

Service
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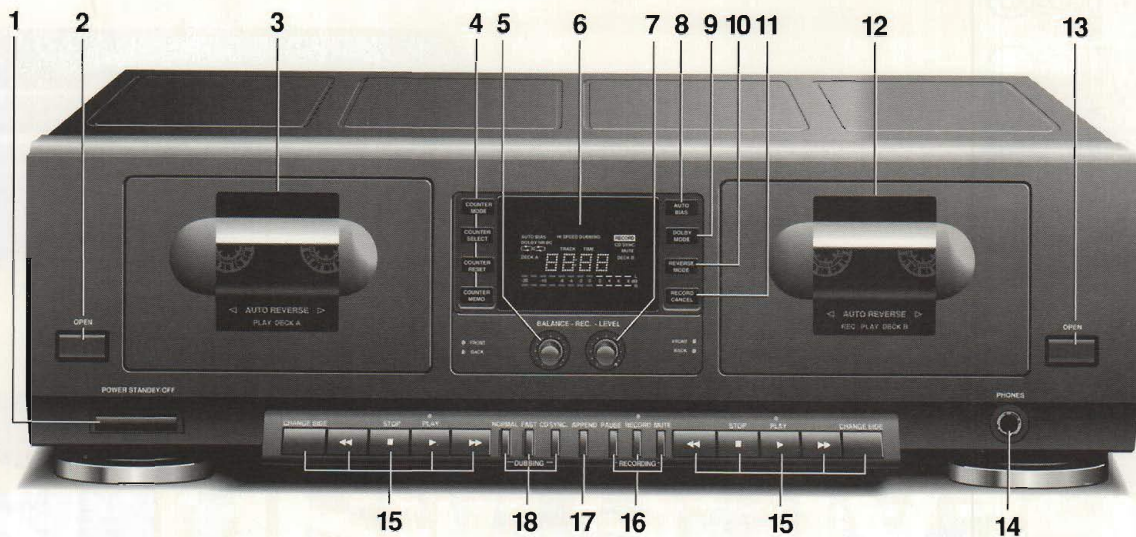
Service Manual

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		cassette deck	
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Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified be used.



CONNECTIONS AND CONTROLS



1 POWER STANDBY/OFF – for switching the cassette deck on and off

2 OPEN – for opening cassette holder 3 of deck A

3 Cassette holder A – for playback in both directions

4 COUNTER

– **COUNTER MODE** – for selecting display to show the tape counter, the total playing time or the track playing time

– **COUNTER SELECT** – for selecting the tape counter to count for deck A or deck B

– **COUNTER RESET** – for returning the tape counter in the display to 0000

– **COUNTER MEMO** – for storing the actual counter reading in the memory

5 REC BALANCE – for adjusting the recording balance

6 Display

7 REC LEVEL – for adjusting the recording volume

8 AUTO BIAS – for starting the automatic procedure which adjust correct recording bias for the tape in deck B.

9 DOLBY MODE – for switching the Dolby Noise Reduction system on and off and selecting Dolby B or Dolby C
Dolby noise reduction and HX Pro headroom extension manufactured under license from Dolby Laboratories Licensing Corporation. Hx Pro originated by Bang and Olufsen. DOLBY, the double-D symbol and HX Pro are trademarks of Dolby Laboratories Licensing Corporation.

10 REVERSE MODE:

– the tape stops at the end of each side.

– playback (+ recording for deck B) of both cassette sides, after which the tape stops at the end of the second side.

– continuous playback of both cassette sides

– for continuous playback of both cassette sides on both decks

11 RECORD CANCEL – for cancelling the current recording. The set will go back to the beginning of the current recording and enter the record pause mode.

12 Cassette holder B – for recording and playback in both directions

13 OPEN – for opening cassette holder 12 of deck B

14 PHONES – socket for stereo headphones

You can connect a pair of stereo headphones with 6.3 mm plug to this socket.

15 Keyboard for deck A and deck B

– – for fast winding in the opposite direction to that in which the tape is travelling or for searching for previous tracks when pressing this key briefly during playback

– **STOP** – for stopping the tape transport

– **PLAY** – for starting playback

– – for fast winding in the tape travel direction or for searching for next tracks when pressing this key briefly during playback

– **CHANGE SIDE** – for reversing the tape travel direction of the playing deck (A or B) or reversing the tape travel direction of both decks when they are in STOP mode. After switching on the power, the unit always automatically displays the last directions chosen.

16 RECORDING

– **RECORD** – for starting recording.

– **MUTE** – for recording a pause (silent passage)

– **PAUSE** – for preparing or interrupting a recording

17 APPEND – for searching for a blank space on the tape in deck B of at least 20 seconds suitable for recording

18 DUBBING

– **NORMAL** – for dubbing from deck A to B at normal speed

– **FAST** – for dubbing from deck A to B at high speed

– **CD SYNC.** – for synchro start of deck B and a CD player when recording from a Compact Disc (provided the CD player is connected via its ESI bus to your Philips system 900 series).



DISPLAY

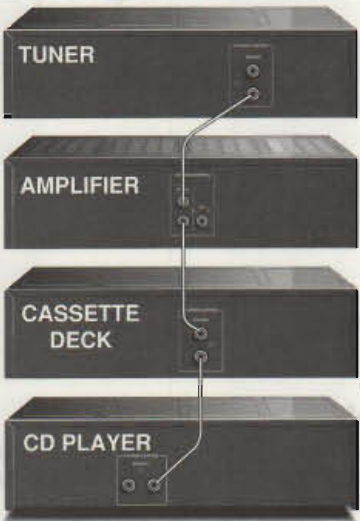


- The display shows:
- (L) (R) – when the reverse-mode continuous playback of both cassette sides on both decks is activated;
 - 88.88 – tape transport counter or time of deck A and deck B;
 - **DOLBY B/C** – when Dolby Noise Reduction System B or C is switched on;
 - **AUTO BIAS** – during the automatic bias adjustment procedure
 - **MUTE** – during recording mute;
 - **RECORD** – during any recording or dubbing; Starts flashing during recording pause mode;
 - **CD SYNC.** – during a synchronized CD recording;
 - **DUBBING** – during dubbing at normal speed;
 - **HI SPEED DUBBING** – during high-speed dubbing;
 - **DECK A/B** – indicating that the tape transport counter is counting for deck A or deck B; blinks when COUNTER MEMO is activated.
 - **Peak level meters** – indicating the output or recording level which can be adjusted with the REC BALANCE and REC LEVEL controls.

CONNECTIONS

- A PLAY** – output sockets for connection to the TAPE input sockets of your amplifier.
- B REC** – input sockets for connection to the TAPE output sockets of your amplifier.
- C ESI BUS** (Enhanced System Intelligence)
Remote control sockets for connecting up the equipment when you are incorporating the cassette deck in a HiFi system with ESI BUS connection (e.g. Philips 900 series)
Connect the ESI socket to the socket of the external equipment that uses the ESI remote-control system.

ESI BUS CONNECTIONS



- D Voltage selector** 115 V/230 V – for selecting the mains voltage (not on all versions)
- E MAINS** – mains lead

SPECIFICATION

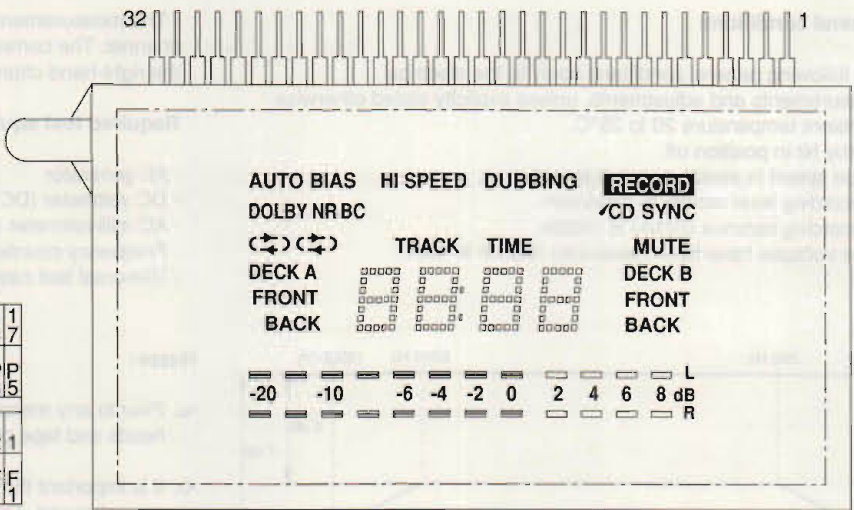
	Nominal value	Typical value	
Motor	: 12V - DC	: 12V - DC	
Cassette system	: Compact cassette		
Number of tracks	: 2x2 (stereo)		
Tape speed	: 4.76 cm/sec	: 4.76 cm/sec	
Speed deviation	: ± 2% (DIN)	: ± 1.5%	
Wow and flutter	: 0.3% (DIN)	: 0.15% (DIN)	
Fast wind time (C60)	: < 100 sec	: < 100 sec	
Bias and erase frequency	: 85kHz ± 5%	: 85kHz ± 5%	
Frequency range	DIN 45500:	IEC:	NAB:
Metal - type IV	: 40 - 15,000 Hz	: 30 - 17,000 Hz	30 - 18,000 Hz
Chromium - type II	: 40 - 15,000 Hz	: 30 - 17,000 Hz	30 - 18,000 Hz
Normal - type I	: 40 - 14,000 Hz	: 30 - 15,000 Hz	30 - 16,000 Hz
Signal/noise	DIN 45500:	IEC/DIN:	NAB:
Metal	: > 53 dB	: 58 dB	60 dB
Chromium	: > 56 dB	: 58 dB	60 dB
Normal	: > 53 dB	: 57 dB	59 dB
Improvement with Dolby B	: > 8.5 dB (CCIR)	: 10 dB	
Improvement with Dolby C	: > 18 dB (CCIR)	: 20 dB	
Distortion	: < 3%	: < 2%	

DISPLAY

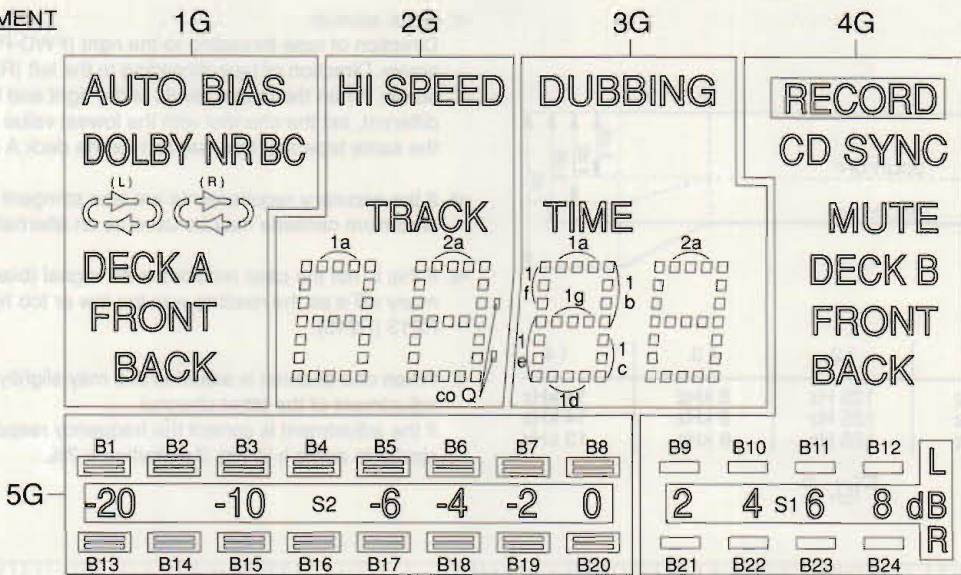
- NOTE** 1) F1, F2 -- Filament
2) NP ---- No pin
3) NC ---- No connection
4) DL ---- Datum Line
5) 1G-5G -- Grid

PIN CONNECTION

PIN NO.	33322222222111
CONNECTION	F F P P P P P P P P 2227654321098765
PIN NO.	11111111111222
CONNECTION	P P P P N N N N 12345N F F 43210C C C C G G G G P 11



GRID ASSIGNMENT



ANODE CONNECTION

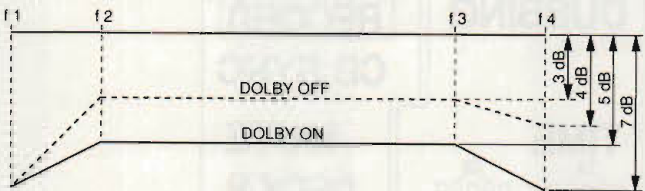
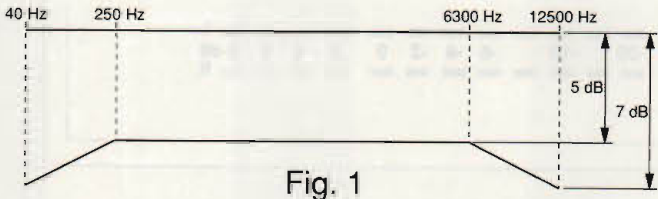
	1G	2G	3G	4G	5G
P1	BACK	1a	1a	BACK	B1
P2	FRONT	1b	1b	FRONT	B2
P3	DECK A	1c	1c	DECK B	B3
P4	(L) (R)	1d	1d	B9	B4
P5	(L) (R)	1e	1e	B10	B5
P6	(L) (R)	1f	1f	B11	B6
P7	(L) (R)	1g	1g	B12	B7
P8	(R) (L)	2a	2a	S1	B8
P9	-	2b	2b	B21	B13
P10	-	2c	2c	B22	B14
P11	-	2d	2d	B23	B15
P12	-	2e	2e	B24	B16
P13	-	2f	2f	-	B17
P14	C	2g	2g	-	B18
P15	B	coQ	-	MUTE	B19
P16	DOLBY NR	TRACK	TIME	CD SYNC	B20
P17	AUTO BIAS	HI SPEED	DUBBING	RECORD	S2

ALIGNMENT

General conditions

The following general conditions apply to the electrical measurements and adjustments, unless explicitly stated otherwise.

- Ambient temperature 20 to 25°C.
- Dolby Nr in position off.
- Tape speed in position normal speed.
- Recording level control at maximum.
- Recording balance control at middle.
- The voltages have been measured relative to earth.



	f 1	f 2	f 3	f 4
Metal	40 Hz	125 Hz	8 kHz	14 kHz
Cr	40 Hz	125 Hz	8 kHz	14 kHz
Normal	40 Hz	125 Hz	8 kHz	13 kHz

Fig. 2

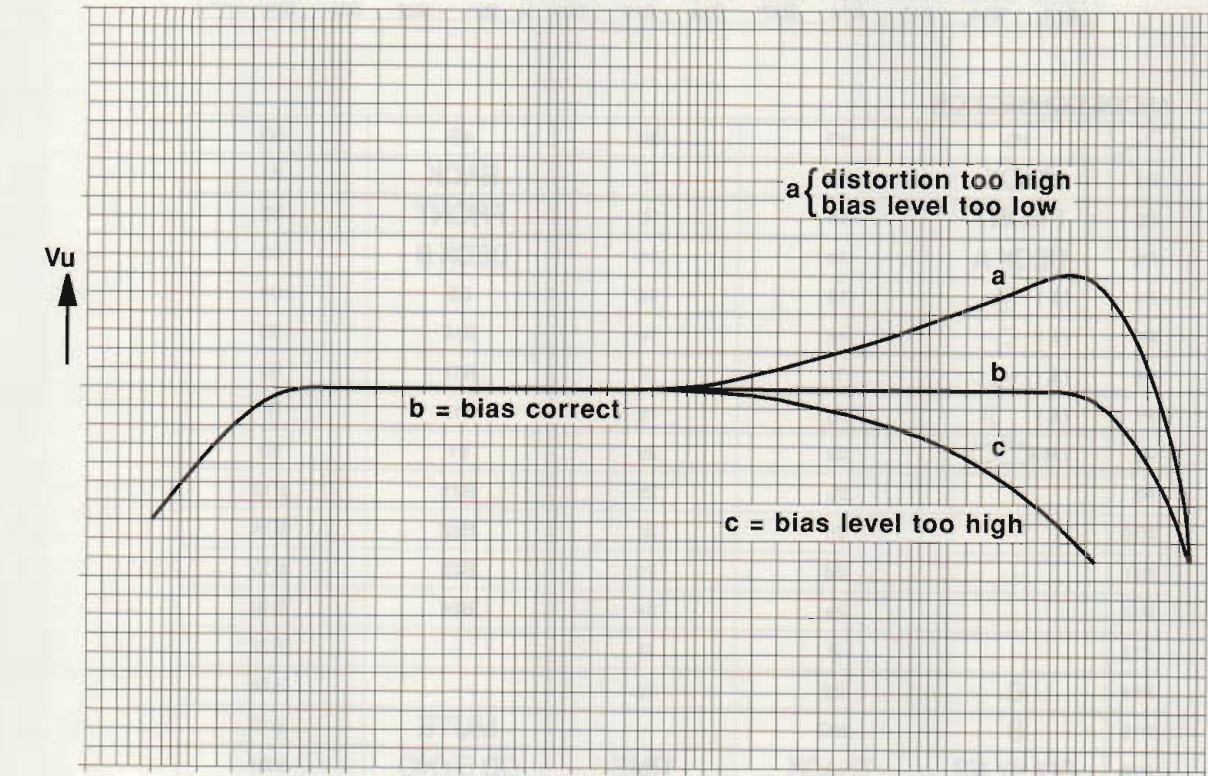


Fig. 3

The measurements and adjustments are related to the left-hand channel. The corresponding test points and adjusting elements for the right-hand channel are given in brackets.

