

INSTRUCTION MANUAL

4V50 Audio Console

November 1983

IM No. 597-0452



BROADCAST ELECTRONICS INC.

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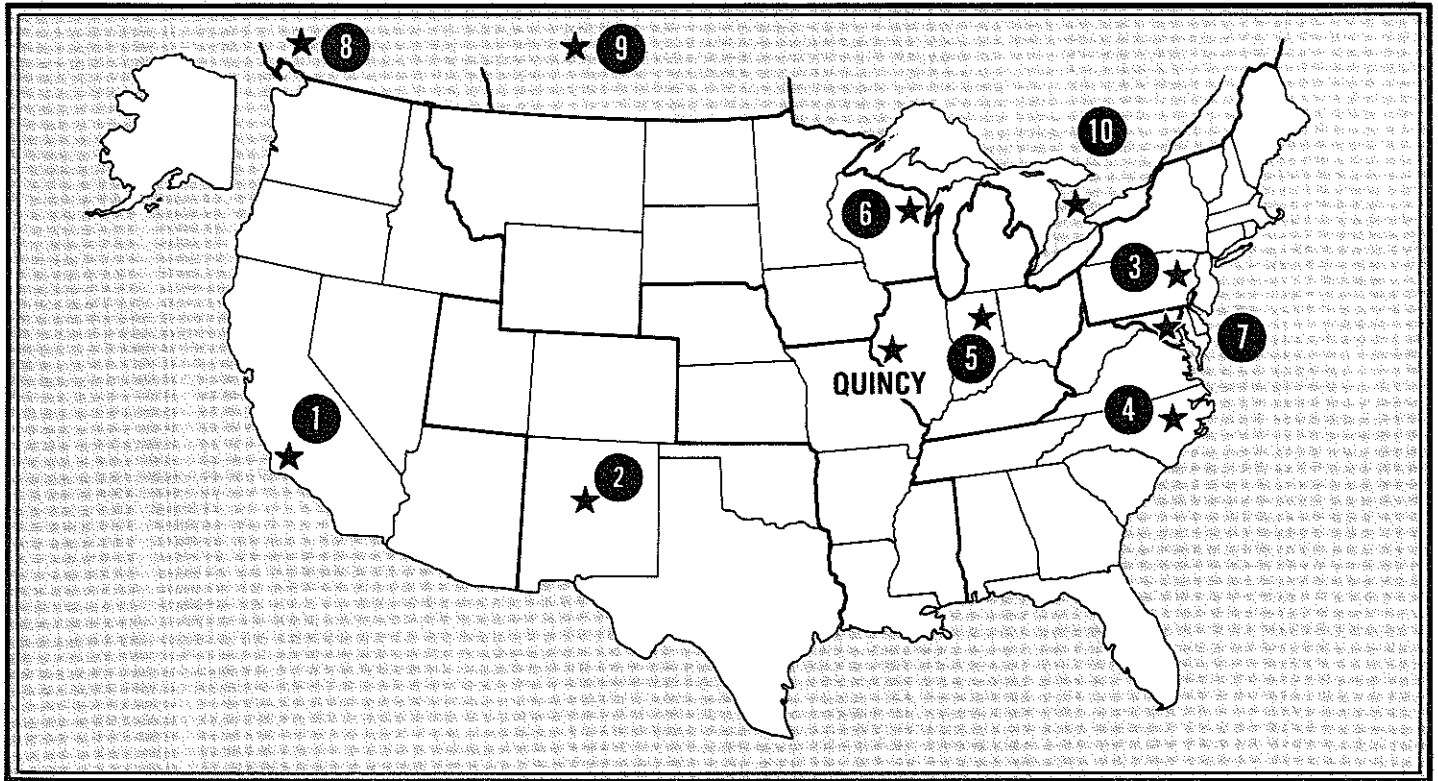
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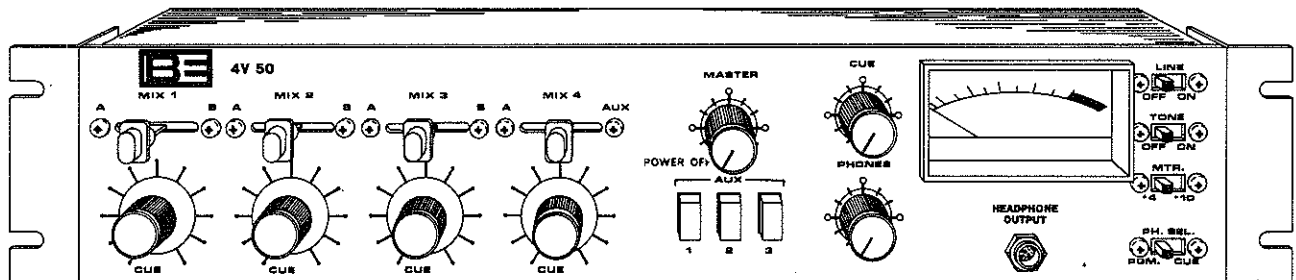
TECHNICAL MANUAL

597-0452

BROADCAST ELECTRONICS

MODEL 4V50

AUDIO CONSOLE



597-0452-1

4V50 - FOUR MIXER MONOPHONIC AUDIO CONSOLE - 938-2000

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SECTION I GENERAL INFORMATION

1-1. SCOPE OF MANUAL.

1-2. This manual provides installation, operation, and maintenance procedures for the Broadcast Electronics 4V50 Audio Console.

1-3. DESCRIPTION AND FEATURES.

1-4. The 4V50 audio console is a dual-channel four mixer monophonic device designed for use in CATV, CCTV, film studios, commercial sound installations, dubbing facilities, etc.

1-5. This console accepts ten inputs: seven inputs which are externally switchable for either HI (line) or LO (microphone) sources, and three inputs which accept HI level sources only. Mixer 1, mixer 2, and mixer 3 accept two inputs each, all level switchable. Mixer 4 has four inputs: one is level switchable and the other three (AUX) inputs are the HI level only inputs. Mixer 1 is designed with an FET mute circuit for use with studio microphones.

1-6. Monitoring features in the 4V50 include a VU meter, front panel headphone jack, and an internal cue speaker. The VU meter can operate at either +10 dBm or +4 dBm output with a \emptyset VU indication. The headphone circuit will monitor either the program or cue channel. An internal 1kHz generator is designed into the 4V50 for calibration of the VU meter and testing circuitry.

1-7. Installation is simplified since most connections are made to rear panel terminal strips. Input connectors and the corresponding level switches, output posts, PA output, and the PA level control are found on the rear panel.

1-8. SPECIFICATIONS.

1-9. Electrical and physical specifications for the 4V50 audio console are presented in Table 1-1.

