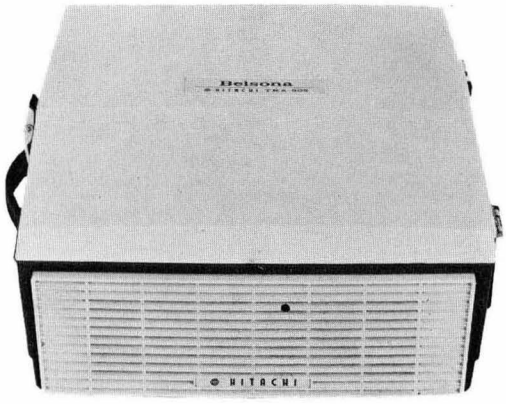
MODEL TRA-505

High Fidelity 4-Track, 2-Channel Tape Recorder

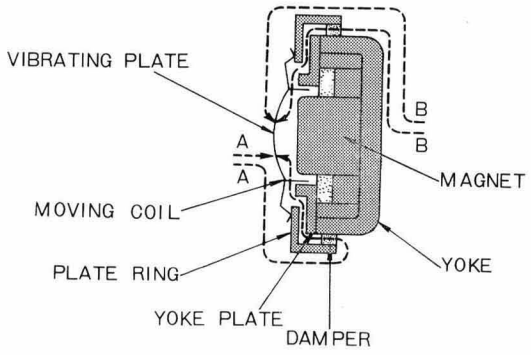


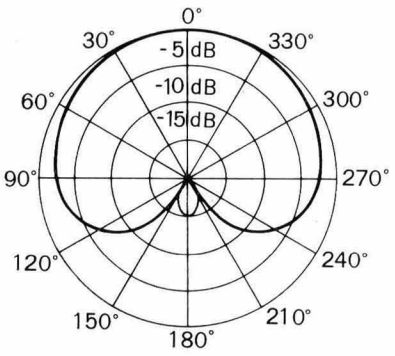
ACCESSORIES

Microphone
Power Source Cord and Extension Cord
5″ Reel and Recording Tape
Earphone
Head Brush and Polishing Cloth
Splicing Tape

SPECIFICATIONS

Vacuum Tubes	12AX7A×2, 6BM8×1
Diodes	1S 314×2 1N 34A×4
Tape Speed	1⅞ and 3¾″/sec.
Tape Reel	3″ or 5″ reed
Recording Time	3 hours at 3¾″/sec. 6 hours at 1⅞″/sec. (in case of this HITACHI LONG PLAY TAPE 5″ reel (35μ tape) is used in monaural recording)
Recording System	AC bias
Erasing System	AC erasing
Track Mechanism	4-track, monaural, stereophonic system
Power Source	AC 110/120/220/240 volts, 50 or 60 cps. (either is specified to your set)
Power Consumption	Approx. 55 W
Speaker	6½″×3¼″, oval type P.M. speaker
Output	1 W
Frequency Response	100~8,500 cps at 3¾″/sec. 100~5,000 cps at 1⅞″sec.
Input Impedance	Microphone 600kΩ Radio 470kΩ
Output Impedance	LINE OUT 100kΩ EXT. SP 8Ω
Fast for Warding Time	Less than 4 minutes (5″ reel used)
Rewinding Time	Less than 3 minutes (5″ reel used)
Microphone	Unidirectional dynamic microphone
Dimensions	Width 11″ (28cm)×Height 5½″ (14cm)×Depth 11¼″ (28.5cm)
Weight	Approx. 12lbs. (5.5kg)





FEATURES

■ **4-Track Recording** Each track records separately, allowing great variety and imagination in recording.

1-1 Monaural recording of 4-track tape can continue up to a maximum of six hours.

1-2 Since its recording-reproducing head is a 4-track stereo type, while recording on one channel, you can reproduce with another channel.

1-3 Connect an external amplifier and reproduce tape which has been stereo recorded.

1-4 Radio and microphone outputs can be recorded together.

