

WILCOX-GAY

Recordio

SERVICE INSTRUCTIONS MODELS 4B10 AND 4F10

PRICE 50 CENTS

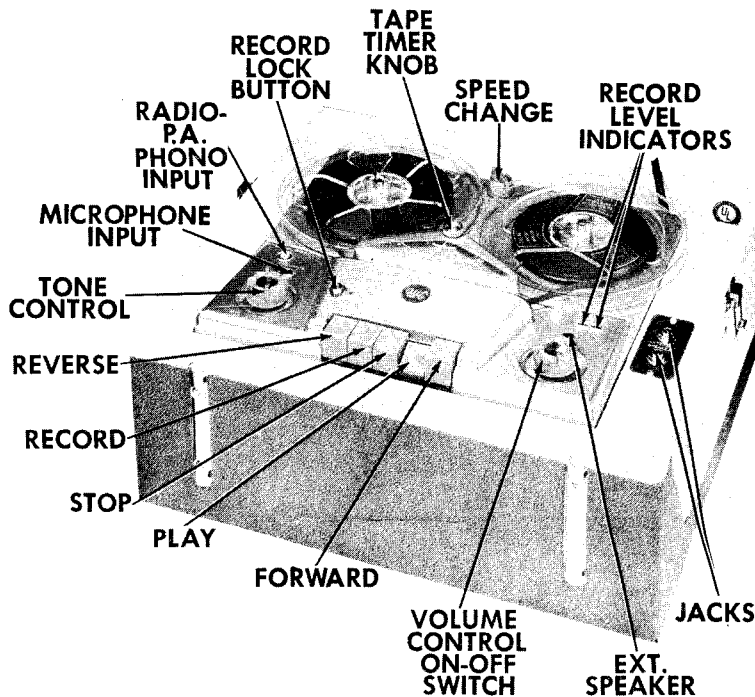


Figure 1

GENERAL INFORMATION

Wilcox-Gay "Recordio" Models 4B10 and 4F10 are mechanically alike. The major difference between the two models is in the amplifiers used. Notice the difference in the schematics located toward the rear of this manual.

Models 4B10 and 4F10 feature fingertip operation for Fast Forward, Playback, Stop, Record, and Fast Reverse. These recorders are designed to record and play back two tracks of material on standard width recording tape. Any reel size up to 7" can be used. Two neon recording indicators simplify the recording level setting. New recordings can be made on previously recorded tape since the erase head is automatically positioned when the "Record" button is pressed, or the same recording may be played back indefinitely. 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 speakers, or an external speaker may be used by connecting to the "Ext. Spkr." jack.

Recordio Models 4B10 and 4F10 have two tape speeds, 3 3/4" and 7 1/2" per second. Using both tracks of the tape the recording time is as follows:

SIZE	3 3/4" SPEED	7 1/2" SPEED
5" reel	1 hour	1/2 hour
7" reel	2 hours	1 hour

These units are designed to operate on 60 cycle, 115 volt, AC supply only. Before connecting to your line supply, be absolutely certain that it agrees with the above specifications.

WILCOX-GAY CORPORATION
CHARLOTTE, MICH.

WILCOX-GAY

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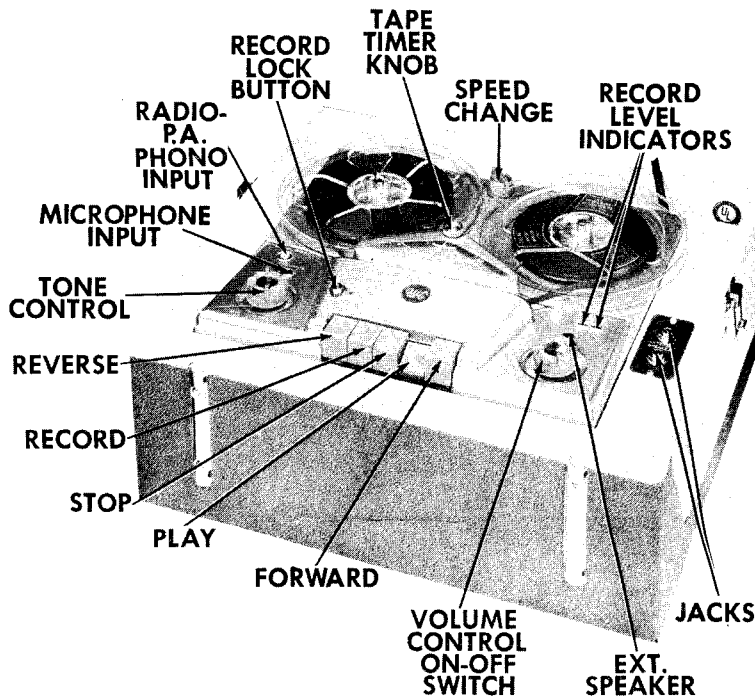


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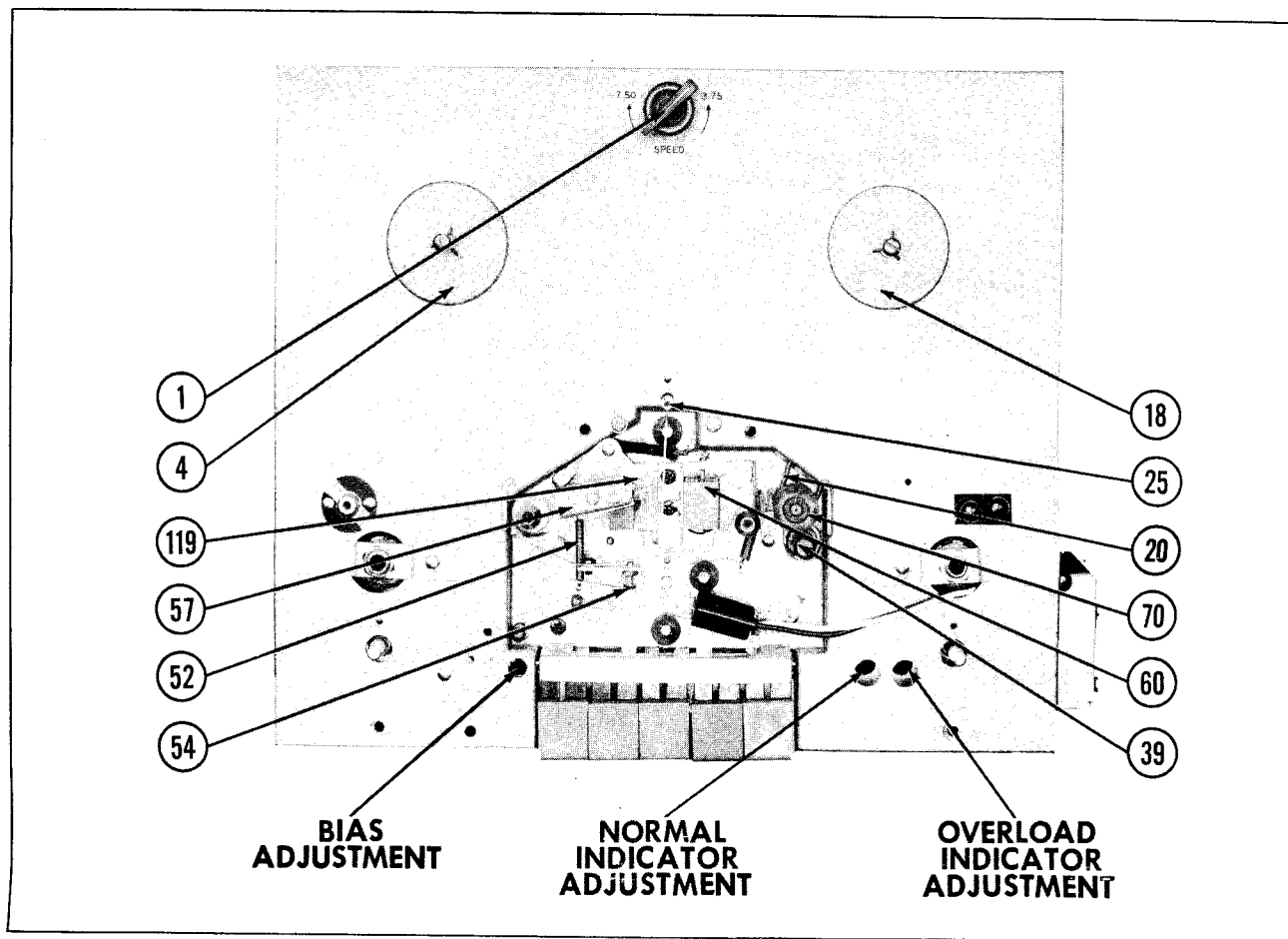


Figure 2

OPERATING INSTRUCTIONS

Preparation For Operation-

1. Remove the AC power cord, 5" reel of tape, empty reel and the microphone from the storage compartment.

2. Depress the "Stop" button.

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

4. Set speed change knob to 7.50 or 3.75 as desired.

5. Place Remote-Normal switch in "Normal" position.

CAUTION: Do not turn speed change knob unless "Stop" button is depressed.

When the Forward or Reverse buttons are depressed, the Record and Play buttons are locked so that they cannot be pressed down, with the possibility of spilling tape. The buttons should always be pressed down firmly until they latch and the Stop button must be depressed before changing functions or speeds of the recorder.

IMPORTANT: Always depress the Stop button when the machine is not in use.

Speed Change Knob-

The arrow on the speed change knob should point at 7.50 or 3.75 according to the speed desired. These recorders have two speeds, 7 1/2" and 3 3/4" per second. The arrow pointing at 7.50 means the unit will operate at the fast speed or 7 1/2" per second.

CAUTION: Turning the speed change knob while the unit is operating will not change the speed. The Stop button must be depressed before the speed can be changed.

Threading The Tape-

1. Place a full reel of tape on the left (supply) spindle, making certain one of the reel slots catch the protrusions of the pan. Unwind about 14" of tape from the supply reel.

