

**AIWA®****AD-F370, S37  
AD-R470, R40****SERVICE  
MANUAL**

• BASIC TAPE MECHANISM : X-3

• TYPE. H, U, C, E, K, G, Z

**SPECIFICATIONS**

<b>Type</b>	Stereo cassette tape deck
<b>Track format</b>	4 tracks 2 channels
<b>Power supply</b>	<b>AD-R470 E, Z, AD-F370 E, Z</b> AC 220 V, 50/60 Hz <b>AD-R470 K, G, AD-F370 K, G</b> AC 240 V, 50/60 Hz <b>AD-R470 C, AD-R40 U</b> <b>AD-F370 C, AD-S37 U</b> AC 120 V, 60 Hz <b>AD-R470 H, AD-F370 H</b> AC 110—120 V/220—240 V switchable, 50/60 Hz
<b>Power consumption</b>	17 W
<b>Frequency response</b>	METAL tape: 20—18,000 Hz CrO <sub>2</sub> position tape: 20—17,000 Hz NORMAL tape: 20—16,000 Hz
<b>Signal-to-noise ratio</b>	73 dB (METAL tape DOLBY C NR ON)
<b>Wow and flutter</b>	According to DIN 45 500 0.15% 0.065% (WRMS)
<b>Tape speed</b>	4.8 cm/sec. (1-7/8 ips)
<b>Rewind time</b>	90 sec. (C-60)
<b>Fast forward time</b>	90 sec. (C-60)
<b>Recording system</b>	AC bias (frequency 85 kHz)
<b>Erase system</b>	AC erase
<b>Motor</b>	DC Servomotor × 1
<b>Head</b>	Record/playback head × 1 ( <b>AD-F370, S37</b> ) Erase head × 1 ( <b>AD-F370, S37</b> ) Record/playback/Erase head × 1 ( <b>AD-R470, R40</b> )

<b>Inputs</b>	LINE IN maximum input sensitivity: 50 mV (over 50 kΩ) DIN max sensitivity (Z model only): 0.3 mV/kΩ (3.3 kΩ)
<b>Outputs</b>	LINE OUT standard output level: 0.36 V (0 VU) ( <b>AD-R470, R40</b> ) 0.35 V (0 VU) ( <b>AD-F370, S37</b> ); suitable load impedance: over 50 kΩ; DIN standard level (Z model only): 0.36 V (0 VU) ( <b>AD-R470, R40</b> ) 0.35 V (0 VU) ( <b>AD-F370, S37</b> ) Headphones: 8 Ω—1 kΩ 430(W)×127.5(H)×233.4(D) mm
<b>Dimensions</b>	
<b>Weight</b>	<b>AD-R470, R40</b> 3.3 kg <b>AD-F370, S37</b> 3.2 kg

- Design and specifications are subject to change without notice.
- Dolby noise reduction and HX Pro headroom extension manufactured under license from Dolby Laboratories Licensing Corporation. HX Pro originated by Bang & Olufsen.
- "DOLBY" the double-D symbol and "HX PRO" are trademarks of Dolby Laboratories Licensing Corporation.

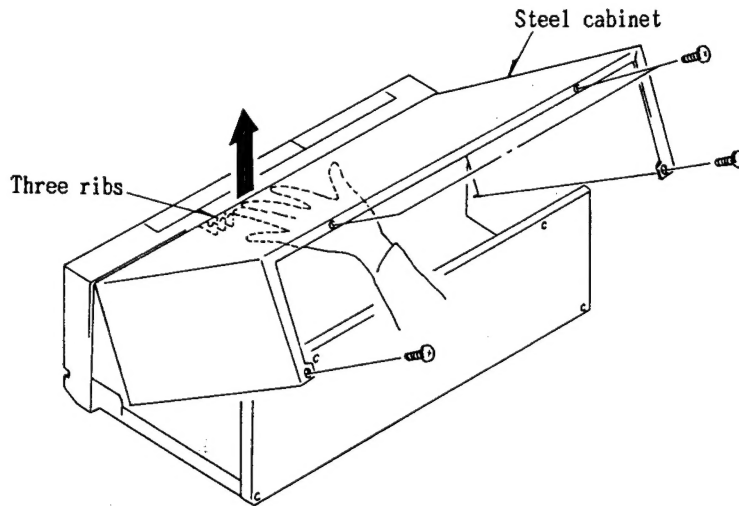
AIWA Co., Ltd.

Tokyo Japan

Printed in Japan

# DISASSEMBLY INSTRUCTIONS

1. Remove the four screws and raise the steel cabinet by approx. 45° as shown in the figure. Insert your hand from behind and raise the steel cabinet from the three-ribs block manually in the direction indicated by arrow and remove it.



## ELECTRICAL MAIN PARTS LIST (AD-R470,R40, AD-F370,S37)

REF.NO.	PART NO.	DESCRIPTION	REF.NO.	PART NO.	DESCRIPTION
---IC---			---MAIN CIRCUIT BOARD SECTION---		
	87-001-143-019	IC,CX20187	PCB-A	*	MAIN CIRCUIT BOARD
	87-020-840-010	IC,ICP-N20	C1	*87-010-389-019	CAP,ELECT 2200-25V SME
	87-001-164-019	IC,LB1408	C2	*87-010-237-019	CAP,ELECT 1000-16V SME
	87-001-334-010	IC,LB9051A	C3	*87-010-565-019	CAP,ELECT 470-12V SME
	82-236-620-010	IC,LC6543H-3715	C4	*87-010-263-019	CAP,ELECT 100-10V
	87-020-680-019	IC,NJM2068S	C5	*87-010-644-019	CAP,ELECT 470-16 MUSE
	87-020-758-019	IC,NJM2068SD	C7	*87-010-263-019	CAP,ELECT 100-10V
			C9	*87-010-384-019	CAP,ELECT 100-25V
---TRANSISTOR---			C31	*87-010-405-019	CAP,ELECT 10-50V SME
	89-502-235-019	FET,2SK223E	C32	*87-010-405-019	CAP,ELECT 10-50V SME
	89-110-155-019	TRANSISTOR,2SA1015GR	C101	*87-018-121-019	CAP,CERA-SOL SS 150P
	89-112-965-019	TRANSISTOR,2SA1296GR(C,E,K,G,Z)	C102	*87-018-121-019	CAP,CERA-SOL SS 150P
	89-106-837-019	TRANSISTOR,2SA683S(H)	C103	*87-018-122-019	CAP,CERA-SOL SS 180P(R470 E,K,G,Z)
	89-109-521-019	TRANSISTOR,2SA952K	C103	*87-018-124-019	CAP,CERA-SOL SS 270P(R470 H,C,R40)
	89-318-156-019	TRANSISTOR,2SC1815BL	C103	*87-018-125-019	CAP,CERA-SOL SS 330P(F370 H,C,S37)
	89-318-155-019	TRANSISTOR,2SC1815GR	C103	*87-018-039-019	CAP,CERA-SOL SS 390P(F370 E,K,G,Z)
	89-322-405-019	TRANSISTOR,2SC2240BL(Z)	C104	*87-018-122-019	CAP,CERA-SOL SS 180P(R470 E,K,G,Z)
	89-331-130-019	TRANSISTOR,2SC3113	C104	*87-018-124-019	CAP,CERA-SOL SS 270P(R470 H,C,R40)
	89-413-023-019	TRANSISTOR,2SD1302S	C104	*87-018-125-019	CAP,CERA-SOL SS 330P(F370 H,C,S37)
	89-414-065-019	TRANSISTOR,2SD1406GR	C104	*87-018-039-019	CAP,CERA-SOL SS 390P(F370 E,K,G,Z)
---DIODE---			C109	*87-018-125-019	CAP,CERA-SOL SS 330P
	82-596-799-019	DIODE,1N4002	C110	*87-018-125-019	CAP,CERA-SOL SS 330P
	87-020-465-019	DIODE,1SS133	C113	*87-010-405-019	CAP,ELECT 10-50V SME
	87-020-123-019	DIODE,DS446	C114	*87-010-405-019	CAP,ELECT 10-50V SME
	87-027-686-019	DIODE,ZENER HZ-12A1	C115	*87-010-405-019	CAP,ELECT 10-50V SME
	87-027-301-019	DIODE,ZENER HZ-3A1	C116	*87-010-405-019	CAP,ELECT 10-50V SME
	87-027-286-019	DIODE,ZENER HZ5C1	C117	*87-010-384-019	CAP,ELECT 100-25V
			C201	*87-018-121-019	CAP,CERA-SOL SS 150P
			C202	*87-018-121-019	CAP,CERA-SOL SS 150P
			C203	*87-018-132-019	CAP,CERA-SOL SS 2200P
			C204	*87-018-132-019	CAP,CERA-SOL SS 2200P
			C205	*87-010-404-019	CAP,ELECT 4.7-50V SME
			C206	*87-010-404-019	CAP,ELECT 4.7-50V SME



REF.NO.	PART NO.	DESCRIPTION		
S831	87-036-135-019	SLIDE SW(DOLBY B/C NR)	<b>Combination circuit board A 82-235-601-019</b> <b>PCB-A 82-235-602-019</b> <b>PCB-B 82-235-603-019</b> <b>PCB-C 82-235-604-019</b> <b>PCB-D 82-235-605-019</b>	
S832	87-036-135-019	SLIDE SW(REVERSE MODE)(R470/R40)		
S833	87-036-135-019	SLIDE SW(TIMER)		
S835	87-031-893-010	TACT SW QVDO4M(▶▶)		
S836	87-031-893-010	TACT SW QVDO4M(▶)	<b>Combination circuit board B 86-535-628-019</b> <b>PCB-E 86-535-629-019</b> <b>PCB-F 86-535-630-019</b>	
S837	87-031-893-010	TACT SW QVDO4M(◀)(R470/R40)		
S838	87-031-893-010	TACT SW QVDO4M(◀◀)		
S839	87-031-893-010	TACT SW QVDO4M(▯ PAUSE)		
S840	87-031-893-010	TACT SW QVDO4M(● REC MUTE)		
S841	87-031-893-010	TACT SW QVDO4M(■ STOP)		
S842	87-031-893-010	TACT SW QVDO4M(● REC)		
VR451	87-024-151-019	VR,250KB(BIAS FINE)		
VR631	87-024-149-019	VR,2GANG,50KA(REC LEVEL)		
VR632	87-024-150-019	VR,100KB(BALANCE)		

===JACK CIRCUIT BOARD SECTION===

PCB-C	*	JACK CIRCUIT BOARD
△C8	*87-019-113-019	CAP, SPARK-GAP 0.0022E
△J661	*87-009-043-010	JACK 6.3(PHONES)
△S1	87-036-015-019	AC SW SDDLDI(POWER)

===POWER CIRCUIT BOARD SECTION===

△PCB-D	*	POWER CIRCUIT BOARD
△PT1	82-236-603-019	POWER TRANSFORMER(E,Z)
△PT1	82-236-601-019	POWER TRANSFORMER(H)
△PT1	82-236-604-019	POWER TRANSFORMER(K,G)
△PT1	82-236-602-019	POWER TRANSFORMER(R470C,R40/F370C,S37)
△S2	87-031-780-019	SLIDE SW(AC VOLTAGE)(H)

