

INSTRUCTION MANUAL

SERIES 3000
MONO DELAY
PROGRAMMER

September, 1986

IM No. 597-0300-001

BROADCAST ELECTRONICS, INC.



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

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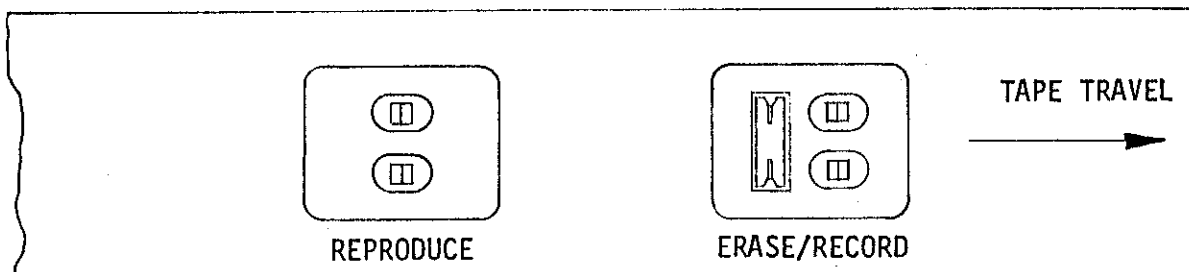
SERIES 3000 MONO DELAY PROGRAMMER
INSTRUCTION MANUAL SUPPLEMENT
597-0300-001

1-1. GENERAL INFORMATION.

1-2. When used in conjunction with the Broadcast Electronics Series 3000 Tape Cartridge Machine manual (597-0300), this supplement provides information required to install, operate, and maintain Series 3000 delay units. It is advised that the operator familiarize himself with the Series 3000 manual prior to using this supplement and the delay unit.

1-3. EQUIPMENT DESCRIPTION.

1-4. The Broadcast Electronics Series 3000 Mono Delay Programmer provides all the standard features of a Series 3000 mono record/playback cartridge machine plus delay circuitry and 150 Hz cue tone circuitry. An erase/record head is substituted for the standard record head, and the positions of the playback and record heads are reversed (refer to Figure 1). The delay unit will operate in the record mode as a delay unit or as a regular unit, and will also operate as a playback unit.



597-0300-001-1

FIGURE 1. DELAY UNIT TAPE HEAD POSITIONS

1-5. Specifications for the delay unit, with the addition of the erasure specifications listed below, are the same as for the standard 3000 record/playback unit.

ERASURE BIAS: 170V p-p at 100 kHz

ERASURE: 50 dB below 0 dBm output at 1kHz at 185 nWb/m

1-6. Most of the options and accessories that are available for Series 3000 units are also available for the delay unit. The options and accessories available for Series 3000 units are listed in Table 1-3 of the 3000 manual.

1-7. INSTALLATION.

1-8. Procedures required for the installation of the delay unit are described in the standard Series 3000 manual. The following procedures can be performed as needed, based on the required performance of the delay unit.

CAUTION

DISCONNECT POWER PRIOR TO PERFORMING ANY INSTALLATION PROCEDURE. DO NOT APPLY AC POWER UNTIL ALL PROCEDURES HAVE BEEN COMPLETED.

CAUTION

1-9. CUE TRACK ERASURE.

1-10. As shipped from the factory, the cue erase portion of the erase/record head (refer to Figure 2) is not wired for operation. This means, that in the delay mode, any previously recorded cue tone will remain on the cue track of the tape, and will be detected by the machine.

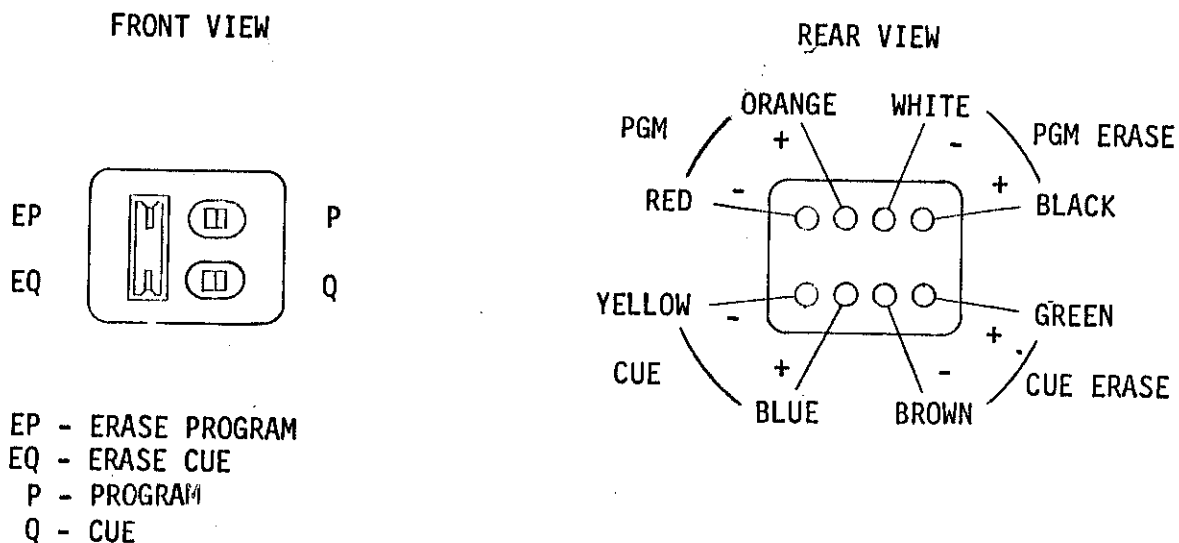


FIGURE 2. DELAY TAPE HEAD CONFIGURATION AND WIRING

1-11. The cue erase portion of the delay head can be wired to operate through a simple jumpering procedure. Refer to drawing B914-1582. To apply erase bias to the cue track, place a jumper between pin 17 and pin 18 and a jumper between pin 15 and pin 16 on the delay circuit board (located in the upper left corner of the tape deck). Also, capacitor C2 on the delay circuit board must be changed to 500 pF (refer to schematic 906-3127).

1-12. Normal delay operation (cue erase not wired) provides 55 to 65 dB of erasure. When cue erase is enabled, the amount of erasure supplied from each portion of the erase channel slightly decreases.

1-13. AUDIO MUTING.

1-14. To mute audio during any mode of operation, wire a normally open switch between pin 3 and pin 14 on rear panel REMOTE connector J5 (refer to drawing B906-3131 in the rear of this supplement). Audio output will be muted whenever the switch is closed.

1-15. 1 KHZ RECORD CIRCUITRY.

1-16. A factory installed jumper between pins 6 and 7 on the delay circuit board (refer to drawing B914-1582) inhibits the recording of the 1kHz stop tone when the unit is in the delay mode. If recording of the 1kHz tone is desired during the delay mode, remove the jumper between pins 6 and 7. The 1kHz disable switch on the circuit board card cage cover can also be used to disable the stop tone record circuitry.

1-17. OPERATION.

1-18. Refer to the Series 3000 manual for information pertaining to the use of the Series 3000 delay unit as a playback machine.

1-19. TAPE SELECTION FOR DELAY OPERATION.

