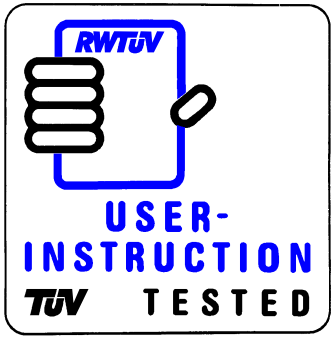
RM600 (Reliant UNIX)

E45/E85 CS45 FC45



Edition August 2000

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Contents

1 Preface

This operating manual describes the E45, E85, CS45 and FC45 models of the RM600 E computer system with the 64-bit Reliant® UNIX® 5.45 operating system.

These models are referred to here for short as the RM600 E system, provided further differentiation is not required. Thus the RM600 E system fits into the high-end or enterprise class of high-performance multiprocessor systems based on RISC technology with an R12000®processor from MIPS® and a symmetrical multiprocessor (SMP) architecture. The system has a 360-MHz CPU and - depending on the model - can be equipped with up to 24 processors and up to 24 Gbytes of main memory.

Reliant UNIX is a standardized open operating system, which meets the most stringent requirements in terms of reliability and availability of hardware and software both in commercial and technical application areas.

These models offer excellent performance features including new fibre channel technology and Cluster Interconnect via Scalable Coherent Interface (SCI), both of which were developed from the perspective of high availability. We are also placing great emphasis on reliability and multiway technologies so that ongoing system operation can be guaranteed even if a connection fails. The new 64-bit PCI subsystem also enables extensive and high-performance enhancement of the external I/O subsystems.

The RM600 CS45 Dual model has been optimized specially for RCS II (Reliant Cluster Server II), the high availability solution from Siemens whose multi-phase concept is ideally suited to fulfill both basic availability requirements and the most stringent demands in general. With its innovative RM600 E system architecture, the RM600 CS45 Dual offers two independent systems in one cabinet, which can be extended to a two-node cluster in a single cabinet.

The RM600 FC45 system allows the system disks to be backed up within the cabinet. With two FC45 systems, a complete high availability solution (up to 2x12 processors, up to 648 Mbytes of data backed up) with FC disk technology and high redundancy of components can be implemented.

1.1 Target group

This operating manual is intended for those responsible for installing the hardware and ensuring that the system runs smoothly. It is easier to come to terms with the various connection options if you are familiar with the hardware (e.g. controllers, cache) and communications (e.g. channels, protocols). Knowledge of the UNIX or Reliant UNIX operating system is a prerequisite. For more detailed information on the Reliant UNIX operating system, please refer to the publications listed at the back of this manual.

This manual does not provide a technical description of the services that can be carried out exclusively by the Fujitsu Siemens Computers GmbH Service department or by trained specialists.

1.2 Summary of contents

It is essential that you read the chapter “Important notes” on page 5 **before** working with the RM600 E system. It contains important information on how to install and operate the system safely.

Refer also to the chapter “Environmental protection and service” on page 179.

The hardware of the RM600 E system is described in the chapter “The system components” on page 23. This chapter gives you an insight into how the system operates from within, providing you with useful information should you wish to extend your system.

The chapters “Installing hardware” on page 47 and “Startup and operation” on page 61 explain everything from installing the cabinets to starting up the operating system. The system administrator can begin configuring file systems and login names, and installing software packages, when the system prompt is displayed.

Please follow all instructions in the sequence specified in this manual in order to avoid errors and enable you to come to grips with the system. Furthermore, you should always observe the device-specific information that is included with the various devices (e.g. the terminal).

You will find more useful information in the reference section at the end of this book, in the chapters “Glossary” on page 183, “Related publications” on page 207 and in the index.

1.3 Certified operating manuals – The proof of quality

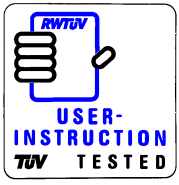
In order to further improve the quality of our operating manuals for RM600 E systems, these manuals are examined thoroughly by an independent body, the RWTÜV in Essen.

The manuals are checked against a criteria catalog developed by the RWTÜV in the following strategic areas:

- General comprehensibility
- User friendliness
- Security, adherence to relevant standards, laws and guidelines
- Layout and quality, legibility
- Correspondence with product

The operating manual will not be tested in isolation, rather together with the product: The examiner works with a system as it is delivered, and tries to unpack it, set it up and commission it following the instructions in the operating manual. This makes it very clear whether the product and manual correspond.

At the same time, the audit provides useful tips for improving the quality of the manuals.



Evidence of having passed the test successfully is provided by the TÜV audit symbol.

The operating manuals for the RM systems are the first manuals in the IT sector to have faced this challenge and both German and English versions have been awarded the audit symbol.

1.4 Notational conventions

In this manual, the following notational conventions are used:

`Typewriter text`	denotes system output such as text on the screen and on the system cabinet's LCD (Liquid Crystal Display)
`Bold typewriter text`	refers to user input in examples
Italics	in the main body of text denote commands, file names, menu names, and entries
Bold	highlights particular elements in the text
Key	keys or key combinations within the main body of text
	additional information and tips
	warning that your health, the functionality of your system, or the security of your data are at risk; this information should be strictly observed
►	manual actions performed by the user
-->	shows ultimate possible solution in case of error recovery or in flowcharts
●	this sign or
–	indicates an element in a list

2 Important notes

This chapter contains important information that you must observe when using your RM600 E system. This includes technical system data such as dimensions, weight, noise level, electrical values, information on electromagnetic compatibility (EMC), information on the required environmental and climatic conditions, interference immunity and communication controller licensing.

The notes on safety, which are summarized in the next section, are also extremely important. You should read these carefully before you install and start up the RM600 E system. These safety notes are also contained in the relevant safety manual for the RM300, RM400, RM600 and SR2000 system families, which has been supplied with your RM600 E system. This manual contains notes on safety in all languages of the European Union (including Norwegian).

2.1 Notes on safety

The RM600 E system complies with the appropriate safety standards for IT equipment, including electronic office equipment for use in the office environment. If you are not sure about the validity of the installation in the intended environment, please contact our Service department.

The following safety guidelines, which are grouped below under different subject headings, should be strictly followed.

Packaging and transport

- You can transport and connect up a system that consists of only one small system unit (E45 model) yourself. Because the cabinet is quite heavy, at least two people should assist in transporting it.
- Transport each device in its original packaging or in other suitable packaging that will protect it against shock or impact.
- A system comprising a number of RM600 E cabinets (multi-cabinet system) must only be transported and connected up by our Service department (for example when relocating).
- Condensation may occur if the device is transported into the computer room from a cold environment. Wait until the device is at room temperature and is completely dry before starting it up, i.e. allow for an acclimatization period of at least two hours.

Setup and installation (except BBU)

- Fire extinguishers, preferably carbon dioxide, should be kept in a visible location near the system.
- You should always keep the key near the system, if possible in a glass case, so that the CPU (system unit) can be switched off immediately in case of an emergency.
- Please note the environmental conditions described in the section “Technical data” on page 12 before installing and operating the device.
- The cabinets and directly connected external peripheral devices should be connected to the same power distributor (sub-distribution board). Otherwise you run the risk of losing data if, for example, the central processing unit is still running but the expansion cabinet has failed during a power failure.
- If redundant power supply units are installed in one cabinet, the individual power supply units in this cabinet must be connected to different phases of the mains power supply.
- Lay the cables so that nobody can trip or fall over them or that they can be damaged. When connecting the device, please read the notes in the chapter “Installing hardware” on page 47.
- Never connect or disconnect data transmission lines during a storm (danger of being hit by lightning).
- In the case of systems comprising several cabinets, a separately fused socket must be available for each cabinet.
- All models are equipped with one to three security tested and approved power supply cables. They must only be connected to a properly grounded socket outlet (otherwise you could get an electric shock).
- When attaching additional components to the device, the cables must be connected or disconnected in the sequence described in the chapters “Installing hardware” on page 47 and “Moving your system” on page 163.
- Please ensure that the socket on the device, the mains isolating switch on the respective cabinet, or the grounded socket outlet of the housing installation is not obstructed in any way, so that the power cable of the small cabinets can be pulled out of the socket in case of

emergency (e.g. the housing or power cable is damaged, liquid or a foreign body has entered the device). Furthermore, the housing installation should have a circuit breaker that disconnects the sockets from the electric circuit. The power supply can then be interrupted in an emergency.

Operation

- Before operation, check that all cables and lines are perfect and undamaged. You should also ensure that all connections are secure. Faulty shielding or cabling can be very dangerous (electric shock) and may adversely affect other devices.
- Make sure that no foreign objects (jewelry, paper clips, etc.) or liquids fall into the device. You could get an electric shock or short circuit the system.
- Unauthorized opening of the device may also present a considerable risk to users. Unauthorized opening of the devices will result in loss of guarantee, and will exempt Fujitsu Siemens Computers AG from any liability.
- Proper operation of the system and maintenance of the EMC limit values can only be guaranteed if the housing cover is mounted and the doors are closed (ventilation, fire protection, shielding against electrical, magnetic, and electromagnetic fields).
- Air inlets and outlets in the front and rear door as well as in the top cover must be left free, i.e. must not be obstructed.
- In case of **emergency**, the devices must be disconnected from the power supply **immediately** and our Service department must be notified.
- Never move a magnetic disk drive or a system when it is operating and observe the **shutdown** time after switching off the system. The read/write heads are hovering an extremely short distance above the surface of the magnetic disk for approx. 30 seconds after switching off a magnetic disk drive or system (**shutdown time**). External forces (e.g. dust, vibrations, etc.) that exceed certain values will inevitably cause impact between the read/write heads and the magnetic disk surface, thereby resulting in loss of data.
- Before opening the CPU (system cabinet), switch off the device and then remove the power plug.

Systems with BBU (Battery Backup Unit)

- Please note the following points in relation to cabinets which are connected to a **BBU cabinet (external BBU)**:
  - The BBU cabinet must only be opened by our Service department or by authorized specialists.
  - The BBU cabinet must only be connected to the power supply by our Service department or by authorized specialists, in accordance with local regulations.
  - Installation of the BBU cabinet (connection to the system) and maintenance work must only be carried out by our Service department or by authorized specialists.
  - The grounded socket outlet of the BBU cabinet or the fuses (automatic circuit breakers) of the housing installation assigned to a BBU cabinet must be freely accessible.
  - The batteries of the BBU cabinet may only be installed and removed by our Service department or by authorized specialists.
  - Cabinets **connected to a BBU cabinet (external BBU)** are disconnected from the mains by pulling out the plug, but voltage is still maintained. In this case, it is the BBU that maintains the voltage.

  For this reason, the BBU must also be disabled as follows **before** the power plug is pulled out:

  ► Enter the shutdown command as described in section “Shutting down the system with the shutdown command” on page 73. In the case of the CS45 Dual model, enter the command for both systems.

  or

  ► Turn the keyswitch on the control panel (on the CS45 Dual, on both control panels in succession) of the system cabinet to the right to the POWER position, hold it down and **at the same time** press the ON/OFF button.

  If the BBU cabinet is also to be disconnected from the power supply, you should then pull out the power plug of the BBU cabinet, or remove the allocated fuses from the housing installation.

Switching off

- Switching off the system cabinet does not disconnect the cabinet, or the other RM600 E units, from the power supply. Each device can only be disconnected from the power supply by removing the power plug (see figure 1 on page 10, small cabinets) or by switching the mains isolator (see figure 2 on page 11, large cabinets).

  Devices **with** a built-in battery backup unit (**internal BBU, small cabinets only**) or **with** a connection to a **BBU cabinet** (**external BBU,** all cabinets) for bridging a power failure, continue to operate if only the power plug is removed or the mains isolator is switched. Therefore with such devices, the BBU must be switched off as follows **before** removing the power plug:

  ► Enter the shutdown command as described in section “Shutting down the system with the shutdown command” on page 73

  or

  ► Turn the keyswitch on the control panel of the system cabinet to the right to the POWER position, hold it down and **at the same time** press the ON/OFF button.

- Switching off the peripheral devices does not disconnect them from the power supply. To do this, you must pull out the power plug.

Maintenance, upgrades and repairs

- The service life of batteries is approximately five years, after which they should be replaced to ensure correct functioning. Batteries must only be replaced by authorized specialists. When disposing of used batteries, the local regulations for the disposal of hazardous waste must be observed.
- When cleaning the devices, please read the notes in the chapter “Maintaining the hardware” on page 155.
- Data security is largely dependent on the condition of the data media used. In order to guarantee data protection, therefore, certain rules must be observed when handling data media and the associated drives. They are explained in the chapters “Using data media” on page 107 and “Operating the drives” on page 123.

- If expanding the system, only use parts that have been approved by Fujitsu Siemens Computers GmbH for use in this system. Use of other parts could impair the electromagnetic compatibility (EMC) or the safety standards and result in system malfunction. Our Service department can provide information on what parts may be installed.
- Repairs to the device must only be carried out by authorized specialists. Makeshift repairs may present a considerable risk to users (electric shock, risk of fire).

2.2 Disconnecting cabinets from the mains

If the RM600 E system is switched off with the *shutdown* command (page 73) at the control panel using the keyswitch, the cabinets are still connected to the power supply.

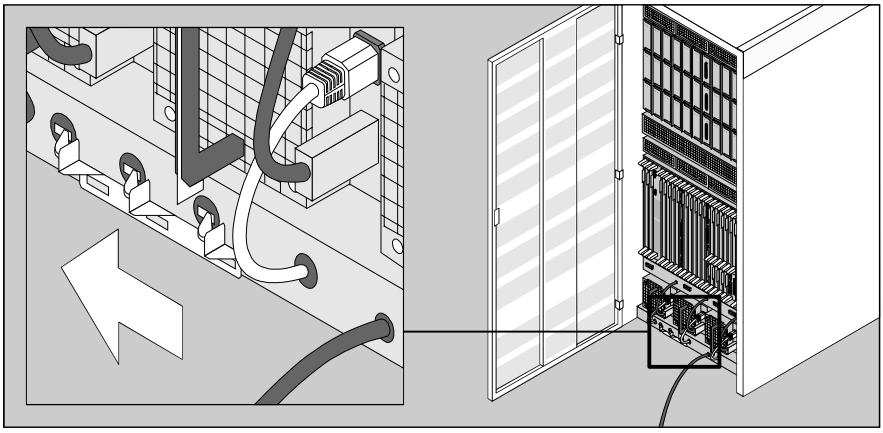


Figure 1: Disconnecting a system from the mains (small cabinets, with two power supply units)

► Remove both power plugs. If three power supply units are installed, remove all three power plugs.

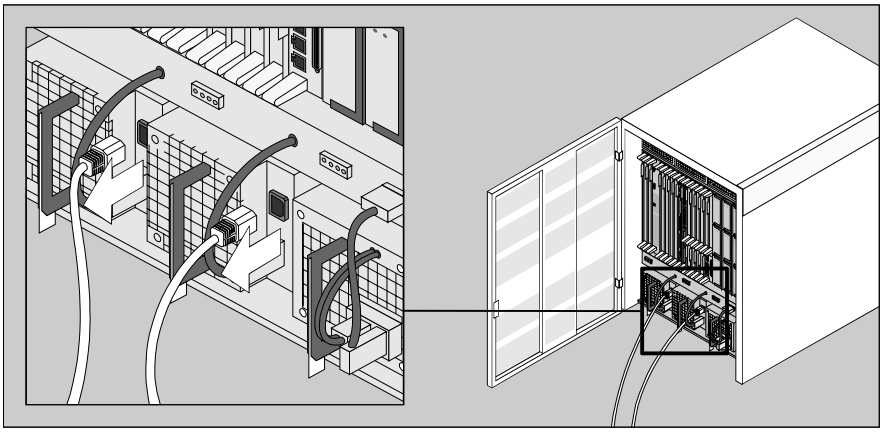


Figure 2: Disconnecting a system from the mains (large cabinets)

► Slide all mains isolating switches in the direction of the door.

