INSTRUCTION MANUAL

5400C SERIES AND 5500C SERIES CARTRIDGE MACHINES

January, 1990 IM No. 597-5000-001

BROADCAST ELECTRONICS, INC.

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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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

Replacement and Warranty Parts may be ordered from the address below. Be sure to include equipment model and serial number and part description and part number.

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4100 N. 24th St., P.O. Box 3606
Quincy, Illinois 62305
Tel: (217) 224-9600
Telex: 25-0142
Cable: BROADCAST
Fax: (217) 224-9607

PROPRIETARY NOTICE

MODIFICATIONS

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

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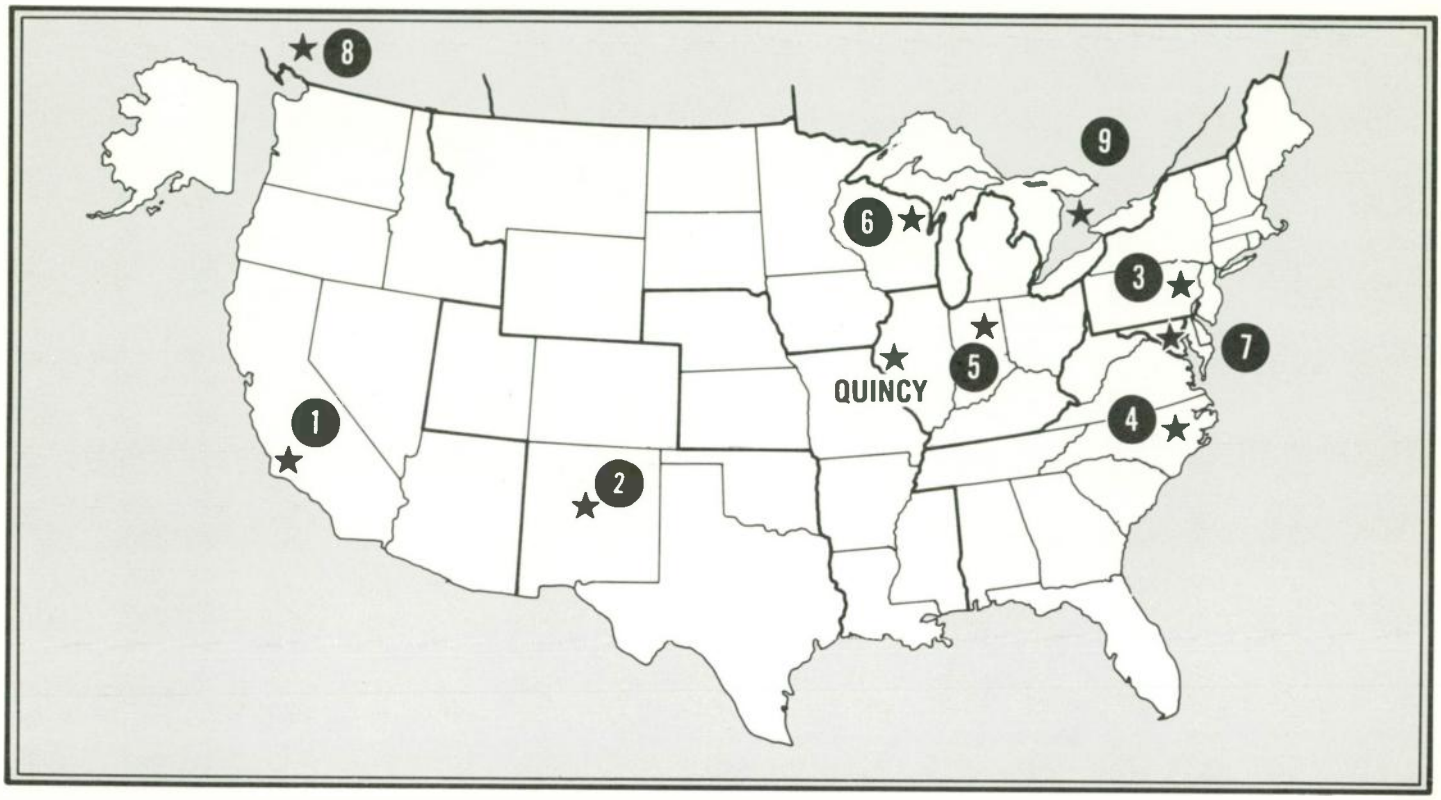
- **Equipped to serve you with Broadcast Electronics parts and repairs—both in and out of warranty**
- **Regional depots reduce parts delivery time and repair turn-around time**



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TECHNICAL MANUAL

BROADCAST ELECTRONICS

5400C SERIES

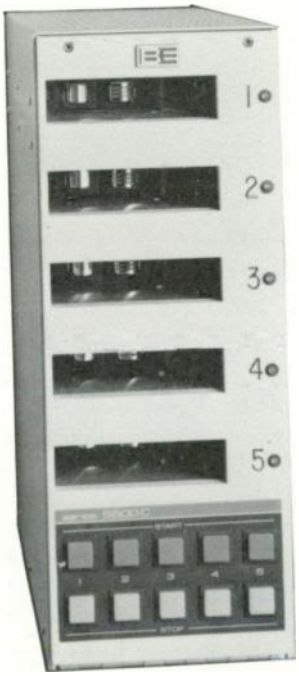
AND

5500C SERIES

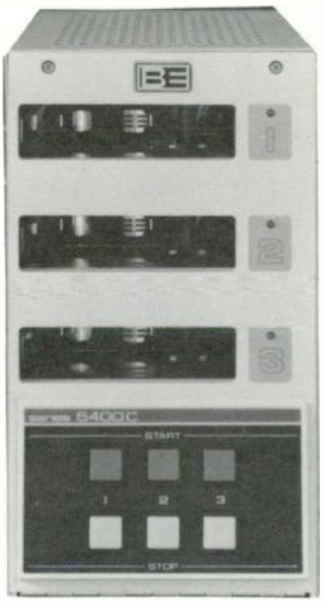
TAPE CARTRIDGE MACHINES

597-5000-001

TECHNICAL MANUAL
BROADCAST ELECTRONICS
5400C SERIES
AND
5500C SERIES
CARTRIDGE MACHINES



5500C



5400C

5500C SERIES CARTRIDGE MACHINE

MODEL	PART NUMBER	DESCRIPTION
5501C	900-5501-001	Five-Deck Monophonic Playback Cartridge Machine Without Secondary and Tertiary Cue Tone Detection Circuitry, NAB A or AA Size Cartridge Operation, 117V ac 60 Hz Power Supply.
5502C	900-5502-011	Five-Deck Monophonic Playback Cartridge Machine With Secondary and Tertiary Cue Tone Detection Circuitry, NAB A or AA Size Cartridge Operation, 117V ac 60 Hz Power Supply.

MODEL	PART NUMBER	DESCRIPTION
5503C	900-5503-001	Five-Deck Stereophonic Playback Cartridge Machine Without Secondary and Tertiary Cue Tone Detection Circuitry, NAB A or AA Size Cartridge Operation, 117V ac 60 Hz Power Supply.
5504C	900-5504-011	Five-Deck Stereophonic Playback Cartridge Machine With Secondary and Tertiary Cue Tone Detection Circuitry, NAB A or AA Size Cartridge Operation, 117V ac 60 Hz Power Supply.

5400C SERIES CARTRIDGE MACHINE

MODEL	PART NUMBER	DESCRIPTION
5401C	900-5401-001	Three-Deck Monophonic Playback Cartridge Machine Without Secondary and Tertiary Cue Tone Detection Circuitry, NAB A or AA Size Cartridge Operation, 117V ac 60 Hz Power Supply.
5402C	900-5402-011	Three-Deck Monophonic Playback Cartridge Machine With Secondary and Tertiary Cue Tone Detection Circuitry, NAB A or AA Size Cartridge Operation, 117V ac 60 Hz Power Supply.
5403C	900-5403-001	Three-Deck Stereophonic Playback Cartridge Machine Without Secondary and Tertiary Cue Tone Detection Circuitry, NAB A or AA Size Cartridge Operation, 117V ac 60 Hz Power Supply.
5404C	900-5404-011	Three-Deck Stereophonic Playback Cartridge Machine With Secondary and Tertiary Cue Tone Detection Circuitry, NAB A or AA Size Cartridge Operation, 117V ac 60 Hz Power Supply.

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

LIST OF TABLES

SECTION I

GENERAL INFORMATION

1

1-1. INTRODUCTION.

1-2. Information presented by this section provides a general description of the Broadcast Electronics 5400C/5500C series cartridge machines and lists equipment specifications.

1-3. EQUIPMENT DESCRIPTION.

1-4. MODEL IDENTIFICATION.

1-5. 5400C SERIES CARTRIDGE MACHINES. The Broadcast Electronics 5400C series cartridge machines are professional three-deck playback units designed for continuous operation. The 5400C series includes monophonic and stereophonic models equipped with or without secondary and tertiary cue tone detection circuitry. The units accept NAB A or AA size tape cartridges. Each deck provides complete playback capabilities. A wide range of assemblies and accessories provide the flexibility required for any type of installation.

1-6. 5500C SERIES CARTRIDGE MACHINES. The Broadcast Electronics 5500C series cartridge machines are professional five-deck playback units designed for continuous operation. The 5500C series includes monophonic and stereophonic models equipped with or without secondary and tertiary cue tone detection circuitry. The units accept NAB A or AA size tape cartridges. Each deck provides complete playback capabilities. A wide range of assemblies and accessories provide the flexibility required for any type of installation.

1-7. ELECTRICAL DESCRIPTION.

1-8. Each cartridge deck of a 5400C or 5500C series cartridge machine is mechanically and electrically independent. Each deck is equipped with modular plug-in amplifier and control circuit boards. A motherboard provides the required interconnections between circuit boards and cartridge decks. A chassis mounted power supply circuit board contains a rectifier and regulator circuit which generates the required dc operating voltages.

1-9. Each control circuit board is equipped with NAB primary (1 kHz) cue tone detection circuitry. The control circuit board also houses secondary (150 Hz) and tertiary (8 kHz) cue tone detection circuitry which is available on specified 5400C and 5500C models. Each amplifier circuit board is designed to accommodate a wide dynamic range without introducing signal distortion. The audio output circuit is transformer balanced with a 600 impedance for interfacing with external audio equipment.

1-10. MECHANICAL DESCRIPTION.

1-11. The 5400C/5500C series cartridge machines contain a rigid aluminum mainframe and bulkhead to provide stable and accurate deck alignment. The front-panel is hinged to allow easy access to the cartridge decks and other internal components. Cartridge decks 1 and 2 on 5400C models and decks 1 through 4 on 5500C models are plug-in modules designed for ease of maintenance. The bottom deck in each model is rigidly attached to the mainframe and bulkhead to support and stabilize the motor assembly.

1-12. Each precision-milled cartridge deck features a cartridge guidance system, an air-damped solenoid, and the Broadcast Electronics PHASE LOK V head assembly. The cartridge guidance system is designed with spring-loaded components to channel a cartridge into the proper play position. An air-damped solenoid provides a rapid response to start commands. The PHASE LOK V head assembly provides the tape heads with a secure and stable environment. The head assembly is designed to permit independent adjustment of the head height/zenith and head azimuth.

1-13. The 5400C/5500C series cartridge machine tape transport mechanism features a direct-drive hysteresis-synchronous motor for precise tape movement. The motor is mounted below the bottom deck with the capstan shaft extending vertically upward through slots in the cartridge decks. The top of the capstan shaft is mechanically supported by a milled aluminum bracket to assure consistent mechanical alignment for direct-drive operation.

1-14. OPTIONS AND ACCESSORIES.

1-15. Refer to Table 1-1 for options and accessories available for 5400C/5500C series cartridge machines.

TABLE 1-1. 5400C/5500C SERIES CARTRIDGE MACHINE OPTIONS AND ACCESSORIES
(Sheet 1 of 4)

OPTIONS AND ACCESSORIES	PART NUMBER
RECORD UNITS	
MODEL 5409 MONOPHONIC RECORDER FOR 5400C/5500C SERIES CARTRIDGE MACHINES. Description: The 5409 recorder operates in conjunction with the cartridge machine bottom deck to provide full record capabilities.	900-5409

TABLE 1-1. 5400C/5500C SERIES CARTRIDGE MACHINE OPTIONS AND ACCESSORIES
(Sheet 2 of 4)

OPTIONS AND ACCESSORIES	PART NUMBER
MODEL 5410 STEREOPHONIC RECORDER FOR 5400C/5500C SERIES CARTRIDGE MACHINES. Description: The 5410 recorder operates in conjunction with the cartridge machine bottom deck to provide full re-record capabilities.	900-5410
AUDIO SWITCHERS	
MODEL SW5F SWITCHER FOR 5500C SERIES CARTRIDGE MACHINES. Description: The SW5F switcher provides a single audio output from five-deck cartridge machines. Up to three switchers may be connected in parallel to provide a single output from three cartridge machines.	904-5001
MODEL SW5E SWITCHER FOR 5400C SERIES CARTRIDGE MACHINES. Description: The SW5E switcher provides a single audio output from three-deck cartridge machines. Up to three switchers may be connected in parallel to provide a single output from three cartridge machines.	904-5000
REMOTE CONTROL UNITS	
MODEL RC3000 REMOTE CONTROL UNIT FOR 5500C SERIES CARTRIDGE MACHINES. Description: The RC3000 remote control unit provides remote mode functions and indications for 5500C series cartridge machines.	906-3016
MODEL RC5300 REMOTE CONTROL UNIT FOR 5400C SERIES CARTRIDGE MACHINES. Description: The RC5300 remote control unit provides remote mode functions and indications for 5400C series cartridge machines.	927-0047

TABLE 1-1. 5400C/5500C SERIES CARTRIDGE MACHINE OPTIONS AND ACCESSORIES
(Sheet 3 of 4)

OPTIONS AND ACCESSORIES	PART NUMBER
MODEL RC5300 REMOTE CONTROL UNIT FOR 5400C SERIES CARTRIDGE MACHINES WITH RECORD UNIT. Description: The RC5300 remote control unit equipped with circuitry to provide remote mode functions and indications for 5400C series cartridge machines with record unit.	927-0048
SPLICE-TRAK 90 Description: The ST-90 provides high speed tape splice detection and tape erasing for A or AA size cartridges.	900-9120-000
TELEPHONE ANSWERING EQUIPMENT	
MODEL PC-1 TELEPHONE INTERFACE. Description: The PC-1 telephone interface provides cartridge machine/telephone network communication. The unit answers incoming telephone calls and enables a cartridge machine for the purpose of transmitting a prerecorded message.	900-0010
RACK MOUNTING ACCESSORIES	
RACK FRAME FOR ONE TO THREE 5500C SERIES CARTRIDGE MACHINES.	906-5506
RACK FRAME FOR ONE TO THREE 5400C SERIES CARTRIDGE MACHINES.	900-5406
1/3 RACK FILLER-PANEL FOR 5500C SERIES CARTRIDGE MACHINES.	906-5507
1/3 RACK FILLER-PANEL FOR 5400C SERIES CARTRIDGE MACHINES.	900-5408
10 UNIT CARTRIDGE RACK ASSEMBLY FOR 5400C SERIES CARTRIDGE MACHINE RACK.	900-5407
4 UNIT CARTRIDGE RACK ASSEMBLY FOR 5400C SERIES CARTRIDGE MACHINE RACK.	900-5405

TABLE 1-1. 5400C/5500C SERIES CARTRIDGE MACHINE OPTIONS AND ACCESSORIES
(Sheet 4 of 4)

OPTIONS AND ACCESSORIES	PART NUMBER
SPARE PARTS KITS	
RECOMMENDED SPARE PARTS KIT FOR THE 5000C SERIES CARTRIDGE MACHINES. Includes selected semi-conductors, switches, relays, fuses, and indicators.	970-0093
TEST EQUIPMENT	
EXTENDER CIRCUIT BOARD FOR 5500C or 5400C SERIES CARTRIDGE MACHINES.	919-5000
TAPE HEAD AND TAPE GUIDE ALIGNMENT GAUGE KIT.	970-0102
MOTOR ALIGNMENT GAUGE KIT.	970-0104
CARTRIDGE MACHINE TEST TAPES:	
Monophonic Reproduce Alignment Tape	800-1005-001
Stereophonic Reproduce Alignment Tape	800-1005
Tape Alignment Cut-Away Test Cartridge	710-0132
Cue Tone Calibration Cartridge	800-1095

1-16. EQUIPMENT SPECIFICATIONS.

1-17. Refer to Table 1-2 for the electrical, mechanical, physical, and environmental specifications of the Broadcast Electronics 5400C/5500C series cartridge machines.

TABLE 1-2. 5400C/5500C SERIES CARTRIDGE MACHINE SPECIFICATIONS
(Sheet 1 of 3)

PARAMETER	SPECIFICATION
ELECTRICAL	
MOTOR	Hysteresis-Synchronous.
TAPE SPEED	7.5 Inches/Second.
WOW AND FLUTTER, PLAYBACK OR RECORD	
5500C	0.18% Maximum DIN. Referenced at 7.5 Inches/Second.
5400C	0.15% Maximum DIN. Referenced at 7.5 Inches/Second.
AUDIO OUTPUT IMPEDANCE	600 Ohm, Balanced, Transformer Coupled.
AUDIO OUTPUT LEVEL	-20 dBm to +10 dBm. Continuously variable. +17 dBm Limit Level.
AUDIO INPUT IMPEDANCE (See Note 3)	50 k Ohms, Bridged, Balanced, Transformer Coupled.
DISTORTION, PLAYBACK OR RECORD	2.0% or Less. Reference: 1 kHz at 250 nWb/m.
NOISE (See Note 1) Hum and Noise	
Monophonic	-58 dB. Reference: 1 kHz at 250 nWb/m.
Stereophonic	-56 dB. Reference: 1 kHz at 250 nWb/m.
Squelch Noise	-70 dB or Greater. Reference: 1 kHz at 250 nWb/m.
CROSSTALK	-50 dB or Greater, Program Channel-to-Program Channel or Program Channel-to-Cue Channel at 1 kHz.

TABLE 1-2. 5400C/5500C SERIES CARTRIDGE MACHINE SPECIFICATIONS
(Sheet 2 of 3)

PARAMETER	SPECIFICATION
FREQUENCY RESPONSE (See Note 1)	±2 dB, 40 Hz to 16 kHz.
EQUALIZATION	
Standard	1975 NAB.
Optional	I.E.C., CCIR, NAB 1964.
POWER REQUIREMENTS	
Standard	105V ac to 125V ac, 60 Hz.
Optional	210V ac to 240V ac, 50 Hz.
CUE TONES	
Standard	1 kHz (Primary).
Optional	150 Hz (Secondary), 8 kHz (Tertiary).
MECHANICAL	
NUMBER OF CARTRIDGE DECKS	
5500C	Five.
5400C	Three.
CARTRIDGE DECK SIZE	NAB A or AA Size Cartridges.
TRANSPORT TYPE	Direct Drive Capstan.
PHYSICAL	
WEIGHT (Packed)	
5500C	52 Pounds (23.6 kg).
5400C	42 Pounds (19 kg).

TABLE 1-2. 5400C/5500C SERIES CARTRIDGE MACHINE SPECIFICATIONS
(Sheet 3 of 3)

PARAMETER	SPECIFICATION
DIMENSIONS (See Note 2)	
5500C	
Height	14.75 Inches (37.5 cm).
Width	5.75 Inches (14.6 cm).
Depth	17 Inches (43.2 cm).
5400C	
Height	10.625 Inches (27 cm).
Width	5.75 Inches (14.6 cm).
Depth	17 Inches (43.2 cm).
MOUNTING	
Standard	Desk-Top.
Optional	Rack Mount. 19 Inch (48.3 cm) EIA Rack. Three Units per Rack.
ENVIRONMENTAL	
AMBIENT OPERATING TEMPERATURE	32°F to 122°F (Ø°C to 50°C).
HUMIDITY	95% Maximum. Non-Condensing.

NOTES:

1. Specification Measured Using 1975 NAB Standard Equalization.
2. Add 3 Inches to Depth of Cartridge Machine for Rear-Panel Connectors.
3. With 5409/5410 Record Unit.

SECTION II
INSTALLATION

2-1. INTRODUCTION.

2-2. This section contains the information required for the installation of the Broadcast Electronics 5400C/5500C series cartridge machines.

2-3. UNPACKING.

2-4. The equipment becomes the property of the customer when the equipment is delivered to the carrier. Carefully unpack the cartridge machine. 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 lists. 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. PLACEMENT.

2-8. The standard 5400C/5500C series cartridge machines are designed for desk-top placement. Units designed for rack mounting are available by optional assembly. To provide adequate structural support, it is recommended the rack mounted unit be installed in a 5400C or 5500C rack shelf (refer to drawing 597-5000-103 in SECTION VII, DRAWINGS). Observe the following requirements and place the unit in any convenient location.

A. Place the cartridge machine within reach of signal and power cables.

B. Do not place the cartridge machine near heat generating equipment.

C. To minimize noise, do not place the cartridge machine near equipment generating excessive 50 Hz or 60 Hz radiation.

D. For rack mounted cartridge machines, allow one inch of rack space above and below the unit for heat dissipation.

WARNING ENSURE ALL CARTRIDGE MACHINE PRIMARY POWER IS DISCONNECTED BEFORE PROCEEDING.

2-9. INTERFACING.

2-10. The 5400C/5500C series cartridge machines are designed with one rear-panel 25-pin output/remote connector for each cartridge deck. Each connector is designed to interface a corresponding cartridge deck audio and remote signals to external equipment. The following list presents the cartridge machine output/remote connector reference designators with the corresponding cartridge decks.

OUTPUT/REMOTE CONNECTOR REFERENCE DESIGNATOR	CORRESPONDING CARTRIDGE DECK
5400C	
J101	Deck 1
J201	Deck 2
J301	Deck 3
5500C	
J101	Deck 1
J201	Deck 2
J301	Deck 3
J401	Deck 4
J501	Deck 5

2-11. An output/remote mating connector for each deck is supplied with the unit (located in the accessory parts kit). Figure 2-1 illustrates the output/remote connector pin designations. Refer to Figure 2-1 as required for the following wiring procedures.

2-12. AUDIO OUTPUT CONNECTIONS. Each cartridge deck audio output is transformer balanced with a 600 Ohm impedance. Construct audio output cabling for each deck using the output/remote mating connectors and 2-conductor shielded audio cable. Attach the conductors to the left channel output, right channel output, and cue channel output terminals.

2-13. REMOTE CONTROL AND INDICATION CONNECTIONS. Each cartridge deck is equipped with remote control, remote indication, and remote deck-status circuitry. For remote control operation, attach conductors from the remote start and remote stop terminals to ground through normally-open momentary-contact switches. For remote indications, attach conductors from the remote start indicator and remote stop indicator terminals to 28V dc through indicator lamps. For remote deck-status signals, attach conductors from the start verify and stop verify terminals to external equipment as required.

2-14. SECONDARY AND TERTIARY CUE TONE DETECTION CIRCUITRY. Each deck may be equipped with secondary and tertiary cue tone detection circuitry. The circuitry is designed to control the operation of the secondary and tertiary cue tone relays. Attach conductors from the QI (secondary cue tone) and QII (tertiary cue tone) terminals to external equipment as required.

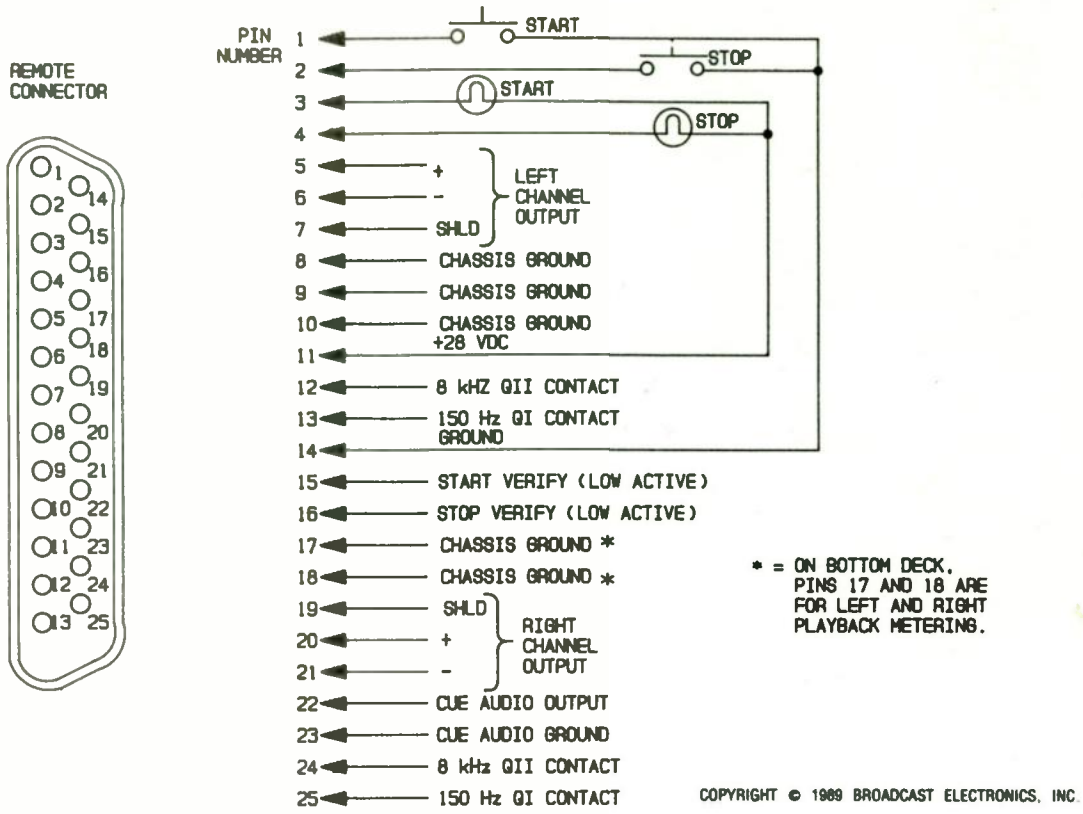


FIGURE 2-1. REMOTE CONNECTOR WIRING DIAGRAM

2

2-15. CIRCUIT BOARD PROGRAMMING.

2-16. The 5500C/5400C cartridge machines are equipped with programmable circuitry which determine two operating characteristics of the unit. Refer to the following text and perform the circuit board programming as required for the desired operating parameter.

2-17. START LOCK-OUT OPERATION. A start lock-out circuit is provided to prevent duplicate on-air cartridge play. Start lock-out is initiated when cartridge play operation is terminated by a primary (1 kHz) stop tone. If start lock-out operation is desired, refer to Figure 2-2 and program the control circuit board as required. Start lock-out conditions are indicated to the operator by a stop indicator flasher circuit.

2-18. STOP INDICATOR FLASHER OPERATION. A circuit is provided to generate stop indicator flashing to indicate the termination of cartridge play operation by a primary (1 kHz) stop tone. If stop indicator flashing operation is desired, refer to Figure 2-2 and program the control circuit board as required.

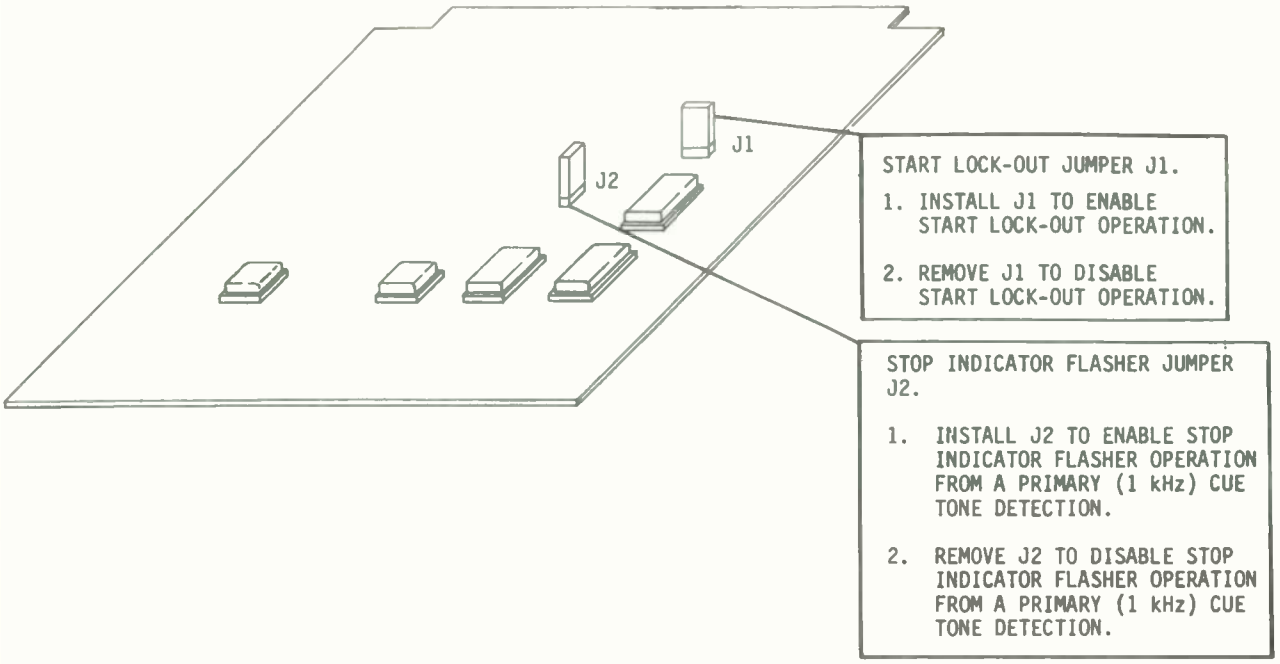


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FIGURE 2-2. CONTROL CIRCUIT BOARD JUMPER PROGRAMMING

2-19. START SEQUENCING.

2-20. If the cartridge machine is equipped with secondary and tertiary cue tone detection circuitry, the detection circuitry may be used to sequentially start the cartridge decks if required. The following text presents wiring procedures for typical 5400C and 5500C cartridge machine start sequences. However, the start sequences may be modified to achieve any start sequence requirement.

2-21. 5400C CARTRIDGE MACHINE START SEQUENCING. The following procedure will produce a start sequence which performs as follows:

A. Deck 1 will start deck 2.
B. Deck 2 will start deck 3.
C. Deck 3 will start deck 1.

2-22. Procedure. Refer to Figure 2-3 and perform the following procedure to generate the preceding start sequence.

A. Connect a jumper from pin 10 to pin 25 on connector J101.
B. Connect a jumper from J101 pin 13 to J201 pin 1.
C. Connect a jumper from pin 10 to pin 25 on connector J201.
D. Connect a jumper from J201 pin 13 to J301 pin 1.
E. Connect a jumper from pin 10 to pin 25 on connector J301.
F. Connect a jumper from J301 pin 13 to J101 pin 1.

2-23. 5500C CARTRIDGE MACHINE START SEQUENCING. The following procedure will produce a start sequence which performs as follows:

A. Deck 1 will start deck 2.
B. Deck 2 will start deck 3.
C. Deck 3 will start deck 4.
D. Deck 4 will start deck 5.
E. Deck 5 will start deck 1.

2-24. Procedure. Refer to Figure 2-3 and perform the following procedure to generate the preceding start sequence.

A. Connect a jumper from pin 10 to pin 25 on connector J101.
B. Connect a jumper from J101 pin 13 to J201 pin 1.
C. Connect a jumper from pin 10 to pin 25 on connector J201.
D. Connect a jumper from J201 pin 13 to J301 pin 1.
E. Connect a jumper from pin 10 to pin 25 on connector J301.
F. Connect a jumper from J301 pin 13 to J401 pin 1.
G. Connect a jumper from pin 10 to pin 25 on connector J401.
H. Connect a jumper from J401 pin 13 to J501 pin 1.
I. Connect a jumper from pin 10 to pin 25 on connector J501.
J. Connect a jumper from J501 pin 13 to J101 pin 1.

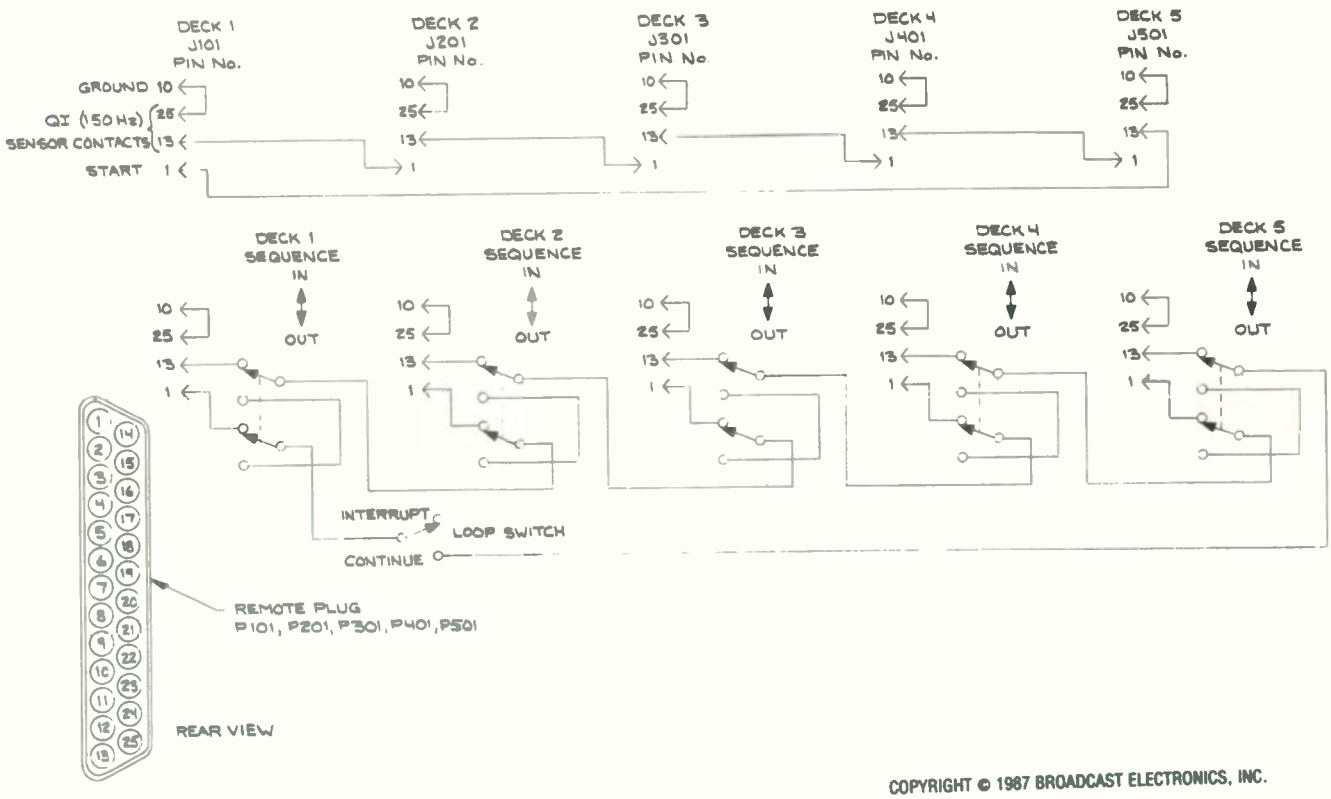

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FIGURE 2-3. 5400C/5500C CARTRIDGE MACHINE START SEQUENCING

2-25. GROUND CONNECTION.

2-26. The most important consideration in assuring low noise performance from the cartridge machine is the grounding and shielding of the various audio interconnections. First, connect the cartridge machine rear-panel GND terminal to a central earth ground using a braided or solid copper conductor. Second, the shields from audio conductors must be grounded to avoid ground loops (inadvertent signal paths through shields and ground connections). Generally, the shields are grounded at the cartridge machine. However, the shields may require grounding at the subsequent device in the audio chain or at a point between the subsequent audio device and cartridge machine. 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.

2-27. AC POWER CONNECTION.

WARNING ENSURE ALL PRIMARY POWER IS DISCONNECTED BEFORE PROCEEDING.

2-28. The 5400C/5500C series cartridge machines are programmed for the proper power supply voltage when shipped from the factory. The operating voltage requirement for the unit is indicated on the cartridge machine identification plate which is located on the cartridge machine rear-panel.

2-29. Remove the fuse from the rear-panel fuse-holder. Ensure the fuse and the spare fuse are slow-blow types rated at 1.5A for 105V to 125V operation or 0.75A for 210V to 240V operation.

2-30. Ensure the rear-panel ON/OFF PWR switch is operated to OFF and connect the cartridge machine line cord to the appropriate power supply.

2-31. ELECTRICAL ADJUSTMENTS.

2-32. AUDIO OUTPUT LEVEL ADJUSTMENT. The cartridge machine audio output level is factory adjusted to Ø dBm. If an alternate output level is required, refer to the ELECTRICAL ADJUSTMENTS procedures in SECTION V, MAINTENANCE and perform the AUDIO OUTPUT LEVEL ADJUSTMENT procedure.

2-33. OPTIONAL EQUIPMENT INSTALLATION.

2-34. GENERAL. The following list presents related publications which provide data required for the installation of options and accessories associated with the 5400C/5500C cartridge machines.

OPTION OR ACCESSORY	PUBLICATION NUMBER
Model 5409 or 5410 Recorder	597-0097-001
Model RC3000 Remote Control Unit	597-0103
Model RC5300 Remote Control Unit	597-5302
Model SW5E/F Audio Switcher	597-5350
Model PC-1 Telephone Interface	597-0047

SECTION III

OPERATION

3-1. INTRODUCTION.

3-2. This section identifies all controls and indicators associated with the 5400C/5500C series cartridge machines and provides standard operating procedures.

3-3. CONTROLS AND INDICATORS.

3-4. Refer to Figure 3-1 for the location of all controls and indicators associated with the 5400C/5500C series cartridge machines. The function of each control or indicator is described by Table 3-1.

TABLE 3-1. 5400C/5500C CARTRIDGE MACHINE CONTROLS AND INDICATORS
(Sheet 1 of 2)

INDEX NO.	NOMENCLATURE	FUNCTION
1	Deck Indicators	Illuminates to indicate the operation of the associated cartridge deck.
2	START Switch/ Indicators	SWITCH: Initiates tape movement of the associated cartridge deck. INDICATOR: A. Illuminates to indicate the operation of the associated cartridge deck. * B. Illuminates brightly to indicate the detection of a secondary (150 Hz) cue tone.
3	STOP Switch/ Indicators	SWITCH: A. Terminates tape movement of the associated cartridge deck. Also, returns the cartridge deck to the ready mode (cartridge inserted into the deck with primary power energized). B. Resets the associated deck start lockout operation. C. Resets the associated deck stop indicator flashing operation.

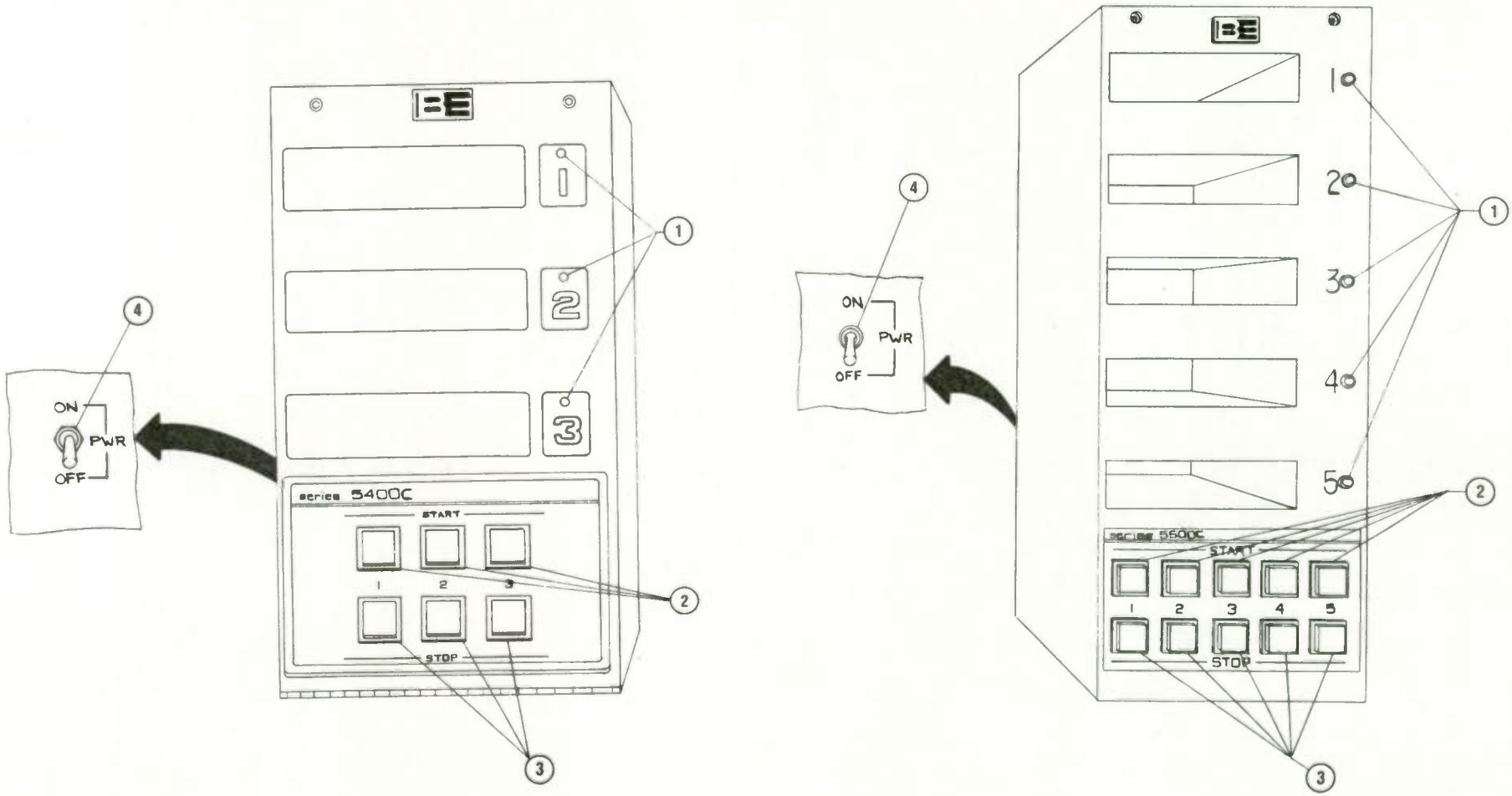

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FIGURE 3-1. 5400C/5500C CARTRIDGE MACHINE CONTROLS AND INDICATORS

TABLE 3-1. 5400C/5500C CARTRIDGE MACHINE CONTROLS AND INDICATORS
(Sheet 2 of 2)

INDEX NO.	NOMENCLATURE	FUNCTION
		INDICATOR: A. Illuminates to indicate the termination of the associated cartridge deck operation. Also, indicates the associated cartridge deck is in the ready mode. B. Flashes to indicate the termination of cartridge play operation by a 1 kHz stop tone if the appropriate circuitry on the control circuit board is enabled. * C. Illuminates during deck operation to indicate the detection of a tertiary (8 kHz) cue tone.
4	ON/OFF PWR Switch	Controls the application of ac power to the cartridge machine (located on the cartridge machine rear-panel).

NOTE:
* If Cartridge Machine is Equipped with Secondary and Tertiary Cue Tone Detection Circuitry.

3-5. OPERATION.

NOTE THE FOLLOWING PROCEDURE ASSUMES THAT THE CARTRIDGE MACHINE IS COMPLETELY INSTALLED AND IS

NOTE FREE OF ANY DISCREPANCIES.

3-6. Operate the ON/OFF PWR switch to ON.

3-7. Insert an NAB A or AA size tape cartridge into the desired deck. The corresponding deck STOP switch/indicator will illuminate.

3-8. Depress the corresponding deck START switch/indicator to begin cartridge play operation. The START switch/indicator and the corresponding deck indicator will illuminate. The deck STOP switch/indicator will extinguish.

3-9. The deck will operate until a primary (1 kHz) stop tone is detected or the deck STOP switch/indicator is depressed. When deck operation is terminated, the START switch/indicator and the deck indicator will extinguish. The deck STOP switch/indicator will illuminate or flash. If the cartridge is removed, the STOP switch/indicator will extinguish.

3-10. If the cartridge machine is equipped with secondary and tertiary cue tone detection circuitry, the cartridge machine will indicate cue tone detection as follows:

A. The deck START switch/indicator will illuminate brightly to indicate the detection of a secondary (150 Hz) cue tone.

B. The deck STOP switch/indicator will illuminate during deck operation to indicate the detection of a tertiary (8 kHz) cue tone.

3-11. STOP INDICATOR FLASHING OPERATION.

3-12. Stop indicator flashing is designed to provide an indication of a special operating condition. If the circuit is enabled, the stop indicator will flash when cartridge play operation is terminated by the detection of a primary (1 kHz) stop tone. To reset the stop indicator flashing, depress the STOP switch/indicator or remove the cartridge.

3-13. START LOCK-OUT OPERATION.

3-14. Start lock-out operation is designed to prevent duplicate on-air cartridge play. If the circuit is enabled, start lock-out operation will be initiated by the detection of a primary (1 kHz) stop tone. Start lock-out conditions are indicated to the operator by stop indicator flashing. To reset start lock-out operation, depress the STOP switch/indicator or remove the cartridge.

SECTION IV

THEORY OF OPERATION

4-1. INTRODUCTION.

4-2. This section presents the theory of operation for the Broadcast Electronics 5400C/5500C series cartridge machines.

4-3. GENERAL DESCRIPTION.

4-4. Figure 4-1 illustrates the overall operation of the 5400C/5500C series cartridge machines. Refer to Figure 4-1 as required for a general description of cartridge machine operation.

4-5. FUNCTIONAL DESCRIPTION.

4-6. TAPE TRANSPORT SYSTEM.

4-7. GENERAL. The 5400C/5500C series cartridge machine tape transport system consists of a hysteresis-synchronous motor and individually controlled cartridge decks. The motor is mounted to the bottom cartridge deck with the capstan shaft extending vertically upward through the decks for direct drive operation. The top of the shaft is supported by an aluminum bearing bracket to assure consistent and stable mechanical alignment. The hysteresis-synchronous motor design provides accurate motor operation for precise tape movement from each deck.

4

4-8. Each cartridge deck is equipped with a cartridge guidance system, an air-damped solenoid, a deck microswitch, and the PHASE LOK V head assembly. The cartridge guidance system consists of several spring-loaded components to channel and lock a cartridge into the proper operating position. The air-damped solenoid provides a rapid response to start commands. A deck microswitch is incorporated into the deck system to provide a ready status for deck circuit operation. The PHASE LOK V head assembly provides the tape heads with a mechanically secure and stable environment. The assembly maintains head alignments for precision audio reproduction.

4-9. OPERATION. When the cartridge machine power switch is operated to on, ac power is applied to the motor assembly to initiate motor operation. When a cartridge is inserted into a deck and the start switch/indicator is depressed, a command pulse from the control circuit board is applied to a deck solenoid driver circuit. The solenoid will energize to raise the pressure roller mechanism and initiate tape movement. The deck will operate until the stop/switch indicator is depressed or a 1 kHz stop tone is detected.

4-10. TAPE HEAD AMPLIFIER CIRCUIT BOARD ASSEMBLY.

4-11. GENERAL. Each deck is equipped with a tape head amplifier circuit board. The tape head amplifier circuit board contains: 1) the program channel audio amplifier and equalization circuitry and 2) the cue channel amplifier and the 1 kHz stop tone detection circuitry. Monophonic tape head amplifier circuit boards contain program left channel and cue channel circuitry. Stereophonic circuit boards contain program left, program right, and cue channel circuitry.

4-12. The tape head amplifier program left and right channels contain identical circuitry, therefore only the left channel will be discussed. Refer to schematic SD910-0092/-001 in SECTION VII, DRAWINGS as required for the following discussion.