1-20. In the delay mode of operation, the length of the delay between recording and playback is determined by the length of the tape in the cartridge being used. Since precise timing is usually desirable, a list providing delay time and the equivalent tape length is provided to serve as a guideline when selecting a tape.

NOTE

ALLOW AN ADDITIONAL TWO TO THREE INCHES FOR THE SPLICE. MAKE THE SPLICE AS CLEAN AS POSSIBLE, SINCE ANY GAP OR OVERLAPPING WILL BE DETECTED AS THE TAPE PASSES THE PLAYBACK HEAD.

NOTE

<u>SECONDS</u>	<u>INCHES</u>
6	45
10	75
13	97.5
15	112.5
20	150
25	187.5
30	225
45	337.5
60	450

1-21. Tape tension is particularly critical in short delay cartridges. Refer to the tape cartridge data in the Appendix of the 3000 manual for information on the care and use of tape cartridges.

1-22. Check delay cartridges frequently. A delay cartridge, particularly in short lengths, wears rapidly since the tape runs continuously rather than intermittently.

1-23. DELAY OPERATION.

1-24. Program material to be recorded is fed to rear panel RECORD LINE IN connector J7 or the optional microphone input (J8). When using a microphone input disconnect the line input. Delayed program material is output from PLAY LINE OUT connector J4.

1-25. Bulk erase the selected cartridge if unwanted cue tones are present on the cue track of the tape. Insert the tape into the deck of the unit. The left-side cartridge guide should fit snugly against the left side of the cartridge.

1-26. Operate the front panel power switch to ON. Depress the START switch/indicator and run the tape in the playback mode to align the tape in the guides and to locate the splice. Stop the machine just past the splice to avoid recording over the splice.

1-27. Depress the RECORD switch/indicator. The RECORD switch/indicator will illuminate. Depress the DELAY switch/indicator after the RECORD switch/indicator has illuminated. The indicator lamp in the DELAY switch will illuminate when the unit is in the DELAY mode. Depress the START switch/indicator to start the unit. The unit will remain on and in the delay mode until the STOP switch/indicator is depressed, or if a 1kHz stop tone is present, the stop tone is detected.

1-28. When using the unit as a normal mono record unit, bulk erase the cartridge before recording, as the erase portion of the erase/record head is operational in the delay mode only.

1-29. THEORY OF OPERATION.

1-30. Section IV in the Series 3000 manual provides discussions on the theory of operation of the playback logic circuit board, the power supply circuit board, and the record logic and tone generator circuit board. Discussion of the theory of operation of the delay circuit board and the record amplifier bias circuit board follows.

1-31. DELAY CIRCUIT BOARD.

1-32. The delay circuit board contains the logic circuitry which enables the unit to operate in the delay mode. This circuit board is located on the tape deck of the unit.

1-33. When the unit is in the record mode, the cathode of diode CR3 is grounded and the erase bias is applied through R5. When the DELAY switch/indicator is depressed, +24 volts dc is momentarily applied through R3 to the base of Q2, enabling Q2 and applying current to ground through CR3. This action energizes Q1. Current applied to the base of Q2 through R1, Q1, CR2, and R3 latches the logic circuit in the delay mode.

1-34. As current is applied to Q2 pin 5 on the circuit board, which is connected to the DELAY switch/indicator, also goes LOW and the DELAY switch/indicator illuminates. Relay K1 energizes since one side of the coil is tied to the delay indicator. The erase head bias current is routed through C2 and the normally open contacts of K1 to the erase head.

1-35. Release from the delay mode occurs when the unit is placed in the stop mode, and the cathode of CR3 is no longer tied to ground. This action causes the base of Q1 to go HIGH turning the stage off. This, in turn, turns Q2 off.

1-36. RECORD AMPLIFIER BIAS CIRCUIT BOARD, MONO DELAY.

1-37. Refer to drawing D910-1050/-1049/-1048 in this supplement and the discussion of the record amplifier bias circuit board in Section IV of the Series 3000 manual. The following statement should be added to the Record Bias Circuit discussion.

1-38. When the bias oscillator turns on, erase bias is routed to the erase/record head circuit board terminals (1, 2, and 3) from the secondary of transformer T3 (terminal 10). Erase bias is routed to the delay circuit board where application of erase bias to the delay head is controlled by relay K1 (refer to the discussion on the delay circuit board).

1-39. MAINTENANCE.

1-40. Refer to Section V of the Series 3000 manual for general maintenance information as well as adjustment and replacement procedures. Drawings in the rear of this supplement are provided as an aid to maintenance.

1-41. PARTS LISTS.

1-42. Parts lists for the playback logic circuit board, the power supply circuit board, and the record logic and tone generator circuit board are found in Section VI of the Series 3000 manual. Specific circuit board assemblies used in delay units are referenced in Table 5-1 of that manual.

1-43. The following parts lists are found in this supplement:

<u>TABLE</u>	<u>TITLE</u>	<u>PART NO.</u>	<u>PAGE</u>
1	Final Assembly, Series 3000 Mono Record/ Playback Delay	900-3204-XXX/ -3304-XXX/ -3404-XXX	7
2	Basic Assembly, 3000 Series Mono Record/ Playback Delay	950-3204/ -3304/ -3404	8

<u>TABLE</u>	<u>TITLE</u>	<u>PART NO.</u>	<u>PAGE</u>
3	Accessory Kit, 3000 Series Mono Record/ Playback Delay	950-3000-002	8
4	Head Lead Assembly, Delay	906-3135/-001	9
5	Mono Delay Circuit Board Assembly	914-1582	9
6	Transformer Assembly, Power	950-7656	9
7	Delay Record Amplifier Bias Circuit Board Assembly	910-1048	10
8	Monophonic Head Lead Playback Assemblies	906-3119-1/-2	11
9	Jumper, Delay Head To Record Amplifier Assembly	940-0012	11
10	Motor Assembly, 7.5 IPS, 60 Hz, 117V, Single-Speed	950-0203	12
11	Motor Assembly	950-1000	12

1-44. DRAWINGS.

1-45. In addition to the drawings in Section VII of the Series 3000 manual, the following assembly drawings, schematic diagrams, and wiring diagrams are provided:

<u>DESCRIPTION</u>	<u>NUMBER</u>
3000 DELAY WIRING DIAGRAM	D906-3129
DELAY CIRCUIT BOARD SCHEMATIC DIAGRAM	B906-3127
DELAY CIRCUIT BOARD ASSEMBLY DRAWING	B914-1582
RECORD AMPLIFIER BIAS CIRCUIT BOARD SCHEMATIC DIAGRAM	D910-1050/ -1049/ -1048
RECORD AMPLIFIER BIAS CIRCUIT BOARD ASSEMBLY DRAWING	C910-1050/ -1049/ -1048
DELAY HEAD LEAD WIRING DIAGRAM	C906-3140
3000 DELAY REAR PANEL CONNECTOR WIRING DIAGRAM	B906-3131

