

PHOTOFACT[®] with

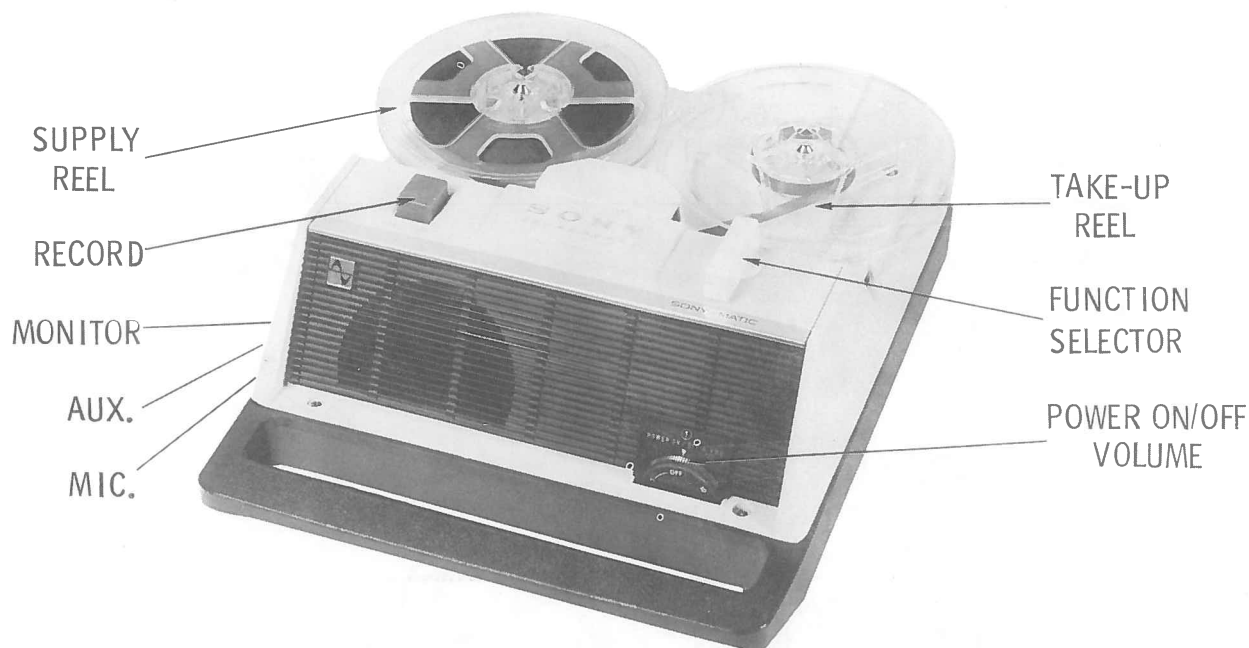
CIRCUITRACE[®]

TRADE NAME : Sony Model TC-135
SUPPLIER : For Current Address, See Annual Index
TYPE SET : 2-Speed, 2-Track Monaural Recorder
POWER SUPPLY : 110 - 120 Volts AC, 60 Cycles
RATING :
 .58 Amp. @ 117VAC (Play, with Motor)
 .57 Amp. @ 117VAC (Record, with Motor)

