ARIES MUSIC SYSTEM 300 SYNTHESIZER

MODULE AR-345

VC ENVELOPE GENERATOR ASSEMBLY INSTRUCTIONS

IT IS RECOMMENDED THAT YOU DO THE FOLLOWING BEFORE YOU PROCEED:

Find a place where you can work through completion, without disturbing your set-up
Use adequate lighting
Wash your hands before starting. This removes contaminating oils and perspiration and makes assembly more comfortable.
As you proceed, check off each step with a pencil.

( ) 1. PREPARATION:
Lay the circuit board down on a sheet of white paper. PLACE METAL FOIL SIDE DOWN! Turn board so that connector strip is to the left.
Lay the assembly drawing near the board.
Unpack the parts carefully and place in a large box or tray SO THEY WON'T GET LOST. PLEASE READ THE GENERAL ASSEMBLY INSTRUCTIONS BEFORE BEGINNING ASSEMBLY.

HAVE THE FOLLOWING TOOLS NEARBY:
Pencil tip soldering iron, hot and tinned (solder coated)
Solder; USE ONLY THIN ROSIN-CORE SOLDER!
Small, diagonal wire cutters
Small wire strippers
Small long-nose pliers
Flat blade screw driver
½" or #16 nut driver
5/16" or #10 nut driver
⅜" or #8 nut driver
A pair of regular pliers can substitute for the nut drivers but will not be as easy to use.

( ) 2. RESISTORS (See general assembly instructions)
Carefully install all resistors on the circuit board in the following sequence. Double check your installation against the P.C. board component layout drawing to be sure that the correct value is in the correct location. To prepare the resistor for insertion hold the body of the resistor between the thumb and index finger of your left hand. With the thumb and index finger of your right hand bend both leads of the resistor at once to form right angles with the body. The resistor will now insert easily into the P.C. board. Once the resistor is inserted, bend the leads on the foil side outward to hold the resistor in place. Solder the resistors to the board and cut the leads about 1/16 of an inch away from the board. For ease in reading the resistor values once they are installed, install the resistors with the gold band facingeither the bottom or the right hand side of the board. For envelope generator I.C.'s labelled with an "A" or "B" no RTI trim resistors will be installed.

a.	Mount	all seven	100K	resistors.	R2,4,6,17,19,21,22.	Solder	&	cut	leads
b.	"	" three	180K	"	R1,3,5	"	"	"	"
c.	"	" three	330K	"	R10,11,12	"	"	"	"
d.	"	" three	470K	"	R13,14,15	"	"	"	"
e.	"	both	10K	"	R7,8	"	"	"	"
f.	"	both	1K	"	R20, 23	"	"	"	"
g.	"	both	150K	"	R16,18	"	"	"	"

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h. Mount the 1Meg resistor. R-9 Solder & cut leads
i. " " 3.9K " R-24 " " " "
j. " additional trimming resistors TRI and RTM. Solder & cut leads.

( ) 3. DIODES (see general assembly instructions)
The black band on the component should correspond with the black band on the diode drawn on the PC board layout drawing.
Mount both diodes; C-1 & 2. Solder and cut leads

( ) 4. INTEGRATED CIRCUITS (see general assembly instructions)
The pin indication on the component should coincide with the indication drawn onthe PC layout drawing.
Mount both LM-301-A op-amps; U-2 & U-3. Solder
Mount the SSM 2050 envelope generator IC, U-1. Solder

( ) 5. CAPACITOR (see general assembly instructions)
Observe the polarity of the tantalum capacitors. The positive lead is the lead closer to the (+) sign on the component.
a. Install both 0.01uf ceramic disc capacitors. C1, 2. Solder & cut leads
b. Install both 33pf ceramic disc capacitors. C3, 4. Solder & cut leads
c. Install both 1uf tantalum capacitors. C6, 7. Solder & cut leads.
d. Install the 0.1uf tantalum capacitor. C5. Solder & cut leads.

( ) 6. TRIM POTS (see general assembly instructions)
Mount the trim pot T1. Solder.

( ) 7. Snap wire saddle into PC board with the loop on the component side of the board.

THIS COMPLETES THE ASSEMBLY OF THE PC BOARD. FOR THE TIME BEING, LAY IT ASIDE AND GO ON TO THE NEXT SECTION.