TABLE 1. FINAL ASSEMBLY, SERIES 3000 MONO RECORD/PLAYBACK DELAY -
900-3204-XXX, 900-3304-XXX, 900-3404-XXX

REF. DES.	DESCRIPTION	PART NO.	QTY.
F1	Fuse, 3AG, 1 Ampere	330-0100	1
----	Head, Playback, Two Channel, Model LMP	252-0017	1
	Inductance: 400 mH		
	Impedance at 1kHz: 2.55 k Ohm		
	DC Resistance: 410 Ohms per channel		
----	Assembly, Head Lead, Monophonic, Playback	906-3119-1	1
----	Assembly, Head Lead, Monophonic, Playback	906-3119-2	1
----	Assembly, Jumper, Delay Head To Record Amplifier	940-0012	1
----	Delay Record Amplifier Bias Circuit Board Assembly	910-1048	1
----	Playback/Logic Circuit Board Assembly (refer to SECTION VI in the 3000 Cartridge Machine Publication)	914-1521	1
----	Power Supply Circuit Board Assembly (refer to SECTION VI in the 3000 Cartridge Machine Publication)	914-1515	1
----	Record Control and Tone Generator Circuit Board Assembly (refer to SECTION VI in the 3000 Cartridge Machine Publication)	914-1513	1
----	Assembly, Motor, 7.5 Inches/Second, 117V/60 Hz, Single-Speed	950-0203	1
----	Accessory Kit, Record Delay	950-3000-002	1
ADDITIONAL PARTS FOR 3200RP/DL MODELS 900-3204-XXX			
----	3200RP/DL Basic Assembly	950-3204	1
----	Assembly, Head Lead, Delay	906-3135	1
ADDITIONAL PARTS FOR 3300RP/DL MODELS 900-3304-XXX			
----	3300RP/DL Basic Assembly	950-3304	1
----	Assembly, Head Lead, Delay	906-3135-001	1
ADDITIONAL PARTS FOR 3400RP/DL MODELS 900-3404-XXX			
----	3400RP/DL Basic Assembly	950-3404	1
----	Assembly, Head Lead, Delay	906-3135-001	1
DELETE PARTS FOR SERIES 3000 RECORD/PLAYBACK DELAY UNITS W/FAST-FORWARD OPTION - 900-3204-X2X, 900-3304-X2X, 900-3404-X2X			
----	Power Supply Circuit Board Assembly	914-1515	1
----	Playback/Logic Circuit Board Assembly	914-1521	1
----	Motor Assembly	950-0203	1
ADDITIONAL PARTS FOR SERIES 3000 RECORD/PLAYBACK DELAY UNITS W/O FAST-FORWARD OPTION - 900-3204-X2X, 900-3304-X2X, 900-3404-X2X			
S4	Switch, Toggle, SPST, Momentary Contact, 5A @ 120V ac or 2A @ 250V ac	347-7108	1
	Power Supply Circuit Board Assembly (refer to SECTION VI in the 3000 Cartridge Machine Publication)	914-1535-1	1
	Playback Logic Circuit Board Assembly (refer to SECTION VI in the 3000 Cartridge Machine Publication)	914-1531	1
	Motor Assembly (refer to SECTION VI in the 3000 Cartridge Machine Publication)	950-0200	1

TABLE 2. BASIC ASSEMBLY, 3000 SERIES MONO RECORD/PLAYBACK DELAY -
950-3204, 950-3304, 950-3404

REF. DES.	DESCRIPTION	PART NO.	QTY.
C1	Capacitor, Electrolytic, 33 uF, 35V	024-3335	1
DS1 THRU DS5	Lamp, No. 327, Incandescent, Subminiature, 28V, 0.040 Ampere (for Front Panel Switches)	321-0327	5
IC1	Integrated Circuit, MC7824, 24V, Positive Regulator, 1.5 Ampere Maximum, TO-3 Case	227-7824	1
J1 THRU J3	Connector, 22-Pin, Card Edge	417-2100	3
J4	Connector, 6-Pin (PLAY LINE OUT)	418-0302	1
J5	Connector, 24-Pin (REMOTE)	418-0303	1
J6	Phone Jack (PHONES)	417-0311	1
J7	Connector, 6-Pin (RECORD LINE IN)	418-0301	1
J10	Connector, 22-Pin, Card Edge	417-2100	1
M1	Meter, VU, 1.5 inch (3.81 cm), dc Microammeter Type, 200 uA Movement, 225 Ohm resistance	319-0081	1
Q1	Transistor, 2N3055, Silicon, NPN, 15 Ampere, TO-3 Case	219-3055	1
R2	Potentiometer, 10 k Ohm $\pm 10\%$, 1/2W (LEVEL Control)	191-1053	1
R3	Resistor, 3.3 Ohm $\pm 5\%$, 2W, W/W	122-3313	1
S1	Switch, Illuminated, SPST, Normally Open, Momentary Contact, Push, 5-100 mA (START Switch/Indicator)	343-0150	1
S2	Switch, Illuminated, SPST, Normally Open, Momentary Contact, Push, 5-100 mA (STOP Switch/Indicator)	343-0012	1
S3	Switch, Miniature Toggle, SPDT, 5 Ampere @ 120V ac or 2 Ampere @ 250V ac (ON/OFF Switch)	347-7101	1
S5,S7,S8	Switch, Illuminated, SPST, Normally Open, Momentary Contact, Push, 5-100 mA (RECORD, DELAY, 150 Hz Switch/Indicator)	343-0012	3
T2	Transformer, Audio Output, 30 mW, ± 15 dBm, 50 Hz to 15 kHz ± 1 dB	370-0025	1
	Dual Primary: 600/150 Ohm Split, dc resistance, 70 Ohms w/windings in series		
	Dual Secondary: 2000/500 Ohm Split, dc resistance, 280 Ohms w/windings in series		
XF1	Fuse Holder, 3AG	415-2012	1
XIC1,XQ1	Socket, TO-3 Case	417-0298	2
----	Switch Cap, Red (STOP & RECORD Switches)	343-0013	2
----	Switch Cap, Green (START Switch)	343-0152	1
----	Switch Cap, Blue (DELAY Switch)	343-0041	1
----	Switch Cap, White (Q1 Switch)	343-0014	1
----	Knob (LEVEL Control)	484-0500	1
----	Transistor Cover	407-3000	1
----	Delay Circuit Board Assembly	914-1582	1
----	Assembly, Power Transformer	950-7656	1

ADDITIONAL PARTS FOR 3200 BASIC ASSEMBLY
950-3204

----	Deck Parts, 3200 Series (refer to SECTION VI in the 3000 Cartridge Machine Publication)	906-3200-2	1
----	Assembly, Cable Harness	945-3416	1

ADDITIONAL PARTS FOR 3300 BASIC ASSEMBLY
950-3304

----	Deck Parts, 3300 Series (refer to SECTION VI in the 3000 Cartridge Machine Publication)	906-3300-2	1
----	Assembly, Cable Harness	906-3107-1	1

ADDITIONAL PARTS FOR 3400 BASIC ASSEMBLY
950-3404

----	Deck Parts, 3400 Series (refer to SECTION VI in the 3000 Cartridge Machine Publication)	906-3400-3	1
----	Assembly, Cable Harness	945-3411-2	1