Required test equipment and test cassettes

- AF generator
- DC voltmeter (DC-meter)
- AC millivoltmeter (mV-meter)
- Frequency counter
- Universal test cassette SBC419Cr-4822 397 30069 (250 nWb/m)

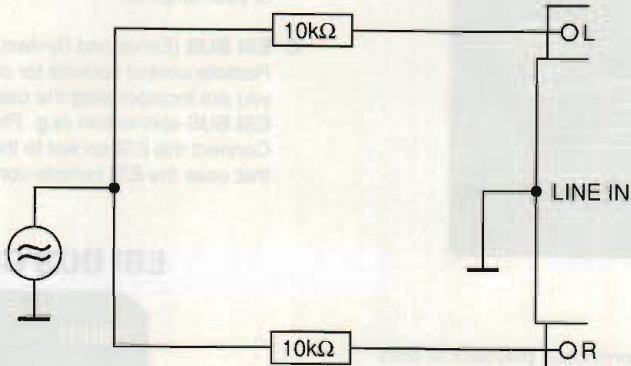
Notes:

- a. Prior to any measurement or adjustment with the tape running, heads and tape guides should be degaussed and cleaned.
- b. It is important that first the high speed is adjusted and hereafter the normal speed. The difference of speed between deck A and B may be 1% at the utmost, both for normal speed and high speed.
- c. Head azimuth
Direction of tape-threading to the right (FWD-PLAY) left-hand screw. Direction of tape-threading to the left (REV-PLAY) righthand screw. When the output levels of the right and left channel are different, set the channel with the lowest value to maximum. Use the same tape and tape section for the deck A and the deck B.
- d. If the accuracy requirements are less stringent a high quality chromium cassette may be used as an alternative.
- e. If this is not the case reduce the AF-signal (bias disabled) by as many dB's as the reading was too low or too high by means of R213 (R215).
- f. When one channel is adjusted this may slightly affect the adjustment of the other channel.
If the adjustment is correct the frequency response curve will be similar to curve b in Fig. 3 distortion < 2%.

Adjustment	Cassette	Recorder in position	Apply signal to	Measure	Read on	Adjust	Value
Tape speed (Dolby off) •b High speed	SBC419 3150Hz	Play (deck A or B)	-	MP-D1 (MP-D2)	Frequency counter	To switch to high speed: - Power off - Press simultaneously << (deck A) and □ (deck B) and switch on with the power button. - Pressing > (deck B): sets Deck B to line-out - Pressing >> (deck B): sets Deck A to line-out - At the end switch off and then on. VR54 (A-deck) 6300Hz ± 0.1% VR61 (B-deck) 6300Hz ± 0.1% At the end make power off and then on.	
						VR51 (A-deck) 3150Hz ± 0.1% VR58 (B-deck) 3150Hz ± 0.1%	
Normal speed	SBC419 3150Hz	Play (deck A or B)	-	MP-D1 (MP-D2)	Frequency counter	VR51 (A-deck) 3150Hz ± 0.1% VR58 (B-deck) 3150Hz ± 0.1%	
Head azimuth	SBC419 10kHz	Play (deck A or B)	-	MP-D1 (MP-D2)	mV-meter	Head azimuth adjust screw •c	Max. output
Playback sensitivity (Dolby off)	SBC419 315Hz - 0 dB	Play (deck A or B)	-	MP-D1 (MP-D2)	mV-meter	R395 (A397) A-deck	490mV ± 0.5dB
						R353 (R354) B-deck	490mV ± 0.5dB
Playback frequency response (Dolby off)	SBC419 40Hz, to 18kHz	Play (deck A or B)	-	MP-D1 (MP-D2)	mV-meter	A-deck If V _{out} from the ratio 315Hz to 12.5kHz is +1 ±0.5dB open bridges B7 (C351) / B8 (C325) / B9 (C327) left channel or B10 (C352) / B11 (C326) / B12 (C328) right channel B-deck If V _{out} from the ratio 315Hz to 12.5kHz is +1 ±0.5dB open bridges B1 (C301) / B2 (C305) / B3 (C313) left channel or B4 (C303) / B5 (C306) / B6 (C315) right channel See graph Fig. 1	
						f-osc Metal cassette Deck B REC/PAUSE MP R242 Frequency counter L106 85kHz ± 1kHz	
Recording calibration (Dolby off)	SBC419 side 2 •d	Deck B REC	500mV 400Hz, to LINE IN Fig. 4	MP-D1 (MP-D2)	mV-meter	Adjust REC. LEVEL POT.	120mV
		Play	-	MP-D1 (MP-D2)	mV-meter	-	120mV ±0.5dB •e
BIAS (Dolby off)	SBC419 side 2 •d	Deck B REC	500mV f ₁ = 400Hz and f ₂ = 12.5kHz, to LINE IN Fig. 4	MP-D1 (MP-D2)	mV-meter	Adjust REC. LEVEL POT.	22mV
		Play	-	MP-D1 (MP-D2)	mV-meter	-	The levels V _{out} (f ₁ = 400Hz) and V _{out} (f ₂ = 12.5kHz) must not differ by more than ±0.5dB. If V _{out} (f ₁ = 400Hz) to V _{out} (f ₂ = 12.5kHz) is greater than 1dB, adjust the BIAS with R231 (R257). See graph Fig. 2 •f
BIAS filters	Metal cassette	Deck B REC (REC. LEVEL POT. min.)	-	MP R213 (MP R215)	mV-meter	F103 (F104)	Adjust for minimum voltage

Adjustment	Cassette	Recorder in position	Apply signal to	Measure	Read on	Adjust	Value
AUTO BIAS (Dolby off)	-	-	-	-	-	To switch on and test 400Hz/12kHz oscillator: - Power off - Press simultaneously << (deck A) and > (deck B) and switch on with the power button. - Pressing > (deck B): sets to 400Hz - Pressing >> (deck B): sets to 12kHz - At the end switch off and then on.	
						Set 400Hz	MP-D1 (MP-D2) mV-meter - f(400Hz ±10%) = 38.8mV = 0dB (ref.)
						Set 12kHz	MP-D1 (MP-D2) mV-meter R337 f(12kHz ±10%) = 0dB ±0.5dB
HX -Pro (Dolby off)	Metal cassette	Deck B REC/PAUSE	-	IC104 MP PIN6 (MP PIN13)	DC-meter	L105 (L108)	Adjust for minimum voltage
MULTIPLEX filters (Dolby off)	Arbitrary cassette	Deck B REC/PAUSE (REC. LEVEL POT. max.)	120mV 400Hz, to LINE IN Fig. 4	MP-D1 (MP-D2)	mV-meter	-	f(400Hz) = 0dB (ref.)
			120mV 19kHz, to LINE IN Fig. 4	MP-D1 (MP-D2)	mV-meter	F101 (F102)	f(19KHz) ≤ -30dB

Fig. 4



SERVICING HINTS

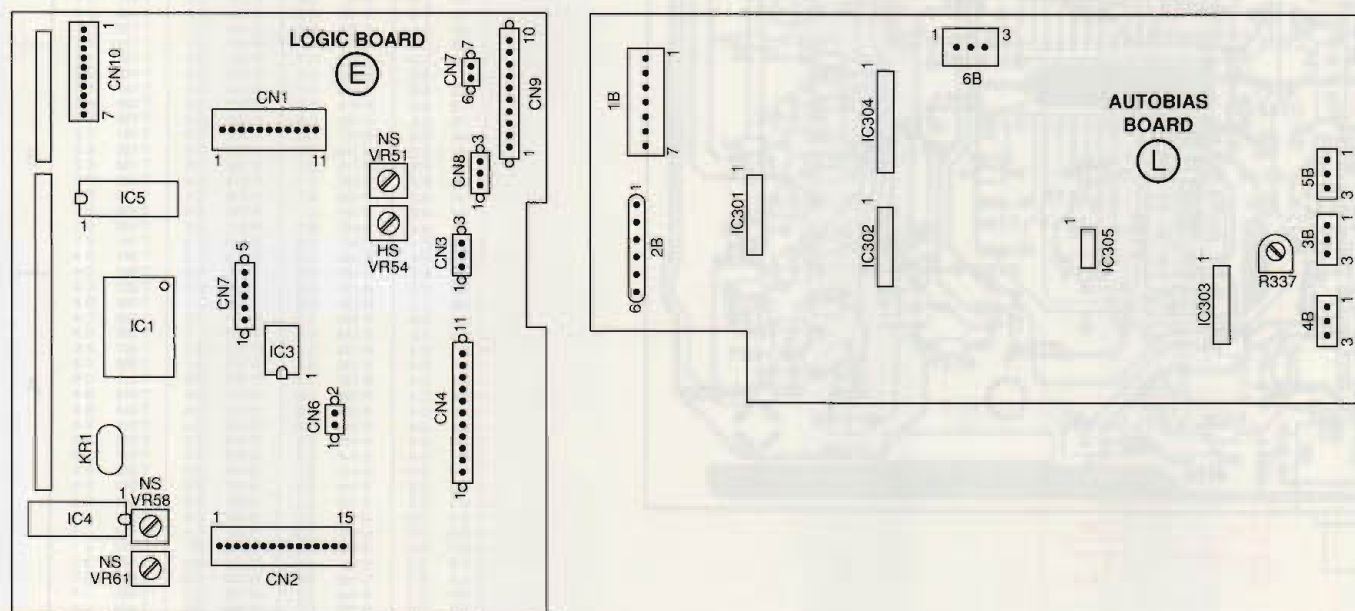
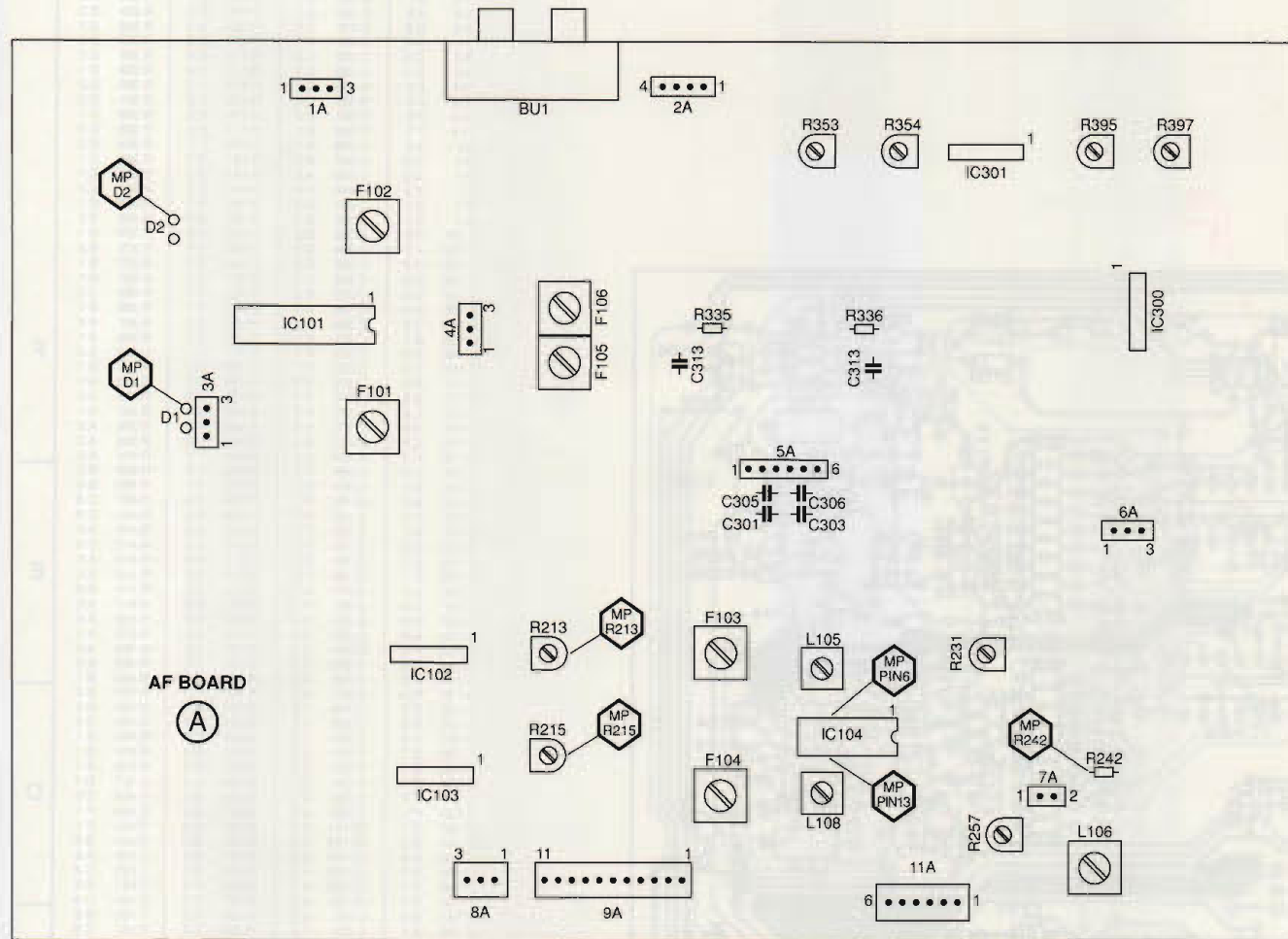
- ESD
All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically.
When repairing, make sure that you are connected with the same potential as the mass of the set via a wrist wrap with resistance. Keep components and tools also at this potential. See Service Information A86 - 1000 for this.
- Warning
If the set is connected to mains voltage, there is a risk of shock-hazard voltages after the set is decased.

- DOLBY HINTS
Dolby noise reduction and HX PRO headroom extension manufactured under license from Dolby Laboratories Licensing Corporation.
"Dolby", the double-D symbol [DOLBY B-C NR HX PRO] are trademarks of Dolby Laboratories Licensing Corporation.

3. ELUCIDATIONS

- Measuring point
- Trimming element

ALIGNMENT LAYOUTS



MECHANICAL ADJUSTMENT AND CHECKS

The tape deck cannot be adjusted without mechanism control circuit.

The torque values

Place a torque test cassette (e. g. test cassette 4822 395 30054) in the set.

The torque values to be measured are specified as follows:

- play take-up torque 40-70 grcm
- supplying reel drag 2-6 grcm
- FF/REW torque 85-170 grcm

MAINTENANCE AND LUBRICATION INSTRUCTIONS

It is advised to clean the tape deck and lubricate the principal points after approx. 500 hours of operation.