===DECK CIRCUIT BOARD SECTION===

PCB-E	*	DECK CIRCUIT BOARD
SFR921	*87-021-966-019	SFR 4.7K(F370,S37)
SOL921	86-535-611-110	SOLENOID,X-3,PL(PLAY)
SOL922	86-535-612-110	SOLENOID,X-3,FR(FR)
SW921	87-036-110-010	PUSH SW(CRO2)
SW922	87-036-040-010	PUSH SW(CST)
SW923	87-036-110-010	PUSH SW(DIR)(R470/R40)
SW951	87-036-110-010	PUSH SW(REA)
SW952	87-036-109-010	PUSH SW(MT)
SW953	87-036-109-010	PUSH SW(REB)(R470/R40)

===SENSOR CIRCUIT BOARD SECTION===

PCB-F	*	SENSOR CIRCUIT BOARD(R470/R40)
CP951	87-001-367-019	PHOTO SENSOR ST1-315-05CD(R470/R40)

===MISCELLANEOUS===

△	*82-187-797-019	AC CORD(E,Z)
△	*82-187-795-019	AC CORD(G)
△	*87-034-749-019	AC CORD(H)
△	*82-187-796-019	AC CORD(K)
△	*87-034-583-019	AC CORD(R470C,R40/F370C,S37)
△	*87-085-199-010	CORD BUSHING 2271
EH	87-046-196-019	E.HEAD(F370/S37)
M921	87-045-296-019	MOTOR
RPEH	87-046-324-019	RPEH(R470 H,C,R40)
RPEH	87-046-289-019	RPEH(R470 E,K,G,Z)
RPH	87-046-322-019	RPH(F370 H,C,S37)
RPH	87-046-323-019	RPH(F370 E,K,G,Z)



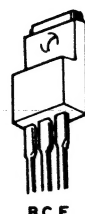
ECB  
2SA683



ECB  
2SA952  
2SA1015  
2SA1296  
2SC1815  
2SC2240  
2SD1302



BCE  
2SC3113



BCE  
2SD1406



SGD  
2SK223

### IC DESCRIPTION

IC, LC6543H-3715

Pin No.	Pin name	Description
1	I-DIRECT	Head direction detection SW input: Low at side A.
2	VDD	Power: 4.5 to 5.5V
3	KS1	Data 0 to 5: KEY MATRIX SCAN output
4	KSO	
5	DATA5	
6	DATA4	
7	DATA3	
8	DATA2	
9	DATA1	
10	DATA0	Data 0 to 5: LED SCAN output
11	DISP	
12	O-LMT	LINE MUTE control: Goes low in PLAY, CUE, REV, REC, REC & PLAY, REC & PAUSE, and RMT modes.
13	O-BIAS	Bias oscillation control: Oscillated in low. Goes low in REC mode and high in reverse mode.

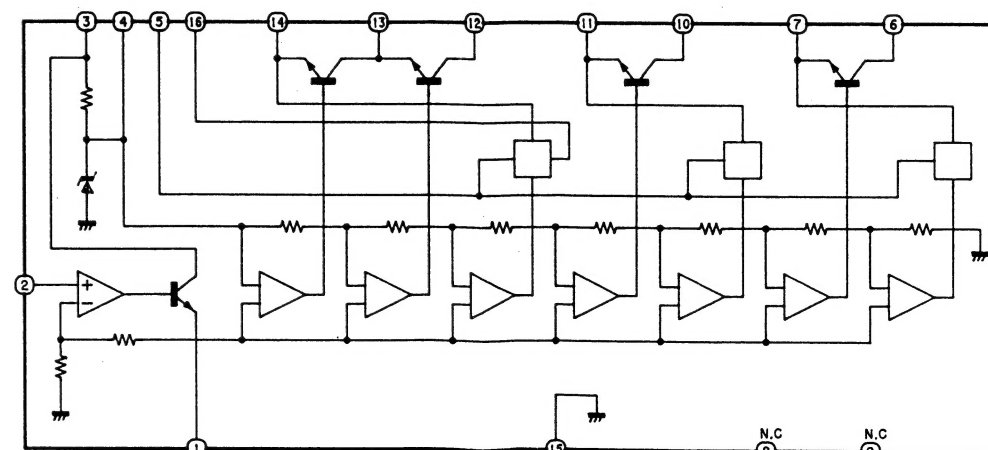
  

KS1="L"	KSO="L"	DISP="L" lights in low
key ►►	key STOP	LED PLAY
key ►	key REC	LED ►
key ◀	key Timer Rec	LED ◀
key ◀◀	key Repeat Timer PLAY	LED REC
key	key	LED
key RMT	key	LED RMT

Indicates a CD sync in reverse mode for AD-R470/R40.

Pin No.	Pin name	Description
14	O-REC	Dolby IC REC/PB selection: Enters the REC mode in low.
15	OSC-2	Clock input
16	OSC-1	Clock input
17	TEST	Test pin: 0V
18	VSS	Power: 0V
19	RESET	Reset control
20	O-RMT	RBC MUTE control: Goes high in REC & PLAY mode and low in reverse mode.
21	I-ONE WAY	MODE selection: Low using AD-R470/R40 Open/high using AD-F370/S37.
22	I/O SYNC	CD SYNC input and output: CD SYNC with CBRS. A low signal is output in REC's QUICK REV mode. When recording is started in low, the set is put into the PAUSE mode.
23	O-MOTOR	Mechanism power control: A motor is rotated in low. Mechanical switch, quick sensor, and auto stop sensor are then activated.
24	O-SOL·FRP	FRP solenoid control: Controlled in low
25	O-SOL·PB	PB solenoid control: Controlled in low
26	I-AUTO	Reel pulse input: Two pulses are input when a take-up reel (at side A) is rotated once. When the input is not changed for more than 4 seconds in PLAY mode and for 0.5 seconds in FF/REW/CUE/REV mode, auto stop is done.
27	I-QUICK	Quick sensor input: Quickened in high. Eight-second input after the mode is changed from FWD PLAY to REV PLAY or PLAY to PAUSE requires no adjustment.
28	I-CST	Cassette detection SW input: Goes low during cassette insertion.
29	I-RE A	Accidental erasure protection SW input (at side A): Can be recorded in low.
30	I-RE B	Accidental erasure protection SW input (at side B): Can be recorded in low.

IC BLOCK DIAGRAM-1 IC, LB1408



SCHEMATIC DIAGRAM-1 (AD-R470,R40, AD-F370,S37)

**A**

MODEL	TYPE	R107	R109	R115	C103	C107
AD-R470	H.C	JP	1.2K	6.8K	270P	0.002P
AD-R40	E.K.G.Z	22K	NC	6.2K	180P	NC
AD-F370	H.C	JP	2.2K	6.8K	330P	0.01J
AD-F370	E.K.G.Z	JP	4.7K	6.8K	390P	3300P
AD-S37	U	JP	2.2K	6.8K	330P	0.01J

**B**

MODEL	TYPE	C211	C215	C217	R201	R217	R227
AD-R470	H.C	0.01J	0.015J	NC	4.7K	10K	NC
AD-R40	U	0.01J	0.015J	NC	4.7K	10K	NC
AD-F370	H.C	0.01J	3300P	3900P	10K	JP	3900P
AD-F370	E.K.G.Z	0.01J	NC	0.015J	10K	NC	0.015J
AD-S37	U	0.01J	3300P	3900P	10K	JP	3900P

**C**

MODEL	TYPE	R225	R215	R209	R231	C213
AD-R470	H.C	10K	270	33K	15K	1800P
AD-R40	E.K.G.Z	18K	220	33K	15K	3300P
AD-R40	U	10K	270	33K	15K	1800P
AD-F370	H.C	10K	220	33K	10K	1800P
AD-F370	E.K.G.Z	3.9K	18K	47K	10K	1800P
AD-S37	U	10K	220	33K	10K	1800P

**D**

MODEL	TYPE	R305	R307	R311	R323
AD-R470	H.C	1.8K	8.2K	220K	100K
AD-R40	U	1.8K	8.2K	220K	100K
AD-F370	H.C	1.8K	8.2K	47K	100K
AD-F370	E.K.G.Z	3.9K	18K	47K	100K
AD-S37	U	1.8K	8.2K	47K	100K

**E**

MODEL	TYPE	Q1	R1	R9-R10
AD-R470	H	2SA6835	560 / 1/2W	220
AD-R40	C	2SA1296GR	560 / 1/4W	330
AD-R40	E.K.Z	2SA1296GR	560 / 1/4W	220
AD-F370	H	2SA6835	560 / 1/2W	220
AD-F370	C	2SA1296GR	560 / 1/4W	330
AD-F370	E.K.Z	2SA1296GR	560 / 1/4W	220
AD-S37	U	2SA1296GR	56C / 1/4W	330

