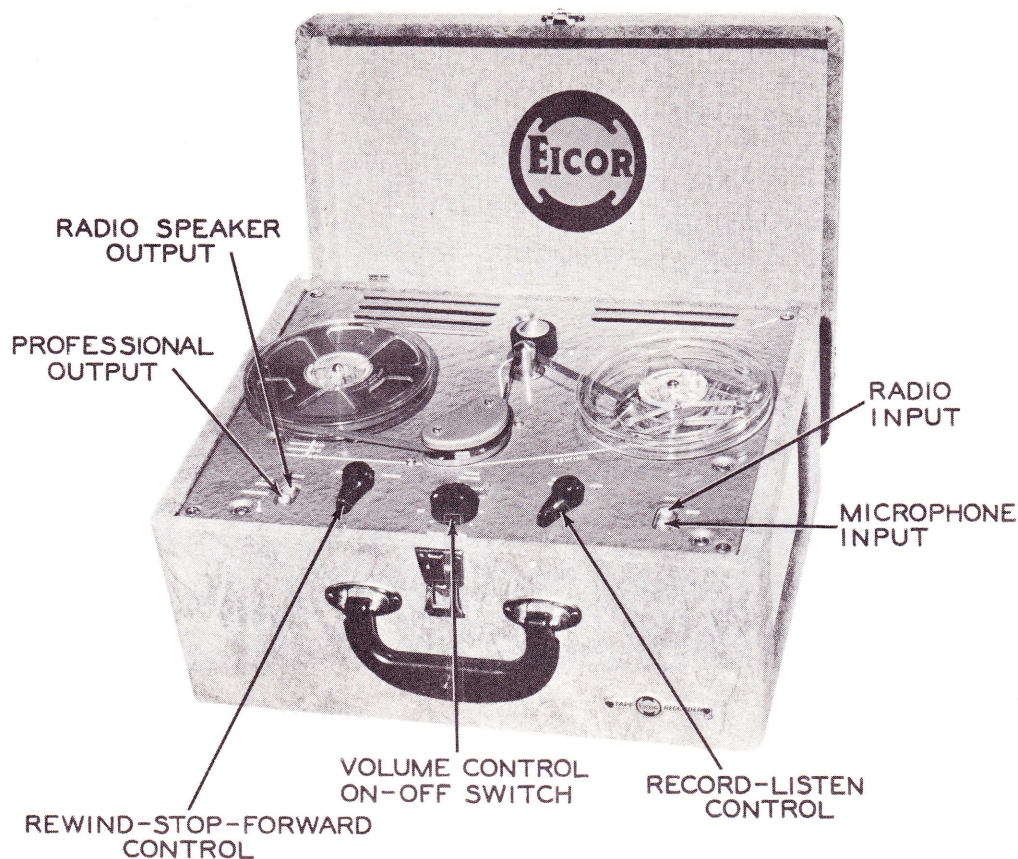




**EICOR
MODEL 400**



**EICOR
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Figure 1

GENERAL INFORMATION

The Eicor Model 400 Tape Recorder is designed to record and play back two tracks of material on standard width (1/4") recording tape, which doubles the playing time with no loss of frequency response or quality. Recordings can be made from a radio, television receiver or phonograph, in addition to those made directly from the microphone. Recordings can be played back through the self-contained speaker, external speaker or through a high fidelity amplifier system.

Using both channels of the tape, the recording time is as follows:

Reel Size	Speed
	3 3/4 I. P. S.
5"	1 hour
7"	2 hours

Connect this recorder only to an outlet supplying 117 volts, 60 cycle, AC supply.

Manufactured by:

Eicor, Inc.
1501 West Congress Street
Chicago, Illinois

This material compiled and published by

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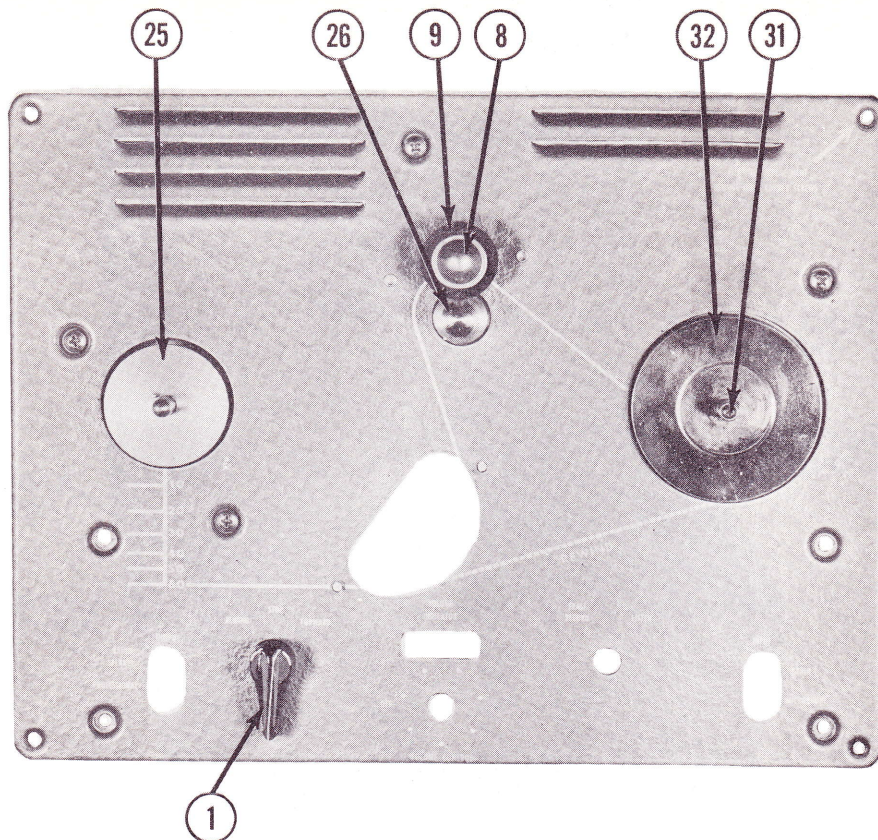


Figure 2

OPERATING CONTROLS

To Start-

Turn volume control knob (10) clockwise.

