The Harman Kardon Model CD301

Manual No. 38A

ULTRAWIDEBAND LINEAR PHASE CASSETTE DECK

Technical Manual

CD301

harman/kardon

240 CROSSWAYS PARK WEST, WOODBURY, N.Y. 11797
PRINTED IN JAPAN 1112-H15238A5 P-08821

SPECIFICATIONS

Track Configuration: 4-track 2 channel Stereo Cassette Deck

- **MECHANICAL SECTION**

	Nominal	Limit
Tape speed	4.75cm/sec.	± 1%
Wow and Flutter	0.04%	≤ 0.1%
F.FWD/REW. Time (for C-60 Cassette)	75 sec.	≤ 85 sec.
Motor	1-DC Servo Motor (Capstan) 1-Flat Torque DC Motor (Reel)	
Take Up Torque	50gcm	
F.FWD Torque	100gcm	
REW. Torque	100gcm	

- **HEAD SECTION**

Recording/Playback	Fe-Al-Si Alloy Core
Erase	Ferrite Core

- **AMPLIFIRE SECTION**

Input Censitivity

MIC.	0.65mV	(0.2mV min. ~ 1.0mV max.)
LINE(Low)	75mV	(50mV min. ~ 100mV max.)
LINE(High)	270mV	(200mV min. ~400mV max.)

Input Impedance

MIC.	2.7kΩ	(2.0kΩ min. ~4.0kΩ max.)
LINE(Low)	15kΩ	(10kΩ min. ~ 20kΩ max.)
LINE(High)	36kΩ	(20kΩ min. ~ 40kΩ max.)

Signal-to-Noise Ratio

(Dolby B to ON)

at MIC. input: 52dB ≥ 46dB (Input 1kHz, 1.5mV for normal tape)

at LINE(Low) input: 61dB (Input 1kHz, 100mV for normal tape)

(Dolby C to ON)

at LINE (Low) input: 68dB (Input 1kHz, 100mV for normal tape)

Erase Ratio: 67dB ≥ 60dB (Input 80Hz for metal tape)

Channel Separation: 45dB ≥ 35dB (Input 1kHz)

Crosstalk: 73dB ≥ 60dB (Input 1kHz)

- **DIMENSIONS (WxHxD)** 17-3/7"x4-1/3"x12-7/4" (443x110x320mm)
- **WEIGHT** 15.7 lbs (7.1 kg)
- **POWER SUPPLY** AC 120V, 60Hz
- **POWER CONSUMPTION** 34W

Specifications and components subject to change without notice. Overall performance will be maintained or improved.

ALIGNMENT PROCEDURES

■ ELECTRICAL ADJUSTMENT

1. BEFORE ADJUSTMENT

- Make sure that primary supply voltage comes within 120V ± 2V.
- After the power switch is pushed on, wait for 10 minutes before measuring to be sere of the most stable operation.
- Since head magnetization, dust accumulations, etc. are likely to introduce error in the various characteristics, it is very important that the heads are properly demagnetized and cleaned before commencing any adjustment, particularly frequency response and head azimuth adjustment.
- Proceed with the recording section adjustment after having finished the playback section adjustment. Should the recording section adjustment be carried out without having completed the playback section adjustment perfectly, the recorded tape may not be played back properly with the other tape deck and the adjustment itself may become impossible.

2. INSTRUMENTS REQUIRED

- Low frequency oscillator
- AC VTVM or dual channel AC VTVM
- Oscilloscope
- Wow/flutter meter

3. TEST TAPE

- Azimuth adjustment MTT-114
- TAPE speed adjustment MTT-111D
- Playback amp. level adjustment MTT-150
- Record level adjustment AC-512
- Frequency response adjustment
  - LN . . . . . XL-I
  - FeCr CS-30
  - CrO_2 . . . . . AC-512
  - Metal AC-711

*C-90 differs with C-60 in the thickness and bias is unequal, so adjust with the tape whose bias is of specified value.

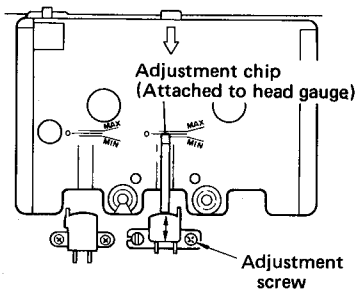


Fig. 4

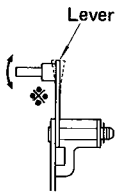


Fig. 5

■ PINCH ROLLER ADJUSTMENT

• PURPOSE

High tape tension is obtained when the pinch roller pressure is high. However, an excessive load is exerted on the spindle bearings of the capstan and the pinch roller if the pressure is too high. This can result in destructive side pressure which will shorten the life of the spindle bearings and cause wow and flutter. Further, the rubber contact surface of the pinch roller is excessively deformed in such cases, and the resulting variations in hardness can also produce wow and flutter and hasten deterioration of the rubber.

