

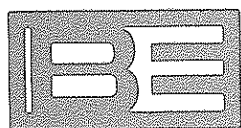
INSTRUCTION MANUAL

4000 MONOPHONIC
4100 STEREOPHONIC
MODULAR, VERTICAL-FADER
AUDIO CONSOLES

OCTOBER 1983

IM No. 597-4000

BROADCAST ELECTRONICS, INC.



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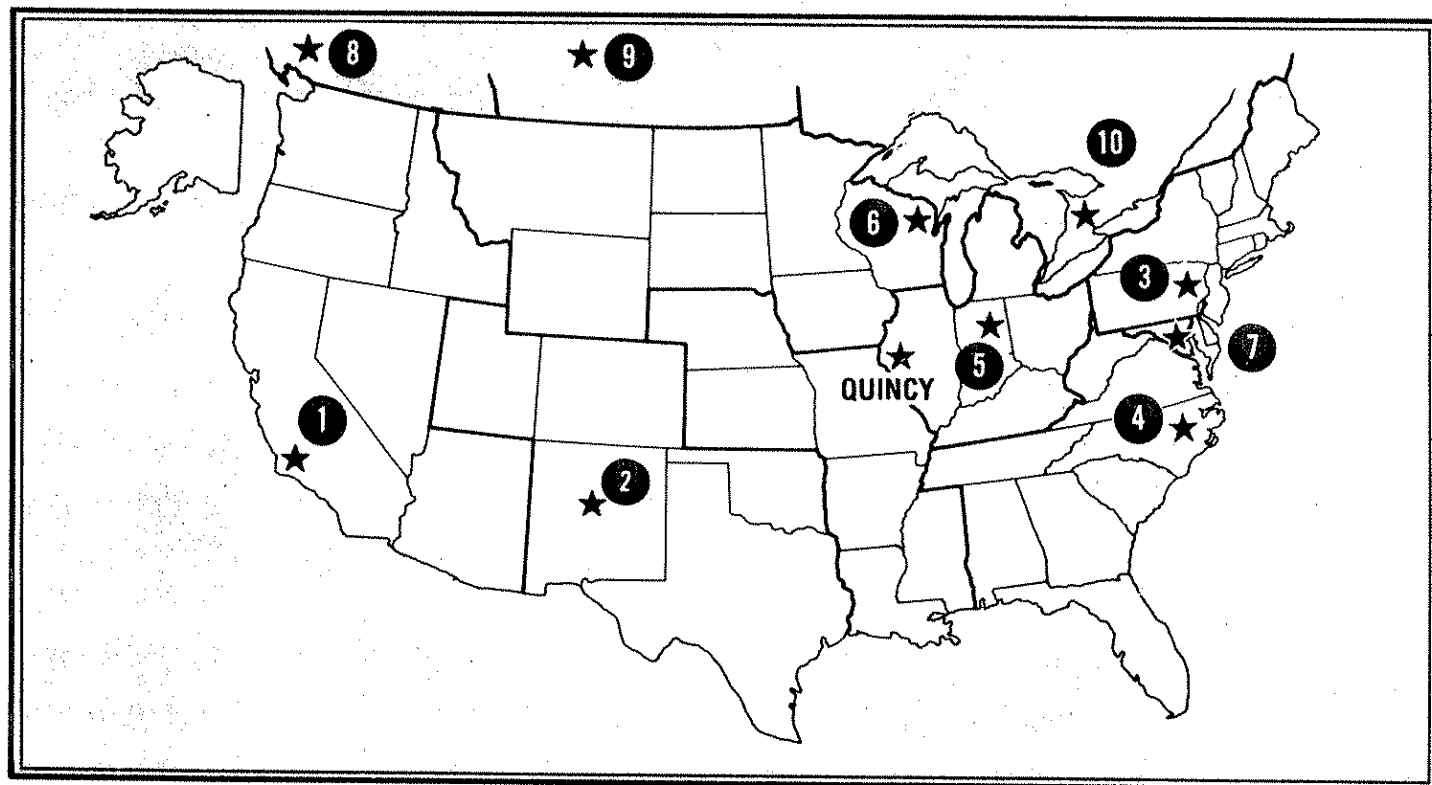
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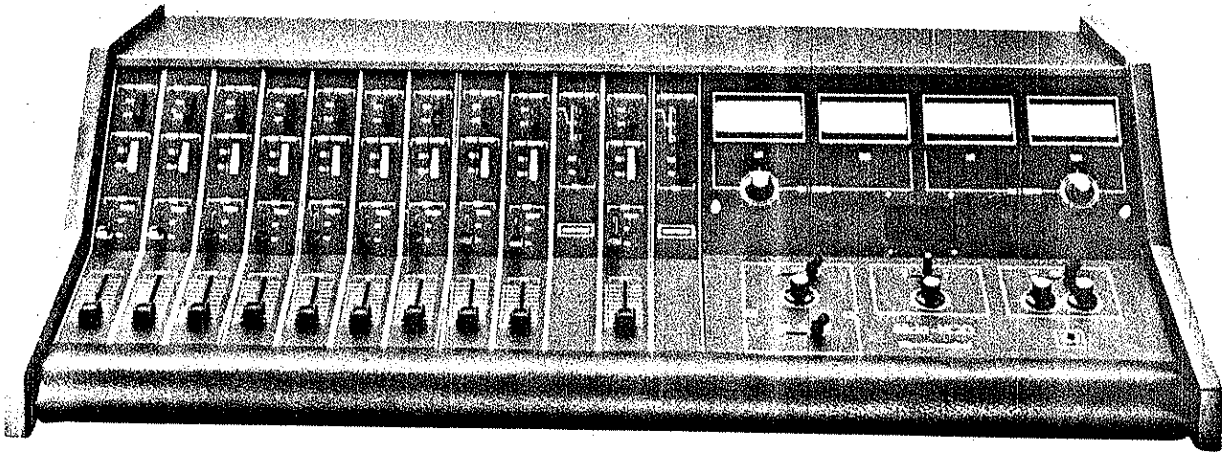
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**BROADCAST
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INSTRUCTION MANUAL
4000 MONOPHONIC/4100 STEREOPHONIC
AUDIO CONSOLES



SL - 4100 CONSOLE

- ML - 4000 - 901-4000-000 Monaural dual-channel console chassis with provision for accepting up to 12 input modules.
- SL - 4100 - 901-4100-000 Stereo dual-channel console chassis with provisions for accepting up to 12 input modules.

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SECTION I INTRODUCTION

1-1. SCOPE OF MANUAL.

1-2. This manual provides installation, operation, and maintenance information for the Broadcast Electronics 4000 Series Audio Consoles.

1-3. FEATURES AND DESCRIPTION.

1-4. The Broadcast Electronics 4000 Series consoles are modular, dual-channel audio consoles, available in monophonic or stereophonic configurations. These consoles permit the switching and mixing of multiple audio sources in AM, FM, and TV broadcast installations, CATV systems, recording studios, and other facilities. The monophonic 4000 and the stereophonic 4100 are designed to provide operating flexibility, installation simplicity, and convenient servicing.

1-5. The mainframe of the console will accept up to 12 mixers. The unused positions can be closed with blank trim panels. The use of plug-in modules permits the operator to tailor console capabilities to meet individual needs. Mixers can be added or deleted as required. All mixer preamplifiers are switch selectable between microphone or line level input. Modules which accept three remote lines are available to replace mixer modules or blank panels. The remote modules permit a signal to be fed back to the remote line from the console.

1-6. Both the 4000 and the 4100 consoles are designed for dual channel operation with both mix outputs identical in operating specifications. The stereophonic 4100 is also equipped to provide a monophonic output derived from both mixed stereo outputs.

1-7. For ease in installation and interconnection most connections are made to screw terminals. All terminals are labeled for quick identification. Since all connections are made inside the cabinet, wiring is protected from dirt, tampering, or accidental damage.

1-8. All console mixers are equipped to feed the cue system. In stereophonic consoles, both the left and right channels are fed to the cue system. The cue system can be monitored on a built-in speaker, and terminals are provided for connecting an external speaker. The cue system is superimposed over the program audio of the consoles headphone circuitry.

1-9. An intercom system permits two-way communication between the console and two studios. Built-in amplifiers are provided for monitor speakers. These outputs are connected through relays which can be activated to mute the speaker when used next to a live microphone. Separate contacts are provided on each relay for controlling a studio on-the-air light. Mixing modules equipped with muting logic permit total flexibility, as the relays can be activated by any combination of mixers, individual inputs, and console outputs.

1-10. SPECIFICATIONS.

1-11. Electrical and physical specifications for 4000/4100 audio consoles are presented in Table 1-1.

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

NOMENCLATURE	SPECIFICATIONS
<u>PROGRAM CHANNELS</u>	
INPUT MIXING CHANNELS:	12 Module spaces provided. Remote input capability requires two spaces: one for remote feed module; one for associated standard input module. Blank trim plates are installed on any open module spaces.
INPUT IMPEDANCES/LEVELS (Remote Feed Modules)	600 Ohms balanced. -20 dBm nominal, +20 dBm maximum.
INPUT IMPEDANCES/LEVELS: (Preamp Modules)	
LOW MODE (MIC)	150 Ohms balanced. -70 dBm nominal, -30 dBm maximum.
HIGH MODE (LINE)	36 k Ohms balanced, bridging. -20 dBm nominal, +20 dBm maximum.
FREQUENCY RESPONSE	+0 dB, -1 dB, 50 Hz - 15 kHz.
DISTORTION	0.5% or less, 30 Hz - 20 kHz @ +8 dBm.
SIGNAL-TO-NOISE (Unweighted)	65 dB or greater below +8 dBm output, with -50 dBm input signal.
OUTPUT IMPEDANCE/LEVEL	600 Ohms balanced, +8 dBm output for 0 VU meter reading, +18 dBm output maximum.
<u>MONITOR CHANNEL</u>	
INPUTS	Mix 1, Mix 2, External; key-switch selectable.
FREQUENCY RESPONSE	±0.75 dB, 50 Hz - 20 kHz.

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

NOMENCLATURE	SPECIFICATIONS
DISTORTION	0.75% or less, 30 Hz - 20 kHz @ rated output and load.
OUTPUT POWER/IMPEDANCE	8 Watts RMS per channel, 8 Ohm load.
<u>HEADPHONE AMPLIFIER</u>	1 Watt RMS per channel. PGM 1/PGM 2/ CUE key-switch input selection. Program and cue levels can be inter-mixed in cue position. Front panel jack.
<u>CUE/INTERCOM AMPLIFIER</u>	1 Watt RMS mono output to panel speaker. Inputs mono or summed L & R in stereo model. Front panel CUE/ TALK/LISTEN and Studio intercom select by key switching.
<u>MUTING</u>	Four relays provided. Programmable assignment of any input/output bus combination. Relays include N.O. contacts terminated for external warning light operation.
<u>POWER REQUIREMENTS</u>	115V ac, 50/60 Hz (230V ac optional) ML-4000, 110W; SL-4100, 130W maximum.
<u>DIMENSIONS</u>	43.5 inches wide X 27.5 inches deep X 11 inches high (110.5 cm wide X 69.9 cm deep X 27.9 cm high).
<u>WEIGHT</u> (Packed)	ML-4000, 200 pounds w/10 modules (90.7 kg). SL-4100, 215 pounds w/12 modules (97.5 kg).

SECTION II INSTALLATION

2-1. INTRODUCTION.

2-2. This section contains information required for installation and preliminary checkout of the Broadcast Electronics ML-4000 and SL-4100 Audio Consoles.

2-3. UNPACKING.

2-4. 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 that no apparent damage has been 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 promptly or the carrier may not accept the claim.

2-5. The contents of the shipment should include a warranty card, a test certification card, and an instruction manual in addition to the console. If the contents are incomplete, or if the unit is damaged electrically or mechanically, notify both the carrier and Broadcast Electronics, Inc.

2-6. INSTALLATION.

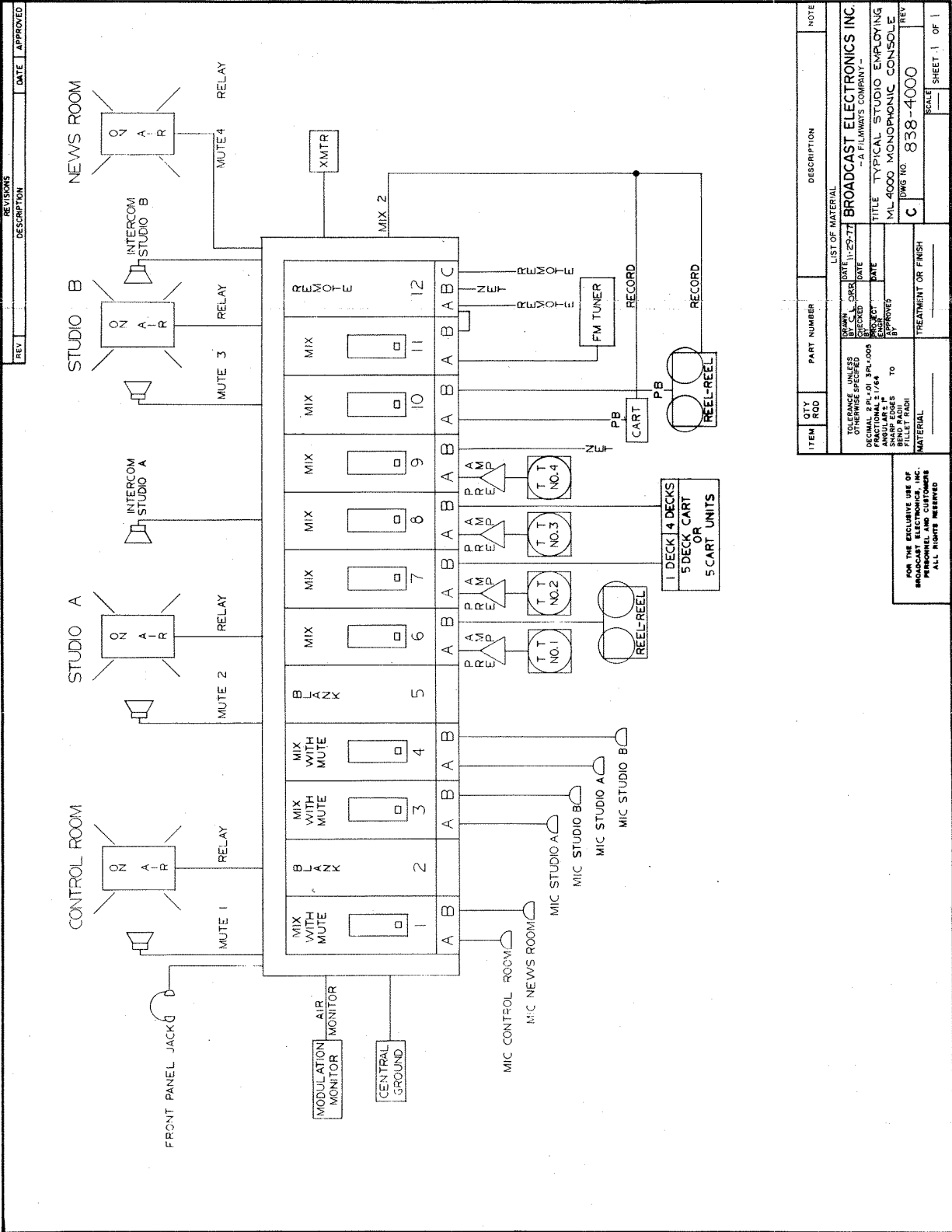
2-7. MOUNTING.

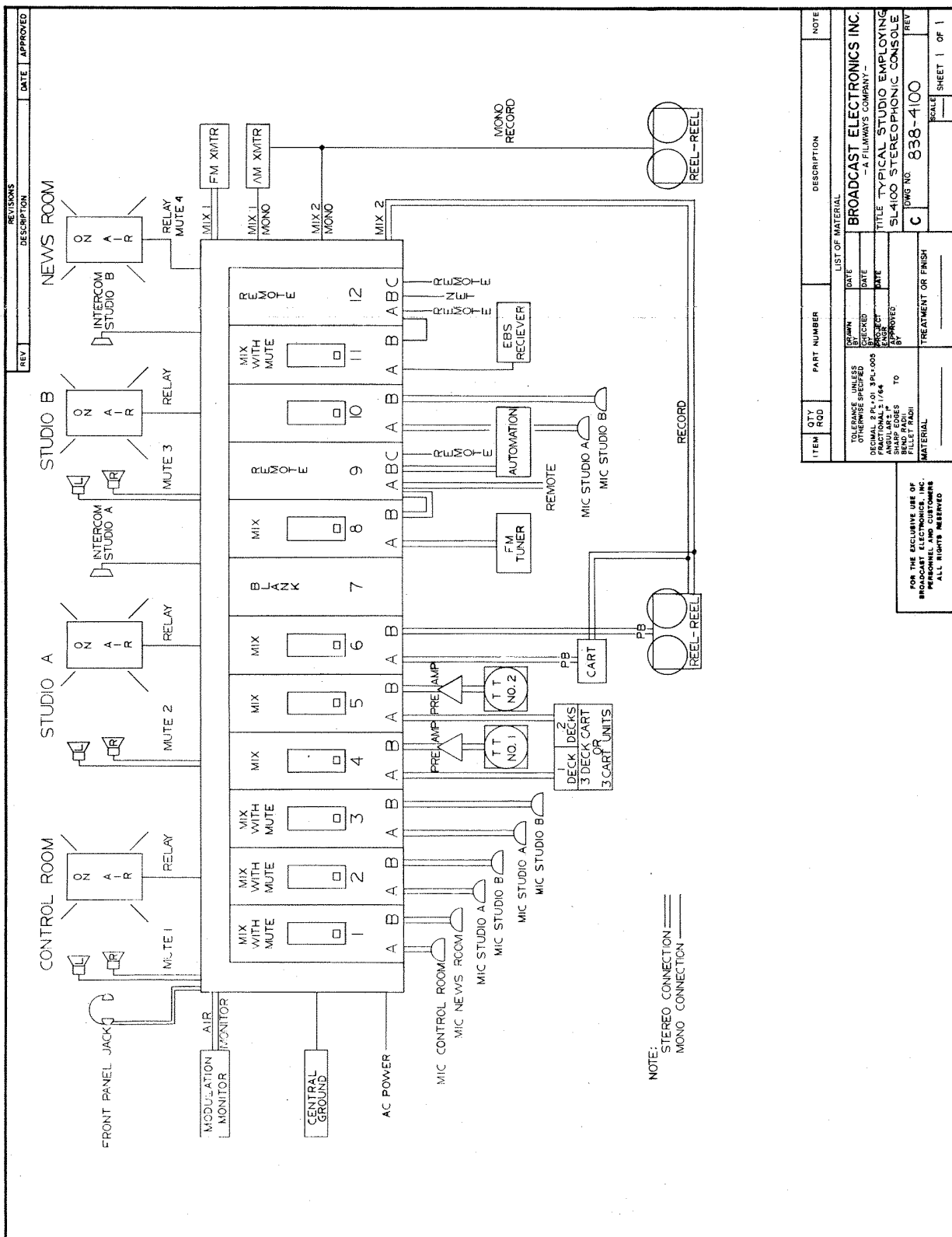
2-8. The ML-4000 and SL-4100 audio consoles are intended for desk top mounting. All connections are made inside the cabinet. The console should be placed within convenient access of the operator and all necessary cabling. Cable access is provided through cutouts located in the bottom of the cabinet. If mounted flush on a table top, matching openings are required in the table top beneath the console.

2-9. ASSIGNMENT OF INPUTS AND OUTPUTS.

2-10. Electrically, the most important consideration in assigning the mixer inputs is the level of the source signal. All inputs to an input mixing module (mixer) must be the same level class (microphone or line level). Microphones should be connected to modules equipped with muting logic to control the four muting relays. The muting control is completely flexible, so microphones from different studios may be connected to the same module (refer to Figures 2-1 and 2-2).

2-11. In stereophonic consoles, the inputs may be monophonic or stereophonic, but both inputs to a mixer must be either monophonic or stereophonic. The remote input module is an exception; it is equipped for one monophonic and two stereophonic inputs.





2-12. The remote input module must be connected to one input (line level) of the adjacent mixing input module, so one other line level input may be connected to the mixing module.

2-13. Operationally, input sources used simultaneously (mixed), cross faded, or used in a rapid sequence should all be on separate mixers. Conversely, two inputs rarely used in conjunction with each other may be assigned to the same mixer.

2-14. The output lines are identical in performance and may be used as required.

2-15. WIRING.

WARNING

DO NOT CONNECT AC POWER UNTIL INSTALLATION IS COMPLETE.

2-16. 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 far as possible. Separate microphone cables from high-level cabling and all inputs from speaker wiring.

2-17. 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 the audio cables.

2-18. GROUNDING. The most important consideration in ensuring good noise performance of the installation is the grounding and shielding of the various interconnections.

2-19. First it is necessary to achieve a good ground for the console itself. This should be 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 terminal (located on the bottom panel inside the console cabinet) should be connected to ground with a braided strap (such as Alpha 1235 or Belden 8657) or solid copper strap.

2-20. Secondly, the grounding of the signal shields is recommended to avoid ground loops (unintended signal paths through shields and grounds). To prevent ground loops, shields are 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 console and the source. 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.

2-21. TERMINATIONS. Proper load or termination for transformer coupled equipment is essential to ensure specified frequency response and level. The program outputs of the console requires a 600 Ohm termination. This may be installed at the console. Proper terminations should be provided for other transformer coupled equipment connected to the console.

2-22. INPUT LEVEL SENSITIVITY. Any mixer will accept either low level (microphone) or high level (line) inputs. This is determined by the position of the attenuation switches on the input modules (refer to drawing D906-7106 in Section VII). Input sensitivities are:

Mic Input: 150 Ohm balanced; -70 dBm nominal; -30 dBm maximum

Line Input: Balanced bridging; -20 dBm nominal; +20 dBm maximum

2-23. MONOPHONIC AND STEREOHONIC INPUTS. Any mixer in 4100 stereophonic consoles will accept either monophonic or stereophonic inputs as determined by the position of the MONO/STEREO switch on the mixing module. When set to MONO, a signal connected to the left input will also be fed to the right channel. In the MONO position, the right input is not connected. When a mixer is set for a monophonic input, both inputs (A or B) must be monophonic.

2-24. INPUT WIRING. The input connections are made to the marked terminal strips inside the console (refer to D906-7106 in Section VII).

2-25. Balanced Inputs. Connect the high side to the \pm terminal and the low side to the COM terminal. Connect the shield to the GND terminal.

2-26. Unbalanced Inputs. Connect the high side to the \pm terminal and the low side to the COM terminal. Connect the shield to the GND terminal and strap the COM terminal to the GND terminal.

2-27. AIR MONITOR INPUT. This input to the monitor amplifier is intended to accept the output of a modulation monitor or other auxiliary audio monitor source. The input is unbalanced with an impedance of approximately 10 k Ohms. The input level should be externally adjusted so that the monitor level remains constant when switching from Mix 1 or Mix 2 monitor feed to the external monitor input.

CAUTION

DO NOT CONNECT AN AC SIGNAL TO THE MIXING
MODULE PROGRAM SWITCH CONTACTS.

2-28. PROGRAM SWITCH CONTACTS. The PGM SW terminals provide access to contacts which close when the module front panel MODE switch is in the PROGRAM position. This feature may be used to control an external dc relay to remotely start turntables, tape recorders, cartridge machines, or other equipment. The switch contacts are rated at 40 milliamperes at 24V dc. Do not connect an ac signal to these contacts.

2-29. CONSOLE PROGRAM OUTPUTS. Two identical channel outputs are provided. Additionally, a monophonic sum output derived from the left and right program signals is provided for each of the stereophonic outputs.

2-30. The program outputs are transformer coupled, balanced with an impedance of 600 Ohms. Connect the high side to the \pm terminal, the low side to the COM terminal, and the shield to the GND terminal. For proper level and frequency response, if the output is not connected to an external 600 Ohm load, a 620 Ohm, half-watt termination should be provided at the console.

2-31. SPEAKER, HEADPHONE, MUTING RELAY AND INTERCOM CONNECTIONS.

2-32. MONITOR SPEAKERS. Outputs for monitor speakers are provided for the control room (console location) and two studios. These speaker outputs are connected through the muting relays for operation with live microphones.

CAUTION

TO AVOID DAMAGE TO THE MONITOR AMPLIFIER, DO NOT EXCEED THE POWER CAPABILITIES OF THE AMPLIFIER. DO NOT OPERATE THE AMPLIFIER INTO SPEAKER LOADS BELOW 8 OHMS.

CAUTION

2-33. The monitor circuitry is designed to drive 8 Ohm speakers. For multiple speaker installations, use 16-Ohm speakers or matching transformers to maintain an overall impedance above 8 Ohms. The console is equipped with 8 watt monitor amplifiers.

2-34. EXTERNAL CUE SPEAKER. An internal cue speaker is provided in the console base, however, an external cue speaker may be connected if desired. This speaker should be 8 or 16 Ohms impedance. When an external cue speaker is connected, disconnect the internal speaker. The internal and external cue speakers are muted by the Mute 1 relay (K1).

2-35. MUTING RELAY CONTACTS. The screw terminals on the power supply chassis give access to the normally open contacts of the muting relays to control studio on-the-air lights. These contacts are rated 1 Ampere resistive at 125V ac. These contacts can be used to activate an external relay to actually switch the lamps.

2-36. MUTING. The console is equipped with four muting relays (K1-K4), referred to as Mute 1 through 4. Mute 1 mutes the control room speaker as well as the cue speakers. Mute 2 mutes Studio A speaker. Mute 3 mutes Studio B speaker. Mute 4 is provided to be used based upon individual requirements. In addition to their speaker muting capabilities, each mute is provided with a pair of normally open contacts.

2-37. The muting relays can be controlled by any mixing module that is equipped with muting logic. This muting logic permits a relay to activate when either or both module inputs (CH A and/or CH B) are operated into either or both mix buses (1 and/or 2).

2-38. The mute activation switches (S8 and S9) are located within each of the input modules (refer to drawings D918-1431 and A906-4131). Set up is best explained by example: To activate muting relay 2 when channel B is feeding mix 1, place switch 6 of the first muting switch array (S8) in the open/operating position.

2-39. INTERCOM. The intercom system permits two-way communications between the control room (console) and two studios. Connect an 8 Ohm speaker to the Studio A or Studio B terminals.

2-40. HEADPHONES. The front panel headphone jack is designed to accept a wide variety of headsets including low-impedance stereo headphones. In monophonic consoles only one channel of the stereo headphones will be active. At no time should a load of less than 8 Ohms be connected to the jack.

2-41. AC POWER.