TABLE 1-1. ELECTRICAL AND PHYSICAL SPECIFICATIONS
(Sheet 1 of 2)

PARAMETER	SPECIFICATIONS
<u>INPUT LEVELS</u>	
Low Level (MIC)	-50 dBm normal range, -38 dBm Maximum, 150 Ohms input impedance, balanced transformer input.
High Level (LINE)	\emptyset dBm normal range, +10 dBm Maximum, 20 k Ohm balanced bridging input impedance.

TABLE 1-1. ELECTRICAL AND PHYSICAL SPECIFICATIONS
(Sheet 2 of 2)

PARAMETER	SPECIFICATIONS
<u>OUTPUTS</u>	
Program	600 Ohms balanced line. +24 dBm maximum.
Cue	1.0 Watt Maximum into 8 Ohms, FET muted by Channel 1. Internal and/or external speaker.
Headphone	1.0 Watt Maximum into 8 Ohms. Less than 0.75% harmonic distortion. Frequency Response: 50 Hz to 20 kHz ± 1.5 dB.
PA (Monitor)	10 k Ohms unbalanced @ 0.45V, +8 dBm program output level.
<u>FREQUENCY RESPONSE</u>	50 Hz to 20 kHz ± 1 dB. 30 Hz to 20 kHz ± 1.5 dB.
<u>DISTORTION</u>	
Harmonic	Less than 0.2% from 30 Hz to 20 kHz at +18 dBm output. Rises to 0.5% at +24 dBm output.
Intermodulation	Less than 0.05% up to +18 dBm output (4:1, 60 Hz/7 kHz).
<u>SIGNAL-TO-NOISE RATIO</u>	70 dB or better below +18 dBm output with a +0 dBm level signal applied to any high-level input (75 dB A-weighted). 65 dB or better below +18 dBm output with a -50 dBm level signal applied to any low-level input (68 dB A-weighted).
<u>POWER REQUIREMENTS</u>	115/230V ac, 50/60 Hz, 11 Watts Maximum
<u>DIMENSIONS</u>	19 inches Wide, 10 inches Deep, 3.5 inches High (48.3 X 25.4 X 8.9 cm) EIA Standard 19 inch rack mounting.

SECTION II INSTALLATION

2-1. INTRODUCTION.

2-2. This section contains information required for installation of the 4V50 Console.

2-3. The equipment becomes the property of the customer when the equipment is delivered to the carrier. Carefully unpack the console and perform a visual inspection to determine if any damage was incurred during shipment. All shipping materials should be retained until it is determined that the unit has not been damaged. Claims for damaged equipment must be filed against the carrier promptly or the carrier may not accept the claim.

2-4. INSTALLATION.

2-5. MOUNTING.

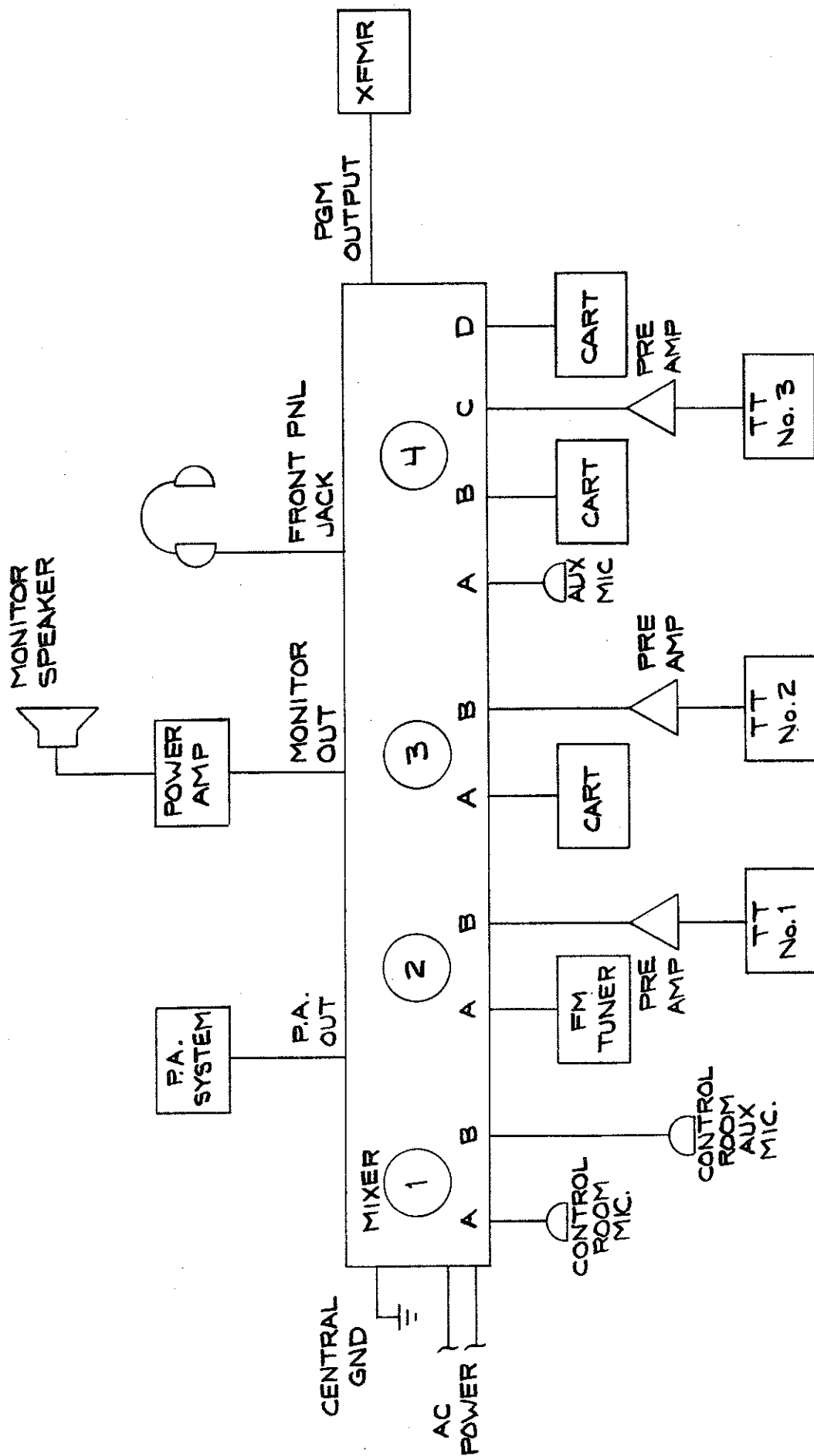
2-6. The console should be placed within convenient access of the operator and within easy access of power and audio cabling. The 4V50 console is intended for rack mounting in a standard EIA 19 inch (48.26 cm) rack with 3 1/2 inches (8.9 cm) of vertical space.

2-7. Select a height for rack mounting that allows easy operator access. Ventilation must be provided as required to prevent the ambient temperature from exceeding 120°F (48.49°C) for best operation. To minimize noise, equipment having 50 or 60 Hz radiation should not be mounted directly above or below the unit.

