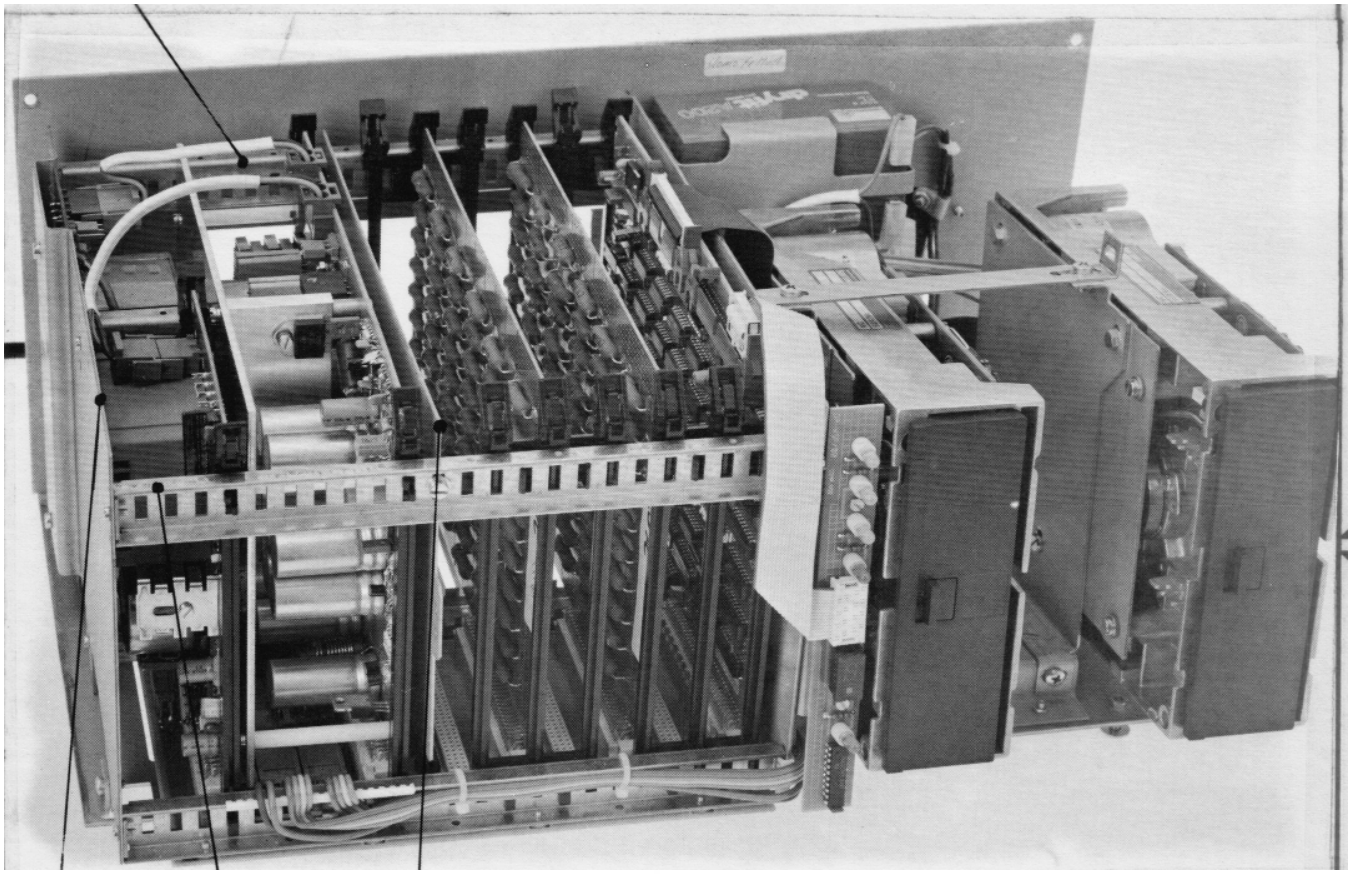
Philips P3500

Ordner Hardware

1



system series: P3000 model: main assy: nr. P3500-048

date: 841017 revised:

title: P3500 rebuild to 16 bit.

note:

To upgrade a P3500 to 16 bit an upgrade kit P3530-80 12NC: 8702 300 09018 is available.

1) Contents of kit (P3530-80)

Description	Qty.	12NC
1. Diodes BYV 33-45	3	5322 130 32246
2. Clamping spring	2	5112 212 00531
3. Cable binder	10	2422 015 05037
4. Air flow plate	1	5112 212 16271
5. Heatsink assy	1	5112 291 94561
6. Screw M3x12	2	2512 252 01008
7. Resistor R20/2	1	8212 221 07171
8. Cap with jumper	2	5112 291 96401
9. Ventilation panel	1	5112 212 04353

2) Due to the limitation of the power supply only the combinations master/slave described in the table below are to be used.

System	PMU80-1 position(s)	total	PMU80-3 position(s)	total	PMU186 position(s)	total
2xmfD		0	MSR	1	SL2,SL3	2
"		0	MSR,SL3	2	SL2,SL3	2
"	MSR	1		0	SL2,SL3	2
"	SL4	1	MSR	1	SL2,SL3	2
"	SL4	1	MSR,SL3	2	SL2	1
"	MSR,SL4	2		0	SL2,SL3	2
"	SL1,SL4	2	MSR	1	SL2,SL3	2
"	SL1,SL4	2	MSR,SL3	2	SL2	1
"	MSR,SL1,SL4	3		0	SL2,SL3	2
"	SL1,SL3,SL4	3	MSR	1	SL2	1
"	MSR,SL1,SL3,SL4	4		0	SL2	1
"	SL1,SL2,SL4	3	MSR,SL3	2		0
1xmfD,FXD		0	MSR	1	SL2,SL3	2
"		0	MSR,SL3	2	SL2	1
"	MSR	1		0	SL2,SL3	2
"	SL3	1	MSR	1	SL2	1
"	SL2	1	MSR,SL1	2		0
"	MSR,SL3	2		0	SL2	1
"	SL3,SL4	2	MSR	1	SL2	1
"	SL2,SL3	2	MSR,SL1	2		0
"	MSR,SL3,SL4	3		0	SL2	1
"	SL1,SL2,SL3	3	MSR	1		0
"	MSR,SL1,SL2,SL3	4		0		0
"	SL2,SL3,SL4	3	MSR,SL1	2		0

revised: nr. P3500-048

3) Implementation

1. Replace ventilation panel in the back cover by the panel of the kit (see fig. 1 and 2).
2. Mount the air flow plate in the cabinet as per fig. 3 and 4.
   Use only outer two holes for the screws.
   Make sure that the air flow plate is mounted tightly to the U-profile and the bottom of the cabinet.
   If necessary remove (part of) the white plastic strip on the U-profile.
3. Bend the flatcable to the MFD as per fig. 5.
4. Modify PSU-WS120 as per SI P3500-052. Use new clamping springs for the diodes.
5. Modify PSU-M2 as per SI P3500-053.
6. Remove the plastic sleeve from the PUC cable and use the cable binders to keep the wires together (fig. 6 and 7).
7. If there is no slave in position slave 1 or position slave 3 mount on this position the cap with jumper. See fig. 8.
8. If there is no slave in position slave 4 mount strap W5. See fig. 8.

4. Remarks

- Backpanel must have 12NC: 5112 291 84464 or higher.
  Which means that backpanel 5112 291 84462 is not suitable for 16 bit.
- FLEXCO/SASI-AD must not be used for 16 bit.
- SI P3500-43 must be done before modifying the WS120 per SI P3500-52.

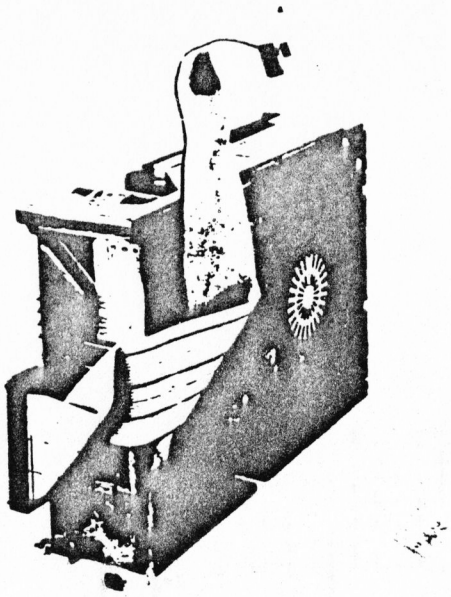


Figure 5

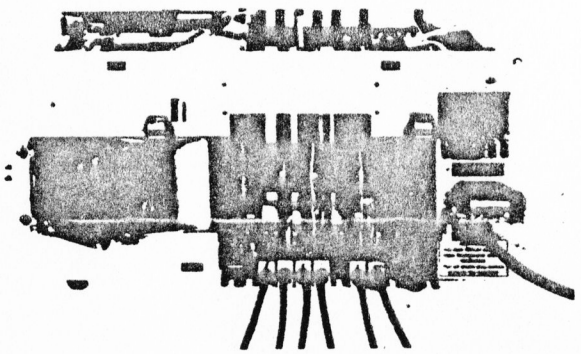


Figure 6

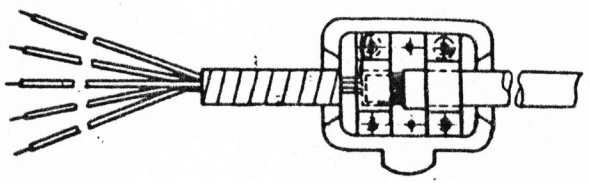


Figure 7

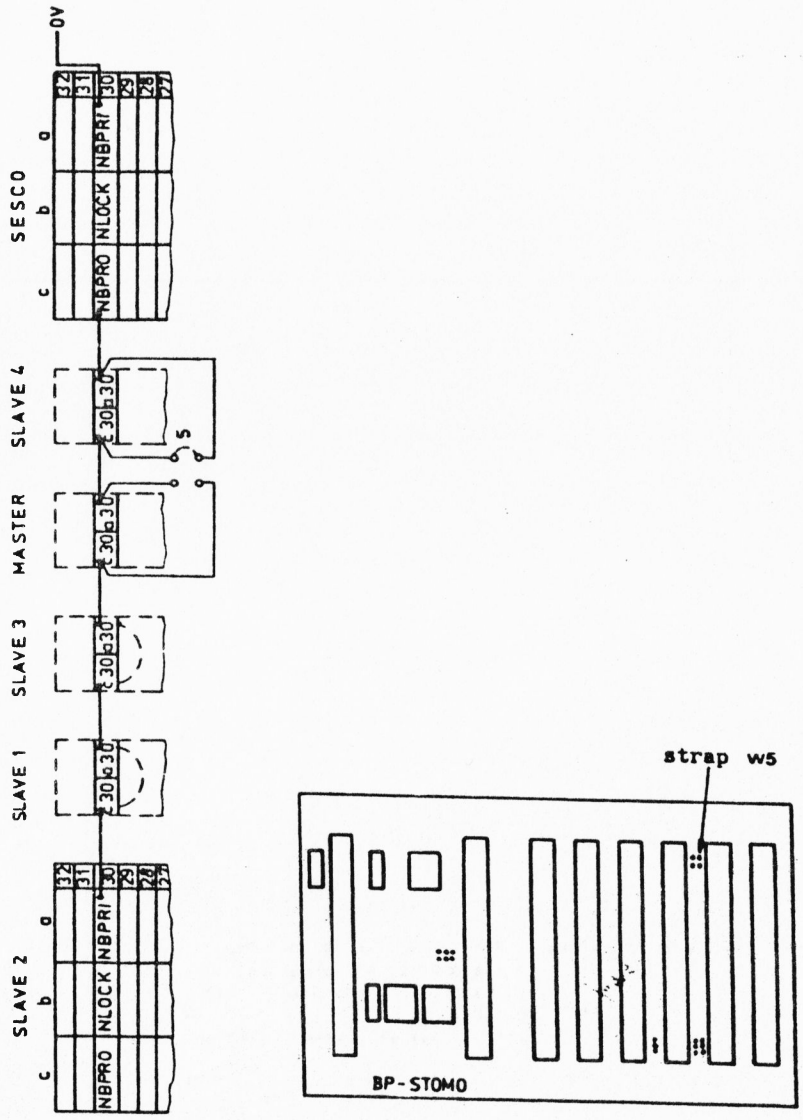

0V
SESCO
SLAVE 4
MASTER
SLAVE 3
SLAVE 1
SLAVE 2
a
b
c
NBPRI
NLOCK
NBPRO
32
31
30
29
28
27
S
strap w5
BP-STOMO

Figure 8

service information | FIELD CHANGE | Data Systems

system series: P3000 **model:** P3500 **main assy:** PSU-WS120 **nr.** P2711-018 P3500-052

units affected: **est.inst.time:**

date: 840820 **revised:**

title: WS120 for 16 bit

note: **this change is:** Retrofit on failure

1. CONDITION : If a P3500 is updated to 16 bit, the WS120 must be changed.
   The PMU 186 needs more current than the PMU 80

2. CORRECTION : Component change on WS120 5112 291 75723.

3. REMOVE : D37, D38 and D39 (see fig.).

4. ADD : - D37, D38, D39, (BYV 33-45).
   If silicone grease was used under the old diodes, mount the new ones also with some silicone grease.
   Do not forget the insulation plate.

   - Mount IC 8 on the heatsink by means of screw M3 x 8, ring and nut, and solder heatsink into the corresponding holes of the PCB.

5. ADJUSTMENTS : None.

6. PARTS :

Diode BYV 33-45	5322 130 32246
Heatsink	2412 490 00239
Screw M3 x 8	2522 178 20059
Nut M3	2522 401 25008
Ring 3.2	2522 600 93016

7. STATUS CHANGE : 12NC becomes 5112 291 75724.
   Service 12NC 5322 214 40086 not changed.

8. TEST FACILITIES AFFECTED : None.

9. DOCUMENTS AFFECTED : Workshop Engineer Manual, 12NC: 5122 991 3296x.

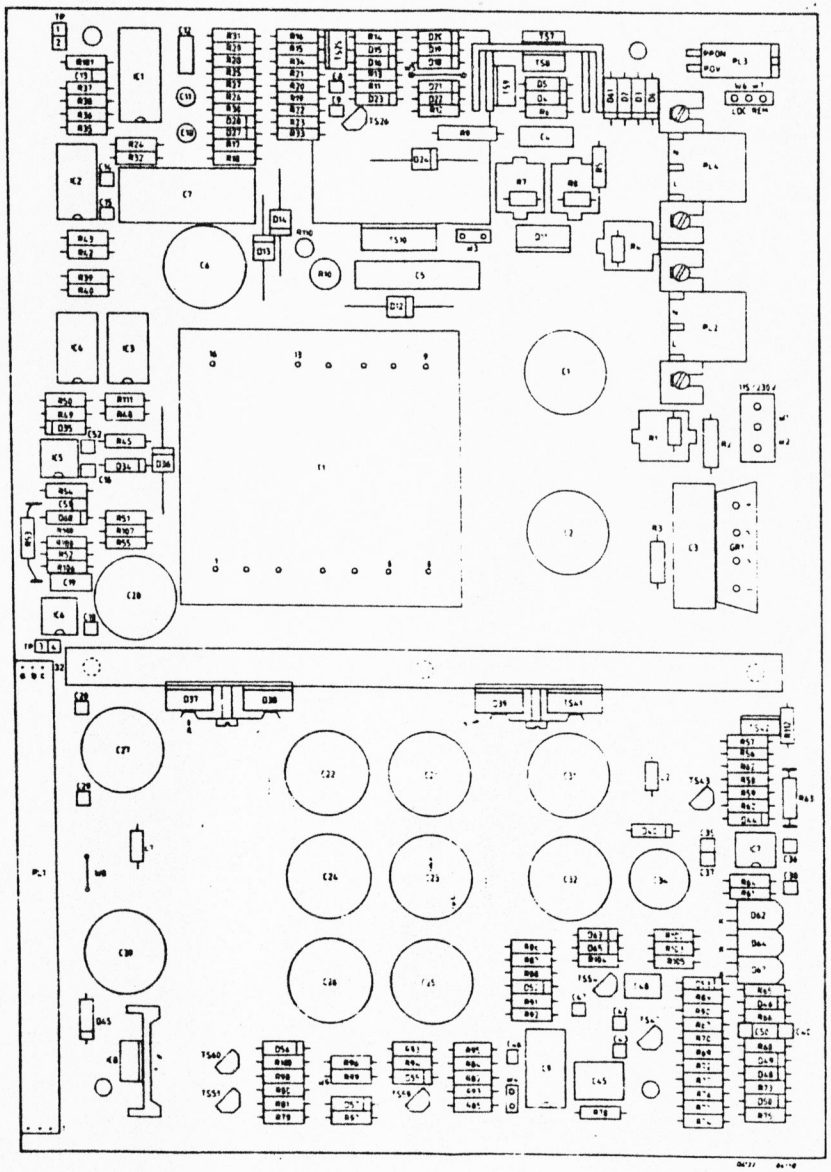
10. REMARKS : - For updating a P3500 to 16 bit, a kit P3530-80 will be made available (containing all necessary hardware parts) (WS120 change is part of it).
    The 12NC of this kit is: 8702 300 09018.
    The kit is available from September 1984 onwards.

    - This change is factory implemented from P3500 serial number 315797 onwards.

    - Modified WS120 can be used for 8 bit as well.

revised: **nr.** P2711-018 P3500-052

COMPONENT LOCATION PSU-WS120



service information | FIELD CHANGE | Data Systems

system series: P3000 P4000 | model: P3500 P4200 | main assy: PSU-M2 | nr. P3500-053 P4200-018

units affected: | est.inst.time:

date: 840717 revised:

title: PSU-M2 for 16 bit

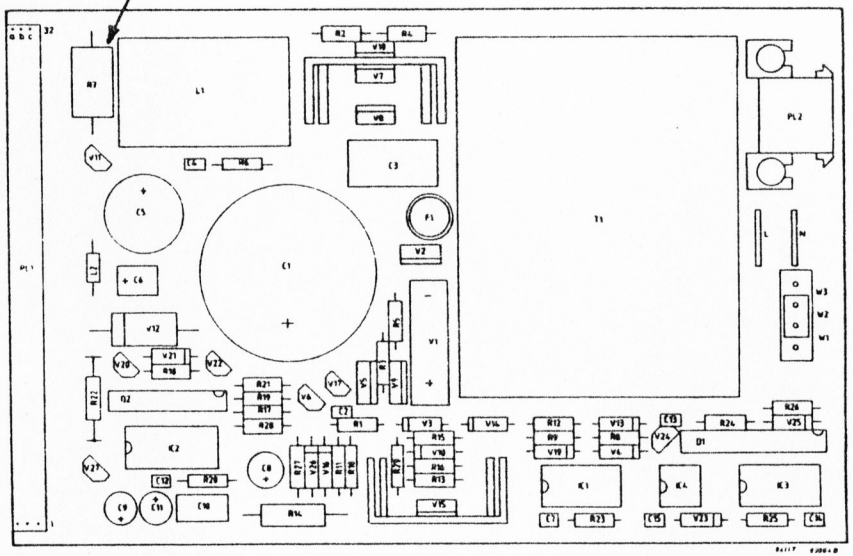
note: | this change is: Retrofit on failure

1. CONDITION : If a P3500 is updated to 16 bit, the PSU-M2 must be changed.
2. CORRECTION : Component change on PSU-M2 5112 291 69763.
3. REMOVE : R7, (E24/2).
4. ADD : R7, (E20/2) see fig.
5. ADJUSTMENTS : None.
6. PARTS : Resistor 200 milli/Ohm, 2W 8212 221 07171.
7. STATUS CHANGE : 12NC becomes 5112 291 69764.
   Service 12NC 5322 214 40178 not changed.
8. TEST FACILITIES AFFECTED : None.
9. DOCUMENTS AFFECTED : Workshop manual P3000.
10. REMARKS : - For updating a P3500 to 16 bit, a kit P3530-80 (---) will be made available (containing all necessary hardware).
    (This PSU-M2 change is part of it).
    The 12NC of this kit is: 8702 300 09018.
    This kit is available from September 1984 onwards.
    - This change is factory implemented from P3500 serial number 315797 onwards.
    - Modified PSU-M2 can be used for 8 bit as well.
    - This modification has no consequences for P4200.

service information Data Systems

revised: nr. P3500-053 P4200-018

COMPONENT LOCATION PSU-M2



2

1. Test and Diagnostics of P3500 Systems

In order to start each application session from a well-defined situation, the P3500 system is provided to run test and diagnostic programs.

After power-on, a so-called Inside Test will run automatically without any user handling.

Since the program is resident within the system and data on data carriers must not be destroyed, it covers not all the hardware functions.

After initial program loading (IPL), the End User may load an additional test program. The Service Engineers may load a special test program to be loaded from a special service diskette.

With these test programs expanded tests may be performed at data carriers or devices like printer or disk drives.

More detailed descriptions of the Inside Test and Test and Diagnosis Program P3500 are given in the following chapters.

2. Inside Test of System

2.1 General Description

With the aid of a resident Inside Test Program that is executed after power-on, the system checks the basic functions of its own hardware to verify the correct working.

The central unit P3500 as well as the workstations have their own Inside Test Program. These test programs are independent of the system configuration and do not communicate with each other.

After execution of the Inside Test the workstation
After execution of the Inside Test the workstation
is switched online, indicated by the lamp "ONLINE" on the keyboard. The central unit P3500 is switched on remotely and will start its Inside Test. On the operator panel of the central unit the lamp "power on" and the test lamps are illuminated. After performing the Inside Test of the central unit P3500 without detecting an error, the test lamps will be extinguished, and initial program loading (IPL) will be performed.

The system is now ready for use.

In case of an error, only that unit where the error is found will indicate this error. For a workstation an error code is displayed on the screen (if applicable) and also the four functions lamps L1 to L4 on the keyboard will indicate the error code. The central unit displays its error code by means of the four lamps 1 to 4 of its operator panel.

In case of an error the end user should call the Service Organization, indicating the error code.

The following tables show the possible error codes of the central unit P3500 and the workstation P2711.

Error codes of central unit P3500:

lamps on operator panel 1	2	3	4	meaning of error code
-	-	-	-	no error
X	X	X	X	processor memory unit
X	X	-	X	SESCO
X	-	X	X	internal FIXCO
X	-	-	X	internal fixed drive
-	X	X	X	internal flexible drive
-	X	-	X	no intern. FLD ready

Error codes of workstation P2711:

function lamps on keyboard L1	L2	L3	L4	error code on screen	meaning of error code
-	-	-	-	-	no error
X	X	X	X	11 to 15	PMU
X	X	X	-	21 to 24	PME
X	X	-	X	31 to 39	CRT-CO
X	X	-	-	41	keyboard interface

note: X = lamp on
- = lamp off

2.2 Inside Test of Display Module (DIMO) P2711

2.2.1 General Description

The purpose of the **Inside Test** is to check the basic functions of the display module P2711 (DIMO) and to verify that the terminal is working correctly. Malfunction of hardware components shall be detected and located down to the field exchangeable unit level. Information provided in case of an error shall guide the operator´s actions.

The **Inside Test** is always executed after power-on or reset. It can also be started by entering the corresponding control sequence via the host interface. Dependent on the input parameters either a single or a continuous test is executed. With the input parameter the part of DIMO to be tested is selected, too.

The **Inside Test** is a stand alone program without any support by the system software and does not require any operator handling after starting. As a result of the Inside Test execution, the status of the DIMO is created. It includes information about whether the terminal is free of errors or what error was detected. The status is stored in the memory and can be fetched from the host.

The state of the DIMO after test will be online. That means, no memory contents will be changed and the initialization of the peripherals will not change. In case of a fatal error, all operations will be stopped immediately.

To indicate the errors to the user, an error code is displayed which gives information about the faulty field-exchangeable unit and its subsection. The first hexadecimal digit of the code indicates the faulty unit, the second hexadecimal digit indicates the faulty subsection (see also table in 2.1).

The meaning of the displayed code is as follows:

11	PMU88	standard RAM address
12	PMU88	non volatile RAM address
13	PMU88	standard RAM memory location
14	PMU88	non vol. RAM memory location
15	PMU88	progr. interrupt controller
21	PME1	programmable interval timer
22	PME1	keyboard interface
23	PME1	auxiliary V24/V28 interface
24	PME1	system v24/v28 interface
31	CTRCO	c.f.e.
32	CRTCO	c.f.e.
33	CRTCO	refresh memory address
34	CRTCO	c.f.e.
35	CRTCO	refresh memory location
36	CRTCO	vertical synchronization
37	CRTCO	horizontal synchronization
38	CRTCO	video signal
39	CRTCO	real time clock
41	KB	keyboard interface

The error code is displayed at the lower left corner of the screen. It is equal to the value of the first byte of the test status. In case of an error, the bell of the keyboard will once be activated for about 100ms.

In case the detected error cannot be displayed on the screen, as an additional interface the keyboard LEDs L1 to L4 are set correspondingly to the test result.

At the beginning of a test module, the four LEDs are set to the corresponding value of this module. If an error occurs, the state of the LEDs remains unchanged and indicates which unit causes the error.

The following indications are given:

LEDs on	field-exchangeable unit
L1, L2, L3, L4	PMU88
L1, L2, L3	PME1
L1, L2, L4	CRTCO
L1, L2	keyboard interface

If no error is indicated, the 4 LEDs will be switched off at the end of test. If the DIMO has been in online mode before testing, the LEDs will change to the value they had before. If the DIMO has been in local mode, they will be switched off. Independent of the mode before running the test program, and independent of the test result, after test the keyboard is switched into the online mode.

As an additional interface to the Service Engineer an Inside Test LED is implemented on all PCBs. These LEDs are switched on automatically after power-on or reset or by theInside Test, if it is initialized by the control sequence. These LEDs will only be switched off if no error was found on the corresponding PCB.

The PCBs of the DIMO are tested in the following sequence:

- PMU88
- PME1
- CRTCO
- Keyboard Interface

If the test is terminated in case of an error, the LEDs of all untested PCBs, including the faulty one, will be switched on.

2.2.2 Detailed Description

The Inside Test Program is developed in a modular way, according to the structure of the DIMO. It includes modules to test the units mentioned in 2.2.1. All modules are divided into several sub-modules which check subsections of a unit.

In the beginning the kernel of the DIMO is verified. After that, the test is expanded to the sub-units. The kernel is formed by the microprocessor, the stack memory and the microprogram of the PMU88.

Not covered is the user interface of the keyboard. Therefore Inside Test must be seen as a test of the processor unit and the elements directly driven by it.

Keyboard (keys), CRT, CRT device electronics and power supply are not tested.

The keyboard interface is checked by interaction of the DIMO processor with the keyboard processor.

2.2.2.1 Test of PMU88

This test module consists of the following steps:

- CPU test
- ROM test
- RAM test
- test of programmable interrupt controller
- interface test
- logic test

All these steps are executed in the same order as listed.

In case of an error, it has to be distinguished between fatal erros and non fatal errors.

Faults of the PMU88 which do not allow further correct program execution are defined as fatal errors. They will cause the CPU to stop program execution and to go into the HALT state.

If a non fatal error is detected, the Inside Test is stopped and error handling will be done.

2.2.2.1.1 CPU Test

In the beginning of the test a kernel has to be checked. Therefore at first the microprocessor is tested by operations like stack handling, test of the microprocessor´s registers, and test of instructions. The test of the stack memory locations is included in the test of stack handling.

2.2.2.1.2 ROM Test

The ROM memory contains microprograms like Inside Test and firmware. To check the contents of the ROM, a hash total is calculated. To verify the hash total it is compared with a check sum stored in the ROM.

2.2.2.1.3 RAM Test

In the first part of this step a test of address lines is performed. This is done to ensure the correct working of each address line.

After this, each memory location is checked by writing it and comparing the contents.

2.2.2.1.4 Test of Programmable Interrupt Controller (PIC)

This test checks if the read/write registers of the programmable interrupt controller can be initiated correctly. Besides, the levels of all pending interrupts which are in a defined state will be checked.

A complete interrupt sequence is performed by enable and activate the system bus interface interrupt NIR7 (interrupt 6), and check of its result.

2.2.2.1.5 Interface Test

The interfaces are provided with a test loop facility. After activation the transmit lines are connected directly to the receive lines. The external drivers are locked. Test pattern written into the transmitters will be compared with the data received.

2.2.2.1.6 Logic Test

This step checks the remaining circuitry of the PMU88 (e.g. DMA, address selection, etc.).

2.2.2.2 Test of PME1

This test module checks the hardware of the PME1 in the following order:

- ROM
- Programmable Interval Timer (PIT)
- Interfaces

If a failure is detected during the test of ROM, this will result in a fatal error and all operations are stopped immediately.

2.2.2.2.1 Test of PME1 ROM

To check the contents of the ROM memory, a hash total is calculated which will be compared with a check sum stored in the ROM.

2.2.2.2.2 Test of PME1 Programmable Interval Timer (PIT)

This test step checks the count registers and the correct counting of each counter.

2.2.2.2.3 Test of PME1 Interface

The external interfaces at the PME1 are all tested by looping them back, locking their external drivers, then sending data through them and comparing them with the data received.

The test also includes testing of the interrupt lines to the PMU88. This is done by reading the interrupt request registers of the PIC at the PMU88 and checking if the level of the interface interrupt lines is the one expected.

The auxiliary V24/V28 interface at the PME1 is not used in the first releases, and therefore, it is tested from Release 2 of TV950* emulation.

2.2.2.3 Test of CRT Controller CRTCO

This module checks the hardware of the CRTCO divided into the following parts:

- refresh memory
- monitor signals
- real time clock

2.2.2.3.1 Test of CRTCO Refresh Memory

This step checks, in a first part, the addressability of each memory location. If no error is detected all locations are written and the contents are compared by reading the data.

Since no data must be destroyed, all data are temporarily stored in a test buffer.

2.2.2.3.2 Test of CRTCO Monitor Signals

The following signals are checked:

- Vertical Synchronization
- Horizontal Synchronization
- Video Signal

This will be done by means of the built-in test and diagnosis feature of the CRTCO, which allows access to these signals via an I/O-port.

The signals are checked on event and duration.

2.2.2.3.3 Test of CRTCO Real Time Clock

The CRTCO provides a real time clock (RTC) which is connected to an interrupt input of the programmable interrupt controller (PIC) of the PMU88.

The frequency of this clock is checked by the Inside Test by reading the interrupt request register of the PIC and evaluating the level of the RTC-interrupt within a given time.

2.2.2.4 Test of Keyboard Interface

Since testing of the complete keyboard requires operator actions, only the interface can be tested by the Inside Test.

It is tested by using the keyboard´s diagnostic feature. The Inside Test Program sends the command "TEST ON" which causes the keyboard ~~to immediately~~ to an immede return, all data received. When the total data string has been checked, the Inside Test sends the command "TEST OFF". With this, the keyboard is set into normal mode again.

If the comparison of data sent and received detects an error, the error code according to table in 2.2.1 is displayed on the screen.

2.3 Inside Test of Storage Module (STOMO) P3500

2.3.1 General Description

The purpose of the Inside Test is to check the basic functions of the STOMO and to verify that the hardware is working correctly. To this end, the program is resident within the system and does not require any user handling. The test is performed without destroying any valid data stored in the working storage or on data carriers.

The STOMO contains several identical processor memory units (PMU) which are used as master or as slave processors, depending on the slot into which they are inserted. According to this structure all PMUs have an own Inside Test Program implemented, which will be executed immediately after power on. However, all test results are collected by the master PMU for administration purposes.

The test programs in the several PMUs are all identical, but their execution differs depending on the function of the PMU within the system (whether it is master or slave). The program is a stand-alone program without any support by the system software. It runs in all PMUs simultaneously.

The slave PMUs as well as the master PMU check their own hardware. The test results of all PMUs are collected by the master PMU. After that the master PMU continues the test and checks the funtions to be used for data transfer at initial program loading (IPL) as well as the functions to be used for data exchange.

The test result of the Inside Test is indicated on the operator panel in front of the STOMO. After the test has been performed normally, only the green power LED remains switched on.

Only in case of an error found by the Inside Test, one or more of the 4 test LEDs will remain switched on, too. In this case the end user should call for the Service Organization.

2.3.2 Detailed Description

As mentioned, the Inside Test programs in the several PMUs are all identical and will run immediately after power-on.

Each test program consists of the following steps:

- test of the microprocesssor and the memory mapping unit
- test of the microprogram ROM
- test of working storage and program memory RAM
- test of serial input/output controller SIO
- test of timer
- test of master-slave-communication

+ - test of the flexible disk controller and the SASI interface adaptor

+ - test of the fixed disk controller and drive

+ - test of the flexible disk drive

All PMUs execute their own test program independently of the other PMUs. After execution of the timer test, the processor of each PMU looks for its use within the system. The test of master-slave communication is initiated by the master, and the slaves will react on request. The master collects the test results of all other PMUs and continues the test by running the test steps marked with a plus sign.

The overall test result is indicated on the operator panel and will be available for a test and diagnostic program running under TurboDOS*.
It is stored in the test buffer.

As an additional interface to the Service Engineer, LED is implemented on all PCBs to show the correct working of the PCB.

* TurboDOS is a trade mark of SOFTWARE 2000 INC.

After performing the Inside Test, the system starts initial program loading (IPL).

If no flexible disk, containing system software, is inserted in the mini flexible disk drive, the system tries to load the system software from the fixed disk (or the second flexible disk drive) or the disk extension module.

In case of an error detected by the Inside Test, an error code will be displayed (see table of error codes, chapter 2.1). Dependent on where this error occurs, the system may work with restrictions.

If the error occurs in an activated slave, the error code for PMU will be displayed on the operator panel. If it occurs in a not activated slave, the error code for PMU will be displayed, too.

The address of the erroneous PMU is deleted in the master´s address table and system software does not know it.

Additionally to the error code displayed, the test indication LED of the defective PMU will remain illuminated. So the Service Engineer may remove the defective PCB without any additional tests.

2.3.2.1 Test of Microprocessor and Memory Mapping Unit

In the beginning of the PMU test a cernel has to be checked. After this, testing is expanded to the system elements. Therefore at first the microprocessor will be tested by operations like comparing, setting of condition flags and conditional jumps. After that, the test will be continued with a test of the processors´s registers and instructions.

In case of an error the microprocessor will run into a HALT state, and no furhter operations will be possible up to the moment a reset will be given via software or master reset. Otherwise the memory mapping unit MMU is tested in conjunction with the test buffer and memory read/write instructions.

2.3.2.2 Test of RAM Memory

This test is split into two parts.

In the first part, a test of address lines is performed to ensure the correct working of each address line.

After verifying the addressability, each memory location is tested in the second part. Each bit cell is set to logical 1 and logical 0 to show the correct storing of data. This is done by writing and re-reading hexa values of ´55´ and ´AA´.

2.3.2.3 Test of ROM Memory

The ROM memory contains microprograms like Inside Test and bootstrap. To check the contents of the ROM, a 16 bit wide hash total is calculated over the whole ROM contents. To verify the hash total it is compared with a check sum stored in the ROM, too.

If no error is detected, the next test step will be performed. Otherwise the processor runs into a HALT state and does not react on normal requests.

2.3.2.4 Test of Timer

The timer consists of 4 channels. Channel 0 and chanel 1 work as baud-rate clock generator. They are tested during the test of SIO. Channel 2 is reserved for special purposes and must not be tested. Channel 3 is used as real-time clock generator.

During the test, this channel 3 is initialized and then checked if the interrupt occurs after the programmed time.

2.3.2.5 Test of Serial Input/Output SIO

The serial interfaces are provided with a test loop facility. After activation, the transmit lines are connected directly to the receive lines. The external devices are disconnected.

Test Characters written into the transmitter of SIO will be sent to the receiver via the test loop. From there they will be read. The test characters and the status of the SIO are checked.

Since the transmission is time-controlled within this step, the baud-rate clock generation is tested, too.

2.3.2.6 Test of Master-Slave Communication

To determine the insertion of a slave PMU in a slot, the master PMU tries to write and read test characters in the memory of each possible slave PMU. If no memory wil be discovered, the corresponding address is deleted in the master´s address table.

The communication between master and slave is supported by a master-slave control port. This control port is programmed by the master. Dependent on the contents of this port, the slaves have to react. The correct reaction is checked by the master.

If the reaction of one of the slave PMUs is not correct or one of the slaves does not react, the error code "PMU" will be displayed on the operator panel. In addition, the test LED of the defective PMU will remain illuminated.

Note:
Only in case all test LEDs on the PCBs (including the LED on the master PMU) are illuminated, the master PMU should be exchanged and the power-on test should be called again by switching on the system.

2.3.2.7 Test of Fixed Disk Device

The test program selects the FXD device via the ~~SASI Adapter or~~ the SASI part of SESCO.

Because the peripheral controller for the fixed disk (FIXCO) contains a microprocessor with own micro program, the test facilities of this controller are used to check the controller itself and the drive.

The Inside Test Program issues the commands:

- Controller diagnostic
- Drive diagnostic

The controller diagnostic test checks the processor, data buffer, error correction circuitry (ECC) and a hash total of the micro program memory.

The drive diagnostic recalibrates the drive, then seeks to each track and verifies each sector 0.

After execution of a diagnostic command the result is given to the master PMU via the SASI interface.

2.3.2.8 Test of Flexible Disk Device

Since the flexible disk controller has no own intelligence, both the controller PCB and the drive have to be tested by the master PMU. This test has to be performed to ensure program loading via the flexible disk device.

On flexible disk there is no track or sector reserved for test purposes. To prevent destroying of data on flexible disk, read accesses will be done only.

With the aid of a port and additional circuits, actions of the controller and drive will be checked against the status given by the controller.

If no disk is inserted the test cannot be performed. In this case the test step will be skipped without test status.

In case of SESCO the flexible disk drive is tested in conjunction with the FLEXCO part of SESCO. After the drive is started, the test program waits for a ready change interrupt. If no flexible disk drive is ready, the test is finished.

When a flexible disk drive is ready, the heads are recalibrated to track 0 and then positioned to track 79. The correct positioning is controlled by reading the identifiers. After this a seek is performed to track 77 and to track 0.

Independent of hardware implementation the test of flexible disk device is time-controlled to prevent hang-up of the system in case of a malfunction of the hardware.

If an error occurs, the test program starts routines to distinguish which hardware unit is faulty (drive or controller) and then sets the corresponding LED code.

3 Test and Diagnosis Program P3500

3.1 General Description

The Test and Diagnosis Program P3500 belongs to the test and diagnostic tools of the P3500 system. It is a program which runs under control of system software.

The main goal is to test the hardware and to give diagnostics on exchangeable-unit level. The program offers tests for the following devices:

- VDU / Keyboard
- Mini Flexible Disk
- Fixed Disk
- Printer (P2932, P2933)

The program is distributed in 3 versions:

1) for the End User: HWTEST 8701 970 7RRLP *

2) for the Field Engineer: FETEST 8701 971 7RRLP *

3) for the System Engineer and the Workshop Engineer: SETEST 8701 972 7RRLP *

* RR = number of release
L = level
P = preversion

The end user version offers quick diagnostics of the hardware, while the Field Engineer version contains all test steps which are required to locate a defective hardware assembly.

The version for the System Engineer and the Workshop Engineer contains all test steps of the Field Engineer's version, but is extended with special test steps like read and write loops for flexible and fixed disks. Additionally, some tests may be performed in a loop.

Any input asked for by the program has to carried out via the keyboard. All messages, information, and menus are displayed on the screen.

The Test and Diagnosis Program P3500 is mainly used in case of a hardware error. It shall detect the erroneous exchangeable unit. By means of this program the end user will be enabled to give indications of errors to the Service Organization. The Field Engineer may localize a defective field-exchangeable unit. The version for the end user is distributed as a utility within the system software, and the other versions of the program reside on a separate mini flexible disk. All versions have to be loaded after IPL.

The test program evaluates internal data of the drivers. Therefore special interfaces to the drivers are used for test and diagnostic purposes. To run the program, preconditions have to be fulfilled before loading. In the following, the preconditions for starting a device test are listed in detail:

1. VDU/Keybord
   This test must be started from the terminal to be tested. It does not matter whether the test runs in the master or slave PMU.

2. Printer P2932 and P2933
   If a printer to be tested is connected to the master, the program has to be loaded into the master PMU. If the printer is connected to a slave (local printer), the test program must be loaded into the appropriate slave PMU.

   On the operator panel of the printer strap 2 of the interface parameters must be switched on.

3. Flexible Disk and Fixed Disk
   The test steps for flexible disk and fixed disk have to run in the master PMU.

Since the test program needs about 32kB available memory, before loading the test program into the master PMU, the buffers of the operating system have to be reduced to the minimum number 2, to get enough available memory size. This is done by entering the commands "**MASTER**" and "**BUFFERS N2**".

If the program is loaded the operator is guided by menu technique. Messages are issued in vernacular language.

3.2 Detailed Description

3.2.1 Test of VDU / Keyboard

Since the devices VDU and keyboard belong together closely, they are tested in one test module.
It must be started from the terminal to be tested.
It does not matter whether the test runs in the master or in the slave PMU.

This test module is split up into the following steps:

1. Diagnosis
2. Inside Test of Display Unit
3. Character Generator Test
4. Character Control Test
5. Screen Adjustment Step
6. Graphics Test

After loading the test program and selecting the VDU / Keyboard Test, the several test steps may be selected via a submenu by entering the select number.

Dependent on which version is used, the execution of the program is different. The end user may run the diagnosis only. Service Enginers may run diagnosis or/and test and adjustment steps.

If an error occurs, the program displays a message. It returns with a short menu, and the operator may select EXIT or DIAGNOSIS.

The program version for the System Engineer and the Workshop Engineer shows the whole menu, and all steps may be selected, independently of errors.

3.2.1.1 Diagnosis

With the selection of this step, the Inside Test, the Character Generator Test, and the Character Control Test will be performed automatically.

The version for the end user selects this step automatically after selecting the VDU/Keyboard test.

Diagnosis starts with the Inside Test of the display and the following steps are called if no error has been found. Otherwise diagnosis stops and the eror message of the Inside Test is displayed. Since there exists a severe hardware error, the program does not continue testing the hardware.

3.2.1.2 Inside Test

This step calls the Inside Test of the display module. If no error is detected during the test, all three versions continue testing with Character Generator Test. Otherwise the program stops and an error message will be displayed. In the version for end users only selection of "EXIT" or "DIAGNOSIS" will be possible.

The result of the Inside Test is stored as terminal status, which will be checked by the Test and Diagnosis Program P3500. For each bit set in the terminal status an error message is issued (see Table in chapter 2.1 and chapter 2.2.1).

3.2.1.3 Character Generator Test

On the screen all capital and lower case letters from A to Z inclusive and the digits 0 to 9 inclusive are displayed. From one row to the other a shift of one character to the left is made. The test is continued up to the moment the operator presses the key "STOP" or ^U.

The operator has to check the following image:

```
AB......YZ 01....89 ab......yz 01....89 ABC
BC.....YZ 01....89 ab......yz 01....89 ABCD
CD....YZ 01....89 ab......yz 01....89 AB..E
DE...YZ 01....89 ab......yz 01....89 AB...F
```

and so on.

