

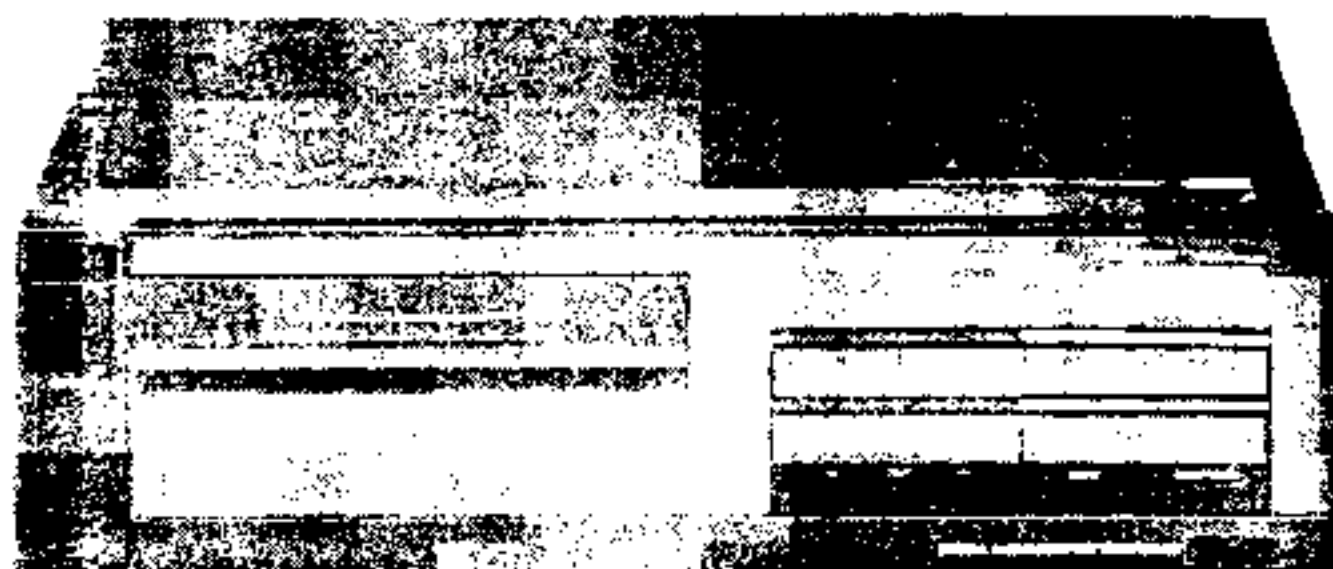
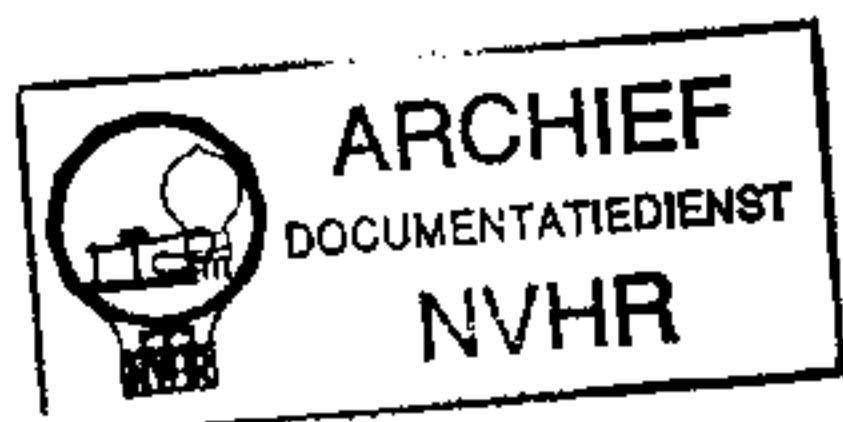
009152

Compact disc player CD150

Service
Service

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

Ned. Ver. v. Historie v/d Radio



37 891 A12

Service Manual

COMPACT
disc
DIGITAL AUDIO

CONTENTS

- 1 Elucidation subdivision and table of contents per page
- 2 Controls and technical specifications
- 3 Servicing hints
- 4 Measurements and adjustments
- 5 Exploded views and parts lists of mechanical components
- 6 Block diagram, circuit diagrams, PCB data, parts lists of electrical components and wiring diagram
- 7 Changes
- 8 Additional information

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

**CLASS 1
LASER PRODUCT**

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



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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.

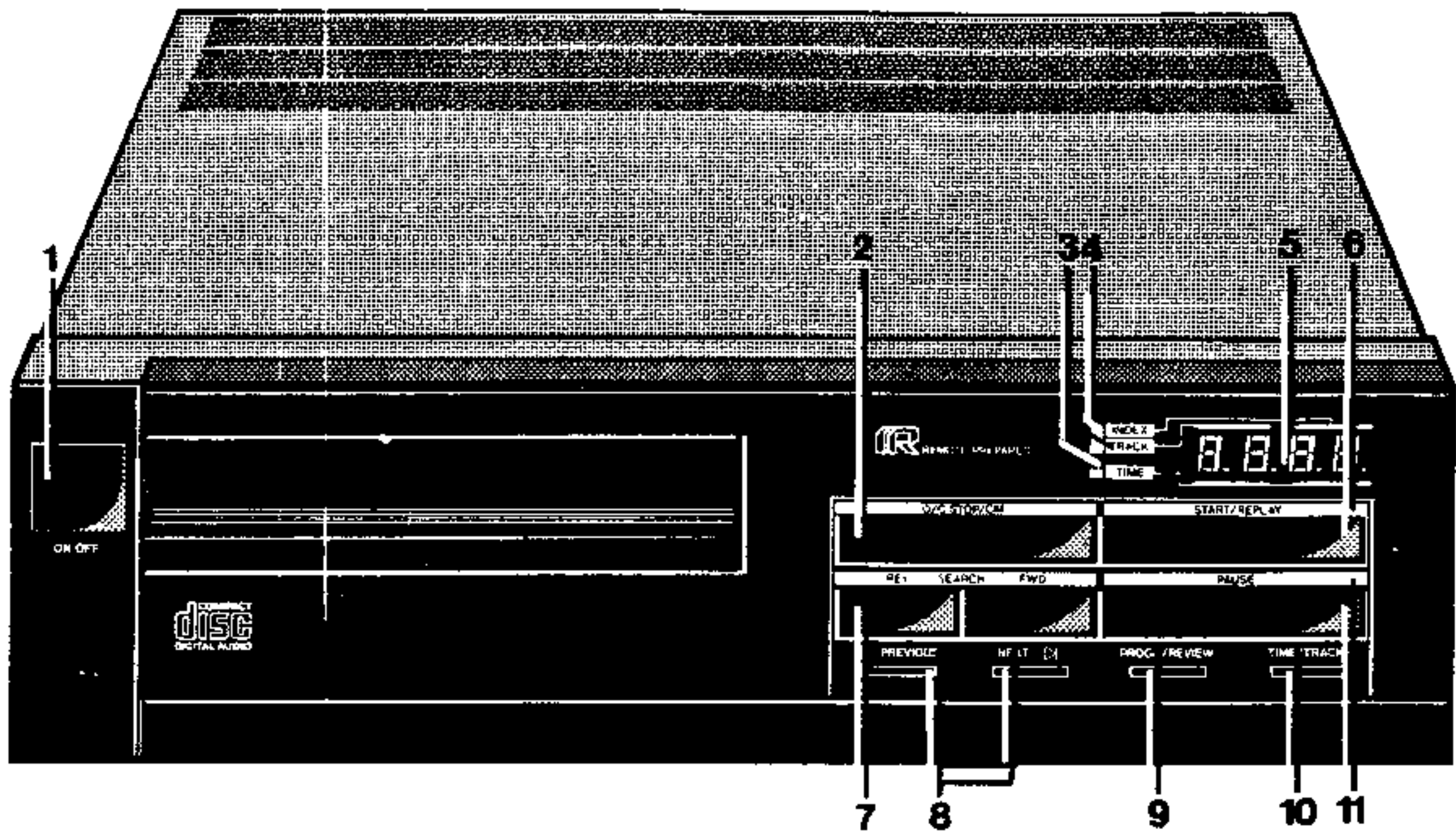
Example

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.

TABLE OF CONTENTS PER PAGE

Chapter	Page	Contents
1	1-1	Elucidation of the subdivision of the documentation
	1-2	Table of contents per page
2	2-1	Controls
	2-2	Technical specification
3	3-1	Servicing hints
	3-2	Disassembly of top cover
		Replacement of glass fuse
		Replacement of transformer fuse
		Servicing of front panel
		Servicing of decoder + power supply PCB
		Servicing of servo + preamplifier PCB
		Servicing of tray mechanism
4	4-1	Electrical measurements and adjustments
		Detailed measuring method
	4-2	Detailed measuring method
	4-3	Detailed measuring method
	4-4	Detailed measuring method
	4-5	Detailed measuring method
5	5-1	Exploded view tray mechanism
		Parts list of mechanical components
	5-2	Exploded view of cabinet
6	6-1	Block diagram
	6-2	Diagram of power supply circuit
	6-3	PCB drawing of power supply + decoder circuit
		Parts list
	6-4	PCB drawing of power supply + decoder circuit
	6-5	Diagram of decoder circuit
	6-6	Diagram of control and display circuit
	6-7	PCB drawings of control and display PCB
		Parts list
	6-8	Diagram of mains switch circuit
		PCB drawing of mains switch PCB
		Parts list
		Survey standard symbols
	6-9	Wiring drawing
	6-10	Parts list chip components



37 925 A15

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 backwards, 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.

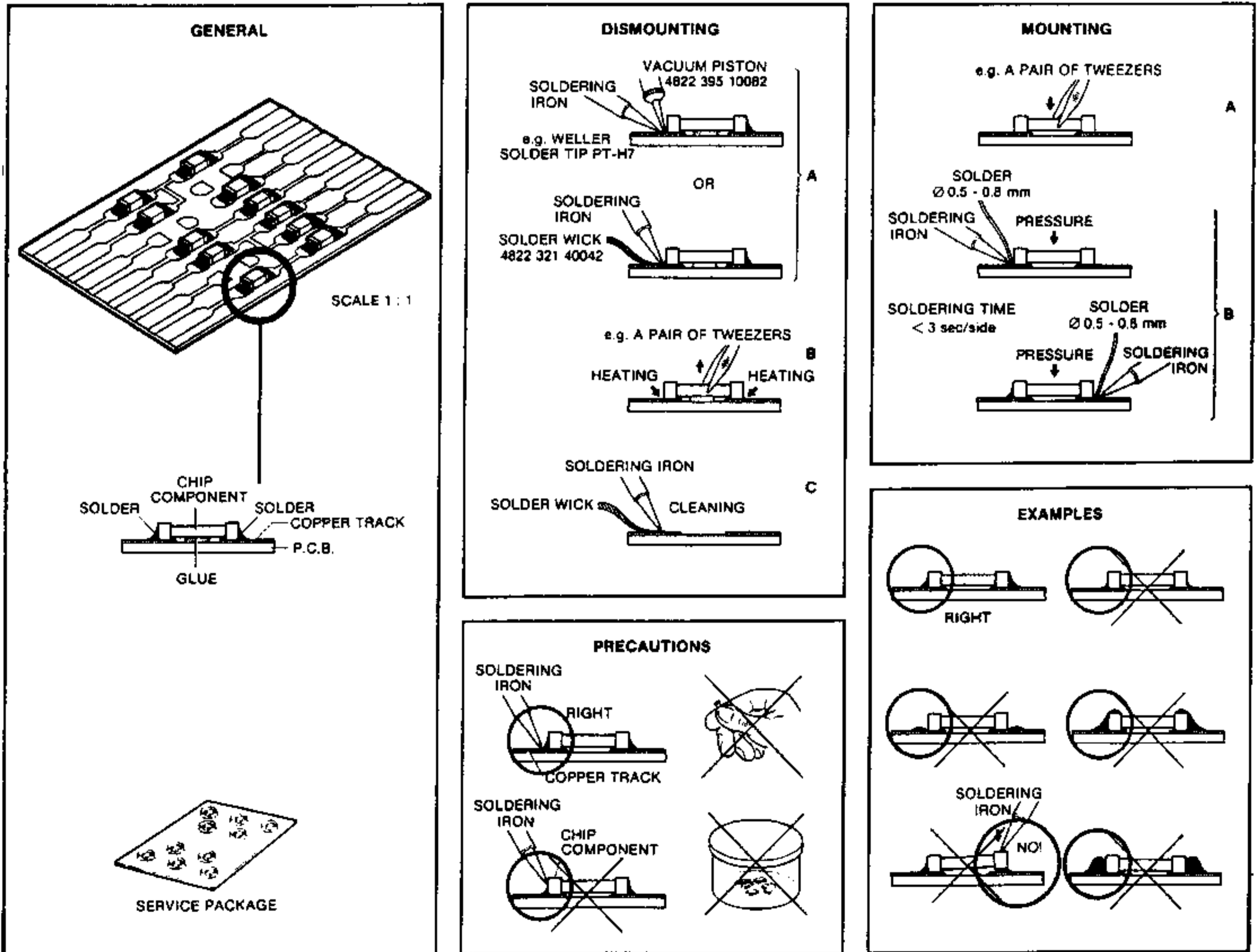
In the set chip components have been applied. For disassembly and assembly of chip components see the figure below.

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 separate 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 532 60906
7th order filter	4822 395 30204



27 012C12

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 supply 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).

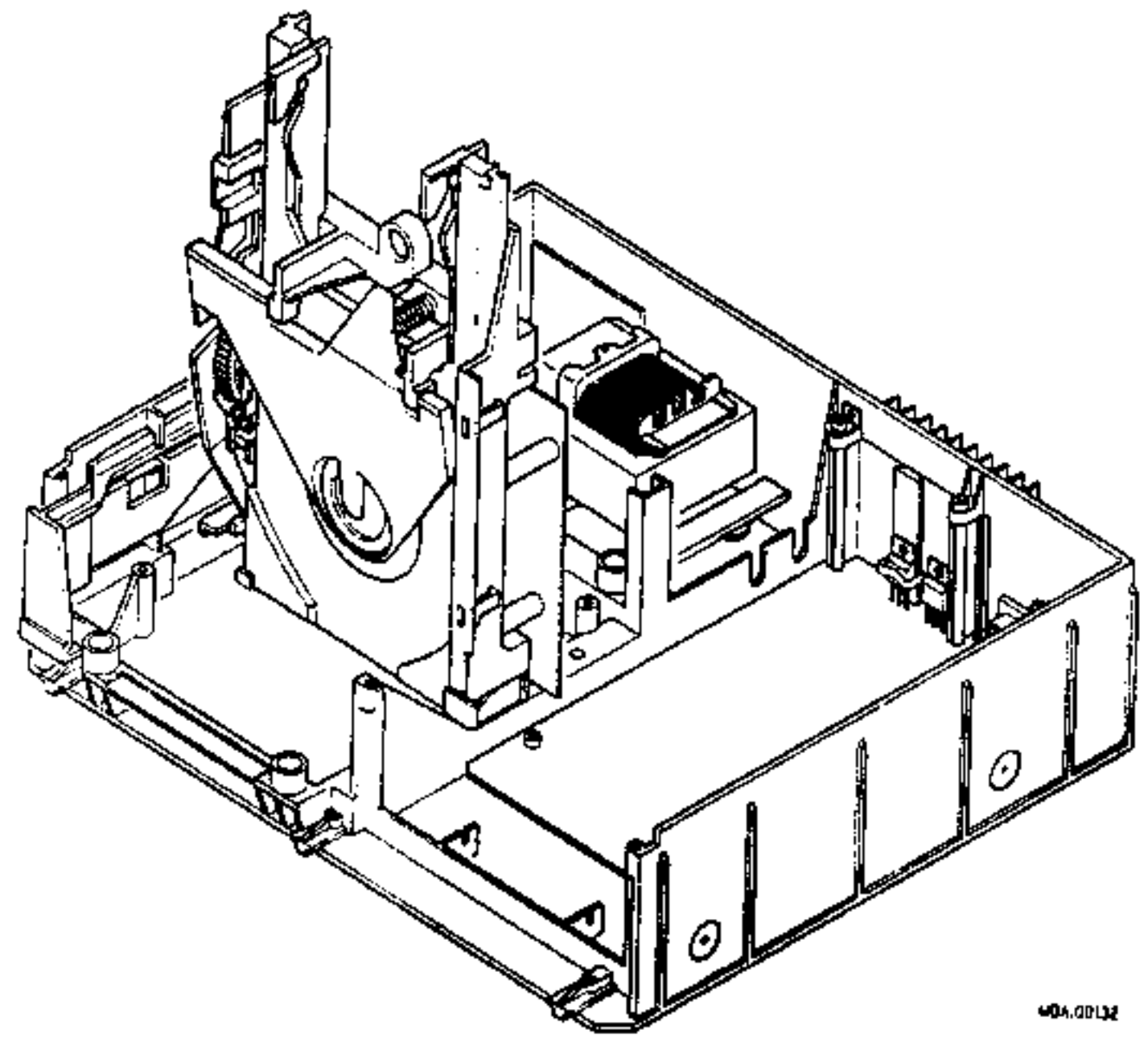


Fig. 3

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

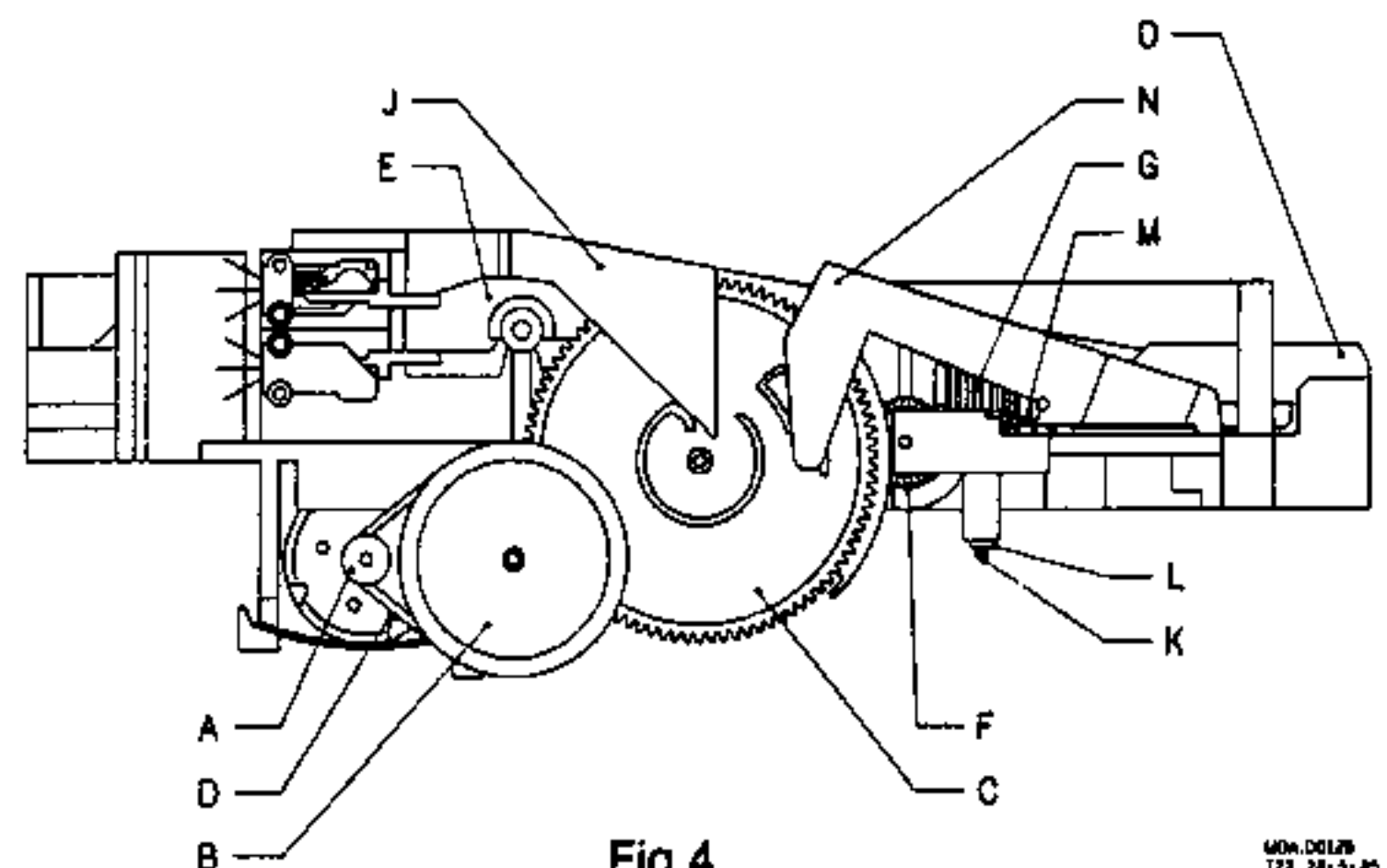


Fig.4

- 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.