■ **Hitachi's unique one-hand control** All operations ——recording, reproducing, erasing, rewinding, pause, stopping——are easily operated single handed.

■ **Tape counter** Each revolution of the tape reel is counted, so that the recorded position on tape can be identified at a glance.

■ **Natural voice reproduction** The highly efficient and unidirectional microphone eliminates all extraneous sounds other than those desired for recording. The speaker incorporates a newly-designed powerful magnet and elliptical diaphragm, reproducing beautiful symphonic tone. A tone control regulates the tone to your preference.

■ **A highly sensitive sound level meter indicates the proper recording condition at a glance.**

■ **A one-touch power switch makes handling extremely convenient.**

■ **Slim and trim, it's easy to carry.** The cover can be closed with 5 inches tape reel mounted. Accessories (microphone, power cord, etc.) can be stored in the bottom of the case.

UNIDIRECTIONAL MICROPHONE

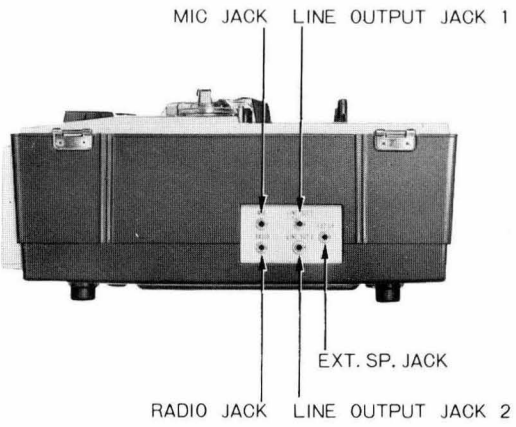
Unidirectional Microphone The unidirectional microphone is extremely sensitive to sounds in front of it only and non-sensitive to extraneous noise in surrounding areas. Beautiful recording with no noise or disturbances is thus possible.

Principle and Structure The microphone receives sound waves on its vibrating plate, and converts this mechanical vibration into electrical signals. The unidirectional microphone is so designed to have a special sensitivity to frontal sounds exclusive of other sounds striking the vibrating plate.

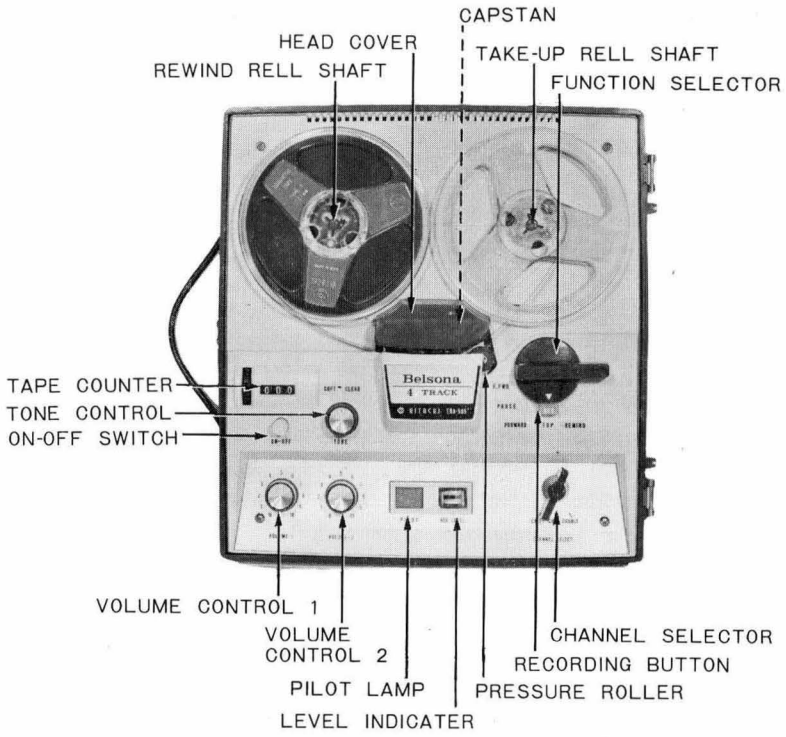
Construction of this microphone is shown in Fig. 12. Let's call frontal sound A. A' and back sound B. B'. Now, A will strike the vibrating plate directly, but A' is a component which will strike the vibrating plate after traveling around the plate ring, as much as longer distance. Phase shift of A, due to this difference in traveled distance is further increased by acoustical impedance of the damper and other factors and at the same time, sound pressure itself is lowered by the damper. Therefore, the effect of A' on A is negligible.