2. Insert free section of tape into the tape slot.

3. Insert free end of tape into one of the three slots in the hub of the right (take-up) reel and while holding the tape in place give the reel two or three turns until the tape is secured.

4. The dull side of the tape should always face away from the operator (rear of unit).

To Record From Microphone-

1. Turn the On-Off Volume control to the right until a click is heard and allow about 30 seconds for

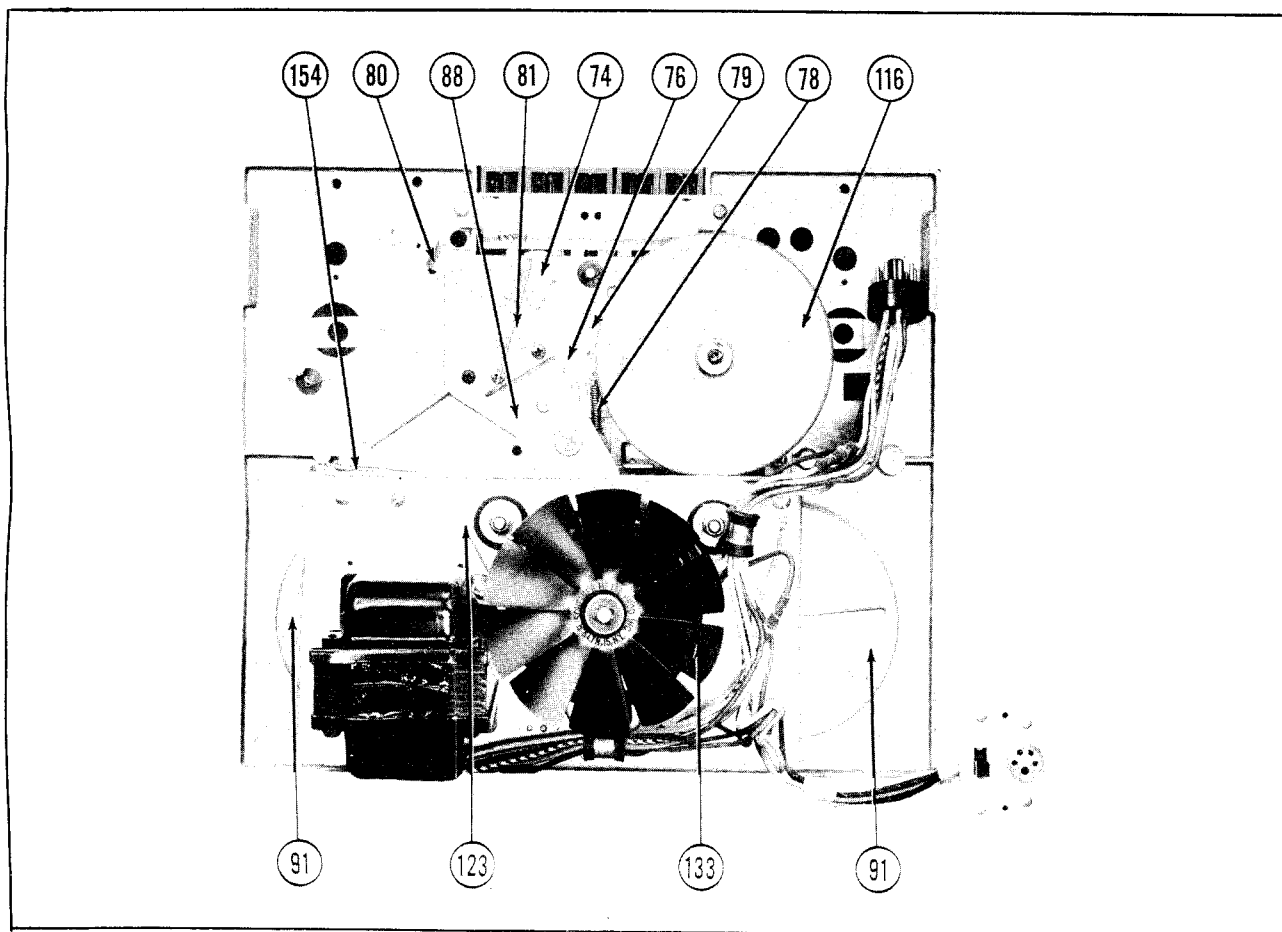


Figure 3

the unit to warm up. The pilot light located above the Stop button will glow when the unit is turned on.

2. Insert the microphone plug into the "Microphone" input.

3. Move the record lock button (27) downward with the left hand. This releases the safety lock which prevents accidental erasure.

4. Depress the "Record" button with the right hand (while holding record lock button (27) with the left hand) until it latches.

5. Adjust the "Volume" control until the "Normal" indicator just flashes, while speaking into the microphone. When the "Volume" control is advanced too far the "Overload" indicator will flash and the recording will be distorted. To prevent overload, lower the "Volume" control to a point where the "Overload" indicator will not flash.

6. The "Tone" control does not operate during recording. When recording from radio, set the radio "Tone" control for maximum treble.

To Record From External Radio, TV, Or Phonograph-

1. Insert the phonograph pickup plug into the "Radio-P. A. -Phono" jack.

2. For radio or TV recording, connect patch cord, part No. C20.233 to the voice coil of the radio

or TV receiver speaker by means of the alligator clips. Plug into "Radio-P. A. -Phono" jack.

3. Proceed as described under "To Record From Microphone".

NOTE: Remove patch cord after recording is completed.

To Use Second Track-

1. Depress the "Stop" button when all the tape has wound onto the take-up reel.

2. Remove reel containing tape and place on left-hand supply pan.

3. Place empty reel on right-hand take-up pan.

4. Thread tape as previously described.

To Play Recordings-

1. Turn on unit with "Volume" control knob.

2. Thread tape as described under "Threading The Tape."

3. Set the speed change knob (1) to the speed at which the recording was made.

4. Depress "Play" button until it latches.

5. Adjust "Volume" and "Tone" controls to desired listening level.

High-Speed Forward Or Reverse-

When it is desirable to play a certain portion of the tape over again it is not necessary to rewind the entire tape. By depressing the "Forward" or "Reverse" button the tape will advance (or reverse) at a rapid speed.

Several minutes of normal recording can be skipped in a few seconds by the "Reverse" and "Forward" buttons.

Tape Timer-

If, when making recordings or playing a recorded tape, you wish to play back a certain recording, note the reading on the timer scale when the particular recording is being made or heard. Rewind the tape until the number you have noted appears on the scale, press "Stop" button, then press "Play" button and you are now listening to the recording you wanted.

When starting a new reel of tape or re-recording a reel, reset the indicator pointer to "0" by rotating the reset knob. By starting at "0" on all tapes, the number location can be cataloged for each selection on any reel.

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 excessive width.

Erasing Recorded Material-

When the record button is depressed, the erase head is automatically positioned, erasing any previous recording before a new one is made. You may erase material no longer needed, without recording, by depressing the "Record" button and turning the "Volume" control knob to the minimum volume position or extreme counter-clockwise position just before the recorder shuts off. One track is erased at a time. To erase the second track, reverse the reels and repeat the above operation.

To Use Recorder As A Public Address System-

Insert the microphone plug into the "Microphone" input jack. Plug in an extension speaker or speakers if desired and depress the "Record" button. Set the "Volume" and "Tone" controls to the desired listening level. A recording can be made at the same time with a tape placed on the unit in the normal manner.

CAUTION: When using the public address feature, see that the microphone is as far away from the speakers as possible, to prevent "feed-back" squeal.

Remote Control Operation-

A socket and switch are provided to allow remote operation up to a distance of 18 feet, either recording or playback. This is accomplished by means of a remote control cable (Mod. No. HC-12). Connect attachment cord as follows:

1. Insert remote control cable plug into remote socket. Be sure remote control switch on end of cable is in "Standby" position.

2. With control switch on the recorder in "Normal" position start the unit in the regular manner and set "Volume" control to the proper level.

3. Place control switch on the set to "Remote" position. Tape will come to a stop.

The recorder can now be operated (start and stop) by means of the remote cable switch. When starting the recorder by means of the remote control, the switch should be rotated to the "Motor" position and then after a slight pause rotated to the "Record-Play" position. To stop recording or playback, rotate the control switch directly to "Standby" position, pausing slightly at the "Motor" position.

ADJUSTMENTS

Disassembly Instructions-

1. Remove two Phillips head screws from rear of case.

2. Remove two Phillips head screws which hold "Normal-Remote" switch to mounting bracket.

3. Remove three Phillips head wood screws which hold "Normal-Remote" mounting bracket in case. Remove bracket from case.

4. Remove push-on type "Volume" and "Tone" control knobs.

5. Remove two screws located under "Volume" and "Tone" control knobs. Remove escutcheon.

6. Remove two hex head screws located under escutcheon.

7. Lift unit out of case, removing leads from speaker before removing unit completely.

Record-Play Head Adjustment- (See Exploded View)-

To adjust the record-play head (60) for maximum frequency response, make the following adjustment:

