B5066

P R E F A C E

This repair manual gives hints to the technicians trained on model SE 1040 with microfloppy, required for repair and maintenance. The participation in a training course for these models supplies the information and provides the requirements for a successful technical support of these machines.

Technical modifications are provided in irregular intervals with service bulletins according to priority.

May, 1985

Central customer service
- Office-machines -

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1. GENERAL

1. General

1.1 Technical specification

Features and performance characteristics SE 1040/SE 5040 microfloppy

Type carrier:	
Style:	Type wheel different typestyles
Character:	100 and country variants
Type wheel change:	without auxiliary tool and without removal of ribbon carrier and correction tape possible
Type performance:	
Speed:	12 - 17 char./sec.
Copies:	6, original with 60 g/m^2
Noise:	58-61 db (A) according to DIN 45635
Paper carrier:	
Layout:	fixed
Maximum length of line:	132 characters 2.54 spacing
Paper width:	420 mm
Paper feed:	Friction platen
Features for the paper guidance:	
Paper holder:	tilting on the paper carrier
Paper support:	tilting on the lower housing
Paper guide:	adjustable on the upper housing
Line finder:	tight on the type wheel carriage
Paper deflector:	tilting on the paper carrier

Mechanical components:
Paper injector
(top left on the paper carrier)
Mechanically only for lifting the paper holder; automatic paper injection via switch contact

Paper release:
(Top right on the paper carrier)
For loosening the paper within the paper guide by lifting the paper holder

Adjust rebound distance:
(Top left on the paper carrier)
3 Positions A, B, C
For adjusting the distance between platen and type wheel

Adjust ribbon transport:
(On the type wheel carriage)
4 Positions

Adjustment of the advance movement is dependent on pitch and ribbon style for optimum utilization of the ribbons.

Ribbon carrier:
Type: Ribbon cartridge, different versions

Version and capacity:

Fabric ribbon, unicolour:	min. 3 mill. characters
Carbon-C-ribbon:	min. 120.000 characters
Carbon-ribbon:	min. 100.000 characters
(Multicarbon-ribbon)	

Capacity in each case for ribbon transport for 2.54 mm spacing.
Exchange: Easy exchange of the cartridge without auxiliary tool

Correction tape:
Type: Correction tape spools, lift-off

Version and capacity:
Lift-off correction tape: min. 2.000 characters
Cover-up correction tape: min. 2.000 characters

Exchange: Easy exchange of the spools without auxiliary tool

Operation program: 58 KB
Data memory: 12 KB

Assignation of memory capacities

Scratchpad (auxiliary cells)	3.5 KB
Effective usable text memory	8.5 KB

Text memory is divided into:

Working memory	4 KB
Phrase memory	4.5 KB

The phrase memory is splittable in 98 individual phrases.

External memory module:
Diskette capacity: 2 X 4 KB
Display: 40-character display
Matrix 5 x 12

Memory preservation in case of power failure:

In case of power failure of less or/equal of 15 ms, machine remains without malfunctions.

Memory preservation in case of power failure:

In case of power interruption (separation from power network) of less or/equal to 500 hours, all data are preserved. All machine adjustments and the position of the type wheel carriage at the time of interruption are restored by basic position routine, when machine is switched again.

Keyboard buffer

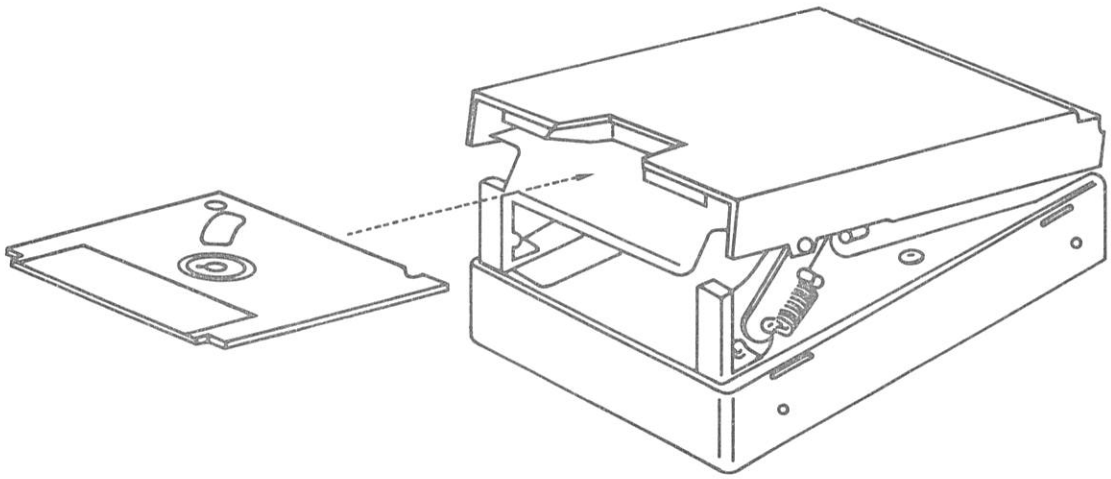
Capacity: 140 Bytes

1.2 Handling of diskettes

Essential recommendations for the handling of diskettes:

- The diskette must be kepted in a clean place.
- The diskette must not be brought into the vicinity of magnets, large metal parts, transformers etc.
- The diskette should always be stored with its protection cover.
- Never put heavy objects on the diskette.
- Never touch on the write/read opening of the diskette.
- Never attempt to clean the diskette.
- Wind no rubber bands around the diskette.
- Put no office clip onto the diskette.
- Never write directly on the diskette (use adhesive label).
- Protect the diskette against heat and sunlight.
- The diskette should be adapted to the floppy drive before using it (ambient temperature).

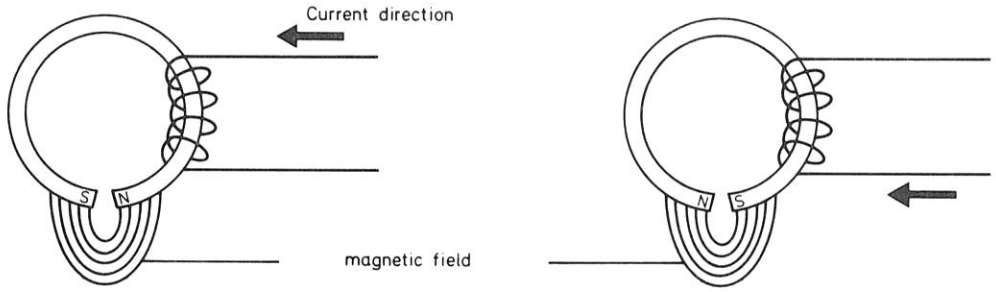
Insertion of a diskette:
Lift the upper cover and insert the diskette in the slot in direction of arrow(see lower diagram). Then, depress the cover downward again.



1.3 General information about the magnetic recording

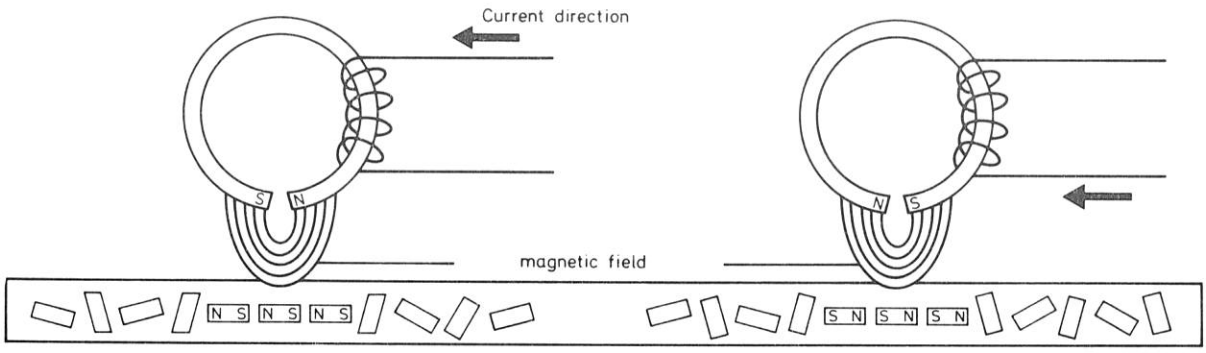
1.3.1 Type of recording:

The recording is based on the fact that a coil sets up a magnetic field during current-flow. The direction of the magnetic field is dependintg on the direction of current.