FRONT PANEL ASSEMBLY PROCEDURE (refer to front panel wiring diagram)
Aries Music face panels are made of anodized aluminum. They will not be scratched in normal operation, but they can be scratched with pliers or a nut driver. When using tools on the front panel, be very careful not to scratch it.

1. Mount ATTACK INITIAL and ATTACK MOD pots. Do not yet fully tighten the nuts because they will be later removed for final assembly. If pots have a flange which prohibits them from mounting flush against the face panel, bend the flange outwards so the pots will mount flush.
2. Mount the remaining 6 pots being sure to include the additional larger 1/16" thick nut between the body of the pot and the lock washer. Tighten the nut firmly against the body of the pot. Mount these pots putting smaller nut on front of face panel.
3. Mount the SWITCH orienting the terminals horizontally. It makes no difference which terminal is on the right. The washer should be placed on the back of the face panel.
4. Mount the 10 JACKS orienting them as shown on the wiring diagram. Mount the washer on the front side on the face panel and tighten the nuts.

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PANEL WIRING AR-345

PLEASE REFER TO THE GENERAL ASSEMBLY INSTRUCTIONS BEFORE GOING ANY FURTHER

The order in which these connections are made has proven to be the easiest and most convenient method of wiring this module. The color-coded wires will facilitate trouble shooting the module.

USING BLACK WIRE, CONNECT AND SOLDER THE FOLLOWING WIRES. CUT THESE WIRES TO LENGTH, STRIP AND TIN. LEAVE AS LITTLE SLACK AS CONVENIENTLY POSSIBLE EXCEPT WHERE SPECIFICALLY INDICATED AT STEPS 1 AND 4.

NOTE: When soldering, be careful not to fill up the solder terminals on the pots or jacks with solder. It may be necessary for other wires to be connected to the terminal at a later time.

1. the CCW tap of PA INITIAL to the CCW tap of PD INITIAL. This wire should be 3" long
2. the CCW tap of PD INITIAL to the CCW tap of PS INITIAL
3. the CCW tap of PS INITIAL to the CCW tap of PR INITIAL
4. the CCW tap of PA MOD to the CCW tap of PD Mod. This wire should be 3" long
5. the CCW tap of PD MOD to the CCW tap of PS MOD
6. the CCW tap of PS MOD to the CCW tap of PR MOD
7. the CCW tap of PR INITIAL to the GROUND of JACK A. (Do not yet solder this wire to the jack)
8. the CCW tap of PR MOD to GROUND of JACK A. (Do not yet solder this wire to the jack)
9. Using un-shielded wire or tinned copper bus wire, connect the GROUNDS of all 10 JACKS together. Solder all three wires to JACK A.

USING RED WIRE, CONNECT AND SOLDER THE FOLLOWING WIRES. CUT THESE WIRES TO LENGTH, STRIP AND TIN. LEAVE AS LITTLE SLACK AS CONVENIENTLY POSSIBLE EXCEPT WHERE SPECIFICALLY INDICATED AT STEP 1.

1. the CW tap of PA INITIAL to the CW tap of PD INITIAL. This wire should be 3" long
2. the CW tap of PD INITIAL to the CW tap of PR INITIAL.
3. the CW tap of PR INITIAL to the LEFT TERMINAL of the SWITCH. Do not solder the left terminal of the SWITCH

USING WHITE WIRE, CONNECT AND SOLDER THE FOLLOWING WIRES. CUT THESE WIRES TO LENGTH, STRIP AND TIN. LEAVE AS LITTLE SLACK AS CONVENIENTLY POSSIBLE.

1. the SHUNT of JACK R to the SHUNT of JACK D
2. the SHUNT of JACK D to the TIP of JACK A
3. the TIP of JACK OUT to the TIP of JACK OUT 2. Do not yet solder the tip of JACK OUT 2.
4. the TIP of JACK OUT INV 1 to the TIP of JACK OUT INV 2. Do not yet solder the tip of JACK OUT INV 1.

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USING THE COLOR CODED WIRE, CONNECT AND SOLDER THE FOLLOWING WIRES. CUT THE WIRES TO LENGTH, STRIP AND TIN. LEAVE AS LITTLE SLACK AS CONVENIENTLY POSSIBLE.

1. connect BROWN wire from CW tap of PA MOD to the TIP of JACK A
2. connect ORANGE wire from CW tap of PD MOD to the TIP of JACK D
3. connect YELLOW wire form CW tap of PS MOD to the TIP of JACK S
4. connect GREEN wire from CW tap of PR MOD to the TIP of JACK R

FOR THE FOLLOWING CONNECTIONS, USE 12" LENGTHS OF COLOR CODED WIRE.