If the amount of pressure is too small, wow and flutter can result due to slipping; therefure, the pressure must be adjusted to within the range which will give stable tape speed.

• INSPECTION PROCEDURE

1. Place the unit in the PLAY state and confirm that the gap between the pinch roller and the level is 0.3 mm ± 0.1 mm.
2. With the unit in the PLAY state, apply the dial tension gauge to the pinch roller spindle and exert pressure in the direction indicated by the arrow (⇗) for a distance of about 0.2mm (to the point where the pinch roller stops turning). Then, gradually return the gauge in the opposite direction (⇖) and confirm that the pinch roller starts turning when the tension gauge reads 350 g. ± 30 g.

• ADJUSTMENT PROCEDURE

Inspection item 1 . . Adjust by moving the ▭ section of the lever to the right or left(↔).

Inspection item 2 . . Adjust by bending the ▭ section of the lever in the direction indicated by the arrow (↷).
Pressure is increased if this section of the lever is bent to the left (↶), and reduced if it is bent to the right (↷).

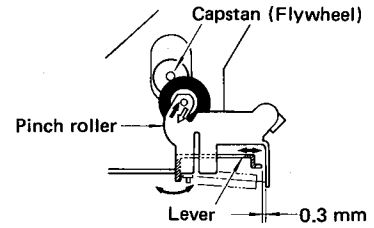


Fig. 6

■ BACK TENSION ADJUSTMENT

• PURPOSE

Back tension is applied during PALY to improve contact between the tape and the head. If back tension is insufficient, the tape is jerked when the unit is switched to PLAY and tape speed will be uneven while the resulting slack is taken up. If back tension is too great, the tape is subjected to excessive tension which can stretch it or cause the capstan drive to slip (resulting in wow just before slippage occurs). If back tension on the supply reel spindle is not even, wow becomes particularly pronounced as the end of the tape is neared because the relative amount of back tension is increased.

• INSPECTION PROCEDURE

1. Clean the reel spindles (both supply and take up) with freon.
2. Use a jug (MAZ-0192) to age the mechanism (place the unit in the PLAY state for approximately 5 seconds).
3. Insert the cassette torque meter in the mechanism and place it in the PLAY state.
4. Confirm that the torque meter reads 5.5 gcm ± 1 gcm at this time.

• CHECK ITEMS

Check the following when the torque meter reading is not as specified.

1. Visually confirm that gap (a) in Fig. 7 is approximately 0.4mm while the unit is in the PLAY state.
2. Visually confirm that gap (b) in Fig. 7 is approximately 0.4mm while the unit is in the CUE state.

• ADJUSTMENT PROCEDURE

1. When gap (a) is not as specified while the unit is in the PLAY state, adjust is by bending the ▨ section of the back tension lever in the direction indicated by the arrow (↴).
2. When gap (b) is not as specified while the unit is in the CUE state, adjust it by bending the ▨ section of the back tension lever in the direction indicated by the arrow (↴).