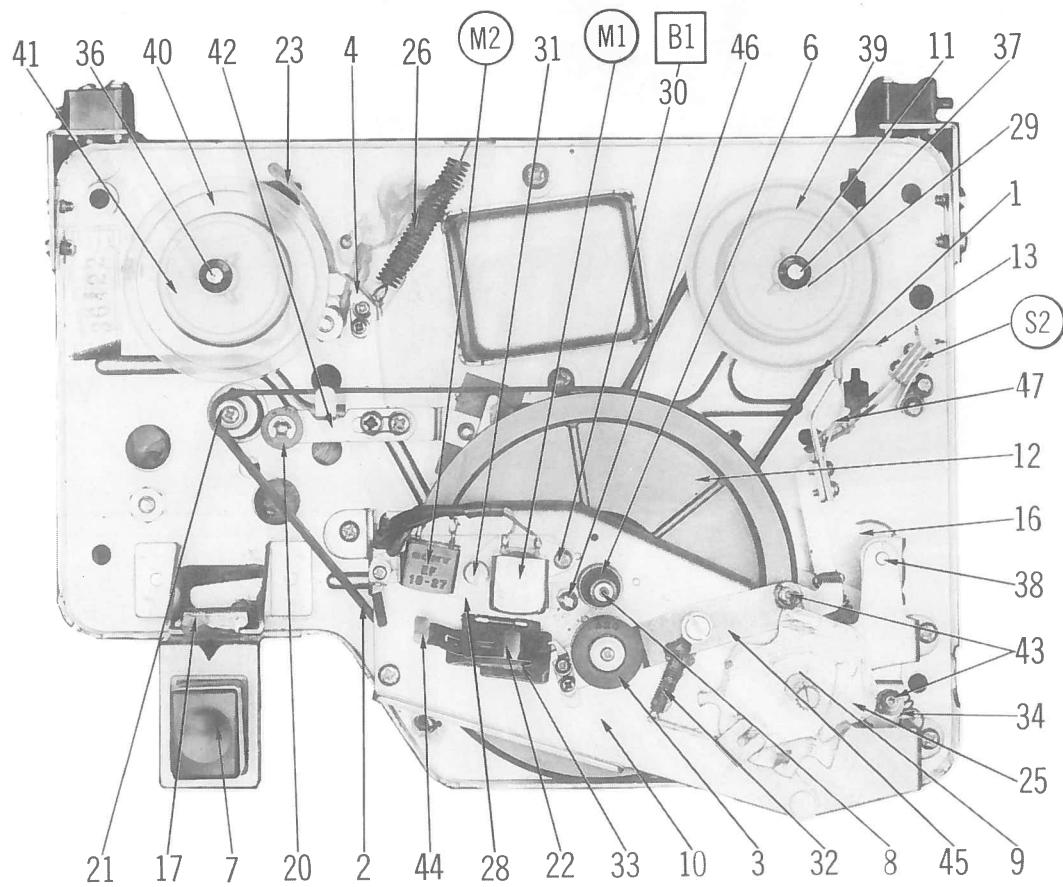
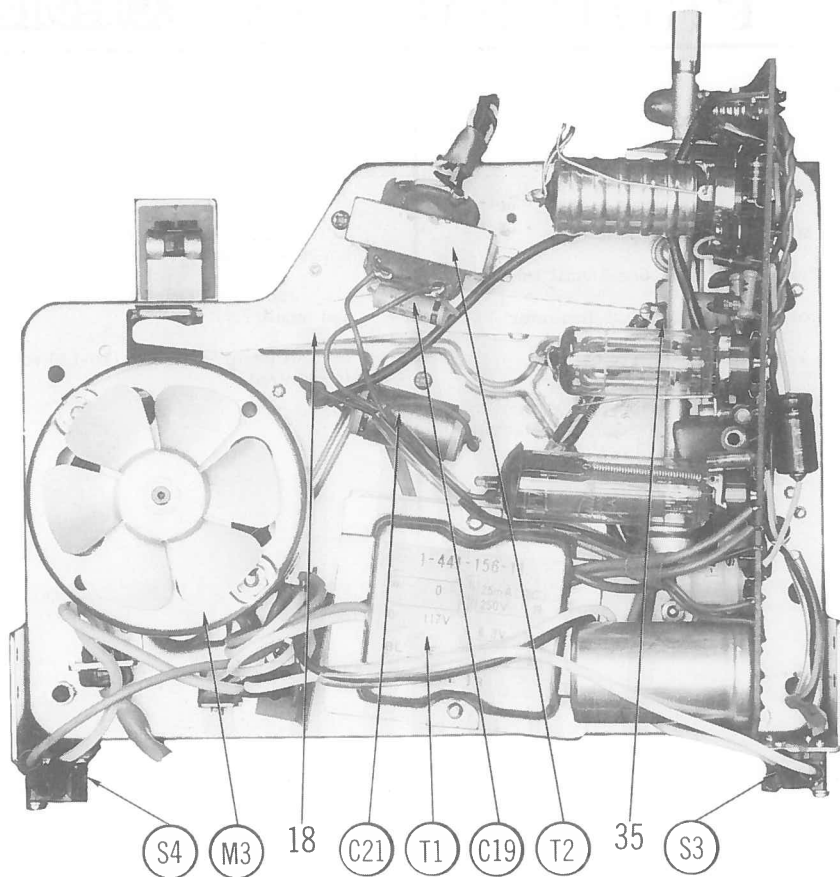
This unit is a two-track monaural recorder having two speeds: 1 7/8 and 3 3/4 ips.