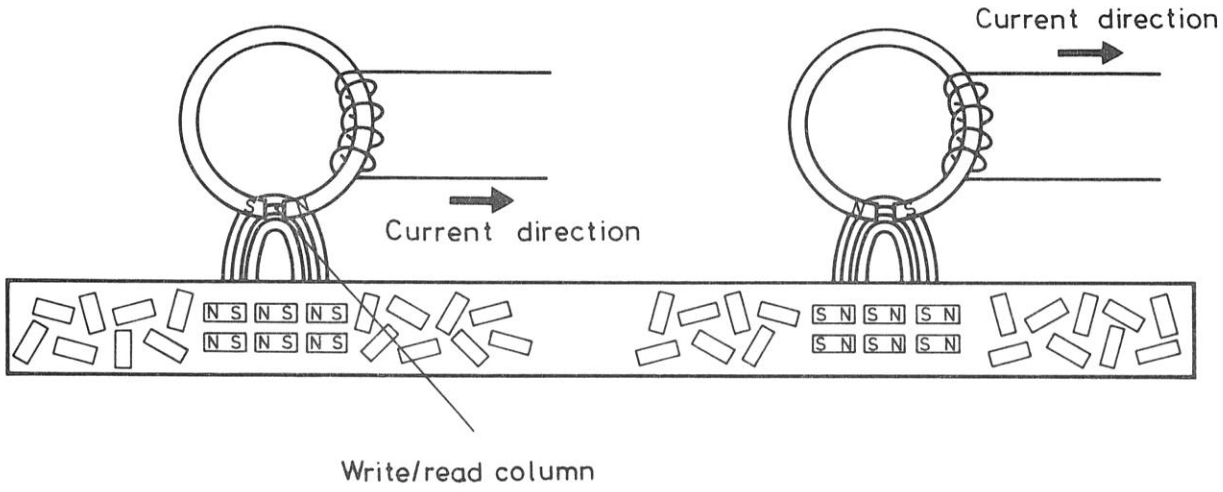
Such a magnetic field is causing a permanent orientation of so-called molecular magnets in suitable materials.

In case of external data carriers such as MFDE or magnetic tape recorders, the combined read/write head is the coil which sets up the magnetic field. The data carrier such as diskette or cassette is the magnetizable material. Depending on the polarity of the core coil, the molecular magnets of the magnetically coated diskette are now aligned in the corresponding direction.
See functional diagram (writing diskette).

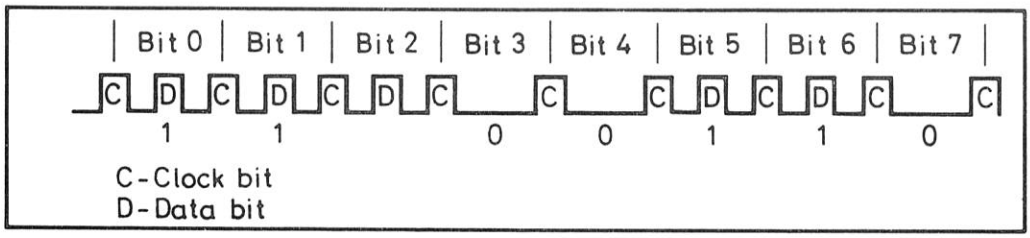


1.3.2 Reading diskette

The reading is based on the fact that the aligned molecular magnets of the data carrier generate a magnetic field. These fields induce a corresponding voltage in its coil when passing the read head.



FM-recording (single density)

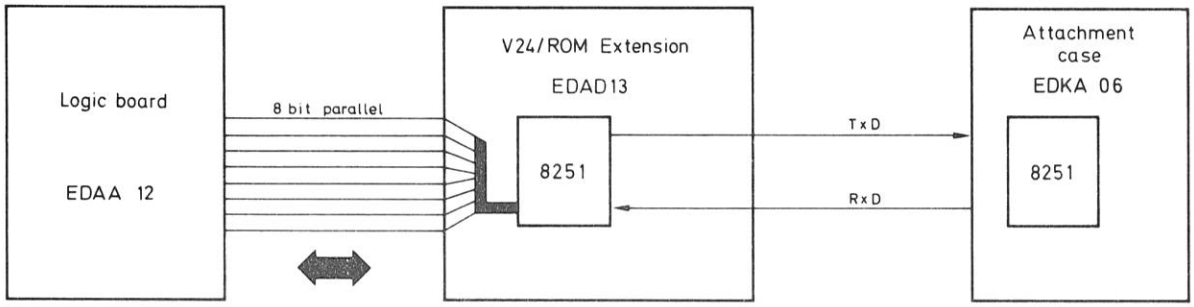


1.4 Transmission mode from and to the basic machine

The data are transmitted in serial with a clock, the so-called baud rate, of 19.2 Khz = 19.200 bits/sec.

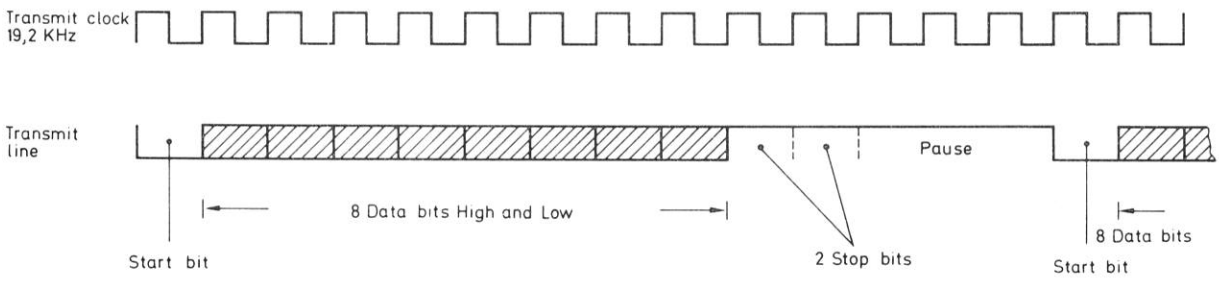
The character code is offered in 8-bit parallel form as transmission data from the logic board EDAA 11 to the interface. The interface component 8251 converts this into a serial form and transmits this via line TxD to the microfloppy unit.

In the reversed case, i.e. when data arrive via the line RxD, the interface component changes the serially arriving data into parallel data of 8 bits.



Transmission structure

The data to be transmitted serially are structured in the following form:



Start bit: The start bit marks the beginning of a byte-information.
Stop bits: The two stop bits mark the end of a data byte-transmission.

2. ASSEMBLY - DISASSEMBLY

(FLOPPY UNIT)

2.1 Disassembly and assembly

2.1.1 Removing cover of the floppy unit:

1. Loosen the 4 screws on the bottom.
2. Remove front and rear cover.
3. Remove the cover upward.

2.1.2 Disassemble floppy drive:

1. Unscrew the two front screws and loosen the two rear screws.
2. Take out plug.
3. Remove floppy drive.

2.1.3 Disassemble PCB. V.24 GM-TEC spiral floppy:

1. Unscrew the four screws on the bottom completely and remove the bottom plate from the chassis.
2. Remove power plug, interface plug (cable to typewriter) and interface plug to the floppy drive.
3. Remove PCB. from the four holding clips.

2.1.4 Diassemble power supply unit, EDKB 09:

1. Unscrew the four screws on the bottom completely and remove the bottom plate from the chassis.
2. Remove power plug from the PCB. V.24 GM- TEC spiral floppy.
3. Remove PCB. from the four holding clips.

2.1.5 The assembly takes place in reversed sequence.

3. POWER SUPPLY UNIT

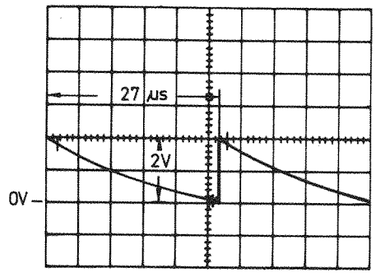
(FLOPPY UNIT)

3. Voltage supply

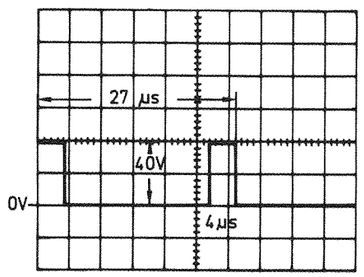
+5V and +12V are required for the microfloppy and related electronics.

As the microfloppy does not work at the same time as the printer, the +5V and +12V are generated from the +39V (motor voltage).

