

INSTRUCTION MANUAL

BROADCAST ELECTRONICS, INC.



SPOTMASTER SERIES 5300A
TAPE CARTRIDGE MACHINE

597-5300

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Quincy, Illinois 62305
Tel: (217) 224-9600
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PUBLICATION CHANGE NOTICE

EQUIPMENT Audio Cartridge Machine MODEL(S) 5300A SERIAL ALL
 PUBLICATION NUMBER 597-5300 BASIC ISSUE/REVISION N/A

INSTRUCTIONS: Make the changes noted below as listed.

Replacement pages will be attached to this change notice as required.

This change notice should be retained with the publication.

<u>CHANGE NO.</u>	<u>DATE</u>	<u>DESCRIPTION</u>
1	8 DEC 1982	If the upper motor shaft bearing is replaced in the field, the new bearing must be secured in place on the motor shaft with an adhesive such as Loctite Brand 85-21 Bearing Mount/B Adhesive-Sealant (P/N 700-0026).

CAUTION

ENSURE THE SEALANT IS APPLIED TO THE MOTOR SHAFT/BEARING AREA ONLY AND DOES NOT ENTER THE BALL BEARING RACE.

- A. Cover the bearing face.
- B. Apply a portion of a single drop of the bearing sealant to the motor shaft just above the bearing. Capillary action will allow even distribution of the sealant.
- C. Allow the sealant to dry.

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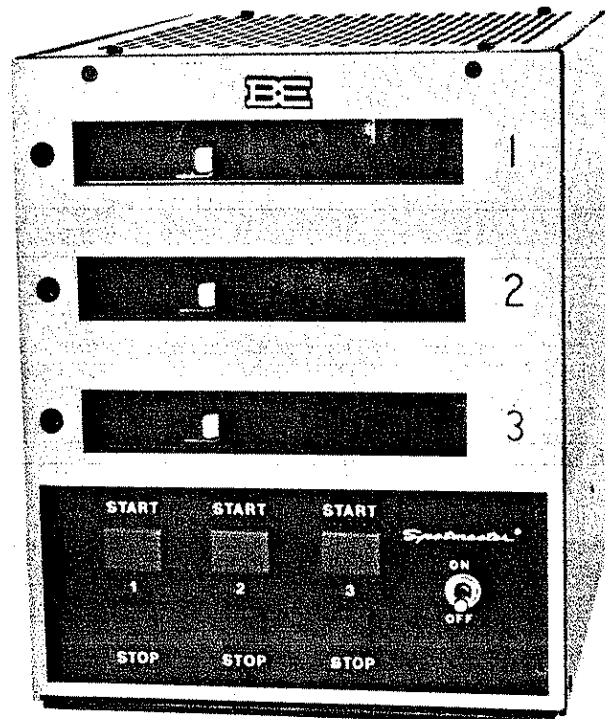
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6.1

DRAWINGS

Drawings



1.5

Spotmaster[®] 5300A

Figure 1



1.6

FIGURE 2

5300A WITH COMPANION RECORDER

Section 2

FUNCTIONAL DESCRIPTION

2.1 GENERAL

The SPOTMASTER Model 5300A Audio Cartridge Machine is a three deck professional unit designed for either monaural or stereo broadcast applications. Each of the three cartridge ports of the 5300A accepts either NAB Size "A", or NAB both "A" and "B" cartridges by appropriate positioning of the left-hand guide bracket located on the decks of the machine. The two upper decks, No. 1 and 2, provide PLAYBACK ONLY facilities. Deck No. 3, the lower deck, operates in the playback mode also, and accepts the optional record amplifier accessory. This arrangement provides a full RECORD/PLAYBACK facility, plus two playback functions in a single machine.

NAB standard "End of Program" cue-tone (1kHz) playback circuitry and sensing logic is included as standard equipment for each playback deck. Deck 3 optional record capability provides similar cue record facilities. 150Hz Secondary and 8000Hz Tertiary cue tone playback and sensing logic is available in a single optional package. The 150Hz and 8kHz Cue I and Cue II facilities are also available for the record option.

The upper two decks of the 5300A are plug-in units, removed easily for complete access to most areas of the machine for cleaning, for maintenance, and for other servicing operations. The lower deck is permanently mounted to the machine side-walls and is rigidly fixed to a 1/2 inch hardened aluminum "Bulkhead" plate which runs vertically upward from this lower deck to the top of the machine, supporting the two upper decks in proper alignment with the lower deck, with the capstan drive-shaft and upper shaft-bearing, and with other critical components of the machine tape transport mechanism. The Bulkhead plate and the transport decks are precision machined from 1/2 inch aluminum stock and provide a rigid mechanical mainframe for stable alignment of the system.

The machine front-panel hinges at the bottom and folds down for easy access to the plug-in decks and to other machine internal components. The hysteresis synchronous drive motor mounts on the lower side of the bottom deck, its rotor shaft extending vertically upward through slots in the three transport decks, providing direct-drive to each of the three decks.

The 5300A uses the Phase Lok III head-mounting bracket, permitting completely independent head adjustments for height, zenith, and azimuth and allowing precise adjustment of stereo phasing. Solenoids are air-damped and utilize low voltage, solid state switching, ensuring silent vibration-free opening and closing action, and providing low heat dissipation coupled with reliable service.

A tapered right-hand cartridge guide accurately channels the inserted cartridge into proper play or record position. The cartridge is held in the correct position by a high tensile strength beryllium copper upper clamp, providing positive locking action. The lower ferromagnetic head shield is inset into the deck-plate, presenting a continuous flat lower surface for accurate cartridge seating. The left-hand cartridge guide may be repositioned to accommodate either NAB "A" or both A and B size cartridges.

Electronics in the 5300A employ advanced transistor and integrated circuit components. The audio amplifier design accommodates an exceptionally wide dynamic operating range without introducing signal distortion. FET switching circuits pass audio from only the started decks of the machine. Non-started decks are muted.

Audio, cue, and control circuits are constructed on removable printed circuit boards that plug into the rear compartment of the machine, a "U" shaped bracket assembly which may be removed from the machine for access to essentially all electronic components.

All front panel controls are removable with the optional, SPOTMASTER Remote Control Panel. Front and rear internal panel connections are made via compact ribbon cable. LED readouts on the rear of control PC boards provide visual status indications of key control functions for ease in servicing. Three 24 pin Cinch connectors, one per deck, provide external connections to the audio and remote control circuits. Mating external plugs for these connectors are included with the machine. After initial installation of the optional Deck No. 3 record heads, two plug-in cables provide complete interconnection between the 5300A and its companion recorder. "Run" indicators adjacent to each deck-port warn the operator that a deck is in "use".

Each deck of the 5300A provides a full "cue-audio" output at the machine rear connectors which may be used, with proper coding and decoding, for program logging in automated broadcast systems or for other program identification applications. The optional SPOTMASTER Audio Switcher, controllable by logic pulses from the 5300A, provides an audio output from only the last deck started while muting all other decks, running or stopped. This switcher will control the audio signals for up to three 5300A's.

2.2 SPECIFICIATIONS

Number of Transport Decks.....	Three; Adjustable for NAB "A" or both A & B size cartridges
Remote Controls Available.....	All Front Panel Controls and Indicators
Transport.....	Direct Drive Capstan
Motor.....	Hysteresis synchronous
Tape Speed.....	7½ ips; 19.05 cm/sec.
Speed Accuracy.....	0.10% or better
Wow and Flutter.....	0.15%, Peak weighted; 0.2 rms unweighted
Cue Tones; Standard.....	1000Hz Stop
Optional.....	150Hz & 8000Hz
Full Cue-Channel Output is standard	
Cueing Accuracy.....	0.1 Seconds
Ambient Operating Temperature.....	0 to 55°C; 32 to 132°F
Power Requirements, Standard.....	105 to 125 VAC, or 210 to 230 Vac, at 60Hz
Optional.....	210 to 230 VAC at 50Hz, Power input 120 watts maximum
External Connections.....	24 pin "Cinch" Connector for each deck. Mating plugs furnished
Mounting, Standard.....	Table Top
Optional.....	19" EIA Rack, 2 5300B's per rack width
Dimensions.....	10-5/8 H x 8-5/8" W x 13-3/8" D (27 cm. x 22 cm. x 34 cm.)
Weight (unpacked)	43 lbs; 19.5 kgs
Audio:	
Frequency Response.....	+ 2dB from 50Hz to 15kHz exclusive of head contour effects
Equalization.....	NAB, IEC, or CCIR; Adjustable
Distortion.....	2% or less record to playback at 160nWb/m, 1kHz
Noise.....	Monophonic: 62dB or better below reference of 400Hz at 3% THD; 54dB below 160nWb/m at 1kHz

	Stereophonic: 60dB or better below reference of 400Hz at 3% THD; 52dB below 160nWb/m at 1kHz
Crosstalk.....	50dB or better (magnetic head limited)
Audio Output.....	Maximum adjustable level +8dBm from 160nWb/m at 1kHz; 600 ohms (transformer) balanced. May be connected for 150 ohms balanced.
Peak Output Level.....	+20dBm before clipping

Recorder Specifications (Optional):

Input Impedance:

Microphone: 150 ohms (transformer) balanced floating.

Line: 50K ohms (transformer) balanced floating.

Input Levels:

Microphone: -70 to -24dBm.

Line: -24 to 20dBm (50mV to 7.7V).

Power Requirements:

105 to 125V/210 to 230V/50 or 60Hz.

Dimensions:

5¼" H x 8-5/8" W x 13½" D.
(13.3 x 22 x 34 cm).

Weight (uncrated):

16 lbs. (7.25 kgs).

Equipment Catalog Numbers:

	<u>Model</u>	<u>Stock Number</u>
Mono Playback with 1kHz Tone.....	5301B	906-5301B
Mono Playback with All Cue Tones.....	5302B	906-5302B
Stereo Playback with 1kHz Tone.....	5303B	906-5303B
Stereo Playback with All Cue Tones.....	5304B	906-5304B

2.3 OPTIONS AND ACCESSORIES

	Model	Stock Number
<u>Mono Recorder:</u> Brings No. 3 Deck up to full Record/Playback capability. Includes 1kHz Cue Tone record.	5309	906-5309
<u>Stereo Recorder:</u> Brings No. 3 Deck up to Full Stereo Record/Playback capability, includes 1kHz Cue Tone record.	5310	906-5310
<u>Audio Switcher:</u> Provides a single audio output from the last deck started, muting all other decks. SW5E accepts three inputs and up to three Switchers may be tied together, providing a single output from three 5300B machines.	SW5E	904-5000
Mixer for Single Balanced Output, Mono		906-5305
Mixer for Single Balanced Output, Stereo		906-5505
<u>Remote Control Units:</u> Provides all front panel controls and indicators.		
Secondary (150Hz) and Tertiary (8kHz) Cue Tones for Mono and Stereo Recorders.		906-5311
Rack Mount Bracket for one unit.		906-5306
Rack Mount Bracket for two units.		906-5307
220V/50Hz Conversion.		906-5508
Extender PC Board.		919-1806
Head Demagnetizer, R-25015; 117 VAC, 50/60Hz.		
Cleaning Fluid, BE-903; for Heads, transport, etc.		
Test Tapes, for frequency response and alignment.		
See Broadcast Electronics, Inc. Catalog for other accessories and broadcast products.		

SECTION 3

SYSTEM DESCRIPTION

3.1 General

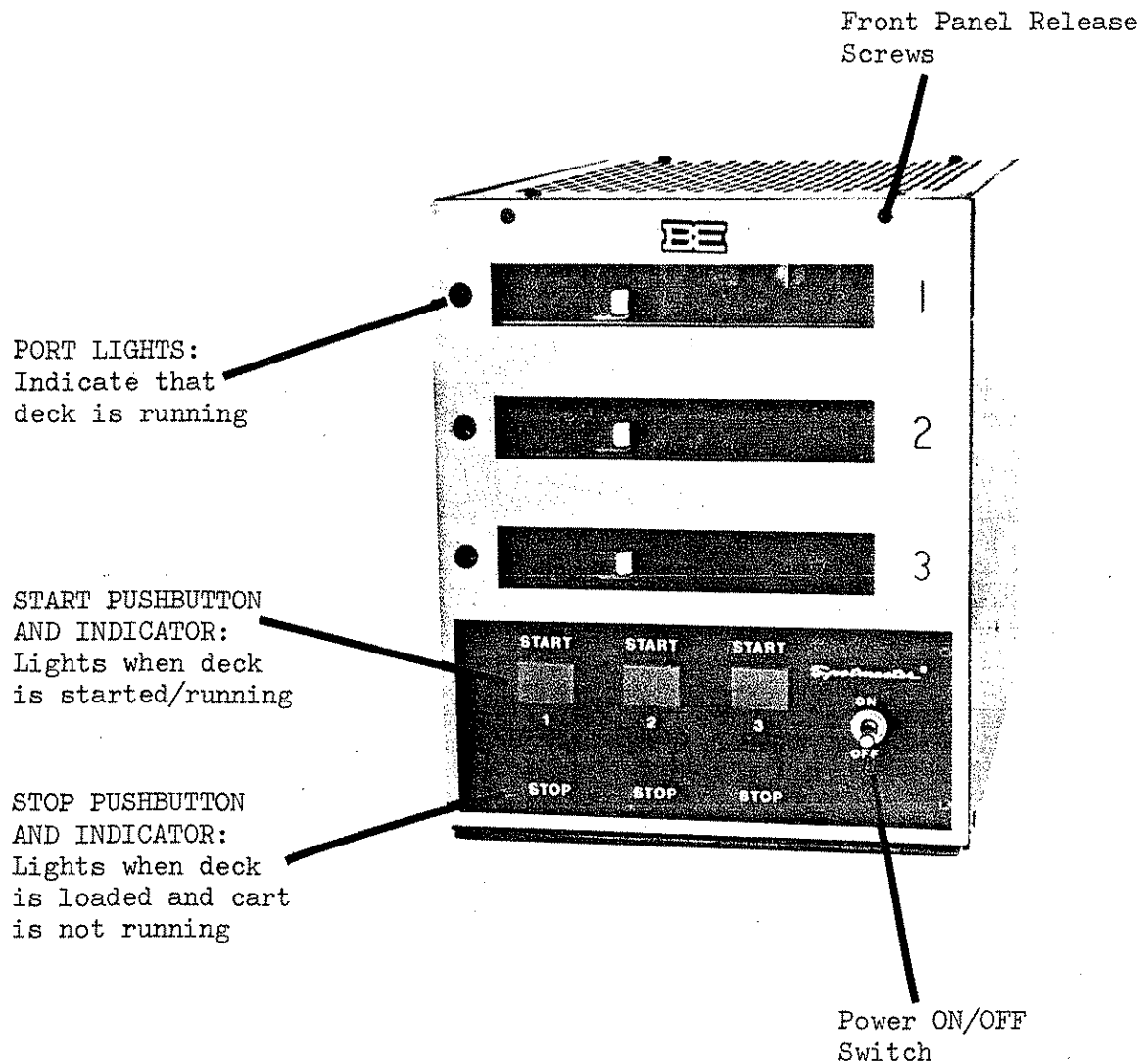
The SPOTMASTER 5300A system consists of the following main components:

- (1) Tape Transport System. Three independently controlled decks are directly driven from the drive-shaft of a synchronous hysteresis motor. These decks are held in proper alignment with the motor drive-shaft and capstan pressure roller by a 1/4 inch thick aluminum "Bulkhead" plate which runs vertically upward from the bottom plate to the top section of the machine. The drive-shaft upper bearing is anchored to the top of the Bulkhead plate.
- (2) Control PC Boards. One plug-in electronic Control PC Board is used for each transport deck. These boards plug into a mother board which is located immediately behind the Bulkhead plate and which also accepts the Head Amplifier PC boards described below. Each control board contains the logic circuitry for tape transport control plus optional 150Hz and 8kHz Cue-Tone Amplifiers with associated tone sensing circuits and relay output logic.
- (3) Tape Head Amplifier PC Boards, one per deck. Monaural machines provide two amplifiers per PC Board; one for the program-audio channel and a second for the cue channel. Stereo units provide the three amplifiers required for the Left, the Right and the Cue channels. In addition, circuitry on this board generates a STOP logic pulse from the 1000Hz End-of-Program tone which is used on the Control Board for tape STOP action.

An analog Cue-Audio output is available from the cue amplifier. This full cue-channel signal may be used in broadcast and other operations, including Automation, for program identification or logging if appropriate coded information is recorded on the cue track.

- (4) Front Panel Controls: Power ON/OFF switch, STOP and START push-buttons, tape READY and START indicators (incorporated in STOP and START pushbuttons, respectively), and TAPE STARTED indicating lights adjacent to each cartridge port.
- (5) U Bracket and Mother Board Assembly. The mother board, most internal machine connectors, solenoid driving transistors, and the system DC power supply and regulators are located on this assembly.
- (6) Rear Panel Assembly. Three Cinch 24-pin connectors are mounted on the machine rear panel, providing output connections for audio, tone, and control signals. When the optional Record Amplifier is used with deck number 3, this unit connects to a receptacle on the 5300A rear panel.

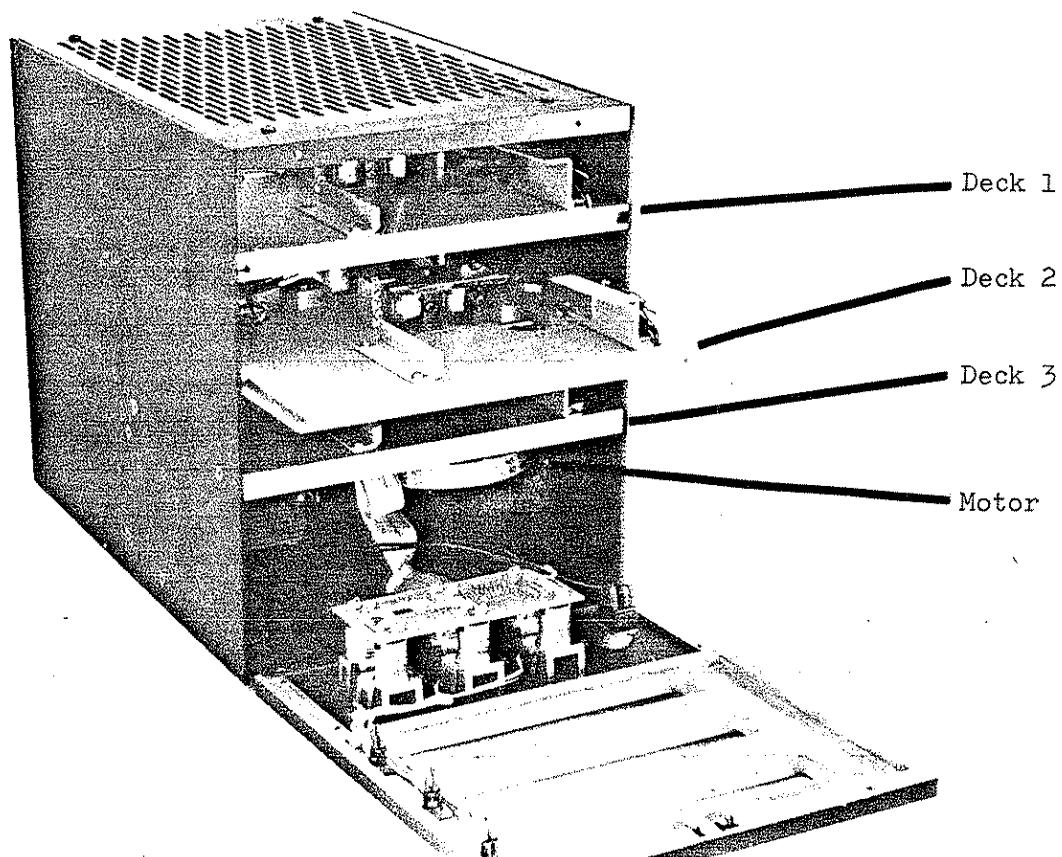
NOTE: See Figures 2-1 thru 2-13, which follow:



3.2

FIGURE 2-1

5300A, Front View

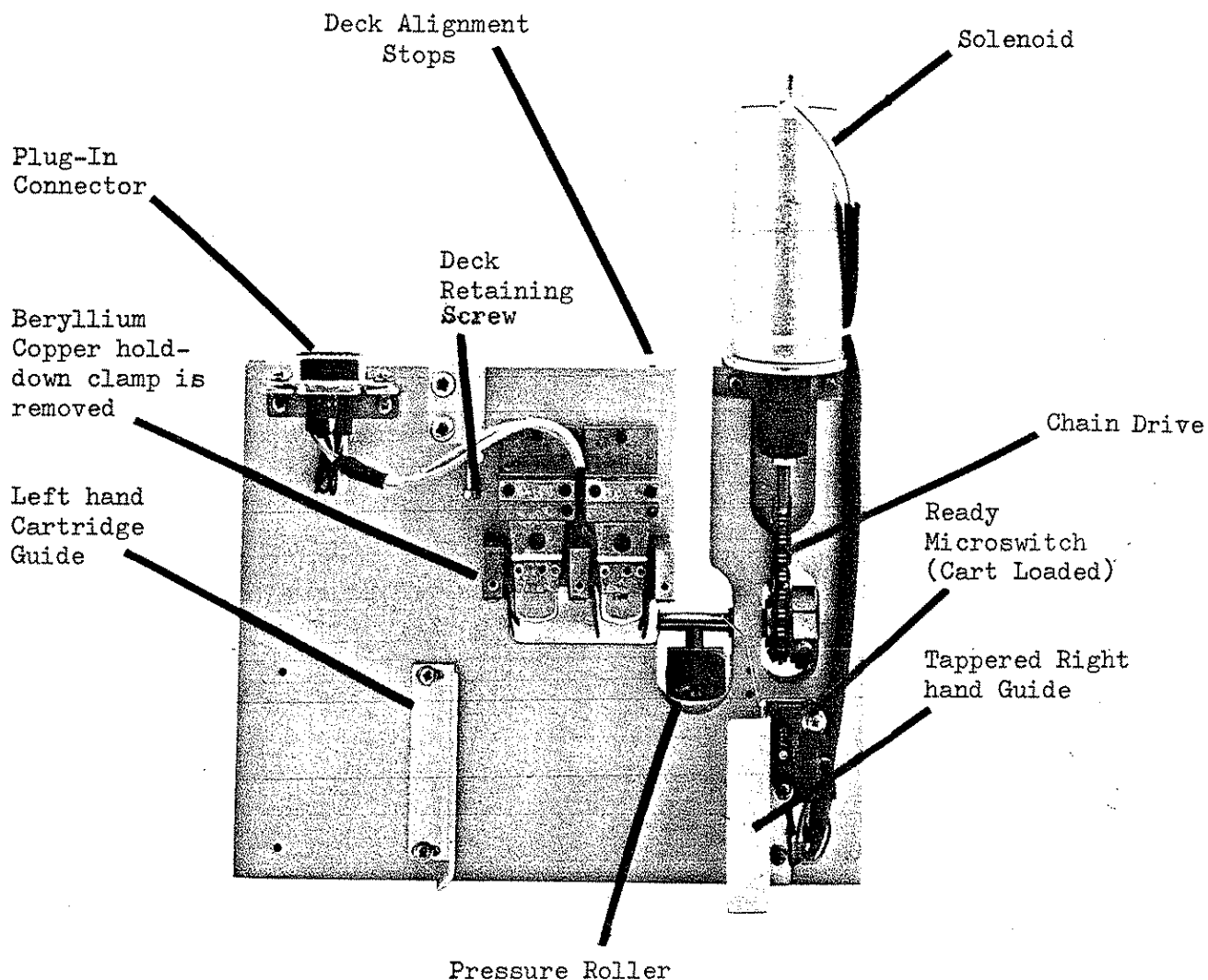


3.3

FIGURE 2-2

Front Panel hinges open for easy removal of plug-in decks.