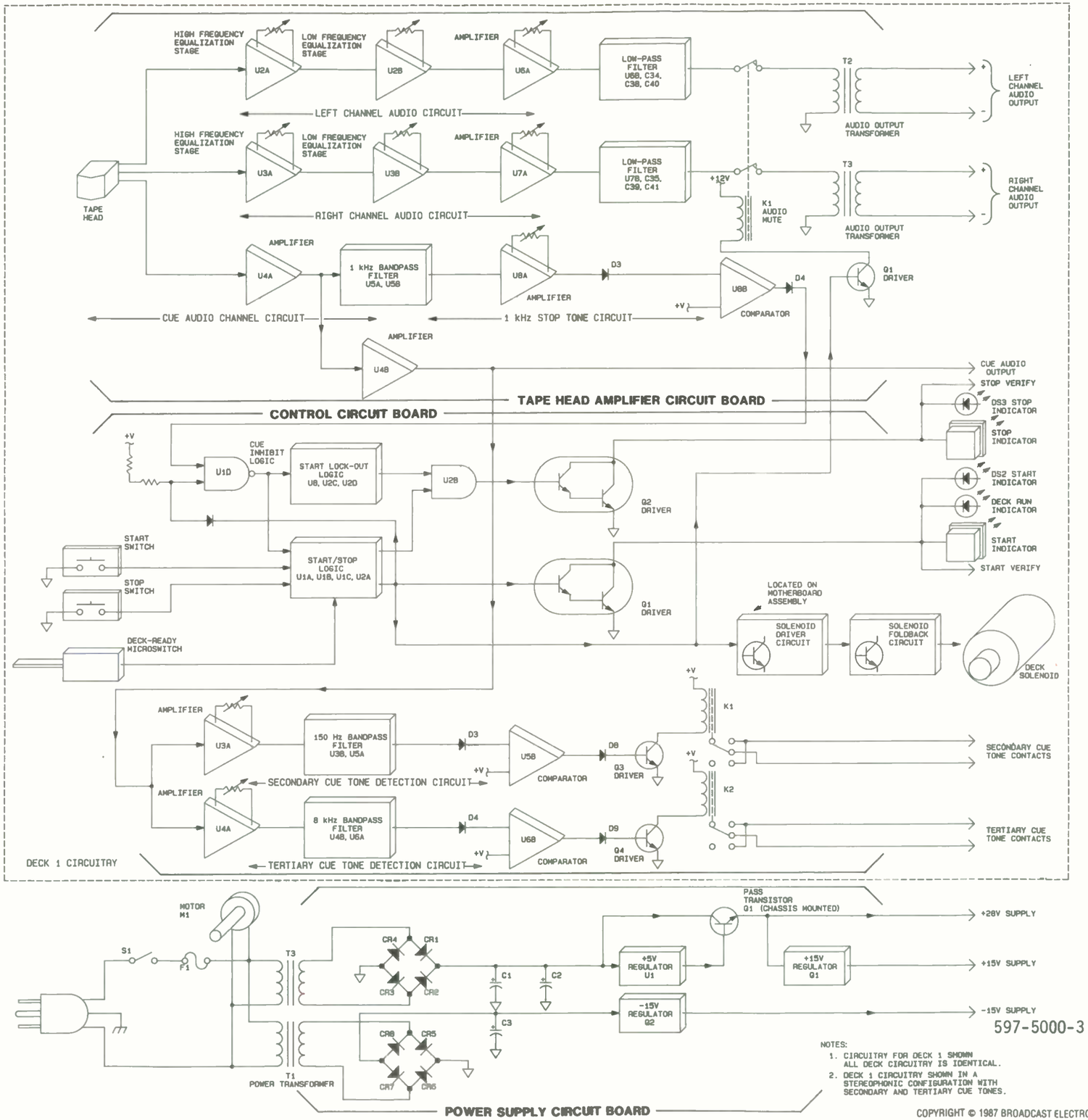
4-13. LEFT CHANNEL AUDIO AMPLIFIER CIRCUIT. Left channel audio from the associated deck tape head is routed to a circuit consisting of inductor L1, capacitor C3, and resistor R3. The circuit provides balanced-to-unbalanced impedance conversion and RFI protection. Audio from the impedance/RFI circuit is applied to high frequency equalization stage U2A. Control of the equalization stage is provided by potentiometer R18.

4-14. The output of the high frequency equalization stage is applied to integrated circuit U2B which is configured as a low frequency equalization stage. Control of the stage is provided by potentiometer R26. The low frequency equalization stage output is applied to a gain stage consisting of amplifier U6A. The gain of U6A is established by output level control R46.

4-15. The output from amplifier stage U6A is applied to operational amplifier U6B and capacitors C40, C38, and C34 which are configured as a third order low-pass filter. The output of the filter is ac coupled through capacitor C45 to the contacts of audio muting relay K1. K1 provides audio muting when deck operation is terminated.

4-16. CUE CHANNEL AMPLIFIER CIRCUIT. Cue channel audio from the associated deck tape head is routed to a circuit consisting of inductor L3, capacitor C7, and resistor R7. The circuit provides balanced-to-unbalanced impedance conversion and RFI protection. Audio from the impedance/RFI circuit is applied to amplifier stage U4A. A gain of approximately 55 dB is established for the stage by feedback resistors R16 and R76. The output from U4A is applied to: 1) a second cue audio amplifier stage and 2) the 1 kHz stop tone detection circuit.

4-17. Operational amplifier U4B is configured as a second cue audio amplifier stage. A gain of approximately 27 dB is established for the amplifier stage by resistors R31 and R24. The output of U4B is routed to the control circuit board assembly for application to the secondary and tertiary cue tone detection circuitry.



NOTES:
1. CIRCUITRY FOR DECK 1 SHOWN ALL DECK CIRCUITRY IS IDENTICAL.
2. DECK 1 CIRCUITRY SHOWN IN A STEREOPHONIC CONFIGURATION WITH SECONDARY AND TERTIARY CUE TONES.

FIGURE 4-1. 5400C/5500C SERIES CARTRIDGE MACHINE BLOCK DIAGRAM

4-18. 1 kHz STOP TONE DETECTION CIRCUIT. Cue audio from amplifier U4A is applied to operational amplifiers U5A and U5B which are configured as a 1 kHz bandpass filter. The output of the filter is routed to amplifier stage U8A. Potentiometer R38 establishes the gain of the amplifier and the resultant sensitivity of the detection circuitry. The output of U8A is half-wave rectified by diode D3 for application to a comparator circuit.

4-19. Operational amplifier U8B is configured as a non-inverting comparator circuit. When the voltage from amplifier U8A increases above the reference level established by resistors R62 and R67, U8B will output a HIGH control pulse for application to the deck control circuitry on the control circuit board assembly.

4-20. AUDIO MUTE CIRCUIT. Transistor Q1, relay K1, and the associated components operate as an audio muting circuit. A +12V dc supply for relay operation is provided by regulator U1. When the deck start switch is depressed, a HIGH is applied through diode D1 to bias transistor Q1 on. Q1 will energize relay K1 which routes audio to the output circuitry. When the deck stop switch or a 1 kHz stop tone is detected, a LOW is applied through D1 to bias Q1 off. Q1 will deenergize relay K1 and mute the output audio.

4-21. CONTROL CIRCUIT BOARD ASSEMBLY.

4-22. GENERAL. Each cartridge deck is equipped with a control circuit board assembly. The control circuit board assembly consists of: 1) the deck control logic circuitry and 2) the optional secondary and tertiary cue tone detection circuitry. Refer to schematic SD910-0108/-0109 in SECTION VII, DRAWINGS as required for the following discussion.

4-23. DECK CONTROL LOGIC CIRCUIT. Commands from the associated deck microswitch and stop/start switch/indicators are routed to the control circuit board to program the deck control logic circuit. The deck control logic consists of: 1) a start/stop flip-flop, 2) a start/stop indicator driver network, and 3) a start lock-out/stop indicator flashing circuit.

4-24. Deck Start Operation. A deck start sequence is initiated when a cartridge is inserted in the deck. The deck microswitch will open to apply a HIGH to NAND gate U1C. The output of U1C will go LOW to configure the control logic for deck start operations. When the start switch/indicator is depressed, a LOW is routed to NAND gates U1A and U1B which are configured as a start/stop flip-flop. The LOW will operate the start/stop flip-flop to the start mode. The flip-flop set output (pin 3) will route a HIGH to: 1) bias transistor Q1 on, 2) enable cue inhibit gate U1D, 3) enable the solenoid driver circuit on the motherboard assembly, and 4) enable the audio mute circuit on the tape head amplifier circuit board assembly. With Q1 biased on, a LOW will be routed to: 1) the start verify control line, 2) illuminate the front-panel start indicator, and 3) illuminate start indicator DS2. The flip-flop reset output (pin 6) will route a LOW to stop driver indicator logic U2B. U2B ANDs the control flip-flop LOW and a HIGH from AND gate U2D to disable the stop indicator driver circuitry.

4-25. Deck Stop Operation, Manual. When the deck stop switch/ indicator is depressed, a LOW is applied to stop gate U2A. U2A will output a LOW to operate the start/stop flip-flop to the stop mode. The flip-flop set output (pin 3) will route a LOW to: 1) bias transistor Q1 off, 2) disable the solenoid driver and muting circuitry, and 3) disable cue inhibit logic U1D. Q1 will output a HIGH to: 1) the start verify line, 2) disable the front-panel start indicator, and 3) extinguish start indicator DS2. The flip-flop reset output (pin 6) will route a HIGH to AND gate U2B. U2B will output a LOW to bias Q2 on. Q2 will output a LOW to: 1) the stop verify control line, 2) illuminate the front-panel stop indicator, and 3) illuminate stop indicator DS3.

4-26. Deck Stop Operation, 1 kHz Cue Tone. When a 1 kHz stop tone is detected, a HIGH is routed to cue inhibit logic U1D. U1D will output a LOW to stop logic U2A and a start lockout circuit. U2A will output a LOW to operate the start/stop flip-flop to the stop mode. The flip-flop will: 1) disable the audio and solenoid driver circuitry, 2) disable the start indicator and verify logic via transistor Q1, and 3) enable the stop indicator and verify logic via transistor Q2.

4-27. Start Lock-Out/Stop Indicator Flashing Circuit. The start lock-out/stop indicator flashing circuit consists of control flip-flop U8A/U8B and logic gates U2C, U2D, U8C, and U8D. The circuit will initiate stop indicator flashing operation and/or start lock-out operation when a 1 kHz stop tone is detected. The circuitry may be disabled via start lock-out jumper J1 and stop indicator flasher jumper J2.

4-28. When a 1 kHz stop tone is detected, cue inhibit gate U1D will output a LOW to NAND gates U8A and U8B which are configured as a flip-flop. The flip-flop set output (pin 3) will route a HIGH to a stop indicator oscillator circuit consisting of NAND gates U8C, U8D, and U2C. The output of the oscillator circuit is routed through jumper J2, AND gate U2D, and AND gate U2B to stop indicator driver Q2. Q2 will route flashing commands to the front-panel stop indicator.

4-29. The flip-flop reset output (pin 4) will route a LOW through start lock-out jumper J1 to NAND gate U1C. U1C will output a HIGH to the start/stop flip-flop to prevent the initiation of a deck start sequence.

4-30. OPTIONAL SECONDARY AND TERTIARY CUE TONE DETECTION CIRCUITS. The following text describes the operation of the optional secondary and tertiary cue tone detection circuitry. The operation of the secondary and tertiary cue tone detection circuits are identical, therefore only the secondary cue tone detection circuit will be discussed.

4-31. Secondary Cue Tone Detection Circuit. Cue audio from the tape head amplifier circuit board is routed to operational amplifier U3A. U3A is configured as an amplifier stage. Potentiometer R9 establishes the gain of the stage and the resultant sensitivity of the detection circuit. The output of U3A is routed to operational amplifiers U3B and U5A which are configured as a 150 Hz bandpass filter. The 150 Hz output of the filter is half-wave rectified by diode D3 for application to a comparator circuit.

4-32. Operational amplifier U5B functions as a non-inverting comparator circuit. When the the voltage from the filter increases above the reference level established by voltage divider R36, R38, and R40, U5B will output a HIGH control signal through diode D8 to driver transistor Q3. The HIGH will bias Q3 on to energize secondary cue tone relay K1.

4-33. MOTHERBOARD ASSEMBLY.

4-34. The 5500C and 5400C motherboard assemblies provide all required cartridge machine internal circuit communication (refer to schematic diagram SD910-0091-001 for 5400C series machines or SD906-5119 for 5500C series machines in SECTION VII, DRAWINGS). The motherboards provide interconnections between the cartridge decks, the deck control and amplifier circuitry, the output circuitry, and the front-panel control circuitry. The motherboard assemblies also house the solenoid driver circuitry.

4-35. Each cartridge deck is equipped with a solenoid driver circuit. The driver circuit consists of a dual transistor network. When a deck start switch/indicator is depressed, a HIGH solenoid enable command from the control circuit board assembly will be applied to the driver network. The HIGH will bias the driver network on to generate a LOW control command for application to the solenoid foldback circuitry.

4-36. SOLENOID FOLDBACK CIRCUIT BOARD ASSEMBLY.

4-37. The solenoid foldback circuit board assembly consists of a transistor driver circuit for each cartridge deck assembly (refer to schematic diagram SC910-0039/-0040 in SECTION VII, DRAWINGS). The driver circuits function to limit the solenoid supply voltage to approximately +12v dc after the completion of a start sequence. Each transistor driver circuit is identical, therefore only the operation of deck 1 will be discussed.

4-38. A +28v dc supply voltage is applied to resistor R1, capacitor C1, and transistor Q1 when the deck is not operational. The supply voltage will bias transistor Q1 on. Q1 will enable darlington driver transistor Q6. With Q6 on, a +28V dc supply is routed to the solenoid for start operations.

4-39. When a deck start sequence is initiated, a LOW start command from the deck 1 solenoid driver circuit on the motherboard assembly will energize the deck 1 solenoid. The LOW is also applied to resistor R1, capacitor C1, and transistor Q1. Capacitor C1 will discharge and bias transistor Q1 off after approximately 150 milliseconds. With Q1 off, transistor Q6 will be disabled. This allows the routing of the +28V dc supply through rear-panel resistor divider R1 to generate a +12V dc solenoid operating supply. The +12V supply is applied to the solenoid for continuous operation.

4-40. FRONT-PANEL CONTROL CIRCUIT BOARD ASSEMBLY.

4-41. The front-panel control circuit board assembly contains the cartridge machine deck stop/start switch/indicators (refer to schematic SC910-0036 for 5500C series machines or SC910-0035 for 5400C series machines in SECTION VII, DRAWINGS). Each deck is equipped with identical switch/indicator circuitry. The stop/start switches provide LOW command outputs when active. The stop/start indicators require LOW control command inputs for illumination.

4-42. FRONT-PANEL RUN INDICATOR CIRCUIT ASSEMBLY.

4-43. Each cartridge deck is designed with an associated front-panel deck run indicator (refer to 5400C/5500C overall schematic diagram in SECTION VII, DRAWINGS). LOW control commands from the deck control circuitry on the control circuit board are applied to illuminate the deck indicator as required.

4-44. OUTPUT TRANSFORMER ASSEMBLY.

4-45. Each cartridge deck is equipped with output transformer(s) which are located on the output transformer assembly (refer to 5400C/5500C overall schematic diagram in SECTION VII, DRAWINGS). Monophonic units are equipped with a single audio output transformer for each cartridge deck. Stereophonic units are equipped with left and right channel audio output transformers for each cartridge deck. The audio transformers provide a balanced 600 Ohm output impedance to interface with external audio equipment.

4-46. POWER SUPPLY CIRCUITRY.

4-47. The 5500C/5400C cartridge machine power supply circuitry consists of: 1) a chassis mounted toroid transformer and pass transistor and 2) a power supply circuit board assembly. The circuit functions to generate a variety of cartridge machine dc operating potentials. Refer to schematic diagram SC906-5116 in SECTION VII, DRAWINGS as required for the following discussion.

4-48. A 28V ac potential from the secondary of power transformer T1 is full-wave rectified by diodes CR1 through CR4 and filtered by capacitors C1 and C2 into a +43V dc supply. The +43V supply is routed to regulator U1 and chassis mounted pass transistor Q1. Transistor Q1 will generate a regulated +28V dc supply for application to: 1) the cartridge deck solenoid circuitry and 2) transistor Q1. Q1 re-regulates the +28 potential into a +15V supply for application to the cartridge machine circuitry. Potentiometer R2 provides adjustment of the +28V dc potential.

4-49. A 22V ac potential from the secondary of power transformer T1 is full-wave rectified by diodes CR5 through CR8 and filtered by capacitors C3 into a -32V dc supply. The supply is regulated into a -15V potential by transistor Q2.

SECTION V

MAINTENANCE

5-1. INTRODUCTION.

5-2. This section provides general maintenance information, mechanical and electrical adjustment procedures, and troubleshooting information for the Broadcast Electronics 5400C/5500C series cartridge machines.

5-3. SAFETY CONSIDERATIONS.

5-4. Low voltages are used throughout 5400C/5500C series cartridge machine circuitry. All high voltages within the cartridge machine chassis have been shielded, therefore do not remove any shields for maintenance procedures. Maintenance with power energized is always considered hazardous and caution should be observed. Good judgement, 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 CARTRIDGE MACHINE PRIMARY POWER BEFORE ATTEMPTING ANY EQUIPMENT MAINTENANCE.

WARNING

5-7. GENERAL.

5-8. Periodically remove abrasions from the cartridge machine chassis with a cloth moistened with a mild household cleaner. Remove dust from the chassis exterior with a brush and vacuum cleaner as required.

5-9. ELECTRICAL.

5-10. The cartridge machine circuitry should be periodically cleaned of accumulated dust using a brush and vacuum cleaner. Check the circuit boards for improperly seated semiconductors and components damaged by overheating.

5-11. MECHANICAL.

WARNING MOST SOLVENTS WHICH REMOVE TAPE RESIDUE ARE VOLATILE AND TOXIC BY NATURE AND MUST BE
WARNING APPLIED IN SMALL AMOUNTS IN A WELL VENTILATED AREA. OBSERVE THE SOLVENT CONTAINER
WARNING SAFETY INFORMATION AND DO NOT USE THE SOLVENT NEAR FLAME, CIGARETTES, AND HOT SOLDERING IRONS.

5-12. Each day clean the heads, pressure roller, tape guides, and capstan shaft with a cleaning solvent to remove accumulated oxide. Recommended cleaning solvents include: 1) Broadcast Electronics head cleaning kit 979-0064 and 2) isopropal alcohol. Approximately once a week, demagnetize the heads and other ferrous components in the tape path. Perform the demagnetizing with an appropriate degausser. Observe the degausser operating instructions to prevent damage to the heads.

5-13. TAPE CARTRIDGES.

5-14. Regularly inspect the tape cartridges for accumulated dust, mechanical defects, and tape wear. Additional tape cartridge maintenance information is presented in SECTION VIII, APPENDIX.

5-15. SECOND LEVEL MAINTENANCE.

5-16. Second level maintenance consists of procedures required to restore a 5400C/5500C series cartridge machine to operation after a fault has occurred. The procedures are divided into mechanical adjustments, electrical adjustments, mechanical components replacement procedures, electrical component replacement procedures, and troubleshooting.

5-17. The 5400C/5500C series cartridge machine maintenance philosophy consists of isolating a problem to a specific assembly with subsequent troubleshooting to isolate defective components. The defective components may be repaired locally or the entire assembly may be returned to Broadcast Electronics, Inc. for repair or replacement.

5-18. MECHANICAL ADJUSTMENTS.

5-19. The following text provides adjustment procedures for mechanical components associated with the 5400C/5500C series cartridge machines. The procedures are presented in the following order.

ADJUSTMENT PROCEDURES

A. Cartridge Deck Access and Removal Procedure.

B. Motor Alignment Procedure.

C. Pressure Roller Indentation Adjustment.

D. Solenoid Response Adjustment.

E. Head Adjustments.

WARNING: DISCONNECT PRIMARY POWER BEFORE SERVICING

5-20. The following test equipment is required for the mechanical adjustment procedures. Refer to the following list as required for each procedure.

TEST EQUIPMENT

A. Calibrated Oscilloscope, 5 MHz Bandwidth, Dual Channel With Lissajous Display of Inputs.

B. Calibrated Low Distortion Audio Generator, 600 Ohm Output, 20 Hz to 20 kHz Audio Range.

C. Tape Head and Tape Guide Alignment Gauge (BE P/N 300-0002).

D. Motor Alignment Gauge (BE P/N 300-0005).

E. Allen Wrenches (supplied with the Cartridge Machine).

F. Tape Alignment Cut-Away Test Cartridge (BE P/N 710-0132).

G. Stereophonic Reproduce Alignment Tape (BE P/N 800-1005). Monophonic Reproduce Alignment Tape (BE P/N 800-1005-001).

H. No. 1 Phillips Screwdriver, 4 Inch (10.2 cm) Blade.

J. Pressure Roller Indentation Gauge (BE P/N 300-0013 supplied with the cartridge machine).

5-21. DECK ACCESS AND REMOVAL PROCEDURE. Various mechanical adjustment procedures require the removal of a cartridge deck. Decks 1 and 2 on 5400C cartridge machines and decks 1 through 4 on 5500C cartridge machines are plug-in modules designed for ease of removal. The bottom decks on 5400C/5500C cartridge machines support the motor assembly and are not designed to be removed for regular maintenance. Access to the bottom deck is obtained by the removal of all the plug-in cartridge decks. The following procedure provides information required to properly remove the cartridge decks.

5

5-22. Procedure. To remove the cartridge decks, refer to Figure 5-1 and perform the procedure as follows:

CAUTION DISCONNECT ALL CARTRIDGE MACHINE POWER BEFORE REMOVING OR REPLACING CARTRIDGE DECKS.

5-23. Disconnect all cartridge machine primary power.

5-24. Remove the two hex-head front-panel retaining screws.

5-25. Pull the hinged front-panel away from the chassis and place the front-panel on a smooth work surface.

WARNING: DISCONNECT PRIMARY POWER BEFORE SERVICING

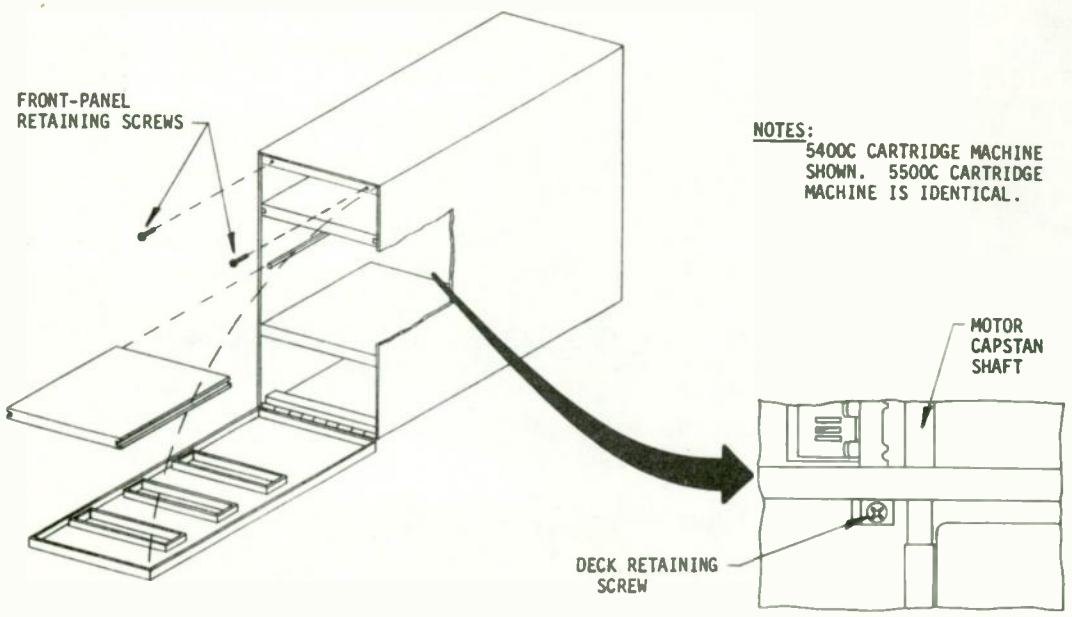


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FIGURE 5-1. DECK ACCESS AND REMOVAL

5-26. Remove the plug-in deck as follows:

A. Loosen the deck retaining screw.

B. Gently pull the cartridge deck out of the chassis.

5-27. To replace a cartridge deck, reverse the preceding procedure. Ensure the deck bulkhead connector is properly inserted into the bulkhead receptacle before securing the deck retaining screw.

5-28. MOTOR ALIGNMENT PROCEDURE. The deck pressure roller operates in conjunction with the motor capstan shaft to provide tape movement. The pressure roller and the motor capstan shaft must be properly aligned to prevent improper tape movement across the heads.

5-29. Procedure. To align the cartridge machine motor and deck solenoids, proceed as follows:

5-30. Disconnect the cartridge machine primary power.

5-31. Access the bottom deck of the cartridge machine by performing the DECK ACCESS AND REMOVAL PROCEDURE described in the preceding text.

5-32. Manually retract the bottom deck solenoid plunger (refer to Figure 5-2) and remove the pressure roller E-ring, pressure roller, and the nylon washers.

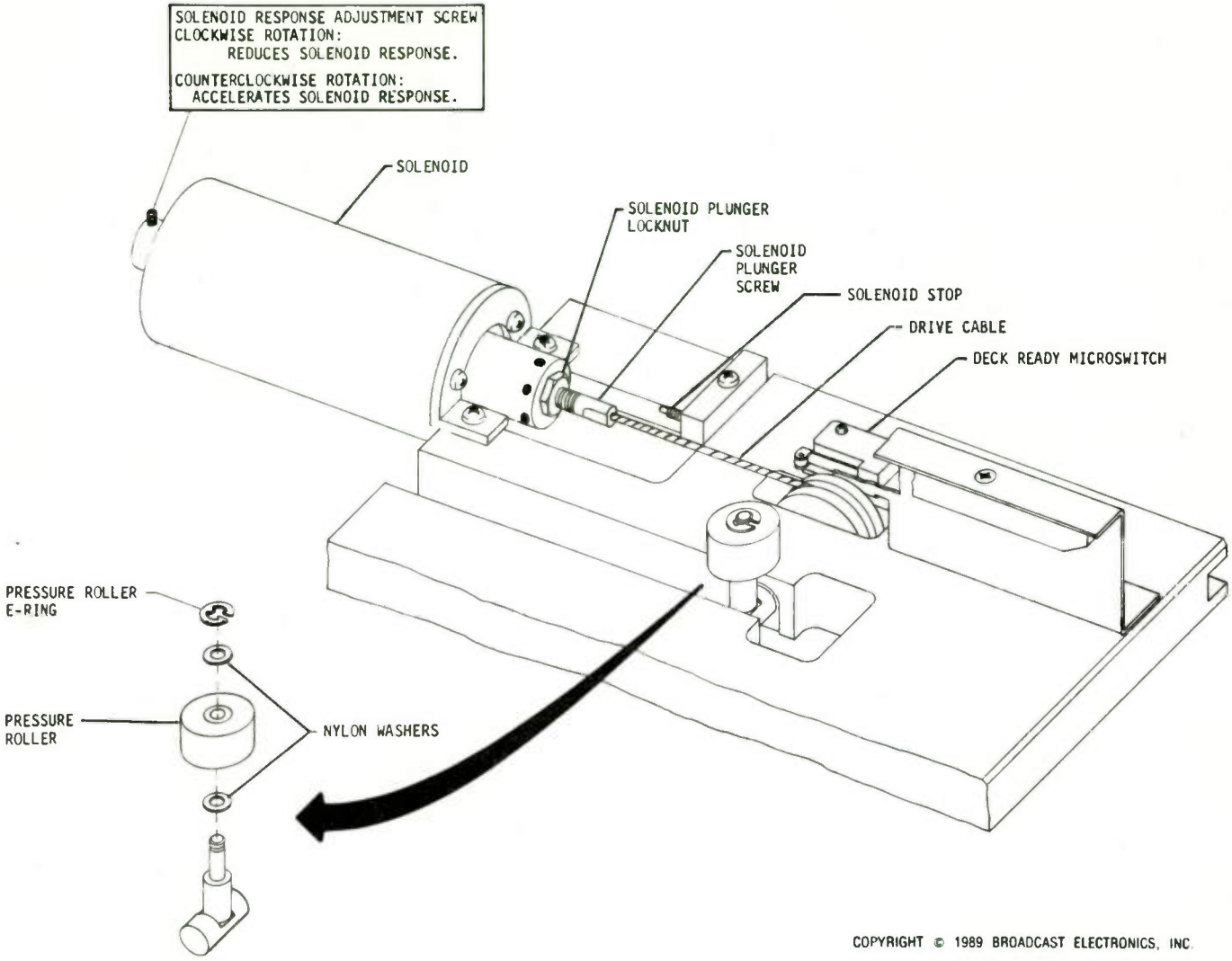


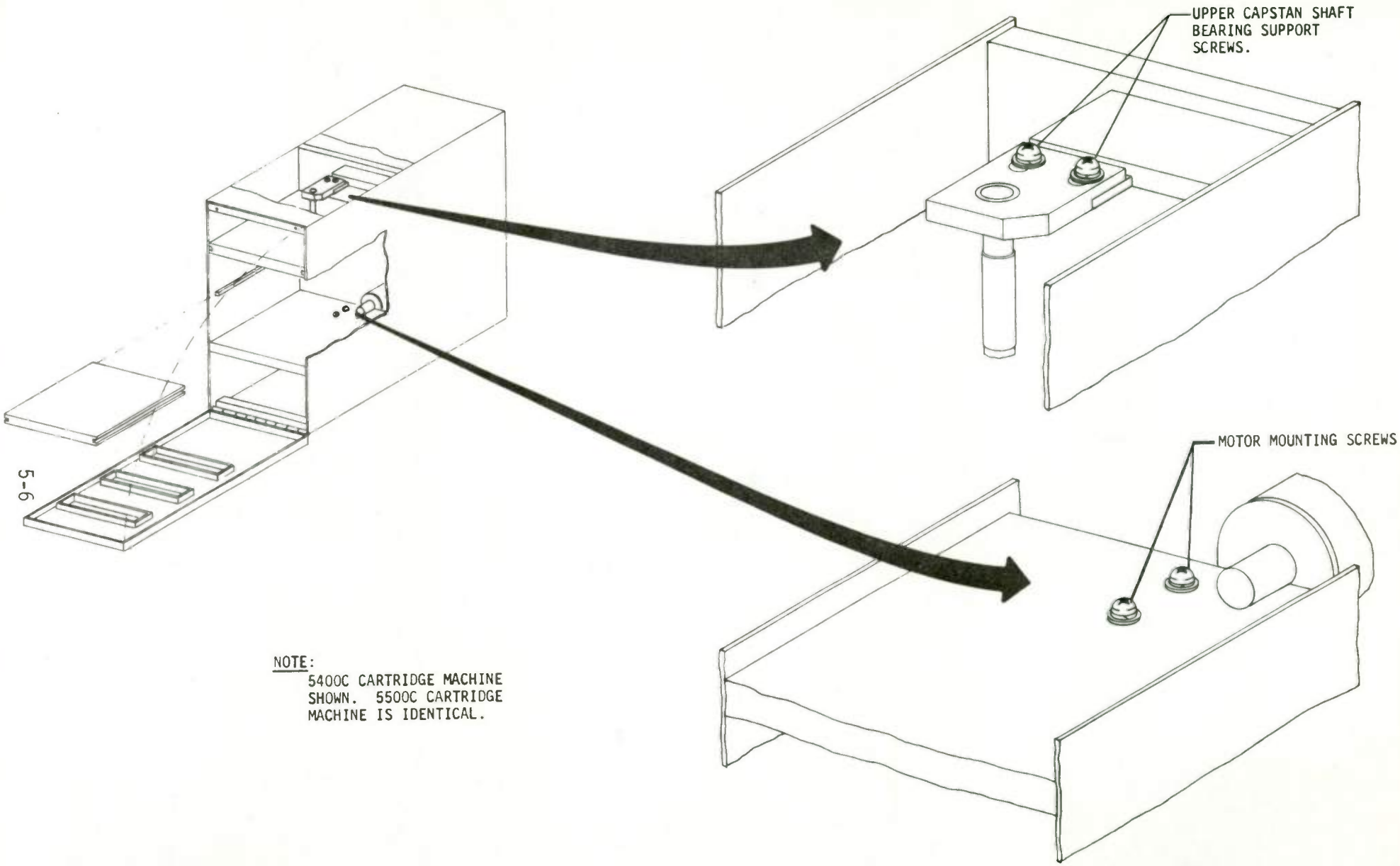
FIGURE 5-2. CARTRIDGE DECK ASSEMBLY

5-33. Refer to Figure 5-3 and loosen the two upper capstan shaft bearing support screws and the two motor mounting screws to allow movement of the motor assembly.

5-34. Refer to Figure 5-4A and place motor alignment gauge 300-0005 on the bottom deck pressure roller shaft.

5-35. Refer to Figure 5-4A and move the motor assembly until the capstan shaft is tangent with the alignment gauge.

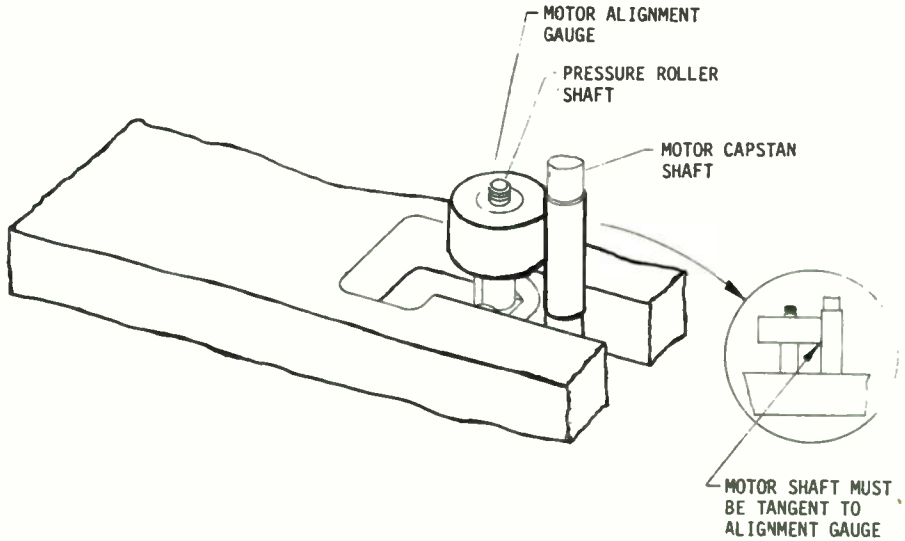
5-36. Secure the two motor mounting screws. Secure the screws alternately to ensure correct motor alignment. Remove the alignment gauge.



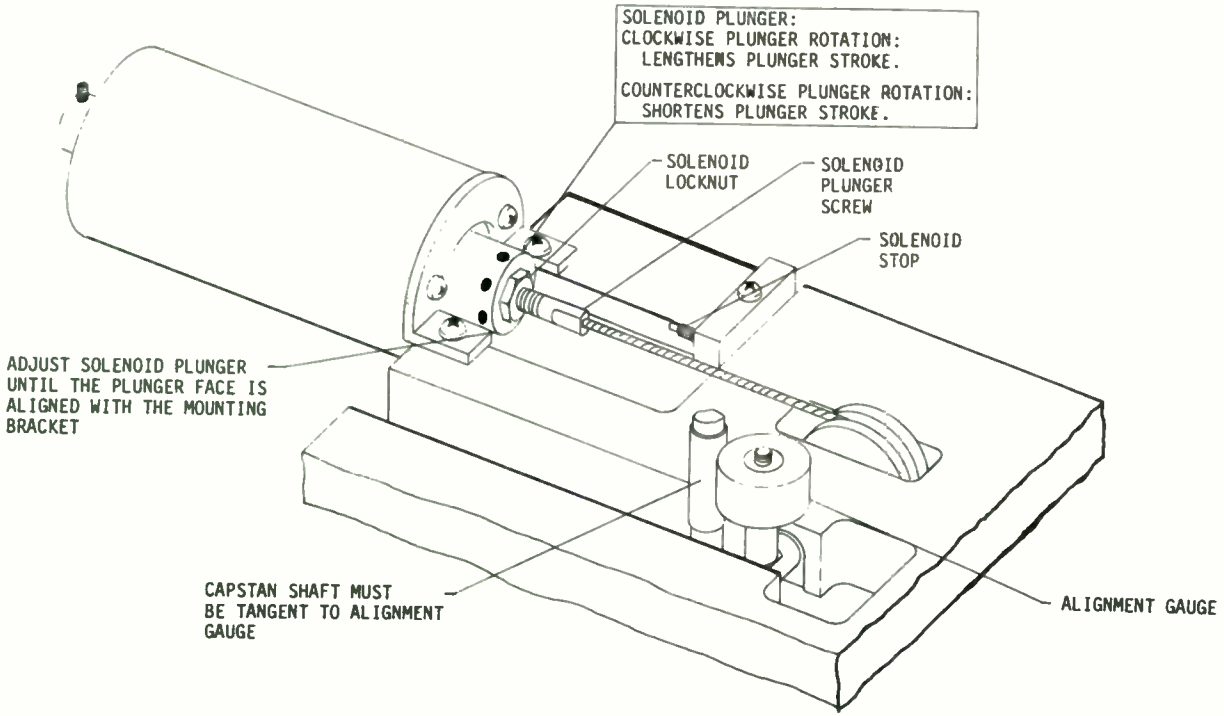
597-5000-5

FIGURE 5-3. MOTOR MOUNTING SCREWS

A
MOTOR ALIGNMENT



B
SOLENOID PLUNGER STROKE ADJUSTMENT



597-5000-6

FIGURE 5-4. MOTOR ALIGNMENT

5-37. Refer to Figure 5-2 and re-install the pressure roller, the nylon washers, and the pressure roller E-ring.

5-38. Refer to Figure 5-2 and adjust the solenoid plunger stop until the pressure roller is just below the deck surface when the solenoid is deenergized.

5-39. Adjust and secure the upper capstan shaft bearing as follows:

A. Apply power to the cartridge machine to allow the capstan shaft and the bearing to stabilize.

CAUTION TO PREVENT DAMAGE TO THE MOTOR AND CAPSTAN SHAFT BEARINGS, DO NOT APPLY LATERAL TORQUE

CAUTION WHEN SECURING THE UPPER CAPSTAN SHAFT BEARING SUPPORT SCREWS.

B. With the motor in operation, secure the upper capstan shaft bearing support screws. Secure the screws alternately to ensure correct motor alignment.

C. Check motor start-up by operating the cartridge machine. If motor start-up is slow, repeat the bearing alignment procedure.

5-40. PRESSURE ROLLER INDENTATION ADJUSTMENT. This procedure adjusts the correct pressure roller indentation. Proper pressure roller indentation determines the amount of tape pull. Refer to Figure 5-4B and coarse adjust the solenoid plunger as follows:

A. Disconnect the cartridge machine primary power.

B. Access the bottom deck of the cartridge machine by performing the DECK ACCESS AND REMOVAL PROCEDURE described in the preceding text.

C. Loosen the solenoid plunger locknut.

D. Rotate the solenoid plunger clockwise or counterclockwise as required until the plunger front-surface is aligned with the solenoid bracket.

E. Finger tighten the solenoid plunger locknut.

CAUTION WHEN OPERATING THE DECK SWITCH TO THE ON POSITION, DO NOT USE A METALLIC OBJECT.

5-41. Fine adjustment of the pressure roller indentation begins by allowing the solenoid to cool for 2 hours. Once the solenoid is cool, temporarily operate the deck switch to the ON position.

5-42. Apply power to the cartridge machine. Depress the appropriate deck start switch/indicator to operate the solenoid.

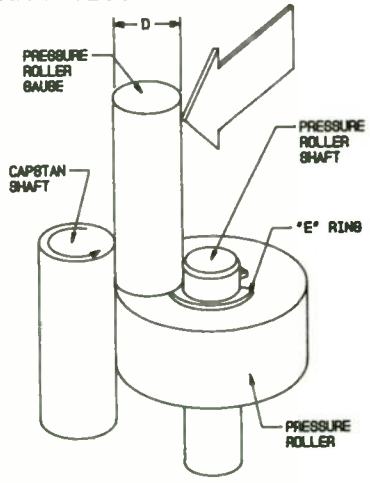
WARNING MAINTENANCE WITH MOVING PARTS IS ALWAYS CONSIDERED HAZARDOUS AND CAUTION SHOULD BE OBSERVED. DO NOT TOUCH THE CAPSTAN SHAFT OR THE PRESSURE ROLLER SHAFT WITH THE PARTS IN MOTION.

WARNING

WARNING

5-43. Fine adjustment of the pressure roller indentation is accomplished by using the pressure roller indentation gauge as shown in Figure 5-5. Insert the gauge between the capstan shaft and pressure roller shaft in the direction indicated while maintaining the gauge perpendicular to the deck surface.

5-44. Refer to Figure 5-5 and adjust the pressure roller indentation by rotating the solenoid plunger clockwise to decrease distance D or counterclockwise to increase distance D as required. Correct adjustment is obtained when the gauge will pass between the shafts with a slight resistance. Deenergize the solenoid between measurements to allow the solenoid to stabilize.



597-5000-15

FIGURE 5-5. PRESSURE ROLLER INDENTATION ADJUSTMENT

5-45. Disconnect the cartridge machine primary power. Secure the plunger locknut and return the deck switch to normal operation.

5-46. Replace the plug-in cartridge decks beginning with the bottom plug-in deck. Check each plug-in deck for proper pressure roller indentation. If a plug-in cartridge deck is improperly aligned, adjust the pressure roller indentation as required.

5-47. SOLENOID RESPONSE ADJUSTMENT. Each solenoid is equipped with a control to adjust the response of the plunger. The control adjusts the rate of air movement through a relief valve to establish the response of the plunger and the level of noise generated. The control is factory adjusted for a compromise between response and noise level. Generally, the solenoid response will not require adjustment. However, the response may be adjusted to obtain any individual requirements. The solenoid response is adjusted as follows.

5-48. Procedure. To adjust the solenoid response, proceed as follows:

5-49. Disconnect the cartridge machine primary power.

5-50. Remove the desired cartridge deck by performing the DECK ACCESS AND REMOVAL PROCEDURE described in the preceding text. The bottom deck may be accessed by removing all plug-in cartridge decks.

5-51. Refer to Figure 5-2 and adjust the solenoid response control clockwise 1/4 of a revolution to reduce the response and decrease the noise level of the solenoid. Adjust the solenoid response control counterclockwise 1/4 of a revolution to accelerate the response and increase the noise level of the solenoid.

5-52. Replace the cartridge deck and perform an operational test to ensure the deck performs as desired. If required, repeat the procedure to obtain the desired results.

5-53. After obtaining the desired results, secure the deck retaining screw and replace the cartridge machine front-panel.

CAUTION TO PREVENT DAMAGE TO THE PHASE LOK V HEAD ASSEMBLY, PERFORM ALL HEAD ASSEMBLY ADJUSTMENTS USING THE ALLEN WRENCH PROVIDED WITH THE UNIT.

CAUTION

5-54. HEAD ADJUSTMENTS. The head adjustments involve the alignment of the tape guide height, head height, head zenith, head azimuth, and head phase response parameters. The head parameters are presented as individual adjustment procedures. Due to the design of the PHASE LOK V head bracket, only head azimuth and the related electrical parameters will require periodic adjustment (example: prior to extensive continuous operation). The following list presents the procedures required for periodic maintenance. When a replacement head is installed, all head adjustment procedures must be performed (refer to the HEAD REPLACEMENT PROCEDURE specific replacement information).

PERIODIC ADJUSTMENT PROCEDURES

MONOPHONIC CARTRIDGE MACHINES

A. The Head Azimuth Adjustment Procedure.

B. The PLAYBACK EQUALIZATION Procedure.

STEREOPHONIC CARTRIDGE MACHINES

A. The Head Azimuth Adjustment Procedure.

B. The Phase Response Adjustment Procedure.

C. The PLAYBACK EQUALIZATION Procedure.

WARNING: DISCONNECT PRIMARY POWER BEFORE SERVICING

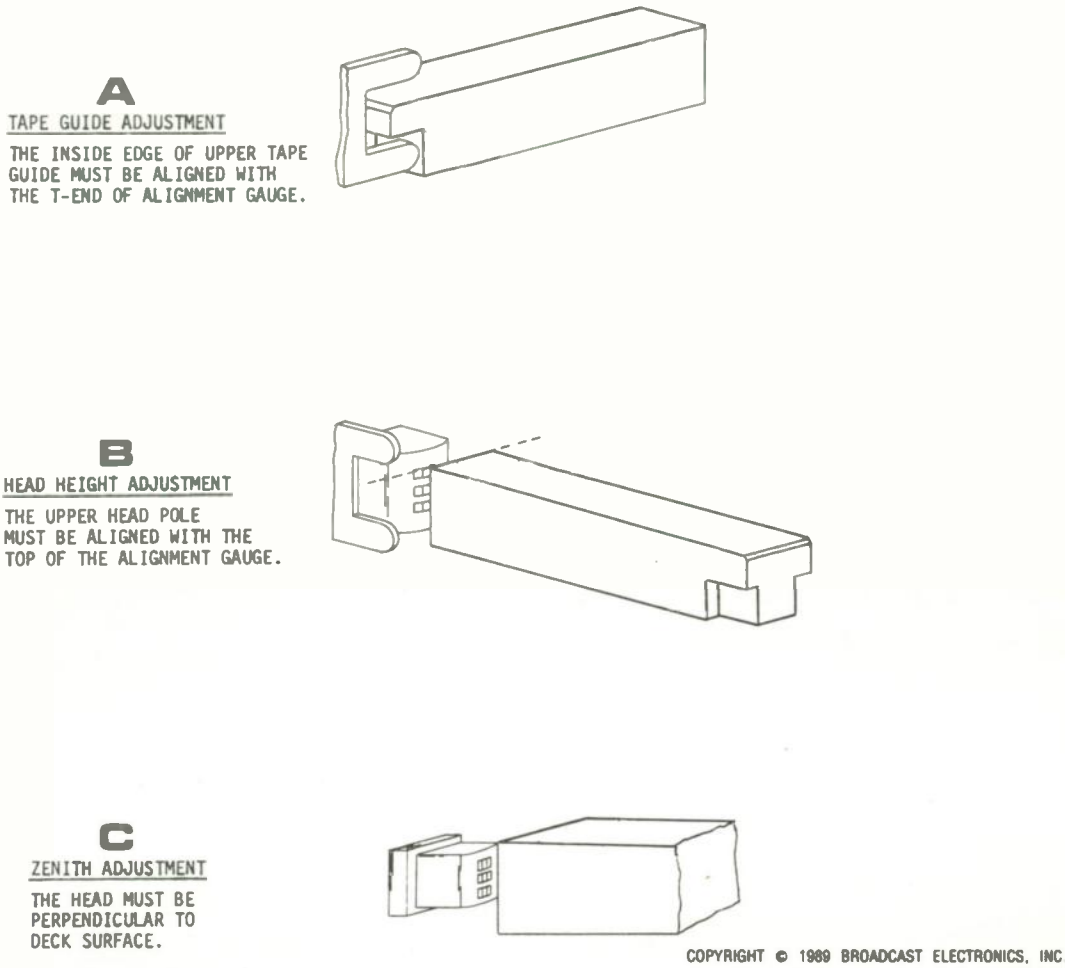


FIGURE 5-6. HEAD AND TAPE GUIDE ADJUSTMENTS

5

5-55. The following text presents adjustment procedures for playback and dummy heads. Record head adjustment procedures are provided in the recorder instruction manual. To access the deck(s) which require adjustment, perform the DECK ACCESS AND REMOVAL PROCEDURE described in the preceding text.

5-56. An adjustment tool (located in the Accessory Parts Kit) is provided with the unit for head assembly alignment. Perform all head alignments using the adjustment tool.