If the test pattern is not displayed correctly, the CRTCO PCB should be replaced. To find the defective functionel unit on the PCB, the following advices are useful:

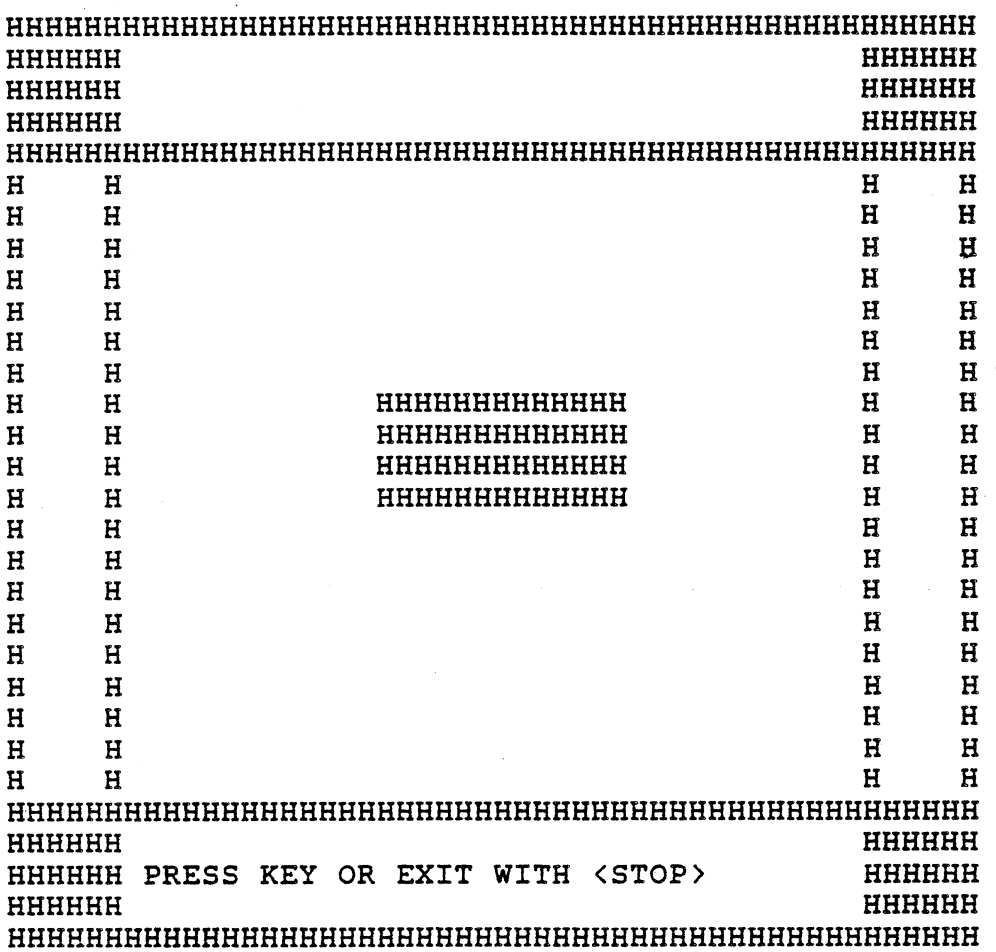
- If the same character in each row is not correct, the Character Generator has to be replaced.

- If a correct character is displayed in a wrong place, the address latch is defective.

- If independently of the character, erroneous information is found, the refresh memory or the refresh circuit is defective.

3.2.1.4 Screen Alignment Check

After selection of this step, which will not be available in the End User´s version, the screen shows a frame like the following picture.



This frame is useful to check horizontal and vertic- linearity and to adjust it, if necessary.

When the operator presses the <STOP> key or ^U, the step is left and the program jumps back to the menu. Otherwise all positions of the screen are filled by the character the key of which is pressed.

3.2.1.5 Graphics Test 1

A test pattern which consists of graphic characters is displayed. The operator is asked to check the pattern visually.

3.2.1.6 Graphics Test 2

In this step a football ground is shown, composed of some graphic characters. The operator is asked to check the pattern visually.

3.2.1.7 Character Control Test

This test shows some lines of test pattern with attributes like inverse video, intensified, blinking and underline.

Each attribute is displayed on the screen and should be checked visually by the operator. A wrong layout indicates failure in emphasis control, character generator and video mixer.

3.2.1.8 Character Attribute Test

This is an additional test step to the Character Control Test. It shows the whole character string with four attributes and their possible combinations.

This test is to check the acceptance of attributes and their combinations in each position on the screen. If there are errors, the RAM memory or the attribute memory should be exercised.

Note: Character Control Test and Character Attribute Test are not contained in the program issued for release 1.1 of P2711.

3.2.2 Test of General Printer (P2932, P2933)

Several types of printers may be connected to the P3500 system. This test module supports the test of the quality matrix printers (general printers) only. Printers of other types cannot be tested by this test program.

In most configurations of the P3500 system only one printer will be installed as a central, shared printer, which is connected to the master PMU. Some configurations may have additional local printers, connected to a slave PMU.

To run the test program, some preparations have to be made before loading.

As the test steps evaluate the status of the printer, strap 2 on the operator panel (automatic status reporting) of the interface parameters must be switched on. The spool function of the system software will be disabled automatically.

Before running the test of a central, shared printer, the operator must be sure that no other user wants to have printouts.

Since the test program needs, as mentioned in chapter 3.1, about 32kB memory, the operator should give the command **"buffers n2"** to the system. If the program has to run in the master PMU, before the command **"master"** must be given. To enable the command "master" the operator must be a privileged user. If both commands are executed by the system software, the Test and Diagnosis Program P3500 may be loaded and the test of the printer selected.

The test of a local printer can be started only from the console the printer is connected to. The console may not be attached to the master PMU.

The test module is split into three parts:

1. Diagnostics
2. Adjustment support
3. Functional test.

If the console is attached to the master and two printers are connected to the master, or if a local printer is connected to the slave and the central printers are set to offline, and the program is running in that slave, the message

PRINTER ASSIGNMENT (A..P):

is displayed. The operator has to select the printer by entering the assignment.

After selecting the test module for the general printer, the message

ERROR IN POWER SUPPLY OR PRINTER NOT CONNECTED

is displayed on the screen and removed, if the printer is connected, switched on, and the correct PMU is selected.

If all conditions are fullfilled, the following sub-menu will be displayed:

```
DEVICE:  PRINTER
PAPER FEED DEVICES

  0  EXIT              3  FRONT FEED
  1  FRICTION FEED     4  TRACTOR FEED 340MM
  2  ASSH              5  TRACTOR FEED 400MM
```

With the numbers 1 to 5, the paper devices of the installed printer will be selected.

Attention:
Do not select a not installed paper device!

If more than one paper device shall be tested, the operator has to leave test program step with "exit". Then he may select the new paper device.

After selecting the paper device, the program starts diagnostics by calling the power-on self-test of the printer.

3.2.2.1 Power On Self-Test

After entering the printer test module via the main menu and selecting one of the paper devices, in case front feed or friction feed will be selected, the following message will be displayed:

"INSERT A FORM AND PRESS START KEY"

If the form is inserted, the program issues the command "TEST MODE ON" and the printer starts printing the following test pattern:

```
AB....YZ   ab....yz   01....89:;<=>?   !"£$%&´()
BC...YZ   ab....yz   01....89:;<=>?   !"£$%&´()*
CD..YZ   ab....yz   01....89:;<=>?   !"£$%&´()*+
DE.YZ   ab....yz   01....89:;<=>?   !"£$%&´()*+,
```

and so on.

The printing may be shortened by manual handling via the printer´s operator panel. If the keys START/STOP, BREAK/ATT and START/STOP are pressed, the printer stops printing and gives his status to the system.

After receiving the printer status, the test program finishes its wait loop and gives the command "TEST MODE OFF". The status will be evaluated and a message displayed on the screen.

After this the paper devices to be examined are tested. To change the paper device, the operator has to leave the test module and to re-select it. Otherwise the message "DEVICE NOT INSTALLED" will be displayed.

3.2.2.2 ASSH Test (Test of Automatic Single Sheet Handler)

Both hoppers of the ASSH may be selected by the test step. Dependent on the selection, the form will be inserted from hopper 1, hopper 2 or both.

Before a form is inserted, the old one is ejected. The positioning mechanism of the friction feed is tested by printig a text on lines 8 and 64. The text must not slide, neither in vertical nor in horizontal position.

3.2.2.3 Test of Front Feed

The test of FF is a test of the vertical positioning. A form is inserted to the position that is destinated by the printer's hardware. During this test horizontal bars are printed.

After printing these bars, the form is positioned backwards to the first printable line. Printing of the horizontal bars is repeated. Then the form is positioned to the first printed line and the bars are printed again.

A similar procedure is applied in the middle of the form.

The Front Feed Device positions correctly, if the double printed bars are superjacent.

The test ends with the ejection of the form. The Service Engineer is asked to check the printout and to perform adjustments in case the positioning mechanism does not work correctly.

3.2.2.4 Typewriter Test

Any character entered via the alphanumeric keyboard will immediately be displayed on the screen and printed on the selected paper device.

Admissible control keys are carriage return, line feed, backspace and shift.

This step shows the possibility of typing all characters and the national variants. Printing is done only with the default font, pitch and line.

The operator is asked to visually check the right interpretation of character codes.

This step is left by pressing key <STOP> or ^U.

3.2.2.5 Printer Adjustment Step

Two adjustment facilities are offered to the Field Engineer or the Workshop Engineer, namely the needle correction and the printhead inclination.

Needle correction has to be done by switches on the operator panel of the printer, while correction of the printhead inclination has to be done by means of screws on the printhead carriage (only P2933).

Dependent on the selection of loop no/yes, ten or a multiple of ten lines of vertical bars are printed, thus forcing an image like:

At the end of each line the print direction changes. That means, every second line is printed in the same direction.

The printhead is adjusted correctly if the bars are vertical. If the needle correction is not adjusted correctly, there exists a horizontal shift from line to line.

Note: It is recommended to adjust first the printhead inclination and then the needle correction, because the vertical bars facilitate the visual examination of the needle correction.

SYSSE

Generate Test Disk

3.2.3 Test of Mini Flexible Disk

Since diskettes to be used on P3500 systems have no tracks or sectors reserved for special service purposes, the mini flexible disk controller and drives are tested with a specially prepared test diskette.

As data or information on those diskettes may be destroyed by malfunctions of the controller or the drive, test diskettes can be generated by the utility "Generate Test Disk". Generation of test diskettes should be performed on a reference drive to guaranty data exchange.

To get quick information about the flexible disk device, a diagnostic step automatically performs seek, read and write tests. If an error occurs, the status will be evaluated and a message displayed.

After selecting the test of mini flexible disk, the menu offers the following steps:

1. Diagnosis
2. Generate Test Disk
3. Copy and Repair Data (not Rel. 1.1)
4. Test and Repair Medium (not Rel. 1.1)
5. Extended Test

Since the controller is connected to the master PMU, the test module has to be loaded into the master. If it is loaded into the slave PMU, the message

CONSOLE NOT ATTACHED TO MASTER PROCESSOR

will be displayed.

3.2.3.1 Diagnosis

The diagnosis of the mini flexible disk controller FLEXCO or the FLEXO PART of SESCO and drive is performed in 4 steps:

1. Pre-Test
2. Seek Test
3. Read Test
4. Write Test

If an error occurs within this steps, the internally gathered errors are evaluated to recognize the exchangeable unit and, if possible, the functional unit.

3.2.3.1.1 Pre-Test

This step checks if the drive is ready and a test diskette is mounted. The expected volume label is "MFD-DIAG". If another diskette is inserted, the program returns with "WRONG MEDIUM" and "MOUNT TEST DISK AND PRESS <RETURN>". To leave the step, if no test diskette is available, the operator has to open the drive door and to press the return key.

3.2.3.1.2 SEEK TEST X SYSSE 10M/5M

If the right diskette was inserted, this step performs the seek test. It is divided into a sequential and a random seek test.

First a sequential seek for all cylinders is executed. The seek is performed from cylinder 80 to cylinder 1. After every positioning the heads are recalibrated to cylinder 0. So the heads are moved from cylinder 0 to cylinder 80, cylinder 0, cylinder 79, cylinder 0, etc.

To test if the expected cylinders have been found, the identifiers of the sectors will be checked. If the right cylinder is found, the next seek command will be issued.

If all cylinders are found without an error, a random seek will be performed.

3.2.3.1.3 Read Test

SYSPF 5M/10M

The test diskette generated by the Test and Diagnosis Program P3500 contains worst-case patterns to check the read channel inclusive the phase locked loop circuit (PLL).

During the read test the heads are positioned to the cylinders 3, 4, 39, 40, 45, 46, 71 and 72. On these cylinders the worst-case pattern hexa ´DB6´ are expected on each sector.

If these patterns are not found, the test stops and an error message will be displayed.

3.2.3.1.4 Write Test

To check the correct functioning of the write channel, the test diskette must contain other data than the data to be recorded during the test.

To prevent wrong diagnostics, cylinders 1, 2, 41, 42, 43, 44, 74 and 75 contain worst-case patterns hexa ´DB6´ on each sector, recorded during the generation step.

During the write test the first half of every sector of the mentioned cylinders is overwritten by the random pattern ´00´X and ´FF´X, being written 16 bytes. So every sector has the following layout:

byte addr.	hex-value															
´000´ H	00	00	00	.....	00	00	00	00
´010´ H	FF	FF	FF	.....	FF	FF	FF	FF
´020´ H	00	00	00	.....	00	00	00	00
´060´ H	00	00	00	.....	00	00	00	00
´070´ H	FF	FF	FF	.....	FF	FF	FF	FF
´080´ H	DB	6D	B6	.....	DB	6D
´090´ H	B6	DB	6D	.....	B6	DB
´0A0´ H	6D	B6	DB	.....	6D	B6
´0F0´ H	B6	DB	6D	.....	B6	DB

These data are expected after writing. If all sectors are compared, the cylinders are overwritten by the value ´DB6´H.

3.2.3.2 Generate Test Disk

With this step, the test medium will be generated. The operator is asked to install a diskette. After a pre-test the volume label - if one is found - will be displayed and the operator is asked to confirm.

After writing the volume label "MFD-DIAG" all sectors of cylinders 1, 2, 3, 4, 39, 40, 41, 42, 43, 44, 45, 46, 71, 72, 74, and 75 are written with the worst case pattern 'DB6'H.

Note:
To guaranty the data exchangeability, the test diskette should be generated on a reference drive.

3.2.3.3 Copy and Repair Data (not implem. Rel. 1.1 and Rel. 2)

This step enables the operator to repair a defective data part of a sector. The repair procedure can be combined with copying the data set to another volume.

The execution of this function depends on the hardware configuration. The program checks the disk configuration automatically.

In case of 2 flexible disks, at first a message is displayed, which specifies the source and the destination drive. After mounting the disk both volume labels are displayed and the operater is asked for acceptance. Then the source volume is copied physically to the destination volume. If an irrecoverable read error occurs, the relevant sector is displayed on the screen. The operator may correct the data and give a command to write it on the destination volume. After that copying is continued until the next irrecoverable error occurs or copying is finished.

If 1 flexible disk and 1 hard disk are configurated, the copy of the flexible disk has to be stored on hard disk temporarily. After confirmation of the mounted flexible disk volume the program checkes the free space on hard disk, regardless of used or unused sectors. If not enough spaces are available, the operator is informed about the space needed additionally.

The flexible disk volume is copied completely as one file to the hard disk. The execution of the program is the same as in case of two flexible disks. After copying the whole flexible disk to the hard disk the operator is asked to mount the destination volume. When the copy is done, the temporarily file on hard disk will be deleted.

3.2.3.4 **Test and Repair Medium** (not Rel. 1.1)

This step tests a flexible disk volume. If a defective data part is found, the relevant sector is displayed. After correction the operator can write it again on the volume. If this seems to be impossible, the step issues an error messages and stops. In this case copy and repair should be selected.

3.2.3.5 Extended Test

This submodule offers expanded test facilities to the System Engineer or the Workshop Engineeer. The following tests may be selected:

1. Random Write
2. Random Read
3. Sequential Write
4. Sequential Read
5. Write one Sector
6. Read one Sector

All steps are offered with loop facilities, thus continuous tests may be executed. If a test step of the Extended Test detects an error, a detailed error protocol is displayed, giving the following information:

- loop counter
- error message
- command
- volume label
- drive indication
- cylinder and sector number

This test can be performed with any formated flexible disk volume. Therefore the operator should not use the special prepared test diskette "MFD-DIAG".

3.2.3.5.1 Random Write

The whole flexible disk volume is written. The sector address is evaluated by a pseudo random generator. Each sector is written only once.

If the loop feature is switched on, writing is repeated until the step is interrupted by <STOP> or ^U.

The operator selects wether the worst case pattern ('DB6'H) or the random pattern shall be written.

3.2.3.5.2 Random Read

Synonymously to the Random Write step, each sector is read. If the operator selects data comparison, the read data are compared with the selected pattern. If the read data differs from the expected data, the sector is displayed in 16-byte size, showing expected and obtained data.

3.2.3.5.3 Sequential Write

The whole volume is sequentially written sector by sector. If the loop feature is chosen, the sequence is repeated. The operator may select the worst case or the random pattern.

3.2.3.5.4 Sequential Read

Synonymously to Sequential Write, all sectors are read. If wanted, the read data are compared with the worst case pattern or the random pattern. If the read data differs from the expected data, the sector is displayed in 16-byte size, showing the expected and the obtained data.

3.2.3.5.5 Write one Sector

This test step writes one sector. The sector can be selected by entering the cylinder number and sector number. The operator may select writing of the worst case or the random pattern and a loop facility.

3.2.3.5.6 Read one Sector

Synonymously to Write one Sector the sector to be read will be selected by entering the cylinder and sector number. If data comparison is selected, the read data will be compared with the worst case or the random pattern. As in the write test a loop facility may be selected.

3.2.4 Test of Fixed Disk Device

With this module the fixed disk device can be checked. The program tests the following field exchangeable units:

- SASI Adaptor or SASI Part of SESCO
- Fixed Disk Controller
- Fixed Disk Drive

For diagnosis purposes on the disk one cylinder is reserved and protected against access by system software.

The test module contains the following submodules and steps:

- Diagnosis
- Seek Test
- Read/Write Test
- Read Medium
- Write Medium
- Dump and Change
- Service Commands

3.2.4.1 Diagnosis

This submodule offers quick diagnostics of the interface of PMU80 to the disk controller and the disk drive complete. After selection the following steps are performed:

- Controller and Drive Test
- Seek Random
- Seek Sequential
- Read/Write Test

3.2.4.1.1 Controller and Drive Test

This step first checks the correct function of the PMU interface part, SASI adaptor and the interface part of the disk controller. After that the disk controller is checked by issueing the controller self-test commands and asking for the status.
If no error is found, the drive is tested by performing a seek to all cylinders.

3.2.4.1.2 Seek Random

The address of to be positioned cylinder is evaluated by a pseudo random pattern generator.
To check the right position of the heads the sector addresses are read and compared with the expected addresses.

3.2.4.1.3 Seek Sequential

Starting with cylinder 0 the heads are positioned to all cylinders in sequential order. (Cylinder 0, cylinder 1, cylinder 0, cylinder 2, cylinder 0, cylinder 3, etc.) If the heads are positioned to the highest cylinder, seek will be performed to cylinders 1,2,3, etc, starting from the highest possible cylinder. As in the random seek test the sector adresses will be compared.

3.2.4.1.4 Read/Write Test

This step works only at the service cylinder and checks DMA, data flow, contoller and memory.

The test is performed in the following way:
After read one sector the read data is inverted and written to the same sector. The the sector is read again and compared with the expected data.

After this 9 continues sectors are searched to be free of error. On this sectors a multiple write is performed. Starting with the first sector the number of sectors is increased and written with worst pattern. So in the first step 1 sector will be written, in the second step 2 sectors, etc. up to 9 sectors. After this in the same way a multiple read will be performed.

3.2.4.2 Seek Test

This step, performed automatically by the step Diagnosis, is split into two parts. First a random seek and then a sequential seek is performed as discribed in 3.2.4.1.2 and 3.2.4.1.3.

If the user has selected the offered loop facility, the test is repeated until an error occurs or the user presses the key <STOP>.

3.2.4.3 Read/Write Test

This test is performed as descibed in 3.2.4.1.4. Additionally the loop facility may be selected by the user.

3.2.4.4 Read Medium

All tracks are read sequentially. The read data may be compared with worst case or random pattern. Worst case pattern are ´DB6DB....´Hex, random pattern are calculated by the following algorithm:

byte p = byte (p-2) + byte (p-1) + 3

where: p > 1.

Initial pattern are: byte 0 ´DB´H and byte 1 ´6D´H, written by Write Medium.

This step is offered with loop facility.

3.2.4.5 Dump and Change Sector

This step enables the operator to read, update and rewrite any selected sector. To update a sector, the operater may enter characters or hexadecimal code.

3.2.4.6 Service Commands

After selecting this test module, a new menu is displayed. The operator may start one of the Disk Controller Commands:

- Controller Diagnostic
- RAM Diagnostic
- Test Drive Ready
- Drive Diagnostic
- Recalibrate
- Seek selectable Cylinders

Since the commands 1 to 4 issued to the disk controller are executed using the test facility, the recalibrate is a normal command used by ASW.

If the step Seek selectable Cylinders is called, the heads are positioned alternately to the selected cylinders. If no addresses are given by the operator, positioning is done to the default addresses of cylinder 0 and cylinder 305. This step runs automatically in a loop until it is cancelled by <STOP>.

3.2.4.7 Write Medium

All tracks of the disk are written sequentially. The operator may select if random or worst case pattern shall be written.

Random pattern and worst case pattern are calculated as described in 3.2.4.4.

Besides it is possible to write any individual pattern, to be entered by the operator in hexadecimal or character code.

Because this test step destroys all data stored on fixed disk, it should be performed only after backup or after repair in the workshop.

3

241 = mehre Teile

Menge	Einheit	Benennung	Norm	Codenummer	UN-D 578	Pos	IND
1	13	GEHAEUSE 15IN DIMO MONT		5112 291 86341		1	
1	13	MASKE MONT		5112 291 76165		2	
1	13	ABSCHIRMBLECH		5112 212 08571		3	
1	13	PRINT MFI-DIMO		5112 291 77582		4	
1	13	ISOLIERPLATTE		5112 212 11802		5	
1	13	HALTEBUEGEL KPL		5112 291 80031		6	
1	13	PCB-HALTER KPL		5112 291 86681		8	
1	13	STECKERHALTER M. U. V.		5112 291 87871		9	
1	13	PUC-SPRING 15IN		5122 110 97622		10	
1	13	SCHUTZABDECKUNG		5112 212 08561		11	
1	13	RUECKWAND KPL		5112 291 74322		12	
1	13	LEISTUNGSSCHILD		5112 212 07671		14	
1	13	TYPENSCHILD		5112 212 06231		15	
1	13	EXT. ANSCHLUSZSCHILD		5112 212 08731		16	
1	13	KLEBESCHILD 2 GP		5112 211 57321		17	
1	13	SCHIEBEBILD 3S10 RT	DIN 40011 SOW-32-861-32	2812 100 23001		18	*
2	13	BEZEICHNUNGSSCHILD		2822 100 23218		19	
1	13	CCA-AUFKLEBER		5112 211 46521		20	
1	13	VERPACKUNG KPL		5112 291 92271		21	
1	13	AUFKLEBER		5112 211 80902		22	
1	13	LTG-BD POWER TERCO		5112 280 05841		23	
1	13	LTG-BD CRT		5112 280 05861		24	
1	13	LTG-BD 12V		5112 280 05781		25	
1	13	SPRING		5122 110 91984		26	
1	13	NETZSCHNUR 2500		2412 073 45023		27	
1	13	LTG-KA POWER		5112 280 06031		28	
6	13	FUEHRUNGSTEIL 1		5112 211 40171		29	

CLASS			IND	KM	Datum
	WS-DIMO P2711-10X	5112 291 86351		3360	831006
				4236	840315
			11	4284	840322

NAME 3140 Ersatzfür — 2 Blätter (Bogen 1)

Menge	Ein-heit	Benennung	Norm	Codenummer	UN-D 578	Pos	IND
6	13	KABELHALTER		2422 015 05175		30	*
4	13	LI-SCHR M5X16-4.8 ZN	DIN 7985 SOW-31-115-30	2522 178 20108		31	
4	13	SCHEIBE B5,3-ST ZN	DIN 9021 SOW-31-611-02	2522 600 93032		32	
5	13	LI-SCHR M4X8-4.8 ZN	DIN 7985 SOW-31-115-30	2522 178 20081		35	
4	13	6KT-MUTTER M4-6 ZN	DIN 934	2522 401 25011		36	
3	13	ZAHNSCHEIBE J4,3-ST	DIN 6797 SOW-31-731-20	2522 615 02007		37	*
2	13	SCHR CM3X8-ST ZN	DIN 7500 SOW-31-145-30	2512 252 01007		38	*
3	13	LI-BLSCHR BZ3,9X6,5-ST ZN	DIN 7981 SOE-31-155-30	2522 163 85095		39	*
3	13	SCHEIBE A4,3-ST ZN	DIN 125 SOW-31-611-02	2522 600 93026		40	
2	13	LI-SCHR M3X4-4.8 ZN	DIN 7985 SOW-31-115-30	2522 178 20056		41	
1	13	FLACHSTECKER	SOW-37-821-17	2422 034 10268		42	
6	13	RIEGEL		5112 211 40224		43	
1	13	STIFTDOSE 3POL		2412 030 00117		44	
1	13	INL. PROTEX. PLATE		5122 110 85881		45	
1	13	G-SCHMELZEINS 250V T1B	DIN 41571 SOW-47-114-10	2412 086 13191		46	
1	13	LTG-LI OV-LOG		5112 280 06051		47	

CLASS			IND	KM	Datum
	WS-DIMO P2711-10X	5112 291 86351		3360	831006
				4236	840315
			11	4284	840322

NAME 3140

PHILIPS

nicht dargestellt: Pos. 6, ,12,14, ,1x19,21,22,
27,

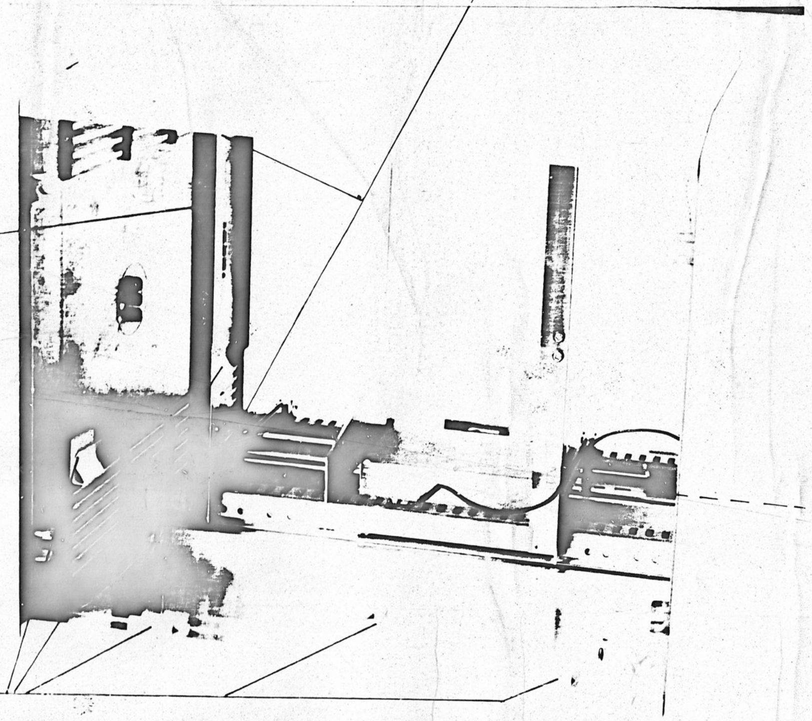
auf Pos.11 geklebt: 16,17,19

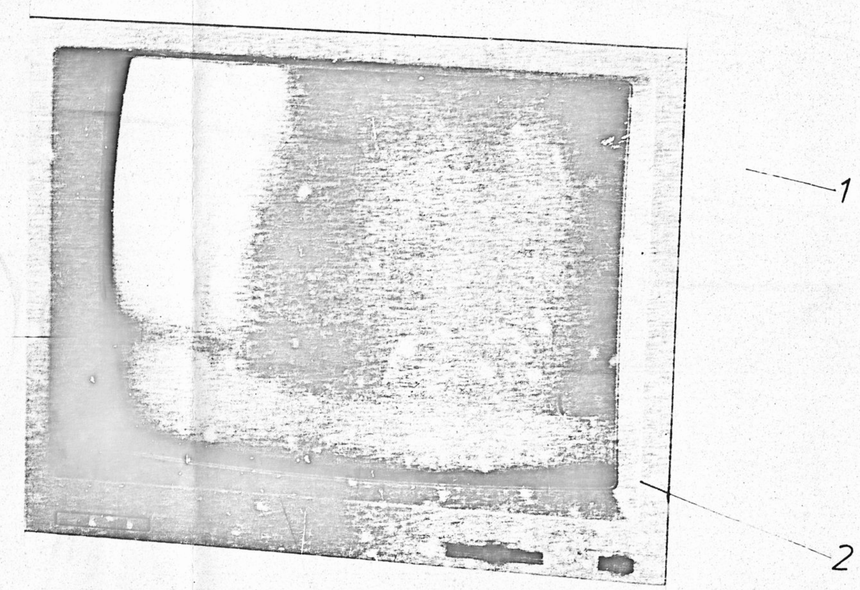
Pos. 26 - Gnd Feder für PSU-Kühlblech

Filterbefestigung: 2×35, 2×37

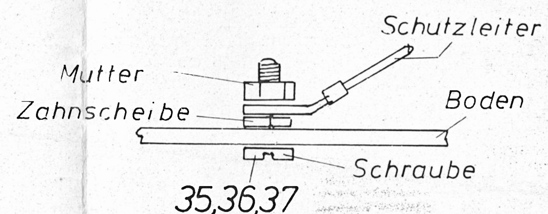
Pos. 42 u 1x36 an Rückwand

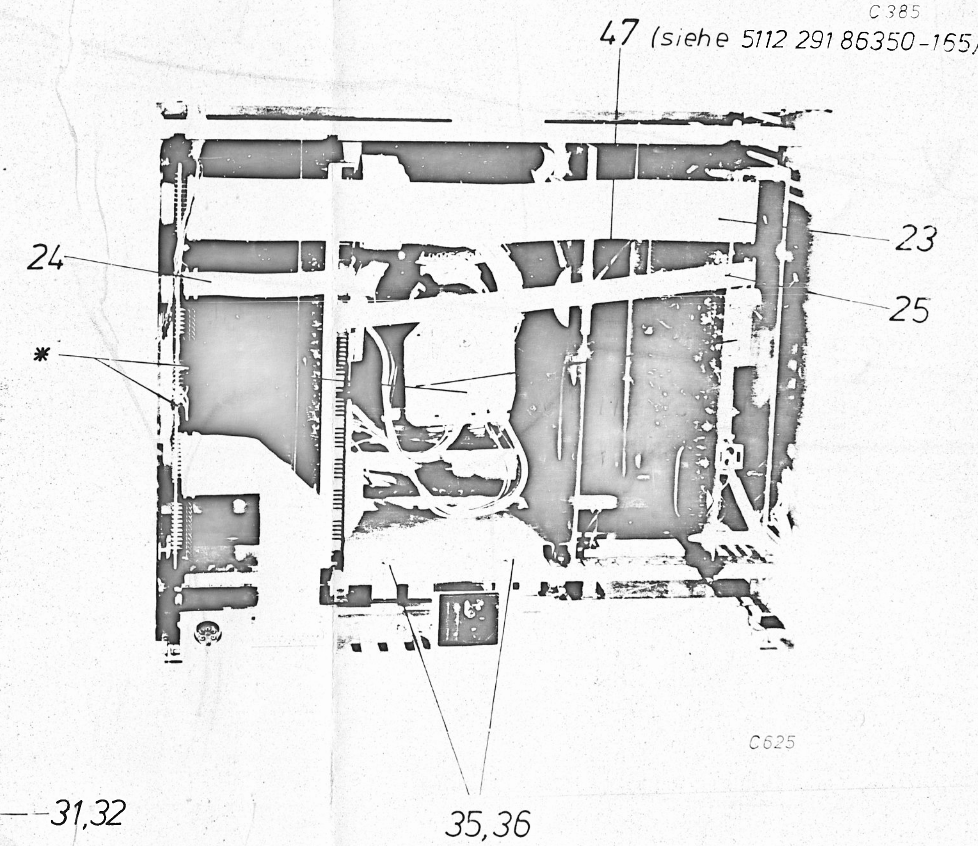
∗ Bestückung laut Modellstücklisten.

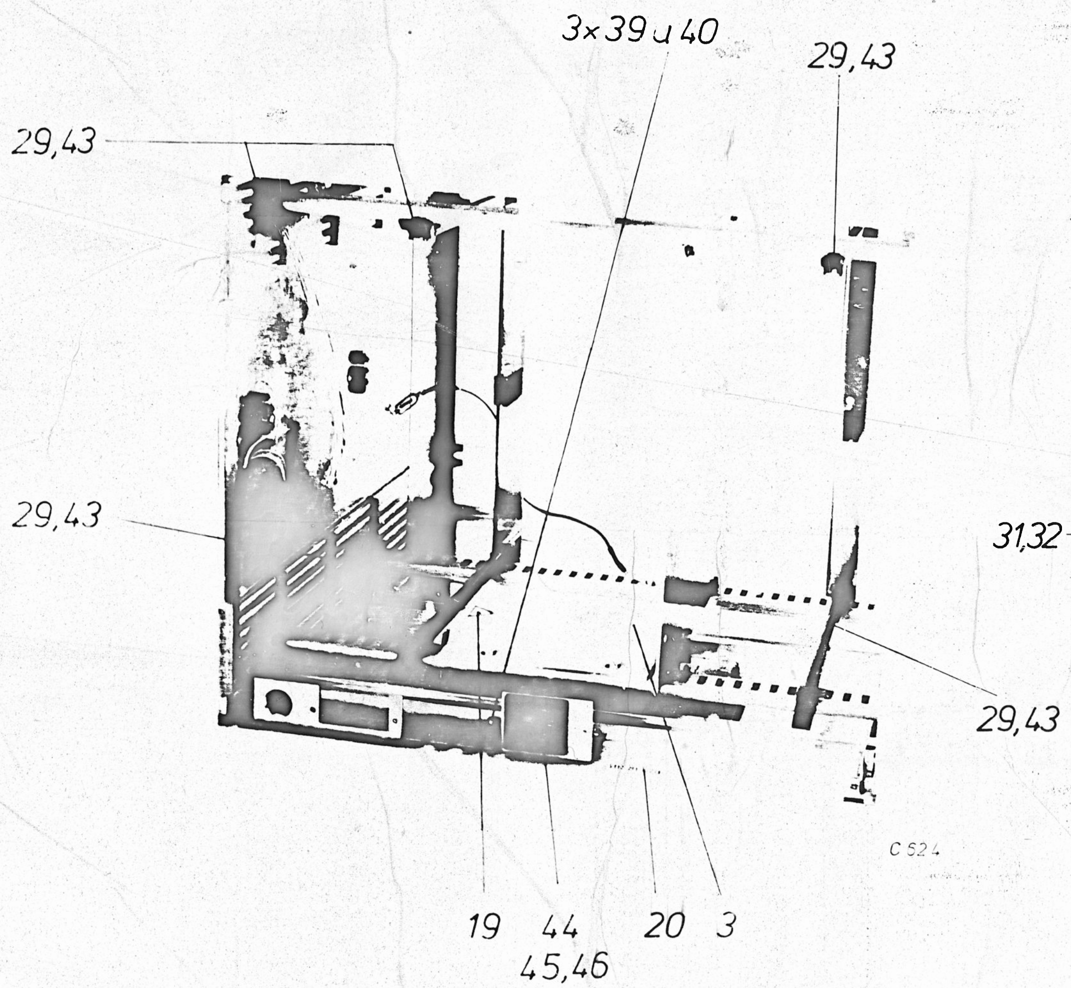


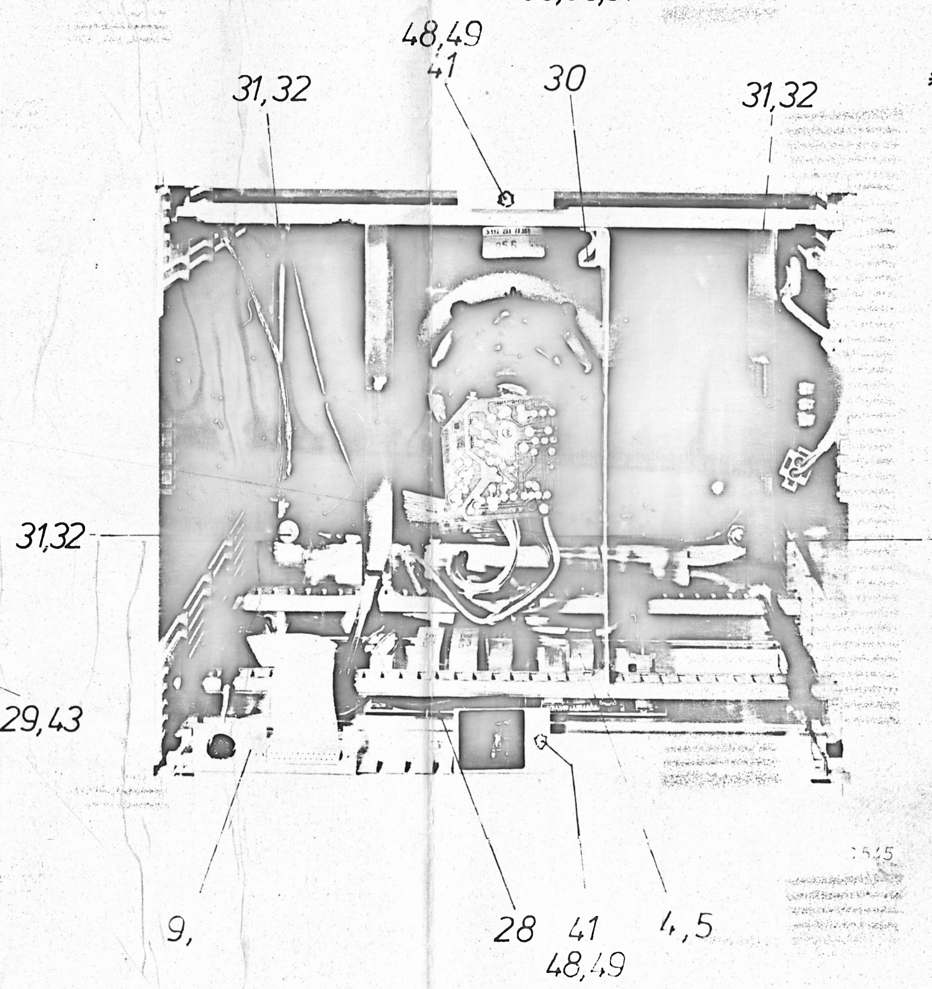


Befestigung des Schutzleiters







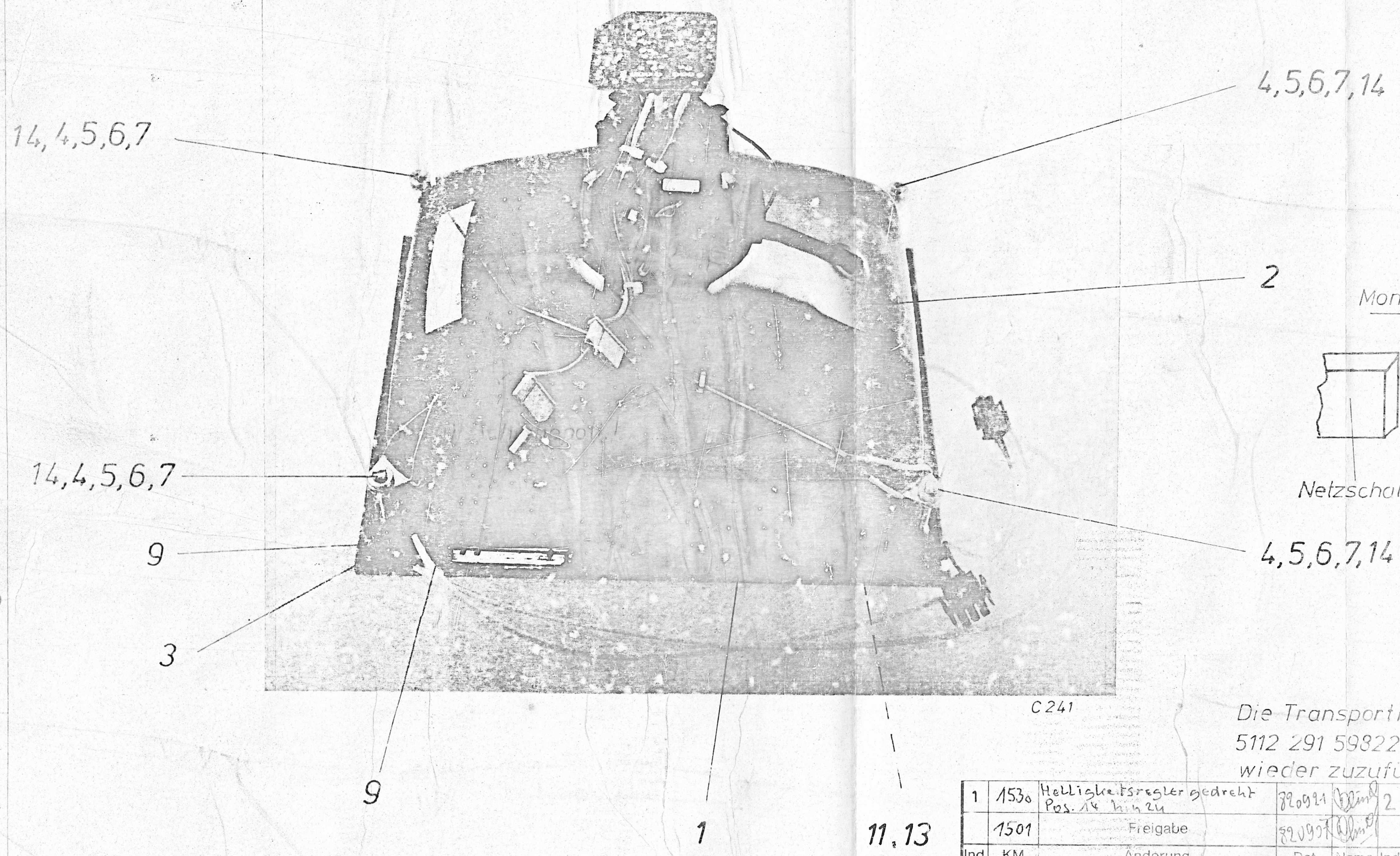


Ind.	KM	Änderung	Dat.	Name
4	4972	Pos. 48,49 hinzu	840705	
3	4284	Zeichnung neu erst.	840315	

WS-DIMO P2711-10X

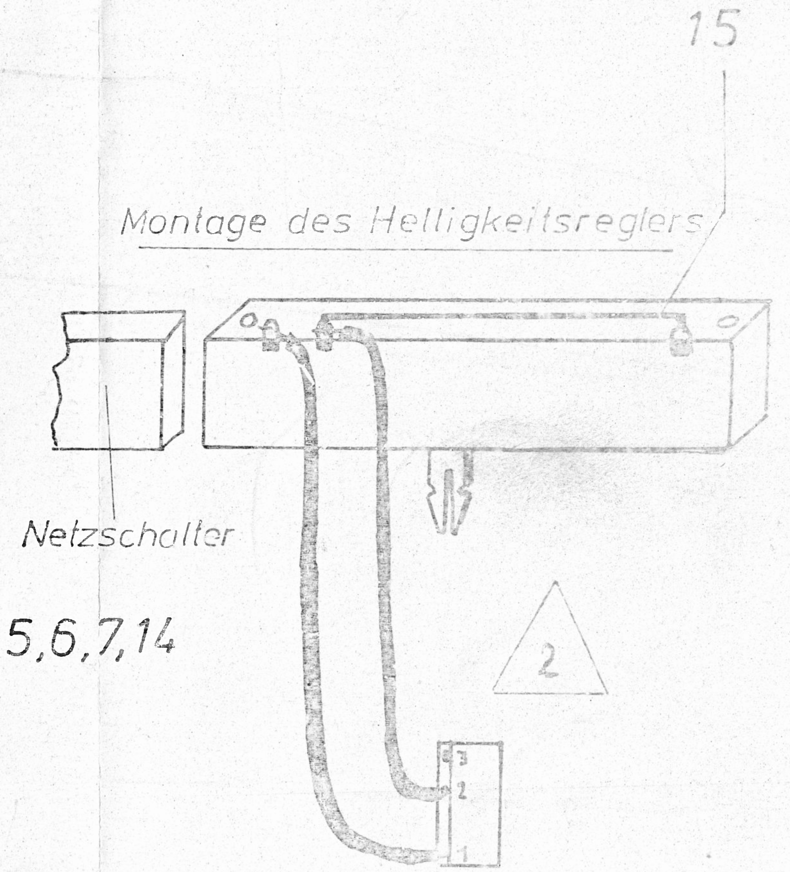
5112 291 86351

840314



Pos.10 nicht dargestellt.
(Befestigungsschrauben für Schiebepoti.)