Volume-

Degree of rotation of volume control knob (10) determines volume of recording and play back.

Tape Travel-

Rewind-Stop-Forward control knob (1) controls direction of tape travel. Always return this knob to "Stop" position before turning unit off.

Record-Listen-

Record-Listen control knob (11) controls amplifier and record play back head. To prevent accidental erasure, place in "Listen" position immediately after recording is completed.

OPERATING INSTRUCTIONS

1. Insert the AC power cord into the receptacle on the rear of the case.

2. Plug the AC cord into a convenient wall receptacle of the proper rating.

Threading The Tape-

1. Place a reel of tape (either 5" or 7") on the left spindle (25) and an empty reel on the right spindle

(32) making sure the reel slots engage the reel pin on the spindle.

2. Thread the tape by following the solid printed line on the top panel (Figure 2).

NOTE: This recorder uses type "A" wound tape, i.e. the dull magnetic coated side faces inward on the reel. If the tape used is type "B" (coated side facing outward) the recording will be made at a very low sound level and the playback will be almost inaudible.

3. Insert the free end of the tape through to the hub of the right reel and place a pencil firmly over the tape, forcing it into one of the three radial slots. Turn the reel several turns (counterclockwise) with the pencil in this position until the tape is secured to the reel and all slack is taken up between reels.

To Record From Microphone-

1. Turn the volume control knob (10) to the right until a click is heard and allow about thirty seconds for the tubes to warm up.

2. Insert microphone plug into input socket labeled "Microphone".

3. Turn record-listen knob (11) to "Record" position. When in this position, all material already on the tape will be erased before a new recording is made.

4. While talking into the microphone, adjust the volume control until the neon indicator light flashes.

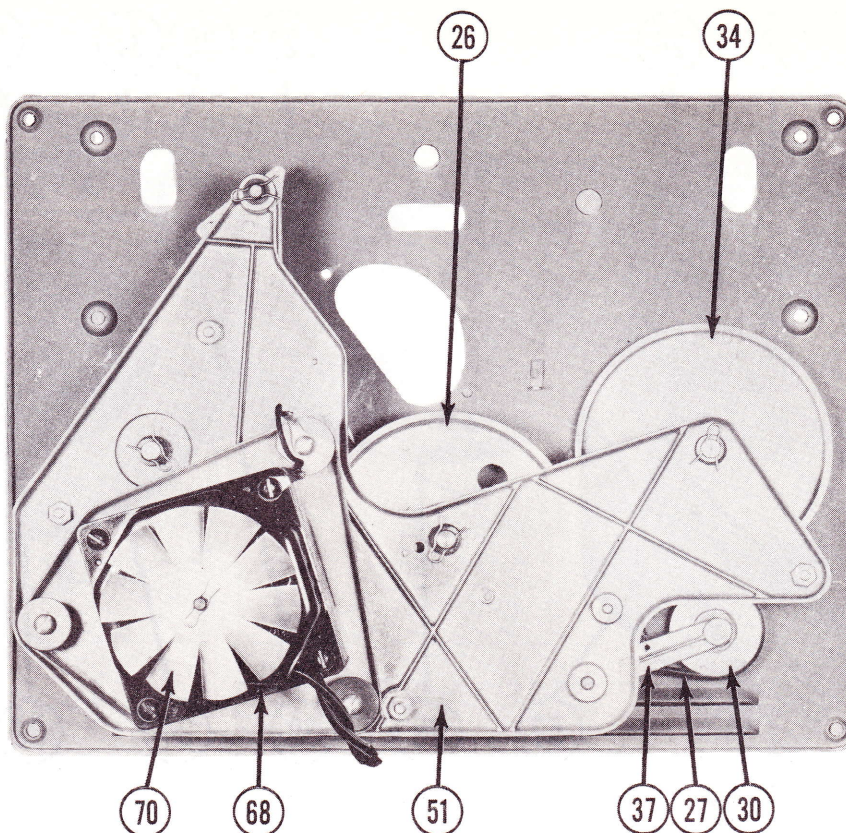


Figure 3

NOTE: Correct recording volume is very important. Too weak a signal, which does not cause the neon indicator to flash, will result in weak playback and high background noise. Too strong a signal, causing the indicator to flash constantly, will result in distortion during playback.

5. Turn the rewind-stop-forward control knob (1) to "Forward" position. The tape is now moving and any sounds entering the microphone will be recorded on the tape.

To Record From Radio-

Recordings can be made from a radio by placing the microphone near the loud-speaker of the radio; however, this type of recording may not be satisfactory as other sounds may be picked up by the microphone which as a result will be recorded on the tape. A superior quality recording can be made by use of a radio-phono attachment cord. Connect attachment cord as follows:

1. Connect the cord clips across the voice coil terminals on the radio speaker.
2. Insert the attachment cord plug into the input socket labeled "Radio".
3. Proceed as described in "To Record From Microphone".

NOTE: To playback through the radio speaker remove the radio-phono attachment cord from the input jack and plug it into the output socket.

To Record From Phonograph-

1. Connect the cord clips of the attachment cord to the pickup leads on the phonograph.
2. Insert the attachment cord plug into the input socket labeled "Radio".
3. Proceed as described in "To Record From Microphone".

NOTE: Should a hum develop from the above connection, reverse the cord clips on the pickup leads.

To Record From Television Receiver-

1. Connect attachment cord as described in "To Record From Radio" and proceed with recording as described in "To Record From Microphone".

