

ARIES SYSTEM 300 SYNTHESIZER

Module *AR-335*

SWITCHES 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

Review general assembly instructions

() 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 down near the board.

Unpack the parts carefully and place in a large box or tray SO 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

Thin needle-nose pliers

Flat blade screw driver

1/2" or #16 nut driver

5/16 or #10 nut driver

3/4" or #8 nut driver

A pair of regular pliers can substitute for the nut drivers but will not be as easy to use.

() 2. JUMPERS

Find jumper wire J-1 on the drawing. Cut off a piece of solid wire, ONE INCH LONGER THAN J-1, old resistor leads will do fine. Bend the ends to right angle and insert into the holes on the board, according to the drawing. While holding the ends down against component side of the board, bend them at a 45° angle on the FOIL SIDE of the board, to hold the wire in place. Solder and cut off the excess. Repeat for the remaining jumpers (J-2 through J-4).

() 3. RESISTORS

Carefully install 128 resistors on the circuit board, (R-1 through R-130; R-122, 111, 88, & 80 have been deleted and will not be shown on the drawing). (P-1 and P-2 are dual potentiometers and will later be mounted on the front panel.) 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 resistors for insertion, hold the body of the resistor between the thumb and index finger of your right hand. With the thumb and index finger of your left hand bend the leads of the resistor 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 of the board 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.

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() 4. INTEGRATED CIRCUITS

At this time install only the four 1458 dual op amps. The other 4 IC's are CMOS integrated circuits and are subject to damage from static charges. Do not remove these ICs from their protective conductive foam until all the module assembly steps have been completed. Double check your installation and solder the leads.

() 5. TRANSISTORS

Sort out the fifteen 2N3638 transistors. Check the P.C. board component layout for the correct orientation of the transistor leads. Match the flat side of the transistor with the flat side on the P.C. board layout. Insert and solder these transistors and cut the leads.

Next, install all seven of the 2N3393 (or A3393) transistors again matching the flat side of the component to the drawing in the layout diagram. The 2N3393 has the same case as the 2N4392 FET, double check the part number on the case and consult the P.C. board assembly drawing to determine where the 2N3393 transistors are to be installed. Solder them and clip the leads. Finally, insert all fifteen 2N4392 transistors, again making sure that the flat sides match the diagram. Solder them and clip the leads.

() 6. CAPACITORS

Install all nine .001 micro farad (C-3 through C-11) disc capacitors. Solder them in and clip the leads. It may be necessary to bend the leads in the following manner to get the capacitors down near the board.

Install both tantalum capacitors (C-1 & C-2) being sure to orient them in the proper direction.

() 7. DIODES

Diodes are polarity sensitive components. Make sure that the black band on the diodes (the cathode) is oriented in the same direction as in the layout drawing. Some diodes require that the leads stretch a long distance before going fown into holes on the board. On all diodes in which there is an inch or more of exposed lead, you must insulate the leads by using the insulation (called "spaghetti") supplied in this kit. Measure the correct length of "spaghetti" and slip it over the leads. Insert all 20 diodes, bend the leads, double check their orientation, solder them and clip the leads.

BEFORE YOU GO ON, RE-READ THE PREVIOUS INSTRUCTIONS. DOUBLE CHECK YOUR WORK AND CORRECT ANY ERRORS YOU MAY HAVE MADE.

FRONT PANEL ASSEMBLY PROCEDURE

Refer to panel wiring diagram.

() 1. Install all 20 mini jacks as shown on the front panel drawing.

() 2. Install all 10 light emitting diodes. Insert the longer of the two pieces of LED mounting hardware through the front panel so that the washer-like surface rests on the front panel and the cylindrical part extends through and protrudes from the back surface of the front panel. Insert the LED into the cylindrical section so that the rounded end sticks out through the section of washer on the front surface of the panel. Rotate the LED so that the lead is oriented as shown in the front panel wiring diagram. The anode lead is the longer and thinner of

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the two leads. Insert the second piece of mounting hardware over the leads of the LED and the cylindrical section of the first piece. Push the second piece all the way up to the panel so that the two pieces of mounting hardware are clasp the panel and holding the LED firmly in place.

