AIR-TRAK 90
SERIES AUDIO
CONSOLES MANUAL

597-6000
NOVEMBER, 1991

IMPORTANT INFORMATION

EQUIPMENT LOST OR DAMAGED IN TRANSIT

When delivering the equipment to you, the truck driver or carrier's agent will present a receipt for your signature. Do not sign it until you have (a) inspected the containers for visible signs of damage and (b) counted the containers and compared with the amount shown on the shipping papers. If a shortage or evidence of damage is noted, insist that notation to that effect be made on the shipping papers before you sign them.

Further, after receiving the equipment, unpack it and inspect thoroughly for concealed damage. If concealed damage is discovered, immediately notify the carrier, confirming the notification in writing, and secure an inspection report. This item should be unpacked and inspected for damage WITHIN 15 DAYS after receipt. Claims for loss or damage will not be honored without proper notification of inspection by the carrier.

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RF/Studio Product Customer Service – Phone (217) 224–9617

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RETURN, REPAIR AND EXCHANGES

Do not return any merchandise without our written approval and Return Authorization. We will provide special shipping instructions and a code number that will assure proper handling and prompt issuance of credit. Please furnish complete details as to circumstances and reasons when requesting return of merchandise. All returned merchandise must be sent freight prepaid and properly insured by the customer.

REPLACEMENT PARTS

Emergency and Warranty Replacement Parts may be ordered from the address below. Be sure to include equipment model and serial number and part description and part number. Non–Emergency Replacement Parts may be ordered directly from the Broadcast Electronics stock room by Fax at the number shown below.

EMERGENCY AND WARRANTY REPLACEMENT PARTS
Broadcast Electronics, Inc.
4100 N. 24th St. P.O. BOX 3606
Quincy, Illinois 62305
Tel: (217) 224–9600 Digital Products (8 AM to 5 PM Central Time)
Tel: (217) 224–9617 RF/Studio Products (8 AM to 5 PM Central Time)
Tel: (217) 224–9600 (Non–Business Hours)
Telex: 25–0142
Fax: (217) 224–9607

NON–EMERGENCY REPLACEMENT PARTS
FAX (217) 224–9609

PROPRIETARY NOTICE

MODIFICATIONS

Broadcast Electronics, Inc. reserves the right to modify the design and specifications of the equipment in this manual without notice. Any modification shall not adversely affect performance of the equipment so modified.

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1–14. **Headphone Circuitry.** The headphone circuitry is designed to monitor five external audio sources and three internal audio sources. Input selection is accomplished by eight color–coded switches. Headphone volume control is provided by a VCA and a monitor level control network.

1–15. **Cue Monitor Circuitry.** Cue channel audio monitoring is provided by the cue monitor circuit. The circuit consists of a volume control network and a power amplifier for driving an internal speaker.

1–16. **Monophonic Output Circuitry.** A monophonic output signal from the console stereophonic output network is generated by the monophonic output circuitry. Monophonic output circuitry is provided for both the program and audition output busses.

1–17. **Talkback Circuitry.** A talkback circuit provides communication between the console operator and studio. The circuit consists of an amplifier and push button switch. Access to the talkback circuitry is provided by patch point input and output connections.

1–18. **CLOCK/TIMER ASSEMBLY.** The clock/timer assembly consists of individual clock and timer sections for convenient operator access to time related information. A crystal controlled six–digit LED clock display presents the time information in a 12 or 24 hour format. The clock circuit design also incorporates an automatic synchronization feature. This feature eliminates drift by synchronizing clock operation to network audio.

1–19. The timer section presents elapsed time information on a five–digit LED display and is equipped with two individual timers: 1) an automatic timer and 2) a manual timer. The automatic timer is controlled by the operation of the program output bus. The manual timer is controlled manually by three switch/indicators to provide stop, start, and reset operations. An auto switch/indicator configures the display between the automatic timer and the manual timer.

1–20. **METERING.** All Air–Trak 90 series consoles are designed with analog metering systems. The 6 channel console is equipped with two meters and a two position color–coded switch to allow the monitoring of either program or audition audio. 12 channel and 18 channel consoles are equipped with two program meters and two audition meters. The 24 channel console is equipped with two mono meters, two program meters, and two audition meters.

1–21. **INDICATORS.** LED displays are used to indicate the presence of audio on the monophonic program bus, monophonic audition bus, and mix–minus bus. In addition, two–color LED displays are used to indicate the phase of the program and audition monophonic audio signals.

1–22. **POWER SUPPLY.** All Air–Trak 90 operating potentials are generated by a self–contained power supply designed for installation in a standard 19 inch EIA rack assembly. The supply contains conventional ac power conversion and dc rectification circuitry. The supply generates both regulated and unregulated potentials for application to the console.

1–23. **RELAY INTERFACE OPTION.** A relay interface circuit board is available for each channel to provide remote on/off control of three audio sources. In addition, the circuit board allows the remote control of the console on/off switch/indicators.

1–24. **MECHANICAL DESCRIPTION.**

1–25. The Air–Trak 90 series audio consoles are ergonomically designed for optimum operator comfort and convenience. The AT–90 series consoles feature a low–profile design. Each console is constructed with modular circuit board and ribbon cable assemblies for ease of service. The console chassis is designed to be surface–mounted to a studio desk or table.

1–26. CONSOLE CONFIGURATIONS.

1–27. The Air–Trak 90 series audio consoles are designed to meet any station installation requirements. The following text presents ordering information for the Air–Trak 90 series consoles.

MODEL NO.	PART NUMBER	DESCRIPTION
AT90–6	901–6006	Air–Trak 90 6 channel console, Penny & Giles conductive plastic fader, 117V ac 50/60 Hz operation.
	901–6006–301	Air–Trak 90 6 channel console, Penny & Giles conductive plastic fader, 220VAC 50 Hz operation.
	901–6006–010	Air–Trak 90 6 channel console, original equipment conductive plastic fader, 117V ac 50/60 Hz operation.

No.	DESCRIPTION	QTY.
1.	Monitor Select Circuit Board Assembly.	1
2.	Monitor Distribution Circuit Board Assembly.	1
3.	Headphone Select Circuit Board Assembly.	1
4.	Timer Reset Circuit Board Assembly.	1
5.	6 Channel Input Circuit Board Assembly	1
6.	Output Circuit Board Assembly.	1
7.	6 Channel Control Circuit Board Assembly.	1
8.	VU Meter Distribution Circuit Board Assembly.	1
9.	VU Meter Assembly.	2
10.	Clock/Timer Assembly.	1
11.	Installation Kit and Instruction Manual.	1
12.	Headphone/Control Room/Cue Gain Circuit Board	1
13.	Power Supply Assembly.	1
14.	Relay Interface Circuit Board Assembly.	3

AT90–12	901–6012	Air–Trak 90 12 channel console, Penny & Giles conductive plastic fader, 117V ac 50/60 Hz operation.
	901–6012–301	Air–Trak 90 12 channel console, Penny & Giles conductive plastic fader, 220VAC 50 Hz operation.
	901–6012–010	Air–Trak 90 12 channel console, original equipment conductive plastic fader, 117V ac 50/60 Hz operation.

SECTION I
GENERAL INFORMATION

1–1. INTRODUCTION.

1–2. Information presented by this section provides a general description of the Broadcast Electronics Air–Trak 90 Series Audio Consoles and lists equipment specifications.

1–3. EQUIPMENT DESCRIPTION.

1–4. The Broadcast Electronics Air–Trak 90 series audio consoles are professional state–of–the–art consoles designed for continuous on–air operation (refer to Figure 1–1). The consoles are designed to provide the operator with advanced operating and performance features. Standard consoles include 6 channel, 12 channel, 18 channel, and 24 channel assemblies. The following text presents a description of the Air–Trak 90 console.

1–5. ELECTRICAL DESCRIPTION.

1–6. **INPUT CIRCUIT BOARD.** The AT–90 input circuit board is a six channel assembly designed to accept line, consumer, or microphone level audio. Each channel will accept audio from 3 stereophonic sources. Programmable attenuator networks allow the assignment of audio sources at different input levels. Line level audio sources may be assigned to any input. Microphone level sources can be applied only to input A of any channel. Output routing to the console program or audition bus is accomplished by electronic switching. A cue bus system is incorporated into the circuitry for the previewing of audio source material.

1–7. Precision control of each channel audio source level is provided by a voltage–controlled–amplifier (VCA) and a Penny/Giles slide–action fader. On/off commands for activating a channel are generated by hall–effect switch/indicators. These commands are also available for starting and stopping external equipment. An internal patch point system is provided for external audio processing equipment applications.

1–8. **CHANNEL CONTROL CIRCUIT BOARD.** A channel control circuit board features hybrid logic circuitry for generating all the audio input/output switching signals used on the input circuit board. A cue sensing circuit determines when the fader is operated to the cue position and configures the selected channel to the cue mode.

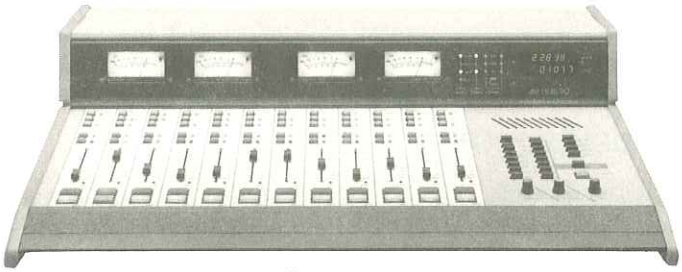
1–9. **OUTPUT CIRCUIT BOARD.** Control room monitoring, studio monitoring, cue operations, and headphone operations are accomplished by the output circuit board. Stereophonic program and audition output amplifier networks provide line level program and audition signals. The circuit board also contains monophonic audio and talkback amplifier networks.

1–10. **Program/Audition Output Amplifier.** Stereophonic program and audition output networks amplify the program and audition signals to a line level. The networks also provide signals for application to the metering circuitry.

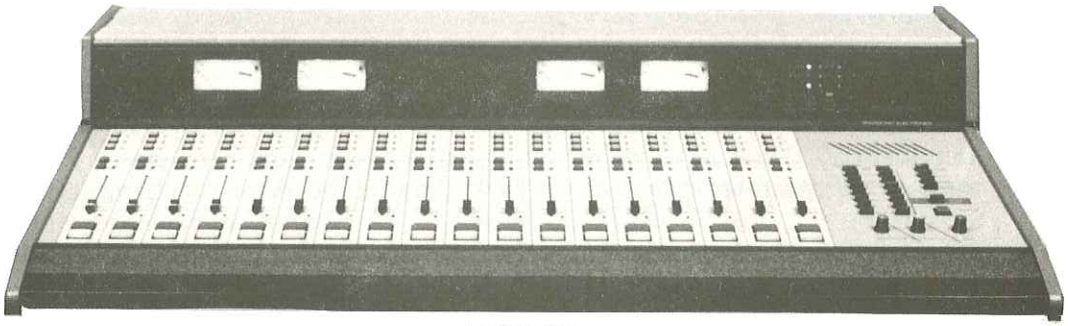
1–11. **Control Room Monitor Circuitry.** The control room monitor circuitry is designed to monitor five external audio sources and three internal audio sources. Monitor input selection is accomplished by eight color–coded switches. Control room monitor speaker volume control is provided by a VCA and a monitor level control network. A solid–state muting system provides muting of the control room speakers.

1–12. The monitor circuitry features a dim circuit which automatically reduces the control room speaker volume during a cue operation. The volume reduction is adjusted by a cue dim level control.

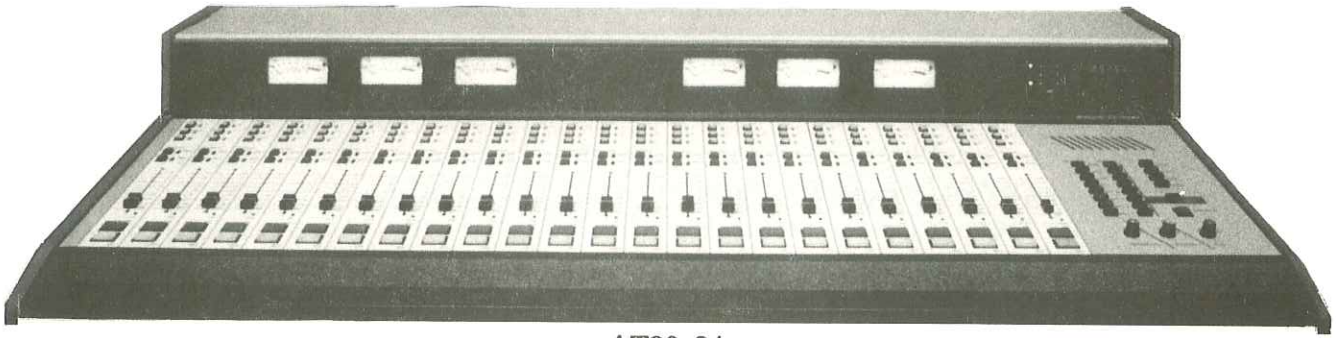
AT90–6



AT90–12



AT90–18



AT90–24

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FIGURE1–1. AT–90 CONSOLES

		No.	DESCRIPTION	QTY.
AT90–12	901–6012	1.	Monitor Select Circuit Board Assembly.	1
	901–6012–301	2.	Monitor Distribution Circuit Board Assembly.	1
	901–6012–010	3.	Headphone Select Circuit Board Assembly.	1
		4.	Timer Reset Circuit Board Assembly.	1
		5.	6 Channel Input Circuit Board Assembly.	2
		6.	Output Circuit Board Assembly.	1
		7.	6 Channel Control Circuit Board Assembly.	2
		8.	VU Meter Distribution Circuit Board Assembly.	1
		9.	VU Meter Assembly.	4
		10.	Clock/Timer Assembly.	1
		11.	Installation Kit and Instruction Manual.	1
		12.	Headphone/Control Room/Cue Gain Circuit Board.	1
		13.	Power Supply Assembly.	1
		14.	Relay Interface Circuit Board Assembly.	6

AT90–18	901–6018	Air–Trak 90 18 channel console, Penny & Giles conductive plastic fader, 117V ac 50/60 Hz operation.
	901–6018–301	Air–Trak 90 18 channel console, Penny & Giles conductive plastic fader, 220VAC 50 Hz operation.
	901–6018–010	Air–Trak 90 18 channel console, original equip–ment conductive plastic fader, 117V ac 60/60 Hz operation.

No.	DESCRIPTION	QTY.
1.	Monitor Select Circuit Board Assembly.	1
2.	Monitor Distribution Circuit Board Assembly.	1
3.	Headphone Select Circuit Board Assembly.	1
4.	Timer Reset Circuit Board Assembly.	1
5.	6 Channel Input Circuit Board Assembly	3
6.	Output Circuit Board Assembly.	1
7.	6 Channel Control Circuit Board Assembly.	3
8.	VU Meter Distribution Circuit Board Assembly.	1
9.	VU Meter Assembly.	4
10.	Clock/Timer Assembly.	1
11.	Installation Kit and Instruction Manual.	1
12.	Headphone/Control Room/Cue Gain Circuit Board.	1
13.	Power Supply Assembly.	1
14.	Relay Interface Circuit Board Assembly.	9

AT90–24	901–6024	Air–Trak 90 24 channel console, Penny & Giles conductive plastic fader, 117V ac 50/60 Hz operation.
	901–6024–301	Air–Trak 90 24 channel console, Penny & Giles conductive plastic fader, 220VAC 50 Hz operation.
	901–6024–010	Air–Trak 90 24 channel console, original equipment conductive plastic fader, 117V ac 50/60 Hz operation.

No.	DESCRIPTION	QTY.
1.	Monitor Select Circuit Board Assembly.	1
2.	Monitor Distribution Circuit Board Assembly.	1
3.	Headphone Select Circuit Board Assembly.	1
4.	Timer Reset Circuit Board Assembly.	1
5.	6 Channel Input Circuit Board Assembly.	4
6.	Output Circuit Board Assembly.	1
7.	6 Channel Control Circuit Board Assembly.	4
8.	VU Meter Distribution Circuit Board Assembly.	1
9.	VU Meter Assembly.	6
10.	Clock/Timer Assembly	1
11.	Installation Kit and Instruction Manual.	1
12.	Headphone/Control Room/Cue Gain Circuit Board.	1
13.	Power Supply Assembly.	1
14.	Relay Interface Circuit Board Assembly.	12

SPARE PARTS KITS

PART NUMBER	DESCRIPTION
971–0050	Spare Parts Kit. Includes Semiconductors, Regulators, Relays, Lamps, Etc.

OPTIONS AND ACCESSORIES

PART NUMBER	DESCRIPTION
951–6021	Relay Interface Circuit Board Assembly (for Controlling Equipment External to the Console).
951–0036	Utility Relay.

1–28. EQUIPMENT SPECIFICATIONS.

1–29. Refer to Table 1–1 for the nominal electrical specifications and Table 1–2 for the physical specifications of the Broadcast Electronics Air–Trak 90 series audio consoles.

TABLE 1–1. AIR–TRAK 90 SERIES AUDIO CONSOLE
NOMINAL ELECTRICAL SPECIFICATIONS (Sheet 1 of 4)

PARAMETER	SPECIFICATION
OVERALL CONSOLE	
MICROPHONE, CONSUMER, OR LINE INPUT TO PROGRAM OR AUDITION OUTPUT CHANNEL	
INPUT HEADROOM	Greater than 25 dB above nominal input level.
TOTAL HARMONIC DISTORTION	
Microphone	Less than 0.05%, 20 Hz to 20 kHz. –60 dBu nominal input level. +10 dBu to 0 dBu output level. Fader at 0 position.
Consumer	Less than 0.05%, 20 Hz to 20 kHz. –10 dBu nominal input level. +10 dBu to 0 dBu output level. Fader at 0 position.
Line	Less than 0.05%, 20 Hz to 20 kHz. +4 dBu nominal input level. +10 dBu to 0 dBu output level. Fader at 0 position.
SMPTE INTERMODULATION DISTORTION	
Microphone	Less than 0.05%, 60 Hz/7 kHz. 4:1 amplitude ratio. –60 dBu input level. +10 dBu to 0 dBu output level. Fader at 0 position.
Consumer	Less than 0.05%, 60 Hz/7 kHz. 4:1 amplitude ratio. –10 dBu input level. +10 dBu to 0 dBu output level. Fader at 0 position.
Line	Less than 0.05%, 60 Hz/7 kHz. 4:1 amplitude ratio. +4 dBu input level. +10 dBu to 0 dBu output level. Fader at 0 position.
FREQUENCY RESPONSE	
Microphone	+0.05 dB –0.25 dB, 20 Hz to 20 kHz. 1 kHz reference. –60 dBu input level. +10 dBu to 0 dBu output level. 150 Ohm source impedance.
Consumer	+0.05 dB –0.25 dB, 20 Hz to 20 kHz. 1 kHz reference. –10 dBu input level. +10 dBu to 0 dBu output level. 600 Ohm source impedance.
Line	+0.05 dB –0.25 dB, 20 Hz to 20 kHz. 1 kHz reference. +4 dBu input level. +10 dBu to 0 dBu output level. 600 Ohm source impedance.
SIGNAL–TO–NOISE RATIO	
Microphone (Program/Audition Output)	Greater than 67 dB, –60 dB input level, 150 Ohm source impedance. 22 Hz to 22 kHz. Fader at 0 position. +10 dBu to 0 dBu output level. Single channel selected to the output.

TABLE 1–1. AIR–TRAK 90 SERIES AUDIO CONSOLE
NOMINAL ELECTRICAL SPECIFICATIONS (Sheet 2 of 4)

PARAMETER	SPECIFICATION
Consumer (Program/Audition Output)	Greater than 85 dB, –10 dB input level, 600 Ohm source impedance. 22 Hz to 22 kHz. Fader at 0 position. +10 dBu to 0 dBu output level. Single channel selected to the output.
Line	
Program Output	Greater than 88 dB, +4 dB input level, 600 Ohm source impedance. 22 Hz to 22 kHz. Fader at 0 position. +10 dBu to 0 dBu output level. Single channel selected to the output.
Audition Output	Greater than 80 dB, +4 dB input level, 600 Ohm source impedance. 22 Hz to 22 kHz. Fader at 0 position. +10 dBu to 0 dBu output level. Single channel selected to the output.
MICROPHONE SOURCE IMPEDANCE	150 Ohms.
LINE SOURCE IMPEDANCE	600 Ohms.
CONSUMER SOURCE IMPEDANCE	2 k Ohms.
FADER GAIN	10 dB minimum from 0 position.
PROGRAM AND AUDITION OUTPUT SPECIFICATIONS.	
NOMINAL OUTPUT LEVEL	Continuously variable from 0 dBm to +10 dBm.
OUTPUT HEADROOM	24 dB above a 0 dBm output level. 16 dB above a +8 dBm output level.
MAXIMUM OUTPUT LEVEL	+24 dBu into a 600 Ohm load.
OUTPUT IMPEDANCE	600 Ohms maximum, electronically balanced, resistive or 300 Ohms maximum, unbalanced, resistive.
LOAD IMPEDANCE	Minimum 600 Ohms.
OUTPUT NOISE	Greater than 95 dB below a 0 dBu output level. All inputs disabled.
CROSSTALK (Program to Audition, Audition to Program. Auxiliary to Program, or Auxiliary to Audition)	Greater than 70 dB below a 0 dBu output level, 20 Hz to 20 kHz. Any input position to selected output, all inputs enabled. Typically better than 90 dB at 1 kHz for +4 dBu input level.

TABLE 1–1. AIR–TRAK 90 SERIES AUDIO CONSOLE
NOMINAL ELECTRICAL SPECIFICATIONS (Sheet 3 of 4)

PARAMETER	SPECIFICATION
SEPARATION (Program Left into Program Right, Program Right into Program Left Audition Left into Audition Right, or Audition Right into Audition Left)	Greater than 70 dB below a 0 dB output level, 20 Hz to 20 kHz. Any input position. Typically better than 100 dB at 1 kHz for +4 dBu input level.
PATCH POINT SPECIFICATIONS	
OUTPUT LEVEL	–5 dBu nominal.
OUTPUT IMPEDANCE	600 Ohms.
INPUT IMPEDANCE	20 k Ohms minimum.
MAXIMUM OUTPUT LEVEL	+20 dBm into a 600 Ohm load. +22 dBu into a high impedance load.
MICROPHONE INPUT SPECIFICATIONS	
NOMINAL BUS OUTPUT LEVEL	–5 dBu.
NOMINAL INPUT LEVEL	–60 dBu.
EQUIVALENT INPUT NOISE	Greater than –127 dBu with a 150 Ohm input source. 22 Hz to 22 kHz bandwidth. No weighting. Fader at 0 position. Single channel selected to output.
COMMON MODE REJECTION RATIO	Greater than 70 dB, dc to 1 kHz. Typically 100 dB at low frequencies.
INPUT IMPEDANCE	Greater than 1500 Ohms.
MICROPHONE AMPLIFIER GAIN	55 dB, ±5 dB.
FREQUENCY RESPONSE	+0.05 dB –.25 dB, 20 Hz to 20 kHz, 1 kHz reference.
OUTPUT ASSIGNMENT AND ON/OFF SWITCH NOISE	–70 dB.
CONSUMER INPUT SPECIFICATIONS	
NOMINAL BUS OUTPUT LEVEL	–5 dBu.
NOMINAL INPUT LEVELS	–10 dBu.
INPUT IMPEDANCE	Greater than 20 k Ohms, balanced bridging.
CONSUMER AMPLIFIER GAIN	17 dB, ±5 dB.
FREQUENCY RESPONSE	+0.05 dB –0.25 dB, 20 Hz to 20 kHz. 1 kHz reference.
OUTPUT ASSIGNMENT AND ON/OFF SWITCH NOISE	–70 dB.

TABLE 1–1. AIR–TRAK 90 SERIES AUDIO CONSOLE NOMINAL ELECTRICAL SPECIFICATIONS (Sheet 4 of 4)

PARAMETER	SPECIFICATION
LINE INPUT SPECIFICATIONS	
NOMINAL BUS OUTPUT LEVEL	–5 dBu.
NOMINAL INPUT LEVEL	+4dBu.
INPUT IMPEDANCE	Greater than 20 k Ohms, balanced bridging.
LINE AMPLIFIER GAIN	3 dB, ±5 dB.
FREQUENCY RESPONSE	+0.05 dB –0.25 dB, 20 Hz to 20 kHz. 1 kHz reference.
OUTPUT ASSIGNMENT AND ON/OFF SWITCH NOISE	–70 dB.
CONTROL ROOM MONITOR AND STUDIO MONITOR SPECIFICATIONS	
OUTPUT IMPEDANCE	60 Ohms unbalanced.
NOMINAL OUTPUT LEVEL	0 dBm.
MAXIMUM OUTPUT LEVEL	+20 dBm into a 600 Ohm load. +22 dBu into a high impedance load.
SIGNAL–TO–NOISE RATIO	Greater than 85 dB below 0 dBm output level. Terminated external input.
HEADPHONE SPECIFICATIONS	
MINIMUM LOAD IMPEDANCE	35 Ohms.
OUTPUT IMPEDANCE	Approximately 10 Ohms.
NOMINAL OPERATING LEVEL	2.8 Volts per channel into a 100 Ohm load.
STEREO VCA TRACKING	Less than 0.5 dB over a 60 dB range.
AC POWER REQUIREMENTS	103V to 127V ac 50/60 Hz or 207V to 253V ac 50/60 Hz.

TABLE 1–2. AIR–TRAK 90 SERIES AUDIO CONSOLE PHYSICAL SPECIFICATIONS (Sheet 1 of 2)

PARAMETER	SPECIFICATION
PHYSICAL SPECIFICATIONS	
DIMENSIONS	
AT90–6	Depth: 28.69 Inches (72.87 cm). Width: 23.50 Inches (60.70 cm). Height: 9.15 Inches (23.24 cm).

TABLE 1–2. AIR–TRAK 90 SERIES AUDIO CONSOLE PHYSICAL SPECIFICATIONS
(Sheet 2 of 2)

PARAMETER	SPECIFICATION
AT90–12	Depth: 28.69 Inches (72.87 cm). Width: 35.50 Inches (90.17 cm). Height: 9.15 Inches (23.24 cm).
AT90–18	Depth: 28.69 Inches (72.87 cm). Width: 47.50 Inches (120.65 cm). Height: 9.15 Inches (23.24 cm).
AT90–24	Depth: 28.69 Inches (72.87 cm). Width: 59.50 Inches (151.13 cm). Height: 9.15 Inches (23.24 cm).
WEIGHT	
AT90–6 Excluding Power Supply	35 Pounds (15.9 kg)
AT90–12 Excluding Power Supply	50 Pounds (22.7 kg)
AT90–18 Excluding Power Supply	65 Pounds (29.5 kg)
AT90–24 Excluding Power Supply	80 Pounds (36.3 kg)

SECTION II
INSTALLATION

2–1. INTRODUCTION.

2–2. This section contains information for the installation of the Broadcast Electronics Air–Trak 90 series 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 power supply module. 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 promptly filed with the carrier or the carrier may not accept the claim.

2–5. The contents of the shipment should be as indicated on the packing list. 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. Each Air–Trak 90 console is assembled, operated, tested, and inspected at the factory prior to shipment and is ready for installation when received. Prior to installation, this publication should be studied to obtain an understanding of the console circuitry, nomenclature, and installation requirements. Installation is accomplished as follows: 1) equipment placement, 2) assignment of input sources, 3) circuit board programming, 4) console system wiring, and 5) installation adjustments.

2–8. EQUIPMENT PLACEMENT.

WARNING ***ENSURE ALL PRIMARY POWER IS DISCONNECTED FROM THE CONSOLE BEFORE PROCEEDING.***

WARNING

2–9. **CONSOLE.** The AT–90 console is designed to be surface mounted to a studio desk or table. The selected furniture must be capable of supporting a minimum of 35 pounds for 6 channel consoles, 50 pounds for 12 channel consoles, 65 pounds for 18 channel consoles, and 80 pounds for 24 channel consoles. To install the console, refer to Figure 2–1 and the following text.

2–10. Select the furniture for console installation. As a minimum requirement, the selected furniture must be of sufficient size and capable of supporting the total weight of the console.

2–11. Evaluate the operator physical comfort parameters and access to the console controls and determine the position of the console. If the console rear–panel is placed against a wall or similar obstruction, a minimum of 2 inches (5.08 cm) must be maintained between the wall and console to assure access to the console circuit boards.

2–12. Once the position of the console is established, refer to Figure 2–1 for the console mounting and cable access hole dimensions. After determining the dimensions, scribe and drill the holes in the studio furniture.

2–13. Place and position the console on the studio furniture. Secure the console to the furniture using wood or sheet–metal screws as determined by the mounting surface of the furniture.

2–14. **CONSOLE POWER SUPPLY.** The console power supply requires 7 inches (17.78 cm) of a 19 inch (48.3 cm) cabinet. It is recommended an additional 1.75 inches (4.4 cm) of cabinet space above and below the unit is provided for adequate ventilation.

2–15. Place the power supply in any convenient location. 10 feet (3.05 m) of power supply cable is provided with the power supply. If a longer cable is required, construct the cable using Belden 8466 18 gauge 12 conductor cable or equivalent. The power supply should not be mounted directly above or below any heat generating equipment, otherwise no additional special requirements need be observed.

2–16. **ASSIGNMENT OF INPUT SOURCES.**

2–17. Assignment of audio input sources is determined by the level and type of audio source. The following is a list of available types of audio sources.

TYPE	NOMINAL LEVEL
Microphone	–60 dBu
Consumer	–10 dBu
Line	+4 dBu

2–18. Each channel of the AT–90 console is equipped with three audio source inputs. The following information is a list of inputs and applications for a typical channel.

INPUT	APPLICATIONS
A	Microphone, Consumer, Line
B	Consumer, Line
C	Consumer, Line

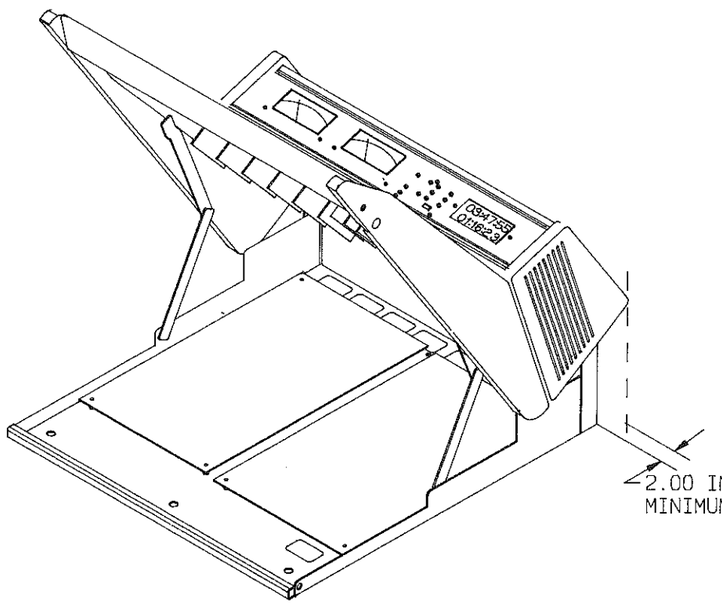
2–19. Microphone level sources can only be assigned to input A. Line level and consumer level sources can be assigned to inputs A, B, or C. For optimum signal–to–noise performance, it is recommended that sources with comparable levels be assigned to the same channel. However, each channel will accept sources at different signal levels with proper attenuator programming. AT–90 consoles will accept either stereophonic or monophonic audio input sources. Monophonic sources must be connected to both the left and right channel input terminals.

2–20. Assignment of audio input sources is also determined by the use of each source. Normally, audio sources such as turntables, cartridge machines, and reel–to–reel machines are assigned to separate channels so that music/commercials may be sequenced easily. A network input line and a reel–to–reel playback source are rarely used together. Therefore, the reel–to–reel and the network input may be assigned to the same channel. The assignment of input sources will vary depending on individual control room or studio requirements.

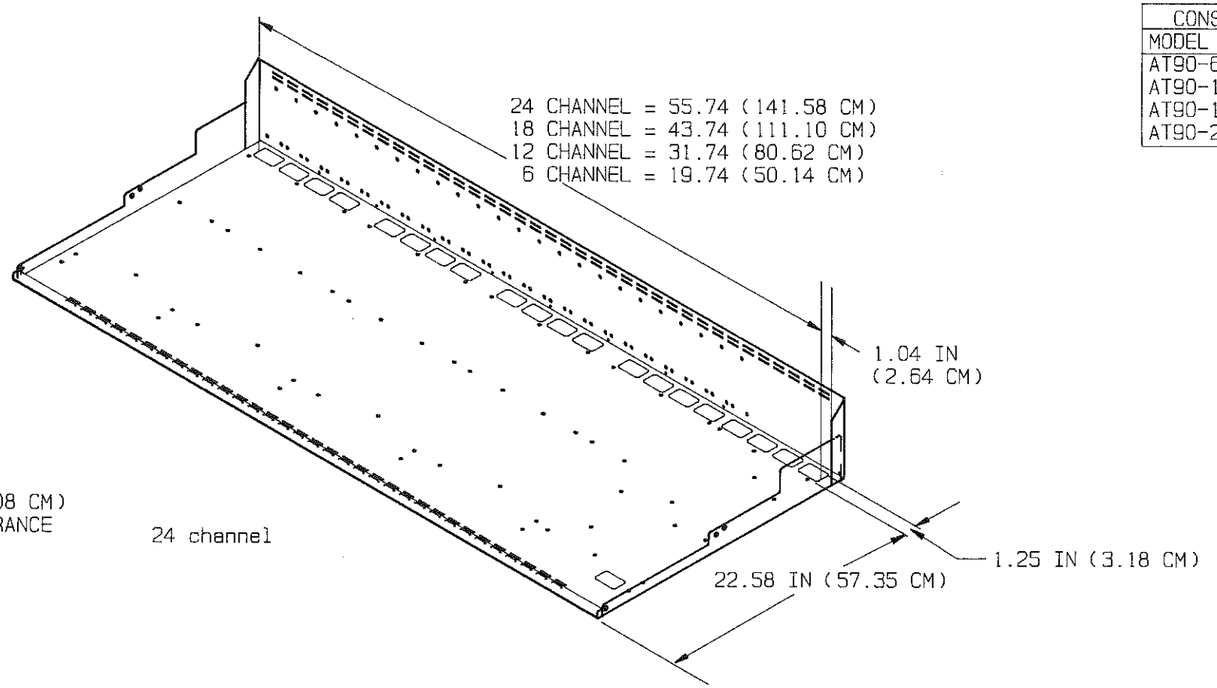
2–21. **CIRCUIT BOARD PROGRAMMING.**

2–22. The input, channel control, VU meter distribution, and clock/timer circuit boards are equipped with programmable operating characteristics to meet any installation requirements. Figure 2–2 presents the locations of the various AT–90 circuit boards. Refer to Figure 2–2 as required and perform the following circuit programming procedures for the desired operating or control parameters.

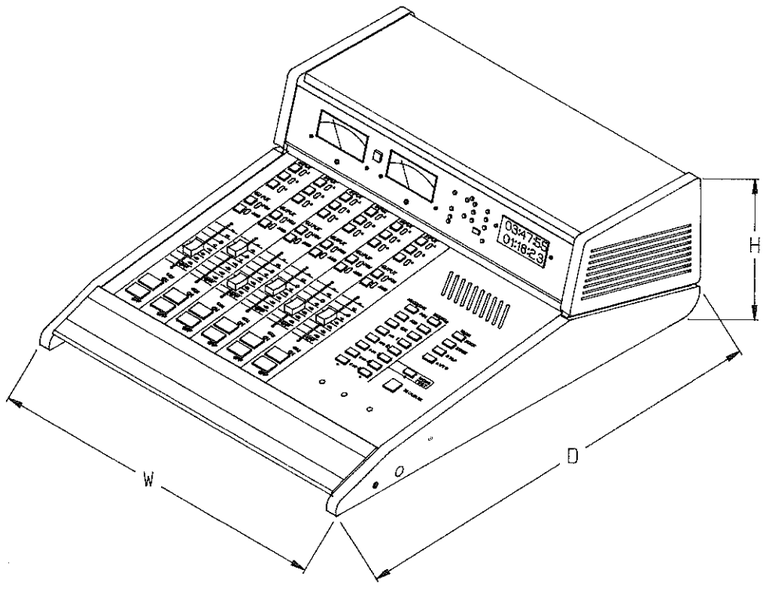
2–23. **INPUT CIRCUIT BOARD PROGRAMMING.** The input circuit board contains six channels with three inputs per channel (refer to Figure 2–3). The circuit board is equipped with programmable jumpers for selecting the gain of each channel, appropriate attenuation for inputs A, B, and C, and enabling a mix minus bus.



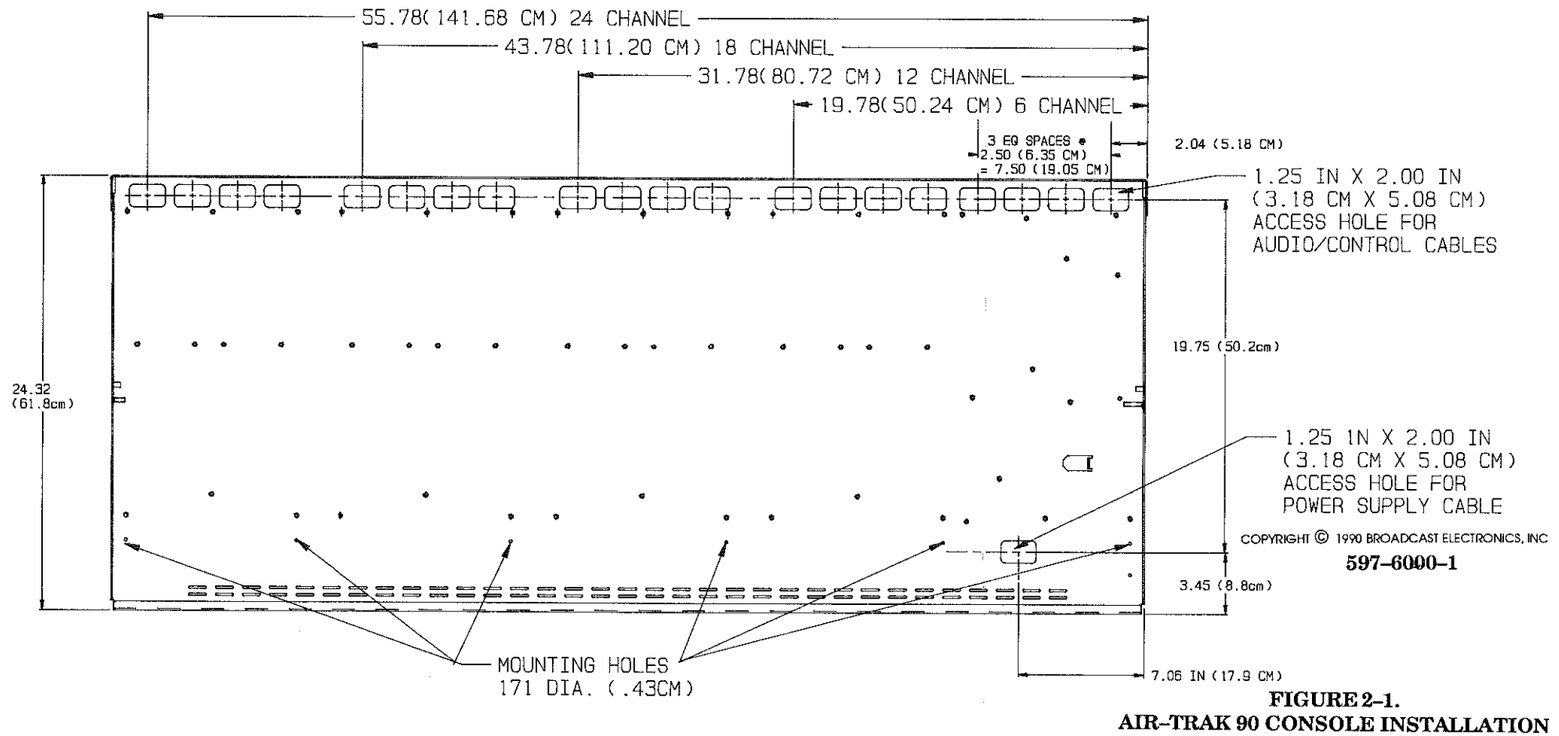
CONSOLE WEIGHT	
MODEL	
AT90-6	35 LBS (15.9 KG)
AT90-12	50 LBS (22.7 KG)
AT90-18	65 LBS (29.5 KG)
AT90-24	80 LBS (36.3 KG)



24 channel

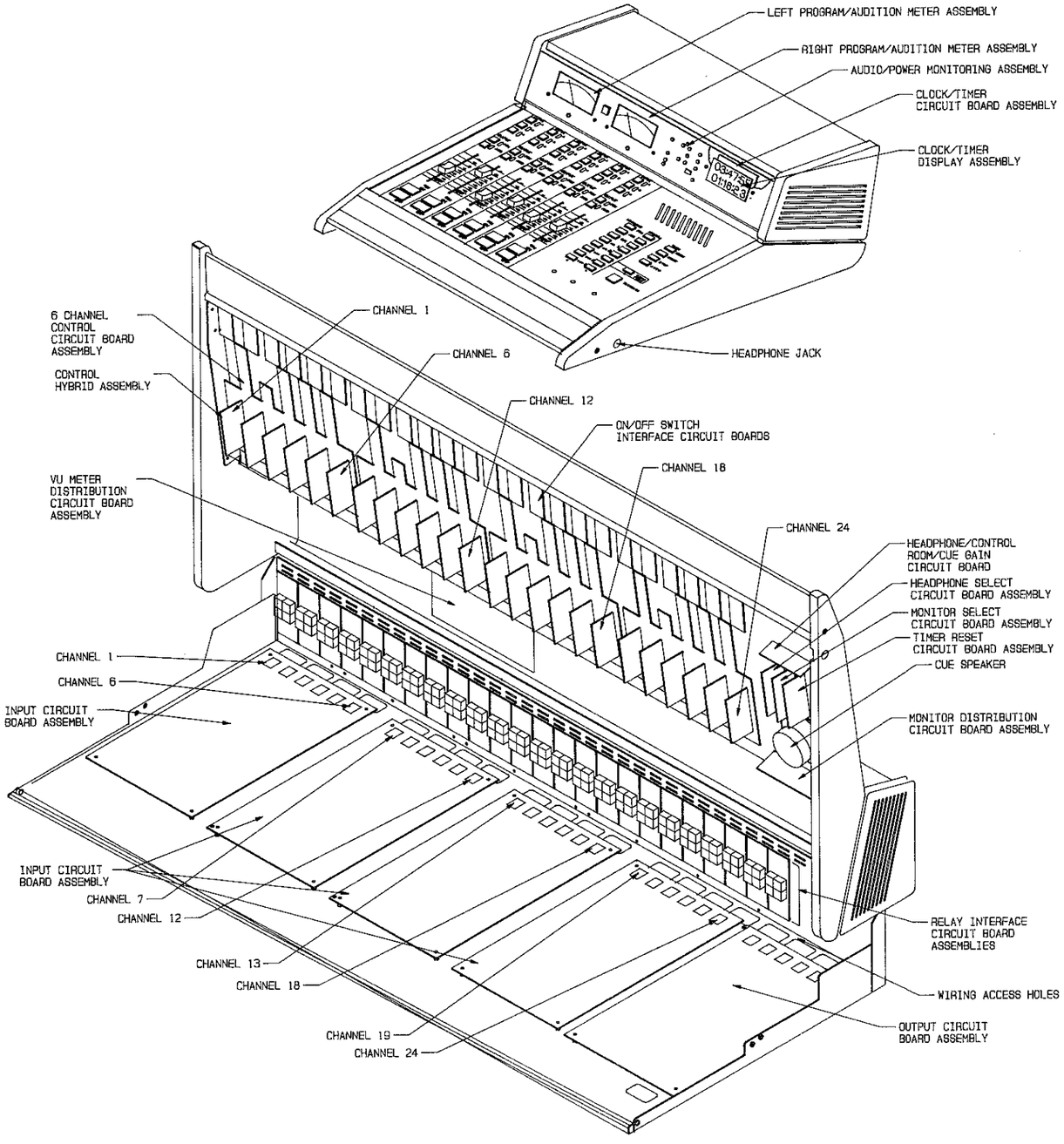


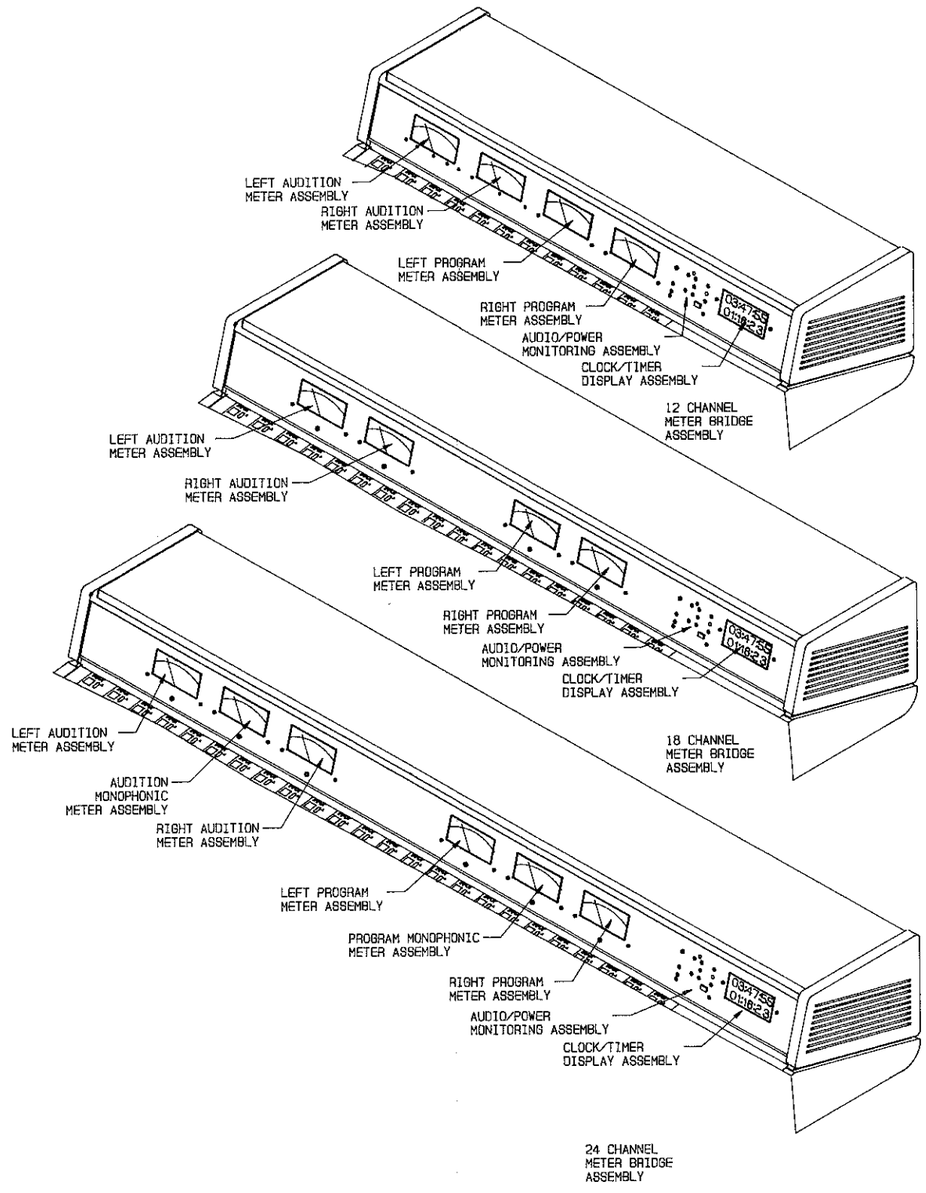
CONSOLE DIMENSIONS			
MODEL	H	W	D
AT90-6	9.15 IN. (23.24 CM)	23.50 IN. (59.69 CM)	28.69 IN. (72.87 CM)
AT90-12	9.15 IN. (23.24 CM)	35.50 IN. (90.17 CM)	28.69 IN. (72.87 CM)
AT90-18	9.15 IN. (23.24 CM)	47.50 IN. (120.65 CM)	28.69 IN. (72.87 CM)
AT90-24	9.15 IN. (23.24 CM)	59.50 IN. (151.13 CM)	28.69 IN. (72.87 CM)



597-6000-1

FIGURE 2-1.
AIR-TRAK 90 CONSOLE INSTALLATION





597–6000–2

FIGURE 2–2. AIR–TRAK 90 CIRCUIT BOARD LOCATIONS

2–24. **Gain Programming.** Each channel is equipped with an amplifier designed with: 1) a microphone gain position and 2) a consumer/line gain position. Headers J608 and J609 select the gain for channel 1. The programming of J608 and J609 is determined by the type and level of the audio source assigned to input A. Only input A is designed to accept a microphone level source. The circuit board is shipped from the factory with the J608 and J609 jumpers programmed for consumer/line gain. Determine if a microphone source is applied to channel 1. Refer to the channel 1 input programming chart in Figure 2–3 and program J608 and J609 in: 1) position 1–2 if a microphone source is applied to the channel or 2) position 2–3 if a microphone source is not applied to the channel.

2–25. **Attenuation Programming.** Programmable headers J601 and J602: 1) bypasses in–line attenuation if a microphone is applied to input A or 2) selects in–line attenuation if a consumer or line source is applied to input A. The circuit board is shipped from the factory with the J601 and J602 jumpers configured for a consumer or line source applied to input A. Determine if a microphone source is assigned to channel 1A. Refer to the channel 1 input programming chart in Figure 2–3 and install J601 and J602 as shown if a microphone source is assigned to channel 1.

2–26. Programmable header J603 selects the appropriate shunt attenuation for the left and right channels of inputs 1A, 1B, and 1C. The circuit board is shipped from the factory with J603 programmed for the attenuation required when the channel is programmed for consumer/line gain. Refer to the channel 1 input programming chart in Figure 2–3 and program J603 as shown for input 1A. Once channel 1A is configured, program the attenuation for channels 1B and 1C.

2–27. **Programming Channels 2 Through 6.** The headers for channels 2 through 6 are also programmed as described for channel 1. Therefore, refer to the programmable header chart in Figure 2–3 to determine the headers associated with the desired channel and program the headers as required.

2–28. **MIX MINUS BUS OPERATION.** A typical mix minus bus configuration is presented in Figure 2–4. Headers J107 through J607 on the audio input circuit board enable/disable the mix minus bus for channels 1 through 6 (refer to Figure 2–3). Examine the information presented in Figure 2–4 and determine the desired mix minus bus configuration. Once the configuration is determined, refer to Figures 2–3 and 2–4 and program the mix minus bus jumpers as required. The circuit board is shipped from the factory with the jumpers in the disabled position.

2–29. **CHANNEL CONTROL CIRCUIT BOARD PROGRAMMING.** The channel control circuit board is equipped with programmable headers for selecting a source enable command, enabling studio and control room muting, and enabling automatic console timer reset operations for six channels.

2–30. **Source Enable Command.** Programmable headers J2, J3, and J4 select a momentary or continuous LOW source enable command for equipment connected to inputs 1A, 1B, and 1C respectively (refer to Figure 2–5). The circuit board is shipped from the factory with the jumpers programmed in position 1–2. Refer to Figure 2–5 and program J2, J3, and J4 as required.

2–31. **Studio Muting.** Programmable header J58 enables/disables studio muting for channel 1A. The circuit board is shipped from the factory with J58 programmed in the disabled position. Refer to Figure 2–5 and program J58 as required.

2–32. **Control Room Muting.** Programmable header J57 enables/disables control room muting for channel 1A. The circuit board is shipped from the factory with J57 programmed in the disabled position. Refer to Figure 2–5 and program J57 as required.

2–33. **Automatic Timer Reset Operation.** Programmable header J69 enables/disables automatic timer reset operations for channel 1A. The circuit board is shipped from the factory with J69 programmed in the enabled position. Refer to Figure 2–5 and program J69 as required.

2–34. **Programming Channels 2 Through 6.** The headers for channels 2 through 6 are also programmed as described for channel 1. Therefore, refer to the programmable header chart in Figure 2–5 to determine the headers associated with the desired channel and program the jumpers as required.

2–35. **VU METER CIRCUIT BOARD PROGRAMMING.** The VU meter circuit board is programmed during final test. To assure the circuit board jumpers have not become dislodged or changed during shipment, refer to Figure 2–6 and ensure headers J8 through J11 are programmed as indicated.

2–36. **CLOCK/TIMER CIRCUIT BOARD PROGRAMMING.** Programmable headers J5 and J6 are installed during final test and must remain in this position. To assure J5 and J6 have not become dislodged during shipment, refer to Figure 2–7 and ensure the jumpers are positioned as indicated.

2–37. **12/24 Hour Clock Display.** The clock/timer clock display may be programmed to display information in a 12 or 24 hour format. Refer to Figure 2–7 and program W5 as desired. The jumper is installed during final test to display clock information in a 12 hour format.

2–38. **Battery Back–Up.** The clock/timer module is equipped with a battery back–up system to maintain clock operation in the event of a power failure (refer to Figure 2–7). The system will operate with a 9 volt Alkaline or 9 volt Nickel–Cadmium battery. The Alkaline battery will maintain clock operation for approximately 2 to 3 hours. Once the 2 to 3 hour period has elapsed, the battery must be replaced. The Nickel–Cadmium battery will maintain clock operation for approximately 30 minutes. However, the battery will be automatically re–charged when power is re–applied to the console. Analyze the two battery types and select a battery for back–up operations. Install a battery and program jumper J4 as indicated in Figure 2–7. If the console is deenergized for an extended period of time, neither battery type will maintain clock operation.

2–39. **Network Synchronization Interfacing.** The clock/timer module is equipped with an automatic synchronization feature. The feature synchronizes the clock circuitry to the network audio to eliminate drift. If network audio synchronization is desired, refer to Figure 2–7 and connect the network audio to J1–1 and J1–2.

2–40. **Master/Slave Clock Operation.** The clock/timer modules in a multiple Air–Trak 90 console installation may be connected in a master/slave clock configuration if desired. If master/slave clock operation is desired, select a clock/timer module as a master. Refer to Figure 2–7 and connect serial output port J1–5 on the master clock/timer module to serial input port J1–4 on the slave clock/timer modules.

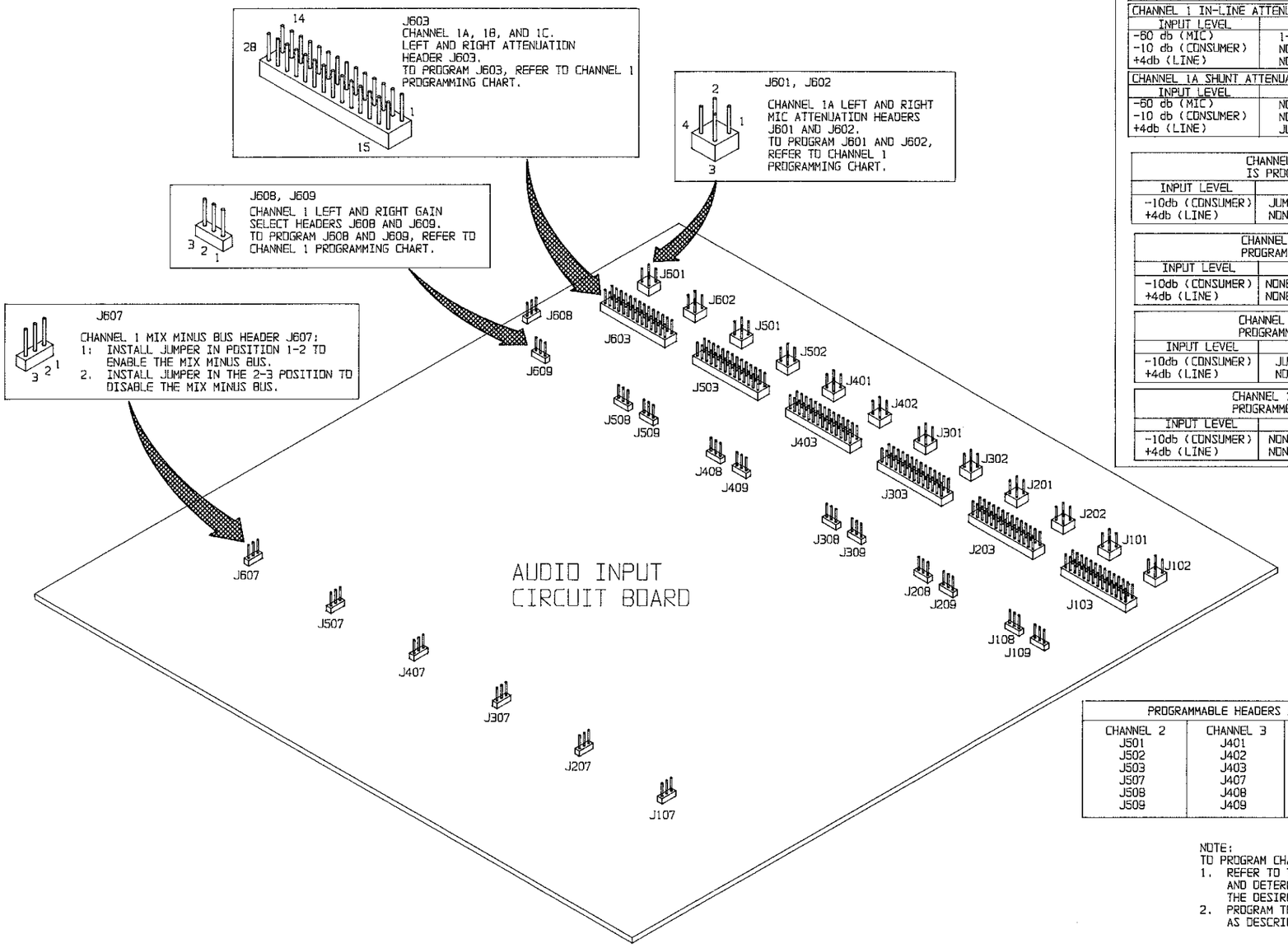
2–41. **CONSOLE SYSTEM WIRING.**

2–42. **GENERAL.** The Air–Trak 90 series audio consoles are equipped with a wiring kit which includes a wiring tool, mating connectors, and connector pins. Access holes for interfacing cables are located on the bottom–panel of the console chassis (refer to Figure 2–2).

2–43. **Wiring Tool.** A wiring tool is supplied in the console installation kit for connector pin crimping operations (refer to Figure 2–8). The tool must be used in an appropriate manner to obtain high–quality connections. Use the tool to assemble all console interfacing cables.

2–44. **GROUNDING.** To obtain optimum noise performance from the AT–90 console, the console and the various audio source interconnections must be properly grounded and shielded. The following text presents console and audio source interconnection grounding information. Additional grounding information is presented in a data sheet which is located in the accessory kit.

2–45. **Console Grounding System.** The AT–90 console is equipped with a programmable ground system. The system consists of: 1) a chassis ground terminal on the console mainframe and 2) a chassis ground terminal and power supply circuit ground on the power supply unit (refer to Figure 2–9). The system is designed to distribute and isolate ground circuits as required for optimum performance.



CHANNEL 1 GAIN AND ATTENUATION PROGRAMMING
(HEADERS J601,J602,J603,J608, AND J609)

CHANNEL 1 GAIN PROGRAMMING		
INPUT LEVEL	J608	J609
-60 db (MIC)	1-2	1-2
-10 db (CONSUMER)	2-3	2-3
+4db (LINE)	2-3	2-3

CHANNEL 1 IN-LINE ATTENUATION PROGRAMMING		
INPUT LEVEL	J601	J602
-60 db (MIC)	1-3,2-4	1-3,2-4
-10 db (CONSUMER)	NONE	NONE
+4db (LINE)	NONE	NONE

CHANNEL 1A SHUNT ATTENUATION PROGRAMMING	
INPUT LEVEL	J603
-60 db (MIC)	NONE ON 14-28,7-21
-10 db (CONSUMER)	NONE ON 14-28,7-21
+4db (LINE)	JUMPER 14-28,7-21

CHANNEL 1B ATTENUATION PROGRAMMING WHEN THE CHANNEL IS PROGRAMMED FOR MICROPHONE GAIN (J608/J609 IN 1-2)			
INPUT LEVEL	J603		
-10db (CONSUMER)	JUMPER 11-25,4-18	NONE ON 12-26,5-19	NONE ON 13-27, 6-20
+4db (LINE)	NONE ON 11-25,4-18	JUMPER 12-26,5-19	NONE ON 13-27, 6-20

CHANNEL 1B ATTENUATION PROGRAMMING WHEN THE CHANNEL IS PROGRAMMED FOR CONSUMER/LINE GAIN (J608/J609 IN 2-3)			
INPUT LEVEL	J603		
-10db (CONSUMER)	NONE ON 11-25,4-18	NONE ON 12-26,5-19	NONE ON 13-27, 6-20
+4db (LINE)	NONE ON 11-25,4-18	NONE ON 12-26,5-19	JUMPER 13-27, 6-20

CHANNEL 1C ATTENUATION PROGRAMMING WHEN THEW CHANNEL IS PROGRAMMED FOR MICROPHONE GAIN (J608/J609 IN 1-2)			
INPUT LEVEL	J603		
-10db (CONSUMER)	JUMPER 8-22,1-15	NONE ON 9-23,2-16	NONE ON 10-24,3-17
+4db (LINE)	NONE ON 8-22,1-15	JUMPER 9-23,2-16	NONE ON 10-24,3-17

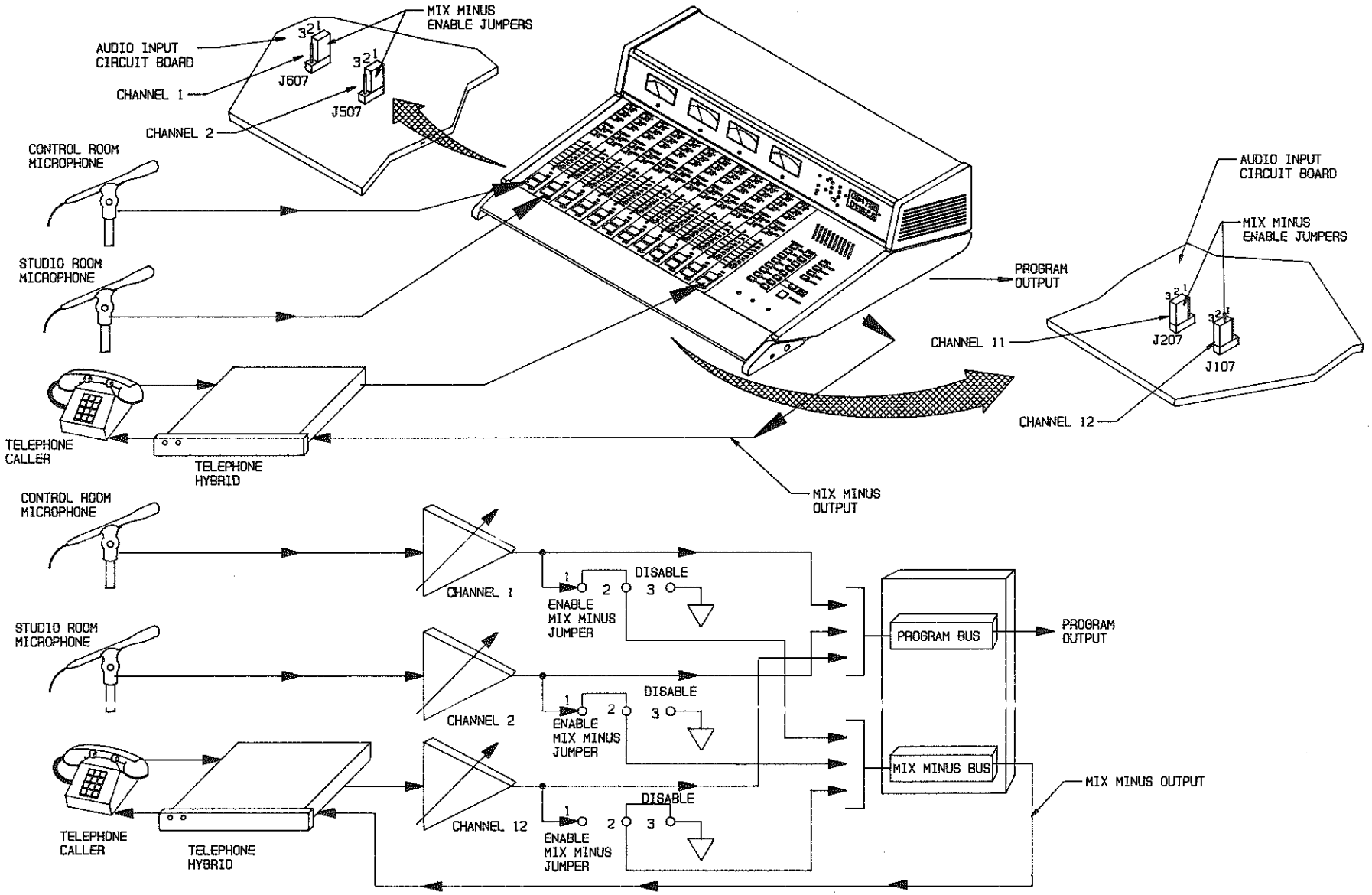
CHANNEL 1C ATTENUATION PROGRAMMING WHEN THE CHANNEL IS PROGRAMMED FOR CONSUMER/LINE GAIN (J608/J609 IN 2-3)			
INPUT LEVEL	J603		
-10db (CONSUMER)	NONE ON 8-22,1-15	NONE ON 9-23,2-16	NONE ON 10-24,3-17
+4db (LINE)	NONE ON 8-22,1-15	NONE ON 9-23,2-16	JUMPER 10-24,3-17

PROGRAMMABLE HEADERS ASSOCIATED WITH CHANNELS 2 THROUGH 6				
CHANNEL 2	CHANNEL 3	CHANNEL 4	CHANNEL 5	CHANNEL 6
J501	J401	J301	J201	J101
J502	J402	J302	J202	J102
J503	J403	J303	J203	J103
J507	J407	J307	J207	J107
J508	J408	J308	J208	J108
J509	J409	J309	J209	J109

NOTE:
TO PROGRAM CHANNELS 2 THROUGH 6:
1. REFER TO THE PROGRAMMABLE HEADER CHART AND DETERMINE THE HEADERS ASSOCIATED WITH THE DESIRED CHANNEL.
2. PROGRAM THE HEADERS FOR THE DESIRED CHANNEL AS DESCRIBED FOR CHANNEL 1.

597-6000-4

FIGURE 2-3.
INPUT CIRCUIT BOARD PROGRAMMING



597-6000-38

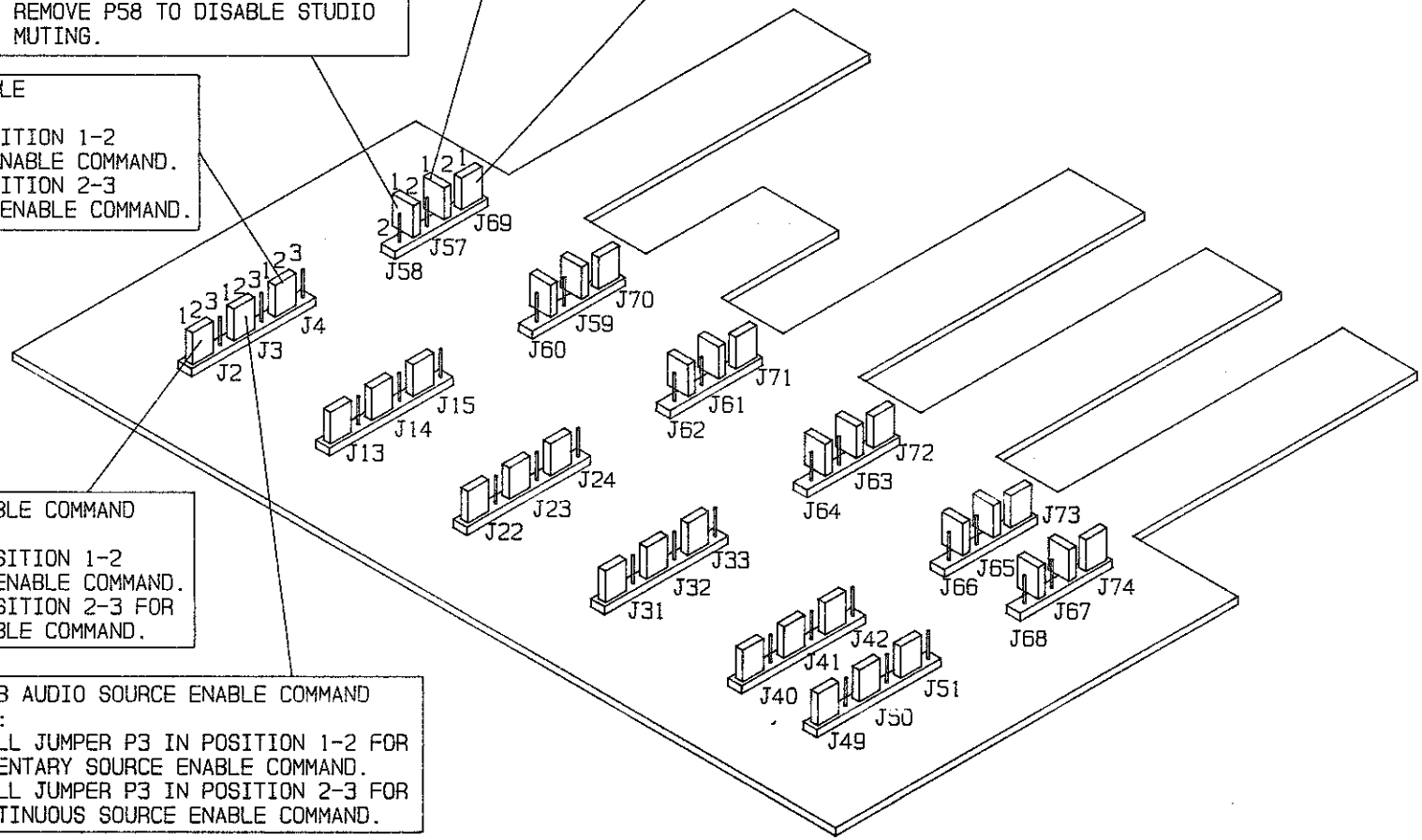
FIGURE 2-4. TYPICAL MIX MINUS BUS CONFIGURATION

CHANNEL 1A CONTROL ROOM MUTE HEADER J57:
1. INSTALL P57 TO ENABLE CONTROL ROOM MUTING.
2. REMOVE P57 TO DISABLE CONTROL ROOM MUTING.

CHANNEL 1 TIMER AUTOMATIC RESET HEADER J69:
1. INSTALL JUMPER P69 FOR TIMER RESET OPERATION ON START COMMANDS.
2. REMOVE JUMPER P69 TO DISABLE TIMER RESET OPERATIONS.

CHANNEL 1A STUDIO MUTE HEADER J58:
1. INSTALL JUMPER P58 TO ENABLE STUDIO MUTING.
2. REMOVE P58 TO DISABLE STUDIO MUTING.

CHANNEL 1C AUDIO SOURCE ENABLE COMMAND HEADER J4:
1. INSTALL JUMPER P4 IN POSITION 1-2 FOR A MOMENTARY SOURCE ENABLE COMMAND.
2. INSTALL JUMPER P4 IN POSITION 2-3 FOR A CONTINUOUS SOURCE ENABLE COMMAND.



CHANNEL 1A AUDIO SOURCE ENABLE COMMAND HEADER J2:
1. INSTALL JUMPER P2 IN POSITION 1-2 FOR A MOMENTARY SOURCE ENABLE COMMAND.
2. INSTALL JUMPER P2 IN POSITION 2-3 FOR A CONTINUOUS SOURCE ENABLE COMMAND.

CHANNEL 1B AUDIO SOURCE ENABLE COMMAND HEADER J3:
1. INSTALL JUMPER P3 IN POSITION 1-2 FOR A MOMENTARY SOURCE ENABLE COMMAND.
2. INSTALL JUMPER P3 IN POSITION 2-3 FOR A CONTINUOUS SOURCE ENABLE COMMAND.

NOTE
TO PROGRAM CHANNELS 1 THROUGH 6:
1. REFER TO THE PROGRAMMABLE HEADER CHART AND DETERMINE THE JUMPERS ASSOCIATED WITH THE DESIRED CHANNEL.
2. PROGRAM THE HEADERS FOR THE DESIRED CHANNEL AS DESCRIBED FOR CHANNEL 1.