2-42. The 4000 and 4100 audio consoles are equipped with three-wire grounded NEMA ac line cords. The standard 4000/4100 console operates at 117V ac at 50/60 Hz. Units for 220V ac, 50/60 Hz operation are available. Operating voltage requirements are indicated on the identification plate, located on the rear panel inside the machine.

2-43. Ensure the power switch is operated to the OFF position and connect the console to the proper ac input source. Operate the power switch to ON and make the following adjustments if required.

2-44. INSTALLATION ADJUSTMENTS.

2-45. VU METER CALIBRATION. The console VU meters are calibrated at the factory to indicate 0 VU (100) when the output level is +8 dBm. If the console is to be operated at a different output level, the VU meters may be re-calibrated as follows:

- A. Connect a 1kHz sine wave signal to any input for use as a test signal.
- B. Connect an external VU meter to an output of the console.
- C. Provide a 600 Ohm termination for the output.
- D. Adjust the console output to the desired level (+10 dBm maximum) as indicated by the external meter.
- E. Adjust the VU meter calibration control, R3, on each meter rectifier circuit board so that the console VU meters indicate 0 VU (100).

NOTE

THE FOLLOWING PROCEDURE IS REQUIRED ONLY IN STEREOPHONIC CONSOLES.

2-46. MONOPHONIC OUTPUT ADJUSTMENT. The controls on the mono matrix circuit board module adjust the input signal so that the left and right channel signals are mixed 50/50 in the monophonic output.

- A. Connect a 1kHz sine wave to the right input of any mixer.
- B. Operate the mixer to the PROGRAM mode and adjust the mixer of that module to obtain an indication of 0 VU on the console VU meters.
- C. Adjust R2, the right channel control on the mono matrix circuit board to obtain a monophonic output indication of +5 dBm as indicated by an external VU meter.
- D. Connect the input signal to the left input of the same mixer module. Repeat the above procedure with R1, the mono matrix left channel control.

SECTION III OPERATION

3-1. OPERATION.

3-2. The Broadcast Electronics 4000 Series Audio Consoles combine several audio sources at various levels into a single channel. For convenience in operation, several subsidiary systems are included.

3-3. A cue circuit allows preview of a source before mixing. Two separate channels, MIX 1 and MIX 2, make the console two units in one. Each mixer may control more than one input, although not simultaneously. Built-in amplifiers allow speaker or headphone monitoring of the two mixing circuits and the cue systems. The controls are explained below.

3-4. INPUT SELECTION.

3-5. Two separate input sources may be connected to each mixer. Operate the selection switch to either the A or B position to feed the desired input to the mixer.

3-6. OUTPUT SELECTION.

3-7. Any input module may be operated into either or both of the two console outputs, MIX 1 or MIX 2. Depress either or both of the OUTPUT selectors and operate the 3-position MODE switch to PROGRAM. When the MODE switch is operated to OFF, the outputs of the input module are disconnected.

3-8. CUE SYSTEM.

3-9. The cue system allows previewing or monitoring of a source prior to mixing. To connect an input module to the cue system, depress either the A or B switch of the INPUT SELECTOR switch and operate the MODE switch to CUE. In stereophonic consoles the cue signal is a monophonic composite of both the left and right channels.

3-10. An internal amplifier and speaker are provided for monitoring the cue system. Activate the speaker and amplifier by operating the 3-position CUE switch to the CUE position. The volume of the cue speaker is controlled by the CUE LEVEL control.

NOTE

THE COMBINATION CUE-LISTEN-TALK, 3-POSITION SWITCH, MUST BE IN THE CUE POSITION FOR MONITORING OF THE CUE SYSTEM.

NOTE

3-11. The cue system may also be monitored by plugging headphones into the front panel jack and increasing the CUE PHONES volume control located above the headphone jack. This superimposes the cue signal over the program signal in the headphones.

3-12. LEVEL CONTROL.

NOTE

BEST PERFORMANCE WILL BE OBTAINED WITH THE FRONT PANEL MASTER GAIN CONTROLS ADJUSTED TO A POSITION BETWEEN 10 O'CLOCK AND 2 O'CLOCK.

NOTE

NOTE

DO NOT ADJUST THE MIX 1 MASTER AND MIX 2 MASTER CONTROLS DURING NORMAL OPERATION.

3-13. The mixers can be used in two ways to control level:

- A. To keep each input at approximately the same level.
- B. To combine signals from two or more inputs in a desired relationship.

3-14. The VU meters and the monitor circuits are provided as an aid in determining the proper level. Adjust the mixer(s) of active sources for a peak level indication of 0 VU (100). When mixing two or more inputs the mixers are adjusted to yield the desired sound while maintaining a peak level meter reading of 0 VU (100). The level is increased by pushing the slide attenuator forward (toward a higher number position).

3-15. VU METERS.

3-16. In the monophonic console, separate VU meters are provided for MIX 1 and MIX 2 outputs. In the 4100 Stereophonic console, separate VU meters are provided for LEFT MIX 1, RIGHT MIX 1, RIGHT MIX 2, and LEFT MIX 2 outputs.

3-17. HEADPHONES.

3-18. The front panel headphone jack is designed to accept a wide variety of headsets including low-impedance stereo headphones.

CAUTION

AT NO TIME SHOULD A LOAD OF LOWER RESISTANCE THAN 8 OHMS BE USED WITH THE HEADPHONE AMPLIFIER. DO NOT USE Y-CONNECTORS TO CONNECT MORE THAN ONE HEADPHONE TO THE JACK.

CAUTION

3-19. The headphones may be connected to either the MIX 1 output, the MIX 2 output, or to an external signal (AIR) by operating the 3-position PHONES switch to the desired position. The headphones volume is determined by the level controls located directly below the 3-position PHONES switch. The headphone jack is never muted.

3-20. MONITOR SPEAKERS.

3-21. An internal amplifier provides audio for a control room speaker as well as separate speakers in several studios. These speakers may be muted for use with live microphones.

3-22. The speakers may monitor either the MIX 1 output, the MIX 2 output, or an external signal (AIR) by operating the 3-position MONITOR switch to the desired position.

3-23. The volume of all speakers connected to the various monitor outputs is determined by the position of the MONITOR LEVEL control.

3-24. INTERCOM.

NOTE

WHEN THE CUE 3-WAY SWITCH IS SET TO LISTEN OR TALK, THE CUE (CUE SUM) SIGNAL FROM THE MIXERS IS DISABLED.

NOTE

3-25. When the intercom speakers are installed in studios A and B, two-way communication with the control room (console) is possible through the cue system. When the CUE-INTERCOM switch is in the LISTEN position the intercom speakers act as microphones to provide a signal to the console cue system. The audio can then be heard on the console cue speaker. When the CUE-INTERCOM switch is in the TALK position, the console cue speaker (or external cue speaker) acts as a microphone to provide a signal to the intercom speakers. In either the LISTEN or TALK positions, the INTERCOM 3-way switch determines whether the system is activated in STUDIO A or B.

3-26. REMOTE INPUTS.

3-27. The remote input modules are designed for sources which originate outside the studio such as telephone lines for remote broadcasts or network feeds. Three push switches labeled 1, 2, and 3 select the desired line. Operate the MODE MIX/FEED switch to MIX to connect a selected remote line to a mixer. The appropriate input (A or B) on the associated mixing module must then be selected. Unless instructed otherwise, the factory connects the remote module to the A input of the mixer to the immediate left of the remote module. The OUTPUT selectors and the MODE switch of the mixing modules can then be used to connect the remote line to an output or the cue system.

3-28. When the MIX/FEED switch is set to FEED the MIX 1 channel output is fed to the remote line. (In stereophonic consoles the monophonic matrix signal from the MIX 1 channel is fed back to the remote line.) This does not disconnect the MIX 1 channel output, but it permits the originator of the remote signal to monitor the console main output. This option permits a broadcaster at a remote location to determine when his broadcast will begin.

3-29. Two cautions should be observed when using the feed capability of the remote module:

1. Some telephone exchanges are not equipped for two-way lines. To be certain check with the local telephone company.
2. Care must be taken not to inadvertently feed a signal back to a network line.

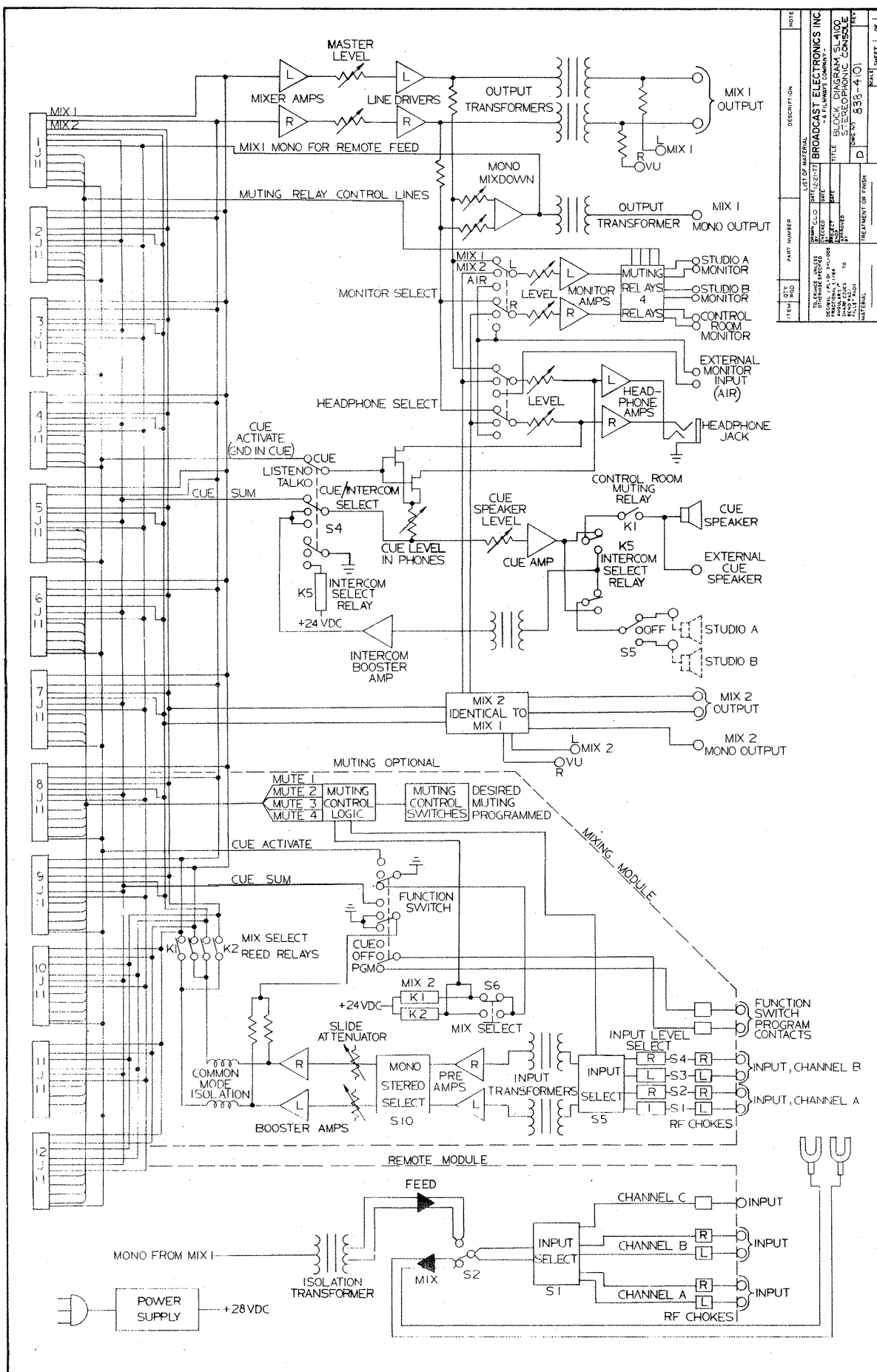
SECTION IV THEORY OF OPERATION

4-1. INTRODUCTION.

4-2. This section provides theory of operation for the Broadcast Electronics 4000 and 4100 Audio Consoles. General system descriptions followed by detailed circuit descriptions are provided. Refer to Figure 4-1 and the schematics in Section VII as required for the following.

4-3. GENERAL SYSTEM DESCRIPTION.

4-4. INPUT MIXING MODULES.



4-5. Two inputs may be connected to operate through each mixer. The inputs are connected through RF suppression chokes to the input level switches. These switches provide attenuation when microphones are connected rather than line level sources. The switches are mechanically ganged so that both inputs are set for microphone or line inputs. One of the inputs (CH.A or CH.B) is selected by INPUT SELECTOR switch S5 and coupled through the transformer(s) to the preamplifier. The output of the preamplifier is fed to an adjustable level control (slide attenuator/mixer). In stereophonic models the signal is connected through a mono/stereo switch (S10) which allows a monophonic input source to be fed to both the right and left sections of the attenuator.

4-6. The output of the attenuator (R46) is fed through a booster amplifier (IC2) and a common-mode isolation transformer (T3) to the reed relays for routing to the mix buses. In stereophonic consoles, the left and right channel signals are bridged from the booster amplifier output, combined, and routed to function (MODE) switch S7. This switch provides a signal whenever switch is placed in the CUE mode.

4-7. The reed relays are activated by the OUTPUT SELECTOR switch, in conjunction with the MODE switch, to connect the output of the booster amplifier to either the Mix 1 or Mix 2 bus or to both simultaneously.

4-8. REMOTE MODULE.

4-9. Three lines may be connected to operate through the remote module. Those lines are connected through RF suppression chokes to REMOTE LINE SELECT switch S1. On stereophonic consoles two lines are stereophonic and one is monophonic. This monophonic line is fed in-phase to both the left and right channels. The selected input (1, 2, or 3) is connected to MODE switch S2. In the MIX position the signal is routed to the input of a mixing module. In the FEED position a signal from the Mix 1 output is fed back to the remote line through isolation transformer T1. In stereophonic consoles the monophonic signal is fed in-phase to both the left and right lines.

4-10. MIXER/LINE DRIVER AMPLIFIERS.

4-11. The MIX 1 outputs of all the input mixing module preamplifiers are bused together and applied to a mixer/line driver amplifier. The Mix 2 outputs are bused together to a separate mixer/line driver amplifier. The amplified signal is routed through a front panel MASTER level control and returned to the line driver amplifier circuit board for final amplification. The amplified signal is fed to the console output through transformer T1. A VU meter signal is bridged from the transformer output to measure the signal level at output.

4-12. MONO MATRIX.

4-13. In stereophonic consoles, two additional outputs are available. These mono mixdown (or matrix) signals are the combined left and right channels of the Mix 1 and Mix 2 outputs. The left and right signals are obtained from the output of the line-driver amplifiers, combined in the mono-mixdown amplifier, and coupled through an output transformer.

4-14. MONITOR, HEADPHONE AND MUTING SYSTEM.

4-15. Outputs from the line-driver amplifiers for Mix 1 and Mix 2 are connected to the MONITOR and PHONES selection switches. A third position (AIR) accepts an external input. The outputs of the selector switches are fed to separate power amplifiers. The monitor amplifier provides sufficient power to drive several speakers. The outputs of these speakers are connected through the muting relays so that the speakers can be disconnected by energizing a particular relay. Three relays are provided so that speakers can be muted in one studio without muting other speakers. The three speaker-muting relays and a fourth relay are also equipped with contacts for use with an external on-the-air light. The muting relays are controlled by optional logic in the mixing module. This logic permits any or all of the four relays to be activated by any position of the INPUT SELECTOR switches and any of the OUTPUT SELECTOR switches on the mixing module. The headphone amplifier provides power to drive a headset connected to the front panel jack. The headphone circuit is not connected through the muting relays.

4-16. CUE SYSTEM.

4-17. A cue (preview) circuit is built into each console. When the MODE switch on a mixing module is operated to the CUE position, the signal from the output of the booster amplifier is connected to the cue (cue sum) bus. The reed relays are shut off to remove the signal from the Mix 1 and Mix 2 buses. The cue bus is routed through the CUE/INTERCOM selection switch to the cue amplifier. The amplified signal is routed through the intercom selection and control room muting relays to the built-in speaker or the terminals for an external speaker. The cue activate bus turns on an FET switch to also supply the cue signal to the input of the headphone amplifier. This superimposes the cue signal over the program signal in the headphones. The PHONES LEVEL control permits adjusting the ratio of cue to program signal in the headphones.

4-18. INTERCOM SYSTEM.

4-19. All consoles are equipped with an intercom to permit conversation between two studios and the console position (control room). When the CUE/INTERCOM switch is in the CUE position, the cue (cue sum) bus is connected as described previously (refer to paragraph 4-17).

4-20. In the TALK position, the cue (cue sum) bus is disconnected and the intercom relay is energized. The cue speaker is connected as a microphone. Signal from the speaker is coupled through a transformer to the input of the intercom booster amplifier. The amplified signal is fed to the cue amplifier and routed to the INTERCOM switch. The signal is then fed to either the studio A or B output. In the LISTEN position, a signal from the studio is fed to the cue amplifier to drive the cue speaker.

4-21. MONOPHONIC SYSTEM DESCRIPTION.

NOTE

REFER TO DRAWING D906-6504 FOR THE FOLLOWING DISCUSSION.

4-22. MIX 1 AND MIX 2 CIRCUITRY.

4-23. The Mix 1 outputs from the mixing modules are obtained from the module connectors (1J11 through 12J11) and bused together on the motherboard. The signal is routed to the mixer-line driver amplifier circuit board through J2 on the motherboard. Following amplification, the signal is routed by the mix-out bus to the front panel master level control (P6). The signal is returned to the mixer-line driver amplifier by the driver-in bus. The signal receives final amplification and is coupled through the output transformer to the output terminals on TS-2. This signal is routed by the motherboard (through J11 pins 11 and 12) to all remote input modules to provide the feed signal. Signal for the Mix 1 VU meter is also obtained from the mixer-line driver amplifier and connected to the VU-1 rectifier module mounted on the rear of the VU meter.

4-24. The signal from the Mix 2 outputs of the mixing modules is handled in a similar fashion. The signal is routed to a second mixer-line driver amplifier through J3 on the motherboard and finally to TS-2. The signal for the Mix 2 VU meter is connected to a rectifier module (VU-2) mounted on the rear of the meter.

4-25. CUE AND INTERCOM CIRCUITRY.

4-26. The cue-activate and cue-sum outputs from all the mixing modules (J11) are bused and connected to the CUE INTERCOM selection switch (S4). When operated to CUE, this switch routes the cue-activate control signal to the headphone amplifier through J4. The cue-sum audio signal is routed to the front panel level controls P1 and P4 (CUE LEVEL, PHONES CUE) which control the level of the cue signal in the headphones and the cue speaker. From P1 the signal is applied to the headphone amplifier. From P4 the signal is fed to the cue intercom amplifier through J1. The amplified signal is routed through the intercom selection and control room muting relays on the power supply circuit board to the cue speaker or the external cue speaker terminals on TS2.

4-27. The intercom selection relay on the power supply circuit board is also connected to the input of the intercom booster amplifier on the cue intercom amplifier. The output of the amplifier is fed to the cue speaker when S4 is in the LISTEN position. An external intercom speaker is used as a microphone in the LISTEN position. The cue speaker and the external intercom speaker change functions when S4 is set to TALK. The studio A and B intercom terminals on TS1 are connected through the intercom switch S5 to the intercom selection relay on the power supply circuit board.

4-28. MONITOR CIRCUITRY.

4-29. Monitor signals from the Mix 1 and Mix 2 channels are obtained from the mixer-line driver amplifiers to the front panel PHONES (S2) and MONITOR (S3) selection switches. The AIR (external) signal is brought in directly from TS2 to S2 and S3. The output of S3 is connected through the front panel MONITOR LEVEL control (P3) to the input of the monitor amplifier. The output of this power amplifier is connected to the muting relays on the power supply. The signal is fed through normally closed contacts and supplied to the speaker terminals on TS1. The output of S2 is connected through the front panel PHONES LEVEL control (P2) to the headphone amplifier for amplification and then connected to the front panel headphone jack (J12).

4-30. POWER SUPPLY.

4-31. All consoles are equipped with a three conductor, NEMA standard, line cord. The high side is connected through RF choke L6 and the fuse to the primary of the power transformer T1. The low side is connected through RF choke L5 and the power switch to the remaining side of the primary of T1. The secondary supplies 32V ac to bridge rectifier CR1. The 28V dc from CR1 is applied to the power supply circuit board for distribution throughout the console.

4-32. STEREOPHONIC SYSTEM DESCRIPTION.

NOTE

REFER TO DRAWING D906-6503 FOR THE FOLLOWING DISCUSSION.

4-33. MIX 1 AND MIX 2 CIRCUITRY.

4-34. The Mix 1 outputs from the mixing modules are obtained from the module connectors (1J11 through 12J11) and bused together on the motherboard. The left and right signals are routed to separate mixer-line driver amplifiers through J2 and J3. Following amplification the two signals are routed by the mix-out buses to front panel MIX 1 MASTER control P6. The two signals are returned to the mixer-line driver amplifiers by the driver-in buses. The signals receive final amplification and are coupled through output transformers to the output terminals on TS2. Signals for the left and right Mix 1 VU meters are taken from the mixer-line driver amplifiers and connected to the VU-1 rectifier module mounted on the rear of each VU meter.

4-35. Signals for the mono mixdown (matrix) module are bridged from the primaries of the output transformers of the Mix 1 left and right mixer-line driver amplifiers. The left and right signals are combined, amplified, and coupled through a transformer to the MONO output terminals on TS-2. The MONO signal is also routed by the motherboard (through J11 pins 11 and 12) to any remote input module to supply the feed mode signal.

4-36. The left and right signals from the Mix 2 outputs of the mixing modules are handled in a similar fashion. The signals are routed to two mixer-line driver amplifier through J5 and J6, front panel MIX 2 MASTER control P5, back to the mixer-line driver amplifiers and finally to TS-2. The signals for the left and right VU meters for Mix 2 are connected to rectifier modules mounted on the rear of the meters. Left and right signals from the mixer-line driver amplifiers are mixed in mono mixdown (matrix) module and connected to the Mix 2 MONO output terminals on TS-2.

4-37. CUE AND INTERCOM CIRCUITRY.

4-38. The cue-activate and cue-sum output from all the mixing modules via J11 are bused and connected to CUE-INTERCOM selection switch S4. When operated to CUE, this switch routes the cue-activate control signal to the headphone amplifier. The cue-sum audio signal is routed to the front panel CUE LEVEL and PHONES CUE controls P1 and P4 which control the level of the cue signal in the headphones and the cue speaker. From P1 the signal is applied to the headphone amplifier. From P4 the signal is fed to the cue intercom amplifier through J1. The amplified signal is routed through the intercom selection and control room muting relays on the power supply circuit board to the cue speaker or the external cue speaker terminals on TS-2.

4-39. The intercom selection relay on the power supply circuit board is also connected to the input of the intercom booster amplifier on the cue intercom amplifier. The output of the booster is fed to the cue speaker when S4 is in the LISTEN position. An external intercom speaker is used as a microphone in the LISTEN position. The cue speaker and the external intercom speaker change functions when S4 is set to TALK. The studio A and B intercom terminals on TS1 are connected through the INTERCOM switch S5 to the intercom selection relay on the power supply circuit board.

4-40. MONITOR CIRCUITRY.

4-41. Monitor signals from the left and right channels of Mix 1 and Mix 2 are routed to the mixer-line driver amplifiers to the front panel PHONES (S2) and MONITOR (S3) selection switches. The AIR (external) signal is brought directly from TS2 to S2 and S3. The output of S3 is connected through the MONITOR LEVEL control (P3) to the input of separate monitor amplifiers. The outputs from these power amplifiers are connected to the muting relays on the power supply circuit board. The left and right channel signals are fed through normally closed contacts and supplied to the speaker terminals on TS1. The output of S2 is connected through the front panel PHONES LEVEL control (P2) to the headphone amplifier for amplification and then connected to the headphone jack (J12).

4-42. POWER SUPPLY.

4-43. Refer to the description in paragraph 4-30.

4-44. DETAILED CIRCUIT DESCRIPTION.

4-45. MONOPHONIC INPUT MIXING MODULES.

4-46. The monophonic input mixing module is available with or without the muting logic required to control the muting relays. These input mixing modules consist of connections for two inputs, a preamplifier, a slide attenuator (mixer), a booster amplifier, and necessary switching mounted in a housing which plugs into the motherboard. Refer to schematic D906-7101 as needed.

4-47. AUDIO CIRCUITRY. Two balanced input lines are brought from the input terminal board located on the top rear edge of the module to input level switches S2 and S4. LC filters consisting L3, L4, L7, L8 and C3, C4, C7, and C8 are installed on both input circuits. The input level switches can be set for microphone (low) or line (high) level inputs. The two switches are mechanically ganged so that both are set to either the MIC or LINE position. In the MIC (low) position the signal is passed directly through the switch. In the LINE (high) position, a 50 dB pad (R3-R4-R11-R12 or R7-R8-R15-R16) is inserted to drop the signal to the proper level and to change the input impedance to 36 k Ohms.

4-48. The signals are next fed to the INPUT SELECTOR switches S5A and S5B. These switches are mechanically interlocked to prevent feeding both input signals simultaneously to the mixer. From the INPUT SELECTOR switches, the signal is coupled through transformer T1 to the input of the preamplifier. The secondary of T1 provides an unbalanced signal at a high impedance and also provides approximately 32 dB of gain. Bias is supplied through T1 to the non-inverting input of IC1A. This operational amplifier supplies 15 dB of gain as determined by feedback components R21, R19, and C11. R17 and C9 provide a termination for T1.

4-49. The output of the preamplifier is coupled through C13 to the slider potentiometer which acts as an attenuator (mixer). The output of the attenuator is coupled through C15 and R23 to the inverting input of IC2A which forms the booster amplifier. Gain in this stage is 30 dB as determined by R23 and feedback resistor R25. The output is coupled through C17 and common-mode isolation transformer T3 to reed relays K1 and K2. The primary of T3 is connected between chassis ground and the ground (SUM & GROUND) Mix 1 and Mix 2 buses.

4-50. The Mix 1 and Mix 2 buses are fed by K2 and K1 respectively. These relays are activated by the OUTPUT SELECTOR switches S6A and S6B. The coils of the relays are connected directly to a +24V dc potential. The switches supply a ground through R31 and R32 to energize the coil. Capacitors C25 and C26 prevent contact chatter at turn on and turn off. Diodes CR5 and CR6 suppress transients at turn on and turn off. The ground is supplied from the MODE switch (S7). In the PROGRAM position the ground is applied to S6A and S6B. In the OFF and CUE positions, ground is not available.

4-51. The signal for the console cue system is bridged from the output of the booster amplifier through R28. It is routed to the cue-sum bus when S7 is in the CUE position. In the PROGRAM and OFF positions, the cue signal is grounded. In the CUE position, a ground is supplied to the cue activate bus.