5-57. Tape Guide Height Adjustment Procedure. To ensure proper tape movement, perform the height adjustment procedure for each tape guide. To adjust the tape guide height, proceed as follows:

5-58. Refer to Figure 5-6A and check the tape guide height. The inside edge of the upper tape guide must be aligned with the top surface of the alignment gauge as shown.

5-59. If adjustment is required, refer to Figure 5-7 and loosen the tape guide adjustment screws.

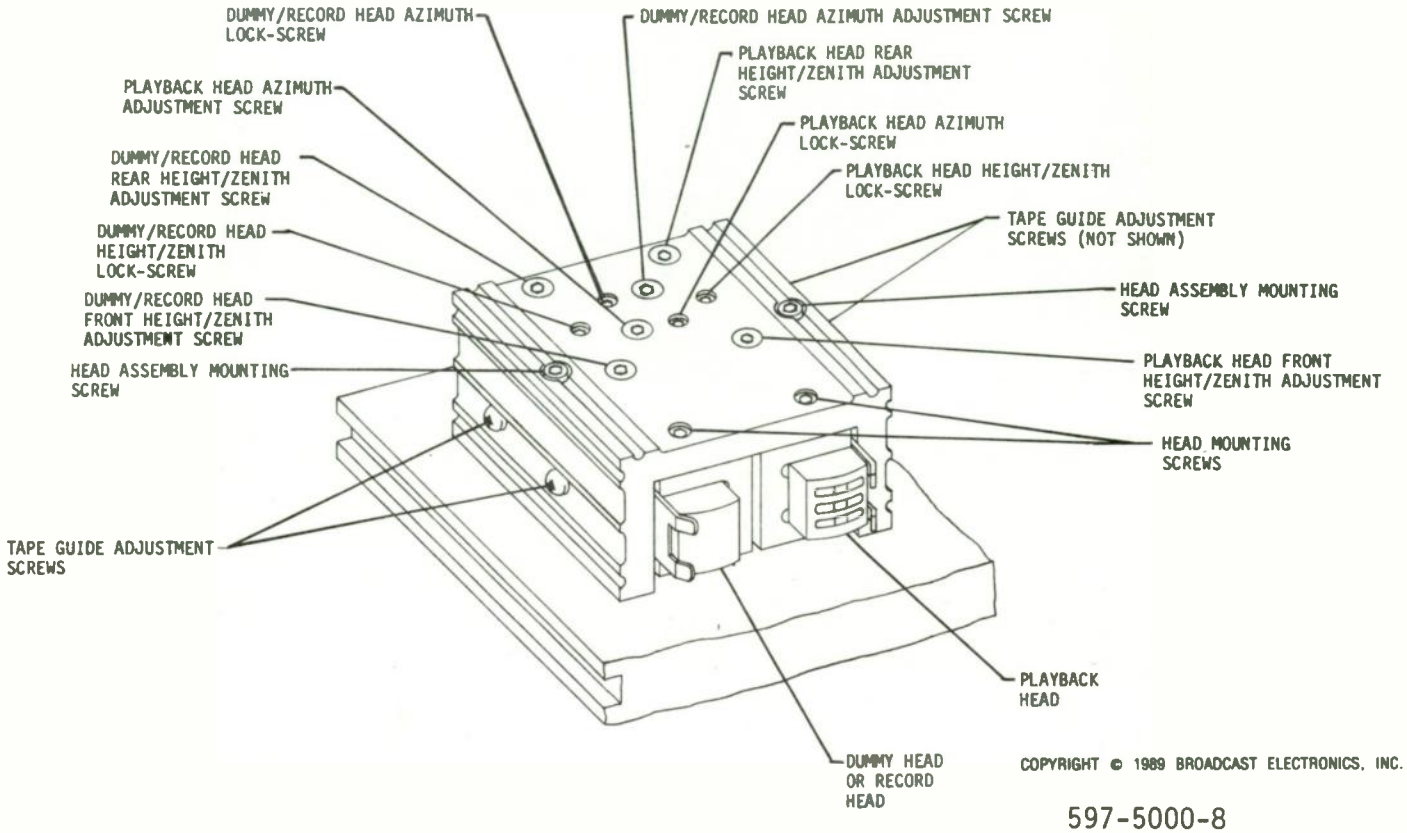


FIGURE 5-7. HEAD ADJUSTMENT CONTROLS

5-60. Adjust the tape guide to obtain proper alignment.

5-61. Secure the tape guide adjustment screws.

5-62. Head Height Adjustment Procedure. To adjust the playback and dummy head height, proceed as follows:

5-63. Refer to Figure 5-6B and check the playback head height. The head upper pole must be aligned with the top of the alignment gauge.

5-64. Insert the tape alignment cut-away test cartridge into the cartridge deck and begin deck operation to visually inspect the tape movement across the heads. The magnetic tape must cover the top and bottom of the head poles (refer to Figure 5-8).

5-65. If adjustment is required, refer to Figure 5-7 and loosen the playback head height/zenith lock-screw.

5-66. Refer to Figure 5-7 and adjust the front and rear playback head height/zenith adjustment screws as required to obtain the proper head height. The height/zenith screws must be adjusted equally to retain the zenith adjustment.

5-67. Secure the playback head height/zenith lock-screw.

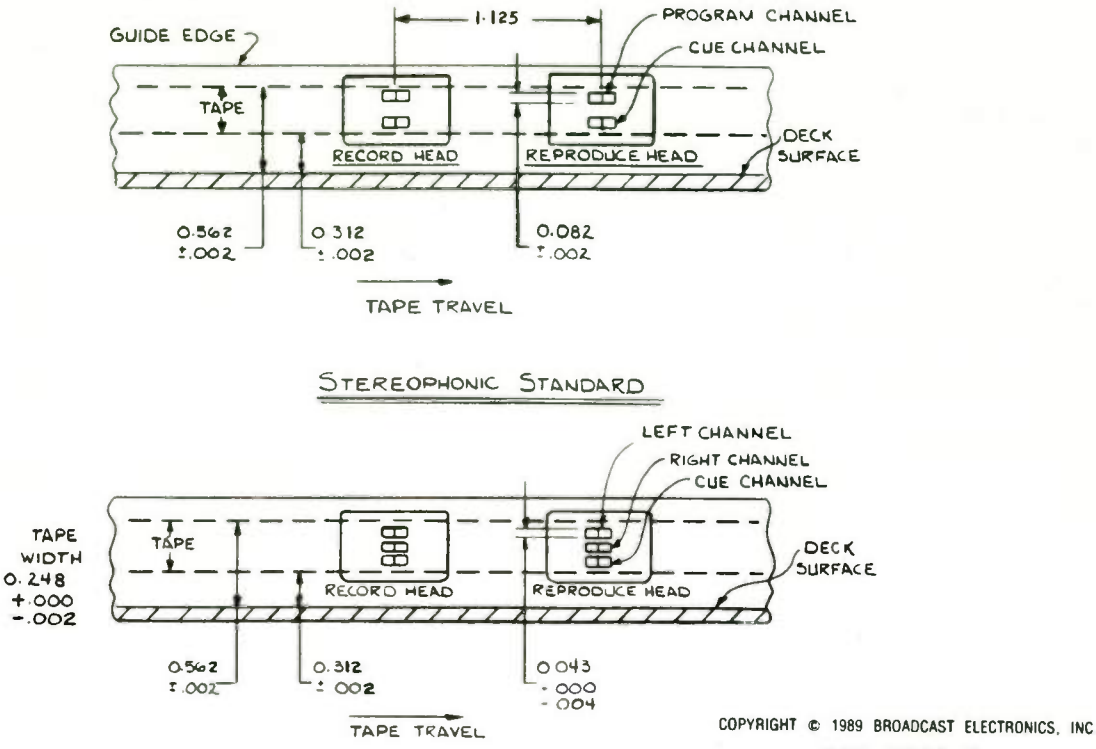


FIGURE 5-8. HEIGHT CARTRIDGE TAPE TRACKING

5-68. To ensure proper tape movement, the top of the dummy head must be aligned with the top of the playback head. Visually check the height of the dummy head. If required adjust the dummy head height as required. Refer to Figure 5-7 for the location of the dummy head height/zenith adjustment screws.

5-69. Head Zenith Adjustment Procedure. To adjust the playback and dummy head zenith, proceed as follows:

5-70. Refer to Figure 5-6C and check the playback head zenith. The head must be perpendicular to the deck surface.

5-71. If adjustment is required, refer to Figure 5-7 and loosen the playback head height/zenith lock-screw.

5-72. Refer to Figure 5-7 and adjust the playback head front or rear height/zenith screw to obtain the proper alignment.

5-73. Refer to the Head Height Adjustment Procedure and check the playback head height. If required, re-adjust the head height.

5-74. Repeat the procedure until the playback head zenith and head height are properly adjusted.

5-75. Secure the playback head height/zenith lock-screw.

5-76. Repeat the procedure for the dummy head. Refer to Figure 5-7 for the location of the dummy head height/zenith adjustment screws.

5-77. Head Azimuth Adjustment Procedure. To adjust the playback head azimuth, proceed as follows:

5-78. Disconnect the cartridge machine primary power.

5-79. Demagnetize the playback head, the dummy head, and all surrounding ferrous components.

5-80. Refer to the OUTPUT LEVEL ADJUSTMENT procedure (located in the ELECTRICAL ADJUSTMENT procedures) and calibrate the cartridge deck for the desired output level.

5-81. Connect the oscilloscope to the cartridge deck left channel output on the output/remote receptacle. The receptacle pin designations are shown in Figure 2-1 (refer to SECTION II, INSTALLATION).

5-82. Refer to Figure 5-7 and loosen the playback head azimuth lock-screw.

5-83. Apply power to the cartridge machine.

5-84. Insert the reproduce alignment test tape into the cartridge deck and reproduce the 12.5 kHz test tone.

5-85. Refer to Figure 5-7 and adjust the playback head azimuth screw for a maximum peak-to-peak voltage indication.

5-86. Secure the playback head azimuth lock-screw.

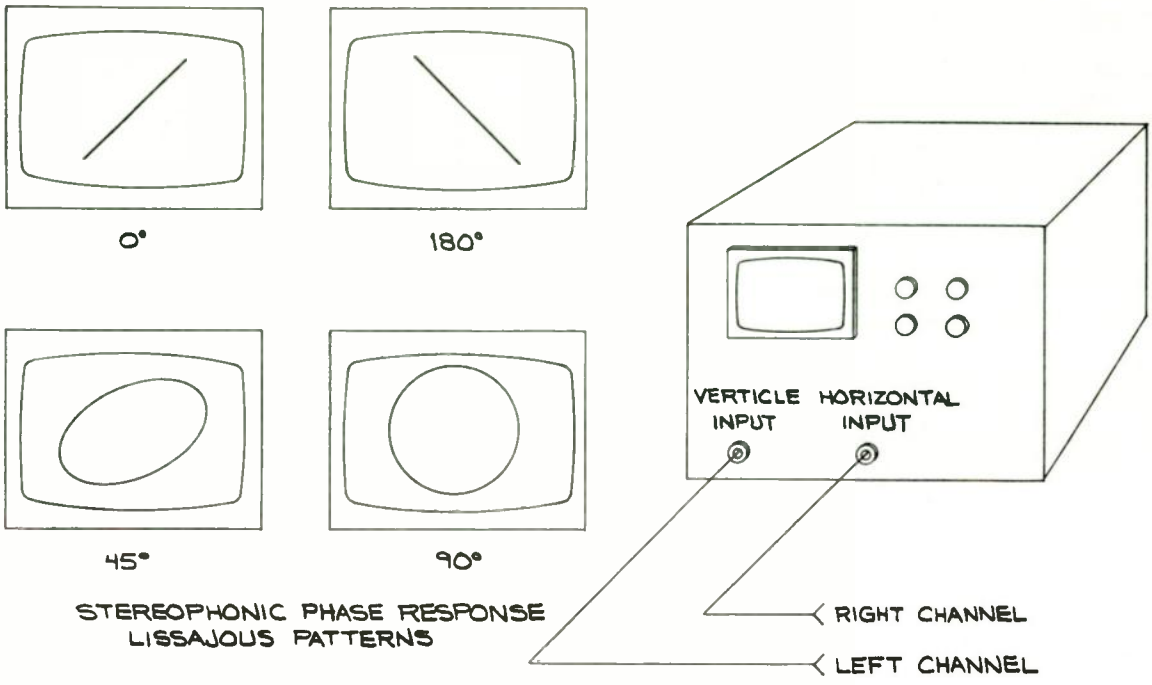
5-87. Disconnect power from the cartridge machine and remove the test equipment.

5-88. Head Phase Response Adjustment (For Stereophonic Cartridge Machines Only). The phase adjustment involves the fine alignment of the playback head azimuth for maximum phase response. To adjust the playback head phase response, proceed as follows:

5-89. Disconnect the cartridge machine primary power.

5-90. Demagnetize the playback head, the dummy head, and all surrounding ferrous components.

5-91. Refer to the OUTPUT LEVEL ADJUSTMENT procedure (located in the ELECTRICAL ADJUSTMENT procedures) and calibrate the cartridge deck for the desired output level.



597-5000-10

FIGURE 5-9. STEREOPHONIC PHASE RESPONSE LISSAJOUS PATTERNS

5-92. Connect the oscilloscope to the cartridge deck outputs on the output/remote receptacle as shown in Figure 5-9. The receptacle pin designations are shown in Figure 2-1 (refer to SECTION II, INSTALLATION).

5-93. Refer to Figure 5-7 and loosen the playback head azimuth lock-screw.

5-94. Apply power to the cartridge machine.

5-95. Operate the oscilloscope for a lissajous display of the inputs.

5-96. Insert the reproduce alignment test tape into the cartridge deck and reproduce the 12.5 kHz test tone.

5-97. Refer to Figure 5-7 and adjust the playback head azimuth screw for a Ø° lissajous pattern (refer to Figure 5-9).

5-98. Secure the playback head azimuth lock-screw.

5-99. Disconnect power from the cartridge machine and remove the test equipment.

5-100. ELECTRICAL ADJUSTMENTS.

5-101. The following text provides electrical adjustment procedures for all controls associated with the 5400C/5500C cartridge machines. The procedures are presented in the following order.

ADJUSTMENT PROCEDURES

A. Power Supply Adjustment.

B. Output Level Adjustment.

C. Playback Equalization.

D. Cue Tone Detection Adjustment.

5-102. The following test equipment is required for the electrical adjustment procedures. Refer to the list as required for each procedure.

TEST EQUIPMENT

A. Calibrated Oscilloscope, 5 MHz Bandwidth, Single Channel.

B. External VU Meter.

C. Stereophonic Reproduce Alignment Tape (BE P/N 800-1005). Monophonic Reproduce Alignment Tape (BE P/N 800-1005-001).

D. Cue Tone Calibration Cartridge (BE P/N 800-1095).

E. Insulated Adjustment Tool (BE P/N 407-0186).

F. No. 1 Phillips Screwdriver, 4 Inch (10.2 cm) Blade.

G. Digital Voltmeter.

5-103. POWER SUPPLY ADJUSTMENT. Potentiometer R2 on the power supply circuit board adjusts the +28V dc operating supply. Adjustment of the control will not be required unless replacement components are installed in the circuit or the complete power supply circuit board is replaced. To adjust potentiometer R2, proceed as follows.

5-104. Procedure. To adjust +28V dc supply control R2, proceed as follows:

5-105. Disconnect the cartridge machine primary power.

5-106. Rotate the unit upside-down and remove the bottom-panel.

5-107. Refer to Figure 5-10 and connect a voltmeter to the emitter junction of transistor Q6 on the foldback circuit board assembly.

5-108. Apply power to the cartridge machine.

WARNING: DISCONNECT PRIMARY POWER BEFORE SERVICING

WARNING DO NOT TOUCH ANY CIRCUIT BOARD TRACES OR COMPONENTS ON THE POWER SUPPLY CIRCUIT BOARD.

5-109. Refer to Figure 5-10 and adjust +28V dc supply control R2 for a +28V dc voltmeter indication.

5-110. Disconnect the cartridge machine primary power.

5-111. Remove the test equipment and replace the cartridge machine bottom-panel.

5-112. OUTPUT LEVEL ADJUSTMENT. The LEVEL control(s) on the tape head amplifier circuit board adjust the output level of the cartridge deck. The output level control(s) are adjusted as follows.

5-113. Procedure. To adjust the deck output level, proceed as follows:

5-114. Disconnect the cartridge machine primary power.

5-115. Connect the external VU meter to the cartridge deck left channel output. The output pin designations are shown in Figure 2-1 (refer to SECTION II, INSTALLATION).

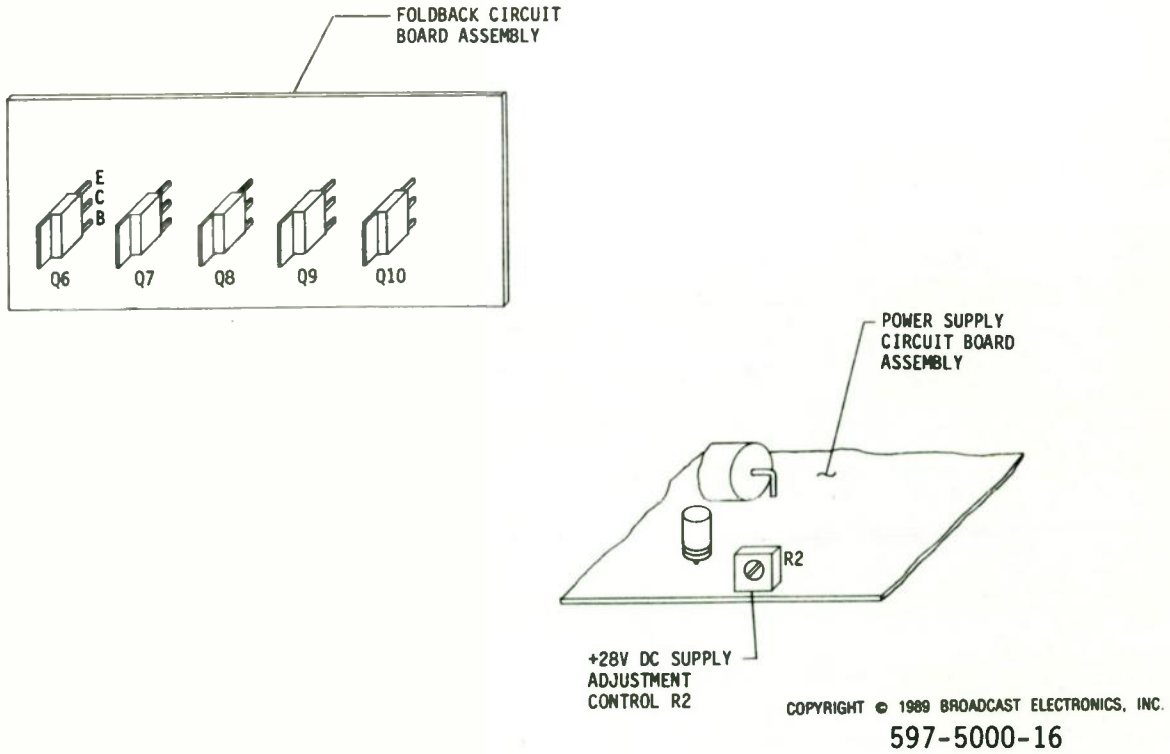


FIGURE 5-10. POWER SUPPLY ADJUSTMENT

5-116. Apply power to the cartridge machine.

5-117. Insert the alignment tape into the deck and reproduce the operating reference level portion of the test tape.

5-118. Refer to Figure 5-11 and adjust left channel output LEVEL control R46 for the desired output level.

5-119. For stereophonic cartridge machines, repeat the procedure for the right channel. Adjust the right channel output level with right channel output LEVEL control R48 (refer to Figure 5-11).

5-120. Disconnect power from the cartridge machine and remove the test equipment.

5-121. PLAYBACK EQUALIZATION. Playback equalization involves the adjustment of the tape head amplifier circuit board equalization controls to obtain the required playback response. The playback equalization is adjusted as follows.

5-122. Procedure. To adjust the equalization controls, proceed as follows:

5-123. Refer to the OUTPUT LEVEL ADJUSTMENT procedure in the preceding text and calibrate the cartridge deck for the desired output level.

5-124. Disconnect the cartridge machine primary power.

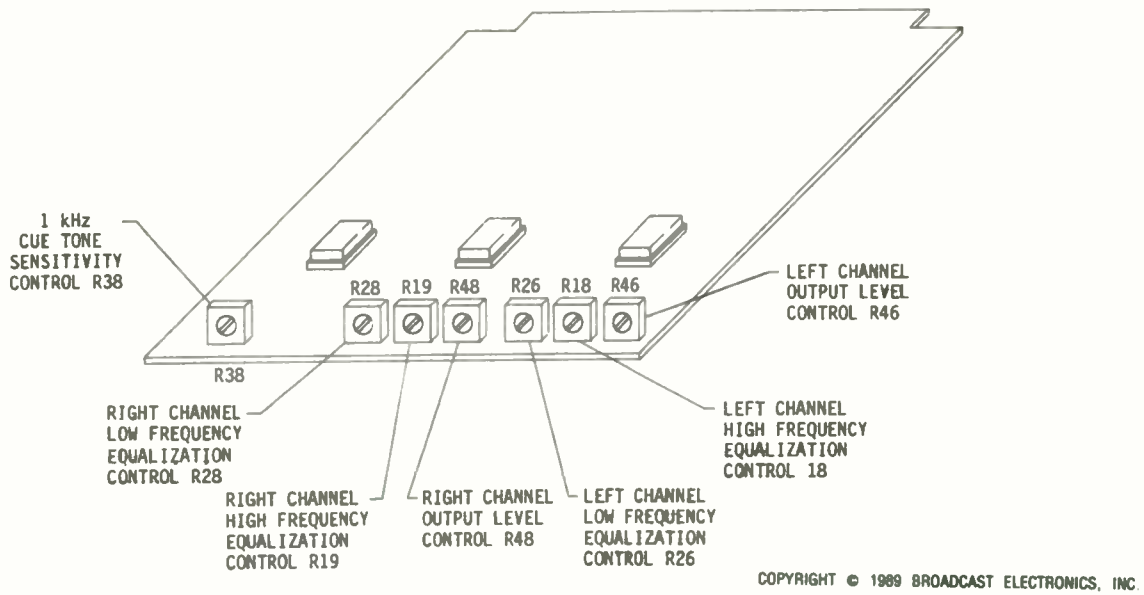


FIGURE 5-11. TAPE HEAD AMPLIFIER CIRCUIT BOARD CONTROLS

WARNING: DISCONNECT PRIMARY POWER BEFORE SERVICING

5-125. Connect the external VU meter to the cartridge deck left channel output on the output/remote receptacle. The receptacle pin designations are shown in Figure 2-1 (refer to SECTION II, INSTALLATION).

5-126. Apply power to the cartridge machine.

5-127. Insert the reproduce alignment tape and reproduce the test tones.

5-128. At the 50 Hz test tone, adjust left channel LF EQ control R26 (refer to Figure 5-11) until the external VU meter indicates a level within -1 dB to Ø dB of the reference tone level.

5-129. At the 12.5 kHz test tone, adjust left channel HF EQ control R18 (refer to Figure 5-11) until the external VU meter indicates level of the reference tone.

5-130. For stereophonic cartridge machines, repeat the procedure for the right channel. Adjust the right channel equalization with right channel LF EQ control R28 and right channel HF EQ control R48 (refer to Figure 5-11).

5-131. Disconnect power from the cartridge machine and remove the test equipment.

5-132. CUE TONE DETECTION ADJUSTMENT. The cue tone controls on the tape head amplifier and control circuit boards adjust the sensitivity of the 1 kHz, 150 Hz, and 8 kHz cue tone detection circuits. The cue tone detection controls are adjusted as follows.

5-133. Procedure. To adjust the cue tone detection controls, proceed as follows:

5

5-134. Insert the cue tone calibration cartridge into the deck and reproduce the 1 kHz test tones.

5-135. Refer to Figure 5-11 and adjust 1 kHz cue tone sensitivity control R38 to stop the cartridge deck during a test tone.

5-136. Insert the cue tone calibration cartridge into the deck and reproduce the 150 Hz test tones.

5-137. Refer to Figure 5-12 and adjust 150 Hz cue tone sensitivity control R9 until the deck start switch illuminates brightly.

5-138. Insert the cue tone calibration cartridge into the deck and reproduce the 8 kHz test tones.

5-139. Refer to Figure 5-12 and adjust 8 kHz cue tone sensitivity control R10 until the deck stop switch illuminates during deck operation.

5-140. MECHANICAL PARTS REPLACEMENT PROCEDURES.

5-141. The following text provides mechanical parts replacement procedures. The procedures are presented in the following order.

A. Pressure Roller Replacement.

B. Head Replacement.

C. Upper Capstan Shaft Bearing Replacement.

D. Motor Replacement.

5-142. The following equipment is required for the replacement procedures. Refer to the list as required for each procedure.

EQUIPMENT

A. No. 1 Phillips Screwdriver, 4 Inch (10.2 cm) Blade.

B. Needle-nose pliers.

C. Allen Wrenches (supplied with the cartridge machine).

5-143. PRESSURE ROLLER REPLACEMENT PROCEDURE. To replace a cartridge deck pressure roller, proceed as follows:

5-144. Disconnect the cartridge machine primary power.

5-145. Access the desired deck performing the DECK ACCESS AND REMOVAL PROCEDURE described in the preceding text.

5-146. Refer to Figure 5-2 and manually retract the solenoid plunger.

5-147. Remove the pressure roller E-ring, the pressure roller, and the nylon washers (refer to Figure 5-2).

5-148. Refer to Figure 5-2 and replace the washers, the pressure roller, and the pressure roller E-ring.

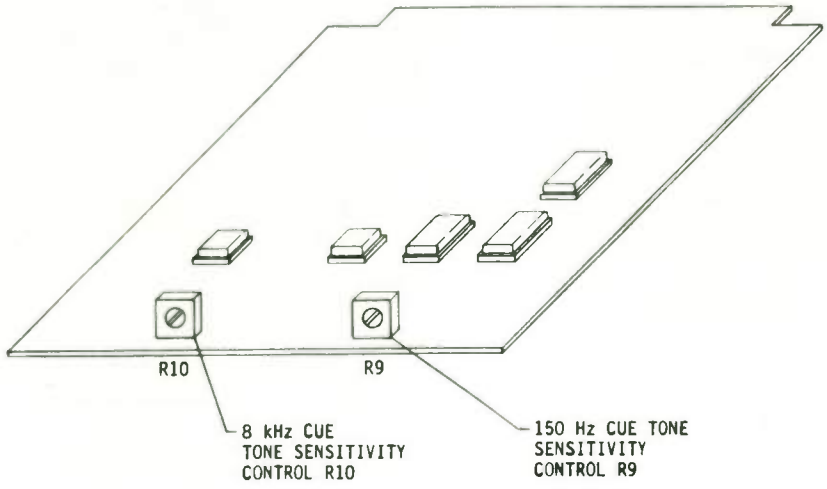
5-149. Check the pressure roller indentation by performing the steps described in the PRESSURE ROLLER INDENTATION ADJUSTMENT procedure.

5-150. HEAD REPLACEMENT. To replace a tape head, proceed as follows:

5-151. Disconnect the cartridge machine primary power.

5-152. Access the desired deck by performing the DECK ACCESS AND REMOVAL PROCEDURE described in the preceding text.

5-153. Loosen the head assembly mounting screws (refer to Figure 5-7) and remove the entire head assembly from the cartridge deck.



597-5000-12

FIGURE 5-12. CONTROL CIRCUIT BOARD ADJUSTMENT CONTROLS

5-154. Refer to Figure 5-7 and loosen the defective tape head mounting screw.

5-155. Remove the defective head from the head assembly and disconnect the head leads.

5-156. Refer to Figure 5-13 and connect the head leads to the replacement head.

5-157. Firmly seat the replacement head into the head assembly and secure the mounting screw.

5-158. Replace the head assembly and secure the mounting screws.

5-159. Align the head by performing all the HEAD ADJUSTMENTS procedures. After completing the head adjustments, perform the PLAYBACK EQUALIZATION procedure presented in the ELECTRICAL ADJUSTMENTS procedures.

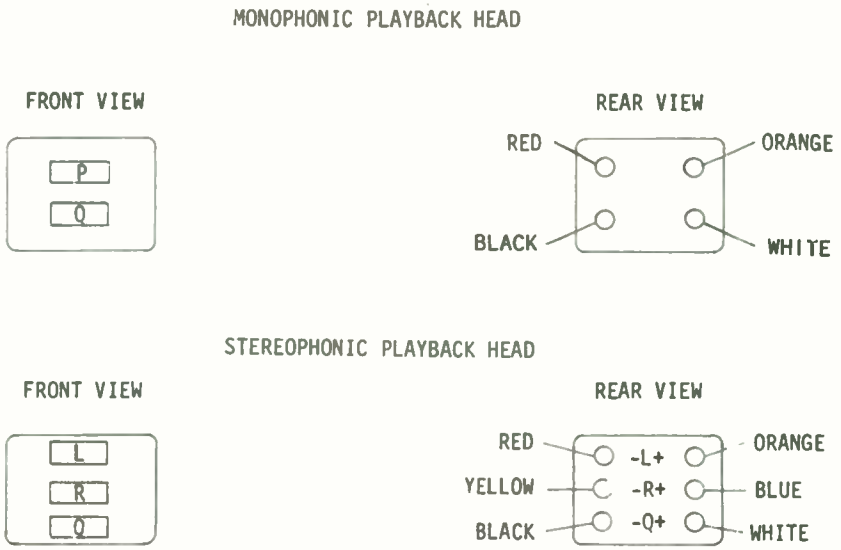
5-160. UPPER CAPSTAN SHAFT BEARING REPLACEMENT. To replace the upper capstan shaft bearing, proceed as follows:

WARNING DISCONNECT ALL CARTRIDGE MACHINE PRIMARY POWER BEFORE PROCEEDING.

5-161. Disconnect the cartridge machine primary power.

5-162. Remove the cartridge machine top-panel.

5-163. Refer to Figure 5-3 and remove the two upper capstan shaft bearing support screws.



597-5000-13

FIGURE 5-13. TAPE HEAD CONFIGURATIONS

5-164. Remove the bearing support bracket.

5-165. Install the replacement bearing support bracket.

5-166. Replace the bearing support bracket screws. Do not tighten the screws at this time.

5-167. Align and secure the sleeve bearing as follows:

1. Apply power to the cartridge machine to allow the capstan shaft and the sleeve bearing to stabilize.

CAUTION

CAUTION

TO PREVENT DAMAGE TO THE MOTOR AND CAPSTAN SHAFT BEARINGS, DO NOT APPLY LATERAL TORQUE WHEN SECURING THE UPPER CAPSTAN SHAFT BEARING SUPPORT SCREWS.

2. With the motor in operation, secure the two upper capstan shaft bearing support screws. Secure the two screws alternately to ensure correct motor alignment.

3. Check the motor start-up by operating the cartridge machine. If motor start-up is slow, repeat the bearing alignment procedure.

4. Disconnect the cartridge machine primary power.

5-168. Replace the cartridge machine top-panel.

5-169. MOTOR REPLACEMENT. To replace the cartridge machine motor, proceed as follows:

WARNING DISCONNECT ALL CARTRIDGE MACHINE PRIMARY POWER BEFORE PROCEEDING.

5-170. Disconnect the cartridge machine primary power.

5-171. Remove the cartridge machine top-panel and bottom-panel.

5-172. Access the bottom cartridge deck by performing the DECK ACCESS AND REMOVAL PROCEDURE described in the preceding text.

5-173. Refer to Figure 5-3 and remove the upper capstan shaft bearing support screws.

5-174. Remove the upper capstan shaft bearing support bracket.

5-175. Place the cartridge machine on a side-panel.

5-176. Refer to the cartridge machine final assembly diagram in SECTION VII, DRAWINGS and perform the following:

A. Disconnect motor power supply connector P2 from the power supply circuit board (located near the bottom of the cartridge machine).

B. Disconnect the motor capacitor wiring.

5-177. Refer to Figure 5-3 and locate the motor mounting screws. While supporting the motor, remove the motor mounting screws and carefully remove the motor from the cartridge machine chassis.

CAUTION EXERCISE CARE WHEN HANDLING THE CARTRIDGE MACHINE MOTOR TO AVOID DAMAGING THE BEARINGS.

CAUTION NEVER HANDLE THE MOTOR BY THE CAPSTAN SHAFT.

5-178. Carefully insert the new motor into the cartridge machine chassis and replace the motor mounting screws. Do not tighten the motor mounting screws at this time.

5-179. Align the motor by performing the MOTOR ALIGNMENT PROCEDURE described in the preceding text. Do not perform the upper capstan shaft bearing alignment steps at this time.

5-180. Inspect the upper capstan shaft bearing for mechanical wear. If required, install a replacement bearing support bracket.

5-181. Replace the bearing support bracket screws. Do not tighten the bearing support screws at this time.

5-182. Reconnect motor power supply connector P2 and the motor capacitor wiring.

5-183. Complete the MOTOR ALIGNMENT PROCEDURE by performing upper capstan shaft bearing alignment steps. Perform the PRESSURE ROLLER INDENTATION ADJUSTMENT procedure for each deck.

5-184. Replace the cartridge machine top-panel and bottom-panel.

5-185. TROUBLESHOOTING.

5-186. Troubleshooting within the cartridge machine chassis is not considered hazardous due to the low voltages and currents involved. All high voltages within the chassis have been shielded. Therefore, do not remove any shields for maintenance procedures. Troubleshooting with power energized is always considered hazardous and caution should be observed. Good judgement, care, and common sense must be practiced to prevent accidents.

5-187. The troubleshooting philosophy for the 5400C/5500C cartridge machines consists of isolating a problem to a specific circuit board. The problem may be isolated by referencing the following information and Table 5-1 which presents 5400C/5500C cartridge machine troubleshooting.

WARNING DISCONNECT ALL CARTRIDGE MACHINE PRIMARY 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 CARTRIDGE MACHINE.
CAUTION

5-188. Once trouble is isolated and power is totally deenergized, refer to the schematic diagrams and the theory of operation to assist in problem resolution. The defective component may be repaired locally or the entire device may be returned to Broadcast Electronics Inc. for repair or replacement.

WARNING DISCONNECT POWER BEFORE REMOVING OR REPLACING CIRCUIT BOARDS OR COMPONENTS.

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

5-189. COMPONENT REPLACEMENT. The circuit boards used in the 5400C/5500C cartridge machines 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.

TABLE 5-1. 5400C/5500C CARTRIDGE MACHINE TROUBLESHOOTING

SYMPTOM	REMEDY
NO TAPE MOVEMENT, ALL DECKS	1. Check the AC line fuse on the cartridge machine rear-panel. 2. Check motor power supply connector P2 on the power supply circuit board. 3. Check the motor start capacitor on the cartridge machine bulkhead assembly. 4. Check the capstan shaft upper bearing. 5. Check motor and motor bearings.
NO TAPE MOVEMENT, INDIVIDUAL DECK	1. Refer to Figure 5-14.
DECK OPERATION WITH NO AUDIO OUTPUT	1. Refer to Figure 5-15.
NO 1 kHz STOP TONE OPERATION	1. Refer to Figure 5-16.
NO SECONDARY CUE TONE OPERATION	1. Refer to Figure 5-17.
NO TERTIARY CUE TONE OPERATION	1. Refer to Figure 5-18.

5-190. 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. Use of a small soldering iron with steady pressure is required for circuit board repairs.

5-191. 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 careful re-heating with a low wattage iron and removing the residual solder with a soldering vacuum tool.

5-192. 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.

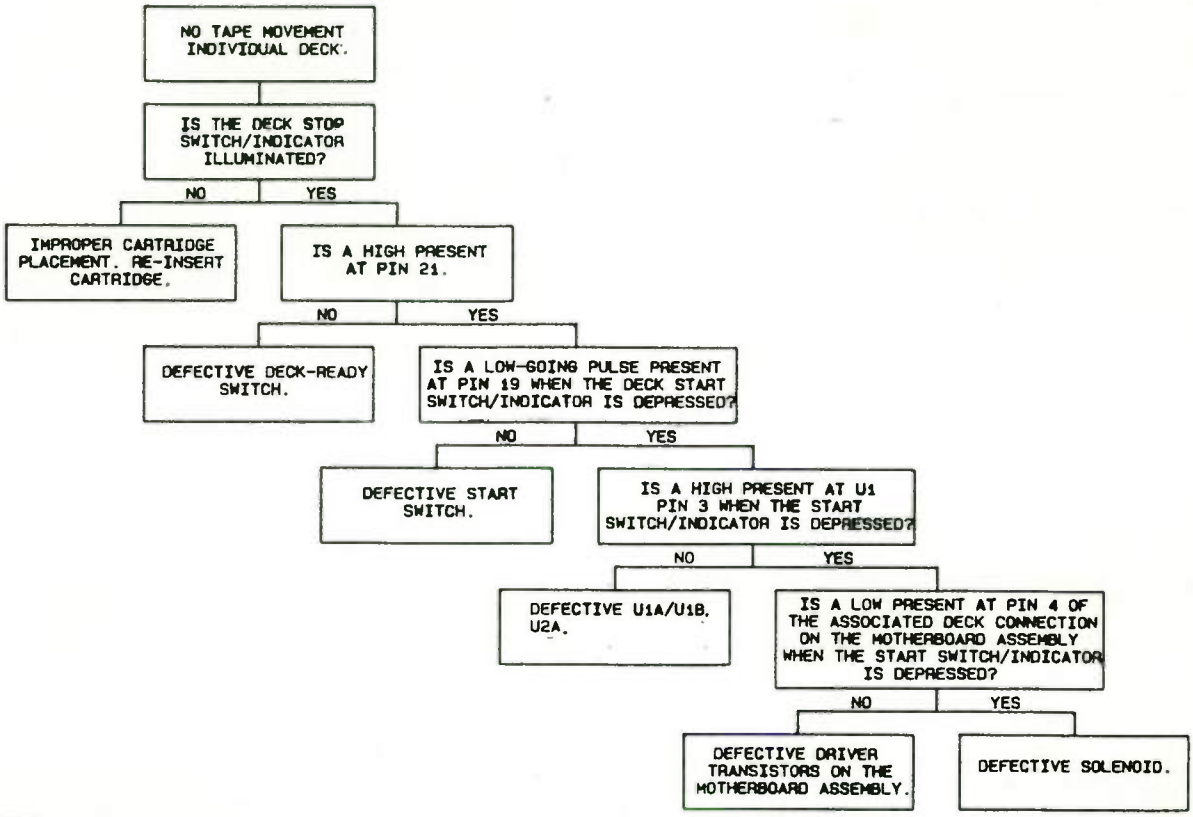
WARNING MOST SOLVENTS WHICH REMOVE ROSIN FLUX ARE VOLATILE AND TOXIC BY NATURE AND SHOULD BE
WARNING USED ONLY IN SMALL AMOUNTS IN A WELL VENTILATED AREA AWAY FROM FLAME, CIGARETTES,
WARNING AND HOT SOLDERING IRONS.

WARNING OBSERVE THE MANUFACTURERS CAUTIONARY INSTRUCTIONS.

5-193. After soldering, remove residual flux with a suitable solvent. Rubbing alcohol is highly diluted and is not effective.

5-194. The board should be checked 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.

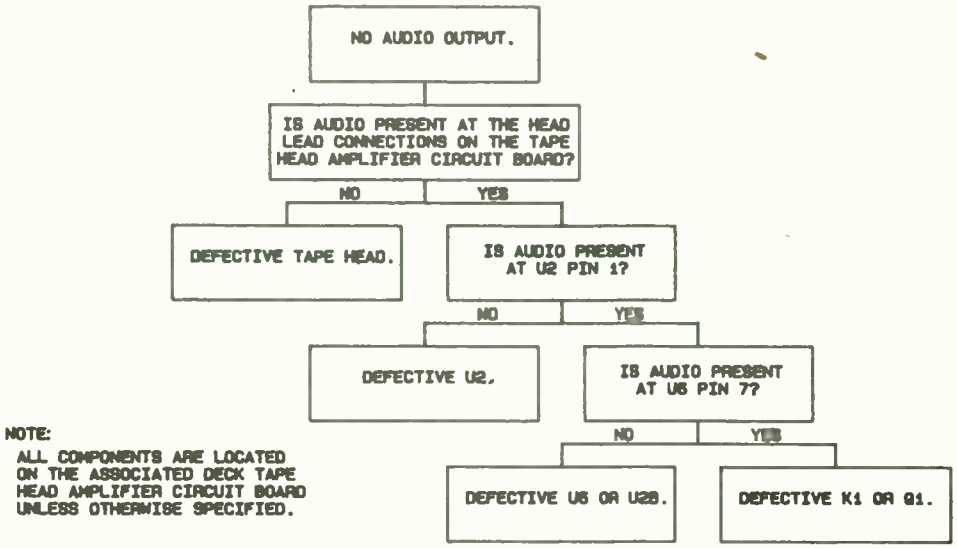
5-195. INTEGRATED CIRCUITS. Special care should be exercised with integrated circuits. Each integrated circuit must be installed by matching the integrated circuit notch with the notch on the socket. Do not attempt to remove an integrated circuit from a socket with your fingers. Use an integrated circuit puller to lightly pry the component from the socket.



NOTE:
ALL COMPONENTS ARE LOCATED ON THE ASSOCIATED DECK CONTROL CIRCUIT BOARD UNLESS OTHERWISE SPECIFIED.

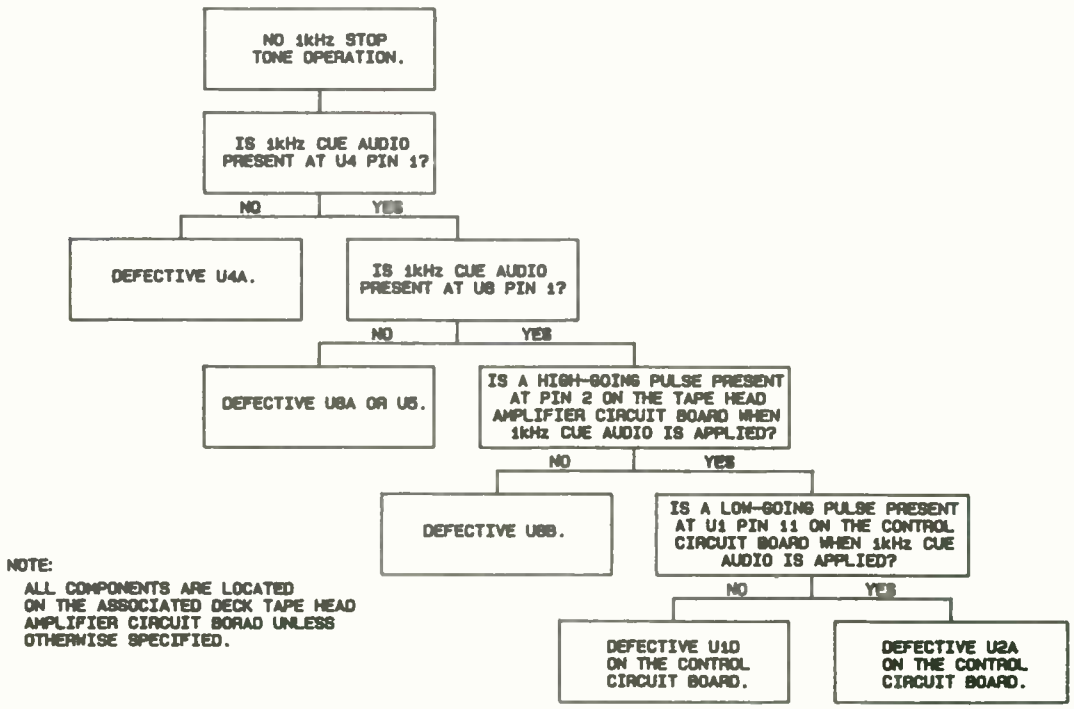
597-5000-20

FIGURE 5-14. TROUBLESHOOTING TREE, INDIVIDUAL DECK FAILURE



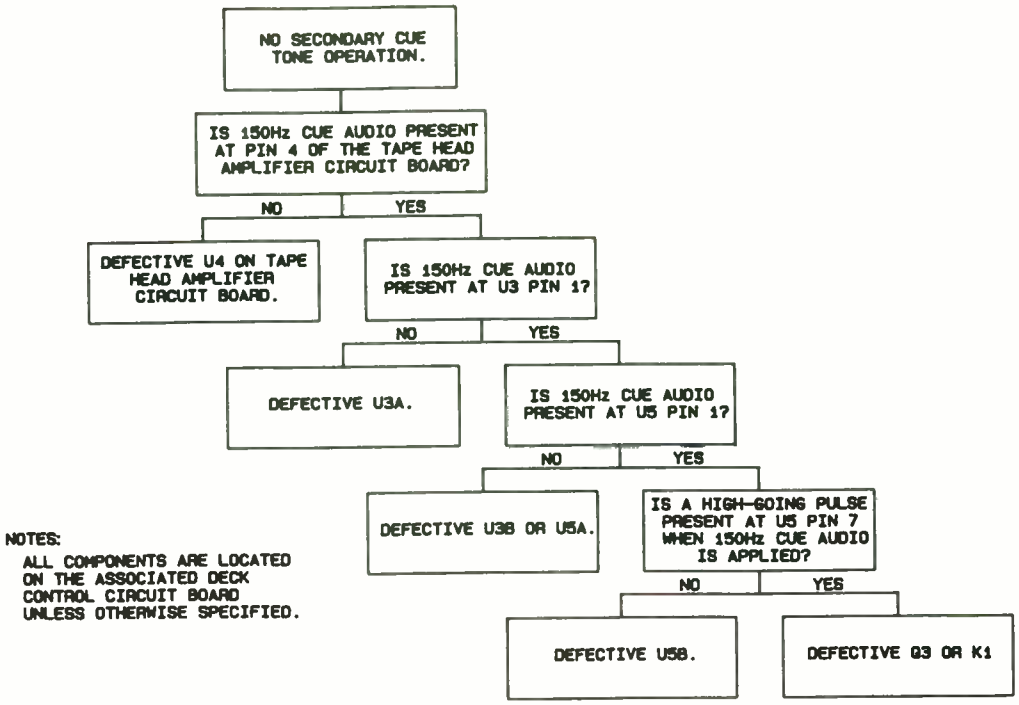
597-5000-21

FIGURE 5-15. TROUBLESHOOTING TREE, NO AUDIO OUTPUT



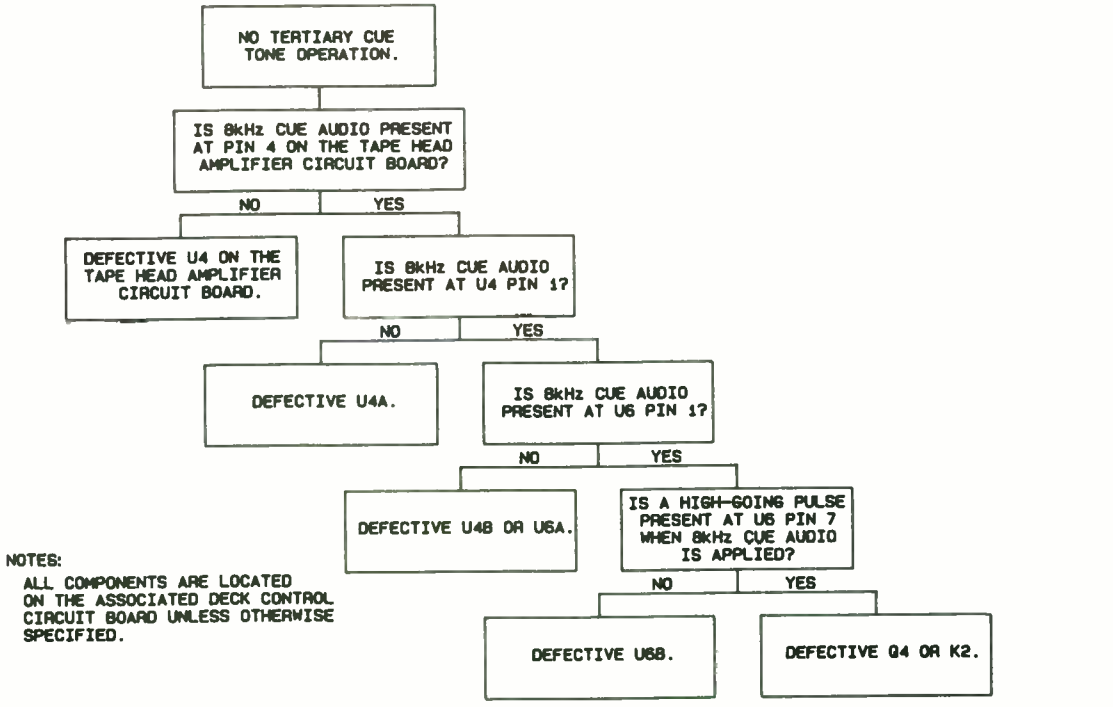
597-5000-22

FIGURE 5-16. TROUBLESHOOTING TREE, NO 1 KHZ STOP TONE OPERATION



597-5000-23

FIGURE 5-17. TROUBLESHOOTING TREE, NO SECONDARY CUE TONE OPERATION



597-5000-24

FIGURE 5-18. TROUBLESHOOTING TREE, NO TERTIARY CUE TONE OPERATION

SECTION VI

PARTS LISTS

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 5400C/5500C series cartridge machines. Each table entry in this section is indexed by reference designators appearing on the applicable schematic diagram. Table 6-1 presents the 5400C/5500C series replaceable parts list index.