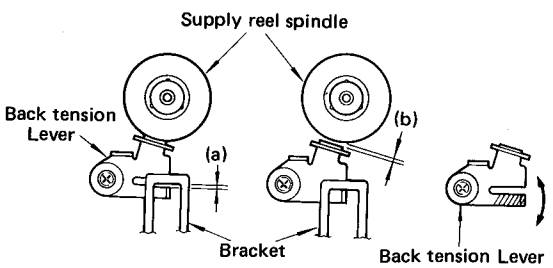
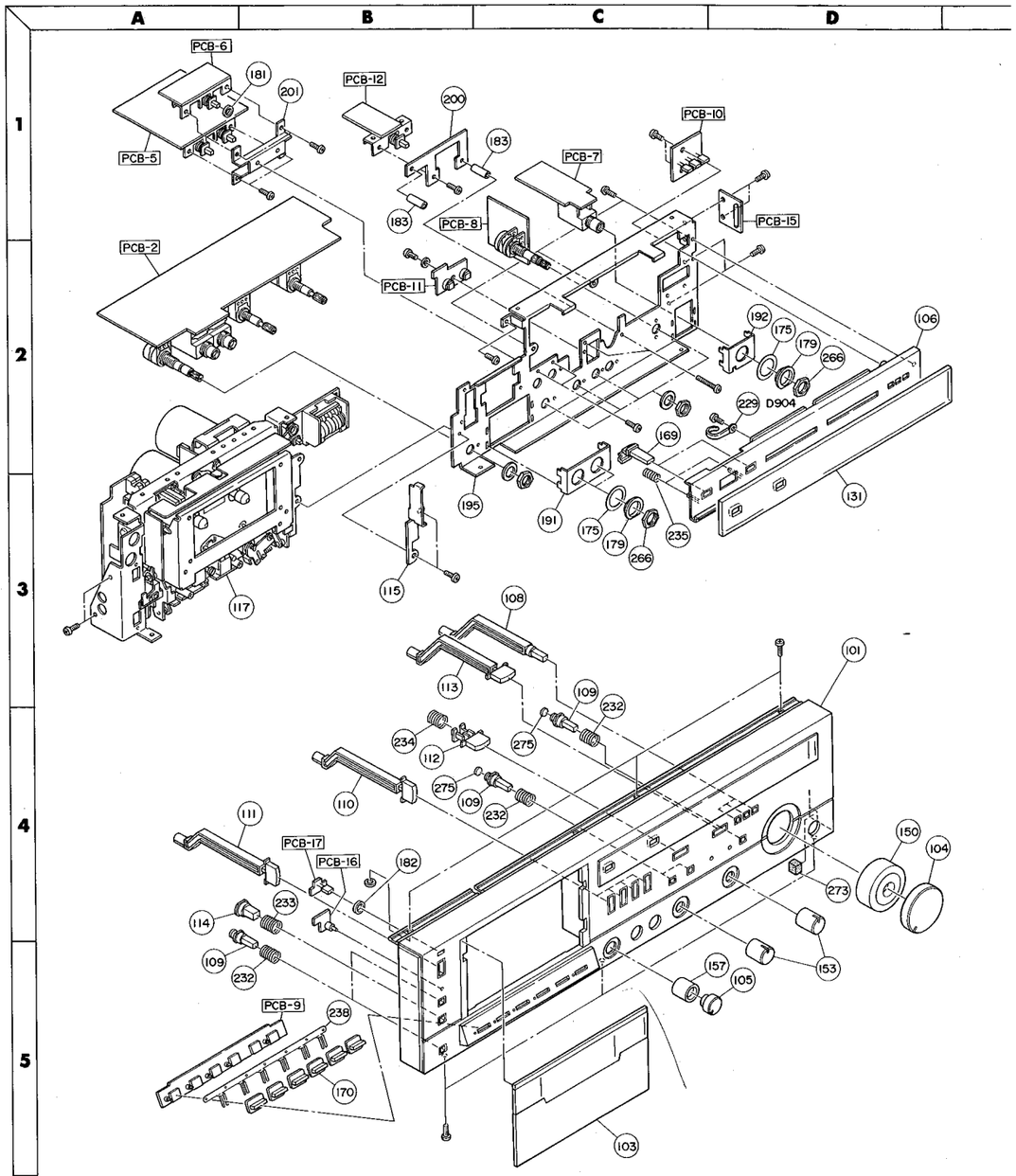


Fig. 7



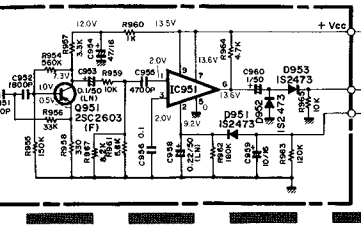
GENERAL UNIT PARTS LIST

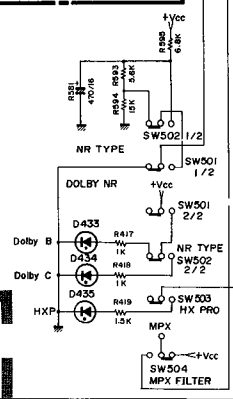
Ref. No.	Part No.	Description
101	A443-CD301A	Front Panel Assembly
102	A423-CD301A	Cabinet Bottom Assembly
103	A452-CD301A	Door Assembly
104	A634-CD301A	Knob Assembly, Line Level (L)
105	A634-CD301B	Knob Assembly, Microphone Level
106	A514-CD301A	Plate Assembly, Meter
107	A414-CD301A	Cabinet Top Assembly
108	A662-CD301A	Push Button Assembly, DOLBY B·C NR type Selector, HX-PRO, MPX filter
109	A662-CD301B	Push Button Assembly, Electronic Auto Search, Rec. Mute, Bias Tone, Record Cal. Tone, Auto Repeat
110	A662-CD301C	Push Button Assembly, Bias/Equalization (METAL, CrO_2, FeCr, LN)
111	A662-CD301G	Push Botton Assembly, Power
112	A662-CD301D	Push Button Assembly, Meter Ballistics
113	A662-CD301E	Push Button Assembly, DOLBY NR
114	A662-CD301F	Push Button Assembly, EJECT
115	B219-CD301A	Bracket Assembly
116	A424-CD301A	Cabinet Back Assembly
117	MR064HF(B)	Cassette, Tape Recorder Mechanical Assembly
118	1319-0139	Foot
131	1441-00203	Clear Panel
150	1630-01801	Knob, Line Level (R)
153	1630-01901	Knob, Bias Fine Trim, Output Level
157	1634-03301	Knob, Microphone Level (R)
169	1662-05801VN	Push Button, Memory, Reset
170	1662-05901VN	Push Button, Record, Rew., Play, F.FWD, Stop, Pause
175	2111-1356	Felt
179	2114-72167	Bushing
180	2114-415027	Bushing
181	2114-01224	Bushing
182	2114-01247	Bushing
183	2132-3007021	Spacer
185	2219-7091	Bracket
186	2219-7648	Bracket
187	2219-7651	Bracket
188	2219-7653	Bracket
189	2219-7654	Bracket
190	2219-7655	Bracket
191	2219-7656	Bracket
192	2219-7657	Bracket
193	2219-7661	Bracket
195	2219-7668	Bracket
197	2219-7093	Bracket
200	2219-7797	Bracket
201	2219-7798	Bracket
202	2219-7800	Bracket
205	2219-7799	Bracket
206	2219-7801	Bracket
208	2222-7131	Heat Sink
217	2240-7120	Holder
229	2218-7001	Holding Bracket
232	2651-210188	Spring
233	2651-210189	Spring
234	2651-210190	Spring
235	2651-210191	Spring
238	2652-00253	Leaf Spring
261	2320-7004	Special Screw (+)
266	2440-6M	Special Nut
273	2112-11248	Sponge
275	2111-1442	Felt
280	2222-5039	Heat Sink
281	2222-5040	Heat Sink
282	2132-01703	Spacer