**F** ACIAT REC NO SIGNAL

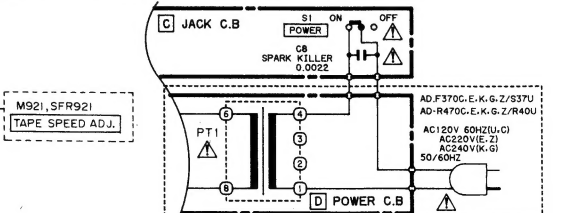
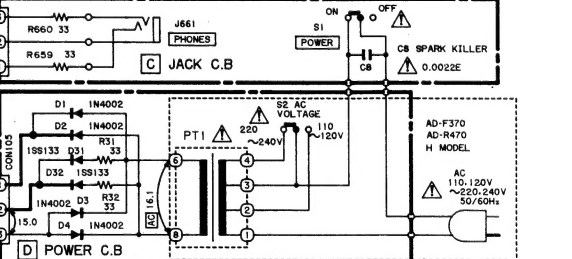
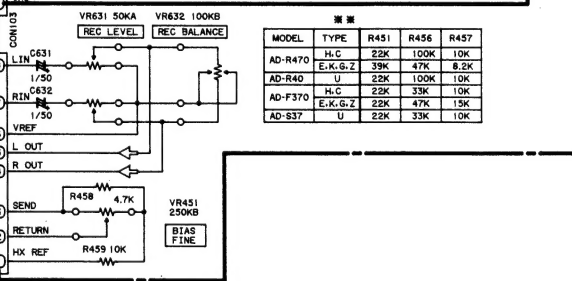
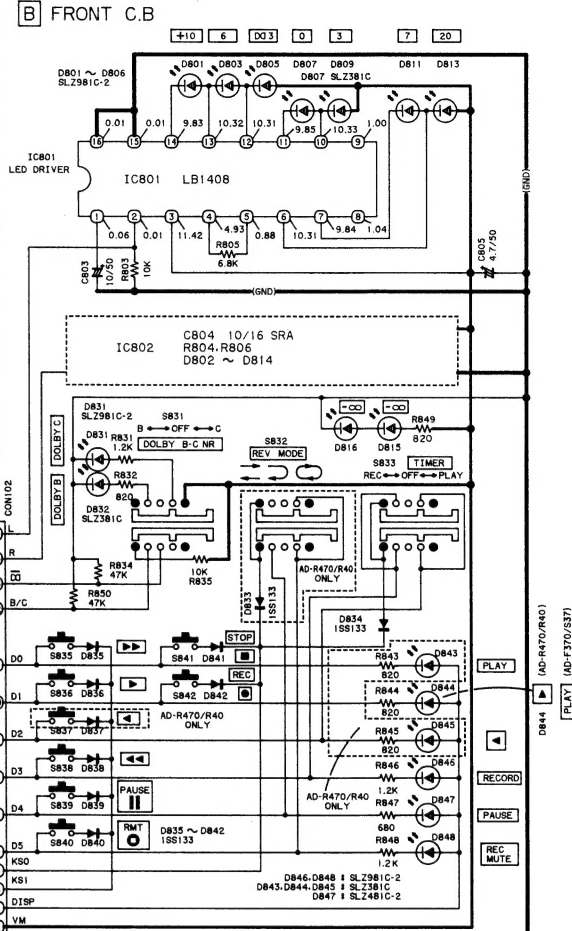
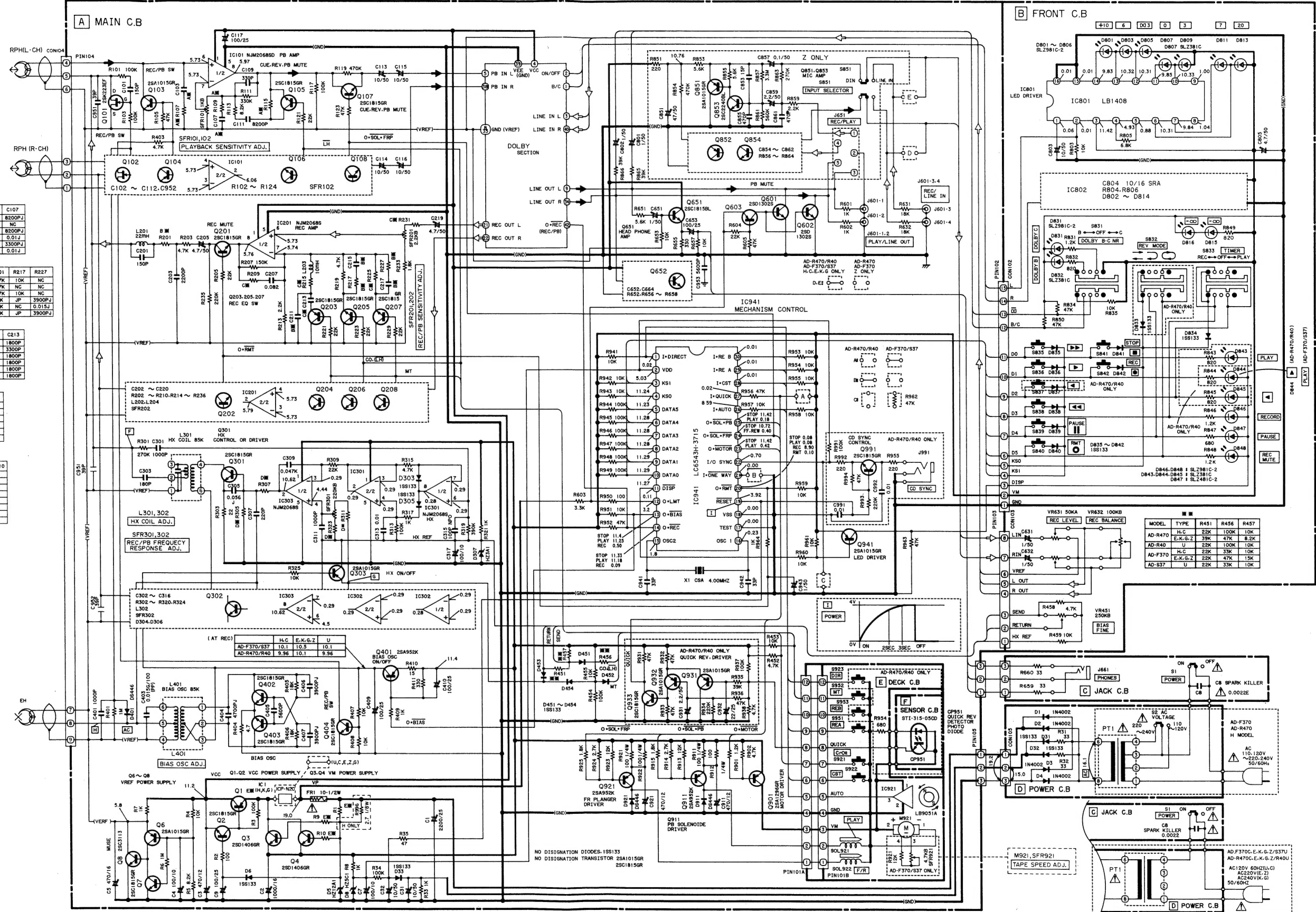
MODEL	H.C	E.K.G.Z	U
AD-F370/S37	15.5	17.6	15.3
AD-F370/S37	20.0	22.9	20.0
AD-F370/S37	28.0	27.3	28.0
AD-R470/R40	14.5	13.6	14.3
AD-R470/R40	24.4	17.8	24.4

**G** (AT REC)

MODEL	H.C	E.K.G.Z	U
AD-F370/S37	LH 5.46	LH 5.27	LH 5.48
AD-F370/S37	CO 6.25	CO 6.00	CO 6.25
AD-F370/S37	MT 8.88	MT 9.21	MT 8.88
AD-R470/R40	LH 6.30	LH 6.36	LH 6.30
AD-R470/R40	CO 6.84	CO 7.00	CO 6.84
AD-R470/R40	MT 9.12	MT 9.15	MT 9.12

**H**

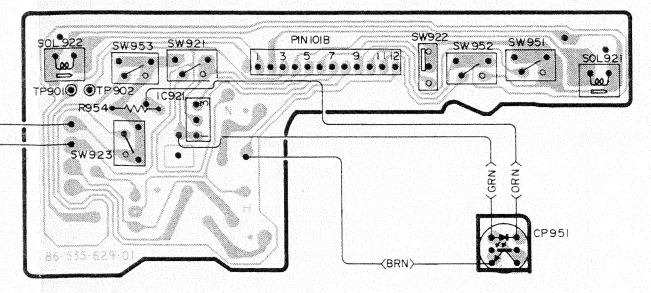
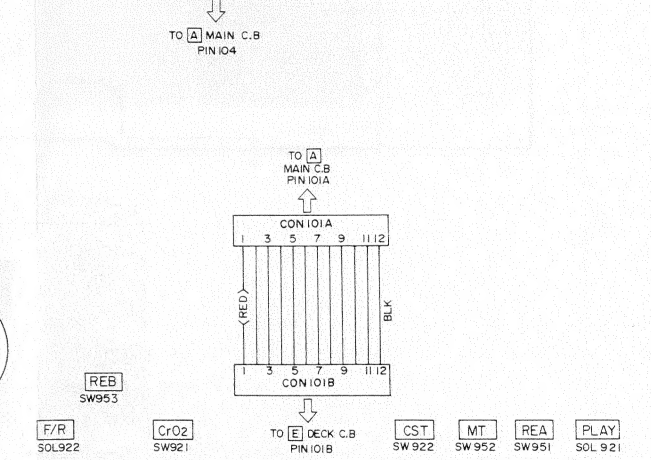
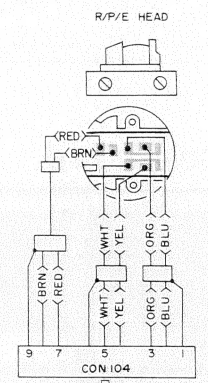
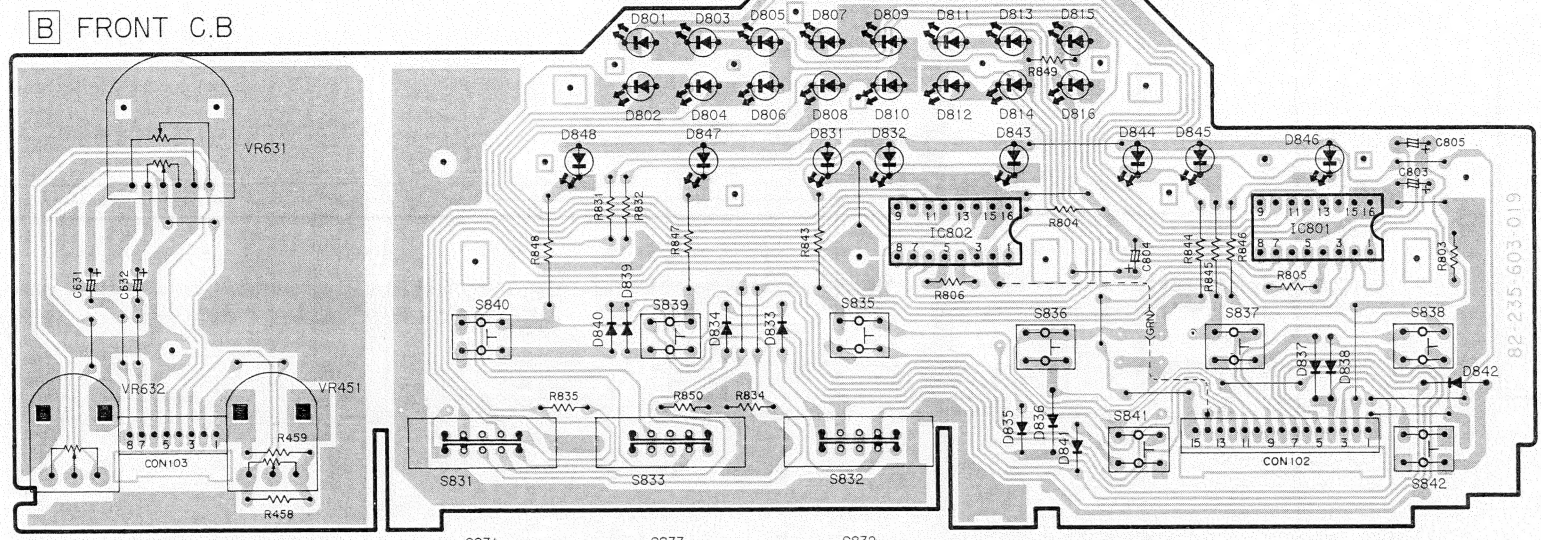
MODEL	H.C	E.K.G.Z	U
AD-F370/S37	26.4	27.5	26.4
AD-R470/R40	31.0	29.8	31.0



