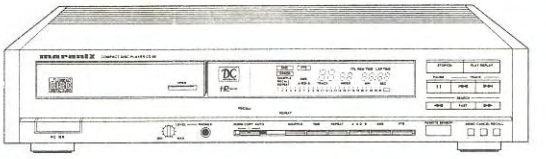
Compact disc player CD85/NB/TB

Service
Service
Service



Remote control is available under codenumber: 4822 218 20797

Service Manual

CHAPTER	CONTENTS
1	Contents Operation Technical data
2	Demounting Exploded view
3	Block diagram Servicing hints
4	Measurements and adjustments
5	Circuit diagram Drawing of PCB Wiring diagram
6	Electrical partslist Symbol explanation

COMPACT disc DIGITAL AUDIO

CLASS 1
LASER PRODUCT
3122 110 03420

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

Documentation Technique Service Dokumentation Documentazione di Servizio Huolte-Ohje Manual de Servicio Manual de Serviçio

Subject to modification
4822 725 22306
Printed in The Netherlands

Published by Service
Consumer Electronics

CS 20 038

MARANTZ DESIGN AND SERVICE

Using superior design and selected high grade components, MARANTZ company has created the ultimate in stereo sound.
Only **original MARANTZ parts** can insure that your MARANTZ product will continue to perform to the specifications for which it is famous.

Parts for your MARANTZ equipment are generally available to our National Marantz Subsidiary or Agent.

MARANTZ INTERNATIONAL
Vestdijk 9
5600 MD Eindhoven
The Netherlands
Phone: +31/40.758290
Telefax: +31/40.75.82.99
Telex: 35000 PHTC NL routing IND NLMTFAT

ORDERING PARTS:

Parts can be ordered either by mail or by telex. In both cases, correct part number has to be specified.
The following information must be supplied to eliminate delays in processing your order:

1. Complete address
2. Complete part numbers and quantities required
3. Description of parts
4. Model number for which part is required
5. Way of shipment
6. Signature: any order form or telex must be signed otherwise such part order will be considered as null and void.

PARTS ORDERING

Parts may be ordered at the following addresses:

AUSTRIA
HORNYPHON
Vertriebsgesellschaft GmbH
Wienerbergstrasse 1
A 1101 Wien
Austria
Telex: 132.332

BELGIUM
SVD DIVISION MARANTZ
Industrialaan 1
1720 Groot-Bijgaarden
Belgium
Telex: 24466

CHILE
MARANTZ
DIVISION OF PHILIPS S.A.
AV. Santa Maria, 0760
Casilla 2687
Santiago
Telex: 240.239

DENMARK
MARANTZ
DIVISION OF PHILIPS
SERVICE A/S
Prags Boulevard 80
Postbox 1919
DK-2300 København S
Denmark
Telex: 31201

FINLAND
MARANTZ
DIVISION OF OY PHILIPS Ab
Kaivokatu 8
00100 Helsinki
Finland
Telex: 124811

FRANCE
MARANTZ FRANCE
4 Rue Bernard Palissy
92600 Asnières
France
Telex: 611651

GERMANY
MARANTZ GERMANY GmbH
Max-Planck-Strasse 22
6072 Dreieich 1
Germany
Telex: 529821

THE NETHERLANDS
Elpro Marantz
Wint Hontlaan 28
3526 KV Utrecht
The Netherlands
Telex: 4748

NORWAY
MARANTZ
DIVISION OF PHILIPS A/S
Sandstuveien 40
0680 Oslo 6
Norway
Telex: 72640

GREAT BRITAIN
MARANTZ AUDIO U.K. Ltd
Unit 15/16
Saxon Way Industrial Estate
Moor Lane
Harmondsworth UB7 OLW
Great Britain
Telex: 935196

GREECE
SHERTON ELECTRONICS S.A.
P.O.Box 21025
Hippocratus Street 188
Athens 11471
Greece
Telex: 216.795

JAPAN
MARANTZ JAPAN, Inc.
35-1, 7-chome, Sagamiono
Sagamihara-shi, Kanagawa
Japan

KUWAIT
AL ALAMIAH ELECTRONICS
Ussama Building
Fahd al Saleem Street
P.O.Box 23781
Safat-Kuwait
Telex: 22694

ITALY
MARANTZ ITALIANA S.P.A.
Via Chiese, 74
20126 Milano
Italy

SAUDI ARABIA
AL ALAMIAH ELECTRONICS
P.O.Box 5954
University Street
Riyadh 11432
Saudi Arabia
Telex: 401530

SOUTH AFRICA
MARANTZ
DIVISION OF PHILIPS S.A.
Main Road Martindale
P.O. Box. 58088
Newville 21114
South Africa

SPAIN
PHONO S.A.
Ignacio Iglesias 10
Badalona (Barcelona)
Spain
Telex: 59355

SWEDEN
MARANTZ
DIVISION OF PHILIPS
Försäljning AB
Tegeluddsvägen 1
S-115 84 Stockholm
Sweden
Telex: 14060

SWITZERLAND
DYNAVOX ELECTRONICS
Route de Villars 105
1701 Fribourg
Switzerland
Telex: 942377

TURKEY
DOGRUOL Ltd.
I.M.C.
6 Blok N°6310
Unkapani
Istanbul
Turkey
Telex: 22085

MALTA
CACHIA & GALEA
Republic Street, 68D
Valetta
Telex: 1682

PORTUGAL
MARANTZ
Divisao philips S.A. service
Outurela-carnaxide
2795 LinDA-A-VELHA
Telex: 43906

All of the above locations are fully equipped to take care of your total service needs. Because various countries have differing configuration requirements, it is necessary that you contact the service facility in your particular country. In the event that there is no service location listed for your country, please, contact the nearest facility for the necessary assistance.

In case of difficulties, do not hesitate to contact the Technical Department at abovementioned address.

1. EXPLANATION OF THE LAYOUT OF THE DOCUMENTATION

The documentation consists of chapters.
The number of the chapter is indicated by the first digit of the page number.
The second digit of the page number is the sequence numbering.

If modifications or supplements require new supplementary or replacement pages, the page number is extended with a third part:

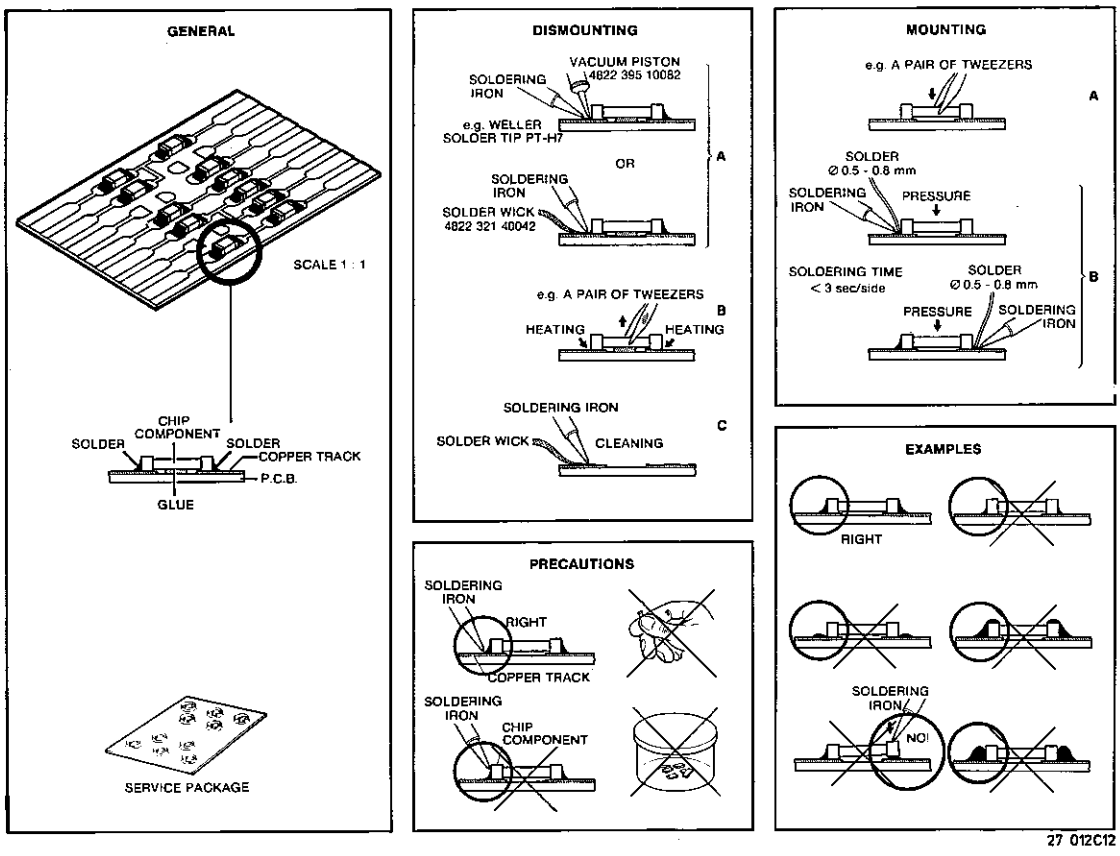
A digit behind the page number indicates that it concerns a supplementary page.
A replacement page is indicated by a letter behind the page number.

Example

3-6	is page 6 of chapter 3
3-6-1	is a supplementary page behind page 3-6
3-6-a	is the replacement page of page 3-6 (so page 3-6 can be removed from the documentation).

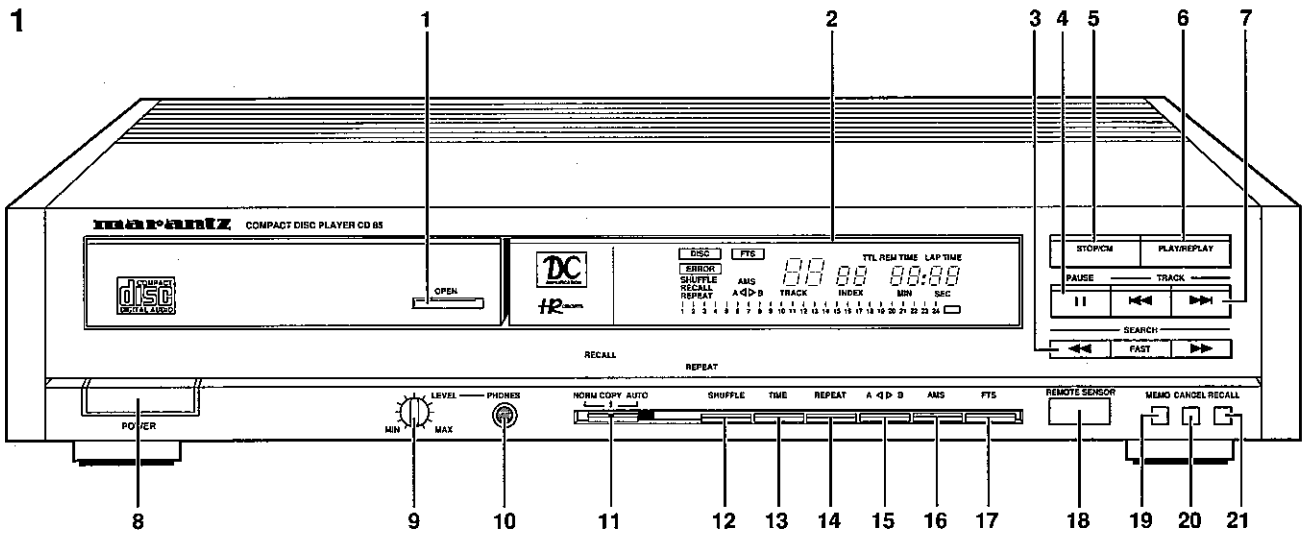
In the set chip components have been applied.
For disassembly and assembly of chip components see the figure below.

TABLE OF CONTENTS PER PAGE



OPERATION

1



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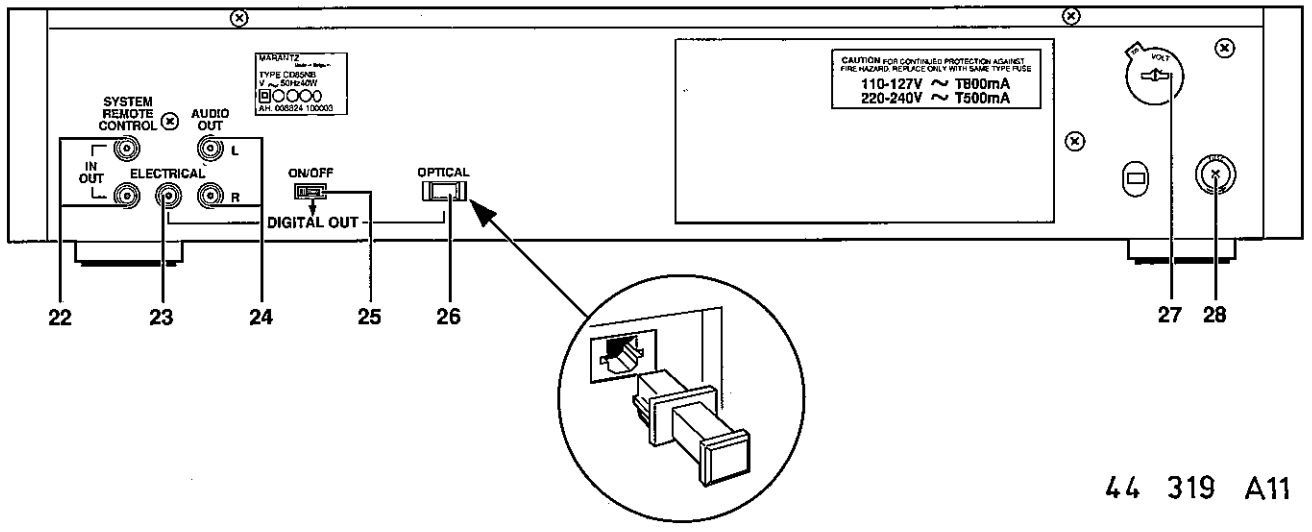


44 319 A11

FRONT OF PLAYER (Fig. 1)

1 Disc tray on which the **OPEN** button is situated; the tray closes when the front is pressed briefly.

2 **DISPLAY**
- Informs you about the functioning of the player.
- Displays details from the disc contents list.

3 **≪SEARCH≫**
Fast search for a particular passage (≪ backwards; ≫ forwards).
When used in conjunction with **FAST**, the search speed is increased and the sound switched off.

4 **PAUSE**
For interrupting play.

5 **STOP/CM**
- Stopping play (**STOP**)
- Erasing a program (**CM** = Clear Memory).

6 **PLAY/REPLAY**
- Starting play (**PLAY**)
- Returning to the beginning of a track (**REPLAY**).
The blue light at the right-hand side of the player acts as **PLAY** indication.

7 **⋘TRACK⋙**
- Selecting another track during play.
- Selecting a track to start play with.
- Selecting tracks when programming.
(⋘ from high to low; ⋙ from low to high).

8 **POWER**
For switching the player on and off.

9 **LEVEL**
Adjusting the volume when listening with headphones.

10 **PHONES**
Connecting headphones.

11 **PLAY MODE SWITCH**
This switch has three positions: **NORM, COPY** and **AUTO.**

12 **SHUFFLE**
Playing in a random order.

13 **TIME**
Selecting the time information you want to see:
- **REM TIME**: The remaining playing time of a track (**REM**= remaining)
- **TTL REM TIME**: The total remaining playing time.
- **LAP TIME**: The elapsed playing time of a track (**LAP**= elapsed).

14 **REPEAT**
Repeating a disc or program.
The **REP** button on the remote control handset has the same function.

15 **A < > B**
Storing the start and stop points of a passage to be repeated.

16 **AMS**
Automatically playing the beginning of each track (**AMS** = Automatic Music Scan).

17 **FTS**
Activating the Favourite Track Selection circuit (**FTS**= Favourite Track Selection).

18 **REMOTE SENSOR**
Receives the signals from the remote control handset.

19 **MEMO**
Storing details when compiling a program.
The **M** button on the remote control handset has the same function.

20 **CANCEL**
- Cancelling mistakes when compiling a program.
- Deleting an item from a program.
- Erasing favourite track selections.

The **C** button on the remote control handset has the same function.

21 **RECALL**
Reviewing and checking a program.

REAR OF PLAYER (Fig. 2)

- **All connections to the rear panel should be made with the power to the entire system switched off.**
- To avoid cross-connection of channels, connect one plug at a time.

22 **SYSTEM REMOTE CONTROL IN/OUT**
- For an external signal receiver for the remote control.
- For the remote control system of a HiFi system.

23 **ELECTRICAL**
For digital signal processing or future applications such as CD-I.
This output supplies a digital signal and can therefore only be connected to an input which is suitable for this signal. Use here a lead with one cinch plug on either end.
Important: Never connect this socket to a non-digital input of an amplifier, such as AUX, CD, TAPE, PHONO, etc. This can damage the amplifier and the loudspeakers.

24 **AUDIO OUT L/R**
Using the lead provided, connect these sockets to the CD or AUX input of the (pre)amplifier. If this is already in use, you can also use the TUNER or TAPE IN output. **Under no circumstances** should you use the PHONO input!.
Note that **L** or white corresponds to the left channel and **R** or red to the right channel.

25 **DIGITAL OUT ON/OFF**
For switching off the **DIGITAL OUT** outputs (**ELECTRICAL** and **OPTICAL**) in case they disturb the signal from the analog outputs.

26 **OPTICAL**
This output supplies a digital signal via an optical path; for this reason it can only be connected to a Digital Analog Converter, an amplifier with an optical digital input or a digital sound processor. For this use the optical lead provided.
To prevent dirt entering this output, it is covered with a little cap which should only be removed when the output is in use.
Important: Ensure that there are no twists in the optical lead because this will hinder the conduction of light.

27 **VOLTAGE SELECTOR**

28 **MAINS FUSE HOLDER**

REMOTE CONTROL

Most of the controls also appear on the remote control handset. The functions below can only be operated using the remote control handset.

1-0 digit buttons
Direct entry of data when:
- Selecting another track or index number during play.
- Selecting a track/index number or time position to start play with.
- Selecting track/index numbers or time positions when programming.

≪INDEX≫
- Selecting another index number during play.
- Selecting an index number to start play with.
- Selecting index numbers when programming.

SELECT
Selecting the **SELECT** position. Using the **1-0** digit buttons data can be entered when:
- Selecting another track- or index number during play.
- Selecting a track- or index number or time position to start play with.
- Selecting track- or index numbers or time positions during programming.

THE INFORMATION ON THE DISPLAY

Each Compact Disc has, along with the music, a list of contents detailing the numbers of the tracks, the playing time of each track and the total playing time of the disc. The player always scans this first and stores it in its memory in order, for instance, to provide information via the display.

DISC
- Flashes when you switch the player on.
- Flashes when the table of contents of a disc is being traced.

ERROR Lights up if you make a mistake when operating the player.

DISC and **ERROR**
Both light up if you try to start play while the disc is loaded upside down, is not loaded at all or is damaged.

SHUFFLE
Lights up when the tracks on the disc or in a program are played in a random order.

RECALL
Lights up when you review a program.

REPEAT
Lights up when a disc or program is repeated.

FTS
- Flashes after **FTS** has been pressed.
- Flashes after loading a disc which has an **FTS** program.
- Lights up when a program from the **FTS** memory of the player is played.

AMS
Lights up during scanning when the beginning of each track is played.

A < > B
- Lights up whenever a passage is repeated.
- Flashes until the stop point is set.

TRACK and **INDEX**
Indicate the track and the index number being played. The numbers above **INDEX** only change if the parts of a track have index numbers.

MIN and **SEC**
Indicate:
- The remaining playing time of a track (**REM TIME**)
- The total remaining playing time (**TTL REM TIME**).
- The elapsed playing time of a track (**LAP TIME**).

1-24 track number indicator
Lights up when the table of contents of the disc has been traced. As many of these numbers as there are tracks on the disc remain alight. Each time a track has been played, the corresponding number goes out on the track number indicator. When starting play from a particular point, during programming or scanning, the track number indicator indicates the number selected.

TECHNICAL DATA

Frequency range	: 20-20000 Hz
Amplitude linearity	: ± 0.01 dB (20-20000 Hz)
Phase linearity	: ± 0.2° (20-20000 Hz)
Dynamic range	: > 96 dB (20-20000 Hz)
Signal-to-noise ratio	: > 103 dB (1 kHz)
Total harmonic distortion	: < 0.002% (1 kHz)
Wow and flutter	: quartz crystal precision
D/A conversion	: quadruple oversampling (176.4 kHz) with digital filter and two 16-bit D/A converters

Outputs

Electrical	: 0.5 V^{pp}
Analogue out FIX	: 2 V^{rms}
Impedance phones	: 8-2000 Ω
Optical readout system (laser	pick-up)
Laser	: semi-conductor ALGAAS
Wave length	: 780 nm
Power consumption	: 30 W approx. mains frequencies: 50 and 60 Hz
Dimensions (wxhxd)	: 420x104x363 mm
Weight	: 10.3 kg approx.

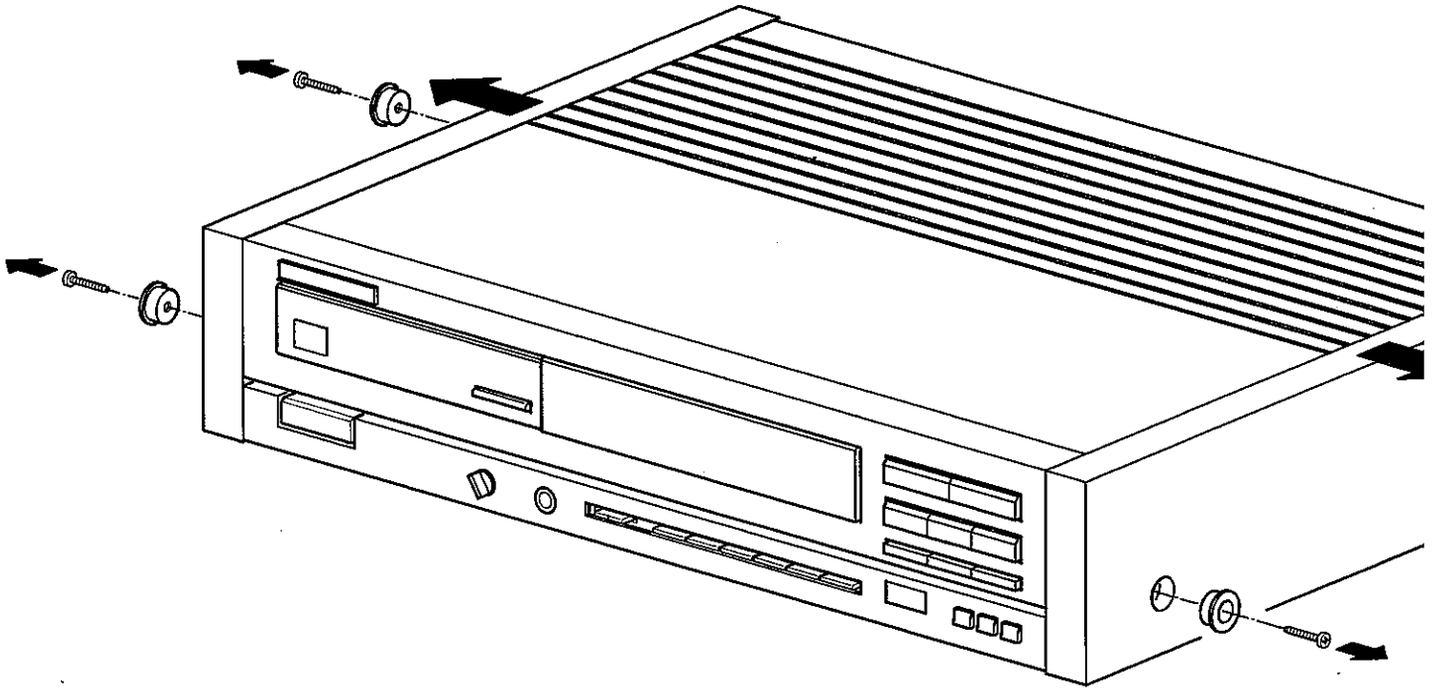
(GB) **WARNING**

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.

ESD

DISASSEMBLY OF THE CABINET

1



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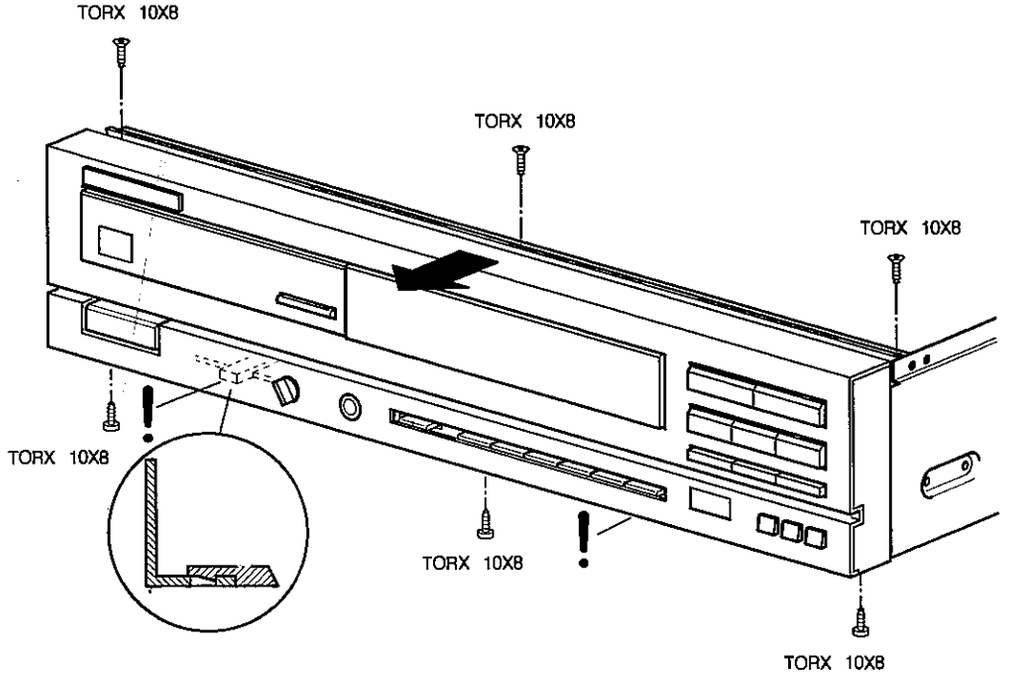

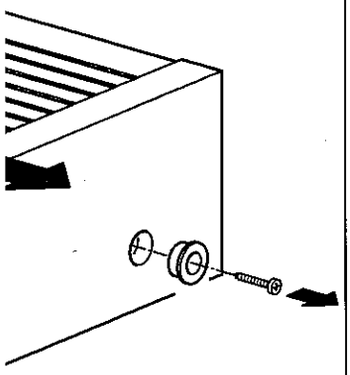

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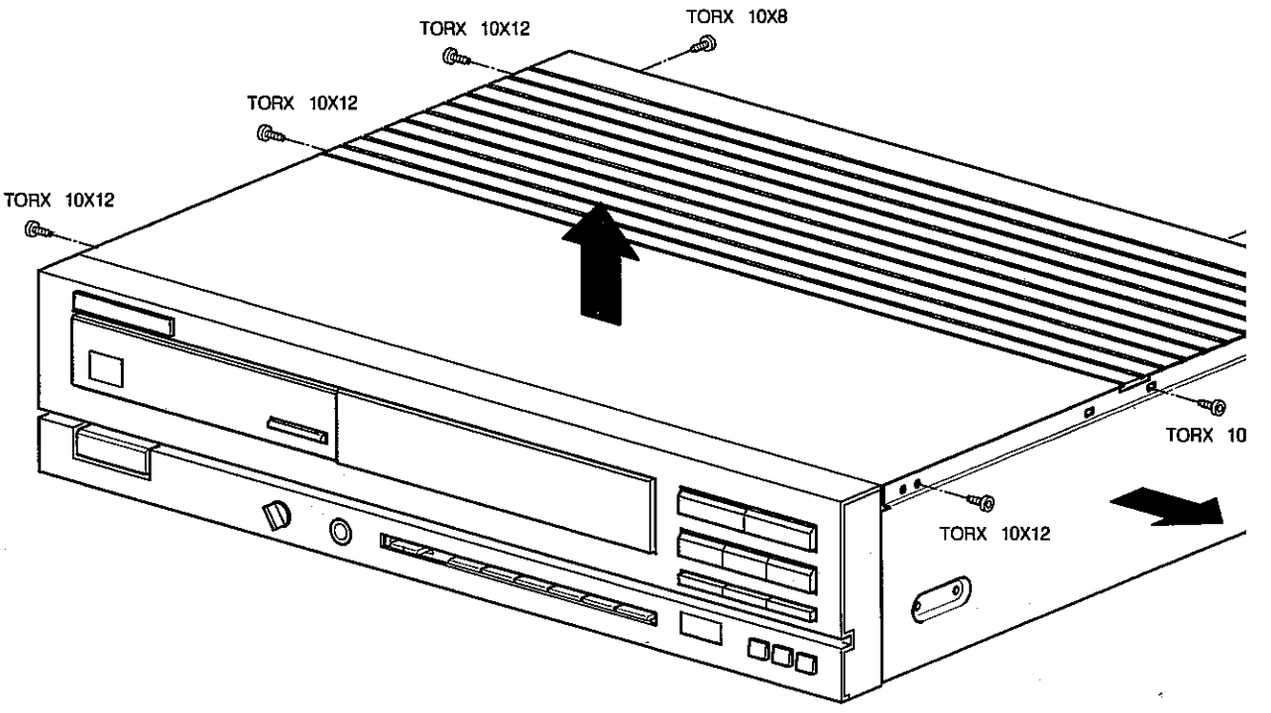
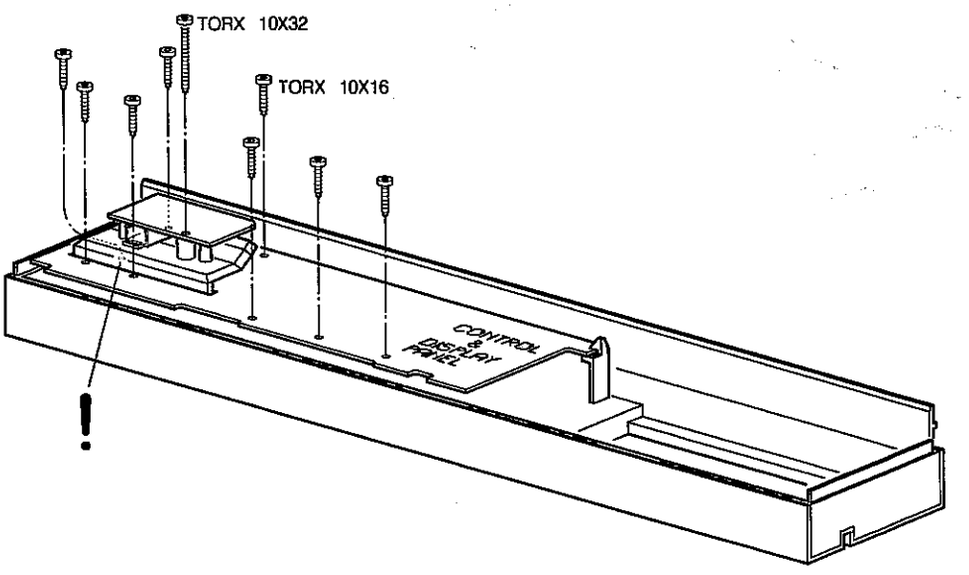
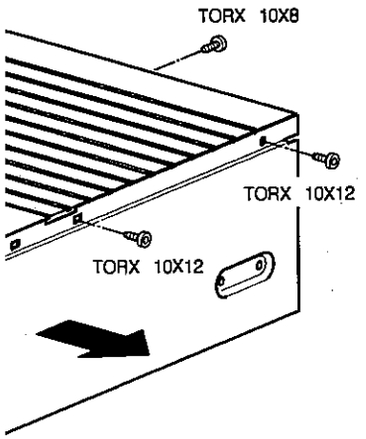

TORX 10X12
TORX 10X8
TORX 10X12
TORX 10X12
TORX 10
TORX 10X12

5


TORX 10X32
TORX 10X16
CONTROL & DISPLAY PANEL
!



