

INSTRUCTION MANUAL

2100 Series Cartridge Machines

15 September 1980

IM No. 839-2100



BROADCAST ELECTRONICS INC. *Spotmaster*[®] TAPE CARTRIDGE SYSTEMS

a FILMWAY company

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INSTRUCTION MANUAL

2100 SERIES

CARTRIDGE MACHINES

P, PS, RP, RPS

2100P	907-2110 - Mono, Playback only, 115V, 60Hz
2100RP	907-2111 - Mono, Record/Playback, 115V, 60Hz
2100PS	907-2112 - Stereo, Playback Only, 115V, 60Hz
2100RPS	907-2113 - Stereo, Record/Playback, 115V, 60 Hz

2100P	907-2120 - Mono, Playback Only, 220V, 50Hz
2100RP	907-2121 - Mono, Record/Playback, 220V, 50Hz
2100PS	907-2122 - Stereo, Playback Only, 220V, 50Hz
2100RPS	907-2123 - Stereo, Record/Playback, 220V, 50Hz

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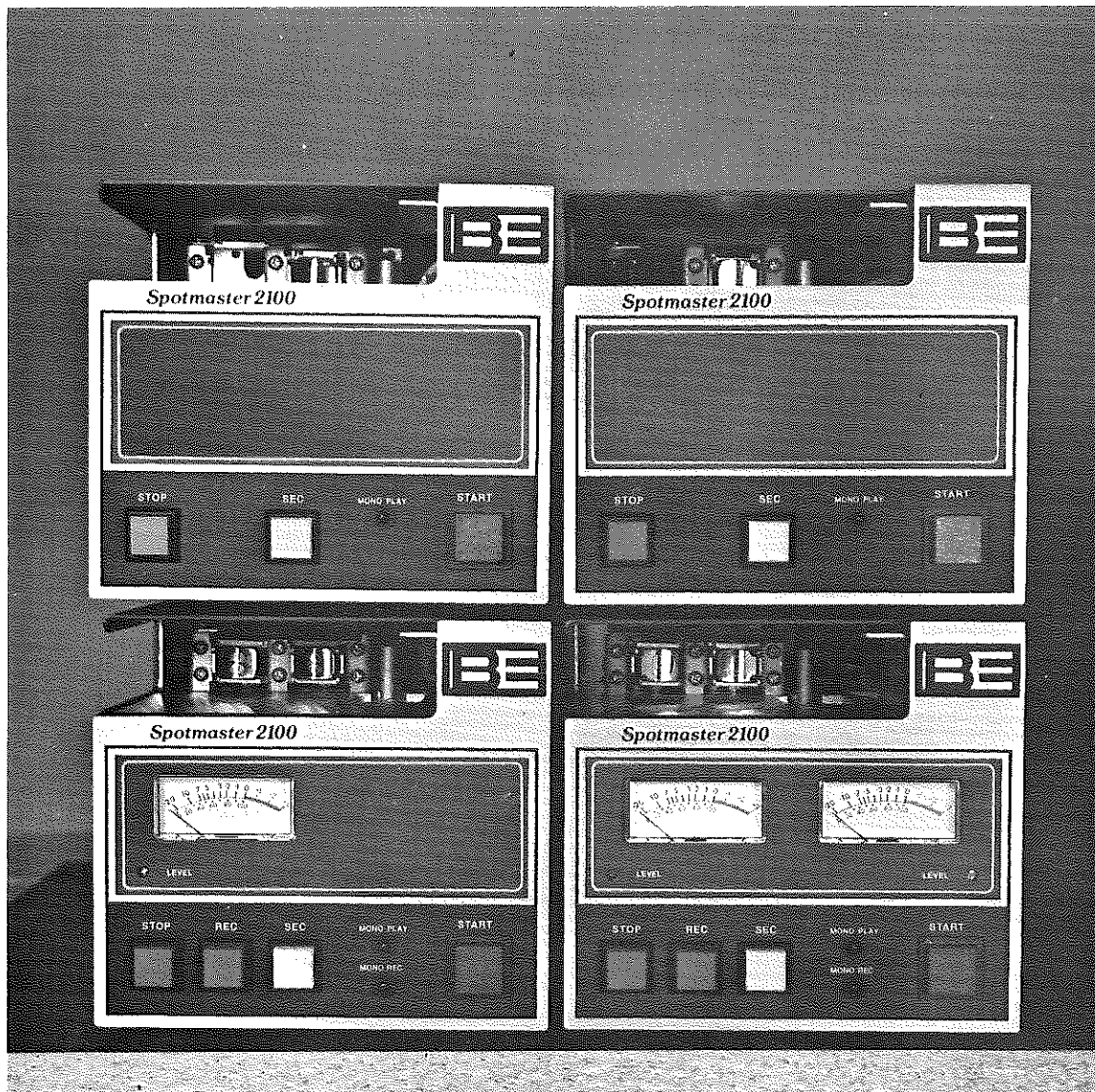


FIGURE 1-1: 2100 SERIES CARTRIDGE MACHINES

Playback (mono) P model

Playback (stereo) RP model

Playback/Record (mono) RP model

Playback/Record (stereo) RPS model

SECTION 1

INTRODUCTION

1.1 GENERAL DESCRIPTION AND FEATURES

The Series 2100 cartridge machines are the first of a series to incorporate high value with top feature versatility. Record/Playback or Playback only models are available in Mono or Stereo versions. All are the same space saving size, due to modular design.

The wide range of cartridge size accepted is A, AA, B, BB, C, and CC. Top quality Nortronics heads are held in the new, exclusive Phase Lok IV head assembly. Azimuth adjustment has no direct effect on height, and no effect on zenith adjustments; assuring tight control of stereo phasing. Extensive head shielding prevents hum pickup.

Like the 1kHz stop tone, the 150Hz secondary tone is standard; along with 2100's exclusive automatic mono/stereo switching. The mono/stereo switching is accomplished by simultaneously recording the 1kHz and 150Hz tone at the beginning of the message on any previously recorded mono cartridge or newly recorded cartridges. A front panel LED indicator identifies Mono encoded tapes. On playback, the program material will be available from the left and right outputs on stereo models.

The tape transport includes a direct drive, hysteresis synchronous motor, a large air-damped solenoid with a teflon coated plunger, and a precision aluminum deck.

1.2 SPECIFICATIONS

Tape Speed

7.5 IPS (1905 cm/s)

Speed Accuracy

+ .2% of 7.5 IPS

Wow and Flutter

0.15% peak weighted

0.2% RMS unweighted

Noise (reproduce electronics only)

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

Distortion

2% or less record to playback

Equalization

NAB, IEC, CCIR as specified

Frequency Response

+2dB from 50Hz to 15kHz exclusive of head contour effect

Crosstalk (magnetic head limited)

Cue channel to program channel, monophonic

150Hz: -50dB or better

1kHz: -55dB or better

Input Impedance (record models)

Line, 78k ohms, balanced bridging

Input Levels

Line, -18 to +20dBm

Audio Output

Maximum adjustable level +8dBm from 160mWb/m at 1kHz, 600 ohms, balanced

Peak Output Level

+20dBm before clipping

Bias Oscillator Frequency

100kHz

Cue Signals

Relay contact closure for external control (150Hz)

External cue input/output available at connector for other control functions

Ambient Operating Temperature

0° to 55° C (32° to 132° F)

Power Requirements

105 to 130V or 210 to 230V, 50 or 60Hz, as specified

Power Consumption

40W maximum

Mounting

Desk top standard, adapters for rack mounting optional

External Connectors

Mating connector furnished

Dimensions

5.25"H, 5.875"W, 15.5"D

13.3cm H, 14.9cm W, 39.4cm D

(add 0.375" to height for rubber feet)

Weight (packed); all models

28 lbs. (12.7 kg)

1.3 ACCESSORIES

<u>STOCK NO.</u>	<u>DESCRIPTION</u>
907-2114	Rack Mount Shelf for EIA 19" Rack
471-2101	Top cover for shelf above
503-2122	Rack Shelf Filler Panel, 1/3 Rack
503-2123	Rack Shelf Filler Panel, 2/3 Rack
919-2100	Extender, P.C. Boards
836-0009	Tape Guide Adjustment Block
836-0005	Pressure Roller Adjustment Guide

1.4 WARRANTY - see inside back cover

1.5 RETURN, REPAIRS, AND EXCHANGES - see inside back cover

1.6 SERVICE - see inside back cover

SECTION 2

INSTALLATION

2.1 MOUNTING

Series 2100 units come standard for tabletop use. An optional shelf is available for mounting units in a standard EIA 19" rack (BE No. 907-2114). Filler panels and top cover for the rack shelf are also available. Three units, set up to play size A cartridges, may be mounted side-by-side in 5.25" of vertical space.

To install units in a rack, remove the top and bottom covers, install any filler panels in the front of the adapter shelf and mount the adapter shelf in the rack opening from the front. Secure the shelf with No. 10 screws from the front through the trim spacers and the rack shelf into the rack rail. Finally, place the units into the adapter shelf from the front and secure with the captive fasteners at the rear of the shelf.

2.2 AUDIO INPUT AND OUTPUT

Refer to INPUT/OUTPUT & REMOTE WIRING DIAGRAM REAR CONNECTOR, Drawing No. 906-2252.

The playback audio output and line level record input are available at the rear connector. The output is balanced with a low impedance for driving a 600 ohm load. The input is high impedance balanced bridging for signals from -18 to +20dBm levels. The output may be connected to unbalanced loads by connecting to GND and either the "-" or "+" output. A terminating resistor need not be used.

To ensure proper grounding and to prevent the formation of ground loops, the shield of the audio cable should be connected at one end only. It may be connected in the middle or both ends if this provides better shielding.

The output levels are adjusted at the factory for 0dBm output at NAB standard level (1kHz, 160nW/m). This may be changed as explained in the Maintenance and Adjustments Section (Section 5).

On Record Models: For use with a microphone input, shunt input resistors R61 and R62 (on stereo models, R63 and R64, also) to increase input preamp gain. See SCHEMATIC RECORD PCB Drawing No. 906-2140.

2.3 REMOTE CONTROL

Refer to INPUT/OUTPUT AND REMOTE WIRING DIAGRAM REAR PANEL CONNECTOR, Drawing No. 906-2252.

A rear panel, 30-pin Amp edge connector allows connection of inputs, outputs, and remote control functions. The schematic of a remote control unit is included on Drawing No. 906-2252.

2.4 GROUND TERMINAL

The rear panel ground terminal should be connected to the central or station ground with a solid or braided ground strap.

2.5 AC POWER

All series 2100 units are equipped with NEMA three-wire grounded AC line cord. The power transformer can be connected for 105-130VAC or 210-230VAC as shown on Drawing No. 906-2141 SCHEMATIC WIRING DIAGRAM MOTHERBOARD. Separate models are available for 50Hz and 60Hz operation.

NOTE

Different fuses are used for 110VAC and
220VAC: 1AMP for 110VAC
.5AMP for 220VAC

SECTION 3

OPERATION

3.1 PLAYBACK

Turn on the AC power by the rear panel switch. The motor shaft should begin to rotate. Insert a pre-recorded cartridge in the deck opening. The red STOP switch will illuminate, indicating that the machine is in the "STOP READY" mode. The 2100 series machines will accept NAB A, AA, B, BB, C, and CC size cartridges.

Play the tape by pushing the green START switch momentarily. The STOP lamp will extinguish and the START lamp will illuminate, indicating the "RUN" mode. The VU meter on record models will indicate the playback levels.

CUE TONE DETECTION

MONO/STEREO SWITCHING: If during the first three seconds of the message, both a 150Hz tone and a 1kHz tone are simultaneously detected on the cue track, the red MONO PLAY LED will illuminate. It will remain lit for the remainder of the "RUN" cycle. This indicates that a mono encoded tape cartridge is identified by the machine. When a stereo machine identifies a mono cartridge, the left track signal is present at both the LEFT PLAY OUT and the RIGHT PLAY OUT. This is especially useful when using a tape library with both stereo and mono cartridges. If all mono cartridges are encoded with the identifying cue tones, automatic mono/stereo switching will be provided.

SEC (CUE I) SWITCH: The white SEC switch will light and stay lit as long as it detects only a CUE I (150Hz) tone on the cue track. Unless jumper W1 on the Playback PCB is moved to its alternate location, (refer to schematic) Cue I cannot be detected for about 3 seconds at the beginning of a "run" cycle. This is useful for a "5" seconds to end-of-message marker", remote control, or similar functions.

Stop/End of Message: If after the first three seconds of the "Run" cycle, the 1kHz tone is detected on the cue track, the machine will stop and the red STOP lamp will illuminate.

A cartridge may also be stopped by depressing the STOP switch on the front panel. When the unit stops, the START light will extinguish and the STOP light will illuminate. When the cartridge is removed, the STOP lamp will extinguish.

3.2 RECORD

The 2100 RP and RPS models can function in the record mode as well as playback mode.

Load a bulk erased tape cartridge in the deck. Select a cartridge at least two seconds longer than the program material to be recorded. If more than one "cut" will be recorded on a cartridge, allow at least two seconds between cuts. Run the cartridge in the playback mode for several seconds. While running the cartridge to align the

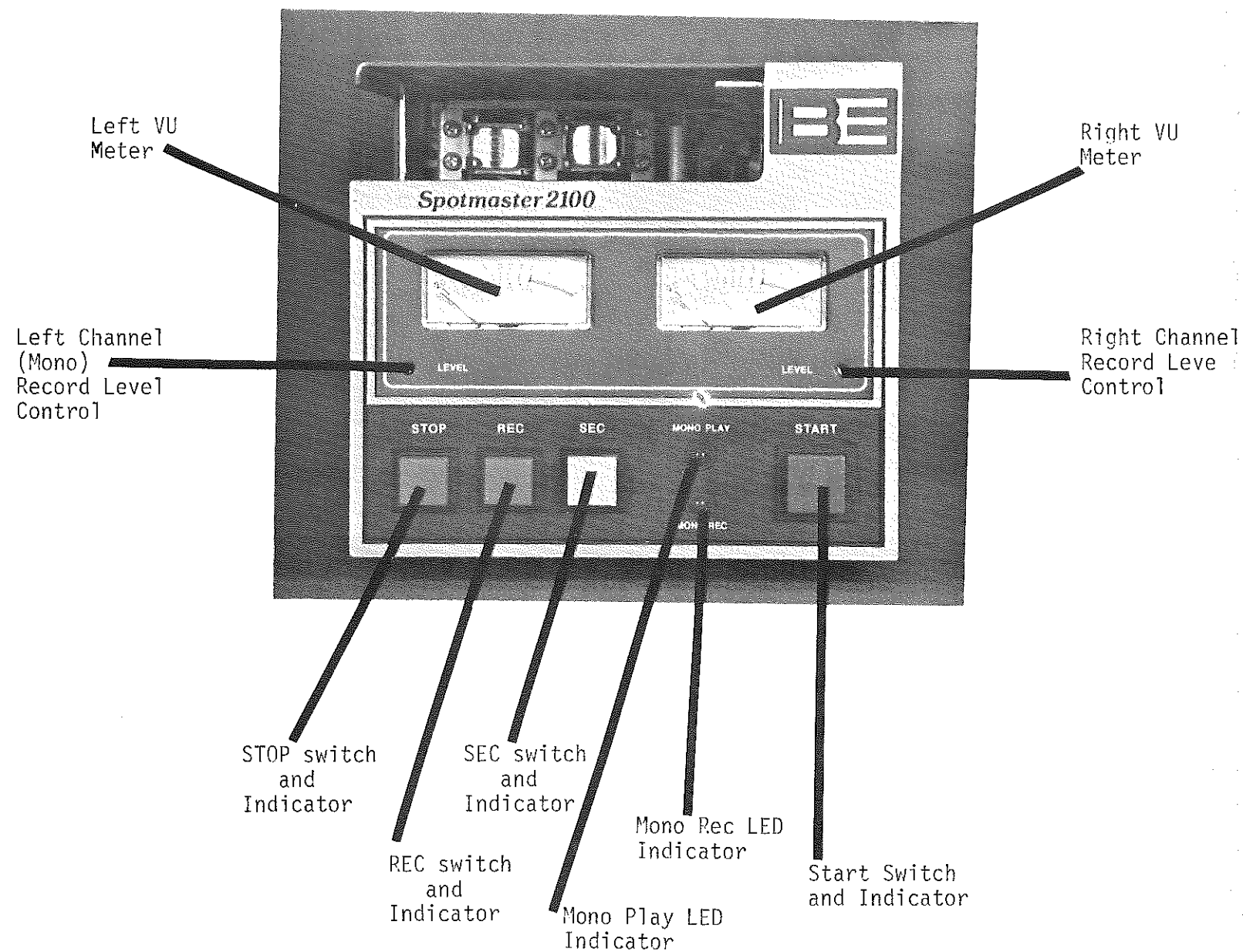


FIGURE 3-1: IDENTIFICATION OF FRONT PANEL CONTROLS AND INDICATORS, RPS MODEL

tape in the guides, check the location of the splice. Avoid recording over the splice, since audio will "drop out" or "bump" on most splices.

NOTE

The splice may be automatically located by use of an accessory Tape Fault/Splice Detector.

Place the unit in the "record" mode by pressing the REC switch; the lamp in this switch will illuminate. Pre-set the record level by playing the material to be recorded. DO NOT START THE CARTRIDGE. Adjust the front panel level control(s) so that the VU meter(s) indicates a maximum of 0 VU (100) on peaks. In the "Record" mode the meter indicates the input to the recorder. After the level is set, re-cue the material to be recorded. Start the machine by depressing the START switch. Both the REC and START switches will be illuminated. Then start the material to be recorded. For best operation, there should be a $\frac{1}{4}$ to $\frac{1}{2}$ second lag between the start of the cartridge and the beginning of the program material.

The STOP cue (1kHz tone) will automatically be recorded on the cue track for $\frac{1}{2}$ second at the beginning of the "Record Run" cycle.

To record a "Mono Encode" tone on the cue track at the start of the "Record Run" cycle, either have the internal, automatic MONO Encode switch in the ON position 1; or, push the SEC switch after the REC switch but before the START switch. The automatic feature is best used when several mono cartridges are being recorded consecutively.

On 2100 RPS models, when operating the "Mono Encode Record" mode; the REC switch, the START switch, the MONO ENCODE LED (and the Mono Play LED after about $\frac{1}{4}$ Sec) will be lit. The LEFT REC IN and the RIGHT REC IN are summed and recorded on the left track.

NOTE

Each time the START switch is pushed while the MONO ENCODE is on, a 1kHz tone will be recorded on the tape at that point. To avoid recording extra stop tones, cue up the cartridge before switching the Mono Encode switch on.

On 2100 RP and RPS models the 150Hz tone can be recorded on the cue track (with the machine in either the RUN or REC mode) at any time by pushing the SEC switch. The SEC switch will illuminate when this recorded tone is detected.

SECTION 4

THEORY OF OPERATION

4.1 INTRODUCTION: THEORY OF OPERATION

This section details the theory of operation by describing the circuits of the various PCB's in the machine. Refer to the Block Diagram Figs. 4-1, 4-2, 4-3. The MOTHERBOARD interconnects the machine's components and contains the power supply. The PLAYBACK PCB contains the playback amplifiers for the program tracks, the cue tone amplifiers, the cue tone sensors, the cue tone command logic, and the solenoid timer circuit. The RECORD PCB: only installed in record models; contains the Program and Cue Track record amplifiers, the cue tone oscillators, the program and cue track controls, the record metering circuitry, and related logic.

Detailed circuit descriptions follow. The drawings show the most complex arrangement, the one that is required for a stereophonic machine with playback/record capabilities. The assembly drawings are coded with shading to differentiate between mono, stereo, play, and record play versions. For easy reference, capitalized terms used in the text are identical to the terms used on the drawings. Right channel information for stereo models appears in parentheses.

4.2 PLAYBACK PCB CIRCUIT DETAILS

Refer to SCHEMATIC PLAYBACK PCB, 906-2139 and PCB ASS'Y PLAYBACK, 914-2110.

4.2-1 AUDIO AND METERING

The program tracks of the playback head, LEFT HAND INPUT (RIGHT HEAD INPUT), are coupled through C3 (C9) to the input of the pre-amplifier, IC 1-A (IC 1-B). This integrated circuit pre-amplifier provides gain and equalization as determined by the surrounding network. The LEFT PLAY LF EQ (RIGHT PLAY LF EQ) control and the LEFT PLAY HF EQ (RIGHT PLAY HF EQ) control permits adjustment of the equalization for matching head and tape characteristics to NAB (1964 version) or other standards.

The output from the preamplifier is directly coupled to the LEFT PLAY METER INPUT CIRCUIT (RIGHT PLAY METER INPUT CIRCUIT) and to the level control, LEFT PLAY LEVEL (RIGHT PLAY LEVEL). Signals from the level controls go to the analog switch, IC-10. The switch, instructed by logic, switches and guides signals to the appropriate output amplifiers and provides muting at the appropriate times.

On Stereo Models: When a machine is in the "Mono Play" mode, the signal from the left preamplifier is fed equally to the left and right output amplifiers. This is accomplished by simultaneously closing the analog switch at pins 1+2 and 8+9 while opening the switch at pins 10+11. The signal from the left preamplifier is allowed to pass to the left and right output amplifiers while the signal from the right preamplifier is muted. In "Stereo Play" mode, the switches are closed at pin 1+2 and 8+9 but open at 10+11. This allows the left preamp signal to go to the left output amp and the

right preamp signal to go to the right output amp. Pins 3, 4, & 5 of the analog switch IC-10 are used as a logic inverter.

The signal from the analog switch goes to a single-ended differential line driver, IC's 2-A,B (IC-A,B). The output signal is balanced.

NOTE

Shorting one side of a differential line driver will drastically reduce the output level. For unbalanced applications, connect only one side.

At "End of Play", logic will instruct the analog switch to open all switches, muting all signals.

4.2-2 CUETRACK

The CUE HEAD INPUT signal is amplified and equalized by IC4-A and further amplified by IC4-B. At this point the signal has three paths, to CUE PLAY OUT, to the 1kHz circuit, and to the 150Hz circuit. In the 1kHz circuit, the signal first passes thru the 1kHz SENSITIVITY adjustment R53. If a 1kHz tone is present, the signal will pass thru the 1kHz active BANDPASS FILTER, IC-5-A and be rectified by the 1kHz PEAK FOLLOWER, IC6-A. The PEAK FOLLOWER converts the signal to logic voltages that are understood by the logic circuits. The 150Hz circuit is similar to the 1kHz circuit; it, too, has a sensitivity adjustment, R54; and active BANDPASS FILTER IC5-B; and 150Hz PEAK FOLLOWER, IC6-B. When these circuits detect a signal or signals, the logic uses them to instruct the analog switch. If a 1kHz tone is detected, the machine will stop. The 150Hz tone, when present, will light the SEC switch. When both tones are present simultaneously, at the beginning of the tape, the machine will go into "Mono Encode". A stereo machine will have the audio from the left track at both left and right output when in this mode.