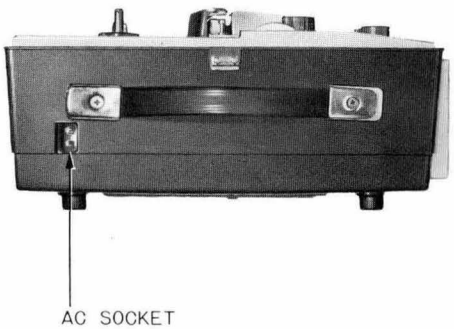
On the other hand, back sound B' will strike the vibrating plate from inside of the plate ring after passing through the damper; B will strike the front face of the vibrating plate after traveling around the plate ring. In this case, phases of B and B' at the vibrating plate are in-phase, and vibrations on the vibrating plate cancel each other. In this manner, the acoustical circuit of this microphone is constructed to be almost free from back sound interference.

Its unique characteristics are as shown in Fig. 13. The ratio of fore and back sound is 14~20 dB (5~10 times) showing a great difference in sensitivity.


MIC JACK
LINE OUTPUT JACK 1
EXT. SP. JACK
RADIO JACK
LINE OUTPUT JACK 2

CONTROLS

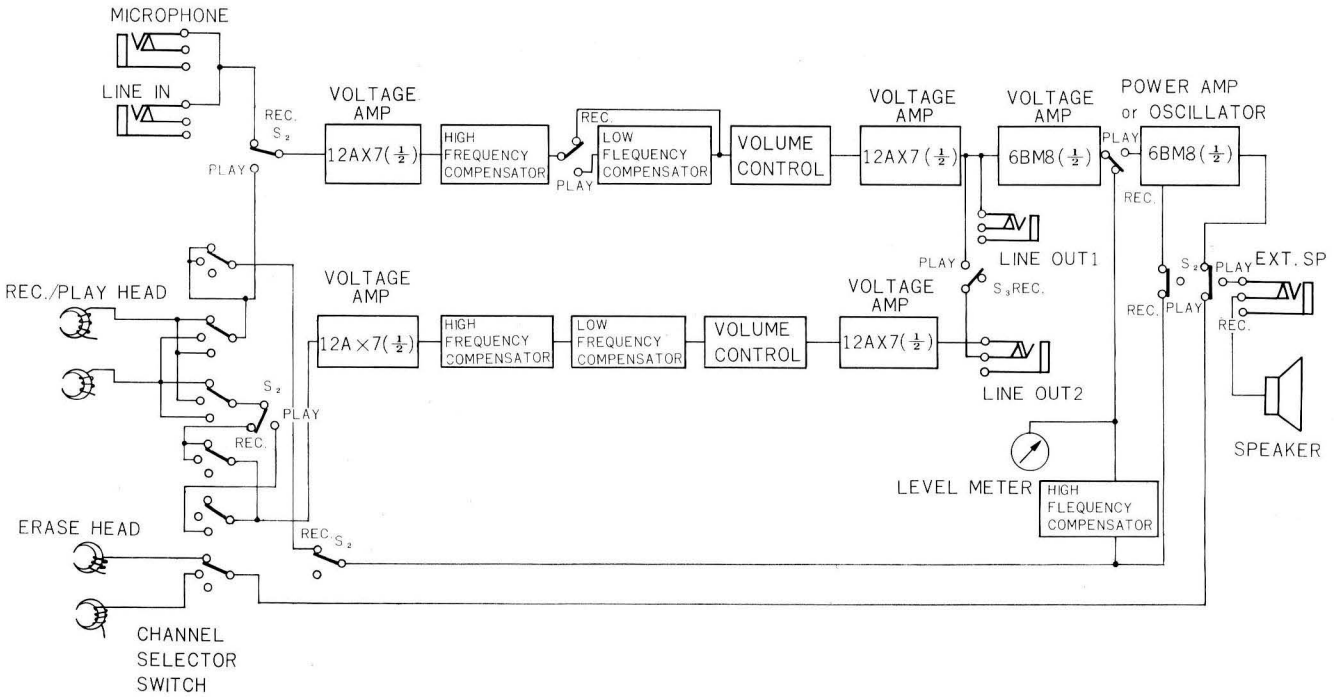

CAPSTAN
HEAD COVER
REWIND RELL SHAFT
TAKE-UP RELL SHAFT
FUNCTION SELECTOR
TAPE COUNTER
TONE CONTROL
ON-OFF SWITCH
Belsona
4 TRACK
VOLUME CONTROL 1
VOLUME CONTROL 2
PILOT LAMP
LEVEL INDICATER
CHANNEL SELECTOR
RECORDING BUTTON
PRESSURE ROLLER