TABLE 3. ACCESSORY KIT, 3000 SERIES MONO RECORD/PLAYBACK DELAY -
950-3000-002

REF. DES.	DESCRIPTION	PART NO.	QTY.
P4	Plug, 6-Pin (PLAY LINE OUT)	418-0304	1
P5	Plug, 24-Pin (REMOTE)	418-0306	1
P7	Plug, 6-Pin (RECORD LINE IN)	418-0305	1

TABLE 4. HEAD LEAD ASSEMBLY, DELAY - 906-3135/-001

REF. DES.	DESCRIPTION	PART NO.	QTY.
----	Head, Erase and Record, Two Channel, <u>Record Section</u> <u>Erase Section</u>	252-0009	1
	Inductance 50 mH 10 mH		
	Impedance @ 1kHz 320 Ohms		
	DC Resistance 130 Ohms 27 Ohms		
----	Crimp-On Terminal, Head Lead Disconnect	417-0160	10

TABLE 5. MONO DELAY CIRCUIT BOARD ASSEMBLY - 914-1582

REF. DES.	DESCRIPTION	PART NO.	QTY.
C1	Capacitor, Mylar, 0.01 uF, 100V	030-1043	1
C2	Capacitor, Mica, 270 pF, 500V	041-2722	1
CR1 THRU CR6	Diode, 1N4005, Silicon, 600V, 1 Ampere	203-4005	6
K1	Relay, SPDT, 24V, 2 Ampere	270-0024	1
Q1	Transistor, GES5817, Silicon, PNP, TO-92 Case	210-5817	1
Q2	Transistor, GES5816, Silicon, NPN, TO-92 Case	211-5816	1
R1 THRU R4	Resistor, 10 k Ohm $\pm 5\%$, 1/4W	100-1053	4
R5	Resistor, 10 k Ohm $\pm 5\%$, 2W	130-1053	1
----	Pins, Disconnect Terminals	418-0161	8
----	Transistor Pad (for Q1, Q2)	409-1814	2
----	Blank Circuit Board	514-1580	1

TABLE 6. TRANSFORMER ASSEMBLY, POWER - 950-7656

REF. DES.	DESCRIPTION	PART NO.	QTY.
T1	Transformer, Power Dual Primary: 108-115V ac, 50/60 Hz Secondary: 21V @ 1.3 Ampere 23V @ 0.5 Ampere	376-7656	1
----	Connector Housing, 12-Pin	418-1271	1
----	Connector Pins	417-0053	12

TABLE 7. DELAY RECORD AMPLIFIER BIAS CIRCUIT BOARD ASSEMBLY
910-1048 (Sheet 1 of 2)

REF. DES.	DESCRIPTION	PART NO.	QTY.
C1,C2	Capacitor, Electrolytic, 100uF, 25V	023-1083	2
C3	Capacitor, Electrolytic, 4.7uF, 35V	024-4764	1
C4	Capacitor, Electrolytic, 47uF, 16V	013-4750	1
C5,C6	Capacitor, Electrolytic, 10uF, 16V	023-1074	2
C7	Capacitor, Mylar, 0.1uF, 100V	030-1053	1
C8	Capacitor, Ceramic Disc, 10pF, 1KV	001-1014	1
C9	Capacitor, Mica, 150pF, 500V	040-1522	1
C10	Capacitor, Electrolytic, 1uF, 35V	024-1064	1
C11	Capacitor, Electrolytic, 4.7uF, 35V	024-4764	1
C12	Capacitor, Mylar, 0.01uF, 100V	030-1043	1
C13	Capacitor, Electrolytic, 1uF, 35V	024-1064	1
C14	Capacitor, Mica, 220pF, 500V	040-2223	1
C15	Capacitor, Mica, 150pF, 500V	040-1522	1
C16	Capacitor, Electrolytic, 4.7uF, 35V	024-4764	1
C17	Capacitor, Electrolytic, 33uF, 35V	024-3335	1
C18	Capacitor, Electrolytic, 4.7uF, 35V	024-4764	1
C19	Capacitor, Mylar, 0.1uF, 100V	030-1053	1
C20	Capacitor, Electrolytic, 33uF, 35V	024-3335	1
C36 THRU C38	Capacitor, Ceramic, 0.0047uF $\pm 10\%$, 200V	032-4733	3
C39	Capacitor, Mylar, 0.02uF, 100V	030-2043	1
C40	Capacitor, Electrolytic, 33uF, 35V	024-3335	1
C41	Capacitor, Mica, 220pF, 500V	040-2223	1
C42	Capacitor, Mica, 150pF, 500V	040-1522	1
C43	Capacitor, Electrolytic, 33uF, 35V	024-3335	1
C44	Capacitor, Mylar, 0.1uF, 100V	030-1053	1
C45	Capacitor, Mica, 22pF, 500V	040-2213	1
D1,D2	Diode, 1N1418, Silicon, 75V @ 0.3 Ampere	203-4148	2
D3	Diode, Zener, 1N4739A, 9.1V $\pm 5\%$, 1W	200-0009	1
D5	Diode, 1N1418, Silicon, 75V @ 0.3 Ampere	203-4148	1
D6	Diode, Zener, 1N4739A, 9.1V $\pm 5\%$, 1W	200-0009	1
J1 THRU J6, J10 THRU J12	Pins, Disconnect	418-0161	9
L1, L3	Inductor, Adjustable, 8-20mH	363-9061	2
LDR-1	Optical Isolator, VTL5C2, LDR/LED Type On Resistance: 500 Ohms Off Resistance: 1 Meg Ohm Cell Voltage: 200V Maximum Cell Current: 10 to 40 mA	323-7345	1
Q1	Transistor, MPS6566, Silicon, NPN, TO-92 Case	211-6566	1
Q2	Transistor, 2N5462, P-Channel, JFET, TO-92 Case	212-5462	1
Q3	Transistor, 2N3644, Silicon, PNP, TO-92 Case	210-3644	1
Q4,Q5	Transistor, GES5816, Silicon, NPN, TO-92 Case	211-5816	2
Q9,Q10	Transistor, 2N3053, Silicon, NPN, TO-92 Case	211-3053	2
Q11	Transistor, GES5817, Silicon, PNP, TO-92 Case	210-5817	1
Q12,Q13	Transistor, GES5816, Silicon, NPN, TO-92 Case	211-5816	2
Q14	Transistor, 2N3904, Silicon, NPN, TO-92 Case	211-3904	1
R1,R2	Resistor, 18 k Ohm $\pm 5\%$, 1/4W	100-1853	2
R3	Resistor, 62k Ohm $\pm 5\%$, 1/4W	100-6253	1
R4	Resistor, 8.2 k Ohm $\pm 5\%$, 1/4W	100-8243	1
R5	Resistor, 470 Ohm $\pm 5\%$, 1/4W	100-4733	1
R6	Resistor, 10 k Ohm $\pm 5\%$, 1/4W	100-1053	1
R7	Resistor, 27 k Ohm $\pm 5\%$, 1/4W	100-2753	1
R8	Resistor, 10 k Ohm $\pm 5\%$, 1/4W	100-1053	1
R9	Resistor, 1 k Ohm $\pm 5\%$, 1/4W	100-1043	1
R10	Resistor, 100 k Ohm $\pm 5\%$, 1/4W	100-1063	1
R11	Resistor, 2.2 k Ohm $\pm 5\%$, 1/4W	100-2243	1
R12	Resistor, 10 k Ohm $\pm 5\%$, 1/4W	100-1053	1
R13	Resistor, 100 k Ohm $\pm 5\%$, 1/4W	100-1063	1
R14	Potentiometer, 250 k Ohm $\pm 10\%$, 1/2W	180-0001	1
R15,R16	Resistor, 10 k Ohm $\pm 5\%$, 1/4W	100-1053	2
R17	Resistor, 240 k Ohm $\pm 5\%$, 1/4W	100-2463	1
R18	Resistor, 100 k Ohm $\pm 5\%$, 1/4W	100-1063	1
R19	Potentiometer, 100 k Ohm $\pm 10\%$, 1/2W	178-1064	1
R20	Resistor, 240 k Ohm $\pm 5\%$, 1/4W	100-2463	1
R21	Resistor, 270 k Ohm $\pm 5\%$, 1/4W	100-2763	1
R22	Resistor, 22 k Ohm $\pm 5\%$, 1/4W	100-2253	1
R23	Resistor, 10 k Ohm $\pm 5\%$, 1/4W	100-1053	1