4.2-3 SOLENOID TIMER

Also on the PLAYBACK PCB is the solenoid timer circuit. It drives P2-B high for .5 seconds at the beginning of run, providing cooler operation.

4.3 RECORD PCB CIRCUIT DETAILS

Refer to SCHEMATIC RECORD PCB, 906-2140; and PCB ASS'Y RECORD, 914-2111.

4.3-1 AUDIO AND METERING

The LEFT REC IN (RIGHT REC IN) signal is amplified by the LEFT RECORD INPUT PREAMP, IC8-A, (RIGHT RECORD INPUT PREAMP, IC8-B). The signal then goes through the LEFT REC LEVEL control, R1, (RIGHT REC

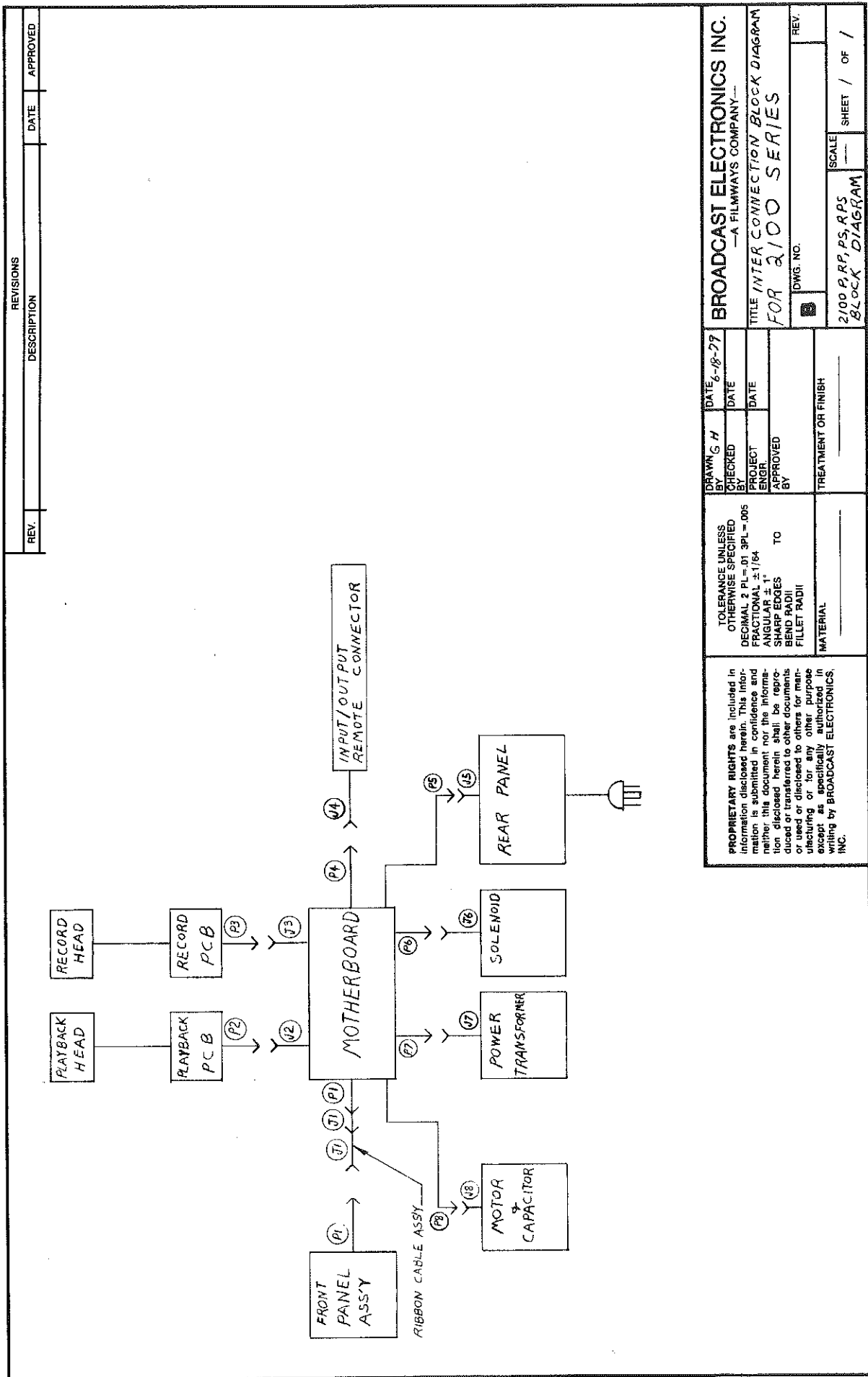
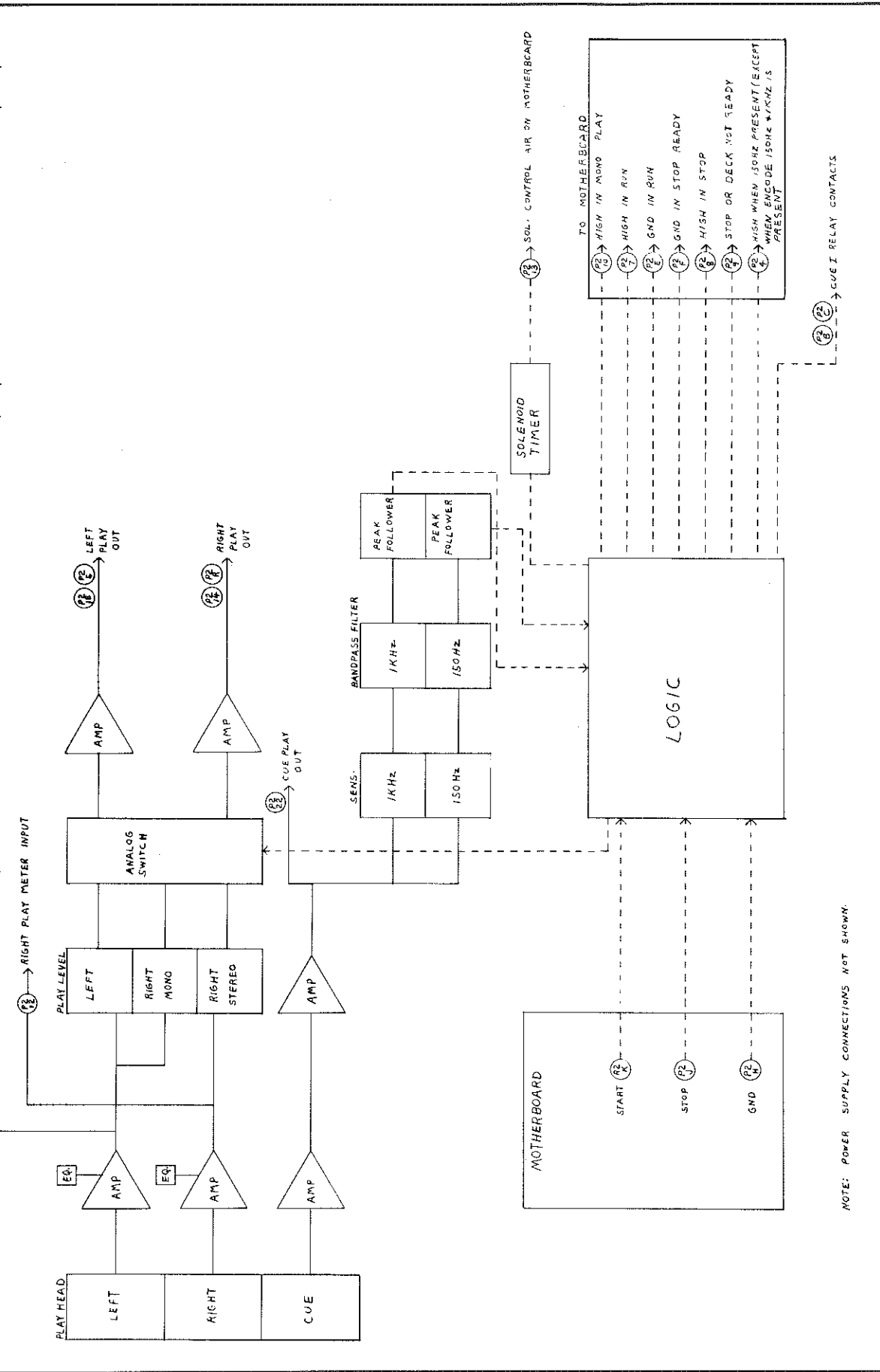


Figure 4-1 Inter Connection Block Diagram

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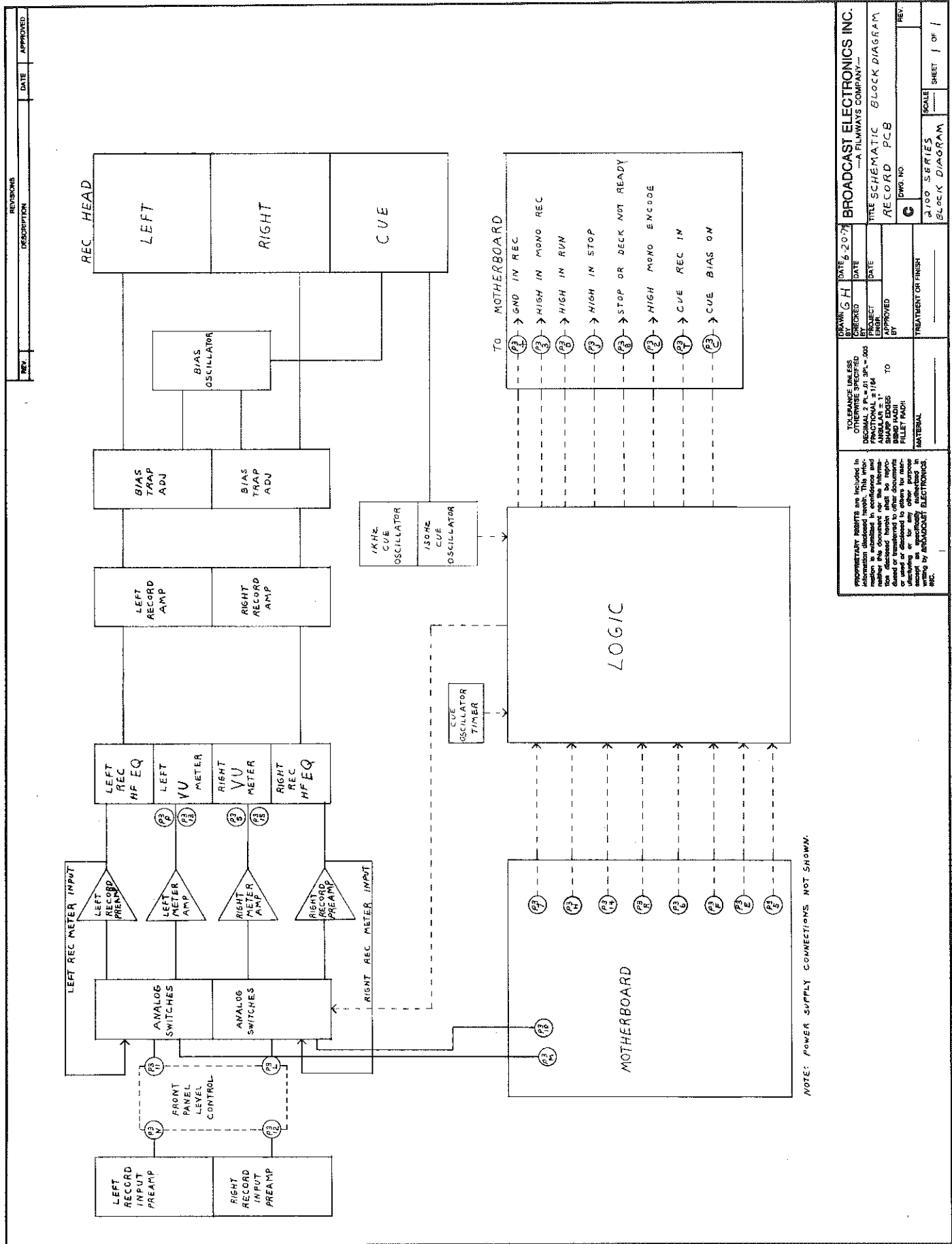
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TITLE: SCHEMATIC BLOCK DIAGRAM FLAYBACK PCB		DATE: 6-19-79 BY: G H APPROVED: G H	SCALE: 1 OF 1 SHEET: 1 OF 1	REV: 1

NOTE: POWER SUPPLY CONNECTIONS NOT SHOWN.

Figure 4-2 Schematic Block Diagram Playback PCB



LEVEL control, R2) which is on the front panel. Audio signals pass directly to the analog switch IC6 (IC5). Metering signals first pass through meter calibration adjustment controls MTR CAL, R106, R107 (R96, R97) and then to the analog switch. As instructed by logic, the analog switch both guides the signals to the appropriate preamplifiers, and provides muting at the appropriate times.

The mode of operation read by the logic will dictate when and what section of the analog switch will open or close. Logic circuits, IC7-C, IC7-D, are in a flip-flop configuration that provides the final instructions to IC-6 pins 1+2 (IC-5 pins 8+9) to open or close the audio circuits in the RECORD mode. When the audio circuit is closed, the metering circuit at IC-6 pins 8+9 (IC-5 pins 1+2) will close, completing the metering circuits. Logic also monitors functions and information from the PLAYBACK PCB. IC7-A and IC7-B monitor the information from the Playback PCB regarding "STOP" and "NOT READY" states.

On Stereo Model, RPS: The analog switches IC-6 (IC-5) also control the stereo/mono switching at pins 1+2, 8+9. In the "STEREO Record" mode, IC-6 is closed at pins 8+9 and IC-5 is closed at pins 1+2. This closes audio and metering circuits, respectively, to the left and right tracks. At the same time, IC-6 pins 11+10 (IC-5 pins 4+3) are instructed by logic to open, muting the Playback circuit to the VU meters. The VU meters respond to the recorded material in "RECORD", to playback material in "PLAY".

When the machine is put into the "MONO RECORD" mode either manually or automatically, logic will instruct the analog switches to sum the LEFT REC and RIGHT REC signals onto the left track. This is accomplished by opening IC-5 pins 8+9 and closing IC-6 pins 1+2 and 4+3. This is controlled by logic circuits, IC10-C and IC10-D, in flip-flop configuration. Back-up logic information for this flip-flop comes from IC10-A, IC10-B and IC11-A. In "MONO RECORD" the left and right tracks are summed at the bus before C51.

NOTE

IC5, pins 1+2, is closed in "MONO RECORD" mode, so that the right VU meter responds to the right track signal; even though there is no signal present at the RIGHT RECORD PREAMP.

After switching at the analog switch, the audio signal is amplified by the LEFT RECORD PREAMP, IC4-A (RIGHT RECORD PREAMP, IC3-B, when in the STEREO RECORD mode). The LEFT REC HF EQ control, R84, (RIGHT REC HF EQ control R83) adjusts the equalization for matching head and tape characteristics to broadcast standards. Next, the signal is further amplified by the LEFT RECORD AMP, composed of Q11 and the surrounding network (RIGHT RECORD AMP, composed of Q10 and the surrounding network).

The program signal is coupled through the bias trap: C61, L3, BIAS TRAP ADJ (C11, L2, BIAS TRAP ADJ); which prevents the high level bias from overloading the RECORD AMP(S). The variable inductor permits tuning the bias trap to the exact frequency of the bias

oscillator. The audio signal is mixed with the bias supplied through R3 (R2), and is available at the LEFT HEAD OUTPUT (RIGHT HEAD OUTPUT). The variable bias control permits adjusting the bias level for optimum frequency response and minimum distortion.

Q1 (Q2) prevents bias from appearing on the program track of the record head except when the machine is in the record mode. The BIAS OSCILLATOR SWITCHING CIRCUIT turns on the bias oscillator only when it is needed, as instructed by logic IC9-C.

4.3-2 BIAS OSCILLATOR, CUETONE OSCILLATORS, AND CUETONE LOGIC

The 2100 series record models have two cuetone generators, 1kHz and 150Hz. The oscillators and the logic to turn them on are located on the RECORD PCB.

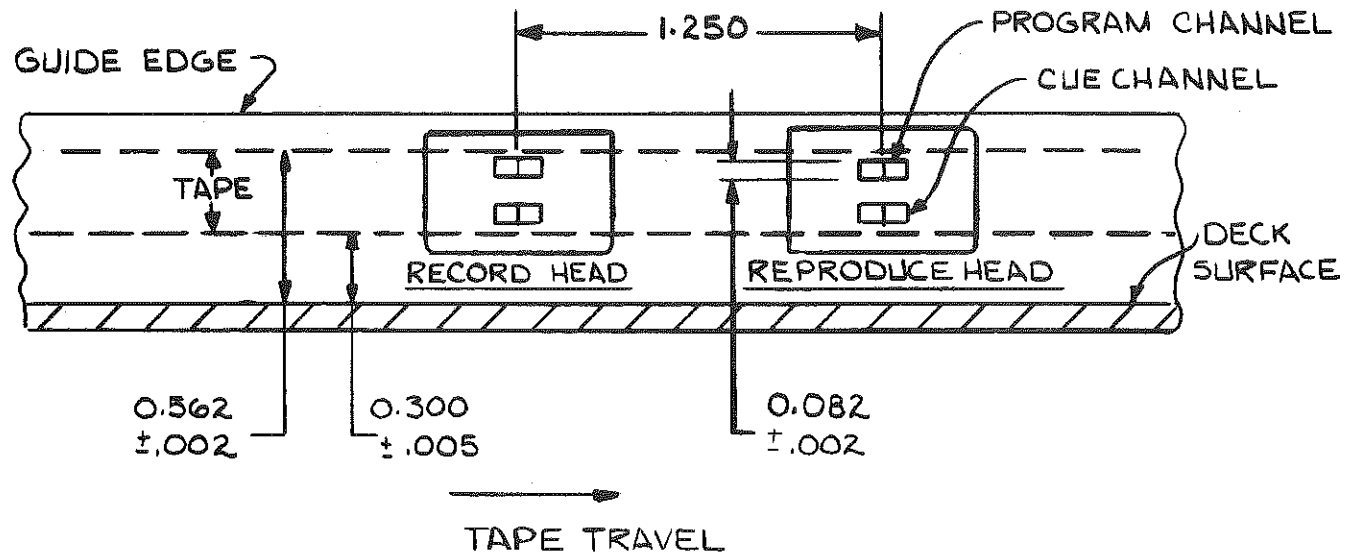
The 1kHz tone generator is IC2-C and IC2-D, the oscillation determined by the network R68, R60, R67, C38, and C39. It will oscillate when positive feedback is available through R70 and R69. The output passes through R6, C7 and level control R5. It is turned on by FET Q12, whenever the CUE OSCILLATOR TIMER is turned on. The CUE OSCILLATOR TIMER, IC2-A and IC2-B and the surrounding network, is a mono stable multivibrator. The output of the multivibrator will go high only when the input from R44 goes high. R44 will go high as instructed by IC12-B. This logic circuit receives its information from flip-flop IC11-B and IC11-C, which processes information from other logic circuits regarding the readiness of the machine and if the machine is in the "MONO ENCODE" mode, requiring a 1kHz tone. The multivibrator and oscillator are also automatically turned on at the beginning of the message by IC12-B whether or not the machine is in MONO ENCODE mode or not. This is for the "STOP" tone.

The 150Hz tone generator is similar. It is composed of IC1-A and IC1-B and network R24, R26, C26, and C25. The 150Hz tone generator will oscillate when positive feedback is available through R21 and R29. The 150Hz output passes through R7, C8, and level control R4. It is turned on by logic, also. Logic circuits, IC12-C, IC11-D process information from other logic circuits regarding the machine's readiness and if the SEC switch has been closed, or when the machine is in the "MONO ENCODE" mode. It too, is timed out by the CUE TONE OSCILLATOR TIMER, when generating a mono encode tone.

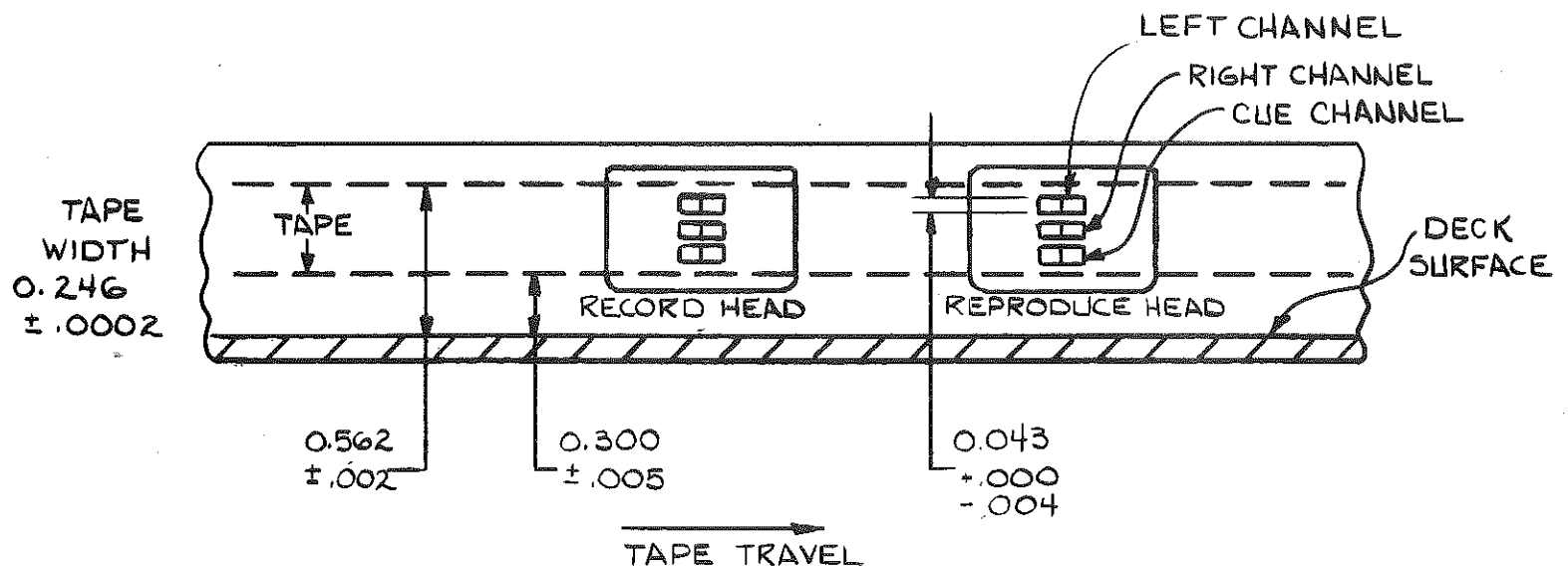
The cue tones are independently amplified by the CUE RECORD PREAMP IC11-C and coupled via C17 and R22 to the CUE BIAS TRAP. The bias trap prevents the 100kHz bias from overloading the CUE RECORD PREAMP. The bias is combined with the cue tone signal and is available at the CUE HEAD OUTPUT. Cue tone audio will pass when IC9-B is on, via Q3. Q3 prevents stray recording of cue tones, which would confuse logic during message playback.