1. Remove the rear escutcheon (6) and rear escutcheon plate (26).

2. Properly thread an alignment tape or a good recorded tape on the machine.

3. Set the controls as described under "To Play Recordings".

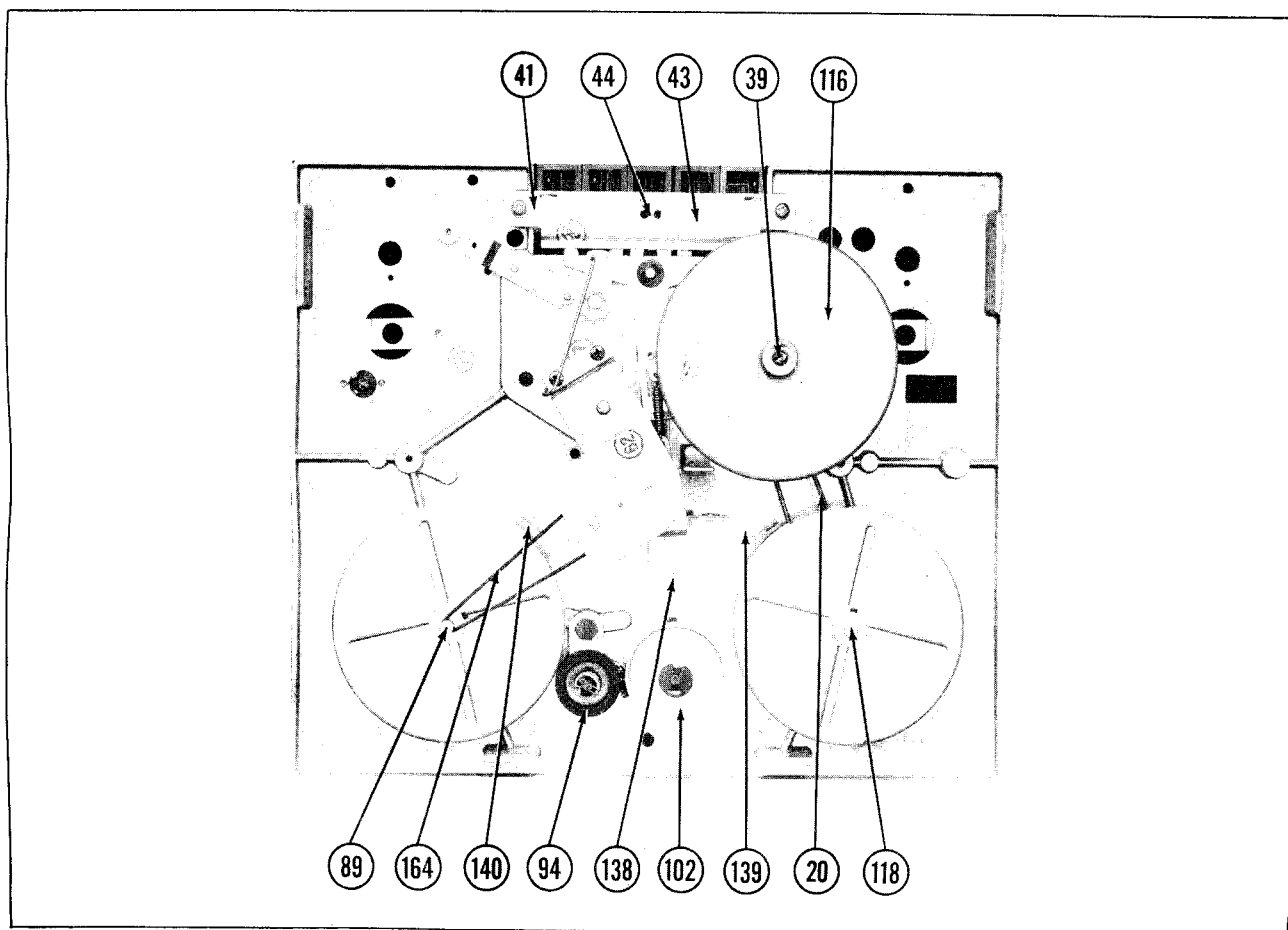


Figure 4

Grip the vertical portion of the record head mounting bracket with a pair of long-nosed pliers. Rock the mounting bracket and record head from side to side slightly until the maximum high frequencies are obtained. Bend the bracket with the pliers to obtain a permanent set at this position.

Pressure Pad Adjustment-
(See Exploded View)-

1. Remove the front escutcheon (10).
2. Depress the "Play" button. Do not turn the recorder on.
3. Use a pencil type postal scale and check the amount of pressure necessary to just pull the pad away from the tape. The test should be made on the end of the pressure pad mounting spring (65). Adjust the pressure pad for $1 \frac{3}{4}$ oz. $\pm 1/4$ oz. pressure.
 - (a) The record head pressure pad is adjusted by the locked adjustment screw (54).
 - (b) The guide post pressure pad (53) is adjusted by bending the pressure pad spring. It must be adjusted for minimum pressure against the tape.
4. After the adjustments are made depress the "Stop" button and replace the front escutcheon.

Erase Head Adjustment-

1. With tape properly threaded, turn recorder on and depress the "Record" button. Allow tape to run for a few seconds then turn recorder off, but leave "Record" button depressed.
2. With the escutcheons removed check the erase head (57) to see if it is parallel with the tape.
3. Check to see if the top edge of the tape coincides with the top end of the diagonal slot in the erase head (junction of long diagonal slot and short vertical slot). To adjust level of tape, loosen set screw (47), see exploded view, and rotate tape guide post (48) to move tape up or down. Tighten set screw (47).
4. After this adjustment has been made, check to see if the tape moves forward approximately $1/64$ " when the "Record" button is depressed. If not, loosen the forward adjustment screw (119), see Figure 2, and turn the screw in or out as required to obtain this $1/64$ " movement. Tighten the lock nut.

Brake Shoe Adjustment-

1. In order to adjust the brake shoes, the complete mechanism must be removed from the carrying case and the speaker disconnected.
2. With all push buttons in the up position the brake shoes (140) should clear the drums by approximately $1/8$ ".

3. Depress the "Stop" button while observing the brake shoes. Both brake shoes must contact the drums at the same time and with equal pressure.

4. The adjustment is accomplished by bending the spring arm (139).

Adjustment For Slow Take-Up Reel-

There are some instances where the spring drive belt (20), see Figures No. 2 and No. 6A, stretches after a period of time. When this happens, the takeup torque will be insufficient to wind tape properly onto the take-up reel. In this case, the belt should be replaced as follows:

Remove rear escutcheon (6) and rear escutcheon plate (26). Remove take-up reel pan (18). With the "Stop" button depressed, remove old spring drive belt from around pressure roller (70) and lift belt clear of recorder. Install new belt by reversing the above procedure.

Bias Adjustment-Model 4B10 and 4F10-

Turn the recorder on and depress the "Record" button; use no tape. To determine if the bias is within satisfactory limits without dismantling the unit, merely connect a VTVM from the top lug of the recording head to chassis. If 75 to 100 volts are present no adjustment is necessary.

If the readings are outside of this range, proceed as follows:

(Model 4B10) 1. Try a new 5879, 12AX7, 6AQ5, and 6X4.

2. If still not within range, remove the chassis shield and connect a low capacity VTVM from test point "A" to chassis and adjust trimmer M4 to obtain a reading of 2.25 volts.

(Model 4F10) 1. Try a new 12AY7, 12AX7, 6AQ5, and 5Y3.

2. If still not within range, remove the chassis shield and connect a low capacity VTVM from test point "A" to chassis. Use low scale. Adjust trimmer M7 for maximum reading. Adjust trimmer M4 to obtain a reading of 2.25 volts. This provides the optimum in performance.

Neon Record Level Indicators-Model 4B10 and 4F10-

The neon record indicator firing level adjustment is only required if a neon bulb is replaced. The two neon indicators are adjusted for correct firing level by means of two trimmer capacitors, one for each indicator.

To adjust indicators proceed as follows:

1. Turn recorder on and depress "Record" button.

2. Connect a short jumper lead across the bias oscillator coil, L1 (short out the coil to disable the oscillator.)

3. Connect an audio oscillator, set at 1000 cycles, into the microphone input jack. Output of audio oscillator should be approximately .01 volt. (A 1 volt output level may be used with a 100 to 1 reduction pad of re-

sistors inserted between the audio oscillator and the microphone jack).

(Model 4B10) Connect probe of low capacity type AC VTVM to test point "B" (junction of two 330K Ω resistors, R22 and R23, mounted on a terminal strip near the volume control).

(Model 4F10) Connect probe of low capacity type AC VTVM to test point "B" (junction of two 330K Ω resistors, R28 and R29, mounted on a terminal strip near the volume control).

5. Adjust volume control to obtain a reading of 36 volts on VTVM and leave control set and VTVM connected.

6. Disconnect shorting jumper from across bias oscillator coil.

7. Adjust "Normal" indicator trimmer M5A fully clockwise and then turn slowly counterclockwise so that upon loosening the trimmer the "Normal" bulb barely lights. This adjustment must be made loosening the trimmer.

8. Short out the bias oscillator coil.

9. Increase volume control to obtain a reading of 88 volts on the VTVM.

10. Remove short from bias oscillator coil.

11. Adjust "Overload" indicator trimmer M5B as described in step "7", for just barely lighting the "Overload" indicator bulb.

IMPORTANT: Do not readjust the recording bias oscillator after setting the indicator light adjustments.

TROUBLES

Push Buttons Fail To Latch Into Position-

1. Lock plate spring (44) loose or broken, resulting in the lock plate not being held against the hinge bracket (41).

Fails To Erase-

1. Spring (52) loose or broken, resulting in the erase head (57) not being pulled forward to engage the tape.

2. Erase head not aligned properly. See "Erase Head Adjustment".

No Fast Forward Or Reverse-

1. Idler lever tension spring (78) may be loose or broken; if so, idler lever (138) will not be actuated.

2. Check idler drive belt (103) to see if it is properly connected.

No Drive On Record Or Playback-

1. Idler tension spring (154 or 160) loose or broken, thereby not holding idler wheel (144) in engagement with motor pulley (147) and flywheel (116).