TABLE 6-1. REPLACEABLE PARTS LIST INDEX
(Sheet 1 of 2)

TABLE 6-1. REPLACEABLE PARTS LISTS INDEX
(Sheet 2 of 2)

TABLE 6-2. 5400C CARTRIDGE MACHINE FINAL ASSEMBLY - 900-5401-XXX, 900-5402-XXX, 900-5403-XXX, 900-5404-XXX (Sheet 1 of 2)

REF. DES.	DESCRIPTION	PART NO.	QTY.
	117V AC 60 Hz ASSEMBLY		
C1	Capacitor, 60 Hz Motor Start, 0.95 uF, 300V ac	029-1075	1
F1	Fuse, AGC, 1.5 Ampere	334-0150	1
XF1	Fuse Holder, North American Standard (Designed for operation with the ac Input Receptacle)	415-0006	1
----	Motor Assembly, 117V 60 Hz, 7.5 Inches Per Second	950-1311	1
	220V AC 50 Hz ASSEMBLY		
C1	Capacitor, 60 Hz Motor Start, 0.95 uF, 300V ac	029-1075	1
F1	Fuse, AGC, 3/4 Ampere	330-0075	1
XF1	Fuse Holder, International Standard (Designed for operation with the ac Input Receptacle)	415-0007	1
----	Motor Assembly, 220V 50 Hz, 7.5 Inches Per Second	950-1371	1
----	AC Line Cord, CEE 7/7 3-Wire European Plug	682-0003	1
----	Head, Dummy, H801016	407-0001	3
----	Bearing Support Bracket with Bearing	478-0099	1
----	Head Box Assembly	950-0302	3
----	Deck Assembly, Removable	950-0300-001	2
----	Accessory Parts Assembly	950-5417	1
----	5400C Cartridge Machine Basic Assembly	950-5411	1
	ADDITIONAL PARTS FOR MODEL 5401 CARTRIDGE MACHINES - 900-5401-XXX		
T2 THRU T4	Output Transformer Assembly	950-0077	3
----	Head, Playback, Monophonic, 2-Channel, Model NPD1484 Inductance at 1 kHz: 475 mH Impedance at 1 kHz: 3.3 Ohms DC Resistance: 500 Ohms	250-0006	3
----	Tapehead Amplifier Circuit Board Assembly, Monophonic	910-0092	3
----	Control Circuit Board Assembly Without Cue Tones	910-0108	3
	ADDITIONAL PARTS FOR MODEL 5402 CARTRIDGE MACHINES - 900-5402-XXX		
T2 THRU T4	Output Transformer Assembly	950-0077	3
----	Head, Playback, Monophonic, 2-Channel, Model NPD1484 Inductance at 1 kHz: 475 mH Impedance at 1 kHz: 3.3 Ohms DC Resistance: 500 Ohms	250-0006	3
----	Tapehead Amplifier Circuit Board Assembly, Monophonic	910-0092	3
----	Control Circuit Board Assembly With Cue Tones	910-0109	3
	ADDITIONAL PARTS FOR MODEL 5403 CARTRIDGE MACHINES - 900-5403-XXX		
T2 THRU T7	Output Transformer Assembly	950-0077	6
----	Head, Playback, Stereophonic, 3-Channel, Model NPD1496 Inductance at 1 kHz: 475 mH Impedance at 1 kHz: 3.3 Ohms DC Resistance: 500 Ohms	250-0007	3
----	Tapehead Amplifier Circuit Board Assembly, Stereophonic	910-0092-001	3
----	Control Circuit Board Assembly Without Cue Tones	910-0108	3

TABLE 6-2. 5400C CARTRIDGE MACHINE FINAL ASSEMBLY - 900-5401-XXX, 900-5402-XXX, 900-5403-XXX, 900-5404-XXX (Sheet 2 of 2)

REF. DES.	DESCRIPTION	PART NO.	QTY.
	ADDITIONAL PARTS FOR MODEL 5404 CARTRIDGE MACHINES - 900-5404-XXX		
T2 THRU T7	Output Transformer Assembly	950-0077	6
----	Head, Playback, Stereophonic, 3-Channel, Model NPD1496 Inductance at 1 kHz: 475 mH Impedance at 1 kHz: 3.3 Ohms DC Resistance: 500 Ohms	250-0007	3
----	Tapehead Amplifier Circuit Board Assembly, Stereophonic	910-0092-001	3
----	Control Circuit Board Assembly With Cue Tones	910-0109	3

TABLE 6-3. 5500C CARTRIDGE MACHINE FINAL ASSEMBLY - 900-5501-XXX, 900-5502-XXX, 900-5503-XXX, 900-5504-XXX (Sheet 1 of 2)

REF. DES.	DESCRIPTION	PART NO.	QTY.
	117V AC 60 Hz ASSEMBLY		
C1	Capacitor, 60 Hz Motor Start, 0.95 uF, 300V ac	029-1075	1
F1	Fuse, AGC, 1.5 Ampere	334-0150	1
XF1	Fuse Holder, North American Standard (Designed for operation with the ac Input Receptacle)	415-0006	1
----	Motor Assembly, 117V 60 Hz, 7.5 Inches Per Second	950-1511	1
	220V AC 50 Hz ASSEMBLY		
C1	Capacitor, 50 Hz Motor Start, 1.4 uF, 250V ac	029-1463	1
F1	Fuse, AGC, 3/4 Ampere	330-0075	1
XF1	Fuse Holder, International Standard (Designed for operation with the ac Input Receptacle)	415-0007	1
----	Motor Assembly, 220V 50 Hz, 7.5 Inches Per Second	950-1571	1
----	AC Line Cord, CEE 7/7 3-Wire European Plug	682-0003	1
----	Head, Dummy, H801016	407-0001	5
----	Bearing Support Bracket with Bearing	478-0099	1
----	Head Box Assembly	950-0302	5
----	Deck Assembly, Removable	950-0300-001	4
----	Accessory Parts Assembly	950-5517	1
----	5500C Cartridge Machine Basic Assembly	950-5511	1
	ADDITIONAL PARTS FOR MODEL 5501 CARTRIDGE MACHINES - 900-5501-XXX		
T2 THRU T6	Output Transformer Assembly	950-0077	5
----	Head, Playback, Monophonic, 2-Channel, Model NPD1484 Inductance at 1 kHz: 475 mH Impedance at 1 kHz: 3.3 Ohms DC Resistance: 500 Ohms	250-0006	5
----	Tapehead Amplifier Circuit Board Assembly, Monophonic	910-0092	5
----	Control Circuit Board Assembly Without Cue Tones	910-0108	5
	ADDITIONAL PARTS FOR MODEL 5502 CARTRIDGE MACHINES - 900-5502-XXX		
T2 THRU T6	Output Transformer Assembly	950-0077	5
----	Head, Playback, Monophonic, 2-Channel, Model NPD1484 Inductance at 1 kHz: 475 mH Impedance at 1 kHz: 3.3 Ohms DC Resistance: 500 Ohms	250-0006	5
----	Tapehead Amplifier Circuit Board Assembly, Monophonic	910-0092	5
----	Control Circuit Board Assembly With Cue Tones	910-0109	5

TABLE 6-3. 5500C CARTRIDGE MACHINE FINAL ASSEMBLY - 900-5501-XXX, 900-5502-XXX, 900-5503-XXX, 900-5504-XXX (Sheet 2 of 2)

REF. DES.	DESCRIPTION	PART NO.	QTY.
	ADDITIONAL PARTS FOR MODEL 5503 CARTRIDGE MACHINES - 900-5503-XXX		
T2 THRU T11	Output Transformer Assembly	950-0077	10
----	Head, Playback, Stereophonic, 3-Channel, Model NPD1496 Inductance at 1 kHz: 475 mH Impedance at 1 kHz: 3.3 Ohms DC Resistance: 500 Ohms	250-0007	5
----	Tapehead Amplifier Circuit Board Assembly, Stereophonic	910-0092-001	5
----	Control Circuit Board Assembly Without Cue Tones	910-0108	5
	ADDITIONAL PARTS FOR MODEL 5504 CARTRIDGE MACHINES - 900-5504-XXX		
T2 THRU T11	Output Transformer Assembly	950-0077	10
----	Head, Playback, Stereophonic, 3-Channel, Model NPD1496 Inductance at 1 kHz: 475 mH Impedance at 1 kHz: 3.3 Ohms DC Resistance: 500 Ohms	250-0007	5
----	Tapehead Amplifier Circuit Board Assembly, Stereophonic	910-0092-001	5
----	Control Circuit Board Assembly With Cue Tones	910-0109	5

TABLE 6-4. MOTOR ASSEMBLIES, 117V 60 Hz AND 220V 50 Hz 950-1311/-1371/-1511/-1571

REF. DES.	DESCRIPTION	PART NO.	QTY.
	5400C 117V AC 60 Hz ASSEMBLY		
M1	Motor, Synchronous, 60 Hz, 450 RPM @ 7 Inch-Ounces, 7.5 Inches per Second (19.05 cm/second), 117V ±10% @ 24W, Model: NAH-1603B6C3L	382-1311-1	1
	5400C 220V AC 50 Hz ASSEMBLY		
M1	Motor, Synchronous, 50 Hz, 500 RPM @ 10 Inch-Ounces, 7.5 Inches per Second (19.05 cm/second), 117V ±10% @ 25W, Model: NAH-1202A5C3L	382-1371-1	1
	5500C 117V AC 60 Hz ASSEMBLY		
M1	Motor, Synchronous, 60 Hz, 450 RPM @ 7 Inch-Ounces, 7.5 Inches per Second (19.05 cm/second), 117V ±10% @ 24W, Model: NAH-1603B6C5L	382-1511-1	1
	5500C 220V AC 50 Hz ASSEMBLY		
M1	Motor, Synchronous, 50 Hz, 500 RPM @ 10 Inch-Ounces, 7.5 Inches per Second (19.05 cm/second), 117V ±10% @ 25W, Model: NAH-1202A5C5L	382-1571-1	1
----	Bearing, Ball, 609Z (Upper Motor) Outside Diameter: 0.9348 Inches (2.37 cm) Inside Diameter: 0.355 Inches (0.902 cm) Height: 0.275 Inches (0.698 cm)	442-0609	1
----	Bearing, Ball, 699Z (Lower Motor) Outside Diameter: 0.7873 Inches (1.99 cm) Inside Diameter: 0.355 Inches (0.902 cm) Height: 0.2346 Inches (0.596 cm)	442-1023	1
----	Connector Housing, 6-Pin	418-0670	1
----	Pins, Connector	417-0053	6

TABLE 6-5. AUDIO OUTPUT TRANSFORMER ASSEMBLY - 950-0077

REF. DES.	DESCRIPTION	PART NO.	QTY.
----	Transformer, Audio Output Primary Impedance: 600 Ohm Secondary Impedance: 600 Ohm Frequency Response: ±2 dB, 30 Hz to 20 kHz Maximum Level: +15 dB	371-0009	1
----	Contact Housing, 4-Pin In-line	417-0138	1
----	Pins, Crimp	417-8766	4

TABLE 6-6. MONOPHONIC AND STEREOPHONIC TAPEHEAD AMPLIFIER CIRCUIT BOARD ASSEMBLY 910-0092/-001 (Sheet 1 of 3)

REF. DES.	DESCRIPTION	PART NO.	QTY.
C1	Capacitor, Electrolytic, 4.7 uF, 35V	024-4753	1
C2	Capacitor, Electrolytic, 1 uF, 50V	024-1064	1
C3	Capacitor, Mica, 100 pF ±5%, 500V	040-1022	1
C4	Capacitor, Electrolytic, 47 uF, 35V	020-4773	1
C7	Capacitor, Mica, 100 pF ±5%, 500V	040-1022	1
C8	Capacitor, Electrolytic, 47 uF, 35V	020-4773	1
C9	Capacitor, Mylar, 0.1 uF ±10%, 100V	030-1053	1
C10	Capacitor, Polycarbonate, 0.01 uF ±2%, 100V	037-1043	1
C11	Capacitor, Electrolytic, 47 uF, 35V	020-4773	1
C12	Capacitor, Electrolytic, 4.7 uF, 35V	024-4753	1
C13	Capacitor, Polycarbonate, 0.01 uF ±2%, 100V	037-1043	1
C16	Capacitor, Electrolytic, 4.7 uF, 35V	024-4753	1
C17	Capacitor, Mylar, 0.1 uF ±10%, 100V	030-1053	1
C19	Capacitor, Mica, 10 pF ±5%, 500V	042-1012	1
C20	Capacitor, Electrolytic, 4.7 uF, 35V	024-4753	1
C21	Capacitor, Mica, 10 pF ±5%, 500V	042-1012	1
C23,C25, C26	Capacitor, Electrolytic, 4.7 uF, 35V	024-4753	3
C27	Capacitor, Electrolytic, 10 uF, 35V	023-1076	1
C29,C30	Capacitor, Polycarbonate, 0.01 uF ±2%, 100V	037-1043	2
C31,C32	Capacitor, Electrolytic, 4.7 uF, 35V	024-4753	2
C34	Capacitor, Mica, 390 pF ±5%, 100V	042-3922	1
C36,C37	Capacitor, Polycarbonate, 0.01 uF ±2%, 100V	037-1043	2
C38	Capacitor, Mica, 390 pF ±5%, 100V	042-3922	1
C40,C42, C43	Capacitor, Electrolytic, 4.7 uF, 35V	024-4753	3
C45	Capacitor, Electrolytic, 47 uF, 35V	020-4773	1
C47	Capacitor, Electrolytic, 4.7 uF, 35V	024-4753	1
C48,C49	Capacitor, Mylar, 0.1 uF ±10%, 100V	030-1053	2
C50,C52	Capacitor, Electrolytic, 10 uF, 35V	023-1076	2
D1 THRU D5	Diode, 1N4148, Silicon, 75V @ 0.3 Amperes	203-4148	5
E1 THRU E9	Receptacle, Single Pin	417-0071-001	9
K1	Relay, RRD52A12, Solid State, Plug-In Coil: 12V dc, 400 Ohms dc Resistive Contacts: DPST, 0.5A @ 100V dc Maximum	270-0046	1
L1,L3	Choke, Ferrite, 4-Leg	956-0002	2
Q1	Transistor, 2N3904, NPN, Silicon, TO-92 Case	211-3904	1
R1	Resistor, 150 k Ohm ±5%, 1/4W	100-1563	1
R2	Resistor, 10 k Ohm ±5%, 1/4W	100-1053	1
R3	Resistor, 300 k Ohm ±5%, 1/4W	100-3063	1
R4	Resistor, 680 Ohm ±5%, 1/4W	100-6833	1
R7	Resistor, 300 k Ohm ±5%, 1/4W	100-3063	1
R8	Resistor, 510 Ohm ±5%, 1/4W	100-5133	1
R9	Resistor, 10 Ohm ±5%, 1/4W	100-1023	1
R10,R11	Resistor, 100 Ohm ±5%, 1/4W	100-1033	2
R12	Resistor, 300 k Ohm ±5%, 1/4W	100-3063	1
R15	Resistor, 100 Ohm ±5%, 1/4W	100-1033	1
R16	Resistor, 300 k Ohm ±5%, 1/4W	100-3063	1
R18	Potentiometer, 10 k Ohm ±10%, 1/2W	178-1054	1
R20	Resistor, 13 k Ohm ±5%, 1/4W	100-1353	1
R22,R23	Resistor, 3.3 k Ohm ±5%, 1/4W	100-3343	2

TABLE 6-6. MONOPHONIC AND STEREOPHONIC TAPEHEAD AMPLIFIER CIRCUIT BOARD ASSEMBLY
910-0092/-001 (Sheet 2 of 3)

REF. DES.	DESCRIPTION	PART NO.	QTY.
R24	Resistor, 4.7 k Ohm ±5%, 1/4W	100-4743	1
R25	Resistor, 1 k Ohm ±5%, 1/4W	100-1043	1
R26	Potentiometer, 50 k Ohm ±10%, 1/2W	178-5054	1
R27	Resistor, 13 k Ohm ±5%, 1/4W	100-1353	1
R30	Resistor, 1 k Ohm ±5%, 1/4W	100-1043	1
R31	Resistor, 100 k Ohm ±5%, 1/4W	100-1063	1
R32	Resistor, 100 Ohm ±5%, 1/4W	100-1033	1
R33	Resistor, 13 k Ohm ±5%, 1/4W	100-1353	1
R34	Resistor, 100 Ohm ±5%, 1/4W	100-1033	1
R37	Resistor, 10 Ohm ±5%, 1/4W	100-1023	1
R38	Potentiometer, 500 k Ohm ±10%, 1/2W	178-5064	1
R39	Resistor, 2.32 k Ohm ±1%, 1/4W	103-2341	1
R40	Resistor, 34.8 k Ohm ±1%, 1/4W	103-3485	1
R41	Resistor, 8.2 k Ohm ±5%, 1/4W	100-8243	1
R42	Resistor, 10 k Ohm ±5%, 1/4W	100-1053	1
R45	Resistor, 137 k Ohm ±1%, 1/4W	103-1376	1
R46	Potentiometer, 500 k Ohm ±10%, 1/2W	178-5064	1
R47,R50	Resistor, 10 Ohm ±5%, 1/4W	100-1023	2
R51	Resistor, 4.7 k Ohm ±5%, 1/4W	100-4743	1
R53	Resistor, 29.4 k Ohm ±1%, 1/4W	103-2945	1
R54	Resistor, 1.96 k Ohm ±1%, 1/4W	103-1964	1
R55,R57	Resistor, 17.4 k Ohm ±1%, 1/4W	103-1745	2
R58	Resistor, 10.2 k Ohm ±1%, 1/4W	103-1025	1
R61	Resistor, 118 k Ohm ±1%, 1/4W	103-1186	1
R62,R63	Resistor, 10 Ohm ±5%, 1/4W	100-1023	2
R64	Resistor, 17.4 k Ohm ±1%, 1/4W	103-1745	1
R67	Resistor, 20 k Ohm ±5%, 1/4W	100-2053	1
R68	Resistor, 10 k Ohm ±5%, 1/4W	100-1053	1
R69	Resistor, 10 Ohm ±5%, 1/4W	100-1023	1
R71	Resistor, 10 k Ohm ±5%, 1/4W	100-1053	1
R72	Resistor, 10 Ohm ±5%, 1/4W	100-1023	1
R73	Resistor, 10 Meg Ohm ±5%, 1/4W	100-1083	1
R74	Resistor, 100 k Ohm ±5%, 1/4W	100-1063	1
R75	Resistor, 1 k Ohm ±5%, 1/4W	100-1043	1
R76	Resistor, 4.3 k Ohm ±5%, 1/4W	100-4343	1
U1	Integrated Circuit, LM340T-12, Fixed Positive 12V Regulator, TO-220 Case	227-7812	1
U2,U4	Integrated Circuit, LM833N, Dual Audio Operational Amplifier, 8-Pin DIP	220-0833	2
U5	Integrated Circuit, TL072CP, Dual JFET-Input Operational Amplifier, 8-Pin DIP	221-0072	1
U6	Integrated Circuit, LM833N, Dual Audio Operational Amplifier, 8-Pin DIP	220-0833	1
U8	Integrated Circuit, TL072CP, Dual JFET-Input Operational Amplifier, 8-Pin DIP	221-0072	1
XK1	Socket, 14-Pin DIP	417-1404	1
XU2,XU4, XU5,XU6,XU8	Socket, 8-Pin DIP	417-0804	5
----	Blank Circuit Board	510-0092	1

ADDITIONAL PARTS FOR STEREOPHONIC TAPEHEAD AMPLIFIER AMPLIFIER CIRCUIT BOARD ASSEMBLY - 910-0092-001

C5	Capacitor, Mica, 100 pF ±5%, 500V	040-1022	1
C6	Capacitor, Electrolytic, 47 uF, 35V	020-4773	1
C14	Capacitor, Electrolytic, 4.7 uF, 35V	024-4753	1
C15	Capacitor, Polycarbonate, 0.01 uF ±2%, 100V	037-1043	1
C18	Capacitor, Mylar, 0.1 uF ±10%, 100V	030-1053	1
C22	Capacitor, Mica, 10 pF ±5%, 500V	042-1012	1
C24	Capacitor, Electrolytic, 4.7 uF, 35V	024-4753	1
C28	Capacitor, Electrolytic, 10 uF, 35V	023-1076	1
C33	Capacitor, Electrolytic, 4.7 uF, 35V	024-4753	1
C35,C39	Capacitor, Mica, 390 pF ±5%, 100V	042-3922	2
C41,C44	Capacitor, Electrolytic, 4.7 uF, 35V	024-4753	2
C46	Capacitor, Electrolytic, 47 uF, 35V	020-4773	1
C51	Capacitor, Electrolytic, 10 uF, 35V	023-1076	1

TABLE 6-6. MONOPHONIC AND STEREOPHONIC TAPEHEAD AMPLIFIER CIRCUIT BOARD ASSEMBLY 910-0092/-001 (Sheet 3 of 3)

REF. DES.	DESCRIPTION	PART NO.	QTY.
	ADDITIONAL PARTS FOR STEREOPHONIC TAPEHEAD AMPLIFIER AMPLIFIER CIRCUIT BOARD ASSEMBLY - 910-0092-001 (Cont'd)		
L2	Choke, Ferrite, 4-Leg	956-0002	1
R5	Resistor, 300 k Ohm ±5%, 1/4W	100-3063	1
R6	Resistor, 680 Ohm ±5%, 1/4W	100-6833	1
R13	Resistor, 100 Ohm ±5%, 1/4W	100-1033	1
R14	Resistor, 300 k Ohm ±5%, 1/4W	100-3063	1
R19	Potentiometer, 10 k Ohm ±10%, 1/2W	178-1054	1
R21	Resistor, 13 k Ohm ±5%, 1/4W	100-1353	1
R28	Potentiometer, 50 k Ohm ±10%, 1/2W	178-5054	1
R29,R35	Resistor, 13 k Ohm ±5%, 1/4W	100-1353	2
R36	Resistor, 100 Ohm ±5%, 1/4W	100-1033	1
R43	Resistor, 8.2 k Ohm ±5%, 1/4W	100-8243	1
R44	Resistor, 10 k Ohm ±5%, 1/4W	100-1053	1
R48	Potentiometer, 500 k Ohm ±10%, 1/2W	178-5064	1
R49	Resistor, 10 Ohm ±5%, 1/4W	100-1023	1
R52	Resistor, 4.7 k Ohm ±5%, 1/4W	100-4743	1
R56,R59	Resistor, 17.4 k Ohm ±1%, 1/4W	103-1745	2
R60	Resistor, 10.2 k Ohm ±1%, 1/4W	103-1025	1
R65	Resistor, 10 Ohm ±5%, 1/4W	100-1023	1
R66	Resistor, 17.4 k Ohm ±1%, 1/4W	103-1745	1
R70	Resistor, 10 Ohm ±5%, 1/4W	100-1023	1
U3,U7	Integrated Circuit, LM833N, Dual Audio Operational Amplifier, 8-Pin DIP	220-0833	2
XU3,XU7	Socket, 8-Pin DIP	417-0804	2

TABLE 6-7. CONTROL CIRCUIT BOARD ASSEMBLY WITHOUT SECONDARY AND TERTIARY CUE TONE DETECTION CIRCUITRY - 910-0108 (Sheet 1 of 2)

REF. DES.	DESCRIPTION	PART NO.	QTY.
C4,C5	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003-1054	2
C6	Capacitor, Electrolytic, 4.7 uF, 35V	024-4753	1
C9,C14, C19	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003-1054	3
C27	Capacitor, Mylar, 0.01 uF ±10%, 100V	031-1043	1
C28,C29	Capacitor, Electrolytic, 4.7 uF, 35V	024-4753	2
C30	Capacitor, Electrolytic, 47 uF, 35V	020-4770	1
C31,C32	Capacitor, Mylar, 0.01 uF ±10%, 100V	031-1043	2
C33	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003-1054	1
C34	Capacitor, Electrolytic, 3.3 uF, 50V	024-3364	1
D1,D2	Diode, 1N4148, Silicon, 75V @ 0.3 Amperes	203-4148	2
D5,D6	Diode, Zener, 1N4733A, 5.1V ±5%, 1W	200-4733	2
D7,D14	Diode, 1N4148, Silicon, 75V @ 0.3 Amperes	203-4148	2
DS1 THRU DS3	Light-Emitting Diode, HP5082-4487, Red, 1.6V @ 20 mA Maximum, T1 Size (Deck Status Indicators)	323-7344	3
J1,J2	Receptacle, Male, 2-Pin In-line	417-4004	2
P1,P2	Jumper, Programmable	340-0004	2
Q1,Q2	Transistor, MPS-A14, Silicon, NPN, Darlington, TO-92 Case	211-0014	2
R3	Resistor, 4.7 k Ohm ±5%, 1/4W	100-4743	1
R6	Resistor, 100 k Ohm ±5%, 1/4W	100-1063	1
R7	Resistor, 10 k Ohm ±5%, 1/4W	100-1053	1
R8	Resistor, 100 k Ohm ±5%, 1/4W	100-1063	1
R13 THRU R15	Resistor, 1 k Ohm ±5%, 1/4W	100-1043	3
R34,R35	Resistor, 10 k Ohm ±5%, 1/4W	100-1053	2
R46,R47	Resistor, 4.7 k Ohm ±5%, 1/4W	100-4743	2
R50	Resistor, 10 Ohm ±5%, 1/4W	100-1023	1
R51 THRU R53	Resistor, 10 k Ohm ±5%, 1/4W	100-1053	3

TABLE 6-7. CONTROL CIRCUIT BOARD ASSEMBLY WITHOUT SECONDARY AND TERTIARY CUE TONE DETECTION CIRCUITRY - 910-0108 (Sheet 2 of 2)

REF. DES.	DESCRIPTION	PART NO.	QTY.
R54	Resistor, 1 Meg Ohm ±5%, 1/4W	100-1073	1
R55	Resistor, 100 k Ohm ±5%, 1/4W	100-1063	1
R56	Resistor, 1 Meg Ohm ±5%, 1/4W	100-1073	1
R57,R58	Resistor, 3.6 k Ohm ±5%, 1/4W	100-3643	2
R59,R60	Resistor, 100 k Ohm ±5%, 1/4W	100-1063	2
R61	Resistor, 10 k Ohm ±5%, 1/4W	100-1053	1
U1	Integrated Circuit, MC14011BCP, Quad 2-Input NAND Gate, CMOS, 14-Pin DIP	228-4011	1
U2	Integrated Circuit, CD4081B, Quad 2-Input AND Gate, CMOS, 14-Pin DIP	225-0008	1
U8	Integrated Circuit, MC14011BCP, Quad 2-Input NAND Gate, CMOS, 14-Pin DIP	228-4011	1
XU1,XU2, XU8	Socket, 14-Pin DIP	417-1404	3
----	Blank Circuit Board	510-0109	1

TABLE 6-8. CONTROL CIRCUIT BOARD ASSEMBLY WITH SECONDARY AND TERTIARY CUE TONE DETECTION CIRCUITRY - 910-0109 (Sheet 1 of 2)

REF. DES.	DESCRIPTION	PART NO.	QTY.
C2	Capacitor, Mylar, 0.1 uF ±10%, 100V	030-1053	1
C3	Capacitor, Polyester, 0.0033 uF ±10%, 400V	030-3033	1
C4,C5	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003-1054	2
C6	Capacitor, Electrolytic, 4.7 uF, 35V	024-4753	1
C7	Capacitor, Mylar, @.1 uF ±10%, 100V	030-1053	1
C8	Capacitor, Polyester, 0.0033 uF ±10%, 400V	030-3033	1
C9	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003-1054	1
C10 THRU C13	Capacitor, Electrolytic, 4.7 uF, 35V	024-4753	4
C14	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003-1054	1
C15	Capacitor, Mylar, 0.1 uF ±10%, 100V	030-1053	1
C16	Capacitor, Polyester, 0.0033 uF ±10%, 400V	030-3033	1
C17	Capacitor, Mylar, 0.1 uF ±10%, 100V	030-1053	1
C18	Capacitor, Polyester, 0.0033 uF ±10%, 400V	030-3033	1
C19	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003-1054	1
C21	Capacitor, Mylar, 0.1 uF ±10%, 100V	030-1053	1
C22	Capacitor, Mylar, 0.01 uF ±10%, 100V	031-1043	1
C23 THRU C26	Capacitor, Electrolytic, 4.7 uF, 35V	024-4753	4
C27	Capacitor, Mylar, 0.01 uF ±10%, 100V	031-1043	1
C28,C29	Capacitor, Electrolytic, 4.7 uF, 35V	024-4753	2
C30	Capacitor, Electrolytic, 47 uF, 35V	020-4770	1
C31,C32	Capacitor, Mylar, 0.01 uF ±10%, 100V	031-1043	2
C33	Capacitor, Monolythic Ceramic, 0.1 uF ±20%, 50V	003-1054	1
C34	Capacitor, Electrolytic, 3.3 uF, 50V	024-3364	1
C36	Capacitor, Polycarbonate, 0.22 uF ±5%, 50V	037-2254	1
D1 THRU D4	Diode, 1N4148, Silicon, 75V @ 0.3 Amperes	203-4148	4
D5,D6	Diode, 1N4733A, Zener, 5.1V ±5%, 1W	200-4733	2
D7 THRU D14	Diode, 1N4148, Silicon, 75V @ 0.3 Amperes	203-4148	8
DS1 THRU DS3	Light-Emitting Diode, HP5082-4487, Red, 1.6V @ 20 mA Maximum, T1 Size (Deck Status Indicators)	323-7344	3
J1,J2	Receptacle, Male, 2-Pin In-line	417-4004	2
P1,P2	Jumper, Programmable	340-0004	2
K1,K2	Relay, W118DIP4, Solid State, Plug-in Coil: 24V dc, 1200 Ohms dc Resistance Contacts: SPDT, 0.25 Amperes @ 8W	270-0045	2
Q1,Q2	Transistor, MPS-A14, Silicon, NPN, Darlington, TO-92 Case	211-0014	2
Q3,Q4	Transistor, 2N3904, Silicon, NPN, TO-92 Case	211-3904	2
R1	Resistor, 12 k Ohm ±5%, 1/4W	100-1253	1
R2	Resistor, 2 k Ohm ±5%, 1/4W	100-2043	1
R3	Resistor, 4.7 k Ohm ±5%, 1/4W	100-4743	1
R4,R5	Resistor, 2 k Ohm ±5%, 1/4W	100-2043	2
R6	Resistor, 100 k Ohm ±5%, 1/4W	100-1063	1
R7	Resistor, 10 k Ohm ±5%, 1/4W	100-1053	1
R8	Resistor, 100 k Ohm ±5%, 1/4W	100-1063	1
R9,R10	Potentiometer, 50 k Ohm ±10%, 1/2W	178-5054	2

TABLE 6-8. CONTROL CIRCUIT BOARD ASSEMBLY WITH SECONDARY AND TERTIARY CUE TONE DETECTION CIRCUITRY - 910-0109 (Sheet 2 of 2)

REF. DES.	DESCRIPTION	PART NO.	QTY.
R11	Resistor, 22.6 k Ohm ±1%, 1/4W	103-2265	1
R12	Resistor, 13 k Ohm ±1%, 1/4W	103-1305	1
R13 THRU R15	Resistor, 1 k Ohm ±5%, 1/4W	100-1043	3
R16	Resistor, 1.5 k Ohm ±1%, 1/4W	103-1504	1
R17	Resistor, 866 Ohm ±1%, 1/4W	103-8663	1
R18	Resistor, 90.9 k Ohm ±1%, 1/4W	103-9095	1
R19	Resistor, 52.3 k Ohm ±1%, 1/4W	103-5235	1
R20 THRU R23	Resistor, 10 Ohm ±5%, 1/4W	100-1023	4
R24	Resistor, 19.6 k Ohm ±1%, 1/4W	103-1965	1
R25	Resistor, 11.3 k Ohm ±1%, 1/4W	103-1135	1
R26	Resistor, 1.33 k Ohm ±1%, 1/4W	103-1331	1
R27	Resistor, 750 Ohm ±1%, 1/4W	103-7503	1
R28	Resistor, 78.7 k Ohm ±1%, 1/4W	103-7875	1
R29	Resistor, 44.2 k Ohm ±1%, 1/4W	103-4425	1
R30	Resistor, 200 k Ohm ±5%, 1/4W	100-2063	1
R31	Resistor, 100 k Ohm ±5%, 1/4W	100-1063	1
R32 THRU R37	Resistor, 10 k Ohm ±5%, 1/4W	100-1053	6
R38,R39	Resistor, 22 k Ohm ±5%, 1/4W	100-2253	2
R40 THRU R43	Resistor, 10 Ohm ±5%, 1/4W	100-1023	4
R44	Resistor, 10 Meg Ohm ±5%, 1/4W	100-1083	1
R46,R47	Resistor, 4.7 k Ohm ±5%, 1/4W	100-4743	2
R48,R49	Resistor, 3.3 k Ohm ±5%, 1/4W	100-3343	2
R50	Resistor, 10 Ohm ±5%, 1/4W	100-1023	1
R51 THRU R53	Resistor, 10 k Ohm ±5%, 1/4W	100-1053	3
R54	Resistor, 1 Meg Ohm ±5%, 1/4W	100-1073	1
R55	Resistor, 100 k Ohm ±5%, 1/4W	100-1063	1
R56	Resistor, 1 Meg Ohm ±5%, 1/4W	100-1073	1
R57,R58	Resistor, 3.6 k Ohm ±5%, 1/4W	100-3643	2
R59,R60	Resistor, 100 k Ohm ±5%, 1/4W	100-1063	2
R61	Resistor, 10 k Ohm ±5%, 1/4W	100-1053	1
U1	Integrated Circuit, MC14011BCP, Quad 2-Input NAND Gate, CMOS, 14-Pin DIP	228-4011	1
U2	Integrated Circuit, CD4081B, Quad 2-Input AND Gate, CMOS, 14-Pin DIP	225-0008	1
U3 THRU U6	Integrated Circuit, TL072CP, Dual JFET-Input Operational Amplifier, 8-Pin DIP	221-0072	4
U8	Integrated Circuit, MC14011BCP, Quad 2-Input NAND Gate, CMOS, 14-Pin DIP	228-4011	1
XU1,XU2	Socket, 14-Pin DIP	417-1404	2
XU3 THRU XU6	Socket, 8-Pin DIP	417-0804	4
XU8	Socket, 14-Pin DIP	417-1404	1
----	Blank Circuit Board	510-0109	1

TABLE 6-9. HEAD BOX ASSEMBLY - 950-0302

REF. DES.	DESCRIPTION	PART NO.	QTY.
----	Tape Guide	445-0004	2
----	Spring, Head Box	430-0012	6

TABLE 6-10. DECK ASSEMBLIES, FIXED/REMOVABLE - 950-0300/-001

REF. DES.	DESCRIPTION	PART NO.	QTY.
----	Shaft, Pressure Roller	446-0056	1
----	Cross Shaft, Pressure Roller	446-0059	1
----	Pressure Roller	444-0700	1
----	"E" Ring, Pressure Roller	454-3318	1
----	Washer, Nylon (for Pressure Roller) Outside Diameter: 0.312 Inches (0.792 cm) Inside Diameter: 0.190 Inches (0.483 cm) Height: 0.010 Inches (0.254 cm)	423-5008	1
----	Washer, Nylon (for Pressure Roller) Outside Diameter: 0.312 Inches (0.792 cm) Inside Diameter: 0.190 Inches (0.483 cm) Height: 0.015 Inches (0.381 cm)	423-5009	1
----	Switch, Micro, Roller Actuator, SPDT, 5 Amperes @ 125V ac (Deck Ready Switch)	346-0027	1
----	Cartridge Guide, Right	445-0006	1
----	Pressure Pad, Cartridge Guide	459-0123	1
----	Spring, Pressure Pad	430-0011	2
----	Spring, Solenoid	430-0014	1
----	Solenoid Assembly	950-0303	1
----	Head Lead Cable Assembly	940-0056	1

TABLE 6-11. SOLENOID ASSEMBLY - 950-0303

REF. DES.	DESCRIPTION	PART NO.	QTY.
----	Solenoid, 32V dc, 1.75 Diameter, Resistance: 37.5 Ohm ±10%	280-0003	1
----	Pins, Connector	417-0142	2

TABLE 6-12. ACCESSORY PARTS KIT - 950-5417, 950-5517

REF. DES.	DESCRIPTION	PART NO.	QTY.
	5400C		
P101,P201, P301	Connector, Male, 25-Pin, D-Type (Mating Connectors for Rear-Panel Output Connectors)	417-0251	3
----	Pins, Connector (for Output Mating Connectors)	418-0048	75
----	Pressure Roller Indentation Gauge	300-0013	1
	5500C		
P101, P201, P301, P401, P501	Connector, Male, 25-Pin, D-Type (Mating Connectors for Rear-Panel Output Connectors)	417-0251	5
----	Pins, Connector (for Output Mating Connectors)	418-0048	125
----	Solenoid Pressure Gauge	300-0013	1

TABLE 6-13. 5400C CARTRIDGE MACHINE BASIC ASSEMBLY - 950-5411
(Sheet 1 of 2)

REF. DES.	DESCRIPTION	PART NO.	QTY.
C1 THRU C3	Capacitor, Electrolytic, 4.7 uF, 35V	024-4753	3
DS1 THRU DS3	Light-Emitting Diode, Green, Miniature, L321DG, 2.5V @ 20 mA Maximum (Deck Run Indicators)	320-0009	3
DS1 THRU DS6	Lamp, Wedge-base, No. 85, 28V @ 0.04 Amperes (START/STOP Indicators)	321-0085	6
J1	Receptacle, Male, 6-Pin Dual-in-Line	417-2600	1
Q1	Transistor, Power, 2N3055, Silicon, NPN, TO-3 Case	219-3055	1
R1	Resistor, 470 Ohm ±5%, 1/4W	100-4733	1
R2	Resistor, 1.8 k Ohm ±5%, 1/4W	100-1843	1
R3,R4	Resistor, 470 Ohm ±5%, 1/4W	100-4733	2

TABLE 6-13. 5400C CARTRIDGE MACHINE BASIC ASSEMBLY - 950-5411
(Sheet 2 of 2)

REF. DES.	DESCRIPTION	PART NO.	QTY.
R5	Resistor, 1.8 k Ohm ±5%, 1/4W	100-1843	1
R6,R7	Resistor, 470 Ohm ±5%, 1/4W	100-4733	2
R8	Resistor, 1.8 k Ohm ±5%, 1/4W	100-1843	1
R9	Resistor, 470 Ohm ±5%, 1/4W	100-4733	1
S1	Switch, Miniature Toggle, 5A @ 120V ac or 2A @ 250V ac (PWR ON/OFF Switch)	348-7101	1
S2 THRU S7	Switch, Micro, Momentary Contact, SPDT, Illuminated, 0.1 Ampere @ 125V ac/dc (Deck START/STOP Switches)	340-0015	6
----	Mounting Bracket, Bearing Support	470-0480	1
----	Cartridge Guide, Left	445-0008	3
----	Pressure Pad, Cartridge Guide	459-0123	3
----	Pressure Guide, Cartridge, Left	430-0010	3
----	Spring, Pressure Pad	430-0011	6
----	Overlay, Front Panel	595-0006-001	1
----	Overlay, Deck 1	595-0007-001	1
----	Overlay, Deck 2	595-0007-002	1
----	Overlay, Deck 3	595-0007-003	1
----	AC Input Receptacle	418-0043	1
----	Switch Cap, Green	340-0019	3
----	Switch Cap, Yellow	340-0014	3
----	Socket, Transistor, TO-3 Case (for Transistor Q1)	417-0298	1
----	Insulator, Transistor Mounting, TO-3 Case (for Q1)	418-0010	1
----	Connector, Header, 6-Pin	417-0200	.3
----	Printed Circuit Board Guide, 4 Slot	407-0082-001	2
----	Printed Circuit Board Guide, 2 Slot	407-0082-002	2
----	Motherboard Circuit Board Assembly	910-0091-001	1
----	Power Supply Circuit Board Assembly	914-1809	1
----	Cable Assembly	940-0054	1
----	Deck Assembly, Fixed	950-0300	1
----	Power Transformer Assembly	950-0080	1
----	Solenoid Foldback Assembly	950-0305	1
----	Blank Circuit Board, Front Panel	510-0035	1
----	Blank Circuit Board, Run Indicator	510-0084	1

TABLE 6-14. 5400C MOTHERBOARD ASSEMBLY - 910-0091-001

REF. DES.	DESCRIPTION	PART NO.	QTY.
C101,C201, C301	Capacitor, Tantalum, 1 uF, 35V	064-1063	3
J1 THRU J6	Connector, 22-Pin, Dual In-line, Printed Circuit Board	417-2300	6
J7 THRU J9	Receptacle, Male, 4-Pin In-line (to Audio Output Transformers)	417-6000-004	3
J10 THRU J12	Receptacle, Male, 4-Pin (to Bulkhead Connectors)	418-0255	3
J13 THRU J16	Receptacle, Male, 26-Pin Dual In-line (3 to Rear Panel Connectors and 1 to Front Panel Circuit Board)	417-2600	4
J18 THRU J20	Receptacle, Male, 4-Pin In-line (to Audio Output Transformers)	417-6000-004	3
Q101,Q201, Q301	Transistor, GES5816, Silicon, NPN, TO-92 Case	211-5816	3
Q102,Q202, Q302	Transistor, TIP-31A, Silicon, NPN, TO-220 AB Case	219-0031	3
R101,R201, R301	Resistor, 1 Ohm ±5%, 1/2W	110-1013	3
R102,R202, R302	Resistor, 1 k Ohm ±5%, 1/4W	100-1043	3
R103,R203, R303	Resistor, 10 k Ohm ±5%, 1/4W	100-1053	3
R104,R204, R304	Resistor, 2.2 k Ohm ±5%, 1/4W	100-2243	3
R105,R205, R305	Resistor, 4.7 k Ohm ±5%, 1/4W	100-4743	3
R106,R206, R306	Resistor, 100 Ohm ±5%, 1/4W	100-1033	3
----	Blank Circuit Board	510-0091	1

TABLE 6-15. 5400C SERIES CARTRIDGE MACHINE CABLE ASSEMBLY - 940-0054

REF. DES.	DESCRIPTION	PART NO.	QTY.
J35 THRU J37	Receptacle, Female, 15-Pin, D-Type (Bulkhead Connector)	417-1504	3
J101,J201, J301	Connector, Female, 25-Pin (Rear-Panel Deck Connectors)	418-3221	3
P1	Connector, Housing, 2-Pin (AC Input to Power Supply Circuit Board)	418-0701	1
P2	Connector, Housing, 6-Pin (Front Panel Run Indicator Circuit Board Assembly to Front Panel Control Circuit Board Assembly)	417-0601	1
P4	Connector, Housing, 4-Pin	418-0240	1
P5	Connector, Housing, 6-Pin	418-0670	1
P10,P11,P12	Connector, Housing, 4-Pin	418-0240	3
P1,P13 THRU P16	Connector, Ribbon Cable, 26-Pin	418-2600	5
P33	Connector, Housing, 20-Pin	417-0122	1
P34	Connector, Housing, 4-Pin	418-0240	1
P38	Connector, Housing, 6-Pin	418-0670	1
----	Pins, Connector (for J2)	417-8766	26
----	Pins, Socket (for Connector Housing P1 and P4)	417-0053	27
----	Pins, Connector	417-0142	63
----	Pins, Socket	417-0143	45

TABLE 6-16. 5400C SOLENOID FOLDBACK ASSEMBLY - 950-0305

REF. DES.	DESCRIPTION	PART NO.	QTY.
R1 THRU R3	Resistor, 62 Ohm ±1%, 10W, W/W	130-6221	3
----	5400C Solenoid Foldback Circuit Board Assembly	910-0039	1

TABLE 6-17. 5400C SOLENOID FOLDBACK CIRCUIT BOARD ASSEMBLY - 910-0039

REF. DES.	DESCRIPTION	PART NO.	QTY.
C1 THRU C3	Capacitor, Mylar, 0.022 uF ±10%, 100V	031-2243	3
D1 THRU D3	Diode, 1N4148, Dilicon, 75V @ 0.3 Amperes	203-4148	3
J1	Connector, Header, 20-Pin In-line	417-0200	1
J2	Connector, Male, 4-Pin	418-0255	1
Q1 THRU Q3	Transistor, 2N3904, NPN, Silicon, TO-92 Case	211-3904	3
Q6 THRU Q8	Transistor, TIP125, Silicon, PNP, Darlington, TO-220 Case	210-0125	3
R1 THRU R3	Resistor, 330 k Ohm ±5%, 1/4W	100-3363	3
R6 THRU R8	Resistor, 10 k Ohm ±5%, 1/4W	100-1053	3
----	Blank Circuit Board	510-0039	1

TABLE 6-18. 5500C CARTRIDGE MACHINE BASIC ASSEMBLY - 950-5511
(Sheet 1 of 2)

REF. DES.	DESCRIPTION	PART NO.	QTY.
C1 THRU C5	Capacitor, Electrolytic, 4.7 uF, 35V	024-4753	5
DS1 THRU DS5	Light-Emitting Diode, Green, Diffused, 2.5V @ 40 mA Maximum (Deck Run Indicators)	323-9224	5
DS1 THRU DS10	Lamp, Wedge-base, No. 85, 28V @ 0.04 Amperes (START/STOP Indicators)	321-0085	10
J1	Receptacle, Male, 26-Pin Dual In-Line	417-2600	1
P2	Connector, Header, 20-Pin	417-0200	0.3
Q1	Transistor, Power, 2N3055, Silicon, NPN, TO-3 Case	219-3055	1
R1 THRU R10	Resistor, 470 Ohm ±5%, 1/4W	100-4733	10
R11 THRU R15	Resistor, 1.8 k Ohm ±5%, 1/4W	100-1843	5
S1	Switch, Miniature Toggle, SPDT, 5A @ 120V ac or 2A @ 250V ac (PWR ON/OFF Switch)	348-7101	1

TABLE 6-18. 5500C CARTRIDGE MACHINE BASIC ASSEMBLY - 950-5511
(Sheet 2 of 2)