4-52. MODE switch S7 is equipped with a pair of contacts which are not used in the console. These contacts are available on the program switch (PGM SW) terminals of any module. These two terminals are shorted when S7 is set to the program position.

4-53. POWER SUPPLY. The input mixing modules are equipped with dual +24V dc and +12V dc supplies which are derived from the console +28V dc power supply. An RF filter (L11 and C24) is installed on the +28V dc input to suppress any RF present on this bus. Filtering is provided by C22 and C23.

4-54. Integrated circuit regulator IC7 supplies highly regulated +24V dc. This is taken from the regulator output to supply power for the audio amplifiers and relays K1 and K2. In the input mixing module equipped with muting logic, a +12V dc source (VDD) is provided from R41 and CR7 to power the muting-relay logic. Separate +12V dc outputs are provided through R42 and R43 to provide bias to amplifiers IC1A and IC2A. Additional filtering is provided to these sources by C20 and C21.

4-55. MUTING RELAY LOGIC. Muting relay logic is installed only in the 980-4021 input mixing module. The muting logic uses CMOS circuitry to provide separate outputs to control the four muting relays on the power supply circuit board. Any one of the relays may be activated when either the A or B input is connected to either the Mix 1 or Mix 2 buses. Switches S8 and S9 permit programming of the desired combinations. Connections to the INPUT and OUTPUT SELECTORS and the MODE switch provide control signals to the logic. Before a muting relay is energized, the proper input must be selected (determined by IC3 and IC4), the proper mix bus must be fed (determined by IC5), and the module must be in the program mode (determined by IC6). The HIGH state within the logic is +12V dc supplied from VDD through resistor arrays R100 and R200. LOW within the logic is ground (0V dc). The inputs of IC3 and IC4 are connected to S5B (INPUT SELECTOR switch) so that pin 9 is LOW when the B input is selected and HIGH when the A input selected. Conversely pin 14 is LOW when the A input is selected and HIGH when the B input is selected. The outputs of IC3 and IC4 can go HIGH (to energize a relay) only if both an input from S8 or S9 and the proper control input are HIGH.

4-56. Integrated circuits IC3 and IC4 are quad AND-OR select gates, each of which consist of two AND gates supplying the inputs of an OR gate to drive the output. Each pair of AND gates includes one AND gate connected to one of the two control inputs (pins 9 and 14) and one AND gate connected to the other control input. The second input to each AND gate is connected individually to an external signal (pins 1 through 7 and 15). The output of the OR gate will be HIGH when either of the AND gates is HIGH.

4-57. The outputs from IC3 and IC4 are connected to the individual inputs of the four AND-OR select gates of IC5. The control inputs of IC5 are connected to OUTPUT SELECTOR switches S6A and S6B. Pin 9 is LOW when Mix 1 is being fed and HIGH when it is not. Pin 14 is LOW when Mix 2 is being fed and HIGH when it is not. (Unlike IC3 and IC4, both control inputs to IC5 can be the same state, since both mix buses can be fed simultaneously.) An output of IC5 can go HIGH to energize a relay, only if the input from IC3 or IC4 and the proper control input are LOW.

4-58. The outputs of IC5 are connected to the quad NAND gates of IC6 which actually drive the mute control outputs through diodes CR1 through CR4. When the output of a NAND gate is LOW (both inputs HIGH), the relay will energize. When the output is HIGH, the relay will de-energize. These gates are interlocked to MODE switch S7 to prevent energizing a relay when the mixing module is in the CUE or OFF modes. When S7 is in either the CUE or OFF position, Q1 is conducting and the control inputs to IC6 are held LOW. When S7 is in the PROGRAM position, Q1 turns off and the control inputs to IC6 go HIGH. A HIGH input to IC6 from IC5 will permit that relay to energize.

4-59. STEREOPHONIC INPUT MIXING MODULES.

4-60. The stereophonic input mixing module is available with or without the muting logic required to control the muting relays. The operation of these two input mixing modules is identical to the monophonic versions described in 4-45 except that an additional identical channel is employed. The signal is brought in from the input terminals to the input level pads connected to S1, S2, S3, and S4. The signals are then applied to the INPUT SELECTOR switches, to transformer T1 (T2), and preamplifier IC1A (IC1B). The preamplifier output is connected to stereo-mono select switch S10.

4-61. In the STEREO position, S1 supplies the left and right signals directly to the stereophonic slide attenuator. In the MONO position, the output of the left channel preamplifier (IC1A) is fed to both the right and left channels of the slide attenuator to provide a center channel monophonic signal. The output of the mixer is fed through booster amplifier IC2A (IC2B) to isolation transformer T3 (T4) and the reed relays for switching to the two mix buses. The signal for the cue system is provided by bridging a single line (CUE SUM) from both the left and right channels. The muting circuitry of the stereophonic input mixing module is identical to that of the monophonic input mixing module.

4-62. MONOPHONIC REMOTE INPUT MODULE.

4-63. This plug-in module provides the switching to connect remote lines to an input mixing module. The remote module consists of a circuit board which mounts the components and a module housing which mounts the board and the input terminal strip. The right channel is not present in the monophonic unit (refer to schematic D906-7105).

4-64. Terminals are provided on the remote module to connect three balanced lines. The signal is taken directly to REMOTE LINE SELECT switch S1. RF suppression is provided by ferrite beads L3 and L4, L7 and L8, L9 and L10 and capacitors C3 and C4, C7 and C8, C9 and C10. Resistors R1, R3, and R5 provide a 600 Ohm termination for the line. Interlocked switch S1 permits selection of one of the lines (1, 2, or 3) which is then connected to MODE MIX/FEED selection switch S2.

4-65. In the MIX position the selected line signal is connected to output leads of the remote module for connection to the input of an input mixing module. In the FEED position, the secondary of isolation transformer T1 is connected to the program output. The primary of T1 is connected to the monitor output of the mixer-line driver amplifier used for Mix 1. This routes the program signal back down the remote line for cueing purposes.

4-66. STEREOPHONIC REMOTE INPUT MODULE.

4-67. This plug-in module provides the switching to connect remote lines to an input mixing module. The stereophonic remote input module consists of a circuit board which mounts the components and a module housing which mounts the board and the input terminal strip.

4-68. The operation of the stereophonic remote input module is identical to the monophonic remote input module (refer to paragraph 4-64) with one exception. The stereophonic module is equipped with two stereo and one monophonic remote line. In the stereophonic console the signal fed back to the remote line is obtained from the mono mixdown (matrix) module for Mix 1. This monophonic signal is fed to both the right and left channels.

4-69. MIXER/LINE DRIVER AMPLIFIER.

4-70. The mixer-line driver amplifier circuit board contains two multiple stage amplifiers and the isolation transformer to supply the console output (refer to schematic D906-7100-1). In monophonic consoles two line driver amplifier circuit boards are used to provide the Mix 1 and Mix 2 outputs. In stereophonic consoles, four of these circuit boards are required to provide the left and right Mix 1 and Mix 2 outputs.

4-71. Signal from the MIX 1 or MIX 2 bus enters on pin 1 and is coupled through C2 to the input of the mixer amplifier composed of IC1, Q1, and Q2. Choke L1 and capacitor C1 act as a low-pass filter to prevent the appearance of RF in the amplifier input. Operational amplifier IC1 supplies 12 dB of gain as determined by R3 and the mix sum resistors in the mixing modules. Output drive is supplied by the complementary pair of Q1 and Q2 which is driven directly by IC1. Capacitor C6 provides bootstrapping for the output stage. Transistor Q3 provides protection in case of a short circuit on the output.

4-72. The output of the mixer amplifier is coupled through C7 to pin 3 and front panel MASTER gain control. The signal is returned through pin 5 for final amplification in the line driver. This three-stage amplifier consists of differential input stage Q4 and Q5, operational amplifier IC2, and complementary-symmetry output pair Q6 and Q7. Transistor Q8 provides short circuit protection. This stage can provide up to 40 dB of gain as determined by R16, R18, and gain balance potentiometer R17. In conjunction with the MASTER level control, R17 permits matching the gain of line driver amplifiers. A signal for use in the monitor circuit is bridged from T1.

4-73. MONO MATRIX AMPLIFIER.

4-74. The signal enters through level balancing controls R1 and R2. L1 and C1 form an RF filter. IC1 performs the active mixing function, while Q3, Q4 and their associated components provide a low impedance output. T1 provides a balanced output. Q2 supplies a decoupled bias source for IC1.

4-75. MONITOR AMPLIFIER.

4-76. The 8 watt monitor (power) amplifier provides low noise and high gain with low distortion. The amplifier provides approximately 26 dB of gain from input to output. Two such amplifiers are used in stereophonic consoles and one amplifier is provided in monaural consoles. Refer to schematic B906-3709.

4-77. Input signal is applied to the non-inverting input of voltage amplifier U1 through RF choke L1 and coupling capacitor C1. Resistor R1 provides isolation from the signal source. Amplifier gain is established by a voltage applied to the inverting input of U1 which is developed from feedback applied across a voltage divider consisting of R2 and R3.

4-78. A constant current source is provided for differential amplifier U2 by C7, D1, and Q1. As U2 senses the voltage drop across R15, transistor Q2 varies the bias on the output stages. U1 acts as a current sink for the bias current.

4-79. The signal output of voltage amplifier U1 is applied to the negative peak power amplifier (Q3) and the positive peak power amplifier (Q4) through C8. The audio output is coupled to the load through C9.

4-80. The load impedance should be 8 Ohms or greater. A lower impedance can cause excessive current flow in the output circuit and open fuse F1.

4-81. HEADPHONE AMPLIFIER.

4-82. The headphone amplifier contains a dual-channel power amplifier to drive the headphone circuit (refer to schematic B906-7102). In monophonic consoles the second channel is not used. An FET circuit is employed on the input of the amplifier to mix signals from the cue program circuits to supply a composite signal to the headphone circuit. Since both channels are identical only one will be described.

4-83. The program signal enters the board on pin 1 and is coupled through R3 and C1 to the non-inverting input of IC1. This device is a dual audio power amplifier with internal power-limiting and short-circuit protection. An RC network comprising R8, R9, and C5 sets the gain at 33 dB. Bias for the input is provided by pin 1 of IC1 and is distributed to its non-inverting inputs via R12 and R13. The output is coupled through C4 and R10 to drive the headphones. IC1 is designed to operate into a load of 8 Ohms or greater, so the amplifier is capable of driving either high or low impedance headphones.

4-84. To permit the cue signal to be monitored in the headphones along with the program signal, P-type FET Q1 is employed. The signal from the cue sum bus is connected through R1 to the drain of Q1. As long as the gate is held high by an +18V potential applied through R6 and R5, Q1 is held off. When a ground is applied to the cue activate, the gate is pulled down and Q1 turns on. The signal is applied through R2 and C1 to the input of IC1. Capacitor C2 prevents transients by slowing down the FET turn on/off process.

4-85. The required +18 volt potential is supplied from the consoles +28V supply by the regulator consisting of Q3, R23, and zener diode CR1. Capacitor C11 acts as a high frequency filter to suppress RF or transients on the +28V line. Filtering for the +18 volt potential is provided by R7 and C3.

4-86. CUE INTERCOM AMPLIFIER.

4-87. The cue intercom circuit board contains the power amplifier for the cue speaker and the intercom booster amplifier (refer to schematic B906-7104).

4-88. The intercom signal from the intercom selection relay enters the board on pins 13 and 15 and is connected to transformer T1, which provides impedance transformation and voltage gain. Ferrite beads (FE-2 and FE-3) are installed on these leads to suppress any RF that is present. The signal is coupled from T1 through C2 to the non-inverting input of IC1. Gain is determined by R2, R4 and C1. The output of IC1 is coupled through C5 to pin 1 for connection to the front panel CUE/INTERCOM selection switch. A ferrite bead (FE-4) is also installed on the output lead. Bias for the input of IC1 is supplied from the voltage divider R6 and R7.

4-89. The cue signal from the CUE/INTERCOM selection switch enters on Pin 2 and is coupled through C6 to the non-inverting input of IC2. This power amplifier provides 32 dB of gain. The output is coupled through load resistor R8 and capacitor C8 to Pin 9. This output is connected to the intercom selection relay on the power supply and relay circuit board. Ferrite beads (FE-5 and FE-6) are installed on both the input and the output to provide filtering.

4-90. The +18V dc power supply for the circuit board is supplied by regulator Q1, resistor R1, and zener diode CR1. Capacitor C7 provides filtering. The +28V dc is applied to the regulator from pin 18. Ferrite bead FE-1 prevents distribution of RF on the power supply bus.

4-91. POWER SUPPLY AND RELAY CIRCUIT BOARD.

4-92. The power supply and relay circuit board contains four muting relays, the intercom selection relay, and the power supply filtering (refer to schematic C906-7103). The +28V dc supply is connected to terminals 5, 6, 7, and 8 as are the buses which supply the rest of the console. Ripple and noise on the +28V dc supply are filtered by the network of R23, C2 and C3.

4-93. Power for muting relays K1, K2, K3, and K4 and intercom selection relay K5 is supplied directly from the +28V dc supply. Relay K5 is controlled by front panel CUE/INTERCOM selection switch S4. K5 is not energized when S4 is in the CUE or LISTEN position but when S4 is in the TALK position, a ground is supplied from S4 to energize K5. Diode CR5 suppresses transients as K5 energizes and deenergizes.

4-94. Relays K1 through K5 are controlled by identical pairs of switching transistors and the four MUTE controls. Power for the switching transistors is supplied from R22 and zener diode CR6. When Q1, (Q2, Q3, or Q4) is not conducting, the associated relay driver Q5 (Q6, Q7, or Q8) cannot conduct. If the mute control goes low, Q1 (Q2, Q3, or Q4) is forward biased and supplies current to the relay driver. The relay driver energizes the relay. The monitor speaker signal connected through the normally closed contacts is disconnected when the relay energizes. The relay contacts connected to the normally open contacts are shorted. The speaker and normally open connections are available on the terminal strips adjacent to the power supply. In monophonic consoles only the left speaker channel is used.

4-95. VU METER RECTIFIER CIRCUIT BOARD.

4-96. This board contains the rectifier circuit for the VU meter (refer to schematic A918-0001). A T-pad comprising resistors R1 and R2 and potentiometer R3 is factory calibrated so that the meter indicates 0 VU (100) when the output is +8 dBm.

4-97. MOTHERBOARD.

4-98. The motherboard contains no active circuitry. The motherboard extends the width of the console and mounts the twelve (1J11 to 12J11) connectors for mounting input mixing modules. Buses for power, signals, and control run along the motherboard.

SECTION V MAINTENANCE

5-1. INTRODUCTION.

5-2. This section provides general maintenance information, adjustment procedures, and troubleshooting procedures for 4000/4100 audio consoles.

5-3. GENERAL MAINTENANCE.

5-4. General maintenance of the consoles 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 cabinet and other surfaces. Remove dust from the interior with a soft-bristled brush.

5-7. Push switches are self-wiping and should not require cleaning. Lever switches may be cleaned as required with an aerosol contact cleaner. Routine cleaning of the circuit boards and connector contacts is not required. However, if intermittent machine performance indicates that the contacts are dirty, clean the contacts with an aerosol contact cleaner. Do not use an abrasive cleaner. The life of the card-edge connector contacts can be prolonged by minimizing the removal and reinsertion of the circuit board modules.

5-8. VISUAL INSPECTION.

5-9. Regularly inspect the console for loose connections and hardware, damaged or improperly seated semi-conductors, components damaged by overheating, or mechanical surfaces requiring lubrication.

5-10. SPECIFICATION MEASUREMENTS.

5-11. A specification test performed periodically is a good way to check for the 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 each unit.

5-12. Specification tests are performed at the factory with a -50 dBm signal supplied to a low level input. The gain controls are adjusted to yield a +8 dBm output. Active inputs and outputs are terminated with the proper load. When measuring the noise figure, the input signal may be disconnected by lightly depressing the input selector switch so that both the A and B inputs are disconnected.

5-13. ADJUSTMENTS.

5-14. MIXER/LINE DRIVER AMPLIFIER LEVEL BALANCE.

5-15. The level balance adjustments on the mixer/line driver amplifier circuit boards balances the left and right/MIX 1 and MIX 2 output levels in stereophonic consoles and matches the MIX 1 and MIX 2 outputs in monophonic consoles. These adjustments are made at the factory and normally will not need readjustment.

5-16. Connect an external VU meter to the console output. Provide a 600 Ohm termination for the output. Connect a 1kHz sine wave signal to the right channel input of any mixer and observe the output level. Make note of the right channel output level as indicated on the external VU meter and disconnect the signal. Connect the same signal to the left input of the same mixer and note the output level.

5-17. Adjust R17, the gain balance control, on the appropriate line driver amplifier circuit board to match the two output levels.

5-18. TROUBLESHOOTING.

CAUTION

AC POWER MUST BE TURNED OFF WHENEVER CIRCUIT BOARDS ARE REMOVED OR INSERTED.

5-19. When determining the cause of a fault in the console it is necessary to isolate the fault to a particular section or circuit board. Begin by determining if the power supply is functioning. Check to see if the VU meter lamps are illuminated, if the muting relays are operational, or perform an actual voltage check. Next, check for signal presence in the MIX 1, MIX 2, and cue channels. Finally, interchange circuit board modules to determine if the fault is caused by a particular module.

NOTE

THE OPTIONAL EXTENDER CIRCUIT BOARD (BE P/N 919-3000) AND THE MODULE EXTENDER (BE P/N

NOTE

911-0013) ARE HELPFUL WHEN PERFORMING TROUBLESHOOTING MEASUREMENTS.

5-20. If a fault is found to occur within more than one circuit board, check wiring continuity within the console.

5-21. 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-ohm-milliammeter. This voltage should be one-half of the dc voltage present at the integrated circuit dc supply voltage input pin (+V). With all power off, test capacitors with an ohmmeter.

5-22. COMPONENT REPLACEMENT ON CIRCUIT BOARDS. Circuit board repair requires that defective components be removed carefully to avoid damage to the board.

5-23. 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.

5-24. 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.

5-25. 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.

5-26. 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.

5-27. 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.

5-28. 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.

SECTION VI PARTS LISTS

6-1. INTRODUCTION.

6-2. This section provides descriptions and part numbers of parts and assemblies required for maintenance of the 4000/4100 Consoles. Table entries in this section are indexed by the reference designators of the applicable schematic diagram.

6-3. Table 6-1 indexes all tables listing assemblies and sub-assemblies having replaceable parts, the table number listing the parts, and the page number of the applicable table.

<u>NOTE</u>	BASIC PARTS THAT ARE COMMON TO ALL MODELS OR
	ALL VERSIONS OF A CIRCUIT BOARD ASSEMBLY ARE
<u>NOTE</u>	LISTED AT THE BEGINNING OF A PARTS TABLE.
	PARTS UNIQUE TO A PARTICULAR MODEL OR VERSION
<u>NOTE</u>	OF THAT CIRCUIT BOARD ASSEMBLY ARE LISTED UNDER
	A SPECIAL HEADING WHICH FOLLOWS THE BASIC PARTS
<u>NOTE</u>	IN THE SAME TABLE.

TABLE 6-1. REPLACEABLE PARTS LIST INDEX

TABLE NO.	DESCRIPTION	PART NO.	PAGE
6-2	4000 SERIES SLIDE-MIXER AUDIO CONSOLE FINAL ASSEMBLY	901-4000- 000 901-4100- 000	35
6-3	INPUT MIXING MODULE ASSEMBLY (MONO OR STEREO)	980-4021 980-4022 980-4023 980-4024	37
6-4	INPUT MIXING CIRCUIT BOARD ASSEMBLY	918-4101 918-4111 918-4121 918-4131	38
6-5	MONO REMOTE INPUT MODULE ASSEMBLY	918-4102	41
6-6	STEREO REMOTE INPUT MODULE ASSEMBLY	918-4112	41
6-7	MIXER/LINE DRIVER AMPLIFIER CIRCUIT BOARD ASSEMBLY	918-3604-1	42
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TABLE 6-1. PARTS LIST INDEX
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TABLE NO.	DESCRIPTION	PART NO.	PAGE
6-9	POWER SUPPLY AND RELAY CIRCUIT BOARD ASSEMBLY	918-4100	44
6-10	MONITOR (8 Watt Audio Power) AMPLIFIER CIRCUIT BOARD ASSEMBLY	918-3709	44
6-11	CUE INTERCOM AMPLIFIER CIRCUIT BOARD ASSEMBLY	918-7018	45
6-12	HEADPHONE AMPLIFIER CIRCUIT BOARD ASSEMBLY	918-3510	46
6-13	VU METER RECEIFIER CIRCUIT BOARD ASSEMBLY	918-0001	46

TABLE 6-2. 4000 SERIES SLIDE-MIXER AUDIO CONSOLE
901-4000-000/-4100-000 (Sheet 1 of 2)

REF. DES.	DESCRIPTION	PART NO.	QTY.
<u>MONAURAL AND STEREO MODELS</u>			
C1,C2	Capacitor, Ceramic, 0.005 μ F, 50V	000-5034	2
CR1	Bridge Rectifier, MDA2502, 200V, 25 Amperes	239-0006	1
F1	Fuse, AGC, 2 Amperes, Slow-Blow	334-0200	1
J1 THRU J4, J9	Receptacle, 18-Pin	417-1801	5
J11	Receptacle, 22-Pin, Card Edge	417-2380	12
J12	Phone Jack, 3 Conductor	417-0311	1
L1,L2	Lamp, No. 1828, 37.5V, 0.05 Ampere (for VU Meters)	321-1828	2
M1,M2	Meter, VU, 3.5 inch (8.89 cm), dc Microammeter Type, 1.9 k Ohm Movement	319-1003	2
P1,P4	Potentiometer, 10 k Ohm, 1W (CUE PHONES and CUE LEVEL Controls)	191-1053C	2
R16	Resistor, 4 Ohm \pm 5%, 2W, W/W	132-4013	1
S1	Switch, Toggle, SPST, Power (ON/OFF)	348-0110	1
S2,S3	Switch, Lever, 2 Pole, 3 Position, 1.5A @ 28V dc, 230 mA @ 115V ac (MONITOR Select, PHONES Select)	343-3004	2
S4	Switch, Lever, 3 Pole, 3 Position, 1.5A @ 28V dc, 230 mA @ 115V ac (CUE INTERCOM Select)	343-3001	1

TABLE 6-2. 4000 SERIES SLIDE-MIXER AUDIO CONSOLE
901-4000-000/-4100-000 (Sheet 2 of 2)

REF. DES.	DESCRIPTION	PART NO.	QTY.
S5	Switch, Lever, 2 Pole, 3 Position, 1.5A @ 28V dc, 230 mA @ 115V ac (INTERCOM STUDIO Select)	343-3004	1
T1	Transformer, Power Primary: 117V $\pm 10\%$, 60 Hz Secondary: 23V ac @ 3 Amperes	376-0007	1
----	Speaker, 3 inch, Permanent Magnet	414-0001	1
----	Knob (Lever Switch)	482-0003	4
----	Knob (Level Control Potentiometers)	482-0002	6
----	Mixer/Line Driver Amplifier Circuit Board Assembly (Table 6-9)	918-3604-1	2
----	Power Supply and Relay Circuit Board Assembly (Table 6-7)	918-4100	1
----	Monitor Amplifier Circuit Board Assembly (Table 6-8)	918-3709	1
----	Headphone Preamplifier Circuit Board Assembly (Table 6-11)	918-3510	1
----	Cue Intercom Circuit Board Assembly (Table 6-10)	918-7018	1
----	VU Meter Circuit Board Assembly (Table 6-12)	918-0001	2
ADDITIONAL PARTS FOR MONAURAL CONSOLES 901-4000-000			
P2,P3, P5,P6	Potentiometer, 10 k Ohm, 1W (PROGRAM PHONES, MONITOR LEVEL, MIX 2 MASTER, MIX 1 MASTER)	191-1053C	4
----	Mono Input Mixing Module, with Muting Logic (Table 6-3) OR	980-4021	1
----	Mono Input Mixing Module, without Muting Logic (Table 6-3)	980-4023	---
----	Mono Remote Input Module (Table 6-4)	980-4025	1
ADDITIONAL PARTS FOR STEREO CONSOLES 901-4100-000			
C3,C4	Capacitor, Ceramic, 0.005 μ F, 50V	000-5034	2
J5 THRU J8,J10	Receptacle, 18-Pin	417-1801	5
L3,L4	Lamp, No. 1828, 37.5V, 0.05 Ampere (for VU Meters)	321-1828	2
M3,M4	Meter, VU, 3.5 inch (8.89 cm), dc Microammeter Type, 1.9 k Ohm Movement		
P2,P3, P5,P6	Potentiometer, Dual, 10 k Ohm, 1W (PROGRAM PHONES, MONITOR LEVEL, MIX 2 MASTER, MIX 1 MASTER)	191-1053C	4
----	Stereo Input Mixing Module, with Muting Logic (Table 6-3) OR	980-4022	1
----	Stereo Input Mixing Module, without Muting Logic (Table 6-3)	980-4024	---
----	Stereo Remote Input Module (Table 6-5)	980-4026	1
----	Mono Matrix Assembly (Table 6-13)	918-3602	1

TABLE 6-3. INPUT MIXING MODULE ASSEMBLY
980-4021/-4022/-4023/-4024

REF. DES.	DESCRIPTION	PART NO.	QTY.
<u>ALL MODULES</u>			
S7	Switch, Lever, 3 Pole, 3 Position, 1.5 Ampere @ 28V dc, 230 mA @ 115V ac (MODE Select)	343-3001	1
----	Pushbutton Switchcap, Black (INPUT SELECTOR: Channel A, Channel B)	343-1003	2
----	Pushbutton Switchcap, White (OUTPUT SELECTOR: MIX 2)	343-1002	1
----	Pushbutton Switchcap, Red (OUTPUT SELECTOR: MIX 1)	343-1001	1
----	Knob, (Lever Switch)	482-0003	1
----	Knob, (Slider Potentiometer)	482-0005	1
<u>ADDITIONAL PARTS FOR MONO MODULE WITH MUTING - 980-4021</u>			
R46	Potentiometer, 10 k Ohm, Slide (LEVEL Vertical Attenuator)	180-1050A	1
----	Input Mixing Circuit Board Assembly (Table 6-6)	918-4111	1
<u>ADDITIONAL PARTS FOR MONO MODULE WITHOUT MUTING - 980-4023</u>			
R46	Potentiometer, 10 k Ohm, Slide (LEVEL Vertical Attenuator)	180-1050A	1
----	Input Mixing Circuit Board Assembly (Table 6-6)	918-4101	1
<u>ADDITIONAL PARTS FOR STEREO MODULE WITH MUTING - 980-4022</u>			
R46	Potentiometer, Dual, 10 k Ohm, Slide, (LEVEL Vertical Attenuator)	180-1050B	1
----	Input Mixing Circuit Board Assembly (Table 6-6)	918-4131	1
<u>ADDITIONAL PARTS FOR STEREO MODULE WITHOUT MUTING - 980-4024</u>			
R46	Potentiometer, Dual, 10 k Ohm, Slide (LEVEL Vertical Attenuator)	180-1050B	1
----	Input Mixing Circuit Board Assembly (Table 6-6)	918-4121	1