PROGRAMMABLE HEADERS ASSOCIATED WITH CHANNELS 2 THROUGH 6				
CHANNEL 2	CHANNEL 3	CHANNEL 4	CHANNEL 5	CHANNEL 6
J13	J22	J31	J40	J49
J14	J23	J32	J41	J50
J15	J24	J33	J42	J51
J60	J62	J64	J66	J68
J59	J61	J63	J65	J67
J70	J71	J72	J73	J74

597-6000-5

FIGURE 2-5. CHANNEL CONTROL CIRCUIT BOARD PROGRAMMING

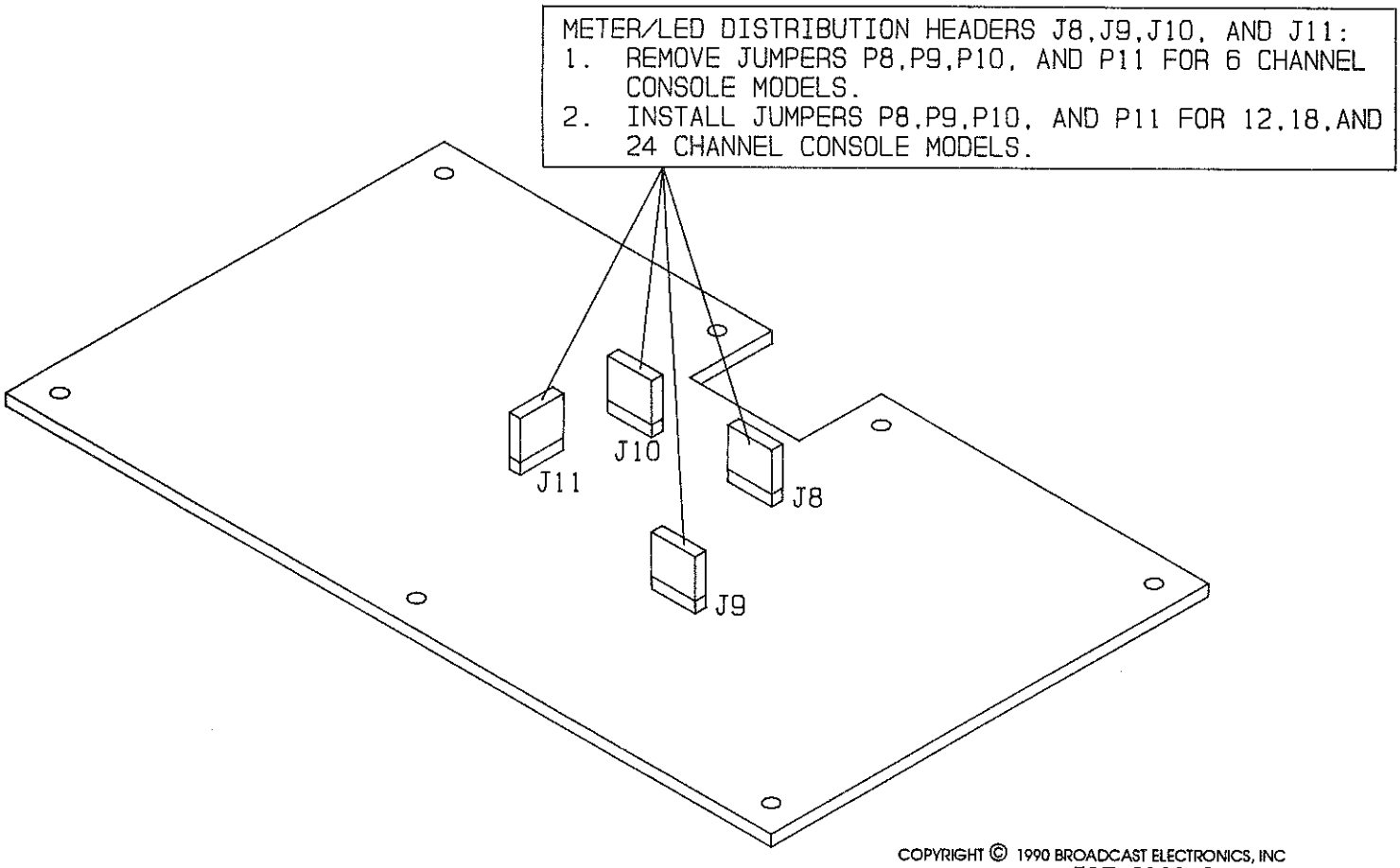


FIGURE 2–6. VU METER DISTRIBUTION CIRCUIT BOARD PROGRAMMING

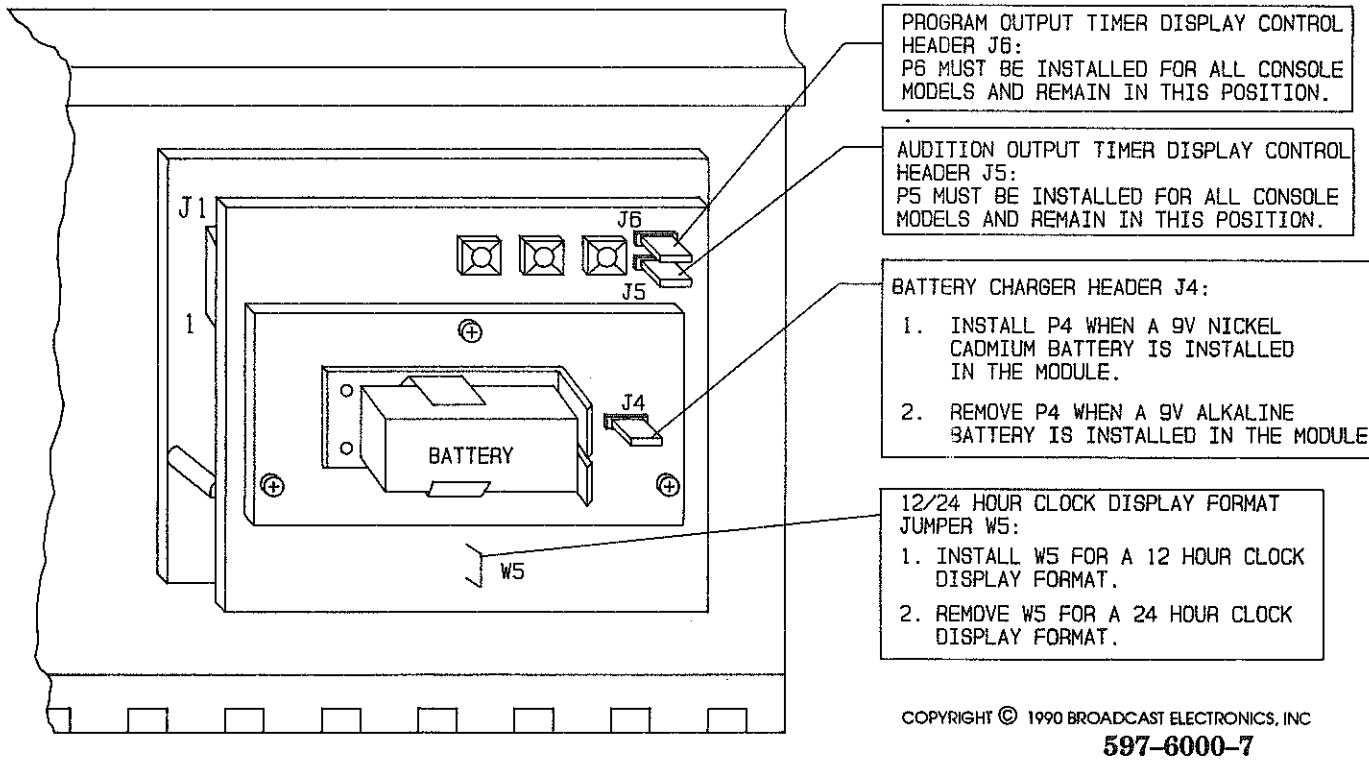
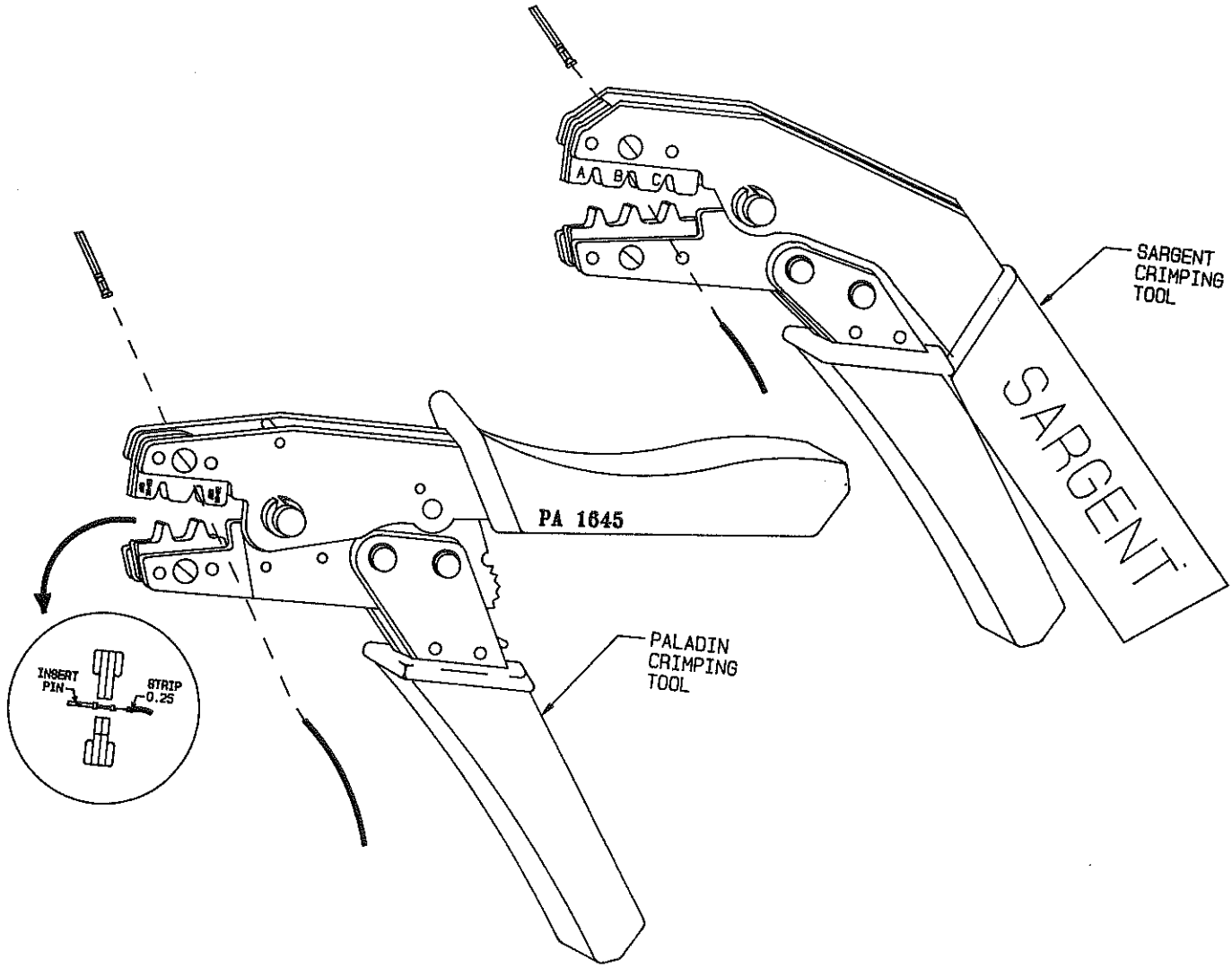


FIGURE 2–7. CLOCK/TIMER CIRCUIT BOARD PROGRAMMING



597-9012-13

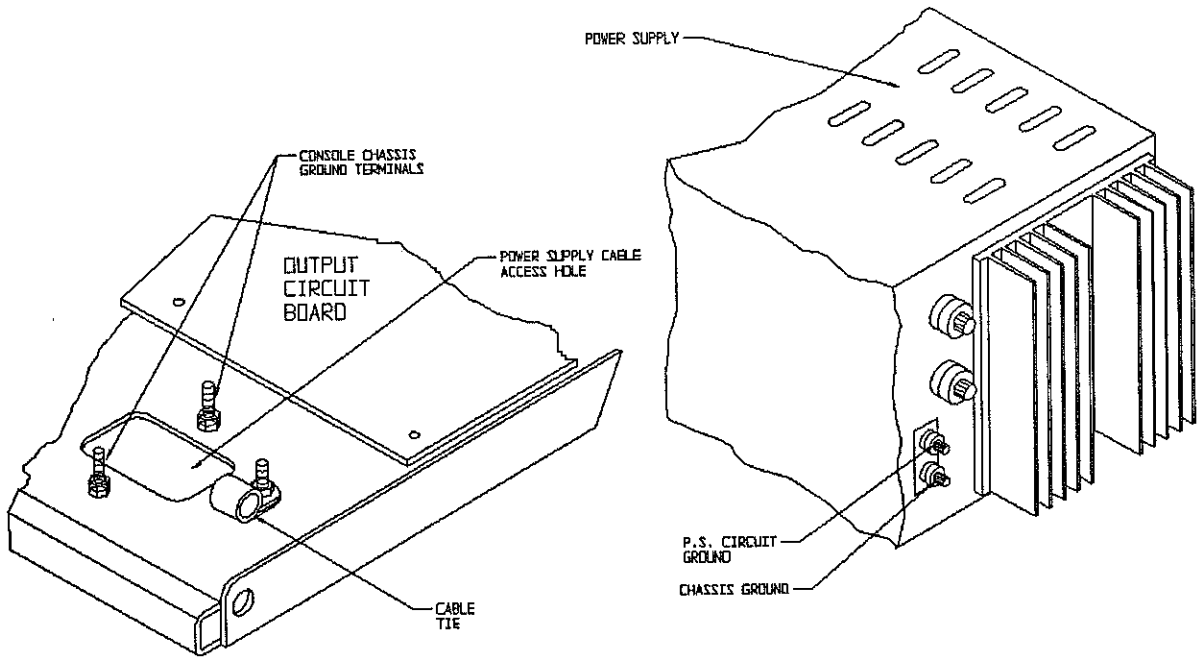
FIGURE 2-8. WIRING TOOL OPERATION

2-46. **Normal Ground Configuration.** A normal ground configuration consists of connecting an earth ground to the power supply unit. Connect an earth ground to the power supply unit **CHASSIS** and **P.S. CIRCUIT** ground terminals.

2-47. **RFI Ground Configuration.** If grounding for RFI is required, an earth ground must be connected to the power supply chassis and the console. Connect an earth ground to the power supply unit **CHASSIS** and **P.S. CIRCUIT** ground terminals. Also, connect an earth ground to the console ground terminal.

2-48. **Console Mainframe Ground Configuration.** If a console mainframe central ground point is required, an earth ground must be connected to the power supply chassis and the console mainframe. Connect an earth ground to the power supply **CHASSIS** ground terminal and the console ground terminal.

2-49. **Floating Ground Configuration.** If a floating ground system is required, contact the Broadcast Electronics Customer Service Department for a recommended procedure.



597-6000-10

FIGURE 2-9. CONSOLE CHASSIS AND POWER SUPPLY GROUND TERMINALS

2-50. **Audio Interconnections.** The shields of audio conductors attached to the console must be grounded to prevent the coupling of extraneous noise. Generally, the shields are grounded at the console. However, the shields may require grounding at the audio source or at a point between the audio source and the console. Particular care must be exercised to avoid ground loops at patch panels, external switching equipment, uninsulated jacks on associated equipment, and grounded racks or cabinets.

2-51. **AUDIO CABLE.** All Air-Trak series consoles require the construction of interfacing cables for internal and external audio communication. The audio interfacing cables must be constructed with the appropriate size and type of cable. The following text presents recommended Belden audio cables for line and microphone level service. Construct the cables with the Belden audio cable or equivalent.

LINE LEVEL AUDIO CABLE

NO.	TYPE OF CABLE	GAUGE	PART NO.
1	2-conductor, braided with shield	24	Belden 8641
2	2-conductor, braided with shield	22	Belden 8451
3	2-conductor, braided with shield	20	Belden 8762
4	2-conductor, braided with shield	18	Belden 8760

MICROPHONE LEVEL AUDIO CABLE

NO.	TYPE OF CABLE	GAUGE	PART NO.
1	2–conductor, braided with shield	22	Belden 8441

2–52. **INPUT CIRCUIT BOARD CONNECTIONS.** Microphone, consumer, and line input audio interfacing is accomplished by modular connectors on the input circuit board. Each input circuit board contains six channels and each channel accepts three audio input sources.

NOTE

NOTE

FOR OPTIMUM AUDIO PERFORMANCE, TERMINATE ALL UNUSED AUDIO INPUTS WITH 600 OHM 1/4 WATT RESISTORS.

2–53. **Audio Input Wiring.** Connectors J100 through J600 on each input circuit board provide audio input interfacing. Figure 2–10 presents pin descriptions for the audio input connectors. Refer to Figure 2–10 and the following text to construct an audio interface cable using the wiring kit supplied with the console and the specified line or microphone level Belden audio cable or equivalent (refer to AUDIO CABLE information in the preceding text).

2–54. For microphone, consumer, and line level balanced stereophonic sources, connect the audio source left and right channels to the modular connector as shown. If a monophonic line or consumer level source is assigned to an input, it is recommended the audio source input be connected to the left and right channels at the modular connector. For a monophonic microphone level source: 1) connect the audio source input to the left and right channels at the modular connector or 2) install a microphone splitting transformer. For optimum audio performance, terminate all unused audio inputs with 600 Ohm 1/4 watt resistors.

2–55. Unbalanced audio input connections are presented in Figure 2–11. Refer to Figures 2–10 and 2–11 and connect the unbalanced audio inputs to the console as required.

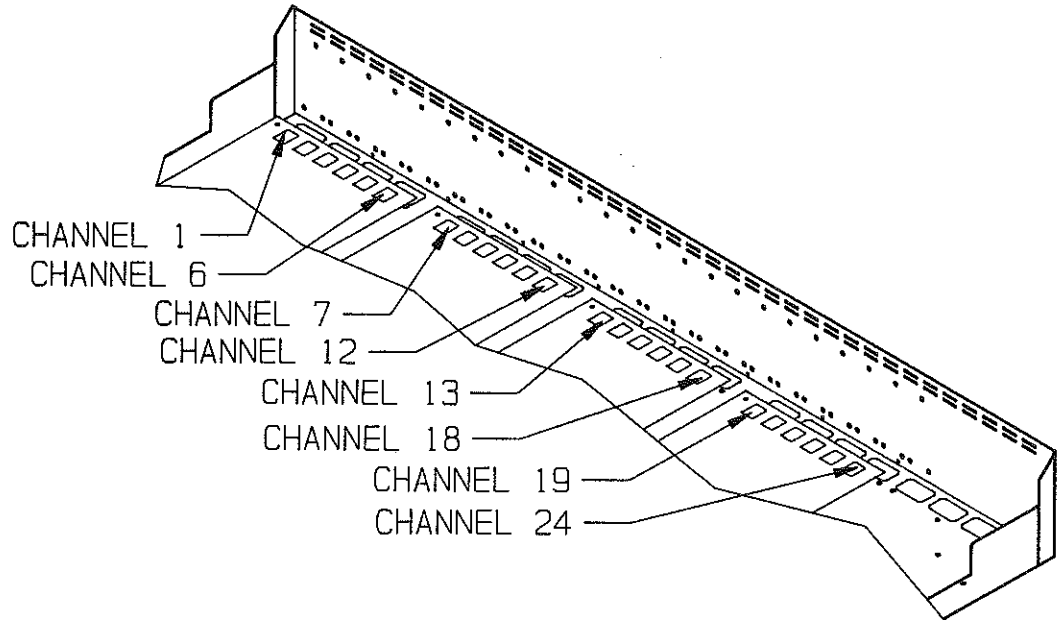
2–56. **Patch Point Interfacing.** Modular connectors on the input circuit board provide interfacing for patch point audio operations (refer to Figure 2–12). Patch points are unbalanced transmitting and receiving terminals for the connection of external audio equipment such as an audio processing unit. Jumpers are installed in the connectors prior to shipment. If patch point operation is desired, remove the jumpers and wire the connectors as follows.

2–57. If patch point operation for channel 1 is desired, refer to Figure 2–12 and construct an interface cable using the wiring kit supplied with the console. Use the specified Belden audio cable or equivalent (refer to AUDIO CABLE information in the preceding text).

2–58. If patch point operations are desired for channels 2 through 6, refer to the chart in Figure 2–12 to determine the connectors associated with the desired channel. Construct an interface cable as described for channel 1 using the wiring kit supplied with the console and the specified Belden audio cable or equivalent (refer to AUDIO CABLE information in the preceding text).

2–59. **OUTPUT CIRCUIT BOARD CONNECTIONS.** The output circuit board contains modular connectors for interfacing with the program and audition, studio and control room monitor, external cue and headphone, mix minus, and monophonic audio output circuits. The circuit board also provides interfacing for the talkback circuitry, mute control circuitry, and off–air and external monitor audio inputs.

2–60. The program, audition, studio room monitor, control room monitor, and the mix minus audio output circuits are designed as balanced output circuits. Therefore, it is recommended that these circuits be interfaced with external audio equipment in a balanced configuration. In addition, these circuits are also designed to fold–back if either the positive or negative output is inadvertently grounded.



PIN NO.	DESCRIPTION
1	A INPUT, RIGHT CHANNEL -
2	A INPUT, RIGHT CHANNEL +
3	A INPUT, LEFT CHANNEL -
4	A INPUT, LEFT CHANNEL +
5	SHIELD GROUND
6	SHIELD GROUND
7	SHIELD GROUND
8	SHIELD GROUND
9	B INPUT, RIGHT CHANNEL -
10	B INPUT, RIGHT CHANNEL +
11	B INPUT, LEFT CHANNEL -
12	B INPUT, LEFT CHANNEL +
13	SHIELD GROUND
14	SHIELD GROUND
15	SHIELD GROUND
16	SHIELD GROUND
17	C INPUT, RIGHT CHANNEL -
18	C INPUT, RIGHT CHANNEL +
19	C INPUT, LEFT CHANNEL -
20	C INPUT, LEFT CHANNEL +

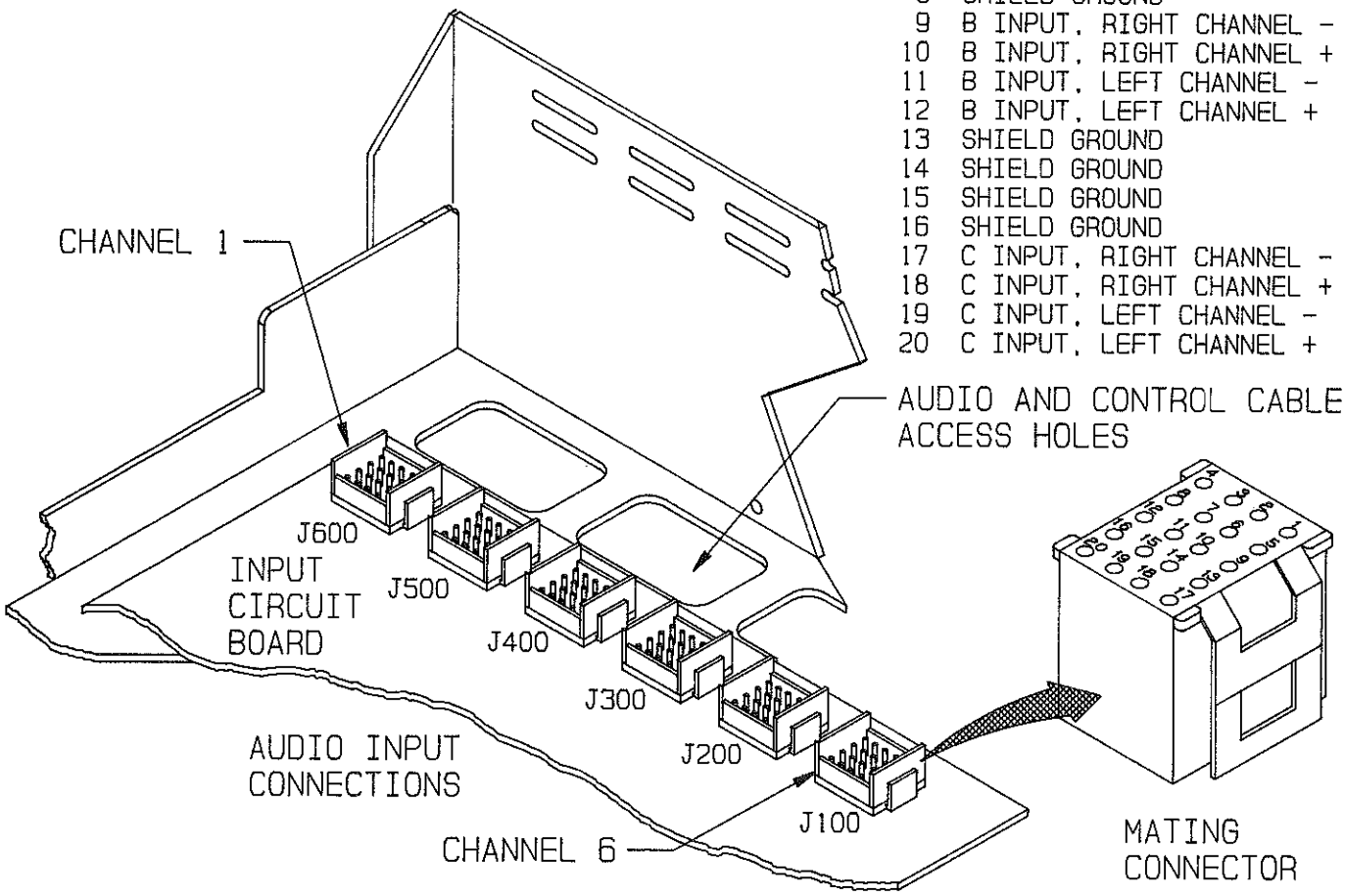
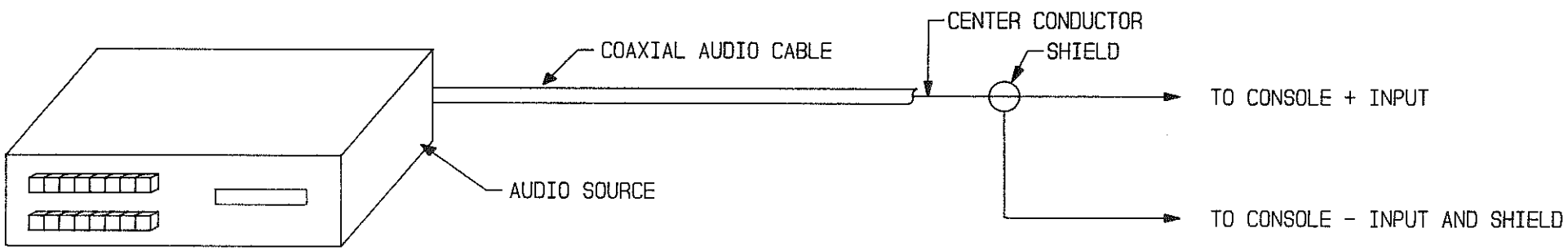
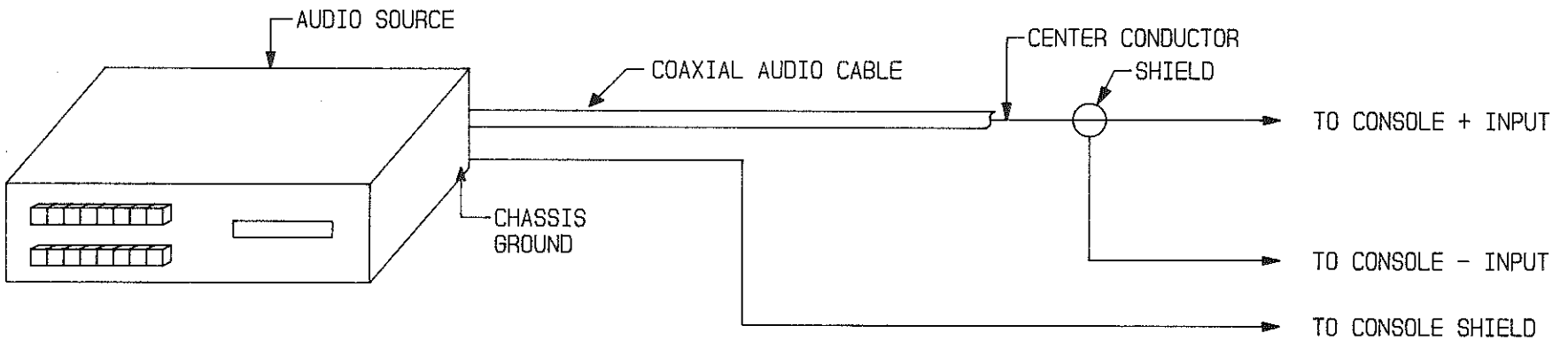


FIGURE 2–10. AUDIO INPUT CONNECTIONS

597–6000–11

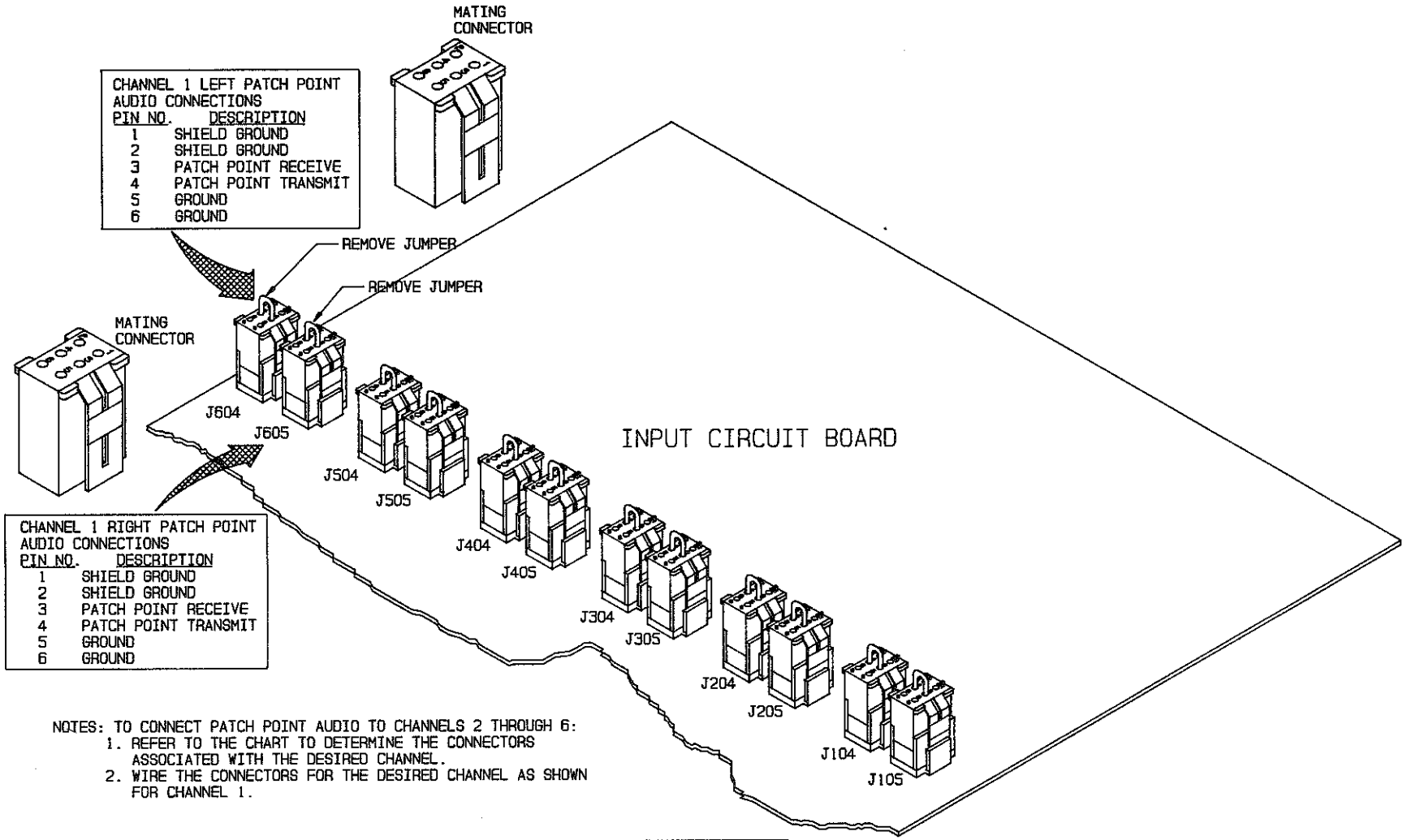




NOTE: COAXIAL CABLE SHOWN. IDENTICAL CONNECTIONS FOR 2 CONDUCTOR AUDIO CABLE WITH SHIELD.

597-6000-3

FIGURE 2-11. UNBALANCED AUDIO INPUT CONNECTIONS



	CONNECTORS ASSOCIATED WITH CHANNELS 2 THROUGH 6				
	CHANNEL 2	CHANNEL 3	CHANNEL 4	CHANNEL 5	CHANNEL 6
LEFT	J504	J404	J304	J204	J104
RIGHT	J505	J405	J305	J205	J105

597-6000-13

FIGURE 2–12. PATCH POINT AUDIO CONNECTIONS

2–61. **Audition/Program Output.** The audition and program output circuits provide a continuously variable level from +0 dBm to +10 dBm with a 600 Ohm minimum load impedance. To interface audition output connector J9 and program output connector J10 to external audio equipment, refer to Figure 2–13 and construct audio interface cables. Construct the cables using the wiring kit supplied with the console and the specified Belden audio cable or equivalent (refer to AUDIO CABLE information in the preceding text).

2–62. **Audition/Program Monophonic Output.** The audition and program monophonic output circuits provide a continuously variable level from +0 dBm to +10 dBm with a 600 Ohm minimum load impedance. To interface audition/program monophonic output connector J8 to external audio equipment, refer to Figure 2–13 and construct an audio interface cable. Construct the cable using the wiring kit supplied with the console and the specified Belden audio cable or equivalent (refer to AUDIO CABLE information in the preceding text).

2–63. **Mix Minus Output.** If the mix minus bus is enabled, the monophonic mix minus output circuit will provide a continuously variable level from +0 dBm to +10 dBm with a 600 Ohm minimum load impedance. To interface mix minus output connector J7 to external audio equipment, refer to Figure 2–13 and construct an audio interface cable. Construct the cable using the wiring kit supplied with the console and the specified Belden audio cable or equivalent (refer to AUDIO CABLE information in the preceding text).

2–64. **Studio/Control Room Monitor Output.** The studio and control room monitor outputs are designed to drive external monitor power amplifiers. The outputs provide a level of +0 dBm with a 600 Ohm minimum load impedance. To interface studio output connector J6 and control room output connector J5 to external audio monitor power amplifiers, refer to Figure 2–13 and construct audio interface cables. Construct the cables using the wiring kit supplied with the console and the specified Belden audio cable or equivalent (refer to AUDIO CABLE information in the preceding text).

2–65. **External Cue/Headphone Output.** The external cue and headphone output circuits provide a level of +0 dBm with a 600 Ohm minimum load impedance. To interface external cue output connector J3 and external headphone output connector J4 to external audio equipment, refer to Figure 2–13 and construct audio interface cables. Construct the cables using the wiring kit supplied with the console and the specified Belden audio cable or equivalent (refer to AUDIO CABLE information in the preceding text).

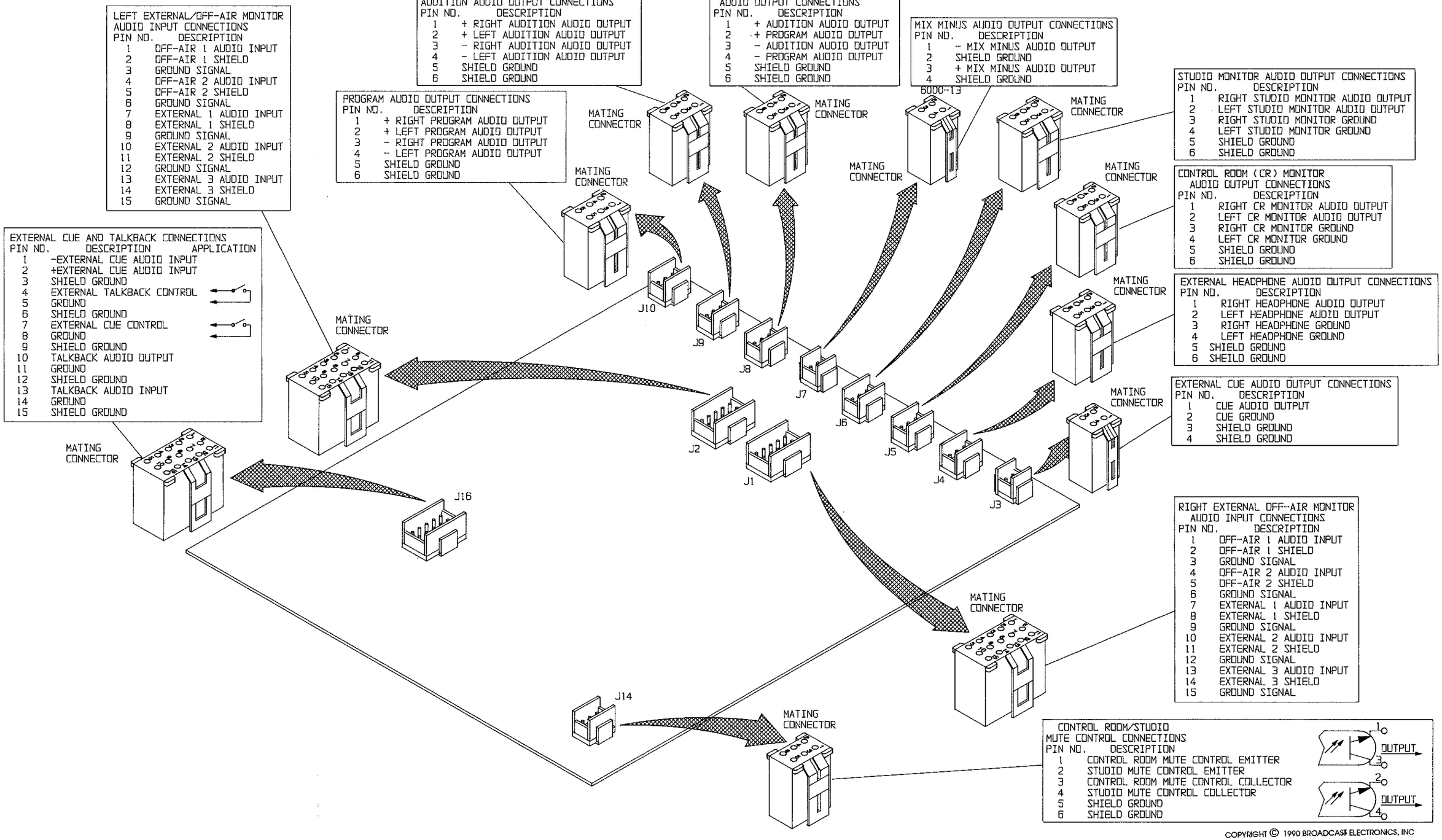
CAUTION ***THE OFF–AIR AND EXTERNAL MONITOR INPUTS ARE UNBALANCED. ENSURE BALANCED AUDIO SOURCES ARE PROPERLY CONNECTED TO THE INPUT TERMINALS.***

CAUTION

2–66. **Off–Air/External Monitor Inputs.** Right channel connector J1 and left channel connector J2 provide unbalanced audio interfacing for off–air 1, off–air 2, external 1, external 2, and external 3 monitor inputs. If off–air and external monitor operations are desired, refer to Figure 2–13 and construct audio interface cables. Construct the cables using the wiring kit supplied with the console and the specified Belden audio cable or equivalent (refer to AUDIO CABLE information in the preceding text).

2–67. **External Cue Input.** Connector J16 provides interfacing for the external cue audio input circuit. If an external cue operation is desired, refer to Figure 2–13 and construct an audio interface cable. Construct the cable using the wiring kit supplied with the console and the specified Belden audio cable or equivalent (refer to AUDIO CABLE information in the preceding text). To activate the external cue circuit, refer to Figure 2–13 and connect an external switch to J16 as shown.

2–68. **Mute Control Operations.** Connector J14 provides interfacing for studio and control room mute control operations. To interface J14, refer to Figure 2–13 and construct an interface cable as required using the wiring kit supplied with the console.



597-6000-12

FIGURE 2-13. AUDIO OUTPUT AND EXTERNAL MONITOR INPUT CONNECTIONS

2–69. **Talkback System Connections.** AT–90 console talkback operations are accomplished by the studio and control room microphones, a control room speaker, the console cue speaker, the external cue circuitry, the talkback circuitry, and the console input channels. Figure 2–14 presents installation information for dual and single console talkback systems. If a talkback system is desired, refer to Figure 2–14 and the following information.

2–70. Refer to Figure 2–12 as required for the location of the patch point connectors. Construct interface cables as required using the wiring kit supplied with the console and the specified Belden audio cable or equivalent (refer to AUDIO CABLE information in the preceding text).

2–71. **CONTROL CIRCUIT BOARD CONNECTIONS.** The control circuit board contains modular connectors for remote control operations. The connectors provide interfacing for the control of the console channels from a remote location and the remote control of audio source equipment.

2–72. **Remote Control.** Connectors J1, J12, J21, J30, J39, and J48 on the control circuit board provide remote control interfacing. Each connector provides interfacing for one channel and allows: 1) on/off control of the channel from a remote location and 2) the remote control of the channel audio source equipment. Figure 2–15 presents pin descriptions for the remote control connectors. To provide remote control operations, construct a cable using the wiring kit supplied with the console and the specified Belden audio cable or equivalent (refer to AUDIO CABLE information in the preceding text). Connect this cable between the appropriate connector on the control circuit board and the external equipment. Repeat the remote control connections for each channel requiring remote control operations.

2–73. **Example – AT–90/Cartridge Machine Connections.** A typical source remote control configuration is presented in Figure 2–15. The illustration provides the connections required to interface an AT–90 audio console to a Broadcast Electronics PT–90 cartridge machine for remote control operations. To provide remote control operations for a PT–90 cartridge machine, refer to Figure 2–15 and connect the AT–90 to the PT–90 as shown. To connect a different cartridge machine to the AT–90, analyze the information presented in Figure 2–15 to determine the required connections. Once the connections are determined, construct the required interfacing cable and connect the cartridge machine to the AT–90 console.

2–74. **SOURCE RELAY INTERFACE CIRCUIT BOARD.** A source relay interface circuit board is designed to allow relay isolated: 1) on/off control of the channel from a remote location and 2) remote control of the channel audio source equipment. The interface circuit board also contains on/off tally outputs to provide remote on/off indications. The AT–90 consoles are shipped with a quantity of relay interface circuit boards for installation to the console channel circuitry. The interface circuit boards are located in the installation kit.

2–75. Figure 2–16 illustrates a typical source relay interface circuit board installation for a 6 channel console. To install a relay interface circuit board for channel 1, refer to Figure 2–17 and mount the circuit board on the rear–panel of the console using three screws. Construct an audio source interface cable using the wiring kit supplied with the console and the specified Belden audio cable or equivalent (refer to AUDIO CABLE information in the preceding text). Connect this cable between the external equipment and J2 on the relay interface circuit board.

2–76. The source relay interface circuit board is supplied with an internal audio interface cable to provide communication between J1 on the relay interface circuit board and J1 on the control circuit board (refer to Figure 2–16). Route the cable from the control circuit board to the relay interface circuit board and attach the mating connector to the cable. Once the cable is assembled, connect the cable between the relay interface circuit board and the channel control circuit board as shown.

2–77. To install a relay interface circuit board for channels 2 through 6, mount the unit on the rear–panel of the console as shown in Figure 2–16. Construct an interface cable as described for channel 1 and connect between the external equipment and J2 on the relay interface circuit board. Assemble and connect the cable supplied with the relay interface circuit board between J1 on the relay interface circuit board and the appropriate connector on the channel control circuit board as listed below.

2–78. **WARNING LIGHT UTILITY RELAY.** A modular utility relay is designed to control ancillary equipment such as an on–air warning light. Refer to Figure 2–17 and connect the relay to the interfacing connectors as shown for the studio and control room operations. Attach the ancillary equipment to the relay contacts as required.

CHANNEL	CONNECTOR
2	J12
3	J21
4	J30
5	J39
6	J48

2–79. **POWER SUPPLY.** The console power supply generates both regulated and unregulated dc operating potentials for application to the console. The power supply interfaces with the console at connectors J15 and J19 on the output circuit board (refer to Figure 2–18).

2–80. The power supply is shipped from the factory with a 10 foot (3 meter) interfacing cable. If an alternate length of cable is required, refer to Figure 2–18 and construct the cable with 18 gauge 12–conductor cable such as Belden 8466 or equivalent. Connect the power supply cable between DC OUT on the power supply and connectors J15 and J19 on the output circuit board.

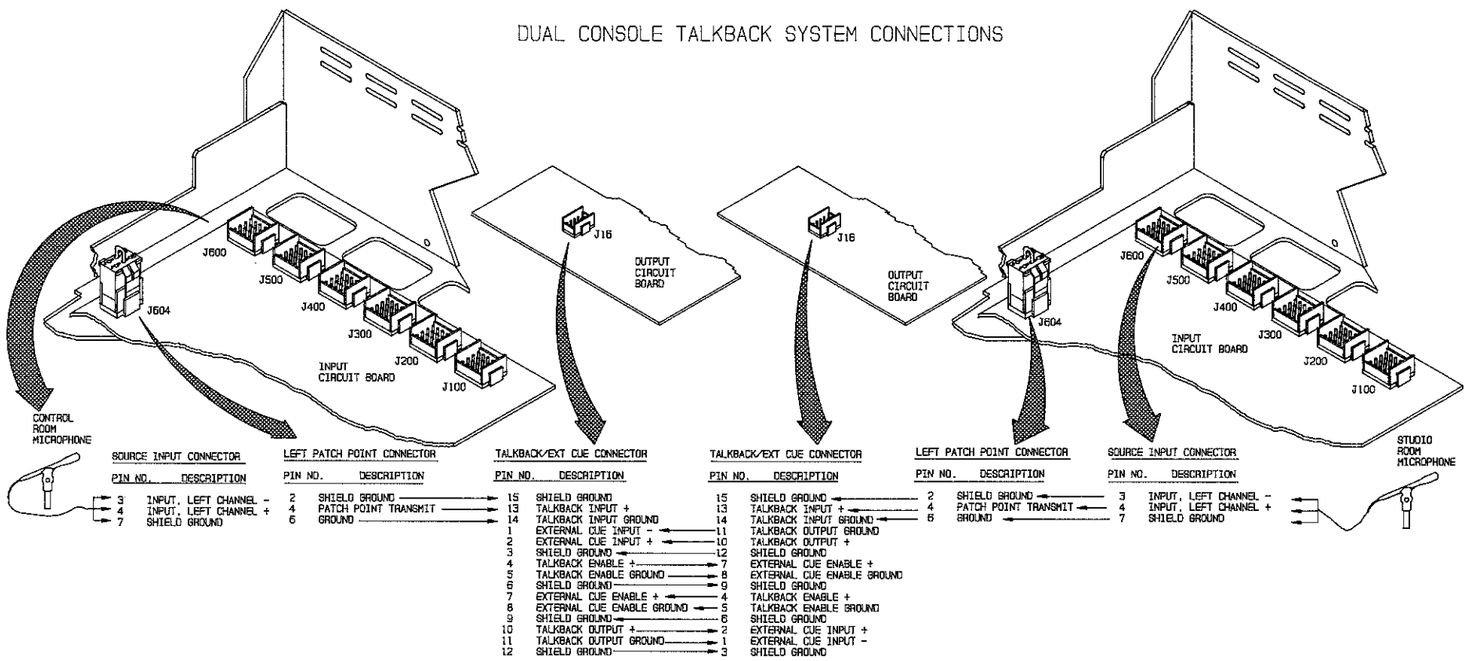
WARNING ***ENSURE ALL PRIMARY POWER IS DISCONNECTED BEFORE PROCEEDING.***

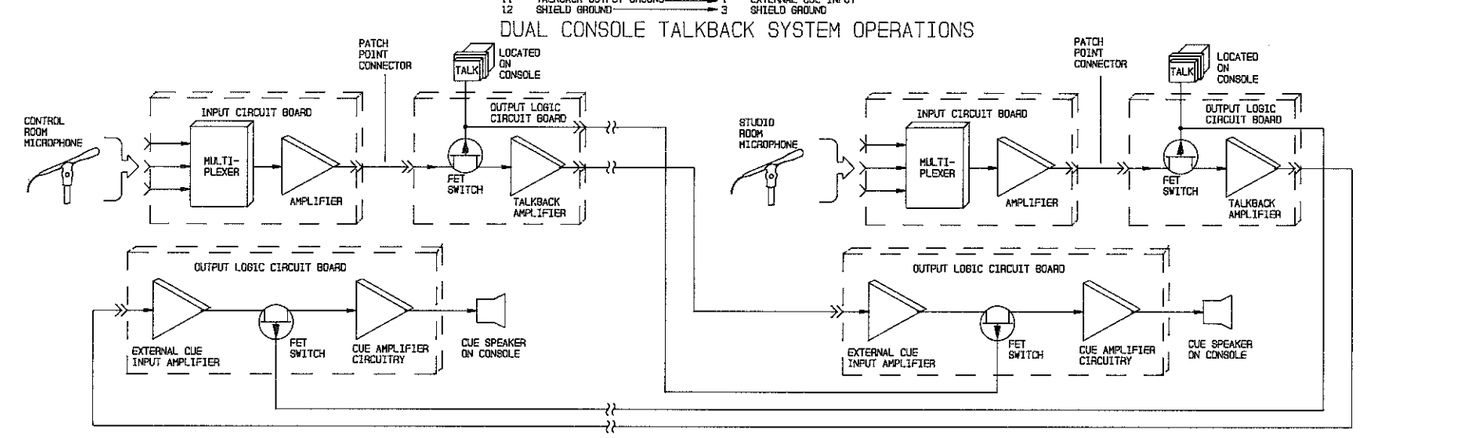
WARNING

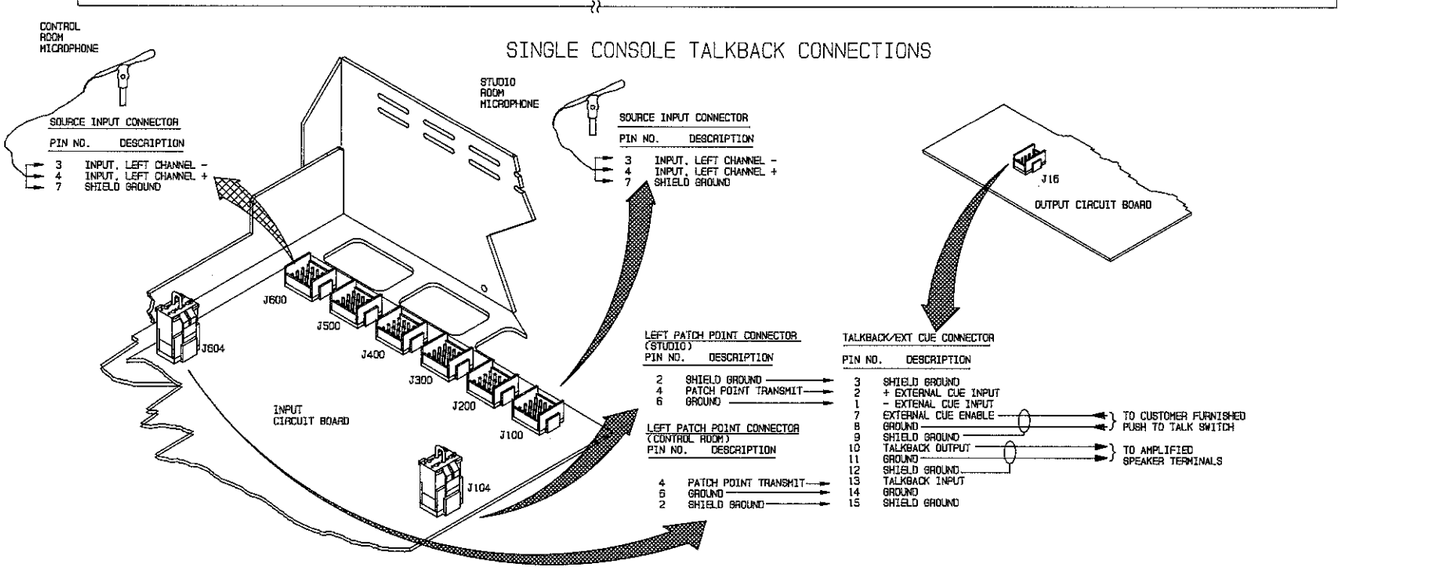
2–81. **AC INPUT.** The Air–Trak 90 power supply is programmed for the proper power supply voltage at the factory prior to shipment. The operating voltage requirement for the unit is indicated on the identification plate. If the unit is to be operated from an alternate power source, refer to Figure 2–19 and reprogram the unit for the desired ac input potential.

2–82. Refer to Figure 2–20 and remove the ac line fuse from the rear–panel ac fuse–holder. Ensure the fuse is a slow–blow type rated at 4A for 105V to 132V operation or 2A for 210V to 264V operation.

2–83. The power supply is also equipped with fuses for the ±24 volt, ±16.5 volt, ±6V, and +14 volt dc potentials. Ensure the appropriate fuse is installed as described below for each dc output.







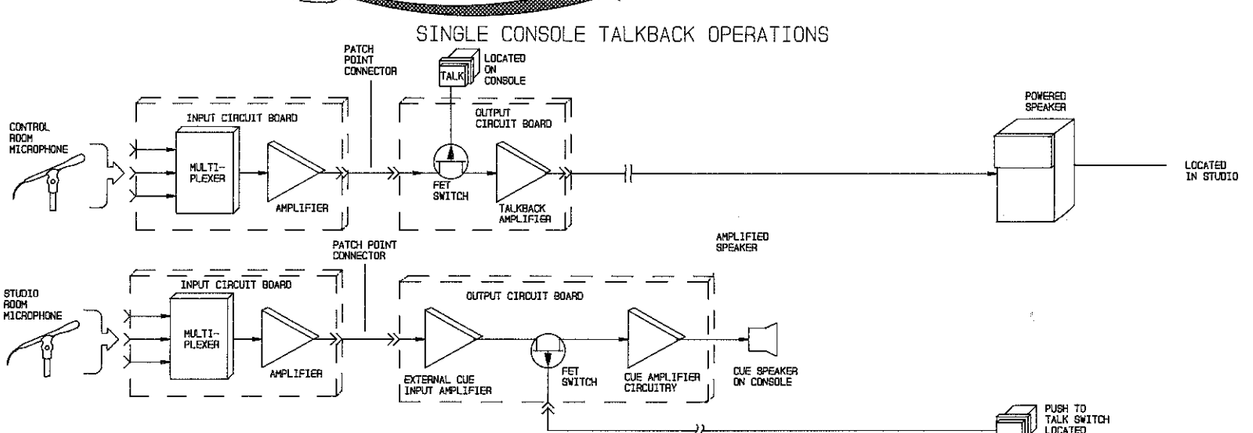
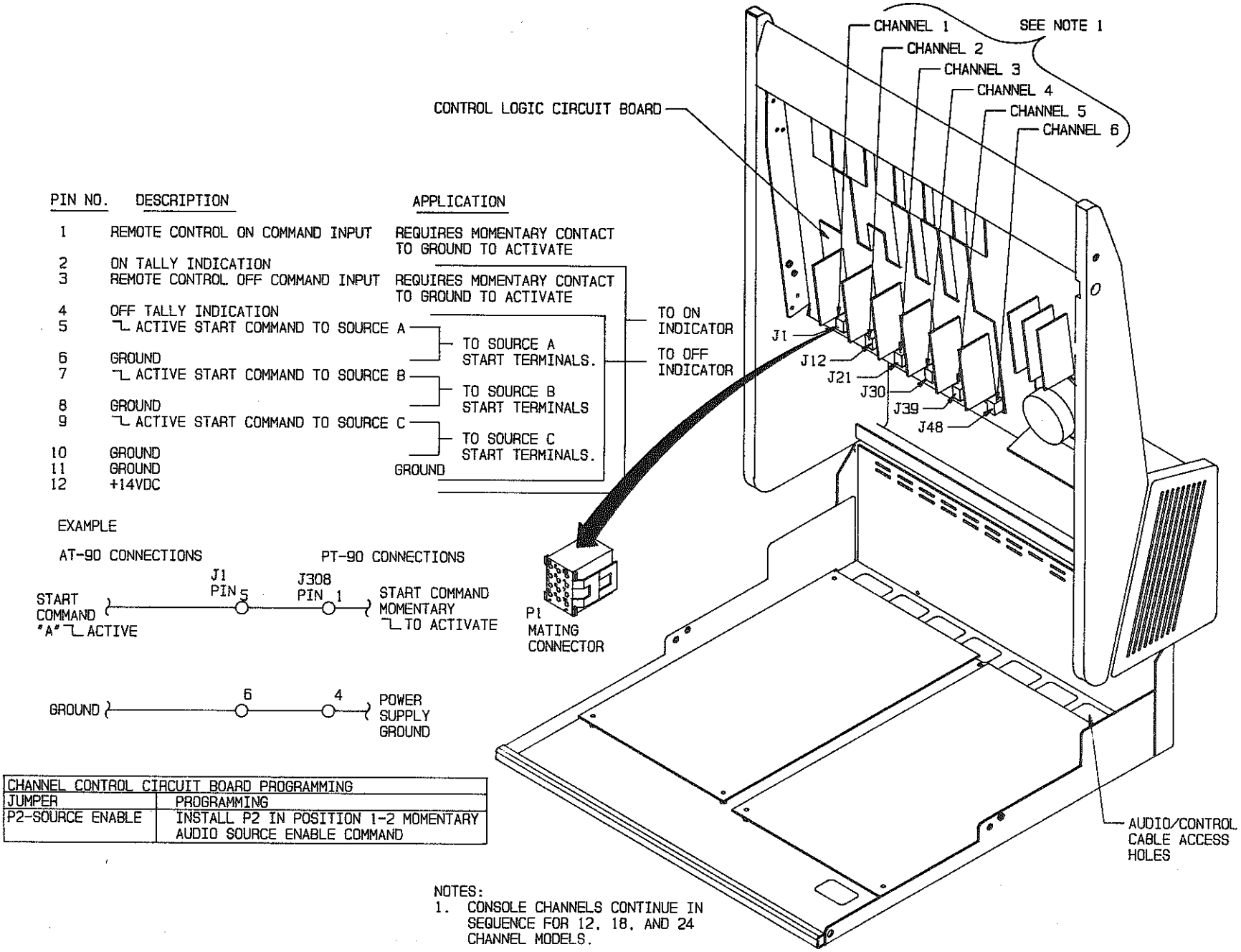


FIGURE 2-14.
CONSOLE TALKBACK SYSTEMS INSTALLATION

597-6000-14

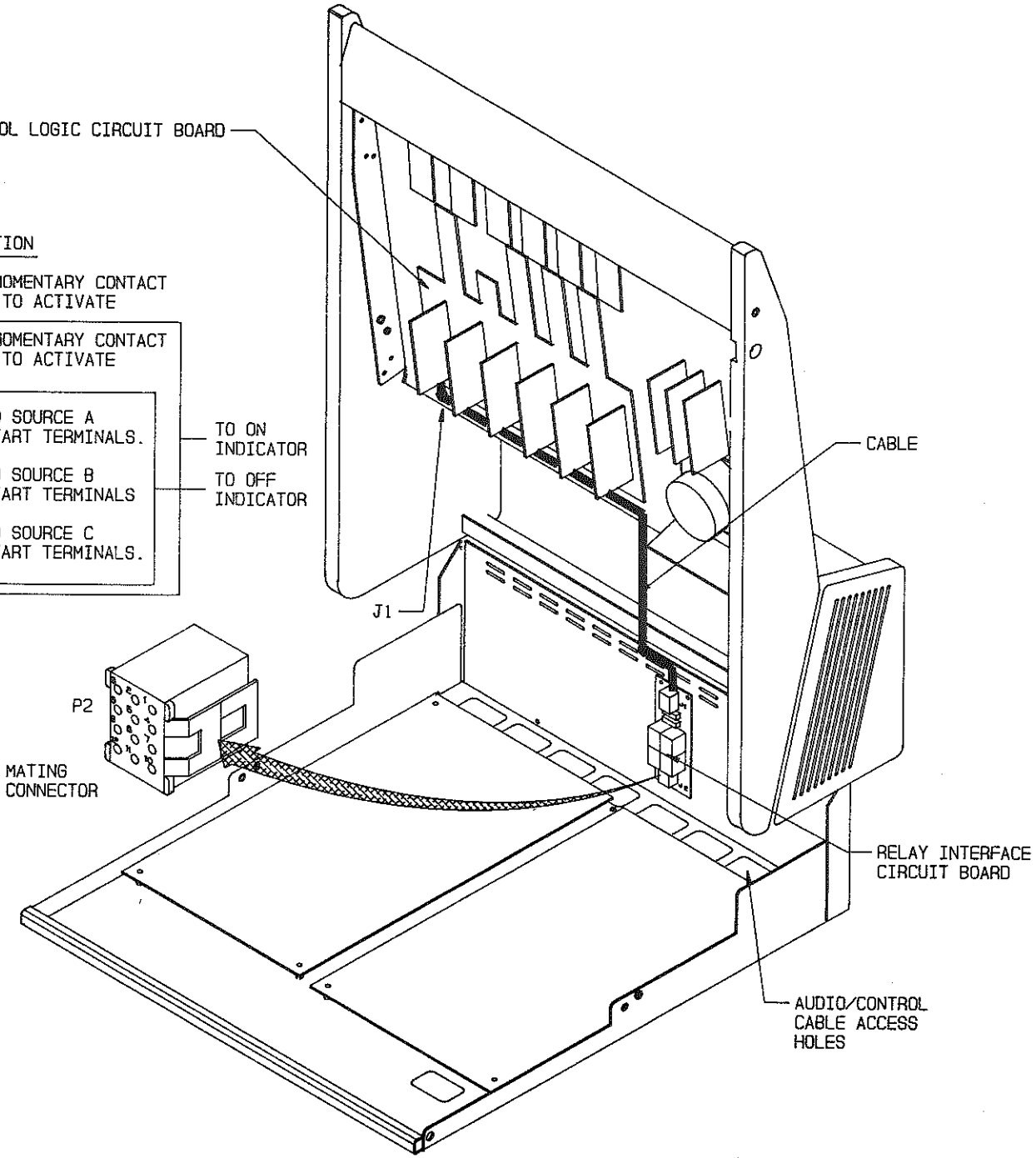


CHANNEL CONTROL CIRCUIT BOARD PROGRAMMING	
JUMPER	PROGRAMMING
P2-SOURCE ENABLE	INSTALL P2 IN POSITION 1-2 MOMENTARY AUDIO SOURCE ENABLE COMMAND

597-6000-35

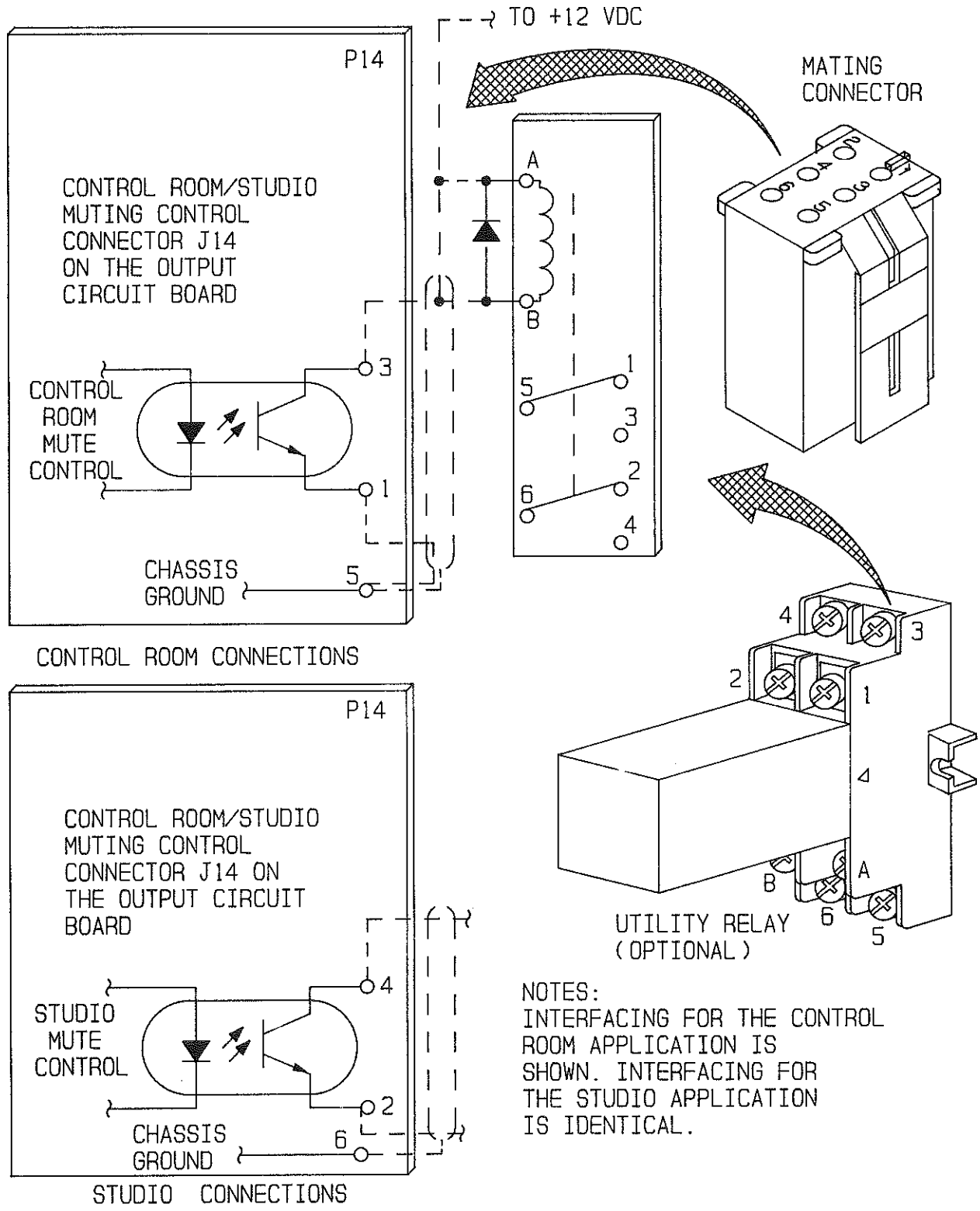
FIGURE 2-15. REMOTE CONTROL INTERFACING

PIN NO.	DESCRIPTION	APPLICATION
1	REMOTE CONTROL ON COMMAND INPUT	REQUIRES MOMENTARY CONTACT TO GROUND TO ACTIVATE
2	ON TALLY INDICATION	
3	REMOTE CONTROL OFF COMMAND INPUT	REQUIRES MOMENTARY CONTACT TO GROUND TO ACTIVATE
4	OFF TALLY INDICATION	
5	START COMMAND TO SOURCE A	TO SOURCE A START TERMINALS.
6	SOURCE A START COMMAND COMMON	
7	START COMMAND TO SOURCE B	TO SOURCE B START TERMINALS
8	SOURCE B START COMMAND COMMON	
9	START COMMAND TO SOURCE C	TO SOURCE C START TERMINALS.
10	SOURCE C START COMMAND COMMON	
11	GROUND	GROUND
12	TALLY RELAY COMMON	TO ON INDICATOR; TO OFF INDICATOR



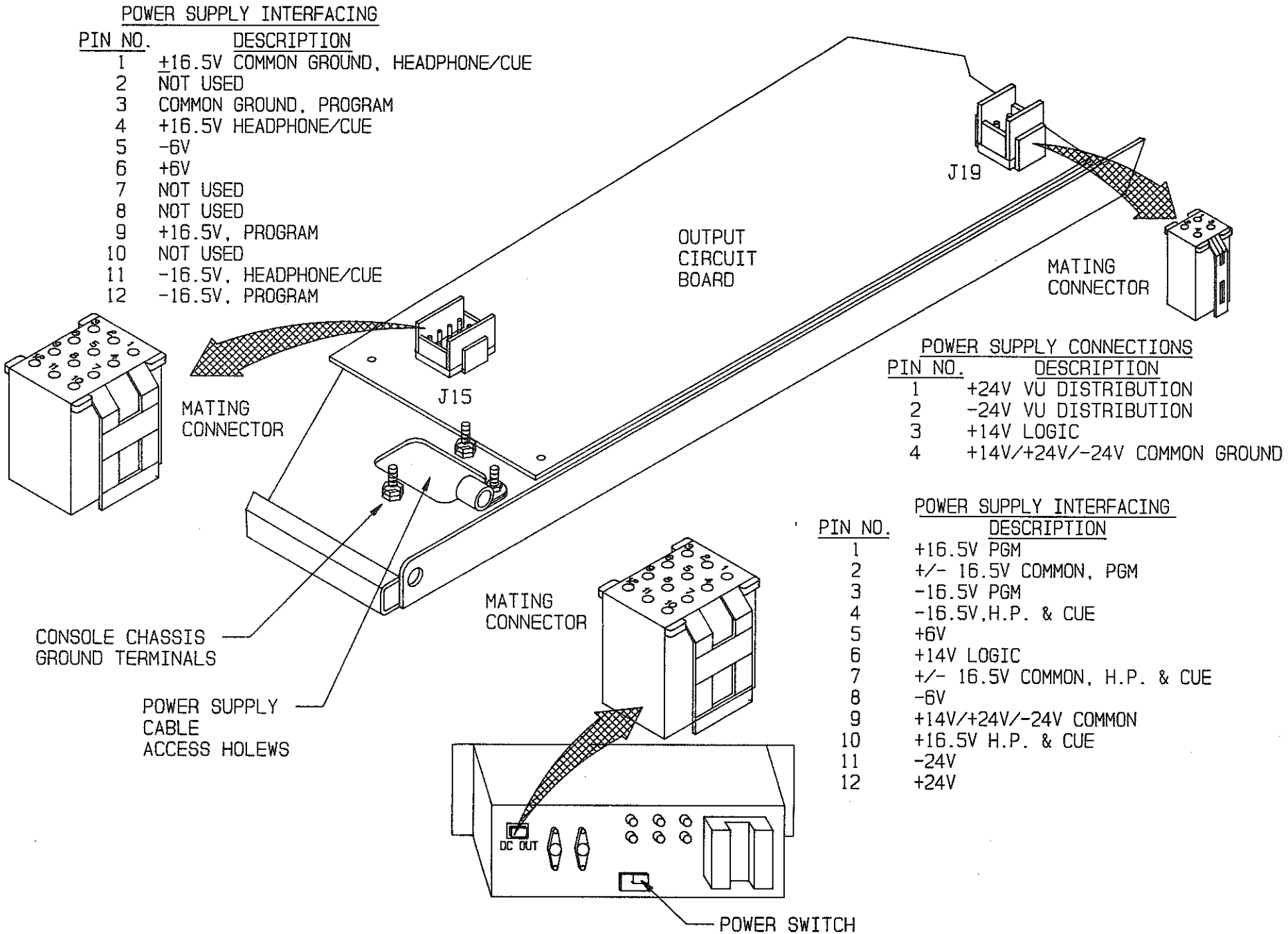
597-6000-8

FIGURE 2–16. RELAY INTERFACE CIRCUIT BOARD INSTALLATION



597-6000-15

FIGURE 2–17. UTILITY RELAY INSTALLATION



597-6000-16

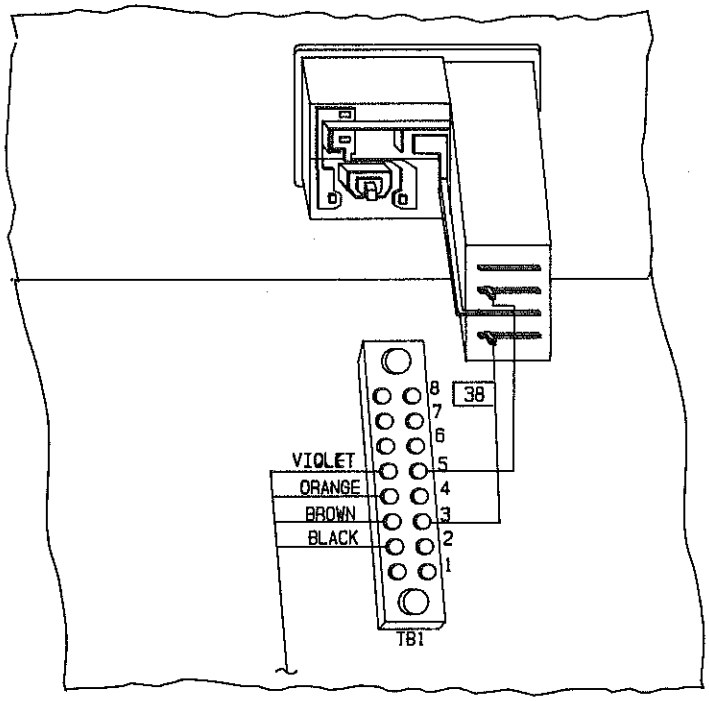
FIGURE 2-18. POWER SUPPLY TO MAINFRAME WIRING

REF. DES.	DC SUPPLY	FUSE
F2	+24 Volt	1A Slow–Blow
F3	–24 Volt	1A Slow–Blow
F1	+16.5 Volt	3A
F4	–16.5 Volt	3A
F5	+6 Volt	.25A
F6	–6 Volt	.25A
F7	+14 Volt	5A

2–84. Refer to Figure 2–20 and ensure the rear–panel power switch is operated to OFF and connect the power supply line cord to the appropriate power source.

2–85. **INSTALLATION ADJUSTMENTS.**

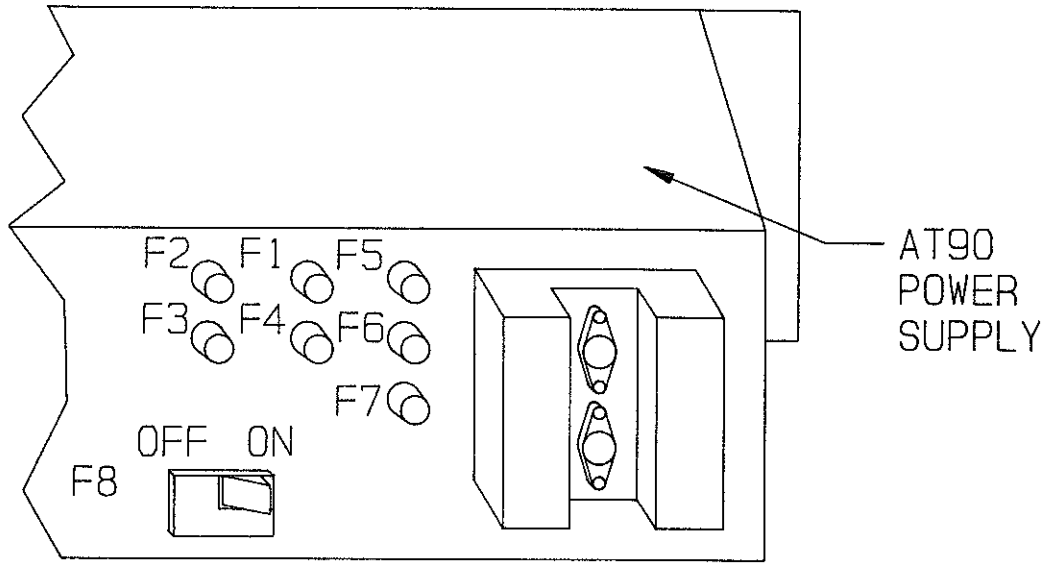
2–86. The Air–Trak 90 console installation adjustments involve the alignment of the console audio level structure. The test equipment required for the installation adjustments is listed below.



PRIMARY AC LINE VOLTAGE PROGRAMMING	
INPUT VOLTAGE	JUMPER TERMINALS
117V AC	INSTALL WIRE #38 IN TERMINAL 3 2-3 4-5
220V AC	INSTALL WIRE #38 IN TERMINAL 2 3-4

597–6000–17

FIGURE 2–19. POWER SUPPLY AC LINE VOLTAGE PROGRAMMING



597-6000-30

FIGURE 2-20. POWER SUPPLY FUSE LOCATIONS

TEST EQUIPMENT

1. Low-distortion Sinewave Output Audio Oscillator (Potomac AG-51 or equivalent).
2. High Impedance dB Calibrated Voltmeter.
3. Two 600 Ohm ±5%, 1/2 Watt Resistors.
4. Audio Source Alignment Tapes.
5. NAB Alignment CD.
6. Audio Analyzer (Potomac AA-51 or equivalent).
7. Insulated adjustment tool.

2-87. **INPUT LEVEL ADJUSTMENTS.** For optimum signal-to-noise performance, the console channels must be individually adjusted to compensate for input level differences between the left and right signal sources. The primary audio source assigned to the channel should be selected for level adjustments.

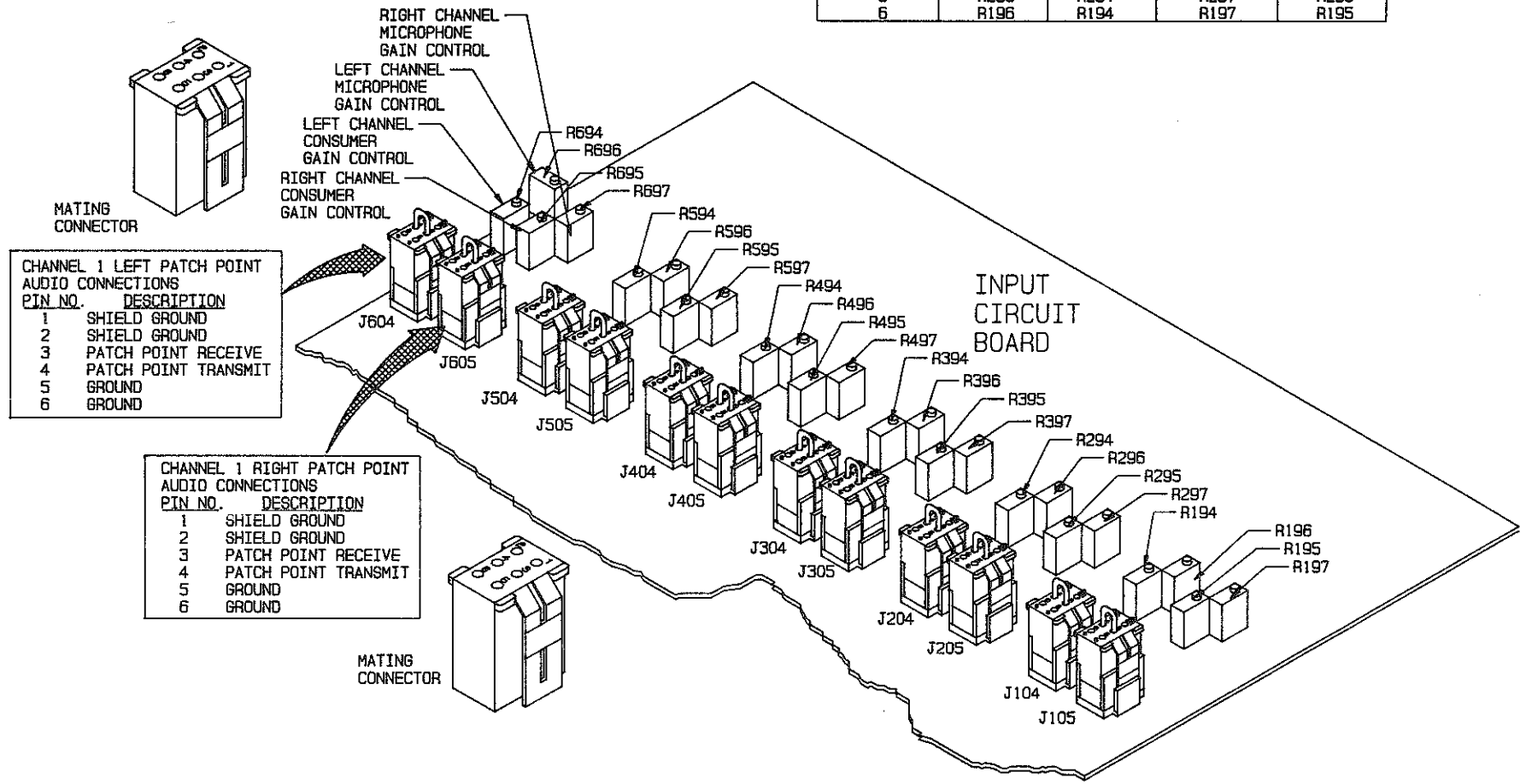
2-88. The input circuit board is equipped with microphone and consumer gain controls for the left and right audio circuits of each console channel. The microphone gain controls are adjusted if the channel is programmed for microphone input operation. The consumer gain controls are adjusted if the channel is programmed for line/consumer operation.

2-89. **Consumer Gain Controls.** To adjust the left consumer gain control for channel 1, proceed as follows:

2-90. Refer to Figure 2-21 and connect a decibel calibrated voltmeter between left channel patch point transmit terminal J604 pin 4 and ground.

2-91. Insert the alignment material into the audio source and reproduce the test audio. If alignment audio is not available, connect the audio oscillator to the channel 1 input terminals and adjust the oscillator for a 1kHz output at -10 dBu.

GAIN ADJUST CONTROLS ASSOCIATED WITH CHANNELS 2 THROUGH 6				
CONSOLE	LEFT CHANNEL CONTROLS		RIGHT CHANNEL CONTROLS	
CHANNEL NO.	MICROPHONE	CONSUMER	MICROPHONE	CONSUMER
2	R596	R594	R597	R595
3	R496	R494	R497	R495
4	R396	R394	R397	R395
5	R296	R294	R297	R295
6	R196	R194	R197	R195



597–6000–18

FIGURE 2–21. AUDIO SOURCE INPUT LEVEL CONTROLS

2–92. Refer to OPERATION in SECTION III and operate the channel to select the test audio.

2–93. With the fader control in the –55 dB position, refer to Figure 2–21 and adjust left consumer gain control R694 for a meter indication of –5 dBu. If a –5 dBu level cannot be obtained, re–programming of the channel attenuation will be required. Refer to INPUT CIRCUIT BOARD PROGRAMMING in the preceding text and perform the procedures to re–program the attenuation.

2–94. Repeat the procedure for the right channel using right consumer gain control R695 and right channel patch point terminal J605 pin 4 (refer to Figure 2–21).

2–95. Repeat the procedure for the remaining channels. Refer to the chart in Figure 2–21 to determine the controls associated with the desired channel.

2–96. When audio level alignment is complete, remove all test equipment.

2–97. **Microphone Gain Controls.** To adjust the left microphone gain control for channel 1, proceed as follows:

2–98. Refer to Figure 2–21 and connect a decibel calibrated voltmeter between left channel patch point transmit terminal J604 pin 4 and ground.

2–99. Operate the microphone source to generate the test audio.

2–100. Refer to OPERATION in SECTION III and operate the channel to select the test audio.

2–101. With the fader control in the –55 dB position, refer to Figure 2–21 and adjust left microphone gain control R696 for a meter indication of –5 dBu. If a –5 dBu level cannot be obtained, re–programming of the channel attenuation will be required. Refer to INPUT CIRCUIT BOARD PROGRAMMING in the preceding text and perform the procedures to re–program the attenuation.

2–102. Repeat the procedure for the right channel using right microphone gain control R697 and right channel patch point terminal J605 pin 4 (refer to Figure 2–21).

2–103. Repeat the procedure for the remaining channels. Refer to the chart in Figure 2–21 to determine the controls associated with the desired channel.

2–104. When audio level alignment is complete, remove the test equipment.

2–105. **OUTPUT LEVEL/VU METER ADJUSTMENT.** Each Air–Trak 90 console is shipped from the factory at a +4 dBu output level. If an alternate console output level is required, refer to the PROGRAM OUTPUT CALIBRATION AND AUDITION OUTPUT CALIBRATION procedures in SECTION V, MAINTENANCE.

2–106. **EXTERNAL CUE INPUT LEVEL ADJUSTMENT.** The external cue circuitry operates in association with the talkback system. The external cue input is equipped with a level control to allow the level to be calibrated to the internal cue channel. The calibration of the control will prevent the adjustment of the cue level control when the external cue audio source is enabled. The external cue input level is calibrated by external cue input level control R118. The external cue input level is calibrated as follows.

2–107. **Procedure.** To calibrate the external cue input level, perform the following procedure. The procedure may be performed acoustically using the external cue input source and the console cue speaker if desired.

2–108. Refer to Figure 2–13 and connect the audio generator to the external cue input terminals at connector J16.

2–109. Refer to Figure 2–13 and connect a switch to the external cue enable terminals at connector J16.

2–110. Refer to Figure 2–13 and terminate the external cue audio output at connector J3 with a 600 Ohm resistor.