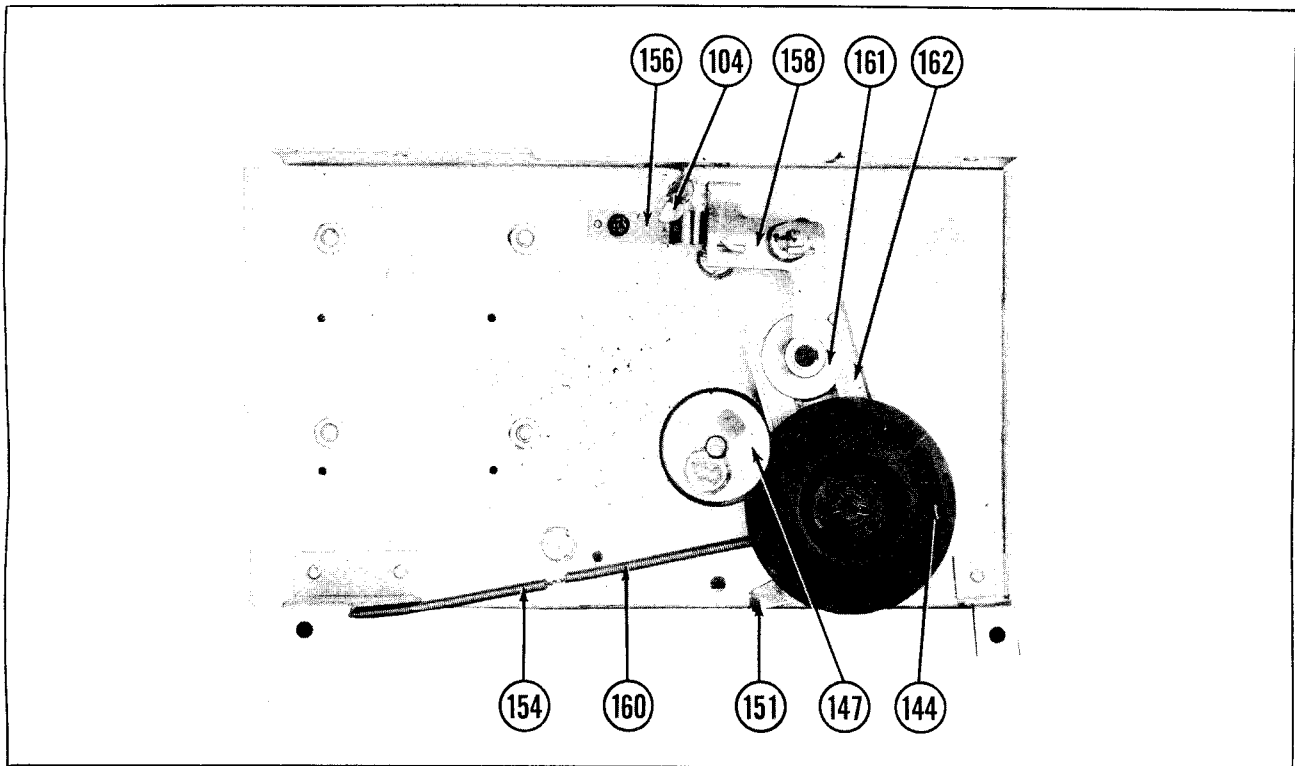


Figure 5

2. Idler slide plate (162) binding on slide bushing (161), thus preventing idler wheel (144) from moving forward.

Tape Fails To Wind On Take-Up Reel During Record Or Playback-

1. Reel drive spring (20) loose or broken. See "Adjustment For Slow Take-Up Reel".

2. Brake drum shaft (118) binding. Clean foreign matter from bearing surface.

Speed Variation Or "Wow"-

1. Check the capstan (39), pinch roller (70), idler wheel (144), motor pulley (147), and flywheel (116) for oil or foreign material on their driving surfaces. Clean these parts with a good cleaning fluid.

2. Check motor pulley (147) to see if it is secured to motor shaft.

3. Check idler tension spring (154 and 160); see if they are holding idler wheel (144) in firm contact with motor pulley (147) and flywheel (116).

4. Idler slide plate (162) binding on slide bushing (161), preventing idler wheel (144) from making positive contact with the motor pulley and flywheel.

Tape Overruns Or Spills When Stop Button Is Depressed During Fast Forward Or Rewind-

1. Brake shoes out of adjustment. See "Brake Shoe Adjustment".

2. Brake pads worn out. Replace pads.

Fails To Record-

1. Tape pressure pad not adjusted properly, resulting in the tape not being held against the recording head. See "Pressure Pad Adjustment".

2. Record head (60) loose on its mounting. Adjust head and tighten into position as described under "Record-Play Head Adjustment".

3. Check the recording tape to see if the dull-coated side faces inward on the reel. If the dull side faces outward a recording cannot be made.

CLEANING

The record head (60), capstan (39), and pressure roller (70) are subject to an accumulation of tape coating residue, which is worn off the tape as it passes these parts. Use a soft cloth and alcohol to clean the head surfaces, capstan and pressure roller.

CAUTION: Do not use a brush or any metal object when cleaning the recording head as this could mar the metal pole piece.

LUBRICATION

All rotating parts are provided with generous size oilite bearings, which are factory lubricated and require no further attention.

An occasional cleaning out of foreign matter under the plastic pushbutton cover is desirable, and a small drop of oil on the sliding lever members is advisable.

