

TYPE 212P-2/212P-1

AUDIO CONSOLES

INSTRUCTION MANUAL



80-1432

Continental Electronics MFG. CO.

4212 S. BUCKNER BLVD.

DALLAS, TEXAS 75227

1 OCTOBER 1980



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SECTION 1

1.1 INTRODUCTION

This instruction book contains all information necessary to install, operate, maintain, and service both the 212P-1 Monaural Audio Console and the 212P-2 Stereo Audio Console. Figure 1-1 depicts the external configuration of the Monaural Console; figure 1-2 shows the stereo console; figure 1-3 shows the internal make-up of the 212P-2 Stereo Audio Console; figure 1-4 is the console power supply; and figure 1-5 shows the optional machine control interface assembly. The sections of this instruction book provide the following classes of information for each of these types of audio console.

- a. Section 1, GENERAL DESCRIPTION, provides a description of the equipment, identifies the major components, lists physical and electrical characteristics, and describes the options.
- b. Section 2, INSTALLATION, provides information relative to incoming inspection, input/output connections, initial adjustments, and wiring instructions.
- c. Section 3, OPERATION, identifies and describes the functions of panel and component mounted controls and indicators, and provides information necessary to set up and operate the console.
- d. Section 4, PRINCIPLES OF OPERATION, provides descriptions of functional circuits within the console, beginning with a general discussion of the overall operation of the console and proceeding to a description of the function and operation of each circuit board.
- e. Section 5, MAINTENANCE, describes procedures for preventive and corrective maintenance, with suggested performance schedules.
- f. Section 6, PARTS LIST, provides information for ordering replacement components and assemblies, and parts location illustrations for each major assembly and each circuit board.
- g. Section 7, DIAGRAMS, contains schematic and wiring diagrams required for console maintenance.

general description



Figure 1-1. 212P-1 Monaural Audio Console.



Figure 1-2. 212P-2 Stereophonic Audio Console.

WARNING: DISCONNECT PRIMARY POWER BEFORE SERVICING.

general description

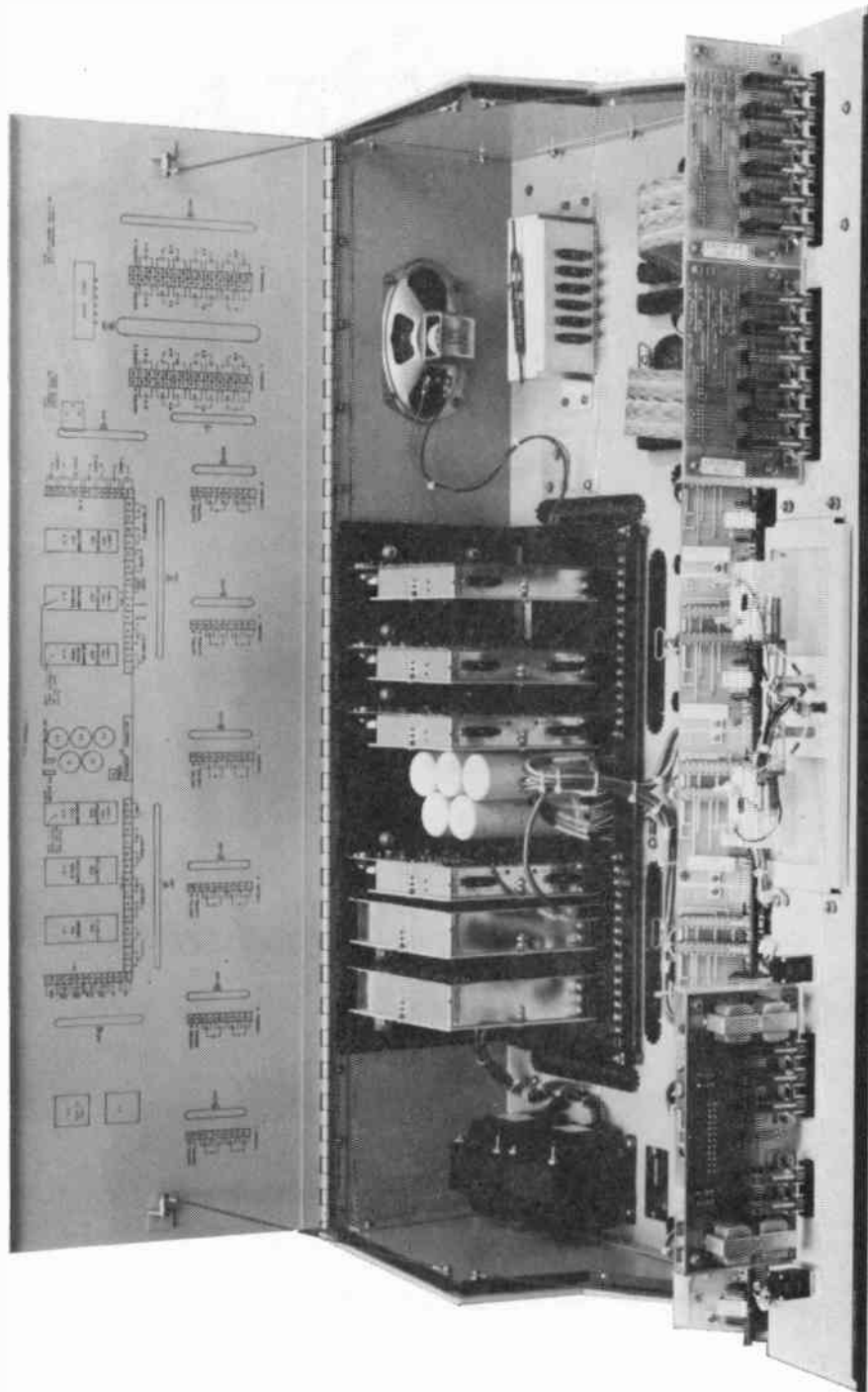


Figure 1-3. Interior view 212P-2 Stereophonic Console.

WARNING: DISCONNECT PRIMARY POWER BEFORE SERVICING.

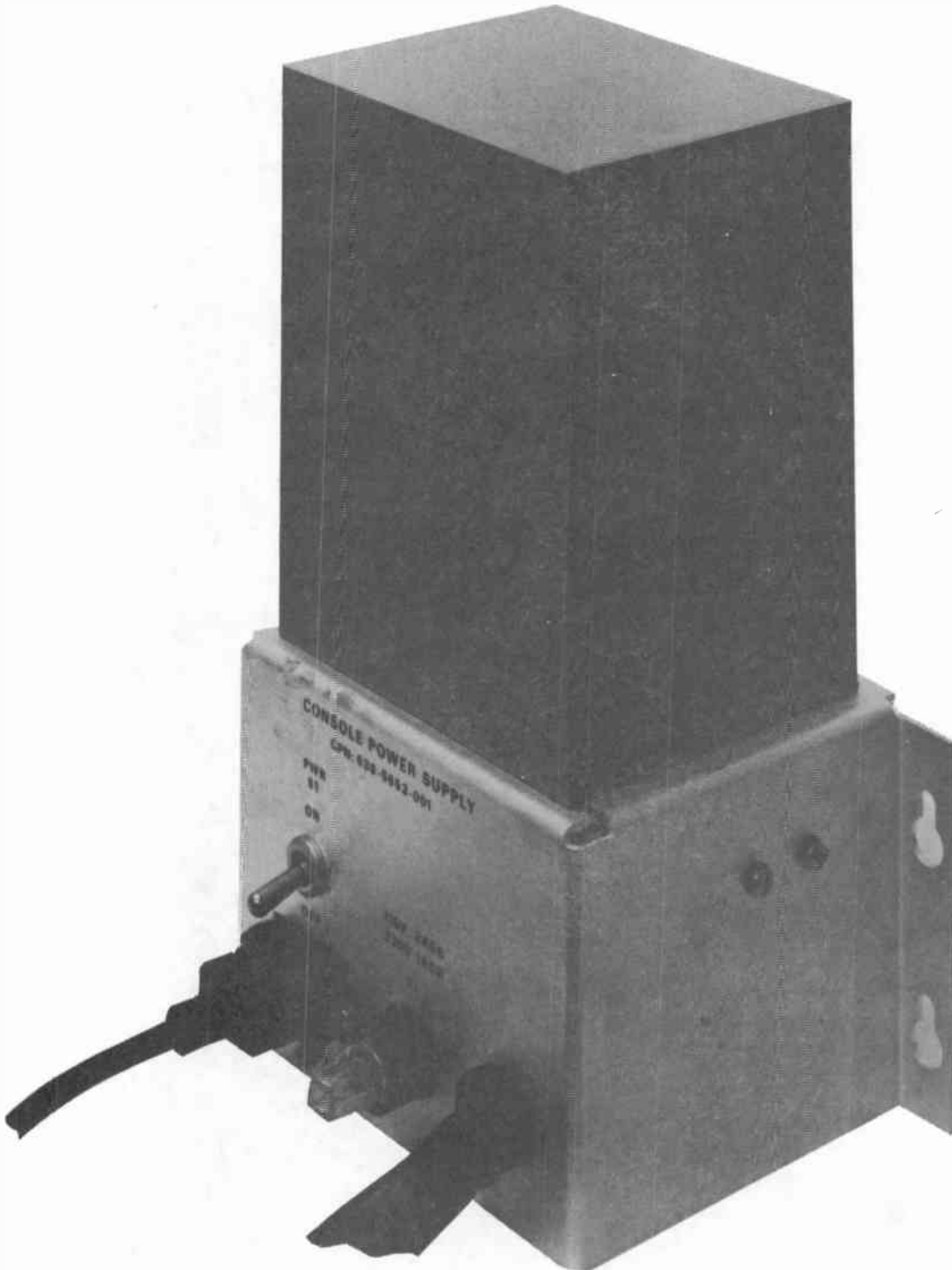


Figure 1-4. Power supply.

general description

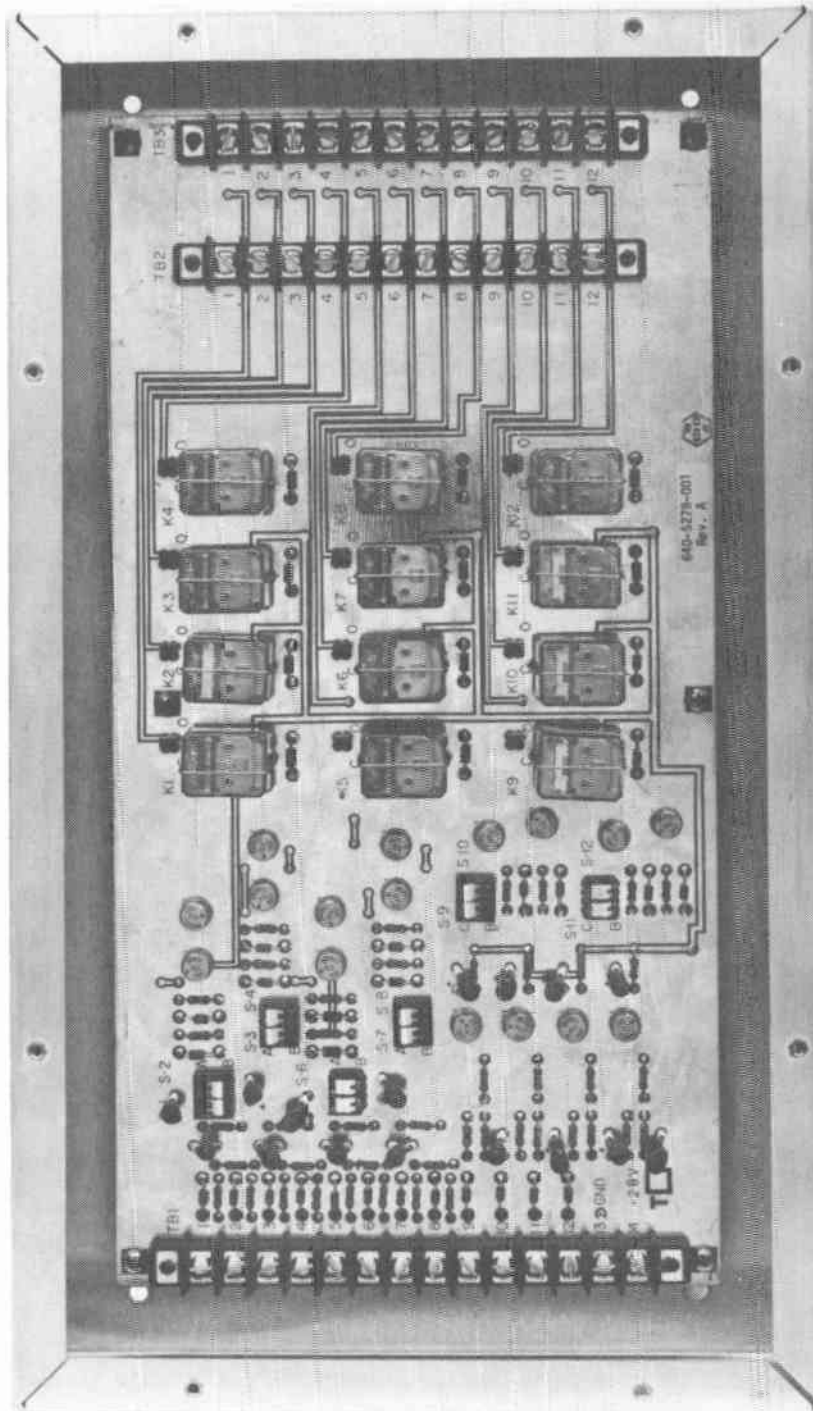


Figure 1-5. Machine Control Interface.

WARNING: DISCONNECT PRIMARY POWER BEFORE SERVICING.

1.2 EQUIPMENT PURPOSE

The audio console is used to mix, control, and monitor audio sources in broadcast service. It also provides cueing facilities on all channels. An (optional) associated machine control interface unit may be used to start and stop audio sources such as tape machines and turntables under control of the console switches.

1.3 PHYSICAL DESCRIPTION

The console is housed in a cabinet designed for desk top mounting. The cabinet is painted with a gray, light diffusing, abrasion resistive paint. The front panel is white, with plastic finished silk screening; and the switches, knobs, and meter(s) are color coordinated. The cabinet is approximately 228.6mm (9 in.) high, 863.6mm (34 in.) wide, and 482.6mm (19 in.) deep. The front panel is hinged at the bottom to allow easy access to the console interior.

The optional machine control interface unit is housed in a metal enclosure 393.7mm (15.5 in.) long, 228.6mm (9in.) wide, and 63.5mm (2.5 in.) high, designed to be mounted in a desk or turntable cabinet.

1.4 FUNCTIONAL DESCRIPTION

The audio console contains all required mixers, amplifiers, program monitoring, cueing, and switching circuits. An external power supply provides required dc voltages to the various components of the console, and machine control unit when this is used. The circuitry is hybrid in design, employing both discrete and monolithic components. Circuits are mounted on glass fiber printed circuit cards. All operating controls are conveniently arranged on the front panel.

There are eight mixer circuits, each with the capability of selecting one of two inputs. Each channel input select switch 1 through 6 can select one of two audio sources to apply to its associated mixer; and each channel input select switch 7 and 8 can select either one direct source or any one of six indirect sources. Any number from one through eight of up to 26 available source signals can be mixed for simultaneous application to the program circuits.

The outputs of the mixer switches are applied to the program buss. In the mono console, a single program buss produces mono signals. In the stereo console, the left and right outputs of the mixer switches are applied to two program busses (left and right) to produce stereo signals. The (mono or stereo) signals are then amplified, adjusted in level, and applied to the program output line(s). The output level is monitored: in the mono console, by a single VU meter; and in the stereo console, by two VU meters, one for the left program output, the other for the right program output. The VU meters are used in adjusting the output level and (in the stereo console) the output balance. Other front panel controls enable connection of program monitor or air monitor, to the speakers and program, air monitor or cue to the headphones.

general description

An optional machine control interface unit can be used to start and stop audio sources such as tape machines and turntables. Up to twelve machines can be controlled through this unit from switches on the audio console.

Table 1-1. 212P-(1/2) Physical and Electrical Characteristics.

ITEM	CHARACTERISTICS
1. SIZE	22mm (8.75 in.) high 86.4mm (34 in.) wide 47.6mm (18.75 in.) deep
2. WEIGHT	29.9kg (66 lb)
3. Service Conditions	
a. Ambient Temperature	0° to 50°C (32° to 122°F)
b. Relative Humidity	0 to 95% (without condensation)
c. Altitude	0 to 4572 m (0 to 15000 ft)
d. Vibration and Shock	Normal transportation and handling
4. Power Requirements	
a. Voltage	105 to 125 volts, or 210 to 250 volts, ac
b. Frequency	50/60 Hz
c. Power	150 watts maximum
5. Specifications	
a. Input Levels:	
Microphones	-50dBm nominal
High Level	0 dBm nominal
Air Monitor	0 dBm nominal
Post Mix	+10 dBm
b. Input Impedances:	(All balanced, transformer coupled except Post Mix input)
Microphones	150 ohms
High Level	150/600 ohms
Air Monitor	600 ohms
Post Mix	600 ohms
c. Output Levels	
Program	+18 dBm nominal; +30 dBm maximum
Headphone	5 watts nominal; 25 watts maximum into 8 ohms
Monitor	25 watts maximum into 8 ohms
Cue	25 watts maximum into 8 ohms
Post Mix Output	0 dBm into 600 ohms
d. Load Impedances	
Program	600 ohms
Monitor	Not less than 8 ohms
Headphone	Not less than 8 ohms
Cue	Not less than 8 ohms

Table 1-1. 212P-(1/2) Physical and Electrical Characteristics (Cont)

ITEM	CHARACTERISTICS
e. Noise: Program circuits High Level Inputs Microphone Inputs	75dB below +18 dBm -125 dBm EIN (equivalent input noise)
f. Frequency Response	+0.5 dB, 50 Hz to 15 kHz, all circuits
g. Distortion	0.25% IMD (intermodulation distortion) all circuits at nominal levels (SMPTE method) 0.25% THD (total harmonic distortion), all circuits at nominal levels.

SECTION 2

INSTALLATION

2.1 UNPACKING AND INSPECTION

Remove all packing material, and carefully lift the units from their boxes. Check the equipment against the packing slips. Visually inspect the units for any apparent damage and for missing components. Check for proper operation of controls. Any claims for damage should be filed promptly with the transportation agency. If such claims are to be filed, all packing material must be retained.

2.2 INSTALLATION PROCEDURE

2.2.1 GENERAL

The console location will be determined by the arrangement of the control room facilities. In general, the console should be centrally located among the source equipment to which it is connected. Frequently used sources such as turntables and cartridge tape playback equipment should be located close to the console for maximum operator convenience. Less frequently used equipment, such as reel to reel tape machines, may be located farther away from the console.

The rear of the console may be placed within 1/2 inch of a window or wall if necessary since no rear access is required. The console need not be bolted or otherwise secured to the top of the table. All connecting cables enter through the bottom of the unit. Outline and mounting dimensions of the console are shown in Figure 2-1. It is recommended that 1 inch diameter holes be drilled in the table for cable entry.

2.2.2 INPUT CONNECTIONS

The mixers should be assigned in such a manner as to provide maximum flexibility for the operator. In general, each source used in the hourly rotation sequence should appear on a separate mixer. For example, let's assume that the control room plant consists of one control microphone, one newsroom microphone, two turntables, three cartridge playback machines, a network, a remote pickup radio system and two remote lines. Of these sources, the following are used repeatedly in the hourly rotation: control room microphone, newsroom microphone, two turntables, three cartridge playback machines and the network line. A logical arrangement would be as follows:

Mixer

1A	Control Room Microphone
2A	Newsroom Microphone
3A	Turntable 1
4A	Turntable 2
5A	Cartridge Tape 1
6A	Cartridge Tape 2
7A	Cartridge Tape 3
8A	Network Line

installation

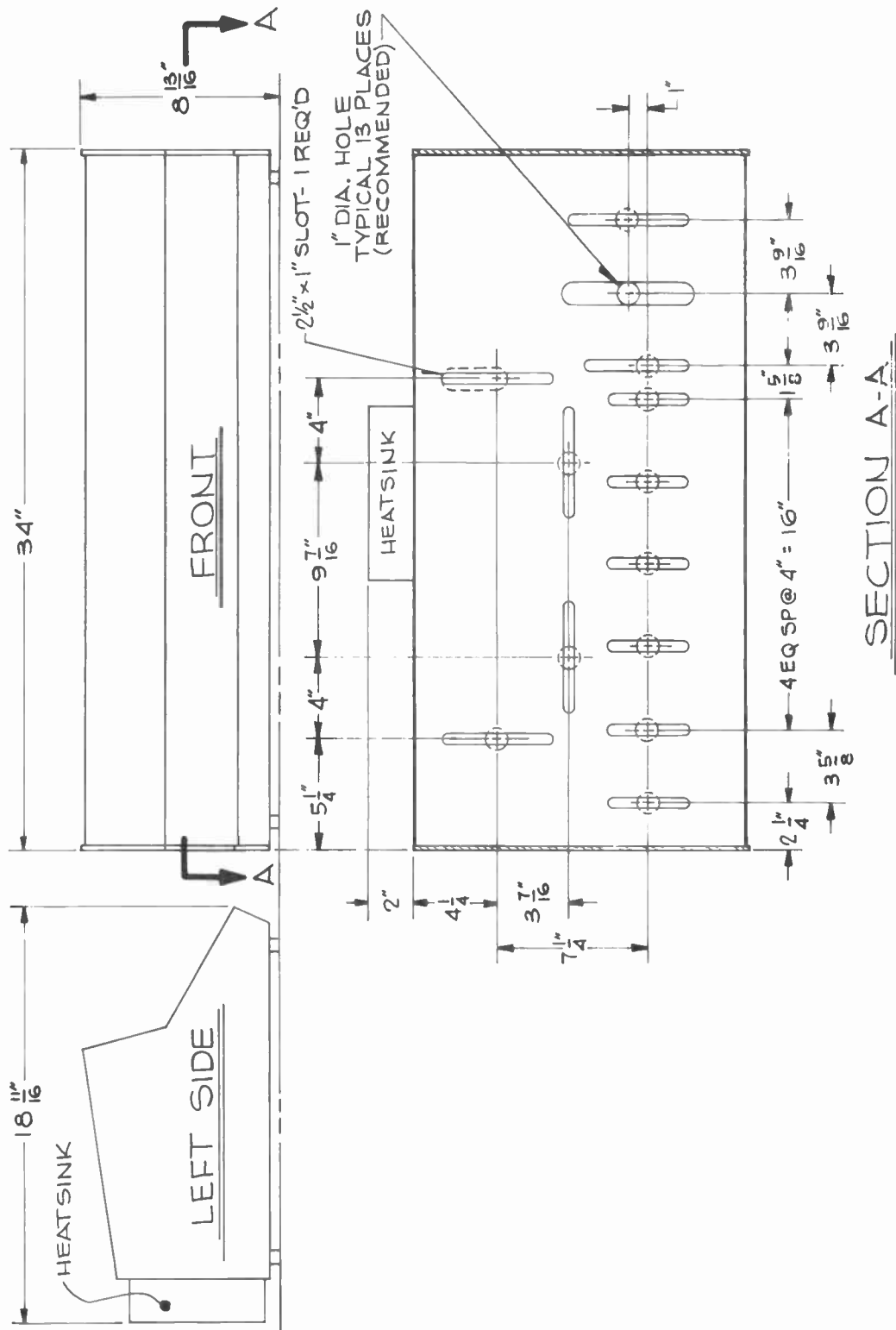


Figure 2-1. Outline Drawing.

WARNING: DISCONNECT PRIMARY POWER BEFORE SERVICING.

All normally used sources appear on separate inputs requiring no routine switching operations for input selection. The remaining sources would be connected as follows:

3B	Reel to Reel 1
4B	Reel to Reel 2
5B	Remote Pick-up System
7/8B-1	Remote 1
7/8B-2	Remote 2

The occasional use circuits would be assigned to the "B" inputs of each mixer requiring only a simple pushbutton operation to air such a source.

2.2.3 WIRING METHODS

All microphone wiring should be dressed away from the medium level wiring associated with the balance of the console.

All wiring should be twisted pair shielded wire. For monaural circuits or stereo circuits which require separate connectors for left and right channels, a single twisted pair cable such as Belden 8451 or equivalent should be used. For stereo circuits terminating in a single connector or terminal board, a double twisted pair cable such as Belden 8723 or equivalent should be used. The shield should be grounded at the console end only with the other end left unterminated. A separate ground of #18 AWG stranded wire should be run from the source equipment to the console ground lug adjacent to the input connection.

The console end of all wiring should be terminated in an insulated spade lug suitable for a #6 screw. Vaco stock number 54206 or equivalent is a suitable lug for use with this console. A little extra time spent in proper planning and execution of the console wiring will pay great dividends in trouble-free future operation and reduced maintenance of the console. Figure 2-2 shows how to prepare and terminate the wiring.

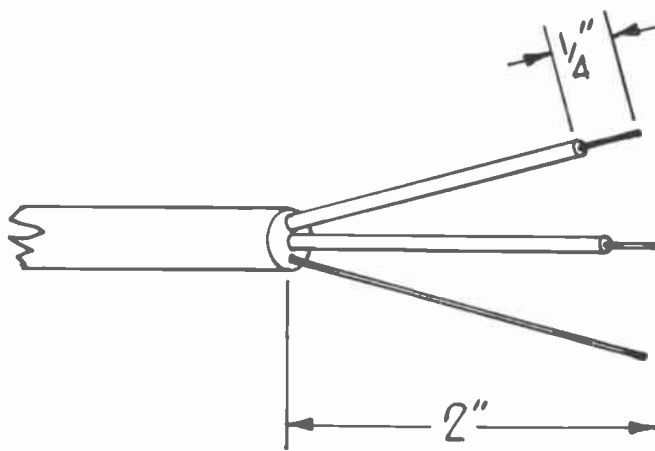


Figure 2.2. Wire Preparation.

installation

- 1) Strip outer insulation sheath back 2 inches from the cable end.
- 2) Strip each conductor insulation back 1/4 inch from wire end.
- 3) Place a 1-3/4 inch length of spaghetti over the drain wire.
- 4) Place a 3/4" length of heat shrinkable tubing over the outer jacket of the wire overlapping equally the stripped and unstripped portions of the wire and heat it until it shrinks over the cable jacket.
- 5) Place a lug on each of the signal leads and solder the drain wire to the console ground lug nearest the terminal board.

USEFUL TOOLS AND MATERIALS

Wire Strippers:	Xcelite 101S
Diagonal Wire Cutters:	Xcelite 54CG
Long Nose Pliers:	Xcelite 79CG
Crimping Tool:	Ideal 30-428
Crimp on Lugs:	Vaco 54206
Heat Shrink Tubing:	Alpha FIT 1/4" ID
Heat Gun:	Master Appliance 10008

2.2.4 GROUNDING

A slot is provided at the right end of the back plane for installation of a 2 inch wide by .036 inch thick ground strap to be connected to the station ground system. Three 10-32 by 1/2 inch machine screws are provided for connection of the ground strap. Use the attached warning notice as a guide to locate the proper hole positions in the end of strap. Drill or punch three holes 3/16 inch in diameter in the strap and mount the end securely with the hardware provided.

2.2.5 POWER SUPPLY INSTALLATION

The power supply is shipped connected for 125 volt AC lines. If your line voltage is less than 115 volts or in the 200 to 250 volt range, reconnect the primary taps for your local line voltage. Refer to Figure 7-6 for the proper connections. If your line voltage is in the range of 200 to 250 volts, change fuse F-1 to 1 AMP slow blow fuse.

Locate the power supply under the table top and mount it on a convenient wall at least one foot from the console. Secure the unit to a wall with #10 hardware. Route the power supply cable through one of the large slots behind the channel 7 attenuator, across to the backplane power connector, J-4. Note that one edge has ribs for proper polarization. Insert the connector in J-4 and press down to make a secure connection.

2.2.6 PHASING OF AUDIO CIRCUITS

In stereophonic circuits it is mandatory that proper phasing of the left and right audio channels be observed. If this is not done, monaural

source material played back through the system may cancel when received on a monaural receiver.

All connections in the console are set up in such a manner that the odd numbered connections of the left and right channels are in phase and the even numbered connections of the left and right channels are in phase. In other words, the low side of the left channel should be connected to an odd numbered terminal and the low side of the right channel should be connected to an odd numbered terminal. The high sides of both channels should be connected to even numbered terminals.

Proper phasing may be determined by playing a monaural source through a channel and placing the channel attenuator in the cue position. If the source is properly phased, a normal output will be heard from the cue speaker. An out of phase condition will result in little or no output from the cue speaker.

2.2.7 HIGH LEVEL INPUT CONNECTIONS

All inputs to the console on channels 1A-8A and 1B-6B are set up for a nominal input level of -10VU. This means that a level of -10dBm will deflect the VU meter to 0VU on a sine wave with normal control settings. All sources should be adjusted to this level for proper operation of the equipment. In certain types of equipment such as most professional reel to reel and cartridge tape machines, the level control on the machine is located ahead of the program amplifier and may cause a noticeable degradation in signal to noise ratio if the level control is retarded to produce the required output. In certain cases it may be desirable to utilize the VU meter on the machine to indicate proper machine operation prior to use on the air. In either of these events, it is necessary to construct an attenuator network and place it in the connecting line between the source equipment and the mixer input of the console.

installation

Proper use of the attenuator network is illustrated in Figure 2-3.

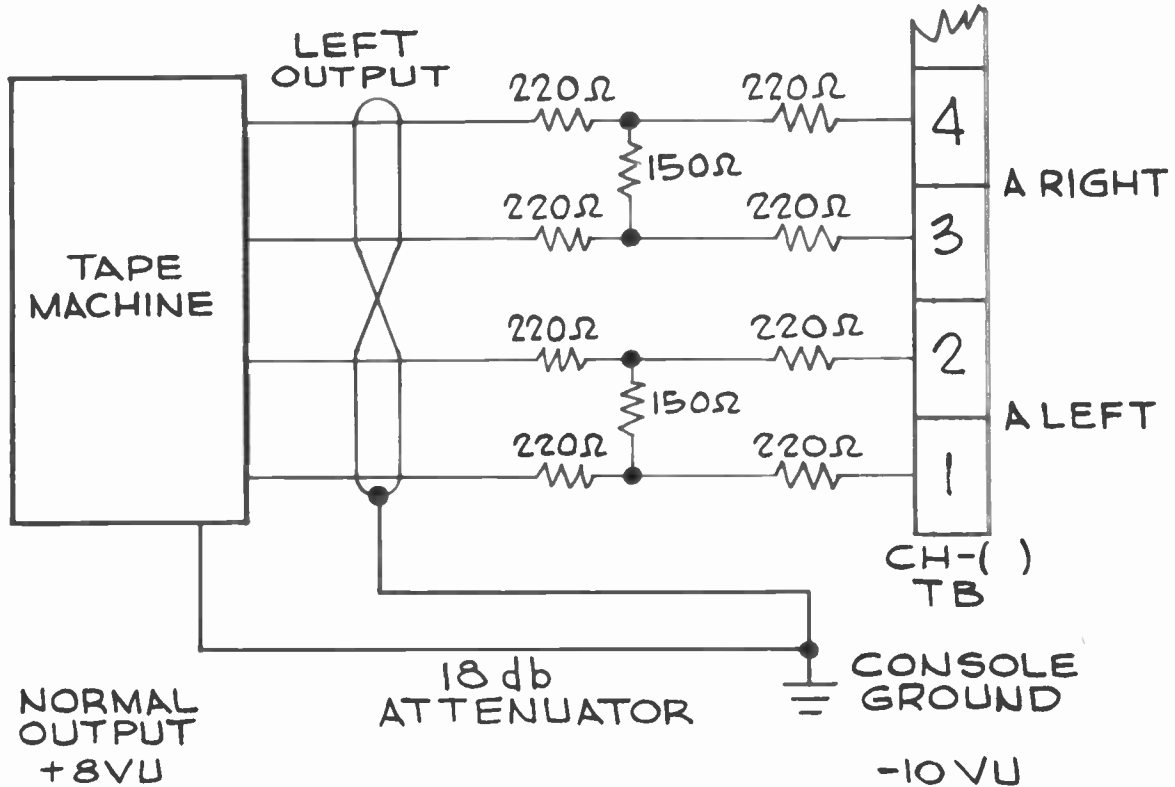


Figure 2-3. Attenuator Network.

Ground the shield at the console end only and run a separate #18 AWG stranded wire for the machine ground.

Table 2-1 is a table of attenuator networks. It is included in this section of the instruction manual for your reference. Resistors may be 1/4 or 1/2 watt 5% or 10% carbon resistors which are available from most electronic parts distributors.

Table 2-1. Attenuator Networks

IMPEDANCE	600 Ohms		600 Ohms	
	R ₁ Ohms	R ₂ Ohms	R ₁ Ohms	R ₂ Ohms
2.0	34.4	2582	69.7	5232
2.5	42.9	2053	87.7	4195
3.0	51.3	1703	106.2	3505
3.5	59.6	1448	120.0	3021
4.0	67.9	1249	143.8	2051
4.5	76.1	1109	162.3	2365
5.0	84.1	987.6	182.3	2141
5.5	92.0	886.8	203.0	1956
6.0	99.7	803.4	223.8	1807
6.5	107.3	730.8	246.3	1679
7.0	114.8	685.2	268.5	1569
7.5	122.1	615.6	292.4	1475
8.0	129.2	567.6	317.1	1393
8.5	136.1	525.0	342.8	1322
9.0	142.9	487.2	369.4	1260
10.0	156.0	421.6	427.0	1154
11.0	168.1	367.4	489.9	1071
12.0	179.5	321.7	550.5	1002
13.0	190.3	282.8	636.3	946.1
14.0	200.2	249.4	721.5	899.1
15.0	209.4	220.4	816.0	859.6
16.0	217.9	195.1	923.2	826.0
17.0	225.7	172.9	1042	797.3
18.0	232.9	152.5	1172	772.8
19.0	239.5	136.4	1335	751.7
20.0	245.2	121.2	1485	733.3
22.0	255.9	95.9	1877	703.6
24.0	264.4	76.0	2369	680.8
26.0	271.4	60.3	2992	663.4
28.0	277.0	47.8	3775	649.7
30.0	281.0	37.99	4750	639.2
32.0	285.3	30.16	5967	630.9
34.0	288.3	23.95	7500	624.4
36.0	290.6	18.98	9480	619.3
38.0	292.5	15.11	11910	615.3
40.0	294.1	12.00	15000	612.1

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WARNING: DISCONNECT PRIMARY POWER BEFORE SERVICING.

installation

2.2.8 CONNECTION OF MONAURAL SOURCES

Monaural sources may be connected to inputs 1A-8A and 1B-6B by a simple dividing network as shown in Figure 2-4.

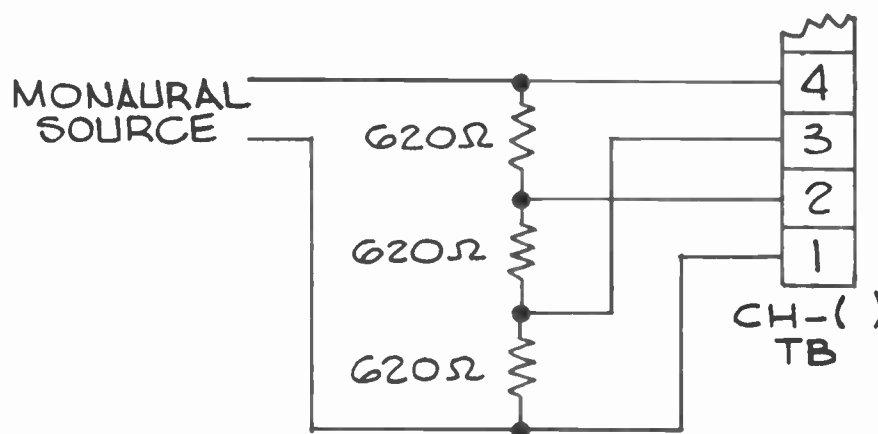


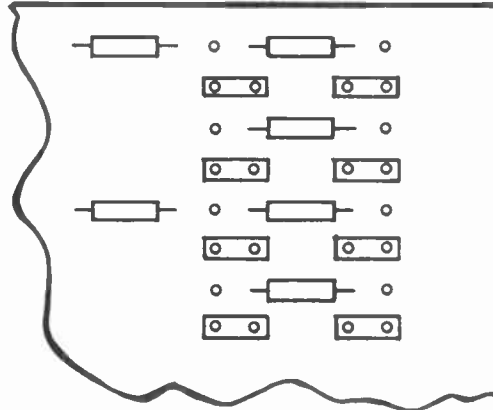
Figure 2-4. Dividing Network.

The source may be either balanced or unbalanced. However, a balanced source is preferred for minimum hum and RFI pickup.

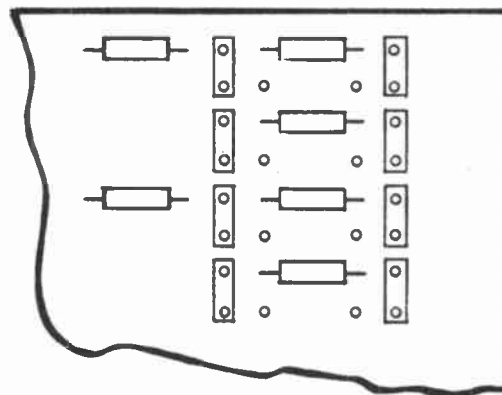
The divider network has a 6dB loss and this loss must be taken into account when adjusting the output level of the source or calculating the value of other attenuator networks between the source and the dividing network.

INPUTS 7B and 8B

Input selector switches 7B and 8B may be wired as 600 ohm terminating inputs with a nominal input level of -10VU or as 6000 ohm bridging inputs with a nominal input level of +8VU by proper connections on the cards. The console is shipped from the factory connected for 600 ohms terminating. Figure 2-5 shows the connections for both cases.



CH 7B & 8B JUMPERS
(AS SHIPPED)
600 OHMS TERMINATING INPUT
(-10VU)



CH 7B & 8B JUMPERS
600 OHMS BRIDGING INPUT
(+8VU)

Figure 2-5. Input Connections for Channels 7B & 8B.

installation

When the inputs are connected for bridging service a monaural signal may be fed in parallel to both inputs without a dividing network in most cases. When the 600 ohm terminating input is used, a dividing network is recommended to avoid excessive loading of the source.

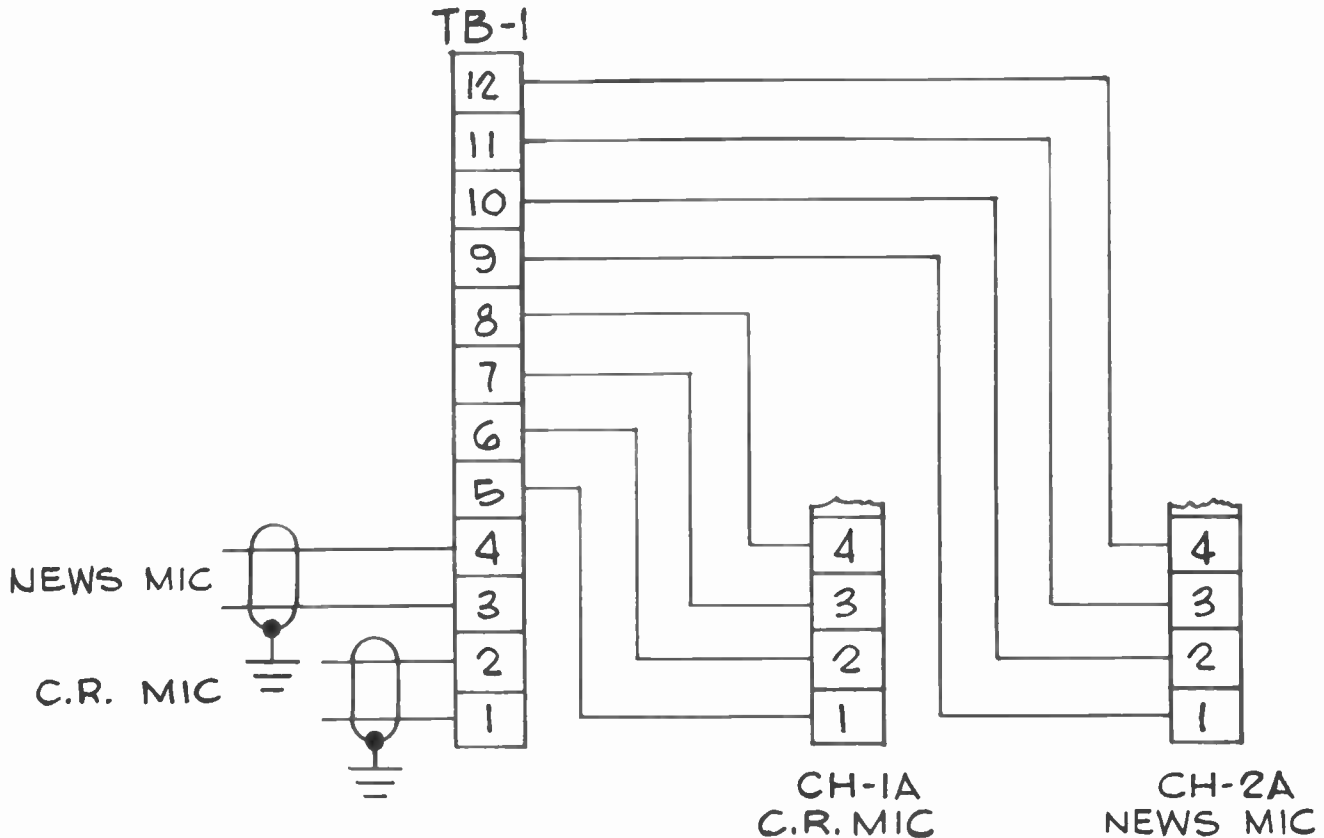


Figure 2-6. Microphone Connections.

2.2.9 MICROPHONE AND MUTING CONNECTIONS

Two microphone preamplifiers are supplied with the console. Each pre-amplifier has two isolated outputs which may be used to feed equal signals to the left and right channels of the console. All inputs and outputs terminate on backplane terminal board TB1.

Connect the balanced output of microphone one to TB1 1&2 and the output of microphone two to TB1 3&4. The outputs of preamp 1 may then be connec-

ted from TB1 5&6 (left output) and TB1 7&8 (right output) to the input of the desired mixer. For example, let mixer 1A be the control room microphone and mixer 2A be the booth or newsroom microphone. Wiring would be connected as shown in Figure 2-6.

MUTING CONNECTIONS

Proper connections for loudspeaker muting must be made in order to avoid feedback from a loudspeaker to an adjacent microphone. These connections are made from the control output of the mixer input channel assigned to a particular microphone and a particular muting relay input to the backplane. In the example previously described a connection would be made between mixer channel 1A control output (CH-1 TB-9) to backplane TB3-9 to mute the control room monitor and cue loudspeakers and between channel 2A control, output (CH-2 TB-9) to backplane TB3-10 to mute the newsroom loudspeaker.

In the event that more than one microphone is utilized in a given room such as the control room, it will be necessary to install steering diodes in each control circuit to allow proper operation as indicated in Figure 2-7.

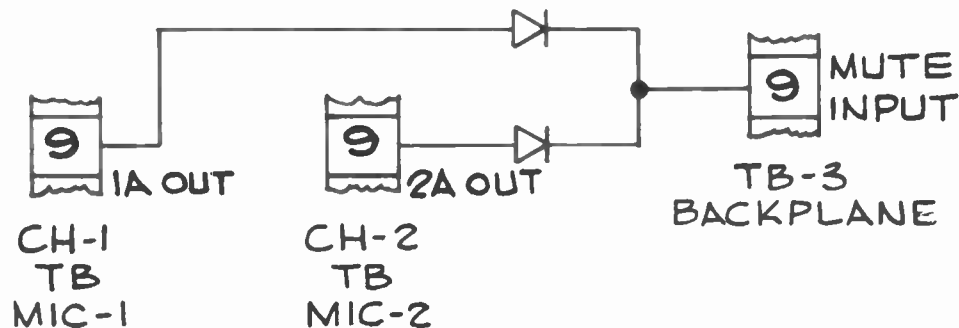


Figure 2-7. Muting Connections for Multiple Microphones.

The diodes may be any common diode such as IN4001, IN914, IN3253, or any similar diode.

installation

MULTIPLE MICROPHONE CONSIDERATIONS

If it is necessary to use several microphones in one location such as a studio where each needs to be individually mixed one of the many low cost microphone mixers such as the Shure M-67 or a common remote broadcast amplifier may be connected to the console through a 600 ohm "H" pad and dividing network as shown in Figure 2-8.

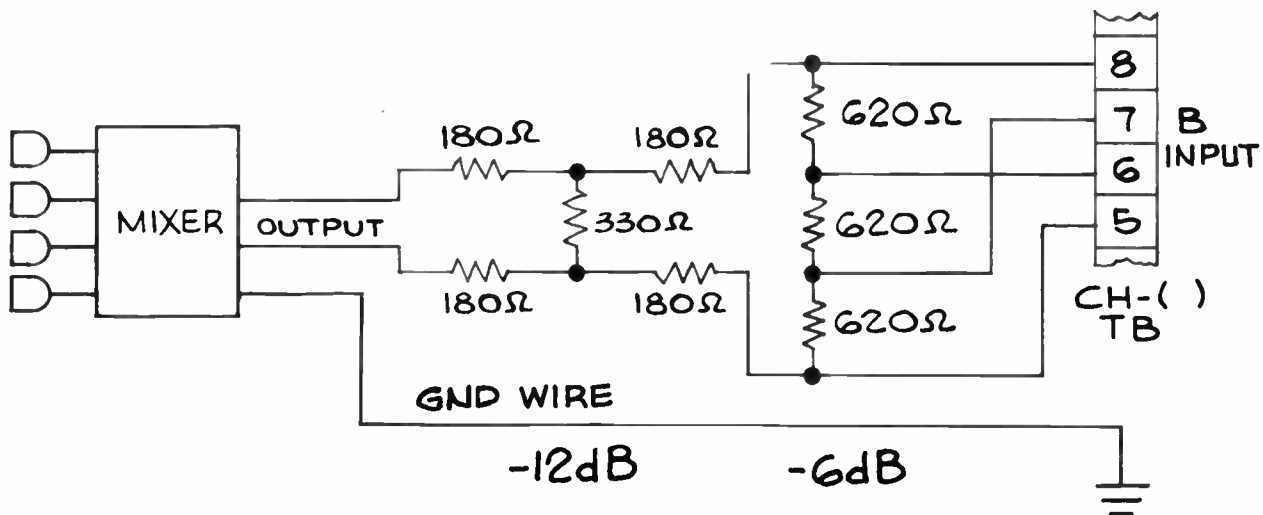


Figure 2-8. External Microphone Mixer Connections.

The mixer output will be split to feed each channel equally.

The muting connections should be set up to mute the associated loudspeaker which in this case is assumed to be a studio loudspeaker, as shown in Figure 2-9.

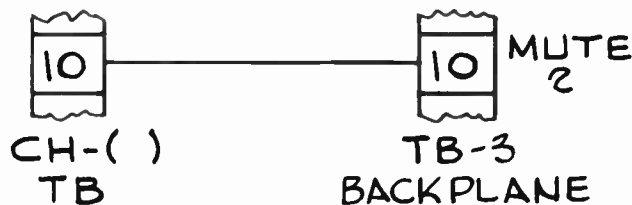


Figure 2-9. Loudspeaker Muting Connections.

The mixer chassis should be connected to the console chassis with a length of #18 AWG stranded wire to avoid hum pickup.

2.2.10 WARNING LIGHT CONNECTIONS

Two form "A" (normally open) dry contacts are provided on the muting relays for control of warning lights. These contacts should be used to control an external low voltage DC coil relay to apply power to the warning lights.

WARNING
DO NOT CONNECT 115 VOLTS TO THE WARNING LIGHT CIRCUITS. INTERFACE THE WARNING LIGHTS WITH AN EXTERNAL RELAY ONLY.

Connections for warning light control relays appear on backplane terminal board TB3 as follows:

Mute 1	TB3-11&12 (Control Room)
Mute 2	TB3-13&14 (Studio)

The contacts may be connected to control the warning light relays with either an electromechanical or solid state relay as shown in Figure 2-10.

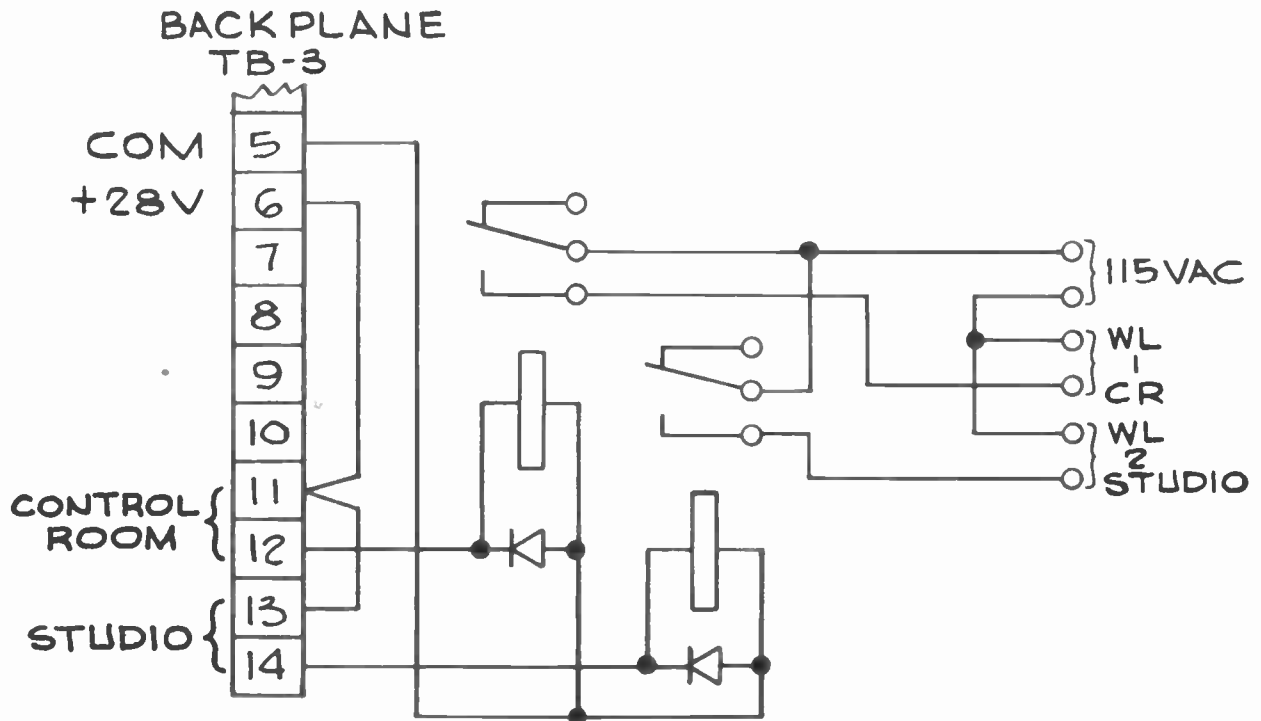


Figure 2-10. Warning Light Relay Connections.