- () 3. Install the switches T-4, 3 & 2 so that one terminal is above the other. Install switch T-1 as shown in the front panel wiring drawing.
- () 4. Mount the two dual pots but do not tighten them fully. They will be removed later when mounting the panel to the frame.

PANEL WIRING

The AR-335 is not a simple module to wire. Not only are there 47 wires from the panel to the P.C. board, some of the terminals have similar designations. Confusion regarding terminals Q01/0, Q0 0/1, Q0, Q0 and other similar designations can be avoided by following the instructions carefully and accurately. Re-checking every wire that you connect and then re-checking each section before proceeding to the next section will help insure that your AR-335 is successfully assembled.

- () 1. Using bus wire, connect the grounds of all 20 jacks together as shown in the wiring diagram.

USING BLACK WIRE

- 1. Connect the cathodes of all 10 LEDs together. The cathode is the shorter and thicker of the 2 leads. The wires should be soldered as close to the body of the LED as is practical. Cut the excess cathode lead after the wires have been soldered, except for the cathodes of L-1 & L-4.
- 2. Connect the jack ground to the cathode of LED L-1 as shown in the wiring diagram. Cut the excess cathode of L-1.
- 3. With a 3" long wire, connect the CCW top of pot C to the cathode of L-4. Cut excess cathode from L-4
- 4. Connect the CCW tops of all 4 pots together.

USING RED WIRE

- 1. Connect the top terminals of switches T4, T3, & T2 together
- 2. Connect the top terminal of switch T2 to the center terminal of switch T1.
- 3. Connect the CW tops of all 4 pots together.

USING 14" LENGTHS OF COLOR CODED WIRE, SOLDER THE CORRECT COLOR TO EACH OF THE FOLLOWING TERMINALS

- 1. BROWN to CT of pot A
- 2. ORANGE to CT of pot B
- 3. RED to CW of pot B
- 4. YELLOW to CT of pot C
- 5. GREEN to CT of pot D

TIE THESE FIVE WIRES TOGETHER WITH A WIRE TIE PLACED ABOUT 2" BELOW POT B

- 1. GREEN to anode of LED L4 (the anode is the longer, thinner lead)
- 2. YELLOW to anode of LED L3
- 3. ORANGE to anode of LED L2
- 4. BROWN to anode of LED L1

TIE THESE 4 WIRES TOGETHER WITH A WIRE TIE PLACED NEAR LD & ABOUT 2" FROM THE PANEL

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1. BROWN to anode of LED LQ0
2. BROWN to anode of LED LQ1

DO NOT TIE THESE 2 WIRES TOGETHER

1. BROWN to anode of LED LA
2. ORANGE to anode of LED LB
3. YELLOW to anode of LED LC
4. GREEN to anode of LED LD

TIE THESE 4 WIRES TOGETHER WITH A WIRE TIE PLACED REAR LB ABOUT 2" FROM THE PANEL

CUT THE EXCESS ANODE LEAD FROM EACH OF THESE LEDs:

1. VIOLET to bottom terminal of switch T-4
2. VIOLET to bottom terminal of switch T-3
3. VIOLET to bottom terminal of switch T-2
4. WHITE to left terminal of switch T-1
5. RED to center terminal of switch T-1
6. BLACK to right terminal of switch T-1

TIE THE 3 WIRES FROM SWITCH T-1 TOGETHER WITH A WIRE TIE PLACED NEAR T-1 AND ABOUT 2" FROM THE PANEL.

1. WHITE to jack SHT S-4
2. GREY to jack TIP S-4 1/0
3. BROWN to jack TIP 1
4. ORANGE to jack TIP 2
5. YELLOW to jack TIP 3
6. GREEN to jack TIP 4
7. BLUE to jack TIP C4

TIE THESE WIRES TOGETHER ALONG WITH THE VIOLET WIRE FROM T-4 WITH A WIRE TIE PLACED NEAR JACK 4 AND ABOUT 2" FROM THE PANEL

1. WHITE to jack SHT S-3
2. GREY to jack TIP Q0 1/0
3. BROWN to jack TIP Q0
4. ORANGE to jack TIP Q0
5. BLUE to jack TIP C-3

TIE THESE WIRES TOGETHER ALONG WITH THE VIOLET WIRES FROM T-3 AND BROWN WIRE FROM LQ0 WITH A WIRE TIE PLACED NEAR JACK C-3 AND ABOUT 2" FROM THE PANEL.