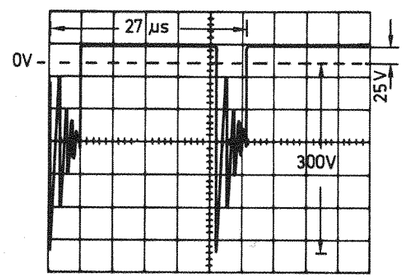
With the aid of a switch regulator (L296) the +5V (clocked) are generated. Via a transformer in the +5V line, a diode and a +12V fixed voltage regulator (7812) +12V are generated.
See the following circuit diagram PCB. EDKB 09.



MP 1

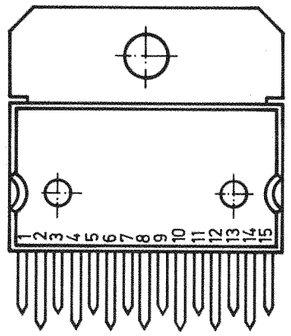


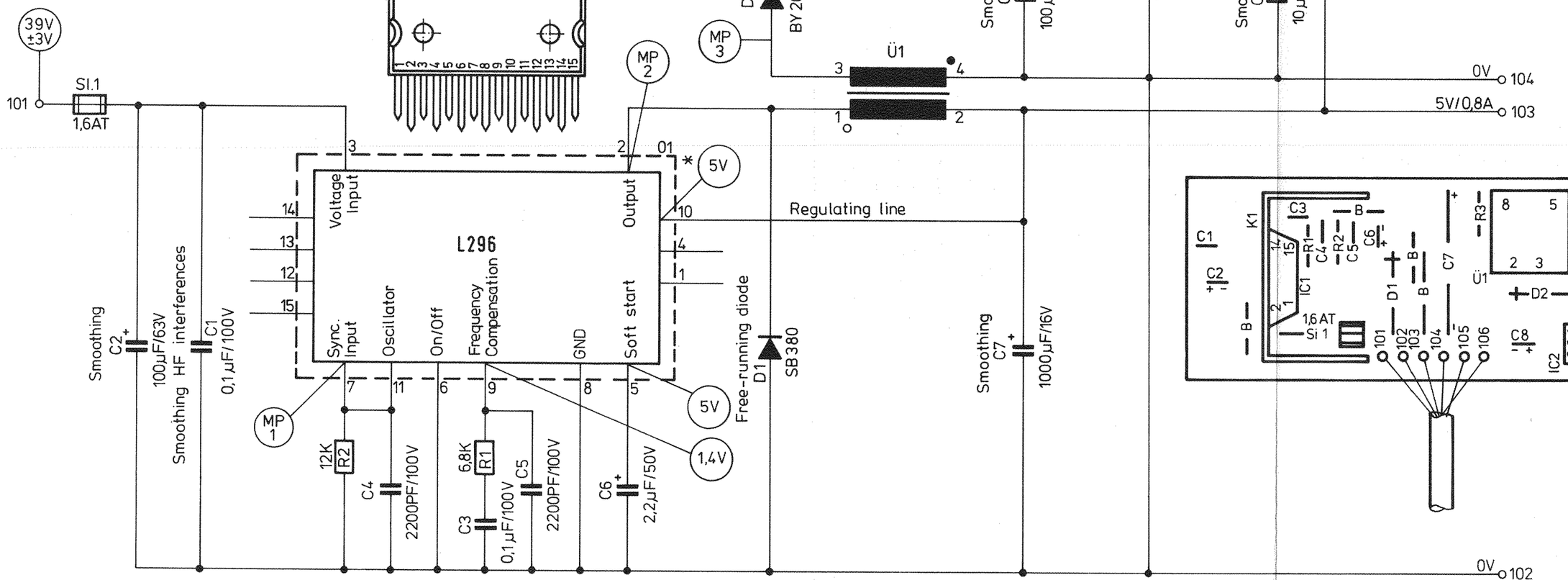
MP 2



MP 3

All measurements are executed from 0V



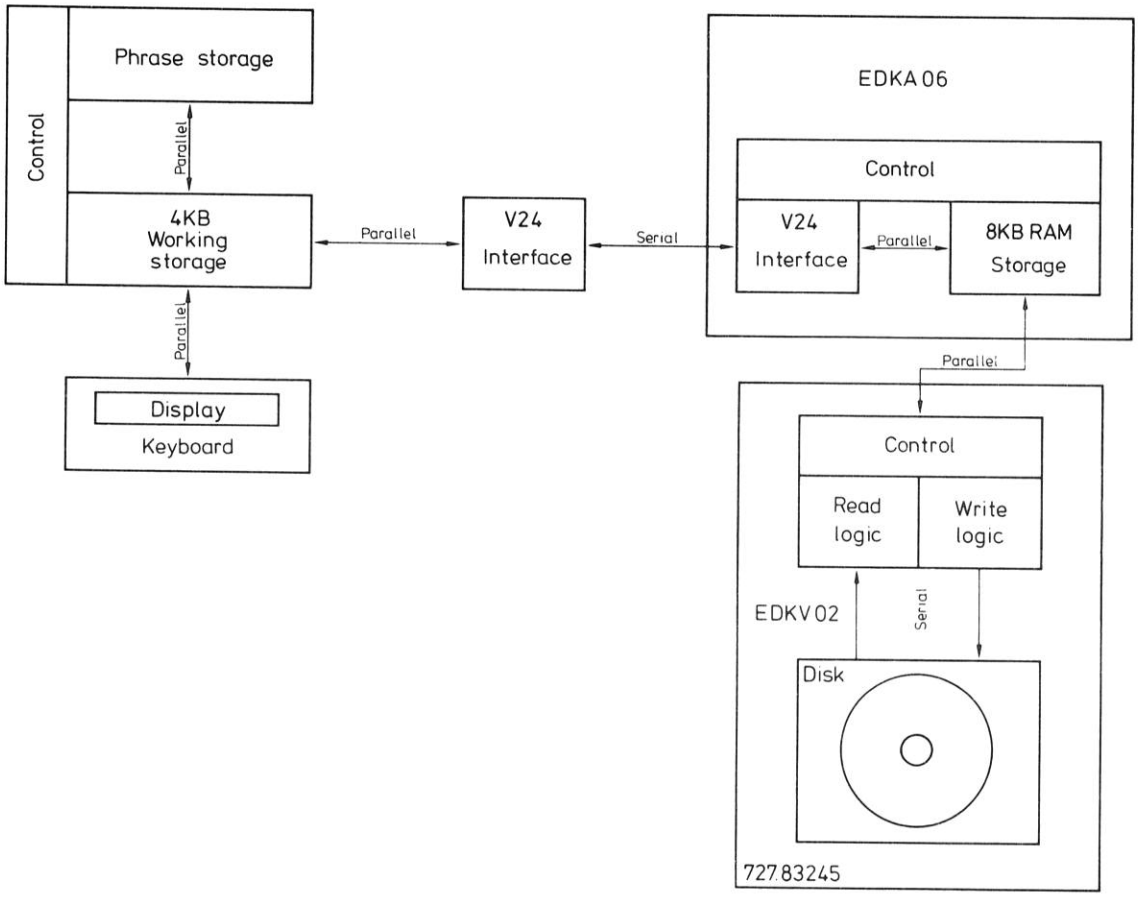


* Kühlkörper /Heat sink

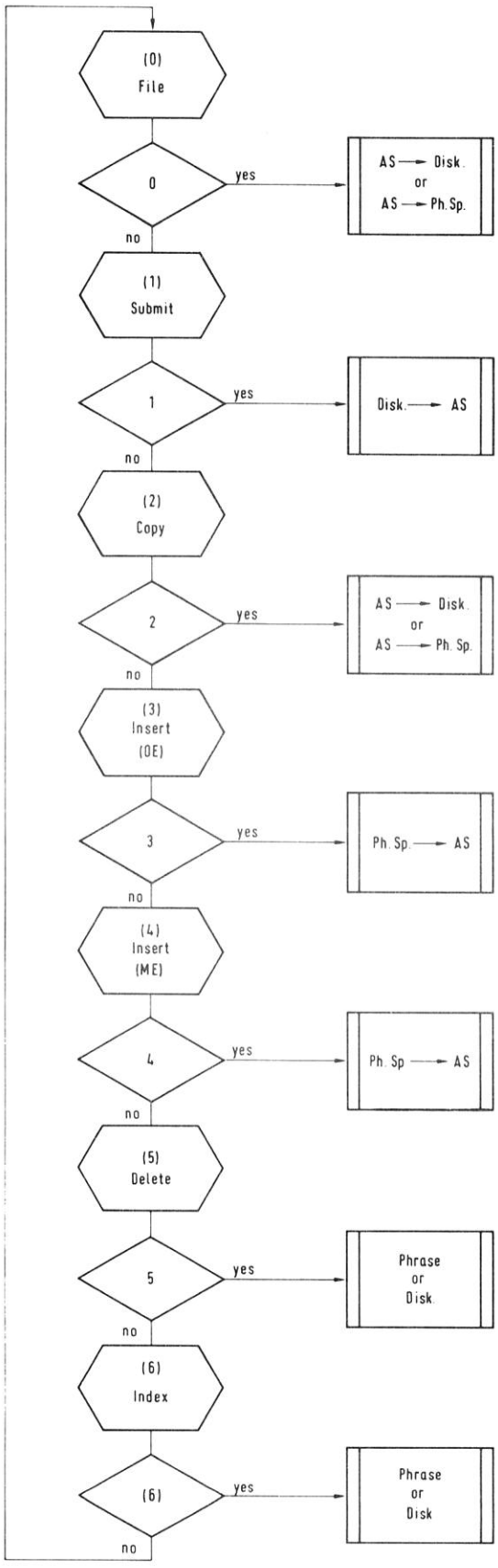
POWER SUPPLY

4. BLOCK DIAGRAM AND FLOW CHARTS

Block diagram SE 1040 Microfloppy