TABLE 6-4. INPUT MIXING CIRCUIT BOARD ASSEMBLY
918-4101/-4111/-4121/-4131 (Sheet 1 of 4)

REF. DES.	DESCRIPTION	PART NO.	QTY.
<u>ALL MODULES</u>			
C3,C4,C7, C8	Capacitor, Ceramic, 0.01 uF, 25V	000-1044	4
C9	Capacitor, Mylar, 0.1 uF, 100V	030-1053	1
C11,C13, C15	Capacitor, Electrolytic, 33 uF, 35V	024-3335	3
C17,C19 THRU C23	Capacitor, Electrolytic, 100 uF, 35V	014-1084	6
C24	Capacitor, Ceramic, 0.05 uF, 100V	000-5044	1
C25,C26	Capacitor, Electrolytic, 1 uF, 35V	064-1063	2
C29	Capacitor, Ceramic, 100 pF, 500V	002-1024	1
IC1,IC2	Integrated Circuit, NE5532AFE, Dual Low-Noise Operational Amplifier, 8-Pin DIP	221-5532	2
IC7	Voltage Regulator, UA7824UC, 24V, TO-220 Case	227-7824A	1
K1,K2	Relay, DPST, 24V dc Coil Normally Open Contacts	275-0001	2
L3,L4, L7 THRU L11	Choke, Ferrite, 2 Turns of #32 Enameled Wire	956-0001	7
R3,R4,R7, R8	Resistor, 18 k Ohm $\pm 5\%$, 1/4W	100-1853	4
R11,R12, R15,R16	Resistor, 100 Ohm $\pm 5\%$, 1/4W	100-1033	4
R17	Resistor, 56 k Ohm $\pm 5\%$, 1/4W	100-5653	1
R19	Resistor, 1 k Ohm $\pm 5\%$, 1/4W	100-1043	1
R21	Resistor, 100 k Ohm $\pm 5\%$, 1/4W	100-1063	1
R23,R25	Resistor, 10 k Ohm $\pm 5\%$, 1/4W	100-1053	2
R28	Resistor, 22 k Ohm $\pm 5\%$, 1/4W	100-2253	1
R29	Resistor, 3.3 k Ohm $\pm 5\%$, 1/4W	100-3343	1
R32	Resistor, 220 Ohm $\pm 5\%$, 1/4W	100-2233	1
R37,R39	Resistor, 6.8 k Ohm $\pm 5\%$, 1/4W	100-6843	2
R41	Resistor, 470 Ohm $\pm 5\%$, 1/4W	100-4733	1
R42	Resistor, 10 k Ohm $\pm 5\%$, 1/4W	100-1053	1
S2,S4	Switch, Slide, DPDT, 0.5 Ampere @ 125V ac (MIC/LINE Select)	345-0863	2
S5	Switch, Push, 4PDT, 2 Station, 0.125 Ampere @ 110V ac, 25W Maximum (INPUT SELECTOR Switch)	343-1401	1
S6	Switch, Push, DPDT, 2 Station, (OUTPUT SELECTOR Switches)	343-1203	1
T1	Transformer, Audio Input, 30 Hz to 20 kHz, ± 0.5 dB Primary: 150 Ohms, 69 Ohms dc Resistance Secondary: 15 k Ohms, 2.6 k Ohms dc Resistance	376-0519	1
T3	Transformer, Output (BE Manufacture)	376-0522	1
XIC1,XIC2	Socket, 8-Pin DIP	417-0800	2
----	Blank Circuit Board	278-4101	1

TABLE 6-4. INPUT MIXING CIRCUIT BOARD ASSEMBLY
918-4101/-4111/-4121/-4131 (Sheet 2 of 4)

REF. DES.	DESCRIPTION	PART NO.	QTY.
ADDITIONAL COMPONENTS FOR MONO MODULE WITHOUT MUTING - 918-4101			
CR5,CR6	Diode, 1N4005, Rectifier, Silicon, 600V, 1 Ampere	203-4005	2
CR7	Diode, Zener, 1N5243B, Silicon, 13V, 500 mW	200-0012	1
R31	Resistor, 220 Ohm $\pm 5\%$, 1/4W	100-2233	1
R43	Resistor, 10 k Ohm $\pm 5\%$, 1/4W	100-1053	1
ADDITIONAL COMPONENTS FOR MONO MODULE WITH MUTING - 918-4111			
C27,C28	Capacitor, Ceramic, 0.1 μ F, 50V	000-1054	2
IC3 THRU IC5	Integrated Circuit, CD4019B, Quad AND/OR Select Gate, 16-Pin DIP	228-4019	3
IC6	Integrated Circuit, MM74C00N, CMOS, Quad, 2-Input NAND Gate, 14-Pin DIP	221-7400	1
Q1	Transistor, 2N3904, Silicon, NPN, TO-92 Case	211-3904	1
R44	Resistor, 100 k Ohm $\pm 5\%$, 1/4W	100-1063	1
R45	Resistor, 10 k Ohm $\pm 5\%$, 1/4W	100-1053	1
R100,R200	Resistor Network, 10 k Ohm	226-1047	2
S8,S9	Switch, SPST, 8 Position, DIP, Maximum Contact Resistance: 50 mA @ 24V dc (Muting Control Switches)	340-0003	2
ADDITIONAL COMPONENTS FOR STEREO MODULE WITHOUT MUTING - 918-4121			
C1,C2,C5, C6	Capacitor, Ceramic, 0.01 μ F, 25V	000-1044	4
C10	Capacitor, Mylar, 0.1 μ F, 100V	030-1053	1
C12,C14, C16	Capacitor, Electrolytic, 33 μ F, 35V	024-3335	3
C20,C21, C22	Capacitor, Electrolytic, 100 μ F, 35V	014-1084	3
C30	Capacitor, Ceramic, 100 pF, 500V	002-1024	1
CR5,CR6	Diode, Rectifier, 1N4005, Silicon, 600V, 1 Ampere	203-4005	2
CR7	Diode, Zener, 1N5243B, Silicon, 13V, 500 mW	200-0012	1
L1,L2,L5, L6	Choke, Ferrite, 2 Turns #32 Enameled Wire	956-0001	4
R1,R2,R5, R6	Resistor, 18 k Ohm $\pm 5\%$, 1/4W	100-1853	4
R9,R10, R13,R14	Resistor, 100 Ohm $\pm 5\%$, 1/4W	100-1033	4
R18	Resistor, 56 k Ohm $\pm 5\%$, 1/4W	100-5653	1
R20	Resistor, 1 k Ohm $\pm 5\%$, 1/4W	100-1043	1
R22	Resistor, 100 k Ohm $\pm 5\%$, 1/4W	100-1063	1
R24,R26	Resistor, 10 k Ohm $\pm 5\%$, 1/4W	100-1053	2

TABLE 6-4. INPUT MIXING CIRCUIT BOARD ASSEMBLY
918-4101/-4111/-4121/-4131 (Sheet 3 of 4)

REF. DES.	DESCRIPTION	PART NO.	QTY.
R27	Resistor, 22 k Ohm $\pm 5\%$, 1/4W	100-2253	1
R30	Resistor, 3.3 k Ohm $\pm 5\%$, 1/4W	100-3343	1
R31	Resistor, 220 Ohm $\pm 5\%$, 1/4W	100-2233	1
R38,R40	Resistor, 6.8 k Ohm $\pm 5\%$, 1/4W	100-6843	2
R43	Resistor, 10 k Ohm $\pm 5\%$, 1/4W	100-1053	1
S1,S3, S10	Switch, Slide, DPDT, 0.5 Ampere @ 125V ac (MIC/LINE Select S1,S3) (Stereo/Mono Select S10)	345-0863	3
T2	Transformer, Audio Input, 30 Hz to 20 kHz ± 0.5 dB Primary: 150 Ohms, 69 Ohms dc Resistance Secondary: 15 k Ohm, 2.6 k Ohm dc Resistance	376-0519	1
T4	Transformer, Audio Output (BE Manufacture)	376-0522	1
ADDITIONAL PARTS FOR STEREO MODULE WITH MUTING - 918-4131			
C1,C2,C5, C6	Capacitor, Ceramic, 0.01 μ F, 25V	000-1044	4
C10	Capacitor, Mylar, 0.1 μ F, 100V	030-1053	1
C12,C14, C16	Capacitor, Electrolytic, 33 μ F, 35V	024-3335	3
C18	Capacitor, Electrolytic, 100 μ F, 35V	014-1084	1
C27,C28	Capacitor, Ceramic, 0.1 μ F, 35V	000-1054	2
C30	Capacitor, Ceramic, 100 pF, 500V	002-1024	1
CR1 THRU CR4	Diode, 1N4148, Silicon, 75V @ 0.3 Amperes	203-4148	4
CR5,CR6	Diode, Rectifier, 1N4005, Silicon, 600V, 1 Ampere	203-4005	2
CR7	Diode, Zener, 1N5243, Silicon, 13V, 500 mW	200-0012	1
IC3 THRU IC5	Integrated Circuit, CD4019BE, Quad AND/OR Select Gate, 16-Pin DIP	228-4019	3
IC6	Integrated Circuit, MM74C00N, CMOS, Quad 2 Input, NAND Gate, 14-Pin DIP	221-7400	1
L1,L2,L5, L6	Choke, Ferrite, 2 Turns #32 Enameled Wire	956-0001	4
Q1	Transistor, 2N3904, Silicon, NPN, TO-92 Case	211-3904	1
R1,R2,R5, R6	Resistor, 18 k Ohm $\pm 5\%$, 1/4W	100-1853	4
R9,R10, R13,R14	Resistor, 100 Ohm $\pm 5\%$, 1/4W	100-1033	4
R18	Resistor, 56 k Ohm $\pm 5\%$, 1/4W	100-5653	1
R20	Resistor, 1 k Ohm $\pm 5\%$, 1/4W	100-1043	1
R22	Resistor, 100 k Ohm $\pm 5\%$, 1/4W	100-1063	1
R24,R26	Resistor, 10 k Ohm $\pm 5\%$, 1/4W	100-1053	2
R27	Resistor, 22 k Ohm $\pm 5\%$, 1/4W	100-2253	1
R29	Resistor, 3.3 k Ohm $\pm 5\%$, 1/4W	100-3343	1
R31	Resistor, 220 Ohm $\pm 5\%$, 1/4W	100-2233	1
R38,R40	Resistor, 6.8 k Ohm $\pm 5\%$, 1/4W	100-6843	2
R43	Resistor, 10 k Ohm $\pm 5\%$, 1/4W	100-1053	1

TABLE 6-4. INPUT MIXING CIRCUIT BOARD ASSEMBLY
918-4101/-4111/-4121/-4131 (Sheet 4 of 4)

REF. DES.	DESCRIPTION	PART NO.	QTY.
R44	Resistor, 100 k Ohm $\pm 5\%$, 1/4W	100-1063	1
R45	Resistor, 10 k Ohm $\pm 5\%$, 1/4W	100-1053	1
R100,R200	Resistor Network, 10 k Ohm, 14-Pin DIP	226-1047	2
S1,S3	Switch, Slide, DPDT, 0.5A @ 125V ac (MIC/LINE Switch)	345-0863	2
S8,S9	Switch, DIP, SPST, 8 Position, Maximum Contact Resistance: 50 mA @ 24V dc (Muting Control)	340-0003	2
S10	Switch, Slide, DPDT, 0.5A @ 125V ac (STEREO/ MONO Select)	345-0863	1
T2	Transformer, Audio Input, 30 Hz to 20 kHz, ± 0.5 dB Primary: 150 Ohms, 69 Ohms dc Resistance Secondary: 15 k Ohms, 2.6 k Ohms dc Resistance	376-0519	1
T4	Transformer, Output (BE Manufactured)	376-0522	1

TABLE 6-5. MONO REMOTE INPUT MODULE ASSEMBLY - 918-4102

REF. DES.	DESCRIPTION	PART NO.	QTY.
C3,C4,C7 THRU C11	Capacitor, Ceramic Disc, 0.01 μ F, 100V	001-1044	7
L3,L4,L7 THRU L10	Choke, Ferrite, 2 Turns of #32 Enameled Wire	956-0001	6
S1	Switch, Push, DPDT, 3 Station, 0.125 Ampere @ 110/120V ac Resistive Load, 25W Maximum	343-1202	1
S2	Switch, Push, DPDT, 2 Station, 0.125 Ampere @ 110/120V ac Resistive Load, 25W Maximum	343-1201	1
R2,R3,R5, R6	Resistor, 620 Ohm $\pm 5\%$, 1/4W	100-6233	4
----	Transformer, Audio Input (BE Manufacture)	376-0525	1
----	Blank Circuit Board	518-4102	1

TABLE 6-6. STEREO REMOTE INPUT MODULE ASSEMBLY - 918-4112

REF. DES.	DESCRIPTION	PART NO.	QTY.
C1 THRU C10	Capacitor, Ceramic Disc, 0.01 μ F, 100V	001-1044	10
L1 THRU L10	Choke, Ferrite, 2 Turns of #32 Enameled Wire	956-0001	10
R1 THRU R6	Resistor, 620 Ohms $\pm 5\%$, 1/4W	100-6233	6
S1	Switch, Pushbutton, 4PDT, 3 Station, 25W Maximum	343-1204	1
S2	Switch, Pushbutton, 4PDT, 2 Station, 25W Maximum	343-1401	1
----	Transformer, Audio Input (BE Manufacture)	376-0525	1
----	Blank Circuit Board	518-4102	1

TABLE 6-7. MIXER/LINE DRIVER AMPLIFIER CIRCUIT BOARD ASSEMBLY
918-3604-1 (Sheet 1 of 2)

REF. DES.	DESCRIPTION	PART NO.	QTY.
C1	Capacitor, Mica, 150 pF, 500V	040-1522	1
C2	Capacitor, Electrolytic, 10 uF, 25V, Tantalum	063-1074	1
C3	Capacitor, Electrolytic, 4.7 uF, 35V	024-4764	1
C5	Capacitor, Electrolytic, 50 pF, 50V, Tantalum	040-5013	1
C6	Capacitor, Electrolytic, 33 uF, 35V	014-3274	1
C7	Capacitor, Electrolytic, 100 uF, 40V	014-1084	1
C8	Capacitor, Electrolytic, 1 uF, 35V, Tantalum	064-1063	1
C9	Capacitor, Electrolytic, 33 uF, 35V	024-3374	1
C11	Capacitor, Ceramic Disc, 5 pF, 500V	001-5004	1
C12	Capacitor, Electrolytic, 33 uF, 35V	014-3274	1
C13	Capacitor, Electrolytic, 100 uF, 40V	014-1084	1
C14	Capacitor, Electrolytic, 100 uF, 25V	023-1084	1
C15	Capacitor, Electrolytic, 22 uF, 50V	024-2274	1
C16,C17	Capacitor, Ceramic Disc, 20 pF, 1 kV	002-2013	2
C18	Capacitor, Electrolytic, 4.7 uF, 35V	024-4764	1
CR1,CR2	Diode, 1N4148, Silicon, 75V @ 0.3 Ampere	203-4148	2
CR3	Diode, 1N98, Germanium, 80V @ 0.2 Ampere	202-0098	1
CR4,CR5	Diode, 1N4148, Silicon, 75V @ 0.3 Ampere	203-4148	1
CR6	Diode, 1N98, Germanium, 80V @ 0.2 Ampere	202-0098	1
IC1,IC2	Integrated Circuit, NE5534AN, Low-Noise Operational Amplifier, 8-Pin DIP	221-5534	2
L1	Inductor, 2.2 uH	364-0022	1
Q1	Transistor, 2N5816, Silicon, NPN, TO-92 Case	211-5816	1
Q2	Transistor, 2N5817, Silicon, PNP, TO-92 Case	210-5817	1
Q3	Transistor, 2N3904, Silicon, NPN, TO-92 Case	211-3904	1
Q4,Q5	Transistor, 2N4250, Silicon, PNP, TO-92 Case	210-4250	2
Q6	Transistor, 2N5816, Silicon, NPN, TO-92 Case	211-5816	1
Q7	Transistor, 2N5817, Silicon, PNP, TO-92 Case	210-5817	1
Q8,Q9	Transistor, 2N3904, Silicon, NPN, TO-92 Case	211-3904	2
R1	Resistor, 1 k Ohm $\pm 5\%$, 1/4W	100-1043	1
R2	Resistor, 47 Ohm $\pm 5\%$, 1/4W	100-4723	1
R3	Resistor, 6200 Ohm $\pm 5\%$, 1/4W	100-6243	1
R4	Resistor, 27 k Ohm $\pm 5\%$, 1/4W	100-2753	1
R5	Resistor, 3.9 k Ohm $\pm 5\%$, 1/4W	100-3943	1
R6	Resistor, 4.7 k Ohm $\pm 5\%$, 1/4W	100-4743	1
R7,R8	Resistor, 18 Ohm $\pm 5\%$, 1/4W	100-1823	2
R9	Resistor, 2 k Ohm $\pm 5\%$, 1/4W	100-2043	1
R10	Resistor, 100 k Ohm $\pm 5\%$, 1/4W	100-1063	1
R11	Resistor, 150 k Ohm $\pm 5\%$, 1/4W	100-1563	1
R12,R13	Resistor, 470 Ohm $\pm 5\%$, 1/4W	100-4733	2
R14,R15	Resistor, 180 k Ohm $\pm 5\%$, 1/4W	100-1863	2
R16	Resistor, 1 k Ohm $\pm 5\%$, 1/4W	100-1043	1
R17	Potentiometer, 50 k Ohm $\pm 10\%$, 1/2W	178-5054	1
R18	Resistor, 47 k Ohm $\pm 5\%$, 1/4W	100-4753	1
R19	Resistor, 3.9 k Ohm $\pm 5\%$, 1/4W	100-3943	1
R20	Resistor, 4.7 k Ohm $\pm 5\%$, 1/4W	100-4743	1
R21,R22	Resistor, 18 Ohm $\pm 5\%$, 1/4W	100-1823	2
R24	Resistor, 9.1 k Ohm $\pm 5\%$, 1/4W	100-9143	1

TABLE 6-7. MIXER/LINE DRIVER AMPLIFIER CIRCUIT BOARD ASSEMBLY
918-3604-1 (Sheet 2 of 2)

REF. DES.	DESCRIPTION	PART NO.	QTY.
R25	Resistor, 10 k Ohm $\pm 5\%$, 1/4W	100-1053	1
R26,R27	Resistor, 220 Ohm $\pm 5\%$, 1/4W	100-2233	2
T1	Transformer, Audio Output, 1:1 600 Ohm (BE Manufactured)	371-0001	1
XIC1,XIC2	Socket, 8-Pin	417-0800	2
----	Blank Circuit Board	518-3604	1

TABLE 6-8. MONAURAL MATRIX CIRCUIT BOARD ASSEMBLY - 918-3602

REF. DES.	DESCRIPTION	PART NO.	QTY.
C1	Capacitor, Mica, 50 pF $\pm 10\%$, 50V	040-5013	1
C2	Capacitor, Electrolytic, 4.7 μ F, 35V	015-5064	1
C3	Capacitor, Electrolytic, 22 μ F, 25V	013-2574	1
C4,C5	Capacitor, Ceramic Disc, 10 pF, 500V	001-1014	2
C6,C7	Capacitor, Electrolytic, 100 μ F, 40V	014-1084	2
C8,C9	Capacitor, Electrolytic, 33 μ F, 35V	014-3274	2
D1,D2	Diode, 1N4148, Silicon, 75V, 10 mA	203-4148	2
D3	Diode, 1N98, Germanium, 80V, 20 mA	202-0098	1
IC1	Integrated Circuit, μ A748C, High Performance Operational Amplifier, 8-Pin DIP	221-7480	1
L1	Choke, Ferrite, 2 Turns #32 Enameled Wire	956-0001	1
Q1,Q2	Transistor, 2N3904, Silicon, NPN, TO-92 Case	211-3904	2
Q3	Transistor, GES5817, Silicon, PNP, TO-92 Case	210-5817	1
Q4	Transistor, GES5816, Silicon, NPN, TO-92 Case	211-5816	1
R1,R2	Potentiometer, 50 k Ohm $\pm 10\%$, 1/2W	178-5054	2
R3,R4	Resistor, 33 k Ohm $\pm 5\%$, 1/4W	100-3353	2
R5	Resistor, 47 Ohm $\pm 5\%$, 1/4W	100-4723	1
R6	Resistor, 4.7 k Ohm $\pm 5\%$, 1/4W	100-4743	1
R7	Resistor, 3.9 k Ohm $\pm 5\%$, 1/4W	100-3943	1
R8,R9	Resistor, 33 k Ohm $\pm 5\%$, 1/4W	100-3353	2
R10	Resistor, 10 k Ohm $\pm 5\%$, 1/4W	100-1053	1
R11	Resistor, 8.2 k Ohm $\pm 5\%$, 1/4W	100-8243	1
R12,R13	Resistor, 18 Ohm $\pm 5\%$, 1/4W	100-1823	2
R14	Resistor, 100 k Ohm $\pm 5\%$, 1/4W	100-1063	1
R15	Resistor, 220 k Ohm $\pm 5\%$, 1/4W	100-2233	1
T1	Transformer, Audio Output, 1:1 Primary: 600 Ohms CT Secondary: 600 Ohms CT (BE Manufactured)	371-0001	1
XIC1	Socket, 8-Pin DIP	417-0800	1
----	Blank Circuit Board	518-3602	1

TABLE 6-9. POWER SUPPLY AND RELAY CIRCUIT BOARD ASSEMBLY - 918-4100

REF. DES.	DESCRIPTION	PART NO.	QTY.
C1	Capacitor, Ceramic Disc, 0.05 μ F, 50V	000-5044	1
C2,C3	Capacitor, Electrolytic, 4700 μ F, 35V	014-4795	2
C4,C5	Capacitor, Ceramic Disc, 0.05 μ F, 50V	000-5044	2
CR1 THRU CR5	Diode, 1N4005, Rectifier, Silicon, 600V, 1 Ampere	203-4005	5
CR6	Diode, Zener, 1N4739A, 9.1V \pm 10%, 1W	200-0009	1
K1 THRU K5	Relay, Socket Mount Contacts: 4 Sets SPDT, 2 Ampere, 28V dc or 115V ac Resistive Load Coil: 700 Ohm, 24V dc	270-0007	5
Q1 THRU Q4	Transistor, GES5817, Silicon, PNP, TO-92 Case	210-5817	4
Q5 THRU Q8	Transistor, GES5816, Silicon, NPN, TO-92 Case	211-5816	4
R1 THRU R8	Resistor, 22 k Ohm \pm 5%, 1/4W	100-2253	8
R9 THRU R16	Resistor, 10 k Ohm \pm 5%, 1/4W	100-1053	8
R17 THRU R21	Resistor, 100 Ohm \pm 5%, 1/4W	100-1033	5
R22	Resistor, 2200 Ohm \pm 5%, 1/4W	100-2243	1
R23	Resistor, 5 Ohm \pm 5%, 5W	133-5013	1
XK1 THRU XK5	Socket, Relay	270-0008	5
----	Blank Circuit Board	518-4100	1

TABLE 6-10. MONITOR AMPLIFIER CIRCUIT BOARD ASSEMBLY
918-3709 (Sheet 1 of 2)

REF. DES.	DESCRIPTION	PART NO.	QTY.
C1 THRU C5	Capacitor, Electrolytic, 4.7 μ F, 35V	024-4764	5
C6	Capacitor, Mica, 100 pF, 50V	040-1022	1
C7,C8	Capacitor, Electrolytic, 4.7 μ F, 35V	024-4764	2
C9	Capacitor, Electrolytic, 4700 μ F, 35V	014-4795	1
D1	Diode, Zener, 1N4744A, 15V \pm 5%, 1W	200-0015	1
D2	Diode, 1N4004, Silicon, 400V, 1 Ampere	203-4004	1
F1	Fuse, 3AG, 1 Ampere	330-0100	1
L1	Choke, Ferrite, 2-Leg, 4 Turns of #32 Enameled Wire	956-0001	1
Q1	Transistor, 2N3904, Silicon, NPN	211-3904	1
Q2	Transistor, MPSA55, Silicon, PNP	210-0055	1
Q3	Transistor, MJ3000, Silicon, Darlington, NPN, TO-3 Case	219-3000	1
Q4	Transistor, MJ2500, Silicon, Darlington, PNP, TO-3 Case	219-2500	1
R1	Resistor, 10 k Ohm \pm 5%, 1/4W	100-1053	1
R2	Resistor, 100 k Ohm \pm 5%, 1/4W	100-1063	1
R3	Resistor, 5.1 k Ohm \pm 5%, 1/4W	100-5143	1
R4	Resistor, 330 Ohm \pm 5%, 1/4W	100-3333	1

TABLE 6-10. MONITOR AMPLIFIER CIRCUIT BOARD ASSEMBLY
918-3709 (Sheet 2 of 2)

REF. DES.	DESCRIPTION	PART NO.	QTY.
R5	Resistor, 180 k Ohm $\pm 5\%$, 1/4W	100-1863	1
R6,R7	Resistor, 220 k Ohm $\pm 5\%$, 1/4W	100-2263	2
R8,R9	Resistor, 3.9 k Ohm $\pm 5\%$, 1/4W	100-3843	2
R11	Resistor, 360 Ohm $\pm 5\%$, 1/4W	100-3633	1
R12 THRU R14	Resistor, 10 Ohm $\pm 5\%$, 1/4W	100-1023	3
R15	Resistor, 0.2 Ohm $\pm 5\%$, 5W, W/W	132-2003	1
U1	Integrated Circuit, NE5534AN, Low-Noise Operational Amplifier	221-5534	1
U2	Integrated Circuit, LM394H, Super-Matched, Low-Noise, NPN Pair	226-0394	1
XF1	Fuse Clip, 3AG	415-2068	2
XU1	Socket, 8-Pin DIP	417-0800	1
----	Ferrite Bead for L1	360-0001	1
----	Blank Circuit Board	518-3709	1