2.3 Technical data

On the back of the cabinets there is an ID plate (e.g. SY64, BG62 etc.), which is used to uniquely identify each cabinet (see also “Models and cabinets of the RM600 E” on page 25).

The RM600 E system cabinets are available in two different configuration variants:

Small cabinets (Standard 19’’ chassis)	System cabinet (SY64), expansion cabinet (BG63), I/O cabinet (BG62), BBU cabinet (BG65).
Large cabinets (24’’ chassis)	System cabinet (SY72), expansion cabinet (BG66), I/O cabinet (BG69).
FC600 E, Fibre Channel magnetic disk subsystem	Peripheral cabinet (BG67).

The tables below contain the technical data and the environmental conditions required for the RM600 E system.

Electrical data for each cabinet	**System SY64 (small)**	**Expansion BG63 (small)**	**I/O BG62 (small)**	**BBU BG65 (small)**	**Expansion BG66 (large)**
Rated voltage Europe:	220 V–240 V	220 V–240 V	220 V–240 V	220 V–240 V	220 V– 240 V
USA[1]:	208 V	208 V	208 V	208 V	208 V
Rated frequency:	47–63 Hz	47–63 Hz	47–63 Hz	47–63 Hz	47–63 Hz
Rated current[2] for 230 V:	2.7 A	3.9 A[3]	2.5 A[3]	9.5 A	4.0 A[4]
Power[5]:	1300 VA	810 VA	510 VA	1950 VA	1620 VA
Active power[5]:	1250 W	810 W	510 W	1156 W	1620 W
Protection class:	1	1	1	1	1
Safety standards maintained:	EN 60950 UL 1950 CSA 22.2 No. 950	EN 60950 UL 1950 CSA 22.2 No. 950	EN 60950 UL 1950 CSA 22.2 No. 950	EN 60950 UL 1950 CSA 22.2 No. 950	EN 60950 UL 1950 CSA 22.2 No. 950

Electrical data for each cabinet	**System SY72 (large) E85**	**System SY72 (large) CS45/FC45**	**FC45 Galaxy boxes**	**I/O BG69 (large)**	**Peripheral BG67 FC600 E[6]**
Rated voltage Europe:	220 V– 240 V	220 V– 240 V	220 V– 240 V	220 V– 240 V	100 V– 240 V
USA[1]:	208 V	208 V	208 V	208 V	208 V
Rated frequency:	47–63 Hz	47–63 Hz	47–63 Hz	47–63 Hz	47–63 Hz
Rated current[2] for 230 V:	3.9 A[4]	2.7 A[4]	5.2 A[4]	2.9 A[3]	2.1 - 5.2 A
Power[5]:	1800 VA	1300 VA	1150 VA	670 VA	1150 VA
Active power[5]:	1750 W	1250 W	1150 W	640 W	1150 W
Protection class:	1	1	1	1	1
Safety standards maintained:	EN 60950 UL 1950 CSA 22.2 No. 950	EN 60950 UL 1950 CSA 22.2 No. 950	EN 60950 UL 1950 CSA 22.2 No. 950	EN 60950 UL 1950 CSA 22.2 No. 950	EN 60950 UL1950 CSA 22.2 No. 950

Table 1: Electrical data for each cabinet

1 208 V between two phases
2 The rated currents must be protected by 16 A slow blowing fuses. Rated current per phase
3 The rated current is distributed from one to two phases with power supply redundancy.
4 The rated current is distributed from two to three phases with power supply redundancy.
5 refers to maximum configuration; corresponds to heat dissipation
6 refers to 1 box in the basic configuration

The I/O shelves in the E85 and in the CS45 Single correspond to the specifications of the BG 69 I/O cabinet.

The values listed above were determined using the following configurations:

Configuration	
E85	6 * fully configured CPU boards 2 * EHIOS 12 * PCI boards
CS 45 D CS 45 S E45-12	3 * fully configured CPU boards 2 * EHIOS 12 * PCI boards 14 * SCSI drives
FC 45	3 * fully configured CPU boards 2 * EHIOS 12 * PCI boards 14 * SCSI drives 3 * Galaxy boxes

Table 2: System cabinet configurations

Environmental conditions	**System SY64 (small)**	**Expan-sion BG63 (small)**	**I/O BG62 (small)**	**BBU BG65 (small)**
Climatic category - operation: (acc. to EN 60721-3-3)	3K2	3K2	3K2	3K2
– Temperature (°C):	15 – 32	15 – 32	15 – 32	15 – 32
– Relative humidity (%):	10 – 75	10 – 75	10 – 75	10 – 75
Climatic category - transport: (acc. to EN 60721-3-2)	2K2	2K2	2K2	2K2
– Temperature (°C):	-25 – +60	-25 – +60	-25 – +60	-25 – +60
– Relative humidity (% at 30°C:	75	75	75	75
Dust class:	3S2	3S2	3S2	3S2
Clearance for adequate ventilation				
– Minimum space front and rear (mm):	200	200	200	200
Space required for servicing				
– Minimum space (mm) front:	1000	1000	1000	1000
rear:	800	800	800	800

Environmental conditions	**System CS45/FC45 SY72**	**System E85 SY72**	**Peripheral FC600 E BG67**	**I/O BG69**	**Expansion BG66**
Climatic category: (acc. to EN 60721-3-3)	3K2	3K2	3K2	3K2	3K2
– Temperature (°C):	15 – 32	15 – 32	15 – 32	15 – 32	15 – 32
– Relative humidity (%):	10 – 75	10 – 75	10 – 75	10 – 75	10 – 75
Climatic category - transport: (acc. to EN 60721-3-2)	2K2	2K2	2K2	2K2	2K2
– Temperature (°C):	-25 – +60	-25 – +60	-25 – +60	-25 – +60	-25 – +60
– Relative humidity (%) at 30°C:	75	75	75	75	75
Dust class:	3S2	3S2	3S2	3S2	3S2
Clearance for adequate ventilation:					
– Minimum space front and rear (mm):	200	200	200	200	200
Space required for servicing					
– Minimum space (mm) front:	1000	1000	1000	1000	1000
rear:	800	800	800	800	800

Table 3: Environmental conditions for the cabinets

Dimensions and weight for each cabinet	**System SY64 (small)**	**Expansion BG63 (small)**	**I/O BG62 (small)**	**BBU BG65 (small)**
Width (mm): Depth (mm): Height (mm): Weight (kg):	600 800 750 approx. 205	600 800 750 approx. 230	600 800 750 approx. 170	600 800 750 approx. 404

Dimensions and weight for each cabinet	**System SY72 (large)**	**Peripheral BG66 (large)**	**I/O BG69 (large)**	**Peripheral FC600 E BG67**
Width (mm): Depth (mm): Height (mm): Weight (kg):	730 930 1825 approx. 450	600 800 1380 approx. 330	730 930 1825 approx. 400	600 930 1825 approx. 330

Table 4: Dimensions of cabinets

Noise level for each cabinet	**System SY64 (small) SY72 (large)**	**Expansion BG63 (small), BG66 (large)**	**I/O BG62 (small)**	**I/O BG69 (large)**	**Peripheral FC600E BG67**
Sound power level (L_{WAd}):	<7.5 B				
Workplace sound pressure level (L_{pAm}):	< 60 dB				

Table 5: Noise leve for each cabinet

EMC data	BG67	SY72, BG69
European standard:	EN 55022-B	EN 55022-B; FC45: EN 55022-A
USA:	FCC Class A	FCC Class A
Canada:	C 108.8 Class A	ICES-003
Interference immunity:	EN 50082-2	EN 50082-2

Table 6: EMC data for each cabinet

2.4 SIDATA facility

The RM600 E offers full SIDATA support (SIDATA: system installation by the user), which means that you can install and connect small single-cabinet systems, (E45 models only) which have no other RM600 E cabinets apart from the system cabinet.

Because the system cabinet is quite heavy, at least two people should assist in unpacking and transporting it.

Multi-cabinet systems may only be installed by our Service department. This does not include connecting external peripheral devices to existing controllers. These have separate operating instructions.

Please note the list of activities contained in the chapter “Installing hardware” on page 47, which may only be carried out by our Service department or by the customer.

2.5 Tools for connecting peripheral devices

You will need the following tools, all of which can be bought in most hardware stores, to carry out the activities described in this manual yourself: a normal flathead screwdriver (2 mm), a 4-mm screwdriver and a Phillips screwdriver.

2.6 Notes on the battery

Improper handling of batteries can be dangerous and may, for example, cause a fire. Do not open, pierce, or exert pressure on a battery. Never throw batteries into a fire. When disposing of used batteries, the local regulations for the disposal of hazardous waste must be observed. The RM600 E contains

batteries in the emergency power supply (BBU, if available), in the Uninterruptible Power Supply (UPS, if available) connected upstream, and in the display workstations. The service life of batteries is approximately five years.

Please read the information on the Battery Backup Unit (BBU) in the section below. It contains notes on the service life of BBU batteries in relation to the ambient temperature.

2.7 Service life of the batteries

The service life of the batteries depends on the ambient temperature of the BBU cabinet, and is usually in the region of three to five years:

Ambient temperature	**Service life**
15 – 22 °C	5 years
22 – 27 °C	4 years
27 – 32 °C	3 years

Once the service life of the batteries has expired, you should have them replaced by our Service department.

The customer must accept full responsibility if the batteries are left in the BBU cabinet after their service life has expired.

2.8 Notes on CE conformity

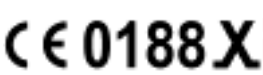
CE The RM600 E complies with the requirements of EC directive 89/336/ECC concerning “electromagnetic compatibility” (EMC) and of EC directive 72/23/ECC named “low voltage directive” (LVD). The CE symbol is located on the back of the device.

2.9 Notes on interference immunity

All other devices connected to the RM600 E as described must also be made immune to interference in accordance with the EC directive 89/336/ECC or with the BMPT (Bundesministerium für Post und Telekommunikation/Federal Ministry for Post and Telecommunications) directive No. 1046/84 or No. 243/91.

Products which meet these requirements are accompanied by a certificate issued by the manufacturer and/or have the CE symbol. Products not complying with these requirements may be operated only after special authorization has been granted by the BZT (Bundesamt für Zulassung in der Telekommunikation/Federal Bureau for Licensing in Telecommunications).

2.10 Notes on communication controller licenses



The integrated WAN and ISDN controllers comply with the specifications of EU directive 91/263/EWG and the currently valid legislation on telecommunications licensing.

2.11 Notes on terminals

Terminals (screen and keyboard) must only be opened by trained personnel.

Unauthorized intervention, particularly involving changes to the high voltage, or the integration of other CRT types, can cause a considerable increase in X-ray emissions. Devices modified in this way no longer comply with the terms of the license and must not be operated.

Further information on safe operation and on ergonomic positioning can be found in the operating manual for the terminals (screen and keyboard).

3 The system components

This chapter describes the hardware components of the RM600 E. It contains important information relevant to those who wish to familiarize themselves with the structure of their system or obtain an initial insight into the expansion options available.

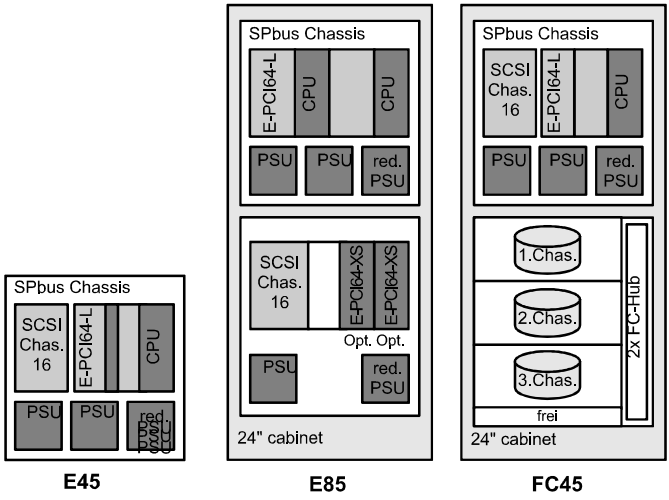
The RM600 E is a multiuser system with a modular structure that runs the Reliant UNIX 5.45 (64 bit) operating system. It comprises a number of hardware components, which either belong to the basic configuration or are available as optional components for expanding the system.

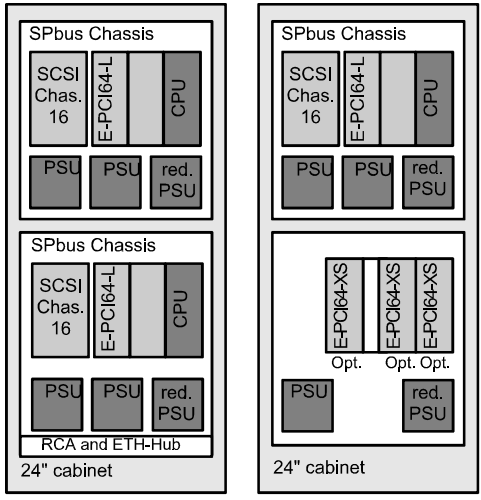
This chapter describes the components that are supplied with the system.

It may be the case that one of the components listed or described in this chapter is not yet released, and is therefore not available. Please ask your local Siemens AG office when such a component will be made available. They will also be able to help you with any other queries you may have on system expansion and on using existing components.

3.1 Models

The RM600 E series with the 360 MHz processor comprises the following models (PSU=Power Supply Unit):





3.2 Models and cabinets of the RM600 E

The RM600 E system cabinets are listed below. The ID plate on the rear of the cabinet contains an identification code that uniquely identifies each cabinet.

Cabinets of the RM600 system	**Identification**	**E45**	**E85**	**CS45-Single**	**CS45-Dual**	**FC45**
System cabinet (small)	SY64	1				
System cabinet (large)	SY72		1	1	1	1
Expansion cabinet (small)	BG63	0–4	0–8	0–2	0–4	0–2
Expansion cabinet (large)	BG66		0–8	0–2	0–4	0–2
I/O cabinet (small)	BG62	0–1				
BBU cabinet (small)	BG65	0–2	0–2	0–2	0–2	0–2[1]
I/O cabinet (large)	BG69		0–1		0–1	0–1
Peripheral cabinet FC600 E	BG67	0–1	0–1	0–1	0–1	0–1

Table 7: Models and system cabinets

[1] Emergency power supply for FC disks via external UPS

The BBU cabinet contains the Battery Backup Unit, which supplies power to the cabinets connected to the BBU cabinet in the event of a power failure. In contrast to the internal BBU, which can only be installed in the small RM600 E cabinets, the BBU cabinet is referred to as the external BBU.

The BBU cabinet may only be opened by our Service department or by authorized specialists.

A maximum of five voltage transformers can be integrated in the BBU cabinet. For each obligatory power supply unit, a voltage transformer is required for connection to a BBU cabinet. Redundant power supply units do not need voltage transformers. If more than five voltage transformers are needed, a further BBU cabinet will be required. The E45 model requires two voltage transformers. The E85 and CS45 models require three voltage transformers and two connection cables. With the FC45 model, only the upper part can be connected to a BBU, while the lower part is connected to a UPS. It is recommended that you connect the entire system to a UPS.

The RM600 E models E45, E85, CS45 and FC45 differ with regard to the number of processors and cabinets. The CPUs are equipped with two normal and one redundant power supply unit, while the expansion units have a second redundant power supply unit.