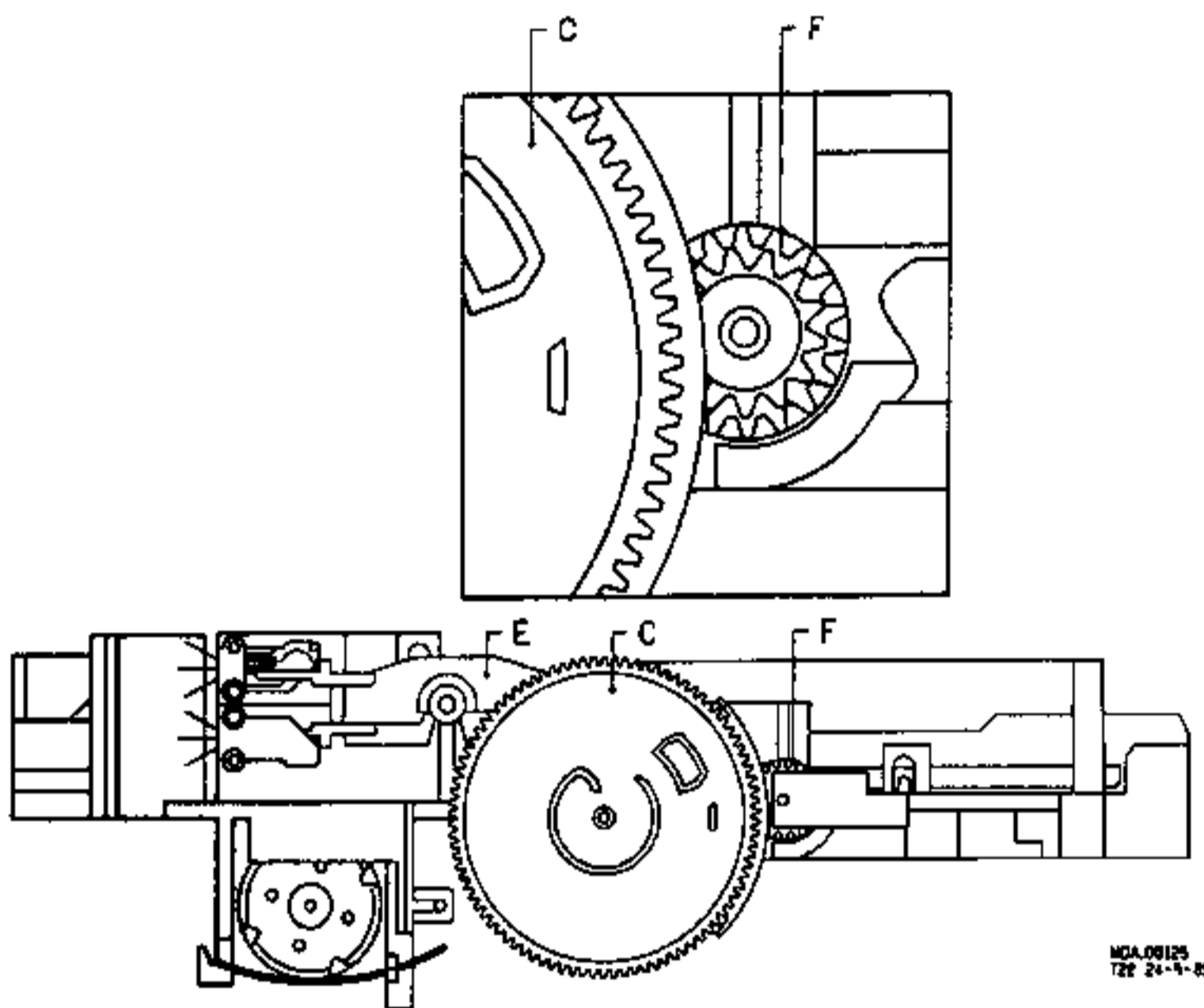


Fig. 5

- 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 pulley 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 + preamp. PCB see the CDM-2 Service Manual.

Specification measurement

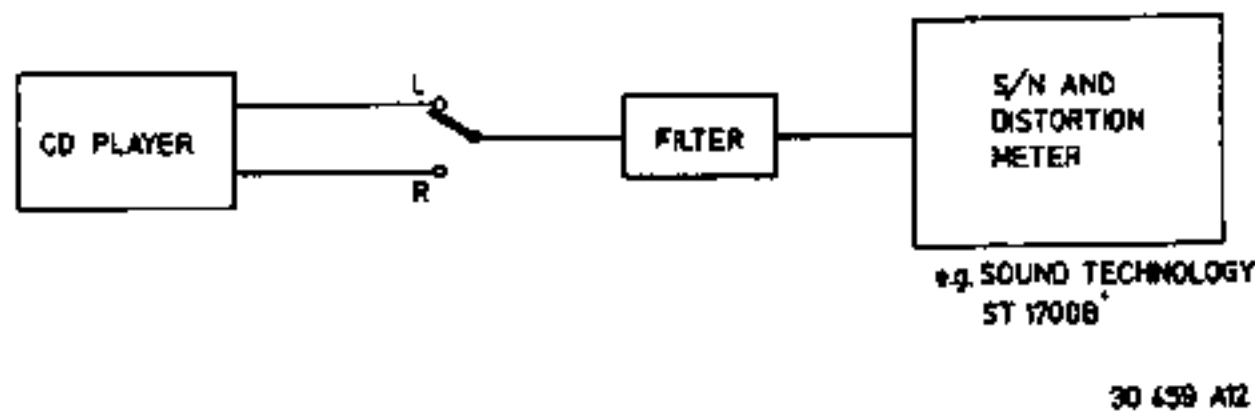


Fig. 6

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

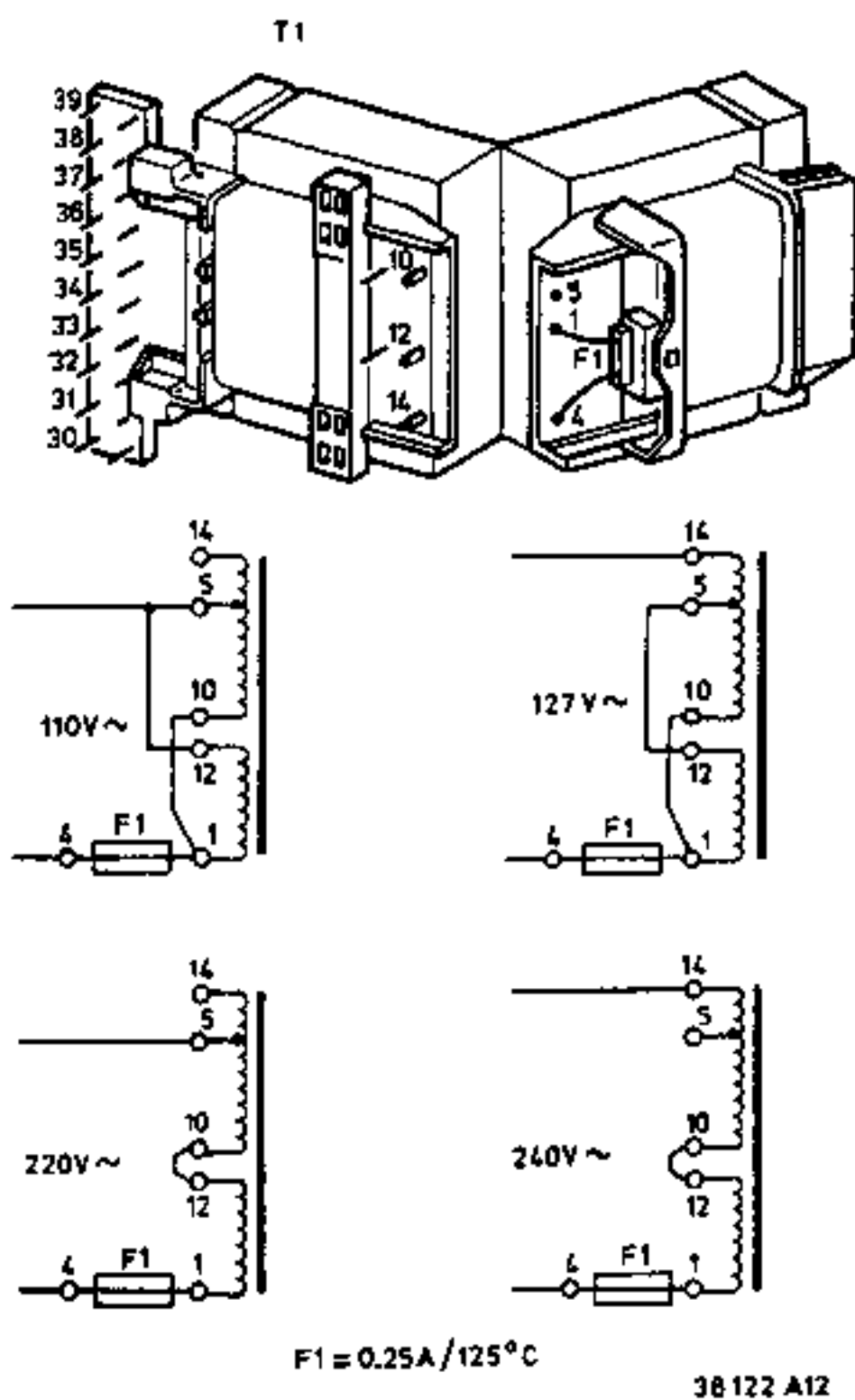


Fig. 7

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.

Selection 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 (\diamond) 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 μ P

With the self-test the following parts of the μ P are tested:

- RAM
 - ROM
 - TIMER
 - serial I/O interface
 - I/O gates
- Interrupt the I²C connection on connector 35-2 on the servo + preampl. PCB.
 - Unsolder pins 1, 7, 26 and 27 of the servo μ P.
 - Render pin 2 of the servo μ P "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 μ P will go low within 1s.

Self-test of the control and display μ P

With this self-test the following parts of the μ P are tested:

- RAM
 - ROM
 - TIMER
 - serial I/O interface
 - I/O gates
- Interrupt the I²C connection on connector pin 21-4 on the control + display PCB.
 - Render pin 2 of the control display μ P "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 μ P will go "low" again within 1s.

Initiation of the servicing programme of the μ P

-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. MUTE is high so that the music information is released.

On the display appears "3".

(Dependent on the length 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 μ P and the arm moves by steps of 64 tracks as long as the key is depressed.

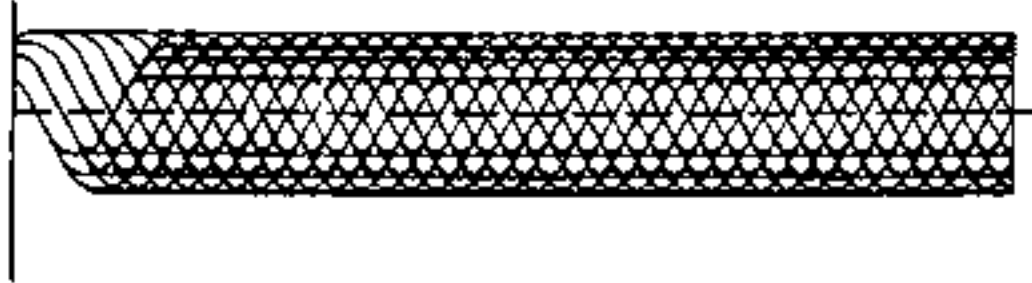
If one of the servicing positions 1, 2 or 3 is disturbed (e.g. braking or removing the disc) the player reassumes servicing position "0".

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 μ s/DIV

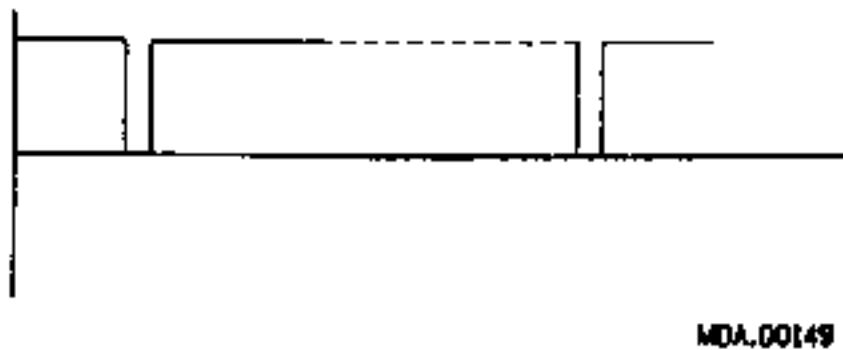
Amplitude $\approx 1,5V_{pp}$



-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 MUTE signal on test point 98

- Insert a disc.
- In the PLAY mode or in SERVICING POSITION 3 in the MUTE signal is "high".
- The 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

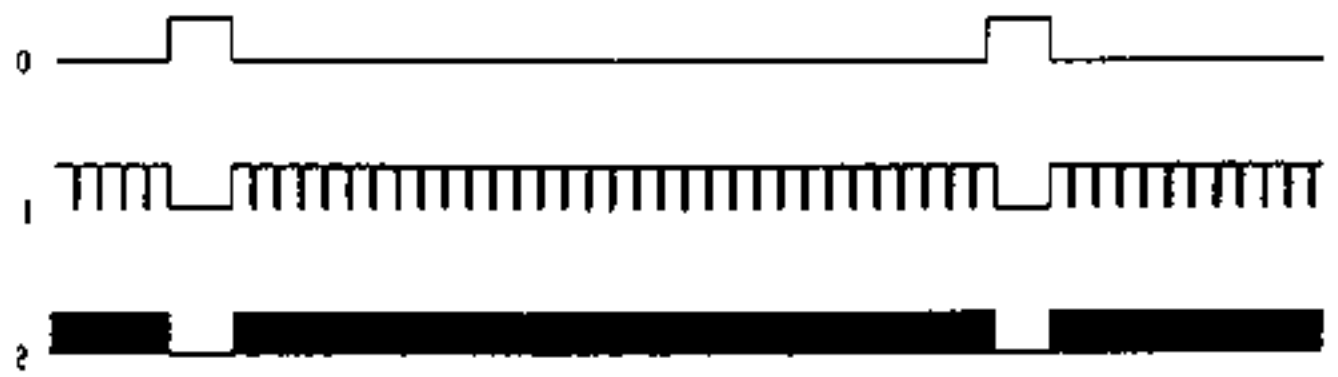
- Insert a disc.
 - Bring the player in one of the following positions
SERVICING POSITION 2 or 3 or the PLAY mode
- Remark: In SERVICING POSITION 2 the timing signals are unstable.

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

FSDE on test point 72
SSDE on test point 76
CLDE on test point 77

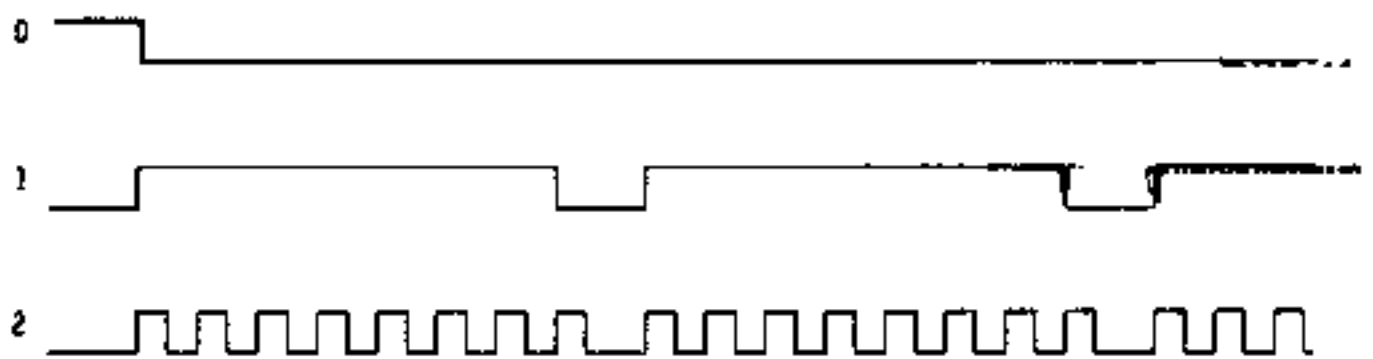
and their interrelations

Position of the oscilloscope 20 μ s/DIV
0 = FSDE, tp 72; 1 = SSDE, tp 76; 2 = CLDE, tp 77



MDA.0093

Position of the oscilloscope 1 μ s/DIV
0 = FSDE, tp 72; 1 = SSDE, tp 76; 2 = CLDE, tp 77



MDA.0094

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 μ s in the PLAY mode and in SERVICING POSITIONS 2 and 3 : 136 μ s

-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



MDA.0097

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

-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

FSEC on test point 79

CLEC on test point 80

and their interrelations

Position of the oscilloscope 20 μ s/DIV

0 = FSEC tp 79

1 = CLEC tp 80



MDA.0088

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

-Check the **MUTE signal on test point 98**

• See sub "I DEMOD IC"

'Check the 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 μ s/DIV



Remark:

The repetition time of the MCES signal is 140 μ s.

• 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 μ s.

Duty cycle is 50%.

Also see "Measurement of turntable 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 ERCO 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

CLEC on test point 80

CLCF on test point 85

STR1 on test point 84

and their interrelations

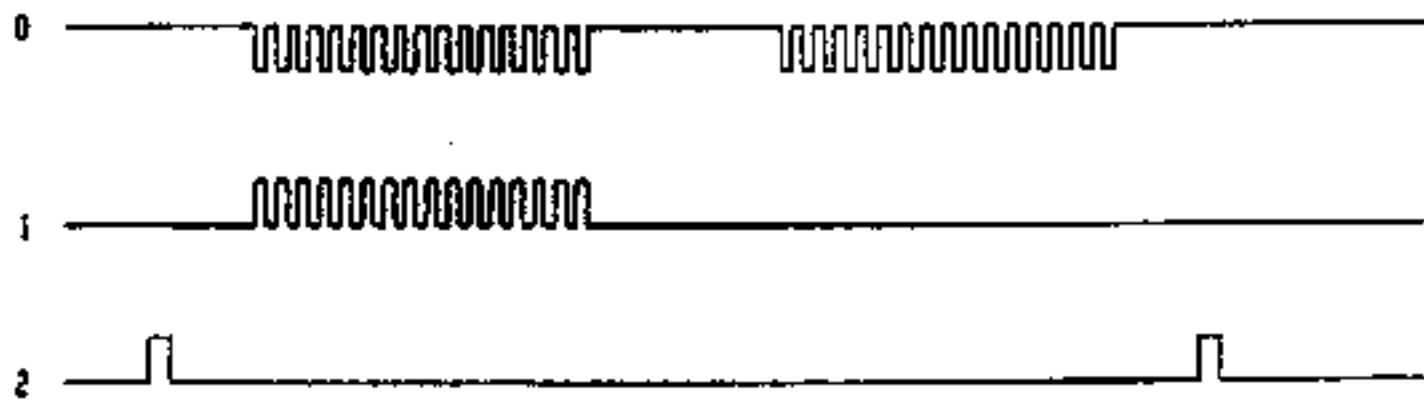
Position of the oscilloscope 5 μ s/DIV

0 = CLEC tp 80

1 = CLCF tp 85

2 = STR1 tp 84

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



404.0000V

- 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

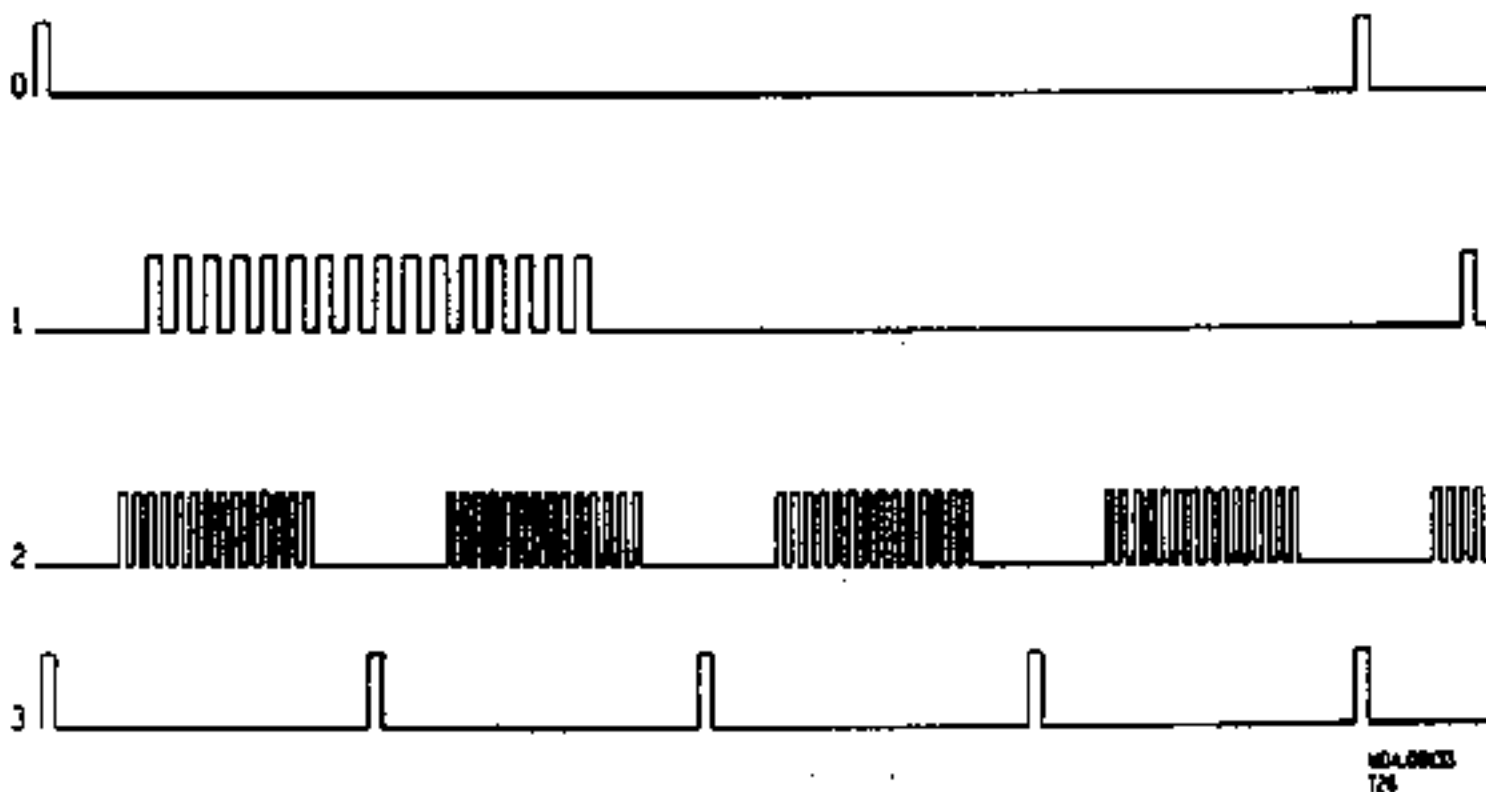
- First check all signals round the **CIM IC** (see "III").
- Check the timing signals
- Bring the player in the **Stand-by** mode (only the mains switch depressed).
- Trigger an oscilloscope with the **STR1** signal at test point 84.
- Check signals

STR1 on test point 84
CLCF on test point 85
CLFD on test point 90
LAT on test point 93

and their interrelations.