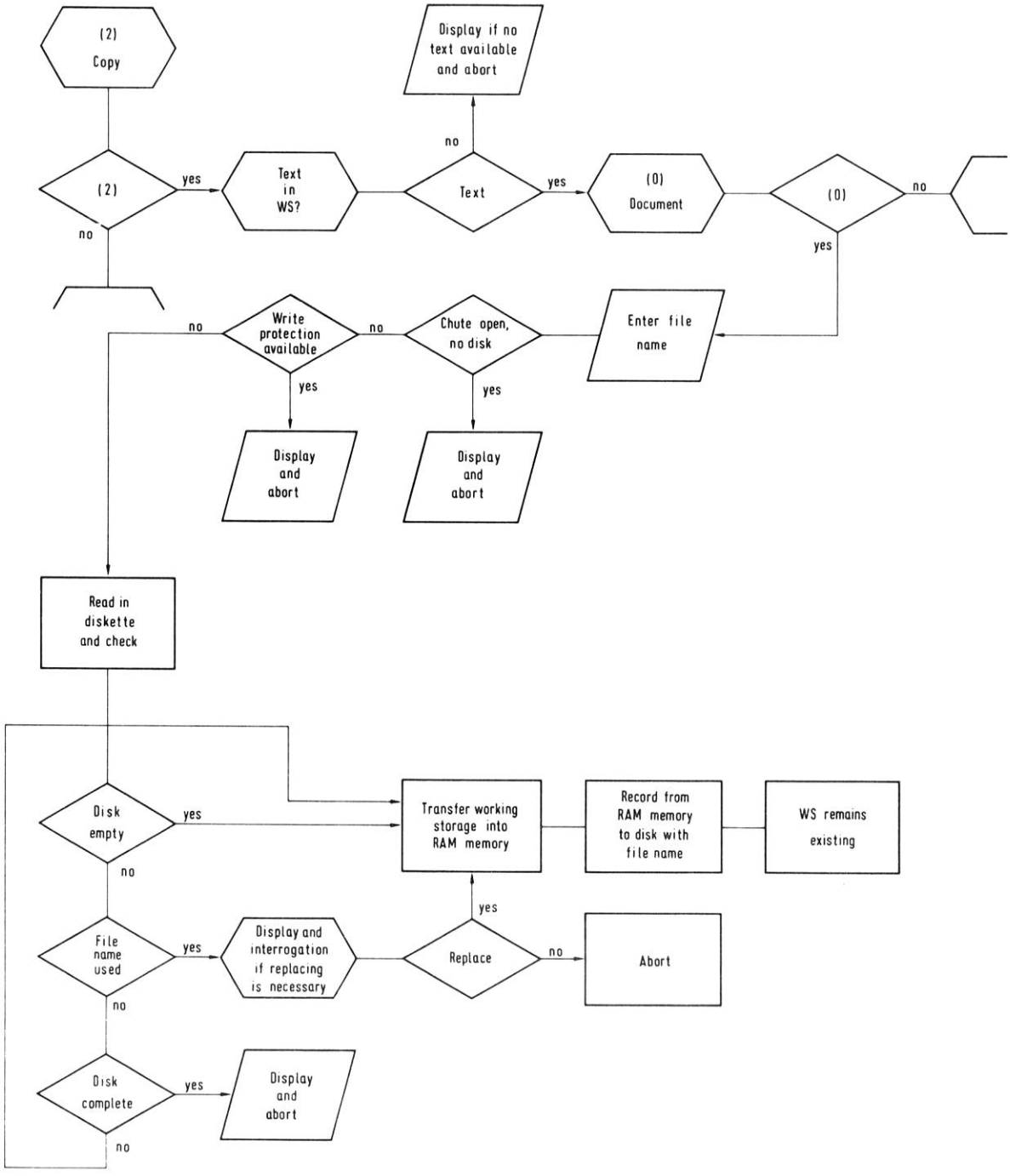


Operator guide - main menu

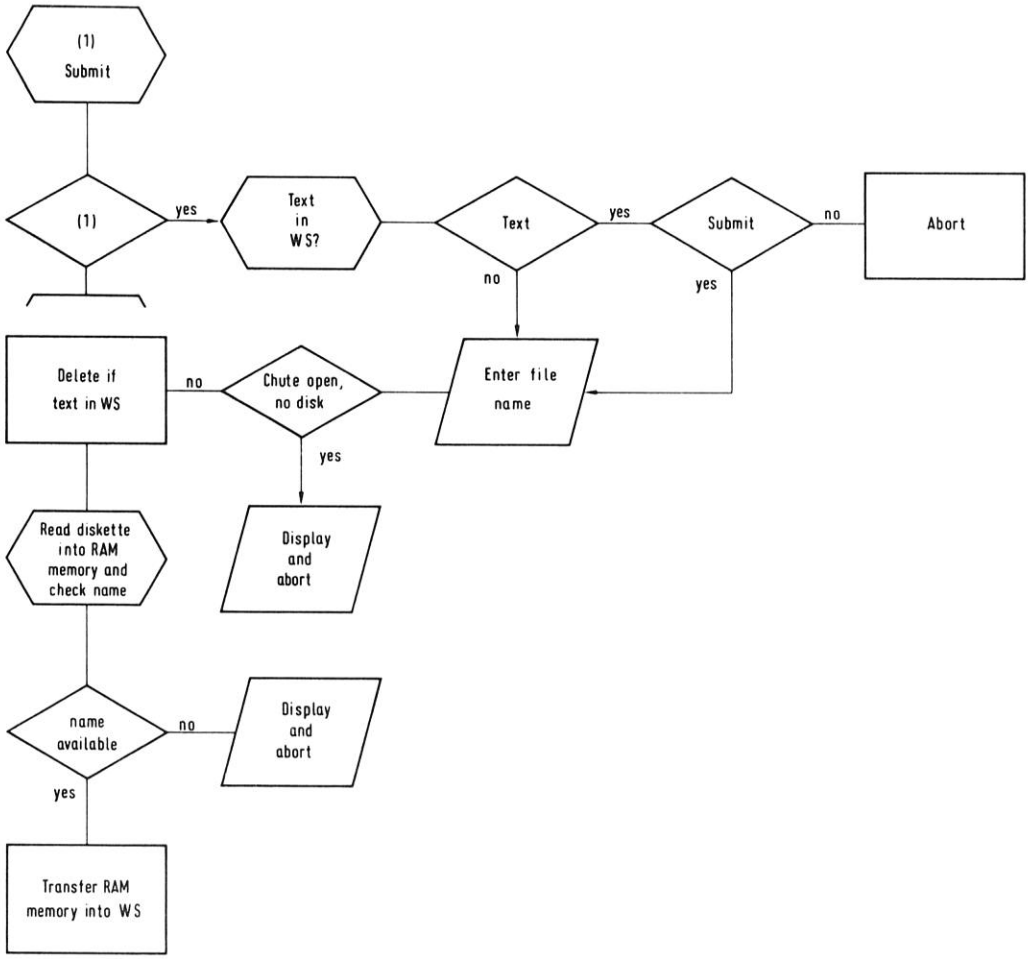


WM = Working Memory
Ph M = Phrase Memory
Disk = Microdiskette

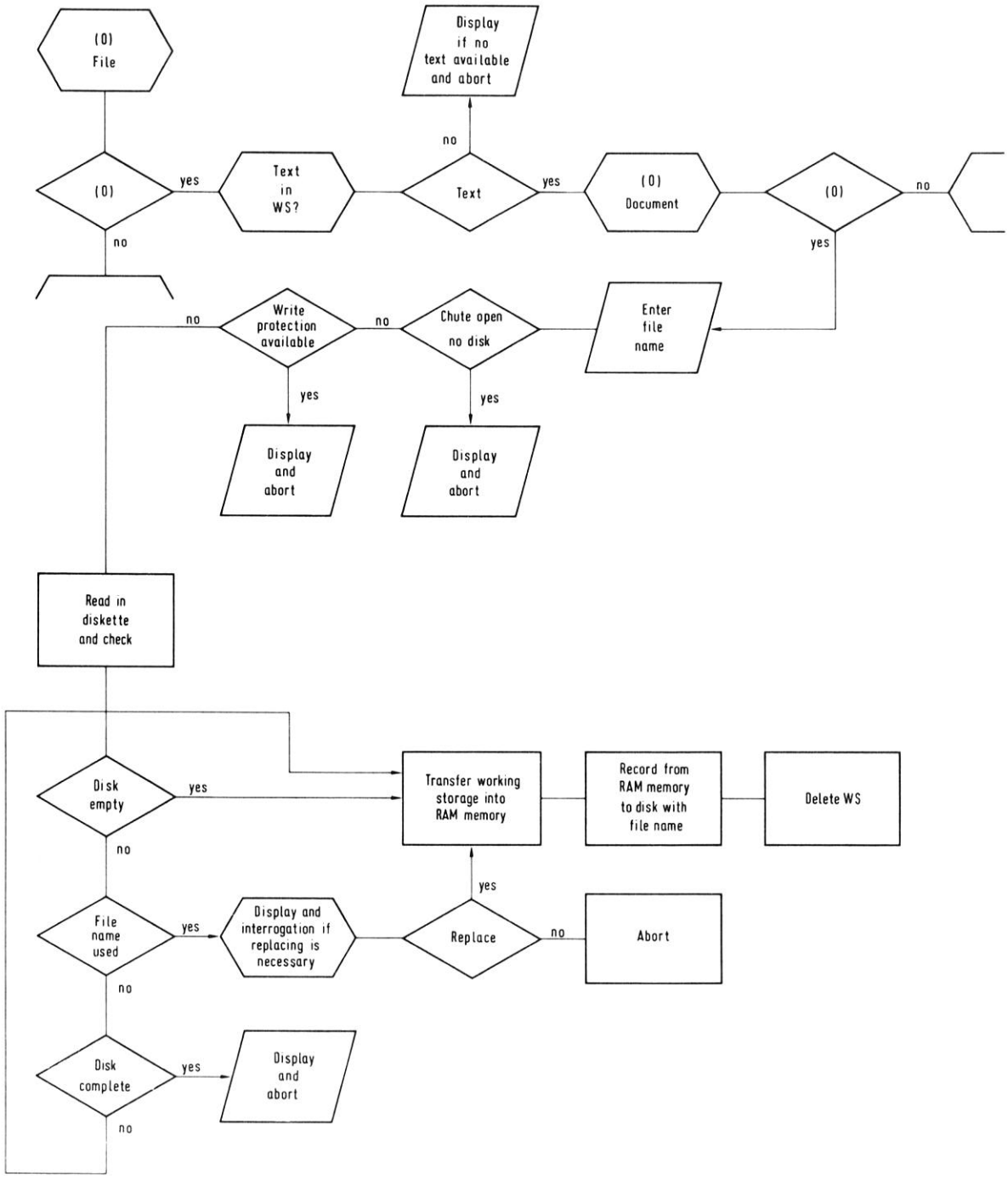
File on Diskette



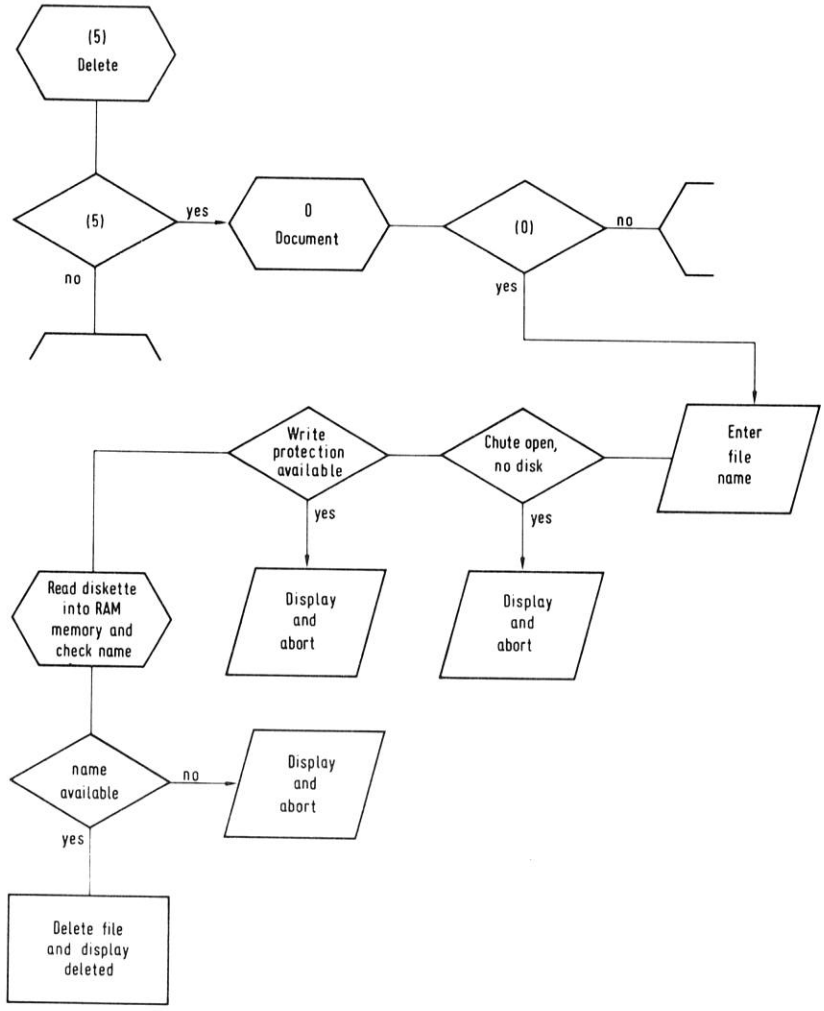
Submit a document stored on the diskette