AC SOCKET

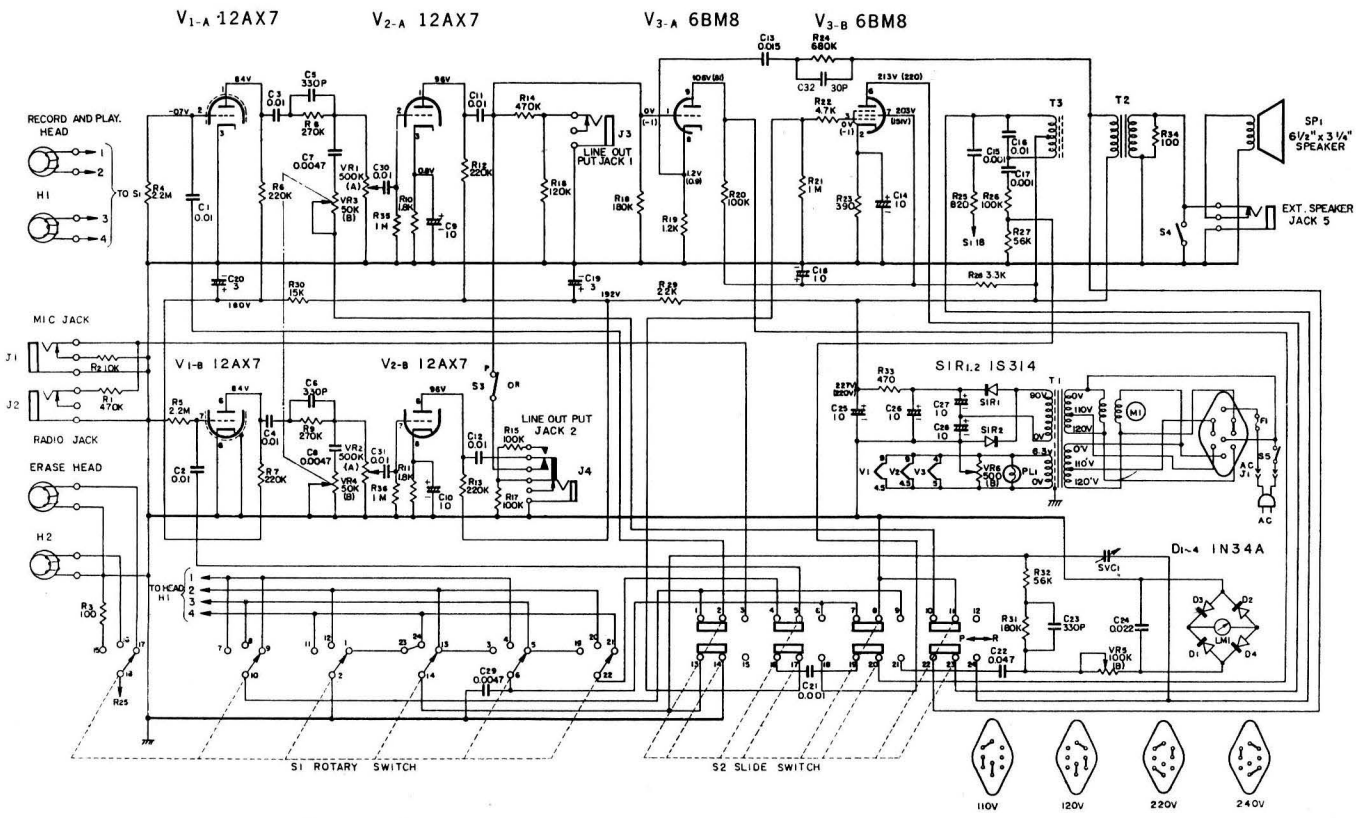
OPERATIONAL TABLE

Recording, Play back Channel		Position of Function Selector Knob	Position of Channel Selector Knob	Volume Control	Layout of Jacks	Remarks
Play back	Play back from channel 1 (CH_1) (Play back from track 1 or 4)	FORWARD	Channel 1 (CH_1)	Volume Control 1 (VOLUME-1)	○ ○ ● ○ ○	When listening with earphone, connect it to ●. In this case, speaker will be silent.
	Play back from channel 2 (CH_2) (Play back from track 3 or 2)	FORWARD	Channel 2 (CH_2)	Volume Control (VOLUME-1)	○ ○ ● ○ ○	When listening with earphone, connect it to ●. In this case, speaker will be silent.
	Play back from channel 1, 2 ($CH_{1.\ 2}$) (Play back simultaneously from track 1, 3 or track 4, 2 simultaneously)	FORWARD	DOUBLE	For channel 1, Volume Control 1 For channel 2, Volume Control 2	○ ○ ● ○ ○	When listening with earphone, connect it to ●. In this case, sounds in channel 1 and 2 can be heard simultaneously. The speaker will be silent.
	Stereo reproduction of stereo recorded tape	FORWARD	DOUBLE	For channel 1, Volume Control 1 For channel 2, Volume Control 2	○ ○ ○ ○ ●	Using auxiliary cord. connect ●. to either radio or other amplifier for stereo reproduction.
Recording	Recording on channel 1 (CH_1) Earphone reproduction from channel 2 (CH_2)	Press recording button "REC", then FORWARD.	Channel 1 (CH_1)	For recording, Volume Control 1 For reproducing, Volume Control 2	● ⊙ ○ ○ ⊙	While recording on channel 1 by connecting microphone to ●, reproduction is possible from channel 2 by connecting earphone to ◎. Recording can be monitored by connecting earphone to ⊙.
	Recording on channel 2 (CH_2) Earphone reproduction 1 from channel 1 (CH_1)	Press recording button "REC", then FORWARD	Channel 2 (CH_2)	For recording, Volume Control 1 For reproducing, Volume Control 2	● ◎ ○ ○ ◎	While recording on channel 2 by connecting microphone to ●, reproduction is possible from channel 1 by connecting earphone to ◎. Recording can be monitored by connecting earphone to ⊙.
		Press recording button "REC", then FORWARD.	DOUBLE	In these cases, recording is not possible.		