1. WHITE to jack SHT S-2
2. GREY to jack TIP Q1 1/0
3. BROWN to jack TIP Q1
4. ORANGE to jack TIP Q1
5. RED to jack SHUNT K
6. BLUE to jack TIP C-2

TIE THESE WIRES TOGETHER ALONG WITH THE WIRES FROM SWITCH T-2 AND LED LQ1, WITH A WIRE TIE PLACED NEAR JACK Q1 AND ABOUT 2" FROM THE PANEL

AR-335 ASSEMBLY CONT.

1. BLACK to jack ground (as shown on diagram)
1. WHITE to jack SHUNT S1
3. GREY to jack TIP S1 1/0
4. BROWN to jack TIP A
5. ORANGE to jack TIP B
6. YELLOW to jack TIP C
7. GREEN to jack TIP D
8. BLUE to jack TIP C1

TIE THESE 8 WIRES TOGETHER WITH A WIRE TIE PLACED NEAR JACK A AND ABOUT 2" FROM THE PANEL.

YOUR FRONT PANEL IS NOW WIRED. BEFORE YOU GO ON RE-READ THE PREVIOUS INSTRUCTIONS. DOUBLE CHECK YOUR WORK AND CORRECT ANY ERRORS YOU MAY HAVE MADE.

REMOVE THE POTS AND SET THEM ASIDE IN PREPARATION FOR THE MODULE ASSEMBLY.

AR-335 Module Assembly Instructions:

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 and nuts, mount the two angle brackets to the frame, as shown. The brackets should be on the component side of the board. The screws should be on the outside of the frame.
- () 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 dual 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 shown in the front panel wiring drawing.
- () 7. Attach bottom of panel to frame, using remaining 4-40 x 3/8" screws and nuts.
- () 8. Turn pot shafts fully counter-clockwise, and mount the knobs pointing to the left-most number. Tighten knob screws

THIS COMPLETES MODULE ASSEMBLY, EXCEPT FOR FINAL PANEL WIRING

FRONT PANEL TO P.C. BOARD WIRING PROCEDURE:

Refer to both panel wiring diagram and P.C. layout drawing.

- () 1. Wire each wire from the front panel to the P.C. board. Connect one wire at a time. Run the wire around the edge to the board whenever possible. Cut each wire about one inch longer than necessary to allow for some slack. Consulting the diagrams connect the wires to the P.C. board in this order:
 1. BROWN from jack Q1 to Q1 0/1 on board
 2. ORANGE from jack Q1 to Q1 0/1 on board
 3. GREY from jack Q1 1/0 to Q1 1/0 on board
 4. WHITE from jack SHUNT S2 to SHUNT Q1 on board
 5. GREEN from jack TIP 4 to 4 0/1 on board
 6. YELLOW from jack TIP 3 to 3 0/1 on board
 7. ORANGE from jack TIP 2 to 2 0/1 on board

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8. BROWN from jack TIP 1 to 1 0/1 on board
9. GREY from jack TIP S4 1/0 to S4 1/0 on board
10. WHITE from jack SHT S4 to SHUNT S4 on board
11. GREEN from jack TIP D to D 0/1 on board
12. YELLOW from jack TIP C to C 0/1 on board
13. ORANGE from jack TIP B to B 0/1 on board
14. BROWN from jack TIP A to A 0/1 on board
15. WHITE from jack SHUNT S1 to SHUNT S1 on board
16. GREY from jack TIP S1 1/0 to S1 1/0 on board