Jacks are provided for low- and high-level inputs and monitor.

A power source of 110-120 volts AC, 60 cycles is required.



SONY MODEL TC-135



OPERATING INSTRUCTIONS

Play ► Pause ● Stop ■ Rewind ►►

Record

1. Select the speed by removing or replacing the capstan sleeve.
2. Thread the tape and connect a recording source.
3. Turn the unit on by rotating the Power On/Off and Volume control clockwise.
4. Press and hold the Record button while turning the Function Selector to the play position. The recording level is automatically maintained.
5. After recording the first track, turn the Func-

tion Selector to the stop position, reverse and invert the reels, thread the tape, and repeat step 4 to record the second track.

Play

1. Select the speed, thread the tape, and turn the unit on.
2. Turn the Function Selector to the play position and adjust the Volume control as desired.
3. After playing the second track, turn the Function Selector to the stop position, reverse and invert the reels, and repeat step 2 to play the second track.

DISASSEMBLY

1. Remove the Function Selector knob.
2. Remove four Phillips screws from the top of the case and remove top of case.
3. Remove two large Phillips screws from the front of the tape deck.
4. Remove two posts from the rear of the tape deck.
5. Lift out the deck and chassis.

SEQUENCE OF OPERATION

Play

Turning the Function Selector to the play position rotates Cam (25), causing Stepper Roller (43) on Rewind Lever Assembly (16) to move into a detent on Cam (25) and to allow Rewind Lever (16) to move. Rewind Lever (16), pivoted by Rewind Lever Spring (26), moves Tension Brake (4) from Supply Reel Table Assembly (40).

The rotation of Cam (25) also causes Stepper Roller (43) on Pinch Lever (45) to move into a detent on Cam (25), allowing Pinch Lever Assembly (45) to be pivoted by Pinch Lever Spring (34). Pinch Lever Assembly (45) moves Brake Felt (13) from Take-up Reel Table (39), allowing the motor, through Motor Pulley (21), Drive Belt (2), Flywheel (12), Take-up Drive Belt (1), and Take-up Reel Drum (11), to rotate Take-up Reel Table Assembly (39). Pinch Lever Assembly (45) also moves Pinch Roller (3) against Capstan (8) on Flywheel (12). Head Shielding Plate (22), released by Pad Shifter (48), on Pinch Lever (45), presses Head Pads (44) against the heads. Pinch Lever (45) also releases the muting switch.

Record

The Record sequence is the same as "Play" except the Record button is depressed, pushing Record Lever Assembly (17) against Recording Lock Lever (18). Recording Lock Lever (18) pulls Record Switch Spring (35) to move Record Switch (S1). A projection on Record Lever Assembly (17) moves into the interior

of Recording Cam (9) to be held when the Function Selector is moved to the play position.

Pause

Moving the Function Selector to the pause position reverses the action of "Play" except Cam (25) prevents Brake Felt (13) from contacting Take-up Reel Table (39) by failing to move Pinch Lever Assembly (45) to its full travel.

Fast Forward

The Fast Forward sequence is the same as "Pause" except the detent in Cam (25) allows Rewind Lever Assembly (16) to move Brake Shoe (23) away from Supply Reel Table Assembly (40).

Rewind

Rotating Cam (25) to Rewind causes Pinch Lever (45), pivoted by Pinch Lever Spring (34), to move Brake Shoe (13) from Take-up Reel Table (39). Stepper Roller (43) on Rewind Lever (16), moving into a deep detent on Cam (25), causes Rewind Lever (16), pulled by Rewind Lever Spring (26), to push Drive Belt (2) against Supply Reel Table (40).

STOP

Turning the Function Selector to the stop position from any function reverses the action of that function.