Model	Number of processors	Processor clock speed	Number of cabinets[1]	Main memory capacity
RM600 E45	1–12	360 MHz	1–6	512 Mbytes–12 Gbytes
RM600 E85	4–24	360 MHz	1–11	1–24 Gbytes
RM600 CS45 Single	4–12	360 MHz	1–10	2–12 Gbytes
RM600 CS45 Dual	2–12[2]	360 MHz	1–10	1–12 Gbytes[2]
RM600 FC45	2–12	360 MHz	1–6	1–12 Gbytes

Table 8: Configuration of models

[1] Excluding BBU cabinets, including system cabinet
[2] For every node in the cabinet

The RM600 models, E45, E85, CS45 Single and FC45 offer the same number of SPbus slots (see the section “Central Processing Unit (CPU) and bus systems” on page 28). The way the slots are assigned depends on how the system is configured. More detailed information in this regard is available from your local Fujitsu Siemens Computers GmbH office.

All cabinets (except the BG67) are equipped with one or two control panels. The control panel also has an LCD (Liquid Crystal Display) for displaying EIP (Environmental Interface Processor) messages in relation to events in the cabinet. The control panel and EIP are described in detail in the chapter “Startup and operation” on page 61.

This figure shows a large E85 system cabinet (SY72). It has a (closed) front door on the right, behind which the drives are located, and a cover on the left, behind which the control panel is located. For more information, refer to the section “The control panels” on page 62 in the chapter "Startup and operation".

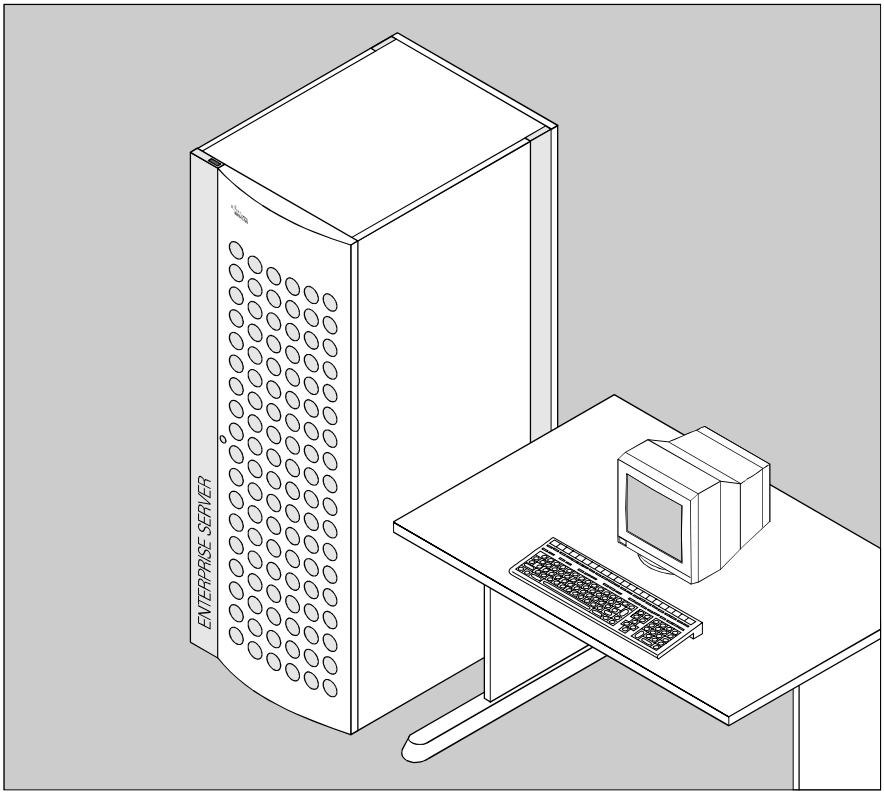


Figure 3: RM600 E system cabinet (large)

3.2.1 FC600 E, fibre channel magnetic disk subsystem

The FC600 E (BG67) cabinet can also be connected to the 19" FC hard disk chassis. Dual-ported magnetic disks are integrated in these 19" FC chassis by means of an FC interface. The FC45 model comes with this cabinet already integrated.

There is a separate operating manual for this cabinet with its installed FC chassis. You will find the title of this manual in the “Related publications” on page 207.

One or two 1-2 uninterruptible power supply units (UPS) can be installed for providing emergency power supply.

The 19" chassis may only be installed by our Service department since the FC600 E unit is not SIDATA compatible. Contact your local branch office any time for further information about this device.

3.3 Central Processing Unit (CPU) and bus systems

The RM600 E is based on one or more RISC microprocessors, depending on the configuration. These RISC microprocessors have the following features:

– R12000 processor
– 360 MHz clock frequency
– integrated floating point processor (coprocessor)
– two 32-Kbyte primary caches and 8/16-Mbyte secondary cache

A maximum of 24 CPUs can be operated.

The main memory is designed with the ccNUMA architecture (cache coherent Non Uniform Memory Access, see “Glossary” on page 183). 256-Mbyte storage modules (2 x 128-Mbyte memory banks) are available for main memory expansion. The main memory can be expanded to 8 Gbytes in the E45 model, to 24 Gbytes in the E85 model and to 12 Gbytes for each node in the CS45 and the EC45 model regardless of the processor configuration.

Access to the main memory and secondary cache is secured by an ECC logic (Error Correction Code). Single bit errors are corrected automatically, while double bit errors are noted and reported.

The RM600 E bus systems

The RM600 E system has a number of different bus systems, which provide optimum control for data flow between the different hardware components. The following elements are of major importance:

– CP bus (Cluster Processor Bus)
– SPbus (Synchronous Pipelined Bus)
– Bus coupling system
– PCI bus (Peripheral Component Interconnect)
– PCI bus coupling system (EHIOS-PCI)
– SCI adapter (Scalable Coherent Interface)
– SCSI bus (single ended)
– FC (Fibre Channel)

In all models, the disks in the 16-slot chassis are connected to SCSI-SE submodules on the EHIOS basic.

In the FC45 model, the Galaxy boxes are connected via Fibre Channel.

The SPbus is a high-performance bus, which handles all transactions between the main memory modules, the CPUs and the I/O systems. EHIOS (Enhanced High Performance Input Output System) boards are used in all models.

The EHIOS basic controller (in the PCI subsystem) controls booting, communicates with the console and monitors various environmental conditions in the system via the EIP (Environmental Interface Processor), for example temperature, ventilation and power supply. This controller also provides the teleservice interface and controls the integrated operable drives.

The CP bus is a high-performance bus, which connects the CPUs on a processor board both to each other and to the main memory modules.

3.4 Connection options for I/O devices and networks

A range of controllers can be used in the RM600 E for controlling the data flow with the help of various drives and I/O devices. These controllers are connected to the CPU and main memory via the various bus systems. Some controllers are used to control installed devices (e.g. diskette drive, hard disks), while others enable external peripheral devices (e.g. RAID subsystems, backup drives) or data lines to be connected. In such cases, the devices or data lines are connected by means of ports which are located on the respective controller, and which are accessible from the rear of the cabinet.

The chapter “Installing hardware” on page 47 describes what should be noted when connecting the various devices and data lines to the controllers. The controllers are described briefly below in order to provide you with an overview of the various controllers and connection options.

3.4.1 SPbus controller

EHIOS

- EHIOS basic subsystem (Enhanced High Performance Input Output System)

  The RM600 E models are fitted with one of these controllers as standard; this controller offers the following connection options in addition to the PCI slots:

  – Console
  – Modem for Teleservice (for diagnostics)
  – One SCSI submodule (8 bit, SE) for operating the boot drive (CD-ROM by default) and for removable media drives that can be operated from the front side of the system cabinet
  – Two SCSI submodules (16 bit, SE) for the system disks (root drive, swap device)
  – One Ethernet 10/100 Mbit/s PCI controller

  The PCI subsystem offers two PCI buses, each with three primary (64-bit) and 3 secondary (32-bit) PCI slots. One primary is assigned one PCI Ethernet controller.

- EHIOS-SCI with two SCI adapters for connecting external PCI subsystems (E-PCI64-XS)

- E-PCI64-L (EHIOS with local PCI subsystem, i.e. in the system cabinet)
- EHIOS-CI controller

  The EHIOS-CI controller (Cluster Interconnect) is a high-availability component available from Reliant UNIX SPS 2.0. The EHIOS-CI comprises the actual EHIOS-V01 board and the SCI-NIC board (Network Interface Controller) on top of this. The CI supports high-performance connections between several nodes in a cluster.

- Cluster connect via SCI switch

  The SCI switch (Scalable Coherent Interface) is required if there are more than two systems in the cluster.

  The switch has four ports for connecting systems with copper cables. SCI switches are supplied as desktop devices. Two SCI switches are required for a redundant configuration.

64-bit PCI subsystem

The PCI controllers require a bus coupling system (E-PCI64-L) in order to be able to exchange data with the SPbus. The controllers can be installed both in the system cabinet as well as in an I/O and an expansion cabinet. If the PCI subsystem (E-PCI64-XS) is installed, an EHIOS controller with an SCI adapter (SCI HE adapter or SCI 4U adapter) must be available in the system cabinet. The modules are connected to one another by means of SCI.

The hard disks in the expansion cabinet can be connected to one another by means of a PCI subsystem, which is connected to the system cabinet by means of SCI cabling. They are controlled by the PCI controller and allow read and write access. SCSI frames or chassis that can hold either eleven (in the system cabinet only) or 36 hard disks are available for installing the hard disks.

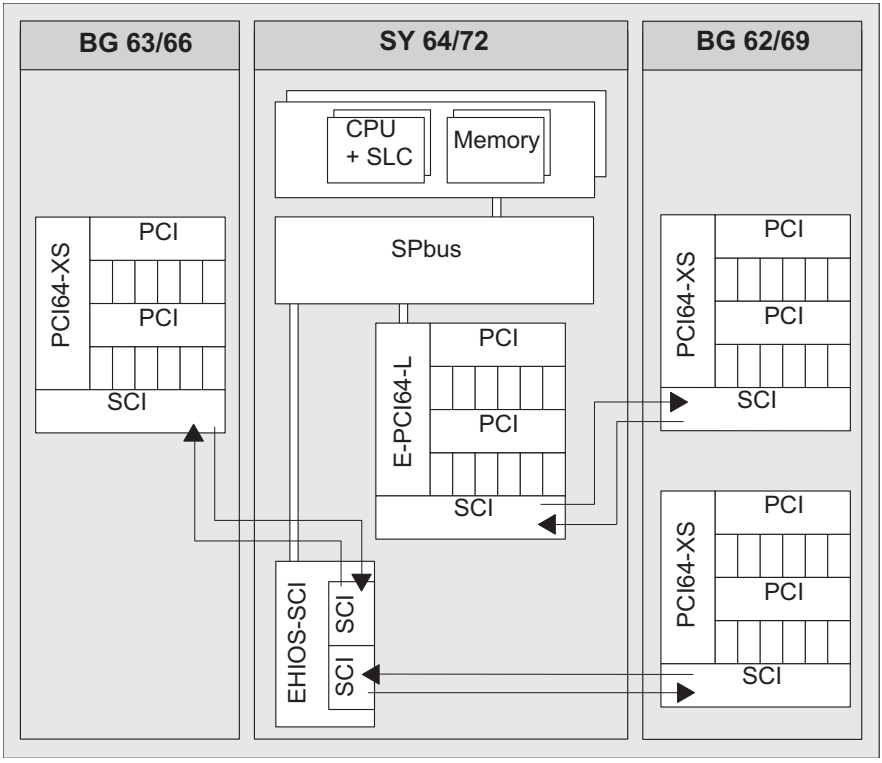


Figure 4: The RM600 E bus systems

3.4.2 PCI controller

The 32-bit and 64-bit PCI controllers can be used both for the 32-bit and 64-bit PCI bus.

- LAN P-ETH controller

  (standard Ethernet controller)

  The P-ETH (PCI LAN Controller Ethernet) allows the RM600 E system to be connected via the PCI bus to a Fast Ethernet 100 Base TX or 10 Base T.

- Gigabit Ethernet controller

  The Gigabit Ethernet controller supports operation in a fiber optic network. This is a 64-bit PCI controller but can also be used in 32-bit PCI subsystems.

- LAN P-LCT controller

  The P-LCT (PCI LAN Controller Token Ring™) allows the RM600 E system to be connected to a Token Ring network based on a TCP/IP or SNA protocol (Systems Network Architecture). It is intended for connecting to networks that operate with transmission rates of 4 Mbit/s or 16 Mbit/s.

- LAN P-LCF controller

  The P-LCF or FDDI (Fibre Distributed Data Interface) controller, as it is also known, allows the RM600 E system to be connected to a fibre optic network.

  Controllers are available with a DAS (Dual Attached Station) interface as well as a SAS (Single Attached Station) interface. Both multi-mode fibre and single-mode fibre can be used as optical transmission media.

- PCI-ATM controller (155 Mbit/s)

  This controller allows the RM600 E system to be connected to an ATM network.

- WAN PWXV controller

  A WAN PWXV (PCI WAN controller with X. and V. interfaces) is available with either two or four channels for connecting the system to the WAN. This controller supports pairing with V.24/V.28 interfaces (up to 19.2 KBd) or V.11, X.21/X.25 interfaces (up to 2 Mbit/s total baud rate).

- WAN PWS0 controller

  The RM600E system is connected to ISDN-S0 networks by means of an ISDN (Integrated Service Digital Network) controller, the WAN (Wide Area Network) PWS0 controller.

  The connection is set up via the S0 interface (transfer rate 2 x 64 Kbit/s, -B- channels; 1 x 16 Kbit/s, -D- channels). The controller can operate two S0 interfaces.

- WAN PWS2 controller

  The WAN (Wide Area Network) PWS2 controller can be used to connect the RM600E system to the ISDN-S2 networks.

  The connection is set up via the S2 interface (transfer rate 30 x 64 Kbit/s, -B- channels; 1x 64 Kbit/s, -D- channels). The controller can operate one interface. A hardware-software interface is also used, which is largely compatible with the ISDN-S2 (PRI) ICCS2 controller (ISDN S2 communication controller).

- PCI SCSI controller

  (standard SCSI controller)

  These (16 bit, DF) 20 MByte/s SCSI controllers or 40 MBytes/s SCSI controllers (for external devices only (RAID,....)), can be used to connect disk strings in the system cabinet and expansion cabinets. This controller is also used to connect RAID systems, backup systems and other SCSI devices.

- PCI Fibre Channel controller

  This controller can be used for connections to RAID systems (PXRE-F, Symmetrix) and FC600 E which require an extremely fast transmission route.

  A 64-bit controller is available with a Gigabit Interface Connector (GBIC) with different interfaces:

  a) MMF (multi-mode fibre GBIC) for distances up to 500 m

  b) SMF (single-mode fibre GBIC) for distances up to 10 km

  Both point-to-point connections between two systems and multipoint connections via FC hubs are possible.

  Transceiver and cable (for Fibre Channel)

  Fibre Channel provides various technologies for different distances. The two types of technology supported in the RM600 E are as follows: Multi-mode fibre optic cable for short to average distances 50/62.5 µm and single-mode fibre optic cable for connections of up to 10 km. The following table summarizes the details regarding cable lengths and technologies.

Type	**Distance**	**T and X intersection**	**Comment**
Multi-mode fibre optic 62.5 µm	up to 175 m	SC duplex	for migration only
Multi-mode fibre optic 50 µm	up to 500 m	SC duplex	
Single-mode fibre optic 9 µm	up to 10 km	SC duplex	

Table 9: Fibre optic connections

The following figure shows the different options for RM600 E system connections via the PCI controller.