NO DESIGNATION DIODES-1S133  
NO DESIGNATION TRANSISTOR 2SA1015GR 2SC1815GR

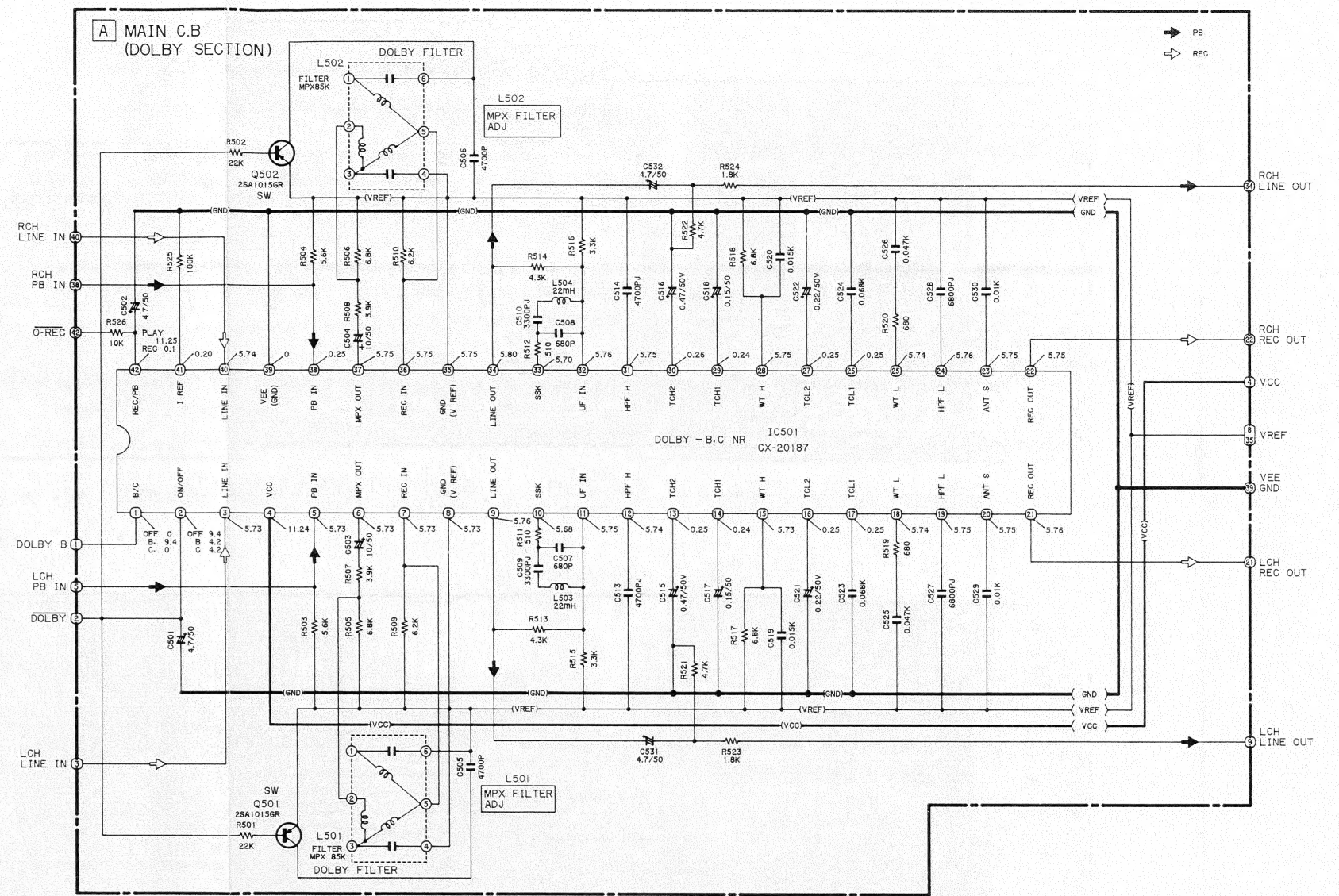
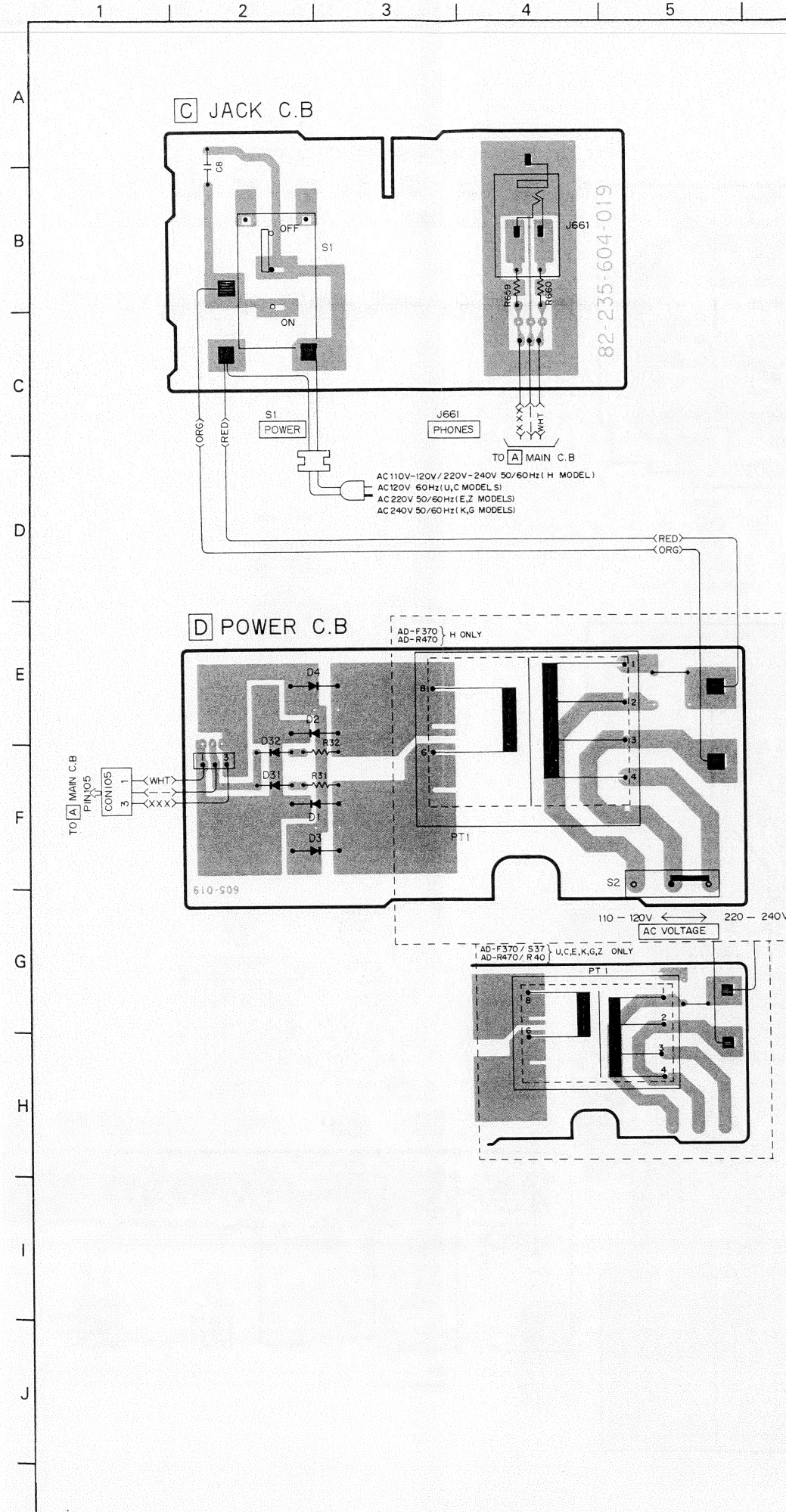
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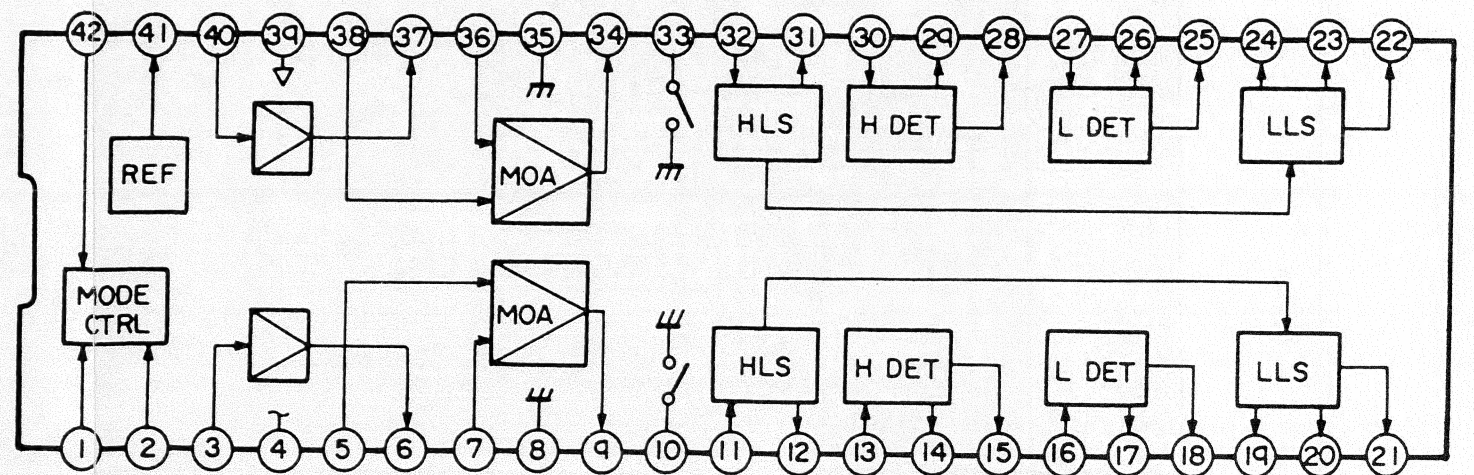


