bottom. Remove them from the carrier and stick them in place.

TESTING

Before installing the case bottom we will test the GATOR. Snap in a fresh 9 volt battery and plug your axe into the "IN" jack and patch the "OUT" to you amplifier. Set both ATTACK DELAY and THRESHOLD controls to minimun and set the LEVEL control to about 50%.

You should now be able to play normally. Continue to provide an output signal from your instrument while you rotate the THRESHOLD control toward max. At some point the sound should stop coming from your amp. If not, press the CANCEL switch and try again.

When the above is successeful, leave the GATOR active and rotate the THRESHOLD control back to minimum.

Now rotate the ATTACK DELAY control to about 50%. Mute your instrument and play a new note or chord. Hold the note out long and note that the sound from your amp slowly rises to the set level. As the ATTACK DELAY control is rotated toward max the delay gets longer.

The LEVEL control lets you set the "gated" (GATOR active) output level to fall below, match, or exceed the level of the normal, ungated (GATOR canceled) signal.

Of course the CANCEL switch turns GATOR off and on. When GATOR is canceled the audio signal from your instrument is allowed to pass unmodified.

Note that plugging your cord into the "IN" turns the power on, so you must keep the GATOR's input unpluged when the unit is not in use to get long life from the battery.

() After testing is complete, install the case bottom by slipping it into place and inserting the four #8 machine screws through the holes in the sides of the case top. Thread them into the "J" clips and tighten securely.

() Install the knobs. Once the control knobs are pushed onto their shafts they will be dificult to remove. Before installing the knobs, set the controls to min and align the pointer on the top of the THRESHOLD knob so it is in about a 7:00 o'clock position, and align the LEVEL and ATTACK DELAY knobs so that they are in about a 5:00 o'clock position. Push the knobs firmly into place.

USING GATOR

GATOR can be applied in more than one way. First let's discuss the most common application; "NOISE GATE". In this case, Gator must be inserted in the signal path after all other effects and before the amplifier, as in figure A. Think of the noise gate as having two inputs, an audio signal input and a trigger signal input. In this patch the "EXT TRIG IN" jack is not used because the noise gate is being triggered by the input signal itself, which is coupled to the trigger input internally unless a jack is inserted into J2, (EXT TRIG IN).

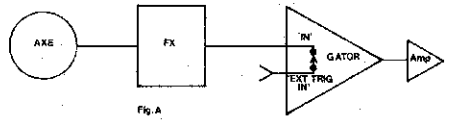


Fig.A

When a plug is inserted into J2, the internal connection is opened and GATOR must recieve an audio signal at J2 in order to trigger. This is handy if the processed signal you are working with is so noisy that the noise itself tends to reach the trigger threshold. You can utilize the external trigger input to trigger the GATOR from a clean source. This scheme is shown in figure B. Note that the processed instrument signal applied to "IN" is no longer coupled to trigger input, and that now the trigger input is provided with an unprocessed instrument signal.

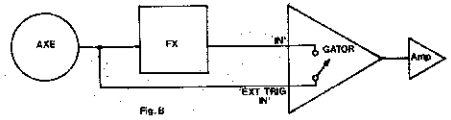


Fig.B

In either of the two configurations discussed above the LEVEL control can be set so that the "gated" output is louder, softer, or the same as the ungated (GATOR canceled) output.

A third option is to use GATOR in a "syncro-sonic" situation as shown in figure C. With this patch another instrument or sound source can be gated under control of your instrument.

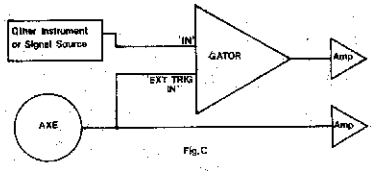


Fig.C

To get GATOR going use the patch shown in figure A, or just patch the 5730 in by itself. Start with the LEVEL control set to minimum, ATTACK DELAY at minimum, and THRESHOLD at maximum. Try playing your instrument as you push the CANCEL switch several times. The sound should go on and off with the action of the switch. Leave the switch in the position that turns the sound off, and keep playing while you rotate the THRESHOLD control toward min. At some point GATOR should "kick in" (turn the sound on).

Note that when the signal from your instrument falls below a certain point GATOR turns off. The THRESHOLD setting you will actually use will probably be somewhat lower than this so that the signal can die down naturally and sustain some before the noise gate shuts down. This is especially true for guitar while it may not even apply to some keyboard instruments.

The ATTACK DELAY function can also be used in either of the two above configurations, but if attack delay is the only function desired (no noise gating necessary), then GATOR can be inserted in the signal path anywhere between the instrument and the amp. There are two things to consider in this case. One is the setting of the LEVEL control when signal processing devices requiring limited input signal levels follow the GATOR in the signal path. Typical devices of this type are analog delay effects such as flangers and chorusing units. For such patches, the LEVEL control on the GATOR will have to be set low. No damage will result from too high a level setting, but the audio signal will be distorted.

The other thing is "DC offset". In the interest of high fidelity, your GATOR is "DC coupled" (except for the input). This means that if you connect the GATOR output to the input of a unit that gives you a choice of "AC" or "DC" coupled inputs, you should use the AC coupled

input, (not to be confused with 110 volts AC power). Again, no damage will result, but the signal will be distorted or will not pass to the amplifier.