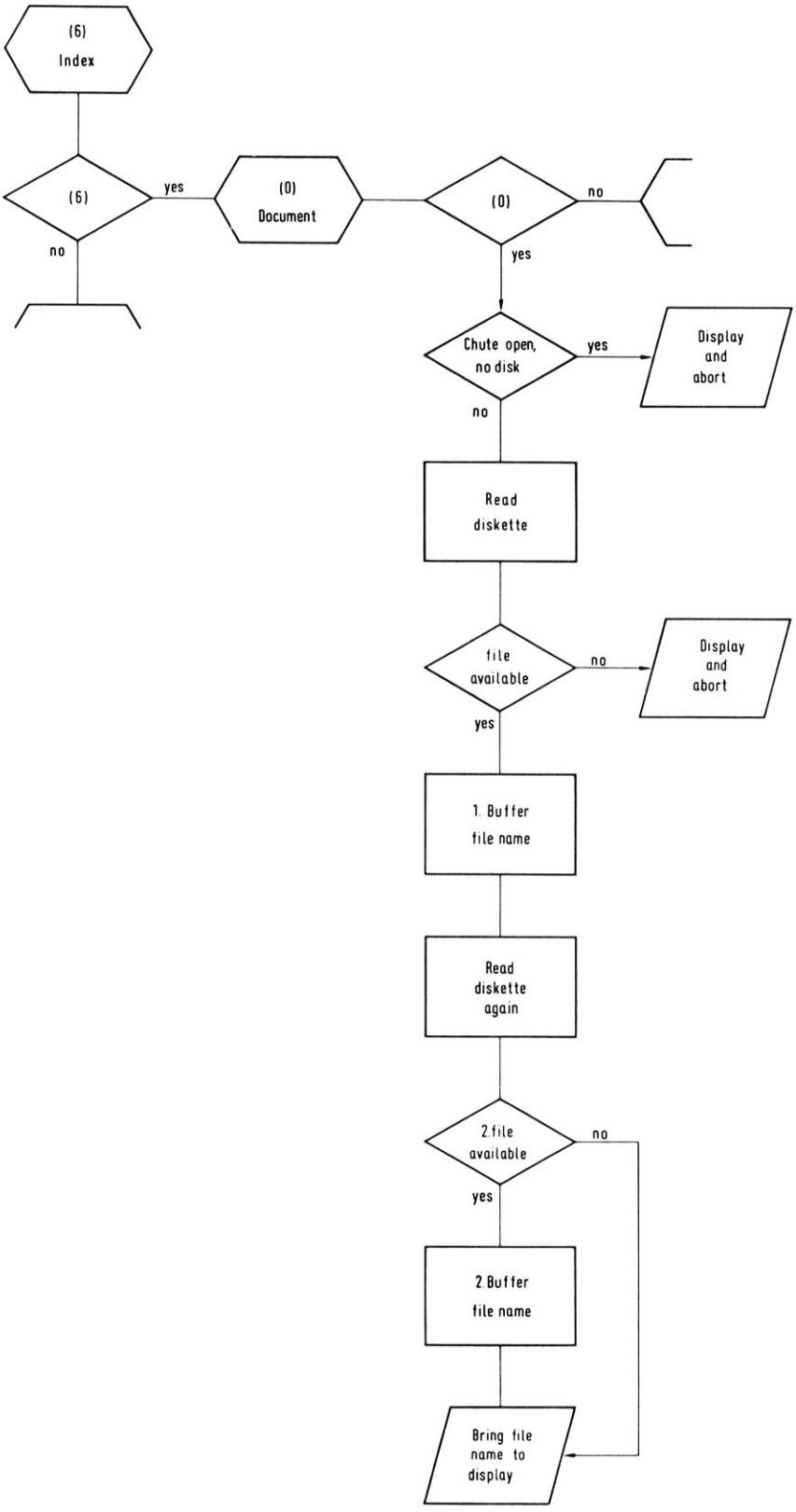
Copy a document on the diskette



Delete a document



Index of the diskette



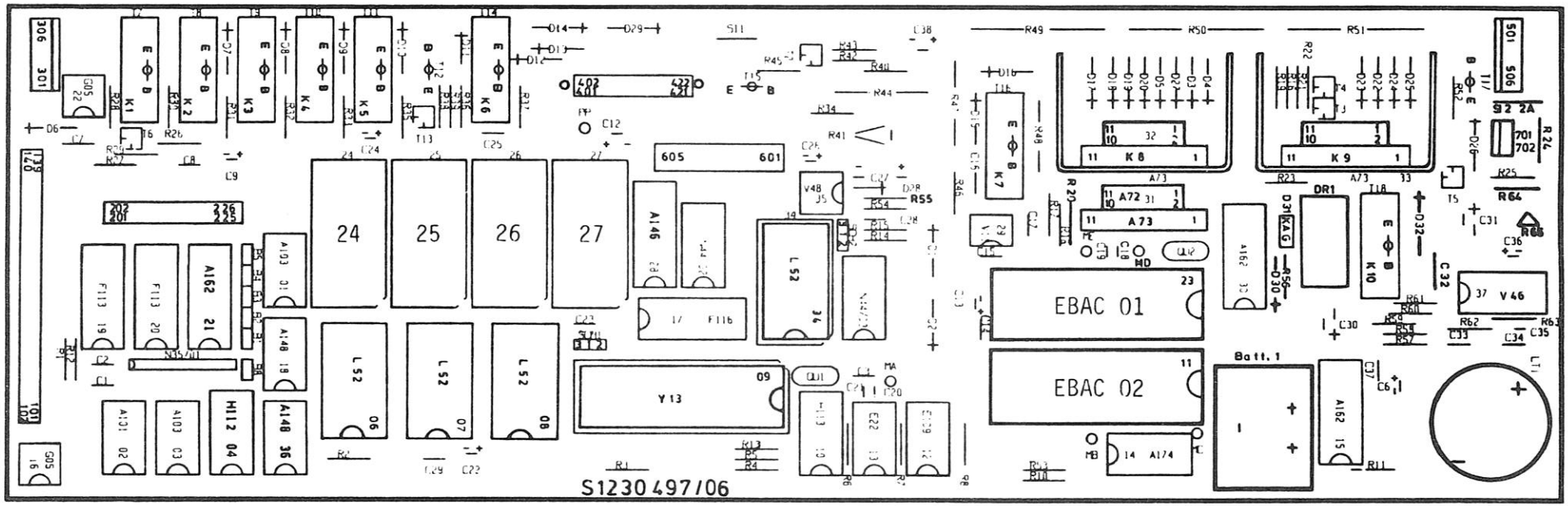
5. L A Y O U T P L A N S

PCB. EDAA 12

PCB. EDAD 13

PCB. EDKA 06

Printed circuit board logic EDAA 12

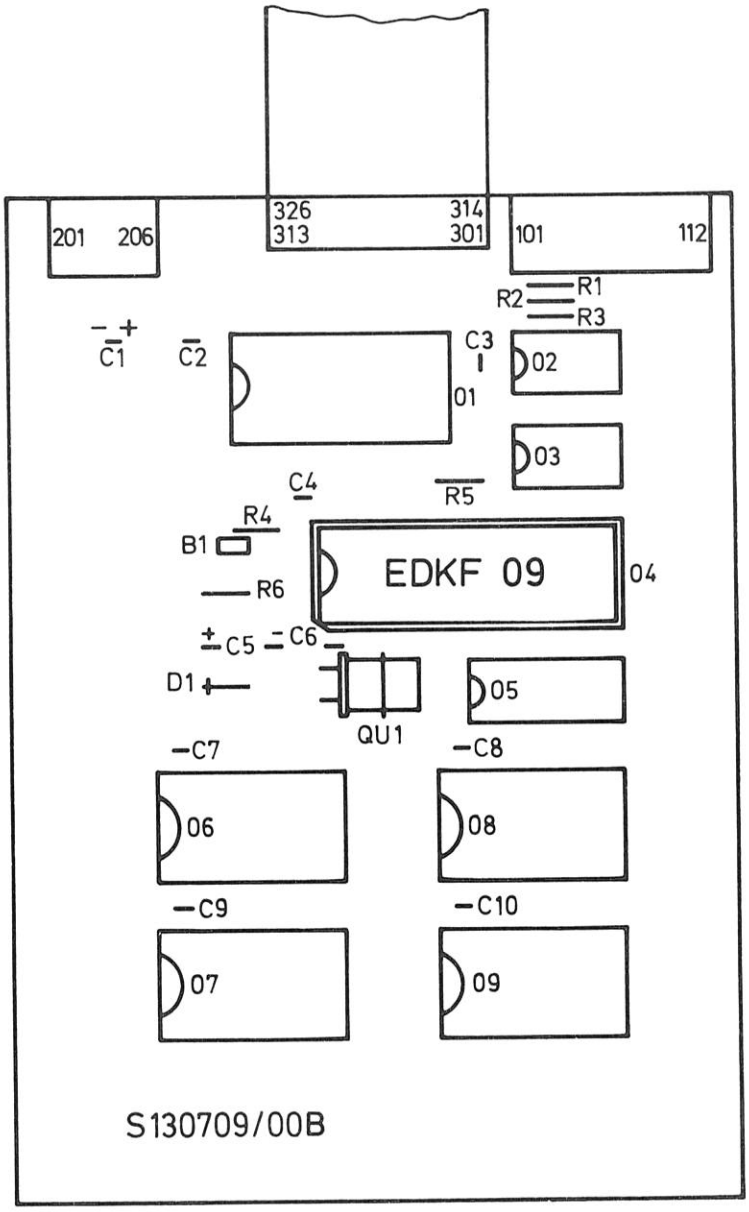


Model	SE 1035 CMD	SE 1040 MD	
Logic board	EDAA	EDAA 11	
IC location 24	EDAF01	EDAE 17	
IC location 25	EDAF02	EDAE 18	
IC location 26	EDAF03	EDAE 19	
IC location 27	EDAF04	EDAE 20	