Montage des Helligkeitsreglers



Die Transporthalterung des Monitors Teile-Nr 5112 291 59822, ist der Herstellerfirma wieder zuzuführen.

Ind.	KM	Änderung	Dat.	Name	Ind.	KM	Änderung	Dat.	Name
1	1530	Helligkeitsregler gedreht Pos. 14 hinzu	820921	[signature]	2	1582	Einarbeitung der HM-SA FK/82/3140 vom 30.9.82	821007	[signature]
	1501	Freigabe	820907	[signature]					

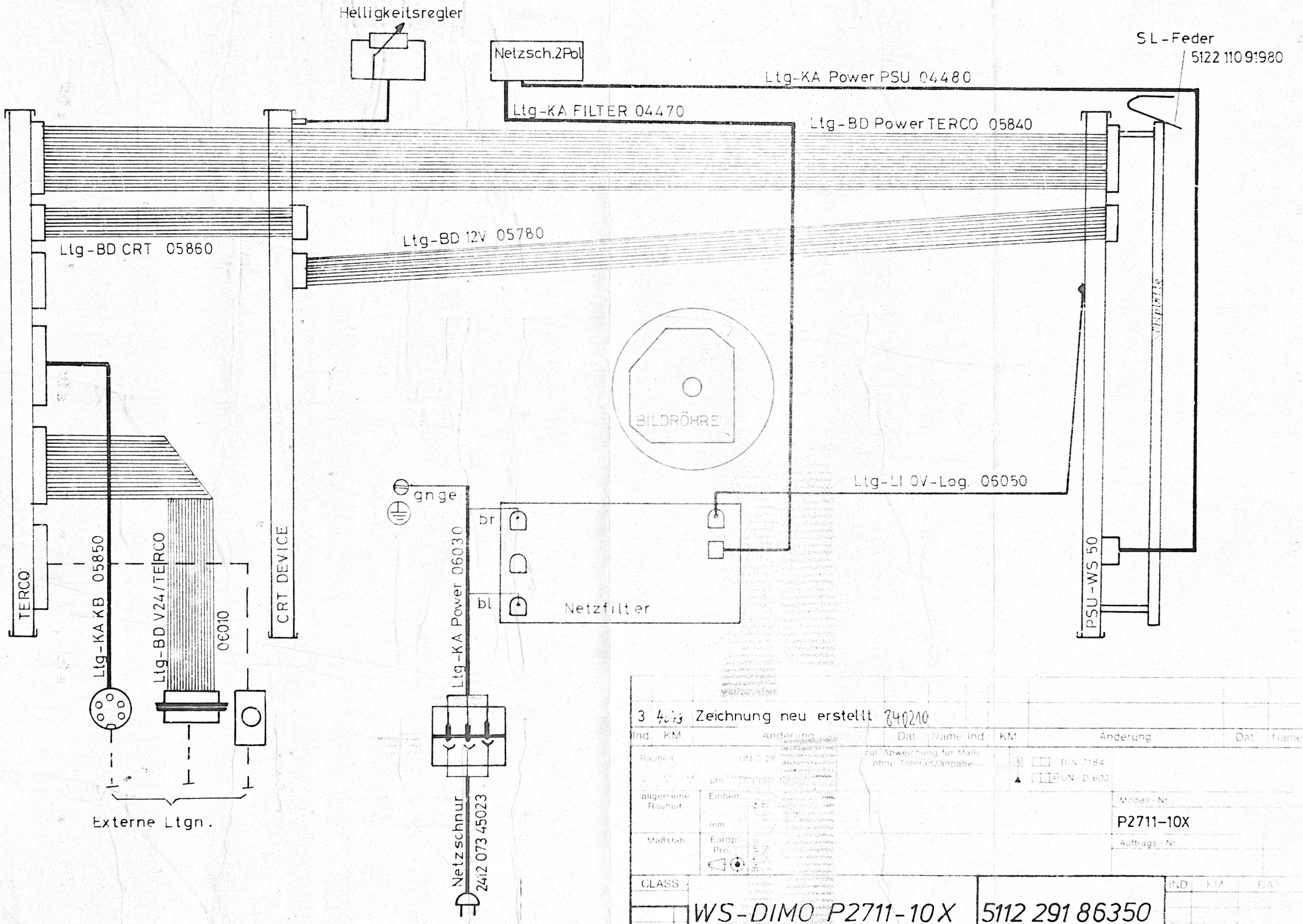
Rauheit DIN 4768 / DIN ISO 1302 — µm
zul. Abweichung für Maße ohne Toleranzangabe — DIN 7184 / DIN 603
allgemeine Rauheit — Einheit mm — Werkstoff
Maßstab — Europ. Proj.
Modell-Nr. P 3000
Auftrags-Nr.

CLASS

MASKE MONT.

5112 291 76161

NAME [signature] 820907 — SUPERS. ERS. F — 1 — SH. BL. 18 — GR 110 — SH. 1
SO — PROPERTY OF / EIGENTUM VON PHILIPS GMBH DATA SYSTEMS 5900 SIEGEN 31 — CHECK KONTR.



3 4ers Zeichnung neu erstellt 840210

Ind.	KM	Änderung	Dat.	Name

Rauheit DIN 7184 DIN 6033

allgemeine Rauheit

Maßstab

Modell-Nr. P2711-10X

Auftrags-Nr.

CLASS

WS-DIMO P2711-10X

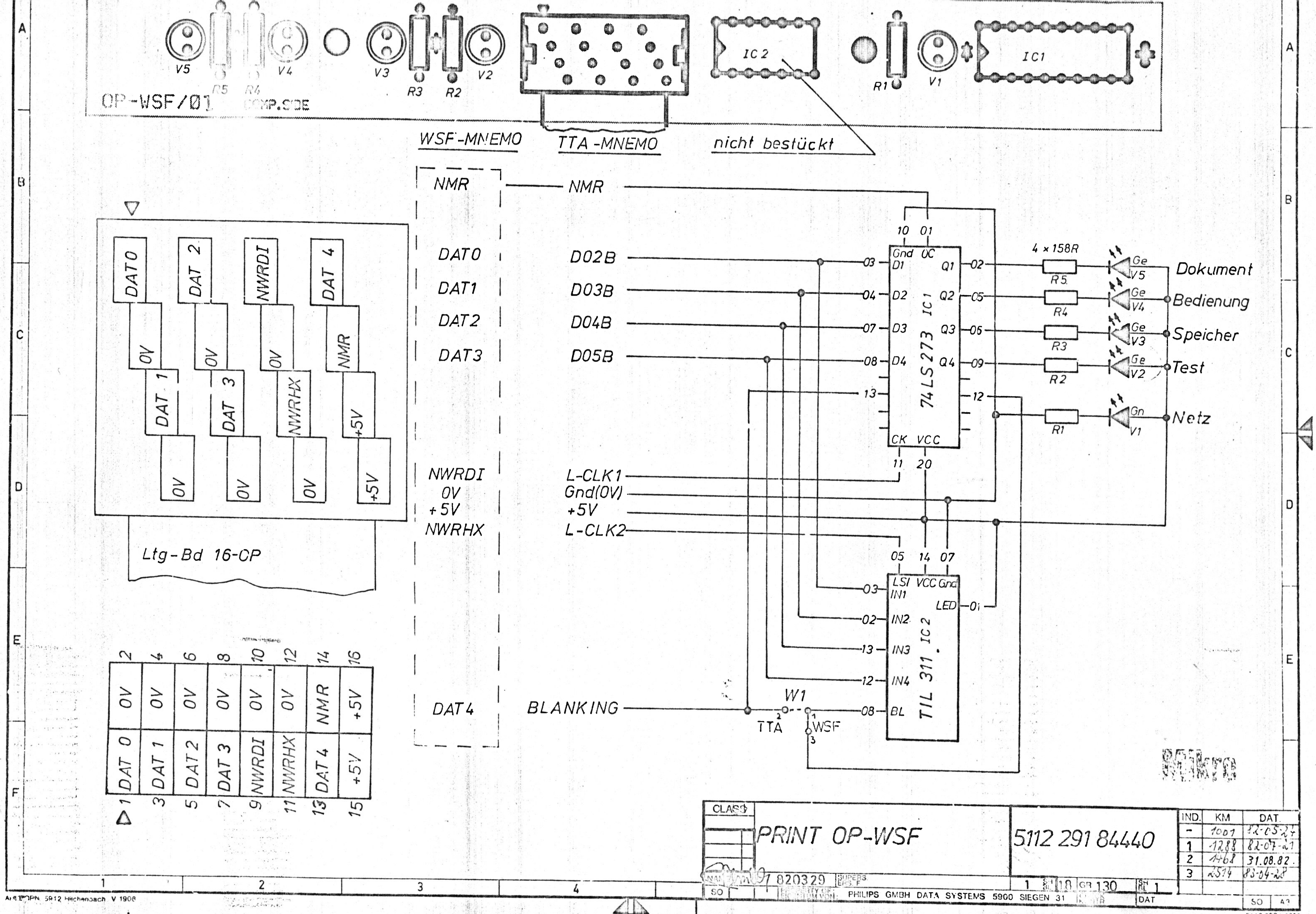
5112 291 86350

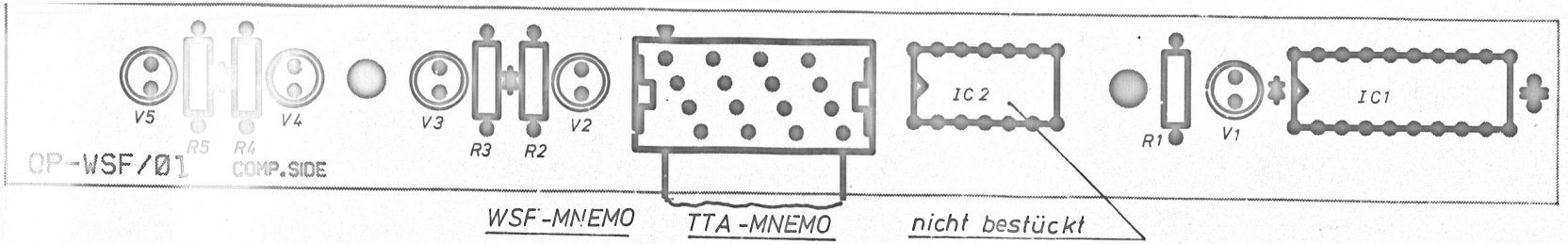
NAME 840210

SO

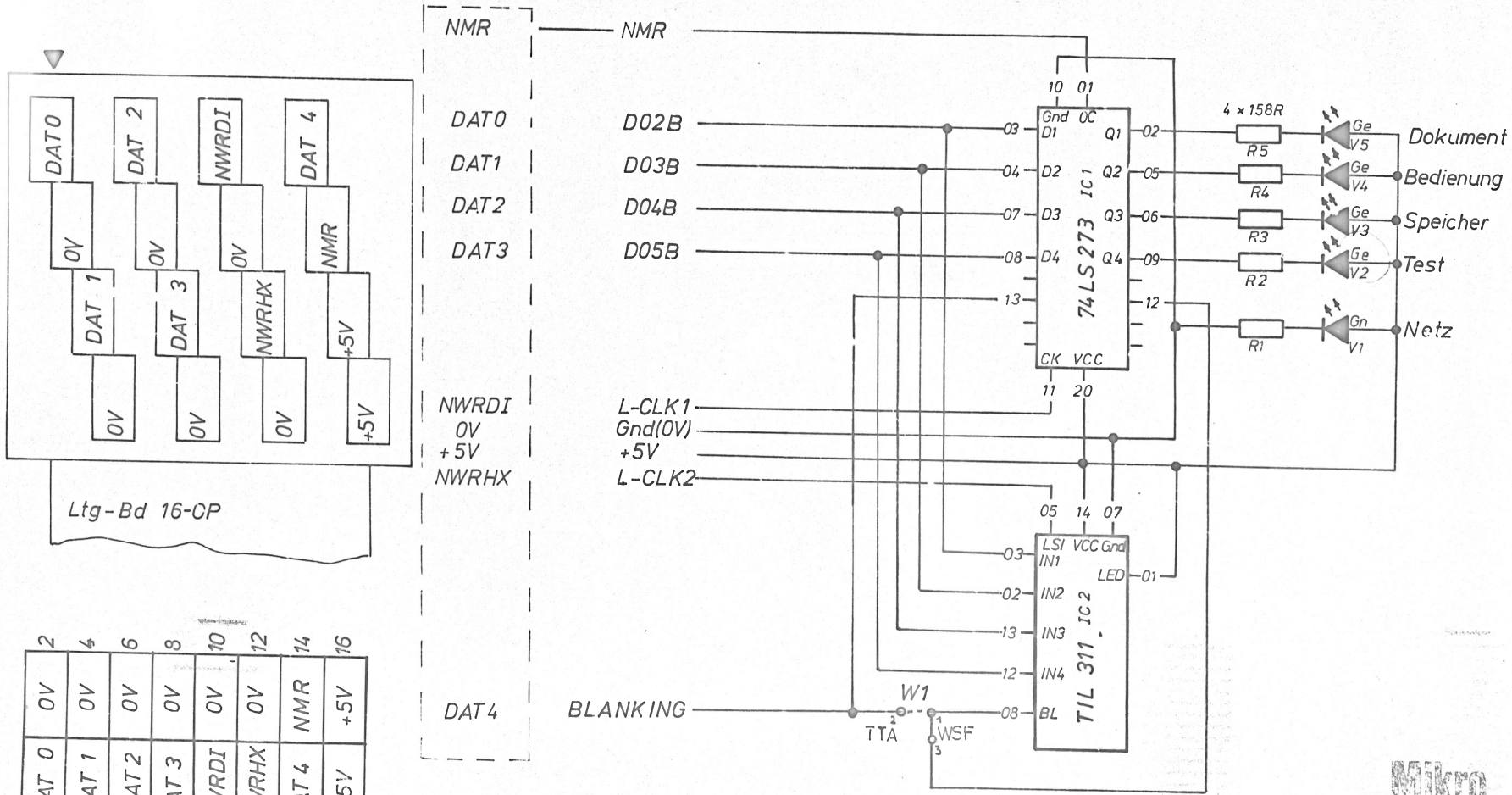
PHILIPS DATA SYSTEMS 5900 SIEGEN

1 131 1





WSF-MNEMO TTA-MNEMO nicht bestückt



CLASS	PRINT OP-WSF	5112 291 84440

IND.	KM	DAT.
-	1001	82-05-24
1	1288	82-07-21
2	1468	31.08.82
3	2514	83-04-28

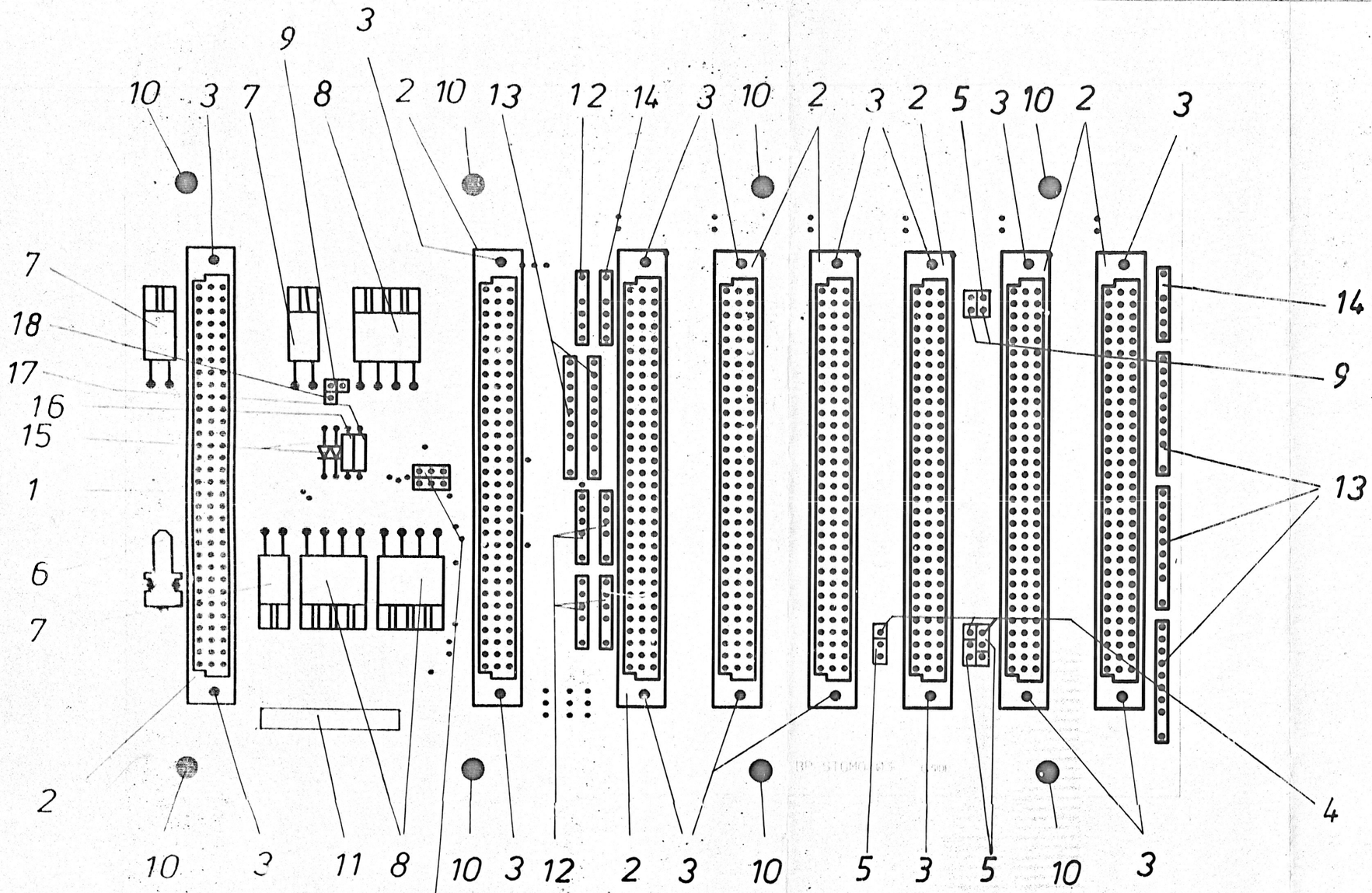
NAME 820329 SUPERS. LEHS. F | 1 SH 18 GR 130 SH 1 | SO

PROPERTY OF PHILIPS GMBH DATA SYSTEMS 5900 SIEGEN 31 | CHECK KONTR | DAT

SO A3

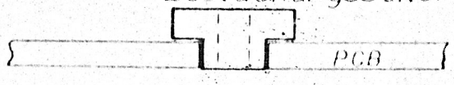
5112 298 00255

APELDOORN 5812 Hilchenbach V 1908



Zu Pos. 10

Buchse eingeführt von Bestückungsseite.



Ind.	KM	Änderung	Dat.	Name	Ind.	KM	Änderung	Dat.	Name
	2514	Freigabe	25.4.83	Iaen					

Rauheit UN D 28 µm DIN ISO 4302

zul. Abweichung für Maße ohne Toleranzangabe

[A] [ ] DIN 7184
[ ] [A] UN D 603

allgemeine Rauheit

Einheit mm

Maßstab Europ Proj

Modell Nr. P 3500

Auftrags Nr.

CLASS

PRINT BP-STOMO

5112 291 84464

IND KM DAT

NAME Schmitz 82 04 27

PHILIPS GMBH DATA SYSTEMS 5900 SIEGEN 31

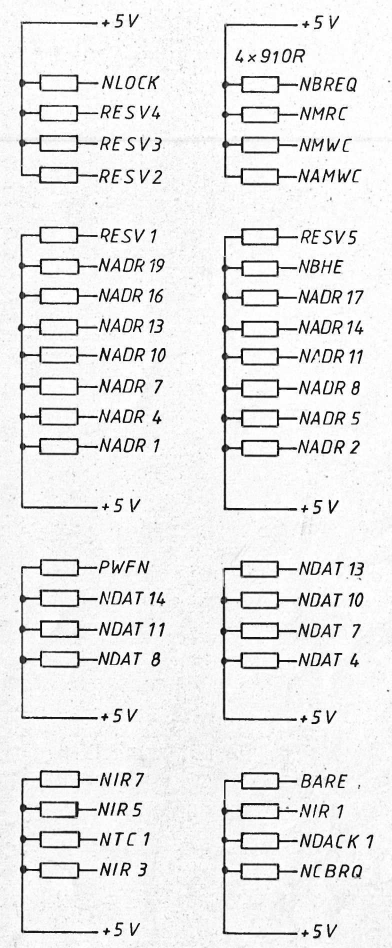
DAT 82-8-10-28

c	b	a	
			32
0V	0V	0V	31
			30
0V	0V	0V	29
			28
0V	0V	0V	27
			26
0V	0V	0V	25
			24
0V	0V	0V	23
			22
0V	0V	0V	21
+BAT	+BAT	+BAT	20
0V	0V	0V	19
+5VM	+5VM	+5VM	18
0V	0V	0V	17
			16
0V	0V	0V	15
			14
0V	0V	0V	13
			12
0V	0V	0V	11
			10
0V	0V	0V	9
0V	0V	0V	8
	0V		7
	0V	0V	6
	0V	SYN	5
RSLN	0V	0V	4
	0V	BAWOFFN	3
	0V		2
	0V	BONN	1

PSU - M2

c	b	a	
+5V	+5V	+5V	32
0V	0V	0V	31
+5V	+5V	+5V	30
0V	0V	0V	29
+5V	+5V	+5V	28
0V	0V	0V	27
+5V	+5V	+5V	26
0V	0V		25
			24
0V	0V	0V	23
-12V	-12V	-12V	22
0V	0V	0V	21
+12V	+12V	+12V	20
0V	0V	0V	19
+5VM	+5VM	+5VM	18
0V	0V	0V	17
+BAT	+BAT	+BAT	16
0V	0V	0V	15
			14
0V	0V	0V	13
			12
0V	0V	0V	11
			10
0V	0V	0V	9
0V	0V	0V	8
	0V		7
	0V	0V	6
	0V	SYN	5
RSLN	0V	0V	4
PWFN	0V	BAWOFFN	3
RPON	0V		2
	0V	BONN	1

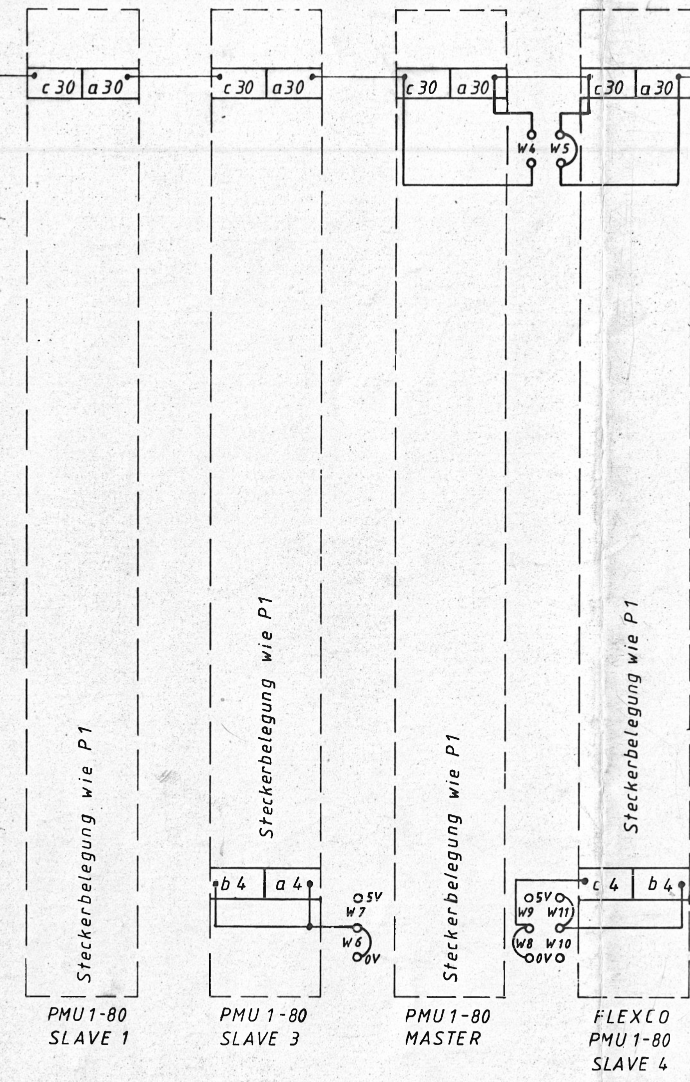
PSU -WS120



+5V
NLOCK
RESV4
RESV3
RESV2
RESV1
NADR 19
NADR 16
NADR 13
NADR 10
NADR 7
NADR 4
NADR 1
PWFN
NDAT 14
NDAT 11
NDAT 8
NIR 7
NIR 5
NTC 1
NIR 3
4×910R
NBREQ
NMRC
NMWC
NAMWC
RESV5
NBHE
NADR 17
NADR 14
NADR 11
NADR 8
NADR 5
NADR 2
NDAT 13
NDAT 10
NDAT 7
NDAT 4
BARE
NIR 1
NDACK 1
NCBRQ

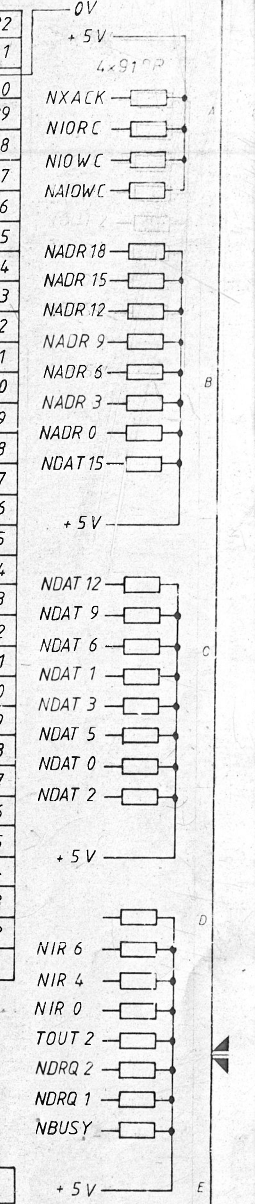
c	b	a	
NBREQ	-5V	-12V	32
+5VM	+5VM	+12V	31
NBPRO	NLOCK	NBPRI	30
NMRC	RESV4	NXACK	29
NMWC	RESV3	NIORC	28
NAMWC	RESV2	NIOWC	27
RESV5	RESV1	NAIOWC	26
NBHE	NADR 19	NADR 18	25
NADR 17	NADR 16	NADR 15	24
NADR 14	NADR 13	NADR 12	23
NADR 11	NADR 10	NADR 9	22
NADR 8	NADR 7	NADR 6	21
NADR 5	NADR 4	NADR 3	20
NADR 2	NADR 1	NADR 0	19
0V	0V	0V	18
NDAT 15	RPON	PWFN	17
NDAT 14	NDAT 13	NDAT 12	16
NDAT 11	NDAT 10	NDAT 9	15
NDAT 8	NDAT 7	NDAT 6	14
NDAT 5	NDAT 4	NDAT 3	13
NDAT 2	NDAT 1	NDAT 0	12
0V	0V	0V	11
NIR 7	RSLN	NIR 6	10
NIR 5	BARE	NIR 4	9
NIR 1	TOUT 2	NIR 0	8
NTC 1	SYN	NDRQ 2	7
NDACK 1	NIR 3	NDRQ 1	6
NCBRQ	NBCLK	NBUSY	5
SLL 2	SLL 1	SLL 0	4
0V	0V	0V	3
SLL 3	+5V	0V	2
+5V	+5V	+5V	1

PMU 1-80 (SLAVE 2)



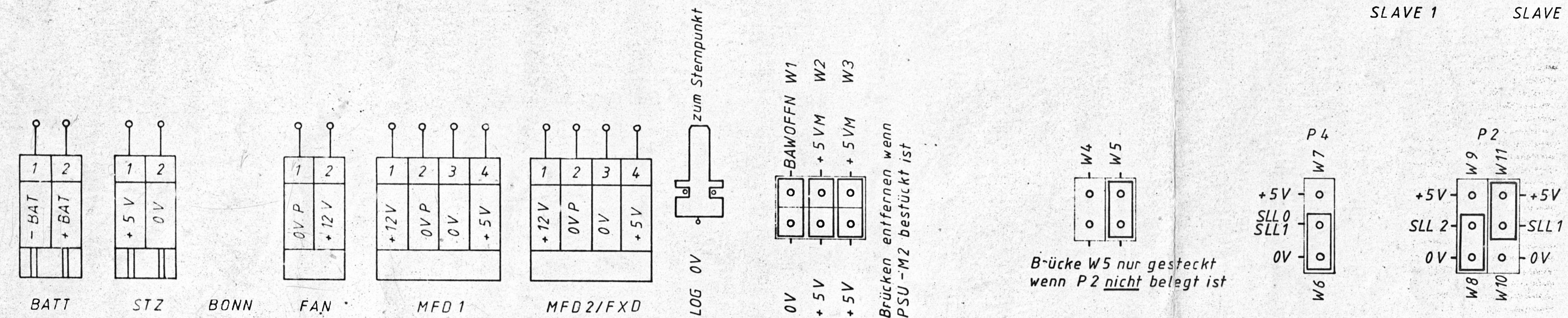
c	b	a	
NBREQ	-5V	-12V	32
+5VM	+5VM	+12V	31
NBPRO	NLOCK	NBPRI	30
NMRC	RESV4	NXACK	29
NMWC	RESV3	NIORC	28
NAMWC	RESV2	NIOWC	27
RESV5	RESV1	NAIOWC	26
NBHE	NADR 19	NADR 18	25
NADR 17	NADR 16	NADR 15	24
NADR 14	NADR 13	NADR 12	23
NADR 11	NADR 10	NADR 9	22
NADR 8	NADR 7	NADR 6	21
NADR 5	NADR 4	NADR 3	20
NADR 2	NADR 1	NADR 0	19
0V	0V	0V	18
NDAT 15	RPON	PWFN	17
NDAT 14	NDAT 13	NDAT 12	16
NDAT 11	NDAT 10	NDAT 9	15
NDAT 8	NDAT 7	NDAT 6	14
NDAT 5	NDAT 4	NDAT 3	13
NDAT 2	NDAT 1	NDAT 0	12
0V	0V	0V	11
NIR 7	RSLN	NIR 6	10
NIR 5	BARE	NIR 4	9
NIR 1	TOUT 2	NIR 0	8
NTC 1	SYN	NDRQ 2	7
NDACK 1	NIR 3	NDRQ 1	6
NCBRQ	NBCLK	NBUSY	5
SLL 2	SLL 1	SLL 0	4
0V	0V	0V	3
SLL 3	+5V	0V	2
+5V	+5V	+5V	1

SESAD (SESCO)

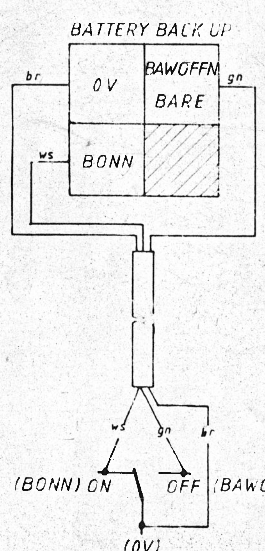


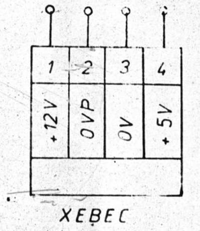
Belegung der SLL-Signale

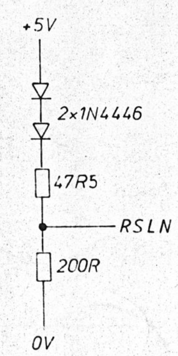
Signale	Stecker P6	P5	P4	P3	P2	P1
SLL 0	+5V	0V	0V	+5V	+5V	+5V
SLL 1	0V	+5V	0V	+5V	+5V	+5V
SLL 2	+5V	+5V	+5V	+5V	0V	+5V
SLL 3	—	—	—	—	—	—

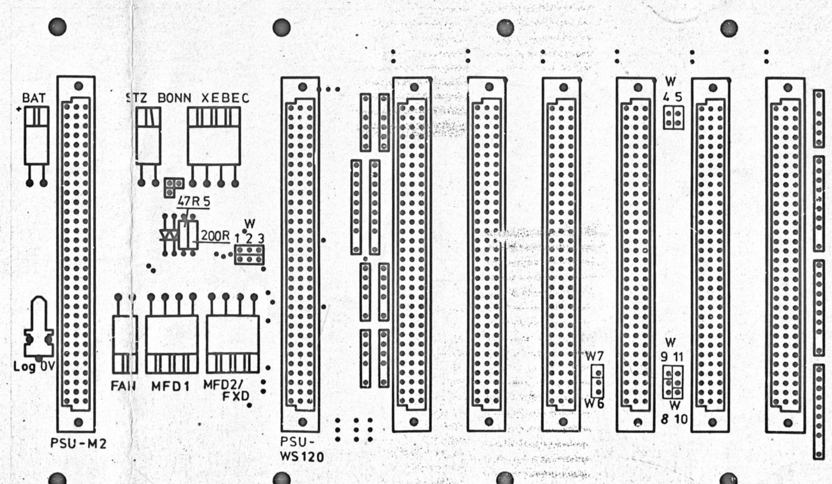


1 2
-BAT +BAT
BATT
1 2
+5V 0V
STZ
BONN
1 2
0VP +12V
FAN
1 2 3 4
+12V 0VP 0V +5V
MFD 1
1 2 3 4
+12V 0VP 0V +5V
MFD 2/FXD
zum Sternpunkt
LOG 0V
BAWOFFN W1
+5VM W2
+5VM W3
0V +5V +5V
Brücken entfernen wenn PSU-M2 bestückt ist
W4 W5
Brücke W5 nur gesteckt wenn P2 nicht belegt ist
P4
W7
+5V
SLL0 SLL1
0V
W6
P2
W9 W11
+5V +5V
SLL 2 SLL1
0V 0V
W8 W10









Alle nicht markierten Pull-up-Widerstände = 3K32

4 2S14	Einarbeitung der Sä 2.20235	25.4.83
1125	Freigabe	21.04.82
Ind. KM	Änderung	Dat. Name Ind. KM

P 3500

PRINT BP - STOMO 5112 291 84460

21.04.1982

P H I L I P S
P4500 / FMS

B A U K A S T E N - S T U E C K L I S T E

ABGERUFEN VON SB:Huebers
ABT:technol Planung
FW:956

ARTIKELNUMMER: 5112 291 84464 BEZEICHNUNG: PRINT BP-STOMO SEITE: 00001
LAGER : 000 NORMBEZEICHNUNG :
HERSTELLER : 0 FREIGABE KM/DAT.: 1125/82.06.22
PLANUNGS-SL: 0 0 1 AENDER. KM/DAT.: 2514/83.04.28
AV-SACHBEAR/DAT.: /00.00.00

IND : 00
Z-IND : 00
DA : 99
ME-B : 13

ST ST	VA	ME	MENGE	ARTIKELNR.	ARTIKELBEZEICHNUNG	SL. POS	T	AG-FOL	FRAKM	GUTLG	S	AFW	BFW	B
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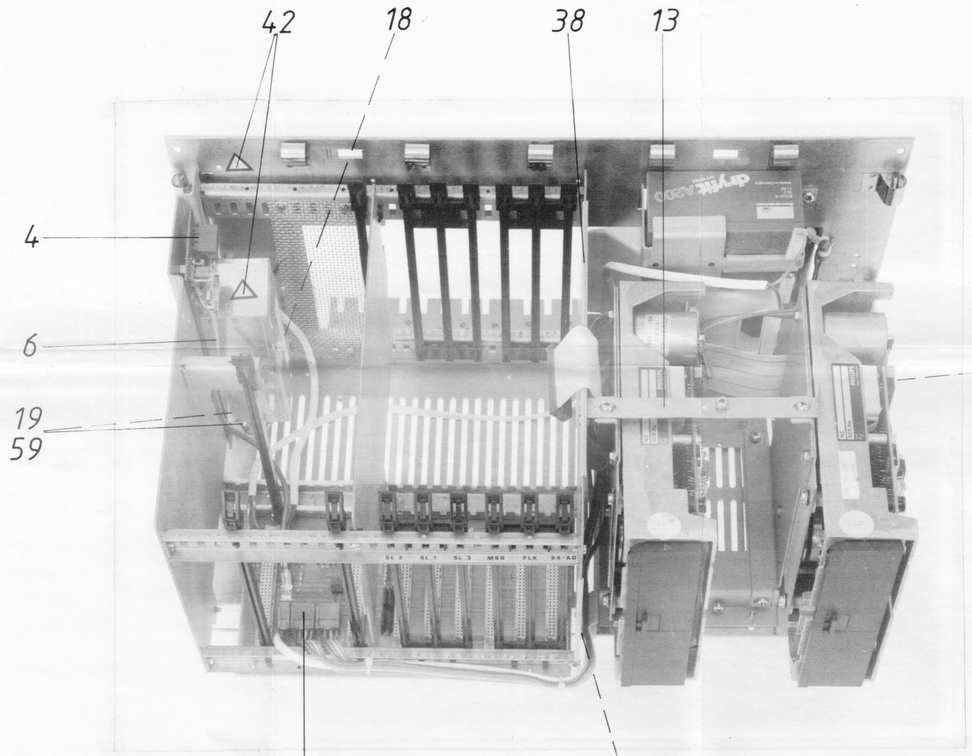
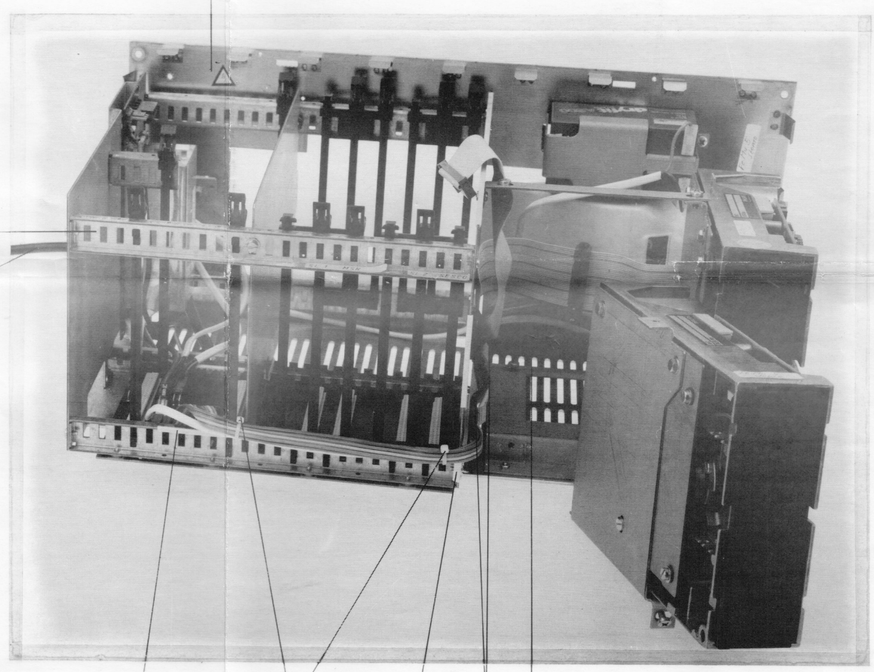
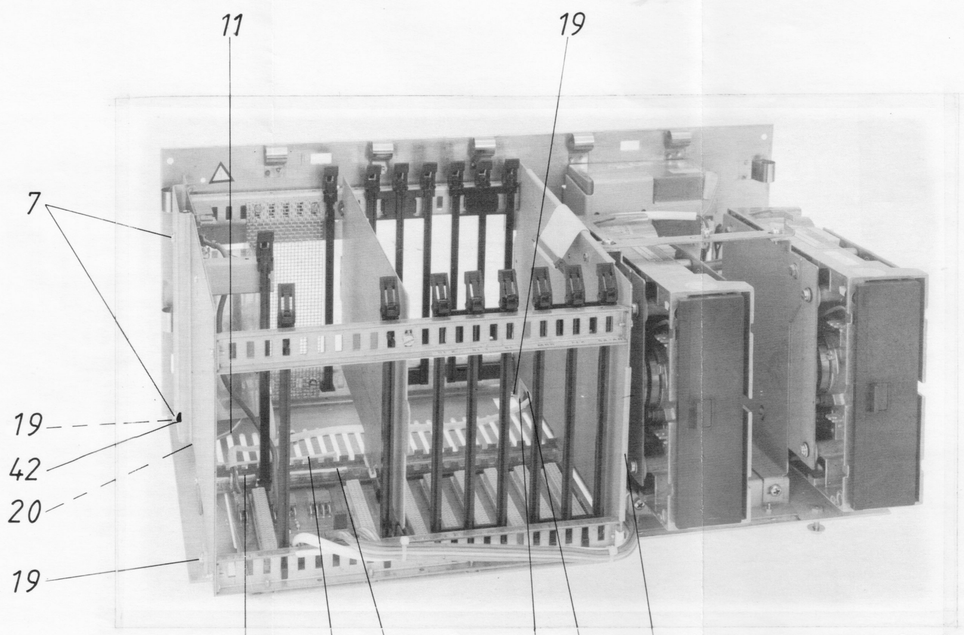
1		13	8	2422 025 89296	FEDERLEISTE 96POL	002	0	000	1125	603	1			
1		13	16	2522 643 16086	ROHRNIET A2,5X0,3X6-MS	003	0	000	1125	603	1			
1		13	5	5112 211 03271	STIFTLEISTE 3POL	004	0	000	2080	603	1			
1		13	7	2422 549 26002	BUCHSENSTECKER 2POL	005	0	000	2080	603	1			
1		13	1	5112 210 22531	LEITERPLATTENFLACHSTECKER	006	0	000	1125	603	1			
1		13	3	2422 025 03527	STIFTLEISTE 2POL	007	0	000	2080	603	1			
1		13	3	2422 025 03179	STIFTLEISTE 4POL	008	0	000	1125	603	1			
1		13	3	5112 211 06041	STIFTLEISTE 2POL	009	0	000	2080	603	1			
1		13	8	5112 211 55782	BUCHSE	010	0	000	1125	733	1			
1		13	1	5112 211 46511	CCA-AUFKLEBER	011	0	000	1125	603	1			
1		13	5	5112 209 12911	IC-SCHALTUNG NW1106	012	0	000	1587	603	1			
1		13	5	5112 209 10221	IC-SCHALTUNG NW0605 (DICK)	013	0	000	1204	603	1			
1		13	2	5112 209 01691	IC-SCHALTUNG ERC1179	014	0	000	1587	603	1			
1		13	2	9331 126 60112	DIODE 1N4446	015	0	000	1587	603	1			
1		13	1	2322 151 54759	ME-WID 0,4/70 47R5/1	016	0	000	1587	603	1			
1		13	1	2322 151 52001	ME-WID 0,4/70 200R/1	017	0	000	1587	603	1			
1		13	1	5112 211 06031	STIFTLEISTE 1POL	018	0	000	2080	603	1			



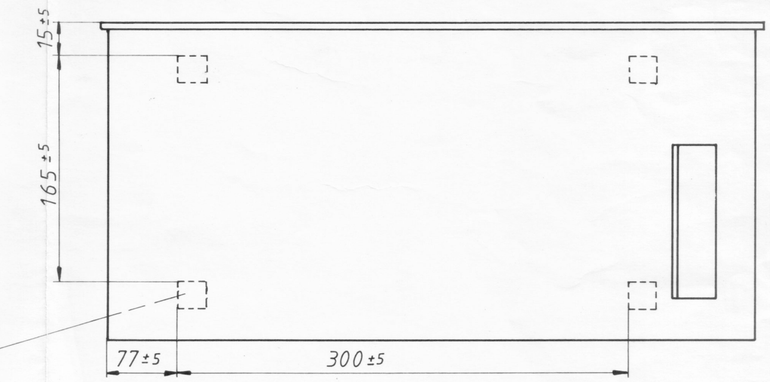
C 398



C 397



C 402



Pos. 49, 57 nicht dargestellt

Ind.	KM	Änderung	Dat.	Name	Ind.	KM	Änderung	Dat.	Name
	2516	Freigabe	19.4.83						

Rauheit UN - D 28 µm DIN ISO 1302 | zul. Abweichung für Maße ohne Toleranzangabe | A DIN 7184 / A UN - D 603

allgemeine Rauheit | Einheit mm | Werkstoff | Modell - Nr. P 3500

Maßstab | Europ. Proj. | Behandlung | Auftrags - Nr.

