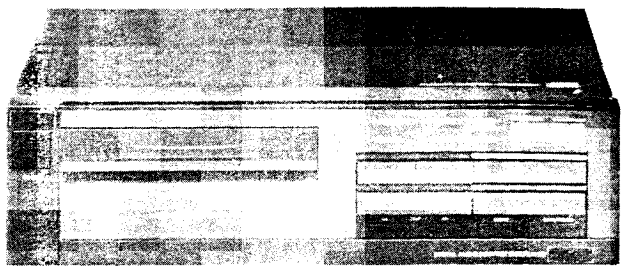
009152

Compact disc player CD150

00/00X/01/05/05X/07/10

Service
Service



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Service Manual

COMPACT disc DIGITAL AUDIO

CONTENTS

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 Serviço
Subject to modification
GB 4822 725 20645
Printed in The Netherlands

PHILIPS CS 102 204
PHILIPS Published by Service Consumer Electronics

1. ELUCIDATION ON 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).

All pages are provided with a date of issue.

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Service **Information**

1986-11-24

CD 150

A86-143

With the use of the µP 6805L3 (40 pins) instead of the MAB 8441P (28 pins) in the CONTROL + DISPLAY CIRCUIT there is second version now. In the manual this version has been stated under the description CONTROL + DISPLAY CIRCUIT B and
CONTROL + DISPLAY PANEL B.

For this reason the pages enclosed should be added to the manual.

Additional pages:

6-7-1
6-7-2

COMPACT disc DIGITAL AUDIO

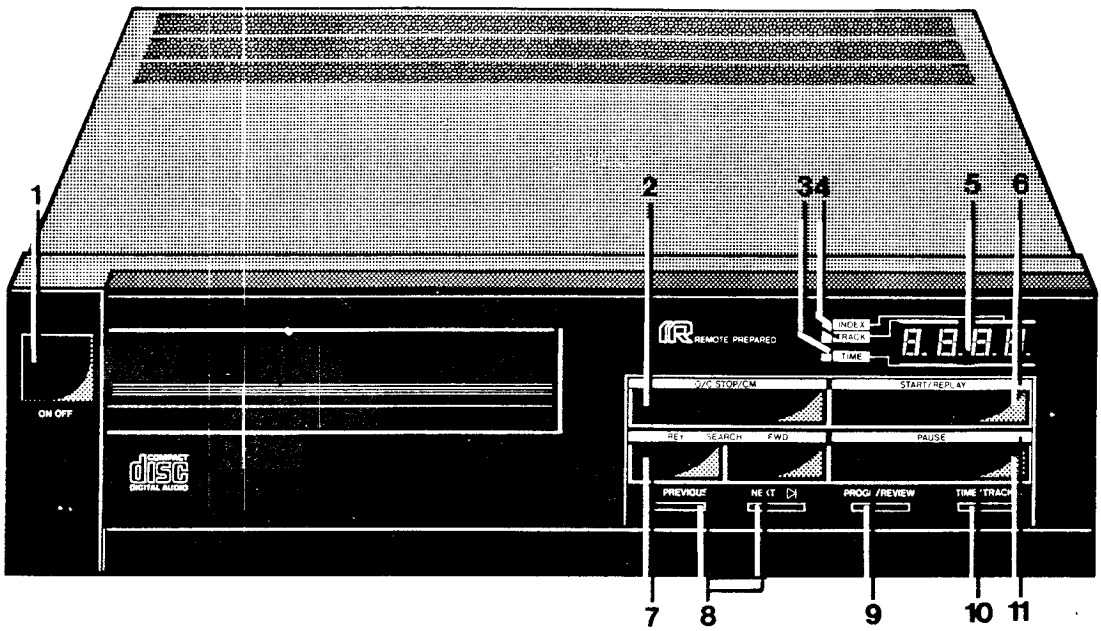

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Fig. 1

2 CONTROLS

1 ON/OFF key: for switching the player on and off.

2 O/C STOP/CM key: for opening and closing the disc tray (O/C=open/close), stopping play during playback (stop) and erasing a programme (CM=Clear Memory).

3 TIME LED: lights during display of playing time.

4 TRACK/INDEX LED: lights during display of track numbers and or index numbers.

5 Display: functions as on/off, stand-by, pause and error indicator; during play, indications which track is being played or the elapsed time; can also show the total number of tracks or the total playing time of the disc; when programming, it is used to indicate the track numbers to be stored and to display the numbers already stored.

6 START/REPLAY key: for starting play (START) and returning to the beginning of a track (REPLAY).

7 REV SEARCH FWD keys: for fast search to a particular passage (REV backwarts, FWD forwards).

8 PREVIOUS and NEXT keys: for indicating the track and-where applicable-index number you want to begin with, and selecting track numbers when compiling a programme (PREVIOUS from high to low and NEXT from low to high); also for returning to a previous track or index number or moving on to a later one during play.

9 PROGR/REVIEW key: for storing the track numbers of a programme and producing the display of the programme stored.

10 TIME/TRACK key: for switching from track number to playing time indication and vice-versa. Also used for selecting index numbers.

11 PAUSE key: for holding play at the start of a track or passage and for interrupting play.

TECHNICAL SPECIFICATION

- System : Compact Disc Digital Audio system
- Mainsvoltages : 110V, 127V, 220V, 240V ± 10% (to be changed by transformer connections)
  : CD150/01 110V, 127V, 220V,240V adaptable by means of the voltage adapter
  : CD150/07/17 117V (special transformer)
- Mains frequencies : 50,60Hz(no adaption required)
- Power consumption : ≤20W
- Frequency range : 20 Hz ÷ 20 kHz ±0,5 dB
- Output voltage : max. 2 V_{rms}/≥10kOhms
- Output impedance : 200 Ohms
- S/N ratio : ≥96 dB
- Channel separation : ≥90 dB
- Channel difference : ≤0,6 dB
- Total harmonic distortion : ≤0,005% (at -86dB)
- Intermodulation distortion : ≤0,005% (at -86dB)
- Remote control : 6-pole DIN bus for RC5 system (EM2000)
- De-emphasis : 0 or 15/50 µs (switched by the subcode on the disc)
- Dimensions wxhxd : 320 x 86 x 300 mm (tray closed) 320 x 86 x 450 mm (tray opened)
- Weight : approx 3 kg

3 SERVICING HINTS

For servicing hints of the CD mechanism and the servo + preamplifier PCB see Service Manual C.D.M.-2

The set consists of various MOS ICs.
Because in general ICs are very sensitive to overloading and too high voltages, the highest care should be taken during servicing.
See the information enclosed in the packaging of the ICs for further instructions.

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

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, one or more than one seperate disc hold-downs should be used.
The set can function normally then.
Code number of the disc hold-down is 4822 532 60906.

When the tray mechanism has been disassembled the player can be prepared for measurements via interconnection of connector pins 22-2 (⏚) and 22-3 (S in) on the control + display PCB.

SERVICE AIDS

Audio test disc	4822 397 30085
Disc without errors + disc with DO errors, black spots and fingerprints	4822 397 30096
Torx screwdrivers	
Set (straight)	4822 395 50145
Set (square)	4822 395 50132
Disc hold-down	4822 582 60906
7th order filter	4822 395 30204

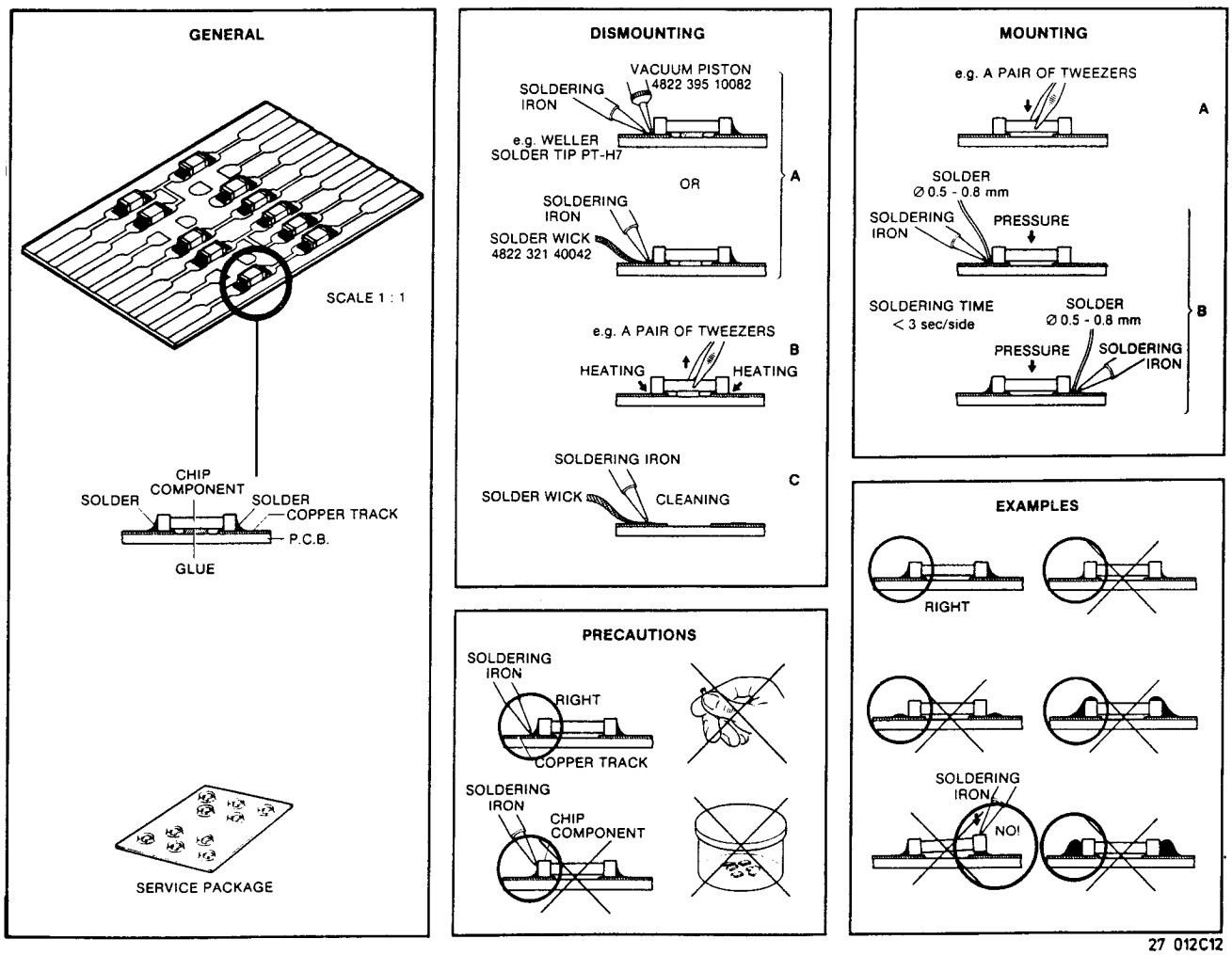

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Fig. 2

DISASSEMBLY OF TOP COVER

- Remove the 4 screws out of side walls of top cover.
- Remove screw at rear of top cover.
- Take top cover cover from set.

REPLACEMENT OF GLASS FUSE 1701

- Remove top cover.
- The glass fuse is situated on the mains switch PCB in the left-hand rear corner of the set.

REPLACEMENT OF TRANSFORMER FUSE

- Remove top cover.
- Remove screening cap that has been placed over transformer.
- Now the transformer fuse is accessible.
- Reapply the screening cap after fuse exchange.

SERVICING OF THE FRONT PANEL

Disassembly of front panel

- Remove top cover.
- Remove the 3 fixing screws at upper side of front panel.
- Now the front panel can be taken off.
- Ensure during mounting that the 3 bosses of the set frame engage with the appropriate holes of the front panel.

Disassembly of control + display PCB

- The control + display PCB can be taken out after removal of the 5 screws.

SERVICING OF THE DECODER + POWER SUPPLY PCB

- Remove top cover.
- Remove the 2 screws on the decoder + power supply PCB.
- Remove the 2 screws at the upper side of the cooling bracket.
- Remove the screw in the backcover for fixation of the 2 CINCH sockets.
- After the connectors have been disconnected the decoder + power suply PCB can be slid forwards and be taken out of the player.

SERVICING OF THE SERVO + PREAMPLIFIER PCB (see Fig. 3)

- Remove top cover.
- Remove the front panel.
- Remove screw 4Nx10 and ring item no. 222 (see exploded view of cabinet) at the rear of the tray mechanism.
- Now the tray mechanism/CDM/servo + pre-ampl. PCB assy can be taken out of the frame and can be placed vertically in the appropriate servicing supports in the frame (see Fig. 3).
- In this way measurements and adjustments can be performed on the servo + preampl. PCB.
- See Service Manual C.D.M.-2 for measurements and adjustments on the servo + preampl. PCB.
- Ensure during mounting of the tray mechanism/CDM/servo + preampl. PCB assy that the suspension rubbers and springs item no. 218 and 219 are present (see exploded view of cabinet).

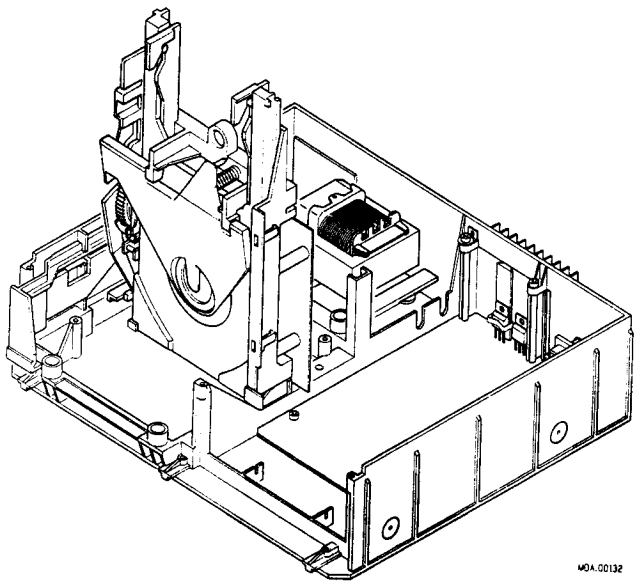


Fig. 3

SERVICING OF THE TRAY MECHANISM/CDM/SERVO + PREAMPL. PCB ASSY

- Disassemble top cover.
- Disassemble front panel.
- Remove screw 4Nx10 and ring item no. 222 (see exploded view cabinet) at the rear of the tray mechanism.
- Now the assy can be taken out of the set after the connectors have been disconnected.
- Remove screw N4x8 and bracket item no. 501 (see exploded view of tray mechanism).
- The CDM + servo + preampl. PCB is kept in place by a boss of the tray mechanism. If this boss, in the region of the foil connector is bent away the CDM + servo + preampl. PCB can be taken out of its support points of the tray mechanism.
- Ensure during mounting of the CDM/servo + preampl. PCB in the tray mechanism that the mechanical brake item no. 123 (see exploded view of tray mechanism) is positioned properly.

SERVICING OF THE TRAY MECHANISM

Disassembly of the tray mechanism

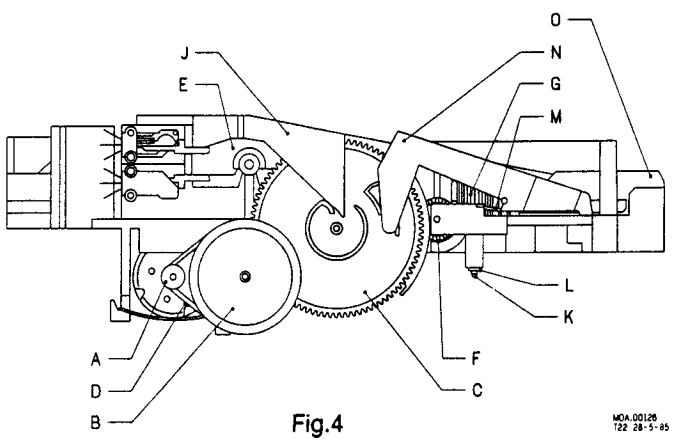


Fig.4

- Remove disc hold-down holder J by disassembling coil spring at rear. Then holder J can be taken out of its hinge points.
- Remove belt D.

- Disassemble pulley B after clamping ring on shaft has been removed.
- Remove lifting bracket N by elevating lug M and sliding bracket out of its shaft guiding.
- Remove gearwheel G by removing shaft K after ring L has been taken away.
- Now disc carrier O can be taken out of the holder by lifting it at the front and sliding it out of the guiding.
- Next cog wheel C, switch bracket E and gearwheel F can be removed successively.
- The tray motor with belt wheel A can be taken out by removing the spring.

Assembly of tray mechanism

- Place disc carrier O in guiding and slide it in place (= disc carrier in position "close").
- Mount gearwheel F.
- Apply switch bracket E. The left-hand boss of the bracket should be positioned between the 2 switches.
- Ensure that the aperture in gearwheel F is vertical (see Fig. 4) and apply cog wheel C in the way described in Fig. 5.