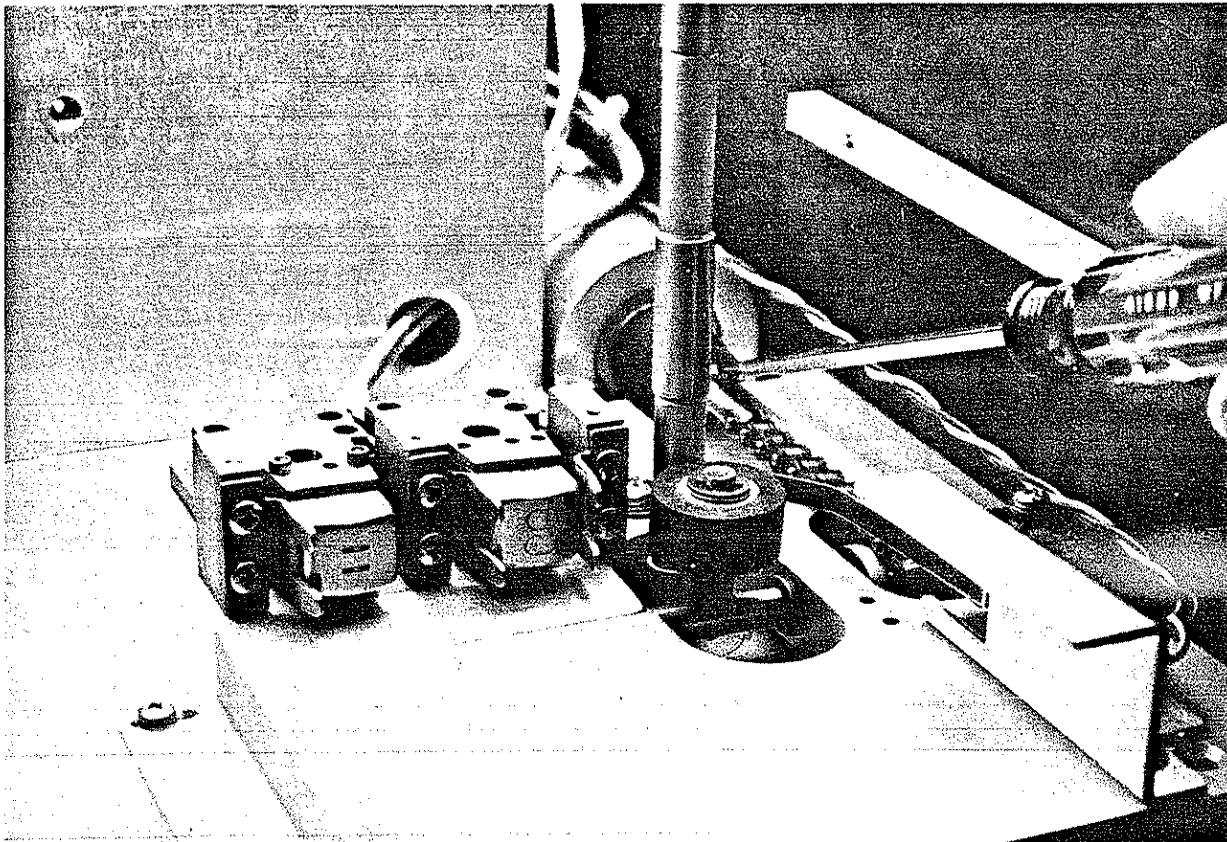
Tape Transport System:



3.4

FIGURE 2-3

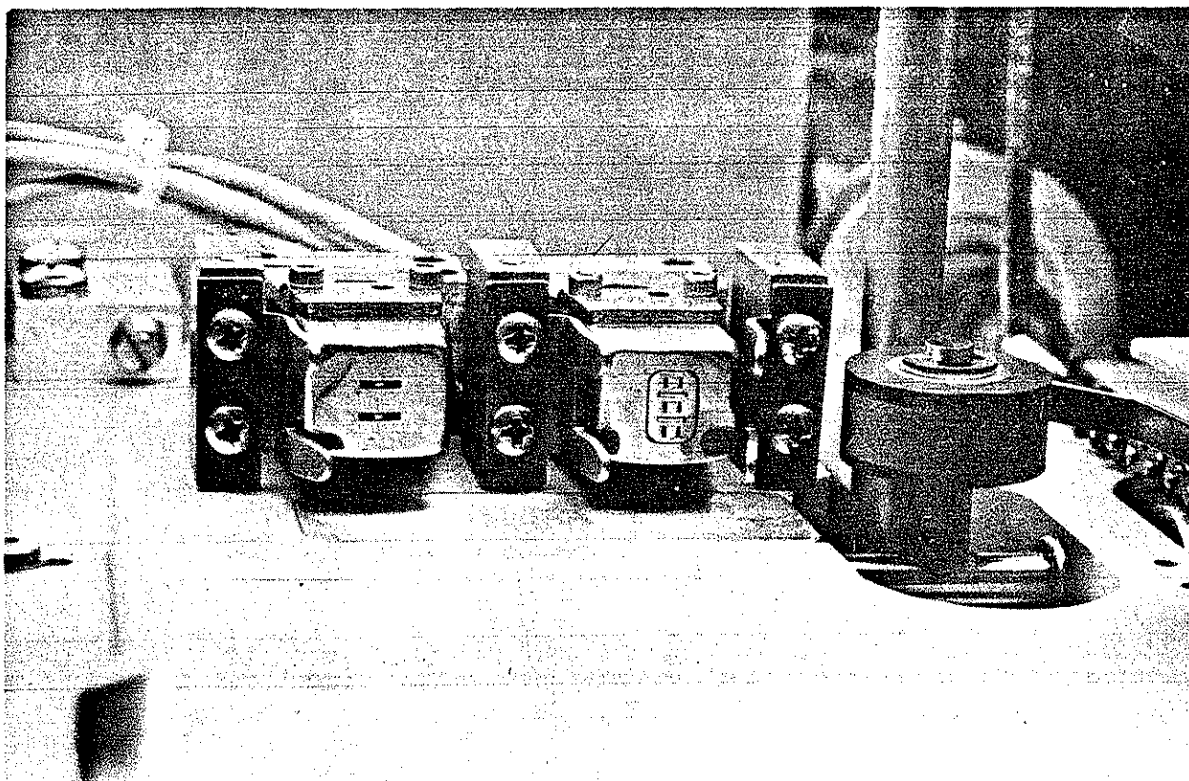
Transport Deck removed from 5300A, showing: Dual Head Assemblies, Plug-in, Electronics Connector, Adjustable Transport deck Positioning Screws (See Fig. 4-3), START/PLAY Solenoid and Chain Drive to Pressure Roller, READY (cartridge loaded) Microswitch, retracted Pressure Roller, Right hand Cartridge Guide, and Left hand guide is set for NAB size A cartridges; it may be shifted to the two screw holes in the lower left hand quadrant of the deck to accommodate NAB size A and B cartridges.



3.5

FIGURE 2-4

Close-up of Head Assemblies and Tape Capstan Drive. The head on the left is a "Dummy", located in the Record-Head position. This dummy is required to maintain proper tape-to-head orientation in playback only machines, particularly in Stereo systems. The pressure roller is in the START or play position. See Section for proper adjustment of the Deck Positioning Screw which insures that constant top-to-bottom pressure is maintained between the Pressure Roller and drive shaft, a necessary condition for a properly operating tape transport. Note the downward taper of the right hand guide which channels the cartridge into accurate position. The Beryllium copper clamp which holds the cartridge in place has been removed for this photo. The aluminum bulkhead plate which functions as a mechanical "main-Frame" for the 5300A, holding all three decks in alignment with the drive shaft, may be seen immediately behind the head assemblies; Head leads are channeled through an opening in this plate.



3.6

FIGURE 2-5

Tape Guides: In a properly adjusted machine, pinch-roller pressure is even from top-to-bottom of the roller/tape/drive shaft contact area and tape flow is directed lightly against the upper three guide edges.

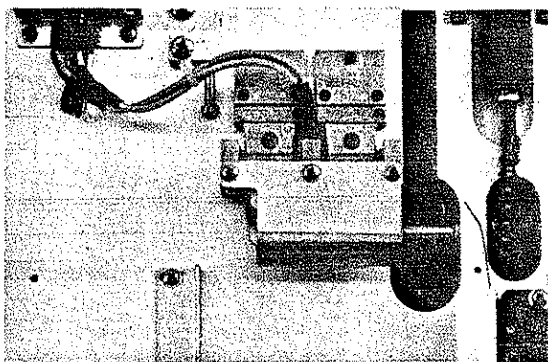


FIGURE 2-6

A Beryllium Copper Clamp holds the cartridge in place.

MONOPHONIC STANDARD

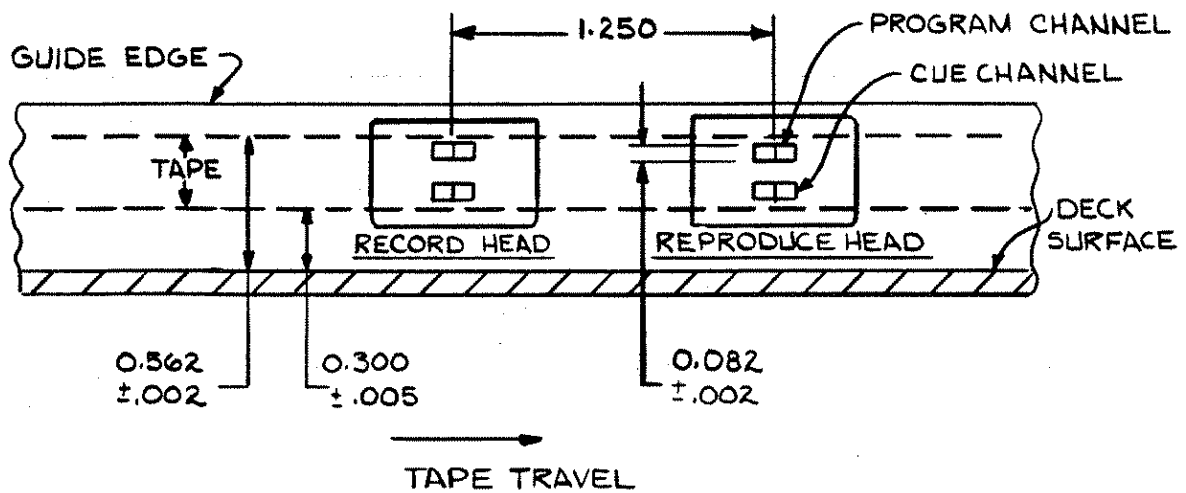


FIG. 2-7

STEREOPHONIC STANDARD

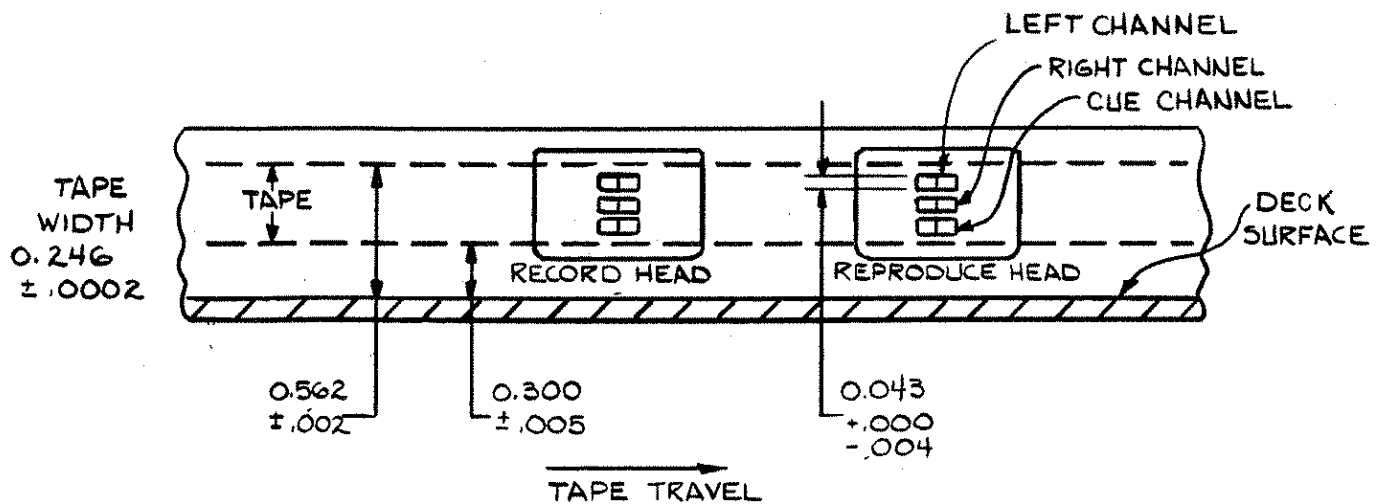
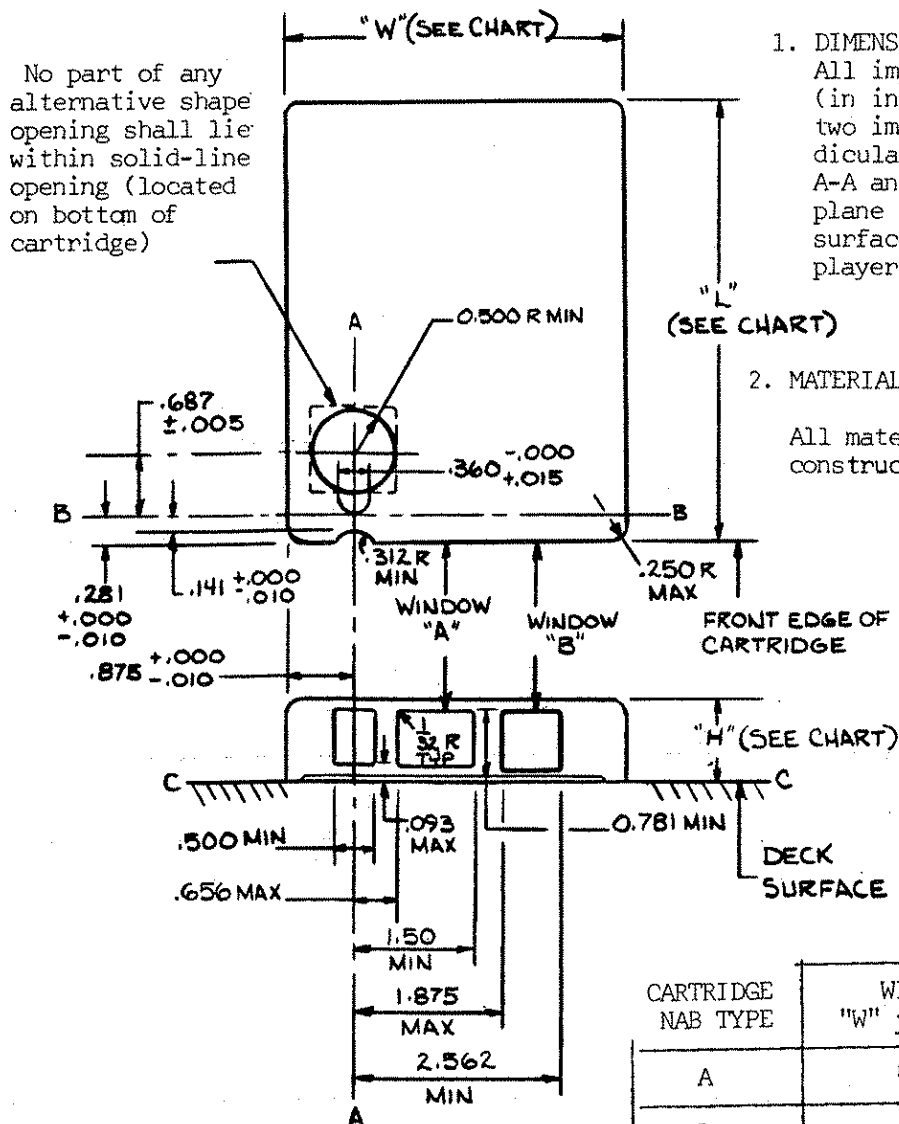


FIG 2-8

NAB STANDARDS, TAPE-HEAD DIMENSIONS



1. DIMENSIONS

All important operating dimensions (in inches) are referenced from two imaginary mutually perpendicular vertical planes marked A-A and B-B, and a third horizontal plane C-C, representing the deck surface of the cartridge tape player.

2. MATERIALS

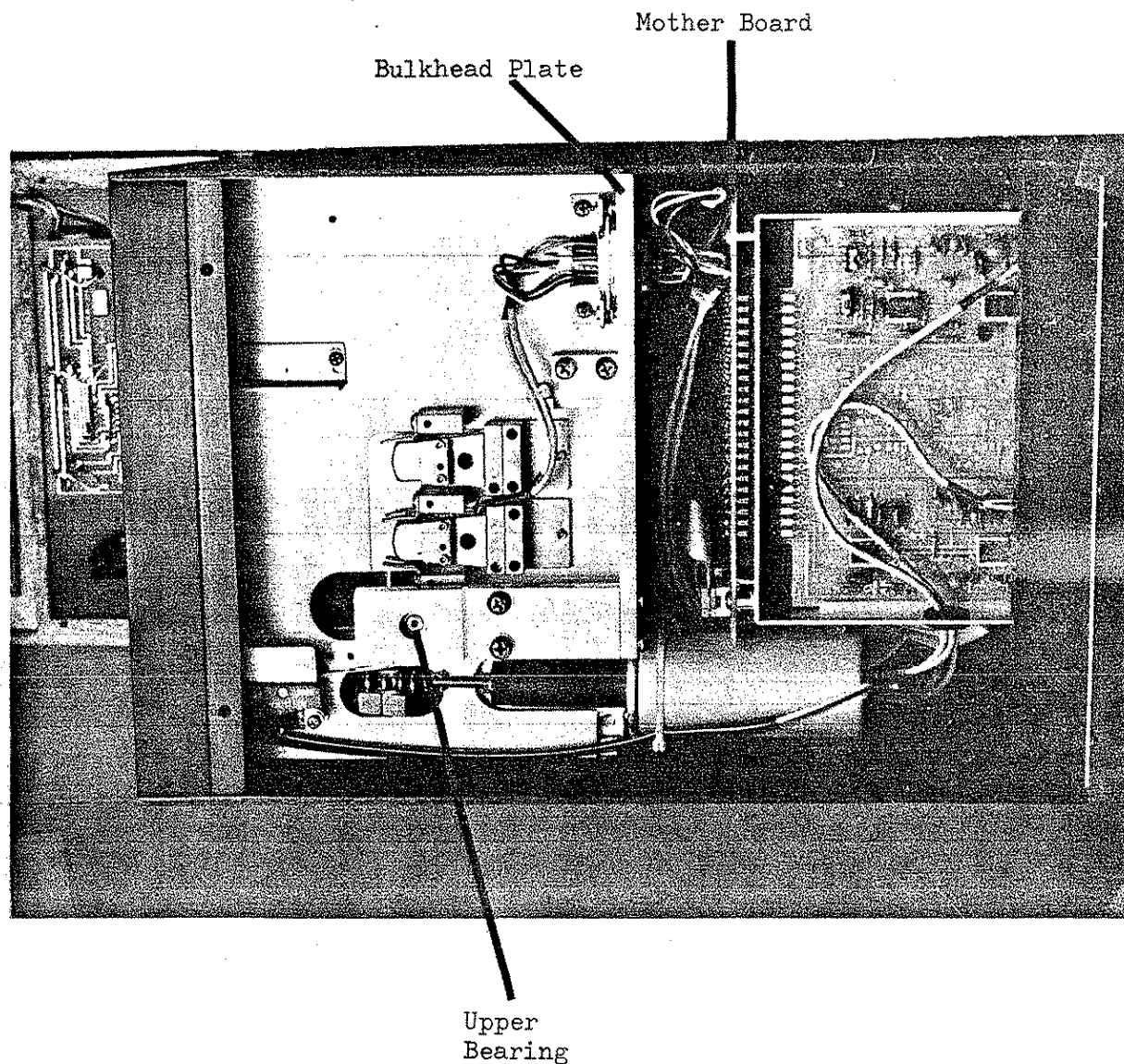
All materials used in the cartridge construction shall be nonmagnetic.

Where applicable, dimensions include draft allowances.

CARTRIDGE NAB TYPE	WIDTH "W" ± 1/64"	LENGTH "L" MAX.	HEIGHT "H" MAX.
A	4"	5½"	0.9375"
B	6"	7"	0.9375"
C	7 5/8"	8½"	0.9375"

FIG 2-9 - NAB CARTRIDGE STANDARD

Electronic System:

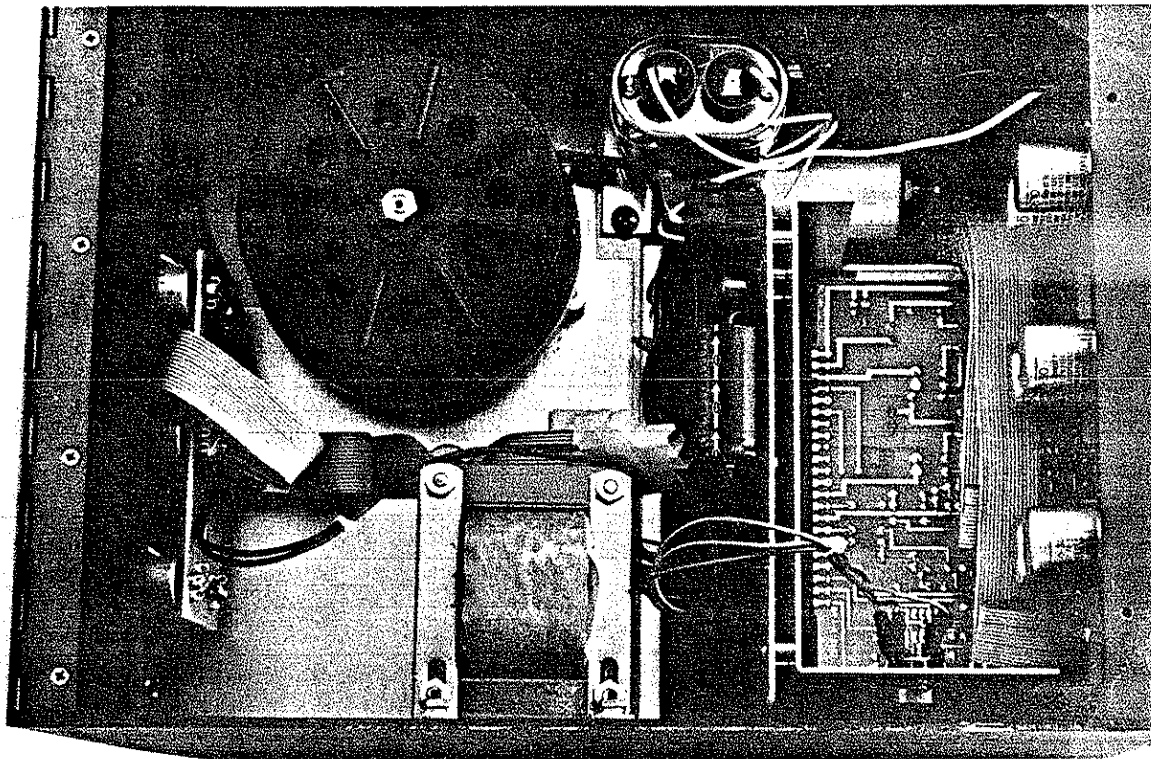


3.9

FIGURE 2-10

TOP VIEW of Spotmaster 5300A, cover removed, showing deckplate assembly and uppermost PC board. Six removable PC boards plug into the rear section of the 5300A, three Head Amplifier boards and three Transport Control boards. PC board interconnections and solenoid drive transistors are located on the Mother Board, shown in the photo. The Bulkhead plate and upper drive shaft bearing are also indicated.

NOTE: The Phase Lok III Head adjustments are described in Sections 5.7, 5.8 & 5.13 Beryllium head clamp is removed from head assembly.

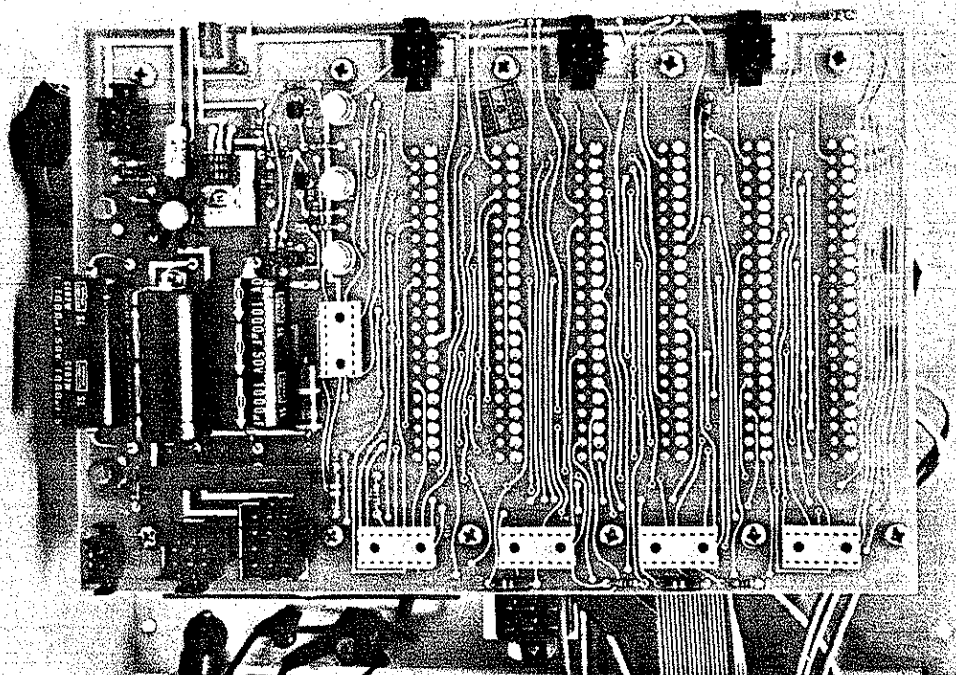


3.10

FIGURE 2-11

MODEL 5300A, BOTTOM SECTION

A hysteresis, synchronous motor provides direct capstan drive for the Series 5300A. The motor is attached directly to the underside of the bottom tape deck with the capstan shaft extending upward, through the deck surfaces. Rear panel connections are made via ribbon cable.