TABLE 6-11. CUE INTERCOM AMPLIFIER CIRCUIT BOARD ASSEMBLY - 918-7018

REF. DES.	DESCRIPTION	PART NO.	QTY.
C1	Capacitor, Electrolytic, 4.7 μ F, 35V	015-5064	1
C2	Capacitor, Ceramic Disc, 0.01 μ F, 50V	000-1054	1
C3	Capacitor, Electrolytic, 4.7 μ F, 35V	015-5064	1
C4	Capacitor, Electrolytic, 220 μ F, 25V	013-2284	1
C5,C6	Capacitor, Ceramic Disc, 0.1 μ F, 50V	015-5064	2
C7	Capacitor, Electrolytic, 100 μ F, 35V	014-1084	1
C8	Capacitor, Electrolytic, 220 μ F, 25V	013-2284	1
CR1	Diode, Zener, 1N5248, 18V, 1W	200-0018	1
IC1	Integrated Circuit, RC741DN, Operational Amplifier, 8-Pin	221-7410	1
IC2	Integrated Circuit, LM380N, Power Amplifier, 14-Pin DIP	222-3800	1
Q1	Transistor, 2N6121, Silicon, NPN, TO-220 Case	219-6121	1
R1	Resistor, 470 Ohm $\pm 5\%$, 1/4W	100-4733	1
R2	Resistor, 10 k Ohm $\pm 5\%$, 1/4W	100-1053	1
R3	Resistor, 100 k Ohm $\pm 5\%$, 1/4W	100-1063	1
R4	Resistor, 220 k Ohm $\pm 5\%$, 1/4W	100-2263	1
R5	Resistor, 1 k Ohm $\pm 5\%$, 1/4W	100-1043	1
R6,R7	Resistor, 100 k Ohm $\pm 5\%$, 1/4W	100-1063	2
R8	Resistor, 10 Ohm $\pm 5\%$, 1/4W	100-1023	1
R9	Resistor, 10 k Ohm $\pm 5\%$, 1/4W	100-1053	1
T1	Transformer, Audio Input, 1:1 Ratio Primary Resistance: 300 Ohms Secondary Resistance: 3 k Ohms (BE Manufacture)	376-0520	1
----	Choke, Ferrite, 2-Leg, 4 Turns of #32 Enameled Wire	956-0001	1
----	Blank Circuit Board	518-7018	1

TABLE 6-12. HEADPHONE AMPLIFIER CIRCUIT BOARD ASSEMBLY - 918-3510

REF. DES.	DESCRIPTION	PART NO.	QTY.
C1,C2	Capacitor, Ceramic Disc, 0.01 uF, 25V	000-1044	2
C3	Capacitor, Electrolytic, 1000 uF, 25V	013-1095	1
C4	Capacitor, Electrolytic, 220 uF, 25V	013-2284	1
C5	Capacitor, Electrolytic, 4.7 uF, 35V, Tantalum	064-4763	1
C6	Capacitor, Electrolytic, 200 uF, 25V	013-2284	1
C7,C8	Capacitor, Ceramic Disc, 0.01 uF, 25V	000-1044	2
C9	Capacitor, Electrolytic, 220 uF, 25V	013-2284	1
C10	Capacitor, Electrolytic, 4.7 uF, 35V, Tantalum	064-4763	1
C11	Capacitor, Ceramic, 0.05 uF, 100V	000-5044	1
CR1	Diode, Zener, 1N5248, 18V	200-0018	1
IC1	Integrated Circuit, LM377N, Dual Audio Power Amplifier, 14-Pin DIP	222-3770	1
Q1,Q2	Transistor, 2N5462, JFET, P-Channel, TO-226AA Case	212-5462	2
Q3	Transistor, 2N6121, Silicon, NPN, TO-220 Case	219-6121	1
R1	Resistor, 1 k Ohm $\pm 5\%$, 1/4W	100-1043	1
R2	Resistor, 2.2 k Ohm $\pm 5\%$, 1/4W	100-2243	1
R3	Resistor, 100 k Ohm $\pm 5\%$, 1/4W	100-1063	1
R4	Resistor, 10 k Ohm $\pm 5\%$, 1/4W	100-1053	1
R5	Resistor, 1 Meg Ohm $\pm 5\%$, 1/4W	100-1073	1
R6	Resistor, 10 k Ohm $\pm 5\%$, 1/4W	100-1053	1
R7	Resistor, 2.7 Ohm $\pm 5\%$, 1/4W	100-2713	1
R8	Resistor, 100 k Ohm $\pm 5\%$, 1/4W	100-1063	1
R9	Resistor, 2.2 k Ohm $\pm 5\%$, 1/4W	100-2243	1
R10	Resistor, 10 Ohm $\pm 5\%$, 1/4W	100-1023	1
R11	Resistor, 10 k Ohm $\pm 5\%$, 1/4W	100-1053	1
R12,R13	Resistor, 1 Meg Ohm $\pm 5\%$, 1/4W	100-1073	2
R14	Resistor, 2.2 k Ohm $\pm 5\%$, 1/4W	100-2243	1
R15	Resistor, 1 Meg Ohm $\pm 5\%$, 1/4W	100-1073	1
R16	Resistor, 100 k Ohm $\pm 5\%$, 1/4W	100-1063	1
R17,R18	Resistor, 10 k Ohm $\pm 5\%$, 1/4W	100-1053	2
R19	Resistor, 100 k Ohm $\pm 5\%$, 1/4W	100-1063	1
R20	Resistor, 2.2 k Ohm $\pm 5\%$, 1/4W	100-2243	1
R21	Resistor, 10 Ohm $\pm 5\%$, 1/4W	100-1023	1
R22	Resistor, 10 k Ohm $\pm 5\%$, 1/4W	100-1053	1
R23	Resistor, 470 Ohm $\pm 5\%$, 1/4W	100-4733	1
----	Blank Circuit Board	518-3510	1

TABLE 6-13. VU METER RECTIFIER CIRCUIT BOARD ASSEMBLY - 918-0001

REF. DES.	DESCRIPTION	PART NO.	QTY.
D1 THRU D4	Diode, 1N34, Germanium, 60V, 8.5 mA	202-0034	4
R1	Resistor, 3.9 k Ohm $\pm 5\%$, 1/4W	100-3943	1
R2	Resistor, 10 k Ohm $\pm 5\%$, 1/4W	100-1053	1
R3	Potentiometer, 10 k Ohm $\pm 10\%$, 1/2W	178-1054	1
----	Blank Circuit Board	518-1502	1

SECTION VII DRAWINGS

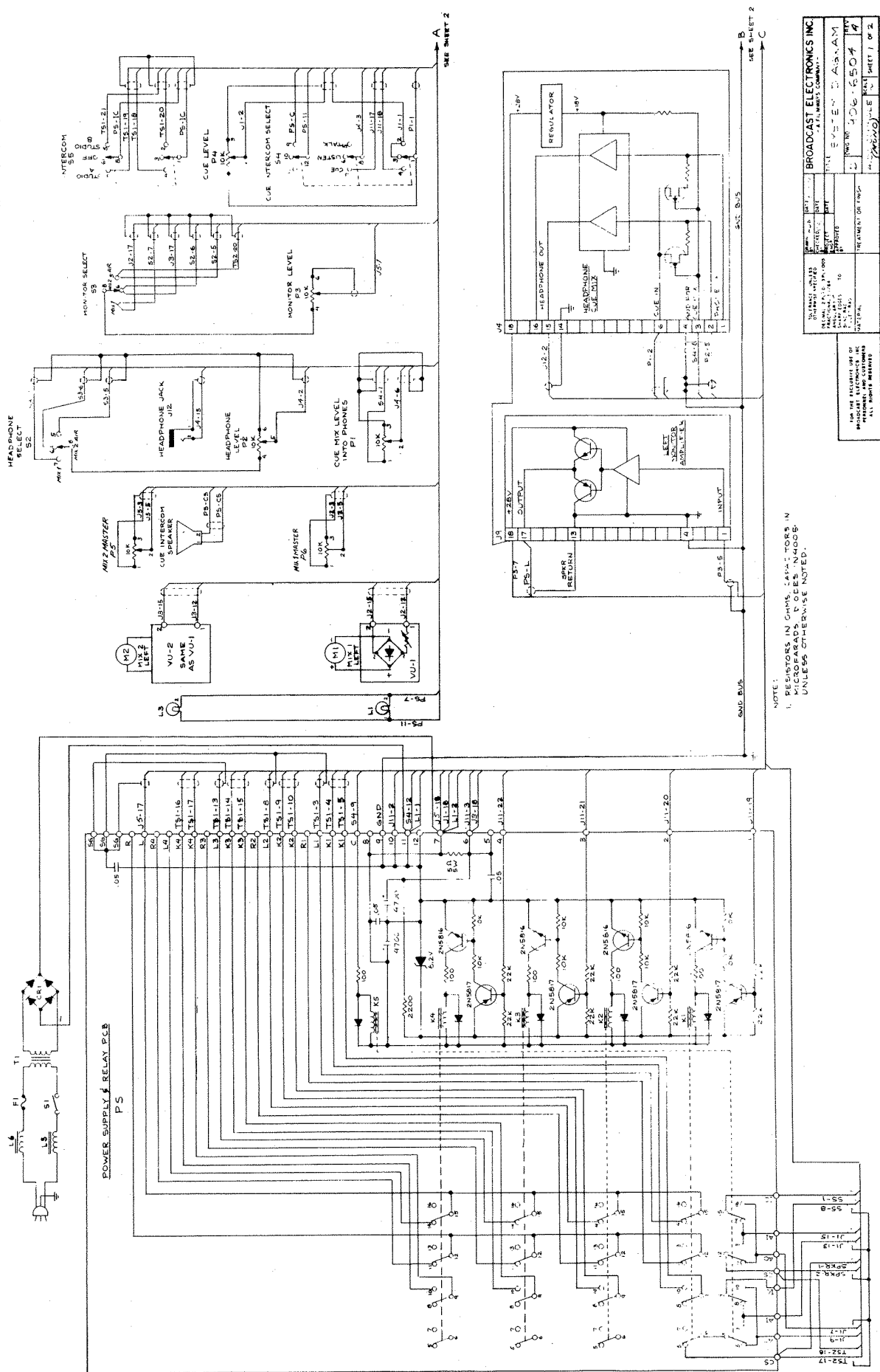
7-1. INTRODUCTION.

7-2. This section provides assembly drawings, schematic diagrams, and wiring diagrams as indexed below.

<u>NOTE</u>	THE ASSEMBLY DRAWINGS AND SCHEMATICS IN THIS SECTION SHOW THE MOST COMPLEX VERSION AVAILABLE, LESS COMPLEX VERSIONS OF THE MACHINE OR ITS COMPONENTS ARE COVERED BY THESE TOP LEVEL DRAWINGS.
<u>NOTE</u>	
<u>NOTE</u>	

<u>FIGURE</u>	<u>DESCRIPTION</u>	<u>NUMBER</u>
7-1	MONOPHONIC SYSTEM SCHEMATIC DIAGRAM (2 Sheets)	D906-6504
7-2	STEREOPHONIC SYSTEM SCHEMATIC DIAGRAM (2 Sheets)	D906-6503
7-3	COMPONENT LAYOUT (MONO)	C906-7110
7-4	COMPONENT LAYOUT (STEREO)	C906-7109
7-5	INPUT MIXING MODULE ASSEMBLY DRAWING	D906-7106
7-6	INPUT MIXING MODULE CIRCUIT BOARD SCHEMATIC DIAGRAM	D906-7101
7-7	INPUT MIXING MODULE CIRCUIT BOARD ASSEMBLY DRAWING	D918-4131
7-8	MUTE SWITCH PROGRAMMING DIAGRAM	A906-4131
7-9	REMOTE INPUT MODULE CIRCUIT BOARD SCHEMATIC DIAGRAM	D906-7105
7-10	REMOTE INPUT MODULE CIRCUIT BOARD ASSEMBLY DRAWING - MONO	D918-4102
7-11	REMOTE INPUT MODULE CIRCUIT BOARD ASSEMBLY DRAWING - STEREO	C918-4112
7-12	MIXER/LINE DRIVER AMPLIFIER CIRCUIT BOARD SCHEMATIC DIAGRAM	D906-7100-1

<u>FIGURE</u>		<u>NUMBER</u>
7-13	MIXER/LINE DRIVER AMPLIFIER CIRCUIT BOARD ASSEMBLY DRAWING	C918-3604-1
7-14	MONO MATRIX CIRCUIT BOARD SCHEMATIC DIAGRAM	C906-3602
7-15	MONO MATRIX CIRCUIT BOARD ASSEMBLY DRAWING	C918-3602
7-16	MONITOR AMPLIFIER (8W POWER AMP) CIRCUIT BOARD SCHEMATIC DIAGRAM	B906-3709
7-17	MONITOR AMPLIFIER (8W POWER AMP) CIRCUIT BOARD ASSEMBLY DIAGRAM	C918-3709
7-18	POWER SUPPLY AND RELAY CIRCUIT BOARD SCHEMATIC DIAGRAM	C906-7103
7-19	POWER SUPPLY AND RELAY CIRCUIT BOARD ASSEMBLY DRAWING	C918-4100
7-20	CUE-INTERCOM CIRCUIT BOARD SCHEMATIC DIAGRAM	B906-7104
7-21	CUE-INTERCOM CIRCUIT BOARD ASSEMBLY DRAWING	C918-7018
7-22	HEADPHONE AMPLIFIER CIRCUIT BOARD SCHEMATIC DIAGRAM	B906-7102
7-23	HEADPHONE AMPLIFIER CIRCUIT BOARD ASSEMBLY DRAWING	C918-3510
7-24	VU METER RECTIFIER CIRCUIT BOARD DIAGRAM	A918-0001

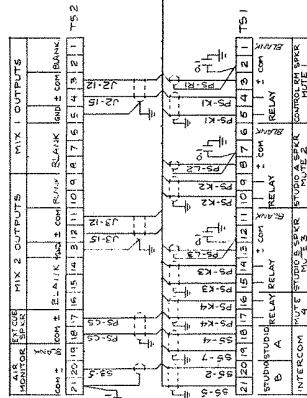
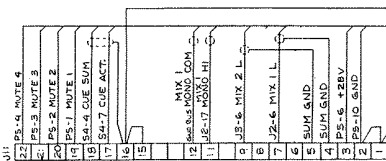


NOTE: 1. RESISTORS IN OHMS, CAPACITORS IN MICROFARADS, UNLESS OTHERWISE NOTED.

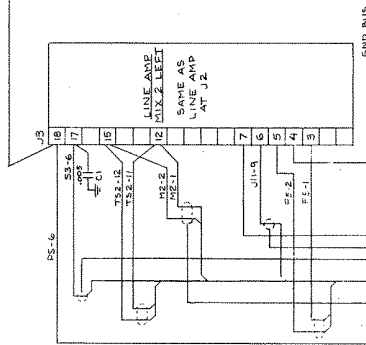
BROADCAST ELECTRONICS INC.	
DESIGNER	DATE
ENGINEER	DATE
TESTER	DATE
REVIEWER	DATE
APPROVED	DATE
REVISIONS	DATE
1	1-19-81
2	1-19-81
3	1-19-81
4	1-19-81
5	1-19-81
6	1-19-81
7	1-19-81
8	1-19-81
9	1-19-81
10	1-19-81

REV A DESCRIPTION DATE APP
PER ECU 2886 1-19-81 MM

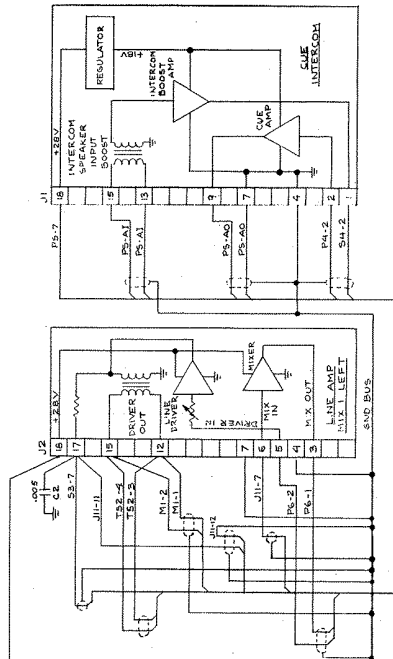
MIXING MODULE



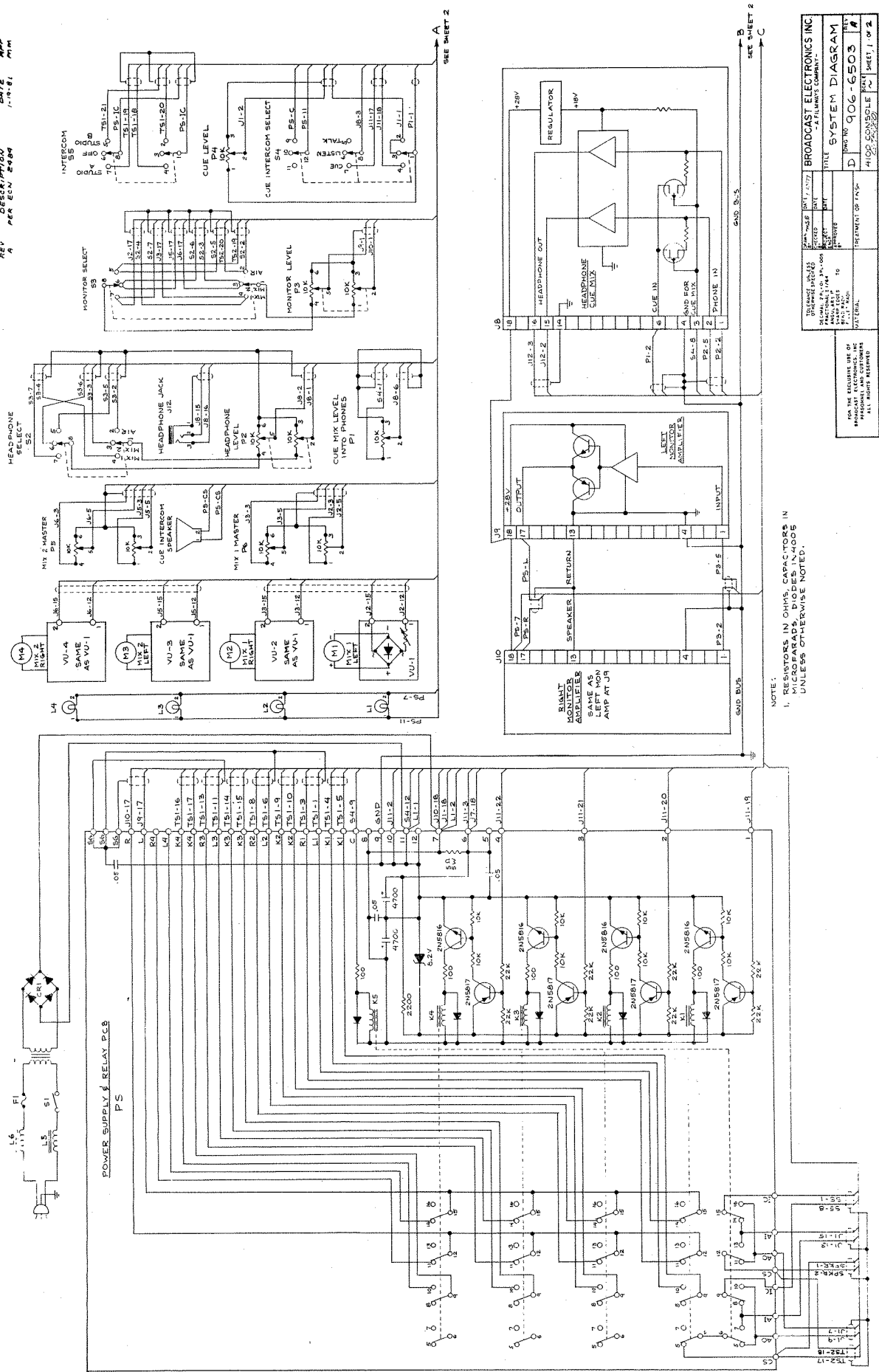
A SEE SHEET 1



B SEE SHEET 1
C SEE SHEET 1



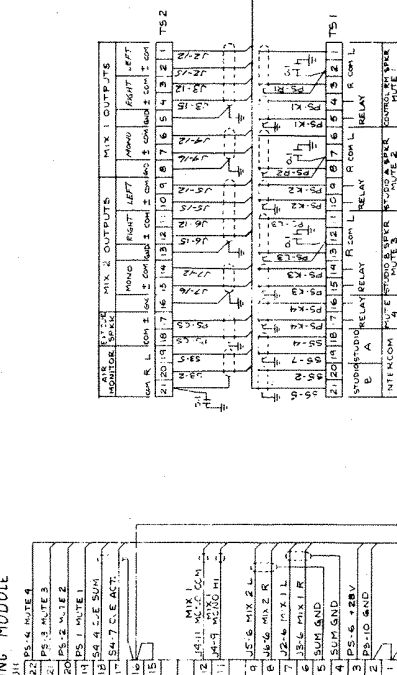
BROADCAST ELECTRONICS INC.	
DESIGNER	DATE
ENGINEER	DATE
TESTER	DATE
ASSEMBLER	DATE
TREATMENT ON THIS	
SHEET 2 OF 2	



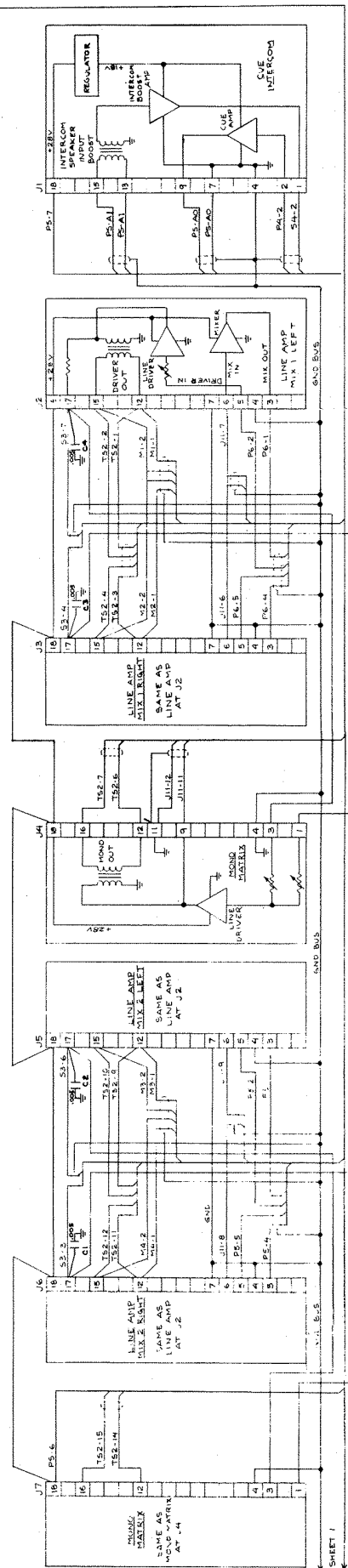
NOTE: 1. RESISTORS IN OHMS, CAPACITORS IN MICROFARADS, DIODES IN AMPS UNLESS OTHERWISE NOTED.

BROADCAST ELECTRONICS INC.	
- A FILMWAYS COMPANY -	
DESIGNED BY	DATE
ENGINEERED BY	DATE
TESTED BY	DATE
APPROVED BY	DATE
PROJECT NO.	906-6503
REVISION NO.	1
REVISION DATE	1-1-81
REVISION BY	MM
REVISION DESCRIPTION	4100 CONSOLE
REVISION SHEET	SHEET 1 OF 2

MIXING MODULE



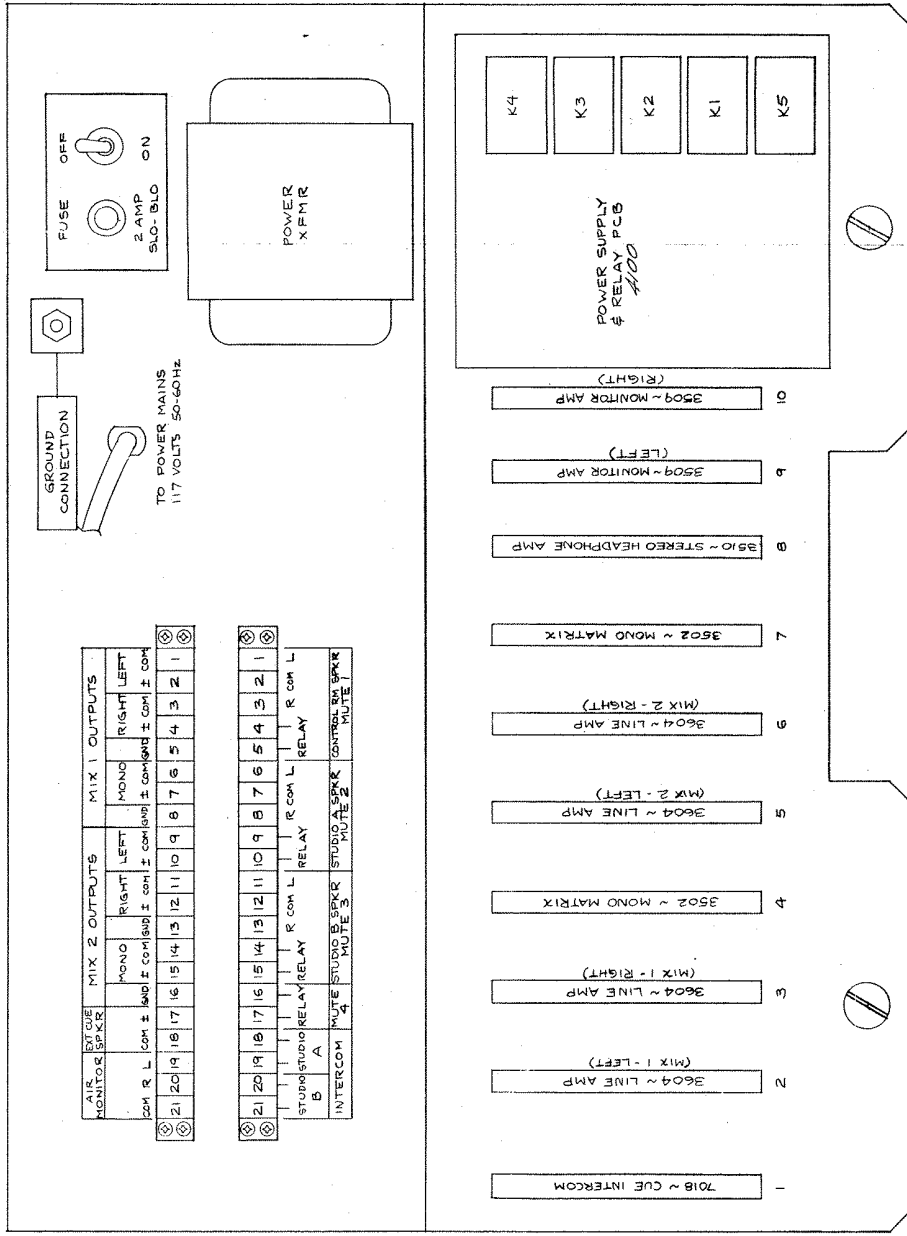
A-
SEE SHEET 1



SEE SHEET 1
B

335

REV	DESCRIPTION	DATE	APPROVED



AIR	ST	QUE	MIX 2 OUTPUTS	MIX 1 OUTPUTS
MONITOR	SPKR		MONO	RIGHT LEFT
20M R L	COM ±	AMP ±	COM ±	COM ±
21	20	19	18	17
16	15	14	13	12
11	10	9	8	7
6	5	4	3	2
1				