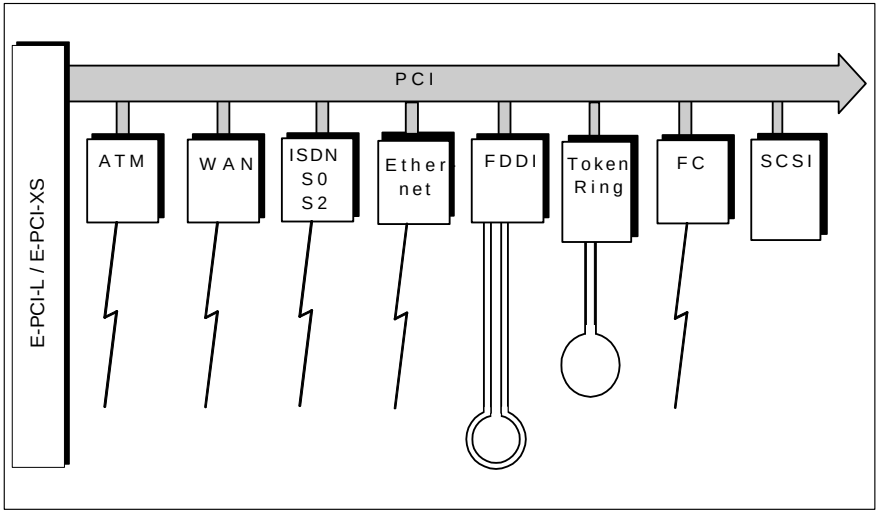


Figure 5: Connection options for the RM600 E system

3.5 Drives and mass storage

The RM600 E has various drives, either integrated in one of the cabinets or housed separately and connected to one of the cabinets via a cable.

The following components can be integrated in one of the cabinets:

– 4.5-Gbyte, 9-Gbyte, 18-Gbyte and 36-Gbyte hard disk drives

  The drives are 3½ inch drives, which are integrated in 3½ inch standard mounting frames. With the FC45 model, the connection is implemented via Fibre Channel.

– Diskette drive for 3½ inch diskettes in 2.0 Mbyte format

– ¼ inch magnetic tape cassette drive for 4-Gbyte cassettes (referred to here as a ¼ inch (4 Gbyte) MTC drive)

– 4.37-Gbyte to 15.91-Gbyte DVD-ROM drive

  The drive can be installed horizontally or vertically. However, horizontal installation is recommended.

  i The drive can only be installed in the special 5 1/4 inch mounting frame in the RM600 E.

Operating system requirement:

Reliant UNIX 5.45 A20	High Sierra Standard File System supported
Reliant UNIX 5.45 A30/B00	UDF format supported

Table 10: DVD-ROM drive

– 4 mm magnetic tape cassette drive for 4-Gbyte or 12-Gbyte cassettes (referred to here as a 4 mm MTC drive)

– 8 mm magnetic tape cassette drive for 20-Gbyte cassettes (referred to here as an 8 mm (20 Gbyte) MTC drive) for 2-Gbyte, 3-Gbyte and 5-Gbyte cassettes (referred to here as an 8 mm MTC drive) and for 5-Gbyte and 7-Gbyte cassettes (referred to here as an 8 mm (7 Gbyte) MTC drive); data compression increases the capacity

– CD-ROM drive (650 Mbyte) for the E45 model

Except for the hard disk drives, 4-mm MTC and diskette, these drives (different models) can also be incorporated in the peripherals box, an auxiliary device that can house up to two drives. The drives for the boxes have different frames and cannot be exchanged as such.

Along with these installable drives, additional components with their own housing can be connected to the RM600 E:

– Optical disk library for WORM disks, ROD and CD-ROM jukeboxes (for data backup and archiving)

  This drive is known as a ROD or WORM changer or jukebox

– MTC jukebox for 8 mm MTCs

– MTC drive (optional with stacker) for ½ inch cassettes with up to 10 Gbytes storage capacity

– ½ inch magnetic tape device

– RAID systems (redundant array of independent disks)

  These storage systems remain operational even if a hard disk fails.

These components are available in different capacities. Some of the devices can also be used in archiving and backup systems with automatic handling for loading media. Your local Siemens AG office has further information in this regard.

3.6 High availability

High availability in a system means that errors caused by hardware, which can cause the system to crash, are dealt with automatically by the system without affecting operation so that the applications remain available for use. The RM600 E models can be equipped optionally with components that permit these measures. They increase the availability of the system and support data security.

3.6.1 High-availability components

Some of these components are outlined below:

– Disk mirroring

  Disk and controller errors are intercepted by creating primary and secondary disk drives on different controllers. From Reliant UNIX 5.45A10, defective hard disks integrated in a 3½ inch mounting frame can be replaced by a trained, experienced system administrator while the system is running, providing certain requirements are met (Online Replacement: OLR).

– Root disk and mirrored root disk
  (connected to submodules on EHIOS; not to PCI controllers)

  The root disk can be mirrored on any hard disk of the same size in the system cabinet. If an error occurs on the root disk, the boot process can be initiated from the mirror disk. The active operating system is likewise contained on the mirror disk. Special measures are required in this case.

– Lockout Auto Recovery (LAR) for modules on the SPbus and controllers in the PCI controllers and SCSI devices

  Hardware modules found to be defective during operation are indicated directly and are not started up the next time the system is switched on (booted) or rebooted automatically.

– Automating regular backup

  The regular backup procedures can be automated using programs, in conjunction with MTC jukeboxes. This means that devices with a total capacity of several Tbytes can be used. Regular data backup is always necessary, even if the security of the data is already guaranteed by mirror disks or the use of redundant systems, for example. The MTC jukebox can be used from two systems (switching between external SCSI peripherals).

– Emergency power supply

  Either one internal (E45 model only) or (alternatively) one external BBU or one UPS (uninterruptible power supply) can be used.

  The external BBU (all models) integrated in the BBU cabinet can be distinguished from the internal BBU primarily on the basis of its higher performance capacity. The BBU maintains the power supply to the cabinet in the event of a power failure. Minor power failures of a few seconds in duration are bridged directly, whereas a shutdown is initiated with longer interruptions. The system can be configured in such a way that an automatic reboot is initiated when power is restored.

  The third option for emergency power supply is a UPS installation. In addition to the RM600 E cabinets, peripheral devices can also be connected to a UPS, where power is also supplied to the peripheral devices in the event of a power failure.

– Redundant power supply units

  The RM600 E cabinets can be equipped with redundant power supply units. This means that with small cabinets failure of one of two power supply units does not have any negative consequences, and with large cabinets one of three power supply units. The defective power supply unit can be replaced during operation (OLR). All power supply units can be increased to n+1 redundancy. A redundant power supply unit is required for each chassis.

The power supply units may only be installed or removed by our Service department.

– Redundant fans

  All RM600 E cabinets are equipped with redundant fans. Each cabinet shelf is equipped with three fan units, each containing two fans. If one of these six fans fails, the remaining five are sufficient for ventilation purposes (with adaptation of rotational speed). The faulty fan can be replaced online (OLR).

The fan units may only be installed or removed by our Service department.

– RAID systems (redundant array of independent disks)

  RAID systems can be connected to the RM600 E system, which ensure uninterrupted access to data even if individual hard disks, fans or power supply units fail.

  The failure of a system or RAID controller and connection cable can also be bridged through configuration and connection using redundant paths (DRAID).

– Redundant systems through 1:1 configurations with switchable hard disks

  The use of redundant systems is a particularly effective way to ensure data security and continuous system operation in the event of errors.

  Both systems can be used productively. As soon as a system crashes, the other system takes over all of its operations in addition to its own. Error recognition and the switch to the other system can take place automatically, so that the system is only interrupted briefly.

3.6.2 System clusters

High-availability components support more complex solutions for increasing the availability of hardware and software, such as combining several systems in clusters. Various configurations are possible depending on the objective of the cluster.

– Redundant systems with shared hard disks

  A multihost configuration offers a means of ensuring the availability of a number of systems, i. e. a system cluster with a maximum of our systems (eight in the E85 model). For service activities, therefore, individual systems can be removed from the cluster both logically and electrically using specific SCSI and FC components.

– Redundant networks for client servers and connecting workstations

  Additional components and redundant networks are used in order to increase availability of applications on the network server and to smoothly intercept a network failure for the connected clients and workstations.

– Reliant Cluster Server (RCSII)

  The Reliant Cluster Server II offers an extensive multi-phase concept for increasing the availability and performance of the overall system. The RM600 CS45 Dual system is specially designed for this purpose. This

system comprises two independent systems, which can be configured to form a cluster with two nodes (refer here to the chapter “Cluster” on page 43).

3.7 Other components and functions

In addition to the hardware components described above, you may find it useful, or even necessary, to install further components for the RM600 E. Some of these components have already been mentioned in this chapter, and are listed again here for the sake of completeness:

– Terminal, RM300, LAN console or PC as console (required for booting and configuring the system). An RM300 can control up to 20 systems.

– Additional alphanumeric or graphics terminals (e.g. X terminals) and various printers.

– Radio clock

  The RM600 E system can be upgraded by a radio clock which controls the system’s time setting by radio. In a system network, for example, this radio control allows the time to be set exactly and absolutely for all participating systems.

  The exact time is provided by the atomic clock at the Federal Institution for Physics and Technology in Braunschweig. The time is sent as a radio signal at regular intervals via a long wave transmitter in Mainfingen, Frankfurt. The geographic reach is 1500 km in radius. The signals are received by the radio clock.

– Teleservice

  With Teleservice tasks such as maintaining the RM600 E system (hardware and software diagnostics), as well as controlling data interchange (file transfer) between the RM600 E and another system, can all be performed from a remote workstation.

  Teleservice is a uniform technical concept for UNIX-based computer systems. Teleservice provides numerous functions for efficient support for local systems over the switched telephone network. This means that services ranging from operator support through to remote maintenance and diagnostics are now directly available on request.

You need the modem supplied in order to use Teleservice. If you require the remote power-on option, you will also need a remote power-on add-on device (FES add-on). In all models, apart from CS45 Dual, the modem is connected to the appropriate V.24 port of the EHIOS basic subsystem (figure 8 on page 57). Teleservice comes pre-installed. CS-45-Dual is the only model with an integrated LAN connection (RCA) for the LAN console.

In the case of the RM300 cluster console or LAN console, the teleservice is connected centrally to the Teleservice port on these consoles; i.e. only one teleservice connection for all network servers.

4 Cluster

It is increasingly the case that individual systems cannot meet the demands placed on them by ever more complex business processes and ever growing requirements for availability of systems, data and scalable performance. One way to avoid the natural limits imposed by single systems is to use a cluster.

A cluster is a configuration of two or more systems that are connected to one another. Each system has its own copy of the operating system and its own applications. From the user's perspective, this type of system appears like an homogeneous system.

We have developed an extensive multi-phase concept for system enhancements based on the RM system family, which aims to increase the availability and efficiency of the entire system.

4.1 Cluster concept

Different objectives can be pursued by combining a number of systems in a cluster. Depending on the importance of a particular objective in the context of the overall demands placed on a data processing system, we offer the following solutions, for example:

- High availability cluster (failover cluster)

  The high-availability cluster increases the availability of applications. If a system fails, another system takes over its tasks.

- Database cluster

  The database cluster increases the availability and efficiency of the data and enables parallel or simultaneous access to data for systems in the cluster.

- Scalable cluster

  The scalable cluster increases the performance of the entire system.

Administration and monitoring of the cluster is handled on the basis of administration domains (Domain Admin). These allow central configuration and management of clusters from one workstation (single point of administration).

These are just some examples taken from the Fujitsu Siemens cluster concept, which offers solution packages for consolidating systems under the name "Reliant Cluster Server II". Depending on the priority of objectives, these can be

pure failover solutions or solutions for increasing the scalability and availability of the entire system.Your local branch office will be glad to provide you with any other information you may need.

4.2 Documentation on clusters and high availability

Detailed explanations on the topic of clustering and high availability can be found in the documentation for the following products:

– Oracle and Informix databases

– Reliant Monitor Software (RMS)

– OBSERVE

– OBSNET

– Siemens Parallel Server (SPS)

– Reliant Cluster Server II (RCS II)

– Domain Admin

The documentation on the topic of “Reliant Cluster Server II (RCS II)” is structured as follows:

- General description
  - High-availability manual

    The manual “High Availability” describes the most important hardware and software failover components in the RM systems.
  - Sales brochures

    The sales brochures provide an overview of the functions and options offered by the “Reliant Cluster Server II” product.

- Installation description
  - “Installation and Operation” manual (Software)
  - Service Manual (Hardware)
- Domain Admin product description
  - “System Administration within a Domain”

You will find the exact manual titles in the Related publications chapter towards the end of this book.

5 Installing hardware

Hardware installation depends on whether your RM600 E system comprises only one cabinet or a number of cabinets. You can install and connect up the single-cabinet system yourself (E45 model only). In the case of multi-cabinet systems, most of the installation is carried out by our Service department. Activities that you can carry out yourself are explicitly marked as such in this chapter.

Modifications to an existing system configuration are carried out exclusively by our Service department or by trained specialists for both single-cabinet and multi-cabinet system configurations. These modifications include:

– connection of an additional cabinet (expansion, I/O or BBU cabinet)
– integration and replacement of controllers
– integration of peripheral devices in one of the cabinets (e.g. the MTC drive)

Replacing defective hard disks. See the chapter “Installing hard disks” on page 95 for information on replacing defective hard disks while the system is running (Online Replacement) and installing additional hard disks while the system is running (Online Installation).

Contact our Service department before replacing or installing hard disks to find out the latest information about the components used.

– upgrades with UPS or BBUs
– any repairs that may be necessary

Of the activities described in this chapter, you can carry out the following yourself:

– unpacking and installing single-cabinet systems
– installing and connecting the system console
– connecting a modem to the V.24 Teleservice interface of the EHIOS basic subsystem (E45 and E85 models only)

The devices that you yourself can connect to the RM600 E are supplied with their own operating manuals. You should always observe the information contained in these manuals.

When installing, please ensure that the environmental conditions required for the RM600 E are maintained. These values are given in the section “Important notes” on page 5.

The cabinet feet contain castors to facilitate movement. The cabinets must be placed on an even surface and the adjustment ring must be properly unscrewed. This is the only way to ensure that the cabinets are steady and can be operated safely.

5.1 Unpacking and installing single-cabinet systems

The system cabinet is very heavy and therefore requires at least two people to unpack and transport it.

When unpacking, please ensure, using the Unpacking Instructions and the section “Basic configuration of the RM600 E” on page 48, that the delivery is complete. Please also check if the delivery is undamaged, as far as may be seen from the outside.

The packaging contains tilt indicators, which use the position of the indicator balls to warn of excessive tilting of the system. A maximum tilt of 30° is permitted.

If a component is missing or damaged, please contact your local Fujitsu Siemens office immediately.

Please do not dispose of the packaging. You may require it later for transport purposes, particularly in the case of the monitor which could implode if not transported correctly.

5.1.1 Basic configuration of the RM600 E

The RM600 E comes with the following basic configuration:

- 1 RM600 E system cabinet with power cable and two keys (1 green, 1 black), plus 2 gray keys (front/rear door); 2 sets of keys are supplied for the CS45 Dual system cabinet
- CD-ROM with the Reliant UNIX 5.45 operating system
- 4 CD-ROMs with other operating system components
- Connecting cable (from system cabinet to monitor)
- Operating manual
- Installation manual for operating system
- Complaints form
- Product card (for service engineers)

– RM system safety guidelines

► Please note the key numbers in case they are mislaid at any stage.

– 1 terminal (console)
– Keyboard
– Power cable
– Connecting cable from keyboard to monitor
– Operating instructions for the monitor
– 1 modem + accessories (see respective operating instructions)

5.1.2 Installing the system cabinet

The system cabinet is very heavy and therefore requires at least two people to unpack and transport it.

► Position the system cabinet beside the table on which your first terminal, which serves as the console, is placed.

When positioning the cabinet, please note the following:

- The device must be protected from direct sunlight.
- The minimum distances required for upgrading, maintenance, and diagnostics must be observed. If this is not possible, you must allow for sufficient lengths of cabling, so that the system cabinet can be moved to a suitable location if required. Please note the restrictions in relation to cable length. For further information here, please contact your local Siemens AG office.
- The power plug must be within easy and safe reach (see also “Notes on safety” on page 5).
- The air vents at the front must not be obstructed.
- It must be possible to access the rear of the system cabinet for connecting peripheral devices and changing disks.
- Access to the drive door, behind which the drives are located on the top right, must not be obstructed.