CLASS **GRUNDPLATTE P3500** **5112 291 79941** IND. KM DAT.

NAME 18.04.1983 | SUPERSERS. F 5112 291 73272 | 1 | SH BL 18 | GR 110 | SH BL 1

SO | PROPERTY OF EIGENTUM VON PHILIPS DATA SYSTEMS 5900 SIEGEN 31 | CHECK KONTR. | DAT. | SO | A2

AHLBORN, 5912 Hilchenbach V 1168

5112 991 00221

PUC Anschl. ext.

Batterie-
Schalter

LTG-LI STZ 04010

LTG-KA BONN TTA 04720

LTG-LI SL 00660

Netzeingang
LTG-KA NETZEINGANG 04080

Kühlplatte

LTG-KA POWER-WS 04000

PCB-Netzfilter

1K
W2
W1
OV-LOG

LTG-LI OV LOG 03970

LTG-SL 00660

LTG-KA PSU-M2-WS 04040

LTG-BD LUEFTER 04030

-Lüfter-
12V

Batterie 12V
1,1Ah

SASI ext.

SASI int.

LTG-BD 50 CU 04220

LTG-LI BATT 03960

LTG-POT-AUSGL 04020

LTG-BD34DR1 03980

LTG-BD POWER 04140

1- +12V
2- OVP
3- OV
4- +5V

BP-WS

+5VM
+5V

BA
STZ
BONN CONTROLLER

OV-LOG

TRAFO

PSU-M2
FAN
MFD1
MFD2/FXD
12V
12V

PSU-WS 120
PMUI-80 SLAVE 2
PMUI-80 SLAVE 1
PMUI-80 SLAVE 3
PMUI-80 MASTER
PMUI-80 SLAVE 4
SESCO

OP-WS

LTG-BD 16 OP 03930

mfD 1

mfD 2
wahlweise

Power

FXD
wahlweise

PCB-CONTROLLER

Ind.	KM	Änderung	Dat.	Name	Ind.	KM	Änderung	Dat.	Name
2.516		Freigabe							

Rauheit UN-D 28 √ √ √ µm DIN ISO 1302
zul. Abweichung für Maße ohne Toleranzangabe
DIN 7184
UN-D 603

allgemeine Rauheit | Einheit mm | Werkstoff | Maßstab | Europ. Proj. | Behandlung

Modell-Nr. P3500
Auftrags-Nr.

CLASS

P 3500 CAB. STAND. 5112 291 79920

IND. KM DAT.

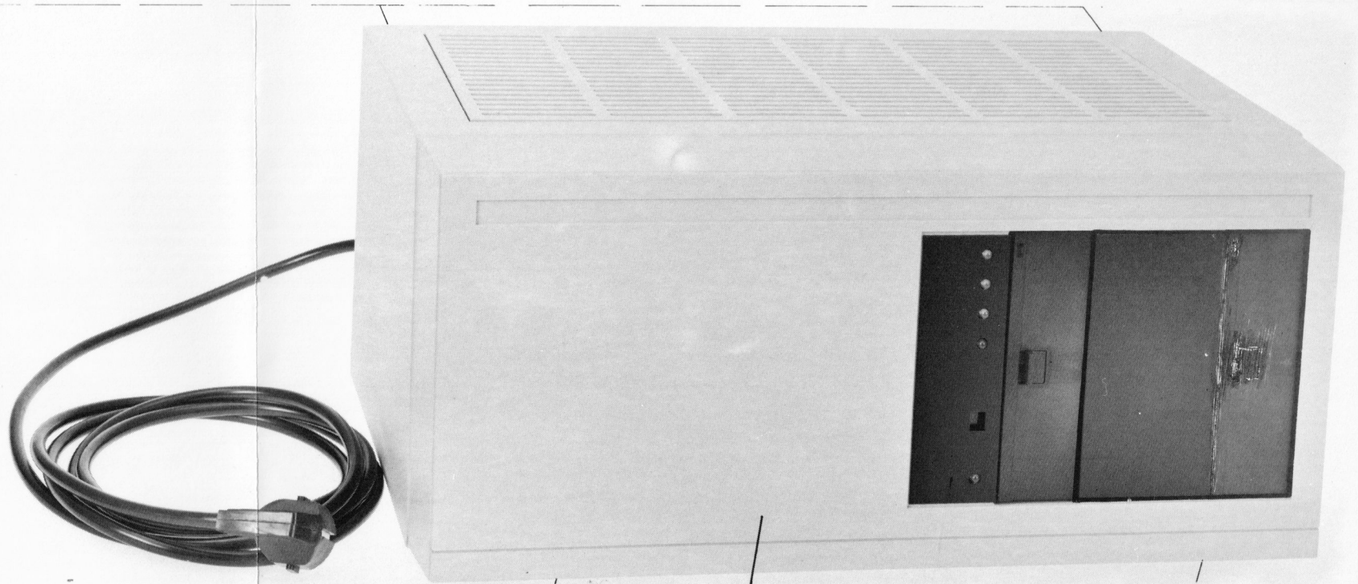
NAME 19.04.1983 SUPERS. ERS. F. 5112 291 72390 3 SH BL 18 GR 131 SH BL 3

SO | PROPERTY OF EIGENTUM VON: PHILIPS GMBH DATA SYSTEMS 5900 SIEGEN 31 | VORIGE KONTR. DAT. | SO A2

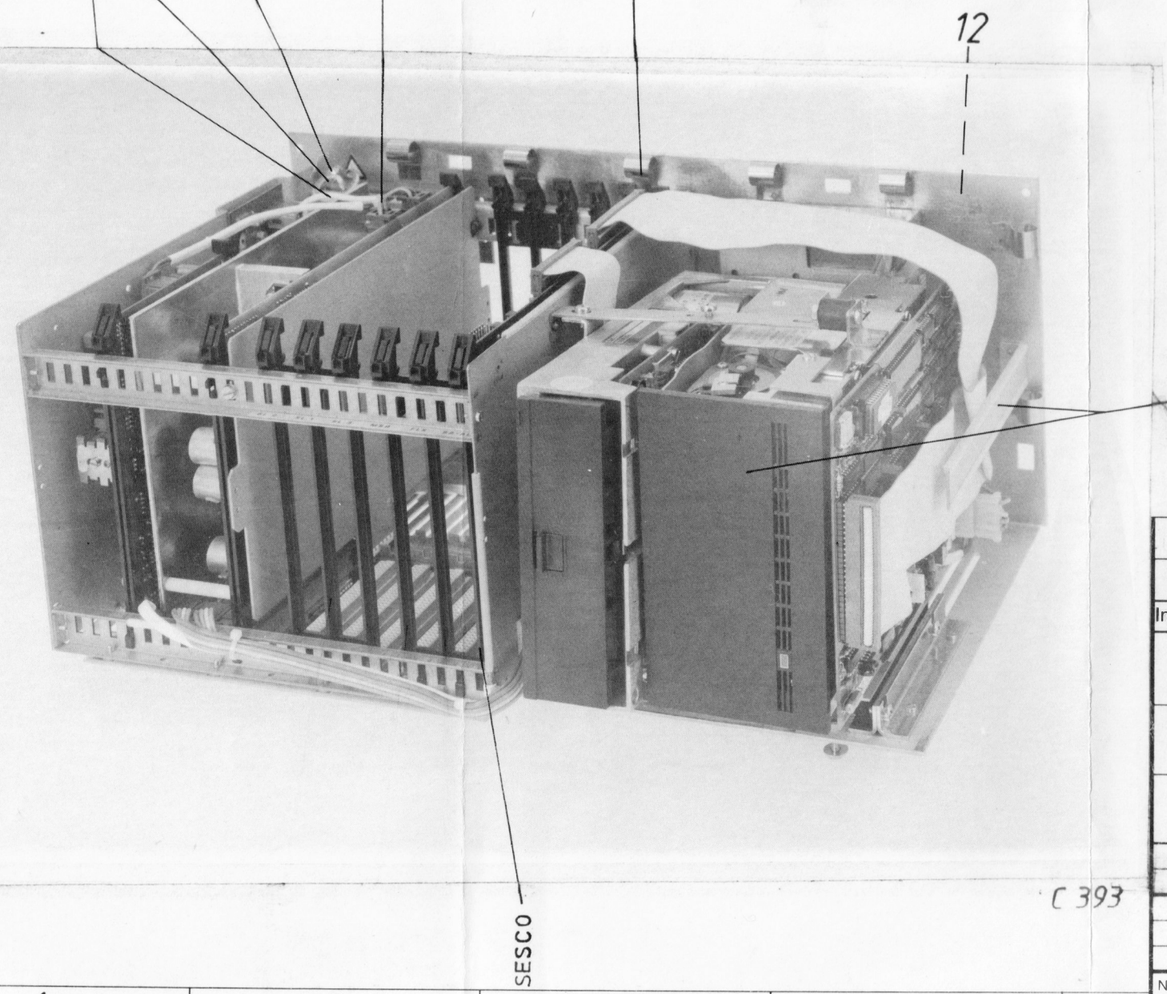
AHLBORN, 5912 Hilchenbach V 1168

5112 298 00263

C 399



C 139



C 393

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4
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11

Pos. 13–17 nicht dargestellt

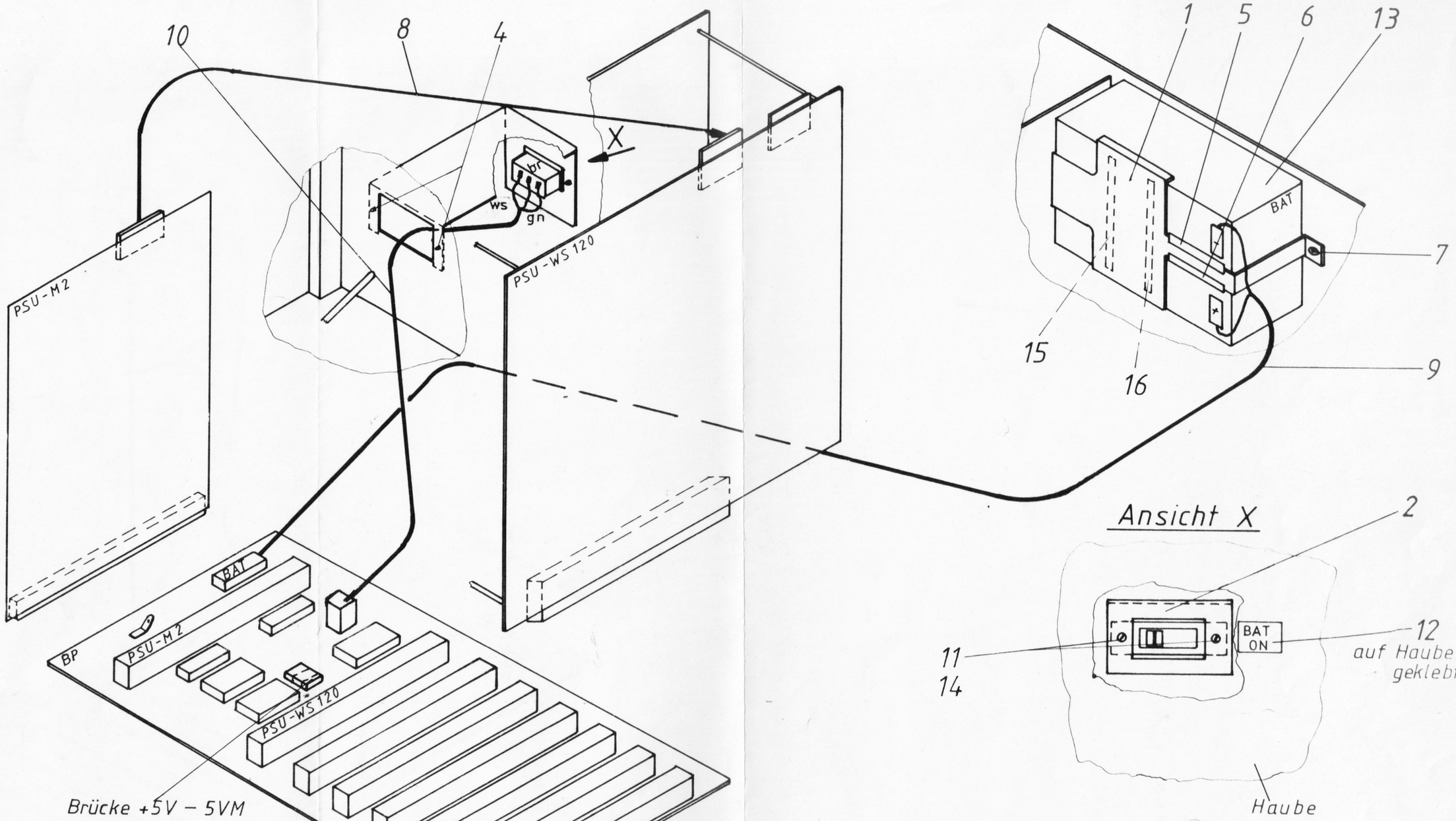
(Bausatz FXD)

SESCO

	2516	Freigabe	19.4.83	Loren							
Ind.	KM	Änderung	Dat.	Name	Ind.	KM	Änderung	Dat.	Name		

Rauheit ✓ ▽ ⌀ µm DIN ISO 1302 UN - D 28		zul. Abweichung für Maße ohne Toleranzangabe	A □□ DIN 7184 / □□A UN - D 603	
allgemeine Rauheit	Einheit mm	Werk-stoff	Modell - Nr. P 3500	
Maßstab	Europ. Proj.	Behand-lung	Auftrags - Nr.	

CLASS	P 3500 CAB. STAND	5112 291 79921	IND.	KM	DAT.				
NAME Loren 19.04.1983	SUPERS. ERS. F. 5112 291 72393	1 SH. BL.	18	GR 110	SH. BL. 1				
SO	PROPERTY OF: EIGENTUM VON: PHILIPS GMBH DATA SYSTEMS 5900 SIEGEN 31	CHECK KONTR.	DAT.			SO	A3		



angegebene Positionen ≙ Stücklistenpositionen

CLASS	P 3030 - 72 BATTERY BACK UP						IND	KM	DAT
			8702 350 09008				—	2516	83-04-28
NAME	14.04.1983	SUPERS ERS F	1	SH BL	GR 165	SH BL 1			
SO	PROPERTY OF EIGENTUM VON PHILIPS GMBH DATA SYSTEMS 5900 SIEGEN 31				CHECK KONTR	DAT		SO	A3

AHLBORN, 5912 Hilchenbach, V 1908

+6M

Blatt Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.
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1983 05 03.

Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.
0	2516	2		4		6		8		10		12		14		16		18	
1		3		5		7		9		11		13		15		17		19	

IND.	KM	DAT.
–	2516	83-04-28

CLASS

P3500 CAB. STAND

5112 291 79920

NAME [signature] 15.04.1983 | SUPERS. ERS. F. 5112 291 72390-161 | 3 SH BL | 18 | GR 161 | SH. BL. 1

SO | PHILIPS GMBH DATA SYSTEMS 5900 SIEGEN 31 | CHECK KONTR. | DAT. | FORM A4

5112 298 00226

AHLBORN 5912 Hilchenbach V 443

1.) Ableitstromprüfung nach VDE 0806 Abschnitt 13.2

Verwendetes Messgerät nach VDE 0806 Anhang D

Ableitstromprüfer JF28 von der Fa. Elektronisches Laboratorium in D-7015 Korntal.

Messpunkt : Netzeingang

2.) Hochspannungsprüfung nach VDE 0806 Abschnitt 16.3 und VDE 0730 Teil 1 § 32

Verwendetes Messgerät :

Hochspannungsprüfer NH 27 von der Fa. Elektronisches Laboratorium in D-7015 Korntal.

Prüfspannung: 1,375 KV 1 Sekunde zwischen beiden Polen gegen Schutzkontakt.

3.) Schutzleiterprüfung nach VDE 0806 Abschnitt 27.5

Verwendetes Messgerät:

Sicherheitsprüfer RD28K von der Fa Elektronisches Laboratorium in D-7015 Korntal

Mikro

CLASS			IND.	KM	DAT.
P3500 CAB. STAND	5112 291 79920		–	2516	83-04-28
NAME 15.04.1983	SUPERS ERS F	3 SH BL	GR 161	SH BL 2	
SO	PROPERTY OF EIGENTUM VON PHILIPS GMBH DATA SYSTEMS 5900 SIEGEN 31		CHECK KONTR.	DAT.	SO A4

3.1) Messpunkte für P3500 STOMO CABINET.

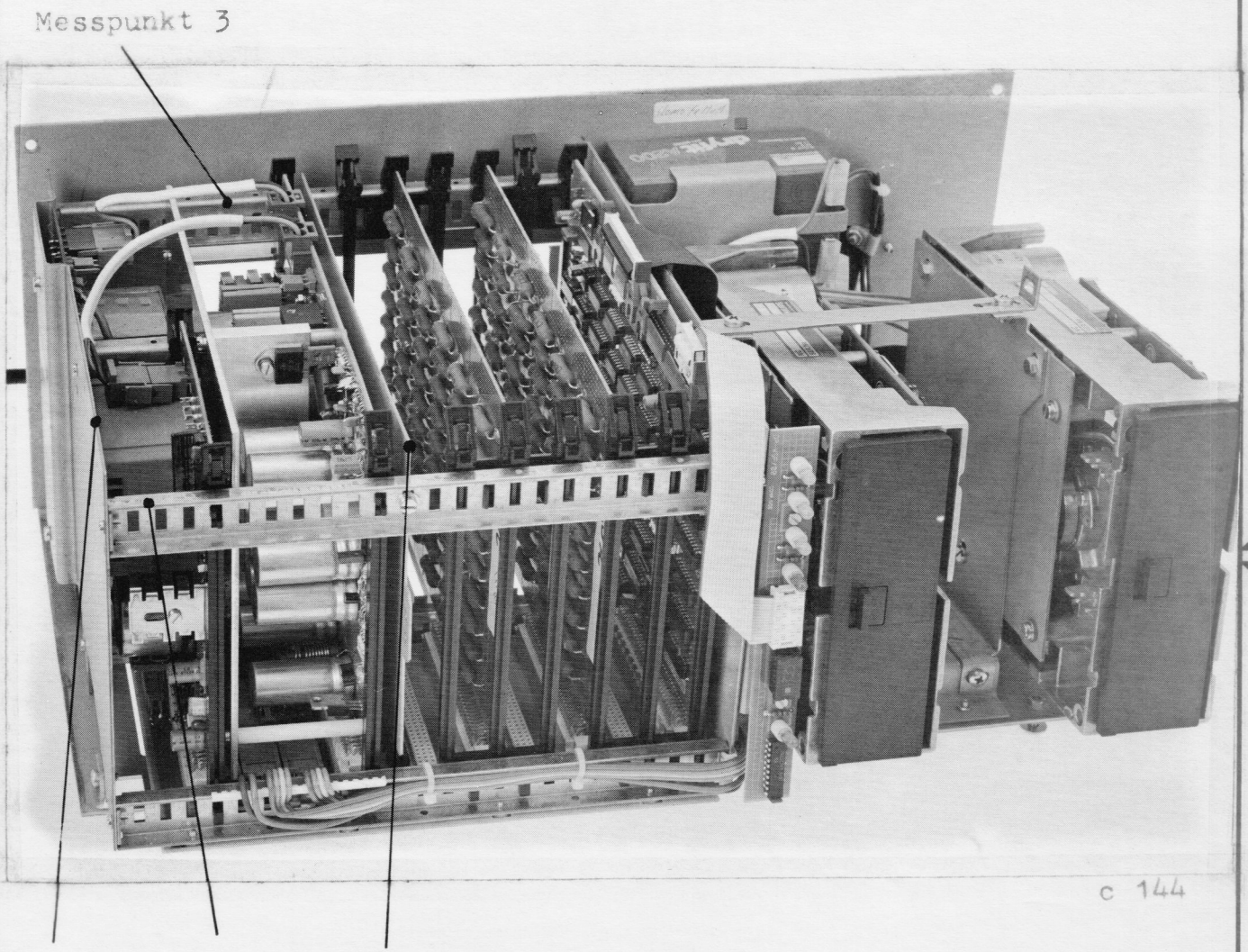
von Schutzkontakt Schukostecker

zu Messpunkt 1. Seitenwand links

2. U-Profilschiene vorne

3. U-Profilschiene hinten

4. Trennwand



+6M

Mikro

1989 05 03.

CLASS			IND.	KM	DAT.
P3500 CAB. STAND	5112 29179920		–	2516	83-04-28

NAME Lorim 15.04.1983 | SUPERS. ERS. F. | 3 SH. BL. | GR 161 | SH. BL. 3

SO | PROPERTY OF: EIGENTUM VON: PHILIPS GMBH DATA SYSTEMS 5900 SIEGEN 31 | CHECK KONTR. | DAT. | SO | A4

PHILIPS

Blatt Nr.	Index Lfd. Nr	Index Lfd. Nr	Index Lfd. Nr	Index Lfd. Nr	Index Lfd. Nr	Index Lfd. Nr	Index Lfd. Nr	Index Lfd. Nr	Index Lfd. Nr	Index Lfd. Nr	Index Lfd. Nr	Index Lfd. Nr	Index Lfd. Nr	Index Lfd. Nr	Index Lfd. Nr	Blatt Nr.	Index Lfd. Nr	Index Lfd. Nr	Index Lfd. Nr	Index Lfd. Nr	Index Lfd. Nr	Index Lfd. Nr	Index Lfd. Nr	Index Lfd. Nr	Index Lfd. Nr	Index Lfd. Nr	Index Lfd. Nr	Index Lfd. Nr	Index Lfd. Nr	Index Lfd. Nr
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0	2516	2		4		6		8		10		12		14		16		18	
1		3		5		7		9		11		13		15		17		19	

CLASS

P3500 CAB. STAND

5112 291 79920

IND.	KM	DAT.
-	2516	83-04-28

NAME 18.04.1983 SUPERS ERS F 3 SH BL 18 GR 165 SH BL 1

SO PHILIPS GMBH DATA SYSTEMS 5900 SIEGEN 31 CHECK KONTR. DAT. FORM A4

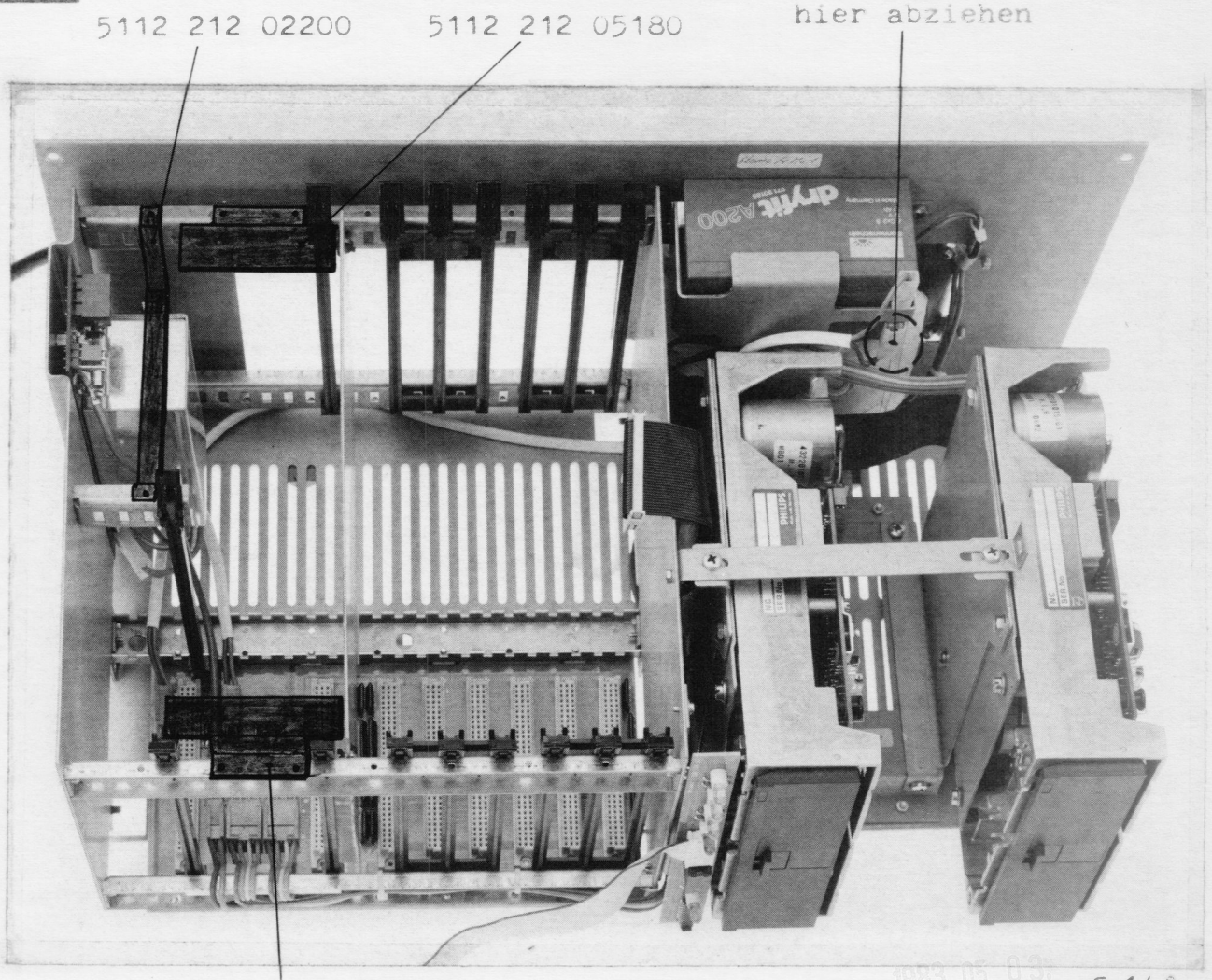
5112 298 002

Transportbedingungen für P 3500 STOMO

1. BBU

Um eine Entladung der Batterien in Folge einer Zwischenlagerung von Maschinen zu vermeiden, muß eine Trennung der Anschlußleitung Batterie + nach Testabschluß im Prüffeld erfolgen.
Dabei ist darauf zu achten, daß die abgezogene Leitung keinen Kurzschluß verursacht. (Sichern durch Kabelbinder).
Vor Inbetriebnahme der Maschinen ist, um die Funktion BBU sicherzustellen, die Leitung Batterie + wieder aufzustecken.
Aus Abb. 1 ist die erforderliche Trennung zu entnehmen.

Abb.1



1983 05. 03.
C 140

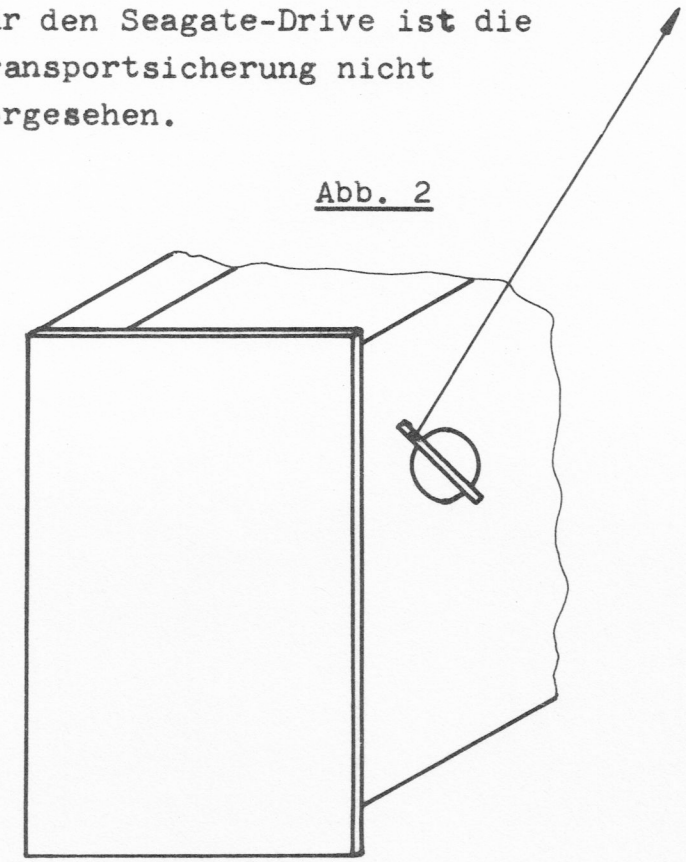
CLASS			IND.	KM	DAT.
	P 3500 CAB. STAND	5112 291 79920	-	2516	83-04-28

NAME	18.04.1983	SUPERS. ERS. F	3 SH. BL.	GR 165	SH. BL. 2		
SO		PROPERTY OF EIGENTUM VON: PHILIPS DATA SYSTEMS 5900 SIEGEN 31		CHECK KONTR.	DAT.	SO	A4

2. FIXED DISK (RODIME)

Die Transportsicherung des Steppermotors ist nach Testabschluß wieder anzubringen (Isoband).
Für den Seagate-Drive ist die Transportsicherung nicht vorgesehen.

Abb. 2



3. Netzteil

Außerdem ist darauf zu achten, daß die Transportsicherungen 12NC-Nr. 5112 212 02200 und 5112 212 05180 nach Abb. 1 montiert sind.
Vor Inbetriebnahme sind diese wieder zu entfernen.

CLASS			IND.	KM	DAT.
P3500 CAB. STAND	5112 291 79920		-	2516	85-04-28
NAME 18.04.1983 SUPERS ERS F	3 SH. BL.	GR 165	SH. BL. 3		
SO PROPERTY OF: EIGENTUM VON: PHILIPS DATA SYSTEMS 5900 SIEGEN 31		CHECK KONTR.	DAT.		SO A4

5112 991 001

PHILIPS

Blatt Nr.	Index	Lfd. Nr.	Blatt Nr.	Index	Lfd. Nr.
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35			69		

1983 05. 03.

Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.
0	2516	2		4		6		8		10		12		14		16		18	
1		3		5		7		9		11		13		15		17		19	

CLASS

P 3500 CAB. STAND

Mikro

5112 291 79920

IND.	KM	DAT.
–	2516	83-04-28

NAME Irene 19.04.1983 | SUPERSERS-F 5112 291 72390 | 3 SH BL. 18 | GR 131 | SH BL. 1

SO | PHILIPS GMBH DATA SYSTEMS 5900 SIEGEN 31 | CHECK KONTR. | DAT. | FORM A4

AHLBORN 5912 Hilchenbach V 443

5112 298 0022

PUC Anschl. ext.

Batterie-
Schalter

LTG-LI STZ 04010

LTG-KABONNTTA 04720

LTG-LI SL 00660

Netzeingang
LTG-KA NETZEINGANG 04080

Kühlplatte

LTG-KA POWER-WS 04000

PCB-Netzfilter

1K

W2

W1

OV-LOG

LTG-LI OV LOG 03970

LTG-SL 00660

LTG-KA PSU-M2-WS 04040

LTG-BD LUEFTER 04030

-Lüfter-

12V

Batterie 12V
1,1Ah

SASI ext.

SASI int.

LTG-BD SOCU 04220

LTG-LI BATT 03960

LTG-POT-AUSGL 04020

LTG-BD34DR1 03980

LTG-BD POWER 04140

1- +12V
2- OVP
3- OV
4- +5V

BP-WS 69860

25760

+5VM

+5V

BA

STZ

BONN

CONTROLLER

OV-LOG

TRAFO

PSU-M2

FAN

MFD1

MFD2/FXD

12V

12V

PSU-WS 120

PMUI-80 SLAVE 2

PMUI-80 SLAVE 1

PMUI-80 SLAVE 3

PMUI-80 MASTER

FLEXCO

SASI AD

OP-WS

LTG-BD16 OP 03930

mfD1

mfD2

wahlweise

Power

34

20

FXD

wahlweise

PCB-CONTROLLER

Ind.	KM	Änderung	Dat.	Name
2516		Freigabe		

Ind.	KM	Änderung	Dat.	Name

Rauheit UN-D 28 µm DIN ISO 1302

zul. Abweichung für Maße ohne Toleranzangabe

DIN 7184

UN-D 603

allgemeine Rauheit

Einheit mm

Werkstoff

Maßstab

Europ Proj

Behandlung

Modell-Nr. P3500

Auftrags-Nr.

CLASS

P3500 CAB. STAND. 5112 291 79920

IND. KM DAT.

NAME 19.04.1983 SUPERS. ERS. F 5112 291 72390 3 SH. BL. 18 GR. 131 SH. BL. 2

SO

PROPERTY OF EIGENTUM VON PHILIPS GMBH DATA SYSTEMS 5900 SIEGEN 31

CHECK KONTR.

DAT.

SO A2

BORN, 5912 Hilchenbach V 1168

5112 298 00263

PHILIPS

+6M

Blatt Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.
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Blatt Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.
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1983 05 03.

Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.
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1		3		5		7		9		11		13		15		17		19	

CLASS

P3500 CAB. STAND

5112 291 79920

IND.	KM	DAT.
–	2516	83-04-28

NAME Loren 15.04.1983 | SUPERS ERS F 5112 291 72390-161 | SH. BL. 3 | 18 | GR 161 | SH. BL. 1

SO | PHILIPS GMBH DATA SYSTEMS 5900 SIEGEN 31 | CHECK KONTR. | DAT. | FORM A4

AHLBORN 5912 Hilchenbach V 443

5112 298 00220

PHILIPS

Blatt Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Blatt Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.
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1983 05. 03.

Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.
0	2516	2		4		6		8		10		12		14		16		18	
1		3		5		7		9		11		13		15		17		19	

CLASS		IND.	KM	DAT.
	P3500 CAB. STAND 5112 291 79920	–	2516	83-04-28

NAME Lorenz 30.03.1983 | SUPERS. ERS. F. | 3 SH. BL. | 18 | GR 412 | SH. BL. 1

SO | PHILIPS GMBH DATA SYSTEMS 5900 SIEGEN 31 | CHECK KONTR. | DAT. | FORM A4

AHLBORN 5912 Hilchenbach V 443

5112 298 00226

a. Service Instruction for Terminator 220/330R
12 Nc - Nr. 5112 291 75560

Abb. 1 P 3500 1× MFD 1× FXD

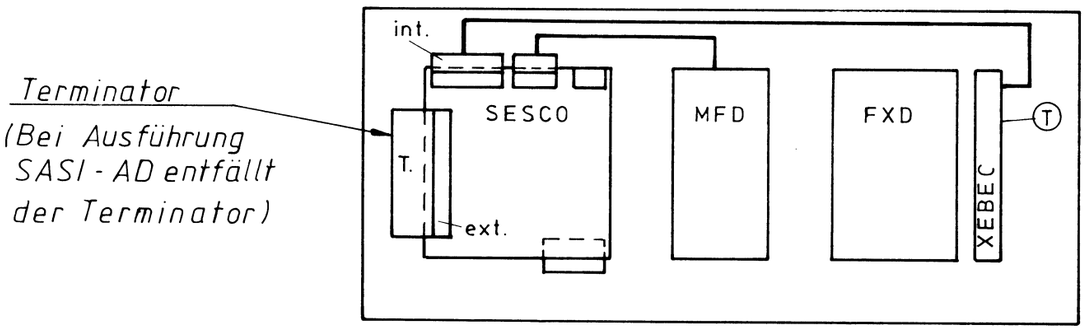
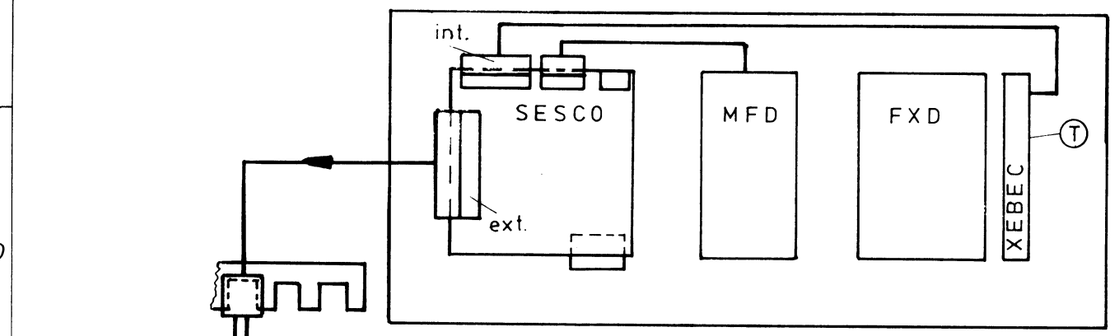


Abb. 2 P3500 1× MFD 1× FXD



DISC-CABLE SAS INTERFACE im 3. Schlitz der PUC-Halterung stecken

Abb. 3 P 3500 2× MFD

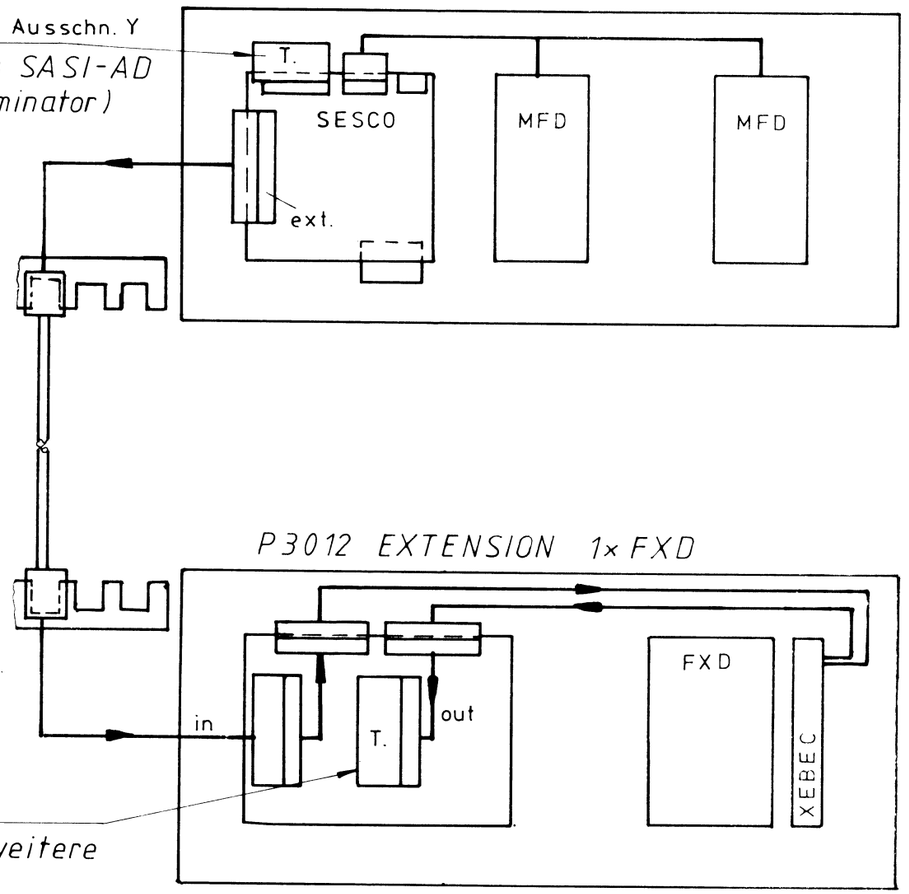
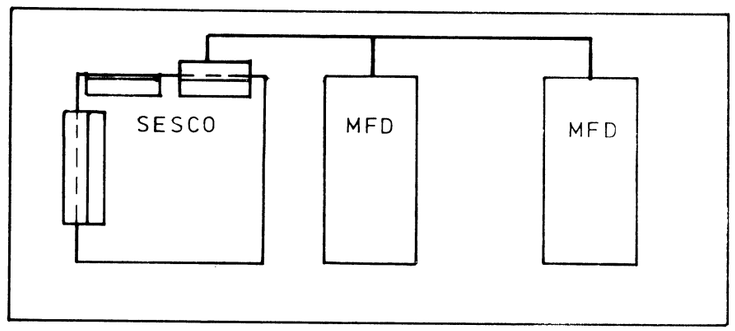


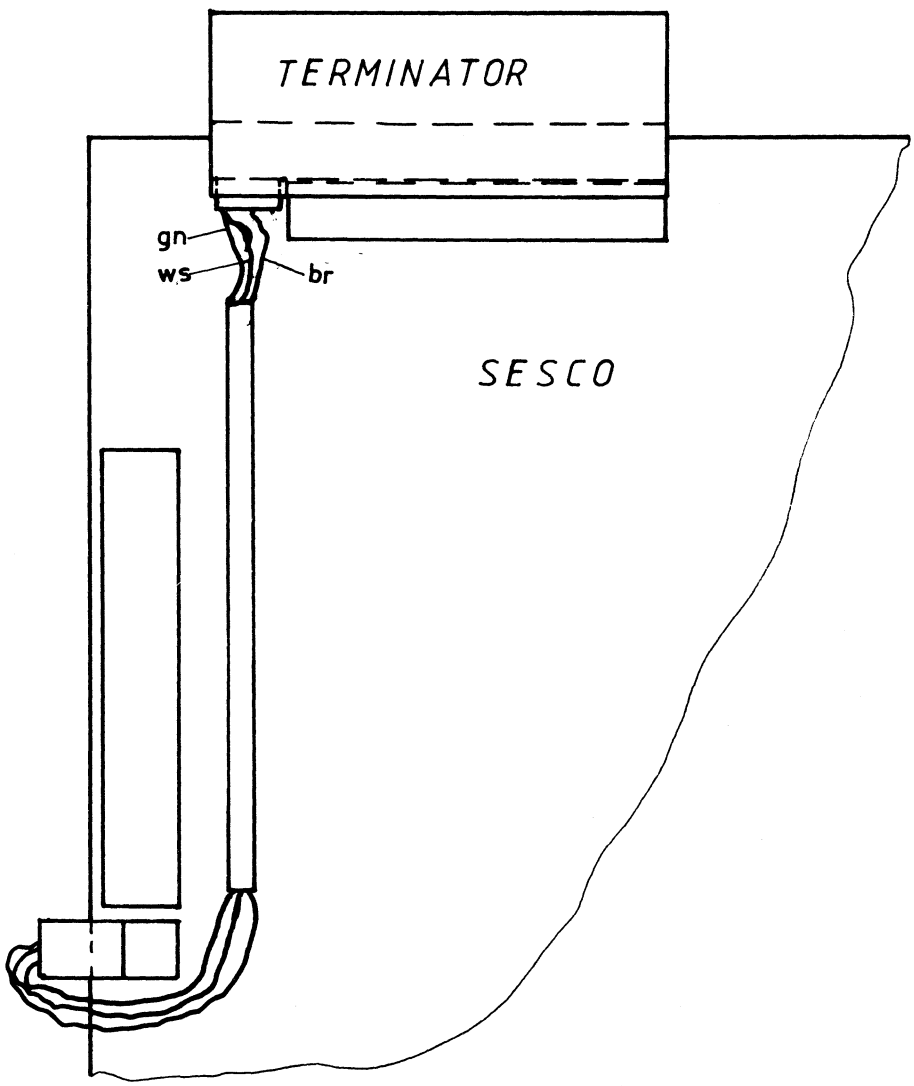
Abb. 4 P3500 2× MFD



Ⓣ ≙ Terminator auf XEBEC-CONTR.