TIE THESE WIRES TOGETHER WITH A WIRE TIE PLACED NEAR RESISTOR R-46

1. BLUE from jack TIP C4 to C4 on board
2. VIOLET from switch T4 to T4 on board
3. BROWN from LED LQ1 to LQ1 on board
4. GREEN from LED L4 to L4 on board
5. YELLOW from LED L3 to L3 on board
6. ORANGE from LED L2 to L2 on board
7. BROWN from LED L1 to L1 on board
8. VIOLET from switch T2 to T2 on board
9. BLUE from jack TIP C2 to CONTROL 2Q1 on board
10. GREEN from LED LD to LD on board
11. YELLOW from LED LC to LC on board
12. WHITE from UFT term. of switch T1 to A on board
13. BLACK from right term. of switch T1 to A on board
14. ORANGE from LED LB to LB on board
15. BROWN from LED LA to LA on board

TIE THESE WIRES TOGETHER WITH A WIRE TIE PLACED TO THE LEFT OF RESISTOR R45

1. RED from CW top of Pot B to +10v on board
2. GREEN from CT top of Pot D to PD on board
3. YELLOW from CT top of Pot C to PC on board
4. ORANGE from CT top of Pot B to PB on board
5. BROWN from CT top of Pot A to PA on board

TIE THESE WIRES TOGETHER WITH A WIRE TIE PLACED NEAR RESISTOR R-8

1. GREY from jack tip Q01/0 to Q01/0 on board
2. WHITE from jack SHT S3 to Q0 SHUNT on board
3. BROWN from jack TIP Q0 to Q0 0/1 on board
4. ORANGE from jack TIP Q0 to Q0 0/1 on board
5. RED from jack Center terminal switch T1 to A +15v on board
6. RED from jack SHUNT K (jack C2) to K on board
7. BROWN from LED LQ0 to LQ0 on board
8. BLACK from jack ground (as shown on wiring drawing) to M on board
9. BLUE from Jack TIP C3 to control 3 on board
10. VIOLET from switch T3 to T3 on board
11. BLUE from jack TIP C1 to 1 control on board

TIE THESE WIRES TOGETHER WITH A WIRE TIE PLACED NEAR RESISTOR R-3

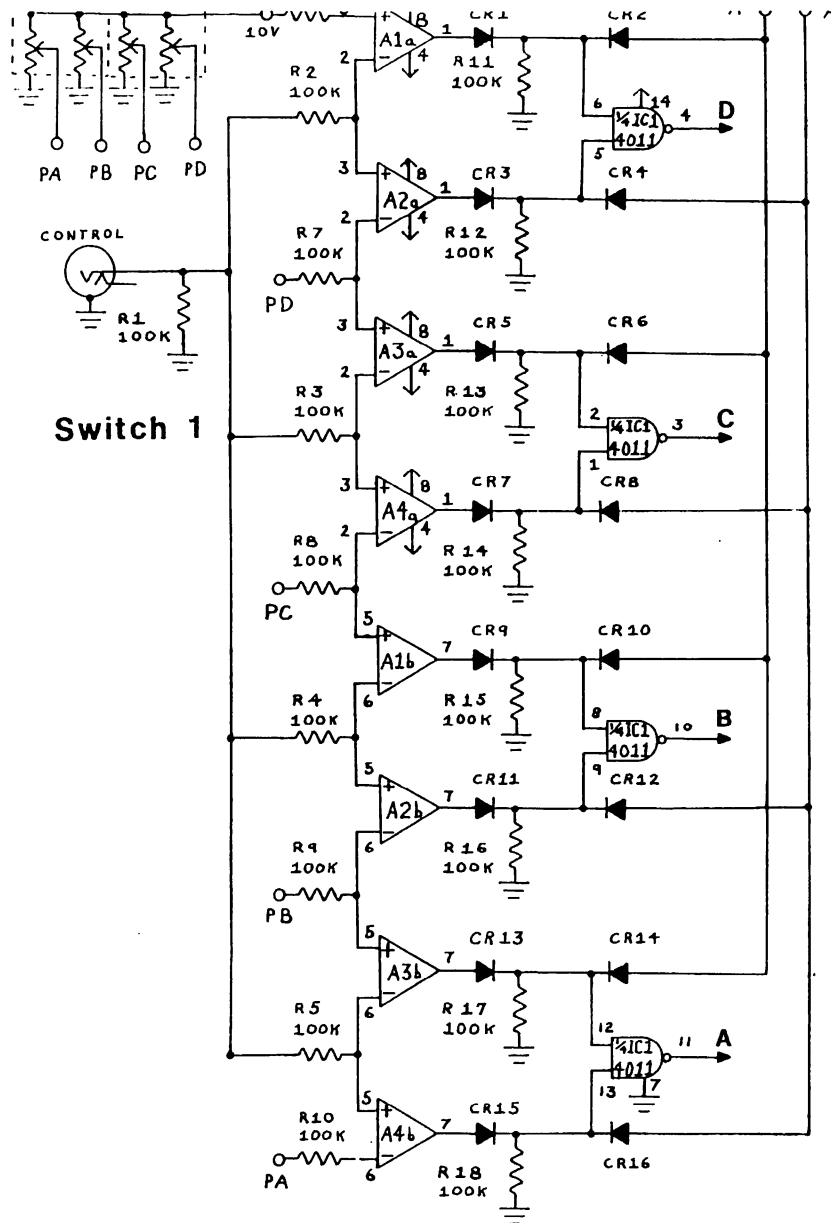
AR-335 ASSEMBLY INSTRUCTIONS, CONT.