The BIAS OSCILLATOR consists of transistors Q5 and Q6, producing a sinewave signal of approximately 100kHz at terminal 6 and 8 of the bias transformer, T1. The bias oscillator frequency is determined by transformer T1 and parallel capacitor C16 which forms a tuned circuit. The bias oscillator operated only in the RECORD mode when +18V are connected to pin 2 of T1 through the oscillator DC power supply circuitry Q6, Q7, and Q8.

MONOPHONIC STANDARD



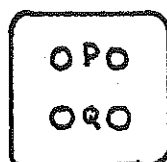
STEREOPHONIC STANDARD



NAB STANDARDS, TAPE-HEAD DIMENSIONS

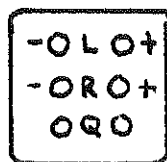
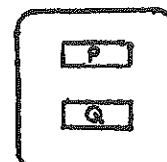
FIGURE 4-4: TAPE HEAD DIMENSIONS, NAB STANDARDS

REAR VIEW

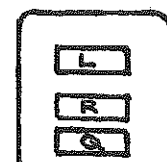


MIP MONO PLAY (252-0007)
MIR MONO RECORD (252-0008)

FRONT VIEW



SIP STEREO PLAY (253-0004)
SIR STEREO RECORD (253-0005)



P = PROGRAM (MONO) TRACK
Q = CUE TRACK
L = LEFT PROGRAM TRACK (STEREO)
R = RIGHT PROGRAM TRACK (STEREO)

FIGURE 4-5: TAPE HEAD CONNECTIONS AND CONFIGURATIONS

SECTION 5

MAINTENANCE AND ADJUSTMENTS

5.1 INTRODUCTION: MAINTENANCE AND ADJUSTMENTS

This section covers routine maintenance, adjustments, and parts replacement in the 2100 series cartridge machines. The following list of equipment is needed to properly test and maintain the cartridge machine:

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

Oscilloscope: any general purpose model

Tape Guide Adjustment Block: Broadcast Electronics, Inc.
836-0009

Pressure Roller Adjustment Guide: Broadcast Electronics, Inc.
836-0005

Set of Allen Wrenches: Supplied with machine

Head Demagnetizer: Broadcast Electronics, Inc. Model R-25015
or equivalent

Test Tapes: NAB Standard Reproduce Alignment Test Cartridge,
Cue Track Test Cartridge, Bulk Erased Cartridge,
Mono-encoded Continuous Level (Left Track) Tone
Cartridge (for stereo models only)

PCB Extender Board: Broadcast Electronics, Inc. 919-2100

Signal Generator: Audio range 20Hz to 20kHz

Cleaning Fluid: Broadcast Electronics, Inc. BE-903 or
equivalent

5.2 ROUTINE MAINTENANCE

5.2-A CLEANING

Use a soft cloth moistened with household ammonia to clean fingerprints and other marks from the machine chassis and other surfaces. Remove dust from the interior with a soft brush.

Clean heads, pressure roller, tape path, guides and capstan at least once a day with BE-903 cleaning solution or isopropyl alcohol.

Routine cleaning of the printed circuit boards and connector contacts is not necessary. However, if intermittent machine performance indicates that the contacts are dirty, clean the contacts with an aerosol contact cleaner. Be sure to disconnect power first. Do not use an abrasive cleaner. Grime can be removed with a soft pencil eraser. After maintenance or repair, PC boards should be cleaned. Clean solder flux from the board with isopropyl alcohol.

5.2-B DEMAGNETIZING

Heads and guides should be demagnetized daily with a Broadcast Electronics Head Degausser. Be careful not to scratch the heads with the degausser.

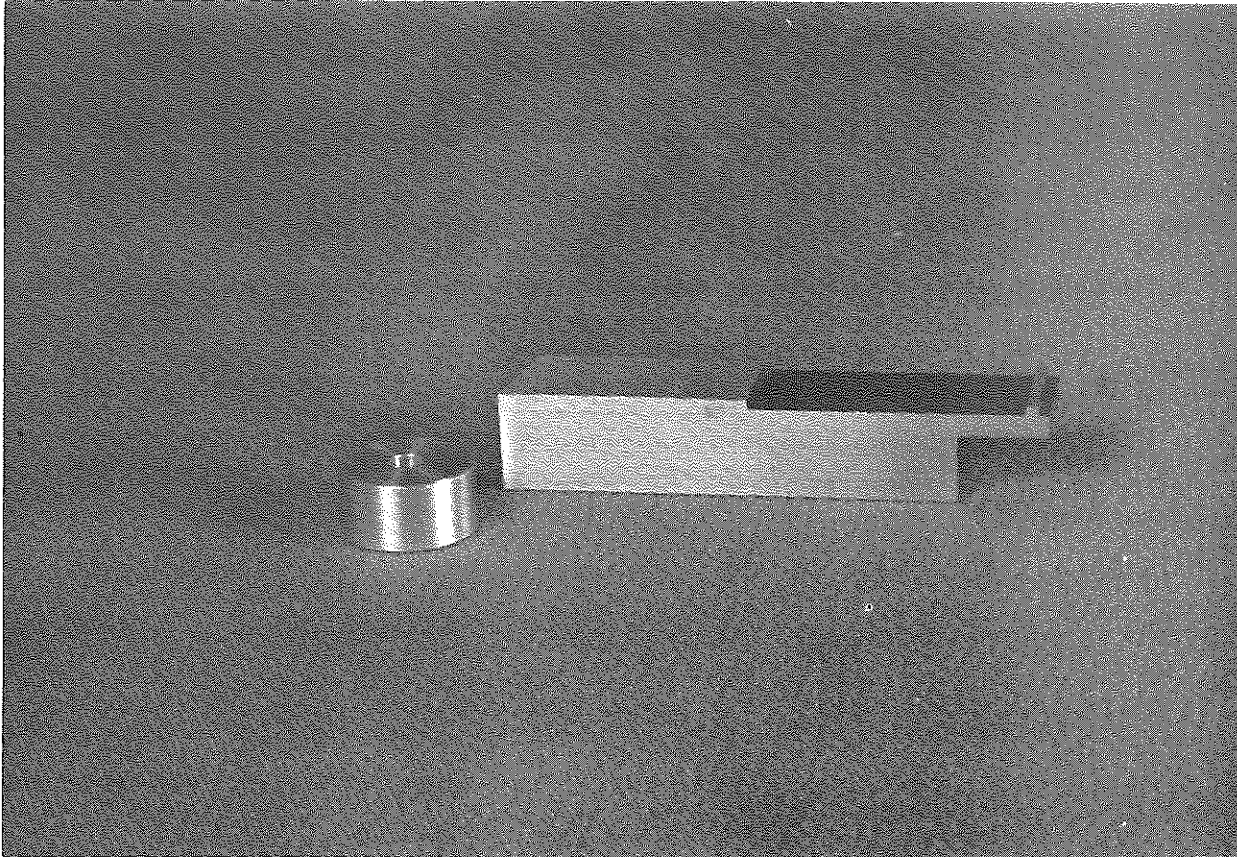


FIGURE 5-1: TAPE GUIDE ADJUSTMENT BLOCK AND PRESSURE ROLLER ADJUSTMENT GUIDE

5.3-C CARTRIDGE MAINTENANCE

An inserted cartridge is part of the machine system. A defective cartridge will have an effect on machine performance. Do not make adjustments with a defective cartridge. Inspect them frequently for cleanliness, mechanical defects, and tape wear. The tape should be frequently inspected for signs of damage or wear. Replace worn tape. A damaged or deformed cartridge shell will distort the tape path, resulting in poor frequency response and phasing. Check for loose corner posts.

Periodically, the cartridge should be cleaned with special attention to the center post. A mild detergent will remove the gummy deposits that can increase tape tension by not allowing parts to turn freely. Check the pressure pads to see that they are aligned squarely with the tape.

It is recommended that only one type of tape be used at a facility. Different brands and different types of the same brand require different bias currents and different record and playback equalization. If more than one type of tape is used, a compromise of control settings will need to be made to obtain acceptable performance from the entire tape library.

It is good practice to avoid putting large numbers of new tapes into a system in a short period of time. A sudden influx of new tapes could increase the deposits on the heads and pose a cleaning problem. It is better to plan a long term phasing or continuous addition program for new tape introduction to replace or increase a tape library.

5.2-D PERFORMANCE CHECKS

It is recommended that the performance of the tape machine be periodically checked to see if it is operating with specifications. If performance is substandard, follow the necessary adjustment procedures outlined in the following sections.

5.3 COMPONENT REPLACEMENT ON PRINTED CIRCUIT BOARDS

NOTE

AC power must be turned off when printed circuit boards are removed or replaced.

Take great care when working on printed circuit boards, since excessive heat may cause the foil to peel off. The Broadcast Electronics warranty is void if boards are damaged by improper handling.

When replacing components on a printed circuit board, use a small soldering iron (15 to 30 watts) with a small tip. Melt the solder with the iron and remove it with a de-soldering tool (Solder Wick ®, Soldersucker, etc.). Unbend the leads with a small pair of diagonal cutters and remove the component.

NOTE

When removing multi-pin components (IC's, sockets, transformers, etc.) de-solder each pin separately before attempting to remove the component. It is virtually impossible to heat all the pins simultaneously.

Put the leads through the holes and trim the leads to about 1/8th inch. Bend the leads through the holes so they touch only the foil strips that the leads are soldered to. Always use rosin core solder (recommended: 22 gauge 67/37 tin/lead alloy). Touch the tip of the iron to both the foil and the lead. Touch the solder to both the foil and the lead. Do not apply the solder to the tip of the iron, but rather let the heated connection melt the solder.

Clean the flux off the PCB with alcohol, because solder flux left on the PCB may cause problems.

Extra care should be exercised with integrated circuits. All IC's must be oriented so that the notch on the IC matches the notch on the IC socket. DO NOT attempt to remove an IC with your fingers--use an IC puller or other tool to lightly pry the IC from its socket.

REMOVING BOARDS

Use pull-out holes (refer to Fig. 5-2) on printed circuit boards to avoid damaging the boards. Insert a pointed instrument, such as a narrow screw driver, in the removal holes and lift up. Do not attempt to pull boards out with your fingers--damaged components may result.

5.5-A PROGRAM PLAYBACK ADJUSTMENTS

This section describes all the adjustments made on the Playback PCB; refer to the PCB ASS'Y PLAYBACK DRAWING, 914-2110 for the location of the components and controls. The SCHEMATIC PLAYBACK PCB DRAWING, 906-2139 may also prove to be helpful. Instructions that are in parentheses apply to the right channel. For easy reference to drawings, capitalized terms are used in the text as they appear on the drawings. Special equipment needed for these adjustments are: NAB standard Alignment Test Tape Cartridge, External VU meter (or a voltmeter calibrated in dB), Q (Cue) Track Test Cartridge.

EQUALIZATION

Azimuth and phasing should be adjusted before the equalization. This adjustment affects the adjustment on the output level. After completing the equalization adjustment, continue on to the following output level adjustment.

Turn the machine on and play the NAB Alignment Test Tape while monitoring the output with the external VU meter. Zero the meter using the 700Hz -10dB reference tone. Adjust the LEFT HF EQ (RIGHT PLAY HF EQ) control so that the 12kHz test tape tone reads the same level on the meter as did the 700Hz reference tone. Adjust the

LEFT PLAY L F EQ (RIGHT PLAY L F EQ) control so that the 50Hz test tape tone is also at the same level as the reference tone, 0 VU. Repeat procedure, maximizing the effect, as these two adjustments interact. Listen to the tape again and note the frequency response at all frequencies on the test tape. (Repeat procedure for right channel)

OUTPUT LEVEL

These adjustments should be made after the equalization adjustments; as they are interrelated and affect one another. The following procedures are given to reproduce the factory-set level. If another output level is desired, refer to the specifications for the range of possible levels and follow the procedure outlined, except using another reference tape recorded at the desired level.

Turn the machine on and play an NAB Reproduce Alignment Test Cartridge while monitoring the output on an external VU meter or a voltmeter calibrated in dB. Adjust the LEFT PLAY LEVEL (RIGHT PLAY LEVEL) control to yield 0dBm output from the 700Hz 0dBm reference tone (repeat the procedure for the right channel).

On record models, first calibrate the cartmachine's left and right VU meters as described in the following section, Record PCB: VU Meter Calibration.

Play a mono encoded tape with a continuous level tone recorded on the program track (i.e., the left track). While monitoring the output on an external VU meter, adjust the RIGHT MONO PLAY LEVEL control to equalize the left and right outputs. Remember; a stereo machine in the "mono" mode has the signal from the left tape track at both the left and right play outputs.

CUE SENSITIVITY

The cue tone sensors are adjusted to operate on a tone at a level below the NAB standard cue tone levels, allowing for variations in tone level caused by tape wear, etc. At the factory, units are adjusted to sense tones below the NAB standard levels.

Turn on the machine and play the Cue Track Test Tape. During the 1kHz stop tone, adjust the 1kHz SENSITIVITY control so that the sensor just triggers and stops the unit.

NOTE

When adjusting the 1kHz and 150Hz controls, wait 3 seconds after the cartridge starts. The sensor is disabled for this time.

During the 150Hz tone on the tape, adjust the 150Hz SENSITIVITY control so that the sensor just lights the indicator lamp during the secondard threshold test tone (150Hz, 1dB below 160nW/m).

5.5-B RECORD PCB ADJUSTMENTS (2100 RP, RPS Models only)

This section describes all the adjustments made on the RECORD PCB: refer to the PCB ASS'Y DRAWING, 914-2111 for the location of component and controls. The SCHEMATIC RECORD PCB may also prove to be helpful. Instructions in parentheses are for the right channel. Special equipment needed to make the following adjustments are: PCB extender board BE# 919-2100, oscilloscope, non-metallic screw-driver, signal generator, Q (Cue) Track Test Cartridge, VU Meter.

BIAS TRAP

Disconnect the AC power and mount the RECORD PCB on the extender board. Connect an oscilloscope (or 100kHz bandwidth voltmeter) to TEST POINT 11 (10). Reconnect the AC power and put the machine in the record mode. This can be done by inserting a tape and pressing the record button on the front panel. With a non-metallic screw-driver, tune the LEFT BIAS TRAP (RIGHT BIAS TRAP) for a minimum 100kHz signal as observed on the oscilloscope. (On stereo models, reconnect the oscilloscope to test Point 10 and Tune L2.)

BIAS LEVEL AND EQUALIZATION

Load a bulk erased cartridge in the unit. Connect an audio signal generator to the left record input. (Right record input) Set the generator for 700Hz -10VU signal. While recording this signal on the left (right) track, adjust the LEFT BIAS (RIGHT BIAS) control for peak play output. Measure the left play output level (right play output level) with an external VU meter. Adjust the azimuth or phasing. Change the generator frequency to 12kHz. Adjust the LEFT REC H F EQ (RIGHT REC H F EQ) control until the left (right) play output level equals that measured at 700Hz. Remeasure the level at 700Hz, read just the LEFT BIAS (RIGHT BIAS) control to peak output. Readjust the LEFT REC H F EQ (RIGHT REC H F EQ) at 12kHz to equal that measured at 700Hz. Continue this process until the left (right) play outputs at 700Hz and 12kHz are equal. (Repeat the process for the right channel)

VU METER CALIBRATION

Play a NAB Standard Reproduce Alignment Cartridge. During the 700Hz reference tone, adjust the LEFT PLAY METER CAL (RIGHT PLAY METER CAL) control to provide a 0 VU reading on the machine's front panel meter.

FOR RECORD MODELS

Connect an audio signal generator to the record input. Set the generator for 700Hz at -18dBm to 20dBm. While recording this signal on the left (right) track of a bulk erased cartridge, set the LEFT REC LEVEL (RIGHT REC LEVEL) to yield 0 dBm playback output on an external VU meter.

Adjust the LEFT REC METER CAL (RIGHT REC METER CAL) control to produce a 0 VU reading on the machine's front panel meter. (Repeat the process for the right channel)

CUE SECTION

Refer to the drawing Panel Connector, 906-2252 for the location of outputs. Turn on the cue bias oscillator and the 1kHz oscillator, by connecting a 10K ohm resistor between IC-2 pins 1 and 14 with clip leads. Play a bulk erased tape while monitoring CUE PLAY OUT (on the back connector) with an oscilloscope. Adjust the CUE BIAS CONTROL for peak cue play output level.

NOTE

When adjusting the Cue PLAY OUT Control, the 3 second lock out will stop the machine. It will be necessary to restart the machine several times to complete this adjustment.

Adjust the 1kHz OSCILLATOR FREQ control to 1kHz + 50Hz at the output, measuring with an oscilloscope, adjust the 1kHz OSCILLATOR REC LEVEL control to record the 160 nW/m tone on the tape. Compare the CUE PLAY OUT level with the level of the secondary threshold test tone level on the CUE Track Test Cartridge. CUE PLAY OUT level should be $2\frac{1}{4}$ times the secondary threshold test tone (7dB above). The 1kHz OSCILLATOR REC LEVEL control adjusts the level of the 1kHz cue tone. Turn off the cue bias oscillator and the 1kHz oscillator by removing the 10K ohm resistor. Next, adjust the 150Hz cue tone. Turn the cue tone on by playing a bulk erased tape and holding the SEC switch on the front panel. Monitor CUE PLAY OUT on the machine's back panel connector with an oscilloscope. Adjust the 150Hz OSCILLATOR FREQ control so that the frequency is 150Hz + 8Hz as observed on the oscilloscope. Compare the CUE PLAY out level with the level of the secondary threshold test tone level on the Q (Cue) Track Test Cartridge. The level of the 150Hz cue tone should be $2\frac{1}{4}$ times the level of 150Hz the secondary threshold test tone (7dB above). The 150Hz OSCILLATOR REC LEVEL control adjusts the level of the 150Hz cue tone.

When finished disconnect the AC power before removing the extender board and replacing the RECORD PCB.

5.6 MECHANICAL PARTS REPLACEMENT(S)

5.6-A MOTOR REPLACEMENT

NOTE

Care must be exercised in handling and storing motors to avoid damaging the bearings. Store spare parts in the original packaging. Do not handle the motor by the shaft; instead handle

the motor by the case. Do not subject the motor to sharp blows, rough handling, etc. Do not let any metal touch the shaft.

Disconnect the AC power cord, remove the top and bottom covers. Remove the PLAYBACK PCB by the removal holes on the corners. Remove the transformer by removing the 4 mounting screws. Unplug the transformer connector and motor connector. Place the machine on its left side. Cut the cable tie which secures the motor cable to the partition. Disconnect the capacitor wires supporting the motor case in one hand, unscrew the two 10-32 mounting screws on the top side of the deck and remove the motor.

To install the new motor, reverse the steps above. When tying the motor cable to the partition, be sure that all the wires are clear of the motor's rotating parts. Refer to the next section for the needed adjustments.

After adjustments are completed, reconnect AC power. The motor shaft should rotate counter clockwise. Test the unit with a cartridge for normal operation.

5.6-B PRESSURE ROLLER REPLACEMENT

Manually raise the pressure roller above the deck surface by pushing in the solenoid plunger. Remove the E ring, teflon washer, pressure roller and metal washer. Check the pressure roller adjustment described in the following section, 5.7-A. Install the metal washer, replace roller, teflon washer and secure with the E ring.

5.6-C HEAD REPLACEMENT

To remove the playback or the record heads, disconnect the AC power and remove the top cover. Remove the Beryllium/Copper hold down spring and the Mu-metal shield by unscrewing the three (3) screws. Loosen the two (2) head clamp screws, withdraw the head from the clamp and disconnect the leads. Plug the leads into the replacement head, insert the head in the clamp and replace the clamp screws. Reconnect the AC power. Adjust tracking, zenith, and azimuth as outlined in the following section, 5.7-C. Reinstall the hold down spring and Mu shield. Replace top cover.

5.6-D POWER TRANSFORMER REPLACEMENT

Disconnect AC power cord. Remove top cover. Remove the four (4) mounting screws, lift transformer away from machine, and unplug the transformer.

Plug in the transformer connector. Install the replacement transformer, securing the four (4) screws. Replace cover and reconnect the AC power cord.

5.6-E SOLENOID REPLACEMENT

Refer to figure 5-3.

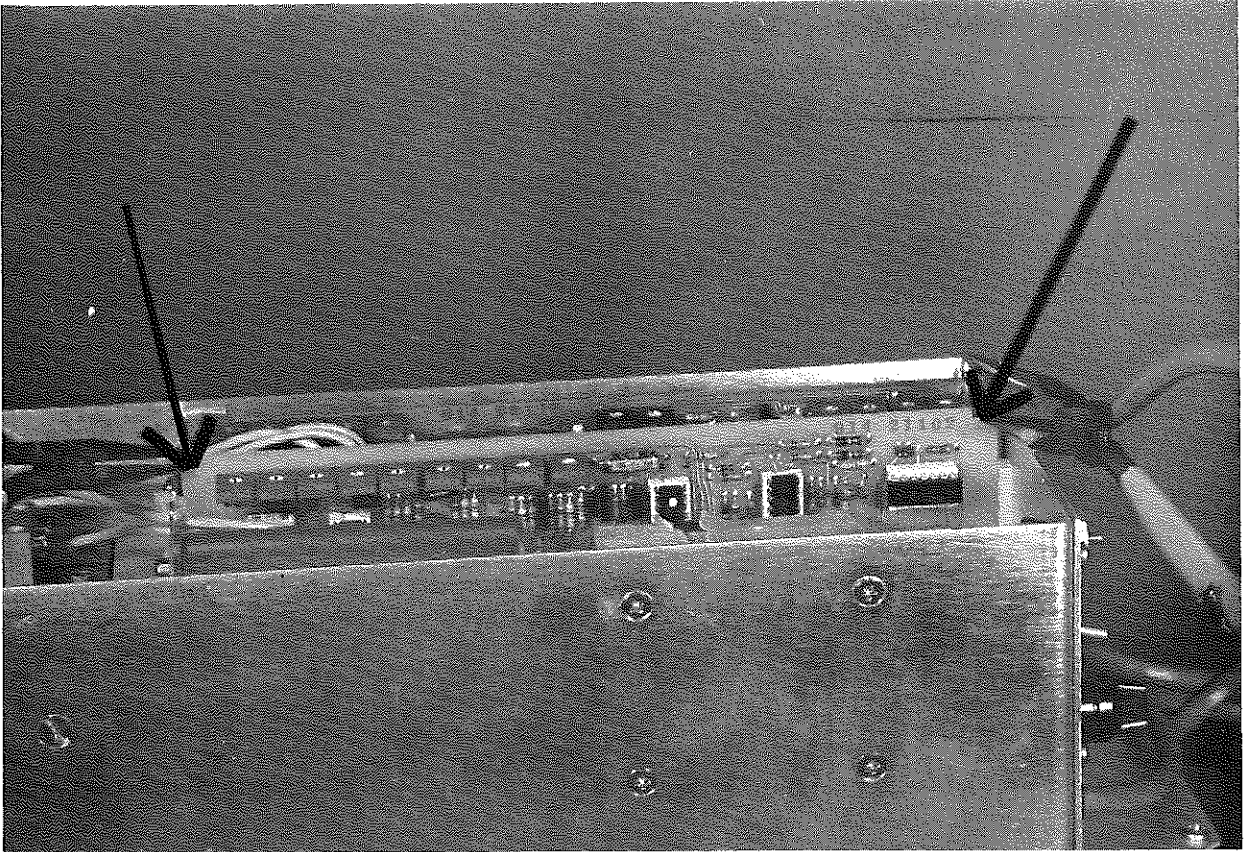


FIGURE 5-2: REMOVAL OF PC BOARDS

Disconnect the AC power cord and remove the top and bottom covers. Unhook the spring from the chain underneath the deck, remove the master chain link and slip the chain out of the modified screw. Manually raise the pressure roller and remove the screw from the roller shaft. Insert the replacement chain in the modified screw. With a small pair of needle nose pliers, fit on the master link and secure it with the lock. Manually raise the pressure roller and reinsert roll pin between 9th and 10th link. See Figure 5-3. Feed the chain through the deck opening and around the chain mounting clamp. Underneath the deck reconnect the spring and chain. Finally, perform the tape deck adjustments described in section, 5.7-B Adjustment.

