

PHOTOFACT[®] with

CIRCUITRACE[®]

These units will record and play mono, stereo, Sound-On-Sound, or Add-A-Track tapes in both directions at speeds of 1 7/8, 3 3/4 or 7 1/2 ips.

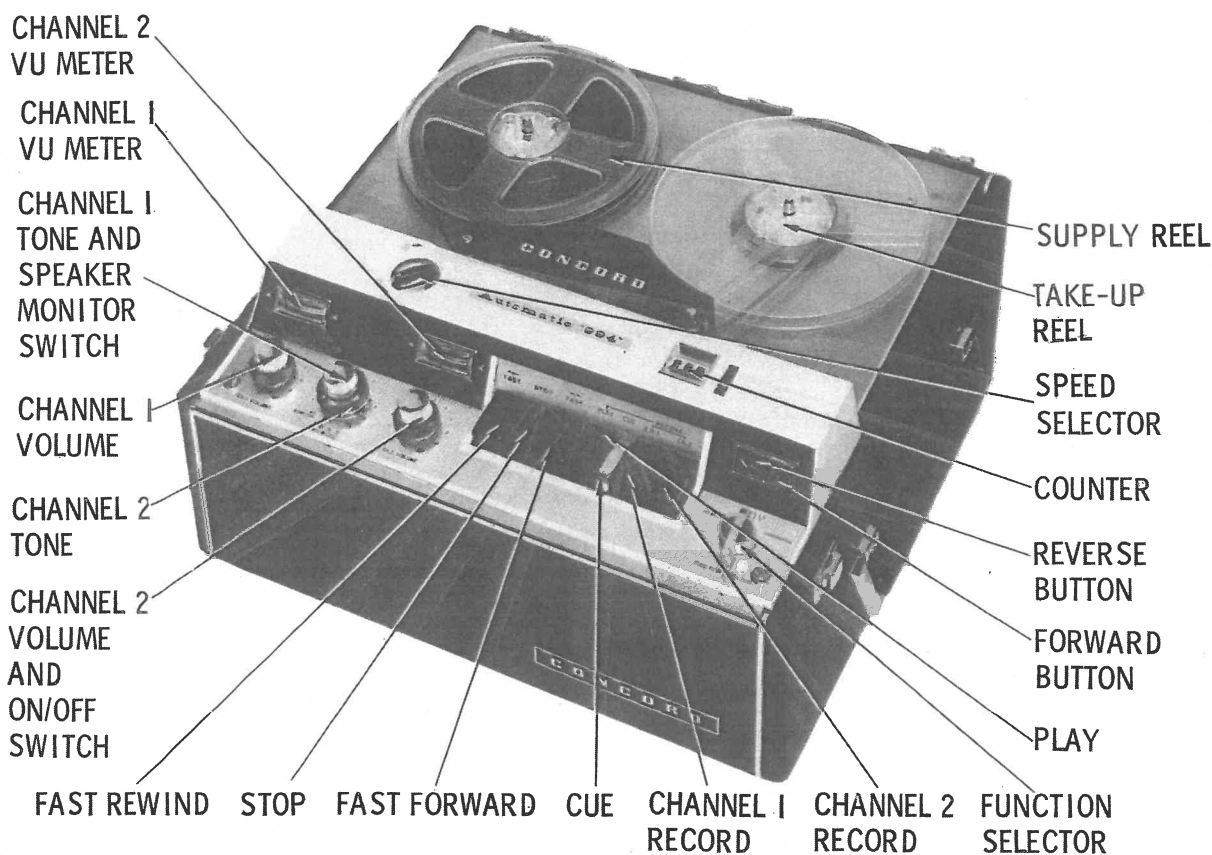
Model 994 is self-contained. Model 990 requires external speakers.

A monitor jack, extension speaker jacks, line output jacks, auxiliary input jacks, and microphone input jacks are provided on the rear of the recorder.

A power source of 110-120 volts AC is required.

TRADE NAME : Concord Models 990, 994
 SUPPLIER : For Current Address, see Master Index
 TYPE SET : 3-Speed, 4-Track Stereo Recorder
 POWER SUPPLY : 110 - 120 Volts AC, 60 Cycles
 RATING : 93 Watts, .83 Amp. @ 117Volts AC (Play, with Motor)
 96 Watts, .86 Amp. @ 117Volts AC (Record, with Motor)
 22 Watts, .15 Amp. @ 117Volts AC (Motor Only)

CONCORD MODELS 990, 994



HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

FUNCTION OF SPECIFIC CONTROLS & JACKS

Function Selector

1. Continuous — Tape will automatically keep reversing direction at any point where a metal sensing foil has been fastened.
2. Auto-Reverse — Tape will automatically reverse direction once, then stop when the sensing tape contacts the tape guide.
3. Single Play — Tape will not automatically reverse direction but will stop when the sensing foil contacts the tape guide.

Note: For normal manual operation, use Single Play position without sensing foil.

These controls and jacks are located on the left side of the recorder. The upper row is channel 1 and the lower row is channel 2:

Monitor Jack

For connecting a low-impedance stereo headphone to monitor a recording or for private listening while playing.

Extension Speaker Jacks

For playback through 8-ohm speakers.

Line Output Jacks

For connecting external power amplifiers. The internal power amplifiers are bypassed.

Auxiliary Input Jacks

For recording directly from a radio, tuner, phonograph, TV, or another tape recorder.

Microphone Input Jacks

For connecting microphones.

Sound-On-Sound Selector Switch

For making Sound-On-Sound recordings.

Keep in Off except when making Sound-On-Sound recordings.

Mixing Switch

For switching the power amplifier connections to the speakers from Mono to Stereo.

OPERATING INSTRUCTIONS

Threading The Tape

1. Turn the Function Selector to Single Play.
2. Place a 7-inch self-threading reel on the supply spindle and an empty reel on the take-up spindle. (A standard-type reel may be used for non-automatic threading).
3. Unwind approximately 20 inches of tape and thread through the tape slot.
4. Loop the free end about 3/4 of the way around the take-up reel spindle. If a self-threading reel was not used in step 2, fasten the tape end to a reel slot and turn the reel several revolutions.
5. Press the Play button to secure the tape.

Changing Tape Direction Automatically

1. Fasten a 1/2-inch length of metal sensing foil to the dull side of the tape about three feet from each end.
2. Turn the Function Selector to Auto Reverse.
3. The tape will then automatically reverse direction.

Changing Tape Direction Manually

1. Turn the Function Selector to Continuous.
2. Press the Reverse (or Forward) button to change tape direction.

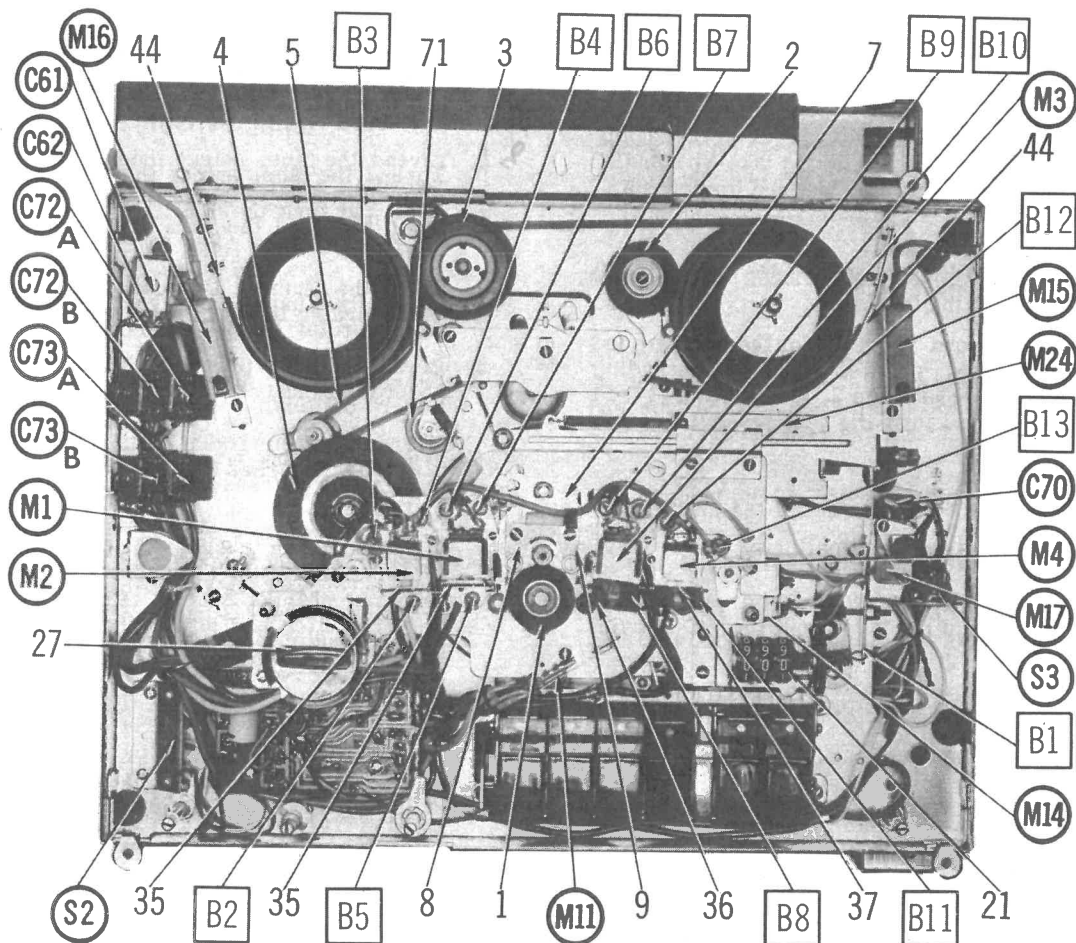
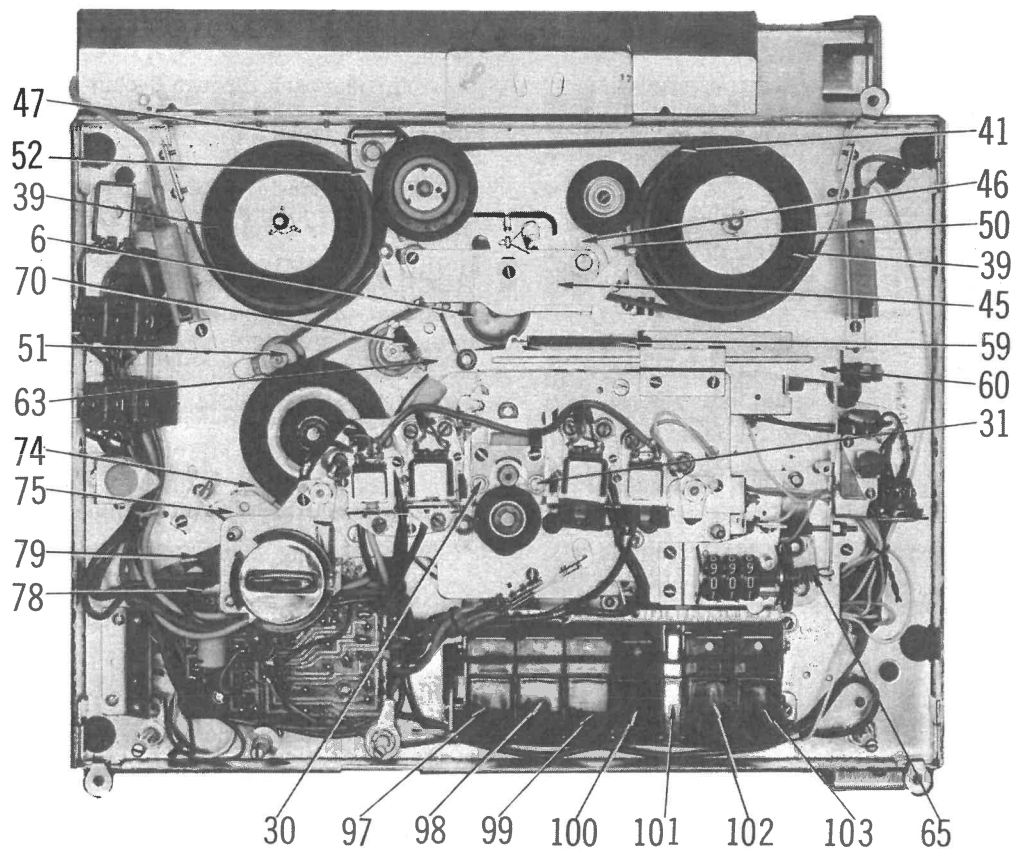
These buttons are operative only when the Function Selector is in Continuous.

Manual Record (Using Sensing Foil)

1. Thread the tape, select the speed, connect the recording source to the appropriate channel 1 input and turn the Function Selector to Auto-Reverse.
2. Press the Channel 1 Record button and adjust the recording level. Press the Stop button.
3. Simultaneously, press the Play and channel 1 Record buttons.
4. After recording track 1, tape direction automatically reverses and recording can continue on track 4.
5. After recording track 4, the tape automatically stops. Connect the recording source to the appropriate channel 2 input. Press the channel 2 Record button and adjust the recording level. Press the Stop button.
6. Simultaneously, press the Play and Channel 2 Record buttons.
7. After recording track 3, tape direction automatically reverses and recording can continue on track 2.