2–111. Refer to Figure 2–13 and connect the audio analyzer to the external cue audio output at connector J3.

2–112. Configure the audio analyzer for level indications.

2–113. Operate the audio generator for a 1 kHz output at a level equal to the external cue audio input source.

2–114. Depress the external cue audio switch to activate the cue circuitry and the external cue audio output.

2–115. Refer to Figure 2–22 and adjust external cue audio input level control R118 until the audio analyzer indicates approximately 0 dB.

2–116. Disconnect all test equipment and reconnect any console cables if required.

2–117. **CONTROL ROOM MONITOR DIM ADJUSTMENT.** The control room monitor dim function conveniently reduces the control room monitor speaker level during cue channel operations. The dim level is adjusted by control room monitor dim level control R163 on the output circuit board. The dim level is adjusted as follows.

2–118. **Procedure.** To adjust the control room monitor dim level, proceed as follows:

2–119. Select two console channels and a line/consumer audio level source assigned to each channel for the procedure.

2–120. Configure one channel by: 1) selecting the test audio source, 2) operating the fader to the 0 position, and 3) routing the audio to the audition bus.

2–121. Configure the second channel by: 1) selecting the test audio source and 2) operating the channel to cue.

2–122. Refer to SECTION III, OPERATION and operate the monitor system to monitor the audition audio.

2–123. Operate the console to start the audio sources.

2–124. Refer to Figure 2–22 and adjust control room monitor dim control R163 for the desired control room monitor level during cue channel monitoring operations.

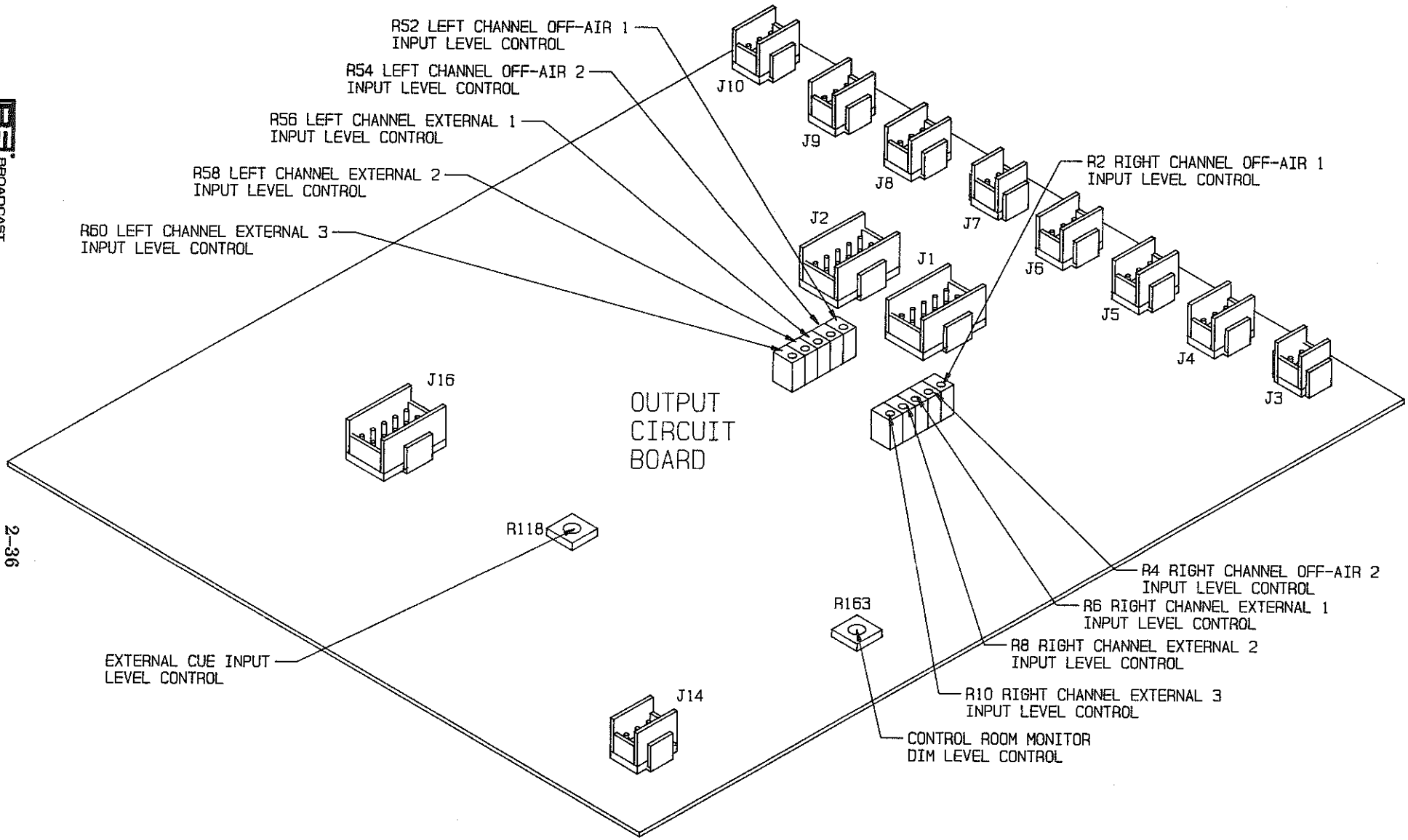
2–125. When the monitor dim level adjustment is complete, return the console to the original configuration.

2–126. **OFF–AIR 1 INPUT LEVEL CALIBRATION ADJUSTMENT.** The off–air 1 input is equipped with level controls to allow the level to be calibrated to the program and audition channels. The calibration of the controls will prevent the adjustment of the monitor level control when monitoring the off–air 1 source. The off–air 1 input level is calibrated by left channel off–air 1 input level control R52 and right channel off–air 1 input level control R2 on the output circuit board. The off–air 1 input level is calibrated as follows.

2–127. **Procedure.** To calibrate the off–air 1 input level, perform the the following procedure. The procedure may be performed acoustically using the off–air 1 audio source and the headphone system if desired.

2–128. Refer to Figure 2–13 and connect the audio generator to the left channel off–air 1 input terminals.

2–129. Refer to Figure 2–13 and terminate the control room monitor output left channel at connector J5 with a 600 Ohm resistor.



597-6000-32

FIGURE 2–22. EXTERNAL MONITOR INPUT, EXTERNAL CUE INPUT, AND CONTROL ROOM MONITOR DIM CONTROLS

2–130. Refer to Figure 2–13 and connect the audio analyzer to the control room monitor output left channel at connector J5.

2–131. Configure the audio analyzer for level indications.

2–132. Operate the audio generator for a 1 kHz output at a level equal to the off–air 1 audio source.

2–133. Refer to SECTION III, OPERATION and operate the monitor system to monitor the off–air 1 audio.

2–134. Refer to Figure 2–22 and adjust left channel off–air 1 input level control R52 until the audio analyzer indicates approximately 0 dB.

2–135. Repeat the procedure for the right channel. Connect the audio generator to the right channel input and the audio analyzer to the control room monitor right channel output. Calibrate the right channel off–air 1 input using right channel off–air 1 input level control R2.

2–136. Disconnect all test equipment and reconnect any console cables if required.

2–137. **OFF–AIR 2 INPUT LEVEL CALIBRATION ADJUSTMENT.** The off–air 2 input is equipped with level controls to allow the level to be calibrated to the program and audition channels. The calibration of the controls will prevent the adjustment of the monitor level control when monitoring the off–air 2 source. The off–air 2 input level is calibrated by left channel off–air 2 input level control R54 and right channel off–air 2 input level control R4. The off–air input level is calibrated as follows.

2–138. **Procedure.** To calibrate the off–air 2 input level, refer to the OFF–AIR 1 INPUT LEVEL CALIBRATION ADJUSTMENT procedure presented in the preceding text and perform the procedure for the off–air 2 input. Connect the audio generator to the off–air 2 input. Calibrate the off–air 2 input using left channel off–air 2 input level control R54 and right channel off–air 2 input level control R4 (refer to Figure 2–22).

2–139. **EXTERNAL 1/EXTERNAL 2/EXTERNAL 3 INPUT LEVEL CALIBRATION ADJUSTMENT.** The external 1/external 2/external 3 inputs are equipped with level controls to allow the levels to be calibrated to the program and audition channels. The calibration of the controls will prevent the adjustment of the monitor level control when monitoring the external 1/external 2/external 3 inputs. The external 1 input level is calibrated by left channel external 1 input level control R56 and right channel external 1 input control R6. The external 2 input level is calibrated by left channel external 2 input level control R58 and right channel external 2 input level control R8. The external 3 input level is calibrated by left channel external 3 input level control R60 and right channel external 3 input level control R10. The external 1/external 2/external 3 input levels are calibrated as follows.

2–140. **Procedure.** To calibrate the external 1/external 2/external 3 input levels, refer to the OFF–AIR 1 INPUT LEVEL CALIBRATION ADJUSTMENT procedure presented in the preceding text and perform the procedure for the external 1/external 2/external 3 inputs. Refer to Figure 2–22 and calibrate the external 1/external 2/external 3 inputs using the following controls.

1. Left channel external 1 input level control R56.
2. Right channel external 1 input level control R6.
3. Left channel external 2 input level control R58.
4. Right channel external 2 input level control R8.
5. Left channel external 3 input level control R60.
6. Right channel external 3 input level control R10.

SECTION III
OPERATION

3–1. INTRODUCTION.

3–2. This section presents operating information for the Air–Trak 90 series audio consoles. The information includes control and indicator identification and standard operating procedures.

3–3. CONTROLS AND INDICATORS.

3–4. CONSOLE MAIN FRAME.

3–5. Refer to Figure 3–1 for the location of controls and indicators associated with the Air–Trak 90 series consoles. The function of each control or indicator is described in Table 3–1.

TABLE 3–1. MAIN FRAME CONTROLS AND INDICATORS
(Sheet 1 of 3)

INDEX NO.	NOMENCLATURE	FUNCTION
1	**RESET** Switch/ Indicator	SWITCH: Resets the clock/timer module timer section manual timer to 00 00.0. INDICATOR: Illuminates to indicate the manual timer reset function is enabled.
2	**START** Switch/ Indicator	SWITCH: Initiates operation of the clock/timer module timer section manual timer. INDICATOR: Illuminates to indicate the manual timer start function is enabled.
3	**STOP** Switch/ Indicator	SWITCH: Terminates the clock/timer module timer section manual timer and freezes the display. INDICATOR: Illuminates to indicate the manual timer stop function is enabled.
4	**AUTO** Switch/ Indicator	SWITCH: Selects either the automatic timer or manual timer for display on the clock/timer module timer section. INDICATOR: Illuminates green to indicate the clock/ timer module timer section automatic timer is displayed.

TABLE 3–1. MAIN FRAME CONTROLS AND INDICATORS
(Sheet 2 of 3)

INDEX NO.	NOMENCLATURE	FUNCTION
5	Control Room/Studio Monitor Select Switch/Indicator Assembly 1. **PGM** 2. **AUD** 3. **CUE** 4. **AIR 1** 5. **AIR 2** 6. **EXT 1** 7. **EXT 2** 8. **EXT 3**	SWITCHES: Configures **PGM, AUD, CUE, AIR 1, AIR 2, EXT 1, EXT 2,** or **EXT 3** audio for application to the control room and studio monitor speakers. INDICATORS: Illuminates yellow to indicate an associated monitor input (**PGM, AUD, CUE, AIR 1, AIR 2, EXT 1, EXT 2,** or **EXT 3**) is selected for application to the control room and studio monitor speakers.
6	**MONO TEST** Switch/Indicator	SWITCH: Applies a monophonic test signal derived from the stereophonic audio signal to the control room monitor speakers. INDICATOR: Illuminates to indicate the monophonic test circuitry is enabled.
7	**TALKBACK** Switch	Allows the operator to communicate with the studio room via the talkback system.
8	Headphone Receptacle	Console headphone receptacle.
9	**CUE** Level Control	Adjusts the console cue speaker level.
10	**MONITOR** Level Control	Adjusts the control room monitor level.
11	**HEADPHONE** Level Control	Adjusts the headphone level.
12	Headphone Select Switch/Indicator Assembly 1. **PGM** 2. **AUD** 3. **CUE** 4. **AIR 1** 5. **AIR 2** 6. **EXT 1** 7. **EXT 2** 8. **EXT 3**	SWITCHES: Configures **PGM, AUD, CUE, AIR 1, AIR 2, EXT 1, EXT 2,** or **EXT 3** for application to the console headphone system. INDICATORS: Illuminates orange to indicate an associated monitor input (**PGM, AUD, CUE, AIR 1, AIR 2, EXT 1, EXT 2,** or **EXT 3**) is selected for application to the console headphone system.

TABLE 3–1. MAIN FRAME CONTROLS AND INDICATORS
(Sheet 3 of 3)

INDEX NO.	NOMENCLATURE	FUNCTION
13	**OFF** Switch/ Indicator	SWITCH: Disables the operation of the console channel. INDICATOR: Illuminates to indicate the console channel is disabled.
14	**ON** Switch/ Indicator	SWITCH: Enables the operation of the console channel. INDICATOR: Illuminates to indicate the console channel is enabled.
15	**CUE** Indicator	Illuminates to indicate the console channel is operated to the cue bus.
16	Fader Control	A. Adjusts the audio output level of the channel. B. Configures the channel to the cue bus when operated to the **OFF** position.
17	**AUD** Switch	Routes the console channel to the audition bus.
18	**AUD** Indicator	Illuminates to indicate the console channel is routed to the audition bus.
19	**PGM** Indicator	Illuminates to indicate the console channel is routed to the program bus.
20	**PGM** Switch	Routes the console channel to the program bus.
21	**C** Input Select Switch	Selects input **C** for audio operations.
22	**C** Input Select Indicator	Illuminates to indicate input **C** is selected for audio operations.
23	**B** Input Select Switch	Selects input **B** for audio operations.
24	**B** Input Select Indicator	Illuminates to indicate input **B** is selected for audio operations.
25	**A** Input Select Switch	Selects input **A** for audio operations.
26	**A** Input Select Indicator	Illuminates to indicate input **A** is selected for audio operations.

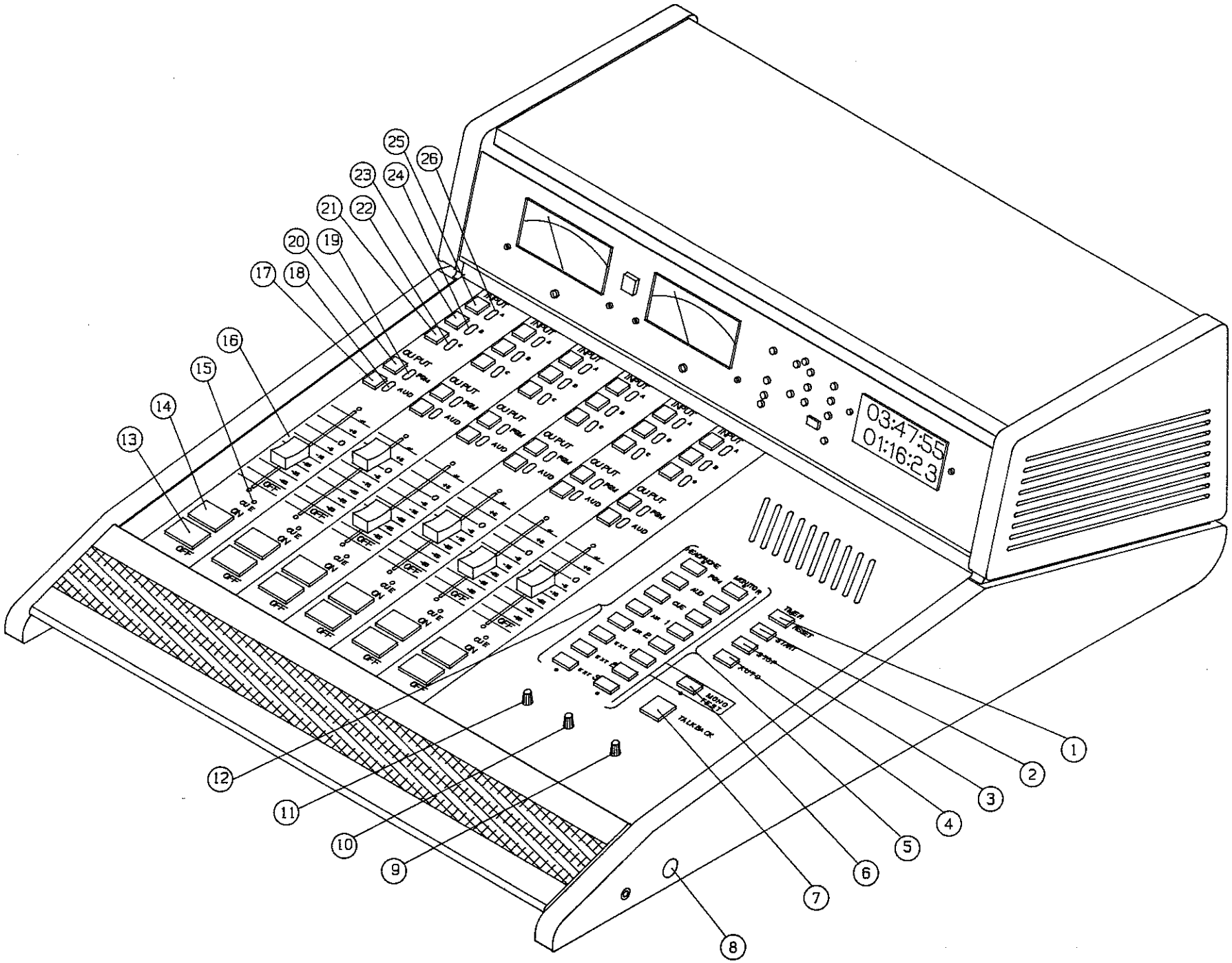


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FIGURE 3-1. CONTROLS AND INDICATORS

3–6. **CONSOLE METER BRIDGE ASSEMBLY.**

3–7. **6 CHANNEL CONSOLE.** Refer to Figure 3–2 for the location of all controls and indicators associated with the 6 channel console meter bridge assembly. The function of each control or indicator is described in Table 3–2.

TABLE 3–2. 6 CHANNEL METER BRIDGE CONTROLS AND INDICATORS
(Sheet 1 of 2)

INDEX NO.	NOMENCLATURE	FUNCTION
1	**LEFT** and **RIGHT** Channel VU Meter Assemblies	Displays left and right channel program or audition output level parameters.
2	Meter Assembly Peak Indicators	Illuminates to indicate peak program or audition audio output conditions.
3	**AUD/PGM** Switch/ Indicator	SWITCH: A. When depressed, configures VU meter to display audition output level parameters. B. When released, configures VU meter to display program output level parameters. INDICATOR: Illuminates orange to indicate the VU meter is configured to display audition output level parameters.
4	**MIX –** Level Indicator	Illuminates to indicate the presence of monophonic mix minus audio.
5	**MONO AUD** Level Indicator	Illuminates to indicate the presence of monophonic audition audio.
6	**MONO PGM** Level Indicator	Illuminates to indicate the presence of monophonic program audio.
7	**MONO AUD** Phase Indicator	Illuminates green to indicate an in–phase condition of audition audio. Illuminates red to indicate an out–of–phase condition of audition audio. The indicator will provide valid indications only when the **MONO AUD** level indicator is illuminated.
8	**MONO PGM** Phase Indicator	Illuminates green to indicate an in–phase condition of program audio. Illuminates red to indicate an out–of–phase condition of program audio. The indicator will provide valid indications only when the **MONO PGM** level indicator is illuminated.
9	±24 V Supply Indicators	Illuminates to indicate the presence of the ±24 volt operating potentials when the **TEST** switch is depressed.

TABLE 3–2. 6 CHANNEL METER BRIDGE CONTROLS AND INDICATORS
(Sheet 2 of 2)

INDEX NO.	NOMENCLATURE	FUNCTION
10	Clock/Timer Assembly	Displays clock information in a 12 or 24 hour time format. Displays associated program material elapsed time information in a minutes and seconds format.
10A	Second Control	Advances the clock/timer second display.
10B	Minute Control	Advances the clock/timer minute display.
10C	Hour Control	Advances the clock/timer hour display.
11	±16V Supply Indicators	Illuminates to indicate the presence of the ±16.5 volt operating potentials when the **TEST** switch is depressed.
12	**TEST** Switch	Enables the ±24V, ±16V, and ±6V display circuitry.
13	±6 V Supply Indicators	Illuminates to indicate the presence of the ±6 volt operating potentials when the **TEST** switch is depressed.

3–8. **12, 18, AND 24 CHANNEL CONSOLE.** Refer to Figure 3–3 for the location of all controls and indicators associated with the 12, 18 and 24 channel console meter bridge assemblies. The function of each control or indicator is described in Table 3–3.

TABLE 3–3. 12, 18, AND 24 CHANNEL METER BRIDGE CONTROLS AND INDICATORS
(Sheet 1 of 3)

INDEX NO.	NOMENCLATURE	FUNCTION
1	**LEFT** and **RIGHT** Channel **AUDITION** Meter Assemblies	Displays left and right channel audition output level parameters.
2	**AUDITION** Meter Assembly Peak Indicators	Illuminates to indicate peak audition audio output conditions.
3	**MONO AUDITION** Meter Assembly (24 Channel Consoles)	Displays monophonic audition output level parameters.
4	**MONO AUDITION** Meter Assembly Peak Indicator (24 Channel Consoles)	Illuminates to indicate peak monophonic audition audio output conditions.

TABLE 3–3. 12, 18, AND 24 CHANNEL METER BRIDGE CONTROLS AND INDICATORS
(Sheet 2 of 3)

INDEX NO.	NOMENCLATURE	FUNCTION
5	**LEFT** and **RIGHT** Channel **PROGRAM** Meter Assemblies	Displays left and right channel program output level parameters.
6	**PROGRAM** Meter Assembly Peak Indicators	Illuminates to indicate peak program audio output conditions.
7	**MONO PROGRAM** Meter Assembly (24 Channel Consoles)	Displays monophonic program output level parameters.
8	**MONO PROGRAM** Meter Assembly Peak Indicator (24 Channel Consoles)	Illuminates to indicate peak monophonic program audio output conditions.
9	**MIX –** Level Indicator	Illuminates to indicate the presence of monophonic mix minus audio.
10	**MONO AUD** Level Indicator	Illuminates to indicate the presence of monophonic audition audio.
11	**MONO PGM** Level Indicator	Illuminates to indicate the presence of monophonic program audio.
12	**MONO AUD** Phase Indicator	Illuminates green to indicate an in–phase condition of audition audio. Illuminates red to indicate an out–of–phase condition of audition audio. The indicator will provide valid indications only when the **MONO AUD** level indicator is illuminated.
13	**MONO PGM** Phase Indicator	Illuminates green to indicate an in–phase condition of program audio. Illuminates red to indicate an out–of–phase condition of program audio. The indicator will provide valid indications only when the **MONO PGM** level indicator is illuminated.
14	±24 V Supply Indicators	Illuminates to indicate the presence of the ±24 volt operating potentials when the **TEST** switch is depressed.
15	Clock/Timer Assembly	Displays clock information in a 12 or 24 hour time format. Displays associated program material elapsed time information in a minutes and seconds format.
15A	Seconds Control	Advances the clock/timer second display.

TABLE 3–3. 12, 18, AND 24 CHANNEL METER BRIDGE CONTROLS AND INDICATORS
(Sheet 3 of 3)

INDEX NO.	NOMENCLATURE	FUNCTION
15B	Minutes Control	Advances the clock/timer minute display.
15C	Hour Control	Advances the clock/timer hour display.
16	±16 V Supply Indicators	Illuminates to indicate the presence of the ±16.5 volt operating potentials when the **TEST** switch is depressed.
17	±6 V Supply Indicators	Illuminates to indicate the presence of the ±6 volt operating potentials when the **TEST** switch is depressed.
18	**TEST** Switch	Enables the ±24V, ±16V, and ±6V supply display circuitry.

3–9. POWER SUPPLY ASSEMBLY.

3–10. Refer to Figure 3–4 for the location of all controls and indicators associated with the power supply assembly. The function of each control or indicator is described in Table 3–4.

TABLE 3–4. POWER SUPPLY ASSEMBLY CONTROLS AND INDICATORS

INDEX NO.	NOMENCLATURE	FUNCTION
1	AC Power Control Switch	Controls the application of ac power to the power supply assembly.

3–11. OPERATION.

NOTE

NOTE

THE FOLLOWING PROCEDURES ASSUME THAT THE AT-90 CONSOLE IS COMPLETELY INSTALLED AND IS FREE OF ANY DISCREPANCIES.

3–12. The following text provides procedures for specific operating functions. Perform the appropriate procedure for the type of operating function desired.

3–13. Operate the ac power switch to the ON position to apply power to the console.

3–14. INPUT SELECTION.

3–15. Configure input A for application to the console audio circuitry by depressing the **A** input switch to illuminate the **A** input indicator. Configure input B for application to the console audio circuitry by depressing the **B** input switch to illuminate the **B** input indicator. Configure input C for application to the console audio circuitry by depressing the **C** input switch to illuminate the **C** input indicator. Only one input may be selected for application to the console channel audio circuitry.

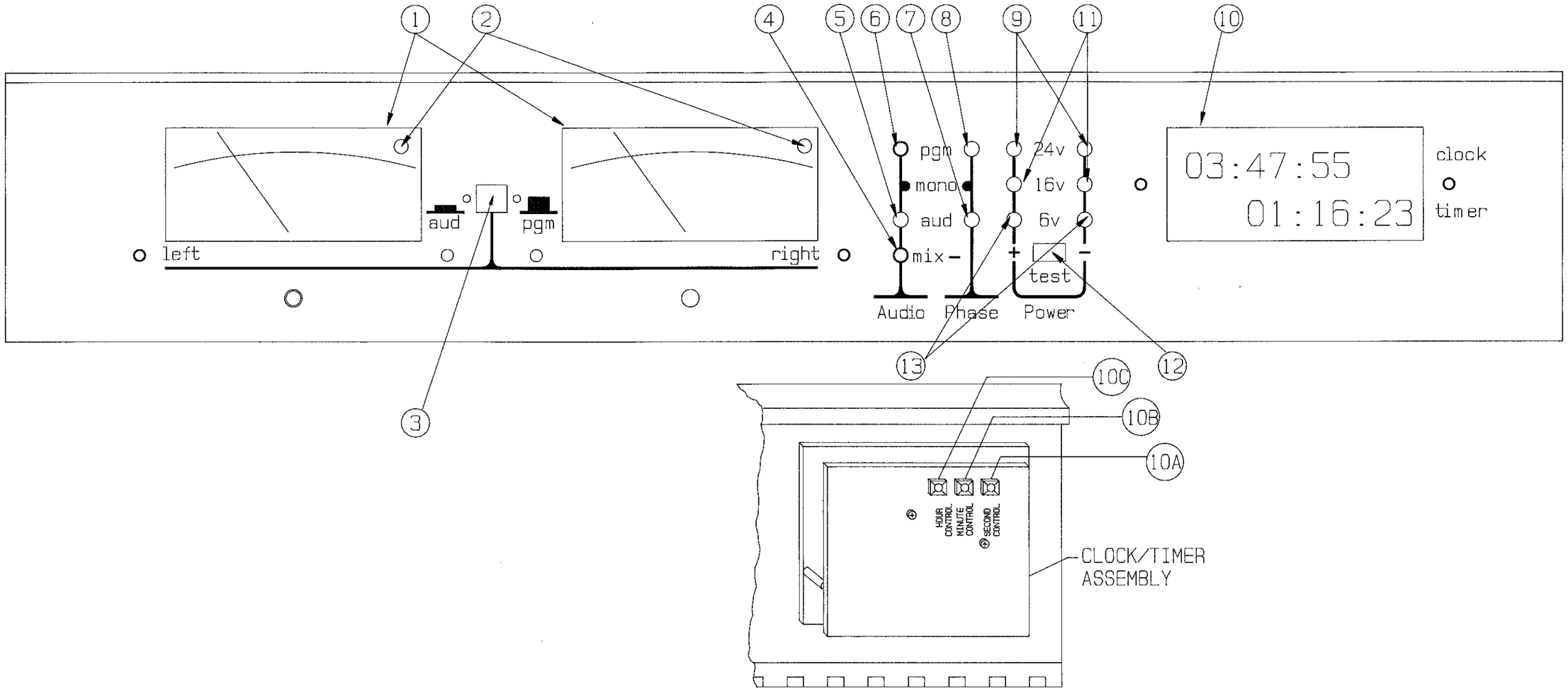

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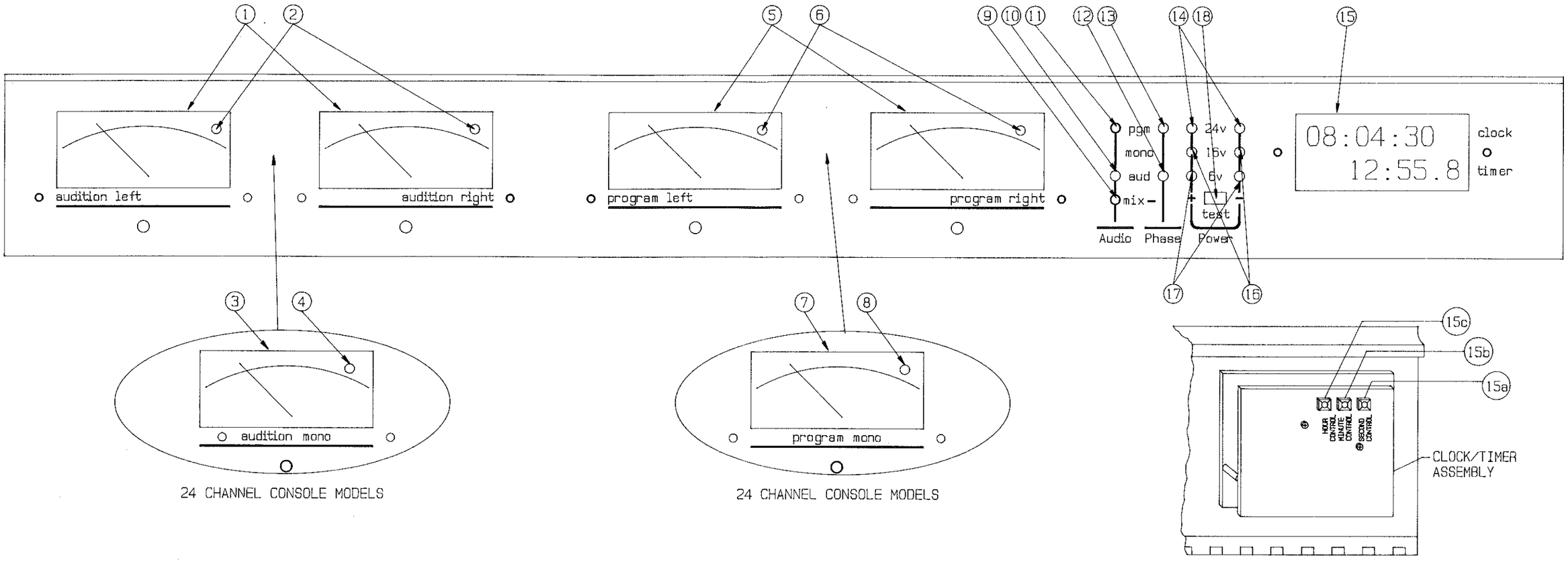
FIGURE 3-2. 6 CHANNEL CONSOLE METER BRIDGE CONTROLS AND INDICATORS



24 CHANNEL CONSOLE MODELS

24 CHANNEL CONSOLE MODELS

FIGURE 3-3.
12, 18, AND 24 CHANNEL CONSOLE METER BRIDGE CONTROLS AND INDICATORS

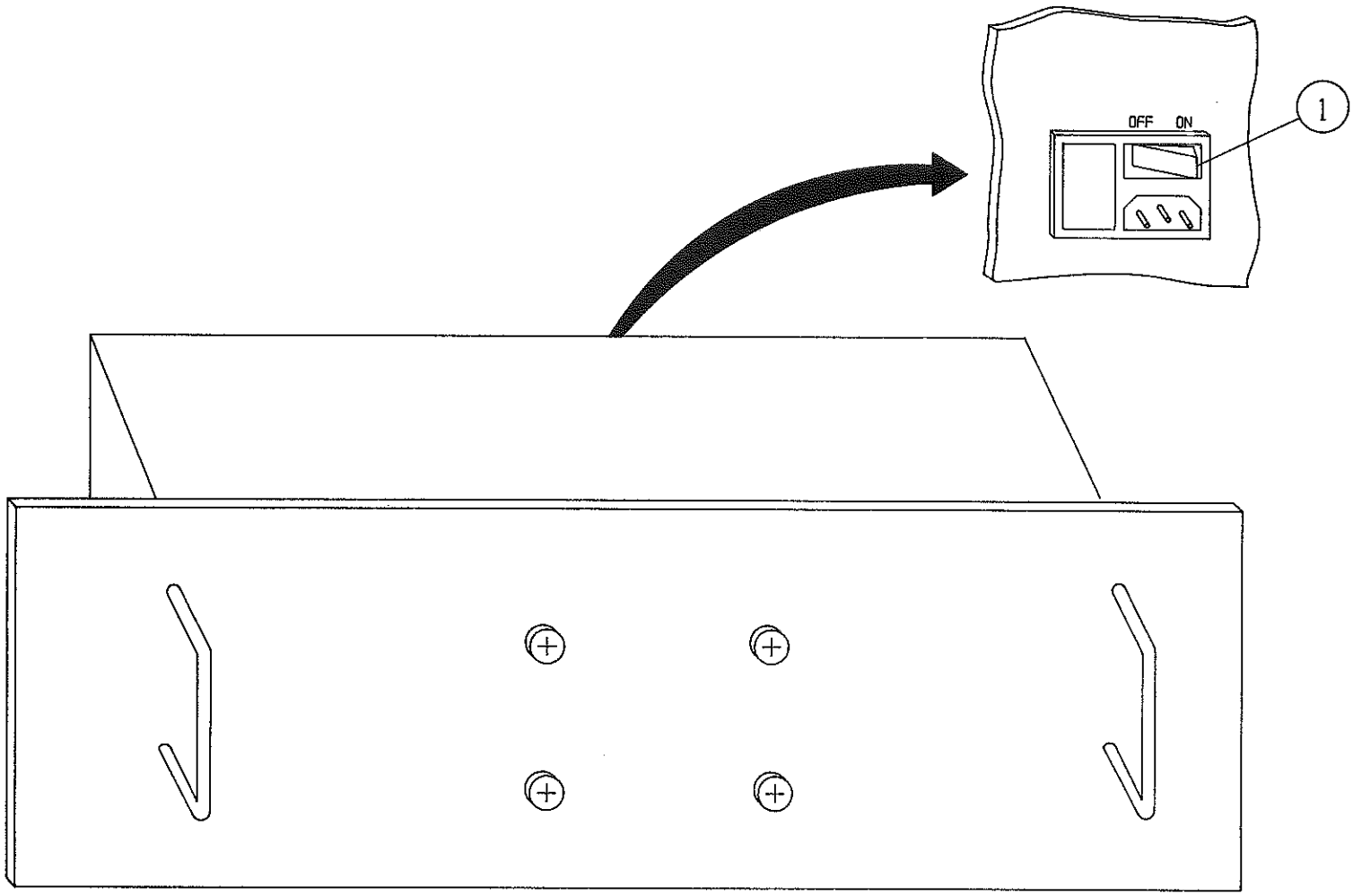


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FIGURE 3–4. POWER SUPPLY MODULE CONTROLS AND INDICATORS

3–16. **PROGRAM/AUDITION BUS SELECTION.**

3–17. To select audio for application to the program bus, depress the **PGM** switch to illuminate the **PGM** indicator. To select audio for application to the audition bus, depress the **AUD** switch to illuminate the **AUD** indicator. To select audio for application to both the program and audition buses, depress both the **PGM** and **AUD** switches to illuminate the indicators.

3–18. **FADER CONTROL.**

3–19. Operate the fader control to maintain or vary the audio input level as required. The fader control range is from +10 dB to –55 dB.

3–20. **CHANNEL ON/OFF CONTROL.**

3–21. Ensure an **A, B,** or **C** input select switch is depressed and enable the console channel by depressing the **ON** switch/indicator to illuminate the switch/indicator. The channel will not operate to **ON** unless an **A, B,** or **C** input select switch is enabled. Disable the console channel by depressing the **OFF** switch/indicator to illuminate the switch/indicator.

3–22. **HEADPHONE SYSTEM.**

CAUTION

CAUTION

DO NOT CONNECT MONOPHONIC HEADPHONES TO THE CONSOLE HEADPHONE RECEPTACLE.

CAUTION

CAUTION

DO NOT CONNECT HEADPHONES OF LESS THAN 35 OHMS TO THE HEADPHONE RECEPTACLE.

3–23. The console headphone receptacle will accept stereophonic headphones with: 1) an impedance range from 35 Ohms to 600 Ohms and 2) a standard 1/4 inch jack. To avoid possible damage to the headphone circuitry, ensure that only stereophonic headphones are connected to the console headphone receptacle.

3–24. To operate the console headphone system, proceed as follows:

WARNING

WARNING

TO MAINTAIN A SAFE OPERATING LEVEL ENVIRONMENT, ALWAYS OPERATE THE HEADPHONE SYSTEM BY INITIALLY ADJUSTING THE VOLUME CONTROL FULLY COUNTERCLOCKWISE AND THEN INCREASE THE LEVEL GRADUALLY.

3–25. Operate the **HEADPHONE** level control fully counterclockwise. Insert the headphone jack into the console headphone receptacle.

3–26. To select headphone system audio, depress either the **PGM, AUD, CUE, AIR 1, AIR 2, EXT 1, EXT 2,** or **EXT 3** switch/indicator to illuminate the switch/indicator orange.

3–27. Operate the **HEADPHONE** level control as required for the desired headphone level.

3–28. **MONITOR SYSTEM.**

3–29. Controls are only provided for the control room monitoring functions. Studio room monitor operations are determined by the control room monitor operations. To operate the console control room monitor system, proceed as follows.

WARNING

WARNING

TO MAINTAIN A SAFE OPERATING LEVEL ENVIRONMENT, ALWAYS OPERATE THE MONITOR SYSTEM BY INITIALLY ADJUSTING THE VOLUME CONTROL FULLY COUNTERCLOCKWISE AND THEN INCREASE THE LEVEL GRADUALLY.

3–30. Operate the **MONITOR** level control fully counterclockwise.

3–31. To select control room monitor audio, depress either the **PGM, AUD, CUE, AIR 1, AIR 2, EXT 1, EXT 2,** or **EXT 3** switch/indicator to illuminate the switch/indicator yellow.

3–32. Operate the **MONITOR** level control as required for the desired monitor level. If a channel is configured for cue monitoring operations, the control room monitor speaker level will be automatically reduced.

3–33. **CUE SYSTEM.**

3–34. To configure a channel for application to the cue bus, operate the fader to the OFF position to illuminate the **CUE** indicator. Input audio will be routed to the console cue speaker for monitoring.

3–35. Operate the **CUE** level control as required for the desired cue speaker level.

3–36. **CLOCK/TIMER SYSTEM.**

3–37. The clock/timer assembly presents clock information on a six–digit LED display and elapsed time information on a five–digit LED display. Observe the displays as required for clock and elapsed time information. Refer to the following text to set the clock section and operate the timer section.

3–38. **CLOCK OPERATION.** To set the clock/timer assembly clock display section, proceed as follows.

3–39. Depress the hour control to advance and set the hour display.

3–40. Depress the minutes control to advance and set the minutes display.

3–41. Depress the seconds control to advance and set the seconds display.

3–42. **TIMER OPERATION.** The clock/timer module timer section consists of two individual internal timers: 1) an automatic timer and 2) a manual timer. The timer display section may be configured as required to display time information generated by the automatic timer or manual timer.

3–43. **Automatic Timer.** To operate the **TIMER** switches to configure the clock/timer module timer section to display the automatic timer, proceed as follows:

3–44. Operate the **AUTO** switch/indicator to illuminate the switch/indicator green.

3–45. Timer start and reset commands will be initiated by the program output bus. When a channel configured for program output is enabled, the timer will start. The timer will reset and start when an additional channel configured for program output is enabled.

3–46. **Manual Mode.** To operate the **TIMER** switches to configure the clock/timer module timer section to display and control the manual timer, proceed as follows:

3–47. Operate the **AUTO** switch/indicator to extinguish the switch/indicator.

3–48. Operate the **RESET, STOP,** and **START** manual mode function switch/indicators to initiate manual timer reset, stop, and start operations as desired.

3–49. **Automatic Timer/Manual Timer Operations.** The clock/timer module timer section may be operated to display automatic timer and manual timer information as required. A typical automatic timer and manual timer operating sequence is presented in the following text. To operate the **TIMER** switches to configure the clock/timer module timer section to display automatic timer and manual timer information, proceed as follows:

3–50. Begin an automatic timer operation such as to display the on–air time of an input module as follows:

A. Operate the **AUTO** switch/indicator to illuminate the switch/indicator green.

B. Enable a channel configured for program output. The timer section will start and display automatic timer information.

3–51. Begin a manual timer operation such as to determine the time length of a commercial as follows:

A. Operate the **AUTO** switch/indicator to extinguish the switch/indicator.

B. Depress the **RESET** switch/indicator. The timer display will reset to 00 00.0.

C. Start the timer by depressing the **START** switch/indicator. The timer will begin operation.

D. Terminate the manual timer operation when the commercial is complete by depressing the **STOP** switch/indicator. The timer will display the time of the commercial (manual timer information display).

3–52. Check the time of the on–air module by operating the **AUTO** switch/indicator to illuminate the switch/indicator green. The timer will indicate the on–air time of the module (automatic timer information display).

3–53. **MONO TEST OPERATION.**

3–54. To test the stereophonic audio signal for out–of–phase (monophonic) conditions, operate the **MONO TEST** switch/indicator to illuminate the switch/indicator. The phase condition of the signal will be monitored by the control room monitor speaker system.

3–55. **TALKBACK SYSTEMS.**

3–56. The following text presents the procedures to operate a dual or single console talkback system. Refer to the appropriate procedure to operate the system installed in the station. Talkback operations may be enabled at any time. However, talkback operations will not be executed during local muting operations.

3–57. **DUAL CONSOLE SYSTEM.** To operate a dual console intercommunication system, proceed as follows.

3–58. **Control Room–To–Studio Operation.** To operate the talkback system for control room–to–studio communication, proceed as follows.

3–59. At the control room console, depress the control room microphone input switch to illuminate the input indicator.

3–60. Talkback audio may be configured for routing to: 1) only the studio room or 2) the studio room and on–the–air. To configure the talkback audio for routing to only the studio room: 1) depress the control room console control room microphone channel **OFF** switch/indicator to illuminate the switch/indicator or 2) depress the control room console control room microphone channel **PGM** and **AUD** switches to extinguish the **PGM** and **AUD** indicators. To configure the talkback audio for routing to the studio room and on–the–air: 1) depress either the control room console control room microphone channel **PGM** or **AUD** switches to illuminate the **PGM** or **AUD** indicators as determined by the output channel configured for on–air operation and 2) depress the control room console control room microphone channel **ON** switch/indicator to illuminate the switch/indicator.

3–61. At the control room console, depress the **TALKBACK** switch and communicate the message to the control room microphone. Intercom information will be routed to the studio room console cue speaker or to the studio room console cue speaker and on–the–air as configured.

3–62. At the studio console, adjust the intercom level by operating the **CUE** level control as required.

3–63. **Studio–To–Control Room Operation.** To operate the talkback system for studio–to–control room communication, proceed as follows.

3–64. At the studio room console, depress the studio room microphone input switch to illuminate the input indicator.

3–65. Talkback audio may be configured for routing to: 1) only the control room or 2) the control room and on–the–air. To configure the talkback audio for routing to only the control room: 1) depress the studio room console studio room microphone channel **OFF** switch/indicator to illuminate the switch/indicator or 2) depress the studio room console studio room microphone channel **PGM** and **AUD** switches to extinguish the **PGM** and **AUD** indicators. To configure the talkback audio for routing to the control room and on–the–air: 1) depress either the studio room console studio room microphone channel **PGM** or **AUD** switches to illuminate the **PGM** or **AUD** indicators as determined by the output channel configured for on–air operation and 2) depress the studio room console studio room microphone channel **ON** switch/indicator to illuminate the switch/indicator.

3–66. At the studio room console, depress the **TALKBACK** switch and communicate the message to the studio room microphone. Intercom information will be routed to the control room console cue speaker or to the control room console cue speaker and on–the–air as configured.

3–67. At the control room console, adjust the intercom level by operating the **CUE** level control as required.

3–68. **SINGLE CONSOLE SYSTEM.** To operate a single console intercommunication system, proceed as follows.

3–69. **Control Room–To–Studio Operation.** To operate the talkback system for control room–to–studio communication, proceed as follows.

3–70. Depress the control room microphone input switch to illuminate the input indicator.

3–71. Depress the control room microphone channel **OFF** switch/indicator to illuminate the switch/indicator or 2) depress the control room microphone channel **PGM** and **AUD** switches to extinguish the **PGM** and **AUD** indicators.

3–72. Depress the console **TALKBACK** switch and communicate the message to the control room microphone. Intercom information will be routed through the talkback circuitry to a studio speaker.

3–73. **Studio–To–Control Room Operation.** To operate the talkback system for studio–to–control room communication, proceed as follows.

3–74. For studio–to–control room intercom operations, configure the console by depressing: 1) the console studio microphone input switch to illuminate the input indicator, 2) the studio microphone channel **OFF** switch/indicator to illuminate the switch/indicator, and 3) the studio microphone channel **PGM** and **AUD** switches to extinguish the **PGM** and **AUD** indicators.

3–75. In the studio, depress the talkback switch and communicate the message to the studio microphone. Intercom information will be routed to the console cue speaker.

3–76. At the console, adjust the level by operating the **CUE** level control as required.

3–77. **METER BRIDGE ASSEMBLIES.**

3–78. **VU METER (6 Channel Consoles).** Observe the **LEFT** and **RIGHT VU** meters for program or audition level indications. The peak indicators will illuminate to indicate peak audio output conditions.

3–79. **AUD/PGM SWITCH (6 Channel Consoles).** To observe audition output level indications on the **LEFT** and **RIGHT VU** meters, depress the **AUD/PGM** switch/indicator to illuminate the switch/indicator orange.

3–80. To observe program output level indications on the **LEFT** and **RIGHT VU** meters, depress the **AUD/PGM** switch/indicator to extinguish the switch/indicator.

3–81. **PROGRAM OUTPUT METER (12, 18, and 24 Channel Consoles).** Observe the **PROGRAM** meters for program output level indications. The peak indicators will illuminate to indicate peak audio output conditions.

3–82. **AUDITION OUTPUT METER (12, 18, and 24 Channel Consoles).** Observe the **AUDITION** meters for audition output level indications. The peak indicators will illuminate to indicate peak audio output conditions.

3–83. **MONOPHONIC OUTPUT METER (24 Channel Consoles).** Observe the **MONO PROGRAM** and **MONO AUDITION** meters for monophonic program and audition output level indications. The peak indicators will illuminate to indicate peak audio output conditions.

3–84. **POWER SUPPLY MONITORING.** To observe the presence of the console operating potentials, depress the **TEST** switch. The ±24V, ±16V, and ±6V supply indicators will illuminate if the supplies are operational.

3–85. **MIX MINUS MONITORING.** Observe the **MIX –** indicator for the presence of monophonic audio on the mix minus bus. The indicator will illuminate if a channel is configured for mix minus bus operation and audio is present.

3–86. **MONOPHONIC MONITORING.** Observe the **MONO AUD** and **MONO PGM** indicators for the presence of monophonic audition and monophonic program audio. The indicators will illuminate if monophonic audio is present.

3–87. **PHASE MONITORING.** Observe the **MONO AUD** and **MONO PGM** phase indicators for in–phase or out–of–phase conditions of the audition or program audio. The indicators will illuminate green for in–phase conditions or red for out–of–phase conditions. The indicators will provide valid indications only when the **MONO AUD** and **MONO PGM** level indicators are illuminated. If audio is removed, the indicators will remain illuminated. During 180 degree out–of–phase conditions, the **MONO AUD/PGM** level indicators may extinguish and the **MONO AUD/PGM** phase indicators will illuminate red.

SECTION IV
THEORY OF OPERATION

4–1. INTRODUCTION.

4–2. This section presents the theory of operation for the Broadcast Electronics AT–90 series audio consoles.

4–3. GENERAL DESCRIPTION.

4–4. A block diagram of the AT–90 series consoles is presented in Figure 4–1. Refer to Figure 4–1 for a general description of the AT–90 series consoles. A functional description of the console circuitry is discussed in the following text.

4–5. FUNCTIONAL DESCRIPTION.

4–6. INPUT CIRCUIT BOARD.

4–7. The input circuit board consists of 6 independent stereophonic audio processing channels. The operation of each channel is identical. Therefore, only the operation of channel 6 will be discussed.

4–8. A detailed block diagram of the left and right channel 6 audio circuits is presented in Figure 4–2. Refer to Figure 4–2 as required for the following description of the channel 6 circuitry.

4–9. When applicable, the text will describe the operation of the left and right channel audio circuits. The left and right channel audio circuits are identical. Therefore, only the left channel circuitry will be discussed.

4–10. **INPUT ATTENUATION NETWORKS.** Each channel will accept inputs from three audio sources. Audio is applied to inputs 1A, 1B, and 1C through attenuation networks consisting of programmable headers J101 and J103. The jumpers select various combinations of resistors to equalize input levels when three sources at different levels are applied to the same channel. Audio from the attenuation network is routed to an input selection circuit.

4–11. **INPUT SELECTION CIRCUIT.** Left channel audio input selection is accomplished by input multiplexer U100. Control lines X and Y from the channel control circuit board are applied to U100. U100 decodes the logic signals to select audio from channel 1A, 1B, or 1C for application to an input amplifier. The following is a list of logic combinations and corresponding operations.

X	Y	SELECTED INPUT
LOW	LOW	NONE
LOW	HIGH	1A
HIGH	LOW	1B
HIGH	HIGH	1C

4–12. **INPUT AMPLIFIER CIRCUIT.** Input amplification is provided by differential amplifier U101. The amplifier circuit is designed to accept and equalize input levels ranging from –60 dB to +4 dB and produce a nominal output bus level of –5 dBu. Microphone or consumer gain operation is selected by programmable header J108. The microphone position is selected if a microphone source is applied to the channel. The consumer position is selected if no microphone source is applied to the channel. In addition, J108 inserts microphone gain control R196 or consumer gain control R194 into the circuit to provide ±5 dB of level adjustment. The output of U101 is routed to a cue amplifier circuit and a voltage controlled amplifier (VCA). Connector J104 provides patch point interfacing for the application of external audio processing equipment. Patch point operations are bypassed by the installation of a wire jumper in connector J104.

4–13. **VCA CIRCUIT.** Audio from the input amplifier or patch point equipment is applied to left channel VCA U104. U104 is a precision low–noise current–input/current–output device with a voltage sensitive control port. The gain of U104 is established by a dc control voltage applied to the control port. The control voltage is generated by a VCA taper control circuit. Potentiometer R153 is provided to cancel any distortion within the VCA stage.

4–14. The output of the VCA is routed to output amplifier U108A. U108A operates in association with the VCA to convert the output current of the VCA to a voltage. U108A also provides a nominal output level of –5dBu for application to an output selection circuit.

4–15. **OUTPUT SELECTION CIRCUIT.** Audio output selection is accomplished by left channel output multiplexer U109. Control lines consisting of program, audition, cue, and enable from the channel control circuit board are applied to U109. U109 decodes the logic signals to select audio for application to either the program, audition, or cue bus. The following is a list of logic combinations and corresponding operations.

ENABLE	CUE	AUDITION	PROGRAM	SELECTED BUS
LOW	LOW	LOW	LOW	NONE
LOW	LOW	LOW	HIGH	PROGRAM
LOW	LOW	HIGH	LOW	AUDITION
LOW	HIGH	LOW	LOW	CUE
LOW	LOW	HIGH	HIGH	PROGRAM+AUDITION

4–16. **PROGRAM MUTE CONTROL.** Audio is routed to the program bus through a program mute circuit consisting of FET Q100 and mute control transistor Q102. When the program bus is selected, the program control line will go HIGH. The HIGH is inverted LOW by Q102 and applied to Q100 to enable the transistor. When the program bus is not selected, the program control line will go LOW to disable Q100 and mute the program output.

4–17. **CUE CIRCUIT.** Audio from left channel input amplifier U101 and right channel input amplifier U103 is applied to cue amplifier U107B through summing resistors. The monophonic output of U107B is routed to left output multiplexer U109. When the fader control is operated to the cue position, the cue control line will go HIGH. The enable, audition, and program control lines will be LOW. U109 will decode the control logic and select cue audio for application to the cue bus.

4–18. **MIX MINUS CIRCUIT.** Program audio from left channel output multiplexer U109 and right channel output multiplexer U110 is applied to amplifier U207B through summing resistors. The output of U207B is applied to the mix minus bus through programmable header J107 at a nominal level of –5 dBu.

4–19. **VCA TAPER CONTROL CIRCUIT.** Left channel audio level control operations are accomplished by VCA U104 and a taper control circuit. The taper control circuit consists of: 1) the channel 1 fader control, 2) a reference control network consisting of diodes D100 through D103, resistors R132 through R135, 3) differential amplifier U106B, and 4) driver U106A.

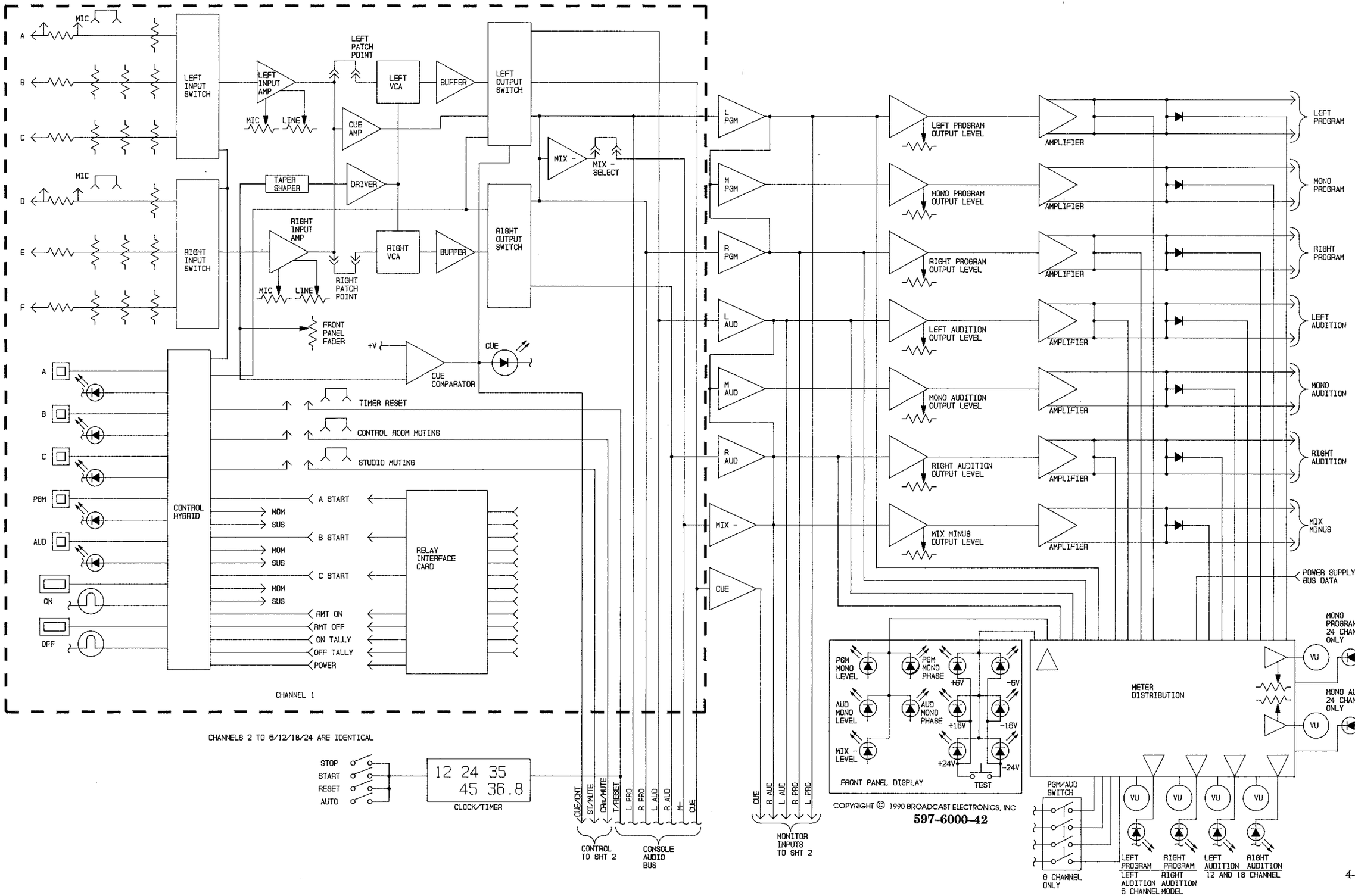

FIGURE 4-1. AT-90 BLOCK DIAGRAM (Sheet 1 of 2)

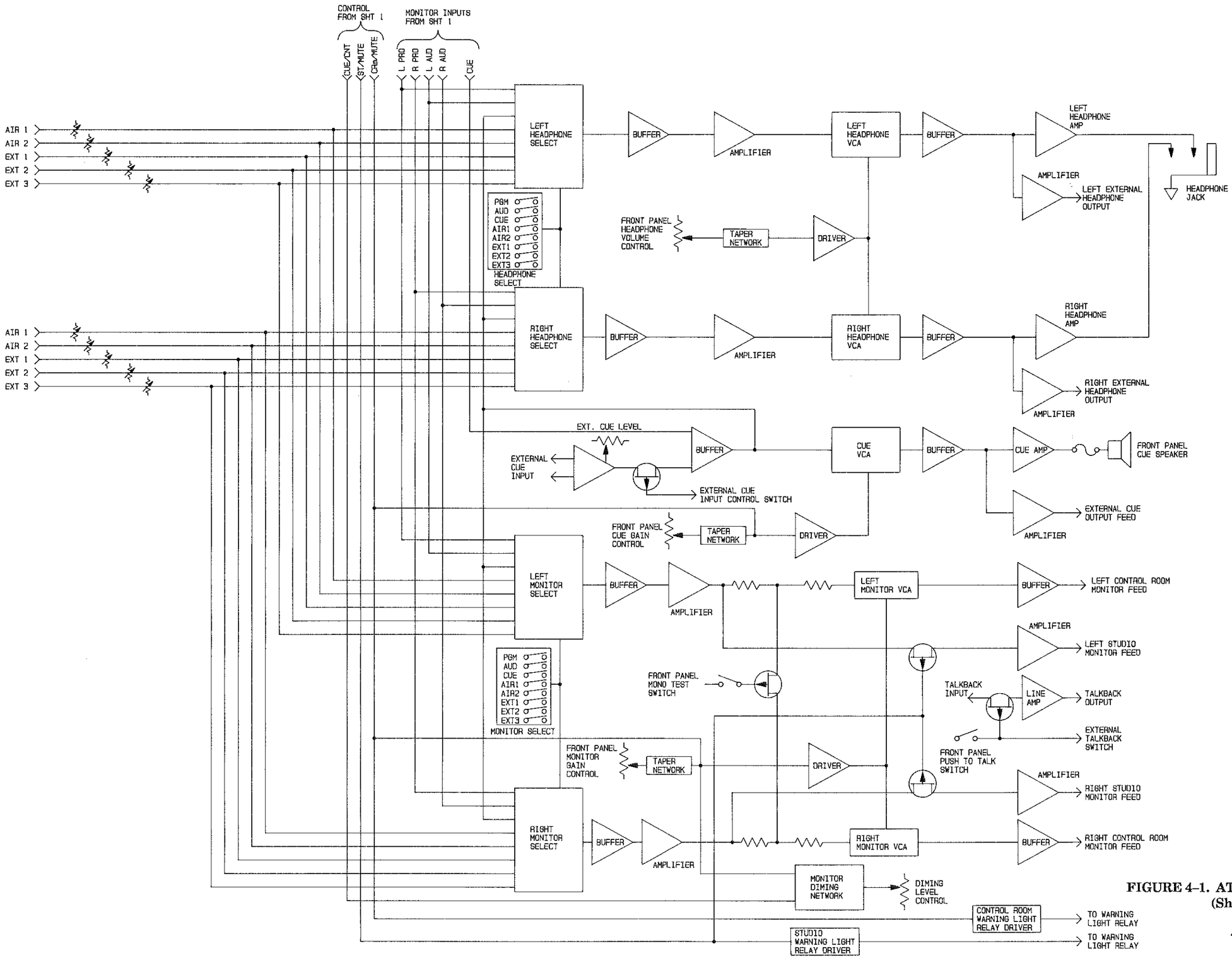

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FIGURE 4–1. AT-90 BLOCK DIAGRAM (Sheet 2 of 2)

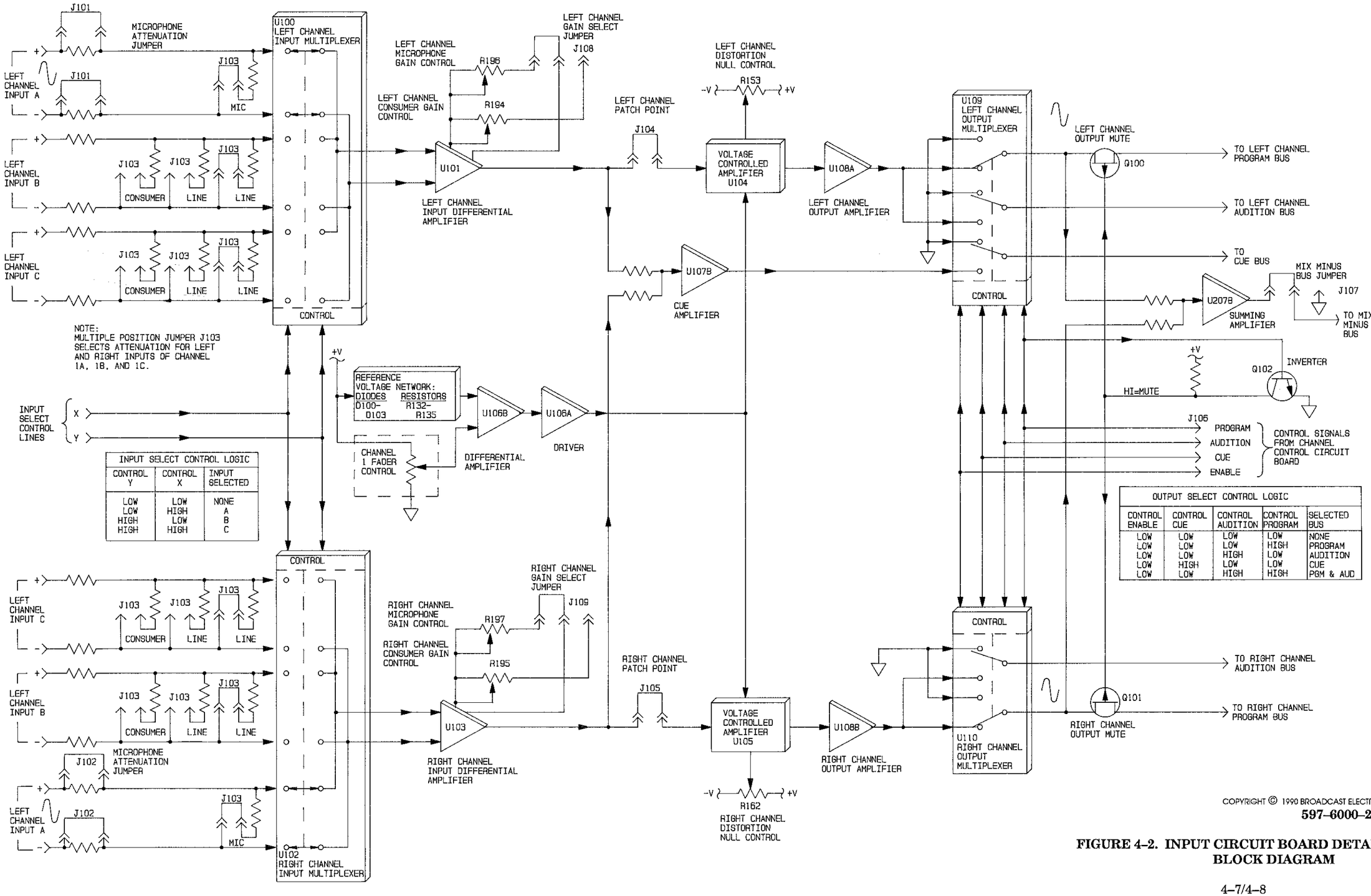

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FIGURE 4-2. INPUT CIRCUIT BOARD DETAILED BLOCK DIAGRAM

4–20. The taper control circuit operates in response to changes in the output voltage from the fader control. The fader control produces a continuously variable dc control voltage from 0 to +5 volts. This control voltage is differentially amplified at U106B with a non–linear reference voltage generated by the reference voltage network. The following is a list of reference voltages, corresponding circuit gains, and relative fader positions.

FADER CONTROL POSITION	REFERENCE VOLTAGE RANGE	U106B CIRCUIT GAIN
+10 dB to –5 dB	0.0 to 2.0	1.0
–5 dB to –30 dB	2.0 to 3.4	1.5
–30 dB to –55 dB	3.4 to 5.0	2.5

4–21. The output of the VCA taper control circuit is designed to apply a voltage to VCA U104 for precision control of the audio level. When the fader control is operated to the +10 dB position, a 0 volt dc reference is applied to differential amplifier U106B. U106B will output approximately 0 volts through a 20:1 voltage divider to driver U106A. U106A will output approximately 0 volts to the VCA to establish maximum gain. When the fader control is operated to the –55 dB position, a +5 volt dc reference is applied to U106B. U106B will output approximately 12 volts dc through the voltage divider to driver U106A. U106A will respond by outputting approximately +0.4V to establish maximum attenuation. The following is a list of gain control voltages, corresponding VCA conditions, and relative fader control positions.

FADER POSITION	GAIN CONTROL VOLTAGE (Output of U106A)	VCA CONDITION
+10 dB	–0.1V	Maximum Gain
–55 dB	+0.42V	Maximum Attenuation

4–22. **OUTPUT CIRCUIT BOARD.**

4–23. The output circuit board consists of amplifier networks for the console audio outputs and monitoring system. The program and audition outputs are amplified to a line level by stereophonic and monophonic output amplifier circuits. Amplifier circuits are also provided for the mix minus, cue, and talkback networks. The control room monitor and headphone systems are equipped with a control network which selects either program, audition, cue, or one of five external audio inputs for application to a stereophonic amplifier network.

4–24. A detailed block diagram of the output circuit board is presented in Figure 4–3. Refer to Figure 4–3 as required for the following description of the output circuit board.

4–25. When applicable, the text will describe the operation of the left and right channel audio circuits. The left and right channel audio circuits are identical. Therefore, only the right channel circuitry will be discussed.

4–26. **PROGRAM AND AUDITION AMPLIFIER CIRCUITS.** The operation of the program and audition amplifier circuits are identical. Therefore, only the program amplifier circuitry will be discussed.

4–27. **Input Amplifier Circuit.** Audio from the program bus is applied to input amplifier U42B. U42B is configured for a gain of approximately 2. The output of U42B is routed to the: 1) VU meter distribution circuit board for application to the program phase error sensor circuit, 2) right channel monitor input multiplexer U1, 3) amplifier U43B, and 4) mono program amplifier U41A. Amplifier U43B and potentiometer R390 adjust the program audio level applied to the right program output amplifier circuit.

4–28. **Program Output Amplifier Circuit.** Audio from U43B is routed through inverter U31B and applied to the amplifier stage in an inverted and non–inverted format. Inverted audio is applied to amplifier stage U32B. Non–inverted audio is applied to amplifier U32A. Together, U32A and U32B operate as a balanced audio output amplifier to provide an output ranging from 0 dBm to +10 dBm. Amplifier U31C functions as a monitoring and gain stage for shorted audio output conditions.

4–29. When the audio output impedance is balanced, the input and output of U31C is at zero volts. When either the positive or negative output terminal is grounded, an audio signal will be applied to U31C. U31C will output a signal to increase the gain of the remaining output amplifier network. Consequently, the network will maintain the rated output into an unbalanced load condition.

4–30. **Monophonic Program Input Amplifier.** Audio from the output of right program input amplifier U42B and left program input amplifier U42A is routed to L+R generator U41A through summing resistors. Potentiometer R383 adjusts the monophonic program audio level applied to the monophonic program output amplifier circuit.

4–31. **Monophonic Program Output Amplifier Circuit.** Audio from U41A is routed through inverter U35A and applied to the amplifier stage in an inverted and non–inverted format. Inverted audio is applied to amplifier stage U36B. Non–inverted audio is applied to amplifier U36A. Together, U36A and U36B operate as a balanced audio output amplifier to provide an output ranging from 0 dBm to +10 dBm. Amplifier U35B functions as a monitoring and gain stage for shorted audio output conditions.

4–32. When the audio output impedance is balanced, the input and output of U35B is at zero volts. When either the positive or negative output terminal is grounded, an audio signal will be applied to U35B. U35B will output a signal to increase the gain of the remaining output amplifier network. Consequently, the network will maintain the rated output into an unbalanced load condition. The output of U36A and U36B is rectified to provide a peak output signal for application to the VU meter distribution circuit board.

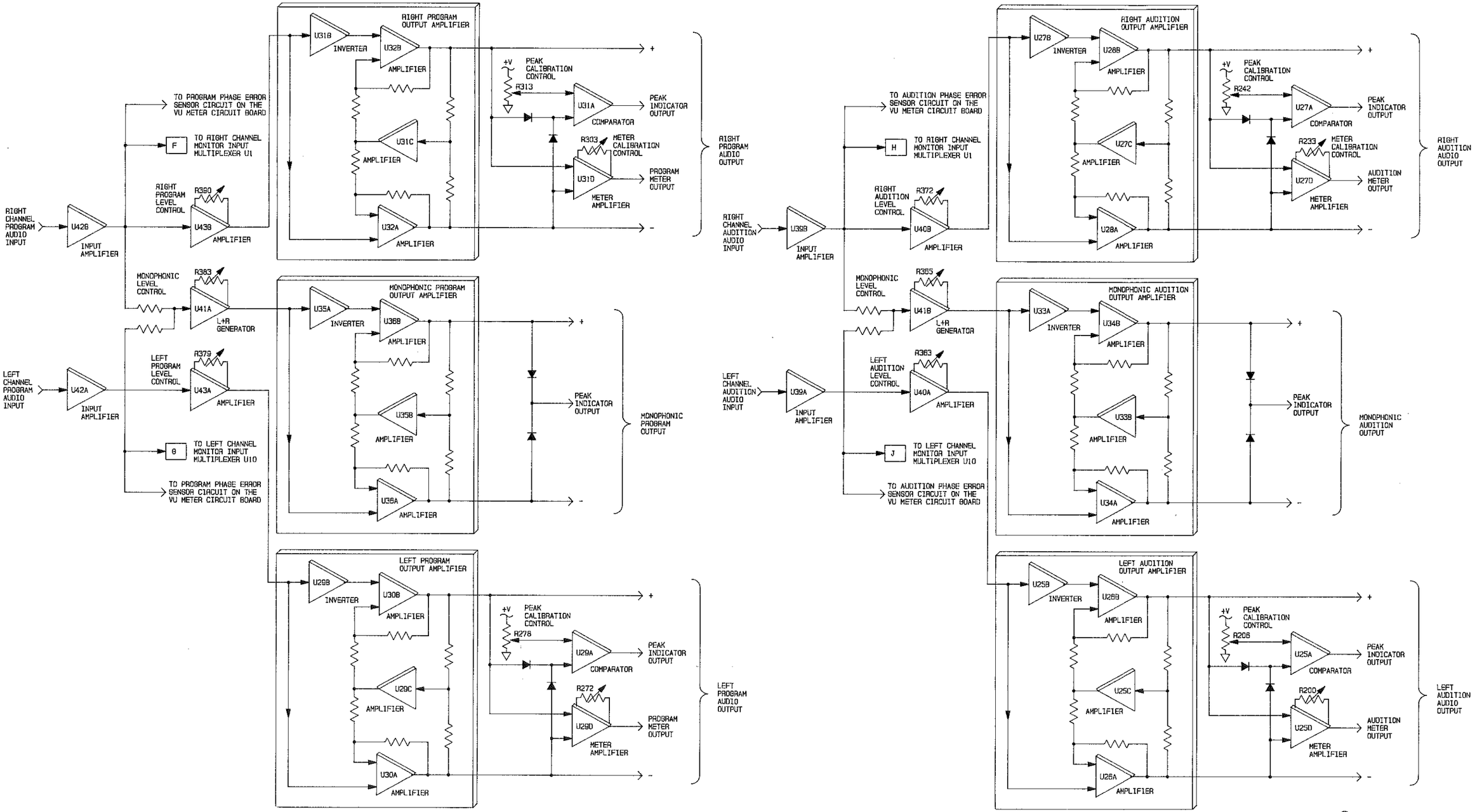
4–33. **OVERLOAD INDICATOR CIRCUIT.** Audio output from U32A and U32B is rectified and applied to the input of comparator U31A. If the input signal exceeds a reference voltage established by peak calibration control R313, the output of U31A will go HIGH. This HIGH is routed to the VU meter distribution circuit board for further processing to illuminate a peak indicator on the program meter.

4–34. **METER DRIVER CIRCUIT.** Balanced audio from U32A and U32B is applied to the input of meter driver U31D. Potentiometer R303 calibrates the right channel program output VU meter. The output of U31D is routed to the VU meter distribution circuit board for further processing and applied to the program meter.

4–35. **CUE AMPLIFIER CIRCUIT.** Audio from the cue bus is routed to the input of amplifier U17B. The output of U17B is applied to the monitor and headphone input multiplexers and voltage controlled amplifier U19 through buffer U18B.

4–36. **VCA Circuit.** U19 is a precision low–noise current–input/current–output device with a voltage sensitive control port. The gain of U19 is established by a dc gain control voltage applied to the control port from a level control network consisting of front–panel cue control R21 and driver U16B. Potentiometer R124 is provided to cancel any distortion within the VCA stage.

4–37. The output level of the cue circuit is determined by front–panel cue control R21 and driver U16B. When a dc voltage applied to R21 is varied, the output of U16B responds by applying a variable control voltage to VCA U19. A mute control signal from U24B is also applied to U16B. When muting is required, the mute control signal will go HIGH to establish maximum VCA attenuation and mute the audio output.