5.7 MECHANICAL ADJUSTMENTS

5.7-A PRESSURE ROLLER AND CAPSTAN ADJUSTMENT (see Figure 5-4)

Disconnect AC cord, turn off AC power, remove top cover. Raise pressure roller above deck level by manually pushing in the solenoid plunger. Remove pressure roller by removing the E ring and teflon washer. Install Pressure Roller Adjustment Gauge. Press-in on the solenoid plunger, raising the gauge against the capstan. Adjust the position of the motor by loosening the two (2) large #10 phillips head screws on the deck plate. The motor should be positioned such that the axes of the pressure roller gauge and capstan are parallel and their surfaces touch the full length of the pressure roller gauge. Tighten the two motor mounting screws. Remove the pressure roller gauge and install the pressure roller.

NOTE

To avoid damage to the unit, do not operate the solenoid with the pressure roller gauge installed.

5.7-B SOLENOID PLUNGER

Remove the top cover and turn the machine on.

Solenoid plunger travel is determined by the setting of the adjustment stop 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; the solenoid will pull the pressure roller into the drive shaft. 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 the solenoid action. Turn the plunger counter-clockwise for $1\frac{1}{2}$ turns beyond the point where the noise has disappeared and tighten the lock-nut snugly against the end of the plunger.

NOTE

The motor alignment has to be performed prior to this adjustment.

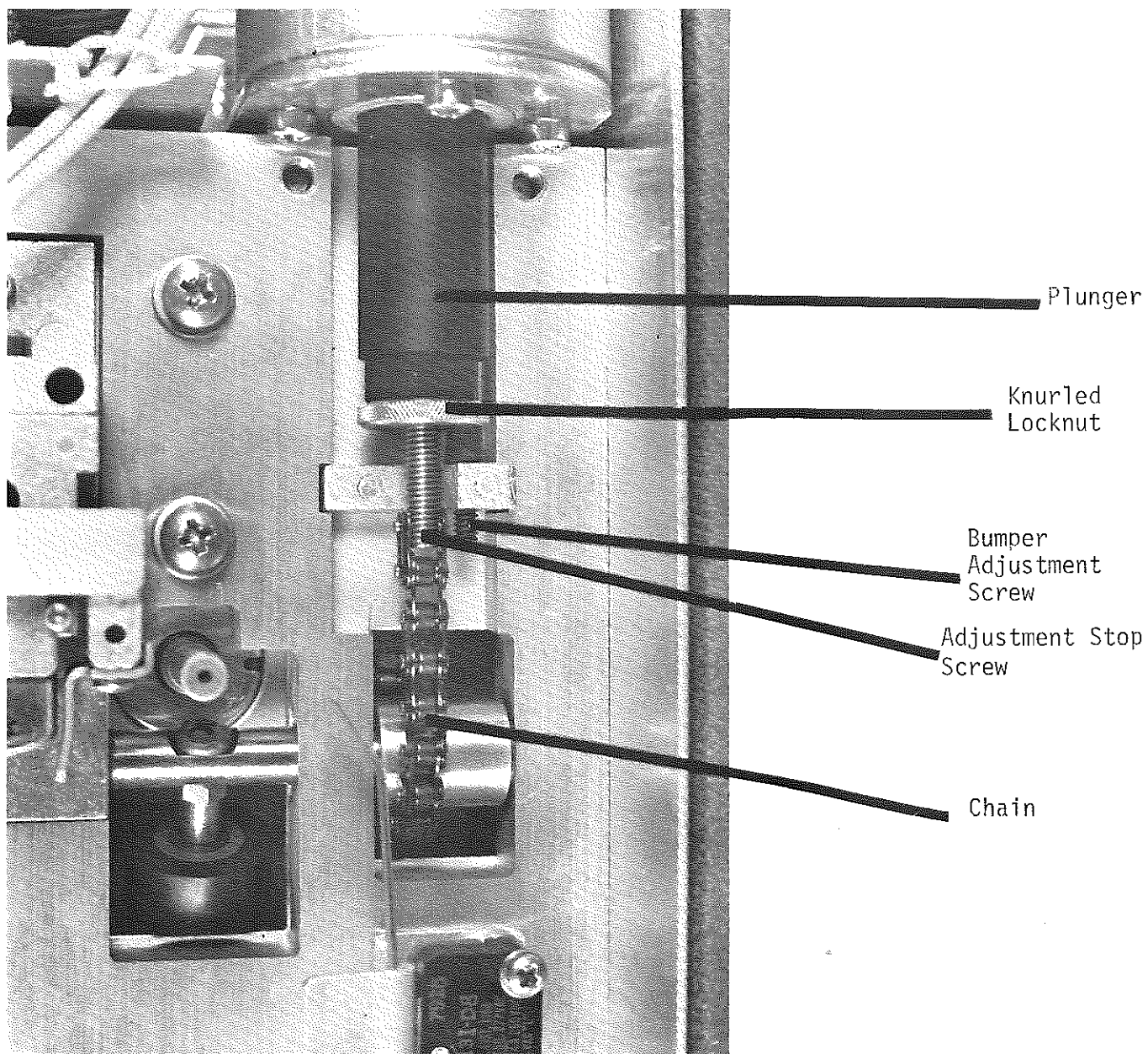


FIGURE 5-3: LOCATION OF SOLENOID PARTS

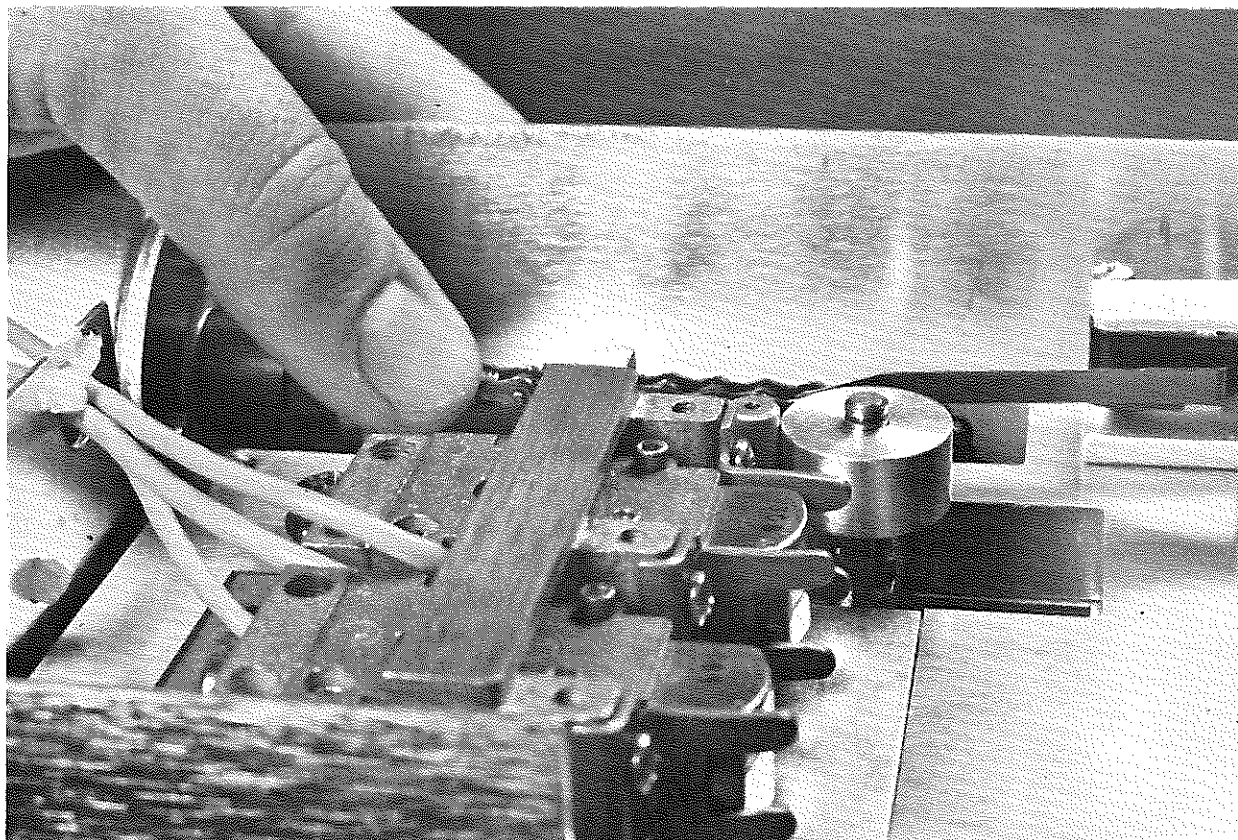


FIGURE 5-4: PRESSURE ROLLER AND CAPSTAN ADJUSTMENT

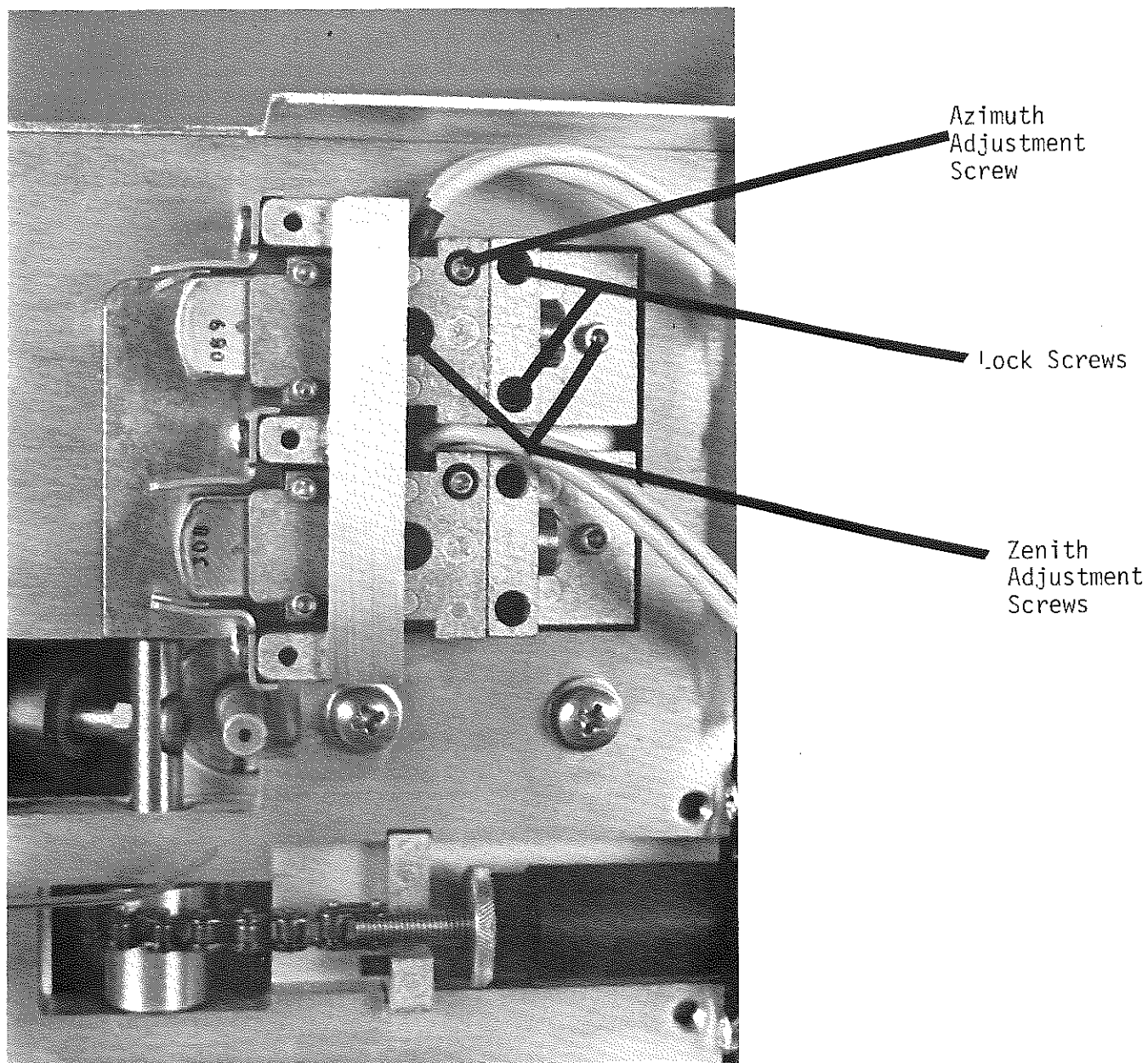


FIGURE 5-5: HEAD ADJUSTMENT SCREW LOCATION

Adjust the solenoid stop screw so that the retracted pressure roller is flush or slightly below the upper surface of the deck plate. See Figure 5-5.

The airdamping device is adjusted by the screw in the base of the solenoid. Turning the screw clockwise increases air pressure, slowing and quieting operation. Turning the screw counter-clockwise increases speed of pull up but also increases noise as the pressure roller hits the capstan.

5.7-C HEAD ADJUSTMENTS

General Consideration: See Figure 5-5 for adjustment screw locations.

Head alignment requires setting the tracking height, head zenith, and head azimuth. Stereophonic units also require performance of a track phasing test. Because of the unique construction of the PHASE-LOK IV head bracket, generally only the azimuth adjustment is required unless the head has been replaced. In record units, the record head is adjusted after the playback head.

An NAB standardized alignment cartridge is required. Two different styles are available from Broadcast Electronics: stock numbers 808-0003 (monophonic NAB type 3) and 808-0004 (monophonic/stereophonic FIDELIPAC 350 STA). The adjustment screws require allen wrenches supplied with each unit.

Other equipment: see-thru "cut away" cartridge.

ZENITH AND HEIGHT

Inspect the tracking height visually with a cut away test cart. Observe the tape as it passes across the head. The tape should just cover the top and bottom of the head pole pieces. (see Figure 5-6) Use the Tape Guide Adjustment Block to check the height of the tape guides. The upper guides should touch the "T" portion of the block.

Loosen the two (2) locking screws to make the following adjustments.

ZENITH -- Use the front and back adjustment screws to adjust the Phase-Lok IV bracket so that the top surface of the base of the bracket is flush with the top surface of the deck (coarse zenith). Using a small square or BE Tape Guide Alignment Block 836-0009, check to see if the head is perpendicular to the deck surface (fine zenith). See Figure 5-6.

HEIGHT -- Lay the gauge block as illustrated in Figure 5-6. The upper pole piece of the head should be even with the top surface of the gauge block. To adjust height, turn both front and rear screws an equal amount to retain the zenith adjustment. Alternate height and zenith adjustment until both are properly adjusted.

When adjustments are completed, tighten the two (2) locking screws equally and snugly, but not too tight. Always recheck zenith after height adjustment.

Verify the adjustments with a cut away test cartridge. The tape should just cover the top and bottom head pole pieces. At start, the tape guides should keep the tape from skewing upward or downward.

Install the hold down spring and Mu-metal shield. Demagnetize the heads and guides with a head degausser before use.

5.7-D AZIMUTH, PHASE ADJUSTMENT

The equipment needed for these adjustments is a Reproduce Alignment Test Cartridge, oscilloscope, (STL #31, BE 808-0004) also, record models will require a bulk-erased new cartridge of the type to be used in the machine, and an audio signal generator.

PLAYBACK HEAD

This should be adjusted before the record head. Turn the machine on and play the Reproduce Alignment Test Cartridge while monitoring the output with the oscilloscope (from either left or right output on stereo models). Adjust the playback head azimuth screw to give peak output level. Remove and reinsert the cartridge several times to verify the adjustments.

PHASE ADJUSTMENT (on stereo models)

Connect the left output to the vertical channel (of oscilloscope) and right output to the horizontal channel as illustrated in Figure 5-7. Trim the playback head azimuth screw yielding a "0" Lissajous pattern (see Figure 5-7) at the nearest position from the present setting. Remove and reinsert cartridge several times to verify the adjustments.

RECORD HEAD (record models only)

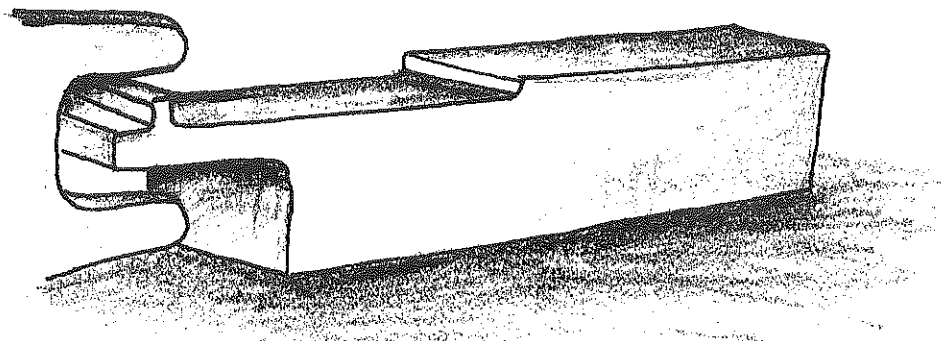
Connect an audio signal generator to the record input. Set the generator for 15kHz. Set record level to -10VU. Monitor output on an oscilloscope. Adjust the record head azimuth screw for peak output level (from the left or the right output on stereo models). Remove and insert the cartridge several times to check adjustments.

PHASE ADJUSTMENT (on stereo models)

Connect the left output to the vertical channel of an oscilloscope, the right output to the horizontal channel as illustrated in Figure 5-7. Trim the record head azimuth screw that yields a "0" Lissajous figure to the nearest position from the present setting. Remove and insert the cartridge several times to check the adjustments.

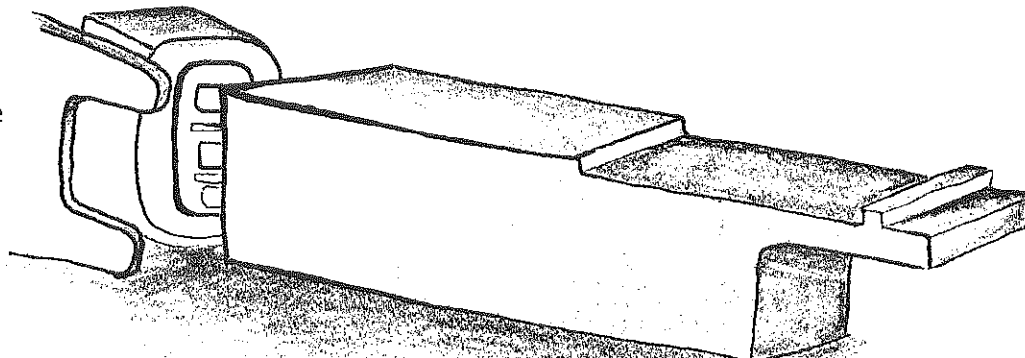
TAPE GUIDE ADJUSTMENT

Tape guide should touch
"T" of block.



HEAD HEIGHT ADJUSTMENT

Top track head should be
same height as block.



ZENITH ADJUSTMENT

Head face should
be at right angle
to deck.