1. To be cleaned with alcohol or spirit

- Heads
 - Capstan and pressure roller
 - Pulleys
 - Belts
- Clean the heads, using a soft cloth or a wadded stick.

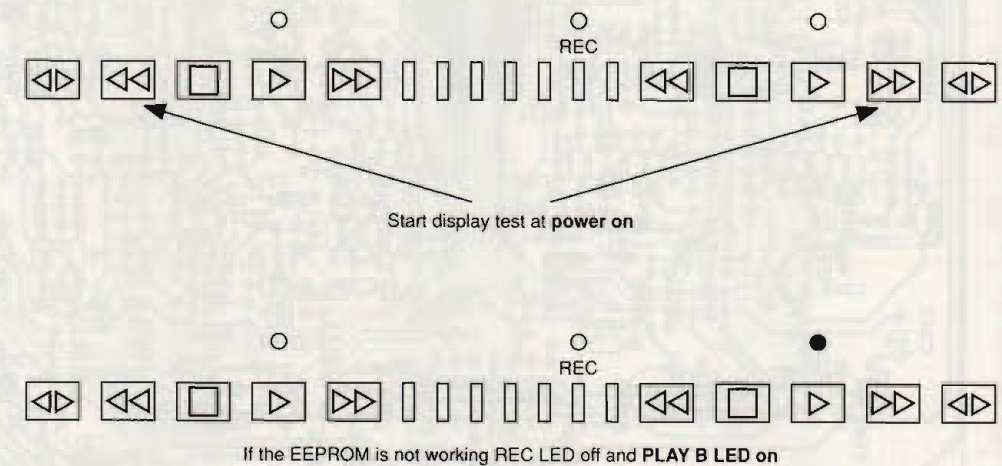
2. Lubrication instructions

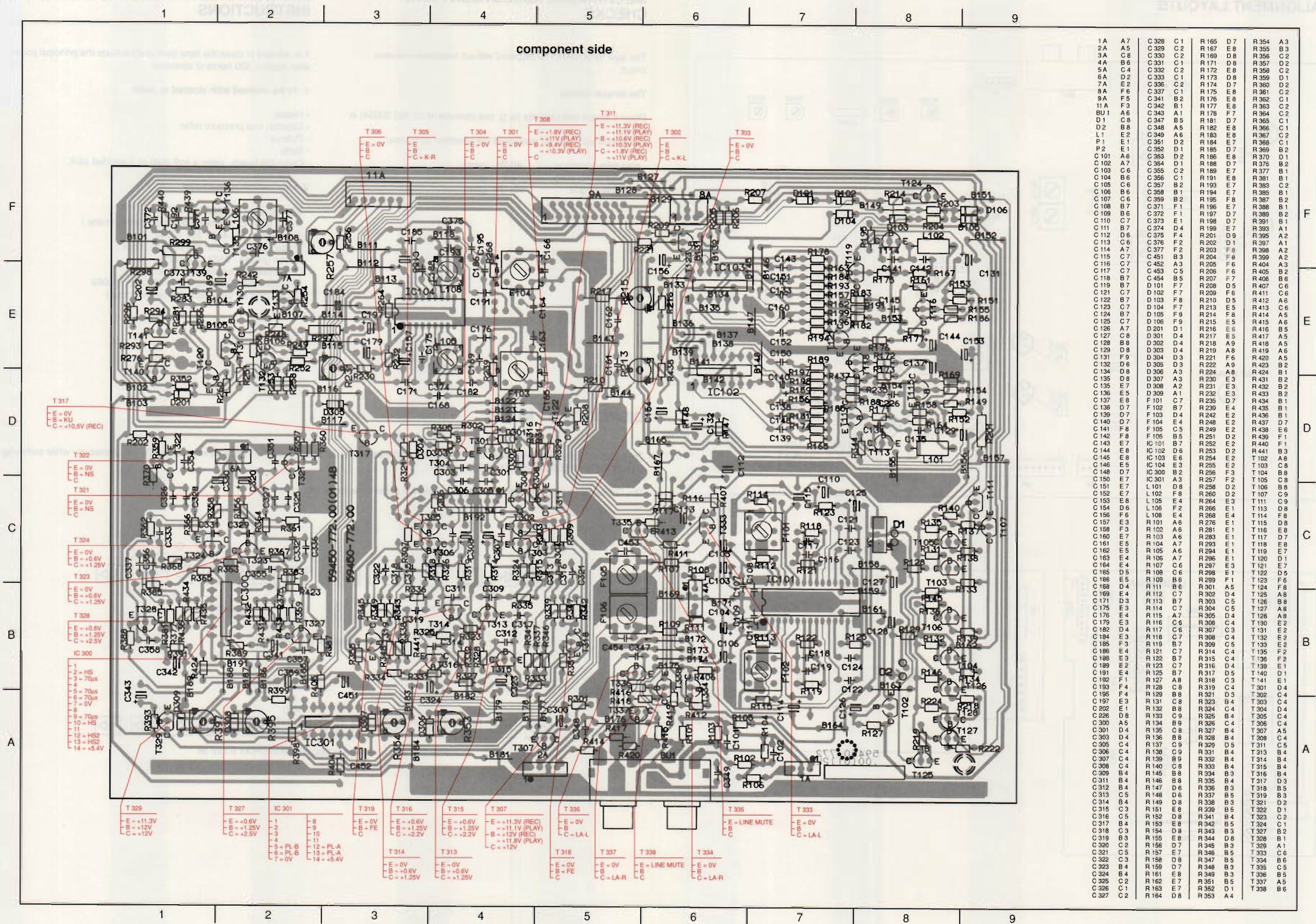
- Shell Alvania 2 4822 389 10001
(To be used for ball bearings, gearwheels, shafts.)
- Shell Clavis 15 4822 390 10048
(To be used for shafts and plain bearings.)
- Silcon grease 5322 390 20011
(To be used for lubricating plastic parts.)
- BP super visco static 20W/50 4822 390 10069
(To be used for lubricating flywheel bearing.)

DISPLAY TEST MODE

To start the Display Test press and hold the buttons "◀◀" (rewind key on deck A) and "▶▶" (forward key on deck B) simultaneously while switching on with the "POWER STAND BY / OFF" button.

The Display Test can be stopped only by switching the cassette recorder off.

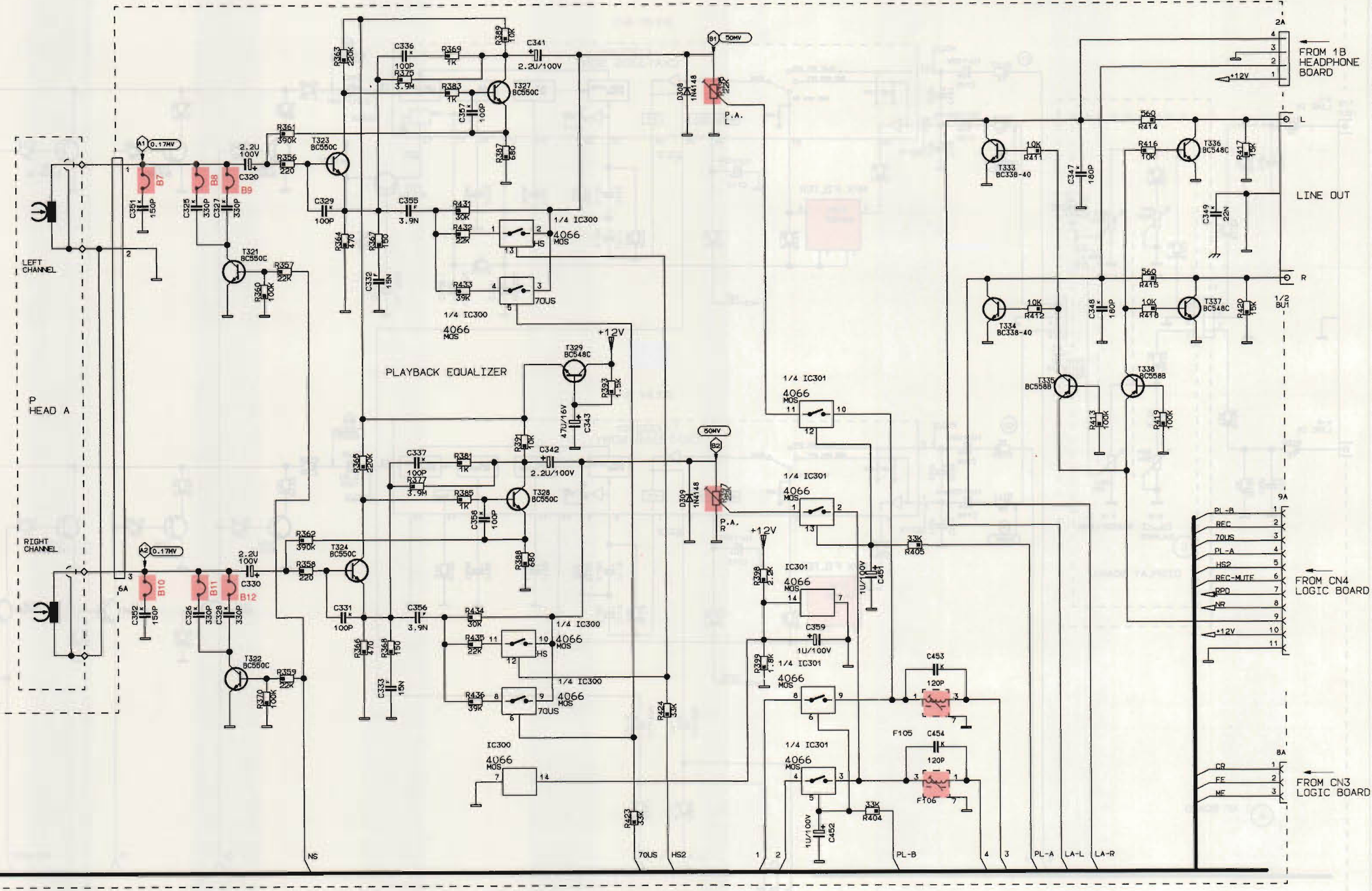
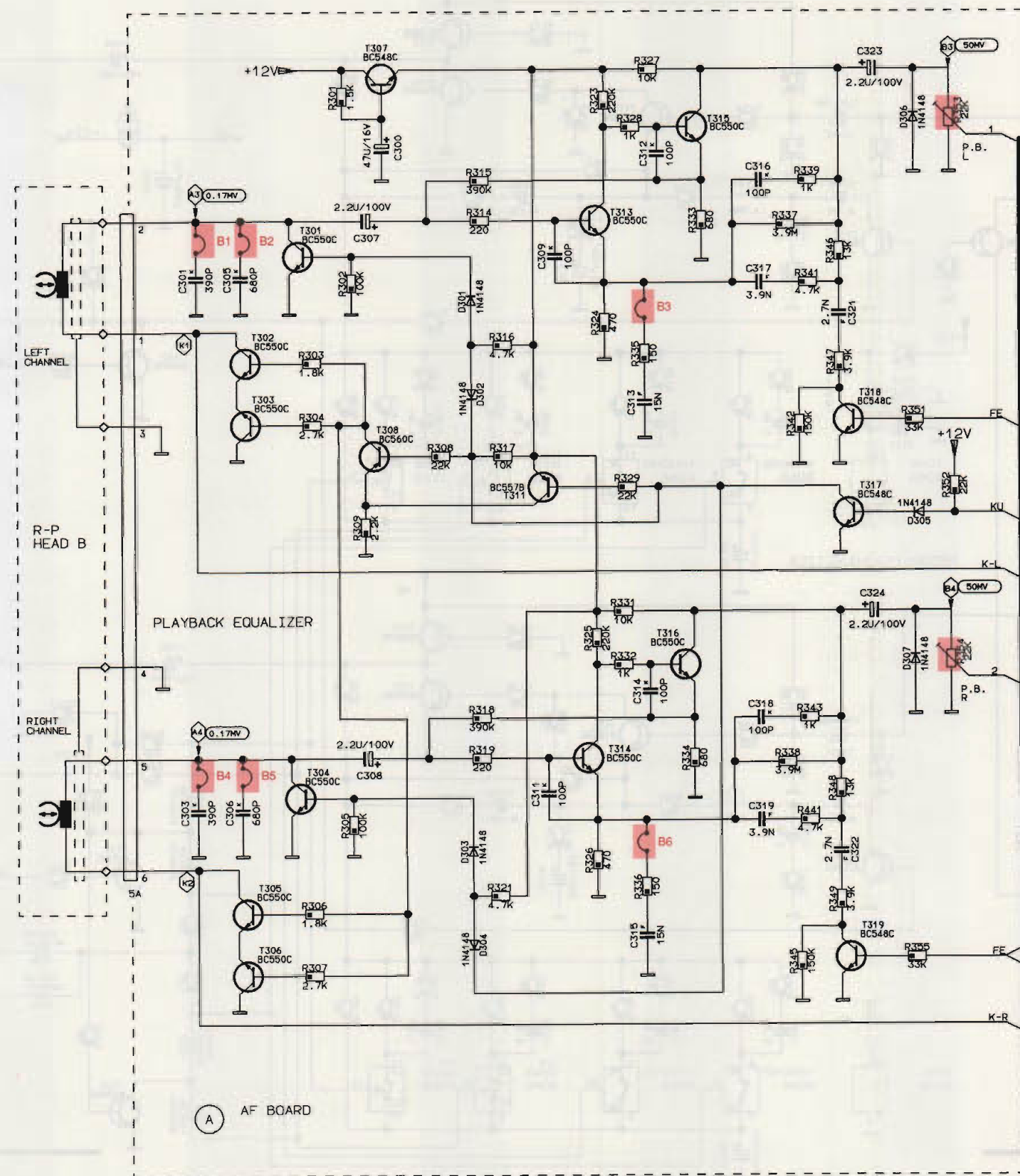