- 1) Diodes may be IN4003 or any common diode 1 amp 200 PIV.
- 2) Relays should be 28 volt DC coil with contacts rated for warning light voltage and current requirements.

installation

2.2.11 LOUDSPEAKER CONNECTIONS

Monitor amplifier outputs are provided for three sets of loudspeakers. One set is an unmuted output for lobby or other applications while the other two sets are intended for control room and studio use. The control room and studio outputs are routed through muting relays located in the cue amplifier module. Any combination of the three outputs may be used as required. It is not necessary to load or otherwise terminate unused outputs. The only rule to observe is that the total load impedance for each output channel, (left or right) must not be less than eight ohms. The monitor amplifiers are rated for continuous service at 25 watts rms into an eight ohm load. The peak power output is considerably in excess of 25 watts allowing the use of low efficiency "Hi Fidelity" loudspeakers with the console. Consequently, one set of eight ohm loudspeakers may be connected to the control room output with no other loudspeakers connected. No transformers are required for this application. Figure 2-11 illustrates this connection. We recommend that the loudspeakers be chosen with care by comparative listening tests conducted at the installation location. For best results, all loudspeakers should be of the same type.

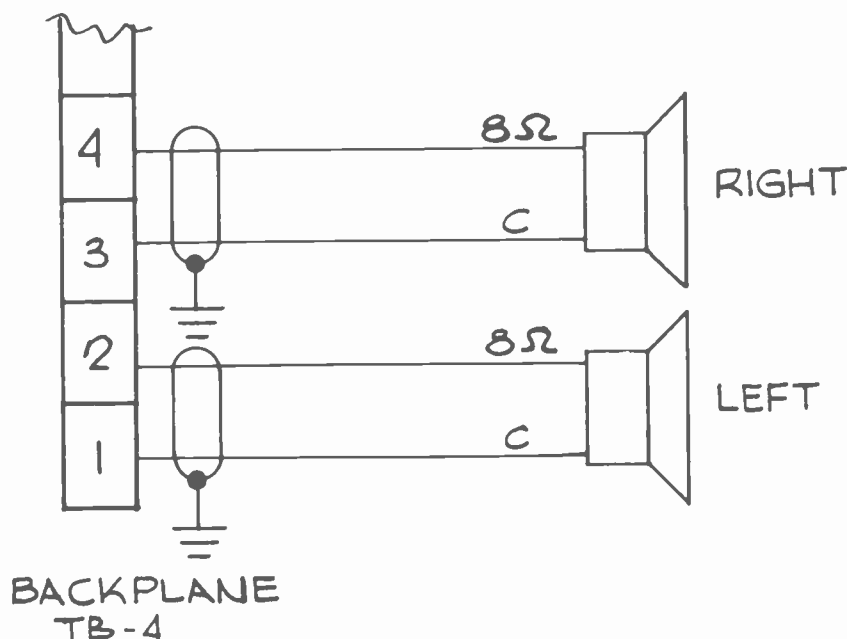


Figure 2-11. Single Loudspeaker Connections.

For multiple loudspeaker installations it is necessary to use a matching transformer to provide the proper load for the monitor amplifier. The Collins part number 667-0316-010 transformer will serve this purpose. The transformer has three primary taps for 16 ohms, 24 ohms and 32 ohms which permits the use of two, three and four sets of speakers respectively to be used with the console. The secondary is intended for use with an eight ohm loudspeaker. The transformer should be mounted on or near the associated loudspeaker. Figure 2-12 is the schematic diagram for the transformer.

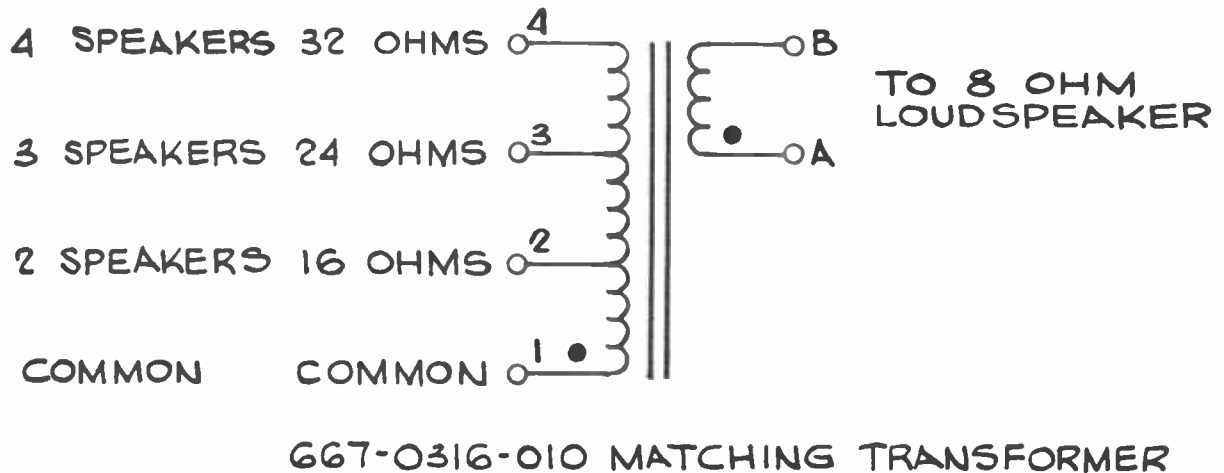


Figure 2-12. Transformer Schematic

Figure 2-13 shows the connections for multiple loudspeaker installations.

All wire should be twisted pair shielded #16 AWG or larger. Belden 8719 or equivalent is a satisfactory type for this application. Ground the shield at the console end only.

2.2.12 PROGRAM LINE CONNECTIONS

The program line output connections appear on the backplane terminal board TB2. The left channel appears on TB2 - 9&10 and the right channel appears on TB2 - 11&12. These terminals should be connected to the input of the station signal processing equipment or other equipment used with the console. The output level is +8VU into 600 ohms. The console is capable of delivering +30 dBm into a 600 ohm load allowing more than adequate headroom.

installation

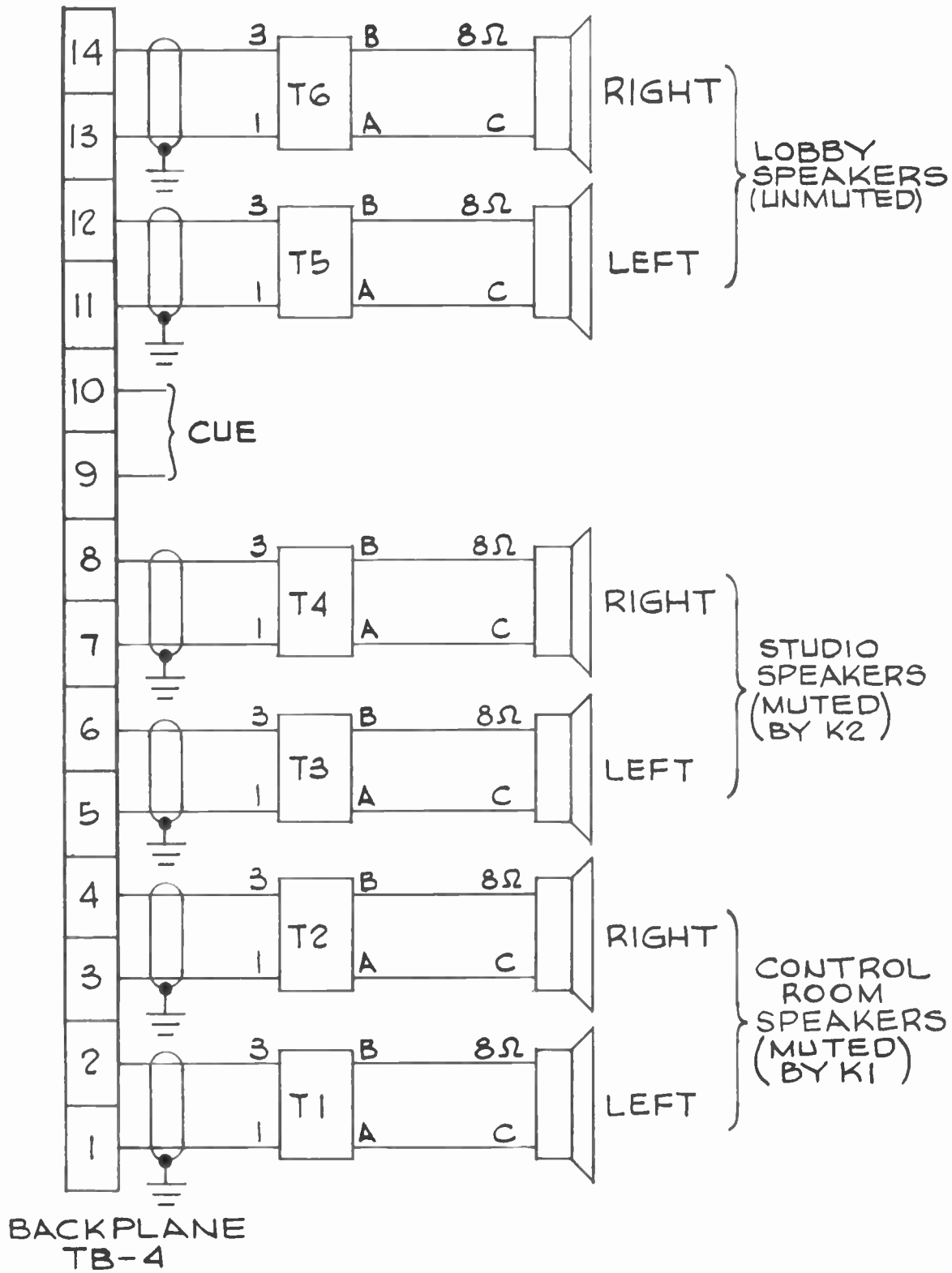


Figure 2-13. Multiple Loudspeaker Connections.

2.2.13 AIR MONITOR CONNECTIONS

An external input is provided for connection to a modulation monitor for off-the-air monitoring. The inputs appear on backplane terminal board TB3 - 1&2 for the left input and TB3 - 3&4 for the right input. The nominal input level is 0 dBm at 600 ohms which is compatible with most available monitors.

2.2.14 MACHINE CONTROL INTERFACE CONNECTIONS

The machine control interface option contains 12 control circuits for control of turntables, tape machines and other sources. Channels 1 through 8 of the interface assembly may be programmed to provide a momentary contact closure or open when the associated channel is turned on, or provide a continuous contact closure or open as long as the channel is on. Channels 9 through 12 may be programmed to provide a momentary contact closure or contact open at the time the channel is turned on or turned off.

Programming is accomplished as follows:

For functional outputs (open or closure) a jumper is placed on the associated relay output between two pins. Place the jumper between pins labelled "O" for normally open or "C" for normally closed output.

The input control action is controlled by a miniature toggle switch associated with the control channel (S-1 through S-12). The control action is as follows:

SW	Posn	Action
A		Maintained Circuit (latching)
B		Momentary when channel is turned on
C		Momentary when channel is turned off

TURNTABLE CONTROL

For most turntables which require a maintained contact closure to operate, only one control channel will be required to operate the turntable. It will be one channel of the first eight. The input switch would be set to mode "A" (maintained circuit), and its output would be strapped for "O" for normally open service. Thus when the associated channel is turned on the contacts would close and remain closed.

PANASONIC SP10 MKII TURNTABLE CONTROL

The SP10 MKII turntable requires a momentary contact closure to both start and stop the turntable. This requires two control channels to operate if start and stop control are required from the console. Only one channel is required for starting the turntable if it is desired to stop it using the turntable control button. This turntable starts on

installation

the first momentary closure and stops on the second momentary closure. The start function is chosen from channels 1 through 8 and the stop function from channels 9 through 12. Both the inputs and the outputs are wired in parallel. The start channel is programmed for mode "B" (momentary on) and for normally open operation. The stop channel is programmed for mode "C" (momentary off) and for normally open operation. Thus a momentary contract closure is generated when the channel is turned on and again when the channel is turned off.

CARTRIDGE TAPE MACHINE CONTROL

Most, if not all, cartridge tape machines in current use require a momentary contact closure to start the machine. Any of the twelve channels may be utilized to start a cartridge tape machine by programming the input of the associated control channel for mode "B" (momentary on) operation and the output for "O" (normally open) operation. This will provide a momentary contact closure to the machine start circuit when the channel is turned on.

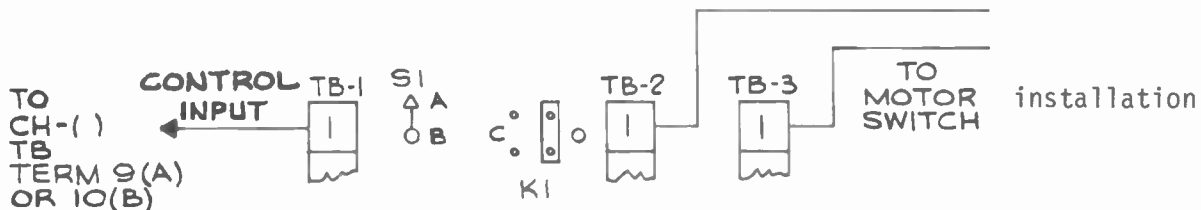
REEL TO REEL TAPE MACHINE CONTROL

Most reel to reel tape machines available today require a momentary contact closure to start and a momentary open or closure to stop the machine - Two control channels are required for both these functions. The inputs are connected in parallel and the outputs are connected to the individual deck control functions as required. The start channel is programmed for mode "B" (momentary on) and for "O" (normally open contacts).

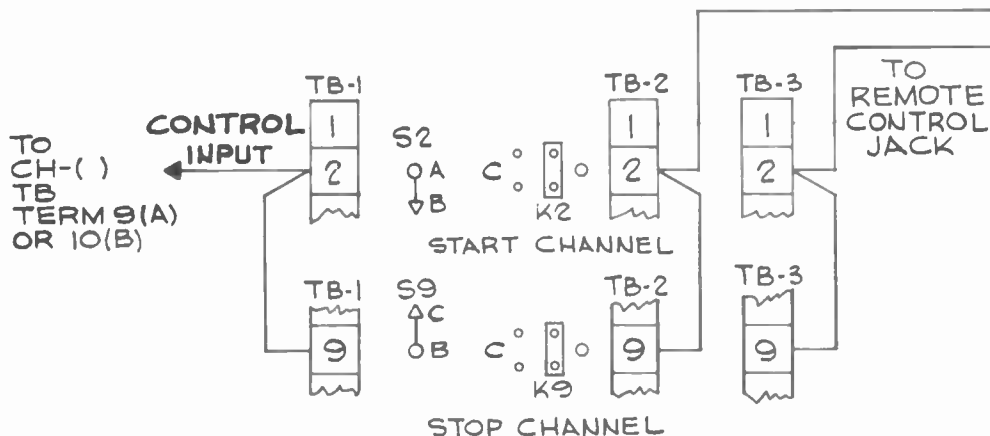
The stop channel is programmed for mode "C" (momentary off) and "C" or "O" depending on machine requirements. Most machines require a normally closed contact and would be set up as "C" or normally closed. However, the ITC 850 series and some other recently available machines require a normally open switch for operation. These machines should be set to "O" or normally open.

Tape machines requiring a maintained contact closure should be set up in the same manner as the normal turntable control system.

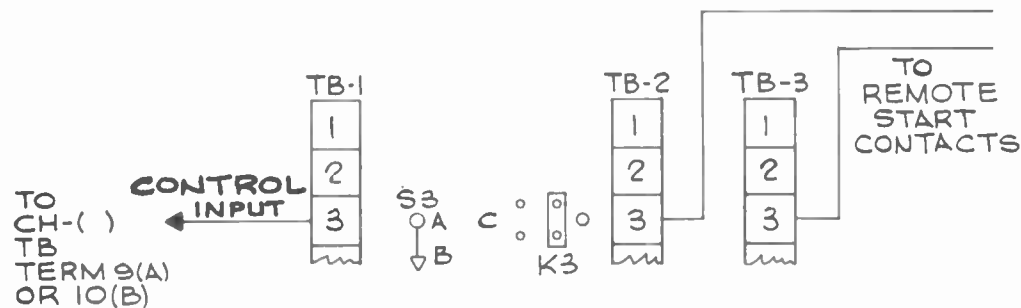
The machine control assembly should be mounted in a convenient location near the console and equipment to be controlled. A wall underneath the desk on which the console is mounted is an excellent location. The power and control wiring from the console should be #20 AWG stranded wire. The control connections to the various machines should be two conductor twisted cable insulated for the control voltage required by the machines. Figure 2-14 illustrates typical connections for various types of machines.



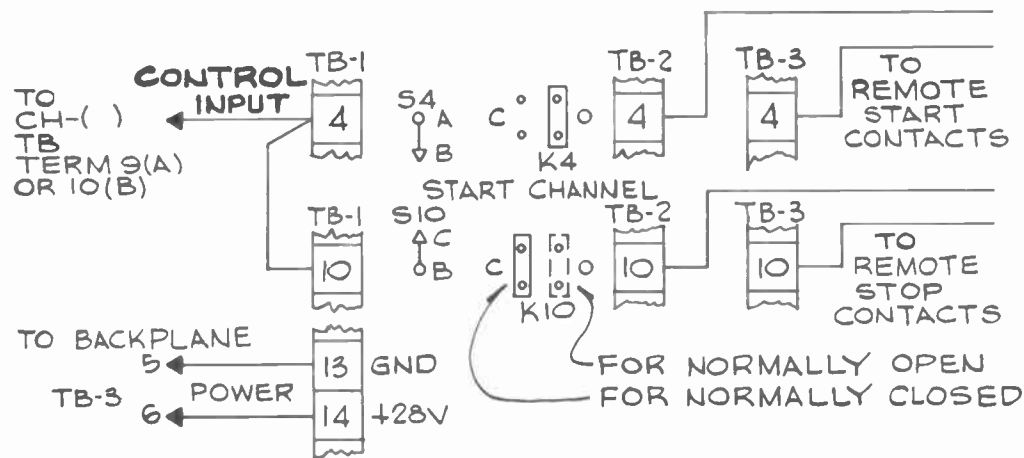
TYPICAL TURNTABLE CONTROL



PANASONIC SP-10 MK II CONTROL



TYPICAL CARTRIDGE TAPE CONTROL



TYPICAL REEL TO REEL TAPE CONTROL

Figure 2-14. Typical Machine Control Connections.

installation

2.3 SPECIAL CIRCUIT CONNECTIONS

2.3.1 SPECIAL MICROPHONE EFFECTS

It is sometimes desired to connect special equalizers, compressors or reverberation equipment to the microphone channel(s) to achieve certain distinctive sounds or special effects. The 212P-() consoles are ideally suited for this purpose because the outputs of the microphone preamplifiers are easily accessible. The preamplifier output impedance is 600 ohms unbalanced on each channel at a nominal level of -10VU when looking into a 600 ohm load. Any special equipment used for this purpose should be designed to operate satisfactorily at this level. If a compressor is to be used, it should have a threshold of at least -25 to -30 dBm to allow a reasonable amount of compression. Figure 2-15 illustrates typical connections for insertion of such devices.

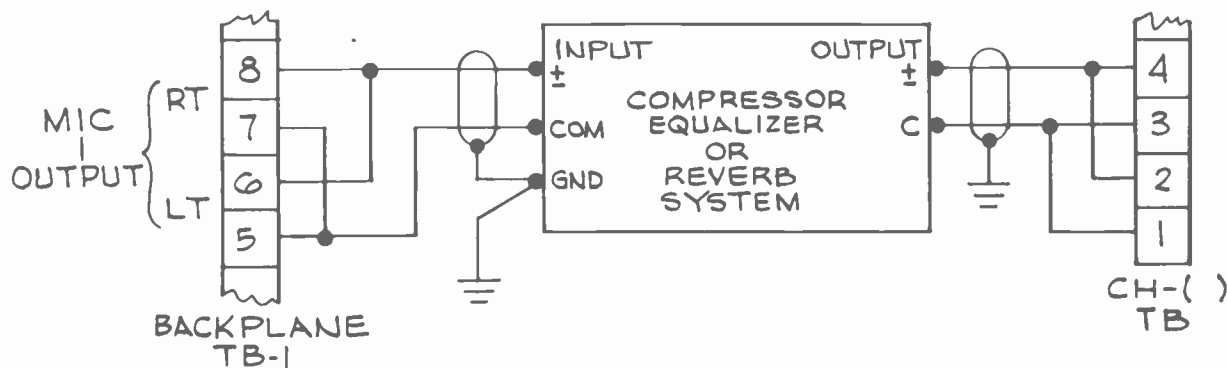


Figure 2-15. Special Microphone Circuit Connections.

2.3.2 USE OF AUXILIARY INPUTS AND OUTPUTS

The 212P-() consoles are unique in the industry in that they provide post-mixing outputs and inputs to the program circuits for special applications such as reverberation insertion and telephone line interface. The auxiliary outputs appear on backplane terminal board TB2. The left channel output appears on TB2 - 5&6 and the right output appears on TB2 - 7&8. The left auxiliary input appears on TB2 - 1&2 with the right auxiliary input on TB2 - 3&4. These circuits provide a very high degree of input to output isolation such that a source applied to the auxiliary input will mix with the program buss for on-air use but will not feed back out the auxiliary output. This leaves the auxiliary output with a clean feed of the mix buss sum without any crosstalk from the auxiliary input source. Such conditions form an ideal configuration for the addition of a reverberation signal or a two-way telephone interface for talk show applications.

The level of the auxiliary outputs is -10VU when looking into a 600 ohm load. The outputs may feed any load from 600 ohms terminating to a bridging load either balanced or unbalanced. The auxiliary input level is approximately 0 VU. The inputs are 600 ohms terminating balanced to ground. These inputs must be fed from a floating, balanced source. No external grounds are permitted.

Figure 2-16 illustrates the connections for a reversion unit.

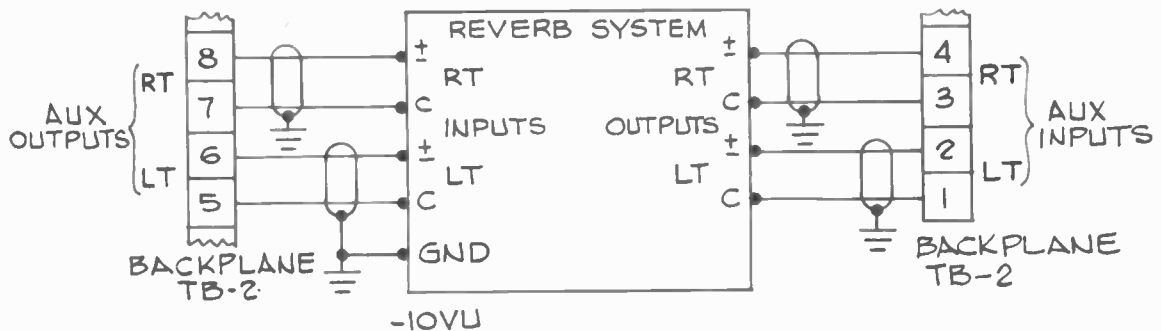


Figure 2-16. Reverb System Connections.

Another application for the auxiliary inputs and outputs is the connection of a two-way telephone interface to the switched telephone network for talk show and listener participation applications. Such an interface may be a locally provided 3-type or 4-type "Speakerphone" device, a Heathkit GD-1112 telephone amplifier or similar device. In this application, the signals from the mixing buss are fed directly to the telephone system and the local subscriber's voice is mixed with the program material from the mixing buss and transmitted in the normal manner. This application has the principal advantage of not degrading the announcer's voice quality by entering the air chain through the telephone microphone. It also provides a complete "hands free" operation.

The volume control on the speakerphone controls the subscriber level on the air, shown in Figures 2-17A and 2-17B.

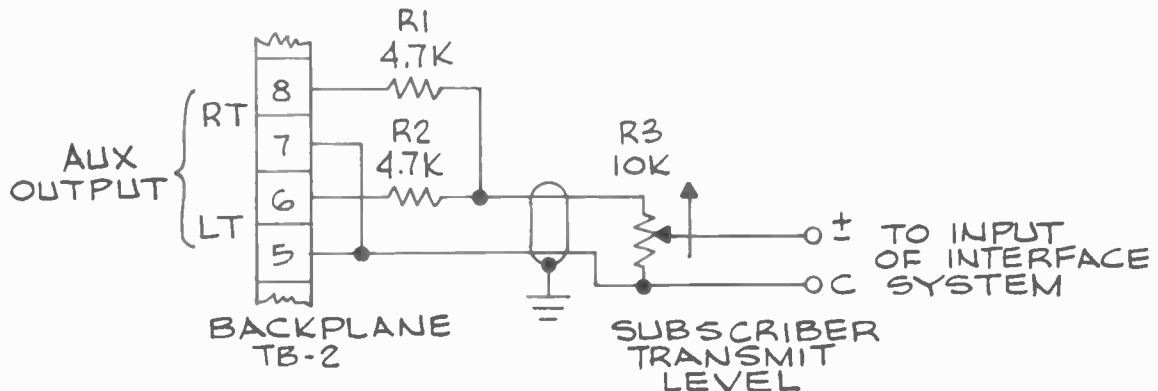


Figure 2-17A. Telephone Interface Connections Transmit Circuit.

installation

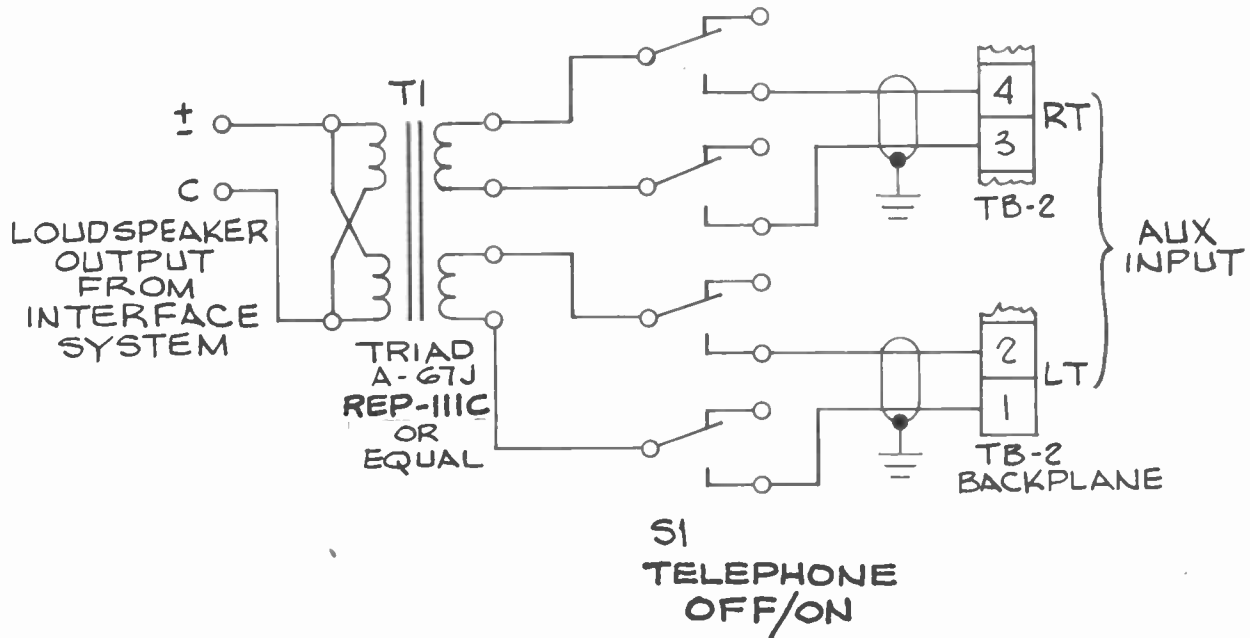
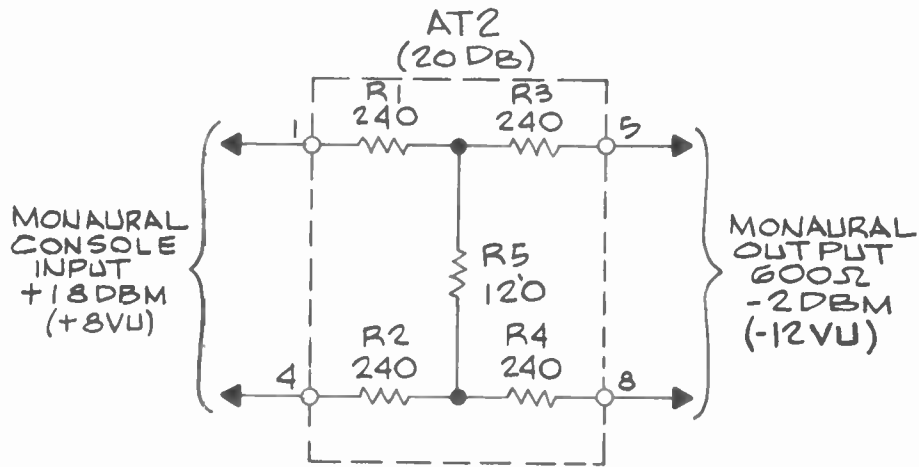
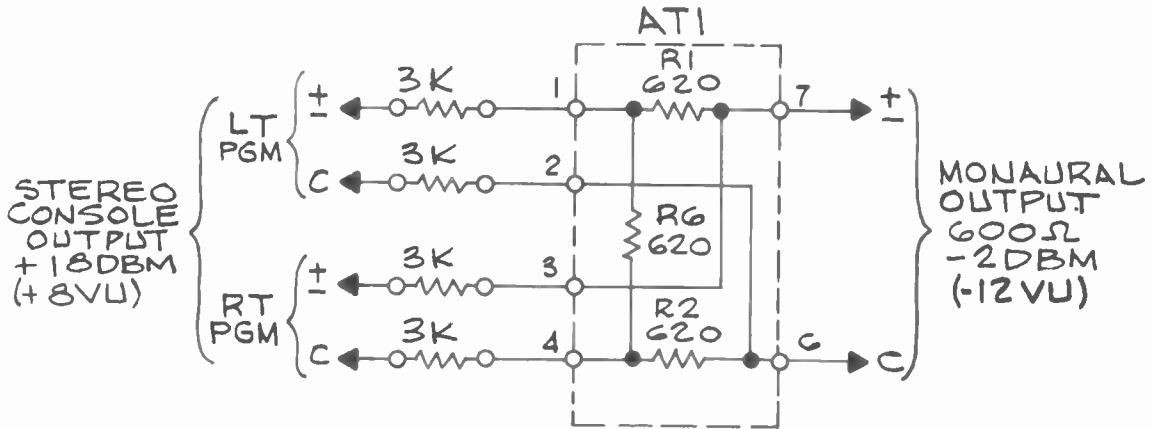


Figure 2-17B. Telephone Interface Connections Receive Circuits.

2.3.3 MONAURAL OUTPUT

A monaural program output may be derived from the console for feeding an AM transmitter by connection of a combining network as shown in Figure 2-18. The combining network has a loss of 20 dB resulting in an output level of -12VU which is adequate for most signal processing equipment. If another console is used part time to feed the AM transmitter, a 20 dB attenuation network will be required between that console and the input to the signal processing equipment in order to maintain the same levels from both studios.



NOTE: AT2 IS USED TO MATCH OUTPUT LEVEL FROM MONAURAL CONSOLE (IF USED) TO OUTPUT LEVEL FROM STEREO CONSOLE.

Figure 2-18. Monaural Combining Networks

installation

TABLE 2-2. EXTERNAL CONNECTIONS.
CHANNEL INPUT TERMINAL BOARDS.

CHANNELS 1-6		CHANNELS 7-8	
TERMINALS	CIRCUIT	TERMINALS	CIRCUIT
1	Input A Left C	1	Input A left C
2	Input A Left +	2	Input A Left +
3	Input A Right C	3	Input A Right C
4	Input A Right +	4	Input A Right +
5	Input B Left C	5	Input B-1 Left C
6	Input B Left +	6	Input B-1 Left +
7	Input B Right C	7	Input B-1 Right C
8	Input B Right +	8	Input B-1 Right +
9	Control A Output	9	Input B-2 Left C
10	Control B Output	10	Input B-2 Left +
		11	Input B-2 Right C
		12	Input B-2 Right +
		13	Input B-3 Left C
		14	Input B-3 Left +
		15	Control A Output
		16	Control B Output
		17	Input B-3 Right C
		18	Input B-3 Right +
		19	Input B-4 Left C
		20	Input B-4 Left +
		21	Input B-4 Right C
		22	Input B-4 Right +
		23	Input B-5 Left C
		24	Input B-5 Left +
		25	Input B-5 Right C
		26	Input B-5 Right +
		27	Input B-6 Left C
		28	Input B-6 Left +
		29	Input B-6 Right C
		30	Input B-6 Right +

TABLE 2-3. EXTERNAL CONNECTIONS.
BACKPLANE TERMINAL BOARDS.

TB-1	CIRCUIT	TB-3	CIRCUIT
1	MIC 1 Input C	1	Air Mon In Lt C
2	MIC 1 Input +	2	Air Mon In Lt +
3	MIC 2 Input \bar{C}	3	Air Mon In Rt \bar{C}
4	MIC 2 Input +	4	Air Mon In Rt +
5	MIC 1 L Out \bar{C}	5	COM
6	MIC 1 L Out +	6	+28V DC
7	MIC 1 R Out \bar{C}	7	*Ext Cue In C
8	MIC 1 R Out +	8	*Ext Cue In +
9	MIC 2 L Out \bar{C}	9	Mute Relay 2
10	MIC 2 L Out +	10	Mute Relay 2
11	MIC 2 R Out \bar{C}	11	Relay 1 Contact
12	MIC 2 R Out +	12	Relay 1 Contact
13	GND	13	Relay 2 Contact
14	GND	14	Relay 2 Contact

TB-2	CIRCUIT	TB-4	CIRCUIT
1	Lt Aux In C	1	*SPKR 1 Lt C
2	Lt Aux In +	2	*SPKR 1 Lt +
3	Rt Aux In \bar{C}	3	*SPKR 1 Rt \bar{C}
4	Rt Aux In +	4	*SPKR 1 Rt +
5	Lt Aux Out \bar{C}	5	*SPKR 2 Lt \bar{C}
6	Lt Aux Out +	6	*SPKR 2 Lt +
7	Rt Aux Out \bar{C}	7	*SPKR 2 Rt \bar{C}
8	Rt Aux Out +	8	*SPKR 2 Rt +
9	Lt Pgm Out \bar{C}	9	*Cue SPKR C
10	Lt Pgm Out +	10	*Cue SPKR +
11	Rt Pgm Out \bar{C}	11	*SPKR 3 Lt \bar{C}
12	Rt Pgm Out +	12	*SPKR 3 Lt +
13	GND	13	*SPKR 3 Rt \bar{C}
14	GND	14	*SPKR 3 Rt +

*Unbalanced circuits, odd terminals grounded.

SECTION 3

OPERATION

3.1 CONTROL FUNCTIONS

3.1.1 MIXERS

The eight mixer controls are located near the lower edge of the front panel of the 212P console. The mixers are identified as channel 1 through channel 8. To the left of each mixer control knob is an alternate action pushbutton switch which turns the associated channel on or off. The mixers adjust the signal levels of the associated sources fed to the program outputs of the console. All mixers are provided with a cue position for cueing and auditioning program material prior to its use on the air.

3.1.2 INPUT SELECTOR SWITCHES

Located above each mixer is a two position pushbutton switch which selects one of two possible input sources to each mixer. The selected source (A or B) is connected to the mixer when the button is pressed. Any associated machine control function is routed through the switch contacts to the associated machine or control function.

3.1.3 MONITOR AND HEADPHONE LEVEL CONTROLS

The monitor and the headphone level controls are located at the upper left hand side of the front panel beside the associated input assignment switches. The monitor level control controls the volume of all loudspeakers connected to the internal monitor amplifier. The headphone level control controls the volume of the headphones connected to the internal headphone amplifier.

3.1.4 MONITOR AND HEADPHONE ASSIGNMENT SWITCHES

The monitor and headphone assignment switches select the source material to be monitored by the monitor and headphone circuits - two pushbuttons are provided for the monitor amplifiers allowing selection of the program output of the console ("PGM" position) or an external source such as one off the air signal from a modulation monitor ("AIR" position).

Three inputs are provided to the headphone amplifier: program monitor, air monitor and cue monitor. The program and air monitor positions function in the same manner as the monitor amplifier selectors and the "CUE" position monitors the output of the cue amplifier allowing monitoring of a network program or cueing of records while the control room microphone is open.

operation

3.1.5 CHANNEL 7B AND CHANNEL 8B INPUT SELECTORS

The channel 7B and 8B selector switches pre-select the source feeding the "B" input of channels 7 and 8 respectively. These inputs would normally be assigned to remote lines or other similar circuits.

3.2 OPERATING PROCEDURES

3.2.1 ROUTINE OPERATION

3.2.1.1 Local Program on the air

- a) Select the required source (A or B) to each mixer.
- b) Press the pushbutton to the left of the mixer which is to be aired and note that the lamp below the mixer is illuminated indicating that the mixer is connected to the program buss.
- c) Rotate the mixer control knob clockwise until the VU meters indicate peaks of 100% or zero VU.

3.2.1.2 Cueing Turntables or other material

- a) Rotate the associated mixer control knob fully counter clockwise to the cue position. A detent will be noted as the mixer is rotated into the cue position
- b) Cue the turntable or other source and rotate the mixer out of the cue position on completion.

3.2.1.3 Removal of Program Material from the Air

At the completion of the source material rotate the mixer control knob fully counter-clockwise to the off position and press the control pushbutton to turn the channel off. Alternately when the source is a cartridge tape source or other source which does not require cueing, the source may be turned off by simply pressing the channel pushbutton and leaving the mixer set at its normal position.

This is required when the machine control option is used with Panasonic Technics SP-10 MKII turntables or cartridge tape machines. The source will not restart unless this procedure has been followed.

4.1 GENERAL

The audio console mixes any number, from one through eight, of 26 available audio inputs and applies them to the program output. Each mixer controls the transmission level of its input. Program monitoring is provided by separate loudspeaker and headphone channels, which can monitor either program material from the console or an external off air monitor. The headphone channel can also monitor the output of the internal cue amplifier. Cueing facilities are provided on all channels through an internal cue amplifier and a loudspeaker. The loudspeaker is muted, when required, by the control room muting relay. A high quality loudspeaker may be substituted for the internal loudspeaker for quality evaluation if desired. An optional machine control interface unit makes it possible to control from the console a number of audio sources such as tape machines and turntables.

The basic circuits of the audio console are: mixer circuits, program circuits, monitor circuits, cueing circuits, microphone circuits, and a dc power supply. The optional machine control unit, when used, is remotely located; this unit is described in paragraph 4.7. Figure 4-1 is a block diagram of the audio console, to be used together with the simplified schematics of the basic console circuits in the following discussion.

Section 7 of this instruction book contains detailed schematic diagrams of each circuit board used in the console and of the machine control unit.

4.2 MIXER CIRCUITS

Figure 4-2 is a simplified schematic of the mixer circuits for channels 1 through 6. Figure 4-3 is a simplified schematic of the mixer circuits for channels 7 and 8, and illustrates the switching differences due to the presence of six indirect inputs each to subchannels 7B and 8B.

In each channel, the choice between input A and input B is made by operation of input select switch (A3A1S1-5) for channels 1 to 5, or input select switch (A3A3A1-3) for channels 6 to 8. In the monaural console, this switch connects the selected input to the level control attenuator (A3AT1-8), which is used to adjust the transmission level. The attenuator output is applied to a solid-state switch (U1 through U8), which either connects the signal to, or blocks it from, the program buss; this switch is controlled by the front panel channel ON/OFF switch (A3S1-8). The monaural signal is produced by combining the input signals in the program bus.

In the stereo console, the mixer process is similar, except that two input signals, left and right, are involved through. The channel select switch connects the selected input to a dual attenuator, which is used to adjust the level of the left and right signals. The attenuator outputs are applied to dual solid state switches, which either connect the two signals to, or block them from, the left and right program buses. The stereo mix signals are produced by combining the left input signals

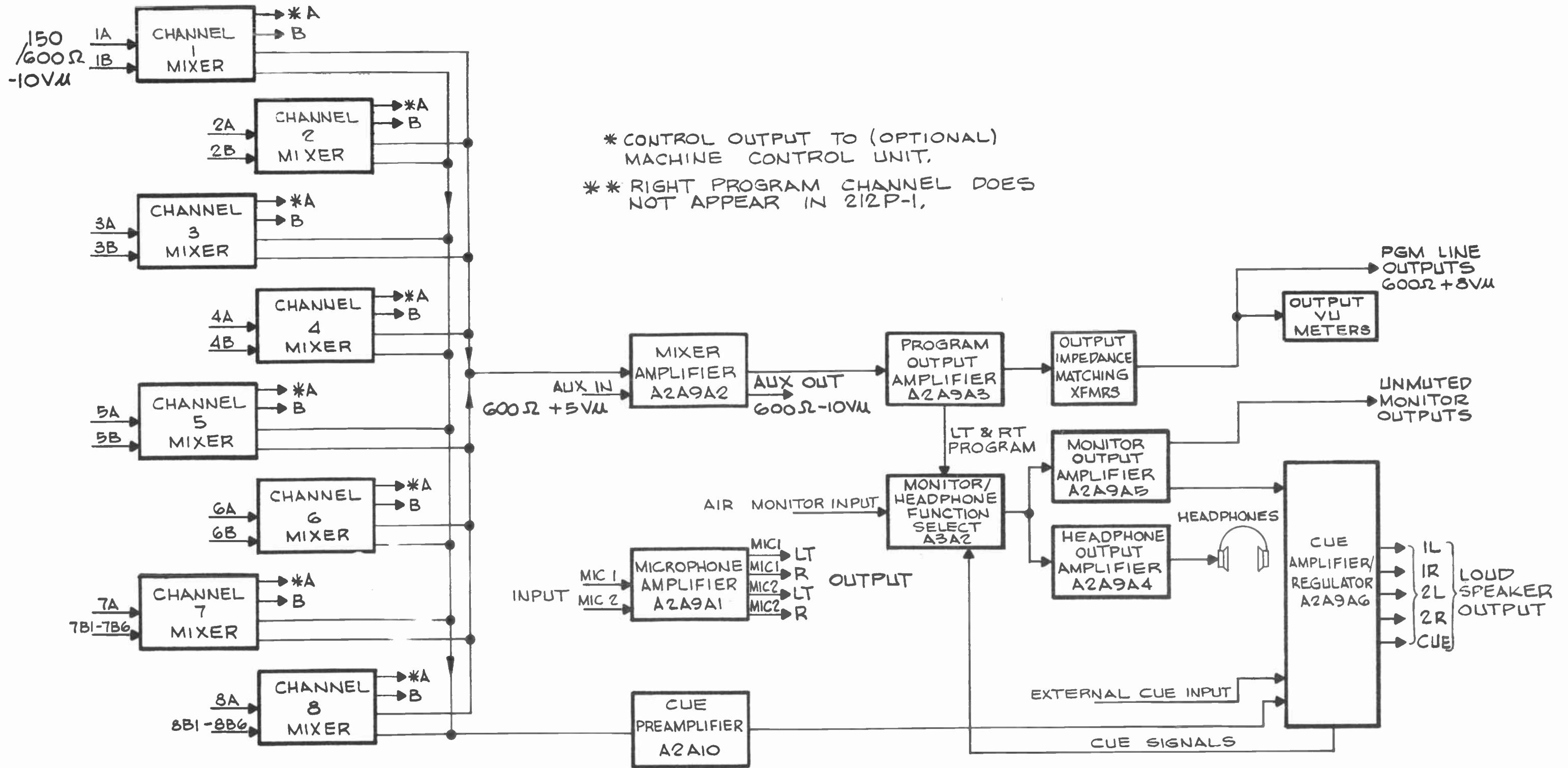


Figure 4-1. Block Diagram 212P-() Audio Console.

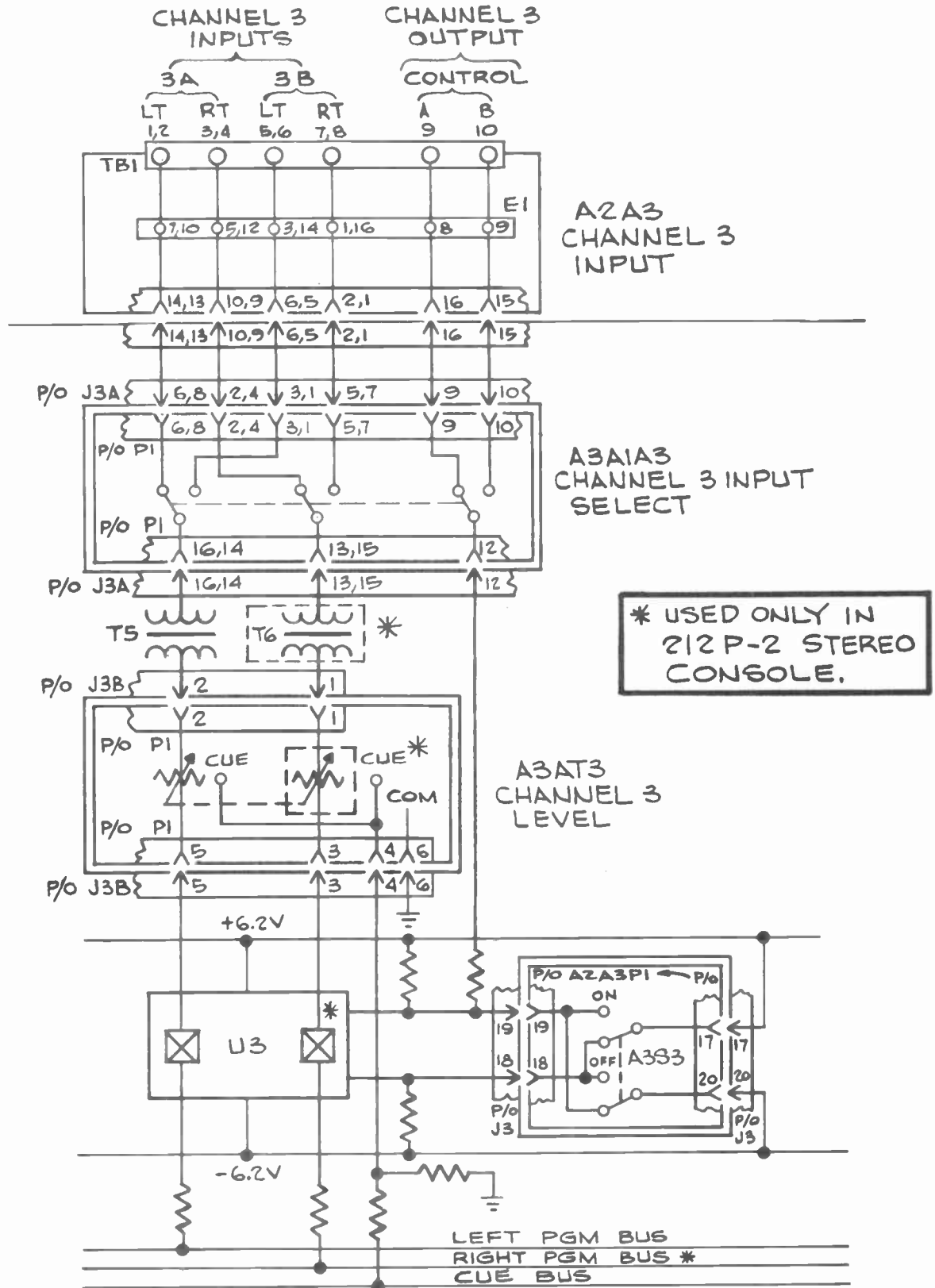


Figure 4-2. Simplified Schematic, Typical Input Channel 1-6.

principles of operation

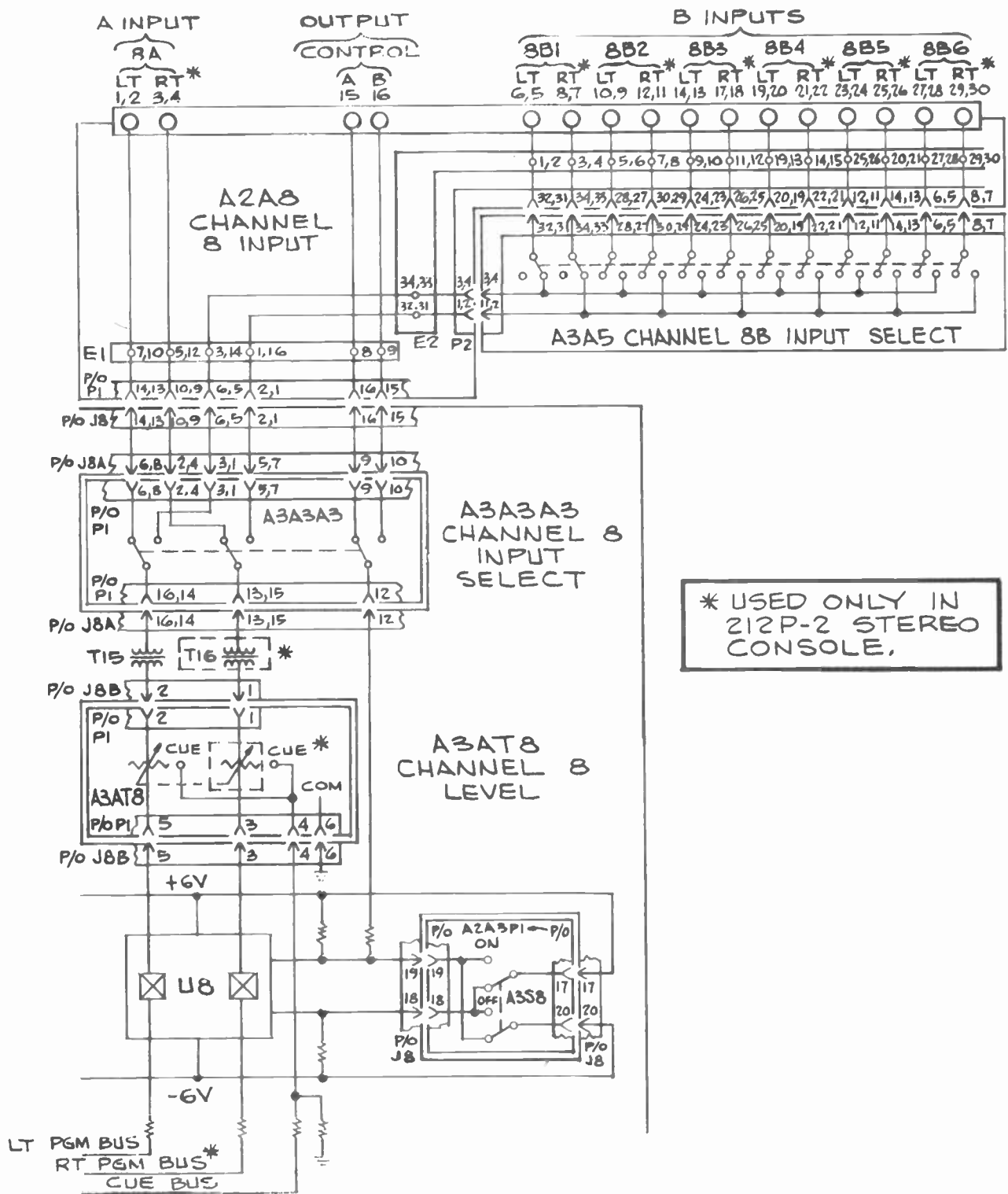


Figure 4-3. Simplified Schematic, Input Channels 7 & 8.

in the left program buss, and the right input signals in the right program buss.