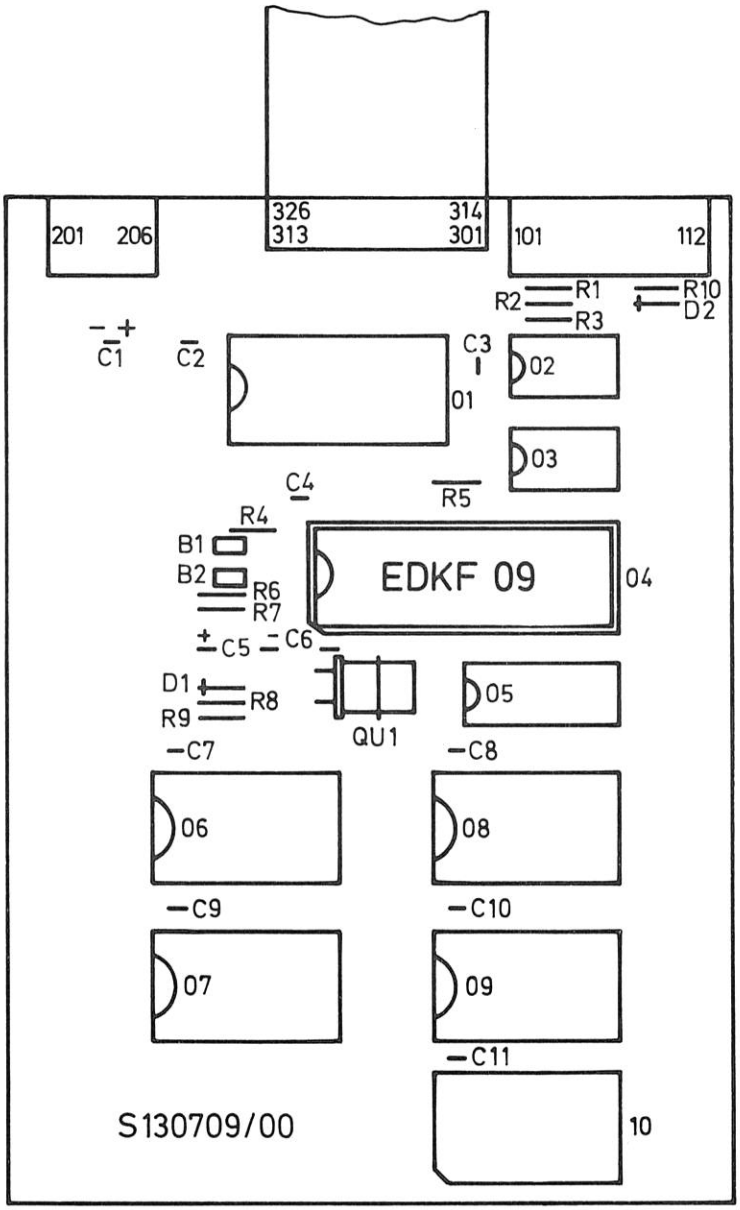
Printed circuit board EDAD 13 V24, ROM and RAM extension

Model	SE 1035 CMD	SE 1040 MD	
Board V.24, ROM, RAM	EDAD 16	EDAD 13	
IC location 02	EDAF 05	EDAE 21	
IC location 03	EDAF 07	EDAE 23	
IC location 04	EDAF 06	EDAE 22	

Layout Plan PCB. NRS spiral floppy EDKA 06 (previous)



Layout plan Logic board NRS spiral floppy EDKA 06 (new)



6. TECHNICAL DATA OF THE MICROFLOPPY DISK UNIT MODEL MC-116

Microfloppy disk unit (model MC-116)

The microfloppy MC-116 is a very compact unit, it has its own electronics and records the data serially in spiral form.

Memory capacity:	8 KB (2X4 KB)
Transmission rate:	50 KB/sec.
Start time:	1.5 Sec.
Run speed:	405 Rev/mins +5%
Recording density:	1996 Bit/inch (max.)
Number of the tracks:	1 (Spiral form)
Type of recording:	FM
Diskette recommendation:	Flexible disk Part-No. E 700.60040

Physical charateristics

Operating voltages:	DC + 12V +5% 0.2A maximum 0.7A DC + 5V +5% 0.2A	
Ambient temperature:	in operation 5° C - 45° C	for memory - 20° C - 60° C
Relative air humidity:	20% - 80%	20% - 80%
Vibrations:	less than 0.2G	packed 3G
Measurement:	Width 78 mm Height: 58 mm Depth: 160 mm Weight: 670 g	

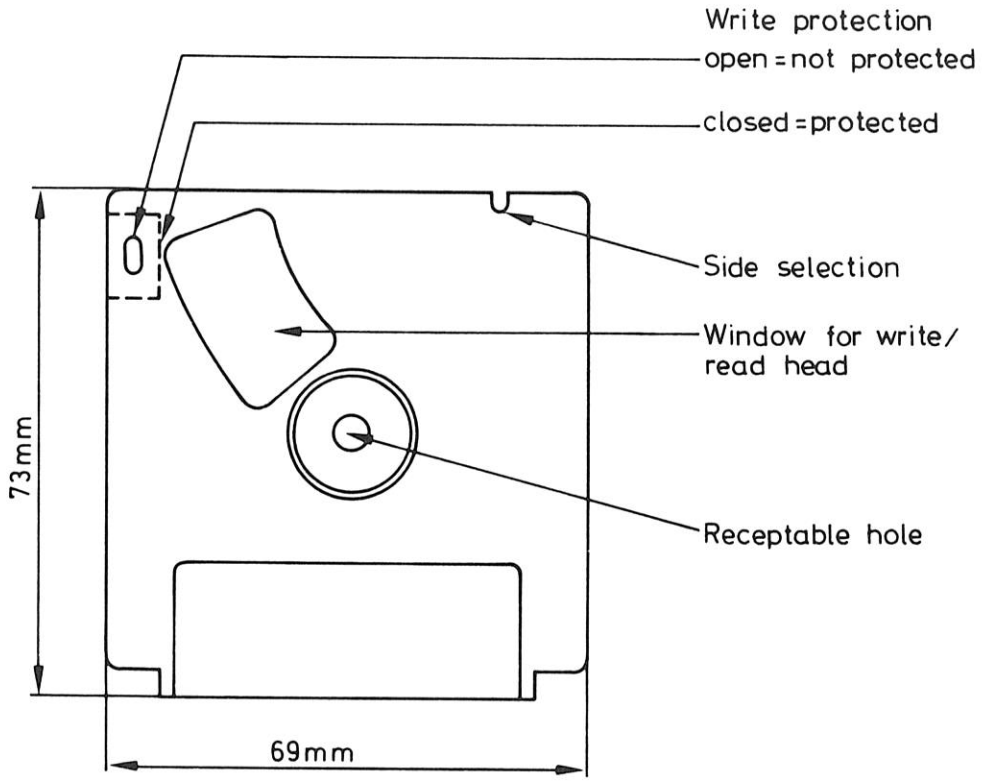
Reliability characteristics

MTBF (mean time between failures)	4.000 Operating hours
Durability	5 Years
MTTR (mean time to repair)	30 Minutes

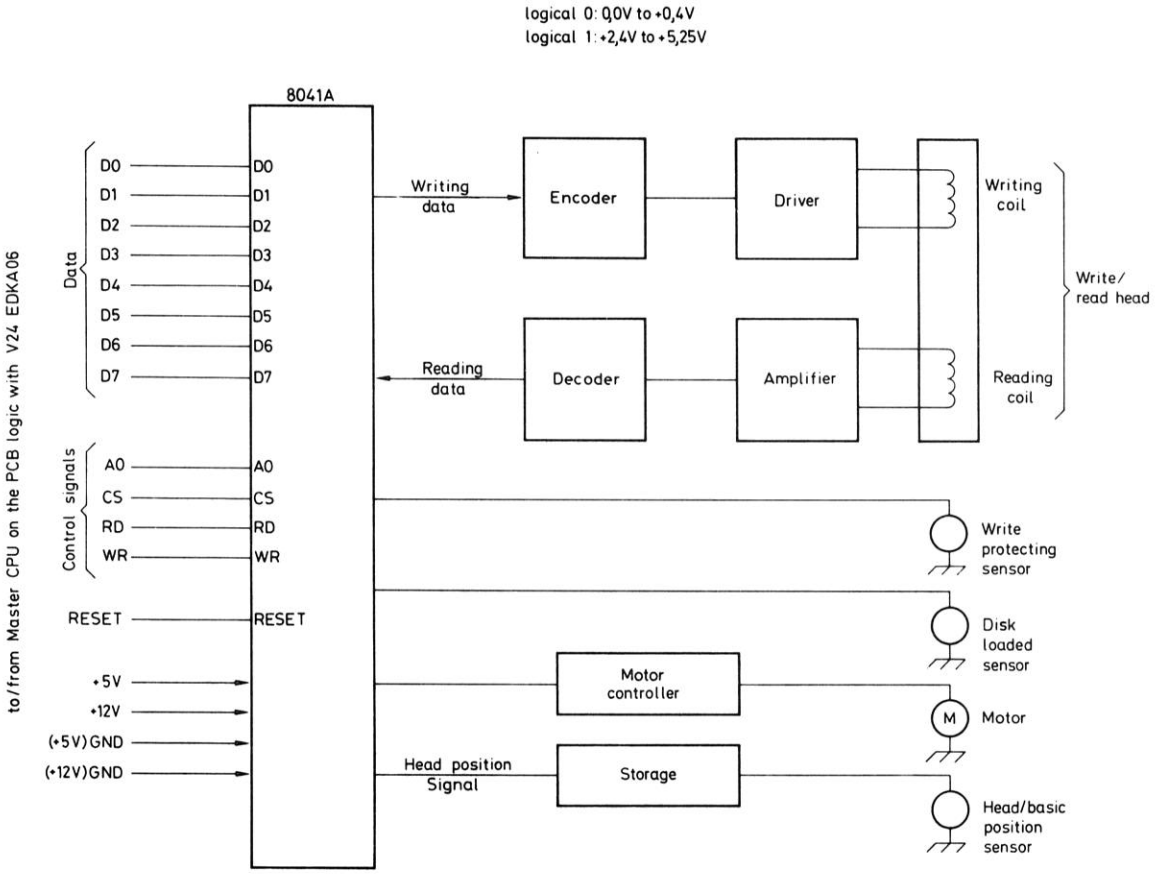
Error rates:

