ARIES MUSIC SYSTEM 300 SYNTHESIZER

MODULE AR-344

DUAL 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.

PLEASE ALSO READ THE GENERAL ASSEMBLY INSTRUCTIONS BEFORE BEGINNING THE ASSEMBLY OF THIS MODULE.

( ) A. 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 THAT THEY WON'T GET LOST.

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
¼" or #8 nut driver
A pair of regular pliers can substitute for the nut drivers but will not be as easy to use, and may scratch the front panel.

( ) B. RESISTORS (See general assembly instructions)
Carefully install all resistors on the circuit board. 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 after installed on the P.C. board. Install the resistors with the gold band facing either the bottom or the right hand side of the board. Please note the envelope generator ICs labelled with either an "A" or "B", no RTI trim resistors will be installed.

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AR-344 ASSEMBLY CONTINUED

1. Mount all ten 100K resistors R2,2,4,4,6,6,17,17,19,19; Solder & cut leads
2. Mount all six 330K resistors R10,10,11,11,12,12 " " " "
3. Mount all six 180K resistors R1,1,3,3,5,5 " " " "
4. Mount all six 470K resistors R13,13,14,14,15,15 " " " "
5. Mount all four 150K resistors R16,16,18,18 " " " "
6. Mount all four 10K resistors R7,7,8,8 " " " "
7. Mount both 1K resistors R20,20 " " " "
8. Mount both 1 Meg. resistors R9,9 " " " "
9. Mount both 3.9K resistors R24,24 " " " "

( ) C. DIODES (see general assembly instructions)
The black band on the component should correspond with the black band on the diode drawn on the P.C. layout drawing.

1. Mount all four diodes CR1,1,2,2 Solder and cut leads

( ) D. INTEGRATED CIRCUITS (see general assembly instructions)
The pin indication on the component should coincide with the indication on the P.C. layout drawing

1. Mount both LM-301A op amps. U2,2. Solder
2. Mount both SSM2050 integrated envelope; U1,1 Solder

( ) E. TRIM RESISTORS
Mount the additional trim resistors RTI and RTM. Consult the additional trimming resistor chart. Use the correct trim resistors RTI and RTM that correspond to the I.C. letter code on the 14 pin envelope generator I.C. Solder and cut the leads.

( ) F. CAPACITORS (see general assembly instructions)
Observe the polarity of the tantalum capacitors. The positive lead is the lead closer to the (+) sign on the component.

1. Mount all four 0.01mf disc capacitors C1,1,2,2; Solder and cut leads.
2. Mount both 33pf disc capacitors; C3,3; " " " "
(30pf may be substituted)
3. Mount both 0.1mf tantalum capacitors; C5,5; Solder and cut leads.
4. Mount both 1.0mf tantalum capacitors; C6,7; Solder and cut leads.

( ) G. TRIM POTS (see general assembly instructions)

1. Mount both 50K trim pots T1,1; solder.

( ) H. 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.

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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 1 and ATTACK 2 pots. Do not yet fully tighten the nuts; they will later be removed for final assembly. If the pots have a flange which prohibits them from mounting flush against the panel, bend the flange outward so the pots can mount flush.

2. Mount remaining 6 pots. First mount the additional larger nut next to the body of the pot. Tighten the nut very firmly. Now mount the pots as shown on the front panel wiring diagram.

3. Mount the 2 SWITCHES orienting the terminals vertically. It makes no difference which terminal is on top. The lock washer should be placed on the back of the face panel. Tighten the nuts.

4. Mount the 14 JACKS orienting them as shown on the wiring diagram. Mount the washer on the front side of the face panel and tighten the nuts.

PANEL WIRING AR-344 (see general assembly instructions)