Each channel ON/OFF switch also applies an output control voltage, through one branch of the channel input select switch and the channel control output, to the (optional) machine control interface unit (refer to paragraph 4.7). These ± 6 volt control voltages are derived from the dc power supply circuits in the cue amplifier/regulator A2A9A6.

In each console type, the mixer circuits for channels 7 and 8 are identical with those for channels 1 through 6, with one exception. The inputs to subchannels 7B and 8B provide a choice of any one of six indirect inputs, 7B1-6 and 8B1-6 (refer to figure 4-3). There are six front panel 7B input select switches, and six similar 8B input select switches.

4.3 PROGRAM CIRCUITS

4.3.1 GENERAL

The monaural signal from the program buss is applied to the program circuits. The stereophonic signals from the left and right program busses are applied to the program circuits; in this application, the program circuits are dual, with one channel for the left program and a separate, identical channel for the right program. Note that in the detailed schematic diagram of each program circuit (refer to Section 8 of this instruction book) and in the circuit parts list and component location illustration (refer to Section 7), the components of the right channel are indicated as used only in the stereo console and therefore not in the monaural console.

The program circuits are: Mixer amplifier, program output amplifier, and output matching transformers. Figure 4-4 is a simplified schematic diagram of these circuits.

4.3.2 MIXER AMPLIFIER

The monaural signal on the program buss is transformer coupled to operational amplifier U101A. The amplified signal is applied through transformer T102 to the auxiliary output, and also across a bridge hybrid to program output amplifier A2A9A3.

In the stereophonic console, each of the two program signals, on the left program buss and the right program buss, is individually transformer coupled to an operational amplifier: the left program to U101A, and the right program to U101B. The two amplified signals are applied, through transformers T102 and T202 respectively, to the left and right auxiliary outputs, and also across two bridge hybrids to the left and right inputs to program output amplifier A2A9A3.

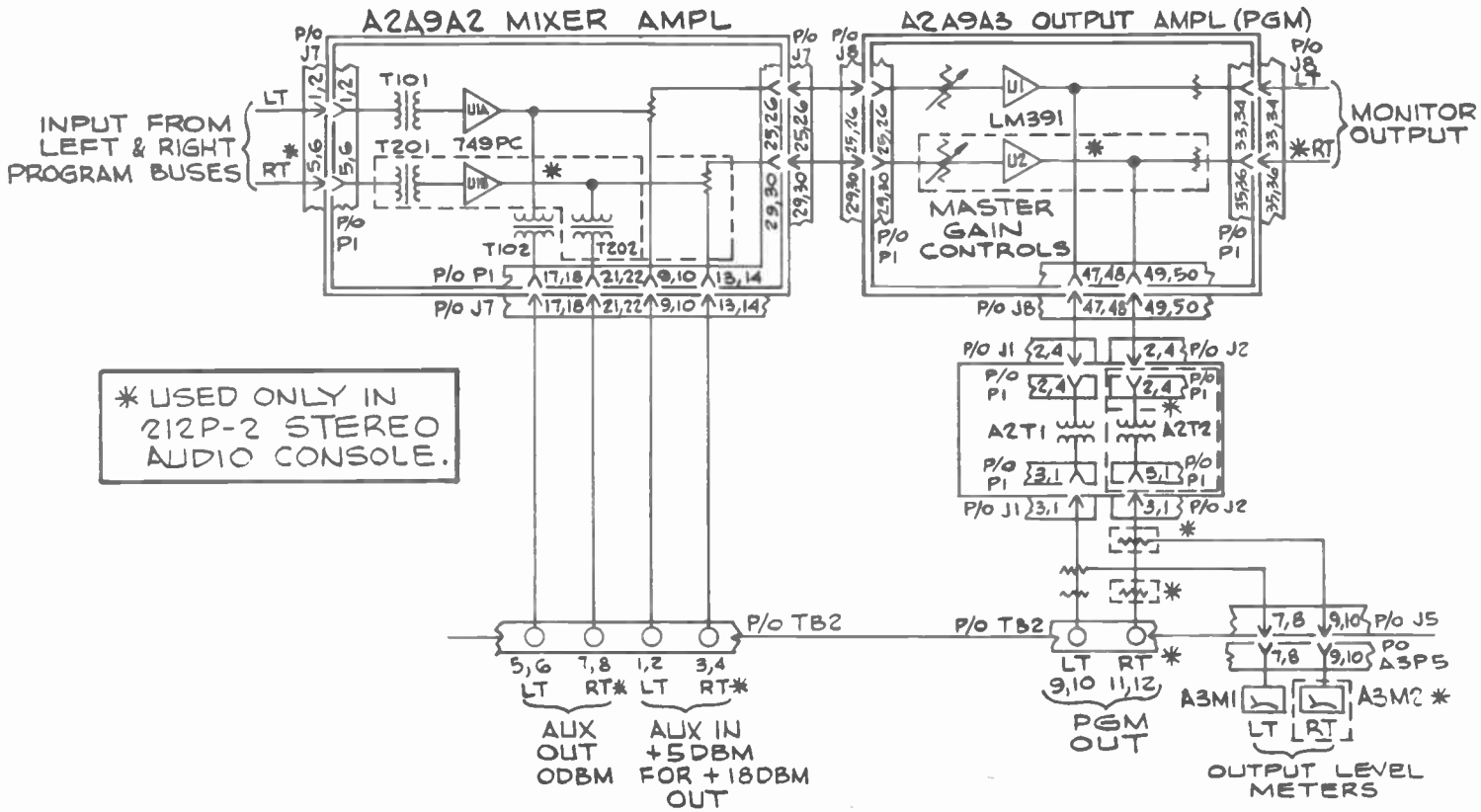


Figure 4-4. Simplified Schematic, Program Output Circuits.

4.3.3 PROGRAM OUTPUT AMPLIFIER

In the monaural console, the signal output of the mixer amplifier is applied, through master gain control (R102 in the program amplifier), to audio power driver U101, which drives power transistors Q103 and Q104. The program amplifier output is connected through transformer assembly A2T1 to the PROGRAM OUT terminals. Part of the output signal from the transformer assembly is used to drive a front panel VU meter which is used for monitoring and adjusting the program output level. The ballistics of a VU meter are such that the meter reads approximately 10dB below peak output level. The meters on the 212P-() consoles are calibrated to read 0 VU on a sinewave signal of +8 dBm. Normal program peaks at the program output terminals are approximately 10 dBm above this level.

In the stereo console, the left program signal proceeds exactly as described above for the monaural console. The right program signal proceeds through a duplicate channel in the program amplifier: master gain control R202, audio power driver U201, power transistors Q203 and Q204, with the output connected through transformer assembly A2T2 to the right PROGRAM OUT terminals. The stereo console has two VU meters, one each for the left and right program outputs.

The outputs of the program amplifier are also applied to the Monitor/Headphone Function Selector A3A2 in the monitor circuits (refer to paragraph 4.4).

To protect the power driver, each program amplifier output is fused with a 2 ampere indicator alarm fuse (one in the monaural console, and two in the stereo console), located on the module.

4.3.4 POWER SUPPLY

Power is supplied to the active components in the mixer amplifier and program output amplifier by power supply A4. In the mixer amplifier, the +30 volt inputs are regulated by 15 volt voltage regulators and filter circuits.

4.4 MONITOR CIRCUITS

4.4.1 GENERAL

The monitor circuits supply, to monitor loudspeakers and/or headphones, program material from either the console program channels or an external off air monitor input. The monitor circuits also include muting relays to mute loudspeakers in studios where live microphones are present.

The monitor circuits are: Monitor/Headphone Function Selector A3A2; Monitor Output Amplifier A2A9A5; Headphone Output Amplifier A2A9A4; and part of Cue Amplifier/Regulator A2A9A6. Figure 4-5 is a simplified schematic diagram of these circuits.

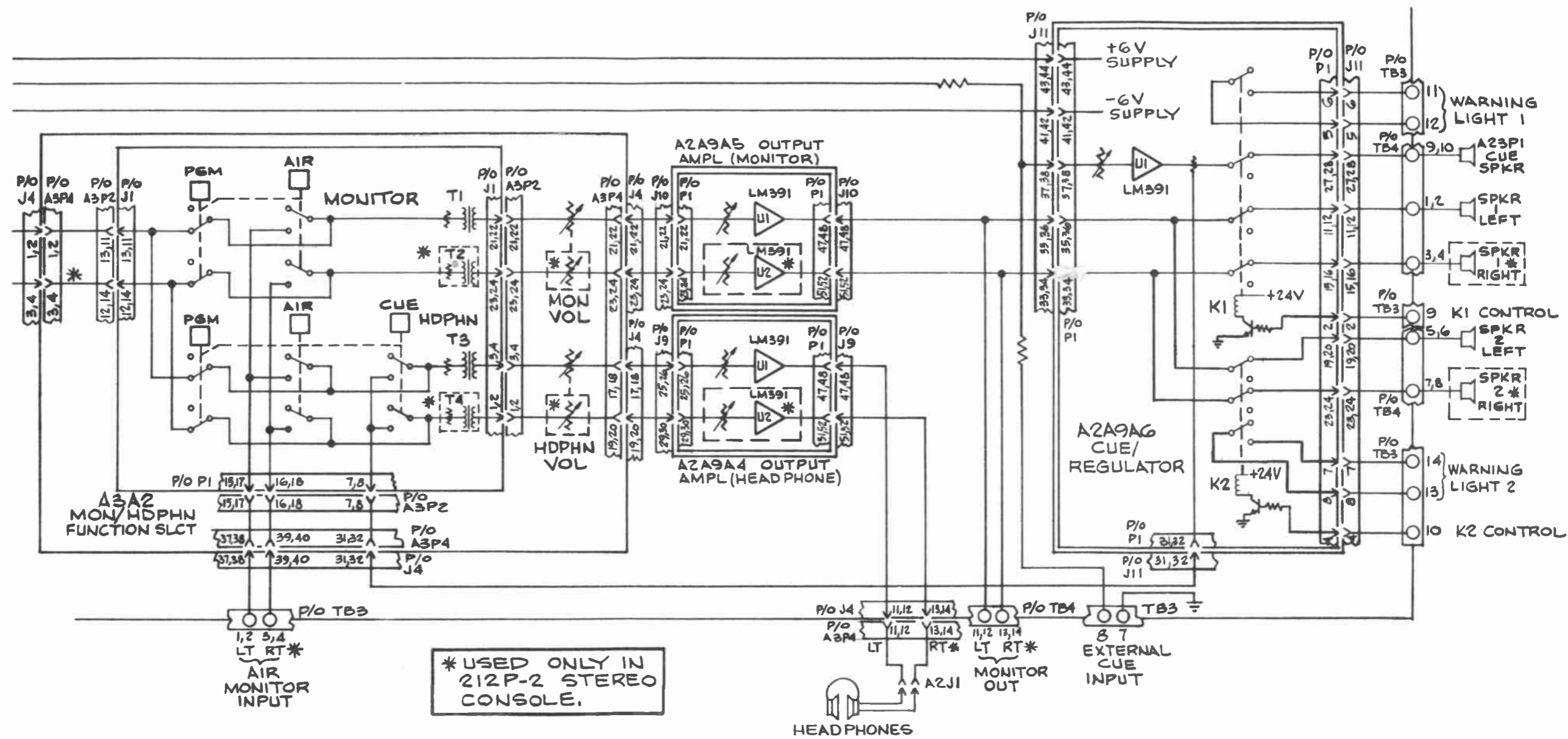


Figure 4-5. Simplified Schematic, Monitor Output Circuits.

WARNING: DISCONNECT PRIMARY POWER BEFORE SERVICING.

4.4.2 MONITOR/HEADPHONE FUNCTION SELECTOR

The monitor output from the program amplifier (refer to paragraph 4.3.3) is applied through input connections of Monitor/Headphone Function Selector A3A2 to two sets of front panel switches, S1 and S2. A direct input from the air monitor line is also connected to these switches.

S1 consists of two switches, S1A (PGM) and S1B (AIR). Pressing the PGM switch connects the output of the program amplifier through the monitor output amplifier (refer to paragraph 4.4.3) and contacts in the muting relays (refer to paragraph 4.4.5) to the monitor loudspeakers. Pressing the AIR switch similarly connects the air monitor input to the loudspeakers.

S2 consists of three switches, S2A (PGM), S2B (AIR), and S2C (CUE). Pressing the PGM switch connects the output of the program amplifier through the headphone output amplifier (refer to paragraph 4.4.4) directly to the headphones. Pressing the AIR switch similarly connects the air monitor input to the headphones. Pressing the CUE switch connects the cue amplifier output to the headphones.

In the monaural console, the input to and output from each switch are, of course, monaural. The S1 PGM or AIR output is connected through matching transformer T1 and front panel "MONITOR" volume control to the input of Monitor Output Amplifier A2A9A5 (refer to paragraph 4.4.3). The S2 PGM, AIR, or CUE output is connected through matching transformer T3 and front panel "HEADPHONES" volume control to the input of Headphone Output Amplifier A2A9A4 (refer to paragraph 4.4.4).

In the stereo console, the left and right PGM or AIR outputs from S1 are connected through matching transformers T1 and T2 and front panel monitor volume control to the left and right inputs of the monitor output amplifier. The left and right PGM, AIR or CUE outputs from S2 are connected through matching transformers T3 and T4 and front panel headphone volume controls to the left and right inputs of the headphone output amplifier.

4.4.3 MONITOR OUTPUT AMPLIFIER

Monitor Output Amplifier A2A9A5 is identical in design with the program output amplifier (refer to paragraph 4.3.3). It further amplifies the output of the program amplifier to drive the monitor loudspeakers.

In the monaural console, two loudspeaker outputs are provided, driven by U101 and transistors Q103 and Q104. One is directly connected, unmuted MONITOR OUTPUT. The other is routed through muting relays in Cue Amplifier/Regulator A2A9A6 (refer to paragraph 4.4.5) to two loudspeakers, Speaker 1 and Speaker 2. These two loudspeakers can be muted individually by front panel switches which activate the two muting relays. The output level at all loudspeakers can be adjusted with the front panel monitor volume control.

principles of operation

In the stereo console, the circuit in the monaural console as described above serves the left program channel, and an identical circuit with 200-series component reference designators serves the right program channel. The amplifier outputs to the MONITOR OUTPUT terminals and to the cue amplifier/regulator unit are dual, left and right channel. The front panel monitor volume controls, R102 and R202 in the monitor amplifier, adjust the volume of the left and right speakers. The monitor amplifiers are fused with 3 ampere fuses.

4.4.4 HEADPHONE OUTPUT AMPLIFIER

Headphone Output Amplifier A2A9A4 is identical in design with the program output amplifier (refer to paragraph 4.3.3). It further amplifies the output of the program amplifier to drive the headphones. The input to the headphone amplifier is selected by front panel triple switch S2 (refer to paragraph 4.4.2).

In the monaural console, one headphone output is provided, driven by U101 and transistors Q103 and Q104.

In the stereo console, the circuit in the monaural console described above serves the left headphone output, and an identical circuit with 200-series component reference designators serves the right headphone output. Output level is controlled in the monaural console by the front panel volume control. In the stereo console, output levels are adjusted by front panel volume controls, R102 and R202 in the headphone amplifier. The headphone amplifiers are fused with 2 ampere fuses.

4.4.5 CUE AMPLIFIER/REGULATOR

The muting relays in Cue Amplifier/Regulator A2A9A6 connect the monitor amplifier outputs to, or block them from, the monitor speakers 1 and 2.

In the monaural console, when relay K1 is activated, the connections between the monitor amplifier output and speaker 1 and between the cue amplifier output and the cue speaker are broken, then speaker 1 is therefore muted. When relay K2 is activated, speaker 2 is muted in the same way.

In the stereo console, when relay K1 is activated, the right and left speakers 1 are muted. When relay K2 is activated, right and left speakers 2 are muted. Operation of the relays to mute all, or selected, speakers is controlled by front panel switches.

4.4.6 POWER SUPPLY

Power to operate the active components in the monitor amplifier and headphone amplifier, and the relays in the cue amplifier/regulator unit, is supplied by Power Supply A4 (refer to paragraph 4.7).

4.5 CUEING CIRCUITS

4.5.1 General

Cueing facilities are provided on all channels. Figure 4-6 is a simplified schematic of the cueing circuits.

A cue output is taken from the channel level control in each mixer and applied to the cue buss, as illustrated in figure 4-2, Mixer Simplified Schematic. These cue outputs are summed on the cue buss, and the resulting cue mix is amplified for application to the internal cue amplifier/regulator, part of the monitor/headphone selector, and the headphone output amplifier.

4.5.2 CUE PREAMPLIFIER

The cue buss is amplified in operational amplifier U1 in Cue Pre-amplifier A2A10. The cue preamplifier output is applied to the cue amplifier circuit in Cue Amplifier/Regulator A2A9A6. The voltages required to operate the operational amplifier are provided by the +6 volt and -6 volt supplies in the cue amplifier/regulator.

4.5.3 CUE AMPLIFIER/REGULATOR

Cue Amplifier/Regulator A2A9A6 consists basically of two separate circuits: a cue amplifier, and two muting relays.

The output of the cue preamplifier is applied across potentiometer R112 to the input of audio power driver U101 in the cue amplifier. Pot R112 sets the input level.

The only other adjustment on this board, bias potentiometer R119, is factory adjusted to set the bias current in the output stage. Integrated circuit U101 drives two power transistors, Q104 and Q106, which provide the audio power output to drive cue speaker A2SP1.

A high quality external loudspeaker may be substituted for the internal cue speaker for quality evaluation if desired.

The cue amplifier output, which is fused with a 2 ampere indicator alarm fuse, is connected through normally closed contacts of muting relay K101 to the cue speaker. Activating the relay opens this circuit and mutes the cue speaker. The cue amplifier output is also connected to an input of the monitor/headphone function selector (refer to paragraph 4.5.4).

An external cue input is connected to the cue amplifier at the same connection as the cue preamplifier output. This permits the use of external cue inputs in addition to the cue buss.

The cue amplifier also contains two power supply circuits which provide regulated +6 volts and -6 volts for use in the cue preamplifier

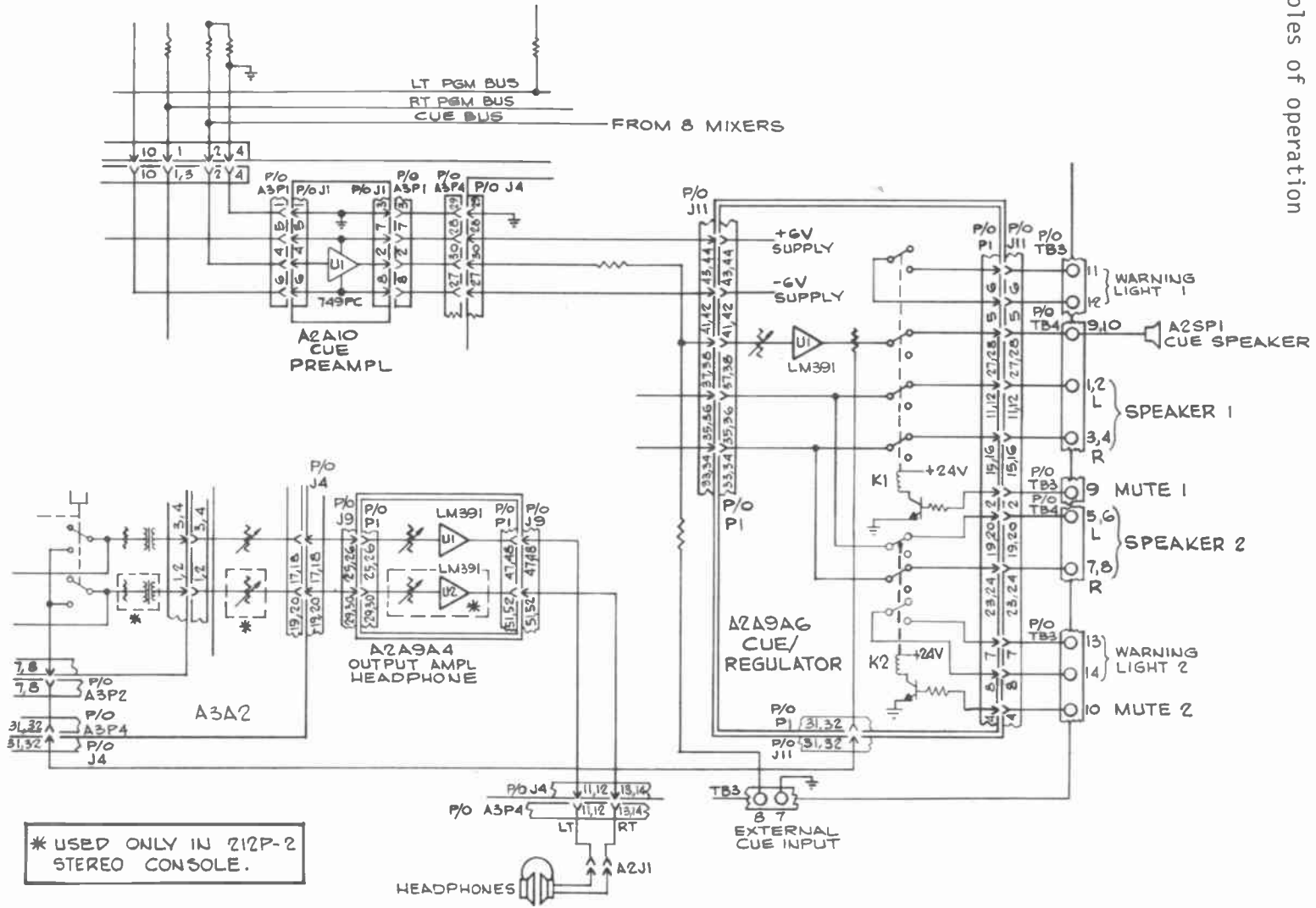


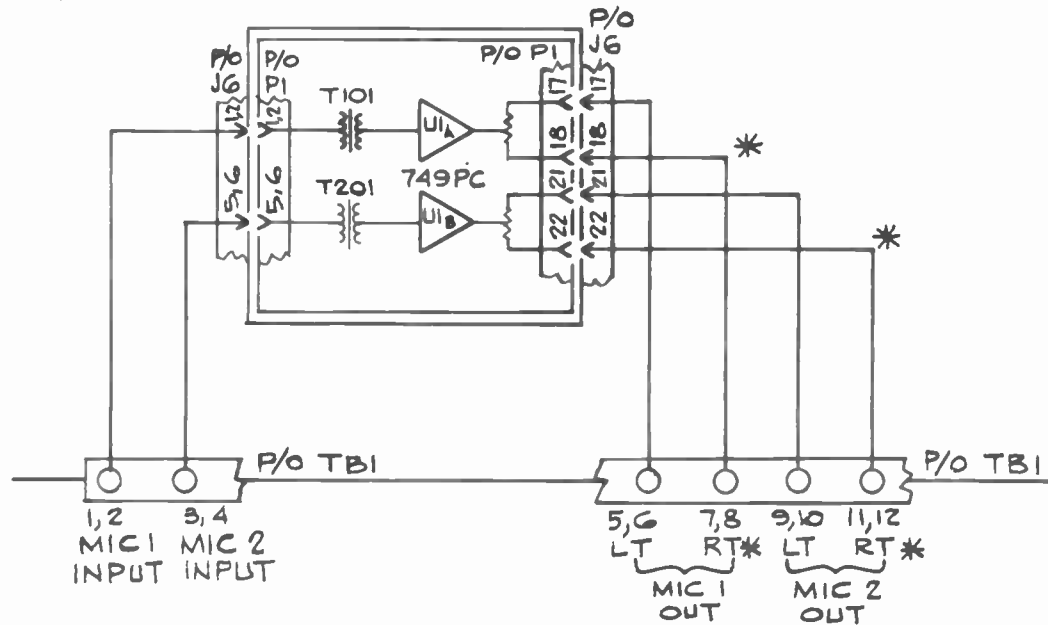
Figure 4-6. Simplified Schematic, Cue Circuits.

and in the solid state switches in the mixer circuits. These voltages also provide control signals through the channel input select switches to the (optional) machine control interface unit. Each power supply circuit comprises a power transistor (Q101 and Q102), a voltage regulator (VR101 and VR102), and filter components.

The cue amplifier/regulator unit contains two muting relays, K101 and K102, each with an associated switching transistor (Q107 and Q108). When one of these relays is activated, it mutes the speakers (monitor or cue) connected through the normally closed relay contacts to an output amplifier.

4.6 MICROPHONE AMPLIFIER

The audio console contains input connections for two microphones. The two inputs are separately amplified in dual operational amplifier U101A/U101B. The two amplifier outputs are connected to separate microphone 1 and microphone 2 output terminals. In the stereo console, each of the two outputs has separate left and right terminals. The amplifiers feed equal outputs to both left and right channels. Figure 4-7 is a simplified schematic diagram of the microphone amplifier circuit.



* USED ONLY IN
STEREO CONSOLE.

Figure 4-7. Simplified Schematic, Microphone Preamplifier.

4.7 POWER SUPPLY

The audio console utilizes an external power supply unit, A4, which provides dc voltages for use in the program, monitor, and relay circuits.

principles of operation

Figure 4-8 is a simplified schematic diagram of power supply A4.

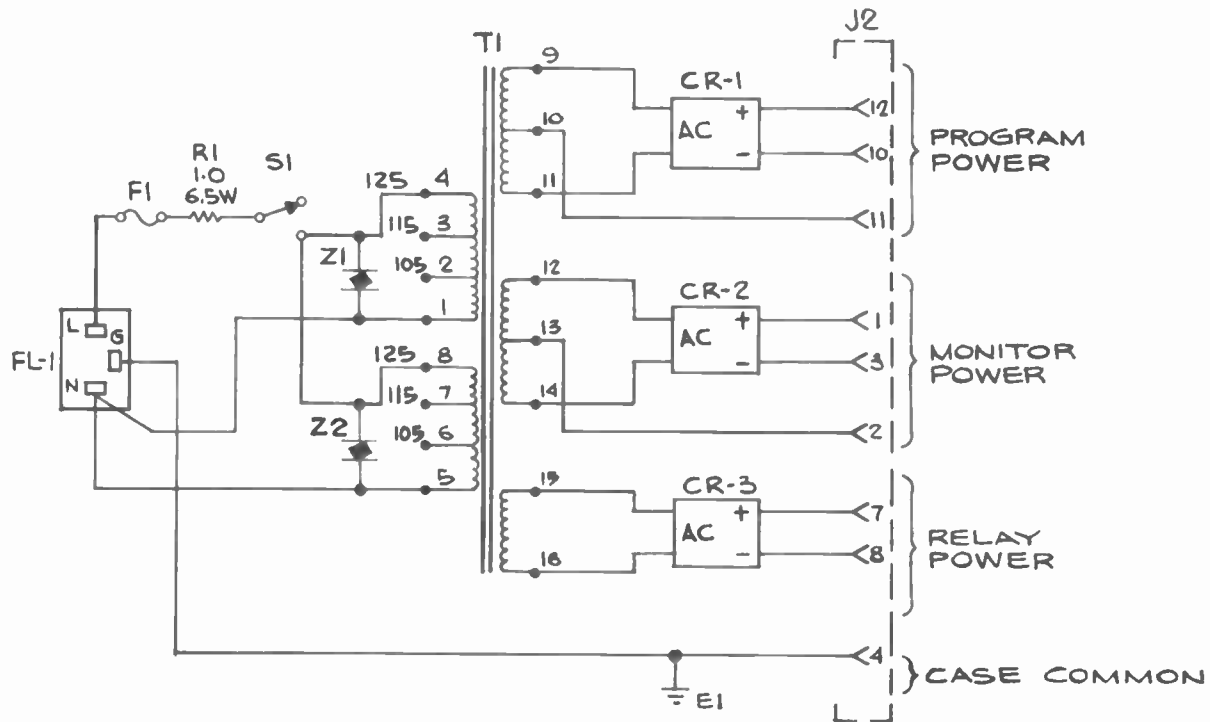


Figure 4-8. Schematic Diagram Power Supply.

The input to the power supply, at 50/60 Hz, can be either 105 to 125 volts, or 210 to 250 volts. Maximum input power required is 150 watts. The input is protected by a 2 ampere slow blow fuse for a nominal 115 volts, or 1 ampere slow blow fuse for a nominal 220 volts. EMI/RFI filtering of the power line input is provided by filter FL1.

The basic components of the power supply are a transformer and three bridge rectifiers. Rectifier CR1 supplies +30 volts to the program output amplifier, the mixer amplifier, and the microphone amplifier. Rectifier CR2 supplies +30 volts to the headphone amplifier, the monitor amplifier, and the cue amplifier. Rectifier CR3 supplies +28 volts to the solenoids of relays in the cue amplifier/regulator, as well as to relays in the machine control interface unit, when used.

4.8 MACHINE CONTROL INTERFACE

The optional machine control interface unit (figure 4-9) is used to control up to twelve tape machines and turntables. Operation of the

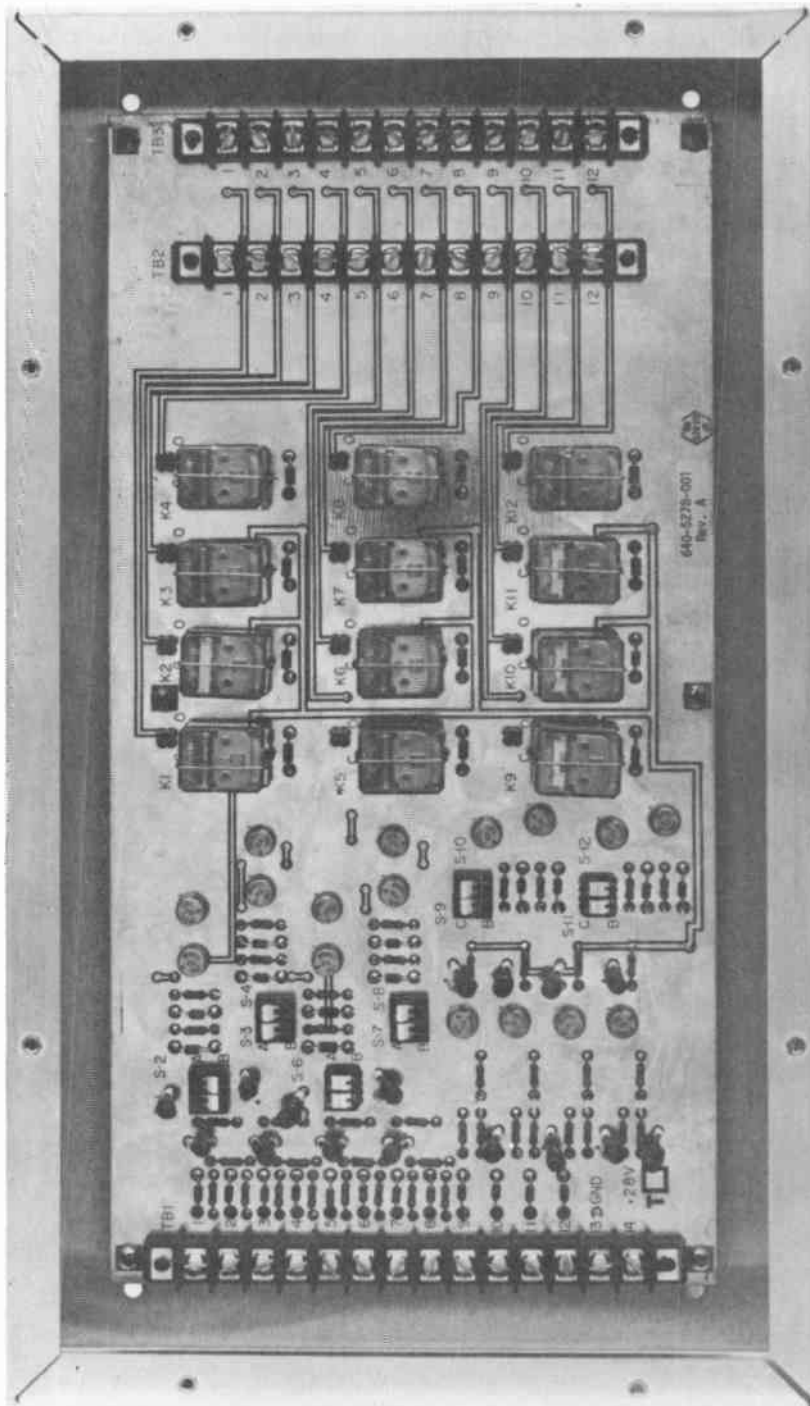


Figure 4-9. Machine Control Interface Unit

WARNING: DISCONNECT PRIMARY POWER BEFORE SERVICING.

principles of operation

unit is controlled by the eight channel control switches on the console.

The unit consists of twelve relays, each with associated circuitry. Figure 4-10 is a schematic diagram of the two types of circuits used in the unit. The circuit shown associated with relay K8 is identical to those with relays K1 through K7; and the circuit shown associated with relay K9 is identical to those with relays K10 through K12.

Each relay is located electrically between a power source and the control circuits of the machine to be controlled by that relay. Each relay may be connected to be either normally open, or normally closed. This connection is completed by a jumper connection between either the two "O" (normally open) or the two "C" (normally closed) pins. These pins are shown in figure 4-10 as CONN 8 for relay K8, and as CONN 9 for relay K9; they are physically located on the PC board just above the upper right-hand corner of each relay (refer to figure 4-9).

Each relay has associated with it a transistor switch (for example, Q8 in figure 4-10). When a positive voltage is applied to the base of the transistor, current flows from the +28 volt supply through K8 and Q8, actuating the armature of K8 and closing the relay contacts if they are normally open, or opening them if they are normally closed.

Preceding the transistor switch in each relay circuit is a SPDT switch (S1 through S12). For relays K1 through K8, a positive voltage at the input on TB1 is applied through a diode directly to the transistor base if the switch is in position A, or through an RC timing circuit to the transistor base if the switch is in position B. With the switch set in position A, the relay armature remains actuated for as long as the control voltage is applied. With the switch in position B, the relay is actuated momentarily, and then returns to its non-actuated state; the duration of actuation is determined by the time constant of the RC circuit. For relays K9 through K12, switches S9 through S12 have positions B and C. With the switch in position B, the relay is not normally actuated; application of a positive control voltage to the circuit input actuates the relay momentarily, then returns it to its normal state. With the switch in position C, the relay is momentarily actuated upon removal of the control voltage from the circuit input.

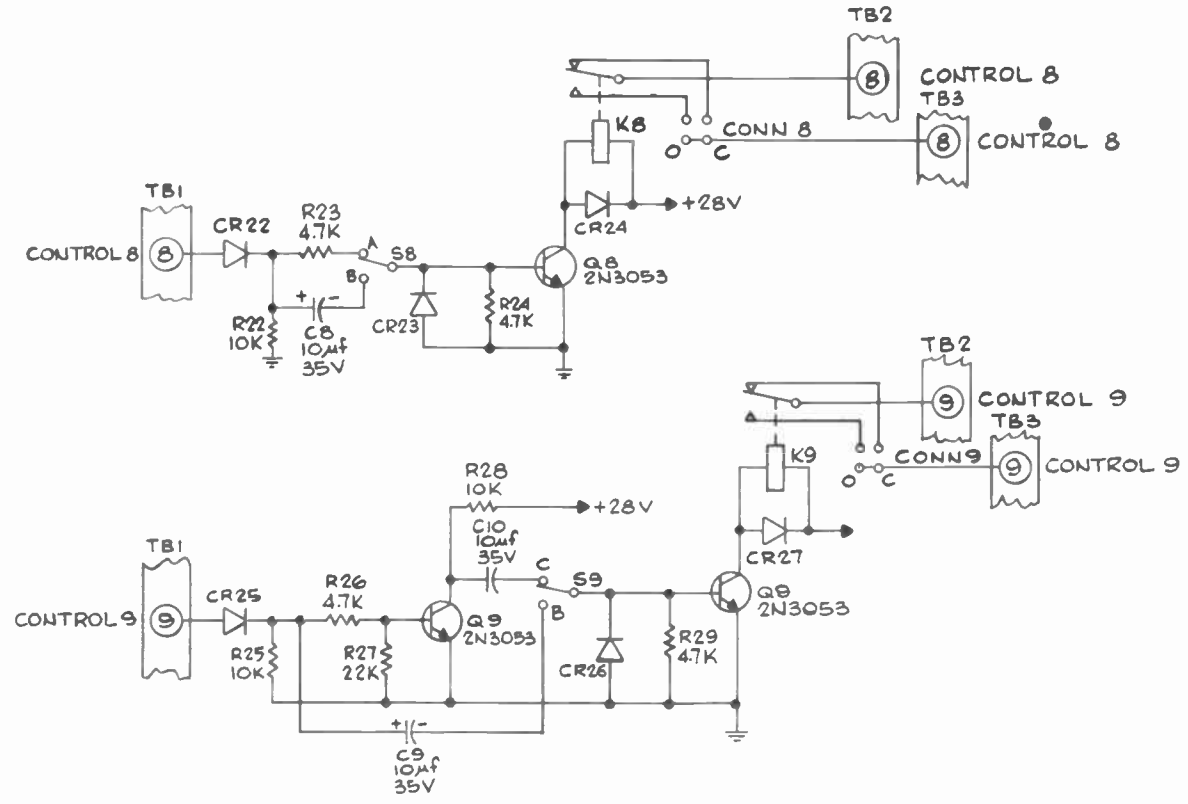


Figure 4-10. Simplified Schematic Machine Control Interface.

SWITCH POSITION		APPLICATION
A-	MAINTAINED CONTACT	TURN TABLE & SOME REEL TO REEL TAPE RECORDERS
B-	MOMENTARY CONTACT ON CHAN ON	CARTRIDGE & REEL TO REEL START
C-	MOMENTARY CONTACT ON CHAN OFF	REEL TO REEL STOP

WARNING: DISCONNECT PRIMARY POWER BEFORE SERVICING.

SECTION 5
MAINTENANCE

WARNING: DISCONNECT PRIMARY POWER BEFORE SERVICING.

5.1 PERIODIC INSPECTIONS AND PREVENTIVE MAINTENANCE

5.1.1 ATTENUATORS

Clean all attenuators at necessary intervals to avoid noisy operation. To clean attenuators, proceed as follows:

- a) Remove the dust cover from the rear of the attenuator by pulling off the rear section.
- b) Saturate a small piece of lint free cloth with denatured alcohol and wipe each contact. Be careful to avoid bending the movable contact arm.
- c) Apply a thin film of contact lubricant such as Daven oil or equivalent.
- d) Replace the dust cover.

5.1.2 WIRING

Check all wiring for frayed insulation or loose connections. Make certain that all terminal board connections are tight.

5.2 REPLACEMENT OF SWITCHES

5.2.1 INPUT SELECTOR SWITCHES

- a) Remove two 4-40 screws which secure the printed circuit board to the mounting brackets.
- b) Pull the switch assembly directly back away from the rear of the control panel.
- c) Insert new switch assembly and press tight against the front panel.
- d) Install the two sets of 4-40 hardware removed in step a.

5.2.2 CHANNEL 7B and 8B SELECTOR SWITCHES

- a) Remove four sets of 6-32 hardware from the four corners of the printed circuit board.
- b) Unplug the cable from the bottom of the printed circuit board.
- c) Plug the cable into the replacement switch assembly.
- d) Mount the replacement switch assembly using the four sets of 6-32 hardware removed in step a.

WARNING: DISCONNECT PRIMARY POWER BEFORE SERVICING.

maintenance

5.2.3 CHANNEL CONTROL SWITCHES

- a) Unsolder connections to the switch assembly being careful to avoid damaging insulation on the wires leading to the switch. Use a small (25 watt) soldering iron and a "solder sucker" (Edsyn "Soldapullt" or equivalent).
- b) Remove the two screws from the rear of the switch assembly and pull the metal retaining bracket off the rear of the switch. Slide the switch through the front panel.
- c) Connect a short length of number 24 solid wire in two places as shown in figure 5-1.
- d) Insert the replacement switch body through the front panel. Slide the metal retaining bracket over the rear of the switch assembly and replace the two screws in the bracket assembly. Rewire the switch assembly according to figure 5-2.

5.3 REPLACEMENT OF ATTENUATOR

- a) Remove control knob from attenuator shaft by loosening two hex head retaining screws in the knob.
- b) Remove two screws from the front panel which retain the attenuator.
- c) Unplug the attenuator from the rear of mixer board.
- d) Install the replacement attenuator by reinstalling the two screws removed in step b.
- e) Rotate the attenuator shaft fully clockwise and reinstall the knob with proper orientation.
- f) Plug the attenuator into the mixer board. The brown wire should line up with pin 1 on the mixer board.

5.4 REMOVAL OF AMPLIFIER MODULES

TURN OFF POWER BEFORE REMOVING MODULES.

5.4.1 MICROPHONE PREAMP AND MIXER AMPLIFIER

The microphone preamp and mixer amplifiers may be removed by loosening one screw at the left rear of the module. The module may then be lifted straight up. When replacing the module be careful to avoid damage to the contact pins. Be certain that all pins are properly aligned before pressing the module into position.

5.4.2 OUTPUT AMPLIFIERS AND CUE AMPLIFIER

The output amplifiers and cue amplifier are removed by loosening two screws on the right, rear of the modules. Pull the module up approximately one half inch then move toward the front panel to disengage from the retaining screws. When replacing the module be careful to avoid damage to the contact pins. Be certain that all pins are properly aligned before pressing the module into position.

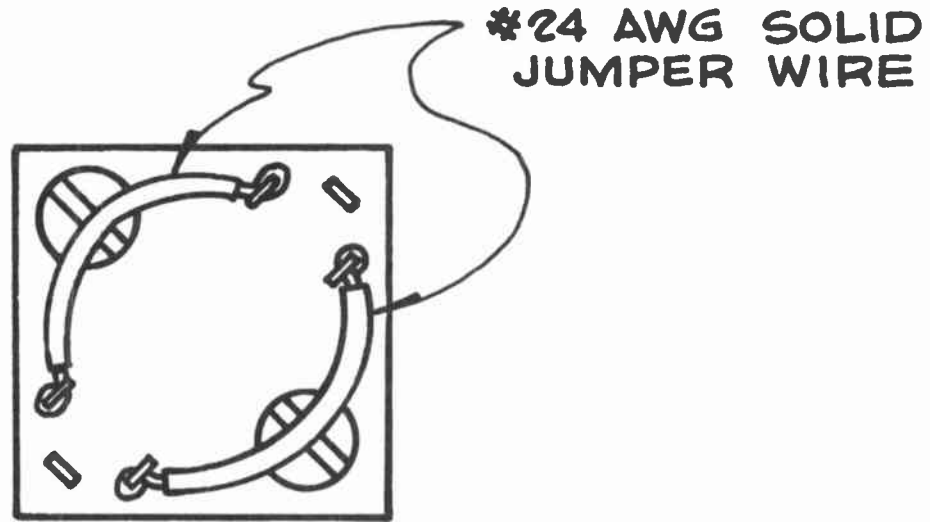


Figure 5-1. Switch Rear View.

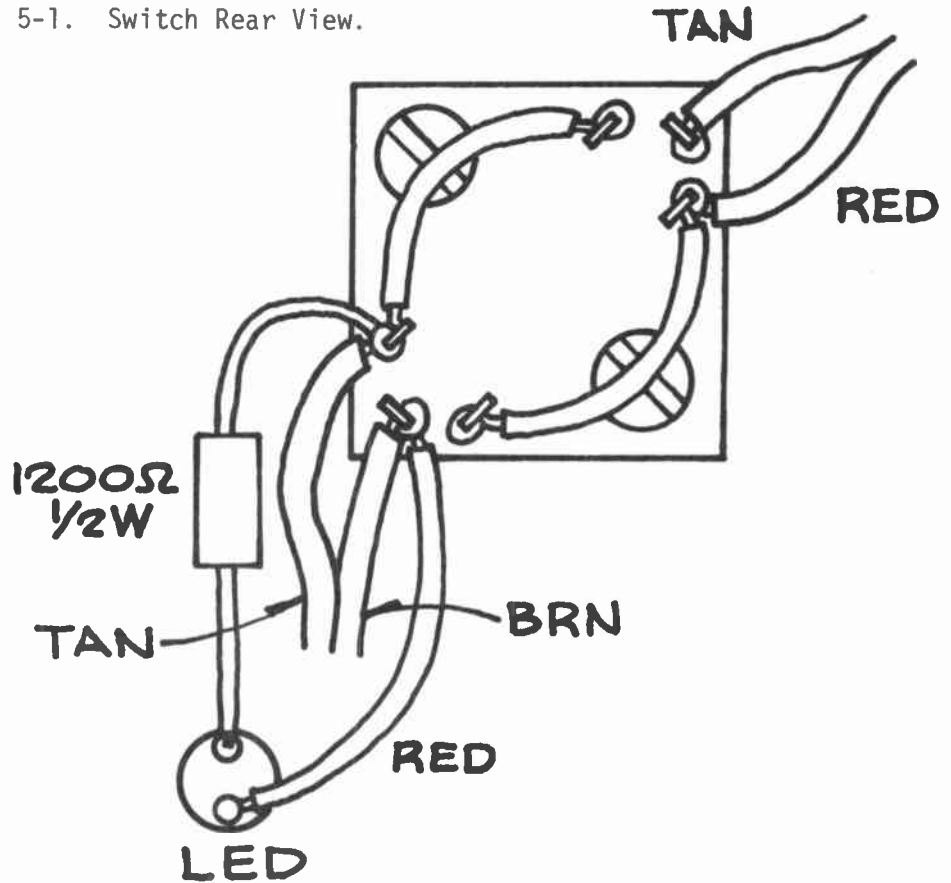


Figure 5-2. Switch Connections.

maintenance

5.5 EXTENDER CARD INSTALLATION

An extender card may be used to allow operation of any module in a position suitable for signal tracing. To install the extender card, first remove the affected module from the console, then replace the extender card in the position occupied by the affected module. Plug the affected module into the right side of the extender card. Figure 5-4 illustrates the use of the extender card.

5.6 OUTPUT AMPLIFIER GAIN SETTINGS

The output amplifier requires different internal gain settings and fusing for Headphone, Monitor and Program amplifier service.

To set up the amplifier gain, remove the cover from the module and connect the two gain strapping jumpers according to figure 5-3. Install the proper fuses for the application and reinstall the cover before installing the module in the console.

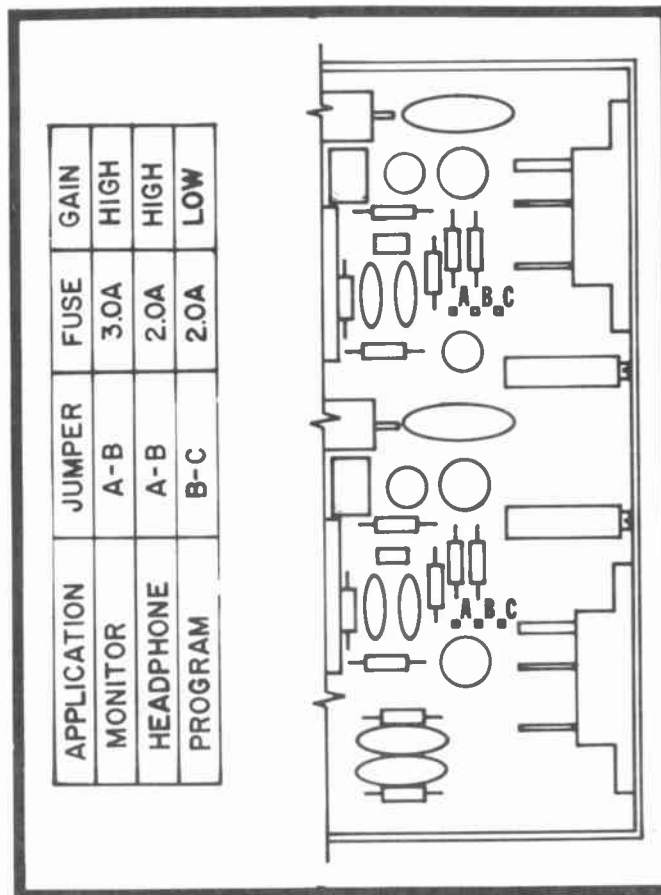


Figure 5-3. Output Module Gain Setting & Fusing Information.

