



ELECTRICAL PARTS LIST

Item No.	Part No.	Use and Description	Item No.	Part No.	Use and Description
V1A	5879	1st AF Amplifier, 5879 Tube	R7	29501-57	1st AF Amp. Screen, 1 Meg., 1/2 Watt
B	6AU6	1st AF Amplifier, 6AU6 Tube (Used in Model 109 - Up to Serial No. 5202)	R8	29501-48	1st AF Amp. Plate, 240K Ohms, 1/2 Watt
V2A	12AX7	2nd AF Amplifier, 12AX7 Tube (Used in Model 109 - Up to Serial No. 5202)	R9	29501-29	1st AF Amp. Decoupling, 22K Ohms, 1/2 Watt
V3	6V6GT	Bias Oscillator, 6V6GT Tube	R10	29501-14	2nd AF Amp. Cathode, 2000 Ohms, 1/2 Watt (Some models use 1000 Ohms)
V4	6V6GT	Power Output, 6B6GT Tube	R11	29501-48	2nd AF Amp. Plate, 240K Ohms, 1/2 Watt
V5	5Y3GT	Rectifier, 5Y3GT Tube	R12	29501-29	Decoupling, 22K Ohms, 1/2 Watt
C1A	241-14236	Filter, 40 Mfd. @ 450 Volts, Electrolytic	R13	29501-41	Tone Compensation, 100K Ohms, 1/2 Watt
B		Filter, 40 Mfd. @ 450 Volts, Electrolytic	R14	29501-41	Tone Compensation, 100K Ohms, 1/2 Watt
C2A	241-14238	Decoupling, 40 Mfd. @ 450 Volts, Electrolytic	R15	29501-19	2nd AF Amp. Grid, 3600 Ohms, 1/2 Watt (Some models use 5100 Ohms)
B		Decoupling, 40 Mfd., @ 450 Volts, Electrolytic	R16	29501-57	2nd AF Amp. Grid, 1 Meg., 1/2 Watt
C		Output Decoupling, 40 Mfd. @ 25 Volts, Electrolytic	R17	29501-35	2nd AF Amp. Grid, 51K Ohms, 1/2 Watt (Not used in all models)
C3	S6063	1st AF Amp. Cathode, 50 Mfd. @ 6 Volts Electrolytic	R18	29501-14	2nd AF Amp. Cathode, 2000 Ohms, 1/2 Watt (Some models use 1000 Ohms)
C4	S6063	2nd AF Amp. Cathode, 50 Mfd. @ 6 Volts, Electrolytic (Not Used in all Models)	R19	29501-48	2nd AF Amp. Plate, 240K Ohms, 1/2 Watt
C5	S3750	Tone Compensation, 500 Mmf. (Models 109 and 110 use 1700 Mmf. in this application)	R20	29501-48	Output Grid, 240K Ohms 1/2 Watt
C6	S3595	1st AF Amp. Screen, .1 Mfd. @ 400 Volts	R21	29501-98	Output Cathode, 300 Ohms, 1 Watt
C7	S4261	Audio Coupling, .05 Mfd. @ 400 Volts	R22	29501-23	Feedback, 2200 Ohms, 1/2 Watt
C8	S3595	Audio Coupling, .1 Mfd. @ 400 Volts	R23		Voice Coil Shunt, 3.3 Ohms, 3 Watts (Some models use 10 Ohms)
C9	29670-2	Tone Compensation, 50 Mmf. @ 500 Volts	R24	29501-48	Tone Compensation 240K Ohms, 1/2 Watt
C10	S4261	Tone Compensation, .05 Mfd. @ 400 Volts	R25	29501-48	Tone Compensation 240K Ohms, 1/2 Watt
C11	241-14974	AF Feedback, .25 Mfd. @ 150 Volts (Used in Models 111, 112 only)	R26	29501-76	Bias Osc. Grid, 10K Ohms, 1 Watt
C12	S4261	Audio Coupling, .05 Mfd., @ 400 Volts	R27	29501-51	Indicator Network, 390K Ohms, 1/2 Watt
C13	241-14260-1	Osc. Grid Cap., 3000 Mmf.	R28	29501-35	Indicator Network, 51K Ohms, 1/2 Watt
C14	241-14260-1	Fixed Trimmer, 3000 Mmf.	R29	29501-35	Indicator Network, 51K Ohms, 1/2 Watt
C15	241-14260-2	Oscillator Coupling, 1700 Mmf.	T1A	242-14288	Power Transformer (Used in Models 109, 111)
C16	S6065-5	Oscillator Coupling, 1000 Mmf.	B	242-15004	Power Transformer (Used in Models 110, 112)
C17	29670-4	Tone Compensation, 200 Mmf. @ 500 Volts	T2	242-14230	Output Transformer
C18	S4261	Audio Coupling, .05 Mfd. @ 400 Volts	SP1	241-14070	8PM Speaker, 5" x 7"
C19	S4261	Indicator Coupling, .05 Mfd. @ 400 Volts	SP2		Part of Speaker
C20	S4556	Indicator Filter, .0005 Mfd. @ 600 Volts	L1	811A-1	Filter Choke, 430 Ohms, 14 Henries
C21	241-14260-1	Output Plate Bypass, .003 Mfd. @ 600 Volts	L2	242-14603	Bias Osc. Coil
R1	241-14233	Volume Control, 500K Ohms, 1/2 Watt	M1		2 Amp., 250 Volt, Type 3AG
R2	241-14234 or 241-14234-1	Tone Control and Switch, 2.5 Meg., 1/2 Watt	M2		Neon Lamp, Type NE-51
R3	29501-29	Tone Compensation, 22K Ohms, 1/2 Watt	M3		Switch, Speaker (Not used in all models)
R4	29501-53	Series High Lever Input, 510K Ohms, 1/2 Watt	M4A	242-14555	Switch, Play-Record (Model 109 up to Serial #5202)
R5	29501-53	1st AF Amp. Grid, 510K Ohms 1/2 Watt	B	242-14555-3	Switch, Play-Record (Models 109, 110)
R6	29501-11	1st AF Amp. Cathode, 1000 Ohms, 1/2 Watt	C	242-14555-3	Switch, Play-Record (Models 111, 112)

EKOTAPE  
MODELS 109, 110, 111, 112



GENERAL INFORMATION

The Webster Electric Ekotape Recorder Models 109, 110, 111, and 112 are designed to magnetically record and play back a recording on a standard 5" or 7" reel of recording tape.