Dual Track Recording-

The Eicor is designed so that only 1/2 the tape width is recorded at a time; thereby resulting in two track recording. This two track operation is accomplished in the following manner:

1. After a reel of tape has been recorded; i.e. all the tape wound on the right reel, place the rewind-stop-forward control knob (1) in the "Stop" position. This stops all movement of the tape.
2. Remove the reels from the recorder, turning

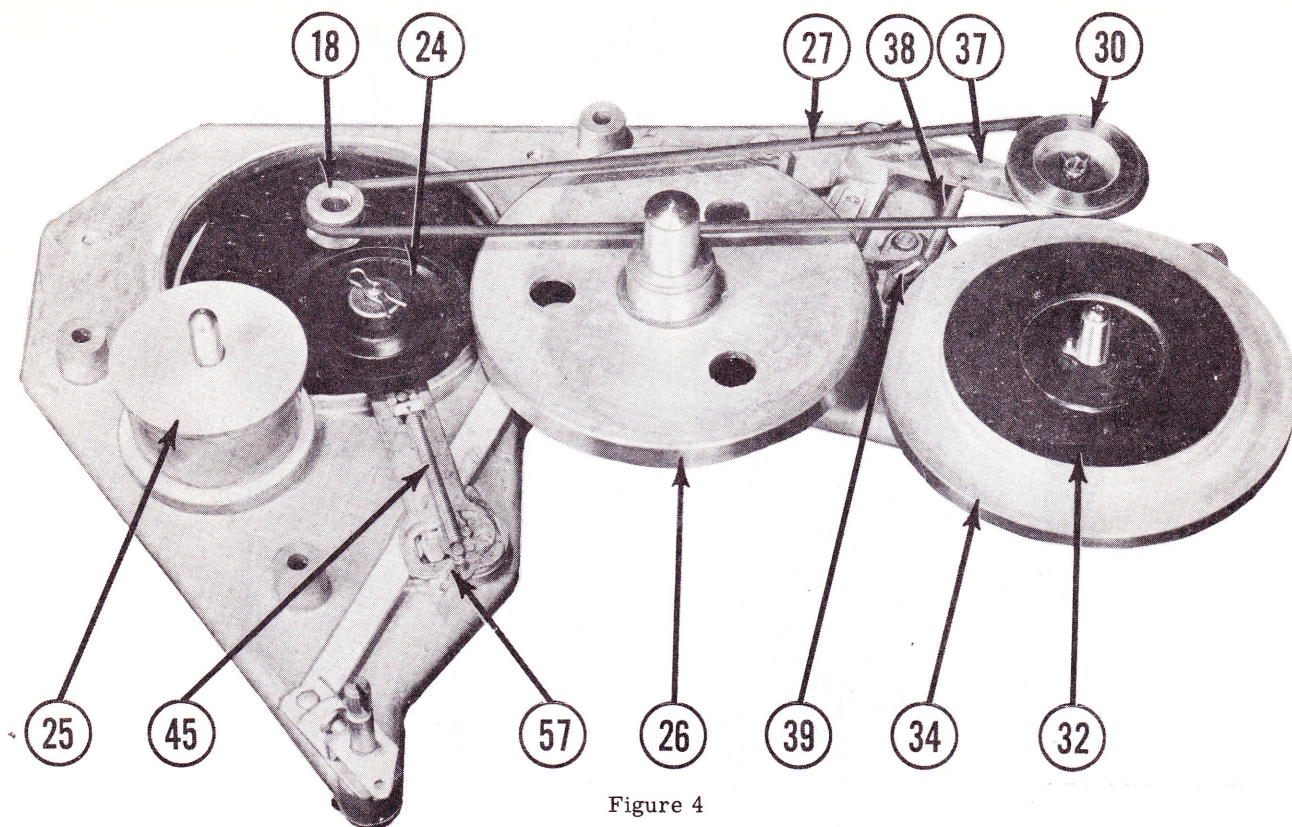


Figure 4

the full reel over and placing it on the left spindle.

3. Properly thread the tape and proceed with the recording.

4. After the second track has been recorded the first track of recording is ready to be played, without rewinding, by reversing the reels as described in Step No. 2 above.

To Rewind-

1. With the volume control knob (10) turned on, turn the record-listen control knob (11) to "Listen".

2. Turn the rewind-forward control knob (1) to "Rewind" position. As the tape is rewinding you will hear the recording played backwards at a high rate of speed. When this sound stops, you have come to the start of the recording. To rewind a full reel of tape, remove the tape from between the pressure roller (9) and capstan so the tape will rewind directly across the recorder to the left-hand reel; it will just touch the bottom of the recording head. This method is faster when rewinding an entire reel and reduces recording head wear.

To Play A Recording-

1. Thread the tape as described under "Threading The Tape".

2. Turn the On-Off-Volume control knob (10) on and allow approximately thirty seconds for the tubes to warm up.

3. Place the record-listen control knob (11) in the "Listen" position.

4. Place the rewind-stop-forward control knob (1) in the "Forward" position and adjust the Volume control for desired level.

To Use An External Speaker-

Any size speaker of the permanent magnet type, having a 3.2Ω voice coil, may be used by connecting the attachment cord across the voice coil terminals of the speaker and then inserting the plug into the output socket labeled "Radio Speaker".

To Edit And Splice Tape-

NOTE: Since it is impossible to edit and splice one track without affecting the other, recordings which are to be edited should be limited to one track only.

1. The tape may be edited by cutting out unwanted portions, or by joining selections into another sequence. Announcements may be inserted between selections, etc. Unused sections of tape can be spliced together for re-use.

2. For best results, cut tape at a slight diagonal, join ends together with splicing tape on the glossy side and trim off any excess width.