597-6000-27A

FIGURE 4-3. OUTPUT CIRCUIT BOARD DETAILED BLOCK DIAGRAM (Sheet 1 of 4)

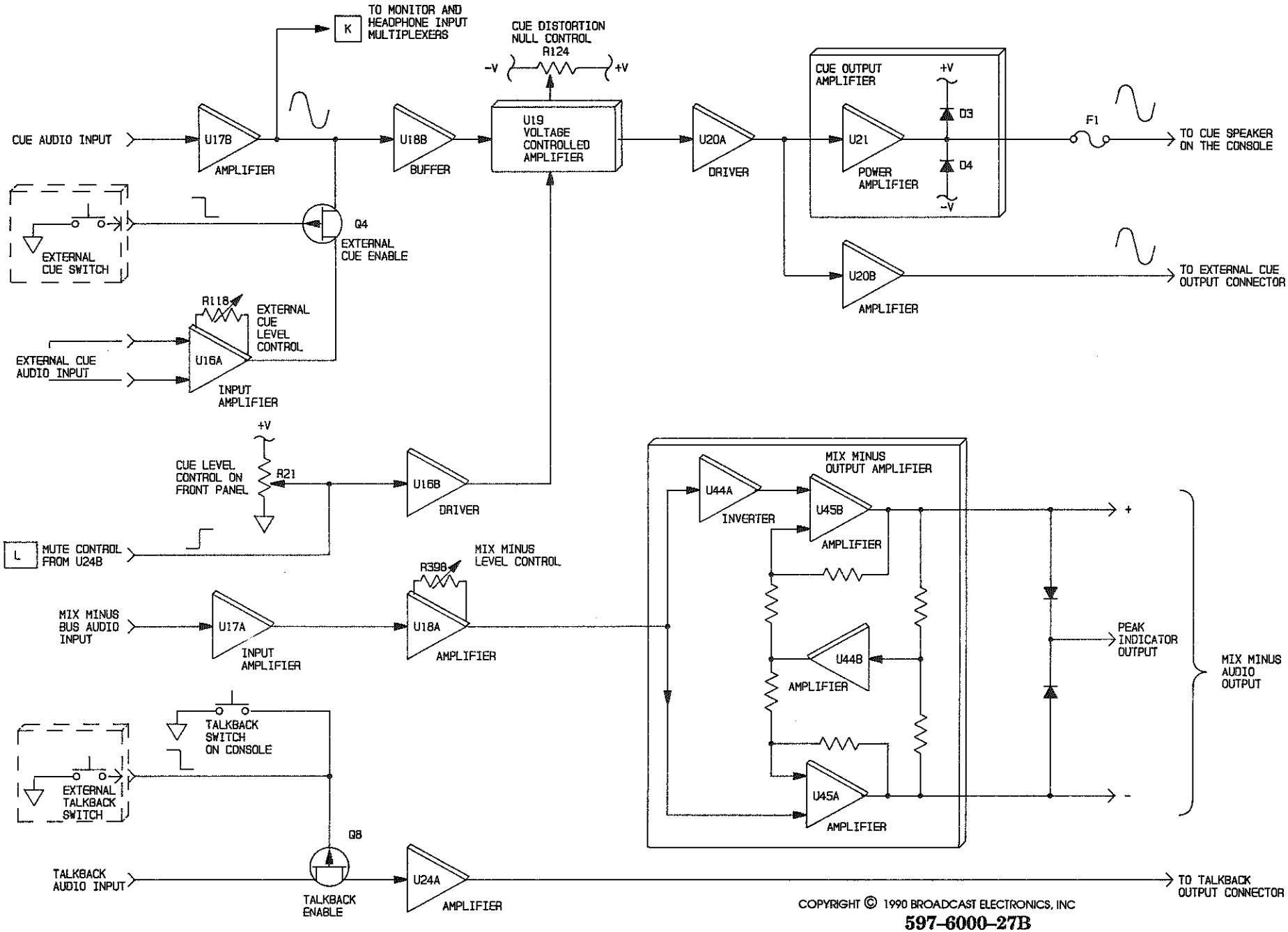


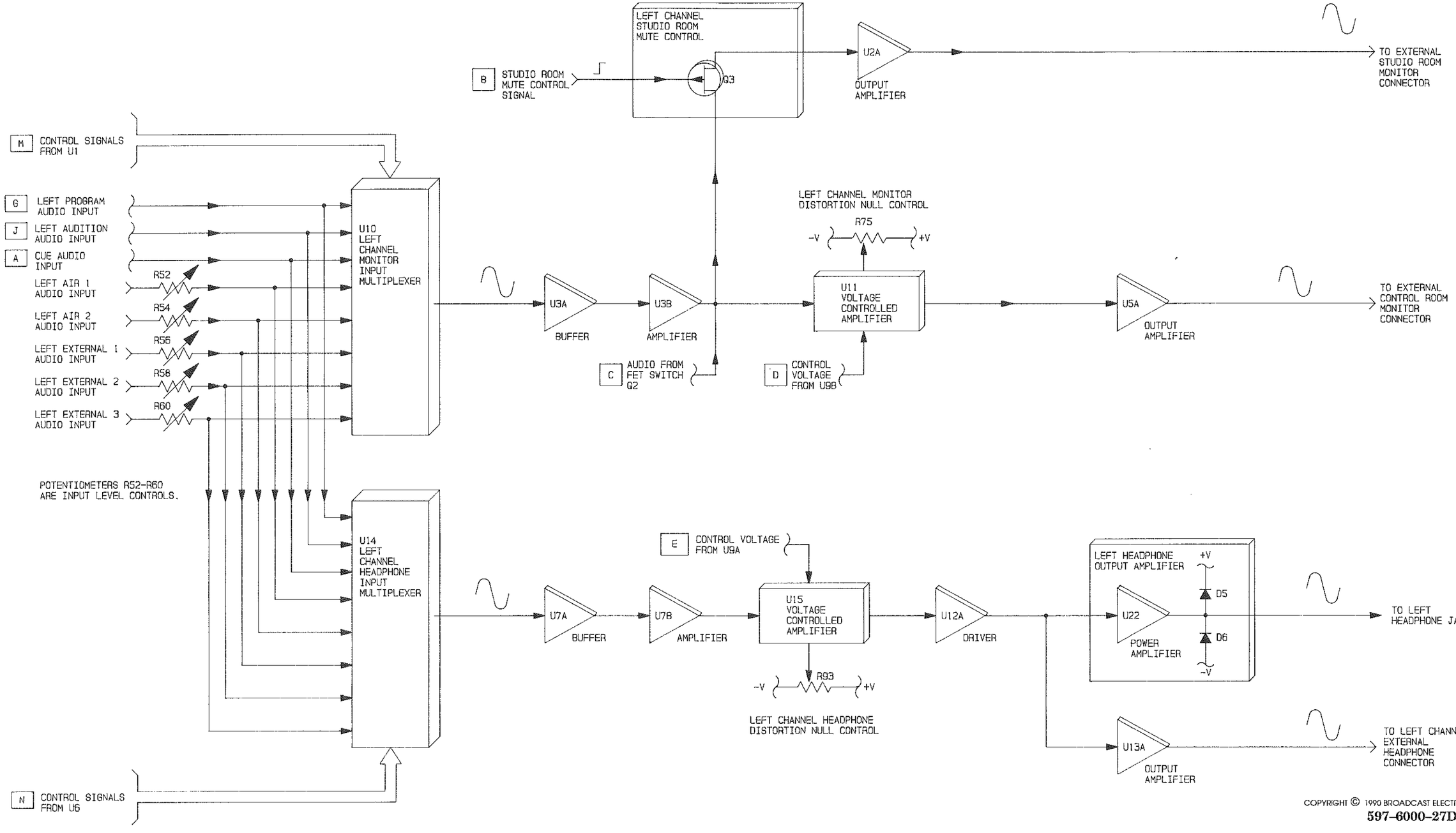
FIGURE 4–3. OUTPUT CIRCUIT BOARD DETAILED BLOCK DIAGRAM
(Sheet 2 of 4)

CONTROL ROOM AND HEADPHONE CONTROL SIGNALS				
INH	C	B	A	SELECTED
HIGH	LOW	LOW	LOW	NONE
LOW	LOW	LOW	LOW	PROGRAM
LOW	LOW	LOW	HIGH	AUDITION
LOW	LOW	HIGH	LOW	CUE
LOW	LOW	HIGH	HIGH	AIR 1
LOW	HIGH	LOW	LOW	AIR 2
LOW	HIGH	LOW	HIGH	EXT 1
LOW	HIGH	HIGH	LOW	EXT 2
LOW	HIGH	HIGH	HIGH	EXT 3

CONTROL SIGNALS FROM CONTROL ROOM SWITCH CIRCUIT BOARD
INH
C
B
A
M TO LEFT CHANNEL MONITOR INPUT MULTIPLEXER U10
F RIGHT PROGRAM AUDIO INPUT
H RIGHT AUDITION AUDIO INPUT
K CUE AUDIO INPUT
RIGHT AIR 1 AUDIO INPUT
RIGHT AIR 2 AUDIO INPUT
RIGHT EXTERNAL 1 AUDIO INPUT
RIGHT EXTERNAL 2 AUDIO INPUT
RIGHT EXTERNAL 3 AUDIO INPUT
R2
R4
R6
R8
R10
U1 RIGHT CHANNEL MONITOR INPUT MULTIPLEXER
POTENTIOMETERS R2-R10 ARE INPUT LEVEL CONTROLS.
B TO LEFT CHANNEL STUDIO ROOM AUDIO CONTROL Q3
RIGHT CHANNEL STUDIO ROOM MUTE CONTROL
Q1
STUDIO ROOM MUTE CONTROL SIGNAL FROM CHANNEL CONTROL CIRCUIT BOARD
U3D BUFFER
U3C AMPLIFIER
S1A
Q2
MONOPHONIC TEST SWITCH ON THE FRONT PANEL
C TO LEFT CHANNEL MONITOR VOLTAGE CONTROLLED AMPLIFIER U11
+V
CONTROL ROOM MONITOR DIM ADJUST
R163
MONITOR DIM CONTROL
Q7
CUE CONTROL SIGNAL FROM CHANNEL CONTROL CIRCUIT BOARD
Q9 INVERTER
CONTROL ROOM MONITOR LEVEL ADJUST ON THE FRONT PANEL
R20
A TO LEFT CHANNEL MONITOR INPUT MULTIPLEXER U10 AND LEFT CHANNEL HEADPHONE INPUT MULTIPLEXER U14.
CONTROL ROOM MUTE SIGNAL FROM CHANNEL CONTROL CIRCUIT BOARD
U24B
U5 RIGHT CHANNEL HEADPHONE INPUT MULTIPLEXER
U7D BUFFER
U7C AMPLIFIER
U6 VOLTAGE CONTROLLED AMPLIFIER
R40
-V
+V
RIGHT CHANNEL HEADPHONE DISTORTION NULL CONTROL
HEADPHONE LEVEL CONTROL ON THE FRONT PANEL
R19
U9A DRIVER
E TO LEFT CHANNEL HEADPHONE VCA U15
U12B DRIVER
CONTROL SIGNALS FROM HEADPHONE SWITCH CIRCUIT BOARD
A
B
C
INH
N TO LEFT CHANNEL HEADPHONE INPUT MULTIPLEXER U14
Q5 INVERTER
U37 OPTICAL COUPLER
TO STUDIO ROOM WARNING LIGHT SYSTEM
U2B OUTPUT AMPLIFIER
TO EXTERNAL STUDIO ROOM MONITOR CONNECTOR
RIGHT CHANNEL MONITOR DISTORTION NULL CONTROL
R29
U4 VOLTAGE CONTROLLED AMPLIFIER
U5B OUTPUT AMPLIFIER
TO EXTERNAL CONTROL ROOM MONITOR CONNECTOR
U9B DRIVER
D10
D TO LEFT CHANNEL MONITOR VOLTAGE CONTROLLED AMPLIFIER U11
L MUTE CONTROL TO DRIVER U16B
Q6 INVERTER
U38 OPTICAL COUPLER
TO CONTROL ROOM WARNING LIGHT SYSTEM
RIGHT HEADPHONE OUTPUT AMPLIFIER
U23 POWER AMPLIFIER
D7
D8
TO RIGHT HEADPHONE JACK
U13B OUTPUT AMPLIFIER
TO RIGHT CHANNEL EXTERNAL HEADPHONE CONNECTOR

597-6000-27C

FIGURE 4-3. OUTPUT CIRCUIT BOARD DETAILED BLOCK DIAGRAM (Sheet 3 of 4)



597-6000-27D

FIGURE 4-3. OUTPUT CIRCUIT BOARD DETAILED BLOCK DIAGRAM (Sheet 4 of 4)

4–38. The output of VCA U19 is routed to driver U20A. U20A operates in association with VCA U19 to convert the output current of the VCA to a voltage. The output of U20A is routed to: 1) external cue audio output amplifier U20B and 2) cue speaker power amplifier U21. Amplifier U20B is configured for a gain of approximately 2. The output of U20B is routed for application to an external cue audio amplifier.

4–39. **Cue Speaker Output Amplifier.** The cue speaker output amplifier consists of power amplifier U21 and peak limiting diodes D3 and D4. U21 will output approximately 2 watts through fuse F1 for application to the console cue speaker.

4–40. **EXTERNAL CUE INPUT AMPLIFIER CIRCUIT.** External cue audio is applied to input amplifier U16A. The gain of U16A is controlled by potentiometer R118 which allows the external cue audio input level to be calibrated to the internal cue audio level. The output of U16A is routed to buffer U18B through external cue enable transistor Q14. When a LOW is applied to the gate of Q14 from an external cue switch, audio from U16A will be routed to the input of U18B.

4–41. **MIX MINUS AMPLIFIER CIRCUIT.** Audio from the mix minus bus is routed to input amplifier U17A. The output of U17A is routed to mix minus level control amplifier U18A. Potentiometer R398 provides a 10 dB range of level adjustment.

4–42. **Mix Minus Output Amplifier Circuit.** Audio from U18A is routed through inverter U44A and applied to the amplifier stage in an inverted and non–inverted format. Inverted audio is applied to amplifier stage U45B. Non–inverted audio is applied to amplifier U45A. Together, U45A and U45B operate as a balanced audio output amplifier to provide an output ranging from 0 dBm to +10 dBm. Amplifier U44B functions as a monitoring and gain stage for shorted audio output conditions.

4–43. When the audio output impedance is balanced, the input and output of U44B is at zero volts. When either the positive or negative output terminal is grounded, an audio signal will be applied to U44B. U44B will output a signal to increase the gain of the remaining output amplifier network. Consequently, the network will maintain the rated output into an unbalanced load condition. The output of U45A and U45B is rectified to provide a peak output signal for application to the VU meter distribution circuit board.

4–44. **TALKBACK AMPLIFIER CIRCUIT.** The talkback amplifier circuit consists of amplifier U24A, talkback enable transistor Q8, and the console talkback switch or an external talkback switch. When either the console or external talkback switch is depressed, a LOW will be applied to transistor Q8. The LOW will enable Q8 and allow talkback audio to be routed to amplifier U24A. The output of U24A is routed for application to external equipment such as an audio amplifier or an additional AT–90 console.

4–45. **CONTROL ROOM MONITOR CIRCUITS.** The control room monitor circuit is designed to allow the monitoring of eight audio sources. The circuit monitors: 1) internal program, audition, and cue audio and 2) external off–air 1, off–air 2, external 1, external 2, and external 3 audio. Input selection is accomplished by an input selection circuit. Muting of the control room monitor output is controlled by a muting control network.

4–46. **Input Selection Circuit.** Right channel audio input selection is accomplished by monitor input multiplexer U1. Control lines A, B, C, and INH from the control room switch circuit board are applied to U1. U1 decodes the logic signals to select audio from the program bus, audition bus, cue bus, or one of five external sources for application to buffer U3D. Potentiometers R2, R4, R6, R8, and R10 allow the input levels of the external audio sources to be calibrated to internal levels.

4–47. **VCA Circuit.** The selected audio is applied to VCA U4 through buffer U3D and amplifier U3C. U4 is a precision low–noise current–input/current–output device with a voltage sensitive control port. The gain of U4 is established by a dc gain control voltage applied to the control port from a level control network consisting of front panel control room monitor level control R20 and driver U9B. Potentiometer R29 is provided to cancel any distortion within the VCA stage.

4–48. The output of the VCA is routed to output amplifier U5B. U5B operates in association with VCA U4 to convert the output current of the VCA to a voltage. The output of U5B provides a nominal output level of 0 dBu for application to an external control room monitor power amplifier.

4–49. **VCA Level Control Circuit.** The output level of VCA U4 is determined by driver U9B and front–panel control room monitor level control R20. When a dc voltage applied to R20 is varied, the output of U9B responds by applying a variable control voltage to the VCA. The VCA will respond by amplifying or attenuating the audio as determined by the control voltage.

4–50. **Monitor Dim Circuit.** During a cue operation, the cue control signal from the channel control circuit board applies a HIGH to transistor Q9. Q9 inverts the HIGH to a LOW to enable monitor dim control FET Q7. With Q7 enabled, a dc voltage from control room monitor dim control R163 is applied to VCA level control driver U9B. The VCA will respond by reducing the control room monitor level as controlled by monitor dim control R163 to allow cue channel monitoring operations.

4–51. **Control Room Mute Circuit.** The control room mute circuit consists of driver U24B. When a microphone input initiates a mute operation, a HIGH is routed from the channel control circuit board to driver U24B. The HIGH from U24B is routed to: 1) monitor level control driver U9B, 2) an auxiliary control room mute circuit, and 3) diode D10. Driver U9B converts the mute signal to a dc gain control voltage which is applied to the control port on VCA U4. The voltage will establish maximum VCA attenuation and mute the control room monitors.

4–52. The HIGH from driver U24B is applied to an auxiliary control room mute circuit consisting of transistor Q6 and optical coupler U38. The HIGH is inverted by transistor Q6 which outputs a LOW to activate optical coupler U38. U38 provides an auxiliary control room mute command for application to external circuitry such as an on–air warning light.

4–53. The HIGH from driver U24B is also applied to diode D10. D10 couples the HIGH mute control signal to the cue mute control circuit to initiate muting of the cue output.

4–54. **STUDIO ROOM MONITOR CIRCUITS.** The monitor switches on the console front–panel are designed to select audio for both the studio and control room monitor circuits. The circuit monitors: 1) internal program, audition, and cue audio and 2) external off–air 1, off–air 2, external 1, external 2, and external 3 audio. Muting of the studio monitor output is controlled by a muting control network.

4–55. **Input Selection Circuit.** Right channel studio room monitor audio is selected by the front panel monitor select switches and multiplexer U1. Control lines A, B, C, and INH from the control room monitor switch circuit board are applied to U1. U1 decodes the logic signals to select audio from the program output, audition output, cue output, off–air 1, off–air 2, external 1, external 2, or external 3 sources. Potentiometers R2, R4, R6, R8, and R10 allow the input levels of the off–air and external audio sources to be calibrated.

4–56. Audio from multiplexer U1 is routed through buffer U3D to amplifier U3C. The output of U3C is routed to the studio mute control circuit.

4–57. **Studio Room Mute Circuit.** The right channel studio room mute circuit consists of studio room mute control transistor Q1 and output amplifier U2B. When muting is not required, a LOW mute command from the channel control circuit board is applied to bias transistor Q1 on. Q1 will route monitor audio from amplifier U3C to amplifier U2B for application to an external studio room power amplifier. When muting is required, a HIGH mute command will be applied to bias transistor Q1 off and mute the studio room output.

4–58. The HIGH mute command from the channel control circuit board is also applied to an auxiliary studio room mute output circuit. The HIGH is inverted by transistor Q5 which outputs a LOW to activate optical coupler U37. U37 provides an auxiliary studio room mute output command for application to external circuitry such as an on–air warning light.

4–59. **MONOPHONIC TEST CIRCUIT.** The monophonic test circuit is designed to test the audio phase conditions between the left and right channel monitor amplifier circuits. The circuit consists of front–panel test switch S1A and FET Q2. When the test switch is depressed, a LOW is applied to enable Q2. Audio from right channel amplifier U3C and left channel amplifier U3B will be combined. If the phase condition is incorrect, a severe loss of level will be observed at the monitor speakers.

4–60. **HEADPHONE MONITOR CIRCUITS.** The headphone monitor circuit is designed to allow the monitoring of eight audio sources. The circuit monitors: 1) internal program, audition, and cue audio and 2) external off–air 1, off–air 2, external 1, external 2, and external 3 audio. The headphone monitor circuit consists of an input selection circuit, a VCA circuit, and VCA level control circuit.

4–61. **Input Selection Circuit.** Right channel audio input selection is accomplished by headphone input multiplexer U6. Control lines A, B, C, and INH from the headphone switch circuit board are applied to U6. U6 decodes the logic signals to select audio from the program bus, audition bus, cue bus or one of five external sources for application to buffer U7D. Potentiometers R2, R4, R6, R8, and R10 allow the input levels of the external audio sources to be calibrated to internal levels.

4–62. **VCA Circuit.** The selected audio is applied to VCA U8 through buffer U7D and amplifier U7C. U8 is a precision low–noise current–input/current–output device with a voltage sensitive control port. The gain of U8 is established by a dc gain control voltage applied to the control port from a level control network consisting of front–panel headphone level control R19 and driver U9A. Potentiometer R40 is provided to cancel any distortion within the VCA stage.

4–63. The output of VCA U8 is routed to driver U12B. U12B operates in association with VCA U8 to convert the output current of the VCA to a voltage. The output of U12B is routed to: 1) external headphone amplifier U13B and 2) headphone power amplifier U23. Amplifier U13B is configured for a gain of approximately 2. The output of U13B is routed for application to an external headphone audio amplifier.

4–64. **Headphone Output Amplifier.** The headphone output amplifier consists of power amplifier U23 and peak limiting diodes D7 and D8. U23 will output approximately 2.8 volts for application to the console right channel headphone jack terminals.

4–65. **VCA Level Control Circuit.** The output level of VCA U8 is determined by driver U9A and headphone monitor level control R19. When a dc voltage applied to R19 is varied, the output of U9A responds by applying a variable control voltage to the VCA. The VCA will respond by amplifying or attenuating the audio as determined by the control voltage.

4–66. **CHANNEL CONTROL CIRCUIT BOARD.**

4–67. The channel control circuit board consists of 6 control networks designed to direct the operation of the associated console audio channels. The operation of each control network is identical. Therefore, only the operation of the channel 1 control circuitry will be discussed.

4–68. A detailed block diagram of the channel control circuit board is presented in Figure 4–4. Only the circuitry for channel 1 is presented in detail. Refer to Figure 4–4 as required for the following channel control circuit board discussion.

4–69. **CHANNEL CONTROL CIRCUIT.** The channel control circuit contains a hybrid logic circuit board which operates as the primary control unit. When input A switch S1, input B switch S2, input C switch S3, program switch S4, audition switch S5, the channel on switch, or the channel off switch is depressed, a LOW is applied to the input of the hybrid logic circuit. In addition, the remote on and off commands from external equipment also route LOW commands to the input of the hybrid logic circuit board.

4–70. The hybrid logic circuit board will process the input signals and output a LOW command to illuminate the selected: 1) source indicator DS1 – input A, DS2 – input B, or DS3 – input C or 2) output bus indicator DS4 – program or DS5 – audition. In addition, a LOW is output to illuminate the selected control switch/indicator: 1) channel on or 2) channel off. Depending on the programming of source start control headers J2, J3, and J4, a continuous or momentary LOW start command will be routed to the selected source when the on switch/indicator is depressed.

4–71. The hybrid logic circuit board also generates HIGH: 1) X and Y control commands for application to the input selection network on the input circuit board and 2) program and audition control commands for the output selection network on the input circuit board. The hybrid also generates LOW on and off tally commands. The tally commands are routed for application to equipment external to the console such as a remote control panel.

4–72. Programmable headers J57, J58, and J69 enable control room muting, studio room muting, and timer reset operations. When the jumpers are installed, a HIGH is output for application to the appropriate console control bus.

4–73. **CONTROL BUS.** The channel control circuit board contains a control bus consisting of the control room muting, studio room muting, timer reset, and cue control signals. The fader reference and cue reference voltages are also routed on the control bus. Connector J6 provides interconnection of control buses when two or more channel control circuit boards are installed in the console. Connector J7 provides connection to a monitor distribution circuit board.

4–74. **CUE DETECTOR CIRCUIT.** The cue detector circuit determines when the channel fader is operated to the cue position. This circuit consists of comparator U1A, diode D1, a cue indicator, and the fader control. A +5 volt fader reference is applied to the input of U1A through the fader control. A +4.95 volt cue reference is also applied to the comparator. When the fader output exceeds +4.95 volts (below the –55dB position), the output of U1A will go HIGH.

4–75. The HIGH from U1A illuminates the cue indicator and instructs the output selection network on the input circuit board to initiate cue bus operation. This HIGH is also routed through diode D1 to the monitor dimming circuit on the output circuit board via the cue control bus.

4–76. **POWER SUPPLY.** Operating potentials for the hybrid logic circuit board, headphone select switches on the headphone select circuit board, and the monitor select switches on the monitor circuit board are generated by a voltage regulator circuit. A +14V supply is regulated to +6 volts by regulator U2 and the associated components.

4–77. **VU METER DISTRIBUTION AND AUDIO/POWER DISPLAY CIRCUIT BOARDS.**

4–78. Figure 4–5 presents a block diagram of the VU meter distribution and audio/power display circuit boards. Refer to Figure 4–5 as required for the following discussion.

4–79. **MONOPHONIC PROGRAM, MONOPHONIC AUDITION, AND MIX MINUS INDICATOR CIRCUITS.** Audio from the monophonic program amplifier on the output circuit board is routed to the input of program comparator U5A on the VU meter distribution circuit board. When the input level exceeds the reference voltage applied to U5A, the output of U5A will go to LOW. The LOW will illuminate mono program status indicator DS1 on the audio/power display circuit board to indicate the presence of mono program audio. The mono audition circuit consisting of comparator U5B/indicator DS2 and the mix minus circuit consisting of comparator U5C/indicator DS3 operate in an identical manner.

4–80. **PHASE ERROR SENSOR CIRCUITS.** The VU meter distribution circuit board contains program and audition phase error detector circuits. These circuits are identical in operation. Therefore, only the program phase error detector circuit will be described.

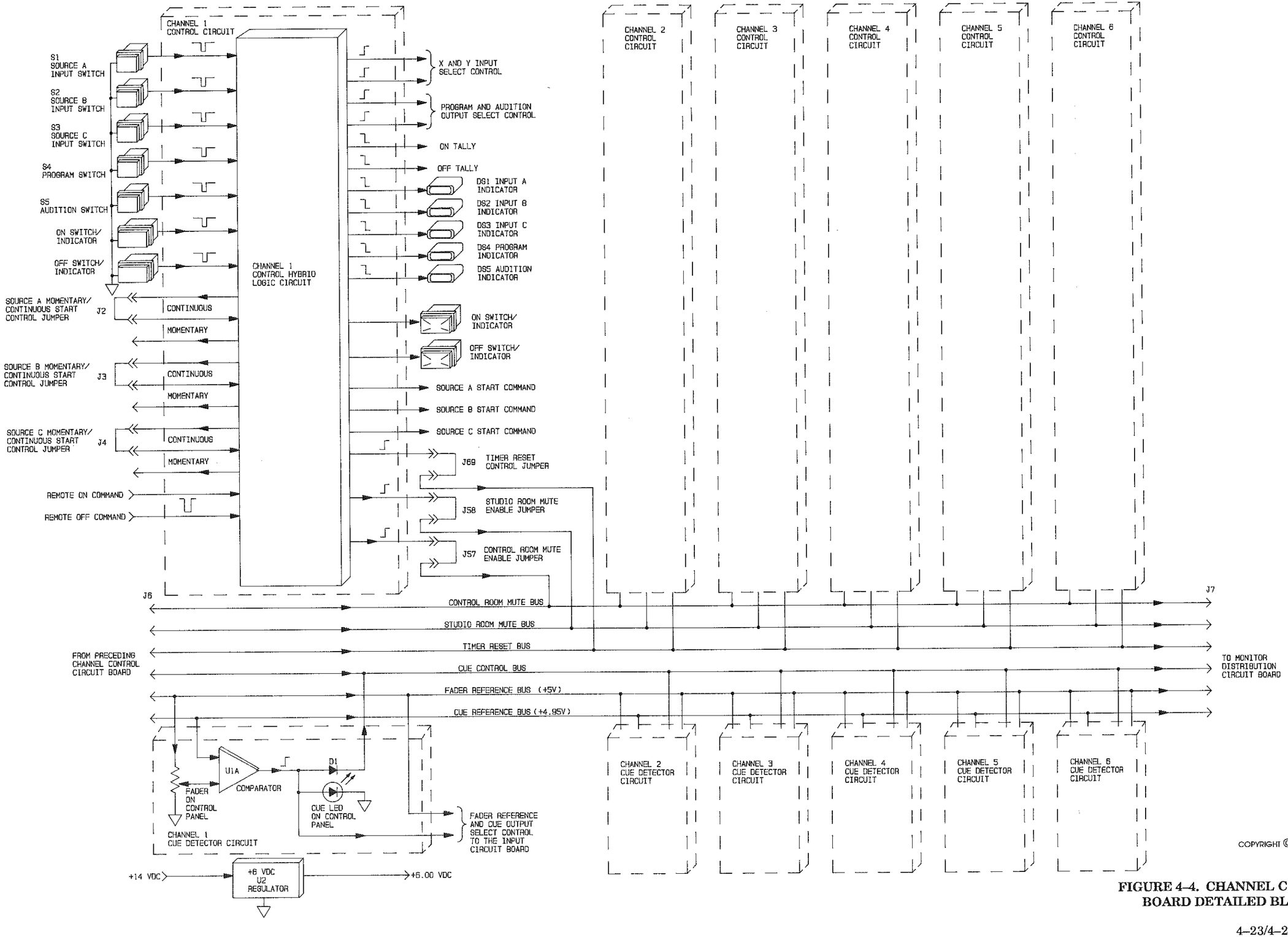


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FIGURE 4–4. CHANNEL CONTROL CIRCUIT BOARD DETAILED BLOCK DIAGRAM

BROADCAST ELECTRONICS INC

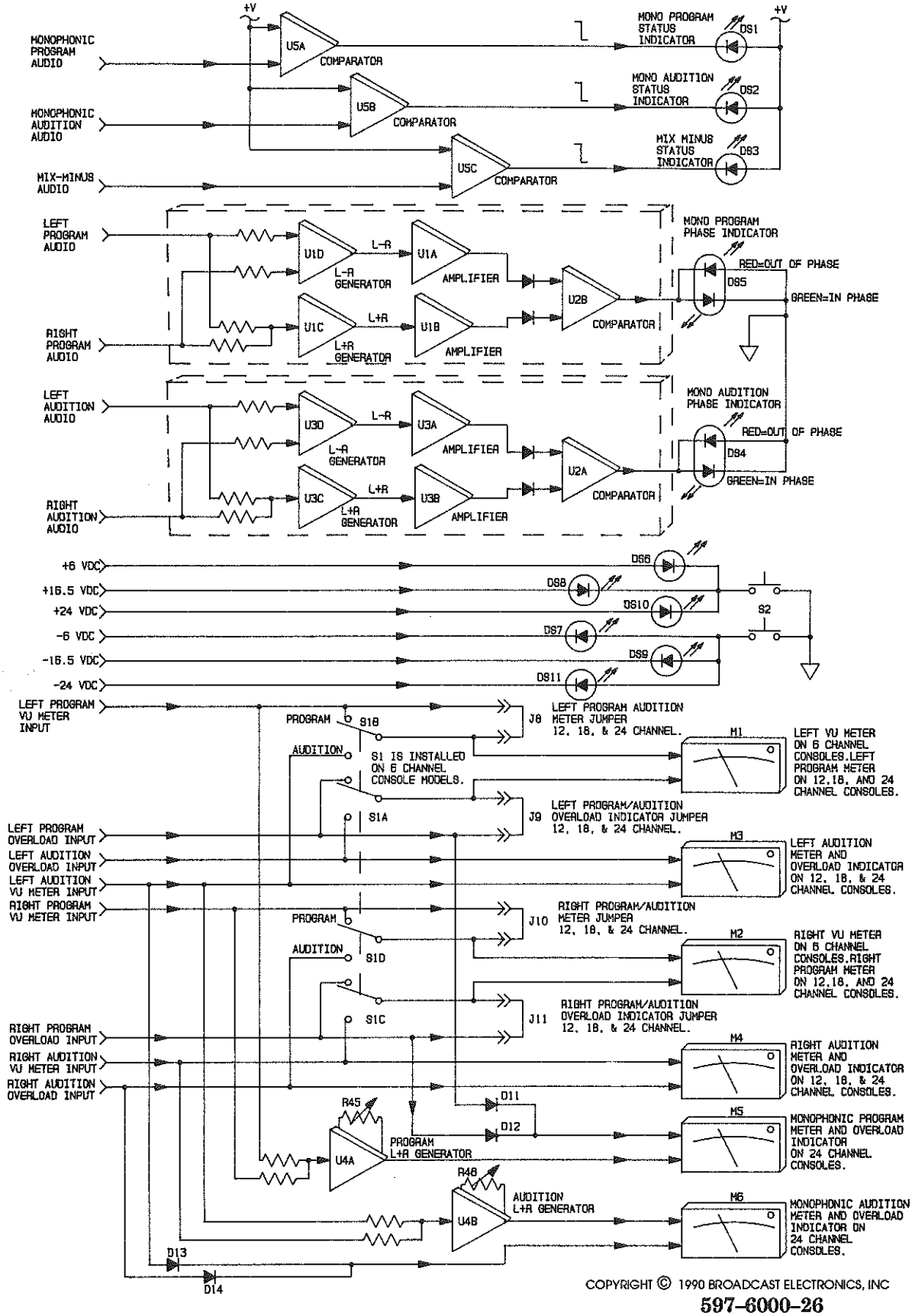

FIGURE 4–5. VU METER DISTRIBUTION AND AUDIO/POWER DISPLAY CIRCUIT BOARD BLOCK DIAGRAM

4–81. Right and left channel program audio from the output circuit board is routed to L–R generator U1D on the VU meter distribution circuit board. The L–R output signal of U1D is applied to amplifier U1A which provides a gain of approximately 9. The output of U1A is rectified and applied to comparator U2B.

4–82. Right and left channel program audio from the output circuit board is also routed to L+R generator U1C on the VU meter distribution circuit board. The L+R output signal of U1C is applied to amplifier U1B which provides a gain of approximately 9. The output of U1B is rectified and applied to comparator U2B.

4–83. When the signals applied to comparator U2B are in–phase, the output of U2B will go HIGH to illuminate phase indicator DS5 green on the audio/power display circuit board. However, if the average level of the L–R signal exceeds the average level of the L+R signal, U2B will output a LOW to illuminate DS5 red to indicate an out–of–phase condition.

4–84. **VOLTAGE INDICATOR CIRCUITS.** The +/–6V, +/–16.5V, and +/–24V supply potentials are applied to indicators DS6 through DS11 on the audio/power display circuit board. The indicators are connected to ground through front–panel **TEST** switch S2. When S2 is depressed, the LEDs will illuminate to indicate the presence of supply voltages.

4–85. **METERING CIRCUITS.** Metering circuits are provided for monitoring the program and audition output levels. The meter circuits contain a jumper programming network consisting of J8 through J11. On 6 channel console models only, the jumpers in the network are removed and program/audition switch S1 is installed. The switch allows 6 channel console left channel meter M1 and right channel meter M2 to display both program and audition normal/peak levels.

4–86. On 12, 18, and 24 channel console models: 1) program/audition switch S1 is not installed and 2) jumpers J8 and J11 are installed as shown. This allows left channel meter M1 and right channel meter M2 to display normal/peak program output levels. Left and right channel normal/peak audition levels are displayed by meters M3 and M4.

4–87. On 24 channel console models, left and right program audio is applied through summing resistors to L+R generator U4A. The audio output of U4A is displayed on monophonic program meter M5. The left and right audition audio is applied through summing resistors to L+R generator U4B. The audio output of U4B is displayed on monophonic audition meter M6. Left and right program and audition audio is summed by diodes D11 through D14 and routed to LEDs on meters M5 and M6 to indicate peak conditions.

4–88. **CONTROL LOGIC HYBRIDS.**

4–89. The Air Trak 90 console is equipped with a control logic hybrid for each channel. Due to the limited troubleshooting and repair of the hybrid, the circuitry on the hybrid is presented only in the schematic diagram. Refer to the control logic hybrid schematic in SECTION VII, DRAWINGS as required for the circuitry contained on the hybrid logic circuit board.

4–90. **MONITOR DISTRIBUTION CIRCUIT BOARD.**

4–91. The monitor distribution circuit board functions as a distribution center for control signals and operating potentials (refer to the monitor distribution circuit board schematic in SECTION VII, DRAWINGS). The circuit board provides interconnections for control signals and operating potentials being routed to/from the output, headphone select, monitor select, control room/headphone/cue gain, and control circuit boards.

4–92. **HEADPHONE SELECT CIRCUIT BOARD.**

4–93. The headphone select circuit board consists of eight position select switch S1 (refer to the headphone select circuit board schematic in SECTION VII, DRAWINGS). The switch selects program, audition, cue, off–air 1, off–air 2, external 1, external 2, or external 3 audio for application to the headphone monitor circuitry. The switches select audio by routing HIGH control commands to a bus consisting of control lines A, B, C, and INH. The control lines are routed through the monitor distribution circuit board for application to the headphone selection network on the output circuit board.

4–94. **MONITOR SELECT CIRCUIT BOARD.**

4–95. The monitor select circuit board consists of eight position select switch S2 (refer to the monitor select circuit board schematic in SECTION VII, DRAWINGS). The switch selects program, audition, cue, off–air 1, off–air 2, external 1, external 2, or external 3 audio for application to the control room/studio monitor circuitry. The switches select audio by routing HIGH control commands to a bus consisting of control lines A, B, C, and INH. The control lines are routed through the monitor distribution circuit board for application to the control room/studio monitor selection network on the output circuit board.

4–96. **CONTROL ROOM/HEADPHONE/CUE GAIN CIRCUIT BOARD.**

4–97. The control room/headphone/cue gain circuit board consists of headphone level control R19, control room monitor level control R20, and cue level control R21 (refer to the control room/headphone/cue gain circuit board schematic in SECTION VII, DRAWINGS). The controls route dc control voltages through the monitor distribution circuit board to the control room monitor, headphone, and cue VCA level control networks on the output circuit board. The circuit board also provides interfacing for the console talkback switch.

4–98. **RELAY INTERFACE CIRCUIT BOARD.**

4–99. The relay interface circuit board is equipped with six individual relay networks (refer to the relay interface circuit board schematic diagram in SECTION VII, DRAWINGS). The start A, start B, start C, and on tally/off tally networks provide isolated control commands for application to source equipment. The remote on and remote off networks are designed to isolate remote channel on and off commands.

4–100. The start A, start B, start C, and on tally/off tally networks are enabled by LOW control commands from the channel control circuit board. The LOW enables the relay to provide isolated remote commands for application to source equipment. Fuses F1 through F4 provide overload protection for the control commands.

4–101. The remote on and remote off networks are enabled by LOW channel on and off commands from a remote location. The LOW enables the relay to provide an isolated LOW remote control command for application to the channel control circuit board.

4–102. **ON/OFF SWITCH INTERFACE CIRCUIT BOARD.**

4–103. Each channel is equipped with an on/off switch interface circuit board (refer to the channel control circuit board schematic in SECTION VII, DRAWINGS). The circuit board allows dc and ground potentials to be interfaced to the channel on and off switches.

4–104. **CLOCK/TIMER MODULE.**

4–105. Console clock and timer information is presented to the console operator by the clock/timer module (refer to Figure 4–6). The module consists of a Motorola MC68701L microprocessor unit and an LED display circuit. The microprocessor is programmed to function as a precision studio clock and as an elapsed timer. Clock information is presented on a 6–digit LED display. Timer information is presented on a 5–digit LED display. The clock section of the module also contains an interface circuit which allows the clock to be synchronized to network audio to eliminate drift.

4–106. **MICROPROCESSOR.**

4–107. Clock and timer information is generated by a microprocessor unit. Integrated circuit U4 is a Motorola MC68701 microprocessor unit with built–in read–only–memory (ROM) and random–access–memory (RAM). U4 also contains three 8–bit bidirectional communication ports and one 5–bit bidirectional communication port.

4–108. The microprocessor built–in ROM consists of a 2048 byte EPROM which provides a permanent location for the clock/timer control code. The code is programmed into the EPROM and directs the microprocessor for clock and timer operations. Microprocessor U4 also contains 128 bytes of RAM. The RAM is used for the processing of control program information.

4–109. **MICROPROCESSOR CLOCK CIRCUIT.** Microprocessor U4 operates from a precision 4 MHz reference signal. The reference signal is generated by crystal oscillator Y1 and capacitors C13 and C14. C14 is an adjustable capacitor provided for frequency calibration.

4–110. **MICROPROCESSOR RESET CIRCUIT.** The microprocessor reset circuit consists of two driver transistors. When a microprocessor reset command is required, a LOW is applied to transistor Q1. The LOW will bias Q1 and Q2 on to apply a LOW reset command to microprocessor U4.

4–111. **TIMER CIRCUIT.**

4–112. Five control lines and two programmable jumpers direct the operation of the clock/timer module timer section. The control lines are interfaced to the microprocessor via communication port 2. Program jumper enables/disables the timer control bus network. An audition timer control bus is not used. Both the program and audition timer control jumpers must be installed in Air–Trak 90 consoles.

4–113. The timer section consists of two individual timers: 1) an automatic timer and 2) a manual timer. A HIGH manual control command or a LOW automatic mode command from the timer reset circuit board is routed through the auto/manual and serial output control lines to select the automatic timer or manual timer. When the automatic timer is selected, the timer is controlled by the program bus. The timer will reset and start when a channel configured for program output routing is enabled. When the manual timer is selected, LOW commands from the timer reset circuit board stop, start, and reset switches are routed to the clock/timer module to control the manual timer as desired. The timer may be configured as required to display time information generated by the automatic timer or manual timer.

4–114. **CLOCK CIRCUIT.**

4–115. Clock operation is directed by a format control jumper, a synchronization circuit, and a clock set circuit. The control circuitry is interfaced to the microprocessor via port 3.

4–116. **FORMAT JUMPER.** The clock/timer module clock format is determined by jumper W5. Jumper W5 programs the clock to display information in a 12 or 24 hour time format. A LOW from W5 configures the clock for a 12 hour time format. A HIGH from W5 configures the clock for a 24 time format.

4–117. **SYNCHRONIZATION CIRCUIT.** The synchronization circuit consists of a differential amplifier/rectifier stage and a comparator network. The circuit allows the clock to be synchronized to network audio to eliminate drift.

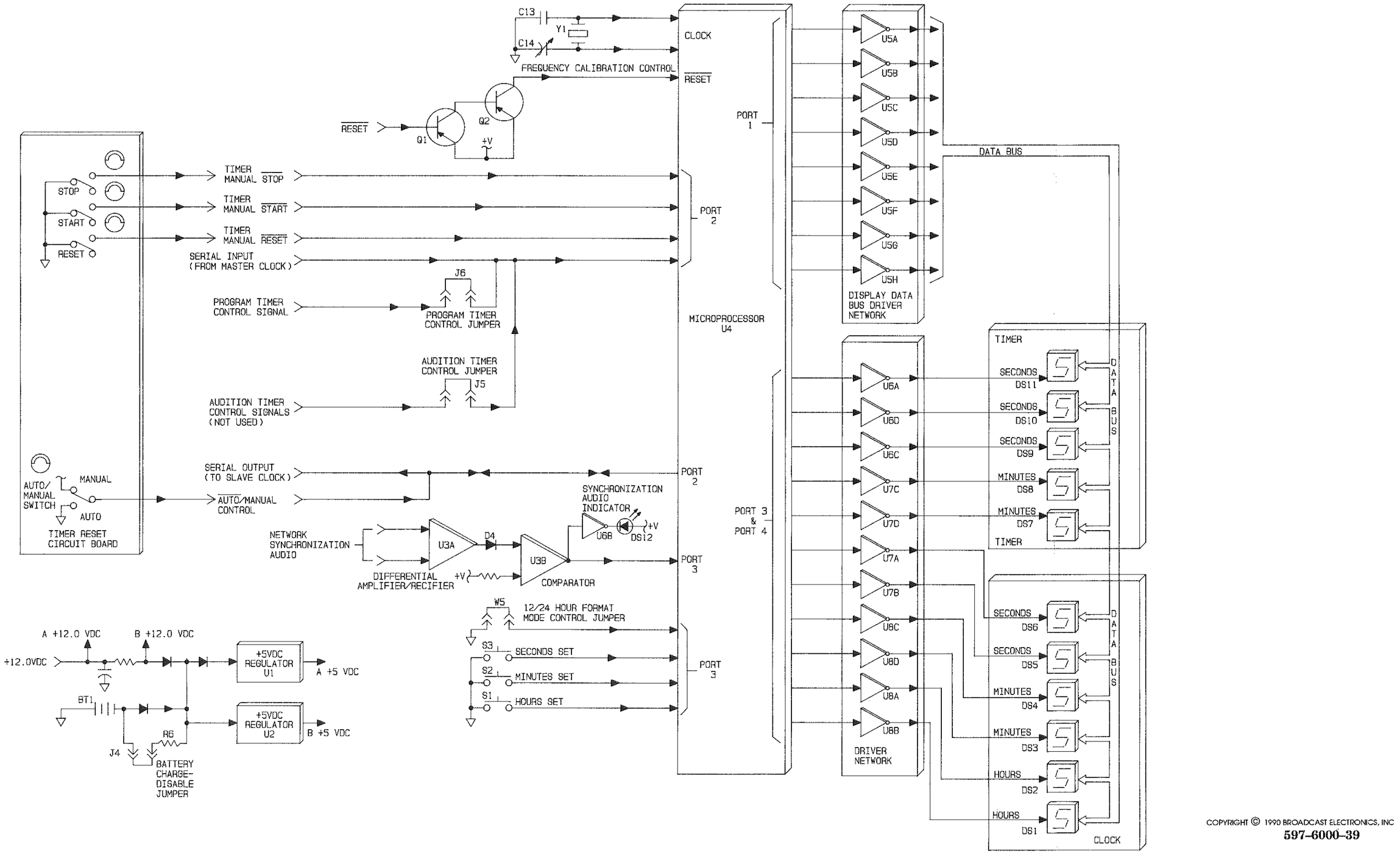

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FIGURE 4–6. CLOCK/TIMER MODULE AND TIMER RESET CIRCUIT BOARD DETAILED BLOCK DIAGRAM

4–118. Clock synchronization is initiated when network audio at a level of –30 dBm or greater is applied to a differential amplifier–rectifier stage consisting of integrated circuit U3A and diode D4. Amplifier/rectifier stage U3A/D4 will output a dc level to comparator U3B. As the audio level increases above the comparator reference voltage, the output of U3B will go HIGH. The HIGH is routed to microprocessor U4. U4 responds by 1) incrementing the clock 0.1 seconds if the audio is received before the hour or 2) decrementing the clock 0.1 seconds if the audio is received after the hour. The HIGH from U3B is also applied to inverter U6B. U6B will output a LOW to illuminate synchronization audio indicator DS12.

4–119. An indication of clock synchronization is provided by the clock decimal indicators. If the clock is incremented, the X10 digit decimal point will illuminate. If the clock is decremented, the clock X1 decimal point will illuminate. The decimal indicator display function is active only when the timer is operated to off.

4–120. **CLOCK SET CIRCUIT.** The clock set circuit consists of hour set switch S1, minutes set switch S2, and seconds set switch S3. The clock hour is set when switch S1 is depressed. A LOW is routed to port 3 of U4 to set the clock hour. Minutes set switch S2 and seconds set switch S3 operate in an identical manner.

4–121. **DATA DISPLAY CIRCUIT.**

4–122. Clock and timer information from microprocessor U4 is displayed on seven–segment LED digits. Clock information is presented on a six–digit display consisting of LED digits DS1 through DS6. Timer information is presented on a five–digit LED display consisting of DS7 through DS11. The data from U4 is interfaced to the LED displays through inverter driver networks.

4–123. When microprocessor U4 is required to display information on the clock seconds display, a HIGH from port 4 of U4 will be applied to inverter U7A. U7A will output a LOW to enable clock seconds display DS6. Next, port 1 of U4 will output an 8–bit code to a display data bus driver network consisting of inverters U5A through U5H. The 8–bit code from the data bus driver network is routed through the data bus to illuminate the required segments of LED display digit DS6. The remaining clock display digits and the timer display digits operate in an identical manner.

4–124. **MASTER/SLAVE CLOCK OPERATION.**

4–125. The clock/timer module may be connected in parallel to additional clock/timer modules for master/slave clock operation. When the serial output line from the master clock/timer module is connected to the serial input on additional clock/timer modules, the modules will be configured for master/slave operation.

4–126. **POWER SUPPLY CIRCUIT.**

NOTE

NOTE

IF THE CLOCK/TIMER MODULE DISPLAYS RANDOM INFORMATION AFTER A POWER FAILURE, PERFORM THE FOLLOWING: 1) REMOVE THE BATTERY, 2) OPERATE THE CONSOLE TO OFF, 3) OPERATE THE CONSOLE TO ON, AND 4) REPLACE THE BATTERY.

4–127. DC operating potentials for application to the clock/timer module components are produced by a regulator network. An unregulated +14V supply is applied through an RC filter network to +5V dc regulators U1 and U2. U1 and U2 are three terminal adjustable regulators containing internal thermal and short–circuit current limiting features. The regulated +5 volt outputs from U1 and U2 are routed for application to the circuit board components.

4–128. The power supply circuit also contains a battery back–up system and battery charging network. The battery will provide a +7.2V dc supply to maintain clock operation during a power failure. The system is designed for the installation of a rechargeable nickel–cadmium battery or a non–rechargeable alkaline battery. The alkaline battery will maintain clock operation for approximately 2 to 3 hours. Once the 2 to 3 hour period has elapsed, the battery must be replaced. The nickel–cadmium battery will maintain clock operation for approximately 30 minutes. However, the battery will be recharged during normal operation via jumper J4 and resistor R6. Jumper J4 is removed when a non–rechargeable alkaline cell is installed in the circuit. If the console is deenergized for an extended period of time, neither battery will maintain clock operation.

4–129. **TIMER RESET CIRCUIT BOARD.**

4–130. The timer reset circuit board consists of four position switch S3 (refer to Figure 4–6). The switch is designed to provide control of the clock/timer module timer section. The timer is equipped with two individual timers: 1) an automatic timer and 2) a manual timer.

4–131. The timer reset circuit board configures the timer section of the clock/timer module for either automatic timer or manual timer display via the auto switch. The switch routes control signals through the auto/manual control line and the serial output line for application to microprocessor U4 on the clock/timer module. A HIGH is routed to U4 to configure the timer for manual timer displays. A LOW is routed to U4 to configure the timer for automatic timer displays.

4–132. When the timer is configured for automatic timer displays, timer reset operations will be controlled by the program bus. Pulses from the bus are routed through the auto mode control line to U4 to reset the timer.

4–133. When the timer is configured for manual timer displays, three switch/indicators provide stop, start, and reset control functions. A manual timer stop command is generated when the stop switch/indicator is depressed. A LOW is routed through the manual stop control line to U4 to stop the manual timer. The manual timer start and reset switch/indicators operate in an identical manner.

4–134. **POWER SUPPLY MODULE.**

4–135. The console power supply consists of a self–contained modular assembly external to the console (refer to Figure 4–7). The module contains ac power transformation, dc rectification, and dc regulator circuitry for the generation of all console operating potentials. The potentials are routed through a power supply cable to the console for distribution.

4–136. **AC INPUT CIRCUIT.**

4–137. Primary ac power is applied to the module through the ac input receptacle. The ac input receptacle is equipped with built–in overload fuse F5 and ac control switch S1. Power from the receptacle is routed to terminal strip TB1. TB1 consists of a programming network for the configuration of the module for 117 volt or 234 volt ac input operation. AC power transformation is provided by transformer T1. T1 is equipped with two primary and two secondary windings. The secondary windings produce low–voltage ac potentials for application to the rectifier and regulator networks.

4–138. **RECTIFIER NETWORKS.**

4–139. The ac potential from secondary 1 of power transformer T1 is full–wave rectified by bridge rectifier D2 and filtered by capacitors C2 and C3 into two ±24 volt dc supplies. The +24 volt potentials are protected from overload conditions by fuses F1 and F2. The –24 volt potentials are protected from overload conditions by fuses F3 and F4. The ±24 volt supplies are routed from the rectifier network to a power supply circuit board.

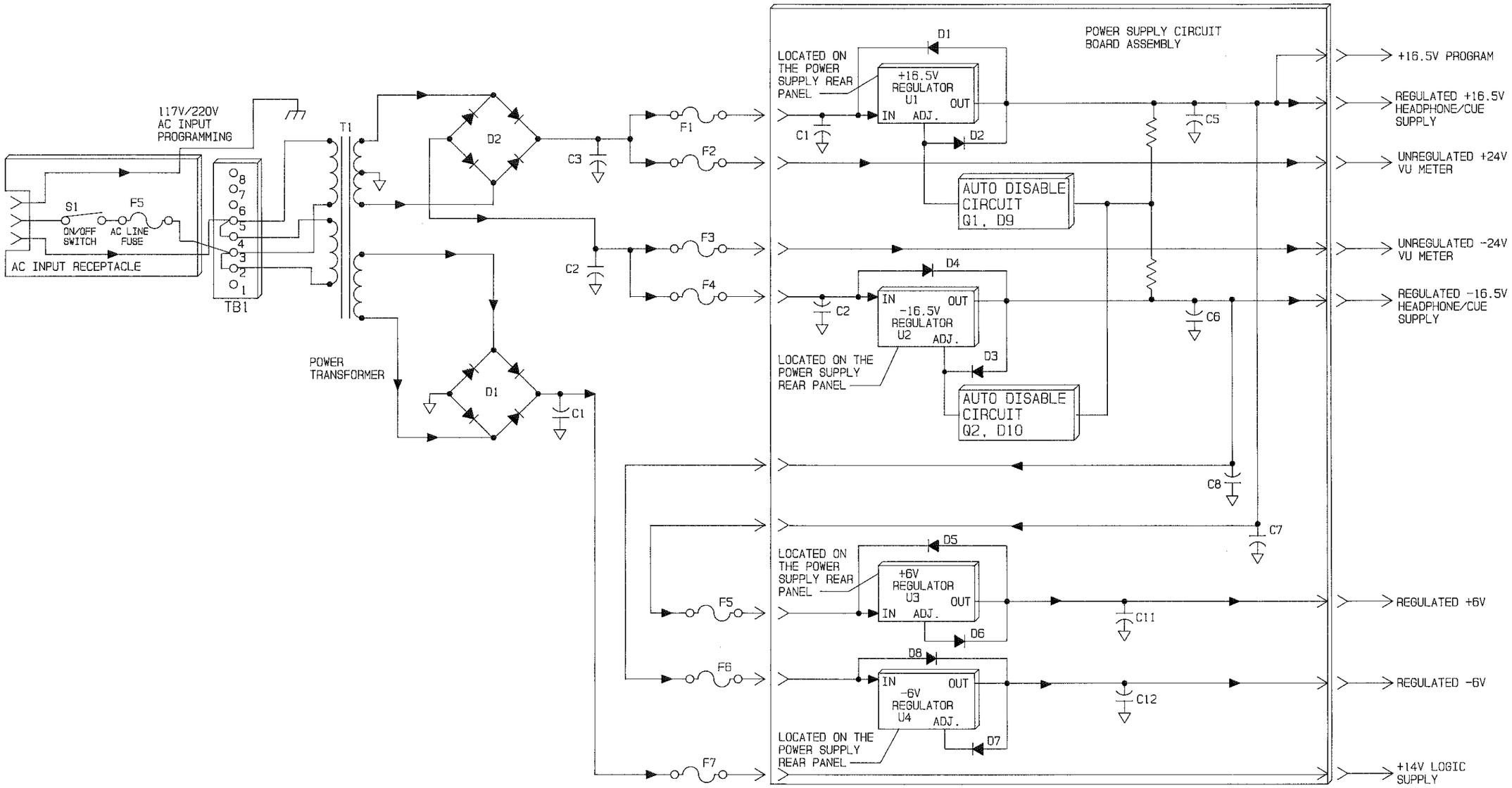

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FIGURE 4-7. POWER SUPPLY MODULE CIRCUITRY

4–140. The ac potential from secondary 2 of power transformer T1 is full–wave rectified by bridge rectifier D1 and filtered by capacitor C1 into a +14 volt dc supply. The supply is protected from overload conditions by fuse F7 and routed through the power supply circuit board for application to the console circuitry.

4–141. **POWER SUPPLY CIRCUIT BOARD.**

4–142. The power supply circuit board contains support circuitry for: 1) a ±16.5 volt regulator network and 2) a ±6 volt regulator network. The circuit board also routes unregulated ±24 volts supplies for application to the console circuitry.

4–143. **±16.5 VOLT REGULATOR CIRCUIT.** ±24 volt supplies from the rectifier circuit are applied to a regulator circuit which produces ±16.5V operating potentials. The +24 volt supply from fuse F1 is applied to +16.5 volt regulator U1. Capacitors C1 and C5 provide filtering for the supply. Transistor Q1 and diode D9 automatically disables the regulator in the event of failure in either the positive or negative supply. The output of U1 is routed for application to the cue/headphone amplifier circuitry. The +24 volt supply from fuse F2 is routed through the power supply circuit board to provide an unregulated dc potential for application to the VU meters.

4–144. The –24 volt supply from fuse F4 is applied to –16.5 volt regulator U2. Capacitors C2 and C6 provide filtering for the supply. Transistor Q2 and diode D10 automatically disables the regulator in the event of a failure in either the positive or negative supply. The output of U2 is routed for application to the cue/headphone amplifier circuitry. The –24 supply from F3 is routed through the power supply circuit board to provide an unregulated dc potential for application to the VU meters.

4–145. Regulators U1 and U2 are three–terminal adjustable devices containing internal thermal–overload and short–circuit current limiting features. Additional protection for the regulators is provided by diodes D1 through D4. Diodes D2 and D3 provide protection from reverse polarity potentials applied to the outputs. Diodes D1 and D4 provide protection from a short circuit applied to the input.

4–146. **±6 VOLT REGULATOR CIRCUIT.** ±16.5 volt supplies from the output of regulators U1 and U2 are applied to a ±6 volt regulator circuit. The +16.5 volt supply from fuse F5 is applied to +6 volt regulator U3. Capacitors C7 and C11 provide filtering for the supply. The output of U3 is routed for application to the console circuitry.

4–147. The –16.5 volt supply from fuse F6 is applied to –6 volt regulator U4. Capacitors C8 and C12 provide filtering for the supply. The output of U4 is routed for application to the console circuitry.

SECTION V
MAINTENANCE

5–1. INTRODUCTION.

5–2. This section presents maintenance and troubleshooting information for the Air–Trak 90 series audio consoles.

5–3. SAFETY CONSIDERATIONS.

5–4. Low voltages are used throughout the Air–Trak 90 console. All high voltages and current sources used within the power supply module have been shielded; however, do not touch any components within the console or power supply module with the power energized. Good judgment, care, and common sense must be practiced to prevent accidents. The procedures contained in this section should be performed only by experienced and trained maintenance personnel.

5–5. FIRST LEVEL MAINTENANCE.

5–6. First level maintenance consists of precautionary procedures applied to the equipment to prevent future failures. The procedures are performed on a regular basis and the results recorded in a performance log.

WARNING *DISCONNECT ALL CONSOLE PRIMARY POWER BEFORE ATTEMPTING ANY EQUIPMENT MAINTENANCE.*

WARNING

5–7. GENERAL.

5–8. Clean the console and the power supply of accumulated dust as required using a nylon–bristle brush and vacuum cleaner. Remove accumulated dirt from the console overlays using a cloth and any mild household cleaner. Inspect the console circuit boards for improperly seated semiconductors and components damaged by overheating. In addition, periodically inspect the circuit boards and the chassis for loose hardware.

5–9. FADER CONTROLS.

5–10. **PENNY AND GILES.** Penny and Giles slide–action fader controls are standard in each AT–90 console. If a fader control becomes defective, the control may require: 1) cleaning or 2) replacement of the control shaft bushings.

5–11. To clean the slide–action fader, remove the fader from the console. Remove the fader end–caps and slide the fader assembly out of the aluminum housing. Using distilled water and a cotton swab, remove all dust and dirt from the fader circuit board area. Re–assemble the fader control and replace the fader assembly in the console.

5–12. To replace the fader shaft bushings, replacement parts and a recommended procedure must be obtained from Penny and Giles Inc. Contact Penny and Giles at the address shown below for the replacement bushings and the installation instructions.

Penny and Giles
2617 Ocean Park Blvd.
Suite 1005
Santa Monica, California 90405

5–13. **SELLMARK.** The AT–90 consoles may be equipped with Sellmark slide–action fader controls. The Sellmark fader is an open frame unit and is not designed for routine maintenance or parts replacement. Therefore, if a Sellmark fader control becomes defective, it is recommended the fader be replaced.

5–14. SECOND LEVEL MAINTENANCE.

5–15. Second level maintenance consists of procedures required to restore the Air–Trak 90 console to operation after a fault has occurred. The procedures are divided into electrical adjustment procedures and troubleshooting.

5–16. ELECTRICAL ADJUSTMENTS.

5–17. The following text provides electrical adjustment procedures for the Air–Trak 90 console controls. The adjustments consist of distortion null, output level calibration, and VU meter calibration controls. Adjustment procedures for the Air–Trak 90 input level controls are presented in SECTION II, INSTALLATION. The adjustment procedures are presented in the following order:

A. Program Output Calibration – Level/VU Meter/Peak LED.

B. Audition Output Calibration – Level/VU Meter/Peak LED.

C. Mix Minus Bus Output Level Calibration.

D. Console Input Channel 1 Distortion Null Adjustment.

E. Console Input Channels 2 Through 6 Distortion Null Adjustment.

F. External Headphone Output Distortion Null Adjustment.

G. Control Room Monitor Distortion Null Adjustment.

H. Cue Channel Distortion Null Adjustment.

5–18. The following equipment is required for the electrical adjustment procedures:

A. Audio Analyzer (Potomac AA–51 or equivalent).

B. Insulated Non–Metallic Adjustment Tool.

C. Audio Signal Generator (Potomac AG–51 or equivalent).

D. 600 Ohm ±5%, 1/2W Resistor.

5–19. Input and output connections for the electrical adjustment procedures are presented in Figure 5–1. Refer to Figure 5–1 as required to connect equipment to the console during the adjustment procedures.

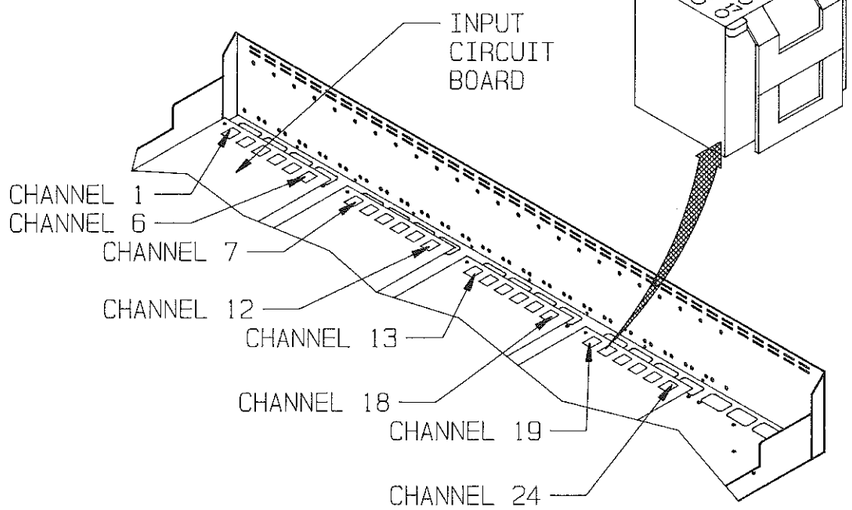
5–20. **PROGRAM OUTPUT CALIBRATION – LEVEL/VU METER/PEAK LED.** On AT–90 consoles, the program output level is adjusted by left channel program output level control R379 and right channel program output level control R390. The program VU meters are calibrated by left channel program VU meter control R272 and right channel program VU meter control R303. The program VU meter peak LEDs are calibrated by left channel program VU meter peak LED control R278 and right channel program VU meter peak LED control R313. On 24 channel console models, the mono program VU meter is calibrated by mono program VU meter control R45. Calibrate the program output level, VU meters, peak LEDs, and mono VU meter by performing the following procedure.

5–21. **Procedure.** To calibrate the program output level, VU meters, peak LEDs, and mono VU meter, proceed as follows:

5–22. Open the console and select a console channel and a source input for the procedure. Ensure the selected source input level is calibrated (refer to INPUT LEVEL ADJUSTMENT procedures in SECTION II, INSTALLATION if required).

5–23. Refer to Figure 5–1 and connect the audio signal generator to the left channel terminals of the selected console channel source input.

PIN NO.	DESCRIPTION
1	A INPUT, RIGHT CHANNEL −
2	A INPUT, RIGHT CHANNEL +
3	A INPUT, LEFT CHANNEL −
4	A INPUT, LEFT CHANNEL +
5	SHIELD GROUND
6	SHIELD GROUND
7	SHIELD GROUND
8	SHIELD GROUND
9	B INPUT, RIGHT CHANNEL −
10	B INPUT, RIGHT CHANNEL +
11	B INPUT, LEFT CHANNEL −
12	B INPUT, LEFT CHANNEL +
13	SHIELD GROUND
14	SHIELD GROUND
15	SHIELD GROUND
16	SHIELD GROUND
17	C INPUT, RIGHT CHANNEL −
18	C INPUT, RIGHT CHANNEL +
19	C INPUT, LEFT CHANNEL −
20	C INPUT, LEFT CHANNEL +



INPUT CONNECTIONS

AUDITION AUDIO OUTPUT CONNECTIONS

PIN NO.	DESCRIPTION
1	+ RIGHT AUDITION AUDIO OUTPUT
2	+ LEFT AUDITION AUDIO OUTPUT
3	− RIGHT AUDITION AUDIO OUTPUT
4	− LEFT AUDITION AUDIO OUTPUT
5	SHIELD GROUND
6	SHIELD GROUND

AUDITION/PROGRAM MONOPHONIC AUDIO OUTPUT CONNECTIONS

PIN NO.	DESCRIPTION
1	+ AUDITION AUDIO OUTPUT
2	+ PROGRAM AUDIO OUTPUT
3	− AUDITION AUDIO OUTPUT
4	− PROGRAM AUDIO OUTPUT
5	SHIELD GROUND
6	SHIELD GROUND

MIX MINUS AUDIO OUTPUT CONNECTIONS

PIN NO.	DESCRIPTION
1	− MIX MINUS AUDIO OUTPUT
2	SHIELD GROUND
3	+ MIX MINUS AUDIO OUTPUT
4	SHIELD GROUND

PROGRAM AUDIO OUTPUT CONNECTIONS

PIN NO.	DESCRIPTION
1	+ RIGHT PROGRAM AUDIO OUTPUT
2	+ LEFT PROGRAM AUDIO OUTPUT
3	− RIGHT PROGRAM AUDIO OUTPUT
4	− LEFT PROGRAM AUDIO OUTPUT
5	SHIELD GROUND
6	SHIELD GROUND

STUDIO MONITOR AUDIO OUTPUT CONNECTIONS

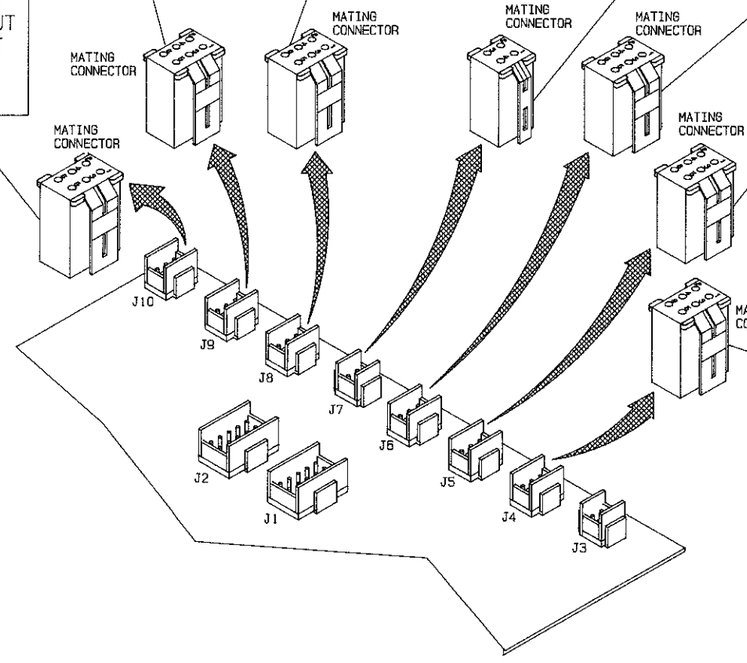
PIN NO.	DESCRIPTION
1	RIGHT STUDIO MONITOR AUDIO OUTPUT
2	LEFT STUDIO MONITOR AUDIO OUTPUT
3	RIGHT STUDIO MONITOR GROUND
4	LEFT STUDIO MONITOR GROUND
5	SHIELD GROUND
6	SHIELD GROUND

CONTROL ROOM (CR) MONITOR AUDIO OUTPUT CONNECTIONS

PIN NO.	DESCRIPTION
1	RIGHT CR MONITOR AUDIO OUTPUT
2	LEFT CR MONITOR AUDIO OUTPUT
3	RIGHT CR MONITOR GROUND
4	LEFT CR MONITOR GROUND
5	SHIELD GROUND
6	SHIELD GROUND

EXTERNAL HEADPHONE AUDIO OUTPUT CONNECTIONS

PIN NO.	DESCRIPTION
1	RIGHT HEADPHONE AUDIO OUTPUT
2	LEFT HEADPHONE AUDIO OUTPUT
3	RIGHT HEADPHONE GROUND
4	LEFT HEADPHONE GROUND
5	SHIELD GROUND
6	SHEILD GROUND



OUTPUT CONNECTIONS

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FIGURE 5–1.
AUDIO INPUT AND OUTPUT CONNECTIONS

5–24. Refer to Figure 5–1 and terminate the program output left channel with a 600 Ohm resistor.

5–25. Refer to Figure 5–1 and connect the audio analyzer to the program output left channel.

5–26. Determine if the selected input is programmed for a microphone, consumer, or line level source. Adjust the audio generator for a 1 kHz output at: 1) –60 dB for an input programmed for a microphone level, 2) –10 dB for an input programmed for a consumer level, or 3) +4 dB for an input programmed for a line level. Record the level _____ .

5–27. Configure the audio analyzer for level indications.

5–28. Operate the console channel fader to the 0 position and route the test audio to the program output bus.

5–29. Refer to Figure 5–2 and adjust left channel program output level control R379 until the audio analyzer indicates the desired output level.

5–30. Refer to Figure 5–2 and adjust left channel program VU meter calibrate control R272 until the left channel program VU meter indicates 0 VU.

5–31. Adjust the audio generator for a 1 kHz output at a level which is 10 dB greater than the level recorded in the preceding text.

5–32. Refer to Figure 5–2 and adjust left channel program peak LED calibrate control R278 until the left channel program peak LED just illuminates.

5–33. Repeat the procedure for the right channel. Connect the audio generator to the right channel input and the audio analyzer to the right channel output. Calibrate the right channel output level using right channel program output level control R390. Calibrate the right channel VU meter using right channel program VU meter calibrate control R303. Calibrate the right channel program peak LED using right channel program peak LED calibrate control R313.

5–34. For 24 channel console models only, adjust the mono program VU meter as follows:

A. Adjust the audio generator for a 1 kHz output at: 1) –60 dB for an input programmed for a microphone level, 2) –10 dB for an input programmed for a consumer level, or 3) +4 dB for an input programmed a line level.

B. Refer to Figure 5–3 and adjust mono program VU meter calibrate control R45 until the mono program VU meter indicates 0 VU.

5–35. Disconnect all test equipment and reconnect any console cables as required.

5–36. **AUDITION OUTPUT CALIBRATION – LEVEL/VU METER/PEAK LED.** On AT–90 consoles, the audition output level is adjusted by left channel audition output level control R363 and right channel audition output level control R372. The audition VU meters are calibrated by left channel audition VU meter control R200 and right channel audition VU meter control R233. The audition VU meter peak LEDs are calibrated by left channel audition VU meter peak LED control R206 and right channel audition VU meter peak LED control R242. On 24 channel console models, the mono audition VU meter is calibrated by mono audition VU meter control R46. Calibrate the audition output level, VU meters, peak LEDs, and mono VU meter by performing the following procedure.

5–37. **Procedure.** To calibrate the audition output, refer to the PROGRAM OUTPUT CALIBRATION – LEVEL/VU METER/PEAK LED procedure presented in the preceding text and perform the procedures for the audition output. Connect the audio analyzer to the audition output terminals and route the audio signal to the audition output. Refer to Figure 5–2 and calibrate the audition output using the following controls.

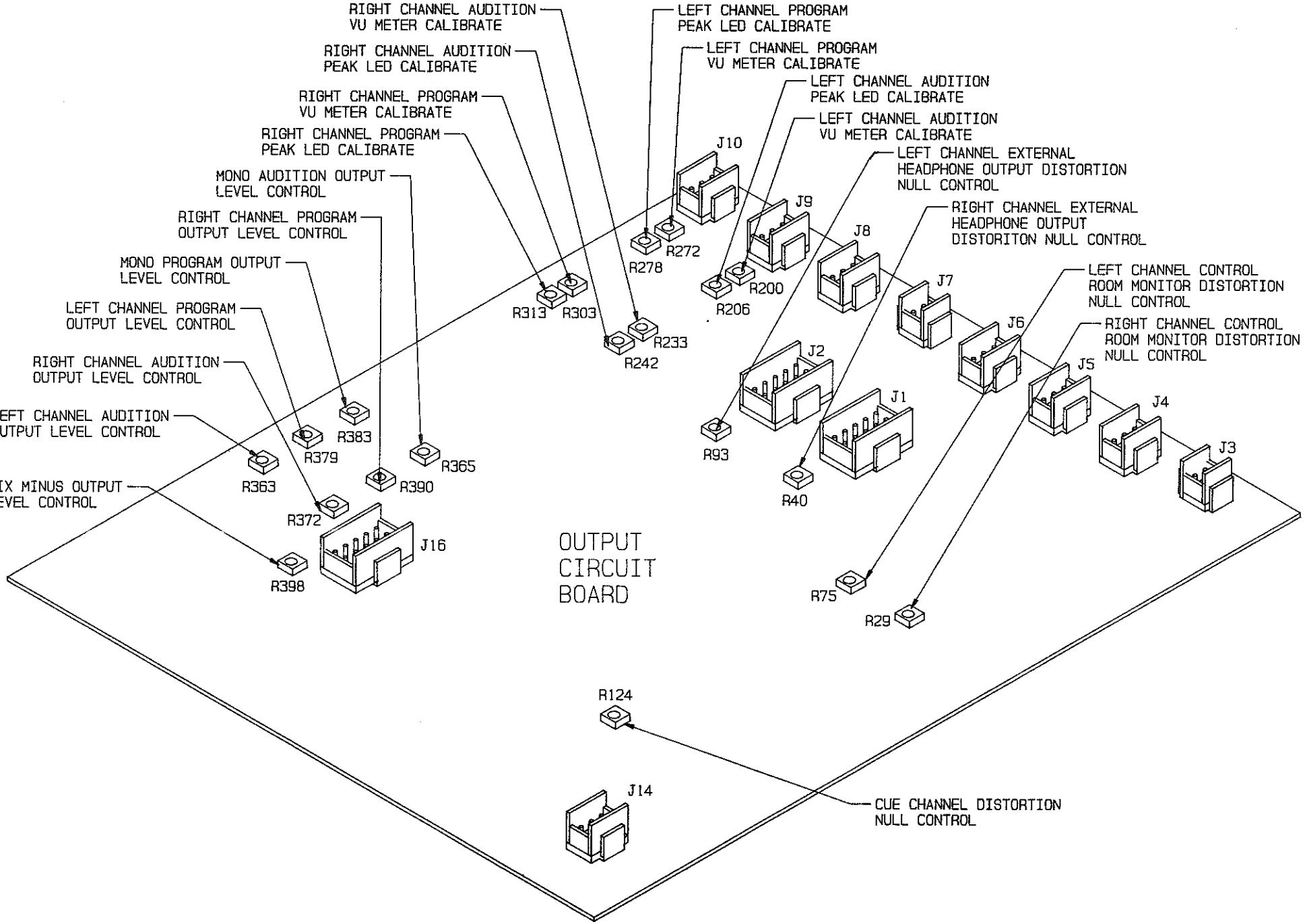

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FIGURE 5–2. DISTORTION NULL, OUTPUT LEVEL, AND VU METER CALIBRATE CONTROLS

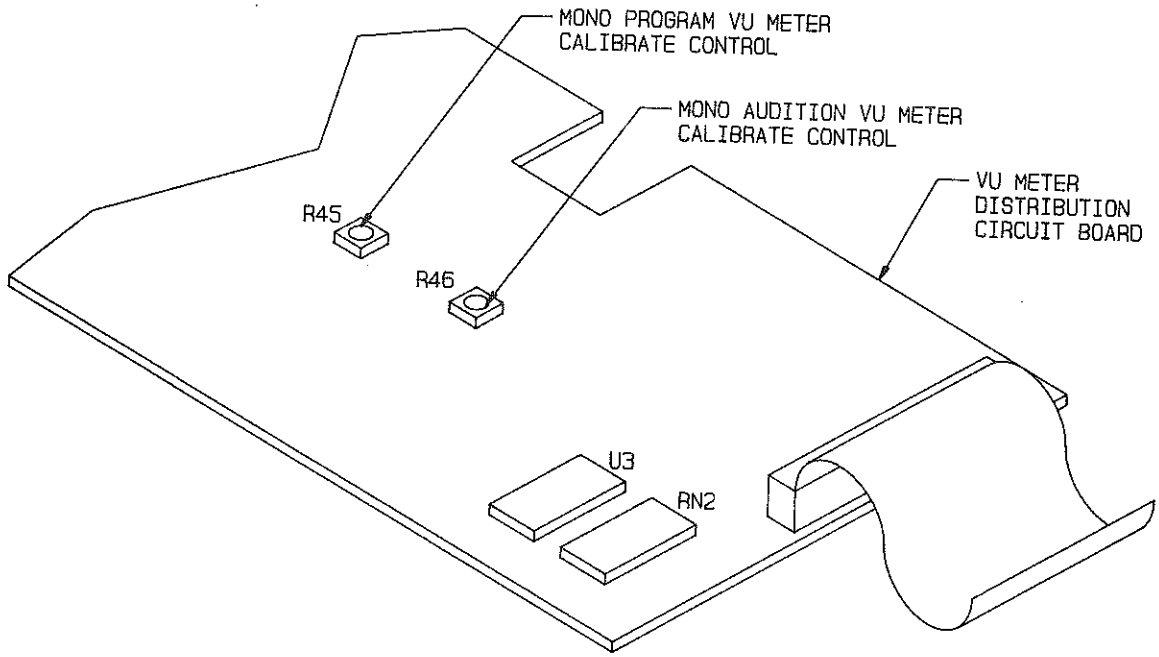

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FIGURE 5–3. MONO PROGRAM AND AUDITION VU METER CONTROLS

1. Left channel audition output level control R363.
2. Right channel audition output level control R372
3. Left channel audition VU meter control R200.
4. Right channel audition VU meter control R233.
5. Left channel audition VU meter peak LED calibrate control R206.
6. Right channel audition VU Peak LED calibrate control R242.
7. Mono audition VU meter calibrate control R46.

5–38. **MIX–MINUS BUS OUTPUT LEVEL CALIBRATION.** The mix–minus bus output level is adjusted by mix–minus bus output level control R398. Adjust the mix–minus bus output level by performing the following procedure.

5–39. **Procedure.** To calibrate the mix minus bus output level, proceed as follows:

5–40. Open the console and select a console channel which is programmed for mix–minus bus operation. Ensure the selected source input level is calibrated (refer to INPUT LEVEL ADJUSTMENT procedures in SECTION II, INSTALLATION if required).

5–41. Refer to Figure 5–1 and connect the audio signal generator to the left channel terminals of the selected console channel source input.

5–42. Refer to Figure 5–1 and terminate the console mix minus bus output with a 600 Ohm resistor.

5–43. Refer to Figure 5–1 and connect the audio analyzer to the mix minus bus output.

5–44. Determine if the selected input is programmed for a microphone, consumer, or line level source. Adjust the audio generator for a 1 kHz output at: 1) –60 dB for an input programmed for a microphone level, 2) –10 dB for an input programmed for a consumer level, or 3) +4 dB for an input programmed for a line level.

5–45. Configure the audio analyzer for level indications.

5–46. Operate the console channel fader to the 0 position.

5–47. Refer to Figure 5–2 and adjust mix minus bus output level control R398 until the audio analyzer indicates the desired output level.

5–48. Disconnect all test equipment and reconnect any console cables as required.

5–49. **CONSOLE INPUT CHANNEL 1 DISTORTION NULL ADJUSTMENT.** The console channel 1 distortion is nulled by left channel 1 distortion null control R653 and right channel 1 distortion null control R662. Null the console channel 1 distortion by performing the following procedure.

5–50. **Procedure.** To null the console channel 1 distortion, proceed as follows:

5–51. Open the console and select a channel 1 source input for the procedure.

5–52. Refer to Figure 5–1 and connect the audio signal generator to the left channel terminals of the selected channel 1 source input.

5–53. Refer to Figure 5–1 and terminate the left channel audition output with a 600 Ohm resistor.

5–54. Refer to Figure 5–1 and connect the audio analyzer to the audition output left channel.

5–55. Determine if the selected input is programmed for a microphone, consumer, or line level source. Adjust the audio generator for a 1 kHz output at: 1) –60 dB for an input programmed for a microphone level, 2) –10 dB for an input programmed for a consumer level, or 3) +4 dB for an input programmed for a line level.

5–56. Configure the audio analyzer for distortion indications.

5–57. Operate the console channel fader to the 0 position and route the audio to the audition output.

5–58. Refer to Figure 5–4 and adjust left channel 1 distortion null control R653 for a minimum distortion indication on the audio analyzer.

5–59. Repeat the procedure for the right channel. Connect the audio generator to the right channel input and the audio analyzer to the right channel audition output. Null the right channel distortion using right channel 1 distortion null control R662.

5–60. Disconnect all test equipment and reconnect any console cables as required.

5–61. **CONSOLE INPUT CHANNEL 2 THROUGH 6 DISTORTION NULL ADJUSTMENT.** Console channel 2 through 6 distortion is nulled by left and right channel distortion null controls. Null the distortion in console channels 2 through 6 by performing the following procedure.