Models 109 and 111 are designed to record two tracks of sound. This allows two one-hour programs to be recorded on the Model 109, using 7" reels, and two half-hour programs on Model 111, using 7" reels.

The mechanical units incorporate a single control which operates the following functions: "Rewind-Stop-Forward" and "Fast-Forward." There are three amplifier controls: Volume control for recording and playback; Play-and-Record selector control, and the On-Off-Tone control.

In the "Fast-Forward" position, the maximum speed is approximately twenty times the normal speed for Model 109, and ten times the normal playing speed for Model 111.

Recordings may be made from the Microphone, or the radio and record player, by using a cord attachment.

Manufactured by:

Webster Electric Company  
Racine, Wisconsin

This material compiled and published by

HOWARD W. SAMS & CO., INC., INDIANAPOLIS, INDIANA

COPYRIGHT 1951 • ALL RIGHTS RESERVED

EKOTAPE  
MODELS 109, 110, 111, 112

DESCRIPTION OF MODELS

The Ekotape Models 109, 110, 111 and 112, described in this manual, are all of the same basic design and construction. All are portable models and include the same accessories. Model 109 is the basic unit; all other models have slight variations and are described in the following paragraphs:

Model 109 (Serial No. 5203 and up) operates on 117 volts, 60 cycles. Tape speed is 3-3/4" per second. The tube complement consists of the following five tubes.

Rectifier ..... 5Y3GT  
Input (playback only) ..... 5879  
Amplifier ..... 12AX7  
Output ..... 6V6GT  
Oscillator ..... 6V6GT

Model 109 (units only), with serial numbers up to 5202, has a different tube complement, as follows:

Rectifier ..... 5Y3GT  
Input (playback only) ..... 6AU6  
Amplifier ..... 12AT7  
Output ..... 6V6GT  
Oscillator ..... 6V6GT

Model 110 operates on 115/230 volts, 50 cycles. Tape speed is 3-3/4" per second. The amplifier is the same as Model 109, except a larger power transformer is used which incorporates a tapped primary for selection of 115 or 230-volt operation. Units are shipped connected for 115-volt operation. For 230-volt operation, it is necessary to move one wire in the amplifier (see paragraph on "Changing from 115 Volts to 230 Volts"). The motor pulley is larger and the flywheel tire is smaller on this model.

Model 111 operates on 117 volts at 60 cycles per second. Tape speed is 7-1/2" per second. Mechanically, this model is the same as Model 109, except the motor pulley-to-flywheel tire ratio has been changed to provide faster tape speed. The amplifier has some differences from Model 109 to accommodate for the increased tape speed.

Model 112 operates on 115/230 volts at 50 cycles per second. The amplifier is the same as Model 111, except a larger power transformer is used which incorporates a tapped primary for selection of 115 or 230-volt operation. Units are shipped connected for 115-volt operation. For 230-volt operation, it is necessary to move one wire in the amplifier (see paragraph on "Changing from 115 Volts to 230 Volts").

OPERATING INSTRUCTIONS

Preparing the Ekotape for Recordings -

1. Remove the lid cover from the carrying case.
2. Insert the power cord into a convenient receptacle of the proper rating.
3. Make sure the control handle (7) is in the "Off" position.
4. Place a full reel of tape on the left-hand

spindle, supply spindle (5), in a manner so that the tape will unwind in a clockwise direction.

NOTE: Make sure the magnetic coating of the tape faces the center of the reel.

5. Place an empty reel on the right-hand spindle, takeup spindle (8).

NOTE: When placing the reels on the spindles, be sure that the slots in the reel engage the keys on the spindles.

6. Thread the tape as shown in Figure 2. The solid line is the position tape is to be threaded for recording and playback. When the tape is threaded on the empty reel, turn the reel four or five revolutions, clockwise, to make sure that the tape is firmly fastened and to take out all the slack in the tape.

Making a Recording -

1. After the recording tape has been properly threaded, turn the "On-Off-Tone" control to the "On" position.
2. Turn the control handle ( 7 ) to the "Forward" setting.
3. Turn the Record-Play-Selector knob to the "Record" position.

NOTE: The Selector knob will stay in the "Record" position only, when the control handle (7) is in the "Forward" setting.

When the control handle is turned to any other setting, the selector automatically returns to the "Play" position. This is a safety feature which prevents the erasing of a recording if the control handle is turned to "Rewind" or "Fast-Forward."

4. Turn the "Volume" control clockwise until the incoming signal causes the "Record Lever Indicator" to flash on high peaks only. A recording is now being made on the tape.

To Record from Microphone -

1. Insert the Microphone plug into the "Mic" jack located on the side of the case.
2. When recording from Microphone, follow the instructions under the heading "Making a Recording." All sounds picked up by the Microphone will be recorded on the tape. Also, do not hold the Microphone too close to your face as breathing will be recorded.

NOTE: When recording with the Microphone, it is suggested that the Ekotape speaker be silenced to prevent feedback. The Ekotape speaker can be silenced by pushing the speaker switch, located on the recessed plate in the side of the case, to the "Off" position.

To Record from Radio -

1. If a recording from a radio is desired without the use of the Microphone, it is recommended that the

- (a) Replace pinch roller (14).

2. Pinch roller spring (19) too weak:

- (a) Replace spring (19).

3. Motor out of adjustment:

- (a) See "Motor Adjustment."