component side

1A	A7	C 328	C1	R 165	D7	R 354	A3
2A	A5	C 329	C2	R 167	E8	R 355	B3
3A	C8	C 330	C2	R 169	D8	R 356	C2
4A	B6	C 331	C1	R 171	D8	R 357	D2
5A	C4	C 332	C2	R 172	E8	R 358	C2
6A	D2	C 333	C1	R 173	D8	R 359	D1
7A	E2	C 336	C2	R 174	D7	R 360	D2
8A	F6	C 337	C1	R 175	E8	R 361	C2
9A	F3	C 341	B2	R 176	E8	R 362	C1
11A	F5	C 342	B1	R 177	E8	R 363	C2
BU1	A6	C 343	A1	R 178	F7	R 364	C2
D1	C8	C 347	B5	R 181	D7	R 365	C1
D2	B8	C 348	A5	R 182	E8	R 366	C1
L1	E2	C 349	A6	R 183	E8	R 367	C2
P1	E1	C 351	D2	R 184	E7	R 368	C1
P2	E1	C 352	D1	R 185	D7	R 369	B2
C101	A6	C 353	D2	R 186	E8	R 370	D1
C102	A7	C 354	D1	R 188	D7	R 375	B2
C103	C6	C 355	C2	R 189	E7	R 377	B1
C104	B6	C 356	C1	R 191	E8	R 381	B1
C105	C6	C 357	B2	R 193	E7	R 383	C2
C106	B6	C 358	B1	R 194	E7	R 385	B1
C107	C6	C 359	B2	R 195	F8	R 387	B2
C108	B7	C 371	F1	R 196	E7	R 388	B1
C109	B6	C 372	F1	R 197	D7	R 389	B2
C110	C7	C 373	E1	R 198	D7	R 391	B1
C111	B7	C 374	D4	R 199	E7	R 393	A1
C112	D6	C 375	F4	R 201	D9	R 395	A2
C113	C6	C 376	F2	R 202	D1	R 397	A1
C114	A7	C 377	F2	R 203	F8	R 398	A2
C115	C7	C 451	B3	R 204	F8	R 399	A2
C116	C7	C 452	A3	R 205	F6	R 404	A3
C117	C7	C 453	C5	R 206	F6	R 405	B2
C118	B7	C 454	B5	R 207	F7	R 406	B6
C119	B7	D101	F7	R 208	D5	R 407	C6
C121	C7	D102	F7	R 209	F6	R 411	C6
C122	B7	D103	F8	R 210	D5	R 412	A6
C123	C7	D104	F7	R 213	E5	R 413	C6
C124	B7	D105	F9	R 214	F8	R 414	A5
C125	C7	D106	F9	R 215	E5	R 415	A6
C126	A7	D201	D1	R 216	E6	R 416	B5
C127	C8	D301	D4	R 217	E5	R 417	A5
C128	B8	D302	D4	R 218	A9	R 418	A5
C129	D8	D303	D4	R 219	A8	R 419	A6
C131	F9	D304	D3	R 221	F6	R 420	A5
C132	D6	D305	D3	R 222	A9	R 423	B2
C134	D8	D306	A3	R 224	A8	R 424	B1
C135	D8	D307	A3	R 230	E3	R 431	B2
C135	E7	D308	A2	R 231	E3	R 432	B2
C136	E5	D309	A1	R 232	E3	R 433	B2
C137	E8	F101	C7	R 235	D7	R 434	B1
C138	D7	F102	B7	R 239	E4	R 435	B1
C139	D7	F103	D4	R 242	E2	R 436	B1
C140	D7	F104	E4	R 248	E2	R 437	D7
C141	F8	F105	C5	R 249	E2	R 438	E6
C142	F8	F106	B5	R 251	D2	R 439	F1
C143	E7	IC101	B7	R 252	E2	R 440	F1
C144	E8	IC102	D6	R 253	D2	R 441	B3
C145	E8	IC103	E6	R 254	E2	T102	A8
C146	E5	IC104	E3	R 255	E2	T103	C8
C148	D7	IC300	B2	R 256	F3	T104	B8
C150	E7	IC301	A3	R 257	F2	T105	C8
C151	E7	L101	D8	R 258	D2	T106	B8
C152	E7	L102	F8	R 260	D2	T107	C9
C153	E8	L105	E4	R 264	C3	T111	C9
C154	D6	L106	F2	R 266	E1	T113	D8
C156	F6	L108	E4	R 268	E4	T114	F8
C157	E3	R101	A6	R 276	E1	T115	D8
C158	F3	R102	A6	R 281	E1	T116	E8
C160	E7	R103	A6	R 283	E1	T117	D7
C161	E5	R104	A7	R 293	E1	T118	E8
C162	E5	R105	A6	R 294	E1	T119	E7
C163	E4	R106	A7	R 296	E1	T120	D1
C164	E4	R107	C6	R 297	E3	T121	E7
C165	D5	R108	C6	R 298	E1	T122	D5
C166	E5	R109	B6	R 299	F1	T123	F6
C168	D4	R111	B6	R 301	A5	T124	F8
C169	E4	R112	C7	R 302	D4	T125	A8
C171	D3	R113	B7	R 303	C5	T126	B8
C173	D3	R114	C7	R 304	C5	T127	A8
C176	A4	R115	A7	R 305	D4	T128	A8
C179	E3	R116	C6	R 306	C4	T130	E2
C182	D4	R117	C3	R 307	C3	T131	E2
C184	C3	R118	C7	R 308	C4	T132	E2
C185	F3	R119	B7	R 309	C5	T133	E2
C186	E4	R121	C7	R 314	C4	T135	F2
C188	E3	R122	B7	R 315	C4	T136	F2
C189	E2	R123	C7	R 316	D4	T139	E1
C191	E4	R125	B7	R 317	D5	T140	D1
C192	F1	R127	A8	R 318	C3	T141	E1
C193	F4	R128	C8	R 319	C4	T142	D1
C195	F4	R129	B8	R 321	D3	T143	C4
C197	E3	R131	C8	R 323	B4	T144	C4
D202	E1	R132	B8	R 324	C4	T145	D4
C226	D8	R133	C9	R 325	B4	T146	C4
C300	A5	R134	B9	R 326	C4	T147	C4
C301	D4	R135	C8	R 327	B4	T148	C4
C303	D4	R136	B8	R 328	B4	T149	C4
C305	C4	R137	C9	R 329	D5	T150	C5
C306	C4	R138	C9	R 330	B4	T151	B4
C307	C4	R139	B9	R 331	B4	T152	B4
C308	C4	R140	C8	R 332	B4	T153	B4
C309	B4	R145	B8	R 334	B3	T154	B4
C311	B4	R146	B8	R 335	B4	T155	D3
C312	B4	R147	D6	R 336	B3	T156	B5
C313	C5	R148	D6	R 337	B5	T157	B3
C314	B4	R149	D8	R 338	B5	T158	D2
C315	C3	R151	E8	R 339	B5	T159	D1
C316	C5	R152	D8	R 341	B4	T160	C2
C317	B4	R153	E8	R 342	B5	T161	C1
C318	C3	R154	D8	R 343	B3	T162	B2
C319	B3	R155	E8	R 344	D8	T163	B1
C320	C2	R156	D7	R 345	B5	T164	A1
C321	C5	R157	E7	R 346	B5	T165	C6
C322	C3	R158	D8	R 347	B5	T166	B6
C323	B4	R159	D7	R 348	B5	T167	C5
C324	B4	R161	E8	R 349	B3	T168	B5
C325	C2	R162	E7	R 350	B5	T169	A5
C326	C1	R163	E7	R 351	D1	T170	B6
C327	C2	R164	D8	R 352	A4	T171	B6

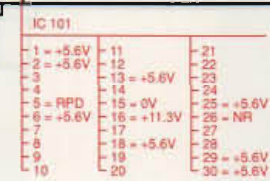
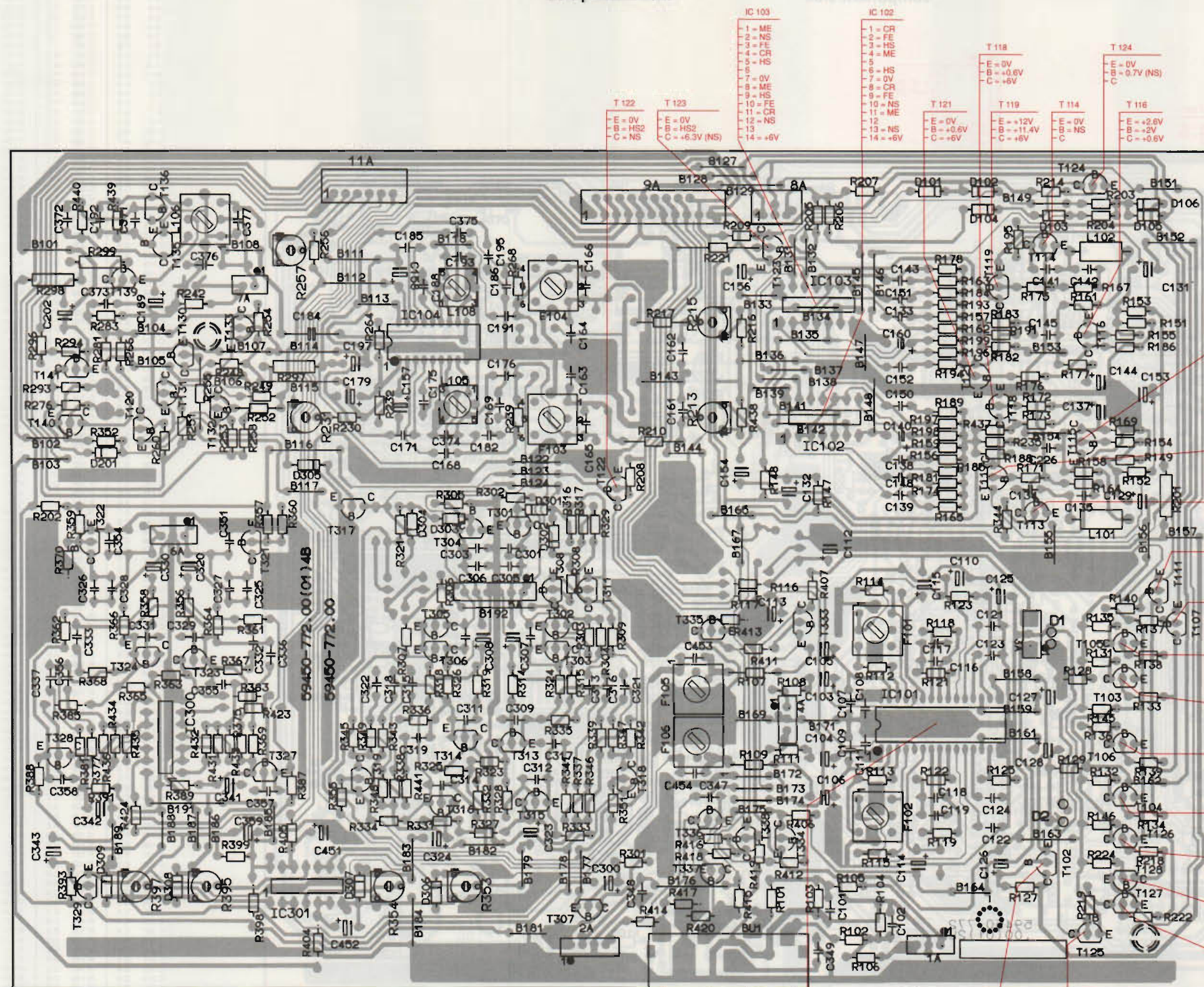
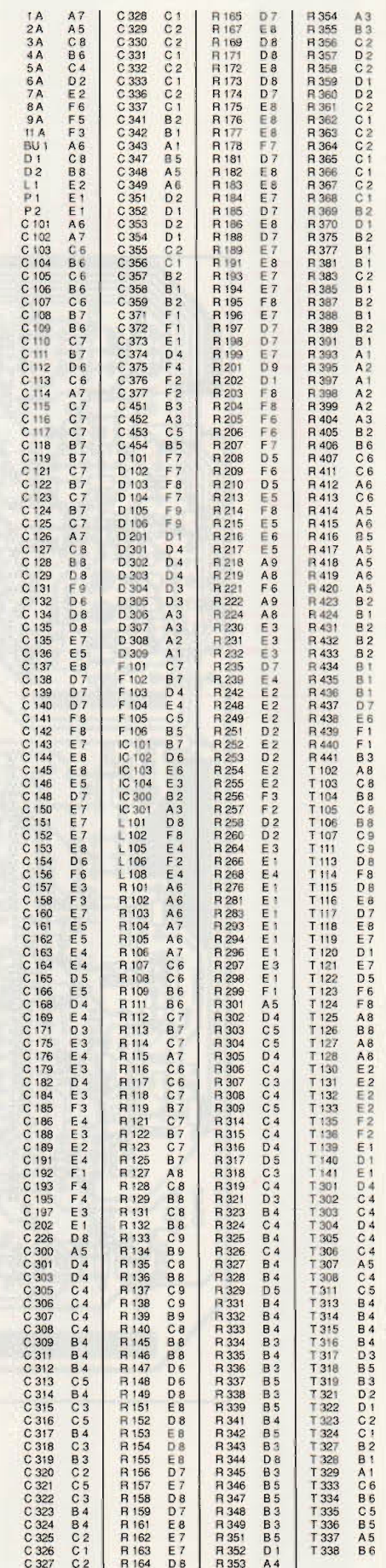
CIRCUIT DIAGRAM AF BOARD - PART 1