Position of the oscilloscope 5µs/DIV

0 = **STR1** tp 84
1 = **CLCF** tp 85
2 = **CLFD** tp 90
3 = **LAT** tp 93



404.0003
72V

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

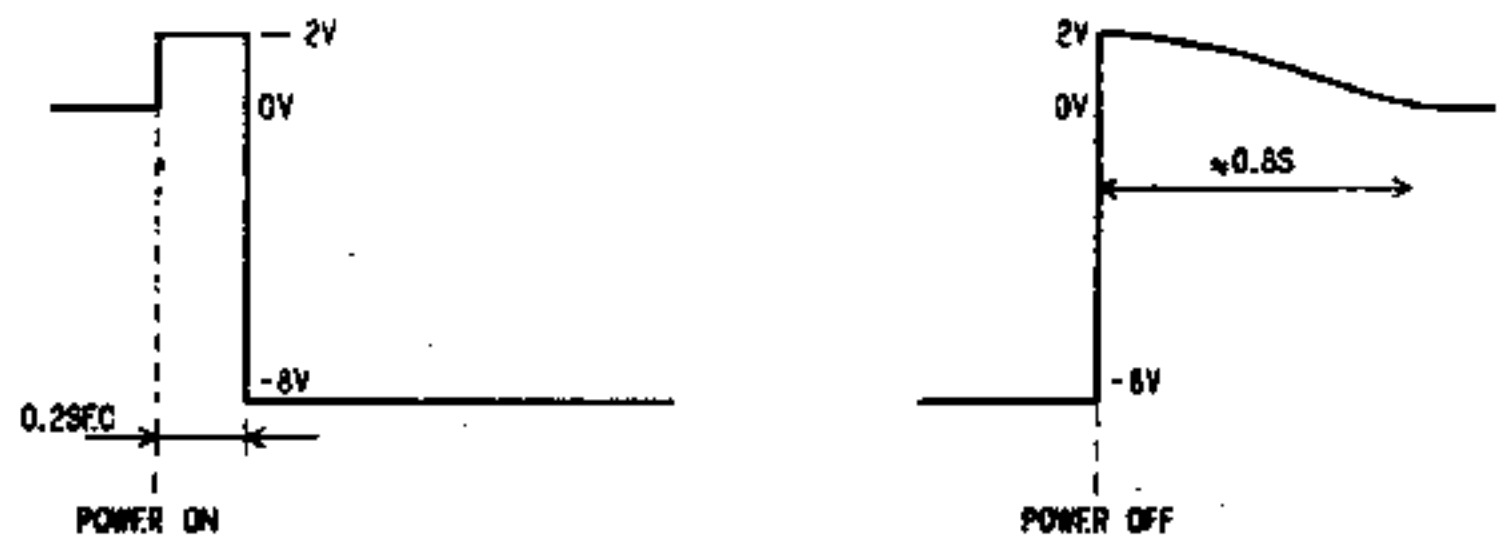
- First check all signals round the **FIL IC**, see IV.
- Check the output of the **OP-AMP** after the **DAC IC**.
- Insert a disc.
- In the **PLAY** mode and in **SERVICING POSITION 3** the analog (=music) signal should be present on the output of the **OP-AMP** after reading of the run-in track.

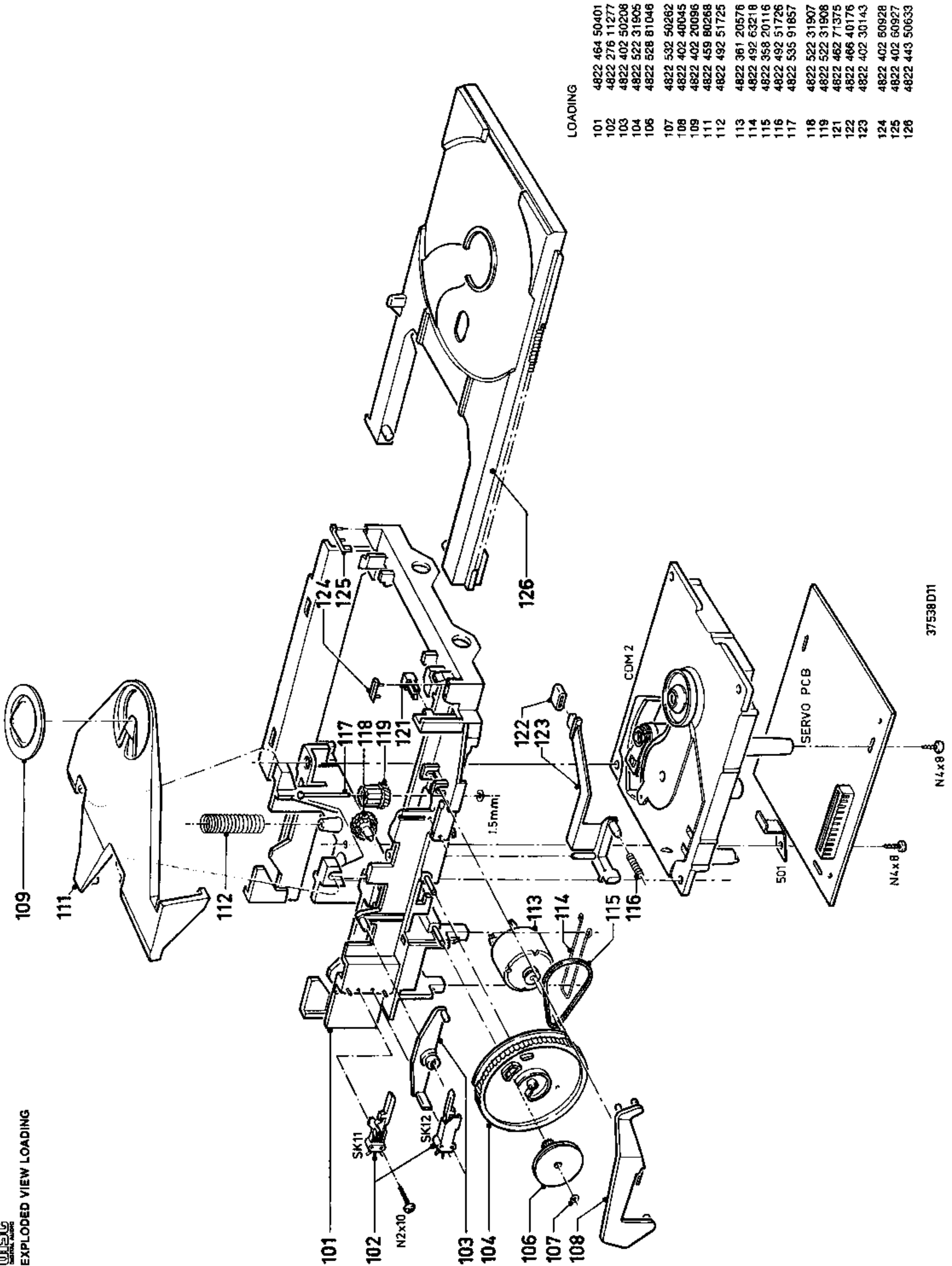
VI DEEMPH CIRCUIT

- Insert test disc 5.
- During playback of track no. 14 (recorded without **PRE-EMPH**) the **DEEMPH** signal on connector 43-2 should be 'high'.
- During playback of track no. 15 (recorded with **PRE-EMPH**) the **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 CIRCUIT

- 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.

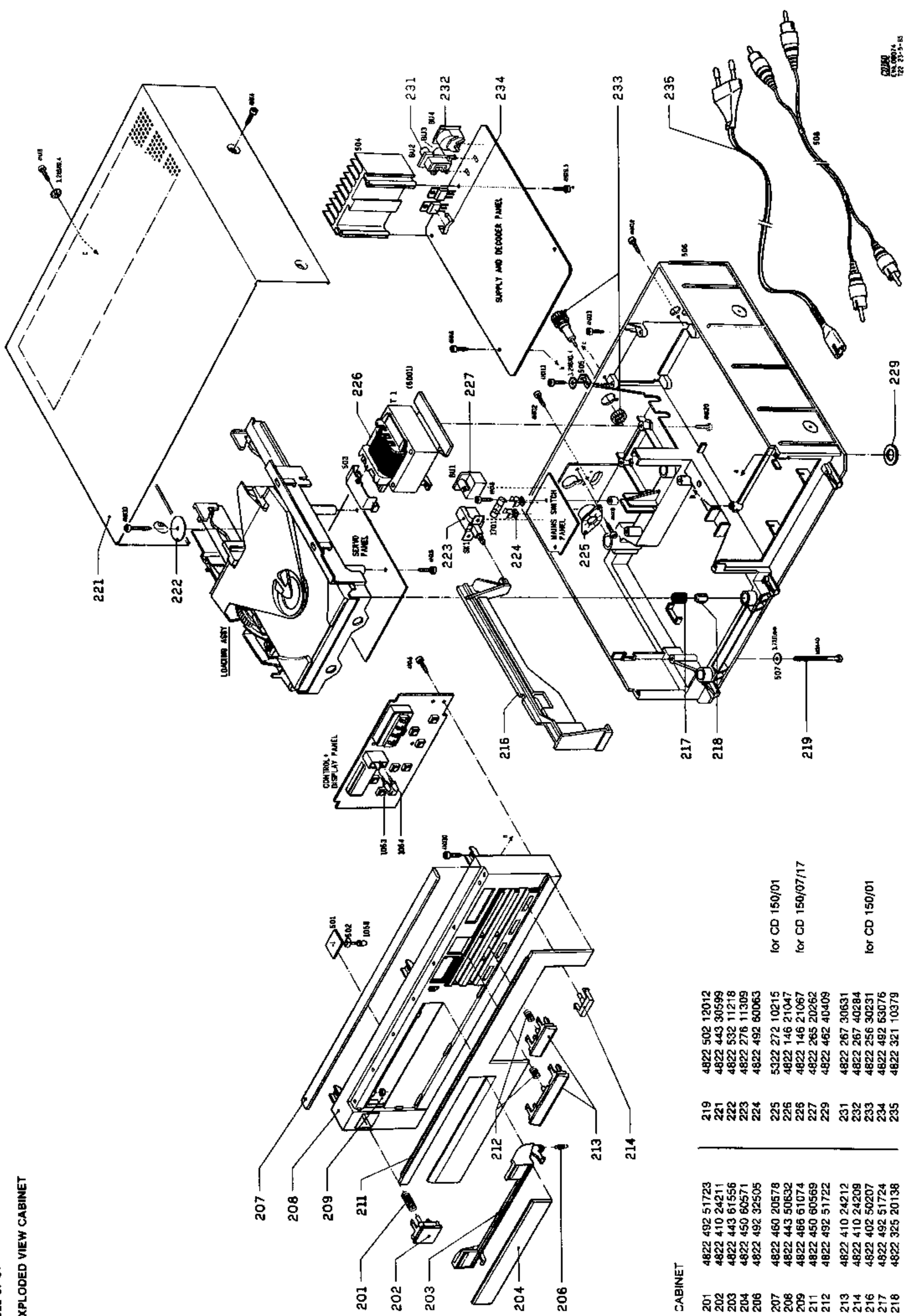




LOADING

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 91657
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
208	4822 443 50632	226	4822 146 21047
209	4822 488 61074	226	4822 146 21067
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
217	4822 492 51724	234	4822 492 63076
218	4822 325 20138	235	4822 321 10379

for CD 150/01

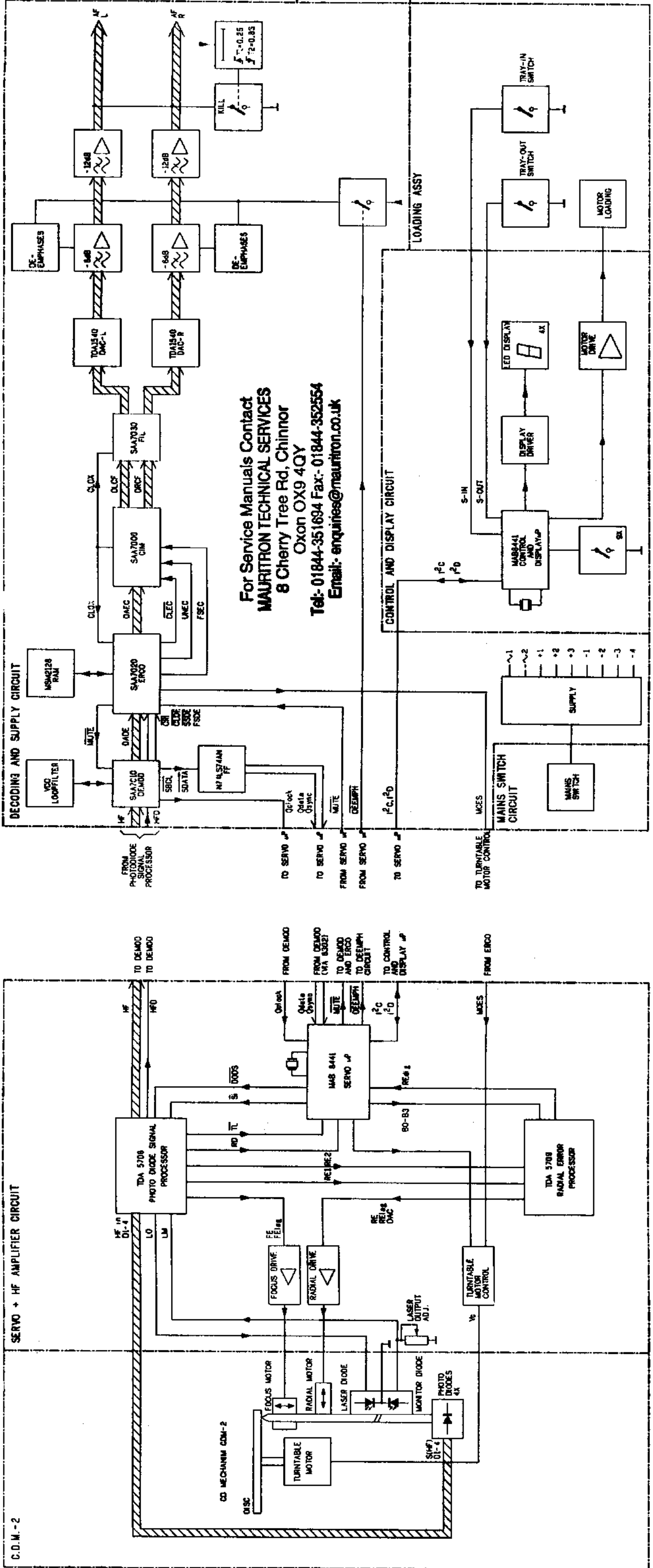
for CD 150/07/17

for CD 150/01

CS 102 218

BLOCK DIAGRAM

C.D.M.-2



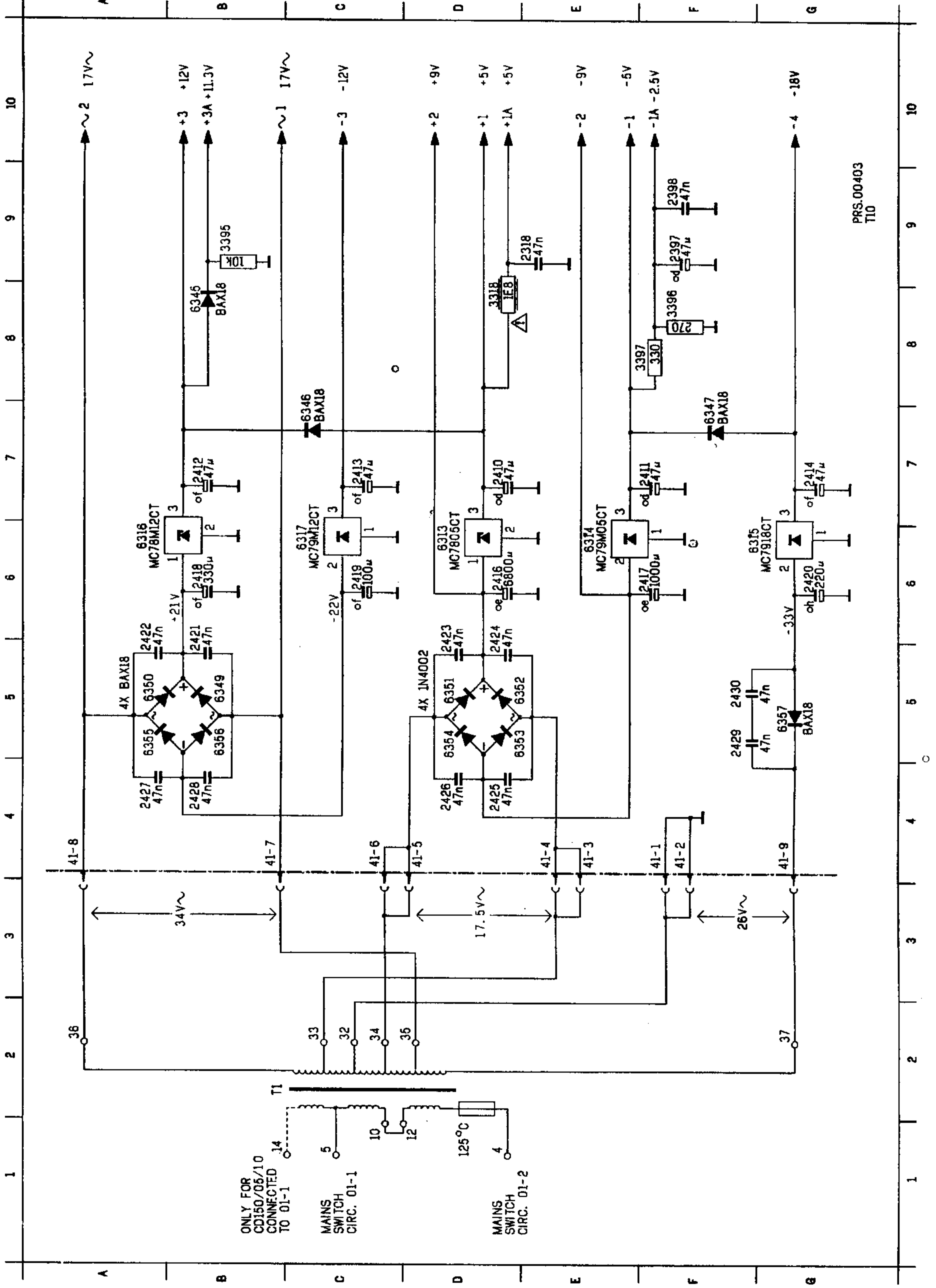
For Service Manuals Contact
MAURITRON TECHNICAL SERVICES
 8 Cherry Tree Rd, Chinnor
 Oxon OX9 4QY
 Tel: 01844-351694 Fax: 01844-352554
 Email: enquiries@mauritron.co.uk