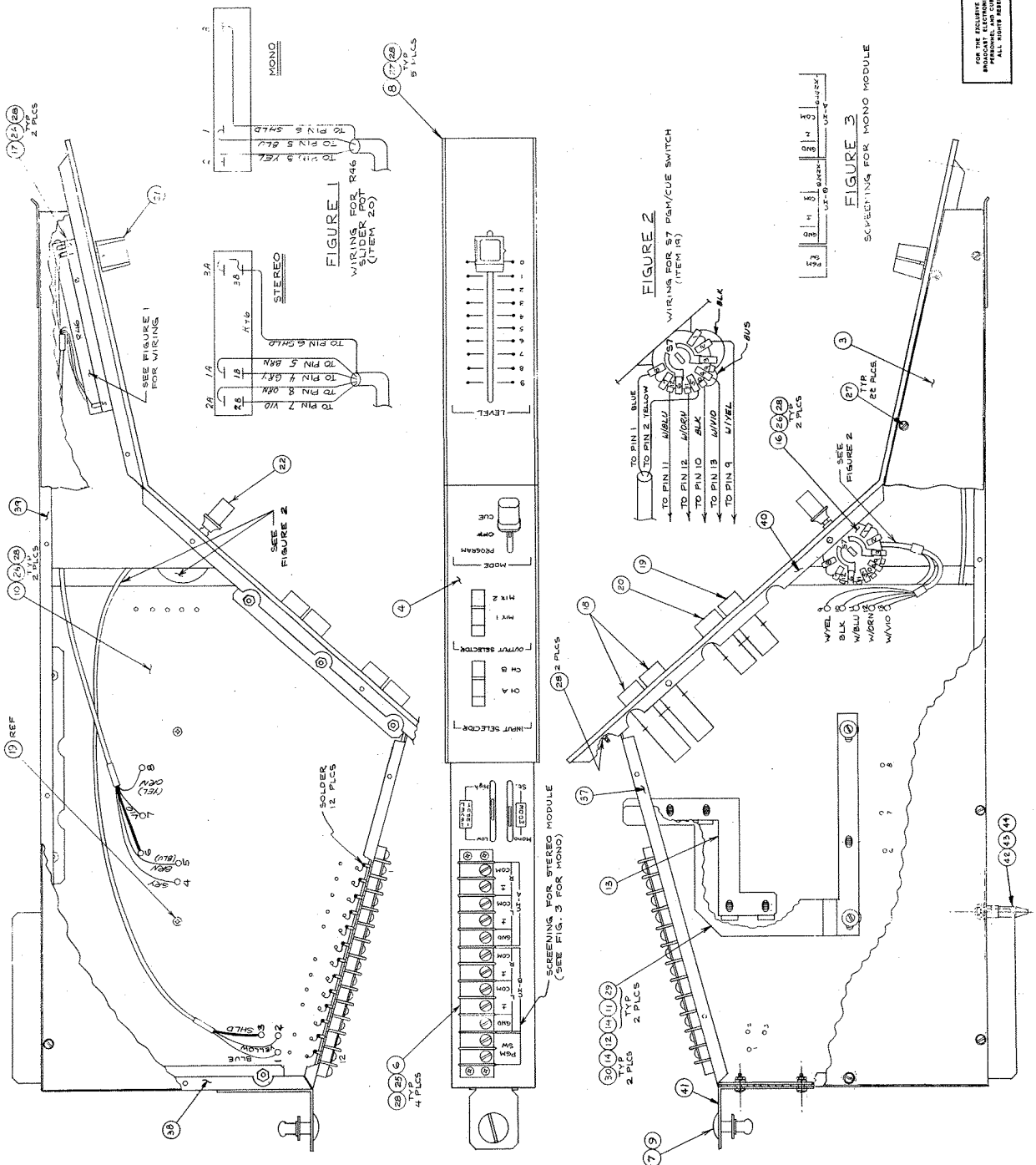
STUDIO	RELAY	RELAY	RELAY	RELAY
STUDIO	RELAY	RELAY	RELAY	RELAY
21	20	19	18	17
16	15	14	13	12
11	10	9	8	7
6	5	4	3	2
1				

TOLERANCE UNLESS OTHERWISE SPECIFIED DECIMAL 2 PL. ± 0.1 3PL. ± 0.005 FRACTIONAL ± 1/64		DATE 6/26/72	REV C
DRAWN BY 765D		DATE 6/26/72	REV C
CHECKED BY 765D		DATE 6/26/72	REV C
APPROVED BY 765D		DATE 6/26/72	REV C
TITLE COMPONENT LAYOUT		POWER SUPPLY SECTION	
DRAWING NO. 906-7109		REV C	
TREATMENT OR FINISH		4100 STEREO CONSOLE	
MATERIAL		SCALE 1 OF 1	

FOR THE EXCLUSIVE USE OF
BROADCAST ELECTRONICS INC.
PERSONNEL AND CUSTOMERS
ALL RIGHTS RESERVED

8-21-78 JHM
 4-18-79 DE
 10-24-80 MAM
 12-3-80 MAM
 12-3-80 MAM

AECN 1279
 REV B 10/2/79
 REV C 10/24/80
 REV D 12/3/80
 REV E 12/3/80

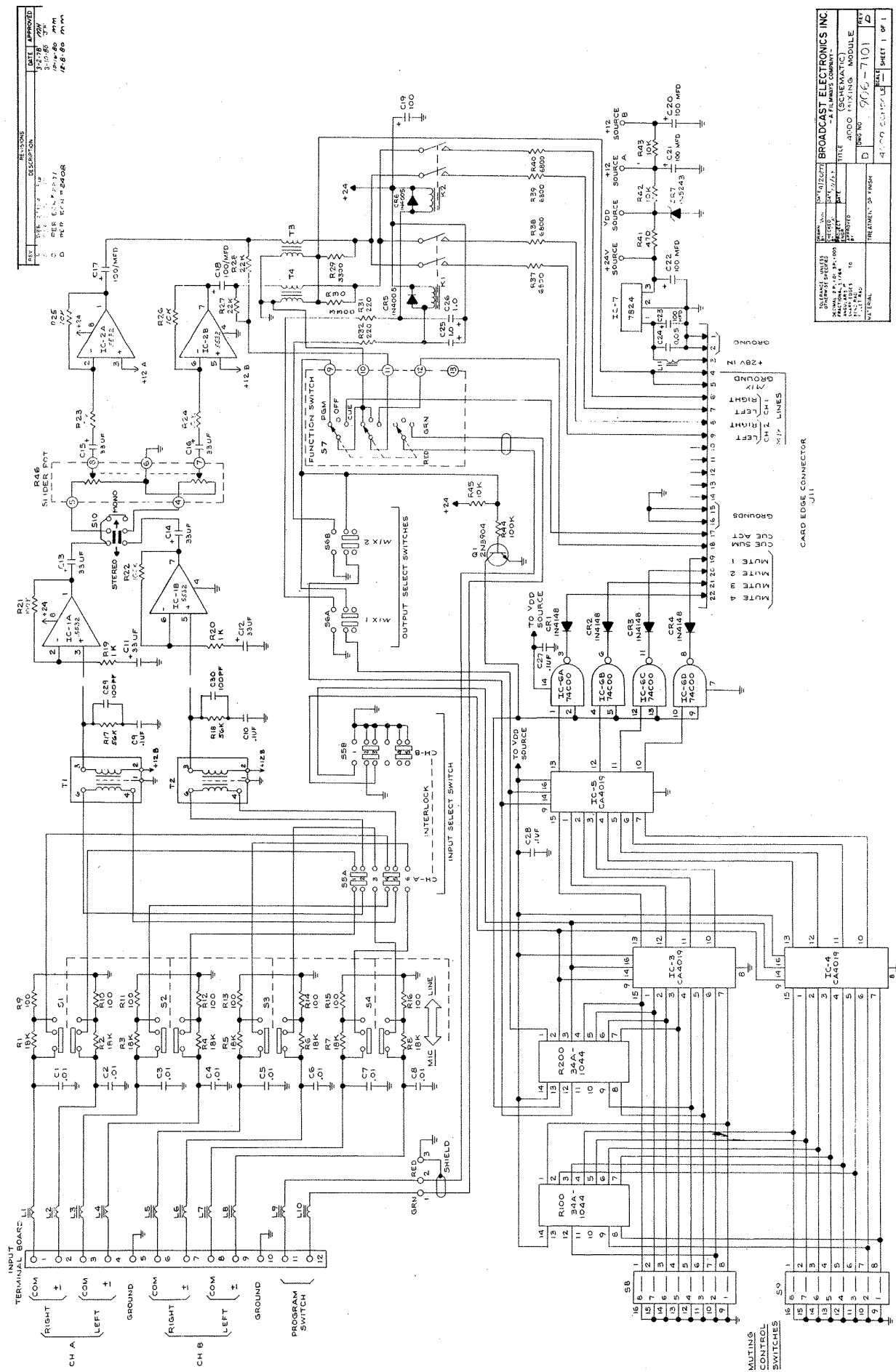


SEE B/M 950-4022 / 950-4024 FOR STEREO
 B/M 950-4021 / 950-4023 FOR MONO

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
1	1	950-4022	STEREO MODULE (ITEM 18)	
2	1	950-4024	STEREO MODULE (ITEM 18)	
3	1	950-4021	MONO MODULE (ITEM 18)	
4	1	950-4023	MONO MODULE (ITEM 18)	
5	1	950-4022	STEREO MODULE (ITEM 18)	
6	1	950-4024	STEREO MODULE (ITEM 18)	
7	1	950-4021	MONO MODULE (ITEM 18)	
8	1	950-4023	MONO MODULE (ITEM 18)	
9	1	950-4022	STEREO MODULE (ITEM 18)	
10	1	950-4024	STEREO MODULE (ITEM 18)	
11	1	950-4021	MONO MODULE (ITEM 18)	
12	1	950-4023	MONO MODULE (ITEM 18)	
13	1	950-4022	STEREO MODULE (ITEM 18)	
14	1	950-4024	STEREO MODULE (ITEM 18)	
15	1	950-4021	MONO MODULE (ITEM 18)	
16	1	950-4023	MONO MODULE (ITEM 18)	
17	1	950-4022	STEREO MODULE (ITEM 18)	
18	1	950-4024	STEREO MODULE (ITEM 18)	
19	1	950-4021	MONO MODULE (ITEM 18)	
20	1	950-4023	MONO MODULE (ITEM 18)	
21	1	950-4022	STEREO MODULE (ITEM 18)	
22	1	950-4024	STEREO MODULE (ITEM 18)	
23	1	950-4021	MONO MODULE (ITEM 18)	
24	1	950-4023	MONO MODULE (ITEM 18)	
25	1	950-4022	STEREO MODULE (ITEM 18)	
26	1	950-4024	STEREO MODULE (ITEM 18)	
27	1	950-4021	MONO MODULE (ITEM 18)	
28	1	950-4023	MONO MODULE (ITEM 18)	
29	1	950-4022	STEREO MODULE (ITEM 18)	
30	1	950-4024	STEREO MODULE (ITEM 18)	
31	1	950-4021	MONO MODULE (ITEM 18)	
32	1	950-4023	MONO MODULE (ITEM 18)	
33	1	950-4022	STEREO MODULE (ITEM 18)	
34	1	950-4024	STEREO MODULE (ITEM 18)	
35	1	950-4021	MONO MODULE (ITEM 18)	
36	1	950-4023	MONO MODULE (ITEM 18)	
37	1	950-4022	STEREO MODULE (ITEM 18)	
38	1	950-4024	STEREO MODULE (ITEM 18)	
39	1	950-4021	MONO MODULE (ITEM 18)	
40	1	950-4023	MONO MODULE (ITEM 18)	
41	1	950-4022	STEREO MODULE (ITEM 18)	
42	1	950-4024	STEREO MODULE (ITEM 18)	
43	1	950-4021	MONO MODULE (ITEM 18)	
44	1	950-4023	MONO MODULE (ITEM 18)	
45	1	950-4022	STEREO MODULE (ITEM 18)	
46	1	950-4024	STEREO MODULE (ITEM 18)	
47	1	950-4021	MONO MODULE (ITEM 18)	
48	1	950-4023	MONO MODULE (ITEM 18)	
49	1	950-4022	STEREO MODULE (ITEM 18)	
50	1	950-4024	STEREO MODULE (ITEM 18)	
51	1	950-4021	MONO MODULE (ITEM 18)	
52	1	950-4023	MONO MODULE (ITEM 18)	
53	1	950-4022	STEREO MODULE (ITEM 18)	
54	1	950-4024	STEREO MODULE (ITEM 18)	
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66	1	950-4024	STEREO MODULE (ITEM 18)	
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68	1	950-4023	MONO MODULE (ITEM 18)	
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71	1	950-4021	MONO MODULE (ITEM 18)	
72	1	950-4023	MONO MODULE (ITEM 18)	
73	1	950-4022	STEREO MODULE (ITEM 18)	
74	1	950-4024	STEREO MODULE (ITEM 18)	
75	1	950-4021	MONO MODULE (ITEM 18)	
76	1	950-4023	MONO MODULE (ITEM 18)	
77	1	950-4022	STEREO MODULE (ITEM 18)	
78	1	950-4024	STEREO MODULE (ITEM 18)	
79	1	950-4021	MONO MODULE (ITEM 18)	
80	1	950-4023	MONO MODULE (ITEM 18)	
81	1	950-4022	STEREO MODULE (ITEM 18)	
82	1	950-4024	STEREO MODULE (ITEM 18)	
83	1	950-4021	MONO MODULE (ITEM 18)	
84	1	950-4023	MONO MODULE (ITEM 18)	
85	1	950-4022	STEREO MODULE (ITEM 18)	
86	1	950-4024	STEREO MODULE (ITEM 18)	
87	1	950-4021	MONO MODULE (ITEM 18)	
88	1	950-4023	MONO MODULE (ITEM 18)	
89	1	950-4022	STEREO MODULE (ITEM 18)	
90	1	950-4024	STEREO MODULE (ITEM 18)	
91	1	950-4021	MONO MODULE (ITEM 18)	
92	1	950-4023	MONO MODULE (ITEM 18)	
93	1	950-4022	STEREO MODULE (ITEM 18)	
94	1	950-4024	STEREO MODULE (ITEM 18)	
95	1	950-4021	MONO MODULE (ITEM 18)	
96	1	950-4023	MONO MODULE (ITEM 18)	
97	1	950-4022	STEREO MODULE (ITEM 18)	
98	1	950-4024	STEREO MODULE (ITEM 18)	
99	1	950-4021	MONO MODULE (ITEM 18)	
100	1	950-4023	MONO MODULE (ITEM 18)	

FOR THE REQUIREMENT OF
 BROADCAST ELECTRONICS INC.
 ALL RIGHTS RESERVED

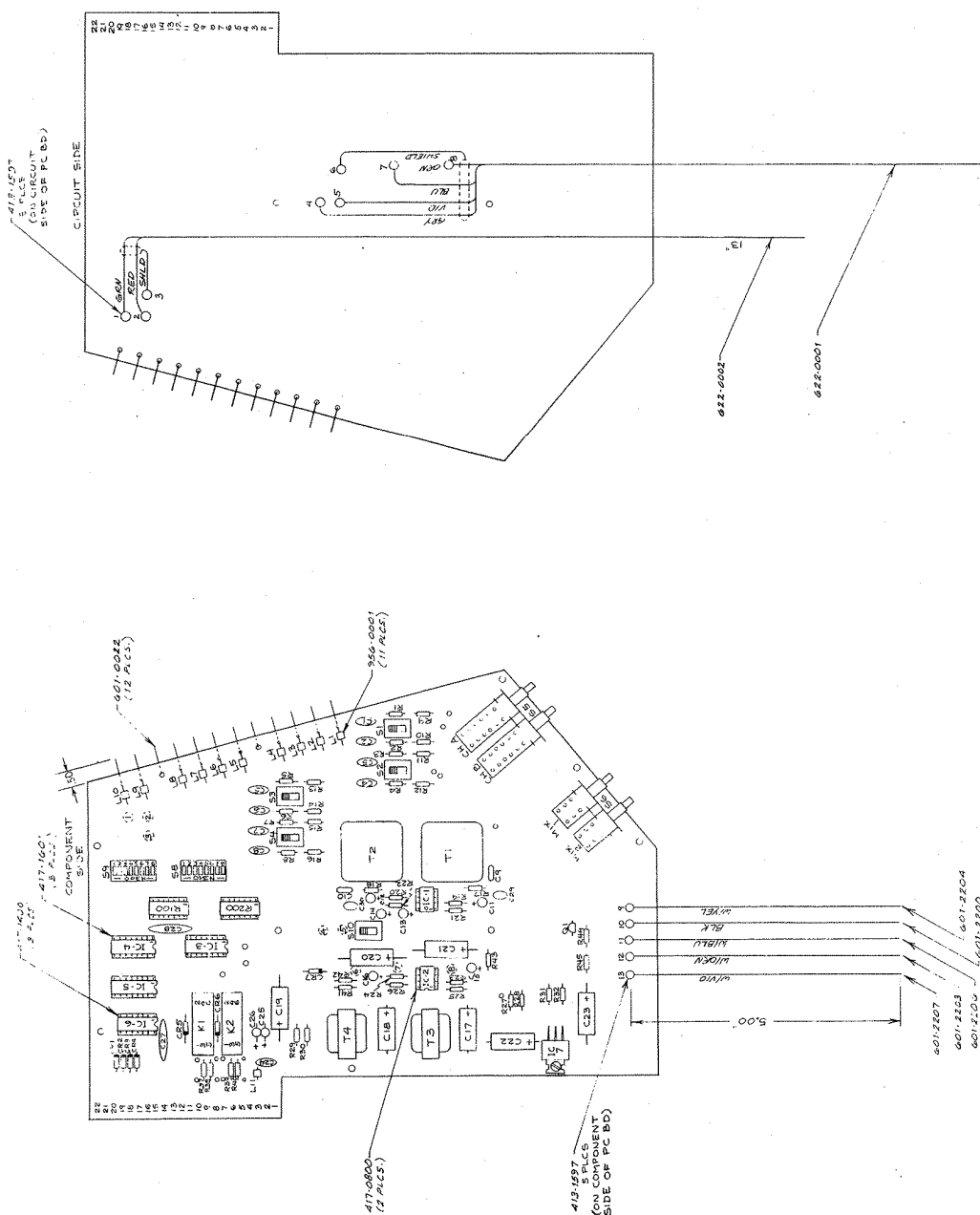
FIGURE 3
 SCREENING FOR MONO MODULE

[illegible]

REV A PER ECH # 1002
REV B PER ECH # 1075
REV C PER ECH # 1080

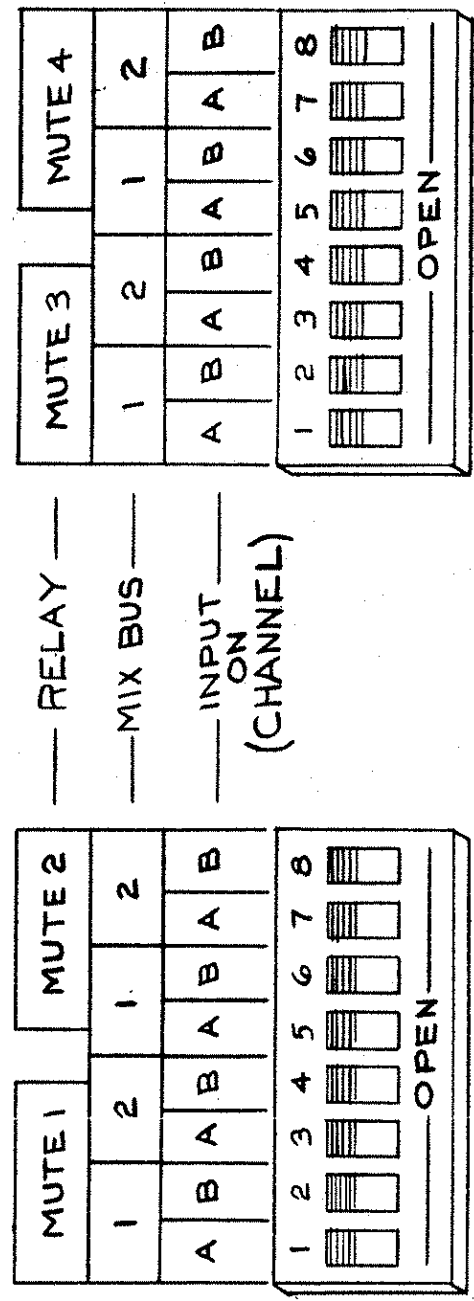
QTY. REQ.	REV. NO.	REV. DATE	LIST OF MATERIAL	DESCRIPTION	NOTE
			DRAWING NO. 10-117-1 SHEET NO. 1 OF 1 SCALE: 1" = 1'-0" DATE: 10-11-71 DESIGNED BY: J. H. H. CHECKED BY: J. H. H. APPROVED BY: J. H. H.	BROADCAST ELECTRONICS INC. -A FILMSTRIPS COMPANY- TITLE: ASSEMBLY PCB PART NO. 10-117-1 1) PART NO. 10-117-1 2) PART NO. 10-117-1 3) PART NO. 10-117-1 4) PART NO. 10-117-1 5) PART NO. 10-117-1 6) PART NO. 10-117-1 7) PART NO. 10-117-1 8) PART NO. 10-117-1 9) PART NO. 10-117-1 10) PART NO. 10-117-1 11) PART NO. 10-117-1 12) PART NO. 10-117-1 13) PART NO. 10-117-1 14) PART NO. 10-117-1 15) PART NO. 10-117-1 16) PART NO. 10-117-1 17) PART NO. 10-117-1 18) PART NO. 10-117-1 19) PART NO. 10-117-1 20) PART NO. 10-117-1 21) PART NO. 10-117-1 22) PART NO. 10-117-1 23) PART NO. 10-117-1 24) PART NO. 10-117-1 25) PART NO. 10-117-1 26) PART NO. 10-117-1 27) PART NO. 10-117-1 28) PART NO. 10-117-1 29) PART NO. 10-117-1 30) PART NO. 10-117-1 31) PART NO. 10-117-1 32) PART NO. 10-117-1 33) PART NO. 10-117-1 34) PART NO. 10-117-1 35) PART NO. 10-117-1 36) PART NO. 10-117-1 37) PART NO. 10-117-1 38) PART NO. 10-117-1 39) PART NO. 10-117-1 40) PART NO. 10-117-1 41) PART NO. 10-117-1 42) PART NO. 10-117-1 43) PART NO. 10-117-1 44) PART NO. 10-117-1 45) PART NO. 10-117-1 46) PART NO. 10-117-1 47) PART NO. 10-117-1 48) PART NO. 10-117-1 49) PART NO. 10-117-1 50) PART NO. 10-117-1 51) PART NO. 10-117-1 52) PART NO. 10-117-1 53) PART NO. 10-117-1 54) PART NO. 10-117-1 55) PART NO. 10-117-1 56) PART NO. 10-117-1 57) PART NO. 10-117-1 58) PART NO. 10-117-1 59) PART NO. 10-117-1 60) PART NO. 10-117-1 61) PART NO. 10-117-1 62) PART NO. 10-117-1 63) PART NO. 10-117-1 64) PART NO. 10-117-1 65) PART NO. 10-117-1 66) PART NO. 10-117-1 67) PART NO. 10-117-1 68) PART NO. 10-117-1 69) PART NO. 10-117-1 70) PART NO. 10-117-1 71) PART NO. 10-117-1 72) PART NO. 10-117-1 73) PART NO. 10-117-1 74) PART NO. 10-117-1 75) PART NO. 10-117-1 76) PART NO. 10-117-1 77) PART NO. 10-117-1 78) PART NO. 10-117-1 79) PART NO. 10-117-1 80) PART NO. 10-117-1 81) PART NO. 10-117-1 82) PART NO. 10-117-1 83) PART NO. 10-117-1 84) PART NO. 10-117-1 85) PART NO. 10-117-1 86) PART NO. 10-117-1 87) PART NO. 10-117-1 88) PART NO. 10-117-1 89) PART NO. 10-117-1 90) PART NO. 10-117-1 91) PART NO. 10-117-1 92) PART NO. 10-117-1 93) PART NO. 10-117-1 94) PART NO. 10-117-1 95) PART NO. 10-117-1 96) PART NO. 10-117-1 97) PART NO. 10-117-1 98) PART NO. 10-117-1 99) PART NO. 10-117-1 100) PART NO. 10-117-1 101) PART NO. 10-117-1 102) PART NO. 10-117-1 103) PART NO. 10-117-1 104) PART NO. 10-117-1 105) PART NO. 10-117-1 106) PART NO. 10-117-1 107) PART NO. 10-117-1 108) PART NO. 10-117-1 109) PART NO. 10-117-1 110) PART NO. 10-117-1 111) PART NO. 10-117-1 112) PART NO. 10-117-1 113) PART NO. 10-117-1 114) PART NO. 10-117-1 115) PART NO. 10-117-1 116) PART NO. 10-117-1 117) PART NO. 10-117-1 118) PART NO. 10-117-1 119) PART NO. 10-117-1 120) PART NO. 10-117-1 121) PART NO. 10-117-1 122) PART NO. 10-117-1 123) PART NO. 10-117-1 124) PART NO. 10-117-1 125) PART NO. 10-117-1 126) PART NO. 10-117-1 127) PART NO. 10-117-1 128) PART NO. 10-117-1 129) PART NO. 10-117-1 130) PART NO. 10-117-1 131) PART NO. 10-117-1 132) PART NO. 10-117-1 133) PART NO. 10-117-1 134) PART NO. 10-117-1 135) PART NO. 10-117-1 136) PART NO. 10-117-1 137) PART NO. 10-117-1 138) PART NO. 10-117-1 139) PART NO. 10-117-1 140) PART NO. 10-117-1 141) PART NO. 10-117-1 142) PART NO. 10-117-1 143) PART NO. 10-117-1 144) PART NO. 10-117-1 145) PART NO. 10-117-1 146) PART NO. 10-117-1 147) PART NO. 10-117-1 148) PART NO. 10-117-1 149) PART NO. 10-117-1 150) PART NO. 10-117-1 151) PART NO. 10-117-1 152) PART NO. 10-117-1 153) PART NO. 10-117-1 154) PART NO. 10-117-1 155) PART NO. 10-117-1 156) PART NO. 10-117-1 157) PART NO. 10-117-1 158) PART NO. 10-117-1 159) PART NO. 10-117-1 160) PART NO. 10-117-1 161) PART NO. 10-117-1 162) PART NO. 10-117-1 163) PART NO. 10-117-1 164) PART NO. 10-117-1 165) PART NO. 10-117-1 166) PART NO. 10-117-1 167) PART NO. 10-117-1 168) PART NO. 10-117-1 169) PART NO. 10-117-1 170) PART NO. 10-117-1 171) PART NO. 10-117-1 172) PART NO. 10-117-1 173) PART NO. 10-117-1 174) PART NO. 10-117-1 175) PART NO. 10-117-1 176) PART NO. 10-117-1 177) PART NO. 10-117-1 178) PART NO. 10-117-1 179) PART NO. 10-117-1 180) PART NO. 10-117-1 181) PART NO. 10-117-1 182) PART NO. 10-117-1 183) PART NO. 10-117-1 184) PART NO. 10-117-1 185) PART NO. 10-117-1 186) PART NO. 10-117-1 187) PART NO. 10-117-1 188) PART NO. 10-117-1 189) PART	

INSTITUTIONS AT CONGUL FINAL ASSY.