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, Record, or Fast Forward.	<ol style="list-style-type: none"> 1. Take-up Belt (1) dirty or worn. 2. Take-up Reel Spindle Drum (11) dirty or worn. 3. Take-up Reel Table (39) dirty or worn.
Supply reel does not revolve in Rewind.	<ol style="list-style-type: none"> 1. Drive Belt (2) dirty or worn. 2. Supply Reel Table (40) dirty.
Take-up reel spills tape in Rewind.	<ol style="list-style-type: none"> 1. Take-up Belt (1) broken.
Reels do not stop immediately when Stop button is pressed.	<ol style="list-style-type: none"> 1. Brake Felts (13, 23) dirty or worn. 2. Reel Tables (39, 40) dirty.
Capstan does not rotate in Play or Record.	<ol style="list-style-type: none"> 1. Defective motor. 2. Defective Capstan Bearing (6). 3. Drive Belt (2) dirty, worn or broken.
Tape rides up and down between capstan and pressure roller.	<ol style="list-style-type: none"> 1. Pinch Roller (3) dirty or worn.
Wow or Flutter.	<ol style="list-style-type: none"> 1. Drive Belt (2) dirty or worn.
Sound is weak or distorted.	<ol style="list-style-type: none"> 1. Record/Play Head (M1) azimuth out of adjustment (B1). 2. Record/Play Head (M1) defective. 3. Record on Playback circuit defective. 4. Head Pads (44) worn or missing.

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 3 3/4 ips with an audio VTVM having a flat response to 100KC.
2. All torque measurements are made at a tape speed of 3 3/4 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 1/4 ounce.
Fast Forward Take-up Torque	No adjustment provided. Nominal value 1/4 ounce.
Rewind Torque	No adjustment provided. Nominal value 2 ounces.
Supply Reel Drag	No adjustment provided. Dependent on reel weight.
Take-up Reel Drag	No adjustment provided. Dependent on reel weight.
Pressure Roller Pressure	No adjustment provided. Nominal value 3 1/2 pounds.
Brake Shoe Pressure	No adjustment provided. Nominal value 7 ounces, measured at point of contact in Stop.
Pause Brake Shoe Pressure	No adjustment provided. Nominal value 7 ounces, measured at point of contact.

ADJUSTMENTS (Continued)

ADJUST	REMARKS
Pressure Pad Pressure	No adjustment provided. Nominal value 3 ounces, measured at point of contact.
Erase Head Height	No adjustment provided.
Erase Head Azimuth	No adjustment provided.
Record/ Play Head Height	No adjustment provided.
Record/ Play Head Azimuth	Play an azimuth test tape and monitor the appropriate output. Adjust B1 for maximum output voltage.
Erase Current	No adjustment provided. Nominal current 110ma (48V rms) in each section of the erase head.
Record Bias	No adjustment provided. Nominal bias 31V rms (.34ma) across each section of the record head.
Bias Oscillator	No adjustment provided. Nominal frequency is 33KC.