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 indicated at step 9 & 12. 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 RELEASE 2 MOD to the CCW tap of RELEASE 2 INITIAL
2. the CCW tap of SUSTAIN 2 MOD to the CCW tap of SUSTAIN 2 INITIAL
3. the CCW tap of DECAY 2 MOD to the CCW tap of DECAY 2 INITIAL
4. the CCW tap of ATTACK 2 MOD to the CCW tp of ATTACK 2 INITIAL
5. the CCW tap of ATTACK 1 MOD to the CCW tap of ATTACK 1 INITIAL
6. the CCW tap of DECAY 1 MOD to the CCW tap of DECAY 1 INITIAL
7. the CCW tap of SUSTAIN 1 MOD to the CCW tap of SUSTAIN 1 INITIAL
8. the CCW tap of RELEASE 1 MOD to the CCW tap of RELEASE 1 INITIAL
9. the CCW tap of ATTACK 2 INITIAL to the CCW tap of DECAY 2 INITIAL (this wire should be 3" long)
10. the CCW tap of DECAY 2 INITIAL to the CCW tap of SUSTAIN 2 INITIAL
11. the CCW tap of SUSTAIN 2 INITIAL to the CCW tap of RELEASE 2 INITIAL
12. the CCW tap of ATTACK 1 INITIAL to the CCW tap of DECAY 1 INITIAL (this wire should be 3" long)
13. the CCW tap of DECAY 1 INITIAL to the CCW tap of SUSTAIN 1 INITIAL
14. the CCW tap of SUSTAIN 1 INITIAL to the CCW tap of RELEASE 1 INITIAL
15. Connect the grounds of all 14 jacks together as shown in the diagram. Solder all connections except the wire to jack A2. Use tinned copper bus wire or unshielded wire for easier wiring of the ground connections. Be careful that the wire does not touch any of the other terminals of the jacks.

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16. Connect the CCW tap of RELEASE 2 INITIAL to jack A2. Do not yet solder the connection at jack A2.
17. Connect the CCW tap of RELEASE 1 INITIAL to jack A2. Do not solder at jack A2.
18. Solder all three wires to the ground of jack A2.

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 indicated at step 1 and 4.

1. the CW tap of ATTACK 2 INITIAL to the CW tap of DECAY 2 INITIAL (this wire should be 3" long)
2. the CW tap of DECAY 2 INITIAL to the CW tap of RELEASE 2 INITIAL
3. the CW tap of RELEASE 2 INITIAL to the TOP TERMINAL of SWITCH 2
4. the CW tap of ATTACK 1 INITIAL to the CW tap of DECAY 1 INITIAL (this wire should be 3" long)
5. the CW tap of DECAY 1 INITIAL to the CW tap of RELEASE 1 INITIAL
6. the CW tap of RELEASE 1 INITIAL to the TOP TERMINAL of SWITCH 1
7. connect the TOP TERMINALS of both SWITCHES together

USING VIOLET WIRE, CONNECT AND SOLDER THE FOLLOWING WIRE

1. the CW tap of SUSTAIN 2 INITIAL to the CW tap of SUSTAIN 1 INITIAL

USING COLOR-CODED WIRE CUT TO LENGTH:

1. Connect GREEN wire from CW of RELEASE 2 MOD, labelled R2T to TIP of jack R2
2. Connect YELLOW wire from CW of SUSTAIN 2 MOD, labelled S2T to TIP of jack S2
3. Connect BLUE wire from CW of DECAY 2 MOD, labelled D2T to TIP of jack D2
4. Connect BROWN wire from CW of ATTACK 2 MOD, labelled A2T to TIP of jack A2
5. Connect BROWN wire from CW of ATTACK 1 MOD, labelled A1T to TIP of jack A1
6. Connect ORANGE wire from CW of DECAY 1 MOD, labelled D1T to TIP of jack D1
7. Connect YELLOW wire from CW of SUSTAIN 1 MOD, labelled S1T to TIP of jack S1
8. Connect GREEN wire from CW of RELEASE 1 MOD, labelled R1T to TIP of jack R1

USING WHITE WIRE, CONNECT AND SOLDER THESE WIRES, LEAVING AS LITTLE SLACK AS CONVENIENTLY POSSIBLE. CUT THE WIRES TO LENGTH AND TIN THE ENDS BEFORE SOLDERING.