PRE-00498

PRE-00498

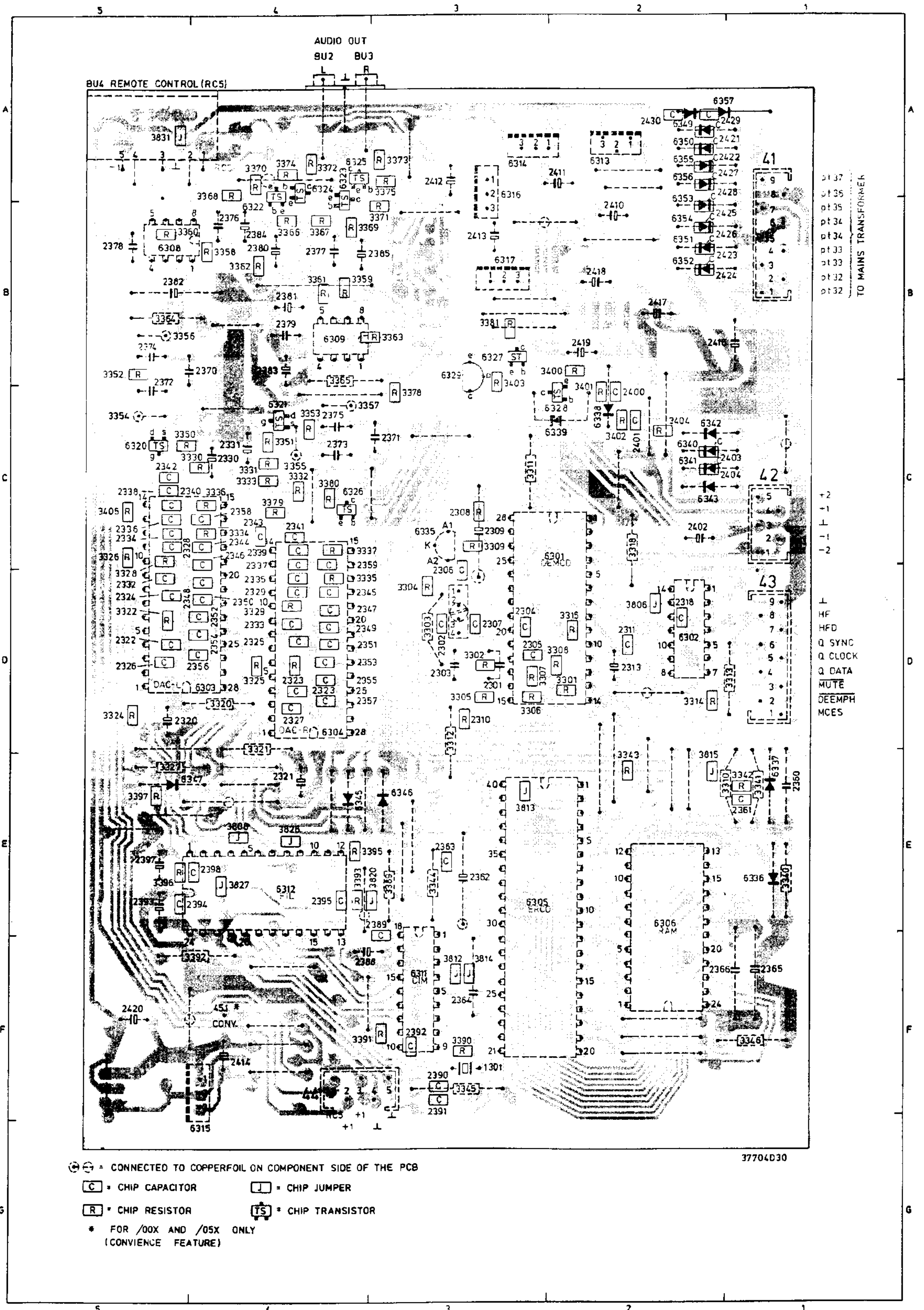
- | | | | | | |
|--------|---|--|---------|---|---------------------------------------|
| 80-B3 | - | Control bits for radial circuit | CLDE | - | Clock from DEMOD to ERCO |
| DAC | - | Current output for track jumping (Digital to Analogue Converter) | CLEC | - | Clock from ERCO to CIM |
| DEEMPH | - | Deemphasis | CRI | - | Counter reset inhibit |
| DODS | - | Drop out detector suppression | DADE | - | Data from DEMOD to ERCO |
| D1+4 | - | Photodiode currents | DAEC | - | Data from ERCO to CIM |
| FE lag | - | Focus error signal | DEEMPH | - | Deemphasis |
| HF | - | HF error signal for LAG network | DLCF | - | Data left from CIM to FIL |
| HFD | - | HF detector output for DEMOD | DRCF | - | Data right from CIM to FIL |
| HF-in | - | HF current input | FSDE | - | Frame sync. from DEMOD to ERCO |
| IC | - | Clock signal servo-control μP | FSEC | - | Frame sync. from ERCO to CIM |
| ICD | - | Data signal servo-control μP | HF | - | HF input for DEMOD |
| LM | - | Laser monitor diode input | HFD | - | HF detector for DEMOD |
| LO | - | Laser amplifier current output | IC | - | Clock signal servo-control μP |
| MCES | - | Motor control from ERCO to servo circuit | ICD | - | Data signal servo-control μP |
| MUTE | - | Mute signal | MCES | - | Motor control from ERCO to servo |
| | | | MUTE | - | Mute signal |
| | | | Q CLOCK | - | Subcode clock signal |
| | | | Q DATA | - | Subcode data signal |
| | | | 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



PR8-00403
T10

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)

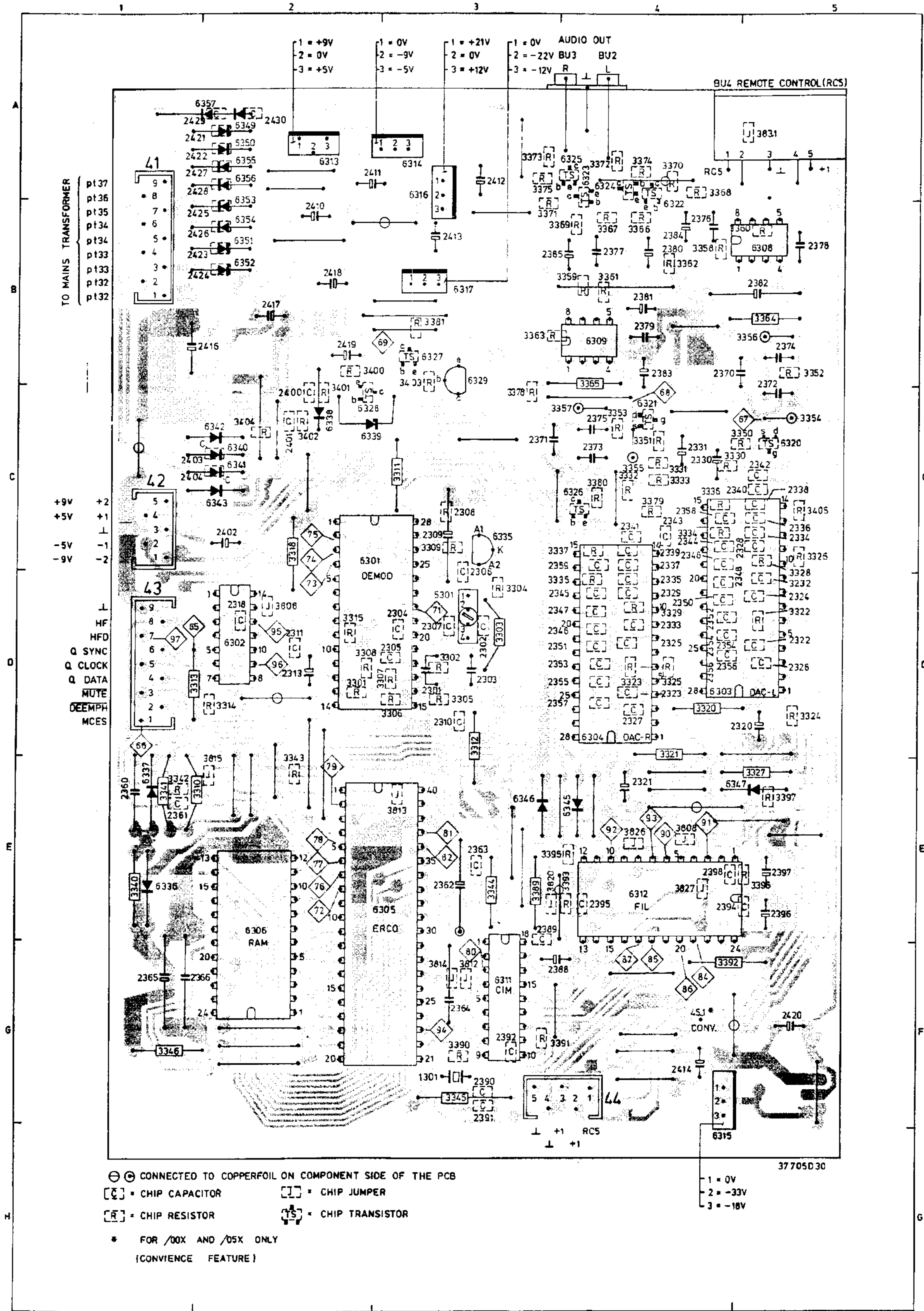
37704D30

pt 37
pt 35
pt 35
pt 34
pt 33
pt 33
pt 32
pt 32

TO MAINS TRANSFORMER

+2
-1
+1
-1
-2

L
HF
HF D
Q SYNC
Q CLOCK
Q DATA
MUTE
DEEMPH
MCES

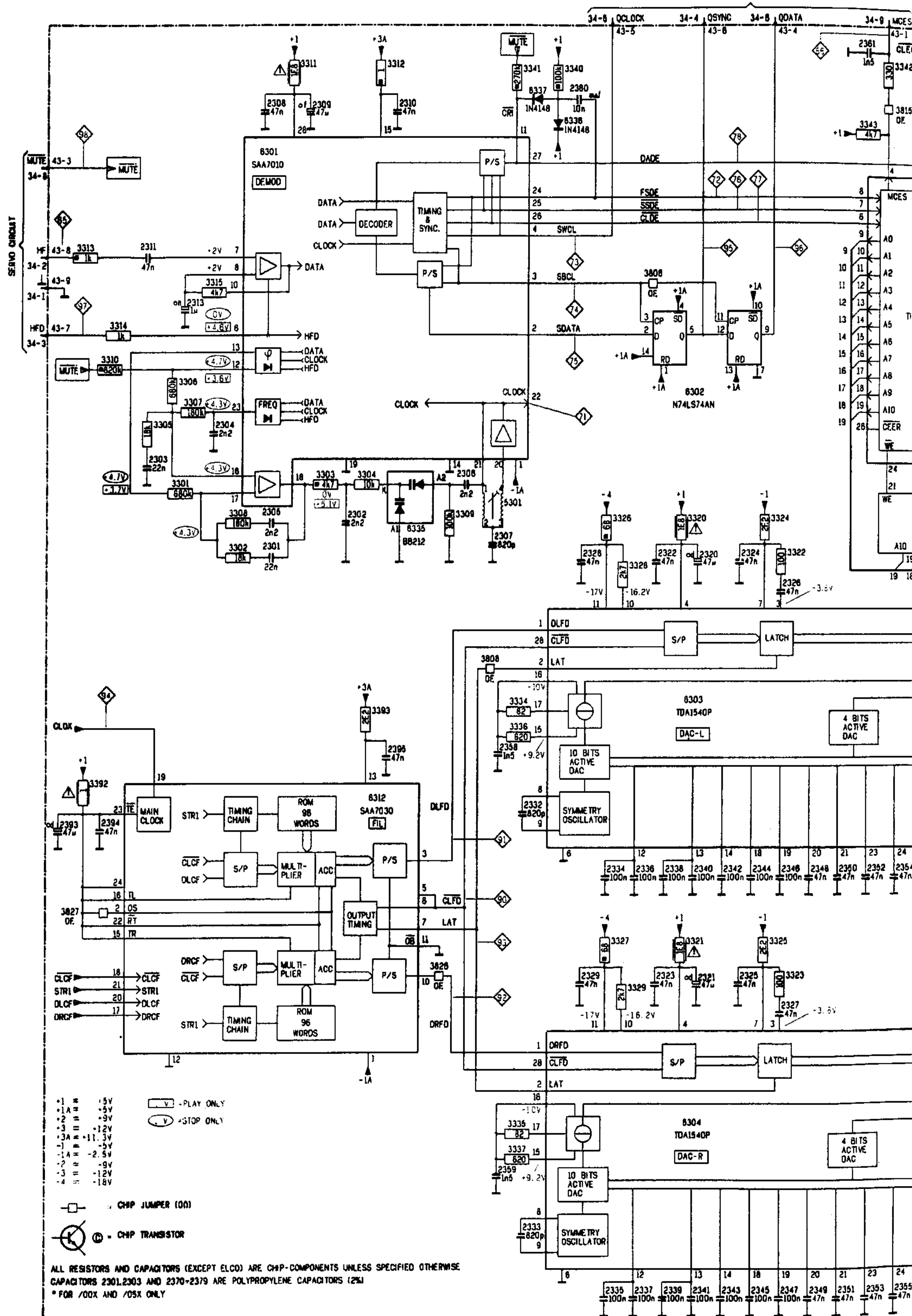


⊖ ⊕ CONNECTED TO COPPERFOIL ON COMPONENT SIDE OF THE PCB
 [C] = CHIP CAPACITOR [J] = CHIP JUMPER
 [R] = CHIP RESISTOR [TS] = CHIP TRANSISTOR
 * FOR /00X AND /05X ONLY
 (CONVENIENCE FEATURE)