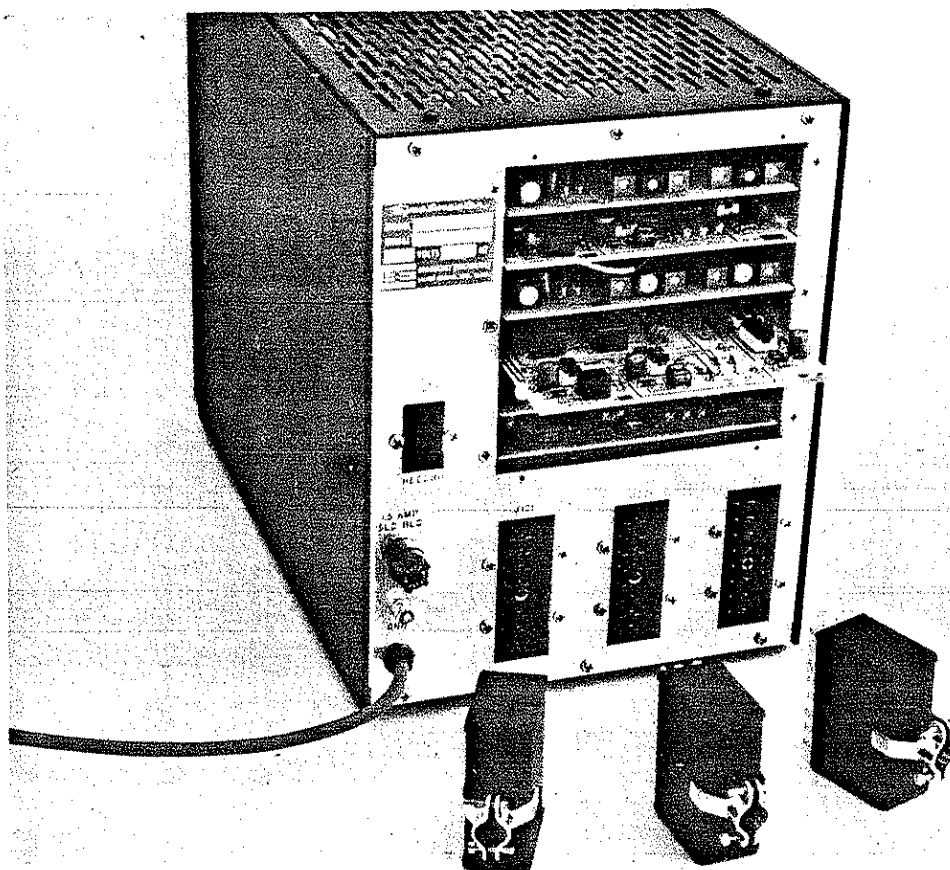


3.11

FIGURE 2-12

MOTHER BOARD, rear side, facing Bulkhead plate. Connectors and major components are listed below:

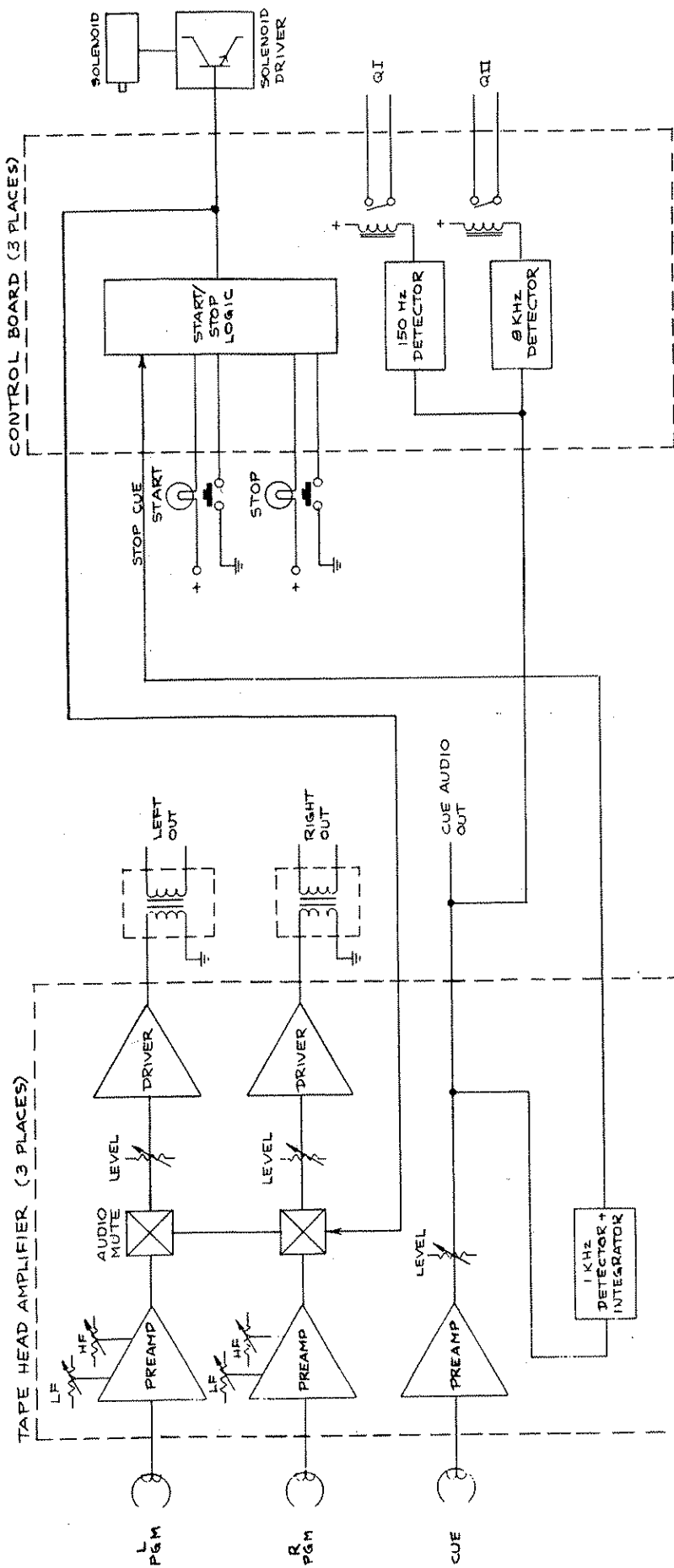
- J1, J3, J5; Head Amp PC boards, decks 1, 2, 3.
- J2, J4, J6; Control PC boards, decks 1, 2, 3.
- J7, J8, J9; To Head Assemblies, decks 1, 2, 3.
- J10; To Front Panel controls.
- J11; To Power Regulator, located on U bracket
- J12; AC line voltage input.
- J13; To drive motor
- J15, J16, J17, J18; To Rear Panel output connectors.



3.12

FIGURE 2-13

REAR VIEW 5300A, rear cover plate removed, showing the plug-in Head Amplifier and Control PC boards, the three Cinch output connectors (one per deck), and the location of the optional Record Amplifier input connector, J401.



5000 SERIES
ELECTRONIC FUNCTIONAL DIAGRAM
3 - DECK

Figure 2-14 Electronic Function Diagram

C-906-5108

DRAWN: 11/20/75 MCB
APVD: 11/5/75 REdy

3.13 Electronics, Functional Description

Figure 2-14 is a Functional Block Diagram of the 5300A electronic system, stereo version, showing: (1) the Tape Heads, Head Amplifier PC Board for a single deck, (2) the hysteresis synchronous motor, (3) the regulated Power Supplies, (4) the tape transport Solenoid Drivers, and (5) Cue output logic.

The Left-Channel Head Amplifier consists of an integrated circuit operational amplifier, U1, with adjustable high and low frequency compensation, an FET switching circuit (Q5) which mutes the audio from all decks not started, driver/output amplifiers U2/Q1/Q2, and transformer T1 which provides a balanced audio output. The Right Channel amplifier is identical to the Left. Individual level controls are provided for each amplifier channel.

The Cue Channel Amplifier, also located on the Head Amplifier PC board, is a broad-band audio channel which passes the full range of NAB tones, up to and including the 8kHz tertiary signal. Two op-amp stages, U5A and B, amplify the head output voltage and provide a low impedance Cue-audio output signal, U5B terminal 7, which is routed to the machine rear-panel output connector for external use and to the control logic PCB for 150Hz and 8kHz decoding. The external signal may be used for program identification or data logging if this type of coded information has been recorded on the Cue-track.

U6A on the Head Amplifier board is an active 1000Hz band-pass filter which selects the End-of-Program tone from the Cue audio, amplifies this signal, and drives rectifier CR7. The output of CR7 is integrated by U6B, providing a logic STOP signal for the Control Board which stops tape motion when the 1kHz tone is detected. R38 provides level control of the Cue signal.

The Control PC Board accepts START and STOP signals from the machine front panel or remote control unit, along with the End-of-Program logic pulse from the (1kHz) cue track, processes these signals via CMOS logic to control tape motion via the transport solenoid/pressure-roller assembly, and generates indicator logic signals which show that the tape deck is in either the READY (cartridge loaded and cued) or START mode (tape running). Solenoid driving transistors are located on the mother board.

Additionally, the Control PC Board provides amplifying, detecting, and logic output circuitry for the 150Hz and 8kHz cue-tone signals, generating Cue-I and Cue-II logic signals to control external machine functions as required in automated control systems and other system applications.

3.15 Tape Head Amplifier Details

Figure 2-15 is a schematic of the 5300A Tape Head Amplifier, stereo version, which provides three audio amplifier channels, the Left and Right Stereo Channels and the 1kHz Cue-Tone Channel. The monophonic version of this PC board provides two amplifiers; the Left Channel (program audio) and the Cue-Tone Channel. As mentioned earlier, one Tape-Head Amplifier is required for each 5300A deck. Stereo capability is accomplished by replacing the two-channel Head-Amp PC boards with the 3-channel stereo version and installing the necessary stereo head assemblies.

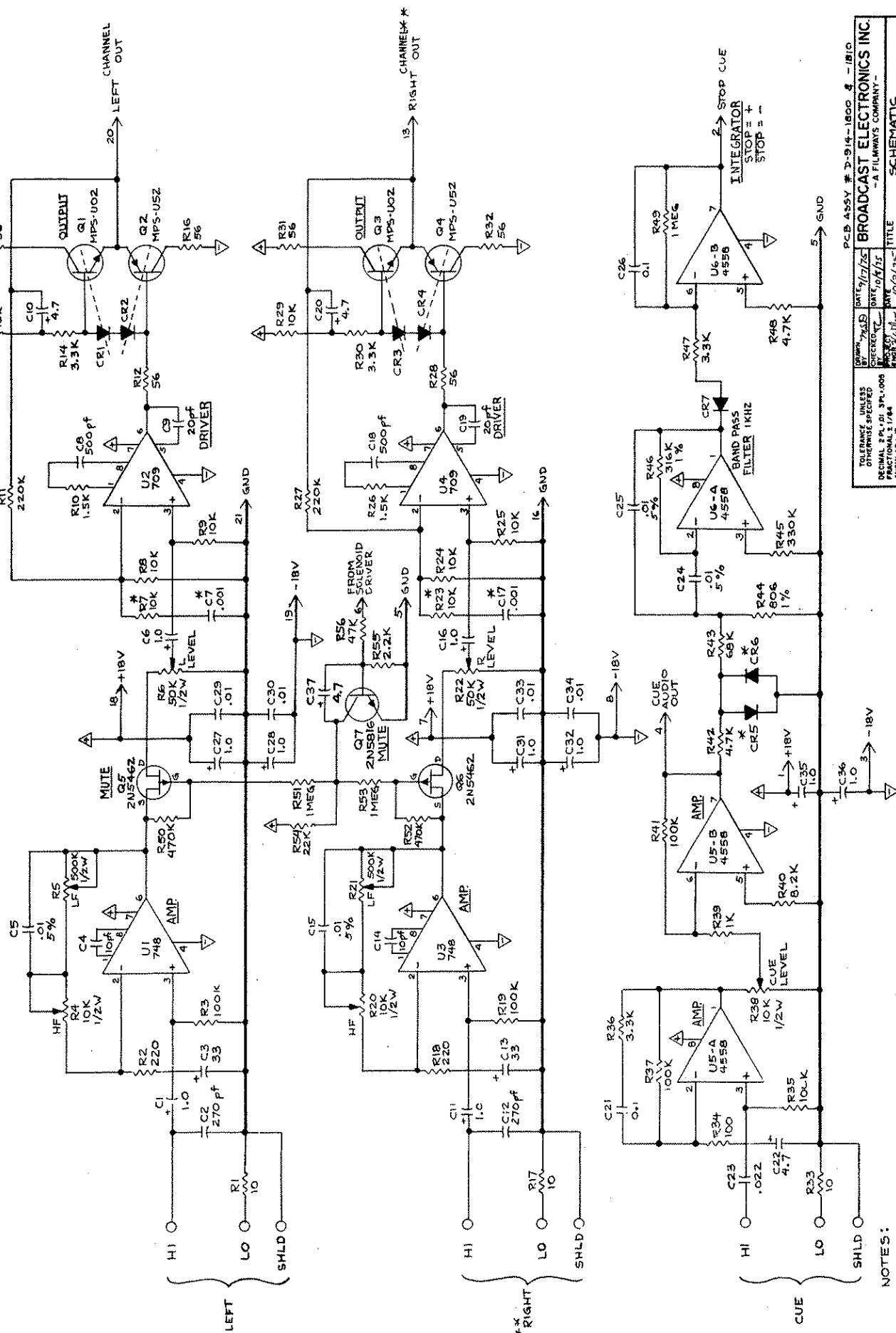
Audio from the tape head (Left Channel) is applied via coupling capacitor C1 to the non-inverting input (terminal 3) of operational amplifier U1, a single stage high-gain I.C. linear amplifier; which drives FET switch Q5. The output of U1 (terminal 6), is also fed back to its inverting input (terminal 2), providing both high-frequency and low-frequency compensation, adjustable via R5 (low-end) and R4 (high-end).

FET's Q5 and Q6 are controlled by the Solenoid Drive signal generated on the Logic Control PC board, passing audio only when the associated deck transport is in the START mode (tape running) and muting all other decks (not running). This solenoid drive logic is applied to the base of controlling transistor Q7 and pulls Q7 base positive when the transport is in the START mode. This causes Q7 to conduct, driving its collector to near-ground potential, and turning Q5 and Q6 on.

FET output audio (Q5 terminal D) is applied to potentiometer R6 for level control, and then routed to the non-inverting input (terminal 3) of operational amplifier U2 which drives complimentary transistor output stages Q1 and Q2 via current limiting resistor R12. Gain of the stage is fixed by the ratio of R11 and R8 and frequency compensation is established by R10, C8 and C9. Diodes CR1 and CR2 are temperature stabilizing elements, shifting the bias of drivers Q1 and Q2 with temperature changes, maintaining stable operation over a wide range of ambient temperatures. R15 and R16 are current limiting resistors, preventing transistor damage if output terminals are shorted.

The Left and Right channel output-driver stages are DC coupled to individual transformers on the Rear-Panel PC board, providing a balanced-line output for each audio channel.

REV A - ECN 605 1/17/75
B - ECN 625 1/17/75



DATE	1/17/75	PCB 455V # D-914-1800 & -1810
BY	7/25	BROADCAST ELECTRONICS INC.
DESIGNED	10/1/72	- A FILMWAYS COMPANY -
REVISION	10/1/72	TITLE
DATE	10/1/72	STEREO/MONO TAPE HEAD AMP
DESIGNED	10/1/72	SCHEMATIC
REVISION	10/1/72	C
DATE	10/1/72	906-5102
DESIGNED	10/1/72	REV
REVISION	10/1/72	8
DATE	10/1/72	5000 SERIES
DESIGNED	10/1/72	SHEET 1 OF 1

- NOTES:
- * - OPTIONAL (R7, R23, C7, C17, C5 & CR6).
 - LAST COMPONENTS USED: R56, C37, U6, CR7 & Q7.
 - * - RIGHT CHANNEL USED ON STEREO UNITS ONLY.
 - RESISTORS IN OHMS, 1/4W, 5%; CAPACITORS IN MICROFARADS; DIODES IN 645, UNLESS OTHERWISE NOTED.

Fig. 2-15; Schematic, Head Amplifier PCB

3.16 Cue Amplifier Circuit Details

The Cue Amplifier Channel, providing flat response to the full range of cue-tones, consists of an equalized pre-amplifier U5A, level control potentiometer R38, and output amplifier U5B. This cue-channel is routed:

- (1) Via terminal 4 to the 5300A output connector on the rear of the machine.
- (2) To two pole active band-pass filter U6A which is tuned to 1kHz.

U6A extracts the 1kHz tone from the cue-signal, passing it to rectifier CR7. The negative DC output from CR7 is applied to terminal 6 of integrator U6B, providing positive output drive when the 1kHz tone is present at the rectifier input. This logic output is routed to the Control PC Board where it is used to stop the tape transport when a 1kHz tone is sensed in the corresponding cue channel.

3.17 Control PC Board Circuit Details

The Control PC Board, one per deck, is shown in Dwg. No. 906-5101. Standard circuitry on this board provides:

- (1) START and STOP action for the associated tape transport deck.
- (2) Logic signals which activate front panel status indicators, and if used, remote control panel indications of transport status.
- (3) START and STOP verify signals.
- (4) Audio-channel muting logic.
- (5) Additionally, the Control PC Board contains the sensing and control logic for the cue-tones QI and QII, when this optional facility is provided in the 5300A system.

The Control Board receives input logic from the START and STOP push-buttons, from the (cartridge loaded) READY micro-switch, and from the 1kHz tone integrator located on the Head Amplifier PC board. Figure 2-16 shows the logic status of the Control PC board under initial conditions, i.e., no cartridge loaded into the transport deck.

The "0" or "1" figures shown at the various IC terminals indicate the logic "status" of that particular point under these static conditions.

When a cartridge is loaded, the READY switch is opened by the inserted cartridge, driving U2-A terminal 2 and U2-B terminal 5 both to a positive logic state. This action drives U2-B output (terminal 6) positive, bringing transistor Q4 into conduction and its collector terminal to approximately ground potential, permitting current to flow from the +28 Volt supply through the LED READY indicator on the rear of the Control PCB and through the front panel READY Indicator light located in the STOP pushbutton assembly. CR10 permits the same two indicators to display the presence of QII tone output logic by lighting both the LED and the front panel indicator to full brightness when this logic signal is present. CR15 provides isolation and Zener CR14 limits the dc voltage applied to LED I3 and the front panel indicator light to approximately 20 volts when Q4 conducts.

Q4 collector circuit also provides a STOP VERIFY current-sink which is routed to the 5300A rear-panel connectors for use in automation systems and in other applications where external status sensing is desired.

As indicated above, the READY logic status from the cartridge-loaded microswitch is routed via CR11 to terminal 2 of IC AND gate U2-A. Terminal 1, the alternate input of this AND gate is at a "1" logic level which emanates from STOP NAND gate U1-D. The output of U2-A (terminal 3) is therefore at zero logic level and drives U1-B (terminal 5), one-half of the Flip-Flop U1A/B. Since U1B's alternate input terminal is at zero, output terminal 6, as well as the flip-flop and other logic elements remain unchanged when a cartridge is loaded.

When the START button of a loaded deck is pushed, the front-panel or remote START button grounds terminal 19 of the PC board connector, creating a zero logic level at U1-A input terminal 1. This action triggers the flip-flop (U1A/B) to its alternate state, generating a "1" logic pulse at output terminal U1-A3 and a zero logic at output U1-B6. U1-B6 triggers U2-B6 to zero output logic, cutting off transistor Q4, de-activating all STOP/READY indicators and the STOP VERIFY output current-sink.

Flip-flop output U1-A3 drives one input each of U2-D (12) and of U2-C (10) to "1" logic level. At the same time, the alternate flip-flop output drive from U1-B6 is inverted in IC U1-C and applied to the alternate input terminals of both U2-D and U2-C. All four input terminals of these two AND gates moved to logic level "1", and both outputs U2-D11 and U2-C8 are driven to the "1" level.

U2-D11 brings transistor Q3 into conduction, activating the solenoid, the START VERIFY, the START LED, and START front-panel indicating light, as explained in the operation of the READY function above.

The output of U2-C8 is coupled via CR12 to STOP NAND gate U1D, input terminal 13. This circuit pre-sets the Cue-STOP NAND gate when a cartridge is started, setting up U1-D to stop tape motion when a decoded 1kHz cue-signal is received at U1-D terminal 12. R20 and C7 prevent operation of U1-D for approximately 3 seconds after the deck has been started. This insures that a previous stop cue-tone will not stop a newly started cartridge.

When going into the STOP mode of operation from a START (tape running) condition, pushing the front-panel stop button grounds input connector terminal 22, sending terminal 2 of AND gate U2-A to zero logic level. This action triggers the START-STOP flip-flop to STOP status, stopping the cartridge and turning all STOP indicator lights ON. This action also provides a STOP-VERIFY signal to the 5300A output connector.

Alternately, a CUE-STOP signal derived from the 1kHz cue-tone at the end of the recorded message will stop tape motion.

3.18 Power Supply

The 5300A power supply consists of, (1) A dual-secondary power transformer, a 28 VAC winding at 2.5 AMPS and an 18 VAC winding at 300 ma. (2) A +28 VDC rectifier/regulator which powers the front panel and remote control start/stop tallies, control deck logic output circuits, the solenoid drivers located in the Mother Board, and the +18 VDC side of the +18 VDC bipolar supply used for Head Amplifier and Control Board Ic's. The bipolar supply provides low crosstalk in the head amplifier, high noise immunity in control logic and permits the use of dc coupling in the head preamps and output amplifier stages. Both CR1 and

CR2 (Dwg. No. 906-5106) are conventional full wave bridge rectifiers. U1 is an IC regulator controlling +28V regulating transistor Q9, located on the "U" bracket assembly which houses the Mother Board. The +28V output level is adjustable via potentiometer R21. Q7 and Q8 are regulating transistors for the +18V bipolar supply and are controlled by zeners CR3 and CR4 respectively.

SECTION 4

INSTALLATION AND OPERATION

4.1 Installation

Rack Mounting: The standard 5300A is packaged for table top mounting, however, a full complement of accessories is available from Broadcast Electronics for rack mounting the units. Two 5300A's may be mounted side-by-side in a standard EIA rack. A single unit rack mounting package is also available. Rack space required is 6 rack units (10.5 inches) for both the single and dual unit arrangements. Blank filler panels are supplied with both mounting packages.

The top and bottom covers of the 5300A are vented to allow a free flow of air through the machine from bottom to top. Do not restrict these vents; Do not place objects on the top of the machine that will restrict the air flow.

4.2 AC Power. The standard 5300A operates on 60Hz AC power at either 105 to 125 VAC or 210 to 230 VAC single phase, via internal strapping of the power transformer primary. Units for 50Hz operation over the same voltage ranges are optionally available. Operating voltage requirements for each machine are indicated on the rear-panel identification plate. Power consumption is 120 watts.

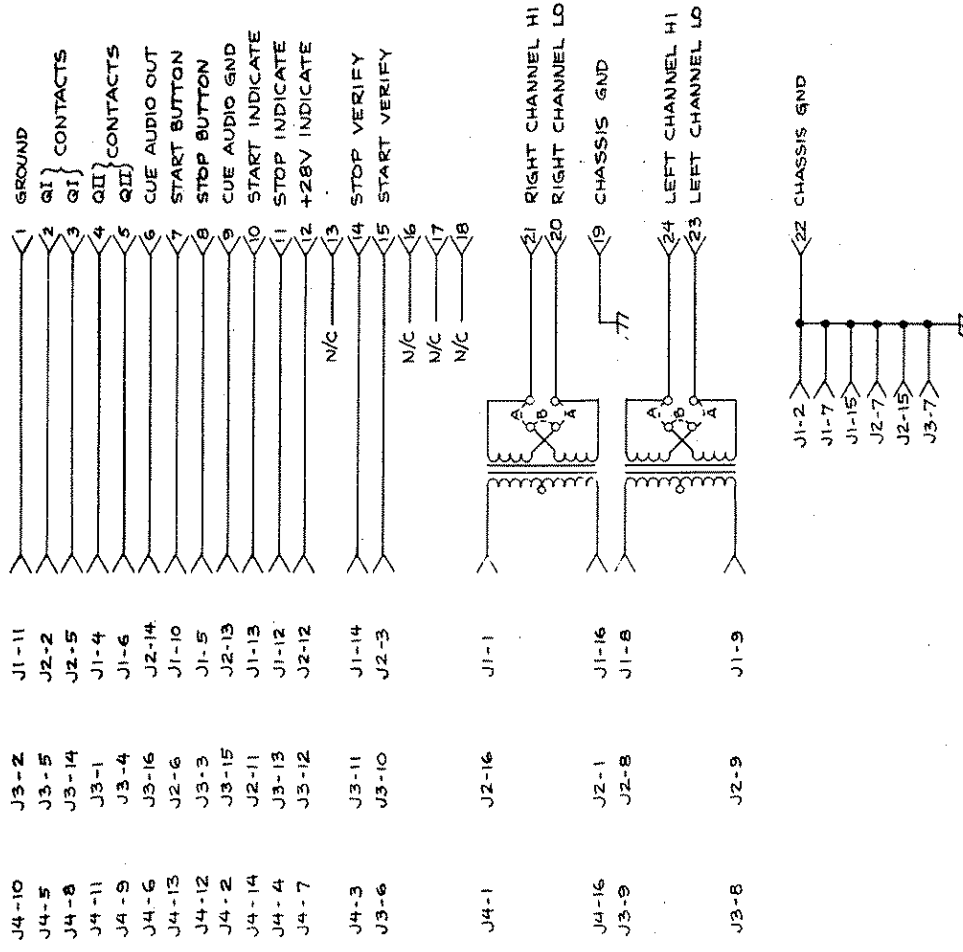
4.3 External Connections. Except for the interconnections between the 5300A and its companion recorder, all input, output, remote control, and other connections between the 5300A and external equipment are made via three, one for each deck, 24 pin Cinch connectors located on the rear-panel of the machine, J101, J201, and J301. J401, a 6-pin Jones connector, also on the 5300A rear-panel, interconnects the unit with the optional recorder for deck No. 3. Terminal connections for the deck-connectors are shown in Figure 3-2. All mating connectors are supplied with the machine.