1. connect the TIP of JACK A1 to the SHUNT of JACK D1
2. connect the SHUNT of JACK D1 to the SHUNT of JACK R1
3. connect the SHUNT of JACK A2 to the SHUNT of JACK D1
4. connect the SHUNT of JACK GATE IN 2 to the TIP of JACK GATE IN 1

USE GREY WIRE FOR THE FOLLOWING CONNECTIONS

1. connect the TIP of JACK A2 to the SHUNT of JACK D2
2. connect the SHUNT of JACK D2 to the SHUNT of JACK R2

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

1. connect BROWN wire to the CT of ATTACK 2 MOD
2. connect GREEN wire to the CT of ATTACK 2 INITIAL

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3. connect ORANGE wire to the CT of DECAY 2 MOD
4. connect BLUE wire to the CT of DECAY 2 INITIAL
5. connect YELLOW wire to the CT of SUSTAIN 2 MOD
6. connect GREY wire to the CT of SUSTAIN 2 INITIAL
7. connect GREEN wire to the CT of RELEASE 2 MOD
8. connect WHITE wire to the CT of RELEASE 2 INITIAL
9. connect BROWN wire to the CT of ATTACK 1 MOD
10. connect GREEN wire to the CT of ATTACK 1 INITIAL
11. connect ORANGE wire to the CT of DECAY 1 MOD
12. connect BLUE wire to the CT of DECAY 1 INITIAL
13. connect YELLOW wire to the CT of SUSTAIN 1 MOD
14. connect GREY wire to the CT of SUSTAIN 1 INITIAL
15. connect GREEN wire to the CT of RELEASE 1 MOD
16. connect WHITE wire to the CT of RELEASE 1 INITIAL
17. connect RED wire to the CW tap of RELEASE 1 INITIAL
18. connect VIOLET wire to the CW tap of SUSTAIN 1 INITIAL

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

1. connect YELLOW wire to the TIP of jack GATE 2 IN
2. connect YELLOW wire to the TIP of jack GATE 1 IN
3. connect BLACK wire to the GROUND of jack A1
4. connect GREEN wire to the SHUNT of jack TRIG 2
5. connect GREEN wire to the SHUNT of jack TRIG 1
6. connect BLUE wire to the TIP of jack TRIG 2 IN
7. connect BLUE wire to the TIP of jack TRIG 1 IN
8. connect WHITE wire to the TIP of jack OUT 2
9. connect WHITE wire to the TIP of jack OUT 1
10. connect ORANGE wire to the BOTTOM TERMINAL of SWITCH 2
11. connect ORANGE wire to the BOTTOM TERMINAL of SWITCH 1
12. take the five wires from SWITCH 1, GATE 1, TRIG 1, TRIG SHUNT 1 and OUT 1 and tie them with a cable tie near the terminal of SWITCH 1.
13. take the five wires from SWITCH 2, GATE 2, TRIG 2, TRIG SHUNT 2 and OUT 2 and tie them with a cable tie near the terminal of SWITCH 2.
14. take all eight wires from the center taps of the channel 2 pots, straighten wires and tie them all together with a cable tie at the back of the RELEASE pot.
15. take all eight wires from the center taps of the channel 1 pots, straighten each wire and tie them all together with a cable tie at the back of the RELEASE pot.

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 the 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 & 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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CONNECT WIRES FROM THE JACKS, SWITCHES AND POTS TO THE BOARD IN THIS ORDER.

AS YOU CONNECT EACH GROUP OF WIRES, RUN THEM THROUGH THE WIRE SADDLE. LEAVE

ABOUT 1" SLACK FOR EACH WIRE; CUT, STRIP, TIN AND SOLDER AT THE BOARD.

( ) A. ENVELOPE 2 (the bottom half of the board) Connect the 8 wires from the center taps of the envelope 2 pots.

1. connect GREY wire from SUSTAIN 2 to board S INITIAL
2. connect YELLOW wire from SUSTAIN 2 to S MOD
3. connect WHITE wire from RELEASE 2 to board R INITIAL
4. connect GREEN wire from RELEASE 2 to board R MOD
5. connect BLUE wire from DECAY 2 to board D INITIAL
6. connect ORANGE wire from DECAY 2 to board D MOD
7. connect GREEN wire from ATTACK 2 to A INITIAL
8. connect BROWN wire from ATTACK 2 to baord A MOD

( ) B. ENVELOPE 2 (the bottom half of the board) Connect the five wires from the jacks and switch of envelope 2 and the ground wire.