BLOCK DIAGRAM



CIRCUIT DIAGRAM TRA-505



REPLACEMENT PARTS

Symbol No.	Stock No.	Description			
CAPACITORS:					
C 1	215521	Paper	0.01μF	M	400WV
C 2	215521	Paper	0.01μF	M	400WV
C 3	215521	Paper	0.01μF	M	400WV
C 4	215521	Paper	0.01μF	M	400WV
C 5	233044	Ceramic cylindric	330pF	K	50WV
C 6	233044	Ceramic cylindric	330pF	K	50WV
C 7	214579	Paper	0.0047μF	K	400WV
C 8	214579	Paper	0.0047μF	K	400WV
C 9	258516	Electrolytic	10μF	K	3WV
C 10	258516	Electrolytic	10μF	K	3WV
C 11	215521	Paper	0.01μF	M	400WV
C 12	215521	Paper	0.01μF	M	400WV
C 13	215073	Paper	0.015μF	K	400WV
C 14	258005	Electrolytic	10μF		25WV
C 15	214521	Paper	0.001μF	M	400WV
C 16	225001	Styrol	0.01μF	K	500WV
C 17	214021	Paper	0.001μF	M	400WV
C 18	258557	Electrolytic	10μF		350WV
C 19	257016	Electrolytic	3μF		350WV
C 20	257016	Electrolytic	3μF		350WV
C 21	214521	Paper	0.001μF	M	400WV
C 22	215529	Paper	0.047μF	M	400WV
C 23	233814	Ceramic cylindric	330μF	K	500WV
C 24	215525	Paper	0.022μF	M	400WV
C 25	258557	Electrolytic	10μF		350WV
C 26	258557	Electrolytic	10μF		350WV
C 27	258011	Electrolytic	10μF		350WV
C 28	258557	Electrolytic	10μF		
C 29	214529	Paper	0.0047μF	M	400WV
C 30	275111	Myler	0.01μF	(M)	
C 31	275111	Myler	0.01μF	(M)	
C 32	232405	Ceramic cylindric	30pF	K	500WV
SVC 1	283087	Semi-Variable	100pF		
RESISTORS:					
R 1	122538	Composition, filmy	470kΩ	K	RD¼L
R 2	122441	Composition, filmy	10kΩ	K	RD¼L
R 3	123281	Composition, filmy	100Ω	K	RD½L
R 4	133537	Composition	2.2MΩ	K	RC½BE
R 5	133537	Composition	2.2MΩ	K	RC½BE
R 6	133525	Composition	220kΩ	K	RC½BE
R 7	122537	Composition, filmy	220kΩ	K	RD¼L
R 8	122541	Composition, filmy	270kΩ	K	RD¼L
R 9	122541	Composition, filmy	270kΩ	K	RD¼L
R 10	122376	Composition, filmy	1.8kΩ	K	RD¼L
R 11	122376	Composition, filmy	1.8kΩ	K	RD¼L
R 12	122537	Composition, filmy	220kΩ	K	RD¼L
R 13	133525	Composition	220kΩ	K	RC½BE
R 14	133529	Composition	470kΩ	K	RC½BE
R 15	122521	Composition, filmy	100kΩ	K	RD¼L
R 16	133522	Composition	120kΩ	K	RC½BE
R 17	122521	Composition, filmy	100kΩ	K	RD¼L
R 18	122540	Composition, filmy	180kΩ	K	RD¼L
R 19	122369	Composition, filmy	1.2kΩ	K	RD¼L
R 20	122521	Composition, filmy	100kΩ	K	RD¼L
R 21	133533	Composition	1MΩ	K	RC½BE
R 22	122372	Composition, filmy	4.7kΩ	K	RD¼L