CLEANING

LUBRICATING

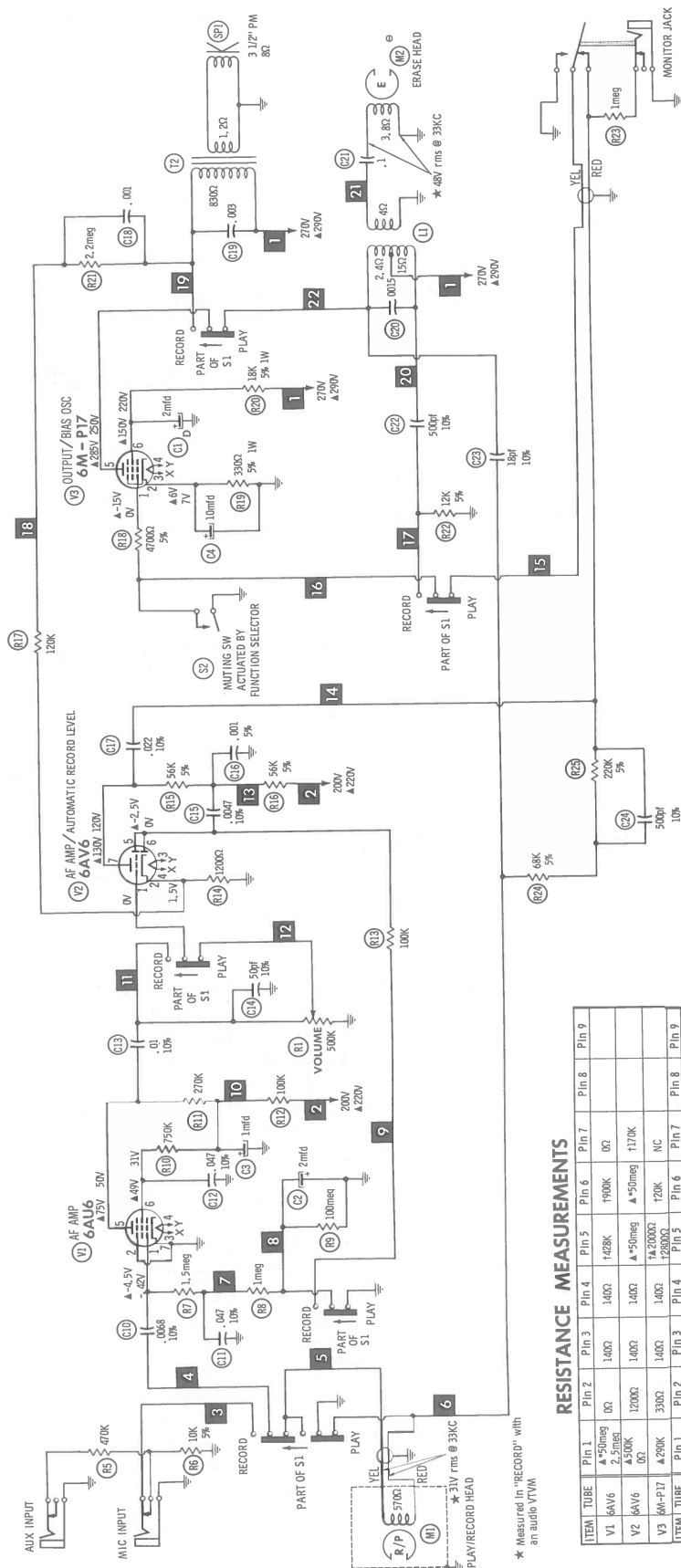
HEAD DEMAGNETIZING

Refer to "General Servicing Information" on page 4.

MECHANICAL PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
*1	*3-401-049-00	* Take-up Belt	23	3-401-124-00	Brake Shoe
2	3-401-050-03	Drive Belt	24	3-420-075-01	Nylon Flywheel Spacer
3	3-401-161-00	Pinch Roller	25	X-34200-06-0	Cam (With Shaft)
4	3-420-033-01	Tension Brake	26	3-420-040-01	Rewind Lever Spring
5	3-401-034-00	Brake	27	3-401-120-00	Stepper Spring
6	3-401-018-00	Capstan Bearing	28	3-420-012-01	Head Mounting Shift
7	3-420-049-02	Recording Button	29	3-420-065-01	Fiber Washer
8	X-34080-16-2	Capstan Assembly	30	3-418-191-00	Head Adjusting Screw
9	3-420-044-02	Recording Cam	31	3-005-001-70	Head Adjusting Spring
10	X-34200-18-0	Head Deck	32	3-401-120-00	Stepper Spring
11	X-34200-10-0	Take-up Reel Spindle Drum	33	3-417-017-00	Head Pad Shifter
12	X-34080-15-1	Flywheel Assembly	34	3-420-039-01	Pinch Lever Spring
13	3-401-012-00	Brake Felt	35	3-420-042-01	Record Switch Spring
14	3-420-067-01	Supply Reel Felt	36	3-420-017-01	Supply Reel Spindle
15	3-420-007-01	Brake Lever Holder	37	3-420-018-01	Take-up Reel Spindle
16	X-34200-04-0	Rewind Lever Assembly	38	3-420-020-01	Rewind Lever Shaft
17	X-34200-08-0	Record Lever Assembly	39	X-34010-22-2	Take-up Reel Table Assembly
18	3-420-010-01	Recording Lock Lever	40	X-34010-12-2	Supply Reel Table Assembly
19	3-401-017-00	Bearing Holding Plate	41	3-401-139-01	Supply Reel Carrier
20	3-401-039-02	Rewind Pulley	42	X-34200-05-0	Stepper Arm Assembly
21	3-420-028-00	Motor Pulley	43	3-401-019-00	Stepper Roller
	3-420-028-01	Motor Pulley (50 Cycles)	44	0-007-259-00	Head Pad
	3-420-028-05	Motor Pulley (50 Cycles)	45	X-34200-02-0	Pinch Lever Assembly
	3-420-028-10	Motor Pulley (60 Cycles)	46	3-420-023-01	Tape Guide
	3-420-028-14	Motor Pulley (60 Cycles)	47	3-420-007-01	Brake Holder
22	X-34200-07-0	Head Shielding Plate Ass'y.	48	3-401-017	Pad Shifter