2-8. ASSIGNMENT OF INPUTS AND OUTPUTS.

2-9. Electrical installation is primarily controlled by the levels of the input signals, the need for microphone muting and separation of various signals.

2-10. Operationally, input sources used simultaneously (mixed), cross faded, or used in rapid sequence should be on separate mixers. Conversely, two inputs rarely or never used in conjunction with each other may be assigned to the same mixer. Examples are provided in Figure 2-1. Each turntable is assigned to a separate mixer so that records may be sequenced or mixed easily. The control room microphone is connected to Mixer 1 so that the built-in FET muting circuitry may be utilized.



597-0452-2

FIGURE 2-1. REPRESENTATIVE STUDIO EMPLOYING MONOPHONIC 4V50 CONSOLE

2-11. WIRING.

WARNING

DO NOT CONNECT AC POWER UNTIL INSTALLATION IS COMPLETE.

2-12. GENERAL. Audio connections to the console should be made with a 2-conductor shielded cable such as Belden 8441, Alpha 2400, etc. Separate the cables carrying different signal levels as much as possible. Separate microphone cables from high-level cabling and all inputs from speaker wiring.

2-13. Similarly, run audio and power cables as far apart as possible. Use the appropriate type wire for power cables. If practical, wire the power connections with shielded cables to prevent ac coupling to audio cables.

2-14. GROUNDING. The most important consideration in ensuring low noise performance from the unit is the grounding and shielding of the various interconnections.

2-15. First, it is necessary to achieve a good ground for the console itself. This should be a central earth ground. If possible, connect the console to the transmitter RF ground. Alternately, connect it to a power line earth ground. The console ground post is located on the rear panel and should be connected to ground with a braided strap (such as Alpha 1235 or Belden 8657) or a solid copper strap.

2-16. Secondly, the grounding of the signal shields is recommended to avoid ground loops. To prevent ground loops, shields should be grounded at only one end of the cable. Generally this is done at the console. However, it may be best to ground the shield at the source equipment or even at a point between the source and the console. Particular care must be exercised to avoid unintended grounds at patch panels, at external switching arrangements, through uninsulated (case grounded) jacks on associated equipment, or from grounded racks or cabinets.

2-17. TERMINATIONS. Proper load or termination of transformer-coupled equipment is essential to ensure specified frequency response. The program outputs of the console require 600 Ohm terminations. This termination may be installed at the console. Proper terminations should be provided for other transformer-coupled equipment connected to the console.

2-18 INPUT LEVEL SENSITIVITY. Both channels on mixers 1 through 3 will accept low level (microphone) or high level (line) inputs. The level is determined by the position of the switches located on the rear panel of the console. Mixer 4 channel A is level switchable, but auxiliary inputs 1, 2, and 3 accept high level inputs only.

- 2-19. **INPUT WIRING.** The input connections are made to the marked terminal strips located in the rear panel of the console.
- 2-20. Balanced Inputs. Connect the high side to the + terminal and the low side to the - terminal. Connect the shields to the GND terminal common to the A and B inputs for a given mixer.
- 2-21. Unbalanced Inputs. Connect the high side to the + terminal. Connect the low side to the - terminal. Connect the shield to the GND terminal and strap the - terminal to the GND.
- 2-22. **PROGRAM OUTPUTS.** The program output is located on the rear panel. Connections may be made to either the color-coded binding posts or to the screw terminals.
- 2-23. Connect the high side to the + terminal or the green binding post, the low side to the - terminal or the red binding post, and the shield to ground.
- 2-24. **CUE.** An internal cue speaker is provided for monitoring purposes. If an external speaker is to be used, disconnect the internal speaker. Unsolder the lead from the speakers voice coil terminal and insulate the exposed end. An external cue speaker should be a high-efficiency 8 Ohm device.
- 2-25. To mute the internal cue speaker, short the + and GND MUTE screw terminal on the rear panel.
- 2-26. **MONITOR OUTPUTS.** External monitoring output terminals are provided on the rear panel. Both the EXT OUT and the MON screw terminal provide unbalanced outputs. These two monitor outputs are wired in parallel to the MONITOR output phone jack.
- 2-27. An unbalanced cue output is also available at the rear panel terminal strip (CUE). This output is wired in parallel to the units internal cue speaker.
- 2-28. **AC POWER.**
- 2-29. The standard 4V50 console operates at 117V ac, 50/60 Hz. The transformer may be rewired for 220V service, refer to schematic DS911-0004. The console power switch is incorporated into the front panel MASTER switch. The fuse is located on the rear panel.
- 2-30. Ensure the power switch is in the OFF position and connect the console to the proper ac input source.

2-31. LEVEL SETTING AND VU METER CALIBRATION.

2-32. The consoles VU meter is calibrated at the factory to indicate 0 VU when the output level is +10 dBm and the front panel MTR switch is set accordingly. To verify the VU meter calibration proceed as follows:

- A. Operate the front panel MASTER switch to the ON position to apply power to the console. Adjust the control to the 12 o'clock position.
- B. Connect an external VU meter to the rear panel program output.
- C. Provide a 600 Ohm termination for the output.
- D. Operate the front panel TONE switch to the ON position to activate the internal 1kHz tone generator.
- E. Adjust the internal tone generator level control, R82 on the circuit board, for a +10 dBm output as indicated on the external meter.

2-33. Following verification, the meter may be used when adjusting individual mixers to obtain a +10 dBm output level (0 VU indication) for each input.

SECTION III OPERATION

3-1. INTRODUCTION.

3-2. This section provides operating procedures for the 4V50 audio consoles.

3-3. OPERATION.

3-4. The main power switch is incorporated in the MASTER gain control switch. Rotate the control clockwise from the POWER OFF position to apply power to the console. The MASTER gain control should then be rotated to the 12 o'clock position.

3-5. The LINE switch located to the right of the VU meter switches the balanced program output. In the OFF position, the program output is disconnected, but the MONITOR and the PA outputs are not affected.

3-6. INPUT SELECTION.

3-7. Two inputs may be connected to mixers 1, 2, and 3. Operate the input selection switch (MIX 1, MIX 2, MIX 3) to either the A or B position to feed the desired input to the mixer. Four inputs may be connected to mixer 4. If AUX is selected, depress one of the three high-level input switches (AUX 1, 2, 3).

3-8. LEVEL CONTROL.

NOTE

DO NOT ADJUST THE MASTER GAIN CONTROL DURING NORMAL OPERATION.

3-9. The mixers can be used to control level in two ways:

1. To keep each input at approximately the same volume.
2. To combine signals from two or more inputs in a desired relationship.

3-10. VU METER. The VU meter is an aid in determining the proper levels or volumes. Adjust the mixer(s) of active sources for a peak level indication of 0 VU (100). When mixing two or more inputs, adjust the mixers to yield the desired sound while maintaining a peak level indication of 0 VU.