R 23	125302	Composition, filmy	390Ω	K	RD1L
R 24	133531	Composition	680kΩ	K	RC½BE
R 25	125308	Composition, filmy	820Ω	K	RD1L
R 26	133521	Composition	100kΩ	K	RC½BE
R 27	133450	Composition	56kΩ	K	RC½BE
R 28	125380	Composition, filmy	3.3kΩ	K	RD1L
R 29	133445	Composition	22kΩ	K	RC½BE
R 30	122449	Composition, filmy	15kΩ	K	RD¼L
R 31	122540	Composition, filmy	180kΩ	K	RD¼L
R 32	133450	Composition	56kΩ	K	RC½BE
R 33	126293	Composition, filmy	470Ω	K	RD2L
R 34	122281	Composition, filmy	100Ω	K	RD¼L
R 35	133533	Composition	1MΩ	K	RC½BE
R 36	133533	Composition	1MΩ	K	RC½BE
VR 1	153032	Variable Carbon	500kΩ	(A)	
VR 2	153032	Variable Carbon	500kΩ	(A)	
VR 3	156049	Twin Variable	500kΩ	(A)	
VR 4	156049	Twin Variable	500kΩ	(B)	
VR 5	159023	Adjustable	100kΩ	(B)	
VR 6	159011	Adjustable	500Ω	(B)	
TUBES; Vacuum					
V 1	12AX7A				
V 2	12AX7A				
V 3	6BM8				
Diode-Germaniums					
D 1	575001	1N34A			
D 2	575001	1N34A			
D 3	575001	1N34A			
D 4	575001	1N34A			
Silicon Rectifier					
SIR 1	552006	1S314			
SIR 2	552006	1S314			
TRANSFOMER					
T 1	411016	Power			
T 2	453065	Output			
T 3	313033	Oscillator			
MISCELLANEOUS					
LM_1	514201	Level mater			
	541042	Lamp socket			
	594004	Pilot lamp			
	542132	Power source socket			
	533082	Push button switch			
	591005	Fuse			
	544402	2 pole terminal plate			
	544384	4 pole terminal plate			
	544404	6 pole terminal plate			
J_1	543082	Jack (with red point mark)			
J_2, J_3	543083	Jack (with white point mark)			
J_4	543172	Jack with switch			
	635593	Jack collar			
S_1	531106	Rotary switch			
S_2	532135	Slide switch			
	541208	9 pole socket for miniature tube			
	541211	9 pole socket for miniature tube (with clamp)			
	596044	Rubber cushion			
	852030	Eyelet			
	592038	Crystal earphone			
		Splicing tape			
	593276	Power sourse cord (for 230V)			
	593283	Power sourse cord (for 120V U.L)			
	593233	Extension cord			
	611142	Brush for head cleaning			
	513259	Record/play head			
	513096	Erase head			
	944259	Muting switch assembly			
	944049	wafer socket for change of voltage assembly			
	542152	Plug for change of voltage			
	514114	HVA-6 induction motor			
SP_1	526115	Speaker			
	968039	Rubber leg			
	958147	Mic-box cover assembly			
	968312	Function selector knob assembly			