CLASS	P 3500 CAB. STAND	5112 291 79920	IND.	KM	DAT.
			1	2516	83.04.28
NAME 30.03.1983	SUPERS. ERS. F	3 SH. BL.	GR 412	SH. BL. 2	
SO	PROPERTY OF EIGENTUM VON	PHILIPS DATA SYSTEMS 5900 SIEGEN 31	CHECK	DAT.	

Ausschnitt „Y" (zu Abb. 3)



1983 05. 03.

CLASS			IND.	KM	DAT.
P 3500 CAB. STAND	5112 291 79920		-	2516	83-04-28

NAME 30.03.1983	SUPERS. ERS. F	3 SH. BL.	GR 412	SH. BL. 3	
SO	PROPERTY OF: EIGENTUM VON: PHILIPS DATA SYSTEMS 5900 SIEGEN 31		CHECK KONTR.	DAT.	SO A4

5112 991 0019

system series: P3000 model: main assy: nr. P3500-048

date: 841017 revised:

title: P3500 rebuild to 16 bit.

note:

To upgrade a P3500 to 16 bit an upgrade kit P3530-80 12NC: 8702 300 09018 is available.

1) Contents of kit (P3530-80)

Description	Qty.	12NC
1. Diodes BYV 33-45	3	5322 130 32246
2. Clamping spring	2	5112 212 00531
3. Cable binder	10	2422 015 05037
4. Air flow plate	1	5112 212 16271
5. Heatsink assy	1	5112 291 94561
6. Screw M3x12	2	2512 252 01008
7. Resistor R20/2	1	8212 221 07171
8. Cap with jumper	2	5112 291 96401
9. Ventilation panel	1	5112 212 04353

2) Due to the limitation of the power supply only the combinations master/slave described in the table below are to be used.

System	PMU80-1 position(s)	total	PMU80-3 position(s)	total	PMU186 position(s)	total
2xmfD		0	MSR	1	SL2,SL3	2
"		0	MSR,SL3	2	SL2,SL3	2
"	MSR	1		0	SL2,SL3	2
"	SL4	1	MSR	1	SL2,SL3	2
"	SL4	1	MSR,SL3	2	SL2	1
"	MSR,SL4	2		0	SL2,SL3	2
"	SL1,SL4	2	MSR	1	SL2,SL3	2
"	SL1,SL4	2	MSR,SL3	2	SL2	1
"	MSR,SL1,SL4	3		0	SL2,SL3	2
"	SL1,SL3,SL4	3	MSR	1	SL2	1
"	MSR,SL1,SL3,SL4	4		0	SL2	1
"	SL1,SL2,SL4	3	MSR,SL3	2		0
1xmfD,FXD		0	MSR	1	SL2,SL3	2
"		0	MSR,SL3	2	SL2	1
"	MSR	1		0	SL2,SL3	2
"	SL3	1	MSR	1	SL2	1
"	SL2	1	MSR,SL1	2		0
"	MSR,SL3	2		0	SL2	1
"	SL3,SL4	2	MSR	1	SL2	1
"	SL2,SL3	2	MSR,SL1	2		0
"	MSR,SL3,SL4	3		0	SL2	1
"	SL1,SL2,SL3	3	MSR	1		0
"	MSR,SL1,SL2,SL3	4		0		0
"	SL2,SL3,SL4	3	MSR,SL1	2		0

revised: nr. P3500-048

3) Implementation

1. Replace ventilation panel in the back cover by the panel of the kit (see fig. 1 and 2).
2. Mount the air flow plate in the cabinet as per fig. 3 and 4.
   Use only outer two holes for the screws.
   Make sure that the air flow plate is mounted tightly to the U-profile and the bottom of the cabinet.
   If necessary remove (part of) the white plastic strip on the U-profile.
3. Bend the flatcable to the MFD as per fig. 5.
4. Modify PSU-WS120 as per SI P3500-052. Use new clamping springs for the diodes.
5. Modify PSU-M2 as per SI P3500-053.
6. Remove the plastic sleeve from the PUC cable and use the cable binders to keep the wires together (fig. 6 and 7).
7. If there is no slave in position slave 1 or position slave 3 mount on this position the cap with jumper. See fig. 8.
8. If there is no slave in position slave 4 mount strap W5. See fig. 8.

4. Remarks

- Backpanel must have 12NC: 5112 291 84464 or higher.
  Which means that backpanel 5112 291 84462 is not suitable for 16 bit.
- FLEXCO/SASI-AD must not be used for 16 bit.
- SI P3500-43 must be done before modifying the WS120 per SI P3500-52.

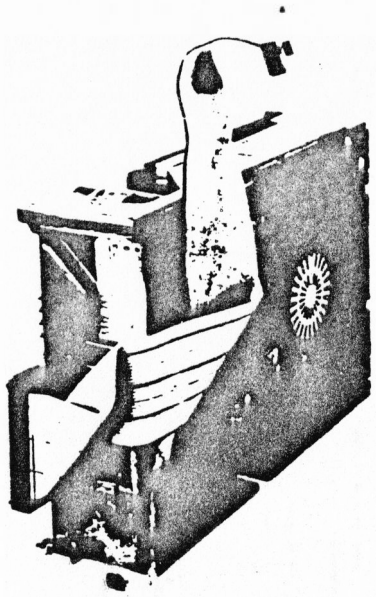


Figure 5

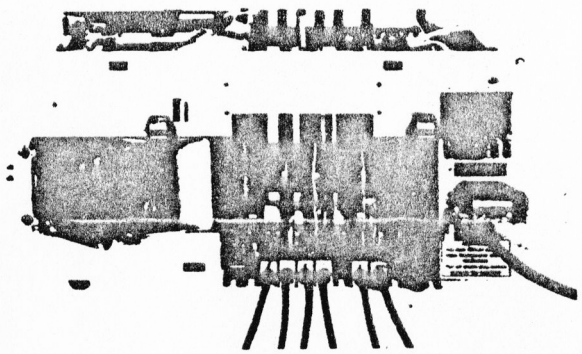


Figure 6

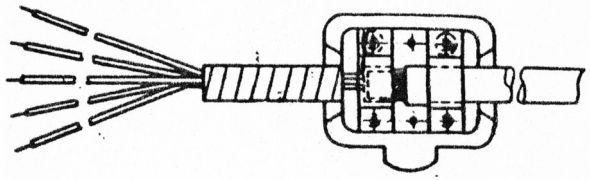


Figure 7

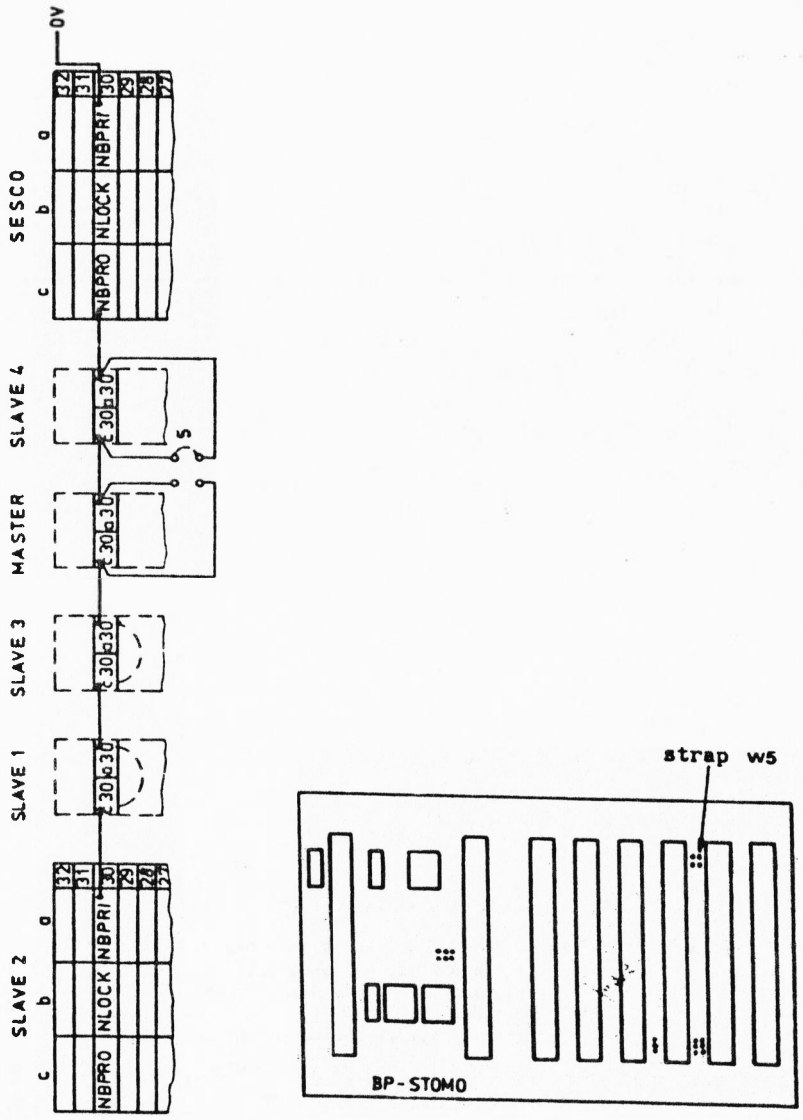

0V
SESCO
SLAVE 4
MASTER
SLAVE 3
SLAVE 1
SLAVE 2
NBPRO
NLOCK
NBPRI
32
31
30
29
28
27
S
strap w5
BP-STOMO

Figure 8

service information | FIELD CHANGE | Data Systems

system series: P3000 model: P3500 main assy: PSU-WS120 nr. P2711-018 P3500-052

units affected: est.inst.time:

date: 840820 revised:

title: WS120 for 16 bit

note: this change is: Retrofit on failure

1. CONDITION : If a P3500 is updated to 16 bit, the WS120 must be changed.
The PMU 186 needs more current than the PMU 80

2. CORRECTION : Component change on WS120 5112 291 75723.

3. REMOVE : D37, D38 and D39 (see fig.).

4. ADD : - D37, D38, D39, (BYV 33-45).
If silicone grease was used under the old diodes, mount the new ones also with some silicone grease.
Do not forget the insulation plate.

- Mount IC 8 on the heatsink by means of screw M3 x 8, ring and nut, and solder heatsink into the corresponding holes of the PCB.

5. ADJUSTMENTS : None.

6. PARTS :

Diode BYV 33-45	5322 130 32246
Heatsink	2412 490 00239
Screw M3 x 8	2522 178 20059
Nut M3	2522 401 25008
Ring 3.2	2522 600 93016

7. STATUS CHANGE : 12NC becomes 5112 291 75724.
Service 12NC 5322 214 40086 not changed.

8. TEST FACILITIES AFFECTED : None.

9. DOCUMENTS AFFECTED : Workshop Engineer Manual, 12NC: 5122 991 3296x.

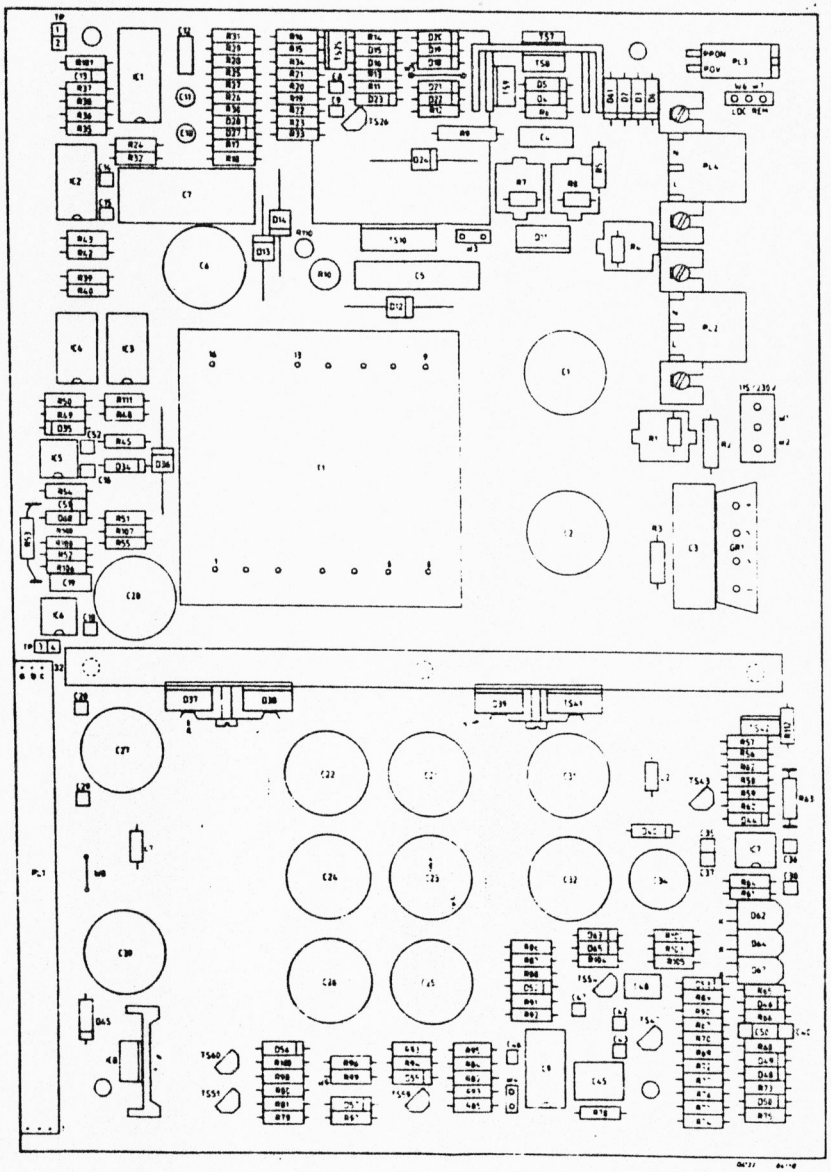
10. REMARKS :
- For updating a P3500 to 16 bit, a kit P3530-80 will be made available (containing all necessary hardware parts) (WS120 change is part of it).
The 12NC of this kit is: 8702 300 09018.
The kit is available from September 1984 onwards.

- This change is factory implemented from P3500 serial number 315797 onwards.

- Modified WS120 can be used for 8 bit as well.

revised: nr. P2711-018 P3500-052

COMPONENT LOCATION PSU-WS120



service information | FIELD CHANGE | Data Systems

system series: P3000 P4000 | model: P3500 P4200 | main assy: PSU-M2 | nr. P3500-053 P4200-018

units affected: | est.inst.time:

date: 840717 revised:

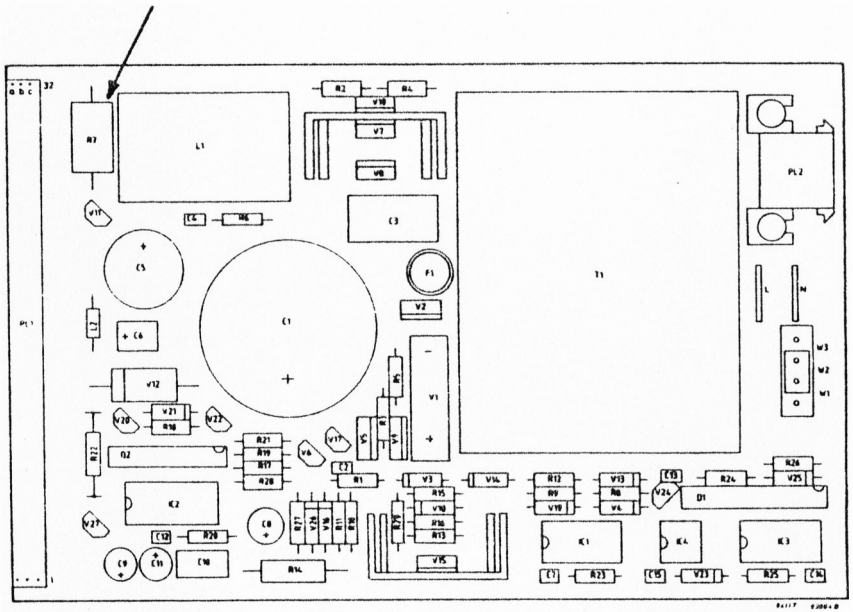
title: PSU-M2 for 16 bit

note: | this change is: Retrofit on failure

1. CONDITION : If a P3500 is updated to 16 bit, the PSU-M2 must be changed.
2. CORRECTION : Component change on PSU-M2 5112 291 69763.
3. REMOVE : R7, (E24/2).
4. ADD : R7, (E20/2) see fig.
5. ADJUSTMENTS : None.
6. PARTS : Resistor 200 milli/Ohm, 2W 8212 221 07171.
7. STATUS CHANGE : 12NC becomes 5112 291 69764.
   Service 12NC 5322 214 40178 not changed.
8. TEST FACILITIES AFFECTED : None.
9. DOCUMENTS AFFECTED : Workshop manual P3000.
10. REMARKS :
    - For updating a P3500 to 16 bit, a kit P3530-80 (---) will be made available (containing all necessary hardware). (This PSU-M2 change is part of it).
      The 12NC of this kit is: 8702 300 09018.
      This kit is available from September 1984 onwards.
    - This change is factory implemented from P3500 serial number 315797 onwards.
    - Modified PSU-M2 can be used for 8 bit as well.
    - This modification has no consequences for P4200.

revised: nr. P3500-053 P4200-018

COMPONENT LOCATION PSU-M2



1. Test and Diagnostics of P3500 Systems

In order to start each application session from a well-defined situation, the P3500 system is provided to run test and diagnostic programs.

After power-on, a so-called Inside Test will run automatically without any user handling.

Since the program is resident within the system and data on data carriers must not be destroyed, it covers not all the hardware functions.

After initial program loading (IPL), the End User may load an additional test program. The Service Engineers may load a special test program to be loaded from a special service diskette.

With these test programs expanded tests may be performed at data carriers or devices like printer or disk drives.

More detailed descriptions of the Inside Test and Test and Diagnosis Program P3500 are given in the following chapters.

2. Inside Test of System

2.1 General Description

With the aid of a resident Inside Test Program that is executed after power-on, the system checks the basic functions of its own hardware to verify the correct working.

The central unit P3500 as well as the workstations have their own Inside Test Program. These test programs are independent of the system configuration and do not communicate with each other.

After execution of the Inside Test the workstation
After execution of the Inside Test the workstation
is switched online, indicated by the lamp "ONLINE" on the keyboard. The central unit P3500 is switched on remotely and will start its Inside Test. On the operator panel of the central unit the lamp "power on" and the test lamps are illuminated. After performing the Inside Test of the central unit P3500 without detecting an error, the test lamps will be extinguished, and initial program loading (IPL) will be performed.

The system is now ready for use.

In case of an error, only that unit where the error is found will indicate this error. For a workstation an error code is displayed on the screen (if applicable) and also the four functions lamps L1 to L4 on the keyboard will indicate the error code. The central unit displays its error code by means of the four lamps 1 to 4 of its operator panel.

In case of an error the end user should call the Service Organization, indicating the error code.

The following tables show the possible error codes of the central unit P3500 and the workstation P2711.

Error codes of central unit P3500:

lamps on operator panel 1	2	3	4	meaning of error code
-	-	-	-	no error
X	X	X	X	processor memory unit
X	X	-	X	SESCO
X	-	X	X	internal FIXCO
X	-	-	X	internal fixed drive
-	X	X	X	internal flexible drive
-	X	-	X	no intern. FLD ready

Error codes of workstation P2711:

function lamps on keyboard L1	L2	L3	L4	error code on screen	meaning of error code
-	-	-	-	-	no error
X	X	X	X	11 to 15	PMU
X	X	X	-	21 to 24	PME
X	X	-	X	31 to 39	CRT-CO
X	X	-	-	41	keyboard interface

note: X = lamp on
- = lamp off

2.2 Inside Test of Display Module (DIMO) P2711

2.2.1 General Description

The purpose of the **Inside Test** is to check the basic functions of the display module P2711 (DIMO) and to verify that the terminal is working correctly. Malfunction of hardware components shall be detected and located down to the field exchangeable unit level. Information provided in case of an error shall guide the operator´s actions.

The **Inside Test** is always executed after power-on or reset. It can also be started by entering the corresponding control sequence via the host interface. Dependent on the input parameters either a single or a continuous test is executed. With the input parameter the part of DIMO to be tested is selected, too.

The **Inside Test** is a stand alone program without any support by the system software and does not require any operator handling after starting. As a result of the Inside Test execution, the status of the DIMO is created. It includes information about whether the terminal is free of errors or what error was detected. The status is stored in the memory and can be fetched from the host.

The state of the DIMO after test will be online. That means, no memory contents will be changed and the initialization of the peripherals will not change. In case of a fatal error, all operations will be stopped immediately.

To indicate the errors to the user, an error code is displayed which gives information about the faulty field-exchangeable unit and its subsection. The first hexadecimal digit of the code indicates the faulty unit, the second hexadecimal digit indicates the faulty subsection (see also table in 2.1).

The meaning of the displayed code is as follows:

11	PMU88	standard RAM address
12	PMU88	non volatile RAM address
13	PMU88	standard RAM memory location
14	PMU88	non vol. RAM memory location
15	PMU88	progr. interrupt controller
21	PME1	programmable interval timer
22	PME1	keyboard interface
23	PME1	auxiliary V24/V28 interface
24	PME1	system v24/v28 interface
31	CTRCO	c.f.e.
32	CRTCO	c.f.e.
33	CRTCO	refresh memory address
34	CRTCO	c.f.e.
35	CRTCO	refresh memory location
36	CRTCO	vertical synchronization
37	CRTCO	horizontal synchronization
38	CRTCO	video signal
39	CRTCO	real time clock
41	KB	keyboard interface

The error code is displayed at the lower left corner of the screen. It is equal to the value of the first byte of the test status. In case of an error, the bell of the keyboard will once be activated for about 100ms.

In case the detected error cannot be displayed on the screen, as an additional interface the keyboard LEDs L1 to L4 are set correspondingly to the test result.

At the beginning of a test module, the four LEDs are set to the corresponding value of this module. If an error occurs, the state of the LEDs remains unchanged and indicates which unit causes the error.

The following indications are given:

LEDs on	field-exchangeable unit
L1, L2, L3, L4	PMU88
L1, L2, L3	PME1
L1, L2, L4	CRTCO
L1, L2	keyboard interface

If no error is indicated, the 4 LEDs will be switched off at the end of test. If the DIMO has been in online mode before testing, the LEDs will change to the value they had before. If the DIMO has been in local mode, they will be switched off. Independent of the mode before running the test program, and independent of the test result, after test the keyboard is switched into the online mode.

As an additional interface to the Service Engineer an Inside Test LED is implemented on all PCBs. These LEDs are switched on automatically after power-on or reset or by theInside Test, if it is initialized by the control sequence. These LEDs will only be switched off if no error was found on the corresponding PCB.

The PCBs of the DIMO are tested in the following sequence:

- PMU88
- PME1
- CRTCO
- Keyboard Interface

If the test is terminated in case of an error, the LEDs of all untested PCBs, including the faulty one, will be switched on.

2.2.2 Detailed Description

The Inside Test Program is developed in a modular way, according to the structure of the DIMO. It includes modules to test the units mentioned in 2.2.1. All modules are divided into several sub-modules which check subsections of a unit.

In the beginning the kernel of the DIMO is verified. After that, the test is expanded to the sub-units. The kernel is formed by the microprocessor, the stack memory and the microprogram of the PMU88.

Not covered is the user interface of the keyboard. Therefore Inside Test must be seen as a test of the processor unit and the elements directly driven by it.

Keyboard (keys), CRT, CRT device electronics and power supply are not tested.

The keyboard interface is checked by interaction of the DIMO processor with the keyboard processor.

2.2.2.1 Test of PMU88

This test module consists of the following steps:

- CPU test
- ROM test
- RAM test
- test of programmable interrupt controller
- interface test
- logic test

All these steps are executed in the same order as listed.

In case of an error, it has to be distinguished between fatal erros and non fatal errors.

Faults of the PMU88 which do not allow further correct program execution are defined as fatal errors. They will cause the CPU to stop program execution and to go into the HALT state.

If a non fatal error is detected, the Inside Test is stopped and error handling will be done.

2.2.2.1.1 CPU Test

In the beginning of the test a kernel has to be checked. Therefore at first the microprocessor is tested by operations like stack handling, test of the microprocessor´s registers, and test of instructions. The test of the stack memory locations is included in the test of stack handling.

2.2.2.1.2 ROM Test

The ROM memory contains microprograms like Inside Test and firmware. To check the contents of the ROM, a hash total is calculated. To verify the hash total it is compared with a check sum stored in the ROM.

2.2.2.1.3 RAM Test

In the first part of this step a test of address lines is performed. This is done to ensure the correct working of each address line.

After this, each memory location is checked by writing it and comparing the contents.

2.2.2.1.4 Test of Programmable Interrupt Controller (PIC)

This test checks if the read/write registers of the programmable interrupt controller can be initiated correctly. Besides, the levels of all pending interrupts which are in a defined state will be checked.

A complete interrupt sequence is performed by enable and activate the system bus interface interrupt NIR7 (interrupt 6), and check of its result.

2.2.2.1.5 Interface Test

The interfaces are provided with a test loop facility. After activation the transmit lines are connected directly to the receive lines. The external drivers are locked. Test pattern written into the transmitters will be compared with the data received.

2.2.2.1.6 Logic Test

This step checks the remaining circuitry of the PMU88 (e.g. DMA, address selection, etc.).

2.2.2.2 Test of PME1

This test module checks the hardware of the PME1 in the following order:

- ROM
- Programmable Interval Timer (PIT)
- Interfaces

If a failure is detected during the test of ROM, this will result in a fatal error and all operations are stopped immediately.

2.2.2.2.1 Test of PME1 ROM

To check the contents of the ROM memory, a hash total is calculated which will be compared with a check sum stored in the ROM.

2.2.2.2.2 Test of PME1 Programmable Interval Timer (PIT)

This test step checks the count registers and the correct counting of each counter.

2.2.2.2.3 Test of PME1 Interface

The external interfaces at the PME1 are all tested by looping them back, locking their external drivers, then sending data through them and comparing them with the data received.

The test also includes testing of the interrupt lines to the PMU88. This is done by reading the interrupt request registers of the PIC at the PMU88 and checking if the level of the interface interrupt lines is the one expected.

The auxiliary V24/V28 interface at the PME1 is not used in the first releases, and therefore, it is tested from Release 2 of TV950* emulation.

2.2.2.3 Test of CRT Controller CRTCO

This module checks the hardware of the CRTCO divided into the following parts:

- refresh memory
- monitor signals
- real time clock

2.2.2.3.1 Test of CRTCO Refresh Memory

This step checks, in a first part, the addressability of each memory location. If no error is detected all locations are written and the contents are compared by reading the data.

Since no data must be destroyed, all data are temporarily stored in a test buffer.

2.2.2.3.2 Test of CRTCO Monitor Signals

The following signals are checked:

- Vertical Synchronization
- Horizontal Synchronization
- Video Signal

This will be done by means of the built-in test and diagnosis feature of the CRTCO, which allows access to these signals via an I/O-port.

The signals are checked on event and duration.

2.2.2.3.3 Test of CRTCO Real Time Clock

The CRTCO provides a real time clock (RTC) which is connected to an interrupt input of the programmable interrupt controller (PIC) of the PMU88.

The frequency of this clock is checked by the Inside Test by reading the interrupt request register of the PIC and evaluating the level of the RTC-interrupt within a given time.

2.2.2.4 Test of Keyboard Interface

Since testing of the complete keyboard requires operator actions, only the interface can be tested by the Inside Test.

It is tested by using the keyboard's diagnostic feature. The Inside Test Program sends the command "TEST ON" which causes the keyboard ~~to immediately~~ to an immedia return, all data received. When the total data string has been checked, the Inside Test sends the command "TEST OFF". With this, the keyboard is set into normal mode again.

If the comparison of data sent and received detects an error, the error code according to table in 2.2.1 is displayed on the screen.

2.3 Inside Test of Storage Module (STOMO) P3500

2.3.1 General Description

The purpose of the Inside Test is to check the basic functions of the STOMO and to verify that the hardware is working correctly. To this end, the program is resident within the system and does not require any user handling. The test is performed without destroying any valid data stored in the working storage or on data carriers.

The STOMO contains several identical processor memory units (PMU) which are used as master or as slave processors, depending on the slot into which they are inserted. According to this structure all PMUs have an own Inside Test Program implemented, which will be executed immediately after power on. However, all test results are collected by the master PMU for administration purposes.

The test programs in the several PMUs are all identical, but their execution differs depending on the function of the PMU within the system (whether it is master or slave). The program is a stand-alone program without any support by the system software. It runs in all PMUs simultaneously.

The slave PMUs as well as the master PMU check their own hardware. The test results of all PMUs are collected by the master PMU. After that the master PMU continues the test and checks the funtions to be used for data transfer at initial program loading (IPL) as well as the functions to be used for data exchange.

The test result of the Inside Test is indicated on the operator panel in front of the STOMO. After the test has been performed normally, only the green power LED remains switched on.

Only in case of an error found by the Inside Test, one or more of the 4 test LEDs will remain switched on, too. In this case the end user should call for the Service Organization.

2.3.2 Detailed Description

As mentioned, the Inside Test programs in the several PMUs are all identical and will run immediately after power-on.

Each test program consists of the following steps:

- test of the microprocesssor and the memory mapping unit
- test of the microprogram ROM
- test of working storage and program memory RAM
- test of serial input/output controller SIO
- test of timer
- test of master-slave-communication

\+ - test of the flexible disk controller and the SASI interface adaptor

\+ - test of the fixed disk controller and drive

\+ - test of the flexible disk drive

All PMUs execute their own test program independently of the other PMUs. After execution of the timer test, the processor of each PMU looks for its use within the system. The test of master-slave communication is initiated by the master, and the slaves will react on request. The master collects the test results of all other PMUs and continues the test by running the test steps marked with a plus sign.

The overall test result is indicated on the operator panel and will be available for a test* and diagnostic program running under TurboDOS*.
It is stored in the test buffer.

As an additional interface to the Service Engineer, LED is implemented on all PCBs to show the correct working of the PCB.

* TurboDOS is a trade mark of SOFTWARE 2000 INC.

After performing the Inside Test, the system starts initial program loading (IPL).

If no flexible disk, containing system software, is inserted in the mini flexible disk drive, the system tries to load the system software from the fixed disk (or the second flexible disk drive) or the disk extension module.

In case of an error detected by the Inside Test, an error code will be displayed (see table of error codes, chapter 2.1). Dependent on where this error occurs, the system may work with restrictions.

If the error occurs in an activated slave, the error code for PMU will be displayed on the operator panel. If it occurs in a not activated slave, the error code for PMU will be displayed, too.

The address of the erroneous PMU is deleted in the master´s address table and system software does not know it.

Additionally to the error code displayed, the test indication LED of the defective PMU will remain illuminated. So the Service Engineer may remove the defective PCB without any additional tests.

2.3.2.1 Test of Microprocessor and Memory Mapping Unit

In the beginning of the PMU test a cernel has to be checked. After this, testing is expanded to the system elements. Therefore at first the microprocessor will be tested by operations like comparing, setting of condition flags and conditional jumps. After that, the test will be continued with a test of the processors´s registers and instructions.

In case of an error the microprocessor will run into a HALT state, and no furhter operations will be possible up to the moment a reset will be given via software or master reset. Otherwise the memory mapping unit MMU is tested in conjunction with the test buffer and memory read/write instructions.

2.3.2.2 Test of RAM Memory

This test is split into two parts.

In the first part, a test of address lines is performed to ensure the correct working of each address line.

After verifying the addressability, each memory location is tested in the second part. Each bit cell is set to logical 1 and logical 0 to show the correct storing of data. This is done by writing and re-reading hexa values of ´55´ and ´**AA**´.

2.3.2.3 Test of ROM Memory

The ROM memory contains microprograms like Inside Test and bootstrap. To check the contents of the ROM, a 16 bit wide hash total is calculated over the whole ROM contents. To verify the hash total it is compared with a check sum stored in the ROM, too.

If no error is detected, the next test step will be performed. Otherwise the processor runs into a HALT state and does not react on normal requests.

2.3.2.4 Test of Timer

The timer consists of 4 channels. Channel 0 and chanel 1 work as baud-rate clock generator. They are tested during the test of SIO. Channel 2 is reserved for special purposes and must not be tested. Channel 3 is used as real-time clock generator.

During the test, this channel 3 is initialized and then checked if the interrupt occurs after the programmed time.

2.3.2.5 Test of Serial Input/Output SIO

The serial interfaces are provided with a test loop facility. After activation, the transmit lines are connected directly to the receive lines. The external devices are disconnected.

Test Characters written into the transmitter of SIO will be sent to the receiver via the test loop. From there they will be read. The test characters and the status of the SIO are checked.

Since the transmission is time-controlled within this step, the baud-rate clock generation is tested, too.

2.3.2.6 Test of Master-Slave Communication

To determine the insertion of a slave PMU in a slot, the master PMU tries to write and read test characters in the memory of each possible slave PMU. If no memory wil be discovered, the corresponding address is deleted in the master´s address table.

The communication between master and slave is supported by a master-slave control port. This control port is programmed by the master. Dependent on the contents of this port, the slaves have to react. The correct reaction is checked by the master.

If the reaction of one of the slave PMUs is not correct or one of the slaves does not react, the error code "PMU" will be displayed on the operator panel. In addition, the test LED of the defective PMU will remain illuminated.

Note:
Only in case all test LEDs on the PCBs (including the LED on the master PMU) are illuminated, the master PMU should be exchanged and the power-on test should be called again by switching on the system.

2.3.2.7 Test of Fixed Disk Device

The test program selects the FXD device via the ~~SASI Adapter or~~ the SASI part of SESCO.

Because the peripheral controller for the fixed disk (FIXCO) contains a microprocessor with own micro program, the test facilities of this controller are used to check the controller itself and the drive.

The Inside Test Program issues the commands:

- Controller diagnostic
- Drive diagnostic

The controller diagnostic test checks the processor, data buffer, error correction circuitry (ECC) and a hash total of the micro program memory.

The drive diagnostic recalibrates the drive, then seeks to each track and verifies each sector 0.

After execution of a diagnostic command the result is given to the master PMU via the SASI interface.

2.3.2.8 Test of Flexible Disk Device

Since the flexible disk controller has no own intelligence, both the controller PCB and the drive have to be tested by the master PMU. This test has to be performed to ensure program loading via the flexible disk device.

On flexible disk there is no track or sector reserved for test purposes. To prevent destroying of data on flexible disk, read accesses will be done only.

With the aid of a port and additional circuits, actions of the controller and drive will be checked against the status given by the controller.

If no disk is inserted the test cannot be performed. In this case the test step will be skipped without test status.

In case of SESCO the flexible disk drive is tested in conjunction with the FLEXCO part of SESCO. After the drive is started, the test program waits for a ready change interrupt. If no flexible disk drive is ready, the test is finished.

When a flexible disk drive is ready, the heads are recalibrated to track 0 and then positioned to track 79. The correct positioning is controlled by reading the identifiers. After this a seek is performed to track 77 and to track 0.

Independent of hardware implementation the test of flexible disk device is time-controlled to prevent hang-up of the system in case of a malfunction of the hardware.

If an error occurs, the test program starts routines to distinguish which hardware unit is faulty (drive or controller) and then sets the corresponding LED code.

3 Test and Diagnosis Program P3500

3.1 General Description

The Test and Diagnosis Program P3500 belongs to the test and diagnostic tools of the P3500 system. It is a program which runs under control of system software.

The main goal is to test the hardware and to give diagnostics on exchangeable-unit level. The program offers tests for the following devices:

- VDU / Keyboard
- Mini Flexible Disk
- Fixed Disk
- Printer (P2932, P2933)

The program is distributed in 3 versions:

1) for the End User: HWTEST 8701 970 7RRLP *

2) for the Field Engineer: FETEST 8701 971 7RRLP *

3) for the System Engineer and the Workshop Engineer: SETEST 8701 972 7RRLP *

* RR = number of release
L = level
P = preversion

The end user version offers quick diagnostics of the hardware, while the Field Engineer version contains all test steps which are required to locate a defective hardware assembly.

The version for the System Engineer and the Workshop Engineer contains all test steps of the Field Engineer's version, but is extended with special test steps like read and write loops for flexible and fixed disks. Additionally, some tests may be performed in a loop.

Any input asked for by the program has to carried out via the keyboard. All messages, information, and menus are displayed on the screen.

The Test and Diagnosis Program P3500 is mainly used in case of a hardware error. It shall detect the erroneous exchangeable unit. By means of this program the end user will be enabled to give indications of errors to the Service Organization. The Field Engineer may localize a defective field-exchangeable unit. The version for the end user is distributed as a utility within the system software, and the other versions of the program reside on a separate mini flexible disk. All versions have to be loaded after IPL.

The test program evaluates internal data of the drivers. Therefore special interfaces to the drivers are used for test and diagnostic purposes. To run the program, preconditions have to be fulfilled before loading. In the following, the preconditions for starting a device test are listed in detail:

1. VDU/Keybord
   This test must be started from the terminal to be tested. It does not matter whether the test runs in the master or slave PMU.

2. Printer P2932 and P2933
   If a printer to be tested is connected to the master, the program has to be loaded into the master PMU. If the printer is connected to a slave (local printer), the test program must be loaded into the appropriate slave PMU.

   On the operator panel of the printer strap 2 of the interface parameters must be switched on.

3. Flexible Disk and Fixed Disk
   The test steps for flexible disk and fixed disk have to run in the master PMU.

Since the test program needs about 32kB available memory, before loading the test program into the master PMU, the buffers of the operating system have to be reduced to the minimum number 2, to get enough available memory size. This is done by entering the commands "**MASTER**" and "**BUFFERS N2**".

If the program is loaded the operator is guided by menu technique. Messages are issued in vernacular language.

3.2 Detailed Description

3.2.1 Test of VDU / Keyboard

Since the devices VDU and keyboard belong together closely, they are tested in one test module.
It must be started from the terminal to be tested.
It does not matter whether the test runs in the master or in the slave PMU.

This test module is split up into the following steps:

1. Diagnosis
2. Inside Test of Display Unit
3. Character Generator Test
4. Character Control Test
5. Screen Adjustment Step
6. Graphics Test

After loading the test program and selecting the VDU / Keyboard Test, the several test steps may be selected via a submenu by entering the select number.

Dependent on which version is used, the execution of the program is different. The end user may run the diagnosis only. Service Enginers may run diagnosis or/and test and adjustment steps.

If an error occurs, the program displays a message. It returns with a short menu, and the operator may select EXIT or DIAGNOSIS.

The program version for the System Engineer and the Workshop Engineer shows the whole menu, and all steps may be selected, independently of errors.

3.2.1.1 Diagnosis

With the selection of this step, the Inside Test, the Character Generator Test, and the Character Control Test will be performed automatically.

The version for the end user selects this step automatically after selecting the VDU/Keyboard test.

Diagnosis starts with the Inside Test of the display and the following steps are called if no error has been found. Otherwise diagnosis stops and the eror message of the Inside Test is displayed. Since there exists a severe hardware error, the program does not continue testing the hardware.

3.2.1.2 Inside Test

This step calls the Inside Test of the display module. If no error is detected during the test, all three versions continue testing with Character Generator Test. Otherwise the program stops and an error message will be displayed. In the version for end users only selection of "EXIT" or "DIAGNOSIS" will be possible.

The result of the Inside Test is stored as terminal status, which will be checked by the Test and Diagnosis Program P3500. For each bit set in the terminal status an error message is issued (see Table in chapter 2.1 and chapter 2.2.1).

3.2.1.3 Character Generator Test

On the screen all capital and lower case letters from A to Z inclusive and the digits 0 to 9 inclusive are displayed. From one row to the other a shift of one character to the left is made. The test is continued up to the moment the operator presses the key "STOP" or ^U.

The operator has to check the following image:

```
AB......YZ 01....89 ab......yz 01....89 ABC
BC.....YZ 01....89 ab......yz 01....89 ABCD
CD....YZ 01....89 ab......yz 01....89 AB..E
DE...YZ 01....89 ab......yz 01....89 AB...F
```

and so on.