5–62. **Procedure.** To null distortion in console channels 2 through 6, refer to the CONSOLE INPUT CHANNEL 1 DISTORTION NULL ADJUSTMENT procedure presented in the preceding text and perform the procedure for console channels 2 through 6. Refer to Figure 5–4 and null the console channel 2 through 6 distortion using the following controls.

1. Left channel 2 distortion null control R553.
2. Right channel 2 distortion null control R562.
3. Left channel 3 distortion null control R453.
4. Right channel 3 distortion null control R462.
5. Left channel 4 distortion null control R353.
6. Right channel 4 distortion null control R362.

7. Left channel 5 distortion null control R253.
8. Right channel 5 distortion null control R262.
9. Left channel 6 distortion null control R153.
10. Right channel 6 distortion null control R162.

5–63. **EXTERNAL HEADPHONE OUTPUT DISTORTION NULL ADJUSTMENT.** The external headphone output distortion is nulled by left channel external headphone output distortion null control R93 and right channel external headphone output distortion null control R40. Null the external headphone output distortion by performing the following procedure.

5–64. **Procedure.** To null the external headphone output distortion, proceed as follows:

5–65. Open the console and select a console channel and a source input for the procedure.

5–66. Refer to Figure 5–1 and connect the audio signal generator to the left channel terminals of the selected console channel source input.

5–67. Refer to Figure 5–1 and terminate the external headphone output left channel with a 600 resistor.

5–68. Refer to Figure 5–1 and connect the audio analyzer to the external headphone output left channel.

5–69. Determine if the selected input is programmed for a microphone, consumer, or line level source. Adjust the audio generator for a 1 kHz output at: 1) –60 dB for an input programmed for a microphone level, 2) –10 dB for an input programmed for a consumer level, or 3) +4 dB for an input programmed for a line level.

5–70. Configure the audio analyzer for distortion indications.

5–71. Operate the console channel fader to the 0 position.

5–72. Route the audio to the audition output and operate the headphone system to monitor the audition audio.

5–73. Refer to Figure 5–2 and adjust left channel external headphone output distortion null control R93 for a minimum distortion indication on the audio analyzer.

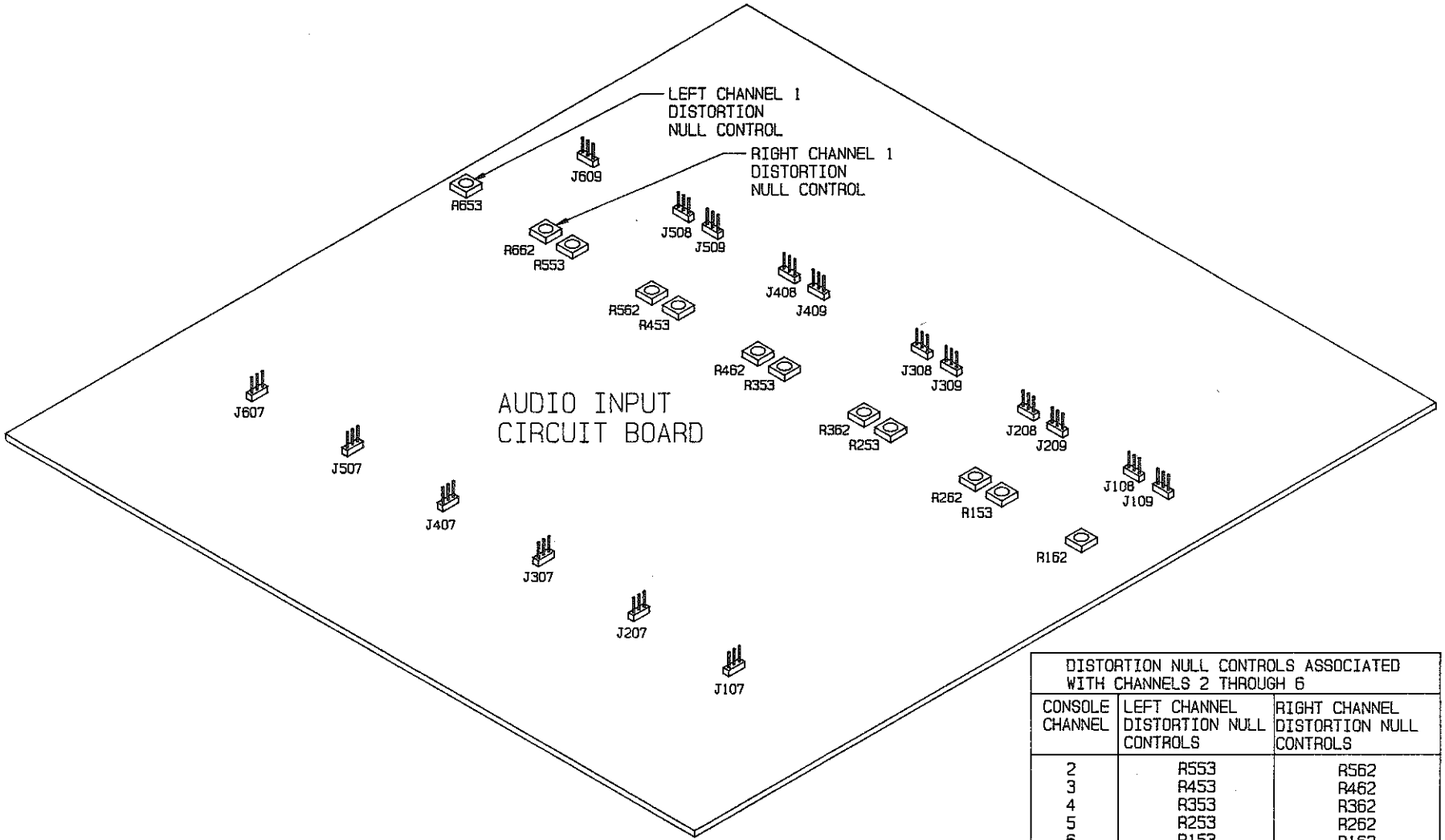
5–74. Repeat the procedure for the right channel. Connect the audio generator to the right channel input and the audio analyzer to the right channel audition output. Null the right channel distortion using right channel external headphone output distortion null control R40.

5–75. Disconnect all test equipment and reconnect any console cables as required.

5–76. **CONTROL ROOM MONITOR DISTORTION NULL ADJUSTMENT.** The control room monitor distortion is nulled by left channel control room monitor distortion null control R75 and right channel control room monitor distortion null control R29 on the output circuit board. Null the control room monitor distortion by performing the following procedure.

5–77. **Procedure.** To null the control room monitor distortion, refer to the EXTERNAL HEADPHONE OUTPUT DISTORTION NULL procedure presented in the preceding text and perform the procedure for the control room monitor. Connect the audio analyzer to the control room monitor output terminals. Refer to Figure 5–2 and null the control room monitor distortion by using left channel control room monitor distortion null control R75 and right channel control room monitor distortion null control R29.

5–78. **CUE CHANNEL DISTORTION NULL ADJUSTMENT.** The cue channel distortion is nulled by cue channel distortion null control R124. Null the cue channel distortion by performing the following procedure.



DISTORTION NULL CONTROLS ASSOCIATED WITH CHANNELS 2 THROUGH 6		
CONSOLE CHANNEL	LEFT CHANNEL DISTORTION NULL CONTROLS	RIGHT CHANNEL DISTORTION NULL CONTROLS
2	R553	R562
3	R453	R462
4	R353	R362
5	R253	R262
6	R153	R162

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FIGURE 5–4. INPUT CHANNEL DISTORTION NULL CONTROLS

5–79. **Procedure.** To null the cue channel distortion, proceed as follows:

5–80. Open the console and select a console channel and a source input for the procedure.

5–81. Refer to Figure 5–1 and connect the audio signal generator to the left channel terminals of the selected console channel source input.

5–82. Refer to Figure 5–1 and terminate the external cue audio output with a 600 Ohm resistor.

5–83. Refer to Figure 5–1 and connect the audio analyzer to the external cue audio output.

5–84. Determine if the selected input is programmed for a microphone, consumer, or line level source. Adjust the audio generator for a 1 kHz output at: 1) –60 dB for an input programmed for a microphone level, 2) –10 dB for an input programmed for a consumer level, or 3) +4 dB for an input programmed for a line level.

5–85. Configure the audio analyzer for distortion indications.

5–86. Operate the console channel to route the audio to the cue bus.

5–87. Refer to Figure 5–2 and adjust cue channel distortion null control R124 for a minimum distortion indication on the audio analyzer.

5–88. Disconnect all test equipment and reconnect any console cables as required.

5–89. **TROUBLESHOOTING.**

5–90. **SAFETY CONSIDERATIONS.** Low voltages are used throughout the Air–Trak 90 console. The power supply contains primary ac line voltage and high current capacitors. All power supply module high voltage and current components contain shields; however, do not perform any maintenance or troubleshooting procedures within the power supply with power energized. Troubleshooting with power energized is always considered hazardous and caution should be observed. Good judgment, care, and common sense must be practiced to prevent accidents.

WARNING ***DISCONNECT ALL CONSOLE POWER BEFORE REMOVING OR INSERTING PRINTED CIRCUIT BOARDS OR REPLACING ANY COMPONENTS.***

WARNING

CAUTION ***INADVERTENT CONTACT BETWEEN ADJACENT COMPONENTS OR CIRCUIT BOARDS WITH TEST EQUIPMENT MAY CAUSE SERIOUS DAMAGE TO THE CONSOLE.***

CAUTION

5–91. **CONSOLE SYSTEM TROUBLESHOOTING.** The troubleshooting philosophy for the Air–Trak 90 console consists of isolating a problem to a specific circuit board. Tables 5–1 through 5–12 present Air–Trak 90 console troubleshooting. Figure 5–5 presents console channel and circuit board locations. Refer to the tables as required to isolate problems to a specific circuit board.

TABLE 5–1. CONSOLE INPUT CHANNEL TROUBLESHOOTING
(Sheet 1 of 4)

SYMPTOM	DEFECT
CHANNEL WILL NOT OPERATE TO ON.	1. Ensure an A, B, or C input is selected. 2. Check the ribbon cable between the channel control circuit board and the channel on/off switch interface circuit board. 3. Check the channel on switch. 4. Check the channel control hybrid.
CHANNEL WILL NOT OPERATE TO OFF.	1. Check the ribbon cable between the channel control circuit board and the channel on/off switch interface circuit board. 2. Check the channel off switch. 3. Check the channel control hybrid.
CHANNEL OPERATES TO CUE – CUE LED DOES NOT ILLUMINATE.	1. Check the ribbon cable between the channel control circuit board and the channel on/off switch interface circuit board. 2. Check cue indicator DS31 on the on/off switch interface circuit board.
CHANNEL WILL NOT OPERATE TO CUE.	1. Check U1, U3, and U4 on the channel control circuit board. 2. Check regulator U1 on the monitor distribution circuit board. 3. Check resistors R8, R9, and capacitor C5 on the monitor distribution circuit board. 4. Check capacitors C3, C7, C13, C21,C22, and C24 on the channel control circuit board. 5. Check the ribbon cable between the channel control circuit board and the input circuit board. 6. Check for a HIGH control signal at pin 9 of U109 – CH6, U209 – CH5, U309 – CH4, U409 – CH3, U509 – CH2, or U609 – CH1 on the input circuit board. 7. Check U109 – CH6, U209 – CH5, U309 – CH4, U409 –CH3, U509 – CH2, or U609 – CH1 on the input circuit board.
CHANNEL WILL OPERATE TO CUE – NO CUE AUDIO OUTPUT.	1. Ensure an A, B, or C input is selected. 2. Ensure the cue level control is operated to obtain normal monitoring levels. 3. Check cue speaker fuse F1 on the output circuit board. 4. Ensure header J57 – CH1, J59 – CH2, J61 – CH3, J63 – CH4, J65 – CH5, or J67 – CH6 on the control circuit board is correctly pro–grammed.

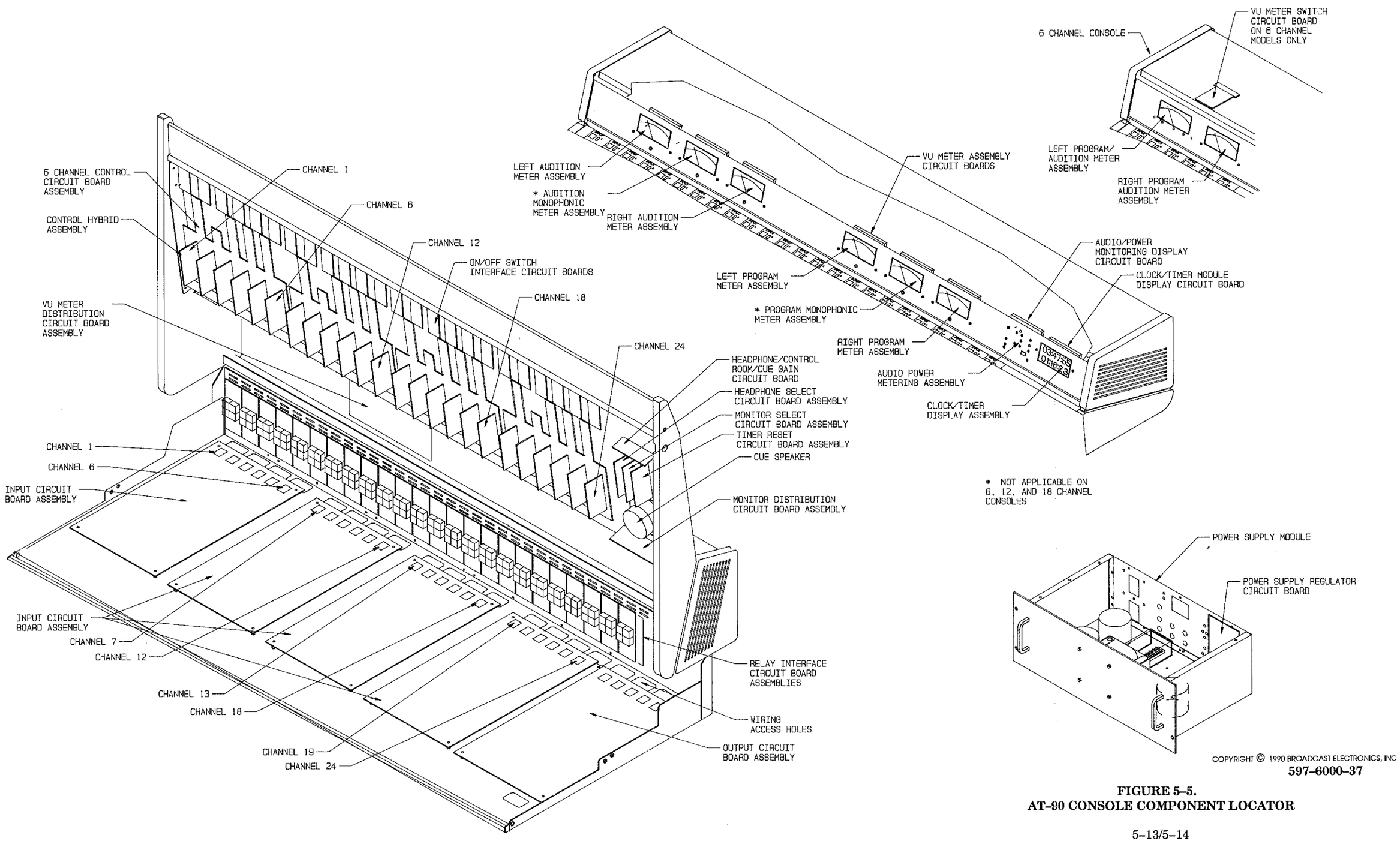

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FIGURE 5–5.
AT-90 CONSOLE COMPONENT LOCATOR

TABLE 5–1. CONSOLE INPUT CHANNEL TROUBLESHOOTING
(Sheet 2 of 4)

SYMPTOM	DEFECT
CHANNEL WILL OPERATE TO CUE – NO CUE AUDIO OUTPUT .	5. Check the cable between the output circuit board and the cue speaker. 6. Check the cable between: 1) the output circuit board and the monitor distribution circuit board and 2) the monitor distribution circuit board and the headphone/control room/cue gain circuit board. 7. Check cue summing amplifier U107B – CH6, U107A – CH5, U307B –CH4, U307A – CH3, U507B – CH2, or U507A – CH1 on the input circuit board. 8. Check U109 – CH6, U209 – CH5, U309 – CH4, U409 – CH3, U509 – CH2, or U609 – CH1 on the input circuit board. 9. Check U21 on the output circuit board. 10. Check the cue speaker.
CHANNEL FADER HAS NO CONTROL OF SIGNAL LEVEL – OUTPUT OF CHANNEL IS HIGH.	1. Check fuse F7 in the power supply. 2. Check the wiring from the fader to the channel control circuit board. 3. Check regulator U1 on the monitor distribution circuit board. 4. Check U106 – CH6, U206 – CH5, U306 – CH4, U406 – CH3, U506 – CH2, or U606 – CH1 on the input circuit board. 5. Check U104/U105 – CH6, U204/U205 – CH5, U304/U305 – CH4, U404/U405 – CH3, U504/U505 – CH2, or U604/U605 – CH1 on the input circuit board.
CHANNEL FADER HAS NO CONTROL OF SIGNAL LEVEL – OUTPUT OF CHANNEL IS LOW.	1. Check the wiring from the fader to channel control circuit board. 2. Check regulator U1 on the monitor distribution circuit board. 3. Check U106 – CH6, U206 – CH5, U306 – CH4, U406 – CH3, U506 – CH2, or U606 – CH1 on the input circuit board. 4. Check U104/U105 – CH6, U204/U205 – CH5, U304/U305 – CH4, U404/U405 – CH3, U504/U505 – CH2, or U604/U605 – CH1 on the input circuit board.

TABLE 5-1. CONSOLE INPUT CHANNEL TROUBLESHOOTING
(Sheet 3 of 4)

SYMPTOM	DEFECT
CHANNEL FADER CONTROL IS OPERATIONAL – AUDIO TAPER IS NOT EQUAL TO OVERLAY.	1. If left channel only is defective, check U104 – CH6, U204 – CH5, U304 – CH4, U404 – CH3, U504 – CH2, or U604 – CH1 on the input circuit board. If right channel only is defective, check U105 – CH6, U205 – CH5, U305 – CH4, U405 – CH3, U505 – CH2, or U605 – CH1 on the input circuit board. 2. Check diodes D100 thru D103 – CH6, D200 thru D203 – CH5, D300 thru D303 – CH4, D400 thru D403 – CH3, D500 thru 503 – CH2, or D600 thru D603 – CH1 on the input circuit board.
CHANNEL FADER CONTROL IS OPERATIONAL – FADER IS NOISY.	1. Clean fader control surface. 2. If left channel only is defective, check U104 – CH6, U204 – CH5, U304 – CH4, U404 – CH3, U504 – CH2, or U604 – CH1 on the input circuit board. If right channel only is defective, check U105 – CH6, U205 – CH5, U305 – CH4, U405 – CH3, U505 – CH2, or U605 – CH1 on the input circuit board.
CHANNEL PROGRAM OUTPUT ROUTING WILL NOT ACTIVATE.	1. Check the cable between the channel channel control circuit board and the input circuit board. 2. Check program switch S4 – CH1, S9 – CH2, S14 – CH3, S19 – CH4, S24 – CH5, or S29 – CH6 on the channel control circuit board. 3. Check the channel control hybrid. 4. Check U109/U110 – CH6, U209/U210 – CH5, U309/U310 – CH4, U409/U410 – CH3, U509/U510 – CH2, or U609/U610 – CH1 on the input circuit board. 5. Check Q100/Q101 – CH6, Q200/Q201 – CH5, Q300/Q301 – CH4, Q400/Q401 – CH3, U500/U501 – CH2, or Q600/Q601 – CH1 on the input circuit board. 6. Check fuses F5 and F6 in the power supply. 7. Check U3 and U4 in the power supply.

WARNING: DISCONNECT PRIMARY POWER PRIOR TO SERVICING

TABLE 5–1. CONSOLE INPUT CHANNEL TROUBLESHOOTING
(Sheet 4 of 4)

SYMPTOM	DEFECT
CHANNEL AUDITION OUTPUT ROUTING WILL NOT ACTIVATE.	1. Check the cable between the channel control circuit board and the input circuit board. 2. Check audition switch S5 – CH1, S10 – CH2, S15 – CH3, S20 – CH4, S25 – CH5, or S30 – CH6 on the channel control circuit board. 3. Check the channel control hybrid. 4. Check U109/U110 – CH6, U209/U210 – CH5, U309/U310 – CH4, U409/U410 – CH3, U509/U510 – CH2, or U609/U610 – CH1 on the input circuit board. 5. Check fuses F5 and F6 in the power supply. 6. Check U3 and U4 in the power supply.
CHANNEL INPUT SELECTION WILL NOT ACTIVATE.	1. Check the cable between the channel channel control circuit board and the input circuit board. 3. Check input A, B, and C switches S1/S2/S3 – CH1, S6/S7/S8 – CH2, S11/S12/S13 – CH3, S16/S17/S18 – CH4, S21/S22/S23 – CH5, or S26/S27/S28 – CH6 on the channel control circuit board. 4. Check the channel control hybrid.
CHANNEL INPUT SELECTION WILL NOT ACTIVATE	5. Check U100/U102 – CH6, U200/U202 – CH5, U300/U302 – CH4, U400/U402 – CH3, U500/U502 – CH2, or U600/U602 – CH1 on the input circuit board. 6. Check fuses F5 and F6 in the power supply. 7. Check U3 and U4 in the power supply.

TABLE 5–2 CLOCK/TIMER TROUBLESHOOTING

SYMPTOM	DEFECT
TIMER WILL NOT RESET WHEN CHANNEL IS OPERATED TO ON.	1. Ensure the **AUTO** switch/indicator is illuminated. 2. Ensure the channel is configured to route audio to the program bus. 3. Ensure jumper P6 on the clock/timer module is installed. 4. Ensure jumpers P69 – CH1, P70 – CH2, P71 – CH3, P72 – CH4, P73 – CH5, or P74 – CH6 on the channel control circuit board is installed.
CLOCK/TIMER DISPLAYS RANDOM INFORMATION DURING POWER–UP CONDITIONS.	1. Remove the battery on the clock/timer module, operate the console to off, re–apply power to the console, and replace the battery.

TABLE 5–3 REMOTE CONTROL TROUBLESHOOTING
(Sheet 1 of 2)

SYMPTOM	DEFECT
AUDIO SOURCE WILL NOT START WHEN CHANNEL ON SWITCH IS DEPRESSED.	1. Ensure the appropriate source input switch is depressed. 2. Ensure headers J2/J3/J4 – CH1, J13/ J14/J15 – CH2, J22/J23/J24 – CH3, J31/J32/J33 – CH4, J40/J41/J42 – CH5, J49/J50/J51 –CH6 on the channel control circuit board are configured for the appropriate type of start command required by the source. 3. Check the channel control hybrid. 4. Check fuse F7 and the +14 volt dc supply.
AUDIO SOURCE WILL NOT START WHEN CHANNEL ON SWITCH IS DEPRESSED – RELAY INTERFACE CIRCUIT BOARD IS INSTALLED.	1. Ensure the appropriate source input switch is depressed. 2. Check the cable between the channel channel control circuit board and the relay interface circuit board. 3. Ensure headers J2/J3/J4 – CH1, J13/ J14/J15 – CH2, J22/J23/J24 – CH3, J31/J32/J33 – CH4, J40/J41/J42 – CH5, J49/J50/J51 –CH6 on the channel control circuit board are configured for the appropriate type of start command required by the source. 4. Check diode D1 on the relay interface circuit board. 5. Check the channel control hybrid. 6. Check fuse F7 and the +14 volt dc supply.
HEADPHONE SWITCH WILL NOT SELECT INPUTS.	1. Check headphone select switch S1 on the headphone select switch circuit board. 2. Check for +6 volts dc at pin 10 of J7 on the headphone select circuit board. 3. Check diodes D3 thru D11 on the headphone select circuit board. 4. Check for +6 volts dc at D8 on the channel control circuit board. 5. Check for +6 volts dc at the output of U2 on the channel control circuit board. 6. Check for +6 volt dc control voltage at J12 pins 5, 7, 9, and 11 on the output circuit board. 7. Check U6 and U14 on the output circuit board.

WARNING: DISCONNECT PRIMARY POWER PRIOR TO SERVICING

TABLE 5–3 REMOTE CONTROL TROUBLESHOOTING
(Sheet 2 of 2)

SYMPTOM	DEFECT
NO HEADPHONE AUDIO OUTPUT.	1. Ensure the desired headphone audio source switch is depressed. 2. Ensure the headphone level control is operated for a normal monitoring level. 3. If the desired headphone audio source is from an external input, check the adjustment of R2/R52 – Off–Air 1, R4/R54 – Off–Air 2, R6/R56 – Ext 1, R8/R58 – Ext 2, or R10/R60 – Ext 3 on the output circuit board. 4. Check the cable between: 1) the output circuit board and the monitor distribution circuit board and 2) the monitor distribution circuit board and the headphone/control room/cue gain circuit board. 5. Check the cable between the audio output circuit board and the headphone jack. 6. Check U6 and U14 on the output circuit board. 7. Check U8 and U15 on the output circuit board. 8. Check U12, U22, and U23 on the output circuit board.

TABLE 5–4 CONTROL ROOM MONITOR SYSTEM TROUBLESHOOTING
(Sheet 1 of 2)

SYMPTOM	DEFECT
CONTROL ROOM MONITOR SWITCH WILL NOT SELECT INPUTS.	1. Check control room monitor select switch S2 on the control room monitor select switch circuit board. 2. Check for +6 volts dc at pin 10 of J7 on the control room monitor select circuit board. 3. Check diodes D12 thru D20 on the control room monitor select circuit board. 4. Check for +6 volts dc at D8 on the channel control circuit board. 5. Check for +6 volts dc at the output of U2 on the channel control circuit board. 6. Check for +6 volt dc control voltage at J12 pins 13, 15, 17, and 19 on the output circuit board. 7. Check U1 and U10 on the output circuit board.
NO CONTROL ROOM MONITOR AUDIO OUTPUT.	1. Ensure the desired control room monitor audio source switch is depressed. 2. Ensure the control room monitor level control is operated for a normal monitoring level.

TABLE 5–4 CONTROL ROOM MONITOR SYSTEM TROUBLESHOOTING
(Sheet 2 of 2)

SYMPTOM	DEFECT
NO CONTROL ROOM MONITOR AUDIO OUTPUT.	3. If the desired control room monitor audio source is from an external input, check the adjustment of R2/R52 – Off–Air 1, R4/R54 – Off–Air 2, R6/R56 – Ext 1, R8/R58 – Ext 2, or R10/R60 – Ext 3 on the output circuit board. 4. Check the cable between: 1) the output circuit board and the monitor distribution circuit board and 2) the monitor distribution circuit board and the headphone/control room/cue gain circuit board. 5. Check U6 and U14 on the output circuit board. 6. Check U4 and U11 on the output circuit board. 7. Check U5 on the output circuit board.

TABLE 5–5. MONO TEST SYSTEM TROUBLESHOOTING.

SYMPTOM	DEFECT
NO MONO TEST SYSTEM OPERATION.	1. Check mono test switch S3 on the timer reset circuit board. 2. Check the cable between: 1) the timer reset circuit board and the monitor distribution circuit board and 2) the monitor distribution circuit board and the output circuit board. 3. Check Q2 on the output circuit board assembly.

TABLE 5–6. 6 CHANNEL CONSOLE VU METER TROUBLESHOOTING.
(Sheet 1 of 2)

SYMPTOM	DEFECT
OUTPUT AUDIO PRESENT – NO VU METER INDICATIONS.	1. Ensure the meter bridge aud/pgm select switch is operated to the appropriate position to monitor the output audio. 2. Check the cable between J13 on the meter switch circuit board and J7 on the VU meter distribution circuit board. 3. Check the cables between J2/J4 on the VU meter distribution circuit board and J1 on each VU meter assembly. 4. Check the cable between J11 on the output circuit board and J1 on the VU meter distribution circuit board. 5. Check U25, U27, U29, and U31 on the output circuit board.

TABLE 5–6. 6 CHANNEL CONSOLE VU METER TROUBLESHOOTING.
(Sheet 2 of 2)

SYMPTOM	DEFECT
VU METERS OPERATE – INDICATIONS ARE NOT CALIBRATED TO 0 VU.	1. Check the adjustment of R200/R233 – audition and R272/R303 – program on the output circuit board.
PEAK LED NOT OPERATING.	1. Ensure the meter bridge aud/pgm select switch is operated to the appropriate position to monitor the output audio. 2. Check the cable between J13 on the meter switch circuit board and J7 on the VU meter distribution circuit board. 3. Check the cables between J2/J4 on the VU meter distribution circuit board and J1 on each VU meter assembly. 4. Check the cable between J11 on the output circuit board and J1 on the VU meter distribution circuit board. 5. Check U25, U27, U29, and U31 on the output circuit board. 6. Check LED DS3 on the VU meter circuit board.
PEAK LED OPERATES – INDICATIONS ARE NOT CALIBRATED.	1. Check the adjustment of R206/R242 – audition and R278/R313 – program on the output circuit board.

TABLE 5–7. 12 AND 18 CHANNEL CONSOLE VU METER TROUBLESHOOTING.
(Sheet 1 of 2)

SYMPTOM	DEFECT
OUTPUT AUDIO PRESENT – NO VU INDICATIONS.	1. Ensure jumpers P8 and P10 on the VU METER meter distribution circuit board are installed. 2. Check the cables between J2/J3/J4/J5 on the VU meter distribution circuit board and J1 on each VU meter assembly. 3. Check the cable between J11 on the output circuit board and J1 on the VU meter distribution circuit board. 4. Check U25, U27, U29, and U31 on the output circuit board.
VU METERS OPERATE – INDICATIONS ARE NOT CALIBRATED TO 0 VU.	1. Check the adjustment of R200/R233 – audition and R272/R303 – program on the output circuit board.

TABLE 5–7. 12 AND 18 CHANNEL CONSOLE VU METER TROUBLESHOOTING.
(Sheet 2 of 2)

SYMPTOM	DEFECT
PEAK LED NOT OPERATING.	1. Ensure jumpers P9 and P11 on the VU meter distribution circuit board are installed. 2. Check the cables between J2/J3/J4/J5 on the VU meter distribution circuit board and J1 on each VU meter assembly. 3. Check the cable between J11 on the output circuit board and J1 on the VU meter distribution circuit board. 4. Check U25, U27, U29, and U31 on the output circuit board. 5. Check LED DS3 on the VU meter circuit board.
PEAK LED OPERATES – INDICATIONS ARE NOT CALIBRATED.	1. Check the adjustment of R206/R242 – audition and R278/R313 – program on the output circuit board.

TABLE 5–8. 24 CHANNEL CONSOLE VU METER TROUBLESHOOTING.
(Sheet 1 of 2)

SYMPTOM	DEFECT
OUTPUT AUDIO PRESENT – NO VU INDICATIONS.	1. Ensure jumpers P8 and P10 on the VU METER meter distribution circuit board are installed. 2. Check the cables between J2/J3/J4/J5/J14/J15 on the VU meter distribution circuit board and J1 on each VU meter assembly. 3. Check the cable between J11 on the output circuit board and J1 on the VU meter distribution circuit board. 4. Check U25, U27, U29, and U31 on the output circuit board. 5. If symptoms appear on the mono VU meters only, check U4 on the VU meter distribution circuit board.
VU METERS OPERATE – INDICATIONS ARE NOT CALIBRATED TO 0 VU.	1. Check the adjustment of: 1) R200/R233 – audition and R272/R303 – program on the output circuit board and 2) R45 – mono program and R46 mono audition on the VU meter distribution circuit board.

TABLE 5–8. 24 CHANNEL CONSOLE VU METER TROUBLESHOOTING.
(Sheet 2 of 2)

SYMPTOM	DEFECT
PEAK LED NOT OPERATING.	1. Ensure jumpers P9 and P11 on the VU meter distribution circuit board are installed. 2. Check the cables between J2/J3/J4/J5/J14/J15 on the VU meter distribution circuit board and J1 on each VU meter assembly. 3. Check the cable between J11 on the output circuit board and J1 on the VU meter distribution circuit board. 4. Check U25, U27, U29, and U31 on the output circuit board. 5. If symptoms appear on the mono VU meters only, check U4 on the VU meter distribution circuit board. 6. Check LED DS3 on the VU meter circuit board.
PEAK LED OPERATES – INDICATIONS ARE NOT CALIBRATED.	1. Check the adjustment of R206/R242 – audition and R278/R313 – program on the output circuit board.

TABLE 5–9. MONO PROGRAM/AUDITION STATUS INDICATOR TROUBLESHOOTING.

SYMPTOM	DEFECT
AUDIO PRESENT AT THE OUTPUT – MONO PROGRAM/ AUDITION STATUS LEDS DO NOT ILLUMINATE.	1. Check the cable between J6 on the VU meter distribution circuit board and J12 on the audio/power monitoring LED display circuit board. 2. Check the cable between J11 on the output circuit board and J1 on the VU meter distribution circuit board. 3. Check U5 on the VU meter distribution circuit board. 4. Check R37, R38, and R51 on the VU meter distribution circuit board. 5. Check LEDs DS1/DS2 on the audio/power monitoring LED display circuit board.

TABLE 5–10. PROGRAM/AUDITION PHASE INDICATOR TROUBLESHOOTING.

SYMPTOM	DEFECT
AUDIO PRESENT AT THE OUTPUT – PROGRAM/AUDITION PHASE LEDS DO NOT ILLUMINATE.	1. Check the cable between J6 on the VU meter distribution circuit board and J12 on the audio/power monitoring LED display circuit board. 2. Check the cable between J11 on the output circuit board and J1 on the VU meter distribution circuit board. 3. Check U2 on the VU meter distribution circuit board. 4. Check R25 and R26 on the VU meter distribution circuit board. 5. Check LEDs DS4/DS5 on the audio/power monitoring LED display circuit board.
AUDIO PRESENT AT THE OUTPUT – PROGRAM/AUDITION PHASE LEDS DO NOT CHANGE WHEN THE SIGNAL IS REVERSED.	1. Check the cable between J11 on the output circuit board and J1 on the VU meter distribution circuit board. 2. Check U1 and U3 on the VU meter distribution circuit board. 3. Check diodes D1 through D4 on the VU meter distribution circuit board. 4. Check U2 on the VU meter distribution circuit board.

TABLE 5–11. POWER SUPPLY STATUS INDICATOR TROUBLESHOOTING.

SYMPTOM	DEFECT
POWER SUPPLY INDICATORS DO NOT ILLUMINATE WHEN TEST SWITCH IS DEPRESSED.	1. Check the ac line fuse in the power supply module. 2. Check the cable between the power supply module and the console. 3. Check the cable between J6 on the VU meter distribution circuit board and J12 on the audio/power monitoring LED display circuit board. 4. Check the cable between J11 on the output circuit board and J1 on the VU meter distribution circuit board. 5. Check switch S2 on the audio/power monitoring LED display circuit board. 6. Check diodes D5 through D10 on the audio/power monitoring LED display circuit board. 7. Check resistors R29 through R34 on the audio/power monitoring LED display circuit board. 8. Check LEDs DS6 through DS11 on the audio/power monitoring LED display circuit board.

TABLE 5–12. TALKBACK SYSTEM TROUBLESHOOTING.

SYMPTOM	DEFECT
NO TALKBACK SYSTEM OPERATION.	1. Ensure talkback audio is connected to the output circuit board. 2. Check the cable between the control room microphone channel patch point and J16 on the output circuit board. 3. Check the cable between J16 on the output circuit board and the external powered speaker or external cue input on the second AT–90 console. 4. Check the cable between the J16 on the output circuit board and the input connector on the second AT–90 console. 5. Check the cable between J12 on the output circuit board and J1 on the monitor distribution circuit board. 6. Check the cable between J3 on the monitor distribution circuit board and J11 on the headphone/control room/cue gain circuit board. 7. Check the cable between the **TALKBACK** switch and the headphone/control room/cue gain circuit board. 8. Check the **TALKBACK** switch.

WARNING ***DISCONNECT ALL PRIMARY POWER BEFORE REPLACING CIRCUIT BOARD COMPONENTS.***

WARNING

CAUTION ***WHEN REPLACING A COMPONENT MOUNTED ON A HEAT–SINK, ENSURE A THIN FILM OF HEAT–SINK COMPOUND IS USED TO ASSURE GOOD HEAT DISSIPATION.***

CAUTION

5–92. **COMPONENT REPLACEMENT.** The circuit boards used in the Air–Trak 90 series consoles are double–sided with plated–through holes. Due to the plated–through hole design, solder fills the holes by capillary action. This condition requires that defective components be removed carefully to avoid damage to the circuit board.

5–93. On all circuit boards, the adhesion between the copper trace and the circuit board fails at almost the same temperature as solder melts. A circuit board trace can be destroyed by excessive heat or lateral movement during soldering. The use of a small soldering iron with steady pressure is required for circuit board repairs.

5–94. To remove a soldered component from a circuit board, cut the leads from the body of the defective component while the device is still soldered to the board. Grip a component lead with needle–nose pliers. Touch the soldering iron to the lead at the solder connection on the circuit side of the board. When the solder begins to melt, push the lead through the back side of the board and cut off the clinched end of the lead. Each lead may now be heated independently and pulled out of each hole. The holes may be cleared by: 1) careful re–heating with a low wattage iron and 2) removing residual solder with a soldering vacuum tool.

5–95. Install the new component and apply solder from the circuit side of the board. If no damage has been incurred to the plated–through holes, soldering of the component side of the board will not be required.

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

WARNING

WARNING ***OBSERVE THE MANUFACTURERS CAUTIONARY INSTRUCTIONS.***

WARNING

5–96. After soldering, remove residual flux with a suitable solvent. Rubbing alcohol is highly diluted and is not effective.

5–97. Inspect the circuit board to ensure the flux has been completely removed. Rosin flux is not normally corrosive, however in time, the flux will absorb enough moisture to become conductive and create problems.

5–98. **INTEGRATED CIRCUITS.** Special care should be exercised with integrated circuits. Each integrated circuit must be installed by matching the integrated circuit notch with the notch on the socket. Do not attempt to remove an integrated circuit from a socket with your fingers. Use an integrated circuit puller to lightly pry the component from the socket.

SECTION VI
PARTS LIST

6–1. INTRODUCTION.

6–2. This section provides descriptions and part numbers of electrical components, assemblies, and selected mechanical parts required for maintenance of the Broadcast Electronics Air–Trak 90 series audio consoles. Each table entry in the section is indexed by reference designators appearing on the applicable schematic diagram.

TABLE 6–1. REPLACEMENT PARTS LISTS
(Sheet 1 of 2)

TABLE 6–1. REPLACEMENT PARTS LISTS
(Sheet 2 of 2)

TABLE 6–2. AT–90 6 CHANNEL LINEAR CONSOLE – 901–6006/–XXX

REF. DES.	DESCRIPTION	PART NO.	QTY.
	901–6006/–301 MODELS		
——	Slide–Action Attenuator With Knob, 10K Ohm, Penny and Giles PGF3210DUA (Channel Faders)	180–0012	6
	901–6006/–010 MODELS		
——	Slide–Action Attenuator With Knob, 10K Ohm, Sellmark CPA7207B (Channel Faders)	180–0014	6
——	Lamp, No. 73, 14V, 0.08A, T–1 3/4 Bulb, Wedge Base (**ON/OFF** Switches)	320–0007	12
——	Switch Cap, Blue, For **TALKBACK** Switch	340–0059	1
——	Switch, Pushbutton, Rectangular, Momentary Contact, Illuminated (Channel **ON/OFF** Switches)	340–0103	12
——	Switch, Push, Illuminated, 2PDT, Square, Momentary Contact, 3A @ 125V ac (**TALKBACK** Switch)	343–0042	1
——	Switch Cap, Amber (for **ON** Switches)	346–1017	6
——	Switch Cap, Red (for **OFF** Switches)	346–1018	6
——	Speaker, 4 Inch (10.16 cm), 8–10 Ohms, 7 Watts	414–0009	1
——	Connector Cover, .09 In. x 1 In. x .5 In. (J3,J4 on input PCB and J6 on control PCB)	417–2602	3
——	Phone Jack, 1/4 inch (0.635 cm), 3 Conductor (Headphone Jack)	417–0311	1
——	Knob, Yellow, 15mm w/Spot, C152 (Monitor Level)	481–0024	1
——	Knob, Orange, 15mm w/Spot, C152 (Headphone Level)	481–0028	1
——	Knob, Red, 15mm w/Spot, C152 (Cue Level)	481–0037	1
——	Overlay, 6 Channel Console, Meter Bridge	595–0086–001	1
——	Overlay, 12 Channel Console, Main Chassis	595–0099	1
——	Monitor Distribution Circuit Board Assembly	911–6000–A	1
——	Headphone Select Circuit Board Assembly	911–6000–B	1
——	Control Room Monitor Selection Circuit Board Assembly	911–6000–C	1
——	Timer Reset Circuit Board Assembly	911–6000–D	1
——	Headphone/Control Room/Cue Gain Circuit Board	911–6000–E	1
——	Audio Output Circuit Board Assembly	911–6004–001	1
——	Audio Input Circuit Board Assembly	911–6005	1
——	Channel Control Circuit Board Assembly	911–6006–A	1
——	**ON/OFF** Switch Interface Circuit Board Assembly	911–6006–B	6
——	VU Meter Distribution Circuit Board Assembly	911–6007–A	1
——	Audio/Power Monitoring Display Circuit Board Assembly	911–6007–B	1
——	VU Meter Switch Circuit Board Assembly	911–6007–C	1
——	Cable Assembly, 6 Channel AT–90 Console	941–0055	1
——	Clock/Timer Module	951–0030	1
——	VU Meter Assembly	951–0044	2
——	Power Supply Assembly	951–6030	1
——	Spare Parts Kit, 6 Channel AT–90 Console	971–0050	1
——	Installation Kit, 6 Channel AT–90 Console	971–0032	1

TABLE 6–3. AT–90 12 CHANNEL LINEAR CONSOLE – 901–6012/–XXX

REF. DES.	DESCRIPTION	PART NO.	QTY.
	901–6012/–301 MODELS		
——	Slide–Action Attenuator With Knob, 10K Ohm, Penny and Giles PGF3210DUA (Channel Faders)	180–0012	12
	901–6012/–010 MODELS		
——	Slide–Action Attenuator With Knob, 10K Ohm, Sellmark CPA7207B (Channel Faders)	180–0014	12
——	Lamp, No. 73, 14V, 0.08A, T–1 3/4 Bulb, Wedge Base (**ON/OFF** Switches)	320–0007	24
——	Switch Cap, Blue (for **TALKBACK** Switch)	340–0059	1
——	Switch, Pushbutton, Rectangular, Momentary Contact, Illuminated (Channel **ON/OFF** Switches)	340–0103	24
——	Switch, Push, Illuminated, 2PDT, Square, Momentary Contact, 3A @ 125V ac (**TALKBACK** Switch)	343–0042	1
——	Switch Cap, Amber (for **ON** Switches)	346–1017	12
——	Switch Cap, Red (for **OFF** Switches)	346–1018	12
——	Speaker, 4 Inch (10.16 cm), 8–10 Ohms, 7 Watts	414–0009	1
——	Connector Cover, .09 In. x 1 In. x .5 In. (J3,J4 on input PCB and J6 on control PCB)	417–2602	3
——	Phone Jack, 1/4 inch (0.635 cm), 3 Conductor	417–0311	1
——	Knob, Yellow, 15mm w/Spot, C152 (Monitor Level)	481–0024	1
——	Knob, Orange, 15mm w/Spot, C152 (Headphone Level)	481–0028	1
——	Knob, Red, 15mm w/Spot, C152 (Cue Level)	481–0037	1
——	Overlay, 12 Channel Console, Meter Bridge	595–0086–002	1
——	Overlay, 12 Channel Console, Main Chassis	595–0099	1
——	Monitor Distribution Circuit Board Assembly	911–6000–A	1
——	Headphone Select Circuit Board Assembly	911–6000–B	1
——	Control Room Monitor Selection Circuit Board Assembly	911–6000–C	1
——	Timer Reset Circuit Board Assembly	911–6000–D	1
——	Headphone/Control/Cue Gain Circuit Board	911–6000–E	1
——	Audio Output Circuit Board Assembly	911–6004–001	1
——	Audio Input Circuit Board Assembly	911–6005	2
——	Channel Control Circuit Board Assembly	911–6006–A	2
——	**ON/OFF** Switch Interface Circuit Board Assembly	911–6006–B	2
——	VU Meter Distribution Circuit Board Assembly	911–6007A–001	1
——	Audio/Power Monitoring Display Circuit Board Assembly	911–6007–B	1
——	Cable Assembly, 12 Channel AT–90 Console	941–0056	1
——	Clock/Timer Module	951–0030	1
——	VU Meter Assembly	951–0044	4
——	Power Supply Assembly	951–6030	1
——	Installation Kit, 6 Channel AT–90 Console	971–0033	1
——	Spare Parts Kit, 6 Channel AT–90 Console	971–0050	1

TABLE 6–4. AT–90 18 CHANNEL LINEAR CONSOLE – 901–6018/–XXX

REF. DES.	DESCRIPTION	PART NO.	QTY.
	901–6018/–301 MODELS		
——	Slide–Action Attenuator With Knob, 10K Ohm, Penny and Giles PGF3210DUA (Channel Faders)	180–0012	18
	901–6018/–010 MODELS		
——	Slide–Action Attenuator With Knob, 10K Ohm, Sellmark CPA7207B (Channel Faders)	180–0014	18
——	Lamp, No. 73, 14V, 0.08A, T–1 3/4 Bulb, Wedge Base (**ON/OFF** Switches)	320–0007	36
——	Switch Cap, Blue (for **TALKBACK** Switch)	340–0059	1
——	Switch, Pushbutton, Rectangular, Momentary Contact, Illuminated (Channel **ON/OFF** Switches)	340–0103	36
——	Switch, Push, Illuminated, 2PDT, Square, Momentary Contact, 3A @ 125V ac (**TALKBACK** Switch)	343–0042	1
——	Switch Cap, Amber (for **ON** Switches)	346–1017	18
——	Switch Cap, Red (for **OFF** Switches)	346–1018	18
——	Speaker, 4 Inch (10.16 cm), 8–10 Ohms, 7 Watts	414–0009	1
——	Connector Cover, .09 In. x 1 In. x .5 In. (J3,J4 on input PCB and J6 on control PCB)	417–2602	3
——	Phone Jack, 1/4 inch (0.635 cm), 3 Conductor (Headphone Jack)	417–0311	1
——	Knob, Yellow, 15mm w/Spot, C152 (Monitor Level)	481–0024	1
——	Knob, Orange, 15mm w/Spot, C152 (Headphone Level)	481–0028	1
——	Knob, Red, 15mm w/Spot, C152 (Cue Level)	481–0037	1
——	Overlay, 18 Channel Console, Meter Bridge	595–0086–003	1
——	Overlay, 12 Channel Console, Main Chassis	595–0099	2
——	Monitor Distribution Circuit Board Assembly	911–6000–A	1
——	Headphone Select Circuit Board Assembly	911–6000–B	1
——	Control Room Monitor Selection Circuit Board Assembly	911–6000–C	1
——	Timer Reset Circuit Board Assembly	911–6000–D	1
——	Headphone/Control/Cue Gain Circuit Board	911–6000–E	1
——	Audio Output Circuit Board Assembly	911–6004–001	1
——	Audio Input Circuit Board Assembly	911–6005	3
——	6 Channel Control Circuit Board Assembly	911–6006–A	3
——	**ON/OFF** Switch Interface Circuit Board Assembly	911–6006–B	18
——	VU Meter Distribution Circuit Board Assembly	911–6007A–001	1
——	Audio/Power Monitoring Display Circuit Board Assemblky	911–6007–B	1
——	Cable Assembly, 18 Channel AT–90 Console	941–0057	1
——	Clock/Timer Module	951–0030	1
——	VU Meter Assembly	951–0044	4
——	Power Supply Assembly	951–6030	1
——	Installation Kit, 18 Channel AT–90 Console	971–0034	1
——	Spare Parts Kit, 6 Channel AT–90 Console	971–0050	1

TABLE 6–5. AT–90 24 CHANNEL LINEAR CONSOLE – 901–6024/–XXX

REF. DES.	DESCRIPTION	PART NO.	QTY.
	901–6024/–301 MODELS		
——	Slide–Action Attenuator With Knob, 10K Ohm, Penny and Giles PGF3210DUA (Channel Faders)	180–0012	24
	901–6024/–010 MODELS		
——	Slide–Action Attenuator With Knob, 10K Ohm, Sellmark CPA7207B (Channel Faders)	180–0014	24
——	Lamp, No. 73, 14V, 0.08A, T–1 3/4 Bulb, Wedge Base (**ON/OFF** Switches)	320–0007	48
——	Switch Cap, Blue (for **TALKBACK** Switch)	340–0059	1
——	Switch, Pushbutton, Rectangular, Momentary Contact, Illuminated (Channel **ON/OFF** Switches)	340–0103	48
——	Switch, Push, Illuminated, 2PDT, Square, Momentary Contact, 3A @ 125V ac (**TALKBACK** Switch)	343–0042	1
——	Switch Cap, Amber (for **ON** Switches)	346–1017	24
——	Switch Cap, Red (for **OFF** Switches)	346–1018	24
——	Speaker, 4 Inch (10.16 cm), 8–10 Ohms, 7 Watts	414–0009	1
——	Connector Cover, .09 In. x 1 In. x .5 In. (J3,J4 on input PCB and J6 on control PCB)	417–2602	3
——	Phone Jack, 1/4 inch (0.635 cm), 3 Conductor	417–0311	1
——	Knob, Yellow, 15mm w/Spot, C152 (Monitor Level)	481–0024	1
——	Knob, Orange, 15mm w/Spot, C152 (Headphone Level)	481–0028	1
——	Knob, Red, 15mm w/Spot, C152 (Cue Level)	481–0037	1
——	Overlay, 24 Channel Console, Meter Bridge	595–0086–004	1
——	Overlay, 12 Channel Console, Main Chassis	595–0099	2
——	Monitor Distribution Circuit Board Assembly	911–6000–A	1
——	Headphone Select Circuit Board Assembly	911–6000–B	1
——	Control Room Monitor Selection Circuit Board Assembly	911–6000–C	1
——	Timer Reset Circuit Board Assembly	911–6000–D	1
——	Headphone/Control Room/Cue Gain Circuit Board	911–6000–E	1
——	Audio Output Circuit Board Assembly	911–6004–001	1
——	Audio Input Circuit Board Assembly	911–6005	4
——	Channel Control Circuit Board Assembly	911–6006–A	4
——	**ON/OFF** Switch Interface Circuit Board Assembly	911–6006–B	24
——	VU Meter DistributionCircuit Board Assembly	911–6007A–002	1
——	Audio/Power Monitoring Display Circuit Board Assembly	911–6007–B	1
——	Cable Assembly, 24 Channel AT–90 Console	941–0058	1
——	Clock/Timer Module	951–0030	1
——	VU Meter Assembly	951–0044	6
——	Power Supply Assembly	951–6030	1
——	Installation Kit, 24 Channel AT–90 Console	971–0035	1
——	Spare Parts Kit, 6 Channel AT–90 Console	971–0050	1

TABLE 6–6. MONITOR DISTRIBUTION CIRCUIT BOARD ASSEMBLY – 911–6000–A

REF. DES.	DESCRIPTION	PART NO.	QTY.
C1 THRU C3	Capacitor, Electrolytic, 100 uF, 25V	023–1084	3
C4,C5	Capacitor, Electrolytic, 10 uF, 35V	023–1076	2
C7	Capacitor, Electrolytic, 470 uF ±20%, 25V	020–4784	1
J1	Connector Header, 40–Pin	417–0173	1
J2	Receptacle, Male, 26–Pin Dual In–Line	417–2600	1
J3 THRU J6	Connector, 10–Pin Dual In–Line	418–1003	4
R1	Resistor, 1 k Ohm ±1%, 1/4W	100–1041	1
R2	Resistor, 162 Ohm ±1%, 1/4W	100–1631	1
R3	Resistor, 1 k Ohm ±1%, 1/4W	100–1041	1
R4	Resistor, 162 Ohm ±1%, 1/4W	100–1631	1
R5	Resistor, 1 k Ohm ±1%, 1/4W	100–1041	1
R6	Resistor, 162 Ohm ±1%, 1/4W	100–1631	1
R8	Resistor, 511 Ohm, ±1%, 1/4W	103–5113	1
R9	Resistor, 48.7 k Ohm ±1%, 1/4W	103–4875	1
U1	Integrated Circuit, MC1805CT, Voltage Regulator, 5V @ 1.0 Ampere, TO–220 Case	227–7805	1
——	Blank Circuit Board	511–6000–A	1

TABLE 6–7. HEADPHONE SELECT CIRCUIT BOARD ASSEMBLY – 911–6000–B

REF. DES.	DESCRIPTION	PART NO.	QTY.
D3 THRU D11	Diode, 1N4148, Silicon, 75V @ 0.3 Amperes	203–4148	9
J7	Ribbon Cable Assembly, 10–Pin, Dual In–Line	941–0060	1
R10 THRU R13	Resistor, 1 Meg Ohm ±1%, 1/4W	103–1007	4
S1	Switch, 8 Section, 2PDT Pushbutton, Black/Orange Indications (Headphone Select)	340–0125	1
——	Blank Circuit Board, Headphone Select	511–6000–B	1

TABLE 6–8. CONTROL ROOM MONITOR SELECT CIRCUIT BOARD ASSEMBLY – 911–6000–C

REF. DES.	DESCRIPTION	PART NO.	QTY.
D12 THRU D20	Diode, 1N4148, Silicon, 75V @ 0.3 Amperes	203–4148	9
J8	Ribbon Cable Assembly, 10–Pin, Dual In–Line	941–0060	1
R14 THRU R17	Resistor, 1 Meg Ohm ±1%, 1/4W	103–1007	4
S2	Switch, 8 Section, 2PDT Pushbutton, Black/Yellow Indications (Control Room Monitor Select)	340–0124	1
——	Blank Circuit Board, Control Room Monitor Select Circuit Board	511–6000–C	1

TABLE 6–9. TIMER RESET CIRCUIT BOARD ASSEMBLY – 911–6000–D

REF. DES.	DESCRIPTION	PART NO.	QTY.
C6	Capacitor, Electrolytic, 1000 uF, 25V	013–1095	1
J9	Ribbon Cable Assembly, 10–Pin, Dual In–Line	941–0060	1
J10	Connector, 10–Pin In–Line	417–0044	1
R18	Resistor, 6.2 Ohm, ±5%, 5W, W/W	130–6253	1
S3	Switch, 5 Section, 2PDT Pushbutton, Black/White Indications (Timer Reset Select)	340–0126	1
——	Blank Circuit Board, Timer Reset	511–6000–D	1

TABLE 6–10. HEADPHONE/CONTROL ROOM/CUE GAIN CIRCUIT BOARD ASSEMBLY – 911–6000–E

REF. DES.	DESCRIPTION	PART NO.	QTY.
E1,E2	Terminal, Barrel, 4 Amperes	417–0133	2
J11	Connector, 10–Pin, Dual In–Line	418–1003	1
R19 THRU R21	Potentiometer, 10K Ohm ±10%, 1/2W (Headphone Monitor, Cue Level Controls)	178–1055	3
——	Cap, Barrel Terminal	417–0133–001	2
——	Blank Circuit Board, Headphone/Control Room/Cue Gain	511–6000–E	1

TABLE 6–11. AUDIO OUTPUT CIRCUIT BOARD ASSEMBLY – 911–6004–001 (Sheet 1 of 15)

REF. DES.	DESCRIPTION	PART NO.	QTY.
——	Blank Circuit Board, Output	511–6004	1
C1 THRU C6	Capacitor, Mica, 330 pF ±5%, 500V	040–3333	6
C7,C8	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	2
C9	Capacitor, Ceramic, 68 pF ±5%, 50V	003–6812	1
C10 THRU C13	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	4
C14	Capacitor, Mylar, 0.01 uF ±10%, 100V	031–1043	1
C15	Capacitor, Electrolytic, 33 uF, 25V	020–3374	1
C16,C18	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	2
C19	Capacitor, Ceramic, 33 pF ±5%, 50V	003–3312	1
C20	Capacitor, Mylar, 0.01 uF ±10%, 100V	031–1043	1
C21,C22	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	2
C23	Capacitor, Ceramic, 33 pF ±5%, 50V	003–3312	1
C24	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C25	Capacitor, Electrolytic, 10 uF, 35V	023–1075	1
C26	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C28	Capacitor, Electrolytic, 1 uF, 50V, Non–Polarized	020–1064	1
C29	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C30	Capacitor, Ceramic, 33 pF ±5%, 50V	003–3312	1
C31	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C32	Capacitor, Mylar, 0.01 uF ±10%, 100V	031–1043	1
C33 THRU C38	Capacitor, Mica, 330 pF ±5%, 500V	040–3333	6
C39,C40	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	2

TABLE 6–11. AUDIO OUTPUT CIRCUIT BOARD ASSEMBLY – 911–6004–001
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REF. DES.	DESCRIPTION	PART NO.	QTY.
C41	Capacitor, Ceramic, 33 pF ±5%, 50V	003–3312	1
C42,C43	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	2
C44	Capacitor, Mylar, 0.01 uF ±10%, 100V	031–1043	1
C45	Capacitor, Electrolytic, 33 uF, 25V	020–3374	1
C47,C48	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	2
C49	Capacitor, Ceramic, 33 pF ±5%, 50V	003–3312	1
C50	Capacitor, Electrolytic, 33 uF, 25V	020–3374	1
C51	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C52	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	1
C53	Capacitor, Mylar, 0.01 uF ±10%, 100V	031–1043	1
C54,C55	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	2
C56	Capacitor, Ceramic, 33 pF ±5%, 50V	003–3312	1
C57	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C58	Capacitor, Electrolytic, 10 uF, 35V	023–1075	1
C60	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C61	Capacitor, Electrolytic, 1 uF, 50V, Non–Polarized	020–1064	1
C62	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C63	Capacitor, Ceramic, 33 pF ±5%, 50V	003–3312	1
C64	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C65	Capacitor, Electrolytic, 33 uF, 25V	020–3374	1
C66	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C67	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	1
C68	Capacitor, Mylar, 0.01 uF ±10%, 100V	031–1043	1
C69	Capacitor, Electrolytic, 33 uF, 25V	020–3374	1
C70	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C71	Capacitor, Silvered Mica, 100 pF ±5%, 500V	040–1022	1
C72,C73	Capacitor, Electrolytic, 10 uF, 35V	023–1075	2
C74 THRU C76	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	3
C77	Capacitor, Electrolytic, 10 uF, 35V	023–1075	1
C79	Capacitor, Ceramic, 33 pF ±5%, 50V	003–3312	1
C80	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C81	Capacitor, Electrolytic, 33 uF, 25V	020–3374	1
C82	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C83	Capacitor, Mylar, 0.22 uF ±10%, 100V	030–2253	1
C84	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C85	Capacitor, Electrolytic, 470 uF, 25V	020–4784	1
C86	Capacitor, Mica, 470 pF ±1%, 500V	040–4721	1
C87	Capacitor, Electrolytic, 3.3 uF, 50V	020–3363	1
C88	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C89	Capacitor, Electrolytic, 470 uF, 25V	020–4784	1
C90	Capacitor, Mylar, 0.22 uF ±10%, 100V	030–2253	1
C91	Capacitor, Mica, 330 pF, ±5%, 500V	040–3333	1
C92	Capacitor, Electrolytic, 33 uF, 25V	020–3374	1
C93	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C94	Capacitor, Electrolytic, 100 uF, 25V	023–1084	1
C95	Capacitor, Electrolytic, 33 uF, 25V	020–3374	1
C96	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C97	Capacitor, Electrolytic, 100 uF, 25V	023–1084	1

TABLE 6–11. AUDIO OUTPUT CIRCUIT BOARD ASSEMBLY – 911-6004-001
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REF. DES.	DESCRIPTION	PART NO.	QTY.
C98	Capacitor, Ceramic Monolithic, 10 pF ±5%, 100V	000–1013	1
C99	Capacitor, Mylar, 0.22 uF ±10%, 100V	030–2253	1
C100	Capacitor, Electrolytic, 33 uF, 25V	020–3374	1
C101	Capacitor, Ceramic Monolithic, 10 pF ±5%, 100V	000–1013	1
C102	Capacitor, Electrolytic, 33 uF, 25V	020–3374	1
C103	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C104	Capacitor, Electrolytic, 100 uF, 25V	023–1084	1
C105	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C106	Capacitor, Electrolytic, 100 uF, 25V	023–1084	1
C107	Capacitor, Mylar, 0.22 uF ±10%, 100V	030–2253	1
C108 THRU C110	Capacitor, Mica, 330 pF, ±5%, 500V	040–3333	3
C111	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C112	Capacitor, Electrolytic, 10 uF, 35V	023–1075	1
C113,C114	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	2
C115,C116	Capacitor, Mica, 330 pF, ±5%, 500V	040–3333	2
C117	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C118	Capacitor, Electrolytic, 10 uF, 35V	023–1075	1
C119	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C120	Capacitor, Electrolytic, 10 uF, 35V	023–1075	1
C121	Capacitor, Mica, 330 pF, ±5%, 500V	040–3333	1
C122,C123	Capacitor, Electrolytic, 220 uF, 25V	023–2273	2
C124 THRU C136	Capacitor, Mica, 330 pF, ±5%, 500V	040–3333	13
C137,C138	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	2
C139,C140	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	2
C141	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	1
C142	Capacitor, Electrolytic, 33 uF, 25V	020–3374	1
C143	Capacitor, Silvered Mica, 100 pF ±5%, 500V	040–1022	1
C144	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C145	Capacitor, Mica, 330 pF, ±5%, 500V	040–3333	1
C146	Capacitor, Mylar Film, 0.047 uF ±10%, 100V	030–4743	1
C147	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C148	Capacitor, Mica, 330 pF, ±5%, 500V	040–3333	1
C149	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	1
C150	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C151,C152	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	2
C153	Capacitor, Electrolytic, 33 uF, 25V	020–3374	1
C154	Capacitor, Silvered Mica, 100 pF ±5%, 500V	040–1022	1
C155,156	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	2
C157,158	Capacitor, Mica, 330 pF, ±5%, 500V	040–3333	2
C159	Capacitor, Mylar Film, 0.047 uF ±10%, 100V	030–4743	1
C160	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C161	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	1
C162	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C163,C164	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	2
C165	Capacitor, Electrolytic, 33 uF, 25V	020–3374	1
C166	Capacitor, Silvered Mica, 100 pF ±5%, 500V	040–1022	1
C167,C168	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	2

TABLE 6–11. AUDIO OUTPUT CIRCUIT BOARD ASSEMBLY – 911–6004–001
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REF. DES.	DESCRIPTION	PART NO.	QTY.
C169,C170	Capacitor, Mica, 330 pF, ±5%, 500V	040–3333	2
C171	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C172	Capacitor, Mylar Film, 0.047 uF ±10%, 100V	030–4743	1
C173	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	1
C174	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C175	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	1
C176	Capacitor, Electrolytic, 33 uF, 25V	020–3374	1
C177	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	1
C178	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C179	Capacitor, Silvered Mica, 100 pF ±5%, 500V	040–1022	1
C180	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C181,C182	Capacitor, Mica, 330 pF, ±5%, 500V	040–3333	2
C183	Capacitor, Mylar Film, 0.047 uF ±10%, 100V	030–4743	1
C184	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C185	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	1
C186	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C187	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	1
C188	Capacitor, Electrolytic, 33 uF, 25V	020–3374	1
C189	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	1
C190	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C191,C192	Capacitor, Mica, 330 pF, ±5%, 500V	040–3333	2
C193	Capacitor, Mylar Film, 0.047 uF ±10%, 100V	030–4743	1
C194 THRU C197	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	4
C198	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	1
C199	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C200	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	1
C201	Capacitor, Electrolytic, 33 uF, 25V	020–3374	1
C202	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	1
C203	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C204,C205	Capacitor, Mica, 330 pF, ±5%, 500V	040–3333	2
C206	Capacitor, Mylar Film, 0.047 uF ±10%, 100V	030–4743	1
C207	Capacitor, Mylar, 0.1 uF ±10%, 100V	030–1053	1
C208	Capacitor, Electrolytic, 330 uF, 25V, Non–Polarized	020–3385	1
C209	Capacitor, Electrolytic, 10 uF, 35V	023–1075	1
C210	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C211	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	1
C212	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C213	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	1
C214	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C215	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	1
C216	Capacitor, Silvered Mica, 100 pF ±5%, 500V	040–1022	1
C217	Capacitor, Mylar, 0.1 uF ±10%, 100V	030–1053	1
C218	Capacitor, Electrolytic, 330 uF, 25V, Non–Polarized	020–3385	1
C219	Capacitor, Electrolytic, 10 uF, 35V	023–1075	1
C220	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C221	Capacitor, Silvered Mica, 100 pF ±5%, 500V	040–1022	1
C222	Capacitor, Mylar, 0.1 uF ±10%, 100V	030–1053	1

TABLE 6–11. AUDIO OUTPUT CIRCUIT BOARD ASSEMBLY – 911–6004–001
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REF. DES.	DESCRIPTION	PART NO.	QTY.
C223	Capacitor, Electrolytic, 100 uF, 50V	020–1085	1
C224	Capacitor, Electrolytic, 10 uF, 35V	023–1075	1
C225	Capacitor, Silvered Mica, 100 pF ±5%, 500V	040–1022	1
C226	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C227	Capacitor, Silvered Mica, 100 pF ±5%, 500V	040–1022	1
C228	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C229	Capacitor, Mylar, 0.1 uF ±10%, 100V	030–1053	1
C230	Capacitor, Electrolytic, 100 uF, 50V	020–1085	1
C231	Capacitor, Electrolytic, 10 uF, 35V	023–1075	1
C232	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	1
C233	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C234	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	1
C235	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C236	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	1
C237	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C238	Capacitor, Electrolytic, 33 uF, 25V	020–3374	1
C239	Capacitor, Silvered Mica, 100 pF ±5%, 500V	040–1022	1
C240	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C241	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	1
C242 THRU C244	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	3
C245	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	1
C246	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C247	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	1
C248	Capacitor, Electrolytic, 33 uF, 25V	020–3374	1
C249	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	1
C250	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C251,C252	Capacitor, Mica, 330 pF ±5%, 500V	040–3333	2
C253	Capacitor, Mylar Film, 0.047 uF ±10%, 100V	030–4743	1
C254,C255	Capacitor, Electrolytic, 100 uF, 25V	023–1084	2
C256	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C257	Capacitor, Mylar, 0.01 uF ±10%, 100V	031–1043	1
C258,C259	Capacitor, Electrolytic, 47 uF, 16V	013–4750	2
C260,261	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	2
C262,C263	Capacitor, Electrolytic, 100 uF, 25V	023–1084	2
C264	Capacitor, Electrolytic, 330 uF, 25V, Non–Polarized	020–3385	1
C265	Capacitor, Electrolytic, 100 uF, 50V	020–1085	1
C266	Capacitor, Electrolytic, 330 uF, 25V, Non–Polarized	020–3385	1
C267 THRU C276	Capacitor, Electrolytic, 10 uF, 35V	023–1075	10
C277	Capacitor, Polyester, 0.0022 uF ±10%, 100V	031–2033	1
C278	Capacitor, Mica, 470 pF ±1%, 500V	040–4721	1
D1,D2	Diode, 1N4148, Silicon, 75V @ 0.3 Amperes	203–4148	2
D3 THRU D8	Diode, 1N4005, Silicon, 600V @ 1 Ampere	203–4005	6
D9 THRU D11	Diode, 1N4148, Silicon, 75V @ 0.3 Amperes	203–4148	3
D12,D13	Diode, 1N4005, Silicon, 600V @ 1 Ampere	203–4005	2
D14 THRU D25	Diode, 1N4148, Silicon, 75V @ 0.3 Amperes	203–4148	12
D26, D27 THRU D31	Diode, HP5082–2800, High Voltage, Schottky Barrier Type, 70V, 15 mA	201–2800	6

TABLE 6–11. AUDIO OUTPUT CIRCUIT BOARD ASSEMBLY – 911–6004–001
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REF. DES.	DESCRIPTION	PART NO.	QTY.
F1	Fuse, AGC, 1A, 250V, Slow–Blow (for 115 Volt operation)	334–0100	1
J1,J2	Connector, Housing, 15–Pin	417–0169	2
J3	Socket, 4–Pin	418–0255	1
J4 THRU J6	Receptacle, 6–Pin	417–0677	3
J7	Socket, 4–Pin	418–0255	1
J8 THRU J10	Receptacle, 6–Pin	417–0677	3
J11,J12	Connector Header, 40–Pin	417–0173	2
J13	Receptacle, Male, 8–Pin In–Line	417–0080	1
J14	Receptacle, 6–Pin	417–0677	1
J15	Receptacle, 12–Pin	417–1276	1
J16	Connector, Housing, 15–Pin	417–0169	1
J17,J18	Receptacle, Male, 13–Pin Dual In–Line	417–2600	2
J19	Socket, 4–Pin	418–0255	1
Q1 THRU Q3	Field Effect Transistor, J270, P–Channel JEFET, TO–92 Case	210–0270	3
Q4	Field Effect Transistor, J271, P–Channel JFET, TO–92 Case	210–0271	1
Q5,Q6	Transistor, MPS–A14, Silicon, NPN, Darlington, TO–92 Case	211–0014	2
Q7,Q8	Field Effect Transistor, J271, P–Channel JFET, TO–92 Case	210–0271	2
Q9	Transistor, 2N3904, NPN, Silicon, TO–92 Case	211–3904	1
R1	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R2	Potentiometer, 2 k Ohm ±10%, 1/2W	177–2045	1
R3	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R4	Potentiometer, 2 k Ohm ±10%, 1/2W	177–2045	1
R5	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R6	Potentiometer, 2 k Ohm ±10%, 1/2W	177–2045	1
R7	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R8	Potentiometer, 2 k Ohm ±10%, 1/2W	177–2045	1
R9	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R10	Potentiometer, 2 k Ohm ±10%, 1/2W	177–2045	1
R11	Resistor, 2 k Ohm ±1%, 1/4W	100–2041	1
R12	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R13	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R14	Resistor, 8.66 k Ohm ±1%, 1/4W	100–8641	1
R15	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R16	Resistor, 30.1 Ohm ±1%, 1/4W	103–3011	1
R17	Resistor, 4.99 k Ohm ±1%, 1/4W	100–5041	1
R18	Resistor, 30.1 Ohm ±1%, 1/4W	103–3011	1
R19	Resistor, 4.99 k Ohm ±1%, 1/4W	100–5041	1
R20	Resistor, 475 k Ohm ±1%, 1/4W	103–4731	1
R21 THRU R23	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	3
R24	Resistor, 1 k Ohm ±1%, 1/4W	100–1041	1
R25	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R26	Resistor, 4.87 k Ohm ±1%, 1/4W	103–4874	1
R27	Resistor, 511 k Ohm ±1%, 1/4W	103–5116	1
R28	Resistor, 51.1 Ohm ±1%, 1/4W	103–5112	1
R29	Potentiometer, 50 k Ohm ±10%, 1/2W	177–5054	1
R30	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R31,R32	Resistor, 30.1 Ohm ±1%, 1/4W	103–3011	2
R33,R34	Resistor, 2.87 k Ohm ±1%, 1/4W	103–2871	2

TABLE 6–11. AUDIO OUTPUT CIRCUIT BOARD ASSEMBLY – 911–6004–001
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REF. DES.	DESCRIPTION	PART NO.	QTY.
R35	Resistor, 2 k Ohm ±1%, 1/4W	100–2041	1
R36	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R37	Resistor, 8.66 k Ohm ±1%, 1/4W	100–8641	1
R38	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R39	Resistor, 1 k Ohm ±1%, 1/4W	100–1041	1
R40	Potentiometer, 50 k Ohm ±10%, 1/2W	177–5054	1
R41	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R42	Resistor, 4.87 k Ohm ±1%, 1/4W	103–4874	1
R43	Resistor, 511 k Ohm ±1%, 1/4W	103–5116	1
R44	Resistor, 51.1 Ohm ±1%, 1/4W	103–5112	1
R45	Resistor, 1 Meg Ohm ±1%, 1/4W	103–1007	1
R46	Resistor, 124 k Ohm ±1%, 1/4W	103–1246	1
R47	Resistor, 1.91 k Ohm ±1%, 1/4W	103–1914	1
R48	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R49,R50	Resistor, 30.1 Ohm ±1%, 1/4W	103–3011	2
R51	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R52	Potentiometer, 2 k Ohm ±10%, 1/2W	177–2045	1
R53	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R54	Potentiometer, 2 k Ohm ±10%, 1/2W	177–2045	1
R55	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R56	Potentiometer, 2 k Ohm ±10%, 1/2W	177–2045	1
R57	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R58	Potentiometer, 2 k Ohm ±10%, 1/2W	177–2045	1
R59	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R60	Potentiometer, 2 k Ohm ±10%, 1/2W	177–2045	1
R61	Resistor, 2 k Ohm ±1%, 1/4W	100–2041	1
R62	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R63	Resistor, 8.66 k Ohm ±1%, 1/4W	100–8641	1
R64	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R65	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R66,R67	Resistor, 4.99 k Ohm ±1%, 1/4W	100–5041	2
R68,R69	Resistor, 30.1 Ohm ±1%, 1/4W	103–3011	2
R70	Resistor, 1 k Ohm ±1%, 1/4W	100–1041	1
R71	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R72	Resistor, 4.87 k Ohm ±1%, 1/4W	103–4874	1
R73	Resistor, 511 k Ohm ±1%, 1/4W	103–5116	1
R74	Resistor, 51.1 Ohm ±1%, 1/4W	103–5112	1
R75	Potentiometer, 50 k Ohm ±10%, 1/2W	177–5054	1
R76	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R77	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R78	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R79	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R80,R81	Resistor, 30.1 Ohm ±1%, 1/4W	103–3011	2
R82,R83	Resistor, 2.87 k Ohm ±1%, 1/4W	103–2871	2
R84	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R85	Resistor, 2 k Ohm ±1%, 1/4W	100–2041	1

TABLE 6–11. AUDIO OUTPUT CIRCUIT BOARD ASSEMBLY – 911–6004–001
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REF. DES.	DESCRIPTION	PART NO.	QTY.
R86	Resistor, 8.66 k Ohm ±1%, 1/4W	100–8641	1
R87	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R88	Resistor, 1 k Ohm ±1%, 1/4W	100–1041	1
R89	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R90	Resistor, 4.87 k Ohm ±1%, 1/4W	103–4874	1
R91	Resistor, 511 k Ohm ±1%, 1/4W	103–5116	1
R92	Resistor, 51.1 Ohm ±1%, 1/4W	103–5112	1
R93	Potentiometer, 50 k Ohm ±10%, 1/2W	177–5054	1
R94	Resistor, 124 k Ohm ±1%, 1/4W	103–1246	1
R95	Resistor, 1 Meg Ohm ±1%, 1/4W	103–1007	1
R96	Resistor, 1.91 k Ohm ±1%, 1/4W	103–1914	1
R97	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R98	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R99	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R100	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R101,R102	Resistor, 30.1 Ohm ±1%, 1/4W	103–3011	2
R103	Resistor, 10 Ohm ±1%, 1/4W	100–1021	1
R104,R105	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	2
R106,R107	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	2
R108	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R109	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R110	Resistor, 475 k Ohm ±1%, 1/4W	103–4731	1
R111	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R112,R113	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	2
R114	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R115,R116	Resistor, 909 Ohm ±1%, 1/4W	103–9031	2
R117	Resistor, 24.9 Ohm ±1%, 1/4W	103–2490	1
R118	Potentiometer, 1 k Ohm ±10%, 1/2W	175–1034	1
R119,R120	Resistor, 909 Ohm, ±1%, 1/4W	103–9031	2
R121	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R122	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R123	Resistor, 1 k Ohm ±1%, 1/4W	100–1041	1
R124	Potentiometer, 50 k Ohm ±10%, 1/2W	177–5054	1
R125	Resistor, 511 k Ohm ±1%, 1/4W	103–5116	1
R126	Resistor, 51.1 Ohm ±1%, 1/4W	103–5112	1
R127	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R128	Resistor, 4.87 k Ohm ±1%, 1/4W	103–4874	1
R129	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R130	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R131,R132	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	2
R133,R134	Resistor, 30.1 Ohm ±1%, 1/4W	103–3011	2
R135	Resistor, 4.32 k Ohm ±1%, 1/4W	103–4324	1
R136	Resistor, 22.1 k Ohm ±1%, 1/4W	103–2211	1
R137	Resistor, 2.21 k Ohm ±1%, 1/4W	103–2241	1
R138	Resistor, 22.1 k Ohm ±1%, 1/4W	103–2211	1
R139	Resistor, 1 Ohm ±5%, 1/2W	110–1013	1

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REF. DES.	DESCRIPTION	PART NO.	QTY.
R140,R141	Resistor, 22.1 k Ohm ±1%, 1/4W	103–2211	2
R142	Resistor, 2.21 k Ohm ±1%, 1/4W	103–2241	1
R143	Resistor, 1 Ohm ±5%, 1/2W	110–1013	1
144	Resistor, 22.1 k Ohm ±1%, 1/4W	103–2211	1
R145	Resistor, 2.21 k Ohm ±1%, 1/4W	103–2241	1
R146	Resistor, 22.1 k Ohm ±1%, 1/4W	103–2211	1
R147	Resistor, 1 Ohm ±5%, 1/2W	110–1013	1
R148	Resistor, 221 Ohm ±1%, 1/4W	103–2213	1
R149	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R150	Resistor, 221 Ohm ±1%, 1/4W	103–2213	1
R151	Resistor, 1 Meg Ohm ±1%, 1/4W	103–1007	1
R152	Resistor, 124 k Ohm, 1/4W	103–1246	1
R153	Resistor, 1.91 k Ohm ±1%, 1/4W	103–1914	1
R154	Resistor, 432 k Ohm ±1%, 1/4W	103–4361	1
R155	Resistor, 100 Ohm ±1%, 1/4W	100–1031	1
R156	Resistor, 1 Meg Ohm ±1%, 1/4W	103–1007	1
R157	Resistor, 1 k Ohm ±1%, 1/4W	100–1041	1
R158	Resistor, 432 k Ohm ±1%, 1/4W	103–4361	1
R159	Resistor, 100 Ohm ±1%, 1/4W	100–1031	1
R160	Resistor, 1 Meg Ohm ±1%, 1/4W	103–1007	1
R161	Resistor, 1 k Ohm ±1%, 1/4W	100–1041	1
R162	Resistor, 5.62 k Ohm ±1%, 1/4W	103–5624	1
R163	Potentiometer, 5 k Ohm ±10%, 1/2W	177–5044	1
R164	Resistor, 1 k Ohm ±1%, 1/4W	100–1041	1
R165	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R166	Resistor, 1 Meg Ohm ±1%, 1/4W	103–1007	1
R167,R168	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	2
R169	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R170	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R171	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R172	Resistor, 61.9 Ohm ±1%, 1/4W	103–6151	1
R173	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R174,R175	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	2
R176	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R177,R178	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	2
R179	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R180,R181	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	2
R182	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R183	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R184	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R185	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R186	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R187	Resistor, 33.2 Ohm ±1%, 1/4W	103–3322	1
R188,R189	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	2
R190	Resistor, 33.2 Ohm ±1%, 1/4W	103–3322	1
R191,R192	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	2
R193	Resistor, 49.9 k Ohm ±1%, 1/4W	103–4951	1