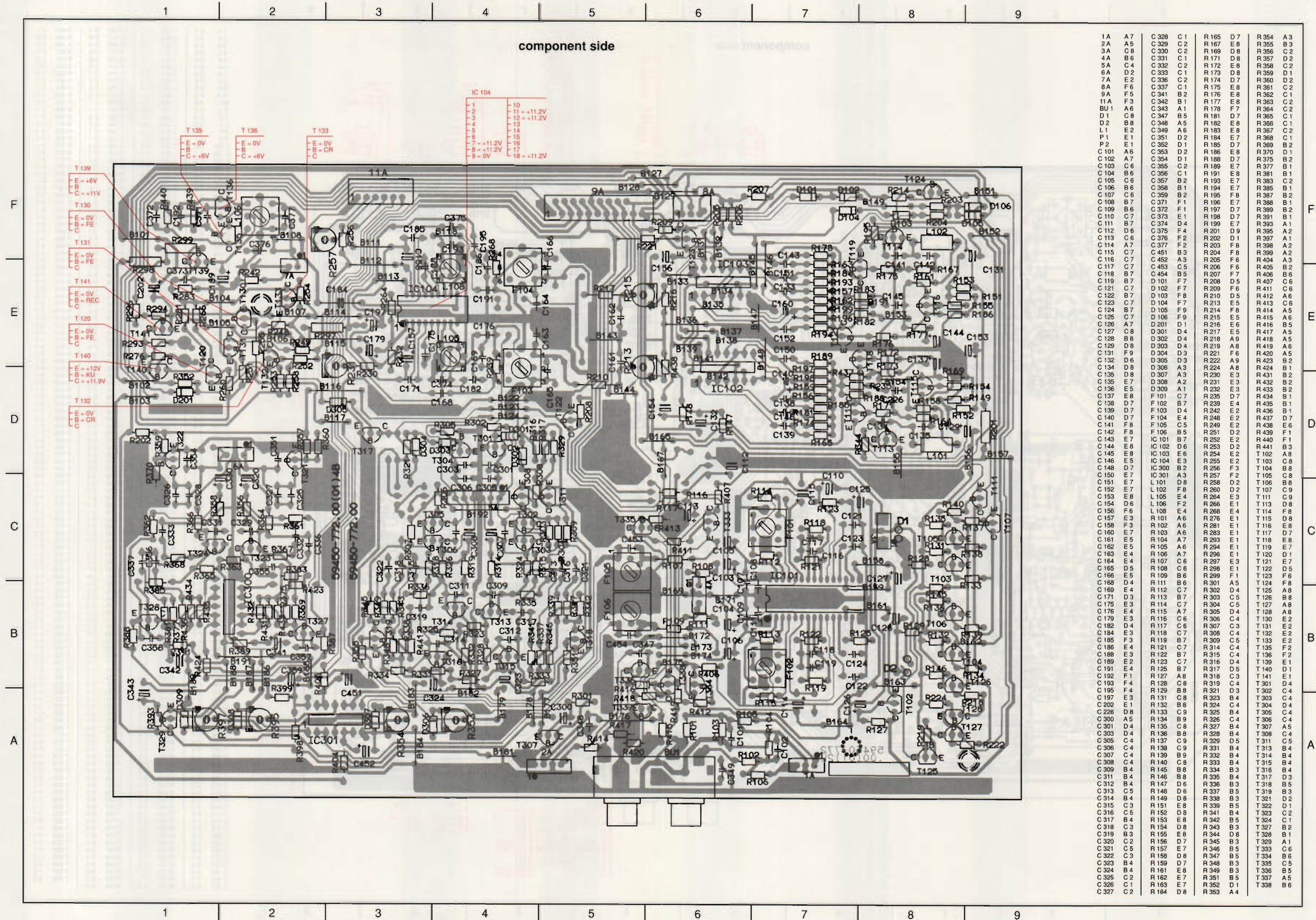


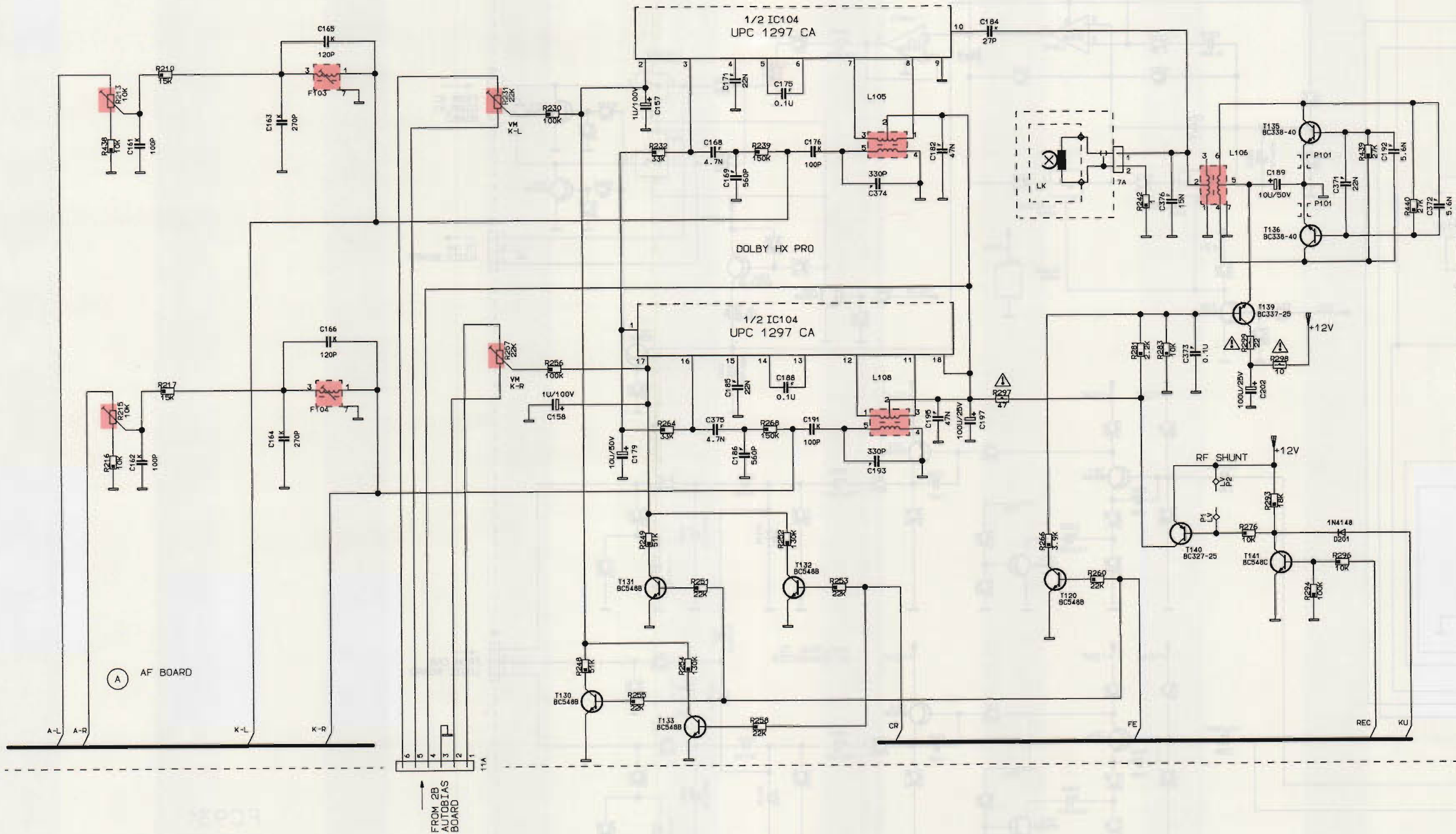
FC931

FIGURE 1







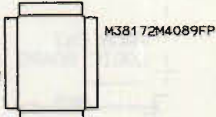
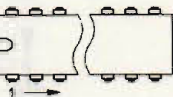
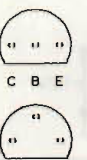


- RESISTOR
- CR16/0.2W (KSW 0204 DIN)
 - CR37/0.5W (KSW 0411 DIN)
 - SFR16T/0.33W (MSW 0204 DIN)
 - CR25/0.33W (KSW 0207 DIN)
 - CR52/0.67W (KSW 0617 DIN)
 - SFR20H/0.6W (MSW 0207 DIN)

- METAL OXIDE
- LOW FLAMMABILITY
- SAFETY RESISTOR

- CAPACITOR
- ELECTROLYTIC
 - TANTALUM ELECTROLYTIC
 - FOIL
 - CERAMIC
 - MULTILAYER
 - POLYPROPYLEN (KS-KP)

TOP VIEW

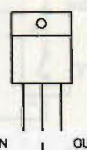


BC548
BC558
BC550
BC338
BC327
BC557

BC636

CD4066
CXA1330S
X24COOP
BA6251
UPC1297CA
LM833
CD4094

FRONT VIEW



MEASUREMENT POINT

ALIGNMENT POINT

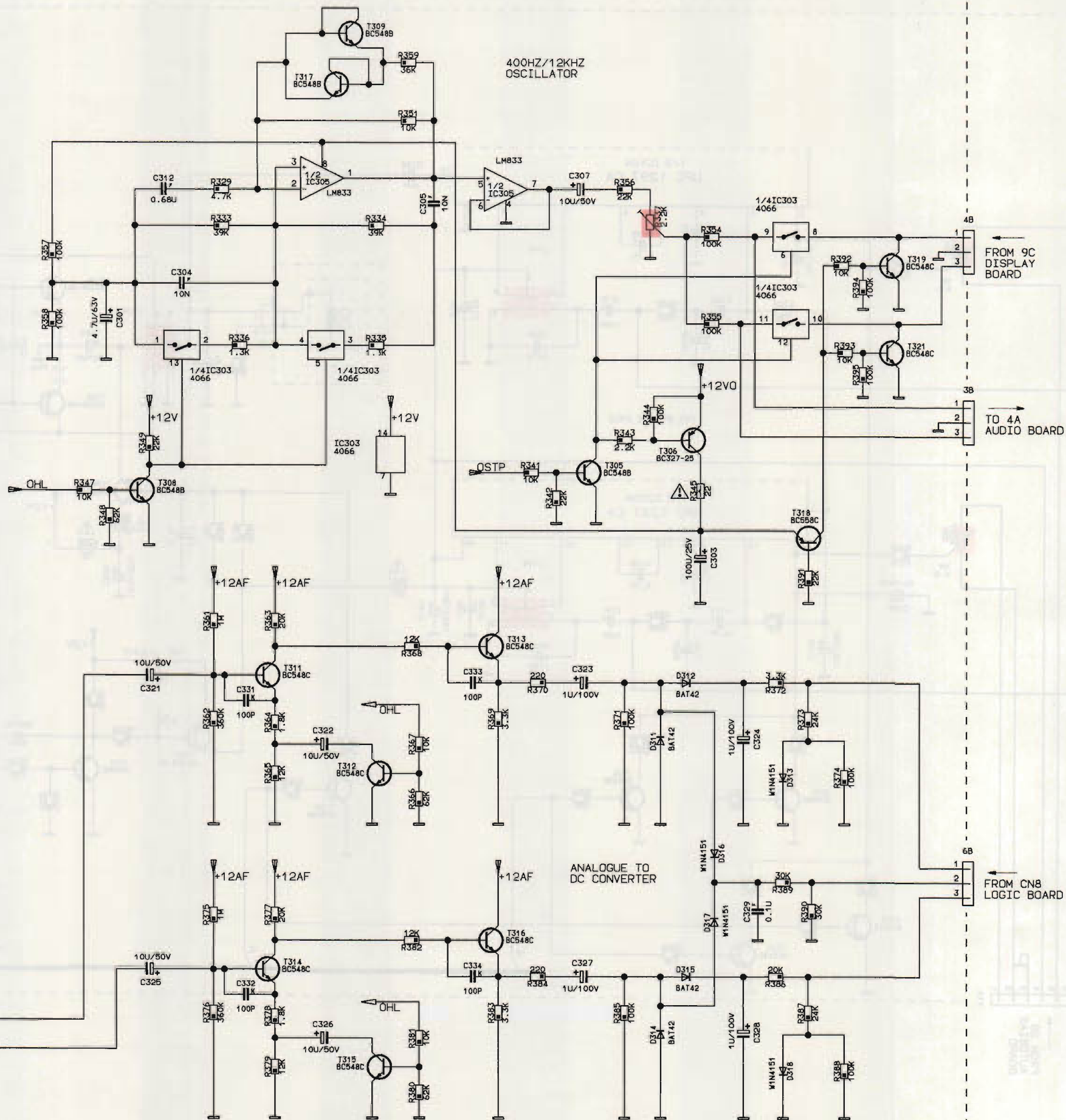
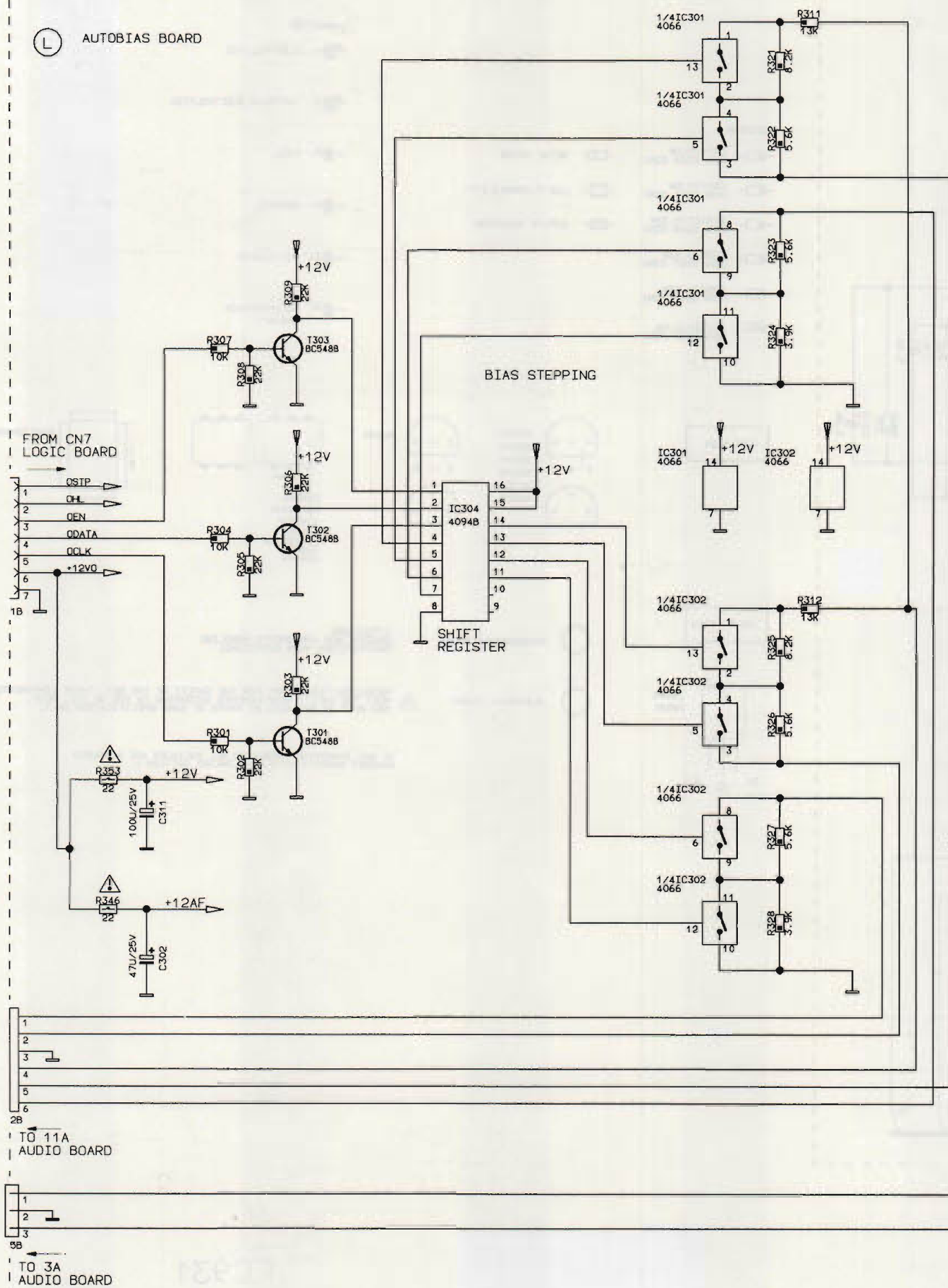
ATTENTION!
OBSERVE MOS COMPONENTS HANDLING INSTRUCTIONS WHEN SERVICING!

ABSOLUTELY NECESSARY FOR THE SAFETY OF THE SET, THESE COMPONENTS MEET THE SAFETY REQUIREMENTS ACCORDING TO VDE OR IEC, RESP. AND MUST BE REPLACED BY PARTS OF SAME SPECIFICATION ONLY.

IF NOT OTHERWISE INDICATED ALL VOLTAGES ARE MEASURED AGAINST CHASSIS WITH A VOLTMETER (R1=10M).