LUBRICATION

This recorder was lubricated at time of manufacture, which should last for a long period of time under normal conditions; however, due to excessive use, or where it is subjected to extreme heat, dust, lint, etc.,

or when the unit is disassembled for repair, the recorder should be thoroughly cleaned with carbon tetrachloride and lubricated as follows:

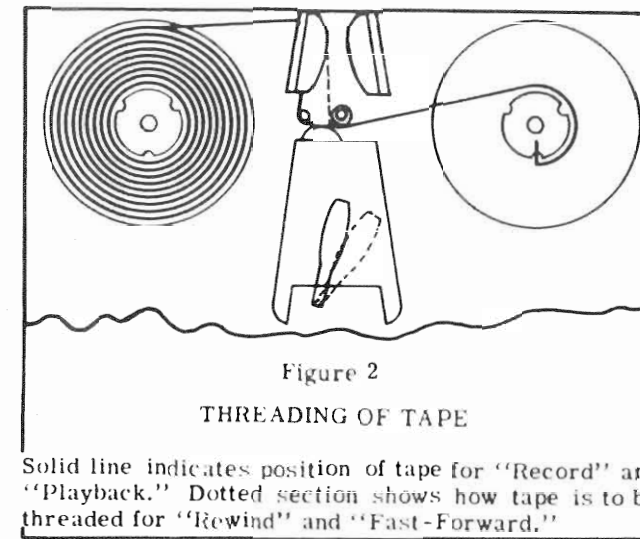
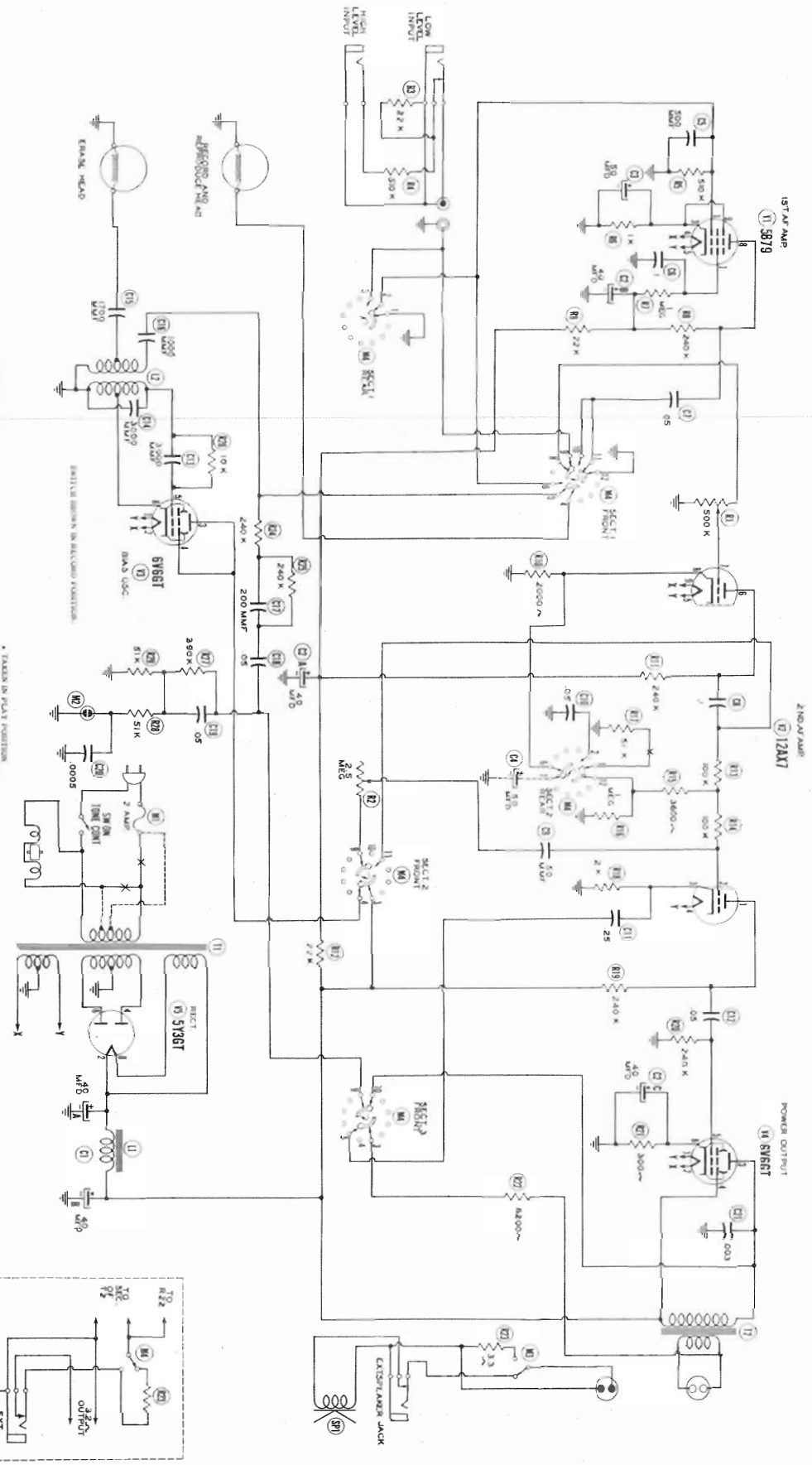
Use light machine oil on oilite bearings of the motor, flywheel, shaft, and spindles.

Use Lubriplate on all frictional moving parts.

CAUTION: Do not overlubricate. Do not allow any grease or oil to come in contact with any of the drive surfaces, such as the rubber drive belts, capstan, pinch roller, motor pulley, etc. If grease or oil should come in contact with any of these surfaces, clean them with carbon tetrachloride.