**E DECK C.B.**

**F SENSOR C.B.**

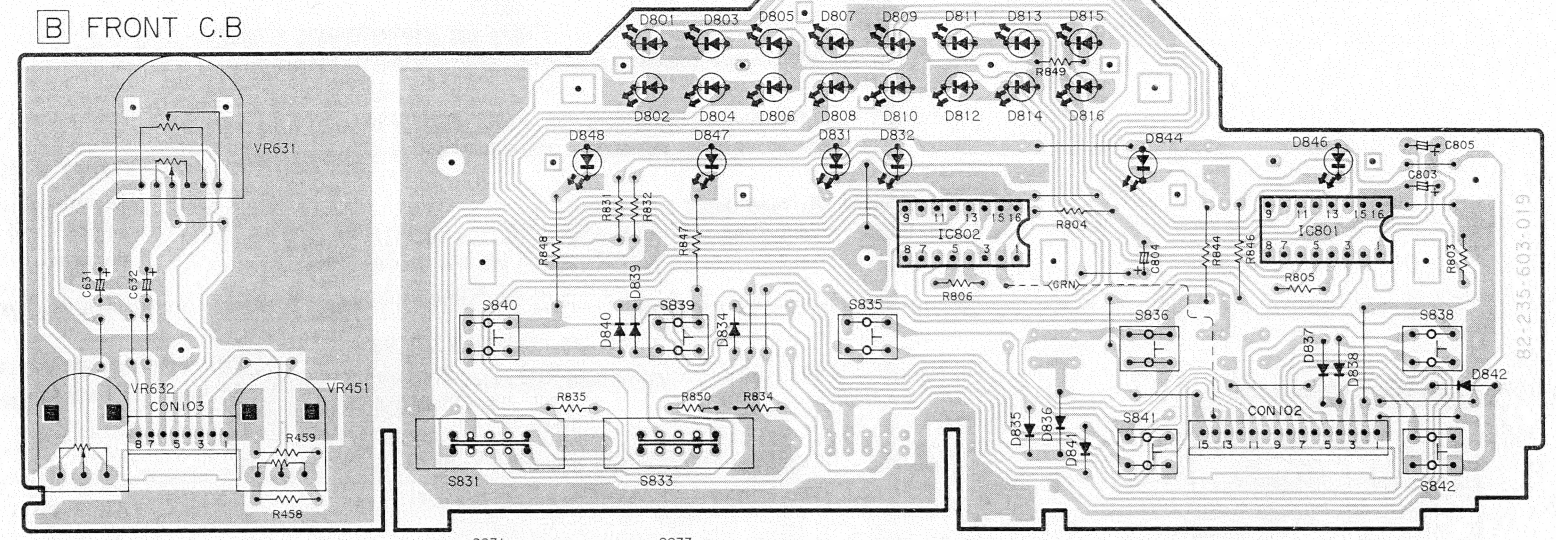


IC BLOCK DIAGRAM-2 IC, CX20187

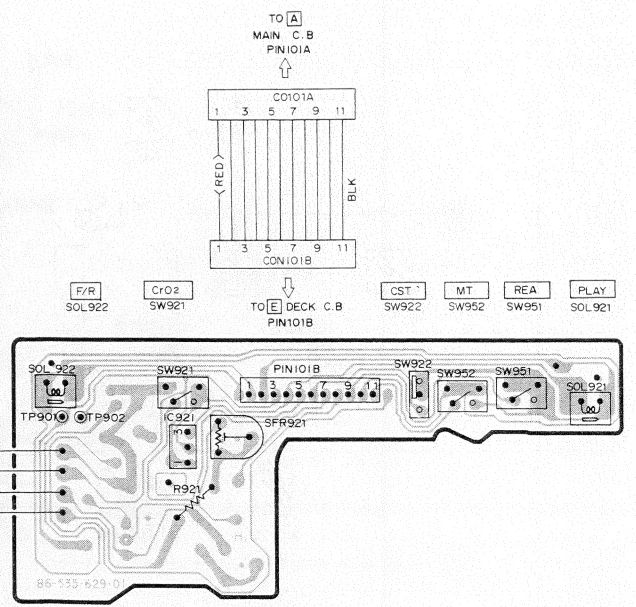
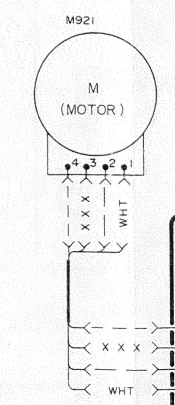
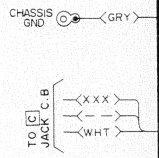
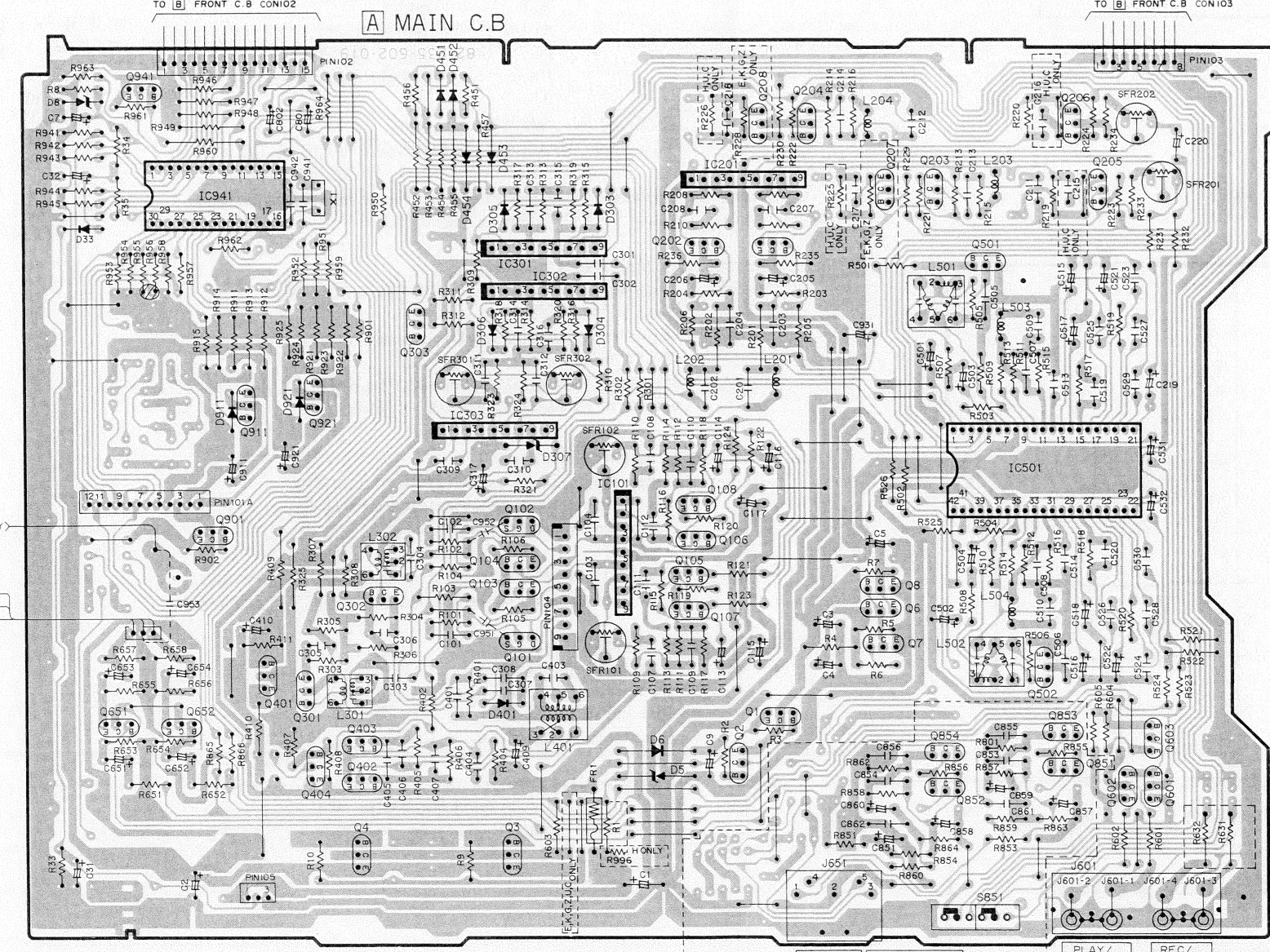
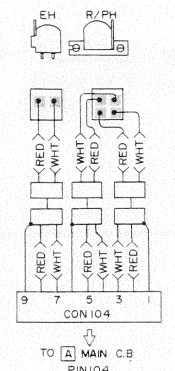
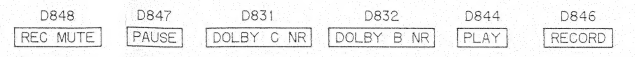
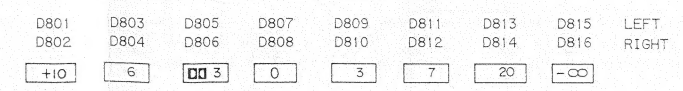




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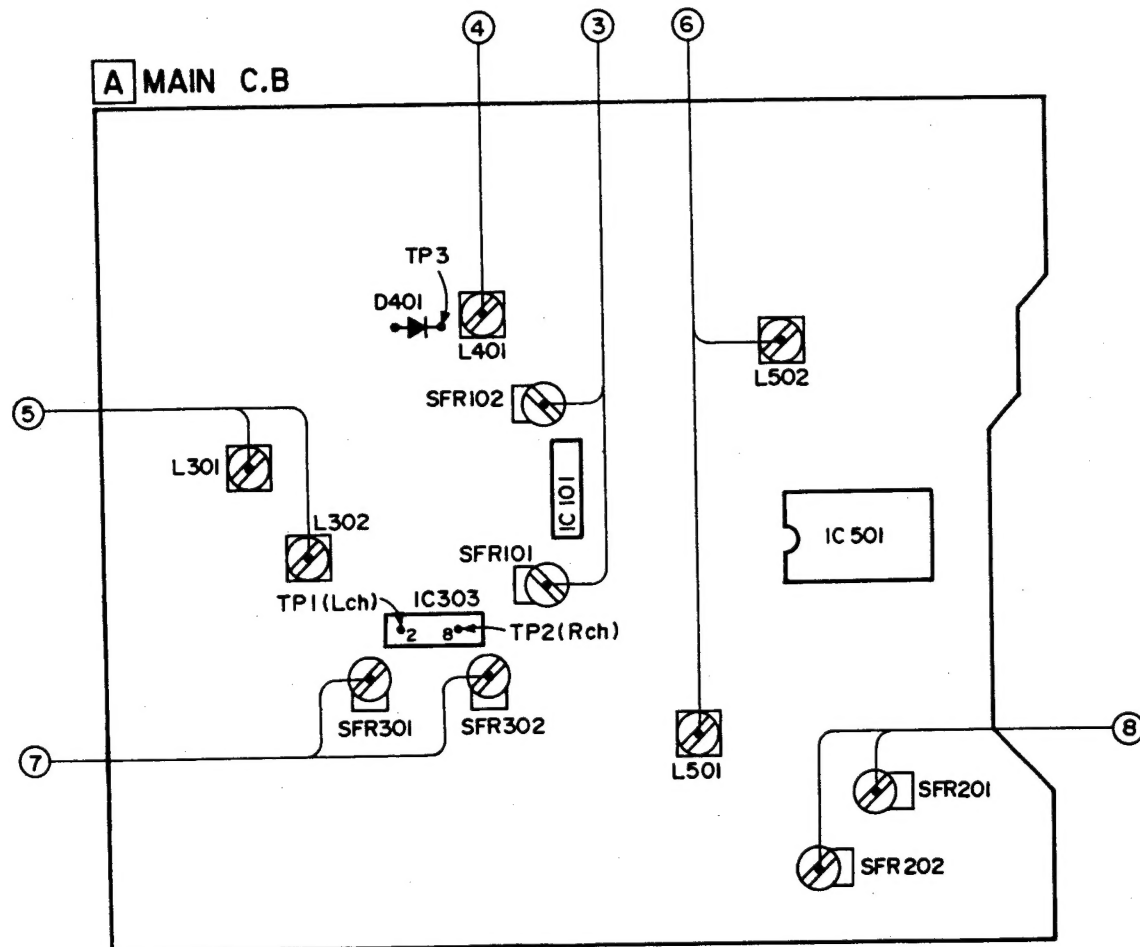
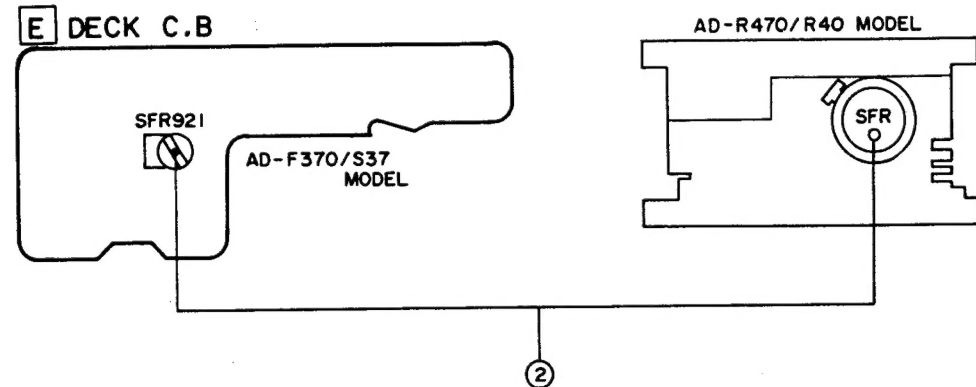
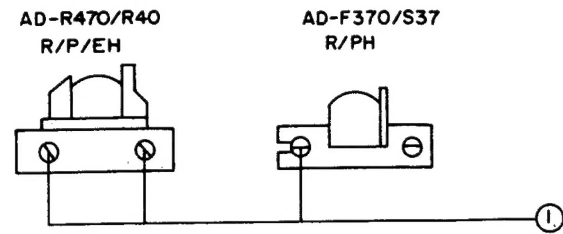