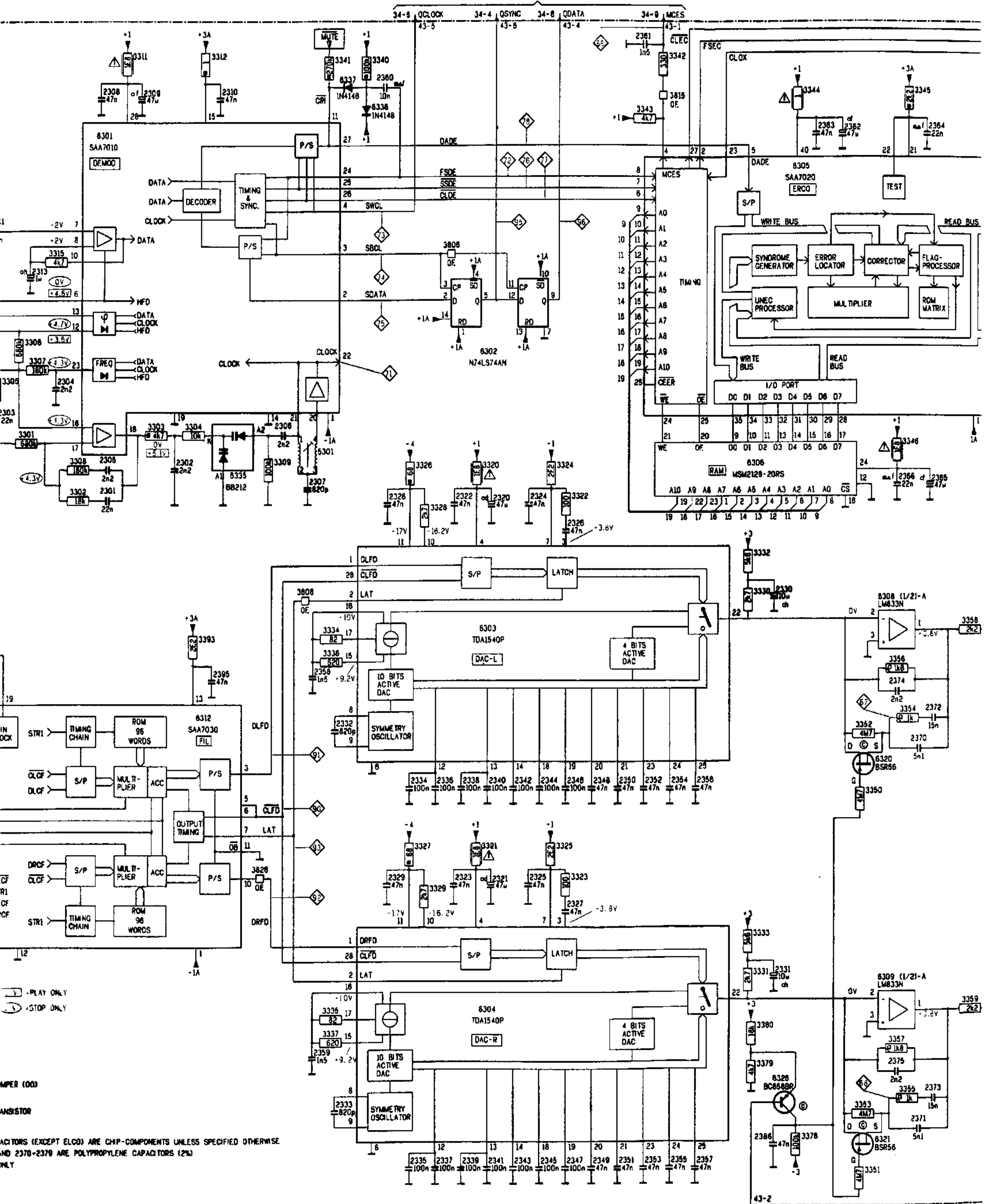
1 = 0V
 2 = -33V
 3 = -18V

DECODER CIRCUIT

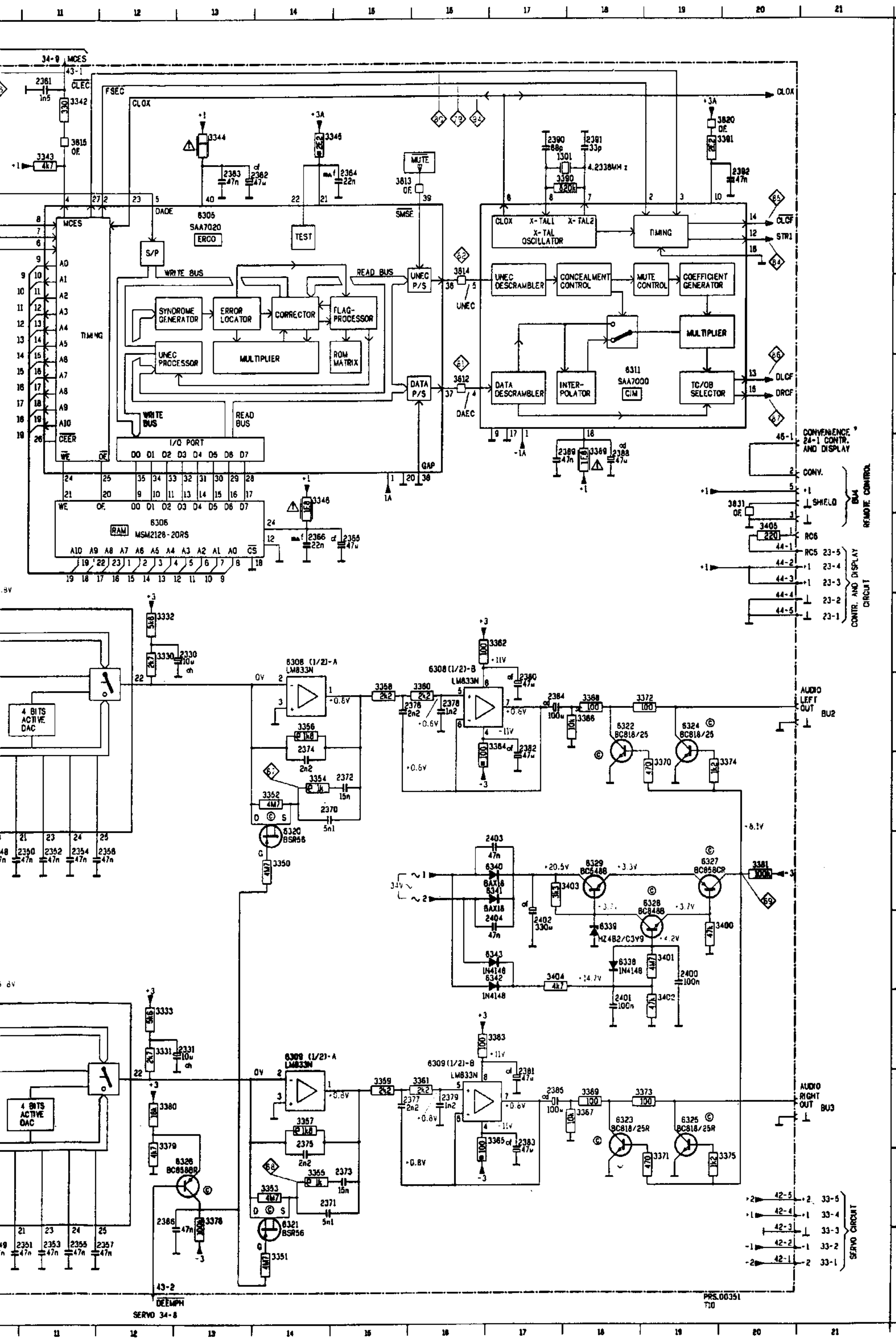
SERVO CIRCUIT



SERVO CIRCUIT



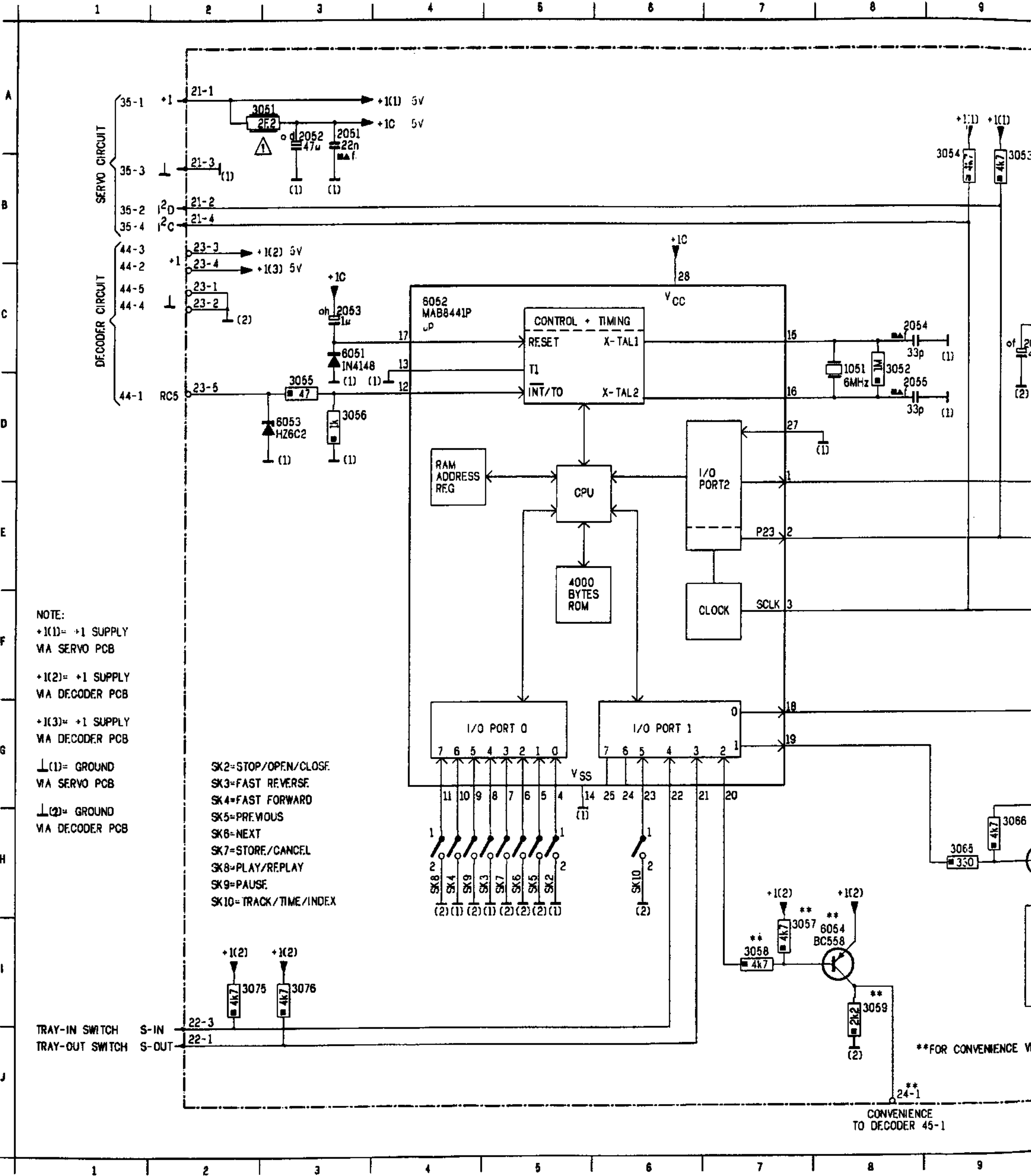
V - PLAY ONLY
 V - STOP ONLY
 AMPER (OO)
 ANSISTOR
 ACTORS (EXCEPT ELCO) ARE CHIP-COMPONENTS UNLESS SPECIFIED OTHERWISE
 AND 2370-2379 ARE POLYPROPYLENE CAPACITORS (2%)
 ONLY



6311	E18	3378	O13
1301	G18	3379	N12
2301	G4	3380	N12
2302	G5	3381	K20
2303	F2	3389	F18
2304	F3	3390	B17
2305	G4	3391	B20
2306	F5	3392	J2
2307	G6	3393	I5
2308	B4	3400	L20
2309	B5	3401	L19
2310	C2	3402	M19
2311	C3	3403	K18
2312	D3	3404	L17
2320	G9	3405	G20
2321	L9	3806	D8
2322	L9	3808	H8
2323	L9	3812	E16
2324	L9	3813	B15
2325	L9	3814	C16
2326	G10	3815	B11
2327	L10	3820	B20
2328	G8	3826	L8
2329	L8	3827	K8
2330	M13	3831	F20
2331	M13	5301	F7
2332	J7	6301	B4
2333	O7	6302	E9
2334	K8	6303	I9
2335	P8	6304	N9
2336	K8	6305	C13
2337	P8	6306	G12
2338	K9	6308	M16
2339	P9	6308	M14
2340	K9	6309	M16
2341	P9	6309	M14
2342	K9	6312	J5
2343	P9	6320	J14
2344	K10	6321	O14
2345	P10	6322	L18
2346	K10	6323	M18
2347	P10	6324	M19
2350	K11	6325	M19
2351	P11	6326	O13
2352	K11	6327	K19
2353	P11	6328	K19
2354	K11	6329	K18
2355	P11	6335	G5
2356	K12	6336	B7
2357	P12	6337	B7
2358	I7	6338	L18
2359	N7	6339	L18
2360	B7	6340	K17
2362	B14	6341	K17
2363	B13	6342	L17
2364	B15	6343	L17
2365	B15		
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	M17		
2382	I17		
2383	M17		
2384	I17		
2385	M17		
2386	O12		
2388	I18		
2389	I18		
2390	B17		
2391	B18		
2392	B20		
2393	J1		
2394	J2		
2395	I5		
2400	L19		
2401	M18		
2402	L17		
2403	K17		
2404	L17		
3301	F3		
3302	G3		
3303	F4		
3304	F5		
3305	F2		
3306	E3		
3307	E3		
3308	G3		
3309	G6		
3310	E2		
3311	A4		
3312	A5		
3313	C1		
3314	O2		
3315	O3		
3320	G9		
3321	L9		
3322	G10		
3323	L10		
3324	G10		
3325	L10		
3326	G8		
3327	L8		
3328	G8		
3329	L8		
3330	M12		
3331	M12		
3332	M12		
3333	M12		
3334	I7		
3335	M7		
3336	I7		
3337	M7		
3340	R7		
3341	R7		
3342	R11		
3343	B11		
3344	B13		
3345	B15		
3346	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	I17		
3363	M17		
3364	I17		
3365	M17		
3366	I18		
3367	M18		
3368	I18		
3369	M18		
3370	I19		
3371	O19		
3372	I19		
3373	M19		
3374	J20		
3375	O20		

CONTROL + DISPLAY CIRCUIT

1051	C 8	1053	C 15	1058	F 16	2052	A 3	2054	C 8	2056	C 10	2058	D 16	3052	C 8	3054	B 9	3056	D 3	3058	I 7	3064	C 10	3066	H 9
1052	B 11	1054	D 15	2051	A 3	2053	C 3	2055	D 8	2057	D 10	3051	A 3	3053	B 9	3055	D 3	3057	I 7	3059	I 8	3065	H 9	3068	I 11



NOTE:
 +1(1)= +1 SUPPLY
 VIA SERVO PCB
 +1(2)= +1 SUPPLY
 VIA DECODER PCB
 +1(3)= +1 SUPPLY
 VIA DECODER PCB
 ⊥(1)= GROUND
 VIA SERVO PCB
 ⊥(2)= GROUND
 VIA DECODER PCB

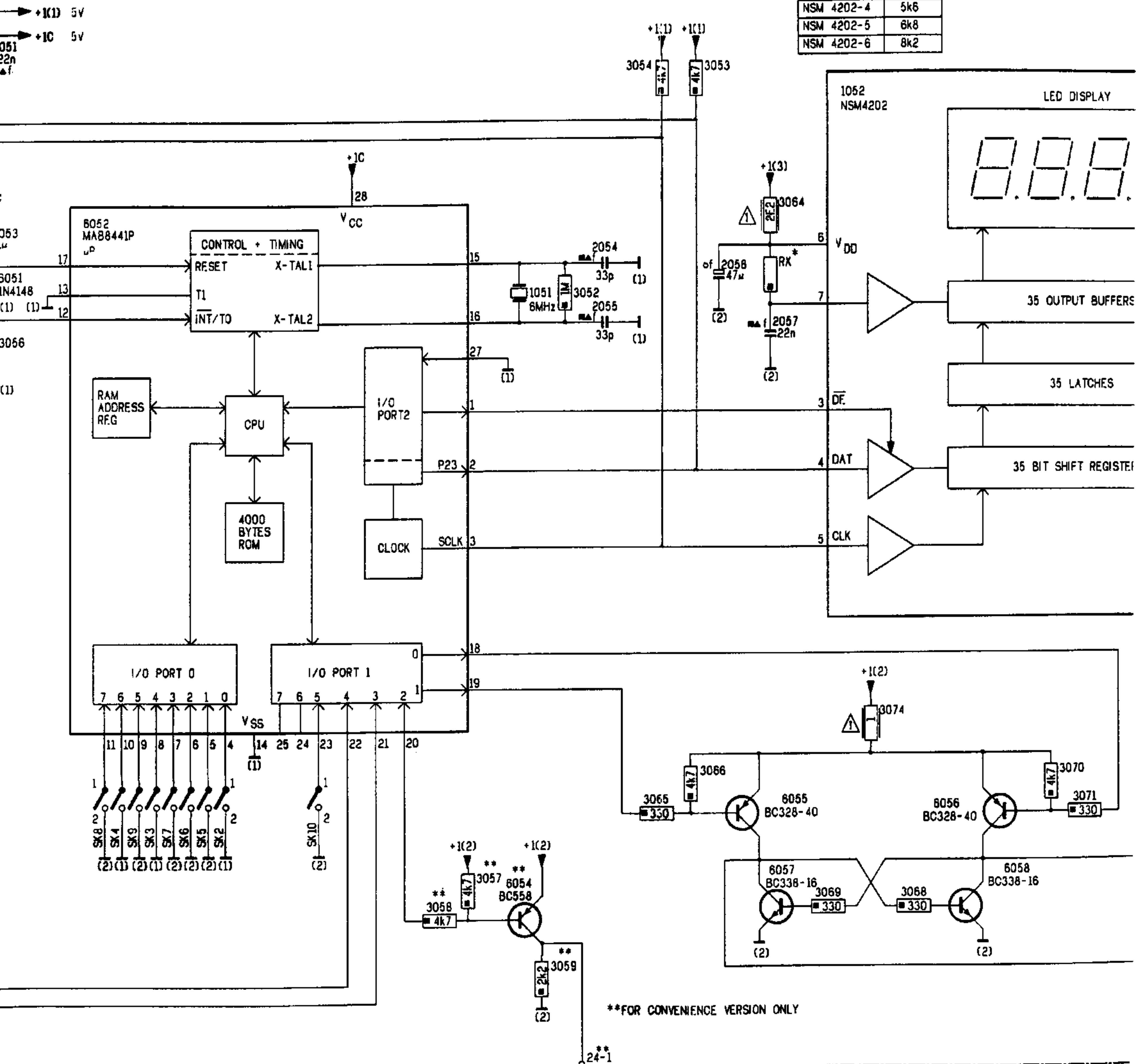
SK2=STOP/OPEN/CLOSE.
 SK3=FAST REVERSE.
 SK4=FAST FORWARD
 SK5=PREVIOUS
 SK6=NEXT
 SK7=STORE/CANCEL
 SK8=PLAY/REPLAY
 SK9=PAUSE
 SK10=TRACK/TIME/INDEX

**FOR CONVENIENCE VIA

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 INTEN:
 TYPENUMBER OF THE DISPLAY IS P

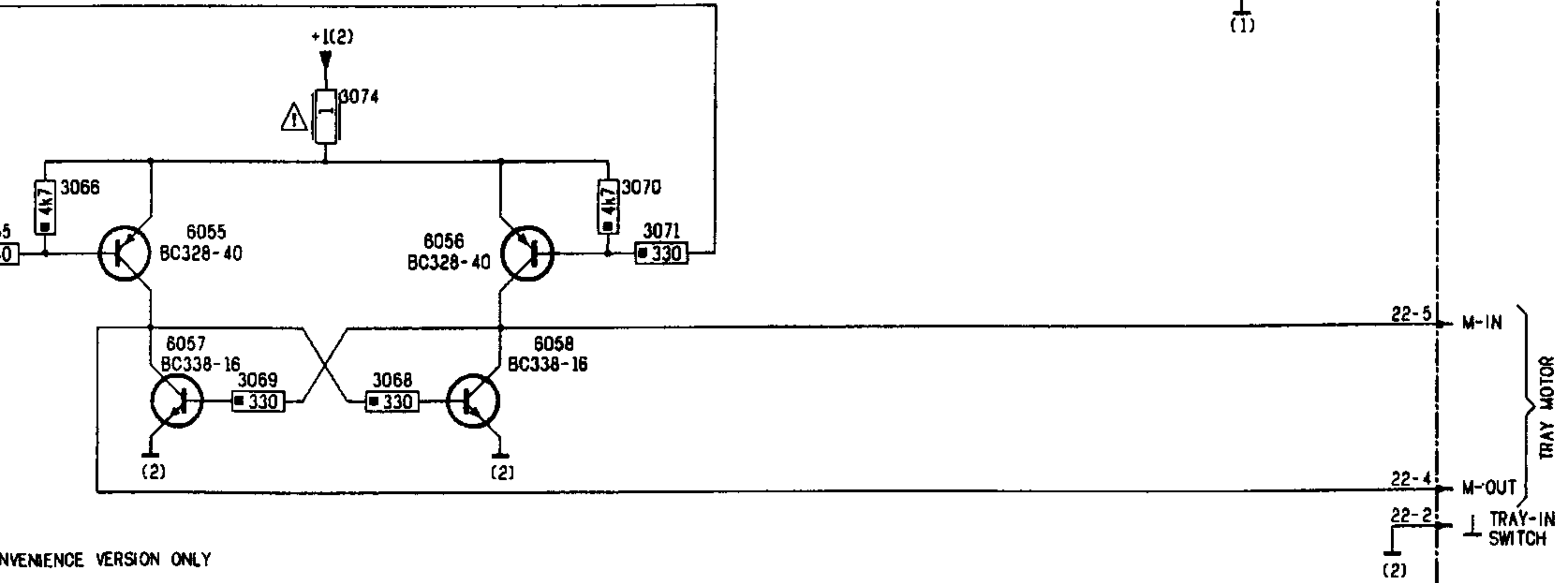
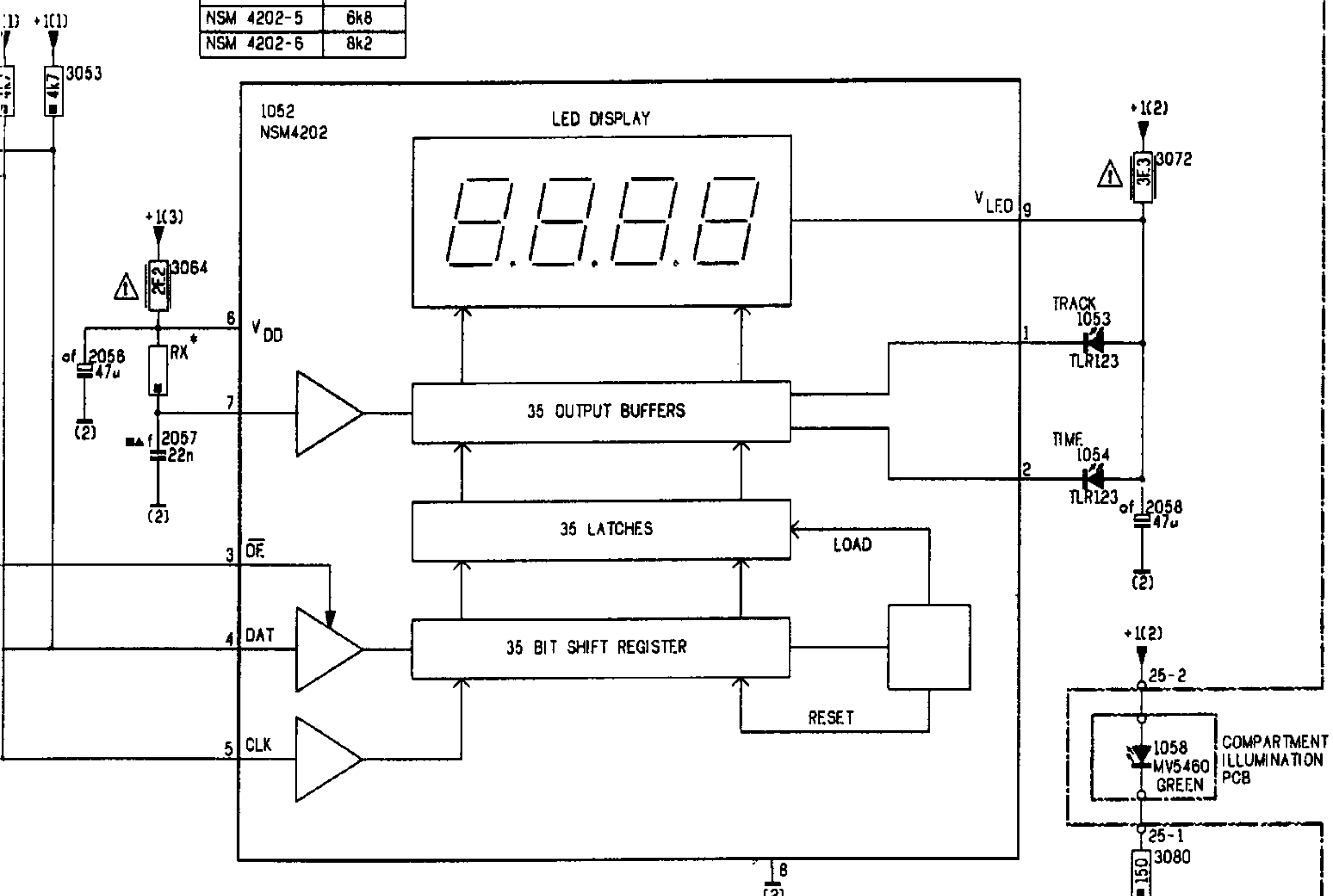


**FOR CONVENIENCE VERSION ONLY

CONVENIENCE
 TO DECODER 45-1

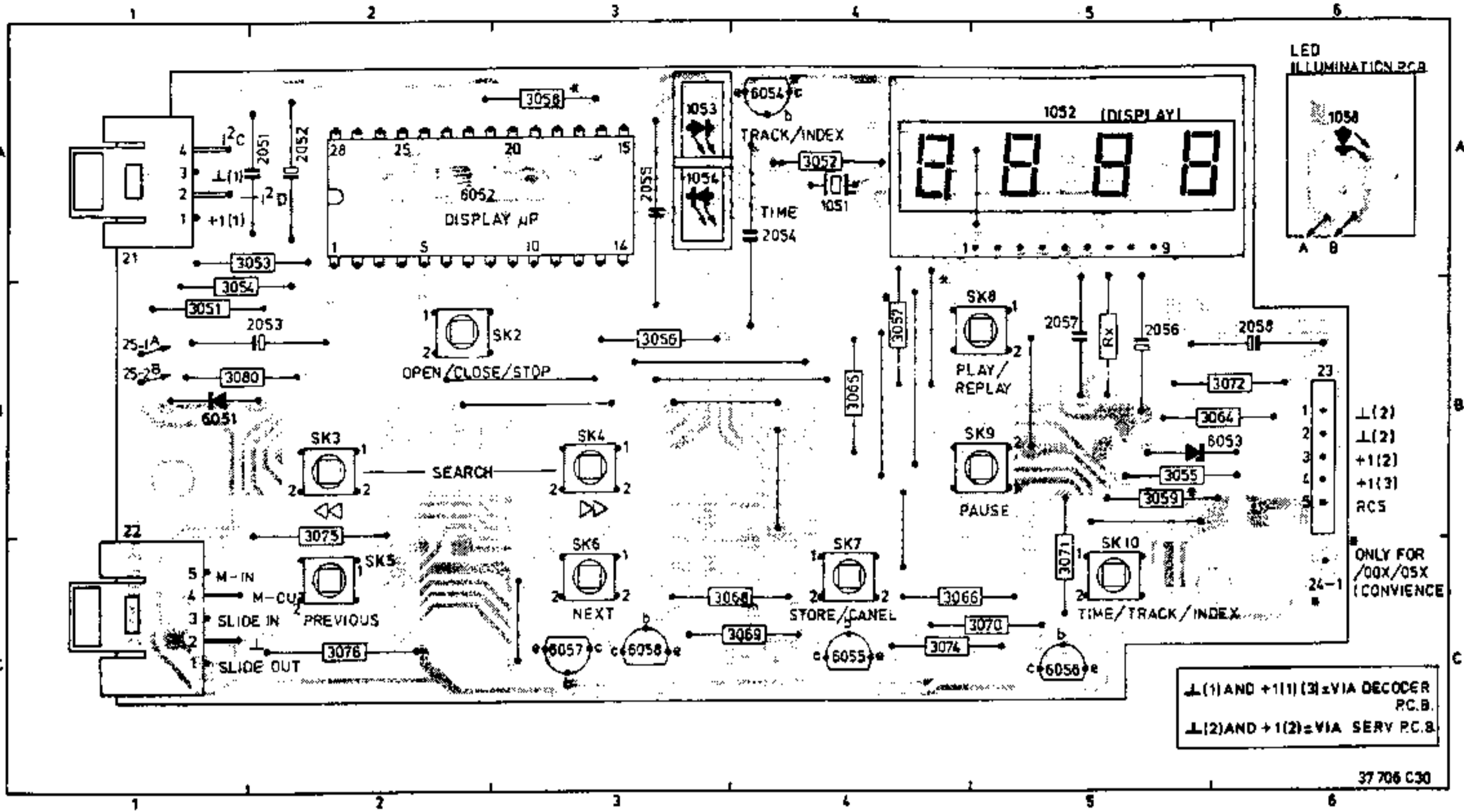
DISPLAY TYPE	RX
NSM 4202-3	4k7
NSM 4202-4	5k6
NSM 4202-5	6k8
NSM 4202-6	8k2