When the 5300A leaves the factory, the audio output transformers are connected for 600 ohms balanced output as shown in the notes on Figure 3-1. However, they may be re-connected for 150 ohms. See notes on Figure 3-1. If unbalanced operation is desired, connect the audio output terminal marked L0 (Fig. 3-1) to the shield of the interconnecting audio cable.

To ensure proper grounding and to prevent the formation of ground loops, the shield should be connected only to the console or remote end of the cable, in most cases. If ground loops persist with this arrangement, try moving the ground connection to the mid-section of the cable or to the other end.

A special rear-panel ground terminal is provided on the 5300A. Connect this terminal to system ground via an appropriately heavy copper conductor or grounding strip.

DECK 3 DECK 2 DECK 1



NOTES:

1. 150 Ω OUTPUT JUMPER 'A' - 2 PLACES EACH CHANNEL
2. 600 Ω OUTPUT JUMPER 'B' - 1 PLACE EACH CHANNEL

PCB ASSY # C-914-1801 & -1811

BROADCAST ELECTRONICS, INC.
A FILMWAYS COMPANY

SCHEMATIC
REAR PANEL CONNECTOR PCB D

5000 SERIES

REV
C-906-5100 A

Figure 3-1 5300A Output Connections

DRAWN: 9/23/75 TJS
CHKD: 11/5/75 TC
APVD: 11/5/75 TJS

Cartridge Size Adjustment. Position the left hand cartridge guide on each deck to accommodate either size A or size A & B cartridges, as required. See Figure 2-3 of this manual.

Remote Control Interconnections. See Figure 3-2.

Recorder Interconnections. Interconnecting cables between the 5300A and the recorder are supplied with the recorder option. See Dwg. No. 906-5126 in the Recorder manual for inter-cabling details. Note that deck 3 connector mates with the recorder plug and that external connections to this deck are made via a 24-pin Cinch connector on the recorder. Details of the recorder are covered in the Recorder manual.

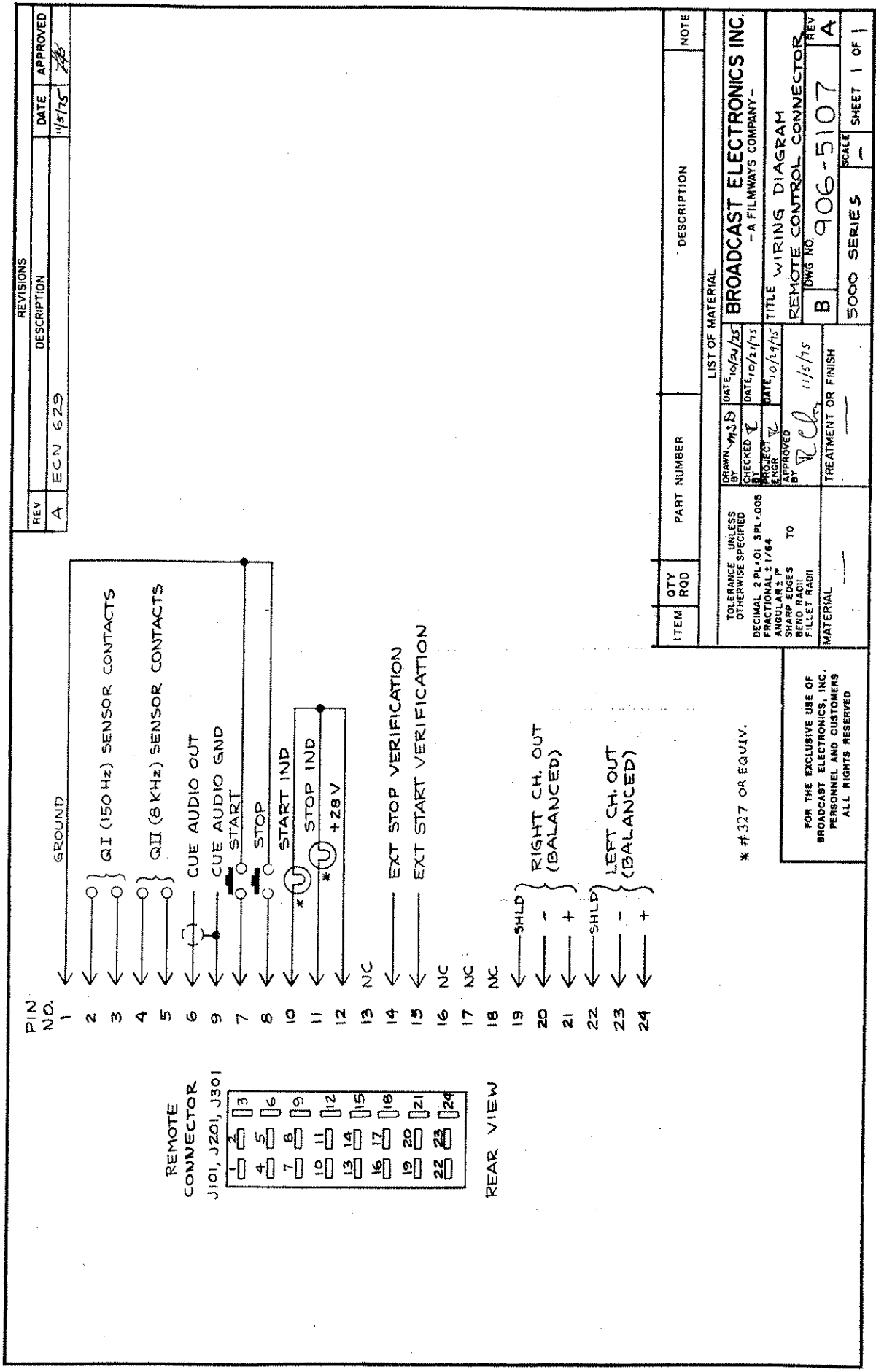
Switcher. The SW5E muting switcher and its inter-connection with the 5300A are described in the SW5E instruction manual.

4.5 Operation

1. Turn the machine power ON via the front-panel toggle switch. This action energizes the motor and starts the capstan driveshaft turning.
2. Load a pre-recorded cartridge into one of the deck-ports. The STOP switch light corresponding to that deck will turn ON, indicating that the deck is in the READY mode.
3. Momentarily press the START pushbutton for the loaded deck. The cartridge will play, the START pushbutton will light, the STOP pushbutton will turn OFF, and the deck-side light for the playing deck will turn ON. The tape will continue to run until either the STOP button is pressed or until a stop cue-tone is sensed.

When the cartridge stops the START light will turn OFF and the STOP light will illuminate. Removing the cartridge from the deck turns the STOP light off.

Figure 3-2



REV		REVISIONS		DATE		APPROVED	
A		ECN 629		11/5/75		[Signature]	
ITEM	QTY	REQ	PART NUMBER	DESCRIPTION		NOTE	
LIST OF MATERIAL BROADCAST ELECTRONICS INC. - A FILMWAYS COMPANY -							
TOLERANCE UNLESS OTHERWISE SPECIFIED		DRAWN		DATE		DATE	
DECIMAL 2 PL. 01 3 PL. 005		BY		10/24/75		10/24/75	
FRACTIONAL 1/64		CHECKED		DATE		DATE	
ANGULAR .015		BY		10/24/75		10/24/75	
SHARP EDGES TO		ENGR		DATE		DATE	
BEND RADIUS		BY		10/24/75		10/24/75	
FILLET RADIUS		APPROVED		DATE		DATE	
MATERIAL		BY		11/5/75		11/5/75	
TREATMENT OR FINISH		BY		DATE		DATE	
5000 SERIES		SCALE		SHEET 1 OF 1		REV	
B		906-5107		A		A	
TITLE		WIRING DIAGRAM		REMOTE CONTROL CONNECTOR		REV	
DWG NO.		906-5107		A		A	

* #327 OR EQUIV.

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PERSONNEL AND CUSTOMERS
ALL RIGHTS RESERVED

SECTION 5

MAINTENANCE AND ALIGNMENT

5.1 General Maintenance Information:

Warning: Always disconnect the main AC power from the machine before removing the covers, the decks, printed circuit boards, or other components.

Caution: Be certain that the large electrolytic capacitors on the power supply section and the motor capacitor on the main chassis are fully discharged before attempting maintenance inside the unit. Do Not remove or insert PC boards while power is supplied to the machine. Turn the unit off or disconnect the main power cord first.

Component Location and Identification. Locations of circuit components are shown in the pictorial diagram accompanying the schematic drawings and parts lists. Resistance values are indicated by the standard color code, and in some cases have an additional color band to indicate military reliability standards. Unfortunately, all manufacturers are not consistent in coding capacitor values and several systems will be encountered. For an explanation of the various coding systems for capacitors, diodes, and other components, consult the ITT "Reference Data for Radio Engineers" or a similar reference.

When replacing components, check the parts list and schematic to determine if exact replacement is required. In some cases, component types and/or values are critical. Incorrect substitutions in some cases may result in improper performance of the equipment.

Removing components from plated-through holes in printed boards may be more difficult than from standard boards because of solder "wicking" effects. Use only sufficient heat and tension to remove the components. It may be easier in some cases to cut the component from the top side of the board and remove the leads separately.

Care should be exercised in replacing integrated circuits, as the pins are quite delicate. All IC's should be oriented so that the notch on one end of the IC is aligned with the notch in the socket. To insert an in-line IC, place one row of pins lightly in the socket and use a straight edge to push the other row of pins into alignment with the socket, then press firmly on the IC to seat it properly. DO NOT attempt to remove an IC with the fingers - use an IC puller or a soldering aid to lightly pry the IC from the socket.

In replacing defective "soldered-in" IC's, first cut the IC from the pins on the component side of the board and then carefully remove the pins and clean individual holes before attempting to insert a replacement. In soldering the pins of the replacement units, heat and solder should be applied quickly, but sufficiently, to avoid overheating the IC.

DO NOT USE EXCESSIVE HEAT ON PC BOARDS AND COMPONENTS. USE A LOW HEAT SOLDERING IRON, NOT EXCEEDING 30 WATTS. USE ONLY A FINE GAUGE (NO. 20), ROSIN CORE SOLDER.

5.2 Test Equipment

List of Test and Maintenance Equipment:

Multimeter: 20,000 ohms/volt or better, Simpson Model 260 or equivalent.

Oscilloscope: (any general purpose)

PC Board Extender: Broadcast Electronics, Stock No. 919-1806.

Tape Guide Adjustment Block: Broadcast Electronics, Stock No. 836-0004.

Set of Allen Wrenches: Supplied with machine.

Head Demagnetizer: Broadcast Electronics Model R-2015 (Stock No. 820-0040)

Cleaning Fluid: Broadcast Electronics BE-903.

Test Tapes: Available from Broadcast Electronics.

Set of Standard Electronics Hand Tools

WARNING

DISCONNECT THE MAIN AC POWER FROM THE MACHINE BEFORE REMOVING COVERS OR BEFORE OPENING FRONT PANEL.

5.3 Deck Access and Removal

1. Remove the grilled upper machine cover held on by four phillips head screws, one near each corner. This provides access to the upper deck, Deck No. 1.

2. Free the front panel to swivel down on its hinged bottom edge by removing the two allen screws located near the top edge of the front panel. Swing the front panel down, placing a small object under the near edge of the panel to prevent the power ON/OFF switch from bearing on the work bench and being damaged. A small roll of electrical tape, for example, is usually handy for this purpose.

3. Decks No. 1 and 2 are removed by first freeing the deck retaining screw, see figure 2-3, which holds it to the bulkhead plate. Loosen the screw and remove the deck, either one or two as required, by carefully pulling the deck forward, freeing it from the machine. Even forward pressure is required to prevent binding of the edges and to avoid possible cable or wiring damage to the equipment.

5.4 Cleaning Procedures

General. Use a soft cloth moistened with ammonia to clean finger-prints and other marks from the machine chassis and other surfaces. Remove dust from the interior with a soft brush.

Heads. Use BE-903 cleaning solution available from Broadcast Electronics. Clean heads, pressure rollers, tape path, guides and capstan at least once per day, more frequently if necessary, to remove accumulated oxide.

PC Board Connectors. Routine cleaning of printed circuit boards and connectors is not necessary; however, if visual inspection of the contacts, intermittent machine performance, or other machine performance symptoms indicate that the contacts may be dirty, they should be sprayed with an aerosol contact cleaner. Rubbing lightly with a soft pencil eraser will remove difficult spots. Exercising the connectors by inserting and removing the PC board several times, but not excessively, is effective also. Do not use abrasive cleaners.

PC Boards. PC Boards should be carefully inspected and cleaned before returning them to service after a maintenance or repair operation. This procedure is particularly necessary if soldering work has been performed on the board.

Clean solder flux from the board with isopropyl alcohol. Flux left on the board may cause electrical noise in the system. Finger prints and other contaminants should also be removed. Inspect the board for solder "bridges" and other possible defects before returning it to service.

5.5 Routine Maintenance.

Cartridge Maintenance. An inserted cartridge is part of the machine system; before placing a cartridge in service, check it for cleanliness, for mechanical defects, and for worn tape. Do not make adjustments on the machine when using defective cartridges.

Clean cartridges with a mild detergent, giving special attention to the teflon washer and the center post. These elements should turn freely to prevent undue tension requirements on the tape. Check the pressure pads to see that they are aligned squarely with the tape.

A damaged or deformed cartridge shell can distort the tape path, adversely affecting frequency response and phasing. Check for loose corner posts, a frequent cause of distorted tape path.

Tape should be inspected for signs of damage or wear. A shiny oxide surface indicates a worn tape. Replace it. Use only graphite lubricated tape. Silicon lubricated tapes cannot stand up to the demanding requirements of tape cartridge operations. Different brands of tape, and sometimes different types of the same brand, require different record bias currents.

Head and Transport Elements. Clean the heads, pressure roller, and other elements of the tape path at least daily, more often if the machine is under heavy usage. A dirty head can cause serious distortion of the audio signal. Use BE-903 cleaning fluid or isopropyl alcohol.

Demagnetize the heads frequently, about once a week. Use a SPOTMASTER or equivalent degausser, following the directions supplied with the unit.

Cartridge Clamps and Guides. An inserted cartridge is directed into the proper play or record position via the tapered right-hand cartridge guide, and held in proper position by the high tensile-strength beryllium upper clamp.

Lateral cartridge movement is prevented by the left-hand cartridge guide. Adjust the left-hand guide to fit snugly against the side wall of the cartridge, with sufficient pressure against the side wall to permit easy removal of the cartridge.

5.6 Tape Guide Adjustment

Use the SPOTMASTER Tape Guide Adjustment Block to adjust the three tape guide brackets that are attached to the tape head assemblies (See Figure 4-1). Clean the guide block and deck-plate, slightly loosen the Phillips head screws holding the guide brackets, and slide the guide adjustment block along the deck-plate until the protruding edge of the block just fits the upper tape-guide prong. Holding the block and the tape guide in this position, tighten the two Phillips head screws. Repeat this operation for the remaining two tape guides. While this adjustment is not required on a daily or even a weekly basis, a weekly check of this parameter with the guide block is rather simple insurance of a properly adjusted tape guide.

Head Positioning Adjustments (Playback). Because of the unique arrangement of the Phase-Lok III head bracket, the only adjustment normally required for head positioning is the azimuth control. Height and zenith adjustments are usually not required unless a head replacement is being made, and this procedure is described under the Head Replacement section. However, a quick check of proper head-height position may be made with the Tape-Guide adjustment block. Clean the deck-plate surface in front of the head assembly area and the bottom surface of the adjustment block, place the block on the deck as shown in Figure 4-1, slide the block into the area of the head pole-pieces, and note the position of the pole-pieces with respect to the protruding end of the block. If the head-height is correctly adjusted, the protruding section of the block will evenly align with the pole-pieces. Also, the Zenith adjustment should be checked as indicated in the Zenith Adjustment section. Do not adjust these parameters, however, unless the checking indications show that adjustments are required.

5.7 Azimuth Adjustment.

Before making azimuth adjustments, clean the head assembly, the tape path, and the pressure roller. Check the pressure roller adjustment to see that it contacts the capstan drive-shaft in a position parallel to the shaft, as described under section 5.14 of this manual. Using the tape guide adjustment block, check the tape guides on the head assemblies for proper positioning. The Azimuth adjustment screw is shown in Figure 4-2, on the next page.