TABLE 7. DELAY RECORD AMPLIFIER BIAS CIRCUIT BOARD ASSEMBLY - 910-1048
(Sheet 2 of 2)

REF. DES.	DESCRIPTION	PART NO.	QTY.
R24	Resistor, 1 k Ohm $\pm 5\%$, 1/4W	100-1043	1
R25	Resistor, 2.7 k Ohm $\pm 5\%$, 1/4W	100-2743	1
R26	Resistor, 100 k Ohm $\pm 5\%$, 1/4W	100-1063	1
R27	Resistor, 1 Meg Ohm $\pm 5\%$, 1/4W	100-1073	1
R28	Resistor, 100 k Ohm $\pm 5\%$, 1/4W	100-1063	1
R29	Resistor, 27 k Ohm $\pm 5\%$, 1/4W	100-2753	1
R30	Resistor, 5.6 k Ohm $\pm 5\%$, 1/4W	100-5643	1
R31	Potentiometer, 250 k Ohm $\pm 10\%$, 1/2W	180-0001	1
R32	Resistor, 27 k Ohm $\pm 5\%$, 1/4W	100-2753	1
R33	Resistor, 8.2 k Ohm $\pm 5\%$, 1/4W	100-8243	1
R34	Resistor, 22 k Ohm $\pm 5\%$, 1/4W	100-2253	1
R35	Resistor, 1 k Ohm $\pm 5\%$, 1/4W	100-1043	1
R63,R64	Resistor, 12 Ohm $\pm 5\%$, 1/4W	100-1223	2
R65,R66	Resistor, 1 k Ohm $\pm 5\%$, 1/4W	100-1043	2
R67,R68	Resistor, 22 k Ohm $\pm 5\%$, 1/4W	100-2253	2
R69	Potentiometer, 250 k Ohm $\pm 10\%$, 1/2W	180-0001	1
R70	Resistor, 5.6 k Ohm, $\pm 5\%$, 1/4W	100-5643	1
R71,R72	Resistor, 10 k Ohm $\pm 5\%$, 1/4W	100-1053	2
R73	Resistor, 39 k Ohm $\pm 5\%$, 1/4W	100-3953	1
R74	Resistor, 47 k Ohm $\pm 5\%$, 1/4W	100-4753	1
R75	Resistor, 10 k Ohm $\pm 5\%$, 1/4W	100-1053	1
R77	Resistor, 4.7 k Ohm $\pm 5\%$, 1/4W	100-4743	1
R78,R79	Resistor, 470 Ohm $\pm 5\%$, 1/2W	110-4733	2
S1	Switch, SPDT, Slide, 300 mA @ 125V ac (Left Channel Gain Switch)	345-0120	1
T1	Audio Input Transformer with Electrostatic Shield, 250 mW Primary 1: 150 Ohm Primary 2: 15 k Ohm Secondary: 60 k Ohm Frequency Response: ± 5 dB @ 30 Hz to 20 kHz	370-0020	1
T3	Bias Oscillator Transformer, B.E. Manufactured, 100 kHz $\pm 5\%$, DC Supply: 24V dc $\pm 0.1\%$	370-0095	1
TP1,TP2	Pin, Amplifier Disconnect	418-0161	2
U1 THRU U3	Integrated Circuit, TL072CP, Dual JFET-Input Operational Amplifier, 8-Pin DIP	221-0072	3
XU1 THRU XU3	Socket, 8-Pin	417-0800	3
----	Transistor Mounting Pad, T0-5	409-0005	3
----	Heatsink, T0-5	455-2963	2
----	Blank Circuit Board	510-1050	1

TABLE 8. MONOPHONIC HEAD LEAD PLAYBACK ASSEMBLIES - 906-3119-1/-2

REF. DES.	DESCRIPTION	PART NO.	QTY.
----	Receptacle, Crimp On	417-0160	3

TABLE 9. JUMPER, DELAY HEAD TO RECORD AMPLIFIER ASSEMBLY - 940-0012

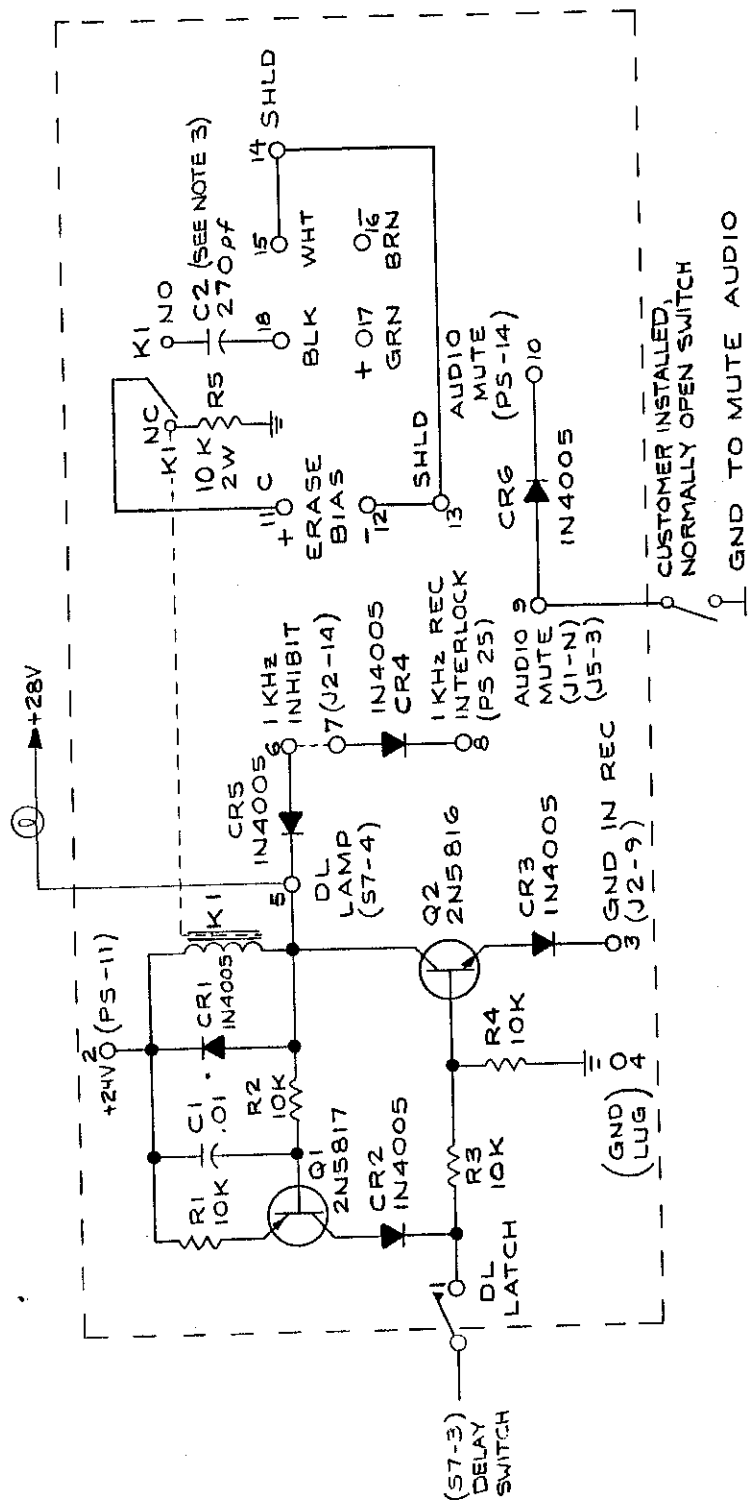
REF. DES.	DESCRIPTION	PART NO.	QTY.
----	Receptacle, Crimp On	417-0160	6