5.2 Installing multi-cabinet systems

Systems that comprise two or more cabinets are installed by our Service department. The steps carried out by our Service department are listed below:

– Cabling the cabinets.
– Installing and cabling UPS cabinets with fixed connections and installing BBUs.
– Connecting LAN cables or additional data lines.

5.3 Installing and connecting external peripheral devices

Please do not dispose of the packaging, especially the monitor packaging (because of the risk of implosion). You may need the packaging for transport at a later stage.

External peripheral devices include all devices that can be connected to the RM600 E cabinets and that are not integrated in any of the cabinets.

5.3.1 General information on installing peripheral devices

There are basic rules and safety measures, which must always be adhered to if you wish to connect an external device to the RM600 E, regardless of whether you are connecting the device (e.g. terminal) for the first time, or you wish to replace a device that is already connected.

► Shut down the operating system properly.

The shutdown procedure switches off the system automatically. Therefore, it is not necessary to switch off the system from the control panel on the system cabinet. The *shutdown* command is explained briefly in the section “Shutting down the system with the shutdown command” on page 73. For a more detailed description, see the manual “Reliant UNIX Operation”.

► Switch off all connected terminals and printers, as well as all other connected peripheral devices (jukebox, magnetic tape device).

► Open up the backplane cover of the system cabinet.

Please ensure that the power cables of the peripheral devices are not connected to the power supply and that there is no power to the system cabinet when you are setting up the connection. Please refer to the section “Disconnecting cabinets from the mains” on page 10.

► Lay the connection cables so that each device has a cable slack of approx. 50 cm.

This prevents overloading of the plugs.

► First, connect the data line of the peripheral device.

If, for example, you wish to connect a terminal directly to the RM600 E, this device must first be installed as described in the relevant operating manual. The terminal cable must then be connected to the corresponding port of the system connection panel.

For information on configuring peripheral devices in the operating system, please refer to the manual “System Administration and Hardware Configuration Using the SYSADM User Interface” or the online help in the WebSysAdmin user interface.

Only insert the power plug into the socket when the peripheral devices have been positioned as desired, and you have connected all data lines.

► Insert the power plug into the socket.

After installation has been completed:

► Close the backplane covers of the cabinets.

Only then is sufficient ventilation and electromagnetic compatibility guaranteed.

If changes are made in the SCSI domain (e.g. connection of additional SCSI devices), the VConfig application must be called. For assistance here, refer to the online help for WebSysAdmin or contact our Service department.

5.3.2 Position of the controllers

When you remove the backplane cover of the system cabinet you will be able to see the controller connection panels and ports. Which controllers and ports are actually available, and the slots where they are located, depends on the hardware configuration of your device.

The position of the EHIOS basic subsystem, which is included in the basic configuration of the RM600 E system, is standardized. The position at which the basic controller is located can be seen in the table below.

Model	Mounting position
E45/CS45/FC45	10
E85	14

The position numbering can be found on the tinplate above the upper slot fastening.

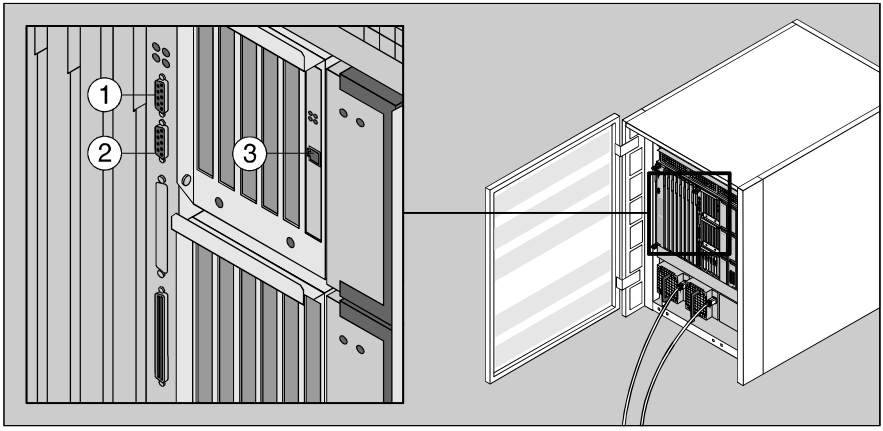


Figure 6: Connections on the backplane (E45 model shown here)

(1) = Console or RCA port

(2) = Teleservice (modem) port

(3) = PCI frame (Peripheral Component Interconnect, e.g. for Ethernet connection). Another port can also be used.

5.3.3 Connecting terminals

Once you have decided on a connection concept for peripheral devices with the help of your local Fujitsu Siemens office, our Service department begins connecting your terminals.

You will be able to connect the console and Teleservice modem yourself.

The necessary cables must be ordered from your local Fujitsu Siemens office in accordance with the type of device and intended use. You will find a list of the most common cable types in the appendix in section “Cable types for peripherals” on page 170.

Failure to observe the connection requirements for peripheral devices can disrupt the transfer of data and damage the devices.

Before you begin connecting terminals, you should select a suitable location. Since terminals are shipped with default settings, you may have to adjust them to the respective interface. You will find information on this in the section “Default settings for consoles” on page 171.

When starting up and operating terminals, you should also refer to the operating instructions for the respective devices. There you will find all the information required for connecting the data line which leads to the system cabinet and for connecting the keyboard.

A description is given below of the connection of consoles, a LAN console, PCs as consoles, modems for Teleservice and Ethernet cables.

5.3.3.1 Connecting the console (all models except CS45 Dual)

The difference between the console and other terminals is purely functional. It enables the system administrator to communicate with the operating system. The console can also be used as a normal terminal.

After you have installed the console in a suitable location, connect it as follows:

- ► Lay the connection cable to the system cabinet.
- ► Connect the cable to the console as described in the operating manual for the terminal.

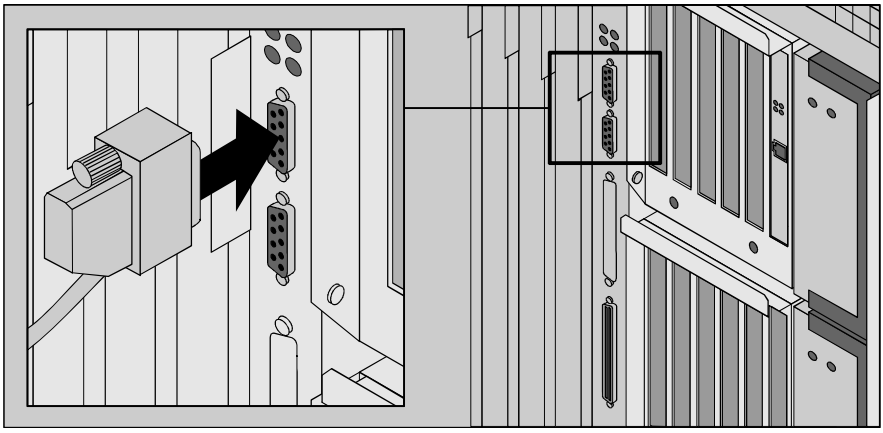


Figure 7: Connecting the console to the backplane of the device (system cabinet, E45 model shown here)

The console cable is connected to the port at the top of the EHIOS basic subsystem (see also figure 6 on page 52).

- ► Insert the connector into the port as specified.

When connecting cables, always ensure that the backplane cover of the system cabinet can be closed again without any difficulty.

- ► Secure the connector by tightening the mounting screws.
- ► Now connect the keyboard to the console, as described in the operating manual for the terminal.

5.3.3.2 Connecting an RM300 as a console

An RM300 system can be used as a console for one or more RM systems. The RM300 system is also available as a so-called cluster console with specific configuration options and can be connected to a group of RM systems. The RM300 system assumes the monitoring function for this group of systems and the console function for each individual RM system.

The RM300 console only differs functionally from other RM300 systems in use. It allows the system administrator to communicate with the RM system's operating system or with the system network. The console can also be used as a regular computer system.

The cluster console or RM300 console may only be installed by our Service department. Contact your local Fujitsu Siemens office for further information about this device.

5.3.3.3 Connecting a LAN console

The LAN console is another console that can take over the tasks of a system console. The LAN console can be used for both individual systems and for networks as well as a cluster console for central administration and monitoring. The advantage of the LAN console is that your location is not restricted to a maximum distance of 15 meters from the system, rather greater distances can be bridged by connecting to a LAN (Local Area Network), for example in another room or in another building.

A PC running the Solaris® operating system is used as a LAN console. The console functions are supported here by means of a V.24/LAN converter, the RCA (Remote Communication Adapter). In the case of the CS45 Dual model, the RCA is part of the cabinet (integrated by default in addition to the Ethernet hub).

The LAN console may only be installed by our Service department. Information about requirements for use, installation and operation can be found in the operating manual for the LAN console (see chapter "Related publications") or obtained from your local Fujitsu Siemens office.

5.3.3.4 Connecting a PC as a console

A PC can also be used as a console on the RM600 E system. It offers the same functions as a conventional console and apart from being used as a console can also function as an autonomous PC workstation. In contrast to the RM300 and LAN console, the PC can only replace one console.

WebSysAdmin is available on all RM systems from Reliant UNIX 5.45. A PC running Windows NT can thus be used as an administration client. If, as system administrator, you would also like to use these graphical applications of the RM600 E system, the PC can be connected to the LAN interface (RM600 E) while also connected as a console. The PC needs to be equipped with an Ethernet controller and possibly a graphical application program (XVision or Exceed) for this purpose. For further information on this topic, contact your local Siemens AG office.

The connection is provided via the V.24 console interface (RM600 E) and the COM interface (PC). The PC is used like an alphanumeric console over this V.24 interface.

Please refer to the operating manual for instructions on how to unpack and set up your PC.

- If the PC has a 25-pin COM interface, connect the cable numbered 57856.00.4.16, KB001-M5/M10 (25-pin connector and 9-pin connector) to the PC's COM interface.
- If the PC has a 9-pin COM interface, connect the cable numbered 7488.00, KB072-M3/M15 (9-pin connector and 9-pin connector) to the PC's COM interface.
- Plug the other cable connector into the RM600 E system, as described in figure 7 on page 54.
- Secure the connector by tightening the mounting screws.

When you have connected the PC to the RM600 E system, you need to carry out further configuration steps to enable the PC to be recognized as a console by the RM600 E system. A detailed description of what you need to do here can be found in the appendix to this operating manual in the section "Configuring the PC as a console" on page 174.

5.3.3.5 Connecting a modem to the Teleservice interface (all models except CS45 Dual)

A modem is supplied with every RM600 E system, which is used by our Service department for the purpose of maintaining the RM600 E. This eliminates the need for a service engineer to work on-site. The EHIOS basic subsystem offers a Teleservice interface, which is provided for connecting up the modem (see also figure 6 on page 52). In the case of CS45 Single model, each system has its own connection.

Once you have installed the modem at the required location, connect it up as follows:

- ► Lay the data line to the system cabinet.
- ► Connect the data line to the modem as described in the operating manual for the modem.

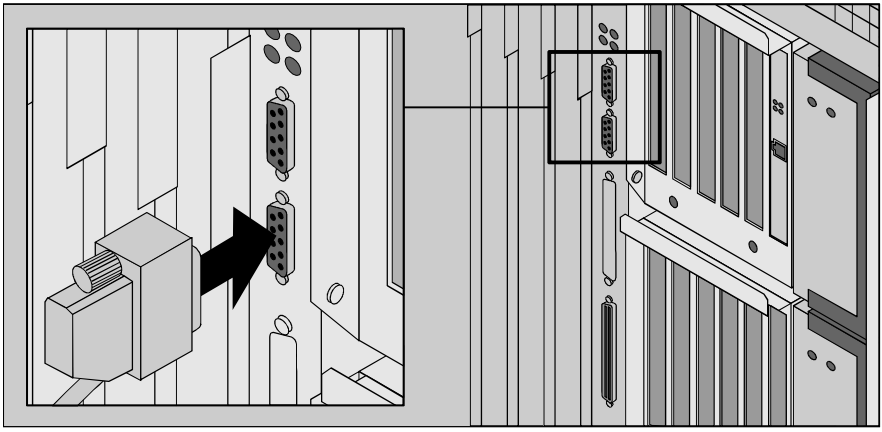


Figure 8: Teleservice interface (E45 model shown here)

The data line from the modem is connected to the port located two positions above the EHIOS basic subsystem.

- ► Insert the connector into the port as shown in figure 8.
- ► Secure the connector by tightening the mounting screws.

When connecting the data line, always ensure that the backplane cover of the system cabinet can be closed again without any difficulty.

5.3.3.6 Ethernet interface for connecting terminals and PCs via a network

The basic configuration of the RM600 E includes one Ethernet connection option, which is supplied by the PCI subsystem (see also figure 6 on page 52).

The network connection is normally cabled in accordance with the LAN standard (TCP/IP standard).

The RM600 E can be connected to a network over this interface. The advantage of this network is that LAN terminals or PCs can be connected at various locations. Printers can be indirectly connected with the RM600 E via PCs and printer boxes.

The network components may only be installed by our Service department. You can obtain further information on these devices from your local Fujitsu Siemens office.

Figure 9: Ethernet interface (E45 model shown here)

A different port can also be used.

5.3.4 Installing SCSI peripheral devices

The following SCSI (Small Computer System Interface) auxiliary devices can be connected to the RM600 E via the PCI controller:

– magnetic tape device (½ inch)
– jukebox for 8 mm magnetic tape cassettes
– jukebox for WORM and ROD disks / CD-ROM
– RAID systems

If changes are made in the SCSI domain (e.g. connection of additional SCSI devices), the *Config* application must be called. For further information on this topic, please refer to the manual “System Administration and Hardware Configuration Using the SYSADM User Interface”, or notify our Service department in this case.

A SCSI auxiliary device is usually connected via a SCSI differential interface (except for SCSI auxiliary box, BG51 for removable drive media).

Auxiliary devices are installed and started up by our Service department.

For more information on these auxiliary devices, please contact your local Siemens AG office.

5.3.5 Installing a BBU or UPS

If you wish to protect the RM600 E against power failures, an internal or external BBU (Battery Backup Unit) or a UPS (uninterruptible power supply) must be installed between the cabinets and the power supply.

A BBU or UPS may only be installed by our Service department or authorized technical staff.

If you want to add on a BBU, UPS or similar type installation to your RM600 E system, contact your local Fujitsu Siemens office.

6 Startup and operation

This chapter explains how to switch on the RM600 E.

The section “Requirements for working with the RM600 E” describes the conditions that must be met in order to work with the RM600 E.

The control panel located at the front of each cabinet is described in the second section. The RM600E CS45 Dual model has two control panels. You can read about this in the section “The control panels” on page 62. The section “LCD messages” on page 75 describes the LCD (Liquid Crystal Display) which supports you with messages should an error occur.

The section “Switching on and off the system” on page 69 describes what to look out for when switching on and starting up (booting process), and when switching off the operating system. The remaining sections provide additional information on the meaning of the messages on the LCD.

6.1 Requirements for working with the RM600 E

In addition to correctly installing the various hardware components, the operating system must also be installed and configured in order to operate the RM600 E.

The operating system comes preinstalled with new RM600 E systems. However, you have to complete the configuration of the network, terminals etc. after startup.

Once switched on, the system starts booting until the login prompt is displayed on the console.

Finally, the system configuration can be newly configured or reconfigured by the system administrator with the help of commands or using the *WebSysAdmin* and *Config* tools (e.g. configuring new printers). This can also be done online. These configuration or administration procedures and the tools available for carrying them out are described in separate RM600 E manuals (see the chapter “Related publications” on page 207).