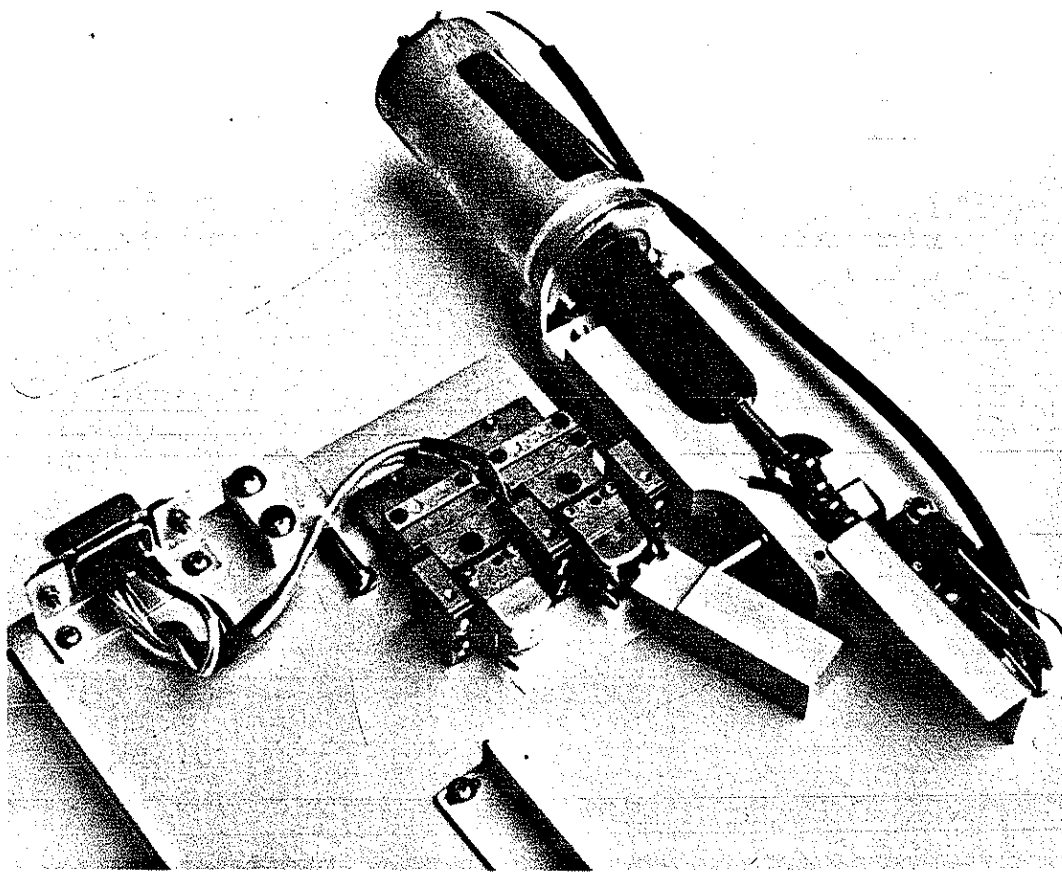


FIGURE 4-1
TAPE GUIDE ADJUSTMENT

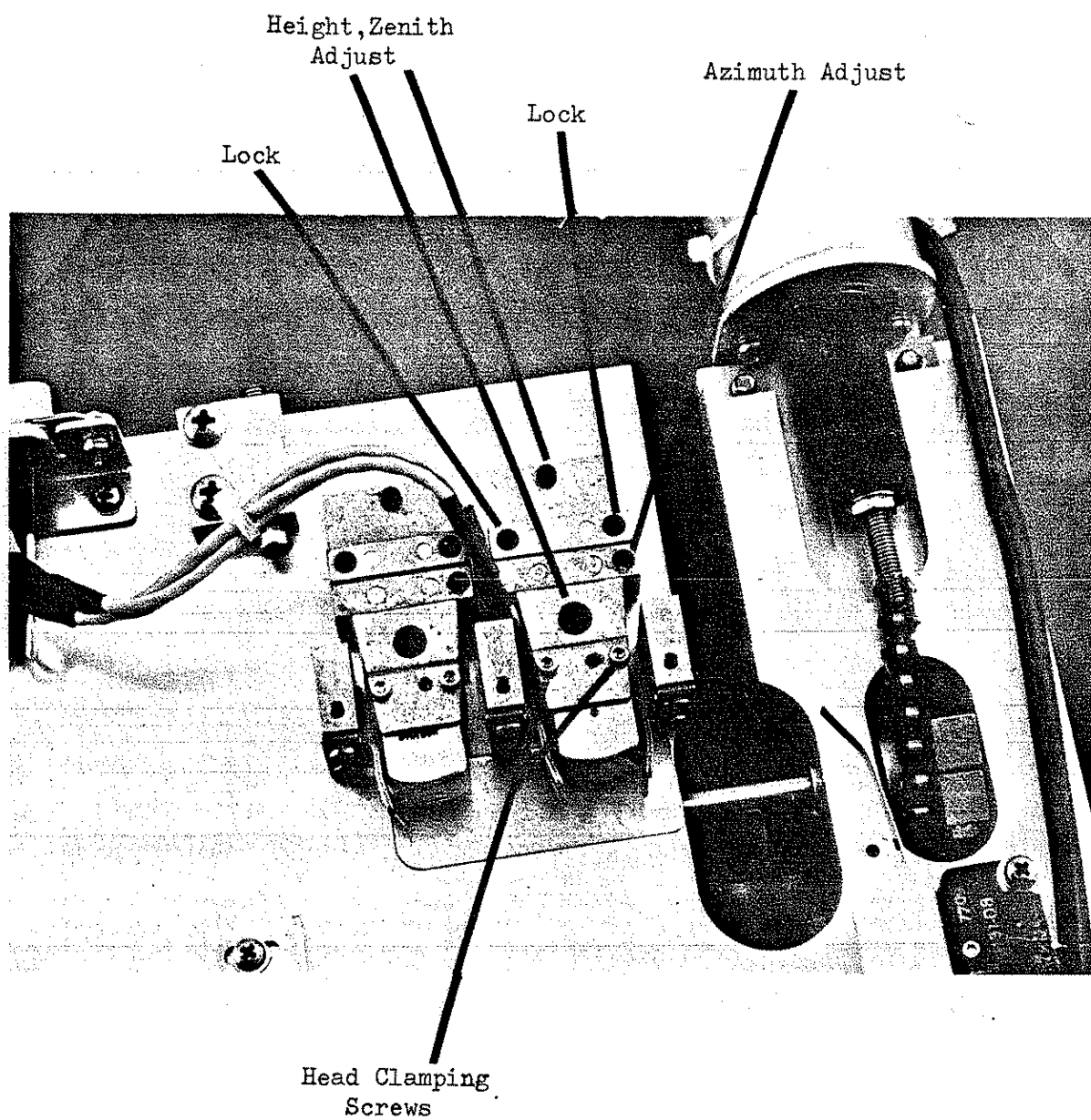


FIGURE 4-2
HEAD ADJUSTMENT SCREWS

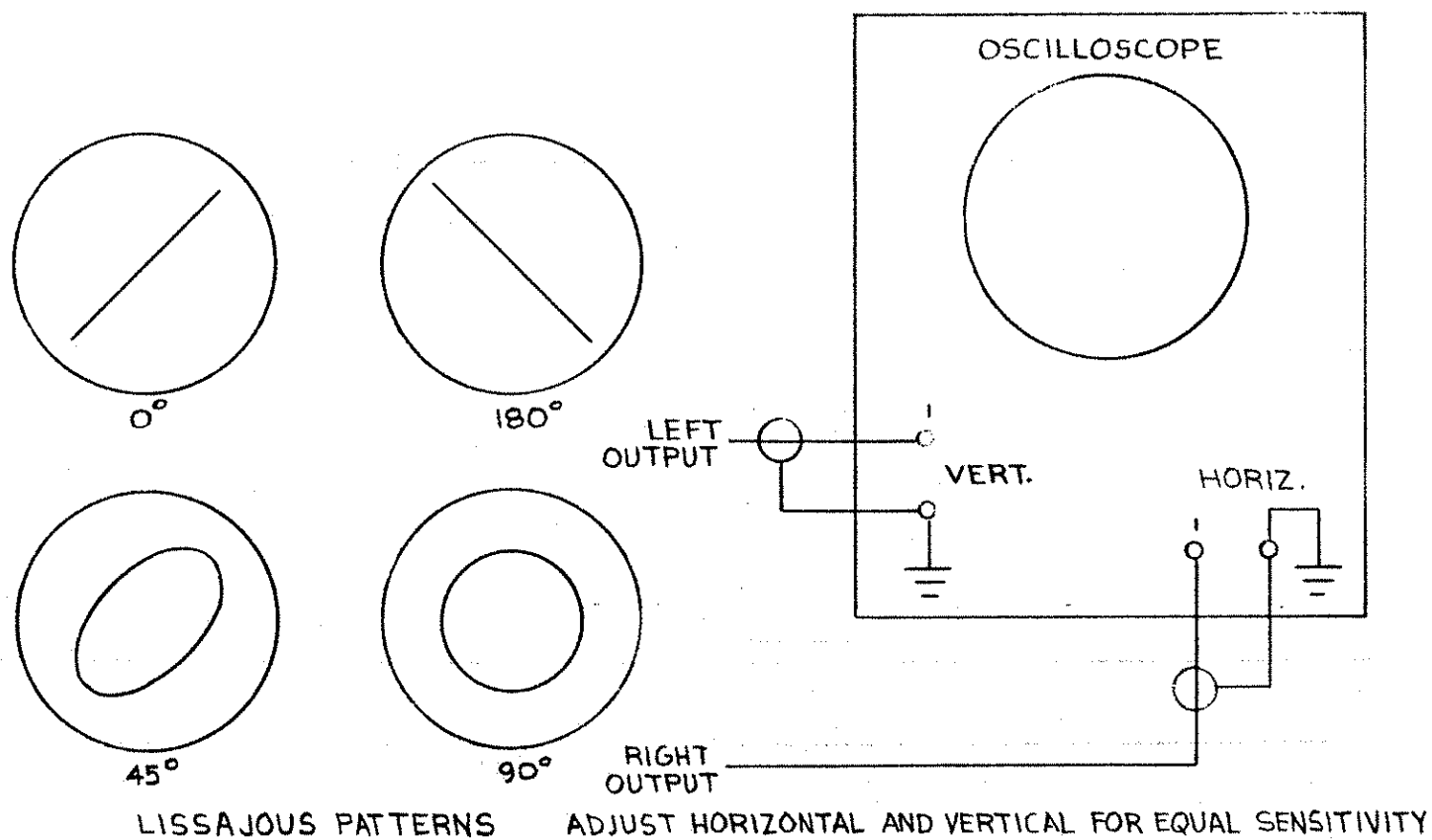


FIGURE 4-3 TRACKING CARTRIDGE AND
STEREO PHASING TEST

Insert a test cartridge into the port of the deck under adjustment, start the cartridge, and observe the machine audio output on a VU meter while listening to the audio on a speaker system. Follow the adjustment instructions given on the test tape, setting the Azimuth control for maximum output level at 15kHz. The 1/16 inch Allen wrench required for this adjustment is supplied with the machine. Remove and re-insert the test cartridge in the machines, check and adjust the phase response as indicated in the paragraph below.

Standard NAB alignment tapes are available from Broadcast Electronics.

5.8 Stereo Phase Response. Before making this adjustment, set playback Equalization as outlined in Section 5.18.

For stereo machines, the Azimuth adjustment should be completed as outlined in the section above, and then trimmed to equalize the phase or delay responses of the Left and Right channels as follows:

Connect the Left channel audio output of the machine to the Vertical deflection channel of an oscilloscope and the Right channel output to the scope Horizontal channel, as shown in Figure 4-3. (Note: To check the phase response difference of the oscilloscope H and V channels, apply the same signal to the H and V channels and note the resultant Lissajous figure displayed on the scope. Matched phase response characteristics between the two channels of the oscilloscope will be indicated by an approximate straight line on the scope face, at an angle of 45 degrees if the H and V channels produce equal deflection amplitudes.)

With the Left channel of the machine connected to the Vertical channel of the oscilloscope and the Right channel to the Horizontal deflection channel of the scope, play back the test tape and note the shape of the Lissajous figures displayed on the scope at both 400Hz and 15kHz. See figure 4-3 for an indication of the relative phase relationships between the Left and Right channels for a given Lissajous pattern. Since an Azimuth adjustment could produce a phase difference of 360 degrees at 15kHz, a serious phase error that would not be detectable with the kHz tone alone, a mid frequency tone in the range of 400Hz or so is required to complete the indication.

Trim the Azimuth adjustment for best phase response (minimum phase angle) at both the 400Hz and the 15kHz frequencies. Remove and reinsert the cartridge and perform the phasing test several times, readjusting for minimum phase difference if necessary.

5.9 Solenoid Replacement

Remove the affected deck from the machine as required, either Deck 1 or Deck 2. Deck 3 is not removable. (1) Disconnect the two solenoid leads at the plug-in deck connector located in the left rear corner of the deck. Note lead connections, listed below:

White lead to terminal 7

Blue lead to terminal 13

(2) Free the cable from the deck by unthreading it through the openings in the deck. (3) Turn the deck bottom side up, locate the junction of the solenoid chain and the solenoid tension spring. Uncouple the spring from the chain and allow the chain to fall through the opening in the deck to the top side. (4) Leave the deck bottom side up and remove the two large screws that hold the solenoid mounting bracket and solenoid assembly to the deck. Carefully remove the solenoid plunger and chain assembly from the deck. (5) Remove the plunger from the solenoid. (6) Note the chain and screw assembly which holds the chain to the plunger. Unscrew the plunger from this assembly. (7) Screw the new plunger to the chain assembly and insert this plunger into the solenoid. Mount the new solenoid and mounting bracket to the deck plate with the two screws previously removed. Turn the deck over, bringing top side up. The plunger should move freely within the solenoid. (8) Thread the chain through the opening in the deck in its previous position, so that the small pin emanating from the pressure roller drive shaft assembly threads through the eighth link opening in the chain. Hold the chain and pressure roller assembly in this position and invert the deck. Maintain slight tension on the chain and recouple the solenoid tension spring to the last link in the chain. Be sure that the end of the spring is completely inserted through the eyelet in the chain. Check the mounting bracket retaining screws for tightness. Turn the deck plate top side up. Check the plunger for free movement within the solenoid for the full extent of its travel. Note that nearly full solenoid plunger action brings the pressure roller to a vertical position and that the guide pin in the pressure roller drive shaft is in the eighth link opening of the chain. (9) Solder the two solenoid leads to the plug-in deck connector, according to the previously noted schedule of connections. (10) The solenoid chain retaining screw which connects the chain to the plunger must now be adjusted according to Section 5.11 of this manual. Return the deck to the machine; be sure that the deck is inserted into its proper position in the machine. Transport decks are numbered on the front edge. They should always be returned to their assigned position in the machine.

5.10 Solenoid Speed Adjustment

The rate at which the solenoid plunger is pulled-in or released is controlled by the Solenoid Speed Adjustment, a spring-loaded screw located on the rear end plate of the solenoid cylinder. The rate of air passage through the pressure release valve is also determined by the setting of this adjustment, establishing the level of acoustical noise generated by solenoid action. This adjustment is set at the factory for a moderate balance between solenoid operating rate and noise level, and generally does not need re-adjustment. If desired, however, it may be reset to suit the individual installation. The procedure is as follows:

Remove AC power from the machine, open the front panel and release the deck to be adjusted (applies to deck one or deck two; deck three is accessible by removing the bottom machine cover). Slide the deck partially forward to gain access to the adjustment screw. Turn the screw about 1/4 turn clockwise

or counter-clockwise as required; Clockwise rotation of the screw will increase solenoid action time and counter-clockwise motion will reduce this time. Noise will increase with faster solenoid action. Replace the deck, apply power to the machine, and test operate the solenoid with a cartridge in the machine. Re-adjust if necessary. After final adjustment is reached, secure the deck with its retaining screw, check for proper engagement between pressure roller and capstan drive-shaft (Section 5-16) and restore the machine to operating condition.

5.11 Solenoid Chain Replacement

Replacement of solenoid chain is best made by removing the deck from the machine. In the case of Deck 3, however, Decks 1 and 2 should be removed and the bottom plate should be taken off to provide access to the parts concerned. With the appropriate deck freed from the machine, observe the end of the chain that joins the solenoid adjustment screw to the plunger. One side of the link at this junction will contain a long U shaped locking bracket which holds the master link of the chain in place. Remove this locking bracket and the master link and remove the chain from the adjustment screw. Turning the deck plate over, remove the solenoid tension spring from the other end of the chain. Note the difference between the two ends of the chain just removed. Attach the tension spring to the new chain at the proper end as noted above. Place the free end of the chain through the hole in the deck plate and attach it to the free end of the solenoid adjustment screw with the master link and U-bracket. Make sure that the pin that penetrates the chain for pressure roller drive is located at the eighth opening of the chain from the adjustment screw. Full accuation of the solenoid when this pin is in the proper position brings the pressure roller slightly past a vertical position. Replace the deck in the machine and check the alignment of the pressure roller with the capstan drive shaft and adjust, if necessary, as outlined in Section 5.16. Set the solenoid plunger adjustment as outlined in Section 5.17. Replace machine covers, AC power and restore the system to normal operation.

5.12 Head Replacement

To replace a tape head on Deck No. 1 or Deck No. 2, remove the affected deck from the machine. If No. 3 deck head is to be replaced, access to this head may be gained by removing decks 1 and 2 from the machine and taking off the machine top cover. Follow the procedure listed below (see figures 2-6, 4-2 for component locations).

1. Remove the beryllium-copper cartridge clamp.
2. Remove the two tape-head holding screws, remove the head assembly from its mounting bracket, and unplug the leads at the rear of the head.
3. Replace the head-lead plugs onto the new head unit according to the connections schedule (Drawing No. 906-5109).
4. Seat the new head in the head mounting clamp and dress the leads neatly between the two head assemblies as shown in Figure 2-3. Holding the head firmly against the clamp backstops and laterally centered in the clamp, tighten the clamp holding screws with moderate pressure. Check the head to see that it is firmly held in the clamp.

Before replacing the cartridge clamp, check for proper head HEIGHT positioning as indicated below.

5. Clean the deck plate area in front of the head and the bottom surface of the Tape Guide Adjustment Block. Place the block on the deck plate and carefully slide it towards the head pole pieces. Note the height of the pole piece relative to the protruding end of the block. If the pole piece is accurately aligned with the protruding section of the block, that is if the top of the upper pole piece is even with the top edge of the protruding portion of the block, the head height is correct and adjustment is not required. Proceed to ZENITH adjustment, step 2 below. If not, perform step 1.

5.13 Height and Zenith Adjustment

1. Height adjustment. Set the front height adjustment screw to bring the top edge of the upper pole piece even with the top edge of the protruding section of the block.
2. Zenith adjustment. Using a machinists square, set the Zenith adjustment screw to bring the surface of the pole pieces perpendicular to the upper deck surface. Check for proper height. If further height adjustments are required, set the front and back (zenith) screws by equal increments to bring head height into proper adjustment while holding the proper zenith adjustment. Make a final check of both height and zenith.
3. Replace the cartridge clamp, return the deck to the machine and secure it to the bulkhead plate, replace machine covers, and restore machine to operating condition.
4. Perform the AZIMUTH adjustment as outlined in figure 4-2.

5.14 Pressure Roller Replacement

The removal and replacement of pressure rollers in Decks 1, 2, and 3 are identical. However, final procedure for adjustment of the interface between the pressure roller surface and the capstan drive shaft surface is the same for Deck 1 and for Deck 2 but different for Deck 3. This alignment procedure is outlined in Section 5-16, under Tape Transport Adjustment. That is, the deck travel screws on the rear edge of the deck plate must be set to allow the deck plate to seat into the machine the exact distance required to bring the pressure roller surface parallel to the capstan drive shaft surface when these two elements are brought into physical contact. This procedure is described in Section 5-16. To replace the pressure roller, however, use a small pair of needle nose pliers to remove the E ring from the top of the pressure roller. Being careful to hold on to both the metal washer and the nylon washer which fit on the shaft. Remove these elements and the roller from the pressure roller shaft. Place the metal washer, the roller and the nylon washer on the shaft, in that order. Then seat the E Ring on the end of the shaft. When the E Ring is seated properly, you will hear it snap onto the shaft. Adjust the transport alignment according to Section 5-16.

5.15 Power Transformer Replacement

Disconnect the AC power cord, turn the 5300 bottom side up, remove the bottom plate and unplug the power transformer from the Mother Board. Remove the four screws that hold the transformer to the right hand side panel of the machine. Remove lower two screws first, top two screws last. The transformer will fall free of the machine. Install the replacement transformer and connector assembly. Note that the transformer is mounted so that the leads are next to Deck No. 3. For better access to the lower screws of the transformer, release the U bracket assembly by removing the six screws on the back of the machine that hold this assembly in place, three at the top and three at the bottom. Replace the motor plug and restore the bottom cover to the machine.

5.16 Motor Replacement and Transport Alignment

NOTE: CARE MUST BE USED IN HANDLING AND STORING MOTORS TO AVOID DAMAGE TO THE BEARINGS. STORE SPARE MOTORS IN THE ORIGINAL PACKING MATERIAL AND HANDLE THE MOTOR BY THE CASE, NEVER BY THE SHAFT. PROTECT THE MOTOR FROM SHARP BLOWS AND ROUGH HANDLING.

To remove the motor, disconnect the AC power, open the front panel, and remove Decks 1 and 2. Remove the top and bottom covers of the machine and place the unit on its left side. Unplug the motor connector from the Mother Board and remove the two white leads that connect to the motor capacitor. Note the two large Phillips head screws on the top side of the deck that hold the motor mounting block to the deck. While holding the motor with hand, remove these two screws from the deck. Gently remove the motor, taking extra precaution to avoid damage to the drive shaft as it comes through the openings in the deck plates. Before inserting the replacement motor, remove the Allen screw on the front end of the motor shaft upper bearing and push the bearing spring clear, so that the end of the motor shaft will fit into the bearing receptacle without damage to the spring. Remount the motor with the two screws previously removed. Replace the Allen screw that held the spring in the upper bearing mounting block. Tighten the Allen screw until end of travel, then back off one-half turn. Align the motor and the upper bearing as described below:

Alignment of the motor and the capstan drive shaft involves positioning these two elements so that the pressure roller will make even contact from top to bottom along the surface area contacting the drive shaft. This insures an even distribution pressure between the roller and the shaft as tape is fed through the capstan. Improper alignment will direct the tape in either an upward or downward direction, resulting in improper tape flow past the RECORD/PLAYBACK heads. Align deck No. 3 before returning decks 1 and 2 to the machine. Lightly loosen the two motor mounting screws and the two Phillips head screws which hold the upper bearing in position. These four screws should be just loose enough to permit the motor and the shaft assembly to move fore and aft in the machine as a single unit.

When the system is properly adjusted, the surface of the pressure roller will be parallel to the capstan shaft when these two elements are brought into contact by the solenoid. This condition can best be seen when shining a light into the machine in the area of the solenoid chain and observing the spacing between the pressure roller surface and the drive shaft as the solenoid is brought into play position. A lamp placed on top of the machine over the solenoid chain assembly is very adequate for this adjustment.

Start the deck while holding the Ready switch, which will bring the pressure roller into contact with the drive shaft. Note the air gap between the roller and the shaft as these two elements come into contact. Look for parallelism as the gap closes. Slide the motor drive shaft assembly fore and aft until these surfaces are parallel at the point of closure. Tighten the two upper and two lower screws and again check for parallelism at point of contact. This completes adjustment for Deck No. 3.

Replace Deck 2 and proceed with alignment of this element. Note the two Allen screws on the rear edge of No. 2 deck plate. These screws bear against the bulkhead plate when the deck is inserted into the machine and hold this deck in proper fore and aft position for correct alignment of the pressure roller with respect to the capstan drive shaft. Again, the roller surface should be parallel to the capstan shaft when they make contact. Insert the deck into the machine and fasten the holding screw. Start the deck. This will bring the pressure roller into contact with the capstan. If contact is not made with these two surfaces in a parallel relationship as in Deck No. 3 adjustments, the Allen screws on the rear edge of the deck plate require adjustment. Remove the deck from the machine and adjust the two Allen screws together, either in or out as required, to bring the pressure roller and capstan drive shaft into a parallel condition when the deck is in the machine. Make sure that both Allen screws are in approximately the same position and that both are acting as deck travel stops, bearing against the bulkhead plate when the deck is in the final position in the machine. Replace and tighten the screw that locks the deck to the bulkhead plate and recheck the pressure roller and drive shaft for parallelism.

Replace and adjust Deck No. 1 according to the procedure outlined for Deck No. 2. This completes Motor Replacement and Transport Alignment. However, solenoid travel for each deck should be adjusted as outlined in Section 5-17 below, before putting the machine into operation.

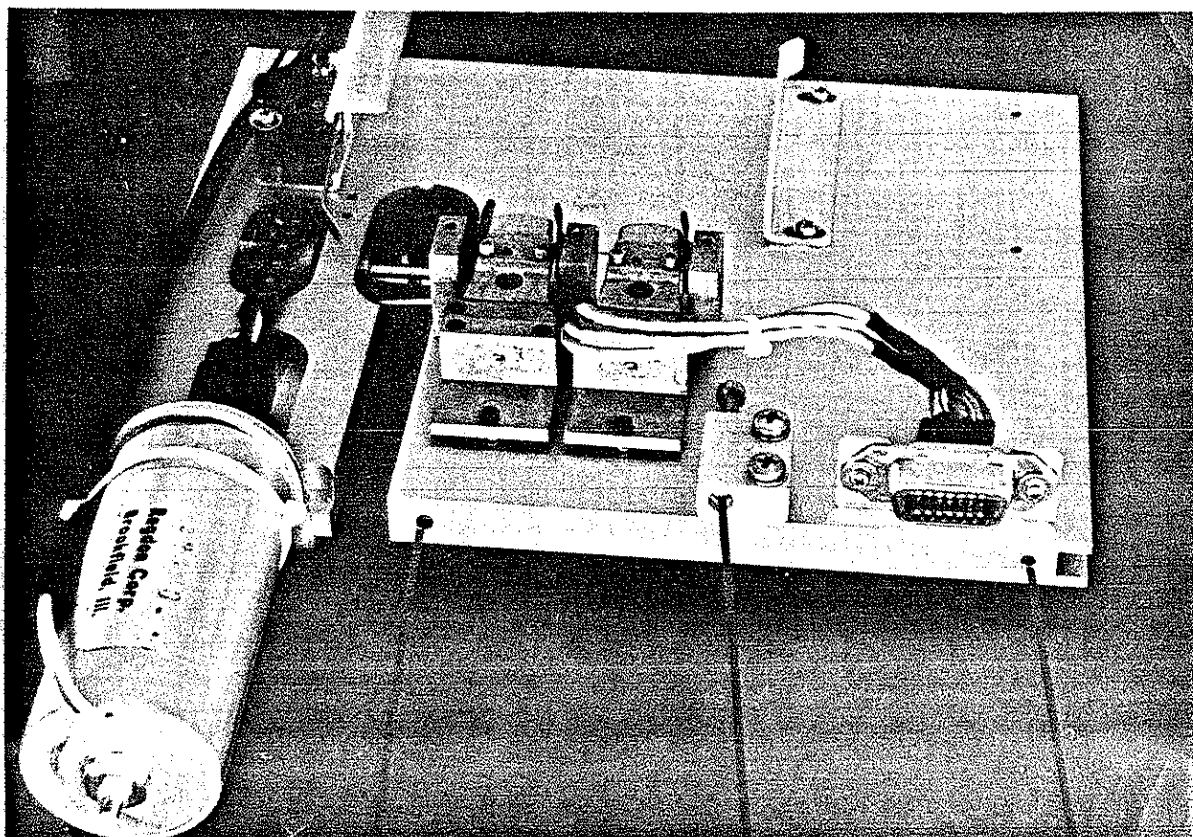
5.17 Solenoid Plunger Adjustment

Solenoid plunger travel is determined by the setting of the adjustment screw which links the plunger to the solenoid chain and is set to bring the pressure roller against the capstan drive shaft just prior to the plunger hitting its limit of travel.

With no cartridge in the machine, hold the READY microswitch open and push the START pushbutton for the deck under adjustment; The solenoid will pull the pressure roller into the driveshaft. Turn the plunger clockwise in one-half turn increments while alternately pushing the START button until an audible noise, the plunger hitting "bottom", is heard with solenoid action. Now turn the plunger counter-clockwise for one-half turn beyond the point that the noise has disappeared and tighten the lock-nut snugly against the end of the plunger.

5.18 Electronic Adjustments

CAUTION: BEFORE ADJUSTING THE SYSTEM ELECTRONICS, CLEAN THE HEAD WITH BE-903 CLEANING FLUID OR WITH ISOPROPYL ALCOHOL. BE SURE THAT THE HEAD IS DEMAGNETIZED AND PROPERLY ALIGNED AS DESCRIBED IN SECTIONS 5.7, 5.8 AND 5.13.



Deck Positioning
Screw

Deck Lock
Screw Assembly

Deck Positioning
Screw

FIGURE 4-4
REAR EDGE, TRANSPORT DECK SHOWING
DECK POSITIONING, SCREWS AND LOCKING SCREW ASSEMBLY

NOTE: THE 5300A IS AVAILABLE FOR OPERATION ON EITHER NAB, IEC, OR CCIR STANDARDS. USE A TEST TAPE RECORDED TO THE APPROPRIATE STANDARDS FOR THE ADJUSTMENTS DESCRIBED BELOW. FOLLOW THE INSTRUCTIONS RECORDED ON THE TEST TAPE.

Output Level. Two output level controls are available on the stereo version of the 5300A, the Left channel and the Right channel. Play back the section of the test tape corresponding to the Operating Reference Level and adjust the L LEVEL and the R LEVEL controls on the Head Amplifier PC Board for the desired output level. On mono versions of the machine, only the left channel is used.

Equalization. Reproduce the Frequency Response series of tones from the test tape. Adjust the LF control(s) to bring the level of the 50Hz tone to within -1 to 0dB of the reference tone level. Adjust the HF control to bring the 12kHz tone to the same level as the reference tone.

Cue Sensitivity. The cue tone sensors are adjusted to trip at a point 6dB below the NAB standard level.

5.19 REPLACEMENT PARTS

The following parts list provides a description and part number for all electrical and selected mechanical components in the 5300 series cartridge machines. All parts are indexed by assembly number and listed by schematic diagram component reference designator when available (see table 5-1).