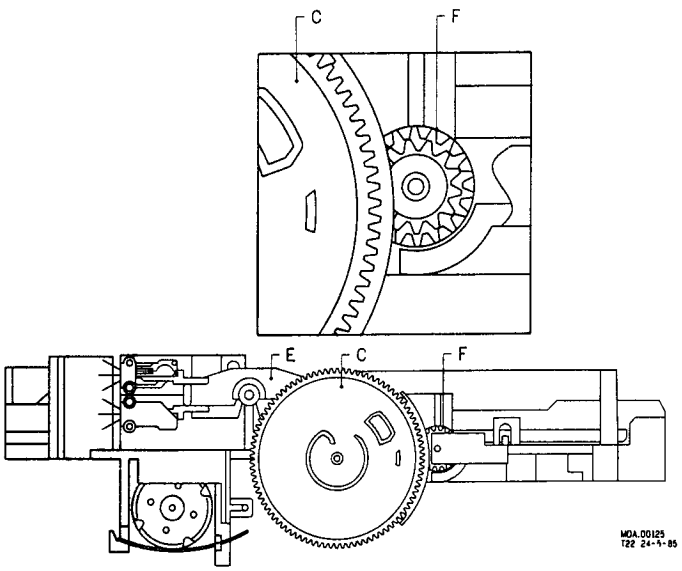


Fig. 5

- Turn cog wheel C counterclockwise till its final position and ensure that the boss of switch bracket E engages with the guiding at the rear of the cog wheel. Turn the cog wheel counterclockwise and clockwise and check if both switches are switched on alternately.
- Turn cog wheel C counterclockwise so that the upper switch is operated and mount pulley B in this position. Next apply the clamping ring.
- Mount gearwheel G and apply shaft K and clamping ring L.
  Ensure that gearwheel G is positioned before shaft and clamping ring are mounted.
- Apply lifting bracket N. Ensure that the fork at the right of the lifting bracket encloses the guide rail of the tray.
- Mount the motor with pully A and apply belt D.
- Next hold-down holder J and the compression spring can be mounted.
- Check after mounting the working of the tray mechanism by turning pulley B counterclockwise and clockwise.

4 ELECTRICAL MEASUREMENTS AND ADJUSTMENTS

For measurements and adjustments on the CD mechanism and the servo + preampl. PCB see the CDM-2 Service Manual.

Specification measurement

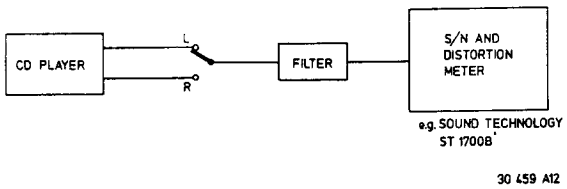


Fig. 6

To measure the specification use can be made of audio test disc 4822 397 30085.
Use 7th order filter 4822 395 30204 (see Fig. 5) to measure:
- Total harmonic distortion (THD)
- Intermodulation distortion
- Signal-to-noise ratio (S/N)

Changing the transformer connections

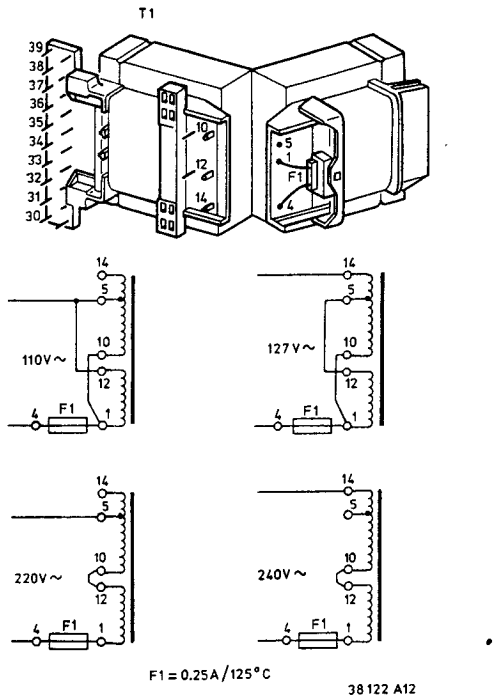


Fig. 7

If the set should be connected to a mains voltage that deviates from the voltage mentioned on the type plate, the transformer connections should be changed, as indicated in Fig. 7.

Attention

In case of a change to 110V or 127V the glass fuse on the mains switch PCB should be changed from 200 mA-T to 400 mA-T.

DETAILED MEASURING METHOD FOR THE DECODER CIRCUIT

HINTS

Test discs

It is important to treat the test discs with great care. The disorders on the discs (black spots, fingerprints, etc.) are exclusive and unambiguously positioned. Damage may cause additional drop-outs etc. rendering the intentional errors no longer exclusive. In that case it will no longer be possible to check e.g. the good working of the track detectors.

Measurements on op-amps

In the electronic circuits op-amps have been used frequently. Some of the applications are amplifiers, filters, inverters and buffers.

In those cases where in one way or the other feedback has been applied the voltage difference at the differential inputs converges to zero. This applies to both DC and AC signals. The cause can be traced to the properties of an ideal op-amp ($Z_i = \infty$, $G = \infty$, $Z_o = 0$). If one input of an op-amp is directly connected to ground it will be virtually impossible to measure at the inverting and the non-inverting inputs. In such cases only the output signal will be measurable.

That is why in most cases the AC voltage at the inputs will not be given. The DC voltages at the inputs are equal.

Stimulation with "0" and "1"

During troubleshooting sometimes certain points should be connect to ground or supply voltage. As a result certain circuits can be brought in a desired state thus shortening the diagnosis time. In a number of cases the related points are outputs of op-amps. These outputs are short-circuit-resistant, i.e. they can be brought to "0" or ground without problems.
The output of an op-amp, however, should never be connected directly to the power supply voltage.

Measurements on microprocessors

Inputs and outputs of microprocessors should **never** be connected directly to the power supply voltage. The inputs and outputs should only be brought to "0" or ground if this is stated explicitly.

Measurements with an oscilloscope

During measurements with an oscilloscope it is recommended to measure with a 1:10 test probe, since a 1:10 probe has a considerably smaller input capacitance than a 1:1 probe.

Selction of ground potential

It is very important to select a ground point that is as close as possible to the test point.

Conditions for injection

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

Continuous burning of the laser

-Bridge capacitor 2174 on the servo + preampl. PCB.
-Connect $\overline{SI}$ (= pin 20 of IC6101 on the servo + preampl. PCB) to ground.
-Switch on the supply voltage.
-Now the laser will burn continuously.

Indication of test points

In the drawings of the diagrams and the PCBs the test points have been indicated by a number (e.g. ◇12) to which the measuring method refers. In the measuring method below, the symbol (◇) has been omitted for the test points indicated.

GENERAL CHECKPOINTS

In the detailed measuring method below a number of general conditions, required for a properly functioning set, will not be mentioned. Before the detailed measuring method is started, these general points should first be checked.
a. Ensure that disc and objective are clean (remove dust, fingerprints, etc.) and work with undamaged discs.
b. Check if all supply voltages are present and if they have the correct values.
c. Check the good working of the two microprocessors by means of their built-in test programme and servicing programme.

Method:
Self-test of the servo µP

With the self-test the following parts of the µP are tested:
-RAM
-ROM
-TIMER
-serial I/O interface
-I/O gates

-Interrupt the I^2C connection on connector 35-2 on the servo + preampl. PCB.
-Unsolder pins 1, 7, 26 and 27 of the servo µP.
-Render pin 2 of the servo µP "low" (ground) and switch on the supply voltage.
-The test starts if pin 2 is rendered "high" again (interrupt the connection to ground).
-If all tests are positive, pin 1 of the servo µP will go low within 1s.

Self-test of the control and display µP

With this self-test the following parts of the µP are tested:
-RAM
-ROM
-TIMER
-serial I/O interface
-I/O gates

-Interrupt the I^2C connection on connector pin 21-4 on the control + display PCB.
-Render pin 2 of the control display µP "low" (ground) and switch on the supply voltage.
-The test starts if pin 2 is rendered "high" again (= interrupt the connection to ground).
-If all tests are positive, pin 1 of the control + display µP will go "low" again within 1s.

Initiation of the servicing programme of the µP

-Servicing position "0"

Simultaneously depress the PREVIOUS, NEXT and TIME/TRACK keys. Keep these three keys depressed while the mains voltage is switched on.

This is the STAND-BY mode, "0" appears on the display.

In this state it is possible to move the arm by means of the SEARCH FORW and SEARCH REV keys with a minimum torque to the outside and the inside resp. This enables a check of the free motion of the arm across the disc.

-Servicing position "1"

From servicing position "0" the player can be brought in servicing position "1" by depressing the NEXT key.

In this state the laser emits light and the objective starts to focus. When the focal point has been reached, "1" appears on the display.

When **no** disc has been inserted the objective goes 16 x to and fro. Then the player reassumes servicing position "0".

As in servicing position "0" the arm can be moved across the diameter of the disc by means of the SEARCH FORW and SEARCH REV keys.

-Servicing position "2"

To be reached by depressing the NEXT key after servicing position "1" has been reached.

The turntable motor starts to run

On the display appears "2".

In preparation of the transition to servicing position "3" the arm is sent to the centre of the disc.

-Servicing position "3"

To be reached by depressing the NEXT key after servicing position "2" has been reached.

The radial control is switched on. The subcode information is ignored. $\overline{MUTE}$ is high so that the music information **is released.**

On the display appears "3".

(Dependent on the lenght of the lead-in track music will be reproduced after approx 1 min.)

In this state it is possible to move the arm by means of the SEARCH FORW and the SEARCH REV keys to the outside and to the inside resp. Now the motion is controlled by the µP and the arm moves by steps of 64 tracks as long as the key is depressed.

If one of the servicing positions 1, 2 or 3 is disturbed (e.g. braking or removing the disc) the player reassumes servicing position "0".

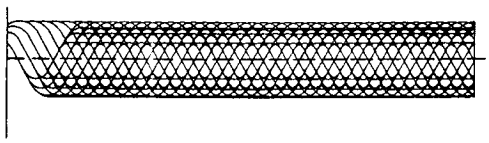
The servicing programme can be left by switching the mains switch (POWER ON/OFF) off and on. (Hardware reset).

-Check the **motor speed.**
See "turntable motor control" in C.D.M.-2 Service Manual, section III.
-Check the **HF signal** on **test point 65 (eye pattern)**
- Insert a disc.
- The HF signal should be present and be stable in the PLAY mode and in:
SERVICING POSITION 3 after the run-in track has been read.

-In SERVICING POSITION 2 and during reading of the lead-in track the RF signal is not stable.

Position of oscilloscope 0,5 µs/DIV

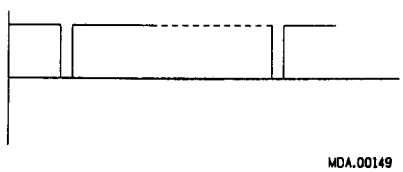
Amplitude ≈ $1{,}5V_{pp}$



-Check the **HFD signal** on **test point 97**

- Insert a disc.
- In the PLAY mode and in SERVICING POSITION 3 the HFD signal is "high"; however, minor pulses may be present and in cause of disorders on the disc.
- In SERVICING POSITION 2 and during playback of track no. 15 of test disc 5A HFD pulses are visible.

Position of the oscilloscope 5ms/DIV



-Check the **$\overline{\text{MUTE}}$ signal** on **test point 98**
- Insert a disc.
- In the PLAY mode or in SERVICING POSITION 3 in the $\overline{\text{MUTE}}$ signal is "high".
- The $\overline{\text{MUTE}}$ signal is "low" in SERVICING POSITIONS 0, 1 and 2, in the STAND-BY (only mains switch depressed) and PAUSE modes and during jumping to a track after command NEXT or PREVIOUS.

-Check the **clock signal** on **test point 71**
- Insert a disc
- In the Stand-by mode (only mains switch depressed) the frequency of the clock signal is 1,88 MHz.
- In the PLAY mode or in SERVICING POSITIONS 2 or 3 the frequency of the clock signal is 4,32 MHz.

Remark: In SERVICING POSITION 2 the clock signal is unstable.

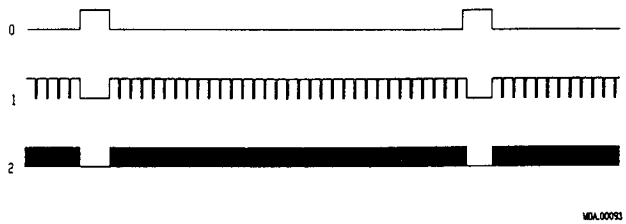
-Check the **timing signals** destined for the **ERCO IC**
- Insert a disc.
- Bring the player in one of the following positions
SERVICING POSITION 2 or 3 or the PLAY mode

Remark: In SERVICING POSITION 2 the timing signals are unstable.

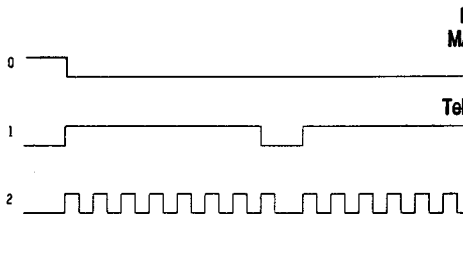
- Trigger an oscilloscope with the **FSDE signal** on test point 72.
- Check signals

FSDE on test point 72
$\overline{\text{SSDE}}$ on test point 76
$\overline{\text{CLDE}}$ on test point 77
and their interrelations

Position of the oscilloscope 20 µs/DIV
0= FSDE, tp 72; 1 = $\overline{\text{SSDE}}$, tp 76; 2 = $\overline{\text{CLDE}}$, tp 77



Position of the oscilloscope 1 µs/DIV
0= FSDE, tp 72; 1 = $\overline{\text{SSDE}}$, tp 76; 2 = $\overline{\text{CLDE}}$, tp 77



Remark: The repetition time of the FSDE signal on tp 72 is in the Stand-by mode and in SERVICING positions 0 and 1 : 312 µs in the PLAY mode and in SERVICING POSITIONS 2 and 3 : 136 µs

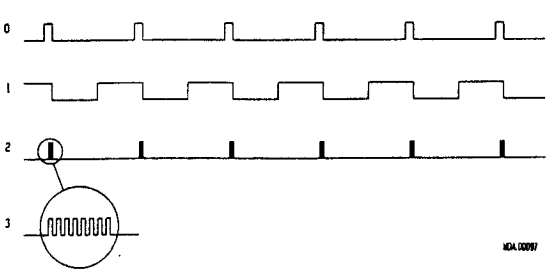
-Check the **DADE signal** on test **point 78**
- Insert a disc.
- In the PLAY mode or in SERVICING POSITION 3 activity should be present at test point 78 after the lead-in track has been read.

-Check the **subcode clock signals**
- Insert a disc.
- Bring the player in one of the following positions:
SERVICING POSITION 3 or PLAY mode
- Trigger an oscilloscope with the FSDE signal on test point 72.
- Check signals

FSDE on test point 72
SWCL/QCLOCK on test point 73
SBCL on test point 74
and measure their interrelations

Positions of the oscilloscope 0,1 ms/DIV

0 =FSDE tp 72
1 =SWCL/QCLOCK tp 73
2 =SBCL tp 74
3 =SBCL tp 74



Remark: The repetition time of the FSDE signal on tp 72 is:
in the STAND-BY mode and in SERVICING POSITIONS 0 and 1:312 µs
in the PLAY mode and in SERVICING POSITIONS 2 and 3 : 136 µs

–Check the **subcode data signals**
•Insert a disc.
•In the PLAY mode or in SERVICING POSITION 3 activity should be present at the following test points

S-DATA test point 75
Q-SYNC test point 95
Q-DATA test point 96

II ERCO IC
–Check the **timing signals coming** from the **DEMOD IC**
•SEE SUB "I DEMOD IC"
'Check the timing signals destined for the ERCO IC'

–Check the **DADE signal** on **test point 78**
•See sub "I DEMOD IC"
'Check the DADE signal on test point 78'

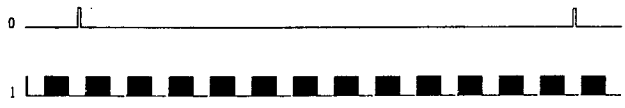
–Check the **CLOX signal** on **test point 94**
•In Stand-by mode (only mains switch depressed) the frequency of the CLOX signal should be 4,2336 MHz.

–Check the **timing signals** destined for the **CIM IC**
•Bring the player in the Stand-by mode (only mains switch depressed).
•Trigger an oscilloscope with the FSEC signal on test point 79.

•Check signals
$\overline{\text{FSEC}}$ on test point 79
$\overline{\text{CLEC}}$ on test point 80
and their interrelations

Position of the oscilloscope 20 µs/DIV

0 = $\overline{\text{FSEC}}$ tp 79
1 = $\overline{\text{CLEC}}$ tp 80



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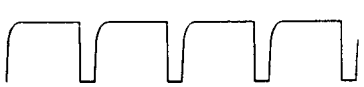
Remark: The repetition time of the FSEC signal is 136 µs.

–Check the $\overline{\text{MUTE}}$ **signal** on **test point 98**
•See sub "I DEMOD IC"
'Check the $\overline{\text{MUTE}}$ signal on test point 98'

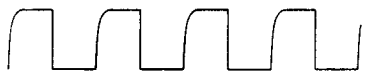
–Check the **DAEC signal** on **test point 81**
•Insert a disc.
•In the PLAY MODE or in SERVICING POSITION 3 activity should be present at test point 81 after reading of the lead-in track.

–Check the **MCES signal** on **test point 66**
•In the Stand-by mode the MCES signal is as indicated in the figure below.
Position of the oscilloscope 50 µs/DIV



Remark:
The repetition time of the MCES signal is 140 µs.

•Insert a disc.
•In the PLAY mode or in SERVICING POSITION 3 the MCES signal is as indicated in the figure below.



MDA.00135

Remark: The repetition time of the MCES signal is 140 µs.
Duty cycle is 50%.
Also see "Measurement of turntabel motor control" in C.D.M.-2 Service Manual, section III.