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



CONVENIENCE VERSION ONLY

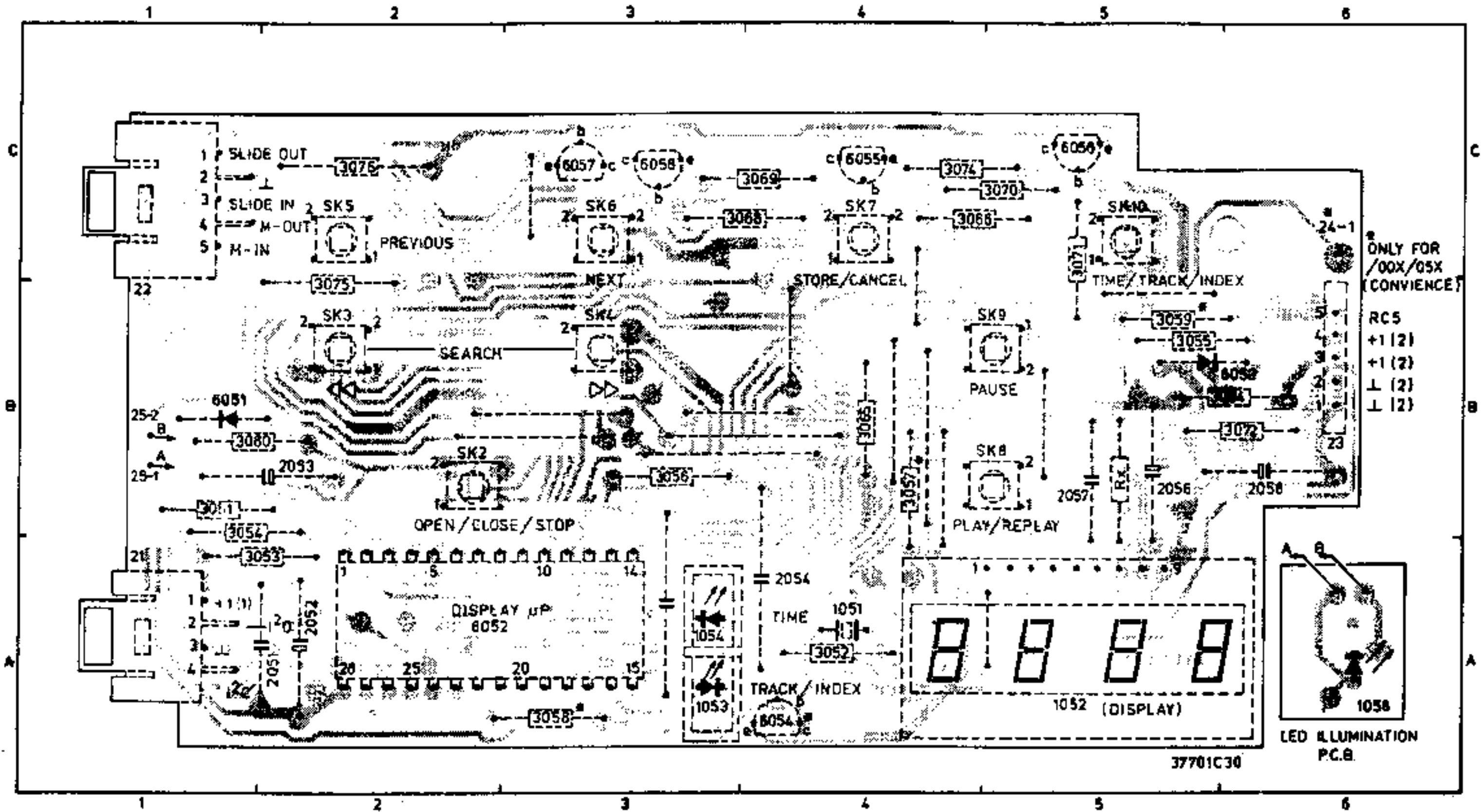
CONTROL + DISPLAY PCB



37 706 C30

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	

- XX B5
- SK2 B2
- SK3 B2
- SK4 B3
- SK5 C2
- SK6 C3
- SK7 C4
- SK8 B5
- SK9 B5
- 1051 A4
- 1052 A3
- 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 C3
- 6057 C3
- 6058 C3
- SK10 C5



ONLY FOR
/00X/05X
(CONVIENCE)

RC5
+1 (2)
+1 (2)
L (2)
L (2)

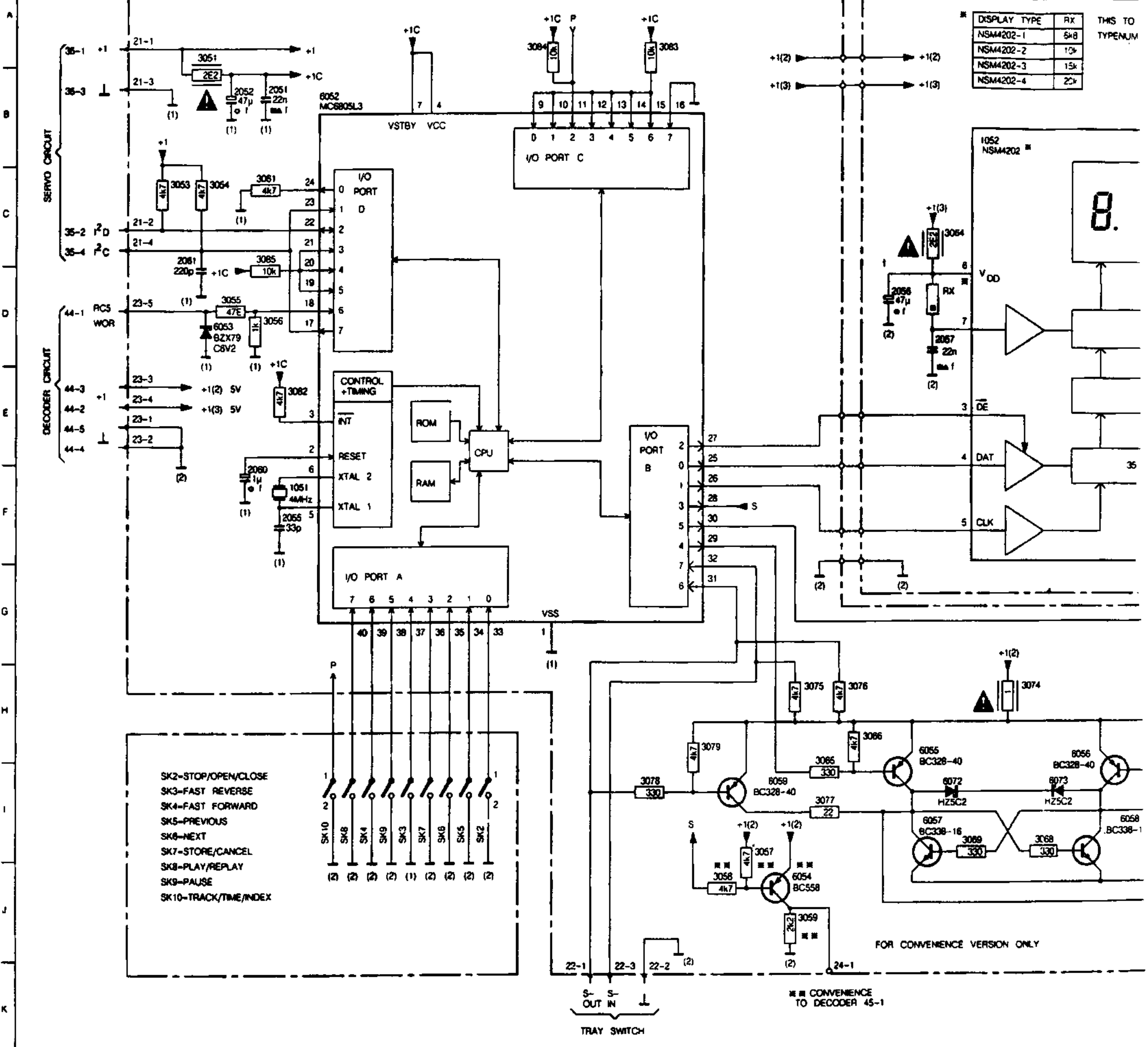


LED ILLUMINATION
P.C.B.

37701C30

1051 F 3 1054 D15 2052 B 3 2057 D10 2061 C 2 3054 C 2 3057 I 8 3061 C 3 3068 H 9 3070 H12 3074 H11 3077 I 8 3080 F16 3084 A 6 E053 D 2 6056
 1052 B10 1058 G16 2055 F 3 2058 E18 3051 A 2 3055 D 2 3058 J 7 3064 C10 3068 I11 3071 H12 3075 H 8 3078 I 7 3082 E 3 3085 C 3 E054 J 8 6057
 1053 D15 2051 B 3 2056 D 9 2060 F 3 3053 C 2 3056 D 3 3059 J 8 3065 H 8 3069 I10 3072 C16 3076 H 9 3079 H 7 3083 A 7 6052 B 3 E055 H10 6058

CONTROL+DISPLAY CIRCUIT B



DISPLAY TYPE	RX	THIS TO
NSM4202-1	5*8	TYPENJM
NSM4202-2	10*	
NSM4202-3	15*	
NSM4202-4	20*	

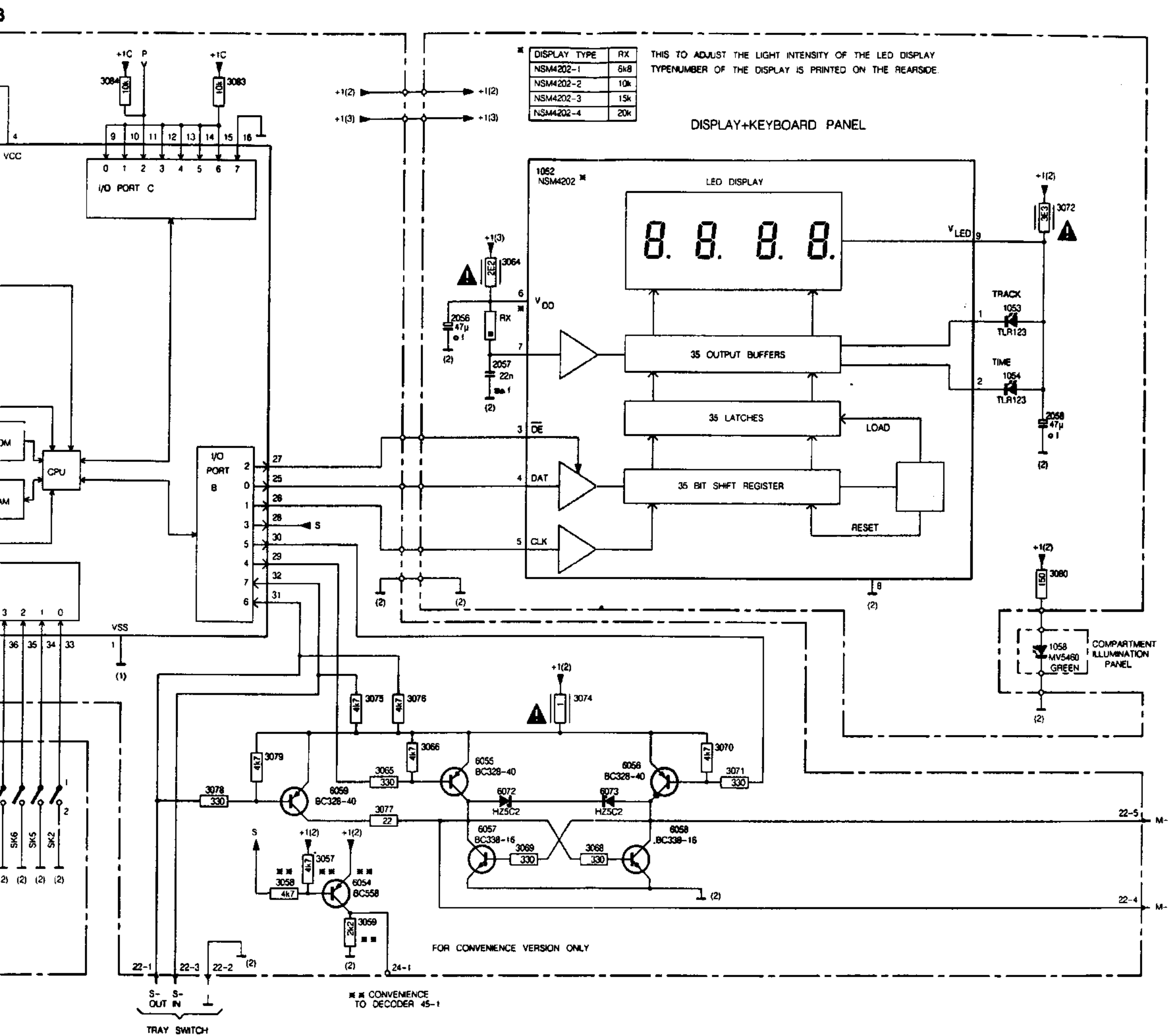
- SK2-STOP/OPEN/CLOSE
- SK3-FAST REVERSE
- SK4-FAST FORWARD
- SK5-PREVIOUS
- SK6-NEXT
- SK7-STORE/CANCEL
- SK8-PLAY/REPLAY
- SK9-PAUSE
- SK10-TRACK/TIME/INDEX

FOR CONVENIENCE VERSION ONLY

CONVENIENCE TO DECODER 45-1

C 2 3057 I 8 3061 C 3 3066 H 9 3070 H12 3074 H11 3077 I 8 3080 F18 3084 A 6 6053 D 2 6056 H11 6059 I 8
D 2 3058 J 7 3064 C10 3068 I11 3071 H12 3075 H 8 3078 I 7 3082 E 3 3085 C 3 6054 J 8 6057 I10 6072 I10
D 3 3059 J 8 3065 H 8 3069 I10 3072 C16 3076 H 9 3079 H 7 3083 A 7 6052 B 3 6055 H10 6058 I12 6073 I11

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



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

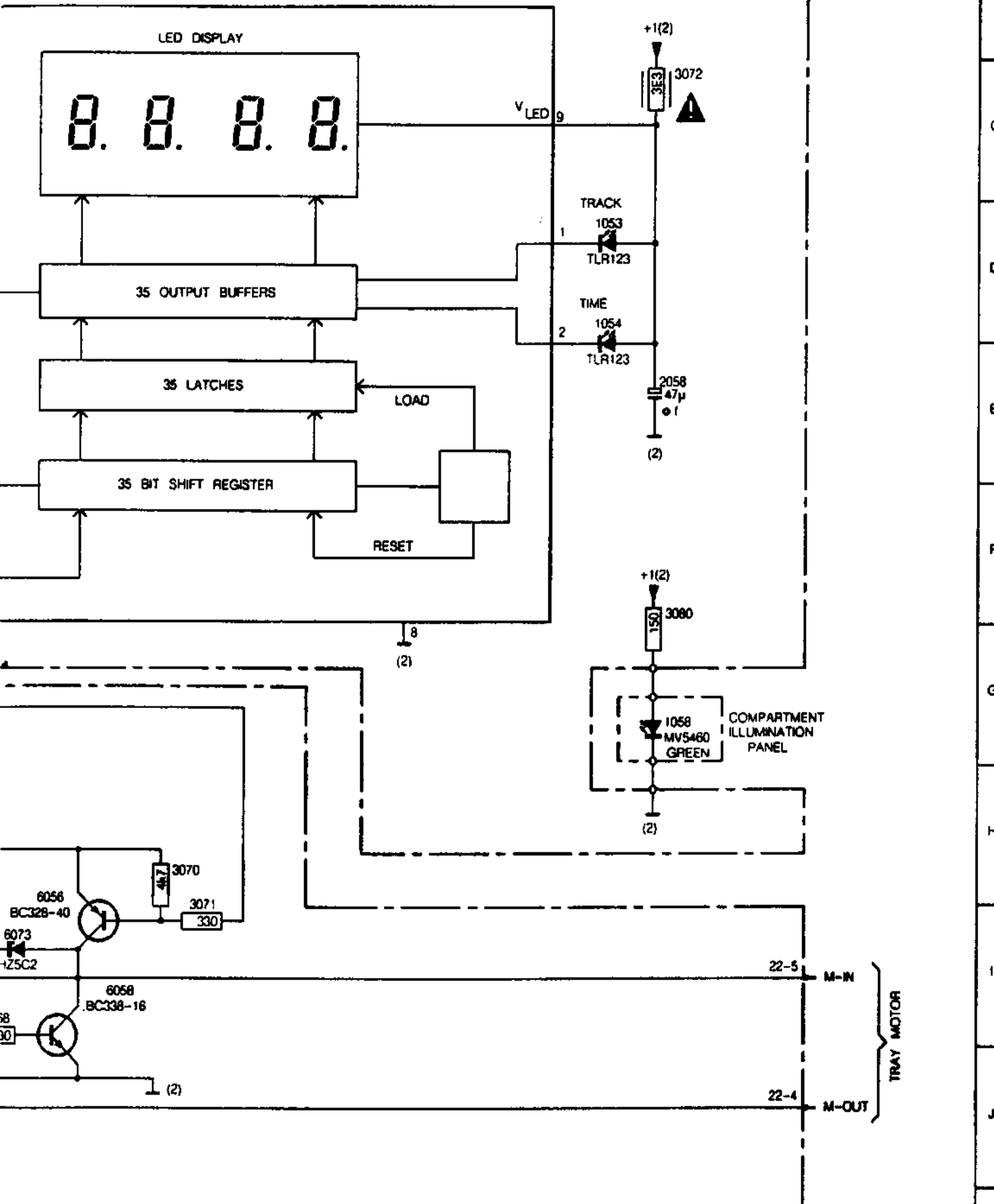
053 O 2 6056 H11 6059 1 8
 054 J 8 6057 110 6072 110
 055 H10 6058 112 6073 111

11 12 13 14 15 16 17

RX
6k8
10k
15k
20k

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

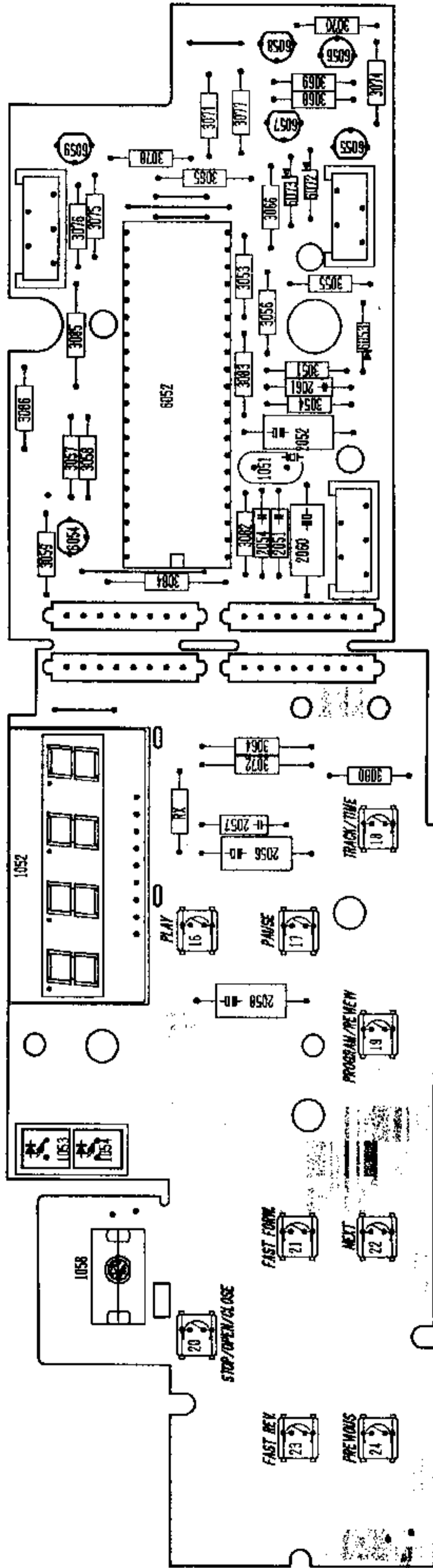
DISPLAY+KEYBOARD PANEL



6-7-2
6-7-2

1051 B 5 1058 A 2 19 C 3 2054 B 5 2060 B 5 23 B 1 3054 B 6 3058 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 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 6 3064 B 4 3068 B 7 3074 C 7 3078 B 7 3084 B 5 6053 C 6 6073 B 7
 1054 B 2 18 C 4 2052 B 5 2058 B 3 22 C 2 3053 B 6 3057 A 5 3070 B 7 3075 B 7 3080 C 4 3085 A 6 6054 A 5 6058 B 7
 RX
 TX