Soft Read Errors (Errors which can be eliminated by repositioning)	$1/10^{8}$ Bits read
Hard Read Errors (Errors which cannot be eliminated)	$1/10^{10}$ Bits read

Memory-medium (micro disk) specification:



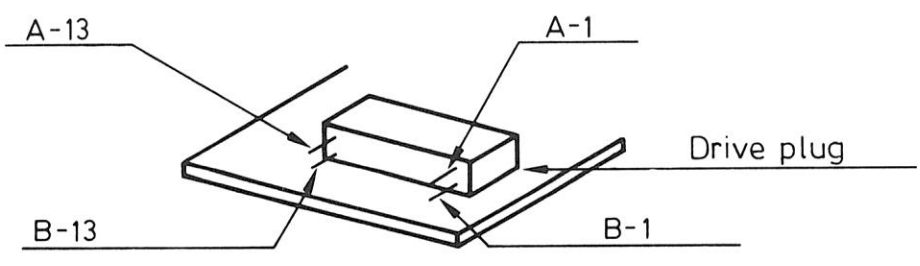
Block diagram



CS	RD	WR	A0	Operation	Transfer direction of the data
0	0	1	0	Reading data	Floppy → Master CPU
0	0	1	1	Reading status	Floppy → Master CPU
0	1	0	0	Writing data	Floppy ← Master CPU
0	1	0	1	Writing command	Floppy ← Master CPU

Pin assignation

Pin.No.	Designation	Pin.No.	Designation
A-1	D7	B-1	D6
A-2	D5	B-2	D4
A-3	D3	B-3	D2
A-4	D1	B-4	D0
A-5	WR/	B-5	A0
A-6	RD/	B-6	CS/
A-7	FG	B-7	RESET/
A-8	GND	B-8	GND
A-9	+5V	B-9	+5V
A-10	R/W	B-10	2
A-11		B-11	+12V
A-12	+12V (MOTOR)	B-12	+12V (MOTOR)
A-13	GND 12	B-13	GND12



7. SERVICE AMD ADJUSTMENT PROGRAM

7. Service program

The SE 1040 microfloppy has three different service programs:

- Service program during the power on routine (self-test)
- Service program in the micro-EDAE 22
- Internal service program of the keyboard printed circuit board

Errors are indicated via the 40-digit display or the LEDs.

7.1 Service program during the power on routine

A built in self-test checks after the machine is switched on if the printer or the display can properly be reset into home position. The error is shown on the display. The LEDs for the display control shows an error in the display interface.

Printer error indicators

Please test printer

Display interface error

All LEDs for the display controlI are on.

7.2 Service program

The error indication of this program is shown on the 40-character display. It is also shown which test is carried out.

7.2.1 Test sequence

Switch on the machine while depressing paper insertion switch.

The first test which is automatically selected refers to the text memory test (RAM test).

Display Indication - Ram - Test

Service	Mem. 12K	1	(Location 6)
		2	(Location 7)
		3	(Location 8)
		4	(Location 34)
		5	(PCB EDAD 17 Location 7)
		6	(PCB EDAD 17 Location 8)

The RAM-test is continuously repeated until the CE key is depressed.

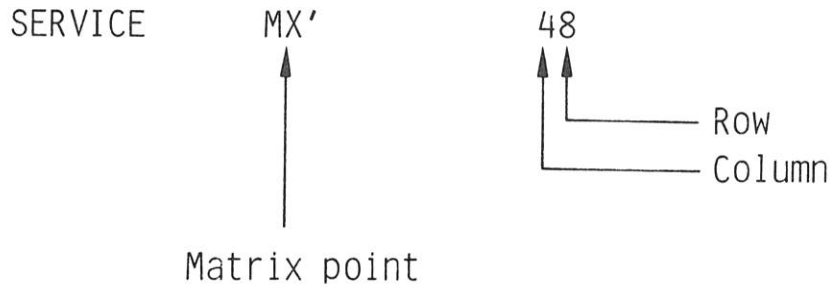
7.2.2 Keyboard test

After the automatic micro-and RAM-test is terminated by depressing the CE key, the display shows only

"SERVICE" on.

By pressing any key of the keyboard, the entire keyboard matrix can now be checked. In the favourable condition, the buzzer sounds for a short time and a code is displayed in the display.

Display Indication - Keyboard Test



7.2.3 Character print

The character set (100 characters) of the type wheel is printed out upon pressing the line distance adjusting key.

Display Indication - Character Print

SERVICE PRINT

7.2.4 Type wheel motor

Upon pressing the pitch selecting key, the test for type wheel motor is selected.

Home position (Clear)	-	Press once right margin key and once left margin key.
Motor step to the left	-	Left margin key
Motor step to the right	-	Right margin key

Display Indicator - Type Wheel Motor

SERVICE DAISY

Termination with CE key

7.2.5 Subfunction motor

When depressing the impact force key, the subfunction motor is set into an electronic home position = clear position. This test is only necessary when the subfunction motor is exchanged and the synchronization must be set between the electronic and mechanical home position.

Display Indicator - Subfunction Motor

SERVICE Low Frequency-Motor

Terminate test by turning off the machine.

7.2.6 RAM test

Upon pressing the print variation key, the test can be repeated under point 7.2.1.

7.2.7 Display test

All display points are selected by pressing the print mode key. In this test, one can recognize if points are missing. Terminate with CE.

7.2.8 Display interface test

A test is selected upon pressing the display selection key, which always transmits defined data to the display processor 8048. This test can only be analyzed with an oscilloscope by the incoming data being checked for their valency (55 or AA) on the component 13 on the keyboard. The display stays dim during test.
Terminate test by turning off the machine.

7.3. Internal display test program

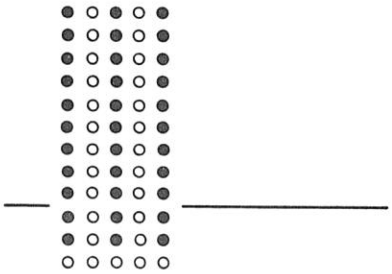
An internal display test program can be selected by setting the bridge 1 on the keyboard from position 1 - 2 to position 1 - 3. The machine must be turned off and turned on accordingly.

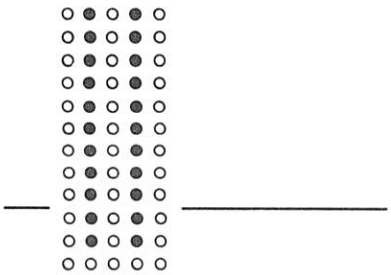
The display processor controls the display in this program, without the help of the main processor on the logic board .

7.3.1 Test sequence

All 40 grids are tested with two check characters.

Check character:





The test run can be interrupted by disconnecting bridge 1.

Furthermore the underline character is tested, which is selected via the JC 8 driver component. Thus, some characters are printed with underlining. An error exists when no character or all characters are displayed with an underlining character.