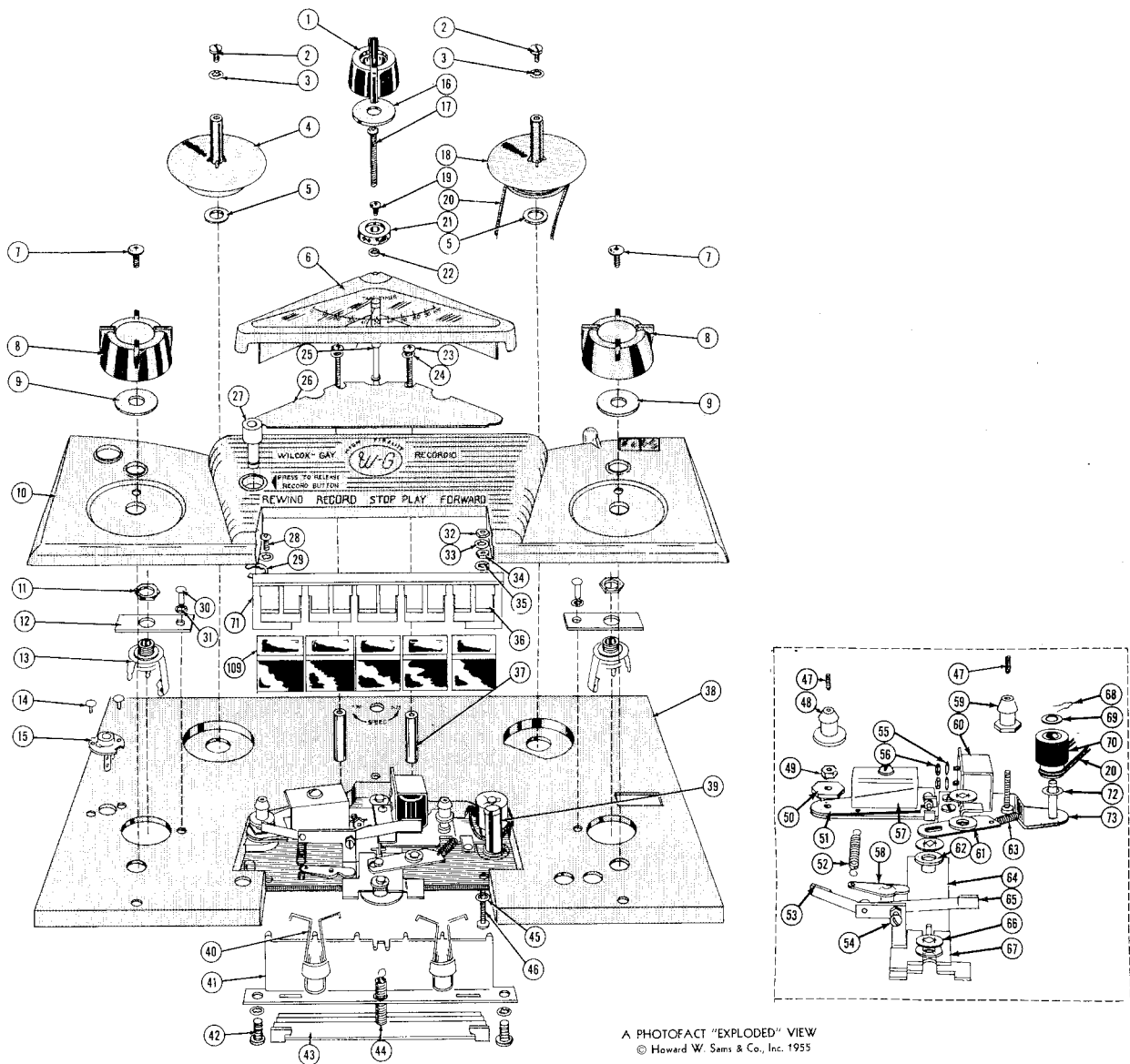


Figure 6A. Exploded View Of Parts Above Baseplate

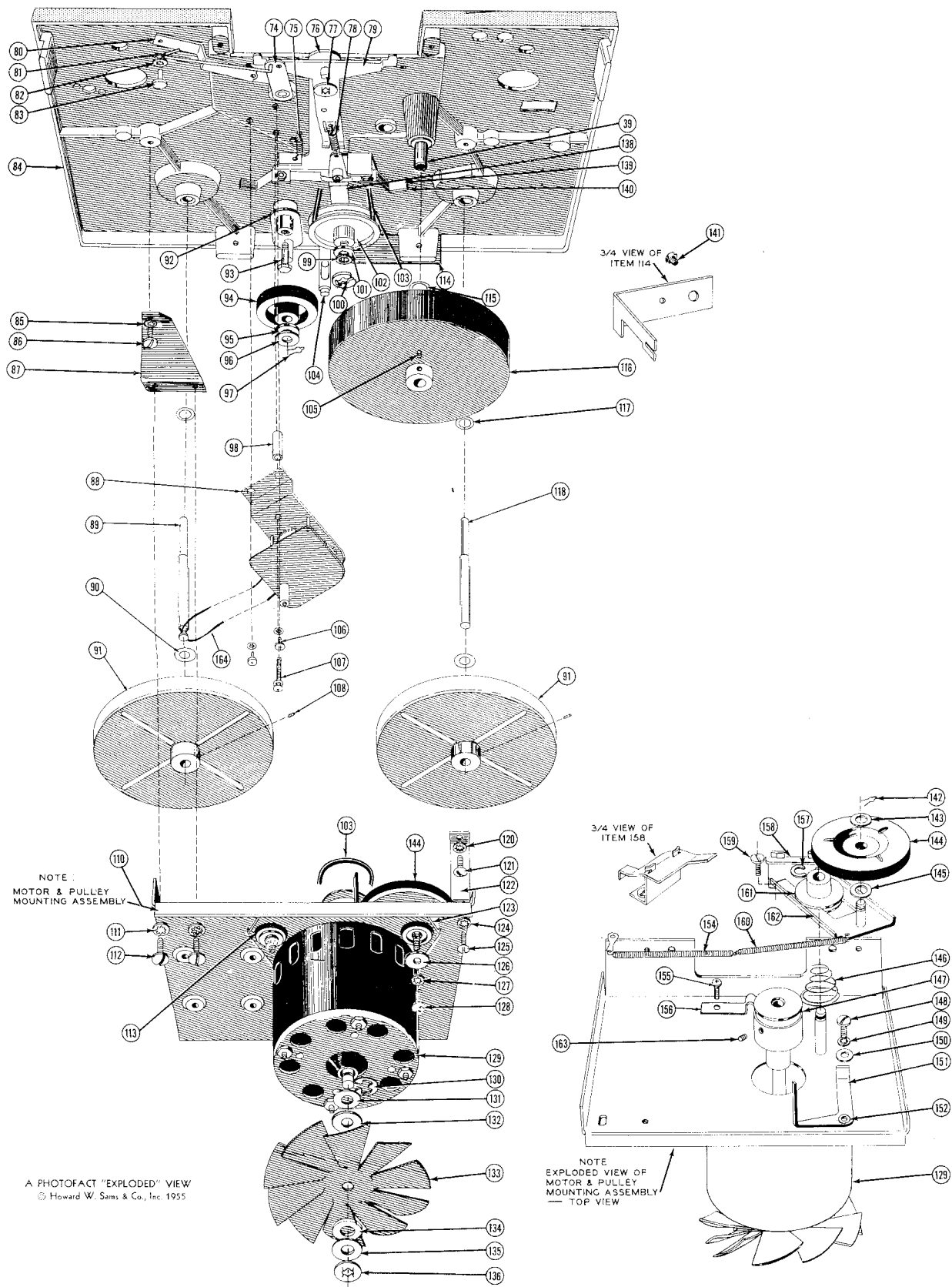
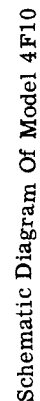
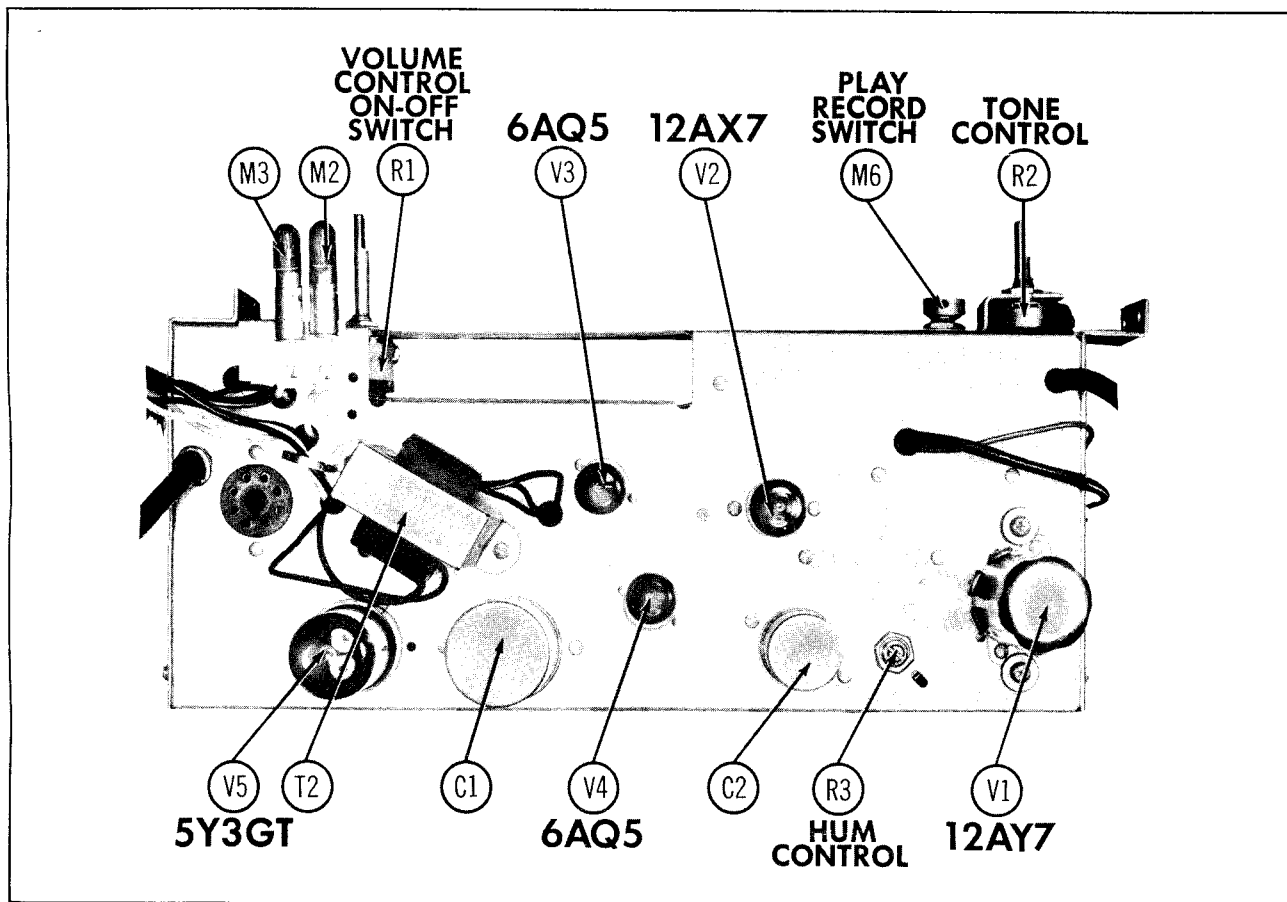
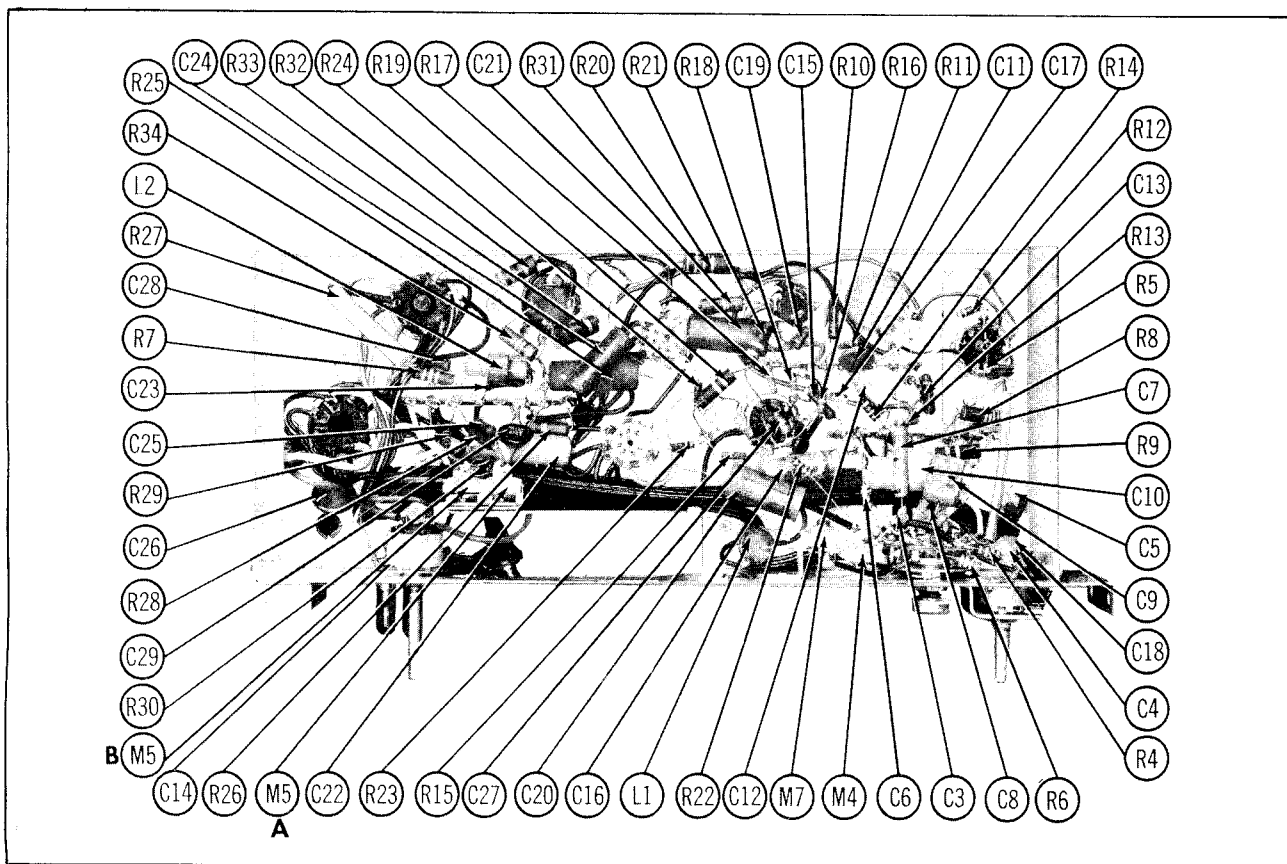