Manual Record (Without Using Sensing Foil)

1. Thread the tape, select the speed, connect the recording source to the appropriate channel 1



input and turn the Function Selector to Continuous.

2. Repeat steps 2 and 3 above.
3. After recording track 1 and before the end of the reel, press the Reverse button and continue recording on track 4.
4. After recording track 4 and before the end of the reel, press the Stop button. Connect the recording source to the appropriate channel 2 input. Press the channel 2 Record button and adjust the recording level. Press the Stop button.
5. Press the Forward button, then simultaneously press the Play and Record buttons.
6. After recording track 3 and before the end of the reel, press the Reverse button and continue recording on track 2.

Stereo Record (Using Sensing Foil)

1. Thread the tape, select the speed, connect the recording source to the appropriate inputs and turn the Function Selector to Auto-Reverse.
2. Press both Record buttons and adjust the recording level of each channel. Press the Stop button.
3. Simultaneously, press the Play and both Record buttons.
4. After recording tracks 1 and 3, tape direction automatically reverses and recording can continue on tracks 2 and 4.

Stereo Record (Without Using Sensing Foil)

1. Thread the tape, select the speed, connect the recording source to the appropriate inputs and turn the Function Selector to Continuous.
2. Repeat steps 2 and 3 above.
3. After recording tracks 1 and 3 and before the end of the reel, press the Reverse button and continue recording on tracks 2 and 3.

Sound-On-Sound Record

1. Turn the Sound-On-Sound Switch to Off and the tone controls to minimum.
2. Make a monaural recording on track 1, channel 1 as outlined under "Monaural Record". Rewind the tape.
3. Remove the recording source from the channel 1

input and connect to the channel 2 input. Press the channel 2 Record button and adjust the recording level. Press the Stop button. Remove the recording source from the channel 2 input.

4. Turn the Sound-On-Sound Switch to Ch. 1-2. Simultaneously press the Play and channel 2 Record buttons. The original recording will now be on tracks 1 and 3. Use the channel 1 Volume control to adjust the recording level. Press the Stop button and rewind the tape when the recording is transferred.
5. Connect the recording source to the Channel 2 input. Simultaneously press the Play and channel 2 Record buttons. The original and new recordings are now being recorded on track 3. To monitor the original track 1 recording, connect a crystal earphone to the channel 1 Line Output jack or a stereo headset to the Monitor jack.
6. A third recording can be made (on channel 1) by turning the Sound-On-Sound Switch to Ch. 2-1 and using the opposite input and record button. Additional recordings can be made by using the above procedure.

Add-A-Track Record

1. Set the Mixing Switch to Mono.
2. Make a recording on channel 1 as outlined under "Monaural Record".
3. Rewind the tape.
4. Connect a recording source to channel 2.
5. While listening to the first recording, make a second recording on channel 2.

Mono and Sound-On-Sound Play

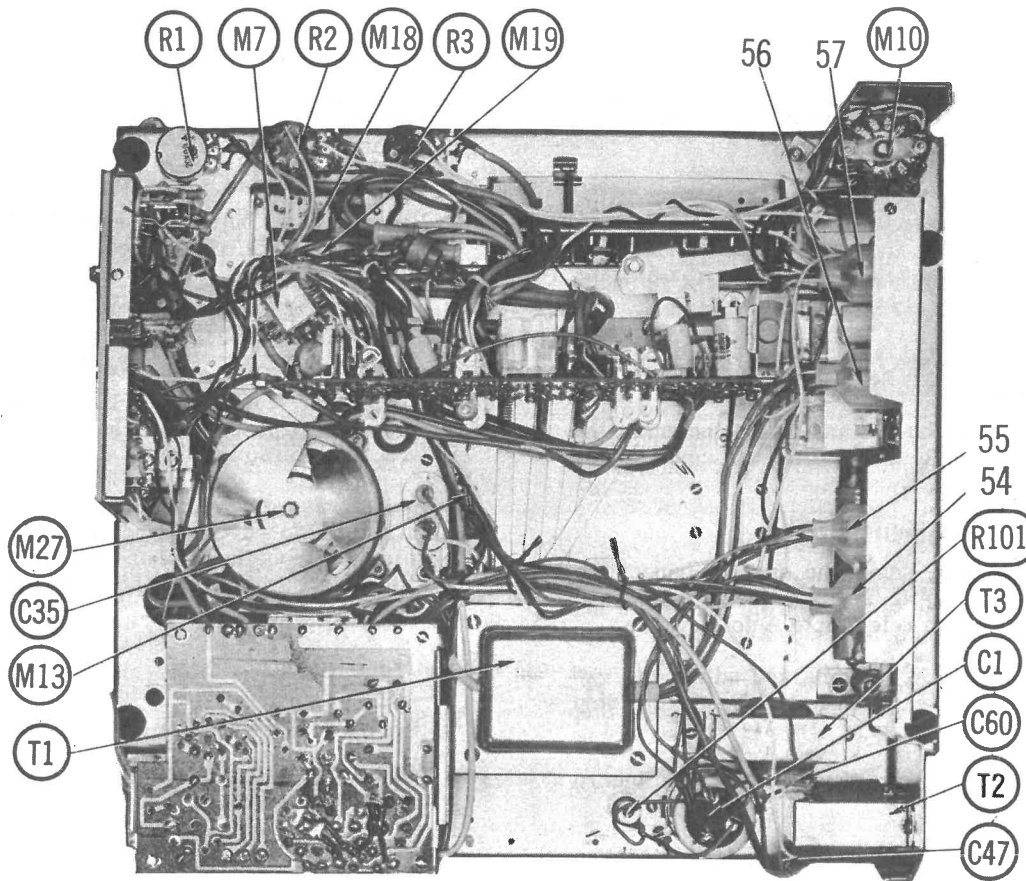
1. Thread the tape, select the speed, set the Mixing switch to Mono, connect external speakers to Model 990, and turn the Function Selector to the desired position.
2. Press the Play button and adjust the appropriate volume and tone controls.

Stereo and Add-A-Track Play

1. Thread the tape, select the speed, set the Mixing switch to Stereo, connect external speakers to Model 990, and turn the Function Selector to the desired position.
2. Press the Play button and adjust both volume and both tone controls as desired.

DISASSEMBLY

1. Remove two screws holding the head cover.
2. Remove five knobs.
3. Remove two Phillips screws holding the plastic front cover. Lift the cover up and disconnect two plugs.
4. Remove two Phillips screws and two hex nuts holding the metal rear deck cover.
5. Remove four screws, one on each corner of the transport, and lift the transport from the cabinet.



CLEANING

HEAD DEMAGNETIZING

LUBRICATING

Refer to "General Servicing Information" on page 4.

SEQUENCE OF OPERATION

Speed Selector

The cam on Speed Selector Knob (27) pushes Idler Lever Shaft (85) down when turning the knob clockwise from the 1 7/8 ips position. This action pushes Idler Arm (75) downward and positions Idler Lever (74) and Drive Idler (4) so they are parallel with the second step of the Motor Pulley (51) or 3 3/4 ips position.

The same action takes place when going from the 3 3/4 ips to 7 1/2 ips position and the reverse action takes place when going from 7 1/2 ips to 3 3/4 ips and 1 7/8 ips position.

Fast Rewind

When the Rewind button is pressed, the Stop button is released and Brake Rod Spring (82) pulls Brake Rod (55) forward, releasing Brake Assembly (44).

Pressing the Rewind button pushes Rewind Rod (54) backward which pivots Rewind Idler Arm (47) so

Rewind Idler Assembly (3) will contact Reel Hub Assembly (39).

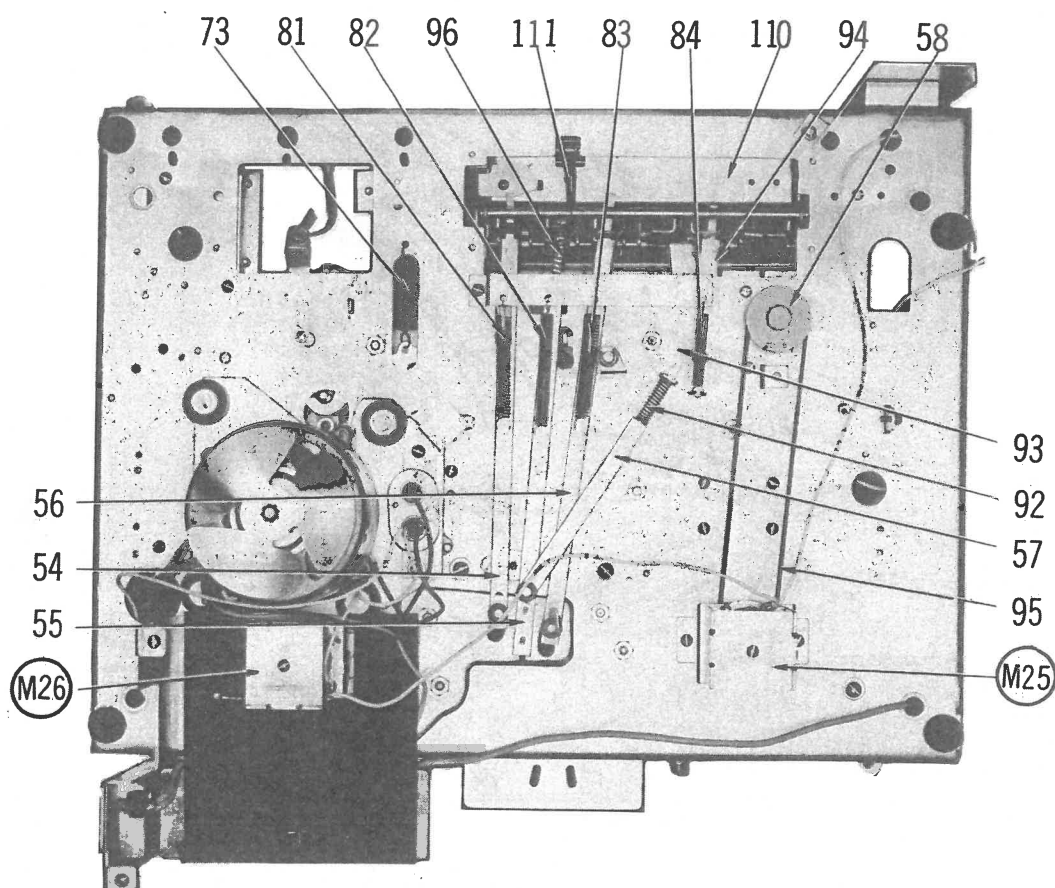
Rewind Idler Assembly (3) is driven by Drive Belt (5).

Fast Forward

Pressing the Fast Forward button releases the Stop button and Brake Rod (55) is pulled forward by Brake Rod Spring (82) releasing the Brake Assembly (44) from the Reel Hub Assemblies (39).

Fast Forward Rod (56) is pushed backward and pivots Fast Forward Roller Lever (50), placing Fast Forward Roller (2) in contact with Reel Hub Assembly (39) and Right Reel Pulley Assembly (41).

The motor drives Right Reel Pulley Assembly (41) through Drive Belt (5) which drives Fast Forward Roller (2).



Stop

Pressing the Stop button releases any button that is pressed and pushes Brake Rod (55) backward which pulls Brake Holder Assembly (45) backward causing Brake Assembly (44) to tighten against Reel Hub Assemblies (39).

Play

Pressing the Play button releases the Stop button and Brake Rod (55) is pulled forward by Brake Rod Spring (82), releasing the brakes from Reel Hub Assemblies (39).

The Play button pivots Pressure Roller Lever (68) which pivots Pressure Roller Lever (64), moving Pressure Roller (1) into contact with the capstan. When Pressure Roller Lever (64) pivots, the pressure pads are released to contact the heads.

Pressure Roller Lever (64) pivots Pressure Roller Lever (66) which pivots Idler Lever (72) through Idler Rod (67), allowing Idler Arm (75) and Idler Lever (74) to pivot so Drive Idler (4) will contact Motor Pulley (51) and Flywheel (26).

Cue

The Cue functions in Record or Play. Pressing the Cue button moves Cue Rod (94) backward permitting Cue Rod Pivot (93) to contact a lance on Pressure Roller Lever (64) moving it forward to disengage Pressure Roller (1) from the capstan.

Cue Rod Pivot (93) forces Cue Lever Rod (57) backward and pushes Brake Holder Assembly (45) backward, applying Brake Assembly (44) to Reel Hub Assemblies (39).