() 2. Using additional cable ties, tie the wires which are connected to the same area of the P.C. board together in bunches. This makes the module look neater and makes servicing and trouble-shooting easier.

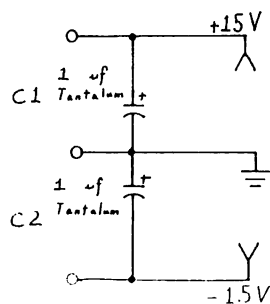
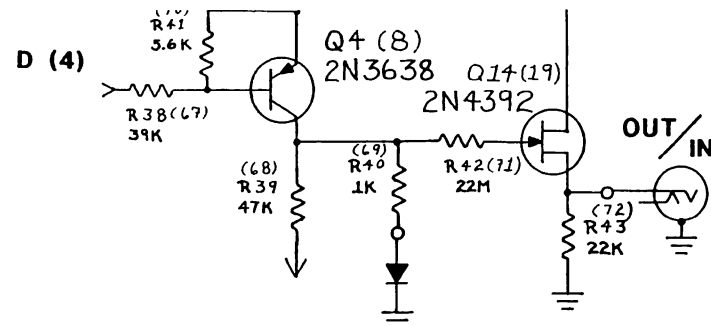
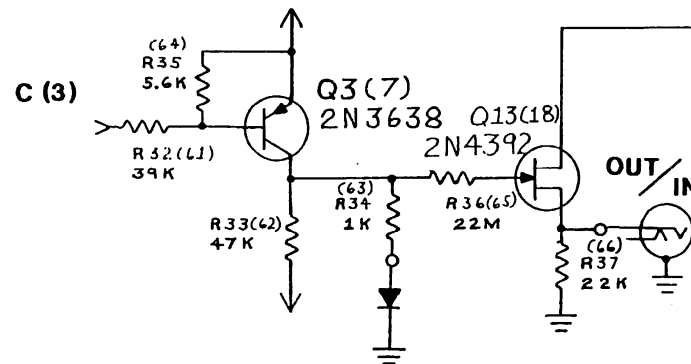
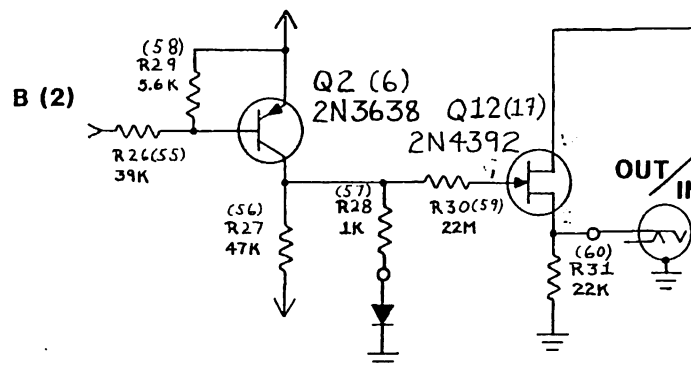
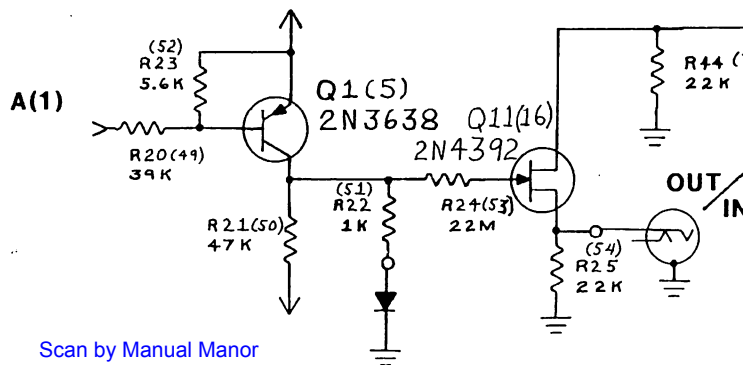
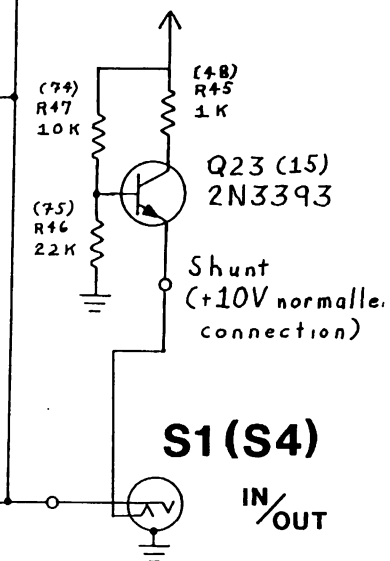
() 3. Finally install IC 1 (4011)
IC 2 (4013)
IC 3 (4013)
IC 4 (4011)

