ARIES System 300 Music Synthesizer
Module AR 323
Dual Mixer Assembly Instructions

The previous pages were written as a general guide, to familiarize the builder with the components. Here, now, are the specific assembly instructions for building your Mixer. 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 SIDE DOWN! Turn board so that connector strip is to the left.

Lay the assembly drawing down near the board.

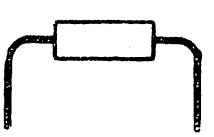
Unpack the parts carefully and place in a large box or tray so they won't get lost.

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
Small long-nose pliers
Regular pliers
Flat blade screw driver

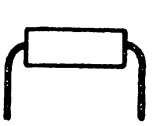
2. Jumpers
Find jumper J1 on the drawing. Measure J1 on the PC board. Cut a piece of insulated wire one inch longer than J1 measures on the PC Board. Strip 1/2 inch of insulation from each end being careful not to damage the wire itself. Bend the bare ends to a right angle and insert into the holes on the board, according to the drawing. While holding the ends down against the board, bend them at a 45 degree angle on the foil side of the board to hold the wire in place. Solder and cut off the excess. (Refer to introduction on parts installation.) Install J2 in the same way.

3. Resistors
Carefully install all 22 resistors on the circuit board (R1 through R22). R23 through R26 will later be mounted on the panel. To avoid breaking the resistor leads, bend the leads at least 1/16 of an inch away from the body of the resistor.
For example:

Correct



Incorrect



4. Capacitors
Install all 14 capacitors on the board. (C1 through C14)

5. Integrated Circuit Amplifiers
Install all 6 Integrated Circuit Amplifiers on the board. (A1 through A6)

MODULE ASSEMBLY-- 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 in the guides which hold the board point toward the rear of the frame. (The bottom one is shown installed in the drawing.)**
3. **Slide the circuit board into the frame, holding the top and bottom of the frame together against the board so that the board fits snugly in the card guides. Be sure that the pairs of plastic tabs pinch the edge of the circuit board properly.**
4. **Using 4-40X3/8" screws and nuts, mount the two angle brackets to the frame as shown in the drawing. The brackets should be entirely on the component side of the board.**
5. **Now screw the board to the brackets. Insert the 4-40 X 3/8" screw from the foil side of the board. DOUBLE CHECK THAT THE HEAD OF THE SCREW DOES NOT TOUCH ANY FOIL!!!**
6. **Unpack the front panel carefully. Avoid scratching its surface. AT THIS POINT you may if you wish skip steps 7-8 and proceed through the first few steps in the panel wiring (those in which wiring is done between components on the panel, but not to the board) before finishing the module assembly.**
7. **Mount the top of the panel to the top of the module frame using the top two potentiometers as follows: If there are tabs sticking up parallel to the shaft on the pots, bend 90 degrees inward out of the way. Put the locking washer on the pots. Insert the pot shafts through the matching 3/8" holes in the frame and the top of the panel. Put on the nuts and tighten them very snugly, but avoid scratching the panel.**
8. **Attach the bottom of the panel to the frame using the remaining 4-40 screws and nuts.**
9. **Install the other pots onto the panel.**
10. **Install all 12 mini-phone jacks as shown in the panel drawing.**
11. **Turn all pot shafts fully counterclockwise and mount the knobs pointing to the leftmost number. Tighten knob screws.**