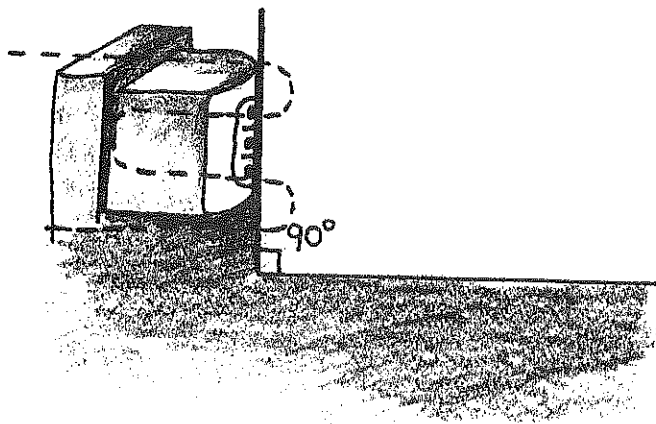


FIGURE 5-6: HEAD AND TAPE GUIDE ADJUSTMENTS
5-16

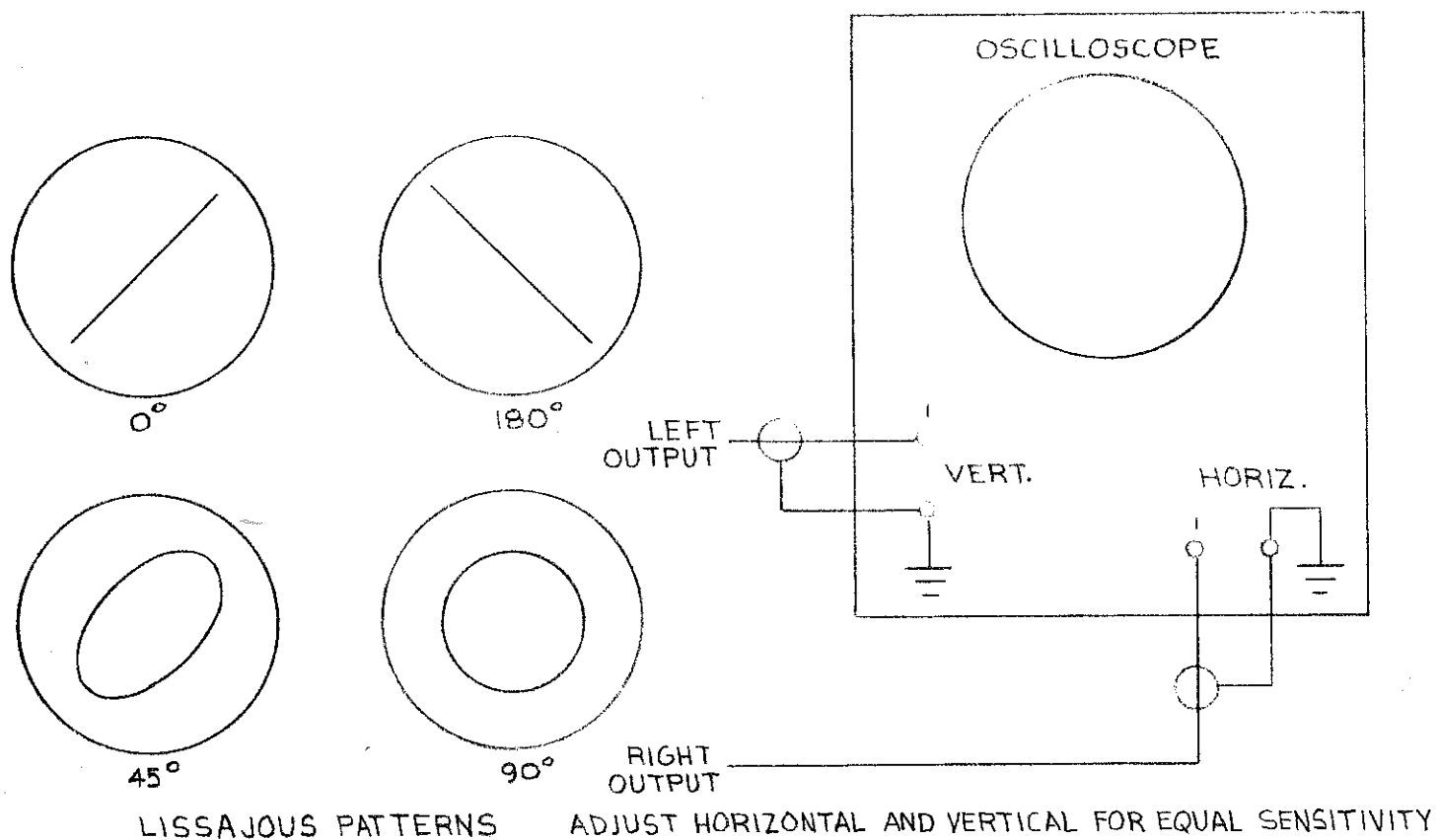


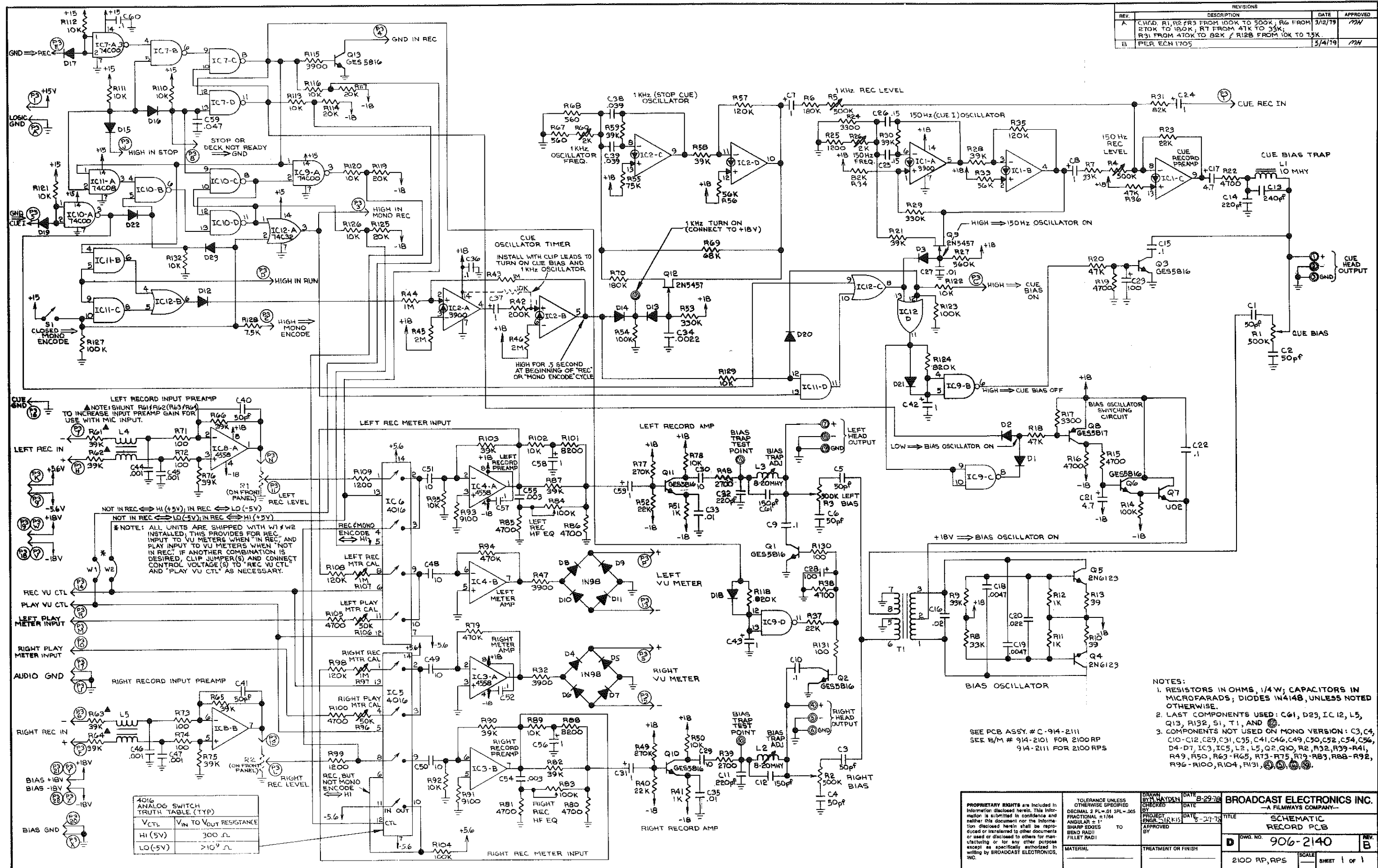
FIGURE 5-7: LISSAJOUS PATTERNS FOR STEREO PHASE ADJUSTMENTS

SECTION 6

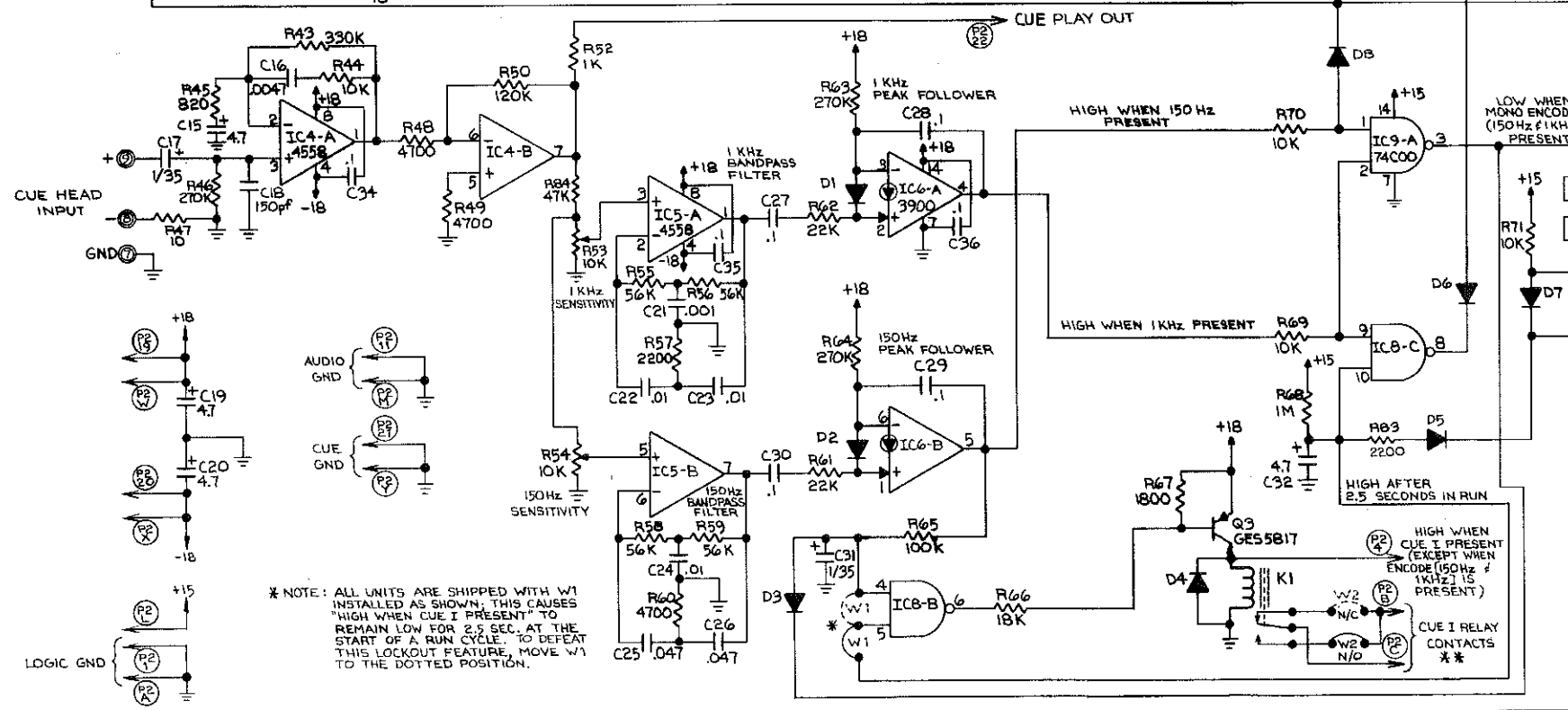
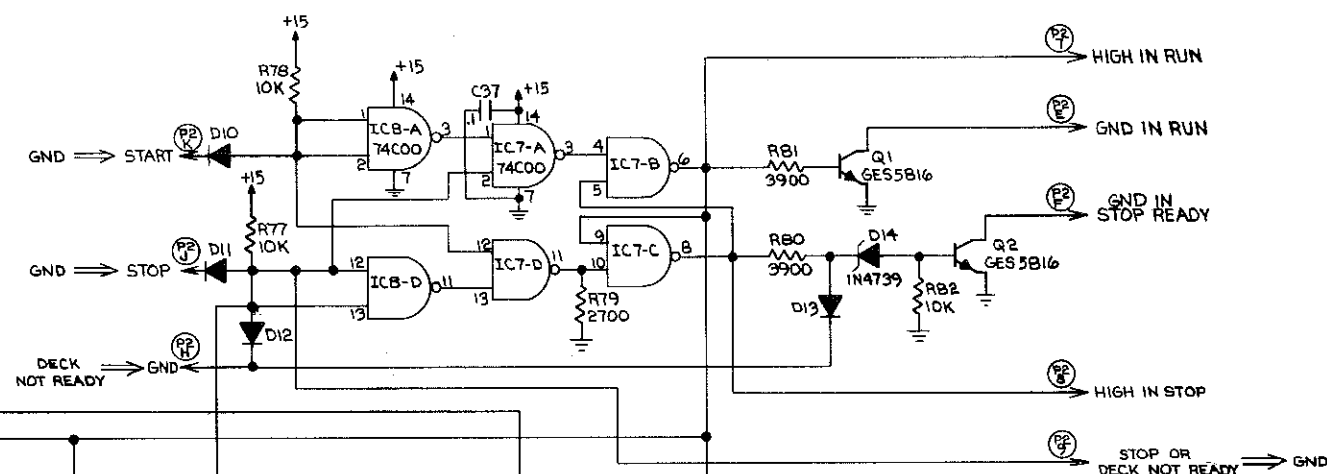
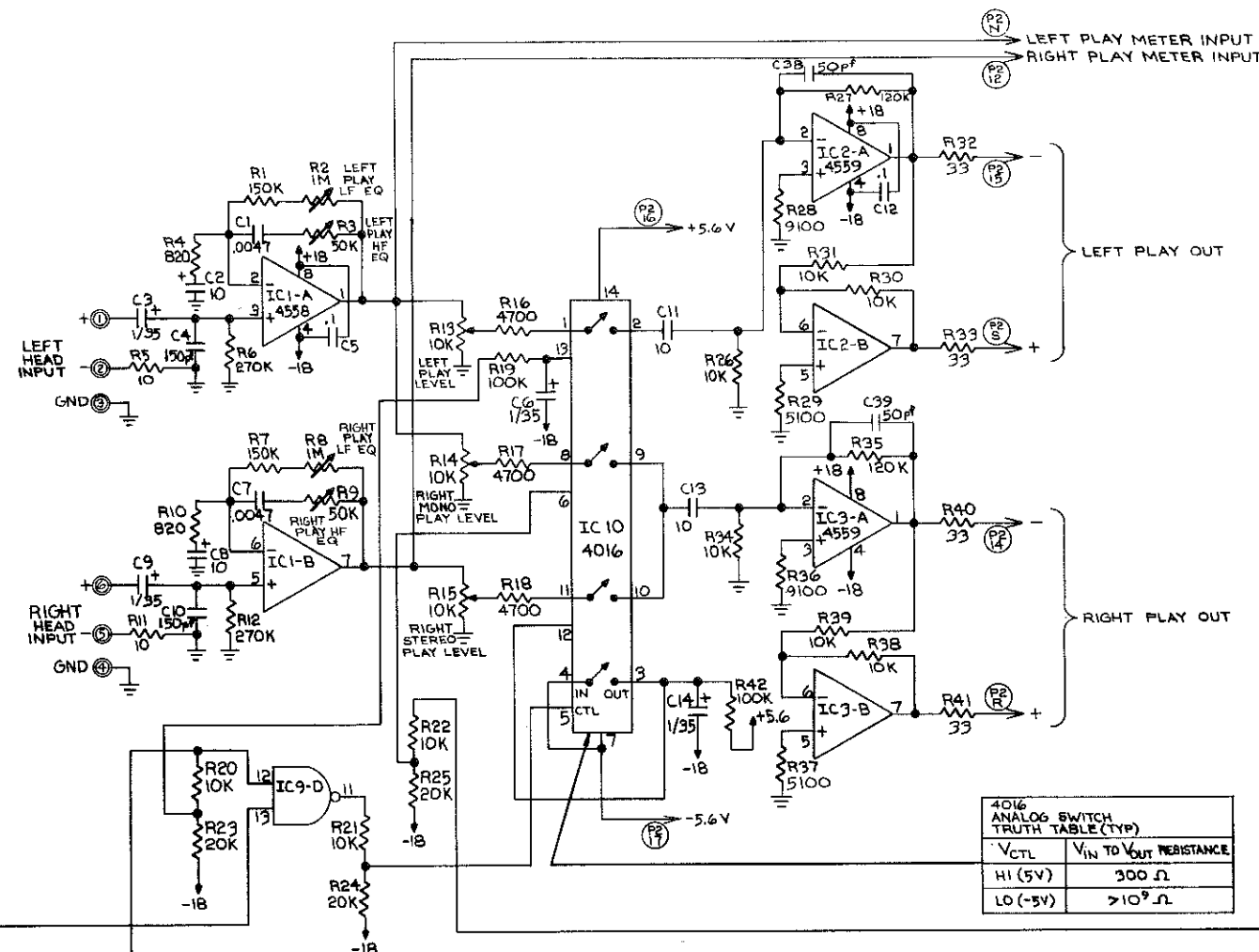
SCHEMATICS

AND

DRAWINGS



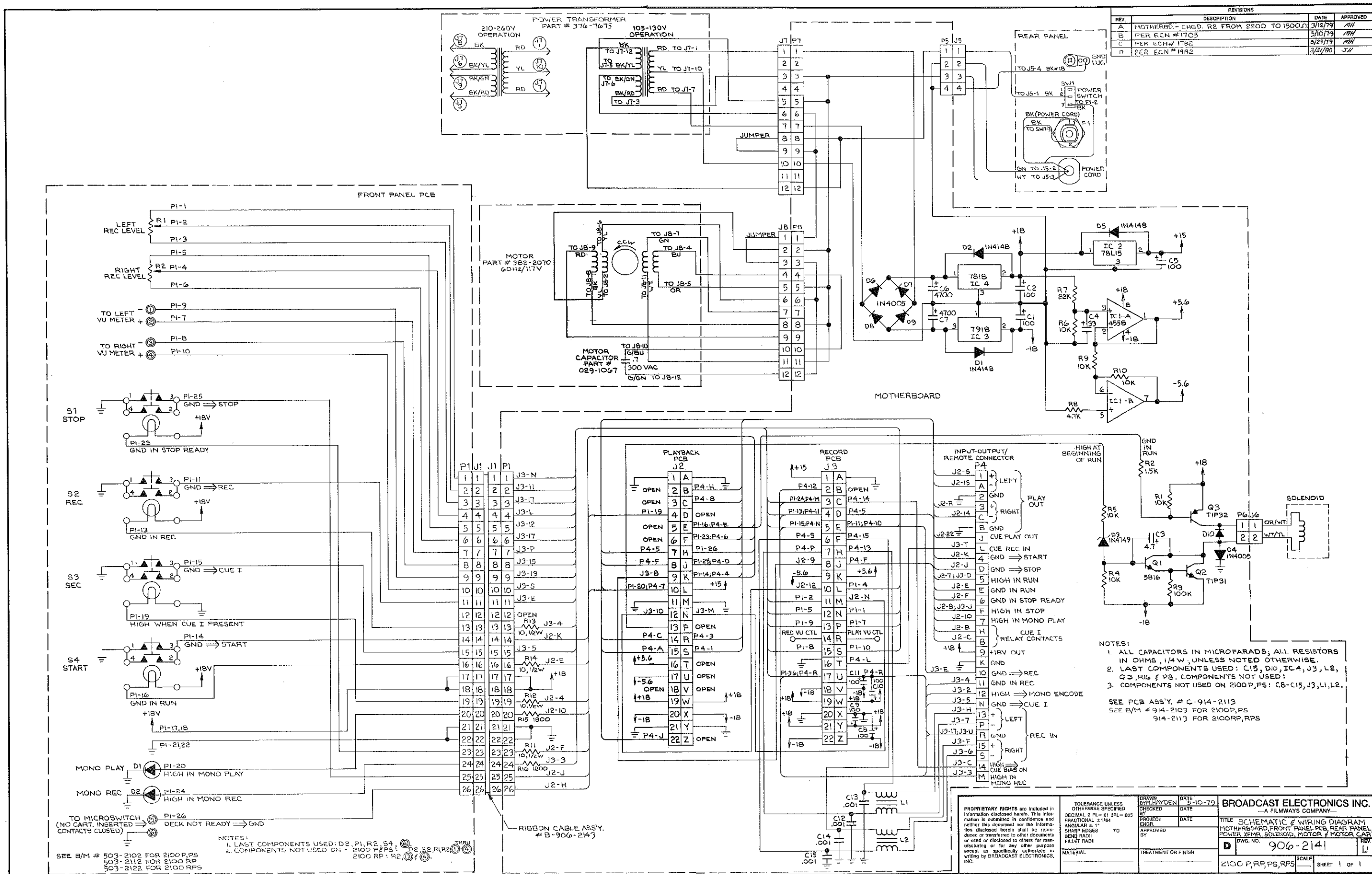
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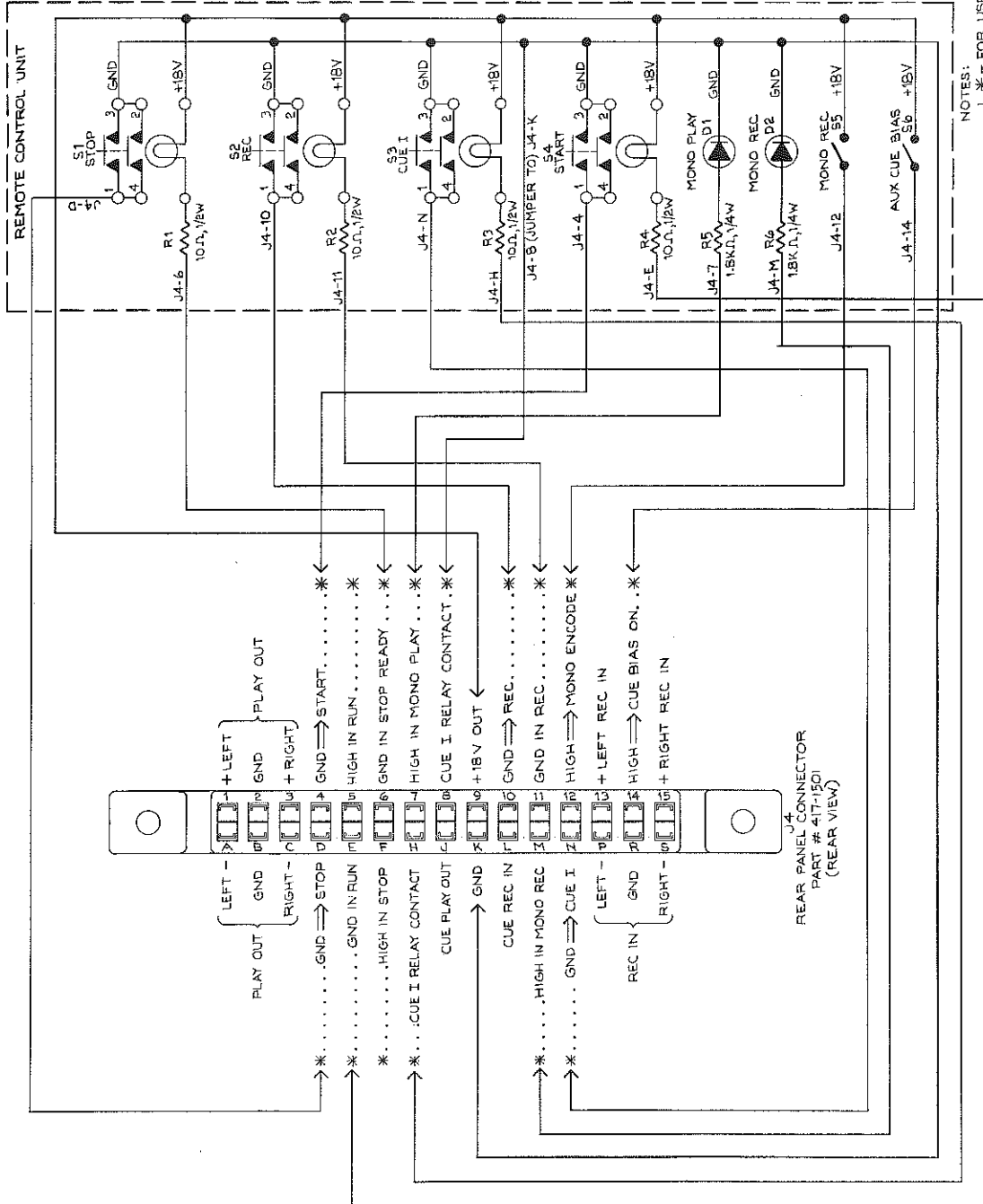
- NOTES:
1. RESISTORS IN OHMS, 1/4-W; CAPACITORS IN MICROFARADS; DIODES IN4148, UNLESS OTHERWISE SPECIFIED.
 2. LAST COMPONENTS USED: C39, D14, IC10, K1, Q3, R84, 1.
 3. COMPONENTS NOT USED: R91
 4. COMPONENTS NOT USED ON MONO VERSIONS: C7-C10, C13, C14, C39, IC3, R7-R12, R14, R15, R17, R18, R21, R22, R24, R25, R34-R42, 1, 1, 1.
- SEE PCB ASSY. # C-914-2110.
SEE B/M # 914-2100 FOR 2100 P, RP
914-2110 FOR 2100 PS, RPS

** NOTE: ALL UNITS ARE SHIPPED WITH W2 INSTALLED AS SHOWN; THIS CAUSES "CUE I RELAY CONTACTS" TO CLOSE WHEN 150 Hz IS HIGH.