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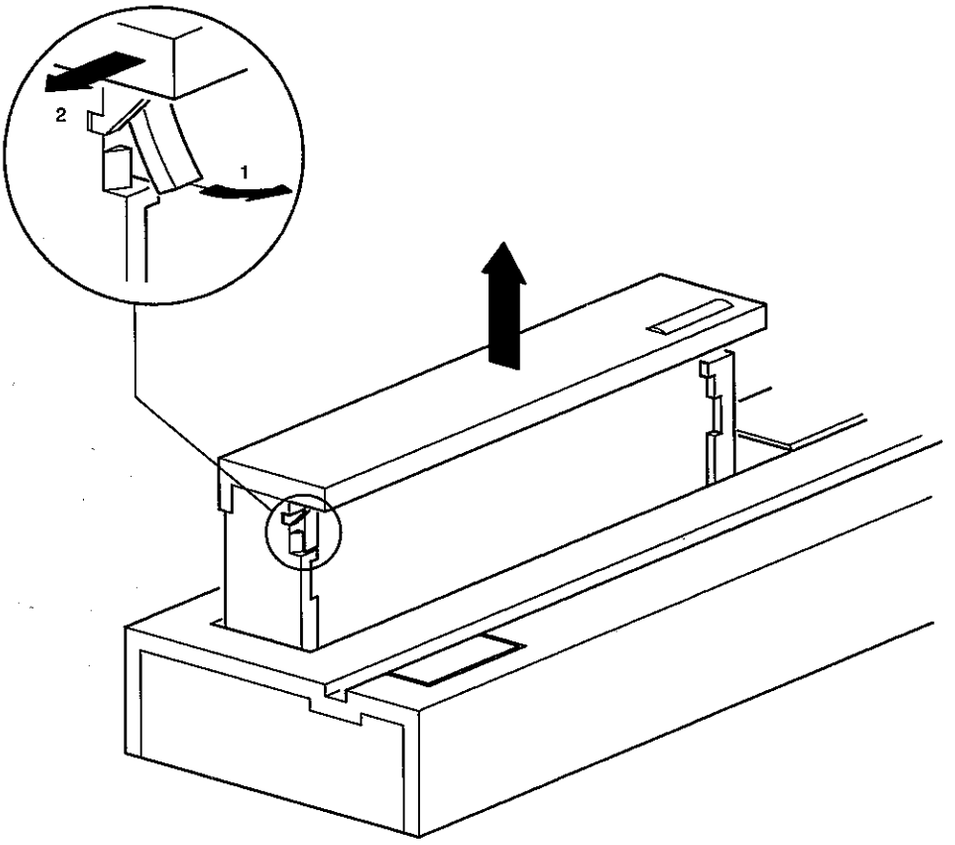

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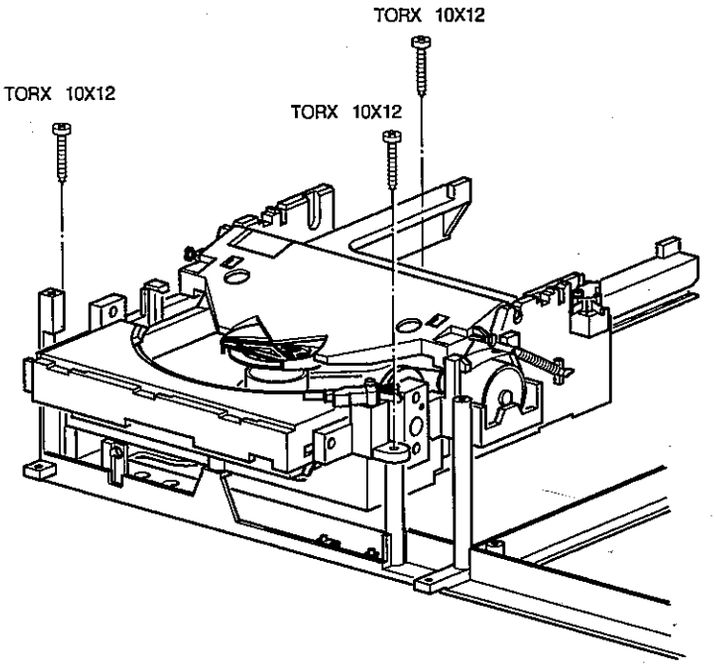

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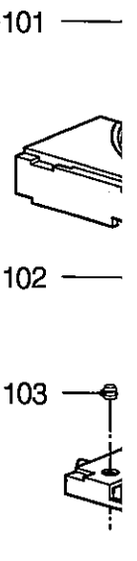

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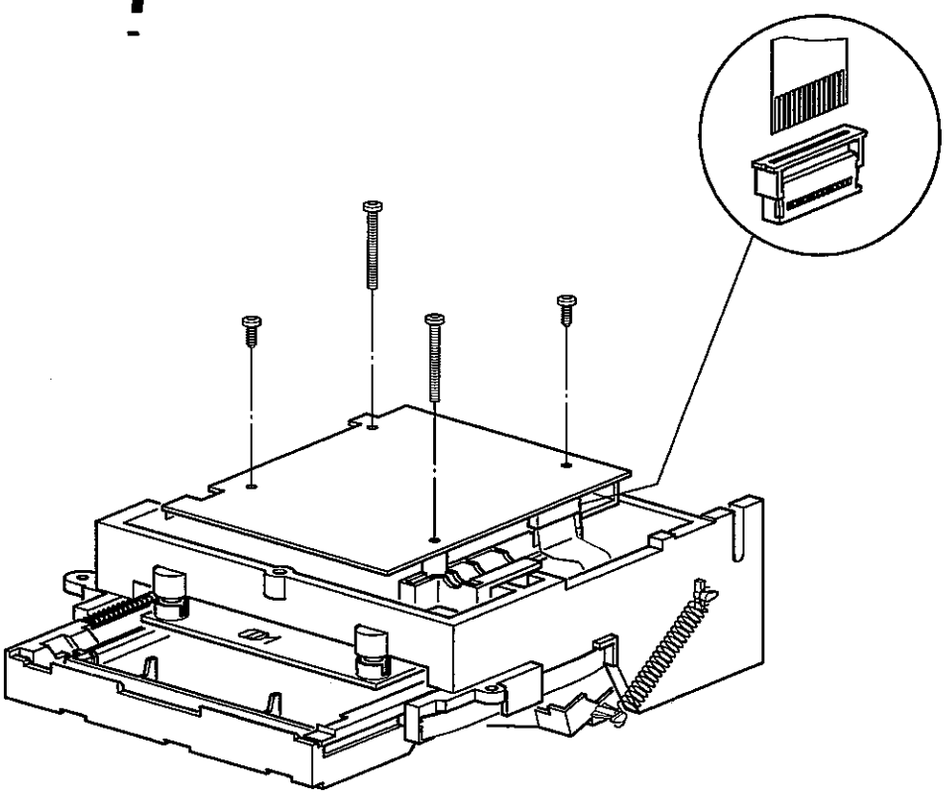
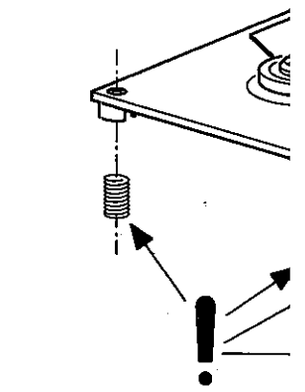
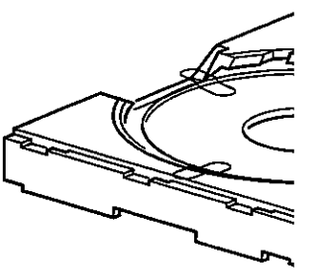


LOADING
"UP–SIDE–DOWN".

8





Exploded vi

101
102
103
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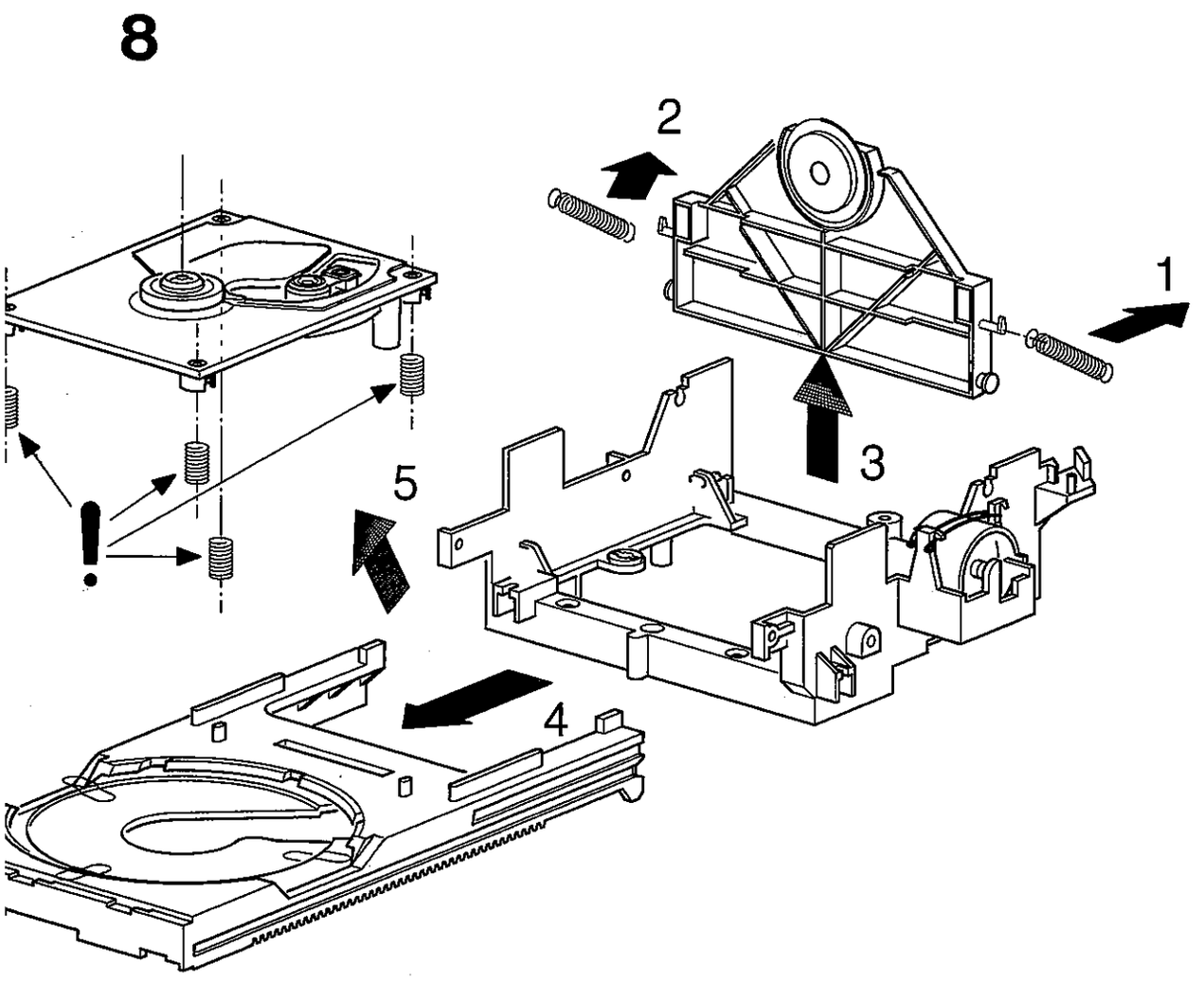
CDM1 MKII



EVA.00746
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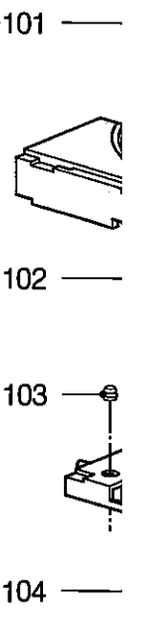
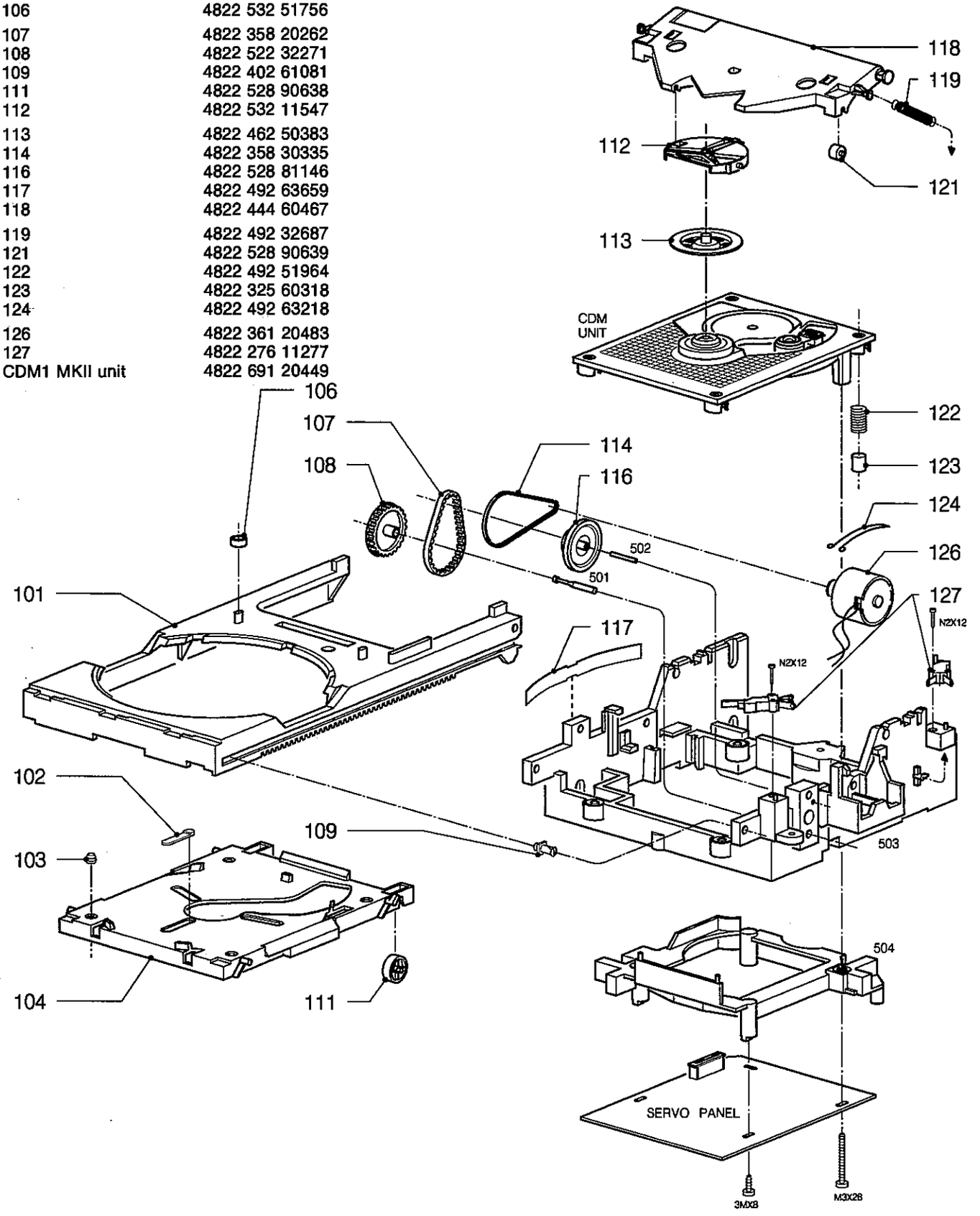


Exploded view tray mechanism

101	4822 444 50566
102	4822 325 60319
103	4822 325 60317
104	4822 466 92111
106	4822 532 51756
107	4822 358 20262
108	4822 522 32271
109	4822 402 61081
111	4822 528 90638
112	4822 532 11547
113	4822 462 50383
114	4822 358 30335
116	4822 528 81146
117	4822 492 63659
118	4822 444 60467
119	4822 492 32687
121	4822 528 90639
122	4822 492 51964
123	4822 325 60318
124	4822 492 63218
126	4822 361 20483
127	4822 276 11277
CDM1 MKII unit	4822 691 20449



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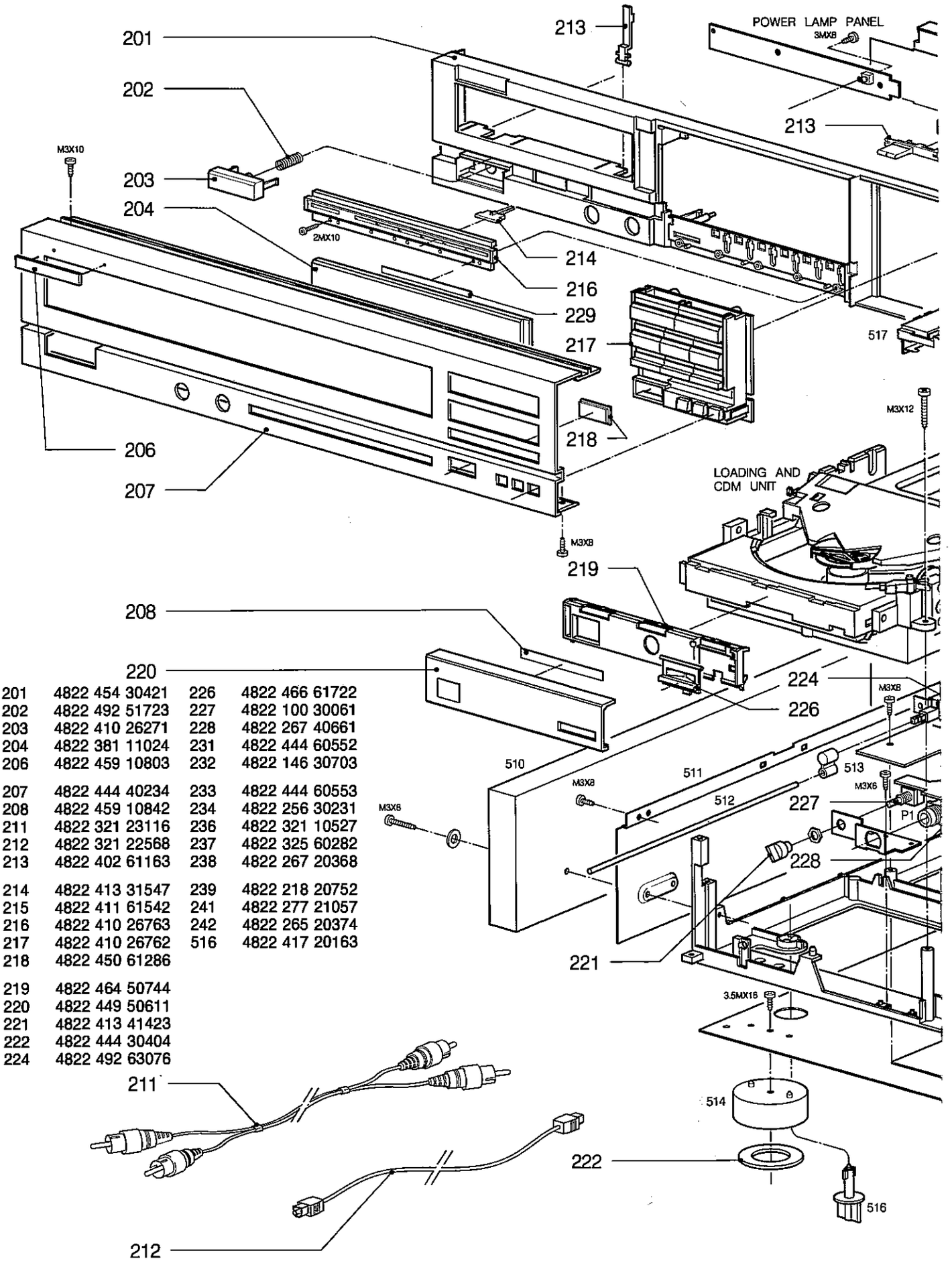
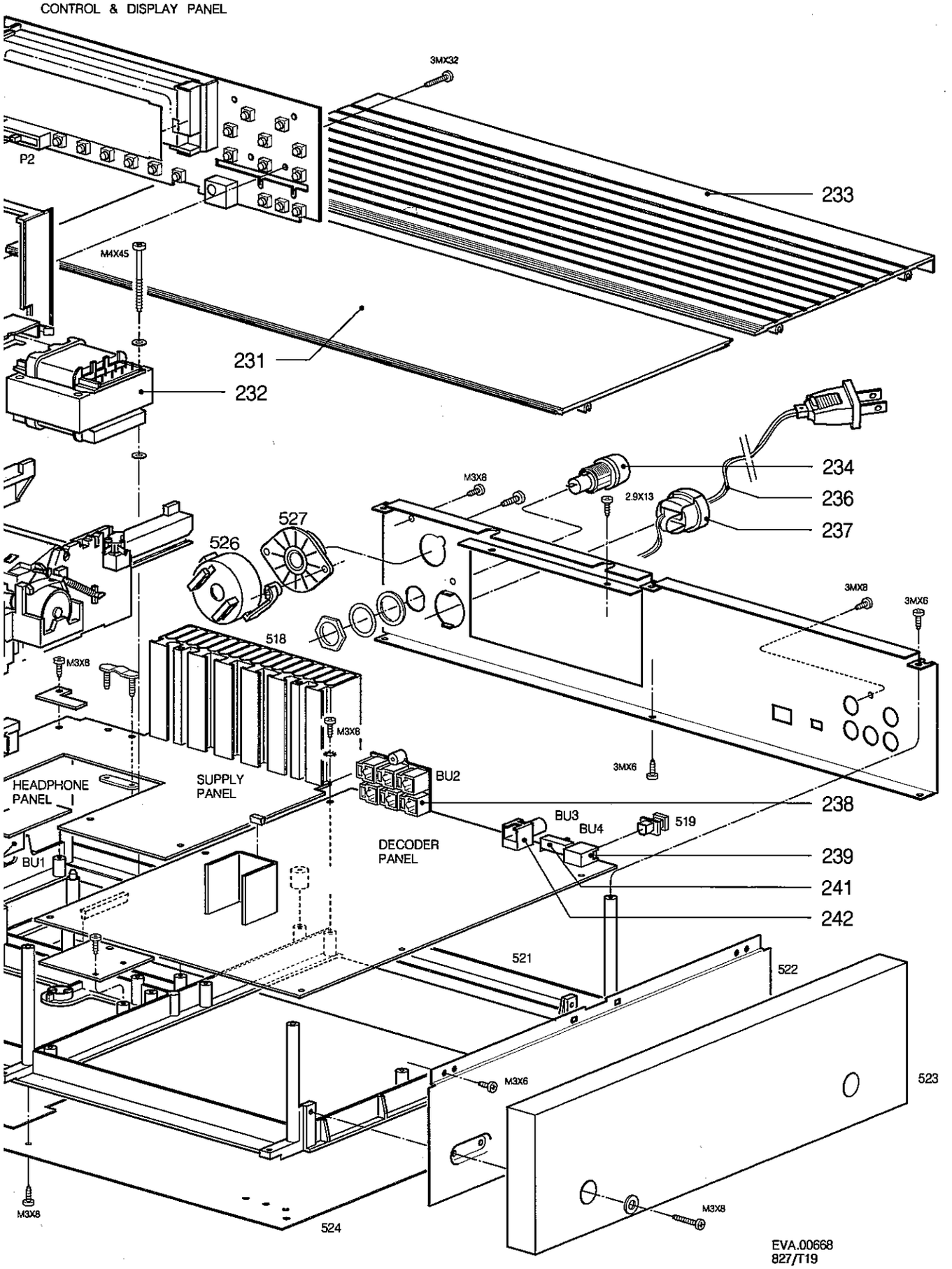
EXPLODED VIEW CABINET

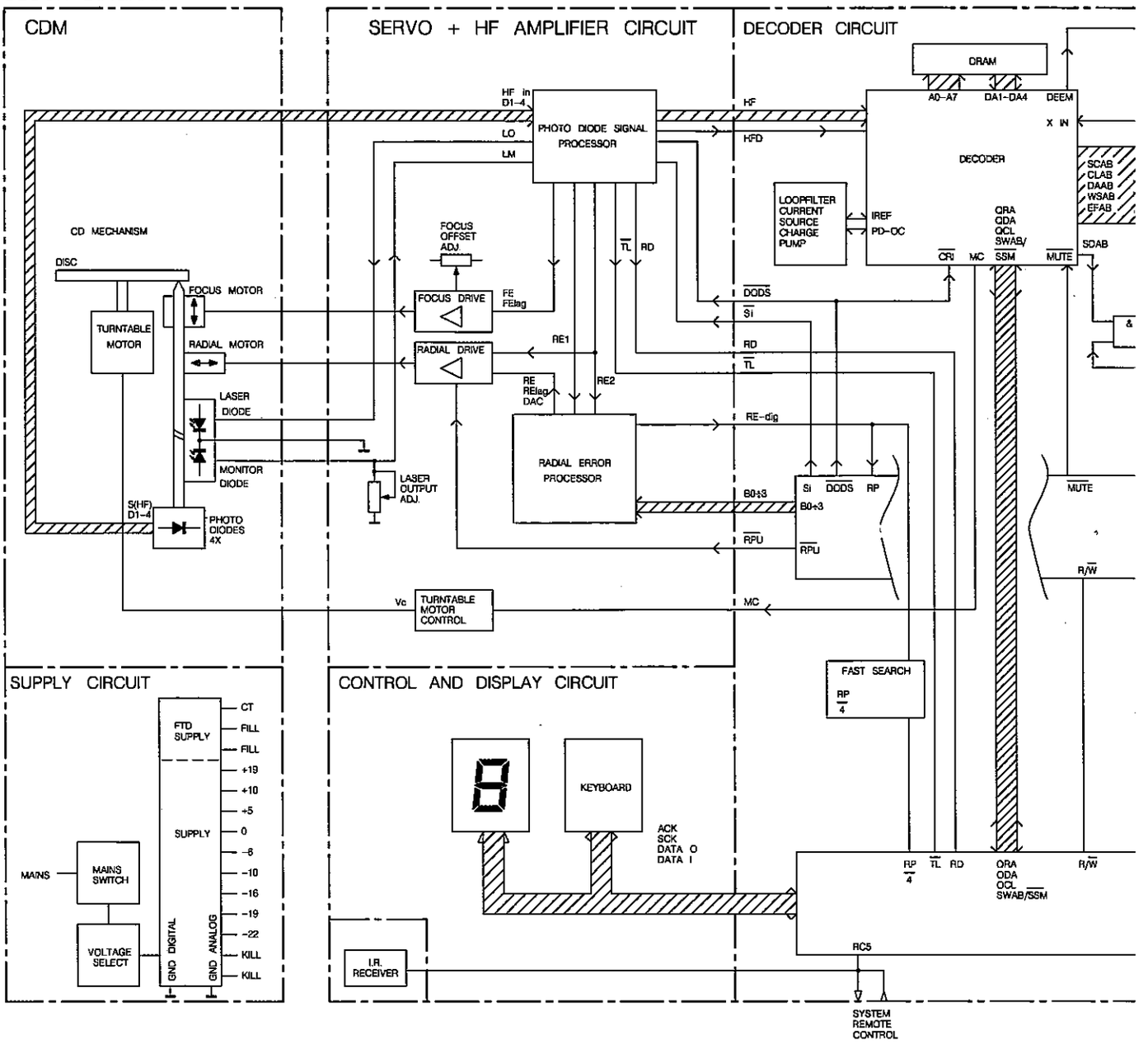


201	4822 454 30421	226	4822 466 61722
202	4822 492 51723	227	4822 100 30061
203	4822 410 26271	228	4822 267 40661
204	4822 381 11024	231	4822 444 60552
206	4822 459 10803	232	4822 146 30703
207	4822 444 40234	233	4822 444 60553
208	4822 459 10842	234	4822 256 30231
211	4822 321 23116	236	4822 321 10527
212	4822 321 22568	237	4822 325 60282
213	4822 402 61163	238	4822 267 20368
214	4822 413 31547	239	4822 218 20752
215	4822 411 61542	241	4822 277 21057
216	4822 410 26763	242	4822 265 20374
217	4822 410 26762	516	4822 417 20163
218	4822 450 61286		
219	4822 464 50744		
220	4822 449 50611		
221	4822 413 41423		
222	4822 444 30404		
224	4822 492 63076		

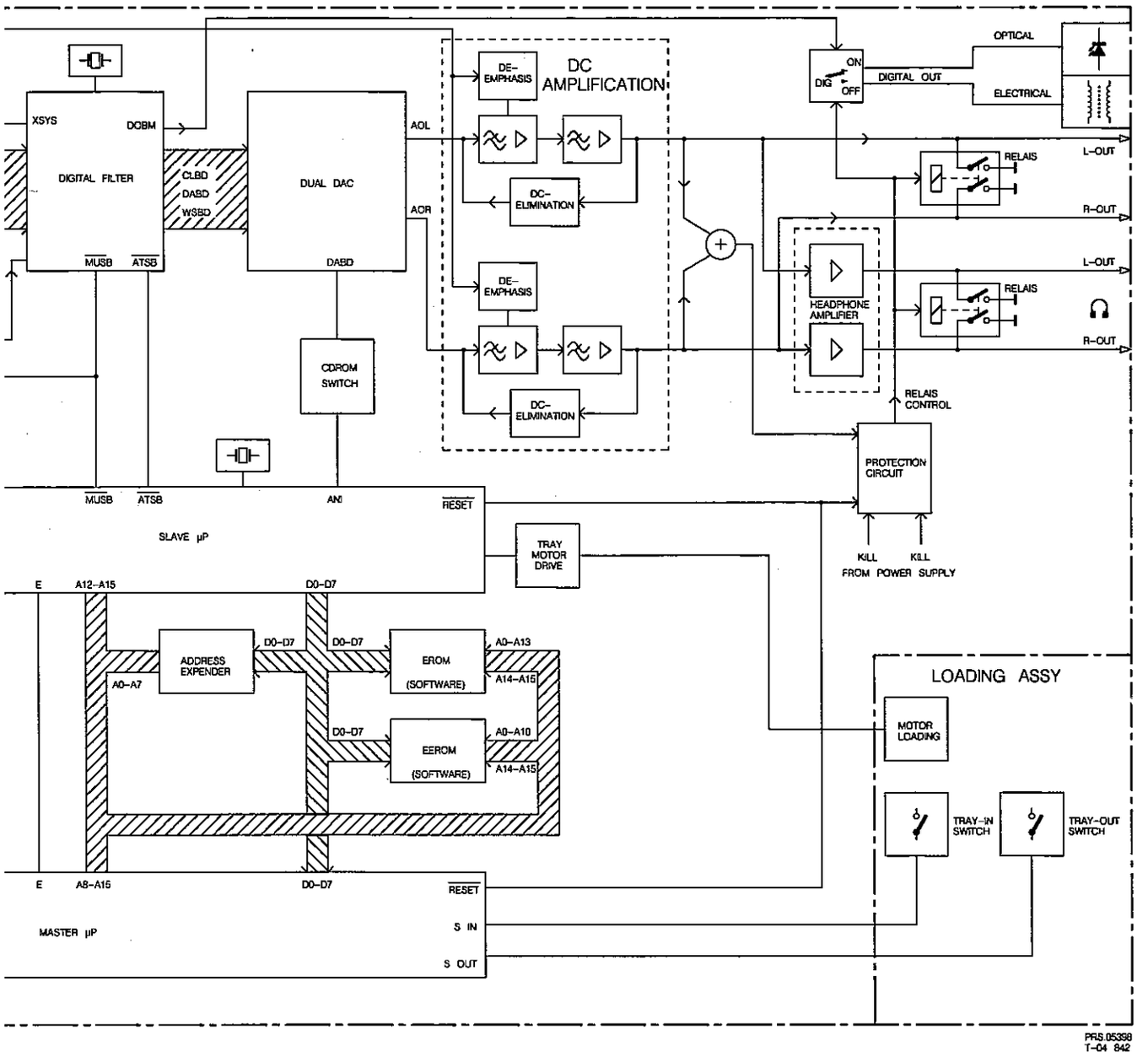
CONTROL & DISPLAY PANEL



BLOCK DIAGRAM



B0-B3	– Control bits for radial circuit	RE1	– Radial error signal 1 (summation of amplified currents D_3 and D_4
DAC	– Current output for track jumping (Digital to Analogue Converted)	RE2	– Radial error signal 2 (summation of amplified currents D_1 and D_2
$\overline{DODS}$	– Drop out detector suppression	RE dig	– Radial error digital = RP
D1÷4	– Photodiode currents	RE lag	– Radial error signal for LAG network
FE	– Focus error signal	RD	– Ready signal, Starting up procedure finished.
FE lag	– Focus error signal for LAG network	$\overline{RPU}$	– Radial puls after track jumping
HF	– HF output for DEMOD	$\overline{Si}$	– On/off control for laser supply and focus circuit
HFD	– HF detector output for DEMOD	$\overline{TL}$	– Track loss signal
HF-in	– HF current input	Vc	– Control voltage for turntable motor
LM	– Laser monitor diode input		
LO	– Laser amplifier current output		
MC	– Motor control signal		
RE	– Radial error signal (Amplified RE_2-RE_1 currents)		



$\overline{\text{ATSB}}$	–	Attenuation of Audio level in Search position (Cueing)
CD ROM	–	Digital Data information on disc signal
Switch		
CEFM	–	Clock Eight-to-Fourteen Modulator
CLAB	–	Clock signal Decoder-A to Filter-B
$\underline{\text{CLBD}}$	–	Clock signal Filter-B to DAC
$\overline{\text{CRI}}$	–	Counter Reset Inhibit
DAAB	–	Data signal Decoder-A to Filter-B
$\underline{\text{DABD}}$	–	Data signal Filter-B to DAC
$\overline{\text{DEEM}}$	–	Deemphasis
DOBM	–	Digital out signal
EFAB	–	Error flag Decoder-A to Filter-B
$\underline{\text{CREF}}$	–	Reference Current
$\overline{\text{MUTE}}$	–	Mute signal
$\overline{\text{MUSB}}$	–	Soft Mute signal
PD/OC	–	Phase detector - oscillator control
QCL	–	Q-channel Clock signal
QDA	–	Q-channel Data signal
QRA	–	Q-channel Request Aknowledge
SCAB	–	Subcode clock Decoder-A to Filter-B
SDAB	–	Subcode data Decoder-A to Filter-B
SWAB/$\overline{\text{SSM}}$	–	Subcode Word/Start-stop motor signal
WSAB	–	Word select Decoder-A to Filter-B
WSBD	–	Word Select Filter-B to DAC
XIN	–	Oscillator signal in Decoder-A
XSYS	–	Oscillator signal out Filter-B

SERVICING HINTS

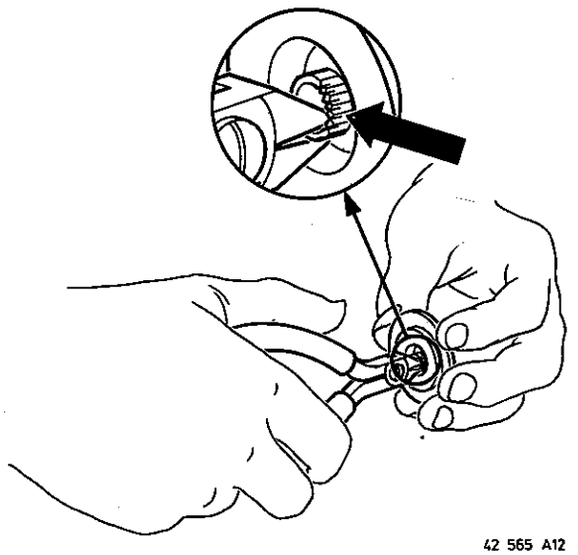
ESD

All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD).
Careless handling during repair can drastically reduce life expectancy.
When repairing, make sure that you are connected via a wrist wrap with resistance to the same potential as the chassis of the set. Keep components and aids also at the same potential.

The disc should always rest properly on the turntable. To achieve this a disc hold–down has been mounted in a bracket of the tray mechanism.
If the tray mechanism has to be disassembled for servicing, a separate disc hold-down should be used.

Compose a service Disc hold-down in the following way

- Cut in the most inner ring of a disc holddown (4822 462 56383) with small and sharp nippers
  See fig. below.
- Enlarge the diameter of the innermost ring slightly with the hind part of a pencil or ballpoint, so that it jams onto the turntable with sufficient force.
- If the jamming force decreases after certain time of use, the diameter has to be enlarged with a pencil or ballpoint again.