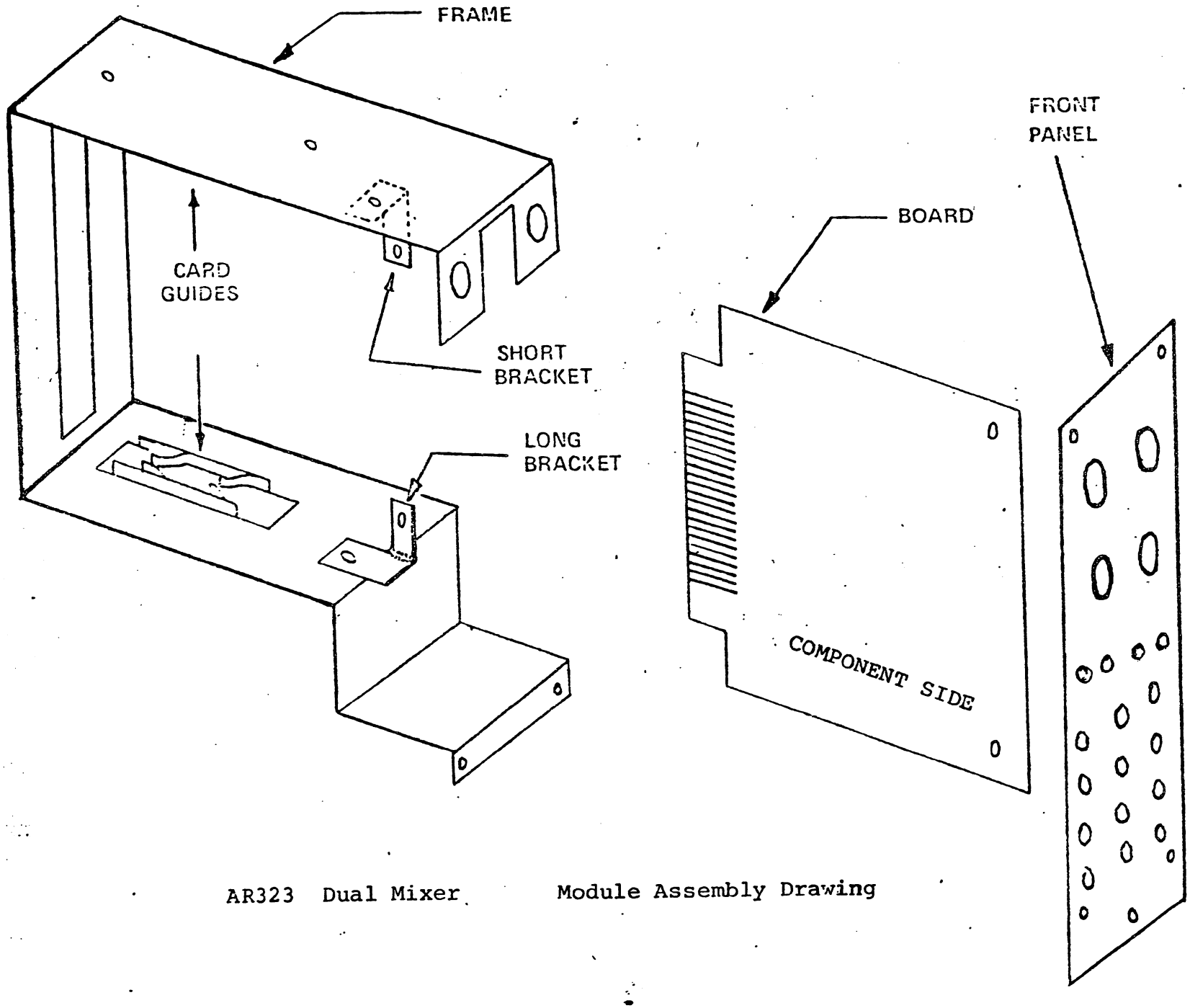
PANEL WIRING--Refer to panel wiring diagram and board assembly drawing.

1. Run an insulated wire connecting pins 1 of all four pots P1 through P4. Run a wire, now, from pin 1 of P2 to the grounds of all 12 jacks, as shown.
2. Connect a 100K resistor to pin 2 of all four pots, as shown. Solder an insulated wire to the unattached end of each resistor 1/16 of an inch away from the body of the resistor. Run the wires to the center terminals of the switches, connecting P1 to S1, P2 to S2, P3 to P3, and P4 to S4.
3. Run an insulated wire connecting the negative terminals of S1 and S2 together and from there to the appropriate point on the board labelled "A-" on the assembly drawing. Wire the positive terminals inthe same manner.
4. Wire S3 and S4 as you did S1 and S2
5. Connect pins 3 of all four pots to the appropriate point on the board as labelled on the assembly drawing.

6. Wire all 12 jacks and pin 1 of P2 to the appropriate point on the board near the edge connector corresponding with the letters on the wiring diagram.

THIS COMPLETES ASSEMBLY OF YOUR AR323 DUAL MIXER.