REF. DES.	DESCRIPTION	PART NO.	QTY.
S2 THRU S11	Switch, Micro, Momentary Contact, SPDT, Illuminated, 0.1 Ampere @ 125V ac/dc (Deck START/STOP Switches)	340-0015	10
----	Mounting Bracket, Bearing Support	470-0480	1
----	Cartridge Guide, Left	445-0008	5
----	Pressure Pad, Cartridge Guide	459-0123	5
----	Pressure Guide, Cartridge, Left	430-0010	5
----	Spring, Pressure Pad	430-0011	10
----	Overlay, Front Panel	595-0063	1
----	AC Input Receptacle	418-0043	1
----	Switch Cap, Green	340-0019	5
----	Switch Cap, Yellow	340-0014	5
----	Socket, Transistor, TO-3 Case (for Transistor Q1)	417-0298	1
----	Insulator, Transistor Mounting, TO-3 Case (for Q1)	418-0010	1
----	Receptacle, Used with 420-0018	421-0019	1
----	Printed Circuit Board Guide, 4 Slot	407-0082-001	4
----	Printed Circuit Board Guide, 2 Slot	407-0082-002	2
----	Motherboard Circuit Board Assembly	914-1808	1
----	Power Supply Circuit Board Assembly	914-1809	1
----	5500C Cable Assembly	940-0055	1
----	Deck Assembly, Fixed	950-0300	1
----	Power Transformer Assembly	950-0080	1
----	Solenoid Foldback Assembly	950-0304	1
----	Blank Circuit Board, Front Panel	510-0036	1

TABLE 6-19. 5500C MOTHERBOARD ASSEMBLY - 914-1808
(Sheet 1 of 2)

REF. DES.	DESCRIPTION	PART NO.	QTY.
C101,C201, C301,C401, C501	Capacitor, Tantalum, 1 uF, 35V	064-1063	5
J1 THRU J10	Connector, 22-Pin, Dual In-line, Printed Circuit Board	417-2300	10
J11 THRU J15	Connector, Header, 4-Pin (To Output Transformer Assembly)	417-0070	5
J16 THRU J20	Connector, Male, 4-Pin (To Deck Solenoids)	418-0255	5
J21 THRU J26	Connector, Header, 13-Pin, Dual In-line (5 to Rear Panel Connectors and 1 to Front Panel Circuit Board)	417-2600	6
J27	Receptacle		
	Housing, 6-Pin (to Power Supply)	417-0677	1
	Pins, Receptacle	417-0053	6
J28 THRU J32	Connector, Header, 4-Pin (To Output Transformer Assembly)	417-0070	5
Q101,Q201, Q301,Q401, Q501	Transistor, GES5816, Silicon, NPN, TO-92 Case	211-5816	5
Q102,Q202, Q302,Q402, Q502	Transistor, TIP-31A, Silicon, NPN, TO-220 AB Case	219-0031	5
R101,R201, R301,R401, R501	Resistor, 1 Ohm ±5%, 1/2W	110-1013	5
R102,R202, R302,R402, R502	Resistor, 1 k Ohm ±5%, 1/4W	100-1043	5
R103,R203, R303,R403, R503	Resistor, 10 k Ohm ±5%, 1/4W	100-1053	5
R104,R204, R304,R404, R504	Resistor, 2.2 k Ohm ±5%, 1/4W	100-2243	5

TABLE 6-19. 5500C MOTHERBOARD ASSEMBLY - 914-1808
(Sheet 2 of 2)

REF. DES.	DESCRIPTION	PART NO.	QTY.
R105,R205, R305,R405, R505	Resistor, 4.7 k Ohm ±5%, 1/4W	100-4743	5
R106,R206, R306,R406, R506	Resistor, 100 Ohm ±5%, 1/4W	100-1033	5
----	Blank Circuit Board	514-1808	1

TABLE 6-20. 5500C SERIES CARTRIDGE MACHINE CABLE ASSEMBLY - 940-0055

REF. DES.	DESCRIPTION	PART NO.	QTY.
J35 THRU J39	Receptacle, Female, 15-Pin, D-Type (Bulkhead Connector)	417-1504	5
J101,J201, J301,J401, J501	Connector, 25-Pin (Rear-Panel Deck Connectors)	418-3221	5
P1	Connector, Housing, 2-Pin (AC Input to Power Supply Circuit Board)	418-0701	1
P2	Connector, Housing, 6-Pin (Front Panel Run Indicator Circuit Board Assembly to Front Panel Control Circuit Board Assembly)	417-0601	1
P4	Connector, Housing, 4-Pin	418-0240	1
P5	Connector, Housing, 6-Pin	418-0670	1
P16 THRU P20	Connector, Housing, 4-Pin	418-0240	5
P1,P21 THRU P26	Connector, Ribbon Cable, 26-Pin	418-2600	7
P27	Connector, Housing, 6-Pin	418-0670	1
P33	Connector, Housing, 20-Pin	417-0122	1
P34	Plug, 4-Pin	418-0240	1
----	Pins, Connector (for P2)	417-8766	26
----	Pins, Receptacle	417-0053	37
----	Pins, Connector	417-0142	111
----	Pins, Socket	417-0143	75

TABLE 6-21. 5500C SOLENOID FOLDBACK - 950-0304

REF. DES.	DESCRIPTION	PART NO.	QTY.
R1 THRU R5	Resistor, 62 Ohm ±1%, 10W, W/W	130-6221	5
----	5500C Solenoid Foldback Circuit Board Assembly	910-0040	1

TABLE 6-22. 5500C SOLENOID FOLDBACK CIRCUIT BOARD ASSEMBLY - 910-0040

REF. DES.	DESCRIPTION	PART NO.	QTY.
C1 THRU C5	Capacitor, Mylar Film, 0.022 uF ±10%, 100V	031-2243	5
D1 THRU D5	Diode, 1N4148, Silicon, 75V @ 0.3 Amperes	203-4148	5
J1	Connector, Header, 20-Pin	417-0200	1
J2	Plug, 4-Pin	418-0255	1
Q1 THRU Q5	Transistor, 2N3904, NPN, Silicon, TO-92 Case	211-3904	5
Q6 THRU Q10	Transistor, TIP125, Silicon, PNP, Darlington, TO-220 Case	210-0125	5
R1 THRU R5	Resistor, 330 k Ohm ±5%, 1/4W	100-3363	5
R6 THRU R10	Resistor, 10 k Ohm ±5%, 1/4W	100-1053	5
----	Blank Circuit Board	510-0039	1

TABLE 6-23. POWER SUPPLY CIRCUIT BOARD ASSEMBLY - 914-1809

REF. DES.	DESCRIPTION	PART NO.	QTY.
C1 THRU C3	Capacitor, Electrolytic, 1000 uF, 50V	014-1094	3
C4	Capacitor, Electrolytic, 33 uF, 35V	024-3335	1
C5	Capacitor, Electrolytic, 100 uF, 25V	023-1083	1
C6	Capacitor, Electrolytic, 470 uF, 25V	013-4783	1
C7	Capacitor, Electrolytic, 33 uF, 35V	024-3335	1
C8	Capacitor, Electrolytic, 470 uF, 25V	013-4783	1
C9,C10	Capacitor, Ceramic Disc, 0.01 uF, 25V	000-1044	2
CR1 THRU CR4	Diode, MR751, Silicon, 100V @ 6 Amperes	202-0751	4
CR5 THRU CR8	Diode, 1N4005, Rectifier, Silicon, 600V @ 1 Ampere	203-4005	4
CR9,CR10	Diode, Zener, 1N4744A, 15V, 1W	200-0015	2
J1	Connector, 2-Pin (to ac fuse)	417-0700	1
J2	Connector, 6-Pin (to Motor)	417-0677	1
J3	Connector, 12-Pin (to Power Transformer)	417-1276	1
J4	Connector, 4-Pin (to Power Transistor)	418-0255	1
J5	Connector, 6-Pin (to Motherboard)	417-0677	1
Q1	Transistor, TIP-31A, Silicon, NPN, TO-220 AB Case	219-0031	1
Q2	Transistor, TIP-32A, Silicon, PNP, TO-220 AB Case	218-0032	1
R1	Resistor, 470 Ohm ±5%, 1/2W	110-4733	1
R2	Potentiometer, 500 Ohm, 1/2W	178-5030	1
R3	Resistor, 1.2 k Ohm ±5%, 1/2W	110-1243	1
R4	Resistor, 620 Ohm ±5%, 1/2W	110-6233	1
R5,R6	Resistor, 25 Ohm ±5%, 5W, W/W	132-2523	2
R7	Resistor, 620 Ohm ±5%, 1/2W	110-6233	1
U1	Integrated Circuit, MC7805, Positive 5 Volt Regulator, TO-220 Case	227-7805	1
----	Blank Circuit Board	514-1809	1

TABLE 6-24. POWER TRANSFORMER ASSEMBLY - 950-0080

REF. DES.	DESCRIPTION	PART NO.	QTY.
P3	Connector Housing, 12-Pin	418-1271	1
T1	Transformer, Power, Torrid Dual Primary: 110V/220V ac, 50/60 Hz Dual Secondary: 24.3V @ 0.3 Amperes 31V @ 2.5 Amperes	370-0022	1
----	Pins, Connector (for P3)	417-0053	12

TABLE 6-25. HEAD LEAD CABLE ASSEMBLY - 940-0056

REF. DES.	DESCRIPTION	PART NO.	QTY.
----	Connector, 15-Pin D-Type	417-1500	1
----	Pins, Connector	417-0142	9

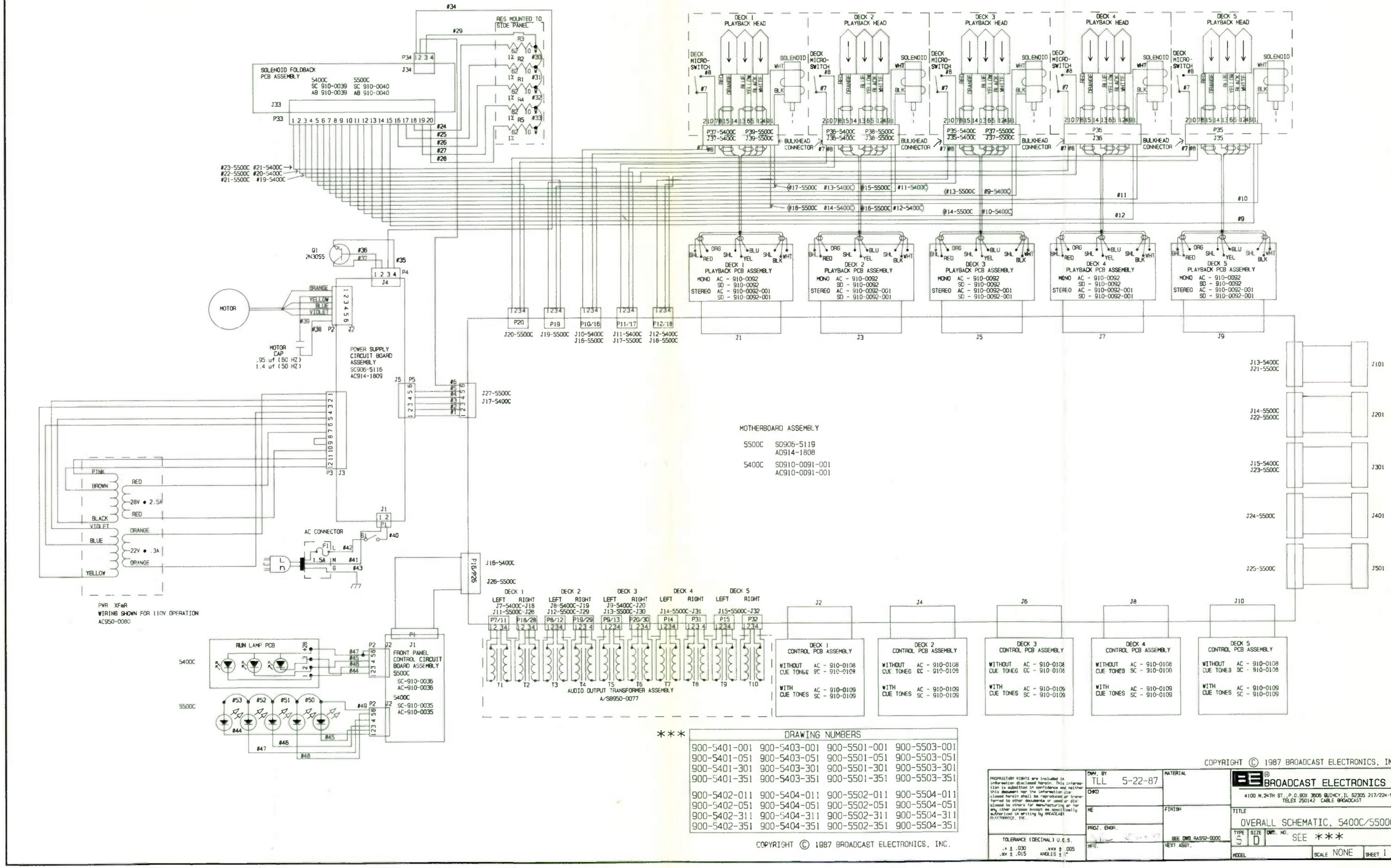
SECTION VII
DRAWINGS

7-1. INTRODUCTION.

7-2. This section provides assembly drawings, wiring diagrams, and schematic diagrams as listed below for the Broadcast Electronics 5500C/5400C series cartridge machines.

FIGURE	TITLE	NUMBER
7-1	SCHEMATIC DIAGRAM, 5500C/5400C SERIES OVERALL	SD900-550X-XXX/ -540X-XXX
7-2	ASSEMBLY DIAGRAM, 5500C SERIES OVERALL	597-5000-100
7-3	ASSEMBLY DIAGRAM, 5400C SERIES OVERALL	597-5000-101
7-4	ASSEMBLY DIAGRAM, FIXED/REMOVABLE DECK, 5500C/5400C SERIES	597-5000-102
7-5	SCHEMATIC DIAGRAM, MONOPHONIC/STEREOPHONIC TAPE HEAD AMPLIFIER CIRCUIT BOARD	SD910-0092/ -001
7-6	ASSEMBLY DIAGRAM, MONOPHONIC/STEREOPHONIC TAPE HEAD AMPLIFIER CIRCUIT BOARD	AC910-0092/ -001
7-7	SCHEMATIC DIAGRAM, CONTROL CIRCUIT BOARD WITH AND WITHOUT SECONDARY AND TERTIARY CUE TONES	SD910-0108/ -0109
7-8	ASSEMBLY DIAGRAM, CONTROL CIRCUIT BOARD WITH AND WITHOUT SECONDARY AND TERTIARY CUE TONES	AC910-0108/ -0109
7-9	SCHEMATIC DIAGRAM, 5400C MOTHERBOARD	SD910-0091-001
7-10	ASSEMBLY DIAGRAM, 5400C MOTHERBOARD	AC910-0091-001
7-11	SCHEMATIC DIAGRAM, 5500C MOTHERBOARD	SD906-5119
7-12	ASSEMBLY DIAGRAM, 5500C MOTHERBOARD	AD914-1808
7-13	SCHEMATIC DIAGRAM, POWER SUPPLY CIRCUIT BOARD	SC906-5116
7-14	ASSEMBLY DIAGRAM, POWER SUPPLY CIRCUIT BOARD	AC914-1809

FIGURE	DESCRIPTION	NUMBER
7-15	ASSEMBLY DIAGRAM, SOLENOID FOLDBACK ASSEMBLY	AC950-0304/ -0305
7-16	SCHEMATIC DIAGRAM, SOLENOID FOLDBACK CIRCUIT BOARD	SC910-0039/ -0040
7-17	ASSEMBLY DIAGRAM, SOLENOID FOLDBACK CIRCUIT BOARD	AB910-0039/ -0040
7-18	SCHEMATIC DIAGRAM, 5500C FRONT PANEL CONTROL CIRCUIT BOARD	SC910-0036
7-19	ASSEMBLY DIAGRAM, 5500C FRONT PANEL CONTROL CIRCUIT BOARD	AC910-0036
7-20	SCHEMATIC DIAGRAM, 5400C FRONT PANEL CONTROL CIRCUIT BOARD	SC910-0035
7-21	ASSEMBLY DIAGRAM, 5400C FRONT PANEL CONTROL CIRCUIT BOARD	AC910-0035
7-22	ASSEMBLY DIAGRAM, AUDIO OUTPUT TRANSFORMER	A/SB950-0077
7-23	ASSEMBLY DIAGRAM, POWER TRANSFORMER	AC950-0080
7-24	ASSEMBLY DIAGRAM, RACK INSTALLATION	597-5000-103
7-25	ASSEMBLY DIAGRAM, MOTOR	597-5000-104



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DRAWING NUMBERS			
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900-5401-051	900-5403-051	900-5501-051	900-5503-051
900-5401-301	900-5403-301	900-5501-301	900-5503-301
900-5401-351	900-5403-351	900-5501-351	900-5503-351
900-5402-011	900-5404-011	900-5502-011	900-5504-011
900-5402-051	900-5404-051	900-5502-051	900-5504-051
900-5402-311	900-5404-311	900-5502-311	900-5504-311
900-5402-351	900-5404-351	900-5502-351	900-5504-351

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

DWN. BY	TLL 5-22-87	MATERIAL	
CHKD			
ME		FINISH	
PROJ. ENGR.		SEE DWG. RA592-0000	
MFG.		NEXT ASSY.	

BROADCAST ELECTRONICS INC.
4100 N.24TH ST., P.O.BOX 3605 QUINCY, IL 62305 217/224-9600
TELEX 250142 CABLE BROADCAST

TITLE: OVERALL SCHEMATIC, 5400C/5500C

TYPE	SIZE	DWG. NO.	REV
S	D	SEE ***	A

MODEL | SCALE NONE | SHEET 1 OF 2

RIBBON CABLE

MOTHER BOARD J13-5400C J21-5500C →		REMOTE J101
PIN #	DESCRIPTION	PIN #
1	REMOTE START SWITCH DECK 1	1
2	REMOTE STOP SWITCH DECK 1	2
3	REMOTE START IND. DECK 1	3
4	REMOTE STOP IND. DECK 1	4
5	LEFT CHAN. PGM HI DECK 1	5
6	LEFT CHAN. PGM LO DECK 1	6
7	UNUSED	
8	RIGHT CHAN. PGM HI DECK 1	20
9	RIGHT CHAN. PGM LO DECK 1	21
10	G AUDIO HI DECK 1	22
11	G AUDIO LO DECK 1	23
12	QII CONTACTS DECK 1	24
13	QI CONTACTS DECK 1	25
14	PWR GND	14
15	START VERIFY IND DECK 1	15
16	STOP VERIFY IND DECK 1	16
17	CHASSIS GND	17
18	CHASSIS GND	18
19	CHASSIS GND	19
20	CHASSIS GND	7
21	CHASSIS GND	8
22	CHASSIS GND	9
23	CHASSIS GND	10
24	+28V	11
25	QII CONTACTS DECK 1	12
26	QI CONTACTS DECK 1	13

RIBBON CABLE

MOTHER BOARD P14-5400C P21-5500C →		REMOTE J201
PIN #	DESCRIPTION	PIN #
1	REMOTE START SWITCH DECK 2	1
2	REMOTE STOP SWITCH DECK 2	2
3	REMOTE START IND. DECK 2	3
4	REMOTE STOP IND. DECK 2	4
5	LEFT CHAN PGM HI DECK 2	5
6	LEFT CHAN PGM LO DECK 2	6
7	UNUSED	
8	RIGHT CHAN PGM HI DECK 2	20
9	RIGHT CHAN PGM LO DECK 2	21
10	G AUDIO HI DECK 2	22
11	G AUDIO LO DECK 2	23
12	QII CONTACTS DECK 2	24
13	QI CONTACTS DECK 2	25
14	PWR GND	14
15	START VERIFY IND DECK 2	15
16	STOP VERIFY IND DECK 2	16
17	CHASSIS GND	17
18	CHASSIS GND	18
19	CHASSIS GND	19
20	CHASSIS GND	7
21	CHASSIS GND	8
22	CHASSIS GND	9
23	CHASSIS GND	10
24	+28V	11
26	QII CONTACT6 DECK 2	12
26	QI CONTACTS DECK 2	13

RIBBON CABLE

MOTHER BOARD P15-5400C P23-5500C →		REMOTE 301
PIN #	DESCRIPTION	PIN #
1	REMOTE START SWITCH DECK 3	1
2	REMOTE STOP SWITCH DECK 3	2
3	REMOTE START IND. DECK 3	3
4	REMOTE STOP IND. DECK 3	4
5	LEFT CHAN PGM HI DECK 3	5
6	LEFT CHAN PGM. LO DECK 3	6
7	UNUSED	
8	RIGHT CHAN PGM. HI DECK 3	20
9	RIGHT CHAN PGM. LO DECK 3	21
10	G AUDIO HI DECK 3	22
11	G AUDIO LO DECK 3	23
12	QII CONTACTS DECK 3	24
13	QI CONTACTS DECK 3	25
14	PWR GND	14
15	START VERIFY IND DECK 3	15
16	STOP VERIFY IND DECK 3	16
17	CHASSIS GND *	17
18	CHASSIS GND *	18
19	CHASSIS GND	19
20	CHASSIS GND	7
21	CHASSIS GND	8
22	CHASSIS GND	9
23	CHASSIS GND	10
24	+28V	11
25	QII CONTACTS DECK 3	12
26	QI CONTACTS DECK 3	13

* ON 5400 PIN 17 IS LEFT CHAN PGM METER OUTPUT. PIN 18 IS RIGHT CHAN PGM METER OUTPUT.

RIBBON CABLE

J24 5500C →		REMOTE 401
PIN #	DESCRIPTION	PIN #
1	REMOTE START SWITCH DECK 4	1
2	REMOTE STOP SWITCH DECK 4	2
3	REMOTE START IND. DECK 4	3
4	REMOTE STOP IND. DECK 4	4
5	LEFT CHAN. PGM HI DECK 4	5
6	LEFT CHAN. PGM LO DECK 4	6
7	UNUSED	
8	RIGHT CHAN. PGM HI DECK 4	20
9	RIGHT CHAN. PGM LO DECK 4	21
10	G AUDIO HI DECK 4	22
11	G AUDIO LO DECK 4	23
12	QII CONTACTS DECK 4	24
13	QI CONTACTS DECK 4	25
14	PWR GND	14
15	START VERIFY IND. DECK 4	15
16	STOP VERIFY IND. DECK 4	16
17	CHASSIS GND	17
18	CHASSIS GND	18
19	CHASSIS GND	19
20	CHASSIS GND	7
21	CHASSIS GND	8
22	CHASSIS GND	9
23	CHASSIS GND	10
24	+28V	11
25	QII CONTACTS DECK 4	12
26	QI CONTACTS DECK 4	13

RIBBON CABLE

P25 5500 →		J501
PIN #	DESCRIPTION	PIN #
1	REMOTE START SWITCH DECK 5	1
2	REMOTE STOP SWITCH DECK 5	2
3	REMOTE START IND. DECK 5	3
4	REMOTE STOP IND. DECK 5	4
5	LEFT CHAN. PGM HI DECK 5	5
6	LEFT CHAN. PGM LO DECK 5	6
7	UNUSED	
8	RIGHT CHAN. PGM HI DECK 5	20
9	RIGHT CHAN. PGM LO DECK 5	21
10	G AUDIO HI DECK 5	22
11	G AUDIO LO DECK 5	23
12	QII CONTACTS DECK 5	24
13	QI CONTACTS DECK 5	25
14	PWR GND	14
15	START VERIFY IND DECK 5	15
16	STOP VERIFY IND DECK 5	16
17	LEFT CHAN PGM METER OUT	17
18	RIGHT CHAN PGM METER OUT	18
19	CHASSIS GND	19
20	CHASSIS GND	7
21	CHASSIS GND	8
22	CHASSIS GND	9
23	CHASSIS GND	10
24	+28V	11
25	QII CONTACTS DECK 5	12
26	QI CONTACTS DECK 5	13

5500C P26 MOTHERBOARD TO P1 FRONT PANEL	
1	START IND DECK 3
2	START SWITCH DECK 2
3	START IND DECK 2
4	START SWITCH DECK 4
5	START IND DECK 4
6	START SWITCH DECK 5
7	OPEN
8	GND
9	GND
10	STOP IND DECK 1
11	STOP SWITCH DECK 1
12	STOP SWITCH DECK 3
13	STOP SWITCH DECK 2
14	START SWITCH DECK 14
15	+28V
16	+28V
17	START IND DECK 1
18	START SWITCH DECK 1
19	OPEN
20	STOP SWITCH DECK 5
21	STOP IND DECK 5
22	STOP SWITCH DECK 4
23	STOP IND DECK 4
24	STOP IND DECK 3
25	STOP IND DECK 2
26	START IND DECK 5

5400C P16 MOTHERBOARD TO P1 FRONT PANEL	
1	START IND DECK 1
2	OPEN
3	OPEN
4	START SWITCH DECK 2
5	START IND DECK 2
6	START SWITCH DECK 3
7	OPEN
8	GND
9	GND
10	OPEN
11	OPEN
12	STOP SWITCH DECK 1
13	OPEN
14	START SWITCH DECK 1
15	+28V
16	+28V
17	OPEN
18	OPEN
19	OPEN
20	STOP SWITCH DECK 3
21	STOP IND DECK 3
22	STOP SWITCH DECK 2
23	STOP IND DECK 2
24	STOP IND DECK 1
25	OPEN
26	START IND DECK 3

P33 FOLDBACK			
PIN#	5400C WIRE#	5500C WIRE#	DESCRIPTION
1	21	23	DECK 1 SOL. ENABLE
2	20	22	DECK 2 SOL. ENABLE
3	19	21	DECK 3 SOL. ENABLE
4	--	20	DECK 4 SOL. ENABLE
5	--	19	DECK 5 SOL. ENABLE
6	13	17	DECK 1 - SOL.
7	11	15	DECK 2 - SOL.
8	9	13	DECK 3 - SOL.
9	--	11	DECK 4 - SOL.
10	--	9	DECK 5 - SOL.
11	14	18	DECK 1 + SOL.
12	12	16	DECK 2 + SOL.
13	10	14	DECK 3 + SOL.
14	--	12	DECK 4 + SOL.
15	--	10	DECK 5 + SOL.
16	26	26	DECK 1 FOLDBACK RES.
17	25	25	DECK 2 FOLDBACK RES.
18	24	24	DECK 3 FOLDBACK RES.
19	--	27	DECK 4 FOLDBACK RES.
20	--	28	DECK 5 FOLDBACK RES.

P34 FOLDBACK		
PIN #	WIRE #	DESCRIPTION
1	34	+28V
2	6	GND
3	29	+28V TO RES PANEL
4	--	OPEN

P5 POWER SUPPLY		
PIN #	WIRE #	DESCRIPTION
1	1	AUDIO GND
2	2	-15V
3	3	+28V
4	4	PWR GND
5	5	+15V
6	-	OPEN

J17 5400C/J27 5500C		
PIN #	WIRE #	DESCRIPTION
1	1	AUDIO GND
2	2	-15V
3	3	+28V
4	4	PWR GND
5	5	+15V
6	6	PWR GND

P20 MOTHERBOARD		
PIN #	WIRE #	DESCRIPTION
1	7	PWR GND
2	-	OPEN
3	8	CART READY DECK 5
4	19	SOL. ENABLE DECK 5

P19 MOTHERBOARD		
PIN #	WIRE #	DESCRIPTION
1	7	PWR GND
2	-	OPEN
3	8	CART READY DECK 4
4	20	SOL. ENABLE DECK 4

P10 5400C/P16 5500C			
PIN #	5400C WIRE #	5500C WIRE #	DESCRIPTION
1	7	7	PWR GND
2	-	-	OPEN
3	8	8	CART READY DECK 3
4	21	23	SOL. ENABLE DECK 3

P11 5400C/P17 5500C			
PIN #	5400C WIRE #	5500C WIRE #	DESCRIPTION
1	7	7	PWR GND
2	-	-	OPEN
3	8	8	CART READY DECK 2
4	20	22	SOL. ENABLE DECK 2

P12 5400C/P18 5500C			
PIN #	5400C WIRE #	5500C WIRE #	DESCRIPTION
1	7	7	PWR GND
2	-	-	OPEN
3	8	8	CART READY DECK 1
4	19	21	SOL. ENABLE DECK 1

DWN. BY TLL 5-21-87
CHKD
ME
PROJ. ENGR.
APVD.
MATERIAL
FINISH
SEE DWG #A502-0000
NEXT ASSY.

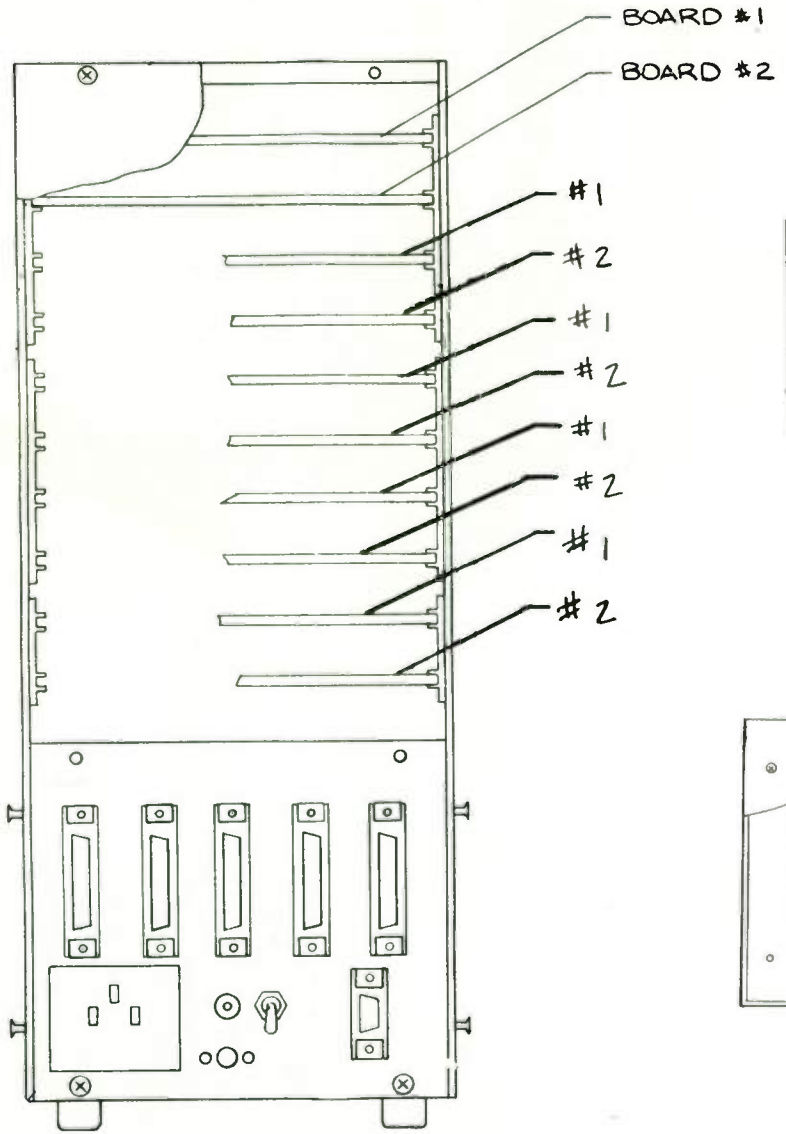
TOLERANCE (DECIMAL) U.O.B.
.x ± .030 .xxx ± .005
.xx ± .015 ANGLES ± 1°

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

TITLE
OVERALL SCHEMATIC 5400C/5500C

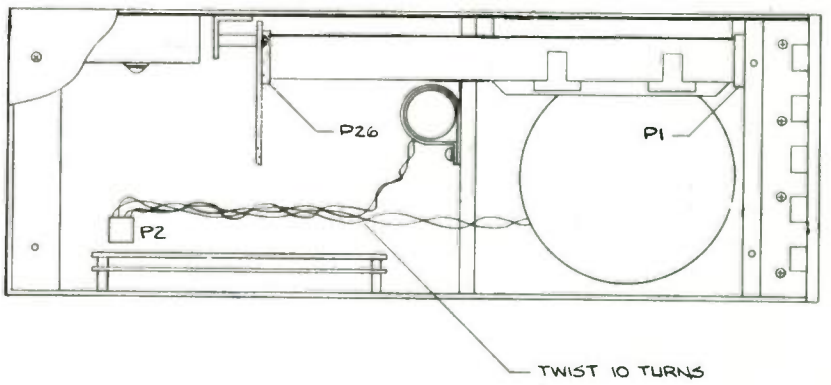
TYPE S SIZE D DWG. NO. SEE PAGE 1 REV A

MODEL SCALE NONE SHEET 2 OF 2



DETAIL A

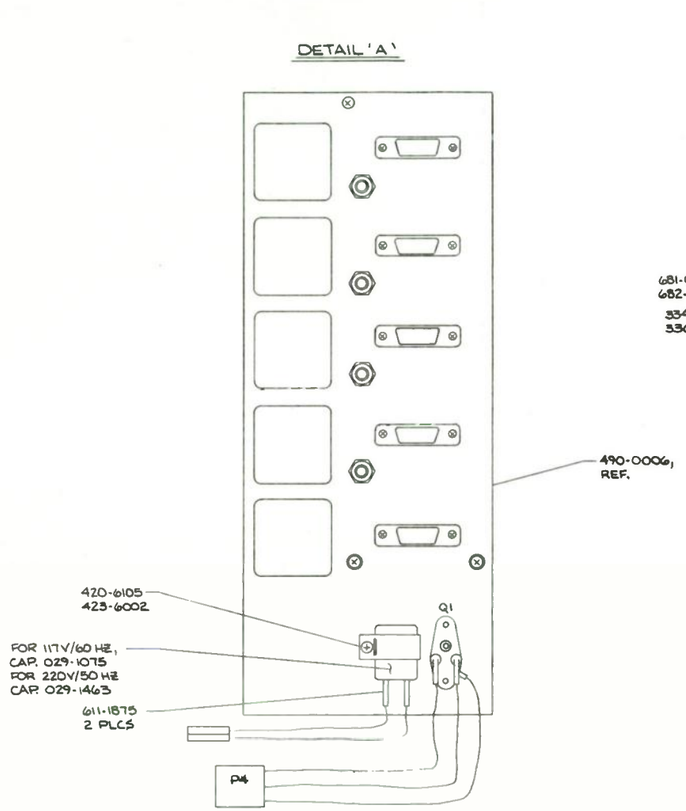
PART No.	BOARD #1	BOARD #2
900-5501-XXX	910-0092	910-0093-001
900-5502-XXX	910-0092	910-0093
900-5503-XXX	910-0092-001	910-0093-001
900-5504-XXX	910-0092-001	910-0093

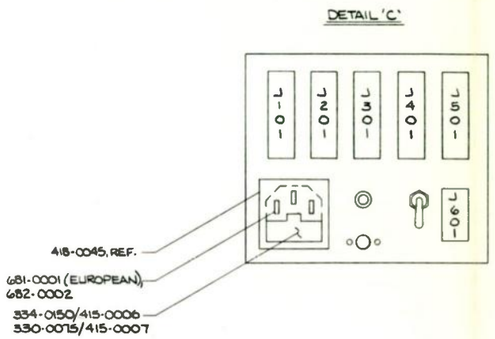


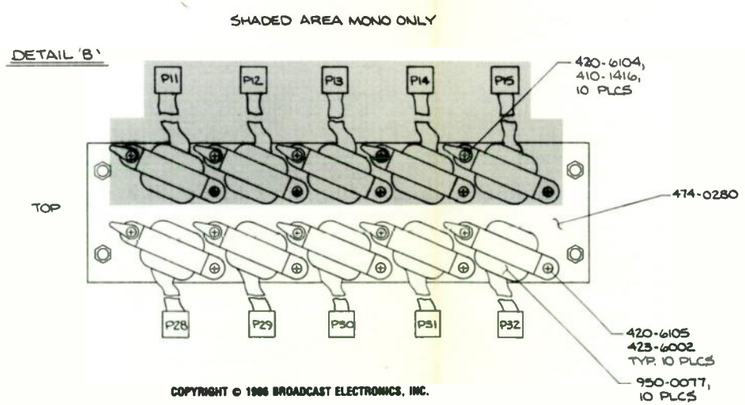
DETAIL B

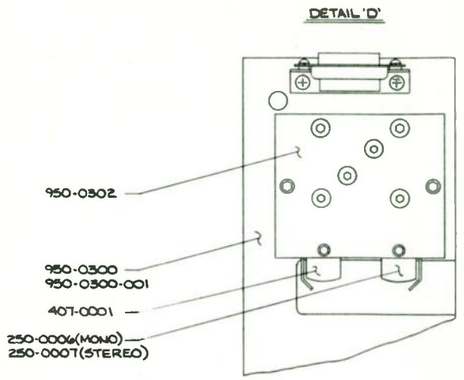
597-5000-100A

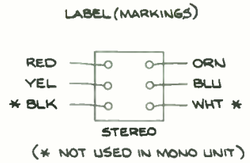
FIGURE 7-2. ASSEMBLY DIAGRAM, 5500C SERIES

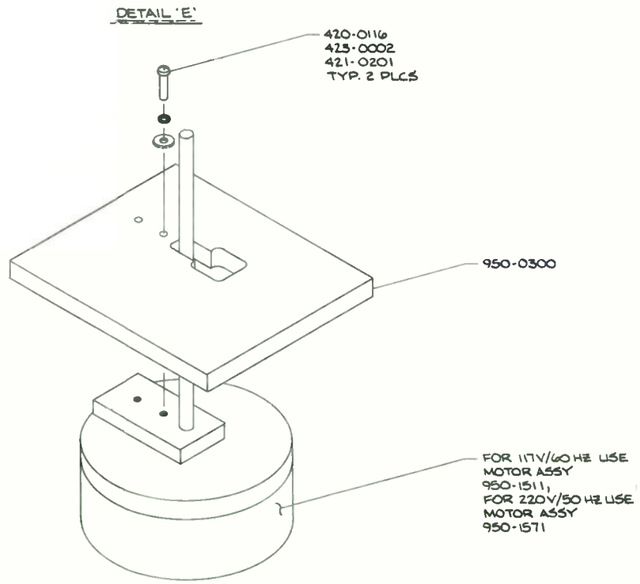








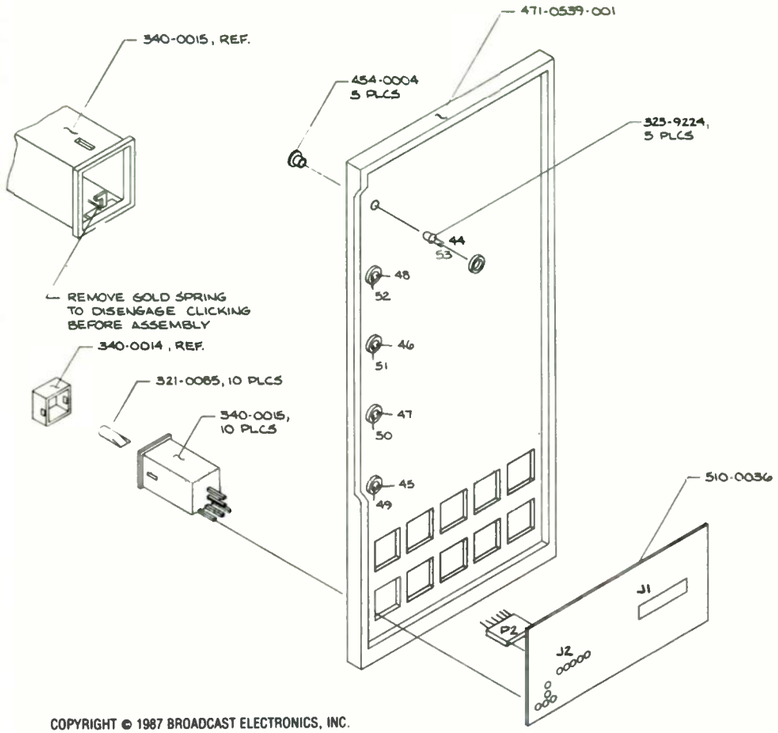


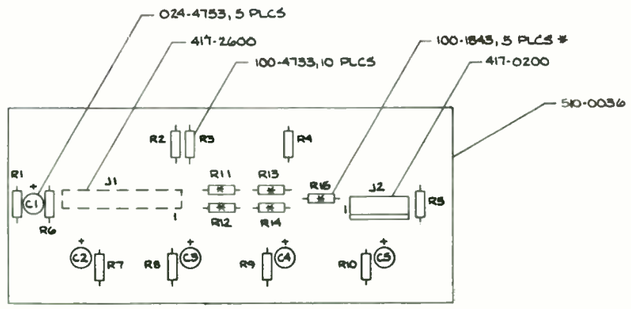


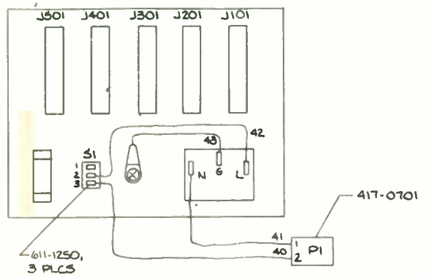
597-5000-100B

FIGURE 7-2. ASSEMBLY DIAGRAM, 5500C SERIES

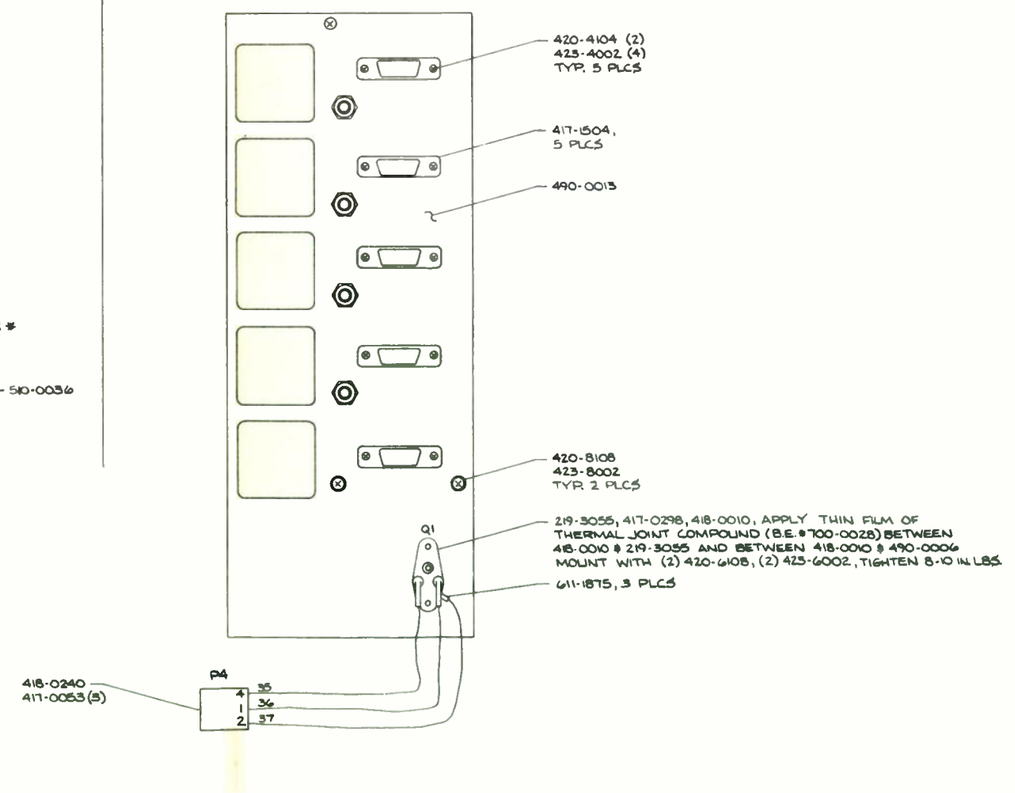
DETAIL 'A'



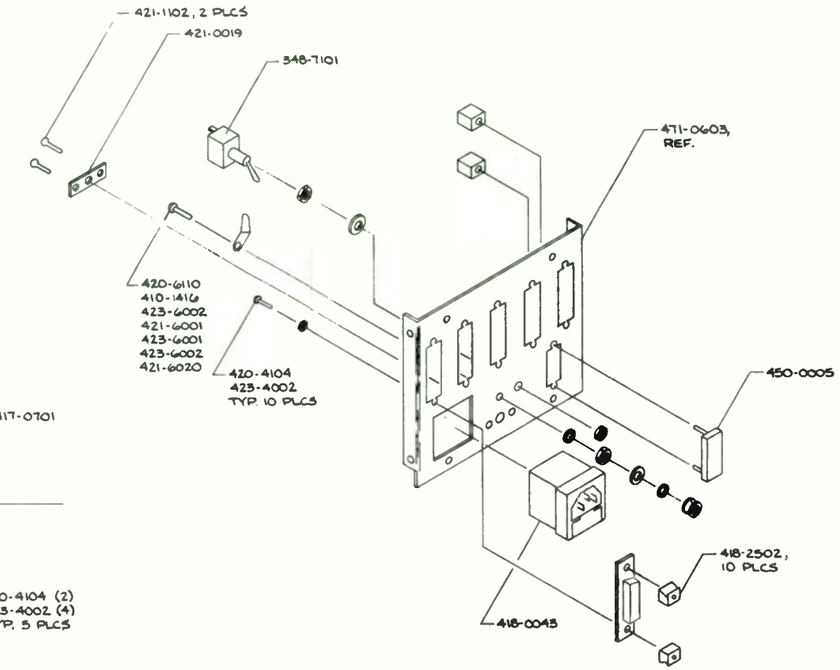




DETAIL 'B'

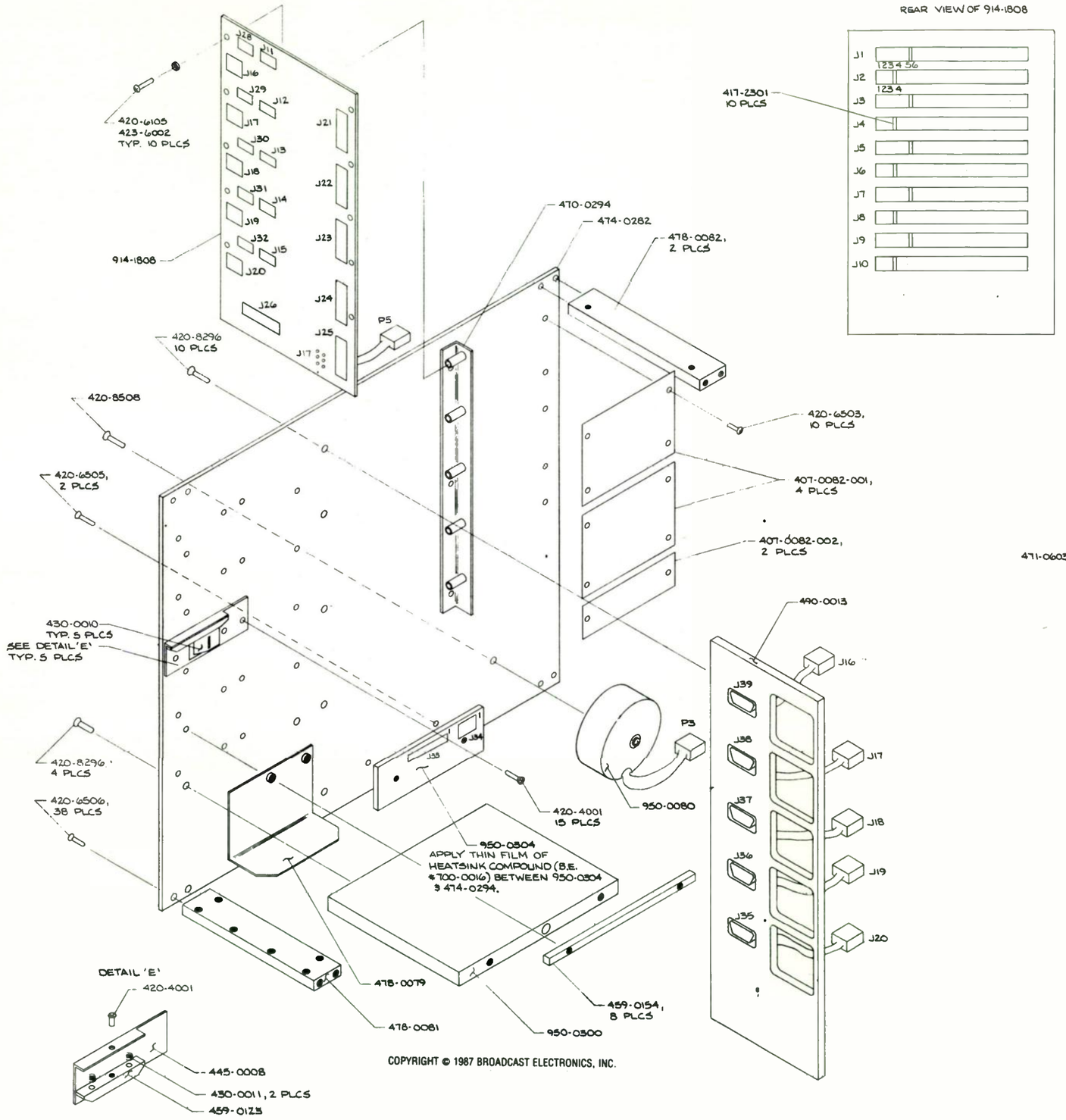


DETAIL 'C'