* Take-up Belt —
WALSCO Part No. 1410-62

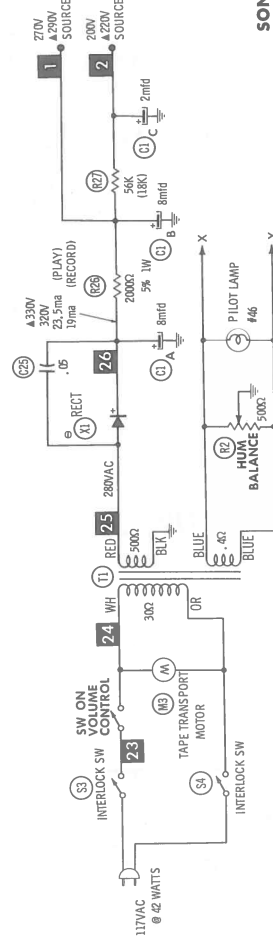


RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6AV6	1	2	3	4	5	6	7	8	9
V2	6AV6	1	2	3	4	5	6	7	8	9
V3	6M-P17	1	2	3	4	5	6	7	8	9

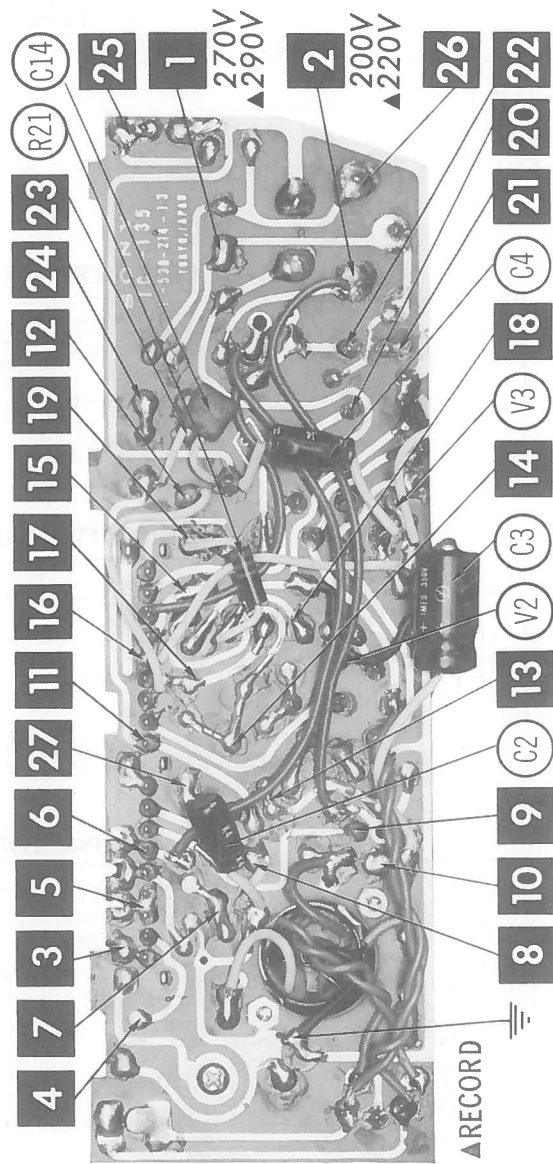
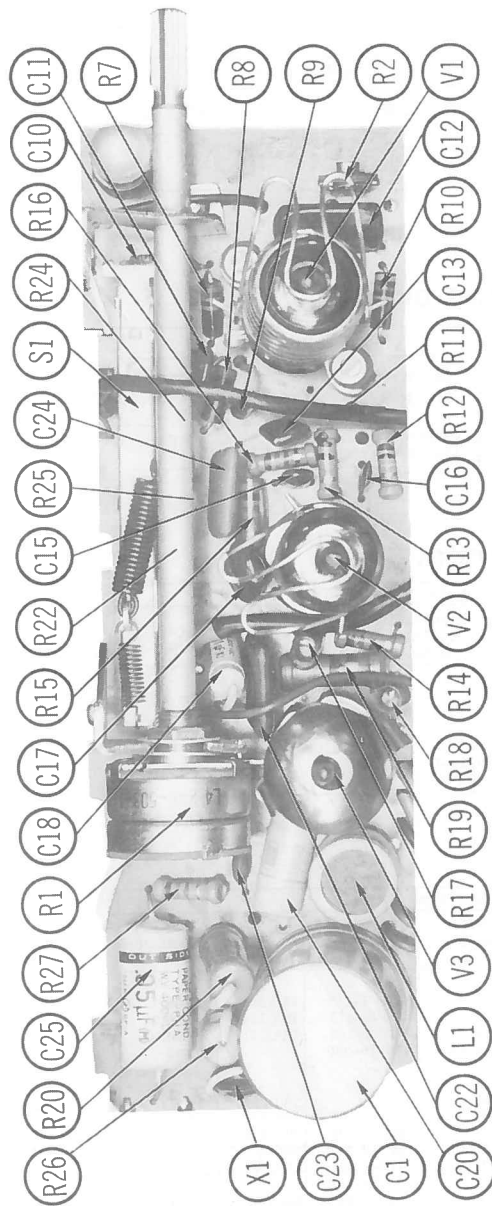
1 MEASURED FROM OUTPUT OF X1 ▲ MEASURED IN "RECORD" * DEPENDS ON CONDITION OF ELECTROLYTIC C2