–Check the **UNEC signal** on **test point 82**
•Insert test disc 5A.
•During playback of track no. 17 UNEC flags should briefly be present at test point 82.
The UNEC flags are also present in case of soft braking of the disc and during fast forward or fast reverse (SEARCH FORW., SEARCH REV.).

Remark: If the UNEC signal at test point 82 remains continuously "high", either the DEMOD IC or the ERCO IC or the RAM IC is defective.

III CIM IC

–Check the **CLOX signal** on test **point 94.**
•See sub "II ERCO IC".
'Check the CLOX signal on test point 94'

–Check the **timing signals coming from the ERCO IC.**
•See sub "II ERCO IC".
'Check the timing signals destined for the CIM IC'

–Check the **DAEC signal on test point 81.**
•See sub "II ERCO IC".
'Check the DAEC signal on test point 81.

–Check the **UNEC signal on test point 82.**
•See sub "II EROC IC".
'Check the UNEC signal on test point 82'

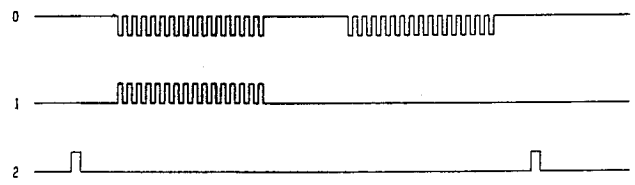
–Check the **timing signals** destined for the **FIL IC.**
•Bring the player in the Stand-by mode (only mains switch depressed).
•Trigger an oscilloscope with the STR1 signal on test point 84.
•Check signals

$\overline{\text{CLEC}}$on test point 80
$\overline{\text{CLCF}}$on test point 85
STR1on test point 84
and their interrelations

Position of the oscilloscope 5 µs/DIV

0 = $\overline{\text{CLEC}}$ tp 80
1 = $\overline{\text{CLCF}}$ tp 85
2 = STR1 tp 84

Remark: The repetition time of the STR1 signal is 22 µs (f=44,1 kHz).



-Check the **DLCF signal** on test **point 86** and the **DRCF signal** on test **point 87**
- Insert a disc.
- In the PLAY mode and in SERVICING POSITION 3 activity should be present at test points 86 and 87 after reading of the lead-in track.

IV FIL IC

-First check all signals round the CIM IC (see "III").

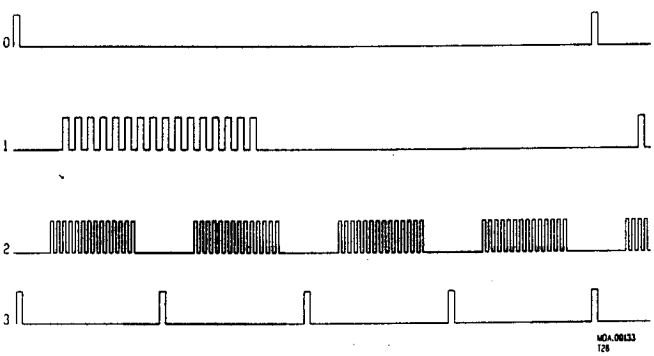
-Check the timing signals
- Bring the player in the Stand-by mode (only the mains switch depressed).
- Trigger an oscilloscope with the STR1 signal at test point 84.
- Check signals

STR1 on test point 84
$\overline{\text{CLCF}}$ on test point 85
$\overline{\text{CLFD}}$ on test point 90
LAT on test point 93

and their interrelations.

Position of the oscilloscope 5µs/DIV

0= STR1 tp 84
1= $\overline{\text{CLCF}}$ tp 85
2= $\overline{\text{CLFD}}$ tp 90
3= LAT tp 93



Remark: The repetition time of the LAT signal is 5,5 µs (f = 176,4 kHz).

-Check the **DLFD signal** on **test point 91** and the **DRFD signal** on **test point 92**
- Insert a disc.
- In the PLAY mode and in SERVICING POSITION 3 activity should be present at test point 91 and 92 after reading of the lead-in track.

V DAC IC

-First check all signals round the FIL IC, see IV.

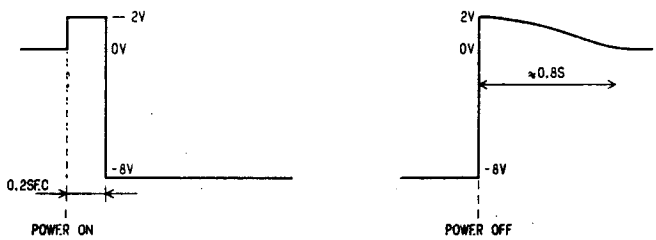
-Check the output of the OP-AMP after the DAC IC.
- Insert a disc.
- In the PLAY mode and in SERVICING POSITION 3 the analog (=music) signal should be present on the output of the OP-AMP after reading of the run-in track.

VI DEEMPH CIRCUIT

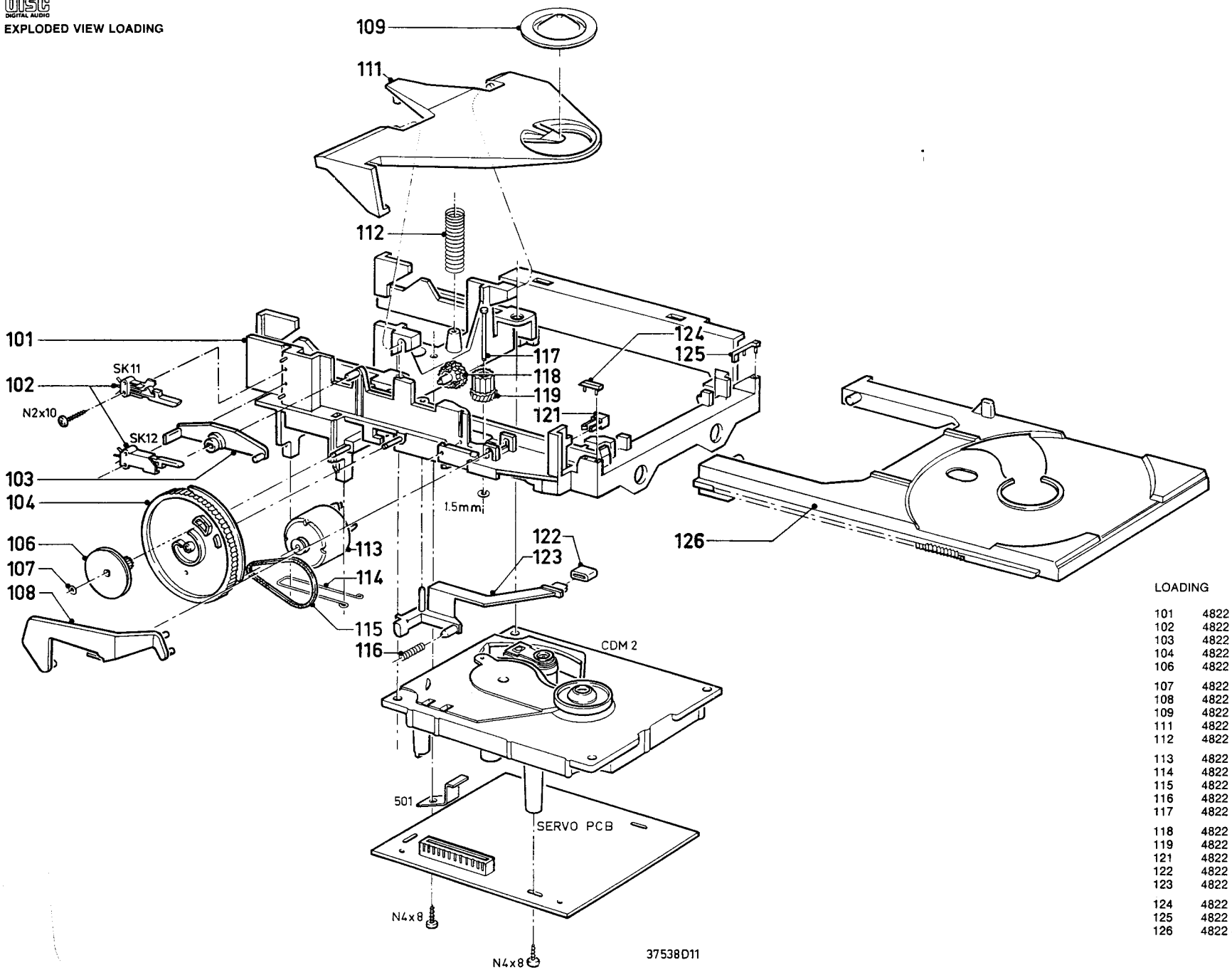
- Insert test disc 5.
- During playback of track no. 14 (recorded without PRE-EMPH) the $\overline{\text{DEEMPH}}$ signal on connector 43-2 should be 'high'.
- During playback of track no. 15 (recorded with PRE-EMPH) the $\overline{\text{DEEMPH}}$ signal on connector 43-2 should be 'low'.
- During playback of track no. 14 the analog signal should be present at the source of 6320 (to be measured at resistor 3354, tp 67) and 6321 (to be measured at resistor 3355, tp 68).
- During playback of track no. 15 the analog signal should be 0 V at the source of 6320 (to be measured at resistor 3354) and 6321 (to be measured at resistor 3355).

VII KILL CICUIT

-During switching on and off of the mains voltage the signal on the collector of 6327 (to be measured on a jumper, tp 69) should be as indicated in the figure below.



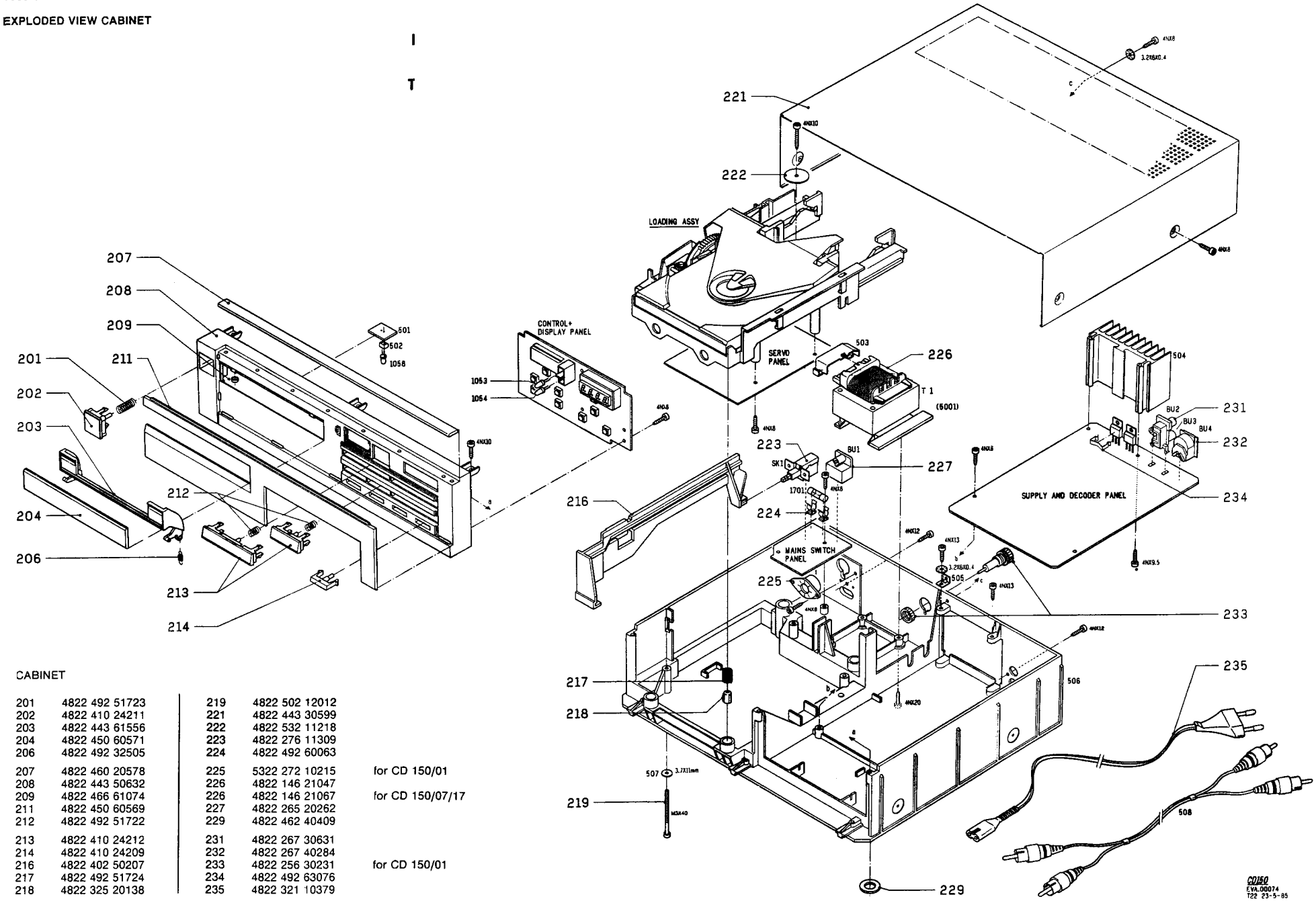
EXPLODED VIEW LOADING



LOADING

101	4822 464 50401
102	4822 276 11277
103	4822 402 50208
104	4822 522 31905
106	4822 528 81046
107	4822 532 50262
108	4822 402 40045
109	4822 402 20096
111	4822 459 80268
112	4822 492 51725
113	4822 361 20576
114	4822 492 63218
115	4822 358 20116
116	4822 492 51726
117	4822 535 91857
118	4822 522 31907
119	4822 522 31908
121	4822 462 71375
122	4822 466 40176
123	4822 402 30143
124	4822 402 60928
125	4822 402 60927
126	4822 443 50633

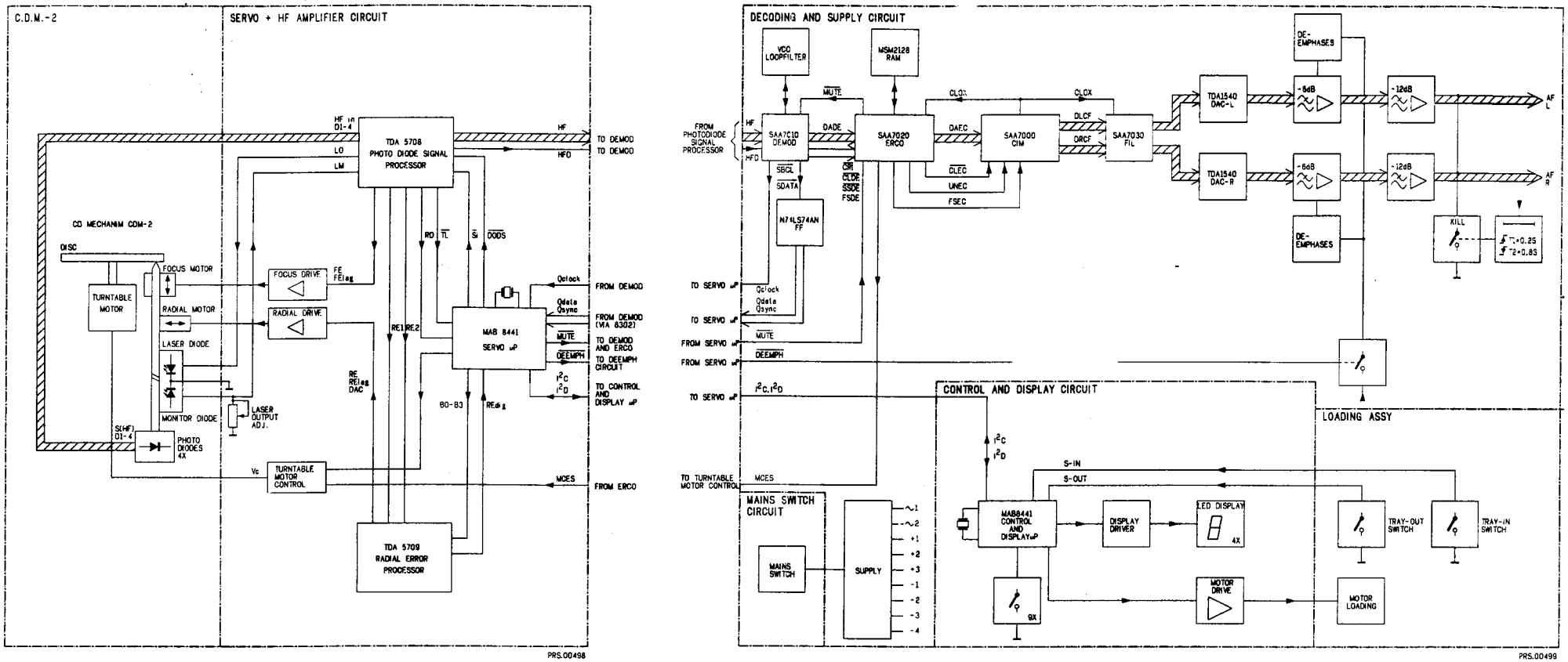
EXPLODED VIEW CABINET



CABINET

201	4822 492 51723		219	4822 502 12012	
202	4822 410 24211		221	4822 443 30599	
203	4822 443 61556		222	4822 532 11218	
204	4822 450 60571		223	4822 276 11309	
206	4822 492 32505		224	4822 492 60063	
207	4822 460 20578		225	5322 272 10215	for CD 150/01
208	4822 443 50632		226	4822 146 21047	
209	4822 466 61074		226	4822 146 21067	for CD 150/07/17
211	4822 450 60569		227	4822 265 20262	
212	4822 492 51722		229	4822 462 40409	
213	4822 410 24212		231	4822 267 30631	
214	4822 410 24209		232	4822 267 40284	
216	4822 402 50207		233	4822 256 30231	for CD 150/01
217	4822 492 51724		234	4822 492 63076	
218	4822 325 20138		235	4822 321 10379	