CIRCUIT DIAGRAM AUTOBIAS BOARD

(L) AUTOBIAS BOARD

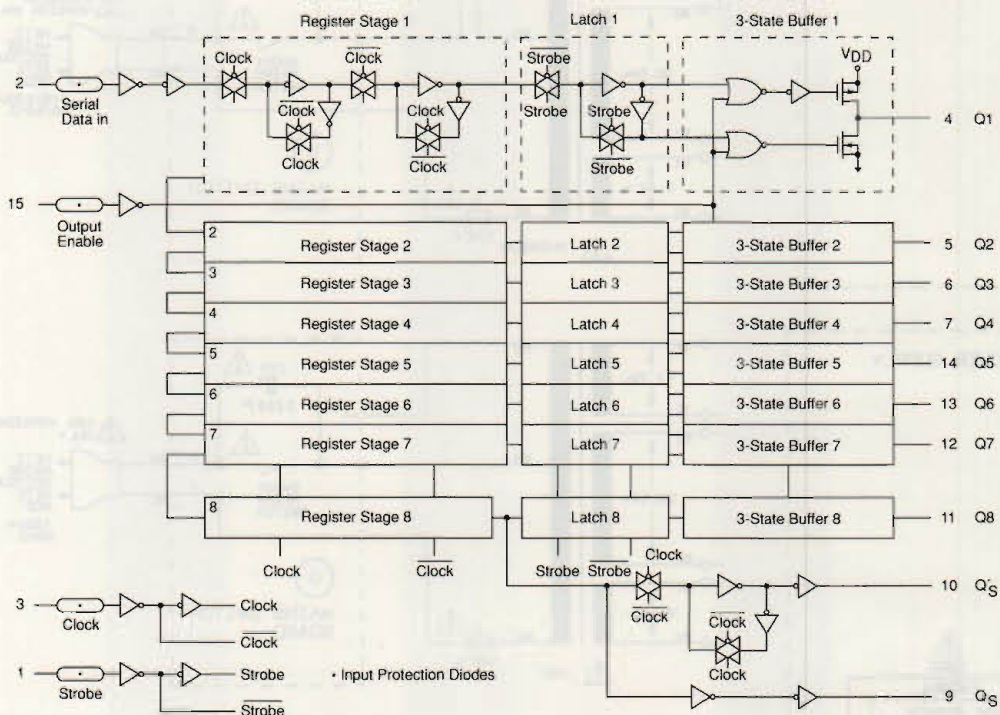


FC931

AUTOBIAS PCB

4094 B

BLOCK DIAGRAM



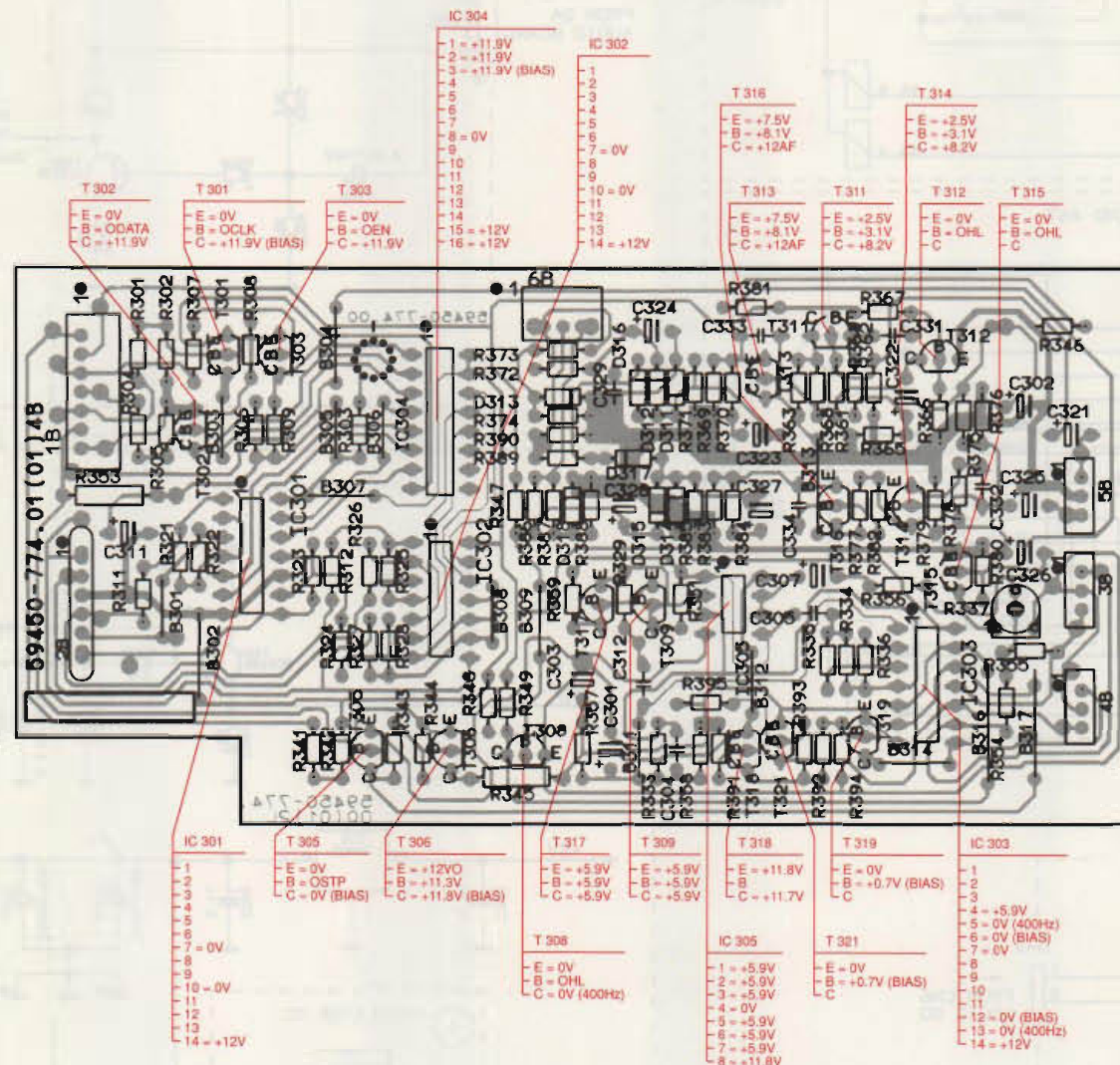
PIN ASSIGNMENT

1	Strobe	VDD	16
2	Data	Output Enable	15
3	Clock	Qs	14
4	Q1	Q6	13
5	Q2	Q7	12
6	Q3	Q8	11
7	Q4	Qs	10
8	VSS	Qs	9

AUTOBIAS PCB

component side

C
B
A



1B	B1	R342	A2
2B	A1	R343	A2
3B	B5	R344	A2
4B	A5	R345	A3
5B	B5	R346	C5
6B	C3	R347	B3
C301	A3	R348	A3
C302	B5	R349	A3
C303	A3	R351	A3
C304	A3	R353	B1
C305	A4	R354	A5
C307	B4	R355	A5
C311	B1	R356	B4
C312	A3	R357	A3
C321	B5	R358	A4
C322	B4	R359	A3
C323	B4	R361	B4
C324	C3	R362	B4
C325	B5	R363	B4
C326	B5	R364	B4
C327	B4	R365	B4
C328	B3	R366	B5
C329	B3	R367	C4
C331	C4	R368	B4
C332	B5	R369	B4
C333	C4	R370	B4
C334	B4	R371	B4
D311	B3	R372	C3
D312	B3	R373	C3
D313	B3	R374	B3
D314	B3	R375	B5
D315	B3	R376	B5
D316	B3	R377	B4
D317	B3	R378	B5
D318	B3	R379	B5
IC301	B2	R380	B5
IC302	B2	R381	C4
IC303	A5	R382	B4
IC304	B2	R383	B4
IC305	A4	R384	B4
R301	C1	R385	B4
R302	C1	R386	B3
R303	B2	R387	B3
R304	B1	R388	B3
R305	B1	R389	B3
R306	C1	R390	B3
R307	C1	R391	A4
R308	C2	R392	A4
R309	B2	R393	A4
R311	B1	T301	C1
R312	B2	T302	B1
R321	B1	T303	C2
R322	B1	T305	A2
R323	B2	T306	A2
R324	A2	T308	A3
R325	B2	T309	A3
R326	B2	T311	C4
R327	A2	T312	C5
R328	A2	T313	B4
R329	A3	T314	B4
R333	A3	T315	B5
R334	A4	T316	B4
R335	A4	T317	A3
R337	A5	T318	A4
R338	A4	T319	A4
R341	A2	T321	A4

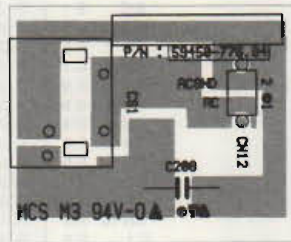
C
B
A

CS 33 161

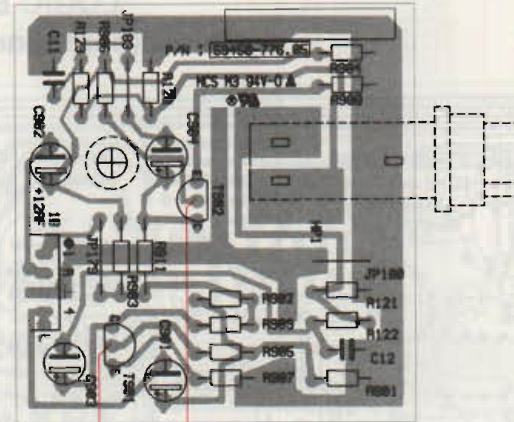


MAINS SWITCH PCB, POWER SUPPLY PCB, HEADPHONE PCB, RC BUS PCB, DRIVE MECHANISM CRD 467 PCB AND CRD 468 PCB

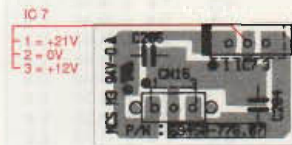
RC BUS BOARD
(component side)



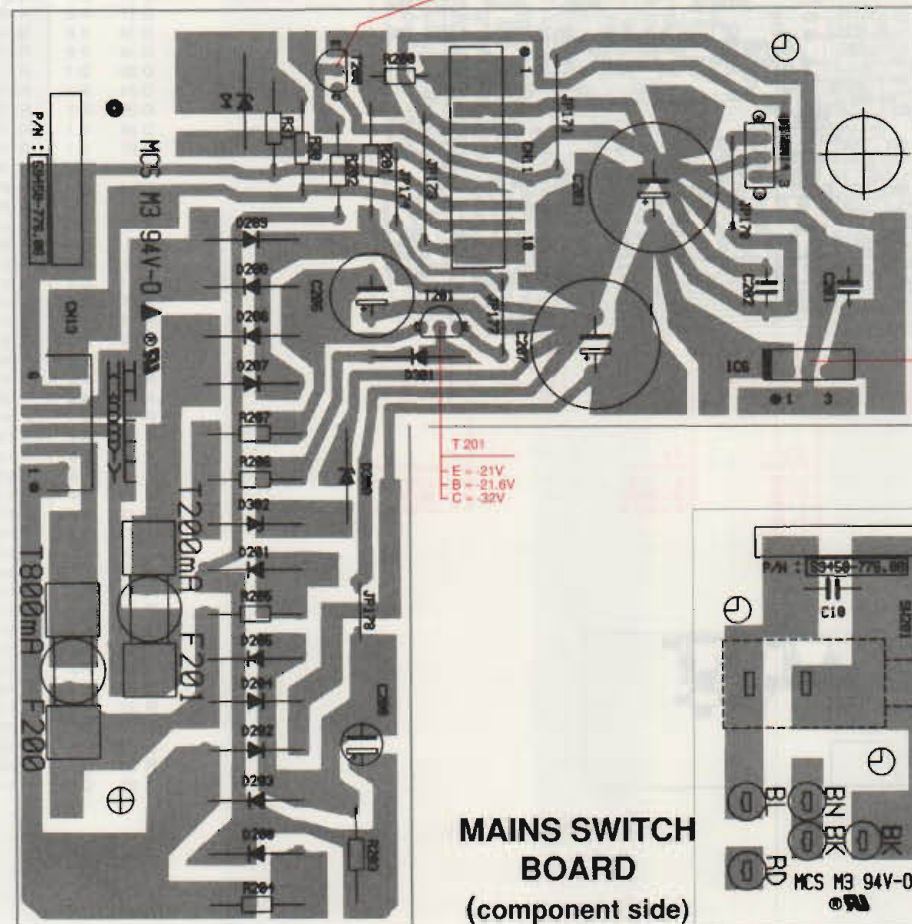
HEADPHONE BOARD
(component side)



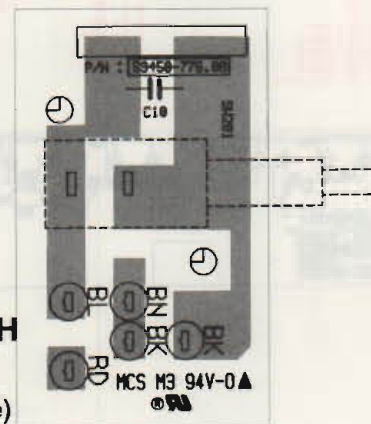
REGULATOR BOARD
(component side)



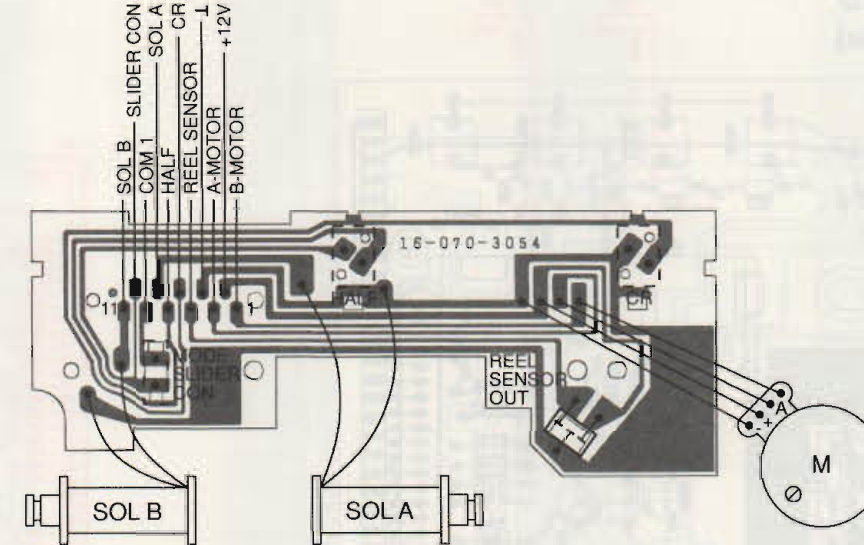
POWER SUPPLY BOARD
(component side)



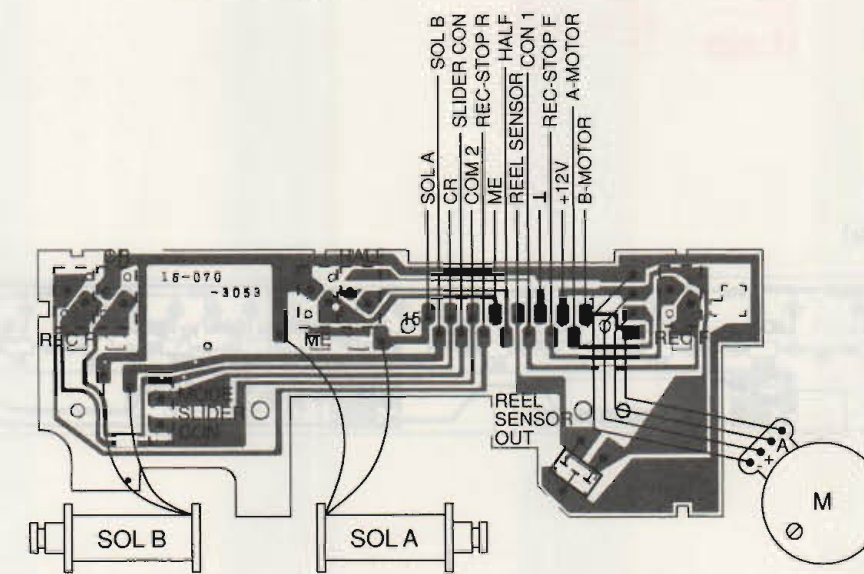
MAINS SWITCH BOARD
(component side)



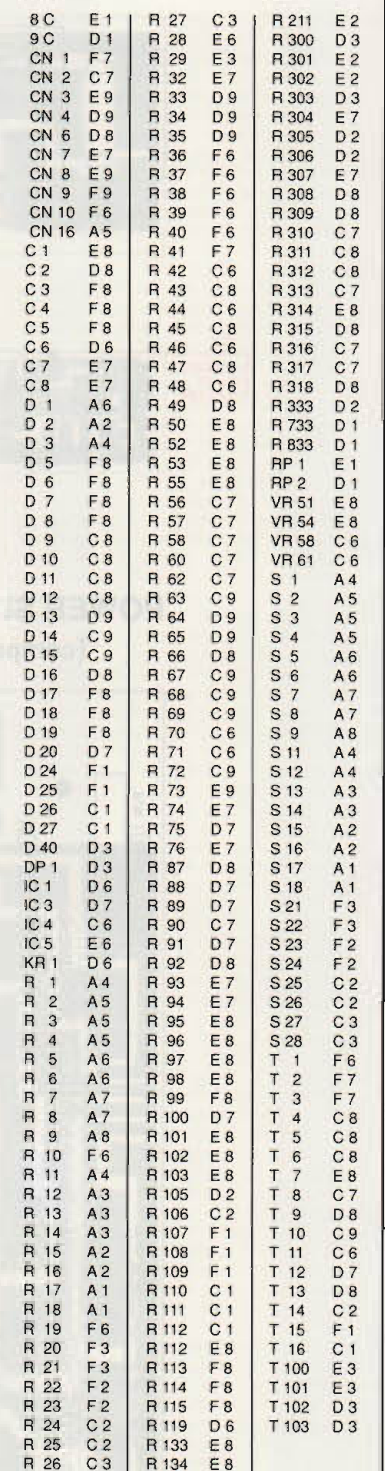
DRIVE MECHANISM A CRD 468
(solder side)