1. connect WHITE wire from OUT 2 jack to board OUT
2. connect BLUE wire from TRIG 2 IN jack to baord TRIG IN
3. connect YELLOW wire from GATE 2 IN jack to board GATE IN
4. connect GREEN wire from SHUNT on the TRIG 2 IN jack to board TRIG SHT
5. connect ORANGE wire from SWITCH 2 to board SWITCH

( ) C. ENVELOPE 1 (the top half of the board) Connect the 8 wires from the center taps of the envelope 2 pots and connect the 2 power supply wires +15V &-15V

1. connect GREY wire from SUSTAIN 1 to board S INITIAL. Run the 2 SUSTAIN wires along the bottom of the frame & then straight up to their terminals in the middle of the board.
2. connect YELLOW wire from SUSTAIN 1 to board S MOD
3. connect WHITE wire from RELEASE 1 to board R INITIAL
4. connect GREEN wire from RELEASE 1 to board R MOD
5. connect BLUE wire from DECAY 1 to board D INITIAL
6. connect ORANGE wire from DECAY 1 to board D MOD
7. connect GREEN wire from ATTACK 1 to board A INITIAL
8. connect BROWN wire from ATTACK 1 to board A MOD
9. connect RED wire from RELEASE 1 to board +15
10. connect VIOLET wire from SUSTAIN 1 to board -15

At the bottom of the P.C. board, just below U1, tie the 4 SUSTAIN wires & the 3 power supply wires together with a cable tie.

( ) D. ENVELOPE 1 (the top half of the board)

1. connect WHITE wire from OUT 1 jack to board OUT
2. connect ORANGE wire from SWITCH 1 to board SWITCH
3. connect GREEN wire from SHUNT on the TRIG 1 IN jack to board TRIG SHT
4. connect YELLOW wire from GATE IN 1 jack to board GATE IN
5. connect BLUE wire from TRIG IN 1 jack to board TRIG IN

TURN ALL POTS SHAFTS FULLY COUNTER-CLOCKWISE AND MOUNT THE KNOBS WITH THE POINTERS AT THE LOWER LEFT. MOUNT THE KNOBS AND TIGHTEN THE KNOB SCREWS IN THIS ORDER
#1 Envelope: RELEASE, SUSTAIN, DECAY, ATTACK
#2 Envelope: RELEASE, SUSTAIN, DECAY, ATTACK

THIS COMPLETES ASSEMBLY OF YOUR AR-344 ENVELOPES MODULE. THE MODULE IS NOW READY TO BE CALIBRATED.

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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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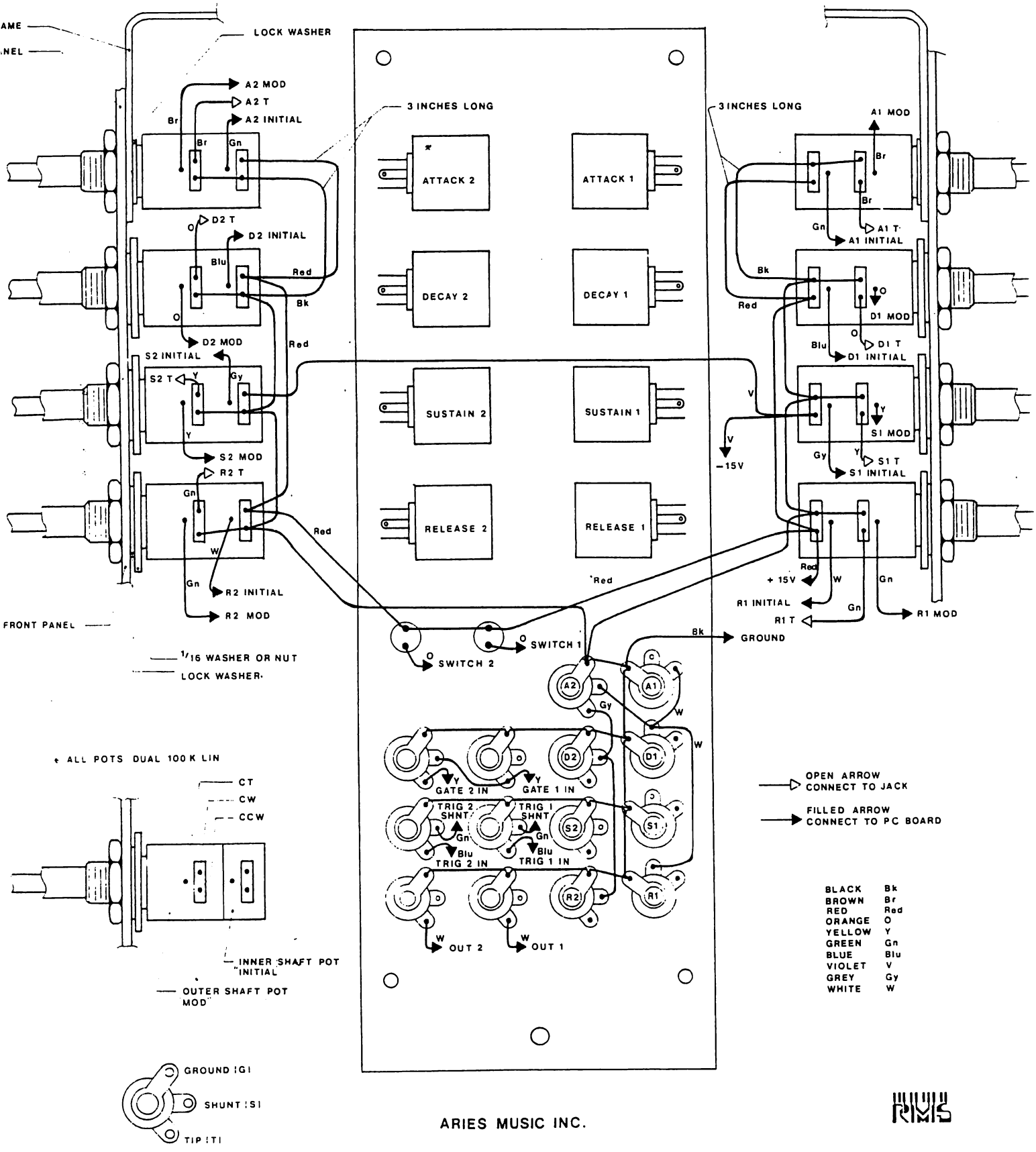
AR 344 ENVELOPES
FRONT PANEL WIRING DIAGRAM