Below are some examples of the software and operating system requirements that must be fulfilled:

- A license key may be required when installing or starting add-on software products. If the software product in question is supported by LVS (License Verification System), it must be “unlocked” with a license key. For more information, please refer to the manual “License Verification System (LVS)”.
- Administration files for describing the system environment with
  - information on processes to be started after switching on the system
  - information on line-specific parameters
  - procedures for mounting file systems and starting background processes
- The system must be informed of all users who want to work on the system, i.e. users must log in with an individual login name and current password after switching on the system.
- Procedures for shutting down the system properly are important. They ensure that files are closed properly such that no data is lost. You should contact our Service department if a shutdown procedure cannot be called, or cannot be fully executed due to a serious error. If our Service department suggests that the system be switched off from the control panel on the system cabinet, you should refer to the section “The LCD control panel for the system cabinet” on page 64 for instructions on how to proceed. Further information on switching off the system in the event of an error can be found in the manuals for installing the operating system and system administration (see the chapter “Related publications” on page 207).

6.2 The control panels

The RM600 E has two different control panels:

– The system cabinet has a control panel, which has three LEDs (Light Emitting Diode), the controls, a keyswitch and an LCD (Liquid Crystal Display).

– The other cabinets, i.e. expansion cabinet, I/O cabinet, and BBU cabinet, also have a control panel but it does not have a keyswitch.

The control panel is located on the front of the respective cabinet.

The RM600 E85 and RM600 CS45 Dual/Single models have two control panels for each cabinet. The lower of the two control panels is only fitted with a keyswitch in the CS45 Dual model, since this model contains two independent systems or subsystems in one cabinet. The upper system is controlled by the upper operating controls and the lower system by the lower controls.

The figure below illustrates how the control panel is accessed.

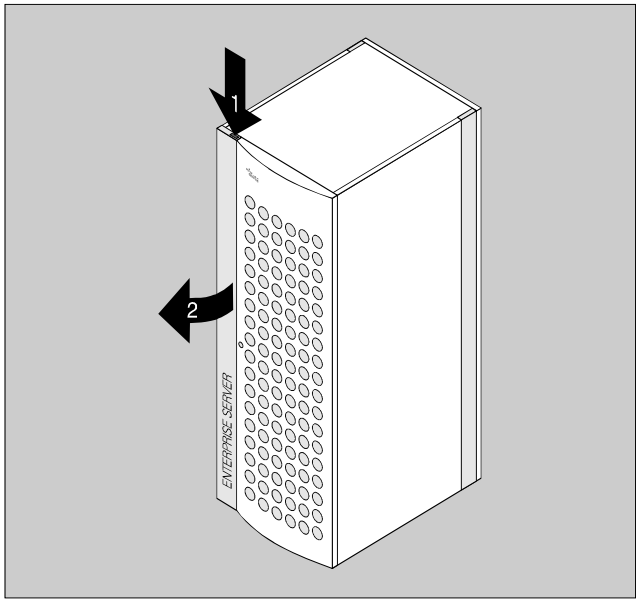


Figure 10: Opening the left cabinet door (system cabinet)

(1) = Unlock

(2) = Open the left cabinet door

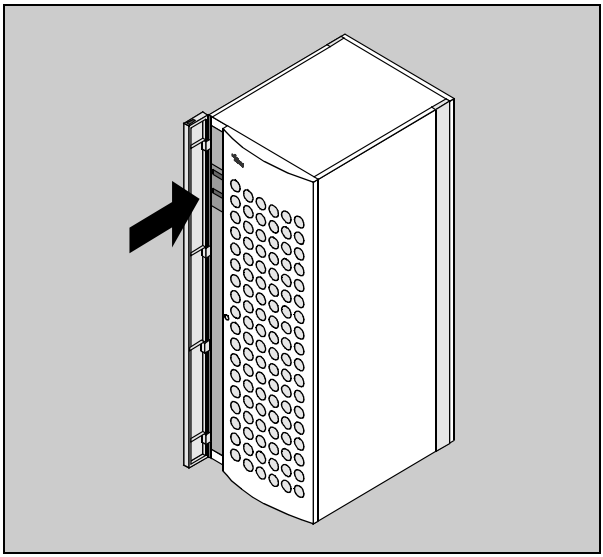


Figure 11: Control panel (system cabinet)

6.2.1 The LCD control panel for the system cabinet

All cabinets that are linked to a system by means of cabling are switched on and off from the system cabinet. Messages concerning events in the system cabinet are output to the LCD of the system cabinet.

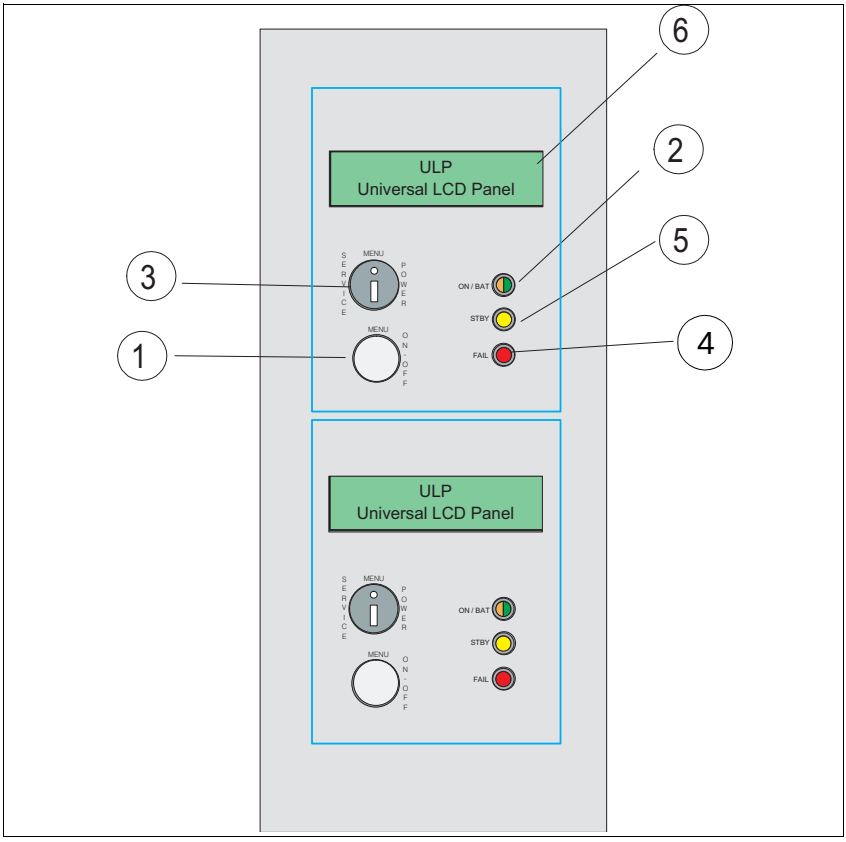


Figure 12: LCD control panel (system cabinet)

The control panel of the system cabinet or the system shelves has the following functions:

(1) **ON/OFF menu button**

This button enables you to switch on and off the system. For safety reasons, the button function is only effective in conjunction with the keyswitch (3), which must be turned to the right (to the POWER position) in order to switch on or off the system. MENU is started by simply pressing the button.

The menu in this case is the EIP menu (Environmental Interface Processor); it is provided almost exclusively for use by our Service department. If, however, automatic shutdown is initiated by the system

(see also “Output when switching on the system” on page 79), you can stop the shutdown procedure by pressing the *MENU* button on the system cabinet.

When the keyswitch is in the POWER position, the system is switched on and the booting process is initiated.

The RM600 E is switched off automatically by the shutdown procedure (see also the manual “Reliant UNIX Operation”). The system can also be switched off by turning the keyswitch to the right (to the POWER position) while at the **same time** pressing the ON/OFF button, but only under the following conditions:

You may only switch off the RM600 E with the keyswitch if the operating system is no longer active. Otherwise data may be lost. The procedure you must follow in case of an emergency is described in the section “Switching off the system” on page 72.

(2) **ON/BATT LED**

This LED lights up when the system is operating.

green: Normal operation
red: BBU operation (e.g. if there is a power failure, or an error in the power supply unit of the system cabinet); only if an external BBU is connected

(3) **POWER keyswitch**

The keyswitch is only available in control panels for system shelves. Your RM600 E comes with two keys, each of which has different functions:

black key: Basic functions
green key: Basic and additional functions

The green key includes all the functions of the black key. If the color of the key is not specified in the following text, this means that it is possible to use both keys.

During normal operation, the keyswitch is in a vertical position. You must turn the key to the right (to the POWER position) if you wish to switch the system on or off with the ON/OFF button. The key does not lock in this position.

The SERVICE position, which can only be reached with the green key, is used exclusively by our Service department for switching on and off various EIP functions (Environmental Interface Processor) which are provided solely for diagnostic purposes.

The system can be switched neither on nor off locally without keys. If the keyswitch is in the SERVICE position, no more powerons are possible. This means that if the RM600 E is already switched on, no more cabinets can be switched on.

It is possible, however, to switch off using the *shutdown* command. During operation, the black key should be stored near the system behind a glass screen, if possible behind an emergency glass screen, so that others can switch off the system in case of an emergency.

(4) **FAIL**

The LED lights up red in the event of an error. The EIP error messages are output on the LCD (6).

(5) **STANDBY**

The LED lights up yellow when the system is switched off and there is still power supply to the system. This indicates that the system can still be switched on remotely. The LED is extinguished when the system is switched on.

(6) **LCD (Liquid Crystal Display)**

The LCD outputs EIP messages. It comprises two lines, each with 16 characters. During normal operation, the LCD displays the system name (e.g. RM600 E45, E85 or RM600 CS45).

Other LCD messages depend on various influences:

– external influences (e.g. occurrence of errors)
– user activities (switch on/off, MENU button)
– commands sent from the multifunctional EHIOS basic controller to the EIP

The structure of the messages is described later in the section “LCD messages” on page 75.

6.2.2 The LCD control panel for the auxiliary cabinets

An expansion cabinet, I/O cabinet, and BBU cabinet are also switched on when the system cabinet is switched on. The control panel therefore only comprises three elements:

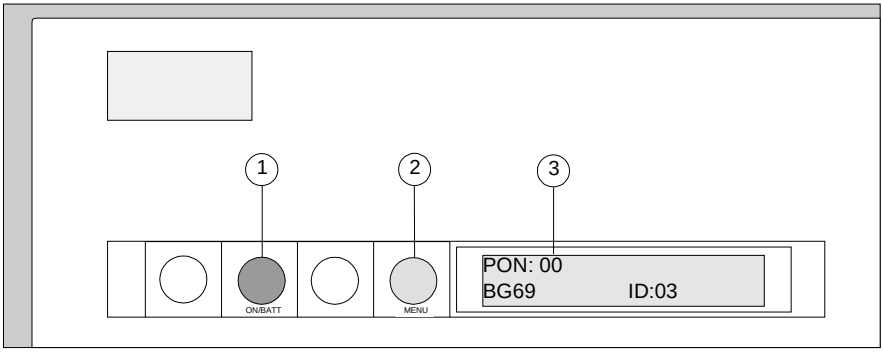


Figure 13: LCD control panel (expansion, I/O and BBU cabinet)

The elements have the following functions:

(1) **ON/BATT LED**

This LED lights up when the system is operating.

green: Normal operation

yellow: Load operation for the BBU accumulators (RM600 E is switched off, LED only lights up on the disabled BBU cabinet)

red:

- on the expansion and I/O cabinet:
  BBU operation (e.g. power failure or error in the power supply unit); the cabinet is supplied by an internal or external BBU
- on the BBU cabinet (e.g. power failure or error in the power supply unit)

(2) **MENU button**

see “The LCD control panel for the system cabinet” on page 64

(3) **LCD (Liquid Crystal Display)**

see “(6)” on page 67

Now that you are familiar with the functions of the individual controls, you can switch on the system. The next section describes what you must look out for here.

6.3 Switching on and off the system

The system can be switched on once the hardware has been connected. The following sections describe the initial startup and the routine switching on of the system.

6.3.1 Initial system startup

Starting up the system, i.e. turning it on and activating the operating system, is referred to as the booting process. The booting process is divided into a number of phases that can be followed using the corresponding messages on the console and on the LCD.

The system is preconfigured in such a way that the booting process runs automatically without user input.

Execute the steps described in the following section one after the other to start up the system.

The doors on the backplanes of all system cabinets must be closed.

► First switch on the console.

You can now switch on the system as follows:

► Turn the keyswitch of the system cabinet to the right to the POWER position, hold it down while at the same time pressing the ON/OFF button.

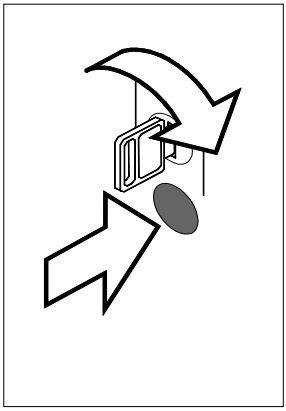


Figure 14: Switching on the system

The keyswitch automatically springs back to the home position when you release it.

The system now boots, i.e. the booting process is started. The LED on the system cabinet now lights up green and the LCD shows the system name as well as the automatic power-off delay. Any additional connected cabinets are also switched on automatically with a short delay; the LED also lights up green in this case. If something goes wrong during booting, you may receive another message on the LCD. These messages are explained in the section “LCD messages” on page 75.

► Please observe the output on the console.

The output depends on the hardware and software configuration of your system. If the output contains error messages, please make a note of them, if possible. This will help the Service department when rectifying errors.

The booting process is complete when text is no longer output, and you are requested to enter your login name.

► Now enter root, and press the ↵ key.

You will then see the following screen output:

```
Console Login: root
Warning: root has no password, use the password command to set
it.

Your password has expired. Choose a new one.
```

► Enter a password and press the ↵ key.

You are prompted to enter the password twice for security reasons.

► Enter the password again and press the ↵ key.

When you have done this, the system goes into multiuser mode. Startup is now complete.

You can then start configuring the system, defining the printer groups, entering users, and installing software products. You can find information about this in the list of publications in the appendix to this manual as well as in the manuals for the relevant products.

6.3.2 Switching on the system

Carry out the following steps in sequence to switch on the system.

The doors on the backplanes of all system cabinets must be closed.

In order to follow the output on the screen during the booting process:

► First switch on the console.

If you have connected additional external peripheral devices to the system (e.g. MTC jukebox):

► These must also be switched on before switching on the system.

You can now switch on the system:

► Turn the keyswitch of the system cabinet to the right to the POWER position while at the same time pressing the ON/OFF button. The keyswitch automatically springs back to the home position when you release it.

► Please observe the output on the console.

If the output contains error messages, please make a note of them, if possible. This will help the Service department when rectifying errors.
The booting process is complete when text is no longer output, and you are requested to enter your login name.

► Now enter root, and press the ↵ key.

You will then see the following screen output:

```
Console Login: root
```

```
Password:
```

► Enter the password and press the ↵ key.

Startup is now complete, and you can begin system administration work.

6.3.3 Switching off the system

If you want to switch off the system, you must carry out the following steps in sequence.

► Enter the command for a specific shutdown procedure or enter the *shutdown* command itself, as described below in the section “Shutting down the system with the shutdown command” on page 73.

The operating system is shut down properly. All cabinets are then switched off automatically and the green LEDs are no longer lighting. If auxiliary cabinets are to be shared by several systems, only switch these off when the last system has been switched off. In this case, the green LEDs are only extinguished when the last system has been switched off. Then:

► First switch off the external peripheral devices and then the console separately.

6.3.3.1 Shutting down the system with the shutdown command

You must have root authorization on your system to use the *shutdown* command. You must therefore be entered as a system administrator.

If the system is in multiuser mode, it is useful to check which users are logged on, for example using the *who* command, before entering the *shutdown* command so that they can then be informed of system shutdown by means of the *wall* command:

► # `who` ↵

Please note that *who* does not tell you whether users are using another computer to access file systems by means of *nfs* or *pcnfs*.