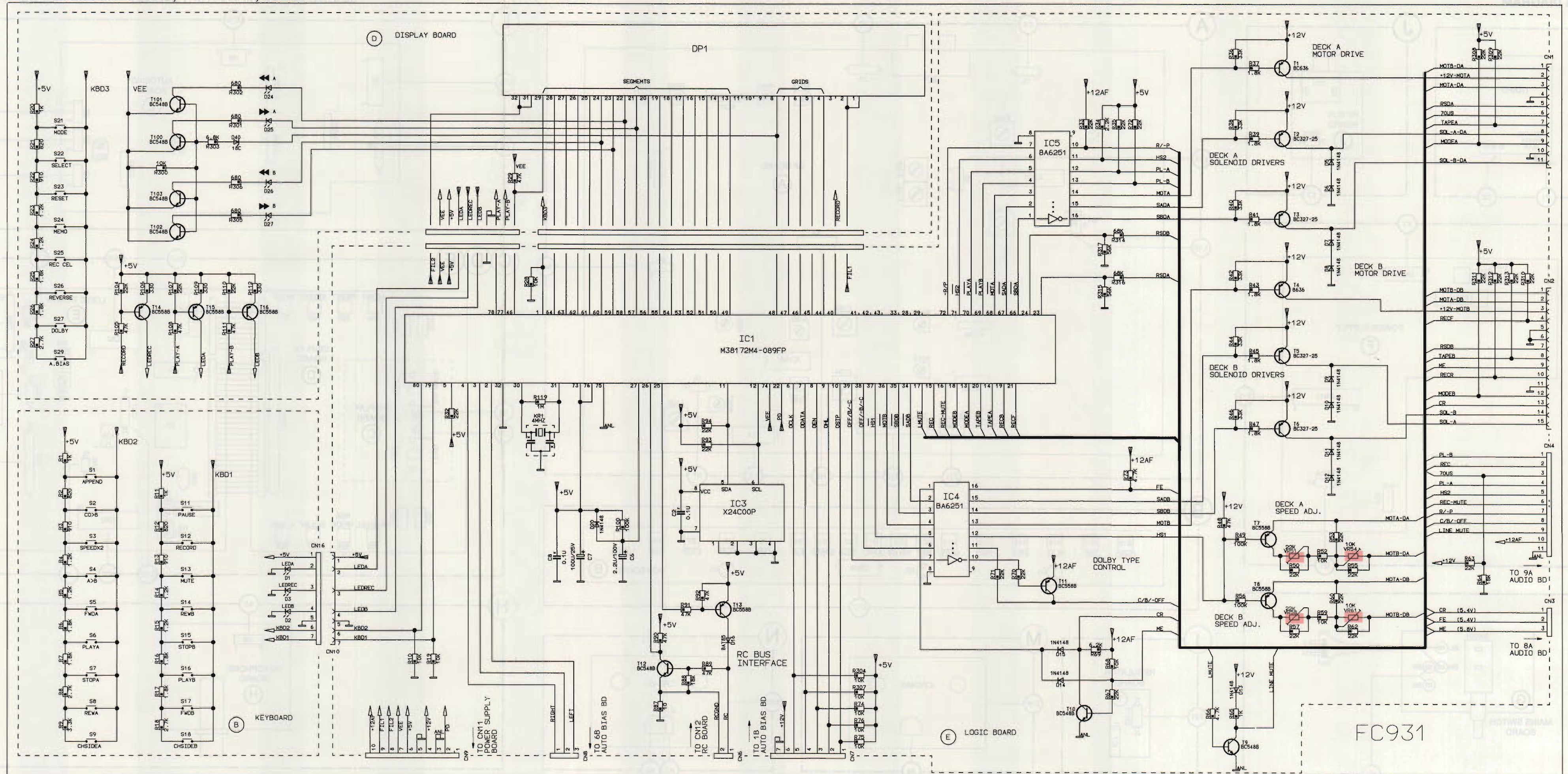
DRIVE MECHANISM B CRD 467
(solder side)

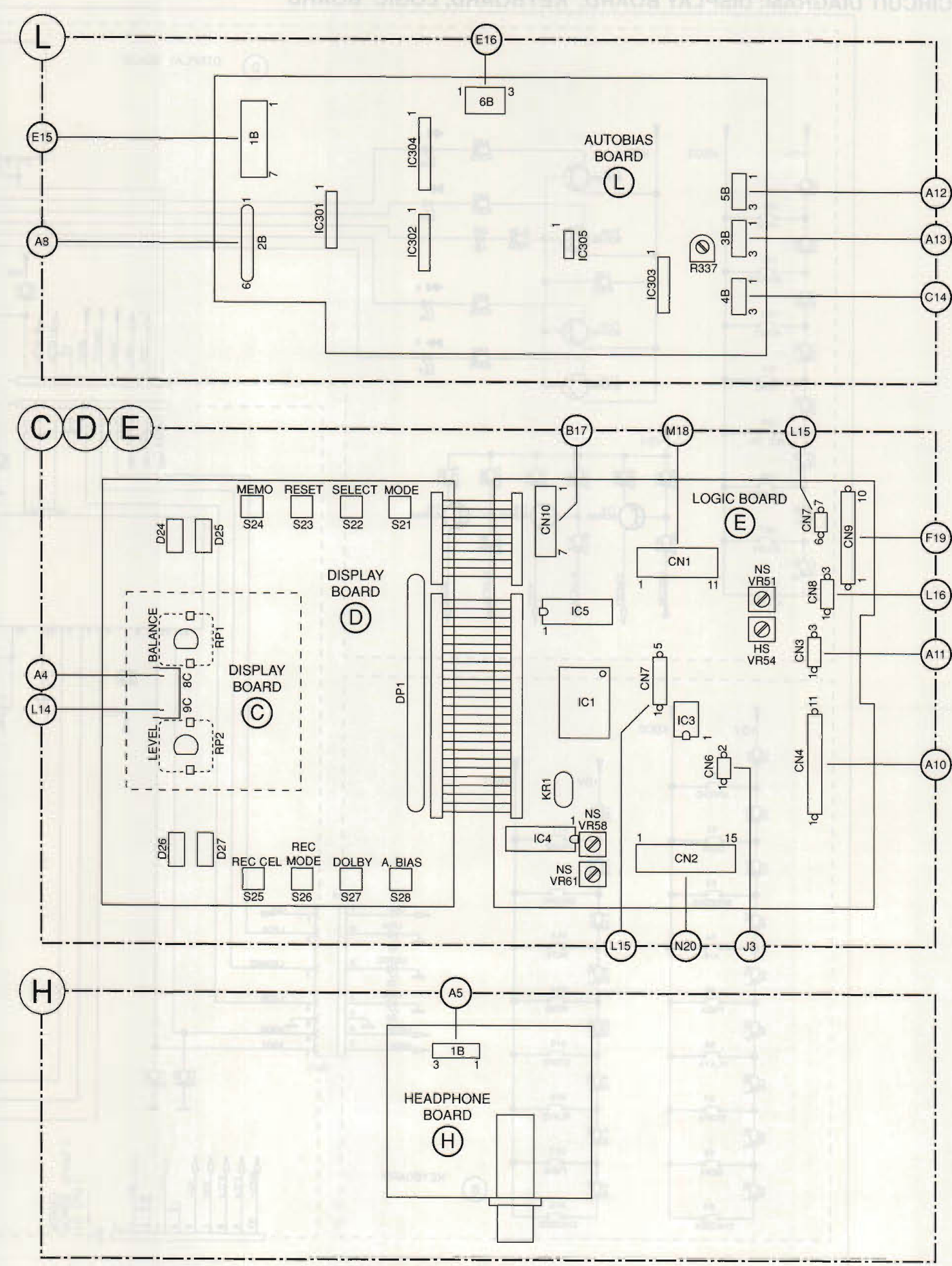


1B	F3
C10	B4
C11	G3
C12	F4
C200	A2
C201	C4
C202	C4
C203	D3
C204	F1
C205	F1
C206	C2
C207	C3
C208	G1
C901	F3
C902	G3
C903	F3
C904	G3
CN11	D3
CN12	G2
CN13	C1
CN14	D4
CN15	F1
CS1	G1
D4	D2
D200	A2
D201	B2
D202	A2
D203	A2
D204	B2
D205	B2
D206	C2
D207	C2
D208	C2
D209	D2
D300	B2
D301	C2
D302	B2
F200	B1
F201	B1
HP1	G4
IC6	C4
IC7	F1
JP170	D4
JP171	D3
JP173	D2
JP174	D2
JP177	C3
JP178	B2
JP179	F3
JP180	F4
JP183	G3
R30	D2
R31	D2
R120	G3
R121	F4
R122	F4
R123	G3
R200	D2
R201	D2
R202	D2
R203	A2
R204	A2
R205	B2
R206	B2
R207	C2
R901	F4
R902	F4
R903	F3
R904	G4
R905	F4
R906	G3
R907	F4
R908	G4
R909	F4
R911	F3
SW201	B4
T200	D2
T201	C2
T901	F3
T902	G4



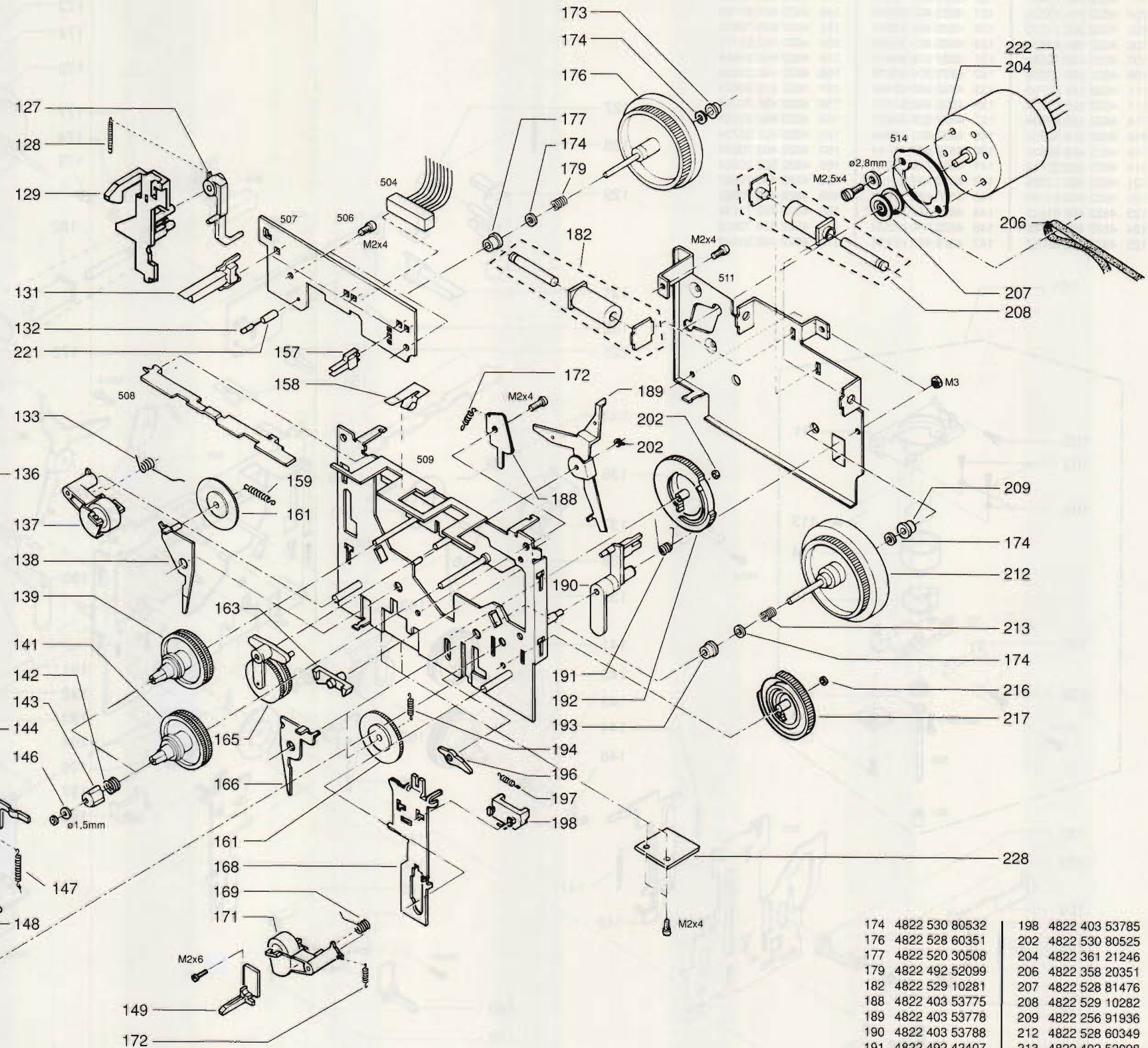
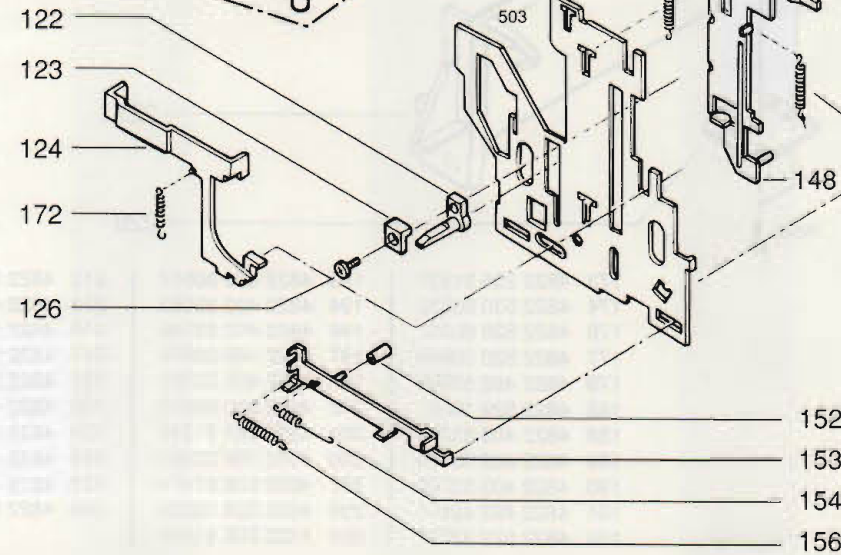
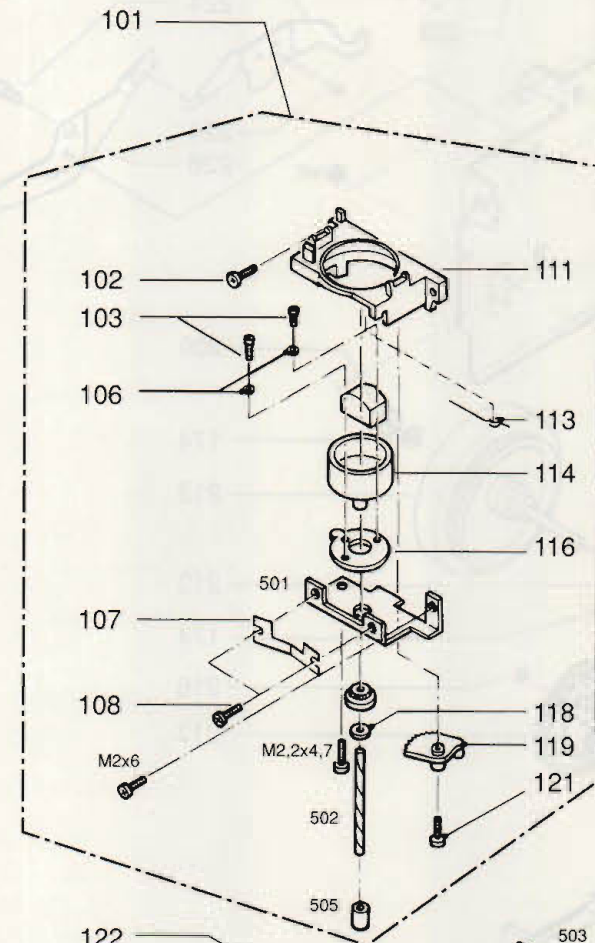
CIRCUIT DIAGRAM: DISPLAY BOARD, KEYBOARD, LOGIC BOARD





EXPLODED VIEW: LIST OF MECHANICAL PARTS DRIVE MECHANISM A (CRD 468)