orienting them in the proper direction according to the indentation on the chip and the P.C. board drawing. Solder them in place.

YOU HAVE COMPLETED ASSEMBLY OF YOUR AR-335 SWITCHES MODULE. THIS MODULE
NEEDS NO TRIMMING OR CALIBRATION; IT IS READY TO USE.

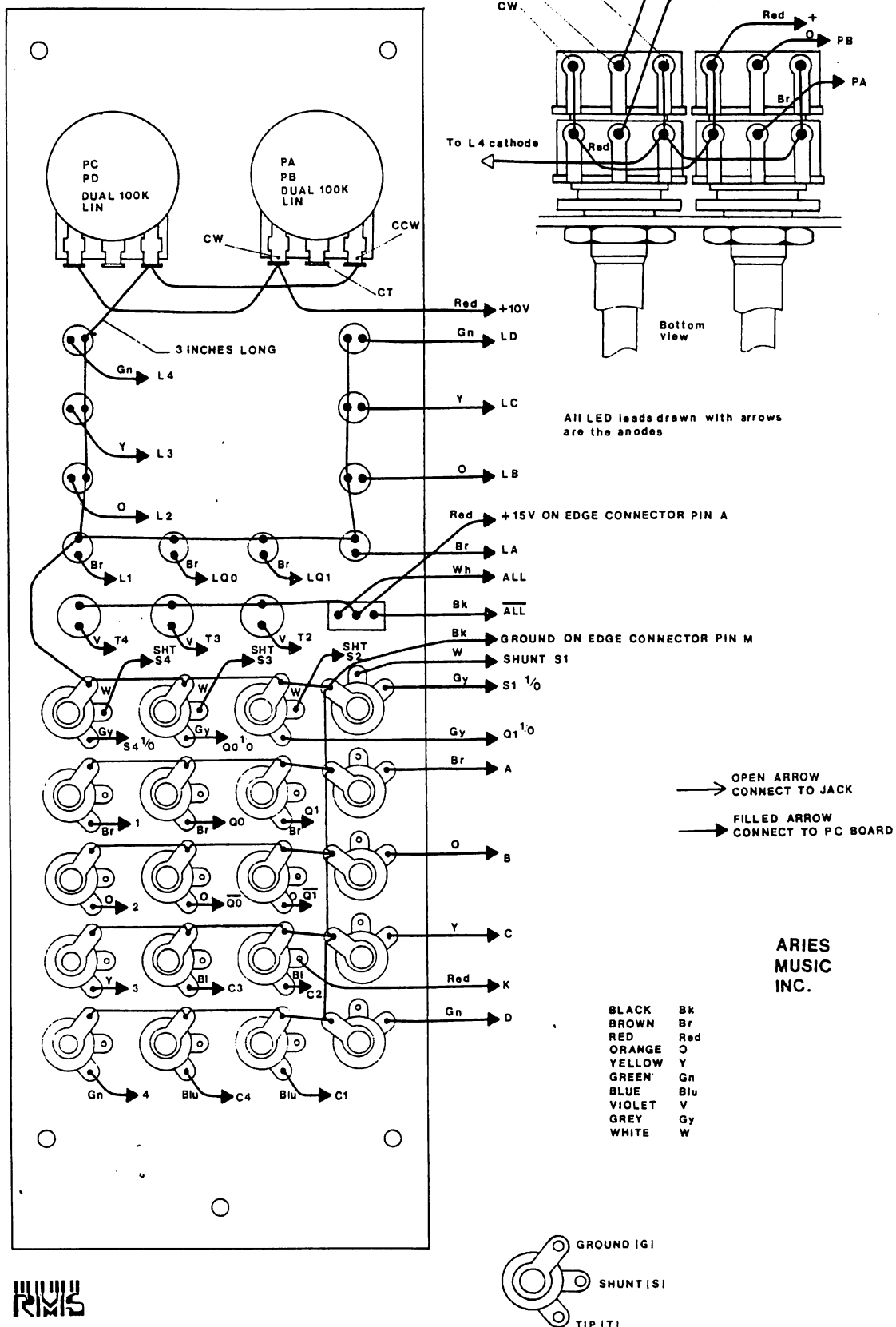


**AR - 335
QUAD SWITCH**



AR-335 SWITCHES

FRONT PANEL WIRING DIAGRAM



ARIES MUSIC SYSTEM 300 SYNTHESIZER

AR-335 SWITCHES MODULE

PARTS LIST

QUANTITY	DESCRIPTION	VOLTAGE & RATINGS
2	Tantalum Capacitor	1uf
9	Ceramic Disc Capacitor	.001uf
2	Dual Concentric Linear pots	100K
2	Dual Concentric Knobs	
14	1/4w carbon resistor	1K
15	" " "	5.6K
8	" " "	10K
1	" " "	12K
20	" " "	22K
3	" " "	33K
15	" " "	39K
15	" " "	47K
24	" " "	100K
3	" " "	1 meg
12	" " "	22 meg
20	Diodes	1N4148
7	Transistor	2N3393 or A3393
15	"	2N3638
12	F.E.T.	2N4392 KE4392
4	Dual op. amp.	1458
2	CMOS IC Quad and Gate	4011
2	CMOS IC Dual "D" Flip Flop	4013
3	Push button Switch	SPST none
1	Toggle Switch	SPDT (on-off-on) off
20	Mini Jacks	
10	LEDs	
10 sets	LED mounting hardware	
1	AR-335 Front Panel	
1	8" Length "spaghetti"	
8	Cable Ties	
1	AR-335 P.C. Board	
1	Module Frame	
1	Bracket, small	
1	Bracket, large	
6	4-40 x 3/8" screws	
6	4-40 nuts	
2	P.C. card guides	
16	Wire ties	
	30" 24 AWG tinned copper bus wire	

14" lengths, color-coded wire (24 AWG 19 strand)

BLACK 6, BROWN 10, RED 7, ORANGE 8, YELLOW 6,
GREEN 6, BLUE 5, VIOLET 4, GREY 5, WHITE 6.