BLOCK DIAGRAM



PRS.00498

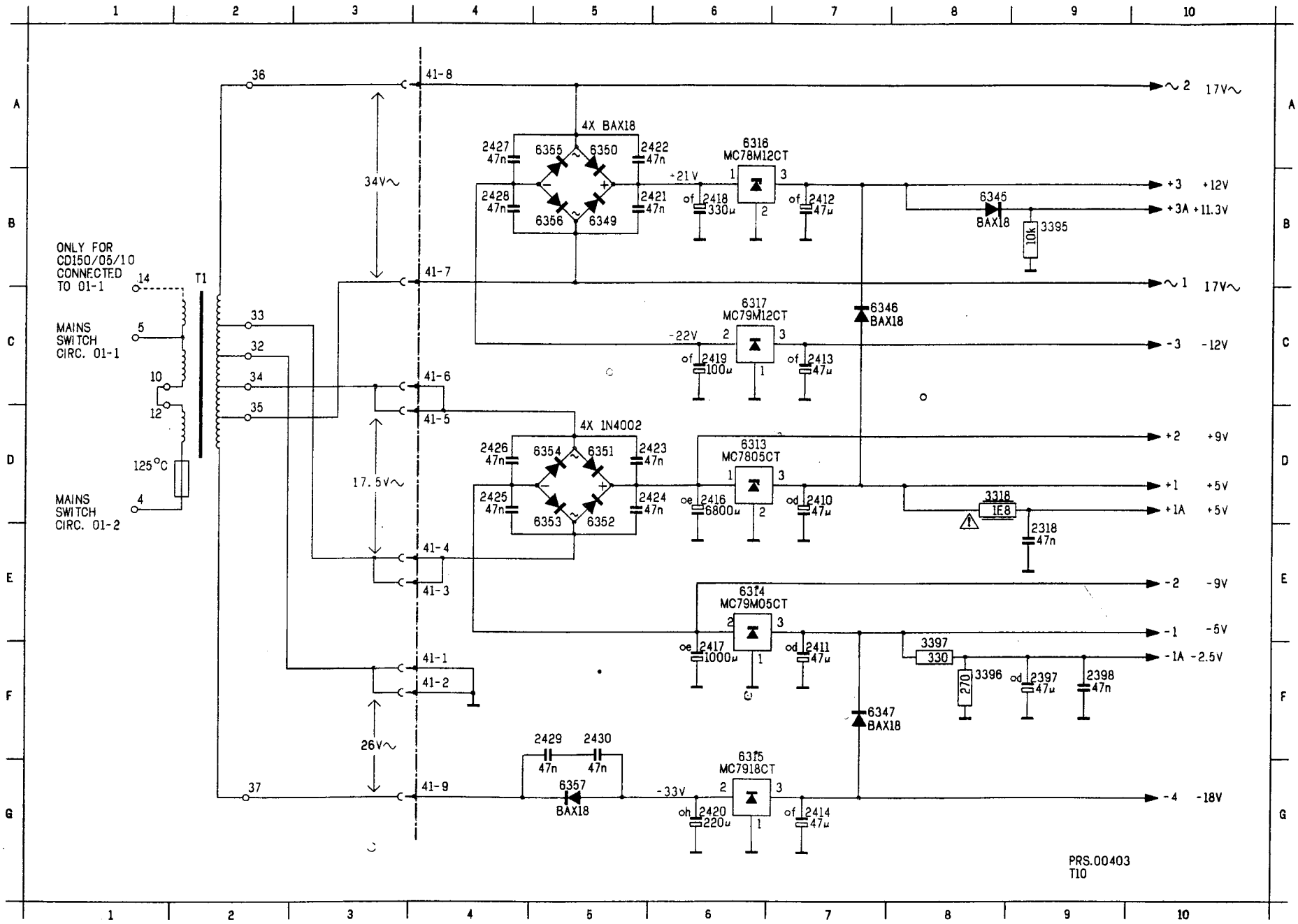
PRS.00499

B0-B3	-	Control bits for radial circuit
DAC	-	Current output for track jumping (Digital to Analogue Converted)
$\overline{\text{DEEMPH}}$	-	Deemphasis
$\overline{\text{DODS}}$	-	Drop out detector supression
D1÷4	-	Photodiode currents
FE	-	Focus error signal
FE lag	-	Focus error signal for LAG network
HF	-	HF output for DEMOD
HFD	-	HF detector output for DEMOD
HF-in	-	HF current input
I²C	-	Clock signal servo-control µP
I²D	-	Data signal servo-control µP
LM	-	Laser monitor diode input
LO	-	Laser amplifier current output
MCES	-	Motor control from ERCO to servo circuit
$\overline{\text{MUTE}}$	-	Mute signal

Q CLOCK	-	Subcode clock input for servo µP
Q DATA	-	Subcode data input for servo µP
Q SYNC	-	Subcode synchronization input for servo µP
RE	-	Radial error signal (amplified RE_2-RE_1 currents)
RE1	-	Radial error signal 1 (summation of amplified currents D_3 and D_4
RE2	-	Radial error signal 2 (summation of amplified currents D_1 and D_2
RE dig	-	Radial error digital
RE lag	-	Radial error signal for LAG network
RD	-	Ready signal, starting up procedure finished
$\overline{\text{SI}}$	-	On/off control for laser supply and focus circuit
$\overline{\text{TL}}$	-	Track loss signal
Vc	-	Control voltage for turntable motor

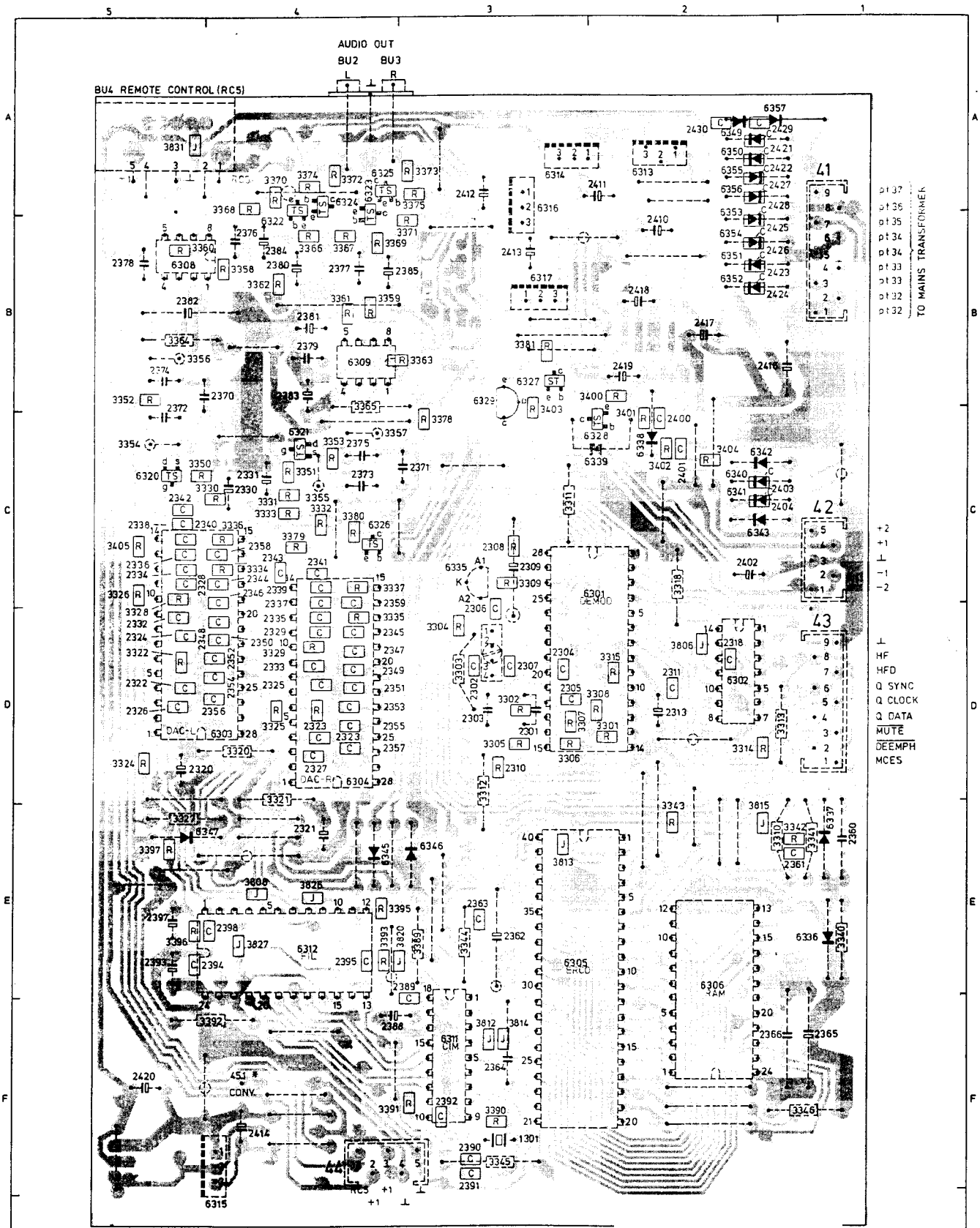
$\overline{\text{CLDE}}$	-	Clock from DEMOD to ERCO
$\overline{\text{CLEC}}$	-	Clock from ERCO to CIM
CLOX	-	Clock from CIM (SystemClock)
$\overline{\text{CRI}}$	-	Counter reset inhibit
DADE	-	Data from DEMOD to ERCO
DAEC	-	Data from ERCO to CIM
$\overline{\text{DEEMPH}}$	-	Deemphasis
DLCF	-	Data left from CIM to FIL
DRCF	-	Data right from CIM to FIL
FSDE	-	Frame sync. from DEMOD to ERCO
FSEC	-	Frame sync. from ERCO to CIM
HF	-	HF input for DEMOD
HFD	-	HF detector for DEMOD
I²C	-	Clock signal servo-control µP
I²D	-	Data signal servo-control µP
MCES	-	Motor control from ERCO to servo
$\overline{\text{MUTE}}$	-	Mute signal
Q CLOCK	-	Subcode clock signal
Q DATA	-	Subcode data dignal
Q SYNC	-	Subcode synchronization signal
SBCL	-	Subcode bit clock
S DATA	-	Subcode data
S-IN	-	Tray in
S-OUT	-	Tray out
UNEC		Unreliable data flag from ERCO to CIM

SUPPLY CIRCUIT



2318	E	9
2397	F	9
2398	F	9
2410	D	7
2411	F	7
2412	B	7
2413	C	7
2414	G	7
2416	D	6
2417	F	6
2418	B	6
2419	C	6
2420	G	6
2421	B	6
2422	A	6
2423	D	6
2424	D	6
2425	D	4
2426	D	4
2427	A	4
2428	B	4
2429	F	5
2430	F	5
3318	D	8
3395	B	9
3396	F	8
3397	F	8
6345	B	8
6346	C	7
6347	F	7
6349	B	5
6350	A	5
6351	D	5
6352	D	5
6353	D	5
6354	D	5
6355	A	5
6356	B	5
6357	G	5
T1	B	2

SUPPLY + DECODER PCB



⊕⊖ = CONNECTED TO COPPERFOIL ON COMPONENT SIDE OF THE PCB

C = CHIP CAPACITOR J = CHIP JUMPER

R = CHIP RESISTOR TS = CHIP TRANSISTOR

* FOR /00X AND /05X ONLY (CONVIENCE FEATURE)

SUPPLY + DECODER
For non active chipcomponents see seperate list

SAA7000	CIM	4822 209 10375
SAA7010	DEMOD	4822 209 10857
SAA7020	ERCO	4822 209 10377
SAA7030	FIL	4822 209 10378
TDA1540	DAC	4822 209 81453
MSM2128-20RS	RAM	4822 209 10379
LM833N		4822 209 83163
SN74LS74AN		4822 209 80782
MC7805CT		4822 209 80891
MC78M12CT		5322 209 86176
MC79M05CT		4822 209 83164
MC7912CT		4822 209 82065
MC7918CT		4822 209 83165

BC548B		4822 130 40937
BC818/25 ©		4822 130 42696
BC818/25R ©		4822 130 42697
BC848B ©		5322 130 41982
BC858BR ©		4822 130 42134
BC858CR ©		4822 130 42634
BSR56 ©		4822 130 42633

IN4002		5322 130 30684
IN4148		4822 130 30621
BAX18		4822 130 34121
HZ4B2/C3V9		4822 130 32843
BB212		4822 130 31129

1301	X-tal 4,2336 MHz	4822 242 70663

5301		4822 156 21155

2301,2303	22nF-2%	4822 121 50609
2370,2371	5,1nF-2%	4822 121 50976
2372,2373	1,5nF-2%	4822 121 50432
2374÷2377	2,2nF-2%	4822 121 50841
2378,2379	1,2nF-2%	5322 121 54135

3311,3318,3320 3321,3346,3389	1,8 Ω-NFR25	4822 111 30489
3344,3392	1 Ω-NFR25	4822 111 30483

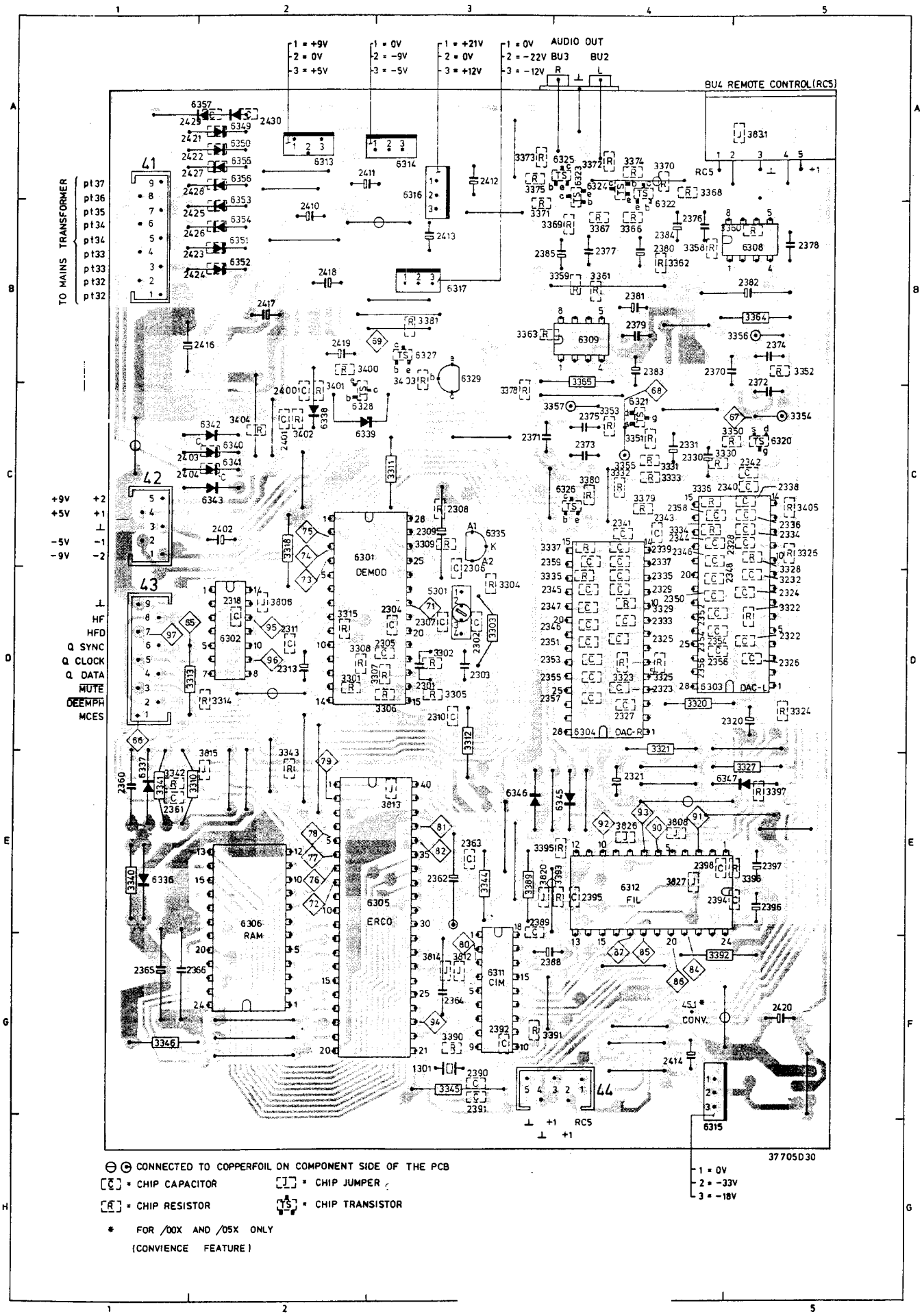
BU2,3	CINCH-socket	4822 267 30631
BU4	DIN-socket	4822 267 40284

Miscellaneous

Spring clip		4822 492 63076
Transformer fuse		4822 252 20007
Mains transf.		4822 146 21047
Mains transf.	(only for 07/17)	4822 146 21067