42 565 A12

Explanation of the symbols used

= oscilloscope (ri ⩾ 10 MΩ)

= meter (voltmeter with ri ⩾ 10 MΩ)

= carry out alignment/adjustment

= test point

– Test discs

It is important that the test discs be treated with great care.
The disturbances on the discs (black, spots, finger-prints, etc.) are exclusive and are unamibiguously positioned.
Damages may cause extra drop-outs etc. thus putting an end to the exclusivity of the intentional error on the disc.
In that case it is not possible anymore to check for example the good functioning of the track detector.

- Ensure that the disc and objective are clean (remove dust, fingerprints, etc.) and use undamaged discs.

- Check that all supply voltages are present and that they have the correct values.

- Remove the transit clamps before using the player. Store the transit clamps in a safe place. **Always** refit them before transporting the player.

– Conditions for injection

- Injection of levels or signals from an **external** source should **never** take place if the relevant circuit has no supply voltage.
- The injected levels or signals should **never** be greater than the supply voltage of the relevant circuit.

– Indication of the test points

In the drawing of the diagrams and PCBs the test points are indicated by a number (e.g. ◈12) to which the measuring method refers.
In the following measuring method the symbol ◇ has been omitted for the test points indicated.

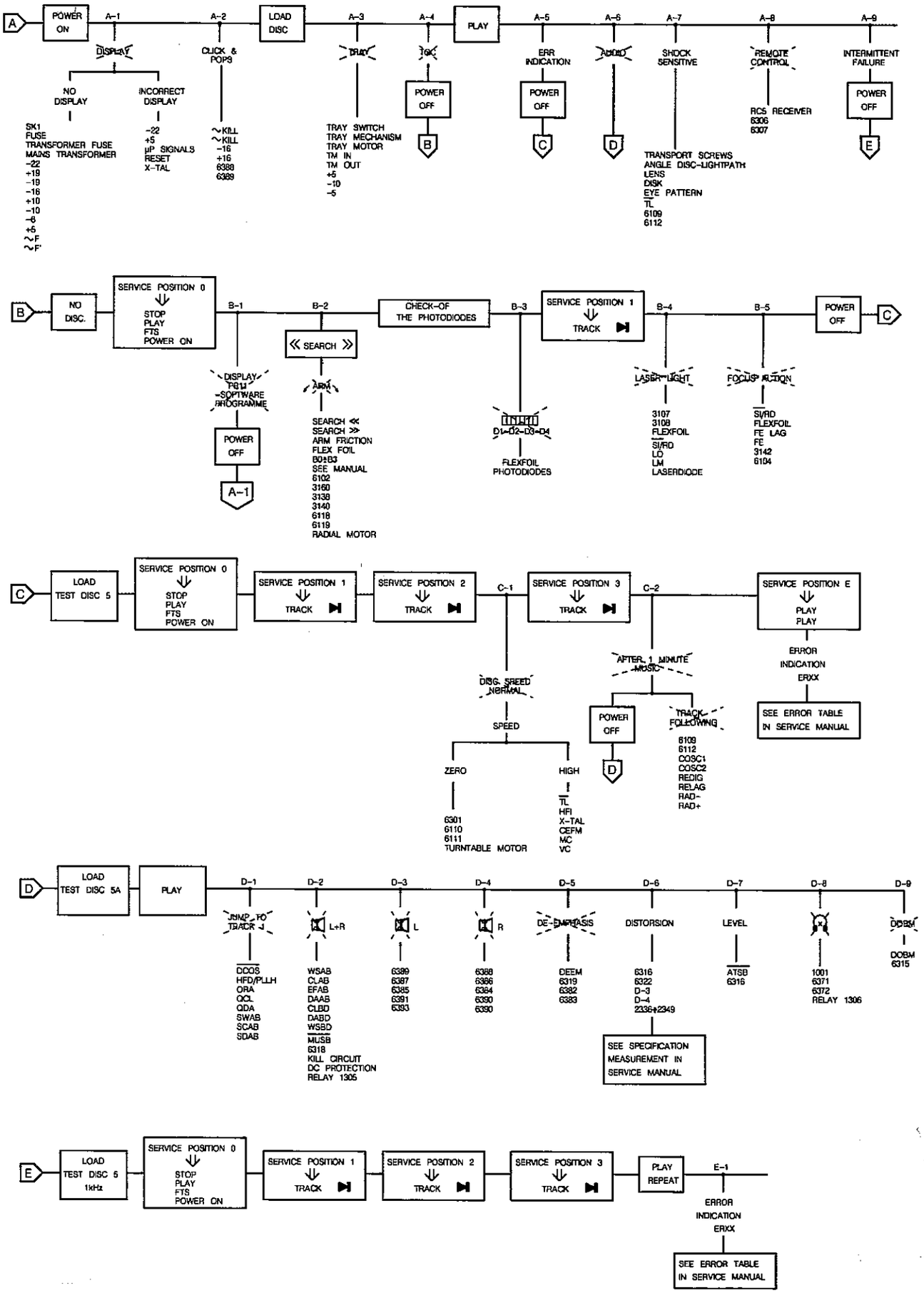
SERVICE AIDS

Audio test disc	(3) 4822 397 30085
Disc without errors + disc with DO errors, black spots and fingerprints	(5+5A)4822 397 30096
Disc (65 min 1kHz) without pause	4822 397 30155
Torx screwdrivers	
Set (straight)	4822 395 50145
Set (square)	4822 395 50132
13th order filter	4822 395 30204

WORKING WITH THE FAULTFINDING TREE

Follow the path of the faultfinding tree, beginning at the top left. Perform the actions you come across in the various blocks.
Look at the various side branches to find out if the information you see there applies to your problem. If, for instance, you find the indication, this means that no picture appears on the display. If you establish this fault, follow the branch and perform the recommended actions. Check the components mentioned. In a number of branches further reference is made to measurements, are explained in several tables further on in this manual.

FAULTFINDING TREE



MDA.01691
T-20 848

A1
µP-SIGNALS

SIGNAL	MODE	◇			REMARKS
RESET	POWER ON	103		PULS "HIGH"	
X-TAL	STAND BY	31 70		8MHz 11,2896MHz	
TRAY IN/OUT	OPEN/CLOSE	83			HIGH WHEN TRAY IS CLOSING LOW WHEN TRAY IS OPENING
TRAY ON/OFF	OPEN/CLOSE	83A			LOW WHEN TRAY IS OPENING HIGH WHEN TRAY IS MOVING
$\overline{ATSB}$	DISC.SEARCH	89		PULS "LOW"	LOW DURING SEARCH
$\overline{MUTE}$	SEARCH PAUSE, PLAY	57		PULSES "HIGH"	STANDBY LOW
RP/4	PLAY	94			NON STABLE SQUARE WAVE
RP/4 SELECT	PLAY NEXT OR PREVIOUS	110		PULSES "HIGH"	BY BIG JUMPS

MDA.01693
T-20 848

A2
RELAY CONTROL

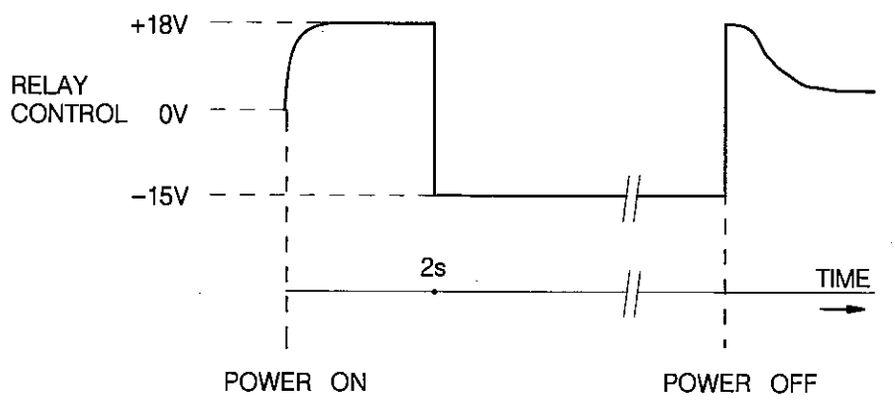
SIGNAL	MODE	◇			REMARKS
DC-RELAYS	POWER ON	96		SEE DRAWING: MDA.01732	
DC-RELAYS	POWER OFF				

MDA.01704
T-20 847

B2
B0,B1,B2,B3 SIGNALS

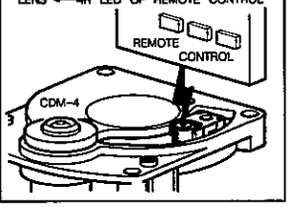
SIGNAL	MODE		◇			REMARKS
B0	SERVICE POSITION 0 OR 1; SEARCH	≫	36		"HIGH"	
	SERVICE POSITION 0 OR 1; SEARCH	≪	36		"LOW"	
B1	SERVICE POSITION 0 OR 1; SEARCH	≫	34		"LOW"	
	SERVICE POSITION 0 OR 1; SEARCH	≪	34		"HIGH"	
B2	SERVICE POSITION 0 OR 1; SEARCH	≫	33		"HIGH"	
	SERVICE POSITION 0 OR 1; SEARCH	≪	33		"HIGH"	
B3	SERVICE POSITION 0 OR 1; SEARCH	≫	32		"LOW"	
	SERVICE POSITION 0 OR 1; SEARCH	≪	32		"LOW"	

MDA.01692
T-20 848



MDA.01732
T27-848

B3
CHECK OF THE PHOTODIODES

STEP	SIGNAL	MODE	◇				REMARKS
1	—	STAND BY	④ ⑥ ⑦ ⑧	—	—	SEE DRAWING 38314A12	SIGNAL DEPENDS ON DISTANCE LENS ⟵ IR LED OF REMOTE CONTROL 

MDA.01378
T-08 847

B4
LASER CURRENT ADJUSTMENT

STEP	SIGNAL	MODE	◇				REMARKS
1	—	POWER OFF	⑪ Ω GND	R3106	1k Ω	—	PRE-ADJUSTMENT OHMIC VALUE
2	EYE-PATTERN HF	TEST DISC 5 PLAY	PIN 25 DECODER A (SAA7210) 10V GND	—	—	SEE DRAWING 37017B6	IF NO SIGNAL SEE: "START UP PROCEDURE"
3	LASER CURRENT ≙ VOLTAGE ACROSS R3102	TEST DISC 5 PLAY TRACK 1	① V ②	R3106	50mV DC	—	Ri = 10M Ω

MDA.01697
T-08 847

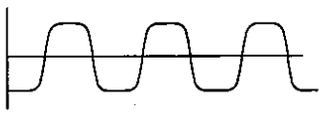
B-4 CHECK OF LASER SUPPLY

The laser, the laser supply plus the monitor diode form a feedback system.
A defect in the laser supply may result in the destruction of the laser. If, in that case, the laser is replaced, (= complete D.C.M.-unit) the new laser will also become defective. However, it is impossible to check and repair a feedback system if a link is missing. For this reason the laser supply can be checked with the replacement circuit for laser assembly.

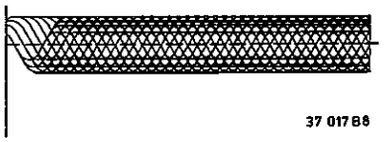
B4
CHECK OF LASER SUPPLY (WITH DEMOUNTED CDM AND ADDITIONAL CIRCUIT)

STEP	SIGNAL	MODE	◇				REMARKS
1	LO	SERV. POS. 2	⑨ V	—	1.8<V <2.3	—	Si=1 ㉑ A K LITTLE LIGHT 330 GREEN LED to LO to LM SK 180 to CONNECTED DIRECTLY TO PANEL
	LM	SK	⑪ V	—	170 <mV <220	—	
2	LO	SERV. POS. 2	⑨ V	—	1.8<V <2.3	—	Si=1 ㉑ A K LITTLE LIGHT 330 GREEN LED to LO to LM SK 180 to CONNECTED DIRECTLY TO PANEL
	LM	SK	⑪ V	—	170 <mV <220	—	
3	LO	POWER ON	⑨ V	—	0V ± 0.2V	—	A K NO LIGHT Si=0 ㉑

MDA.01379
T-08 824



38 314 A12



37 017 B6

B5
FOCUS ACTION

SIGNAL	MODE	◇			REMARKS
$\overline{SI}$	SERVICE POSITION 1 WHEN REPEATING START UP PROCEDURE	21		PULSES	SEE DRAWING: MDA.01706
FE	TEST DISC 5A, SERVICE POSITION 1 WHEN REPEATING START UP PROCEDURE	26			SEE DRAWING: MDA.01413 NO DISC
FE-LAG	TEST DISC 5A,	27			SEE: ADJUSTMENT OF FOCUS-OFFSET
RD	PLAY	24		PULSES	SEE DRAWING: MDA.01706

MDA.01695
T-08 848

B5
ADJUSTMENT OF FOCUS-OFFSET

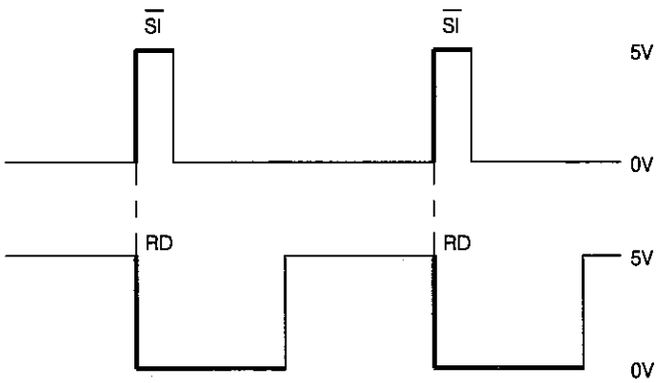
STEP	SIGNAL	MODE	◇				REMARKS
1	—	POWER ON	—	R3146	—	—	ADJUST FOR OPTICAL MID-POSITION
2	FE LAG	PLAY TEST DISC 5 TRACK 1	27	R3146	400mV ±40mV DC	—	FINE ADJUSTMENT

MDA.01696
T-08 847

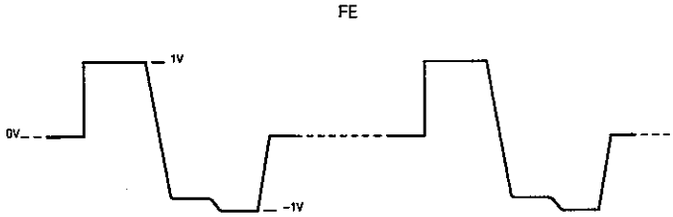
C1
HIGH SPEED DISC ROTATION

SIGNAL	MODE	◇			REMARKS
$\overline{TL}$	TEST DISC 5, PLAY OR SERVICE POSITION 2	16		PULSES "LOW"	WHEN SLIGHTLY BUMPED AGAINST THE CDM
HFI	TEST DISC 5, PLAY OR SERVICE POSITION 2	65			SEE DRAWING: 3701738
X-tal	TEST DISC 5A, PLAY OR SERVICE POSITION 2	69		11.29MHz	IF THIS FREQUENCY DEVIATES CHECK X-OUT ON FILTER-B
CEFM	TEST DISC 5A, PLAY OR SERVICE POSITION 2	68		4.32MHz	
MC	TEST DISC 5, PLAY OR SERVICE POSITION 2	12			SEE DRAWING: 38849A12
VC	TEST DISC 5A, PLAY OR SERVICE POSITION 2	13	APPROX -1V		

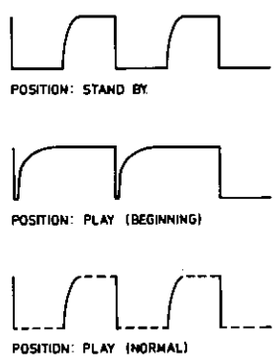
MDA.01694
T-08 848



MDA.01706
T20 847



MDA.01413
T33/823



38 849 A12

C2
TRACK FOLLOWING

SIGNAL	MODE	◇			REMARKS
C osc1	TEST DISC 5, PLAY OR SERVICE POSITION 3	30		2 mS	
C osc2	TEST DISC 5, PLAY OR SERVICE POSITION 3	31		650Hz	
RE dig	TEST DISC 5, PLAY OR SERVICE POSITION 3 *	37		* PULSES "LOW" * SQUARE WAVES	
RE lag	TEST DISC 5, PLAY OR SERVICE POSITION 3	41		650Hz 100mVpp	SIGNAL DEPENDS ON TRACKING
RE 1	TEST DISC 5, PLAY OR SERVICE POSITION 2	18		100mVpp	SEE DRAWING: 30743 B12/A 2ms/DIV
RE 2		22			

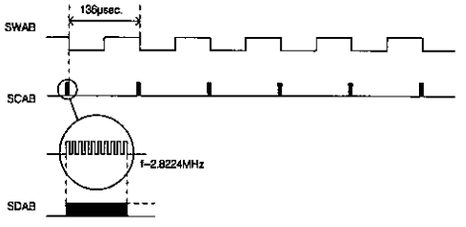
MDA.01709
T-20 847

D1
JUMP TO TRACK 1

SIGNAL	MODE	◇			REMARKS
$\overline{DODS}$	TEST DISC 5A, PLAY + SEARCH ⊳⊳ SEARCH ≪	19			SEE DRAWING: MDA.01705
HFD/$\overline{PLLH}$	TEST DISC 5A: TRACK 13-14-15, PLAY	23		PULSES "LOW"	SEE DRAWING: MDA.00240
QRA	TEST DISC 5A, PLAY	75			SEE DRAWING: MDA.00453
QDA	TEST DISC 5A, PLAY	77			
QCL	TEST DISC 5A, PLAY	76			
SWAB	TEST DISC 5A, PLAY	78			SEE DRAWING: MDA.00239
SCAB	TEST DISC 5A, PLAY	79			SEE DRAWING: MDA.00239
SDAB	TEST DISC 5A, PLAY	80			SEE DRAWING: MDA.00239

MDA.01708
T-20 848

SWAB-SCAB-SDAB-SIGNALS



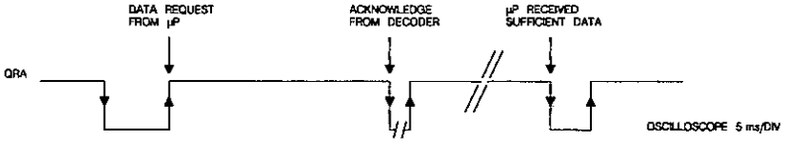
MDA.00239
T12/638

$\overline{DODS}$-SIGNAL

POSITION PLAYER	POWER ON	SERVICE POSITION 3	PLAY	SEARCH PAUSE
$\overline{DODS}$ SIGNAL	"HIGH"	"LOW"	"HIGH"	

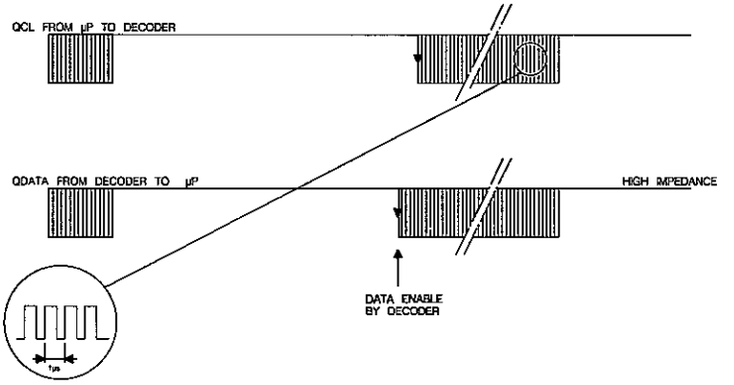
MDA.01705
T20-847

QRA-QDA-QCL-SIGNALS



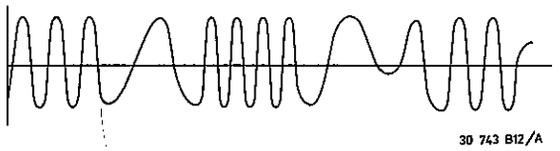
HFD-SIGNAL

MDA.00240
T07-804



MDA.00453
T27/840

RE-1 AND RE-2 SIGNAL



30 743 B12/A

D2
NO AUDIO OUTPUT LEFT + RIGHT

SIGNAL	MODE	◇			REMARKS
XTAL	STAND-BY	70		11,2896MHz	OR COUNTER 11,28967MHz
WSAB	DISC. PLAY	71			SEE DRAWING: 38847C12
CLAB	DISC. PLAY	72			SEE DRAWING: 38847C12
DAAB	DISC. PLAY	73		ACTIVITY	SEE DRAWING: 38847C12
EFAB	TEST DISC 5A.	74		PULSES	WHEN THE DISC IS SLOWLY BRAKED BY HAND
CLBD	DISC. PLAY	87			SEE DRAWING: 38848C12
DABD	DISC. PLAY * STAND BY *	88		* ACTIVITY * 352.8KHz	SEE DRAWING: 38848C12
WSBD	DISC. PLAY	85			SEE DRAWING: 38848C12
$\overline{\text{MUSB}}$	DISC. PLAY PAUSE. OR NEXT OR PREVIOUS	90		PULSES "LOW"	"LOW" DURING TRACK JUMPING

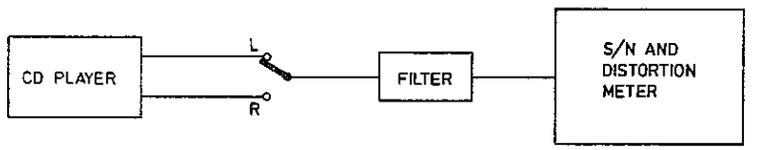
MDA.01707
T-20 848

D6
SPECIFICATIONS MEASUREMENT

SIGNAL	MODE	◇			REMARKS
BU2-L	TEST DISC 3. PLAY. TOTAL HARMONIC DISTORSION	FILTER OUTPUT	⊢—⊣		SEE DRAWING: 30459A12
BU2-R	TEST DISC 3. PLAY. TOTAL HARMONIC DISTORSION	FILTER OUTPUT	⊢—⊣		SEE DRAWING: 30459A12
BU2-L	TEST DISC 3. PLAY. SIGNAL-TO-NOISE RATIO	FILTER OUTPUT	⊢—⊣		SEE DRAWING: 30459A12
BU2-R	TEST DISC 3. PLAY. SIGNAL-TO-NOISE RATIO	FILTER OUTPUT	⊢—⊣		SEE DRAWING: 30459A12

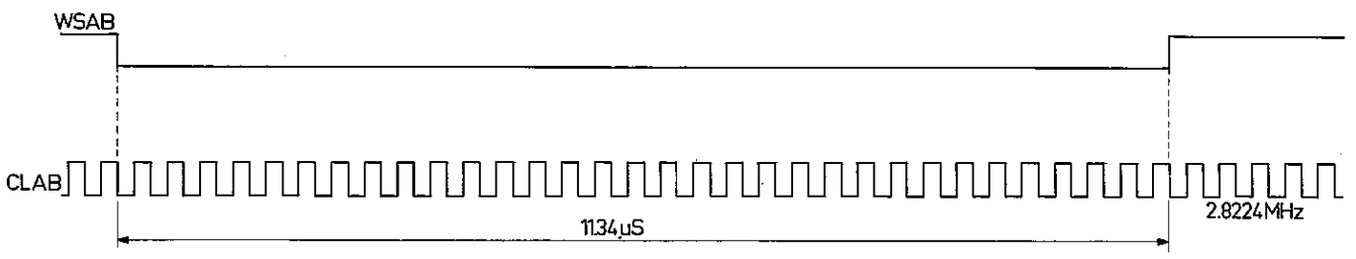
⊢—⊣ SEE TECHNICAL DATA

MDA.01395
T-08 832

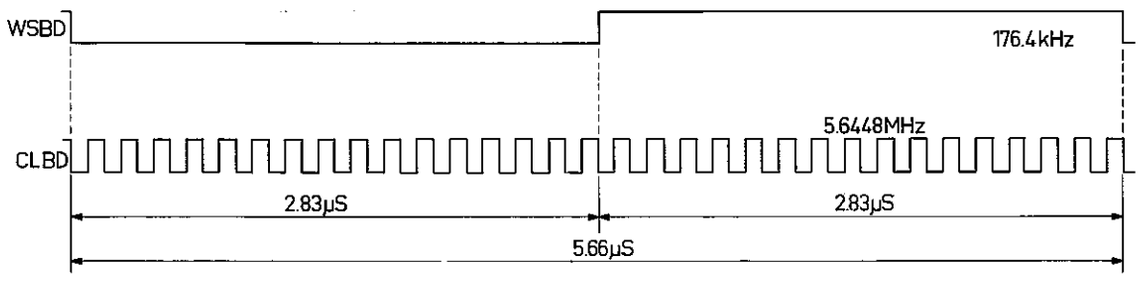


30 459 A12

e.g. SOUND TECHNOLOGY
ST 1700B



38 847 C12



38 848 C12

Errors indicated in display when player is set in play-mode in service-position 3:

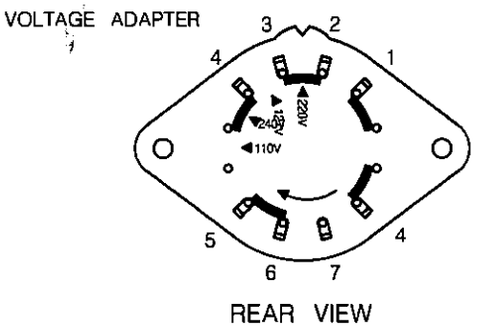
ERROR TABLE

System errors

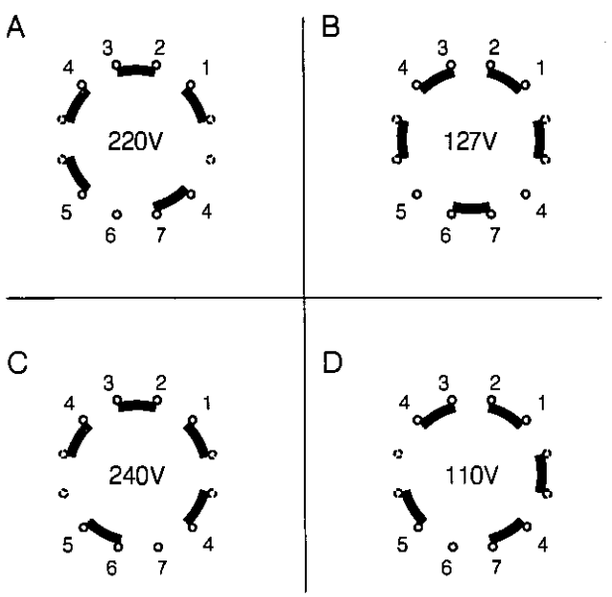
Er 01: RD pulse is missing. Check the start capacity Sc, the RD signal and the photodiode signal processor. (Starting error).
Er 01: TL pulse is missing during start-up. Check the $\overline{TL}$ signal, the HF-signal and the Photodiode signal processor. (Starting error).
Er 03: Lead-in track not found. Check the disc used. Check also that the radial arm rests against the inside. Check the RE-dig signal and the Radial error processor. (Starting error).
Er 04: Too many $\overline{TL}$ pulses during play. Check the quality of the disc used. Check the $\overline{HFD}$ signal. (Error during PLAY).
Er 05: $\overline{TL}$ pulse is low for more than 50 msec. Check the disc used. Check the HF-in signal and the photodiodes (Error during PLAY)
Er 06: No $\overline{TL}$ pulse received within 0.5 sec. in case of track jumping. Check the RE-lag circuit. (Error during SEARCH or NEXT/PREVIOUS).
Er 07: Subcode error. In case of track loss during play the information of the subcode is used to determine the place of the last information that was still well readable. In case of an interruption of HF or other signals, this will lead to ER 07. (Error during PLAY)
Er 08: TOC error (Table of Contents). Check the quality of the disc used. Check the initial speed of the turntable motor and the motor control. Check also that the radial arm rests against the inside. (Starting error).

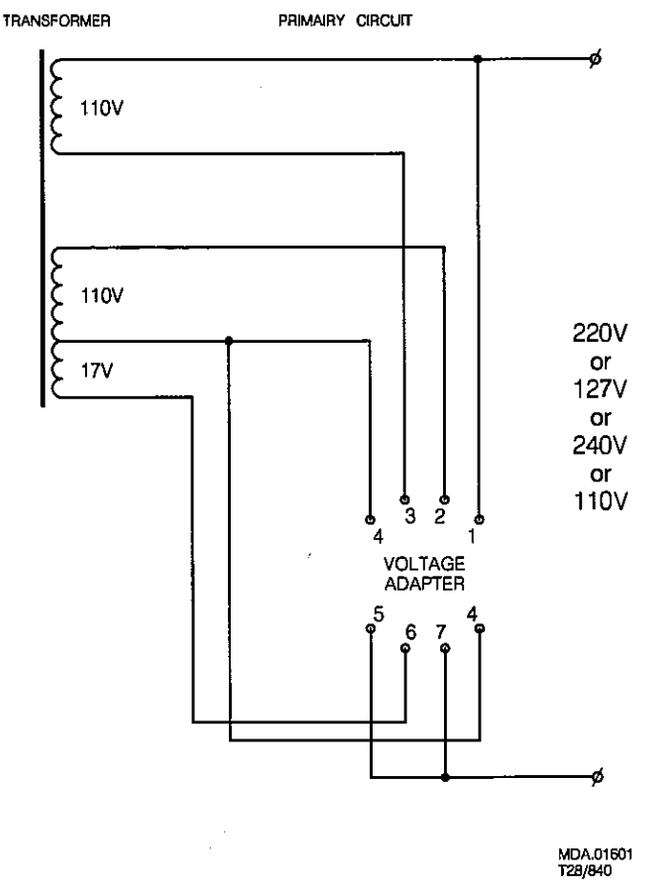
Operating errors

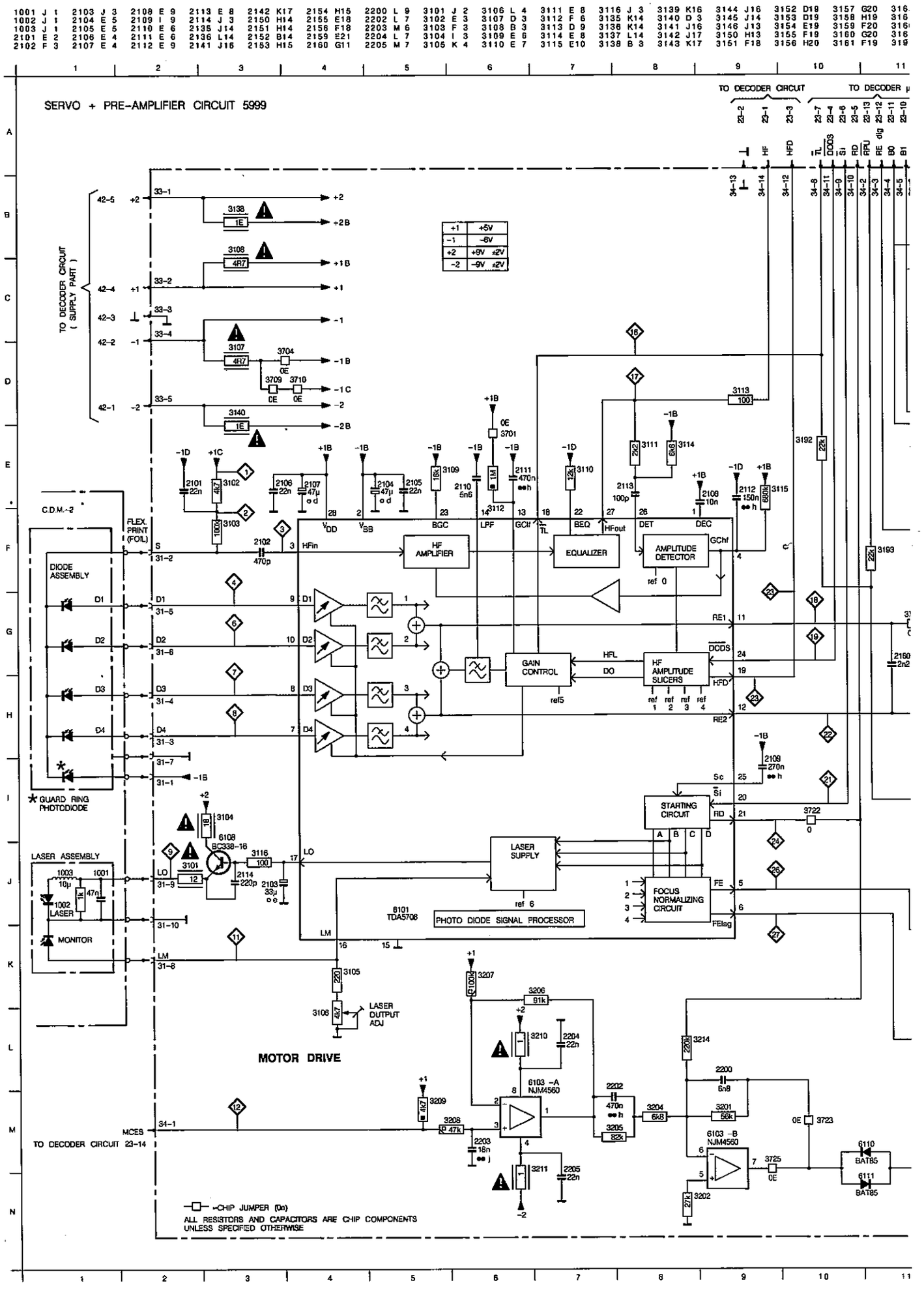
Er 30: NEXT when repeat is off
Er 31: PREVIOUS when repeat is off
Er 32: INDEX selected when no track selected
Er 33: Selected index does not exist on this CD
Er 34: Review error: no program
Er 35: Program memory full
Er 36: Programmed track is non existing on this CD
Er 37: Selected track is non existing on this CD
Er 60: Fast forward bound
Er 61: Fast forward bound