Figure 6B. Exploded View Of Parts Below Baseplate

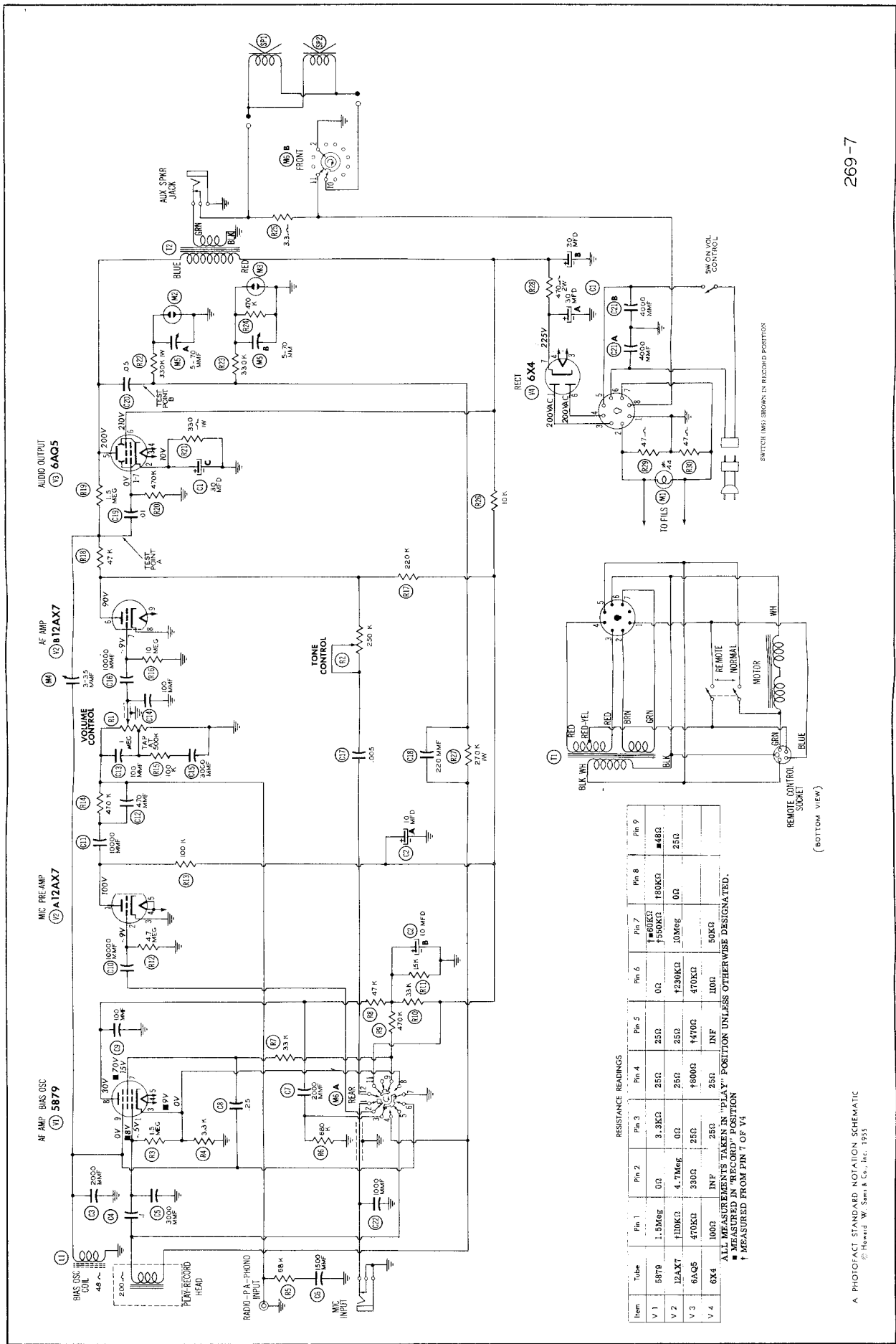




Top View Of Model 4F10 Amp. Chassis

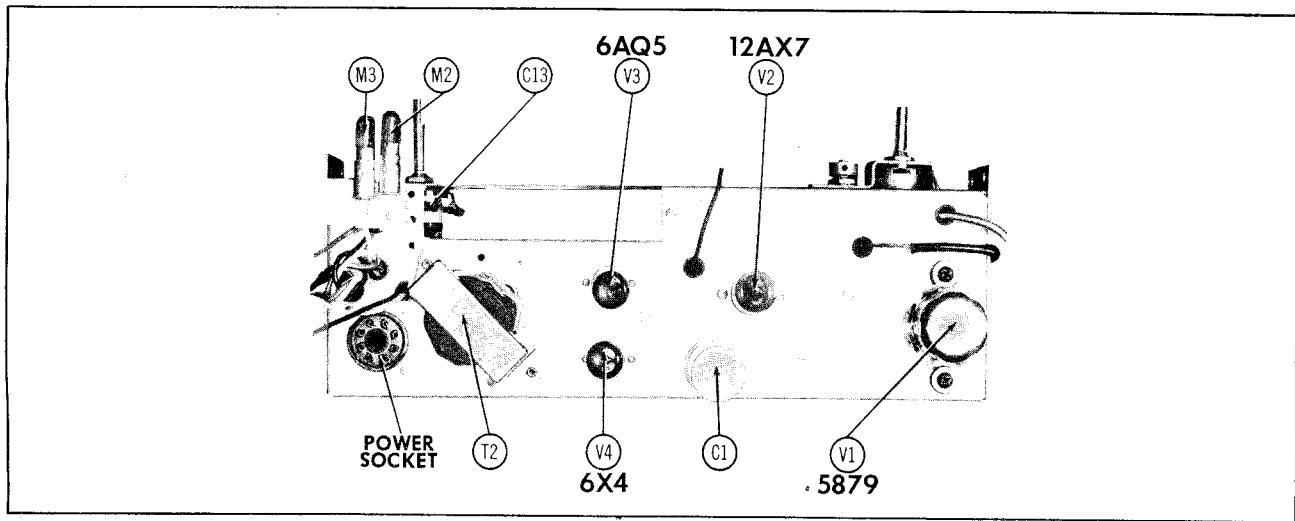


Bottom View Of Model 4F10 Amp. Chassis

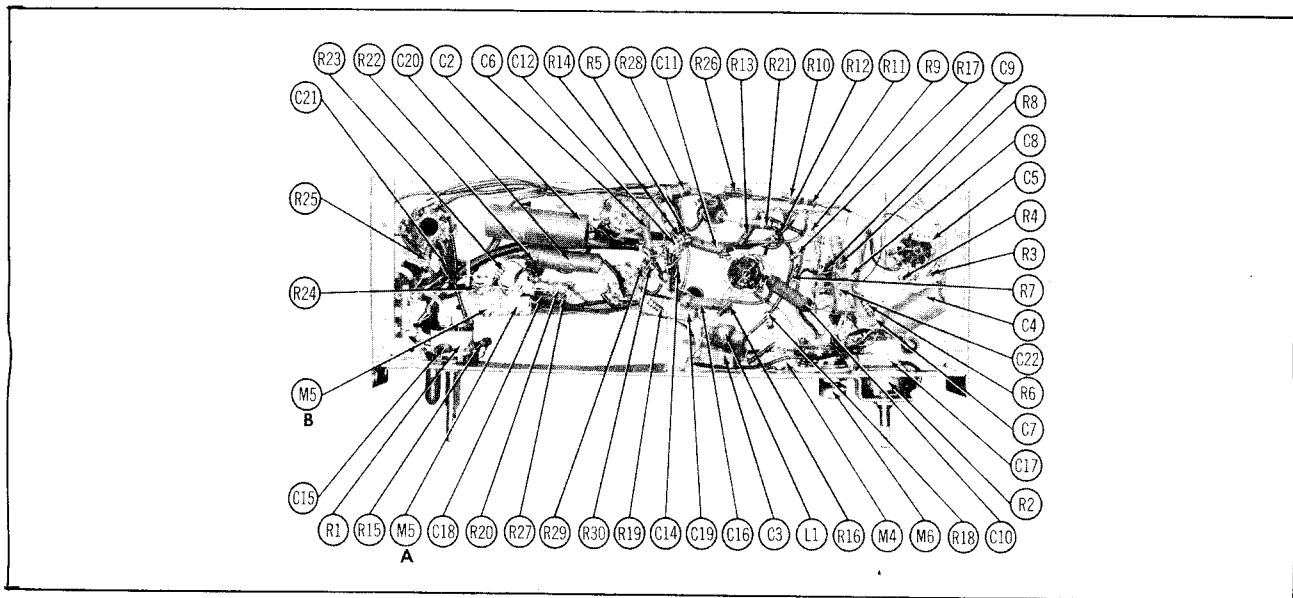


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Schematic Diagram Of Model 4B10



Top View Of Model 4B10 Amp. Chassis



Bottom View Of Model 4B10 Amp. Chassis

ELECTRICAL PARTS LIST
Model 4B10

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
V1	69-2222	5879AF Amp. -Bias Osc.	C5	C-4.109-31R	Cap. Ceramic 3000MMF
V2	69-2175	12AX7 Mic. , Pre-Amp. , AF Amp.	C6	C-4.109-13R	Cap. Ceramic 1500 MMF
V3	69-2171	6AQ5 Audio. Output	C7	D-3.100-2	Cap. Paper .002 Mfd. @ 600 volts
V4	69-2172	6X4 Rectifier	C8	D-3.100-30N	Cap. Paper .25 Mfd. @ 200 volts
C1A	B-5.437B	Elect. Cap. 30 Mfd. @ 250 volts	C9	C-4.109-10R	Cap. Ceramic 100 MMF
C1B		Elect. Cap. 30Mfd. @ 250 volts	C10	C-4.109-33R	Cap. Ceramic 10000MMF
C1C		Elect. Cap. 30 Mfd. @ 25 volts	C11	C-4.109-33	Cap. Ceramic 10000MMF
C2A	B-5.444	Elect. Cap. 10 Mfd. @ 200 volts	C12	C-4.109-29	Cap. Ceramic 470MMF
C2B		Elect. Cap. 10 Mfd. @ 200 volts	C13	C-4.109-10R	Cap. Ceramic 100 MMF
C3	D-4.105-56C	Cap. Mica 2000MMF	C14	C-4.109-10R	Cap. Ceramic 100 MMF
C4	D-3.100-22N	Cap. Paper .1 Mfd. @ 600 volts	C15	C-4.109-31	Cap. Ceramic 3000MMF
			C16	C-4.109-33R	Cap. Ceramic 10000MMF
			C17	D-3.100-4N	Cap. Paper .005 Mfd. @ 600 volts
			C18	C-4.109-27R	Cap. Ceramic 220 MMF
			C19	D-3.100-7N	Cap. Paper .01 Mfd. @ 400 volts

ELECTRICAL PARTS LIST-CON'T.