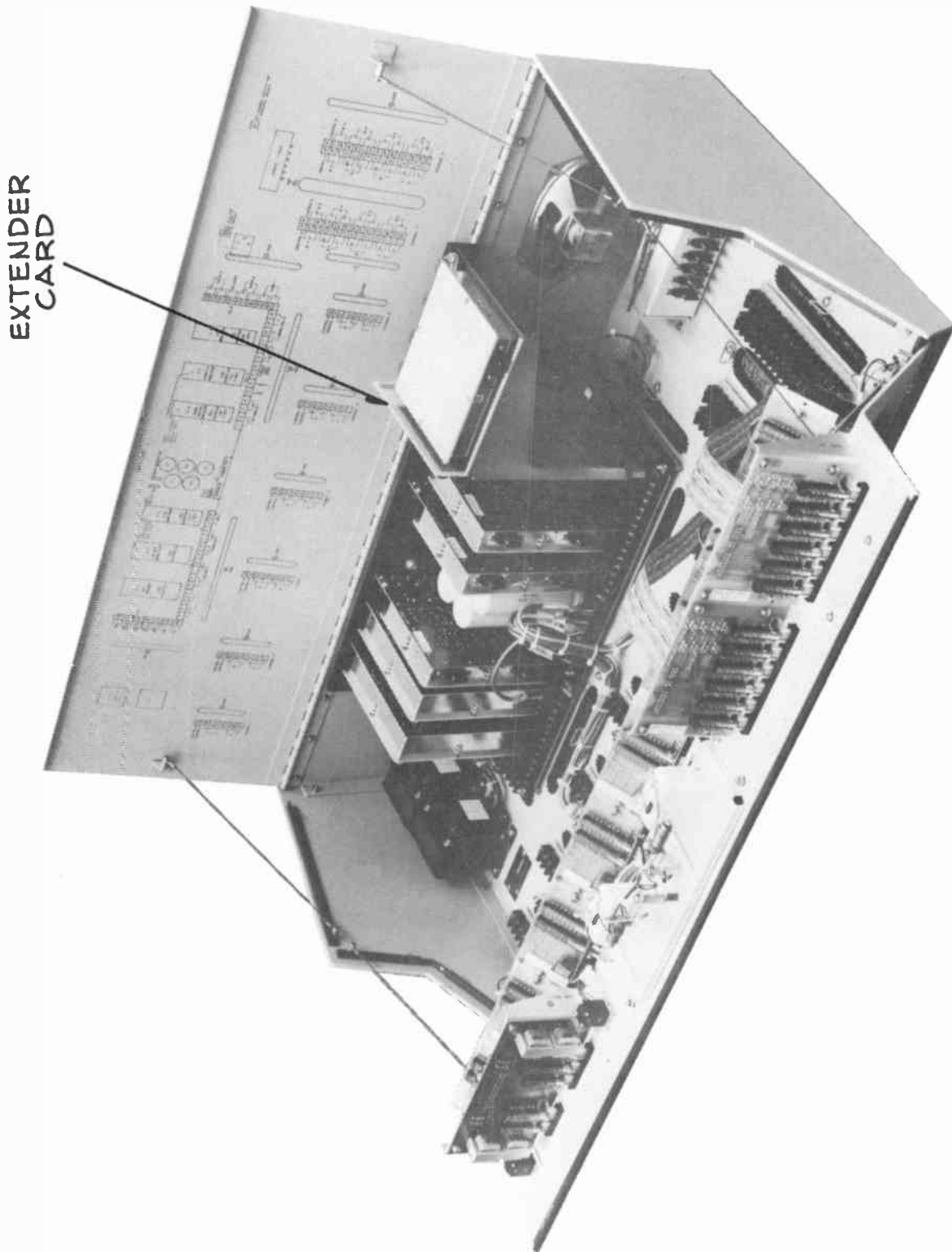


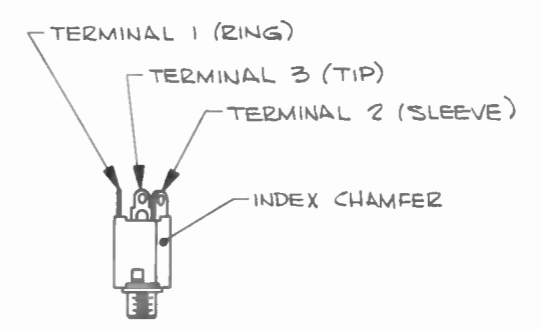
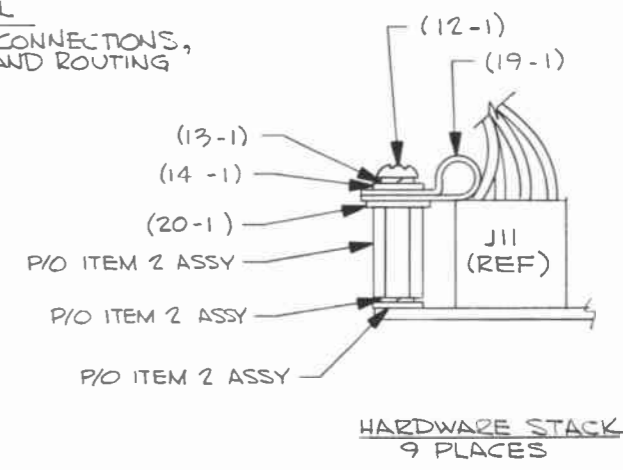
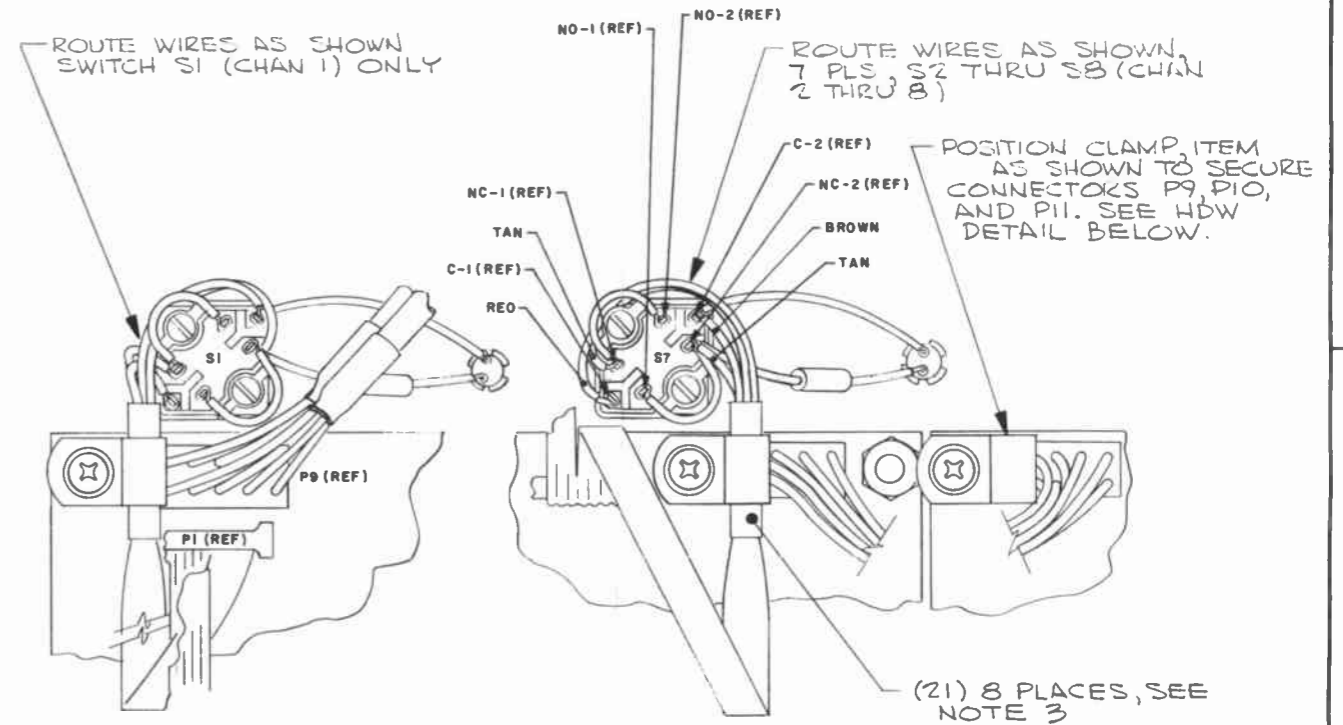
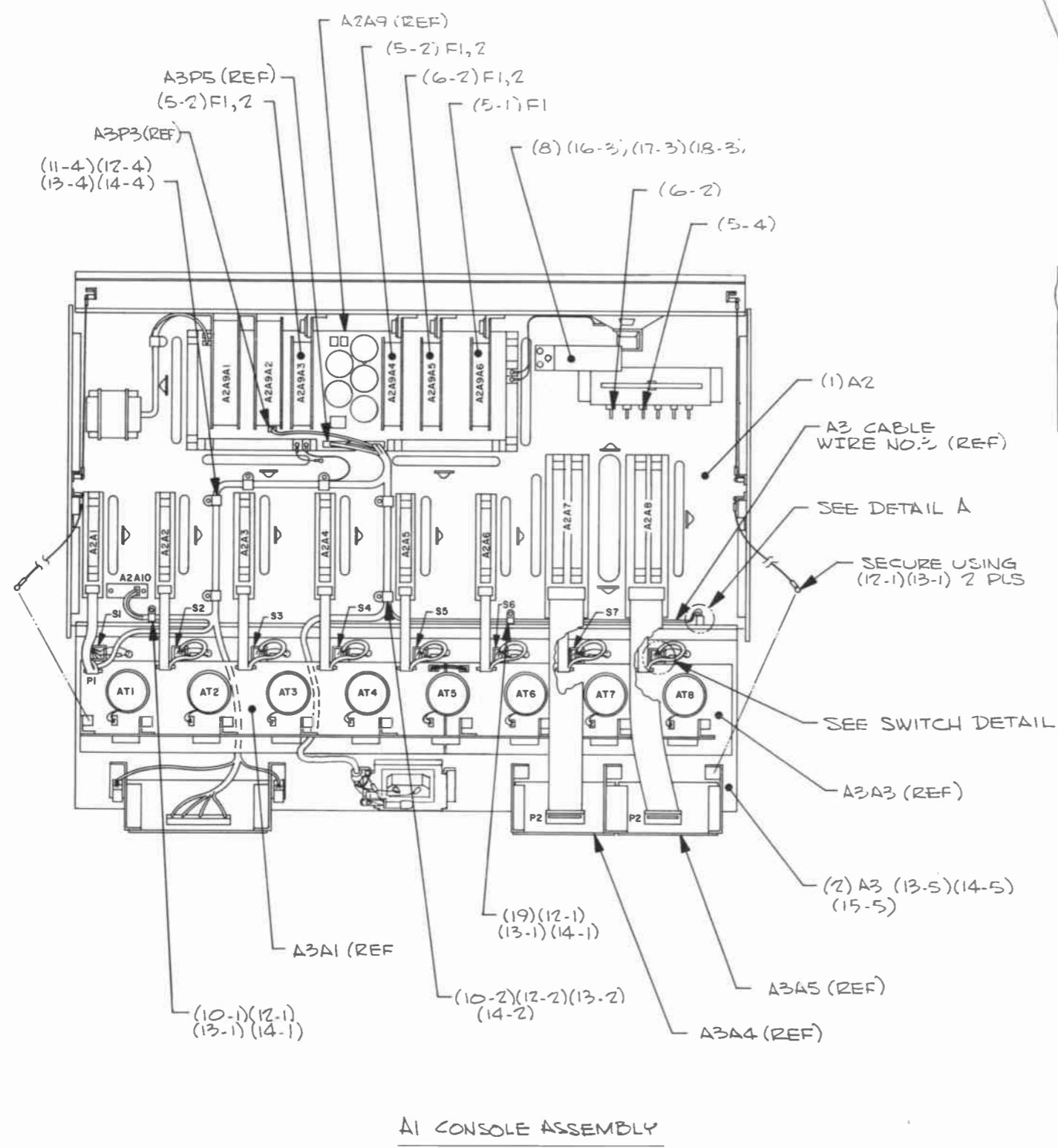
Figure 5-4. Picture of Console with Extender Card in Place.

SECTION 6 - SCHEMATICS AND PARTS LISTS

6.1 GENERAL

This section contains schematics, drawings and parts lists for all repairable/replaceable electrical, electronic and critical mechanical parts for the 212P-2 Stereophonic Audio Console, the 212P-1 Monaural Audio Console, and the Machine Control Interface Unit. The drawings are filed in Sub-assembly order.

<u>Assy. No.</u>	<u>Title</u>	<u>Parts/Assy. No.</u>	<u>Schematic</u>
-	Monaural Console 212P-1	636-3646	
-	Stereo Console 212P-2	636-3647	
A2	Base Assembly	636-5571	C147030
A2A1	Channel 1 Input	636-5639	C147030
A2A2	Channel 2 Input	636-5639	C147030
A2A3	Channel 3 Input	636-5639	C147030
A2A4	Channel 4 Input	636-5639	C147030
A2A5	Channel 5 Input	636-5639	C147030
A2A6	Channel 6 Input	636-5639	C147030
A2A7	Channel 7 Input Terminal	636-5642	C147031
A2A8	Channel 8 Input Terminal	636-5642	C147031
A2A9	Backplane	636-5610	J147037
A2A9A1	MIC Amp	636-5613	D147035
A2A9A2	Mixer Amp	636-5613	D147036
A2A9A3	PGM Amplifier	636-5579	D147028
A2A9A4	Headphone Amplifier	636-5579	D147028
A2A9A5	Monitor Amplifier	636-5579	D147028
A2A9A6	Cue Amplifier Board	636-5576	D147027
A2A10	Cue Pre-Amplifier Board	636-5668	B147029
A3	Control Panel Assembly	636-5594	J147039
A3A1	Mixer Board Channels 1-5	636-5582	J147039
A3A1A2-A5	Input Select Board	636-5585	J147039
-	Attenuator Assembly	636-5632	
A3A2	Headphone/Monitor Board	636-5588	C147032
A3A3	Channels 6-8 Mixer Board	636-5602	J147039
A3A3A1-A3	Input Select Board	636-5585	J147039
A3A3A6-A8	Input Select	636-5585	J147039
A3A4	Channel 7B	636-5591	C147033
A3A5	Channel 8B	636-5591	C147034
A4	Power Supply	636-5653	C147038
A5	Card Extender (Dwg. Not Sup.)	636-5663	
A6	Machine Control (Optional)	640-5274	E640-5295
A6A1	Machine Control Board (Opt.)	640-5278	E640-5295



PREP A. Dawson 1978	SIZE D	DWG NO. 622-3646	REV LTR C
CHK A. Dawson 1978	SCALE NONE		SHEET 2

NOTES:
 1. PARENTHEICAL ITEM IDENTIFICATION DENOTES (ITEM NO., QTY).
 2. THE FOLLOWING PART NO'S MAY BE SUBSTITUTED FOR ITEM NO'S 10, 11, AND 19:
 150-1541-000 (ITEM 10)
 150-1555-000 (ITEM 11)
 150-1554-000 (ITEM 19)
 3. CUT SLEEVING INTO 3/4 INCH LONG PIECES,
 B REQ'D.

-001		REVISIONS		
NO	REV	DESCRIPTION	DATE	APVD
A,1R	A	J-53918	10-19-77	CA
B,2AR	B	J-55959: ADD ITEMS TO P/L	3-10-78	AB
C,2AK	C	J-59462: UPDATE, ADD ITEMS 10 THRU 18, SHEET 2.	10-25-78	LW
	D	J-59645: CHG DETAIL B (SHEET 2)	11-8-78	LW
D,2AR	E	J-61475: CHG QTY'S OF ITEMS 10, 12-14, ADD ITEM 19.	4-2-79	LW
E,2AR	F	J-64152: MOVED W/L TO SH 1, CHGD QTY OF ITEMS 12-14, 19, ADD ITEMS 20, 21, NOTE 3, REV SW DETAIL ON SH 2	10-31-79	AB

WIRE NO.	ITEM NO.	TO	FROM	NOTES
A3 CABLE WIRE NO.3		SHIELD	A2J1-7	
		GREEN	A2J1-1	
		WHITE	A2J1-2	
		RED	A2J1-3	
		BLACK	A2J1-2	
		A2A8P2	A3A5J1	
		A2A8P1	A3A3J8	
		A2A7P2	A3A4J1	
		A2A7P1	A3A3J7	
		A2A6P1	A3A3J6	
		A2A5P1	A3A1J5	
		A2A4P1	A3A1J4	
		A2A3P1	A3A1J3	
		A2A2P1	A3A1J2	
	A2A1P1	A3A1J1		
A3 CABLE WIRE NO.4		A2A9TB1-14		
		A3P1	A2A10J1	
		A3P3	A2A9J3	
		A3P5	A2A9J5	
		A3S8-NC2	A2A8P1-TAN	
		A3S8-C2	A2A8P1-BRN	
		A3S8-NC1	A2A8P1-TAN	
		A3S8-C1	A2A8P1-RED	
		A3S7-NC2	A2A7P1-TAN	
		A3S7-C2	A2A7P1-BRN	
		A3S7-NC1	A2A7P1-TAN	
		A3S7-C1	A2A7P1-RED	
		A3S6-NC2	A2A6P1-TAN	
		A3S6-C2	A2A6P1-BRN	
		A3A6-NC1	A2A6P1-TAN	
		A3A6-C1	A2A6P1-RED	
		A3S5-NC2	A2A5P1-TAN	
		A3S5-C2	A2A5P1-BRN	
		A3S5-NC1	A2A5P1-TAN	
		A3S5-C1	A2A5P1-RED	
		A3S4-NC2	A2A4P1-TAN	
		A3S4-C2	A2A4P1-BRN	
		A3S4-NC1	A2A4P1-TAN	
		A3S4-C1	A2A4P1-RED	
		A3S3-NC2	A2A3P1-TAN	
		A3S3-C2	A2A3P1-BRN	
		A3S3-NC1	A2A3P1-TAN	
		A3S3-C1	A2A3P1-RED	
		A3S2-NC2	A2A2P1-TAN	
		A3S2-C2	A2A2P1-BRN	
		A3S2-NC1	A2A2P1-TAN	
		A3S2-C1	A2A2P1-RED	
	A3S1-NC2	A2A1P1-TAN		
	A3S1-C2	A2A1P1-BRN		
	A3S1-NC1	A2A1P1-TAN		
	A3S1-C1	A2A1P1-RED		

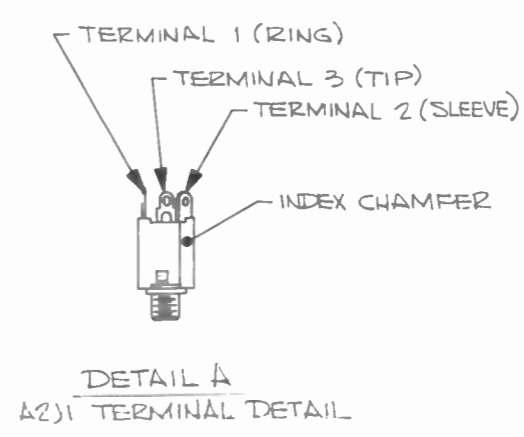
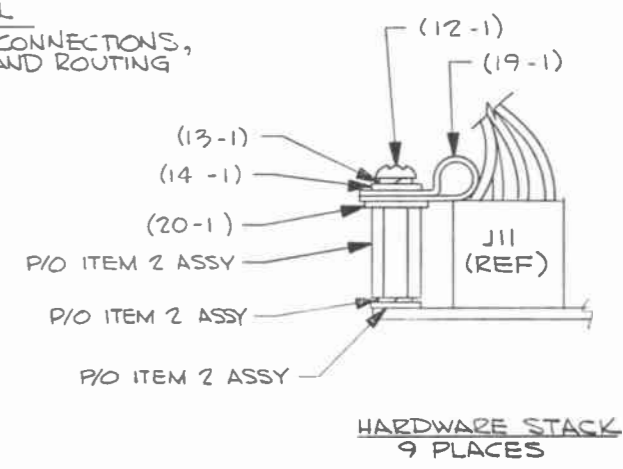
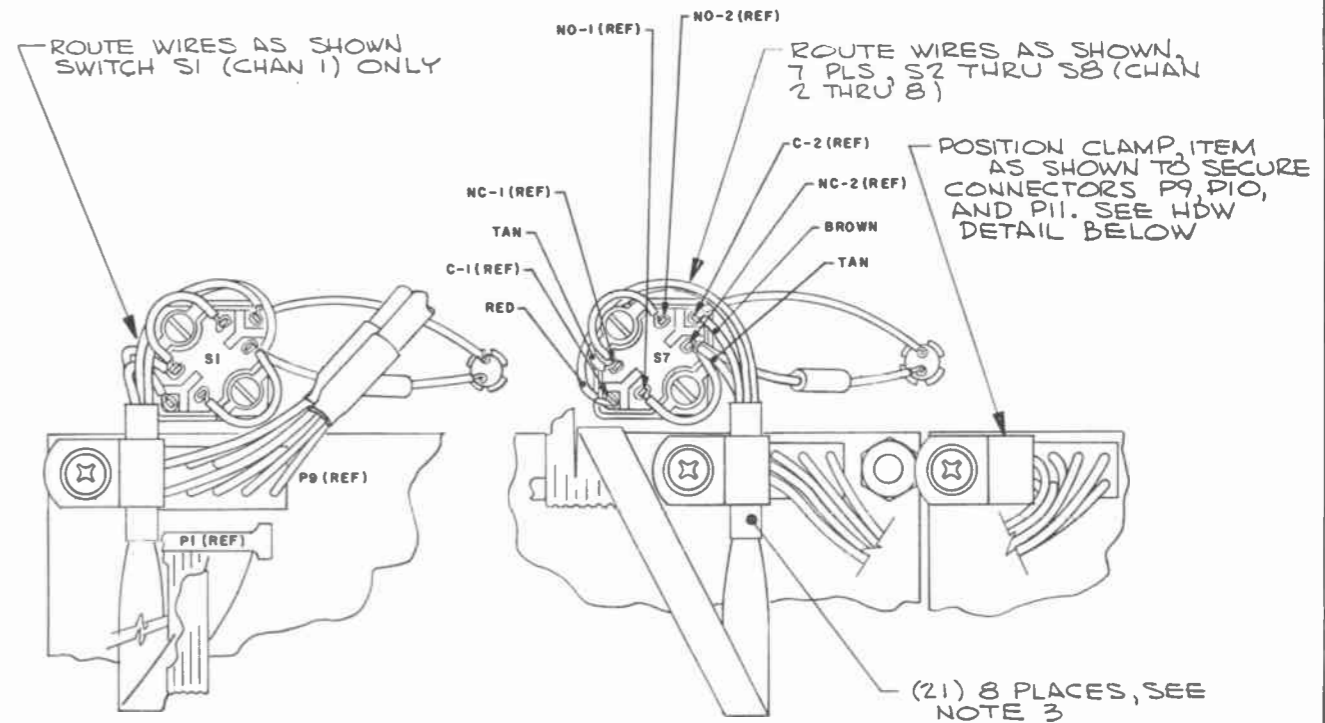
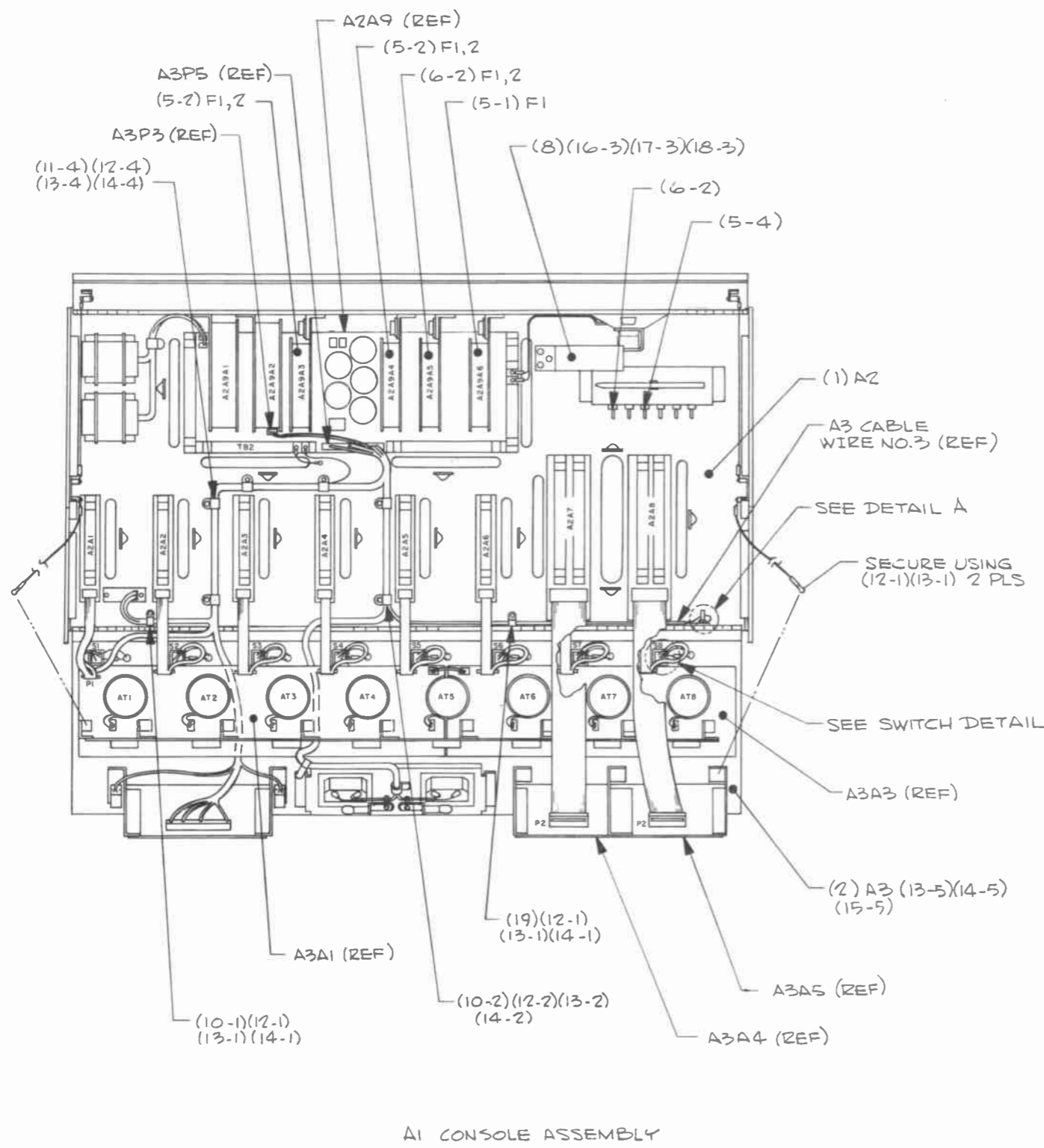
WIRE LIST

QTY	ITEM NO.	PART OR IDENTIFYING NO.	COLLINS PART NO.	NOMENCLATURE OR DESCRIPTION	REV LTR	DOCUMENT NO.	CODE IDENT	ALTN PREF	UM MN	NOTES
0.6	21		152-1369-000	SLEEVING (FT)						3
9.0	20		310-6360-000	NO.6 FLAT WSHR 3/8 Ø.D.						
10.0	19		150-0708-010	CABLE CLAMP, 1/8						
3.0	18		310-0049-000	NO. 10 FLAT WASHER						
3.0	17		310-0284-000	NO. 10 LOCK WASHER						
3.0	16		343-0226-000	10-32 X 3/8 PPH SCREW						
5.0	15		313-0045-000	NO. 6-32 HEX NUT						
22.0	14		310-0046-000	NO. 6 FLAT WASHER						
24.0	13		310-0282-000	NO. 6 LOCK WASHER						
19.0	12		343-0168-000	6-32 X 5/16 PPH SCREW						
4.0	11		150-0708-070	CABLE CLAMP, 1/2						2
3.0	10		150-0708-030	CABLE CLAMP, 1/4						2
2.0	9		305-2050-020	BLIND RIVET						
1.0	8		640-5312-001	GROUNDING DECAL						
1.0	7		640-5310-001	NAME PLATE						
4.0	6		264-0606-000	FUSE, 3A						
9.0	5		264-0605-000	FUSE, 2A						
1.0	4		636-5663-001	EXTENDER ASSY						
1.0	3		636-5653-001	PWR SUPPLY ASSY						
1.0	2		636-5594-001	CØNTRØL PNL ASSY-A3						
1.0	1		636-5571-001	CHASSIS ASSY-A2						

REVISED AND REDRAWN 10/26/79

REV STATUS OF SHEETS	REV SHEET	FF	1	2
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MATERIAL	N/A	FINISH	N/A
UNLESS OTHERWISE SPECIFIED, DUAL DIMENSIONED DWGS ARE IN MILLIMETERS (INCHES) SINGLE DIMENSIONED DWGS ARE IN INCHES		CONTRACT NO.	
METRIC TOL ON METRIC DIM: X - ±0.5, XX = ±0.2 HOLE DIAMETERS UNDER 6.38 Ø = +0.13 - 0.13 6.38 TO 12.7 Ø = +0.15 - 0.13 OVER 12.7 Ø = +0.20 - 0.13 ANGLES ±10° ECCENTRICITY BETWEEN DIAMETERS ON AN AXIS NOT TO EXCEED 0.25 Ø PART SHALL COMPLY TO 580-5400-001		US CUSTOMARY [] TOL ON [] DIM: XX = ±0.2, XXX = ±0.008 HOLE DIAMETERS UNDER 251 Ø = +0.05 - 0.05 251 TO 500 Ø = +0.06 - 0.05 OVER 500 Ø = +0.08 - 0.05 ANGLES ±10° ECCENTRICITY BETWEEN DIAMETERS ON AN AXIS NOT TO EXCEED 0.10 Ø THIRD ANGLE PROJECTION	
PREP A. Bowman OCT 26 1979 CHK A. Bowman OCT 26 1979 APVD: OCT 26 1979		ROCKWELL INTERNATIONAL CORPORATION COLLINS RADIO GROUP DALLAS TEX 75207 NEWPORT BEACH CALIF 92660 LEONARD HARTLEY IA 42428 MK 8 STEREO CONSOLE 212P-2	
SIZE CODE IDENT DWG NO D 13499 622-3647		SCALE NONE SHEET 1 OF 2	



ROCKWELL INTERNATIONAL CORPORATION
 COLLINS DIVISIONS
 DALLAS, TEX 75207 NEWPORT BEACH, CALIF 92663 CEDAR RAPIDS, IA 52406

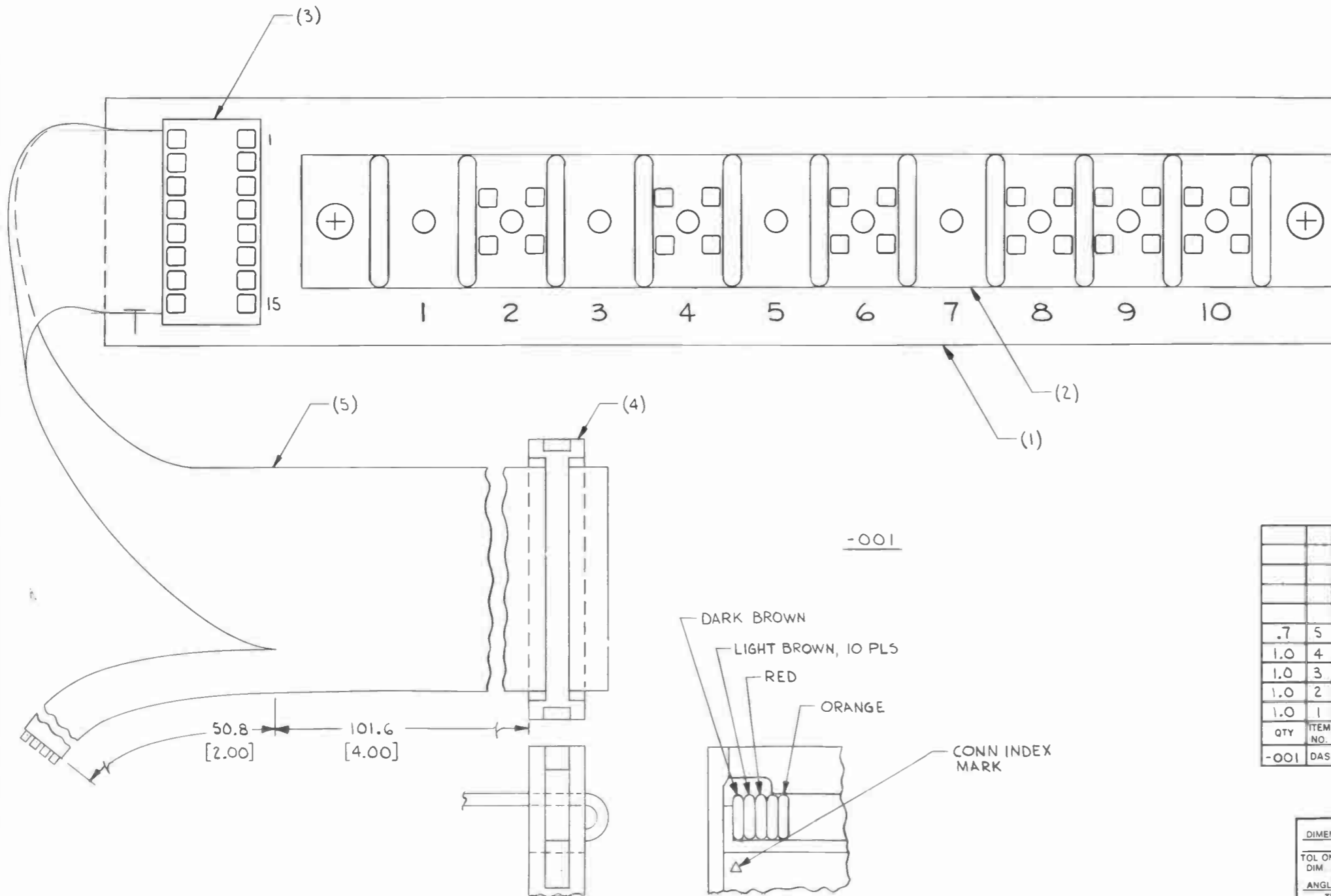
PREP A. Roum	SIZE D	FSCM 13499	DWG NO. 622-3647	REV LTR F
CHK A. Roum	SCALE NONE			SHEET 2

A2	Base Assembly	636-5571
A2A1	Channel 1 Input	636-5639
A2A2	Channel 2 Input	636-5639
A2A3	Channel 3 Input	636-5639
A2A4	Channel 4 Input	636-5639
A2A5	Channel 5 Input	636-5639
A2A6	Channel 6 Input	636-5639
A2A1-A2A6	Input Terminal Board CH1-6 Schematic	C147030

NOTES :

1. MARK ASSY 636-5639-001, REV, AND REV LTR WHERE SPACE PERMITS PER 580-0497-000.

-001		REVISIONS		
HOW REV	LTR	DESCRIPTION	DATE	APVD
	A	J-52008: ADD VIEW TO SHOW WIRE ORIENTATION	4-26-77	AB
A.2AR	B	J-57557: CHG P/N ITEM 2	6-21-78	LW



QTY	ITEM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REV	ALTN LTR	UM	MN	NOTES	REF DESIGNATOR
	.7	5	424-0867-010					FLAT CABLE	FT
	1.0	4	372-2648-200					CONN	
	1.0	3	372-2636-030					CONN	
	1.0	2	367-1888-100					TERM BD	
	1.0	1	636-5638-001					FAB BOARD	

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN MILLIMETRES (INCHES), METRIC (US CUSTOMARY [])

TOL ON METRIC DIM: DIM X = ±0.5, XX = ±0.2, ANGLES ±1.0°

TOL ON [] DIM: DEC DIM: XX = ±.02, XXX = ±.008, ANGLES ±1.0°

THIRD ANGLE PROJECTION

CONTRACT NO. _____

PREP *A. Bowman* 11 MAY 1976

CHK *A. Bowman* 11 MAY 1976

APVD *A. Bowman* 3-28-77

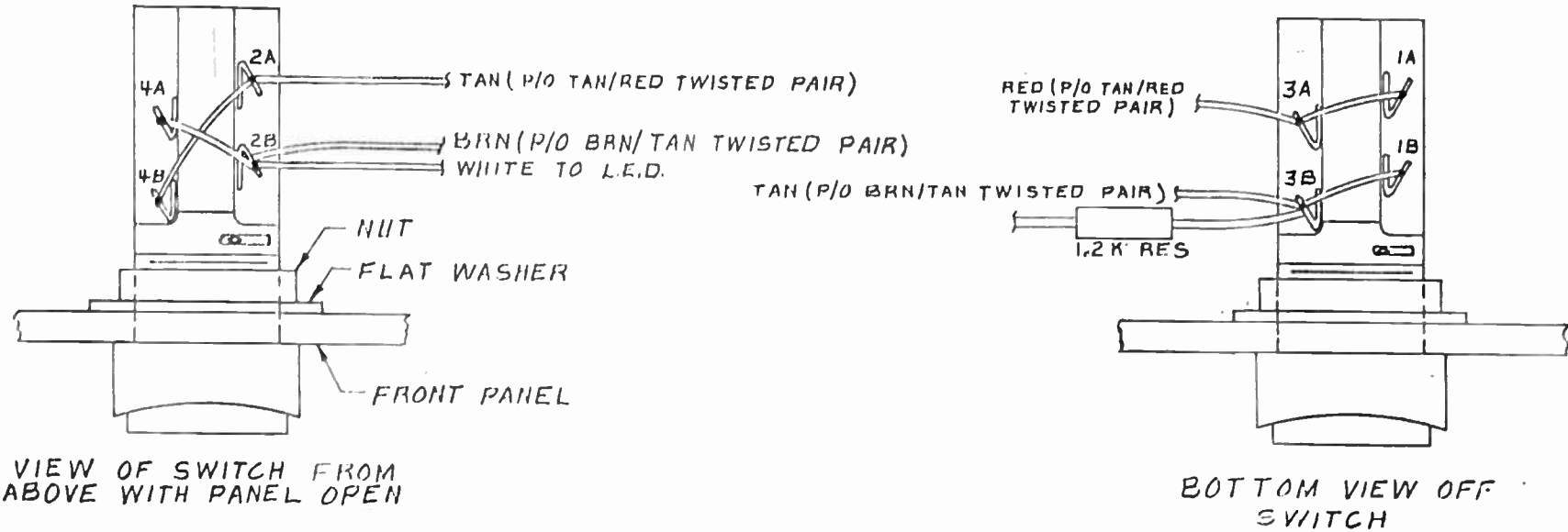
ROCKWELL INTERNATIONAL CORPORATION
COLLINS RADIO GROUP
DALLAS, TEX 75207 NEWPORT BEACH, CALIF 92663 CEDAR RAPIDS, IA 52408

BOARD ASSEMBLY - CHANNEL INPUT BOARD

SIZE CODE IDENT DWG NO.
D13499 636-5639

SCALE 4/1 SHEET

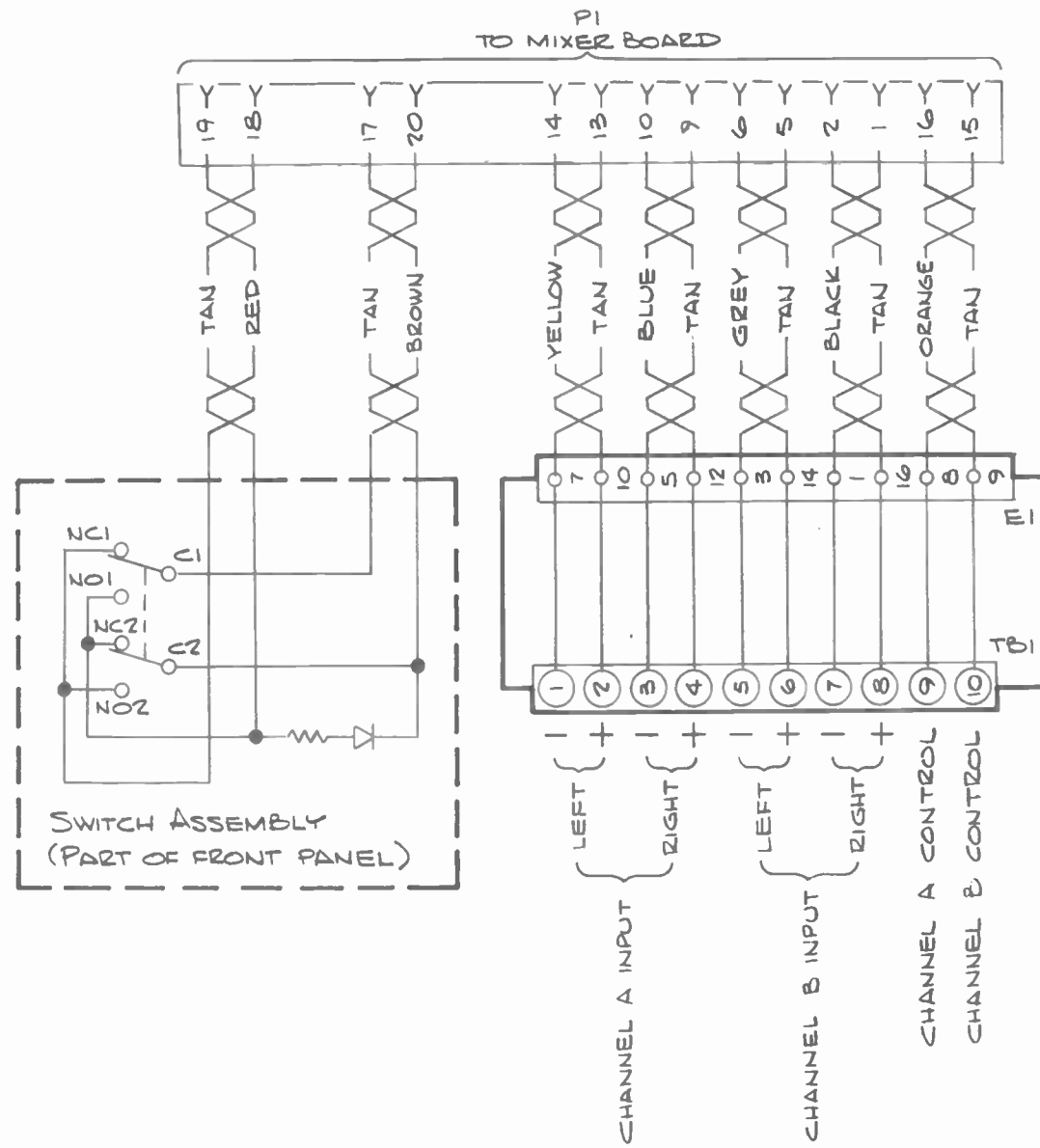
212R-1 SWITCH INSTALLATION



REPLACEMENT PROCEDURE:

1. Remove defective switch
2. Install Switch as illustrated above
3. After Switch is in place and securely tightened, use small screwdriver to bend connection tabs outward just enough to permit installation of wiring and soldering.
4. Use 24 gauge insulated or sleeved buss wire to make jumper connections shown above.
5. Connect remaining wires and Resistor to Switch as shown above.

REVISIONS			
ZONE	LTR	DESCRIPTION	DATE



Continental Electronics
MFG. CO. DALLAS, TEXAS

SCHEMATIC,
INPUT TERM BOARD-CHI-6

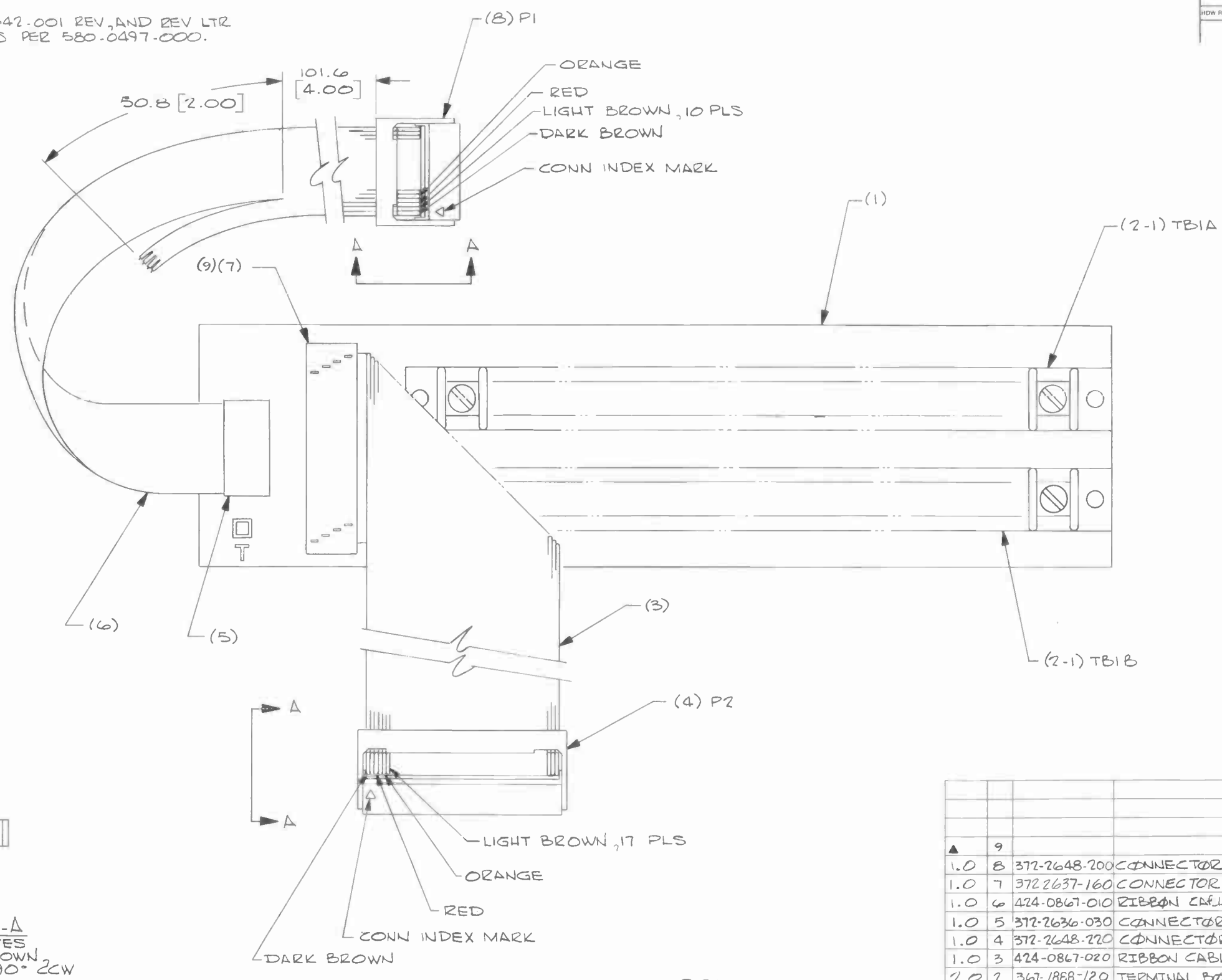
SIZE	CODE IDENT NO.	147030
C	52151	
SCALE:	WT	SHEET OF

A2A7-
A2A8

A2A7	Channel 7 Input Terminal	636-5642
A2A8	Channel 8 Input Terminal	636-5642
A2A7/A2A8	Input Terminal Board CH 7/ CH 8 Schematic	C147031

NOTES
 1. MARK ASSY 636-5642-001 REV, AND REV LTR
 WHERE SPACE PERMITS PER 580-0497-000.