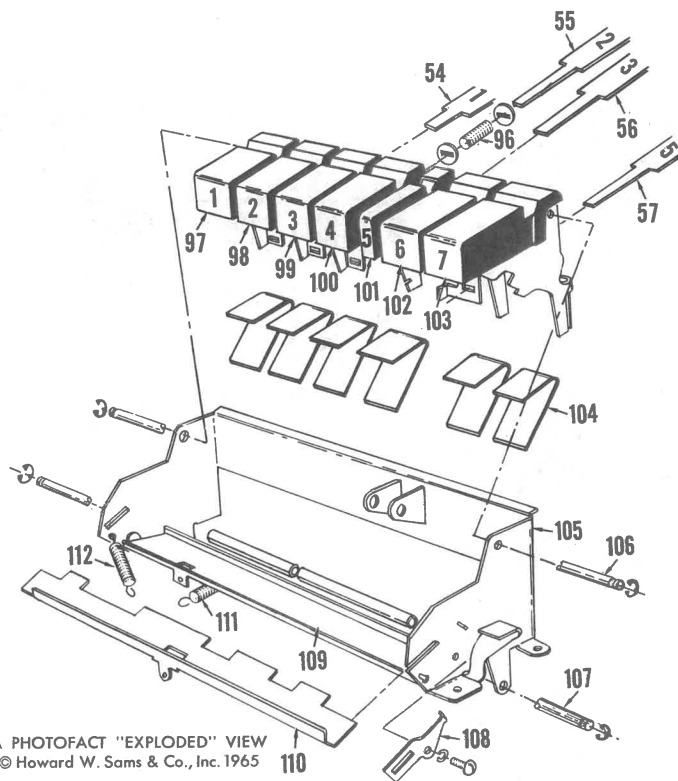
Channel 1 (2) Record

Pressing this button moves the Record-Play switch in the amplifier to the Record position.

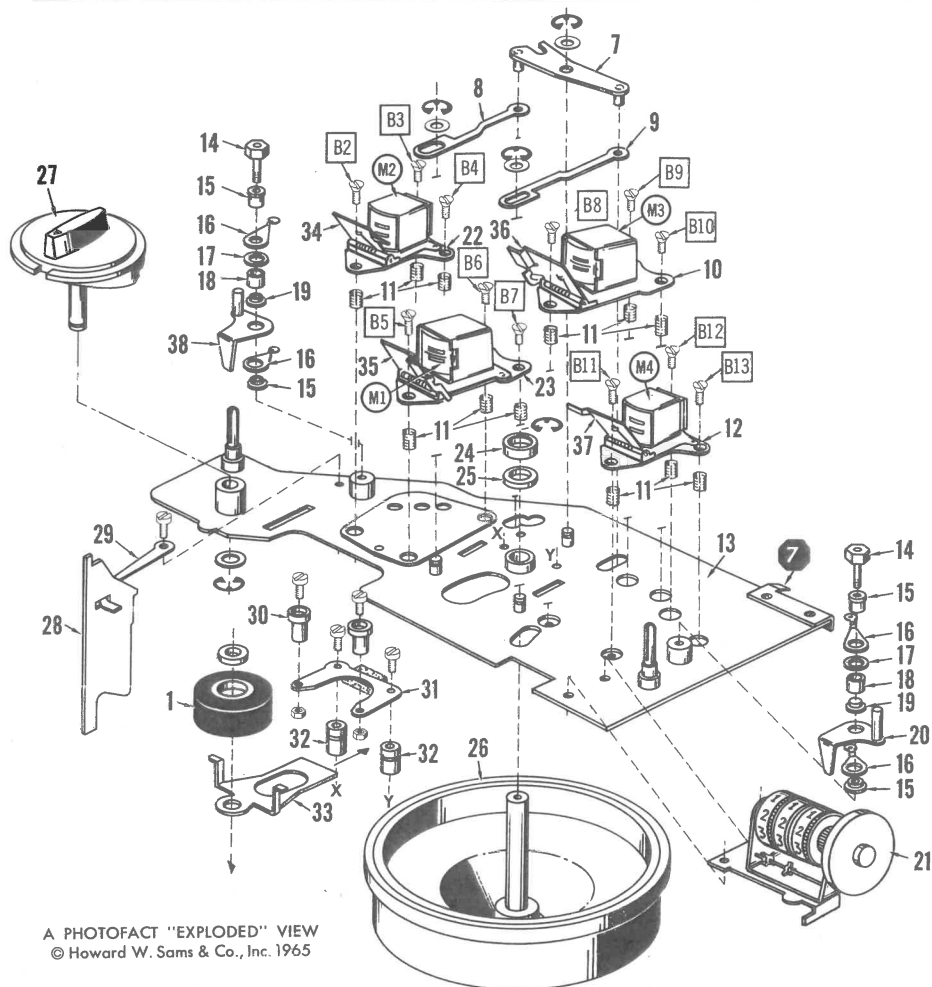
Function Selector

(Continuous or Auto-Reverse Positions)

The reversing solenoid is actuated when the sensing foil contacts the tape guide. The solenoid pushes Reverse Idler Rod (60) to the left and pivots Pressure Pad See-Saw Assembly (7, 8, 9), reversing the pressure pads. Reverse Idler Rod Arm (63) pivots, moving Reverse Roller (71) into contact with Flywheel (26) and Drive Idler (4).



A PHOTOFAC "EXPLODED" VIEW
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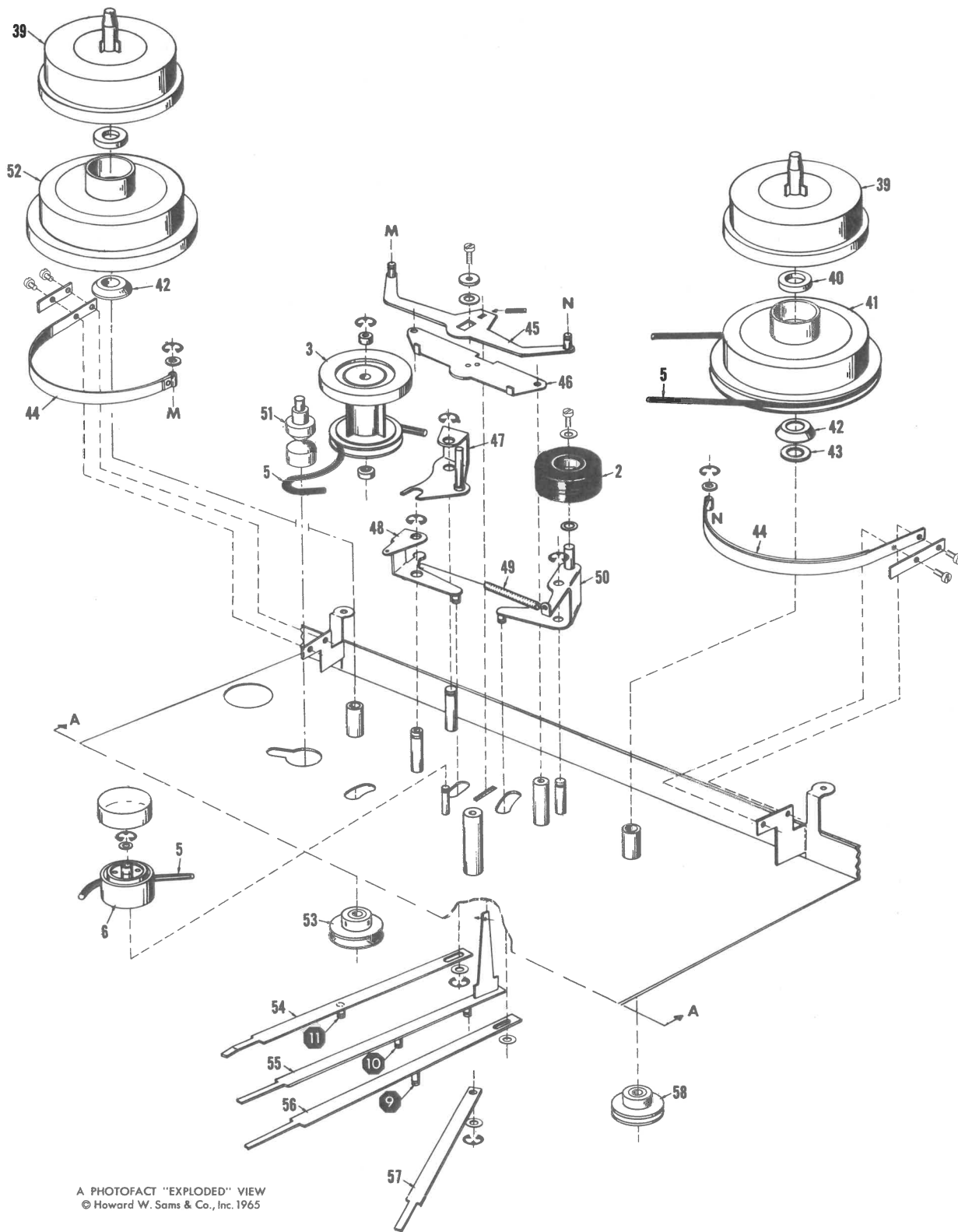
ADJUSTMENTS

IMPORTANT: Before making any adjustments, refer to "General Servicing Information" on page 4.

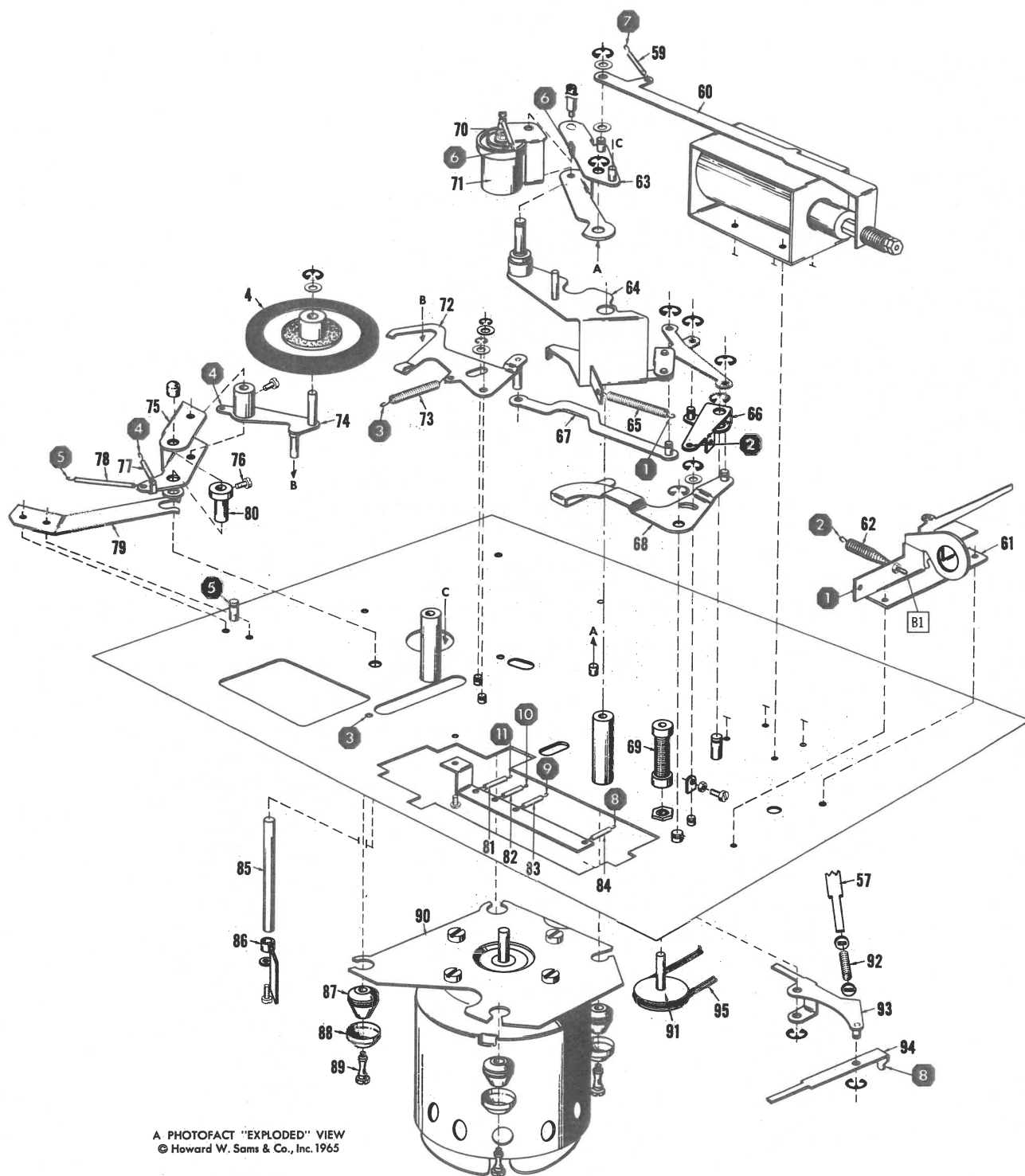
1. All voltage measurements are made at a tape speed of 7 1/2 ips with an audio VTVM having a flat response to 100KC.
2. All torque measurements are made at a tape speed of 7 1/2 ips with a spring scale applied to a point on an empty tape reel 2 inches from reel center.
3. All pressure measurements are made by using a spring scale to determine that point at which pressure is just removed.