Erasing Recorded Material-

It is not necessary to first erase a recorded tape if the same tape is to be used for a new recording. Erasing of recorded material takes place automatically when new material is recorded. If it is desired only to erase a tape, set the machine for recording without

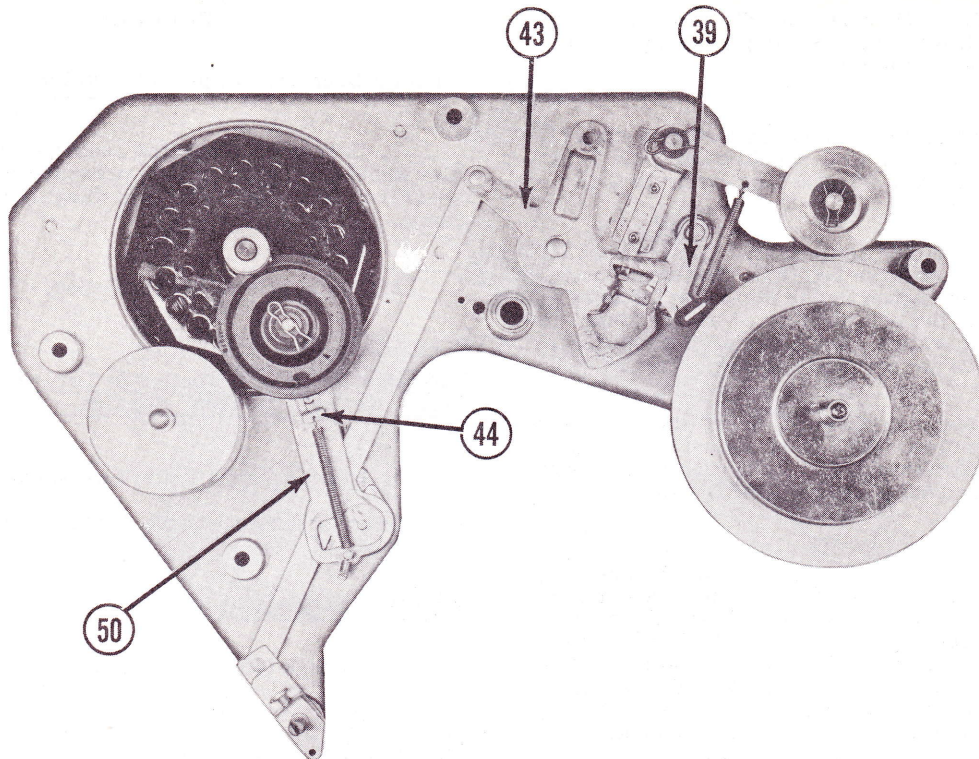


Figure 5

having the microphone or attachment cord connected to input jacks.

DISASSEMBLY INSTRUCTIONS

To remove the recorder from its cabinet, remove the four phillips head screws (13) from the corners of the top panel (17). Insert a thin-blade screwdriver between the panel and the cabinet and pry upwards enough to slip the fingers under the panel. Lift up enough to permit the speaker plug and AC leads to be disconnected. The recorder can now be removed complete.

In handling the recorder out of its cabinet, care must be taken to avoid damage to the motor fan (70) and the motor shaft. When replacing the recorder, check to be sure the speaker leads and AC leads will not be pinched or will not interfere with the recorder mechanism.

INSPECTION OF COMPLETE RECORDER

1. Visually inspect the alignment of the cam on the "Forward-Stop-Rewind" shaft. The cam should close the erase interlock switch when in the "Forward" position.

2. Move the tape through the machine, first in the forward direction and then in the rewind direction. The tape should pass midway between the flanges of the reel which is receiving the tape. Change shims under the recording head, if necessary, to achieve this.

3. With the recorder out of the cabinet and the motor running, orient the power transformer for minimum audible hum from the speaker. Tighten the four transformer mounting screws.

4. When placing the recorder in the cabinet, check for bent fan and for paths of speaker leads, motor leads and AC leads which will not interfere with any moving part of the mechanism.

5. Using plastic base tape, make microphone voice recordings at various volume control settings, including a recording of loud talking close to the mike with the volume control at maximum gain. Upon playback, the best recording should be that made with the neon bulb flashing only on the louder syllables. Erase the portion of tape having overloaded recording. No trace of the recording should remain.

6. Make a music recording from a disc or other source. Play back and listen for over-all quality.

7. Check for easy operations of controls.

MECHANICAL DRIVE ASSEMBLY

1. With the rewind-stop-forward control knob (1) in the "Stop" position, idler wheel (24) should be in a neutral position; that is, there should be a clearance of 1/32" between the motor shaft and the idler wheel.

2. With control knob (1) in the "Rewind" position, idler wheel (24) is pivoted against the rewind drum (25) and the motor shaft. This accounts for the fast rewind speed. Make a check, by turning the rewind drum (25) counterclockwise, to see if these parts contact each other properly. The idler wheel should turn the motor shaft. If this does not occur, check for binding parts, oil on the friction surfaces, or looseness of springs (45 and 57).

3. When control knob (1) is in the "Forward" position, idler (24) is pivoted against the flywheel and

capstan (26) and the "O" ring belt (27), which is driven by the motor belt pulley (18), is pivoted against the rim of the take-up drum (34).

4. With the motor running and control knob (1) in the "Stop" position there should be at least 1/32" clearance between belt (27) and take-up drum (34).

5. With the motor running and control knob (1) in "Stop" position, observe belt (27). The same portion of the belt surface should run in the pulley grooves at all times, that is the belt should not rotate about the center of a cross section. If such rotation does occur, belt pulley (18) is not correctly located.

6. Check end play of rewind drum (25), flywheel (26) and take-up drum (34). Each should have some end play, not more than 1/32". Correct assembly of washers on these shafts should control this.

7. With control knob (1) in "Rewind" position, there should be at least 1/32" clearance between the rubber on the brake (39) and the take-up drum (34). With the motor running, move the control knob slowly from "Rewind" to "Stop". Meanwhile, rotate the take-up drum (34) manually. The brake should contact the take-up drum before the rewind drum stops rotating. Bend the brake arm to meet these requirements.