TABLE 6–11. AUDIO OUTPUT CIRCUIT BOARD ASSEMBLY – 911–6004–001
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REF. DES.	DESCRIPTION	PART NO.	QTY.
R194,R195	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	2
R196	Resistor, 49.9 k Ohm ±1%, 1/4W	103–4951	1
R197	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R198,R199	Resistor, 24.9 k Ohm ±1%, 1/4W	103–2495	2
R200	Potentiometer, 100 k Ohm ±10%, 1/2W	177–1064	1
R201,R202	Resistor, 24.9 k Ohm ±1%, 1/4W	103–2495	2
R203	Resistor, 1.82 k Ohm ±1%, 1/4W	100–1841	1
R204	Resistor, 3.65 k Ohm ±1%, 1/4W	100–3611	1
R205	Resistor, 8.25 k Ohm ±1%, 1/4W	103–8254	1
R206	Potentiometer, 5 k Ohm ±10%, 1/2W	177–5044	1
R207	Resistor, 82.5 Ohm ±1%, 1/4W	103–8251	1
R208	Resistor, 1 Meg Ohm ±1%, 1/4W	103–1007	1
R209	Resistor, 1.3 k Ohm ±1%, 1/4W	103–1304	1
R210,R211	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	2
R212	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R213,R214	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	2
R215	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R216,R217	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	2
R218	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R219	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R220	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R221	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R222	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R223	Resistor, 33.2 Ohm ±1%, 1/4W	103–3322	1
R224,R225	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	2
R226	Resistor, 33.2 Ohm ±1%, 1/4W	103–3322	1
R227,R228	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	2
R229	Resistor, 49.9 k Ohm ±1%, 1/4W	103–4951	1
R230	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R231,R232	Resistor, 24.9 k Ohm ±1%, 1/4W	103–2495	2
R233	Potentiometer, 100 k Ohm ±10%, 1/2W	177–1064	1
R234	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R235	Resistor, 49.9 k Ohm ±1%, 1/4W	103–4951	1
R236	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R237,R238	Resistor, 24.9 k Ohm ±1%, 1/4W	103–2495	2
R239	Resistor, 1.82 k Ohm ±1%, 1/4W	100–1841	1
R240	Resistor, 3.65 k Ohm ±1%, 1/4W	100–3611	1
R241	Resistor, 8.25 k Ohm ±1%, 1/4W	103–8254	1
R242	Potentiometer, 5 k Ohm ±10%, 1/2W	177–5044	1
R243	Resistor, 82.5 Ohm ±1%, 1/4W	103–8251	1
R244	Resistor, 1 Meg Ohm ±1%, 1/4W	103–1007	1
R245	Resistor, 1.3 k Ohm +1%, 1/4W	103–1304	1
R246,R247	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	2
R248	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R249,R250	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	2
R251	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R252,R253	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	2

TABLE 6–11. AUDIO OUTPUT CIRCUIT BOARD ASSEMBLY – 911–6004–001
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REF. DES.	DESCRIPTION	PART NO.	QTY.
R254	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R255	Resistor, 33.2 Ohm ±1%, 1/4W	103–3322	1
R256	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R257	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R258,R259	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	2
R260	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R261	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R262	Resistor, 33.2 Ohm ±1%, 1/4W	103–3322	1
R263,R264	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	2
R265	Resistor, 49.9 k Ohm ±1%, 1/4W	103–4951	1
R266,R267	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	2
R268	Resistor, 49.9 k Ohm ±1%, 1/4W	103–4951	1
R269	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R270,R271	Resistor, 24.9 k Ohm ±1%, 1/4W	103–2495	2
R272	Potentiometer, 100 k Ohm ±10%, 1/2W	177–1064	1
R273,R274	Resistor, 24.9 k Ohm ±1%, 1/4W	103–2495	2
R275	Resistor, 1.82 k Ohm ±1%, 1/4W	100–1841	1
R276	Resistor, 3.65 k Ohm ±1%, 1/4W	100–3611	1
R277	Resistor, 8.25 k Ohm ±1%, 1/4W	103–8254	1
R278	Potentiometer, 5 k Ohm ±10%, 1/2W	177–5044	1
R279	Resistor, 82.5 Ohm ±1%, 1/4W	103–8251	1
R280	Resistor, 1 Meg Ohm ±1%, 1/4W	103–1007	1
R281	Resistor, 1.3 k Ohm ±1%, 1/4W	103–1304	1
R282,R283	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	2
R284,R285	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	2
R286 THRU R288	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	3
R289	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R290	Resistor, 33.2 Ohm ±1%, 1/4W	103–3322	1
R291	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R292	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R293,R294	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	2
R295	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R296	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R297	Resistor, 33.2 Ohm ±1%, 1/4W	103–3322	1
R298,R299	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	2
R300	Resistor, 49.9 k Ohm ±1%, 1/4W	103–4951	1
R301,R302	Resistor, 24.9 k Ohm ±1%, 1/4W	103–2495	2
R303	Potentiometer, 100 k Ohm ±10%, 1/2W	177–1064	1
R304,R305	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	2
R306	Resistor, 49.9 k Ohm ±1%, 1/4W	103–4951	1
R307	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R308,R309	Resistor, 24.9 k Ohm ±1%, 1/4W	103–2495	2
R310	Resistor, 1.82 k Ohm ±1%, 1/4W	100–1841	1
R311	Resistor, 3.65 k Ohm ±1%, 1/4W	100–3611	1
R312	Resistor, 8.25 k Ohm ±1%, 1/4W	103–8254	1
R313	Potentiometer, 5 k Ohm ±10%, 1/2W	177–5044	1

TABLE 6–11. AUDIO OUTPUT CIRCUIT BOARD ASSEMBLY – 911–6004–001
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REF. DES.	DESCRIPTION	PART NO.	QTY.
R314	Resistor, 82.5 Ohm ±1%, 1/4W	103–8251	1
R315	Resistor, 1 Meg Ohm ±1%, 1/4W	103–1007	1
R316	Resistor, 1.3 k Ohm ±1%, 1/4W	103–1304	1
R317 THRU R319	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	3
R320,R321	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	2
R322 THRU R324	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	3
R325	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R326	Resistor, 33.2 Ohm ±1%, 1/4W	103–3322	1
R327R328	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	2
R329	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R330 THRU R332	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	3
R333	Resistor, 33.2 Ohm ±1%, 1/4W	103–3322	1
R334	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R335	Resistor, 1 Meg Ohm ±1%, 1/4W	103–1007	1
R336	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R337,R338	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	2
R339,R340	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	2
R341 THRU R343	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	3
R344	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R345	Resistor, 33.2 Ohm ±1%, 1/4W	103–3322	1
R346	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R347	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R348 THRU R350	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	3
R351	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R352	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R353	Resistor, 33.2 Ohm ±1%, 1/4W	103–3322	1
R354	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R355	Resistor, 1 Meg Ohm ±1%, 1/4W	103–1007	1
R356	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R357,R358	Resistor, 6.81 k Ohm ±1%, 1/4W	103–6814	2
359,R360	Resistor, 15 k Ohm ±5%, 1/4W	100–1551	2
R361	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R362	Resistor, 5.62 k Ohm ±1%, 1/4W	103–5624	1
R363	Potentiometer, 25K Ohm ±10%, 1/2W	177–2553	1
R364	Resistor, 2.05 k Ohm ±1%, 1/4W	103–2054	1
R365	Potentiometer, 25K Ohm ±10%, 1/2W	177–2553	1
R366	Resistor, 6.81 k Ohm ±1%, 1/4W	103–6814	1
R367	Resistor, 10 Ohm ±1%, 1/4W	103–1021	1
R368	Resistor, 6.81 k Ohm ±1%, 1/4W	103–6814	1
R369	Resistor, 15 k Ohm ±5%, 1/4W	100–1551	1
R370	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R371	Resistor, 5.62 k Ohm ±1%, 1/4W	103–5624	1
R372	Potentiometer, 25K Ohm ±10%, 1/2W	177–2553	1

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REF. DES.	DESCRIPTION	PART NO.	QTY.
R373	Resistor, 15 k Ohm ±5%, 1/4W	100–1551	1
R374	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R375,R376	Resistor, 6.81 k Ohm ±1%, 1/4W	103–6814	2
R377	Resistor, 15 k Ohm ±5%, 1/4W	100–1551	1
R378	Resistor, 5.62 k Ohm ±1%, 1/4W	103–5624	1
R379	Potentiometer, 25K Ohm ±10%, 1/2W	177–2553	1
R380	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R381	Resistor, 15 k Ohm ±5%, 1/4W	100–1551	1
R382	Resistor, 2.05 k Ohm ±1%, 1/4W	103–2054	1
R383	Potentiometer, 25K Ohm ±10%, 1/2W	177–2553	1
R384	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R385	Resistor, 6.81 k Ohm ±1%, 1/4W	103–6814	1
R386	Resistor,10 Ohm ±1%, 1/4W	103–1021	1
R387	Resistor, 6.81 k Ohm ±1%, 1/4W	103–6814	1
R388	Resistor, 15 k Ohm ±5%, 1/4W	100–1551	1
R389	Resistor, 5.62 k Ohm ±1%, 1/4W	103–5624	1
R390	Potentiometer, 25K Ohm ±10%, 1/2W	177–2553	1
R391	Resistor, 15 k Ohm ±1%, 1/4W	100–1551	1
R392	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R393	Resistor, 10 Ohm ±1%, 1/4W	103–1021	1
R394 THRU R396	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	3
R397	Resistor, 2.05 k Ohm ±1%, 1/4W	103–2054	1
R398	Potentiometer, 25K Ohm ±10%, 1/2W	177–2553	1
R399	Resistor, 6.19 k Ohm ±1%, 1/4W	103–6194	1
R400,R401	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	2
R402	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R403	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R404	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R405	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R406	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R407 THRU R409	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	3
R412	Resistor, 33.2 Ohm ±1%, 1/4W	103–3322	1
R413,R414	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	2
R415	Resistor, 33.2 Ohm ±1%, 1/4W	103–3322	1
R416	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R417	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R418	Resistor, 1 Meg Ohm ±1%, 1/4W	103–1007	1
R419,R420	Resistor, 10 Ohm ±1%, 1/4W	103–1021	2
R421,R422	Resistor, 1 k Ohm ±1%, 1/4W	100–1041	2
R423 THRU R426	Resistor, 200 Ohm ±1%, 1/4W	103–2003	4
R427	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R428,R430	Resistor, 10 Ohm ±5%, 2W	130–1023	2
R431	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R432 THRU R435	Resistor, 100 Ohm ±5%, 2W	132–1033	4

TABLE 6–11. AUDIO OUTPUT CIRCUIT BOARD ASSEMBLY – 911–6004–001
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REF. DES.	DESCRIPTION	PART NO.	QTY.
R437,R438	Resistor, 2.21 k Ohm ±1%, 1/4W	103–2241	2
R439	Resistor, 2.87 k Ohm ±1%, 1/4W	103–2871	1
R440	Resistor, 13 k Ohm ±1%, 1/4W	103–1305	1
R441	Resistor, 3.01 k Ohm ±1%, 1/4W	103–3014	1
R442,R443	Resistor, 2 Ohm ±1%, 5W	130–2011	2
U1	Integrated Circuit, MC14051, 8–Bit Analog Multiplexer, CMOS, 16–Pin DIP	220–4051	1
U2	Integrated Circuit, NE5532AP, Dual Low Noise Operational Amplifier, 8–Pin DIP	221–5532–001	1
U3	Integrated Circuit, LM837, Quad Input Operational Amplifier, 14–Pin DIP	221–0837	1
U4	Integrated Circuit, 2150A, Voltage Controlled Amplifier, 8–Pin DIP	220–2150	1
U5	Integrated Circuit, NE5532AP, Dual Low Noise Operational Amplifier, 8–Pin DIP	221–5532–001	1
U6	Integrated Circuit, MC14051, 8–Bit Analog Multiplexer, CMOS, 16–Pin DIP	220–4051	1
U7	Integrated Circuit, LM837, Quad Input Operational Amplifier, 14–Pin DIP	221–0837	1
U8	Integrated Circuit, 2150A, Voltage Controlled Amplifier, 8–Pin DIP	220–2150	1
U9	Integrated Circuit, TL072CP, Dual JFET–Input Operational Amplifier, 8–Pin DIP	221–0072	1
U10	Integrated Circuit, MC14051, 8–Bit Analog Multiplexer, CMOS, 16–Pin DIP	220–4051	1
U11	Integrated Circuit, 2150A, Voltage Controlled Amplifier, 8–Pin DIP	220–2150	1
U12	Integrated Circuit, TL072CP, Dual JFET–Input Operational Amplifier, 8–Pin DIP	221–0072	1
U13	Integrated Circuit, NE5532AP, Dual Low Noise Operational Amplifier, 8–Pin DIP	221–5532–001	1
U14	Integrated Circuit, MC14051, 8–Bit Analog Multiplexer, CMOS, 16–Pin DIP	220–4051	1
U15	Integrated Circuit, 2150A, Voltage Controlled Amplifier, 8–Pin DIP	220–2150	1
U16 THRU U18	Integrated Circuit, NE5532AP, Dual Low Noise Operational Amplifier, 8–Pin DIP	221–5532–001	3
U19	Integrated Circuit, 2150A, Voltage Controlled Amplifier, 8–Pin DIP	220–2150	1
U20	Integrated Circuit, NE5532AP, Dual Low Noise Operational Amplifier, 8–Pin DIP	221–5532–001	1
R410	Resistor, 5.11 k Ohm +1%, 1/4W	103–5141	1
R411	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
U21 THRU U23	Integrated Circuit, TDA2030V, Audio Power Amplifier, 14W Output, Pentawatt Package	220–2030	3
U24	Integrated Circuit, NE5532AP, Dual Low Noise Operational Amplifier, 8–Pin DIP	221–5532–001	1
U25	Integrated Circuit, TLO74CN, Quad JFET–Input Operational Amplifier, 14–Pin DIP	221–0074	1
U26	Integrated Circuit, NE5532AP, Dual Low Noise Operational Amplifier, 8–Pin DIP	221–5532–001	1
U27	Integrated Circuit, TLO74CN, Quad JFET–Input Operational Amplifier, 14–Pin DIP	221–0074	1
U28	Integrated Circuit, NE5532AP, Dual Low Noise Operational Amplifier, 8–Pin DIP	221–5532–001	1
U29	Integrated Circuit, TLO74CN, Quad JFET–Input Operational Amplifier, 14–Pin DIP	221–0074	1
U30	Integrated Circuit, NE5532AP, Dual Low Noise Operational Amplifier, 8–Pin DIP	221–5532–001	1
U31	Integrated Circuit, TLO74CN, Quad JFET–Input Operational Amplifier, 14–Pin DIP	221–0074	1
U32	Integrated Circuit, NE5532AP, Dual Low Noise Operational Amplifier, 8–Pin DIP	221–5532–001	1

TABLE 6–11. AUDIO OUTPUT CIRCUIT BOARD ASSEMBLY – 911–6004–001
(Sheet 15 of 15)

REF. DES.	DESCRIPTION	PART NO.	QTY.
U33	Integrated Circuit, TL072CP, Dual JFET–Input Operational Amplifier, 8–Pin DIP	221–0072	1
U34	Integrated Circuit, NE5532AP, Dual Low Noise Operational Amplifier, 8–Pin DIP	221–5532–001	1
U35	Integrated Circuit, TL072CP, Dual JFET–Input Operational Amplifier, 8–Pin DIP	221–0072	1
U36	Integrated Circuit, NE5532AP, Dual Low Noise Operational Amplifier, 8–Pin DIP	221–5532–001	1
U37,U38	Integrated Circuit, 4N33, Optical Isolator, NPN Photo Transistor/Infared Emitting Diode Type, 1500V Isolation, Response: 30 kHz Maximum, Current: 50 mA Maximum, 6–Pin DIP	229–0033	2
U39 THRU U43	Integrated Circuit, NE5532AP, Dual Low Noise Operational Amplifier, 8–Pin DIP	221–5532–001	5
U44	Integrated Circuit, TL072CP, Dual JFET–Input Operational Amplifier, 8–Pin DIP	221–0072	1
U45	Integrated Circuit, NE5532AP, Dual Low Noise Operational Amplifier, 8–Pin DIP	221–5532–001	1
XF1	Fuse Clips, AGC	415–2068	1
XU1	Socket, 16–Pin DIP	417–1604	1
XU2	Socket, 8–Pin DIP	417–0804	1
XU3	Socket, 14–Pin DIP	417–1404	1
XU5	Socket, 8–Pin DIP	417–0804	1
XU6	Socket, 16–Pin DIP	417–1604	1
XU7	Socket, 14–Pin DIP	417–1404	1
XU9	Socket, 8–Pin DIP	417–0804	1
XU10	Socket, 16–Pin DIP	417–1604	1
XU12,XU13	Socket, 8–Pin DIP	417–0804	2
XU14	Socket, 16–Pin DIP	417–1604	1
XU16 THRU XU18, XU20, XU24	Socket, 8–Pin DIP	417–0804	5
XU25	Socket, 14–Pin DIP	417–1404	1
XU26	Socket, 8–Pin DIP	417–0804	1
XU27	Socket, 14–Pin DIP	417–1404	1
XU28	Socket, 8–Pin DIP	417–0804	1
XU29	Socket, 14–Pin DIP	417–1404	1
XU30	Socket, 8–Pin DIP	417–0804	1
XU31	Socket, 14–Pin DIP	417–1404	1
XU32 THRU XU36	Socket, 8–Pin DIP	417–0804	5
XU37,XU38	Socket, 6–Pin DIP	417–0600	2
XU39 THRU XU45	Socket, 8–Pin DIP	417–0804	7

TABLE 6–12. AUDIO INPUT CIRCUIT BOARD ASSEMBLY – 911–6005
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REF. DES.	DESCRIPTION	PART NO.	QTY.
C1 THRU C4	Capacitor, Electrolytic, 100 uF, 50V	020–1083	4
C100 THRU C111	Capacitor, Mica, 330 pF ±5%, 500V	040–3333	12
C112 THRU C123	Capacitor, Electrolytic, 10 uF, 25V, Non–Polarized	023–1075	12

TABLE 6–12. AUDIO INPUT CIRCUIT BOARD ASSEMBLY – 911–6005
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REF. DES.	DESCRIPTION	PART NO.	QTY.
C124,C125	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	2
C126,C127	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	2
C128	Capacitor, Mica, 120 pF ±5%, 500V	042–1222	1
C129	Capacitor, Ceramic 47 pF ±5%, 50V	003–4712	1
C130	Capacitor, Ceramic, 33 pF ±5%, 50V	003–3312	1
C131 THRU C134	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	4
C135	Capacitor, Mica, 120 pF ±5%, 500V	042–1222	1
C136	Capacitor, Ceramic 47 pF ±5%, 50V	003–4712	1
C137	Capacitor, Ceramic, 33 pF ±5%, 50V	003–3312	1
C138,C139	Capacitor, Electrolytic, 33 uF, 25V	020–3374	2
C140	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C141	Capacitor, Electrolytic, 10 uF, 25V, Non–Polarized	023–1075	1
C142	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C143,C144	Capacitor, Electrolytic, 33 uF, 25V	020–3374	2
C147,C148	Capacitor, Ceramic, 33 pF ±5%, 50V	003–3312	2
C149	Capacitor, Electrolytic, 33 uF, 25V, Non–Polarized	020–3374	1
C150	Capacitor, Ceramic, 68 pF ±5%, 50V	003–6812	1
C151	Capacitor, Electrolytic, 10 uF, 25V, Non–Polarized	023–1075	1
C152	Capacitor, Electrolytic, 33 uF, 25V, Non–Polarized	020–3374	1
C153,C154	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	2
C155	Capacitor, Electrolytic, 10 uF, 35V, Non–Polarized	023–1075	1
C156,C157	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	2
C158	Capacitor, Ceramic, 68 pF ±5%, 50V	003–6812	1
C159 THRU C162	Capacitor, Mica, 330 pF ±5%, 500V	040–3333	4
C163 THRU C165	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	3
C200 THRU C211	Capacitor, Mica, 330 pF ±5%, 500V	040–3333	12
C212 THRU C223	Capacitor, Electrolytic, 10 uF, 25V, Non–Polarized	023–1075	12
C224,C225	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	2
C226,C227	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	2
C228	Capacitor, Mica, 120 pF ±5%, 500V	042–1222	1
C229	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	1
C230	Capacitor, Ceramic, 33 pF ±5%, 50V	003–3312	1
C231 THRU C234	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	4
C235	Capacitor, Mica, 120 pF ±5%, 500V	042–1222	1
C236	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	1
C237	Capacitor, Ceramic, 33 pF ±5%, 50V	003–3312	1
C238,C239	Capacitor, Electrolytic, 33 uF, 25V	020–3374	2
C240	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C241	Capacitor, Electrolytic, 10 uF, 25V, Non–Polarized	023–1075	1
C242	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C243,C244	Capacitor, Electrolytic, 33 uF, 25V	020–3374	2
C246	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C247,C248	Capacitor, Ceramic, 33 pF ±5%, 50V	003–3312	2
C249	Capacitor, Electrolytic, 33 uF, 25V	020–3374	1

TABLE 6–12. AUDIO INPUT CIRCUIT BOARD ASSEMBLY – 911–6005
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REF. DES.	DESCRIPTION	PART NO.	QTY.
C250	Capacitor, Ceramic, 68 pF ±5%, 50V	003–6812	1
C251	Capacitor, Electrolytic, 10 uF, 25V, Non–Polarized	023–1075	1
C252	Capacitor, Electrolytic, 33 uF, 25V	020–3374	1
C253,C254	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	2
C255	Capacitor, Electrolytic, 10 uF, 25V, Non–Polarized	023–1075	1
C256	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C258	Capacitor, Ceramic, 68 pF ±5%, 50V	003–6812	1
C259 THRU C262	Capacitor, Mica, 330 pF ±5%, 500V	040–3333	4
C263 THRU C265	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	3
C300 THRU C311	Capacitor, Mica, 330 pF ±5%, 500V	040–3333	12
C312 THRU C323	Capacitor, Electrolytic, 10 uF, 25V, Non–Polarized	023–1075	12
C324,C325	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	2
C326,C327	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	2
C328	Capacitor, Mica, 120 pF ±5%, 500V	042–1222	1
C329	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	1
C330	Capacitor, Ceramic, 33 pF ±5%, 50V	003–3312	1
C331 THRU C334	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	4
C335	Capacitor, Mica, 120 pF ±5%, 500V	042–1222	1
C336	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	1
C337	Capacitor, Ceramic, 33 pF ±5%, 50V	003–3312	1
C338,C339	Capacitor, Electrolytic, 33 uF, 25V	020–3374	2
C340	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C341	Capacitor, Electrolytic, 10 uF, 25V, Non–Polarized	023–1075	1
C342	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C343,C344	Capacitor, Electrolytic, 33 uF, 25V	020–3374	2
C347,C348	Capacitor, Ceramic, 33 pF ±5%, 50V	003–3312	2
C349	Capacitor, Electrolytic, 33 uF, 25V	020–3374	1
C350	Capacitor, Ceramic, 68 pF ±5%, 50V	003–6812	1
C351	Capacitor, Electrolytic, 10 uF, 25V, Non–Polarized	023–1075	1
C352	Capacitor, Electrolytic, 33 uF, 25V	020–3374	1
C353,C354	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	2
C355	Capacitor, Electrolytic, 10 uF, 35V	023–1075	1
C356,C357	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	2
C358	Capacitor, Ceramic, 68 pF ±5%, 50V	003–6812	1
C359 THRU C362	Capacitor, Mica, 330 pF ±5%, 500V	040–3333	4
C363 THRU C365	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	3
C400 THRU C411	Capacitor, Mica, 330 pF ±5%, 500V	040–3333	12
C412 THRU C423	Capacitor, Electrolytic, 10 uF, 25V, Non–Polarized	023–1075	12
C424,C425	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	2
C426,C427	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	2
C428	Capacitor, Mica, 120 pF ±5%, 500V	042–1222	1
C429	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	1

TABLE 6–12. AUDIO INPUT CIRCUIT BOARD ASSEMBLY – 911–6005
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REF. DES.	DESCRIPTION	PART NO.	QTY.
C430	Capacitor, Ceramic, 33 pF ±5%, 50V	003–3312	1
C431 THRU C434	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	4
C435	Capacitor, Mica, 120 pF ±5%, 500V	042–1222	1
C436	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	1
C437	Capacitor, Ceramic, 33 pF ±5%, 50V	003–3312	1
C438,C439	Capacitor, Electrolytic, 33 uF, 25V	020–3374	2
C440	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C441	Capacitor, Electrolytic, 10 uF, 25V, Non–Polarized	023–1075	1
C442	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C443,C444	Capacitor, Electrolytic, 33 uF, 25V	020–3374	2
C446	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C447,C448	Capacitor, Ceramic, 33 pF ±5%, 50V	003–3312	2
C449	Capacitor, Electrolytic, 33 uF, 25V	020–3374	1
C450	Capacitor, Ceramic, 68 pF ±5%, 50V	003–6812	1
C451	Capacitor, Electrolytic, 10 uF, 25V, Non–Polarized	023–1075	1
C452	Capacitor, Electrolytic, 33 uF, 25V	020–3374	1
C453,C454	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	2
C455	Capacitor, Electrolytic, 10 uF, 25V, Non–Polarized	023–1075	1
C456	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C458	Capacitor, Ceramic, 68 pF ±5%, 50V	003–6812	1
C459 THRU C462	Capacitor, Mica, 330 pF ±5%, 500V	040–3333	4
C463 THRU C465	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	3
C500 THRU C511	Capacitor, Mica, 330 pF ±5%, 500V	040–3333	12
C512 THRU C523	Capacitor, Electrolytic, 10 uF, 25V, Non–Polarized	023–1075	12
C524,C525	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	2
C526,C527	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	2
C528	Capacitor, Mica, 120 pF ±5%, 500V	042–1222	1
C529	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	1
C530	Capacitor, Ceramic, 33 pF ±5%, 50V	003–3312	1
C531 THRU C534	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	4
C535	Capacitor, Mica, 120 pF ±5%, 500V	042–1222	1
C536	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	1
C537	Capacitor, Ceramic, 33 pF ±5%, 50V	003–3312	1
C538,C539	Capacitor, Electrolytic, 33 uF, 25V	020–3374	2
C540	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C541	Capacitor, Electrolytic, 10 uF, 25V, Non–Polarized	023–1075	1
C542	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C543,C544	Capacitor, Electrolytic, 33 uF, 25V	020–3374	2
C547,C548	Capacitor, Ceramic, 33 pF ±5%, 50V	003–3312	2
C549	Capacitor, Electrolytic, 33 uF, 25V	020–3374	1
C550	Capacitor, Ceramic, 68 pF ±5%, 50V	003–6812	1
C551	Capacitor, Electrolytic, 10 uF, 25V, Non–Polarized	023–1075	1
C552	Capacitor, Electrolytic, 33 uF, 25V	020–3374	1
C553,C554	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	2

TABLE 6–12. AUDIO INPUT CIRCUIT BOARD ASSEMBLY – 911–6005
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REF. DES.	DESCRIPTION	PART NO.	QTY.
C555	Capacitor, Electrolytic, 10 uF, 25V, Non–Polarized	023–1075	1
C556,C557	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	2
C558	Capacitor, Ceramic, 68 pF ±5%, 50V	003–6812	1
C559 THRU C562	Capacitor, Mica, 330 pF ±5%, 500V	040–3333	4
C563 THRU C565	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	3
C600 THRU C611	Capacitor, Mica, 330 pF ±5%, 500V	040–3333	12
C612 THRU C623	Capacitor, Electrolytic, 10 uF, 25V, Non–Polarized	023–1075	12
C624,C625	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	2
C626,C627	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	2
C628	Capacitor, Mica, 120 pF ±5%, 500V	042–1222	1
C629	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	1
C630	Capacitor, Ceramic, 33 pF ±5%, 50V	003–3312	1
C631 THRU C634	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	4
C635	Capacitor, Mica, 120 pF ±5%, 500V	042–1222	1
C636	Capacitor, Ceramic, 47 pF ±5%, 50V	003–4712	1
C637	Capacitor, Ceramic, 33 pF ±5%, 50V	003–3312	1
C638,C639	Capacitor, Electrolytic, 33 uF, 25V	020–3374	2
C640	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C641	Capacitor, Electrolytic, 10 uF, 25V, Non–Polarized	023–1075	1
C642	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C643,C644	Capacitor, Electrolytic, 33 uF, 25V	020–3374	2
C646	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C647,C648	Capacitor, Ceramic, 33 pF ±5%, 50V	003–3312	2
C649	Capacitor, Electrolytic, 33 uF, 25V	020–3374	1
C650	Capacitor, Ceramic, 68 pF ±5%, 50V	003–6812	1
C651	Capacitor, Electrolytic, 10 uF, 25V, Non–Polarized	023–1075	1
C652	Capacitor, Electrolytic, 33 uF, 25V	020–3374	1
C653,C654	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	2
C655	Capacitor, Electrolytic, 10 uF, 25V, Non–Polarized	023–1075	1
C656	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	1
C658	Capacitor, Ceramic, 68 pF ±5%, 50V	003–6812	1
C659 THRU C662	Capacitor, Mica, 330 pF ±5%, 500V	040–3333	4
C663 THRU C665	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003–1054	3
D100 THRU D103, D200 THRU D203, D300 THRU D303, D400 THRU D403, D500 THRU D503, D600 THRU D603	Diode, 1N4148, Silicon, 75V @ 0.3 Amperes	203–4148	24
J1 THRU J4	Receptacle, Male, 13–Pin Dual In–Line	417–2600	4
J100	Connector, Male, 20–Pin, PCB Mount	417–0230	1
J101 THRU J103	Connector Header, 36–Pin, Dual In–Line	417–0231	3

TABLE 6-12. AUDIO INPUT CIRCUIT BOARD ASSEMBLY - 911-6005
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REF. DES.	DESCRIPTION	PART NO.	QTY.
J104,J105	Receptacle, 6-Pin	417-0677	2
J106	Connector Header, 36-Pin, Dual In-Line	417-0231	1
J107 THRU J109	Receptacle, Male, 3-Pin In-line	417-0003	3
J200	Connector, Male, 20-Pin, PCB Mount	417-0230	1
J201 THRU J203	Connector Header, 36-Pin, Dual In-Line	417-0231	3
J204,J205	Receptacle, 6-Pin	417-0677	2
J206	Connector Header, 36-Pin, Dual In-Line	417-0231	1
J207 THRU J209	Receptacle, Male, 3-Pin In-line	417-0003	3
J300	Connector, Male, 20-Pin, PCB Mount	417-0230	1
J301 THRU J303	Connector Header, 36-Pin, Dual In-Line	417-0231	3
J304,J305	Receptacle, 6-Pin	417-0677	2
J306	Connector Header, 36-Pin, Dual In-Line	417-0231	1
J307 THRU J309	Receptacle, Male, 3-Pin In-line	417-0003	3
J308,J309	Receptacle, Male, 3-Pin In-line	417-0003	2
J400	Connector, Male, 20-Pin, PCB Mount	417-0230	1
J401 THRU J403	Connector Header, 36-Pin, Dual In-Line	417-0231	3
J404,J405	Receptacle, 6-Pin	417-0677	2
J406	Connector Header, 36-Pin, Dual In-Line	417-0231	1
J407 THRU J409	Receptacle, Male, 3-Pin In-line	417-0003	3
J500	Connector, Male, 20-Pin, PCB Mount	417-0230	1
J501 THRU J503	Connector Header, 36-Pin, Dual In-Line	417-0231	3
J504	Receptacle, 6-Pin	417-0677	1
J506	Connector Header, 36-Pin, Dual In-Line	417-0231	1
J507 THRU J509	Receptacle, Male, 3-Pin In-line	417-0003	3
J600	Connector, Male, 20-Pin, PCB Mount	417-0230	1
J601 THRU J603	Connector Header, 36-Pin, Dual In-Line	417-0231	3
J605	Receptacle, 6-Pin	417-0677	1
J606	Connector Header, 36-Pin, Dual In-Line	417-0231	1
J607 THRU J609	Receptacle, Male, 3-Pin In-line	417-0003	3
J505.J604	Receptacle, 6-Pin	417-0677	1
P100 THRU P112, P200 THRU P212, P300 THRU P312, P400 THRU P412, P420,P421, P500 THRU P512, P520, P521, P600 THRU P612, P620,P621	Jumper, Programmable, 2-Pin	340-0004	84
Q100,Q101	Field Effect Transistor, J271, P-Channel JFET, TO-92 Case	210-0271	3
Q102	Transistor, 2N3904, NPN, Silicon, TO-92 Case	211-3904	1
Q200,Q201	Field Effect Transistor, J271, P-Channel JFET, TO-92 Case	210-0271	2
Q202	Transistor, 2N3904, NPN, Silicon, TO-92 Case	211-3904	1
Q300,Q301	Field Effect Transistor, J271, P-Channel JFET, TO-92 Case	210-0271	2

TABLE 6–12. AUDIO INPUT CIRCUIT BOARD ASSEMBLY – 911–6005
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REF. DES.	DESCRIPTION	PART NO.	QTY.
Q302	Transistor, 2N3904, NPN, Silicon, TO–92 Case	211–3904	1
Q400,Q401	Field Effect Transistor, J271, P–Channel JFET, TO–92 Case	210–0271	2
Q402	Transistor, 2N3904, NPN, Silicon, TO–92 Case	211–3904	1
Q500,Q501	Field Effect Transistor, J271, P–Channel JFET, TO–92 Case	210–0271	2
Q502	Transistor, 2N3904, NPN, Silicon, TO–92 Case	211–3904	1
Q600,Q601	Field Effect Transistor, J271, P–Channel JFET, TO–92 Case	210–0271	2
Q602	Transistor, 2N3904, NPN, Silicon, TO–92 Case	211–3904	1
R100	Resistor Network, 4–20 k Ohm ±0.1% Resistors, 8–Pin DIP	226–2010	1
R101	Resistor Network, 8–20 k Ohm ±0.1% Resistors, 16–Pin DIP	226–2011	1
R102	Resistor, 2.49 k Ohm ±1%, 1/4W	103–2494	1
R103,R104	Resistor Network, 7–6.8 k Ohm 1% Resistors, 8–Pin Single In–Line Package	226–6800	2
R105	Resistor, 127 Ohm ±1%, 1/4W	103–1273	1
R106	Resistor, 24.9 Ohm ±1%, 1/4W	103–2490	1
R107	Resistor, 2.49 k Ohm ±1%, 1/4W	103–2494	1
R110	Resistor, 127 Ohm ±1%, 1/4W	103–1273	1
R111	Resistor, 24.9 Ohm ±1%, 1/4W	103–2490	1
R112,R115	Resistor, 2.49 k Ohm ±1%, 1/4W	103–2494	1
R118	Resistor, 127 Ohm ±1%, 1/4W	103–1273	1
R119	Resistor, 24.9 Ohm ±1%, 1/4W	103–2490	1
R120	Resistor, 2.49 k Ohm ±1%, 1/4W	103–2494	1
R123	Resistor, 127 Ohm ±1%, 1/4W	103–1273	1
R124	Resistor, 24.9 Ohm ±1%, 1/4W	103–2490	1
R125	Resistor, 2.49 k Ohm ±1%, 1/4W	103–2494	1
R128	Resistor, 10 Ohm ±1%, 1/4W	103–1021	1
R129	Resistor, 1.10 k Ohm ±1%, 1/4W	103–1104	1
R130,R131	Resistor, 2 k Ohm ±1%, 1/4W	100–2041	2
R132	Resistor, 49.9 k Ohm ±1%, 1/4W	103–4951	1
R133	Resistor, 33.2 k Ohm ±1%, 1/4W	103–3325	1
R134	Resistor, 49.9 k Ohm ±1%, 1/4W	103–4951	1
R135	Resistor, 12.4 k Ohm ±1%, 1/4W	103–1245	1
R136	Resistor, 10 Ohm ±1%, 1/4W	103–1021	1
R137	Resistor, 1.10 k Ohm ±1%, 1/4W	103–1104	1
R138,R139	Resistor, 2 k Ohm ±1%, 1/4W	100–2041	2
R140	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R141	Resistor, 60.4 Ohm ±1%, 1/4W	103–6040	1
R142	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R143	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R144	Resistor, 226 k Ohm ±1%, 1/4W	103–2276	1
R145	Resistor, 1 k Ohm ±1%, 1/4W	103–1041	1
R146	Resistor, 19.1 k Ohm ±1%, 1/4W	103–1915	1
R147	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R148	Resistor, 1 k Ohm ±1%, 1/4W	103–1041	1
R149	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R150	Resistor, 60.4 Ohm ±1%, 1/4W	103–6040	1
R151	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R152	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R153	Potentiometer, 50 k Ohm ±10%, 1/2W	177–5054	1

TABLE 6–12. AUDIO INPUT CIRCUIT BOARD ASSEMBLY – 911–6005
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REF. DES.	DESCRIPTION	PART NO.	QTY.
R154	Resistor, 511 k Ohm ±1%, 1/4W	103–5116	1
R155	Resistor, 51.1 Ohm ±1%, 1/4W	103–5112	1
R156	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R157	Resistor, 30.1 k Ohm ±1%, 1/4W	100–3051	1
R158	Resistor, 4.87 k Ohm ±1%, 1/4W	103–4874	1
R159	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R160,R161	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	2
R162	Potentiometer, 50 k Ohm ±10%, 1/2W	177–5054	1
R163	Resistor, 511 k Ohm ±1%, 1/4W	103–5116	1
R164	Resistor, 51.1 Ohm ±1%, 1/4W	103–5112	1
R165	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R166	Resistor, 30.1 k Ohm ±1%, 1/4W	100–3051	1
R167	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R168	Resistor, 4.87 k Ohm ±1%, 1/4W	103–4874	1
R169	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R170 THRU R173	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	4
R174	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R175	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R176	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R177	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R178 THRU R181	Resistor, 3.40 k Ohm ±1%, 1/4W	103–3404	4
R182	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R183	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R184,R185	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	2
R186,R187	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	2
R188 THRU R191	Resistor, 3.40 k Ohm ±1%, 1/4W	103–3404	4
R192,R193	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	2
R194,R195	Potentiometer, 20 k Ohm ±10%, 1/2W	176–2011	2
R196,R197	Potentiometer, 20 Ohm ±10%, 1/2W	176–2010	2
R198	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R199	Resistor, 1 Meg Ohm ±1%, 1/4W	103–1007	1
R200	Resistor Network, 4–20 k Ohm ±0.1% Resistors, 8–Pin DIP	226–2010	1
R201	Resistor Network, 8–20 k Ohm ±0.1% Resistors, 16–Pin DIP	226–2011	1
R202	Resistor, 2.49 k Ohm ±1%, 1/4W	103–2494	1
R203,R204	Resistor Network, 7–6.8 k Ohm ±1% Resistors, 8–Pin Single In–Line Package	226–6800	2
R205	Resistor,127 Ohm ±1%, 1/4W	103–1273	1
R206	Resistor, 24.9 Ohm ±1%, 1/4W	103–2490	1
R207	Resistor, 2.49 k Ohm ±1%, 1/4W	103–2494	1
R210	Resistor,127 Ohm ±1%, 1/4W	103–1273	1
R211	Resistor, 24.9 Ohm ±1%, 1/4W	103–2490	1
R212,R215	Resistor, 2.49 k Ohm ±1%, 1/4W	103–2494	2
R218	Resistor,127 Ohm ±1%, 1/4W	103–1273	1
R219	Resistor, 24.9 Ohm ±1%, 1/4W	103–2490	1

TABLE 6–12. AUDIO INPUT CIRCUIT BOARD ASSEMBLY – 911–6005
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REF. DES.	DESCRIPTION	PART NO.	QTY.
R220	Resistor, 2.49 k Ohm ±1%, 1/4W	103–2494	1
R223	Resistor,127 Ohm ±1%, 1/4W	103–1273	1
R224	Resistor, 24.9 Ohm ±1%, 1/4W	103–2490	1
R225	Resistor, 2.49 k Ohm ±1%, 1/4W	103–2494	1
R228	Resistor, 10 Ohm ±1%, 1/4W	103–1021	1
R229	Resistor, 1.10 k Ohm ±1%, 1/4W	103–1104	1
R230,R231	Resistor, 2 k Ohm ±1%, 1/4W	100–2041	2
R232	Resistor, 49.9 k Ohm ±1%, 1/4W	103–4951	1
R233	Resistor 33.2 k Ohm ±1%, 1/4W	103–3325	1
R234	Resistor, 49.9 k Ohm ±1%, 1/4W	103–4951	1
R235	Resistor, 12.4 k Ohm ±1%, 1/4W	103–1245	1
R236	Resistor, 10 Ohm ±1%, 1/4W	103–1021	1
R237	Resistor, 1.10 k Ohm ±1%, 1/4W	103–1104	1
R238,R239	Resistor, 2 k Ohm ±1%, 1/4W	100–2041	2
R240	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R241	Resistor, 60.4 Ohm ±1%, 1/4W	103–6040	1
R242	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R243	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R244	Resistor, 226 k Ohm ±1%, 1/4W	103–2276	1
R245	Resistor, 1 k Ohm ±1%, 1/4W	103–1041	1
R246	Resistor, 19.1 k Ohm ±1%, 1/4W	103–1915	1
R247	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R248	Resistor, 1 k Ohm ±1%, 1/4W	103–1041	1
R249	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R250	Resistor, 60.4 Ohm ±1%, 1/4W	103–6040	1
R251	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R252	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R253	Potentiometer, 50 k Ohm ±10%, 1/2W	177–5054	1
R254	Resistor, 511 k Ohm ±1%, 1/4W	103–5116	1
R255	Resistor, 51.1 Ohm ±1%, 1/4W	103–5112	1
R256	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R257	Resistor, 30.1 k Ohm ±1%, 1/4W	100–3051	1
R258	Resistor, 4.87 k Ohm ±1%, 1/4W	103–4874	1
R259	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R260,R261	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	2
R262	Potentiometer, 50 k Ohm ±10%, 1/2W	177–5054	1
R263	Resistor, 511 k Ohm ±1%, 1/4W	103–5116	1
R264	Resistor, 51.1 Ohm ±1%, 1/4W	103–5112	1
R265	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R266	Resistor, 30.1 k Ohm ±1%, 1/4W	100–3051	1
R267	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R268	Resistor, 4.87 k Ohm ±1%, 1/4W	103–4874	1
R269	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R270 THRU R273	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	4
R274	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R275	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1

TABLE 6–12. AUDIO INPUT CIRCUIT BOARD ASSEMBLY – 911–6005
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REF. DES.	DESCRIPTION	PART NO.	QTY.
R276	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R277	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R278 THRU R281	Resistor, 3.40 k Ohm ±1%, 1/4W	103–3404	4
R282	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R283	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R284,R285	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	2
R286,R287	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	2
R288 THRU R291	Resistor, 3.40 k Ohm ±1%, 1/4W	103–3404	4
R292,R293	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	2
R294,R295	Potentiometer, 20 k Ohm ±10%, 1/2W	176–2011	2
R296,R297	Potentiometer, 20 Ohm ±10%, 1/2W	176–2010	2
R298	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R299	Resistor, 1 Meg Ohm ±1%, 1/4W	103–1007	1
R300	Resistor Network, 4–20 k Ohm ±0.1% Resistors, 8–Pin DIP	226–2010	1
R301	Resistor Network, 8–20 k Ohm ±0.1% Resistors, 16–Pin DIP	226–2011	1
R302	Resistor, 2.49 k Ohm ±1%, 1/4W	103–2494	1
R303,R304	Resistor Network, 7–6.8 k Ohm ±1% Resistors, 8–Pin Single In–Line Package	226–6800	2
R305	Resistor, 127 Ohm ±1%, 1/4W	103–1273	1
R306	Resistor, 24.9 Ohm ±1%, 1/4W	103–2490	1
R307	Resistor, 2.49 k Ohm ±1%, 1/4W	103–2494	1
R310	Resistor, 127 Ohm ±1%, 1/4W	103–1273	1
R311	Resistor, 24.9 Ohm ±1%, 1/4W	103–2490	1
R312,R315	Resistor, 2.49 k Ohm ±1%, 1/4W	103–2494	2
R318	Resistor, 127 Ohm ±1%, 1/4W	103–1273	1
R319	Resistor, 24.9 Ohm ±1%, 1/4W	103–2490	1
R320	Resistor, 2.49 k Ohm ±1%, 1/4W	103–2494	1
R323	Resistor, 127 Ohm ±1%, 1/4W	103–1273	1
R324	Resistor, 24.9 Ohm ±1%, 1/4W	103–2490	1
R325	Resistor, 2.49 k Ohm ±1%, 1/4W	103–2494	1
R328	Resistor, 10 Ohm ±1%, 1/4W	103–1021	1
R329	Resistor, 1.10 k Ohm ±1%, 1/4W	103–1104	1
R330,R331	Resistor, 2 k Ohm ±1%, 1/4W	100–2041	2
R332	Resistor, 49.9 k Ohm ±1%, 1/4W	103–4951	1
R333	Resistor, 33.2 k Ohm ±1%, 1/4W	103–3325	1
R334	Resistor, 49.9 k Ohm ±1%, 1/4W	103–4951	1
R335	Resistor, 12.4 k Ohm ±1%, 1/4W	103–1245	1
R336	Resistor, 10 Ohm ±1%, 1/4W	103–1021	1
R337	Resistor, 1.10 k Ohm ±1%, 1/4W	103–1104	1
R338,R339	Resistor, 2 k Ohm ±1%, 1/4W	100–2041	2
R340	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R341	Resistor, 60.4 Ohm ±1%, 1/4W	103–6040	1
R342	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R343	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R344	Resistor, 226 k Ohm ±1%, 1/4W	103–2276	1

TABLE 6–12. AUDIO INPUT CIRCUIT BOARD ASSEMBLY – 911–6005
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REF. DES.	DESCRIPTION	PART NO.	QTY.
R345	Resistor, 1 k Ohm ±1%, 1/4W	103–1041	1
R346	Resistor, 19.1 k Ohm ±1%, 1/4W	103–1915	1
R347	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R348	Resistor, 1 k Ohm ±1%, 1/4W	103–1041	1
R349	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R350	Resistor, 60.4 Ohm ±1%, 1/4W	103–6040	1
R351	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R352	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R353	Potentiometer, 50 k Ohm ±10%, 1/2W	177–5054	1
R354	Resistor, 511 k Ohm ±1%, 1/4W	103–5116	1
R355	Resistor, 51.1 Ohm ±1%, 1/4W	103–5112	1
R356	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R357	Resistor, 30.1 k Ohm ±1%, 1/4W	100–3051	1
R358	Resistor, 4.87 k Ohm ±1%, 1/4W	103–4874	1
R359	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R360,R361	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	2
R362	Potentiometer, 50 k Ohm ±10%, 1/2W	177–5054	1
R363	Resistor, 511 k Ohm ±1%, 1/4W	103–5116	1
R364	Resistor, 51.1 Ohm ±1%, 1/4W	103–5112	1
R365	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R366	Resistor, 30.1 k Ohm ±1%, 1/4W	100–3051	1
R367	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R368	Resistor, 4.87 k Ohm ±1%, 1/4W	103–4874	1
R369	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R370 THRU R373	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	4
R374	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R375	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R376	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R377	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R378 THRU R381	Resistor, 3.40 k Ohm ±1%, 1/4W	103–3404	4
R382	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R383	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R384,R385	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	2
R386,R387	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	2
R388 THRU R391	Resistor, 3.40 k Ohm ±1%, 1/4W	103–3404	4
R392,R393	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	2
R394,R395	Potentiometer, 20 k Ohm ±10%, 1/2W	176–2011	2
R396,R397	Potentiometer, 20 Ohm ±10%, 1/2W	176–2010	2
R398	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R399	Resistor, 1 Meg Ohm ±1%, 1/4W	103–1007	1
R400	Resistor Network, 4–20 k Ohm ±0.1% Resistors, 8–Pin DIP	226–2010	1
R401	Resistor Network, 8–20 k Ohm ±0.1% Resistors, 16–Pin DIP	226–2011	1
R402	Resistor, 2.49 k Ohm ±1%, 1/4W	103–2494	1
R403,R404	Resistor Network, 7–6.8 k Ohm ±1% Resistors, 8–Pin Single In–Line Package	226–6800	2

TABLE 6–12. AUDIO INPUT CIRCUIT BOARD ASSEMBLY – 911–6005
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REF. DES.	DESCRIPTION	PART NO.	QTY.
R405	Resistor, 127 Ohm ±1%, 1/4W	103–1273	1
R406	Resistor, 24.9 Ohm ±1%, 1/4W	103–2490	1
R407	Resistor, 2.49 k Ohm ±1%, 1/4W	103–2494	1
R410	Resistor, 127 Ohm ±1%, 1/4W	103–1273	1
R411	Resistor, 24.9 Ohm ±1%, 1/4W	103–2490	1
R412,R415	Resistor, 2.49 k Ohm ±1%, 1/4W	103–2494	2
R418	Resistor, 127 Ohm ±1%, 1/4W	103–1273	1
R419	Resistor, 24.9 Ohm ±1%, 1/4W	103–2490	1
R420	Resistor, 2.49 k Ohm ±1%, 1/4W	103–2494	1
R423	Resistor, 127 Ohm ±1%, 1/4W	103–1273	1
R424	Resistor, 24.9 Ohm ±1%, 1/4W	103–2490	1
R425	Resistor, 2.49 k Ohm ±1%, 1/4W	103–2494	1
R428	Resistor, 10 Ohm ±1%, 1/4W	103–1021	1
R429	Resistor, 1.10 k Ohm ±1%, 1/4W	103–1104	1
R430,R431	Resistor, 2 k Ohm ±1%, 1/4W	100–2041	2
R432	Resistor, 49.9 k Ohm ±1%, 1/4W	103–4951	1
R433	Resistor, 33.2 k Ohm ±1%, 1/4W	103–3325	1
R434	Resistor, 49.9 k Ohm ±1%, 1/4W	103–4951	1
R435	Resistor, 12.4 k Ohm ±1%, 1/4W	103–1245	1
R436	Resistor, 10 Ohm ±1%, 1/4W	103–1021	1
R437	Resistor, 1.10 k Ohm ±1%, 1/4W	103–1104	1
R438,R439	Resistor, 2 k Ohm ±1%, 1/4W	100–2041	2
R440	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R441	Resistor, 60.4 Ohm ±1%, 1/4W	103–6040	1
R442	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R443	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R444	Resistor, 226 k Ohm ±1%, 1/4W	103–2276	1
R445	Resistor, 1 k Ohm ±1%, 1/4W	103–1041	1
R446	Resistor, 19.1 k Ohm ±1%, 1/4W	103–1915	1
R447	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R448	Resistor, 1 k Ohm ±1%, 1/4W	103–1041	1
R449	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R450	Resistor, 60.4 Ohm ±1%, 1/4W	103–6040	1
R451	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R452	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R453	Potentiometer, 50 k Ohm ±10%, 1/2W	177–5054	1
R454	Resistor, 511 k Ohm ±1%, 1/4W	103–5116	1
R455	Resistor, 51.1 Ohm ±1%, 1/4W	103–5112	1
R456	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R457	Resistor, 30.1 k Ohm ±1%, 1/4W	100–3051	1
R458	Resistor, 4.87 k Ohm ±1%, 1/4W	103–4874	1
R459	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R460,R461	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	2
R462	Potentiometer, 50 k Ohm ±10%, 1/2W	177–5054	1
R463	Resistor, 511 k Ohm ±1%, 1/4W	103–5116	1
R464	Resistor, 51.1 Ohm ±1%, 1/4W	103–5112	1

TABLE 6–12. AUDIO INPUT CIRCUIT BOARD ASSEMBLY – 911–6005
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REF. DES.	DESCRIPTION	PART NO.	QTY.
R465	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R466	Resistor, 30.1 k Ohm ±1%, 1/4W	100–3051	1
R467	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R468	Resistor, 4.87 k Ohm ±1%, 1/4W	103–4874	1
R469	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R470 THRU R473	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	4
R474	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R475	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R476	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R477	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R478 THRU R481	Resistor, 3.40 k Ohm ±1%, 1/4W	103–3404	4
R482	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R483	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R484,R485	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	2
R486,R487	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	2
R488 THRU R491	Resistor, 3.40 k Ohm ±1%, 1/4W	103–3404	4
R492,R493	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	2
R494,R495	Potentiometer, 20 k Ohm ±10%, 1/2W	176–2011	2
R496,R497	Potentiometer, 20 Ohm ±10%, 1/2W	176–2010	2
R498	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R499	Resistor, 1 Meg Ohm ±1%, 1/4W	103–1007	1
R500	Resistor Network, 4–20 k Ohm ±0.1% Resistors, 8–Pin DIP	226–2010	1
R501	Resistor Network, 8–20 k Ohm ±0.1% Resistors, 16–Pin DIP	226–2011	1
R502	Resistor, 2.49 k Ohm ±1%, 1/4W	103–2494	1
R503,R504	Resistor Network, 7–6.8 k Ohm ±1% Resistors, 8–Pin Single In–Line Package	226–6800	2
R505	Resistor, 127 Ohm ±1%, 1/4W	103–1273	1
R506	Resistor, 24.9 Ohm ±1%, 1/4W	103–2490	1
R507	Resistor, 2.49 k Ohm ±1%, 1/4W	103–2494	1
R510	Resistor, 127 Ohm ±1%, 1/4W	103–1273	1
R511	Resistor, 24.9 Ohm ±1%, 1/4W	103–2490	1
R512,R515	Resistor, 2.49 k Ohm ±1%, 1/4W	103–2494	2
R518	Resistor, 127 Ohm ±1%, 1/4W	103–1273	1
R519	Resistor, 24.9 Ohm ±1%, 1/4W	103–2490	1
R520	Resistor, 2.49 k Ohm ±1%, 1/4W	103–2494	1
R523	Resistor, 127 Ohm ±1%, 1/4W	103–1273	1
R524	Resistor, 24.9 Ohm ±1%, 1/4W	103–2490	1
R525	Resistor, 2.49 k Ohm ±1%, 1/4W	103–2494	1
R528	Resistor, 10 Ohm ±1%, 1/4W	103–1021	1
R529	Resistor, 1.10 k Ohm ±1%, 1/4W	103–1104	1
R530,R531	Resistor, 2 k Ohm ±1%, 1/4W	100–2041	2
R532	Resistor, 49.9 k Ohm ±1%, 1/4W	103–4951	1
R533	Resistor, 33.2 k Ohm ±1%, 1/4W	103–3325	1
R534	Resistor, 49.9 k Ohm ±1%, 1/4W	103–4951	1

TABLE 6–12. AUDIO INPUT CIRCUIT BOARD ASSEMBLY – 911–6005
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REF. DES.	DESCRIPTION	PART NO.	QTY.
R535	Resistor, 12.4 k Ohm ±1%, 1/4W	103–1245	1
R536	Resistor, 10 Ohm ±1%, 1/4W	103–1021	1
R537	Resistor, 1.10 k Ohm ±1%, 1/4W	103–1104	1
R538,R539	Resistor, 2 k Ohm ±1%, 1/4W	100–2041	2
R540	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R541	Resistor, 60.4 Ohm ±1%, 1/4W	103–6040	1
R542	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R543	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R544	Resistor, 226 k Ohm ±1%, 1/4W	103–2276	1
R545	Resistor, 1 k Ohm ±1%, 1/4W	103–1041	1
R546	Resistor, 19.1 k Ohm ±1%, 1/4W	103–1915	1
R547	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R548	Resistor, 1 k Ohm ±1%, 1/4W	103–1041	1
R549	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R550	Resistor, 60.4 Ohm ±1%, 1/4W	103–6040	1
R551	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R552	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R553	Potentiometer, 50 k Ohm ±10%, 1/2W	177–5054	1
R554	Resistor, 511 k Ohm ±1%, 1/4W	103–5116	1
R555	Resistor, 51.1 Ohm ±1%, 1/4W	103–5112	1
R556	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R557	Resistor, 30.1 k Ohm ±1%, 1/4W	100–3051	1
R558	Resistor, 4.87 k Ohm ±1%, 1/4W	103–4874	1
R559	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R560,R561	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	2
R562	Potentiometer, 50 k Ohm ±10%, 1/2W	177–5054	1
R563	Resistor, 511 k Ohm ±1%, 1/4W	103–5116	1
R564	Resistor, 51.1 Ohm ±1%, 1/4W	103–5112	1
R565	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R566	Resistor, 30.1 k Ohm ±1%, 1/4W	100–3051	1
R567	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R568	Resistor, 4.87 k Ohm ±1%, 1/4W	103–4874	1
R569	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R570 THRU R573	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	4
R574	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R575	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R576	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R577	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R578 THRU R581	Resistor, 3.40 k Ohm ±1%, 1/4W	103–3404	4
R582	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R583	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R584,R585	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	2
R586,R587	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	2
R588 THRU R591	Resistor, 3.40 k Ohm ±1%, 1/4W	103–3404	4

TABLE 6–12. AUDIO INPUT CIRCUIT BOARD ASSEMBLY – 911–6005
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REF. DES.	DESCRIPTION	PART NO.	QTY.
R592,R593	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	2
R594,R595	Potentiometer, 20 k Ohm ±10%, 1/2W	176–2011	2
R596,R597	Potentiometer, 20 Ohm ±10%, 1/2W	176–2010	2
R598	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R599	Resistor, 1 Meg Ohm ±1%, 1/4W	103–1007	1
R600	Resistor Network, 4–20 k Ohm ±0.1% Resistors, 8–Pin DIP	226–2010	1
R601	Resistor Network, 8–20 k Ohm ±0.1% Resistors, 16–Pin DIP	226–2011	1
R602	Resistor, 2.49 k Ohm ±1%, 1/4W	103–2494	1
R603,R604	Resistor Network, 7–6.8 k Ohm ±1% Resistors, 8–Pin Single In–Line Package	226–6800	2
R605	Resistor, 127 Ohm ±1%, 1/4W	103–1273	1
R606	Resistor, 24.9 Ohm ±1%, 1/4W	103–2490	1
R607	Resistor, 2.49 k Ohm ±1%, 1/4W	103–2494	1
R610	Resistor, 127 Ohm ±1%, 1/4W	103–1273	1
R611	Resistor, 24.9 Ohm ±1%, 1/4W	103–2490	1
R612,R615	Resistor, 2.49 k Ohm ±1%, 1/4W	103–2494	2
R618	Resistor, 127 Ohm ±1%, 1/4W	103–1273	1
R619	Resistor, 24.9 Ohm ±1%, 1/4W	103–2490	1
R620	Resistor, 2.49 k Ohm ±1%, 1/4W	103–2494	1
R623	Resistor, 127 Ohm ±1%, 1/4W	103–1273	1
R624	Resistor, 24.9 Ohm ±1%, 1/4W	103–2490	1
R625	Resistor, 2.49 k Ohm ±1%, 1/4W	103–2494	1
R628	Resistor, 10 Ohm ±1%, 1/4W	103–1021	1
R629	Resistor, 1.10 k Ohm ±1%, 1/4W	103–1104	1
R630,R631	Resistor, 2 k Ohm ±1%, 1/4W	100–2041	2
R632	Resistor, 49.9 k Ohm ±1%, 1/4W	103–4951	1
R633	Resistor, 33.2 k Ohm ±1%, 1/4W	103–3325	1
R634	Resistor, 49.9 k Ohm ±1%, 1/4W	103–4951	1
R635	Resistor, 12.4 k Ohm ±1%, 1/4W	103–1245	1
R636	Resistor, 10 Ohm ±1%, 1/4W	103–1021	1
R637	Resistor, 1.10 k Ohm ±1%, 1/4W	103–1104	1
R638,R639	Resistor, 2 k Ohm ±1%, 1/4W	100–2041	2
R640	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R641	Resistor, 60.4 Ohm ±1%, 1/4W	103–6040	1
R642	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R643	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R644	Resistor, 226 k Ohm ±1%, 1/4W	103–2276	1
R645	Resistor, 1 k Ohm ±1%, 1/4W	103–1041	1
R646	Resistor, 19.1 k Ohm ±1%, 1/4W	103–1915	1
R647	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R648	Resistor, 1 k Ohm ±1%, 1/4W	103–1041	1
R649	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R650	Resistor, 60.4 Ohm ±1%, 1/4W	103–6040	1
R651	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R652	Resistor, 5.11 k Ohm ±1%, 1/4W	103–5141	1
R653	Potentiometer, 50 k Ohm ±10%, 1/2W	177–5054	1
R654	Resistor, 511 k Ohm ±1%, 1/4W	103–5116	1

TABLE 6–12. AUDIO INPUT CIRCUIT BOARD ASSEMBLY – 911–6005
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REF. DES.	DESCRIPTION	PART NO.	QTY.
R655	Resistor, 51.1 Ohm ±1%, 1/4W	103–5112	1
R656	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R657	Resistor, 30.1 k Ohm ±1%, 1/4W	100–3051	1
R658	Resistor, 4.87 k Ohm ±1%, 1/4W	103–4874	1
R659	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R660,R661	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	2
R662	Potentiometer, 50 k Ohm ±10%, 1/2W	177–5054	1
R663	Resistor, 511 k Ohm ±1%, 1/4W	103–5116	1
R664	Resistor, 51.1 Ohm ±1%, 1/4W	103–5112	1
R665	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R666	Resistor, 30.1 k Ohm ±1%, 1/4W	100–3051	1
R667	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R668	Resistor, 4.87 k Ohm ±1%, 1/4W	103–4874	1
R669	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R670 THRU R673	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	4
R674	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R675	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R676	Resistor, 20.0 k Ohm ±1%, 1/4W	103–2051	1
R677	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R678 THRU R681	Resistor, 3.40 k Ohm ±1%, 1/4W	103–3404	4
R682	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	1
R683	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R684,R685	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	2
R686,R687	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	2
R688 THRU R691	Resistor, 3.40 k Ohm ±1%, 1/4W	103–3404	4
R692,R693	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R694,R695	Potentiometer, 20 k Ohm ±10%, 1/2W	176–2011	2
R696,R697	Potentiometer, 20 Ohm ±10%, 1/2W	176–2010	2
R698	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	1
R699	Resistor, 1 Meg Ohm ±1%, 1/4W	103–1007	1
U100	Integrated Circuit, M74HC4052B1, Dual 4 – Channel Analog Multiplexers/Demultiplexers, CMOS MSI, 2P4T, 16–Pin DIP	220–4052–001	1
U101	Integrated Circuit, SSM2016, Low Noise Differential Audio Amplifier, 16–Pin DIP	220–2016	1
U102	Integrated Circuit, M74HC4052B1, Dual 4 – Channel Analog Multiplexers/Demultiplexers, CMOS MSI, 2P4T, 16–Pin DIP	220–4052–001	1
U103	Integrated Circuit, SSM2016, Low Noise Differential Audio Amplifier, 16–Pin DIP	220–2016	1
U104,U105	Integrated Circuit, 2150A, Voltage Controlled Amplifier, 8–Pin DIP	220–2150	2
U106	Integrated Circuit, TL072CP, Dual JFET–Input Operational Amplifier, 8–Pin DIP	221–0072	2
U108	Integrated Circuit, NE5532AP, Dual Low Noise Operational Amplifier, 8–Pin DIP	221–5532–001	1
U109	Integrated Circuit, MC14053B, Analog Multiplexers/Demulti–plexers, CMOS MSI, 16–Pin DIP	220–4053	2
U111	Integrated Circuit, TL072CP, Dual JFET–Input Operational Amplifier, 8–Pin DIP	221–0072	1

TABLE 6–12. AUDIO INPUT CIRCUIT BOARD ASSEMBLY – 911–6005
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REF. DES.	DESCRIPTION	PART NO.	QTY.
U200	Integrated Circuit, M74HC4052B1, Dual 4 – Channel Analog Multiplexers/Demultiplexers, CMOS MSI, 2P4T, 16–Pin DIP	220–4052–001	1
U201	Integrated Circuit, SSM2016, Low Noise Differential Audio Amplifier, 16–Pin DIP	220–2016	1
U202	Integrated Circuit, M74HC4052B1, Dual 4 – Channel Analog Multiplexers/Demultiplexers, CMOS MSI, 2P4T, 16–Pin DIP	220–4052–001	1
U203	Integrated Circuit, SSM2016, Low Noise Differential Audio Amplifier, 16–Pin DIP	220–2016	1
U204,U205	Integrated Circuit, 2150A, Voltage Controlled Amplifier, 8–Pin DIP	220–2150	2
U206	Integrated Circuit, TL072CP, Dual JFET–Input Operational Amplifier, 8–Pin DIP	221–0072	1
U208	Integrated Circuit, NE5532AP, Dual Low Noise Operational Amplifier, 8–Pin DIP	221–5532–001	1
U209,U210	Integrated Circuit, MC14053B, Analog Multiplexers/Demulti–plexers, CMOS MSI, 16–Pin DIP	220–4053	2
U300	Integrated Circuit, M74HC4052B1, Dual 4 – Channel Analog Multiplexers/Demultiplexers, CMOS MSI, 2P4T, 16–Pin DIP	220–4052–001	1
U301	Integrated Circuit, SSM2016, Low Noise Differential Audio Amplifier, 16–Pin DIP	220–2016	1
U302	Integrated Circuit, M74HC4052B1, Dual 4 – Channel Analog Multiplexers/Demultiplexers, CMOS MSI, 2P4T, 16–Pin DIP	220–4052–001	1
U303	Integrated Circuit, SSM2016, Low Noise Differential Audio Amplifier, 16–Pin DIP	220–2016	1
U304,U305	Integrated Circuit, 2150A, Voltage Controlled Amplifier, 8–Pin DIP	220–2150	2
U306,U307	Integrated Circuit, TL072CP, Dual JFET–Input Operational Amplifier, 8–Pin DIP	221–0072	2
U308	Integrated Circuit, NE5532AP, Dual Low Noise Operational Amplifier, 8–Pin DIP	221–5532–001	1
U309,U310	Integrated Circuit, MC14053B, Analog Multiplexers/Demulti–plexers, CMOS MSI, 16–Pin DIP	220–4053	2
U311	Integrated Circuit, TL072CP, Dual JFET–Input Operational Amplifier, 8–Pin DIP	221–0072	1
U400	Integrated Circuit, M74HC4052B1, Dual 4 – Channel Analog Multiplexers/Demultiplexers, CMOS MSI, 2P4T, 16–Pin DIP	220–4052–001	1
U401	Integrated Circuit, SSM2016, Low Noise Differential Audio Amplifier, 16–Pin DIP	220–2016	1
U402	Integrated Circuit, M74HC4052B1, Dual 4 – Channel Analog Multiplexers/Demultiplexers, CMOS MSI, 2P4T, 16–Pin DIP	220–4052–001	1
U403	Integrated Circuit, SSM2016, Low Noise Differential Audio Amplifier, 16–Pin DIP	220–2016	1
U404,U405	Integrated Circuit, 2150A, Voltage Controlled Amplifier, 8–Pin DIP	220–2150	2
U406	Integrated Circuit, TL072CP, Dual JFET–Input Operational Amplifier, 8–Pin DIP	221–0072	1
U408	Integrated Circuit, NE5532AP, Dual Low Noise Operational Amplifier, 8–Pin DIP	221–5532–001	1
U409,U410	Integrated Circuit, MC14053B, Analog Multiplexers/Demulti–plexers, CMOS MSI, 16–Pin DIP	220–4053	2
U500	Integrated Circuit, M74HC4052B1, Dual 4 – Channel Analog Multiplexers/Demultiplexers, CMOS MSI, 2P4T, 16–Pin DIP	220–4052–001	1
U501	Integrated Circuit, SSM2016, Low Noise Differential Audio Amplifier, 16–Pin DIP	220–2016	1
U502	Integrated Circuit, M74HC4052B1, Dual 4 – Channel Analog Multiplexers/Demultiplexers, CMOS MSI, 2P4T, 16–Pin DIP	220–4052–001	1
U503	Integrated Circuit, SSM2016, Low Noise Differential Audio Amplifier, 16–Pin DIP	220–2016	1
U504,U505	Integrated Circuit, 2150A, Voltage Controlled Amplifier, 8–Pin DIP	220–2150	2

TABLE 6–12. AUDIO INPUT CIRCUIT BOARD ASSEMBLY – 911–6005
(Sheet 18 of 18)

REF. DES.	DESCRIPTION	PART NO.	QTY.
U506,U507	Integrated Circuit, TL072CP, Dual JFET–Input Operational Amplifier, 8–Pin DIP	221–0072	2
U508	Integrated Circuit, NE5532AP, Dual Low Noise Operational Amplifier, 8–Pin DIP	221–5532–001	1
U509,U510	Integrated Circuit, MC14053B, Analog Multiplexers/Demulti–plexers, CMOS MSI, 16–Pin DIP	220–4053	2
U511	Integrated Circuit, TL072CP, Dual JFET–Input Operational Amplifier, 8–Pin DIP	221–0072	1
U600	Integrated Circuit, M74HC4052B1, Dual 4 – Channel Analog Multiplexers/Demultiplexers, CMOS MSI, 2P4T, 16–Pin DIP	220–4052–001	1
U601	Integrated Circuit, SSM2016, Low Noise Differential Audio Amplifier, 16–Pin DIP	220–2016	1
U602	Integrated Circuit, M74HC4052B1, Dual 4 – Channel Analog Multiplexers/Demultiplexers, CMOS MSI, 2P4T, 16–Pin DIP	220–4052–001	1
U603	Integrated Circuit, SSM2016, Low Noise Differential Audio Amplifier, 16–Pin DIP	220–2016	1
U604,U605	Integrated Circuit, 2150A, Voltage Controlled Amplifier, 8–Pin DIP	220–2150	2
U606	Integrated Circuit, TL072CP, Dual JFET–Input Operational Amplifier, 8–Pin DIP	221–0072	1
U608	Integrated Circuit, NE5532AP, Dual Low Noise Operational Amplifier, 8–Pin DIP	221–5532–001	1
U609,U610	Integrated Circuit, MC14053B, Analog Multiplexers/Demulti–plexers, CMOS MSI, 16–Pin DIP	220–4053	2
XU100 THRU XU103	Socket, 16–Pin DIP	417–1604	4
XU106 THRU XU108	Socket, 8–Pin DIP	417–0804	3
XU109,XU110	Socket, 16–Pin DIP	417–1604	2
XU111	Socket, 8–Pin DIP	417–0804	1
XU200 THRU XU203	Socket, 16–Pin DIP	417–1604	4
XU206,XU208	Socket, 8–Pin DIP	417–0804	2
XU209,XU210, XU300 THRU XU303	Socket, 16–Pin DIP	417–1604	6
XU306 THRU XU308	Socket, 8–Pin DIP	417–0804	3
XU309,XU310	Socket, 16–Pin DIP	417–1604	2
XU311	Socket, 8–Pin DIP	417–0804	1
XU400 THRU XU403	Socket, 16–Pin DIP	417–1604	4
XU406,XU408	Socket, 8–Pin DIP	417–0804	2
XU409,XU410, XU500 THRU XU503	Socket, 16–Pin DIP	417–1604	6
XU506 THRU XU508	Socket, 8–Pin DIP	417–0804	3
XU509,XU510	Socket, 16–Pin DIP	417–1604	2
XU511	Socket, 8–Pin DIP	417–0804	1
XU600 THRU XU603	Socket, 16–Pin DIP	417–1604	4
XU606,XU608	Socket, 8–Pin DIP	417–0804	2
XU609,XU610	Socket, 16–Pin DIP	417–1604	2
——	Blank Circuit Board, Audio Input	511–6005	1

TABLE 6–13. CONTROL BOARD CIRCUIT ASSEMBLY – 911–6006–A
(Sheet 1 of 3)

REF. DES.	DESCRIPTION	PART NO.	QTY.
A1 THRU A6	Control Logic Hybrid Assembly	220–0018	6
C1	Capacitor, Electrolytic, 22000 uF,16VDC	024–2290	1
C3,C4,C7	Capacitor, Monolythic Ceramic, 0.1 uF 20%, 50V	003–1054	3
C8 THRU C10	Capacitor, Electrolytic, 10 uF, 35V	023–1076	3
C13,C14,C21 THRU C30	Capacitor, Monolythic Ceramic, 0.1 uF 20%, 50V	003–1054	12
D1 THRU D6	Diode, 1N4148, Silicon, 75V @ 0.3 Amperes	203–4148	6
D7,D8	Diode, 1N4005, Silicon, 600V @ 1 Ampere	203–4005	2
DS1 THRU DS3	LED, Yellow, MV53173, 25 mA Maximum, Light Intensity I–J	320–3173	3
DS4,DS5	LED, Green, MV54173, Light Intensity I	320–0016	2
DS6 THRU DS8	LED, Yellow, MV53173, 25 mA Maximum, Light Intensity I–J	320–3173	3
DS9,DS10	LED, Green, MV54173, Light Intensity I	320–0016	2
DS11 THRU DS13	LED, Yellow, MV53173, 25 mA Maximum, Light Intensity I–J	320–3173	3
DS14,DS15	LED, Green, MV54173, Light Intensity I	320–0016	2
DS16 THRU DS18	LED, Yellow, MV53173, 25 mA Maximum, Light Intensity I–J	320–3173	3
DS19,DS20	LED, Green, MV54173, Light Intensity I	320–0016	2
DS21 THRU DS23	LED, Yellow, MV53173, 25 mA Maximum, Light Intensity I–J	320–3173	3
DS24,DS25	LED, Green, MV54173, Light Intensity I	320–0016	2
DS26 THRU DS28	LED, Yellow, MV53173, 25 mA Maximum, Light Intensity I–J	320–3173	3
DS29,DS30	LED, Green, MV54173, Light Intensity I	320–0016	2
E1 THRU E18	Terminal, Barrel, 4 Amperes	417–0133	18
J1	Receptacle, 12–Pin	417–1276	1
J2 THRU J4	Receptacle, Male, 20–Pin In–Line	417–0200	3
J5 THRU J7	Receptacle, Male, 13–Pin Dual In–Line	417–2600	3
J8	Connector, 10–Pin	418–1003	1
J12	Receptacle, 12–Pin	417–1276	1
J13 THRU J15	Receptacle, Male, 20–Pin In–Line	417–0200	3
J16	Receptacle, Male, 13–Pin Dual In–Line	417–2600	1
J17	Connector, 10–Pin	418–1003	1
J21	Receptacle, 12–Pin	417–1276	1
J22 THRU J24	Receptacle, Male, 20–Pin In–Line	417–0200	3
J25	Receptacle, Male, 13–Pin Dual In–Line	417–2600	1
J26	Connector, 10–Pin	418–1003	1
J30	Receptacle, 12–Pin	417–1276	1
J31 THRU J33	Receptacle, Male, 20–Pin In–Line	417–0200	3
J34	Receptacle, Male, 13–Pin Dual In–Line	417–2600	1
J35	Connector, 10–Pin	418–1003	1
J39	Receptacle, 12–Pin	417–1276	1
J40 THRU J42	Receptacle, Male, 20–Pin In–Line	417–0200	3
J43	Receptacle, Male, 13–Pin Dual In–Line	417–2600	1
J44	Connector, 10–Pin	418–1003	1
J48	Receptacle, 12–Pin	417–1276	1
J49 THRU J51	Receptacle, Male, 20–Pin In–Line	417–0200	3
J52	Receptacle, Male, 13–Pin Dual In–Line	417–2600	1
J53	Connector, 10–Pin	418–1003	1
J57 THRU J74	Receptacle, Male, 20–Pin In–Line	417–0200	18

TABLE 6–13. CONTROL BOARD CIRCUIT ASSEMBLY – 911–6006–A
(Sheet 2 of 3)

REF. DES.	DESCRIPTION	PART NO.	QTY.
P2 THRU P4, P13 THRU P15, P22 THRU P24, P31 THRU P33, P40 THRU P42, P49 THRU P51, P57 THRU P74	Jumper, Programmable, 2–Pin	340–0004	36
R1	Resistor, 2.2 Ohm ±5% ,1/4W	100–2213	1
R2	Resistor, 475 Ohm ±1%, 1/4W	103–4753	1
R3	Resistor, 2.2 Ohm ±5% ,1/4W	100–2213	1
R4	Resistor, 475 Ohm ±1%, 1/4W	103–4753	1
R5	Resistor, 1.5 k Ohm ±1%, 1/4W	103–1504	1
R6	Resistor, 2.2 Ohm ±5% ,1/4W	100–2213	1
R7	Resistor, 475 Ohm ±1%, 1/4W	103–4753	1
R8	Resistor, 2.2 Ohm ±5% ,1/4W	100–2213	1
R9	Resistor, 475 Ohm ±1%, 1/4W	103–4753	1
R10	Resistor, 1.5 k Ohm ±1%, 1/4W	103–1504	1
R11	Resistor, 2.2 Ohm ±5% ,1/4W	100–2213	1
R12	Resistor, 475 Ohm ±1%, 1/4W	103–4753	1
R13	Resistor, 2.2 Ohm ±5% ,1/4W	100–2213	1
R14	Resistor, 475 Ohm ±1%, 1/4W	103–4753	1
R15	Resistor, 1.5 k Ohm ±1%, 1/4W	103–1504	1
R16	Resistor, 121 Ohm ±5%, 1/4W	100–1231	1
R17	Resistor, 511 Ohm ±1%, 1/4W	103–5113	1
R18 THRU R20	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	3
R21	Resistor, 2.2 Ohm ±5% ,1/4W	100–2213	1
R22	Resistor, 475 Ohm ±1%, 1/4W	103–4753	1
R23	Resistor, 2.2 Ohm ±5% ,1/4W	100–2213	1
R24	Resistor, 475 Ohm ±1%, 1/4W	103–4753	1
R25	Resistor, 1.5 k Ohm ±1%, 1/4W	103–1504	1
R26	Resistor, 2.2 Ohm ±5% ,1/4W	100–2213	1
R27	Resistor, 475 Ohm ±1%, 1/4W	103–4753	1
R28	Resistor, 2.2 Ohm ±5% ,1/4W	100–2213	1
R29	Resistor, 475 Ohm ±1%, 1/4W	103–4753	1
R30	Resistor, 1.5 k Ohm ±1%, 1/4W	103–1504	1
R31	Resistor, 2.2 Ohm ±5% ,1/4W	100–2213	1
R32	Resistor, 475 Ohm ±1%, 1/4W	103–4753	1
R33	Resistor, 2.2 Ohm ±5% ,1/4W	100–2213	1
R34	Resistor, 475 Ohm ±1%, 1/4W	103–4753	1
R35	Resistor, 1.5 k Ohm ±1%, 1/4W	103–1504	1
R36 THRU R65	Resistor, 510 Ohm ±5%, 1/2W	110–5133	30
R66 THRU R68	Resistor, 100 k Ohm ±1%, 1/4W	103–1062	3
R71 THRU R74	Resistor, 1 Meg Ohm ±1%, 1/4W	103–1007	4
S1 THRU S3	Switch, SPST Normally Open, 50V dc @ 125 mA Maximum, Gray/Yellow Indications (Input Select)	340–0127	3
S4,S5	Switch, SPST Normally Open, 50V dc @ 125 mA Maximum, Gray/Green Indications (PGM/AUD Select)	340–0128	2