* ALL POTS DUAL 100 K 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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AR-344
ENVELOPES

(Both cicuits identical)

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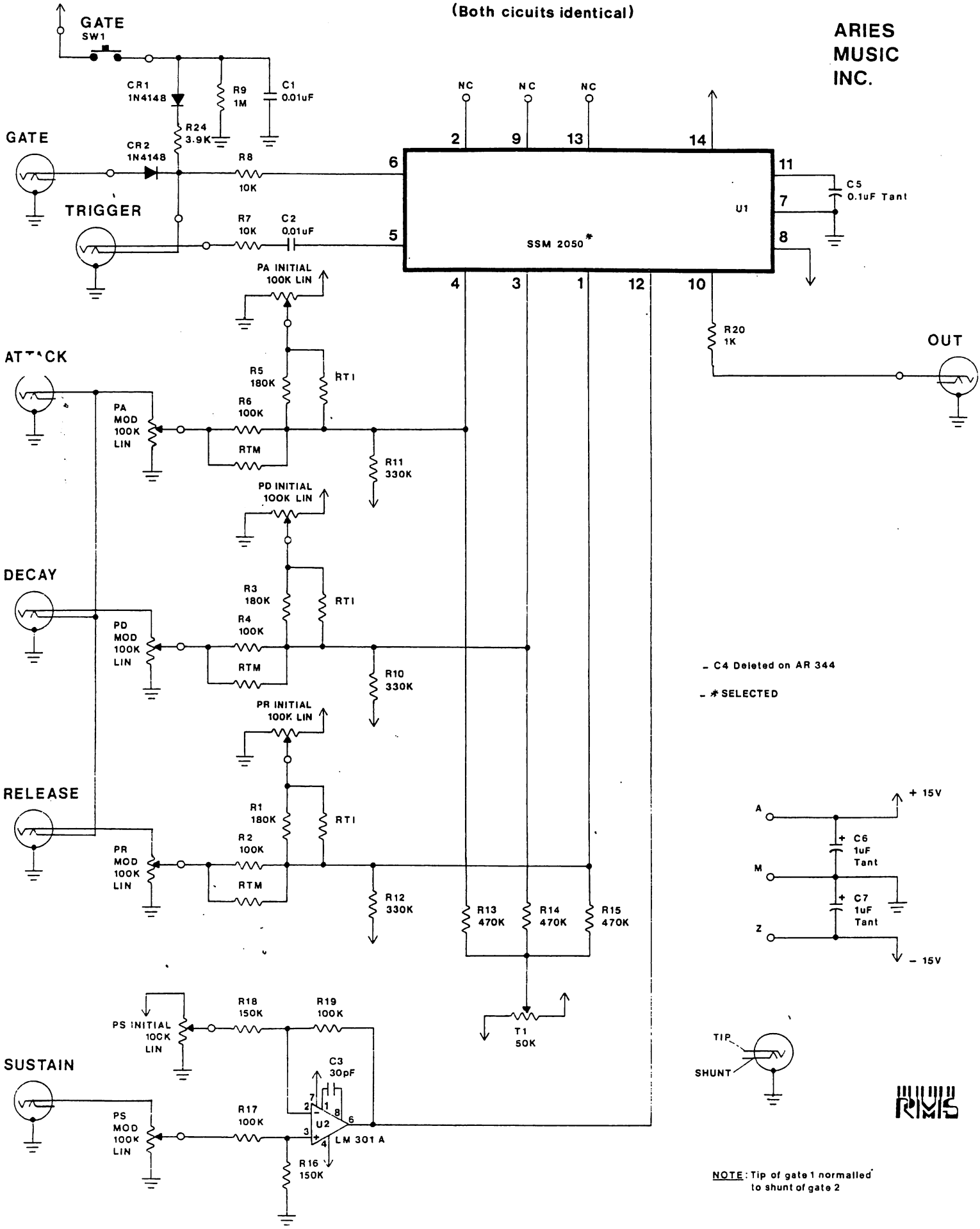