If the test pattern is not displayed correctly, the CRTCO PCB should be replaced. To find the defective functionel unit on the PCB, the following advices are useful:

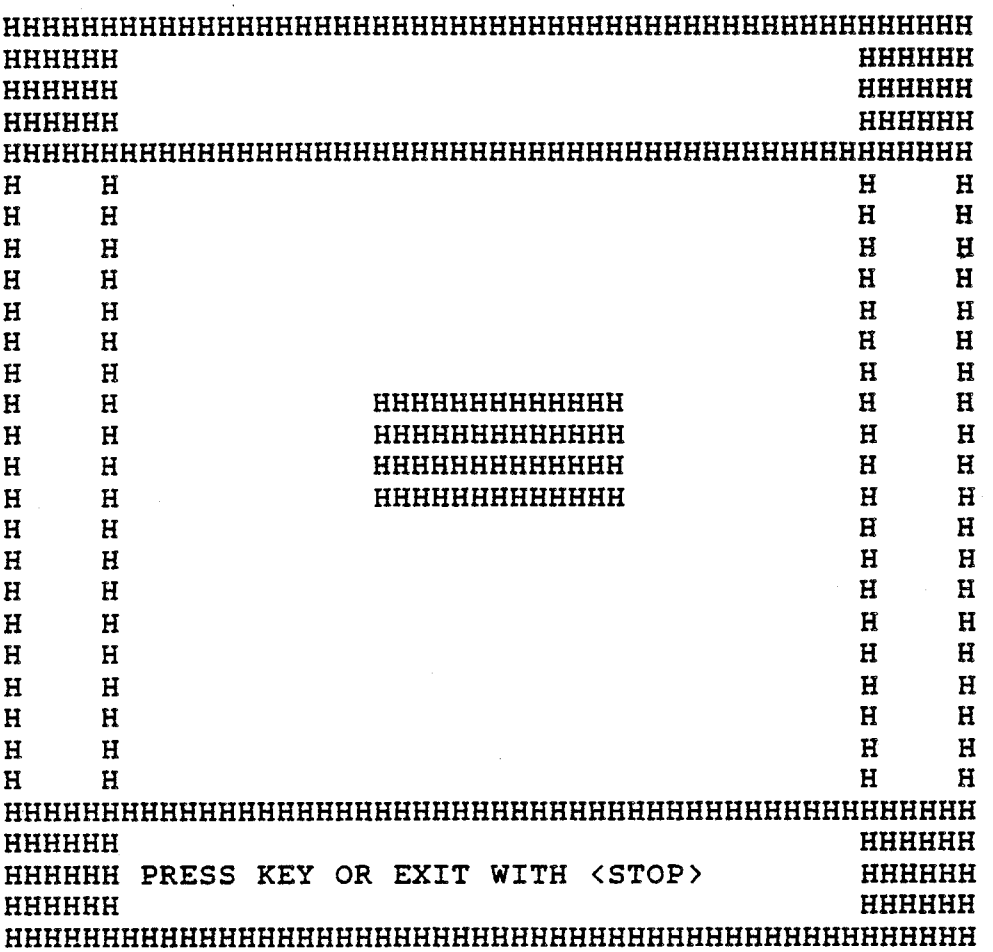
- If the same character in each row is not correct, the Character Generator has to be replaced.

- If a correct character is displayed in a wrong place, the address latch is defective.

- If independently of the character, erroneous information is found, the refresh memory or the refresh circuit is defective.

3.2.1.4 Screen Alignment Check

After selection of this step, which will not be available in the End User´s version, the screen shows a frame like the following picture.



This frame is useful to check horizontal and vertic- linearity and to adjust it, if necessary.

When the operator presses the <STOP> key or ^U, the step is left and the program jumps back to the menu. Otherwise all positions of the screen are filled by the character the key of which is pressed.

3.2.1.5 Graphics Test 1

A test pattern which consists of graphic characters is displayed. The operator is asked to check the pattern visually.

3.2.1.6 Graphics Test 2

In this step a football ground is shown, composed of some graphic characters. The operator is asked to check the pattern visually.

3.2.1.7 Character Control Test

This test shows some lines of test pattern with attributes like inverse video, intensified, blinking and underline.

Each attribute is displayed on the screen and should be checked visually by the operator. A wrong layout indicates failure in emphasis control, character generator and video mixer.

3.2.1.8 Character Attribute Test

This is an additional test step to the Character Control Test. It shows the whole character string with four attributes and their possible combinations.

This test is to check the acceptance of attributes and their combinations in each position on the screen. If there are errors, the RAM memory or the attribute memory should be exercised.

Note: Character Control Test and Character Attribute Test are not contained in the program issued for release 1.1 of P2711.

3.2.2 Test of General Printer (P2932, P2933)

Several types of printers may be connected to the P3500 system. This test module supports the test of the quality matrix printers (general printers) only. Printers of other types cannot be tested by this test program.

In most configurations of the P3500 system only one printer will be installed as a central, shared printer, which is connected to the master PMU. Some configurations may have additional local printers, connected to a slave PMU.

To run the test program, some preparations have to be made before loading.

As the test steps evaluate the status of the printer, strap 2 on the operator panel (automatic status reporting) of the interface parameters must be switched on. The spool function of the system software will be disabled automatically.

Before running the test of a central, shared printer, the operator must be sure that no other user wants to have printouts.

Since the test program needs, as mentioned in chapter 3.1, about 32kB memory, the operator should give the command "**buffers n2**" to the system. If the program has to run in the master PMU, before the command "**master**" must be given. To enable the command "master" the operator must be a privileged user. If both commands are executed by the system software, the Test and Diagnosis Program P3500 may be loaded and the test of the printer selected.

The test of a local printer can be started only from the console the printer is connected to. The console may not be attached to the master PMU.

The test module is split into three parts:

1. Diagnostics
2. Adjustment support
3. Functional test.

If the console is attached to the master and two printers are connected to the master, or if a local printer is connected to the slave and the central printers are set to offline, and the program is running in that slave, the message

PRINTER ASSIGNMENT (A..P):

is displayed. The operator has to select the printer by entering the assignment.

After selecting the test module for the general printer, the message

ERROR IN POWER SUPPLY OR PRINTER NOT CONNECTED

is displayed on the screen and removed, if the printer is connected, switched on, and the correct PMU is selected.

If all conditions are fullfilled, the following sub-menu will be displayed:

```
DEVICE:  PRINTER
PAPER FEED DEVICES

  0  EXIT              3  FRONT FEED
  1  FRICTION FEED     4  TRACTOR FEED 340MM
  2  ASSH              5  TRACTOR FEED 400MM
```

With the numbers 1 to 5, the paper devices of the installed printer will be selected.

Attention:
Do not select a not installed paper device!

If more than one paper device shall be tested, the operator has to leave test program step with "exit". Then he may select the new paper device.

After selecting the paper device, the program starts diagnostics by calling the power-on self-test of the printer.

3.2.2.1 Power On Self-Test

After entering the printer test module via the main menu and selecting one of the paper devices, in case front feed or friction feed will be selected, the following message will be displayed:

"INSERT A FORM AND PRESS START KEY"

If the form is inserted, the program issues the command "TEST MODE ON" and the printer starts printing the following test pattern:

```
AB....YZ   ab....yz   01....89:;<=>?   !"£$%&´()
BC...YZ   ab....yz   01....89:;<=>?   !"£$%&´()*
CD..YZ   ab....yz   01....89:;<=>?   !"£$%&´()*+
DE.YZ   ab....yz   01....89:;<=>?   !"£$%&´()*+,
```

and so on.

The printing may be shortened by manual handling via the printer´s operator panel. If the keys START/STOP, BREAK/ATT and START/STOP are pressed, the printer stops printing and gives his status to the system.

After receiving the printer status, the test program finishes its wait loop and gives the command "TEST MODE OFF". The status will be evaluated and a message displayed on the screen.

After this the paper devices to be examined are tested. To change the paper device, the operator has to leave the test module and to re-select it. Otherwise the message "DEVICE NOT INSTALLED" will be displayed.

3.2.2.2 ASSH Test (Test of Automatic Single Sheet Handler)

Both hoppers of the ASSH may be selected by the test step. Dependent on the selection, the form will be inserted from hopper 1, hopper 2 or both.

Before a form is inserted, the old one is ejected. The positioning mechanism of the friction feed is tested by printig a text on lines 8 and 64. The text must not slide, neither in vertical nor in horizontal position.

3.2.2.3 Test of Front Feed

The test of FF is a test of the vertical positioning. A form is inserted to the position that is destinated by the printer´s hardware. During this test horizontal bars are printed.

After printing these bars, the form is positioned backwards to the first printable line. Printing of the horizontal bars is repeated. Then the form is positioned to the first printed line and the bars are printed again.

A similar procedure is applied in the middle of the form.

The Front Feed Device positions correctly, if the double printed bars are superjacent.

The test ends with the ejection of the form. The Service Engineer is asked to check the printout and to perform adjustments in case the positioning mechanism does not work correctly.

3.2.2.4 Typewriter Test

Any character entered via the alphanumeric keyboard will immediately be displayed on the screen and printed on the selected paper device.

Admissible control keys are carriage return, line feed, backspace and shift.

This step shows the possibility of typing all characters and the national variants. Printing is done only with the default font, pitch and line.

The operator is asked to visually check the right interpretation of character codes.

This step is left by pressing key <STOP> or ^U.

3.2.2.5 Printer Adjustment Step

Two adjustment facilities are offered to the Field Engineer or the Workshop Engineer, namely the needle correction and the printhead inclination.

Needle correction has to be done by switches on the operator panel of the printer, while correction of the printhead inclination has to be done by means of screws on the printhead carriage (only P2933).

Dependent on the selection of loop no/yes, ten or a multiple of ten lines of vertical bars are printed, thus forcing an image like:

At the end of each line the print direction changes. That means, every second line is printed in the same direction.

The printhead is adjusted correctly if the bars are vertical. If the needle correction is not adjusted correctly, there exists a horizontal shift from line to line.

Note: It is recommended to adjust first the printhead inclination and then the needle correction, because the vertical bars facilitate the visual examination of the needle correction.

SYSSE

Generate Test Disk

3.2.3 Test of Mini Flexible Disk

Since diskettes to be used on P3500 systems have no tracks or sectors reserved for special service purposes, the mini flexible disk controller and drives are tested with a specially prepared test diskette.

As data or information on those diskettes may be destroyed by malfunctions of the controller or the drive, test diskettes can be generated by the utility "Generate Test Disk". Generation of test diskettes should be performed on a reference drive to guaranty data exchange.

To get quick information about the flexible disk device, a diagnostic step automatically performs seek, read and write tests. If an error occurs, the status will be evaluated and a message displayed.

After selecting the test of mini flexible disk, the menu offers the following steps:

1. Diagnosis
2. Generate Test Disk
3. Copy and Repair Data (not Rel. 1.1)
4. Test and Repair Medium (not Rel. 1.1)
5. Extended Test

Since the controller is connected to the master PMU, the test module has to be loaded into the master. If it is loaded into the slave PMU, the message

CONSOLE NOT ATTACHED TO MASTER PROCESSOR

will be displayed.

3.2.3.1 Diagnosis

The diagnosis of the mini flexible disk controller FLEXCO or the FLEXO PART of SESCO and drive is performed in 4 steps:

1. Pre-Test
2. Seek Test
3. Read Test
4. Write Test

If an error occurs within this steps, the internally gathered errors are evaluated to recognize the exchangeable unit and, if possible, the functional unit.

3.2.3.1.1 Pre-Test

This step checks if the drive is ready and a test diskette is mounted. The expected volume label is "MFD-DIAG". If another diskette is inserted, the program returns with "WRONG MEDIUM" and "MOUNT TEST DISK AND PRESS <RETURN>". To leave the step, if no test diskette is available, the operator has to open the drive door and to press the return key.

3.2.3.1.2 SEEK TEST X SYSSE 10M/5M

If the right diskette was inserted, this step performs the seek test. It is divided into a sequential and a random seek test.

First a sequential seek for all cylinders is executed. The seek is performed from cylinder 80 to cylinder 1. After every positioning the heads are recalibrated to cylinder 0. So the heads are moved from cylinder 0 to cylinder 80, cylinder 0, cylinder 79, cylinder 0, etc.

To test if the expected cylinders have been found, the identifiers of the sectors will be checked. If the right cylinder is found, the next seek command will be issued.

If all cylinders are found without an error, a random seek will be performed.

3.2.3.1.3 Read Test

SYSPF 5M/10M

The test diskette generated by the Test and Diagnosis Program P3500 contains worst-case patterns to check the read channel inclusive the phase locked loop circuit (PLL).

During the read test the heads are positioned to the cylinders 3, 4, 39, 40, 45, 46, 71 and 72. On these cylinders the worst-case pattern hexa ´DB6´ are expected on each sector.

If these patterns are not found, the test stops and an error message will be displayed.

3.2.3.1.4 Write Test

To check the correct functioning of the write channel, the test diskette must contain other data than the data to be recorded during the test.

To prevent wrong diagnostics, cylinders 1, 2, 41, 42, 43, 44, 74 and 75 contain worst-case patterns hexa ´DB6´ on each sector, recorded during the generation step.

During the write test the first half of every sector of the mentioned cylinders is overwritten by the random pattern ´00´X and ´FF´X, being written 16 bytes. So every sector has the following layout:

byte addr.	hex-value															
´000´ H	00	00	00	.....	00	00	00	00
´010´ H	FF	FF	FF	.....	FF	FF	FF	FF
´020´ H	00	00	00	.....	00	00	00	00
´060´ H	00	00	00	.....	00	00	00	00
´070´ H	FF	FF	FF	.....	FF	FF	FF	FF
´080´ H	DB	6D	B6	.....	DB	6D
´090´ H	B6	DB	6D	.....	B6	DB
´0A0´ H	6D	B6	DB	.....	6D	B6
´0F0´ H	B6	DB	6D	.....	B6	DB

These data are expected after writing. If all sectors are compared, the cylinders are overwritten by the value ´DB6´H.

3.2.3.2 Generate Test Disk

With this step, the test medium will be generated. The operator is asked to install a diskette. After a pre-test the volume label - if one is found - will be displayed and the operator is asked to confirm.

After writing the volume label "MFD-DIAG" all sectors of cylinders 1, 2, 3, 4, 39, 40, 41, 42, 43, 44, 45, 46, 71, 72, 74, and 75 are written with the worst case pattern 'DB6'H.

Note:
To guaranty the data exchangeability, the test diskette should be generated on a reference drive.

3.2.3.3 Copy and Repair Data (not implem. Rel. 1.1 and Rel. 2)

This step enables the operator to repair a defective data part of a sector. The repair procedure can be combined with copying the data set to another volume.

The execution of this function depends on the hardware configuration. The program checks the disk configuration automatically.

In case of 2 flexible disks, at first a message is displayed, which specifies the source and the destination drive. After mounting the disk both volume labels are displayed and the operater is asked for acceptance. Then the source volume is copied physically to the destination volume. If an irrecoverable read error occurs, the relevant sector is displayed on the screen. The operator may correct the data and give a command to write it on the destination volume. After that copying is continued until the next irrecoverable error occurs or copying is finished.

If 1 flexible disk and 1 hard disk are configurated, the copy of the flexible disk has to be stored on hard disk temporarily. After confirmation of the mounted flexible disk volume the program checkes the free space on hard disk, regardless of used or unused sectors. If not enough spaces are available, the operator is informed about the space needed additionally.

The flexible disk volume is copied completely as one file to the hard disk. The execution of the program is the same as in case of two flexible disks. After copying the whole flexible disk to the hard disk the operator is asked to mount the destination volume. When the copy is done, the temporarily file on hard disk will be deleted.

3.2.3.4 Test and Repair Medium (not Rel. 1.1)

This step tests a flexible disk volume. If a defective data part is found, the relevant sector is displayed. After correction the operator can write it again on the volume. If this seems to be impossible, the step issues an error messages and stops. In this case copy and repair should be selected.

3.2.3.5 Extended Test

This submodule offers expanded test facilities to the System Engineer or the Workshop Engineeer. The following tests may be selected:

1. Random Write
2. Random Read
3. Sequential Write
4. Sequential Read
5. Write one Sector
6. Read one Sector

All steps are offered with loop facilities, thus continuous tests may be executed. If a test step of the Extended Test detects an error, a detailed error protocol is displayed, giving the following information:

- loop counter
- error message
- command
- volume label
- drive indication
- cylinder and sector number

This test can be performed with any formated flexible disk volume. Therefore the operator should not use the special prepared test diskette "MFD-DIAG".

3.2.3.5.1 Random Write

The whole flexible disk volume is written. The sector address is evaluated by a pseudo random generator. Each sector is written only once.

If the loop feature is switched on, writing is repeated until the step is interrupted by <STOP> or ^U.

The operator selects wether the worst case pattern ('DB6'H) or the random pattern shall be written.

3.2.3.5.2 Random Read

Synonymously to the Random Write step, each sector is read. If the operator selects data comparison, the read data are compared with the selected pattern. If the read data differs from the expected data, the sector is displayed in 16-byte size, showing expected and obtained data.

3.2.3.5.3 Sequential Write

The whole volume is sequentially written sector by sector. If the loop feature is chosen, the sequence is repeated. The operator may select the worst case or the random pattern.

3.2.3.5.4 Sequential Read

Synonymously to Sequential Write, all sectors are read. If wanted, the read data are compared with the worst case pattern or the random pattern. If the read data differs from the expected data, the sector is displayed in 16-byte size, showing the expected and the obtained data.

3.2.3.5.5 Write one Sector

This test step writes one sector. The sector can be selected by entering the cylinder number and sector number. The operator may select writing of the worst case or the random pattern and a loop facility.

3.2.3.5.6 Read one Sector

Synonymously to Write one Sector the sector to be read will be selected by entering the cylinder and sector number. If data comparison is selected, the read data will be compared with the worst case or the random pattern. As in the write test a loop facility may be selected.

3.2.4 Test of Fixed Disk Device

With this module the fixed disk device can be checked. The program tests the following field exchangeable units:

- SASI Adaptor or SASI Part of SESCO
- Fixed Disk Controller
- Fixed Disk Drive

For diagnosis purposes on the disk one cylinder is reserved and protected against access by system software.

The test module contains the following submodules and steps:

- Diagnosis
- Seek Test
- Read/Write Test
- Read Medium
- Write Medium
- Dump and Change
- Service Commands

3.2.4.1 Diagnosis

This submodule offers quick diagnostics of the interface of PMU80 to the disk controller and the disk drive complete. After selection the following steps are performed:

- Controller and Drive Test
- Seek Random
- Seek Sequential
- Read/Write Test

3.2.4.1.1 Controller and Drive Test

This step first checks the correct function of the PMU interface part, SASI adaptor and the interface part of the disk controller. After that the disk controller is checked by issueing the controller self-test commands and asking for the status.
If no error is found, the drive is tested by performing a seek to all cylinders.

3.2.4.1.2 Seek Random

The address of to be positioned cylinder is evaluated by a pseudo random pattern generator.
To check the right position of the heads the sector addresses are read and compared with the expected addresses.

3.2.4.1.3 Seek Sequential

Starting with cylinder 0 the heads are positioned to all cylinders in sequential order. (Cylinder 0, cylinder 1, cylinder 0, cylinder 2, cylinder 0, cylinder 3, etc.) If the heads are positioned to the highest cylinder, seek will be performed to cylinders 1,2,3, etc, starting from the highest possible cylinder. As in the random seek test the sector adresses will be compared.

3.2.4.1.4 Read/Write Test

This step works only at the service cylinder and checks DMA, data flow, contoller and memory.

The test is performed in the following way:
After read one sector the read data is inverted and written to the same sector. The the sector is read again and compared with the expected data.

After this 9 continues sectors are searched to be free of error. On this sectors a multiple write is performed. Starting with the first sector the number of sectors is increased and written with worst pattern. So in the first step 1 sector will be written, in the second step 2 sectors, etc. up to 9 sectors. After this in the same way a multiple read will be performed.

3.2.4.2 Seek Test

This step, performed automatically by the step Diagnosis, is split into two parts. First a random seek and then a sequential seek is performed as discribed in 3.2.4.1.2 and 3.2.4.1.3.

If the user has selected the offered loop facility, the test is repeated until an error occurs or the user presses the key <STOP>.

3.2.4.3 Read/Write Test

This test is performed as descibed in 3.2.4.1.4. Additionally the loop facility may be selected by the user.

3.2.4.4 Read Medium

All tracks are read sequentially. The read data may be compared with worst case or random pattern. Worst case pattern are ´DB6DB....´Hex, random pattern are calculated by the following algorithm:

byte p = byte (p-2) + byte (p-1) + 3

where: p > 1.

Initial pattern are: byte 0 ´DB´H and byte 1 ´6D´H, written by Write Medium.

This step is offered with loop facility.

3.2.4.5 Dump and Change Sector

This step enables the operator to read, update and rewrite any selected sector. To update a sector, the operater may enter characters or hexadecimal code.

3.2.4.6 Service Commands

After selecting this test module, a new menu is displayed. The operator may start one of the Disk Controller Commands:

- Controller Diagnostic
- RAM Diagnostic
- Test Drive Ready
- Drive Diagnostic
- Recalibrate
- Seek selectable Cylinders

Since the commands 1 to 4 issued to the disk controller are executed using the test facility, the recalibrate is a normal command used by ASW.

If the step Seek selectable Cylinders is called, the heads are positioned alternately to the selected cylinders. If no addresses are given by the operator, positioning is done to the default addresses of cylinder 0 and cylinder 305. This step runs automatically in a loop until it is cancelled by <STOP>.

3.2.4.7 Write Medium

All tracks of the disk are written sequentially. The operator may select if random or worst case pattern shall be written.

Random pattern and worst case pattern are calculated as described in 3.2.4.4.

Besides it is possible to write any individual pattern, to be entered by the operator in hexadecimal or character code.

Because this test step destroys all data stored on fixed disk, it should be performed only after backup or after repair in the workshop.

241 = mehre Teile

Menge	Einheit	Benennung	Norm	Codenummer	UN-D 578	Pos	IND
1	13	GEHAEUSE 15IN DIMO MONT		5112 291 86341		1	
1	13	MASKE MONT		5112 291 76165		2	
1	13	ABSCHIRMBLECH		5112 212 08571		3	
1	13	PRINT MFI-DIMO		5112 291 77582		4	
1	13	ISOLIERPLATTE		5112 212 11802		5	
1	13	HALTEBUEGEL KPL		5112 291 80031		6	
1	13	PCB-HALTER KPL		5112 291 86681		8	
1	13	STECKERHALTER M. U. V.		5112 291 87871		9	
1	13	PUC-SPRING 15IN		5122 110 97622		10	
1	13	SCHUTZABDECKUNG		5112 212 08561		11	
1	13	RUECKWAND KPL		5112 291 74322		12	
1	13	LEISTUNGSSCHILD		5112 212 07671		14	
1	13	TYPENSCHILD		5112 212 06231		15	
1	13	EXT. ANSCHLUSZSCHILD		5112 212 08731		16	
1	13	KLEBESCHILD 2 GP		5112 211 57321		17	
1	13	SCHIEBEBILD 3S10 RT	DIN 40011 SOW-32-861-32	2812 100 23001		18	*
2	13	BEZEICHNUNGSSCHILD		2822 100 23218		19	
1	13	CCA-AUFKLEBER		5112 211 46521		20	
1	13	VERPACKUNG KPL		5112 291 92271		21	
1	13	AUFKLEBER		5112 211 80902		22	
1	13	LTG-BD POWER TERCO		5112 280 05841		23	
1	13	LTG-BD CRT		5112 280 05861		24	
1	13	LTG-BD 12V		5112 280 05781		25	
1	13	SPRING		5122 110 91984		26	
1	13	NETZSCHNUR 2500		2412 073 45023		27	
1	13	LTG-KA POWER		5112 280 06031		28	
6	13	FUEHRUNGSTEIL 1		5112 211 40171		29	

CLASS			IND	KM	Datum
	WS-DIMO P2711-10X	5112 291 86351		3360	831006
				4236	840315
			11	4284	840322

NAME 3140 Einheit = 2 Blatt 1 von 1

Menge	Einheit	Benennung	Norm	Codenummer	UN-D 578	Pos	IND
6	13	KABELHALTER		2422 015 05175		30	*
4	13	LI-SCHR M5X16-4.8 ZN	DIN 7985 SOW-31-115-30	2522 178 20108		31	
4	13	SCHEIBE B5,3-ST ZN	DIN 9021 SOW-31-611-02	2522 600 93032		32	
5	13	LI-SCHR M4X8-4.8 ZN	DIN 7985 SOW-31-115-30	2522 178 20081		35	
4	13	6KT-MUTTER M4-6 ZN	DIN 934	2522 401 25011		36	
3	13	ZAHNSCHEIBE J4,3-ST	DIN 6797 SOW-31-731-20	2522 615 02007		37	*
2	13	SCHR CM3X8-ST ZN	DIN 7500 SOW-31-145-30	2512 252 01007		38	*
3	13	LI-BLSCHR BZ3,9X6,5-ST ZN	DIN 7981 SOE-31-155-30	2522 163 85095		39	*
3	13	SCHEIBE A4,3-ST ZN	DIN 125 SOW-31-611-02	2522 600 93026		40	
2	13	LI-SCHR M3X4-4.8 ZN	DIN 7985 SOW-31-115-30	2522 178 20056		41	
1	13	FLACHSTECKER	SOW-37-821-17	2422 034 10268		42	
6	13	RIEGEL		5112 211 40224		43	
1	13	STIFTDOSE 3POL		2412 030 00117		44	
1	13	INL. PROTEX. PLATE		5122 110 85881		45	
1	13	G-SCHMELZEINS 250V T1B	DIN 41571 SOW-47-114-10	2412 086 13191		46	
1	13	LTG-LI OV-LOG		5112 280 06051		47	

CLASS			IND	KM	Datum
	WS-DIMO P2711-10X	5112 291 86351		3360	831006
				4236	840315
			11	4284	840322

NAME 3140

PHILIPS

nicht dargestellt: Pos. 6, ,12,14, ,1x19,21,22, 27,

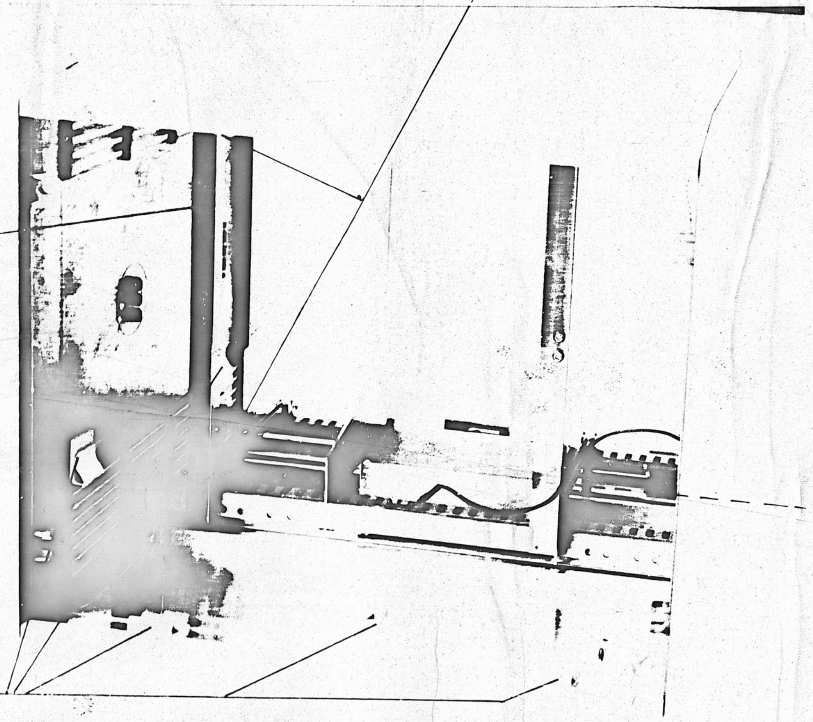
auf Pos.11 geklebt: 16,17,19

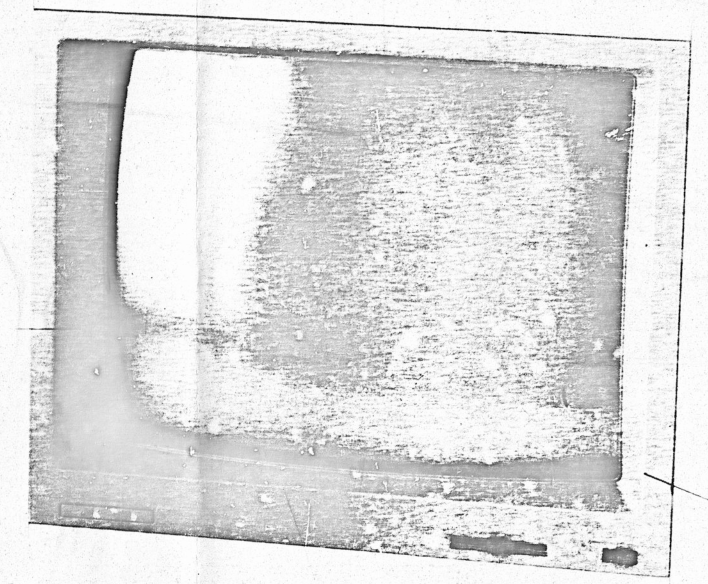
Pos. 26 - Gnd Feder für PSU-Kühlblech

Filterbefestigung: 2×35, 2×37

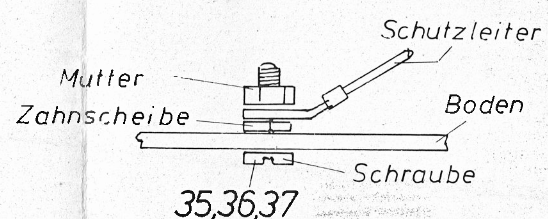
Pos. 42 u 1x36 an Rückwand

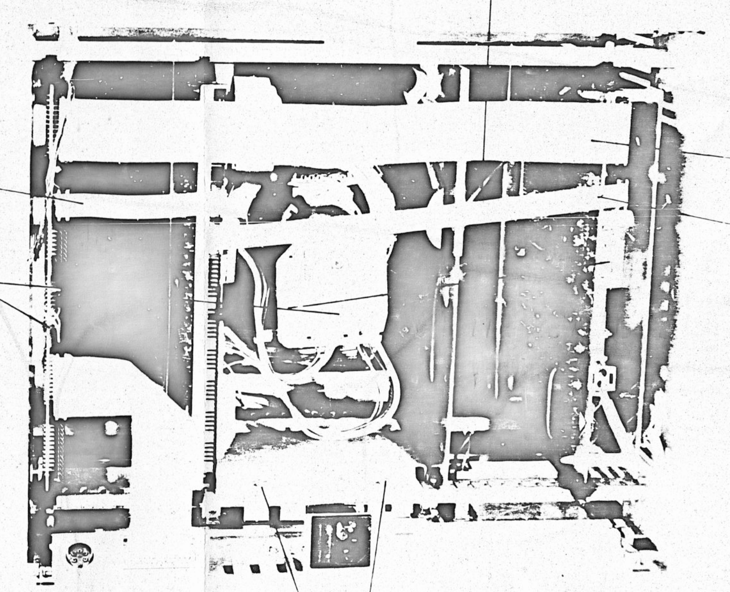
* Bestückung laut Modellstücklisten.

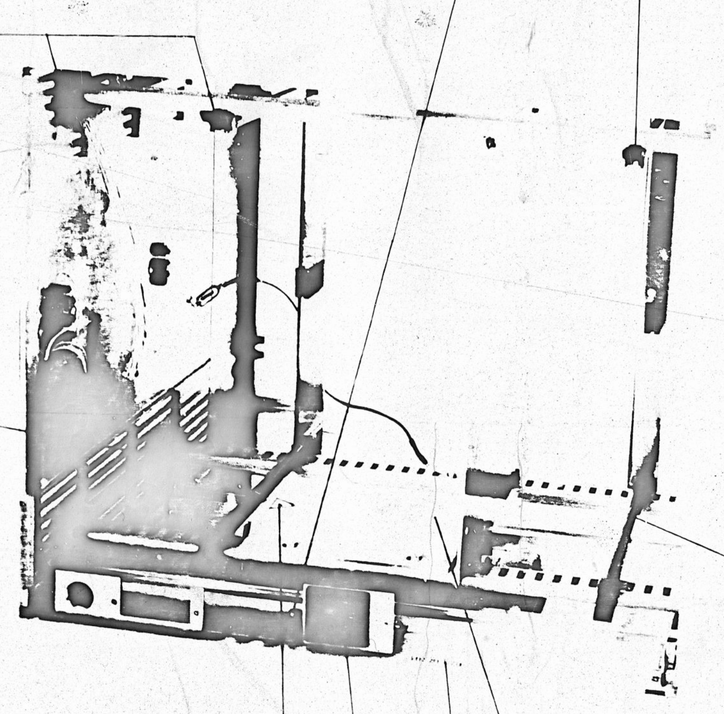


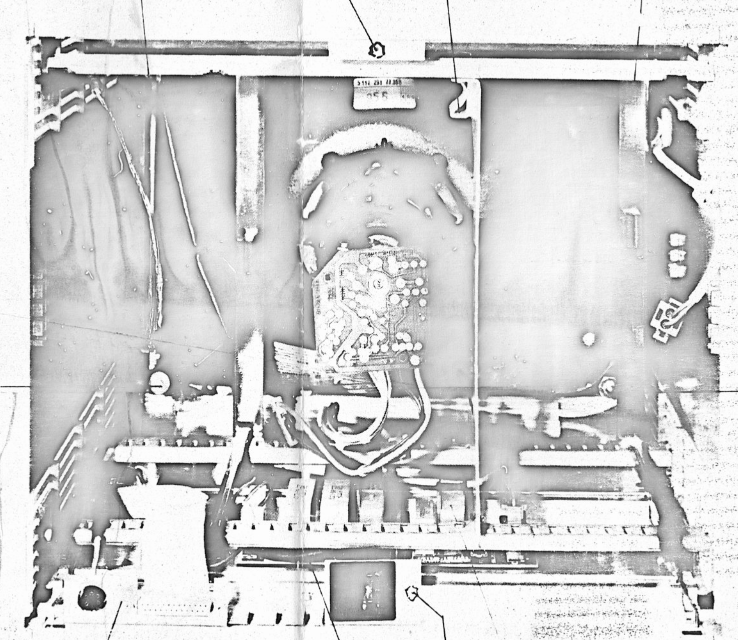


Befestigung des Schutzleiters







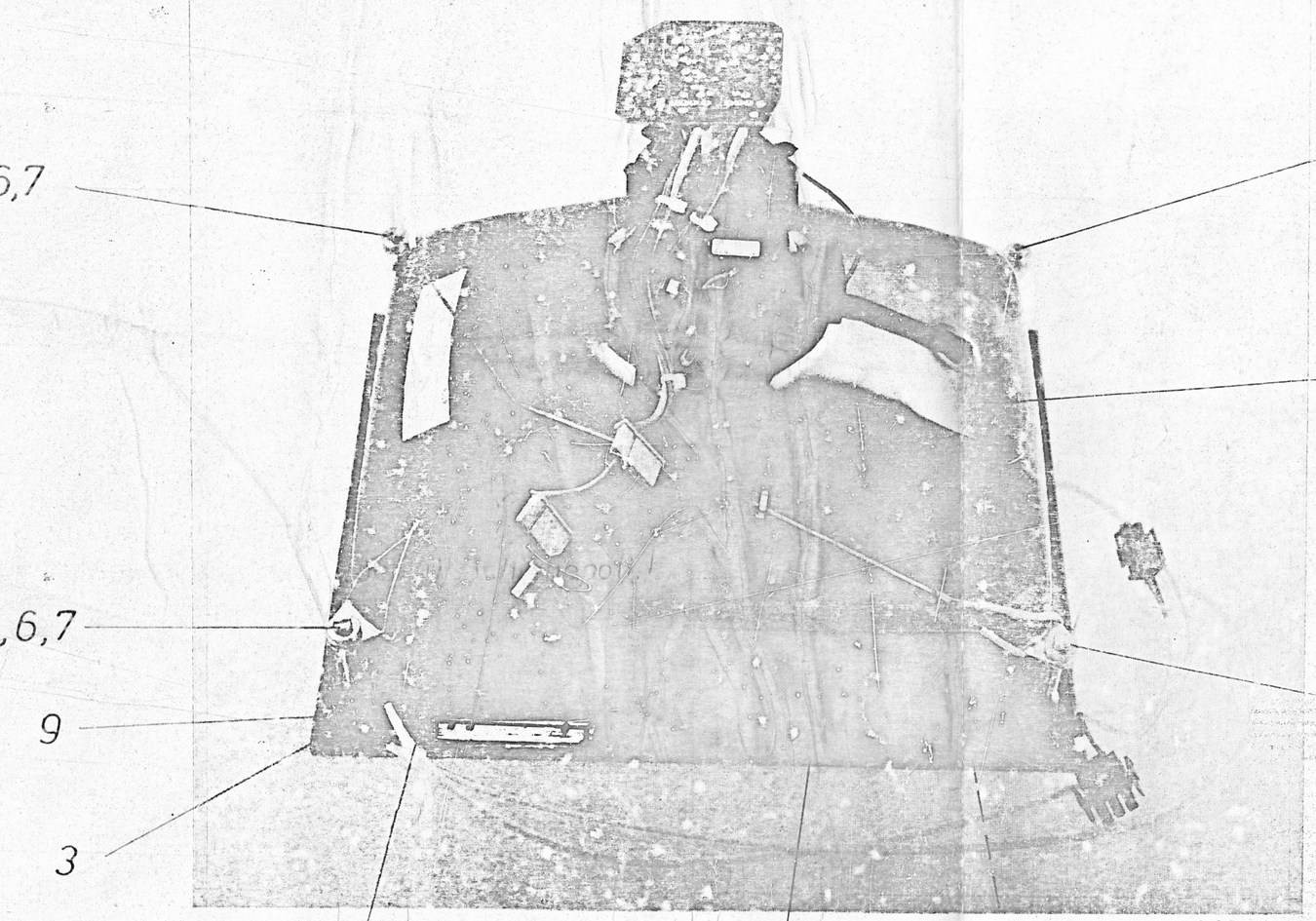


Ind.	KM	Änderung	Dat.	Name
4	4972	Pos. 48,49 hinzu	840705	[illegible]
3	4284	Zeichnung neu erst.	840315	[illegible]

CLASS

WS-DIMO P2711-10X 5112 291 86351

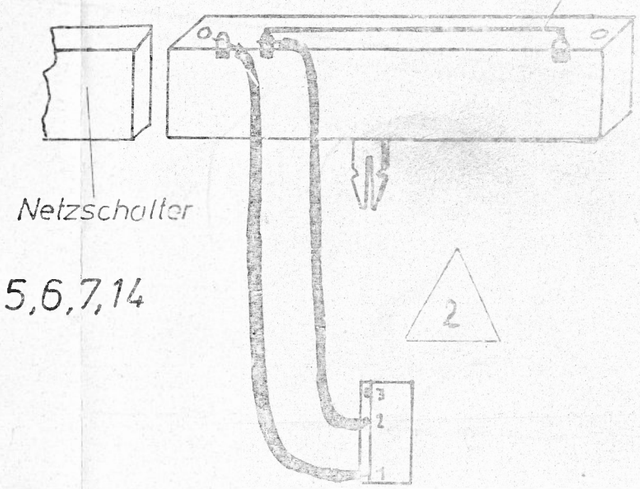
840314



Pos.10 nicht dargestellt.
(Befestigungsschrauben für Schiebepoti.)

15

Montage des Helligkeitsreglers

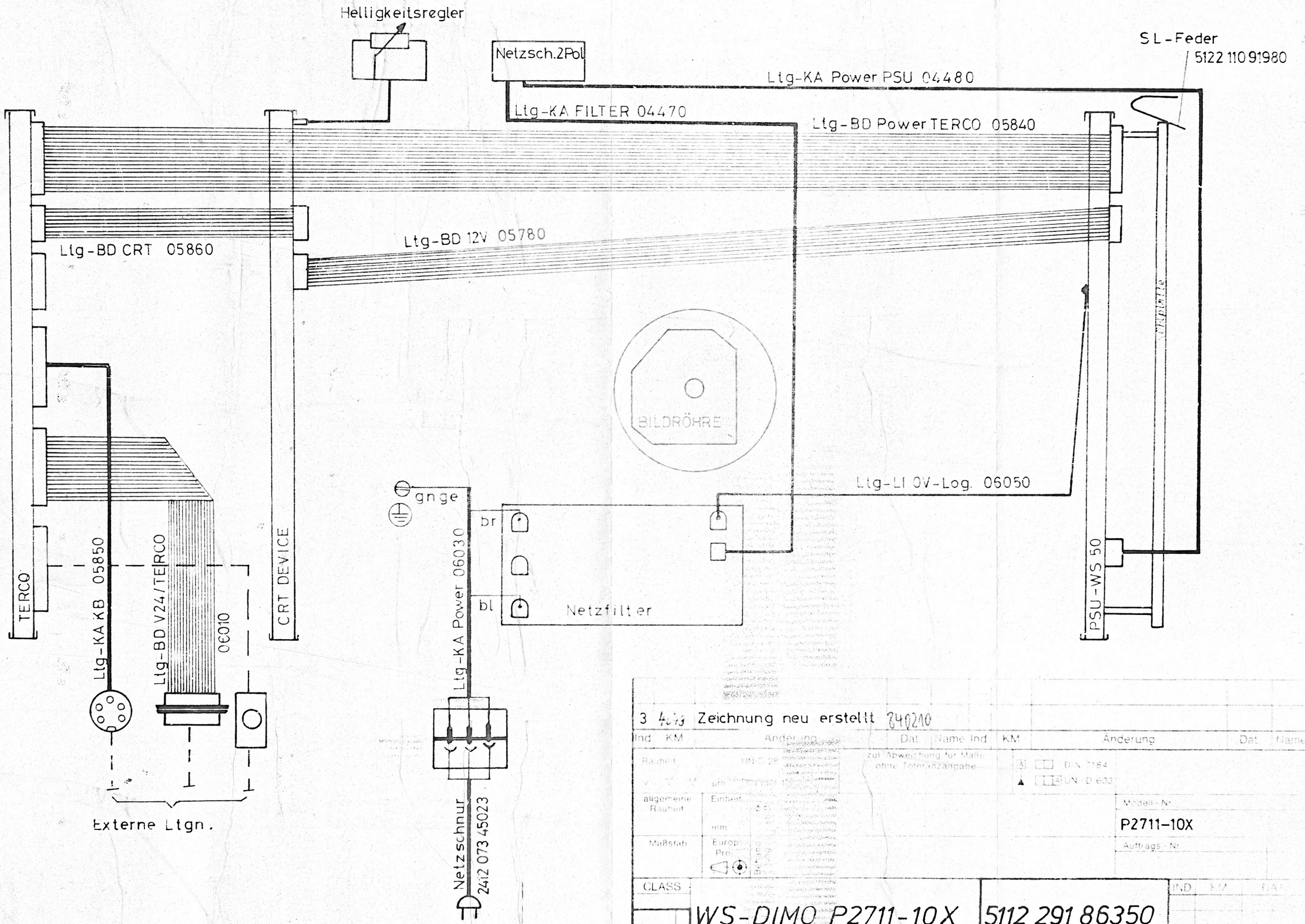


Die Transporthalterung des Monitors Teile-Nr. 5112 291 59822, ist der Herstellerfirma wieder zuzuführen.

Ind.	KM	Änderung	Dat.	Name
1	1530	Helligkeitsregler gedreht Pos. 14 hin zu	820921	
	1501	Freigabe	820907	

Ind.	KM	Änderung	Dat.	Name
2	1582	Einarbeitung der HM-SW FK/82/3140 vom 30.9.82	821007	

Rauheit ... DIN ISO 1302
zul. Abweichung für Maße ohne Toleranzangabe ... DIN 7184 ... DIN 7600
allgemeine Toleranz ... Einheit mm ... Werkstoff
Maßstab ... Europ. Proj.
Modell-Nr. P 3000
Auftrags-Nr.
CLASS
MASKE MONT.
5112 291 76161
IND. KM DAT.
NAME 820907 PHILIPS
SO
PROPERTY OF PHILIPS GMBH DATA SYSTEMS 5900 SIEGEN 31



3 4ers Zeichnung neu erstellt 840210

Ind.	KM	Änderung	Dat.	Name	Ind.	KM	Änderung	Dat.	Name

Rauheit DIN ISO 1302 — zul. Abweichung für Maße ohne Toleranzangabe: DIN 7184 / DIN 7168

allgemeine Rauheit — Einheit mm — Maßstab — Europ. Proj.