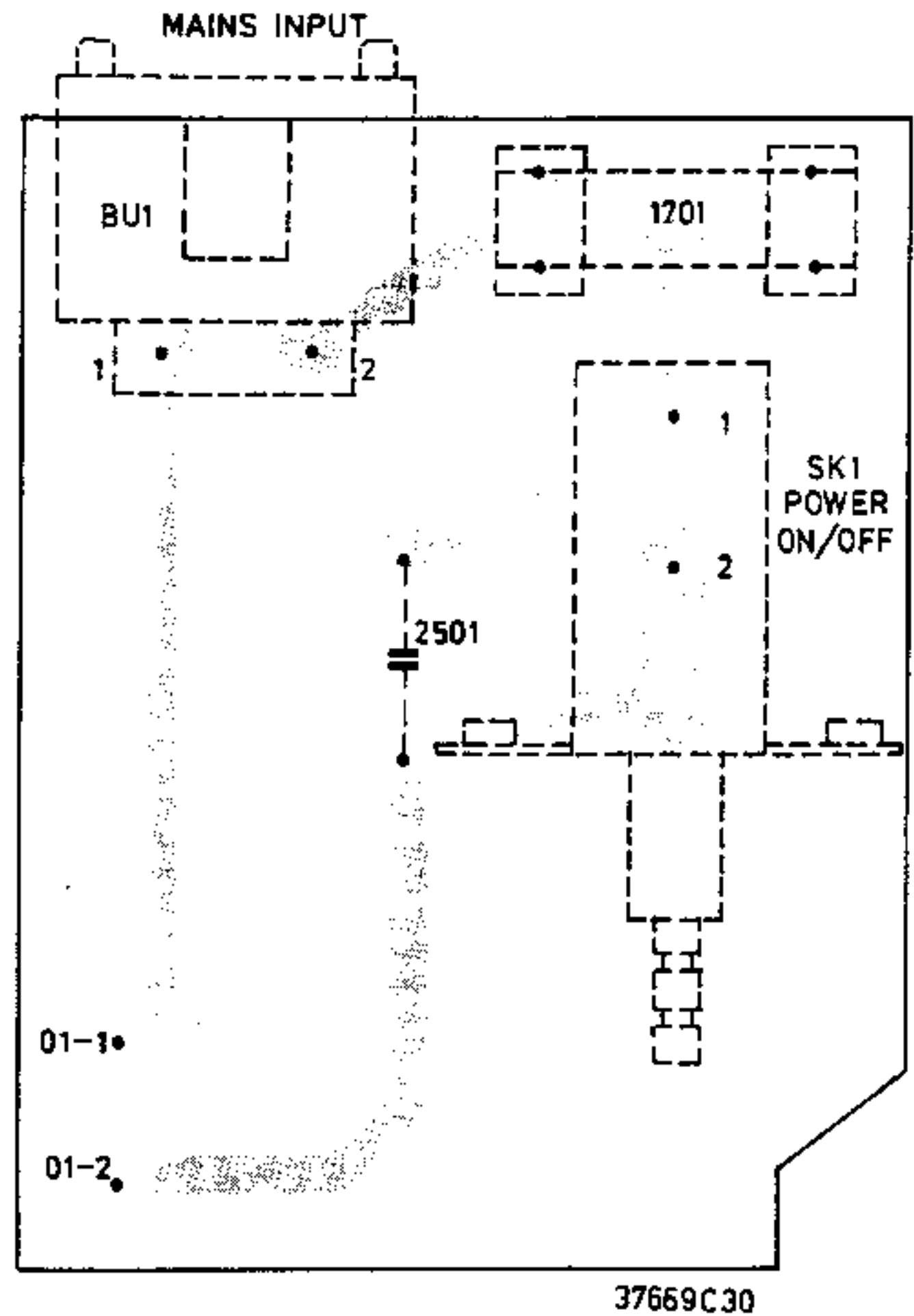
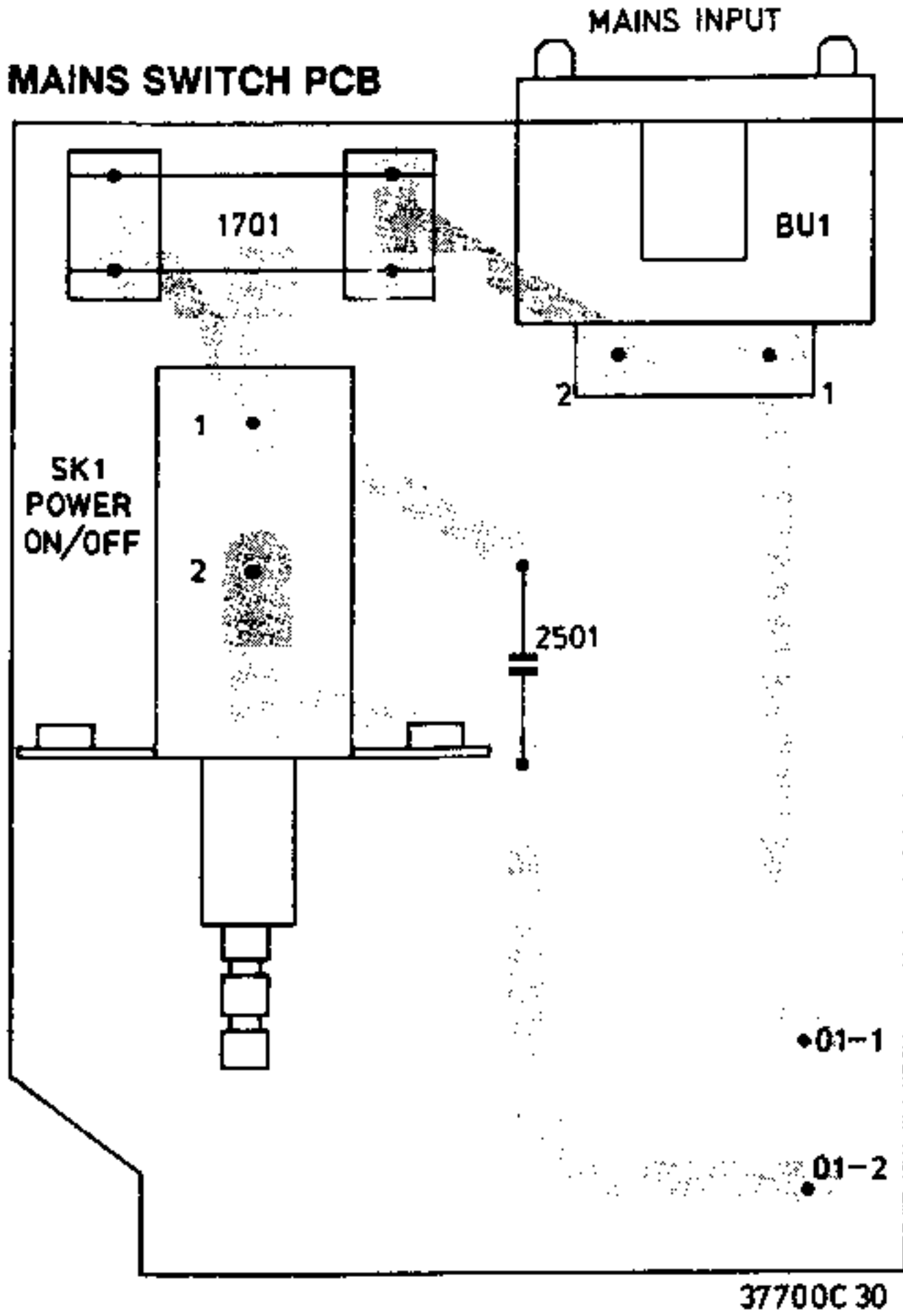
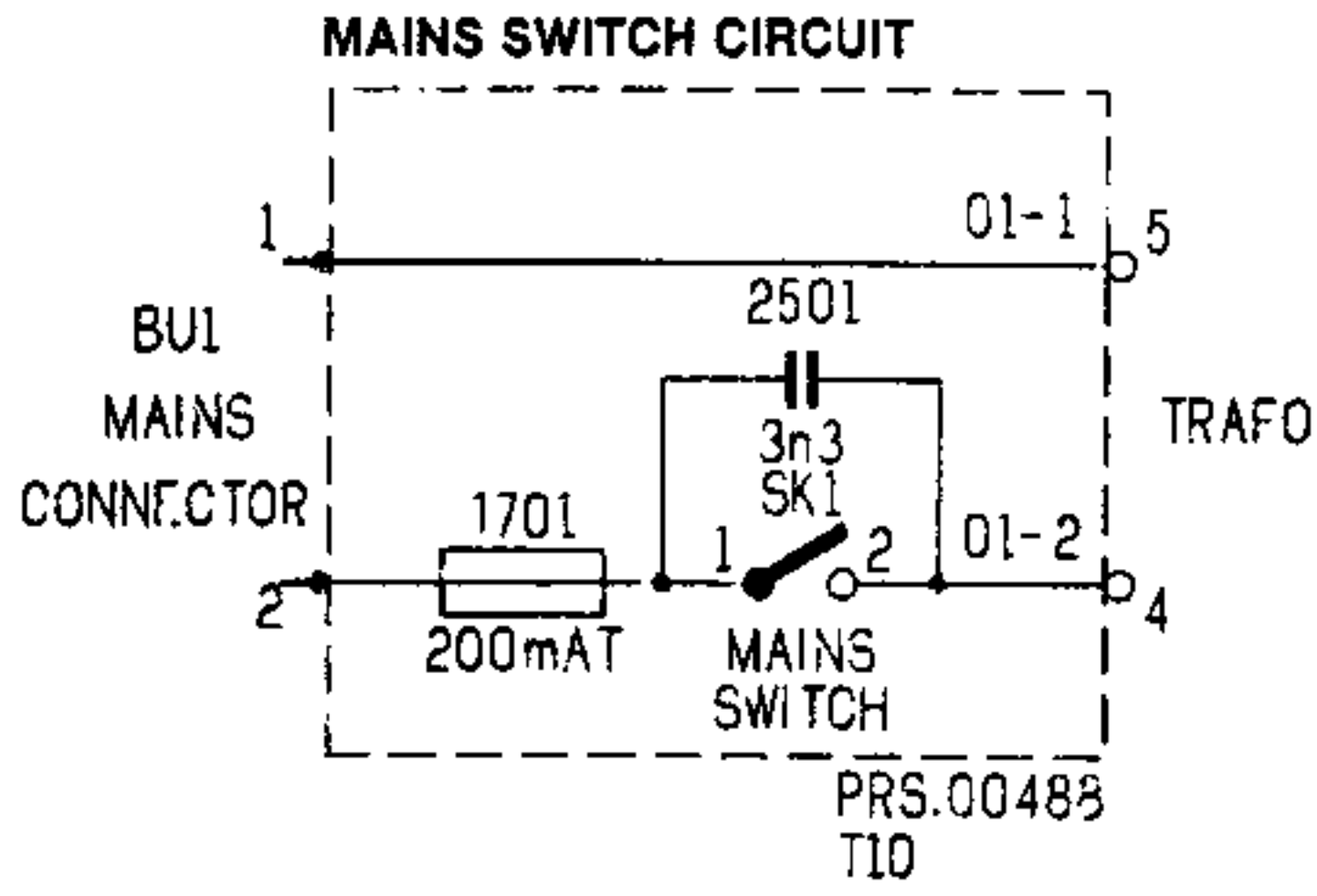
CONTROL AND DISPLAY PANEL - B







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

6052	μP MC8805L3P	4822 209 11445	3051, 3064 3072 3074	2.2Ω-NFR25 3.3Ω-NFR25 2Ω-NFR25	4822 111 30492 4822 111 30493 4822 111 30483
BC328-40 BC338-16 BC558		4822 130 41715 4822 130 40692 4822 130 44197			
			1051	X-181 4 MHz	4822 242 70831
			Display		
IN4148 HZ5C2 (5V1)		4822 130 30621 4822 130 33293	1052	NSM4202	4822 130 90141
			SK+10	TACT SWITCH	4822 276 11276
1053, 1054 1058	TLR123 (RED) MV5460 (GREEN)	5322 130 34957 4822 130 32842			


39 977 C12



	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		4822 492 60063
	BU-1 mains inlet		4822 265 20262

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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