8. Place a full 5" reel of tape on the take-up spindle (32) and run the machine in the "Forward" position. Measure the tension required to hold the tape reel stationary. This tension should be 1 to 2 ounces.

NOTE: This tension should be measured after the machine has been running with the clutch slipping for at least one minute. The tension is controlled by the type and amount of lubricant used on the felt washer.

9. Place a full 5" reel of tape on the rewind drum (25) and measure the tension required to pull tape off the reel. The tension should be 3/8 to 3/4 ounce. The tension is controlled by the type and amount of lubricant used on the felt washer.

10. Using a 7 inch reel of tape and an empty 7 inch reel, thread the tape as for playing and observe the passage of the tape between the reel flanges on forward drive and on rewind. The tape should be centered between the reel flanges, and the clearance between reel flanges and top plate should be ample without having interference around the entire reel perimeter. If the clearance varies around the reel perimeter, it will be necessary to replace defective parts.

11. When threaded as for playing, and when powered by 115 volts 60 cycles, the unit should start rewinding when switched from "Off" to "Rewind" with an almost full 7 inch reel on the rewind drum and only a dozen or so turns of tape on the take-up reel. Failure to start may be due to weak motor or friction in the bearings of the capstan or take-up drum.

12. Check functioning of pressure roller by holding clutch plate on take-up drum and letting tape run through capstan. If tape does not run through smoothly, check to see if pressure roller surface is clean. The shaft should be well oiled. The pressure roller in contact should be flush up against the capstan.

TROUBLES

Take-Up Drum And Capstan Speed Irregular-

1. Grease or oil on the rubber drive surface of idler wheel (24), motor shaft, pressure roller (9), "O" belt (27) and take-up drum (34). Clean these parts with naphtha.

2. Motor belt pulley (18) loose.

Tape Overruns When Control Is Turned From "Rewind" to "Stop" Position-

1. Brake assembly (39) not adjusted properly.

See "Mechanical Drive Assembly #7".

Tape Will Not Rewind-

1. Springs (45 and 57) loose.

Tape Will Not Run Forward-

1. Springs (45 and 57) loose.

Failure To Erase-

1. Check head windings for open or shorted coils.

2. Check playing surfaces for dirt or other foreign material which would prevent close contact of the tape to the erase head surface.

3. Check position of head to be sure the tape is running over correct surfaces.

4. Check the head for excessive wear of the erase head surface.

5. Check the operation of the erase interlock switch.

Faulty Play-back-

1. Same as above.

2. Check amplifier circuits, tubes, etc.

Wows-

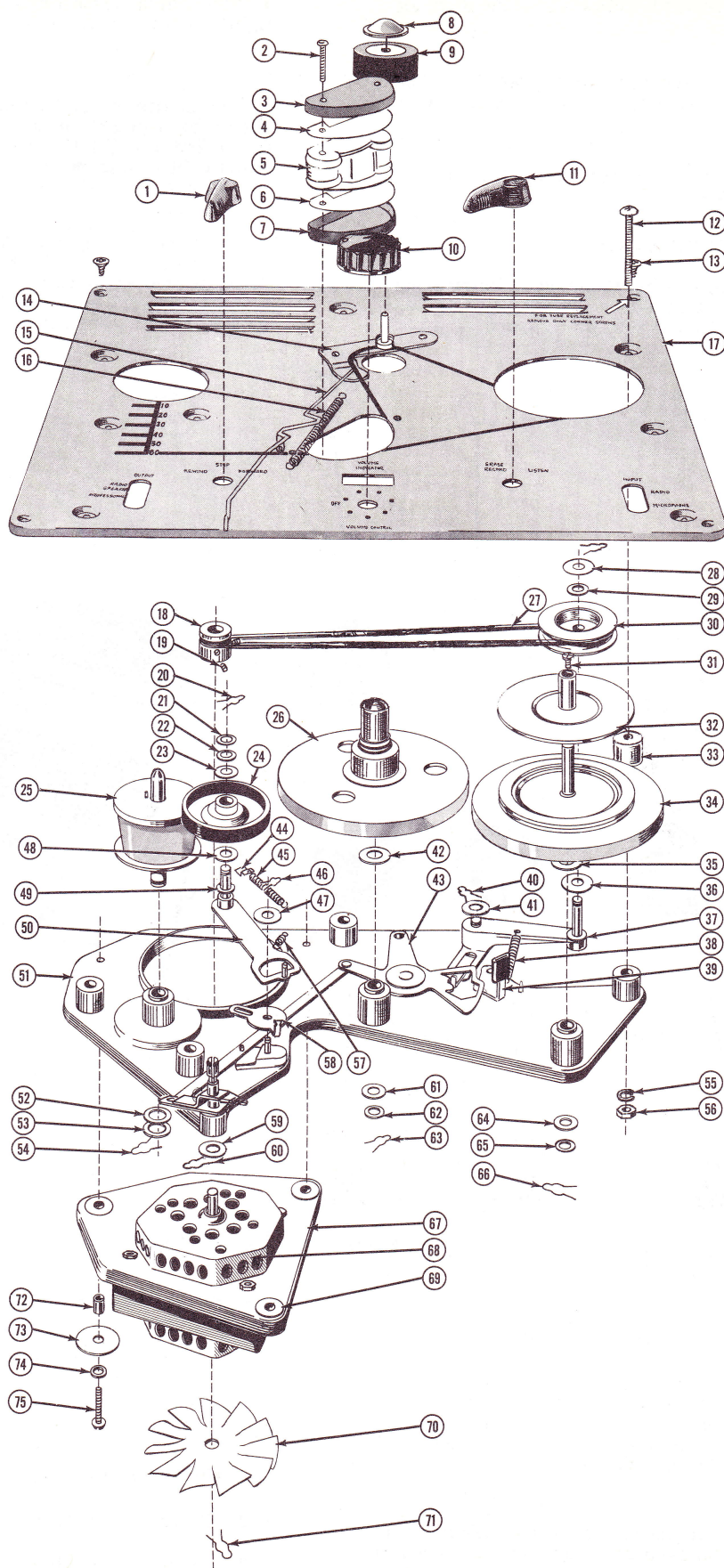
1. Check capstan (26) for excessive run-out.