3-11. MONITORING.

3-12. HEADPHONES. The monitor system is made up of three parts: the headphone system, the internal cue speaker system, and the MONITOR output.

CAUTION

HEADPHONE AMPLIFIER LOAD IMPEDANCE SHOULD NOT BE LESS THAN 8 OHMS.

3-13. The headphone jack on the front panel will accept a wide variety of head sets, including low impedance stereo headphones. When using stereo headphones with the 4V50 console, only one channel of the headphones will be active.

NOTE

THE HEADPHONE OUTPUT JACK IS NOT FET MUTED BY ACTIVATION OF MIXER 1.

3-14. The headphones may be used to monitor either the program or the cue output. The PH. SEL. switch determines which output is monitored. Headset volume is controlled by the phone level control.

3-15. CUE SYSTEM. The internal speaker only monitors the cue system. It is activated by setting a mixer to the CUE position. All mixer controls have a CUE position at the extreme counterclockwise stop. Rotate the mixer to this position to connect the input to the cue system. An internal cue speaker is provided for monitoring the cue system as are headphone jacks. The volume of the cue speaker is determined by the setting of CUE control to the left of the VU meter. The cue speaker is muted by the activation of the input selector switch for mixer 1.

3-16. MONITOR. Two MONITOR outputs are provided on the rear panel for use with an external amplifier and speaker. The MONITOR jack and the EX OUT screw terminal allow monitoring of the program output only.

3-17. MISCELLANEOUS. A PA OUTPUT is provided as an auxiliary program output for use with an input to a public address system. A level control is also provided (PA LEVEL) on the rear panel.

SECTION IV THEORY OF OPERATION

4-1. INTRODUCTION.

4-2. This section details the theory of operation of the 4V50 Console. Refer to schematic D911-0004 for the following discussion.

4-3. CIRCUIT DESCRIPTION.

4-4. The 4V50 is a rack mounted, monophonic, four mixer unit. Mixers 1, 2, and 3 have two inputs, each switchable for HI or LO levels. Mixer 4 has one level-switchable input and three auxiliary inputs (HI level only).

4-5. Each mixer has a transformer coupled input, followed by an integrated circuit amplifier, U1, U2, U3, and U4. Mixer potentiometers are placed between sections A and B of the input integrated circuits. The output of all mixer amplifiers are connected to a common bus. (In addition to the mixer amplifier, a 1kHz tone generator, which is enabled by switch S9, is connected to this bus by R82. All mixers have a CUE position at the extreme counterclockwise position. From the common bus, the signal is first routed to a FET switch which will mute the CUE signal when the input selector switch for mixer 1 is activated. Therefore, any microphones located at or near the console for announcing purposes should be used with mixer 1 to take advantage of the muting feature. Mixers 2, 3, and 4 do not have this muting feature.

4-6. The volume of the CUE signal is controlled by the CUE control on the front panel and connected to the internal cue speaker. In addition to the built-in speaker, the cue signal is available at the PHONE jack when the PHONE SELECT switch is in the CUE position. Volume is controlled by PHONE gain control, R74. With the PHONE selector in the PROGRAM position, the output program line is sampled.

4-7. The signal for the program bus is first applied to amplifier U5A and then connected to the MASTER GAIN control, R87. From there it is routed to the line driver consisting of U5B, Q1, and Q2. The signal at this point is also connected to output jack J1 located below the VU meter. Output transformer T5, provides isolation and proper impedance matching. An additional output signal from the program line is available at PA OUT terminals. Level is adjusted by control P1, on the back panel. LINE switch S8 on the front panel allows the interruption of the program line only.

4-8. The VU meter will measure the voltage level at the output terminals of the program line and can be switched, by S10, to indicate \emptyset VU with a line level of either +10 dBm or +4 dBm. The console has a self-contained power supply which provides the necessary regulated dc voltages of +30V and +15V, and an unregulated voltage of +17V for the headphone and cue amplifiers.

SECTION V MAINTENANCE

5-1. INTRODUCTION.

5-2. This section provides general maintenance information for the Broadcast Electronics 4V50 Audio Console.

5-3. GENERAL MAINTENANCE.

5-4. General maintenance of the 4V50 console falls into the category of good housekeeping, which consists of procedures performed on a regular basis to maintain the correct operational environment for the console.

WARNING

DISCONNECT POWER PRIOR TO SERVICING.

5-5. CLEANING.

5-6. Use a soft cloth moistened with a mild household cleaner to remove fingerprints and other marks from the machine chassis. The mixer control are sealed units and do not require cleaning. Lever switches may be cleaned, if required, with an aerosol spray contact cleaner.

5-7. VISUAL INSPECTION.

5-8. Regularly inspect the console for loose connections and hardware, damaged or improperly seated semi-conductors, and components damaged by over heating.

5-9. SPECIFICATION MEASUREMENTS.

5-10. A specification test performed periodically is a good way to check for proper operation of the console. A copy of the original factory specifications test results can be obtained from Broadcast Electronics by returning the test certification card which is supplied with the unit.

5-11. These specification tests are performed at the factory with a 0 dBm signal supplied to a high level input. The gain controls are adjusted to yield a +18 dBm output. Active inputs and outputs are terminated with the proper load. When measuring the signal-to-noise ratio, the input signal should be disconnected.

5-12. TROUBLESHOOTING.

5-13. When determining the cause of a fault in the console it is necessary to isolate the fault to a particular section. Begin by determining if the power supply is functioning by performing an actual voltage check. Next, check for signal presence in the program and cue channels.

5-14. The major faults which occur on circuit boards are the failure of integrated circuits or shorted capacitors. Test the integrated circuits by measuring the dc voltage present on the IC input and output pins using a Simpson 260 or equivalent Volt Ohmmeter. This voltage should be one-half the dc voltage present at the integrated circuit's dc supply voltage input pin (+V). With all power off, test capacitors with an Ohmmeter.

5-15. COMPONENT REPLACEMENT ON CIRCUIT BOARDS. Circuit board repair requires that defective components be removed carefully to avoid damage to the board.

5-16. On all circuit boards, the adhesive securing the copper track to the board melts at almost the same temperature at which solder melts. A circuit board track can be destroyed by excessive heat or lateral movement during soldering. Use of a small iron with steady pressure is required for circuit board repairs.

5-17. To remove a component from a circuit board, cut the leads from the body of the defective component while the device is still soldered to the board.

5-18. Grip each component lead, one at a time, with long nose pliers. Turn the board over and touch a soldering iron to the lead at the solder connection. When the solder begins to melt, push the lead through the back side of the board and cut off the bent-over outer end of the lead. Each lead may now be heated independently and pulled out of each hole. The holes may be cleared of solder by carefully re-heating with a low wattage iron and removing the residual solder with a soldering vacuum tool.