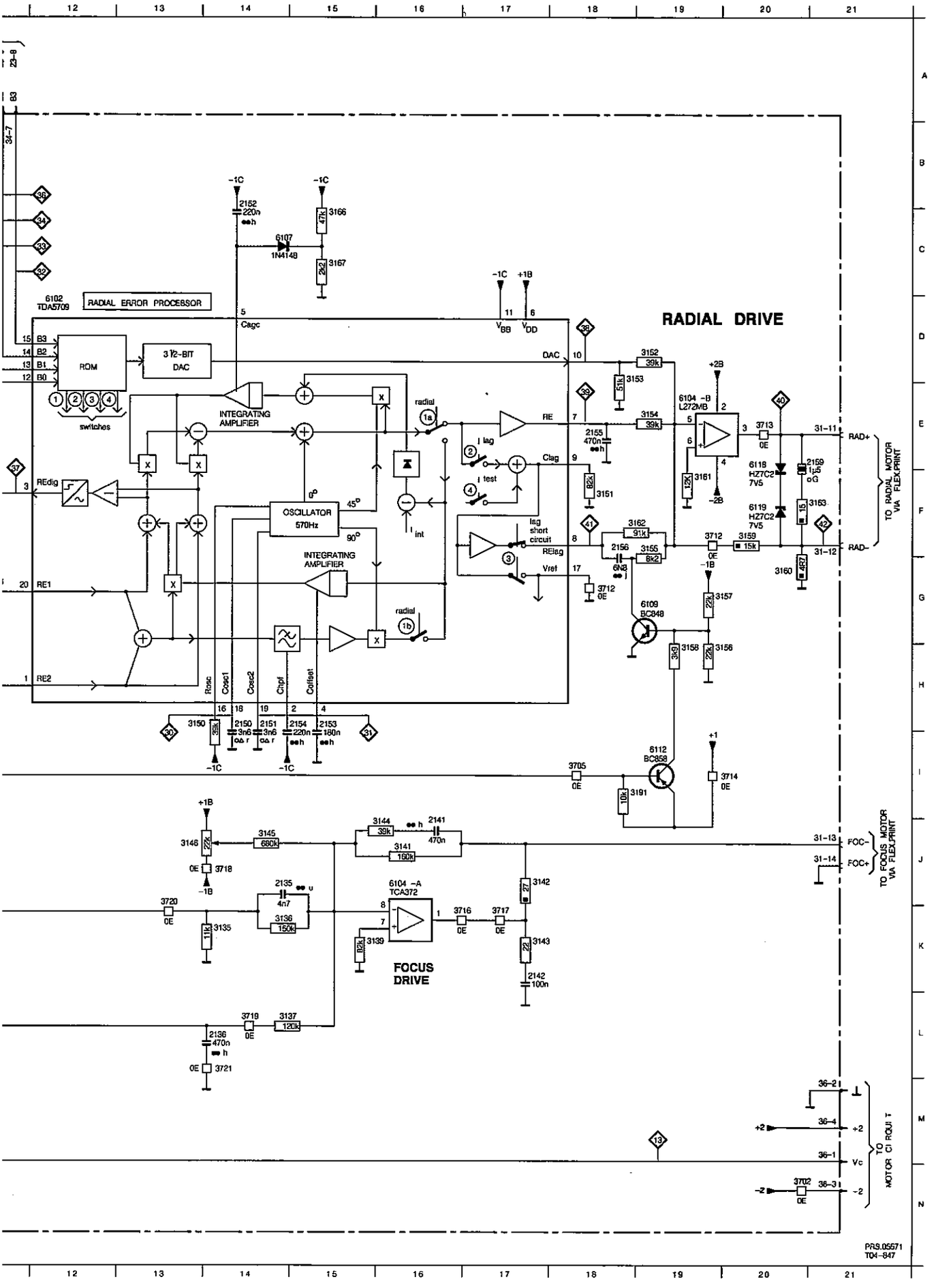
CONNECTIONS INSIDE VOLTAGE ADAPTER






SERVO + PRE-AMPLIFIER CIRCUIT 5999
TO DECODER CIRCUIT
TO DECODER CIRCUIT (SUPPLY PART)
HF AMPLIFIER
EQUALIZER
AMPLITUDE DETECTOR
GAIN CONTROL
HF AMPLITUDE SLICERS
STARTING CIRCUIT
LASER SUPPLY
FOCUS NORMALIZING CIRCUIT
PHOTO DIODE SIGNAL PROCESSOR
6101 TDA5708
DIODE ASSEMBLY
LASER ASSEMBLY
FLEX. PRINT (FOIL)
C.D.M.-2
GUARD RING PHOTODIODE
MONITOR
LASER OUTPUT ADJ
MOTOR DRIVE
6103 -A NJM4560
6103 -B NJM4560
6108 BC338-16
TO DECODER CIRCUIT 23-14
CHIP JUMPER (On)
ALL RESISTORS AND CAPACITORS ARE CHIP COMPONENTS UNLESS SPECIFIED OTHERWISE

F19 3192 E10 3205 M 7 3210 L 7 3704 D 4 3712 G18 3717 K17 3722 I 10 6103 M 9 6108 I 3 6119 F20
F21 3193 F11 3206 K 7 3211 M 7 3705 I 18 3712 F19 3718 J14 3723 M10 6103 L 7 6109 G19
C15 3201 M 9 3207 K 6 3214 L 9 3706 G11 3713 E20 3719 L14 3725 M 9 6104 E19 6110 M11
C16 3202 N 9 3208 M 6 3701 E 6 3709 D 3 3714 I20 3720 J13 6101 J 5 6104 J18 6111 N11
I19 3204 M 8 3209 M 5 3702 N20 3710 D 4 3716 K17 3721 L14 6102 D12 6107 C14 6118 E20

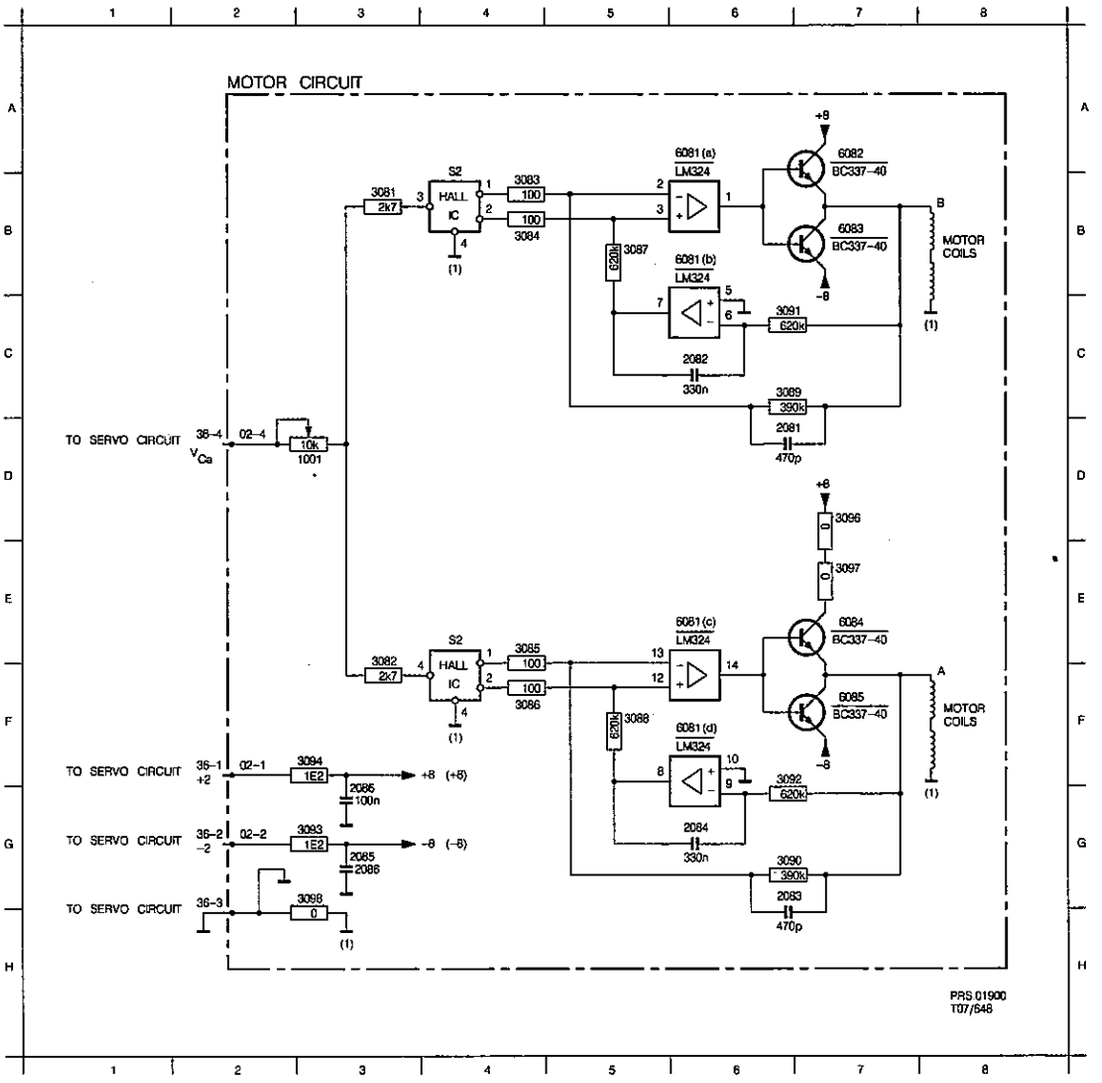


PRS.05571
T04-647

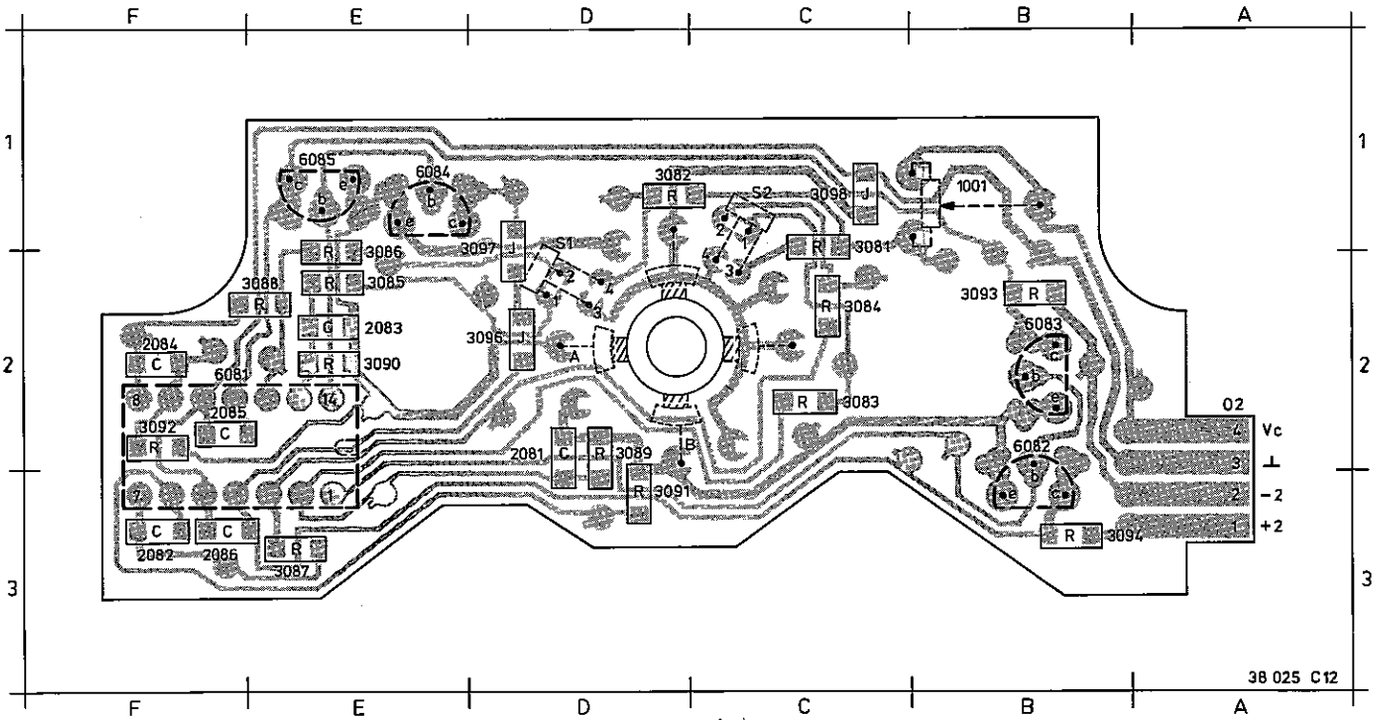
METRICAL

MOTOR CIRCUIT

1001	D 3	2084	G 6	3082	E 3	3086	F 4	3090	G 6	3094	F 3	6081	A 6	6082	A 7
2081	D 6	2085	G 3	3083	B 4	3087	B 5	3091	C 6	3096	D 7	6081	B 6	6083	B 7
2082	C 6	2086	G 3	3084	B 4	3088	F 5	3092	F 6	3097	E 7	6081	E 6	6084	E 7
2083	G 6	3081	B 3	3085	E 4	3089	C 6	3093	G 3	3098	G 3	6081	F 6	6085	F 7



MOTOR PANEL



CS 20 057

Check of the motor control (Hall control) (see motor PCB)

Principle

With the oscilloscope the form of the voltage across resistor 3094 in the +2 lead and across resistor 3093 in the –2 lead is seen. This voltage is a consequence of the current and in this way current signals (pictures) are formed.
The current through the motor–coils A and B is sinusoidal. This current is switched on and controlled by the Hall ICs.
The Hall ICs are mounted at an angle of 90 degrees with respect to each other. Consequently the currents through A and B are shifted in phase 90 degrees.
In figure 4 the origin of the current signal through the +2 and –2 leads is shown graphically.

1. Interrupt the Vc connection by unsoldering the connector point 36–4 on the servo + preamplifier p.c.b.

2. Connect a trimming potentiometer of 22K Ohm to the motor print between 02–3(⊥) and connector 33–2(–1) on the servo board.

3. Connect the slider with 02–4(Vc) via switch S. (See figure 5).

4. Measure with an oscilloscope first across 3094 and hereafter across 3093.
   Do not measure across both resistors at the same time, since the currents are measured through the +2 lead and –2 lead.

5. Put the trimming potentiometer in the maximum position (the slider is then connected to connector 33–2(–1)).

6. With a disc on the turntable, put the set in service–loop 0. (See trouble shooting). Switch S on and adjust the trimming potentiometer back in such a way that 3 complete pulses are visible during 0.1 sec. (fig. 3). The polarity of the oscilloscope must be chosen so that the tops of the pulses are in upward position.
   The rotor magnet of the motor has 3 polespairs. Therefore the behaviour of the motor during one revolution with a speed of 600 r.p.m. is visible.

7. Measure with a DC–voltmeter on 02–4(Vc).
   A. V_c = –1.7 +/– 0.5 V.
   B. Measure across 3094, value 1 = maximum 56.4 mV.
   C. Measure across 3093, value 2 = maximum 58.8 mV.
   D. Difference: **(value 1 - value 2)** maximum 6 mV. If the difference exceeds 6 mV, while value 1 and value 2 are below the maximum the motor is then wrong!

8. For a good functioning the signal has to meet the following values:
   Top is not specified by value, see 6.

Top difference	<24 mV
Flank difference	<36 mV
Foot	is not specified

   Remark:
   Flank difference is at one asymmetrical pulse.
   Foot is DC offset.

9. Examples of the wave form faults: see figure 7.

10. Adjust the voltage on 02–4(Vc) with the potentiometer back to –0,9 V. The motor must still turn. Although the top height is much lower now the wave form has to be symmetrical and rounded.

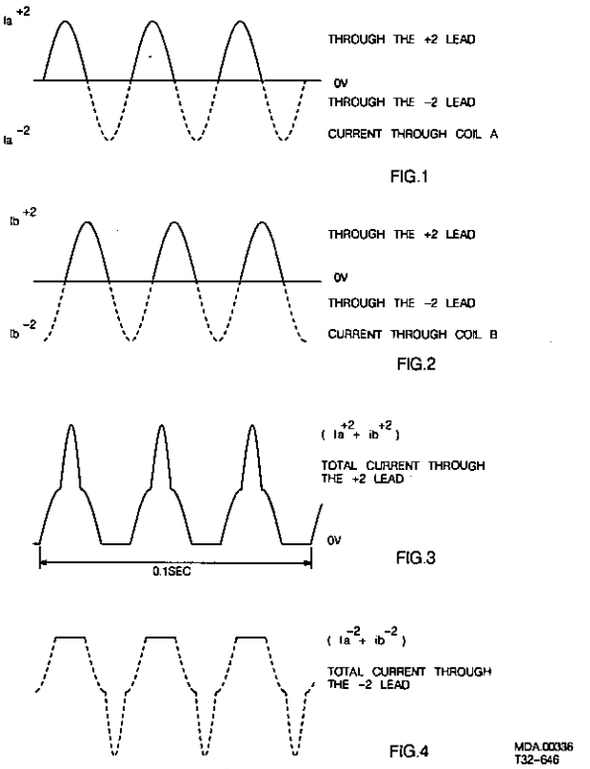


Fig. 4

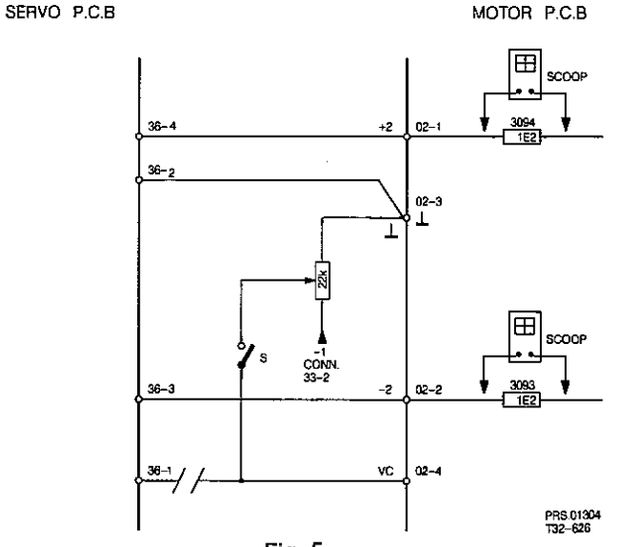


Fig. 5

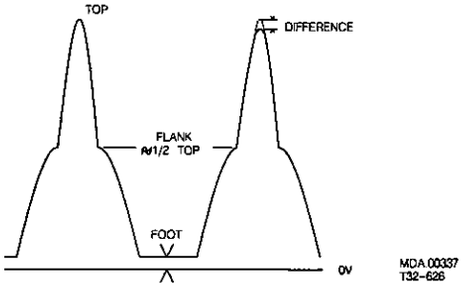


Fig. 6

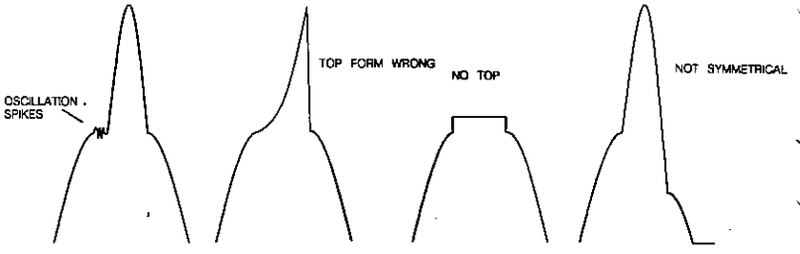
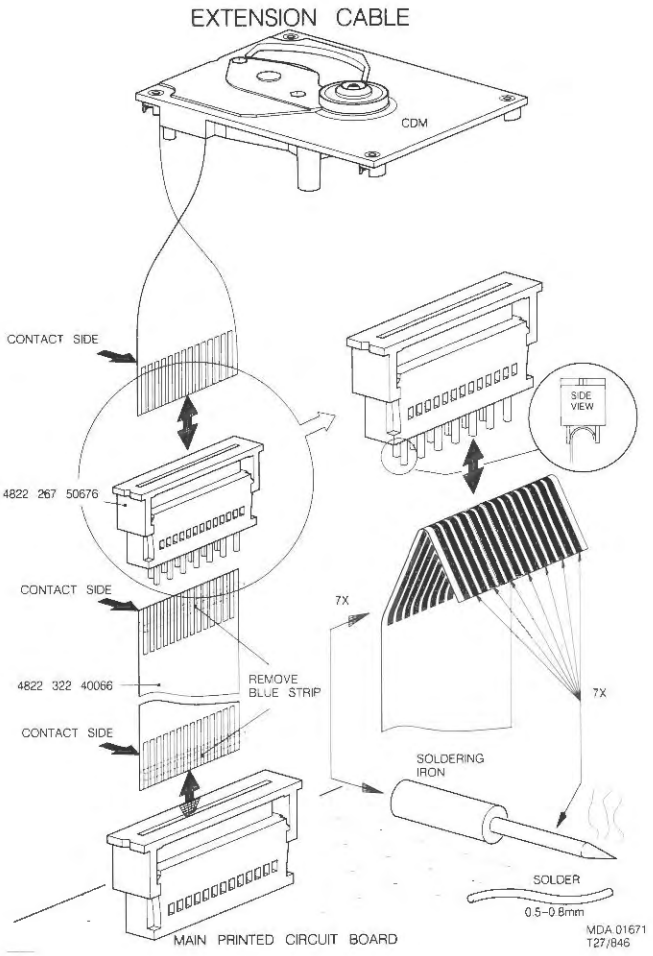
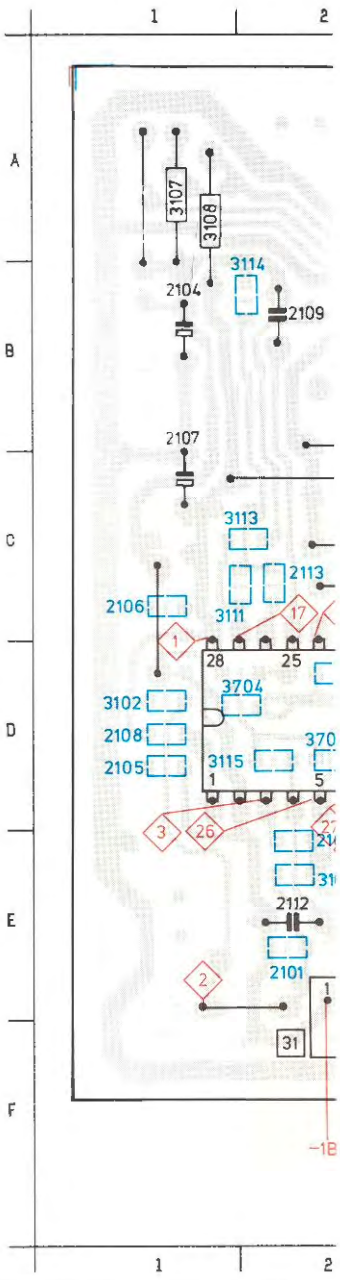


Fig. 7





Repair procedure

Since laser, monitor diode and photodiodes are very sensitive to static charges, care should be taken that during measurements and adjustments the aids and yourself have a potential that is equal to that of the CD mechanism.

TDA5708	4822 209 72938
TDA5709	4822 209 83203
NJM4560D	4822 209 83274
TCA0372DP2	4822 209 72587

BC848B	5322 130 41982
BC858B	5322 130 41983
BC338-16	4822 130 40892

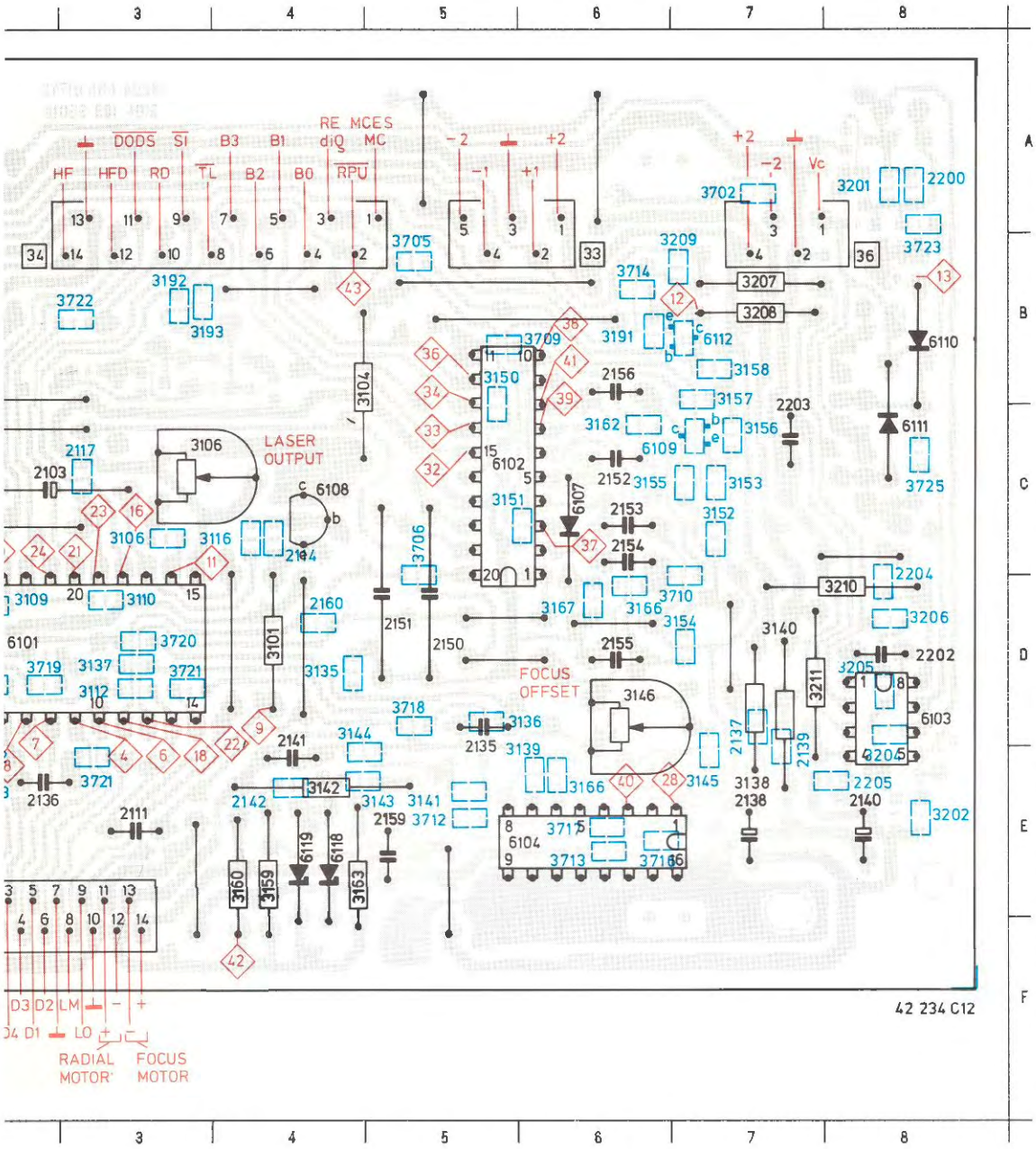
BAT85	4822 130 31982
HZ7C2	4822 130 32862
1N4148	4822 130 30621
BZX55C7V5	4822 130 81101

14p	Flex print connector	4822 290 60602

2150,2151 3.6 nF-160 V-1%	4822 121 51001
Elco bipolar 1.5 µF	4822 124 41601

⚠ safety res. 12 Ω	4822 111 30511
⚠ safety res. 18 Ω	4822 111 30515
⚠ safety res. 1 Ω	4822 111 30483
22 kΩ Trimpot	4822 100 20522
4.7 kΩ Trimpot	4822 101 10685
⚠ safety res. 4.7 Ω	4822 111 30499

NEL

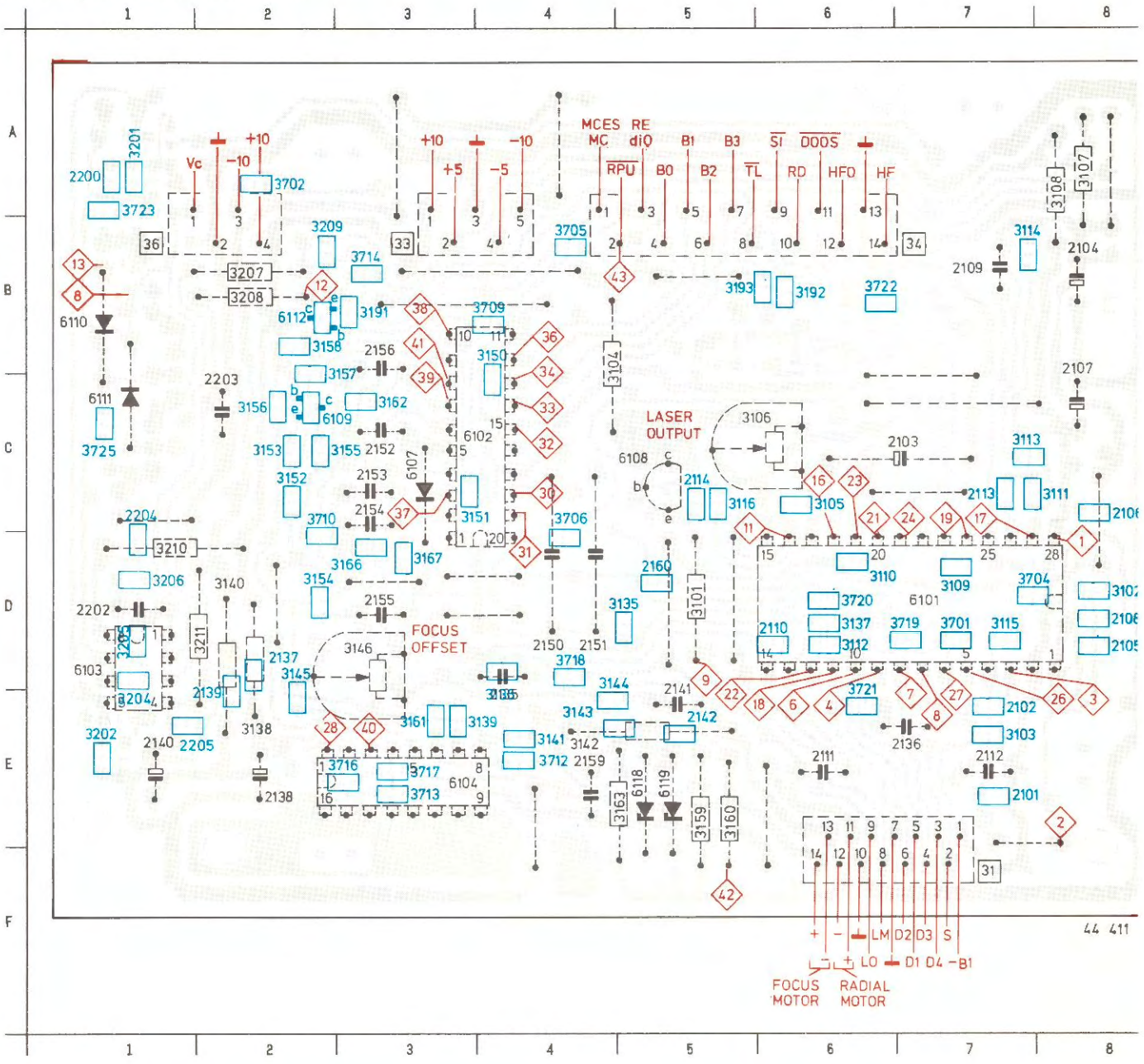


2101	E	2	3152	C	7		
2102	E	2	3153	C	7		
2103	C	2	3154	D	7		
2104	B	1	3155	C	6		
2105	D	1	3156	C	7		
2106	C	1	3157	B	7		
2107	B	1	3158	B	7	A	
2108	D	1	3159	E	4		
2109	B	2	3160	E	4		
2111	E	3	3162	C	6		
2112	E	2	3163	E	5		
2113	C	2	3166	D	6		
2114	C	4	3166	E	6		
2117	C	3	3167	D	6		
2135	D	5	3191	B	6		
2136	E	2	3201	A	8		
2137	D	7	3202	E	8	B	
2137	E	7	3204	E	8		
2138	E	7	3205	D	8		
2140	E	8	3206	D	8		
2141	D	4	3207	B	7		
2142	E	4	3208	B	7		
2150	D	5	3209	B	7		
2151	D	5	3210	D	8		
2152	C	6	3211	D	7		
2153	C	6	3701	D	2		
2154	C	6	3702	A	7		
2155	D	6	3704	D	2	C	
2156	B	6	3705	B	5		
2159	E	5	3706	C	5		
2160	D	4	3709	B	6		
2200	A	8	3710	D	7		
2202	D	8	3712	E	5		
2203	C	7	3713	E	6		
2204	C	8	3714	B	6		
2205	E	8	3716	E	6		
3101	D	4	3717	E	6		
3102	D	1	3718	D	5	D	
3103	E	2	3719	D	2		
3106	C	3	3720	D	3		
3106	C	3	3721	D	3		
3107	A	1	3721	E	3		
3108	A	1	3723	B	8		
3109	D	2	3725	C	8		
3110	D	3	6101	D	2		
3111	C	1	6102	C	5		
3112	D	3	6103	D	8		
3113	C	2	6104	E	6	E	
3114	B	2	6107	C	6		
3115	D	1	6108	C	4		
3116	C	4	6109	C	6		
3135	D	4	6110	B	8		
3136	D	6	6111	C	8		
3137	D	3	6112	B	7		
3138	E	7	6118	E	4		
3139	E	6	6119	E	4		
3140	D	7					
3141	E	5				F	
3142	E	4					
3143	E	5					
3144	D	4					
3145	E	7					
3146	D	6					
3150	B	5					
3151	C	5					

PRS.02850

B0-B3	–	Control bits for radial circuit	RE1	–	Radial error signal 1 (summation of amplified currents D_3 and D_4
DAC	–	Current output for track jumping (Digital to Analogue Converted)	RE2	–	Radial error signal 2 (summation of amplified currents D_1 and D_2
$\overline{\text{DODS}}$	–	Drop out detector suppression	RE dig	–	Radial error digital = RP
D1÷4	–	Photodiode currents	RE lag	–	Radial error signal for LAG network
FE	–	Focus error signal	RD	–	Ready signal, Starting up procedure finished.
FE lag	–	Focus error signal for LAG network	$\overline{\text{RPU}}$	–	Radial puls after track jumping
HF	–	HF output for DEMOD	$\overline{\text{Si}}$	–	On/off control for laser supply and focus circuit
HFD	–	HF detector output for DEMOD	$\overline{\text{TL}}$	–	Track loss signal
HF-in	–	HF current input	Vc	–	Control voltage for turntable motor
LM	–	Laser monitor diode input			
LO	–	Laser amplifier current output			
MC	–	Motor control signal			
RE	–	Radial error signal (Amplified RE_2-RE_1 currents)			

SERVO + PRE-AMPLIFIER PANEL



Checking the angle setting

The angle setting can be checked with the glass-disc method which is explained below.