ADJUST	REMARKS
Play Take-up Torque	No adjustment provided. Nominal value 3/4 ounce.
Fast Forward Take-up Torque	No adjustment provided. Nominal value 12 ounces.
Rewind Torque	No adjustment provided. Nominal value 7 ounces.
Supply Reel Drag	No adjustment provided. Nominal value 1/8 ounce. (Forward Position)
Take-up Reel Drag	No adjustment provided. Nominal value 1/8 ounce, measured in Record.
Pressure Roller Pressure	Adjust B1 for 3 3/4 pounds.
Brake Shoe Pressure	No adjustment provided. Nominal value 1 1/2 pounds, measured at point of contact in Stop.
Pause Brake Shoe Pressure	No adjustment provided. Nominal value 1 pound, measured at point of contact.
Pressure Pad Pressure	No adjustment provided. Nominal value 1/2 ounce, measured at point of contact on all heads.
Erase Head Height	Adjust B2, B3, B4, B11, B12 & B13 until top of upper pole piece is even with top edge of a properly threaded tape.
Erase Head Azimuth	Adjust B2, & B13 until the pole piece is perpendicular to the lateral tape motion.
Record/ Play Head Height	Play a 2-frequency, height test tape and monitor the appropriate output. Adjust B5, B6, B7, B8, B9 & B10 for equal output voltage for each frequency.
Record/ Play Head Azimuth	Play an azimuth test tape and monitor the appropriate output. Adjust B7 & B10 for maximum output voltage.
Erase Current	Adjust C61 for 36V rms (95ma) across each section of the erase head.
Record Bias	Adjust C72A (Left Channel Forward), C73A (Left Channel Reverse), C72B (Right Channel Forward), and C73B (Right Channel Reverse) for 21V rms (.35ma) across each section of the record head.
Bias Oscillator	Adjust C65 for 80KC.
Record Level Indicator Calibration	Remove the bias oscillator tube. Apply a 1000-cycle signal to each mic input and adjust each volume control for .7V rms, measured across each section of the record/play heads. Adjust R10 (Left Channel) and R17 (Right Channel) for the normal peak level on the indicators.

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TROUBLE CHART

IMPORTANT : Before consulting this chart be sure all servicing procedures listed on page 4 have been followed.

SYMPTOM	REMARKS
Take-up reel revolves erratically, or not at all in Play or Record	<ol style="list-style-type: none"> 1. Drive Idler (4) dirty or oily. 2. Motor Pulley (51) loose. 3. Drive Belt (5) broken.
Take-up reel does not revolve in Fast Forward.	<ol style="list-style-type: none"> 1. Fast Forward/Reverse Idler Lever Spring (49) broken. 2. Fast Forward Roller (2) oily or dirty.
Take-up reel revolves rapidly in Play or Record.	<ol style="list-style-type: none"> 1. Pressure Roller (1) worn or dirty.
Supply reel does not revolve in Rewind.	<ol style="list-style-type: none"> 1. Drive Belt (5) broken. 2. Rewind Idler Assembly (3) dirty.
Reels do not stop immediately when Stop button is pressed.	<ol style="list-style-type: none"> 1. Brake Rod (55) bent. 2. Brake Assembly (44) worn.
Capstan does not rotate in Play or Record.	<ol style="list-style-type: none"> 1. Motor Pulley (51) loose. 2. Flywheel bearing defective. 3. Drive Idler (4) oily.
Tape rides up and down between capstan and pressure roller.	<ol style="list-style-type: none"> 1. Excessive oxide built up on capstan and pressure roller.
Wow or Flutter.	<ol style="list-style-type: none"> 1. Record/Play Heads (M1 and M3) dirty or worn. 2. Motor Pulley (51) loose. 3. Drive Idler (4) oily. 4. Pressure Roller (1) dirty or worn.
Sound is weak or distorted.	<ol style="list-style-type: none"> 1. Record/Play Heads (M1 and M3) dirty or worn. 2. Pressure pads dirty.
Erase weak or inoperative.	<ol style="list-style-type: none"> 1. Erase Heads (M2 and M4) dirty, worn or defective. 2. Insufficient erase current.

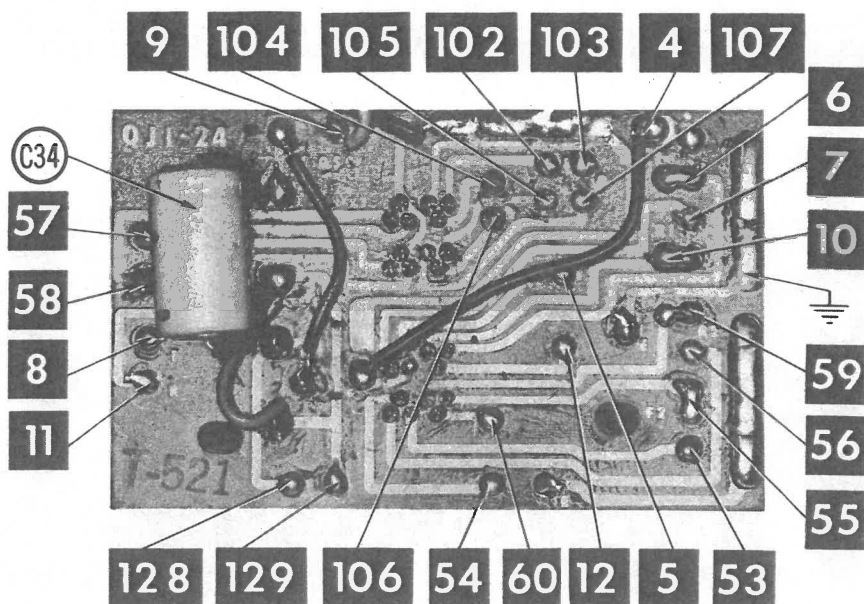
MECHANICAL PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
1		Pressure Roller	26		Flywheel
2		Fast Forward Roller	27		Speed Selector Knob
3		Rewind Idler Assembly	28		Speed Selector Safety Bracket
4		Drive Idler	29		Speed Selector Spring
5		Drive Belt	30		Tape Guides
6		Tension Roller	31		Tape Guide Plate
7		Pressure Pad See-Saw Ass'y.	32		Tape Guide Post
8		Pressure Pad Rod	33		Pressure Pad Slide Plate
9		Pressure Pad Rod	34		Normal Erase Head
10		Reverse Record-Play Head Mounting Plate			Pressure Pad
11		Head Adjustment Springs	35		Normal Record-Play Head
12		Reverse Erase Head Mounting Plate			Pressure Pad
13		Upper Baseplate	36		Reverse Record-Play Head
14		Tape Guide Screw			Pressure Pad
15		Insulation Pipe	37		Reverse Erase Head Pressure Pad
16		Sensing Post Terminal			
17		Lower Sensing Pole	38		Left Sensing Post
18		Upper Sensing Pole	39		Reel Hub Assembly
19		Insulation Pipe	40		Washer
20		Right Sensing Post	41		Right Reel Pulley Assembly
21		Counter	42		Rubber Bushing
22		Normal Erase Head Mounting Plate	43		Washer
23		Normal Record-Play Head Mounting Plate	44		Brake Assembly
24		Oil Cap	45		Brake Holder Assembly
25		Felt Ring	46		Brake Holding Plate
			47		Rewind Idler Arm
			48		Rewind Idler Lever
			49		Fast Forward-Reverse Idler Lever Spring

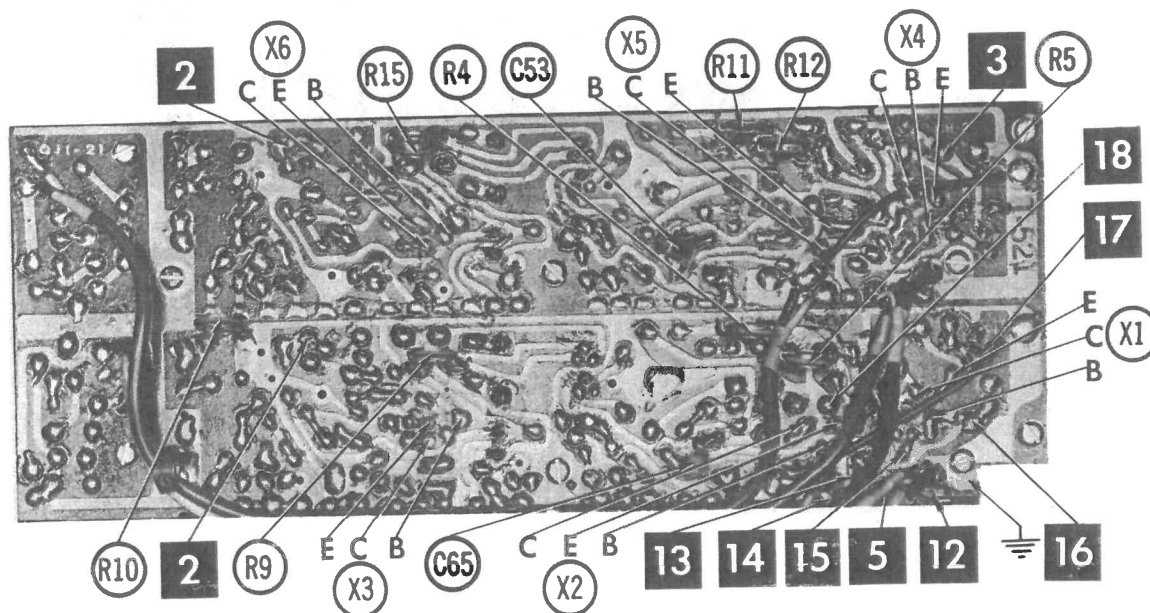
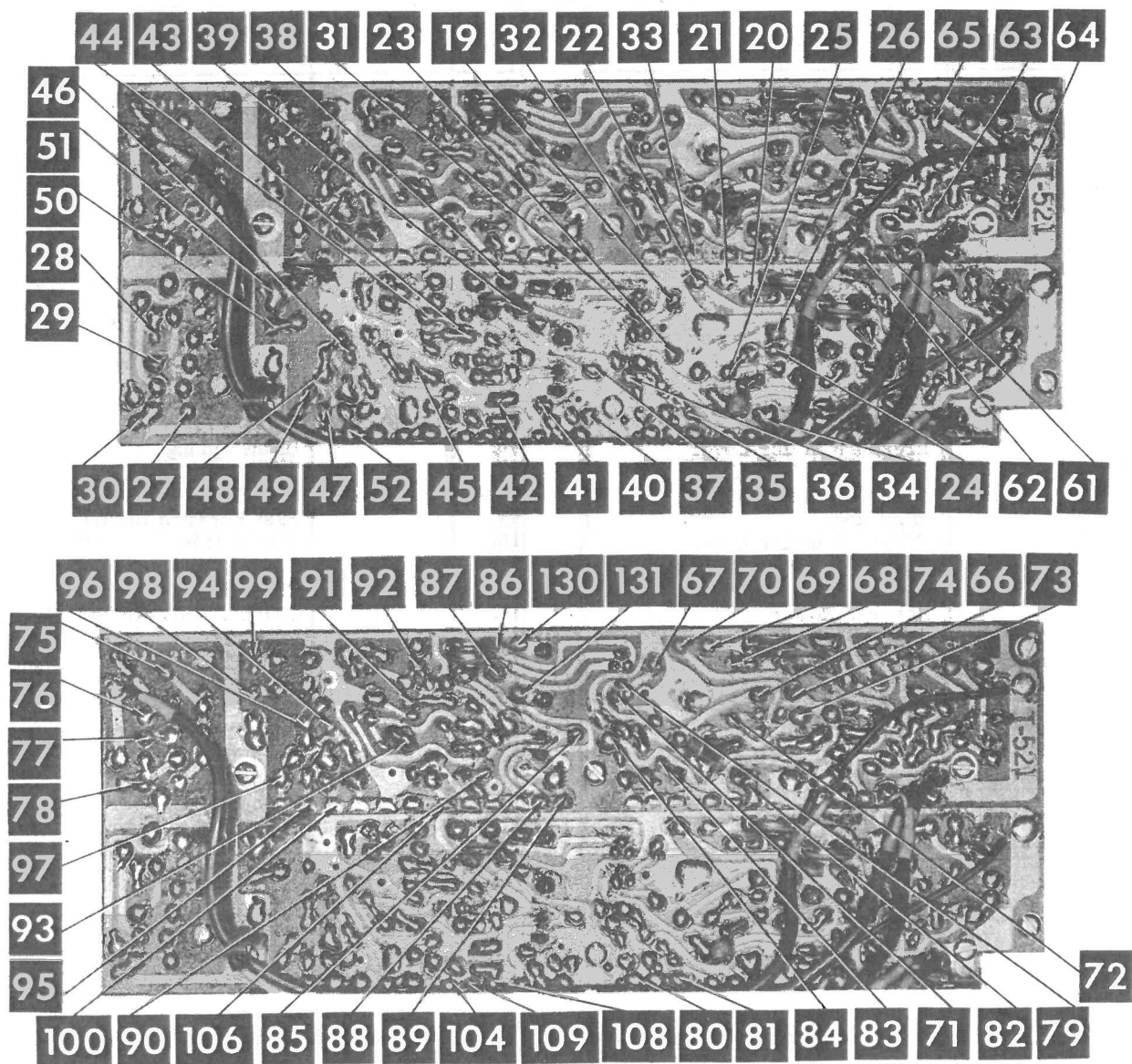
MECHANICAL PARTS LIST