MECHANICAL PARTS LIST

Ref No.	Part No.	Description	Ref No.	Part No.	Description
1	29528-5	Cover Screw, 4-40 x 3/8" Phillips Head	29	242-14124	Flywheel Assembly for Model 109
2	241-14062-3	Record Head Cover - Left		242-14124-2	Flywheel Assembly for Model 110
3		Tape Roller		242-14124-1	Flywheel Assembly for Model 111
4		Tape Roller Bushing		242-14125-4	Flywheel Assembly for Model 112
5	242-14142	Supply Shaft and Disc Assembly	30	242-14123	Support Bracket Assembly
6	241-14062-4	Record Head Cover - Right	31	241-14110	Fast-Forward Pulley Spring
7	241-14072-1	Control Handle	32	241-14131	Fast-Forward Mechanism Spring
	241-15116	Control Handle Set Screw, Cone Point Socket head, #8-32 x 1/4", Special	33	242-14785	Fast-Forward Pulley Assembly
8	242-14145	Takeup Shaft and Disc Assembly	34	241-14129-2	Fast-Forward Belt
9	242-14147	Top Plate Assembly	35	241-14129-1	Rewind Drive Belt
10	242-14148	Takeup Pulley and Disc Assembly	36	241-14152	Supply Pulley
11	241-14129-3	Takeup Drive Belt	37	241-14140	Motor Suspension Bracket, R.H.
12	242-14159	Record Head and Can Assembly	38	241-13665-1	Motor Shock Mount
13	242-14181	Tape Guide Roller Assembly	39	242-14136	Motor Mounting Bracket and Spring Assembly
14	241-14205	Tape Guide Top		241-14141	Motor Suspension Bracket, L.H.
15	242-14155	Pinch Roller Assembly	41	241-14139	Motor Rock Spring
16	242-14090	Pinch Roller Lever and Shaft Assembly	42	241-14135-2	Motor Pulley - Model 109
		Pressure Pad Lever Assembly on Units Below Serial 5550		241-14135-1	Motor Pulley - Model 110
	242-14200	Pressure Pad Lever Assembly on Units Above Serial 5550		241-14772-1	Motor Pulley - Model 111
	242-15154	Pressure Pad Lever Assembly on Units Above Serial 5550		241-15032-1	Motor Pulley - Model 112
	241-12059	Pressure Pad Wave Washer	43	241-14133	Motor Fan
	2965-1	Pressure Pad Retaining Ring	44	241-14134	Motor Return Spring
17	241-14219	Pressure Pad Spring on Serial 5550 and Higher	45	241-14220	Fast Forward Release Lever
18	241-14116	Bell Crank Spring	46	241-14088	Fast-Forward Arm and Pulley Assembly
19	241-14187	Pinch Roller Spring	47	242-14108	Fast-Forward Plate and Pulley Assembly
20	241-14099	Brake Lever Spring	48	242-14111	Lift Lever and Spring Assembly
21	242-14095	Brake Yoke Assembly	49		Lift Lever Adjusting Lock Nut
22	242-14079	Mounting Plate Assembly	50	241-12035	Trip Mechanism Spring
23		Brake Lever	51	241-14130	Fast-Forward Trip Brake Assembly
24	241-15210	Lift Lever Spring	52	242-14117	Tone Control Knob
25		Lift Actuator Arm			Fuse Assembly Knob
26	242-14153	Control Cam and Shaft Assembly			Selector Knob
27	242-14073	Record Lock Arm Assembly			Microphone Assembly
28	242-14762	Record Lock Arm Spring Assembly			External Speaker Cord and Plug Assembly
	441-13609	Index Ball (for Item 27)			



radio, or external speaker cord attachment, be connected to the speaker voice coil by means of the alligator clips, and the other end of the cord plugged into the "Radio-Phono" jack located on the left side of the case. It is also possible to make a connection across the detector load. This kind of connection may be more desirable, because any circuit deficiencies in the amplifier of the radio will not be included in the recording.

2. Set the radio for soft playing; then adjust the controls on the Ekotape, as described under "Making a Recording."

NOTE: In the event that a hum should develop during recording, reverse the connections to the speaker or detector.

#### To Record from Phonograph -

1. To record from a phonograph, connect the alligator clips of the radio, or external speaker cord attachment, to the ends of the pickup leads of the phonograph; then plug the other end of the attachment into the "Radio Phono" jack.
2. To make a recording from a phonograph, or from a "Radio-Phonograph" combination, connect the alligator clips across the voice coil on the speaker, turn the radio on, and then turn the radio-phono select switch to "Phono." Set the radio for soft playing, and then adjust the controls on the Ekotape, as described under "Making a Recording."

NOTE: If hum develops during recording, switch alligator clip connections.

#### To Rewind -

1. To rewind a reel of tape for playback, turn the control handle (7) to "Rewind." It is suggested to stop the "Rewind" operation before all the tape is unwound from the takeup spool. By doing this, there is a saving in the operation of rethreading the tape.

- (a) Thread tape on recorder as shown in figure 2, by the dotted line.

#### Twin Track Operation -

The Ekotape Models 109 and 111 are designed to record

two tracks of recording on a standard width tape instead of one which doubles the recording time of a reel of tape. By using this twin-track operation, two full one-hour programs on a 7" reel, with the Model 109, or two half-hour programs on a 7" reel on Model 111, may be recorded:

1. When a full reel of tape has been recorded, that is, on Models 109 and 111, stop the recorder by turning the control handle (7) to "Stop."
2. Remove the empty reel from the supply spindle.
3. Remove the full reel of tape from the takeup spindle, turn it over, and place it on the supply spindle (5).
4. Place the empty reel of tape on the takeup spindle; thread the tape as shown in Figure (2), and then continue your recording, as described under "Making a Recording."

#### To Play a Recording -

1. With tape properly threaded, turn the control handle (7) to the "Forward" position.
2. Adjust the "Volume" and "Tone" controls to suit.
3. Be sure the external speaker switch, located on the right side of the case, is turned to the "On" position.

NOTE: In case both tracks of recording have been used, it will be necessary to reverse the reels, as described in Steps 2, 3, and 4 under "Twin Track Operation."

#### Fast-Forward -

1. If any portion of the tape is to be skipped, it may be done by turning the control handle (7) to "Fast Forward." The tape will now wind at a fast speed until the control handle is turned to "Forward" or to the "Off" position.

#### Using an External Speaker -

1. Connect the alligator clips of the external speaker cord attachment to the voice coil of the external speaker; then plug the other end of the cord attachment into the "External Speaker" jack, located on the right side of the case.
2. Be sure the "On-Off" speaker switch is in the "On" position.

NOTE: When the speaker attachment cord is plugged into the "External Speaker" jack, the Ekotape speaker is automatically cut out.

#### To Operate the Ekotape as a P.A. System -

1. Insert the Microphone cord into the "Mic" jack.
2. Turn the "Off-Tone" control on.
3. Remove the reels from the recorder.