1. connect BLUE wire to CT of PA INITIAL
2. connect GREY wire to CT of PD INITIAL
3. connect WHITE wire to CT of PS INITIAL
4. connectVIOLET wire to CW tap of PS INITIAL
5. connect BROWN wire to CT of PR INITIAL
6. connect BROWN wire to CT of PA MOD
7. connect ORANGE wire to CT of PD MOD
8. connect YELLOW wire to CT of PS MOD
9. connect GREEN wire to CT of PR MOD
10. connect BLACK wire to CCW tap of PR MOD
11. connect RED wire to LEFT terminal of SWITCH & solder wire from PR INITIAL
12. connect ORANGE wire to RIGHT terminal of SWITCH
13. connect GREY wire to the TIP of JACK OUT 2; solder white wire to JACK OUT 2
14. connect WHITE wire to the TIP of JACK OUT INV 1, solder short wire from OUT INV 2 to OUT INV 1.
15. connect GREEN wire to the SHUNT of JACK TRIG
16. connect BLUE wire to the TIP of JACK TRIG
17. connect YELLOW iwre to the TIP of JACK GATE

THIS COMPLETES THE FRONT PANEL WIRING FOR THE AR-345.
PLEASE GO BACK AND CHECK ALL CONNECTIONS.

PLEASE REFER TO MODULE ASSEMBLY DRAWING

( ) 1. Unpack the frame, bag of hardware and front panel
( ) 2. Snap the two plastic card guides into the holes in the frame. Be sure that th pairs of tabs point toward the rear, as shown.
( ) 3. Slide the printed circuit board into the frame, holding top and bottom of frame together against the board, so that the board fits snugly in the guides, between the tabs.
( ) 4. Using the 4-40 x 3/8" screws and nuts, mount the two angle brackets to the frame, as shown. The brackets should be on the component side of the board.
( ) 5. Now screw the board to the brackets. Insert the 4-40 x 3/8" screw from foil side of board. DOUBLE CHECK THAT SCREW HEAD DOES NOT TOUCH ANY METAL FOIL!!!
( ) 6. Refer again to MODULE ASSEMBLY DRAWING. Mount top of panel to frame, using the two UPPER pots. Put on lock washers and insert pot shaft through rear of upper holes in front of frame. Bring panel against frame, so these pots also go through matching holes in panel. Tighten nuts on front of panel, with pots oriented in same direction as lower pots.
( ) 7. Attach bottom of panel to frame, using remaining 4-40 x 3/8" screws & nuts.

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WIRING OF THE FRONT PANEL TO THE PC BOARD

CONNECT WIRES FROM JACKS, SWITCHES AND POTS TO THE BOARD IN THIS ORDER.
RUN ALL WIRES THROUGH THE WIRE SADDLE. LEAVE ABOUT 1" SLACK FOR EACH WIRE;
CUT, STRIP AND TIN AND SOLDER AT THE BOARD.

1. connect VIOLET wire from PS INITIAL to board -15v at pin Z on the edge conn.
2. connect BLACK wire from PR MOD to board GROUND at pin M on the edge connector
3. connect RED wire from SWITCH to board +15v at pin A on the edge connector
4. connect WHITE wire from JACK OUT INV 1 to board OUT INV
5. connect GREY wire from JACK OUT 2 to board OUT
6. connect ORANGE wire from SWITCH to board SWITCH
7. connect GREEN wire from JACK TRIG to board TRIG SHT
8. connect YELLOW wire from JACK GATE to board GATE IN
9. connect BLUE wire from JACK TRIG to board TRIG IN
10. connect BROWN wire from PA MOD to board A MOD
11. connect BLUE wire from PA INITIAL to board A INITIAL
12. connect ORANGE wire from PD MOD to board D MOD
13. connect GREY wire from PD INITIAL to board D INITIAL
14. connect GREEN wire from PR MOD to board R MOD
15. connect BROWN wire from PR INITIAL to board R INITIAL
16. connect WHITE wire from PS INITIAL to board INITIAL S
17. connect YELLOW wire from PS MOD to board MOD S

DOUBLE CHECK EACH CONNECTION

18. use one cable tie to tie the wires into a bunch at a point near the front panel
    use the other cable tie to tie the five wires extending across the board at a
    point right below the envelope generator IC
19. turn all pot shafts fully counter-clockwise. Mount knobs so that the pointer is
    pointing to the lower left. Tighten knob screws. Mount knobs in this order.
    Release Mod
    Sustain Mod
    Decay Mod
    Attack Mod
    Release Initial
    Sustain Initial
    Decay Initial
    Attack Initial

THIS COMPLETES THE ASSEMBLY OF THE AR-345 ENVELOPE MODULE

PLEASE GO BACK AND DOUBLE CHECK THE LAST ASSEMBLY STEPS. THE AR-345 IS

NOW READY TO CALIBRATE.