TABLE 10. MOTOR ASSEMBLY, 7.5 IPS, 60 Hz, 117V, Single-Speed - 950-0203

REF. DES.	DESCRIPTION	PART NO.	QTY.
----	Capacitor, Motor, 0.7 uF, 300V	029-1067	1
----	Motor Assembly	950-1000	1

TABLE 11. MOTOR ASSEMBLY - 950-1000

REF. DES.	DESCRIPTION	PART NO.	QTY.
----	Motor, Synchronous, 60 Hz, 600 RPM @ 7 Inch-Ounces, 7.5 Inches per Second (19.05 cm/second), 117V $\pm 10\%$ @ 26W, Model: NAH-1202B6C	380-1000	1
----	Connector, Housing, 12-Pin	418-1271	1
----	Pins	417-0053	6



- NOTES:
1. REMOVE JUMPERS FROM BETWEEN PINS 6 AND 7 ON THE CIRCUIT BOARD TO ENABLE 1 KHZ RECORD CIRCUITRY.
 2. PLACE A JUMPER BETWEEN PIN 17 AND 18 AND A JUMPER BETWEEN PIN 15 AND PIN 16 FOR ERASURE OF CUE TRACK.
 3. C2 TO BE 500PF FOR MONO UNITS WHEN CUE TRACK ERASE IS DESIRED

SEE PC ASSY DWG # B-914-1580 & -1582

ITEM	QTY	ROD	PART NUMBER	DESCRIPTION	NOTE
LIST OF MATERIAL					
TOLERANCE UNLESS OTHERWISE SPECIFIED		DRAWN W/m.		DATE 11/21/75	
DECIMAL 2 PL ± 0.1		CHECKED		DATE	
FRACTIONAL 1/64		BY		DATE	
ANGULAR 1°		PROJECT		DATE	
SHARP EDGES		APPROVED		DATE	
BEND RADIUS		BY		DATE	
Fillet Radii		TREATMENT OR FINISH		REV	
MATERIAL		B		906-3127	
		3000 SERIES		SCALE	
		SHEET 1		OF 1	

BROADCAST ELECTRONICS INC.

- A FILMWAYS COMPANY -

TITLE (SCHEMATIC)