Symbol No.	Stock No.	Description
SP_1	968131	Head cover
	619681	Channel selector knob
	619850	Volume control knob
	968166	Push button
	968227	Pad cover assembly
	646403	Cover cushion
	958067	Push button felt
	948449	Brake lever assembly
	944005	Tape guide (L)
	944146	Tape guide (R)
	948154	Tape guide spring
	944263	Function selector cam assembly
	638825	Rewind roller
	630020	Muting ring washer
	630347	Clip ring
	948169	Take-up pully
	948035	Capstan washer
	948058	Take-up base
	948045	Rewind reel base assembly
	971003	Motor holding rubber
	971002	Motor rubber cushion
	638850	Collar
	948455	Counter belt
	637445	"E" ring
	636553	Rewind washer
	639912	Capstan collar
	638858	Belt
	971028	Belt
	638821	Pressure roller
	637443	"E" ring
	944009	Collar
	944087	Motor pully for 50c/s
	944088	Motor pully for 60c/s
	630375	Rewind collar
	645587	Washer
	630370	Oil cap
	940570	Jack name plate
	715416	3mmϕ×16mm screw (for pannel)
	940059	3mmϕ×12mm Truss screw (for pannel)
	697517	Uni-directional dynamic microphone
	968009	Handle assembly
	968217	Case assembly
	960018	Hinge
	960021	Hinge holding metal
	968091	Speaker grill assembly
	968239	Pannel assembly
	968255	Case cover assembly