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TRIM PROCEDURE AR-344 & AR-345

Patch a LF 50% pulse with a frequency of about 1 Hz into the gate input of the first envelope generator. Connect the envelope output to a direct coupled oscilloscope. Set the time base of the scope to display 2ms per horizontal division and set the scope so that it triggers on the positive slope. Turn all the pots of envelope #1 counter-clockwise so they are at minimum value. While monitoring the envelope output on the scope, adjust T1 (the trim closer to the edge connector) so that the minimum attack time is equal to 2ms (one horizontal division). If you have an AR-345, this completes the trim; if you have an AR-344, repeat this procedure for the second envelope.

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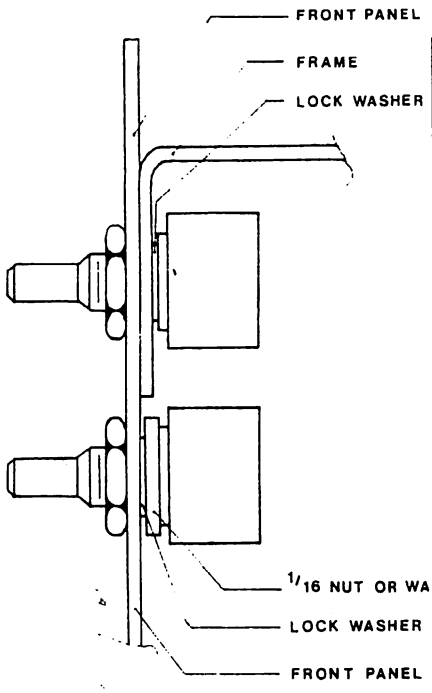
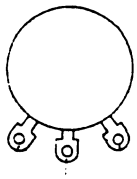
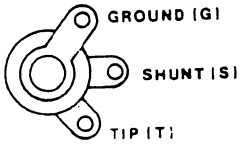
AR-345 ENVELOPE
FRONT PANEL WIRING DIAGRAM

ARIES
MUSIC
INC.