REVISIONS							
HDW REV	HDW REV	HDW REV	HDW REV	LTR	DESCRIPTION	DATE	APVD
			438	A	J-54251	11-16-77	CAH
			B.5	B	J-55010: PFL ITEMS 7 AND 9	1-17-78	LM
			C.2AR	C	J-56487: ADD PIN TO L/M	4-13-78	LM
			D.2AR	D	J-55557: CHG P/N ITEM 2	6-21-78	LW
				E	J-61401:	3-27-79	LW



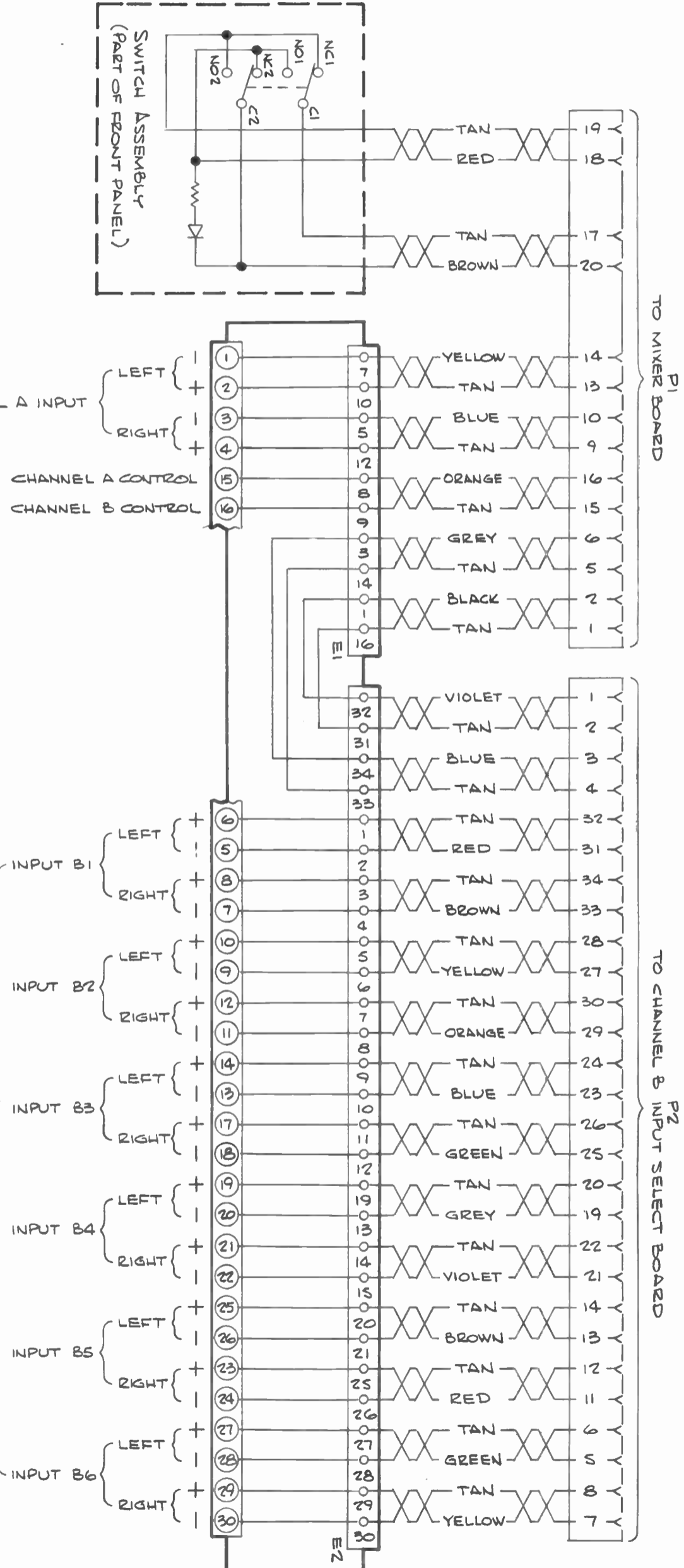
VIEW A-A
 2 PLACES
 ONE AS SHOWN
 ONE ROT 90° CCW

QTY	ITEM NO	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	REV LTR	ALTN PREF	UM	MN	NOTES	REF DESIGNATOR
	9								
1.0	8	372-2648-200	CONNECTOR						P1
1.0	7	372-2637-160	CONNECTOR						E2
1.0	6	424-0867-010	RIBBON CABLE, 20 COND						
1.0	5	372-2636-030	CONNECTOR						E1
1.0	4	372-2648-220	CONNECTOR						P2
1.0	3	424-0867-020	RIBBON CABLE, 34 COND						
2.0	2	367-1868-120	TERMINAL BOARD						TB1-A, B
1.0	1	636-5641-001	FAB BOARD						

MATERIAL SEE P/L	UNLESS OTHERWISE SPECIFIED, DUAL DIMENSIONED DWGS ARE IN MILLIMETRES (INCHES). SINGLE DIMENSIONED DWGS ARE IN INCHES.		CONTRACT NO. ROCKWELL INTERNATIONAL CORPORATION COLLINS RADIO GROUP DALLAS, TEX 75207 NEWPORT BEACH, CALIF 92663 CEDAR RAPIDS, IA 52406
	METRIC TOL ON METRIC DIM: X = ±0.5, XX = ±0.2 HOLE DIAMETERS: UNDER 6.38 Ø = +0.13 - 0.13 6.38 TO 12.7 Ø = +0.15 - 0.13 OVER 12.7 Ø = +0.20 - 0.13 ANGLES: ±1.0° ECCENTRICITY BETWEEN DIAMETERS ON AN AXIS NOT TO EXCEED 0.25 Ø	US CUSTOMARY [] TOL ON [] DIM: XX = ±.02, XXX = ±.008 HOLE DIAMETERS: UNDER .251 Ø = +.005 - .005 .251 TO .500 Ø = +.006 - .005 OVER .500 Ø = +.008 - .005 ANGLES: ±1.0° ECCENTRICITY BETWEEN DIAMETERS ON AN AXIS NOT TO EXCEED .010 Ø	
FINISH NONE	PART SHALL COMPLY TO 580-5400-001 — THIRD ANGLE PROJECTION		PREP CHK APVD
PARTS LIST (US CUSTOMARY MEASUREMENTS ONLY)			SIZE CODE IDENT DWG NO. D 13499 636-5642
			SCALE NONE SHEET

REVISIONS		DATE	APPROVED
ZONE	LTR	DESCRIPTION	

CINC FORM 381



CHANNEL B INPUTS

Continental Electronics
MFG. CO. DALLAS, TEXAS

SCHEMATIC,
INPUT TERM BD-CH 7-B

SIZE CODE IDENT NO.
C 52151
SCALE: 147031

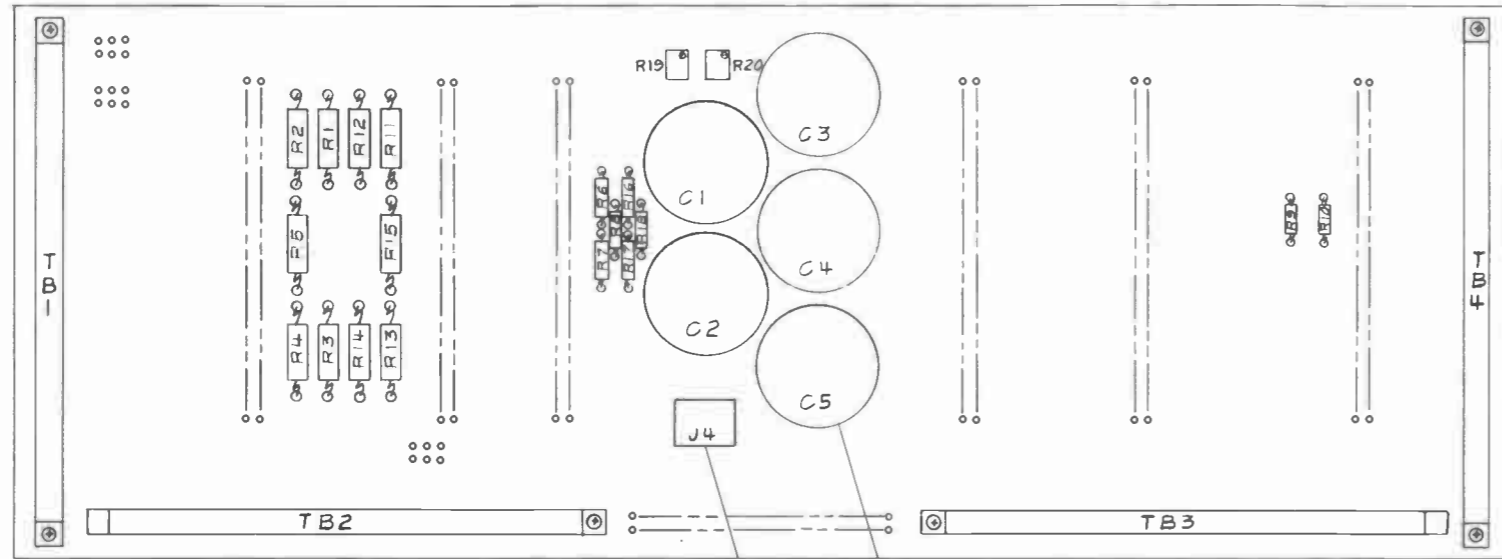
A2A9 Backplane

636-5610

A2A9 Interconnect Cabling & Backplane J147037

NOTES:
 1. MARK 636-5610-001, REV, AND REV LTR LOCATED APPROX AS SHOWN ON OPP SIDE PER 580-0497-000.
 2. PARENTHEICAL ITEM IDENTIFICATION DENOTES (ITEM NO.-QTY)

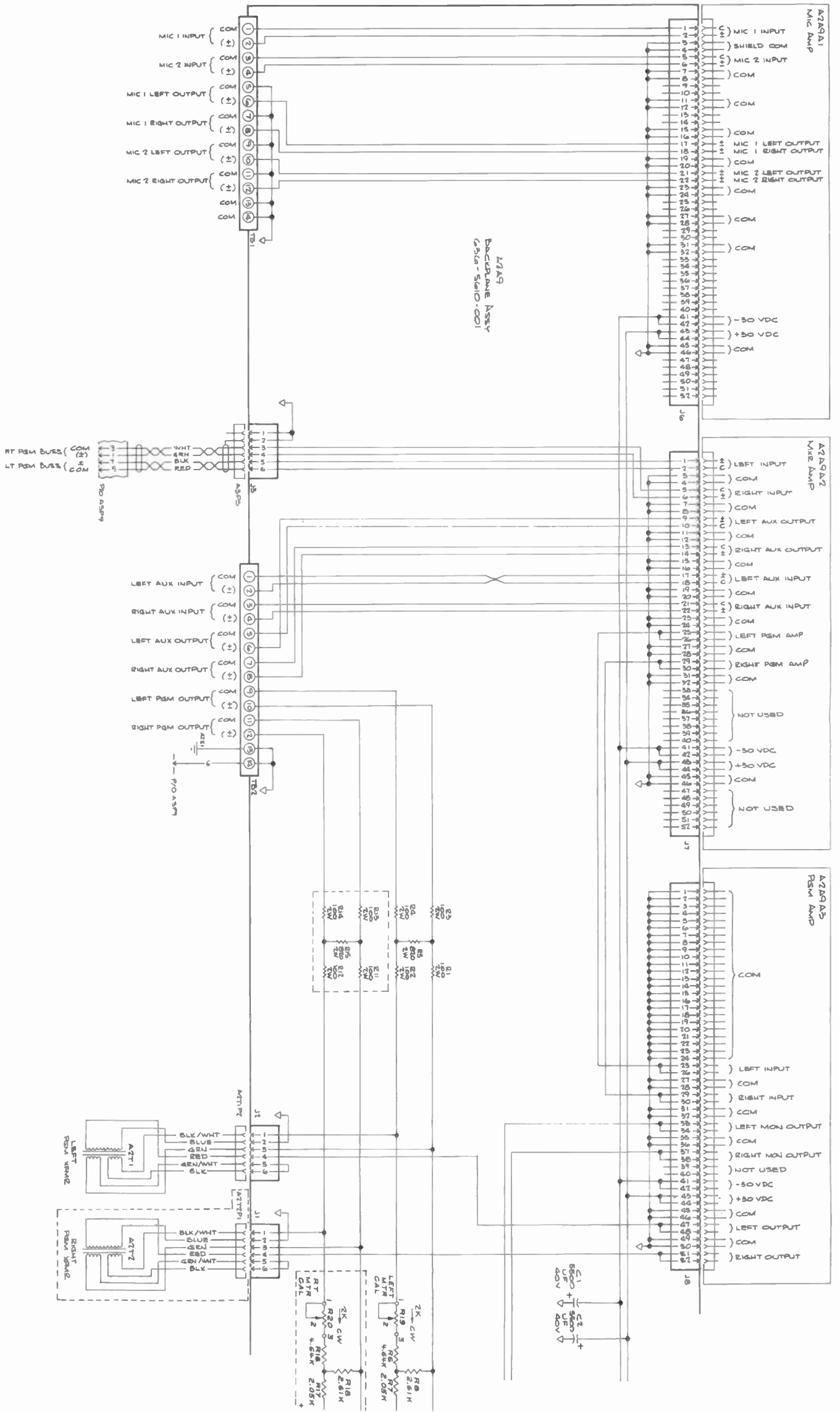
-001				REVISIONS			
HOW REV	HOW REV	HOW REV	HOW REV	LTR	DESCRIPTION	DATE	APVD
A,2AR	A				J-55591: CHG ITEM 3 & 6 PN	2-16-78	AB
B,2AR	B				J-57557: CHG P/N ITEM 2	6-21-78	LW
C,2AR	C				J-58923: ADD ITEM 15	9-18-78	LW



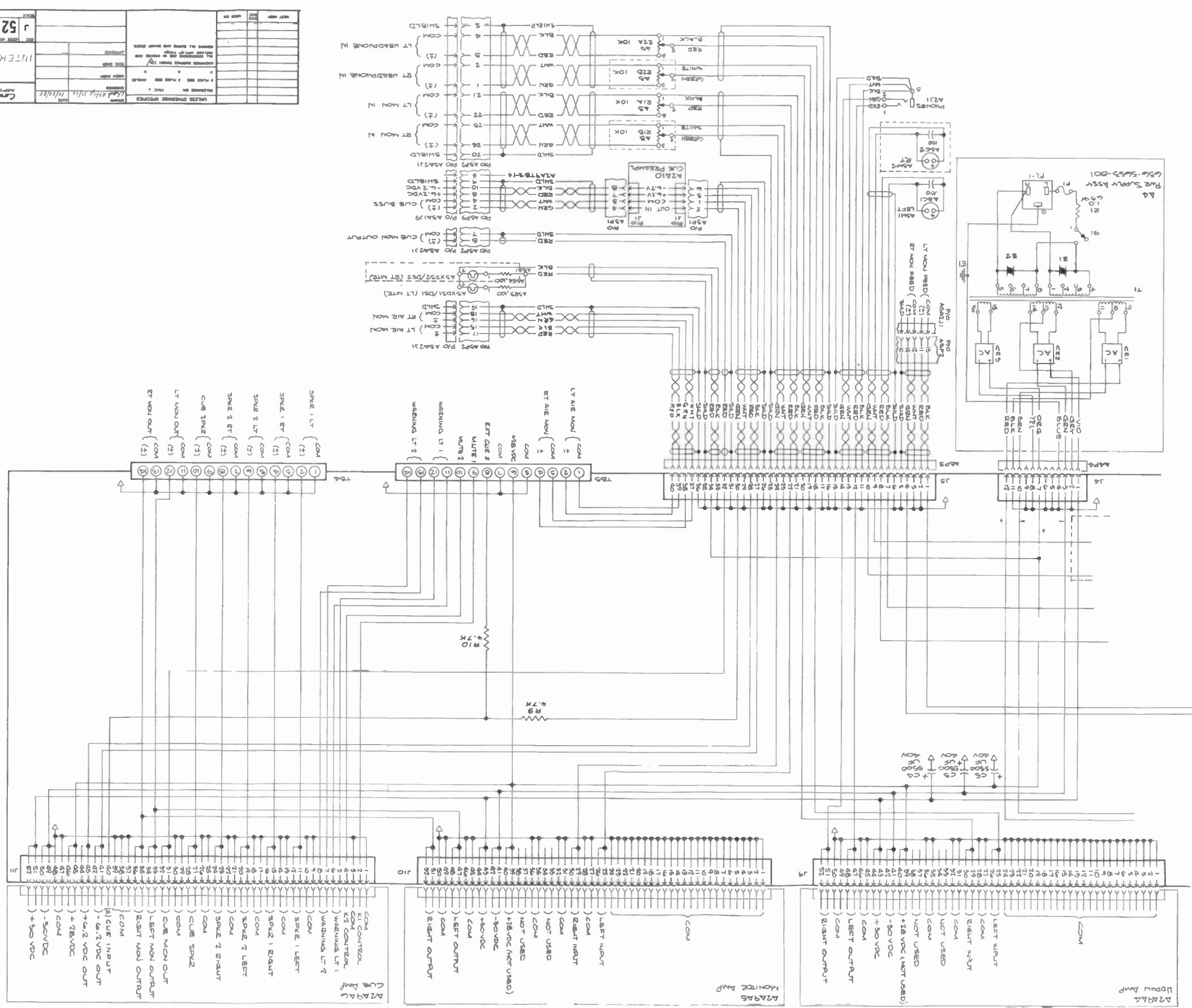
-001

QTY	ITEM NO	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	REV LTR	ALTN PREF	UM	MN	NOTES	REF DESIGNATOR
2.0	15	745-0910-810	RES, 4.7K, 1/4 W						R9, R10
5.00	14	310-0059-000	WASHER, NO. 10 FLAT						
5.00	13	310-0100-000	WASHER, NO. 10 LØCK						
5.00	12	343-0346-000	SCREW, 10-32x7/16						
5.0	11	183-1278-180	CAP., 5500UF, 40V						C1-5
2.0	10	705-6611-000	RES, 2.05K, 1/4 W, 1 P.C.						R7, R17
2.0	9	705-6616-000	RES, 2.61K, 1/4 W, 1 P.C.						R8, R18
2.0	8	705-6628-000	RES, 4.64K, 1/4 W, 1 P.C.						R6, R16
2.0	7	382-1405-050	VAR RES, 2K, 25T						R19, R20
2.0	6	745-5649-000	RES, 820, 2W						R5, R15
8.0	5	745-5610-000	RES, 100, 2W						R1, 2, 3, 4
12.0	4	372-5909-860	PIN CONTACT						R11, 12, 13, 14
1.0	3	372-5909-320	RECEPTACLE						J4
4.0	2	367-1888-110	TERMINAL BD-14 PØS						TB1-4
1.0	1	636-5654-001	STAKED BD						

MATERIAL N/A	UNLESS OTHERWISE SPECIFIED, DUAL DIMENSIONED DWGS ARE IN MILLIMETRES (INCHES). SINGLE DIMENSIONED DWGS ARE IN INCHES. METRIC TOL ON METRIC DIM: X = ±0.5, .XX = ±0.2 HOLE DIAMETERS: UNDER 6.38 Ø = +0.13 - 0.13 6.38 TO 12.7 Ø = +0.15 - 0.13 OVER 12.7 Ø = +0.20 - 0.13 ANGLES: ±1.0° ECCENTRICITY BETWEEN DIAMETERS ON AN AXIS NOT TO EXCEED 0.25 Ø PART SHALL COMPLY TO 580-5400-001	US CUSTOMARY [] TOL ON [] DIM: .XX = ±0.02, .XXX = ±0.008 HOLE DIAMETERS: UNDER .251 Ø = +.005 - .005 .251 TO .500 Ø = +.006 - .005 OVER .500 Ø = +.008 - .005 ANGLES: ±1.0° ECCENTRICITY BETWEEN DIAMETERS ON AN AXIS NOT TO EXCEED .010 Ø THIRD ANGLE PROJECTION	CONTRACT NO. PREP <i>Chad atty 10/5/77</i> CHK <i>Chad atty 10/13/77</i> APVD <i>i 12/76</i>	ROCKWELL INTERNATIONAL CORPORATION COLLINS RADIO GROUP DALLAS, TEX 75207 NEWPORT BEACH, CALIF 92663 CEDAR RAPIDS, IA 52408 BACKPLANE SIZE CODE IDENT DWG NO. D 13499 636-5610 SCALE 1/1 SHEET
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CONDENSATOR 52151 11p 7C 57		CHEMATIC, INTERCONNECT CABINETS AND INSTRUMENTAL	
CONDENSATOR 52151 11p 7C 57		CHEMATIC, INTERCONNECT CABINETS AND INSTRUMENTAL	
CONDENSATOR 52151 11p 7C 57		CHEMATIC, INTERCONNECT CABINETS AND INSTRUMENTAL	



REV	DATE	BY	DESCRIPTION
1	11/7/57	J 52151	INITIAL DRAWING

CHECK ALL DIMENSIONS AND SPACING
 ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED
 2 PLACE DEC. PLACE DEC. ZEROES
 UNLESS OTHERWISE SPECIFIED
 DRAWING TITLE
 PROJECT NO.
 SHEET NO. OF TOTAL SHEETS
 DRAWING NO.

INTERCONNECT CABLING AND
 INSTRUMENT
 CHEMICAL DRAWING
 MFG. CO.

A2A9A1

A2A9A2

A2A9A1	MIC Amp	636-5613
A2A9A2	Mixer Amp	636-5613
A2A9A1	Microphone Pre-Amp Schematic	D147035
A2A9A2	Mixer Amplifier Schematic	D147036



NOTES:

- MARK 636-5613-XXX, REV, AND REV LTR LOCATED APPROX AS SHOWN ON OPP SIDE PER 580-0497-000.
- PARENTHETICAL ITEM IDENTIFICATION DENOTES (ITEM NO. - QTY).
- COMPONENTS SHOWN IN PHANTOM ARE USED IN -002 AND -003 (C111, T102, R114) ASSEMBLIES ONLY.
- USE TYRAPS, ITEM 32, AS NEED TO SECURE WIRES FROM T101 AND T201.
- ATTACH 1/2 INCH LENGTH OF ITEM 39 TO SIDE OF SHIELD NEXT TO T101 AND T201-LOCATED AS SHOWN.
- COMPONENTS SHOWN WITH DASHED OUTLINE ARE NOT USED ON -003 VERSION.
- THESE CONNECTIONS ARE NOT USED ON -003 VERSION.

REVISIONS					
REV	DATE	DESCRIPTION	APVD	LTR	REV
A.2AR	1-5-78	J-54835	CAM	A	
B.5	1-17-78	J-55070: ADD -003	JCH	B	
C.2AR	3-10-78	J-55959: CHG WIRING OF T101	AB	C	
D.2AR	4-13-78	J-56487: CHG PIN	LW	D	
E.2AR	8-3-78	J-58266: CHG QTY'S OF ITEMS 2, 38, 40. ADD ITEM 41. CHG PN ITEM 38. CHG NOTES	LW	E	
F.2AR	11-20-78	J-59819: W/L CHGS ON -001	LW	F	
G.2AR	3-5-79	J-61090: CHG P/N OF ITEM 28	LW	G	
H.2AR	4-2-79	J-61475: W/L CHGS ON -001	LW	H	

WIRE NO.	ITEM NO.	TO	FROM	NOTES
T101-BLK/WHT	26	E14		
T101-BLK	26	E13		
T101-BLU/WHT	26	E12		
T101-BLU	26	E11		
T101-YEL	26	E6		
T101-RED	26	E5		
T101-WHT	26	E4		
T201-BLU	26	E10		7
T201-BLU/WHT	26	E9		7
T201-BLK	26	E8		7
T201-BLK/WHT	26	E7		7
T201-YEL	26	E3		7
T201-RED	26	E2		7
T201-WHT	26	E1		7

WIRE LIST FOR -002 AND -003 VERSIONS

WIRE NO.	ITEM NO.	TO	FROM	NOTES
T101-BLUE	26	E14		
T101-BLU/WHT	26	E13		
T101-BLACK	26	E12		
T101-BLK/WHT	26	E11		
T101-YEL	26	E6		
T101-RED	26	E5		
T101-WHT	26	E4		
T201-BLU	26	E10		
T201-BLU/WHT	26	E9		
T201-BLK	26	E8		
T201-BLK/WHT	26	E7		
T201-YEL	26	E3		
T201-RED	26	E2		
T201-WHT	26	E1		

WIRE LIST FOR -001 VERSION

636-5613-001 ~ MICROPHONE PREAMP BOARD
 636-5613-002 ~ MIXER PREAMP BOARD (STEREO)
 636-5613-003 ~ MIXER PREAMP BOARD (MONO)

QTY	QTY	QTY	ITEM NO.	PART OR IDENTIFYING NO.	NAME	DESCRIPTION	REV LTR	ALTN PREF	UM MN	NOTES	R/U	DESIGNATOR
0.0	0.0	0.0	43	D147035	SCHEMATIC							
0.0	0.0	4.0	41	912-2982-000	CAP	560 PF, 500V						C114, 214
1.0	1.0	4.0	40	636-5614-002	SHIELD							
0.1	0.1	0.1	39	B20-1573-030	TAPE	FOAM (FT)						
1.0	2.0	▲	38	912-2971-000	CAP	430 PF, 500V						C114, 214
1.0	2.0	2.0	37	313-0002-000	NUT	6-32						
1.0	2.0	2.0	36	310-0071-000	WASHER	LOCK 6						
2.0	2.0	2.0	35	310-0046-000	WASHER	FLAT 6						
2.0	2.0	2.0	34	343-0166-000	SCREW	6-32 x 3/16						
4.0	4.0	4.0	33	330-3520-000	SCREW	TAPPING 4-40 x 3/4						
4.0	4.0	▲	32	435-1169-100	TYRAP							
▲	▲	▲	31									
1.0	1.0	1.0	30	220-0049-010	SOCKET	INT CKT						XU101
1.0	2.0	2.0	29	353-3054-000	DIODE	ZENER IN3024B						VR101, VR102
1.0	1.0	1.0	28	351-1088-030	INT CKT	μ A 749						U101
1.0	2.0	2.0	27	667-0284-010	XFMR							T102, T202
1.0	2.0	2.0	26	667-0294-010	XFMR							T101, T201
2.0	2.0	2.0	25	745-3342-000	RESISTOR	560, 1W						R115, R116
5.0	10.0	4.0	24	705-0985-000	RESISTOR	590, 1/8 W						R110, R111, R112, R113, R114, R210, R211, R212, R213, R214
2.0	4.0	4.0	23	745-0914-170	RESISTOR	10, 1/2 W						R108, R109, R208, R209
1.0	2.0	2.0	22	745-0910-820	RESISTOR	5.1K, 1/4 W						R107, R207
1.0	2.0	2.0	21	705-1098-000	RESISTOR	133K, 1/8 W						R106, R206
1.0	2.0	2.0	20	745-0910-410	RESISTOR	100, 1/4 W						R105, R205
1.0	2.0	2.0	19	745-0910-290	RESISTOR	33, 1/4 W						R104, R204
1.0	2.0	2.0	18	705-1028-000	RESISTOR	4.64K, 1/8 W						R103, R203
3.0	6.0	6.0	17	745-0910-890	RESISTOR	10K, 1/4 W						R101, R102, R107, R201, R202, R217
1.0	2.0	2.0	16	352-0551-010	XSTR	ZN2907A						Q102, Q202
1.0	2.0	2.0	15	352-0661-020	XSTR	ZN222A						Q101, Q201
2.0	4.0	4.0	14	353-3644-010	DIODE	1N4454						CR101, CR102, CR201, CR202
1.0	2.0	2.0	13	184-9102-200	CAPACITOR	100UF, 10V						C111, C211
1.0	2.0	2.0	12	184-9102-110	CAPACITOR	220UF, 10V						C110, C210
1.0	2.0	2.0	11	912-2773-000	CAPACITOR	27PF, 500V						C109, C209
2.0	2.0	2.0	10	184-9102-280	CAPACITOR	68UF, 25V						C107, C108
1.0	2.0	2.0	9	184-9102-410	CAPACITOR	10UF, 35V						C106, C206
1.0	2.0	2.0	8	913-5019-660	CAPACITOR	.01UF, 100V						C104, C204
4.0	4.0	4.0	7	913-5019-720	CAPACITOR	.1UF, 50V						C103, C105, C112, C113
1.0	2.0	2.0	6	912-2828-000	CAPACITOR	150PF, 500V						C102, C202
1.0	2.0	2.0	5	912-2819-000	CAPACITOR	110PF, 500V						C101, C201
1.0	1.0	1.0	4	636-5646-001	BRACKET							
1.0	1.0	1.0	3	636-5615-001	COVER							
▲	▲	▲	2	636-5614-001	SHIELD							
1.0	1.0	1.0	1	636-5655-001	BOARD	STAKED						

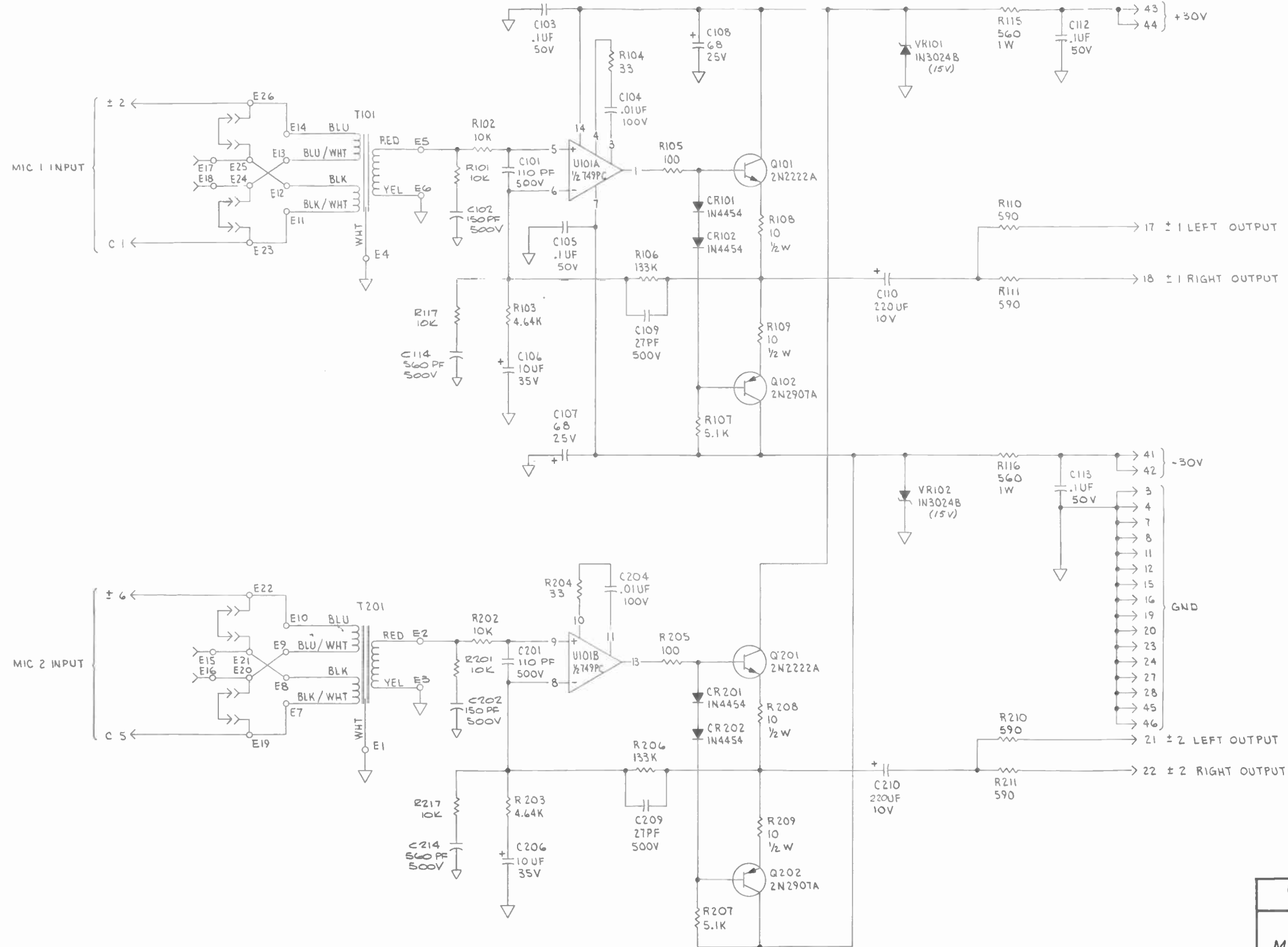
REV STATUS OF SHEETS	REV SHEET	H B	1 2
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MATERIAL	UNLESS OTHERWISE SPECIFIED, DUAL DIMENSIONED DWGS ARE IN MILLIMETRES (INCHES). SINGLE DIMENSIONED DWGS ARE IN INCHES.		CONTRACT NO.	ROCKWELL INTERNATIONAL CORPORATION COLLINS RADIO GROUP DALLAS, TEX 75207 NEWPORT BEACH, CALIF 92663 CEDAR RAPIDS, IA 52408
	METRIC	US CUSTOMARY []		
FINISH	TOL ON METRIC DIM: X = ±0.5, XX = ±0.2	TOL ON [] DIM: XX = ±0.2, XXX = ±0.08	CHK [Signature]	BOARD ASSEMBLY - MIC AMP AND MIXER AMP
	HOLE DIAMETERS: UNDER 6.38 Ø = +0.13 - 0.13 6.38 TO 12.7 Ø = +0.15 - 0.13 OVER 12.7 Ø = +0.20 - 0.13	HOLE DIAMETERS: UNDER .251 Ø = +.005 - .005 .251 TO .500 Ø = +.006 - .005 OVER .500 Ø = +.008 - .005	APVD [Signature]	SIZE CODE IDENT DWG NO. E 13499 636-5613
ANGLES: ±1.0° ECCENTRICITY BETWEEN DIAMETERS ON AN AXIS NOT TO EXCEED 0.25 Ø		ANGLES: ±1.0° ECCENTRICITY BETWEEN DIAMETERS ON AN AXIS NOT TO EXCEED .010 Ø	SCALE 4/1	SHEET 1 OF 2
PART SHALL COMPLY TO 580-5400-001 — THIRD ANGLE PROJECTION				

NOTE:

1. UNLESS OTHERWISE NOTED
RESISTORS ARE 1/4 W

REVISIONS			
ZONE	LTR	DESCRIPTION	DATE



Continental Electronics
MFG. CO. DALLAS TEXAS

**SCHEMATIC,
MICROPHONE PREAMP**

DATE: D 52151 147035

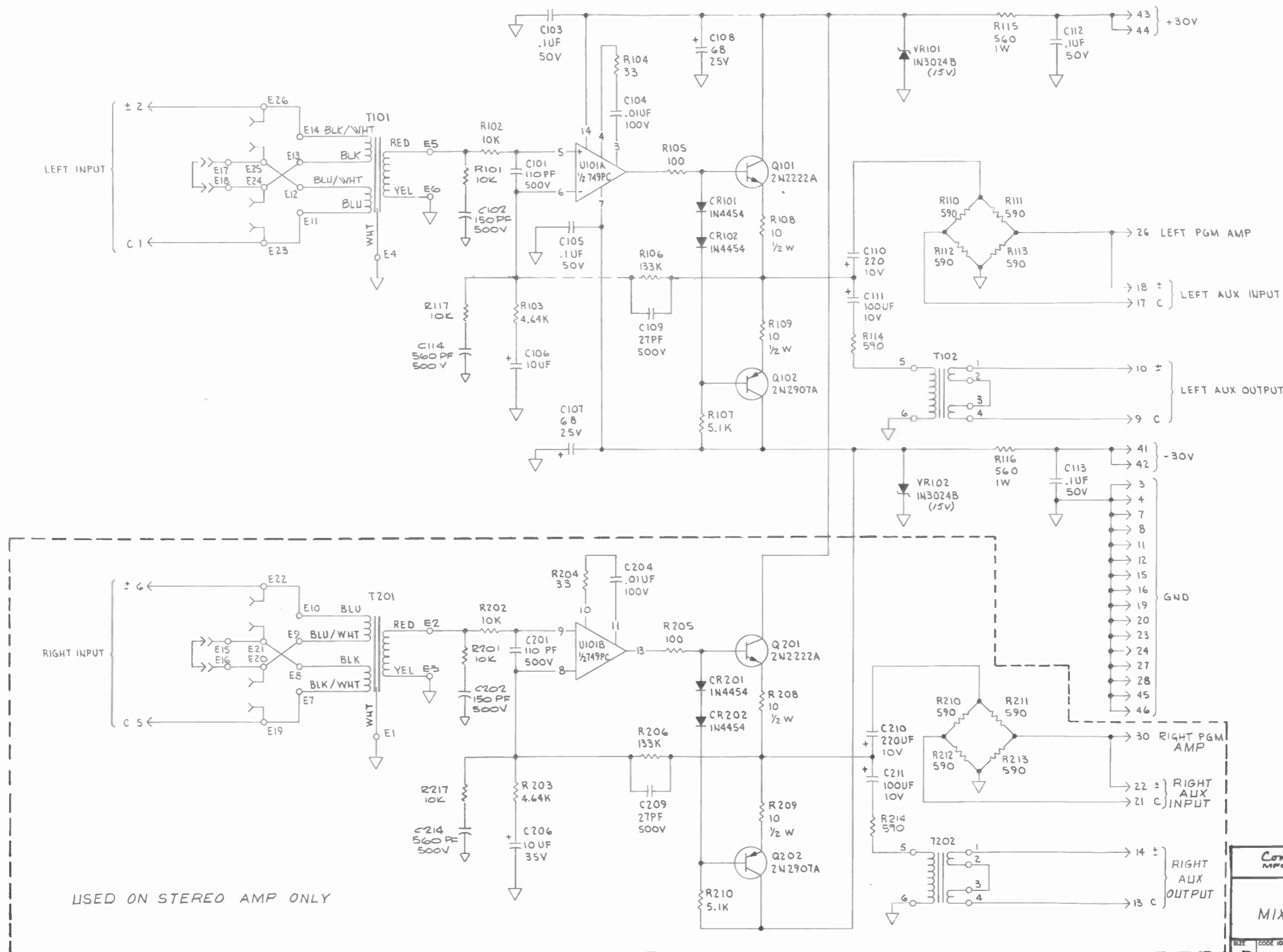
SCALE: 1/16" = 1"

SHEET 1 OF 1

1. UNLESS OTHERWISE NOTED
RESISTORS ARE 1/4 W

THESE CHANGES ONLY
ON 770 1MX AMP

REVISEMENTS		DATE	APPROVED
ZONE	LTR		



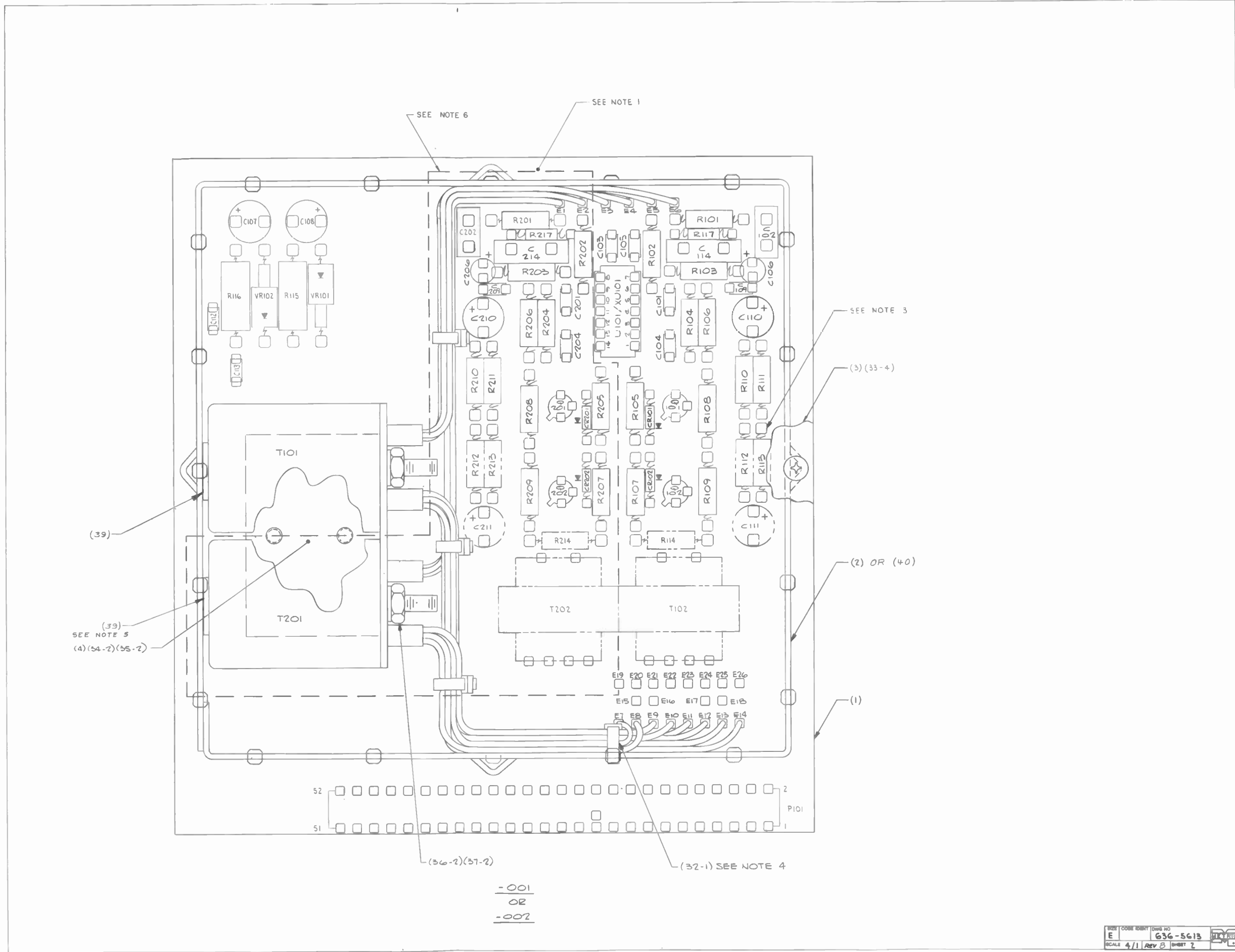
USED ON STEREO AMP ONLY

Continental Electronics
MFG. CO. DALLAS, TEXAS

**SCHEMATIC,
MIXER AMPLIFIER**

CODE IDENT. NO. **D 52151** 147036

SCALE: _____ WT _____ SHEET _____ OF _____



A2A9A3	PGM Amplifier	636-5579
A2A9A4	Headphone Amplifier	636-5579
A2A9A5	Monitor Amplifier	636-5579
A2A9A3	PGM Amplifier Output Amp Schematic	D147028
A2A9A4	Headphone Amplifier Output Amp Schematic	D147028
A2A9A5	Monitor Amplifier Output Amp Schematic	D147028



NOTES:

- MARK 636-5579-001, REV, AND REV LTR LOCATED APPROX AS SHOWN ON OPP SIDE PER 580-0497-000.
- PARENTHEICAL ITEM IDENTIFICATION DENOTES (ITEM NO. - QTY).
- ITEM 53 TO BE CUT TO 4.8 [19] LENGTHS AND USED AS AN INSULATOR BETWEEN ITEMS 4 AND 50. CUT 4.8 [19] LENGTHS AND USE AS AN INSULATOR FOR LEADS OF Q103, Q104, Q203, AND Q204.
- CUT LEADS OF Q103, Q104, Q203 AND Q204 TO 7.9 [31] LONG.
-
- TWIST WIRES 1 AND 2, 3 AND 4 APPROX 5 TIMES BETWEEN TERMINATIONS.
- COMPONENTS SHOWN WITH DASHED OUTLINES ARE NOT USED ON -002 VERSION.
- CONNECTION NOT USED ON -002 VERSION.

WIRE NO.	ITEM NO.	TO	FROM	NOTES
4	60	E3	XF201-2	6,8
3	59	E2	XF201-1	6,8
2	58	E4	XF101-2	6
1	57	E1	XF101-1	6

WIRE LIST

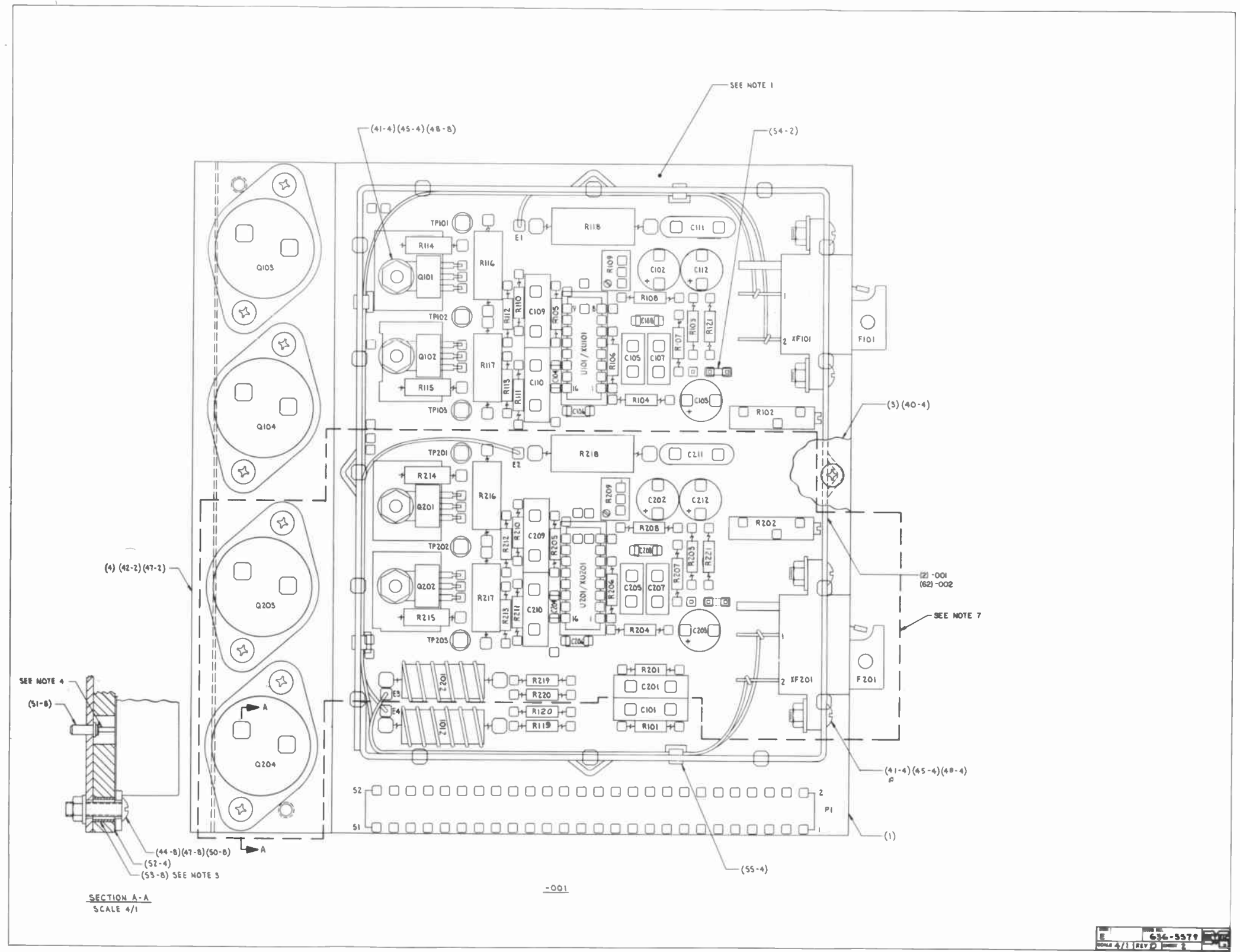
636-5579-001 = STEREO
636-5579-002 = MONO

-002 -001 REVISIONS					
HOW REV	HOW REV	LTR	DESCRIPTION	DATE	APVD
C,2AR	G,2AR	G	J-5755: 118 QTY	6-2-78	LW
D,2AR	H,2AR	H	J-59819: P/N CHG	11-20-78	LW
E,5	J,5	J	J-62204	5-31-79	MAH
F	K	K	DEL #9; ADD QTY'S TO # 79	11-7-80	CJA
		L	ITEM 24 WAS 745-0911-000	30 JAN 81	ON

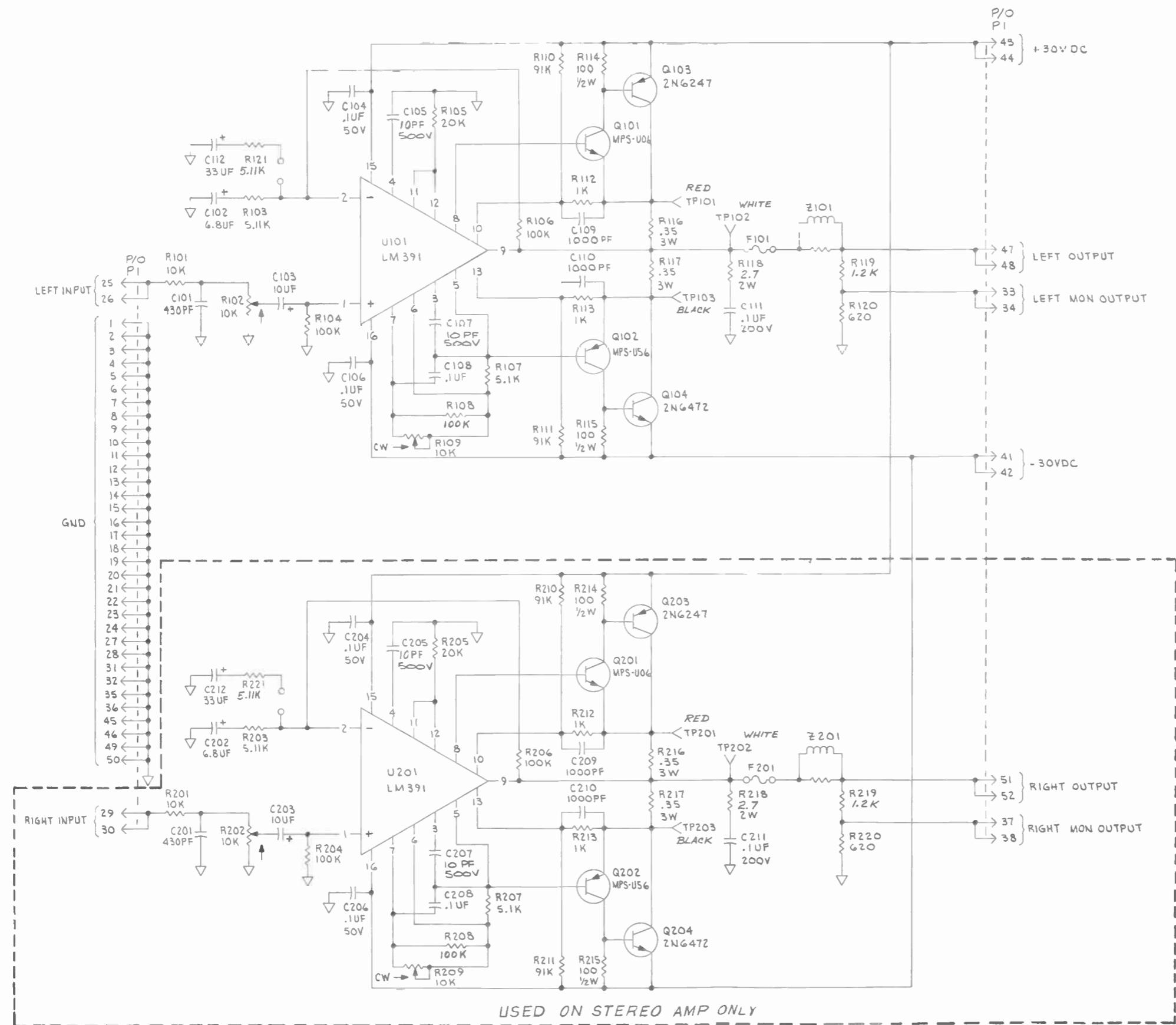
-002 -001 REVISIONS					
HOW REV	HOW REV	LTR	DESCRIPTION	DATE	APVD
	A,2AR	A	J-53994	10-26-77	CA
	B,3AR	B	J-54524	12-13-77	LC
	C,2AR	C	J-54835	1-5-78	CAH
	D,E	D	J-55070: ADD -002 VERSION	1-17-78	JCH
A,2AR	I,2AR	E	J-55959: CHG. ADD P/N	3-10-78	AB
B,2AR	E,2AR	F	J-56487: CHG P/N	4-13-78	LWH

QTY	QTY	ITEM NO.	PART OR IDENTIFYING NO.	NAME	DESCRIPTION	REV LTR	ALTN PREF	UM MN	NOTES	R/U	DESIGNATOR
1.0	62	636-5643-002		SHIELD							
1.0	2.0	61	745-3533-000	RESISTOR	2.7.1W						R118, R218
0.5	1.0	60	439-4262-000	WIRE	A20TA00X91XX						
0.5	1.0	59	439-4292-000	WIRE	A20TA00X1XXX						
0.5	1.0	58	439-4263-000	WIRE	A20TA00X92XX						
0.5	1.0	57	439-4263-000	WIRE	A20TA00X2XXX						
		▲	56								
4.0	4.0	55	435-1169-100	TYRAP							
1.0	1.0	54	367-1508-010	CLIP	COMMONING						
.15	.15	53	152-1701-000	SLEEVING		FT					3
2.0	4.0	52	352-9882-010	INSULATOR	XSTR						
4.0	8.0	51	360-2002-010	JACK	TIP						
4.0	8.0	50	313-0053-000	NUT	6-32						
		▲	49								
6.0	12.0	48	313-0051-000	NUT	4-40						
5.0	10.0	47	310-0055-000	WASHER	6						
		▲	46								
4.0	8.0	45	310-0054-000	WASHER	4						
4.0	8.0	44	343-0332-000	SCREW	6-32 x 1/2						
		▲	43								
1.0	2.0	42	343-0328-000	SCREW	6-32 x 1/4						
4.0	8.0	41	343-0287-000	SCREW	4-40 x 3/8						
4.0	4.0	40	330-3519-000	SCREW	TAPPING 4-40 x 3/8						
2.0	4.0	39	912-2753-000	CAP	10 PF 500V						C107, 207, 105, 205
1.0	2.0	38	220-0049-020	SOCKET	INT CKT, 16 PIN						XU101, XU201
1.0	2.0	37	265-1142-000	FUSEHOLDER							XF101, XF201
1.0	2.0	36	351-1291-020	INT CKT	LM391						U101, U201
1.0	2.0	35	360-0489-030	JACK	BLACK						TP103, TP203
1.0	2.0	34	360-0489-010	JACK	WHITE						TP102, TP202
1.0	2.0	33	360-0489-020	JACK	RED						TP101, TP201
1.0	1.0	32	705-0998-000	RESISTOR	1.1K, 1/8 W						R121, R221
1.0	2.0	31	745-0910-600	RESISTOR	620, 1/4 W						R120, R220
1.0	2.0	30	640-5292-001	ASSY	R/L						Z101, Z201
2.0	4.0	29	747-5126-000	RESISTOR	.35, 3W						R116, R117, R216, R217
2.0	4.0	28	745-0914-410	RESISTOR	100, 1/2 W						R114, R115, R214, R215
2.0	4.0	27	745-0910-650	RESISTOR	1K, 1/4 W						R112, R113, R212, R213
2.0	4.0	26	745-0911-130	RESISTOR	91K, 1/4 W						R110, R111, R210, R211
1.0	2.0	25	382-1405-070	RESISTOR	VAR, 10K						R109, R209
1.0	2.0	24	745-0911-140	RESISTOR	100K, 1/4 W						R108, R208
1.0	2.0	23	745-0910-820	RESISTOR	5.1K, 1/4 W						R107, R207
1.0	2.0	22	745-0910-960	RESISTOR	20K, 1/4 W						R105, R205
2.0	4.0	21	705-1092-000	RESISTOR	100K, 1/8 W						R104, R106, R204, R206
1.0	2.0	20	705-1030-000	RESISTOR	5.11K, 1/8 W						R103, R203
1.0	2.0	19	382-0012-290	RESISTOR	VAR, 10K						R102, R202
1.0	2.0	18	745-0910-890	RESISTOR	10K, 1/4 W						R101, R201
1.0	2.0	17	352-1113-010	XSTR	2N6472						Q104, Q204
1.0	2.0	16	352-1113-020	XSTR	2N6247						Q103, Q203
1.0	2.0	15	352-1114-020	XSTR	MPS-U-56						Q102, Q202
1.0	2.0	14	352-1114-010	XSTR	MPS-U-06						Q101, Q201
1.0	2.0	13	745-0910-670	RESISTOR	1.2K, 1/4 W						R119, R219
1.0	2.0	12	184-9102-440	CAPACITOR	33UF, 35V						C112, C212
1.0	2.0	11	913-3681-000	CAPACITOR	.1UF, 200V						C111, C211
2.0	1.0	10	912-3001-000	CAPACITOR	1000PF, 500V						C109, C110, C209, C210
0.0	0.0	9	D14702B	SCHEMATIC							
3.0	6.0	8	913-5019-720	CAPACITOR	.1UF, 50V						C104, C106, C108, C204, C206, C208
1.0	2.0	7	184-9102-410	CAPACITOR	10UF, 35V						C103, C203
1.0	2.0	6	184-9102-400	CAPACITOR	6.8UF, 35V						C102, C202
1.0	2.0	5	912-2971-000	CAPACITOR	430PF, 500V						C101, C201
1.0	1.0	4	636-5620-001	HEATSINK							
1.0	1.0	3	636-5636-002	COVER							
		2	636-5643-001	SHIELD							
1.0	1.0	1	636-5645-001	BOARD	STAKED						