597-5000-100C

FIGURE 7-2. ASSEMBLY DIAGRAM, 5500C SERIES



597-5000-100D

FIGURE 7-2. ASSEMBLY DIAGRAM, 5500C SERIES

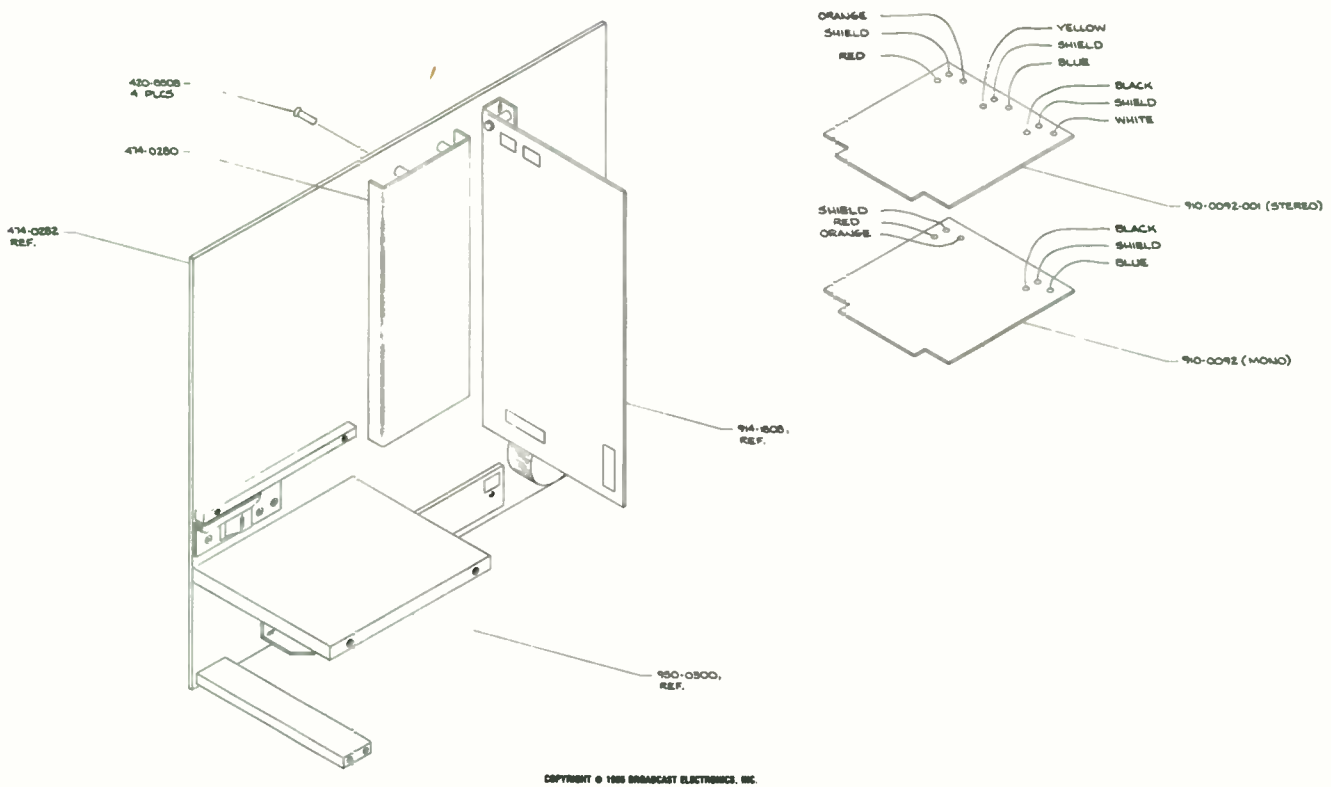
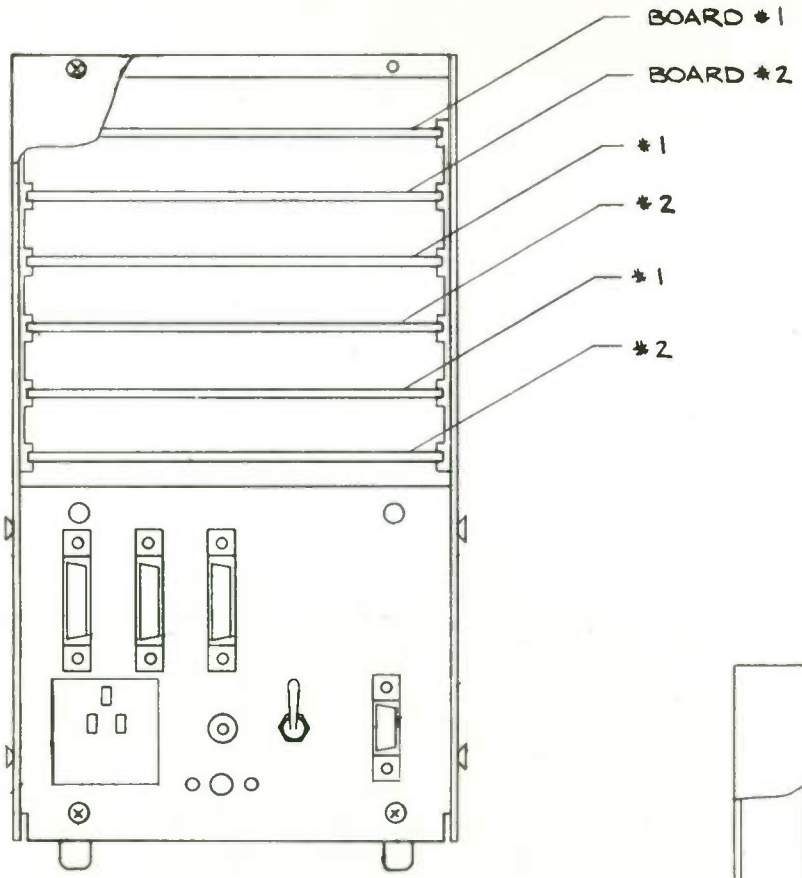


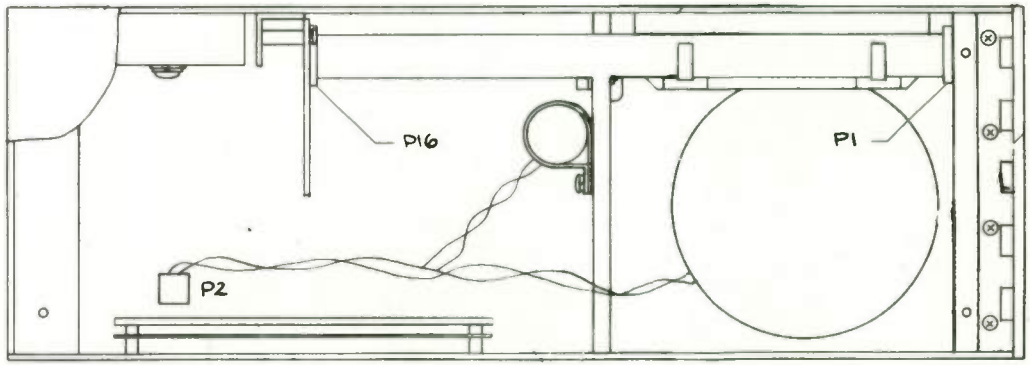
FIGURE 7-2. ASSEMBLY DIAGRAM, 5500C SERIES

597-5000-100E



DETAIL A

PART No.	BOARD 1	BOARD 2
900-5402-XXX	910-0092	910-0093
900-5401-XXX	910-0092	910-0093-001
900-5404-XXX	910-0092-001	910-0093
900-5403-XXX	910-0092-001	910-0093-001

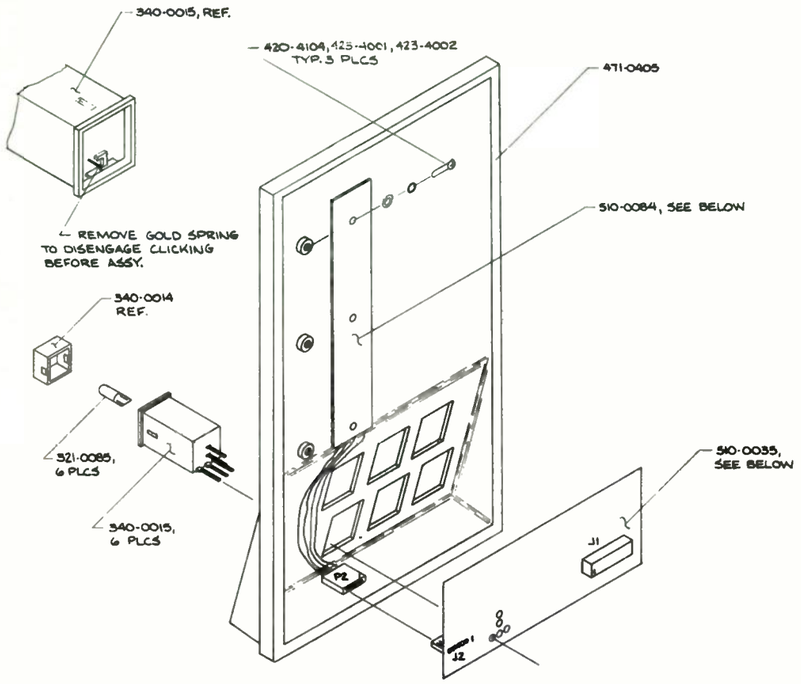


DETAIL B

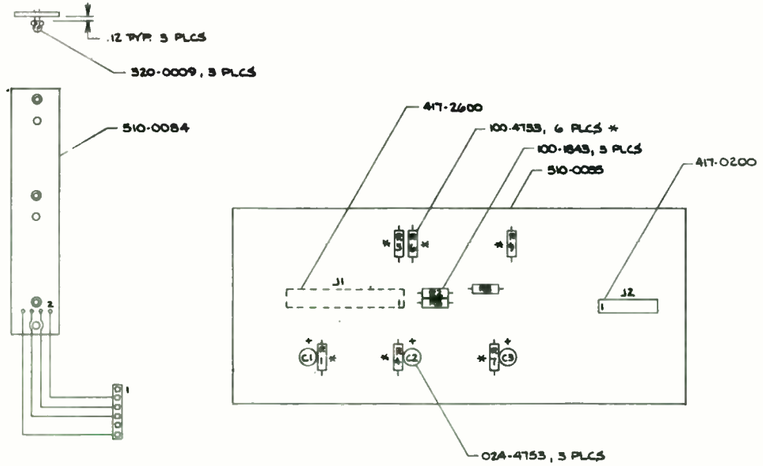
597-5000-101A

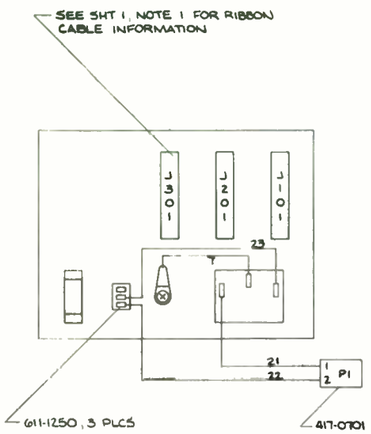
FIGURE 7-3. ASSEMBLY DIAGRAM, 5400C SERIER SERIES

DETAIL 'A'

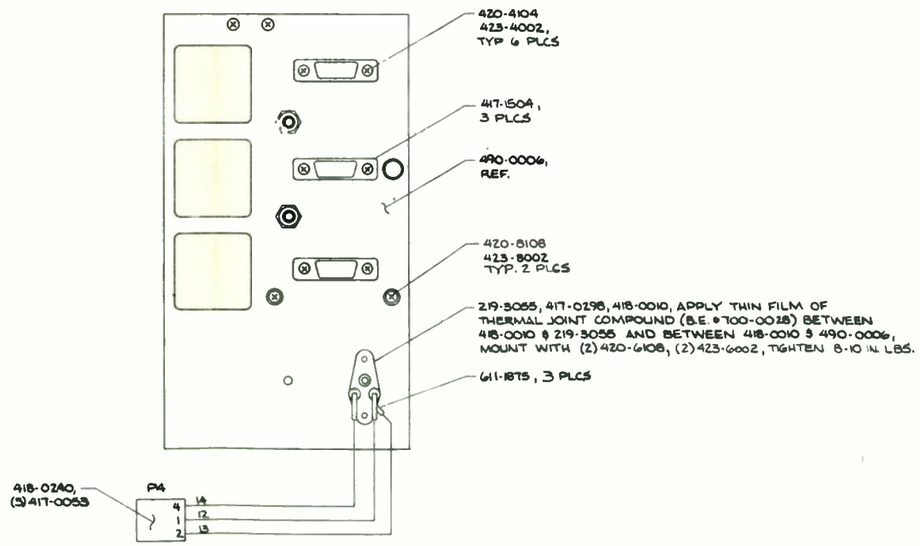


NOTE:
LED, STRAIGHT LEG IS GROUND, FLAG LEG IS POSITIVE SIDE

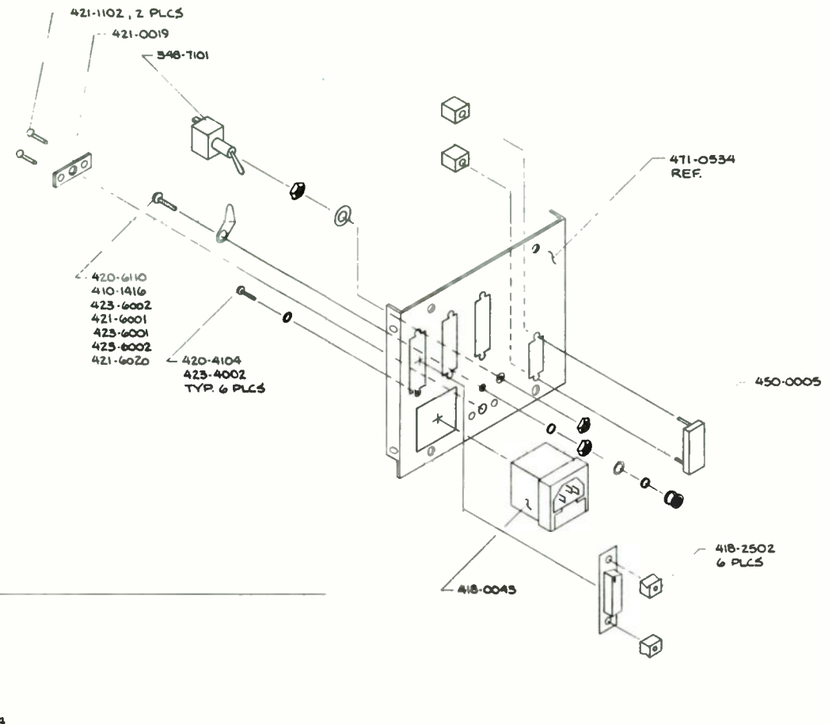




DETAIL 'B'

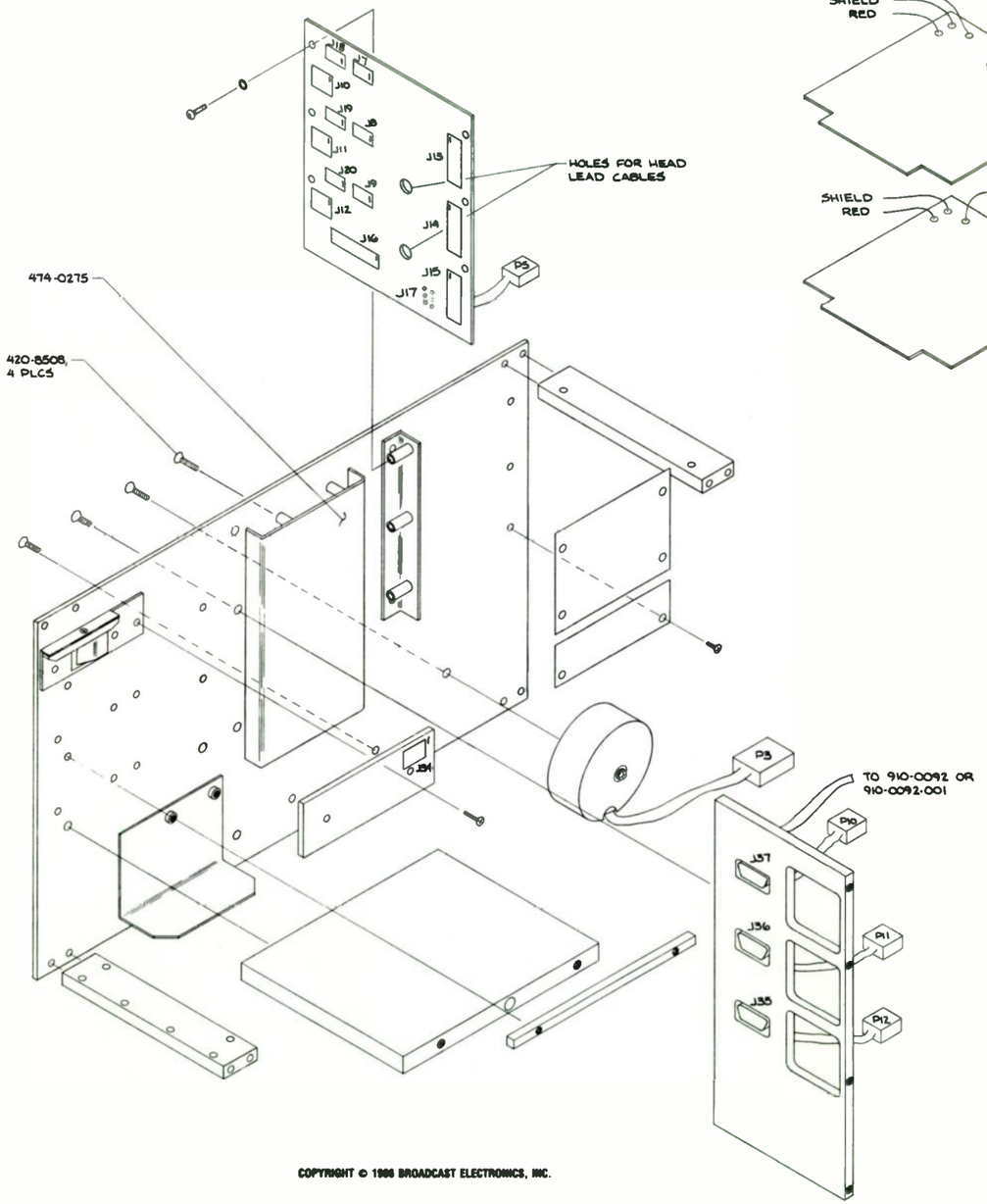


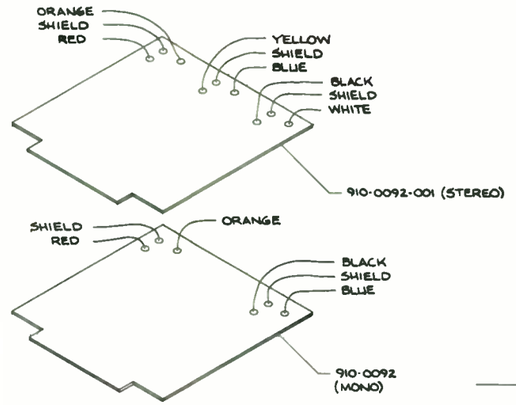
DETAIL 'C'



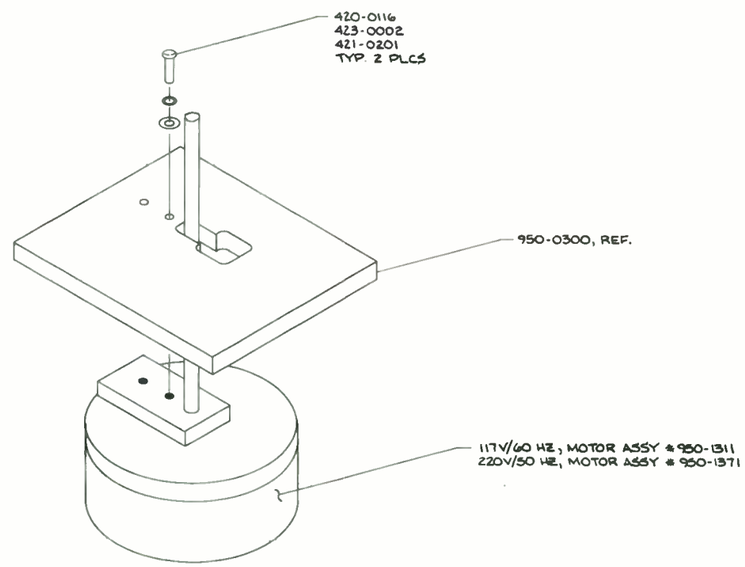
597-5000-101B

FIGURE 7-3. ASSEMBLY DIAGRAM, 5400C SERIES



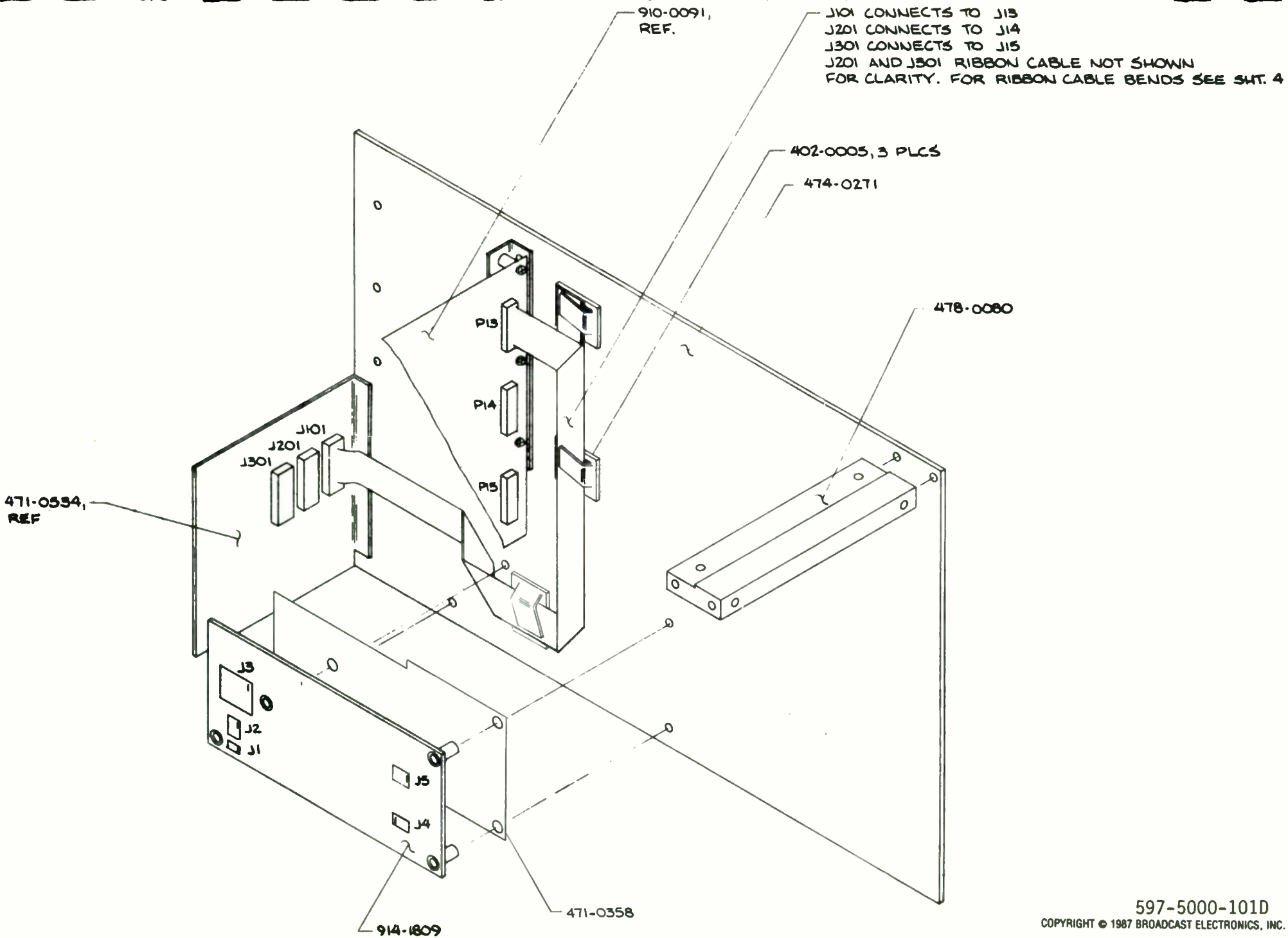


DETAIL 'E'



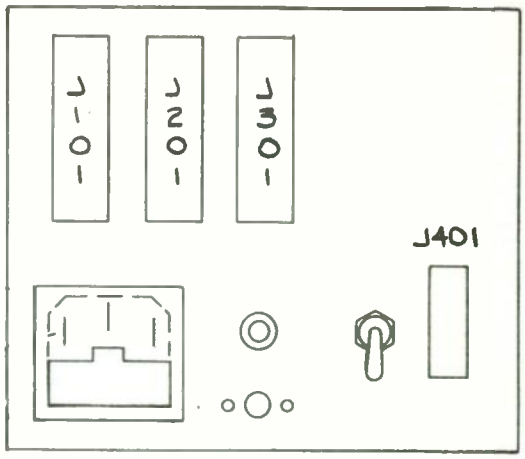
597-5000-101C

FIGURE 7-3. ASSEMBLY DIAGRAM, 5400C SERIES



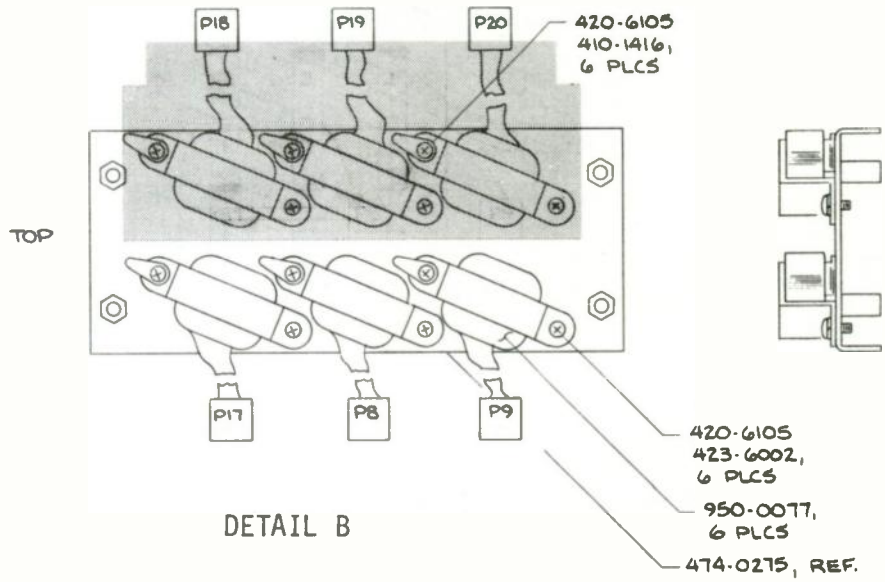
597-5000-101D

FIGURE 7-3. ASSEMBLY DIAGRAM, 5400C SERIES

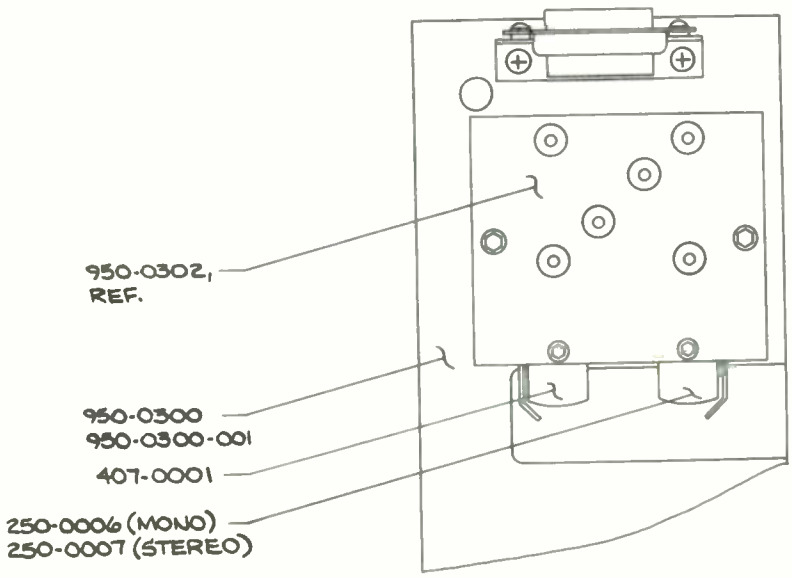


DETAIL A

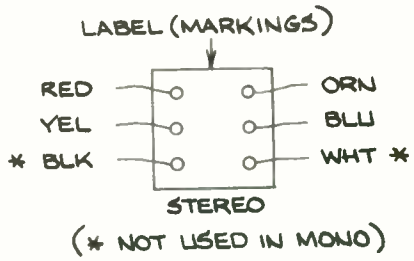
SHADED AREA MONO ONLY



DETAIL B

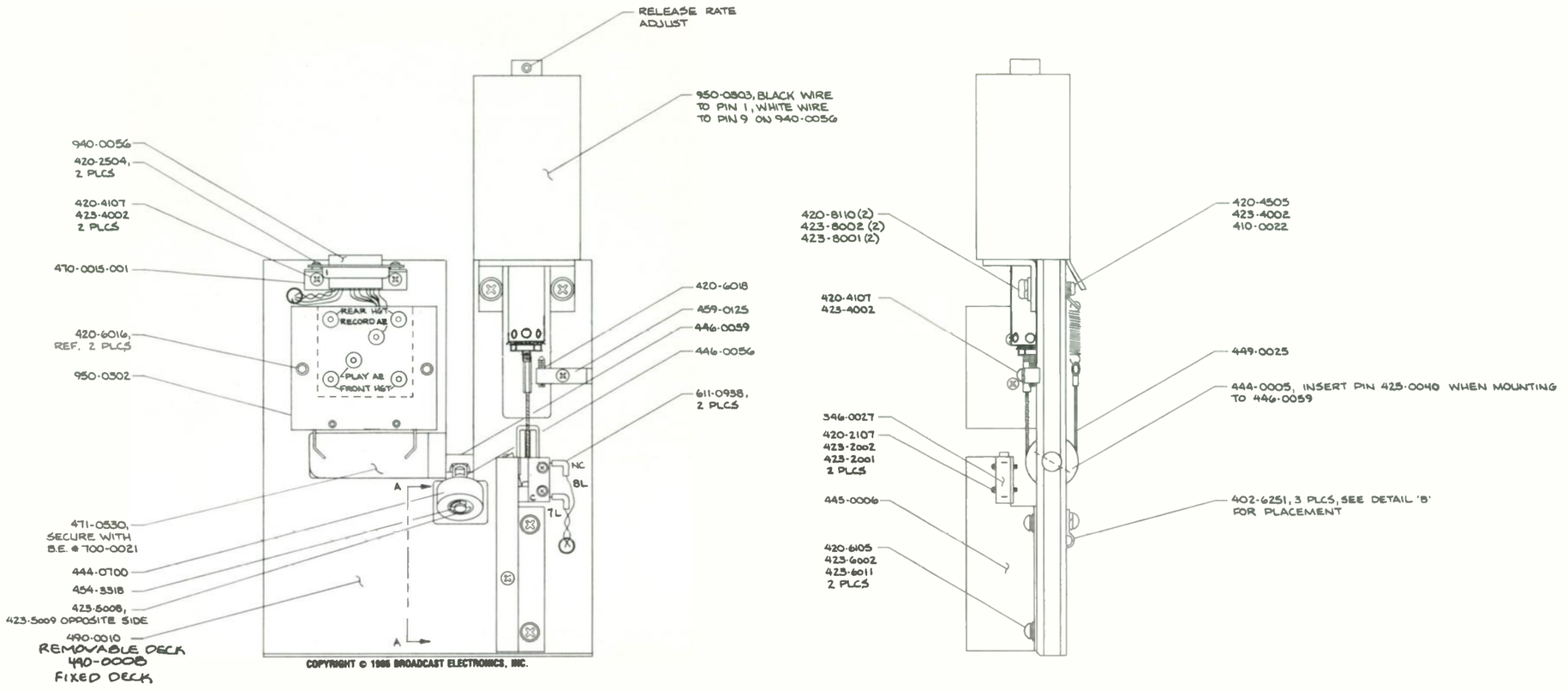


DETAIL C



597-5000-101E

FIGURE 7-3. ASSEMBLY DIAGRAM, 5400C SERIES



NOTES:
1.) SOME PARTS SHOWN ONLY IN ONE VIEW FOR CLARITY.
2.) CROSS-SHAFT LUBRICATION APPLY SILICONE GREASE B.E. # 700-0137.

597-5000-102

FIGURE 7-4. ASSEMBLY DIAGRAM, FIXED/REMOVABLE DECK, 5500C/5400C SERIES

LEFT +15V
LEFT -15V
RIGHT +15V
RIGHT -15V
CUE +15V
CUE -15V
LEFT
RIGHT
CUE
SHIELD
LEVEL
LF EQ
HF EQ
LEFT CHANNEL OUT
LEFT CHANNEL GND
RIGHT CHANNEL OUT
RIGHT CHANNEL GND
STOP CUE
CUE GND
CUE AUDIO OUT
SOLENOID DRIVER (MUTE)

NOTES:
1. ALL RESISTORS IN OHMS, ¼W, 5%; ALL CAPACITORS IN MICROFARADS; UNLESS OTHERWISE NOTED.
2. LAST COMPONENTS USED: C52, D5, K1, L3, Q1, U8, E9, R96
3. COMPONENTS NOT USED: R17
4. CIRCUITRY IN DASHED LINES NOT USED ON 910-0092 (MONO)

TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .010 ANGLES ± 1°

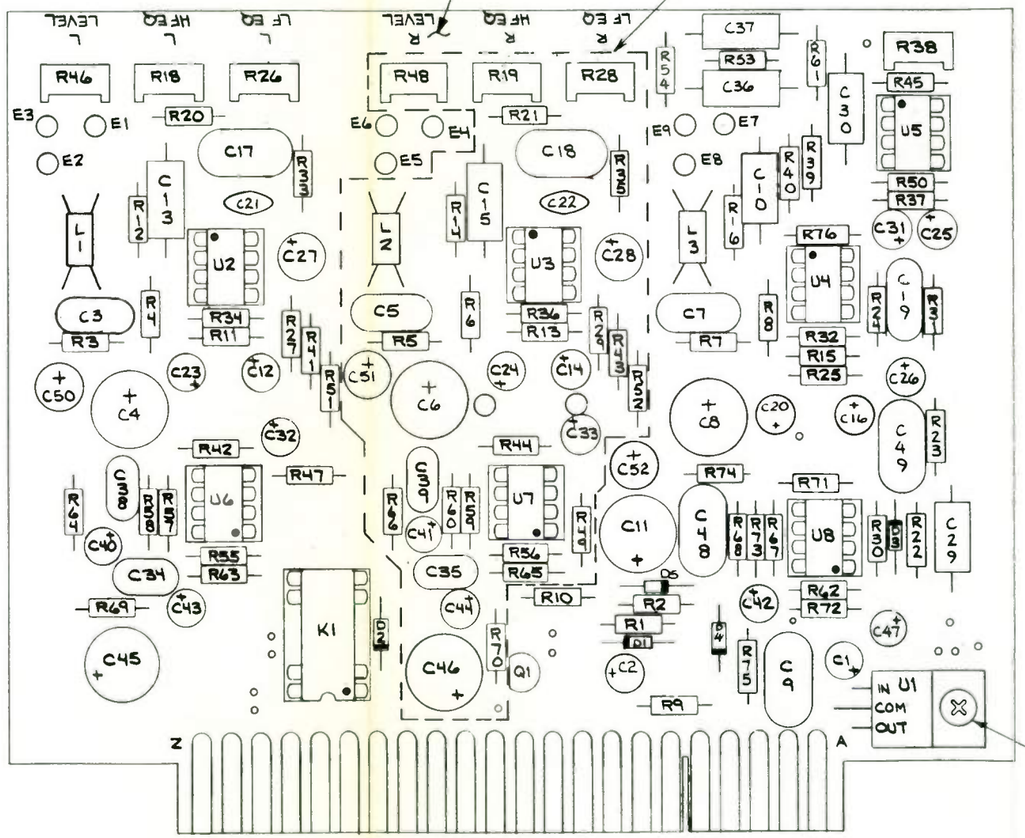
DWN. BY MERKEL 3-6-84
CHKD
ENG
PROJ. ENGR.
MFG.
MATERIAL
FINISH
NEXT ASSY.

BROADCAST ELECTRONICS INC.
4100 N. 24TH ST., P.O. BOX 3606 QUINCY, IL 62305 217/224-9600
TELEX 280142 CABLE BROADCAST

TITLE SCHEMATIC - TAPE HEAD AMP
TYPE S SIZE D DWG. NO. 910-0092 910-0092-001 REV E
MODEL 5000 SERIES SCALE NTS SHEET 1 OF 1

PCB BLANK
510-0092

OUTLINED COMPONENTS NOT USED IN MONO UNITS (910-0092)



420-6105
510-0092
423-6002
421-6001

SEE SCHEMATIC: D910-0092
SEE B/M: 910-0092

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

DWN. BY AH 3-23-84
CHKD.
MF
EE
PROJ. ENGR. [illegible] 11-[illegible]-85
DFTG. SUPVR.
MFG [illegible] 11-8-85

NEXT ASSY.

PRODUCT USED ON
5000C
SERIES

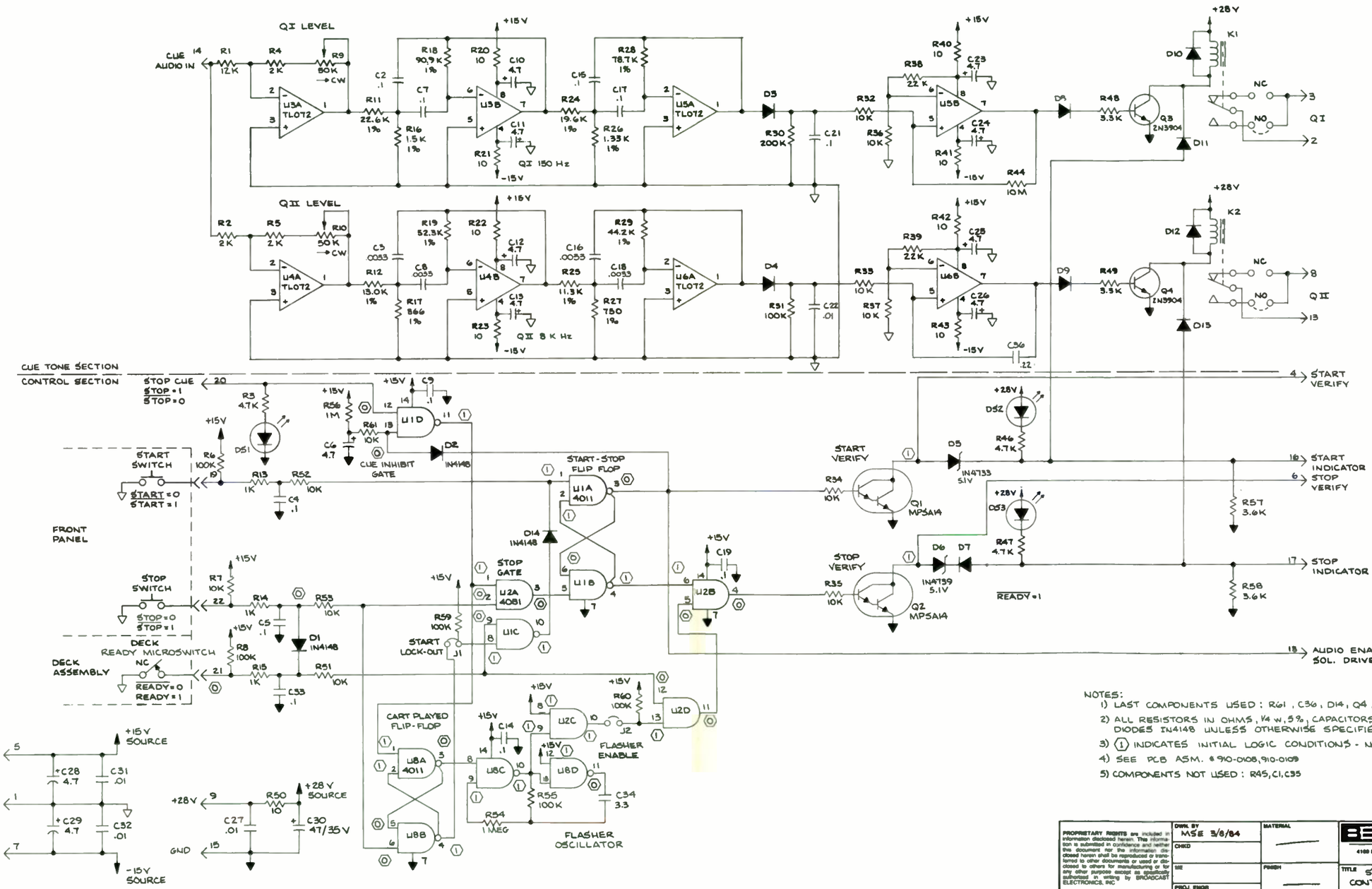
FINISH

BE BROADCAST ELECTRONICS INC.
4100 N. 24TH ST. QUINCY, IL 62305 217/224-9600
TELEX 250142 CABLE BCST ELECT QUI

TITLE PCB ASSEMBLY
TAPE HEAD AMP

SHEET 1 OF 1
SCALE 2/1
REV F

TYPE A SIZE C DWG. NO. 910-0092
910-0092-001



NOTES:

1) LAST COMPONENTS USED : R61 , C36 , D14 , Q4 , U8 , D53 , K2.
2) ALL RESISTORS IN OHMS , 1/4 W, 5% ; CAPACITORS IN MICROFARADS , DIODES IN4148 UNLESS OTHERWISE SPECIFIED.
3) (1) INDICATES INITIAL LOGIC CONDITIONS - NO TAPE NEEDED.
4) SEE PCB ASM. # 910-0108, 910-0109
5) COMPONENTS NOT USED : R45, C1, C35

DWN. BY	MSE 3/8/84
CHK'D	
ISS	
PROJ. ENGR	
MFG	
MATERIAL	—
FINISH	—
NEXT ASSY.	

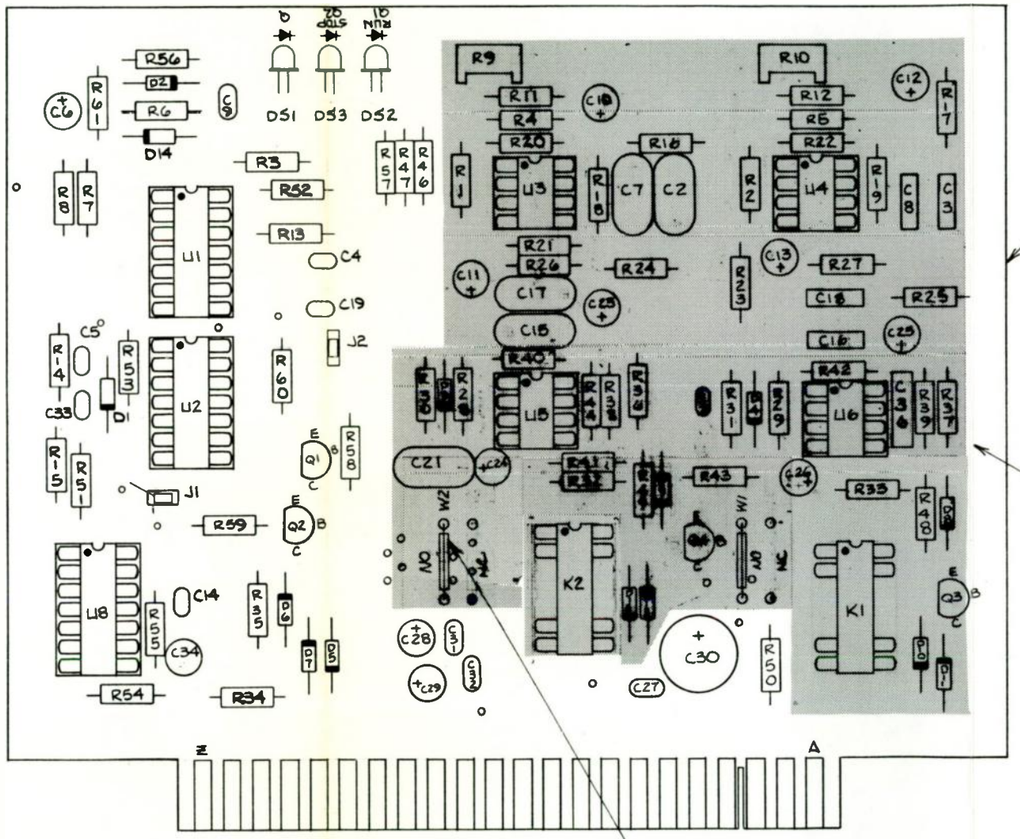
TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .010 ANGLES ± 1°

BROADCAST ELECTRONICS INC.
4100 N. 24TH ST., P.O. BOX 3606 QUINCY, IL 62305 217/224-9660
TELEX 280142 CABLE BROADCAST

TITLE: SCHEMATIC CONTROL BOARD W/Q'S

TYPE	SIZE	DWG NO	REV
S	D	910-0108, 910-0109	E

MODEL — SCALE — SHEET 1 OF 1



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

DWN. BY MSE 7-6-84
CHKD
MS
PROJ. ENGR. JRL 11-8-85
MFG MB 11-8-85

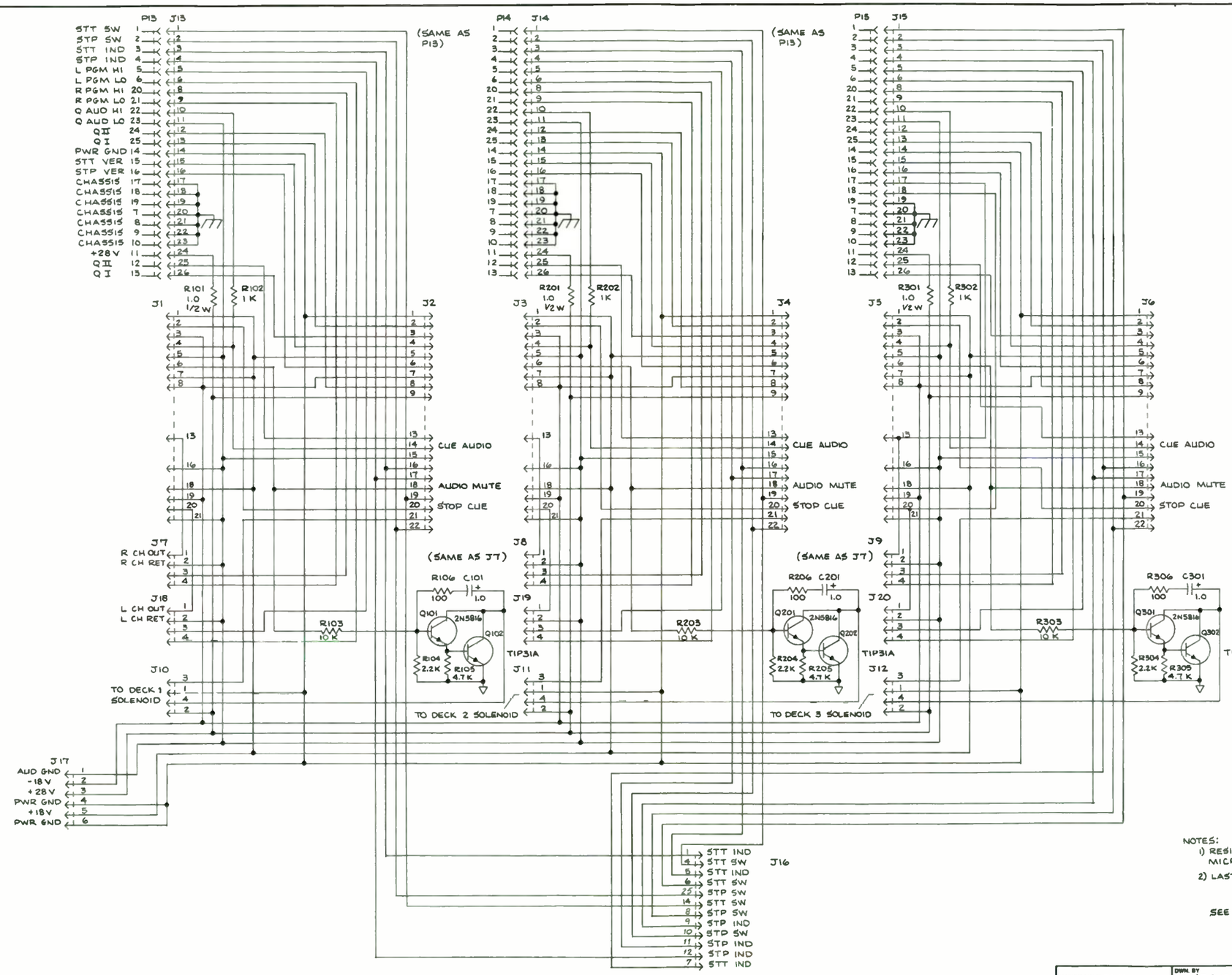
MATERIAL SEE B/M
FINISH
NEXT ASSY.