TABLE 5-1. REPLACEMENT PARTS LIST INDEX

TABLE	DESCRIPTION	PART NUMBER
5-2	Chassis Mounted Components	906-5301B/ -5302B/-5303B/ -5304B
5-3	Rear Panel Connector Board, Monaural	914-1801
5-4	Mother Board Back Plane	914-1804
5-5	Tape Head Amplifier Printed Circuit Board Assembly, Monaural	914-1830
5-6	Control Printed Circuit Board Assembly, (no Cue Tones)	914-1831
5-7	Control Printed Circuit Board Assembly, (with Cue Tones)	914-1841
5-8	Rear Panel Connector Board, Stereophonic	914-1811
5-9	Tape Head Amplifier Printed Circuit Board Assembly, Stereophonic	914-1840

Table 5-2. Chassis Mounted Components
906-5301B/-5302B/-5303B/-5304B (sheet 1 of 3)

DESCRIPTION	PART NO.	QUANTITY
Connector, Female, 4 Pin, AMP	418-0240	4
Connector, Female, 2 Pin AMP	418-0701	1
Connector, Housing, 12 Pin AMP	418-1271	1
Connector, Female, 6 Pin AMP	418-0670	1
Contact Pins, AMP	417-0053	25
Connector, Housing, 2 Pin Molex	417-0220	2
Connector, Pins, Female, Molex	417-0221	4
Connector, Male, 24 Pin, Cinch	418-0306	3
Connector, Ribbon Cable, 16 Pin	417-1602	10
Connector, Socket, 14 Pin, No Latch	417-1420	2
Connector, Plug, 14 Pin	418-1410	2
Socket, IC, 16 Pin DIP, PC Mount	514-1802	1
Socket, Transistor, TO-3	417-0298	1
Insulator, TO-3	418-0010	1
Transistor, Power, 2N3055, TO-3, NPN, Silicon	211-3055	1
Motor, 60 Hz Synchronous, 450 r/s at 7 oz-in (0.05 N-m), 7.5 in/s (19.05 cm/s), 117 Vac $\pm 10\%$ at 24 W. Bearings: Precision Ball. Duty Cycle: Continuous. Model: 43H131	376-1310	1
Alternate 50 Hz Motor (500 r/s). Model: 43H137	382-1370	1
Capacitor, Motor Start, 1.5 μ F, 660 Vac, 60 Hz	029-1070	1
Alternate Capacitor, Motor Start, 2 μ F, 660 Vac, 50 Hz	029-2063	1
Transformer, Power Dual Primary: 105-123 Vac, 50/60 Hz Secondary: 28 V at 2.5 Amperes 22 V at 0.3 Amperes	376-7660	1
Head, 2 track, Monaural, Model LMP	252-0017	3
Head, Dummy	407-0001	3

Table 5-2. Chassis Mounted Components
906-5301B/-5302B/-5303B/-5304B - continued (sheet 2 of 3)

DESCRIPTION	PART NO.	QUANTITY
Terminal, Crimp, Tape Head Disconnect	417-0160	30
Pinch Roller Assembly	404-0001	3
Tape Guide	452-0032	6
Tape Guide	452-0032-1	6
Bearing, Ball: 0.25 inch bore X 0.625 inch OD X 0.1875 inch thick/with shields (0.635 cm X 1.588 cm X 0.476 cm)	442-2000	1
Solenoid, Air Damped, 24 Volt, 1.5 inch (3.81 cm) Diameter	289-2566	3
Stop Assembly, Solenoid	A-449-0020	3
Fuse Holder, 3AG	415-2012	1
Fuse, 1.5 Ampere, Slow-Blow, 3 AG	334-0150	1
Micro Switch, SPDT, 1/2 Ampere, 125 Vdc	346-6100	3
Switch, Toggle, SPST, 3 Ampere, 250 Vac	348-8280	1
Lamp Assembly, Green, 28 V	324-0151	3
Switch with Bezel, Illuminated, Normally Open, SPST, Push	343-0150	3
Switch Cap, Green	343-0152	3
Switch with Bezel, Illuminated, Normally Open, Momentary Contact, SPST, Push	343-0012	3
Switch Cap, Red	343-0013	3
Lamp, Subminiature, 28 V, 0.040 Ampere	321-0327	6
Rubber Foot	403-2194	4
Display Control Printed Circuit Board	514-1802	1
Rear Panel Connector Circuit Board, Monarual	914-1801	1
Mother Board Back Plane	914-1804	1
Tape Head Amplifier Circuit Board, Monarual	914-1830	3
Control Circuit Board (no Cue Tones)	194-1831	3

Table 5-2. Chassis Mounted Components
906-5301B/-5302B/-5303B/-5304B - continued (sheet 3 of 3)

DESCRIPTION	PART NO.	QUANTITY
<u>ALTERNATE PARTS FOR 906-5302B MACHINE ONLY</u>		
Control Circuit Board (with Cue Tones)	914-1841	3
<u>ALTERNATE PARTS FOR 906-5303B MACHINE ONLY</u>		
Terminal, Crimp, Tape Head Disconnect	417-0160	45
Head, 4 Track Stereo, Model LSP	253-0014	3
Rear Panel Connector Circuit Board, Stereophonic	914-1811	1
Tape Head Amplifier Circuit Board, Stereophonic	914-1840	3
<u>ALTERNATE PARTS FOR 906-5304B MACHINE ONLY</u>		
Terminal, Crimp, Tape Head Disconnect	417-0160	45
Head, 4 Track Stereo, Model LSP	253-0014	3
Rear Panel Connector Circuit Board, Stereophonic	914-1811	1
Tape Head Amplifier Circuit Board, Stereophonic	914-1840	3
Control Circuit Board (with Cue Tones)	914-1841	3

Table 5-3. Rear Panel Connector Board, Monaural 914-1801

REF. DES.	DESCRIPTION	PART NO.	QUANTITY
J1 thru J4	Socket, Integrated Circuit, 16 Pin DIP.	417-1601	4
J101, J201, J301	Connector, Female, 24 Pin, Cinch	418-0303	3
T1 thru T3	Transistor Audio Interstage Transformer, 6.3 mW, 30 Hz-20 kHz \pm 1 dB Primary: Dual 250 ohm Secondary: Dual 250 ohm	370-0030	3
----	Printed Circuit Board	514-1801	1

Table 5-4. Mother Board Back Plane 914-1804
(Sheet 1 of 2)

REF. DES.	DESCRIPTION	PART NO.	QUANTITY
C1	Capacitor, Electrolytic, 1.0 uF $\pm 10\%$, 35V, Tantalum	064-1063	1
C2	Capacitor, Electrolytic, 33 uF $\pm 10\%$, 35V, Tantalum	064-3373	1
C3 thru C5	Capacitor, Electrolytic, 1000 uF $\pm 50\%$, -10%, 50V	014-1094	3
C6	Capacitor, Electrolytic, 33 uF $\pm 10\%$, 35V, Tantalum	064-3373	1
CR1, CR2	Diode Bridge Rectifier, Full Wave, MDA970-3, 200V, 4 Amperes	239-0003	2
CR3, CR4	Diode, Zener, 1N4744A, 15V $\pm 5\%$, 1W	200-0015	2
J1 thru J6	Connector, Card Edge, Dual 22 Pin, Solder Type, AMP	417-2300	6
J7 thru J9	Connector, Printed Circuit Board Mount, 4 Pin, AMP	418-0255	3
J10	Connector, Header, 16 Pin DIP	417-1601	1
J11	Connector, Card Edge, Dual 22 Pin, Solder Type, AMP	417-2300	1
J12	Connector, Printed Circuit Board Mount, 2 Pin, AMP	417-0700	1
J13	Connector, Printed Circuit Board Mount, Male, 6 Pin, AMP	417-0677	1
J14	Connector, Printed Circuit Board Mount, 12 Pin, AMP	417-1276	1
J15 thru J18	Connector, Header, 16 Pin DIP	417-1601	4
Q1	Transistor, Silicon, NPN, 2N3053	211-3053	1
Q2	Transistor, Silicon, NPN, GES5816	211-5816	1
Q3	Transistor, Silicon, NPN, 2N3053	211-3053	1
Q4	Transistor, Silicon, NPN, GES5816	211-5816	1
Q5	Transistor, Silicon, NPN, 2N3053	211-3053	1

Table 5-4. Mother Board Back Plane 914-1804
(Sheet 2 of 2)

REF. DES.	DESCRIPTION	PART NO.	QUANTITY
Q6	Transistor, Silicon, NPN, GES5816	211-5816	1
Q7	Transistor, Silicon, NPN, 2N3053	211-3053	1
Q8	Transistor, Silicon, PNP, MPS U52	211-0052	1
R1 thru R3	Resistor, 10 k ohm $\pm 5\%$, 1/4 W	100-1053	3
R4 thru R6	Resistor, 2.2 k ohm $\pm 5\%$, 1/4 W	100-2243	3
R7 thru R9	Resistor, 4.7 k ohm $\pm 5\%$, 1/4 W	100-4743	3
R10 thru R12	Resistor, 1 k ohm $\pm 5\%$, 1/4 W	100-1043	3
R13 thru R15	Resistor, 1 ohm $\pm 5\%$, 1/2 W	110-1012	3
R16	Resistor, 470 ohm $\pm 5\%$, 1/4 W	100-4733	1
R17	Resistor, 1.2 k ohm $\pm 5\%$, 1/2 W	110-1243	1
R18	Resistor, 47 ohm $\pm 1\%$, 3.5 W	132-4721	1
R19	Resistor, Wirewound, 62 ohm $\pm 5\%$, 2 W	130-6223	1
R20	Resistor, 620 ohm $\pm 5\%$, 1/2 W	110-6233	1
R21	Potentiometer, 500 ohm $\pm 20\%$, 1/2 W	178-5030	1
R22	Resistor, 680 ohm $\pm 5\%$, 1/4 W	110-6833	1
----	Transistor Mounting Pad (For Q1, Q3, Q5, Q7)	409-0121	4
----	Heatsink, T0-5 (For Q7)	455-0207	1
----	Printed Circuit Board	C-514-1804	1

Table 5-5. Tape Head Amplifier Printed Circuit Board Assembly, Monaural 914-1830
(Sheet 1 of 3)

REF. DES.	DESCRIPTION	PART NO.	QUANTITY
C1	Capacitor, Ceramic, 0.0047 uF, 200V	032-4733	1
C2	Capacitor, Electrolytic, 22 uF $\pm 10\%$, 20V, Tantalum	063-2273	1
C3	Capacitor, Mica, 150 pF $\pm 5\%$, 500V	040-1522	1
C4	Capacitor, Mylar Film, 0.01 uF, 100V	030-1043	1
C5, C6	Capacitor, Electrolytic, 1.0 uF $\pm 10\%$, 35V, Tantalum	064-1063	2
C7	Capacitor, Mylar Film, 0.01 uF, 100V	030-1043	1
C8	Capacitor, Electrolytic, 33 uF $\pm 10\%$, 35V, Tantalum	064-3373	1
C9, C10	Capacitor, Electrolytic, 1.0 uF $\pm 10\%$, 35V, Tantalum	064-1063	2
C11, C12	Capacitor, Disc Ceramic, 10 pF $\pm 5\%$, 1 kV, NPO	001-1014	2
C13	Capacitor, Electrolytic, 4.7 uF $\pm 10\%$, 35V, Tantalum	064-4763	1
C27	Capacitor, Electrolytic, 1.0 uF $\pm 10\%$, 35V, Tantalum	064-1063	1
C28	Capacitor, Mica, 150 pF $\pm 5\%$, 500V	040-1522	1
C29, C30	Capacitor, Electrolytic, 4.7 uF $\pm 10\%$, 35V, Tantalum	064-4763	2
C31	Capacitor, 0.0047 uF, 200V	032-4733	1
C32, C33	Capacitor, Mylar Film, 0.01 uF, 100V	030-1043	2
C34	Capacitor, Mylar Film, 0.001 uF $\pm 10\%$, 100V	030-1033	1
C35	Capacitor, Mylar Film, 0.01 uF, 100V	030-1053	1
C36, C37	Capacitor, Electrolytic, 1.0 uF $\pm 10\%$, 35V, Tantalum	064-1063	2
CR1, CR2, CR5	Diode, Small Signal, Silicon, 1N4148, 100V, 10 mA	203-4148	3
Q1	Field Effect Transistor, Junction Type P-Channel, 2N5462	212-5462	1

Table 5-5. Tape Head Amplifier Printed Circuit Board Assembly, Monaural 914-1830
(Sheet 2 of 3)

REF. DES.	DESCRIPTION	PART NO.	QUANTITY
Q2, Q3	Transistor, PNP, Small Signal, Silicon, GES 5817	210-5817	2
Q4, Q5, Q11	Transistor, NPN, Small Signal, Silicon, GES 5816	211-5816	3
R1	Potentiometer, 10 k ohm $\pm 10\%$, 1/2 W, Single Turn	178-1054	1
R2	Potentiometer, 50 k ohm $\pm 10\%$, 1/2 W, Single Turn	178-5054	1
R3	Potentiometer, 1 Megohm $\pm 10\%$, 1/2 W. Single Turn	178-1074	1
R7	Resistor, 150 k ohm $\pm 5\%$, 1/4 W	100-1562	1
R8	Resistor, 330 ohm $\pm 5\%$, 1/4 W	100-3333	1
R9	Resistor, 270 k ohm $\pm 5\%$, 1/4 W	100-2763	1
R10	Resistor, 10 ohm $\pm 5\%$, 1/4 W	100-1023	1
R11	Resistor, 4.7 k ohm $\pm 5\%$, 1/4 W	100-4743	1
R12, R13	Resistor, 120 k ohm $\pm 5\%$, 1/4 W	100-1263	2
R14	Resistor, 1 Megohm $\pm 5\%$, 1/4 W	100-1073	1
R15	Resistor, 560 k ohm $\pm 5\%$, 1/4 W	100-5662	1
R16	Resistor, 4.7 k ohm $\pm 5\%$, 1/4 W	100-4743	1
R17	Resistor, 3.9 k ohm $\pm 5\%$, 1/4 W	100-3943	1
R18, R19	Resistor, 10 ohm $\pm 5\%$, 1/4 W	100-1023	2
R29	Resistor, 22 k ohm $\pm 5\%$, 1/4 W	100-2253	1
R34	Resistor, 270 k ohm $\pm 5\%$, 1/4 W	100-2763	1
R35	Resistor, 820 ohm $\pm 5\%$, 1/4 W	100-8232	1
R36	Resistor, 10 ohm $\pm 5\%$, 1/4 W	100-1023	1
R37, R38	Resistor, 2.2 k ohm $\pm 5\%$, 1/4 W	100-2243	2
R39	Resistor, 27 k ohm $\pm 5\%$, 1/4 W	100-2752	1
R40	Resistor, 56 k ohm $\pm 5\%$, 1/4 W	100-5653	1

Table 5-5. Tape Head Amplifier Printed Circuit Board Assembly, Monaural 914-1830
(Sheet 3 of 3)

REF. DES.	DESCRIPTION	PART NO.	QUANTITY
R41	Resistor, 4.7 k ohm $\pm 5\%$, 1/4 W	100-4743	1
R42	Resistor, 390 k ohm $\pm 5\%$, 1/4 W	100-3963	1
R43	Resistor, 33 k ohm $\pm 5\%$, 1/4 W	100-3353	1
R44	Resistor, 10 k ohm $\pm 5\%$, 1/4 W	100-1053	1
R45	Resistor, 330 k ohm $\pm 5\%$, 1/4 W	100-3362	1
R46	Resistor, 4.7 k ohm $\pm 5\%$, 1/4 W	100-4743	1
R47	Resistor, 3.9 k ohm $\pm 5\%$, 1/4 W	100-3943	1
R48	Resistor, 56 k ohm $\pm 5\%$, 1/4 W	100-5653	1
R49	Resistor, 120 k ohm $\pm 5\%$, 1/4 W	100-1263	1
R50	Potentiometer, 2 k ohm $\pm 10\%$, 1/2 W, Single Turn, In-Line Pins	178-2044	1
U1	Integrated Circuit, High Performance Operational Amplifier, uA748, 8 Pin DIP	221-7480	1
U3	Integrated Circuit, Dual Operational Amplifier, MC 4558 PI, 8 Pin DIP	221-4558	1
U4	Integrated Circuit, High Performance Operational Amplifier, uA748, 8 Pin DIP	221-7480	1
U6	Integrated Circuit, Dual Operational Amplifier, MC 4558 PI, 8 Pin DIP	221-4558	1
XU1, XU3, XU4, XU6	Socket, 8 Pin DIP	417-0800	4
----	Pin, Amplifier Disconnect, AMP	418-0161	6
----	Printed Circuit Board	C-524-1840	1

Table 5-6. Control Printed Circuit Board Assembly (No Cue Tones) 914-1831

REF. DES.	DESCRIPTION	PART. NO.	QUANTITY
C1	Capacitor, Electrolytic, 4.7 uF $\pm 10\%$, 35V, Tantalum	064-4763	1
C2	Capacitor, Mylar Film, 0.1 uF, 100V	030-1053	1
C3, C4	Capacitor, Disc Ceramic, 0.01 uF, 25V	000-1044	2
C5	Capacitor, Mylar Film, 0.1 uF, 100V	030-1053	1
C6	Capacitor, Electrolytic, 1.0 uF $\pm 10\%$, 35V, Tantalum	064-1063	1
C7	Capacitor, Mylar, 0.022 uF, 200V	031-2243	1
C8	Capacitor, Disc Ceramic, 0.005 uF, 50V	000-5034	1
CR1, CR2	Diode, Small Signal, Silicon, 1N4148, 100V, 10 mA	203-4148	2
CR3	Diode, Silicon, Zener, 1N4739, 9.1V $\pm 10\%$, 1W	200-0009	1
CR4	Diode, Small Signal, Silicon, 1N4148, 100V, 10 mA	203-4148	1
CR5	Diode, Silicon, Zener, 1N4739, 9.1V $\pm 10\%$, 1 W	200-0009	1
I1, I2 I3	Diode, Light Emitting, 5082-4487, 20 mA at 1.6V, Clear Lens	323-7344	3
Q1, Q2	Transistor, Silicon, NPN, GES 5816	211-5816	3
R1	Resistor, 1 Megohm $\pm 5\%$, 1/4 W	100-1073	1
R2 thru R5	Resistor, 10 k ohm $\pm 5\%$, 1/4 W	100-1053	4
R6	Resistor, 33 k ohm $\pm 5\%$, 1/4 W	100-3353	1
R7 thru R11	Resistor, 4.7 k ohm $\pm 5\%$, 1/4 W	100-4743	5
U1	Integrated Circuit, MM 74C00 N, Quad 2-Input NAND Gate, CMOS, 14 Pin DIP	221-7400	1
U2	Integrated Circuit, 74C08, Quad 2-Input AND Gate, CMOS, 14 Pin DIP	221-7408	1
XU1, XU2	Socket, Integrated Circuit, 14 Pin DIP	417-1400	2
----	Printed Circuit Board	C-514-1841	1

Table 5-7. Control Printed Circuit Board Assembly (With Cue Tones) 914-1841
(sheet 1 of 3)

REF. DES.	DESCRIPTION	PART NO.	QUANTITY
C1	Capacitor, Electrolytic, 4.7 uF $\pm 10\%$, 35V, Tantalum	064-4763	1
C2	Capacitor, Mylar Film, 0.1 uF, 100V	030-1053	1
C3, C4	Capacitor, Disc Ceramic, 0.01 uF, 25V	000-1044	2
C5	Capacitor, Mylar Film, 0.1 uF, 100V	030-1053	1
C6	Capacitor, Electrolytic, 1.0 uF $\pm 10\%$, 35V, Tantalum	064-1063	1
C7	Capacitor, Mylar, 0.022 uF, 100V	031-2234	1
C8	Capacitor, Disc Ceramic, 0.005 uF, 50V	000-5034	1
C9	Capacitor, Mica, 500 pF, 500V	041-5023	1
C10, C11	Capacitor, Silvered Mica, 1000 pF, 500V, Radial Leads	041-1032	2
C12	Capacitor, Electrolytic, 1.0 uF $\pm 10\%$, 35V Tantalum	064-1063	1
C13, C14	Capacitor, Disc Ceramic, 0.01 uF, 25V	000-1044	2
C15	Capacitor, Electrolytic, 1.0 uF $\pm 10\%$, 35V, Tantalum	064-1063	1
C16	Capacitor, Mylar Film, 0.1 uF, 100V	030-1053	1
C17	Capacitor, 0.01 uF, 100V	030-1043	1
C18, C19	Capacitor, Ceramic, 0.047 uF, 100V	030-4743A	2
C20	Capacitor, Mylar Film, 0.1 uF, 100V	030-1053	1
C21	Capacitor, Disc Ceramic, 0.01 uF, 25V	000-1044	1
C22	Capacitor, Electrolytic, 1.0 uF $\pm 10\%$, 35V, Tantalum	064-1063	1
CR1, CR2	Diode, Small Signal, Silicon, 1N4148, 100V, 10 mA	203-4148	2
CR3	Diode, Silicon, Zener, 1N4739, 9.1V $\pm 10\%$, 1 W	200-0009	1
CR4	Diode, Small Signal, Silicon, 1N4148, 100V, 10 mA	203-4148	1

Table 5-7. Control Printed Circuit Board Assembly (With Cue Tones) 914-1841
(Sheet 2 of 3)

REF. DES.	DESCRIPTION	PART NO.	QUANTITY
CR5	Diode, Silicon, Zener, 1N4739, 9.1V $\pm 10\%$, 1 W	200-0009	1
CR6	Diode, Small Signal, Silicon, 1N4148, 100 V, 10 mA	203-4148	1
CR7	Diode, Silicon, Zener, 1N4739, 91.V $\pm 10\%$, 1 W	200-0009	1
CR8 thru CR11	Diode, Small Signal, Silicon, 1N4148 100 V, 10 mA	203-4148	4
CR12	Diode, Silicon, Zener, 1N4739, 9.1V $\pm 10\%$, 10 mA	200-0009	1
CR13	Diode, Small Signal, Silicon, 1N4148, 100V, 10 mA	203-4148	1
I1, I2, I3	Diode, Light Emitting, 5082-4487, 20 mA at 1.6V, Clear Lens	323-7344	3
K1, K2	Relay, Printed Circuit Mount: Coil: 24V Contacts: SPDT, 24V at 2 Amperes	270-0024	2
Q1 thru Q4	Transistor, Silicon, NPN, GES 5816	211-5816	4
R1	Resistor, 1 Megohm $\pm 5\%$, 1/4 W	100-1073	1
R2 thru R5	Resistor, 10 k ohm $\pm 5\%$, 1/4 W	100-1053	4
R6	Resistor, 33 k ohm $\pm 5\%$, 1/4 W	100-3353	1
R7 thru R11	Resistor, 4.7 k ohm $\pm 5\%$, 1/4 W	100-4743	5
R12	Resistor, 5.1 k ohm $\pm 5\%$, 1/4 W	100-5143	1
R13, R14	Resistor, 39 k ohm $\pm 5\%$, 1/4 W	100-3953	2
R15	Resistor, 2.2 k ohm $\pm 5\%$, 1/4 W	100-2243	1
R16	Resistor, 510 k Ohm $\pm 5\%$, 1/4W	100-5163	1
R17	Resistor, 4.7 k ohm $\pm 5\%$, 1/4 W	100-4743	1
R18	Resistor, 2.2 k ohm $\pm 5\%$, 1/4 W	100-2243	1
R19, R20	Resistor, 56 k ohm $\pm 5\%$, 1/4 W	100-5653	2

Table 5-7. Control Printed Circuit Board Assembly (With Cue Tones) 914-1841
(Sheet 3 of 3)

REF. DES.	DESCRIPTION	PART NO.	QUANTITY
R21	Resistor, 510 k Ohm $\pm 5\%$, 1/4W	100-5163	1
R22, R23	Resistor, 3.3 k ohm $\pm 5\%$, 1/4 W	100-3343	2
R24, R25	Potentiometer, 1-Turn, In-Line Pins, 2 k ohm $\pm 10\%$, 1/2 W	178-2044	2
R26	Resistor, 8.2 k ohm $\pm 5\%$, 1/4 W	100-8242	1
U1	Integrated Circuit, MM 74C00 N, Quad 2-Input NAND Gate, CMOS, 14 Pin DIP	221-7400	1
U2	Integrated Circuit, 74C08, Quad 2-Input AND Gate, CMOS, 14 Pin DIP	221-7408	1
U3, U4	Integrated Circuit, MC 4558 PI, Dual Operational Amplifier, 8 Pin DIP	221-4558	2
XU1, XU2	Socket, Integrated Circuit, 14 Pin DIP	417-1400	2
XU3, XU4	Socket, Integrated Circuit, 8 Pin DIP	417-0800	2
----	Printed Circuit Board	C-417-1400	1

Table 5-8. Rear Panel Connector Board, Stereophonic 914-1811

REF. DES.	DESCRIPTION	PART NO.	QUANTITY
J1 thru J4	Socket, Integrated Circuit, 16 Pin DIP, Printed Circuit Mount	417-1601	4
J101, J201, J301	Connector, Female, 24 Pin, Cinch	418-0303	3
T1 thru T6	Transistor Audio Interstage Transformer, 6.3 mW, 30 Hz-20 kHz \pm 1 dB Primary: Dual 250 ohm Secondary: Dual 250 ohm	370-0030	6
----	Printed Circuit Board	514-1801	1

Table 5-9. Tape Head Amplifier Assembly Printed Circuit Board Assembly (914-1840)
(Sheet 1 of 4)