5-19. Install the new component and apply solder from the bottom side of the board.

WARNING

MOST SOLVENTS WHICH WILL REMOVE ROSIN FLUX ARE VOLATILE AND TOXIC BY THEIR NATURE AND SHOULD BE USED ONLY IN SMALL AMOUNTS IN A WELL VENTILATED AREA, AWAY FROM FLAME, INCLUDING CIGARETTES AND A HOT SOLDERING IRON.

WARNING

WARNING

WARNING

OBSERVE THE MANUFACTURER'S CAUTIONARY INSTRUCTIONS.

5-20. After soldering, remove flux with a cotton swab moistened with a suitable solvent. Rubbing alcohol is highly diluted and is not effective. Solvents are available in electronic supply houses which are useful.

5-21. The board should be checked to ensure the flux has been removed and not just smeared about. Rosin flux is not normally corrosive, but rosin will absorb enough moisture in time to become conductive and cause problems.

5-22. PARTS LISTS.

5-23. Replacement parts for 4V50 consoles are listed in Tables 5-1 and 5-2.

5-24. DRAWINGS.

5-25. The following drawings are contained in this section as aids to maintenance:

<u>FIGURE</u>	<u>DESCRIPTION</u>	<u>NUMBER</u>
5-1	4V50 CONSOLE SCHEMATIC DIAGRAM	SD911-0004
5-2	4V50 CONSOLE ASSEMBLY DRAWING	AD911-0004

TABLE 5-1. FINAL ASSEMBLY 4V50 CONSOLE - 938-2000

REF. DES.	DESCRIPTION	PART NO.	QTY.
F1	Fuse, 1/4 Ampere, Slow-Blow	330-0250	1
J1,J2	Phone Jack, 2 Conductor (MONITOR, Front Panel)	417-0111	2
J3	Phono Jack, (PA OUT)	417-0135	1
M1	VU Meter <i>FS=2000A (900A movement)</i>	319-1002	1
P1	Potentiometer, 10 k Ohm (PA VOLUME)	191-1053C	1
P2	Potentiometer, 100 k Ohm W/ON-OFF Switch (MASTER)	190-1063	1
P3,P4	Potentiometer, 10 k Ohm (CUE, PHONES)	191-1053C	2
P5 THRU P8	Potentiometer, 10 k Ohm, Sealed Mixer (CUE)	193-1053B	4
R1 THRU R49	Resistor, 10 k Ohm $\pm 5\%$, 1/4W	100-1053	18
R56	Resistor, 1 k Ohm $\pm 5\%$, 1/4W	100-1043	1
R62,R69	Resistor, 10 k Ohm $\pm 5\%$, 1/4W	100-1053	2
R71	Resistor, 8.06 k Ohm $\pm 1\%$, 1/4W	103-8064	1
R84,R85	Resistor, 10 k Ohm $\pm 5\%$, 1/4W	100-1053	2
R98	Resistor, 620 Ohm $\pm 5\%$, 1/4W	100-6233	1
S1 THRU S11	Switch, Slide, DPDT, 125V ac @ 1 Ampere (HI/LO LEVEL, LINE ON/OFF, TONE ON/OFF, MTR +4/+10, PH.SEL. PGM/CUE)	345-0126	11
S12 THRU S15	Switch, Lever, 3 Pole, 3 Position (MIX 1 A/B, MIX 2 A/B, MIX 3 A/B, and MIX 4 A/AUX)	343-3001	4
S16	Switch, DPDT, 3 Station, Interlocked, Push, 25W Maximum, 0.125 Ampere @ 110/120V ac, Resistive Load (AUX 1, 2, 3)	343-1202	1
T6	Transformer, Power Primary: 115/230V ac, 50/60 Hz Secondary: +34V dc +17V dc	370-0090	1
TS1,TS2	Barrier Strip, 20 Position	412-0020	2
XF1	Fuse Holder	415-2012	1
----	Speaker Cue, 3 inch	414-0001	1
----	4V50 Circuit Board Assembly (Table 5-2)	911-0004	1

TABLE 5-2. 4V50 CIRCUIT BOARD ASSEMBLY - 911-0004
(Sheet 1 of 3)