1301	F3	2305	D3	2310	D3	2321	E4	2326	D5	2331	C4	2336	C5	2341	C4	2346	C4	2352	D4
2301	D3	2306	D3	2311	D2	2322	D5	2327	D4	2332	D5	2337	C4	2342	C5	2347	D4	2353	D4
2302	D3	2307	D3	2313	D2	2323	D4	2328	C5	2333	D4	2338	C5	2343	C4	2348	D4	2354	D4
2303	D3	2308	C3	2318	D2	2324	D5	2329	D4	2334	C5	2339	C4	2344	C4	2350	D4	2355	D4
2304	D3	2309	C3	2320	D5	2325	D4	2330	C4	2335	D4	2340	C5	2345	D4	2351	D4	2356	D4
2357	D4	2362	E3	2370	B5	2375	C4	2380	B4	2385	B4	2392	F3	2400	C2	2410	B2	2416	B1
2358	C4	2363	E3	2371	C3	2376	B4	2381	B4	2388	F3	2394	E5	2401	C2	2411	A2	2417	B2
2359	C4	2364	F3	2372	C5	2377	B4	2382	B5	2389	E4	2395	E4	2402	C2	2412	A3	2418	B2
2360	E1	2365	F1	2373	C4	2378	B5	2383	B4	2390	F3	2396	E5	2403	C2	2413	B3	2419	B2
2361	E1	2366	F1	2374	B5	2379	B4	2384	B4	2391	F3	2397	E5	2404	C2	2414	F4	2420	F5
2421	A2	2426	B2	3232	D5	3305	D3	3310	E1	3315	D2	3323	D4	3329	D4	3334	C4	3341	E1
2422	A2	2427	A2	3301	D2	3306	D3	3311	C3	3318	C2	3324	D5	3330	C4	3335	D4	3342	E1
2423	B2	2428	A2	3302	D3	3307	D3	3312	D3	3320	D4	3325	D4	3331	C4	3336	C4	3343	E2
2424	B2	2429	A1	3303	D3	3308	D2	3313	D1	3321	D4	3326	C5	3332	C4	3337	C4	3344	E3
2425	B2	2430	A2	3304	D3	3309	C3	3314	D2	3322	D5	3328	C5	3333	C4	3340	E1	3345	F3
3346	F1	3354	C5	3360	B5	3365	B4	3370	A4	3375	A3	3380	C4	3391	F3	3400	B2	3405	C5
3350	C5	3355	C4	3361	B4	3366	B4	3371	B3	3376	B3	3381	B3	3392	F4	3401	C2	3806	D2
3351	C4	3356	B5	3362	B4	3367	B4	3372	A4	3377	B3	3385	B4	3393	E4	3402	C2	3808	E4
3352	B5	3357	C4	3363	B3	3368	A4	3373	A3	3378	C3	3389	E3	3395	E4	3403	B3	3812	F3
3353	C4	3359	B4	3364	B5	3369	B4	3374	A4	3379	C4	3390	F3	3396	E5	3404	C2	3813	E3
3814	F3	3831	A5	6304	D4	6310	B3	6316	A3	6323	A4	6328	C2	6338	C2	6343	C2	6351	B2
3815	E2	5301	D3	6305	E3	6311	F3	6317	B3	6324	A4	6329	B3	6339	C2	6345	E4	6352	B2
3820	E3	6301	C2	6306	E2	6312	E4	6320	C5	6325	A4	6335	C3	6340	C2	6346	E3	6353	B2
3826	E4	6302	D2	6308	B5	6313	A2	6321	C4	6326	C4	6336	E1	6341	C2	6349	A2	6354	B2
3827	E4	6303	D4	6309	B4	6314	A3	6322	A4	6327	B3	6337	E1	6342	C2	6350	A2	6355	A2
6356	A2																		
6357	A2																		

SUPPLY + DECODER PCB



SUPPLY + DECODER
For non active chipcomponents see seperate list

SAA7000	CIM	4822 209 10375
SAA7010	DEMOD	4822 209 10857
SAA7020	ERCO	4822 209 10377
SAA7030	FIL	4822 209 10378
TDA1540	DAC	4822 209 81453
MSM2128-20RS	RAM	4822 209 10379
LM833N		4822 209 83163
SN74LS74AN		4822 209 80782
MC7805CT		4822 209 80891
MC78M12CT		5322 209 86176
MC79M05CT		4822 209 83164
MC7912CT		4822 209 82065
MC7918CT		4822 209 83165

BC548B		4822 130 40937
BC818/25 ©		4822 130 42696
BC818/25R ©		4822 130 42697
BC848B ©		5322 130 41982
BC858BR ©		4822 130 42134
BC858CR ©		4822 130 42634
BSR56 ©		4822 130 42633

IN4002		5322 130 30684
IN4148		4822 130 30621
BAX18		4822 130 34121
HZ4B2/C3V9		4822 130 32843
BB212		4822 130 31129

1301	X-tal 4,2336 MHz	4822 242 70663

5301		4822 156 21155

2301,2303	22nF-2%	4822 121 50609
2370,2371	5,1nF-2%	4822 121 50976
2372,2373	1,5nF-2%	4822 121 50432
2374÷2377	2,2nF-2%	4822 121 50841
2378,2379	1,2nF-2%	5322 121 54135

3311,3318,3320 3321,3346,3389	1,8 Ω-NFR25	4822 111 30489
3344,3392	1 Ω-NFR25	4822 111 30483

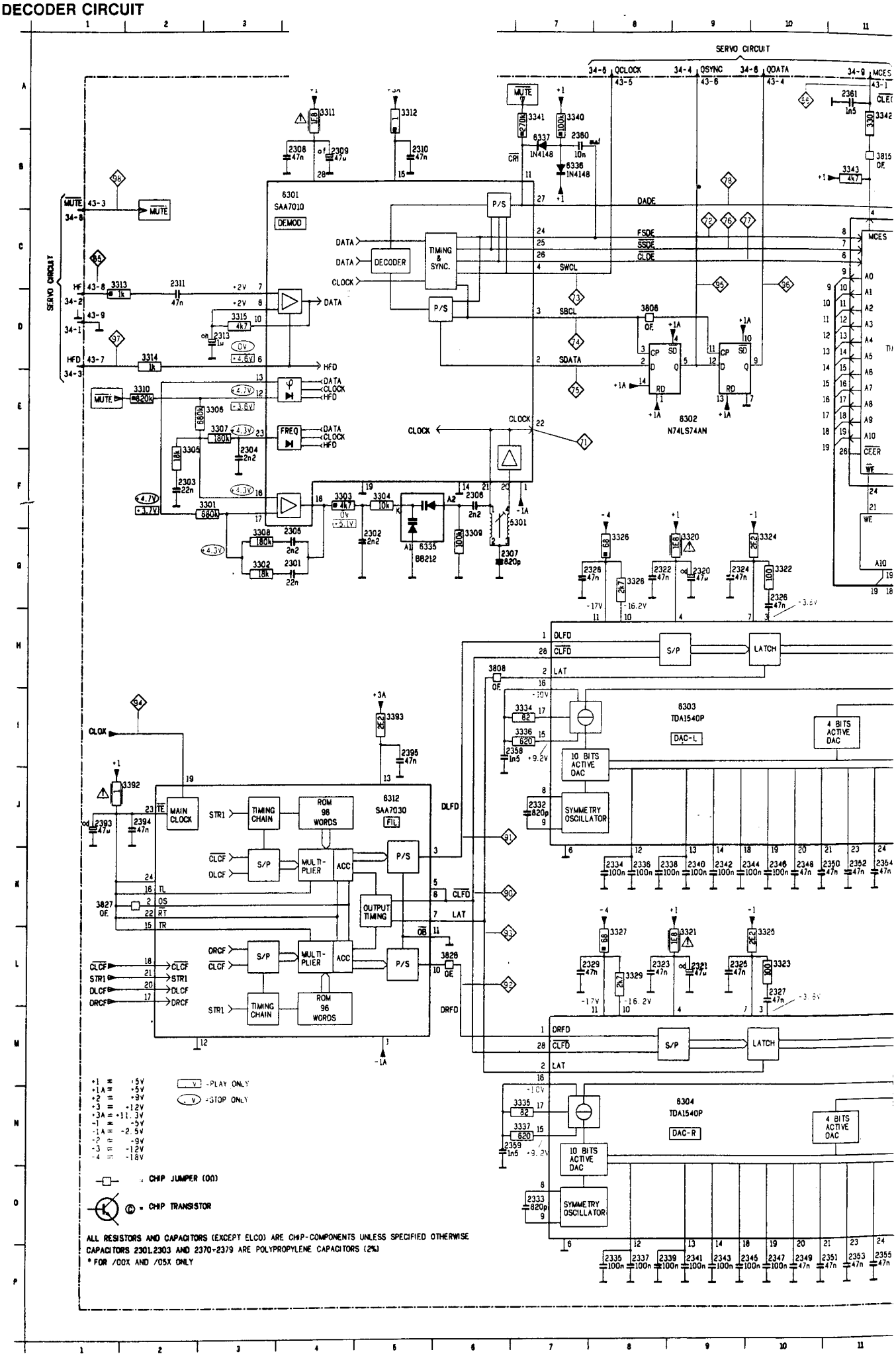
BU2,3	CINCH-socket	4822 267 30631
BU4	DIN-socket	4822 267 40284

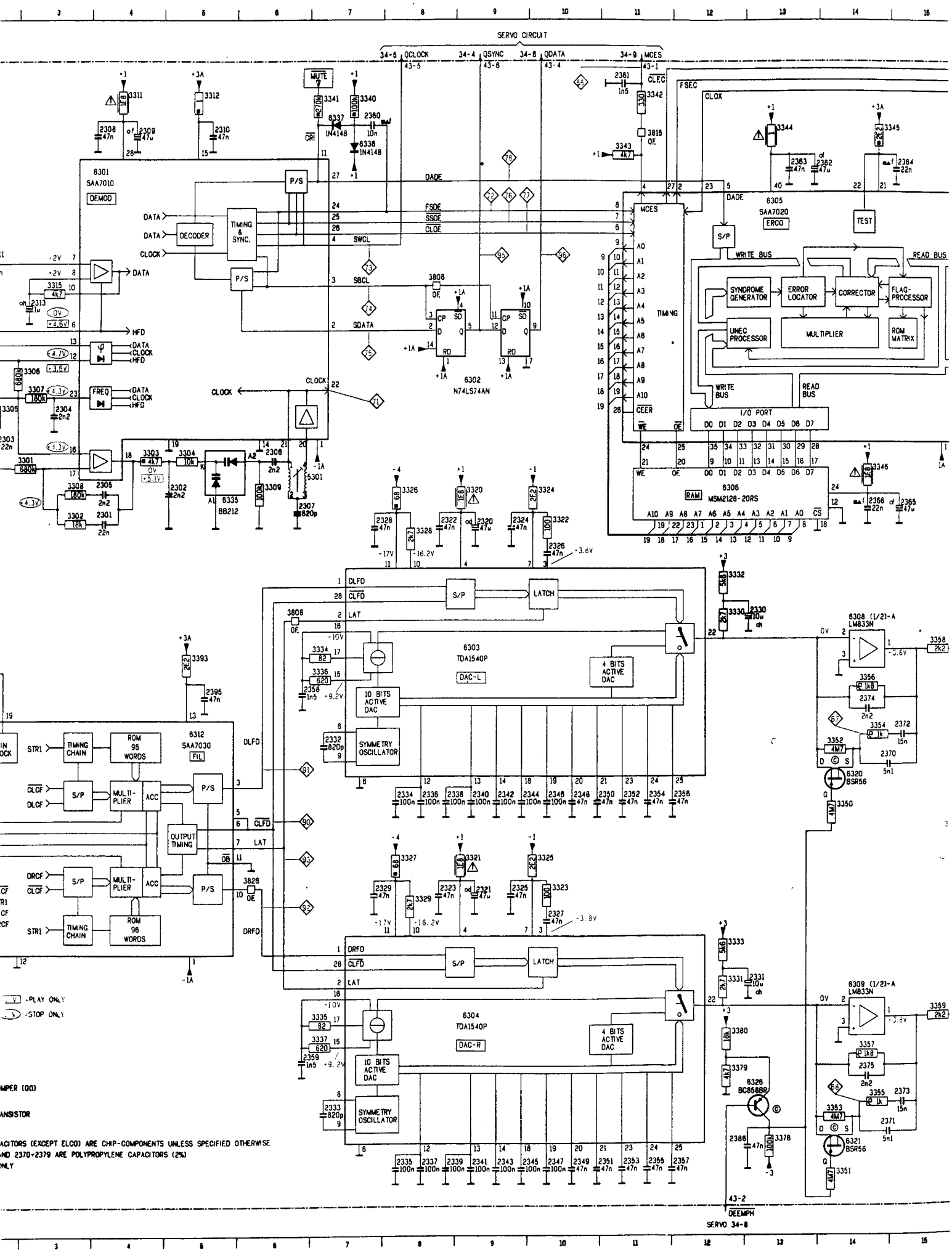
Miscellaneous

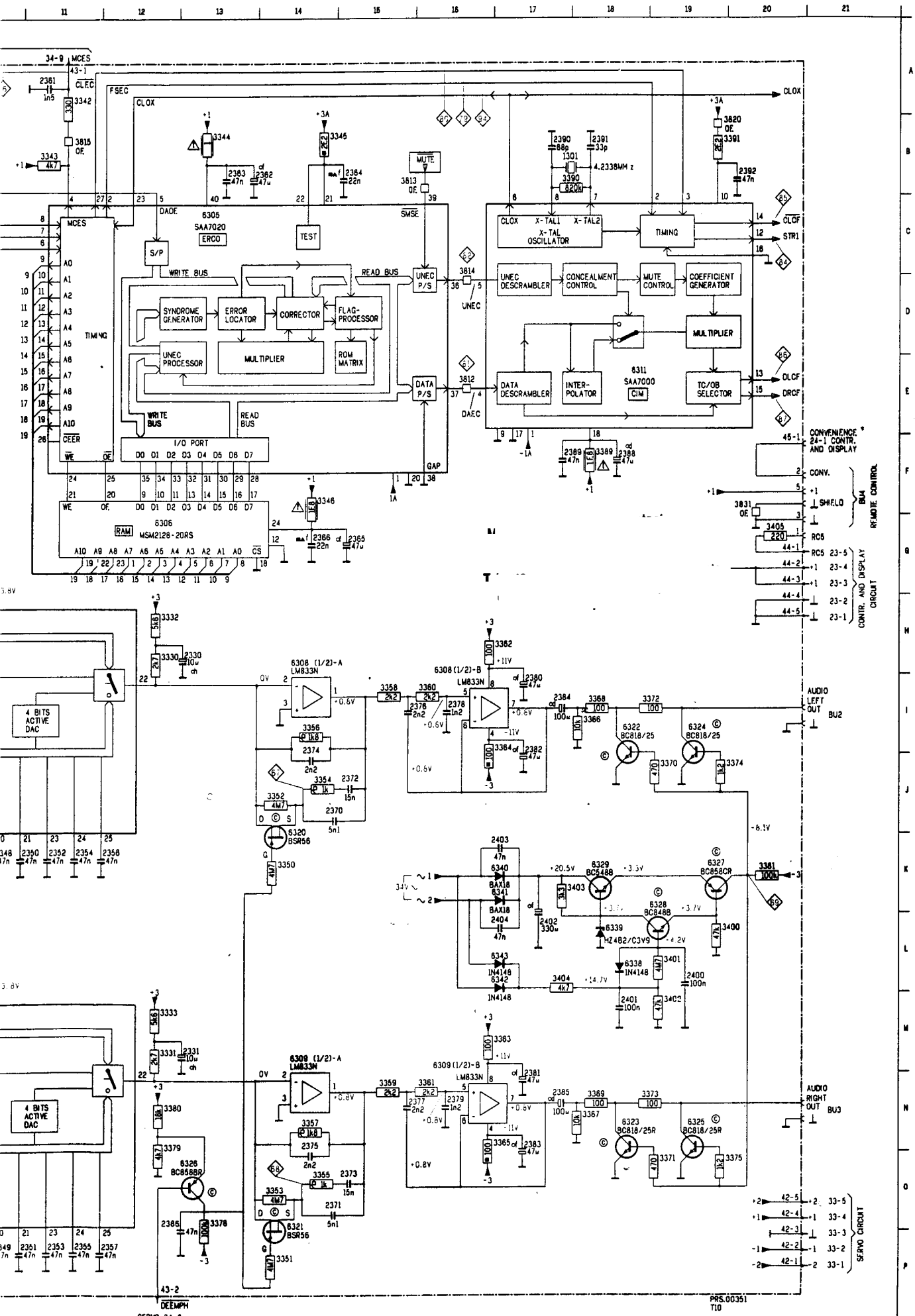
Spring clip		4822 492 63076
Transformer fuse		4822 252 20007
Mains transf.		4822 146 21047
Mains transf.	(only for 07/17)	4822 146 21067