TABLE 6–13. CONTROL BOARD CIRCUIT ASSEMBLY – 911–6006–A (Sheet 3 of 3)

REF. DES.	DESCRIPTION	PART NO.	QTY.
S6 THRU S8	Switch, SPST Normally Open, 50V dc @ 125 mA Maximum, Gray/Yellow Indications (Input Select)	340–0127	3
S9,S10	Switch, SPST Normally Open, 50V dc @ 125 mA Maximum, Gray/Green Indications (PGM/AUD Select)	340–0128	2
S11 THRU S13	Switch, SPST Normally Open, 50V dc @ 125 mA Maximum, Gray/Yellow Indications (Input Select)	340–0127	3
S14,S15	Switch, SPST Normally Open, 50V dc @ 125 mA Maximum, Gray/Green Indications (PGM/AUD Select)	340–0128	2
S16 THRU S18	Switch, SPST Normally Open, 50V dc @ 125 mA Maximum, Gray/Yellow Indications (Input Select)	340–0127	3
S19,S20	Switch, SPST Normally Open, 50V dc @ 125 mA Maximum, Gray/Green Indications (PGM/AUD Select)	340–0128	2
S21 THRU S23	Switch, SPST Normally Open, 50V dc @ 125 mA Maximum, Gray/Yellow Indications (Input Select)	340–0127	3
S24,S25	Switch, SPST Normally Open, 50V dc @ 125 mA Maximum, Gray/Green Indications (PGM/AUD Select)	340–0128	2
S26 THRU S28	Switch, SPST Normally Open, 50V dc @ 125 mA Maximum, Gray/Yellow Indications (Input Select)	340–0127	3
S29,S30	Switch, SPST Normally Open, 50V dc @ 125 mA Maximum, Gray/Green Indications (PGM/AUD Select)	340–0128	2
U1	Integrated Circuit, LM358N, Dual Operational Amplifier, 8–Pin DIP	221–0358	1
U2	Integrated Circuit, LM317T, Adjustable Positive Voltage Regulator, 1.2V to 37V, 1.5 Ampere, TO–220 Case	227–0317	1
U3,U4	Integrated Circuit, LM358N, Dual Operational Amplifier, 8–Pin DIP	221–0358	2
XU1,XU3,XU4	Socket, 8–Pin DIP	417–0804	3
——	Cap, Barrel Terminal	417–0133–001	1
——	Socket, 20–Pin Single In–Line (For Control Logic Hybrids)	417–0172	1
——	Blank Circuit Board	511–6006–A	1

TABLE 6–14. ON/OFF SWITCH INTERFACE CIRCUIT BOARD – 911–6006–B

REF. DES.	DESCRIPTION	PART NO.	QTY.
DS31	LED, Red, 5341H1	320–0029	1
J75	Connector, 10–Pin	418–1003	1
P75 THRU P84	Sockets, Terminal Plug–N, 50864–6	417–0198	10
——	Blank Circuit Board, ON/OFF Switch Interface	511–6006–B	1

TABLE 6–15. VU METER DISTRIBUTION CIRCUIT BOARD ASSEMBLY 911–6007A, –001, –002 (Sheet 1 of 3)

REF. DES.	DESCRIPTION	PART NO.	QTY.
C1 THRU C6	Capacitor, Monolythic Ceramic, 0.1 uF 20%, 50V	003–1054	6
C7 THRU C10	Capacitor, Electrolytic, 1 uF, 50V	024–1064	4
C11,C12	Capacitor, Electrolytic, 10 uF, 35V	023–1076	2
C15,C16	Capacitor, Monolythic Ceramic, 0.1 uF 20%, 50V	003–1054	2
C17	Capacitor, Electrolytic, 10 uF, 35V	023–1076	1

TABLE 6–15. VU METER DISTRIBUTION CIRCUIT BOARD ASSEMBLY 911–6007A, –001, –002 (Sheet 2 of 3)

REF. DES.	DESCRIPTION	PART NO.	QTY.
D1 THRU D4	Diode, 1N4148, Silicon, 75V @ 0.3 Amperes	203–4148	4
J1	Connector Header, 40–Pin	417–0173	1
J2 THRU J5	Receptacle, Male, 8–Pin In–Line	417–0080	4
J6,J7	Receptacle, Header, Dual In–Line 8–Pin	417–1603	2
J8 THRU J11	Receptacle, Male, 2–Pin In–line	417–4004	4
R5,R6	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	2
R9 THRU R12	Resistor, 90.9 k Ohm ±1%, 1/4W	103–9095	4
R13 THRU R16	Resistor, 15 k Ohm ±5%, 1/4W	100–1551	4
R17 THRU R20	Resistor, 1 Meg Ohm ±1%, 1/4W	103–1007	4
R21,R22	Resistor, 1 k Ohm ±1%, 1/4W	100–1041	2
R23,R24	Resistor, 4.7 Meg Ohm ±5%, 1/4W	100–4773	2
R25,R26	Resistor, 1.5 k Ohm ±1%, 1/4W	103–1504	2
R27,R28	Resistor, 10 Ohm ±5%, 1/4W	100–1024	2
R35	Resistor, 16.2 k Ohm ±1%, 1/4W	103–1625	1
R36	Resistor, 240 Ohm ±1%, 1/4W	103–2431	1
R37,R38,R51	Resistor, 1.6 k Ohm± 5%, 1W	120–1643	3
RN1,RN2	Resistor Network, 8–10 k Ohm ±1%, 1/4W, 16–Pin DIP	226–1055	2
U1	Integrated Circuit, TLO74CN, Quad JFET–Input Operational Amplifier, 14–Pin DIP	221–0074	1
U2	Integrated Circuit, TL072CP, Dual JFET–Input Operational Amplifier, 8–Pin DIP	221–0072	1
U3,U5	Integrated Circuit, TLO74CN, Quad JFET–Input Operational Amplifier, 14–Pin DIP	221–0074	2
XDS1 THRU XDS11	Socket/Spacer, LED	407–0074	11
XU1	Socket, 14–Pin DIP	417–1404	1
XU2	Socket, 8–Pin DIP	417–0804	1
XU3,XU5	Socket, 14–Pin DIP	417–1404	2
——	Blank Circuit Board , VU Meter Distribution	511–6007A	1
	FOR 911–6007A–001 ASSEMBLY		
	DELETE COMPONENTS		
J7,J13	Receptacle, Header, Dual In–Line 8–Pin	417–1603	2
S1	Switch, 1 Section 4PDT Pushbutton, Black/Orange Indications (PGM/AUD Meter Switch, 6 Channel Models Only)	340–0129	1
	ADD COMPONENTS		
P8,P9,P10,P11	Jumper, Programmable, 2–Pin	340–0004	4
	FOR 911–6007A–002 ASSEMBLY		
	DELETE COMPONENTS		
J7,J13	Receptacle, Header, Dual In–Line 8–Pin	417–1603	2
S1	Switch, 1 Section 4PDT Pushbutton, Black/Orange Indications (PGM/AUD Meter Switch, 6 Channel Models Only)	340–0129	1

TABLE 6–15. VU METER DISTRIBUTION CIRCUIT BOARD ASSEMBLY 911–6007A, –001, –002 (Sheet 3 of 3)

REF. DES.	DESCRIPTION	PART NO.	QTY.
	ADD COMPONENTS		
C13,C14	Capacitor, Monolythic Ceramic, 0.1 uF 20%, 50V	003–1054	2
D11 THRU D14	Diode, 1N4148, Silicon, 75V @ 0.3 Amperes	203–4148	4
J14,J15	Receptacle, Male, 8–Pin In–Line	417–0080	2
P8 THRU P11	Jumper, Programmable, 2–Pin	340–0004	4
R39 THRU R42	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	4
R43,R44	Resistor, 1.5 k Ohm ±1%, 1/4W	103–1504	2
R45,R46	Potentiometer, 10 k Ohm ±10%, 1/2W	177–1054	2
R47,R48	Resistor, 10 Ohm, ±5%, 1/4W	100–1024	2
R49,R50	Resistor, 200 Ohm, ±1%, 1/4W	103–2003	2
U4	Integrated Circuit, TL072CP, Dual JFET–Input Operational Amplifier, 8–Pin DIP	221–0072	1
XU4	Socket, 8–Pin DIP	417–0804	1

TABLE 6–16. AUDIO/POWER MONITORING CIRCUIT BOARD – 911–6007–B

REF. DES.	DESCRIPTION	PART NO.	QTY.
D5 THRU D10	Diode, 1N4148, Silicon, 75V @ 0.3 Amperes	203–4148	6
DS1 THRU DS3	Indicator, LED, Green, 521–9175, 3V @ 40 mA Maximum	323–9224	3
DS4,DS5	Indicator, LED, Green/Red Bi–Color, OPL710, T–1 3/4 Bulb, 2.5V @ 40 mA Maximum	320–0018	2
DS6 THRU DS11	Indicator, LED, Yellow, 521–9176, 3V @ 40 mA Maximum	323–9225	6
J12	Receptacle, Header, Dual In–Line 8–Pin	417–1603	1
R29,R30	Resistor, 182 Ohm ±1%, 1/4W	103–1823	2
R31,R32	Resistor, 680 Ohm ±5%, 1/2W	110–6833	2
R33,R34	Resistor, 1 k Ohm ±5%, 1/2W	110–1043	2
S2	Switch, Pushbutton, SPDT, 50V @ 25 mA Maximum (Test Switch)	340–0112	1
——	Blank Circuit Board, Audio/Power Monitoring Display	511–6007–B	1

TABLE 6–17. VU METER SWITCH CIRCUIT BOARD – 911–6007–C

REF. DES.	DESCRIPTION	PART NO.	QTY.
J13	Receptacle, Header, Dual In–Line 8–Pin	417–1603	1
S1	Switch, 1 Section 4PDT Pushbutton, Black/Prange Indicators (PGM/AUD Meter Switch, 6 Channel Models Only)	340–0129	1
——	Blank Circuit Board, VU Meter Switch	511–6007–C	1

TABLE 6–18. AT–90 CONSOLE POWER SUPPLY ASSEMBLY – 951–6030

REF. DES.	DESCRIPTION	PART NO.	QTY.
——	Power Supply Regulator Circuit Board Assembly	911–6030	1
C1 THRU C3	Capacitor, Electrolytic, 22,000 uF, 50V	027–2200	3
C3,C4	Capacitor, Polyester, 0.47 uF ±10%, 100V	038–4753	2
D1,D2	Full–Wave Bridge Rectifier, MDS2502, Silicon, 200 PIV, 25 Amperes	239–0006	2
F1,F4	Fuse, 3AG, 250V, 3 Amperes	330–0300	2
F2,F3	Fuse, AGC, 1 Ampere, Fast–Blow	330–0100	2
F5,F6	Fuse, AGC, 250V, 1/4 Ampere	330–0025	2
F7	Fuse, 3AG, 250V, 5 Amperes	330–0500	1
	110V OPERATION		
F8	Fuse, 4AG, 125V, Slow–Blow	334–0400	2
	220V OPERATION		
F8	Fuse, 3AG, 250V, 2 Amperes, Slow–Blow	334–0200	2
T1	Transformer, Power Primary: 117V/234V 10%, 50/60 Hz, Single Phase Secondary: 1. 39.7V AC Center Tapped 2. 10.7V AC	370–2359	1
TB1	Barrier Strip, 8 Terminal	412–0023	1
U1,U3	Integrated Circuit, LM317K, Three–Terminal Adjustable Positive Voltage Regulator, 1.2 to 37V, 1.5 Ampere Maximu, TO–3 Case	227–0318	2
U2,U4	Integrated Circuit, LM337K, Adjustable Negative Voltage Regulator, 1.2V to 37V, 1.5 Ampere, TO–3 Case	227–0338	2
XF1 THRU XF7	Fuse Holder, AGC	415–2012	7
XU1 THRU XU4	Socket, Transistor, TO–3	417–0298	4
——	AC Line Cord, N.E.M.A. 3–Wire North American Plug	682–0001	1
——	Connector, Power, Snap–in, Black (Combination fuse holder, switch, and IEC Connector)	418–0050	1
——	Cable Assembly, Power Supply Module	941–0036–001	1
——	Wire Harness, Power Supply Module	941–0059	1

TABLE 6–19. POWER SUPPLY REGULATOR CIRCUIT BOARD ASSEMBLY – 911–6030
(Sheet 1 of 2)

REF. DES.	DESCRIPTION	PART NO.	QTY.
——	Blank Circuit Board, Power Supply Regulator	511–6030	1
C1 THRU C12	Capacitor, Electrolytic, 10 uF, 35V	023–1076	12
D1 THRU D8	Diode, 1N4005, Silicon, 600V @ 1 Ampere	203–4005	8
D9,D10	Diode, 1N5817, Schottky Barrier Type, 20V, 1 Ampere	200–0019	2
E1 THRU E3	Terminal, Turret, Double Shoulder	413–1597	3
E4,E5	Turret, Single Shoulder	413–0315	2
E6 THRU E21	Terminal, Turret, Double Shoulder	413–1597	16
E22,E23	Turret, Single Shoulder	413–0315	2
J1	Receptacle, 12–Pin	417–1276	1
Q1	Transistor, 2N3904, NPN, Silicon, TO–92 Case	211–3904	1
Q2	Transistor, 2N3906, PNP, Silicon, TO–92 Case	210–3906	1
R1,R2	Resistor, 1.47 k Ohm ±1%, 1/4W	103–1474	2
R3,R4	Resistor, 121 Ohm ±5%, 1/4W	100–1231	2
R5,R6	Resistor, 464 Ohm ±1%, 1/4W	103–4643	2
R7,R8	Resistor, 121 Ohm ±5%, 1/4W	100–1231	2

TABLE 6–19. POWER SUPPLY REGULATOR CIRCUIT BOARD ASSEMBLY – 911–6030
(Sheet 2 of 2)

REF. DES.	DESCRIPTION	PART NO.	QTY.
R9,R10	Resistor, 75 Ohm ±1%, 1/4W	103–7502	2
R11,R12	Resistor, 10 k Ohm ±1%, 1/4W	100–1051	2

TABLE 6–20. CLOCK TIMER MODULE ASSEMBLY – 951–0030
(Sheet 1 of 2)

REF. DES.	DESCRIPTION	PART NO.	QTY.
C1	Capacitor, Monolythic Ceramic, 0.1 uF 20%, 50V	003–1054	1
C2 THRU C4	Capacitor, Electrolytic, 220 uF, 25V	013–2284	3
C5	Capacitor, Electrolytic, 10 uF, 35V	023–1076	1
C6 THRU C9	Capacitor, Monolythic Ceramic, 0.1 uF 20%, 50V	003–1054	4
C10,C11	Capacitor, Electrolytic, 10 uF, 35V	023–1076	2
C12	Capacitor, Electrolytic, 47 uF, 35V	020–4773	1
C13	Capacitor, Mica, 68 pF 5%, 500V	040–6813	1
C14	Capacitor, Mica, Adjustable Compression, 4 to 45 pF, 175V	090–0403	1
C15	Capacitor, Monolythic Ceramic, 0.1 uF 20%, 50V	003–1054	1
D1	Diode, 1N4005, Silicon, 600V @ 1 Ampere	203–4005	1
D2,D3	Diode, 1N5817, Schottky Barrier Type, 20V, 1 Ampere	200–0019	2
D4,D5	Diode, 1N4005, Silicon, 600V @ 1 Ampere	203–4005	2
D5	Indicator, LED, Red, 521–9212, 1.7V @ 50 mA Maximum	323–9217	1
DS1 THRU DS6	LED, HD11070, Red, 7–Segment High Efficiency Common Cathode	320–0023	6
DS7 THRU DS11	LED, HD1107G, Green, 7–Segment High Efficiency Common Cathode	320–0022	5
J1	Housing, 9–Pin In–Line	417–0161	1
J2	Receptacle Header, 12–Pin In–Line	417–1203	1
J3	Receptacle, Male, 3–Pin In–line	417–0003	1
J4 THRU J6	Receptacle, Male, 2–Pin In–line	417–4004	3
P3	Socket, Connector, 3–Pin	417–0223	1
P4 THRU P6	Jumper, Programmable, 2–Pin	340–0004	3
Q1,Q2	Transistor, 2N3906, PNP, Silicon, TO–92 Case	210–3906	2
R1	Resistor, 0.5 Ohm ±5%, 1/2W	110–5000	1
R2	Resistor, 121 Ohm ±5%, 1/4W	100–1231	1
R3	Resistor, 365 Ohm ±1%, 1/4W	103–3631	1
R4	Resistor, 121 Ohm ±5%, 1/4W	100–1231	1
R5	Resistor, 365 Ohm ±1%, 1/4W	103–3631	1
R6	Resistor, 2.7 k Ohm ±5%, 1/4W	100–2743	1
R7,R8	Resistor, 18.2 k Ohm ±1%, 1/4W	103–1825	2
R9,R10	Resistor, 221 k Ohm ±1%, 1/4W	103–2216	2
R11,R12	Resistor, 4.7 k Ohm ±5%, 1/4W	100–4743	2
R13	Resistor, 470 Ohm ±5%, 1/4W	100–4733	1
R14	Resistor, 665 k Ohm ±1%, 1/4W	103–6654	1
R15	Resistor, 470 Ohm ±5%, 1/4W	100–4733	1
R16	Resistor, 10 Meg Ohm ±5%, 1/4W	100–1083	1
R17,R18	Resistor, 10 k Ohm ±5%, 1/4W	100–1053	2
R19	Resistor, 22 k Ohm ±5%, 1/4W	100–2253	1
R20	Resistor, 4.7 k Ohm ±5%, 1/4W	100–4743	1
R21	Resistor Network, 9 – 10 k Ohm ±2%, 1/4W Resistors, Single In–Line 10–Pin Package	226–1050	1

TABLE 6–20. CLOCK TIMER MODULE ASSEMBLY – 951–0030
(Sheet 2 of 2)

REF. DES.	DESCRIPTION	PART NO.	QTY.
R22	Resistor, 4.7 k Ohm ±5%, 1/4W	100–4743	1
R23 THRU R25	Resistor, 10 k Ohm ±5%, 1/4W	100–1053	3
R26 THRU R33	Resistor, 62 Ohm ±5%, 2W	130–6223	8
R34	Resistor, 1 k Ohm ±5%, 1/4W	100–1043	1
S1 THRU S3	Switch, Pushbutton, Momentary, Circuit Board Mount	340–0116	3
TP1	Terminal, Turret, Double Shoulder	413–1597	1
U1,U2	Integrated Circuit, LM317LZ, Adjustable Positive Voltage Regulator, 1.2 to 37V @ 0.1 Ampere, TO–92 Case	220–0317	2
U3	Integrated Circuit, LM358N, Dual Operational Amplifier, 8–Pin DIP	221–0358	1
U4	Integrated Circuit, MC68701, MOS, N–Channel, Silicon–Gate, Deplection Load with Clock/Timer Program, 40–Pin DIP	220–6871	1
U5	Integrated Circuit, UDN2981A, CMOS, High–Voltage/High–Current Source Drivers, 50V @ 350 mA, 18–Pin DIP	220–2981	1
U6 THRU U8	Integrated Circuit, ULN2068B, 35V, 1.5A Darlington Quad Driver, 16–Pin DIP	220–2068	3
W1/W2, W3/W4	Flexstrip Jumper, 22–Pin	417–0253	2
XBT1	Battery Holder, 9 Volt Rectangular	415–0002	1
XU3	Socket, 8–Pin DIP	417–0804	1
XU4	Socket, 40–Pin DIP	417–4005	1
XU5	Socket, 18–Pin DIP	417–1804	1
XU6 THRU XU8	Socket, 16–Pin DIP	417–1604	3
Y1	Crystal, 4.0 MHz ±30 PPM @ 25° C, A/T Cut, HC–49 Case	390–0022	1
——	Blank Circuit Board, Clock/Timer Module	511–0030	1

TABLE 6–21. VU METER ASSEMBLY – 951–0044

REF. DES.	DESCRIPTION	PART NO.	QTY.
——	Blank Circuit Board, VU Meter Assembly	511–0044	1
D1,D2	Diode, Zener, 1N4735, 6.2V ±10%, 1W	200–4735	2
DS1,DS2	Lamp, FK6332430, Incandescent, 24V, 3 Watts	321–0692	2
DS3	LED, 534141, Red, Peak Flasher, PCB Mount	320–0029	1
J1	Receptacle, Male, 8–Pin In–Line, Right Angle	417–0080–001	1
M1	Meter, 3.5 Inch (8.89 cm), Model 3LW Window Mount w/Peak Flasher, Taut Band Type, 3900 Ohm Resistance	319–0004	1
XDS1,XDS2	Fuse Clips, AGC	415–2068	4

TABLE 6–22. INSTALLATION KIT, 6 CHANNEL ASSEMBLY – 971–0032
(Sheet 1 of 2)

REF. DES.	DESCRIPTION	PART NO.	QTY.
——	Adjustment Tool, 8 T000/5 Spectrol	407–0186	1
——	Tool, Contact Removal	710–0002	1
——	Receptacle, 20–Pin	417–0176	6

TABLE 6–22. INSTALLATION KIT, 6 CHANNEL ASSEMBLY – 971–0032
(Sheet 2 of 2)

REF. DES.	DESCRIPTION	PART NO.	QTY.
——	Connector Housing, 6–Pin	418–0670	7
——	Plug, Housing, 4–Pin	418–0240	2
——	Connector, Housing, 15–Pin	417–2379	3
——	Plug, Connector Housing, 12–Pin	418–1271	6
——	Crimping Tool, Paladin PA–1645/Sargent 4129CT	300–0010	1
——	Pins, Connector	417–0053	350
——	Source Remote Relay Interface Circuit Board Kit Assembly	951–6021–001	3

TABLE 6–23. INSTALLATION KIT, 12 CHANNEL ASSEMBLY – 971–0033

REF. DES.	DESCRIPTION	PART NO.	QTY.
——	Adjustment Tool, 8 T000/5 Spectrol	407–0186	1
——	Tool, Contact Removal	710–0002	1
——	Receptacle, 20–Pin	417–0176	12
——	Connector Housing, 6–Pin	418–0670	7
——	Plug, Housing, 4–Pin	418–0240	2
——	Connector, Housing, 15–Pin	417–2379	3
——	Plug, Connector Housing, 12–Pin	418–1271	12
——	Crimping Tool, Paladin PA–1645/Sargent 4129CT	300–0010	1
——	Pins, Connector	417–0053	625
——	Source Remote Relay Interface Circuit Board Kit Assembly	951–6021–001	6

TABLE 6–24. INSTALLATION KIT, 18 CHANNEL ASSEMBLY – 971–0034

REF. DES.	DESCRIPTION	PART NO.	QTY.
——	Adjustment Tool, 8 T000/5 Spectrol	407–0186	1
——	Tool, Contact Removal	710–0002	1
——	Receptacle, 20–Pin	417–0176	18
——	Connector Housing, 6–Pin	418–0670	7
——	Plug, Housing, 4–Pin	418–0240	2
——	Connector, Housing, 15–Pin	417–2379	3
——	Plug, Connector Housing, 12–Pin	418–1271	18
——	Crimping Tool, Paladin PA–1645/Sargent 4129CT	300–0010	1
——	Pins, Connector	417–0053	890
——	Source Remote Relay Interface Circuit Board Kit Assembly	951–6021–001	9

TABLE 6–25. INSTALLATION KIT, 24 CHANNEL ASSEMBLY – 971–0035
(Sheet 1 of 2)

REF. DES.	DESCRIPTION	PART NO.	QTY.
——	Adjustment Tool, 8 T000/5 Spectrol	407–0186	1
——	Tool, Contact Removal	710–0002	1
——	Receptacle, 20–Pin	417–0176	24
——	Connector Housing, 6–Pin	418–0670	7
——	Plug, Housing, 4–Pin	418–0240	2
——	Connector, Housing, 15–Pin	417–2379	3

TABLE 6–25. INSTALLATION KIT, 24 CHANNEL ASSEMBLY – 971–0035 (Sheet 2 of 2)

REF. DES.	DESCRIPTION	PART NO.	QTY.
——	Plug, Connector Housing, 12–Pin	418–1271	24
——	Crimping Tool, Paladin PA–1645/Sargent 4129CT	300–0010	1
——	Pins, Connector	417–0053	1155
——	Source Remote Relay Interface Circuit Board Kit Assembly	951–6021–001	12

TABLE 6–26. SPARE PARTS KIT, 6,12,18 & 24 CH. AT–90 – 971–0050

REF. DES.	DESCRIPTION	PART NO.	QTY.
——	Fuse, AGC, 1A, 250V, Slow–Blow (for 115 Volt operation)	334–0100	1
——	Fuse, 3AG, 32V, 4 Amperes	330–0400	1
——	Fuse, 3AG, 250V, 3 Amperes	330–0300	1
——	Fuse, AGC, 250V, 1/4 Ampere	330–0025	1
——	Fuse, 3AG, 250V, 5 Amperes	330–0500	1
——	Integrated Circuit, M74HC4052B1, Dual 4–Channel Analog Multiplexers/Demultiplexers, CMOS MS1, 2P4T, 16–Pin DIP	220–4052–001	1
——	Integrated Circuit, NE5532AP, Dual Low Noise Operational Amplifier, 8–Pin DIP	221–5532–001	2
——	Integrated Circuit, LM317T, Adjustable Positive Voltage Regulator, 1.2V to 37V, 1.5 Ampere, TO–220 Case	227–0317	1
——	Integrated Circuit, LM317K, Three–Terminal Adjustable Positive Voltage Regulator, 1.2 to 37V, 1.5 Ampere Maximum, TO–3 Case	227–0318	1
——	Integrated Circuit, LM337K, Adjustable Negative Voltage Regulator, 1.2V to 37V, 1.5 Ampere, TO–3 Case	227–0338	1
——	Jumper, Programmable, 2–Pin	340–0004	2
——	Integrated Circuit, TL072CP, Dual JFET–Input Operational Amplifier, 8–Pin DIP	221–0072	2
——	Integrated Circuit, 2150A, Voltage Controlled Amplifier, 8–Pin DIP	220–2150	1
——	Lamp, No. 73, 14V, 0.08A, T–1 3/4 Bulb, Wedge Base	320–0007	2
——	Field Effect Transistor, J270, P–Channel JFET, TO–92 Case	210–0270	1
——	Field Effect Transistor, J271, P–Channel JFET, TO–92 Case	210–0271	1
——	Integrated Circuit, TDA2030V, Audio Power Amplifier, 14V Output, Pentawatt Package	220–2030	1
——	Integrated Circuit, 4N33, Optical Isolator, NPN Photo Transistor/Infared Emitting Diode Type, 1500V Isolation, Response: 30 kHz Maximum, Current: 50 mA Maximum, 6–Pin DIP	229–0033	1
——	Lamp, FK6332430, Incandescent, 24V, 3 Watts	321–0692	2
——	Integrated Circuit, MC14051, 8–Bit Analog Multiplexer, CMOS, 16–Pin DIP	220–4051	1
——	Integrated Circuit, TL074CN, Quad JFET–Input Operational Amplifier, 14–Pin DIP	221–0074	1
——	Integrated Circuit,	220–2016	1
——	Integrated Circuit, MC14053B, Analog Multiplexers/Demulti–plexers, CMOS MSI, 16–Pin DIP	220–4053	1
——	Integrated Circuit, LM358N, Dual Operational Amplifier, 8–Pin DIP	221–0358	1

TABLE 6–27. CABLE ASSEMBLY, 6 CHANNEL AT–90 CONSOLE – 941–0055

REF. DES.	DESCRIPTION	PART NO.	QTY.
——	Connector Housing, 6–Pin	418–0670	12
——	Connector, 16–Pin	417–0131	4
——	Plug, 26–Pin, Dual In–Line	417–0047	6
——	Plug, 40–Pin, Dual In–Line	417–0118	4
——	Connector Housing, 10–Pin	417–0148	1
——	Plug, Housing, 8–Pin	417–0046	5
——	Pins, Crimp Type	417–8766	55
——	Plug, Housing, 12–Pin	417–1202	1
——	Socket, Connector, 10–Pin	417–1003	2
——	Pins, Connector	417–0053	24
——	Cable Assembly, ON/OFF Switch Interface Circuit Board To Control Control Circuit Board	941–0061	6
——	Cable Assembly, Input Circuit Board To Control Circuit Board	941–0062	6

TABLE 6–28. CABLE ASSEMBLY, 12 CHANNEL AT–90 CONSOLE – 941–0056

REF. DES.	DESCRIPTION	PART NO.	QTY.
——	Connector Housing, 6–Pin	418–0670	24
——	Connector, 16–Pin	417–0131	2
——	Plug, 26–Pin, Dual In–Line	417–0047	12
——	Plug, 40–Pin, Dual In–Line	417–0118	4
——	Connector Housing, 10–Pin	417–0148	1
——	Plug, Housing, 8–Pin	417–0046	9
——	Pins, Crimp Type	417–8766	83
——	Plug, Housing, 12–Pin	417–1202	1
——	Socket, Connector, 10–Pin	417–1003	2
——	Pins, Connector	417–0053	48
——	Cable Assembly, ON/OFF Switch Interface Circuit Board To Control Control Circuit Board	941–0061	12
——	Cable Assembly, Input Circuit Board To Control Circuit Board	941–0062	12

TABLE 6–29. CABLE ASSEMBLY, 18 CHANNEL AT–90 CONSOLE – 941–0057

REF. DES.	DESCRIPTION	PART NO.	QTY.
——	Connector Housing, 6–Pin	418–0670	36
——	Connector, 16–Pin	417–0131	2
——	Plug, 26–Pin, Dual In–Line	417–0047	18
——	Plug, 40–Pin, Dual In–Line	417–0118	4
——	Connector Housing, 10–Pin	417–0148	1
——	Plug, Housing, 8–Pin	417–0046	9
——	Pins, Crimp Type	417–8766	83
——	Plug, Housing, 12–Pin	417–1202	1
——	Socket, Connector, 10–Pin	417–1003	2
——	Pins, Connector	417–0053	72
——	Cable Assembly, ON/OFF Switch Interface Circuit Board To Control Control Circuit Board	941–0061	18
——	Cable Assembly, Input Circuit Board To Control Circuit Board	941–0062	18

TABLE 6–30. CABLE ASSEMBLY, 24 CHANNEL – 941–0058

REF. DES.	DESCRIPTION	PART NO.	QTY.
——	Connector Housing, 6–Pin	418–0670	48
——	Connector, 16–Pin	417–0131	2
——	Plug, 26–Pin, Dual In–Line	417–0047	24
——	Plug, 40–Pin, Dual In–Line	417–0118	4
——	Connector Housing, 10–Pin	417–0148	1
——	Plug, Housing, 8–Pin	417–0046	12
——	Pins, Crimp Type	417–8766	105
——	Plug, Housing, 12–Pin	417–1202	1
——	Socket, Connector, 10–Pin	417–1003	2
——	Pins, Connector	417–0053	96
——	Cable Assembly, ON/OFF Switch Interface Circuit Board To Control Control Circuit Board	941–0061	24
——	Cable Assembly, Input Circuit Board To Control Circuit Board	941–0062	24

TABLE 6–31. CABLE ASSEMBLY, POWER SUPPLY – 941–0036–001

REF. DES.	DESCRIPTION	PART NO.	QTY.
——	Pins, Connector	417–0053	24
——	Plug, Connector Housing, 12–Pin	418–1271	2
——	Plug, Housing, 4–Pin	418–0240	1

TABLE 6–32. OPTIONAL RELAY INTERFACE CIRCUIT BOARD ASSEMBLY – 951–6021

REF. DES.	DESCRIPTION	PART NO.	QTY.
C1	Capacitor, Electrolytic, 100 uF, 25V	013–1084	1
D2 THRU D5	Diode, 1N4005, Silicon, 600V @ 1 Ampere	203–4005	4
J1,J2	Receptacle, 12–Pin	417–1276	2
K1 THRU K4	Relay, Circuit Board Mount Coil: 12V dc Contacts: SPDT, 3A @ 28V dc and 3A @ 120V ac	270–0059	4
K5,K6	Relay, Coil: 12V dc, 800 Ohms Contacts: 100V dc @ 0.5 Amperes Maximum	270–0056	2
——	Resistor, 1 Ohm ±5%, 1/4W	100–1013	1
——	Blank Circuit Board, Relay Interface	511–6021	1

TABLE 6–33. SOURCE REMOTE RELAY INTERFACE CIRCUIT BOARD KIT 951–6021–001

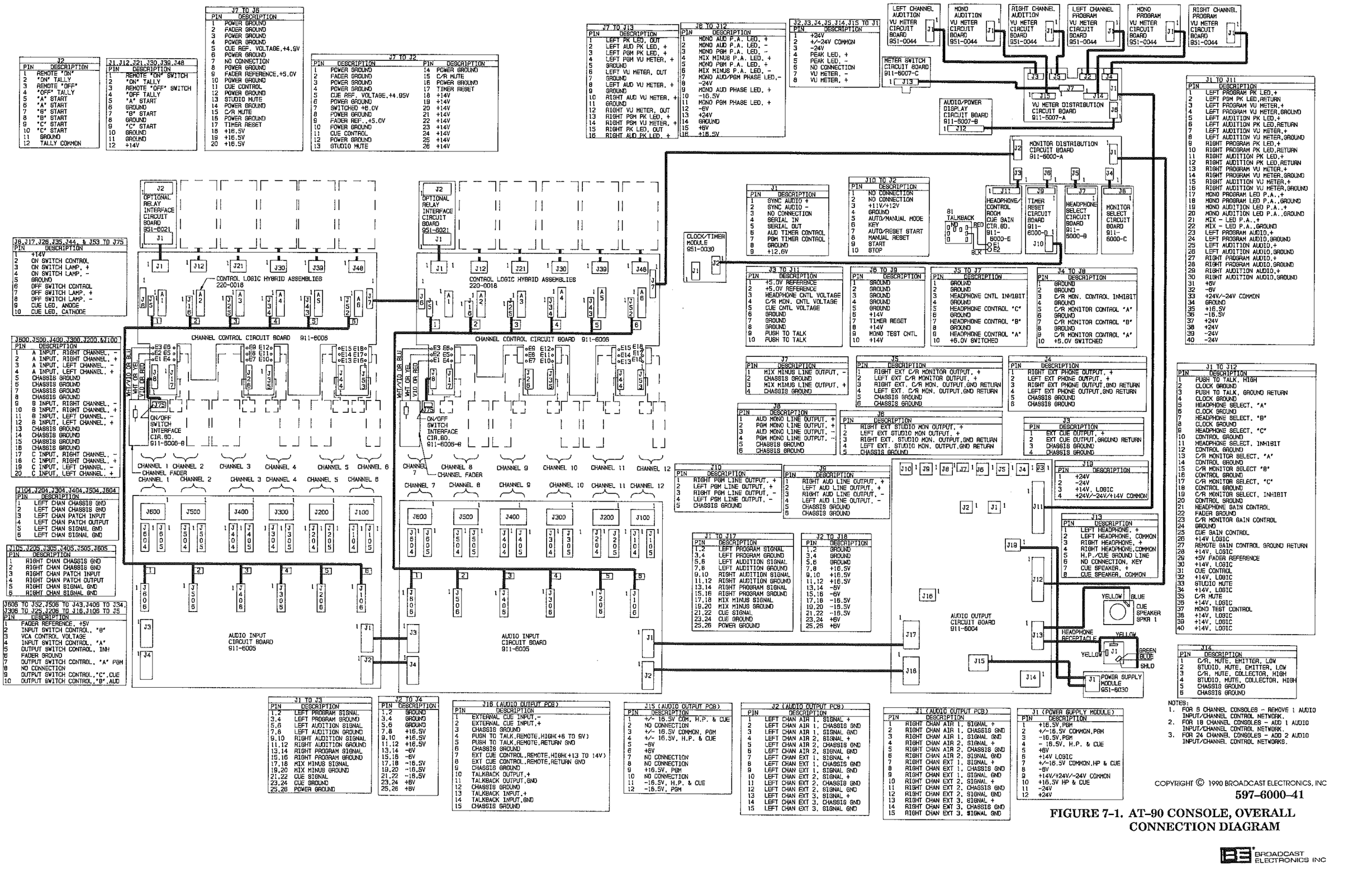
REF. DES.	DESCRIPTION	PART NO.	QTY.
——	Source Remote Relay Interface Circuit Board	951–6021	1
——	Cable Assembly, Source Remote Relay Interface Circuit Board	941–0063	1

SECTION VII
DRAWINGS

7–1. INTRODUCTION

7–2. This section provides assembly drawings, wiring diagrams, and schematic diagrams as listed below for the Broadcast Electronics Air –Trak 90 series audio consoles.

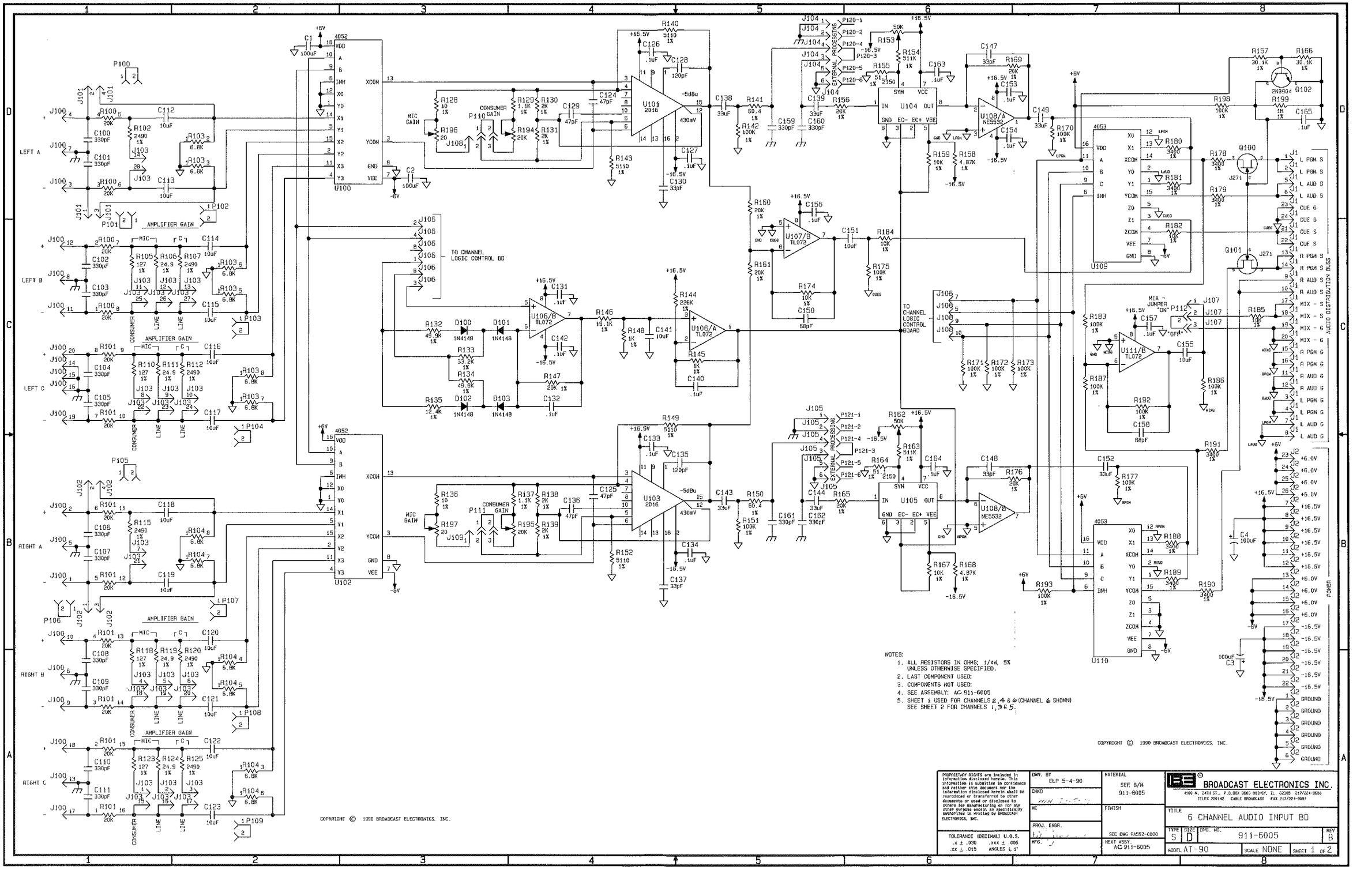
FIGURE	TITLE	NUMBER
7–1	OVERALL CONNECTION DIAGRAM, AT–90 CONSOLE	597–6000–41
7–2	SCHEMATIC DIAGRAM, 6 CHANNEL AUDIO INPUT CIRCUIT BOARD	SD911–6005
7–3	ASSEMBLY DIAGRAM, 6 CHANNEL AUDIO INPUT CIRCUIT BOARD	AD911–6005
7–4	SCHEMATIC DIAGRAM, INPUT CONTROL CIRCUIT BOARD	SD911–6006
7–5	ASSEMBLY DIAGRAM, INPUT CONTROL CIRCUIT BOARD	AC911–6006
7–6	SCHEMATIC DIAGRAM, AUDIO OUTPUT CIRCUIT BOARD	SD911–6004–001
7–7	ASSEMBLY DIAGRAM, AUDIO OUTPUT CIRCUIT BOARD	AD911–6004–001
7–8	SCHEMATIC DIAGRAM, DISTRIBUTION/SWITCH/ DISPLAY CIRCUIT BOARD	SD911–6007/ –001 –002
7–9	ASSEMBLY DIAGRAM, DISTRIBUTION/SWITCH/ DISPLAY CIRCUIT BOARD	AC911–6007/ –001 –002
7–10	SCHEMATIC DIAGRAM, MONITOR DISTRIBUTION CIRCUIT BOARD	SD911–6000–A
7–11	SCHEMATIC DIAGRAM, HEADPHONE SELECT CIRCUIT BOARD	SC911–6000–B
7–12	SCHEMATIC DIAGRAM, CONTROL ROOM MONITOR SELECT CIRCUIT BOARD	SC911–6000–C
7–13	SCHEMATIC DIAGRAM, TIMER RESET CIRCUIT BOARD	SC911–6000–D
7–14	SCHEMATIC DIAGRAM, HEADPHONE CONTROL ROOM CUE GAIN CIRCUIT BOARD	SC911–6000–E
7–15	ASSEMBLY DIAGRAM, 911–6000–A THROUGH 911–6000–E CIRCUIT BOARDS	AC911–6000–A–E
7–16	SCHEMATIC DIAGRAM, RELAY INTERFACE CIRCUIT BOARD	SC951–6021
7–17	ASSEMBLY DIAGRAM, RELAY INTERFACE CIRCUIT BOARD	AB951–6021
7–18	SCHEMATIC DIAGRAM, POWER SUPPLY MODULE	SC951–6030
7–19	SCHEMATIC DIAGRAM, POWER SUPPLY REGULATOR CIRCUIT BOARD	SC911–6030
7–20	ASSEMBLY DIAGRAM, POWER SUPPLY REGULATOR CIRCUIT BOARD	AB951–6030



NOTES:
1. FOR 8 CHANNEL CONSOLES - REMOVE 1 AUDIO INPUT/CHANNEL CONTROL NETWORK.
2. FOR 18 CHANNEL CONSOLES - ADD 1 AUDIO INPUT/CHANNEL CONTROL NETWORK.
3. FOR 24 CHANNEL CONSOLES - ADD 2 AUDIO INPUT/CHANNEL CONTROL NETWORKS.

597-6000-41

FIGURE 7-1. AT-90 CONSOLE, OVERALL CONNECTION DIAGRAM


LEFT A
LEFT B
LEFT C
RIGHT A
RIGHT B
RIGHT C
AMPLIFIER GAIN
MIC
LINE
CONSUMER
TO CHANNEL LOGIC CONTROL BD
TO CHANNEL LOGIC CONTROL BOARD
EXTERNAL PROCESSING
MIX - JUMPER "ON" P112
AUDIO DISTRIBUTION BUSS
POWER
U100
U101 2016
U102
U103 2016
U104 OUT
U105 OUT
U106/A TL072
U106/B TL072
U107/B TL072
U108/A NE5532
U108/B NE5532
U109
U110
U111/B TL072
Q100
Q101
Q102 2N3904
MIC GAIN
CONSUMER GAIN
-5dBu
430mV
+6V
-6V
+16.5V
-16.5V
NOTES:
1. ALL RESISTORS IN OHMS, 1/4W, 5% UNLESS OTHERWISE SPECIFIED.
2. LAST COMPONENT USED:
3. COMPONENTS NOT USED:
4. SEE ASSEMBLY: AC 911-6005
5. SHEET 1 USED FOR CHANNELS 2,4 & 6 (CHANNEL 6 SHOWN)
SEE SHEET 2 FOR CHANNELS 1,3 & 5.
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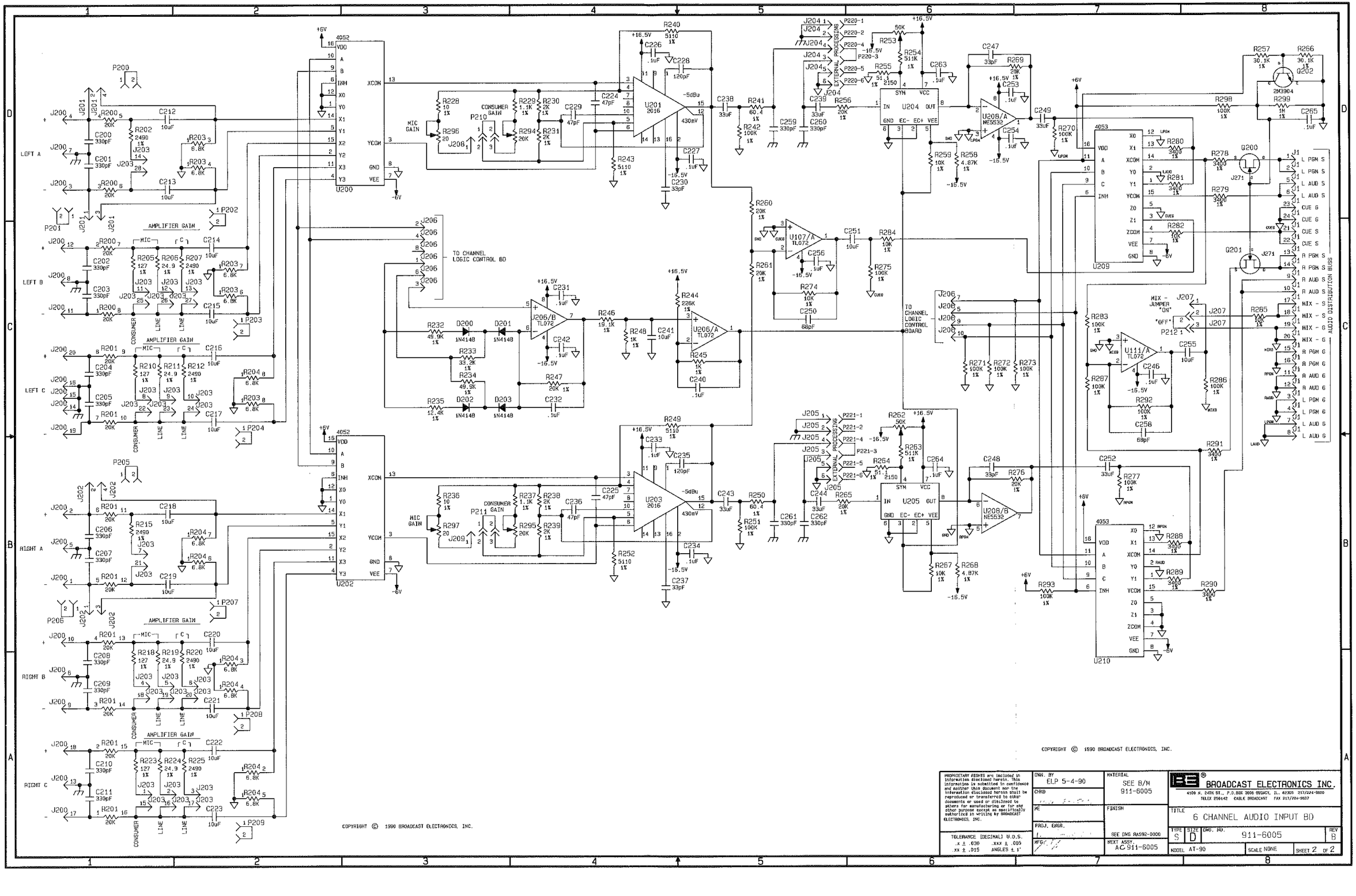
TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°
DWN. BY ELP 5-4-90
CHKD
ENG
PROJ. ENGR.
MFG.
MATERIAL SEE B/M 911-6005
FINISH SEE DWG RA592-0000
NEXT ASSY AC 911-6005
BROADCAST ELECTRONICS INC.
4100 N. 24TH ST., P.O.BOX 3666 QUINCY, IL. 62305 217/224-9600
TELEX 250142 CABLE BROADCAST FAX 217/224-9607
TITLE 6 CHANNEL AUDIO INPUT BD
TYPE S SIZE D DWG. NO. 911-6005 REV B
MODEL AT-90 SCALE NONE SHEET 1 OF 2


LEFT A
LEFT B
LEFT C
RIGHT A
RIGHT B
RIGHT C
AMPLIFIER GAIN
MIC
CONSUMER
LINE
TO CHANNEL LOGIC CONTROL BD
MIC GAIN
CONSUMER GAIN
EXTERNAL PROCESSING
TO CHANNEL LOGIC CONTROL BOARD
MIX - JUMPER "ON" "OFF"
AUDIO DISTRIBUTION BUSS
L PGM S
L AUD S
CUE G
CUE S
R PGM S
R AUD S
MIX - S
MIX - G
R PGM G
R AUD G
L PGM G
L AUD G
U200
U201
U202
U203
U204
U205
U209
U210
U107/A TL072
U111/A TL072
U206/A TL072
U206/B TL072
U208/A NE5532
U208/B NE5532
4052
4053
2016
+16.5V
-16.5V
+6V
-6V
-5dBu
430mV
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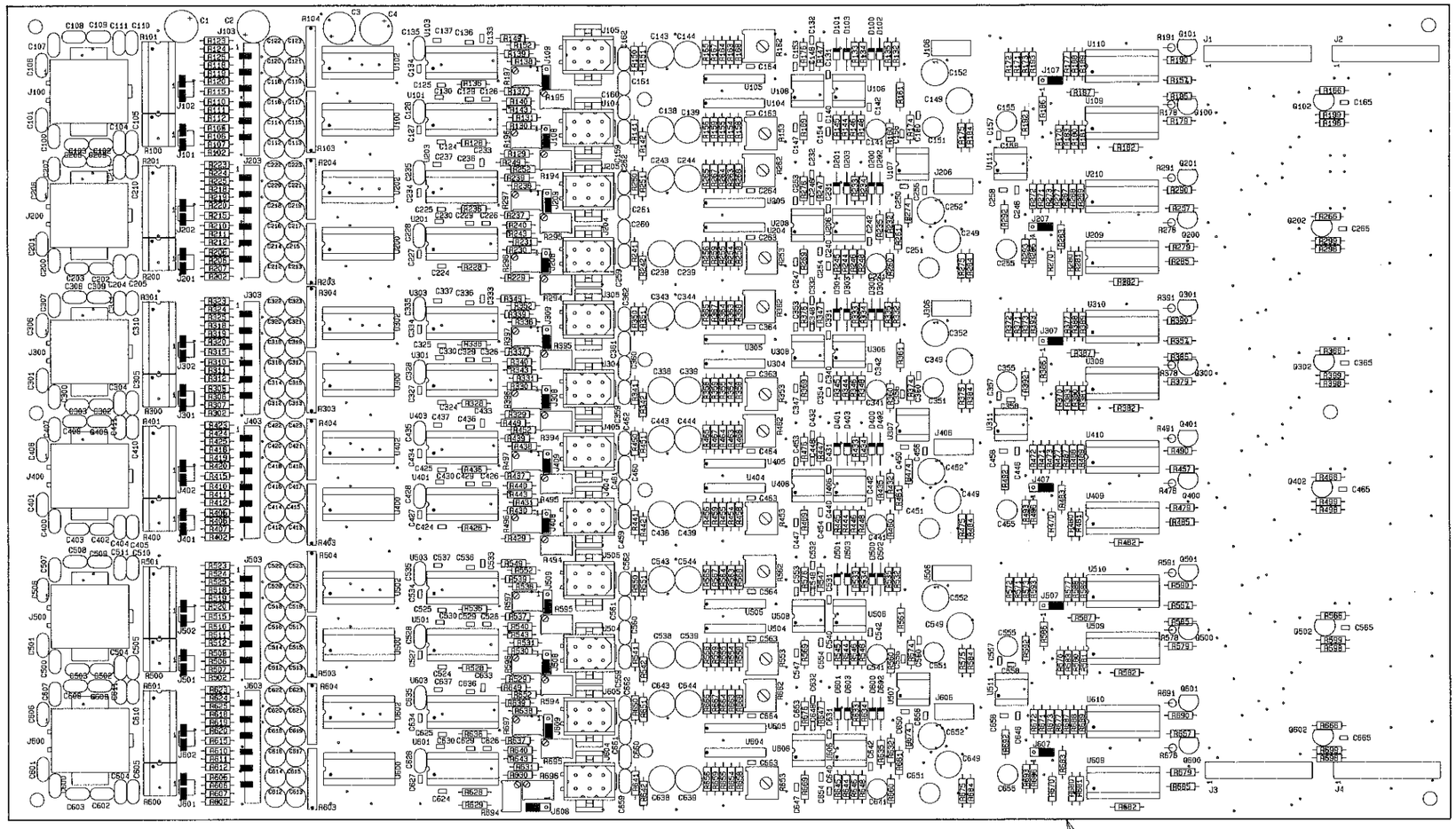
TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°
DWN. BY ELP 5-4-90
CHKD
ME
PROJ. ENGR.
MFG.
MATERIAL SEE B/M 911-6005
FINISH
SEE DWG #A592-0000
NEXT ASSY. AC 911-6005
BROADCAST ELECTRONICS INC.
4100 N. 24TH ST., P.O.BOX 3606 QUINCY, IL. 62305 217/224-9600
TELEX 250142 CABLE BROADCAST FAX 217/224-9607
TITLE 6 CHANNEL AUDIO INPUT BD
TYPE S SIZE D DWG. NO. 911-6005 REV B
MODEL AT-90 SCALE NONE SHEET 2 OF 2



511-6005

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TOLERANCE (DECIMAL) U.O.S.
.X ± .030 .XXX ± .005
.XX ± .015 ANGLES + 1°

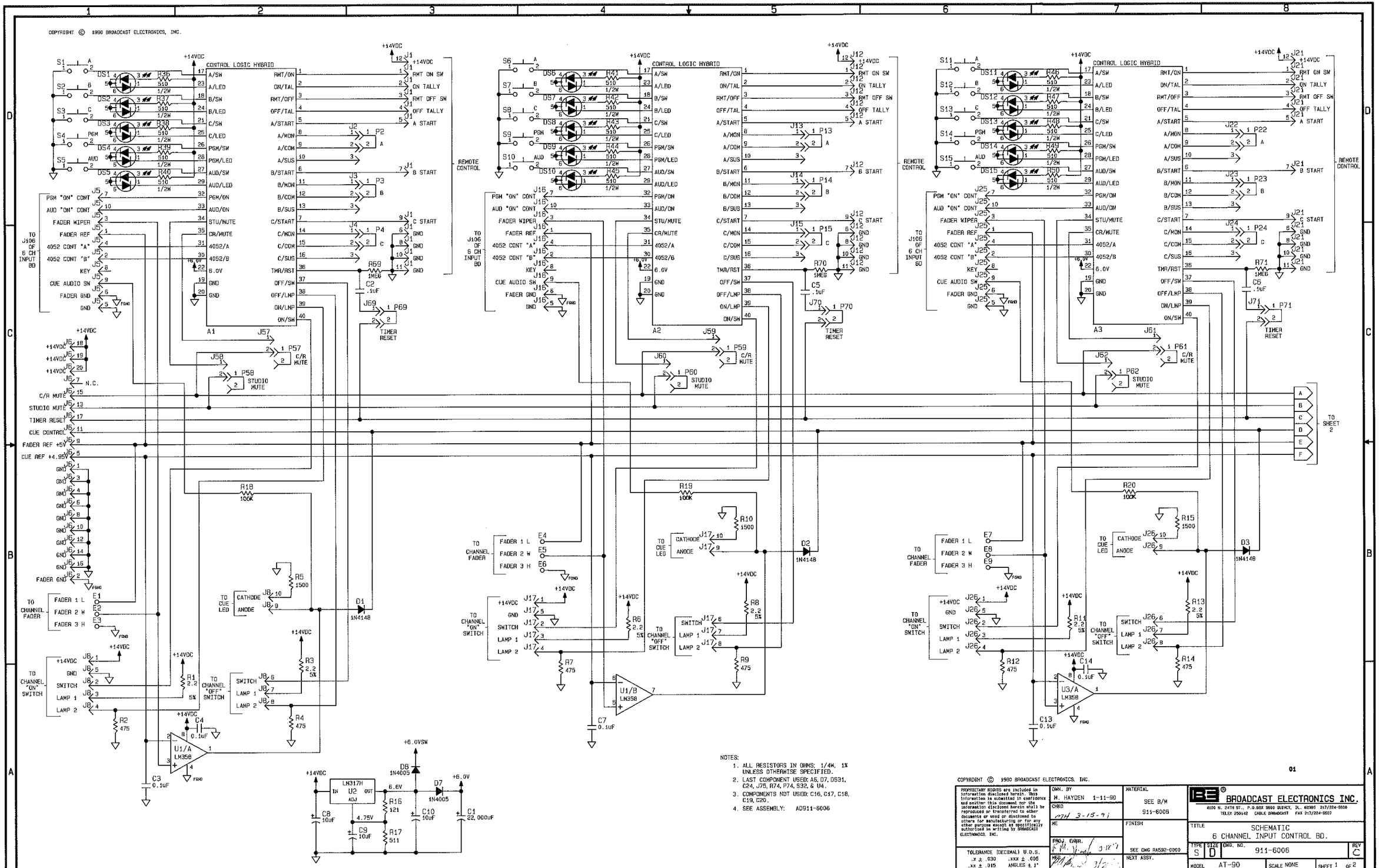
DWN. BY	JAH 11-29-90
CHKD	MH 3-15-91
ME	3/20/91 JH STEINKAMP
PROJ. ENGR.	3-18-91 R. McDONOUGH
MFG.	PR BROSE 3/20/91
MATERIAL	SEE B/M 911-6005
FINISH	
NEXT ASSY.	SEE DWG RA592-0000

BE® BROADCAST ELECTRONICS INC.
4100 N.24TH ST. P.O.BOX 3606 QUINCY, IL. 62305 PH. 217/224-9600
TELEX 250142 CABLE BROADCAST FAX 217/224-9607

TITLE: PCB ASSEMBLY
6 CHANNEL INPUT BD

TYPE	SIZE	DWG No.	REV
A	C	911-6005	F

MODEL AT-90 | SCALE 1=1 | SHEET 1 OF 1



NOTES:

1. ALL RESISTORS IN OHMS; 1/4W, 1% UNLESS OTHERWISE SPECIFIED.
2. LAST COMPONENT USED: A6, D7, DS31, C24, J75, R74, P74, S32, & U4.
3. COMPONENTS NOT USED: C16, C17, C18, C19, C20.
4. SEE ASSEMBLY: AD911-6006

01

TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°

DWN. BY	M. HAYDEN 1-11-90
CHKD	MH 3-15-91
ME	
PROJ. ENGR.	
MFR	
MATERIAL	SEE B/M 911-6006
FINISH	SEE DWG RA592-0000
NEXT ASSY.	

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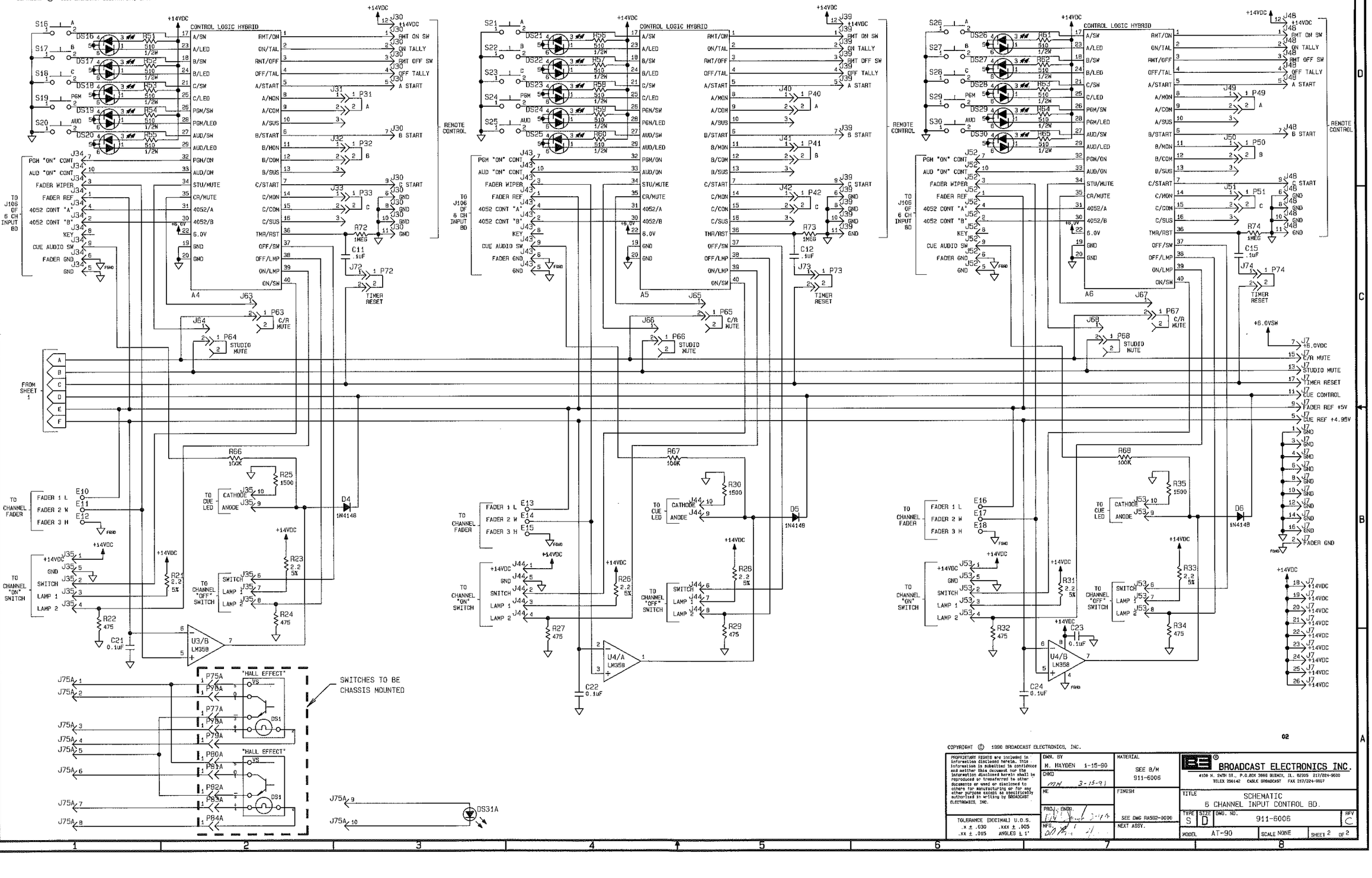
TELEX 250142 CABLE BROADCAST FAX 217/224-9607

TITLE: SCHEMATIC
6 CHANNEL INPUT CONTROL BD.

TYPE	SIZE	DWG. NO.	REV
S	D	911-6006	C

MODEL	SCALE	SHEET
AT-90	NONE	1 OF 2



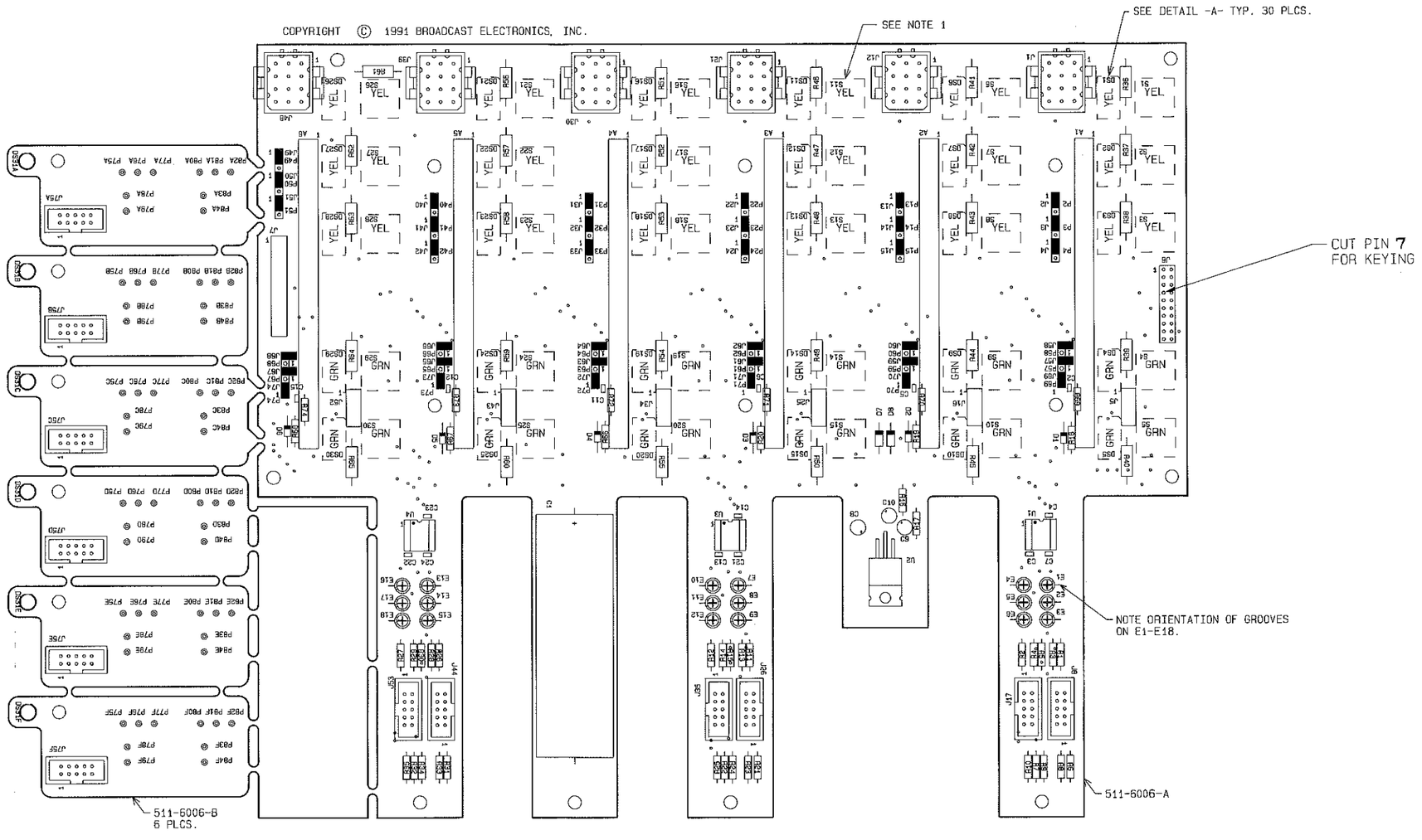
DWN. BY	M. HAYDEN 1-15-90
CHKD	3-15-91
ME	
PROJ. ENGR.	
MFG.	
TOLERANCE (DECIMAL) U.O.S.	.x ± .030 .xxx ± .005 .xx ± .015 ANGLES ± 1°
MATERIAL	SEE B/M 911-6006
FINISH	
NEXT ASSY.	SEE DWG RA502-9006

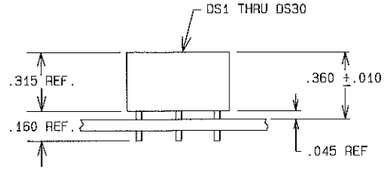
BROADCAST ELECTRONICS INC.
4100 N. 24TH ST., P.O.BOX 3606 QUINCY, IL. 62305 217/224-9600
TELEX 256142 CABLE BROADCAST FAX 217/224-9607

TITLE: SCHEMATIC
6 CHANNEL INPUT CONTROL BD.

TYPE	SIZE	DWG. NO.	REV
S	D	911-6006	C

MODEL AT-90 SCALE NONE SHEET 2 OF 2





DETAIL -A- SCALE 2=1

USE TOOL NO. 911-6006
TO SET SPACING ON LED'S

NOTES:

1. COMPONENTS SHOWN WITH DOTTED LINES TO BE MOUNTED ON SOLDER SIDE.
2. SEE SCHEMATIC SD911-6006.

TOLERANCE (DECIMAL) U.O.S.
.X ± .030 .XXX ± .005
.XX ± .015 ANGLES ± 1°

DWN. BY	JAH 3-28-90
CHKD	MH 3-15-91
ME	3/19/91 JH STEINKAMP
PROJ. ENGR.	11-27-90 R.M. McDONOUGH
MFG.	PR BROSE 3/20/91

MATERIAL: SEE B/M 911-6006

FINISH: ~~SEE DWG RA592-0000~~

NEXT ASSY.

BROADCAST ELECTRONICS INC.
4100 N.24TH ST. P.O.BOX 3606 QUINCY, IL. 62305 PH. 217/224-9600
TELEX 250142 CABLE BROADCAST FAX 217/224-9607

TITLE: PCB ASSY
6 CHANNEL INPUT CONTROL BD

TYPE	SIZE	DWG No.	REV
A	C	911-6006	F

MODEL AT-90 SCALE 1/1 SHEET 1 OF 1

+10dBu
+4dBu NOMINAL
-2dBu

A AIR 1
A AIR 2
A EXT 1
A EXT 2
A EXT 3

L AIR 1
L AIR 2
L EXT 1
L EXT 2
L EXT 3

SHT-3 RPGM
SHT-3 RAUD
SHT-3 LPGM
SHT-3 LAUD
CUE

U1 U6 U10 U14 4051

U2/B U2/A U3/D U3/C U3/B U3/A U7/D U7/C U7/B U7/A NE5532 LM837

U4 U11 U5/B U5/A U8 U15 U12/B U12/A U13/B U13/A SYM IN OUT GND EC- EC+ VEE VCC TL072

U9/B U9/A

Q1 Q2 Q3 J271

D1 D2 1N4148

STMUTE SHT-2
STUDIO MUTE CONTROL
RIGHT STUDIO MON.
LEFT STUDIO MON.
CRMON SHT-2 (MUTE)
MONITOR DIM SHT-2
C/R MONITOR GAIN
HEADPHONE GAIN CONTROL
RPA SHT-2
LPA SHT 2
LPA SHT-2
CR R EXT MON 0dBM
CR L EXT MON 0dBM
RIGHT EXT PHONE AMP 0dBM
LEFT EXT PHONE AMP 0dBM

NOTES:
1. ALL RESISTORS IN OHMS; 1/4W, 1% UNLESS OTHERWISE SPECIFIED.
2. LAST COMPONENT USED: C278, D31, F1, J19, R443, Q9, U45
3. COMPONENTS NOT USED: C17, C27, C46, C59, C78, R429, R436
4. SEE ASSEMBLY: 911-6004-001

TOLERANCE (DECIMAL) U.O.S.
.X ± .090 .XXX ± .005
.XX ± .015 ANGLES ± 1°

DRW. BY JAH 5-17-91
CHKD 5-17-91
MFG. 5-21-91
MATERIAL SEE BOM 911-6004-001
FINISH
NEXT ASSY.

BROADCAST ELECTRONICS INC.
4100 N. 24TH ST., P.O.BOX 3808 QUINCY, IL. 62305 217/224-9600
TELEX 250142 CABLE BROADCAST FAX 217/224-9607

TITLE
SCHEMATIC
AUDIO OUTPUT BOARD

TYPE S SIZE D DRW. NO. 911-6004-001 REV B
MODEL AT-90 SCALE NONE SHEET 1 OF 4

CUE SUMMING INPUT

EXTERNAL CUE INPUT -20dBu TO +4dBu

EXTERNAL CUE INPUT GAIN

CUE DISTORTION NULL

EXT CUE ACTIVATION SWITCH

EXT CUE OUTPUT

CUE AMP

CUE SPEAKER

N.C. KEY

TO J15-1

LEFT PHONE AMP

LEFT HEADPHONE

RIGHT PHONE AMP

RIGHT HEADPHONE

STUDIO W.L. RELAY

CR W.L. RELAY

MON DIM SHT-1

C/A MUTE

C/A MONITOR DIM LEVEL

CUE GAIN CONTROL

TALKBACK INPUT -5dBu

TALKBACK OUTPUT

PUSH TO TALK CONSOLE

PUSH TO TALK REMOTE

TO CONSOLE POWER SUPPLY

HP-CUE GND

+/-16.5V GND

CLOCK GND

CONTROL GND

FADER REFERENCE

TOLERANCE (DECIMAL) U.O.S.
.x ± .050 .xxx ± .005
.xx ± .015 ANGLES ± 1°

DWN. BY JAH 5-17-91
CHKD 5-17-91
ENGR.
MFG.

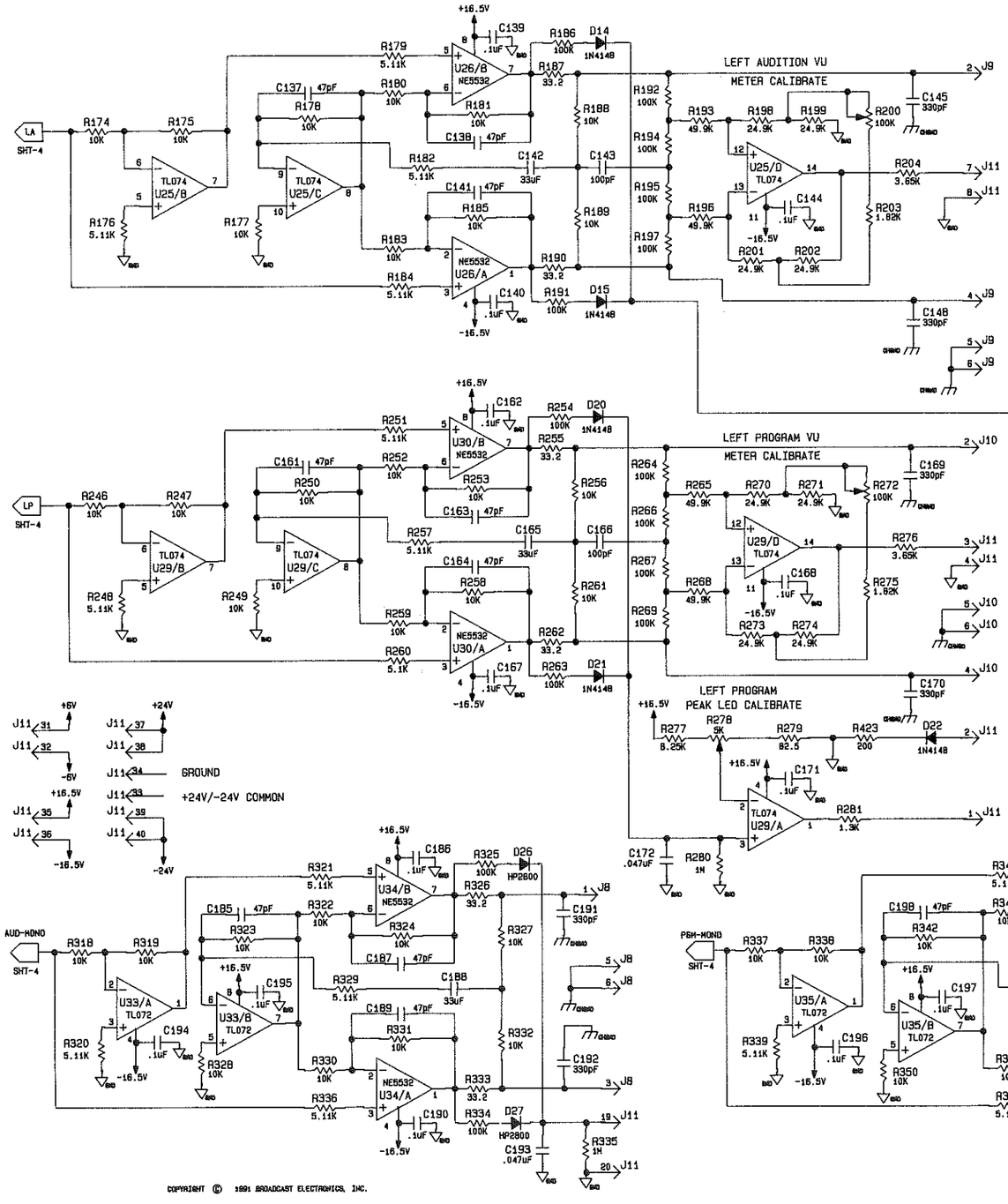
MATERIAL SEE BOM 911-6004-001
FINISH
NEXT ASSY.

BROADCAST ELECTRONICS INC.
4100 N. 24TH ST., P.O.BOX 3606 QUINCY, IL. 62306 217/224-9600
TELEX 250142 CABLE BROADCAST FAX 217/224-9607

TITLE
SCHEMATIC
AUDIO OUTPUT BOARD

TYPE S | SIZE D | DWG. NO. 911-6004-001 | REV B

MODEL AT-90 | SCALE NONE | SHEET 2 OF 4



TOLERANCE (DECIMAL) U.O.S.
.X ± .090 .XXX ± .005
.XX ± .015 ANGLES ± 1°

DWN. BY JAH 5-17-91
CHKD 5-17-91
ENG
PROJ. ENGR. 5-24-91
MFG.