REVISES		
REV	DESCRIPTION	DATE

A PER ECN # 4602 LEFT 9-30-83 JH



58

ITEM	QTY RQD	PART NUMBER	DESCRIPTION	NOTE
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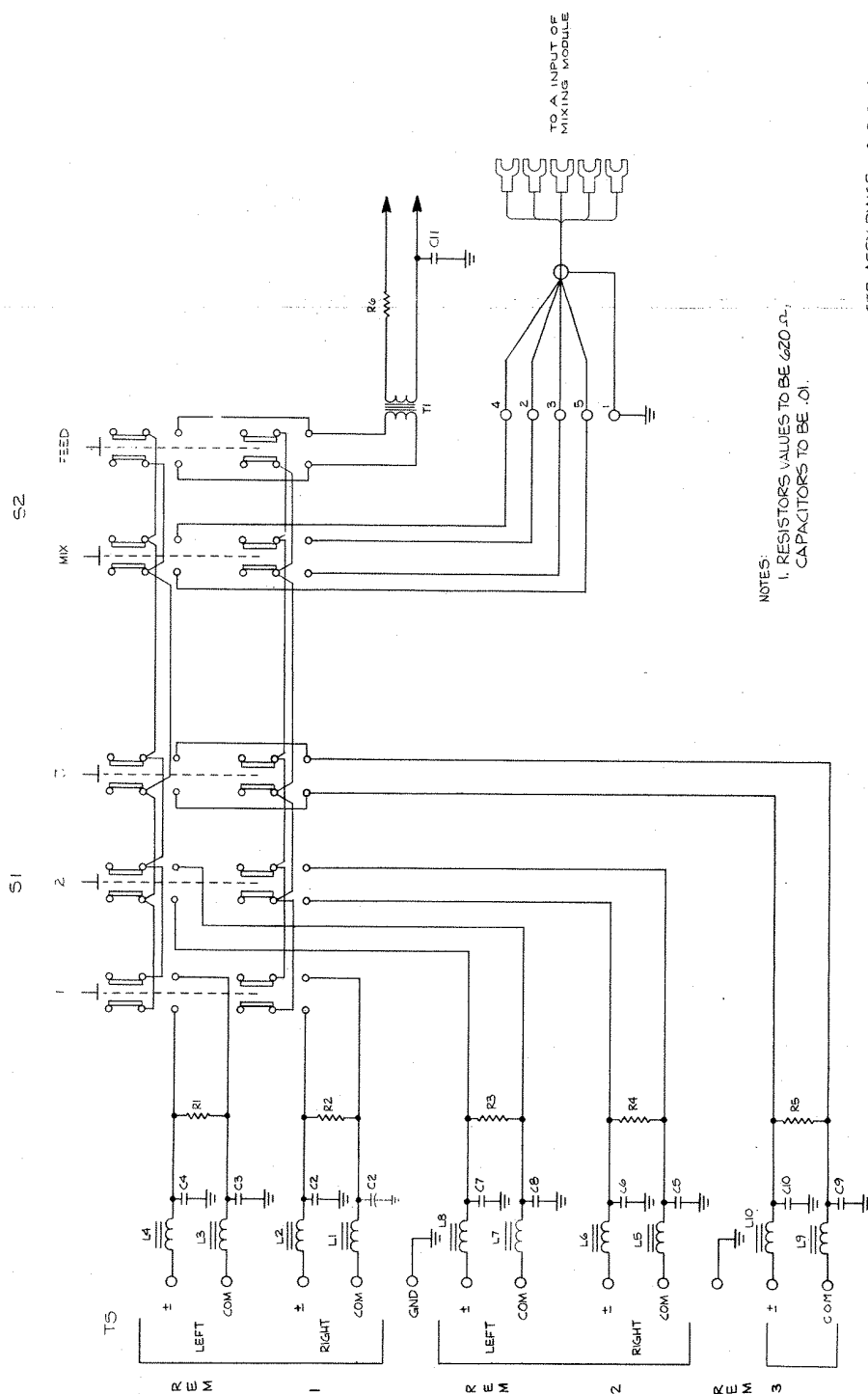
TOLERANCE UNLESS OTHERWISE SPECIFIED		DRAWN BY M. HAYDEN		DATE 3-29-78
DECIMAL 2 PL+.01 3 PL+.005		CHECKED BY		DATE
FRACTIONAL $\pm 1/64$		PROJECT ENGR		DATE
ANGULAR $\pm 1^\circ$		APPROVED BY		
SHARP EDGES TO				
BEND RADIO				
FILLET RADIO				
MATERIAL		TREATMENT OR FINISH		

LIST OF MATERIAL

BROADCAST ELECTRONICS INC. - A FILMWAYS COMPANY -	
TITLE MUTE SWITCH PROGRAMMING	
DWG NO. 906-4131	REV A
4000 CONSOLE	
SCALE	SHEET 1 OF 1

FOR THE EXCLUSIVE USE OF
BROADCAST ELECTRONICS, INC.
PERSONNEL AND CUSTOMERS
ALL RIGHTS RESERVED

	DATE	APPROVED
DESCRIPTION		
10-17-68		



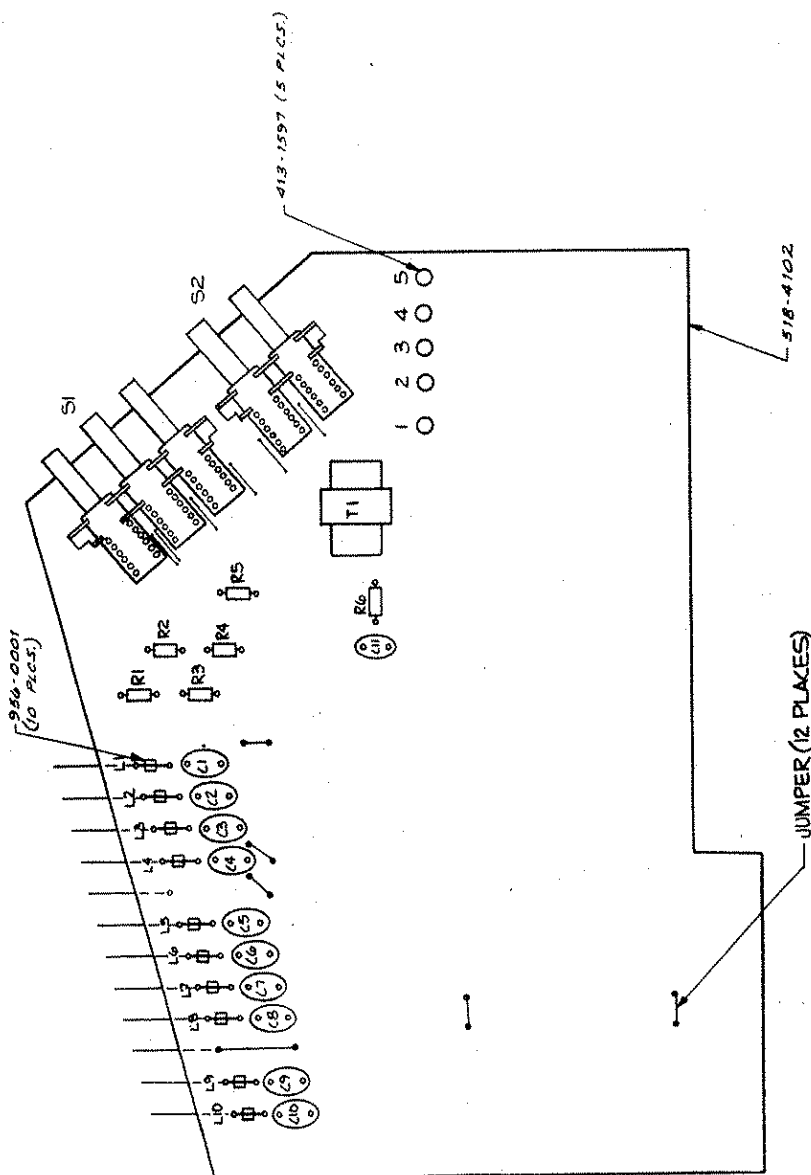
NOTES:

1. RESISTORS VALUES TO BE 620 Ω , CAPACITORS TO BE .01.

SEE ASSY DWGS # C-918-4102 AND C-918-4112

[illegible]

REVISIONS		
REV	DESCRIPTION	DATE
A	PER ECN # 1143	2-14-78
B	PER ECN # 1461	11-2-78
C	PER ECN 3443	4-26-82

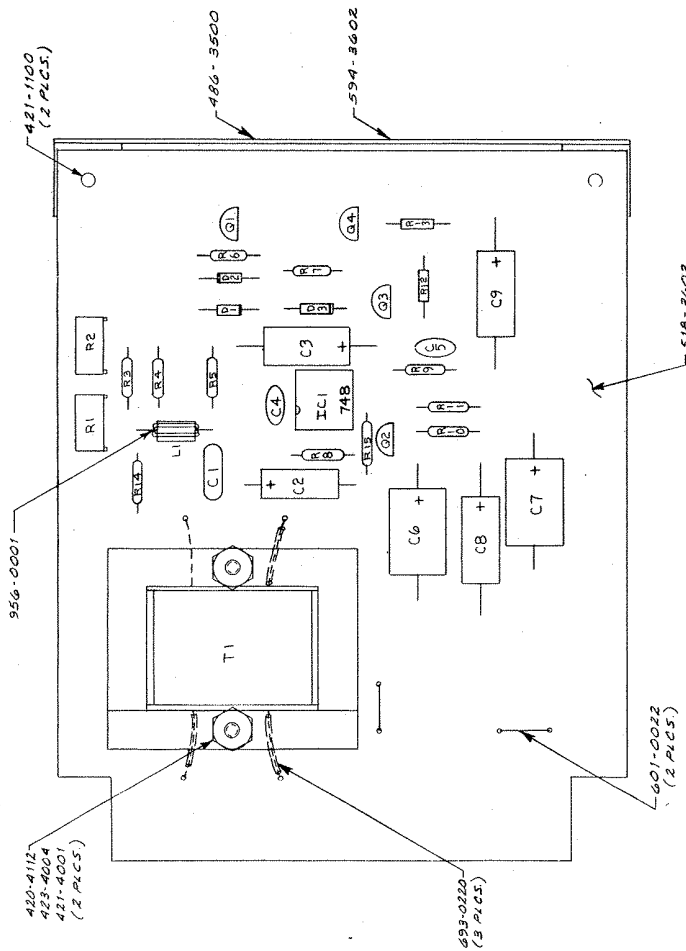


NOTE:
1. SEE B/M 918-4112

ITEM	QTY	ROD	PART NUMBER	DESCRIPTION	NO. E
LIST OF MATERIAL					
BROADCAST ELECTRONICS INC.					
- A FILMWAYS COMPANY -					
TITLE REMOTE INPUT MODULE (STEREO)					
PCB ASSY					
C 918-4112					
4000 CONSOLE					
SCALE 1:1					
SHEET 1 OF 1					

FOR THE EXCLUSIVE USE OF
BROADCAST ELECTRONICS, INC.
PERSONNEL AND CUSTOMERS
ALL RIGHTS RESERVED

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	PER ECN #1148	2-15-78	JW
B	PER ECN #1148	2-15-78	JW
C	PER ECN #1148	2-15-78	JW
D	PER ECN #1148	2-15-78	JW
E	PER ECN #1148	2-15-78	JW
F	PER ECN #1148	2-15-78	JW
G	PER ECN #1148	2-15-78	JW
H	PER ECN #1148	2-15-78	JW
I	PER ECN #1148	2-15-78	JW
J	PER ECN #1148	2-15-78	JW
K	PER ECN #1148	2-15-78	JW
L	PER ECN #1148	2-15-78	JW
M	PER ECN #1148	2-15-78	JW
N	PER ECN #1148	2-15-78	JW
O	PER ECN #1148	2-15-78	JW
P	PER ECN #1148	2-15-78	JW
Q	PER ECN #1148	2-15-78	JW
R	PER ECN #1148	2-15-78	JW
S	PER ECN #1148	2-15-78	JW
T	PER ECN #1148	2-15-78	JW
U	PER ECN #1148	2-15-78	JW
V	PER ECN #1148	2-15-78	JW
W	PER ECN #1148	2-15-78	JW
X	PER ECN #1148	2-15-78	JW
Y	PER ECN #1148	2-15-78	JW
Z	PER ECN #1148	2-15-78	JW

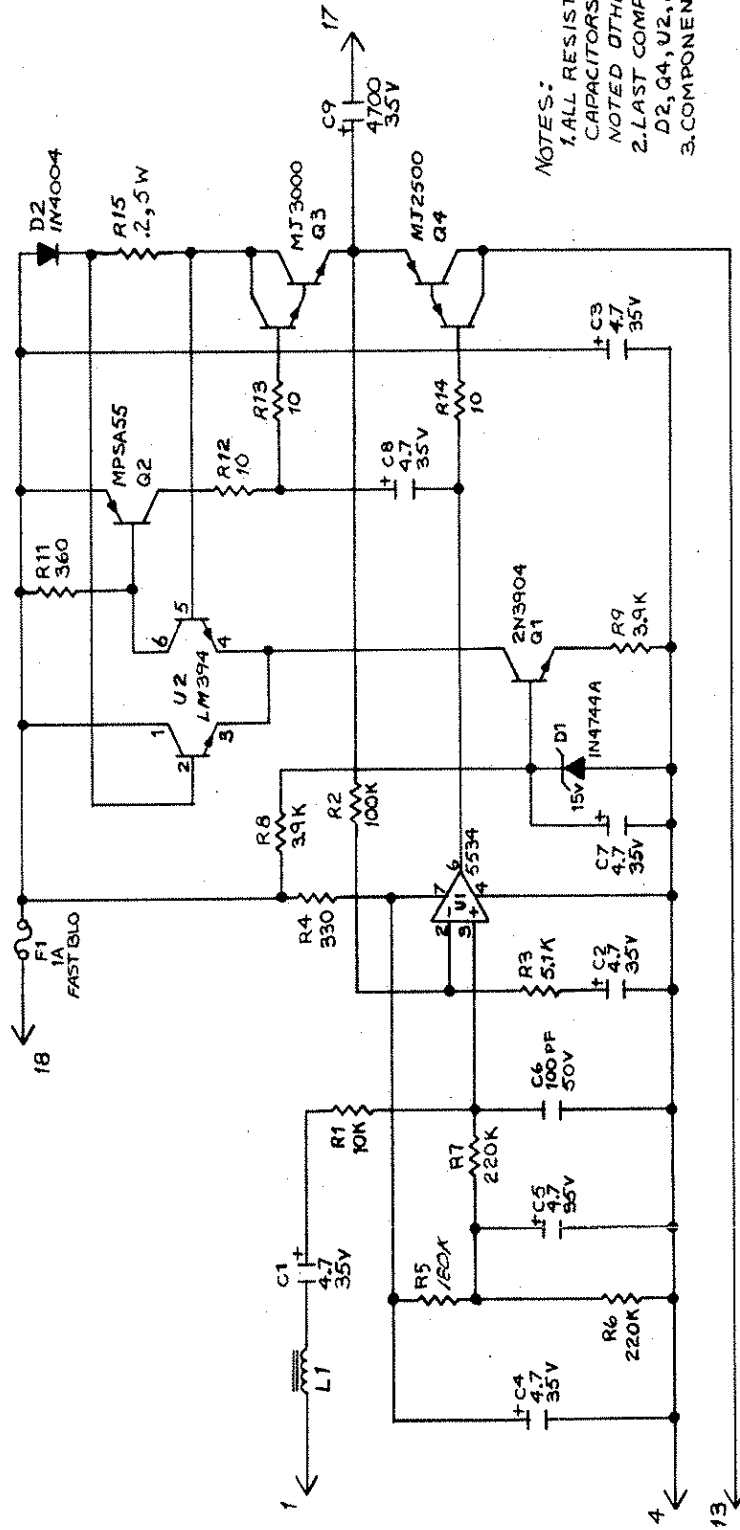


SEE B/M NO. 918-3602
LAST USED: C9, R15, D3, Q4, L1, T1, IC1

ITEM	QTY	QD	PART NUMBER	DESCRIPTION	NOTE
LIST OF MATERIAL					
TOLERANCE UNLESS OTHERWISE SPECIFIED					
ORIGINAL 2 PL. 01 3 PL. 005					
FRACTIONAL 1/64					
ANGULAR 1/64					
BEND RADIUS TO					
Fillet Radii					
MATERIAL					
TREATMENT OR FINISH					
BROADCAST ELECTRONICS INC.					
-A FILMWAYS COMPANY-					
TITLE ASSY, MONO MATRIX CARD					
DWG NO 918-3602					
REV F					
CONSOLES					
SHEET 1 OF 1					

FOR THE EXCLUSIVE USE OF
BROADCAST ELECTRONICS INC.
PERSONNEL AND CUSTOMERS
ALL RIGHTS RESERVED

REVISIONS		
REV.	DESCRIPTION	DATE



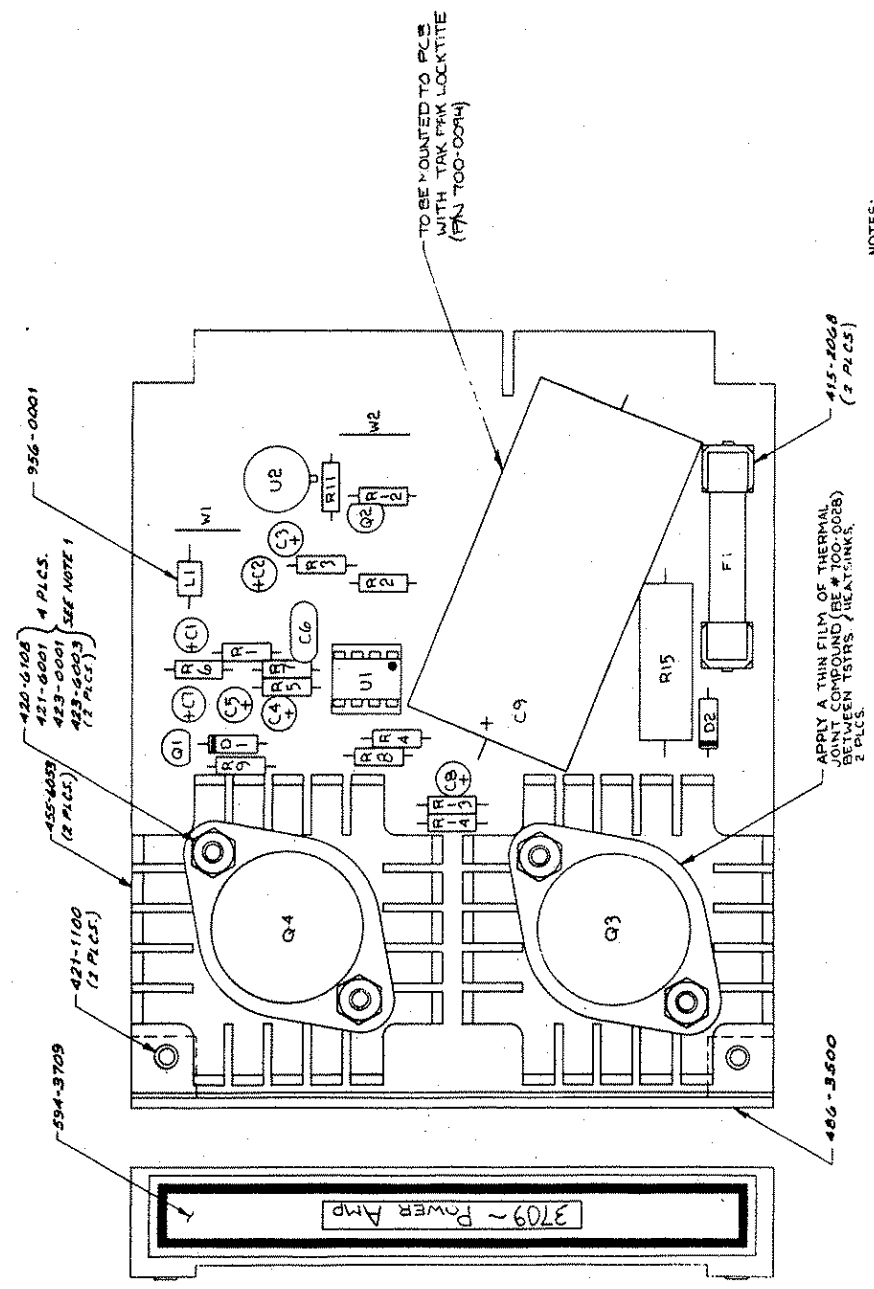
NOTES:
 1. ALL RESISTORS IN OHMS, 1/4 W; ALL CAPACITORS IN MICROFARADS, UNLESS NOTED OTHERWISE.
 2. LAST COMPONENTS USED: C9, R15, D2, Q4, U2, F1, L1.
 3. COMPONENTS NOT USED: RIO.

BROADCAST ELECTRONICS INC. — A FILMWAYS COMPANY —		DATE: 3-80
TITLE: SCHEMATIC - 8W POWER AMP		DATE:
DWG. NO. 906-3709		DATE:
REV. B		DATE:
SEE PCB ASSY. # C-918-3709		DATE:
SCALE:		DATE:
SHEET 1 OF 1		DATE:

TOLERANCE UNLESS OTHERWISE SPECIFIED: DECIMALS: PL-01 3PL-005 PERCENTS: 1/104 ANGLES: ± 1° SHARP EDGES BEND RADIUS FILLET RADIUS	BY:
CHECKED BY:	PROJECT ENGR:
APPROVED BY:	TREATMENT OR FINISH:
MATERIAL:	

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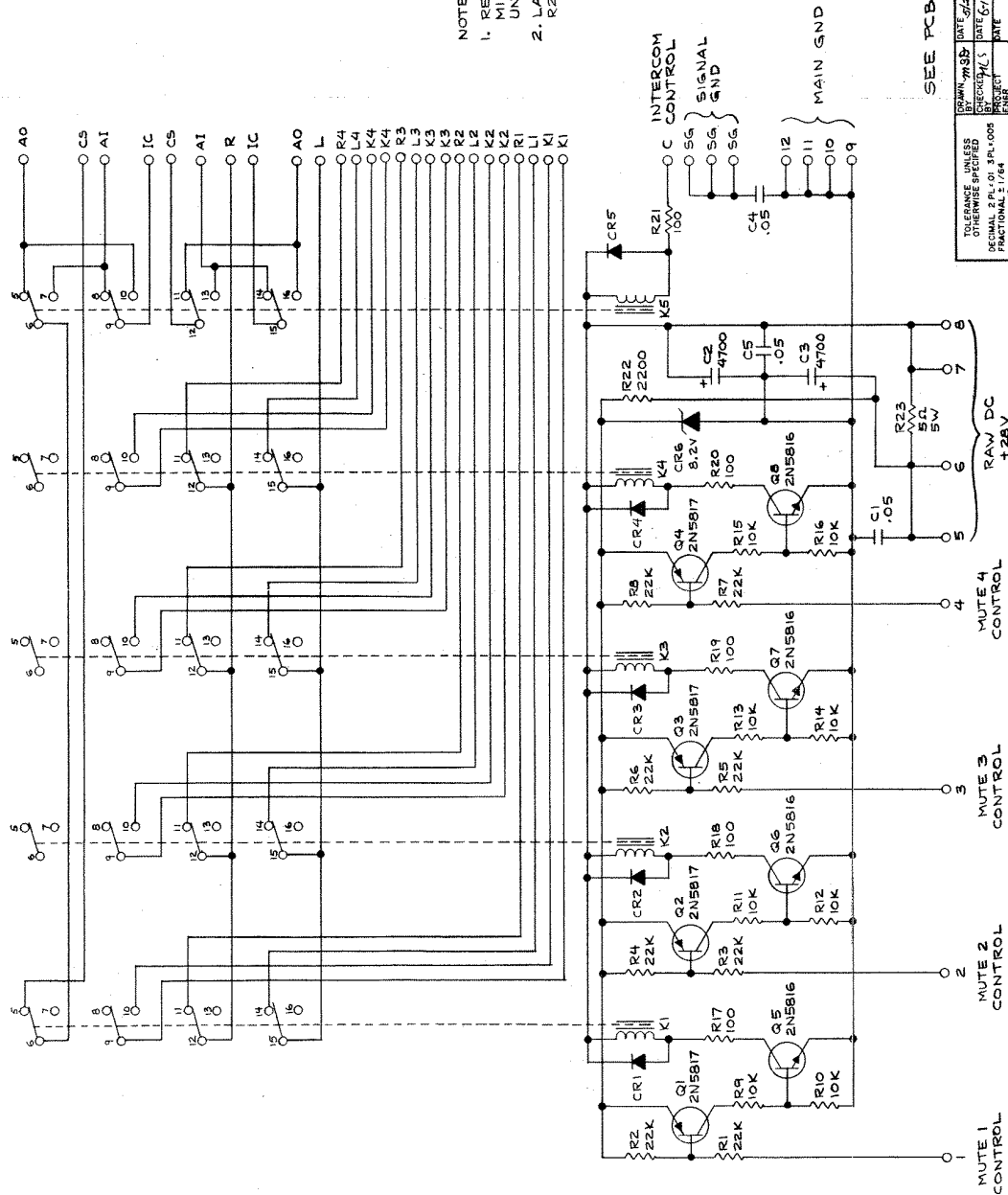
REV.	DESCRIPTION	DATE	APPROVED
A	PER ECN #1934	2-28-80	MM
B	PER ECN #2787	10-19-81	MDM
C	PER ECN #2061	1-18-82	MMR DWA
D	PER ECN #3443	4-26-82	MMR
E	PER ECN #3622	7-9-82	DAWK



NOTES:
 1. POSITION #10 FLAT WASHERS (#23-0-0) ON CREW'S BETWEEN HEAT SINK / PCB BOARD POSITION IN LOCK WASHER UNDER HEAD OF SCREW.
 2. SEE B/M # 918-3709
 SEE SCHEMATIC # B-306-3709

BROADCAST ELECTRONICS INC.		DATE: 12-28-79	
--A FILMWAYS COMPANY--		DATE: 12-28-79	
TITLE: PCB ASSEMBLY		DATE: 12-28-79	
BW POWER AMP, NON-INVERTING		DATE: 12-28-79	
C 918-3709		DATE: 12-28-79	
CONSOLES		DATE: 12-28-79	
SHEET 1 OF 1		DATE: 12-28-79	
TOLERANCE UNLESS OTHERWISE SPECIFIED		DATE: 12-28-79	
DECIMAL: 1/16" - 0.005		DATE: 12-28-79	
FRACTIONAL: 1/16" - 0.005		DATE: 12-28-79	
ANGULAR: 1/16" - 0.005		DATE: 12-28-79	
HOLE: 1/16" - 0.005		DATE: 12-28-79	
FILLET: 1/16" - 0.005		DATE: 12-28-79	
MATERIAL: 1/16" - 0.005		DATE: 12-28-79	
TREATMENT: 1/16" - 0.005		DATE: 12-28-79	
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REV	DESCRIPTION	DATE	APPROVED



NOTES:

1. RESISTORS IN OHMS, CAPACITORS IN MICROFARADS, DIODES IN 4005 UNLESS OTHERWISE SPECIFIED.
2. LAST COMPONENTS USED: R23, C5, CR6, Q8 & K5.