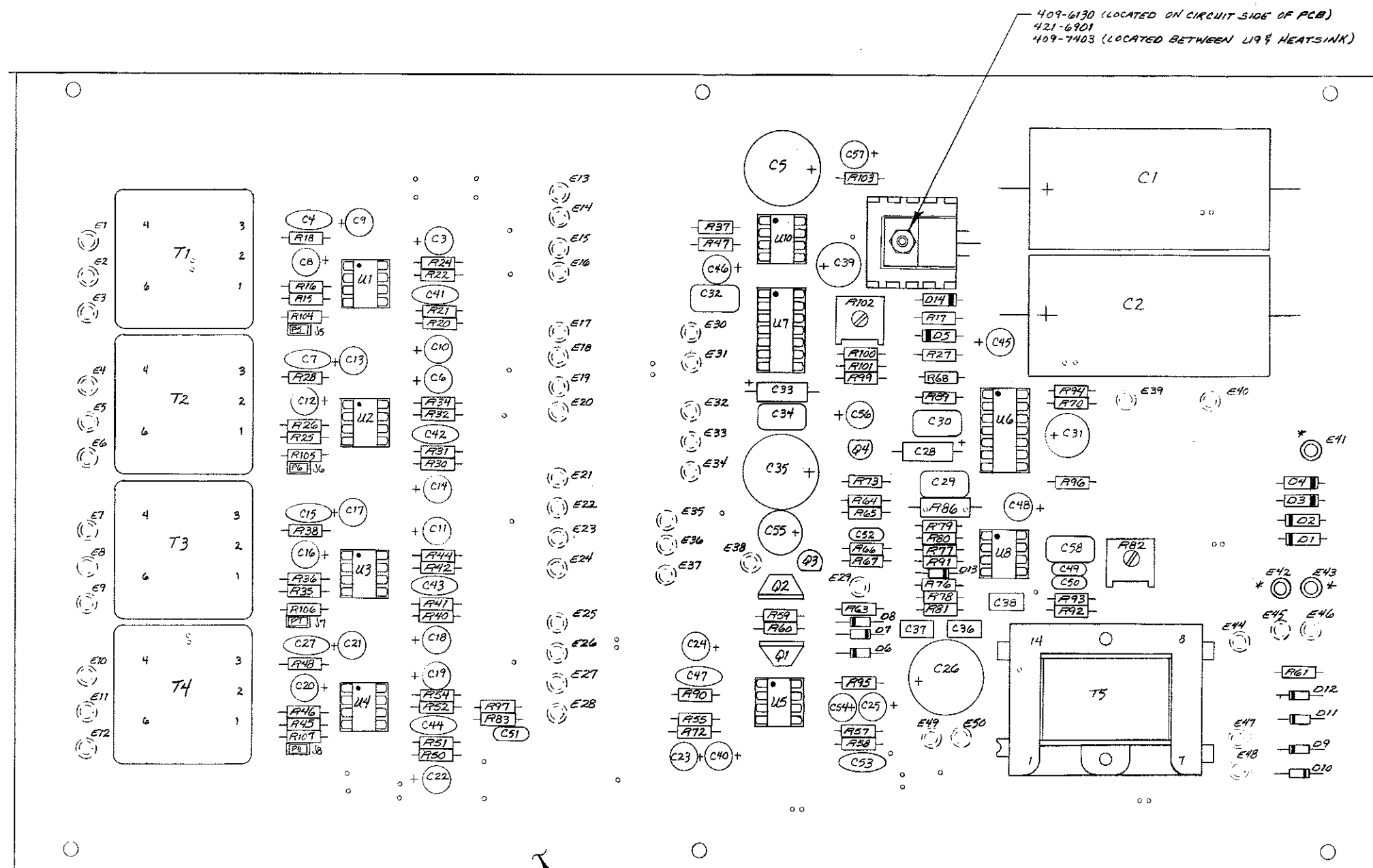
REF. DES.	DESCRIPTION	PART NO.	QTY.
C1,C2	Capacitor, Electrolytic, 4700 uF, 50V	014-4793	2
C3	Capacitor, Electrolytic, 10 uF, 35V	023-1076	1
C4	Capacitor, Ceramic Disc, 5 pF, 500V	001-5004	1
C5	Capacitor, Electrolytic, 470 uF, 35V	024-4773	1
C6	Capacitor, Electrolytic, 10 uF, 35V	023-1076	1
C7	Capacitor, Ceramic Disc, 5 pF, 500V	001-5004	1
C8 THRU C14	Capacitor, Electrolytic, 10 uF, 35V	023-1076	7
C15	Capacitor, Ceramic Disc, 5 pF, 500V	001-5004	1
C16 THRU C25	Capacitor, Electrolytic, 10 uF, 35V	023-1076	10
C26	Capacitor, Electrolytic, 470 uF, 35V	024-4773	1
C27	Capacitor, Ceramic Disc, 5 pF, 500V	001-5004	1
C28	Capacitor, Electrolytic, 22 uF, 25V	013-2574	1
C29,C30	Capacitor, Mylar, 0.1 uF, 100V	030-1053	2
C31	Capacitor, Electrolytic, 100 uF, 25V	023-1084	1
C32	Capacitor, Mylar, 0.1 uF, 100V	030-1053	1
C33	Capacitor, Electrolytic, 22 uF, 25V	013-2574	1
C34	Capacitor, Mylar, 0.1 uF, 100V	030-1053	1
C35	Capacitor, Electrolytic, 470 uF, 35V	024-4773	1
C36 THRU C38	Capacitor, Mylar, 0.047 uF, 100V	030-4743	3
C39	Capacitor, Electrolytic, 100 uF, 25V	023-1084	1
C40	Capacitor, Electrolytic, 10 uF, 35V	023-1076	1
C41 THRU C44	Capacitor, Ceramic Disc, 5 pF, 500V	001-5004	4
C45,C46	Capacitor, Electrolytic, 10 uF, 35V	023-1076	2
C47	Capacitor, Ceramic Disc, 10 pF $\pm 10\%$, 1 kV	001-1014	1
C48	Capacitor, Electrolytic, 10 uF, 35V	023-1076	1
C49	Capacitor, Mylar, 0.022 uF, 200V	031-2243	1
C50,C51	Capacitor, Mylar, 0.01 uF, 100V	030-1043	2
C52	Capacitor, Mylar, 0.022 uF, 200V	031-2243	1
C53	Capacitor, Ceramic Disc, 10 pF $\pm 10\%$, 1 kV	001-1014	1
C54	Capacitor, Electrolytic, 10 uF, 35V	023-1076	1
C55	Capacitor, Electrolytic, 100 uF, 50V	020-1083	1
C56,C57	Capacitor, Electrolytic, 10 uF, 35V	023-1076	2
C58	Capacitor, Mylar, 0.1 uF, 100V	030-1053	1
D1 THRU D5	Diode, 1N4005, Rectifier, Silicon, 600V @ 1 Ampere	203-4005	5
D6 THRU D8	Diode, 1N4148, Silicon, 75V @ 0.3 Ampere	203-4148	3
D9 THRU D12	Diode, 1N60, Germanium, 25V @ 50 mA	202-0060	4
D13	Diode, 1N4148, Silicon, 75V @ 0.3 Ampere	203-4148	1
D14	Diode, 1N4005, Rectifier, Silicon, 600V @ 1 Ampere	203-4005	1
J5 THRU J8	Connector, Header, 2-Pin	417-4004	4
P5 THRU P8	Jumper, Programmable (Secondary Gain Control)	340-0004	4

TABLE 5-2. 4V50 CIRCUIT BOARD ASSEMBLY - 911-0004
(Sheet 2 of 3)