► # `wall` ↵

Send the message to all currently logged on users, informing them that the system will be shut down and that they should log off.

► CTRL `d`

When all users have logged off, enter the following command:

► `shutdown -y -i0 -g0` ↵

The individual arguments have the following meaning:

-y: Answer all questions from *shutdown* with yes.
-i0: Set the system to state 0 (off).
-g0: Set the time until logoff to 0 seconds.

A detailed description of the *shutdown* command can be found in the manual “Reliant UNIX Operation”.

6.3.3.2 Switching off the system in an emergency

Always contact our Service department if there is an emergency.

- Switching off devices with **no mains buffering** (BBU).

  ► Turn the keyswitch to the POWER position, hold it down while at the **same time** pressing the ON/OFF button.

  You can also switch off the device immediately as follows:

► Pull out the system cabinet power plug or switch the mains isolator and pull out the power plugs of the other devices.

If necessary:

► Pull out the power plugs of the other cabinets or switch the mains isolator.

Devices which have a module for mains buffering (BBU) will continue to operate if only the power plug has been pulled out or the isolator switched.

- Switching off devices **with mains buffering** (BBU).

  ► Turn the keyswitch on the system cabinet to the right to the POWER position (for both systems in the case of the CS45 model), hold it down while at the **same time** pressing the ON/OFF button.

  ► Pull out the system cabinet power plug or the power plugs of the other devices, and switch the isolator.

6.3.4 Reinstalling Reliant UNIX

The complete installation kit for the current Reliant UNIX 5.45 operating system version or the operating system version that you have ordered is included in your RM600 E delivery package.

If you are using a preinstalled version of the Reliant UNIX 5.45 operating system, a CD-ROM is generally not required. You need only carry out an installation yourself if the installed operating system has been corrupted. The necessary information is provided in the manual “Reliant UNIX Installation”.

6.4 LCD messages

The system cabinet and the expansion, I/O, and BBU cabinet of the RM600 E are equipped with an environmental interface processor (EIP) for monitoring and controlling internal processes. The individual EIPs are connected to each other by means of a diagnostic bus. The EIP status and error messages are output decentrally on the LCD of the system cabinet and the auxiliary cabinets.

The EIP basically performs the following tasks:

– controls the switching on and off of the system (local and remote power-on/off)
– controls the LCD control panel
– monitors temperature, power supplies and fans
– monitors emergency power supply (external BBU and UPS)
– stores information on the type and number of cabinets
– forwards error and status messages
– stores causes of errors for subsequent diagnostics

Operation of the system via the LCD must only be performed by our Service department.

The following figure illustrates the EIP functions in the system cabinet and in the auxiliary cabinets:

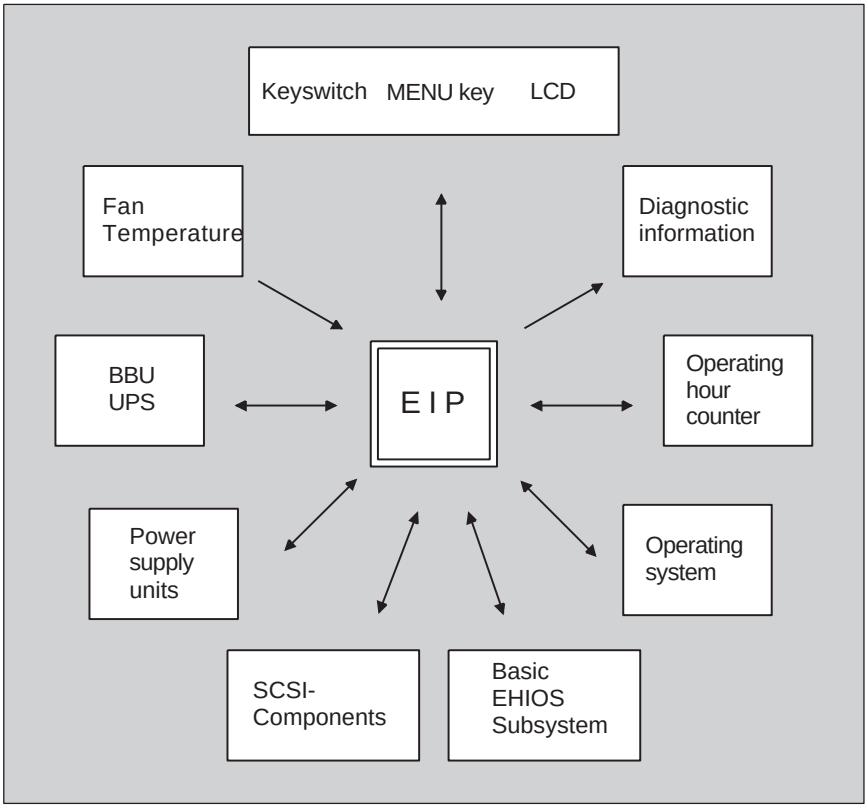


Figure 15: EIP functions

Keyswitches and basic EHIOS subsystem are components that are only integrated in the system cabinets.

The output on the LCD can, on the one hand, be initiated by certain actions or events in the system, such as switching on the system or sudden errors. Output can also be initiated through navigation in the EIP menu system, which is described below.

6.4.1 EIP menu system

The following figure illustrates the hierarchical structure of the EIP menu system. The structure is the same for LCD output on the auxiliary cabinets.

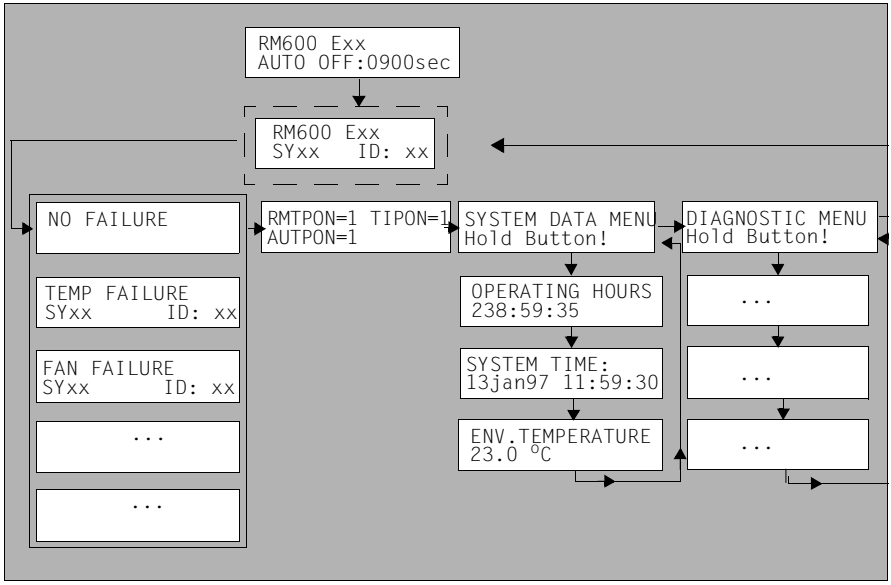


Figure 16: EIP menu system (system cabinet in this case)

The periods in the boxes indicate that further output is possible under this main menu option. This can differ between the system cabinet and auxiliary cabinets. The xx characters in the boxes represent two digits.

If the RM600 E system is operating properly after being switched on, one of the following outputs appears on the LCD:

```
RM600 E45
SY64     ID: xx
```

```
RM600 E85
SY72     ID: xx
```

`ID: xx` indicates the unique ID number of the cabinet within a system. In a high-availability configuration, there can be a number of system cabinets each with different ID numbers.

The following output appears on the LCD of the auxiliary cabinet:

```
PON: xx
BGxx       ID: xx
```

`PON: xx` specifies the system cabinet from which this cabinet was switched on. If the cabinet is integrated in a high-availability configuration, you may find several ID numbers here.

`BGxx` indicates the cabinet type (page 23).

`ID: xx` also specifies the unique ID number of the auxiliary cabinet within a system.

In figure 16 on page 77, the output `RM600 Exx` is enclosed in a double frame. If you press the MENU button, the first menu item appears on the LCD: `NO FAILURE`. If you want to move from one menu item to another menu item on the same level, for example from `NO FAILURE` to `RMTPON=1 ...` to `SYSTEM DATA MENU ...` you must hold down the MENU button for less than 0.7 seconds. If, however, you wish to change from the highest menu level to the next lower one, you must first select a menu item on the highest level, which outputs the following message in the second line:

```
Hold Button!
```

In this case, you must hold down the MENU button for more than 0.7 seconds, so that you can change to the underlying menu level.

If all four menu items

– Environmental Conditions
– Status Display
– System Data Menu
– Diagnostic Menu

were selected in turn, the system name reappears when the MENU button is pressed again. If the output on the LCD does not change after one minute, the system name is displayed until the MENU button is pressed again.

6.4.1.1 Output when switching on the system

When you switch on the system, the following message is output on the LCD of the system cabinet:

```
RM600 E45
AUTO OFF: 0900sec
```

```
RM600 E85
AUTO OFF: 0900sec
```

If the RESET signal of the system is active, the message `**SYSTEM RESET**` is displayed in the second line. This message can only been seen for a few seconds.

The automatic power-off delay is active once the system is switched on (shown here by `0900sec`). The power-off delay counter counts down in seconds. It is normally interrupted by the operating system during the boot process.

The counter can also be stopped by pressing the MENU button.

Once the counter reaches the value `0000`, however, the system is switched off. The current value is displayed on the LCD.

The counter is started purely for security reasons in case the automatic booting cannot be carried out properly due to a malfunction. In this way it is ensured that the system does not remain in an undefined state.

6.4.1.2 Environmental Conditions menu item

The *Environmental Conditions* menu item either shows that there are no errors or that the EIP has detected an error. The EIP outputs the error either as an error message or as a warning on the LCD.

If several errors occur at the same time, only the error with the highest priority is displayed, for example `FAN FAILURE` and `TEMP FAILURE` have the highest priority. The other errors can be displayed by pressing the MENU button.

If you exit the menu item with the MENU button and if the button is not pressed for one minute, the LCD automatically displays the error with the highest priority again.

The LCD output appears as follows:

```
FAN FAILURE
AUTO OFF:360 sec
```

```
TEMP FAILURE
AUTO OFF:600 sec
```

In this case, the power-off delay cannot be halted with the MENU button.

The system normally carries out the operating system shutdown procedure automatically, and then shuts down properly before the auto-off time has expired.

The other cases are as shown in figure 16 on page 77.

► Please contact our Service department in all such cases.

6.4.1.3 Status Display menu item

This display can only be seen on the system cabinet.

The status display specifies whether the system may be switched on remotely, whether a timed automatic power-on is permitted by the EIP, and whether the system is switched on again automatically after a power failure. These three functions are specified by 0 (function not active) or 1 (function active) after the name. The LCD output might then be as follows:

```
RMTPON=0 TIPON=1
AUTPON=1
```

```
RMTPON=1 TIPON=1
AUTPON=0
```

RMTPON (Remote Power-On)	specifies whether the system may be switched on remotely,
AUTPON (Auto Power-On)	specifies whether the system is to be switched on again automatically after a power failure,
TIPON (Timed Power-On)	specifies that timed power-on is to be executed after the specified time period has expired.

6.4.1.4 System Data Menu

By pressing briefly on the MENU button, the system branches from the status display to the system data menu.

```
SYSTEM DATA MENU
Hold Button!
```

This diagram shows the uppermost menu level for all output related to system data. If the MENU button is held down, the EIP switches to the underlying level.

- Operating hours counter

  This diagram indicates the total runtime of the system cabinet or auxiliary cabinet.

  ```
  OPERATING HOURS:
  HHHHHH:MM:SS
  ```

  The fields are divided into hours, minutes, and seconds.

  ```
  HHHHHH:    Hours
  MM:        Minutes
  SS:        Seconds
  ```

- System Time

  You can display the system time on the LCD:

  ```
  SYSTEM TIME
  13jan97 11:59:30
  ```

  The output has the following format:

  DayMonthYear Hours:Minutes:Seconds

  The system time can be set by the system administrator using the UNIX *date* command (see also the manual “System Administrator’s Guide”).

- Ambient temperature

  The air temperature is displayed.

```
ENV. TEMPERATURE
    21.2 °C/70.1 oF
```

6.4.1.5 Diagnostic Menu

The information offered differs greatly for the different system cabinets depending on their size and configuration.

```
DIAGNOSTIC MENU
Hold Button!
```

This menu is used exclusively by our Service department for diagnostics purposes and for resetting the system. Data may be lost if this menu item is executed incorrectly at the system cabinet.

7 Troubleshooting during startup and operation

Errors and steps for recovery are described in the section “What to do if....” to assist you should errors occur with the RM600 E system. Further assistance is provided by the error diagnostics flowchart (page 88).

7.1 What to do if...

Some of the problems that can arise when working with the RM600 E are listed in a table below.

The lefthand column describes errors that can occur when switching on the system (booting process), followed by errors that can occur when the system is operating, and finally, errors relating to the terminal.

The middle column of the table lists possible causes for each problem.

The righthand column contains notes telling you how you can rectify the error in question.

You may be able to rectify some errors yourself, but in the case of more serious errors, you should always notify our Service department.

Problem (booting process)	Possible cause	Solution option
During power-on, the ON/BATT LED does not light up, no output on the LCD	POWER keyswitch not turned as far as it will go	Switch on again
	No power	Check power cables to the system Check fuses of the housing power distributor -->Contact Service department
During power-on, the ON/BATT LED on the system cabinet control panel suddenly lights red (also applies for expansion and I/O cabinets)	No power, internal or external BBU is active instead;	The system is switched off automatically --> Contact Service department
During power-on, the ON/BATT LED is green, but LCD outputs no message		Switch on again -->Contact Service department even if booting process is running
LCD outputs `**SYSTEM RESET**` at switch-on	Internal system parameters could not be reset	Switch on again If message remains -->Contact Service department
No output on console during booting	See screen	See screen“Screen remains dark (console)” on page 87
Error messages on console during booting		End booting process Power down system -->Contact Service department

Table 11: Problems during the booting process

Problem (operation)	Possible cause	Solution option
LCD outputs TEMP FAILURE	– Air drawn in is too warm – Front and back ventilation slits are obstructed – Room temperature too high	Remove obstruction from front, back, and sides of cabinet (for minimum distance, see table 3 on page 17) Switch on or regulate air-conditioning Power down system Switch on system again If message remains -->Contact Service department
LCD outputs FAN FAILURE	EIP reports failure of ventilators	Power down system, otherwise RM600 E powers down automatically after a few minutes Check that fan modules have been inserted correctly Switch on again If message remains -->Contact Service department
ON/BATT LED on the control panel of a cabinet lights red (all except for BBU cabinet)	No power to this cabinet, backed up by BBU cabinet (internal or external)	Check fuses of the housing power distributor, power down system, otherwise RM600 E powers down automatically after a few minutes
ON/BATT LED on the control panel of a cabinet suddenly lights red	No power to one or more cabinets, backed up by BBU cabinet	Power down system, otherwise RM600 E powers down automatically after a few minutes --> Contact Service department
Machine checks - output on console	Hardware error detected by the HIOS basic controller	Power down system; Initiate booting process If error messages remain -->Contact Service department
Panic error messages on console (system switches to IKDB)	Hardware or software errors detected by operating system	Refer to the manual “System Administrator’s Guide”

Table 12: Problems during operation

Problem (operation)	**Possible cause**	**Solution option**
		Enter the *ex* command; A reboot process is started automatically; If error messages remain -->Contact Service department
Problem (operation)	Possible cause	Solution option

Table 12: Problems during operation

Problem (screen)	**Possible cause**	**Solution option**
Screen remains dark (console)	Screen automatically non-displaying	Press ↵ key
	Brightness control set to dark	Set control to bright
	Connection from system cabinet to terminal faulty; No power	If it is the console on a multi-cabinet system -->Contact Service department
		If it is the console on a single-cabinet system, shut down the system properly from another terminal Switch off system cabinet
		Check that the following plugs are inserted correctly in the sockets: – Device plug of connection cable between terminal and system cabinet – Device plug of power cable
		Check that there is power coming from the socket
		Switch on system cabinet again
		If the screen is still black -->Contact Service department

Table 13: Screen problems

7.2 Error diagnostics flowchart

If the LCD control panel on the system cabinet or auxiliary cabinet outputs error messages, you should attempt to locate and, if possible, rectify the error using the following flowchart. The first five diagrams refer to the power-on phase, and the last deals with errors that occur during runtime.