REF. DES.	DESCRIPTION	PART NO.	QUANTITY
C1	Capacitor, Ceramic, 0.0047 uF, 200V	032-4733	1
C2	Capacitor, Electrolytic, 22 uF $\pm 10\%$, 20V, Tantalum	063-2273	1
C3	Capacitor, Mica, 150 pF $\pm 5\%$, 500V	040-1522	1
C4	Capacitor, Mylar Film, 0.01 uF, 100V	030-1043	1
C5, C6	Capacitor, Electrolytic, 1.0 uF $\pm 10\%$, 35V, Tantalum	064-1063	2
C7	Capacitor, Mylar Film, 0.01 uF, 100V	030-1043	1
C8	Capacitor, Electrolytic, 33 uF $\pm 10\%$, 35V, Tantalum	064-3373	1
C9, C10	Capacitor, Electrolytic, 1.0 uF $\pm 10\%$, 35V, Tantalum	064-1063	2
C11, C12	Capacitor, Disc Ceramic, 10 pF $\pm 10\%$, 1 kV, NPO	001-1014	2
C13	Capacitor, Electrolytic, 4.7 uF $\pm 10\%$, 35V, Tantalum	064-4763	1
C14	Capacitor, Ceramic, 0.0047 uF, 200V	032-4733	1
C15	Capacitor, Electrolytic, 22 uF $\pm 10\%$, 20V, Tantalum	063-2273	1
C16	Capacitor, Mica, 150 pF $\pm 5\%$, 500V	040-1522	1
C17	Capacitor, Mylar Film, 0.01 uF, 100V	030-1043	1
C18, C19	Capacitor, Electrolytic, 1.0 uF $\pm 10\%$, 35V, Tantalum	064-1063	2
C20	Capacitor, Mylar Film, 0.01 uF, 100V	030-1043	1
C21	Capacitor, Electrolytic, 33 uF $\pm 10\%$, 35V, Tantalum	064-3373	1
C22, C23	Capacitor, Electrolytic, 1.0 uF $\pm 10\%$, 35V, Tantalum	064-1063	2
C24, C25	Capacitor, Disc Ceramic, 10 pF $\pm 10\%$, 1 kV, NPO	001-1014	2
C26	Capacitor, Electrolytic, 4.7 uF $\pm 10\%$, 35V, Tantalum	064-4763	1

Table 5-9. Tape Head Amplifier Assembly Printed Circuit Board Assembly (914-1840)
(Sheet 2 of 4)

REF. DES.	DESCRIPTION	PART NO.	QUANTITY
C27	Capacitor, Electrolytic, 1.0 uF $\pm 10\%$, 35V, Tantalum	064-1063	1
C28	Capacitor, Mica, 150 pF $\pm 5\%$, 500V	040-1552	1
C29, C30	Capacitor, Electrolytic, 4.7 uF $\pm 10\%$ 35V, Tantalum	064-4763	2
C31	Capacitor, Ceramic, 0.0047 uF, 200V	032-4733	1
C32, C33	Capacitor, Mylar Film, 0.01 uF, 100V	030-1043	2
C34	Capacitor, Mylar Film, 0.001 uF $\pm 10\%$, 100V	030-1033	1
C35	Capacitor, Mylar Film, 0.1 uF, 100V	030-1053	1
C36, C37	Capacitor, Electrolytic, 1.0 uF $\pm 10\%$, 35V, Tantalum	064-1063	2
CR1 thru CR5	Diode, Small Signal, Silicon, 1N4148, 100V, 10 mA	203-4148	5
Q1	Field Effect Transistor, Junction Type, P-Channel, 2N5462	212-5462	1
Q2, Q3	Transistor, PNP, Small Signal, Silicon, GES 5817	210-5817	2
Q4, Q5	Transistor, NPN, Small Signal, Silicon, GES 5816	211-5816	2
Q6, Q7	Transistor, PNP, Small Signal, Silicon, GES 5817	210-5817	2
Q8	Field Effect Transistor, Junction Type, P-Channel, 2N5462	212-5462	1
Q9 thru Q11	Transistor, NPN, Small Signal, Silicon, GES 5816	211-5816	3
R1	Potentiometer, 10 k ohm $\pm 10\%$, 1/2 W, Single Turn	178-1054	1
R2	Potentiometer, 50 k ohm $\pm 10\%$, 1/2 W, Single Turn	178-5054	1
R3	Potentiometer, 1 Megohm, $\pm 10\%$, 1/2 W, Single Turn	178-1074	1
R4	Potentiometer, 10 k ohm $\pm 10\%$, 1/2 W, Single Turn	178-1054	1

Table 5-9. Tape Head Amplifier Assembly Printed Circuit Board Assembly (914-1840)
(Sheet 3 of 4)

REF. DES.	DESCRIPTION	PART NO.	QUANTITY
R5	Potentiometer, 50 k ohm $\pm 10\%$, 1/2 W, Single Turn	178-5054	1
R6	Potentiometer, 1 Megohm, $\pm 10\%$, 1/2 W, Single Turn	178-1074	1
R7	Resistor, 150 k ohm $\pm 5\%$, 1/4 W	100-1562	1
R8	Resistor, 330 ohm $\pm 5\%$, 1/4 W	100-3333	1
R9	Resistor, 270 k ohm $\pm 5\%$, 1/4 W	100-2763	1
R10	Resistor, 10 ohm $\pm 5\%$, 1/4 W	100-1023	1
R11	Resistor, 4.7 k ohm $\pm 5\%$, 1/4 W	100-4743	1
R12, R13	Resistor, 120 k ohm $\pm 5\%$, 1/4 W	100-1263	2
R14	Resistor, 1 Megohm $\pm 5\%$, 1/4 W	100-1073	1
R15	Resistor, 560 k ohm $\pm 5\%$, 1/4 W	100-5662	1
R16	Resistor, 4.7 k ohm $\pm 5\%$, 1/4 W	100-4743	1
R17	Resistor, 3.9 k ohm $\pm 5\%$, 1/4 W	100-3943	1
R18, R19	Resistor, 10 ohm $\pm 5\%$, 1/4 W	100-1023	2
R20	Resistor, 150 k ohm $\pm 5\%$, 1/4 W	100-1562	1
R21	Resistor, 330 ohm $\pm 5\%$, 1/4 W	100-3333	1
R22	Resistor, 270 k ohm $\pm 5\%$, 1/4 W	100-2763	1
R23	Resistor, 10 ohm $\pm 5\%$, 1/4 W	100-1023	1
R24	Resistor, 4.7 k ohm $\pm 5\%$, 1/4 W	100-4743	1
R25, R26	Resistor, 120 k ohm $\pm 5\%$, 1/4 W	100-1263	2
R27, R28	Resistor, 10 ohm $\pm 5\%$, 1/4 W	100-1023	2
R29	Resistor, 22 k ohm $\pm 5\%$, 1/4 W	100-2253	1
R30	Resistor, 1 Megohm $\pm 5\%$, 1/4 W	100-1073	1
R31	Resistor, 560 k ohm $\pm 5\%$, 1/4 W	100-5662	1
R32	Resistor, 4.7 k ohm $\pm 5\%$, 1/4 W	100-4743	1
R33	Resistor, 3.9 k ohm $\pm 5\%$, 1/4 W	100-3943	1

Table 5-9. Tape Head Amplifier Assembly Printed Circuit Board Assembly (914-1840)
(Sheet 4 of 4)

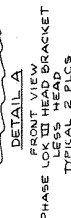
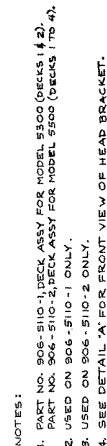
REF. DES.	DESCRIPTION	PART NO.	QUANTITY
R34	Resistor, 270 k ohm $\pm 5\%$, 1/4 W	100-2763	1
R35	Resistor, 820 ohm $\pm 5\%$, 1/4 W	100-8232	1
R36	Resistor, 10 ohm $\pm 5\%$, 1/4 W	100-1023	1
R37, R38	Resistor, 2.2 k ohm $\pm 5\%$, 1/4 W	100-2243	2
R39	Resistor, 27 k ohm $\pm 5\%$, 1/4 W	100-2752	1
R40	Resistor, 56 k ohm $\pm 5\%$, 1/4 W	100-5653	1
R41	Resistor, 4.7 k ohm $\pm 5\%$, 1/4 W	100-4743	1
R42	Resistor, 220 k Ohm $\pm 5\%$, 1/4W	100-2263	1
R43	Resistor, 82 k Ohm $\pm 5\%$, 1/4WW	100-8253	1
R44	Resistor, 10 k ohm $\pm 5\%$, 1/4 W	100-1053	1
R45	Resistor, 330 k ohm $\pm 5\%$, 1/4 W	100-3362	1
R46	Resistor, 4.7 k ohm $\pm 5\%$, 1/4 W	100-4743	1
R47	Resistor, 3.9 k ohm $\pm 5\%$, 1/4 W	100-3943	1
R48	Resistor, 56 k ohm $\pm 5\%$, 1/4 W	100-5653	1
R49	Resistor, 120 k ohm $\pm 5\%$, 1/4 W	100-1263	1
R50	Potentiometer, 2 k ohm $\pm 10\%$, 1/2 W, Single Turn, In-Line Pins	178-2044	1
U1, U2	Integrated Circuit, High Performance Operational Amplifier, uA748, 8 Pin DIP	221-7480	2
U3	Integrated Circuit, Dual Operational Amplifier, MC 4558 PI, 8 Pin DIP	221-4558	1
U4, U5	Integrated Circuit, High Performance Operational Amplifier, uA748, 8 Pin DIP	221-7480	2
U6	Integrated Circuit, Dual Operational Amplifier, MC 4558 PI, 8 Pin DIP	221-4558	1
XU1 thru XU6	Socket, 8 Pin DIP	417-0800	6
----	Pin, Amplifier Disconnect, AMP	418-0161	9
----	Printed Circuit Board	C-524-1840	1

SECTION 6

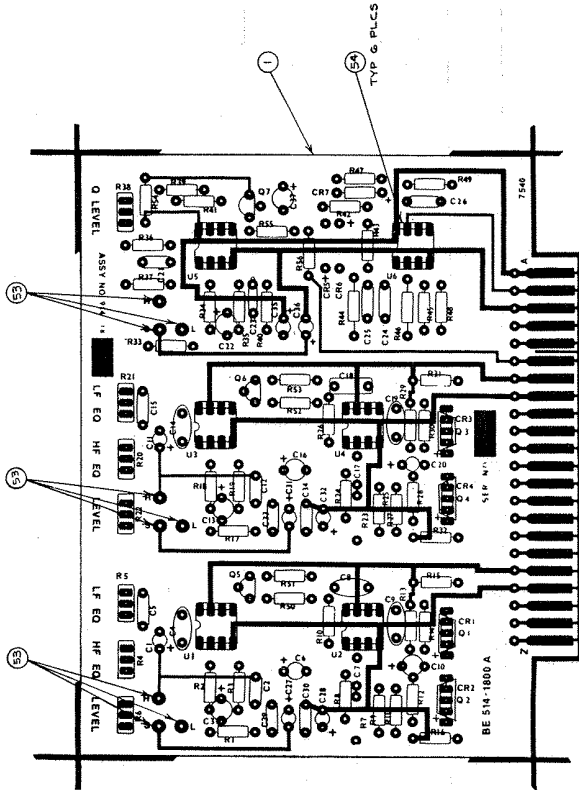
DRAWINGS

6.1 This section provides assembly drawings, schematic diagrams, and parts lists as indexed below.

<u>NUMBER</u>	<u>TITLE</u>
D906-3122	Deck Assembly, 5000, 4000, and 5000 Series
D906-5110	Slide Out Deck Assembly
D914-1810	Tape Head Amp (Stereo)
D914-1813	Control Board W/Q1 and Q11
A906-5109	Tape Head Connections
B906-5103	Schematic, Panel Control Assembly
C914-1802	Front Panel Control Board Assembly
A906-5104	Schematic, Motor Assembly
D906-5106	Schematic, Back Plane Motherboard
C914-1804	Motherboard Back Plane
C914-1811	Rear Panel Connector Board (Stereo) Assembly
A906-0006	Multi-Deck Mixer Network

[illegible]

REV	REVISIONS	DATE	APPROVED
A	ECN 629	1/6/77	
B	ECN 650	12/8/75	
C	ECN 1096	11/18/76	



ITEM	QTY	ROD	PART NUMBER	DESCRIPTION	NOTE
44	2		178-5054	RESISTOR, 50K POT, 1/2W	(R5, R22)
43	2		178-5064	500K POT, 1/2W	(R5, R21)
42	2		178-1054	10K POT, 1/2W	(R4, R24, R39)
41	3		100-6081	606Ω, 1/4W 1%	(R44)
40	1		100-3161	316K, 1%	(R46)
39	1		100-2253	22KΩ, 5%	(R54)
38	1		100-4763	470KΩ	(R50, R52)
37	2		100-2243	22KΩ	(R55)
36	1		100-6243	62K	(R40)
35	1		100-4753	47K	(R56)
34	1		100-6853	68KΩ	(R43)
33	1		100-3363	330KΩ	(R45)
32	1		100-4743	47KΩ	(R42, R40)
31	2		100-1073	10KΩ	(R43, R55)
30	2		100-2263	220KΩ	(R11, R27)
29	3		100-1043	10K	(R35)
28	2		100-5623	56Ω	(R28, R38, R32)
27	1		100-2343	23K	(R12, R18, R16)
26	6		100-1543	1.5K	(R14, R20)
25	4		100-1014	10Ω	(R10, R26)
24	2		100-1023	10K	(R45, R9, R13)
23	6		100-1033	100Ω	(R34)
22	1		100-1023	10K	(R17, R23)
21	3		100-1023	100K	(R25, R27, R4)
20	5		100-1063	100K	(R3, R19)
19	2		100-2233	RESISTOR, 220Ω, 1/4W, 5%	(R2, R18)
18					
17			031-2243	CAPACITOR, 0.22μF, 250V, 10%	(C23)
16	1		030-1053	10μF, 100V	(C26, C21)
15	2		001-1014	10μF	(C4, C14)
14	2		001-5024	500μF	(C8, C18)
13	2		002-2015	20μF	(C9, C19)
12	2		037-1042	.018μF, 50V, 5%	(C5, C13, C28, C36)
11	4				
10	10		064-1063	1μF, 35V	(C16, C11, C16)
9	4		064-4763	47μF, 35V	(C20, C22, C27)
8	2		064-3373	CAPACITOR, 33μF, 85V	(C3, C13)
7	5		208-4148	DIODE, SILICON 1N4148	(41THRU 44, CRT)
6	2		211-0052	TRANSISTOR, NPN MPS U2	(R2, R4)
5	2		221-0002	TRANSISTOR, NPN MPS U02	(R1, R2)
4	2		221-4558	I.C. LINEAR 4558	(U5, U2)
3	2		221-7091	I.C. LINEAR 7091	(U2, U4)
2	2		221-7450	I.C. LINEAR 7450	(U1, U3)
1	1		514-1800	P.C. BOARD	

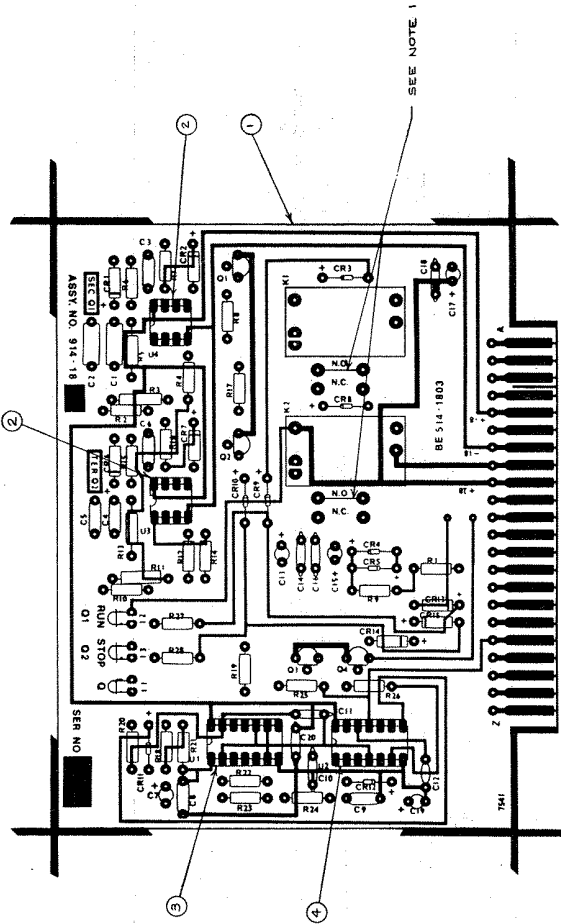
SCHEMATIC

54	6	417-0800	SOCKET, 8-PIN, DIP
53	9	418-0161	PINS, TAPE HEAD, AMP
52			
51	2	041-2722	CAPACITOR, 270μF
50	4	000-1044	CAPACITOR, 0.1μF, 25V
49			
48	1	211-5816	TRANSISTOR, NPN 585816
47	2	212-5462	TRANSISTOR, FET 2125462
46			
45			

BROADCAST ELECTRONICS INC.	
DATE: 1/6/77	BY: [Signature]
PROJECT: 514-1800	DESIGN: 514-1800
REVISION: 1096	DATE: 11/18/76
TAPES: 514-1810	
5000 SERIES	
SHEET 1 OF 1	

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BROADCAST ELECTRONICS INC.
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REV	DESCRIPTION	DATE	APPROVED
A	ECN 423	11/7/71	11/7/71
B	ECN 483	11/7/71	11/7/71
C	ECN 1000	11/7/71	11/7/71
D	ECN 109L	11/7/71	11/7/71



NOTES:
1. JUMPER N.O. FOR NORMALLY OPEN CONTACTS.
JUMPER N.C. FOR NORMALLY CLOSED CONTACTS.

ITEM	QTY	REQ	PART NUMBER	DESCRIPTION	NOTE
1	1		514-1803	RELAY, 24V SPDT P.C. MOUNT (K1X2)	
2	2		270-0024	DIODE, INDICATING, L.E.D. (112,13)	
3	3		323-7344	CR4, CR5, CR6, CR8, CR9, CR10, CR11, CR12, CR13	
4	4		201-0457V	DIODE, SILICON, SIGNAL INHIBIT (CR1, CR3, CR7, CR13, CR14)	
5	5		200-0009	DIODE, SILICON, ZENER 1N4739 (CR2, CR6, CR10, CR12, CR13)	
6	6		211-5816	TRANSISTOR, NPN, 65516 (Q1 THRU Q4)	
7	7		221-7406	I.C. DIGITAL 74000 (U2)	
8	8		221-7400	I.C. DIGITAL 74000 (U1)	
9	9		221-4558	I.C. LINEAR 4558 (U3, U4)	
10	10		514-1803	P.C. BOARD	
11	11		514-1803	P.C. BOARD	
12	12		514-1803	P.C. BOARD	
13	13		514-1803	P.C. BOARD	
14	14		514-1803	P.C. BOARD	
15	15		514-1803	P.C. BOARD	
16	16		514-1803	P.C. BOARD	
17	17		514-1803	P.C. BOARD	
18	18		514-1803	P.C. BOARD	
19	19		514-1803	P.C. BOARD	
20	20		514-1803	P.C. BOARD	
21	21		514-1803	P.C. BOARD	
22	22		514-1803	P.C. BOARD	
23	23		514-1803	P.C. BOARD	
24	24		514-1803	P.C. BOARD	
25	25		514-1803	P.C. BOARD	
26	26		514-1803	P.C. BOARD	
27	27		514-1803	P.C. BOARD	
28	28		514-1803	P.C. BOARD	
29	29		514-1803	P.C. BOARD	
30	30		514-1803	P.C. BOARD	
31	31		514-1803	P.C. BOARD	
32	32		514-1803	P.C. BOARD	
33	33		514-1803	P.C. BOARD	
34	34		514-1803	P.C. BOARD	
35	35		514-1803	P.C. BOARD	
36	36		514-1803	P.C. BOARD	
37	37		514-1803	P.C. BOARD	
38	38		514-1803	P.C. BOARD	
39	39		514-1803	P.C. BOARD	
40	40		514-1803	P.C. BOARD	
41	41		514-1803	P.C. BOARD	
42	42		514-1803	P.C. BOARD	
43	43		514-1803	P.C. BOARD	
44	44		514-1803	P.C. BOARD	
45	45		514-1803	P.C. BOARD	
46	46		514-1803	P.C. BOARD	
47	47		514-1803	P.C. BOARD	
48	48		514-1803	P.C. BOARD	
49	49		514-1803	P.C. BOARD	
50	50		514-1803	P.C. BOARD	
51	51		514-1803	P.C. BOARD	
52	52		514-1803	P.C. BOARD	
53	53		514-1803	P.C. BOARD	
54	54		514-1803	P.C. BOARD	
55	55		514-1803	P.C. BOARD	
56	56		514-1803	P.C. BOARD	
57	57		514-1803	P.C. BOARD	
58	58		514-1803	P.C. BOARD	
59	59		514-1803	P.C. BOARD	
60	60		514-1803	P.C. BOARD	
61	61		514-1803	P.C. BOARD	
62	62		514-1803	P.C. BOARD	
63	63		514-1803	P.C. BOARD	
64	64		514-1803	P.C. BOARD	
65	65		514-1803	P.C. BOARD	
66	66		514-1803	P.C. BOARD	
67	67		514-1803	P.C. BOARD	
68	68		514-1803	P.C. BOARD	
69	69		514-1803	P.C. BOARD	
70	70		514-1803	P.C. BOARD	
71	71		514-1803	P.C. BOARD	
72	72		514-1803	P.C. BOARD	
73	73		514-1803	P.C. BOARD	
74	74		514-1803	P.C. BOARD	
75	75		514-1803	P.C. BOARD	
76	76		514-1803	P.C. BOARD	
77	77		514-1803	P.C. BOARD	
78	78		514-1803	P.C. BOARD	
79	79		514-1803	P.C. BOARD	
80	80		514-1803	P.C. BOARD	
81	81		514-1803	P.C. BOARD	
82	82		514-1803	P.C. BOARD	
83	83		514-1803	P.C. BOARD	
84	84		514-1803	P.C. BOARD	
85	85		514-1803	P.C. BOARD	
86	86		514-1803	P.C. BOARD	
87	87		514-1803	P.C. BOARD	
88	88		514-1803	P.C. BOARD	
89	89		514-1803	P.C. BOARD	
90	90		514-1803	P.C. BOARD	
91	91		514-1803	P.C. BOARD	
92	92		514-1803	P.C. BOARD	
93	93		514-1803	P.C. BOARD	
94	94		514-1803	P.C. BOARD	
95	95		514-1803	P.C. BOARD	
96	96		514-1803	P.C. BOARD	
97	97		514-1803	P.C. BOARD	
98	98		514-1803	P.C. BOARD	
99	99		514-1803	P.C. BOARD	
100	100		514-1803	P.C. BOARD	

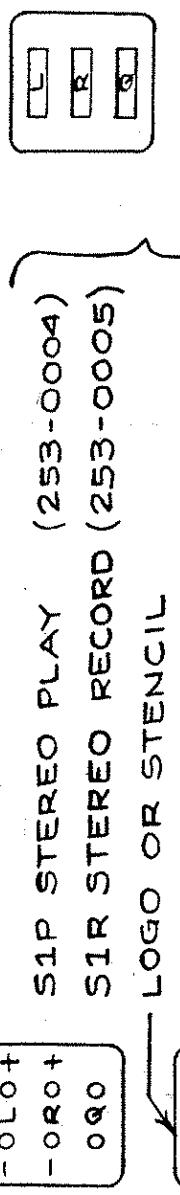
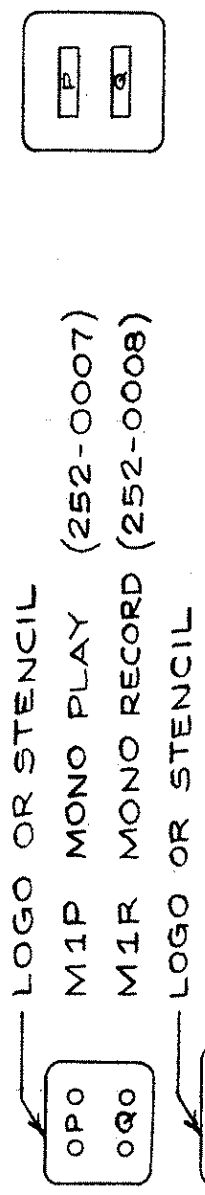
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BROADCAST ELECTRONICS INC.
ALL RIGHTS RESERVED

REVISIONS		
REV	DESCRIPTION	DATE
A	REDRAWN PER ECN #824	6/14/76

APPROVED *[Signature]*

REAR VIEW

FRONT VIEW



ALTERNATE CONFIGURATION
S1P & S1R

WIRE COLOR CODE

- L + ORG
- L - RED
- R + BLU
- R - YEL
- Q + WHT
- Q - BLK

NOTE:
1. MONO HEADS, USE RIGHT
CHAN COLOR CODE FOR
PGM CHAN.
P = PROGRAM (MONO) TRACK
Q = CUE TRACK
L = LEFT PGM TRACK (STEREO)
R = RIGHT PGM TRACK (STEREO)