REF. DES.	DESCRIPTION	PART NO.	QTY.
Q1	Transistor, MPSU55, Silicon, PNP	210-0155	1
Q2	Transistor, MPSUC5, Silicon, NPN	211-0005	1
Q3	Transistor, 2N3904, Silicon, NPN, TO-92 Case	211-3904	1
Q4	Transistor, J271, Silicon, N-Channel, FET	210-0271	1
R14	Resistor, 10 k Ohm $\pm 1\%$, 1/4W	100-1051	1
R15	Resistor, 100 k Ohm $\pm 1\%$, 1/4W	103-1062	1
R16	Resistor, 4.02 k Ohm $\pm 1\%$, 1/4W	103-4024	1
R17	Resistor, 121 Ohm $\pm 1\%$, 1/4W	100-1231	1
R18,R20	Resistor, 49.9 k Ohm $\pm 1\%$, 1/4W	103-4951	2
R21	Resistor, 10 k Ohm $\pm 1\%$, 1/4W	100-1051	1
R22	Resistor, 121 k Ohm $\pm 1\%$, 1/4W	103-1261	1
R24	Resistor, 10 k Ohm $\pm 1\%$, 1/4W	100-1051	1
R25	Resistor, 100 k Ohm $\pm 1\%$, 1/4W	102-1062	1
R26	Resistor, 4.02 k Ohm $\pm 1\%$, 1/4W	103-4024	1
R27	Resistor, 2.8 k Ohm $\pm 1\%$, 1/4W	103-2804	1
R28,R30	Resistor, 49.9 k Ohm $\pm 1\%$, 1/4W	103-4951	2
R31	Resistor, 10 k Ohm $\pm 1\%$, 1/4W	100-1051	1
R32	Resistor, 121 k Ohm $\pm 1\%$, 1/4W	103-1261	1
R34	Resistor, 10 k Ohm $\pm 1\%$, 1/4W	100-1051	1
R35	Resistor, 100 k Ohm $\pm 1\%$, 1/4W	103-1062	1
R36	Resistor, 4.02 k Ohm $\pm 1\%$, 1/4W	103-4024	1
R37	Resistor, 10 k Ohm $\pm 1\%$, 1/4W	100-1051	1
R38,R40	Resistor, 49.9 k Ohm $\pm 1\%$, 1/4W	103-4951	2
R41	Resistor, 10 k Ohm $\pm 1\%$, 1/4W	100-1051	1
R42	Resistor, 121 k Ohm $\pm 1\%$, 1/4W	103-1261	1
R45	Resistor, 100 k Ohm $\pm 1\%$, 1/4W	103-1062	1
R46	Resistor, 4.02 k Ohm $\pm 1\%$, 1/4W	103-4024	1
R47	Resistor, 10 k Ohm $\pm 1\%$, 1/4W	100-1051	1
R48,R50	Resistor, 49.9 k Ohm $\pm 1\%$, 1/4W	103-4951	2
R51	Resistor, 10 k Ohm $\pm 1\%$, 1/4W	100-1051	1
R52	Resistor, 121 k Ohm $\pm 1\%$, 1/4W	103-1261	1
R54	Resistor, 10 k Ohm $\pm 1\%$, 1/4W	100-1051	1
R55	Resistor, 100 k Ohm $\pm 5\%$, 1/4W	100-1063	1
R57	Resistor, 6.8 k Ohm $\pm 5\%$, 1/4W	100-6843	1
R58	Resistor, 20 k Ohm $\pm 5\%$, 1/4W	100-2053	1
R59,R60	Resistor, 10 Ohm $\pm 5\%$, 1/4W	100-1023	2
R61	Resistor, 3.6 k Ohm $\pm 5\%$, 1/4W	100-3643	1
R63	Resistor, 5.1 k Ohm $\pm 5\%$, 1/4W	100-5143	1
R64 THRU R66	Resistor, 10 k Ohm $\pm 5\%$, 1/4W	100-1053	3
R67	Resistor, 2 Meg Ohm $\pm 5\%$, 1/4W	100-2073	1
R68	Resistor, 10 k Ohm $\pm 5\%$, 1/4W	100-1053	1
R70	Resistor, 2.7 Ohm $\pm 5\%$, 1/4W	100-2713	1
R72	Resistor, 49.9 k Ohm $\pm 1\%$, 1/4W	103-4951	1
R73	Resistor, 2.7 Ohm $\pm 5\%$, 1/4W	100-2713	1
R76	Resistor, 10 k Ohm $\pm 5\%$, 1/4W	100-1053	1
R77	Resistor, 100 k Ohm $\pm 5\%$, 1/4W	100-1063	1

TABLE 5-2. 4V50 CIRCUIT BOARD ASSEMBLY - 911-0004
(Sheet 3 of 3)

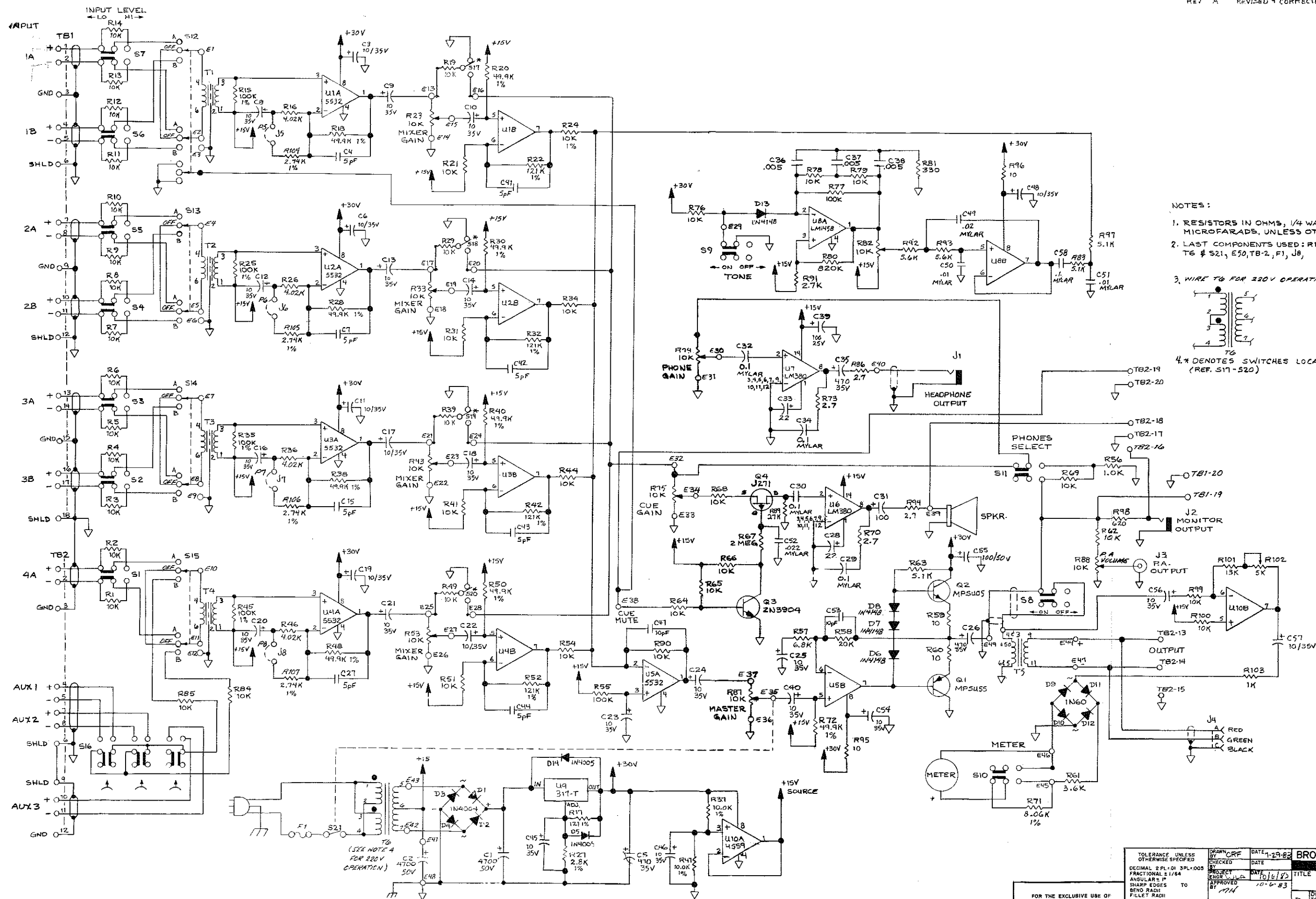
REF. DES.	DESCRIPTION	PART NO.	QTY.
R78,R79	Resistor, 10 k Ohm $\pm 5\%$, 1/4W	100-1053	2
R80	Resistor, 820 k Ohm $\pm 5\%$, 1/4W	100-8263	1
R81	Resistor, 330 Ohm $\pm 5\%$, 1/4W	100-3323	1
R82	Potentiometer, 10 k Ohm $\pm 10\%$, 1/2W	177-1054	1
R86	Resistor, 2.7 Ohm $\pm 5\%$, 1/4W	100-2713	1
R87	Resistor, 5.1 k Ohm $\pm 5\%$, 1/4W	100-5143	1
R89	Resistor, 27 k Ohm $\pm 5\%$, 1/4W	100-2753	1
R90	Resistor, 10 k Ohm $\pm 1\%$, 1/4W	100-1051	1
R91	Resistor, 2.7 k Ohm $\pm 5\%$, 1/4W	100-2743	1
R92,R93	Resistor, 5.6 k Ohm $\pm 5\%$, 1/4W	100-5643	2
R94	Resistor, 2.7 Ohm $\pm 5\%$, 1/4W	100-2713	1
R95,R96	Resistor, 10 Ohm $\pm 5\%$, 1/4W	100-1023	2
R97	Resistor, 5.1 k Ohm $\pm 5\%$, 1/4W	100-5143	1
R99,R100	Resistor, 10 k Ohm $\pm 5\%$, 1/4W	100-1053	2
R101	Resistor, 13 k Ohm $\pm 5\%$, 1/4W	100-1353	1
R102	Potentiometer, 5 k Ohm $\pm 10\%$, 1/2W	177-5044	1
R103	Resistor, 1 k Ohm $\pm 5\%$, 1/4W	100-1043	1
R104 THRU R107	Resistor, 2.74 k Ohm $\pm 1\%$, 1/4W	103-2744	4
T1 THRU T4	Transformer, Audio Input Frequency Response: ± 0.5 dB @ 30 Hz to 20 kHz Primary: 150 Ohm Secondary: 100 k Ohm	376-0521	4
T5	Transformer, Audio Output, 30 Hz - 20 kHz Primary: 150 Ohm/600 Ohm Secondary: 600 Ohm	370-1217	1
U1 THRU U5	Integrated Circuit, NE5532, Dual Low Noise Operational Amplifier, 8-Pin DIP	221-5532	5
U6,U7	Integrated Circuit, LM380, Power Amplifier, 14-Pin DIP	222-3800	2
U8	Integrated Circuit, RC4559, Operational Amplifier, 8-Pin DIP	221-4559	1
U9	Integrated Circuit, LM317T, Adjustable Positive Voltage Regulator, 1.2V to 37V, T0-220 Case	227-0317	1
U10	Integrated Circuit, RC4559, Operational Amplifier, 8-Pin DIP	221-4559	1
XU1 THRU XU5, XU8, XU10	Socket, 8-Pin DIP	417-0804	7