- See parts list.
- Switches viewed from knob or actuator end unless otherwise indicated.
- Resistors are 1/2 watt or less and rated 10% or 20% unless otherwise indicated.
- Voltage and resistance readings taken with a VTVM.
- Supply voltage maintained at rated value for voltage measurements.
- All controls set for normal operation, as shown on panel.
- Measurements taken from bottom unless otherwise indicated.
- Numbers assigned to terminals may not be found on the unit.



A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUIACE
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SONY MODEL TC-135



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

SONY MODEL TC-135

PARTS LIST AND DESCRIPTION

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

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in 12 Colors 8524 (Stranded) Available in 12 Colors
Power Cord	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)

TUBES

♦ AMPEREX ♦			♦ GENERAL ELECTRIC ♦			♦ RCA ♦			♦ SYLVANIA ♦		
ITEM No.	USE		TYPE			ITEM No.	USE		TYPE		
V1	AF Amp.		6AU6			V3	Output - Bias Oscillator		6M-P17		
V2	AF Amp. -Automatic Record Level		6AV6								

POWER RECTIFIERS & SIGNAL DIODES

ITEM No.	MEASURED CURRENT	ORIGINAL Part or Type No.	RECTIFIERS & DIODES		RECTIFIERS		
			GENERAL ELECTRIC PART No.	INTERNATIONAL RECTIFIER PART No.	MALLORY PART No.	RCA PART No.	SARKES TARZIAN PART No.
X1		8-719-205-10 (5G-J)	GE-504A	8D4 or 5A4-D	1N540 or 1N2070	SK-3016 or SK-3017A	40C or F-4

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA					
	CAP.	VOLT.	SONY PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	GENERAL ELECTRIC PART No.	MALLORY PART No.	SPRAGUE PART No.
C1A	8	350	1-125-044-11					
B	8	350						
C	2	350						
D	2	350						
C2	2	15	1-121-210-11	BCD15002	NLW2-50	MT1-1	MTV2CB50	TL-1149
C3	1	350	1-119-060-00	PRS1700	BRI-450	QT1-1	TT350X2	TVA-1700
C4	10	15	1-119-091-00	CRE457A	NLW10-15	MT1-5	TT15X10	TL-1155