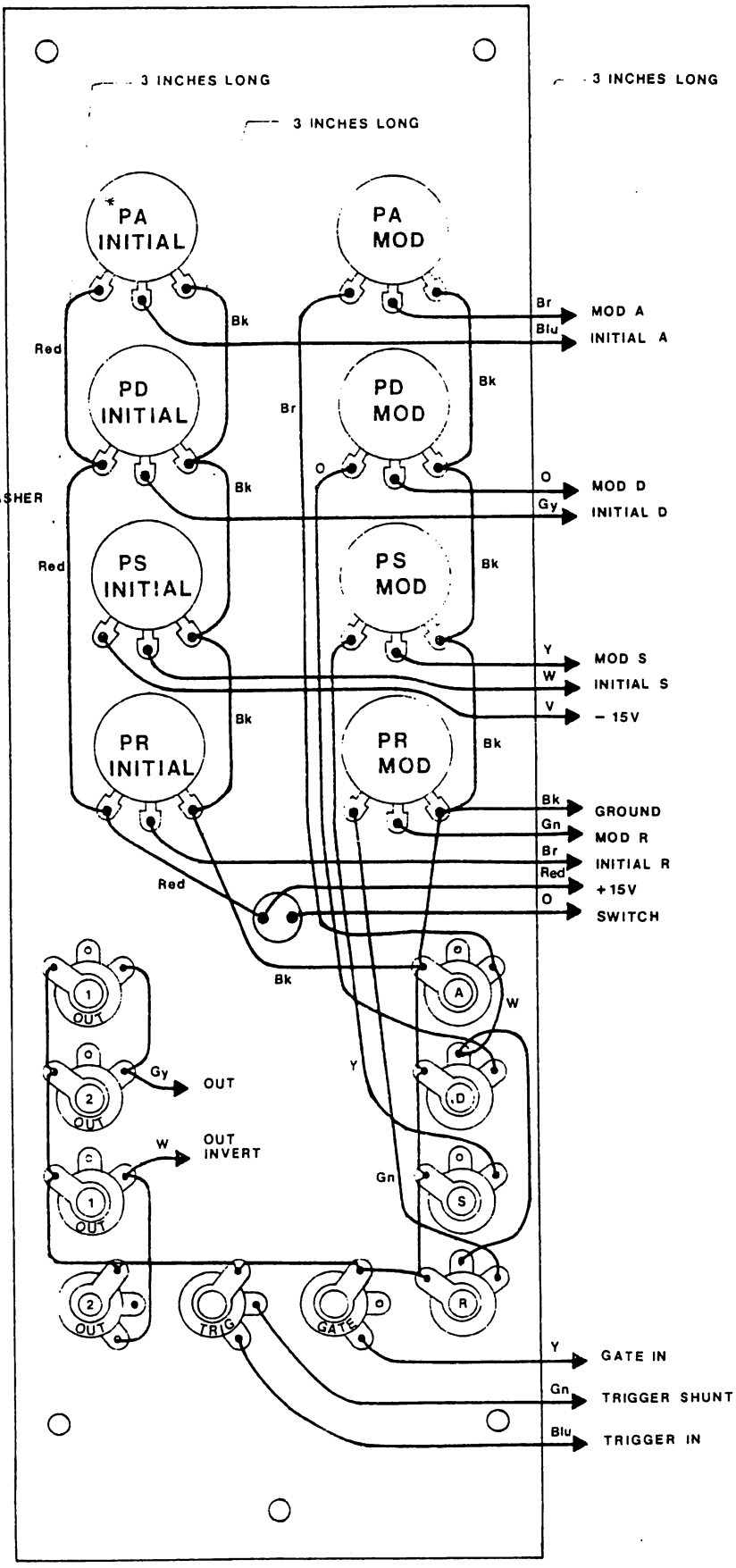
ALL POTS 100K LIN



OPEN ARROW
CONNECT TO JACK

FILLED ARROW
CONNECT TO PC BOARD

BLACK	Bk
BROWN	Br
RED	Red
ORANGE	O
YELLOW	Y
GREEN	Gn
BLUE	Blu
VIOLET	V
GREY	Gy
WHITE	W



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ENVELOPE AR-345

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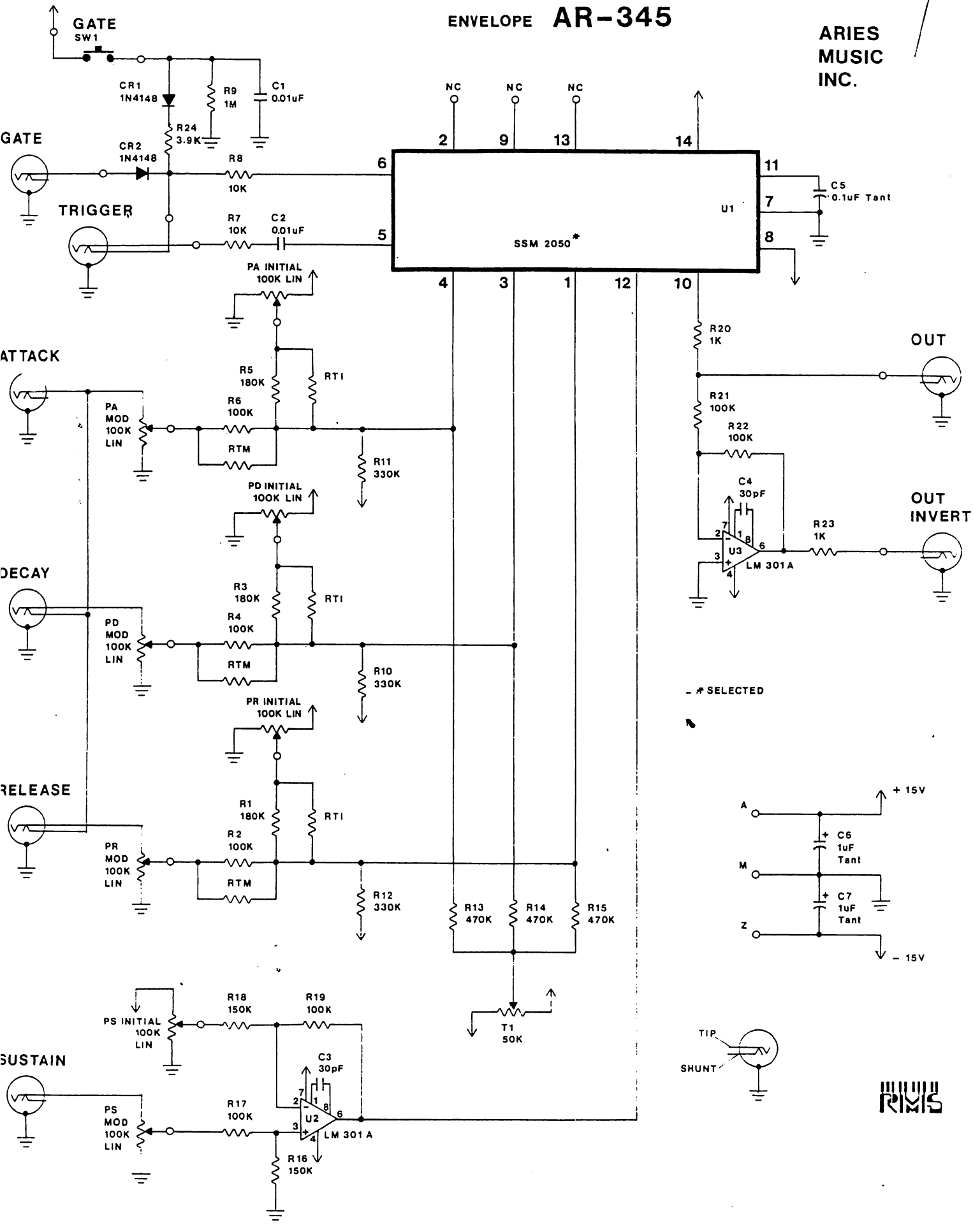