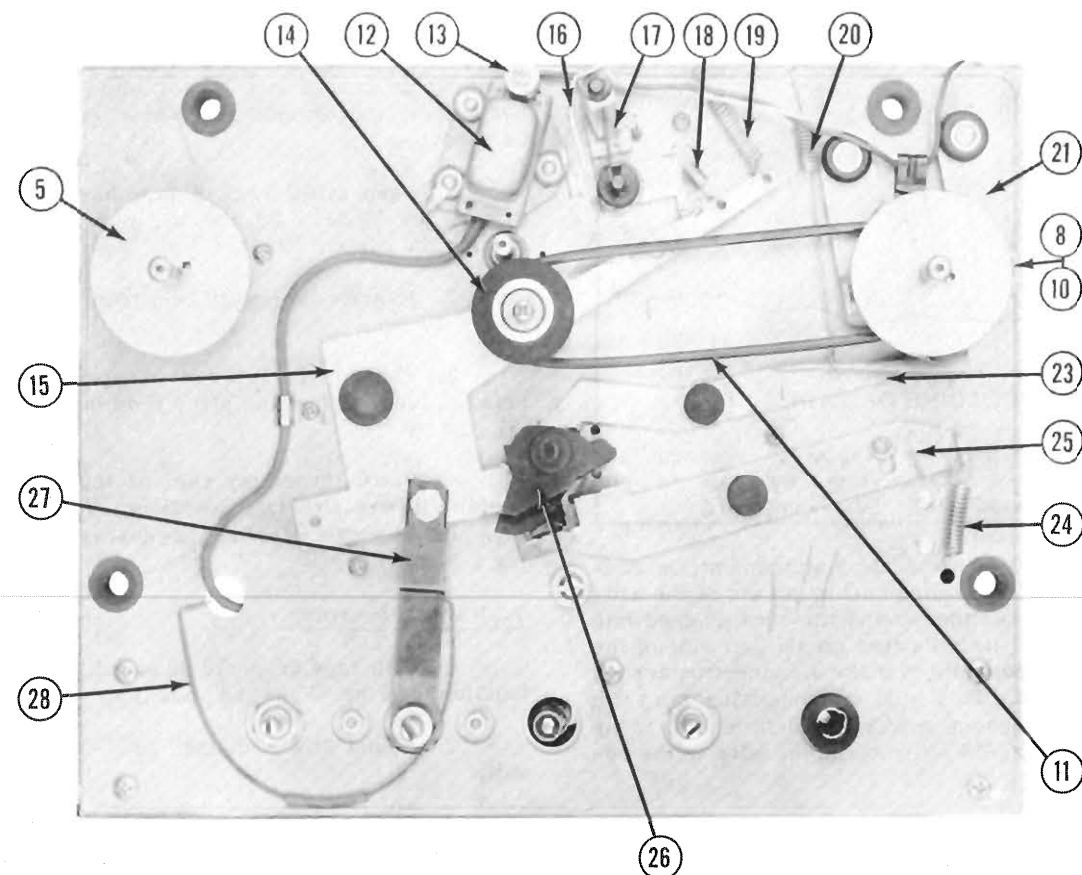


Figure 3

4. Turn the control handle (7) to "Forward."
5. Turn the "Play-Record" Selector knob to "Record."
6. "On-Off" speaker switch should be in the "On" position.
7. Speak into the Microphone and adjust the "Volume" control to suit.

NOTE: Do not place the Microphone close to the speaker when "Volume" is turned up, as a loud shrill will develop.

#### Changing from 115 Volts to 230 Volts -

Models 110 and 112 have a power transformer tapped for 115 or 230-volt operation. Both models are shipped connected for 115-volt operation. To change from to 230-volt operation, change one connection in the amplifier, as follows: The black wire coming from the fuse holder is connected to a lug on a terminal strip in the chassis. This lug is connected to a blue wire coming from the power transformer. This is the 115-volt connection. There is another lug on the terminal strip which is connected by a red wire to the power transformer. For 230-volt operation, remove the black wire from the lug with the blue transformer wire, and resolder it on the lug with the red transformer wire.

After changing to 230-volt operation, mark the nameplate in the cover of the carrying case for future reference when servicing is required.

#### Removing the Top Plate (9) -

In order to gain access to the operating mechanism, the top plate (9) must be removed:

1. Remove the four Phillips mounting screws which fasten the recorder to the carrying case.
2. Remove the fuse holder cover, and pull off the Volume and Tone control knobs.
3. Loosen the set screw in the Selector knob and control handle (7), and remove.
4. Remove the head cover plate (6).
5. Raise the recorder unit enough so as to remove the input jack connection and speaker plug connection to the amplifier chassis; then remove the unit from the case.

6. The top plate (9) is rubber mounted on the mechanism mounting plate (22) and held in place by four screws and large washers installed from the back of the chassis. To remove the top plate, pivot the pressure pad assembly (16) so as to clear the hole in the baseplate. While holding it in this position, carefully work the top plate off the rubber mounts.

To re-assemble, reverse the above procedure.

#### Replacing Forward Takeup Belt (11) -

The "Fast-Forward" (34) and "Rewind" spindle belt (35) can be replaced without disassembly other than