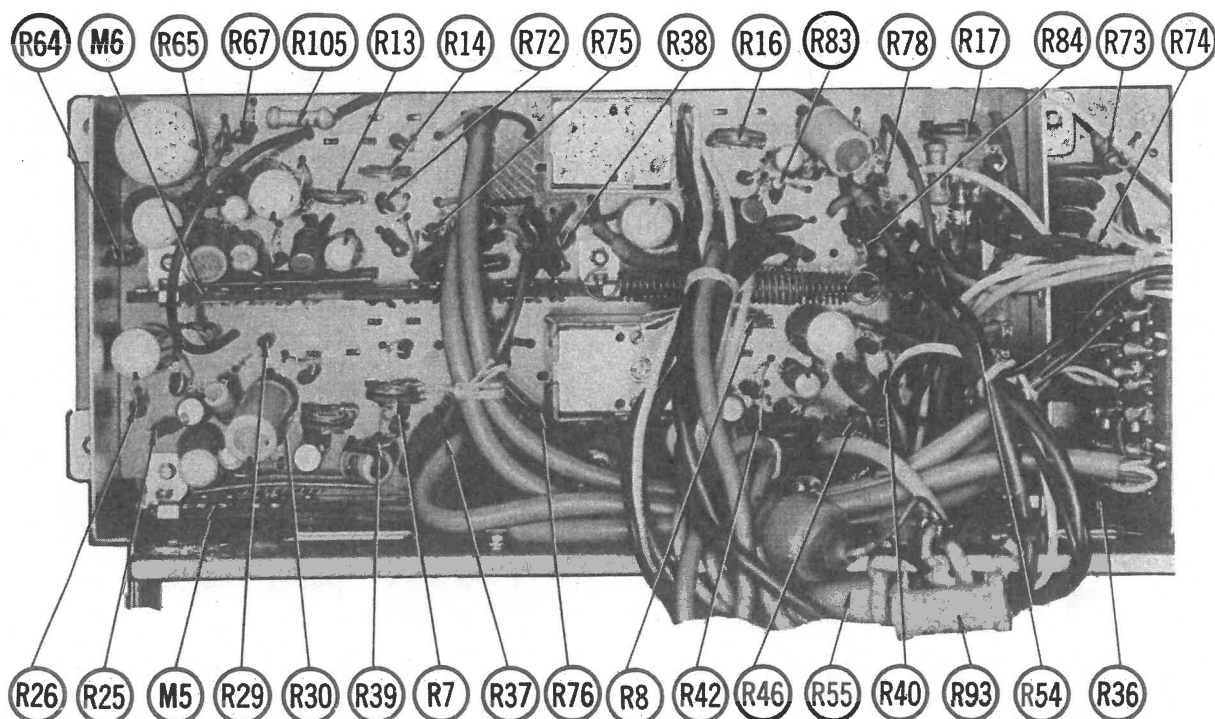
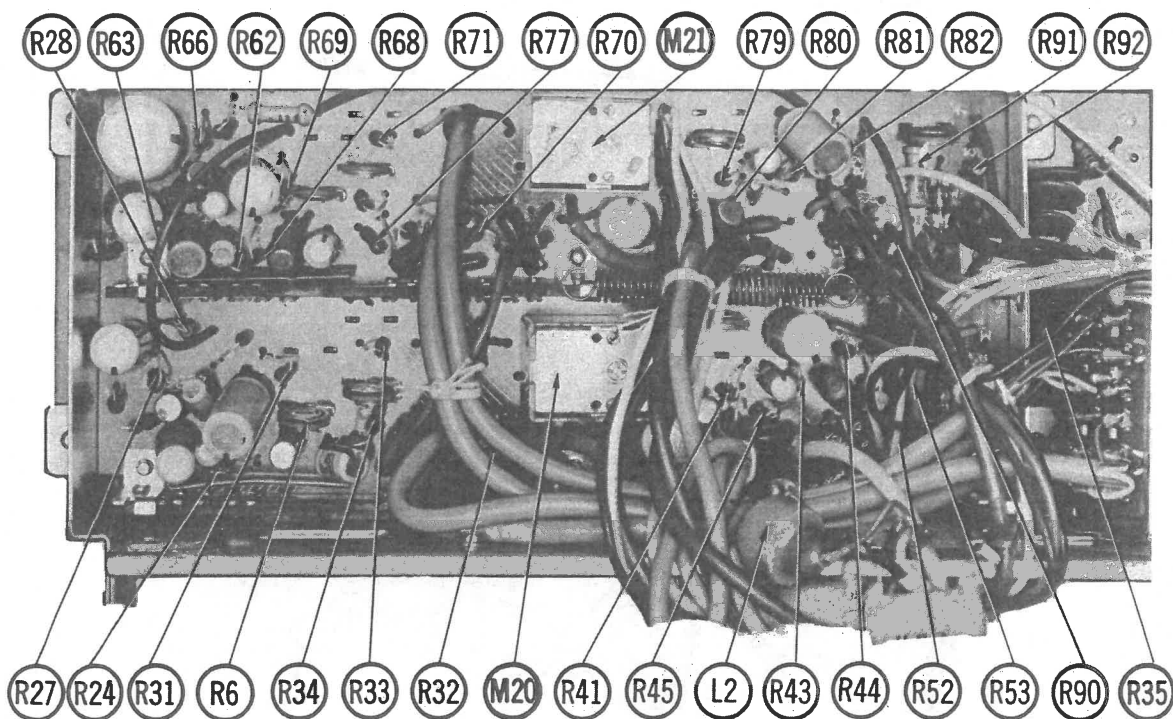
Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
50		Fast Forward Roller Lever	81		Rewind Rod Spring
51		Motor Pulley	82		Brake Rod Spring
52		Left Reel Pulley Assembly	83		Fast Forward Rod Spring
53		Left Reel Hub Bearing	84		Cue Rod Spring
54		Rewind Rod	85		Idler Lever Shaft
55		Brake Rod	86		Guide
56		Fast Forward Rod	87		Motor Mount
57		Cue Lever Rod	88		Motor Mounting Screw
58		Right Reel Hub Bearing	89		Motor Mount Washer
59		Reverse Idler Spring	90		Motor Mounting Plate
60		Reverse Idler Rod	91		Counter Pulley
61		Micro Switch Lever	92		Cue Lever Rod Spring
		Mounting Base	93		Cue Rod Pivot
62		M3 ϕ x 25 Screw	94		Cue Rod
63		Reverse Idler Rod Arm	95		Counter Belt
64		Pressure Roller Lever	96		Brake Spring
65		Pressure Roller Spring	97		Rewind Button
66		Pressure Roller Lever	98		Stop Button
67		Idler Rod	99		Fast Forward Button
68		Pressure Roller Lever	100		Play Button
69		Tape Counter Spring Joint	101		Cue Button
70		Reverse Idler Spring	102		Channel 1 Record Button
71		Reverse Roller	103		Channel 2 Record Button
72		Idler Lever	104		Push Button Leaf Spring
73		Idler Spring	105		Push Button Frame Assembly
74		Idler Lever	106		Push Button Shaft
75		Idler Arm	107		Push Button Shaft
76		Set Screw	108		Push Button Frame Bracket
77		Idler Lever Spring	109		Push Button Lever
78		Idler Spring	110		Push Button Lever
79		Idler Spring	111		Push Button Lever Spring
80		Idler Lever Collar	112		Push Button Lever Spring