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
C20	D-3.100-19N	Cap. Paper .05 Mfd. (a) 400 volts	R20	D-7.101-128R	Resistor 470K 1/2 Watt
C21A	B-4.131	Cap. Disc. Dual 4000 MMF	R21	D-7.102-2R	Resistor 330Ω 1Watt
C21B	B-4.131	Cap. Disc. Dual 4000 MMF	R22	D-7.101-121R	Resistor 330K 1/2 Watt
C22	C-4.109-9R	Cap. Mica 1000MMF	R23	D-7.101-121R	Resistor 330K 1/2 Watt
R1	C-8.227-2G	Vol. Cont. & Switch 1 Meg.	R24	D-7.101-128R	Resistor 470 K 1/2 Watt
R2	C-8.231-1A	Tone Control 250K	R25	C-6.212-1B	Resistor 3.3Ω 1 Watt
R3	D7-101-148	Resistor 1.5Meg. 1/2 Watt	R26	D-7.101-58R	Resistor 10K 1/2 Watt
R4	D7-101-37	Resistor 3.3K 1/2 Watt	R27	D-7.102-126	Resistor 270K 1/2 Watt
R5	D7-101-93R	Resistor 68K 1/2 Watt	R28	D-7.103-72C	Resistor 470Ω 2 Watt
R6	D-7.101-134R	Resistor 680K 1/2 Watt	R29	D-7.101-250R	Resistor 47Ω 1/2 Watt
R7	D-7.101-79R	Resistor 33K 1/2 Watt	R30	D-7.101-250R	Resistor 47Ω 1/2 Watt
R8	53.2834	Resistor 47K 1/2 Watt	T1	C-35.804A	Power Trans. & Plug Assy.
R9	D-7.101-128R	Resistor 470K 1/2 Watt	T2	C-9.264E	Transformer, Output
R10	D-7.101-79R	Resistor 33K 1/2 Watt	SP1&SP2	D-30.341-2	8Ω PM Speaker
R11	D-7.101-65	Resistor 15K 1/2 Watt	L1	17-3137-A	Coil Bias Osc. Inc. C-3
R12	D-7-101-178R	Resistor 4.7 Meg. 1/2 Watt	M1	45-2003	Pilot Lamp #44
R13	D-7-101-100R	Resistor 100K 1/2 Watt	M2	45-2036-0	Neon Lamp NE51 Normal Indicator
R14	D-7-101-128R	Resistor 470K 1/2 Watt	M3	45-2036-0	Neon Lamp NE51 Overload Indicator
R15	D-7.101-100R	Resistor 100K 1/2 Watt	M4	B-4.144	Trimmer Bias Adj. (3-35 MMF)
R16	D-7.101-192R	Resistor 10Meg. 1/2 Watt	M5A	B-4.145	Trimmer Normal Ind. (5-70MMF)
R17	D-7-101-114R	Resistor 220K 1/2 Watt	M5B	B-4.145	Trimmer Overload Ind. (5.70MMF)
R18	D-7.101-86R	Resistor 47K 1/2 Watt	M6A	B-11.230F	Play Record Sw. (Viewed from Rear)
R19	D-7.101-148R	Resistor 1.5Meg. 1/2 Watt	M6B		Play Record Sw. (Viewed from Front)

ELECTRICAL PARTS LIST

Model 4F10

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
V1	69-2224	12AY7 Bias Osc. -Mic. Pre-Amp	C11	B-4.115-1	Cap. Disc. .005 Mfd.
V2	69-2175	12AX7AF Amp. -AF Amp- Phase Inv.	C12	C-4.109-2	Cap. Ceramic 470 MMF
V3	69-2171	6AQ5 Output	C13	C-4.109-9	Cap. Ceramic 1000MMF
V4	69-2171	6AQ5 Output	C14	C-4.109-10	Cap. Ceramic 100MMF
V5	69-2227	5Y3 Rectifier	C15	C-4.109-10	Cap. Ceramic 100MMF
C1A	C-5.421-7	Elect. 250 Mfd. (a) 450 volts	C16	D-3.100-18	Cap. Paper .05 Mfd. (a) 200 volts
C1B		Elect. 250 Mfd. (a) 450 volts	C17	C-4.109-10	Cap. Ceramic 100MMF
C1C		Elect. 250 Mfd. (a) 450 volts	C18	D-3.100-7	Cap. Paper .01 Mfd. (a) 400 volts
C1D		Elect. 20 Mfd. (a) 25 volts	C19	C-4.109-27	Cap. Ceramic 220 MMF
C2A	B-5.437	Elect. 30 Mfd. (a) 250 volts	C20	D-3.100-19	Cap. Paper .05 Mfd. (a) 400 volts
C2B		Elect. 30 Mfd. (a) 250 volts	C21	D-3.100-19	Cap. Paper .05 Mfd. (a) 400 volts
C3	C-4.109-9	Cap. Ceramic 1000MMF	C22	D-3.100-46	Cap. Paper .035 Mfd. (a) 600 volts
C4	C-4.109-13	Cap. Ceramic 1500 MMF	C23	D-4.104-88	Cap. Mica .001 Mfd. (a) 500 volts
C5	D-3.100-18	Cap. Paper .05 Mfd. (a) 200 volts	C24	D-3.100-58	Cap. Paper .015 Mfd. (a) 600 volts
C6	C-4.109-13	Cap. Ceramic 1500 MMF	C25	C-4.109-34	Cap. Ceramic 20 MMF (a) 500 volts
C7	C-4.109-33	Cap. Ceramic .01 Mfd. (a) 500 volts	C26A	B-4.131	Cap. Disc. Dual 4000 MMF
C8	C-4.109-2	Cap. Ceramic 470 MMF	C26B	B-4.131	Cap. Disc. Dual 4000 MMF
C9	C-4.109-33	Cap. Ceramic .01 Mfd. (a) 500 volts	C27	C-4.109-13	Cap. Ceramic 1500 MMF
C10	D-3.100-46	Cap. Paper .035 Mfd. (a) 600 volts			

ELECTRICAL PARTS LIST-CON'T.

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
C28	C-4.109-27	Cap. Ceramic 220 MMF	R27	C-6.215-10	Resistor 3.3 Ω @7 Watt
C29	B-4.129-7	Cap. Disc. 1500 MMF	R28	D-7.101-121	Resistor 330K@1/2 Watt
R1	C-8.227-2	Vol. Cont. & Switch 1Meg	R29	D-7.101-121	Resistor 330K@1/2 Watt
R2	C-8.231-1	Tone Cont. 250 K	R30	D-7.101-128	Resistor 470K@1/2 Watt
R3	C-8.207-7	Hum. Cont. 500 Ω	R31	D-7.102-72	Resistor 15K@1 Watt
R4	D-7.101-121	Resistor 330K@1/2 W.	R32	D-7.102-23	Resistor 1 K@1 Watt
R5		Resistor 1.5Meg. @1/2W.	R33	D-7.103-58	Resistor 220 Ω @2 Watt
R6	D-7.101-134	Resistor 680 K@1/2 W.	R34	D-7.103-23	Resistor 33 Ω @2 Watt
R7	D-7.102-126	Resistor 270K@1 Watt	T1	C-35.804A	Power Trans. & Plug Assy.
R8	D-7.102-80	Resistor 22K@1 Watt	T2	C-9.261C	Output Transformer
R9	D-7.102-112	Resistor 120K@1 Watt.	SP1	D-30.341-2	8 Ω PM Speaker
R10	D-7.101-58	Resistor 10K@1/2 Watt	SP2	D-30.341-2	8 Ω PM Speaker
R11	D-7.101-114	Resistor 220K@1/2 Watt	L1	B-1.557	Bias Osc. Coil
R12	D-7.101-178	Resistor 4.7 Meg. @1/2 Watt	L2	B-1.556	Tone Choke
R13	D-7.101-93	Resistor 68K@1/2 Watt	M1	45-2003	Pilot Lamp #44
R14	D-7.101-128	Resistor 470 K@1/2 Watt	M2	45-2036-0	Neon Lamp NE51 (Normal Ind.)
R15	D-7.101-178	Resistor 4.7 Meg. @1/2 Watt	M3	45-2036-0	Neon Lamp NE51 (Overload Ind.)
R16	D-7.101-114	Resistor 220K@1/2 Watt	M4	C-4.142A	Trimmer Bias Adj. (3-35 MMF)
R17	D-7.101-155	Resistor 2.2 Meg. @1/2 Watt	M5A	B-4.140	Trimmer Normal Ind. (5-70MMF)
R18	D-7.101-44	Resistor 4.7K@1/2 Watt	M5B		Trimmer Overload Ind. (5-70-MMF)
R19	D-7.102-112	Resistor 120K@1 Watt	M6A		Play-Record Sw. (Viewed from Rear)
R20	D-7.103-153	Resistor 39K@2 Watt	M6B		Play-Record Sw. (Viewed from Front)
R21	D-7.102-112	Resistor 120K@1 Watt	M7	C-4.142A	Trimmer, Bias Osc. Freq. Adj. (850-1150MMF)
R22	D-7.101-86	Resistor 47K@1/2 Watt			
R23	D-7.101-114	Resistor 220K@1/2 Watt			
R24	D-7.101-114	Resistor 220K@1/2 Watt			
R25	53-2825	Resistor 270 Ω @2 Watt			
R26	D-7.102-72	Resistor 15K@1 Watt			