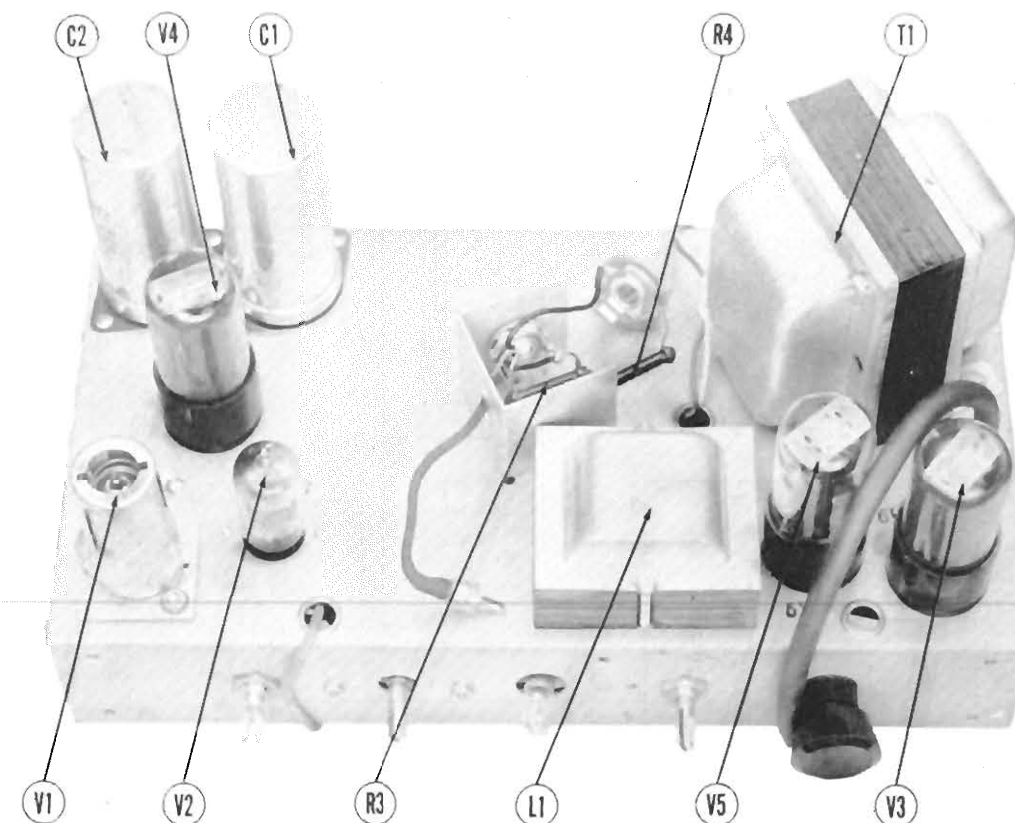


Figure 6

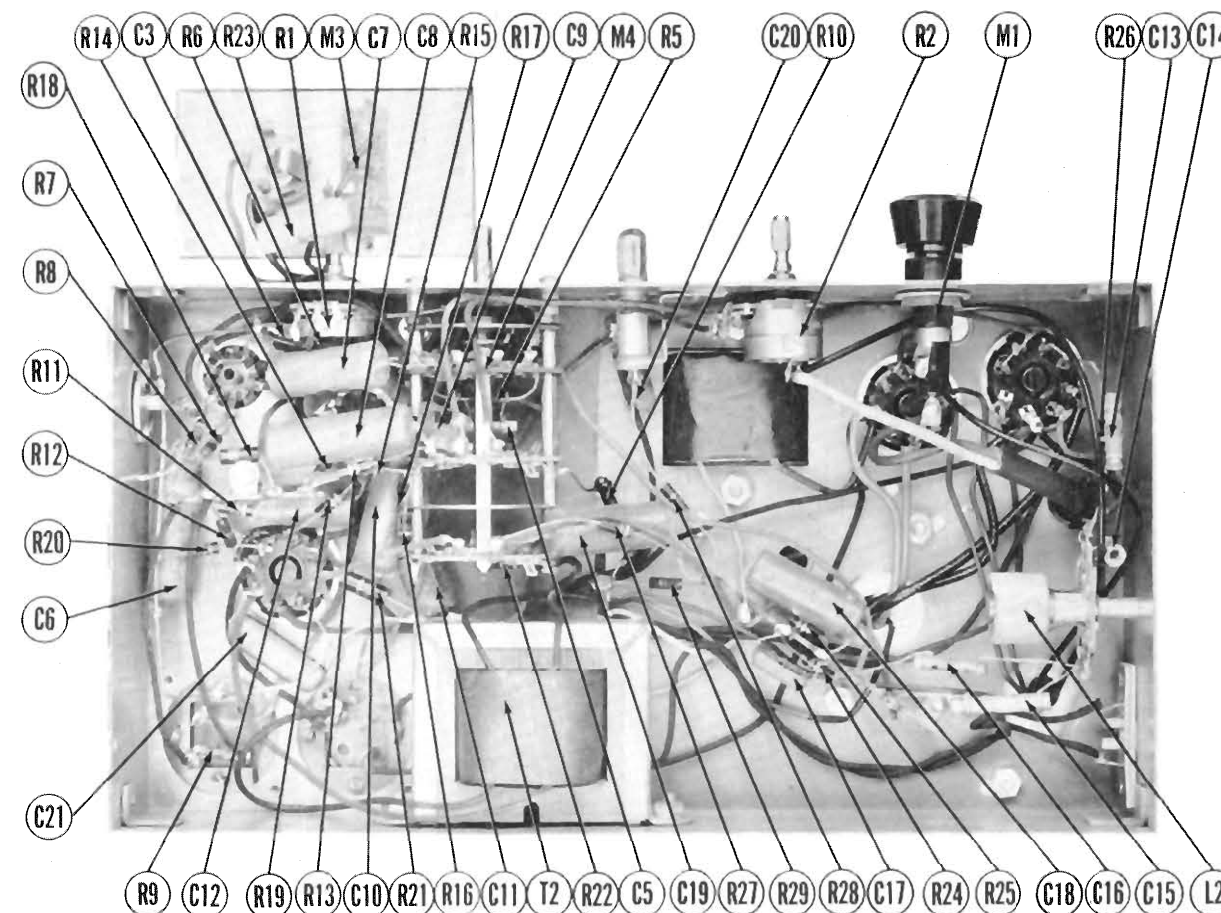


Figure 7

Too weak a signal, which does not cause the indicator to flicker, will result in weak playback. Too strong a signal, causing the indicator to glow continuously, will result in distortion during playback.

#### Failure of Tape Erasing -

1. Check to see if the head assembly (12) is properly aligned:

(a) If the head assembly (12) is loose, or if the head assembly has been replaced, it will be necessary to align it for optimum output level and maximum high frequency response. If a constant frequency response tape is not available, play back a tape previously recorded; then adjust the three recording head mounting screws for maximum high frequency response.

2. Dirty head:

(a) Clean with carbon tetrachloride.

3. Pressure pad spring loose:

(a) Replace

4. Pressure pads worn:

(a) Replace.

5. Oscillator coil assembly or tube not operating:

(a) Replace oscillator coil (L2) or tube (V3).

6. Defective erase coil in head:

(a) Replace head (12). To gain access to the head assembly (12), see paragraphs on "Removing the Top Plate" and "Failure of Tape Erasing, 1-(a)."