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.
C10	.0068 50V 10%	#1-105-671-11						
C11	.047 50V 10%		DBE2S47		DMF2S47	4DP-3-473	PVC2147	4PS-S47
C12	.047 200V 10%		DBE2S47		DMF2S47	4DP-3-473	PVC2147	2PS-S47
C13	.01 200V 10%		DBE4S1	CPR-10000J	DMF2S1	4DP-1-103	PVC211	2TM-S10
C14	50 500V 10%		ADM-15-500		CD100E500J500	DM-15-500		MS-45
C15	.0047 200V 10%	#1-105-749-12						
C16	.001 200V 5%	#1-105-901-12						
C17	.022 200V 10%		DBE2S22		DMF2S22		PVC2122	2PS-S22
C18	.001 6000V		DBE6D1	CPR-1000J	DMF6D1	6DP-1-102	PVC621	6PS-D12
C19	.003 600V		DBE6D3			6DP-1-302	PVC623	6PS-D30
C20	.0015 600V		ADM-20-152	CPR-1500J	CD19F152J500	DM-19-152	SX215	MS-215
C21	.1 400V		DBE4P1		DMF4P1	4DP-3-104	PVC601	4PS-P10
C22	500 500V 10%		ADM-15-501			DM-16-501		MS-351
C23	18 500V 10%		ADM-15-180		CD15C180J500	DM-15-180	SX418	MS-418
C24	500 500V 10%		ADM-15-501			DM-16-501		MS-351
C25	.05 400V		DBE4S47		DMF4S47	4DP-3-473	PVC4147	4PS-S47

Sony Part Number.

CONTROLS

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

ITEM No.	USE	RESIST-ANCE	REPLACEMENT DATA				
			SONY PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.
R1	Volume & Switch	500K	1-221-503-11	F2-500K ①, SU500, KR-1	A47-500K-Z ①, KSS-5, SWE-12	B13-133, AQ5 ①, 76-1, or (BU1 ①, CF25, SS12, GC)*	U48 ①, DS36, US26
R2	Hum Balance	500Ω	1-221-463-11	T-500		X201R501B	MTC52L1

* "SNAPTROL"

① Enlarge Mounting Hole.

PARTS LIST AND DESCRIPTION (CONTINUED)

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

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				
		SONY PART No.	MEISSNER Part No.	MERIT PART No.	MILLER PART No.	WORKMAN PART No.
L1	Bias Oscillator	1-433-048-11				

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA					NOTES
	PRI.	SEC. 1	SEC. 2	SONY PART No.	MERIT PART No.	STANCOR PART No.	THORDARSON PART No.	TRIAD PART No.	
T1	117VAC @ .58A	280VAC @ .023A DC	6.3VAC @ 1.25A	1-441-156-11					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	SONY PART No.	MERIT PART No.	STANCOR PART No.	THORDARSON PART No.	TRIAD PART No.	
T2	8000Ω	8Ω	1-427-081-11	A-2900 ①	A-3856 ①	24S04 ①	S-52X ①	① Drill New Mounting Holes

SPEAKER

ITEM No.	TYPE	REPLACEMENT DATA			NOTES
		SONY PART No.	JENSEN PART No.	QUAM PART No.	
SP1	3 1/2" PM 8Ω	1-502-135-12	TP-35V		

TAPE HEADS

ITEM NO.	MEASURED			SONY PART NO.	NORTRONICS PART NO.	DESCRIPTION
	INDUCTANCE	BIAS/ERASE VOLTS (RMS)	BIAS FREQ.			
M1	880mh	31V rms	33KC	3-820-827-00 (PP18-27)	3000 ①	2-Track Monaural Record/Play
M2	1.75mh	48V rms	33KC	8-826-627-01 (EF18-27H)	3600 & QK-19 ②	2-Track Monaural Erase

① Mount Head inside original head case.

② Add .001mfd capacitor in series with erase head to raise voltage to 64V rms.

MISCELLANEOUS

ITEM No.	PART NAME	SONY PART No.	NOTES
M3	Motor	8-833-322-03	Tape Transport
S1	Switch	1-513-231-14	Record/Play
S2	Switch	1-514-052-00	Muting
S3	Switch	1-514-059-00	Interlock
S4	Switch	1-514-059-00	Interlock
	Printed Circuit Board	1-538-214-13	

CABINETS & CABINET PARTS

(When Ordering Specify Model, Chassis & Color)

ITEM	PART No.	ITEM	PART No.
Cabinet Bottom Assembly, Red	X-34200-11-2	Cabinet Cover Assembly	X-34200-13-0
Cabinet Bottom Assembly, Gray	X-34200-11-3	Knob, Function Selector	3-420-054-02
Cabinet Top Assembly, Red	X-34200-12-8	Knob, Volume	3-420-053-01
Cabinet Top Assembly, Gray	X-34200-12-9		