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

TITLE PCB ASM, CONTROL BD. W/CUES

TYPE A | SIZE C | DWG. NO. 910-0108, 910-0109 | REV E

MODEL 5000 SERIES | SCALE 2/1 | SHEET 1 OF 1



NOTES:

1) RESISTORS IN OHMS, ¼ W, CAPACITORS IN MICROFARADS, U.O.S.

2) LAST USED: C301, J20, Q302, R305

SEE B/M 910-0091

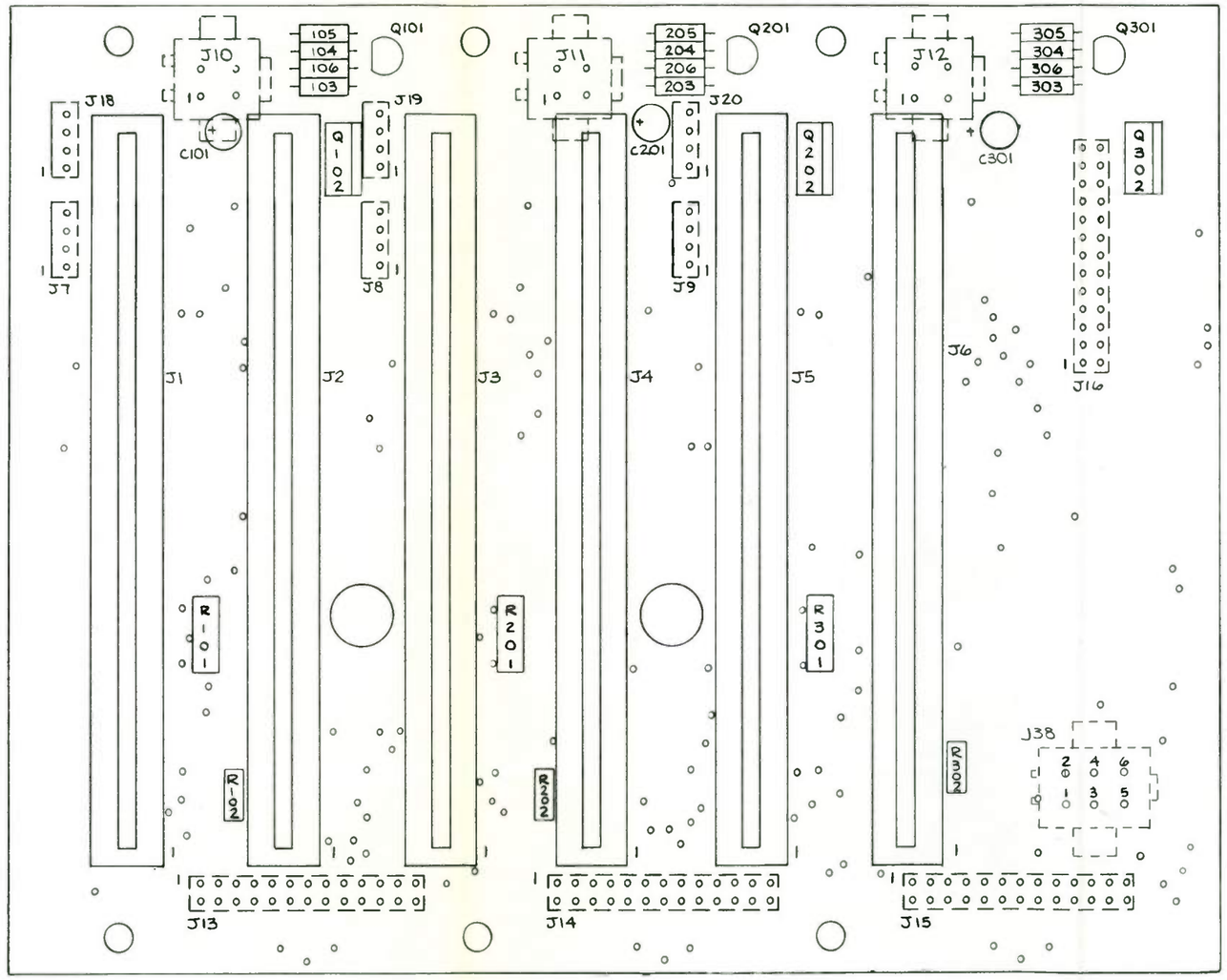
TOLERANCE (DECIMAL) U.O.S.
.X ± .030 .XXX ± .005
.XX ± .015 ANGLES ± 1°

DWN. BY MSE 9-15-86
CHKD
ISS
PROJ. ENGR.
APPD.
MATERIAL
FINISH
NEXT ASSY.

BROADCAST ELECTRONICS INC.
4100 N. 24TH ST., P.O. BOX 3606, QUINCY, IL 62305 217/224-9600
TELEX 280142 CABLE BROADCAST

TITLE
SCHEMATIC
BACK PLANE MOTHER PCB

TYPE S | SIZE D | DWG. NO. 910-0091 910-0091-001 | REV D
MODEL 5400 SERIES | SCALE — | SHEET 1 OF 1



SEE SCHEMATIC # 910-0091-001
SEE B/M # 910-0091-001

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

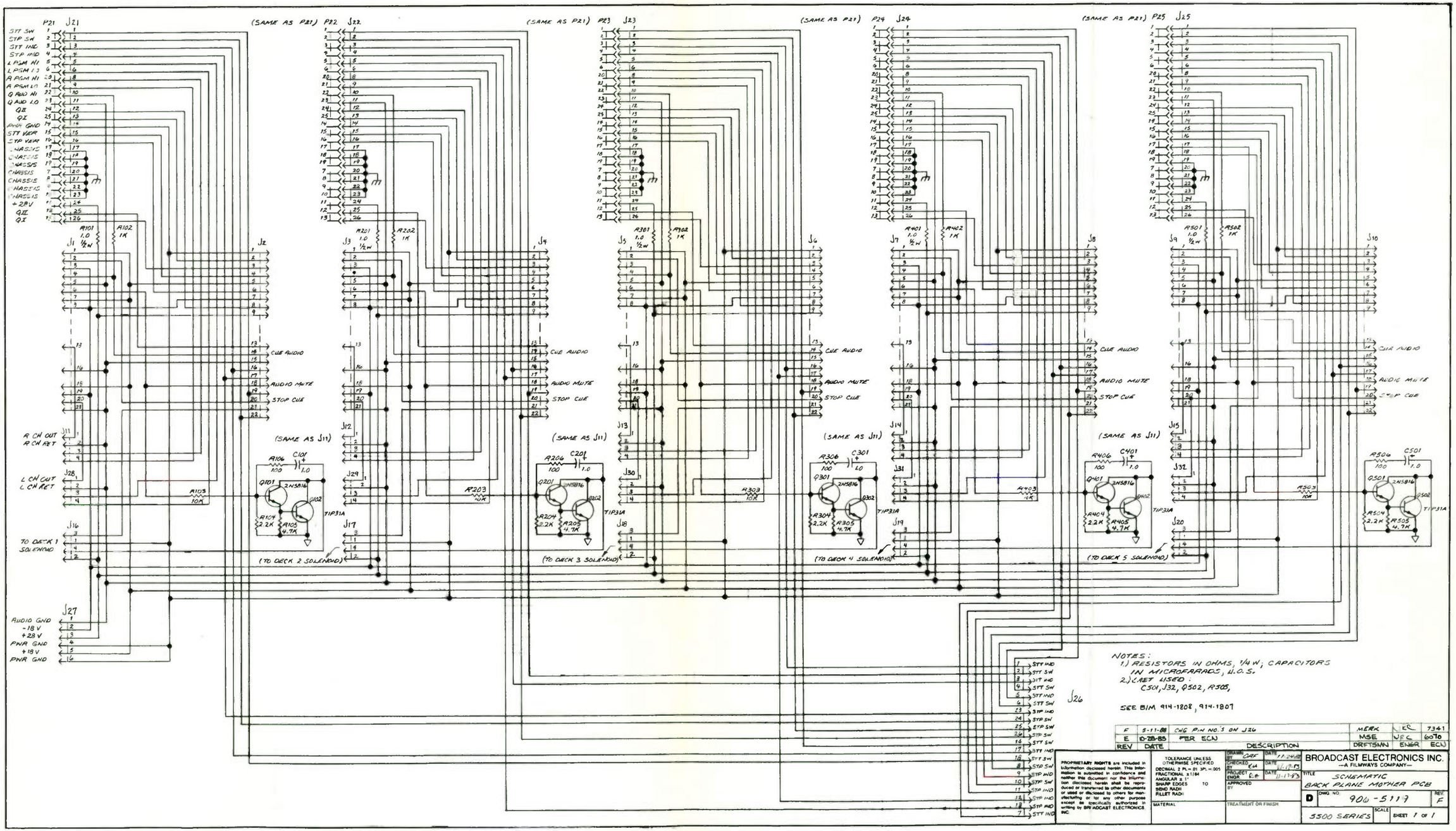
DWN. BY MSE 9-15-86
CHKD.
ME
EE
PROJ. ENGR.
DFTG. SUPVR.
MFG.

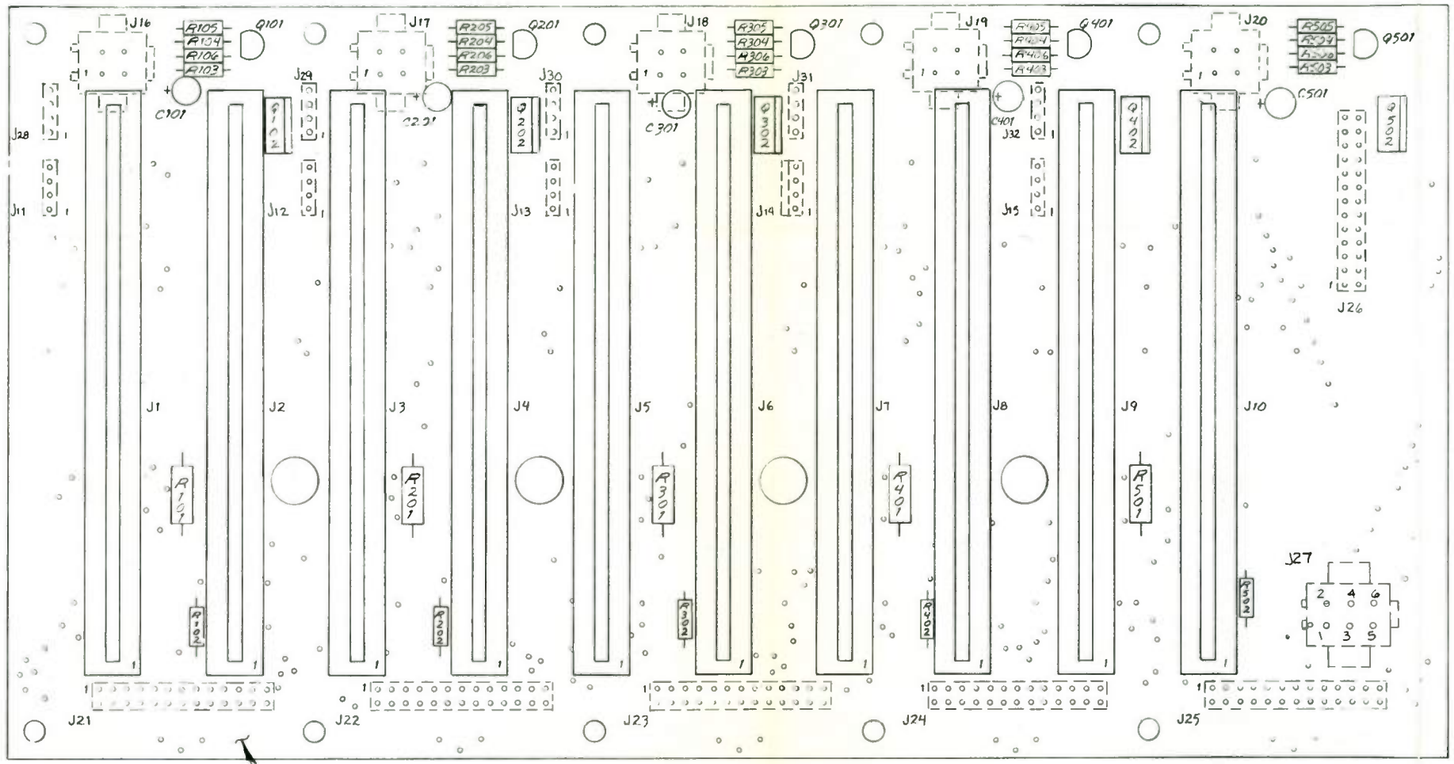
NEXT ASSY.
PRODUCT USED ON
FINISH —

BROADCAST ELECTRONICS INC.
4100 N. 24TH ST. QUINCY, IL 62305 217/224-9600
TELEX 250142 CABLE BCST ELECT QUI

TITLE
PCB ASSEMBLY
BACK PLANE MOTHER PCB
(5400 SERIES)

SHEET 1 OF 1
SCALE 2/1
REV 3
TYPE A
SIZE C
DWG. NO. 910-0091-001





PCB BLANK
#D514-1808

SEE SCHEMATIC #D906-5119
SEE B/M #914-1808

TOLERANCE UNLESS OTHERWISE SPECIFIED
DECIMAL 2 PL = .01 3PL = .005
FRACTIONAL ± 1/64
ANGULAR ± 1°
SHARP EDGES TO BEND RADII FILLET RADII

MATERIAL

DRAWN BY DARF DATE 7-13-83
CHECKED BY [illegible] DATE [illegible]
PROJECT ENGR [illegible] DATE [illegible]
APPROVED BY

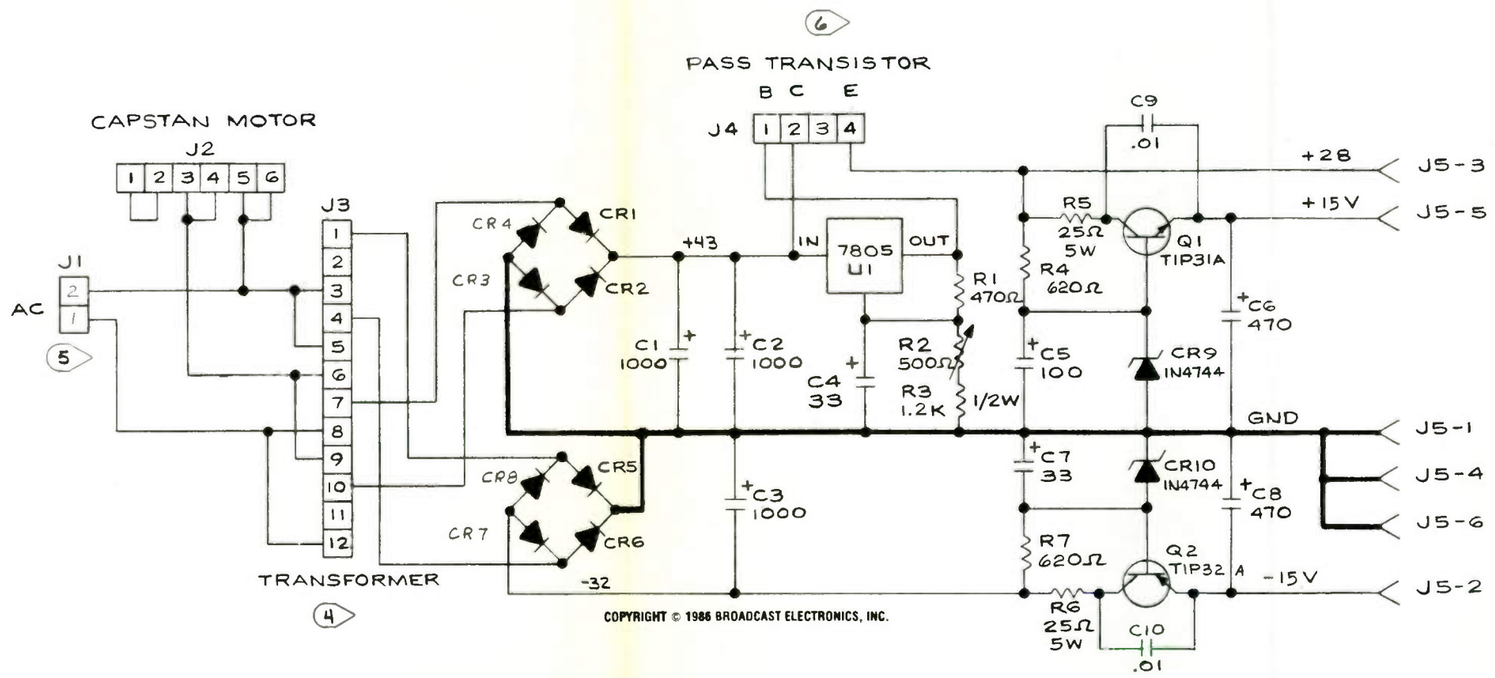
TREATMENT OR FINISH

BROADCAST ELECTRONICS INC.

TITLE PCB ASSEMBLY
BACK PLANE MOTHER PCB

D DWG. NO. 914-1808 REV H

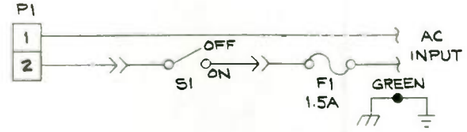
5500 SERIES SCALE 2/1 SHEET 1 OF 1



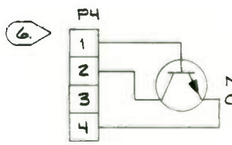
NOTES:

1. RESISTORS IN OHMS, 1/4W, 5%, CAPACITORS IN MICROFARADS, UNLESS OTHERWISE NOTED.
2. LAST COMPONENTS USED: J5, Q2, C8, R7, CR10 & U1
3. CR1 THRU 4 MR751, CR5 THRU 8 IN4005

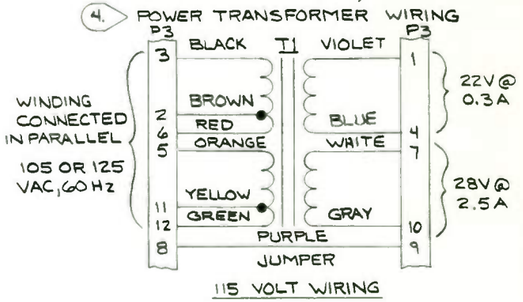
5.

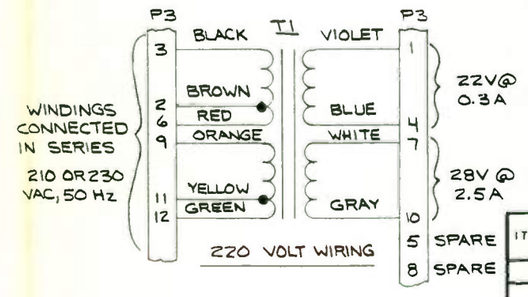


6.



4. POWER TRANSFORMER WIRING





SEE PC ASSY DWG # C-914-1809

ITEM	QTY RQD	PART NUMBER	DESCRIPTION	NOTE

LIST OF MATERIAL

TOLERANCE UNLESS OTHERWISE SPECIFIED
DECIMAL 2 PL ± .01 3 PL ± .005
FRACTIONAL ± 1/64
ANGULAR ± 1°
SHARP EDGES TO BEND RADII FILLET RADII

MATERIAL —

TREATMENT OR FINISH —

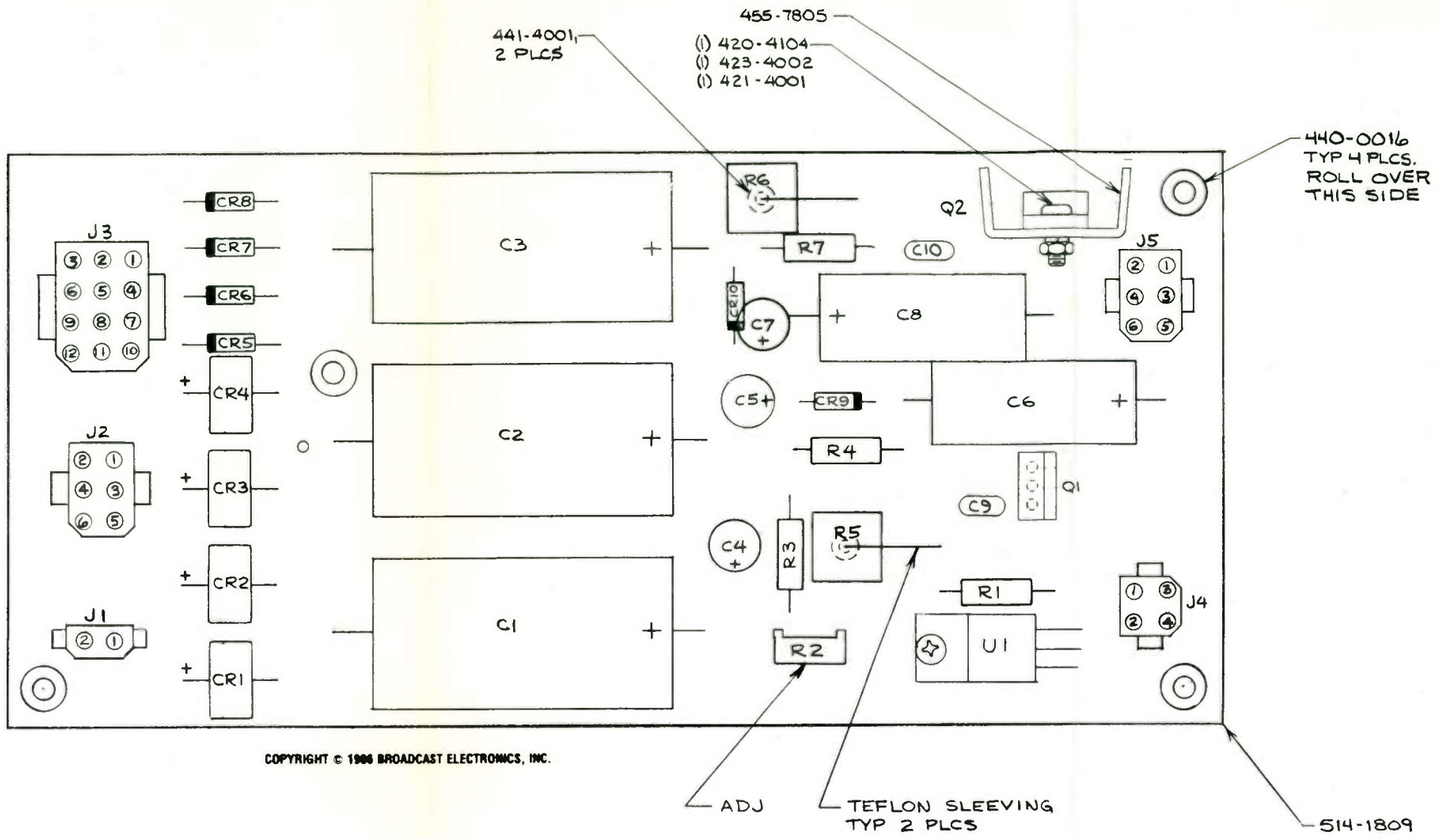
DRAWN BY Wm. DATE 1/22/76
CHECKED BY DATE 2-23-76
PROJECT ENGR DATE 2/19/76
APPROVED BY

BROADCAST ELECTRONICS INC.
- A FILMWAYS COMPANY -

TITLE 5 DECK (SCHEMATIC) POWER SUPPLY BD.

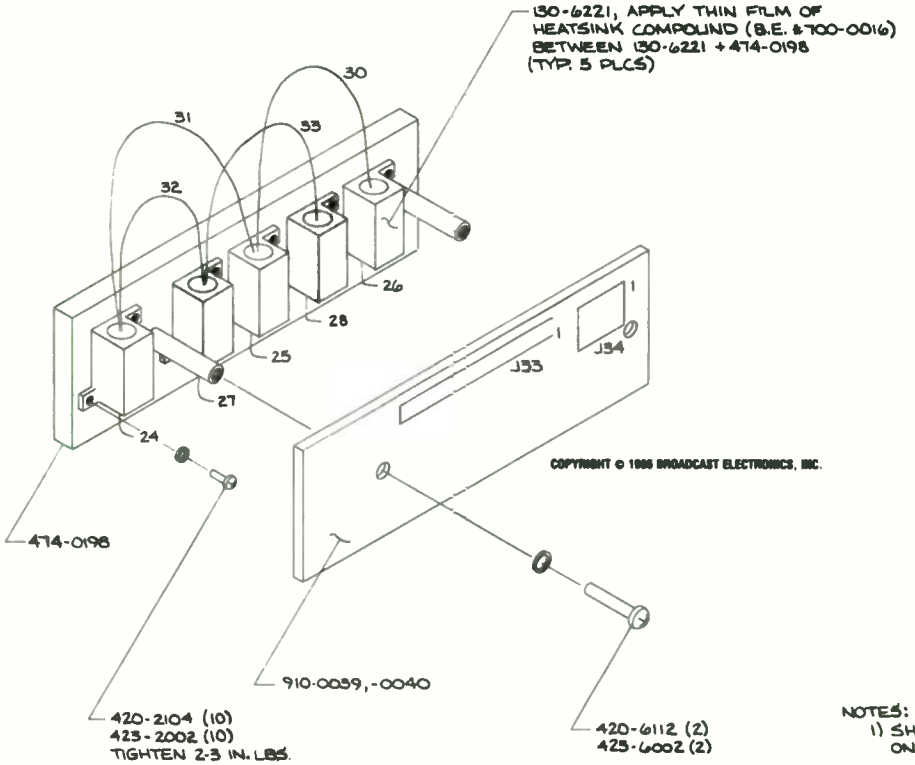
C DWG NO. 906-5116 REV H

5000 SERIES SCALE SHEET 1 OF 1



SEE SCHEMATIC No. C906-5116
SEE B/M No. 914-1809

TOLERANCE UNLESS OTHERWISE SPECIFIED DECIMAL 2 PL ± .01 3 PL ± .005 FRACTIONAL ± 1/64 ANGULAR ± 1° SHARP EDGES TO BEND RADII FILLET RADII	DRAWN BY MSB DATE 2/17/76 CHECKED BY DATE 2-23-76 PROJECT ENGR DATE APPROVED BY	BROADCAST ELECTRONICS INC. – A FILMWAYS COMPANY –	
MATERIAL —	TREATMENT OR FINISH —	TITLE ASSEMBLY POWER SUPPLY P C BD	
		C DWG NO. 914-1809	REV H
		5500 SERIES	SCALE 2/1 SHEET 1 OF 1



NOTES:
1) SHADED COMPONENTS NOT USED ON 950-0303 (5400C)

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

DWN. BY MSE 4-22-86
CHKD
ME
PROJ. ENGR.
MFG.

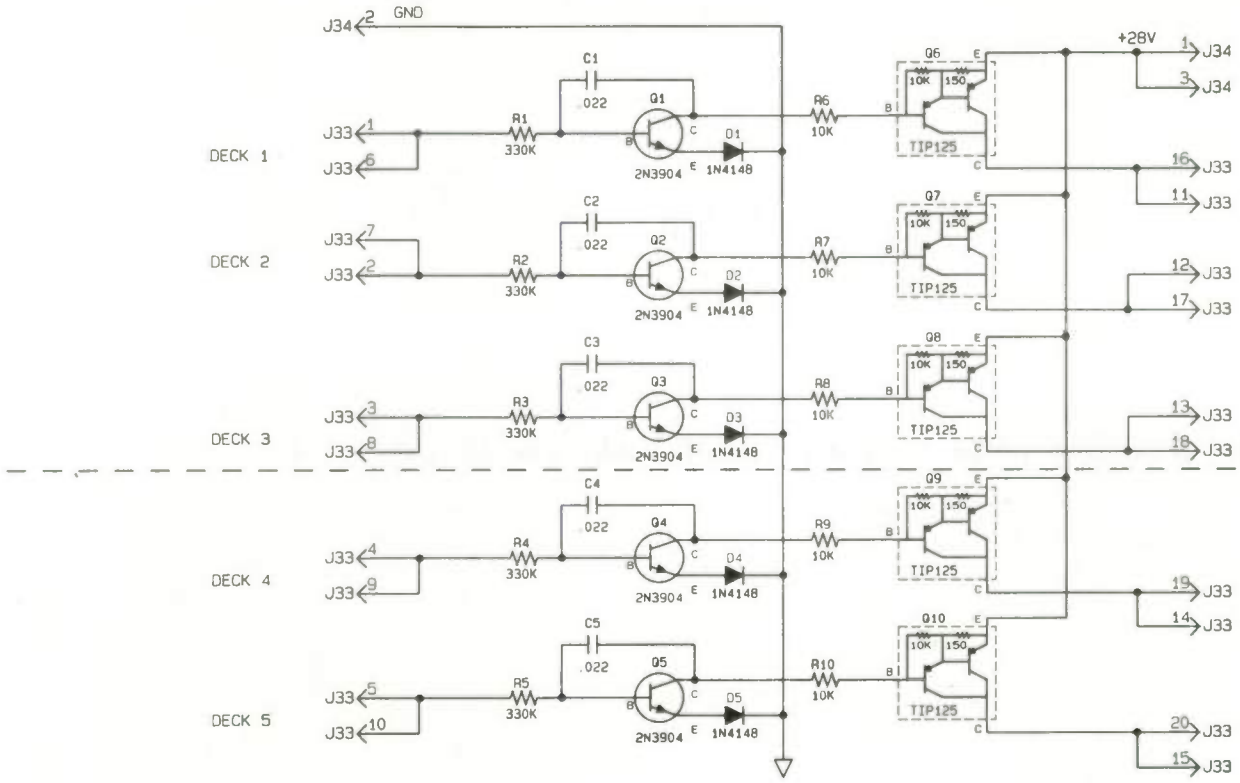
MATERIAL SEE B/M 950-0304, -0305
FINISH
NEXT ASSY.

BROADCAST ELECTRONICS INC.
4100 N. 24TH ST., P.O. BOX 3606 QUINCY, IL 62305 217/224-9600
TELEX 280142 CABLE BROADCAST

TITLE ASSY, SOLENOID FOLDBACK

TYPE A | SIZE C | DWG. NO. 950-0304, 950-0305 | REV A

MODEL 5000 SERIES | SCALE ~ | SHEET 1 OF 1



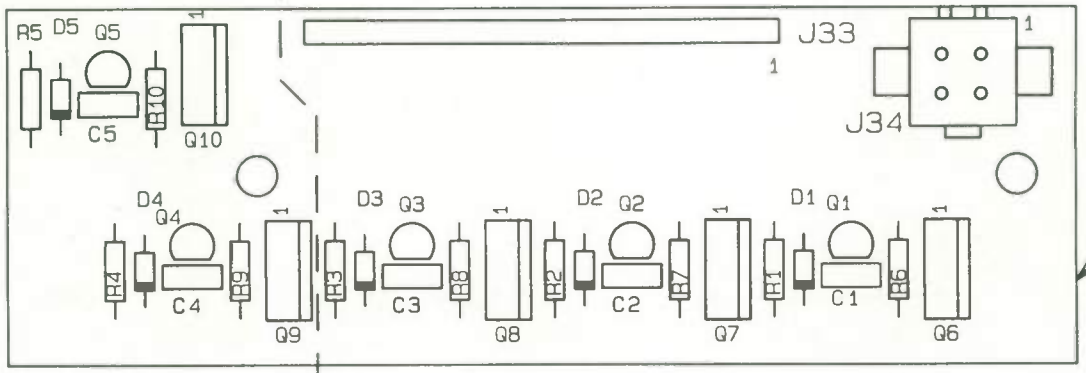
NOTES:

1. ALL RESISTORS IN OHMS, 1/4W, 5%: ALL CAPACITORS IN MICROFARADS, UNLESS OTHERWISE SPECIFIED.
2. LAST COMPONENTS USED: R10, Q10, C5, J34, D5
3. SEE PCB ASSEMBLY: AB910-0039, -0040

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

DWN BY MSE	DATE 3-27-86	MATERIAL SEE B/M 910-0039, -0040	BROADCAST ELECTRONICS INC.
CHKD			
ME		FINISH	TITLE SCHEMATIC, SOLENOID FOLDBACK
PROJ ENGR			TYPE S SIZE C DWG. NO. 910-0039, -0040 REV B
MFG		NEXT ASSY	MODEL 5300C 5400C SCALE —— SHEET 1 OF 1

4100 N. 24TH ST., QUINCY, IL. 62305 217/224-9600
TELEX 250142 CABLE "BROADCAST"



COMPONENTS LEFT OF DASHED LINE
NOT USED ON 5300C AND 5400C.

SEE SCH. SB910-0039, -0040

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

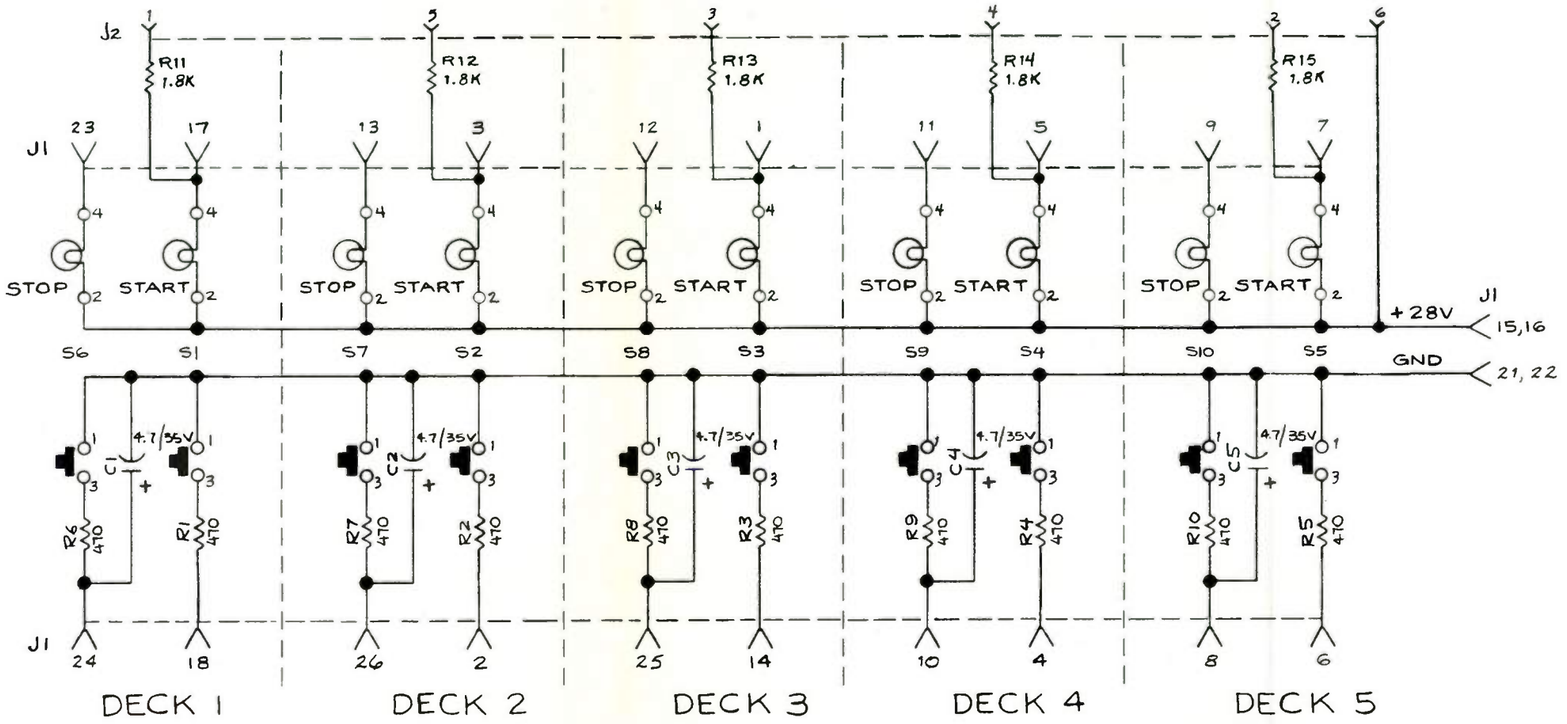
DWN BY	MSE
DATE	4-7-86
CHKD	
ME	
PROJ ENGR	
MFG	
MATERIAL	SEE B/M 910-0039, -0040
FINISH	
NEXT ASSY	

BROADCAST ELECTRONICS INC.
4100 N. 24TH ST. QUINCY, IL. 62305 217/224-9600
TELEX 250142 CABLE "BROADCAST"

TITLE: PCB ASSY, SOLENOID FOLDBACK

TYPE	SIZE	DWG. NO.	REV
A	B	910-0039, -0040	A

MODEL 5300C 5400C 5500C | SCALE 2/1 | SHEET 1 OF 1



NOTES:

1. ALL RESISTORS, IN OHMS, 1/4 W, 5%,: ALL CAPACITORS IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
3. LAST COMPONENTS USED: C5, J2, R15, & S10

SEE PC ASSY DWG # C-914-1807

ITEM	QTY RQD	PART NUMBER	DESCRIPTION	NOTE

LIST OF MATERIAL

TOLERANCE UNLESS OTHERWISE SPECIFIED
DECIMAL 2 PL ± .01 3 PL ± .005
FRACTIONAL ± 1/64
ANGULAR ± 1°
SHARP EDGES TO BEND RADII
FILLET RADII

DRAWN BY TL DATE 5-4-87
CHECKED BY DATE
PROJECT ENGR PC DATE
APPROVED BY

MATERIAL —

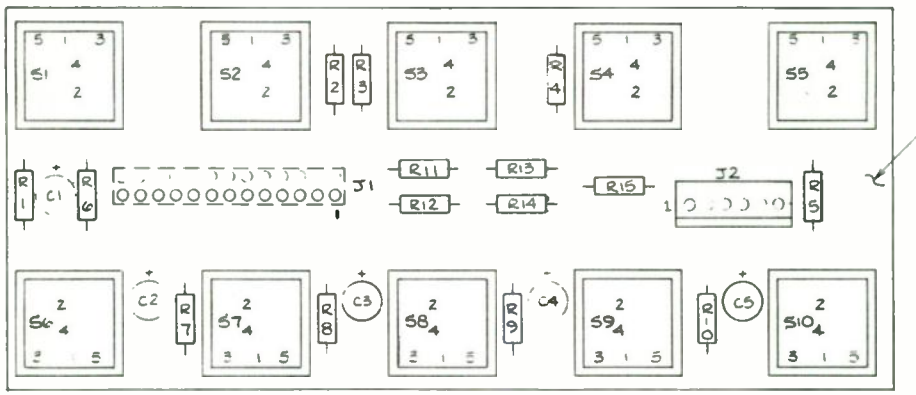
TREATMENT OR FINISH —

BROADCAST ELECTRONICS INC.
-A FILMWAYS COMPANY-

TITLE (SCHEMATIC) FRONT PANEL SWITCH ASSY.

C DWG NO. 910-0036 REV B

5500 SERIES SCALE SHEET 1 OF 1



NOTES:

1) SEE SCHEMATIC #SC906-5113
2) J1 MOUNTED ON SOLDER SIDE OF PCB.

TOLERANCE (DECIMAL) U.O.S.
.x ± .030 .xxx ± .005
.xx ± .010 ANGLES ± 1°

DWN. BY MSE 7-24-84
CHKD
ME
PROJ. ENGR.
MFG.

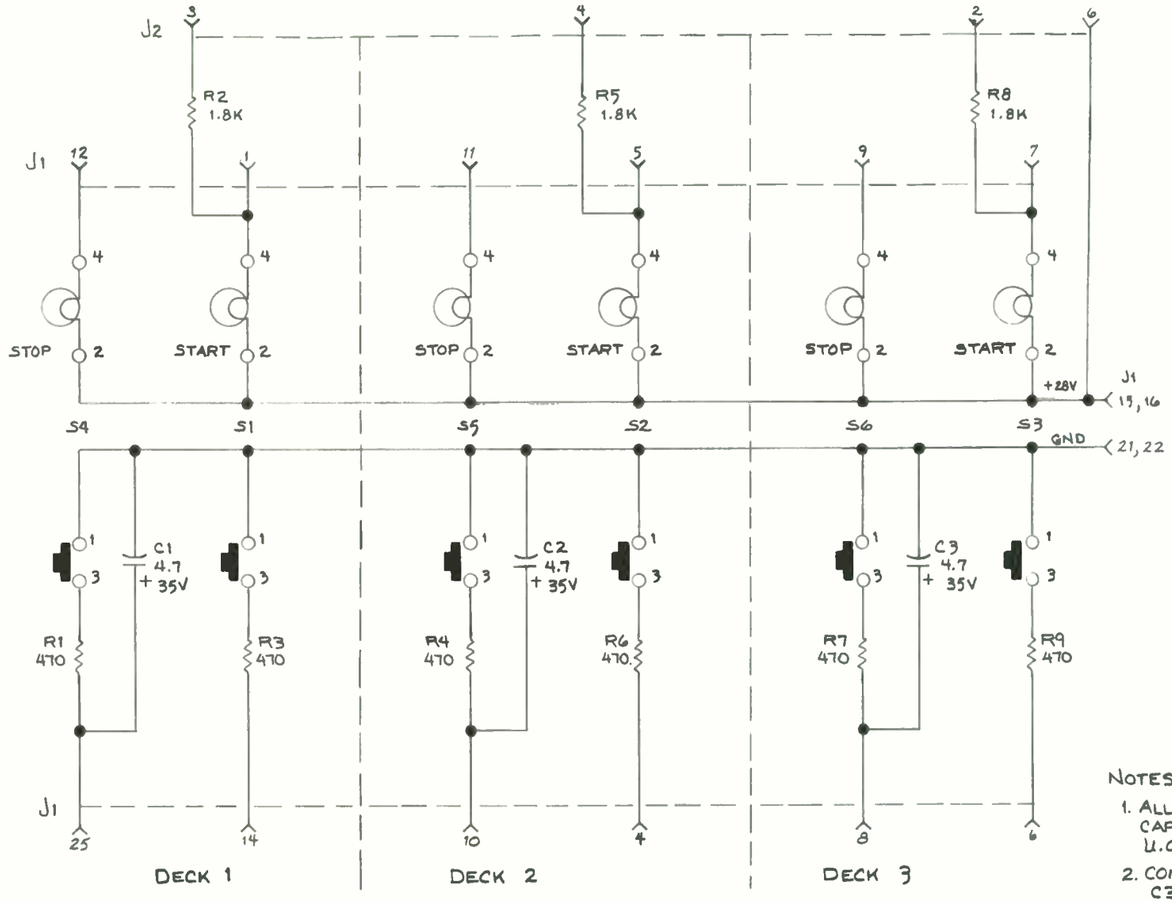
MATERIAL SEE B/M 910-0036
FINISH
NEXT ASSY.

BROADCAST ELECTRONICS INC.
4100 N. 24TH ST., P.O. BOX 3606 QUINCY, IL 62305 217/224-9600
TELEX 280142 CABLE BROADCAST

TITLE PCB ASM., FRONT PANEL SWITCH BOARD

TYPE A | SIZE C | DWG. NO 910-0036 | REV B

MODEL 5500C | SCALE 2/1 | SHEET 1 OF 1



NOTES:

1. ALL RESISTORS IN OHMS, 1/4W 5%, CAPACITORS IN MICROFARADS, U.O.S.
2. COMPONENTS LAST USED: C3, J2, R9, S6

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

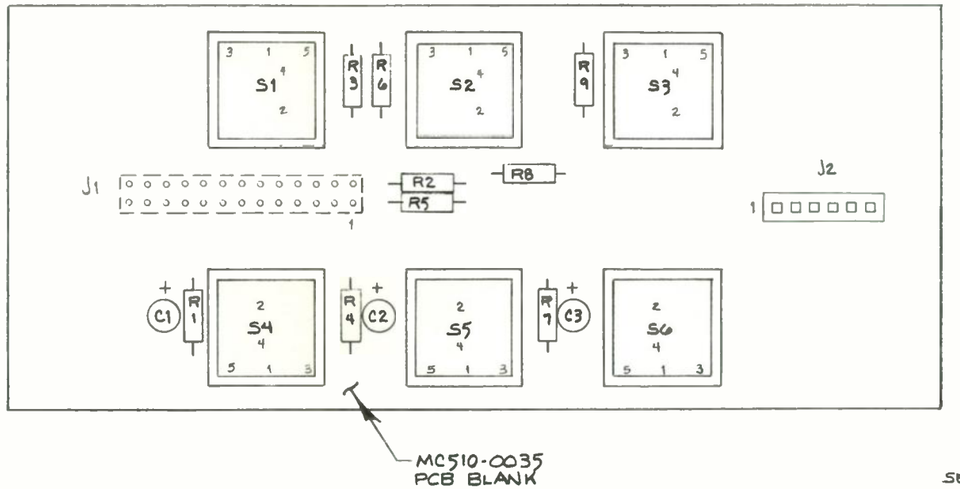
DWN. BY MJ.ORF 4-16-84	MATERIAL	
CHKD MH 5-24-84		
ME RA 5-24-84	FINISH	
PROJ. ENGR.		
MFG.	NEXT ASSY.	

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

TITLE SCHEMATIC
FRONT PANEL SWITCH BOARD

TYPE	SIZE	DWG. NO.	REV
S	C	910-0035	D

MODEL 5400 SERIES | SCALE NTS | SHEET 1 OF 1



NOTE:
S1 THRU S6 ARE INSTALLED AT FINAL ASSEMBLY.