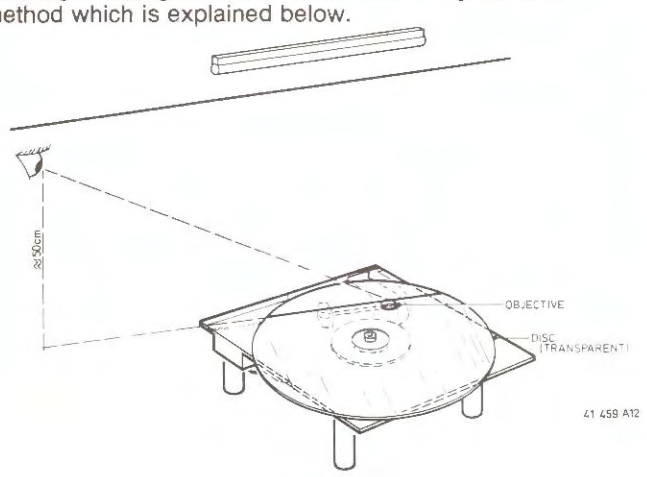


Fig. 5

Put glass disc 4822 395 90204 on the turntable.
Make sure that the glass disc beds down well on the turntable.
Place the CD mechanism under a light source, under which there is a straight line (e.g. under a fluorescent tube with grid).
Set the arm to mid-position of its radial track.
Turn the mechanism until the arm is parallel to the line under the light source (see figure below).
Look into the direction and in the extension of the line to the reflection there of on the glass disc and in the objective.
Locate the CDM in such a way that the line reflected by the glass disc runs across the centre of the objective.
The line reflected by the objective should fall just within the surface of the objective. If this is the case, the two lines are not more than 4 mm apart and squareness is correct.

	2101	E 7	3146	D 3
	2102	E 7	3150	B 4
	2103	C 7	3151	C 4
	2104	B 8	3152	C 2
	2105	D 8	3153	C 2
	2106	C 8	3154	D 2
A	2107	B 8	3155	C 3
	2108	D 8	3156	C 2
	2109	B 7	3157	C 3
	2110	D 6	3158	B 2
	2111	E 6	3159	E 5
	2112	E 7	3160	E 5
	2113	C 7	3161	E 3
	2114	C 5	3162	C 3
	2117	C 6	3163	E 5
	2135	E 4	3166	D 3
B	2136	E 7	3167	D 3
	2137	D 2	3191	B 3
	2138	E 2	3192	B 6
	2139	E 2	3193	B 5
	2140	E 1	3201	A 1
	2141	D 5	3202	E 1
	2142	E 5	3204	E 1
	2150	D 4	3205	D 1
	2151	D 4	3206	D 1
	2152	C 3	3207	B 2
	2153	C 3	3208	B 2
C	2154	C 3	3209	B 2
	2155	D 3	3210	D 1
	2156	B 3	3211	D 2
	2159	E 4	3701	D 7
	2160	D 5	3702	A 2
	2200	A 1	3704	D 7
	2202	D 1	3705	B 4
	2203	C 2	3706	C 4
	2204	C 1	3709	B 4
	2205	E 2	3710	C 2
D	3101	D 5	3712	E 4
	3102	D 8	3713	E 3
	3103	E 7	3714	B 3
	3104	B 5	3716	E 3
	3105	C 6	3717	E 3
	3106	C 6	3718	D 4
	3107	A 8	3720	D 6
	3108	A 8	3721	D 6
	3109	D 7	3722	B 6
	3110	D 6	3723	A 1
E	3111	C 8	3725	C 1
	3112	D 6	6101	D 7
	3113	C 7	6103	D 1
	3114	B 7	6104	E 3
	3115	D 7	6105	C 4
	3116	C 5	6107	C 3
	3119	D 7	6108	C 5
	3135	D 4	6109	C 2
	3135	E 4	6110	B 1
	3137	D 6	6111	C 1
	3138	E 2	6112	B 2
F	3139	E 4	6118	E 5
	3140	D 2	6119	E 5
	3141	E 4		
	3142	E 4		
	3143	E 4		
	3144	D 4		
	3145	D 2		

11

PRS.02853

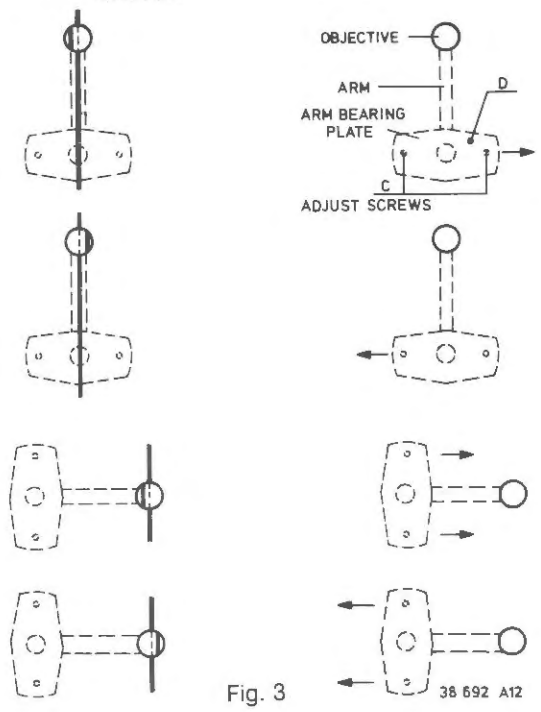


Fig. 3

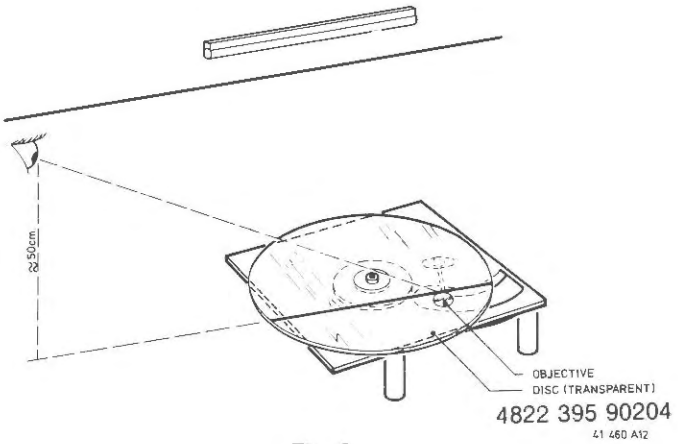


Fig. 6

Turn the CD mechanism through 90° relative to the previous position. The arm must be kept in mid-position (see figure above).
Repeat the previous check.

Adjusting the angle setting

For adjusting the angle setting one or both of the two locking knocks for the bearing plate on pos. 51 must be taken out.
If a check on the angle setting shows that the angle falls outside the tolerance, the angle should NOT be adjusted for minimum deviation, but it should be adjusted within the tolerance.
The new setting should lie between the old setting and the optimum setting. After adjusting the setting, the friction of the arm must be checked. This is done by means of a spring pressure gauge which is held against the magnet of the focusing unit.
The friction of the arm, measured over the entire meter reading, should not be greater than 25 mN.
When the friction appears to be too high, the RAFOC unit must be replaced and the angle between disc and light path adjusted.

The lock is adjusted as follows:

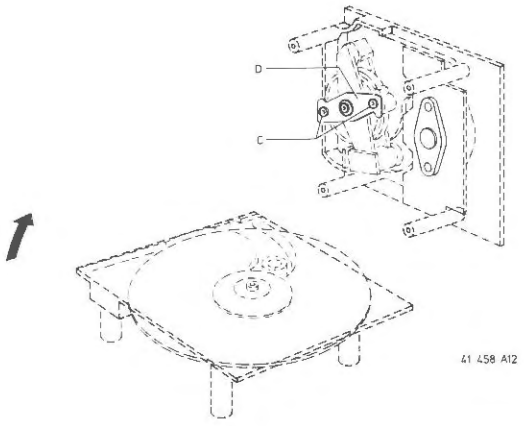
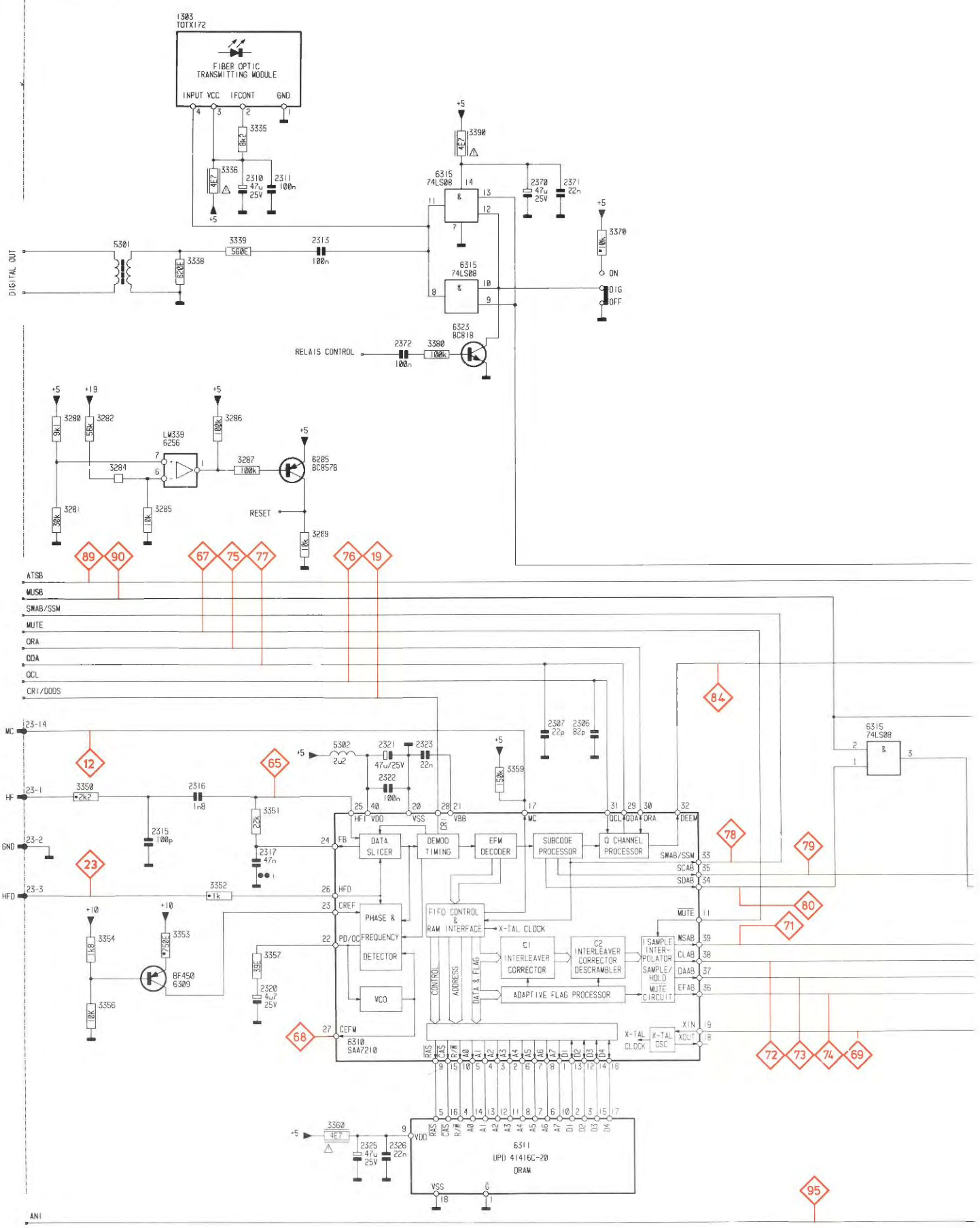


Fig. 7

Loosen screws C (see figure above) until bearing plate D can be displaced. Correct the angle setting by moving the bearing plate into the direction shown in figure below. Tighten screws C, ensuring that the setting does not drift. Then double check the setting in two directions.

DECODING 1


1303
TOTX172
FIBER OPTIC
TRANSMITTING MODULE
INPUT VCC IFCONT GND
DIGITAL OUT
RELAIS CONTROL
ON
OFF
LM339
6256
6285
BC857B
RESET
6315
74LS08
6325
BC818
6311
UPD 41416C-20
DRAM
6310
SAA7210
DATA SLICER
DEMOD TIMING
EFM DECODER
SUBCODE PROCESSOR
Q CHANNEL PROCESSOR
PHASE & FREQUENCY DETECTOR
VCO
FIFO CONTROL & RAM INTERFACE
X-TAL CLOCK
C1 INTERLEAVER CORRECTOR
C2 INTERLEAVER CORRECTOR DESCRAMBLER
ADAPTIVE FLAG PROCESSOR
I SAMPLE INTERPOLATOR
SAMPLE/HOLD MUTE CIRCUIT
ATSB
MUSB
SWAB/SSM
MUTE
QRA
QDA
QCL
CRI/DODS
ANT
MC
HF
GND
HFD
89
90
67
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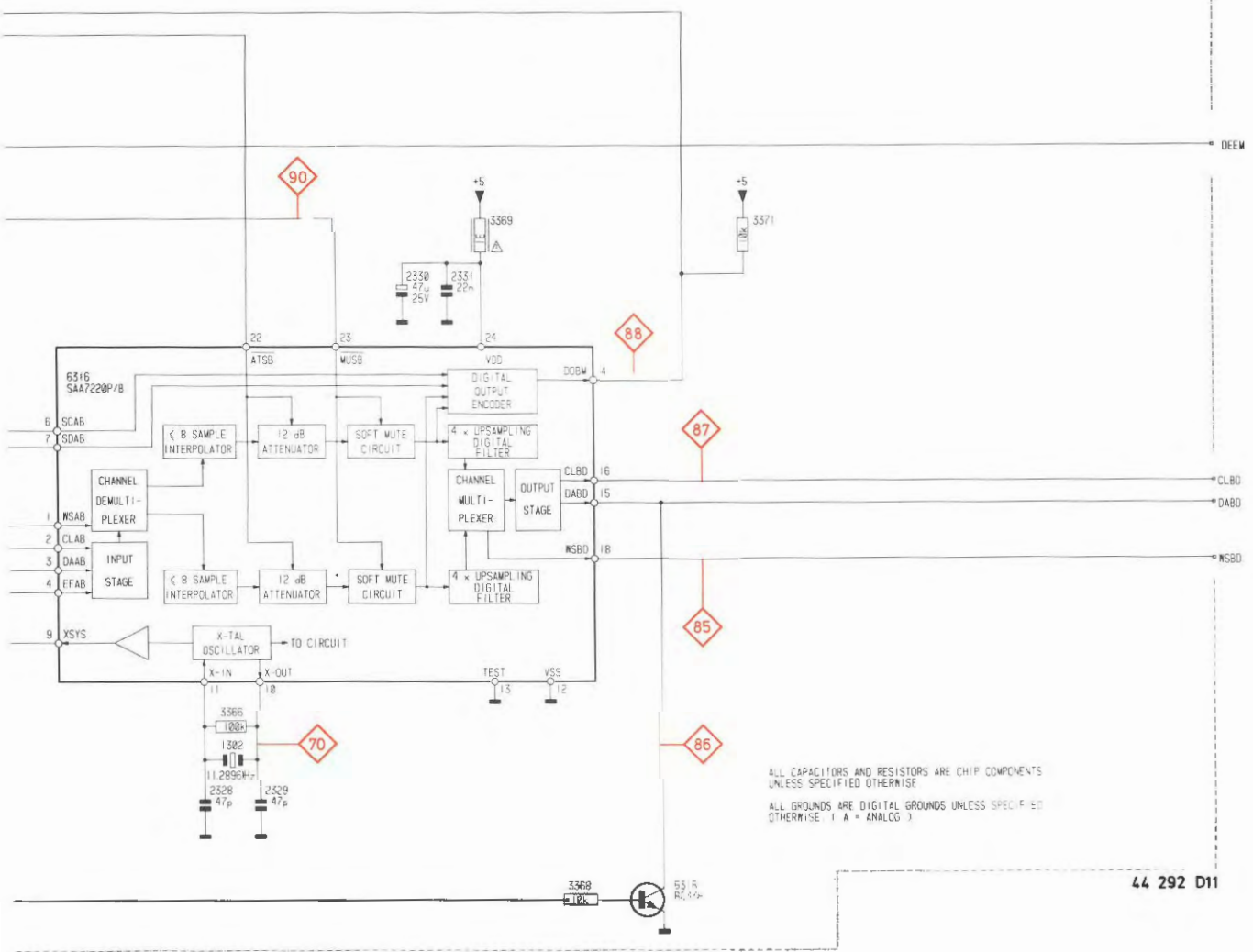
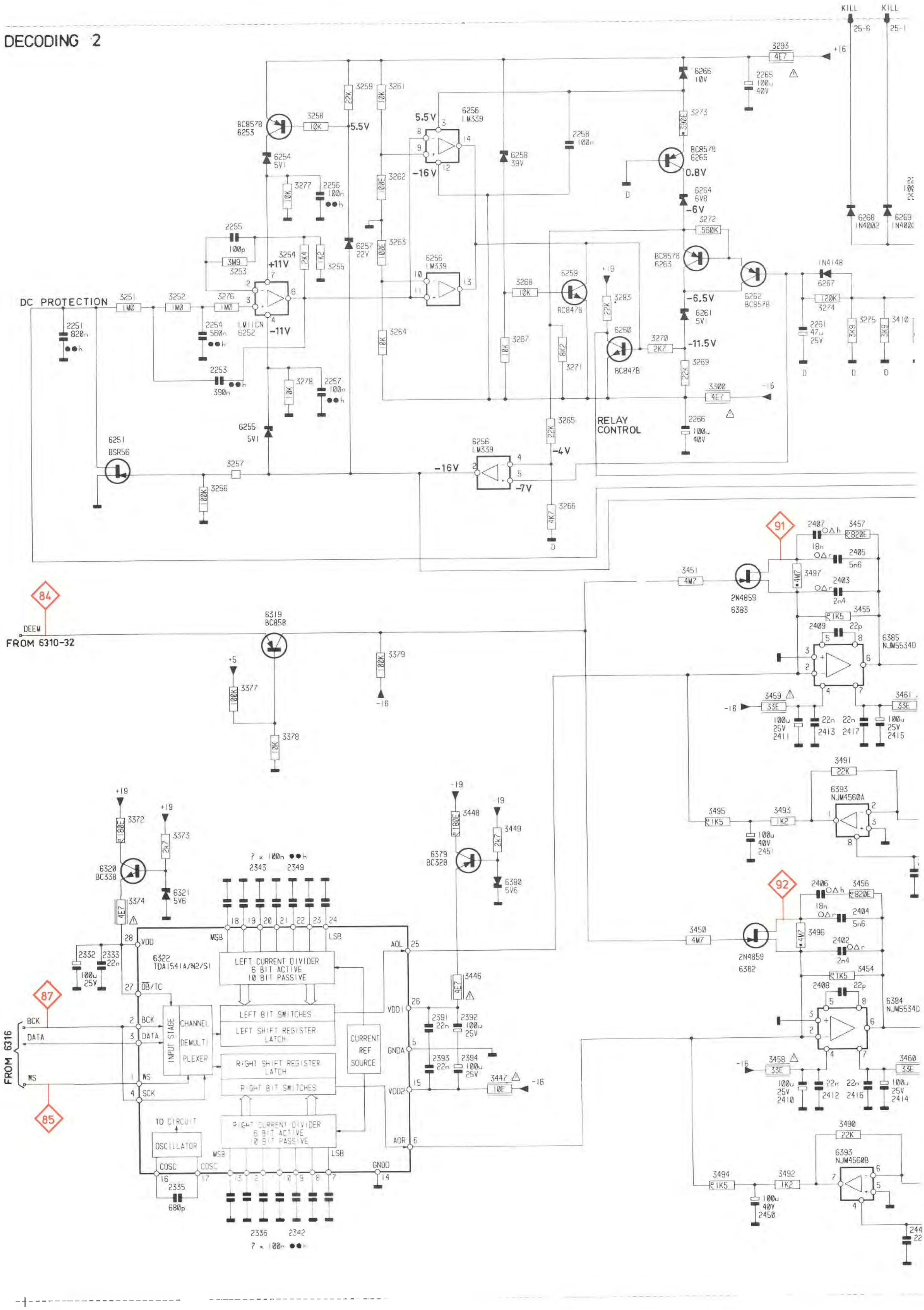
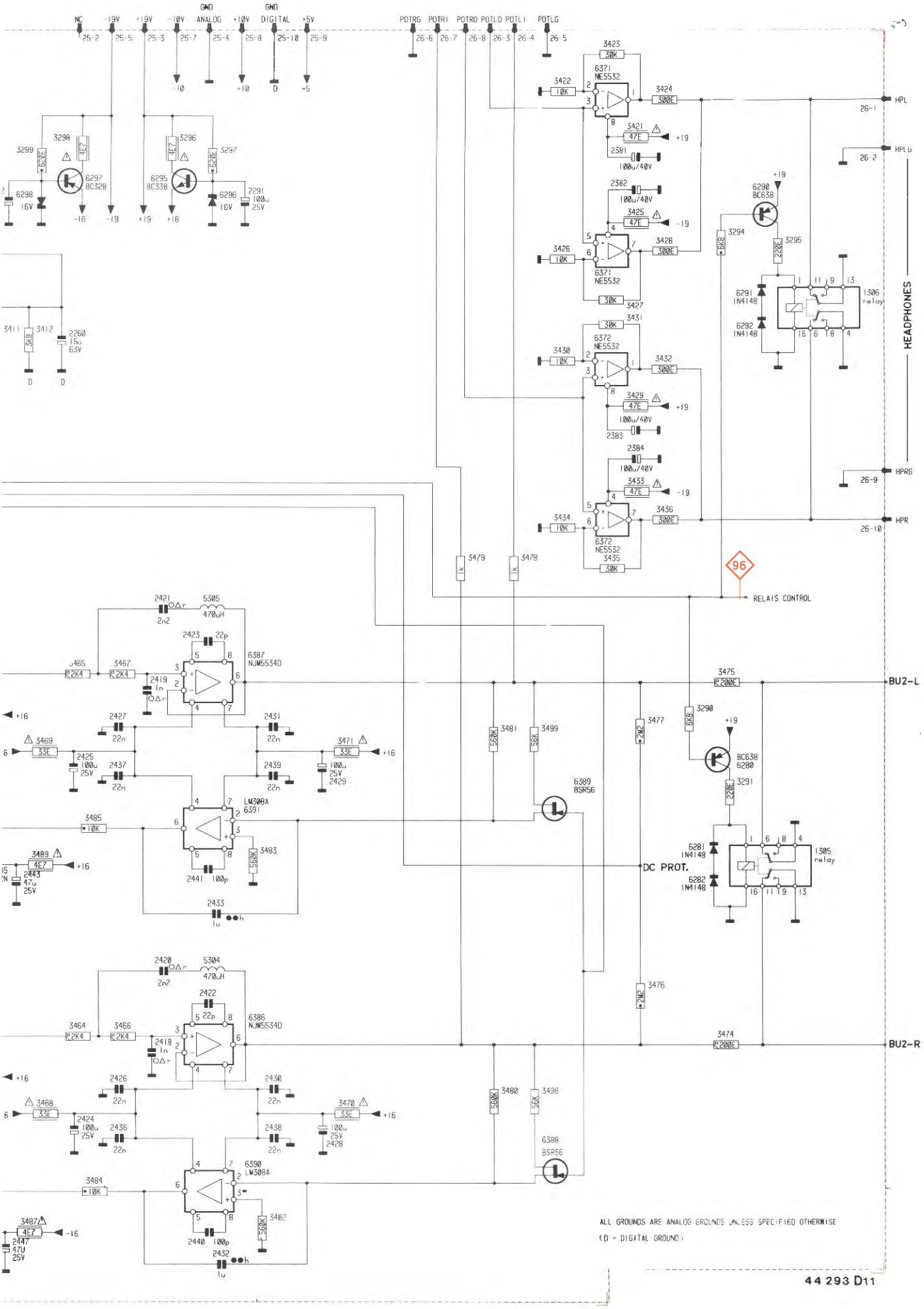
78
79
80
71
68
72
73
74
69
95


DEEM
90
+5
3369
+5
3371
2330 47µ 25V
2331 22n
88
22 ATSB
23 MUSB
24 VDD
DOBM 4
6316 SAA7220P/B
DIGITAL OUTPUT ENCODER
6 SCAB
7 SDAB
< 8 SAMPLE INTERPOLATOR
12 dB ATTENUATOR
SOFT MUTE CIRCUIT
4 x UPSAMPLING DIGITAL FILTER
87
CHANNEL DEMULTI-PLEXER
CHANNEL MULTI-PLEXER
OUTPUT STAGE
CLBD 16
DABD 15
CLBD
DABD
1 WSAB
2 CLAB
3 DAAB
4 EFAB
INPUT STAGE
WSBD 18
WSBD
< 8 SAMPLE INTERPOLATOR
12 dB ATTENUATOR
SOFT MUTE CIRCUIT
4 x UPSAMPLING DIGITAL FILTER
85
9 XSYS
X-TAL OSCILLATOR
TO CIRCUIT
X-IN 11
X-OUT 10
TEST 13
VSS 12
3366 120k
1302
11.2896MHz
2328 47p
2329 47p
70
86
ALL CAPACITORS AND RESISTORS ARE CHIP COMPONENTS UNLESS SPECIFIED OTHERWISE
ALL GROUNDS ARE DIGITAL GROUNDS UNLESS SPECIFIED OTHERWISE (A = ANALOG)
3368 10k
53 R
44 292 D11

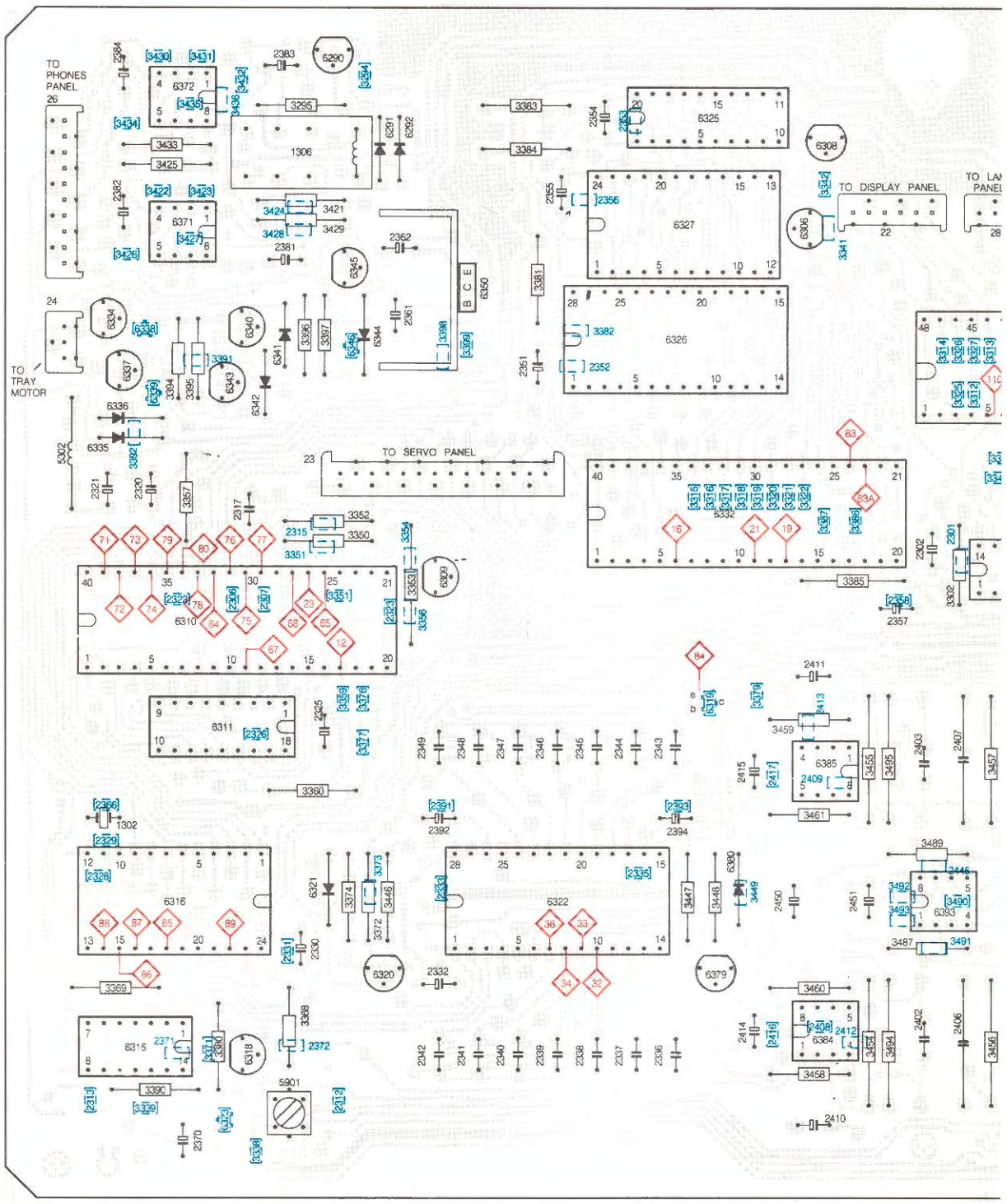
DECODING 2



KILL
DC PROTECTION
RELAY CONTROL
DEEM
FROM 6310-32
FROM 6316
BCK
DATA
WS
LM339
LM11CN
BSR56
BC857B
BC847B
2N4859
NJM5534D
NJM4560A
NJM4560B
BC858
BC338
BC328
TDA1541A/N2/S1
LEFT CURRENT DIVIDER
6 BIT ACTIVE
10 BIT PASSIVE
LEFT BIT SWITCHES
LEFT SHIFT REGISTER
LATCH
RIGHT SHIFT REGISTER
LATCH
RIGHT BIT SWITCHES
RIGHT CURRENT DIVIDER
6 BIT ACTIVE
10 BIT PASSIVE
CURRENT
REF
SOURCE
INPUT STAGE
CHANNEL
DEMULTI
PLEXER
TO CIRCUIT
OSCILLATOR
VDD
OB/TC
BCK
DATA
WS
SCK
MSB
LSB
AOL
VDD1
GNDA
VDD2
AOR
GNDD
COSC
7 x 100n


NC
-19V
+19V
-10V
GND
ANALOG
+10V
GND
DIGITAL
+5V
25-2
25-5
25-3
25-7
25-4
25-8
25-10
25-9
-10
+10
D
+5
PDTRG
PDTRI
PDTRO
PDTLO
PDTLI
PDTLG
26-6
26-7
26-8
26-3
26-4
26-5
HPL
HPLG
HPRG
HPR
26-1
26-2
26-9
26-10
HEADPHONES
3423
30K
6371
NE5532
3422
10K
3424
300E
3421
47E
+19
2381
100u/40V
2382
100u/40V
3425
47E
-19
3426
10K
3428
300E
6371
NE5532
30K
3427
3431
30K
6372
NE5532
3430
10K
3432
300E
3429
47E
+19
100u/40V
2383
2384
100u/40V
3433
47E
-19
3434
10K
3436
300E
6372
NE5532
3435
30K
6290
BC638
3294
6K8
3295
220E
6291
1N4148
6292
1N4148
1306
relay
3479
1K
3478
1K
96
RELAIS CONTROL
3299
620E
3298
4E7
6297
BC328
6298
16V
3296
4E7
6295
BC338
3297
620E
6296
16V
2291
100u
25V
-16
-19
+19
+16
3411
3K9
3412
2260
15u
65V
D
D
2421
2n2
5305
470uH
2423
22p
6387
NJM5534D
3465
2K4
3467
2K4
2419
1n
2427
22n
2431
22n
3469
33E
3471
33E
+16
2425
100u
25V
2437
22n
2439
22n
100u
25V
2429
3485
10K
LM308A
6391
3483
560K
2441
100p
3489
4E7
+16
2443
47u
25V
2433
1u
3481
560K
3499
56K
6389
BSR56
3477
2M2
3475
200E
BU2-L
DC PROT.
3290
6K8
+19
BC638
6280
3291
220E
6281
1N4148
6282
1N4148
1305
relay
3476
2M2
2420
2n2
5304
470uH
2422
22p
6386
NJM5534D
3464
2K4
3466
2K4
2418
1n
2426
22n
2430
22n
3468
33E
3470
33E
+16
2424
100u
25V
2436
22n
2438
22n
100u
25V
2428
3484
10K
6390
LM308A
3482
560K
2440
100p
3487
4E7
-16
2447
47u
25V
2432
1u
3480
560K
3498
56K
6388
BSR56
3474
200E
BU2-R
ALL GROUNDS ARE ANALOG GROUNDS UNLESS SPECIFIED OTHERWISE
(D = DIGITAL GROUND)
44 293 D11