MATERIAL	NONE	CONTRACT NO.	PREP L. EVANS 3-11-77
FINISH	NONE	CHK	Chad 043 9/27/77
UNLESS OTHERWISE SPECIFIED, DUAL DIMENSIONED DWGS ARE IN MILLIMETRES [INCHES]. SINGLE DIMENSIONED DWGS ARE IN INCHES.		APVD	
METRIC TOL ON METRIC DIM: X = ±0.5, XX = ±0.2 HOLE DIAMETERS: UNDER 6.38 Ø = +0.13 - 0.13 6.38 TO 12.7 Ø = +0.15 - 0.13 OVER 12.7 Ø = +0.20 - 0.13 ANGLES: ±1.0° ECCENTRICITY BETWEEN DIAMETERS ON AN AXIS NOT TO EXCEED 0.25 Ø		US CUSTOMARY [] TOL ON [] DIM: XX = ±0.02, XXX = ±0.08 HOLE DIAMETERS: UNDER .251 Ø = +0.05 - .005 .251 TO .500 Ø = +0.06 - .005 OVER .500 Ø = +0.08 - .005 ANGLES: ±1.0° ECCENTRICITY BETWEEN DIAMETERS ON AN AXIS NOT TO EXCEED .010 Ø	
PART SHALL COMPLY TO 580-5400-001 — THIRD ANGLE PROJECTION		CONTINENTAL ELECTRONICS MFG. CO. DALLAS, TEXAS BOARD ASSEMBLY OUTPUT AMP SIZE CODE IDENT DWG NO. E 52151 636-5579 SCALE 4/1 SHEET 1 OF 2	



REVISIONS			
LTR	DESCRIPTION	DATE	APVD
A	R108 & R208 WERE 5K, NOW 100K	30 JUN 81	ONEY



Continental Electronics
MFG. CO. DALLAS, TEXAS

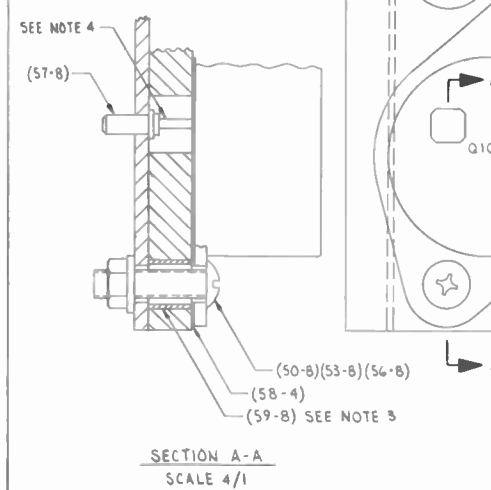
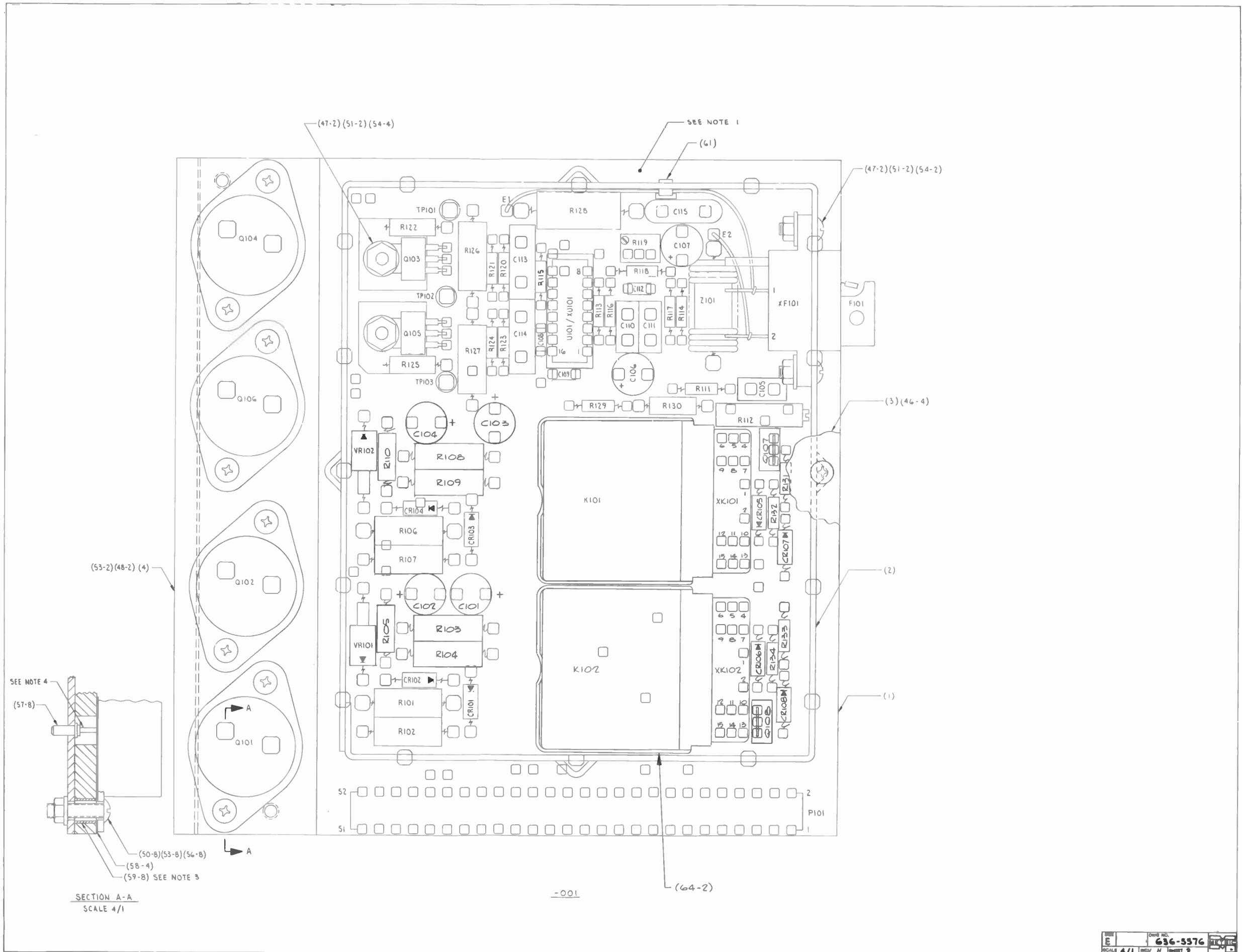
**SCHEMATIC,
OUTPUT AMP BOARD ASSY**

SIZE	CODE IDENT NO	147028
52151		
SHEET	OF	1

A2A9A6
A2A9A6

Cue Amplifier Board 636-5576
Cue Amplifier Board Schematic D147027

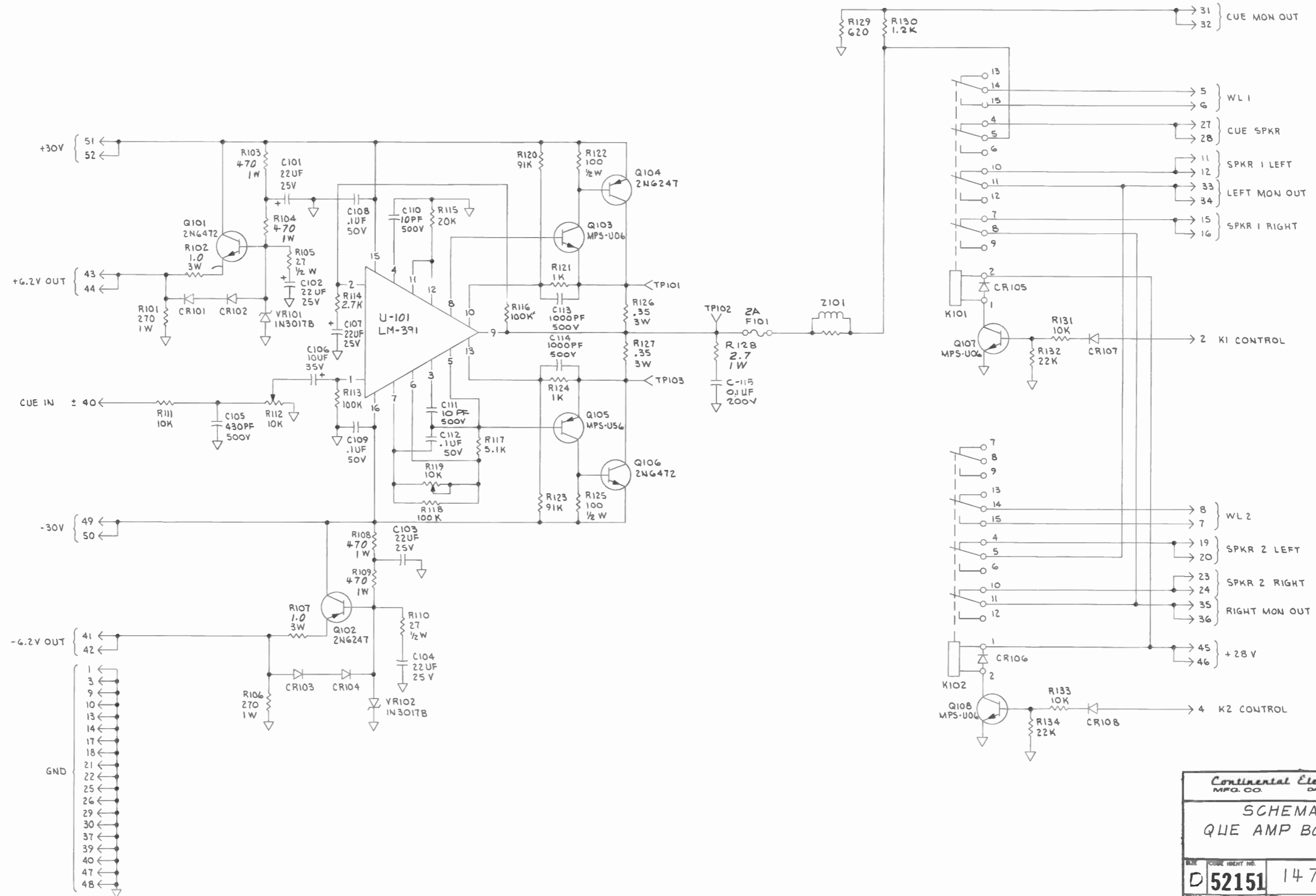




NOTES:

1. CR101 THRU CR108 ARE IN4003.
2. UNLESS NOTED ALL RESISTORS ARE 1/4 W.

REVISIONS		
LTR	DESCRIPTION	DATE APD
A	R118 WAS 56 K, NOW 100 K	30 JAN 81 DNEY



Continental Electronics
MFG. CO. DALLAS TEXAS

**SCHEMATIC,
QUE AMP BOARD ASSY**

Q 52151 147027

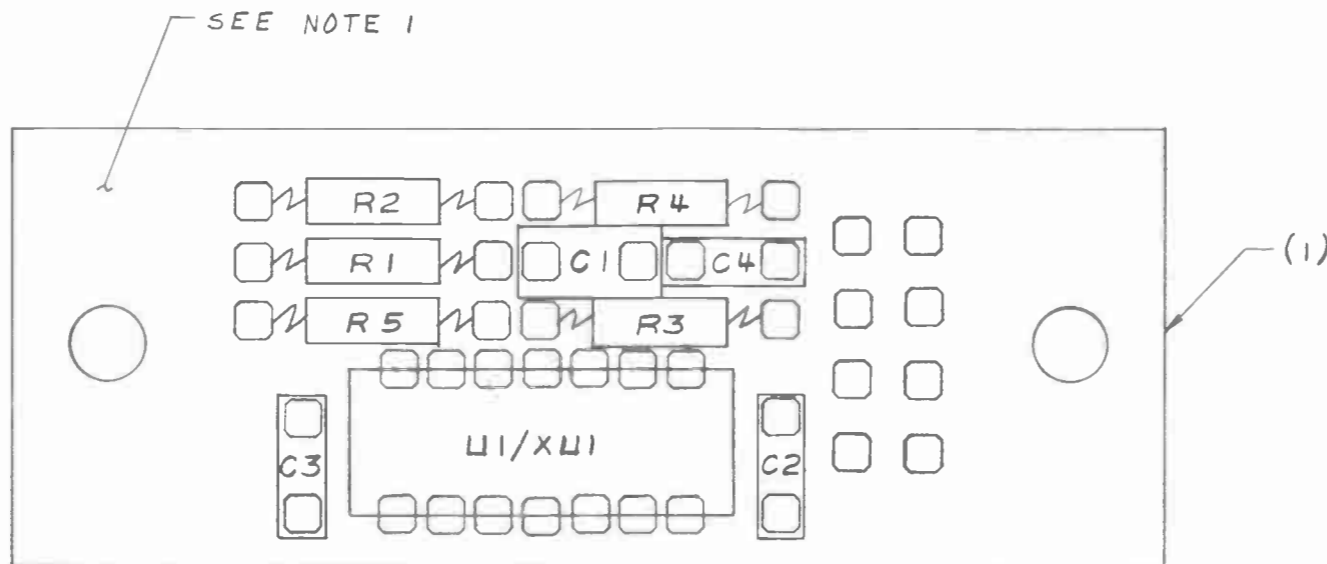
SCALE: _____ BY: _____ SHEET 1 OF _____

A2A10 Cue Pre-Amplifier Board 636-5668
A2A10 Cue Pre-Amplifier Board Schematic B147029



NOTES:
 1. MARK 636-5668-001, REV, AND REV LTR LOCATED APPROX AS SHOWN ON OPP SIDE PER 580-0497-000.
 2. PARENTHETICAL ITEM IDENTIFICATION DENOTES (ITEM NO. - QTY).

REVISIONS				
DWG REV	LTR	DESCRIPTION	DATE	APPROVED
A, 2AR	A	J-61090: CHG P/N OF ITEM 10	3-5-79	LW <i>[Signature]</i>



-001

QTY	ITEM NO.	PART OR IDENTIFYING NO.	NAME	DESCRIPTION	UM	MN	ALTN PREF
1.0	11	220-0049-010	SOCKET	XU1			
1.0	10	351-1088-030	XSTR	U1			
1.0	9	913-5019-660	CAP.	C4 .01UF			
2.0	8	913-5019-720	CAP.	C2, C3 0.1UF			
1.0	7	913-3279-590	CAP.	C1 1UF			
1.0	6	745-0910-820	RES.	R5 5.1K, 1/4 W			
1.0	5	745-0910-410	RES.	R4 100, 1/4 W			
1.0	4	745-0910-290	RES.	R3 33, 1/4 W			
1.0	3	745-0911-260	RES.	R2 330K, 1/4 W			
1.0	2	745-0910-890	RES.	R1 10K, 1/4 W			
1.0	1	636-5669-001	BOARD	STAKED			

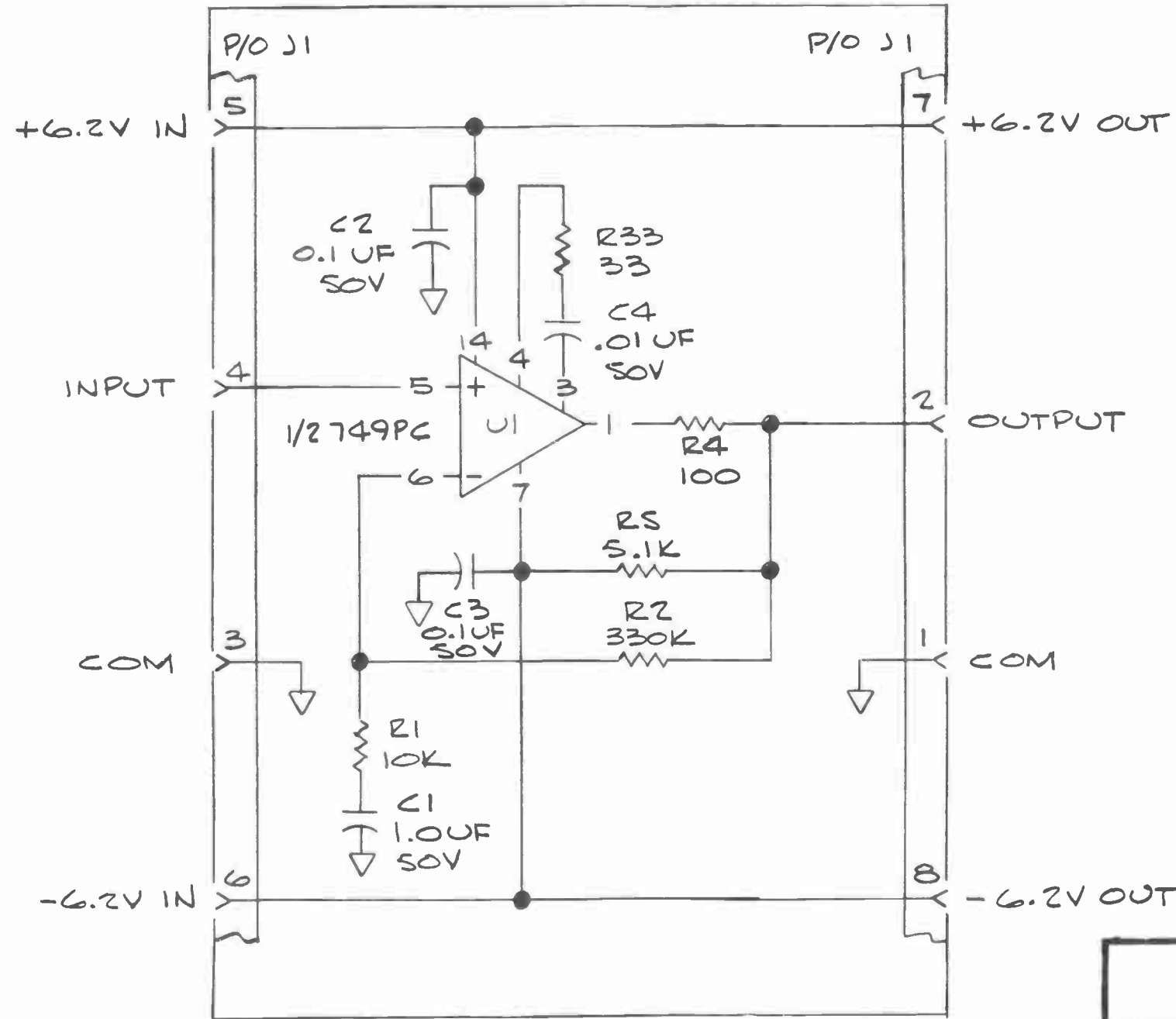
PARTS LIST

MATERIAL	N/A	UNLESS OTHERWISE SPECIFIED	CONTRACT NO.	COLLINS RADIO COMPANY		
FINISH	N/A	DIMENSIONS ARE IN INCHES; TOL ON DEC DIM.: .XX = ±.02, .XXX = ±.008	PREP <i>Charles Abbey 9/9/77</i>	DALLAS, TEX NEWPORT BEACH, CALIF CEDAR RAPIDS, IA		
		HOLE DIAMETERS: UNDER .251 DIA = +.005-.005 .251 TO .500 DIA = +.006-.005 OVER .500 DIA = +.008-.005	CHK <i>Charles Abbey 9/12/77</i>	MARK B CUE PRE-AMPL BOARD ASSY		
		ANGLES: ±1.0°	APVD <i>[Signature]</i>	SIZE	CODE IDENT	DWG NO.
		ECCENTRICITY BETWEEN DIA ON AN AXIS NOT TO EXCEED .010 DIA		C	13499	636-5668
		PART SHALL COMPLY TO 580-5400-001		SCALE	4/1	SHEET

074-3227-004
NEXT ASSY :

TYPE NO :

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

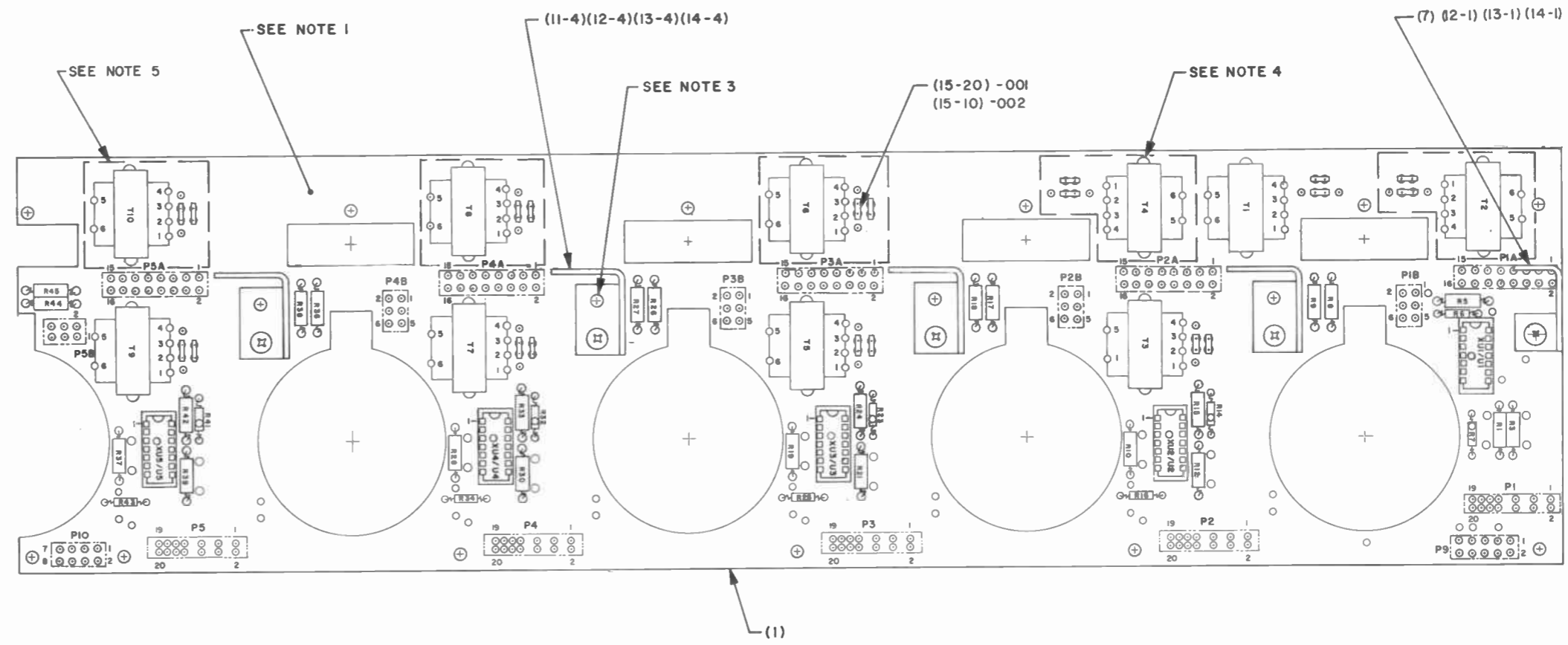


Continental Electronics
 MFG. CO. DALLAS, TEXAS

**SCHEMATIC,
 CUE PREAMPLIFIER**

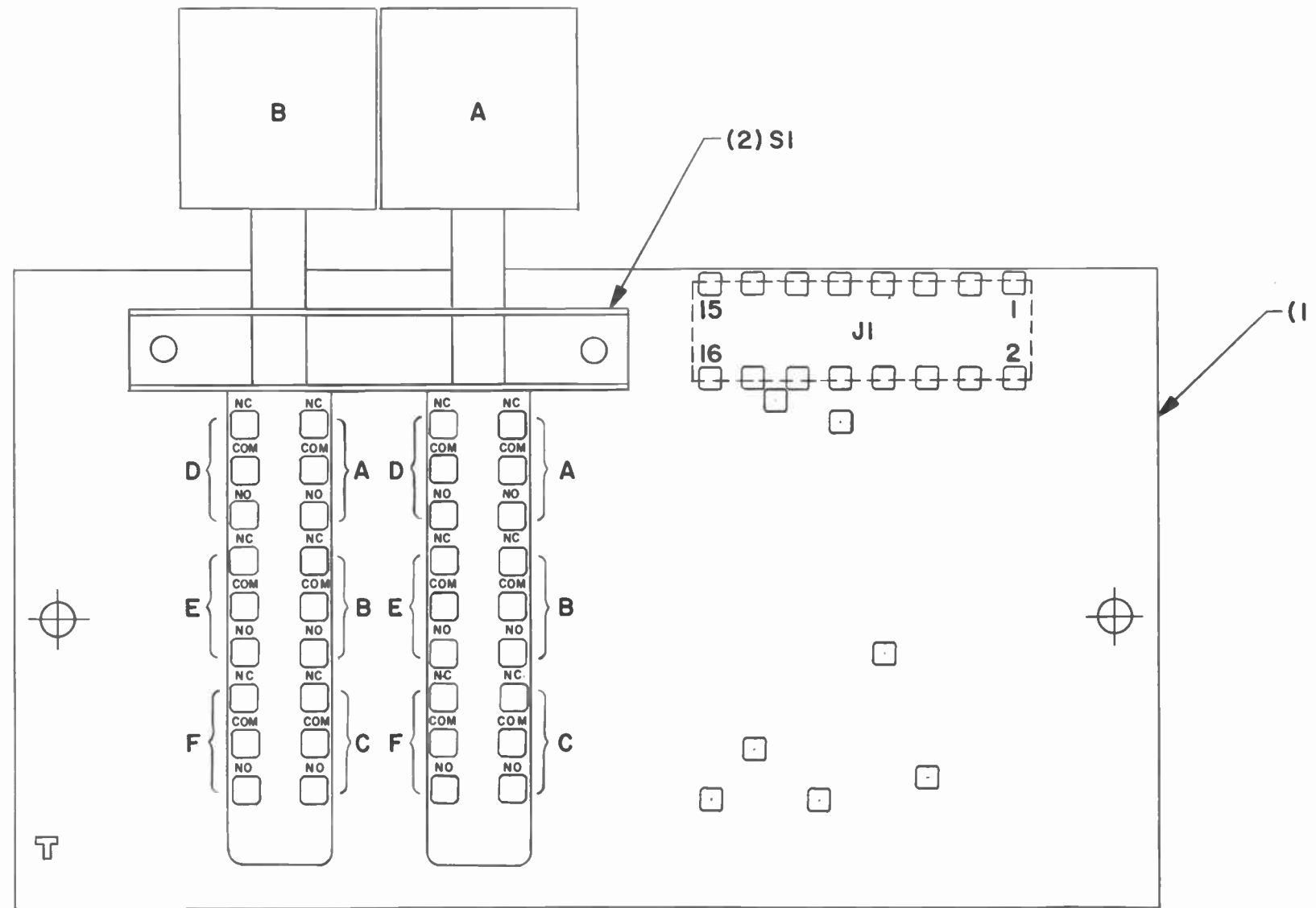
SIZE	CODE IDENT NO.	
B	52151	147029
SCALE:	WT	SHEET OF

		<u>Assembly</u>	<u>Schematic</u>
A3	Control Panel Assembly (Front)	636-5594	D147039
A3A1	Mixer Board Channels 1-5	636-5582	D147039
A3A1A2-A5	Input Select Board Assembly	636-5585	D147039
-	Attenuator Assembly	636-5632	D147039
A3A2	Headphone/Monitor Board	636-5588	C147032
A3A3	Channels 6-8 Mixer Board	636-5602	D147039
A3A3A1-A3	Input Select Board Assembly	636-5585	D147039
A3A3A6-A8	Input Select Board Assembly	636-5585	D147039
A3A4	Channel 7B	636-5591	C147033
A3A5	Channel 8B	636-5591	C147034



NOTES:
 1. PARENTHETICAL ITEM IDENTIFICATION DENOTES (ITEM FIND NO. - QTY)
 2. MARK ASSY 636-5586-001, REV, AND REV LTR WHERE SPACE PERMITS PER 580-0497-000.

-001		REVISIONS		
HOW REV	LTR	DESCRIPTION	DATE	APVD
A	2AR	A-54835	1-5-78	CA



QTY	ITEM NO.	PART OR IDENTIFYING NO.	NAME	DESCRIPTION	UM	MIN	ALTN PREF	R,U	REF DESIGNATOR
▲	3								
1.0	2	266-7507-050	SWITCH	2 STN 6PDT/STN					R SI
1.0	1	640-5291-001	BOARD	STAKED					

PARTS LIST

CONTRACT NO.		ROCKWELL INTERNATIONAL CORPORATION COLLINS RADIO GROUP	
DALLAS, TEX 75207		NEWPORT BEACH, CALIF 92663 CEDAR RAPIDS, IA 52408	
PREP	A. Bowman	6 FEB 1976	
CHK	A. Bowman	6 FEB 1976	
APVD	A. Bowman	2/2/76	
SIZE	CODE IDENT	DWG NO.	
D	13499	636-5585	
SCALE	4/1	SHEET	

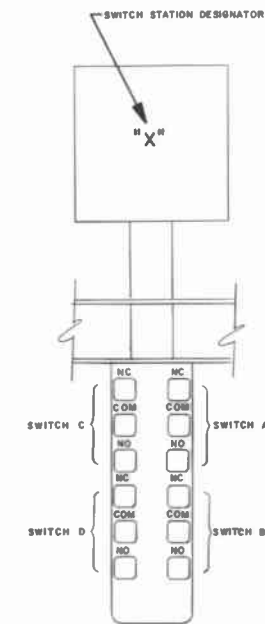
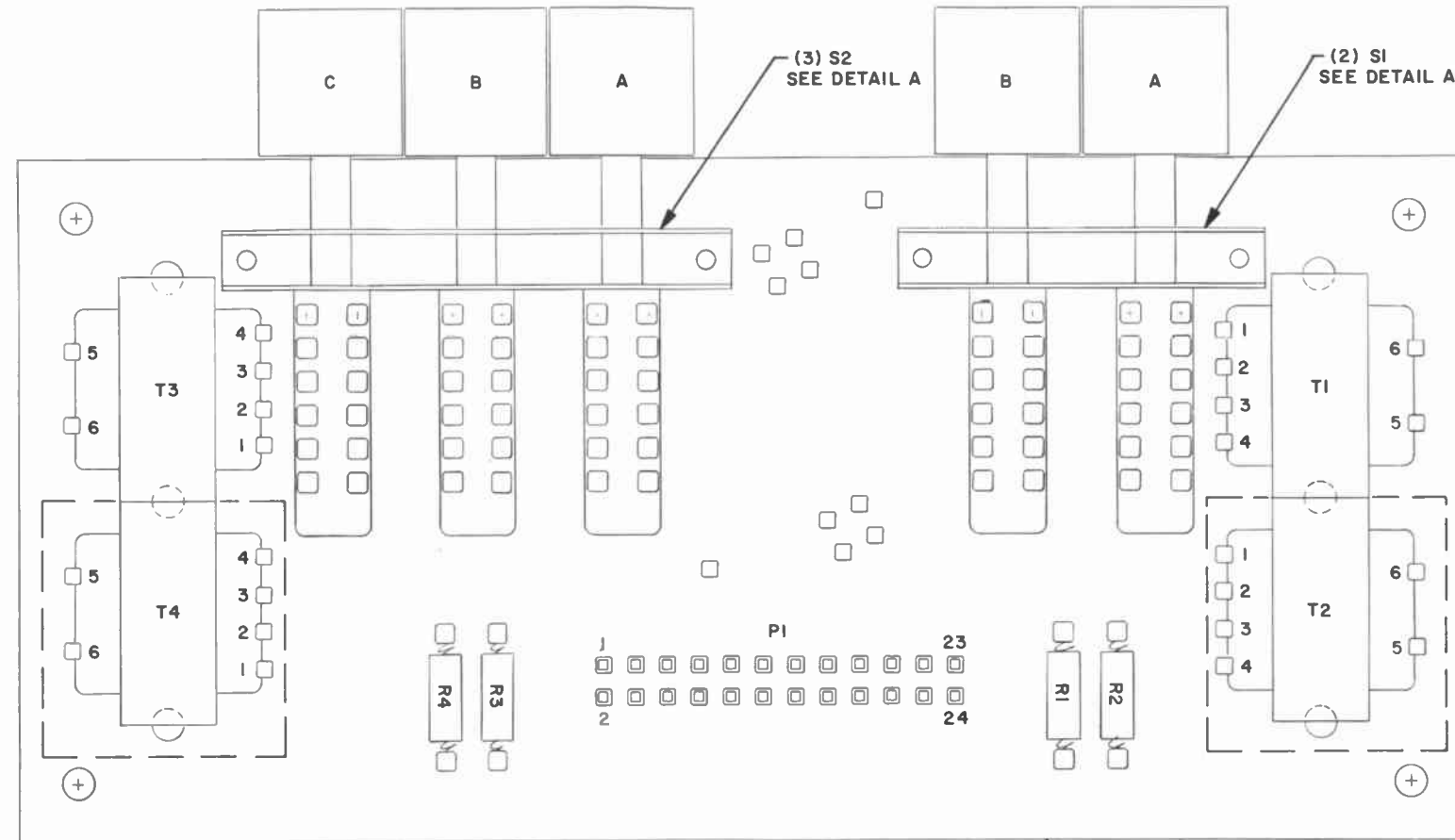
-001

NEXT ASSY:

REV. A TC. A CRONB 02 TO 0

NOTES:
 1. PARENTHETICAL ITEM IDENTIFICATION DENOTES (ITEM FIND NO.-QTY)
 2. MARK ASSY 636-5588-001, REV, AND REV LTR WHERE SPACE PERMITS PER 580-0497-000.
 3. COMPONENTS SHOWN WITH DASHED OUTLINES ARE NOT USED ON -002 VERSION.

REV	DATE	DESCRIPTION	BY	CHKD
0	1-17-78	636-5588-001		



DETAIL A
 SWITCH FUNCTION,
 REF. DESIGNATION ASSIGNMENTS

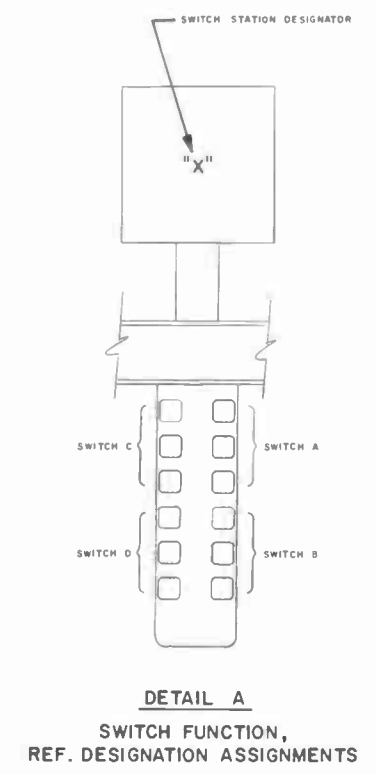
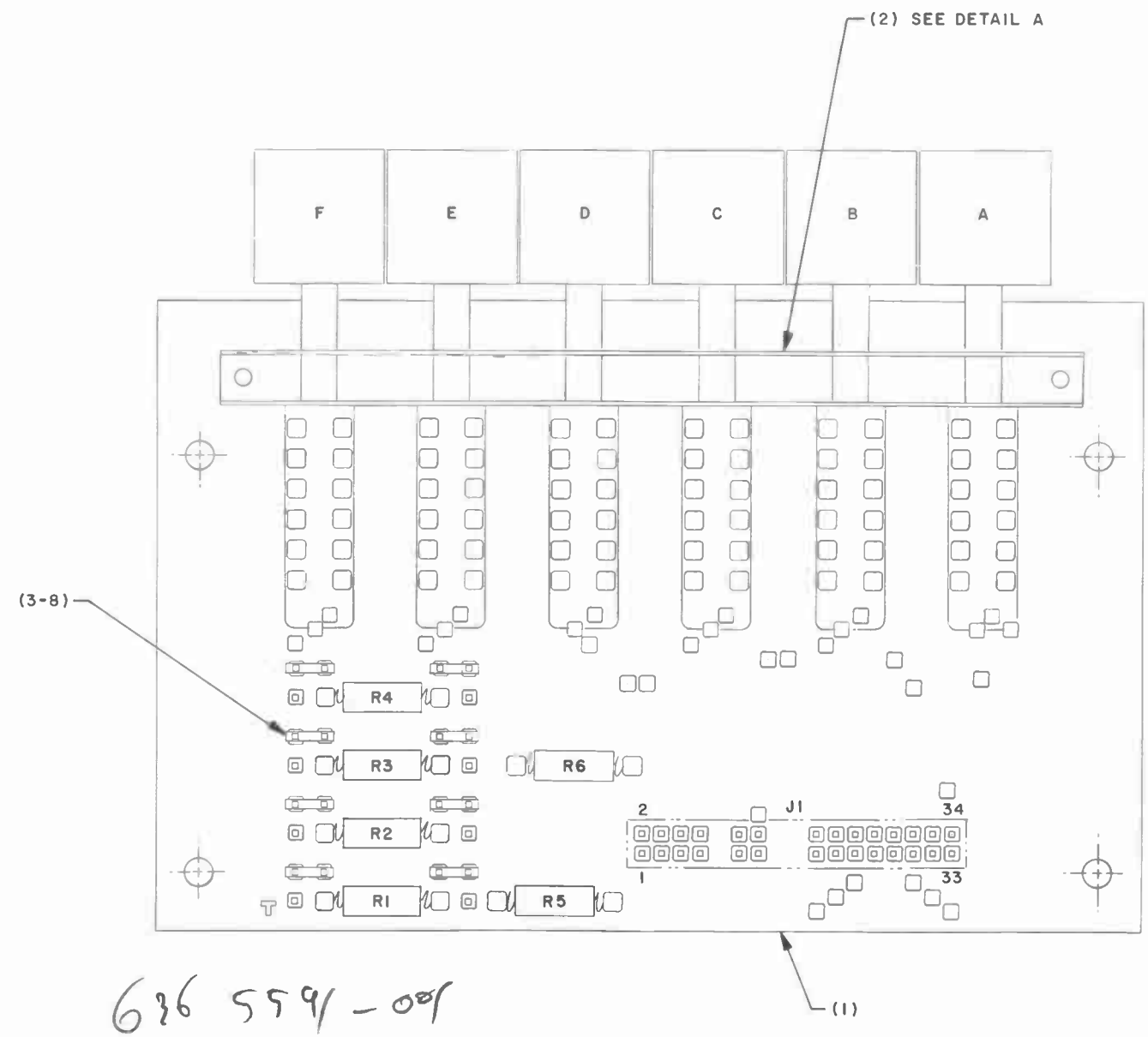
-001
 OR
 -002

QTY	ITEM NO.	PART OR IDENTIFYING NO.	NAME	DESCRIPTION	UNIT	REF DESIGNATOR
2.0	4	667-0284-00	XFMR	SK-4711-2		R T1, 3
4.0	4.0	5 745-1436-000	RES	100K, 1/2W		R R1-R4
4.0	4	667-0284-010	XFMR	SK-4711-2		R T1-T4
1.0	1.0	3 266-7507-060	SWITCH	5 STN 4 PDT/STN		R S2
1.0	1.0	2 266-7507-070	SWITCH	2 STN 4 PDT/STN		R S1
1.0	1.0	1 636-5628-001	BOARD	STAKED		

CONTRACT NO.		PARTS LIST	
PREP	A	DATE	1-17-78
CHK	R	BY	
APVD	A	DATE	1-17-78
SCALE 4/1		SHEET 1 OF 1	

NOTES:
 1. PARENTHETICAL ITEM IDENTIFICATION DENOTES (ITEM FIND NO. - QTY)
 2. MARK ASSY 636-5591-001, REV, AND REV LTR WHERE SPACE PERMITS ON SIDE SHOWN PER 580-0497-000.

REV		REVISIONS		
NO.	DATE	DESCRIPTION	DATE	APVD
A	10-26-77	J-53994		
B	4-2-79	J-61475: UPDATE OF DWGS TO ACTUAL CONFIGURATION OF BOARD		



QTY	ITEM NO.	PART OR IDENTIFYING NO.	NAME	DESCRIPTION	UNITS	ALTS	R/J	REF DESIGNATOR
2.0	5	745-0914-670	RES	1.2K 1/2W				R R5,6
4.0	4	745-0914-770	RES	3.3K 1/2W				R R1-R4
8.0	3	367-1508-010	CLIP	COMMONING				
1.0	2	266-7507-040	SWITCH	6 STN 4PDT/STN				R S1
1.0	1	636-5629-001	BOARD	STAKED				

PARTS LIST

CONTRACT NO.	
PREP. BY	REV. BY
CHK. BY	DATE
APVD	
SEE CODE IDENT DWG NO.	636-5591
SHEET	1
REV. B	TC A

NEXT ASSY: 636-5594-001 EQUIP TYPE

NOTES:

1. PARENTHETICAL ITEM IDENTIFICATION DENOTES (ITEM FIND NO. - QTY)
2. REMOVE EXISTING BRKT MTG HARDWARE, REPLACE AND INSTALL BRKT WITH HARDWARE SHOWN
3. NOT APPLICABLE ON -002 VERSION.
4. SECURE ITEM 56 TO ITEM 1 OR ITEM 36 USING ADHESIVE
5. USE TUBING (ITEM 35) TO INSULATE LEADS OF RESISTORS R3 THRU R12 (ITEMS 18 AND 42.)
6. SECURE HARDWARE USING GLYP, 11 PLACES.
7. INSTALL GROMMET (ITEM 61) ON EDGES OF BRKTS (ITEMS 5 AND 6) TO PREVENT CHAFING OR CUTTING OF CABLE (ITEM 54). GROMMET TO BE SECURED USING ADHESIVE.
8. DENOTES (WIRE NO., COLOR), FOR REF ONLY.
9. UNUSED WIRES ON -002 VERSION TO BE TIED BACK AND SECURED USING CABLE TIES (ITEM 62.)
10. LED HOUSING (ITEM 39) TO BE SECURED TO FRONT PANEL (ITEM 1) USING ADHESIVE.
11. WHERE CABLE (ITEM 54) IS ROUTED UNDER MIXER BOARD (ITEM 27 OR 57) INSTALL TAPE (ITEM 65) BETWEEN CABLE AND BOARD TO PRECLUDE LEADS OF BOARD CUTTING INTO CABLE.
12. BROWN WIRE ON ATTENUATOR ASSY PLUG DENOTES PIN 1.

-002						-001						REVISIONS					
HOW REV	HOW REV	LTR	DESCRIPTION	DATE	APVD	HOW REV	HOW REV	LTR	DESCRIPTION	DATE	APVD	HOW REV	HOW REV	LTR	DESCRIPTION	DATE	APVD
E, 5		F	J-62443: DEL ITEM 55 FROM -002, ADD ITEM 66 TO -002	6-19-79	LW				J-55070: ADD -002 VERSION, CHG PL	1-17-78	JCH				J-55959: L/M CHGS AND I/WG CHGS	3-10-78	AB
F, 2AR	D, 2AR	G	J-64152: ADD ITEM 67, CHG MTG HDW STACK ON ITEMS 28, 29, 57, 59, CHG QTY ITEM 20, REV SHEET 3 AND 4	10-31-79	AB				J-57732: DEL ITEMS 2, 28, 29 FROM -002, ADD ITEMS 57-59 TO -002	6-30-78	LW				J-58950: CHG PN OF ITEM 41	9-19-78	LW
									J-59462:	10-25-78	LW						

QTY	QTY	ITEM NO	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	REV LTR	ALTN PREF	UM	MN	NOTES	R	REF DESIGNATOR
4.0	4.0	48	428-4824-000	WIRE Z22TMOOXXXX (FT)							
▲	0.5	47	439-7067-000	WIRE A22PB00XXXX (FT)							
▲		46									
1.0	2.0	45	150-0708-030	CABLE CLAMP							
▲	▲	44									
2.0	4.0	43	304-0482-000	LUG, SOLDER							
8.0	8.0	42	745-0914-670	RES 1.2K 1/2W							R5-R12
2.0		41	376-0272-020	VAR RESISTOR							R1, R2
8.0	8.0	40	353-3725-010	LED							CR1-8
8.0	8.0	39	353-0316-010	LED HOUSING							XCR1-8
1.0		38	640-5298-001	METER BRACKET							
8.0		37	636-5632-002	ATTN ASSY-MONO							AT1-AT8
1.0		36	640-5296-001	PANEL, CONTROL-MONO							A3
▲	.4	35	152-1603-000	INSUL TUBING							
8.0	8.0	34	281-0628-050	KNØB							
7.0	7.0	33	636-5585-001	CHAN 2-B INPUT SLCT BD							A3A1A2-A5, A3A3A1-A3
18.0	18.0	32	310-0779-030	WASHER, NØ. 4 FLAT							
16.0	16.0	31	343-0133-000	SCREW, 4-40 X 1/4							
1.0	1.0	30	636-5625-001	CHAN 1 INPUT SLCT BD							A3A1A1
▲	1.0	29	636-5582-001	CHAN 1-5 MXR BD							A3A1
▲	1.0	28	636-5602-001	CHAN 6-8 MXR BD							A3A3
33.0	33.0	27	540-9205-003	HEX PØST							
1.0	2.0	26	262-1863-000	LAMP							DS1, DS2
1.0	2.0	25	262-0913-000	LIGHTHØLDER							XDS1, XDS2
20.0	20.0	24	310-0279-000	WASHER, NØ. 4 LØCK							
14.0	14.0	23	343-0167-000	SCREW, PFH 6-32 X 1/4							
53.0	53.0	22	310-0046-000	WASHER, FLAT NØ. 6							
48.0	48.0	21	310-0282-000	WASHER, LØCK NØ. 6							
30.0	30.0	20	313-0002-000	NUT, HEX 6-32							
1.0	2.0	19	540-9219-003	PØST, HEX							
1.0	2.0	18	745-0914-410	RES, 100, 1/2 W							R3, R4
1.0	2.0	17	455-0009-010	METER, VU							RM1, M2
1.0	2.0	16	912-2816-000	CAP							RC1, C2
▲	1.0	15	343-0132-000	SCREW, 4-40 X 3/16 PPH							
	2.0	14	376-0272-010	RES, VAR - 10K							R R1, R2
	8.0	13	636-5632-001	ATTENUATOR ASSY							R AT1-AT8
▲	1.0	12	306-0234-000	INSUL TERM.							E1
2.0	2.0	11	281-0628-020	KNØB							
8.0	8.0	10	266-6968-030	SWITCH, PUSHBUTTON							R S1-S8
1.0	1.0	9	636-5618-001	BRKT, MTG - A3A4, A3A5							
1.0	1.0	8	636-5617-002	BRKT, MTG - A3A5							
1.0	1.0	7	636-5617-001	BRKT, MTG - A3A4							
1.0	1.0	6	636-5593-001	BRKT, MTG L.H. - A3A2							
1.0	1.0	5	636-5616-001	BRKT, MTG R.H. - A3A2							
	1.0	4	636-5599-001	BRKT, MTR SUPPORT							
2.0	2.0	3	636-5591-001	INPUT SELECT BD							R A3A4, A3A5
▲	1.0	2	636-5588-001	HEADPHN/MON BD							R A3A2
	1.0	1	636-5595-001	PANEL, CONTROL							

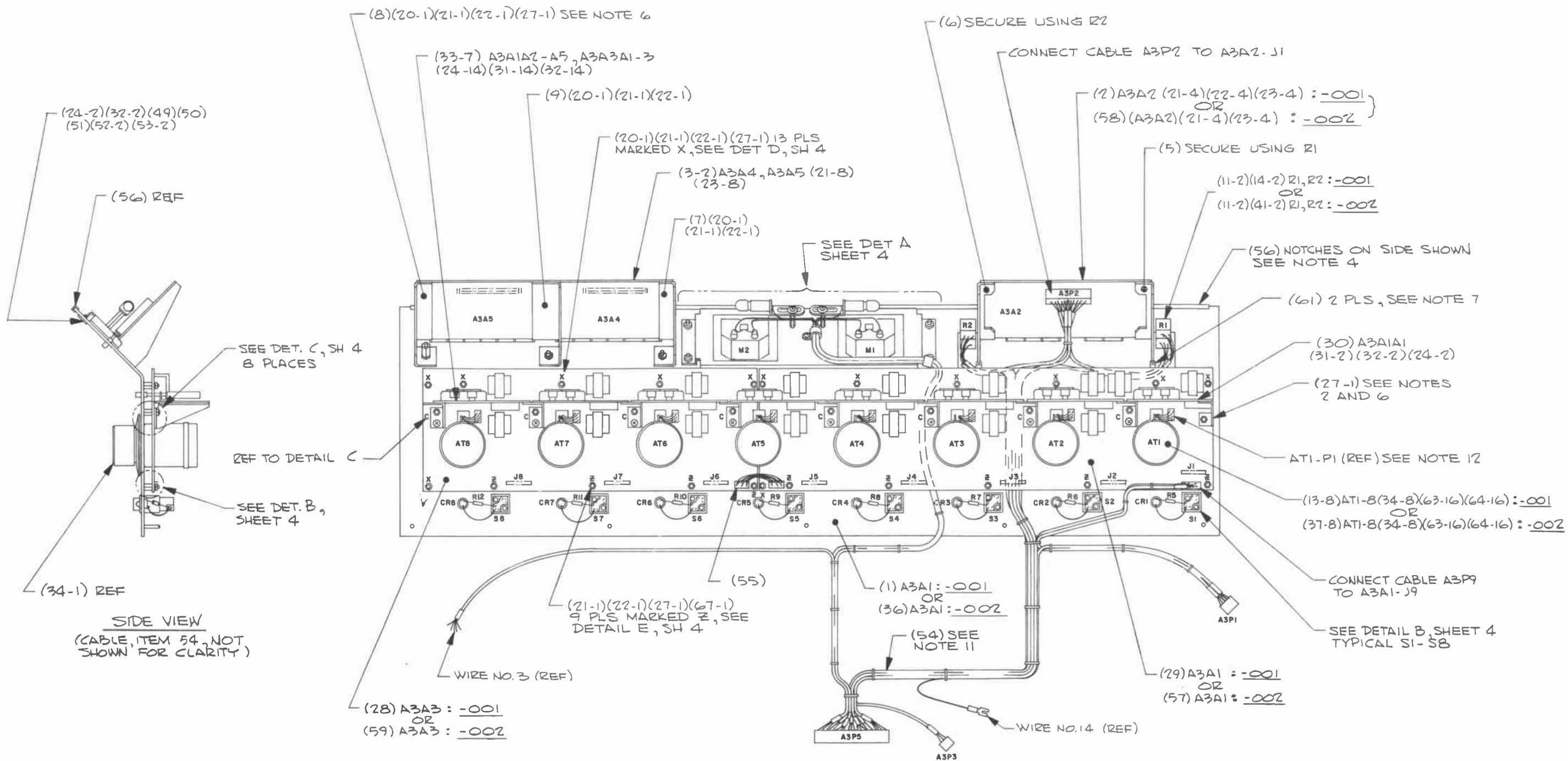
QTY	QTY	ITEM NO	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	REV LTR	ALTN PREF	UM	MN	NOTES	R	REF DESIGNATOR
9.0	9.0	67	540-9209-003	6-32 X 1/2 LG HEX POST							
1.0		66	640-5313-002	MONO MXR BD INTRCNCT							
1.5	1.5	65	014-1401-070	FOAM TAPE (FT)							
16.0	16.0	64	310-0048-000	NO. 8 FLAT WASHER							
16.0	16.0	63	343-0185-000	8-32 X 1/4 LG PPH SCREW							
10.0	10.0	62	435-1169-110	CABLE TIE							
0.4	0.4	61	200-1128-020	EXTRUDED GROMMET (FT)							
1.0		60	306-2519-030	INSULATED TERMINAL							E1
1.0		59	636-5602-002	CHAN 6-8 MXR BD							A3A3
1.0		58	636-5588-002	HDPHN/MON BD							A3A2
1.0		57	636-5582-002	CHAN 1-5 MXR BD							A3A1
1.0	1.0	56	640-5315-001	TRIM STRIP					4		
▲	1.0	55	640-5313-001	MXR BD INTERCONNECT							
1.0	1.0	54	636-5656-001	INTERCONNECT CABLE							
2.0	2.0	53	313-0043-000	HEX NUT 4-40							
2.0	2.0	52	342-0046-000	PFH SCREW 4-40 X 3/8							
1.0	1.0	51	636-5660-001	INSERT							
1.0	1.0	50	632-5201-001	IDENT. HOLDER							
1.0	1.0	49	623-9008-001	ROCKWELL INSERT							

-001 AND -002

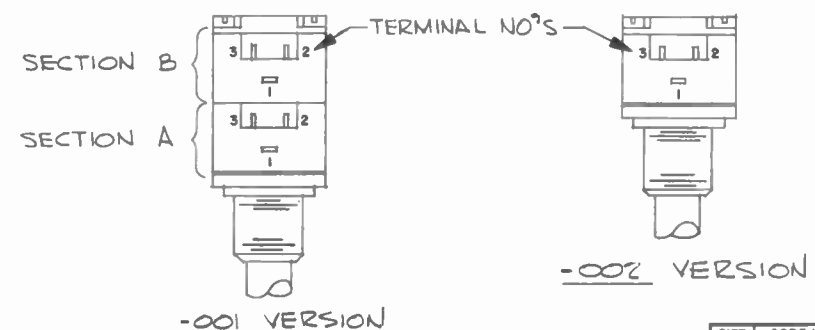
UNLESS OTHERWISE SPECIFIED, DUAL DIMENSIONED DWGS ARE IN MILLIMETRES (INCHES) SINGLE DIMENSIONED DWGS ARE IN INCHES.