Modell-Nr. P2711-10X

Auftrags-Nr.

CLASS

WS-DIMO P2711-10X

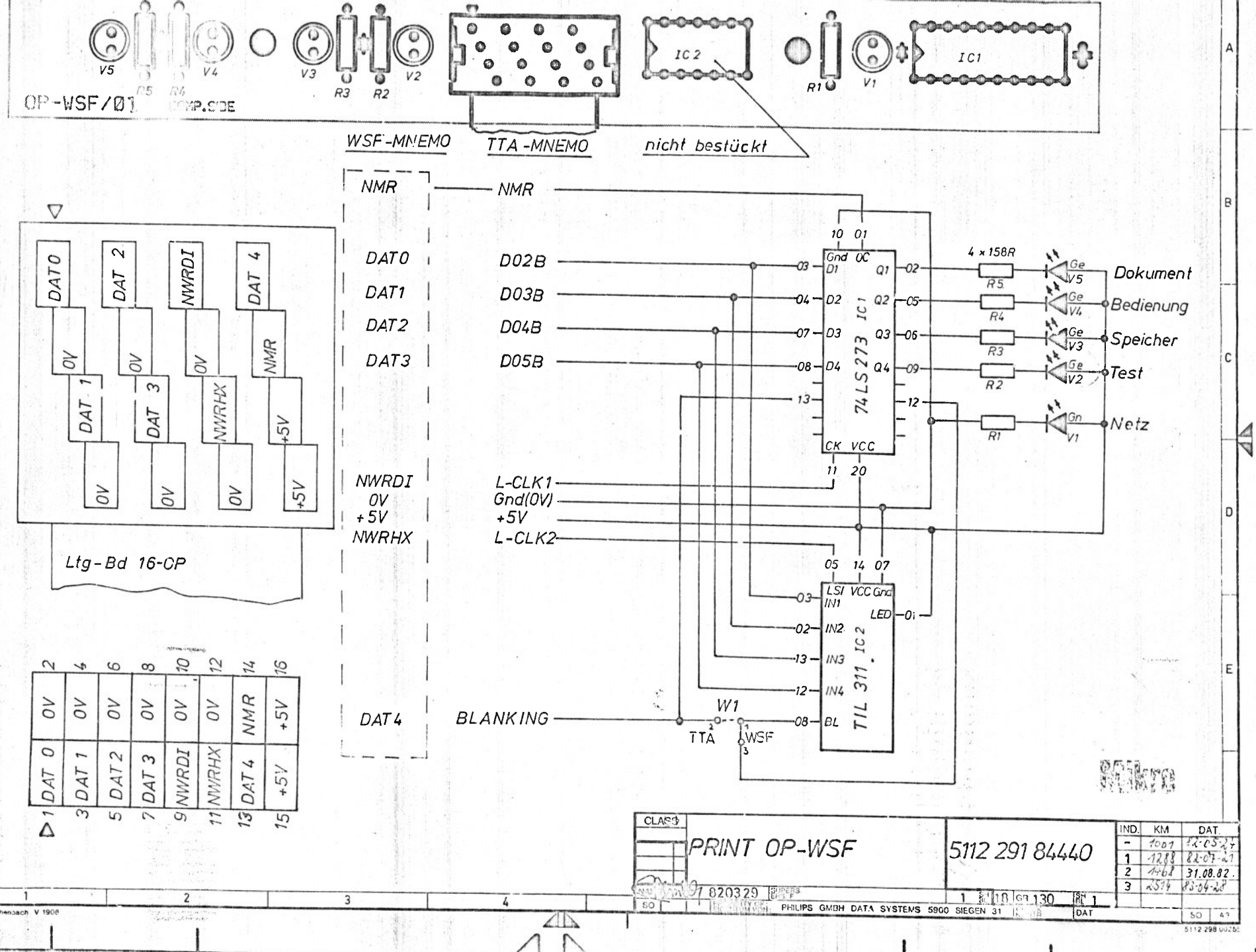
5112 291 86350

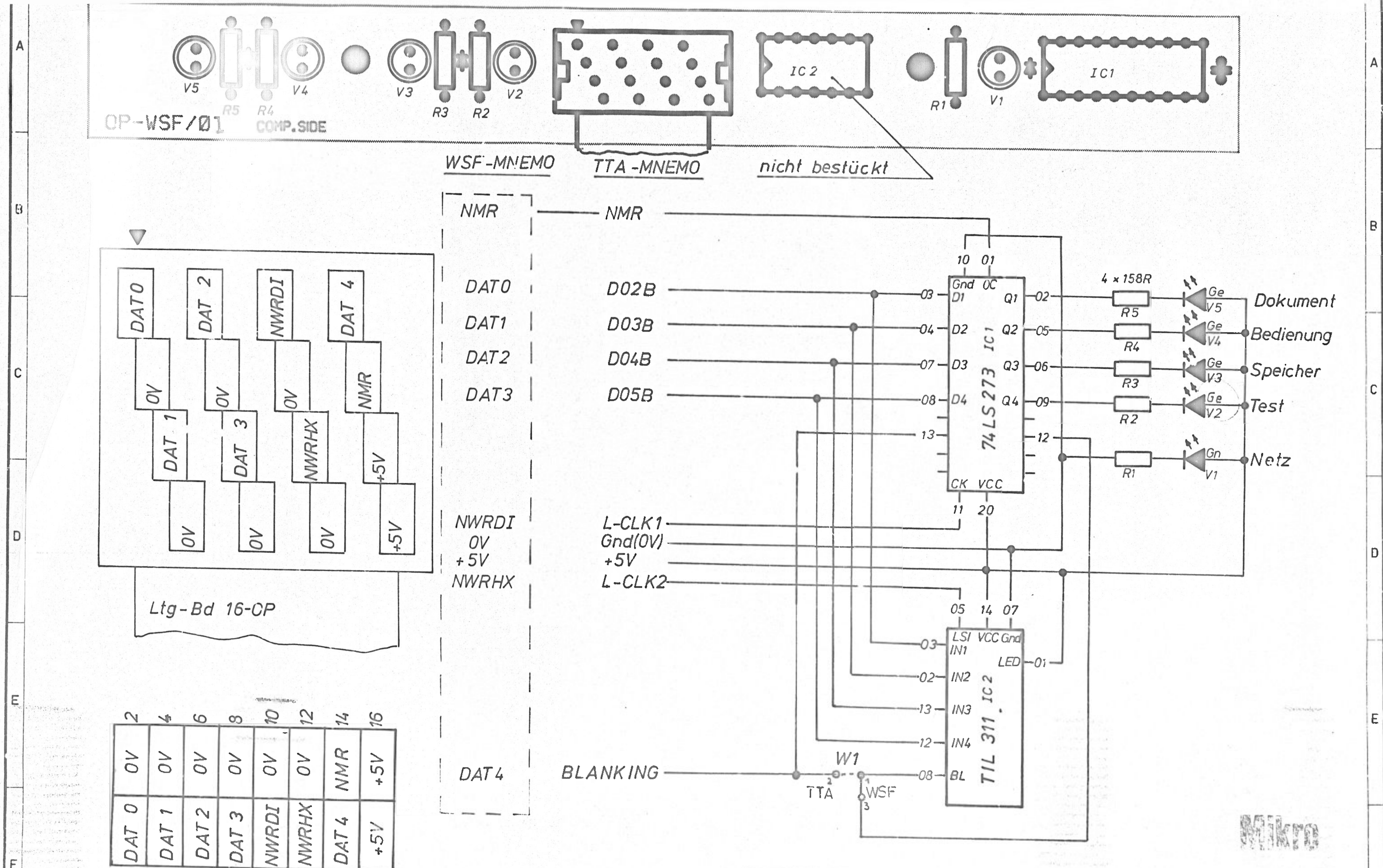
IND. KM DAT.

NAME 840210 — SO — PROPERTY OF PHILIPS — PHILIPS DATA SYSTEMS 5000 SIEGEN

1 131 1

DAT


OP-WSF/01
COMP.SIDE
V5
V4
V3
V2
V1
R5
R4
R3
R2
R1
IC2
IC1
WSF-MNEMO
TTA -MNEMO
nicht bestückt
NMR
DAT0
DAT1
DAT2
DAT3
NWRDI
0V
+5V
NWRHX
DAT4
BLANKING
D02B
D03B
D04B
D05B
L-CLK1
Gnd(0V)
+5V
L-CLK2
74LS273 IC1
TIL 311 IC2
4 x 158R
Dokument
Bedienung
Speicher
Test
Netz
W1
TTA
WSF
Ltg-Bd 16-CP
DAT 0
DAT 1
DAT 2
DAT 3
NWRDI
NWRHX
DAT 4
+5V
PRINT OP-WSF
5112 291 84440
PHILIPS GMBH DATA SYSTEMS 5900 SIEGEN 31

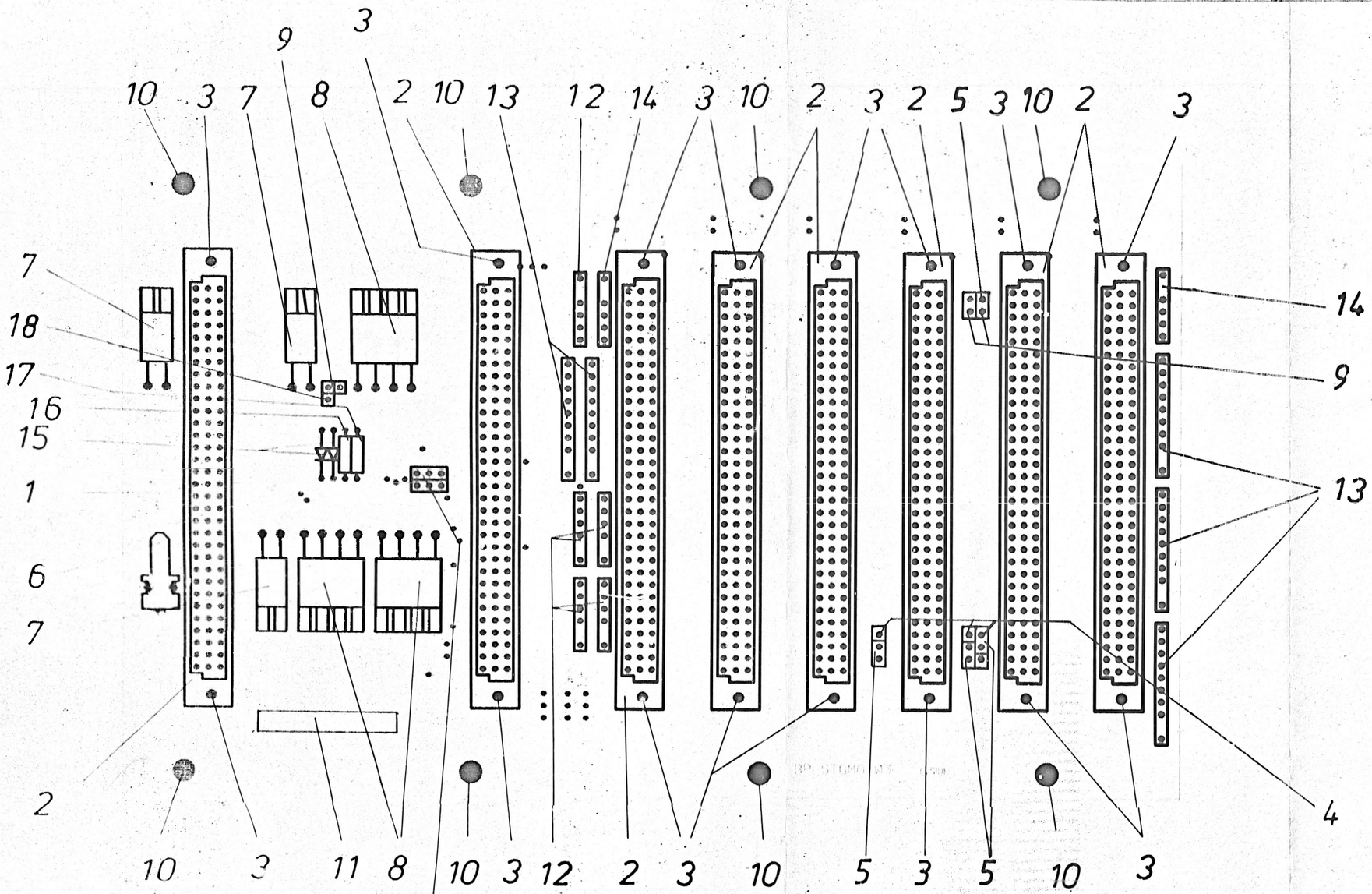


CLASS	PRINT OP-WSF	5112 291 84440

IND.	KM	DAT.
–	1001	82-05-24
1	1288	82-07-21
2	1468	31.08.82
3	2514	83-04-28

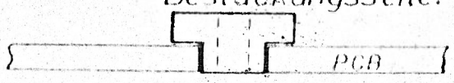
NAME 820329 SUPERS. ERS. F
1 SH BL 18 GR 130 SH BL 1
PROPERTY OF EIGENTUM VON: PHILIPS GMBH DATA SYSTEMS 5900 SIEGEN 31
SO A3

5112 298 00255



Zu Pos. 10

Buchse eingeführt von Bestückungsseite.



Ind.	KM	Änderung	Dat.	Name
2514		Freigabe	25.4.83	Jan

Ind.	KM	Änderung	Dat.	Name

Rauheit UN D 28 — √ √ 9 µm DIN ISO 4302

zul. Abweichung für Maße ohne Toleranzangabe

[A] [ ] DIN 7184
[ ] [A] UN D 603

allgem. ohne Rauheit

Einheit mm

Maßstab

Europ Proj

Modell Nr. P 3500

Auftrags Nr.

CLASS

PRINT BP-STOMO

5112 291 84464

IND | KM | DAT

NAME Schmitz 82.04.27

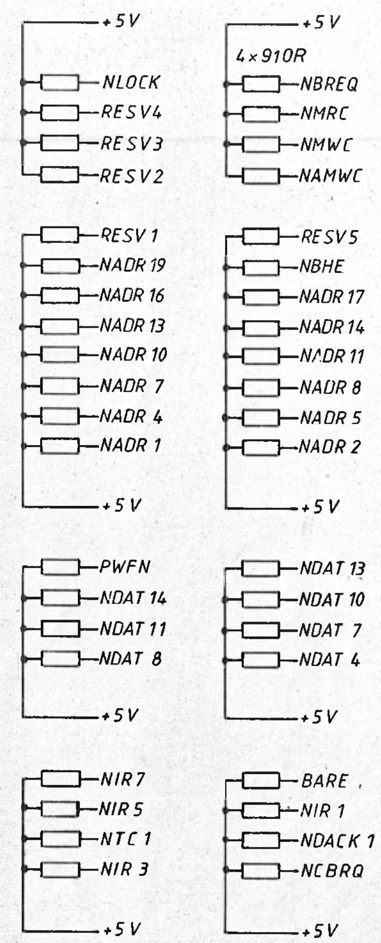
DAT 27.4.83 - 10 - 28

PSU-M2

c	b	a	Pin
			32
0V	0V	0V	31
			30
0V	0V	0V	29
			28
0V	0V	0V	27
			26
0V	0V	0V	25
			24
0V	0V	0V	23
			22
0V	0V	0V	21
+BAT	+BAT	+BAT	20
0V	0V	0V	19
+5VM	+5VM	+5VM	18
0V	0V	0V	17
			16
0V	0V	0V	15
			14
0V	0V	0V	13
			12
0V	0V	0V	11
			10
0V	0V	0V	9
0V	0V	0V	8
	0V		7
	0V	0V	6
	0V	SYN	5
RSLN	0V	0V	4
	0V	BAWOFFN	3
	0V		2
	0V	BONN	1

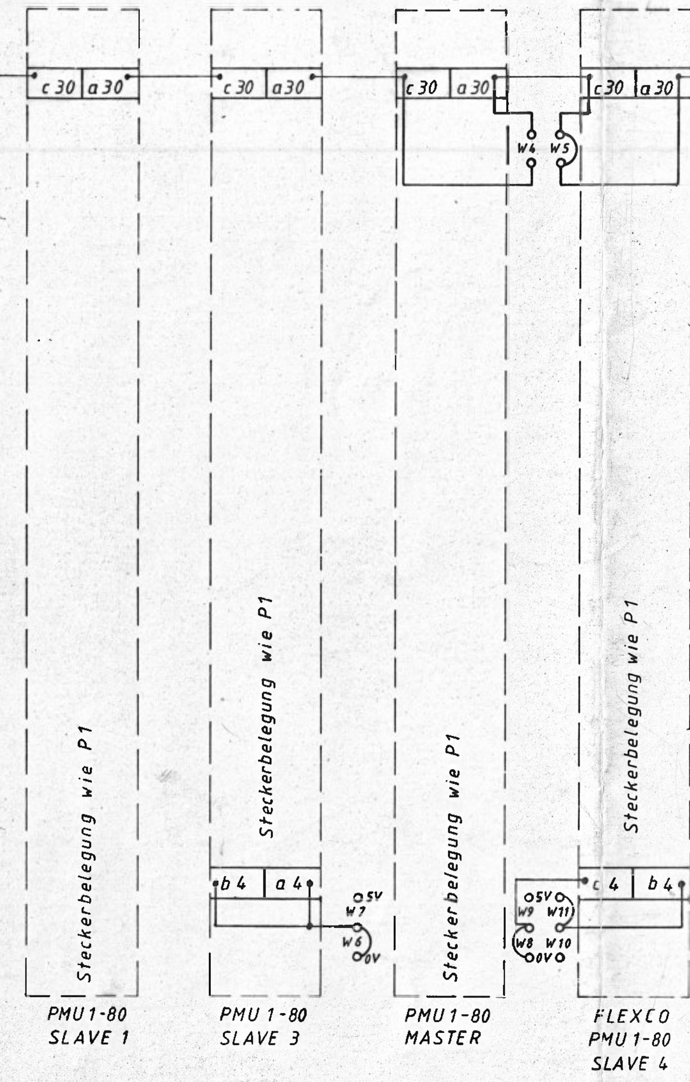
PSU-WS120

c	b	a	Pin
+5V	+5V	+5V	32
0V	0V	0V	31
+5V	+5V	+5V	30
0V	0V	0V	29
+5V	+5V	+5V	28
0V	0V	0V	27
+5V	+5V	+5V	26
0V	0V	0V	25
			24
0V	0V	0V	23
-12V	-12V	-12V	22
0V	0V	0V	21
+12V	+12V	+12V	20
0V	0V	0V	19
+5VM	+5VM	+5VM	18
0V	0V	0V	17
+BAT	+BAT	+BAT	16
0V	0V	0V	15
			14
0V	0V	0V	13
			12
0V	0V	0V	11
			10
0V	0V	0V	9
0V	0V	0V	8
	0V		7
	0V	0V	6
	0V	SYN	5
RSLN	0V	0V	4
PWFN	0V	BAWOFFN	3
RPON	0V		2
	0V	BONN	1



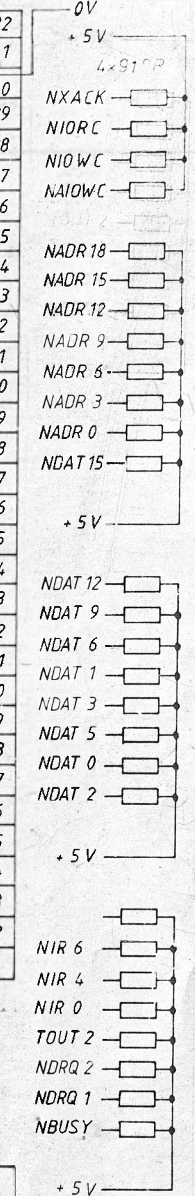
PMU 1-80 (SLAVE 2)

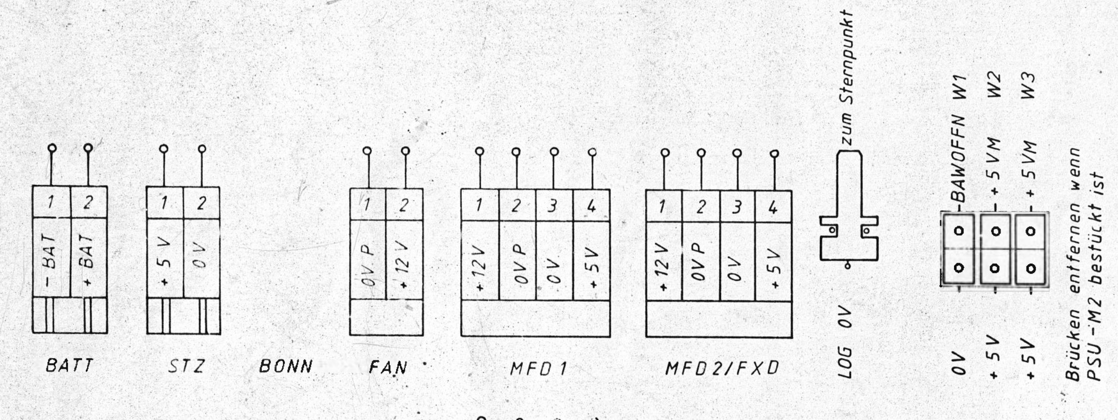
c	b	a	Pin
NBREQ	-5V	-12V	32
+5VM	+5VM	+12V	31
NBPRO	NLOCK	NBPRI	30
NMRC	RESV4	NXACK	29
NMWC	RESV3	NIORC	28
NAMWC	RESV2	NIOWC	27
RESV5	RESV1	NAIOWC	26
NBHE	NADR 19	NADR 18	25
NADR 17	NADR 16	NADR 15	24
NADR 14	NADR 13	NADR 12	23
NADR 11	NADR 10	NADR 9	22
NADR 8	NADR 7	NADR 6	21
NADR 5	NADR 4	NADR 3	20
NADR 2	NADR 1	NADR 0	19
0V	0V	0V	18
NDAT 15	RPON	PWFN	17
NDAT 14	NDAT 13	NDAT 12	16
NDAT 11	NDAT 10	NDAT 9	15
NDAT 8	NDAT 7	NDAT 6	14
NDAT 5	NDAT 4	NDAT 3	13
NDAT 2	NDAT 1	NDAT 0	12
0V	0V	0V	11
NIR 7	RSLN	NIR 6	10
NIR 5	BARE	NIR 4	9
NIR 1	TOUT 2	NIR 0	8
NTC 1	SYN	NDRQ 2	7
NDACK 1	NIR 3	NDRQ 1	6
NCBRQ	NBCLK	NBUSY	5
SLL 2	SLL 1	SLL 0	4
0V	0V	0V	3
SLL 3	+5V	0V	2
+5V	+5V	+5V	1

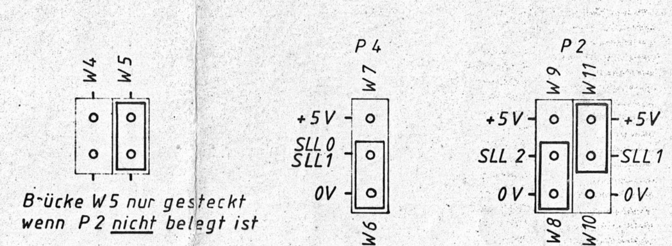


SESAD (SESCO)

c	b	a	Pin
NBREQ	-5V	-12V	32
+5VM	+5VM	+12V	31
NBPRO	NLOCK	NBPRI	30
NMRC	RESV4	NXACK	29
NMWC	RESV3	NIORC	28
NAMWC	RESV2	NIOWC	27
RESV5	RESV1	NAIOWC	26
NBHE	NADR 19	NADR 18	25
NADR 17	NADR 16	NADR 15	24
NADR 14	NADR 13	NADR 12	23
NADR 11	NADR 10	NADR 9	22
NADR 8	NADR 7	NADR 6	21
NADR 5	NADR 4	NADR 3	20
NADR 2	NADR 1	NADR 0	19
0V	0V	0V	18
NDAT 15	RPON	PWFN	17
NDAT 14	NDAT 13	NDAT 12	16
NDAT 11	NDAT 10	NDAT 9	15
NDAT 8	NDAT 7	NDAT 6	14
NDAT 5	NDAT 4	NDAT 3	13
NDAT 2	NDAT 1	NDAT 0	12
0V	0V	0V	11
NIR 7	RSLN	NIR 6	10
NIR 5	BARE	NIR 4	9
NIR 1	TOUT 2	NIR 0	8
NTC 1	SYN	NDRQ 2	7
NDACK 1	NIR 3	NDRQ 1	6
NCBRQ	NBCLK	NBUSY	5
SLL 2'	SLL 1	SLL 0	4
0V	0V	0V	3
SLL 3	+5V	0V	2
+5V	+5V	+5V	1

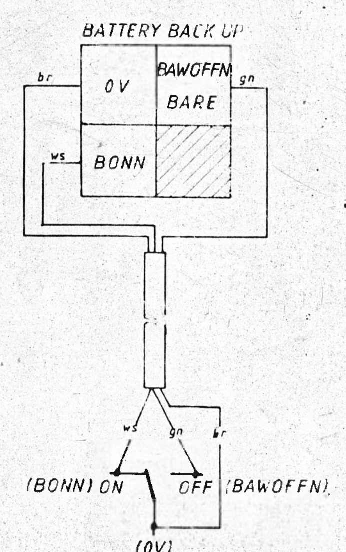


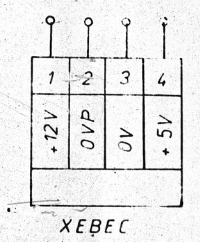


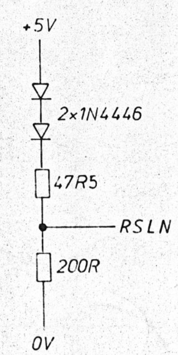


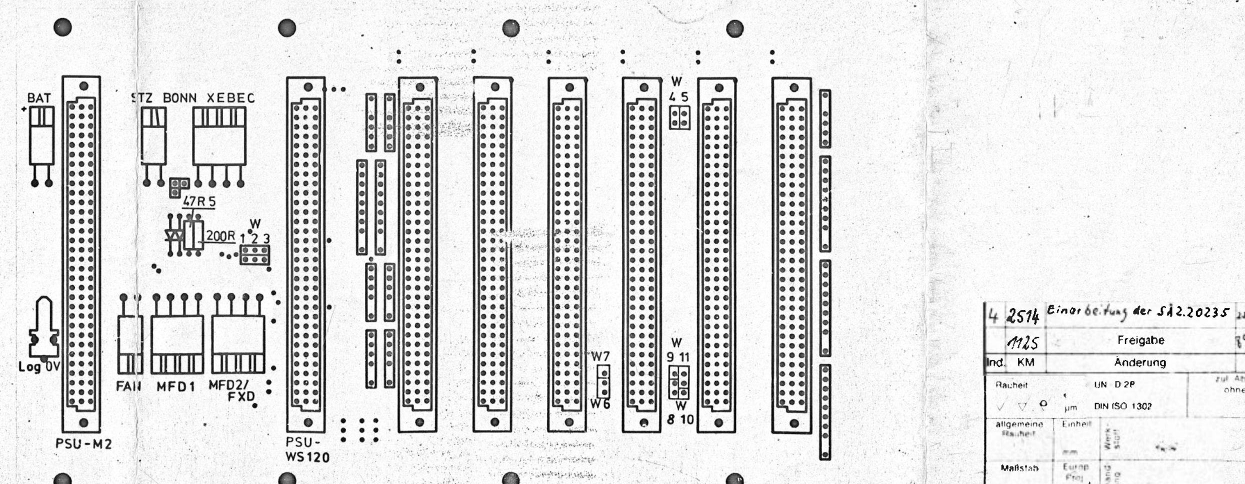
Belegung der SLL-Signale

Signale	Stecker P6	P5	P4	P3	P2	P1
SLL 0	+5V	0V	0V	+5V	+5V	+5V
SLL 1	0V	+5V	0V	+5V	+5V	+5V
SLL 2	+5V	+5V	+5V	+5V	0V	+5V
SLL 3	—	—	—	—	—	—









Alle nicht markierten Pull-up-Widerstände = 3K32

4 2514	Einarbeitung der SA2.20235		
1125	Freigabe		
Ind. KM	Änderung	Dat. Name	Ind. KM Änderung

P 3500

PRINT BP - STOMO

5112 291 84460

21.04.1982

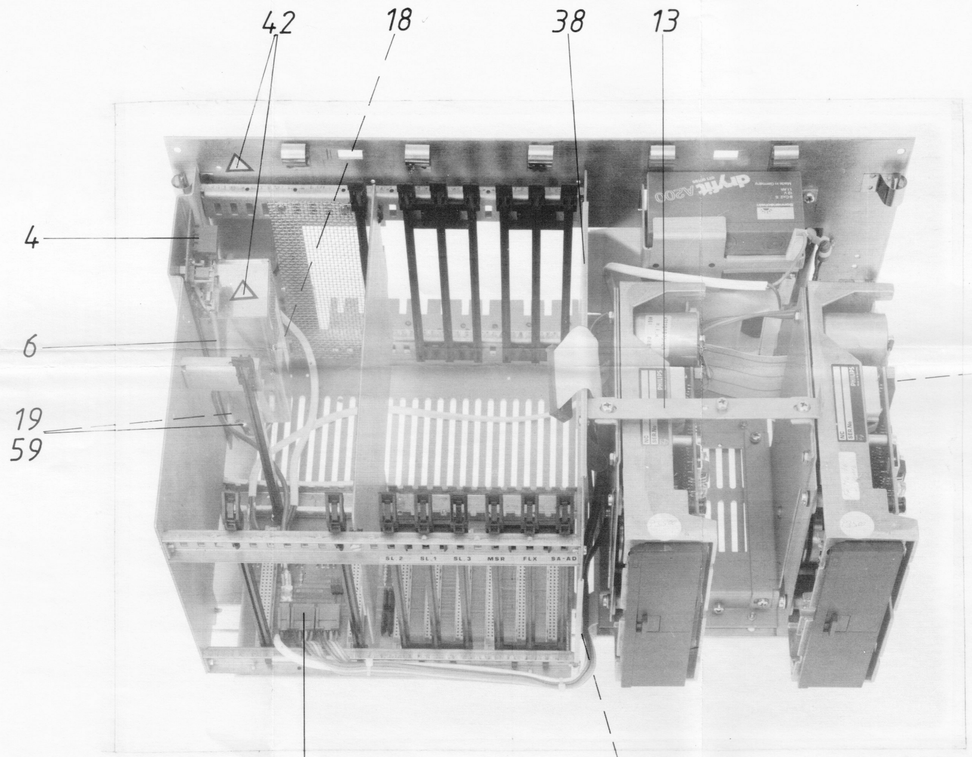
P H I L I P S
P4500 / FMS

B A U K A S T E N - S T U E C K L I S T E

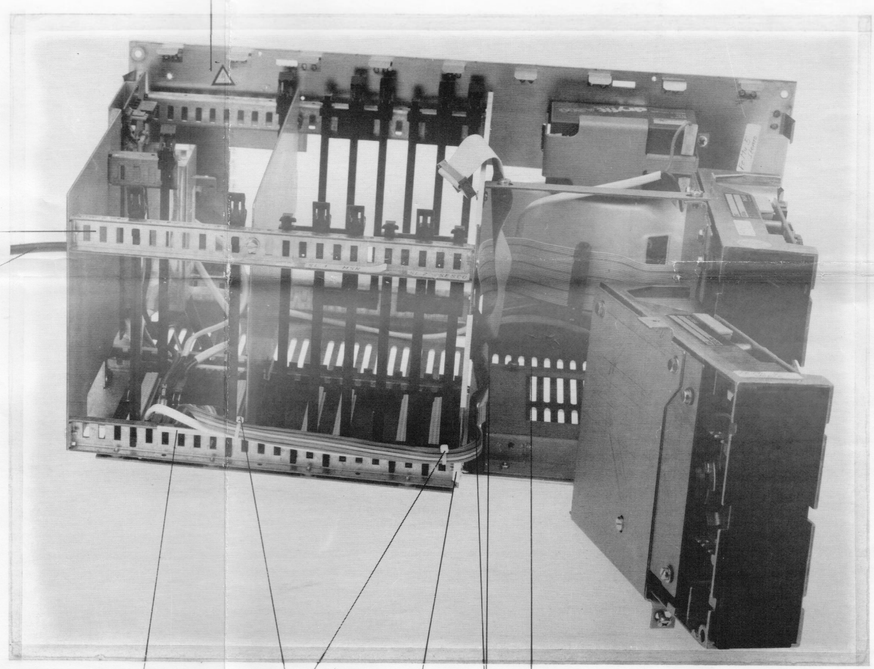
ABGERUFEN VON SB:Huebers
ABT:technol Planung
FW:956

ARTIKELNUMMER: 5112 291 84464 BEZEICHNUNG: PRINT BP-STOMO SEITE: 00001
LAGER : 000 NORMBEZEICHNUNG :
HERSTELLER : 0 FREIGABE KM/DAT.: 1125/82.06.22 IND : 00
PLANUNGS-SL: 0 0 1 AENDER. KM/DAT.: 2514/83.04.28 Z-IND : 00
AV-SACHBEAR/DAT.: /00.00.00 DA : 99
ME-B : 13

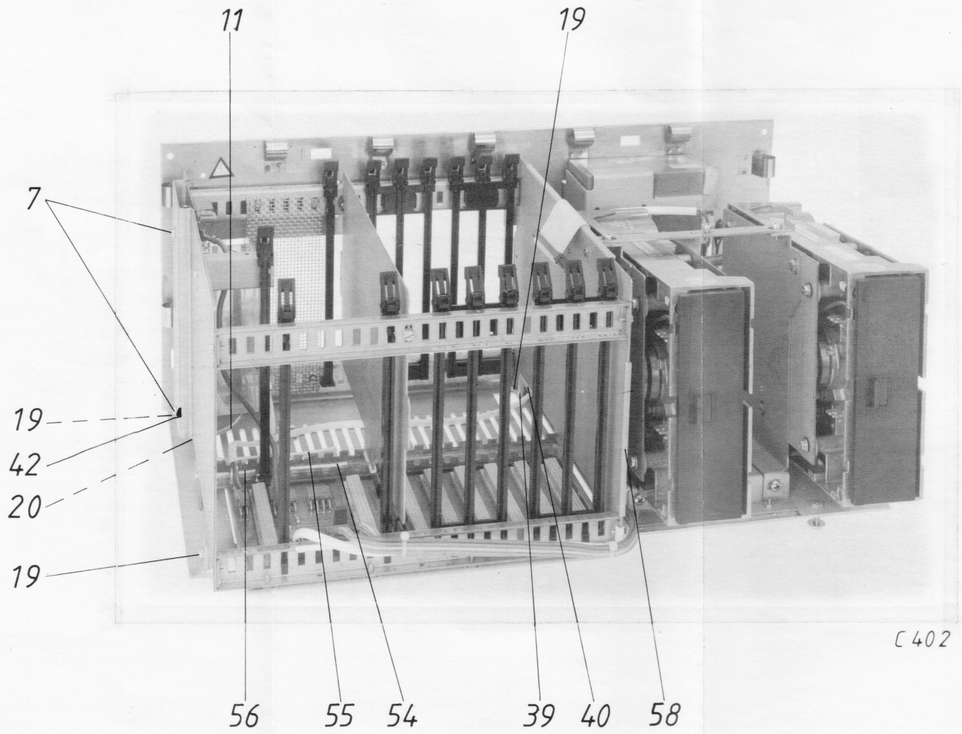
ST ST	VA	ME	MENGE	ARTIKELNR.	ARTIKELBEZEICHNUNG	SL. POS	T	AG-FOL	FRAKM	GUTLG	S	AFW	BFW	B
1		13	1	5112 212 01204	PRINT BP-STOMO/03	001	0	000	2514	000	1			
1		13	8	2422 025 89296	FEDERLEISTE 96POL	002	0	000	1125	603	1			
1		13	16	2522 643 16086	ROHRNIET A2,5X0,3X6-MS	003	0	000	1125	603	1			
1		13	5	5112 211 03271	STIFTLEISTE 3POL	004	0	000	2080	603	1			
1		13	7	2422 549 26002	BUCHSENSTECKER 2POL	005	0	000	2080	603	1			
1		13	1	5112 210 22531	LEITERPLATTENFLACHSTECKER	006	0	000	1125	603	1			
1		13	3	2422 025 03527	STIFTLEISTE 2POL	007	0	000	2080	603	1			
1		13	3	2422 025 03179	STIFTLEISTE 4POL	008	0	000	1125	603	1			
1		13	3	5112 211 06041	STIFTLEISTE 2POL	009	0	000	2080	603	1			
1		13	8	5112 211 55782	BUCHSE	010	0	000	1125	733	1			
1		13	1	5112 211 46511	CCA-AUFKLEBER	011	0	000	1125	603	1			
1		13	5	5112 209 12911	IC-SCHALTUNG NW1106	012	0	000	1587	603	1			
1		13	5	5112 209 10221	IC-SCHALTUNG NW0605 (DICK)	013	0	000	1204	603	1			
1		13	2	5112 209 01691	IC-SCHALTUNG ERC1179	014	0	000	1587	603	1			
1		13	2	9331 126 60112	DIODE 1N4446	015	0	000	1587	603	1			
1		13	1	2322 151 54759	ME-WID 0,4/70 47R5/1	016	0	000	1587	603	1			
1		13	1	2322 151 52001	ME-WID 0,4/70 200R/1	017	0	000	1587	603	1			
1		13	1	5112 211 06031	STIFTLEISTE 1POL	018	0	000	2080	603	1			



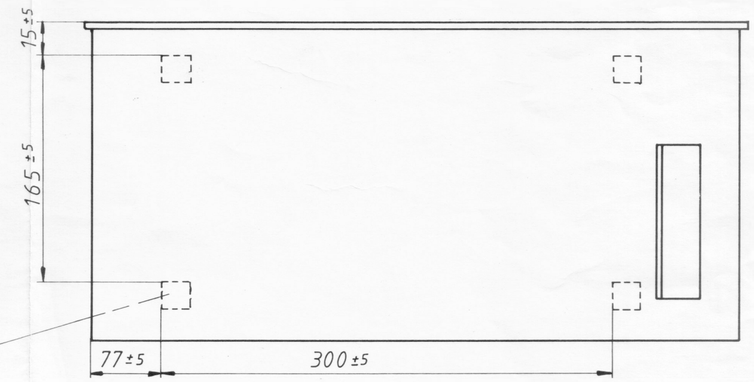
C 398



C 397



C 402



Pos. 49, 57 nicht dargestellt

Ind.	KM	Änderung	Dat.	Name
2516		Freigabe	19.4.83	

Ind.	KM	Änderung	Dat.	Name

Rauheit UN - D 28 µm DIN ISO 1302

zul. Abweichung für Maße ohne Toleranzangabe

DIN 7184 UN - D 603

allgemeine Rauheit | Einheit mm | Werkstoff | Modell - Nr. P 3500

Maßstab | Europ. Proj. | Behandlung | Auftrags - Nr.

CLASS **GRUNDPLATTE P3500** 5112 291 79941

IND. | KM | DAT.

NAME 18.04.1983 | SUPERSERS F 5112 291 73272 | 1 | SH BL 18 | GR 110 | SH BL 1

SO | PROPERTY OF EIGENTUM VON: PHILIPS DATA SYSTEMS 5900 SIEGEN 31 | CHECK KONTR. | DAT. | SO | A2

AHLBORN, 5912 Hilchenbach V 1168

5112 991 00221

PUC Anschl. ext.

Batterie-
Schalter

LTG-LI STZ 04010

h

LTG-KA BONN TTA 04720

LTG-LI SL 00660

Netzeingang
LTG-KA NETZEINGANG 04080

Kühlplatte

LTG-KA POWER-WS 04000

PCB-Netzfilter

1K

W2

W1

OV-LOG

LTG-LI OV LOG 03970

LTG-SL 00660

LTG-KA PSU-M2-WS 04040

gnge

br

bl

BA

STZ

BONN CONTROLLER

+5VM

+5V

DV-LOG

TRAFO

PSU-M2

FAN

MFD1

MFD2/FXD

12V

12V

PSU-WS 120

PMU1-80 SLAVE 2

PMU1-80 SLAVE 1

PMU1-80 SLAVE 3

PMU1-80 MASTER

PMU1-80 SLAVE 4

SESCO

BP-WS

SASI ext.

SASI int.

LTG-BD LUEFTER 04030

- Lüfter -

12V

Batterie 12V
1,1Ah

LTG-BD 50 CU 04220

LTG-LI BATT 03960

LTG-POT-AUSGL 04020

LTG-BD34DR1 03980

LTG-BD POWER 04140

1- +12V
2- OVP
3- OV
4- +5V

mfD 1

mfD 2

wahlweise

Power

FXD

wahlweise

PCB-CONTROLLER

OP-WS

LTG-BD 16 OP 03930

Ind.	KM	Änderung	Dat.	Name	Ind.	KM	Änderung	Dat.	Name
	2.516	Freigabe							

Rauheit UN-D 28 √ √ √ µm DIN ISO 1302

zul. Abweichung für Maße ohne Toleranzangabe

DIN 7184

UN-D 603

allgemeine Rauheit

Einheit mm

Werkstoff

Maßstab

Europ. Proj.

Behandlung

Modell-Nr. P3500

Auftrags-Nr.

CLASS

P 3500 CAB. STAND. 5112 291 79920

IND. KM DAT.