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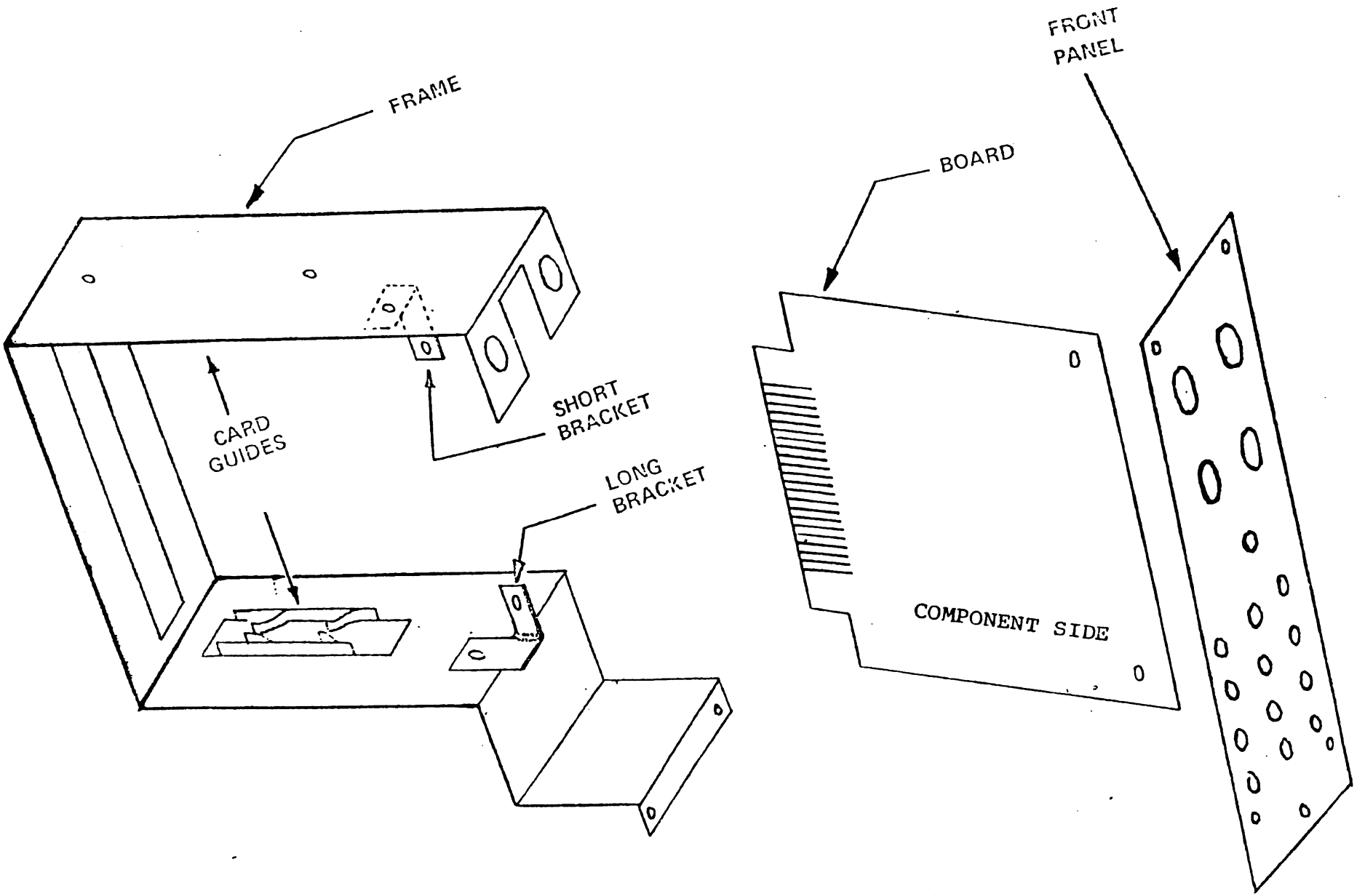