DELAY BOARD

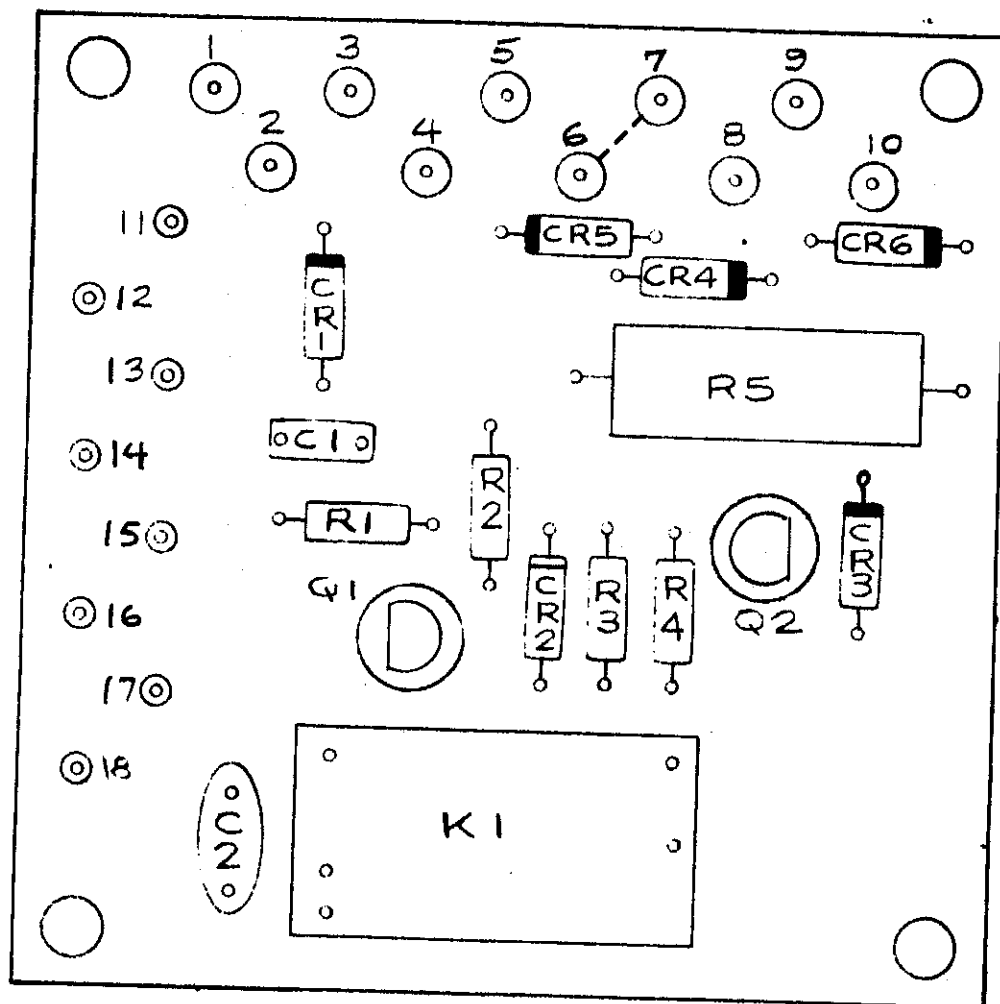
REV C

DWG NO. 906-3127

3000 SERIES

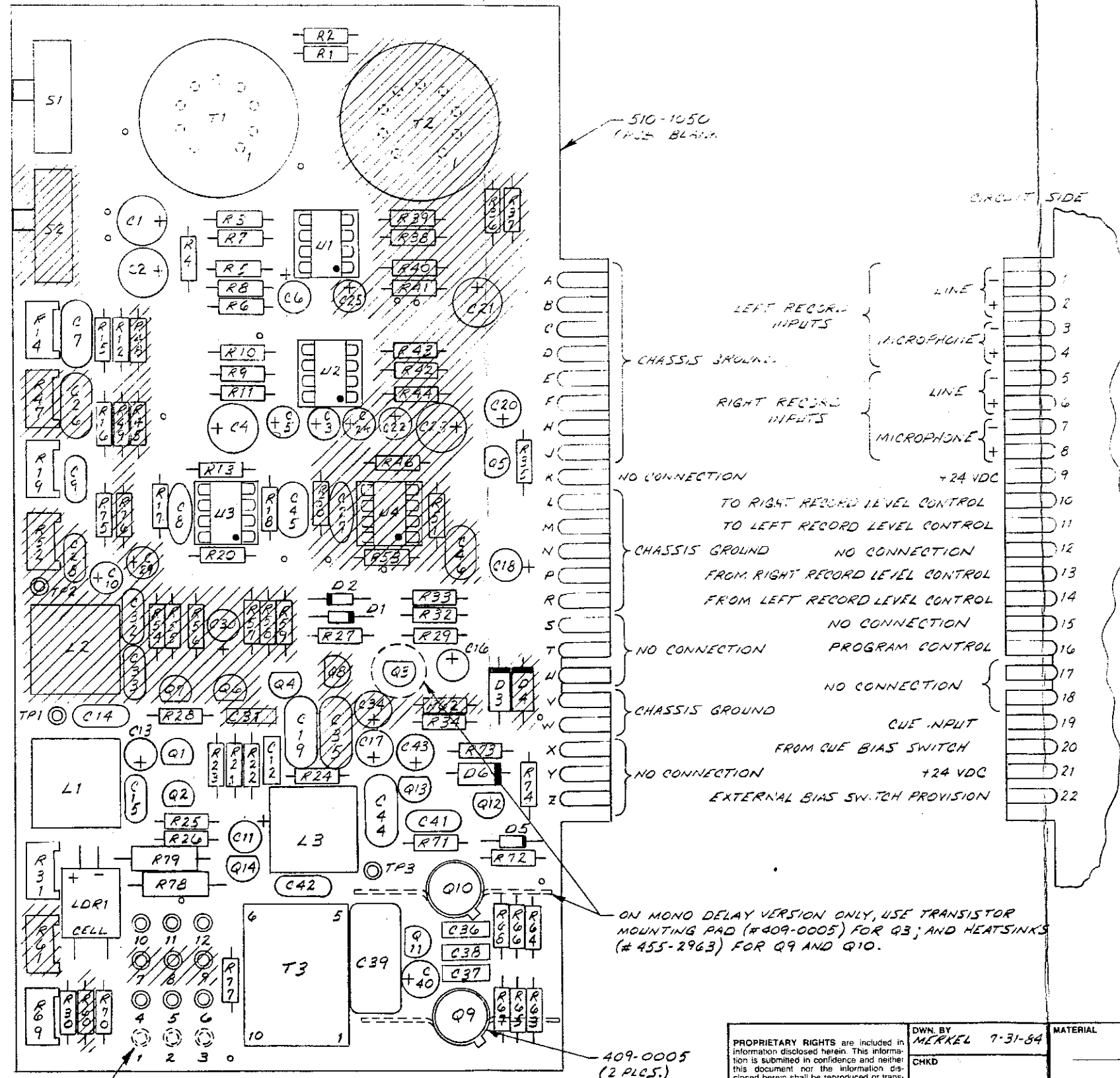
SHEET 1 OF 1

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PERSONNEL AND CUSTOMERS
ALL RIGHTS RESERVED



MONO DELAY CIRCUIT BOARD

B914-1582



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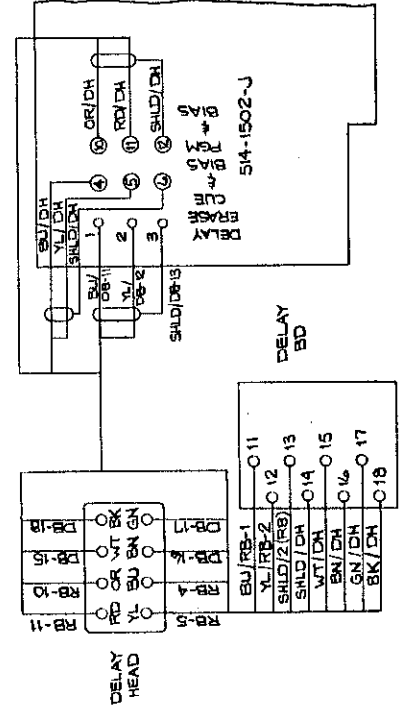
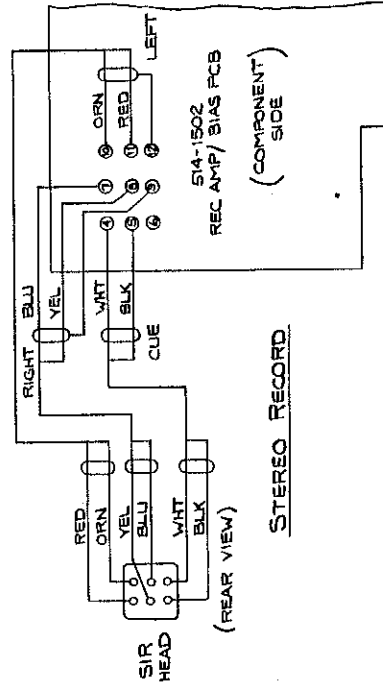
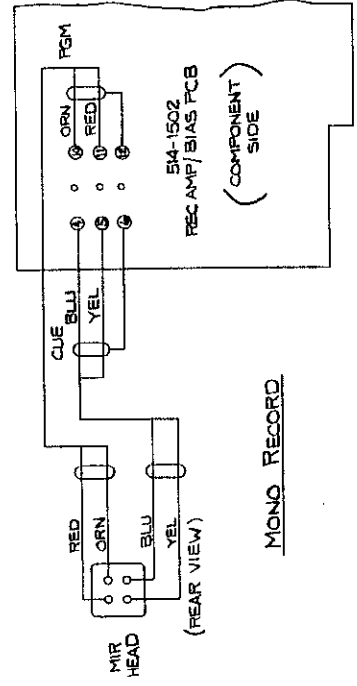
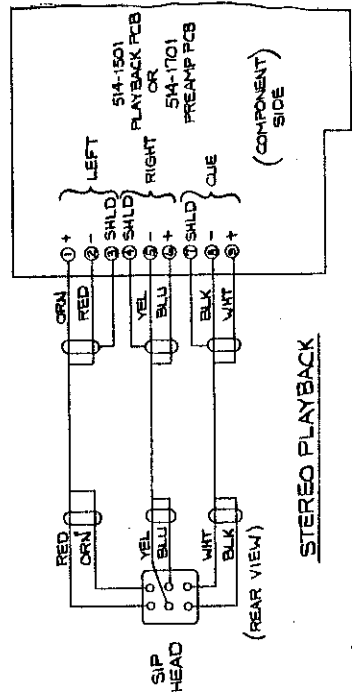
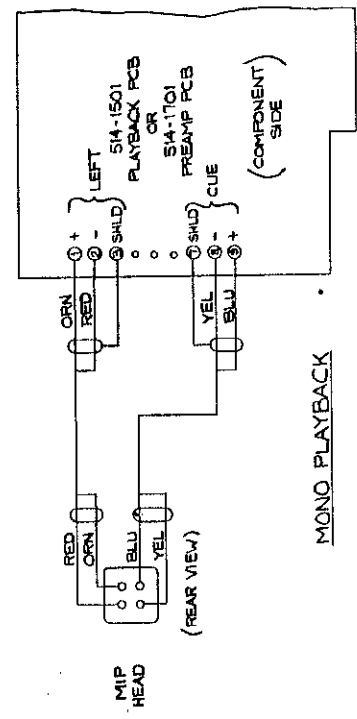
PINS 1, 2 & 3 USED ONLY ON MONO DELAY VERSION (#910-1048)
(SEE NOTE # 3.)