SEE SCHEMATIC # SC910-0035
SEE B/M # 910-0035

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

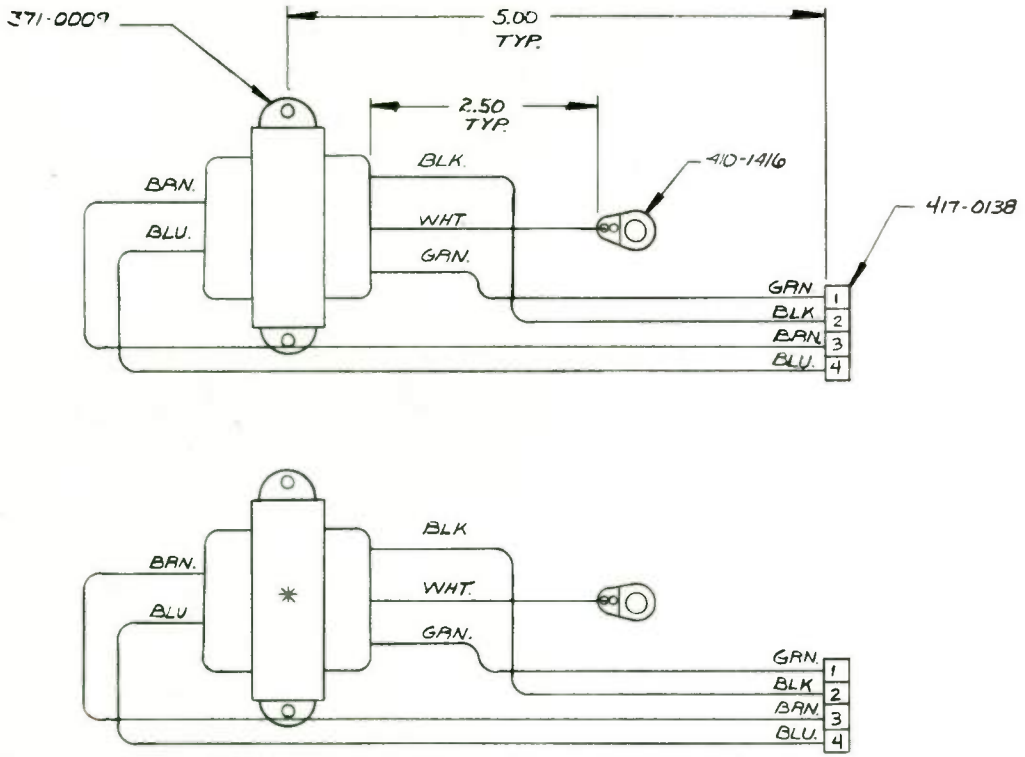
DWN. BY MJ ORF 4-16-84
CHKD MH 5-24-84
ME RA 5-24-84
PROJ. ENGR.
MFG.

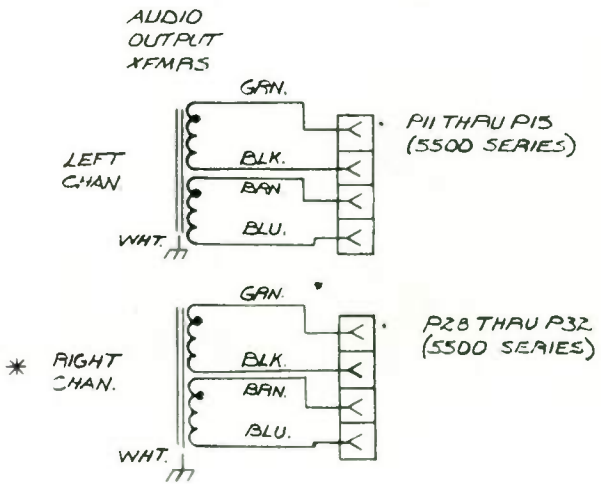
MATERIAL
FINISH
NEXT ASSY.

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

TITLE PCB ASSEMBLY
FRONT PANEL SWITCH BOARD

TYPE A | SIZE C | DWG. NO. 910-0035 | REV G
MODEL 5400 SERIES | SCALE 2/1 | SHEET 1 OF 1





NOTES:

1. ✳ ITEM NOT USED IN MONO UNITS.

TOLERANCE UNLESS OTHERWISE SPECIFIED
DECIMAL 2 PL ± .01 3PL ± .005
FRACTIONAL ± 1/64
ANGULAR ± 1°
SHARP EDGES TO
BEND RADII
FILLET RADII

MATERIAL NOTED

TREATMENT OR FINISH —

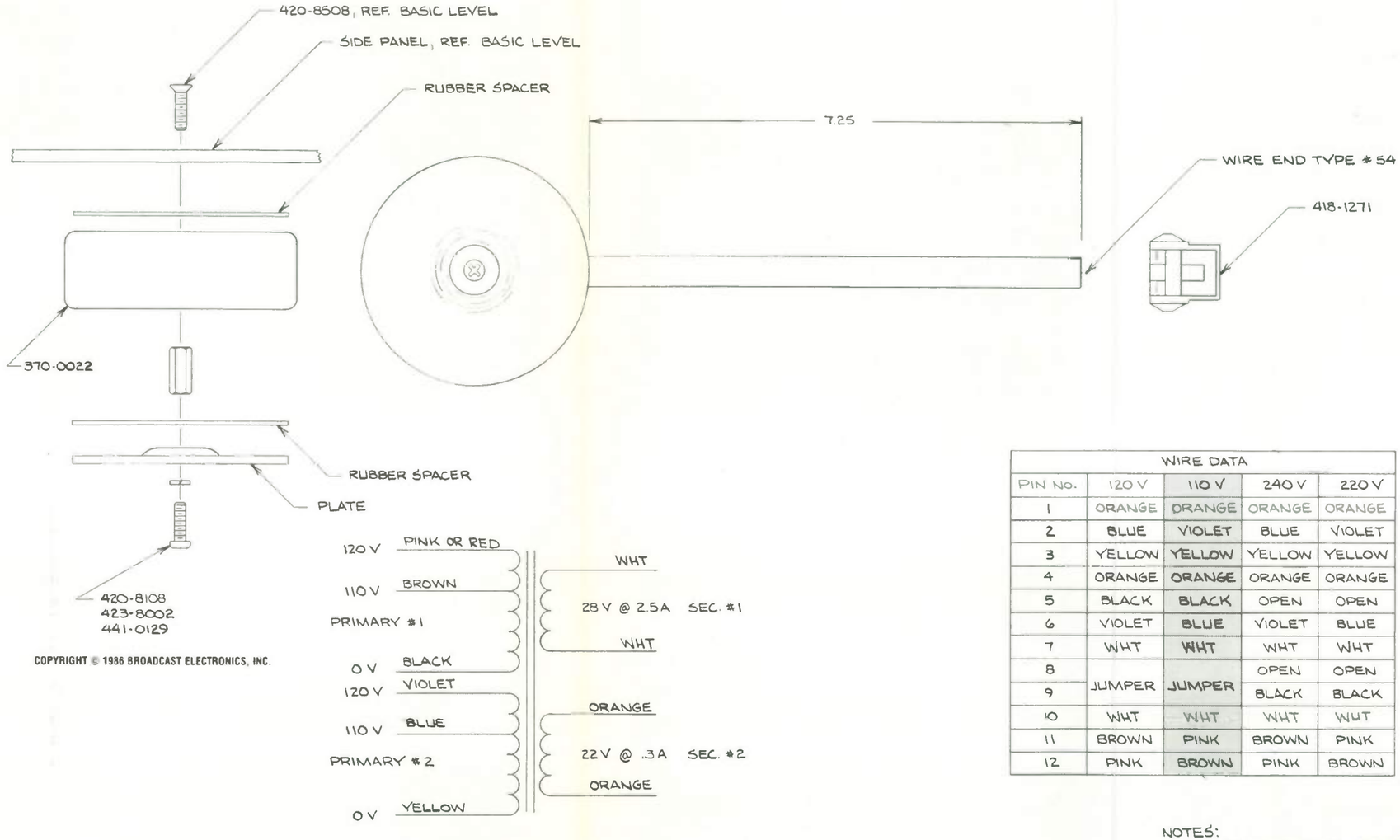
DRAWN BY LEF DATE 10-12-83
CHECKED BY KA DATE 10-13-83
PROJECT ENGR. RA DATE 10-13-83
APPROVED BY MH 10-13-83

BROADCAST ELECTRONICS INC.

TITLE AUDIO OUTPUT XFMR CABLE ASS'Y & SCHEMATIC

B | DWG. NO. 950-0077 | REV. B

5500B SERIES | SCALE — | SHEET 1 OF 1



WIRE DATA				
PIN No.	120 V	110 V	240 V	220 V
1	ORANGE	ORANGE	ORANGE	ORANGE
2	BLUE	VIOLET	BLUE	VIOLET
3	YELLOW	YELLOW	YELLOW	YELLOW
4	ORANGE	ORANGE	ORANGE	ORANGE
5	BLACK	BLACK	OPEN	OPEN
6	VIOLET	BLUE	VIOLET	BLUE
7	WHT	WHT	WHT	WHT
8	JUMPER	JUMPER	OPEN	OPEN
9			BLACK	BLACK
10	WHT	WHT	WHT	WHT
11	BROWN	PINK	BROWN	PINK
12	PINK	BROWN	PINK	BROWN

NOTES:
1) JUMPERS TO BE B.E. #601-2209 WHITE, 22 GAUGE, 2.0" LG.
2) SHADED AREA TO BE DEFAULT VOLTAGE
3) PRIMARY WIRES HAS BLACK TUBING

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

DWN. BY MSE 1-22-86
CHKD MH 1-22-86
ME
PROJ. ENGR.
MFG.

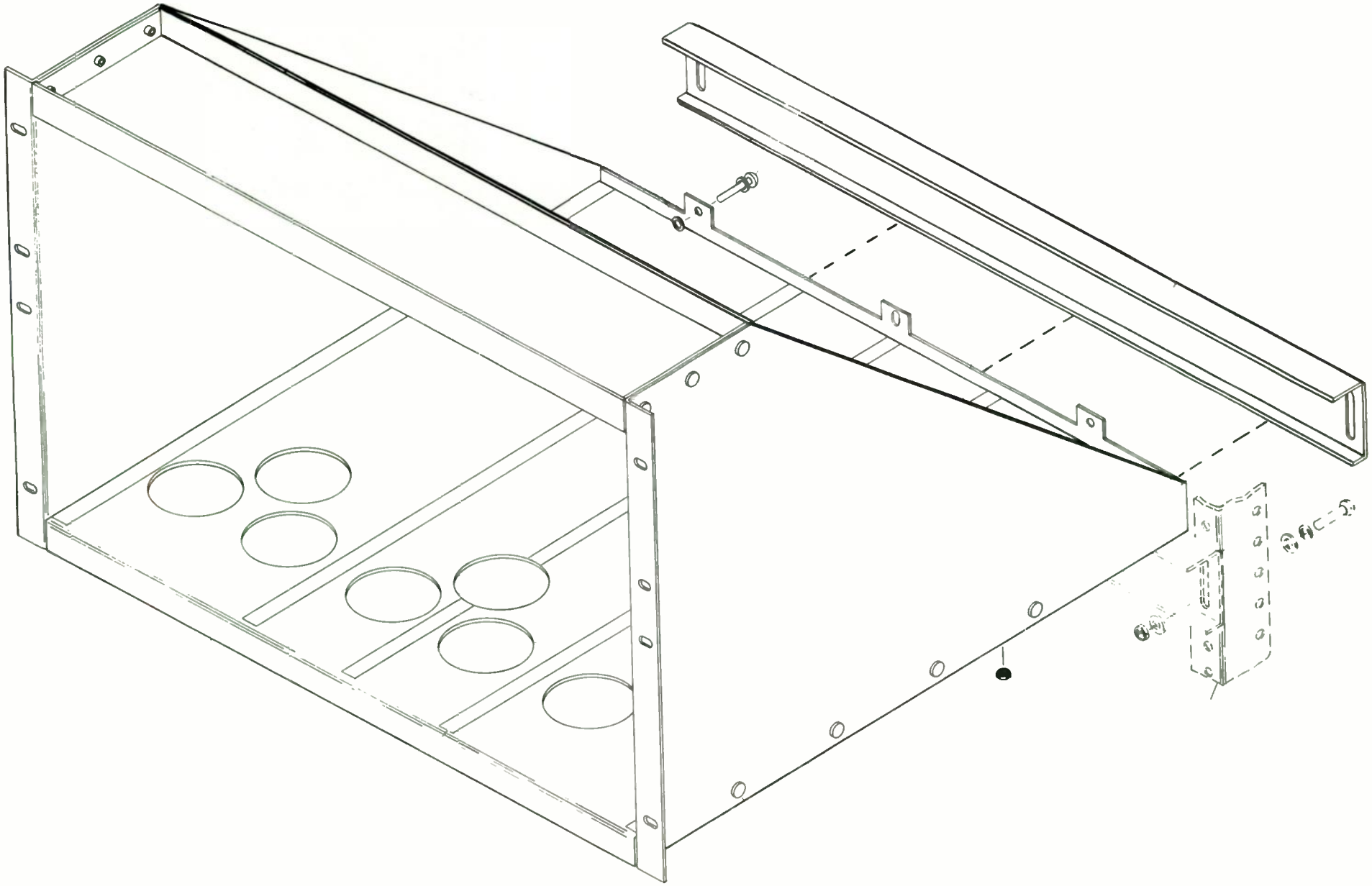
MATERIAL SEE B/M 950-0080
FINISH
NEXT ASSY.

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

TITLE ASSY, POWER TRANSFORMER

TYPE A | SIZE C | DWG. NO. 950-0080 | REV C

MODEL 5300C 5400C 5500C | SCALE ~ | SHEET 1 OF 1



597-5000-103

FIGURE 7-24. ASSEMBLY DIAGRAM, RACK INSTALLATION

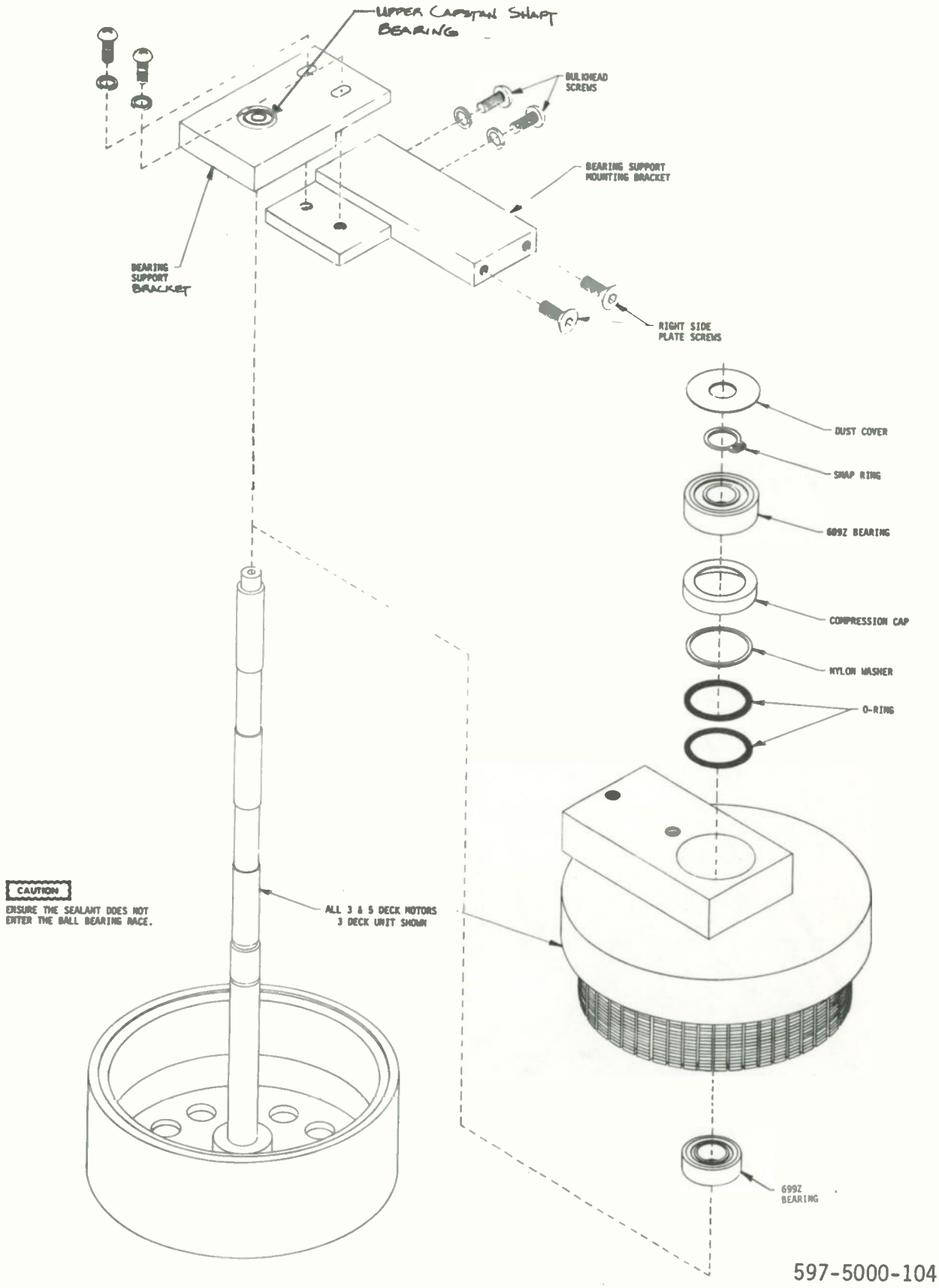


FIGURE 7-25. ASSEMBLY DIAGRAM, MOTOR

SECTION VIII
APPENDIX

8-1. INTRODUCTION.

8-2. This appendix provides technical data associated with the maintenance of the Broadcast Electronics 5400C/5500C series cartridge machines. The information contained in this appendix is presented in the following order.

A. The NAB Tape Cartridge and Associated Maintenance.

BROADCAST ELECTRONICS, INC.

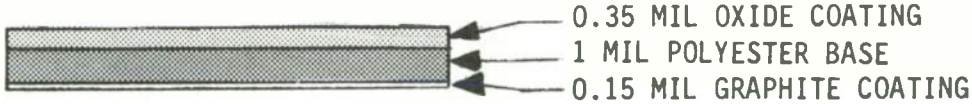
The NAB Tape Cartridge and Associated Maintenance

THE NAB TAPE CARTRIDGE

The National Association of Broadcasters (NAB) defines a cartridge as "a plastic or metal enclosure containing an endless loop of lubricated tape, wound on a rotatible hub in such a fashion as to allow continuous motion". Cartridges from various manufacturers differ slightly in design, but all cartridges used in NAB standardized systems fit the preceding definition.

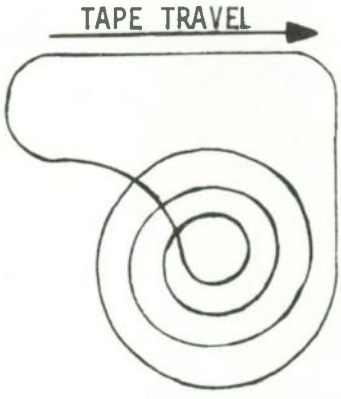
THE TAPE

Cartridge tape consists of a synthetic base material approximately 1 mil (0.001 inch) thick. One side of the base is coated with ferrite oxide particles for magnetic recording. The other surface is coated with a graphite layer. The total thickness of the tape is approximately 1.5 mils (0.0015 inch). The tape is 0.248 (+0/-0.002) inches wide.



CARTRIDGE TAPE

An endless loop is formed by wrapping the tape with the oxide side out into a spiral. The two ends are spliced together so that as the tape is pulled from the center, the tape passes across the tape heads and returns to the outside of the tape spiral.

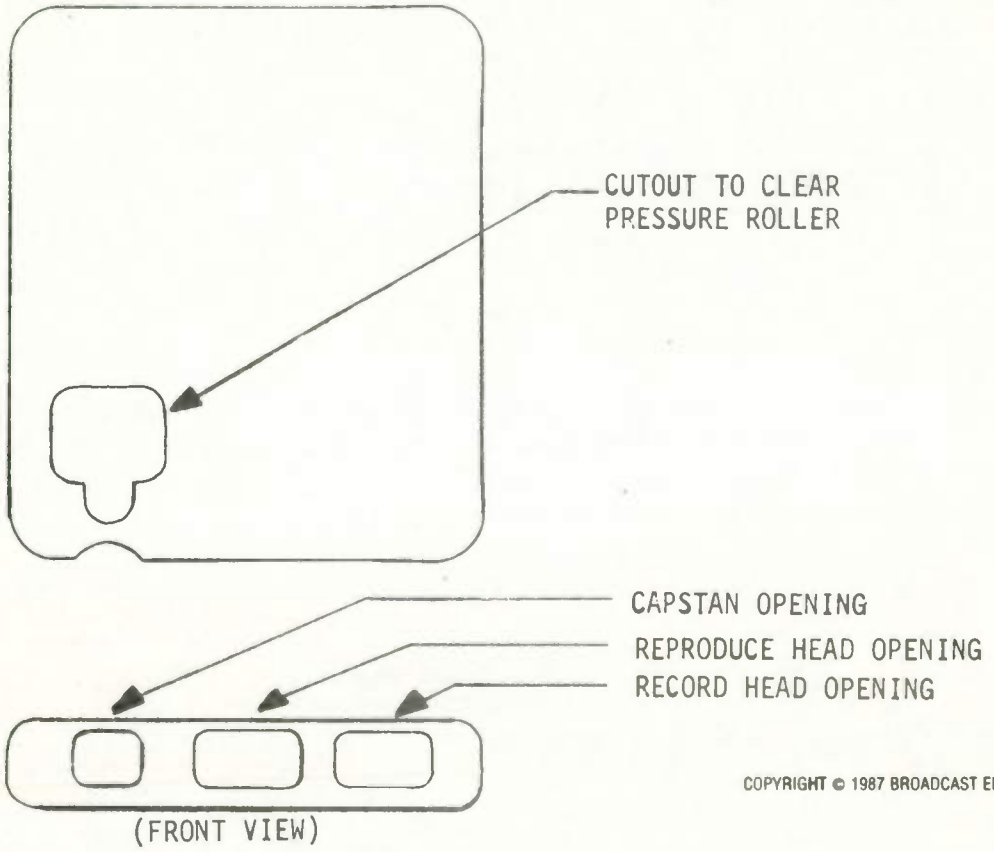


TAPE SPIRAL

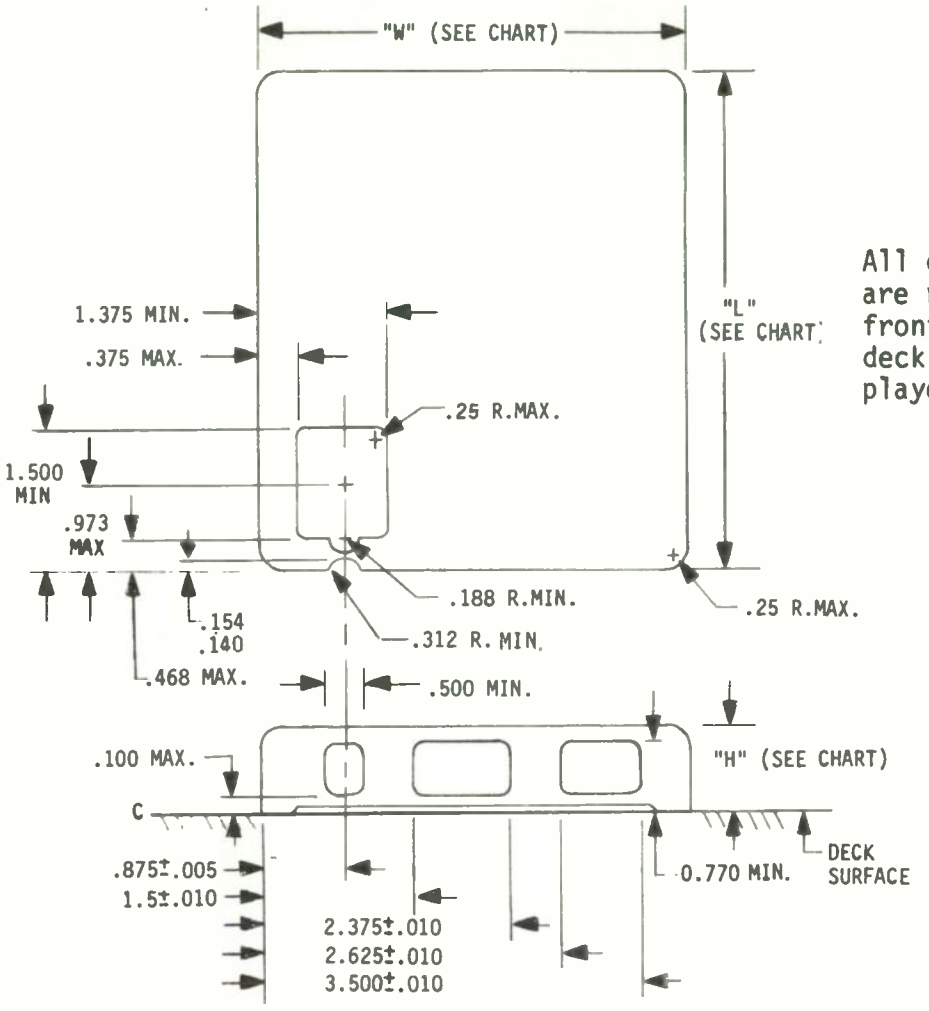
THE SHELL

The shell houses the tape and other mechanical components. Three nominal NAB size shells are available: 1) A or AA, 2) B or BB, or 3) C or CC. Assuming 1.5 mil tape, the A/AA size cartridge can be installed with up to 395 feet of tape, the B/BB with 650 feet, and the C/CC with 1,250 feet.

Three openings across the front of the cartridge allows the heads and capstan to penetrate the shell and contact the tape. In addition, an opening in the bottom is provided for the pressure roller to rotate through the cartridge behind the tape. Unlike cartridges used in consumer entertainment systems, the pressure roller (pinch roller or capstan idler) is a component of the cartridge player and not the cartridge.



NAB tape cartridge dimension standards are presented in Figure 1 and NAB tape head dimension standards are presented in Figure 2.



All dimensions are in inches and are referenced from the side and front of the cartridge and the deck surface of the cartridge tape player.

CARTRIDGE NAB TYPE	WIDTH ±0.015625	LENGTH MAXIMUM	HEIGHT MAXIMUM
A,AA	4"	5.25"	0.9375" FOR A 0.895" FOR AA
B,BB	6"	7"	0.9375" FOR B 0.895" FOR BB
C,CC	7.625"	8.5"	0.9375" FOR C 0.895" FOR CC

FIGURE 1. NAB CARTRIDGE DIMENSION STANDARDS

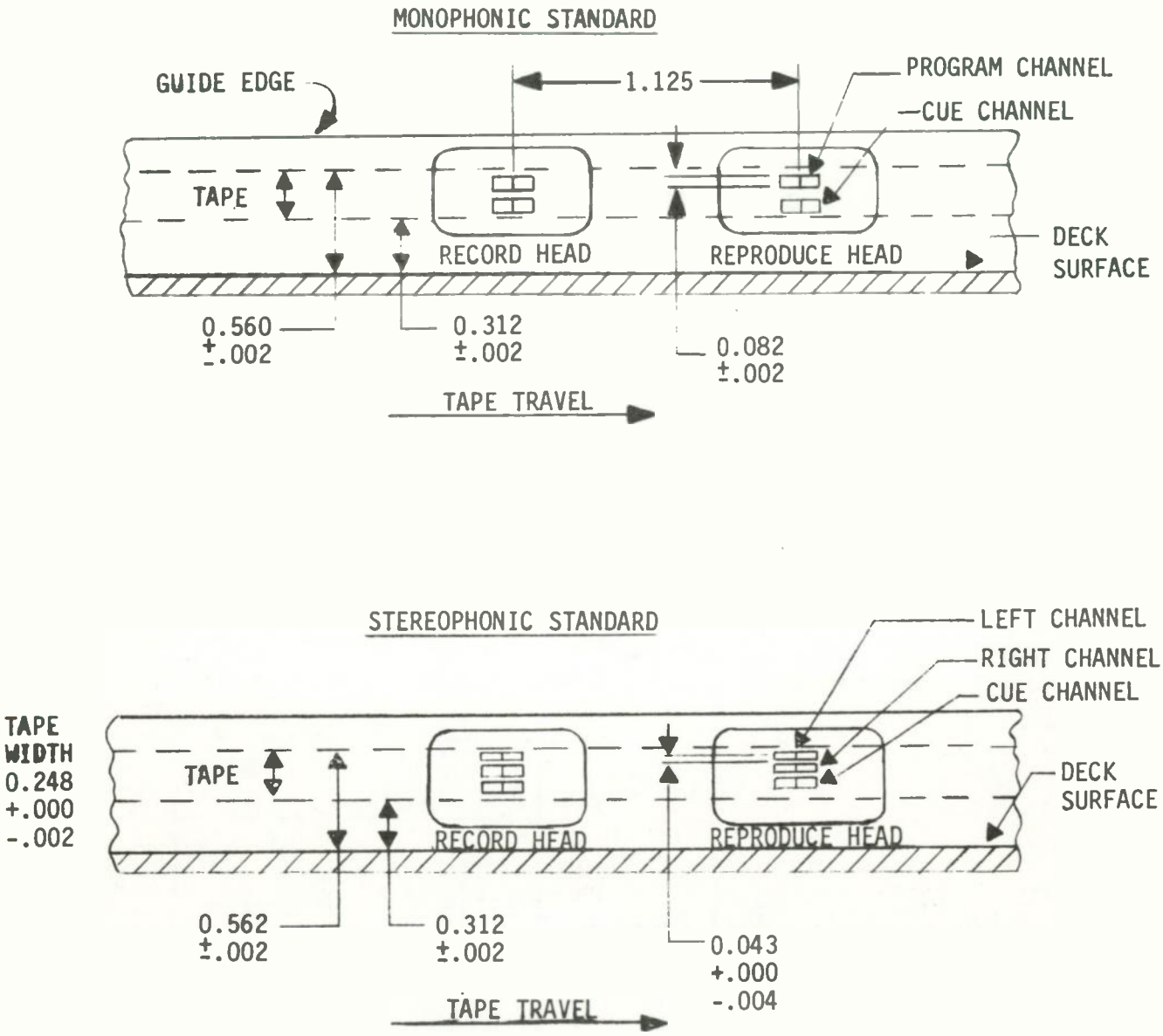
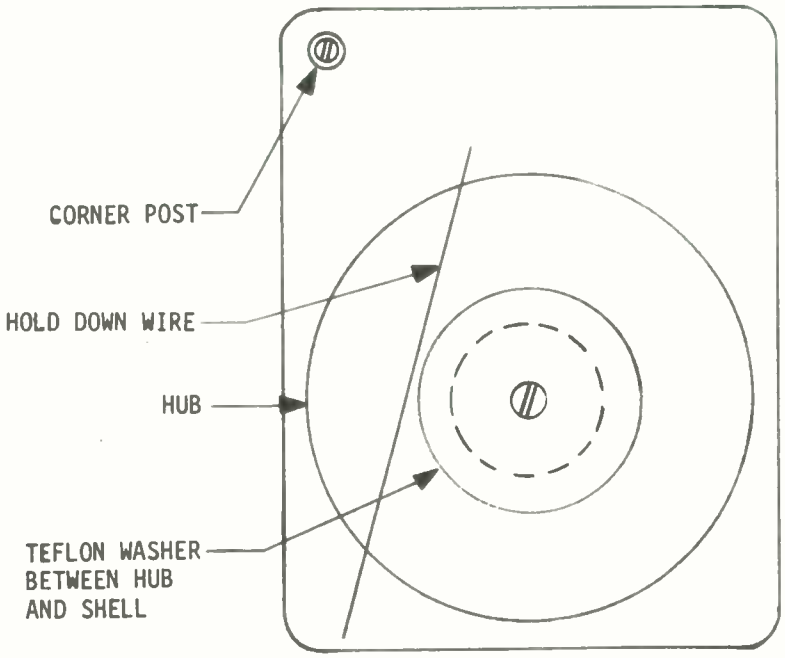


FIGURE 2. NAB TAPE HEAD DIMENSION STANDARDS

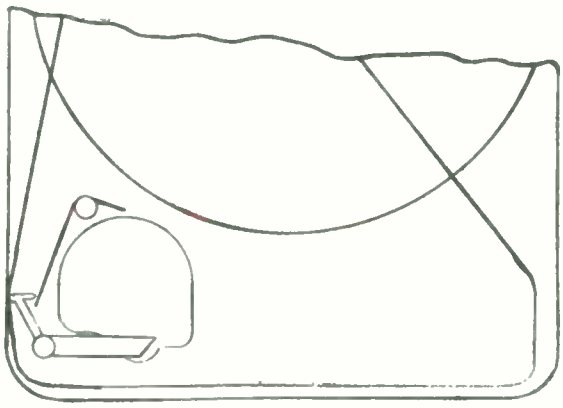
TAPE HUB, TEFLON WASHER, AND CENTER POST

The tape hub contains all cartridge tape. The hub is designed to rotate around a center post. To allow free rotation, a teflon washer is installed between the hub and the shell. To maintain proper tape placement on the hub, the cartridge design will include: 1) a separate hub cover, 2) a close-tolerance molded cover, or 3) a hold-down wire.



CLUTCH SPRING OR HUB BRAKE

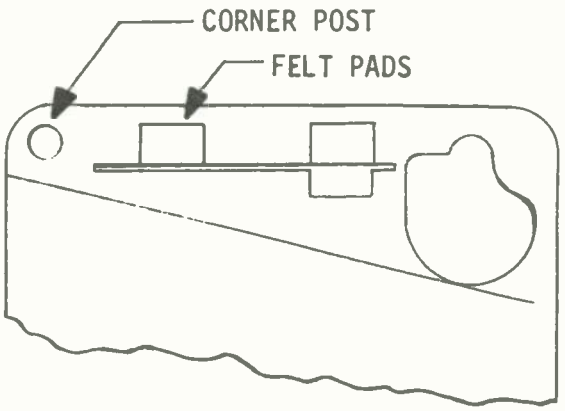
The clutch spring or hub brake prevents tape movement when the cartridge is not in operation. This is accomplished by applying a brake to the hub or by pressing the tape against the shell. The clutch or brake is released by the shaft of the pressure roller when the roller is in the play position.



PRESSURE PADS

The pressure pads maintain tape-to-head contact. A foam plastic is the most commonly used material for the pressure pads. The compression of the foam provides pressure to wrap the tape slightly around the heads.

The pads may be in a single block configuration mounted behind the two openings for the record and reproduce heads and secured to the cartridge shell. Alternately, the pads may be separated and fastened to a metal or plastic arm. A third type mounts the pads on a spring-loaded plastic block.



TAPE GUIDANCE

Primary control of the tape as it moves across the heads is maintained by external guides in the head bracket. Guidance is provided within the cartridge to maintain tape travel in the same path. This is generally accomplished with tabs and grooves molded into the shell. Of primary importance is the corner post which must straighten the tape before it passes across the front openings of the shell. This post may be molded into the shell or a separate component molded into a recessed area in the shell.

CARTRIDGE MAINTENANCE TIPS

The cartridge is the second half of the tape cartridge system. The cartridge requires regular maintenance for proper operation. The service department of Broadcast Electronics has developed over the years a rule of thumb for troubleshooting: Check the cartridge before adjusting the machine.

TAPE

For maximum performance, the tape must be in good condition. The tape in cartridges wears rapidly, particularly in short length cartridges (70 seconds or less) and cartridges that are used frequently. The tape should be inspected regularly and frequently for obvious signs of wear.

Cartridges should be rewound or replaced when the oxide side of the tape is shiny. Likewise the tape should be discarded if it is wrinkled, or contaminated with fingerprints, grease, or dirt. Less obvious are areas where the iron oxide particles have worn from the base of the tape. Missing oxide areas may not be visible, but will cause a loss of audio signal.

If possible only one type of tape should be used in a single installation. Different brands, and even different types of the same brand of tape require different bias recording levels for optimum response.

When rewinding cartridges, use only a graphite lubricated tape. Silicone lubricated tapes will not provide adequate service in rugged NAB cartridge operation.

Every cartridge tape must have one splice, but multiple splices can cause problems. If the top tape ends overlap at the splice or do not meet squarely, the audio may not reproduce. In addition, a poor splice will catch on the cartridge or the hub. After a splice has been in use for some time, the tape tension may pull the two ends of the tape apart slightly opening the splice.

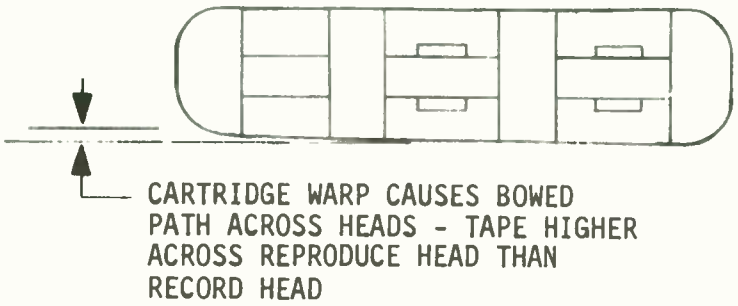
Proper tape tension is most critical. If the tension is too great, the tape will wear rapidly as it is squeezed against the hub, the pressure pads, the corner post, and the tape on the hub. If the tension is too light, the tape will not be pulled back into the hub.

The NAB specifies that tape tension at the capstan should not exceed 3 ounces. Cartridges greater than 70 seconds in length usually have less than 3 ounces, while cartridges less than 70 seconds usually have greater than 3 ounces. When in operation, a properly wound cartridge moves tape freely with no reluctance to wind onto the hub. To increase the tension in a cartridge, open up the splice and gently pull the tape as it wraps onto the hub. To decrease the tension, open up the splice and gently remove several loops from the center of the hub. Remove the excess and resplice the tape.

THE SHELL

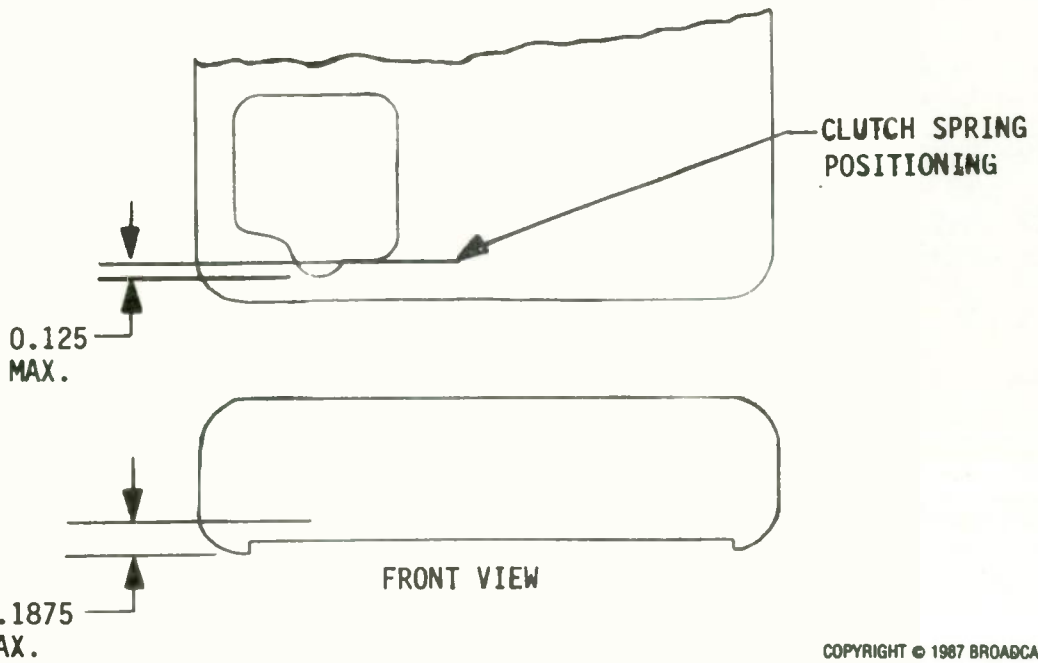
A deformed shell can adversely affect frequency response by distorting the tape path. In particular, a warped cartridge may cause the tape to traverse the head openings in an arc or bowed path rather than a straight line. Also, an misaligned top can spread the sides of the cartridge enough to cause this same problem. Check suspect cartridges on a flat surface.

Periodically, the cartridge center post should be cleaned. Deposits on the post increase tape tension by not allowing the tape hub to rotate freely. Also, check the tape hub washer. This washer should always be in place underneath the tape hub, between the hub and the shell. This washer is easily misplaced when the cartridge is opened and the hub removed.



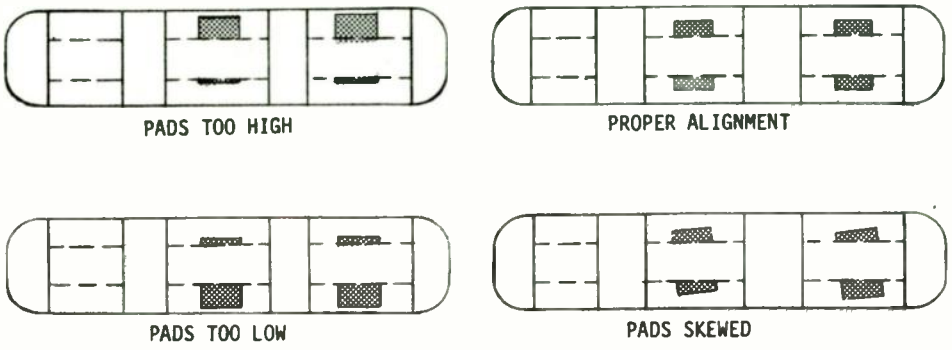
CLUTCH SPRING OR HUB BRAKE

The clutch spring or hub brake should completely release when the pressure roller is in the vertical position. This allows the hub and the tape to move freely. An improperly adjusted clutch spring or defective hub brake may prevent the roller from engaging or dis-engaging. The clutch should be parallel to the bottom of the shell and no more than 0.1875 inches above the surface of the tape deck. The clutch must not protrude more than 0.125 inch into the opening for the pressure roller. Less than 8 ounces should be required to release the clutch.



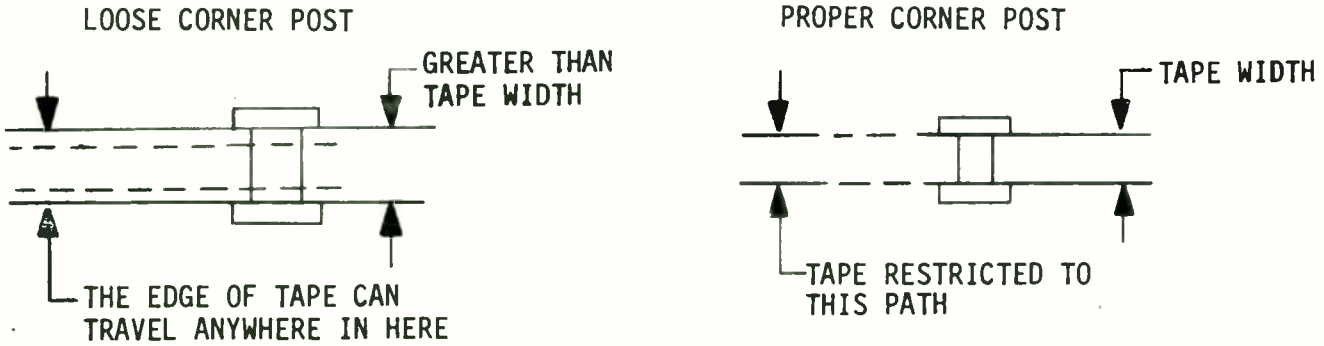
PRESSURE PADS

The pressure pads must wrap the tape around the front of the heads. The pressure applied must be uniform across the tape as it is in contact with the head. Periodically check the pads for proper alignment. If a portion of the tape is not in contact with the pads, the improper tape-to-head contact will occur. This will result in poor frequency response from an individual cartridge.



THE TAPE PATH

The most frequent cause of distortion of the tape path in the cartridge is a loose corner post. The post must be mounted 0.250 inches from the bottom of the shell. If the distance between the shell and post is greater than 0.250 inches, the tape will not pass straight across the heads. A loose post frequently causes muffled-sounding audio when the cartridge unit starts.



The hold-down wire used in many cartridges is important in maintaining proper tape travel. This wire maintains proper tape placement on the hub as tape is pulled from the center. The wire must not exert any pressure on the stored tape or the tape may wrinkle and jam. If a cartridge is dropped, this hold-down wire may unseat.

CARTRIDGE STORAGE

The cartridges should be stored away from direct sunlight, or heat from electronic equipment, radiators, etc. Ideal conditions are a temperature of 70° and a relative humidity of 50%. The cartridge storage area should be as free from dust as possible.

CARTRIDGE RECORDING PROCEDURE

The following procedure is particularly important when recording cartridges. When the cartridge is first inserted into the machine, operate the deck to allow the tape to seat properly in the tape guides.

Stop the tape. Do not remove the cartridge after the initial operation. Ensure the tape splice is between the end and the beginning of the program material.

CARTRIDGES FOR STEREOPHONIC SYSTEMS

MAINTENANCE

Cartridges operated in a stereophonic format require rigorous maintenance due to the generation of phase errors by improper tape movement. When the program material is combined, phase differences cause degradation of the frequency response.

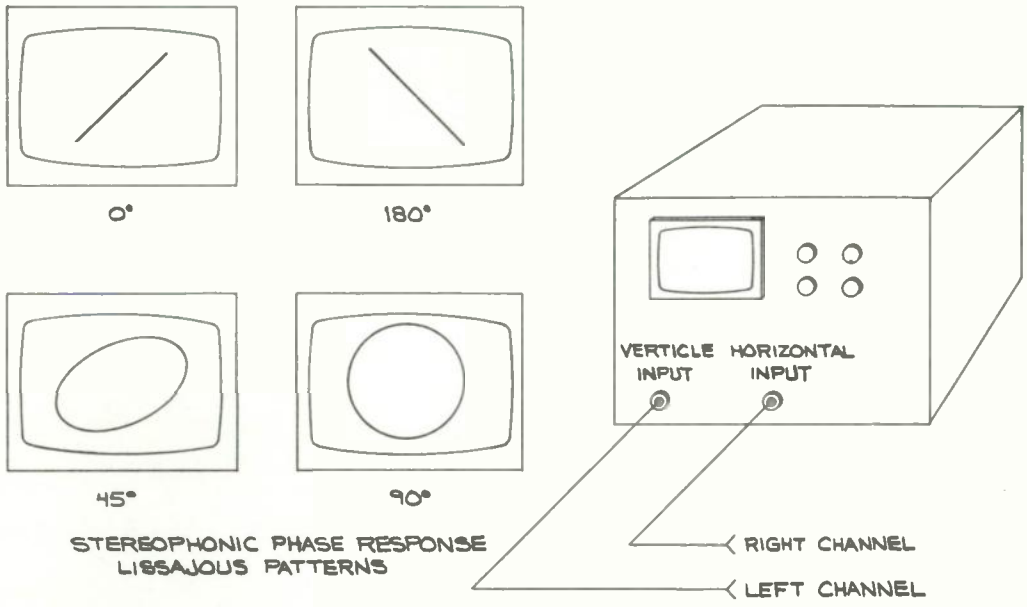
The most important characteristic of a cartridge operated in a stereophonic format is the ability to maintain an identical tape path each time the cartridge is inserted in the deck. This ensures reliable recording and subsequent accurate reproduction.

Cartridges used in a stereophonic system should initially be selected for phase repeatability using the phasing test outlined below. This test should be repeated on a regular basis throughout the life of the cartridge. A cartridge which fails this test should be discarded.

To provide better guidance within the cartridge, several manufacturers have introduced cartridges with an adjustable corner post. The post is threaded into the shell so that the precise post height may be maintained. These and other cartridges designed to improve performance should be considered for use in a stereophonic system.

STEREO PHASING TEST

Connect the output of a record/playback unit to an oscilloscope as shown. Connect an audio signal generator to both inputs of the recorder. While recording, observe the phase of the reproduce signals. Remove and re-insert the cartridge several times. Cartridges which exhibit poor phase repeatability of stability should be discarded. Do not test only at higher frequencies, also check selected frequencies across the audio band.



STEREOPHONIC PHASE RESPONSE
LISSAJOUS PATTERNS

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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