REV STATUS OF SHEETS	REV SHEET	1	2	3	4
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MATERIAL	SEE P/L	CONTRACT NO.	ROCKWELL INTERNATIONAL CORPORATION COLLINS RADIO GROUP
FINISH	NONE	PREP	A. Rowman 25 FEB 1976
		CHK	Chick's 18 OCT 1977
		APVD	
		SIZE	CODE IDENT DWG NO. D 13499 636-5594
		SCALE	1/2 SHEET 1 OF 4



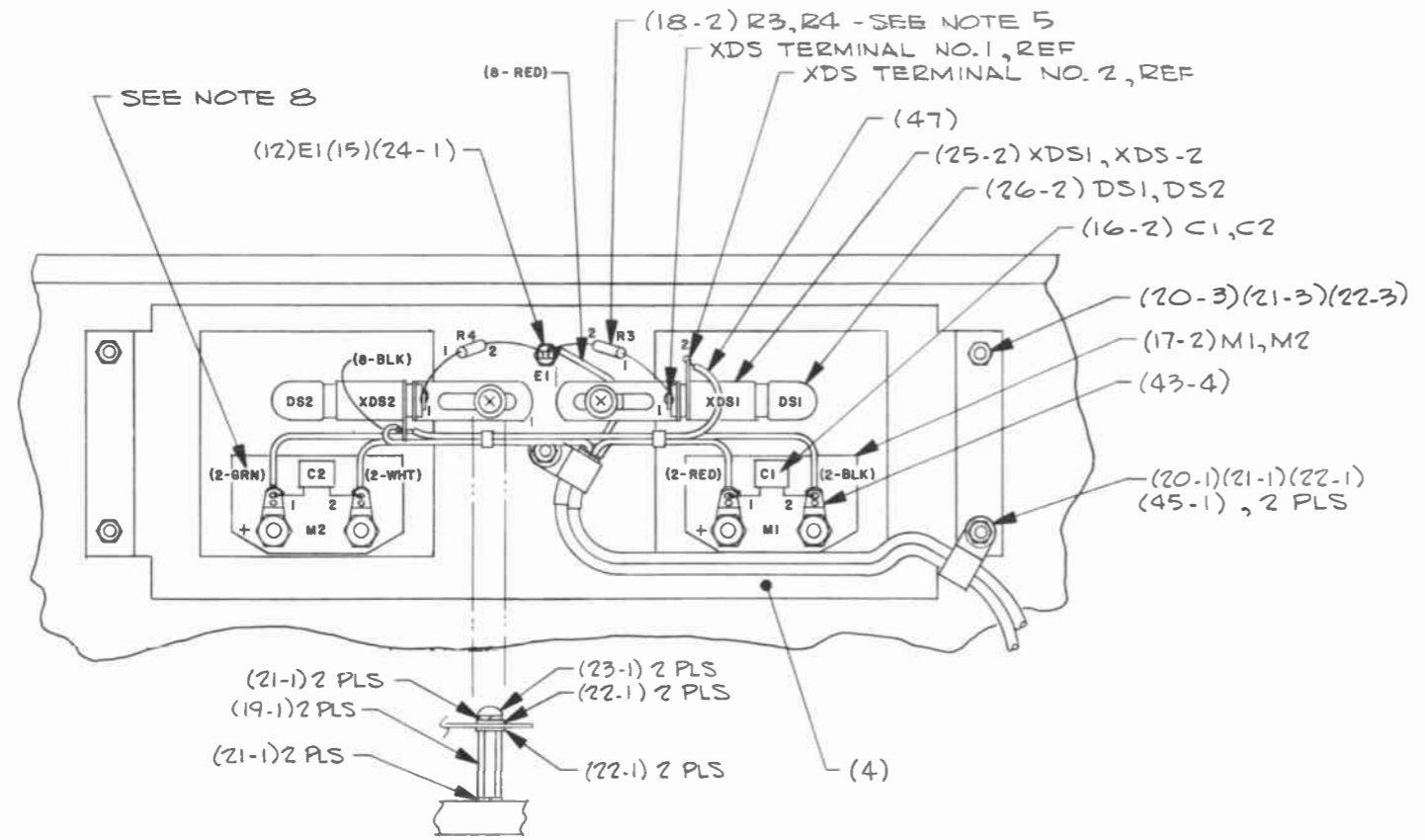
A3 CONTROL PANEL
-001 (STEREO) VERSION SHOWN
AS VIEWED FROM REAR



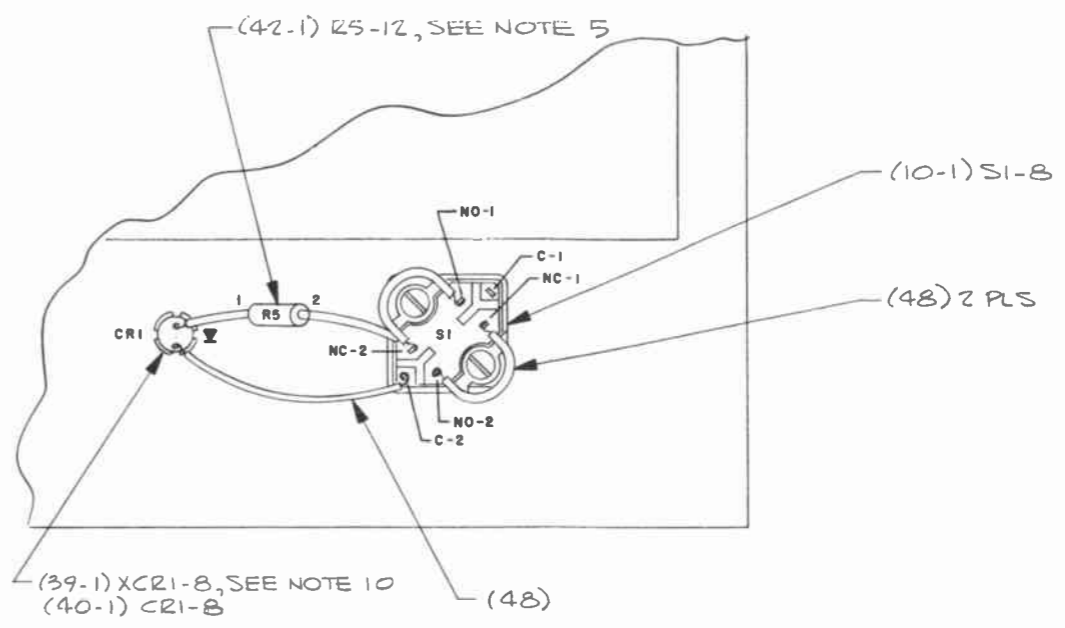
DETAIL E
SCALE: 2/1

REDRAWN BY: A. Bowman 10-30-79
CHECKED BY: A. Bowman 10-30-79
APPROVED BY: A. Bowman 10-30-79

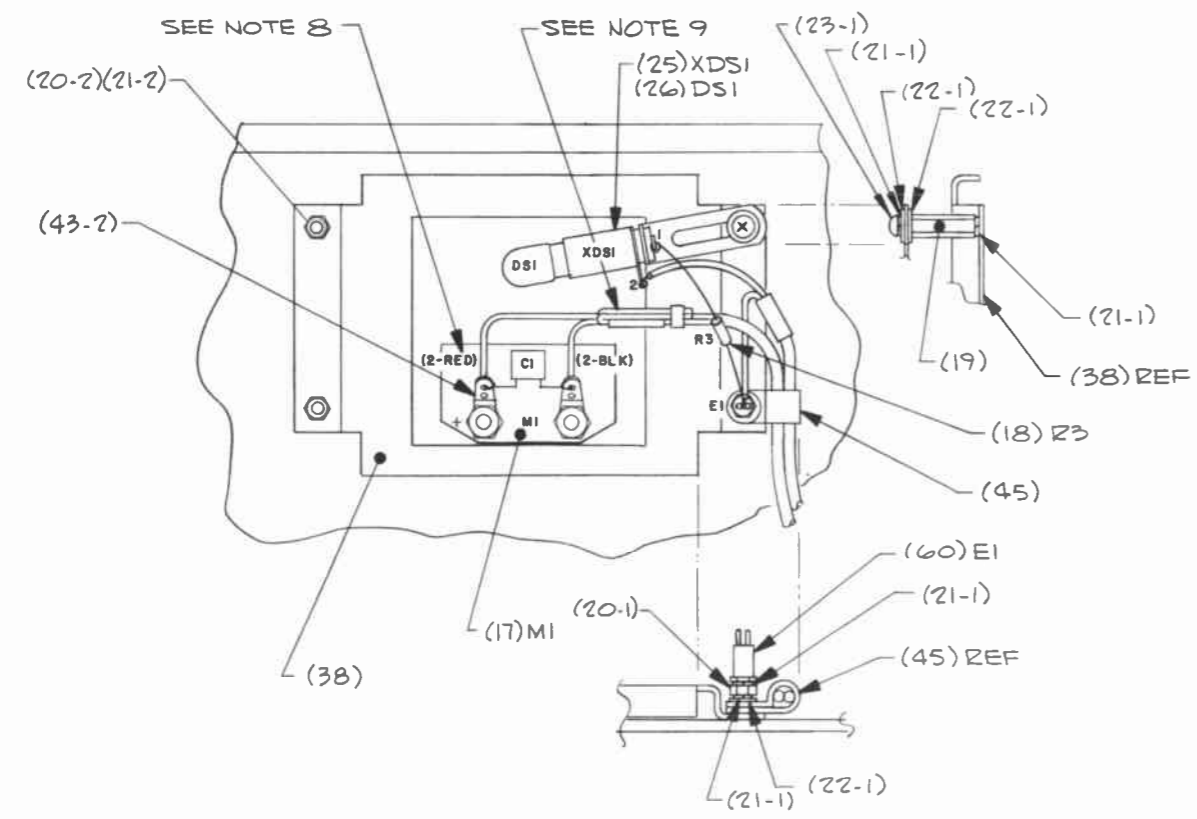
SIZE	CODE IDENT	DWG NO.
D	13499	636-5594
SCALE 1/2	REV 6	SHEET 3



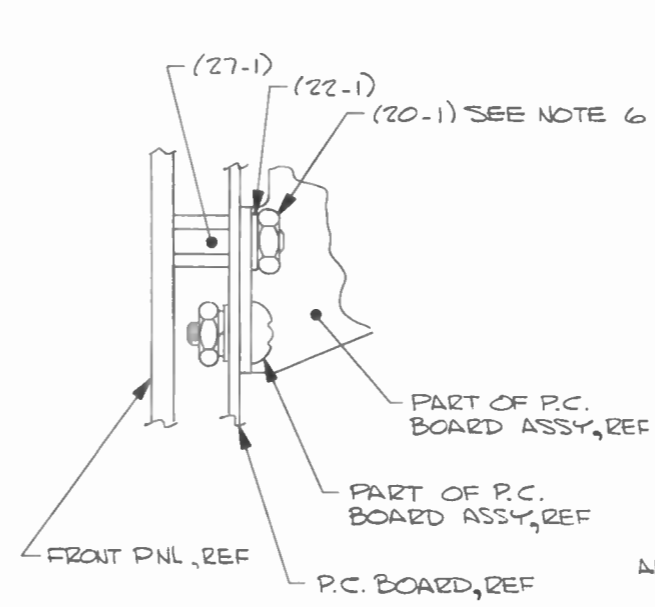
DETAIL A FOR -001 VERSION
SCALE: 1/1



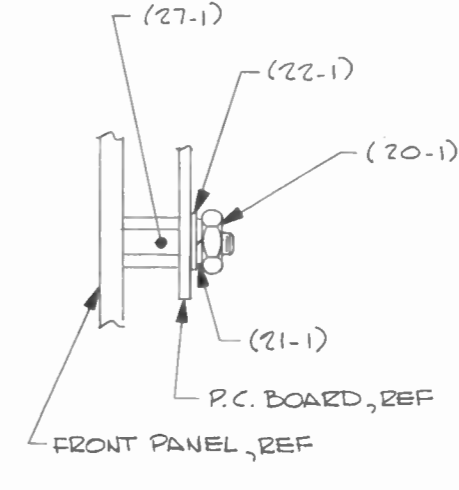
DETAIL B
SCALE: 2/1, 8 PLS
TYPICAL SI THROUGH S8
(SI SHOWN)



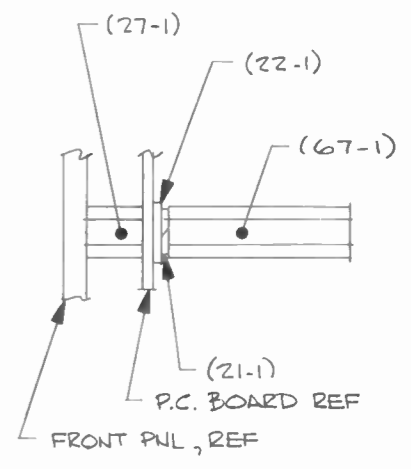
DETAIL A FOR -002 VERSION
SCALE: 1/1



DETAIL C
SCALE: 2/1, 8 PLS



DETAIL D
SCALE: 2/1, 22 PLS
ALL POSITIONS MARKED 'X'



DETAIL E
SCALE: 2/1, 9 PLS
ALL POSITIONS MARKED 'Z'

ROCKWELL INTERNATIONAL CORPORATION
COLLINS DIVISIONS
DALLAS, TEX 75207 NEWPORT BEACH, CALIF 92663 CEDAR RAPIDS, IA 52405

PREP A. Rowan	SIZE D	FSCM 13499	DWG NO. 636-5594	REV LTR 6
CHR A. Rowan	SCALE NOTED			SHEET 4

NOTES

1. MARK ASSY, 636-5602-001, REV, AND REV LTR LOCATED APPROX AS SHOWN PER 580-0497-000.
2. PARENTHEICAL ITEM IDENTIFICATION DENOTES (ITEM FIND NO. -QTY)
3. BEFORE SECURING BRKTS, ITEM 11, ALIGN UNUSED HOLE IN BRKT WITH HOLE ON BOARD, ITEM 1.
4. SECURE XFMR'S TO BOARD BY BENDING XFMR MTG TABS FLAT AGAINST BOARD AND SOLDER TO PADS PROVIDED ON BOARD.
5. COMPONENTS SHOWN WITH DASHED OUTLINES ARE NOT USED ON -002 VERSION.
6. CONNECTIONS TO BE MADE ON BACK (OPP COMPONENT SIDE) SIDE OF BOARD.

REV		REV		REV		REV		REV		REV		REV		REV	
HOW	REV	HOW	REV	HOW	REV	HOW	REV	HOW	REV	HOW	REV	HOW	REV	HOW	REV

WIRE NO.	ITEM NO.	TO	FROM
3	9	P8B-2	P8B-1
2	9	P7B-2	P7B-1
1	9	P6B-2	P6B-1

WIRE LIST (-002 ONLY)

-001
OR
002

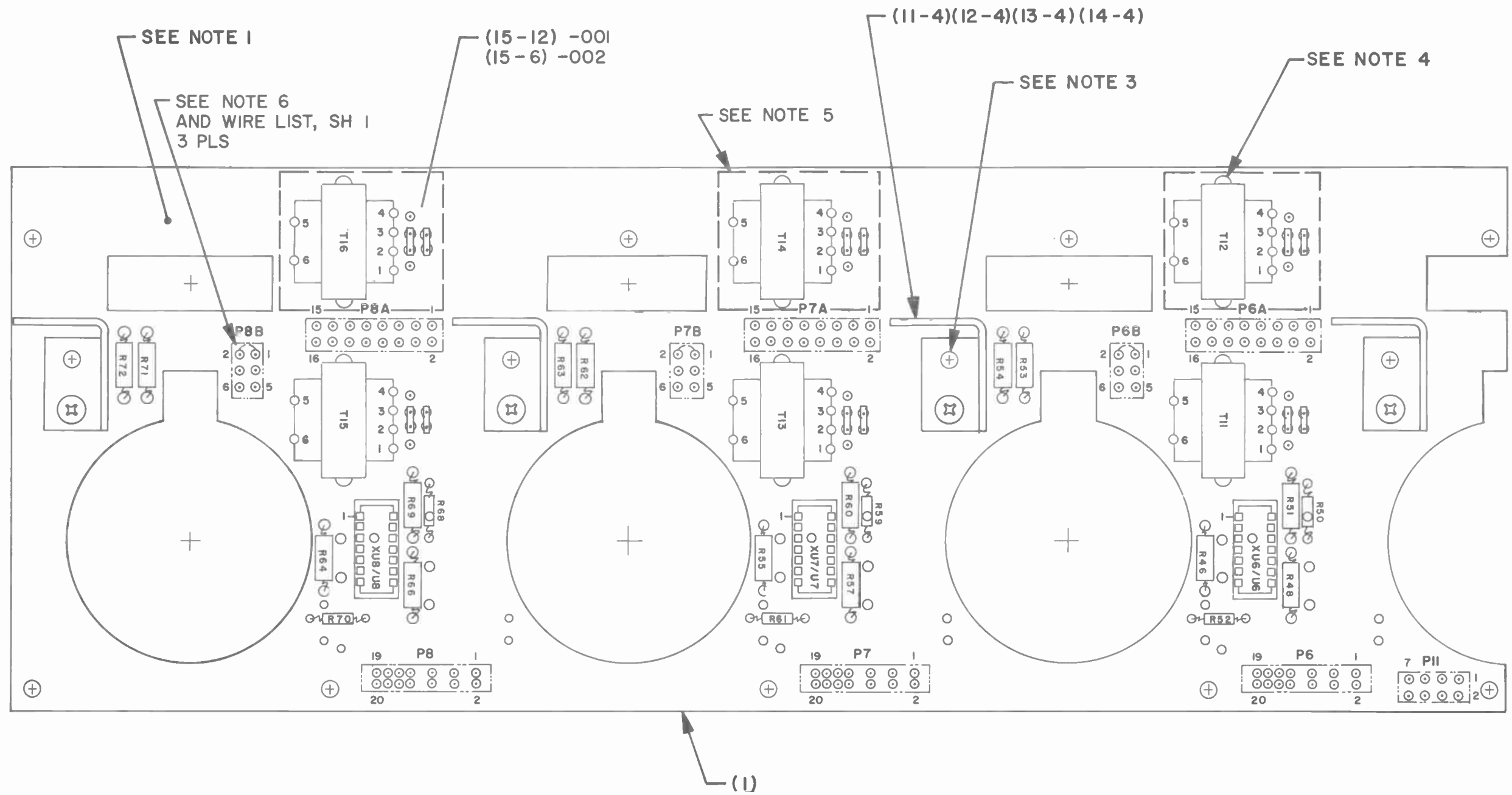
QTY	QTY	ITEM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REV LTR	ALTN PREF	UM	MMN	NOTES	REF DESIGNATOR
	0.5	16	421-2220-000	WIRE, NO 22 UNINSUL.						
	3.0	8	667-0284-010	XFMR						T11, 13, 15
	6.0	12.0	15	367-1508-010	CLIP, COMM MONING					
	4.0	4.0	14	313-0045-000	NUT, HEX 6-32					
	4.0	4.0	13	310-0282-000	WASHER, LOCK NØ.6					
	4.0	4.0	12	343-0169-000	SCREW, PPH 6-32 X					
	4.0	4.0	11	636-5592-001	BRKT, MTG					
	3.0	3.0	10	220-0049-010	SOCKET, I.C., 14 PIN					R XUG-XUB
	3.0	3.0	9	351-8252-010	INT CKT, CD4066AE					R UG-UB
	6.0	8	667-0284-010	XFMR						R T11-T16
	3.0	3.0	6	705-6661-000	RES, 22.6K, 1/4W, 1 PC					R R54, 63, 72
	3.0	3.0	5	705-6586-000	RES, 619, 1/4W, 1 PC					R R53, 62, 71
	6.0	6.0	4	745-0910-890	RES, 10K, 1/4W, 10 PC					R R51, 52, 60, R R61, 69, 70
	6.0	6.0	3	705-6628-000	RES, 4.6K, 1/4W, 1 PC					R R46, 48, 55 R R57, 64, 66 R R50, 59, 68
	3.0	3.0	2	745-0914-650	RES, 1K, 1/2W, 10 PC					
	1.0	1.0	1	636-5631-001	BOARD, STAKED					

REV STATUS OF SHEETS	REV	SHEET
	6	2
	1	2

MATERIAL	SEE P/L	FINISH	NONE
UNLESS OTHERWISE SPECIFIED, DUAL DIMENSIONED DWGS ARE IN MILLIMETRES (INCHES) SINGLE DIMENSIONED DWGS ARE IN INCHES.		CONTRACT NO.	
METRIC TOL ON METRIC DIM: X = ±0.5, XX = ±0.2 HOLE DIAMETERS UNDER 6.38 Ø = +0.13 - 0.13 6.38 TO 12.7 Ø = +0.15 - 0.13 OVER 12.7 Ø = +0.20 - 0.13 ANGLES ±1.0° ECCENTRICITY BETWEEN DIAMETERS ON AN AXIS NOT TO EXCEED 0.25 Ø		US CUSTOMARY [] TOL ON [] DIM: .XX = ±0.2, .XXX = ±0.08 HOLE DIAMETERS UNDER 251.0 = +0.05 - 0.05 251 TO 500 = +0.06 - 0.05 OVER 500 = +0.08 - 0.05 ANGLES ±1.0° ECCENTRICITY BETWEEN DIAMETERS ON AN AXIS NOT TO EXCEED 0.10 Ø	
PART SHALL COMPLY TO 580-5400-001 - - THIRD ANGLE PROJECTION		ROCKWELL INTERNATIONAL CORPORATION COLLINS RADIO GROUP DALLAS, TEX 75207 NEWPORT BEACH CALIF 92663 CEDAR RAPIDS IA 52406 BOARD ASSEMBLY - MIXER BD, CHNL'S 6 THRU 8	
PREP A. Bowman 12 FEB 1976 CHK A. Bowman APVD [Signature] 3-10-77		SIZE CODE IDENT DWG NO. D 13499 636-5602 SCALE NONE SHEET 1 OF 2	

NEXT ASSY 622-3646-001 TYPE NO 212P-2
622-3647-001

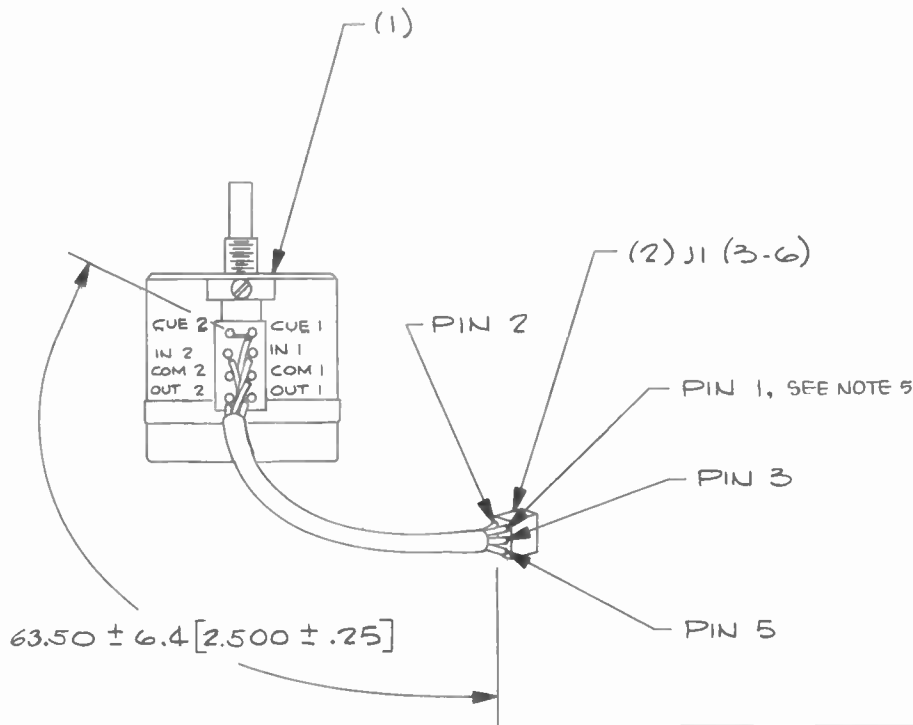
FRO NFP REL REV C TC A CR NB DL 2 TO



NG TES

1. SPACE PRECLUDES MARKING OF PART WITH IDENTIFYING NUMBER.
2. PARENTHEICAL ITEM IDENTIFICATION DENOTES (ITEM FIND NO. - QTY).
3. ALL WIRES GOING TO CONN J1, ITEM 2, SHALL BE TERMINATED WITH CONTACT, ITEM 3. CONTACTS ARE TO BE CRIMPED PER 580-9370 USING TOOL NO. 372-8092-XXX AND INSERTED INTO HOUSING PER 580-0529 USING TOOL 372-8093-010.
4. NOT USED ON -002 VERSION.
5. PIN 1 OF CONNECTOR HOUSING, ITEM 2, IS TO BE IDENTIFIED ON HOUSING WITH A DOT OR STRIPE TO PRECLUDE CONFUSION WHEN INSTALLING THIS ASSY AT A HIGHER LEVEL. THIS MARKING SHALL BE OF A CONTRASTING COLOR TO THAT OF HOUSING (SUCH AS WHITE).

REVISIONS							
HOW REV	HOW REV	HOW REV	HOW REV	LTR	DESCRIPTION	DATE	APVD
	0	A, 5		A	J-55070: ADD -002	1-17-78	JC
	A, 2AR			B	J-58214: WRONG DASH NO. ON ITEM 13	8-1-78	LW
	B, 5	B, 5		C	J-64728: CHG DIM OF WIRE HARNESS	12-18-79	LW
	C, 2AR	C, 2AR		D	J-65175: ADD MARKING NOTE TO CONN.	1-30-80	LW



WIRE NO.	ITEM NO.	TO	FROM	NOTES
8	10	J1-6	AT-COM 1	3
7	9	J1-5	AT-OUT 1	3
6	8	J1-4	AT-CUE 1	3
5	7	J1-3	AT-OUT 2	3,4
4	6	J1-2	AT-IN 1	3
3	5	J1-1	AT-IN 2	3,4
2	4	AT-COM 2	AT-COM 1	4
1	4	AT-CUE 2	AT-CUE 1	4

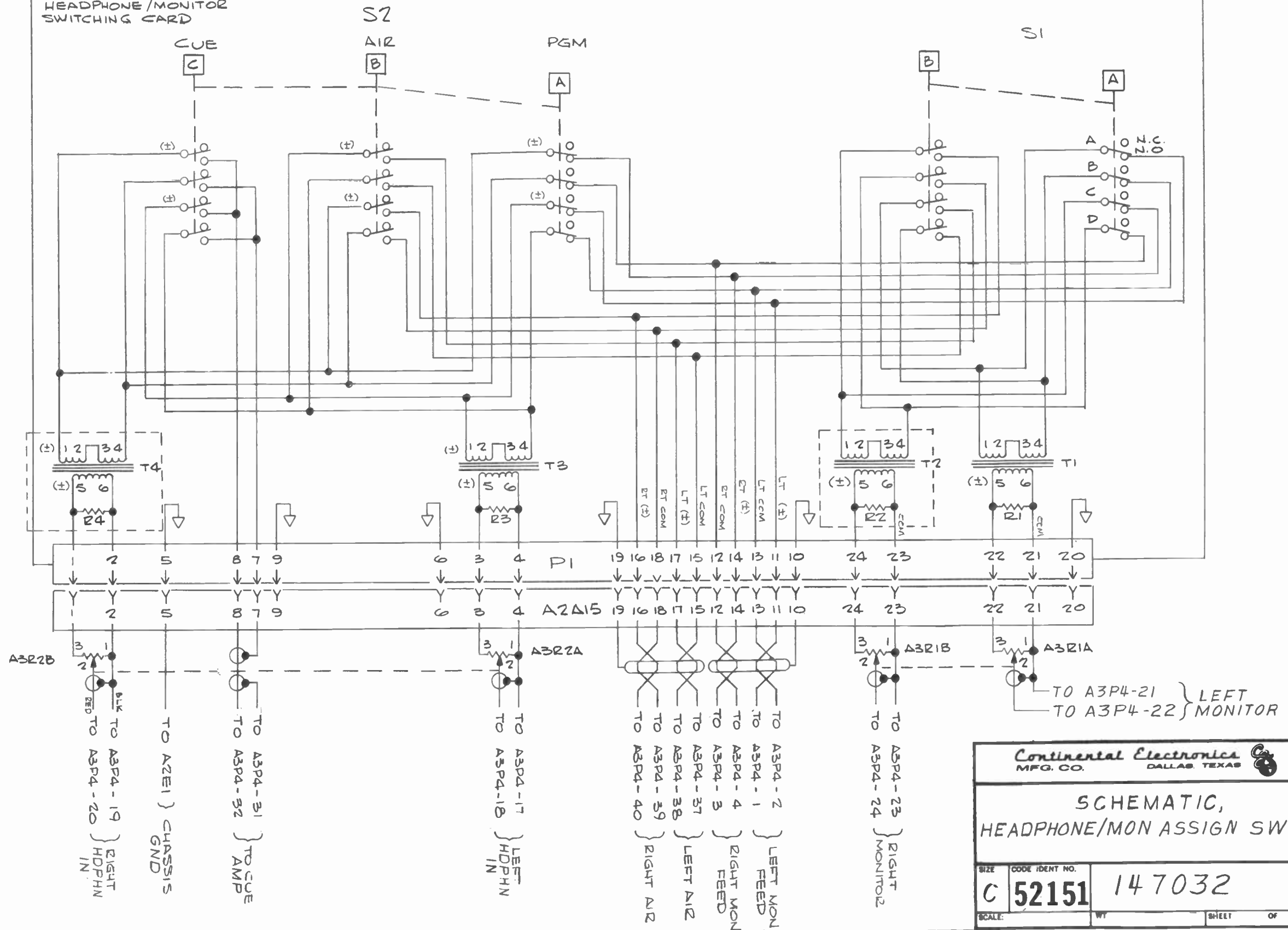
-001
OR
-002

QTY	QTY	ITEM NO	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	REV LTR	ALTN PREF	UM MN	NOTES	REF DESIGNATOR
	1.0	13	378-0596-030	ATTENUATOR, VAR					R AT
	0.5	0.5	10	439-7074-000	WIRE, A22PB00X6XXX				
	0.5	0.5	9	439-7069-000	WIRE, A22PB00X5XXX				
	0.5	0.5	8	439-7073-000	WIRE, A22PB00X4XXX				
	0.5	0.5	7	439-7072-000	WIRE, A22PB00X3XXX				
	0.5	0.5	6	439-7068-000	WIRE, A22PB00X2XXX				
	4.0	6.0	3	372-2755-010	CONTACT, CONN				
	1.0	1.0	2	372-2626-012	HOUSING, CONN				R P1
	1.0	1.0	1	378-0596-010	ATTENUATOR, VAR				R AT

MATERIAL SEE P/L	UNLESS OTHERWISE SPECIFIED, DUAL DIMENSIONED DWGS ARE IN MILLIMETRES (INCHES), SINGLE DIMENSIONED DWGS ARE IN INCHES.		CONTRACT NO.		ROCKWELL INTERNATIONAL CORPORATION COLLINS RADIO GROUP DALLAS, TEX 75207 NEWPORT BEACH, CALIF 92663 CEDAR RAPIDS, IA 52408
	FINISH NONE	METRIC TOL ON METRIC DIM: X = ±0.5, .XX = ±0.2 HOLE DIAMETERS: UNDER 6.38 Ø = +0.13 - 0.13 6.38 TO 12.7 Ø = +0.15 - 0.13 OVER 12.7 Ø = +0.20 - 0.13 ANGLES: ±1.0° ECCENTRICITY BETWEEN DIAMETERS ON AN AXIS NOT TO EXCEED 0.25 Ø PART SHALL COMPLY TO 580-5400-001 -- THIRD ANGLE PROJECTION	US CUSTOMARY [] TOL ON [] DIM: .XX = ±0.2, .XXX = ±0.008 HOLE DIAMETERS: UNDER .251 Ø = +.005 - .005 .251 TO .500 Ø = +.006 - .005 OVER .500 Ø = +.008 - .005 ANGLES: ±1.0° ECCENTRICITY BETWEEN DIAMETERS ON AN AXIS NOT TO EXCEED .010 Ø	PREP A. Bowman 23 FEB 1976 CHK L. Bowman 21 MAR 1977 APVD A. Bowman 21 MAR 1977	

ZONE		LTR		DESCRIPTION	DATE	APPROVED

A3A2
HEADPHONE/MONITOR
SWITCHING CARD



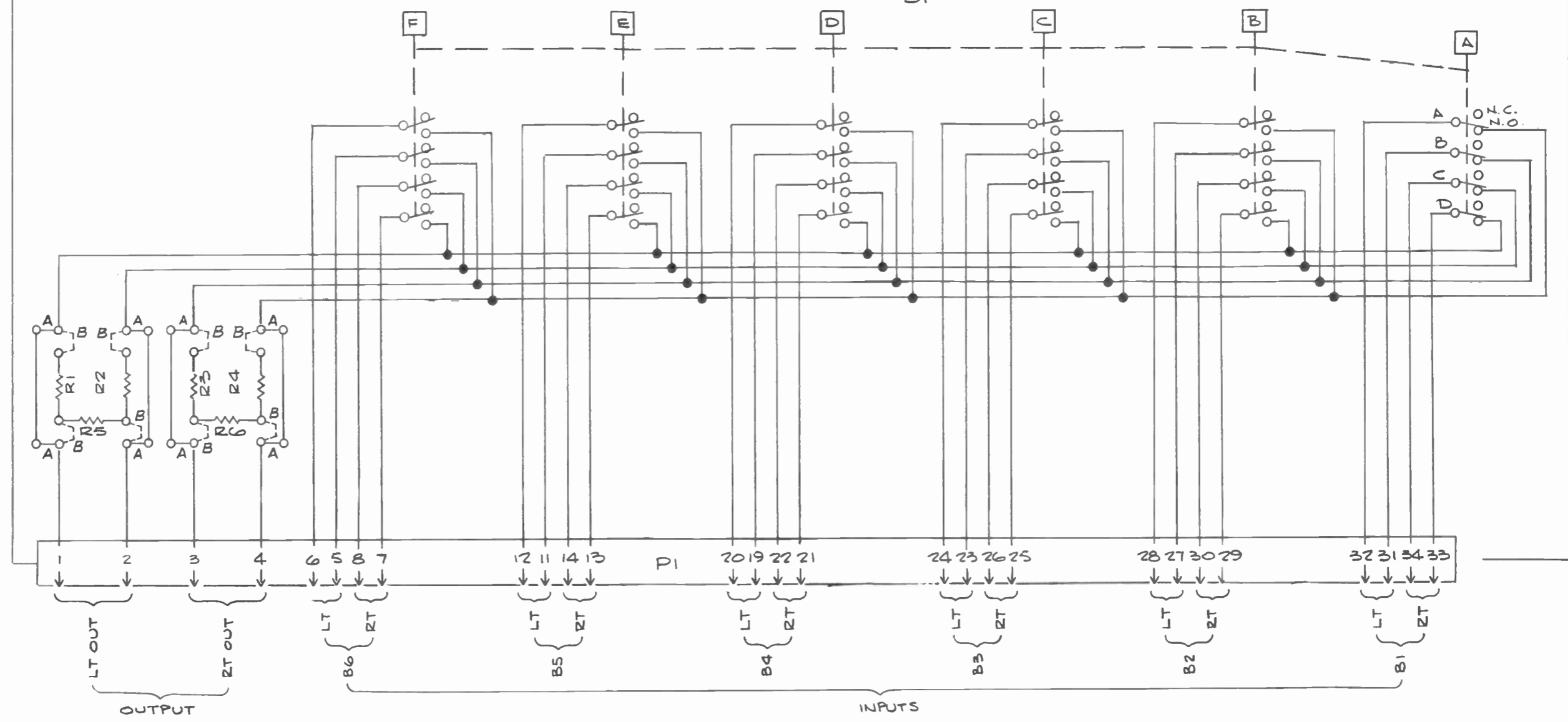
Continental Electronics
MFG. CO. DALLAS, TEXAS

**SCHEMATIC,
HEADPHONE/MON ASSIGN SW**

SIZE	CODE IDENT NO.	147032
C	52151	
SCALE:	WT	SHEET OF

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

A3A4
CHANNEL 7B INPUT
SWITCHING CARD



- NOTES:
1. FOR 600Ω-10VU, USE "A" STRAPS
 2. FOR BRDG. INPUT +8VU, USE "B" STRAPS

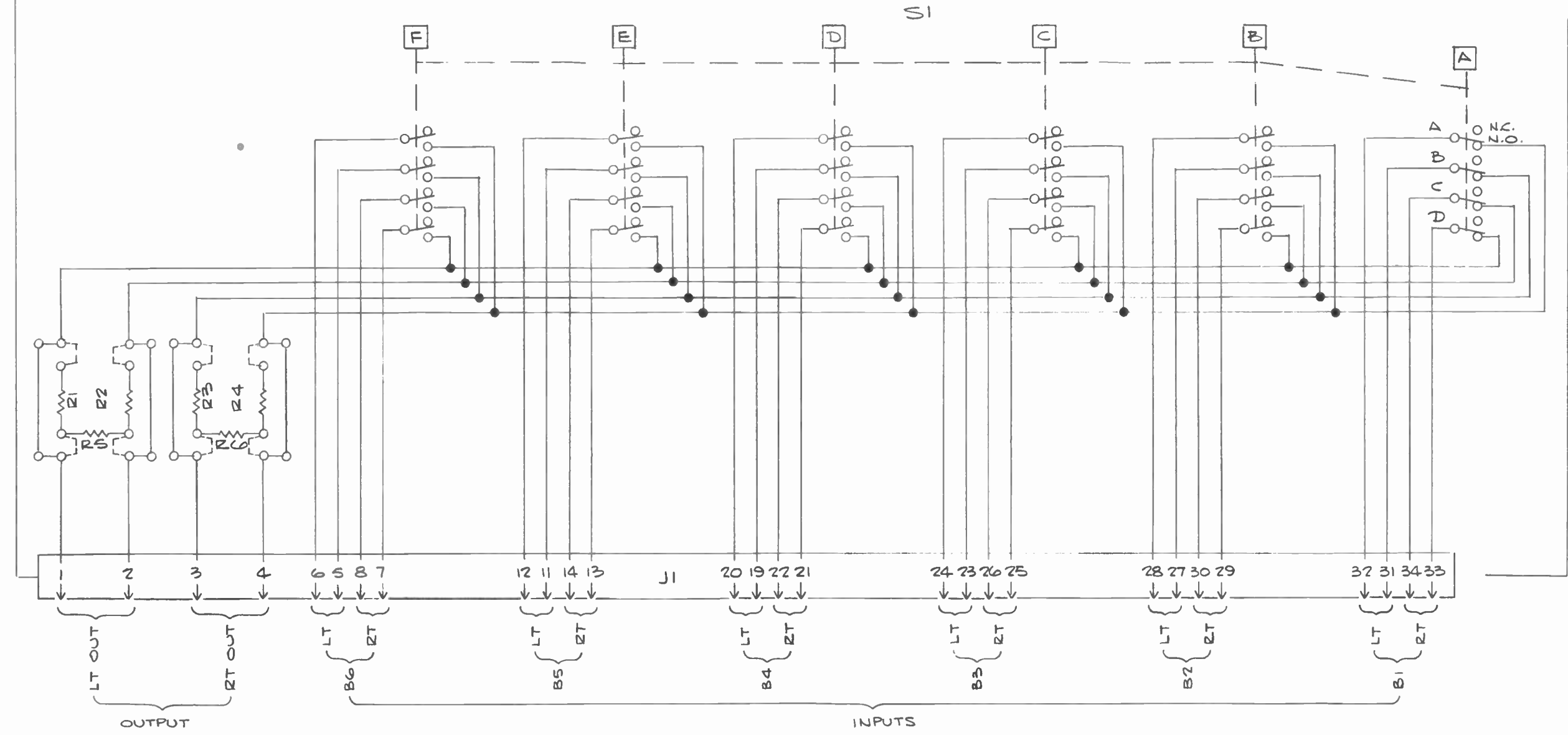
Continental Electronics
MFG. CO. DALLAS, TEXAS

SCHMATIC,
CHAN 7B INPUT SWITCH CARD

SIZE	CODE IDENT NO.	
C	52151	147033
SCALE:	WT	SHEET OF

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

USE FOR CHAN 7B & 8B ON 212P
 USE FOR CHAN 9B & 10B ON 212R



- NOTES:
1. FOR 600Ω-10VU, USE "A" STRAPS
 2. FOR BRDG. INPUT +8VU, USE "B" STRAPS

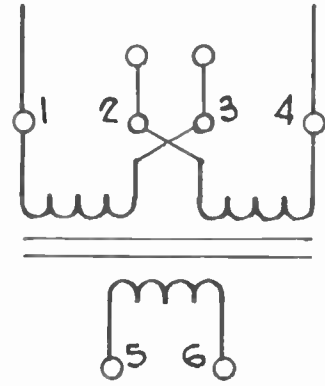
Continental Electronics
 MFG. CO. DALLAS, TEXAS

SCHMATIC,
 CHAN INPUT SWITCH CARD

SIZE	CODE IDENT NO.	147034
C	52151	
SCALE:	WT	SHEET OF

Notes:

- Components with Asterisk (*) are not used on 212P-1 (Monaural) version.