8 POINT PEAK LEVEL METER



DECK C.B.

# ADJUSTMENT (AD-R470,R40, AD-F370,S37)



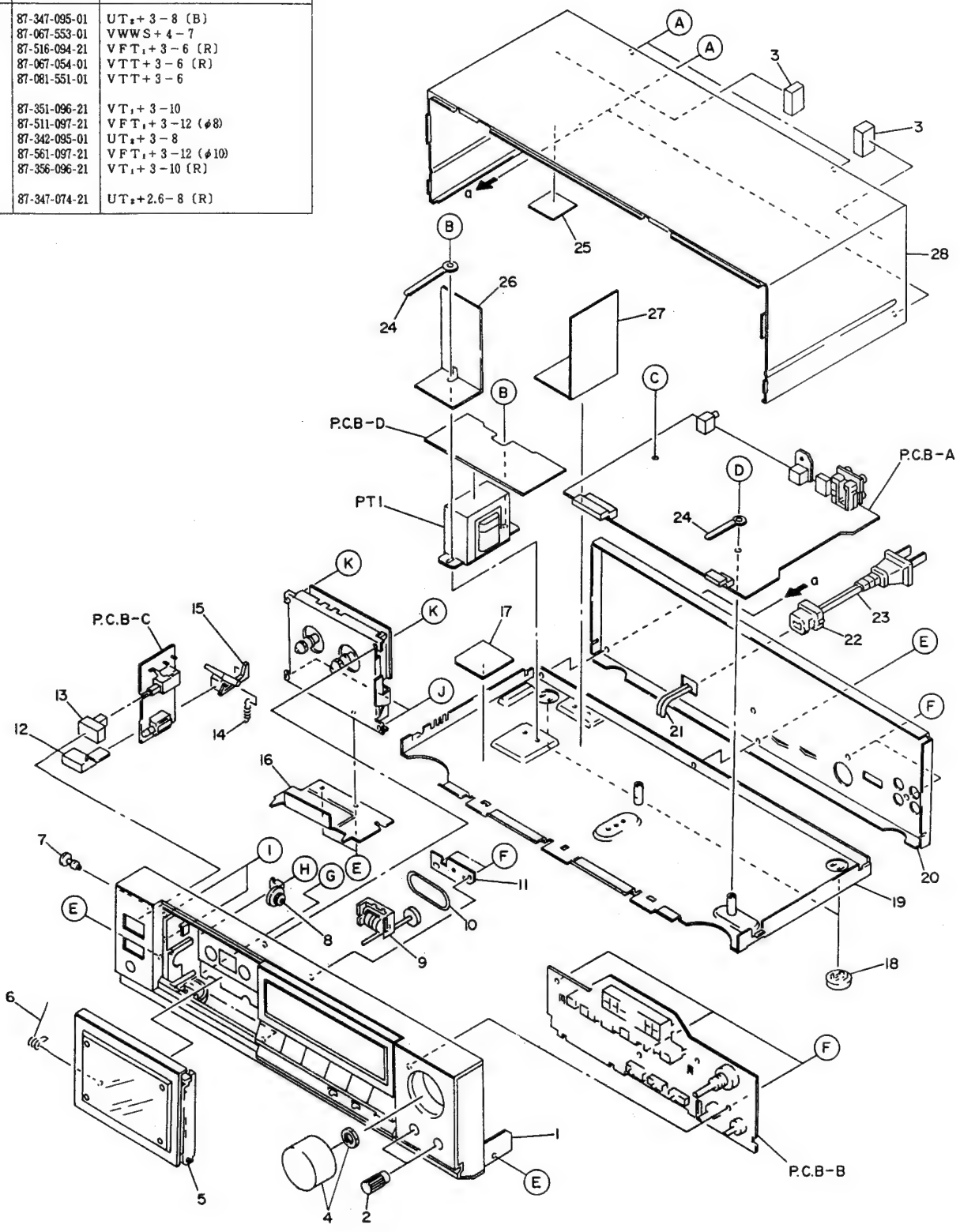
1. Azimuth Adjustment
  - Settings : • Test tape : TTS-310 (TTA-317E)
  - Test point : LINE OUT (AD-F370/S37, AD-R470/R40 H, C, E, K, G ONLY)
  - DIN OUT (AD-F370/R470 Z ONLY)
  - Adjustment location : Azimuth adjustment screw
  - Method : Playback the 10kHz signals of the test tape, and adjust the screw for maximum output.
2. Tape Speed Adjustment
  - Settings : • Test tape : TTA-100 (TTA-111S)
  - Test point : LINE OUT (AD-F370/S37, AD-R470/R40 H, C, E, K, G ONLY)
  - DIN OUT (AD-F370/R470 Z ONLY)
  - Adjustment location : SFR921 (AD-F370/S37) MOTOR SFR (AD-R470/R40)
  - Method : Playback the test tape and adjust the SFR for frequency of 3,000Hz.
3. Playback Sensitivity Adjustment
  - Settings : • Test tape : TTS-200 (TTA-161, TCC-130)
  - Test point : LINE OUT (AD-F370/S37, AD-R470/R40 H, C, E, K, G ONLY)
  - J601-1 (L-CH)
  - J601-2 (R-CH)
  - DIN OUT (AD-F370/R470 Z ONLY)
  - J651
  - DOLBY NR SW : OFF
  - Adjustment location : SFR101 (L-CH) SFR102 (R-CH)
  - Method : Playback the test tape and adjust so that output is  $490 \pm 1\%$ mV.
4. Bias OSC. Coil Adjustment
  - Settings : • Test tape : TTA-620 (TTA-119MP)
  - Test point : TP3
  - Adjustment location : L401
  - DOLBY NR SW : OFF
  - Method : Adjust so that the frequency at the test points is  $85\text{kHz} \pm 200\text{Hz}$ .
5. HX Coil Adjustment
  - Settings : • Test tape : TTA-600 (TTA-119K)
  - Test point : IC303 (HX comparator), pin 2,8
  - Adjustment location : L301 (L-CH) L302 (R-CH)
  - Method : Adjust so that the DC voltage at the test point is minimized in the REC STANDBY mode.
6. MPX Filter Adjustment
  - Settings : • Test tape : Blank tape
  - Input signal : 19kHz signal at LINE IN
  - Test point : LINE OUT
  - Adjustment location : L501 (L-CH) L502 (R-CH)
  - Method : Record the test tape, and adjust so that the output DOLBY B/C SW ON becomes up to 27dB for the output at DOLBY B/C SW OFF.
7. REC/PB Frequency Response Adjustment
  - Settings : • Test tape : TTA-600 (TTA-119K)
  - Test point : LINE OUT (AD-F370/S37, AD-R470/R40 H, C, E, K, G ONLY)
  - J601-1 (L-CH)
  - J601-2 (R-CH)
  - DIN OUT (AD-F370/R470 Z ONLY)
  - J651
  - Adjustment location : SFR301 (L-CH) SFR302 (R-CH)
  - DOLBY NR SW : OFF
  - Method : Record and playback the 1kHz and 10kHz signals and adjust so the output difference becomes  $+0.5 \pm 8.5\text{dB}$  (AD-F370/S37, AD-R470/R40 H, C, E, K, G ONLY)
  - $-3 \pm 3\text{dB}$  (AD-F370/R470 Z ONLY)
8. REC/PB Sensitivity Adjustment
  - Settings : • Test tape : TTA-600 (TTA-119K) (AD-F370/S37, AD-R470/R40 H, C, E, K, G ONLY)
  - TTA-610 (TTA-119H) (AD-F370/R470 Z ONLY)
  - Test point : LINE OUT (AD-F370/S37, AD-R470/R40 H, C, E, K, G ONLY)
  - J601-1 (L-CH)
  - J601-2 (R-CH)
  - DIN OUT (AD-F370/R470 Z ONLY)
  - J651
  - DOLBY NR SW : OFF
  - Adjustment location : SFR201 (L-CH) SFR202 (R-CH)
  - Method : Record and Playback a 1kHz (AD-F370/S37, AD-R470/R47, H, C, E, K, G ONLY), 400Hz (AD-F370/R470 Z ONLY) signal and adjust so that the LINE, DIN output difference became  $0 \pm 0.3\text{dB}$  (AD-F370/S37, AD-R470/R40 H, C, E, K, G ONLY),  $355 \pm 50\text{mV}$  (AD-F370/R470 Z ONLY)

PRACTICAL SERVICE FIGURE (AD-R470,R40, AD-F370,S37)