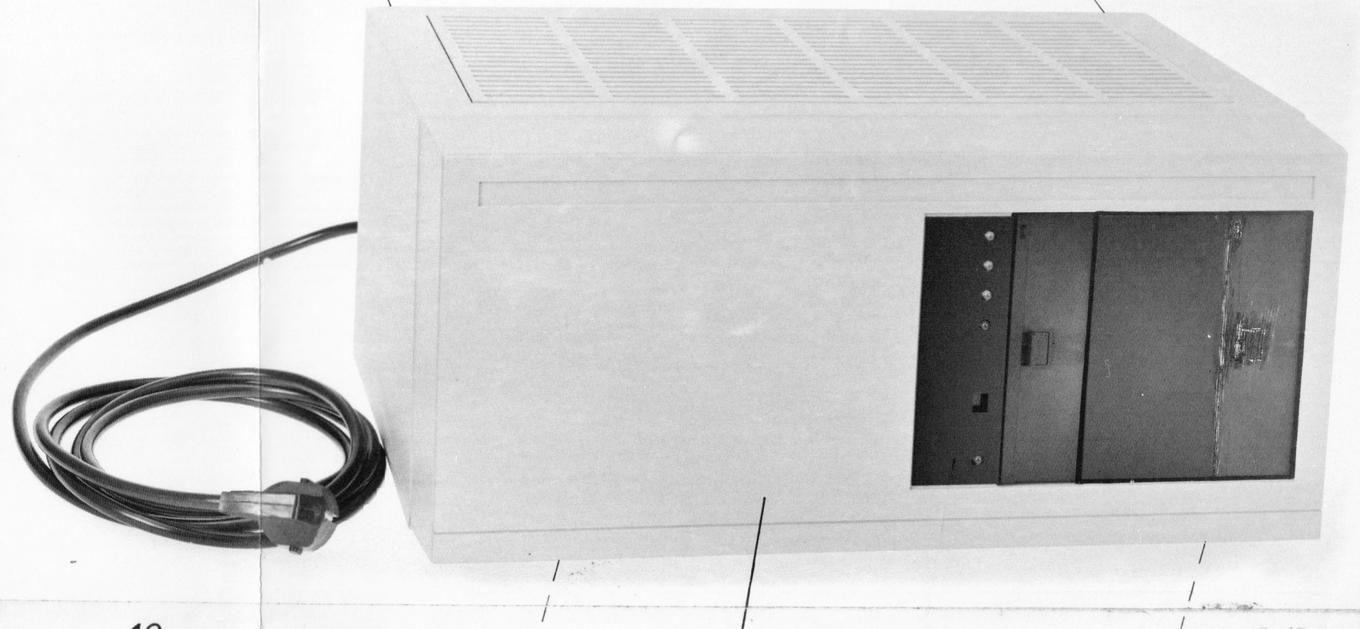
NAME 19.04.1983 SUPERSEDES 5112 291 72390 3 SH BL 18 GR 131 SH BL 3

SO PROPERTY OF EIGENTUM VON: PHILIPS GMBH DATA SYSTEMS 5900 SIEGEN 31 FORCE CONTR. DAT. SO A2

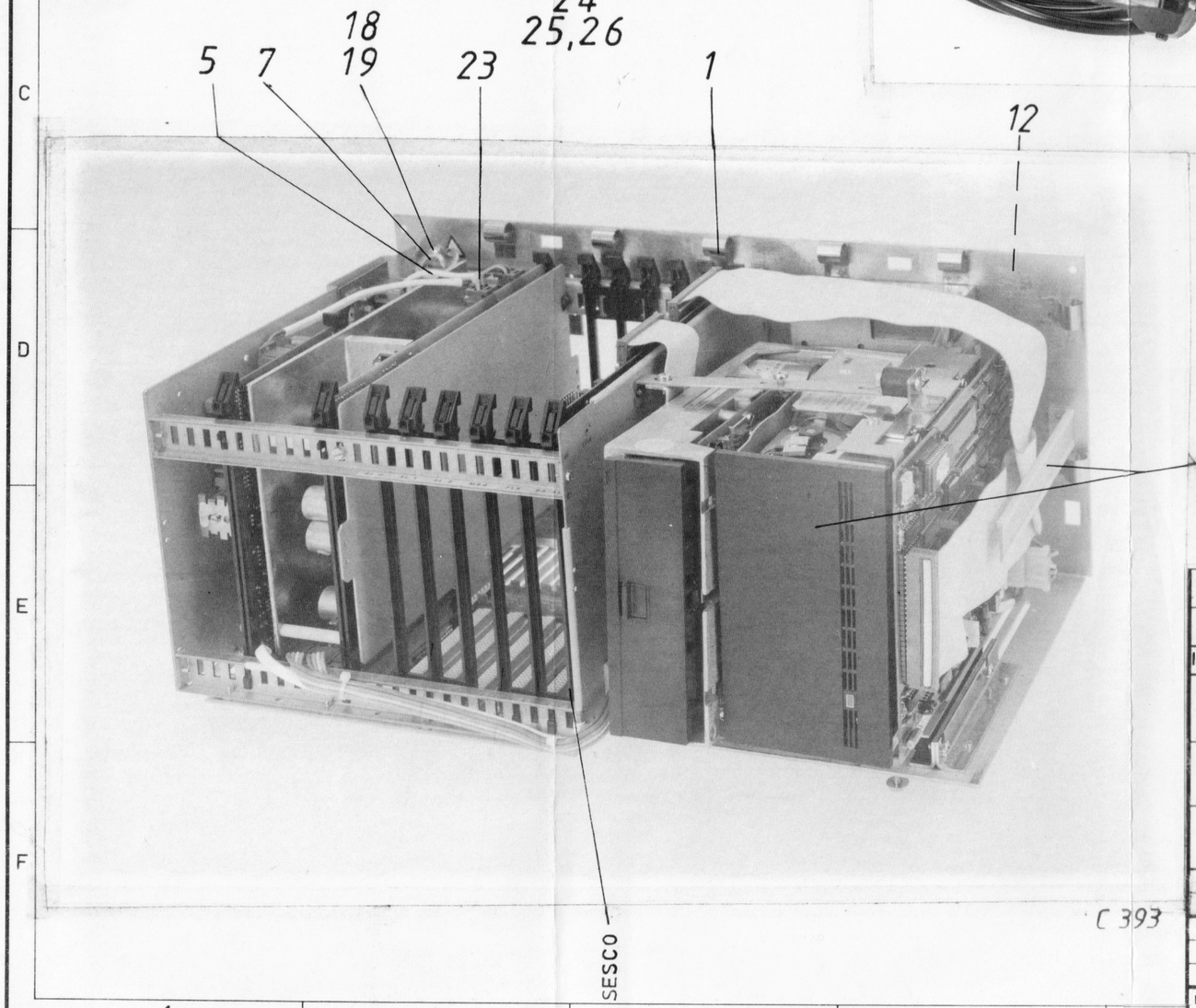
AHLBORN, 5912 Hilchenbach V 1168

5112 298 00263

C 399



C 139



C 393

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11

(Bausatz FXD)

SESCO

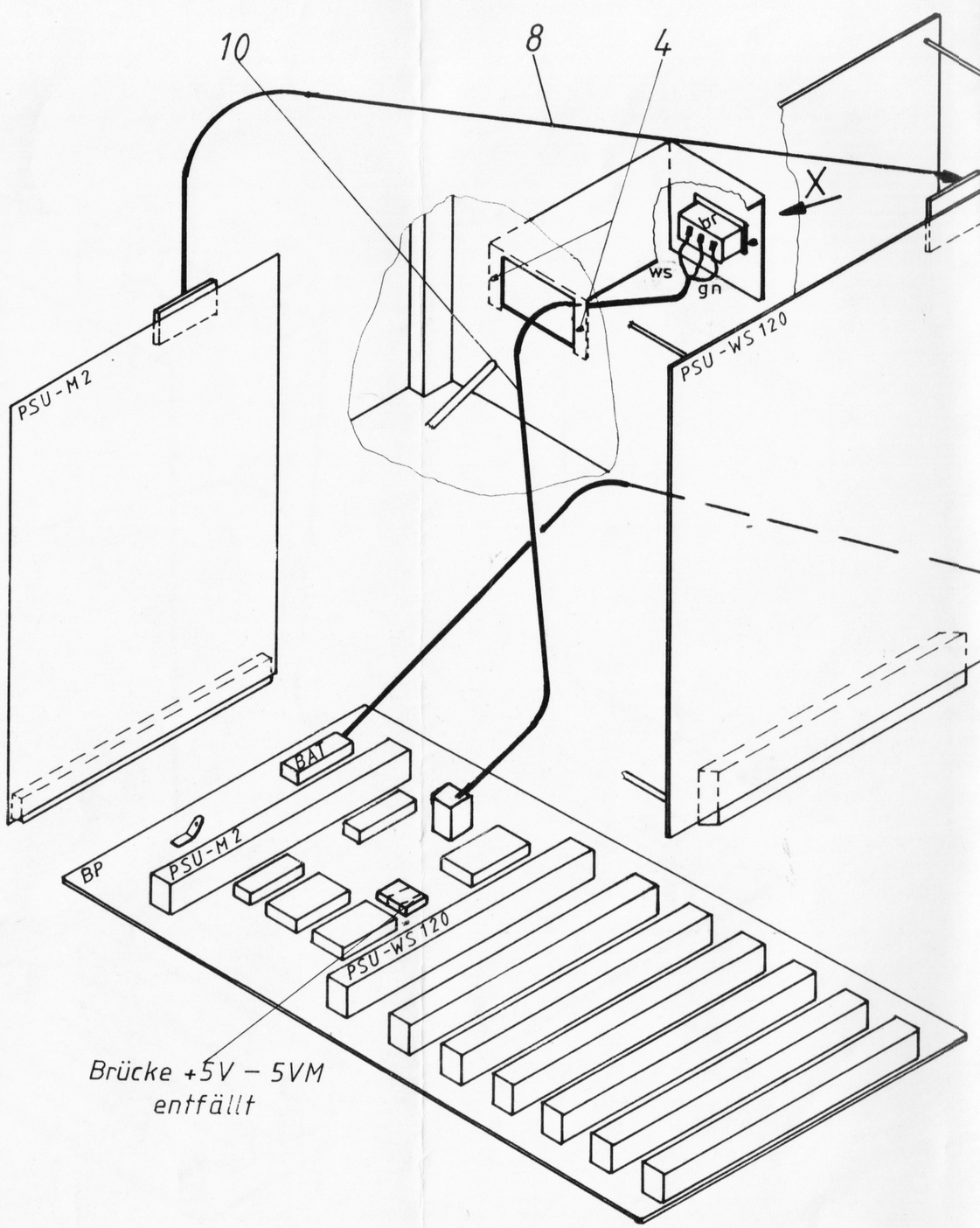
Pos. 13-17 nicht dargestellt

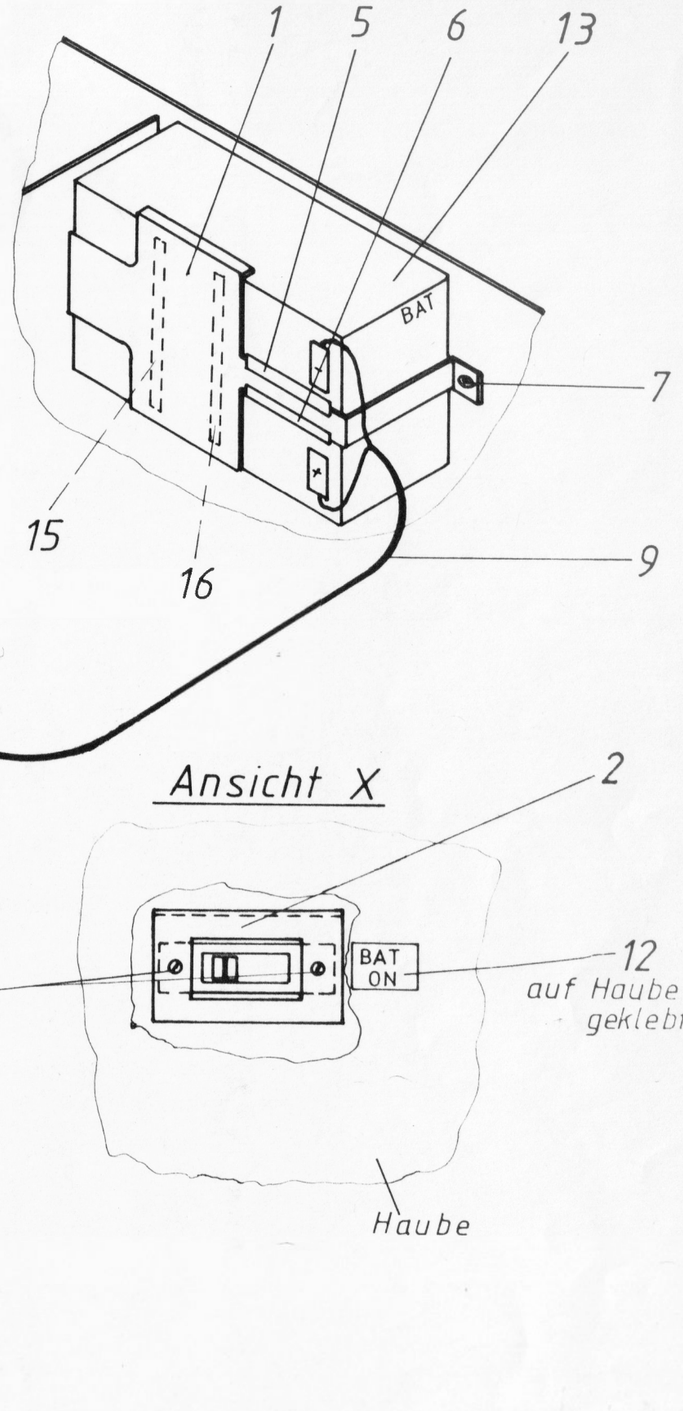
Ind.	KM	Änderung	Dat.	Name	Ind.	KM	Änderung	Dat.	Name
	2516	Freigabe	19.4.83	Forem					

Rauheit ✓ ▽ ∇ µm DIN ISO 1302	UN - D 28	zul. Abweichung für Maße ohne Toleranzangabe	A DIN 7184 / A UN - D 603
allgemeine Rauheit	Einheit mm	Werk-stoff	Modell - Nr. P 3500
Maßstab	Europ. Proj.	Behand-lung	Auftrags - Nr.

CLASS			IND.	KM	DAT.
	P3500 CAB.STAND	5112 291 79921			

NAME Forem 19.04.1983	SUPERSERS F. 5112 291 72393	1 SH BL	18	GR 110	SH BL 1
SO	PROPERTY OF EIGENTUM VON: PHILIPS GMBH DATA SYSTEMS 5900 SIEGEN 31	CHECK KONTR	DAT.		SO A3





Ansicht X

angegebene Positionen ≙ Stücklistenpositionen

CLASS	P 3030 - 72 BATTERY BACK UP		8702 350 09008		IND.	KM	DAT
					—	2516	83-04-28
NAME Lorenz 14.04.1983	SUPERS ERS F	1 SH BL	GR 165	SH BL 1			
SO	PROPERTY OF EIGENTUM VON PHILIPS GMBH DATA SYSTEMS 5900 SIEGEN 31		CHECK KONTR	DAT		SO	A3

AHLBORN 5912 Hilchenbach V 1908

PHILIPS

Blatt Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Blatt Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.
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1983 05 03.

+6M

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0	2516	2		4		6		8		10		12		14		16		18	
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CLASS

P3500 CAB. STAND

5112 291 79920

IND.	KM	DAT.
–	2516	83-04-28

NAME [signature] 15.04.1983 SUPERS. ERS. F. 5112 291 72390-161 | 3 SH. BL. | 18 | GR 161 | SH. BL. 1

SO | PHILIPS GMBH DATA SYSTEMS 5900 SIEGEN 31 | CHECK KONTR. | DAT. | FORM A4

5112 298 00226

AHLBORN 5912 Hilchenbach V 443

+6M

1.) Ableitstromprüfung nach VDE 0806 Abschnitt 13.2

Verwendetes Messgerät nach VDE 0806 Anhang D

Ableitstromprüfer JF28 von der Fa. Elektronisches Laboratorium in D-7015 Korntal.

Messpunkt : Netzeingang

2.) Hochspannungsprüfung nach VDE 0806 Abschnitt 16.3 und VDE 0730 Teil 1 § 32

Verwendetes Messgerät :

Hochspannungsprüfer NH 27 von der Fa. Elektronisches Laboratorium in D-7015 Korntal.

Prüfspannung: 1,375 KV 1 Sekunde zwischen beiden Polen gegen Schutzkontakt.

3.) Schutzleiterprüfung nach VDE 0806 Abschnitt 27.5

Verwendetes Messgerät:

Sicherheitsprüfer RD28K von der Fa Elektronisches Laboratorium in D-7015 Korntal

25 02 83

Mikro

CLASS		IND.	KM	DAT.
P3500 CAB. STAND	5112 291 79920	-	2516	83-04-22

NAME 15.04.1983 | SUPERS ERS. F | 3 SH BL | GR 161 | SH BL 2

SO | PROPERTY OF EIGENTUM VON PHILIPS GMBH DATA SYSTEMS 5900 SIEGEN 31 | CHECK KONTR. | DAT. | SO | A4

5112 298 002

PHILIPS

3.1) Messpunkte für P3500 STOMO CABINET.

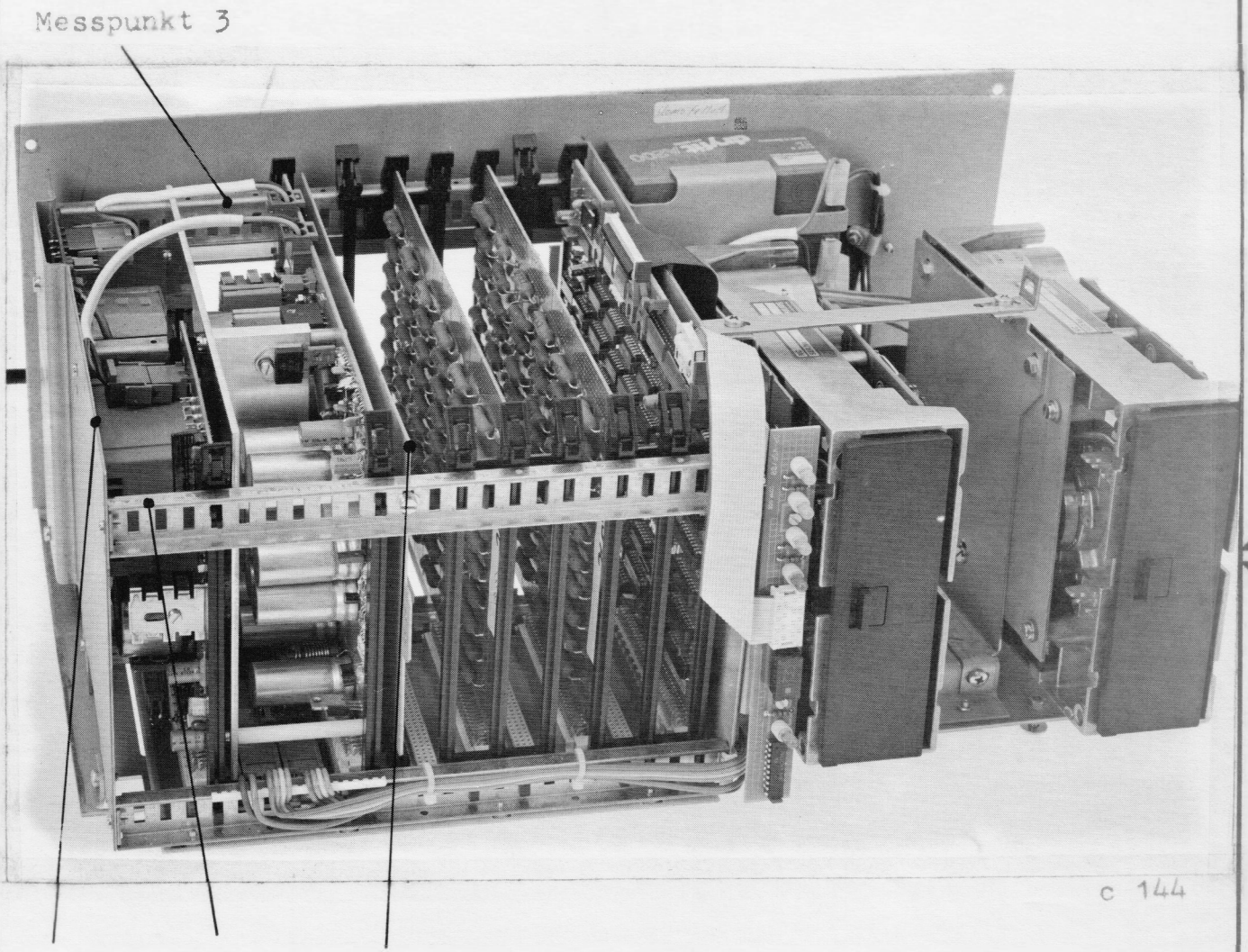
von Schutzkontakt Schukostecker

zu Messpunkt 1. Seitenwand links

2. U-Profilschiene vorne

3. U-Profilschiene hinten

4. Trennwand



+6M

Mikro

CLASS			IND.	KM	DAT.
	P3500 CAB. STAND	5112 29179920	-	2516	83-04-28

NAME	15.04.1983	SUPERS. ERS. F.	3	SH. BL.	GR 161	SH. BL. 3
SO		PROPERTY OF: EIGENTUM VON: PHILIPS GMBH DATA SYSTEMS 5900 SIEGEN 31			CHECK KONTR.	DAT.	SO A4

PHILIPS

Blatt Nr.	Index Lfd. Nr.	Index Lfd. Nr.	Index Lfd. Nr.	Index Lfd. Nr.	Index Lfd. Nr.	Index Lfd. Nr.	Index Lfd. Nr.	Index Lfd. Nr.	Index Lfd. Nr.	Index Lfd. Nr.	Blatt Nr.	Index Lfd. Nr.	Index Lfd. Nr.	Index Lfd. Nr.	Index Lfd. Nr.	Index Lfd. Nr.	Index Lfd. Nr.	Index Lfd. Nr.	Index Lfd. Nr.	Index Lfd. Nr.	Index Lfd. Nr.
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CLASS

P3500 CAB. STAND

5112 291 79920

IND.	KM	DAT.
-	2516	83-04-28

NAME 18.04.1983 SUPERS ERS 3 SH BL 18 GR 165 SH BL 1

SO PHILIPS GMBH DATA SYSTEMS 5900 SIEGEN 31 CHECK KONTR. DAT. FORM A4

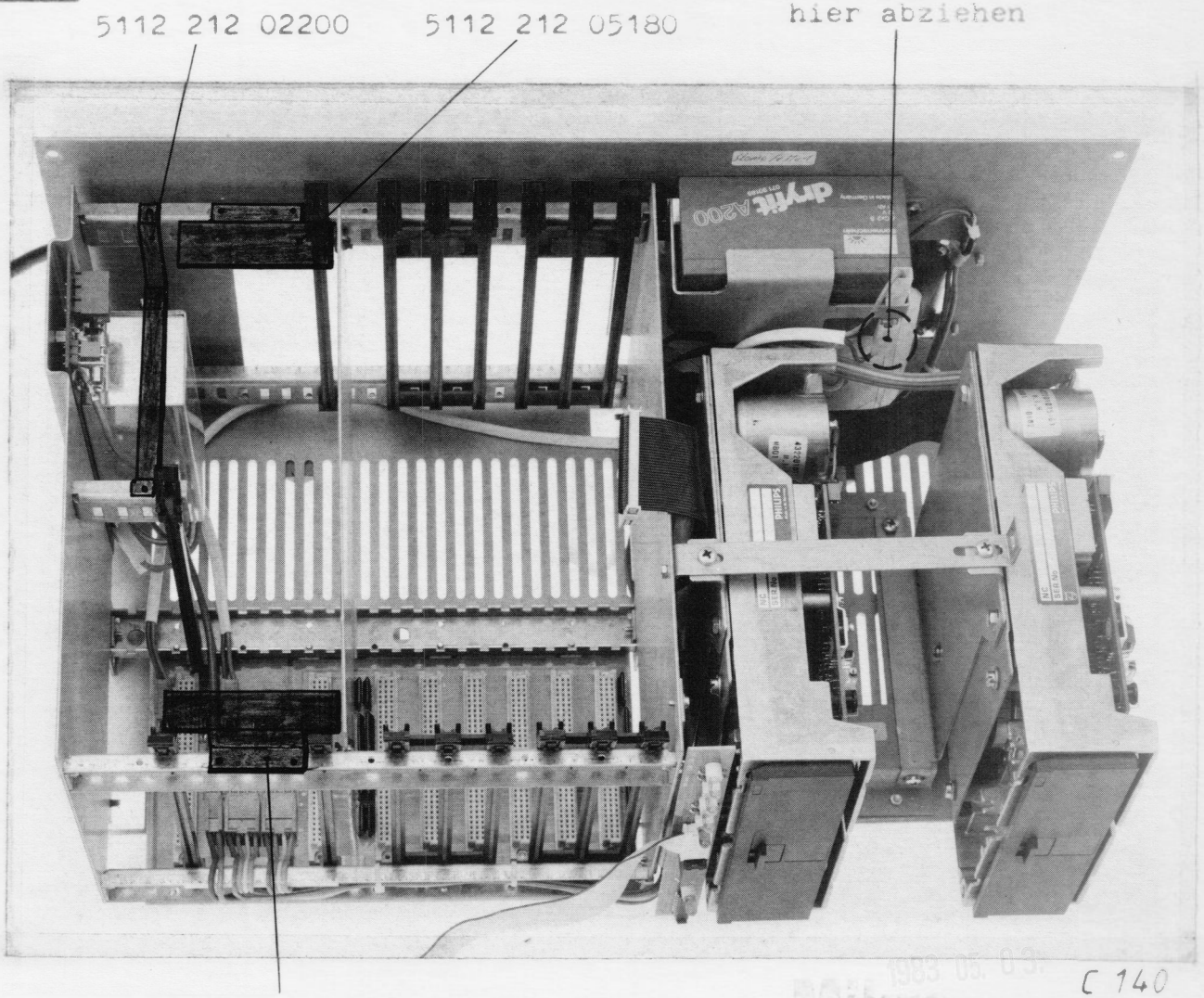
5112 298 002

Transportbedingungen für P 3500 STOMO

1. BBU

Um eine Entladung der Batterien in Folge einer Zwischenlagerung von Maschinen zu vermeiden, muß eine Trennung der Anschlußleitung Batterie + nach Testabschluß im Prüffeld erfolgen.
Dabei ist darauf zu achten, daß die abgezogene Leitung keinen Kurzschluß verursacht. (Sichern durch Kabelbinder).
Vor Inbetriebnahme der Maschinen ist, um die Funktion BBU sicherzustellen, die Leitung Batterie + wieder aufzustecken.
Aus Abb. 1 ist die erforderliche Trennung zu entnehmen.

Abb.1



C 140

CLASS			IND.	KM	DAT.
	P 3500 CAB. STAND	5112 291 79920	-	2516	83-04-28

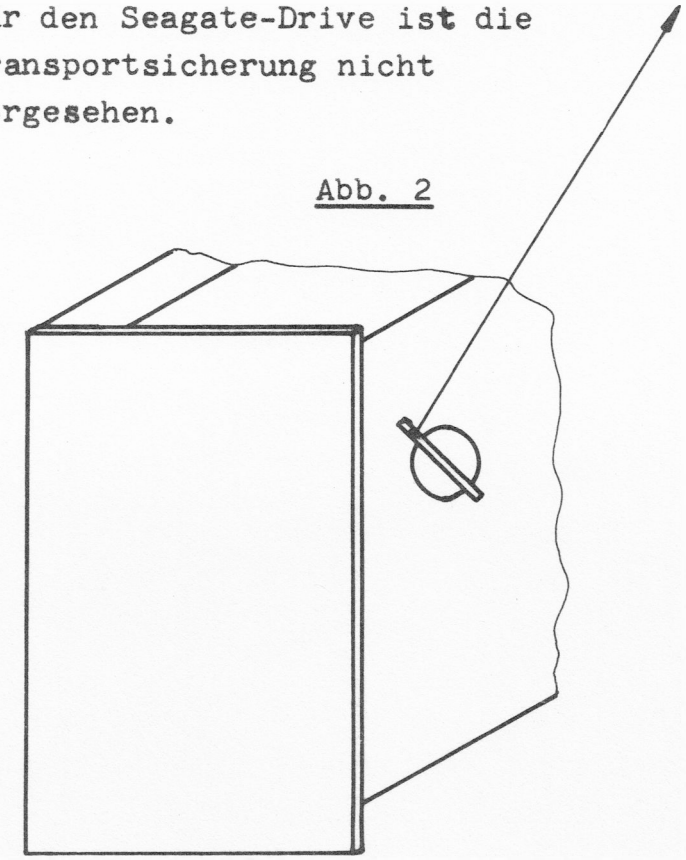
NAME 18.04.1983 | SUPERS ERS F | 3 SH. BL. | GR 165 | SH. BL. 2
SO | PROPERTY OF EIGENTUM VON. PHILIPS DATA SYSTEMS 5900 SIEGEN 31 | CHECK KONTR. | DAT. | SO | A4

Hermann Jung KG, Siegen, Tel. 55306 08 6244 81

2. FIXED DISK (RODIME)

Die Transportsicherung des Steppermotors ist nach Testabschluß wieder anzubringen (Isoband).
Für den Seagate-Drive ist die Transportsicherung nicht vorgesehen.

Abb. 2



3. Netzteil

Außerdem ist darauf zu achten, daß die Transportsicherungen 12NC-Nr. 5112 212 02200 und 5112 212 05180 nach Abb. 1 montiert sind.
Vor Inbetriebnahme sind diese wieder zu entfernen.

CLASS			IND.	KM	DAT.
P3500 CAB. STAND	5112 291 79920		-	2516	85-04-28
NAME 18.04.1983 SUPERS ERS F	3 SH. BL.	GR 165	SH. BL. 3		
SO PROPERTY OF: EIGENTUM VON PHILIPS DATA SYSTEMS 5900 SIEGEN 31		CHECK KONTR.	DAT		SO A4

5112 991 001

PHILIPS

Blatt Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.
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1983 05. 03.

Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.
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1		3		5		7		9		11		13		15		17		19	

CLASS

P3500 CAB. STAND

Mikro

5112 291 79920

IND.	KM	DAT.
–	2516	83-04-28

NAME Irene 19.04.1983 | SUPERS CRS-F 5112 291 72390 | 3 | SH BL 18 | GR 131 | SH BL 1

SO | PHILIPS GMBH DATA SYSTEMS 5900 SIEGEN 31 | CHECK KONTR. | DAT. | FORM A4

AHLBORN 5912 Hilchenbach V 443

5112 298 0022

PUC Anschl. ext.

Batterie-
Schalter

LTG-LI STZ 04010

LTG-KA BONN TTA 04720

LTG-LI SL 00660

Netzeingang
LTG-KA NETZEINGANG 04080

Kühlplatte

LTG-KA POWER-WS 04000

PCB-Netzfilter

1K

W2

W1

OV-LOG

LTG-LI OV LOG 03920

LTG-SL 00660

LTG-KA PSU-M2-WS 04040

LTG-BD LUEFTER 04030

- Lüfter -
12V

Batterie 12V
1,1Ah

SASI ext.

SASI int.

LTG-BD SOCU 04220

LTG-LI BATT 03960

LTG-POT-AUSGL 04020

LTG-BD34DR1 03980

LTG-BD POWER 04140

1- +12V
2- OVP
3- OV
4- +5V

BP-WS 69860

25760

+5VM

+5V

BA

STZ

BONN

CONTROLLER

OV-LOG

TRAFO

PSU-M2

FAN

MFD1

MFD2/FXD

12V

12V

PSU-WS 120

PMUI-80 SLAVE 2

PMUI-80 SLAVE 1

PMUI-80 SLAVE 3

PMUI-80 MASTER

FLEXCO

SASI AD

LTG-BD16 OP 03930

OP-WS

mfD 1

mfD 2

Power

34

34

20

20

FXD

wahlweise

wahlweise

PCB - CONTROLLER

Ind.	KM	Änderung	Dat.	Name
2516		Freigabe		

Ind.	KM	Änderung	Dat.	Name

Rauheit UN - D 28 √ √ ▽ µm DIN ISO 1302

zul. Abweichung für Maße ohne Toleranzangabe

A DIN 7184
▲ A UN - D 603

allgemeine Rauheit | Einheit mm | Werkstoff | Maßstab | Europ Proj | Behandlung

Modell - Nr. P3500

Auftrags - Nr.

CLASS

P 3500 CAB. STAND. 5112 291 79920

IND. KM DAT

NAME 19.04.1983 SUPERS. ERS. F 5112 291 72390 3 SH. BL. 18 GR. 131 SH. BL. 2

SO

CHECK KONTR. DAT SO A2

BORN, 5912 Hilchenbach V 1188

5112 298 00263

PHILIPS

+6M

Blatt Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.
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0	2516	2		4		6		8		10		12		14		16		18	
1		3		5		7		9		11		13		15		17		19	

CLASS		IND.	KM	DAT.
P3500 CAB. STAND	5112 291 79920	–	2516	83-04-28

NAME Loem 15.04.1983 | SUPERSERS F 5112 291 72390-161 | 3 SH. BL. | 18 | GR 161 | SH. BL. 1

SO | PHILIPS GMBH DATA SYSTEMS 5900 SIEGEN 31 | CHECK KONTR. | DAT. | FORM A4

AHLBORN 5912 Hilchenbach V 44 1

5112 298 00220

PHILIPS

Blatt Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.
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Blatt Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.	Index	Lfd. Nr.
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1983 05. 03.

Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.	Lfd. Nr.	KM-Nr.
0	2516	2		4		6		8		10		12		14		16		18	
1		3		5		7		9		11		13		15		17		19	

CLASS		IND.	KM	DAT.
	P3500 CAB. STAND	–	2516	83-04-28

5112 291 79920

NAME Imm 30.03.1983 | SUPERS. ERS. F. | 3 SH. BL. | 18 | GR 412 | SH. BL. 1

SO | PHILIPS GMBH DATA SYSTEMS 5900 SIEGEN 31 | CHECK KONTR. | DAT. | FORM A4

AHLBORN 5912 Hilchenbach V 443

5112 298 00226

a. Service Instruction for Terminator 220/330R
12 Nc - Nr. 5112 291 75560

Abb. 1 P 3500 1× MFD 1× FXD

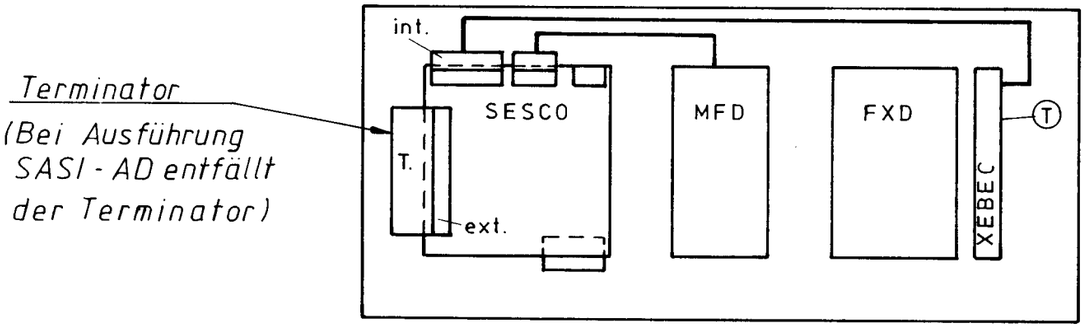
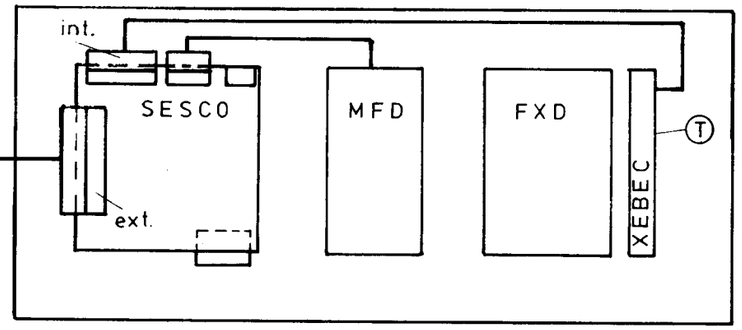
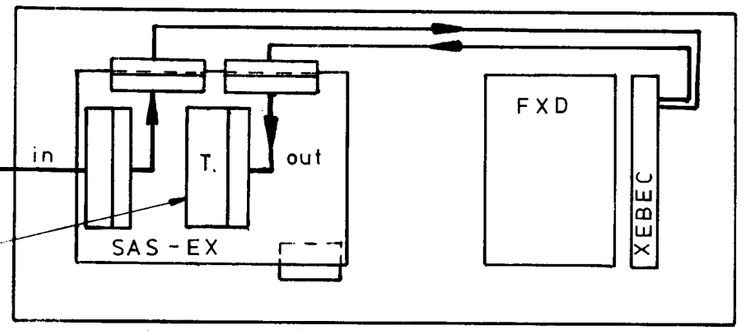


Abb. 2 P3500 1× MFD 1× FXD



P3012 Extension 1× FXD



DISC-CABLE SAS INTERFACE im 3. Schlitz der PUC-Halterung stecken

Abb. 3 P 3500 2× MFD

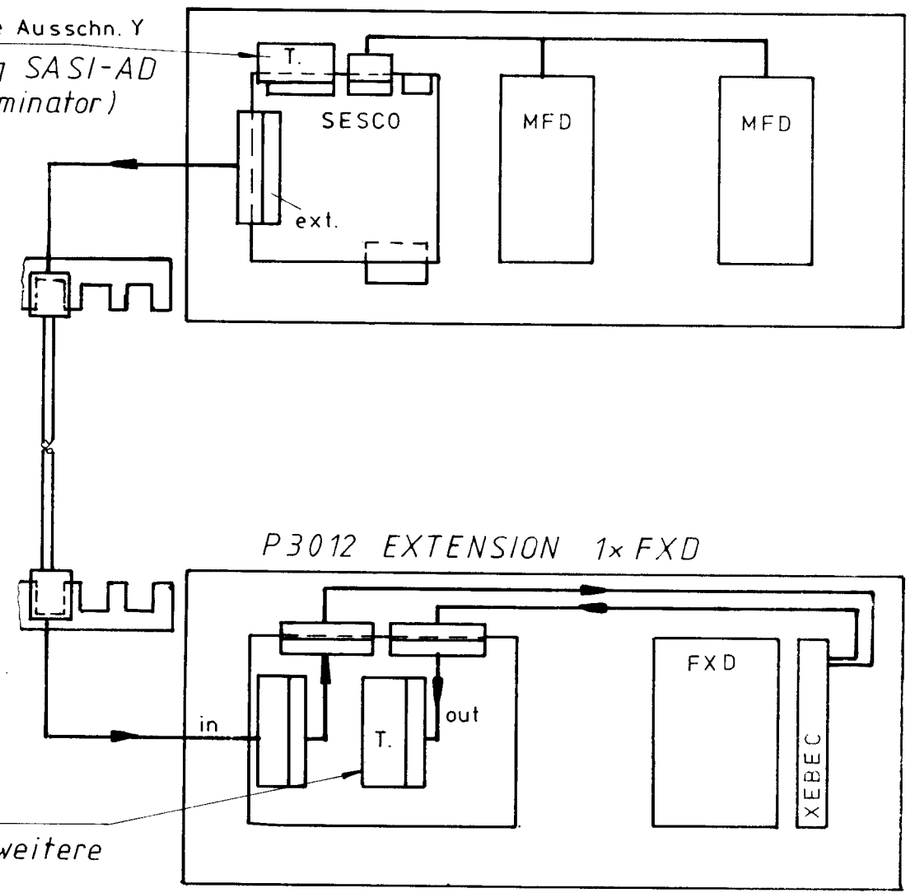
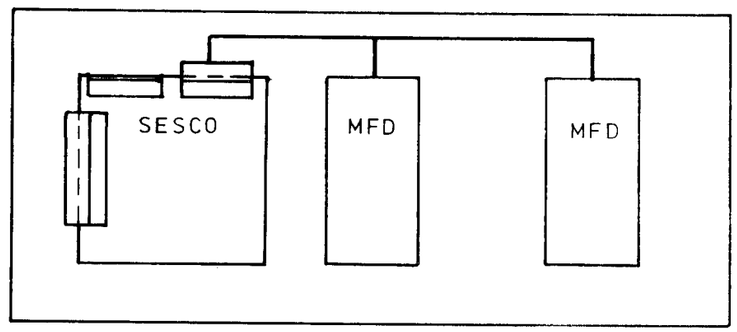


Abb. 4 P3500 2× MFD



Ⓣ ≙ Terminator auf XEBEC-CONTR.

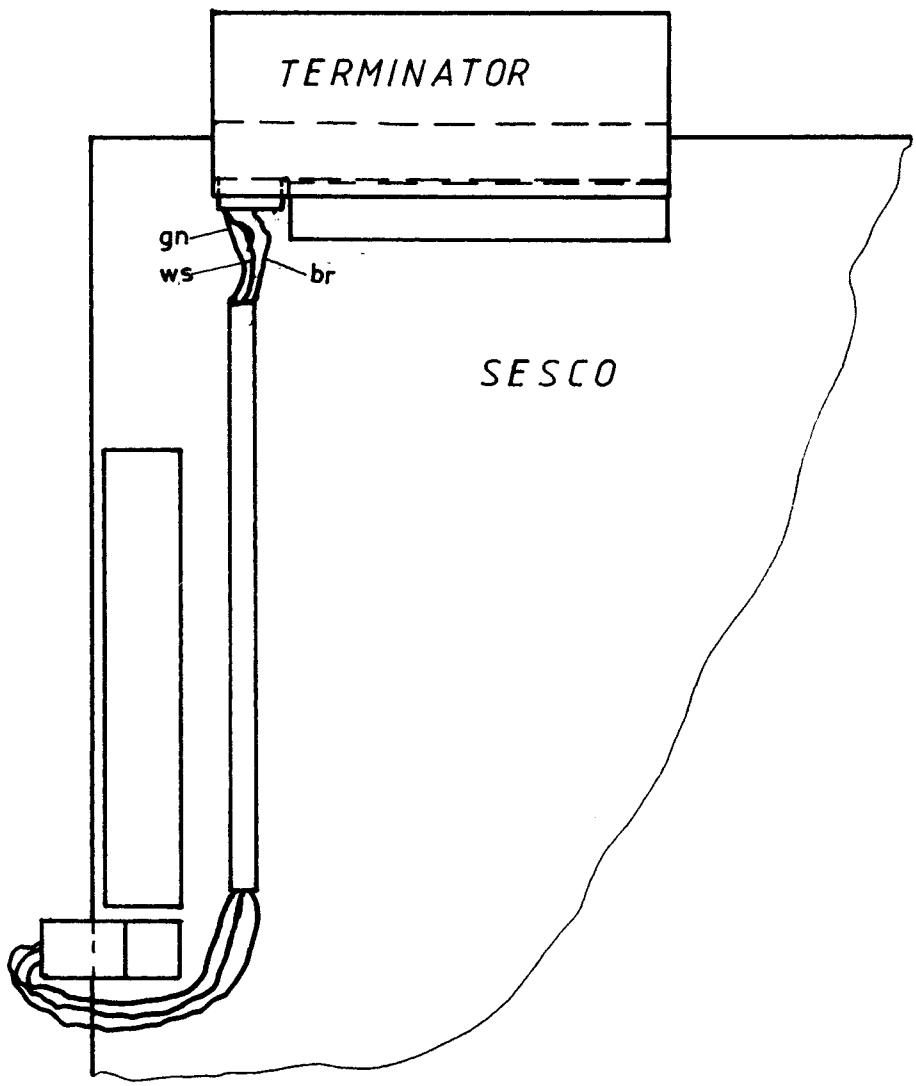
CLASS	P 3500 CAB. STAND	5112 291 79920	IND.	KM	DAT.
			4	2516	83-04-28

NAME 30.03.1983 SUPERS. ERS. F | 3 SH. BL. | GR 412 | SH. BL. 2

SO | PROPERTY OF EIGENTUM VON | PHILIPS DATA SYSTEMS 5900 SIEGEN 31 | CHECK | DAT.

PHILIPS

Ausschnitt „Y" (zu Abb. 3)



1983 05. 03.

CLASS			IND.	KM	DAT.
P 3500 CAB. STAND	5112 291 79920		-	2516	83-04-28

NAME 30.03.1983 Folm	SUPERS. ERS. F	3 SH. BL.	GR 412	SH. BL. 3	
SO	PROPERTY OF. EIGENTUM VON. PHILIPS DATA SYSTEMS 5900 SIEGEN 31		CHECK KONTR.	DAT.	SO A4

5112 991 0015