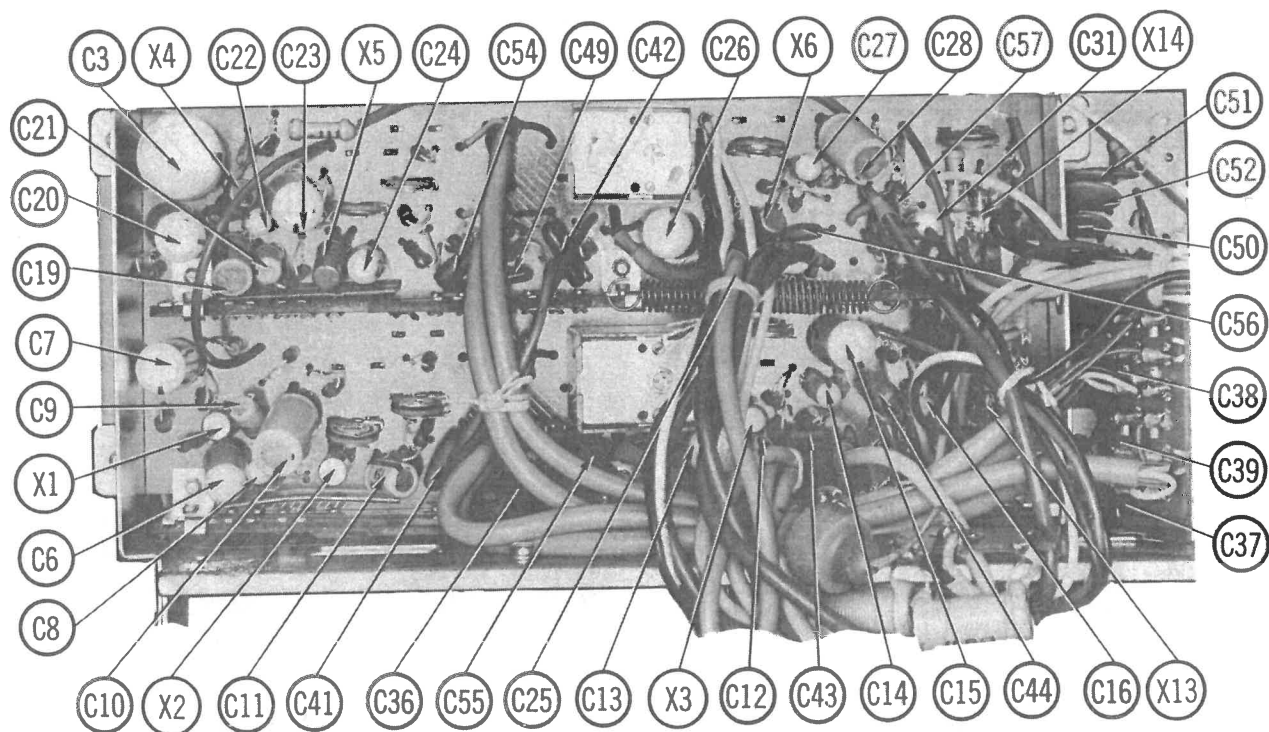
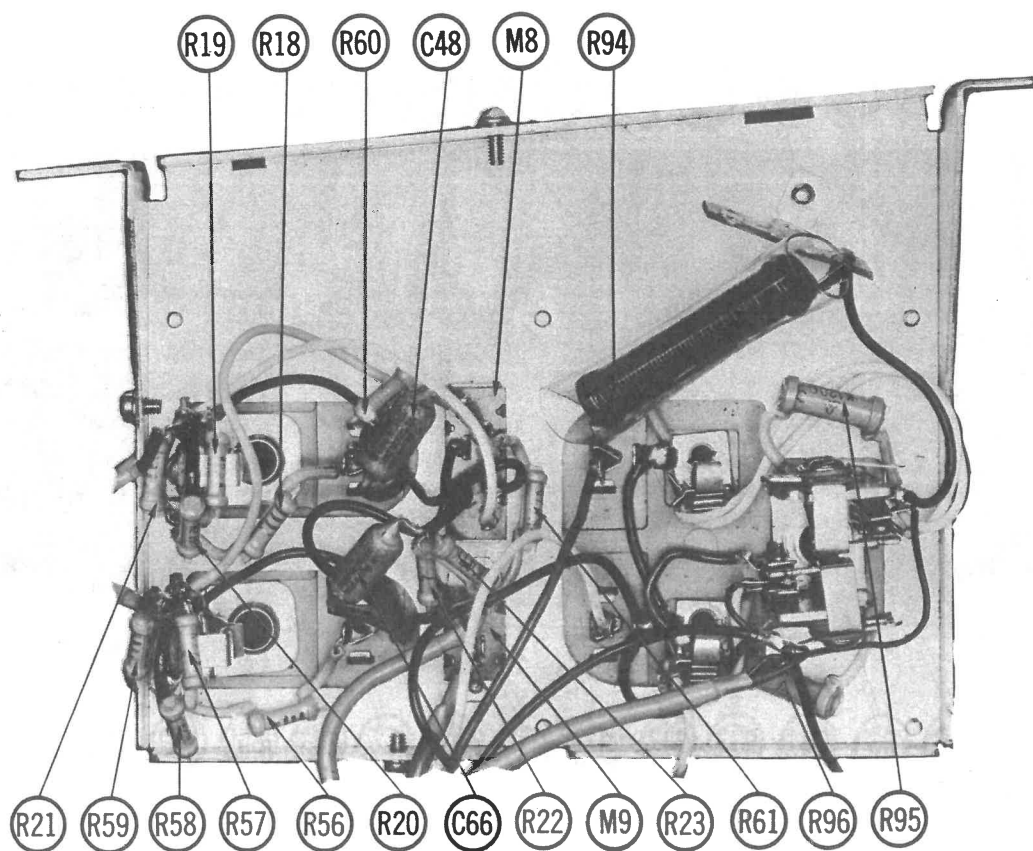
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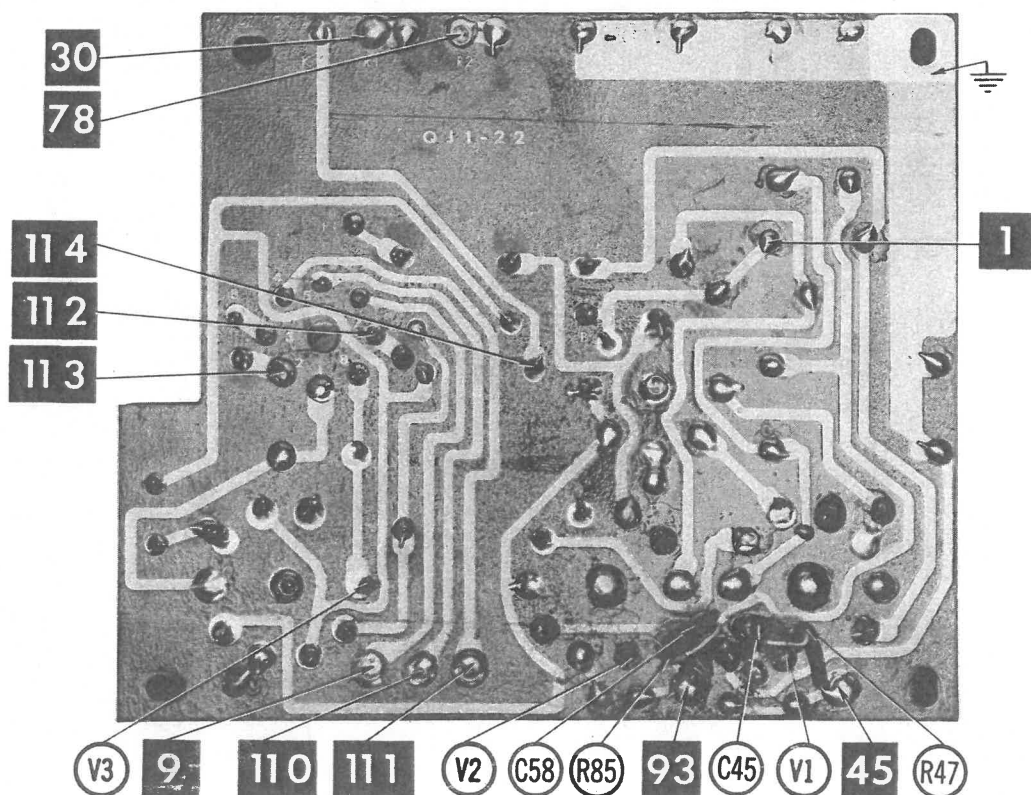
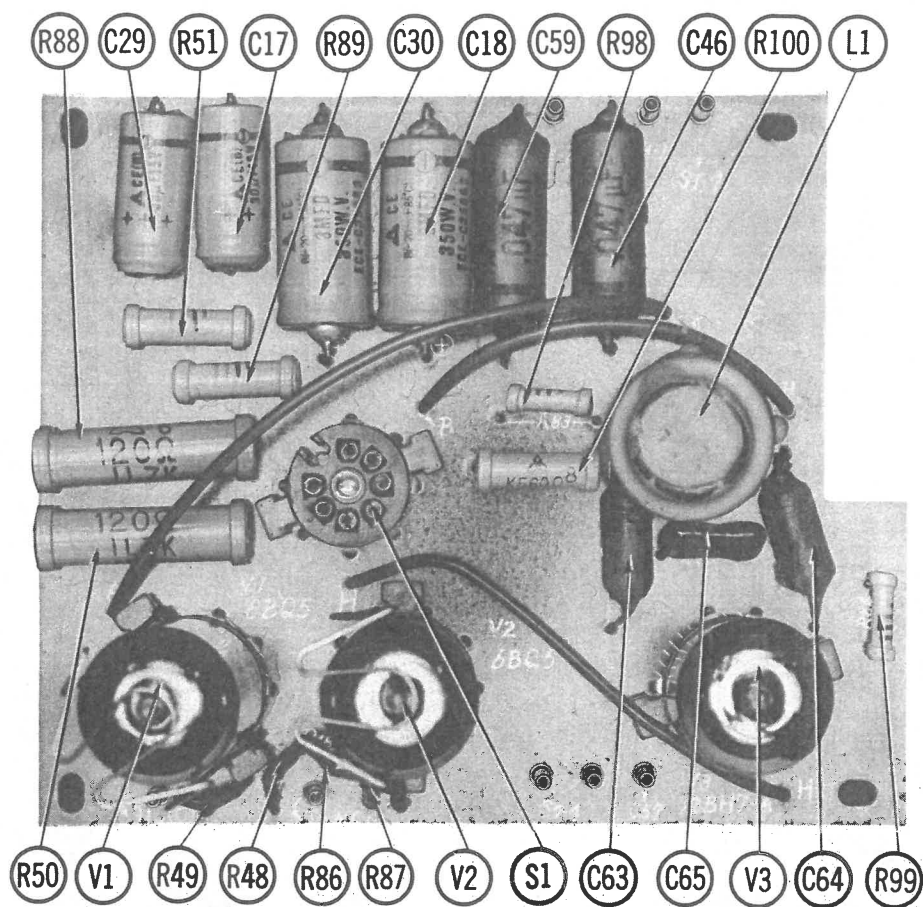


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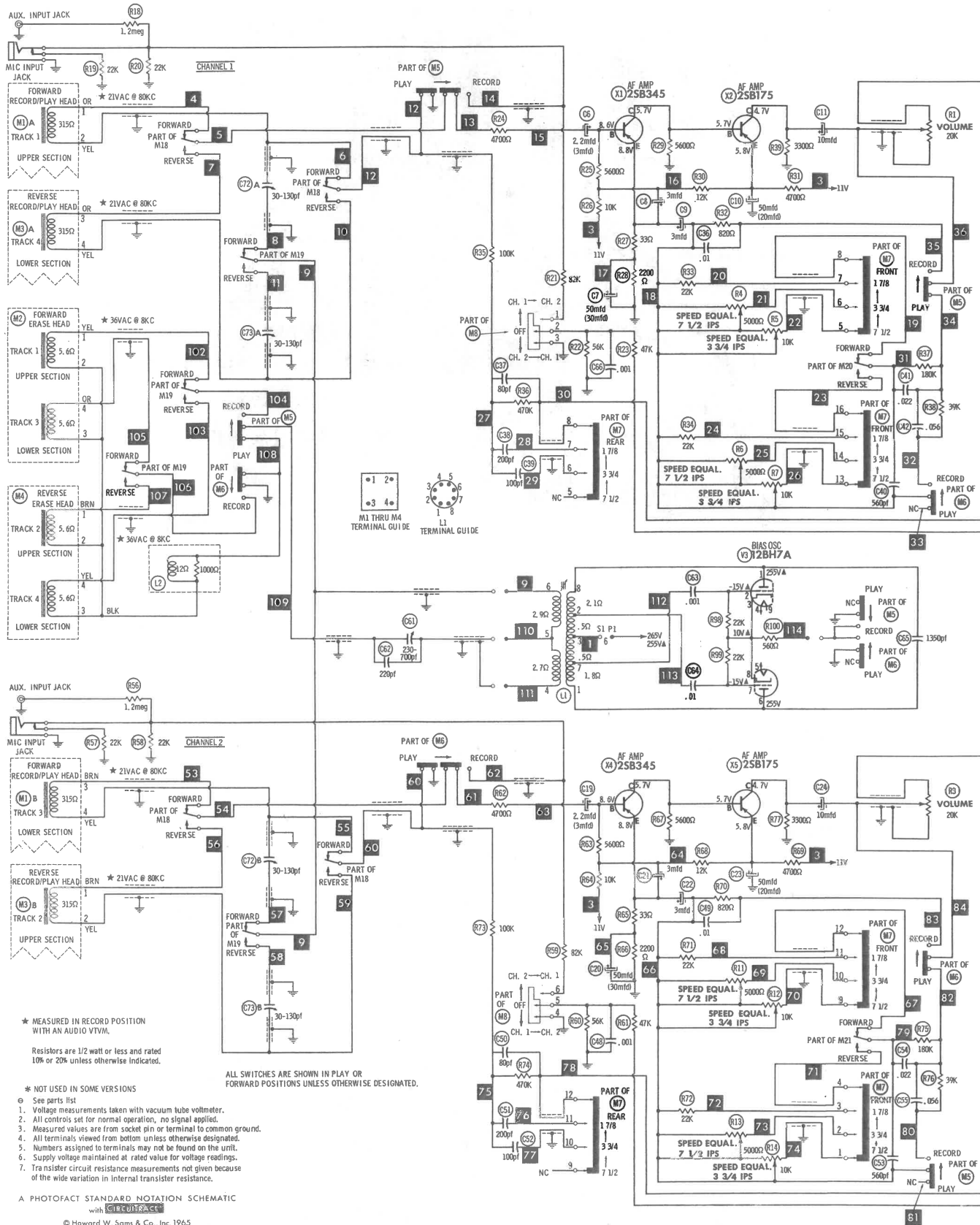


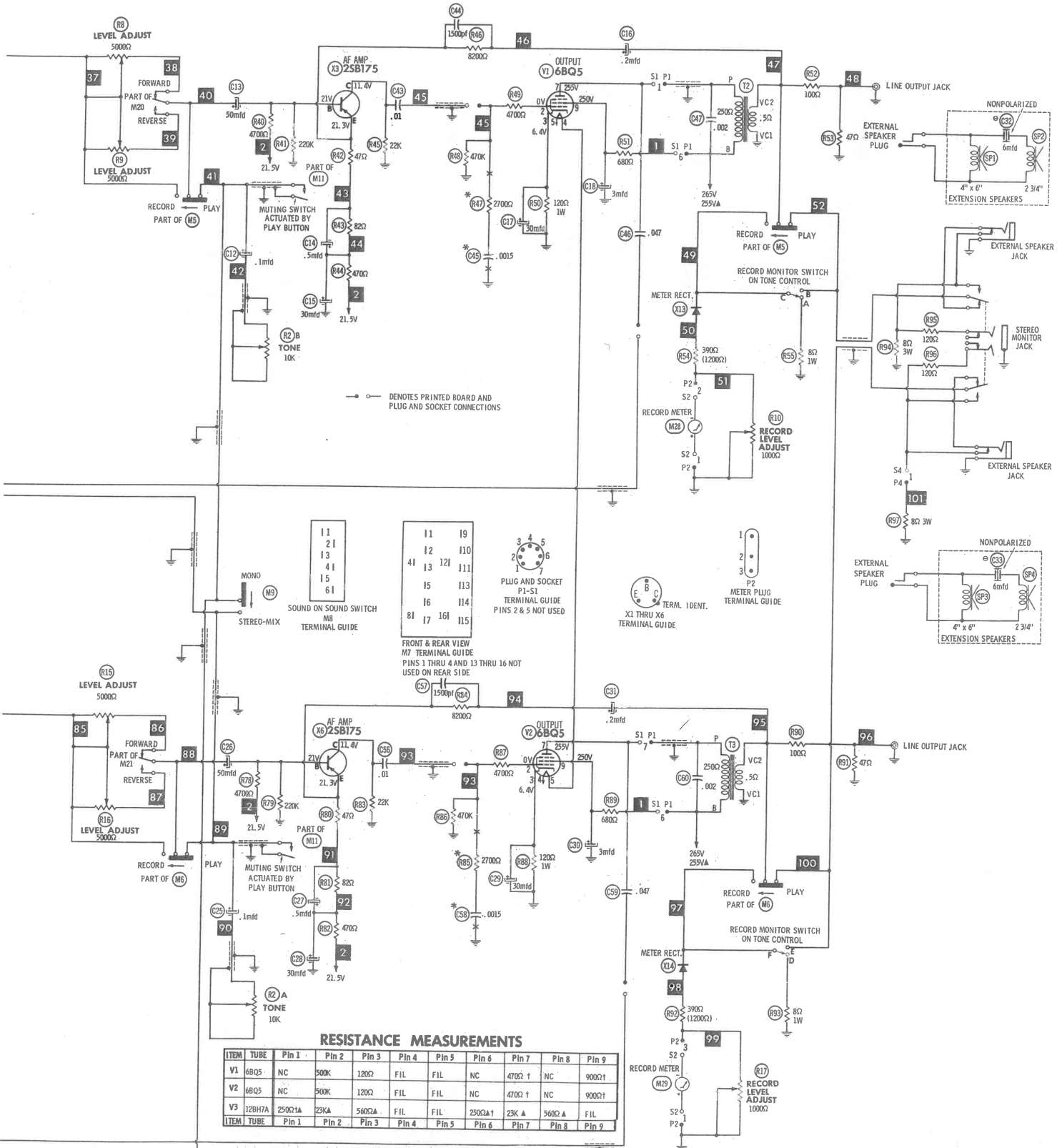


ARROWS INDICATING TUBE LOCATIONS ARE
POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