NOTE:
1. TURRET TERMINALS MOUNTED ON
CIRCUIT SIDE OF PCB.
2. SEE SCHEMATIC *0911-0004
SEE B/M #911-0004

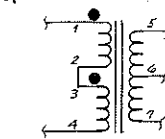
0511-0004
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- NOTES:
1. RESISTORS IN OHMS, 1/4 WATT; CAPACITORS IN MICROFARADS, UNLESS OTHERWISE NOTED.
 2. LAST COMPONENTS USED: R107, C58, D14, U10, Q4, T6, S21, E50, TB-2, F1, J8.

3. WIRE TG FOR 220V OPERATION AS FOLLOWS



4.* DENOTES SWITCHES LOCATED BEHIND AUDIO FADERS
(SEE 517-520)

FOR THE EXCLUSIVE USE OF BROADCAST ELECTRONICS, INC. PERSONNEL AND CUSTOMERS ALL RIGHTS RESERVED	TOLERANCE UNLESS OTHERWISE SPECIFIED DECIMAL 2 PL. 01 3 PL. 005 FRACTIONAL 3/164 ANGULAR ± 1° SHARP EDGES TO BEND RADIUS FILLET RADIUS	DRAWN BY <u>CRF</u> CHECKED PROJECT ENGINEER <u>WJD</u> APPROVED AT <u>10-6-83</u>	DATE <u>1-29-83</u> DATE <u>10/6/83</u> DATE <u>10-6-83</u>	BROADCAST ELECTRONICS INC.	
	MATERIAL	TREATMENT OR FINISH	TITLE SCHEMATIC 4-V-50 CONSOLE		D
			DWG NO 911-0004 4-V-50 SCALE	REV A	SHEET 1. OF 1

PRODUCT WARRANTY

LIMITED ONE YEAR

While this warranty gives you specific legal rights, which terminate one (1) year (6 months on turntable motors) from the date of shipment, you may also have other rights which vary from state to state.

Broadcast Electronics, Inc. ("BE"), 4100 North 24th Street, P. O. Box 3606, Quincy, Illinois 62305, hereby warrants cartridge machines, consoles, transmitters and other new Equipment manufactured by BE against any defects in material or workmanship at the time of delivery thereof, that develop under normal use within a period of one (1) year (6 months for turntable motors) from the date of shipment. Other manufacturers' Equipment, if any, shall carry only such manufacturers' standard warranty. This warranty extends to the original user and any subsequent purchaser during the warranty period. BE's sole responsibility with respect to any Equipment or parts not conforming to this warranty is to replace such equipment or parts upon the return thereof F.O.B. BE's factory or authorized repair depot within the period aforesaid.

In the event of replacement pursuant to the foregoing warranty, only the unexpired portion of the warranty from the time of the original purchase will remain in effect for any such replacement. However, the warranty period will be extended for the length of time that the original user is without the services of the Equipment due to its being serviced pursuant to this warranty. The terms of the foregoing warranty shall be null and void if the Equipment has been altered or repaired without specific written authorization of BE, or if Equipment is operated under environmental conditions or circumstances other than those specifically described in BE's product literature or instruction manual which accompany the Equipment purchased. BE shall not be liable for any expense of any nature whatsoever incurred by the original user without prior written consent of BE.

BE shall not be liable to the original user for any and all incidental or consequential damages for breach of either expressed or implied warranties. However, some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. All express and implied warranties shall terminate at the conclusion of the period set forth herein.

Except as set forth herein, and except as to title, there are no warranties, or any affirmations of fact or promises by BE, with reference to the Equipment, or to merchantability, fitness for a particular application, signal coverage, infringement, or otherwise, which extend beyond the description of the Equipment in BE's product literature or instruction manual which accompany the Equipment. Any card which is enclosed with the Equipment will be used by BE for survey purposes only.

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4100 North 24th Street, P. O. Box 3606, Quincy, Illinois 62305