1301	F3	2305	D3	2310	D3	2321	E4	2326	D5	2331	C4	2336	C5	2341	C4	2346	C4	2352	D4
2301	D3	2306	D3	2311	D2	2322	D5	2327	D4	2332	D5	2337	C4	2342	C5	2347	D4	2353	D4
2302	D3	2307	D3	2313	D2	2323	D4	2328	C5	2333	D4	2338	C5	2343	C4	2348	D4	2354	D4
2303	D3	2308	C3	2318	D2	2324	D5	2329	D4	2334	C5	2339	C4	2344	C4	2350	D4	2355	D4
2304	D3	2309	C3	2320	D5	2325	D4	2330	C4	2335	D4	2340	C5	2345	D4	2351	D4	2356	D4
2357	D4	2362	E3	2370	B5	2375	C4	2380	B4	2385	B4	2392	F3	2400	C2	2410	B2	2416	B1
2358	C4	2363	E3	2371	C3	2376	B4	2381	B4	2388	F3	2394	E5	2401	C2	2411	A2	2417	B2
2359	C4	2364	F3	2372	C5	2377	B4	2382	B5	2389	E4	2395	E4	2402	C2	2412	A3	2418	B2
2360	E1	2365	F1	2373	C4	2378	B5	2383	B4	2390	F3	2396	E5	2403	C2	2413	B3	2419	B2
2361	E1	2366	F1	2374	B5	2379	B4	2384	B4	2391	F3	2397	E5	2404	C2	2414	F4	2420	F5
2421	A2	2426	B2	3232	D5	3305	D3	3310	E1	3315	D2	3323	D4	3329	D4	3334	C4	3341	E1
2422	A2	2427	A2	3301	D2	3306	D3	3311	C3	3318	C2	3324	D5	3330	C4	3335	D4	3342	E1
2423	B2	2428	A2	3302	D3	3307	D3	3312	D3	3320	D4	3325	D4	3331	C4	3336	C4	3343	E2
2424	B2	2429	A1	3303	D3	3308	D2	3313	D1	3321	D4	3326	C5	3332	C4	3337	C4	3344	E3
2425	B2	2430	A2	3304	D3	3309	C3	3314	D2	3322	D5	3328	C5	3333	C4	3340	E1	3345	F3
3346	F1	3354	C5	3360	B5	3365	B4	3370	A4	3375	A3	3380	C4	3391	F3	3400	B2	3405	C5
3350	C5	3355	C4	3361	B4	3366	B4	3371	B3	3376	B3	3381	B3	3392	F4	3401	C2	3806	D2
3351	C4	3356	B5	3362	B4	3367	B4	3372	A4	3377	B3	3385	B4	3393	E4	3402	C2	3808	E4
3352	B5	3357	C4	3363	B3	3368	A4	3373	A3	3378	C3	3389	E3	3395	E4	3403	B3	3812	F3
3353	C4	3359	B4	3364	B5	3369	B4	3374	A4	3379	C4	3390	F3	3396	E5	3404	C2	3813	E3
3814	F3	3831	A5	6304	D4	6310	B3	6316	A3	6323	A4	6328	C2	6338	C2	6343	C2	6351	B2
3815	E2	5301	D3	6305	E3	6311	F3	6317	B3	6324	A4	6329	B3	6339	C2	6345	E4	6352	B2
3820	E3	6301	C2	6306	E2	6312	E4	6320	C5	6325	A4	6335	C3	6340	C2	6346	E3	6353	B2
3826	E4	6302	D2	6308	B5	6313	A2	6321	C4	6326	C4	6336	E1	6341	C2	6349	A2	6354	B2
3827	E4	6303	D4	6309	B4	6314	A3	6322	A4	6327	B3	6337	E1	6342	C2	6350	A2	6355	A2
6356	A2																		
6357	A2																		

DECODER CIRCUIT

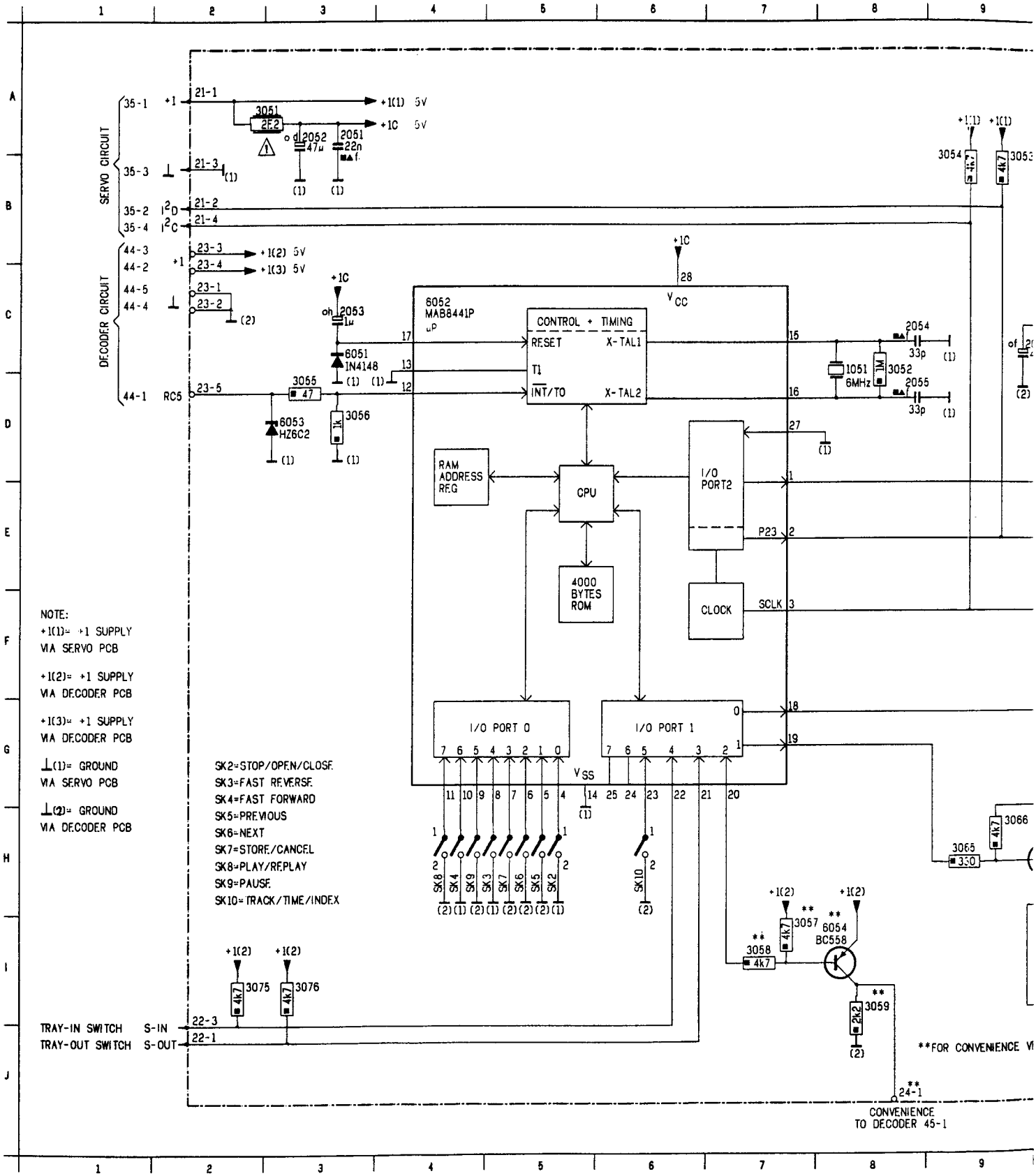


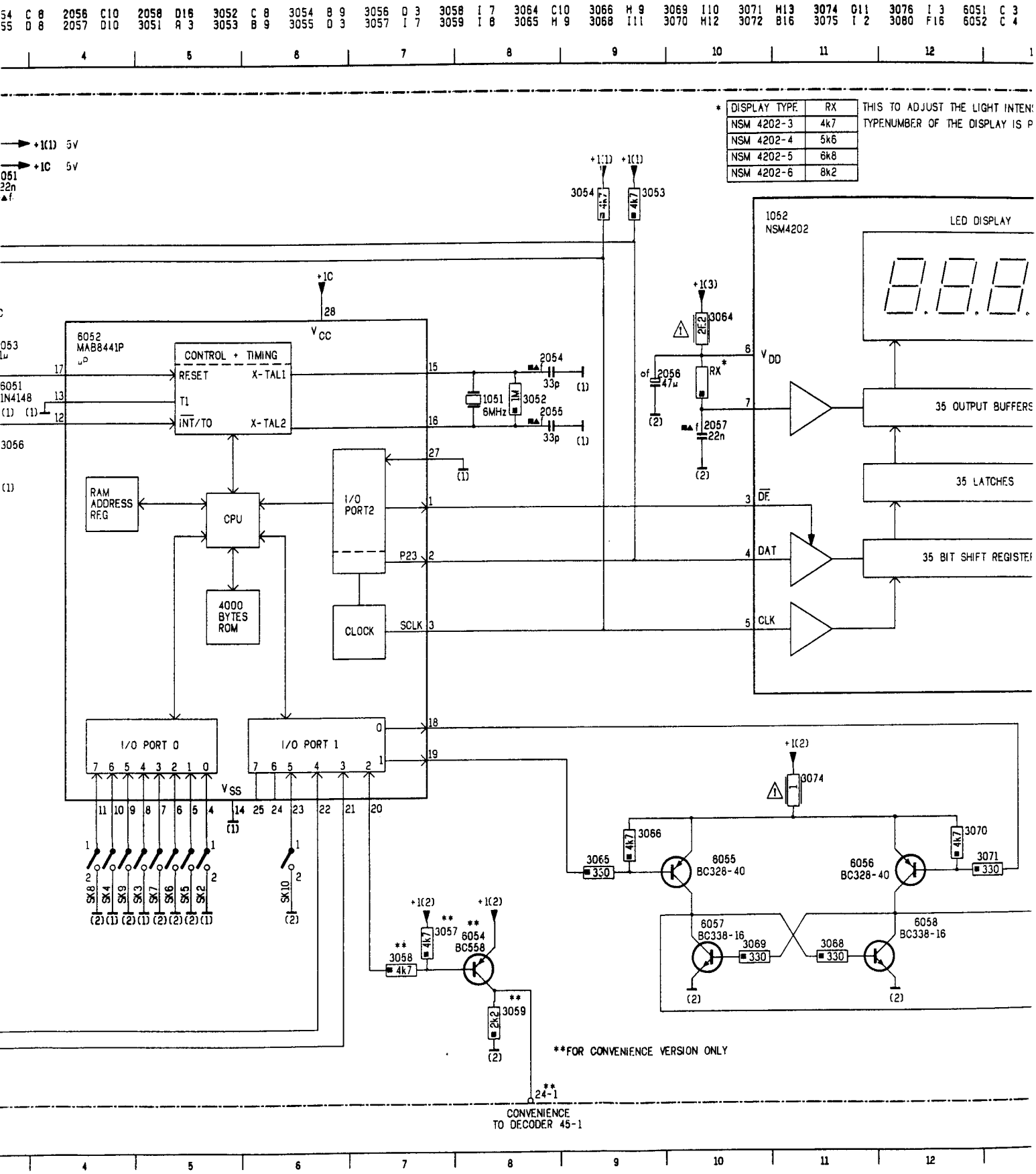

SERVO CIRCUIT
QCLOCK
QSYNC
QDATA
MCES
6301
SAA7010
DEMOD
DECODER
TIMING & SYNC.
P/S
DATA
CLOCK
HFD
FSDE
SSDE
CLDE
SWCL
SBCL
SDATA
FREQ
6302
N74LS74AN
CLEC
FSEC
CLOX
DADE
6305
SAA7020
ERCO
TEST
S/P
WRITE BUS
READ BUS
SYNDROME GENERATOR
ERROR LOCATOR
CORRECTOR
FLAG-PROCESSOR
UNEC PROCESSOR
MULTIPLIER
ROM MATRIX
TIMING
I/O PORT
CEER
6306
MSM2128-20RS
RAM
MUTE
6303
TDA1540P
DAC-L
4 BITS ACTIVE DAC
10 BITS ACTIVE DAC
SYMMETRY OSCILLATOR
LATCH
DLFD
CLFD
LAT
6304
TDA1540P
DAC-R
DRFD
6312
SAA7030
FIL
TIMING CHAIN
ROM 96 WORDS
MULTI-PLIER
ACC
OUTPUT TIMING
STR1
DLCF
DRCF
6308 (1/2)-A
LM833N
6309 (1/2)-A
LM833N
6320
BSR56
6321
BSR56
6326
BC858B
DEEMPH
SERVO 34-8
-PLAY ONLY
-STOP ONLY
ACITORS (EXCEPT ELCO) ARE CHIP-COMPONENTS UNLESS SPECIFIED OTHERWISE
ND 2370÷2379 ARE POLYPROPYLENE CAPACITORS (2%)
NLY
MPER (00)
ANSISTOR



6311	E18	3378	O13
1301	B18	3379	N12
2301	G 4	3380	N12
2302	G 5	3381	K20
2303	F 2	3389	F18
2304	F 3	3390	B17
2305	G 4	3391	B20
2306	F 5	3392	J 2
2307	G 6	3393	I 5
2308	B 4	3400	L20
2309	B 4	3401	L19
2310	B 5	3402	M19
2311	C 2	3403	K18
2313	D 3	3404	L17
2320	G 9	3405	G20
2321	L 9	3806	D 8
2322	G 8	3808	H 6
2323	L 8	3812	E16
2324	G 9	3813	B15
2325	L 9	3814	C16
2326	G10	3815	B11
2327	L10	3820	B20
2328	G 8	3826	L 6
2329	L 8	3827	K 1
2330	H13	3831	F20
2331	M13	5301	F 7
2332	J 7	6301	B 4
2333	O 7	6302	E 9
2334	K 8	6303	I 9
2335	P 8	6304	N 9
2336	K 8	6305	C13
2337	P 8	6306	G12
2338	K 9	6308	M16
2339	P 9	6308	H14
2340	K 9	6309	M16
2341	P 9	6309	M14
2342	K 9	6312	J 5
2343	P 9	6320	J14
2344	K10	6321	O14
2345	P10	6322	I18
2346	K10	6323	N18
2347	P10	6324	I19
2350	K11	6325	N19
2351	P11	6326	O13
2352	K11	6327	K19
2353	P11	6328	K19
2354	K11	6329	K18
2355	P11	6335	G 5
2356	K12	6336	B 7
2357	P12	6337	B 7
2358	I 7	6338	L18
2359	N 7	6339	L18
2360	B 7	6340	K17
2361	B14	6341	K17
2362	B14	6342	L17
2363	B13	6343	L17
2364	B15		
2365	G15		
2366	G14		
2370	J14		
2371	O14		
2372	J15		
2373	O15		
2374	I14		
2375	M14		
2376	I16		
2377	M16		
2378	I16		
2379	M16		
2380	I17		
2381	N17		
2382	I17		
2383	N17		
2384	I17		
2385	M17		
2386	O12		
2388	P18		
2389	P18		
2390	B17		
2391	B18		
2392	B20		
2393	J 1		
2394	J 2		
2395	I 5		
2400	L19		
2401	M18		
2402	K17		
2403	L17		
2404	L17		
3301	F 3		
3302	G 3		
3303	F 4		
3304	F 5		
3305	F 2		
3306	E 3		
3307	E 3		
3308	G 3		
3309	G 6		
3310	E 2		
3311	A 4		
3312	A 5		
3313	C 1		
3314	D 2		
3315	D 3		
3320	G 9		
3321	L 9		
3322	G10		
3323	L10		
3324	G10		
3325	L10		
3326	G 8		
3327	L 8		
3328	G 8		
3329	L 8		
3330	M12		
3331	M12		
3332	M12		
3333	M12		
3334	I 7		
3335	N 7		
3336	I 7		
3337	N 7		
3340	A 7		
3341	A 7		
3342	A11		
3343	B11		
3344	B13		
3345	B15		
3348	F14		
3350	K14		
3351	P14		
3352	J14		
3353	O14		
3354	J14		
3355	O14		
3356	I14		
3357	M14		
3358	I15		
3359	M15		
3360	I16		
3361	M16		
3362	M17		
3363	M17		
3364	I17		
3365	N17		
3366	I18		
3367	N18		
3368	I19		
3369	N18		
3370	J19		
3371	O19		
3372	I19		
3373	N19		
3374	J20		
3375	O20		

CONTROL + DISPLAY CIRCUIT




* DISPLAY TYPE RX
NSM 4202-3 4k7
NSM 4202-4 5k6
NSM 4202-5 6k8
NSM 4202-6 8k2
THIS TO ADJUST THE LIGHT INTEN
TYPENUMBER OF THE DISPLAY IS P
+1(1) 5V
+1C 5V
1052
NSM4202
LED DISPLAY
6052
MAB8441P
CONTROL + TIMING
RESET
X-TAL1
T1
INT/TO
X-TAL2
35 OUTPUT BUFFERS
35 LATCHES
35 BIT SHIFT REGISTE
RAM ADDRESS REG
CPU
4000 BYTES ROM
I/O PORT2
CLOCK
SCLK
P23
DF
DAT
CLK
I/O PORT 0
I/O PORT 1
VCC
VSS
VDD
RX*
3064
3054
3053
2054
2055
2056
2057
1051
6MHz
3052
1M
33p
47µ
22n
3074
3066
3065
3070
3071
3057
3058
3059
6054
BC558
6055
BC328-40
6056
BC328-40
6057
BC338-16
6058
BC338-16
3068
3069
330
4k7
2k2
SK8
SK4
SK9
SK3
SK7
SK6
SK5
SK2
SK10
**FOR CONVENIENCE VERSION ONLY
24-1
CONVENIENCE
TO DECODER 45-1

*	DISPLAY TYPE	RX
	NSM 4202-3	4k7
	NSM 4202-4	5k6
	NSM 4202-5	6k8
	NSM 4202-6	8k2

THIS TO ADJUST THE LIGHT INTENSITY OF THE LED DISPLAY.
TYPENUMBER OF THE DISPLAY IS PRINTED ON THE REARSIDE.