#### Failure to Record -

1. Record coil open:

(a) Replace record head unit (12).

2. Insufficient bias voltage:

(a) Check bias voltage across record head with AC vacuum tube voltmeter. There should be approximately 100 volts; if low, check bias oscillator circuit.

3. Pressure pad assembly (16) not holding tape against lamination on the recording head:

(a) Pressure pads worn; replace.

(b) Pressure pad spring (17) loose; replace.

4. Recording head loose:

(a) Play back a recording that is known to be good, and adjust the head as described under "Failure of Tape Erasing, 1-(a)."

#### Will Not Play Back -

1. Open coil in head:

(a) Replace recording head.

2. Pressure pad assembly (16) not functioning properly:

(a) Pressure pad spring (17) loose; replace.

(b) Pressure pad felts worn; replace.

3. Dirty recording head:

(a) Clean with carbon tetrachloride.

#### Takeup Reel (8) does not take up Tape on Play Position -

1. Broken or defective takeup drive belt (11):

(a) Replace.

2. Pinch roller spring (19) not fastened:

(a) If this spring is loose, the pinch roller lever (15) will not be actuated, thereby preventing the pinch roller (14) from contacting the flywheel capstan and, in turn, not driving the takeup spindle (8).

3. Motor springs (45) not connected:

(a) Replace.

#### Fast-Forward does not Operate -

1. "Fast-Forward" mechanism spring (32) loose or broken:

(a) If this spring is not connected, the "Fast-Forward" pulley and arm assembly (47) will not engage the pulley (33); replace the spring.

2. "Fast-Forward" belt (34) defective or broken:

(a) Replace belt (34).

3. "Fast-Forward" pulley (33) loose on shaft:

(a) Tighten set screw in pulley (33).

4. Motor out of adjustment:

(a) See "Motor Adjustment."

#### Tape Overruns from Rewind to Stop -

1. Brake lever spring (20) loose or broken:

(a) Replace brake lever spring (20).

2. Takeup pulley (33) and spindle shaft (8) out of adjustment:

(a) See "Takeup Pulley and Shaft Adjustment."

3. Pads on brake yoke (21) worn or missing:

(a) Replace brake pads.

#### "Wows" Caused by Tape Slipping -

1. Worn or damaged pinch roller (14):

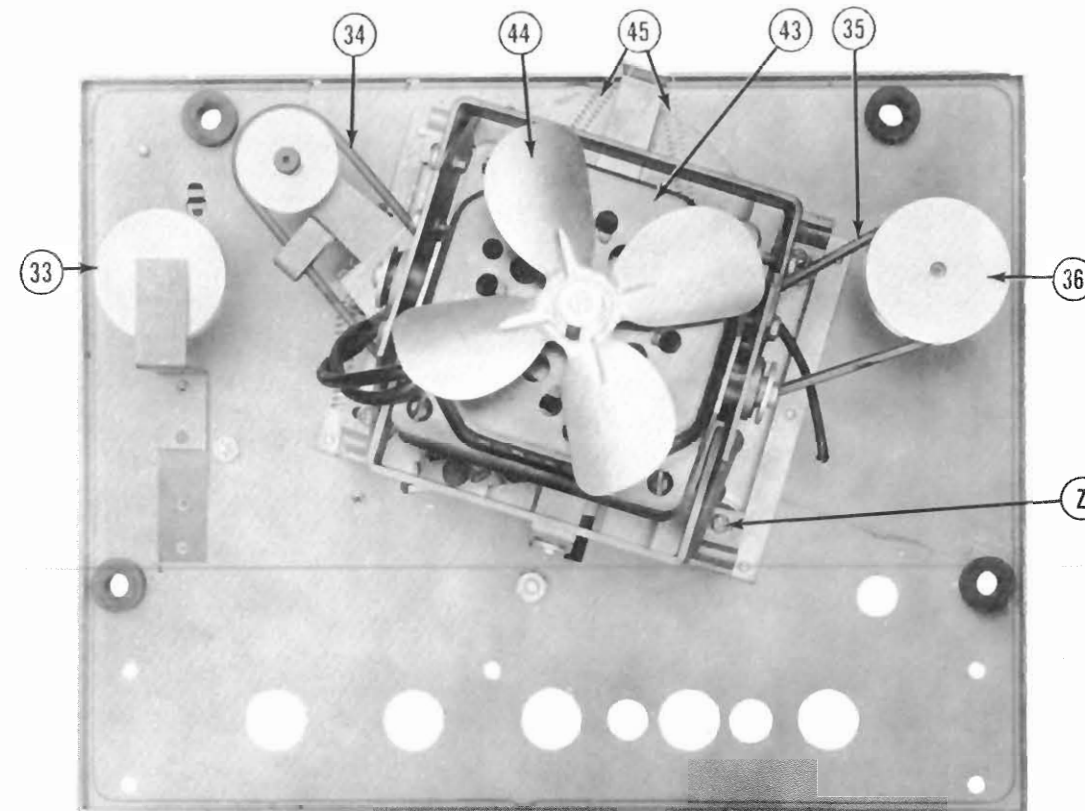


Figure 4

removing chassis from the carrying case. Use care in handling the drive belts to prevent distortion or contact with grease or oil. Be sure there is no grease or oil on pulleys.

The "Forward" takeup belt (11) is located under the top plate; therefore, the chassis must be removed from the carrying case and the top plate (9) removed (See "Removing the Top Plate"). After the top plate has been removed, loosen the set screw in the "Fast-Forward" pulley (33); then remove reel shaft (8). Remove pulley assembly (10) and work belt over the pinch roller (14).

Work new belt over pinch roller. Place the belt in the groove of the pulley assembly (10) and replace the pulley (10), reel shaft (8), and "Fast-Forward" pulley (33). With the mechanism in the "Forward" position, press down lightly on the reel shaft and tighten the set screw in the "Fast-Forward" pulley (33), leaving a clearance of .010 to .015 inch between the pulley (33) and bearing.

#### Motor Adjustment -

The drive clearance of the motor must be carefully adjusted so the mechanism will function properly in all control knob positions.