1301	B 7	2301	D 5	2323	D 3	2344	E 4	2366	E 1	2408	F 5	2426	F 8	2450	F 5	3267	B 8	3286	C 9	3304	C 6	3322	C 5
1302	E 1	2302	D 5	2325	E 2	2345	E 4	2370	G 2	2409	E 5	2427	E 8	2451	F 5	3268	B 8	3287	C 9	3305	C 7	3324	C 6
1305	F 8	2303	C 7	2326	E 2	2346	E 3	2371	F 1	2410	G 5	2428	F 7	2910	D10	3269	B 8	3289	C10	3306	C 7	3325	C 6
1306	B 2	2304	C 7	2328	F 1	2347	E 3	2372	F 2	2411	D 5	2429	E 7	3251	C 8	3270	B 8	3290	E 9	3307	C 6	3326	C 6
2251	C 8	2305	C 7	2329	E 1	2348	E 3	2381	B 2	2412	F 5	2430	F 8	3252	C 9	3271	B 9	3291	F 9	3308	C 6	3327	C 6
2252	C 8	2306	D 2	2330	F 2	2349	E 3	2382	B 1	2413	E 5	2430	E 7	3253	C 9	3272	A 8	3292	E 7	3309	C 7	3328	C 6
2253	C 8	2307	D 2	2331	F 2	2351	C 3	2383	A 2	2414	F 4	2431	E 8	3254	C 9	3273	B 8	3293	D 9	3310	C 7	3329	C 6
2254	C 9	2308	D 7	2332	F 3	2352	C 4	2384	A 1	2415	E 4	2432	G 7	3255	C 9	3274	B 9	3294	A 2	3311	C 7	3330	C 7
2255	C 9	2309	D 7	2333	F 3	2353	A 4	2391	E 3	2416	F 5	2433	E 7	3256	C 8	3275	B 9	3295	A 2	3312	C 6	3331	C 7
2256	C 9	2311	D10	2335	F 4	2354	A 4	2392	E 3	2417	E 5	2436	G 7	3257	C 8	3276	C 9	3296	D 9	3313	C 6	3335	D 9
2257	C 9	2312	G 2	2336	G 4	2355	B 3	2393	E 4	2418	F 8	2437	E 7	3258	B 8	3277	C 9	3297	D 9	3314	C 5	3336	E 9
2258	B 8	2313	G 1	2337	G 4	2356	B 4	2394	E 4	2419	E 8	2438	F 7	3259	C 8	3278	C 9	3298	D 8	3315	C 4	3338	G 2
2260	B 9	2314	E 9	2338	G 4	2357	D 5	2402	F 6	2420	G 8	2440	F 7	3261	B 8	3280	C 9	3299	D 8	3316	C 4	3339	G 1
2261	B 9	2315	D 2	2339	G 3	2358	D 5	2403	E 5	2421	D 8	2441	E 7	3262	B 9	3281	B 9	3300	D 8	3317	C 4	3341	B 5
2265	D 9	2317	D 2	2340	G 3	2359	B 7	2404	F 5	2422	F 8	2443	F 6	3263	B 8	3282	B 9	3301	C 7	3318	C 4	3342	B 5
2266	D 8	2320	C 1	2341	G 3	2361	B 3	2405	E 6	2423	E 8	2445	E 6	3264	B 9	3283	B 8	3301	D 7	3319	C 4	3343	C 6
2291	D 9	2321	C 1	2342	G 3	2362	B 3	2406	F 6	2424	F 7	2447	F 6	3265	B 9	3284	C 9	3302	D 5	3320	C 5	3343	C 6
2292	D 8	2322	D 2	2343	E 4	2363	B 7	2407	E 6	2425	E 7	2449	F 6	3266	B 9	3285	B 9	3303	C 7	3321	C 5	3345	C 6



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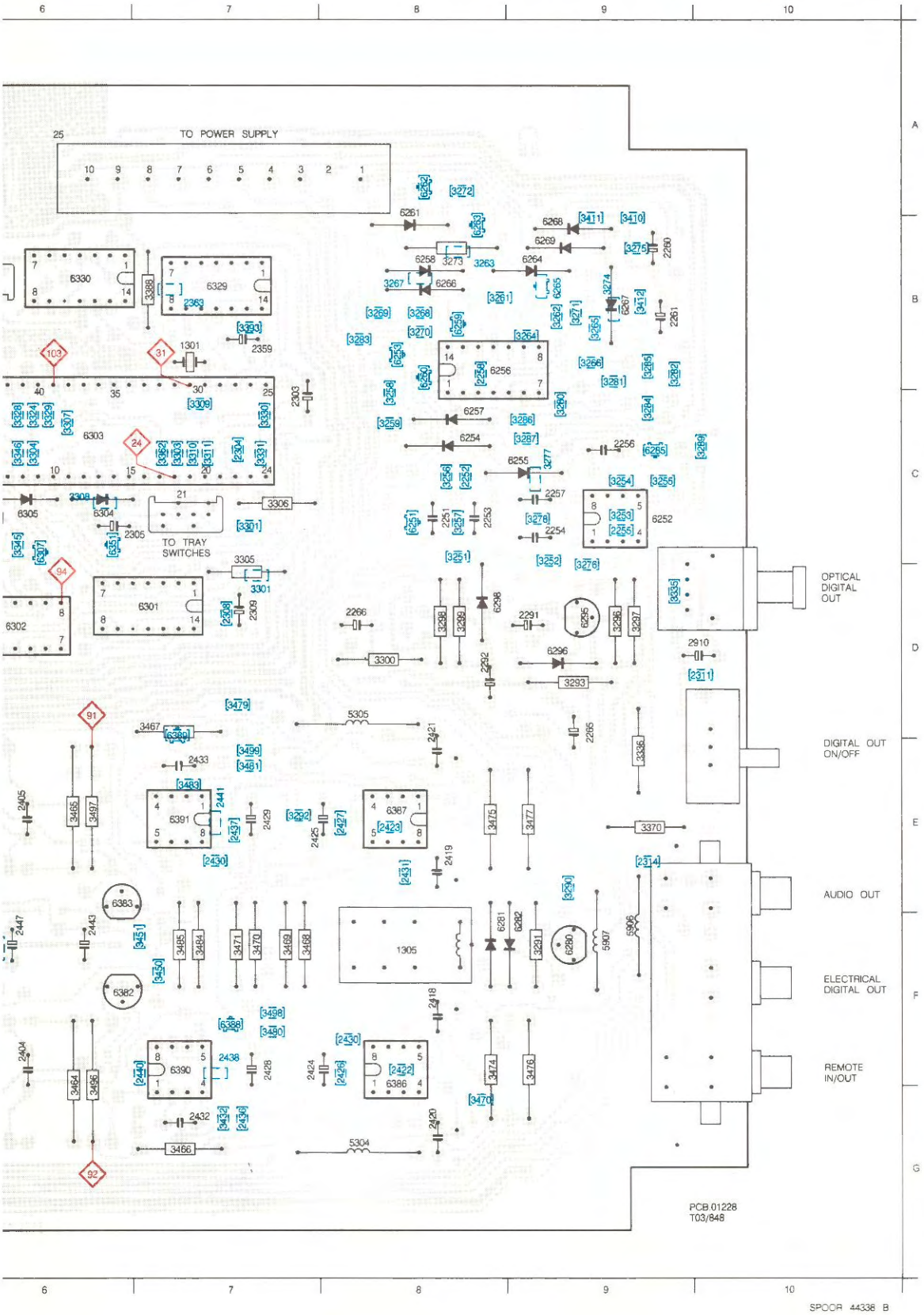
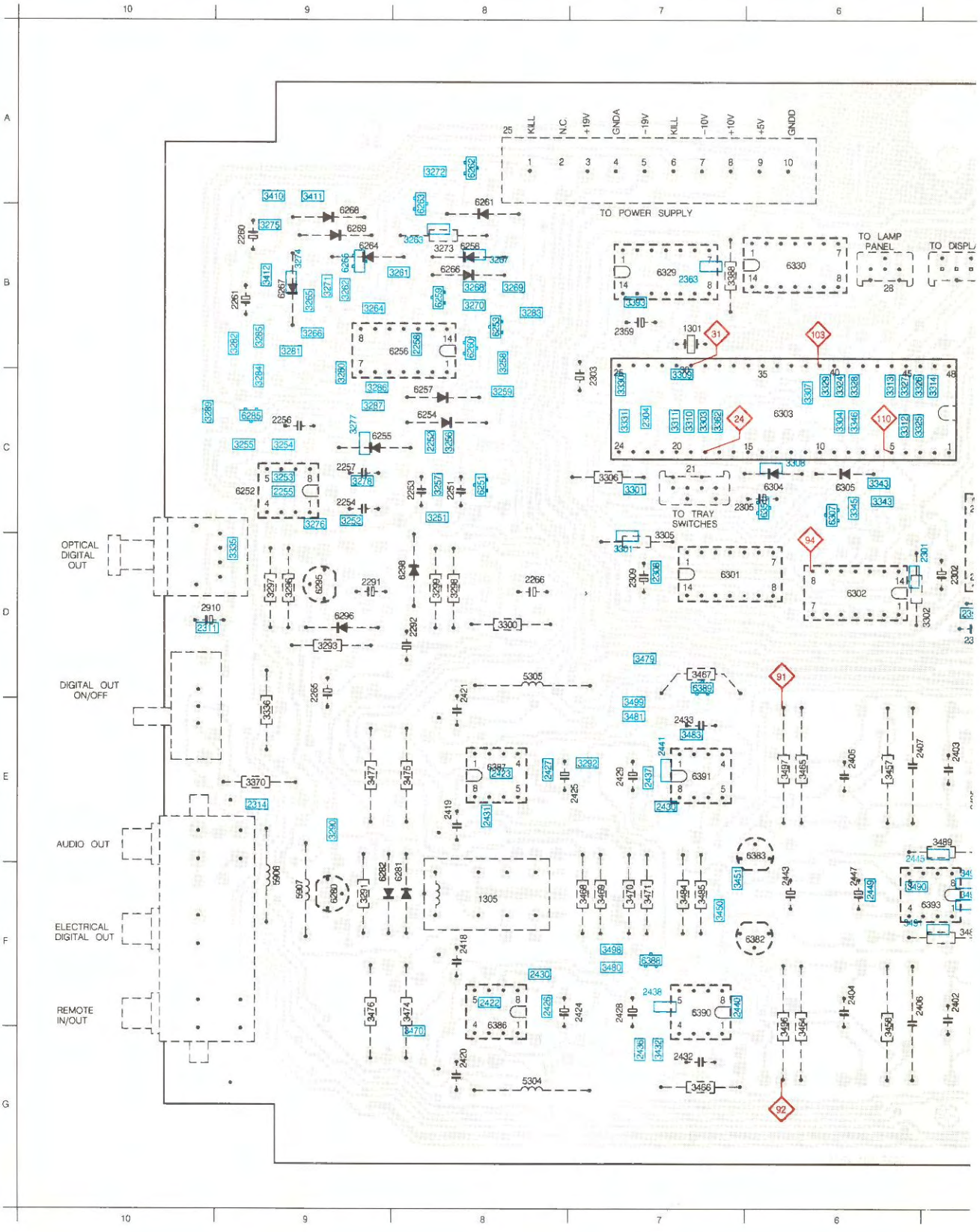
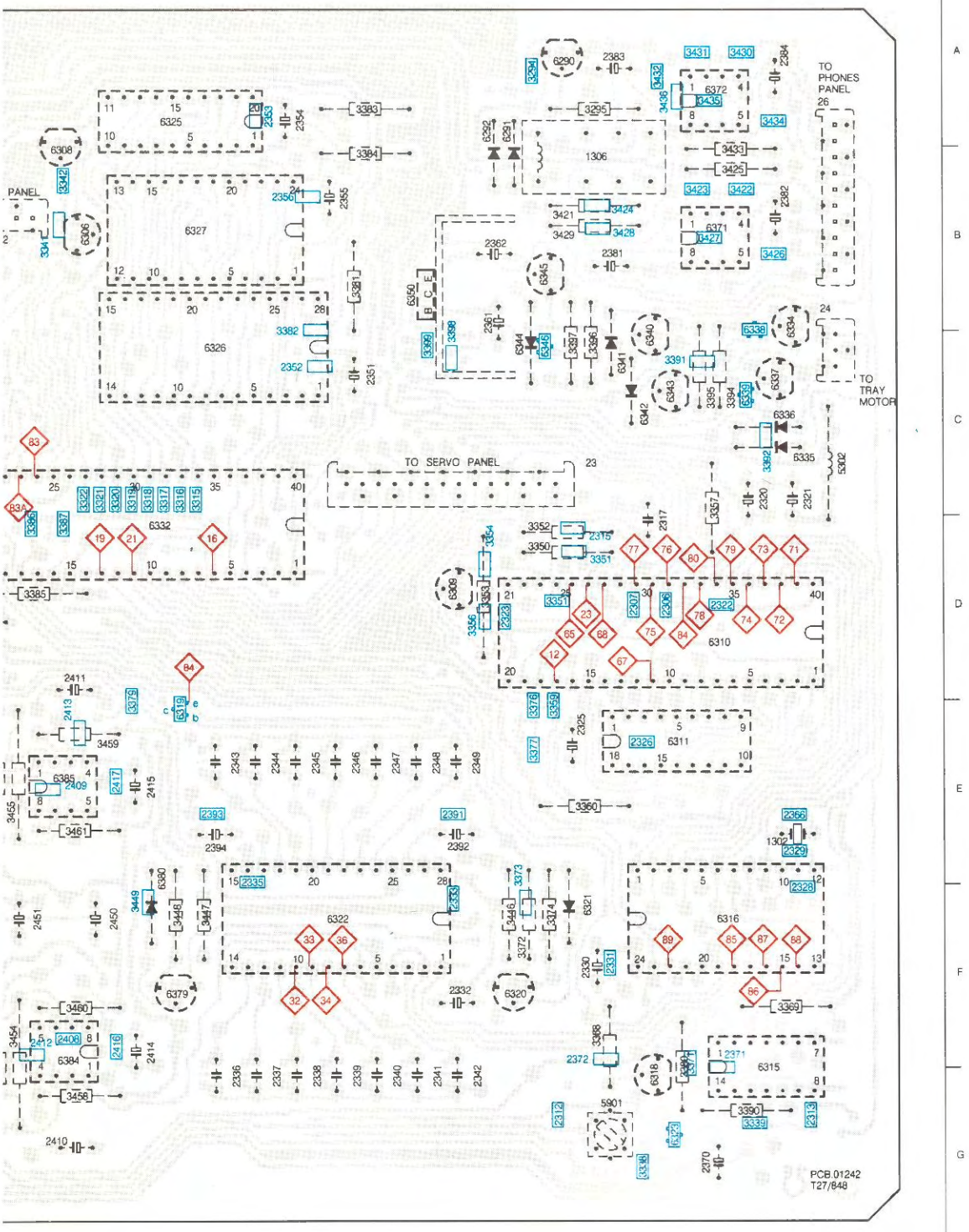
350	D 2	3376	E 2	3396	C 2	3432	A 2	3460	F 5	3483	E 7	5901	G 2	6266	B 8	6304	C 6	6327	B 4	6351	C 6
351	D 2	3377	E 2	3397	C 2	3432	G 7	3461	E 5	3484	F 7	5906	F 9	6267	B 9	6305	C 6	6329	B 7	6371	B 2
351	D 2	3379	E 4	3398	C 3	3433	B 1	3464	F 6	3485	F 7	5907	F 9	6268	B 9	6306	B 5	6330	B 6	6372	A 2
352	D 2	3380	F 2	3399	C 3	3434	A 1	3465	E 6	3487	F 5	6251	C 8	6269	B 9	6307	C 6	6332	D 4	6379	F 4
353	D 3	3381	B 3	3410	A 9	3435	A 2	3466	G 7	3489	E 5	6252	C 9	6280	F 9	6308	B 5	6334	B 1	6380	E 4
354	D 3	3382	C 4	3411	A 9	3436	A 2	3467	D 7	3490	F 6	6253	B 8	6281	F 8	6309	D 3	6335	C 1	6382	F 6
356	D 3	3383	A 3	3412	B 9	3446	F 3	3468	F 7	3491	F 6	6254	C 8	6282	F 9	6310	D 2	6336	C 1	6383	E 6
357	C 2	3384	B 3	3421	B 2	3447	F 4	3469	F 7	3492	F 5	6255	C 9	6282	F 9	6311	E 2	6337	C 1	6384	F 5
359	E 2	3385	D 5	3422	B 1	3448	F 4	3470	G 8	3493	F 5	6256	B 8	6285	C 9	6315	F 1	6338	C 1	6385	E 5
360	E 2	3386	D 5	3423	B 2	3449	F 4	3470	F 7	3494	F 5	6257	C 8	6290	A 2	6316	F 2	6339	C 1	6386	F 8
362	C 7	3387	D 5	3424	B 2	3450	F 7	3471	F 7	3495	E 5	6258	B 8	6291	A 3	6318	G 2	6340	B 2	6387	E 8
368	F 2	3388	B 7	3425	B 1	3451	F 7	3474	F 8	3496	F 6	6259	B 8	6292	A 3	6319	E 4	6341	C 2	6388	F 7
369	F 1	3390	G 1	3426	B 1	3454	F 5	3475	E 8	3497	E 6	6260	B 8	6295	D 9	6320	F 3	6342	C 2	6389	D 7
370	E 9	3391	C 2	3427	B 2	3455	E 5	3476	F 9	3498	F 7	6261	A 8	6296	D 9	6321	F 2	6343	C 2	6390	F 7
371	F 2	3392	C 1	3428	B 2	3456	F 6	3477	E 9	3499	E 7	6262	A 8	6298	D 8	6322	F 3	6344	C 3	6391	E 7
372	F 3	3393	B 7	3429	B 2	3457	E 6	3479	D 7	5302	C 1	6263	B 8	6301	D 7	6323	G 2	6345	B 2	6393	F 5
373	E 3	3394	C 1	3430	A 1	3458	G 5	3480	F 7	5304	G 8	6264	B 9	6302	D 6	6325	A 4	6346	C 2		

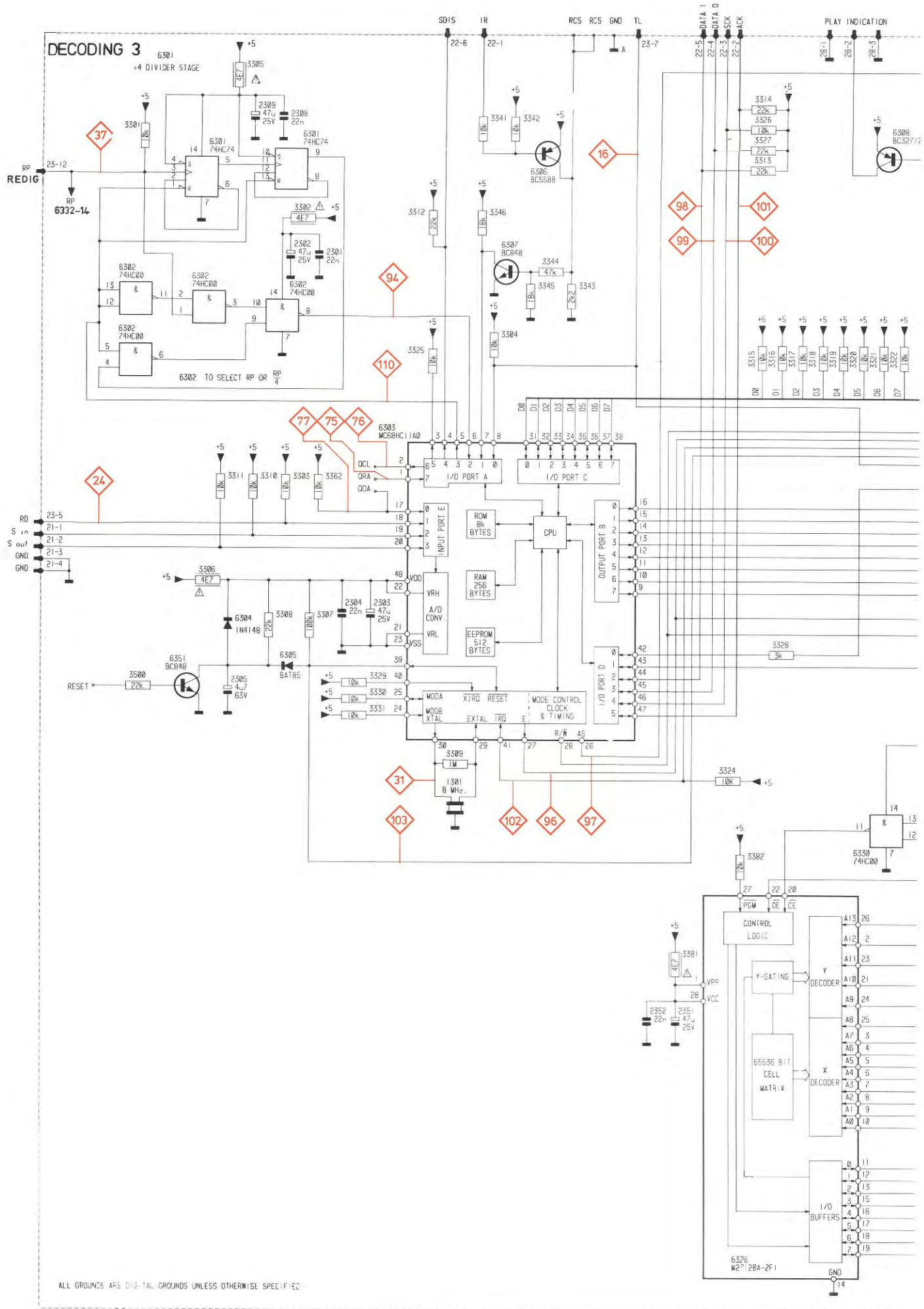


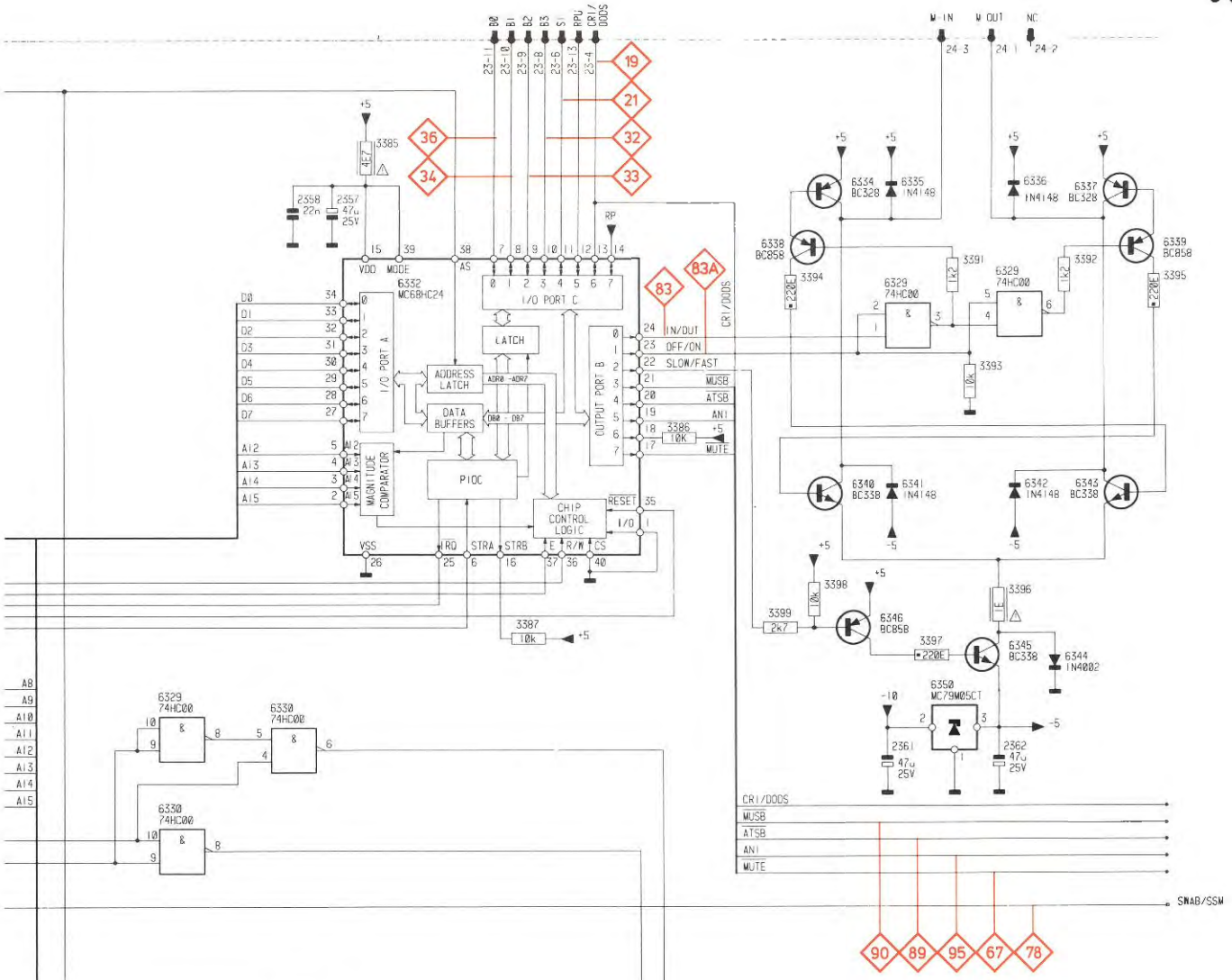
1301	B 7	2301	D 5	2323	D 3	2344	E 4	2366	E 1	2408	F 5	2426	F 8	2450	F 5	3267	B 8	3286	C 9	3304	C 6	3322	C 5	3
1302	E 1	2302	D 5	2325	E 2	2345	E 4	2370	G 2	2409	E 5	2427	E 8	2451	F 5	3268	B 8	3287	C 9	3305	C 7	3324	C 6	3
1305	F 8	2303	C 7	2326	E 2	2346	E 3	2371	F 1	2410	G 5	2428	F 7	2910	D10	3269	B 8	3289	C10	3306	C 7	3325	C 6	3
1306	B 2	2304	C 7	2328	F 1	2347	E 3	2372	F 2	2411	D 5	2429	E 7	3251	C 8	3270	B 8	3290	E 9	3307	C 6	3326	C 6	3
2251	C 6	2305	C 7	2329	E 1	2348	E 3	2381	B 2	2412	F 5	2430	F 8	3252	C 9	3271	B 9	3291	F 9	3308	C 6	3327	C 6	3
2252	C 8	2306	D 2	2330	F 2	2349	E 3	2382	B 1	2413	E 5	2430	E 7	3253	C 9	3272	A 8	3292	E 7	3309	C 7	3328	C 6	3
2253	C 8	2307	D 2	2331	F 2	2351	C 3	2383	A 2	2414	F 4	2431	E 8	3254	C 9	3273	B 8	3293	D 9	3310	C 7	3329	C 6	3
2254	C 9	2308	D 7	2332	F 3	2352	C 4	2384	A 1	2415	E 4	2432	G 7	3255	C 9	3274	B 9	3294	A 2	3311	C 7	3330	C 7	3
2255	C 9	2309	D 7	2333	F 3	2353	A 4	2391	E 3	2416	F 5	2433	E 7	3256	C 8	3275	B 9	3295	A 2	3312	C 6	3331	C 7	3
2256	C 9	2311	D10	2335	F 4	2354	A 4	2392	E 3	2417	E 5	2436	G 7	3257	C 8	3276	C 9	3296	D 9	3313	C 6	3335	D 9	3
2257	C 9	2312	G 2	2336	G 4	2355	B 3	2393	E 4	2418	F 8	2437	E 7	3258	B 8	3277	C 9	3297	D 9	3314	C 5	3336	E 9	3
2258	B 8	2313	G 1	2337	G 4	2356	B 4	2394	E 4	2419	E 8	2438	F 7	3259	C 8	3278	C 9	3298	D 8	3315	C 4	3338	G 2	3
2260	B 9	2314	E 9	2338	G 4	2357	D 5	2402	F 6	2420	G 8	2440	F 7	3261	B 8	3280	C 9	3299	D 8	3316	C 4	3339	G 1	3
2261	B 9	2315	D 2	2339	G 3	2358	D 5	2403	E 5	2421	D 8	2441	E 7	3262	B 9	3281	B 9	3300	D 8	3317	C 4	3341	B 5	3
2265	D 9	2317	D 2	2340	G 3	2359	B 7	2404	F 5	2422	F 8	2443	F 6	3263	B 8	3282	B 9	3301	C 7	3318	C 4	3342	B 5	3
2266	D 8	2320	C 1	2341	G 3	2361	B 3	2405	E 6	2423	E 8	2445	E 6	3264	B 9	3283	B 8	3301	D 7	3319	C 4	3343	C 6	3
2291	D 9	2321	C 1	2342	G 3	2362	B 3	2406	F 6	2424	F 7	2447	F 6	3265	B 9	3284	C 9	3302	D 5	3320	C 5	3343	C 6	3
2292	D 8	2322	D 2	2343	E 4	2363	B 7	2407	E 6	2425	E 7	2449	F 6	3266	B 9	3285	B 9	3303	C 7	3321	C 5	3345	C 6	3

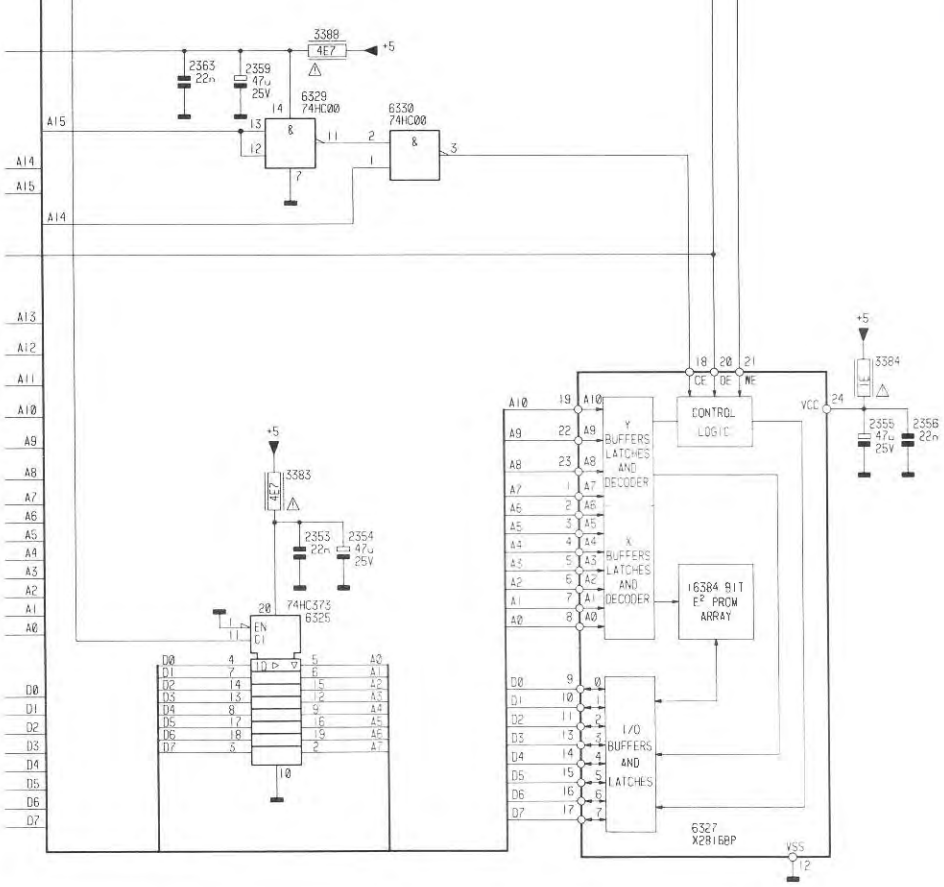


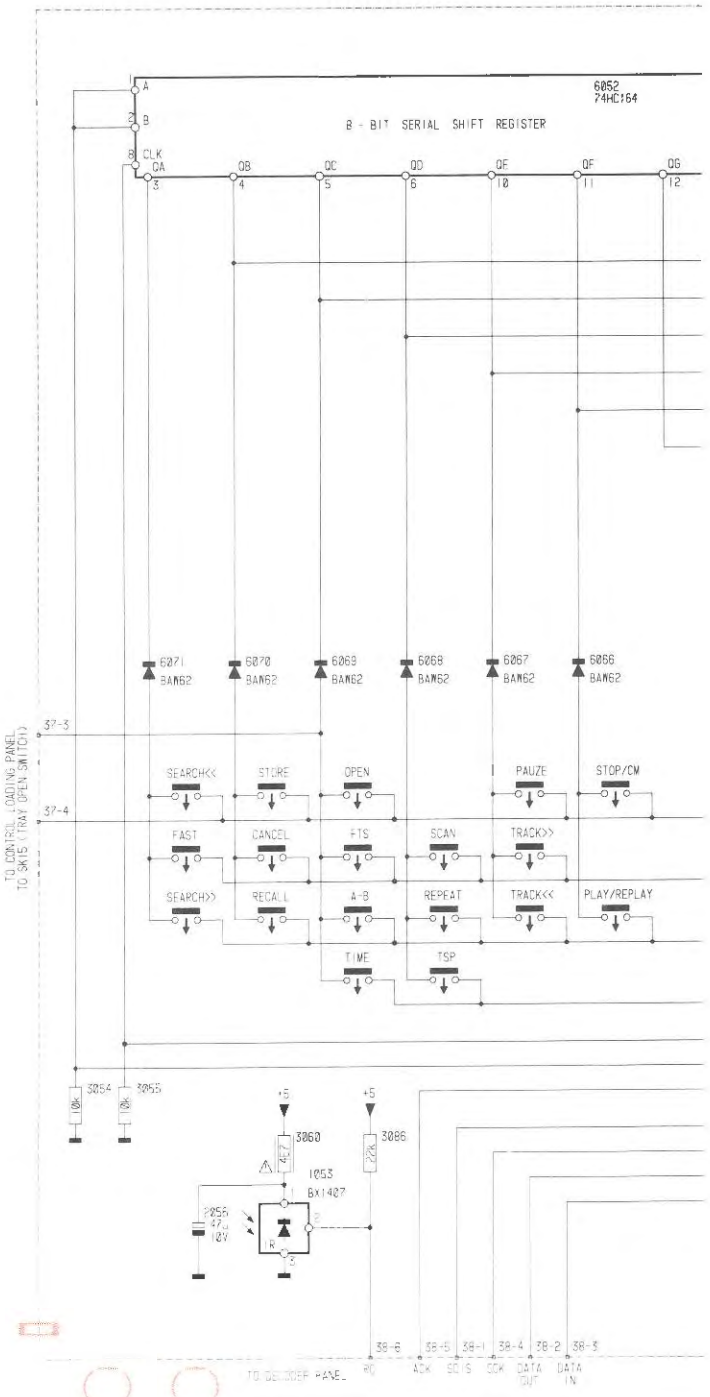
6	C	6	3374	F	2	3395	C	2	3431	A	2	3459	E	5	3481	E	7	5305	D	8	6265	B	9	6303	C	6	6326	C	4	6350	B	3
0	D	2	3376	E	2	3396	C	2	3432	A	2	3460	F	5	3483	E	7	5901	G	2	6266	B	8	6304	C	6	6327	B	4	6351	C	6
1	D	2	3377	E	2	3397	C	2	3432	G	7	3461	E	5	3484	F	7	5906	F	9	6267	B	9	6305	C	6	6329	B	7	6371	B	2
1	D	2	3379	E	4	3398	C	3	3433	B	1	3464	F	6	3485	F	7	5907	F	9	6268	B	9	6306	B	5	6330	B	6	6372	A	2
2	D	2	3380	F	2	3399	C	3	3434	A	1	3465	E	6	3487	F	5	6251	C	8	6269	B	9	6307	C	6	6332	D	4	6379	F	4
3	D	3	3381	B	3	3410	A	9	3435	A	2	3466	G	7	3489	E	5	6252	C	9	6280	F	9	6308	B	5	6334	B	1	6380	E	4
4	D	3	3382	C	4	3411	A	9	3436	A	2	3467	D	7	3490	F	6	6253	B	8	6281	F	8	6309	D	3	6335	C	1	6382	F	6
6	D	3	3383	A	3	3412	B	9	3446	F	3	3468	F	7	3491	F	6	6254	C	8	6282	F	9	6310	D	2	6336	C	1	6383	E	6
7	C	2	3384	B	3	3421	B	2	3447	F	4	3469	F	7	3492	F	5	6255	C	9	6282	F	9	6311	E	2	6337	C	1	6384	F	5
9	E	2	3385	D	5	3422	B	1	3448	F	4	3470	G	8	3493	F	5	6256	B	8	6285	C	9	6315	F	1	6338	C	1	6385	E	5
0	E	2	3386	D	5	3423	B	2	3449	F	4	3470	F	7	3494	F	5	6257	C	8	6290	A	2	6316	F	2	6339	C	1	6386	F	8
2	C	7	3387	D	5	3424	B	2	3450	F	7	3471	F	7	3495	E	5	6258	B	8	6291	A	3	6318	G	2	6340	B	2	6387	E	8
8	F	2	3388	B	7	3425	B	1	3451	F	7	3474	F	8	3496	F	6	6259	B	8	6292	A	3	6319	E	4	6341	C	2	6388	F	7
9	F	1	3390	G	1	3426	B	1	3454	F	5	3475	E	8	3497	E	6	6260	B	8	6295	D	9	6320	F	3	6342	C	2	6389	D	7
0	E	9	3391	C	2	3427	B	2	3455	E	5	3476	F	9	3498	F	7	6261	A	8	6296	D	9	6321	F	2	6343	C	2	6390	F	7
1	F	2	3392	C	1	3428	B	2	3456	F	6	3477	E	9	3499	E	7	6262	A	8	6298	D	8	6322	F	3	6344	C	3	6391	E	7
2	F	3	3393	B	7	3429	B	2	3457	E	6	3479	D	7	5302	C	1	6263	B	8	6301	D	7	6323	G	2	6345	B	2	6393	F	5
3	E	3	3394	C	1	3430	A	1	3458	G	5	3480	F	7	5304	G	8	6264	B	9	6302	D	6	6325	A	4	6346	C	2			