- NOTES:
1. FOR 910-1050, 910-1050-001 (STEREO), USE ALL PARTS.
 2. // - INDICATES COMPONENTS NOT USED ON 910-1049, 910-1049-001, (MONO).
 3. FOR 910-1048 (MONO DELAY), USE PINS 1, 2 & 3; DO NOT USE COMPONENTS INDICATED IN NOTE #2.
 4. SEE B/M # 910-1050 (STEREO)
910-1050-001 (STEREO)
910-1049 (MONO)
910-1049-001 (MONO)
910-1048 (MONO DELAY)
 5. SEE SCHEMATIC # SD 910-1050;
910-1050-001; 910-1049;
910-1049-001; 910-1048.

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TOLERANCE (DECIMAL) U.S.S. .x ± .030 .xxx ± .005 .xx ± .015 ANGLES ± 1°		TITLE PCB ASSEMBLY - RECORD AMP BIAS TYPE A SIZE C DWG. NO. 910-1050; 910-1050-001; 910-1049; 910-1049-001; 910-1048 MODEL 3000 SERIES SCALE 2/1 SHEET 1 OF 1		

REV	DATE	DESCRIPTION	BY	CHK
A	7-8-86	SEE ECN	JAH	5878
B	9-9-86	REDRAWN PER PRINTER W/CHANGE	JAH	64 462



BROADCAST ELECTRONICS INC. 4100 N. 17TH ST. P.O. BOX 1000 MINNEAPOLIS, MN 55401-1000	
DATE: JAN 9-9-86 TIME: 9:00 AM	TITLE: HEAD LEAD TO PCB WIRING
DRAWN BY: JAH CHECKED: JAH	PART NO.: 906-3140
SCALE: 1/1	SHEET: 1 of 1

PLAY LINE OUT
(J4)

CINCH NO. S-306-AB
6 PIN MALE
B-E P/N 418-0302

20	01
40	03
60	05

REMOTE
CONNECTOR
(J5)

CINCH NO. S-324-AB
24 PIN MALE
B-E P/N 418-0303

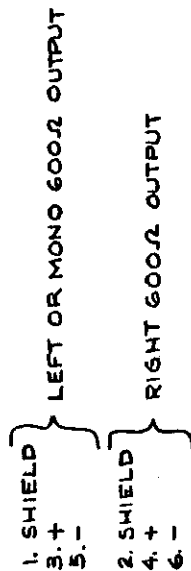
1	03	2	03
4	05	5	06
7	08	8	09
10	11	11	12
13	14	14	15
16	17	17	18
19	20	20	21
22	23	23	24

RECORD LINE IN
(J7)

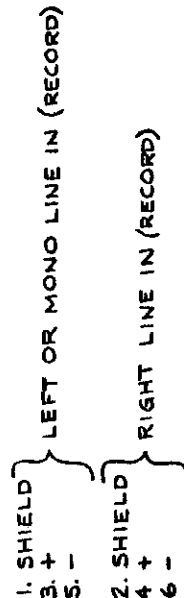
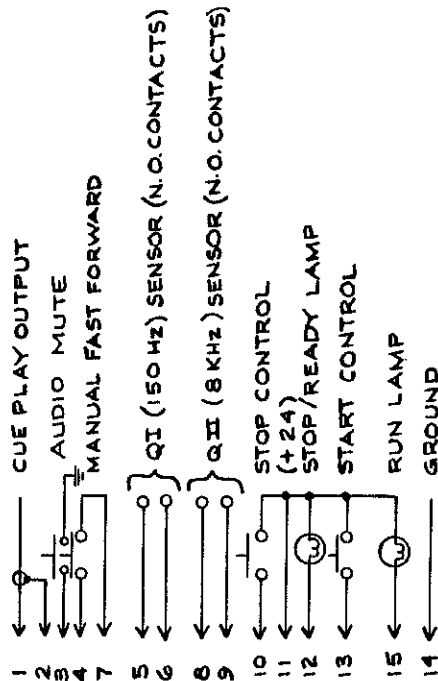
CINCH NO. P-306-AB
6 PIN FEMALE
B-E P/N 418-0301

10	02
30	04
50	06

REAR VIEW, MATING CONNECTORS



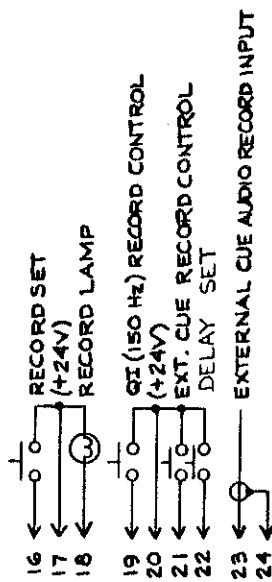
PLAY SECTION



NOTES:

1. ANY 24V PIN (11 PLAY, 11, 17 & 20 RECORD/PLAY) MAY BE USED AS COMMON FOR ALL CONTROLS & LAMPS IF DESIRED.
2. ALL LAMPS 28V, .05A OR LESS.
3. QI & QII CONTACTS RATED 5.0A RESISTIVE, 120V RMS OR 28VDC. AVOID EXCESSIVE CURRENT INTERRUPTION TO AVOID NOISE.
4. CUE OUTPUT LOAD 1.5KΩ MINIMUM. CUE INPUT IMPEDANCE APPROX. 50KΩ UNBALANCED.

RECORD SECTION



BROADCAST ELECTRONICS INC

3000 DL SERIES

REAR PANEL CONNECTOR WIRING

B-906-3131

REV.
A

DRAWN: 11/26/75 W.L.J.

PRODUCT WARRANTY

LIMITED ONE YEAR

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

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

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

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

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

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