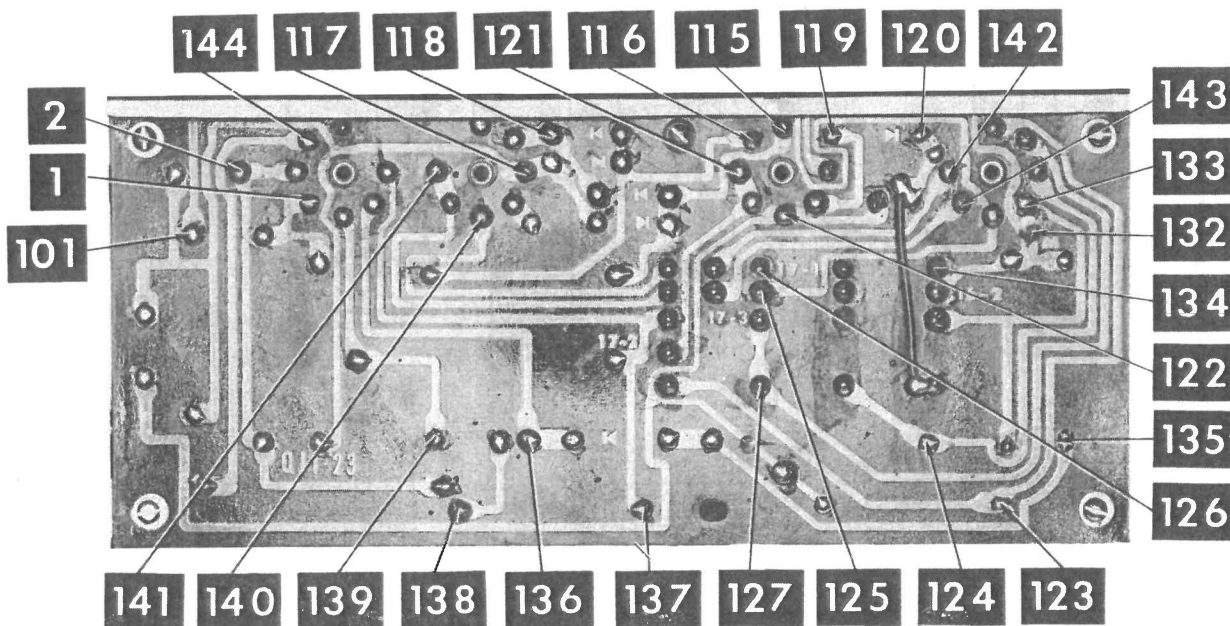
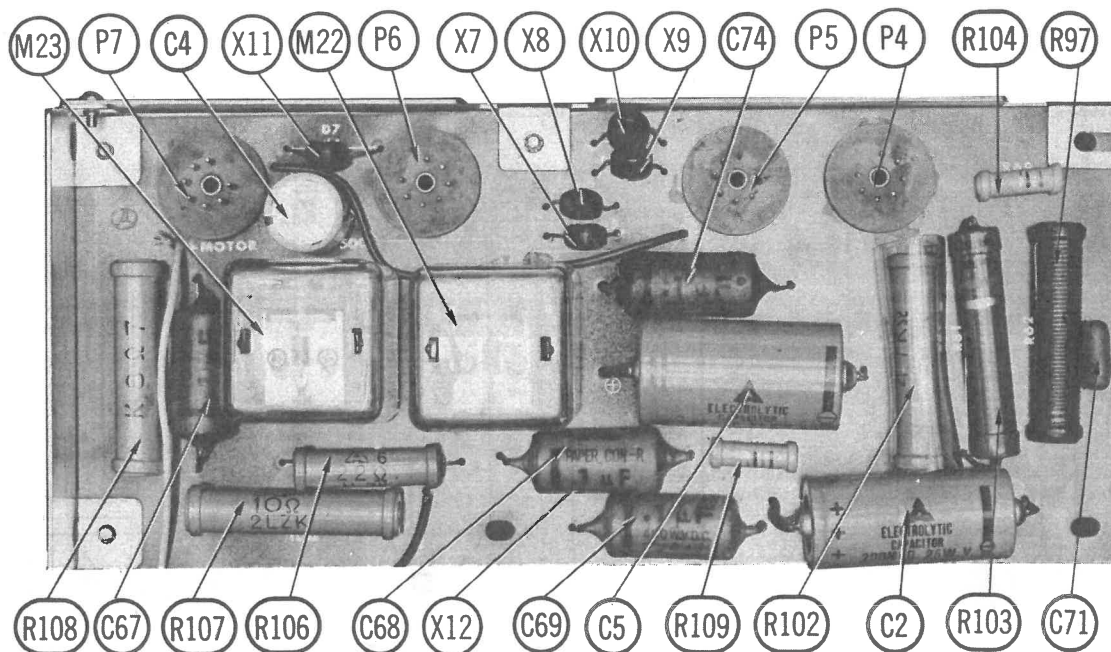
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NOTE: DEMAGNETIZE HEADS AFTER SERVICING RECORDER

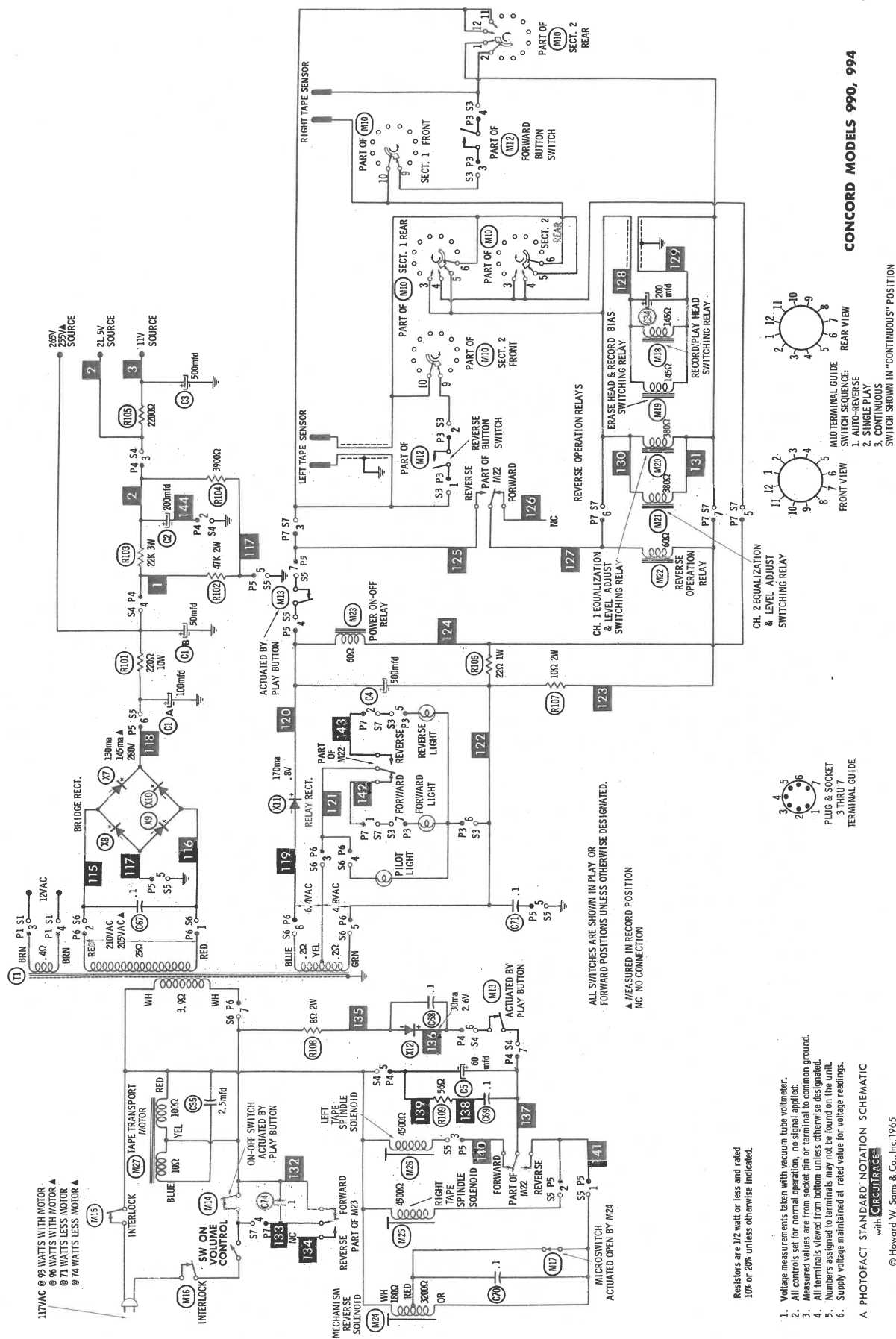




CONCORD MODELS 990, 994



NOTE: DEMAGNETIZE HEADS AFTER SERVICING RECORDER



PARTS LIST AND DESCRIPTION

(When ordering parts, state Model, Part Number, and Description.)

TUBES

AMPEREX			GENERAL ELECTRIC			RCA			SYLVANIA		
ITEM No.	USE		TYPE			ITEM No.	USE		TYPE		
V1	Output		6BQ5			V3	Bias Osc.		12BH7A		
V2	Output		6BQ5								

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA			NOTES
			DELCO PART No.	GENERAL ELECTRIC PART No.	RCA PART No.	
X1	2SB345	AF Amp.	DS-16	GE-2	SK-3004	PNP
X2	2SB175	AF Amp.	DS-16	GE-2	SK-3004	PNP
X3	2SB175	AF Amp.	DS-16	GE-2	SK-3004	PNP
X4	2SB345	AF Amp.	DS-16	GE-2	SK-3004	PNP
X5	2SB175	AF Amp.	DS-16	GE-2	SK-3004	PNP
X6	2SB175	AF Amp.	DS-16	GE-2	SK-3004	PNP

POWER RECTIFIERS & SIGNAL DIODES

ITEM No.	MEASURED CURRENT	ORIGINAL Part or Type No.	RECTIFIERS				DIODES
			GENERAL ELECTRIC PART No.	MALLORY PART No.	RCA PART No.	SARKES TARZIAN PART No.	GENERAL ELECTRIC PART No.
X7	.145A	FR-1M	1N1697	1N2096 or 1N1492 or FW600①	SK-3016	F6 or 60H or 60C	
X8	.145A	FR-1M	1N1697	1N2096 or 1N1492 or FW600①	SK-3016	F6 or 60H or 60C	
X9	.145A	FR-1M	1N1697	1N2096 or 1N1492 or FW600①	SK-3016	F6 or 60H or 60C	
X10	.145A	FR-1M	1N1697	1N2096 or 1N1492 or FW600①	SK-3016	F6 or 60H or 60C	
X11	.170A	FR-1M	1N91	1N2091 or A100 or 1N537	SK-3016 or SK-3017	F1 or 10H or 10C	
X12	.030A	SW-05-01	1N1693	1N2092 or 1N2069 or 1N537	SK-3016 or SK-3017	F4 or 40H or 40C	
X13		OA-70					1N34AS
X14		OA-70					1N34AS