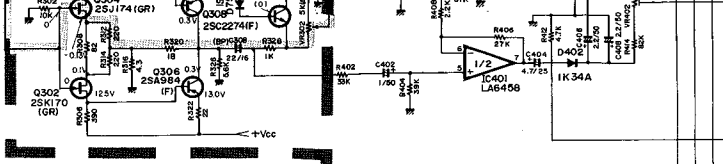
Ref. No.	Part No.	Description
	PCB-3 LOGIC CONTROL P. C. BOARD	
	RESISTORS	
R816, 859	5102-1004713	10Ω, ±2%, 1/4W, Fuse
R860	5102-1004715	10Ω, ±2%, 1/4W, Fuse
	CONTROLS	
VR851	5101-50171920	500Ω
	CAPACITORS	
C808	5345-684F-0212	0.68μF, ±20%, 50V, Electrolytic
C809	5345-106-16	10μF, +50% −10%, 16V, Electrolytic
C811	5345-476C0212	47μF, ±20%, 16V, Electrolytic
C812	5345-107C041	100μF, ±20%, 16V, Electrolytic
C813, 815	5345-226-16	22μF, +50% −10%, 16V, Electrolytic
C818	5345-474-50	0.47μF, +75% −10%, 50V, Electrolytic
	INTEGRATED CIRCUIT	
IC801	5654-TC9121P	TC9121P
IC802	5654-μPD4023C	μPD4023C
IC803, 806	5654-μPD4001C	μPD4001C
IC804	5654-μPD4011C	μPD4011C
IC805	5654-μPD4516C	μPD4516C
IC807	5654-AN6250	AN6250
IC851	5653-BA6109	BA6109
	TRANSISTOR	
Q801, 856, 859	5613-2236(Y)	2SC2236(Y)
Q803, 805, 808, 809, 855, 858	5611-1115(E)or(F)	2SA1115(E) or 2SA1115(F)
Q804, 806, 807, 852, 853, 854, 857	5613-2603(E)or(F)	2SC2603(E) or 2SC2603(F)
	DIODES	
D801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832	5631-1S2473	1S2473
D851, 852	5635-RD10EB2	Zener, RD10EB2
	MISCELLANEOUS	
P801	4443-060158	Connector, 6-Pin
P802	4443-070158	Connector, 7-Pin
P803, 804	4443-030158	Connector, 3-Pin
P805, 806, 807, 808	4443-020158	Connector, 2-Pin
P809	4443-090177	Connector, 9-Pin
	PCB-4 HX-PRO P. C. BOARD	
	RESISTORS	
R687, 688	5102-1004715	10Ω, ±2%, 1/4W, Fuse
	CONTROLS	
VR671, 672	5101-20371920	20kΩB
	CAPACITORS	
C685, 686	5345-476C041	47μF, ±20%, 16V, Electrolytic
	INTEGRATED CIRCUIT	
IC671, 672	5652-HA17082PS	HA17082PS
IC673	5652-NJM4559D	NJM4559D
	TRANSISTORS	
Q671, 672	5614-667(C)	2SD667(C)
	DIODES	
D671, 672, 673, 674	5631-1S2473	1S2473

ONE OSC.
OSC.

MUSIC SENSE CIRCUIT







LEVEL DISPLAY