2. Check idler (24) for worn or uneven surface.

3. Check for low line voltage.

4. Check for sticky tape or foreign material on the pick-up surface.

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5. Check the tape width and be sure that it is not binding in the guides.

6. Check for distorted reels or any other friction which might cause an excessive load on the motor or drive assembly.

7. Check pressure roller (9) for signs of foreign matter or excessive wear.

LUBRICATION

Extreme care should be taken when lubricating the mechanism. For satisfactory operation, the instructions in this section should be followed:

1. Mechanical linkages should be lubricated lightly at points of friction with Sta-Put No. 18-H.

2. The shafts of rotating parts, when replaced, should be wiped clean with a lint-free cloth or paper and oiled lightly with Kensington No. 9 Spindle Oil. Use two or three drops.

3. When lubricating the felt washers on the take-up and rewind drum, use Sta-Put Oil No. 360. Saturate the felt washers and then remove as much of the oil as possible by pressing a cloth or absorbent paper against them.

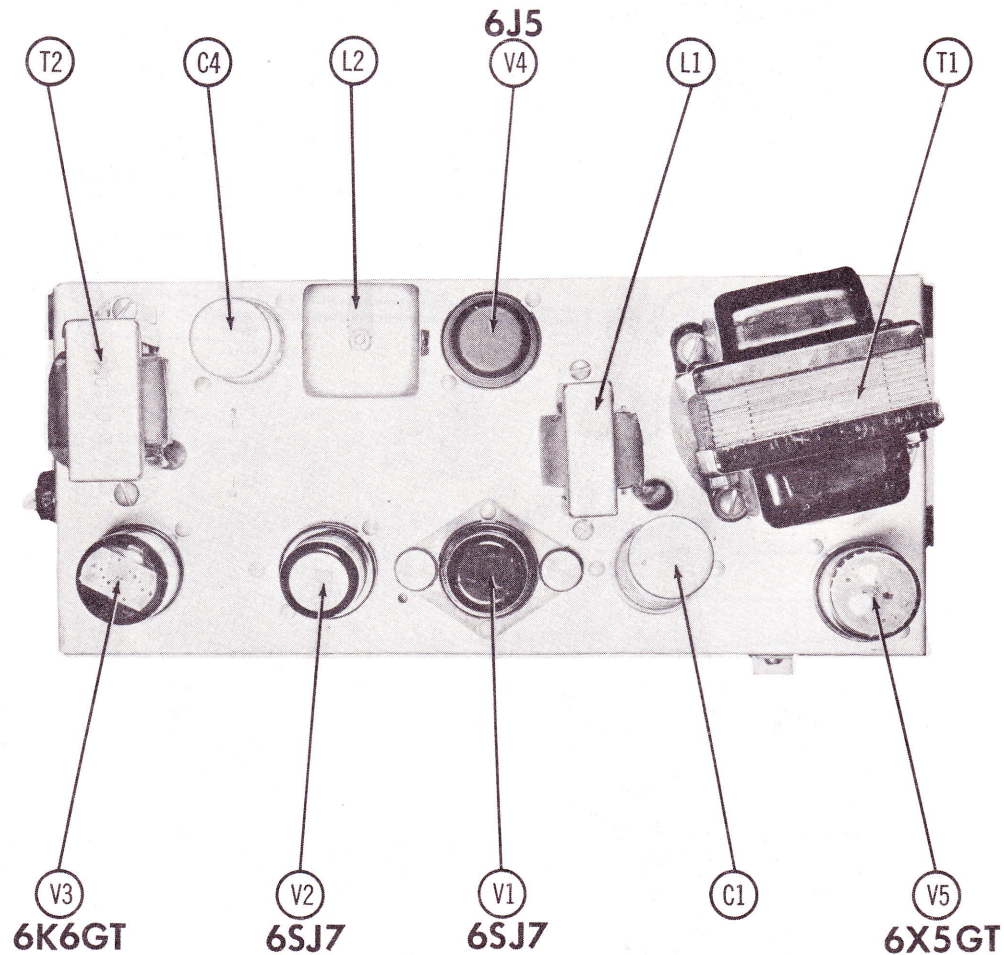
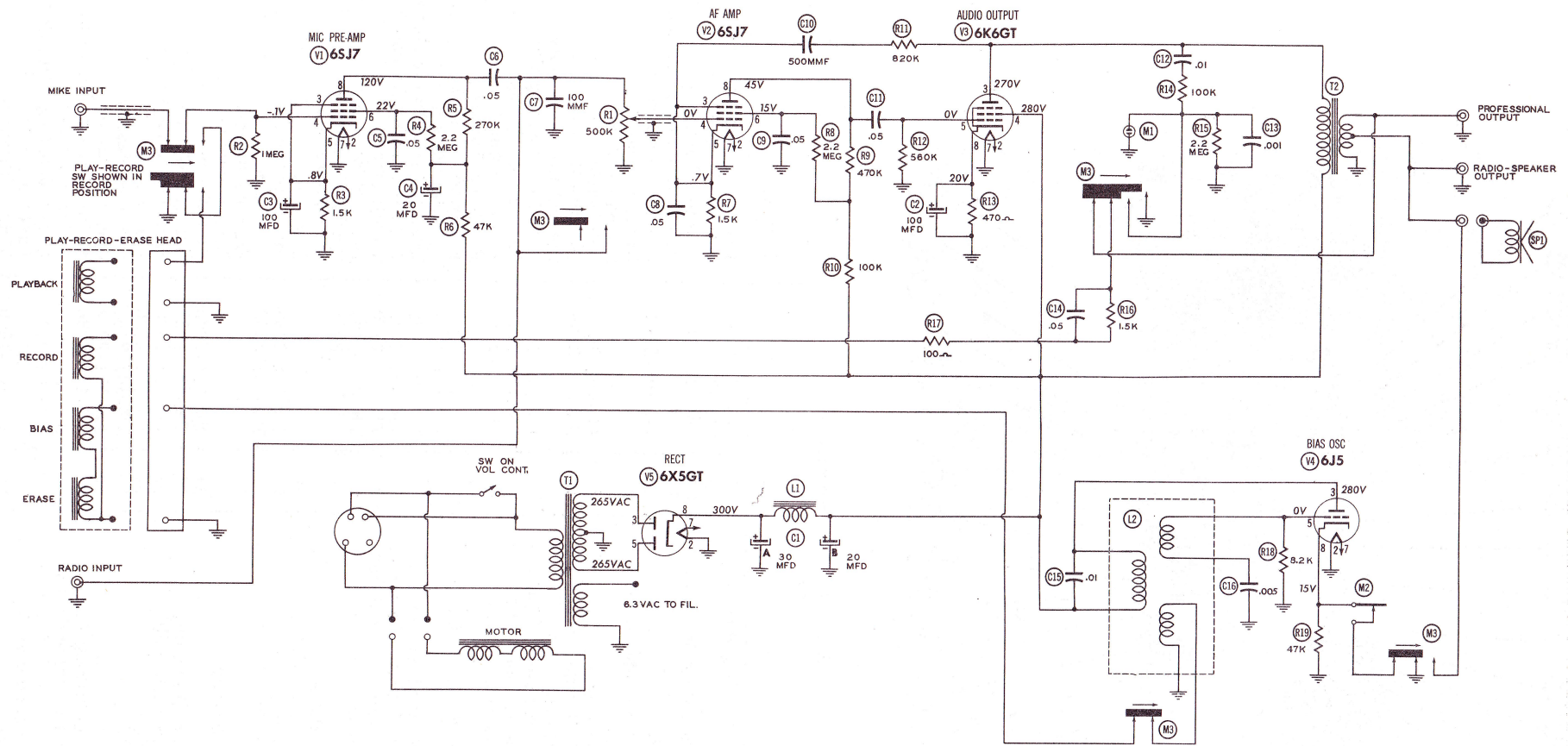