ITEM	QTY RQD	PART NUMBER	DESCRIPTION	NOTE
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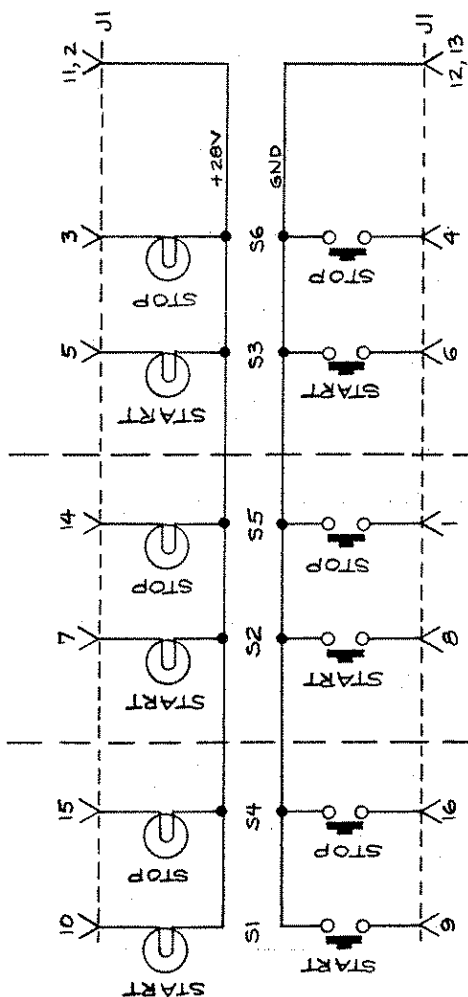
LIST OF MATERIAL

TOLERANCE UNLESS OTHERWISE SPECIFIED DECIMAL 2 PL ± 0.1 3 PL ± 0.005 FRACTIONAL ± 1/64 ANGULAR ± 1° SHARP EDGES TO BEND RADIUS	DRAWN BY	Wm.	DATE	6/14/76	BROADCAST ELECTRONICS INC. - A FILMWAYS COMPANY -
	CHECKED BY	M/SB	DATE	6/17/76	
	PROJECT ENGR		DATE		
	APPROVED BY				
	TITLE				
TAPE HEAD CONNECTIONS					

DWG NO. 906-5109		REV A
TREATMENT OR FINISH		SCALE —
SHEET 1 OF 1		

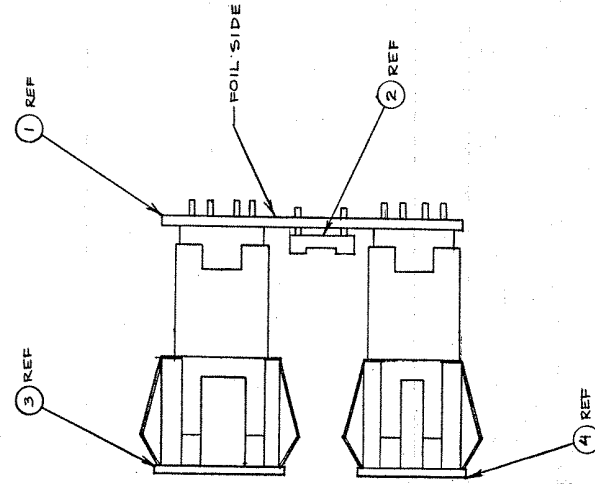
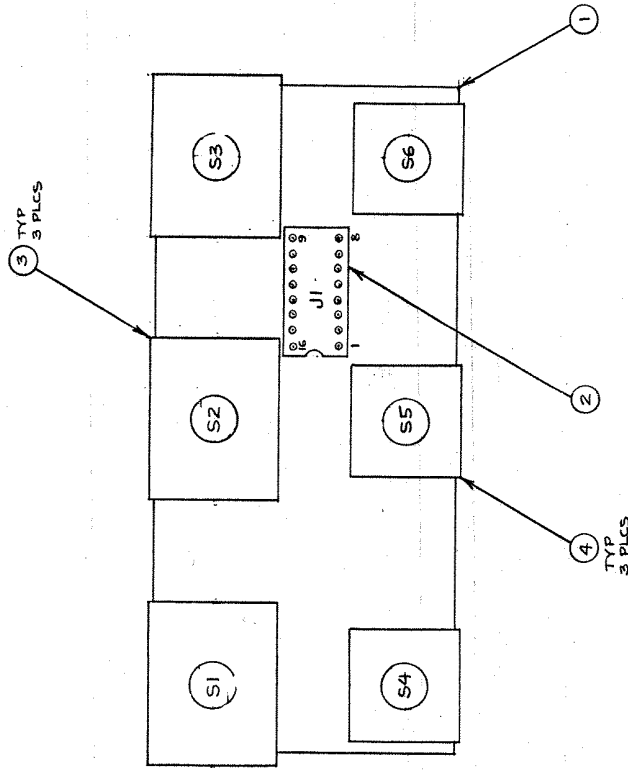
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REVISIONS		
REV	DESCRIPTION	DATE APPROVED



PCB ASSY # C-914-1802

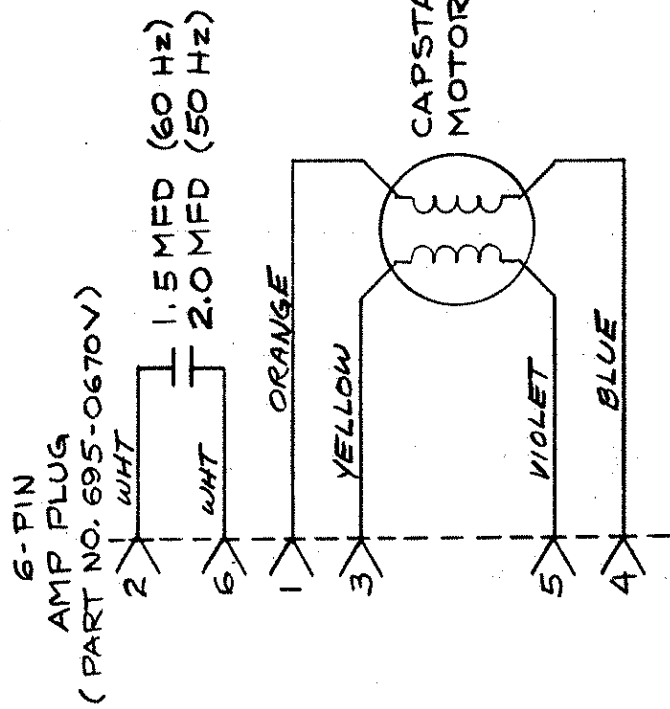
ITEM	QTY	ROD	PART NUMBER	DESCRIPTION	NOTE
LIST OF MATERIAL					
TOLERANCE UNLESS OTHERWISE SPECIFIED		BROADCAST ELECTRONICS INC.			
DECIMAL 2 PL. 01 3 PL. 005		- A FILMWAYS COMPANY -			
FRACTIONAL 2 1/64		TITLE SCHEMATIC			
ANGULAR 2 1/64		FRONT PANEL CONTROL ASSY			
SHARP EDGES		DWG NO. 906-5103			
BEND RADIUS		REV			
FILLET RADIUS		B			
MATERIAL		TREATMENT OR FINISH			
FOR THE EXCLUSIVE USE OF BROADCAST ELECTRONICS, INC. PERSONNEL AND CUSTOMERS ALL RIGHTS RESERVED		5000 SERIES			
		SCALE			
		SHEET 1 OF 1			



ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	B-906-5103	SCHEMATIC
2	1		
3	1		
4	1		
5	1		
6	1		
7	1		
8	1		
9	1		
10	1		
11	1		
12	1		
13	1		
14	1		
15	1		
16	1		
17	1		
18	1		
19	1		
20	1		
21	1		
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31	1		
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99	1		
100	1		

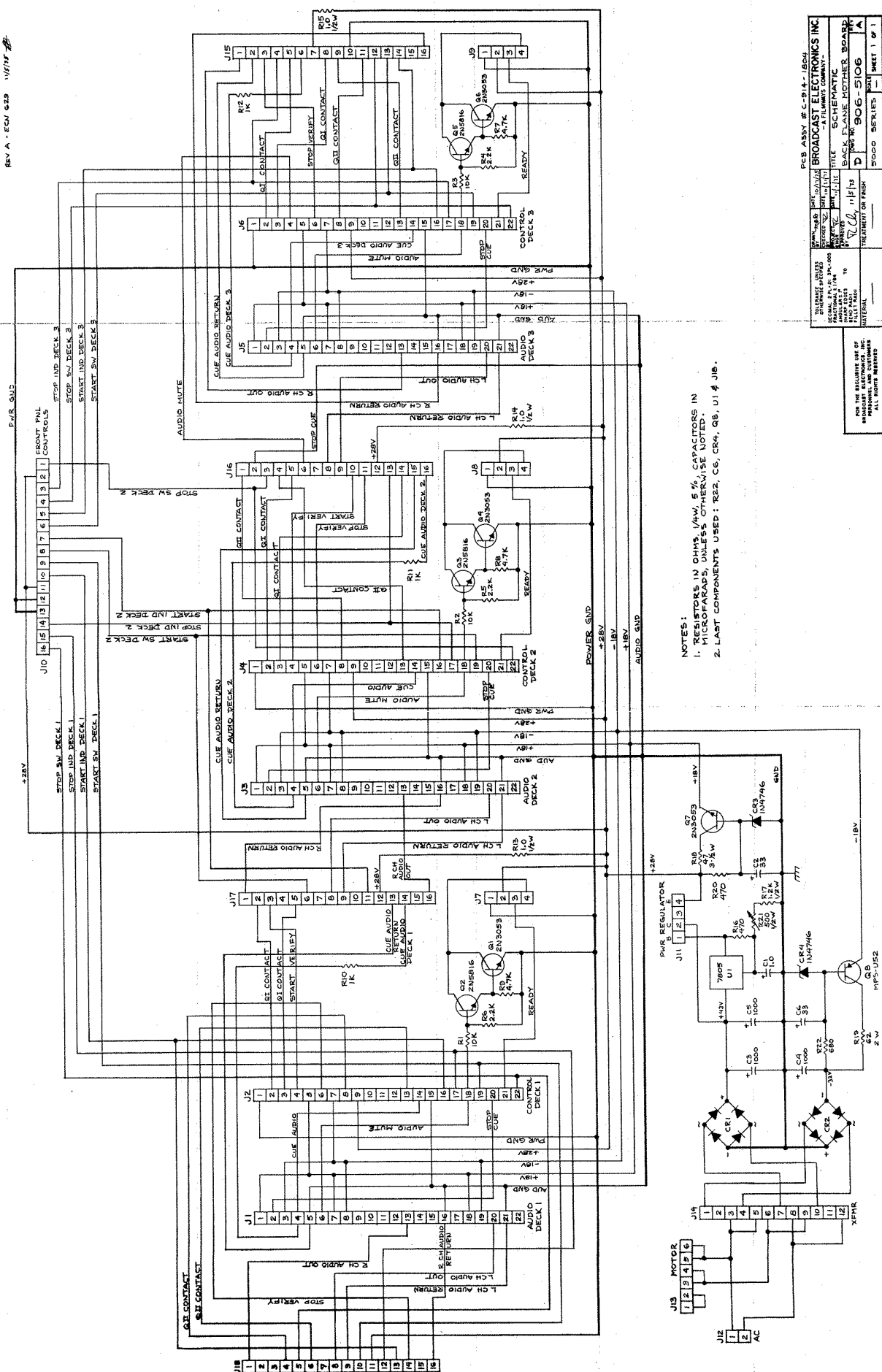
BROADCAST ELECTRONICS, INC.
- A RILWAYS COMPANY -
FRONT PANEL CONTROL BD
P C BD ASSEMBLY
C-914-1802

REVISES		
REV	DESCRIPTION	DATE



ITEM	QTY RQD	PART NUMBER	DESCRIPTION	NOTE
LIST OF MATERIAL				
TOLERANCE UNLESS OTHERWISE SPECIFIED		BROADCAST ELECTRONICS INC.		
DECIMAL 2 PL ± .01 3 PL ± .005		- A FILMWAYS COMPANY -		
FRACTIONAL ± 1/64		TITLE		
ANGULAR ± 1°		SCHEMATIC		
SHARP EDGES TO		MOTOR ASSEMBLY		
BEND RADIUS		DWG NO. A		
FILLET RADIUS		REV 906-5104		
MATERIAL		5000 SERIES		
TREATMENT OR FINISH		SCALE FULL SHEET 1 OF 1		

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ALL RIGHTS RESERVED



NOTES:

1. RESISTORS IN OHMS, 1/4W, 5%, CAPACITORS IN MICROFARADS, UNLESS OTHERWISE NOTED.
2. LAST COMPONENTS USED: R22, C6, CR4, Q8 U1 & J18.

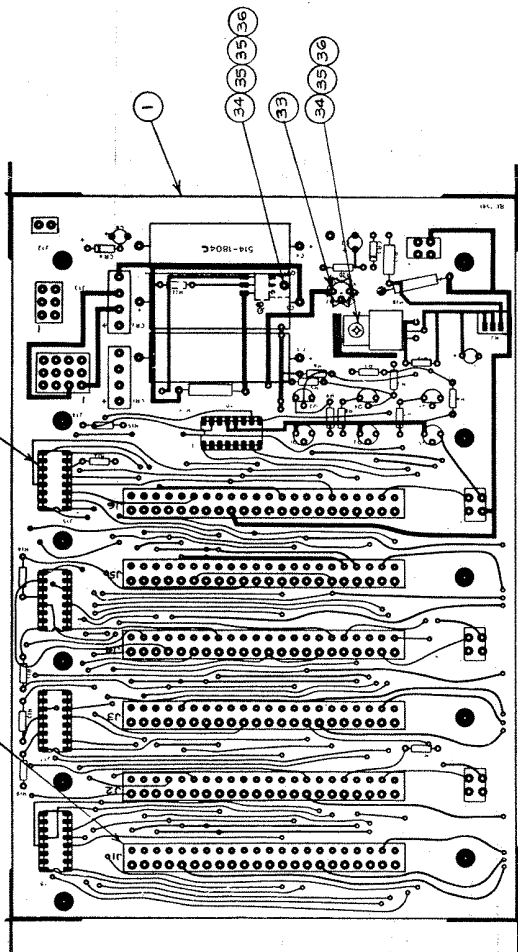
PCB ASBY C-914-1854	
BROADCAST ELECTRONICS INC. A FILMUNIT COMPANY	
DRAWING NO. 100-000000 REVISIONS 100-000000 SCALE 1/4" = 1"	SHEET NO. 100-000000 SHEET TOTAL 100-000000 DATE 10/1/72
PROJECT NO. 100-000000 PROJECT NAME TO PROJECT NO. 100-000000 PROJECT NAME TO PROJECT NO. 100-000000 PROJECT NAME TO	
TITLE SCHEMATIC BACK PLANE MOTHER BOARD D NO 906-5106 2000 SERIES SHEET 1 OF 1	
TREATMENT OR FINISH INTERNAL	

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REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
C	ECN 955	02/23/77	WMA
D	ECN 1096	11/16/78	CLO

3 TYP 5 PLCS

2 TYP 6 PLCS



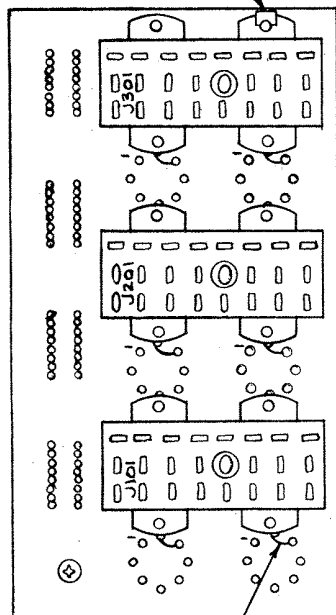
37	8	409-0121	TRANSISTOR MTG PAD Q1357
36	2	HEX NUTS 4-40	
35	3	INTERNAL TOOTH LOCKWASHER #4	
34	2	PHMS 4-40 X 1/4	

ITEM	QTY	ROD	PART NUMBER	DESCRIPTION	NOTE
33	1		455-0207	HEATSINK, TOS TYPE	
32	1		130-6223	RESISTOR, 62Ω, 2W 5%	(R19)
31	1		110-1243	RESISTOR, 1.2KΩ, 1/2W	(R17)
30	1		178-5030	POT, 500Ω, 1/2W	(R21)
29	2		100-4733	470Ω, 1/4W	(R16, R20)
28	1		100-6833	680Ω	(R22)
27	3		100-1043	1KΩ	(R10, R11, R12)
26	3		100-4743	4.7KΩ	(R7, R8, R9)
25	3		100-2243	2.2KΩ	(R4, R5, R6)
24	3		100-1053	10KΩ, 1/4W	(R1, R2, R3)
23	3		110-1012	1Ω, 1/2W, 5%	(R3, R4, R5)
22	1		132-4721	RESISTOR, 47Ω, 3/2W	(R18)
21				CAPACITOR, TANT 14F @ 35V	(C1)
19	2		064-3373	ELEC, 33μF @ 35V	(C2, C6)
18	3		014-1094	CAPACITOR ELEC, 1000μF @ 50V	(C3, C4, C5)
17					
16	1		227-7805	I.C. REGULATOR, 7805	(U1)
15					
14	1		211-0052	TRANSISTOR, MPS 152	(Q8)
13	3		211-5816	TRANSISTOR, 6ES5816	(Q2, Q4, Q6)
12	4		211-3053	TRANSISTOR, 2N3053	(Q1, Q3, Q5, Q7)
11					
10	2		200-4746	DIODE, ZENER, IN4746 18V	(CR3, CR4)
9	2		239-0003	DIODE, BRIDGE, MDA970-3	(CR1, CR2)
8					
7	4		418-0255	CONNECTOR, 4 POS AMP SOCKET	(J7, J8, J9, J11)
6	1		695-1276V	12 POS AMP SOCKET	(J4)
5	1		695-0700V	2 POS AMP SOCKET	(J2)
4	1		695-0677V	6 POS AMP SOCKET	(J3)
3	5		417-1601	16 POS	(J10, J15, J16, J17, J18)
2	6		417-2300	CONNECTOR, 22 POS	(J1, J2, J3, J4, J5, J6)
1	1		514-1804A	P.C. BOARD	

LIST OF MATERIAL			
ITEM	QTY	ROD	PART NUMBER
37	8		409-0121
36	2		HEX NUTS 4-40
35	3		INTERNAL TOOTH LOCKWASHER #4
34	2		PHMS 4-40 X 1/4

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BROADCAST ELECTRONICS INC.			
- A FILMWAYS COMPANY -			
DATE	DATE	DATE	DATE
10/29/78	10/31/77	11/1/75	11/1/75
DESIGNED BY	CHECKED BY	APPROVED BY	TITLE
WMA	WMA	WMA	MOTHER BOARD BACK PLANE
REV	REV	REV	REV
C	C	C	C
5000 SERIES	2/1	5000 SERIES	2/1
SHEET 1	OF 1	SHEET 1	OF 1

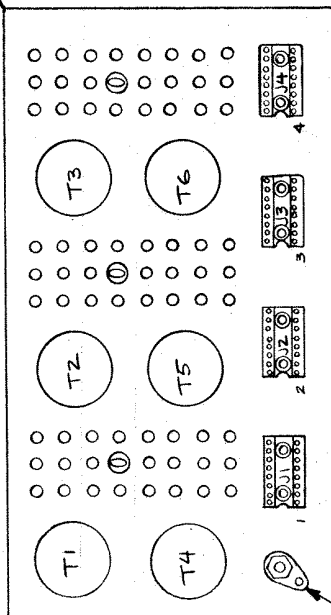


JUMPER
TYPICAL
6 PLCS

(5)
TYPICAL
12 PLCS

- NOTES:
1. REMOVE JUMPER FROM ITEM 2, TERMINALS 2 TO 3.
 2. WHEN INSTALLING ITEM 2, MAKE SURE XFMR TERMINALS 6 & 7 MATE WITH HOLES THAT ARE JUMPED ON P C BD.

(1)



(6)
(7)
(8)

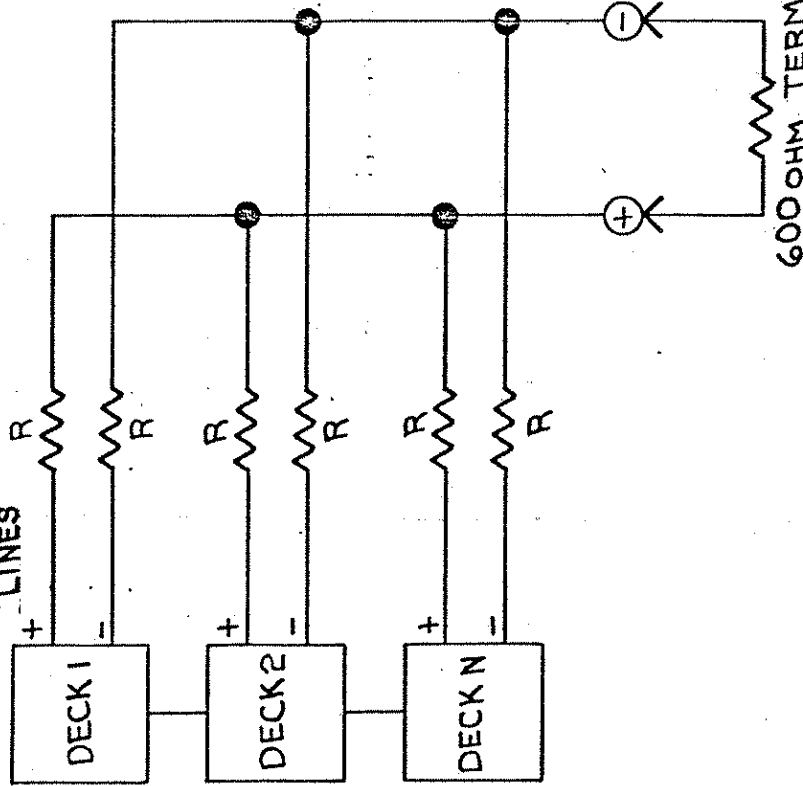
ITEM QTY		PART NUMBER	DESCRIPTION
X	X	B-906-5103	SCHEMATIC
8	1	HEX NUT, #6-32	
7	1	PHMS, #6-32 X 1/4	
6	1	LUG, SOLDER, #6	
5	12	430-5000	FASTENER, SPRING CLIP, TINNERMAN
4	3	418-0503	CONNECTOR, 24-PIN CINCH, FEMALE (181)
3	4	417-1601	SOCKET, DIP, 16-PIN (J1, J2, J3, J4)
2	6	370-0030	BALANCING TRANSFORMER, 0-30 (1, 2, 3)
1	1	514-1801	P C BOARD
X	X	514-1811	REAR PNL CONN P C BD ASSY (STEREO)
LIST OF MATERIAL		BROADCAST ELECTRONICS INC	
TOLERANCE UNLESS OTHERWISE SPECIFIED	DATE 1/25/75	CHECKED	DATE 1/11/75
DECIMAL 2 PL. 0.3PL. 0.003	DATE 1/11/75	APPROVED	DATE 1/11/75
FRACTIONAL 1/4"	DATE 1/11/75	APPROVED	DATE 1/11/75
SHARP EDGES	DATE 1/11/75	APPROVED	DATE 1/11/75
BEND RADIUS	DATE 1/11/75	APPROVED	DATE 1/11/75
MATERIAL	DATE 1/11/75	APPROVED	DATE 1/11/75
TREATMENT OR FINISH	DATE 1/11/75	APPROVED	DATE 1/11/75
SCALE	DATE 1/11/75	APPROVED	DATE 1/11/75
5000 SERIES	DATE 1/11/75	APPROVED	DATE 1/11/75
PULL	DATE 1/11/75	APPROVED	DATE 1/11/75
SHEET 1	DATE 1/11/75	APPROVED	DATE 1/11/75
OF 1	DATE 1/11/75	APPROVED	DATE 1/11/75

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REVISIONS

REV DESCRIPTION DATE APPROVED

OUTPUT LINES



NUMBER OF DECKS	R(OHMS)	ATTENUATOR LOSS (dB)
2	180	8
3	220	11
4	220	13
5	240	15
6	240	16
7	270	17
8	270	18
9	270	19
10	270	20

NOTE:

1. THIS CIRCUIT MAY BE USED TO CONVERT MULTIDECK CARTRIDGE MACHINES TO A SINGLE MIXED OUTPUT. SELECT PROPER RESISTOR VALUES FOR NUMBER OF OUTPUTS TO BE MIXED.

600 OHM TERMINATION

ITEM	QTY RQD	PART NUMBER	DESCRIPTION	NOTE
LIST OF MATERIAL				
TOLERANCE UNLESS OTHERWISE SPECIFIED		BROADCAST ELECTRONICS INC.		
DECIMAL 2 PL ± 01 3 PL ± 005		- A FILMWAYS COMPANY -		
FRACTIONAL ± 1/64		TITLE MULTI-DECK MIXER NETWORK		
ANGULAR ± 1°		DWG NO. 906-0006		
SHARP EDGES TO BEND RADIUS		REV		
FILLET RADIUS		A		
MATERIAL		SCALE		
TREATMENT OR FINISH		SHEET 1 OF 1		

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PRODUCT WARRANTY

LIMITED ONE YEAR

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

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

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

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

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

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

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