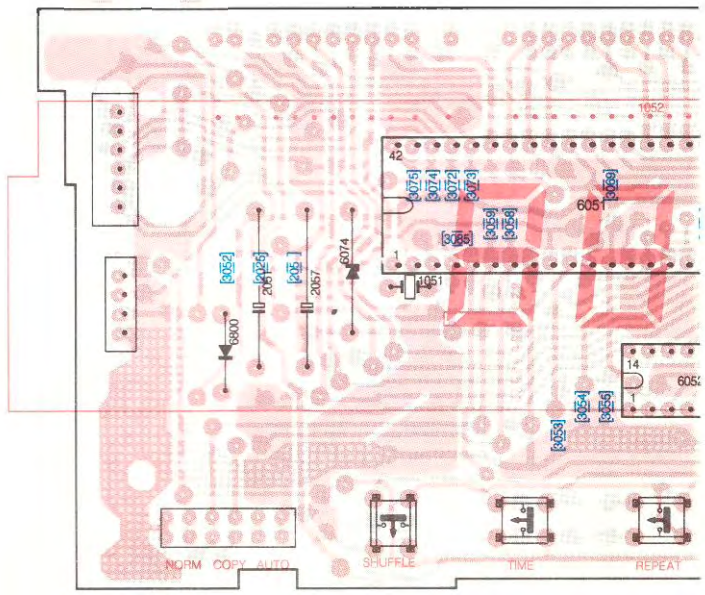


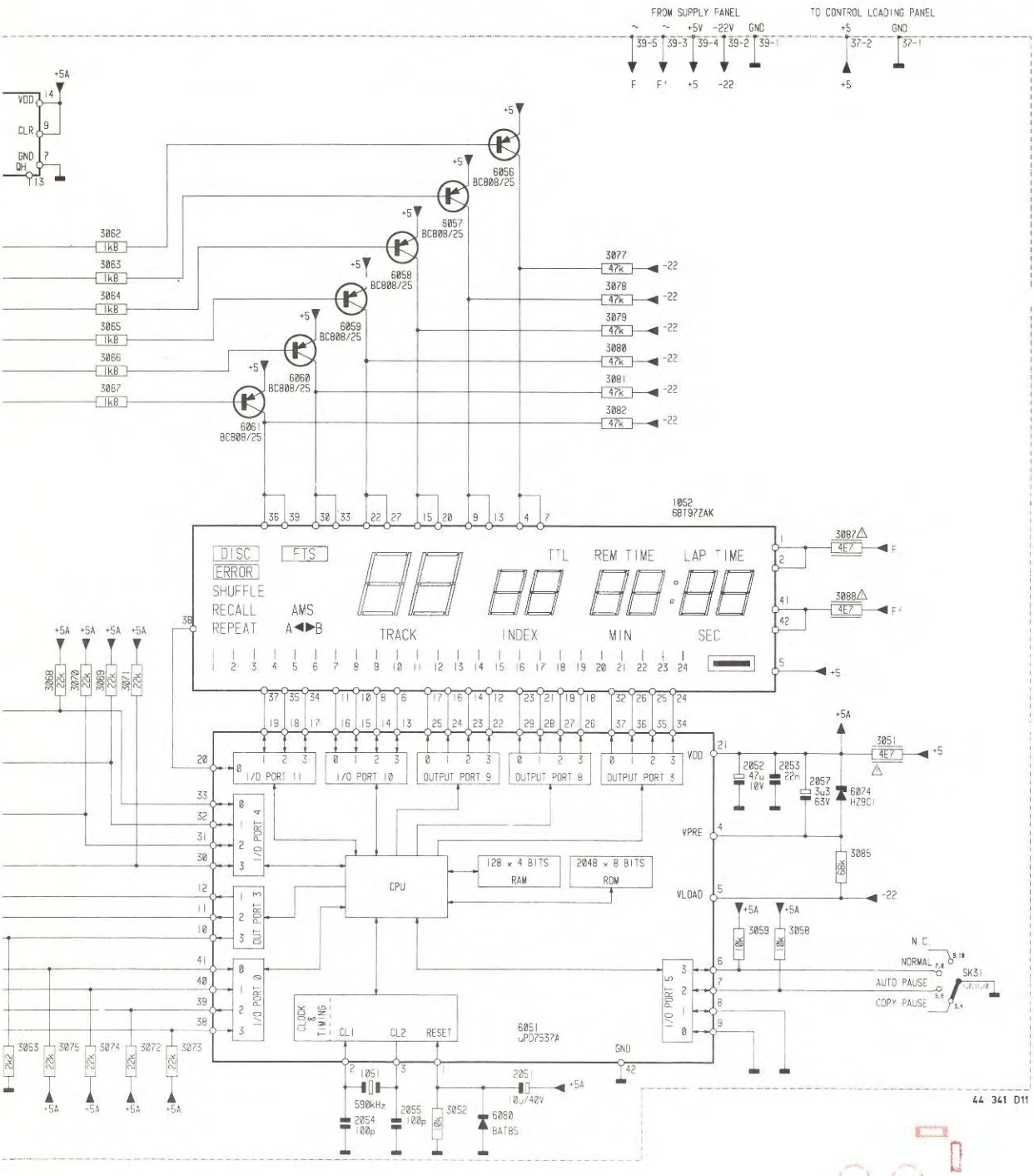

DECODING 3
6301
÷4 DIVIDER STAGE
SDIS
IR
RC5
GND
TL
DATA I
DATA O
SCK
ACK
PLAY INDICATION
REDIG
RP
6332-14
6302 TO SELECT RP OR RP/4
6303 MC68HC11A0
I/O PORT A
I/O PORT C
INPUT PORT E
ROM 8k BYTES
CPU
RAM 256 BYTES
EEPROM 512 BYTES
OUTPUT PORT B
I/O PORT D
A/D CONV.
MODE CONTROL CLOCK & TIMING
8 MHz.
RESET
RD
S in
S out
GND
GND
CONTROL LOGIC
Y-GATING
Y DECODER
X DECODER
65536 BIT CELL MATRIX
I/O BUFFERS
6326 M27128A-2F1
ALL GROUNDS ARE DIGITAL GROUNDS UNLESS OTHERWISE SPECIFIED

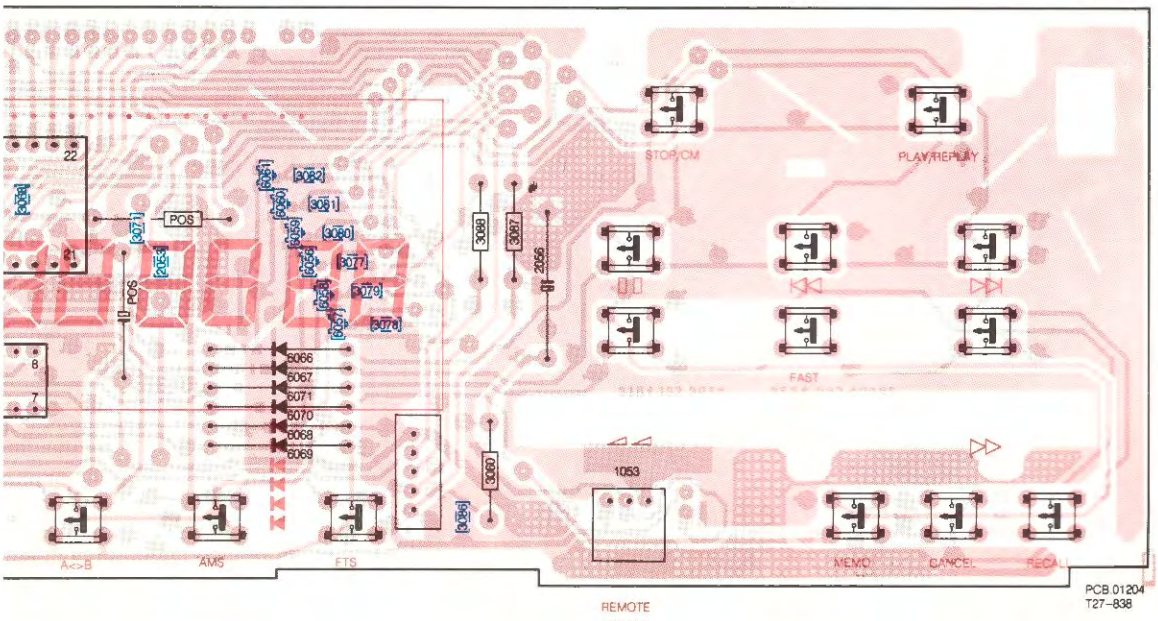

6332 MC68HC24
I/O PORT A
I/O PORT B
I/O PORT C
LATCH
ADDRESS LATCH
DATA BUFFERS
PIOC
MAGNITUDE COMPARATOR
CHIP CONTROL LOGIC
MODE
AS
VDD
VSS
IRQ
STRA
STRB
E
R/W
CS
RESET
I/O
IN/OUT
OFF/ON
SLOW/FAST
MUSB
ATSB
ANI
MUTE
CRI/DODS
W IN
W OUT
NC
RP
6329 74HC00
6330 74HC00
6334 BC328
6335 IN4148
6336 IN4148
6337 BC328
6338 BC858
6339 BC858
6340 BC338
6341 IN4148
6342 IN4148
6343 BC338
6344 IN4002
6345 BC338
6346 BC858
6350 MC79M05CT
SNAB/SSM


74HC373
6325
CONTROL LOGIC
Y BUFFERS LATCHES AND DECODER
X BUFFERS LATCHES AND DECODER
16384 BIT E² PROM ARRAY
I/O BUFFERS AND LATCHES
6327 X28168P
74HC373 6325

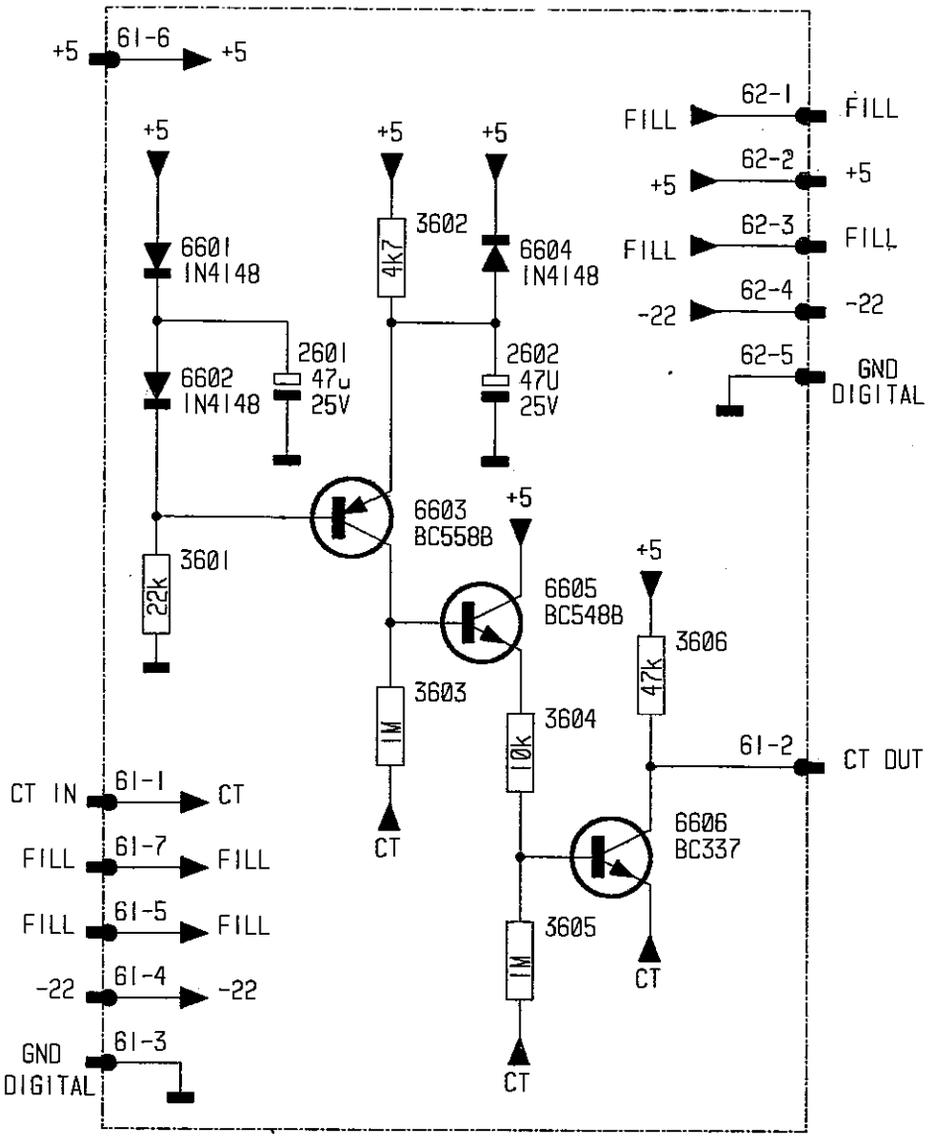

6052
74HC164
8 - BIT SERIAL SHIFT REGISTER
A
B
CLK
QA
QB
QC
QD
QE
QF
QG
6071 BAW62
6070 BAW62
6069 BAW62
6068 BAW62
6067 BAW62
6066 BAW62
37-3
37-4
TO CONTROL LOADING PANEL
TO SK15 (TRAY OPEN SWITCH)
SEARCH<<
STORE
OPEN
PAUZE
STOP/CM
FAST
CANCEL
FTS
SCAN
TRACK>>
SEARCH>>
RECALL
A-B
REPEAT
TRACK<<
PLAY/REPLAY
TIME
TSP
3054
3055
3060
3086
1053
BX1427
3056
47u
10V
38-6
38-5
38-1
38-4
38-2
38-3
RC
ACK
SCIS
SCK
DATA OUT
DATA IN
TO DECODER PANEL


1052
42
6051
6074
6800
1051
14
NORM
COPY
AUTO
SHUFFLE
TIME
REPEAT


FROM SUPPLY PANEL
TO CONTROL LOADING PANEL
DISC
ERROR
SHUFFLE
RECALL
REPEAT
FTS
AMS
A◄►B
TTL
REM TIME
LAP TIME
TRACK
INDEX
MIN
SEC
I/O PORT 11
I/O PORT 10
OUTPUT PORT 9
OUTPUT PORT 8
OUTPUT PORT 3
I/O PORT 4
OUT PORT 3
I/O PORT 0
I/O PORT 5
CPU
128 x 4 BITS RAM
2048 x 8 BITS ROM
CLOCK & TIMING
CL1
CL2
RESET
6051 µPD7537A
VDD
VPRE
VLOAD
GND
N.C.
NORMAL
AUTO PAUSE
COPY PAUSE
SK31
590kHz
6080 BAT85
1052 6BT97ZAK
44 341 D11

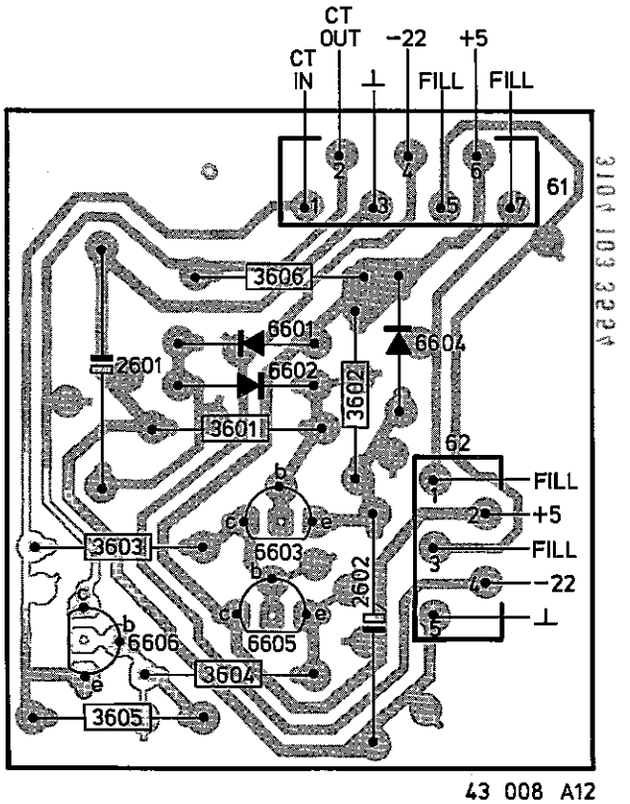

STOP/OM
PLAY/REPLAY
FAST
POS
A<>B
AMS
FTS
MEMO
CANCEL
RECAL
REMOTE SENSOR
PCB.01204
T27-838

FTD-KILL CIRCUIT

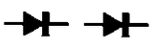
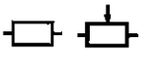


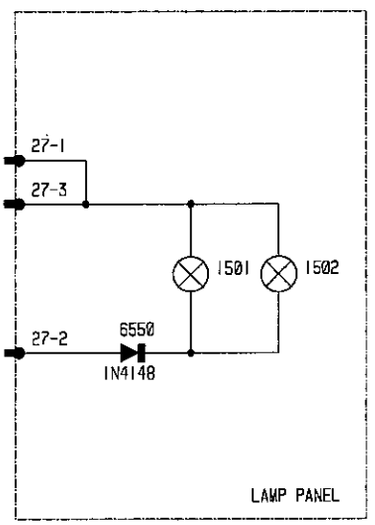
43 020 A12

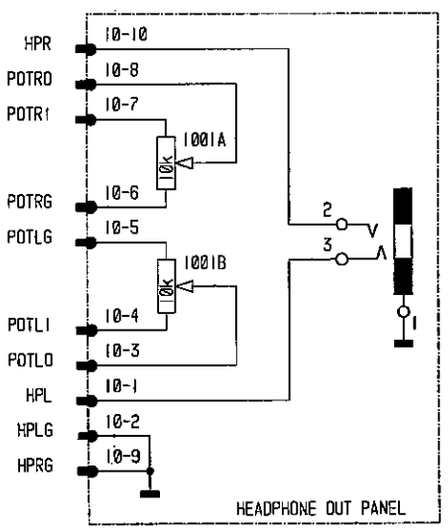
FTD-KILL PANEL

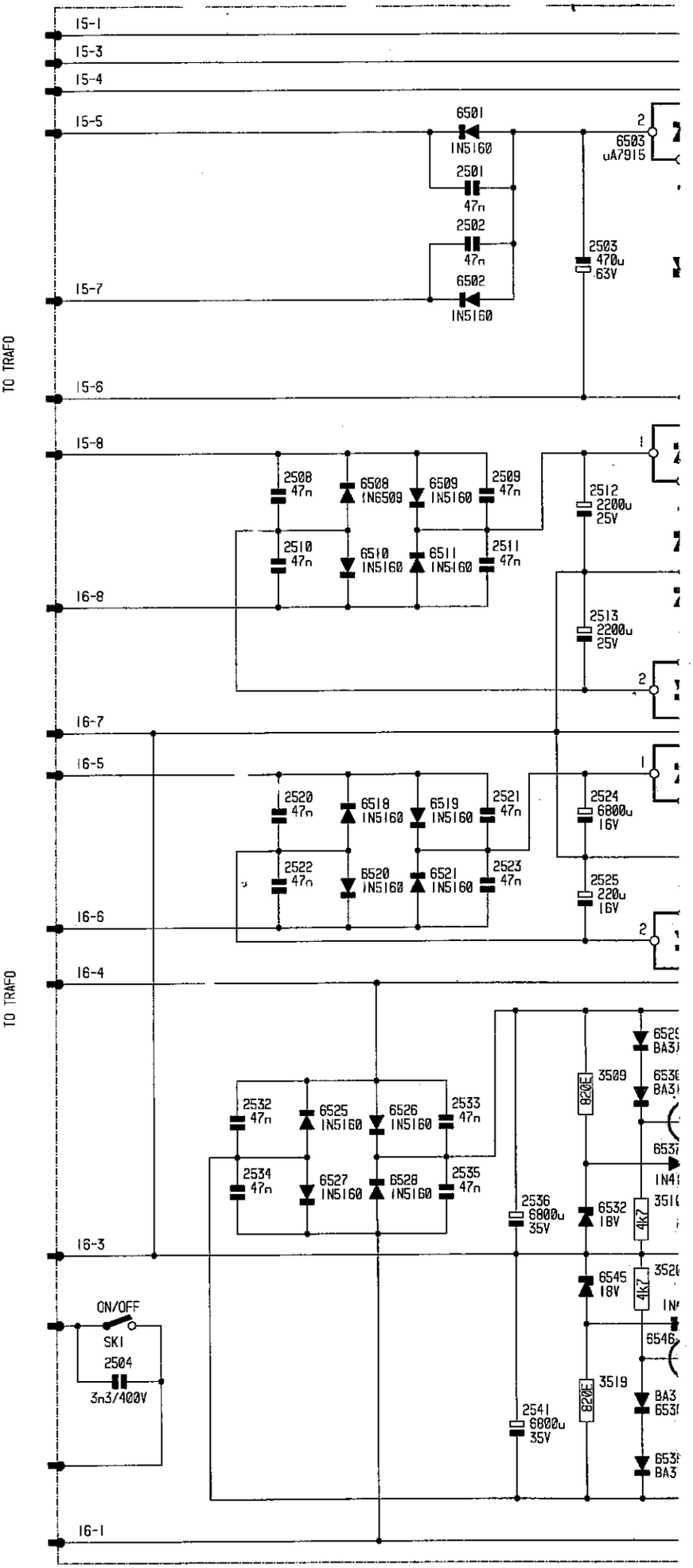


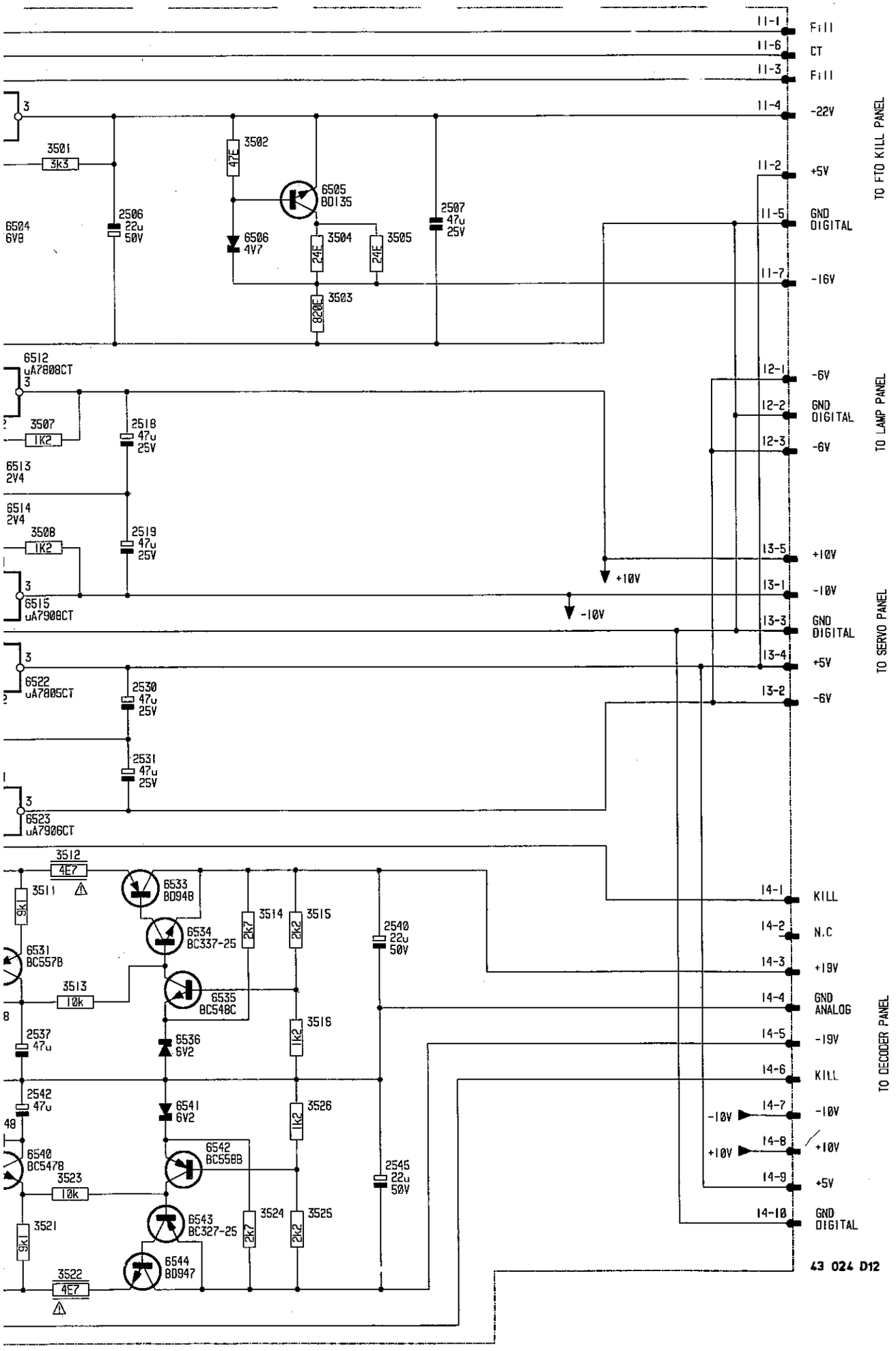
43 008 A12

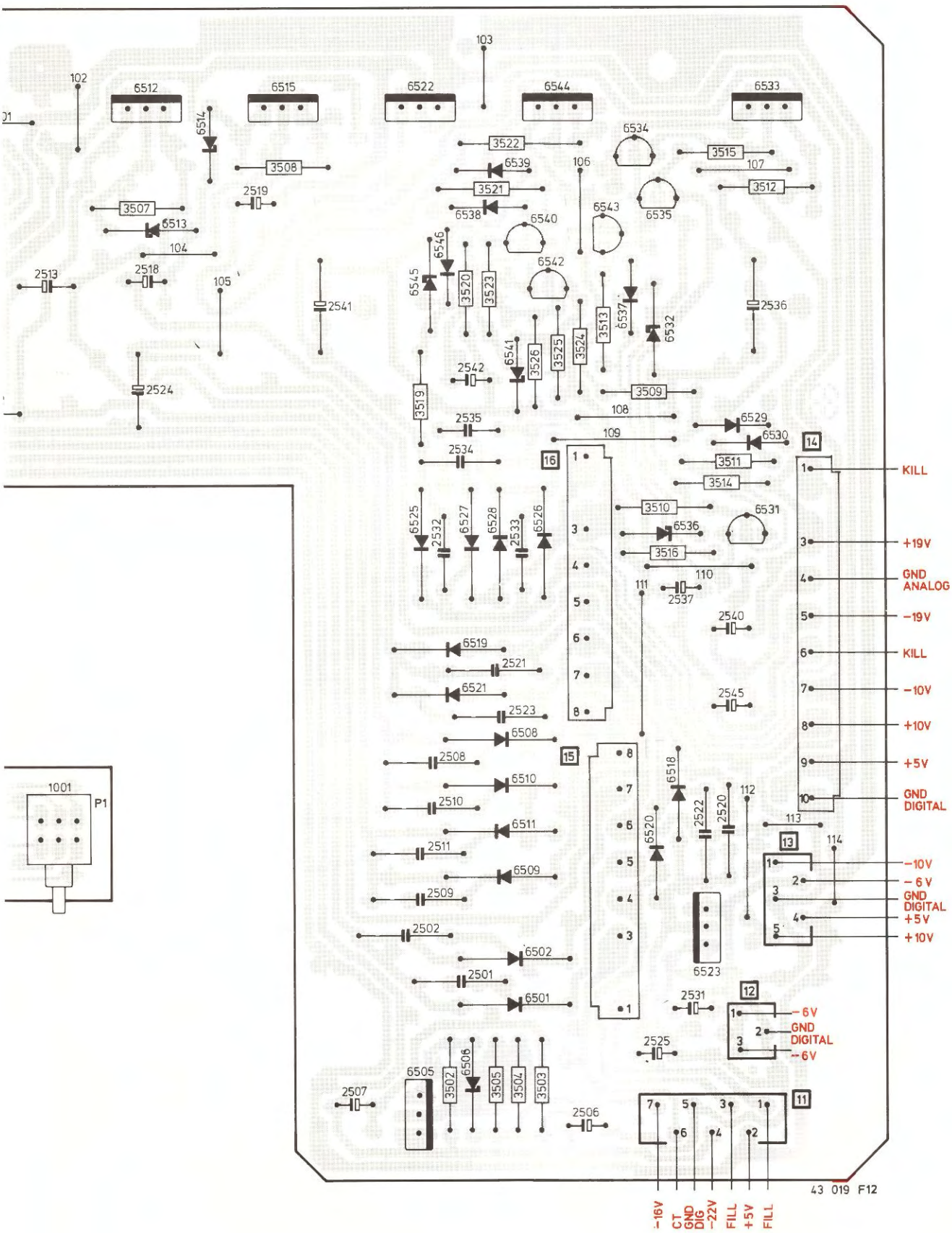
	
MC 79M15 CT	5322 209 86361
MC 7808 CT	4822 209 72554
MC 7908 CT	4822 209 82112
TY 40408	4822 209 71579
MC 7906 CT	4822 209 82056
 c	
BD 135	4822 130 40823
BC 557B	4822 130 44568
BD 948F	4822 130 60935
BC 337-25	4822 130 40981
BC 548C	4822 130 44196
BC 547B	4822 130 40959
BC 558B	4822 130 44197
BD 947F	4822 130 60934
BC 548B	4822 130 40937
BC 337	4822 130 40855
	
IN5060	4822 130 31164
HZ7A3	4822 130 33523
HZ5B1	4822 130 32986
HZ2C2	4822 130 32861
BA314	4822 130 30879
HZ18-3	4822 130 80422
HZ6C2	4822 130 32698
IN4148	4822 130 30621
	
Safety res. 47R	4822 111 30526
Safety res. 4E7	4822 111 30499
1001 Trim pot 10 kΩ LOG.	4822 100 30061
Miscellaneous	
Mains switch	4822 276 12343
Clamping spring	4822 492 63076
Phone socket	4822 267 40661


27-1
27-3
1501
1502
27-2
6550
IN4148
LAMP PANEL

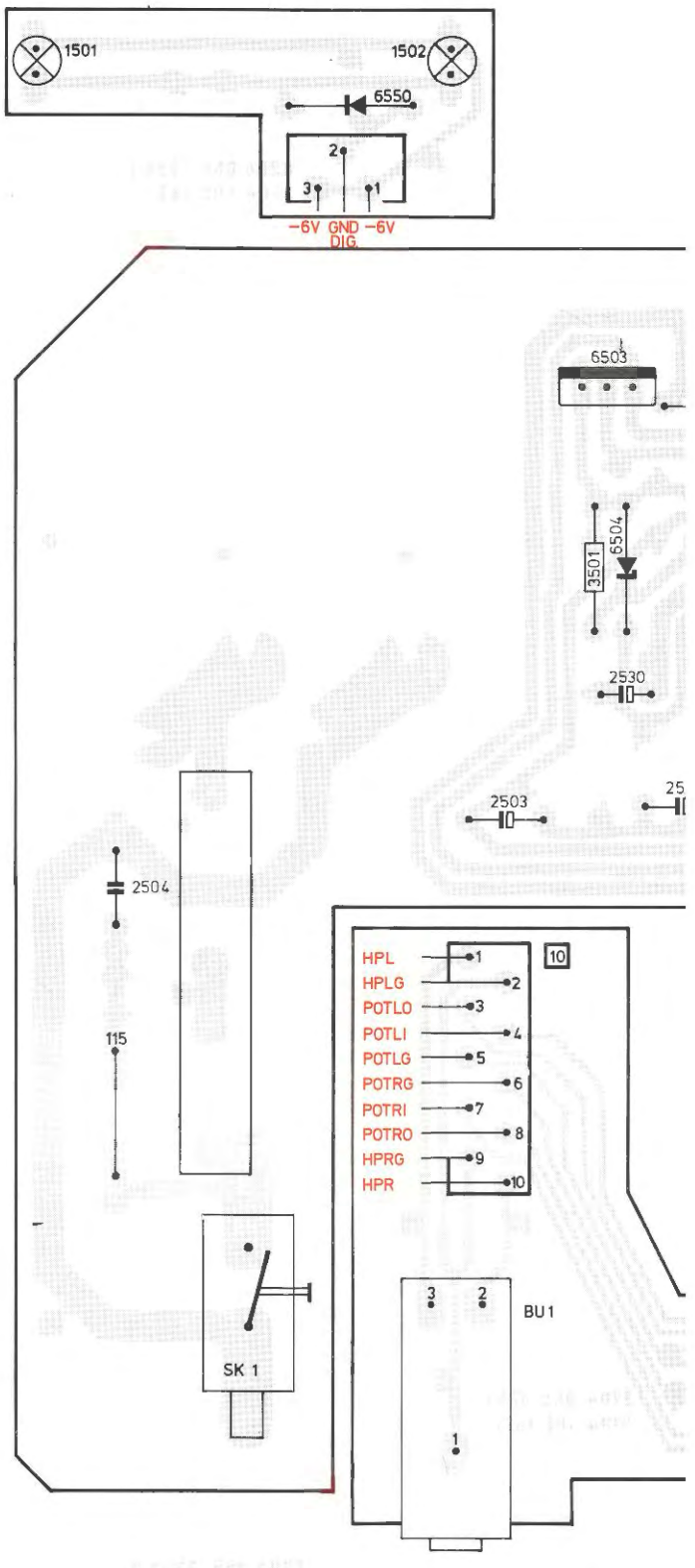

HPR
POTRO
POTR1
POTRG
POTLG
POTLI
POTLO
HPL
HPLG
HPRG
10-10
10-8
10-7
10-6
10-5
10-4
10-3
10-1
10-2
10-9
1001A
1001B
10K
10K
2
3
1
HEADPHONE OUT PANEL