Figure 6



THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS									
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	6SJ7	0Ω	0Ω	1.5KΩ	1Meg	1.5KΩ	†2.2Meg	.2Ω	†320KΩ
V 2	6SJ7	0Ω	.2Ω	1.5KΩ	500KΩ	1.5KΩ	†2.3Meg	0Ω	†570KΩ
V 3	6K6GT	0Ω	.2Ω	†900Ω	†480Ω	560KΩ	†820KΩ	0Ω	470Ω
V 4	6J5	0Ω	0Ω	†490Ω	†480Ω	8.2KΩ	8.2KΩ	.2Ω	47KΩ
V 5	6X5GT	0Ω	0Ω	33Ω	INF	31Ω	INF	.2Ω	150KΩ

† MEASURED FROM PIN 8 OF V5
MEASUREMENTS TAKEN IN RECORD POSITION

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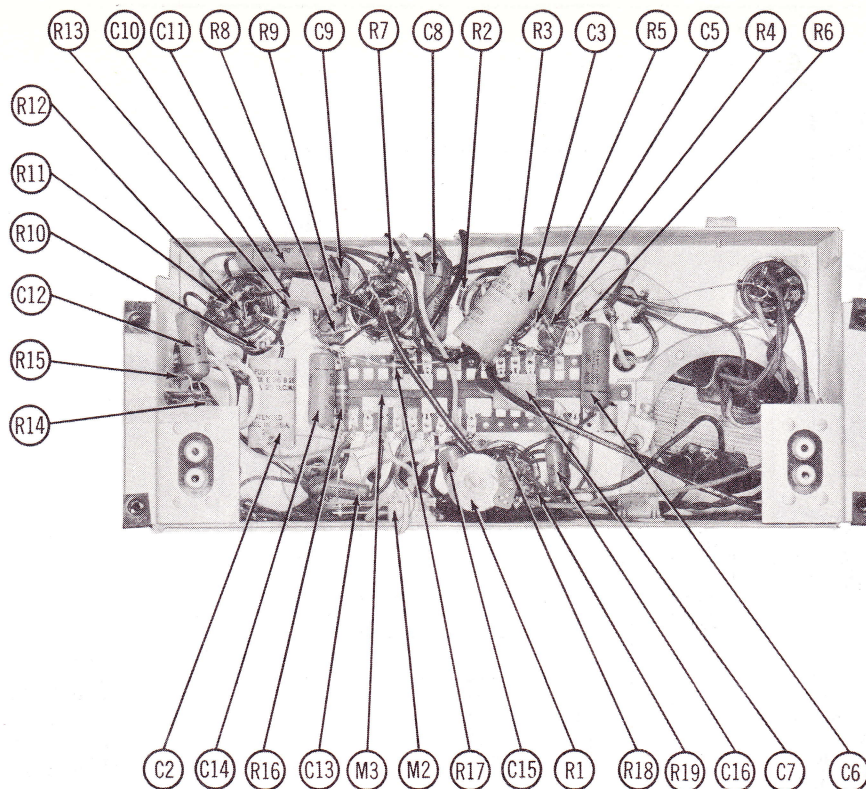