- C4 Deleted on AR 344
- * SELECTED

NOTE: Tip of gate 1 normalled to shunt of gate 2

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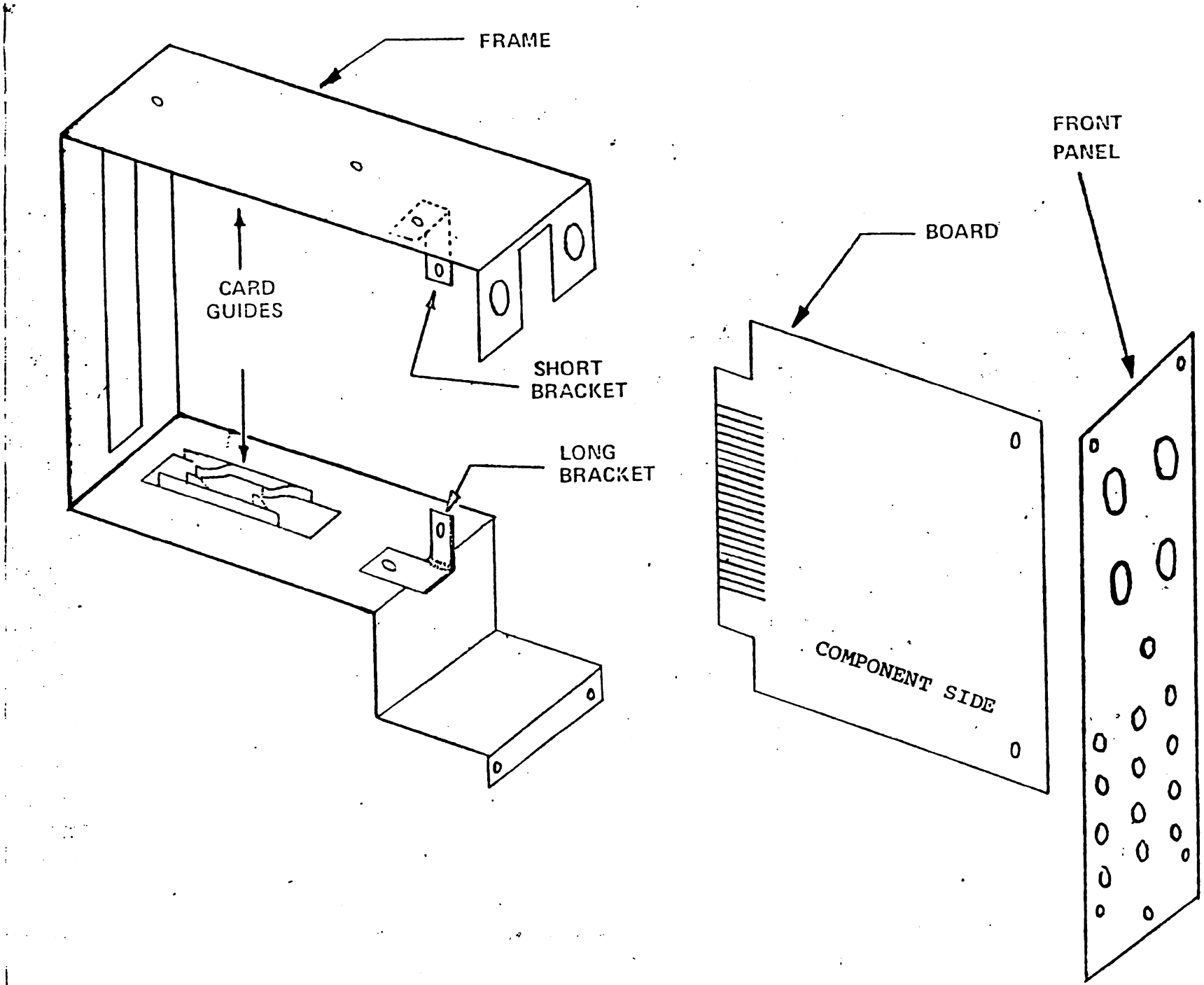