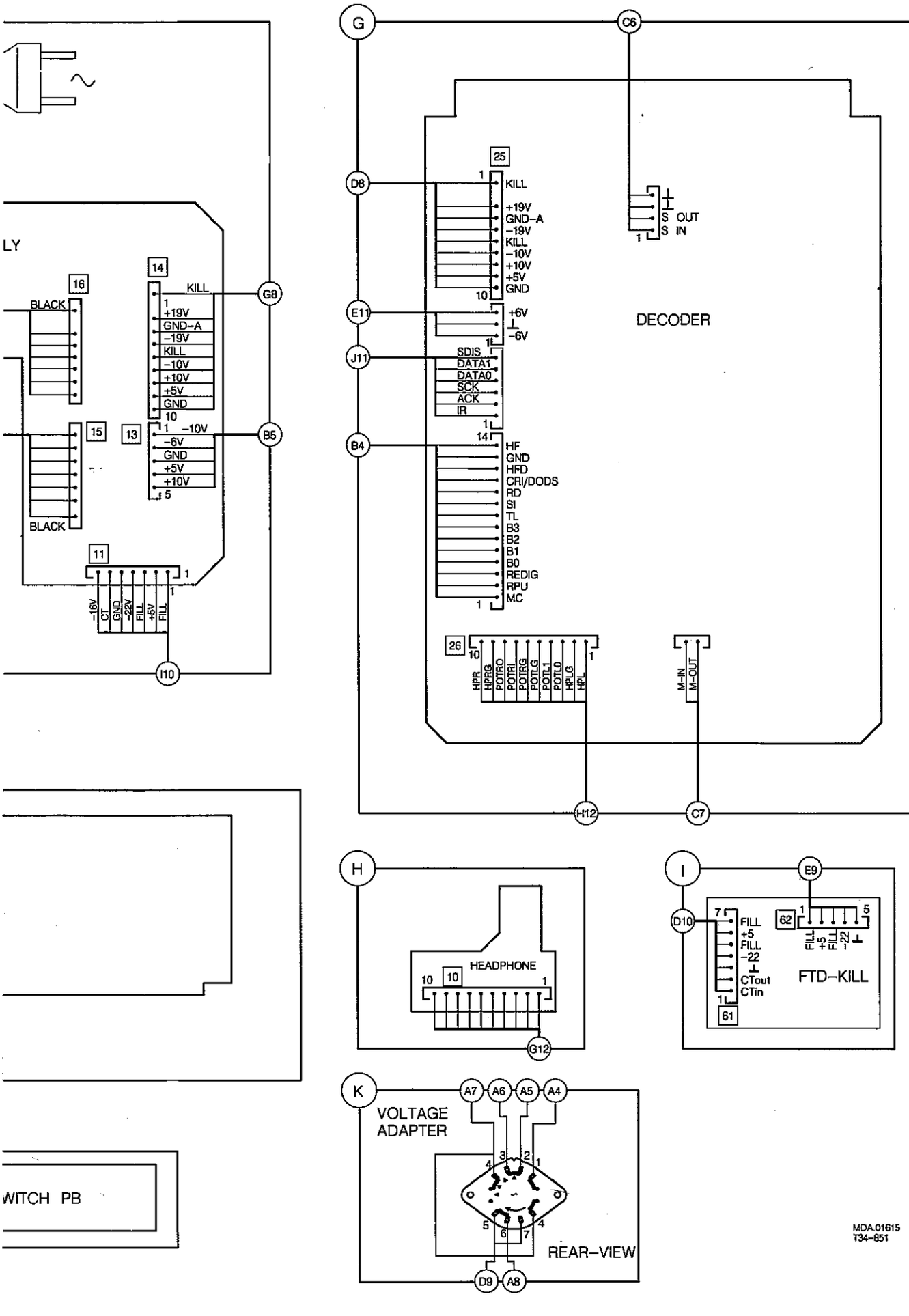

TO TRAFO
TO TRAFO
15-1
15-3
15-4
15-5
15-7
15-6
15-8
16-8
16-7
16-5
16-6
16-4
16-3
16-1
6501
IN5160
2501
47n
2502
47n
6502
IN5160
2503
470u
63V
6503
uA7915
2508
47n
6508
IN6509
6509
IN5160
2509
47n
2510
47n
6510
IN5160
6511
IN5160
2511
47n
2512
2200u
25V
2513
2200u
25V
2520
47n
6518
IN5160
6519
IN5160
2521
47n
2522
47n
6520
IN5160
6521
IN5160
2523
47n
2524
6800u
16V
2525
220u
16V
2532
47n
6525
IN5160
6526
IN5160
2533
47n
2534
47n
6527
IN5160
6528
IN5160
2535
47n
2536
6800u
35V
2541
6800u
35V
3509
820E
3519
820E
6532
18V
6545
18V
4k7
4k7
ON/OFF
SKI
2504
3n3/400V

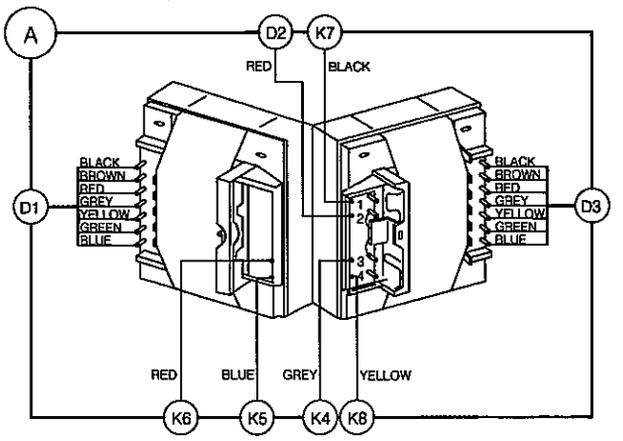

11-1
Fill
11-6
CT
11-3
Fill
11-4
-22V
11-2
+5V
11-5
GND DIGITAL
11-7
-16V
TO FTO KILL PANEL
3501
3k3
3502
47E
6505
BD135
6506
4V7
3504
24E
3505
24E
3503
820E
2506
22u
50V
2507
47u
25V
6504
6V8
6512
uA7808CT
3507
1K2
2518
47u
25V
6513
2V4
6514
2V4
3508
1K2
2519
47u
25V
6515
uA7908CT
12-1
-6V
12-2
GND DIGITAL
12-3
-6V
TO LAMP PANEL
+10V
-10V
13-5
+10V
13-1
-10V
13-3
GND DIGITAL
13-4
+5V
13-2
-6V
TO SERVO PANEL
6522
uA7805CT
2530
47u
25V
2531
47u
25V
6523
uA7906CT
3512
4E7
3511
9k1
6533
BD948
6534
BC337-25
3514
2k7
3515
2k2
2540
22u
50V
6531
BC557B
3513
10k
6535
BC548C
3516
1K2
2537
47u
6536
6V2
2542
47u
6541
6V2
3526
1K2
6540
BC548B
6542
BC558B
3523
10k
2545
22u
50V
3521
9k1
6543
BC327-25
3524
2k7
3525
2k2
6544
BD947
3522
4E7
14-1
KILL
14-2
N.C
14-3
+19V
14-4
GND ANALOG
14-5
-19V
14-6
KILL
14-7
-10V
14-8
+10V
14-9
+5V
14-10
GND DIGITAL
TO DECODER PANEL
43 024 D12

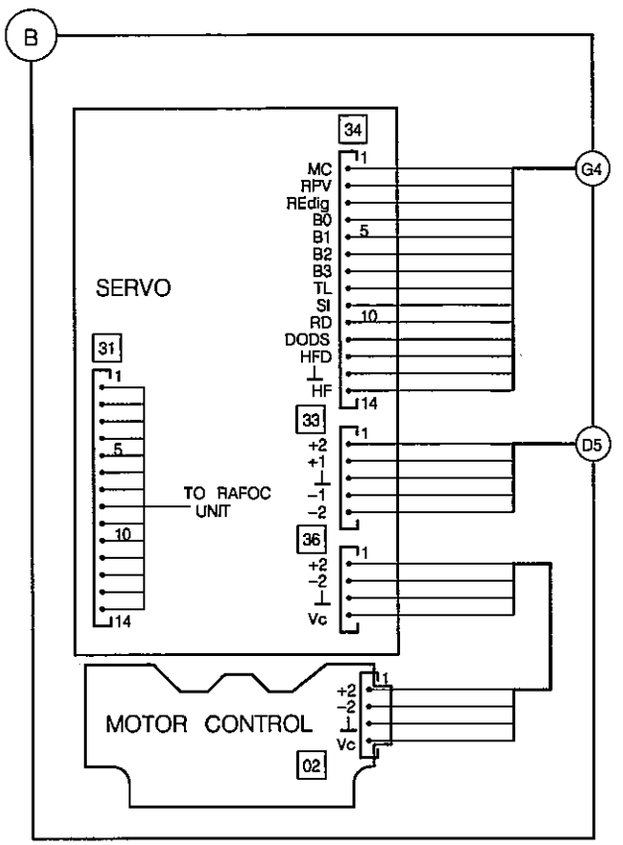

KILL
+19V
GND ANALOG
-19V
KILL
-10V
+10V
+5V
GND DIGITAL
-10V
- 6 V
GND DIGITAL
+5V
+10V
- 6V
GND DIGITAL
-6V
-16V
CT
GND DIG
-22V
FILL
+5V
FILL
1001
P1
43 019 F12

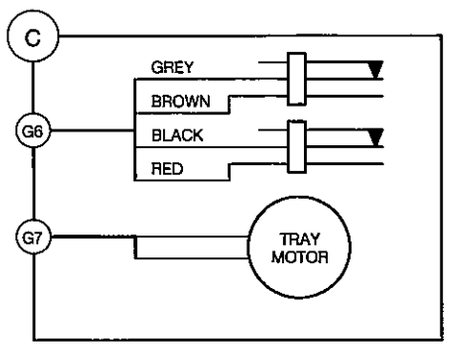
SUPPLY, HEADPHONE AND LAMP PANEL

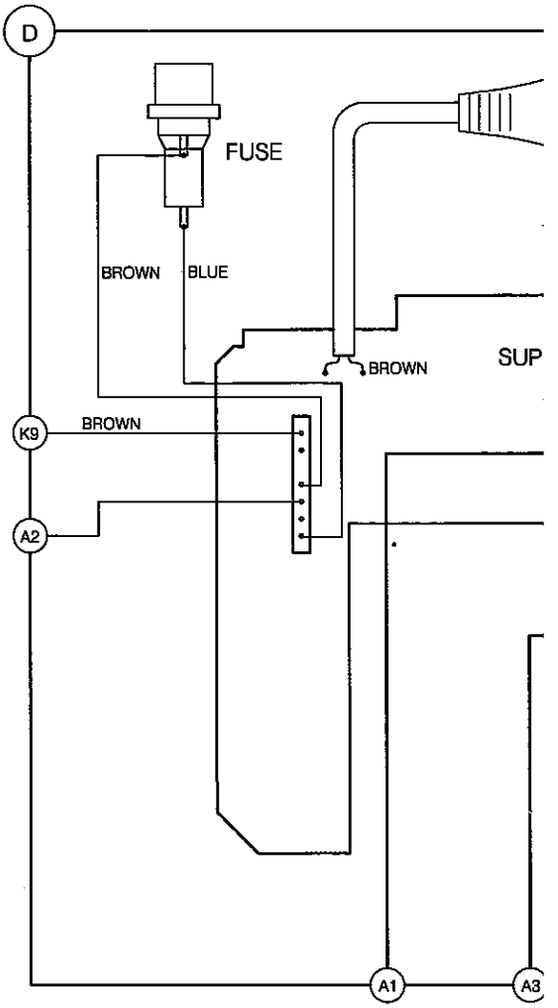


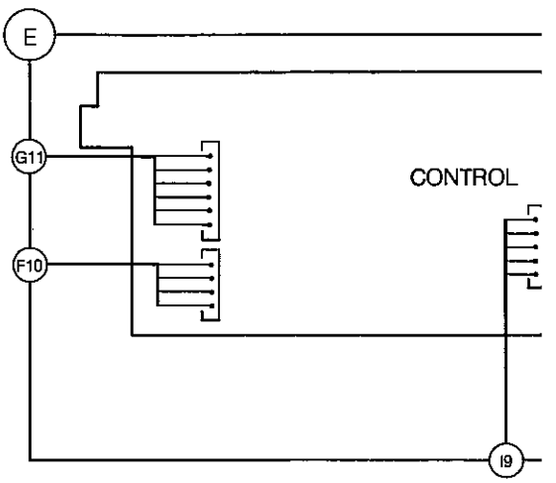

LY
16
BLACK
15
BLACK
14
KILL
1
+19V
GND-A
-19V
KILL
-10V
+10V
+5V
GND
10
13
1 -10V
-6V
GND
+5V
+10V
5
11
-16V
CT
GND
-22V
FILL
+5V
FILL
G8
B5
I10
G
C6
25
D8
KILL
+19V
GND-A
-19V
KILL
-10V
+10V
+5V
GND
E11
+6V
-6V
J11
SDIS
DATA1
DATA0
SCK
ACK
IR
B4
HF
GND
HFD
CRI/DODS
RD
SI
TL
B3
B2
B1
B0
REDIG
RPU
MC
26
HPR
HPRG
POTRO
POTRI
POTRG
POTLG
POTL1
POTL0
HPLG
HPL
S OUT
S IN
DECODER
M-IN
M-OUT
H12
C7
H
HEADPHONE
10
G12
I
E9
D10
7
FILL
+5
FILL
-22
CTout
CTin
1
61
62
FILL
+5
FILL
-22
FTD-KILL
K
A7
A6
A5
A4
VOLTAGE
ADAPTER
REAR-VIEW
D9
A8
WITCH PB
MDA.01615
T34-851

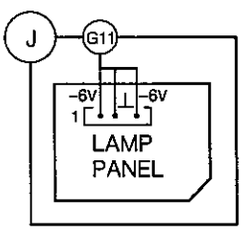

A
D2
K7
RED
BLACK
BLACK
BROWN
RED
GREY
YELLOW
GREEN
BLUE
D1
D3
RED
BLUE
GREY
YELLOW
K6
K5
K4
K8

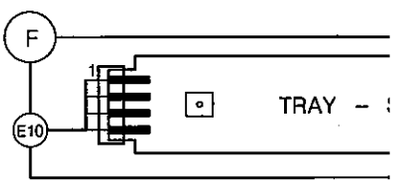

B
34
MC
RPV
REdig
B0
B1
B2
B3
TL
SI
RD
DODS
HFD
HF
14
G4
SERVO
31
TO RAFOC UNIT
33
+2
+1
−1
−2
D5
36
+2
−2
Vc
MOTOR CONTROL
02


C
GREY
BROWN
BLACK
RED
G6
G7
TRAY MOTOR


D
FUSE
BROWN
BLUE
BROWN
SUP
K9
BROWN
A2
A1
A3


E
G11
CONTROL
F10
I9


J
G11
−6V
−6V
1
LAMP PANEL


F
1
E10
TRAY

6252	LM11CN	4822 209 60278
6256	LM339N	4822 209 80631
6301	PC74HC74P	5322 209 82575
6302	MC74HC00N	4822 209 72542
6303	MC68HC11A0	4822 209 72537
6310	SAA7210P/04	4822 209 71001
6311	MN4264-15	4822 209 70422
6315	SN74LS08N	5322 209 81826
6316	SAA7220	4822 209 72545
6322	TDA1541	4822 209 72969
6325	MC74HC373N	4822 209 72543
6328	EPROM	4822 209 60277
6327	X2816BP	4822 209 72102
6332	MC68HC24/	4822 209 72538
6350	MC7905CT	5322 209 11222
6371	NE5532N	5322 209 86234
6390	LM308AN	5322 209 86056
6384	NJM5534D	4822 209 70228
6393	NJM4560D	4822 209 83274
6503	MC79M15CT	5322 209 86381
6512	MC7808CT	4822 209 72554
6518	MC7908CT	4822 209 82112
6522	TY40408	4822 209 71579
6523	MC7906CT	4822 209 82056
6051	µPD7537A	4822 209 72552
6052	PC74HC164P	4822 209 11605

6251	BSR56	4822 130 42633
6253	BC857B	5322 130 60508
6259	BC847B	4822 130 60511
6280	BC638	4822 130 41087
6290	BC638	4822 130 41087
6295	BC338	4822 130 44121
6297	BC328	4822 130 44104
6306	BC558B	4822 130 44197
6307	BC848	4822 130 61207
6308	BC327-25	4822 130 41246
6309	BF450	4822 130 44237
6319	BC858	5322 130 42012
6323	BC818	4822 130 42675
6382	2N4859	4822 130 60933
6384	NJM5534D	4822 209 70226
6388	BSR56	4822 130 42633
6505	BD135	4822 130 40823
6531	BC557B	4822 130 44568
6533	BD948F	4822 130 60935
6534	BC337-25	4822 130 40981
6543	BC327-25	4822 130 41246
6544	BD947F	4822 130 60934
6056	BC808-25	5322 130 42048
6605	BC548B	4822 130 40937
6606	BC337	4822 130 40855

Miscellaneous

1303	TOTX172	4822 218 20752
1305	G2VN237P-12VDC	4822 280 70362
1306	G2VN237P-12VDC	4822 280 70362
	Mains switch	4822 276 12343
1501	Lamp	4822 134 40909
	Slide switch	4822 277 21057
	Tact switch	4822 278 11276
1052	Display	4822 130 90596
1053	IR receiver	4822 218 10212

6257	BZX55-C22	4822 130 34441
6258	BZX55-C39	4822 130 34145
6264	BZX55-C6V8	4822 130 80513
6266	BZX55-C10	4822 130 34297
6267	1N4148	4822 130 30621
6268	1N4002	5322 130 30684
6296	BZX55-C16	4822 130 34268
6305	BAT85	4822 130 31983
6321	BZX79-B5V6	4822 130 34173
6501	1N5060	4822 130 31164
6506	BZX55-C4V7	5322 130 80275
6513	BZX55-C2V4	4822 130 81048
6529	BA314	4822 130 30879
6532	BZX55-C18	4822 130 81046
6536	BZX55-C6V2	4822 130 81045
6066	BAW62	4822 130 30613
6074	BZX55-C9V1	4822 130 81047

1301	CST8.00MC	4822 242 72066
1302	11.289600MC	4822 242 71349
1051	590 kHz	4822 242 72068

2251	820 nF-63 V	4822 121 51436
2253	390 nF-63 V	4822 121 51393
2254	580 nF-63 V	4822 121 51412
2255	100 pF-50V	4822 122 31765
2256	100 nF-63 V	5322 121 42386
2260	15 µF-63 V	4822 124 41714
2261	47 µF-25 V	4822 124 40433
2265	100 µF-40 V	5322 124 21189
2291	100 µF-25 V	4822 124 22473
2305	4µF7-63 V	4822 124 40246
2306	82 pF-50 V	4822 122 31839
2307	22 pF-63 V	4822 122 32482
2311	100 nF-63 V	4822 122 33104
2317	47 nF-100 V	5322 121 42491
2328	47 pF-50 V	4822 122 31772
2335	680 pF-50 V	4822 122 31775
2402	C-BTS242F	4822 121 51227
2406	18 nF-63 V	4822 121 51225
2408	22 pF-63 V	4822 122 32482
2418	1000 pF	4822 121 51135
2420	2nF2-63 V	4822 121 51126
2432	1 µF-63 V	5322 121 42114

3251	1MΩ-5% 0.125 W Ⓒ	5322 111 90094
3254	ERj-8GCG242 Ⓒ	4822 116 90271
3255	ERj-8GCG122 Ⓒ	4822 116 90418
3262	ERj-8GCG101P Ⓒ	5322 116 90091
3280	ERj-8GCG912P Ⓒ	4822 111 90373
3293	4Ω7-5% 0.33 W ⚠	4822 111 30499
3384	1Ω-5% 0.33 W ⚠	4822 111 30483
3421	47Ω-5% 0.33 W ⚠	4822 111 30526
3428	ERj-8GCG301P Ⓒ	4822 111 90156
3458	33Ω-5% 0.33 W ⚠	4822 111 30522
3480	ERj-8GCG564P Ⓒ	4822 111 90169

5301	Transformer	4822 148 80281
5302	AL0410ST2R2K	4822 157 53176
5304	AL0410ST471K	4822 157 53141
	Mains transformer	4822 146 30703

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1 pF	5%	4822 122 32479
1,2 pF	5%	4822 122 33013
1,5 pF	5%	4822 122 31792
1,8 pF	5%	4822 122 32087
2,2 pF	5%	4822 122 32425
3,3 pF	5%	4822 122 32079
3,9 pF	5%	4822 122 32081
4,7 pF	5%	4822 122 32082
5,6 pF	5%	4822 122 32506
6,8 pF	5%	4822 122 32507
8,2 pF	5%	4822 122 32083
10 pF	5%	4822 122 31971
12 pF	5%	4822 122 32139
15 pF	5%	4822 122 32504
18 pF	5%	4822 122 31769
22 pF	10%	4822 122 31837
27 pF	5%	4822 122 31966
33 pF	5%	4822 122 31756
39 pF	5%	4822 122 31972
47 pF	5%	4822 122 31772
56 pF	5%	4822 122 31774
68 pF	5%	4822 122 31961
82 pF	10%	4822 122 31839
100 pF	5%	4822 122 31765
120 pF	5%	4822 122 31766
150 pF	5%	4822 122 31767
180 pF	2%	4822 122 31794
220 pF	5%	4822 122 31965
270 pF	5%	4822 122 32142
330 pF	10%	4822 122 31642
390 pF	5%	4822 122 31771
470 pF	5%	4822 122 31727
560 pF	5%	4822 122 31773
680 pF	5%	4822 122 31775
820 pF	5%	4822 122 31974
1 nF	10%	5322 122 31647
1,2 nF	5%	4822 122 31807
1,5 nF	10%	4822 122 31781
1,8 nF	10%	4822 122 32153
2,2 nF	10%	4822 122 31644
2,7 nF	10%	4822 122 31783
3,3 nF	10%	4822 122 31969
3,9 nF	10%	4822 122 32566
4,7 nF	10%	4822 122 31784
5,6 nF	10%	4822 122 31916
6,8 nF	10%	4822 122 31976
10 nF	10%	4822 122 31728
12 nF	10%	5322 122 31648
15 nF	10%	4822 122 31782
18 nF	10%	4822 122 31759
22 nF	10%	4822 122 31797
27 nF	10%	4822 122 32541
33 nF	10%	4822 122 31981
47 nF	10%	4822 122 32542
56 nF	10%	4822 122 32183
100 nF	10%	4822 122 31947
180 nF	10%	4822 122 32915
220 nF	20%	4822 122 32715

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0 E	jumper	4822 111 90163
1 E	5%	4822 111 90184
1,1 E	5%	4822 111 90377
1,2 E	5%	4822 111 90378
1,3 E	5%	4822 111 90379
1,5 E	5%	4822 111 90381
1,6 E	5%	4822 111 90382
1,8 E	5%	4822 111 90383
2 E	5%	4822 111 90384
2,2 E	5%	5322 111 90104
2,4 E	5%	4822 111 90385
2,7 E	5%	4822 111 90386
3 E	5%	4822 111 90387
3,3 E	5%	4822 111 90388
3,6 E	5%	4822 111 90389
3,9 E	5%	4822 111 90391
4,3 E	5%	4822 111 90392

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4,7 E	5%	5322 111 90376
5,1 E	5%	4822 111 90393
5,6 E	5%	4822 111 90394
6,2 E	5%	4822 111 90395
6,8 E	5%	4822 111 90254
7,5 E	5%	4822 111 90396
8,2 E	5%	4822 111 90397
9,1 E	5%	4822 111 90398
10 E	2%	5322 111 90095
11 E	2%	4822 111 90338
12 E	2%	4822 111 90341
13 E	2%	4822 111 90343
15 E	2%	4822 111 90344
16 E	2%	4822 111 90347
18 E	2%	5322 111 90139
20 E	2%	4822 111 90352
22 E	2%	4822 111 90186
24 E	2%	4822 111 90355
27 E	2%	5322 111 90105
30 E	2%	4822 111 90356
33 E	2%	4822 111 90357
36 E	2%	4822 111 90359
39 E	2%	4822 111 90361
43 E	2%	5322 116 90125
47 E	2%	4822 111 90217
51 E	2%	4822 111 90365
56 E	2%	4822 111 90239
62 E	2%	4822 111 90367
68 E	2%	4822 111 90203
75 E	2%	4822 111 90371
82 E	2%	4822 111 90124
91 E	2%	4822 111 90375
100 E	2%	5322 111 90091
110 E	2%	4822 111 90335
120 E	2%	4822 111 90339
130 E	2%	4822 111 90164
150 E	2%	5322 111 90098
160 E	2%	4822 111 90345
180 E	2%	5322 111 90242
200 E	2%	4822 111 90348
220 E	2%	4822 111 90178
240 E	2%	4822 111 90353
270 E	2%	4822 111 90154
300 E	2%	4822 111 90156
330 E	2%	5322 111 90106
360 E	1%	4822 111 90288
360 E	2%	4822 111 90358
390 E	2%	5322 111 90138
430 E	2%	4822 111 90362
470 E	2%	5322 111 90109
510 E	2%	4822 111 90245
560 E	2%	5322 111 90113
620 E	2%	4822 111 90366
680 E	2%	4822 111 90162
750 E	2%	5322 111 90306
820 E	2%	4822 111 90171
910 E	2%	4822 111 90372
1 k	2%	5322 111 90092
1,1 k	2%	4822 111 90336
1,2 k	2%	5322 111 90096
1,3 k	2%	4822 111 90244
1,5 k	2%	4822 111 90151
1,6 k	2%	5322 111 90265
1,8 k	2%	5322 111 90101
2 k	2%	4822 111 90165
2,2 k	2%	4822 111 90248
2,4 k	2%	4822 111 90289
2,7 k	2%	4822 111 90569
3 k	2%	4822 111 90198
3,3 k	2%	4822 111 90157
3,6 k	2%	5322 111 90107
3,9 k	2%	4822 111 90571
4,3 k	2%	4822 111 90167
4,7 k	2%	5322 111 90111
5,1 k	2%	5322 111 90268
5,6 k	2%	4822 111 90572
6,2 k	2%	4822 111 90545

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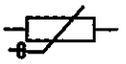
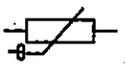
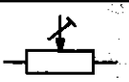
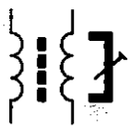
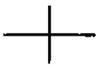
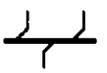
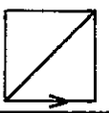
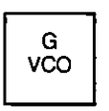
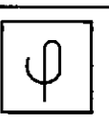
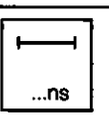
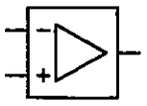
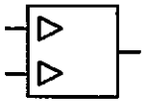
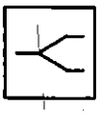
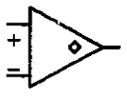
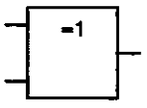
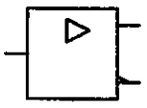
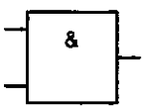
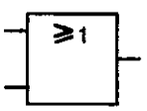
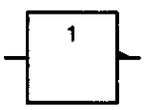
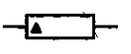
1U

6,8 k	2%	4822 111 90544
7,5 k	2%	4822 111 90276
8,2 k	2%	5322 111 90118
9,1 k	2%	4822 111 90373
10 k	2%	4822 111 90249
11 k	2%	4822 111 90337
12 k	2%	4822 111 90253
13 k	2%	4822 111 90509
15 k	2%	4822 111 90196
16 k	2%	4822 111 90346
18 k	2%	4822 111 90238
20 k	2%	4822 111 90349
22 k	2%	4822 111 90251
24 k	2%	4822 111 90512
27 k	2%	4822 111 90542
30 k	2%	4822 111 90216
33 k	2%	5322 111 90267
36 k	2%	4822 111 90514
39 k	2%	5322 111 90108
43 k	2%	4822 111 90363
47 k	2%	4822 111 90543
51 k	2%	5322 111 90274
56 k	2%	4822 111 90573
62 k	2%	5322 111 90275
68 k	2%	4822 111 90202
75 k	2%	4822 111 90574
82 k	2%	4822 111 90575
91 k	2%	5322 111 90277
100 k	2%	4822 111 90214
110 k	2%	5322 111 90269
120 k	2%	4822 111 90568
130 k	2%	4822 111 90511
150 k	2%	5322 111 90099
160 k	2%	5322 111 90264
180 k	2%	4822 111 90565
200 k	2%	4822 111 90351
220 k	2%	4822 111 90197
240 k	2%	4822 111 90215
270 k	2%	4822 111 90302
300 k	2%	5322 111 90266
330 k	2%	4822 111 90513
360 k	2%	4822 111 90515
390 k	2%	4822 111 90182
430 k	2%	4822 111 90168
470 k	2%	4822 111 90161
510 k	2%	4822 111 90364
560 k	2%	4822 111 90169
620 k	2%	4822 111 90213
680 k	2%	4822 111 90368
750 k	2%	4822 111 90369
820 k	2%	4822 111 90205
910 k	2%	4822 111 90374
1 M	2%	4822 111 90252
1,1 M	5%	4822 111 90408
1,2 M	5%	4822 111 90409
1,3 M	5%	4822 111 90411
1,5 M	5%	4822 111 90412
1,6 M	5%	4822 111 90413
1,8 M	5%	4822 111 90414
2 M	5%	4822 111 90415
2,2 M	5%	4822 111 90185
2,4 M	5%	4822 111 90416
2,7 M	5%	4822 111 90417
3 M	5%	4822 111 90418
3,3 M	5%	4822 111 90191
3,6 M	5%	4822 111 90419
3,9 M	5%	4822 111 90421
4,3 M	5%	4822 111 90422
4,7 M	5%	4822 111 90423
5,1 M	5%	4822 111 90424
5,6 M	5%	4822 111 90425
6,2 M	5%	4822 111 90426
6,8 M	5%	4822 111 90235
7,5 M	5%	4822 111 90427
8,2 M	5%	4822 111 90237
9,1 M	5%	4822 111 90428
10M	5%	5322 111 91141

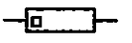
SYMBOL	DESCRIPTION
	Capaeitor, general
	Electrolytic capacitor (+ and – may be omitted)
	Bipolar electrolytic capacitor (+ may be omitted)
	Resistor, general
	N.T.C. resistor
	P.T.C. resistor
	Voltage divider with preset adjustment
	Chip jumper
	Pin contact
	Bus contact
	Coil, self–induction
	Transformer with electrically poor conducting core and adjustable pre–magnetization
	Diode
	Zener diode
	Stabistor
	Double variable capacity diode (in one envelope)
	Photo conductive diode
	L.E.D.

SYMBOL	DESCRIPTION
	Transistor (N.P.N.)
	Transistor (P.N.P.)
	Direct current (DC)
	Alternating current (AC)
	Earth (functional)
	Frame or chassis connection
	Direction in which AC voltages are passed on (optional present)
	Interrupted line
	Not–connected crossing lines
	Connected lines
	Cable tree with lead–outs
	Changer, general (arrow is optional)
	Voltage Controlled Oscillator
	Band–pass filter
	Phase changing network
	Delay element
	Amplifier, general

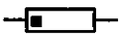
SYMBOL	DESCRIPTION
	Operational amplifier
	Differential amplifier
	Splitter
	Operational amplifier with open output
	Exclusive OR gate
	True/complement amplifier with high input
	Flip Flop
	AND gate
	OR gate
	Inverter with high input



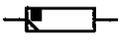
0.2W (CR 16) ≤ 220kΩ 5% > 270kΩ 10%



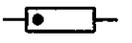
0.33W (CR 25) ≤ 1MΩ 5% > 1MΩ 10%



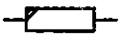
0.33W (SFR25) 5%



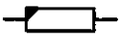
0.25W (VR 25) ≤ 10MΩ 5% > 10MΩ 10%



0.5W (CR 37) ≤ 1MΩ 5% > 1MΩ 10%



0.67W (CR 52) 5%



1.15W (CR 68) 5%

Ceramic plate

Polyester flat foil

Polyester mepolesco

Mylar (Polyester flat foil small sized)

Micropoco

Tubular ceramic (body colour pink or yellow/green)

Miniature single elco

Subminiature tantalum

* a=2,5V
b=4V
c=6,3V
d=10V
e=16V
f=25V
g=40V
h=63V
i=100V
j=125V
l=125V
m=150V
n=160V
q=200V
r=250V
s=300V
t=350V
u=400V
v=500V
w=630V
x=1000V
A=1.6V
B=6V
C=12V
D=15V
E=20V
F=35V
G=50V
H=75V
I=80V

MDA.00084
T32-735

M.T.P