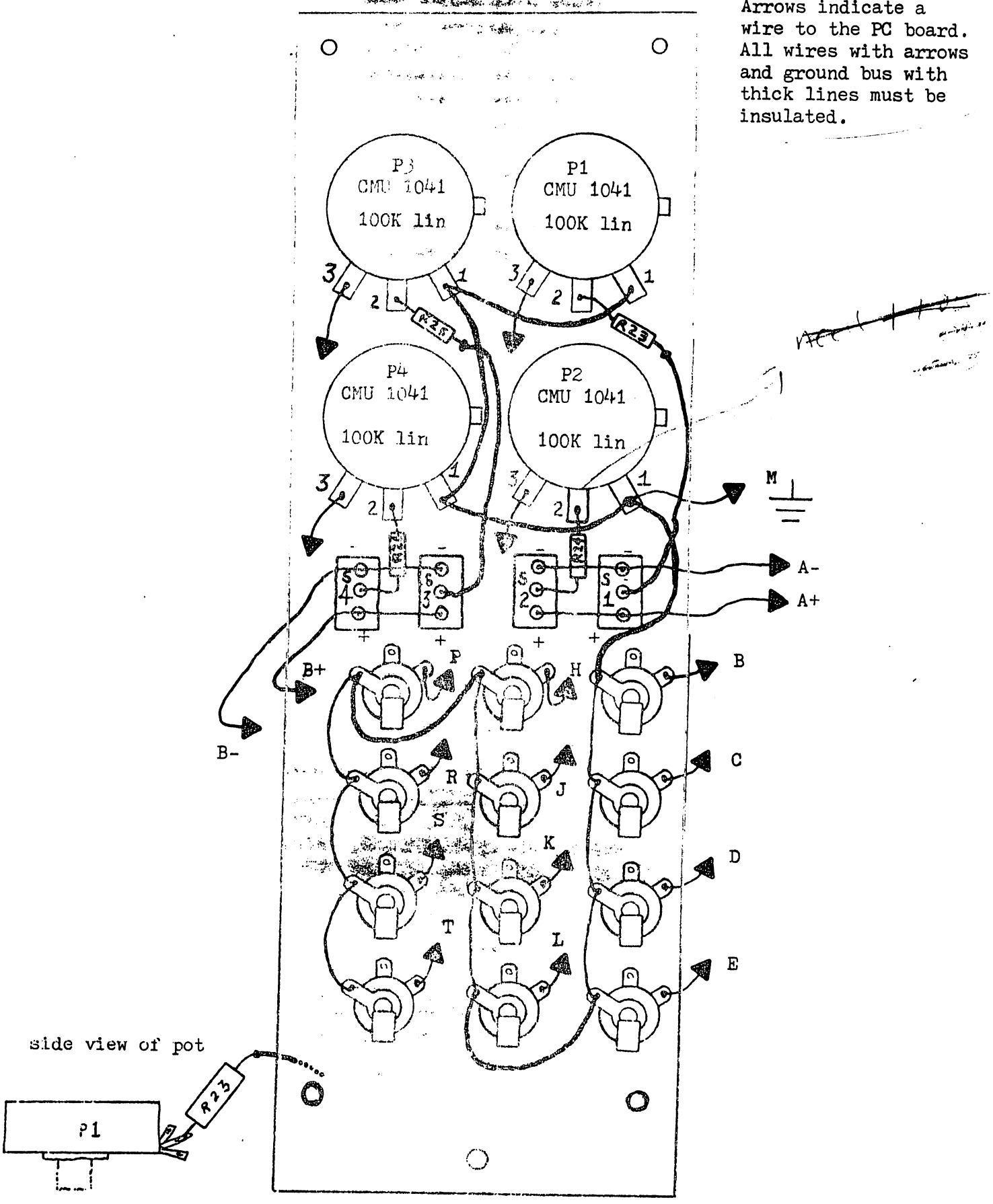
There is no calibration or test procedure required. Your AR 323 Dual Mixer is now ready to use.



AR323 Dual Mixer Module Assembly Drawing

AR 323 DUAL MIXER PANEL WIRING DIAGRAM--rear view

Arrows indicate a wire to the PC board. All wires with arrows and ground bus with thick lines must be insulated.