MATERIAL SEE BOM
911-6004-001
FINISH
NEXT ASSY.

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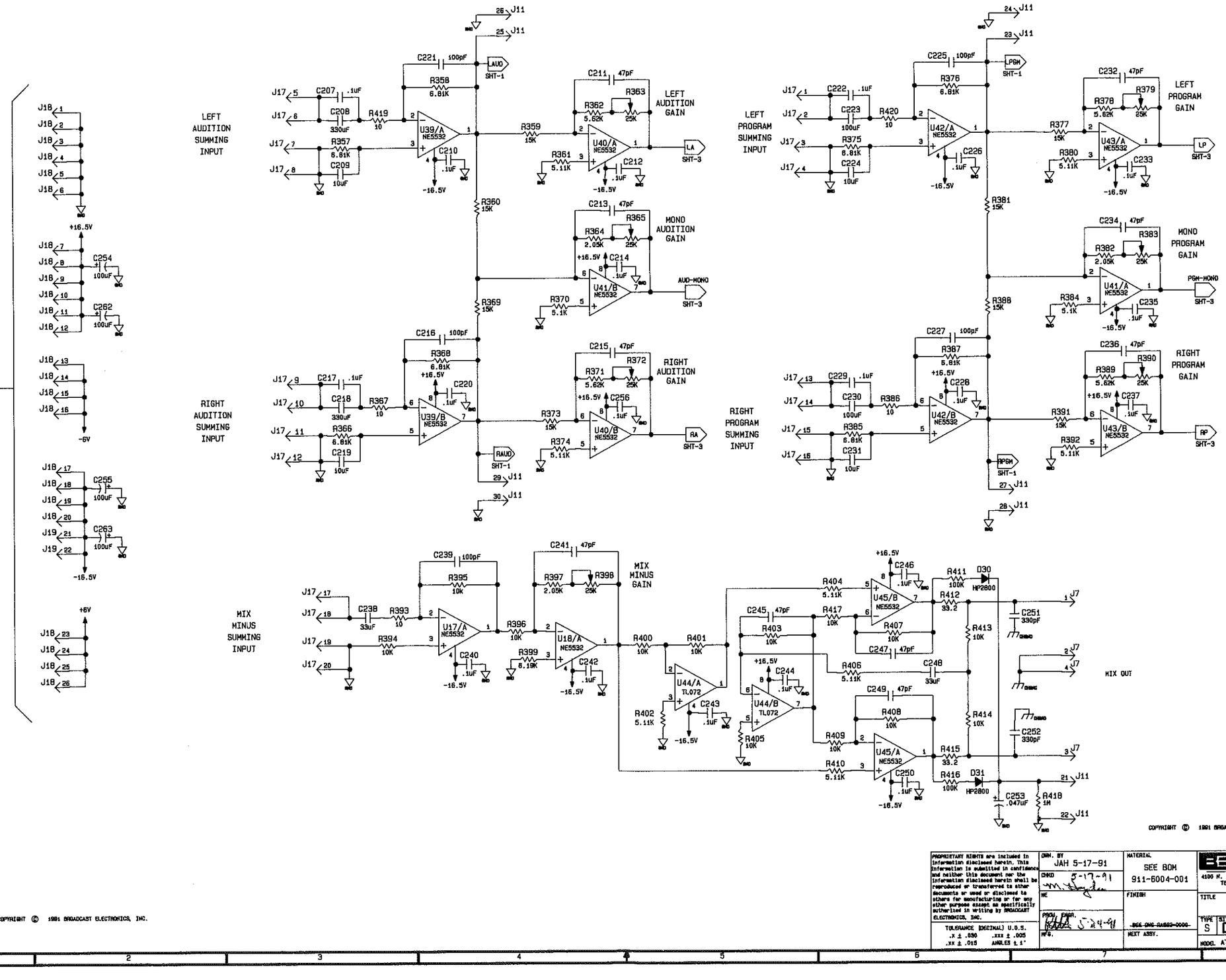
4100 N. 24TH ST., P.O.BOX 3606 QUINCY, IL. 62305 217/224-9600
TELEX 250142 CABLE BROADCAST FAX 217/224-9607

TITLE SCHEMATIC
AUDIO OUTPUT BOARD

TYPE S | SIZE D | DWG. NO. 911-6004-001 | REV B

MODEL AT-90 | SCALE NONE | SHEET 3 OF 4



TOLERANCE (DECIMAL) U.O.S.
.X ± .030 .XXX ± .005
.XX ± .015 ANGLES ± 1°

DRN. BY JAH 5-17-91
CHKD 5-17-91
MC
PROJ. ENGR.
MFG.

MATERIAL SEE BOM 911-6004-001
FINISH
NEXT ASSY.

BROADCAST ELECTRONICS INC.
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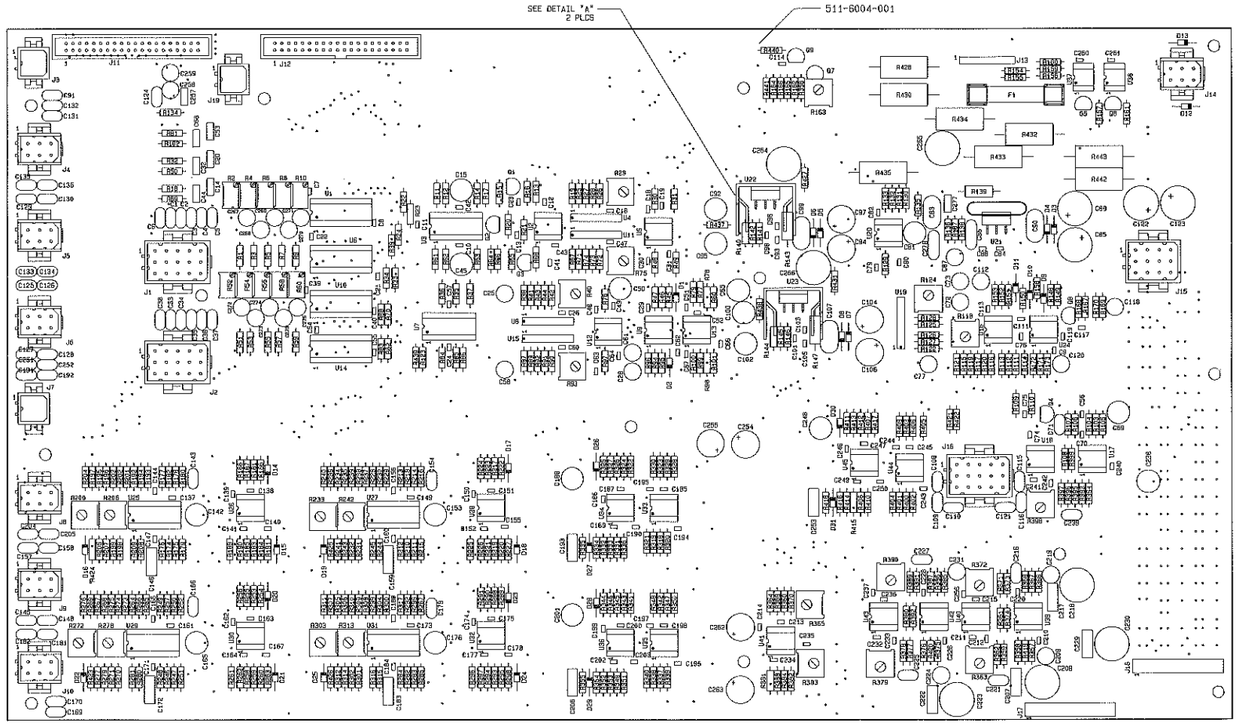
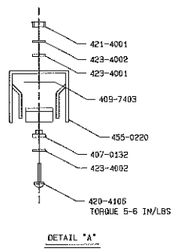
TELEX 250142 CABLE BROADCAST FAX 217/224-9607

TITLE SCHEMATIC AUDIO OUTPUT BOARD

TYPE S | SIZE D | DWG. NO. 911-6004-001 | REV B

MODEL AT-90 | SCALE NONE | SHEET 4 OF 4





DETAIL "A"

TOLERANCE (DECIMAL) U.O.S.
.X ± .030 .XXX ± .005
.XX ± .015 ANGLES ± 1°

DWN. BY JAH 5-17-91
CHKD
ME
PROJ. ENGR.
MFG.

MATERIAL SEE BOM 911-6004-001
FINISH
-SEE DWG RA502-0069-
NEXT ASSY.

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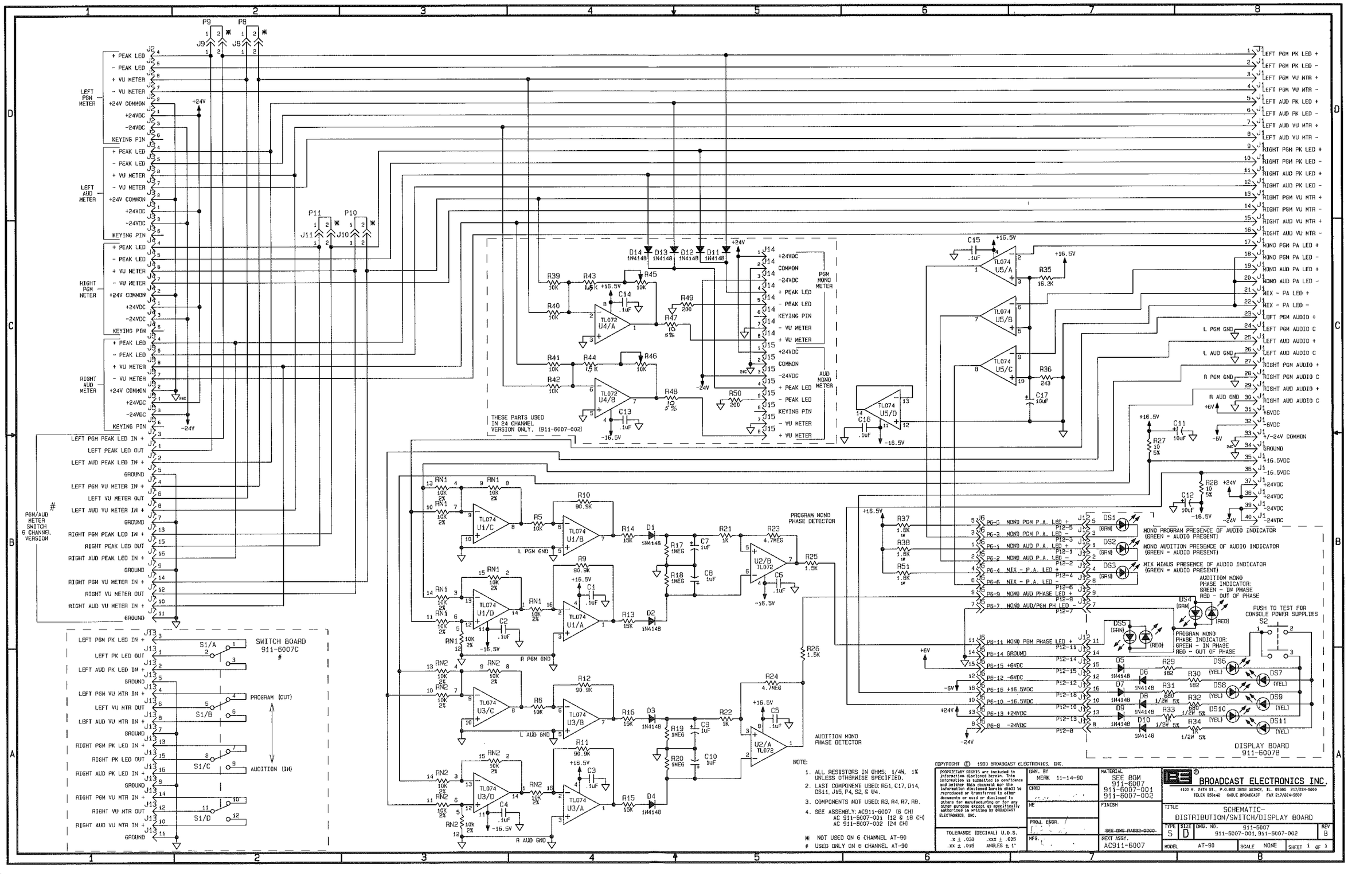
TITLE PCB ASSY AUDIO OUTPUT

TYPE	SIZE	DWG No.	REV
A	D	911-6004-001	E1

MODEL AT-90 SCALE 1.5/1 SHEET 1 OF 1


LEFT PGM METER
LEFT AUD METER
RIGHT PGM METER
RIGHT AUD METER
+ PEAK LED
- PEAK LED
+ VU METER
- VU METER
+24V COMMON
+24VDC
-24VDC
KEYING PIN
LEFT PGM PEAK LED IN +
LEFT PEAK LED OUT
LEFT AUD PEAK LED IN +
GROUND
LEFT PGM VU METER IN +
LEFT VU METER OUT
LEFT AUD VU METER IN +
RIGHT PGM PEAK LED IN +
RIGHT PEAK LED OUT
RIGHT AUD PEAK LED IN +
RIGHT PGM VU METER IN +
RIGHT VU METER OUT
RIGHT AUD VU METER IN +
PGM/AUD METER SWITCH 6 CHANNEL VERSION
SWITCH BOARD 911-6007C
PROGRAM (OUT)
AUDITION (IN)
THESE PARTS USED IN 24 CHANNEL VERSION ONLY. (911-6007-002)
PGM MONO METER
AUD MONO METER
PROGRAM MOND PHASE DETECTOR
AUDITION MOND PHASE DETECTOR
MONO PROGRAM PRESENCE OF AUDIO INDICATOR (GREEN = AUDIO PRESENT)
MONO AUDITION PRESENCE OF AUDIO INDICATOR (GREEN = AUDIO PRESENT)
MIX MINUS PRESENCE OF AUDIO INDICATOR (GREEN = AUDIO PRESENT)
AUDITION MONO PHASE INDICATOR: GREEN - IN PHASE RED - OUT OF PHASE
PROGRAM MONO PHASE INDICATOR: GREEN - IN PHASE RED - OUT OF PHASE
PUSH TO TEST FOR CONSOLE POWER SUPPLIES
DISPLAY BOARD 911-6007B
NOTE:
1. ALL RESISTORS IN OHMS; 1/4W, 1% UNLESS OTHERWISE SPECIFIED.
2. LAST COMPONENT USED: R51, C17, D14, DS11, J15, P4, S2, & U4.
3. COMPONENTS NOT USED: R3, R4, R7, R8.
4. SEE ASSEMBLY: AC911-6007 (6 CH) AC 911-6007-001 (12 & 18 CH) AC 911-6007-002 (24 CH)
* NOT USED ON 6 CHANNEL AT-90
# USED ONLY ON 6 CHANNEL AT-90
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TOLERANCE (DECIMAL) U.O.S. .x ± .030 .xxx ± .005 .xx ± .015 ANGLES ± 1°
DWN. BY MERK 11-14-90
CHKD
ME
PROJ. ENGR.
MFG.
MATERIAL SEE BOM 911-6007 911-6007-001 911-6007-002
FINISH SEE DWG RA592-0000
NEXT ASSY. AC911-6007
BROADCAST ELECTRONICS INC.
4100 N. 24TH ST., P.O.BOX 3606 QUINCY, IL. 62305 217/224-9600
TELEX 250142 CABLE BROADCAST FAX 217/224-9607
TITLE SCHEMATIC- DISTRIBUTION/SWITCH/DISPLAY BOARD
TYPE S SIZE D DWG. NO. 911-6007 911-6007-001, 911-6007-002 REV B
MODEL AT-90 SCALE NONE SHEET 1 OF 1

SEE DETAIL "A" FOR ASSEMBLY TYP 10 PLCS.

DISPLAY BD.
ASSY. 911-6007B

SWITCH BD.
ASSY. 911-6007C

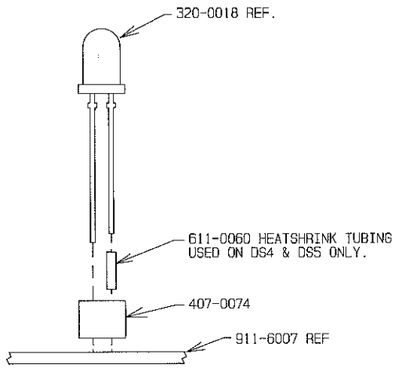
P8, P9, P10 & P11
NOT USED ON 911-6007.

SEE NOTE 2

511-6007

DISTRIBUTTION BD.
ASSY. 911-6007A

DETAIL "A" 2=1
ASSEMBLY OF LED'S DS1-DS10



CUT HEATSHRINK TUBING TO THE SAME HEIGHT AS SPACER. INSERT TUBING OVER ONE LEG FIRST. THEN INSERT SPACER OVER BOTH LEGS. DO NOT SHRINK TUBING. LED SHOULD BE INSERTED FLUSH AGAINST SPACER.

NOTES:

1. DASHED COMPONENTS TO BE MOUNTED FROM OPPOSITE SIDE.
2. PIN 6 OF CONNECTORS J2,J3,J4,J5,J14 & J15. TO BE REMOVED FOR KEYING.
3. # - INDICATES ADDITIONAL COMPONENTS USED ON 911-6007 ONLY.

   * - INDICATES ADDITIONAL COMPONENTS USED ON 911-6007-002 ONLY.
4. SEE SCHEMATIC SD 911-6007 (6 CHANNEL)
   SD 911-6007-001 (12&18 CHANNEL)
   SD 911-6007-002 (24 CHANNEL)

TOLERANCE (DECIMAL) U.O.S.
.X ± .030 .XXX ± .005
.XX ± .015 ANGLES ± 1°

DWN. BY	JAH 4-24-90
CHKD	MH 3-15-91
ME	3/20/91 JH STEINKAMP
PROJ. ENGR.	3/20/91 R. McDONOUGH
MFG.	PR BROSE 3/20/91
MATERIAL	SEE B/M 911-6007, 911-6007-001 911-6007-002
FINISH	SEE DWG RA592-0000
NEXT ASSY.	

BROADCAST ELECTRONICS INC.
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TELEX 250142 CABLE BROADCAST FAX 217/224-9507

TITLE	PCB ASSEMBLY DISTRIBUTION/SWITCH/DISPLAY BD		
TYPE	SIZE	DWG No.	REV
A	C	911-6007 911-6007-001 & 911-6007-002	E
MODEL	AT-90	SCALE 1/1	SHEET 1 OF 1

FROM OUTPUT BD

PUSH TO TALK J1 1
PUSH TO TALK J1 3
+14VDC J1 38
+14VDC J1 39
+14VDC J1 40
FADER REF +5V J1 29
CUE CONTROL J1 31
STUDIO MUTE J1 33
C/R MUTE J1 35
C/T GROUND J1 2
C/T GROUND J1 4
C/T GROUND J1 6
C/T GROUND J1 8
GROUND J1 10
GROUND J1 12
GROUND J1 14
GROUND J1 16
GROUND J1 18
GROUND J1 20
GROUND J1 22
GROUND J1 24
+14VDC J1 26
+14VDC J1 28
+14VDC J1 30
+14VDC J1 32
+14VDC J1 34
+14VDC J1 36
MONO SELECT J1 37
MON A CONT J1 13
MON B CONT J1 15
MON C CONT J1 17
MON INHIBIT J1 19
H.P. A CONT J1 5
H.P. B CONT J1 7
H.P. C CONT J1 9
HP INHIBIT J1 11
C/R VCA CT J1 23
FADER/VCA CT J1 27
GND
HDPH VCA CT J1 21
CUE VCA CT J1 25

R7 75
C7 470uF 25V
7805 U1 IN OUT GND
+5.0VDC
C4 10uF
R8 511
R9 48.7K
C5 10uF
+4.95VDC

C3 100uF R6 162 R5 1K
C2 100uF R4 162 R3 1K
C1 100uF R2 162 R1 1K

TO CLOCK/TIMER BD
J6 5 +14VDC
J6 8 +14VDC
J6 10 +14VDC
J6 7 TIMER RESET
J6 9 MONO SELECT
J6 1 GROUND
J6 2 GROUND
J6 3 GROUND
J6 4 GROUND
J6 5 GROUND

TO CONTROL BD
J2 18 +14VDC
J2 19 +14VDC
J2 20 +14VDC
J2 21 +14VDC
J2 22 +14VDC
J2 23 +14VDC
J2 24 +14VDC
J2 25 +14VDC
J2 26 +14VDC
J2 9 FADER REF +5V
J2 11 CUE CONTROL
J2 13 STUDIO MUTE
J2 15 C/R MUTE
J2 1 GROUND
J2 3 GROUND
J2 4 GROUND
J2 5 GROUND
J2 8 GROUND
J2 10 GROUND
J2 12 GROUND
J2 14 GROUND
J2 16 GROUND
J2 5 REF +4.95V
J2 7 +6.0VDC (SWITCHED)
J2 2 FADER GROUND
J2 17 TIMER RESET

TO HEADPHONE SELECT BD
J4 9 "A" CONTROL
J4 7 "B" CONTROL
J4 5 "C" CONTROL
J4 3 INHIBIT
J4 10 +6.0VDC
J4 1 GROUND
J4 2 GROUND
J4 4 GROUND
J4 6 GROUND
J4 8 GROUND

TO C/R MONITOR SELECT BD
J5 9 "A" CONTROL
J5 7 "B" CONTROL
J5 5 "C" CONTROL
J5 3 INHIBIT
J5 10 +6.0VDC
J5 1 GROUND
J5 2 GROUND
J5 4 GROUND
J5 6 GROUND
J5 8 GROUND

C/R MONITOR, HEADPHONE & CUE SYSTEM GAIN CONTROLS
J3 4 C/R MONITOR WIPER RTN
J3 1 FADER REF +5V
J3 2 FADER REF +5V
J3 3 HEADPHONE WIPER RTN
J3 6 FADER GROUND
J3 7 FADER GROUND
J3 8 FADER GROUND
J3 5 CUE SYSTEM WIPER RTN

TO PUSH TO TALK SWITCH
J3 9 PUSH TO TALK
J3 10 PUSH TO TALK

NOTES:
1. ALL RESISTORS IN OHMS; 1/4W, 1% UNLESS OTHERWISE SPECIFIED.
2. LAST COMPONENT USED; R9, C7, U1, J5
3. COMPONENTS NOT USED:
4. SEE ASSEMBLY: AC 911-6000A

TOLERANCE (DECIMAL) U.O.S.
.X ± .030 .XXX ± .005
.XX ± .015 ANGLES ± 1°

DWN. BY JAH 12-18-89
CHKD
ME
PROJ. ENGR.
MFG.

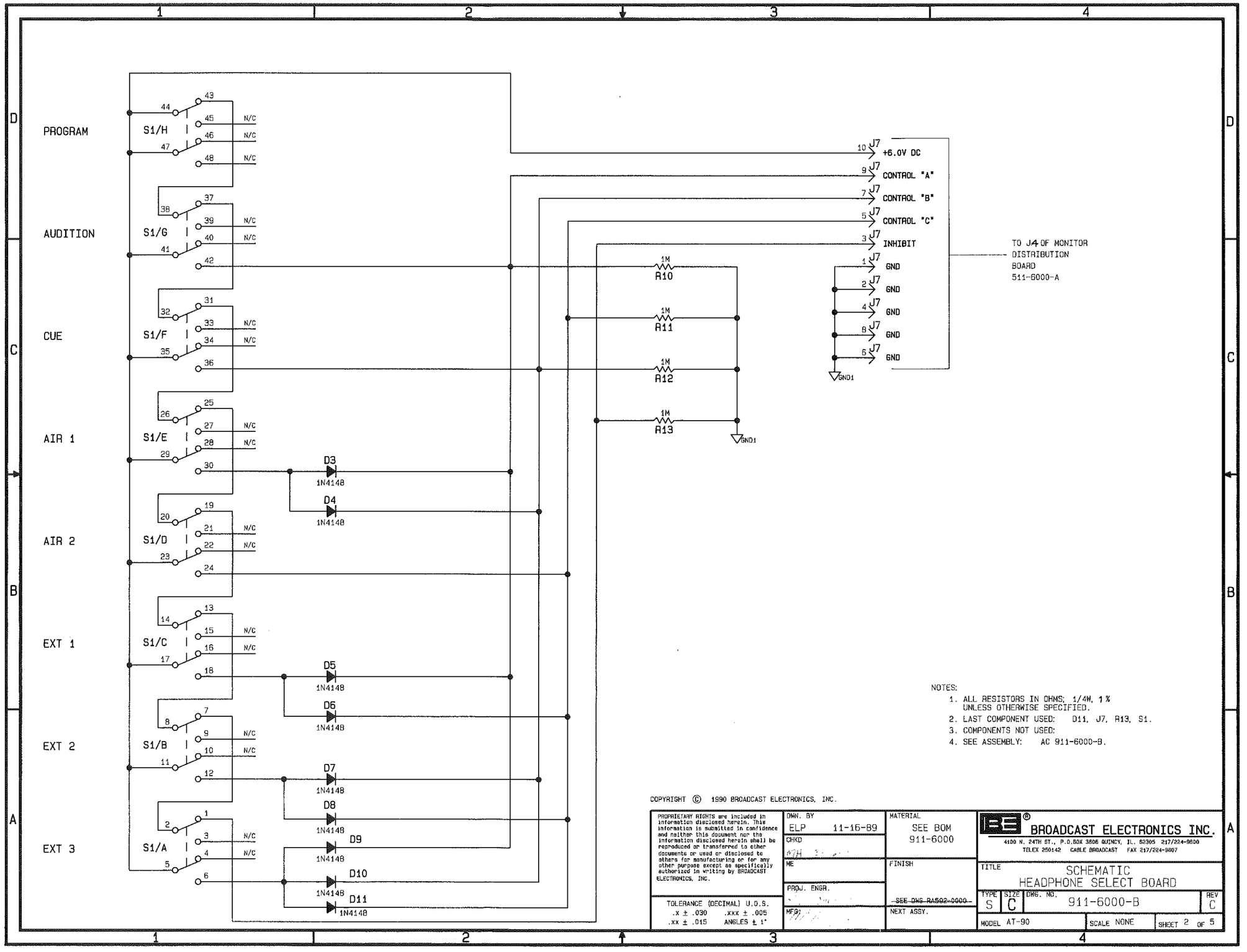
MATERIAL SEE BOM 911-6000
FINISH
~~SEE DWG RA982-0000~~
NEXT ASSY.

BROADCAST ELECTRONICS INC.
4100 N. 24TH ST., P.O.BOX 3606 QUINCY, IL. 62305 217/224-9600
TELEX 250142 CABLE BROADCAST FAX 217/224-9607

TITLE SCHEMATIC MONITOR DISTRIBUTION BD.

TYPE S | SIZE D | DWG. NO. 911-6000-A | REV C

MODEL AT-90 | SCALE NONE | SHEET 1 OF 5



NOTES:

1. ALL RESISTORS IN OHMS; 1/4W, 1 % UNLESS OTHERWISE SPECIFIED.
2. LAST COMPONENT USED: D11, J7, R13, S1.
3. COMPONENTS NOT USED:
4. SEE ASSEMBLY: AC 911-6000-B.

TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°

DWN. BY ELP 11-16-89
CHKD
ME
PROJ. ENGR.
MFG

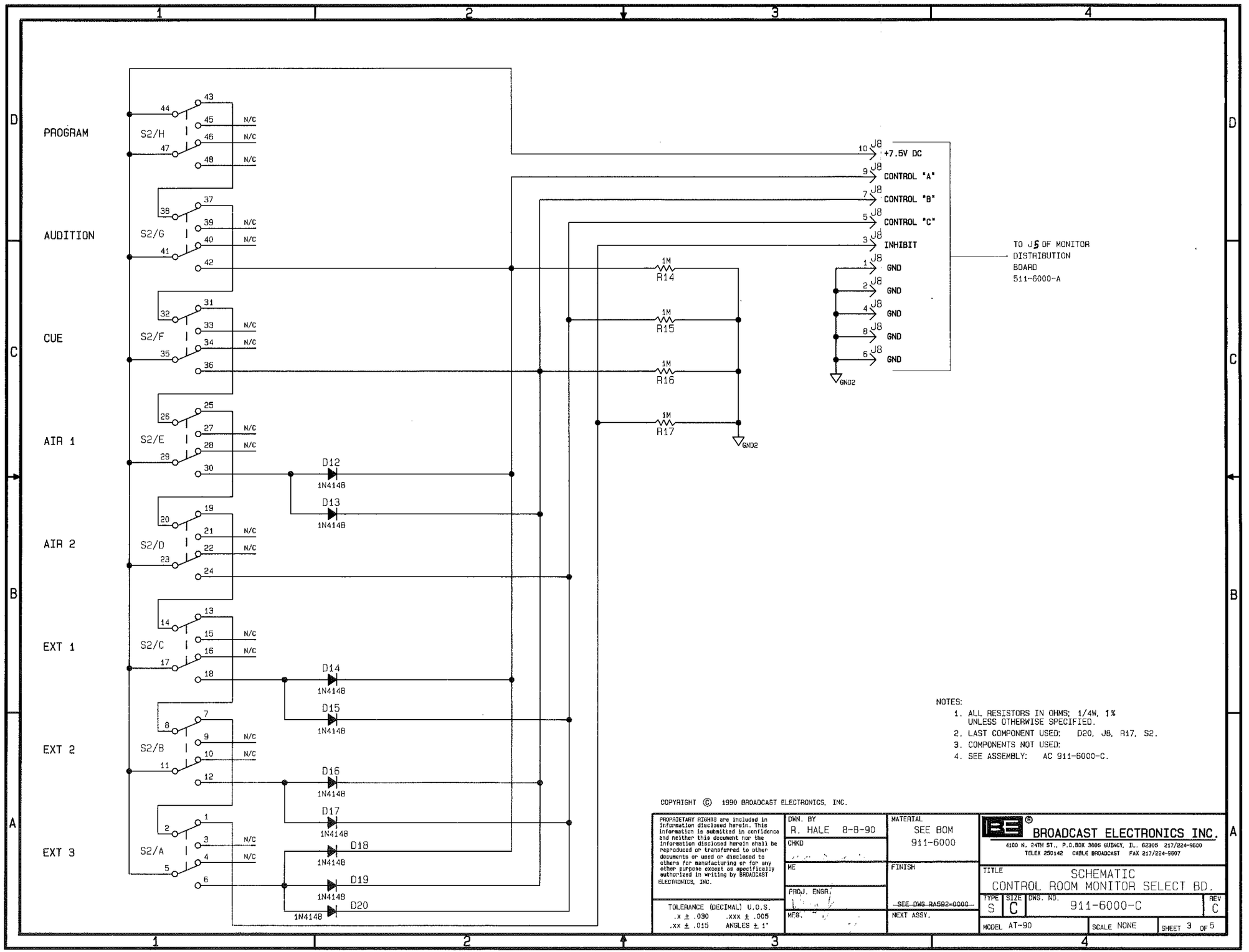
MATERIAL SEE BOM 911-6000
FINISH
~~SEE DWG RA592-0000~~
NEXT ASSY.

BROADCAST ELECTRONICS INC.
4100 N. 24TH ST., P.O.BOX 3606 QUINCY, IL. 62305 217/224-9600
TELEX 250142 CABLE BROADCAST FAX 217/224-9607

TITLE SCHEMATIC HEADPHONE SELECT BOARD

TYPE S | SIZE C | DWG. NO. 911-6000-B | REV C

MODEL AT-90 | SCALE NONE | SHEET 2 OF 5



NOTES:

1. ALL RESISTORS IN OHMS; 1/4W, 1% UNLESS OTHERWISE SPECIFIED.
2. LAST COMPONENT USED: D20, J8, R17, S2.
3. COMPONENTS NOT USED:
4. SEE ASSEMBLY: AC 911-6000-C.

TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°

DWN. BY	R. HALE 8-8-90
CHKD	
ME	
PROJ. ENGR.	
MFG.	
MATERIAL	SEE BOM 911-6000
FINISH	SEE DWG RA592-0000
NEXT ASSY.	

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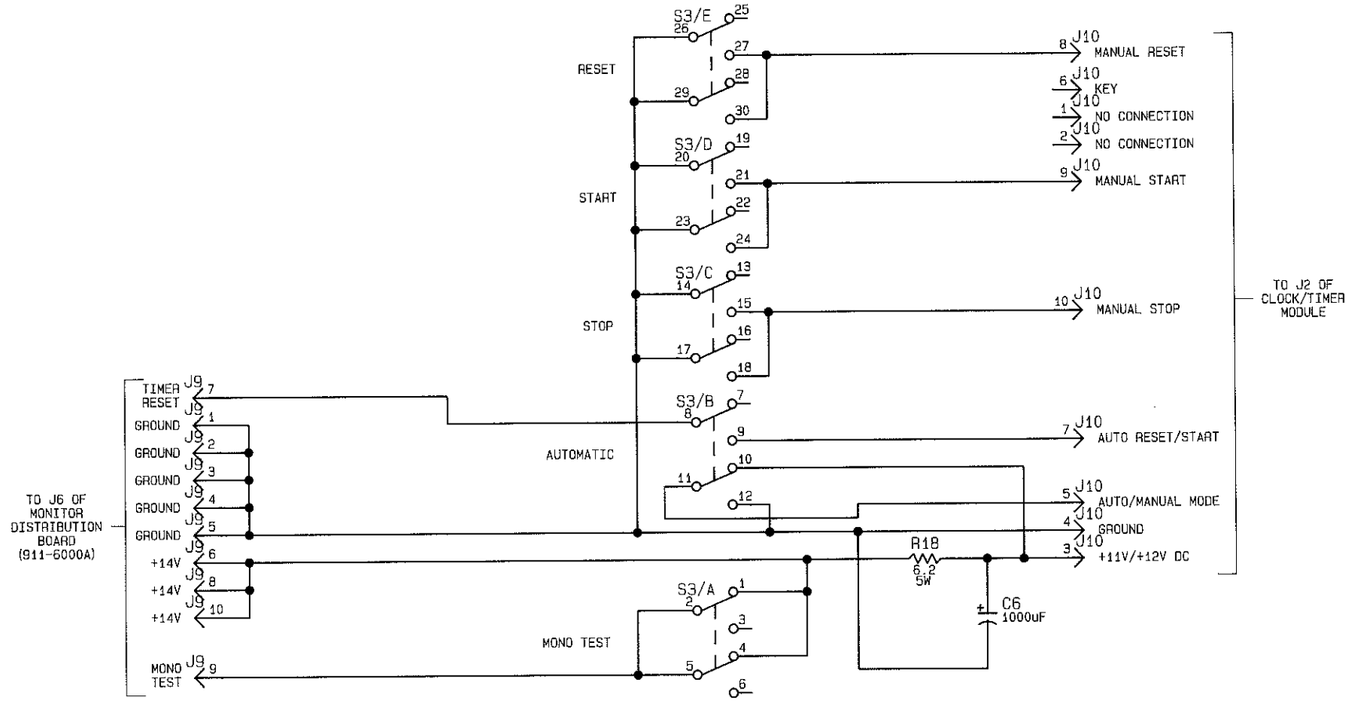
TELEX 250142 CABLE BROADCAST FAX 217/224-9607

TITLE	SCHEMATIC CONTROL ROOM MONITOR SELECT BD.		
TYPE S	SIZE C	DWG. NO. 911-6000-C	REV C
MODEL AT-90	SCALE NONE	SHEET 3 OF 5	



NOTES:

1. ALL RESISTORS IN OHMS; 1/4W, 1%
   UNLESS OTHERWISE SPECIFIED.
2. LAST COMPONENT USED: R18, C6, J10, & S3
3. COMPONENTS NOT USED:
4. SEE ASSEMBLY: AC 911-6000-D

TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°

DWN. BY JAH 12-14-89
CHKD
ME
PROJ. ENGR.
MFG

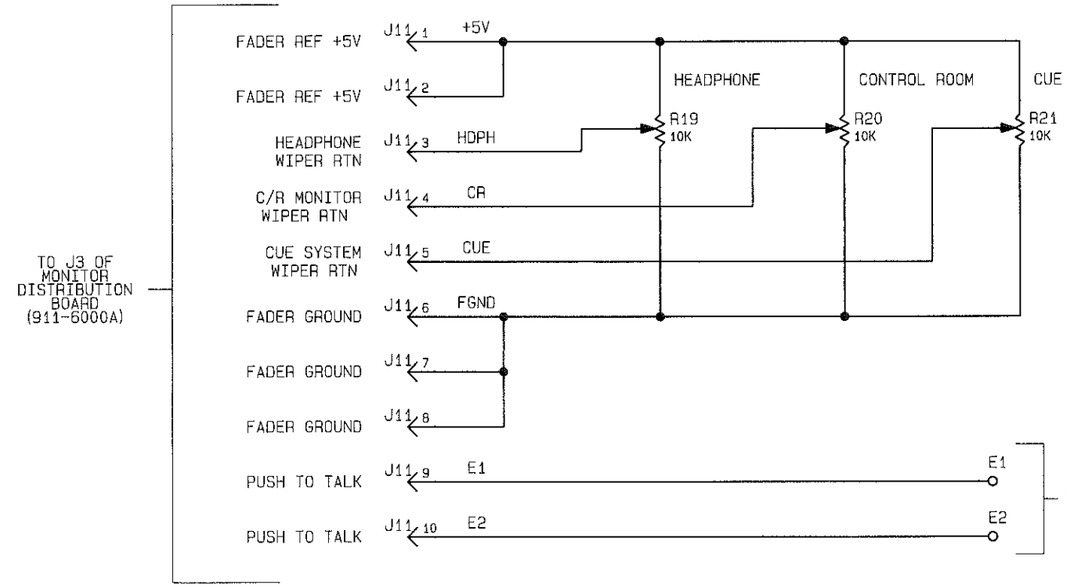
MATERIAL SEE BOM 911-6000
FINISH
~~SEE DWG RA592-0000~~
NEXT ASSY.

BROADCAST ELECTRONICS INC.
4100 N. 24TH ST., P.O.BOX 3606 QUINCY, IL. 62305 217/224-9600
TELEX 250142 CABLE BROADCAST FAX 217/224-9607

TITLE SCHEMATIC
TIMER RESET BOARD

TYPE S | SIZE C | DWG. NO. 911-6000-D | REV C

MODEL AT-90 | SCALE NONE | SHEET 4 OF 5



NOTES:

1. ALL RESISTORS IN OHMS, 1/4W, 1% UNLESS OTHERWISE SPECIFIED.
2. LAST COMPONENT USED: R21, J11, E2
3. COMPONENTS NOT USED:
4. SEE ASSEMBLY: AC 911-6000-E

TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°

DWN. BY AB 7-27-90
CHKD MH 8-16-90
ME
PROJ. ENGR.
MFG.

MATERIAL SEE BOM 911-6000
FINISH
~~SEE DWG RA592-0000~~
NEXT ASSY.

BROADCAST ELECTRONICS INC.
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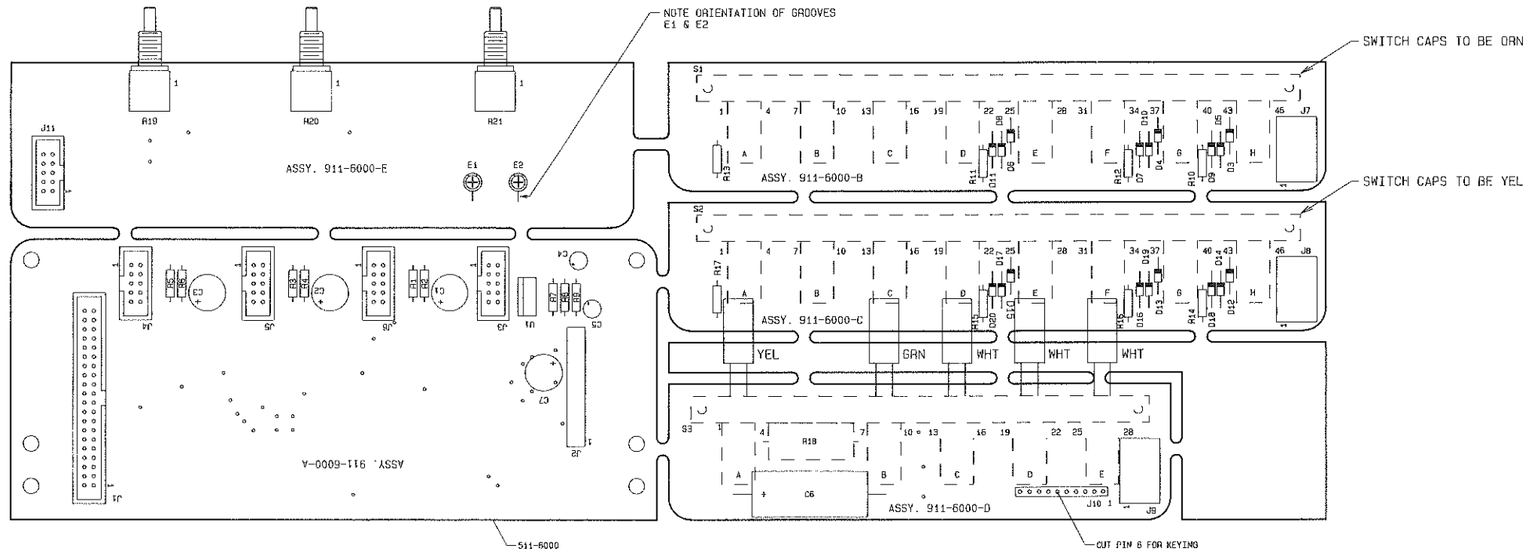
TELEX 250142 CABLE BROADCAST FAX 217/224-9607

TITLE SCHEMATIC
HEADPHONE CNTL RM CUE GAIN BD.

TYPE	SIZE	DWG. NO.	REV
S	C	911-6000-E	C

MODEL AT-90 SCALE NONE SHEET 5 OF 5

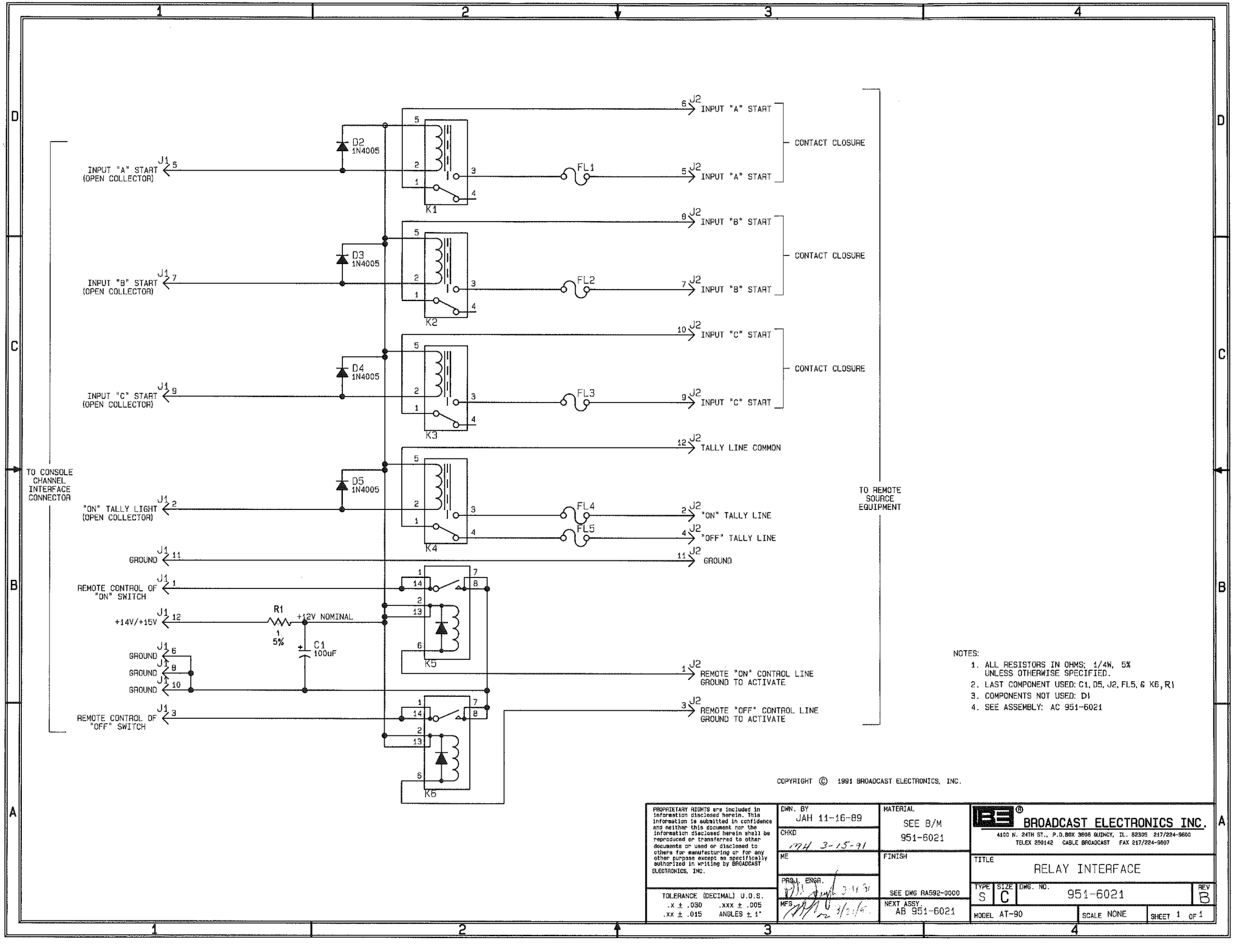


TOLERANCE (DECIMAL) U.O.S.
.X ± .030 .XXX ± .005
.XX ± .015 ANGLES ± 1°

DWN. BY	MH 8-18-90
CHKD	M. HAYDEN 3-16-91
ME	3/20/91 JH STEINKAMP
PROJ. ENGR.	RMD 3-18-91 RMcDONOUGH 11-27-90
MFG.	PR BROSE 3/20/91
MATERIAL	SEE B/M 911-6000
FINISH	
	~~SEE DWG RA592-0000~~
NEXT ASSY.	

BROADCAST ELECTRONICS INC.
4100 N.24TH ST. P.O.BOX 3606 QUINCY, IL. 62305 PH. 217/224-9600
TELEX 250142 CABLE BROADCAST FAX 217/224-9607

TITLE	PCB ASSEMBLY- MONITOR DISTRIBUTION SYSTEM		
TYPE A	SIZE A	DWG No. 911-6000-A THRU E	REV C
MODEL AT-90	SCALE 1/1	SHEET 1 OF 1	



NOTES:

1. ALL RESISTORS IN OHMS; 1/4W, 5% UNLESS OTHERWISE SPECIFIED.
2. LAST COMPONENT USED: C1, D5, J2, FL5, & K6, R1
3. COMPONENTS NOT USED: D1
4. SEE ASSEMBLY: AC 951-6021

TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°

DWN. BY JAH 11-16-89
CHKD MH 3-15-91
ME
PROJ. ENGR.
MFG

MATERIAL SEE B/M 951-6021
FINISH
SEE DWG RA592-0000
NEXT ASSY. AB 951-6021

BROADCAST ELECTRONICS INC.
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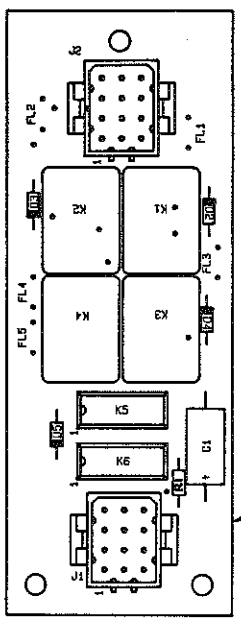
TELEX 250142 CABLE BROADCAST FAX 217/224-9607

TITLE RELAY INTERFACE

TYPE S | SIZE C | DWG. NO. 951-6021 | REV B

MODEL AT-90 | SCALE NONE | SHEET 1 OF 1



TOLERANCE (DECIMAL) U.O.S.
.X ± .030 .XXX ± .005
.XX ± .015 ANGLES ± 1°

DWN. BY JAH 4-27-90
CHKD MH 3-15-91
ME [signature] 3/20/91
PROJ. ENGR. [signature] 3-19-91
MFG [signature] 3/20/91

MATERIAL SEE B/M 951-6021
FINISH SEE DWG RA592-0000
NEXT ASSY.

BROADCAST ELECTRONICS INC.
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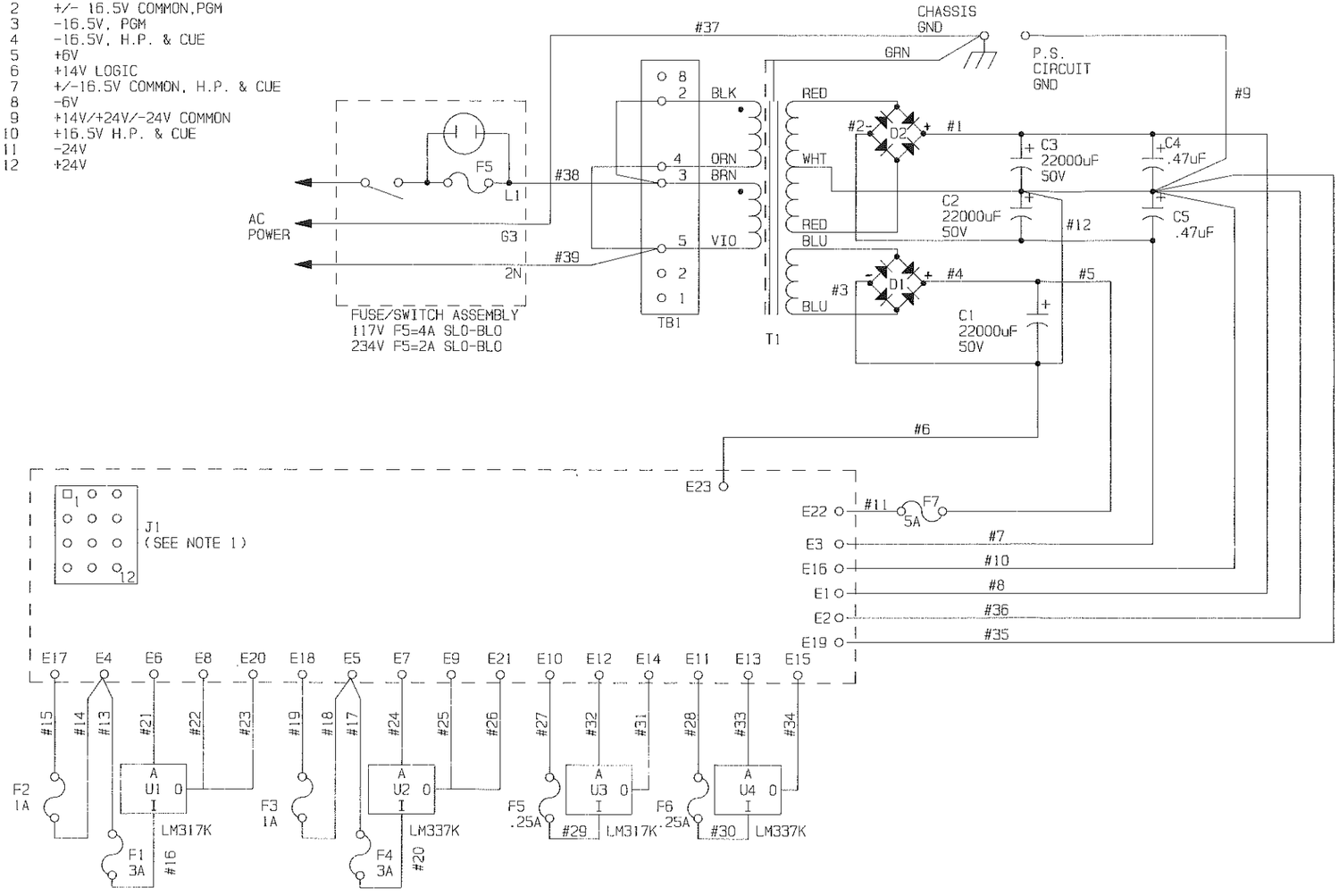
TELEX 250142 CABLE BRDADCAST FAX 217/224-9607

TITLE PCB ASSEMBLY
RELAY INTERFACE

TYPE	SIZE	DWG.No.	REV
A	B	951-6021	B

MODEL LINEAR CONSOLE | SCALE 1=1 | SHEET 1 OF 1

NOTES:
1. PIN # DESCRIPTION
1 +16.5V, PGM
2 +/- 16.5V COMMON,PGM
3 -16.5V, PGM
4 -16.5V, H.P. & CUE
5 +6V
6 +14V LOGIC
7 +/-16.5V COMMON, H.P. & CUE
8 -6V
9 +14V/+24V/-24V COMMON
10 +16.5V H.P. & CUE
11 -24V
12 +24V



TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°

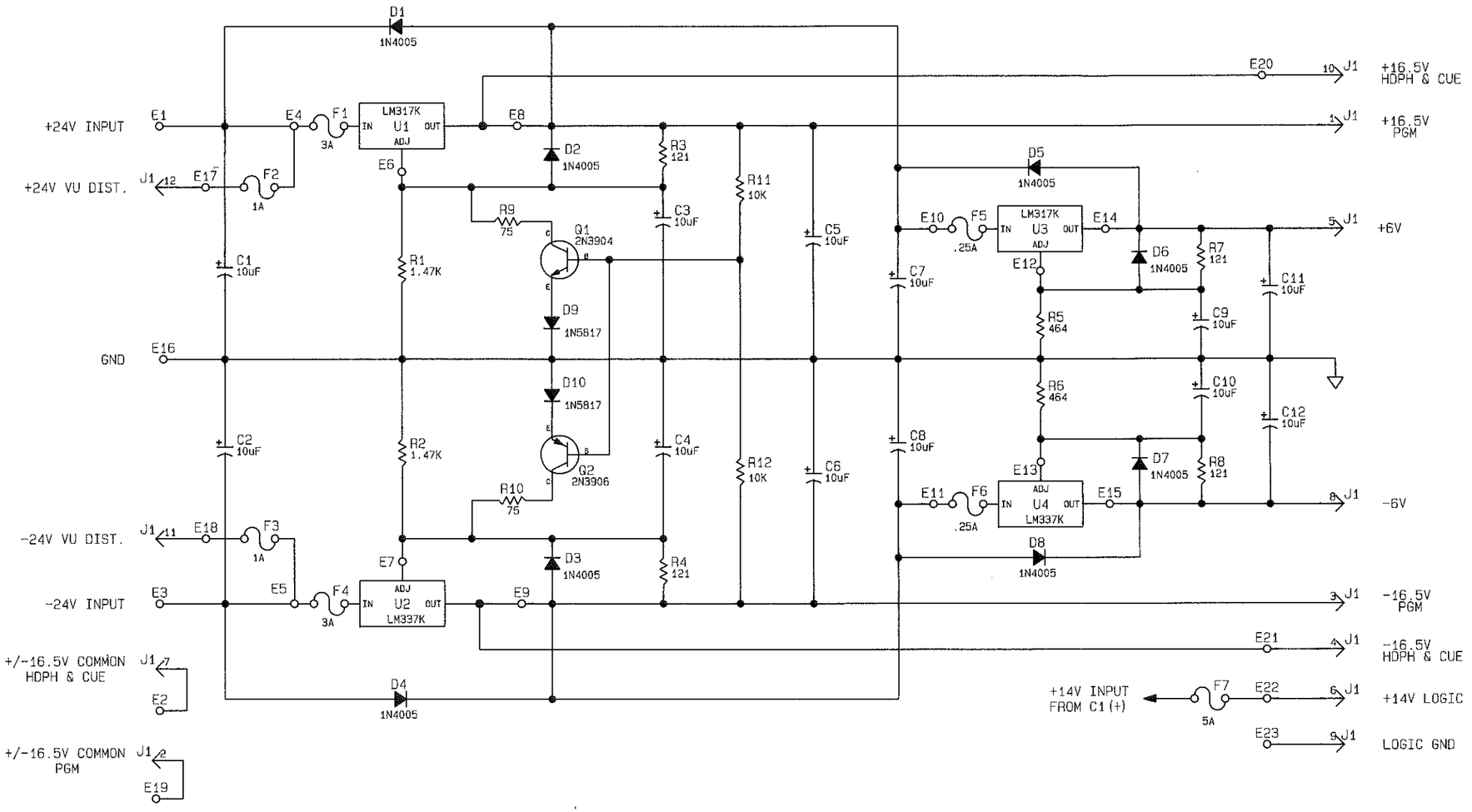
DWN. BY C.RENARD 1-24-91
CHKD
ME
PROJ. ENGR.
MFG.
MATERIAL
FINISH
SEE DWG RA592-0000
NEXT ASSY.

BROADCAST ELECTRONICS INC.
4100 N.24TH ST..P.O.BOX 3606 QUINCY,IL 62305 217/224-9600
TELEX 250142 CABLE BROADCAST FAX 217/224-9607

TITLE: POWER SUPPLY SCHEMATIC AT90

TYPE	SIZE	DWG. NO.	REV
S	C	951-6030	A

MODEL AT90 SCALE NONE SHEET 1 OF 1



NOTES:

1. ALL RESISTORS IN OHMS; 1/4W, 1% UNLESS OTHERWISE SPECIFIED.
2. LAST COMPONENT USED: R12, C12, D10, E23, J1, F7, & U4.
3. COMPONENTS NOT USED:
4. SEE ASSEMBLY: AB 911-6030
5. COMPONENTS U1-U4 & F1-F7 ARE NOT LOCATED ON BOARD.

TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°

DWN. BY ELP 4-3-90
CHKD
ME
PROJ. ENGR.
MFG.

MATERIAL SEE B/M 911-6030
FINISH SEE DWG RA592-0000
NEXT ASSY.

BROADCAST ELECTRONICS INC.
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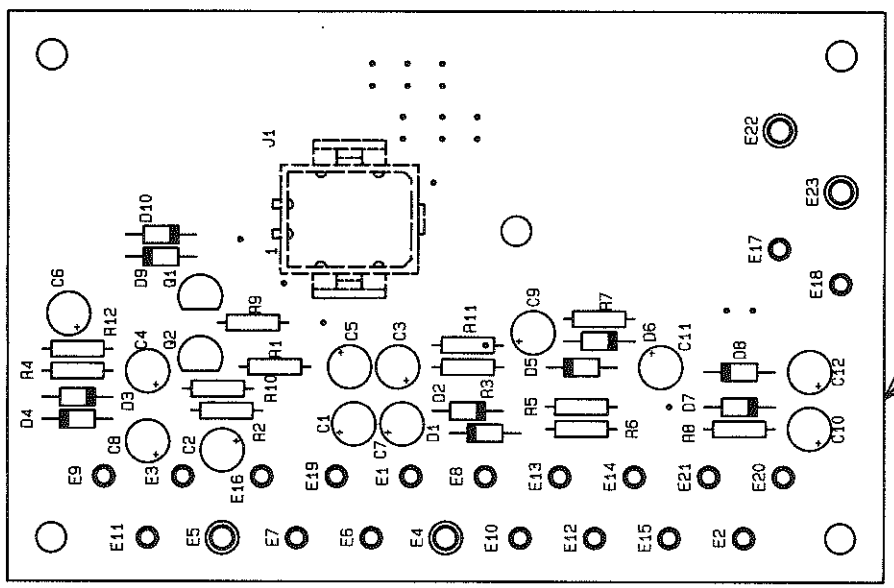
TITLE SCHEMATIC
POWER SUPPLY REGULATOR BD.

TYPE	SIZE	DWG. NO.	REV
S	C	911-6030	A

MODEL AT-90 SCALE NONE SHEET 1 OF 1



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TOLERANCE (DECIMAL) U.O.S.
.X ± .030 .XXX ± .005
.XX ± .015 ANGLES ± 1°

DWN. BY AEB 8-17-90
CHKD MH 3-18-91
ME 3/20/91
PROJ. ENGR. 3-18-91
MFG 3/20/91

MATERIAL SEE BOM 911-6030
FINISH SEE DWG RA592-0000
NEXT ASSY.

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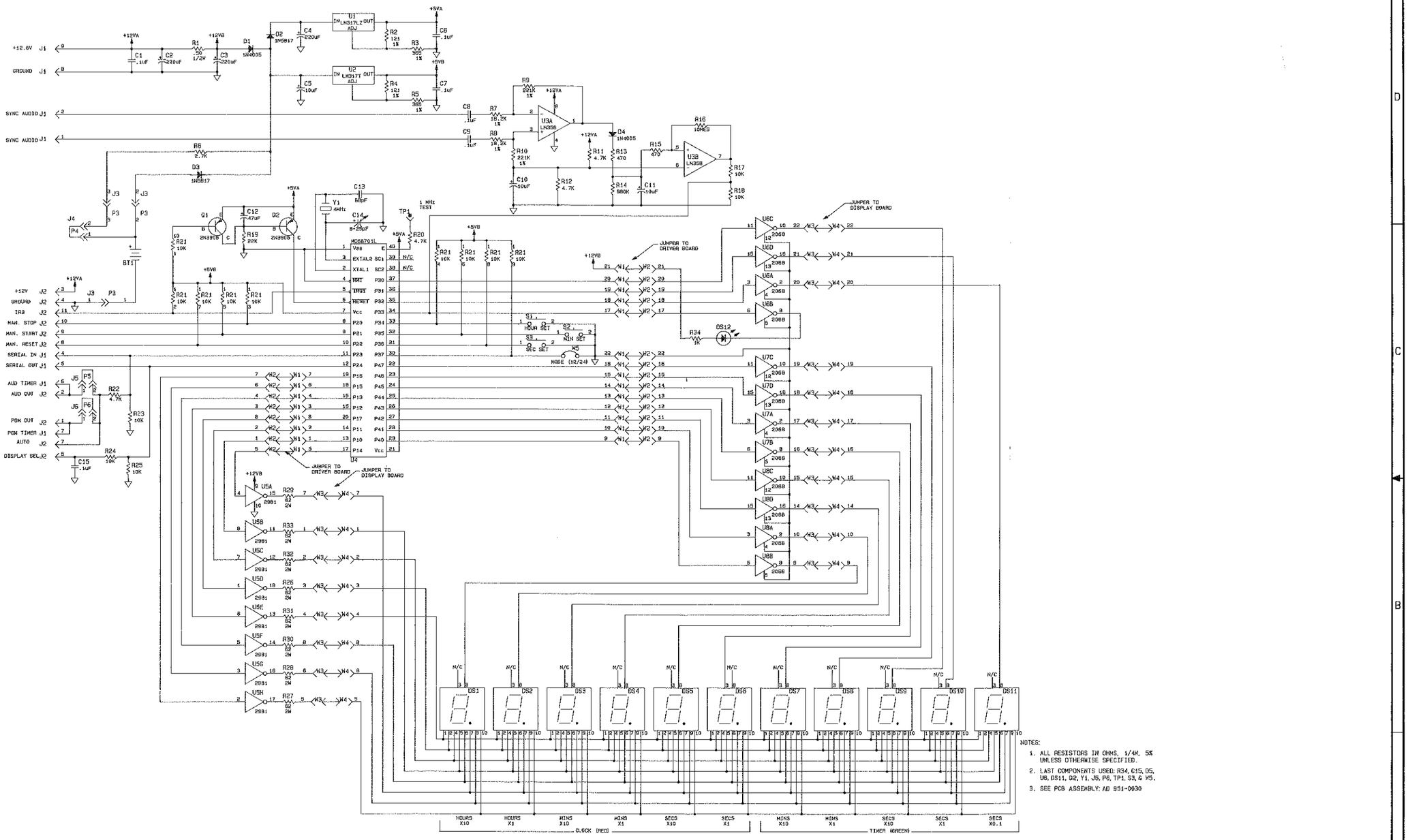
TITLE POWER SUPPLY REGULATOR BD.

TYPE	SIZE	DWG No.	REV
A	B	911-6030	A

MODEL AT-90 SCALE 1.5/1 SHEET 1 OF 1



NOTES:

1. ALL RESISTORS IN OHMS, 1/4W, 5% UNLESS OTHERWISE SPECIFIED.
2. LAST COMPONENTS USED: R34, C15, D5, U8, DS11, D2, Y1, J5, P6, TP1, S3, & W5.
3. SEE PCB ASSEMBLY: AD 951-0030

TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°

DWN. BY JAH 11-2-87
CHKD
ENG
PROJ. ENGR.
MFG.

MATERIAL SEE B/M 951-0030
FINISH
SEE DWG RA932-0000
NEXT ASSY. 901-8012 (12CH) 901-8018 (18CH)

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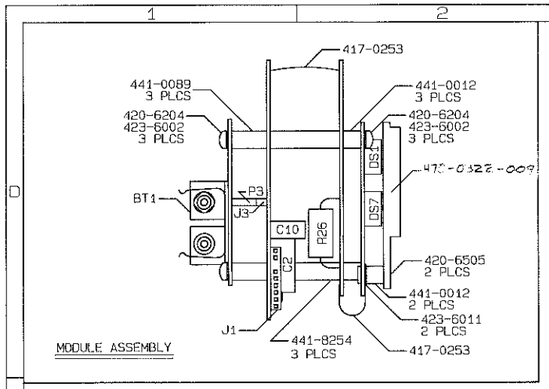
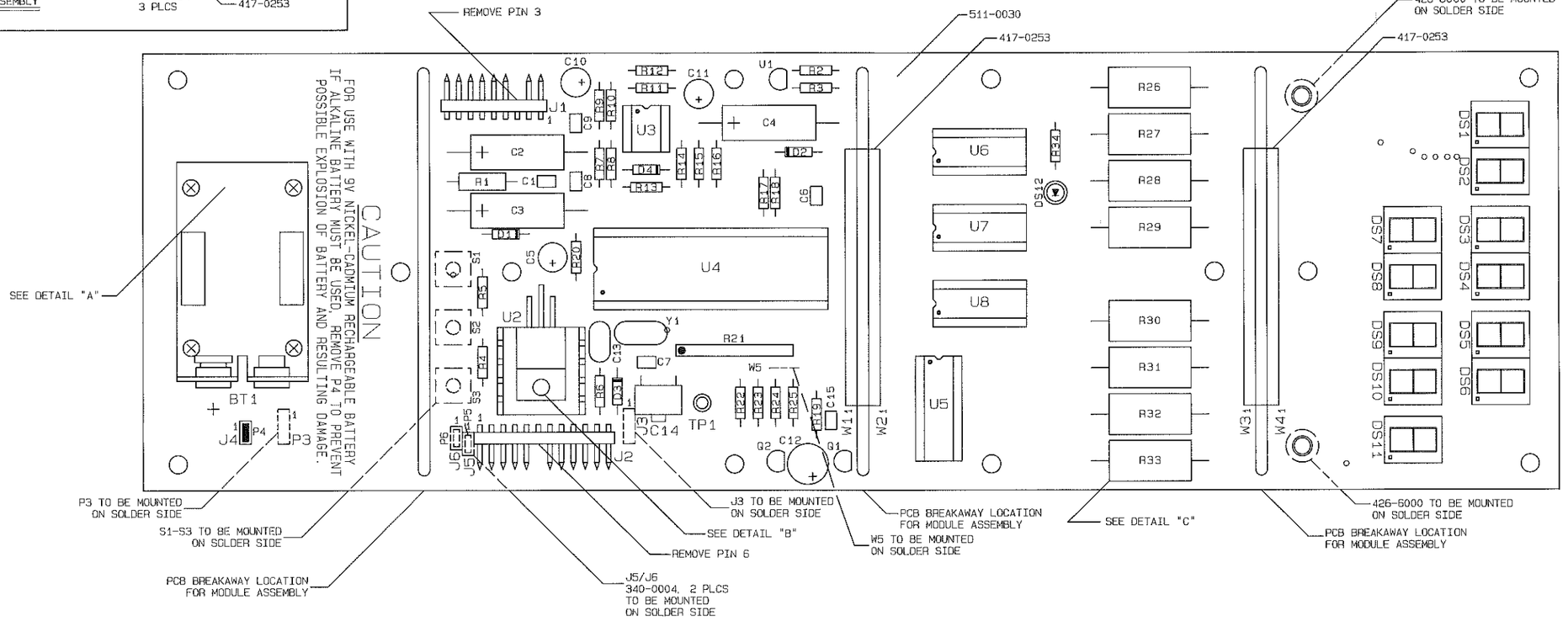
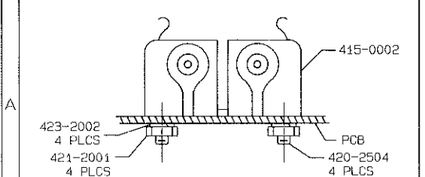
TITLE CLOCK/TIMER MODULE

TYPE S | SIZE D | DWG. NO. 951-0030 | REV A

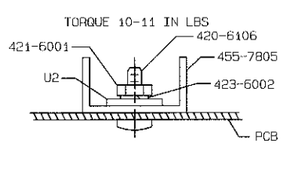
MODEL MT-90 | SCALE NONE | SHEET 1 OF 1



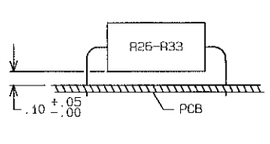




DETAIL "A"



DETAIL "B"



DETAIL "C"

NOTE:
1. SEE SCHEMATIC SD951-0030.

TOLERANCE DECIMAL U.O.S.
.X ± .030 .XXX ± .005
.XX ± .015 ANGLES ± 1°

DWN BY	7-19-88
CHKD	
ME	
PROJ. ENGR.	
MFG.	

MATERIAL: SEE B/M 951-0030
FINISH:
NEXT ASSY:

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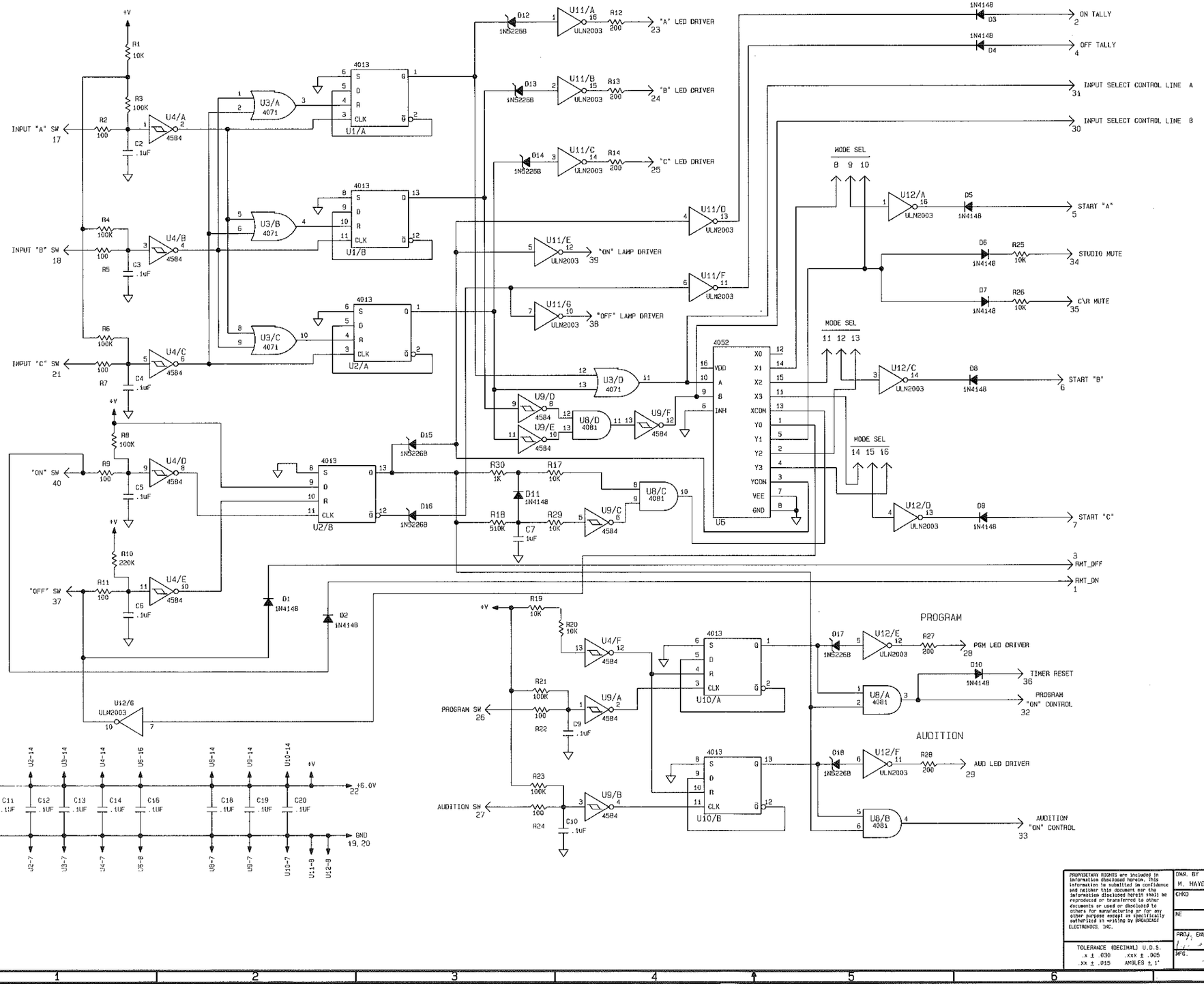
TITLE: ASSEMBLY CLOCK/TIMER MODULE

TYPE	SIZE	DWG.NO.	REV
A	D	951-0030	C

MODEL MT-90 SCALE 2/1 SHEET 1 OF 1



NOTES:
1. ALL RESISTORS IN OHMS; 1/4W, 5% UNLESS OTHERWISE SPECIFIED.
2. LAST COMPONENT USED: C20, D18, R30 & U12.
3. COMPONENTS NOT USED: C1, C2, C3, C17, R15, R16, U5 & U7.
4. SEE ASSEMBLY: 220-0018.

DWN. BY M. HAYDEN	5-14-90
CHKD	
ME	
PROJ. ENGR.	
MFG.	
MATERIAL	
FINISH	SEE DWG #A502-0009
NEXT ASSY.	

TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ±, 1°

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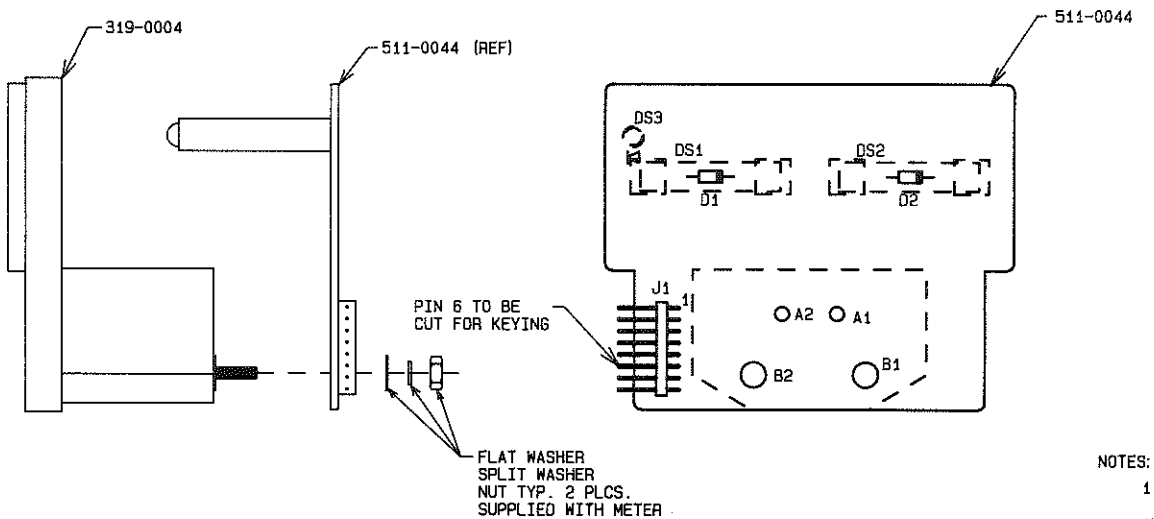
TITLE: SCHEMATIC
CHANNEL CONTROL LOGIC HYBRID

TYPE	SIZE	DWG. NO.	REV
S	D	220-0018	A

MODEL AT-90 SCALE NONE SHEET 1 OF 1



NOTES:

1. DASHED COMPONENTS MOUNTED ON OPPOSITE SIDE SHOWN.
2. SEE SCHEMATIC SB 951-0044.

TOLERANCE (DECIMAL) U.O.S.
.X ± .030 .XXX ± .005
.XX ± .015 ANGLES ± 1°

DWN. BY JAH 11-13-89
CHKD MH 11-14-89
ME
PROJ. ENGR.
MFG.

MATERIAL SEE B/M 951-0044
FINISH
SEE DWG RA592-0000
NEXT ASSY.

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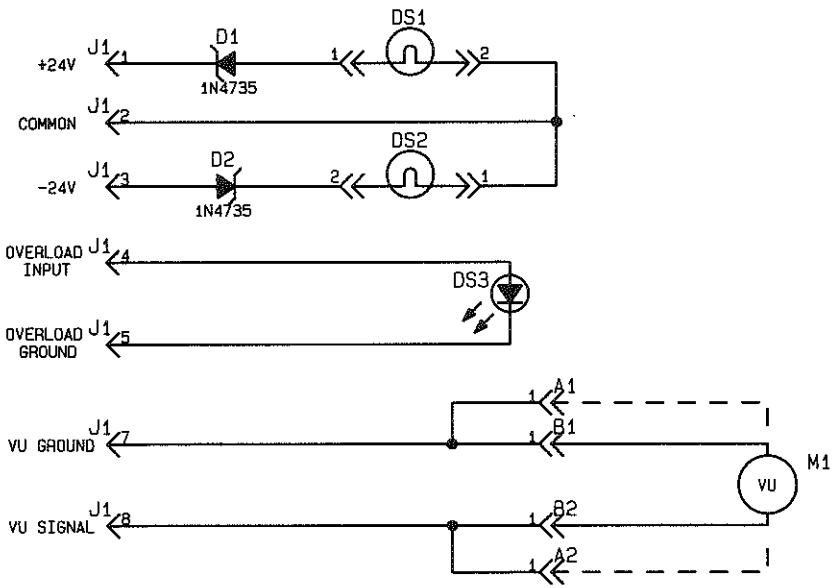
TITLE: VU METER PCB

TYPE	SIZE	DWG.No.	REV
A	B	951-0044	A

MODEL MT-90 SCALE 1=1 SHEET 1 OF 1



TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°

DWN. BY JAH 7-20-89
CHKD MH 11-14-89
ME 11/15/89
PROJ. ENGR. 11-14-89
MFG

MATERIAL SEE B/M 951-0044
FINISH SEE DWG RA592-0000
NEXT ASSY. AB 951-0044

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TITLE VU METER BD

TYPE	SIZE	DWG. NO.	REV
S	B	951-0044	A

MODEL MT-90 SCALE NONE SHEET 1 OF 1

PRODUCT WARRANTY

LIMITED ONE YEAR

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

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

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

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

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

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