1052
NSM4202

LED DISPLAY

8.8.8.8

V_{LED} 9

V_{DD} 6

7 35 OUTPUT BUFFERS

3 $\overline{DE}$ 35 LATCHES LOAD

4 DAT 35 BIT SHIFT REGISTER

5 CLK RESET

8 (2)

+1(1) 3053 4k7

+1(3) 3064 2F2

RX*

of 2056 47µ (2)

f 2057 22n (2)

+1(2) 3072 3F3

TRACK 1053 TLR123 1

TIME 1054 TLR123 2

of 2058 47µ (2)

+1(2) 25-2

1058 MV5460 GREEN COMPARTMENT ILLUMINATION PCB

25-1 3080 150 (1)

+1(2) 3074 1

3066 4k7

6055 BC328-40

6056 BC328-40

3070 4k7

3071 330

6057 BC338-16

6058 BC338-16

3069 330

3068 330

(2) (2)

22-5 M-IN

22-4 M-OUT

22-2 TRAY-IN SWITCH

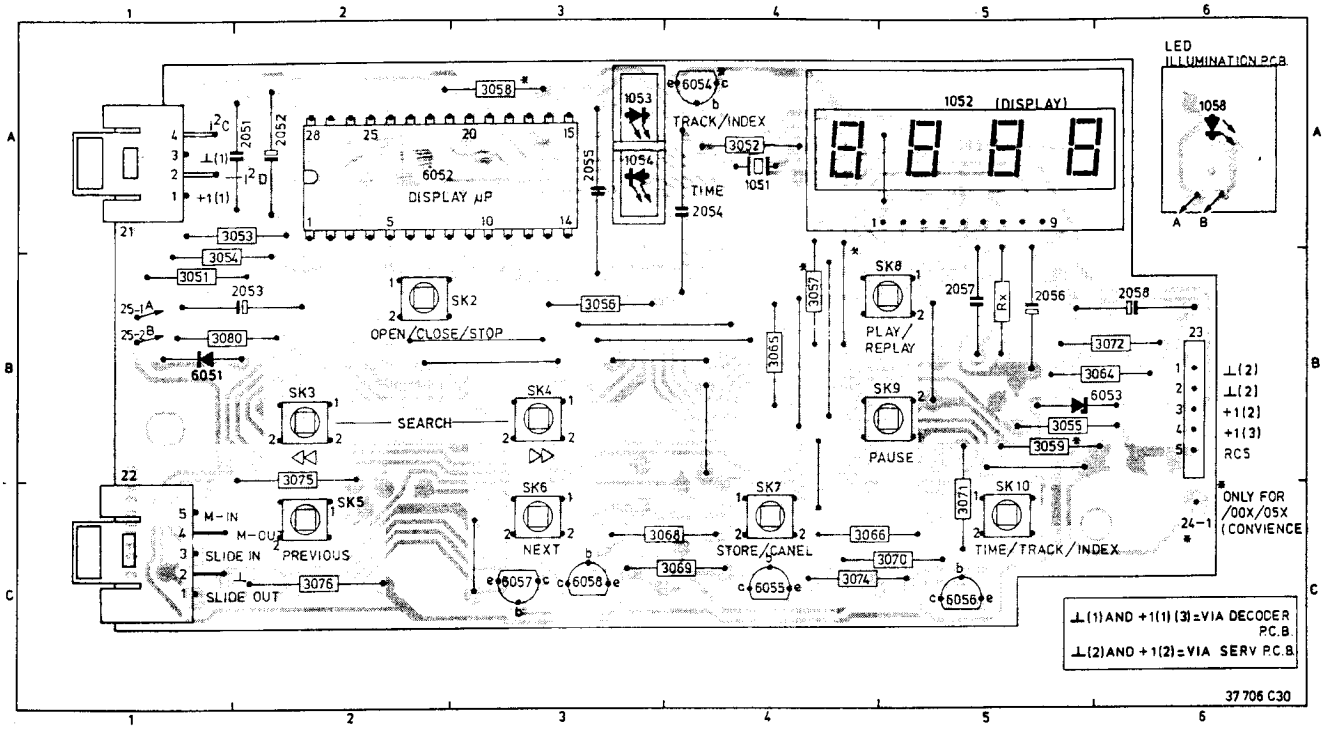
TRAY MOTOR

(2)

NVENIENCE VERSION ONLY

PRS.00353
T 3

CONTROL + DISPLAY PCB



6052	µP MAB8441P/T0144822 209 11063	
BC328-40 BC338-16 BC558		4822 130 41715 4822 130 40892 4822 130 44197
IN4148 HZ6C2 (6V2)		4822 130 30621 4822 130 32698
1053,1054 1058	TLR123 (RED) MV5460 (GREEN)	5322 130 34957 4822 130 32842
3051,3064 3072 3074	2,2Ω-NFR25 3,3Ω-NFR25 1Ω-NFR25	4822 111 30492 4822 111 30593 4822 111 30483
1051	X-tal 6MHz	4822 242 70392
Display		
1052	NSM4202	4822 130 90141
SK2÷10	TACT SWITCH	4822 276 11276

RX B5
SK2 B2
SK3 B2
SK4 B3
SK5 C2

SK6 C3
SK7 C4
SK8 B5
SK9 B5
1051 A4

1052 A5
1053 A3
1054 A3
1058 A6
2051 A2

2052 A2
2053 B2
2054 A4
2055 A3
2056 B5

2057 B5
2058 B6
3051 B1
3052 A4
3053 A1

3054 B1
3055 B5
3056 B3
3057 B4
3058 A3

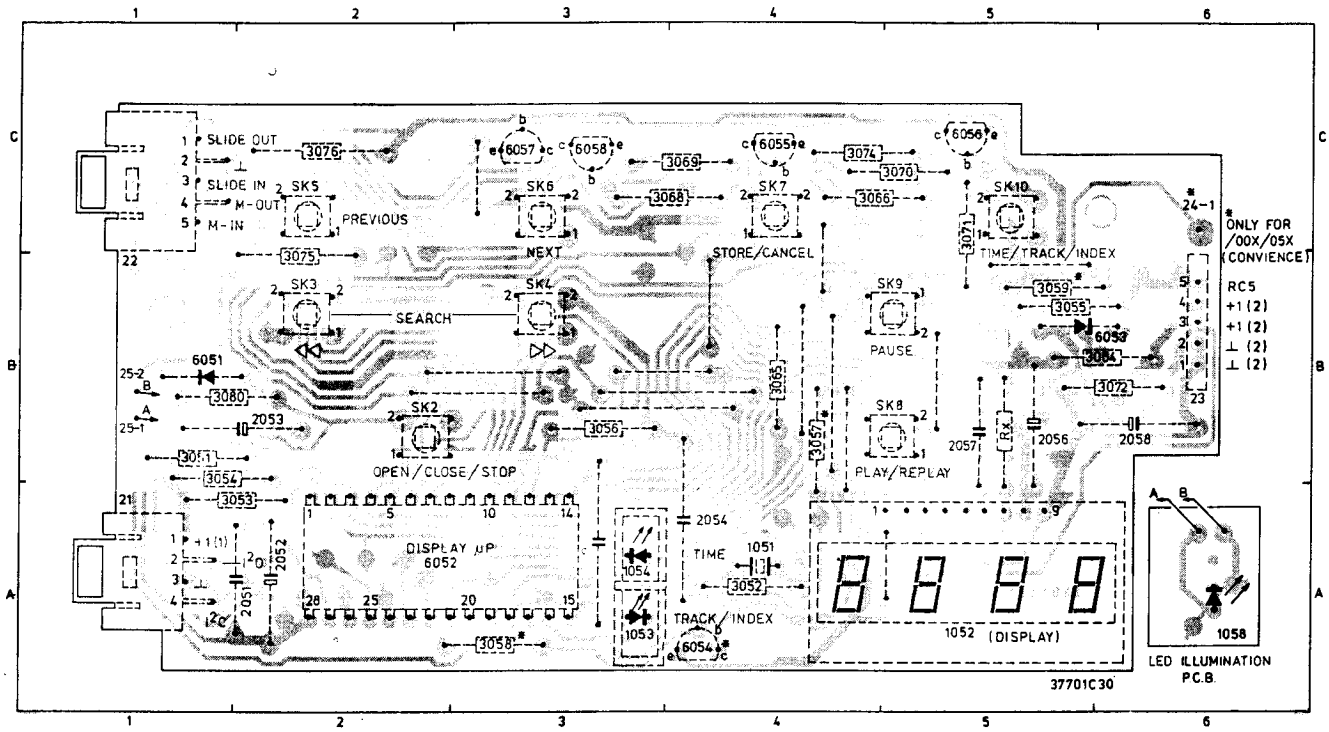
3059 B5
3064 B6
3065 B4
3066 C4
3068 C3

3069 C4
3070 C5
3071 C5
3072 B6
3074 C4

3075 B2
3076 C2
3080 B1
6051 B1
6052 A2

6053 B5
6054 A4
6055 C4
6056 C5
6057 C3

6058 C3
SK10 C5


SLIDE OUT
SLIDE IN
M-OUT
M-IN
SK5
PREVIOUS
SK6
NEXT
SK7
STORE/CANCEL
SK10
TIME/TRACK/INDEX
SK3
SEARCH
SK4
SK9
PAUSE
SK2
OPEN/CLOSE/STOP
SK8
PLAY/REPLAY
DISPLAY UP
6052
TIME
TRACK/INDEX
1052 (DISPLAY)
LED ILLUMINATION P.C.B.
1058
ONLY FOR /00X/05X (CONVIENCE)
RC5
37701C30

1

CONTROL+DISPLAY CIRCUIT B

DISPLAY TYPE	RX
NSM4202-1	6k8
NSM4202-2	10k
NSM4202-3	15k
NSM4202-4	22k

THIS TO TYPENUM

SK2=STOP/OPEN/CLOSE
SK3=FAST REVERSE
SK4=FAST FORWARD
SK5=PREVIOUS
SK6=NEXT
SK7=STORE/CANCEL
SK8=PLAY/REPLAY
SK9=PAUSE
SK10=TRACK/TIME/INDEX

FOR CONVENIENCE VERSION ONLY

C 2 3057 I 8 3061 C 3 3066 H 9 3070 H12 3074 H11 3077 I 8 3080 F16 3084 A 6 6053 D 2 6056 H11 6059 I 8
D 2 3058 J 7 3064 C10 3068 I 11 3071 H12 3075 H 8 3078 I 7 3082 E 3 3085 C 3 6054 J 8 6057 I 10 6072 I 10
D 3 3059 J 8 3065 H 8 3069 I 10 3072 C16 3076 H 9 3079 H 7 3083 A 7 6052 B 3 6055 H10 6058 I 12 6073 I 11

5 6 7 8 9 10 11 12 13 14 15 16

3

DISPLAY TYPE	RX
NSM4202-1	6k8
NSM4202-2	10k
NSM4202-3	15k
NSM4202-4	20k

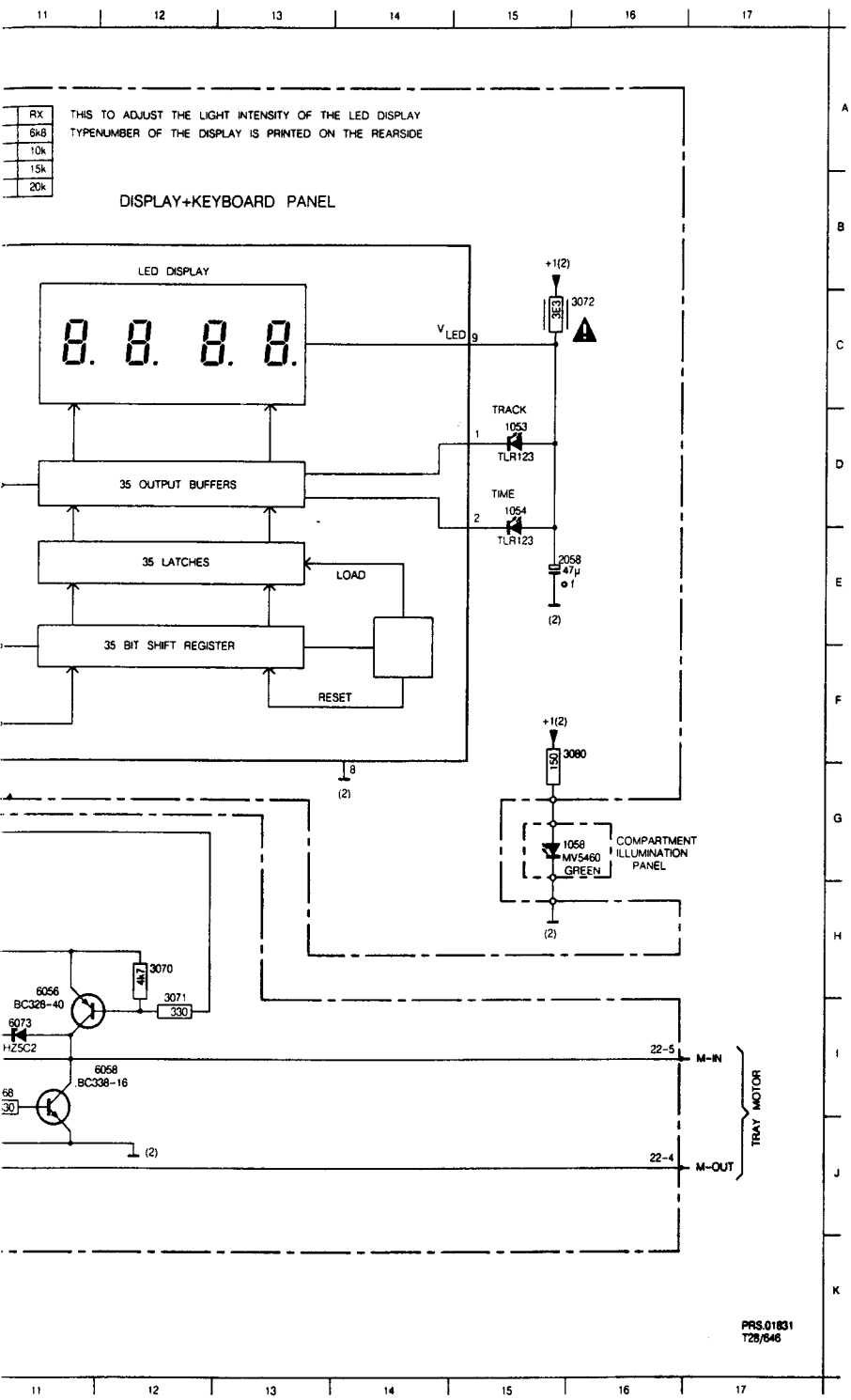
THIS TO ADJUST THE LIGHT INTENSITY OF THE LED DISPLAY
TYPENUMBER OF THE DISPLAY IS PRINTED ON THE REARSIDE

DISPLAY+KEYBOARD PANEL

+1C P +1C
3084 10k 3083 10k
+1(2) +1(2)
+1(3) +1(3)
VCC
I/O PORT C
1052 NSM4202
LED DISPLAY
8. 8. 8. 8.
V_{LED} 9
+1(2) 3E3 3072
+1(3) 2E2 3064
6 V_{DD}
2056 47µ o f
RX
7
2057 22n f
35 OUTPUT BUFFERS
TRACK 1053 TLR123
TIME 1054 TLR123
2058 47µ o f
35 LATCHES
LOAD
3 DE
4 DAT
35 BIT SHIFT REGISTER
RESET
5 CLK
8
CPU
I/O PORT B
27 25 26 28 30 29 32 31
S
+1(2) 150 3080
1058 MV5460 GREEN
COMPARTMENT ILLUMINATION PANEL
VSS
3 2 1 0
36 35 34 33
SK6 SK5 SK2
4k7 3075 4k7 3076
+1(2) 3074
4k7 3079 4k7 3066 4k7 3070
3065 330 6055 BC328-40 6056 BC328-40 3071 330
3078 330 6059 BC328-40 3077 22 6072 HZ5C2 6073 HZ5C2
22-5 M-
S +1(2) +1(2) 4k7 3057
3058 4k7 6054 BC558
6057 BC338-16 3069 330 3068 330 6058 BC338-16
3059 2k2
22-4 M-
FOR CONVENIENCE VERSION ONLY
22-1 22-3 22-2
S- OUT S- IN
TRAY SWITCH
CONVENIENCE TO DECODER 45-1