side view of pot

THEORY OF OPERATION AR-323

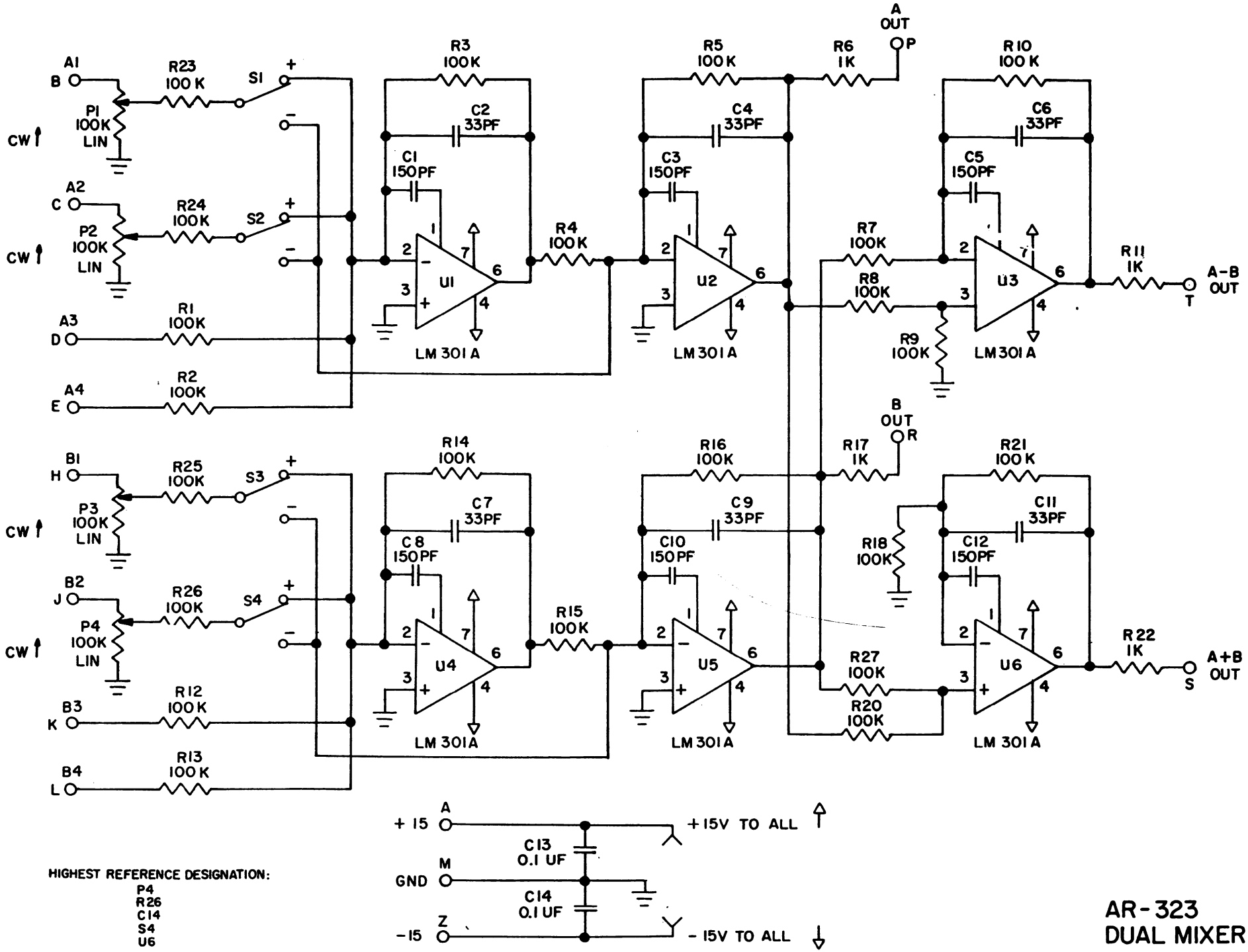
DUAL MIXER

Signals from inputs A3 and A4 are mixed by R1 and R2 into A1, which inverts the signals. A2 re-inverts the signals to come out non-inverted again. A1 and A2, however, are first controlled in level (attenuated) by P1 and P2, and switch selected to go either directly into A2, in which case they come out inverted, or into A1, in which case they come out non-inverted.

Mixer B works the same way.Now, A3 is a differential amplifier which mixes the outputs of mixer A and mixer B, but B is inverted, while A is not.Thus, the output is A-B.

A6, on the other hand, is a non-inverting mixer which adds the two outputs from A and B to give A+B.

All 6 amplifiers are LM 301A op amps with feed-forward compensation (the 150 pf capacitor) for good high frequency response.



HIGHEST REFERENCE DESIGNATION:

P4
R26
C14
S4
U6

AR-323
DUAL MIXER

PARTS LIST * AR-323 * DUAL MIXER

NUMBER	QUANTITY	DESCRIPTION	VALUE AND RATINGS
C1,3,5,8,10,12	6	Capacitor,Disc	150 pf
~~C2,4,6,7,9,11~~	6	" "	33 pf
~~C13,14~~	2	" "	0.1 mfd at 50v
P1,2,3,4	4	Potentiometer	100k, linear
~~R1,2,3,4,5,7,8,9,10,~~ 12,~~13,14~~,18 19,20,21, 23,24,26,27,28,29	22	Resistor	100k, 5%
R6,11,17,22	4	"	1k, 10%
~~S1,2~~,3,4	4	Switch,Toggle	SPDT
~~A1 thru A6~~	6	Operational Amplifier	LM301A
	12	Jack,Mini-Phone	
	1	Printed Circuit Board	
	1	Front Panel	
	4	Knob	
	1	Frame	
	2	Brackets (one long,one short)	
	2	P C Card Guides	
	6	Screw, 4-40 x 3/16"	
	6	Nut,4-40	

ead

rts

t board (R1 through
the panel. To avoid
t least 1/16 of an inch

Incorrect