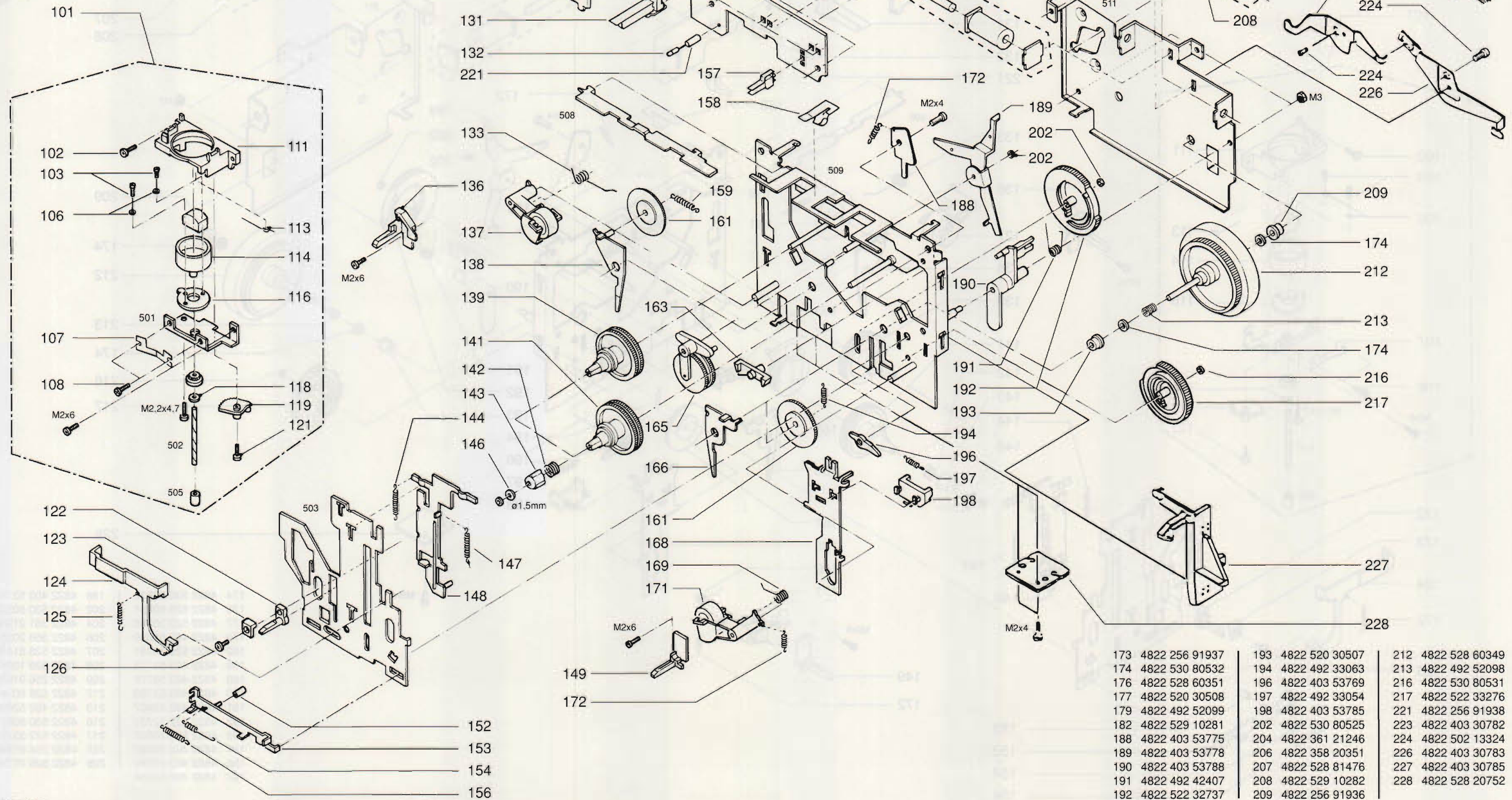
101	4822 249 10466	127	4822 403 53784	149	4822 403 53782
102	4822 502 13322	128	4822 492 33062	152	4822 528 70803
103	4822 502 13323	129	4822 403 70669	153	4822 403 53777
106	4822 466 82935	131	4822 278 90613	154	4822 492 33056
107	4822 492 70258	132	4822 209 60879	156	4822 492 33058
108	4822 502 13326	133	4822 492 42409	157	4822 278 90609
111	4822 464 50766	136	4822 403 53781	158	4822 492 70257
113	4822 492 71135	137	4822 528 70801	159	4822 492 33055
114	4822 466 82937	138	4822 403 70668	161	4822 522 32734
116	4822 466 92356	139	4822 528 10744	163	4822 403 70664
118	4822 466 82936	141	4822 528 10743	165	4822 528 20664
119	4822 522 32738	142	4822 492 52101	166	4822 403 70667
121	4822 502 13325	143	4822 462 71853	168	4822 403 70665
122	4822 403 53783	144	4822 492 33057	169	4822 492 71134
123	4822 466 61823	146	4822 530 80529	171	4822 528 70802
124	4822 403 53786	147	4822 492 42406	172	4822 492 33053
126	4822 502 13321	148	4822 403 70666	173	4822 256 91937



174	4822 530 80532	198	4822 403 53785
176	4822 528 60351	202	4822 530 80525
177	4822 520 30508	204	4822 361 21246
179	4822 492 52099	206	4822 358 20351
182	4822 529 10281	207	4822 528 81476
188	4822 403 53775	208	4822 529 10282
189	4822 403 53778	209	4822 256 91936
190	4822 403 53788	212	4822 528 60349
191	4822 492 42407	213	4822 492 52098
192	4822 522 32737	216	4822 530 80531
193	4822 520 30507	217	4822 522 33276
194	4822 492 33063	221	4822 256 91938
196	4822 403 53769	228	4822 528 20752
197	4822 492 33054		

EXPLODED VIEW: LIST OF MECHANICAL PARTS DRIVE MECHANISM B (CRD 467)

101	4822 249 10467	126	4822 502 13321	148	4822 403 70666
102	4822 502 13322	127	4822 403 53784	149	4822 403 53782
103	4822 502 13323	128	4822 492 33062	152	4822 528 70803
106	4822 466 82935	129	4822 403 30784	153	4822 403 53777
107	4822 492 70258	131	4822 278 90613	154	4822 492 33056
108	4822 502 13326	132	4822 209 60879	156	4822 492 33058
111	4822 464 50766	133	4822 492 42409	157	4822 278 90609
113	4822 492 71135	136	4822 403 53781	158	4822 492 70257
114	4822 466 82934	137	4822 528 70801	159	4822 492 33055
116	4822 466 92356	138	4822 403 70668	161	4822 522 32734
118	4822 466 82936	139	4822 528 10744	163	4822 403 70664
119	4822 522 32738	141	4822 528 10743	165	4822 528 20664
121	4822 502 13325	142	4822 492 52101	166	4822 403 70667
122	4822 403 53783	143	4822 462 71853	168	4822 403 70665
123	4822 466 61823	144	4822 492 33057	169	4822 492 71134
124	4822 403 53786	146	4822 530 80529	171	4822 528 70802
125	4822 492 33053	147	4822 492 42406	172	4822 492 33342



173	4822 256 91937	193	4822 520 30507	212	4822 528 60349
174	4822 530 80532	194	4822 492 33063	213	4822 492 52098
176	4822 528 60351	196	4822 403 53769	216	4822 530 80531
177	4822 520 30508	197	4822 492 33054	217	4822 522 33276
179	4822 492 52099	198	4822 403 53785	221	4822 256 91938
182	4822 529 10281	202	4822 530 80525	223	4822 403 30782
188	4822 403 53775	204	4822 361 21246	224	4822 502 13324
189	4822 403 53778	206	4822 358 20351	226	4822 403 30783
190	4822 403 53788	207	4822 528 81476	227	4822 403 30785
191	4822 492 42407	208	4822 529 10282	228	4822 528 20752
192	4822 522 32737	209	4822 256 91936		

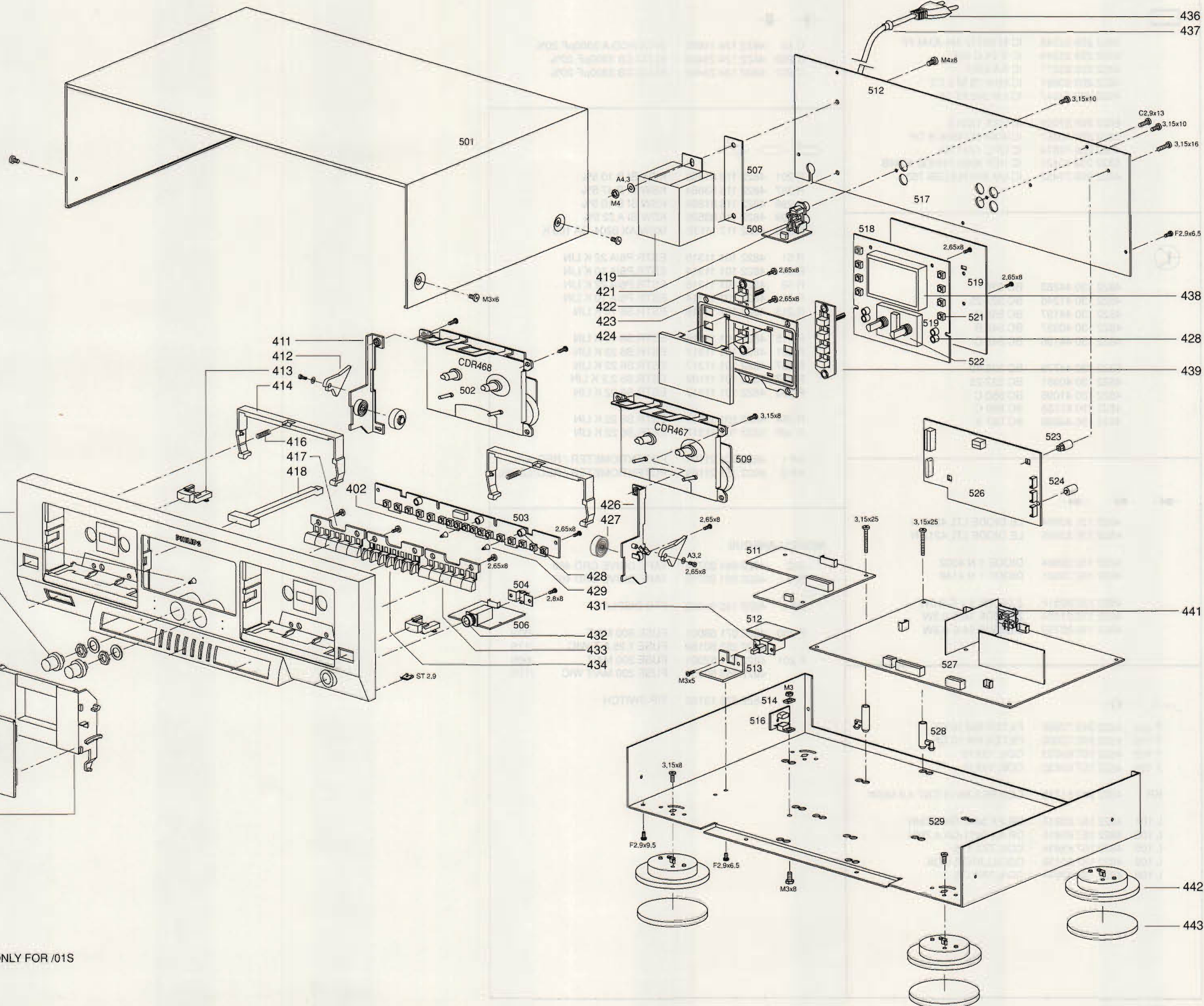
EXPLODED VIEW: LIST OF MECHANICAL PARTS CASSETTE DECK

401	4822 443 41369	
402	4822 381 11494	
403	4822 413 31794	
404	4822 492 52395	
406	4822 443 63663	
407	4822 443 63564	
408	4822 443 63565	
409	4822 443 63664	
411	4822 403 70658	
412	4822 403 70659	
413	4822 410 61747	
414	4822 403 70656	
416	4822 492 20058	
417	4822 410 63173	
418	4822 410 61748	
419	4822 146 31351	/00S
	4822 146 31379	/01S/17S
421	4822 267 31767	
422	4822 464 51035	
423	4822 464 51036	
424	4822 450 62214	
426	4822 403 70657	
427	4822 528 90849	
428	4822 255 30221	
429	4822 381 11493	
431	4822 272 20077	
432	4822 267 31463	
433	4822 410 63172	
434	4822 410 63167	
436	4822 321 10767	/00S
	4822 321 11068	/17S
437	4822 325 50164	/00S
	4822 325 50228	/17S

401	
402	
403	
404	
406	
407	
408	
409	

438	4822 256 92182
439	4822 410 63174
441	4822 267 41153
442	4822 462 41888
443	4822 462 41887
	4822 277 11349

VOLTAGE SELECTOR ONLY FOR /01S
(NOT SHOWN)



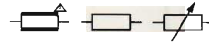
LIST OF ELECTRICAL PARTS



4822 209 33348	IC M 38172-M4-XXM FP
4822 209 33349	IC X 24 C 00P
4822 209 83077	IC BA 6251
4822 209 80891	IC MHz 78 M 5 CT
4822 209 33347	IC LM 340 AT-12
4822 209 31009	IC CXA 1330 S
5322 209 10357	IC 4066 B/14066 B CP
4822 209 72874	IC UPC 1297 CA
5322 209 10421	IC HEF 4094 PHI/CD 4094B
4822 209 73452	IC LM 833 N/ELDB 793



C 10	4822 126 11805	SI-CERCO.A 3300pF 20%
C 203	4822 124 23498	ELCO CB 3300μF 20%
C 207	4822 124 23498	ELCO CB 3300μF 20%



R 201	4822 116 81858	KSW SI B 10 5%
R 297	4822 116 53664	KSW SI B 47 5%
R 298	4822 116 81858	KSW SI B 10 5%
R 299	4822 116 83526	KSW SI A 22 5%
R 305	4822 117 11132	MSW AX 0204-GA 100 K

R 51	4822 101 11315	ESTR.P6/A 22 K LIN
R 54	4822 101 11314	ESTR.P6/A 10 K LIN
R 58	4822 101 11315	ESTR.P6/A 22 K LIN
R 61	4822 101 11314	ESTR.P6/A 10 K LIN
R 213	4822 101 11316	ESTR.S6 10 K LIN

R 215	4822 101 11316	ESTR.S6 10 K LIN
R 231	4822 101 11317	ESTR.S6 22 K LIN
R 257	4822 101 11317	ESTR.S6 22 K LIN
R 337	5322 101 11109	ESTR.S6 2,2 K LIN
R 353	4822 101 11317	ESTR.S6 22 K LIN

R 354	4822 101 11317	ESTR.S6 22 K LIN
R 395	4822 101 11317	ESTR.S6 22 K LIN

RP 1	4822 101 21191	POTENTIOMETER / REC. BAL.
RP 2	4822 101 21189	POTENTIOMETER / REC. LEVEL

MISCELLANEOUS

502	4822 691 20734	TAPE DRIVE CRD 468
509	4822 691 20735	TAPE DRIVE CRD 467

DP 1	4822 130 91342	FTD DISPLAY
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F 200	4822 071 58001	FUSE 800 MA/T	/00S
	4822 253 50159	FUSE 1.25 A/T WIC	/17S
F 201	4822 071 52001	FUSE 200 MA/T	/00S
	4822 253 50158	FUSE 200 MA/T WIC	/17S

4822 276 13152	TIP SWITCH
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4822 130 44283	BC 636
4822 130 41246	BC 327-25
4822 130 44197	BC 558 B
4822 130 40937	BC 548 B
4822 130 44196	BC 548 C

5322 130 44779	BC 338-40
4822 130 40981	BC 337-25
4822 130 41096	BC 550 C
4822 130 61755	BC 560 C
4822 130 44568	BC 557 B



4822 130 82954	LE DIODE LTL 4232 N
4822 130 82955	LE DIODE LTL 4212 N

5322 130 30684	DIODE 1 N 4002
4822 130 30621	DIODE 1 N 4148

4822 130 80515	Z DIODE 5,1 C 0,5W
4822 130 31024	Z DIODE 18 C 0,5W
4822 130 82753	Z DIODE 24 C 0,5W



F 101	4822 242 72602	FILTER KM 10 DF
F 102	4822 242 72602	FILTER KM 10 DF
F 103	4822 157 63633	COIL 10X10
F 104	4822 157 63633	COIL 10X10
KR 1	4822 242 81735	CER.RES.86/13 CST 4.0 MGW
L 101	4822 157 63815	DR AX 0411-GA 4.7MH
L 102	4822 157 63815	DR AX 0411-GA 4.7MH
L 105	4822 157 63634	COIL 7X7 175
L 106	4822 157 60198	OSCILLATOR-COIL
L 108	4822 157 63634	COIL 7X7 175