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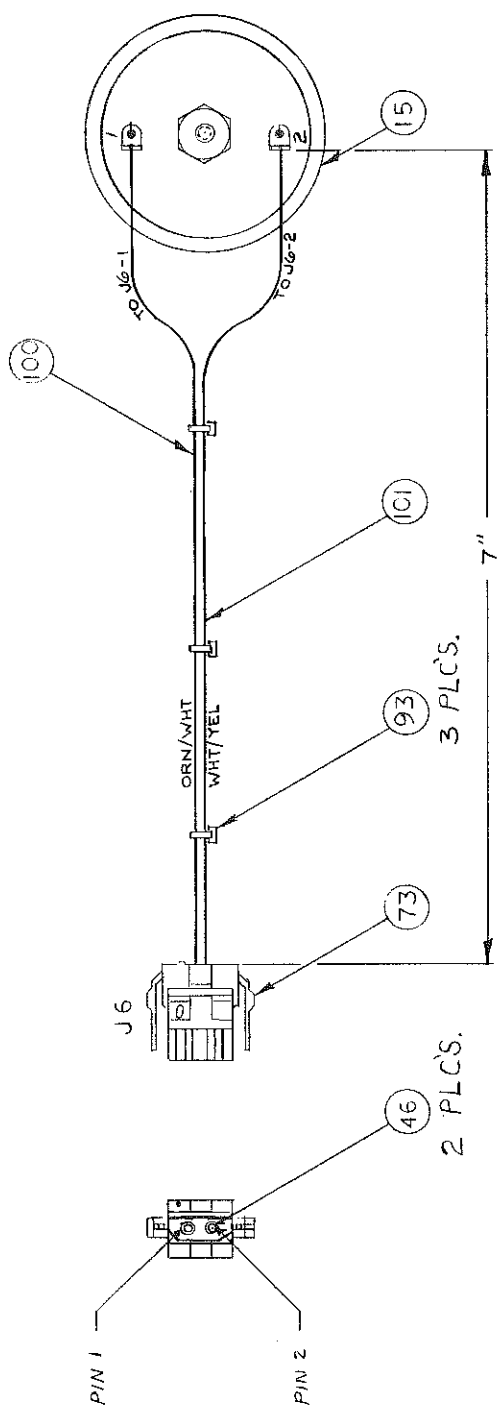
REVISIONS		DATE		APPROVED	
REV.	DESCRIPTION				



NOTES:
1. * - FOR USE WITH REMOTE MONITORING AND CONTROL ONLY.

TO REMOTE MONITORING UNIT OTHERWISE SPECIFIED		DATE 1-17-79		DRAWN BY	
FRACTIONAL 2 PL=01 SPL=005		DATE		CHECKED BY	
SHARP EDGES TO BEND PADS!		DATE		PROJECT	
MATERIAL		DATE		APPROVED BY	
TREATMENT OR FINISH		DATE		BY	
INC.		DATE		BY	
BROADCAST ELECTRONICS INC.		DATE		BY	
TITLE INPUT/OUTPUT & REMOTE WIRING DIAGRAM		DATE		BY	
REAR PANEL CONNECTOR		DATE		BY	
DWG. NO. 906-2252		DATE		BY	
REV.		DATE		BY	
2100 P.P.P.S. RPS		DATE		BY	
SHEET 1 OF 1		DATE		BY	

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
A	CHANGED DIODE ORIENTATION AND REVERSE PINS ON P6 CONNECTOR; LABEL WIRE LENGTH FOR ITEMS 100 & 101.	2-15-79	B E
B	PER ECN #1705	5-7-79	MH
C	PER ECN #1982	3-31-80	JH



SEE B/M NO. 907-2110 FOR 2100P
 907-2111 FOR 2100RP
 907-2112 FOR 2100PS
 907-2113 FOR 2100RPS

PROPRIETARY RIGHTS are included in information disclosed herein. This information is submitted in confidence and shall not be disclosed, in whole or in part, to other documents or used or disclosed to others for manufacturing or for any other purpose except as specifically authorized in writing by BROADCAST ELECTRONICS, INC.		TOLERANCE UNLESS OTHERWISE SPECIFIED DECIMAL 2 PL = .01 3 PL = .005 FRACTIONAL $\pm 1/64$ ANGULAR $\pm 1^\circ$ SHARP EDGES TO BEND RADIUS FILLET RADIUS MATERIAL _____	DRAWN CRM DATE 12-8-78 BY _____ CHECKED DATE _____ BY _____ SUBJECT HWM APPROVED BY _____	BROADCAST ELECTRONICS INC. —A FILMWAYS COMPANY—
			TITLE SOLENOID WIRING DIAGRAM DWG. NO. 906-2237 REV. C	SCALE 2100 P, RP, PS, RPS SHEET 1 OF 1

SECTION 7

PARTS LIST

PARTS LIST: Motherboard PCB - P, PS, RP, RPS models

Schematic: C-906-2141

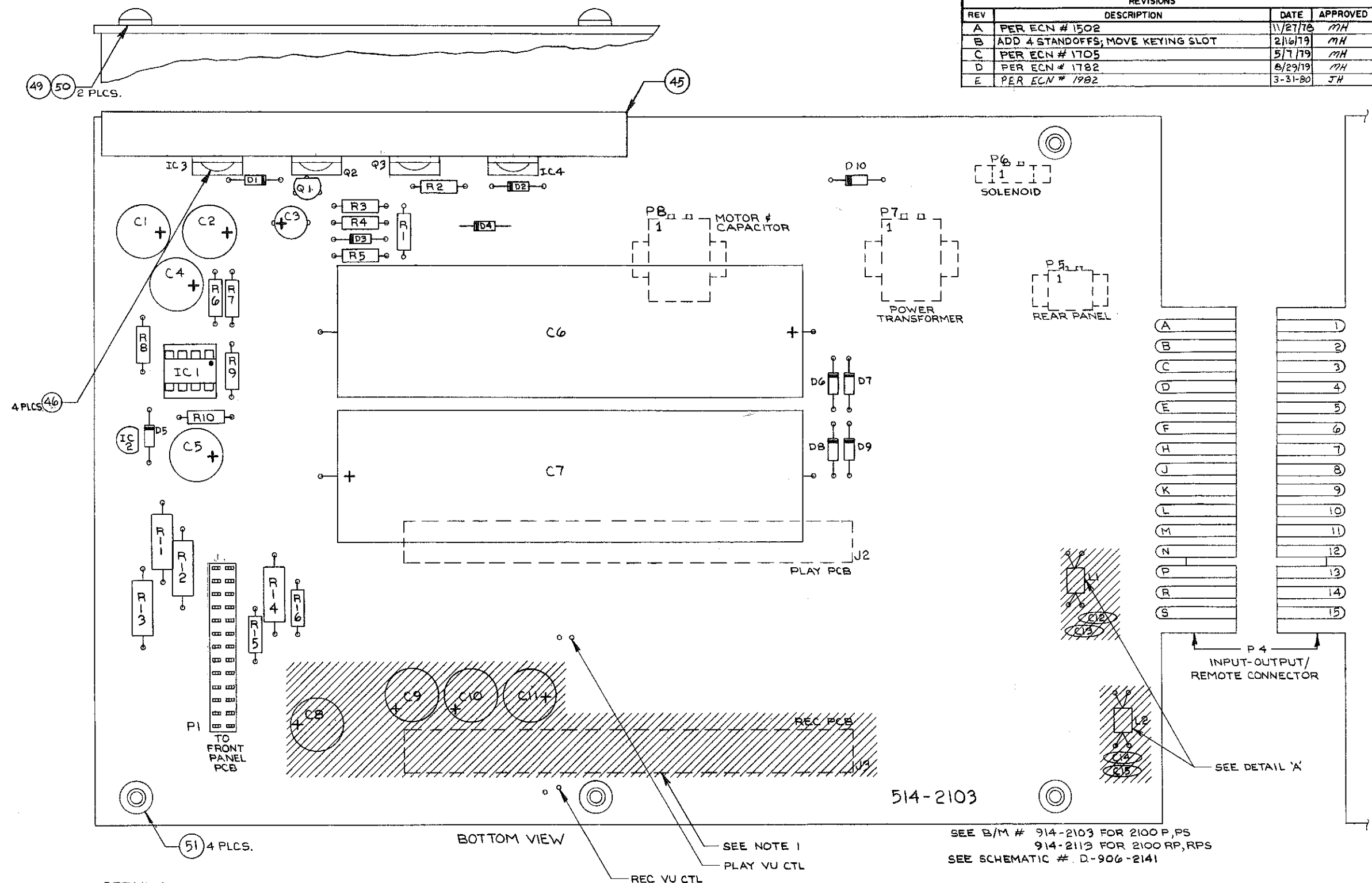
Assembly drawing: C-914-2113

Qty.	Reference Designation	Part Number	Description
	<u>Capacitors:</u>		
7	C1, C2, C5, C8, C9 C10, C11	023-1084	Elec. stand-up, 100MFD, 25V
1	C3	024-4764	Elec. stand-up, 4.7MFD, 35V
1	C4	024-3374	Elec. stand-up, 33MFD, 35V
2	C6, C7	014-4793	Elec., 4700MFD, 50V
4	C12, C13, C14, C15	002-1034	Disc, ceramic, .001MFD, 1000V
	<u>Resistors:</u>		
6	R1, R4, R5, R6, R9 R10	100-1052	10K ohm, $\frac{1}{4}W$
1	R2	100-1543	1500 ohm, $\frac{1}{4}W$
1	R3	100-1063	100K ohm, $\frac{1}{4}W$
1	R7	100-2253	22K ohm, $\frac{1}{4}W$
1	R8	100-4743	4700 ohm, $\frac{1}{4}W$
4	R11, R12, R13, R14	110-1023	100 ohm, $\frac{1}{2}W$
2	R15, R16	100-1843	1800 ohm, $\frac{1}{4}W$
	<u>Diodes:</u>		
3	D1, D2, D5	203-4148	IN4148
1	D3	200-0024	Zener, IN4749
5	D4, D6, D7, D8, D9	203-4005	IN4005
	<u>Transistors:</u>		
1	Q1	211-5816	GES5816
1	Q2	219-0031	TIP-31A
1	Q3	218-0031	TIP-32A

PARTS LIST: Motherboard PCB - P, PS, RP, RPS models
Page 2

Qty.	Reference Designation	Part Number	Description
	<u>Integrated Circuits:</u>		
1	IC1	221-4558	RC4558
1	IC2	227-7815	78L15
1	IC3	227-7918	Voltage regulator -18V
1	IC4	227-7818	Voltage regulator +18V
	<u>Inductors:</u>		
2	L1, L2	360-0001	Ferrite Beads, 1/4" large
	<u>Miscellaneous:</u>		
1		D-514-2103	Blank PCB
4		409-7403	Transistor mounting pad for Q2, Q3 IC3, IC4
1		417-0800	Integrated circuit sockets, 8-pin dip
1	J1	417-2600	Connector, header, 26-pin
2	J2, J3	417-2300	Connector, card edge, 22-pin
1	J5	417-0477	Connector, PCB, mnt., 4-pin
1	J6	417-0700	Connector, PCB mnt., 2-pin
2	J7, &8	417-1276	Connector, PCB mnt., 12-pin
1		B-455-2103	Heatsink-MOTHERBOARD
4			#6-32 x 3 1/16" nylon screw
4"		640-3200	#32 solid enameled wire
2			#6-32 x 1/4 lg. phms
2			#6 split lockwashers
4		440-9638	Standoff-hex, swagged, 1/4
1	66	C-914-2103	PCB assembly, motherboard; P, PS models
1	66	C-914-2113	PCB assembly, motherboard; RP, RPS models

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	PER ECN # 1502	11/27/78	MH
B	ADD 4 STANDOFFS, MOVE KEYING SLOT	2/16/79	MH
C	PER ECN # 1705	5/7/79	MH
D	PER ECN # 1782	8/29/79	MH
E	PER ECN # 1982	3-31-80	JH



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ITEM	QTY	QTD	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°			PCB ASS'Y		
SHARP EDGES			MOTHERBOARD		
BEND RADI			C DWG NO. 914-2113		
FILLET RADI			REV E		
MATERIAL			2100 P,RP,PS,RPS		
TREATMENT OR FINISH			SCALE 2/1		
			SHEET 1 OF 1		

PARTS LIST: Playback PCB - P, PS, RP, RPS models

Schematic: D-906-2139

Assembly drawing: 914-2110

Qty.	Reference Designation	Part Number	Description
	<u>Capacitors:</u>		
3	C1, C7, C16	032-4733	Capacitor, ceramic, .0047MFD, 100V
2	C2, C8	013-1074	Elec., 10MFD, 16V
6	C3, C6, C9, C14, C17 C31	015-1064A	Elec., 1MFD, 35V
3	C4, C10, C18	040-1522	Dipped mica, radial, 150pF, 500V
6	C5, C12, C34, C35 C36, C37	003-1054	Monolythic, ceramic, .1MFD, 50V
2	C11, C13	023-1075	Elec., stand-up, non-polarized, 10MFD, 16V
3	C15, C19, C20	015-5064	Elec., 4.7MFD, 35V
1	C21	030-1033	Molded film, radial, .001MFD, 100V
3	C22, C23, C24	030-1043	Molded film, radial, .01MFD, 100V
2	C25, C26	030-4743A	Molded mylar, radial, .047MFD, 100V
4	C27, C28, C29, C30	030-1053	Dipped film, radial, .1MFD, 100V
1	C32	064-4763	Dipped tant., 4.7MFD, 35V
1	C33	064-1063	Dipped tant., 1MFD, 35V
2	C38, C39	040-5013	Dipped mica, radial, 50pF, 50V
	<u>Resistors:</u>		
2	R1, R7	100-1562	150K ohm, $\frac{1}{4}W$
2	R2, R8	178-1074	*Trimmer, Horiz. Adj., 1M ohm
2	R3, R9	178-5054	*Trimmer, Horiz. Adj., 50K ohm
3	R4, R10, R45	100-8232	820 ohm, $\frac{1}{4}W$
3	R5, R11, R47	100-1023	10 ohm, $\frac{1}{4}W$
5	R6, R12, R46, R63, R64	100-2763	270K ohm, $\frac{1}{4}W$

*Use only Bourne Pots

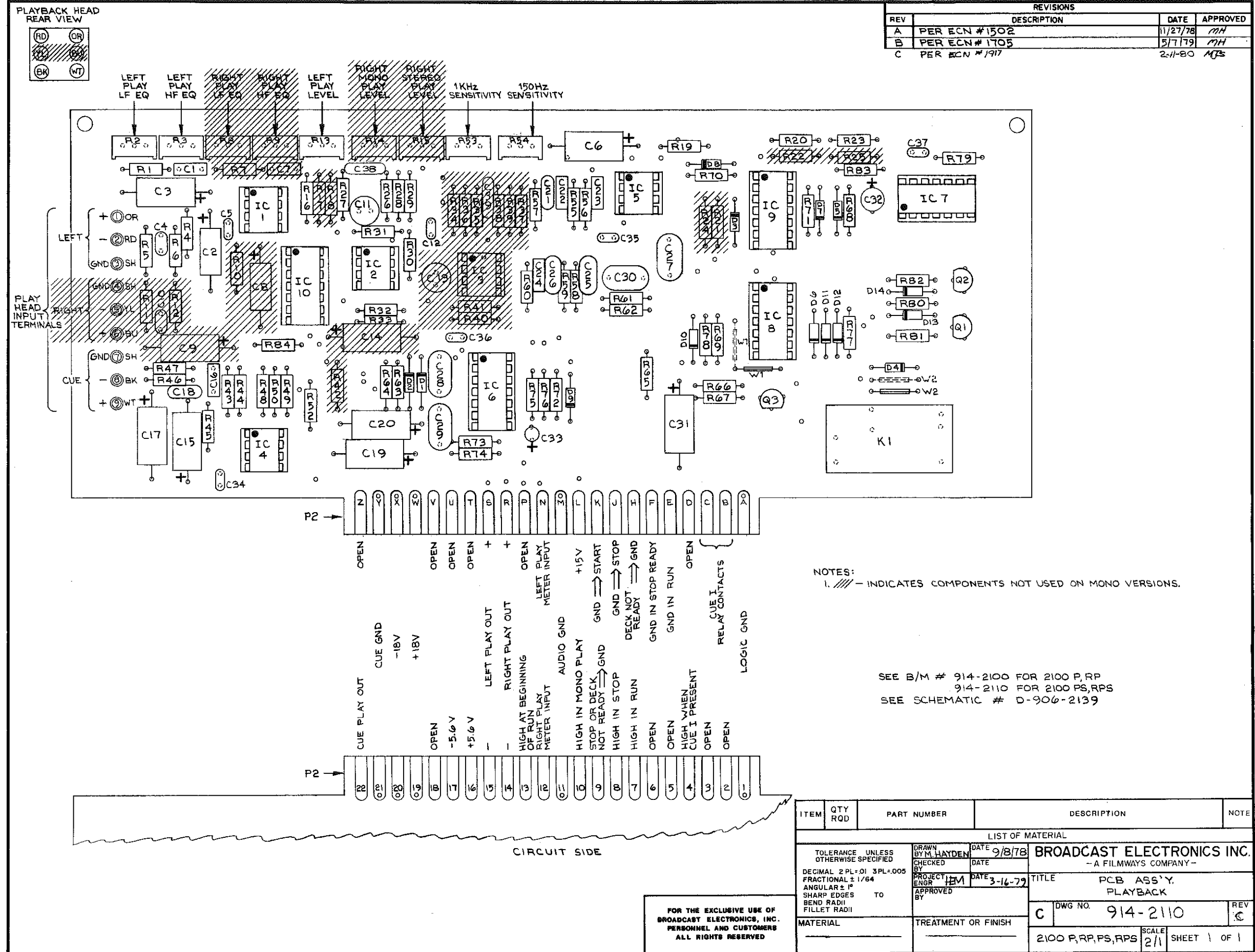
PARTS LIST: Playback PCB - P, PS, RP, RPS models
Page 2

Qty.	Reference Designation	Part Number	Description
	<u>Resistors Cont'd.:</u>		
5	R13, R14, R15, R53, R54	178-1054	*Trimmer, Horiz. Adj. 10K ohm
6	R16, R17, R18, R48, R49 R60	100-4743	4700 ohm, $\frac{1}{4}W$
3	R19, R42, R65	100-1063	10K ohm, $\frac{1}{4}W$
16	R20, R21, R22, R26 R30, R31, R34, R38 R39, R44, R69, R70 R71, R77, R78, R82	100-1052	10K ohm, $\frac{1}{4}W$
3	R23, R24, R25	100-2053	20K ohm, $\frac{1}{4}W$
3	R27, R35, R50	100-1263	120K ohm, $\frac{1}{4}W$
1	R28, R36	100-9142	9100 ohm, $\frac{1}{4}W$
2	R29, R37	100-5143	5100 ohm, $\frac{1}{4}W$
4	R32, R33, R40, R41	100-3322	33 ohm, $\frac{1}{4}W$
1	R43	100-3362	330 ohm, $\frac{1}{4}W$
1	R52	100-1042	1000 ohm, $\frac{1}{4}W$
4	R55, R56, R58, R59	100-5653	56K ohm, $\frac{1}{4}W$
2	R57, R83	100-2242	2200 ohm, $\frac{1}{4}W$
1	R61	100- 8242 8243	8200 ohm, $\frac{1}{4}W$ 5% (ECN 2917)
1	R62	100-1553	15K ohm, $\frac{1}{4}W$
1	R66	100-1853	18K ohm, $\frac{1}{4}W$
1	R67	100-1843	1800 ohm, $\frac{1}{4}W$
3	R68, R72, R76	100-1073	1M ohm, $\frac{1}{4}W$
2	R73, R74	100-2072	2M ohm, $\frac{1}{4}W$
1	R75	100-2062	200K ohm, $\frac{1}{4}W$
1	R79	100-2743	2700 ohm, $\frac{1}{4}W$

*Use only Bourne Pots

PARTS LIST: Playback PCB - P, PS, RP, RPS models
Page 3

Qty.	Reference Designation	Part Number	Description
	<u>Resistors Cont'd.:</u>		
2	R80, R81	100-3943	3900 ohm, $\frac{1}{4}$ W
1	R84	100-4753	47K ohm, $\frac{1}{4}$ W
	<u>Diodes:</u>		
13	D1, D2, D3, D4, D5 D6, D7, D8, D9, D10 D11, D12, D13	203-4148	Diode, 1N4148
1	D14	200-0009	Diode, Zener, 1N4739
	<u>Transistors:</u>		
2	Q1, Q2	211-5816	GES5816
1	Q3	210-5817	GES5817
	<u>Integrated Circuits:</u>		
3	IC1, IC4, IC5	221-4558	RC4558
2	IC2, IC3	221-4559	RC4559
1	IC6	221-3900	LM3900
3	IC7, IC8, IC9	221-7400	MM74C00N
1	IC10	228-8016	CD4016A3
	<u>Miscellaneous:</u>		
1		C-514-2100	Blank PCB
1	K1	270-0024	Relay, SPDT, 24V
5		417-0800	Integrated circuit socket, 8-pin dip
5		417-1400	Integrated circuit socket, 14-pin dip
9	TT1, TT2, TT3, TT4 TT5, TT6, TT7, TT8 TT9	418-0161	Disconnect pin, PCB
1"		601-0022	Wire, Buss, Awg 22
1"		693-0200	Teflon tubing
1	68	C-914-2100	PCB assembly, playback; (mono) P, RP models
1	68	C-914-2110	PCB assembly, playback; (stereo) PS, RPS models



PARTS LIST: Record PCB - RP, RPS models

Schematic: D-906-2140

Assembly drawing: C-914-2111

Qty.	Reference Designation	Part Number	Description
8	Capacitors: C1, C2, C3, C4, C5 C6, C40, C41	040-5013	Dipped mica, radial, 50pF, 50V
14	C7, C8, C24, C31, C37 C42, C43, C53, C56 C58	024-1064	Elec. stand-up, 1MFD, 50V
4	C9, C10, C15, C22	030-1953	Dipped film, radial, .1MFD, 100V
3	C11, C14, C32	040-2223	Dipped mica, radial, 220pF, 50V
2	C12, C61	040-1522	Dipped mica, radial, 150pF, 500V
1	C13	040-2422	Dipped mica, radial, 240pF, 500V
1	C16	030-2043	Dipped film, radial, .02MFD, 100V
2	C17, C21	024-4764	Elec. stand-up, 4.7MFD, 35V
2	C18, C19	032-4733	Ceramic, .0047MFD, 50V
1	C20	031-2243	Dipped film, radial, .022MFD, 200V
2	C23, C28	023-1084	Elec. stand-up, 100MFD, 25V
2	C25, C26	030-1553	Dipped film, radial, .15MFD, 100V
3	C27, C33, C35	030-1043	Molded film, radial, .01MFD, 100V
6	C29, C30, C48, C49 C50, C51	023-1075	Elec. stand-up, nonpolarized, 10MFD 16V
1	C34	031-2033	Molded film, radial, .0022MFD, 200V
4	C36, C52, C57, C60	003-1054	Monolythic, .1MFD, 100V
2	C38, C39	030-3942	Molded film, radial, .039MFD, 100V
4	C44, C45, C46, C47	002-1034	Disc, .001MFD, 1000V
2	C54, C55	030-3033	Molded film, radial, .003MFD, 100V
1	C59	030-4743A	Molded film, radial, .047MFD, 100V