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ARIES MUSIC SYSTEM 300

SYNTHESIZER

PARTS LIST * AR-345 * VC ENVELOPE GENERATOR

QUANTITY	DESCRIPTION	VOLTAGE & RATING
2	¼ watt carbon film resistor	1K
1	" " " "	3.9K
2	" " " "	10K
7	" " " "	100K
2	" " " "	150K
3	" " " "	180K
3	" " " "	330K
3	" " " "	470K
1	" " " "	1M
3	Resistor; Trim mod. 5% CF ¼w	RTM
3	" Trim Initial 5% CF ¼w	RTI
1	Trim Pot	50K
8	Pots, lin.	100K
2	Diodes	1N4148
2	Ceramic Disc Caps	0.01uf
2	" " "	33pf (or 30pf)
1	Tantalum Capacitor	0.1uf
2	" "	1uf
1	Selected Env. Generator I.C.	SSM2050
2	Op Amps	LM-301-A
1	Switch; Momentary; Normally open push	
10	Jacks; mini Switchcraft 42-A	
8	Knobs	
1	Wire saddle	
6	Nut; 1/16 thick, same internal diameter as pot bushing	
1	AR-345 Front Panel	
1	P.C. Board	
1	Module Frame	
1	Bracket, large	
1	Bracket, small	
3	Screw; 6-32 x 3/8" Phillips-head for module mounting	
4	Screw; 4-40 x 3/8"	
2	Screw; Phillips-head, black	
6	Nuts; #4-40	
2	P.C. Card guides	
5	12" BLACK wire	
3	12" BROWN "	
3	12" RED "	
3	12" ORANGE wire	
3	12" YELLOW "	
3	12" GREEN wire	

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AR-345 VC ENVELOPE GENERATOR

PARTS LIST CONT.

QUANTITY	DESCRIPTION	VOLTAGE & RATING
3	12" BLUE Wire	
2	12" VIOLET Wire	
3	12" GREY wire	
4	12" WHITE Wire	
1	24 gauge tinned copper bus wire; 16"	
2	Cable Ties	
	ADDITIONAL TRIMMING RESISTORS	

Note that the 14 pin envelope generator IC has been especially marked with a letter. Depending upon the letter, you have been given 3 or 6 additional resistors. Three of the resistors are of one value and the other three of another value. These resistors are used when necessary, to trim the initial and modulation inputs to the input sensitivity of the I.C. RTI is "resistor trim initial" and RTM is "resistor trim modulation". These resistors are indicated on the schematic and the P.C. layout drawing. Consult the table below to determine the values of your trimming resistors based on the letter designation of your chip.

IC LETTER CODE	RTI	RTM
A	None used	2.7M
B	" "	2.2M
C	12M	1.8M
D	3.6M	1.1M
E	1.3M	560K
F	910K	390K
G	680K	330K
H	560K	240K
I	430K	200K
K	360K	180K
L	300K	150K
M	240K	120K

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