Figure 7

MECHANICAL PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
1		Rewind-Stop-Forward Control Knob	34	TR-301-2194	Take-Up Drum Assembly
2	TR-101-7031	Phillips Round Head Screw, 6-32	35	TR-301-2185	Bakelite Washer
3	TR-101-1016A	Upper Head Shield	36	TR-301-2184	Bakelite Washer
4	TR-101-1027	.010" Shield	37		Belt Pulley Lever and Bushing
5	TR-301-1062	Head Assy. (cartridge only)	38	TR-101-2101	Brake Drive Spring
6	TR-101-1027	.010" Shield	39		Brake Assembly
7	TR-301-1065A	Lower Head Shield	40		Spring Retainer
8		Pressure Roller Retaining Cap	41	TR-101-2012	Felt Washer
9		Pressure Roller	42	TR-301-2185	Bakelite Washer
10		On-Off-Volume Control Knob	43		Control Link Assembly
11		Record-Listen Control Knob	44	TR-101-2042	Idler Lever Spring Clip
12		Phillips Round Head Machine Screw	45	TR-101-2038	Idler Lever Spring
13		Phillips Head Self Tapping Screw	46	TR-101-2071	Spring Retainer
14		Pressure Roller Pivot Arm	47	TR-101-2031	Retaining Washer
15		Pressure Roller Arm Pivot Rod	48	TR-101-2065	Fishpaper Washer
16		Pressure Roller Arm and Rod	49	TR-101-2044	Bakelite Washer
17		Tension Spring	50	TR-101-2089	Idler Lever & Pin Assembly
18	TR-101-2033	Top Plate	51	TR-301-2178	Base & Bushing Assembly
19	TR-101-7004	Motor Belt Pulley	52	TR-101-2070	Felt Washer
20	TR-101-2073	Allen Set Screw, 6-32	53	TR-301-2185	Bakelite Washer
21	TR-101-2044	Spring Retainer	54	TR-101-2073	Spring Retainer
22	TR-101-2030	Bakelite Washer	55		Split Lockwasher
23	TR-101-2065	Felt Washer	56		Hex. Nut
24	TR-101-2003	Fishpaper Washer	57	TR-101-2039	Idler Cam Spring
25	TR-101-2003	Idler Wheel	58	TR-101-2043	Idler Cam
26	TR-301-2195	Rewind Drum Assembly	59		Bakelite Washer
27	TR-101-2002	Capstan Drum Assembly	60		Spring Retainer
28	TR-101-2081	"O" Ring Belt	61	TR-101-2070	Felt Washer
29	TR-301-2184	Bakelite Washer	62	TR-301-2185	Bakelite Washer
30	TR-101-2012	Felt Washer	63	TR-101-2073	Spring Retainer
31	TR-101-2081	Belt Pulley & Bushing Assy.	64	TR-101-2070	Felt Washer
32	TR-101-7005	Binder Head Machine Screw, 4-40-3/16	65	TR-301-2185	Bakelite Washer
33	TR-101-2079	Tape Disc Assembly	66	TR-101-2073	Spring Retainer
		Base Spacer	67	TR-101-2086	Motor Mounting Plate (for Alliance motor)
				TR-101-2134	Motor Mounting Plate (for Fasco motor)
			68	TR-101-1000	Motor (Alliance)

MECHANICAL PARTS LIST (Continued)

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
69	TR-101-2136	Motor (Fasco)	72	TR-101-2006	Bushing
70	TR-101-2001	Grommet	73	TR-101-2150	Washer
71	TR-101-2095	Fan	74	TR-301-7002	Split Lockwasher, No. 10
	TR-101-2073	Spring Retainer	75	TR-101-7003	Round Head Machine Screw

ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
V1	TR-101-3042	6SJ7, Mic. Pre-Amp.	R4		Resistor, 2.2 Meg., 1/2 Watt
V2		6SJ7, AF Amp.	R5		Resistor, 270K Ω , 1/2 Watt
V3		6K6GT, Audio Output	R6		Resistor, 47K Ω , 1/2 Watt
V4		6J5, Bias Oscillator	R7		Resistor, 1500 Ω , 1/2 Watt
V5		6X5GT, Rectifier	R8		Resistor, 2.2 Meg., 1/2 Watt
C1A		Elect. Cap., 30mfd. @350V.	R9		Resistor, 470K Ω , 1/2 Watt
C1B		Elect. Cap., 20mfd. @350V.	R10		Resistor, 100K Ω , 1/2 Watt
C2		Elect. Cap., 100mfd. @25V.	R11		Resistor, 820K Ω , 1/2 Watt
C3		Elect. Cap., 100mfd. @25V.	R12		Resistor, 560K Ω , 1/2 Watt
C4	TR-101-3041	Elect. Cap., 20mfd. @350V.	R13		Resistor, 470 Ω , 1 Watt
C5		Cap., .05mfd. @400V.	R14		Resistor, 100K Ω , 1/2 Watt
C6		Cap., .05mfd. @400V.	R15		Resistor, 2.2 Meg., 1/2 Watt
C7		Cap., 100mmf., Mica	R16		Resistor, 1500 Ω , 1 Watt
C8		Cap., .05mfd. @400V.	R17		Resistor, 100 Ω , 1/2 Watt
C9		Cap., .05mfd. @400V.	R18		Resistor, 8200 Ω , 1/2 Watt
C10		Cap., 500mmf., Mica	R19		Resistor, 47K Ω , 1/2 Watt
C11		Cap., .05mfd. @400V.	T1	TR-101-3052-6	Power Transformer
C12		Cap., .01mfd. @600V.	T2	TR-101-3056-3	Output Transformer
C13		Cap., .001mfd. @600V.	L1	TR-101-3085	Filter Choke
C14	TR-101-3044	Cap., .05mfd. @200V.	L2		Bias Osc. Coil
C15		Cap., .01mfd. @600V.	SP1	TR-101-3377	Speaker, PM (3, 2 Ω)
C16		Cap., .005mfd. @600V.	M1		Neon Lamp (Record Level Indicator)
R1		Volume Cont. & Switch, 500K Ω	M2		Switch, Erase Interlock
R2		Resistor, 1 Meg., 1/2 Watt	M3		Play-Record Switch
R3		Resistor, 1500 Ω , 1/2 Watt			

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