Attack delay is handy for "bowing" effects and fade-ins. Just rotate the ATTACK DELAY control toward max to increase the delay time. GATOR will cause the sound to "fade in" at a rate set by this control each time a new trigger occurs (when you mute your instrument and then play again).

Don't confuse the ATTACK DELAY control with the THRESHOLD control. They may seem to be interactive at first, but they're not really. The thing to do is to find a good THRESHOLD setting first, then play with the ATTACK DELAY control.

REMEMBER THAT THE POWER (battery) TO YOUR GATOR IS TURNED ON AUTOMATICALLY WHEN A PLUG IS INSERTED INTO THE "IN" JACK. TO PRESERVE BATTERY LIFE, UNPLUG THE CORD FROM THE INPUT WHEN THE UNIT IS NOT IN USE.

For an unbeatable team to process guitar dynamics, try PAIA's 5710 HOTLYX sustain unit with your GATOR. Placing HOTLYX in front of GATOR provides a strong, clean, long lasting signal for GATOR to work with. You'll love it!

PAIA also produces other quality special effects kits for electronic guitarists. Send for our FREE catalog.

DESIGN ANALYSIS

When a MONO 1/4" phone jack is inserted into J1, the ring connector of the jack is grounded, connecting the negative side of the battery to circuit ground and applying power to the circuitry.

The input signal is coupled by DC blocking capacitor C1 to the noninverting input of op-amp IC1. Resistors R1 and R2 hold this input at a DC potential that is 1/2 the supply voltage. The op-amp is configured as a common voltage follower buffer.

The output of IC1 delivers the buffered audio signal to two points. One is lug 2 of the closed circuit switching jack J2 (EXTERNAL TRIGGER INPUT). If there is no plug in J2, lugs 1 and 2 will be switched together so that the signal will be applied to the THRESHOLD control pot R10. The wiper of R10 (lug 2), picks off the desired signal level and feeds it to the control circuitry, (more on this later).

The instrument signal from the output of the buffer amp IC1 is also coupled by R3 to the inverting input of transconductance op-amp IC2. R4 keeps the signal level at this input attenuated to less than 100mv as required by the 3080 chip.

Any signal present at the output of IC2 is buffered, slightly amplified and inverted again by op-amp IC3a. The second invertion puts the output signal back in phase with the input, an important consideration when using multiple paralleled effects. R9 couples the processed signal to the output jack J3.

Back at the threshold control R10, the level adjusted signal at the wiper is coupled by DC blocking capacitor C4 to the first amplifier stage in the control circuitry, built around op-amp IC3b. Here the positive excursions of the audio signal are inverted and greatly amplified. The resulting negative going transits at the output of IC3b are coupled to the next stage by R15.

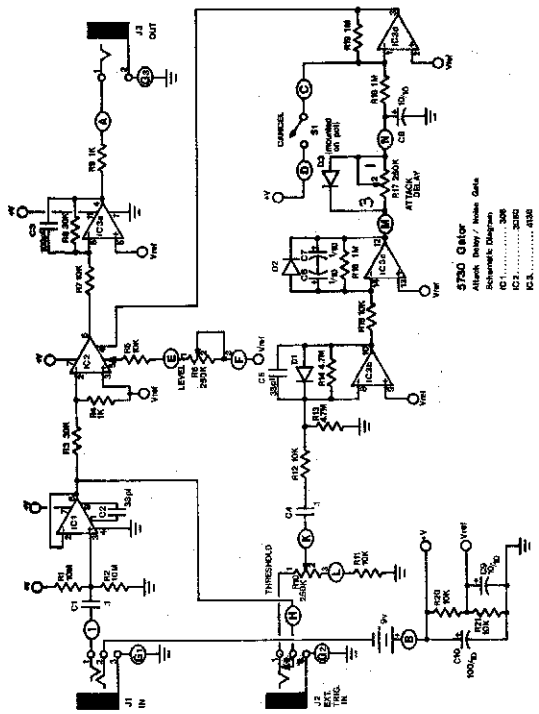
This stage, built around IC3c, exhibits still more high gain and through the action of integrator capacitors C6 and C7, smooths the negative going pulses into a positive DC voltage.

That voltage is applied to the ATTACK DELAY control pot R17 and used to charge capacitor C8. The value to which R17 is set determines the charge time. When the input signal falls below the threshold, the output of IC3c falls toward ground but can only go as far negative as Vref (minus 1 diode drop), due to the clamping action of diode D2. C8 then discharges through D3 back into the output of op-amp IC3c.

IC3d buffers and inverts the voltage on C8 and uses this to drive the negative power input of IC2 (pin 4). When this pin is pulled negative, current can flow through the gain control input (pin 5) of the 3080. The amount of current flowing into this input is governed by the value of R5 and LEVEL control pot R6. When the voltage on pin 4 of IC2 is as far positive as Vref or higher the TOA shuts down and will not pass the audio signal.

If the CANCEL switch S1 is closed, +V is applied to the inverting input of IC3d, overiding any voltage on C8 and causing the output of the op-amp to go near ground. This turns on IC2 regardless of the threshold situation so that the noise gate and attack delay functions are defeated and the audio signal is passed unaltered.

Resistors R20 and R21 form a voltage divider between +V and ground. The voltage at their junction is approximately 1/2 the supply voltage and is used as a reference voltage for all but one of the op-amps. Capacitor C9 filters this voltage while C10 filters the supply voltage.



Tip - 1
Slv - 2
Sw - 3