Playback output: (TTS-200(TTA-161, TCC-130))	EXCEPT Z 470 ± 50mV (LINE OUT) Z ONLY 490 ± 50mV (DIN OUT)	(Weighted)	More than 44/52/62dB (DOLBY-NR OFF/B/C with NORM. tape) More than 46/54/64dB (DOLBY-NR OFF/B/C with CrO <sub>2</sub> , MT. tapes)
PB/REC output: (TTA-600(TTA-119K))	EXCEPT Z 340mV ± 1.5dB (LINE OUT) Z ONLY 340mV ± 1.5dB (DIN OUT)	Recording bias frequency:	85kHz
		Tape speed: (TTA-100(TTA-111S))	3kHz ± 1.5%
PB/REC distortion:	AD-R470, R40 AD-F370, S37 Less than 2.0% (NORM) AD-R470, R40 Less than 2.2% (CrO <sub>2</sub> ) AD-F370, S37 Less than 2.0% (CrO <sub>2</sub> ) AD-R470, R40 AD-F370, S37 Less than 2.0% (MT)	Wow & flutter: (W. R. M. S)	Less than 0.065%
		Take-up torque:	45 ± 10g-cm (0.44 ± 0.1mN·m)
		Fast forward torque:	120 ± 30g-cm (1.18 ± 0.29mN·m)
		Rewind torque:	120 ± 30g-cm (1.18 ± 0.29mN·m)
		Back-tension:	3 ± 1g-cm (0.03 ± 0.02mN·m)
Playback noise:	AD-R470, R40 AD-F370, S37 Less than 4.0mV (DOLBY-B NR OFF, with NORM. tape) AD-R470, R40 AD-F370, S37 Less than 3.0mV (DOLBY-B NR OFF, with CrO <sub>2</sub> tape) AD-R470, R40 Less than 2.0/1.8mV (DOLBY-B/C NR ON, with NORM. tape) AD-F370, S37 Less than 2.2/2.0mV (DOLBY-B/C NR ON, with NORM. tape) AD-R470, R40 AD-F370, S37 Less than 2.0/1.8mV (DOLBY-B/C NR ON, with CrO <sub>2</sub> tape) More than 60dB	Test tape:	METAL TTA-620(TTA-119MP) CrO <sub>2</sub> TTA-610(TTA-119H) NORMAL TTA-600(TTA-119K)
Erase ratio: (125Hz)	More than 60dB		
PB/REC SN ratio: (Unweighted)	More than 38/44/44dB (DOLBY-NR OFF/B/C with NORM. tape) More than 40/46/46dB (DOLBY-NR OFF/B/C with CrO <sub>2</sub> , MT. tapes)		

# EXPLODED VIEW-1

REF. NO.	PART NO.	DESCRIPTION
A	87-347-095-01	UT <sub>z</sub> +3-8 (B)
B	87-067-553-01	VWWS+4-7
C	87-516-094-21	VFT <sub>1</sub> +3-6 (R)
D	87-067-054-01	VTT+3-6 (R)
E	87-081-551-01	VTT+3-6
F	87-351-096-21	VT <sub>1</sub> +3-10
G	87-511-097-21	VFT <sub>1</sub> +3-12 (φ8)
H	87-342-095-01	UT <sub>z</sub> +3-8
I	87-561-097-21	VFT <sub>1</sub> +3-12 (φ10)
J	87-356-096-21	VT <sub>1</sub> +3-10 (R)
K	87-347-074-21	UT <sub>z</sub> +2.6-8 (R)

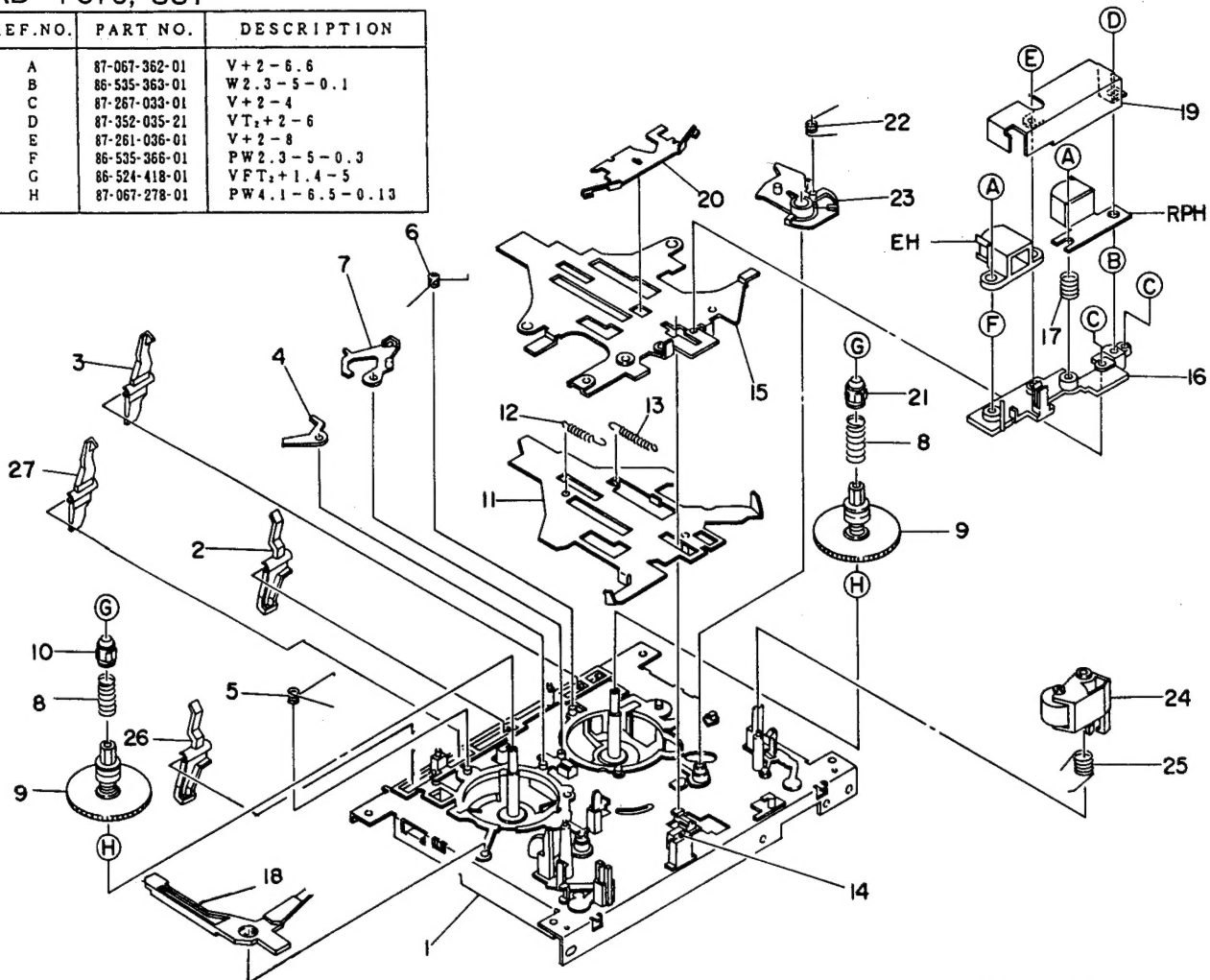


# MECHANICAL PARTS LIST

PART NO. CHANGED TO	REF. NO.	PART NO.	DESCRIPTION	COMMON MODEL	Q'TY
	1-1	★09-047-383-010	CABINET FRONT ASSY (F370)	※	1
	1-1	★09-047-384-010	CABINET FRONT ASSY (S37)	※	1
	1-1	★09-047-398-010	CABINET FRONT ASSY (R470)	※	1
	1-1	★09-047-399-010	CABINET FRONT ASSY (R40)	※	1
	1-2	★82-234-018-010	KNOB, BIAS		2
	1-3	★84-711-306-019	G CUSHION 10-5-5		2
	1-4	★82-235-014-019	KNOB, REC	※	1
	1-5	09-047-385-010	CASSETTE BOX ASSY (H, C ONLY) (F370)	※	1
	1-5	09-047-387-010	CASSETTE BOX ASSY (U ONLY) (S37)	※	1
	1-5	09-047-386-010	CASSETTE BOX ASSY (E, K, G, Z ONLY) (F370)	※	1
	1-5	09-047-395-010	CASSETTE BOX ASSY (H, C ONLY) (R470)	※	1
	1-5	09-047-397-010	CASSETTE BOX ASSY (U ONLY) (R40)	※	1
	1-5	09-047-396-010	CASSETTE BOX ASSY (E, K, G, Z ONLY) (R470)	※	1
	1-6	★82-235-208-019	T-SPRING, EJECT	※	1
	1-7	★87-084-077-019	NYLON RIVET 3.5-4.5		1
	1-8	★87-063-143-010	OIL DAMPER 75		1
	1-9	★87-040-194-010	COUNTER		1
	1-10	★82-235-207-010	BELT, COUNTER	※	1
	1-11	★82-205-208-010	HOLDER, COUNTER		1
	1-12	★82-234-015-010	PUSH-KEY, EJECT		1
	1-13	★84-721-023-010	PUSH-BUTTON, POWER		1
	1-14	★82-235-206-019	E-SPRING, EJECT	※	1
	1-15	★82-235-202-019	LEVER, EJECT	※	1
	1-16	★82-235-209-010	PLATE, SHIELD HEAD (R470, R40)	※	1
	1-17	★82-231-615-010	SILICON STEEL 43-43 (F370, S37)		1
	1-18	★87-055-059-010	FOOT B		2
	1-19	---	CHASSIS, AMP.		1
	1-20	★82-236-005-019	PANEL, REAR (H ONLY) (F370)	※	1
	1-20	★82-236-006-019	PANEL, REAR (U ONLY) (S37)	※	1
	1-20	★82-236-007-019	PANEL, REAR (C ONLY) (F370)	※	1
	1-20	★82-236-008-019	PANEL, REAR (E ONLY) (F370)	※	1
	1-20	★82-236-009-019	PANEL, REAR (K ONLY) (F370)	※	1
	1-20	★82-236-010-019	PANEL, REAR (G ONLY) (F370)	※	1
	1-20	★82-236-011-019	PANEL, REAR (Z ONLY) (F370)	※	1
	1-20	★82-235-016-019	CHASSIS, REAR (H ONLY) (R470)	※	1
	1-20	★82-235-018-019	CHASSIS, REAR (U ONLY) (R40)	※	1
	1-20	★82-235-019-019	CHASSIS, REAR (C ONLY) (R470)	※	1
	1-20	★82-235-020-019	CHASSIS, REAR (E ONLY) (R470)	※	1
	1-20	★82-235-021-019	CHASSIS, REAR (K ONLY) (R470)	※	1
	1-20	★82-235-022-019	CHASSIS, REAR (G ONLY) (R470)	※	1
	1-20	★82-235-024-019	CHASSIS, REAR (Z ONLY) (R470)	※	1
	1-21	★87-830-814-019	TUBE UL 8φ-140mm (H, U, C ONLY)		1
	1-22	★87-085-199-010	CORD BUSHING		1
	1-23	★87-034-749-019	AC CORD (H ONLY) (F370, R470)		1
	1-23	★87-034-583-019	AC CORD (U, C ONLY) (F370, S37, R470, R40)		1
	1-23	★82-187-797-019	AC CORD (E, Z ONLY) (F370, R470)		1
	1-23	★82-187-796-019	AC CORD (K ONLY) (F370, R470)		1
	1-23	★82-187-795-019	AC CORD (G ONLY) (F370, R470)		1
	1-24	---	WIRE BINDER		2
	1-25	★82-226-274-010	DUMPER 80-60-3 (E, K, Z ONLY)		1
	1-26	★82-235-620-010	SILICON BOARD A2 (R470, R40)	※	1
	1-27	★82-104-212-010	SILICON BOARD A (R470, R40)		1
	1-28	★82-235-002-019	CABINET, STEEL	※	1