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ARIES MUSIC SYSTEM 300

SYNTHESIZER

PARTS LIST * AR-344 * DUAL VC ENEVLOPE

QUANTITY		DESCRIPTION	VOLTAGE & RATING
2		¼ watt carbon film resistor	1K
2		" " " "	3.9K
4		" " " "	10K
10		" " " "	100K
4		" " " "	150K
6		" " " "	180K
6		" " " "	330K
6		" " " "	470K
2		" " " "	1 Meg
FOR ELOPE I	3	resistor; trim modulation 5% carbon film; ¼ watt	RTM
	3	resistor; trim initial; 5% carbon film; ¼ watt	RTI
FOR ELOPE II	3	resistor; trim modulation; 5% carbon film; ¼ watt	RTM
	3	resistor; trim initial; 5% carbon film; ¼ watt	RTI
8		100K linear dual pots	
4		Diodes	1N4148
4		Disc capacitor	0.01uf
2		" "	33pf (or 30pf)
2		Tantalum Capacitor	0.1uf
2		" "	1.0uf
2		Op-amp I.C.	LM-301-A
2		Selected env. gen. I.C.	SSM-2050
2		Switches; momentary N.O. push	
14		mini jacks	
8	sets	Knobs; dual concentric	
1		wire saddle	
6		Nuts; 1/16 thick; 3/8* diameter	
1		AR-344 Front Panel	
1		AR-344 P.C. Board	
1		Module Frame	
1		Bracket; large	
1		Bracket; small	
3		Screws; Phillips-head for module mounting	
4		Screws; #4-40 x 3/8"	
2		Screws; Phillips-head, black	
6		Nuts; #4-40	
2		P.C. Card guides	
5		Cable Ties	
2		Trim Pots	50K

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AR-344 DUAL VC ENVELOPE

PARTS LIST CONT.

QUANTITY	DESCRIPTION	VOLTAGE & RATING
	12" LENGTHS OF COLOR-CODED WIRE:	
5	BLACK	
7	GREEN	
5	BROWN	
4	BLUE	
4	RED	
2	VIOLET	
5	ORANGE	
3	GREY	
5	YELLOW	
5	WHITE	
24"	24 gauge tinned copper bus wire	

INPUT TRIM RESISTORS:

Note that each of the two 14 pin I.C.'s has been especially marked with a letter. Depending upon the letter, you have been given 3 to 6 additional resistors for each I.C. For each I.C., three of the resistors are of one value and three are of another value. These resistors are additional trimming resistors selected especially for your I.C.s. RTI is "resistor trim initial" and RTM is "resistor trim modulation". These resistors are indicated on the schematic and on the PC board layout drawing. Consult the table below to determine the correct values of your trimming resistors based on the letter designation of your particular chips.

IC LETTER CODE	RTI	RTM
A	none used	2.7M
B	none used	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

Note: The AR-344 Envelope Generator is a dual module and the circuits of both envelopes are identical. The components numbering system on the schematic drawing, the P.C. layout drawing and these instructions reflect this. Each envelope circuit has, for example, a resistor labeled "R-1"; therefore there are two "R-1" resistors. You should install these on the P.C. Board at the two places indicated.

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