SEE PCB ASSY DWG # C-918-4100

TOLERANCE UNLESS SPECIFIED		DRAWN BY: JMS		DATE: 5/24/77		BROADCAST ELECTRONICS INC.	
BY: JMS		CHECKED BY: JMS		DATE: 6/1/77		- A FILMWAYS COMPANY -	
FRACTIONAL 1/64		PROJECT NO: 674-77		DATE: 6/1/77		TITLE: SCHEMATIC	
BEND RADIUS		APPROVED BY: JMS		DATE: 6/1/77		POWER SUPPLY & RELAY PCB	
MATERIAL		TREATMENT OR FINISH		SCALE		REV	
						C 906-7103	
						4000 CONSOLE	
						SHEET 1 OF 1	

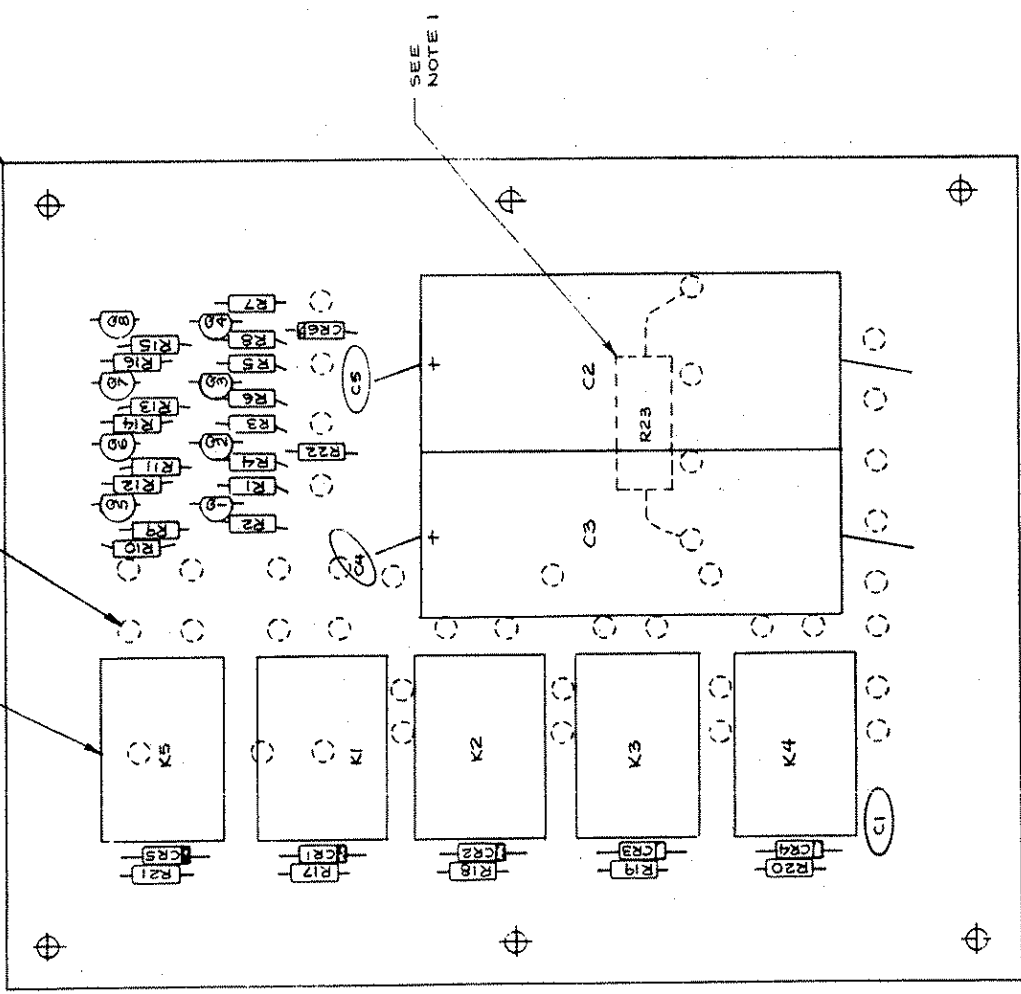
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REV	DESCRIPTION	DATE	APPROVED
A	PER ECN #1053	1/27/77	CJO
B	PER ECN 1096	1-16-78	CJO
C	PER ECN 1896	1-31-80	
D	PER ECN # 3707	3/12/82	ml

518-1100

413-157
TYP 42 PLCS.
(SEE NOTE 1)

270-0007
270-0008
270-0017
TYP 5 PLCS.
(SEE NOTE 2)



SEE
NOTE 1

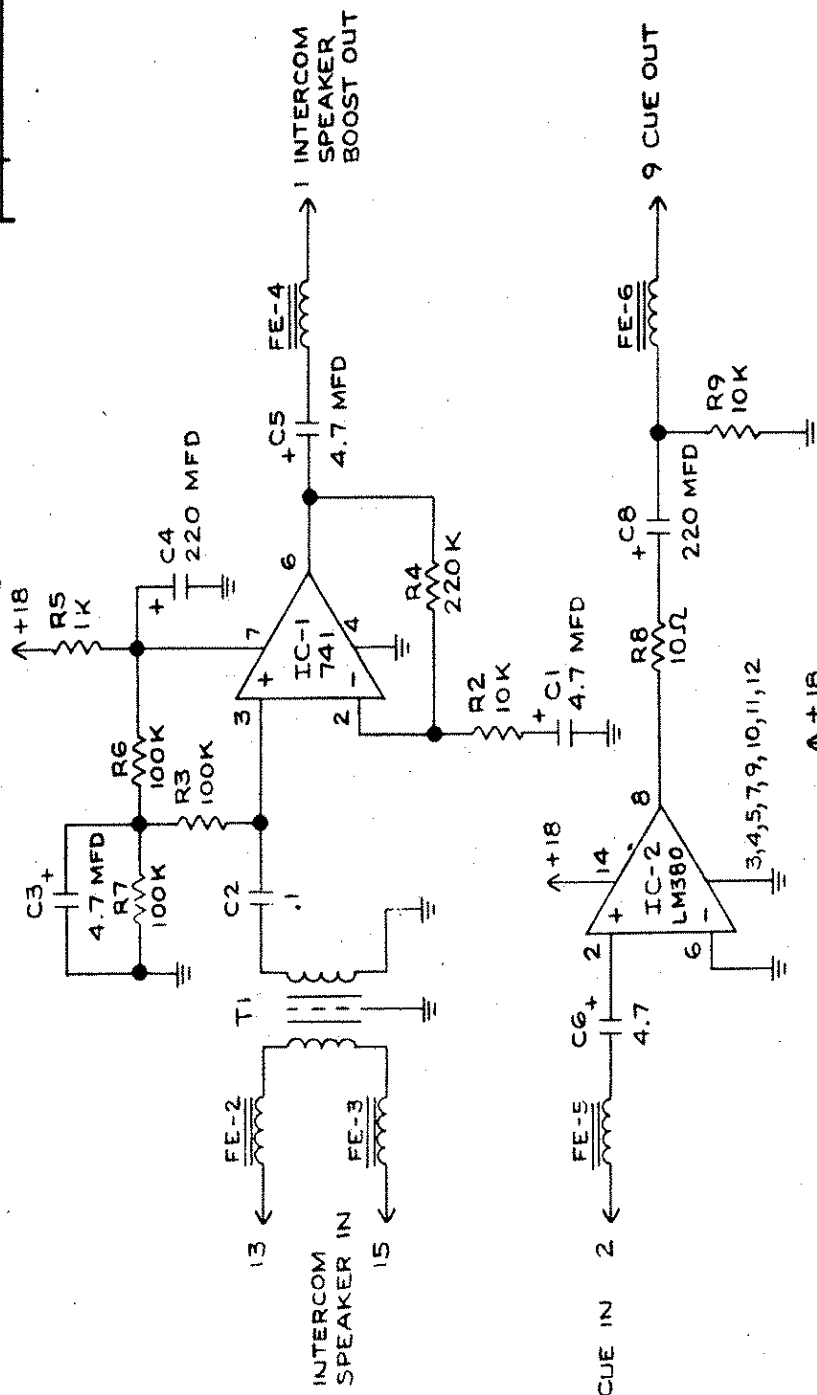
NOTES:

- * 1. ITEM NOS. 6 & 17 TO BE MOUNTED ON FOIL SIDE OF BOARD,
- 2. INSTALL SLEEVING TO R23
- 3. CENTER GROUND LEG OF RELAY SOCKET TO BE REMOVED

ITEM	QTY	ROD	PART NUMBER	DESCRIPTION	NOTE
LIST OF MATERIAL					
BROADCAST ELECTRONICS INC.					
-A FILMWAYS COMPANY-					
TITLE ASSEMBLY					
POWER SUPPLY & RELAY PCB					
REV C					
DWG NO. 918-4100					
TREATMENT OR FINISH					
MATERIAL					
4000 CONSOLE					
SHEET 1 OF 1					

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ALL RIGHTS RESERVED

REVISIONS		
REV	DESCRIPTION	DATE APPROVED



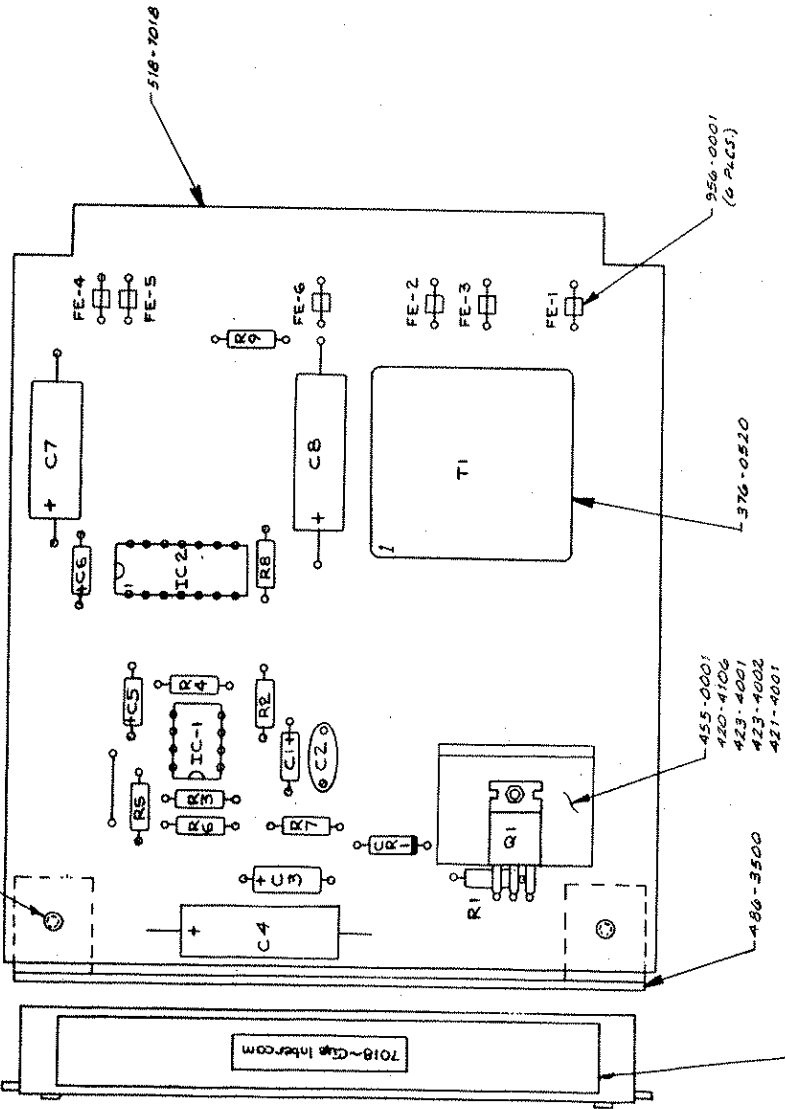
NOTES:
1.) LAST COMPONENTS USED:
R9, C8, CR1, Q1, IC-2, T1, FE-6

SEE PCB ASSY. NO. C-918-7018

ITEM	QTY	ROD	PART NUMBER	DESCRIPTION	NOTE
LIST OF MATERIAL					
TOLERANCE UNLESS OTHERWISE SPECIFIED		DATE 6/9/77		BROADCAST ELECTRONICS INC.	
DECIMAL 2 PL. 01 3 PL. 005		DATE		- A FILMWAYS COMPANY -	
FRACTIONAL 2 1/84		DATE		TITLE SCHEMATIC	
ANGULAR 2 1/84		DATE		CUE INTERCOM	
SHARP EDGES TO		DATE		DWG NO 906-7104	
BEND RADIUS		DATE		REV	
FILLET RADIUS		DATE		B	
MATERIAL		TREATMENT OR FINISH		3000 ± 4000	
				CONSOLES	
				SHEET 1 OF 1	

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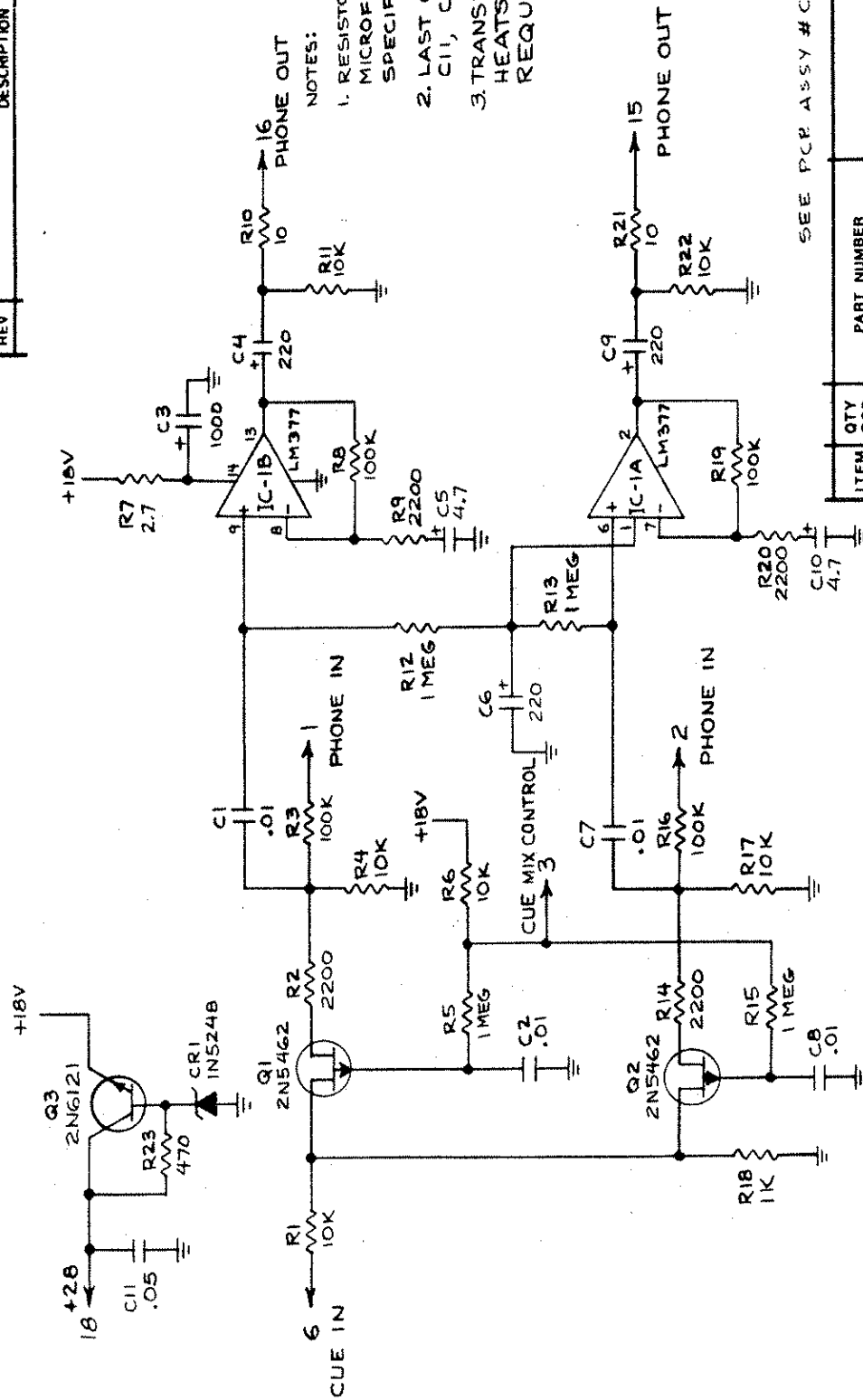
REVISIONS		
REV	DESCRIPTION	DATE
A	ECN # 1048	11-21-77
B	ECN # 1214	6-6-78
C	ECN # 1402	10-19-78
D	ECN # 1867	2-17-80
E	PER ECN # 3353	4-8-82



SEE S/M 318-7018
SEE SCHEMATIC # 900-7104

ITEM	QTY	ROD	PART NUMBER	DESCRIPTION	NOTE
LIST OF MATERIAL					
TOLERANCE UNLESS OTHERWISE SPECIFIED					
DECIMAL 2 PL/DI 3 PL/1.000					
FRACTIONAL 1/16"					
SHARP EDGES TO BEND RADII					
Fillet Radii					
MATERIAL					
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DRAWN W/F/D					
CHECKED BY W/X					
DATE 5/31/77					
TITLE					
BROADCAST ELECTRONICS INC. - A FILMWAYS COMPANY -					
CUE INTERCOM PCB					
ASSEMBLY					
TREATMENT OR FINISH					
C					
JWG NO 918-7018					
REV					
3000 ± 4000					
CONSOLES					
2:1					
SHEET 1 OF 1					

REVISIONS		
REV	DESCRIPTION	DATE

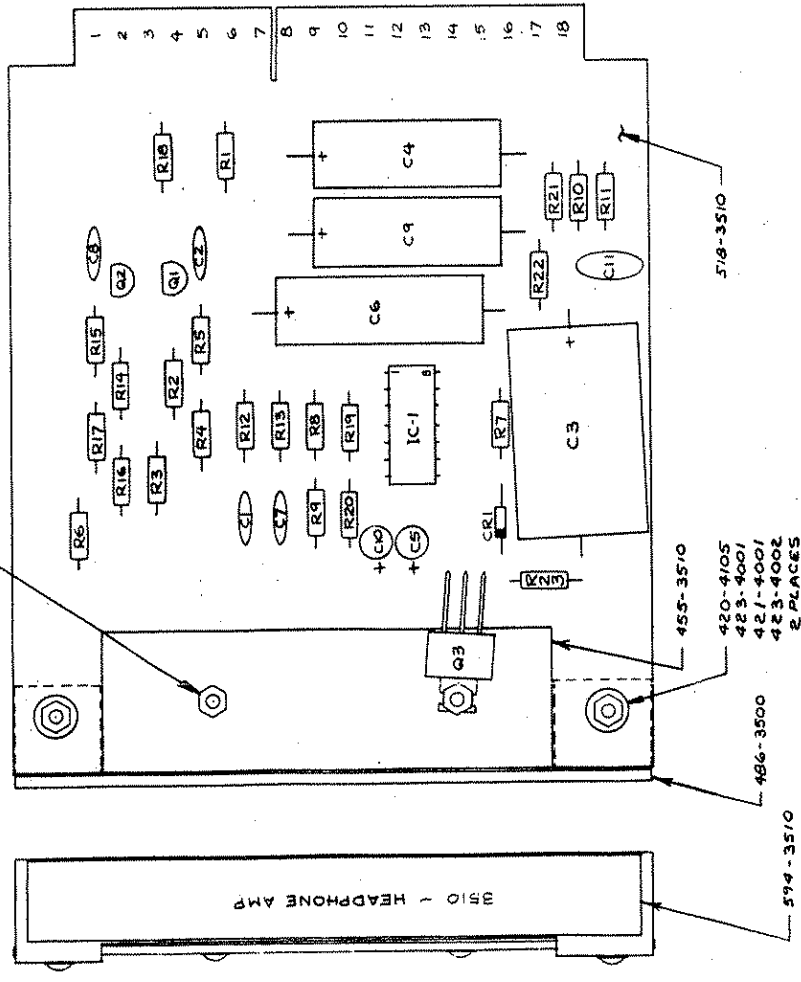


SEE PCB ASSY # C-918-3510

ITEM	QTY	ROD	PART NUMBER	DESCRIPTION	NOTE
LIST OF MATERIAL					
TOLERANCE UNLESS OTHERWISE SPECIFIED					
DECIMAL 2 PL. 01 3 PL. 005					
FRACTIONAL 1/64					
ANGULAR 2°					
SHARP EDGES					
BEND RADI					
FILLET RADI					
MATERIAL					
TREATMENT OR FINISH					
DATE 5/24/77					
DRAWN MCB					
CHECKED MCB					
APPROVED MCB					
BROADCAST ELECTRONICS INC.					
- A FILMWAYS COMPANY -					
TITLE SCHEMATIC					
HEADPHONE AMPLIFIER					
DWG NO. 906-7102					
REV B					
4000 SERIES					
CONSOLE					
SHEET 1 OF 1					

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REV	DESCRIPTION	DATE	APPROVED
A	PER ECN #1057	11-29-77	MM
B	PER ECN #1234	6-9-78	MM
C	PER ECN #2340	7-25-80	MM
D	PER ECN #2271	10-4-80	MM
E	PER ECN #2571	3-7-81	LA

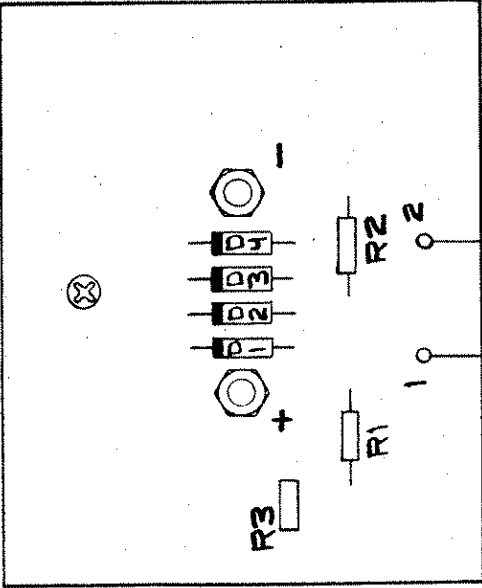


NOTES:
 1. TRANSISTOR Q3 MOUNTED TO HEATSINK.
 SILICON GREASE REQUIRED.

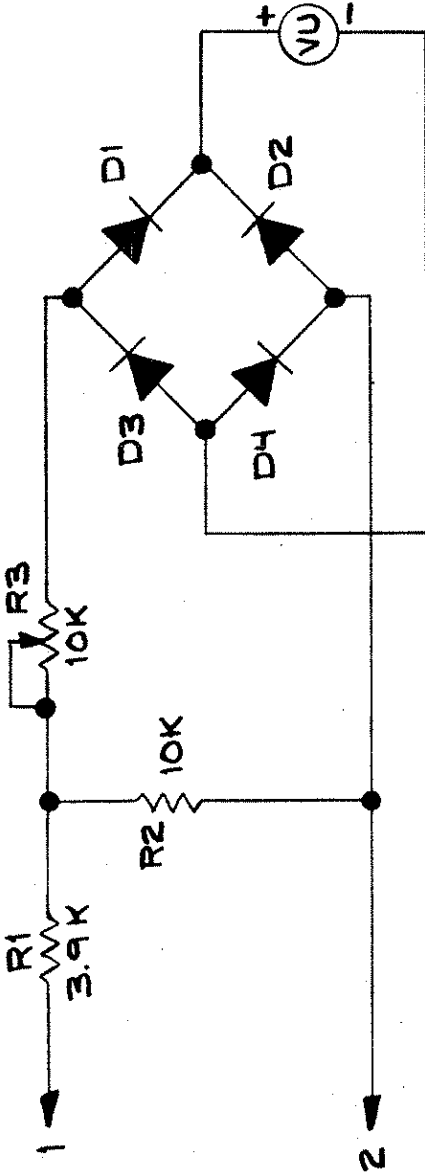
BROADCAST ELECTRONICS INC.		DATE 5/24/77	
- A FILMINTS COMPANY -		DATE	
TITLE HEADPHONE AMPLIFIER PCB		DATE	
DWG NO. 918-3510		DATE	
SCALE 1/4"		DATE	
SHEET 1 OF 1		DATE	
TREATMENT OR FINISH		DATE	
MATERIAL		DATE	

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REVISIONS		DESCRIPTION	DFTSMN	ENGR	ECN
REV	DATE	DESCRIPTION	DFTSMN	ENGR	ECN
A	8-18-83	REDRAWN W/O CHG	JAH		



RED GREEN



NOTE:
1 ALL DIODES IN 98
OR EQUIVALENT

BROADCAST ELECTRONICS INC. 4100 N. 24TH ST. QUINCY, IL 62305 217/224-9600 TELEX 250142 CABLE BCST ELECT QUI		TITLE METER RECTIFIER CARD VU-1	
DWN. BY	JAH	DATE	8-18-83
CHKD			
ME			
PROJ. ENGR.			
MFG.			
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MATERIAL _____ FINISH _____ NEXT ASSY. _____		TYPE A SIZE A DWG. NO. 918-0001 MODEL _____ SCALE _____ 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.

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