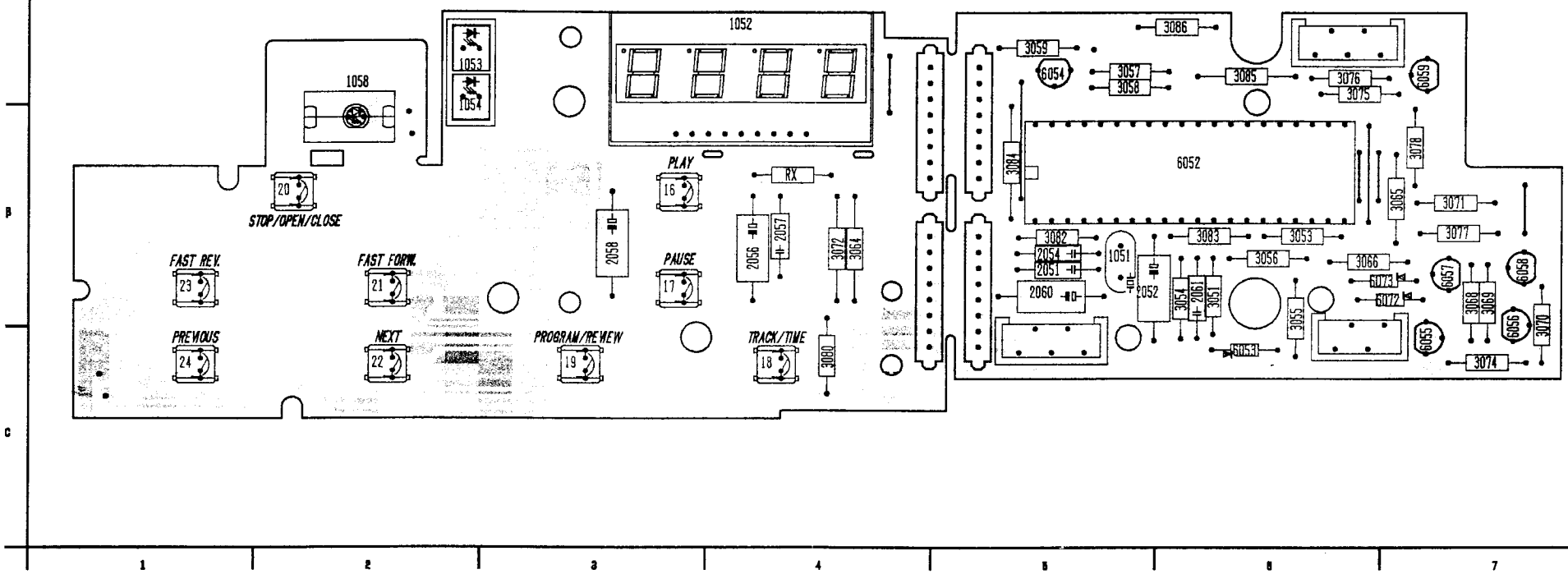
5 6 7 8 9 10 11 12 13 14 15 16

6053 D 2 6056 H11 6059 I 8
6054 J 8 6057 I 10 6072 I 10
6055 H10 6058 I 12 6073 I 11



1051	B 5	1058	A 2	19	C 3	2054	B 5	2060	B 5	23	B 1	3054	B 6	3058	A 5	3066	B 6	3071	B 7	3076	A 6	3082	B 5	3086	A 6	6055	C 7	6059	A 7
1052	A 4	16	B 3	20	B 2	2056	B 4	2061	B 6	24	C 1	3055	B 6	3059	A 5	3068	B 7	3072	B 4	3077	B 7	3083	B 6	6052	B 6	6056	B 7	6072	B 7
1053	A 2	17	B 3	2051	B 5	2057	B 4	21	B 2	3051	B 6	3056	B 8	3064	B 4	3069	B 7	3074	C 7	3078	B 7	3084	B 5	6053	C 6	6057	B 7	6073	B 7
1054	B 2	18	C 4	2052	B 5	2058	B 3	22	C 2	3053	B 6	3057	A 5	3065	B 7	3070	B 7	3075	A 6	3080	C 4	3085	A 6	6054	A 5	6058	B 7	RX	B 4

CONTROL AND DISPLAY PANEL – B



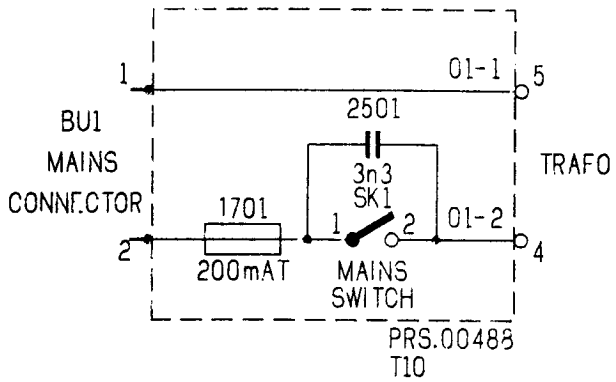
39 977 C12

6052	**µP MC6805L3P**	4822 209 11445
BC328-40		4822 130 41715
BC338-16		4822 130 40892
BC558		4822 130 44197
IN4148		4822 130 30621
HZ5C2 (5V1)		4822 130 33293
1053, 1054	TLR123 (RED)	5322 130 34957
1058	MV5460 (GREEN)	4822 130 32842

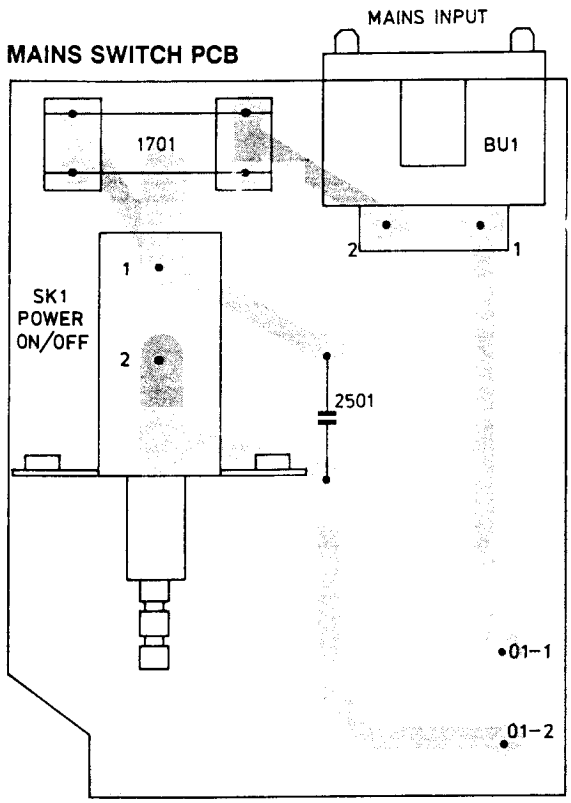
3051,3064	2,2Ω-NFR25	4822 111 30492
3072	3,3Ω-NFR25	4822 111 30493
3074	2Ω-NFR25	4822 111 30483
1051	X-tal 4 MHz	4822 242 70831
Display		
1052	NSM4202	4822 130 90141
SK+10	TACT SWITCH	4822 276 11276

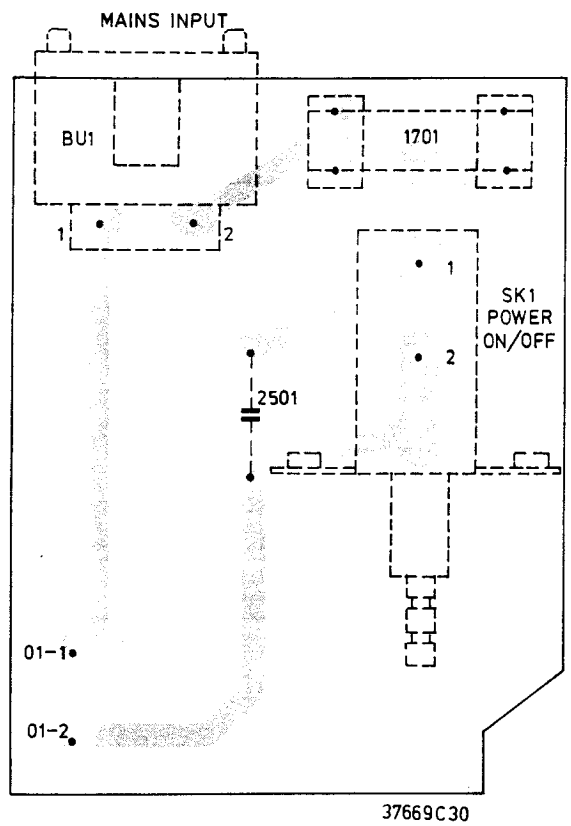
SK2 = pos. 20
SK3 = pos. 23
SK4 = pos. 21
SK5 = pos. 24
SK6 = pos. 22
SK7 = pos. 19
SK8 = pos. 16
SK9 = pos. 17
SK10 = pos. 18

MAINS SWITCH CIRCUIT



MAINS SWITCH PCB





SK1	MAINS SWITCH	4822 276 11309
2701	3,3 nF-400V	4822 122 40327
1701	220/240V version 200 mAT 110/127V version 400 mAT	 4822 253 30012 4822 253 30016
Miscellaneous		
Fuse holder BU-1 mains inlet		4822 492 60063 4822 265 20262

© Chips 50 V NP0 S1206

1 pF	5%	4822 122 32279
1,5 pF	5%	4822 122 31792
1,8 pF	5%	4822 122 32087
3,3 pF	5%	4822 122 32079
3,9 pF	5%	4822 122 32081
4,7 pF	5%	4822 122 32082
8,2 pF	5%	4822 122 32083
10 pF	5%	4822 122 31971
12 pF	5%	4822 122 32139
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 32267
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
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
56 nF	10%	4822 122 32183
100 nF	20%	4822 122 31947

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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 90338
3,6 E	5%	4822 111 90389
3,9 E	5%	4822 111 90391
4,3 E	5%	4822 111 90392
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

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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 90375
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
6,8 k	2%	4822 111 90544

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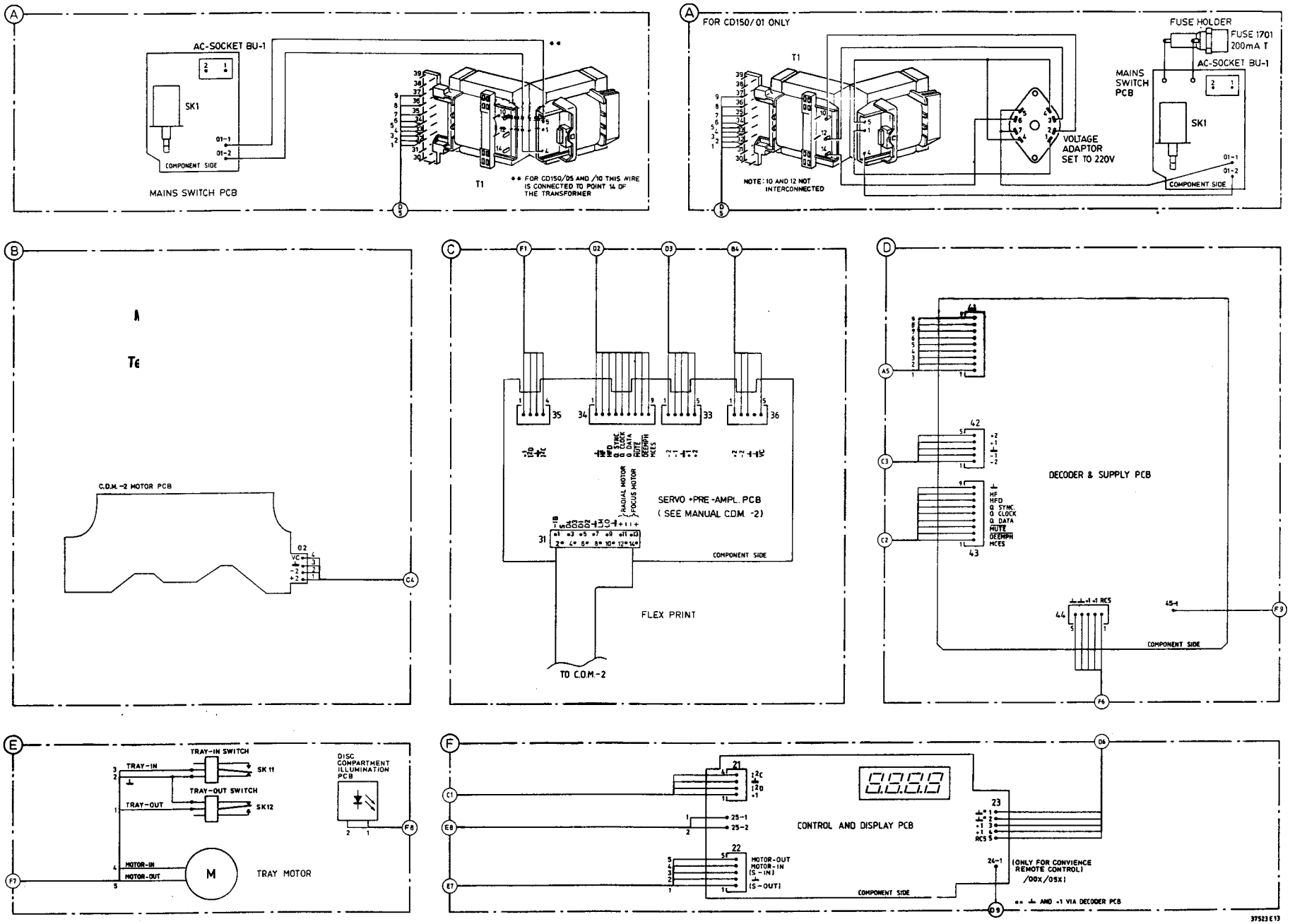
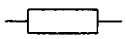
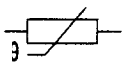
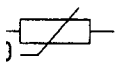
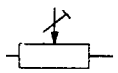
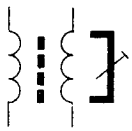
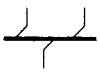
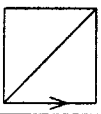
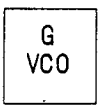
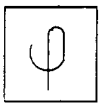
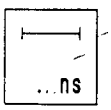
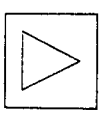
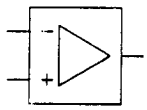
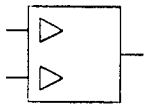
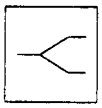
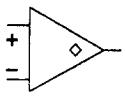
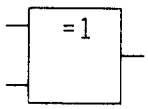
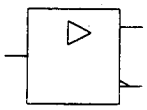
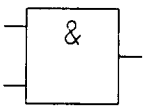
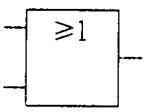
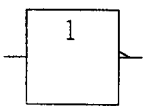
7,5 k	2%	4822 111 90276
8,2 k	2%	5322 111 90118
9,1 k	2%	4822 111 90373
10 k	2%	4822 111 90249
11 k	2%	4822 111 90337
12 k	2%	4822 111 90253
13 k	2%	4822 111 90509
15 k	2%	4822 111 90196
16 k	2%	4822 111 90346
18 k	2%	4822 111 90238
20 k	2%	4822 111 90349
22 k	2%	4822 111 90251
24 k	2%	4822 111 90512
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

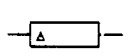

AC-SOCKET BU-1
SK1
01-1
01-2
COMPONENT SIDE
MAINS SWITCH PCB
T1
** FOR CD150/05 AND /10 THIS WIRE IS CONNECTED TO POINT 14 OF THE TRANSFORMER
FOR CD150/01 ONLY
NOTE: 10 AND 12 NOT INTERCONNECTED
VOLTAGE ADAPTOR SET TO 220V
FUSE HOLDER
FUSE 1701 200mA T
MAINS SWITCH PCB
C.D.M.-2 MOTOR PCB
SERVO +PRE-AMPL. PCB
(SEE MANUAL CDM. -2)
FLEX PRINT
TO C.D.M.-2
DECODER & SUPPLY PCB
TRAY-IN SWITCH
TRAY-OUT SWITCH
TRAY-IN
TRAY-OUT
SK 11
SK12
DISC COMPARTMENT ILLUMINATION PCB
MOTOR-IN
MOTOR-OUT
M
TRAY MOTOR
CONTROL AND DISPLAY PCB
MOTOR-OUT
MOTOR-IN
(ONLY FOR CONVIENCE REMOTE CONTROL)
/00X/05X)
COMPONENT SIDE

SYMBOL	DESCRIPTION
	Capacitor, 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.

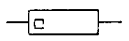
SYMBOL	DESCRIPTION
	Transistor (N.P.N.)
	Transistor (P.N.P.)
	Direct current (DC)
	Alternating current (AC)
	Earth (functional)
	Frame or chassis connection
	Direction in which AC voltages are passed on (optional present)
	Interrupted line
	Not-connected crossing lines
	Connected lines
	Cable tree with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

MDA.00083 T28

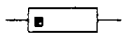
SYMBOL	DESCRIPTION
	Operational amplifier
	Differential amplifier
	Splitter
	Operational amplifier with open output
	Exclusive OR gate
	True/complement amplifier with high input
	Flip Flop
	AND gate
	OR gate
	Inverter with high input



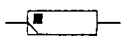
0.2W (CR 16) ≤ 220kΩ 5%
> 270kΩ 10%



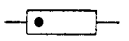
0.33W (CR 25) ≤ 1 MΩ 5%
> 1 MΩ 10%



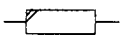
0.33W (SFR25) 5%



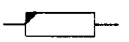
0.25W (VR 25) ≤ 10MΩ 5%
> 10MΩ 10%



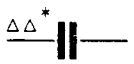
0.5W (CR 37) ≤ 1 MΩ 5%
> 1 MΩ 10%



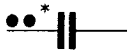
0.67W (CR 52) 5%



1.15W (CR 68) 5%

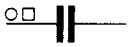


Ceramic plate



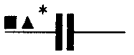
Polyester flat foil

Polyester mepolesco



Mylar
(Polyester flat foil small sized)

Micropoco



Tubular ceramic
(body colour pink or yellow/green)

Miniature single elco

Subminiature tantalum

*

a	= 2.5	V
b	= 4	V
c	= 6.3	V
d	= 10	V
e	= 16	V
f	= 25	V
g	= 40	V
h	= 63	V
i	= 100	V
j	= 125	V
l	= 125	V
m	= 150	V
n	= 160	V
q	= 200	V
r	= 250	V
s	= 300	V
t	= 350	V
u	= 400	V
v	= 500	V
w	= 630	V
x	= 1000	V
A	= 1.6	V
B	= 6	V
C	= 12	V
D	= 15	V
E	= 20	V
F	= 35	V
G	= 50	V
H	= 75	V
I	= 80	V

MDA.00084