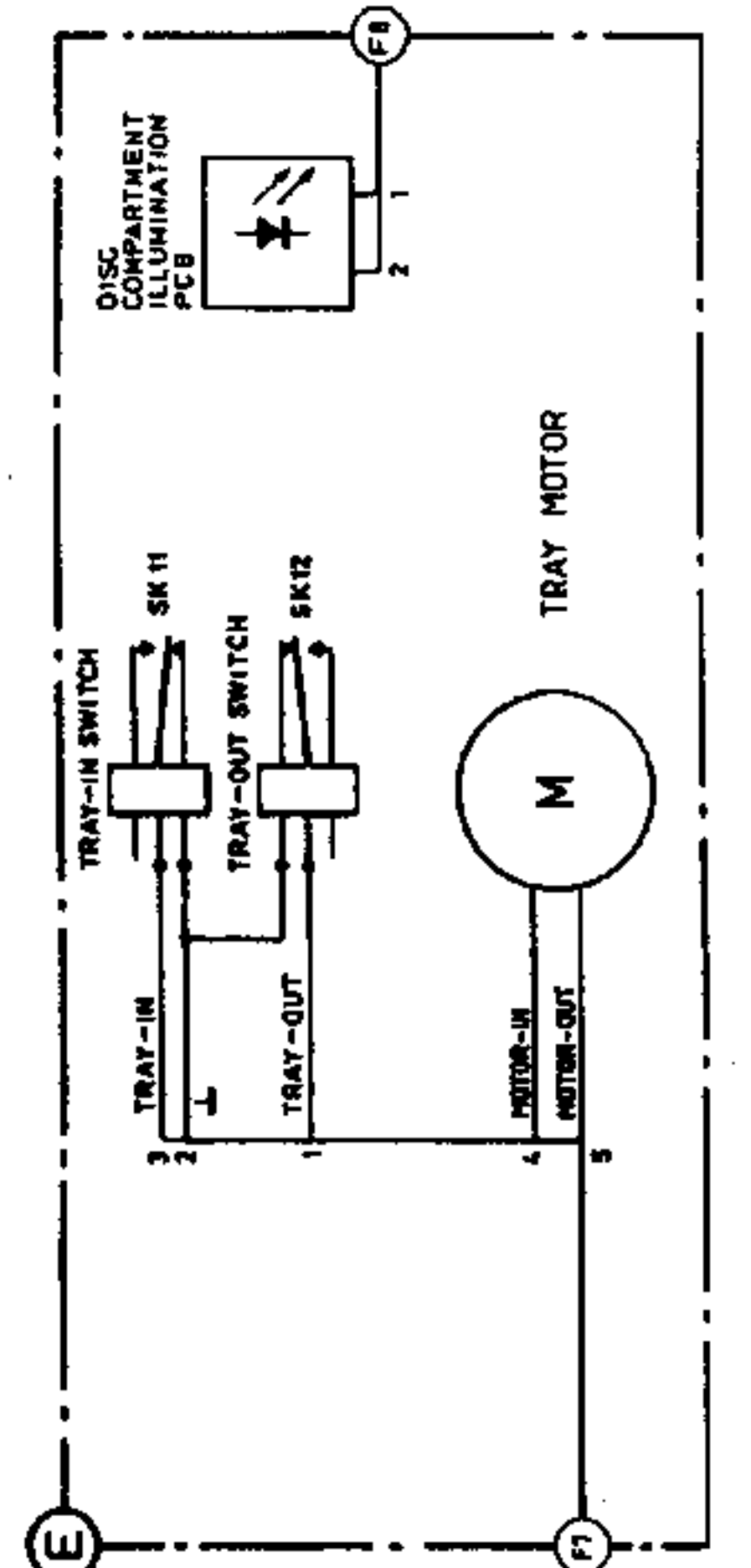
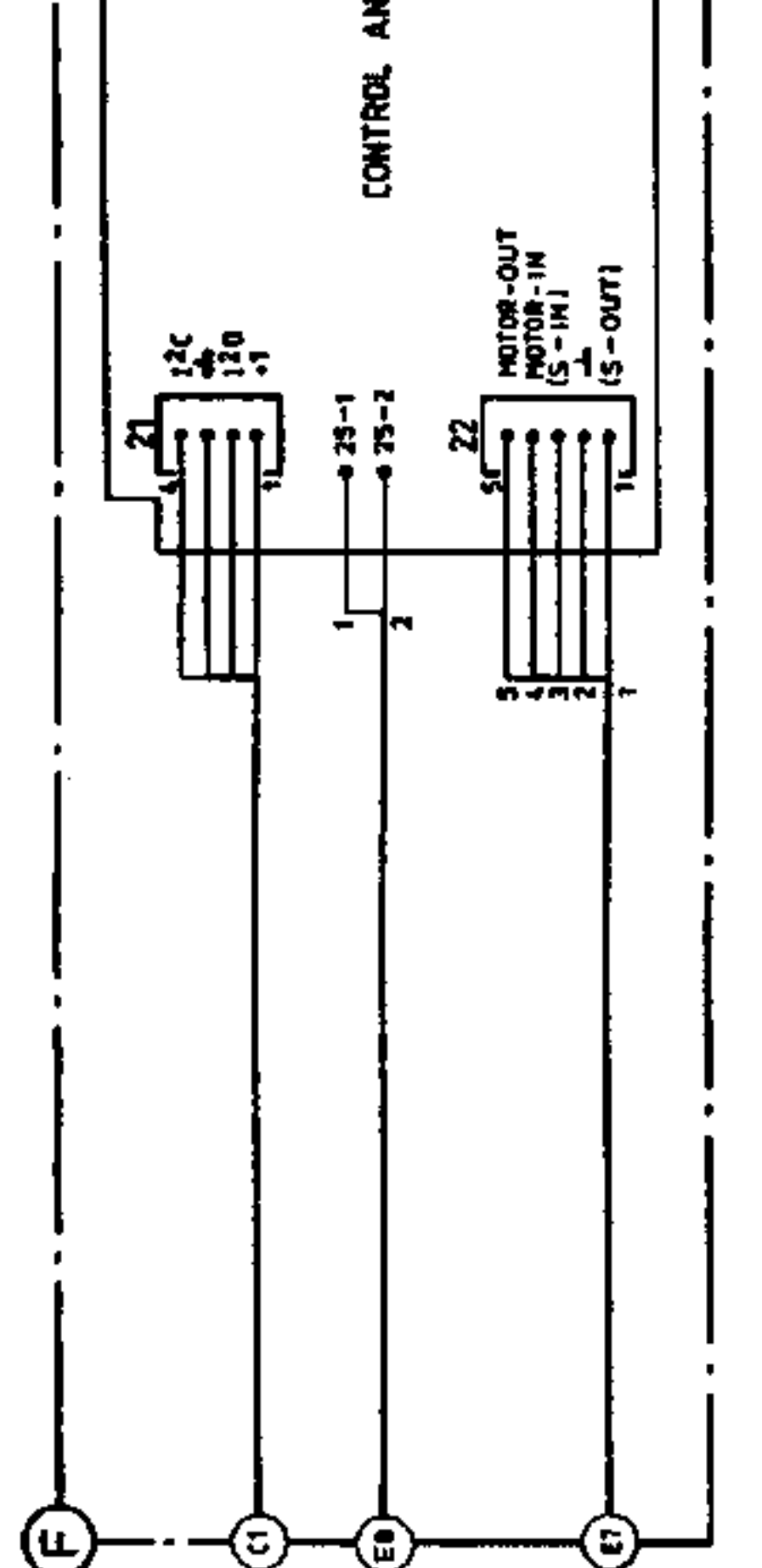
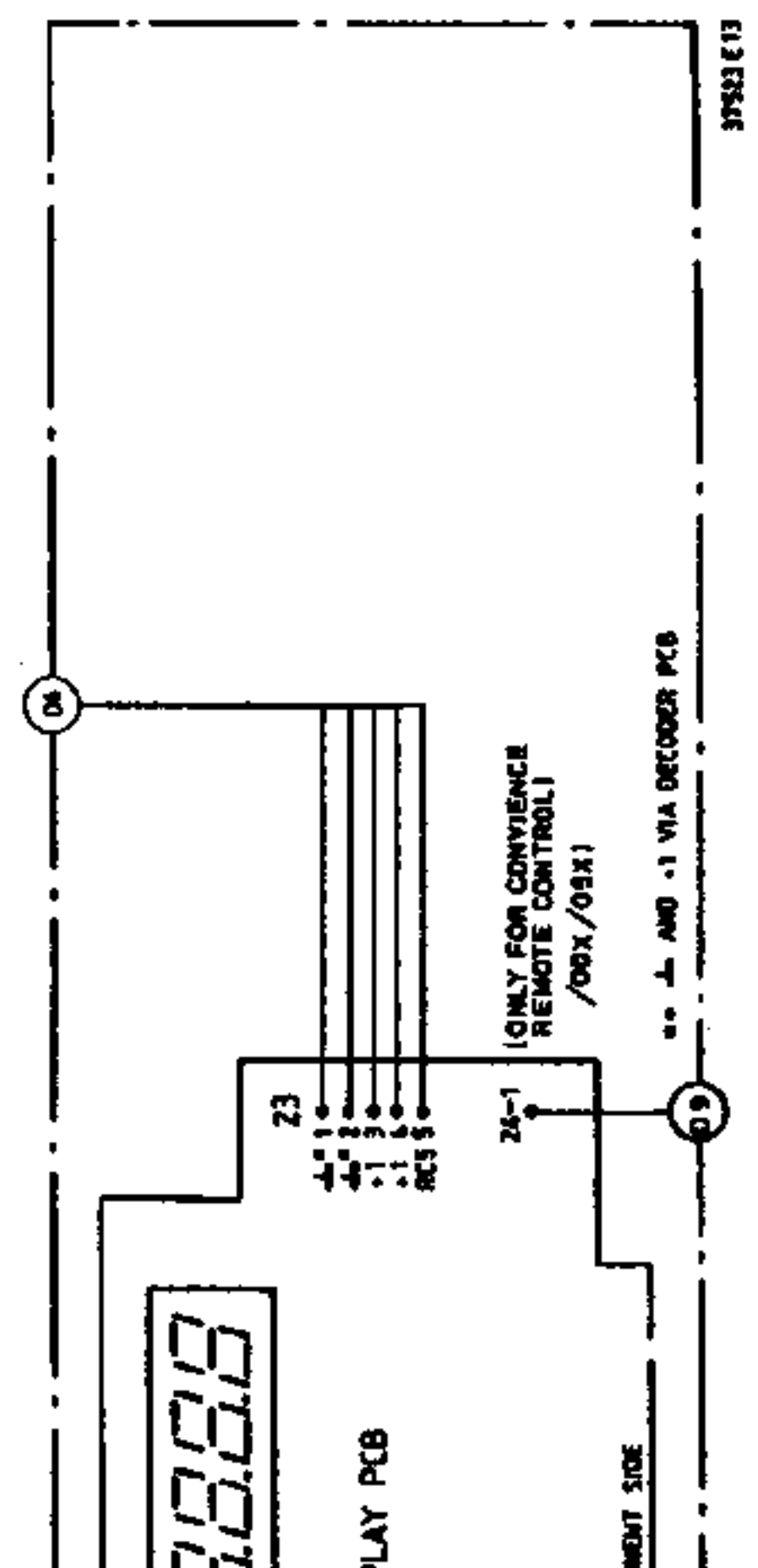
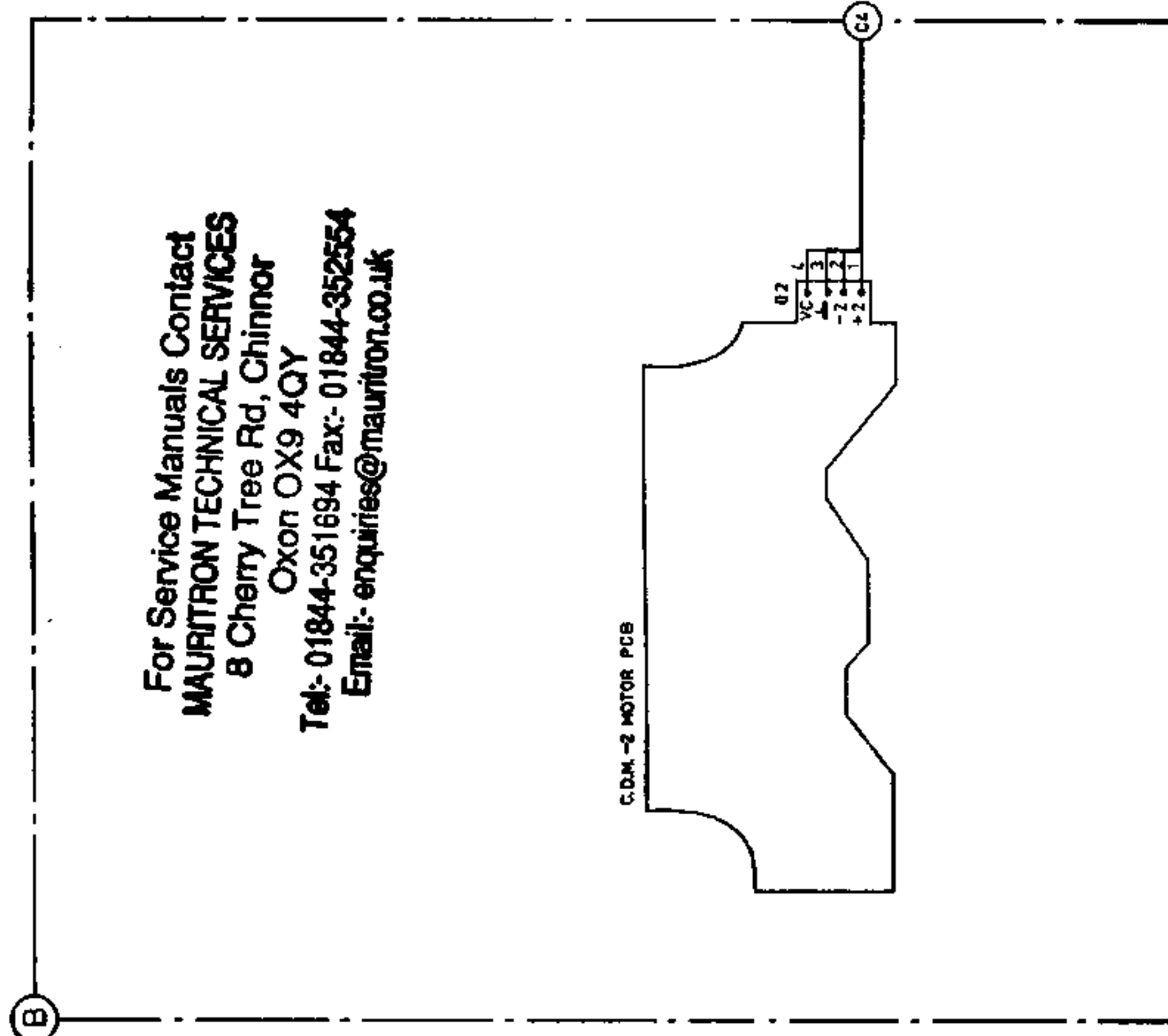
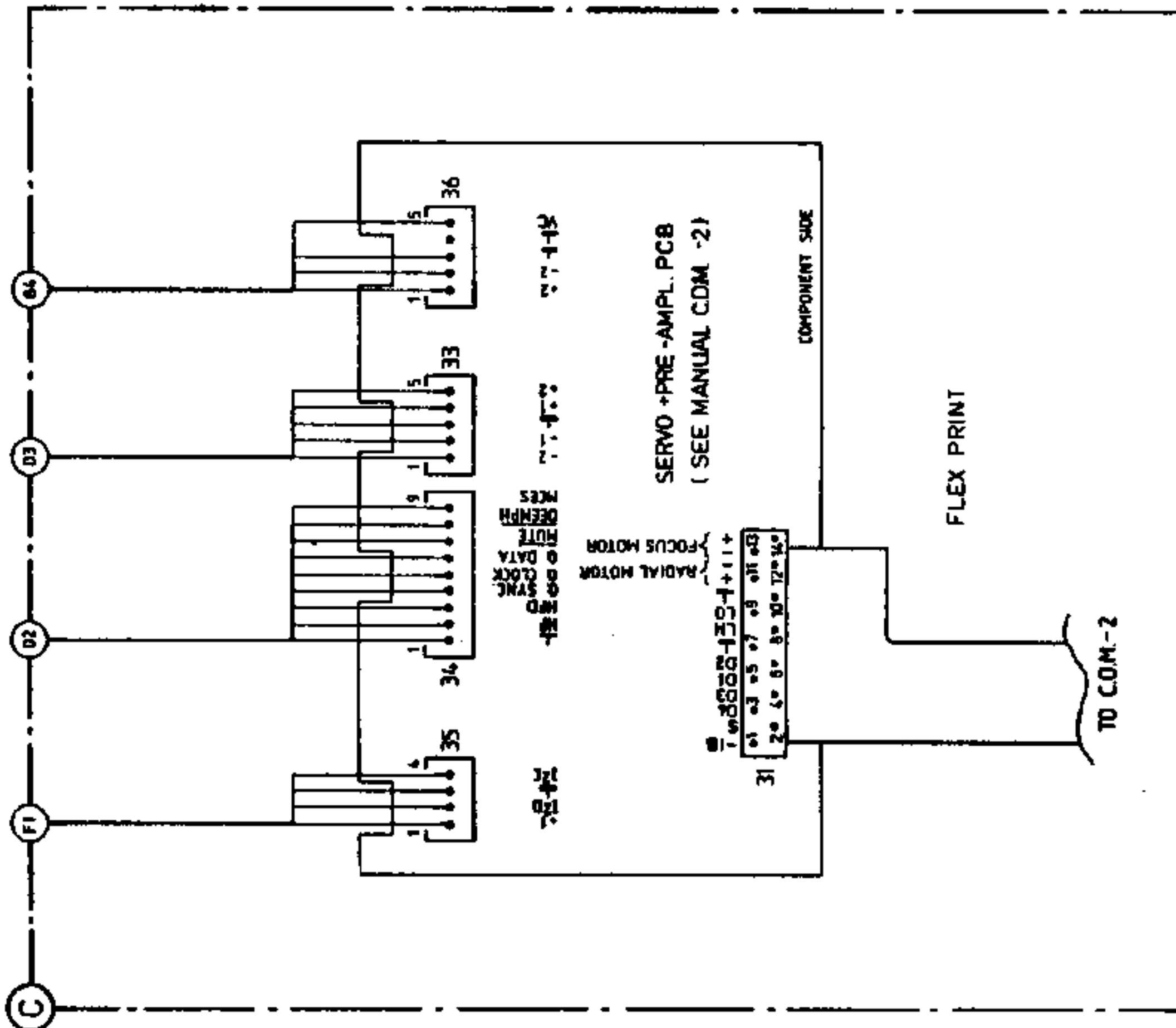
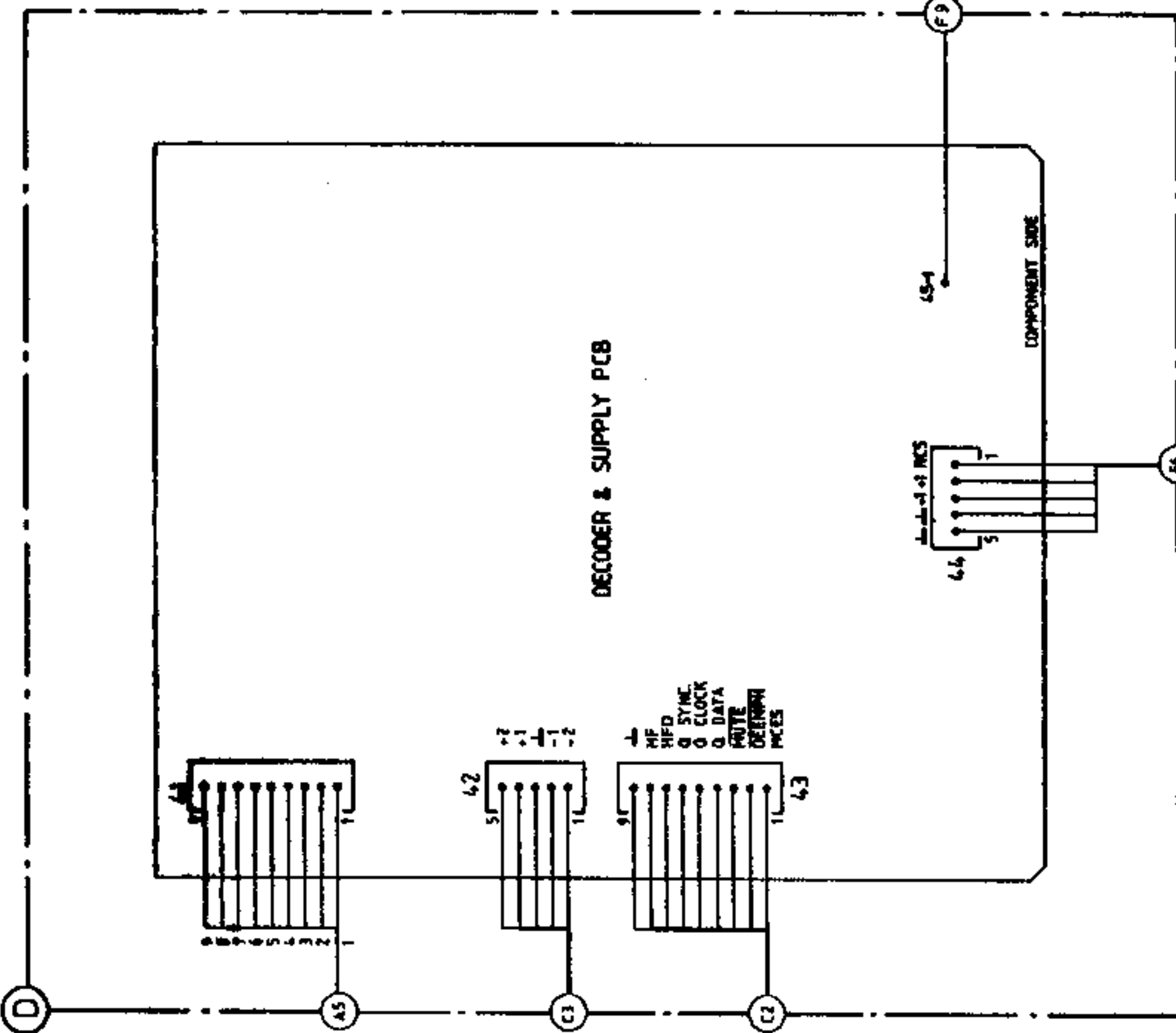
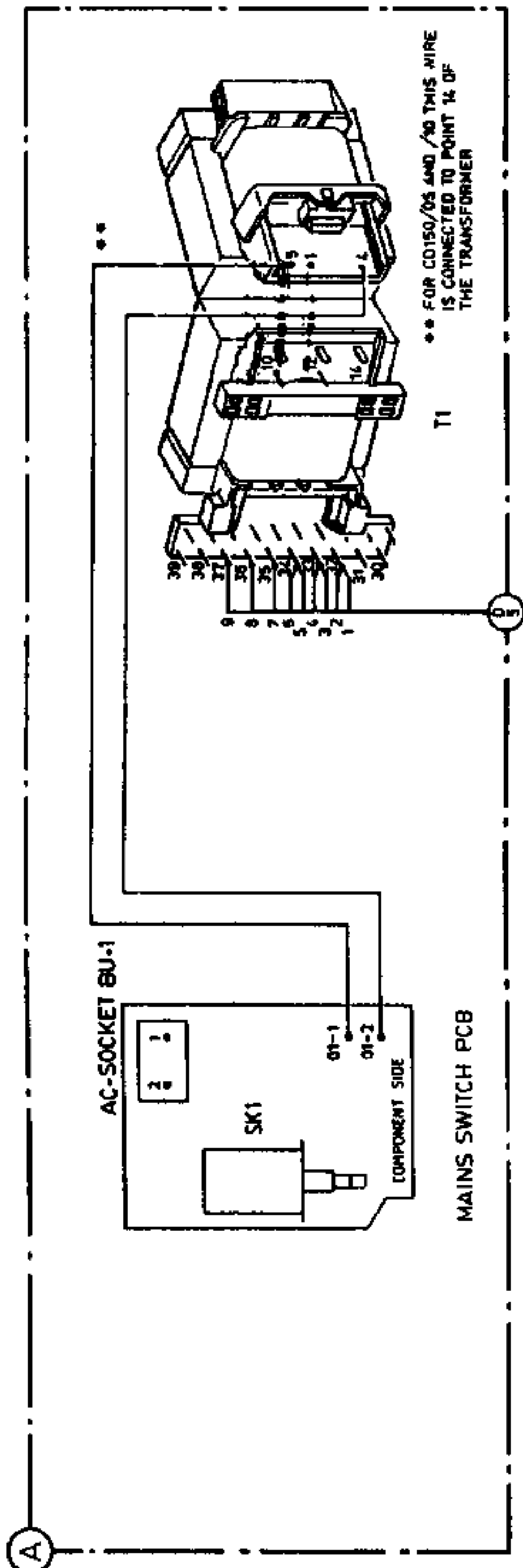
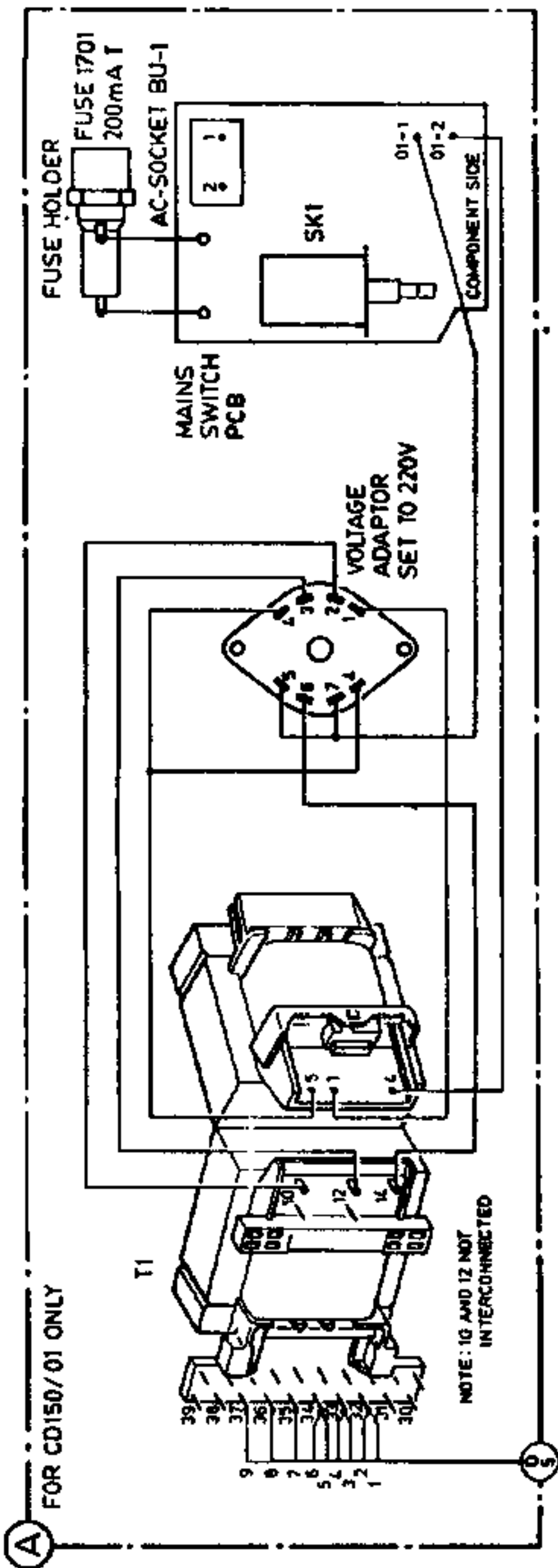
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6.8 E	5%	4822 111 90254
7.5 E	5%	4822 111 90396
8.2 E	5%	4822 111 90397
9.1 E	5%	4822 111 90398
10 E	2%	5322 111 90095
11 E	2%	4822 111 90338
12 E	2%	4822 111 90341
13 E	2%	4822 111 90343
15 E	2%	4822 111 90344
16 E	2%	4822 111 90347
18 E	2%	5322 111 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

WIRING DIAGRAM



For Service Manuals Contact
MAURITRON TECHNICAL SERVICES
 8 Cherry Tree Rd, Chinnor
 Oxon OX9 4QY
 Tel: 01844-351694 Fax: 01844-352554
 Email: enquiries@mauratron.co.uk

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

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)	$\leq 220k\Omega$ $> 270k\Omega$	5% 10%
	0.33W (CR 25)	$\leq 1 M\Omega$ $> 1 M\Omega$	5% 10%
	0.33W (SFR25)		5%
	0.25W (VR 25)	$\leq 10M\Omega$ $> 10M\Omega$	5% 10%
	0.5W (CR 37)	$\leq 1 M\Omega$ $> 1 M\Omega$	5% 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

With the use of the μ P 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