With all springs attached, make the following adjustments:

1. "Fast-Forward" position: The "Fast-Forward" drive belt (34) should engage the motor pulley (42) and the "Fast-Forward" pulley (33), with the kick-out lever (46) clear of the "Fast-Forward" and pulley assembly (47). The trip pin (X) on the "Fast-Forward" drive mechanism should engage the brake trip of the trip assembly (52), passing beyond the dog

(Y) of the brake trip, not exceeding 1/16 inch (See Figure 5). This prevents overrun or looping of the tape in going from "Fast-Forward" to "Forward,"

To correct any misalignment of above, loosen the four mounting screws (Z), see Figure 4, and with all springs attached and mechanism in "Fast-Forward" position, make adjustments by shifting the motor bracket in the slotted mounting holes. After the proper adjustment is made, tighten the four screws.

NOTE: Check the "Fast-Forward" brake spring (52) to see that a clearance of approximately 3/64 inch exists between the brake spring (51) and "Rewind" belt (35) in the "Fast-Forward" and "Forward" positions.

2. In the "Stop" position, the motor drive pulley (42) should not touch any part.

3. In the "Rewind" position, the motor pulley should engage the "Rewind" belt. If an adjustment is necessary, it can be made by slightly bending the rocker arm bracket.

4. In the "Forward" position, the motor pulley should engage the flywheel tire only. Adjustment is made by moving the motor bracket in the slotted mounting holes.

#### Record Lock Arm Adjustment -

The record lock arm (27) locks the "Selector" knob in the "Record" position only when the control handle (7) is turned to "Forward." The lock arm automatically returns the "Selector" knob to the "Play" position when the control handle is turned to any other location. This is accomplished by the movement of the

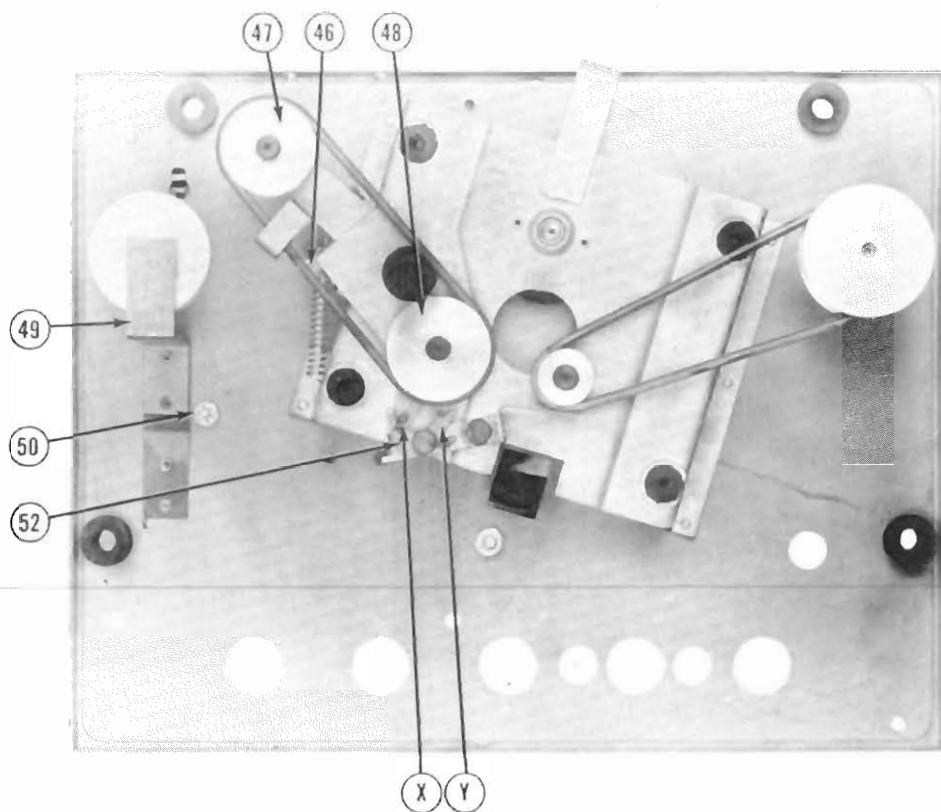


Figure 5

pinch roller lever (15), which is actuated by the control handle (7), causing the index ball bearing to slip out of the detent of the roller lever (15). The spring (28) then automatically pivots the lock arm (27) and "Selector" knob to "Play." This is a safety feature to prevent a recording from being erased:

1. To adjust the lock arm, set the control knob (7) at "Forward."
2. Remove the spring (28) from the lock arm.
3. Loosen the set screws holding the lock arm (27) to the "Selector" shaft.
4. Turn the "Selector" shaft to its extreme counterclockwise position.
5. Move the lock arm (27) so that the index will engage the index hole in the pinch roller lever and shaft assembly (15); then move the lock arm approximately 1/16 inch farther counterclockwise, and tighten the set screws.
6. Replace the spring (28).

#### TROUBLES AND REMEDIES

Motor and Amplifier do not Operate when Tone Control Switch is Turned On -

1. Check fuse (M1) to see if it has blown. Fuse is locked in a fuse holder in the right-hand side of the top plate (See Figure 1).
2. Check to see if power is reaching recorder.
3. Damaged power cord:

(a) Repair or replace.

4. Damaged "On-Off-Tone" control switch:

(a) Replace tone control and switch assembly.

Recorded Sound is Faint, Fuzzy, Distorted or No Sound at all -

1. Dirty head:

(a) Check the recording head (12) to see if it is dirty. The recording head is subject to an accumulation of tape coating residue, which is worn off as the tape passes. This must be periodically removed since it may cause a faint recording. The accumulation may be removed with carbon tetrachloride and a small cotton swab on the end of a tooth pick.

2. Pressure pad spring (17) loose or missing:

(a) The pressure pad lever assembly (16) should apply pressure against the tape, thus holding the tape tightly against the recording head. If this is not true, check the pressure pad spring (17); if loose or missing, replace.

3. Worn or dirty pressure pad:

(a) Replace or clean pressure pad assembly (16).

4. Amplifier trouble.

5. Over-recorded or under-recorded tape:

(a) Correct recording volume is very important.