PARTS LIST: Record PCB - RP, RPS models
Page 2

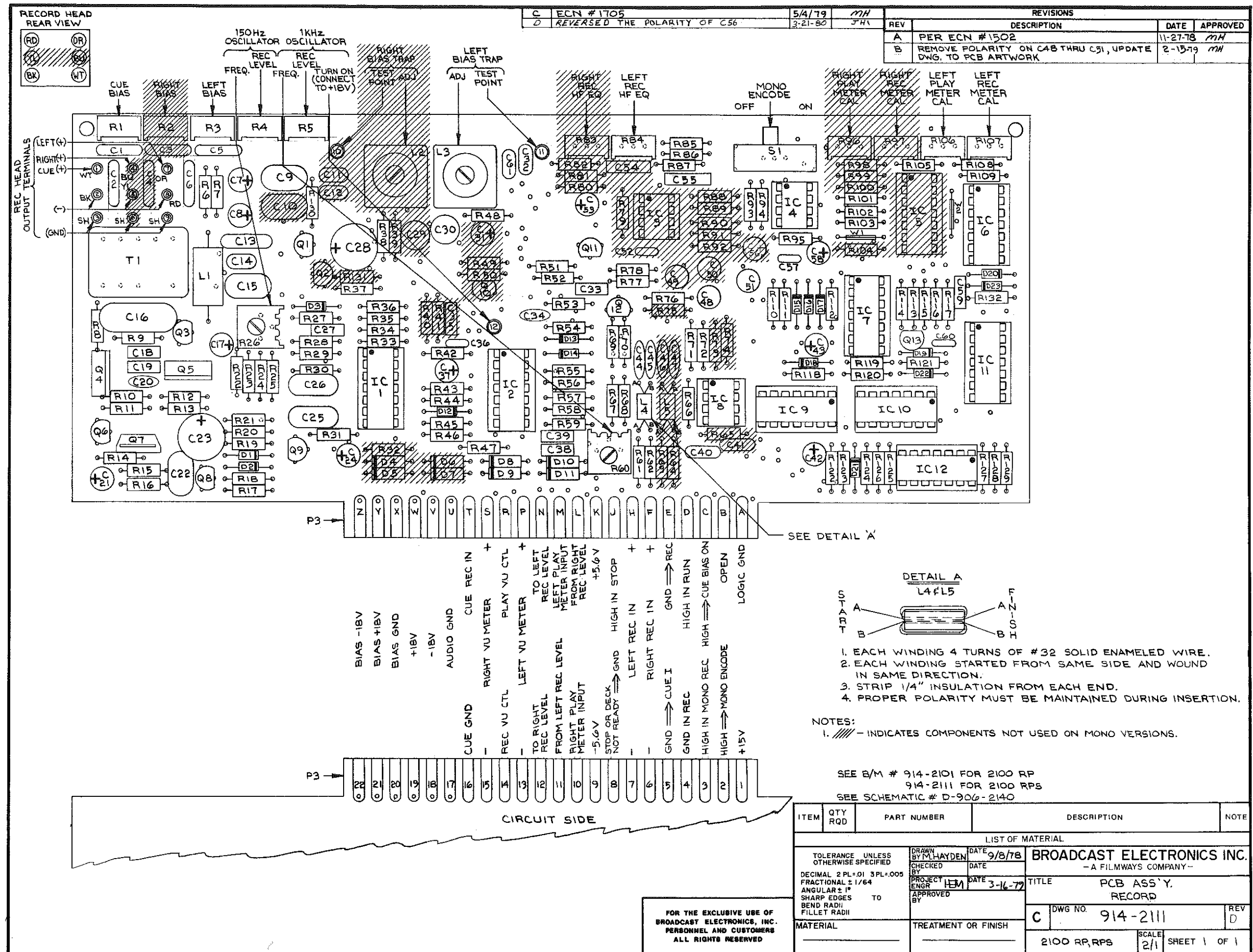
Qty.	Reference Designation	Part Number	Description
	<u>Resistors:</u>		
5	R1, R2, R3, R4, R5	178-5064	Trimmer, Horiz. Adj, 500K ohm
2	R6, R70	100-1863	180K ohm, $\frac{1}{4}W$
3	R7, R8, R9	100-3353	33K ohm, $\frac{1}{4}W$
2	R10, R13	100-3922	39 ohm, $\frac{1}{4}W$
4	R11, R12, R41, R51	100-1042	1K ohm, $\frac{1}{4}W$
4	R14, R54, R104, R123 R127	100-1063	100K ohm, $\frac{1}{4}W$
11	R15, R16, R19, R22 R38, R80, R81, R85 R86, R100, R105	100-4743	4700 ohm, $\frac{1}{4}W$
3	R17, R24, R25	100-3343	3300 ohm, $\frac{1}{4}W$
3	R18, R20, R36	100-4753	47K ohm, $\frac{1}{4}W$
17	R21, R28, R30, R58 R59, R61, R62, R63 R64, R65, R66, R75 R76, R82, R87, R90 R103	100-3952	39K ohm, $\frac{1}{2}W$
4	R23, R37, R40, R52	100-2253	22K ohm, $\frac{1}{4}W$
2	R26, R60	177-2044	Trimmer, Vert. Adj., 2K ohm
1	R27	100-5662	560K ohm, $\frac{1}{4}W$
2	R29, R53	100-3362	330K ohm, $\frac{1}{4}W$
2	R31, R34	100-8253	82K ohm, $\frac{1}{4}W$
3	R32, R47, R115	100-3943	3900 ohm, $\frac{1}{4}W$
2	R33, R56	100-5653	56K ohm, $\frac{1}{4}W$
4	R35, R57, R98, R108	100-1263	120K ohm, $\frac{1}{4}W$
2	R39, R48	100-2743	2700 ohm, $\frac{1}{4}W$
1	R42	100-2062	200K ohm, $\frac{1}{4}W$
2	R43, R44	100-1073	1M ohm, $\frac{1}{4}W$
2	R45, R46	100-2072	2M ohm, $\frac{1}{4}W$

PARTS LIST: Record PCB - RP, RPS models
Page 3

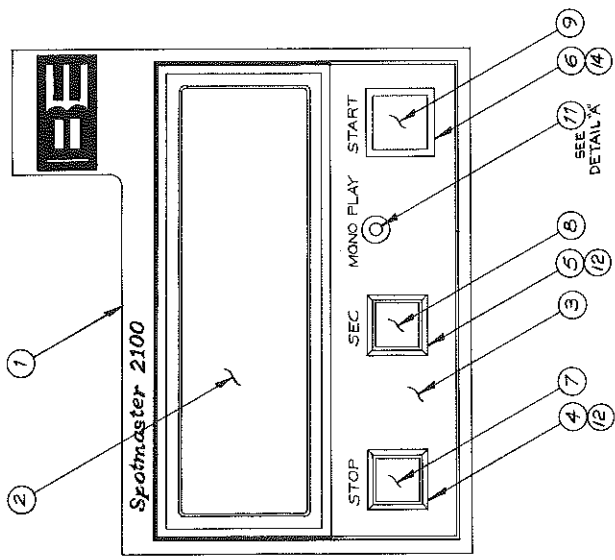
Qty.	Reference Designation	Part Number	Description
	<u>Resistors Cont'd.:</u>		
2	R49, R77	100-2763	270K ohm
17	R50, R78, R89, R92 R95, R102, R110, R111 R112, R113, R116 R120, R121, R122 R126, R129, R132	100-1052	10K ohm, $\frac{1}{4}$ W
1	R55	100-7552	75K ohm, $\frac{1}{4}$ W
2	R67, R68	100-5633	560 ohm, $\frac{1}{4}$ W
1	R69	100-6853	68K ohm, $\frac{1}{4}$ W
6	R71, R72, R73, R74 R130, R131	100-1033	100 ohm, $\frac{1}{4}$ W
2	R79, R94	100-4762	470K ohm, $\frac{1}{4}$ W
2	R83, R84	178-1064	Trimmer, Horiz. Adj., 100K ohm
2	R88, R101	100-8242	8200 ohm, $\frac{1}{4}$ W
2	R91, R93	100-9142	9100 ohm, $\frac{1}{4}$ W
2	R96, R106	178-5054	Trimmer, Horiz. Adj., 50K ohm
2	R97, R107	178-1074	Trimmer, Horiz. Adj., 1M ohm
2	R99, R109	100-1243	1200 ohm, $\frac{1}{4}$ W
4	R114, R117, R119, R125	100-2053	20K ohm, $\frac{1}{4}$ W
2	R118, R124	100-8263	820K ohm, $\frac{1}{4}$ W
1	R128	100-7543	7.5K ohm, $\frac{1}{4}$ W
	<u>Diodes:</u>		
5	D1, D2, D3, D12 D23	203-4148	1N4148
8	D4, D5, D6, C7, D8 D9, D10, D11	202-0098	1N98
	<u>Transistors:</u>		
7	Q1, Q2, Q3, Q6 Q10, Q11, Q13	211-5816	GES5816

PARTS LIST: Record PCB - RP, RPS models
Page 4

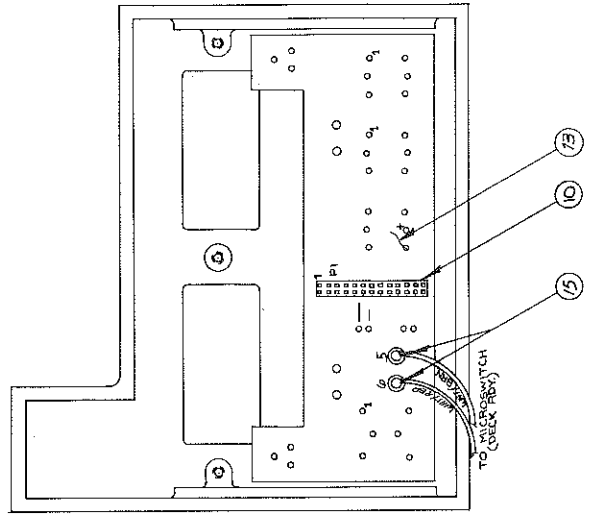
Qty.	Reference Designation	Part Number	Description
<u>Transistors Cont'd.:</u>			
2	Q4, Q5	219-0031	2N6123
2	Q9, Q12	212-5457	2N5457
<u>Integrated Circuits:</u>			
2	IC1, IC2	221-3900	LM3900
3	IC3, IC4, IC8	221-4558	RC4558
2	IC5, IC6	228-8016	CD4016AE
3	IC7, IC9, IC10	221-7400	MM74C00N
1	IC11	221-7408	MM74C08N
1	IC12	221-7432	MM74C32N
<u>Miscellaneous:</u>			
1	S1	345-0120	Switch, SPST, slide
1	L1	364-0670	Choke, 10MHY
2	L2, L3	363-9061	Inductor, Adj., 8-20MHY
2	L4, L5	360-0001	Ferrite Bead, 1/4" LG.
1	T1	372-0095	XFMR, Bias Oscillator
9	TT1, TT2, TT3, TT4 TT5, TT6, TT7, TT8 TT9	418-0161	Disconnect pin, PCB
3	TT10, TT11, TT12	413-1597	Turret Terminal, D bl. shldr.
1"		601-0022	Wire, buss, Awg 22
4"		640-3200	#32 solid enameled wire
1"		693-0200	Teflon tubing
1	67	C-914-2101	PCB assembly, record; (mono) RP model
1	67	C-914-2111	PCB assembly, record; (stereo) RPS model



REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	PER ECN # 1755	6-27-74	GM
B	PER ECN # 2246	8-12-80	MM

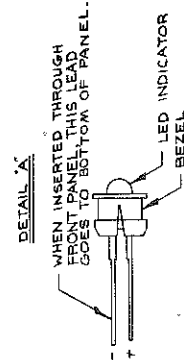


FRONT VIEW



REAR VIEW

- NOTES:
- ASSEMBLY PROCEDURE:
 - CLEAN FRONT PANEL (ITEM 1) WHERE OVERLAYS (ITEM 2 & 3) LAYS (ITEMS 2 & 3).
 - INSERT LAMPS (ITEMS 12 & 14) INTO SWITCHES (ITEMS 4 & 6) AND INDICATOR (ITEM 9). INSERT LAMPS INTO SWITCHES (ITEMS 11 & 13) AND INDICATOR (ITEM 10) INTO FRONT PANEL.
 - PER DETAIL A: INSERT LED ASS'Y INTO FRONT PANEL.
 - SOLDER CONNECTOR (ITEM 10) AND TURRET TERMINALS (ITEM 15) TO PART NO. SIDE OF PCB BLANK (ITEM 13).
 - ATTACH TURRET TERMINALS TO SWITCHES (ITEMS 7, 8 & 9) AND LED INDICATOR PER ASS'Y DWG.
 - SOLDER WIRE (ITEM 16) TO TURRET TERMINAL NO. 5 AND WHT/RED WIRE (ITEM 16) TO TURRET TERMINAL NO. 6.



SEE B/M NO. 503-2102
SEE SCHEMATIC NO. B-906-2142

ITEM	QTY	ROD	PART NUMBER	DESCRIPTION	NOTE
LIST OF MATERIAL					
TOLERANCE UNLESS OTHERWISE SPECIFIED					
DECIMAL 2 PL. 01 3 PL. 005					
FRACTIONAL 2 1/64					
ANGULAR 2 1/64					
BEND RADIUS TO					
Fillet Radii					
MATERIAL					
DATE 20-75					
BROADCAST ELECTRONICS INC.					
-A FILMWAYS COMPANY-					
TITLE ASSEMBLY					
DATE 3-14-79					
APPROVED					
TREATMENT OR FINISH					
DWG NO. 503-2102					
SCALE 1/1					
2/00 P.P.S					
SHEET 1 OF 1					

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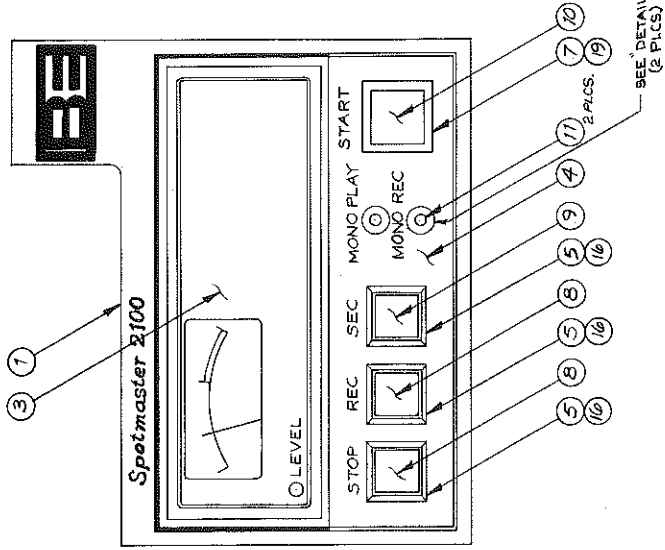
PARTS LIST: Front Panel Assembly - P, PS models

Schematic: 906-2141

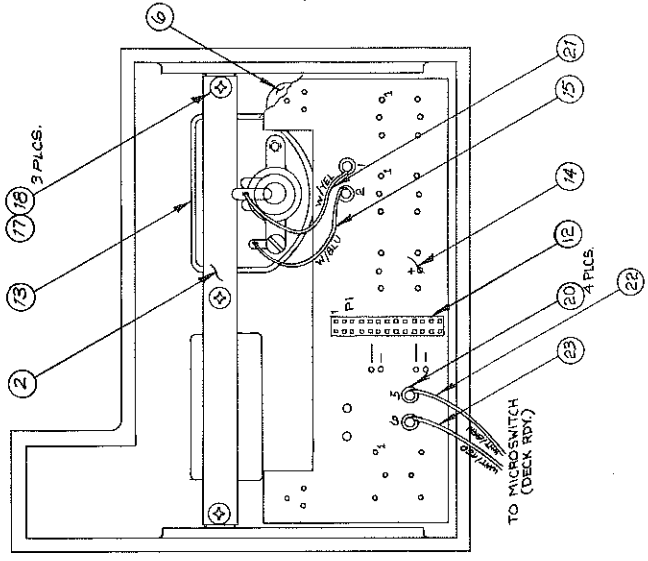
Assembly drawing: 503-2102

Qty.	Reference Designation	Item Number	Broadcast Electronics Part Number	Description
1		1	D-460-0004	Front panel casting
1		2	B-596-0004	Upper overlay - P, PS models
1		3	B-596-0001	Lower overlay - P, PS models
1		4	343-0175	Switch, STOP
1		5	343-0155	Indicator, SEC
1		6	343-0225	Switch, START
1		7	343-0176	Switch cap, Red; STOP
1		8	343-0156	Switch cap, White; SEC
1		9	343-0226	Switch cap, Green; START
1		10	417-2600	Connector, header, dual 13-pin
1		11	323-0023	LED indicator and bezel
2		12	321-0085	Lamp, type 85, wedge mount
1		13	B-514-2102	PCB blank, front panel
1		14	321-0327	Lamp, type 327
1		15	413-1597	Turret terminal
6"		16	601-2212	Wire, Awg 22, Wht/Red
6"		17	601-2211	Wire, Awg 22, Wht/Brn

REV	DESCRIPTION	DATE	APPROVED
A	PER ECN #1735	8-27-74	SH
B	PER ECN #2246	8-12-80	M/M



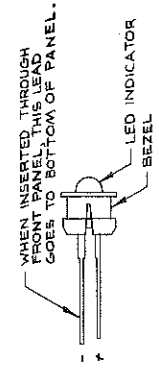
FRONT VIEW



REAR VIEW

- NOTES:
- ASSEMBLY PROCEDURE:
 - CLEAN FRONT PANEL (ITEM 1) WHERE OVERLAYS (ITEMS 2 & 4) ARE LOCATED. ATTACH OVERLAYS (ITEMS 2 & 4).
 - INSERT LAMPS (ITEMS 16 & 19) INTO SWITCHES (ITEMS 5 & 7).
 - INSERT SWITCHES INTO FRONT PANEL. NOTE POSITION OF PINS ON SWITCHES IN RELATION TO HOLES IN PCB (ITEM 14).
 - PER DETAIL A, INSERTED ASS'Y INTO FRONT PANEL.
 - SOLDER CONNECTOR (ITEM 2) AND TURRET TERMINALS (ITEM 20) TO PART NO. SIDE OF PCB BLANK (ITEM 14).
 - SOLDER 10K POT (ITEM 6) TO ASS'Y. SIDE OF PCB PER ASSY. DWG. CH. PCB (ITEM 14) TO SWITCHES AND LED INDICATORS PER ASSY. DWG. AND SOLDER.
 - INSERT METER (ITEM 13) THROUGH REAR OF FRONT PANEL. POSITION VU METER BRKT. (ITEM 2) PER ASSY. DWG. AND INSERT ITEMS 17 & 18.
 - INSERT ITEMS 15, 21, 22 & 23 PER ASSY. DWG.
 - ATTACH SWITCH CAPS (ITEMS 8, 9 & 10) TO SWITCHES PER ASSY. DWG.

DETAIL A



SEE B/M NO. 503-2112
SEE SCHEMATIC NO. B-906-2142

ITEM	QTY	ROD	PART NUMBER	DESCRIPTION	NOTE
LIST OF MATERIAL					
BROADCAST ELECTRONICS INC.					
- A FILMWAYS COMPANY -					
TITLE: ASSEMBLY					
FRONT PANEL					
DWG NO. 503-2112					
REV B					
SCALE 1/1					
SHEET 1 OF 1					

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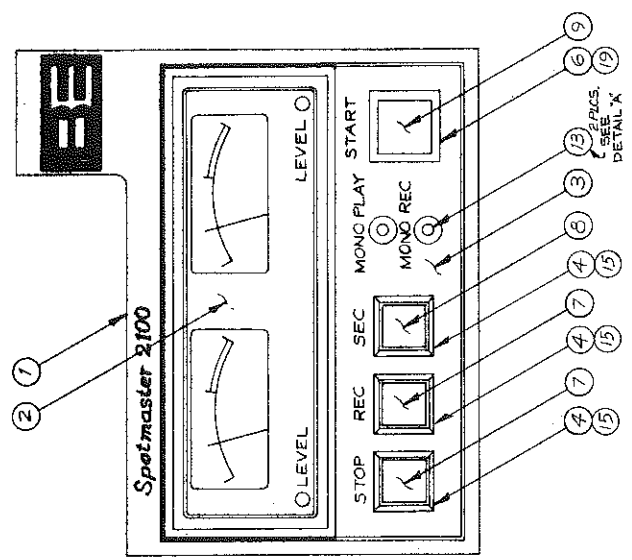
PARTS LIST: Front Panel, RP model

Schematic: D-906-2141

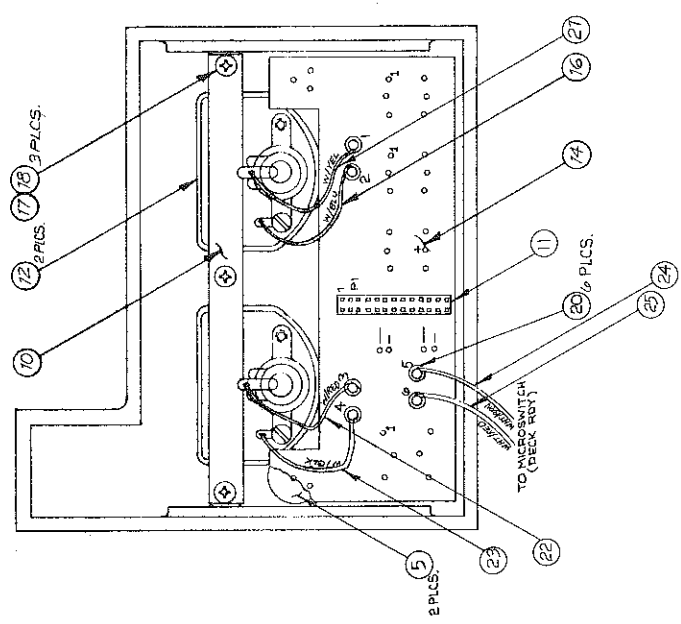
Assembly drawing: 503-2112

Qty.	Reference Designation	Item Number	Broadcast Electronics Part Number	Description
1		1	D-460-0004	Front panel casting
1		2	A-471-0044	Bracker, VU meter
1		3	B-596-0003	Upper overlay -RP Mono
1		4	B-596-0000	Lower overlay - RP
3		5	343-0175	Switch, STOP, REC, SEC
1		6	191-1053D	Pot, 10K ohm
1		7	343-0225	Switch, START
2		8	343-0176	Switch cap, red; STOP, REC
1		9	343-0156	Switch cap, white; SEC
1		10	343-0226	Switch cap, green; START
2		11	323-0023	LED indicator and brezel
1		12	417-2600	Connector, header, dual 13-pin
1		13	319-0081	VU meter
1		14	B-514-2102	PCB blank, front panel
3"		15	601-2218	Wire, 22 GA, Wht/Blue
3		16	321-0085	Lamp, type 85, wedge mount
3		17		#6-32 x 1/4 phillips head metal screws
3		18		#6 split lock washer
1		19	321-0327	Lamp, type 327
4		20	413-1597	Turret terminal
3"		21	601-2213	Wire, 22 GA, Wht/Yel
6"		22	601-2211	Wire, 22 GA, Wht/Brn
6"		23	601-2212	Wire, 22 GA, Wht/Red

REV	DESCRIPTION	DATE	APPROVED
A	REVERSED WIRES ON TT3 & 4	3-7-79	MW
B	PER ECN #1755	6-27-79	GM
C	PER ECN #2246	8-12-80	MW



FRONT VIEW

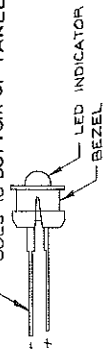


REAR VIEW

- NOTES:
- ASSEMBLY PROCEEDURE:
 - CLEAN FRONT PANEL (ITEM 1) WHERE OVERLAYS (ITEMS 2 & 3) WILL BE IN CONTACT WITH FRONT PANEL. ATTACH OVERLAYS (ITEMS 2 & 3).
 - INSERT LAMPS (ITEMS 15 & 19) INTO SWITCHES (ITEMS 4 & 6).
 - INSERT SWITCHES INTO FRONT PANEL. NOTE POSITION OF PINS ON SWITCHES IN RELATION TO HOLES IN PCB (ITEM 14).
 - ASSEMBLE LED INDICATORS (ITEMS 12) AND LED BEZEL PANEL (ITEM 13).
 - SOLDER CONNECTOR (ITEM 11) AND TURRET TERMINALS (ITEM 20) TO PART NO. SIDE OF PCB BLANK (ITEM 14).
 - SOLDER OK POTS (ITEM 5) TO ASSY SIDE OF PCB PER ASSY. DWG.
 - ATTACH PCB (ITEM 14) TO SWITCHES AND LED INDICATORS PER ASSY. DWG.
 - INSERT METERS (ITEM 12) THROUGH REAR OF FRONT PANEL. POSITION VU METER BRKT. (ITEM 10) PER ASSY. DWG. AND INSERT ITEMS 17 & 18.
 - SOLDER ITEMS 16, 21, 22, 23, 24, 25 PER ASSY. DWG.
 - ATTACH SWITCH CAPS (ITEMS 7, 8 & 9) TO SWITCHES PER ASSY. DWG.