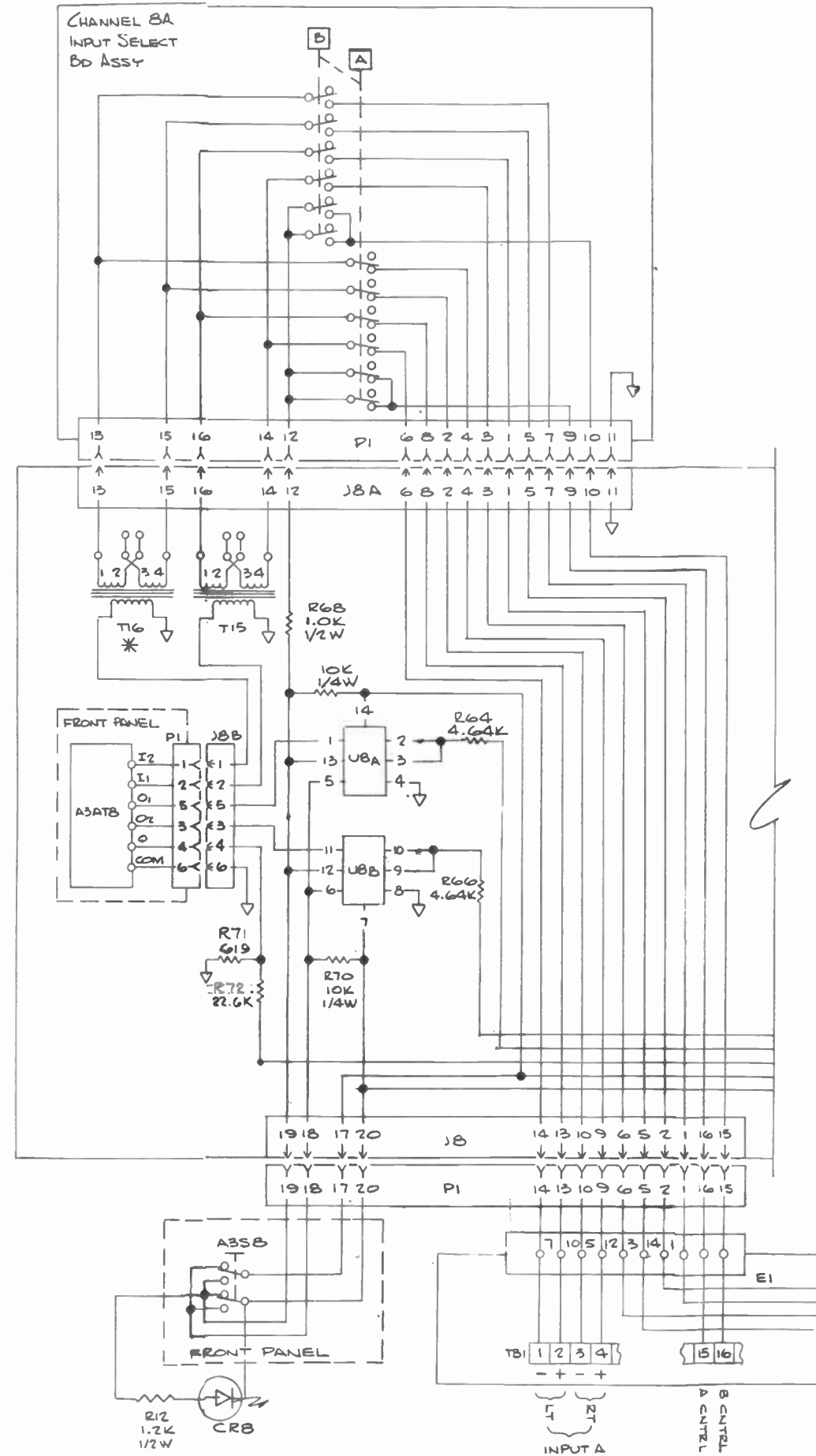


INPUT IMPEDANCE		
	150Ω	600Ω
STRAP:	1-2;3-4	2-3

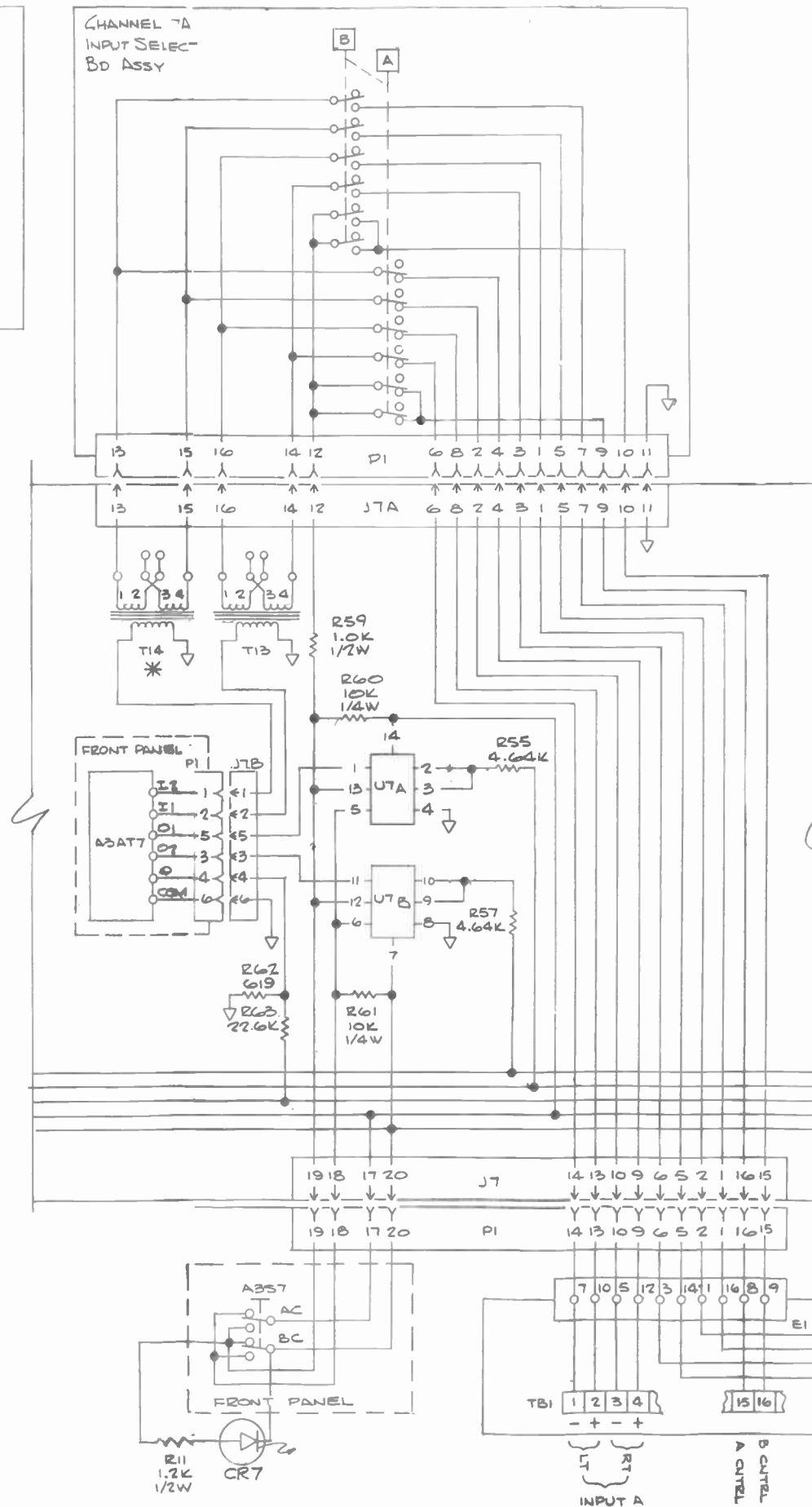
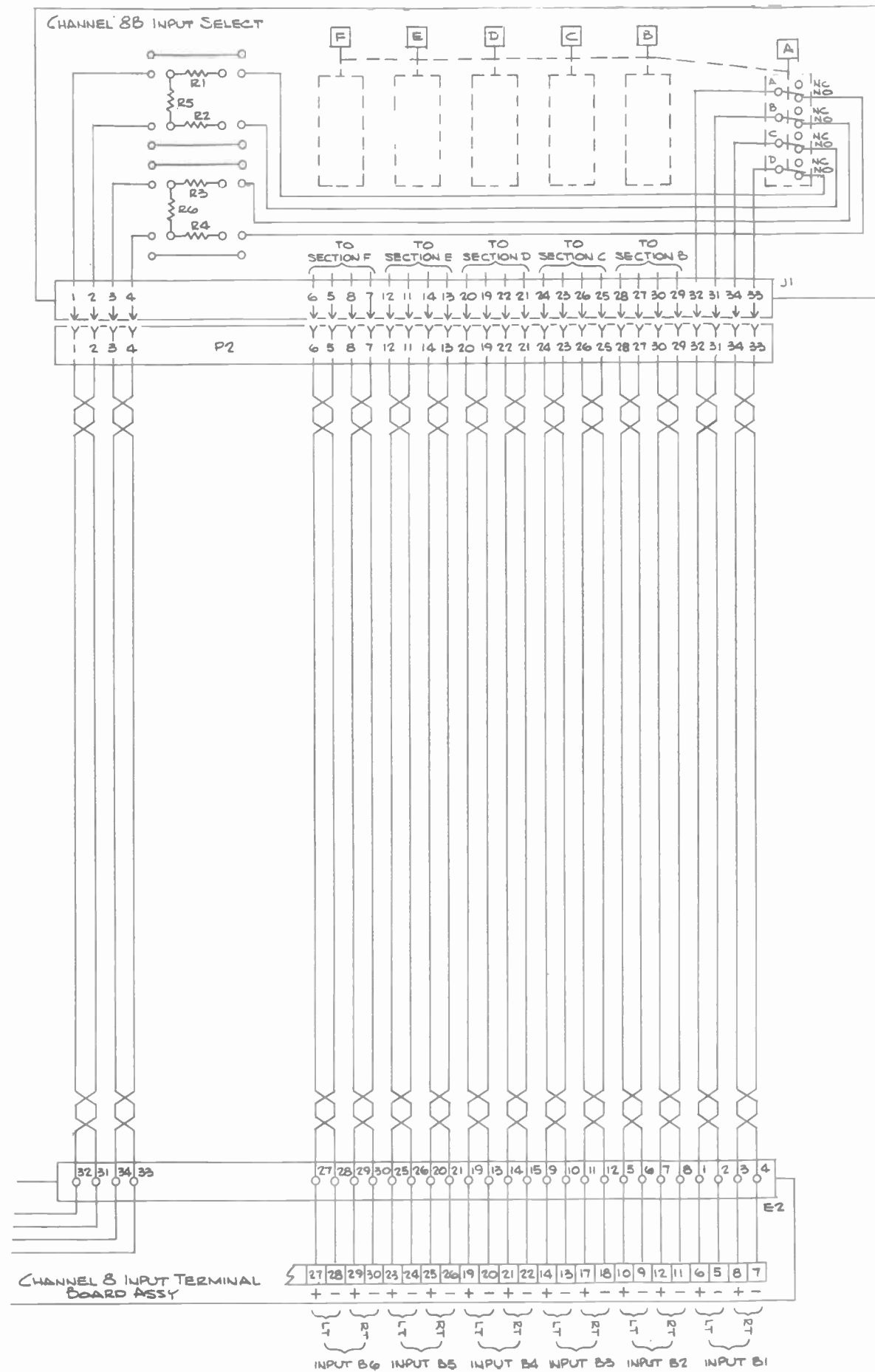
CHANGES:

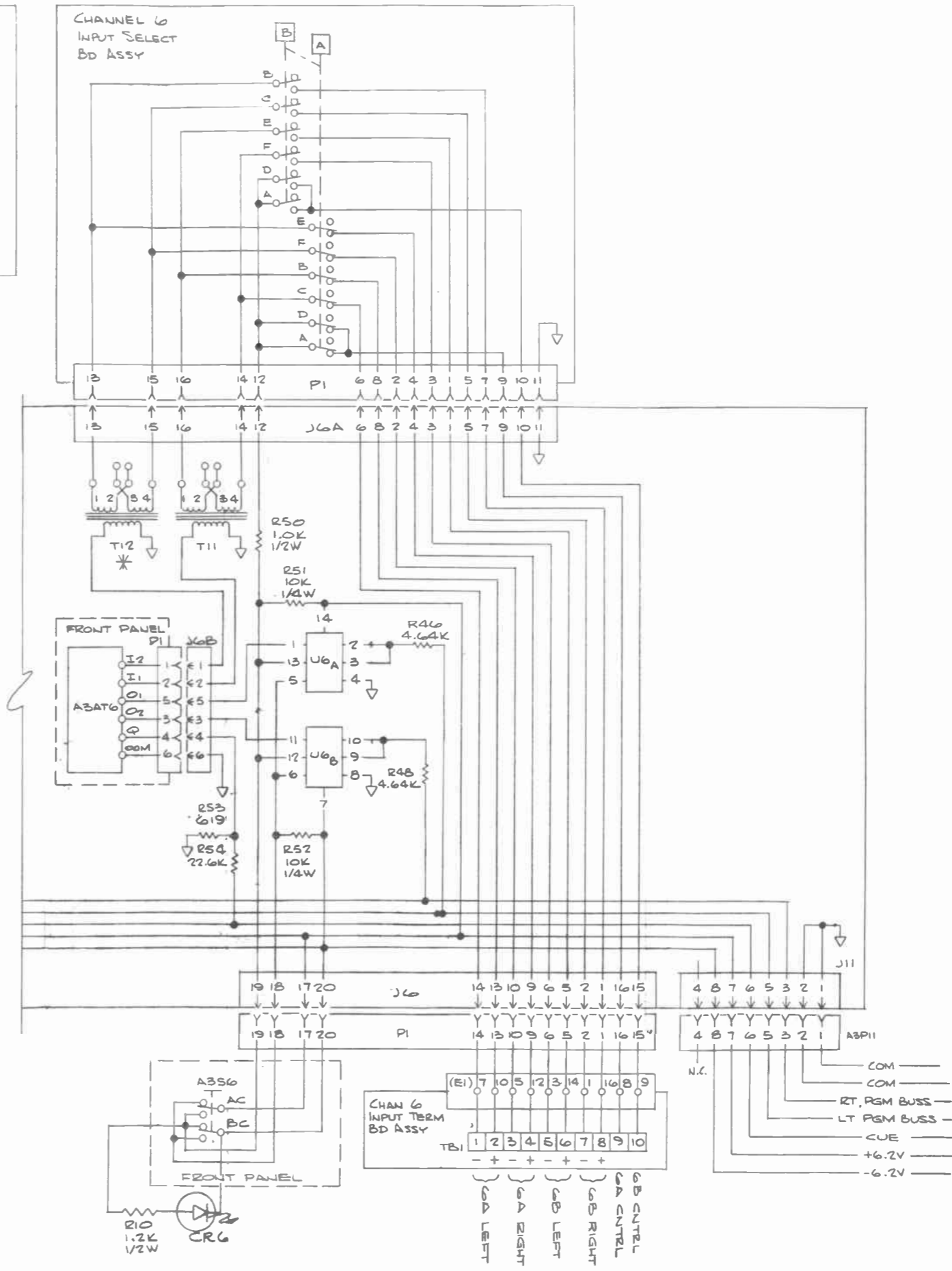
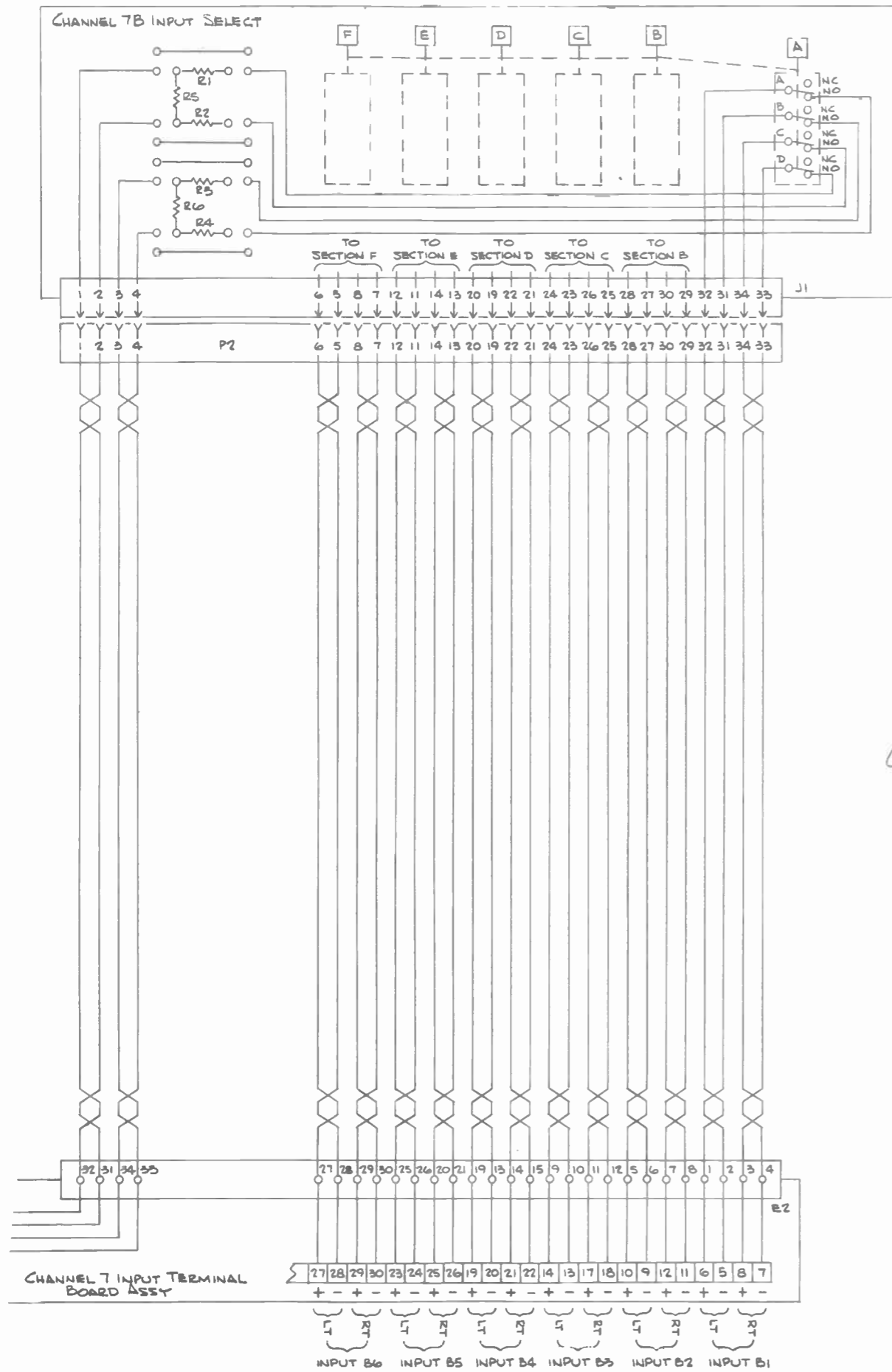
REV A (1-17-78, TB) ADDED CHAN. 7 & 8 INPUT AND SELECT BOARDS, CHGD REF DES. ON INPUT COIL.

REV B (3-20-78, TB) REVISED SWITCH (S1 THRU S8), LED WIRING TO AS BUILT CONFIGURATION

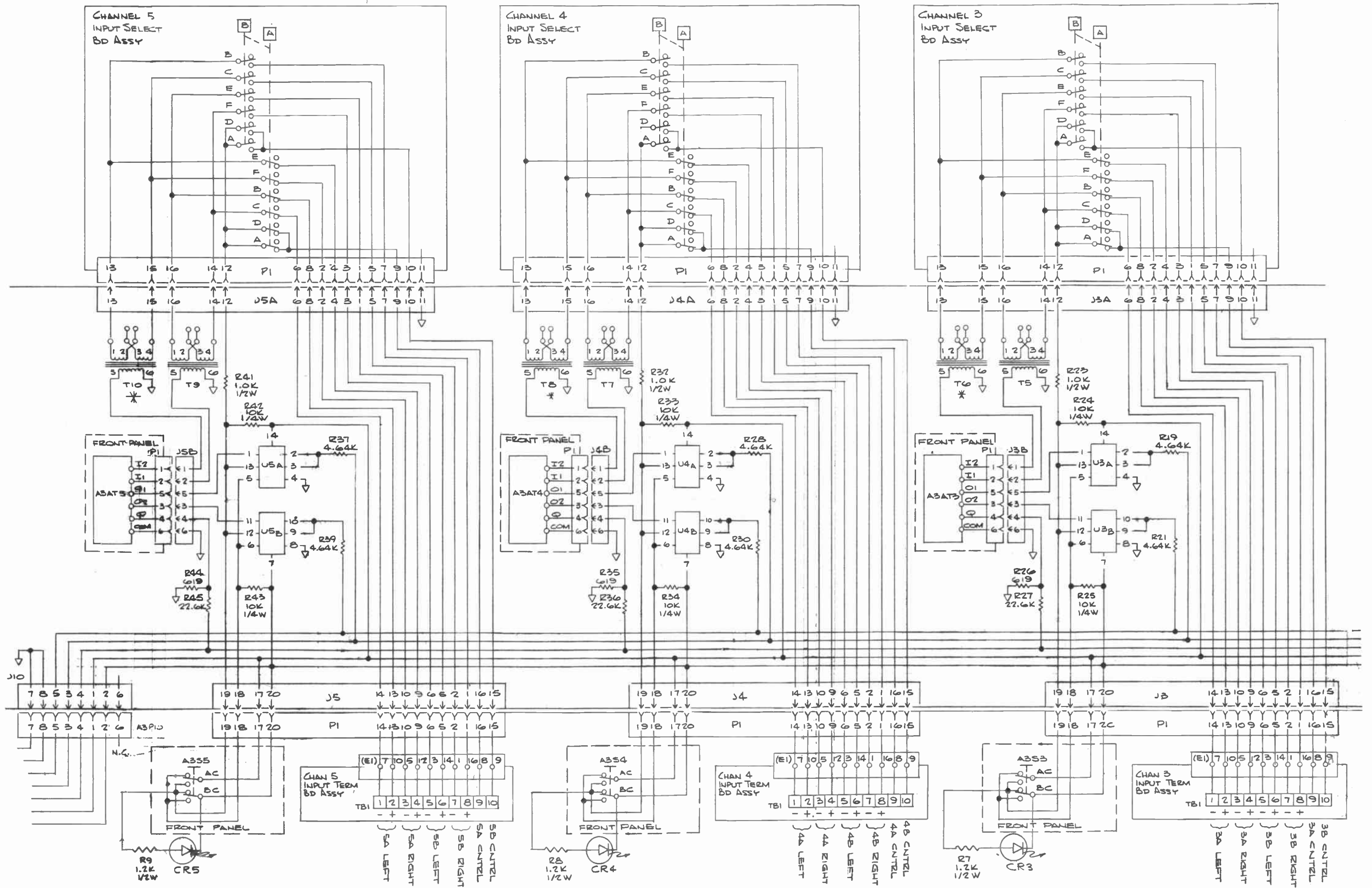


Continental Electronics MFG. CO. DALLAS, TEXAS	
SCHEMATIC, FRONT PANEL	
DM 52151	147039
SCALE	BY SHEET OF

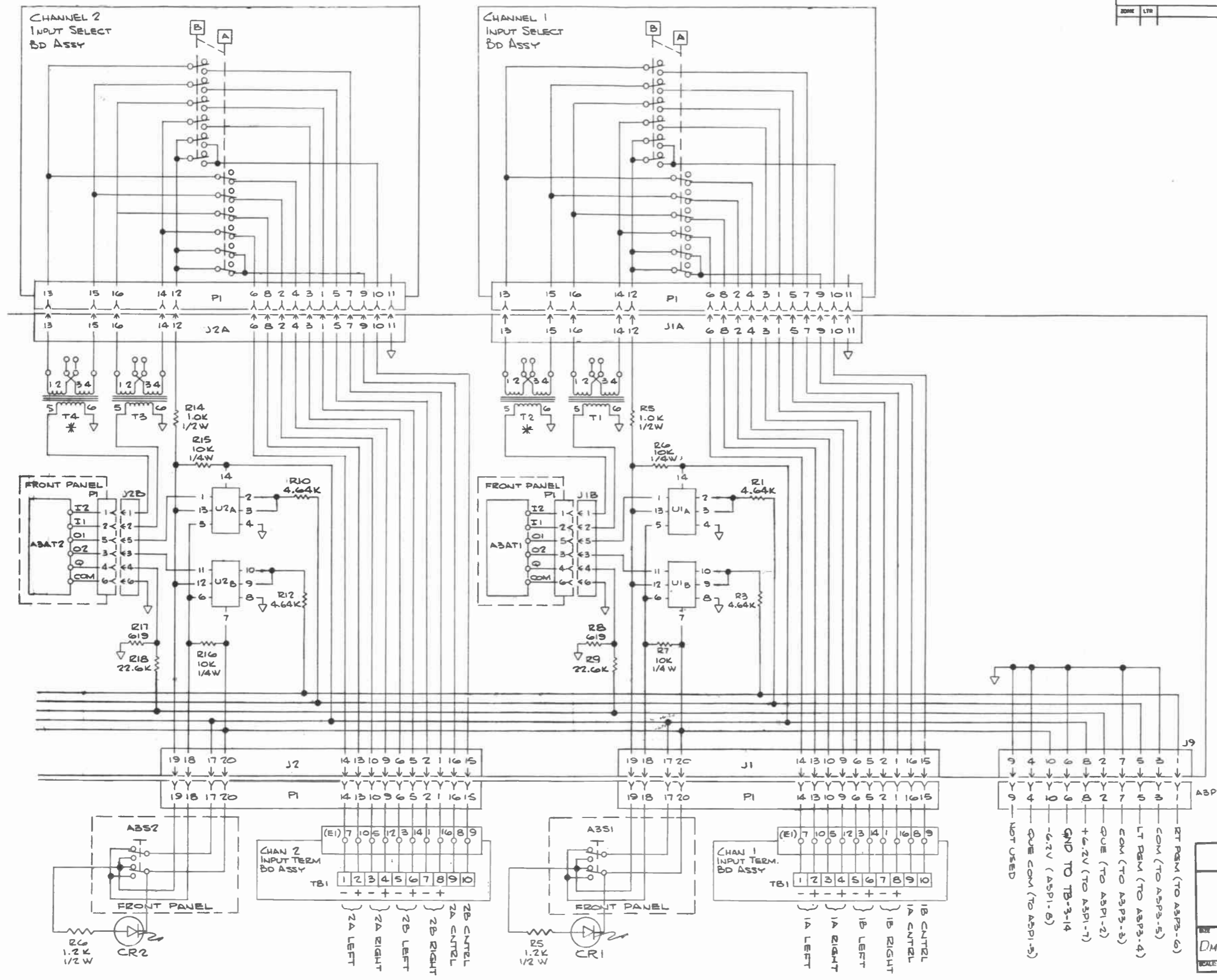




147039



REVISIONS			
EDR#	LTR	DESCRIPTION	DATE



Continental Electronics
MFG. CO. DALLAS, TEXAS

**SCHEMATIC,
FRONT PANEL**

DM	52151	147039
SCALE:	BY:	SHEET OF:

A4 Power Supply Assembly 636-5653
A4 Power Supply Schematic C147038

NOTES

1. MARK 636-5653 UOI, REV, AND REV LTR LOCATED APPROX AS SHOWN P/R 550-0497-000.
2. SOLDER ONE END OF ITEM 48 TO XF1-2. SOLDER OTHER END OF ITEM 48 TO S1-C.
3. WIRES 1, 3, 4, 6, 7, 8, 10, 11, 12, 13, 14, AND 15 TERMINATED AT CR1, 2, 3 END WITH ITEMS 27 OR 47. ALL OTHER WIRES ARE SOLDER TERMINATED.

REV		REV		REV		REV		-001		REVISIONS			
HOW	REV	HOW	REV	HOW	REV	HOW	REV	HOW	REV	LTR	DESCRIPTION	DATE	APVD
A, 2AR	A	J	54631									12-14-77	CA
B, 5	B	J	55218									1-25-78	JC
C, 2AR	C	J	55591	CHG	ITEM 7 P/N							2-16-78	AB
D, 2AR	D	J	55959	ADD	ITEM TO P/L CHG							3-10-78	AB
					WIRING								
E, 2AR	E	J	61090	CHG	P/N OF ITEM 49							3-5-79	LW
F, 2AR	F	J	61475	DEL	NOTE 4, ADD Z1, Z2 (ITEM 50) TO W/L							4-2-79	LW
G, 6	G	J	65725	CHG	P/N OF ITEM 4							3-11-80	LW

WIRE NO.	ITEM NO.	FROM	TO
	50	T1-B	T1-5
	50	T1-4	T1-1
	48	S1-COM	XF1-2
21	45	FL1-L	XF1-1
19	44	FL1-N	T1-5
18	41	S1-NC	T1-8
17	42	FL1-N	T1-1
16	43	S1-NC	T1-4
15	40	T1-16	CR3-AC
14	40	T1-15	CR3-AC
13	39	T1-14	CR2-AC
12	39	T1-12	CR2-AC
11	38	T1-11	CR1-AC
10	38	T1-9	CR1-AC
9	34	FL1-G	J2-4
8	33	CR3-(-)	J2-8
7	32	CR3-(+)	J2-7
6	35	CR2-(-)	J2-3
5	37	T1-13	J2-2
4	36	CR2-(+)	J2-1
3	30	CR1-(-)	J2-10
2	28	T1-10	J2-11
1	31	CR1-(+)	J2-12

WIRING CHART

QTY	ITEM NO.	PART OR IDENTIFYING NO.	NAME	DESCRIPTION	UM	MN	ALTN PREF	NOTE	REF DESIG
1.0	51	264-0305-000	FUSE	2DA 250V SB					F1
2.0	50	714-3258-030	RES	VARISTOR					Z1, Z2
7.5	49	152-1393-000	SLEEVING						
1.0	48	747-5400-000	RES	1, 6.5 W					R1
2.0	47	304-8019-070	LUG	16-14					
1.0	46	439-8011-000	WIRE	A20PB00X6XXX					
1.0	45	439-8009-000	WIRE	A20PB00X4XXX					
1.0	44	439-8007-000	WIRE	A20PB00X3XXX					
1.0	43	439-8006-000	WIRE	A20PB00X2XXX					
1.0	42	439-8005-000	WIRE	A20PB00X1XXX					
1.0	41	439-8004-000	WIRE	A20PB00X0XXX					
2.0	40	439-8125-000	WIRE	A18PB00X915X					
2.0	39	439-8226-000	WIRE	A16PB00X912X					
2.0	38	439-8119-000	WIRE	A18PB00X902X					
8.0	37	439-8211-000	WIRE	A16PB00X8XXX					
8.0	36	439-8221-000	WIRE	A16PB00X7XXX					
8.0	35	439-8209-000	WIRE	A16PB00X5XXX					
8.0	34	439-8111-000	WIRE	A18PB00X6XXX					
8.0	33	439-8109-000	WIRE	A18PB00X4XXX					
8.0	32	439-8107-000	WIRE	A18PB00X3XXX					
8.0	31	439-8106-000	WIRE	A18PB00X2XXX					
8.0	30	439-8105-000	WIRE	A18PB00X1XXX					
1.0	29	426-1034-010	CABLE						
8.0	28	439-8104-000	WIRE	A18PB00X0XXX					
10.0	27	304-8019-060	LUG	22-18					
▲	26								
4.0	25	313-0017-000	NUT	8-32					
4.0	24	310-0283-000	LOCKWASHER	8					
4.0	23	310-0048-000	WASHER	8					
▲	22								
7.0	21	310-0071-000	LOCKWASHER	6					
6.0	20	310-0, 46-000	WASHER	6					
6.0	19	343-0168-000	SCREW	6-32 x 5/16 PPH					
1.0	18	0147038	SCHEMATIC						
2.0	17	313-0042-000	NUT	4-40					
2.0	16	310-0275-000	LOCKWASHER	4					
4.0	15	310-0045-000	WASHER	4					
2.0	14	345-0284-000	SCREW	4-40 x 1/2 PPH B					
1.0	13	266-0130-000	NUT	SWITCH					
9.0	12	372-5439-040	CONTACT						
1.0	11	150-0051-000	BUSHING						
1.0	10	265-1241-090	HOLDER	FUSE					R XF1
1.0	9	662-0607-010	IFMR						R T1
1.0	8	266-3031-000	SWITCH						R S1
1.0	7	372-5907-340	CONN						R J2
1.0	6	241-8054-010	FILTER						K FL1
3.0	5	343-0191-000	SCREW	8-32 x 3/4 PPH					
3.0	4	353-0417-060	DIODE						CR1, CR2, CR3
1.0	3	636-5670-001	BPACKET	FAB					
1.0	2	636-5652-001	COVER	FAB					
1.0	1	636-5651-001	CHASSIS	FAB					

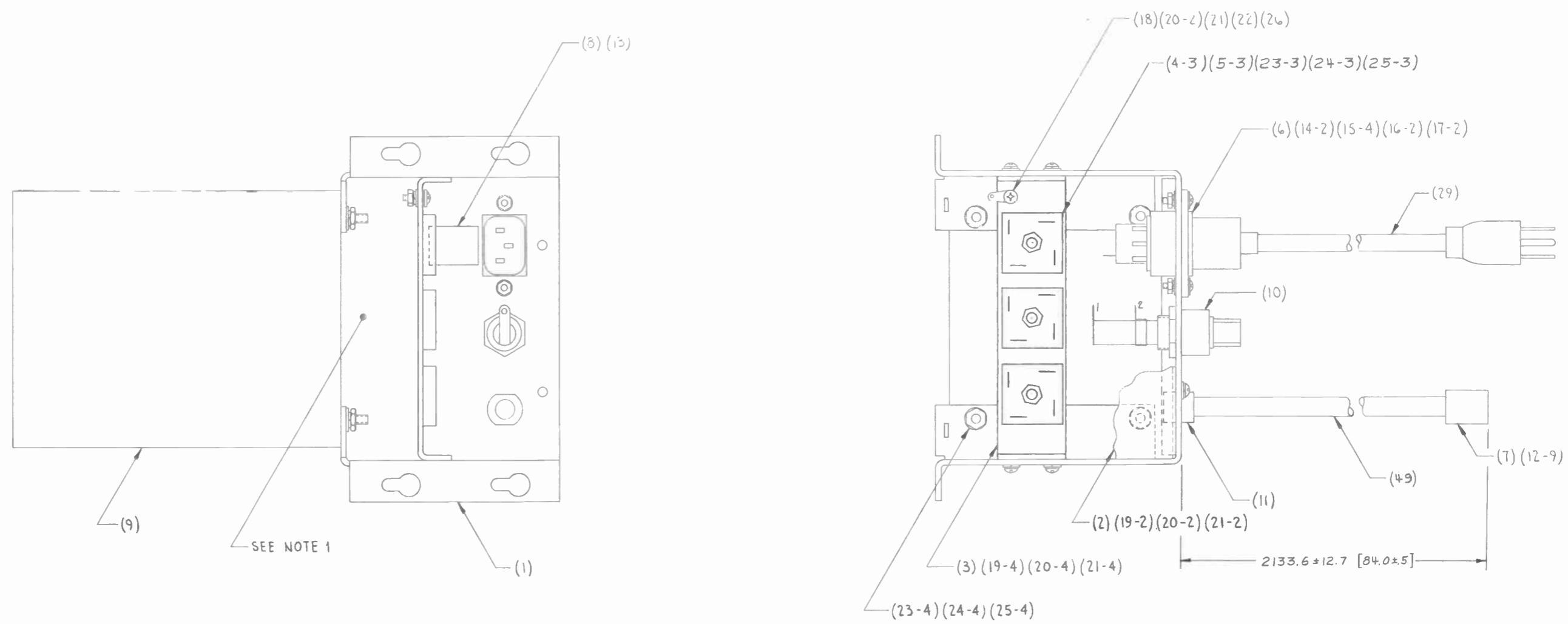
MATERIAL	UNLESS OTHERWISE SPECIFIED, DUAL DIMENSIONED DWGS ARE IN MILLIMETRES (INCHES) SINGLE DIMENSIONED DWGS ARE IN INCHES.	CONTRACT NO.	ROCKWELL INTERNATIONAL CORPORATION COLLINS RADIO GROUP DALLAS, TEX 75207 NEWPORT BEACH CALIF 92853 CEDAR RAPIDS, IA 52406
FINISH	METRIC TOL ON METRIC DIM. X = ±0.5, XX = ±0.2 HOLE DIAMETERS: UNDER 6.38 Ø = +0.13 - 0.13 6.38 TO 12.7 Ø = +0.15 - 0.13 OVER 12.7 Ø = +0.20 - 0.13 ANGLES ±1.0° ECCENTRICITY BETWEEN DIAMETERS ON AN AXIS NOT TO EXCEED 0.25 Ø PART SHALL COMPLY TO 580-5400-001	PREP L. EVANS 7/23/77 CHK <i>[Signature]</i> 10/12/77 APVD <i>[Signature]</i> 11/1/77	POWER SUPPLY ASSEMBLY
	US CUSTOMARY [] TOL ON [] DIM. XX = ±0.2, XXX = ±0.008 HOLE DIAMETERS: UNDER 25.4 Ø = +0.05 - 0.05 25.4 TO 500.8 Ø = +0.06 - 0.05 OVER 500.8 Ø = +0.08 - 0.05 ANGLES ±1.0° ECCENTRICITY BETWEEN DIAMETERS ON AN AXIS NOT TO EXCEED 0.10 Ø — THIRD ANGLE PROJECTION	SIZE CODE IDENT DWG NO. D 13499 636 5653	METRIC
REV STATUS OF SHEETS	REV SHEET 1 2	SCALE 1/1	SHEET 10F 2

014 12/28/76
NEXT ASSY. 622-3644-001 TYPE NO 212R-1
622-3647-001 212F-2
622-3685-001 212R-1

M FRO [] NFP [] REL [] REV 2 TC [] CR2 NB DL 2 TO 2

NOTES

REVISIONS					DESCRIPTION	DATE	APVD
HOW	REV	HOW	REV	LTR			



-001

MATERIAL NA	UNLESS OTHERWISE SPECIFIED, DUAL DIMENSIONED DWGS ARE IN MILLIMETRES (INCHES). SINGLE DIMENSIONED DWGS ARE IN INCHES.		CONTRACT NO.	ROCKWELL INTERNATIONAL CORPORATION COLLINS RADIO GROUP DALLAS, TEX 75207 NEWPORT BEACH, CALIF 92663 CEDAR RAPIDS, IA 52408	
	METRIC TOL ON METRIC DIM. X = ±0.5, .XX = ±0.2 HOLE DIAMETERS: UNDER 6.38 Ø = +0.13 - 0.13 6.38 TO 12.7 Ø = +0.15 - 0.13 OVER 12.7 Ø = +0.20 - 0.13 ANGLES: ±1.0° ECCENTRICITY BETWEEN DIAMETERS ON AN AXIS NOT TO EXCEED 0.25 Ø PART SHALL COMPLY TO 580-5400-001			US CUSTOMARY [] TOL ON [] DIM XX = ±.02, .XXX = ±.008 HOLE DIAMETERS: UNDER .251 Ø = +.005 - .005 .251 TO .500 Ø = +.006 - .005 OVER .500 Ø = +.008 - .005 ANGLES: ±1.0 ECCENTRICITY BETWEEN DIAMETERS ON AN AXIS NOT TO EXCEED .010 Ø — — THIRD ANGLE PROJECTION	
FINISH NA			CHK	POWER SUPPLY ASSEMBLY	
			APVD [Signature]	SCALE 1/1	SHEET 2 of 2
				D 13499	636-5653

674 1028-010
NEXT ASSY: TYPE NO

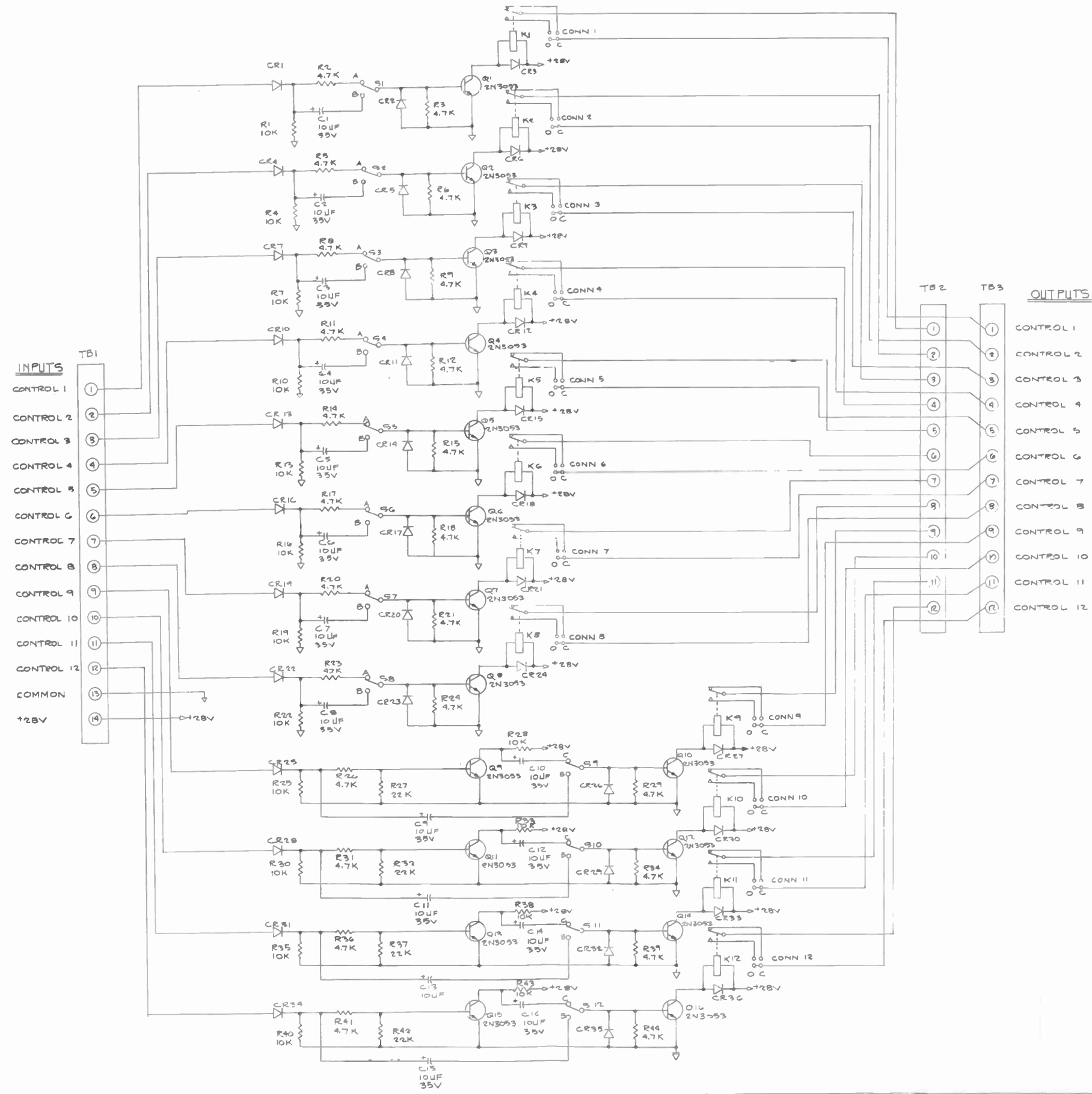
FRO NFP REL REV TC CR NB DL TO

A6	Machine Control	640-5274
A6A1	Machine Control Board	640-5278
A6	Machine Control Schematic	640-5295



4





SWITCH CODE	
A	MAINTAINED CIRCUIT / CHAN ON
B	MOMENTARY CIRCUIT / CHAN ON
C	MOMENTARY CIRCUIT / CHAN OFF

RELAY CODE	
O	NORMALLY OPEN
C	NORMALLY CLOSED

NOTE:
1. ALL DIODES 1N4008

FROM <i>Cont. Atty</i> DATE <i>11/15/60</i> DESIGNED BY CHECKED BY APPROVED BY	Continental Electronics MFG. CO. DALLAS, TEXAS SCHEMATIC, MACHINE CONTROL F. 52151 C40-5295-001
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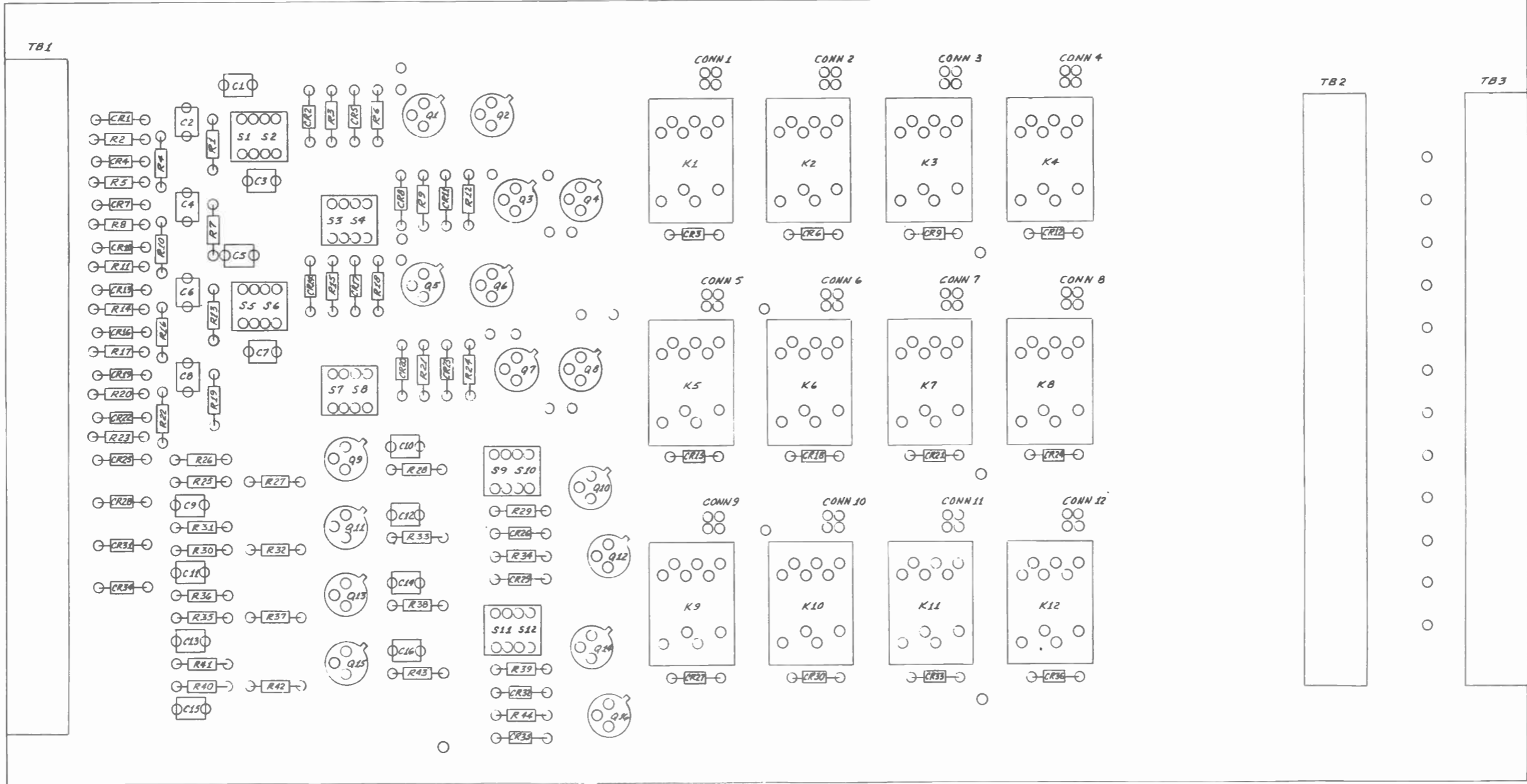
NOTES

- I. INSTRUCTIONS FOR ASSEMBLY:
 (A.) MOUNT HEX POSTS IN HOUSING USING ITEM 7.
 (B.) MOUNT BOARD ON HEX POSTS USING ITEMS 8, 10, AND 11.
 (C.) ATTACH GROMMETS TO SIDES OF HOUSING.
 (D.) ATTACH COVER TO HOUSING USING ITEMS 4 AND 5.

-001		REVISIONS		
HOW REV	LTR	DESCRIPTION	DATE	APVD
A,5	A	J-56832	5-8-78	LW

QTY	ITEM NO.	PART OR IDENTIFYING NO.	COLLINS PART NO.	NOMENCLATURE OR DESCRIPTION	REV LTR	DOCUMENT NO.	CODE IDENT	ALTN PREF	UM MN	NOTES
-001		DASH NO.		PARTS LIST (US CUSTOMARY MEASUREMENTS ONLY)						
0.0	12		640-5295-001	SCHEMATIC						
6.0	11		302-0026-000	WASHER, NØ. 6 CØRK						
6.0	10		310-0779-050	WASHER, NØ. 6 FLAT						
4.0	9		201-0006-000	GRØMMET						
6.0	8		343-0167-000	SCREW, 6-32 X 1/4 PPH						
6.0	7		342-0060-000	SCREW, 6-32 X 1/4 PFH						
6.0	6		540-9209-003	HEX PØST, 6-32 X 1/2						
8.0	5		310-0282-000	WASHER, LØCK-NØ. 6						
8.0	4		343-0169-000	SCREW, 6-32 X 3/8 PPH						
1.0	3		640-5278-001	BD ASSY						
1.0	2		640-5279-001	CØVER						
1.0	1		640-5280-001	HØUSING						

MATERIAL	UNLESS OTHERWISE SPECIFIED, DUAL DIMENSIONED DWGS ARE IN MILLIMETRES [INCHES]. SINGLE DIMENSIONED DWGS ARE IN INCHES.		CONTRACT NO.	ROCKWELL INTERNATIONAL CORPORATION COLLINS RADIO GROUP DALLAS, TEX 75207 NEWPORT BEACH, CALIF 92663 CEDAR RAPIDS, IA 52406	
N/A	METRIC	US CUSTOMARY []	PREP <i>Charles Abbey 12/12/77</i>	MACHINE CONTROL ASSY	
FINISH	TOL ON METRIC DIM: X = ±0.5, .XX = ±0.2 HOLE DIAMETERS: UNDER 6.38 Ø = +0.13 - 0.13 6.38 TO 12.7 Ø = +0.15 - 0.13 OVER 12.7 Ø = +0.20 - 0.13 ANGLES: ±1.0° ECCENTRICITY BETWEEN DIAMETERS ON AN AXIS NOT TO EXCEED 0.25 Ø	TOL ON [] DIM: .XX = ±.02, .XXX = ±.008 HOLE DIAMETERS: UNDER .251 Ø = +.005 - .005 .251 TO .500 Ø = +.006 - .005 OVER .500 Ø = +.008 - .005 ANGLES: ±1.0° ECCENTRICITY BETWEEN DIAMETERS ON AN AXIS NOT TO EXCEED .010 Ø	CHK <i>Charles Abbey 12/12/77</i>	APVD <i>J. S. 12-12-77</i>	SIZE CODE IDENT DWG NO. C 13499 640-5274
N/A	PART SHALL COMPLY TO 580-5400-001 -- THIRD ANGLE PROJECTION		SCALE NONE	SHEET	METRIC



MACHINE CONTROL
BOARD ASSEMBLY

SIZE	CODE IDENT	DWG NO
D	13499	640-527B
SCALE	REV	SHEET
2/1		2 of 2

FACTORY TEST DATA

[Faint, illegible text, likely bleed-through from the reverse side of the page]

FACTORY TEST DATA

TYPE 212P-2 SERIAL NO. 228 DATE 8-18-81
 STATION Prima Radio LOCATION Tuscon, Arizona

PROGRAM CIRCUITS

FREQUENCY (Hz)	LEFT CHANNEL		RIGHT CHANNEL	
	RESPONSE -db	THD-%	RESPONSE -db	THD-%
50	<u>-0.3</u>	<u>.065</u>	<u>-0.4</u>	<u>.075</u>
1,000	<u>0</u>	<u>.03</u>	<u>0</u>	<u>.03</u>
5,000	<u>0</u>	<u>.05</u>	<u>0</u>	<u>.035</u>
15,000	<u>-0.5</u>	<u>.06</u>	<u>-0.5</u>	<u>.055</u>
IMD	<u>.03%</u>		<u>.03%</u>	
NOISE	<u>-75 dB</u>		<u>-75 dB</u>	

MONITOR CIRCUITS

FREQUENCY (Hz)	LEFT CHANNEL		RIGHT CHANNEL	
	RESPONSE -db	THD-%	RESPONSE -db	THD-%
50	<u>-0.3</u>	<u>.13</u>	<u>-0.4</u>	<u>.13</u>
1,000	<u>0</u>	<u>.03</u>	<u>0</u>	<u>.025</u>
5,000	<u>0</u>	<u>.02</u>	<u>0</u>	<u>.02</u>
15,000	<u>-0.4</u>	<u>.04</u>	<u>-0.5</u>	<u>.03</u>
IMD	<u>.025%</u>		<u>.03%</u>	
NOISE	<u>-85.5 dB</u>		<u>-86 dB</u>	

HEADPHONE CIRCUITS

<u>FREQUENCY</u> <u>(Hz)</u>	<u>LEFT CHANNEL</u>		<u>RIGHT CHANNEL</u>	
	<u>RESPONSE</u> -db	<u>THD</u> -%	<u>RESPONSE</u> -db	<u>THD</u> -%
50	<u>-0.3</u>	<u>.13</u>	<u>-0.3</u>	<u>.14</u>
1,000	<u>0</u>	<u>.025</u>	<u>0</u>	<u>.025</u>
5,000	<u>0</u>	<u>.02</u>	<u>0</u>	<u>.02</u>
15,000	<u>-0.4</u>	<u>.03</u>	<u>-0.4</u>	<u>.03</u>
IMD	<u>.015%</u>		<u>.035%</u>	
NOISE	<u>-87 dB</u>		<u>-83 dB</u>	

MICROPHONE CIRCUITS

<u>FREQUENCY</u> <u>(Hz)</u>	<u>MIC-1</u>		<u>MIC-2</u>	
	<u>RESPONSE</u> -db	<u>THD</u> -%	<u>RESPONSE</u> -db	<u>THD</u> -%
50	<u>-0.5</u>	<u>.085</u>	<u>-0.6</u>	<u>.09</u>
1,000	<u>0</u>	<u>.04</u>	<u>0</u>	<u>.04</u>
5,000	<u>+0.1</u>	<u>.06</u>	<u>+0.1</u>	<u>.055</u>
15,000	<u>-0.2</u>	<u>.06</u>	<u>-0.1</u>	<u>.055</u>
IMD	<u>.04%</u>		<u>.04%</u>	
NOISE	<u>-75 dB</u>		<u>-75 dB</u>	

RETURN MATERIAL AUTHORIZATION

NO. RMA-

Issued to:

Date: _____

Radio
195
Tucson

IMPORTANT NOTICE

Goods will not be accepted at our plant unless the outside of the package bears the above RMA number.

You are hereby authorized to return the following material to us for:

() REPAIR () REPLACEMENT () CREDIT

Return material via _____ transportation charges **PREPAID**.

Material originally ordered on your Order No. _____ our _____

Quantity	Description	Remarks

Replacement prior to examination of claimed defective part or parts in no way admits coverage of claim by warranty. We reserve the right to charge for repairs or replacements which are made necessary through no fault of our own.

CANARY COPY of this permit to be retained for your file.

WHITE COPY of this permit **MUST** be returned to us with material and signed by an official to whom we can address correspondence.

K... ..
Name of Company

CONTINENTAL ELECTRONICS MFG. CO.
4212 South Buckner Blvd.
Dallas, Texas

Signature

By _____