EXPLODED VIEW-2 (X-3 SR1UN, SR2UN)  
AD-F370, S37

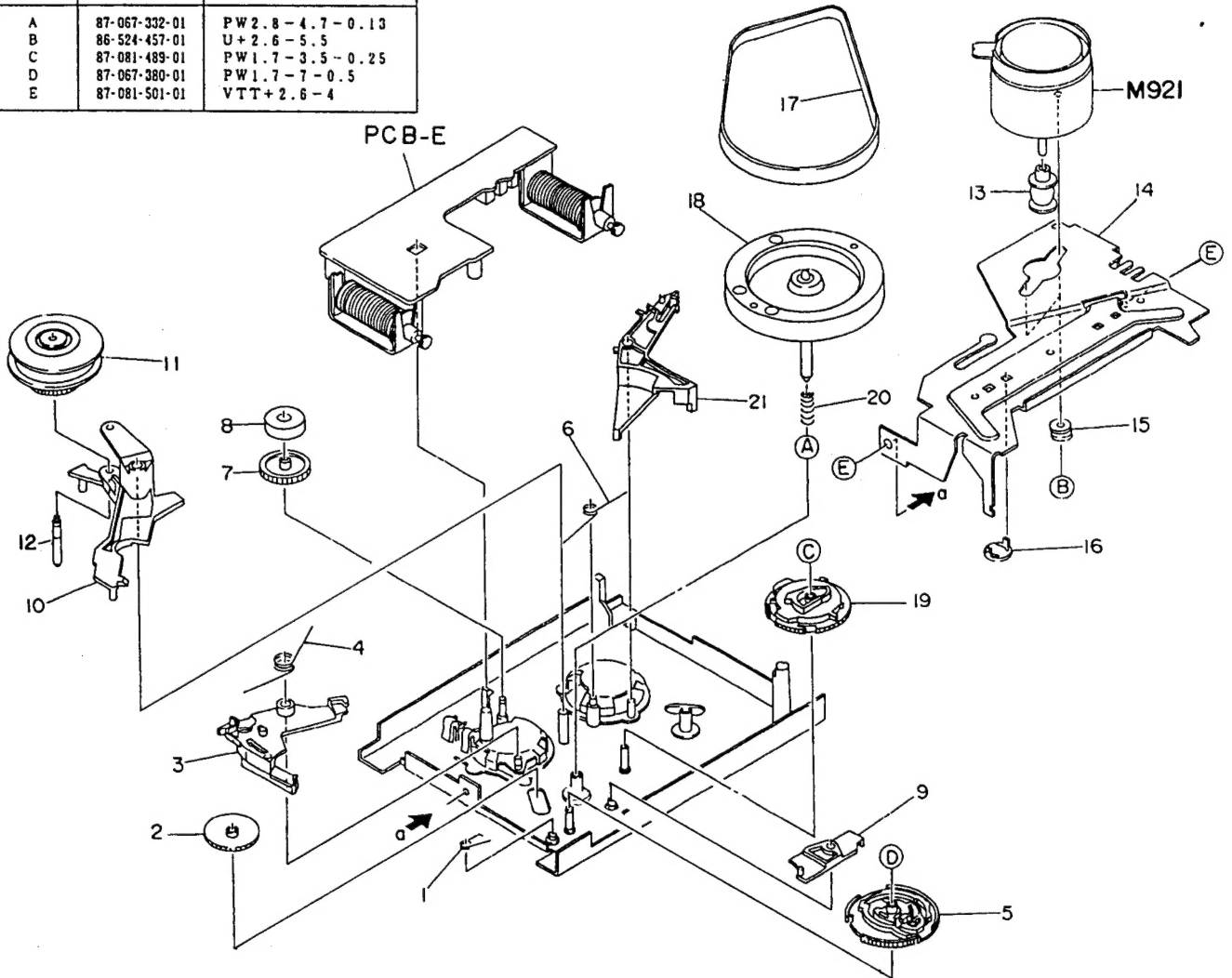
REF.NO.	PART NO.	DESCRIPTION
A	87-067-362-01	V+2-6.6
B	86-535-363-01	W2.3-5-0.1
C	87-267-033-01	V+2-4
D	87-352-035-21	VT <sub>2</sub> +2-6
E	87-261-036-01	V+2-8
F	86-535-366-01	PW2.3-5-0.3
G	86-524-418-01	VFT <sub>2</sub> +1.4-5
H	87-067-278-01	PW4.1-6.5-0.13



PART NO. CHANGED TO	REF. NO.	PART NO.	DESCRIPTION	COMMON MODEL	Q'TY
	2-1	★86-535-339-310	MECHANISM CHASSIS ASSY S		1
	2-2	★86-535-249-110	LEVER, CASSETTE S		1
	2-3	★86-535-254-110	LEVER, CHROME		1
	2-4	★86-535-252-210	LEVER, BRAKE R		1
	2-5	★86-535-371-019	T-SPRING, BRAKE R		1
	2-6	★86-535-370-019	T-SPRING, BRAKE F		1
	2-7	★86-535-251-010	LEVER, BRAKE F		1
	2-8	★86-535-293-019	C-SPRING, REEL PLATFORM		2
	2-9	86-535-240-110	REEL PLATFORM A ASSY		2
	2-10	★86-524-218-119	STOPPER S, REEL PLATFORM		1
	2-11	★86-535-385-210	SLIDE PLATE S ASSY		1
	2-12	★86-535-285-019	E-SPRING, SLIDE		1
	2-13	★86-535-286-019	E-SPRING, ACTUATING		1
	2-14	★86-535-353-010	FELT 5-4-2		1
	2-15	★86-535-311-310	ACTUATING CHASSIS S		1
	2-16	★86-535-314-010	BASE, HEAD		1
	2-17	★86-535-359-010	C-SPRING, AZIMUTH S		1
	2-18	★82-235-204-010	LEVER, PROTECT		1
	2-19	★86-535-362-010	PLATE, HEAD SHIELD		1
	2-20	★86-535-289-010	P-SPRING, ACTUATING		1
	2-21	★86-524-233-119	STOPPER T, REEL PLATFORM		1
	2-22	★86-535-282-019	T-SPRING, PLAT GEAR F		1
	2-23	★86-535-238-110	LEVER, PLAY F		1
	2-24	86-535-226-110	PINCH LEVER F ASSY		1
	2-25	★86-535-312-010	T-SPRING, PINCH S		1
	2-26	★86-535-247-210	LEVER, REC A		1
	2-27	★86-535-250-010	LEVER, METAL		1

EXPLODED VIEW-3 (X-3 SR1UN, SR2UN)  
AD-F370, S37

REF.NO.	PART NO.	DESCRIPTION
A	87-067-332-01	PW 2.8-4.7-0.13
B	86-524-457-01	U+2.6-5.5
C	87-081-489-01	PW 1.7-3.5-0.25
D	87-067-380-01	PW 1.7-7-0.5
E	87-081-501-01	VTT+2.6-4



PART NO. CHANGED TO	REF. NO.	PART NO.	DESCRIPTION	COMMON MODEL	Q'TY
	3-1	★86-535-291-110	T-SPRING, FR CAM		1
	3-2	86-535-259-310	GEAR, PLAY		1
	3-3	★86-535-230-210	LEVER, TRIGGER FR		1
	3-4	★86-535-278-019	T-SPRING, FR		1
	3-5	★86-535-261-310	CAM, FR P		1
	3-6	★86-535-279-010	T-SPRING, MAIN		1
	3-7	86-535-258-310	GEAR, IDLER		1
	3-8	★86-535-614-010	RING, MAGNET (4P)		1
	3-9	★86-535-223-310	LEVER, PAUSE		1
	3-10	★86-535-233-010	LEVER, FR		1
	3-11	★86-535-301-010	SLIPDISC ASSY		1
	3-12	★86-535-235-010	SHAFT, FR		1
	3-13	★86-535-389-110	PULLEY, MOTOR C		1
	3-14	---	HOLDER, MOTOR		1
	3-15	★86-513-441-110	COLLAR		2
	3-16	★86-535-255-010	FLYWHEEL TABLE		1
	3-17	86-535-391-110	BELT SC		1
	3-18	86-535-264-010	FLYWHEEL F ASSY		1
	3-19	★86-535-260-310	CAM, MAIN		1
	3-20	★86-535-288-019	C-SPRING, FLYWHEEL		1
	3-21	★86-535-231-210	LEVER, TRIGGER PLAY		1

See the X-3 Mechanism Guide (Supplement of Service Manual) for the exploded views.  
 The following parts have been changed for this model.

### AD-R470,R40 ALTERATION PARTS LIST

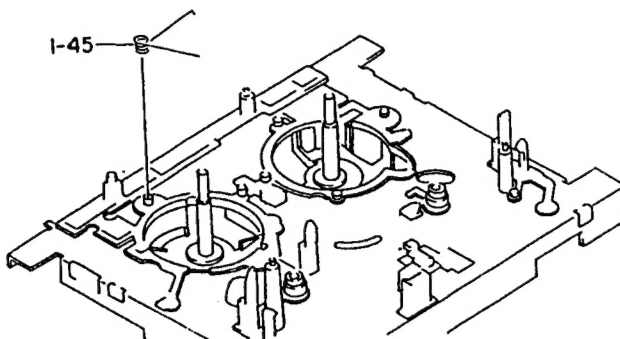
PART NO. CHANGED TO	REF. NO.	PART NO.	DESCRIPTION	COMMON MODEL	Q'TY
	1-11	★86-535-370-019	T-SPRING, BRAKE F		1
	1-20	★86-535-351-310	HEAD CHASSIS PH ASSY		1
	1-23	★86-535-356-010	HEAD HOUSING PH ASSY		1
	1-44	★86-535-353-010	FELT SQ 5-4-2		1
	2-13	★86-535-389-010	PULLY MOTOR C 1		1
	2-17	86-535-390-010	BELT RC		1

The following REF. NOS are not used in this model.  
 1-4, 1-35, 2-9

### ADDITIONAL PARTS LIST

PART NO. CHANGED TO	REF. NO.	PART NO.	DESCRIPTION	COMMON MODEL	Q'TY
	1-45	★86-535-371-019	T-SPRING, BRAKE R		1

### EXPLODED VIEW



### ACCESSORIES/PACKAGE LIST

#### AD-F370,S37

PART NO. CHANGED TO	REF. NO.	PART NO.	DESCRIPTION	COMMON MODEL	Q'TY
	1	★82-236-904-019	INSTRUCTION BOOKLET	※	1
	2	★87-032-845-019	SIEMENS PLUG (H ONLY)		1
	3	★87-034-773-010	CORD PIN, R-237W-1M		2

#### AD-R470,R40

PART NO. CHANGED TO	REF. NO.	PART NO.	DESCRIPTION	COMMON MODEL	Q'TY
	1	★82-235-904-019	INSTRUCTION BOOKLET	※	1
	2	★87-032-845-019	SIEMENS PLUG (H ONLY)		1
	3	★87-034-773-010	CORD PIN, R-237W-1M		2