DETAIL X

WHEN INSERTED THROUGH FRONT PANEL, THIS LEAD GOES TO BOTTOM OF PANEL.



SEE B/M NO. 503-2122
SEE SCHEMATIC NO. B-906-2142

ITEM	QTY	ROD	PART NUMBER	DESCRIPTION	NOTE
LIST OF MATERIAL					
BROADCAST ELECTRONICS INC.					
- A FILMWAYS COMPANY -					
TITLE FRONT PANEL					
C DWG NO. 503-2122					
2100 RPS					
SCALE 1/1					
SHEET 1 OF 1					

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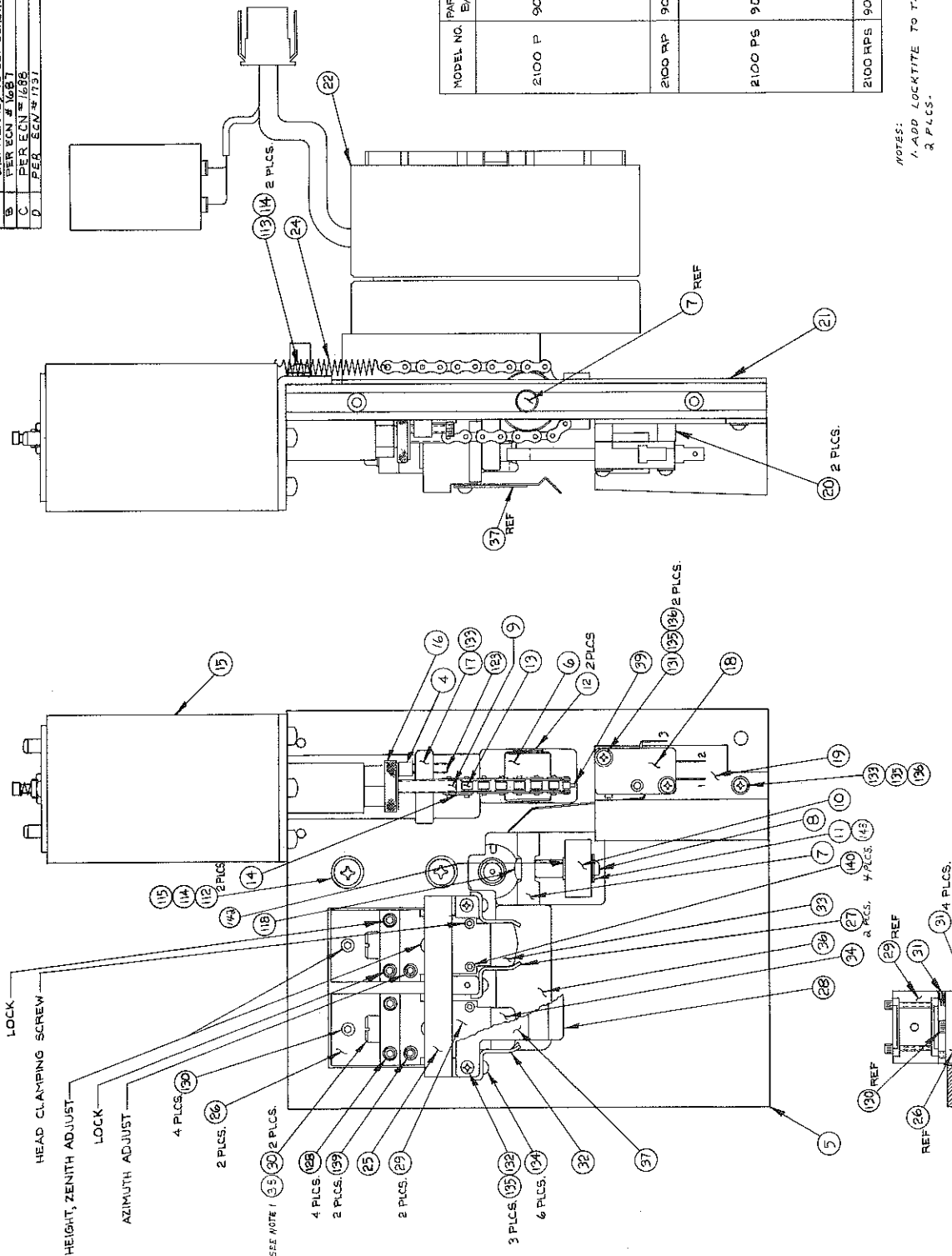
PARTS LIST: Front Panel Assembly - RPS model

Schematic: 906-2141

Assembly drawing: 503-2122

Qty.	Reference Designation	Drawing Item No.	Broadcast Electronics Part Number	Description
1		1	D-460-0004	Front panel casting
1		2	B-596-0002	Upper overlay, RPS model
1		3	B-596-0000	Lower overlay; RP, RPS models
3		4	343-0175	Switch; STOP, REC, and SEC
2		5	191-1053D	Pot, 10K ohm
1		6	343-0225	Switch-START
2		7	343-0176	Switch cap-Red, STOP, REC
1		8	343-0156	Switch cap-White, SEC
1		9	343-0226	Switch cap-Green, START
1		10	A-471-0044	Bracket-VU meter
1		11	417-2600	Connector, header, dual 13 pin
2		12	319-0081	VU meter
2		13	323-0023	LED indicator and bezel
1		14	B-514-2102	PCB blank-front panel
3		15	321-0085	Lamp, type 85, wedge mount
3"		16	601-2218	Wire-22 GA, Wht/Blue
3		17		#6-32 x 1/4 phillips head screws
3		18		#6 split-lock washers
1		19	321-0327	Lamp, type 327
6		20	413-1597	Turret terminal
3"		21	601-2213	Wire-22 GA, Wht/Yel
3"		22	601-2214	Wire-22 GA, Wht/Blk
3"		23	601-2212	Wire-22 GA, Wht/Red
6"		24	601-2211	Wire-22 GA, Wht/Brn
6"		25	601-2212	Wire-22 GA, Wht/Red

REV.	DESCRIPTION	DATE	APPROVED
A	ITEM 12 WAS ON LEFT SIDE OF ITEM 6, REVISE QTY OF ITEM 12 FROM 1 TO 2; DELETE ITEM 14; CHG. ITEM 123 TO SET SCREW.	2-20-79	RMT
B	PER ECN # 1687	4-11-79	77H
C	PER ECN # 1685	4-11-79	BE
D	PER ECN # 1737	6-2-79	GH



MODEL NO.	PART NO./E/M NO.	DELETIONS
2100 P	907-2110	ITEM QTY 26 1 29 1 30 1 31 5 34 1 128 2 130 2 139 1 140 2
2100 RP	907-2111	NONE
2100 PS	907-2112	26 1 29 1 30 1 31 5 34 1 128 2 130 2 139 1 140 2
2100 RPS	907-2113	NONE

NOTES:
1. ADD LOCKTITE TO THREADS OF SHOULDER SCREWS,
2 PLCS.

BROADCAST ELECTRONICS INC. —A FILMWAYS COMPANY—	
DATE 12-15-78	DATE 3-14-79
BY M. HANSEN	BY M. HANSEN
CHECKED	APPROVED
PROJECT 3-14-79	BY
TOLERANCE UNLESS OTHERWISE SPECIFIED: DIMENSIONAL ±.005 FRACTIONAL ±.004 ANGULAR ±1° HOLE LOCATIONS ±.005 HOLE ROUNDS ±.005 FILLET RADIUS	
MATERIAL	
TREATMENT OR FINISH	
SCALE 1/1	
SHEET 1 OF 1	

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DECK ASSEMBLY
2100 SERIES
C
906-2222
REV D

PARTS LIST: Deck Assembly - P, PS, RP, RPS models

Assembly drawing: 906-2222

Qty.	Item Number	Broadcast Electronics Part Number	Description
ITEMS LISTED ARE FOR ALL MODELS EXCEPT WHERE NOTED IN DESCRIPTION			
1	4	407-0858	Rubber bumper for solenoid locknut
1	5	D-494-0000	Deck casting
1	6	A-459-0163	Chain mounting clamp
1	7	B-459-0161	Shaft pressure roller
1	8	B-459-0162	Shaft-pinch roller
1	9	A-459-0083	Screw-modified
1	10	B-404-0001	Pinch roller assembly
1	11	454-3318	E-ring
2	12		Washer, fibre, .562 O.D. x .031 THK
1	13	A-449-0035	Chain
1	14	449-0036	Chain link
1	15	289-2565	Air damped solenoid
1	16	B-459-0160	Lock nut, solenoid
1	17	B-459-0158	Solenoid stop
1	18	346-6100	Microswitch
1	19	B-452-0031	Guide, right
2	20	441-9223	Spacer, $\frac{1}{4}$ O.D. x $\frac{1}{4}$ L.G.
1	21	C-471-0049	Shield, deck plate
1	22	954-0009	Motor assembly (see motor assembly parts list)
1	24	B-432-0045	Spring <i>Super</i>
1	25	B-459-0156	Guide, support
1	<u>26</u>	B-459-0157	Base, head clamp for models P, PS
2	<u>26</u>	B-459-0157	Base, head clamp for models RP, RPS

830-0011
Conn. Kit for 2100 RPS, PS

PARTS LIST: Main Body Assembly - Top

Figure 7-1

Qty.	Item Number	Broadcast Electronics Part Number	Description
1	43	376-7675	Power transformer
4	44	441-8217	Standoff hex, 5/8" long
1	49	203-4005	Diode, IN4005
2	50	693-0200	Teflon tubing, 5/8" long to cover diode
1	52	C-471-0046	Side plate, right
1	53	C-471-0047	Side plate, left
1	55	C-471-0048	Partition
1	56	C-471-0050	Panel, rear
2	57	409-0020	PCB card guide; P, PS models
4	57	409-0020	PCB card guide; RP, RPS models
1	59	B-471-0045	Shield, PCB
1	60	A-594-2110	Label, (playback)
1	69	417-2301	Keying plug for J2 on 914-2103
1	72	418-0241	Plug, 4-pin
1	73	418-0701	Plug, 2-pin for solenoid
1	86	D-471-0054	Top cover (pot shown)
2	89	B-906-3147-1	Head lead cable 7"; for models RP, PS, P, RPS
2	90	B-906-3147-2	Head lead cable 7"; for models RP, PS, P, RPS
2	91	B-906-3147-3	Head lead cable 7"; for models PS, RPS
8	93	402-0000	Cable ty-wrap, TY-3 for head leads
1 1/2"	95	690-1200	PVC tubing, 1/2" diam.

PARTS LIST: Main Body Assembly - Top
Page 2

Figure 7-1

Qty.	Item Number	Broadcast Electronics Part Number	Description
<u>Miscellaneous:</u>			
1		421-0019	Fastener, rack
2		421-1102	Pop rivet 3/32 diam., 250 grip
7"			Wire, 22GA, orange/white
7"			Wire, 22GA white/yellow
11"			Wire, 22GA g/blue
11"			Wire, 22GA g/green
3"			Wire, 22GA black
9"			Wire, 22GA black
8"			Wire, 18GA, black
<u>Hardware:</u>			
4		420-0506	#10-32 x 3/8 large phillips head machine screws
4		420-8116	#8-32 x 1/4 large phillips flat head machine screws
4		420-6122	#6-32 x 1 3/8" large phillips head machine screws
2		420-6505	#6-32 x 5/16 large phillip flat head machine screws
6		420-6506	#6-32 x 3/8 large phillips flat head machine screws
27		420-6104	#6-32 x 1/4 large phillips head machine screws
4		421-6001	#6-32 hex nut
18		423-6002	#6 split lock washer
2		423-6011	#6 flat washer

PARTS LIST: Main Body Assembly - Underside

Figure 7-2

Qty.	Item Number	Broadcast Electronics Part Number	Description
2	42	453-0010	Capacitor mounting clamps
1	47	402-0835	Ribbon cable clamp
1	83	B-906-2143	Ribbon cable assembly from mother- board to front panel
1	85	C-471-0079	Bottom cover
4	87	403-2194	Rubber foot

PARTS LIST: Back Panel Assembly

Figure 7-3

Qty.	Item Number	Broadcast Electronics Part Number	Description
15	46	417-0053	Socket pins
1	61	B-470-0099	Bracket, support
1	62	417-1501	Connector, AMP 582773-1
1	63	417-1502	Key plug, AMP 582501-1
1	64	417-1503	Hood, AMP 530087-2, plastic
1	70	681-1723	Power cord
1	71	401-0005	Strain relief, power cord
1	75	415-2012	Fuse post
1	76	330-0100	Fuse, 1 amp
1	78	348-7101	Power switch
1	80	410-1416	Terminal lug w/No. 6 hole
1	81	421-6020	Knurled nut
1	82	402-0005	Press clip

*Conn Kit
830-0011*

PARTS LIST: Deck Assembly - P, PS, RP, RPS models
Page 1

Assembly drawing: 906-2222

Qty.	Item Number	Broadcast Electronics Part Number	Description
ITEMS LISTED ARE FOR ALL MODELS EXCEPT WHERE NOTED IN DESCRIPTION			
1	27	B-452-0001	Tape guide
1	28	B-452-0033	Spring, cartridge
1	29	B-459-0159	Clamp, head
1	30	420-0193	Screw shoulder, #10-32
5	31	430-0310	Spring, phase lok IV head for P, PS models
10	31	430-0310	Spring, phase lok IV head for RP, RPS models
1	32	B-452-0001	Tape guide
<u>Heads:</u>			
1	33	A-252-0007	Head, MIP for mono playback, models P, RP
1	33	A-253-0004	Head, SIP for stereo playback, models PS, RPS
1	34	A-252-0008	Head, MIR for mono record, model RP
1	34	A-253-0005	Head, SIR for stereo record, model RPS
<u>Miscellaneous:</u>			
1	35	438-0002	Wave washer, models P, PS
2	35	438-0002	Wave washer, models RP, RPS
1	36	A-471-0116	Deck, insert
1	37	A-471-0157	Shield
1	39	425-0006	Roll pin
2	112	420-0116	#10-32 x 1" large phillips head machine screws

PARTS LIST: Deck Assembly - P, PS, RP, RPS models
Page 2

Assembly drawing: 906-2222

Qty.	Item Number	Broadcast Electronics Part Number	Description
ITEMS LISTED ARE FOR ALL MODELS EXCEPT WHERE NOTED IN DESCRIPTION			
2	113	420-0108	#10-32 x 1/2" large phillips head machine screws
4	114	423-0002	#10 split lock washer
2	115	423-0001	#10 flat washer
1	118	420-8105	#8-32 x 5/16 large phillips head machine screws
1	123	420-6498	#6-32 x 1/2 large socket head set screw
4	128		#4-40 x 3/4 large socket head cap screw (blk)
4	130	420-4408	#4-40 x 1/2 large socket head cap screw
2	131	420-4114	#4-40 x 7/8 large phillips head machine screw
3	132	420-4106	#4-40 x 3/8 large phillips head machine screw
2	133	420-4104	#4-40 x 1/4 large phillips head machine screw
6	134	420-4103	#4-40 x 3/16 large phillips head machine screw
9	135	423-4002	#4 split lock washer
	136	423-4001	#4 flat washer
4	139	420-2410	#2-56 x 5/8 large socket head cap screw
2	140	420-2409	#2-56 x 9/16 large socket head cap screw
1	142	423-5009	Nylatron washer 3/16 I.D. x 5/16 O.D. x .015 THK
1	143	423-5008	Nylon washer 3/16 I.D. x 3/8 O.D. x .010 THK

PARTS LIST: Rack Mount Shelf - Optional

Qty.	Broadcast Electronics Part Number	Description
1	D-471-2100	Rack mount
2	A-459-2100	Rack mount trim strip
3	420-5003	Screw assembly
1	C-503-2124	Blank panel, "A" size, 1/3 rack
1	C-503-2123	Blank panel, "B" size, 2/3 rack
2	420-6106	#6-32 x 3/8 lg. phillips head screws, SS
2	423-6003	#6-Internal tooth lock washer
2	421-6001	#6-32 hex nut, SS
4	421-0013	Thumb nut (for cover) #6-32
1	D-471-2101	Cover

PARTS LIST: Motor Assembly

Qty.	Broadcast Electronics Part Number	Description
1	382-2070	Motor NIDEC, 117V, 60Hz, 70 IPS
1	029-1067	0.7MFD capacitor, 300VAC NIDEC
1	418-1271	12-pin amp connector housing
10	417-0053	Socket, std. contact for amp connector

PRODUCT WARRANTY

LIMITED ONE YEAR

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

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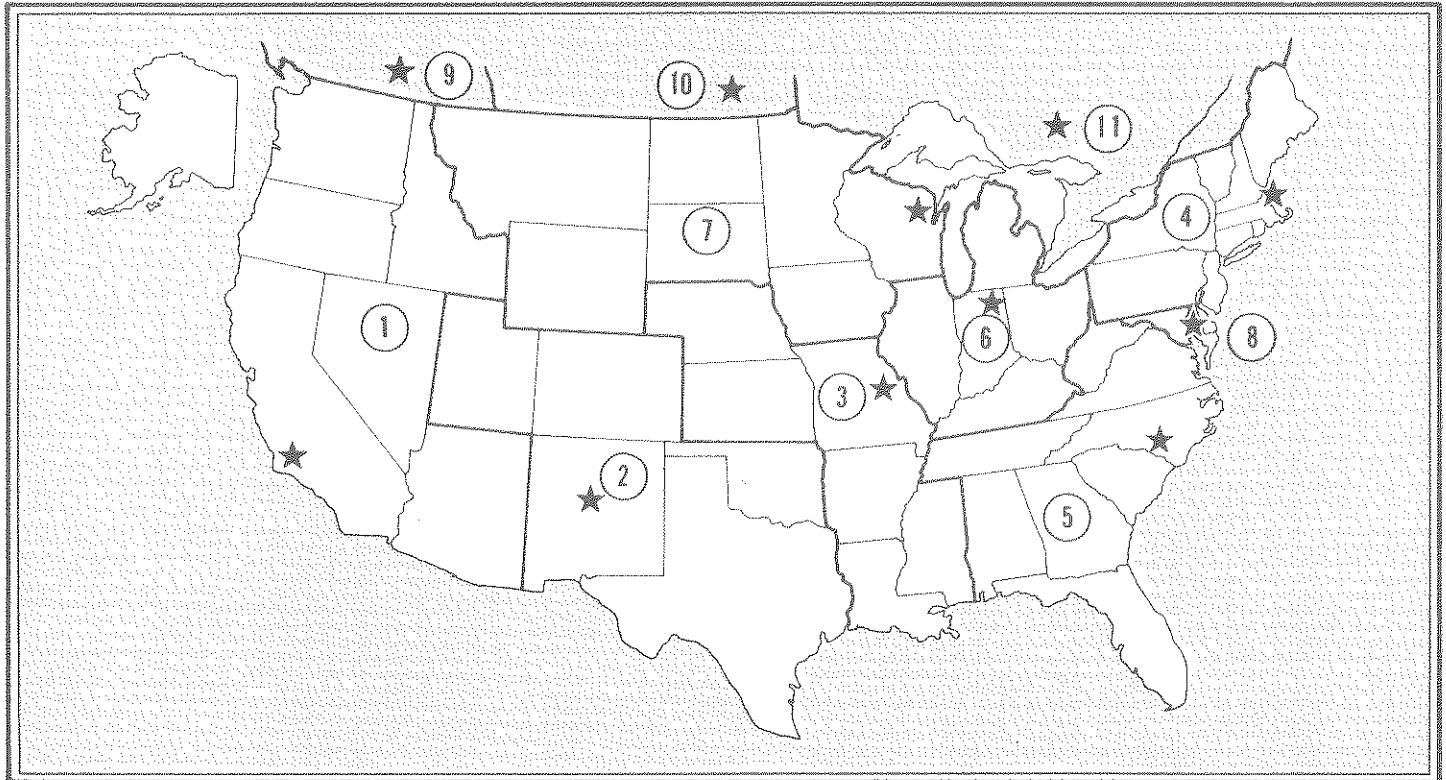
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