① Part #FW600 will replace X7, X8, X9 and X10 with a single unit.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA					
	CAP.	VOLT.	CONCORD PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	GENERAL ELECTRIC PART No.	MALLORY PART No.	SPRAGUE PART No.
C1A	B 50	350		AFH2-41-40	BB0332	XC2-39	WP331, 7A	TVL-2639
B	A 100	350						
C2	200	25		PRS1280	BR250-25	QT1-28	MTA200F25	TVA-1208
C3	500	15		PRS1220	BR500-15	QT1-30	TC1505	TVA-1162
C4	500	15		PRS1220	BR500-15	QT1-30	TC1505	TVA-1162
C5	60	200		PRS1590	BR60-250	QT1-18	TC68	TVA-1513
C6	2.2	5	①	BCD15003	NLW3-15	MT1-3	TT15X3	VL-1162
C7	50	25	②	BCD25050	NLW50-25	MT1-17	TT25X50	VL-1215
C8	3	15		BCD15003	NLW3-15	MT1-3	TT15X3	VL-1162
C9	3	15		BCD15003	NLW3-15	MT1-3	TT15X3	VL-1162
C10	50	25	③	BCD25050	NLW50-25	MT1-17	TT25X50	VL-1215
C11	10	15		BCD15010	ECSP10-15	MT1-5	TT15X10	VL-1167
C12	0.1	50			TYR13BER10K			
C13	50	25	④	BCD25050	NLW50-25	MT1-17	TT25X50	VL-1215
C14	0.5	15			TYR13BBR56K		TAS474K015POA	
C15	30	25		CRE613A	NLW30-25	MT1-14	TT25X30	VL-1212
C16	0.2	25			TYR13BBR22K		TAS224K035POA	
C17	30	15		CRE463A	NLW30-15	MT1-14	TT15X30	TE-1158
C18	3	350		PRS1600	BR4-350	QT1-2.1	TC60	TVA-1601
C19	2.2	15	①	BCD15003	NLW3-15	MT1-3	TT15X3	VL-1162
C20	50	25	②	BCD25050	NLW50-25	MT1-17	TT25X50	VL-1215
C21	3	15		BCD15003	NLW3-15	MT1-3	TT15X3	VL-1162
C22	3	15		BCD15003	NLW3-15	MT1-3	TT15X3	VL-1162
C23	50	25	③	BCD25050	NLW50-25	MT1-17	TT25X50	VL-1215
C24	10	15		BCD15010	ECSP10-15	MT1-5	TT15X10	VL-1167
C25	0.1	50			TYR13BER10K			
C26	50	25	④	BCD25050	NLW50-25	MT1-17	TT25X50	VL-1215
C27	0.5	15			TYR13BBR56K		TAS474K015POA	
C28	30	25		CRE613A	NLW30-25	MT1-14	TT25X30	VL-1212
C29	30	15		CRE463A	NLW30-15	MT1-14	TT15X30	TE-1158
C30	3	350		PRS1600	BR4-350	QT1-2.1	TC60	TVA-1601
C31	0.2	25			TYR13BBR22K		TAS224K035POA	
C32	6	10NP	⑤		BRNP8-10		TCN106	
C33	6	10NP	⑤		BRNP8-10		TCN106	
C34	200	15		CRE433A	NLW200-15	QT1-28	TT15X200	TE-1164

① Some versions may use 3mfd.

② Some versions may use 30mfd.

③ Some versions may use 20mfd.

④ Some versions may use 10mfd.

⑤ Used only in Model 994.

PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

CAPACITORS

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL- DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C35	2.5 250V							
C36	.01		P488N-01	D6-103	PM4S1	4DP-1-103	GEM411	4TM-S10
C37	80		DI-82	DD-820	JBZ601YP820K	CCD-820	GP462	10TS-Q82
C38	200		DI-200	DD-201	JBZ601YP221K	CCD-201	GP320	10TS-T20
C39	100		DI-100	DD-101	JBZ601YP101K	CCD-101	GP310	10TS-T10
C40	560			CPR-560J	5R5-T56JF	CM-20D-561	SX356	MS-356
C41	.022		P488N-022	DD-203	PM4S22	4DP-2-223	GEM4112	4TM-S22
C42	.056		P488N-05	DD-503	PKM-4S56	4DP-3-563	GEM615	4PS-S56
C43	.01		P488N-01	D6-103	PM4S1	4DP-1-103	GEM411	4TM-S10
C44	1500		CM-30D-152	CPR-1500J	5R5-D15JF	CM-20E-152	SX215	MS-215
C45	.0015		DI-1500	DD-152		CCD-152	GP215	10TS-D15
C46	.047 400V		P488N-047	DD-503	PM4S47	4DP-3-473	GEM4147	4TM-S47
C47	.002 600V		P688N-022	DD-203	PM6S22	6DP-2-223	GEM6122	6TM-S22
C48	.001 400V		P688N-001	D6-102	PM6D1	6DP-1-102	GEM621	6TM-D10
C49	.01		P488N-01	D6-103	PM4S1	4DP-1-103	GEM411	4TM-S10
C50	80		DI-82	DD-820	JBZ601YP820K	CCD-820	GP462	10TS-Q82
C51	200		DI-200	DD-201	JBZ601YP221K	CCD-201	GP320	10TS-T20
C52	100		DI-100	DD-101	JBZ601YP101K	CCD-101	GP310	10TS-T10
C53	560			CPR-560J	5R5T56JF	CM-20D-561	SX356	MS-356
C54	.022		P488N-022	DD-203	PM4S22	4DP-2-223	GEM4112	4TM-S22
C55	.056		P488N-05	DD-503	PKM-4S56	4DP-3-563	GEM615	4PS-S56
C56	.01		P488N-01	D6-103	PM4S1	4DP-1-103	GEM411	4TM-S10
C57	1500		CM-30D-152	CPR-1500J	5R5D15JF	CM-20E-152	SX215	MS-215
C58	.0015		DI-1500	DD-152		CCD-152	GP215	10TS-D15
C59	.047 400V		P488N-047	DF-503	PM4S47	4DP-3-473	GEM4147	4TM-S47
C60	.002 600V		P688N-002	DD-202	PM6D22	6DP-2-222	GEM6222	6TM-D22
C61	230-700							
C62	220			CPR-220J	22R5T22JF	CM-15-E-221	SX322	MS-322
C63	.001 400V		P688N-001	D6-102	PM6D1	6DP-1-102	GEM601	6TM-D10
C64	.01 400V		P488N-01	D6-103	PM4S1	4DP-1-103	GEM411	4TM-S10
C65	1350		ADM-19-132		CD7-F132J100	CM-30-B-132	SX213	MS-213
C66	.001 400V		P688N-001	D6-102	PM6D1	6DP-1-102	GEM601	6TM-D10
C67	.1 400V		P488N-1	DF-104	PM4P1	4DP-3-104	GEM401	4TM-P10
C68	.1 400V		P488N-1	DF-104	PM4P1	4DP-3-104	GEM401	4TM-P10
C69	.1 400V		P488N-1	DF-104	PM4P1	4DP-3-104	GEM401	4TM-P10
C70	.1 250V		P488N-1	DF-104	PM4P1	4DP-3-104	GEM401	4TM-P10
C71	.1		P488N-1	DF-104	PM4P1	4DP-3-104	GEM401	4TM-P10
C72A	30-130							
C72B	30-130							
C73A	30-130							
C73B	30-130							
C74	.1 400V		P488N-1	DF-104	PM4P1	4DP-1-104	GEM401	4TM-P1

CONTROLS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	USE	RESIST- ANCE	REPLACEMENT DATA				
			CONCORD PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.
R1	Volume, Left	20K		F2-25K ①, SSK200		Q13-120 ①, or (BU1 ①, CF11, SS1, DC1)*	RU253L, SL36, SL3250 or (UA24A ①, SL3500) or (U24 ①)
R2A	Tone, Right	10K					
B	Tone, Left	10K					
R3	Monitor Switch						
	Volume, Right	20K		F2-25K ①, SSK200, KR-1		Q13-120 ①, 76-1 or (BU1 ①, CF11, SS1, GC)*	RU253L, SL36, SL3250, US41 or (UA24A ①, SL3500, US41) or (U24 ①, US26)
	Power Switch						MTC53L1
R4	Speed Equalization	5000Ω				X201R502B	MTC14L1
	7 1/2 IPS, Left						
R5	Speed Equalization	10K				X201R103B	MTC53L1
	3 3/4 IPS, Left						
R6	Speed Equalization	5000Ω				X201R502B	MTC14L1
	7 1/2 IPS, Left						
R7	Speed Equalization	10K				X201R103B	MTC53L1
	3 3/4 IPS, Left						
R8	Level Adjust, Left	5000Ω				X201R502B	MTC53L1
R9	Level Adjust, Left	5000Ω				X201R502B	MTC53L1
R10	Record Level	1000Ω				X201R102B	MTC13L1
	Adjust, Left						
R11	Speed Equalization	5000Ω				X201R502B	MTC53L1
	7 1/2 IPS, Right						
R12	Speed Equalization	10K				X201R103B	MTC14L1
	3 3/4 IPS, Right						
R13	Speed Equalization	5000Ω				X201R502B	MTC53L1
	7 1/2 IPS, Right						
R14	Speed Equalization	10K				X201R103B	MTC14L1
	3 3/4 IPS, Right						
R15	Level Adjust, Right	5000Ω				X201R502B	MTC53L1
R16	Level Adjust, Right	5000Ω				X201R502B	MTC53L1
R17	Record Level	1000Ω				X201R102B	MTC13L1
	Adjust, Right						

* "SNAPTROL"

① Enlarge Mounting Hole.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					
		CONCORD PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	STANCOR PART No.	WORKMAN PART No.
L1	Bias Oscillator						
L2	Loading Coil		19-3500 ①	TV-203 ①	6138 ①	RTC-8580 ①	T323 ①

① Parallel with 1000Ω, 1Watt Resistor.

CONCORD MODELS 990, 994

PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA					NOTES
	PRI.	SEC. 1	SEC. 2	CONCORD PART No.	MERIT PART No.	STANCOR PART No.	THORDARSON PART No.	TRIAD PART No.	
T1	117V @ .68A	210V @ .145A	12V @ 1.8A	QLP-332					
	SEC. 3	SEC. 4	SEC. 5						
	6.4V @ .170A Tap @ 4.8V @ .3A								

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	CONCORD PART No.	MERIT PART No.	STANCOR PART No.	THORDARSON PART No.	TRIAD PART No.	
T2	5000Ω	6-8Ω	OT844		A-3849 ①	24S09	S-51X ①	① Drill New Mounting Hole(s)
T3	5000Ω	6-8Ω	OT844		A-3849 ①	24S09	S-51X ①	

SPEAKER

ITEM No.	TYPE	REPLACEMENT DATA		NOTES
		CONCORD PART No.	QUAM PART No.	
SP1	4" x 6" PM 6-8Ω	15D57SA	46A1Z8	
SP2	2 3/4" PM 6-8Ω	65PH09SB		
SP3	4" x 6" PM 6-8Ω	15D57SA	46A1Z8	
SP4	2 3/4" PM 6-8Ω	65PH09SB		

TAPE HEADS

ITEM NO.	MEASURED			CONCORD PART NO.	NORTRONICS PART NO.	DESCRIPTION
	INDUCTANCE	BIAS/ERASE VOLTS (RMS)	BIAS FREQ.			
M1	205mh	21V	80KC	WY-411Z	1207 & QK66	4-Track Stereo Record/Play (Forward)
M2	1.35mh	36V	80KC	WY-503Y	1401 & QK-19 ①	4-Track Stereo Erase (Forward)
M3	205mh	21V	80KC	WY-411Z	1207 & QK66	4-Track Record/Play (Reverse)
M4	1.35mh	36V	80KC	WY-503Y	1401 & QK-19 ①	4-Track Stereo Erase (Reverse)

① Add 10mh choke in series with mono erase choke.

MISCELLANEOUS

ITEM No.	PART NAME	CONCORD PART No.	NOTES
M5	Switch	ESR-C263L42	Record/Play, Right Channel (Slide)
M6	Switch		Record/Play, Left Channel (Slide)
M7	Switch		Speed Equalization (Rotary Wafer)
M8	Switch		Sound-On-Sound (Slide, DPTD)
M9	Switch		Mono-Stereo Mix (Slide, SPST)
M10	Switch		Function Selector (Rotary Wafer)
M11	Switch		Muting (Leaf)
M12	Switch		Forward-Reverse (Leaf)
M13	Switch		Relay and Plunger Activating (Leaf)
M14	Switch		On-Off (Leaf)
M15	Switch		Interlock (Micro)
M16	Switch		Interlock (Micro)
M17	Switch		Main Plunger Selector (Micro)
M18	Relay		Record/Play Switching
M19	Relay		Erase Head/Recording Bias Switching
M20	Relay		Equalization Switching/Gain Adj., Left Channel
M21	Relay		Equalization Switching/Gain Adj., Right Channel
M22	Relay		Reverse Operation
M23	Relay		Power On-Off
M24	Solenoid		Mechanism Reverse
M25	Solenoid		Tape Spindle, Right Channel
M26	Solenoid		Tape Spindle, Left Channel
M27	Motor	2HC-30C	
M28	Meter	V-303B	Left Channel
M29	Meter	V-303B	Right Channel

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in 12 Colors
Power Cord	8524 (Stranded) Available in 12 Colors
	Use BELDEN No. 17106 (Plastic) or 17126 (Rubber) - 6 Ft.
	17109 (Plastic) or 17129 (Rubber) - 9 Ft.
Power Cord (Interlock Type)	Use BELDEN No. 8874 (Rubber) or 8895 (Plastic)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401 or 8421
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor-Unshielded)
	8429 (Two Conductor-Shielded)
	8419 (Three Conductor-Shielded)