MECHANICAL PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
1	C-13.253-5E	Speed Shift Knob, Blue (Model 4B10)	19	57-3678-1	#4-40x 5/16 Phillips OHMS
	C-13.253-4E	Speed Shift Knob, Gray (Model 4F10)	20	B-31.351	Reel Drive Spring (Belt)
2	57-2049-4	Screw, #6-32x1/4 BHMS	21	B-32.302	Timer Knob
3	73-2334-1	#6 Cantlink Washer	22	73-2231-3	#4 Internal Lockwasher
4	B-13.261-6G	Reel Pan For Feed Reel, Blue (Model 4B10)	23	57-2552-1	#6-32x 1 1/4 Phillips RHMS
	B-13.261-1	Reel Pan For Feed Reel, Gray (Model 4F10)	24	73-2334-1	#6 Cantlink Washer
5	B-28.163	Linen Washer	25	35-851	Timer Shaft and Pointer Assy.
6	D-13.292-2F	Rear Escutcheon, Silver	26	B-19.975-4B	Rear Escutcheon Plate, Blue (Model 4B10)
7	57-3445-1	#8-32x3/8 Phillips RHMS		B-19.975-3B	Rear Escutcheon Plate, Gray (Model 4F10)
8	C-13.254-8E	Tone Control Knob, Blue (Model 4B10)	27	B-32.308-1	Record Lock Button
	C-13.254-7E	Tone Control Knob, Gray (Model 4F10)	28	57-2109-2	#6-32x 3/16 BHMS Brz. Phillips
9	73-2254-3	Felt Washer	29	33.415	"E" Ring Retainer
10	E-13.293-3F	Front Escutcheon	30	54-2030-35	Drilled Rivet 1/4x.122x7/32
11	48-2213-1	Hex. Nut, 3/8-32x1/2	31	73-2231-5	#8 Int. Lockwasher
12	B-19.985-1A	Bracket for Input Jack	32	48-410-1	#6-32 Hex. Nut
13	B-33.453	Midget Jack	33	73-2234-3	#6 Ext. Lockwasher
14	54-2030-35	Drilled Rivet 1/4x.122x7/32	34	48-410-1	#6-32 Hex. Nut
15	B-33.370	Phono Jack	35	73-2234-3	#6 Ext. Lockwasher
16	73-2254-3	Felt Washer	36	B-19.876D	Push Button Lever
17	57-2552-2	Screw, 6-32x1 1/4 Phillips RHMS	37	B-33.446	Spacer
			38	D-35.807-7F	Base Plate Assy., Blue (Model 4B10)
18	B-13.262-6H	Reel Pan for Take-Up Reel, Blue (Model 4B10)		D-35.807-6F	Base Plate Assy., Gray (Model 4F10)
	B-13.262-1	Reel Pan for Take-Up Reel, Gray (Model 4F10)	39	B-32.259F	Capstan Shaft

MECHANICAL PARTS LIST- CON'T.

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
40	B-31.337B	Push Button Return Spring	105	57-3589-1	8-32x1/4 Bristol Head Set Screw
41	B-19.859-1F	Hinge Bracket for Push Buttons	106	57-2109-2	#6-32x3/16 Phillips BHMS
42	57-3445-1	#8-32x 3/8 RHMS	107	57-3679-1	#6-32x7/8 Phillips BHMS
43	B-19.870A	Locking Plate for Push Buttons	108	57-3589-1	#8-32x1/4 Bristol Hd. Set Screw
44	B-31.343A	Lock Plate Spring	109	B-35.755-6D	Push Button Assy., Blue (Model 4B10)
45	73-2231-4	#6 Int. Lockwasher		B-35.755-5D	Push Button Assy., Gray (Model 4F10)
46	57-3603-1	#6-32x 1/2 Phillips BHMS	110	D-35.753-1	Drive Mounting Plate Assembly
47	57-3439-0	#6-32x 3/16 Bristol Head Set Screw	111	73-2231-5	Internal Lockwasher
48	B-32.300D	Tape Guide Post (Left)	112	57-2102-3	#8-32x1/4 RHMS
49		6-32 Hex Nut	113	B-28-159	Shock Mount
50	B-32.260D	Tape Guide Post Spacer	114	B-19-840E	Steady Bracket
51	B-35.794	Erase Head Plate Assembly	115	B-23.163	Linen Washer
52	B-31.347B	Erase Head Tension Spring	116	C-13.257-1C	Flywheel
53	B-31.334A	Pressure Pad (Felt) 2 used	117	B-28.163	Linen Washer
54	57-428-1	#6-32x 3/8 RHMS	118	B-32.297B	Brake Drum Shaft
55	73-2233-1	Int. Lockwasher	119		Erase Head Forward Adjust-ment Screw
56	48-2216-1	#2-56x 3/16 Hex. Nut	120	73-2231-5	Internal Lockwasher
57	C-35.756A	Erase Head	121	57-2102-3	#8-32x1/4 RHMS
58	B-35.766C	Record Actuating Lever Assy.	122	B-19.862C	Angle Bracket for Mounting Drive Assy.
59	F-32.309	Tape Guide Post (Right)	123	C-19.837F	Motor Adapter Plate
60	C-36.156B	Tape Recording Head (Shure TR16H)	124	73-2231-5	#8 Int. Lockwasher
61	B-19.881C	Playback Actuating Lever	125	57-2102-3	#8-32x1/4 RHMS
62	73-2241-148F	Flat Washer	126	B-33.411A	Flat Washer
63	B-31.336D	Pinch Roller Tension Spring	127	73-2231-5	#8 Internal Lockwasher
64	B-35.758	Playback Slide Plate Assembly	128	48-409-1	8-32x5/16 Hex. Nut
65	B-35.764D	Pressure Pad Spring Assembly	129	D-36.153E	Motor, Round Type (Fasco)
66	B-33.412	Push-On-Stud Nut, 3/16" Stud		D-36.154G	Motor, Square Type (GI and Alliance)
67	B-19.368A	Record Slide Plate	130	B-33.418	Truearc Retaining "E" ring
68	B-33.409	Hairpin Clip	131	73-2241-143	Flat Washer
69	73-2241-118	Linen Washer	132	73-2254-3	Felt Washer
70	B-33.404E	Pinch Roller	133	C-19.887A	Fan Blade
71	B-19.858	Push Button Retainer Bracket	134	73-2254-3	Felt Washer
72	73-2340	Linen Washer	135	73-2241-143	Flat Washer
73	B-35.824A	Pinch Roller Plate Assy.	136	33.415	Push-On Fastener
74	110-48-B	Switch Lever Assy.	138	35.834	Idle Lever Assy.
75	B-31.338B	Brake Return Spring	139	97-3062	Brake Spring
76	C-35.835	Brake Slide Plate Assembly	140	B-31.335A	Brake Pad, Felt
77	B-33.412	Push-On-Stud Nut, 3/16 Stud	141	57.3683-1	8-32x1/4 Undercut Flat Head
78	B-31.339	Idle Lever Tension Spring	142	B-33.409	Hairpin Clip
79	B-35.759	Shift Plate Assembly	143	B-28.163	Linen Washer
80	B-35.774	Record Interlock Assembly	144	B-33.408C	Rubber Bonded Idle Wheel, 2 1/2" Dia.
81	B-31.333	Switch Arm Link	145	B-28.163	Linen Washer
82	73-2241-118	Flat Washer	146	B-31.327D	Idle Lift Compression Spring
83	54-2030-35	Drilled Rivet 1/4x.122x7/32 (Bottom View of Item 38)	147	B-32.288D	Motor Pulley
84			148	57-2102-3	#8-32x1/4 RHMS
85	73-2231-5	#8 Int. Lockwasher	149	73-2231-5	#8 Internal Lockwasher
86	57-2102-3	#8-32x1/4 RHMS	150	73-2241-143	Flat Washer
87	B-19.863	Drive Mounting Plate Bracket	151	110-47	Idle Throw-Out Lever
88	D-33.445	Gear Train for Tape Index	152	B-32.291	Shoulder Washer
89	B-32.301	Brake Drum Shaft (Grooved)	154	B-31.324A	Idle Spring(Tension)
90	B-28.163	Linen Washer	155	57-2109-2	#6-32x3/16 Phillips BHMS
91	C-35.823	Brake Drum & Bushing Assy.	156	B-19.961	Speed Control Shaft Detent Spring
92	B-35.757D	Sub. Idle Plate Assy.	157	B-33.407-1	"C" Washer
93	B-32.275-1E	#8-32 HH Shoulder Screw	158	51-3182	Shift Plate for High Speed
94	B-35.405E	Sub. Idle Wheel	159	57-2109-2	#6-32x3/16 Phillips BHMS
95	73-2254-6	Felt Washer	160	B-31.324A	Idle Spring (Tension)
96	73-2241-150	Flat Washer	161	B-32.264F	Idle Slide Bushing
97	B-33.409	Hairpin Clip	162	B-35.768A	Idle Slide Plate Assembly
98	B-33.118A	Spacer	163	57-3589-1	#8-32x1/4 Bristol Hd. Set Screw
99	73-2241-150	Flat Washer, Blued Steel			
100	B-33.418	Truearc Retaining "E" ring			
101	73-2254-6	Felt Washer			
102	B-33.406C	Idle Drive Sheave			
103	B-28.162	Idle Drive Belt			
104	C-35.816	Speed Control Shaft Assy.			