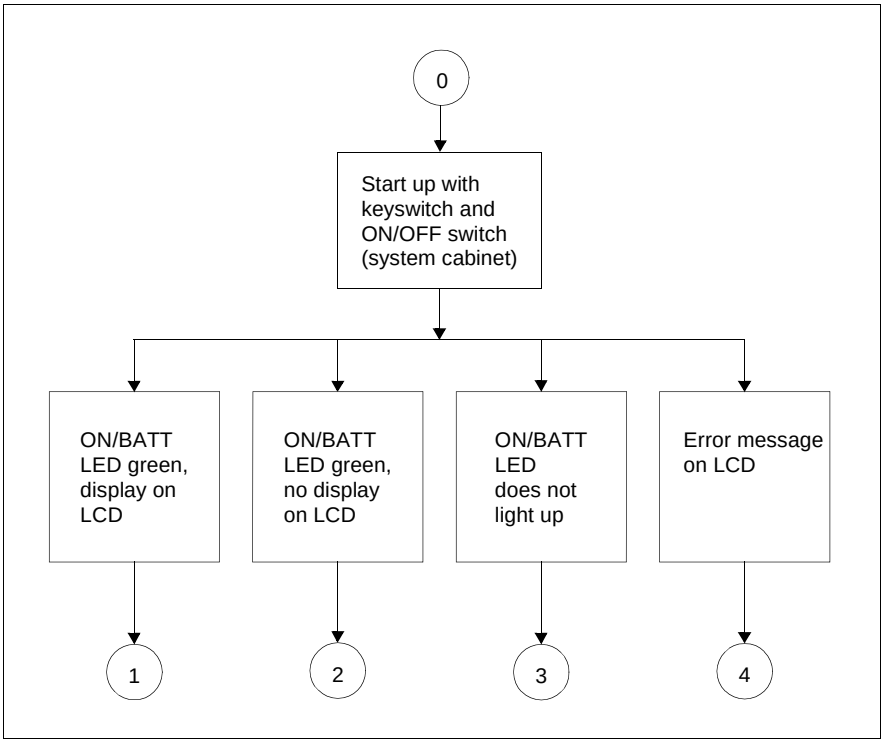


Figure 17: Possible errors during power-on (overview)

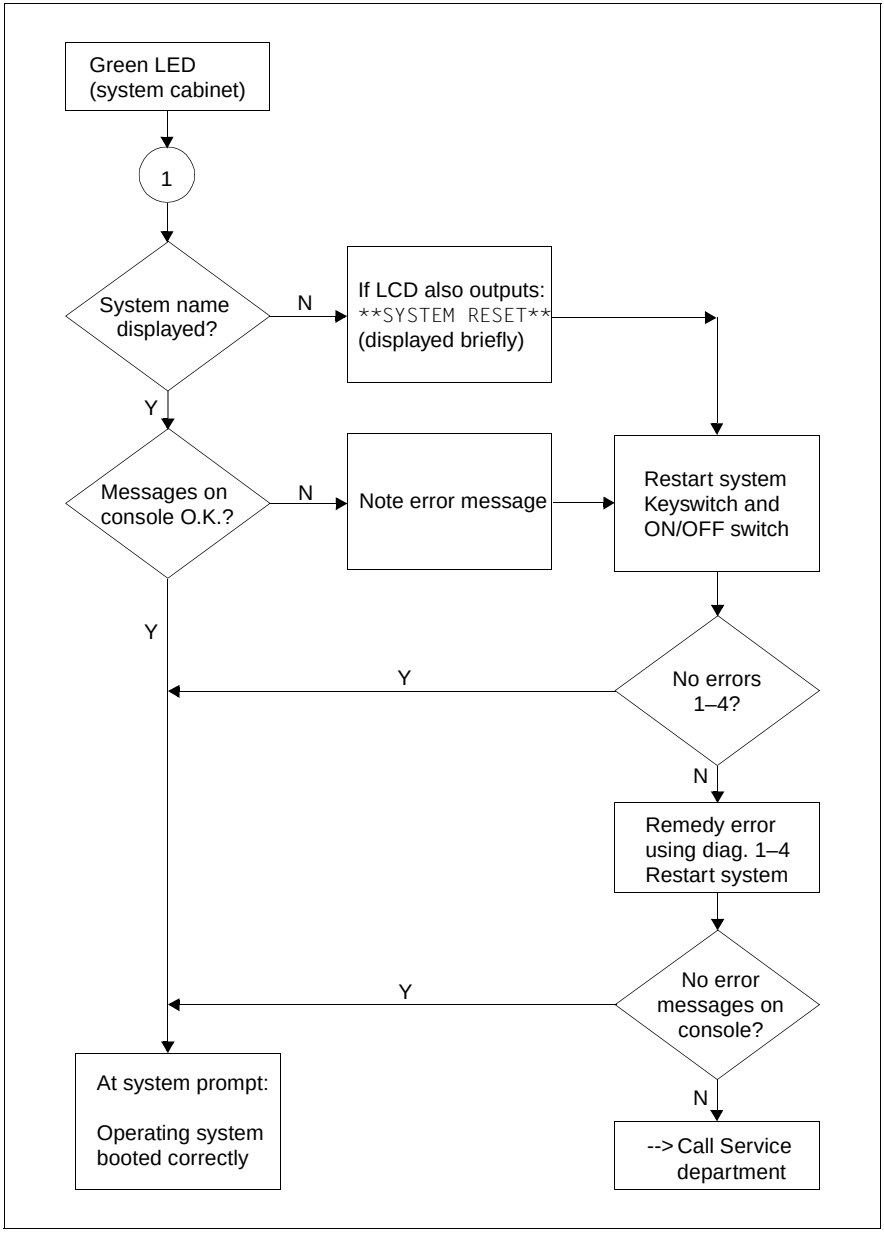


Figure 18: Possible errors during power-on (part 1)

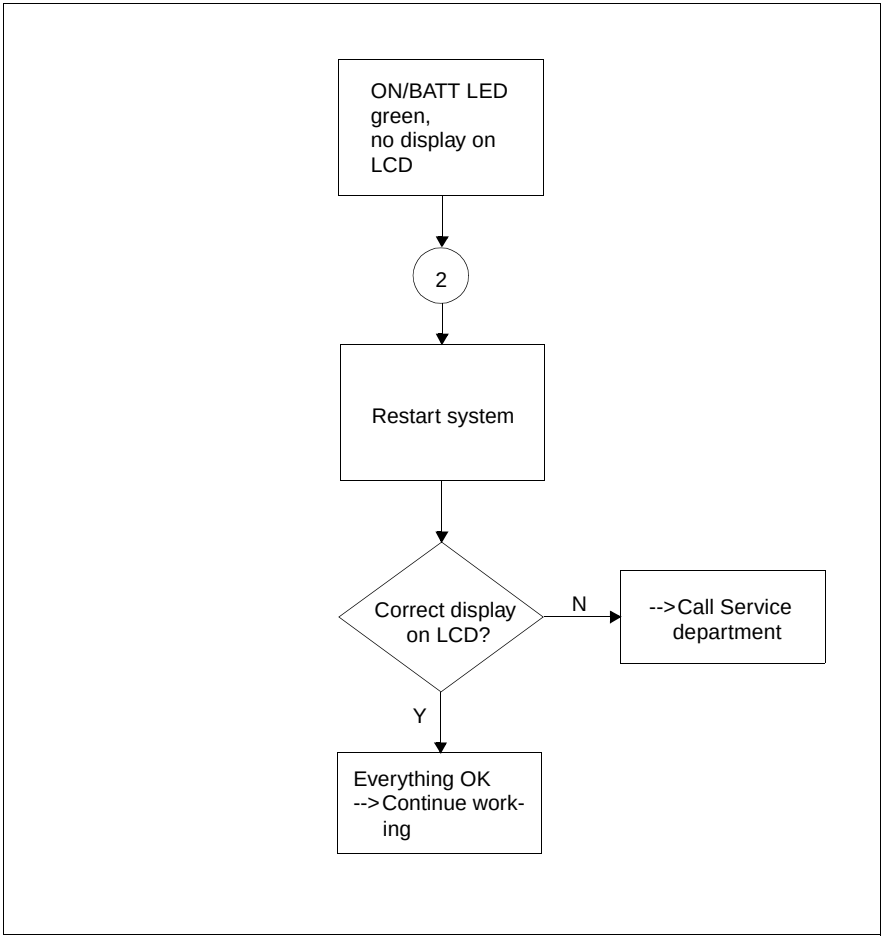


Figure 19: Possible errors during power-on (part 2)

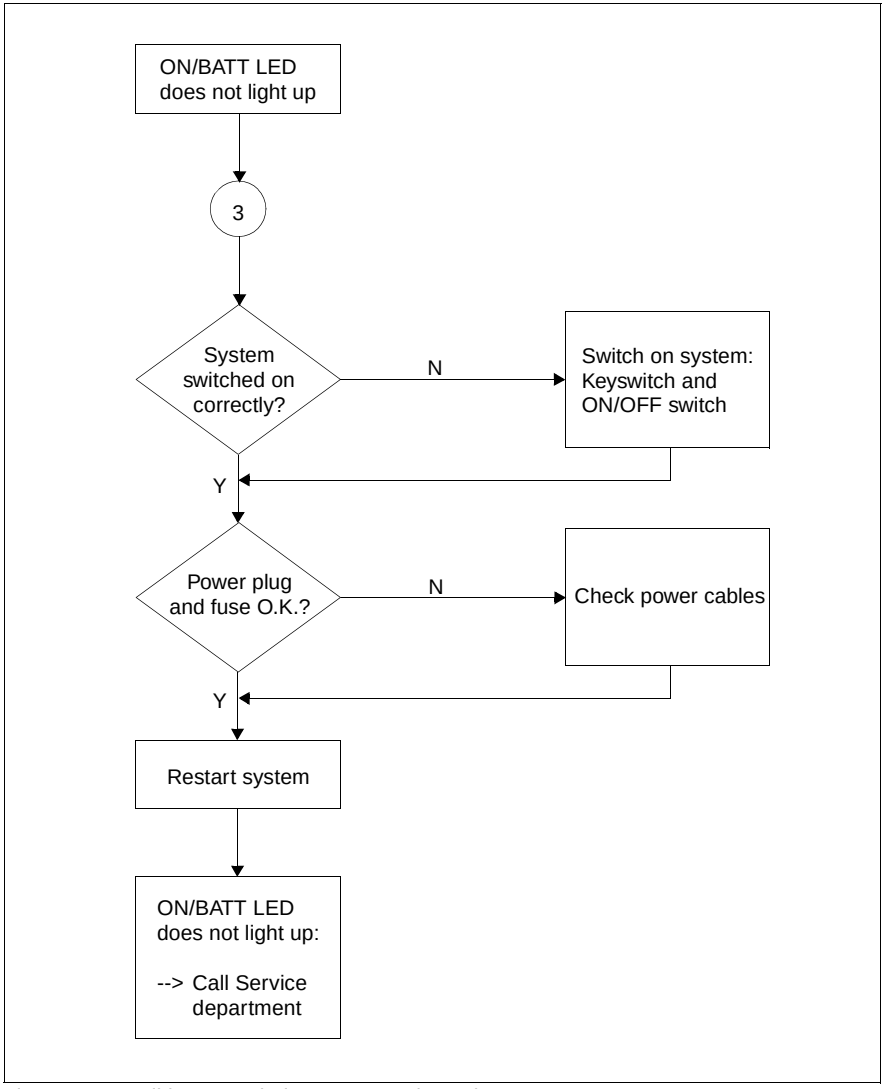


Figure 20: Possible errors during power-on (part 3)

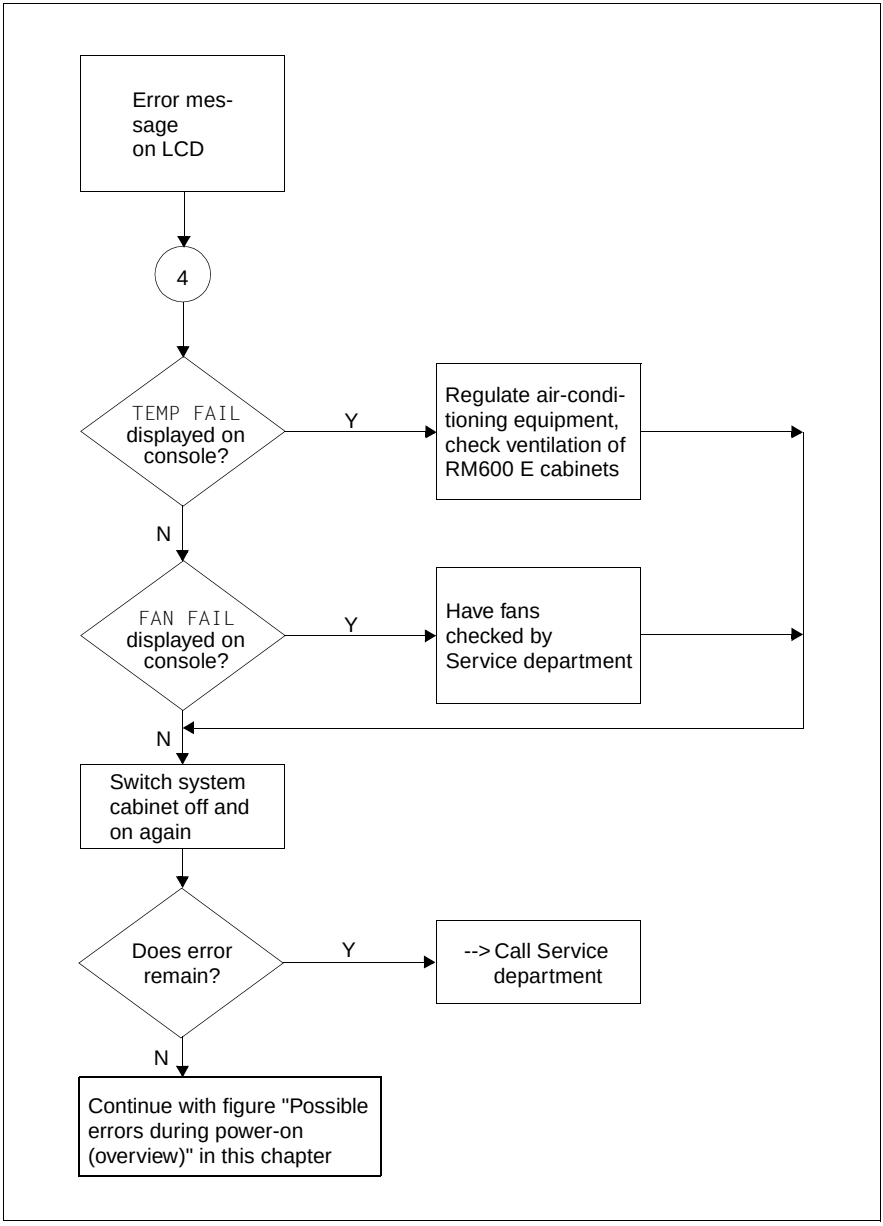


Figure 21: Possible errors during power-on (part 4)

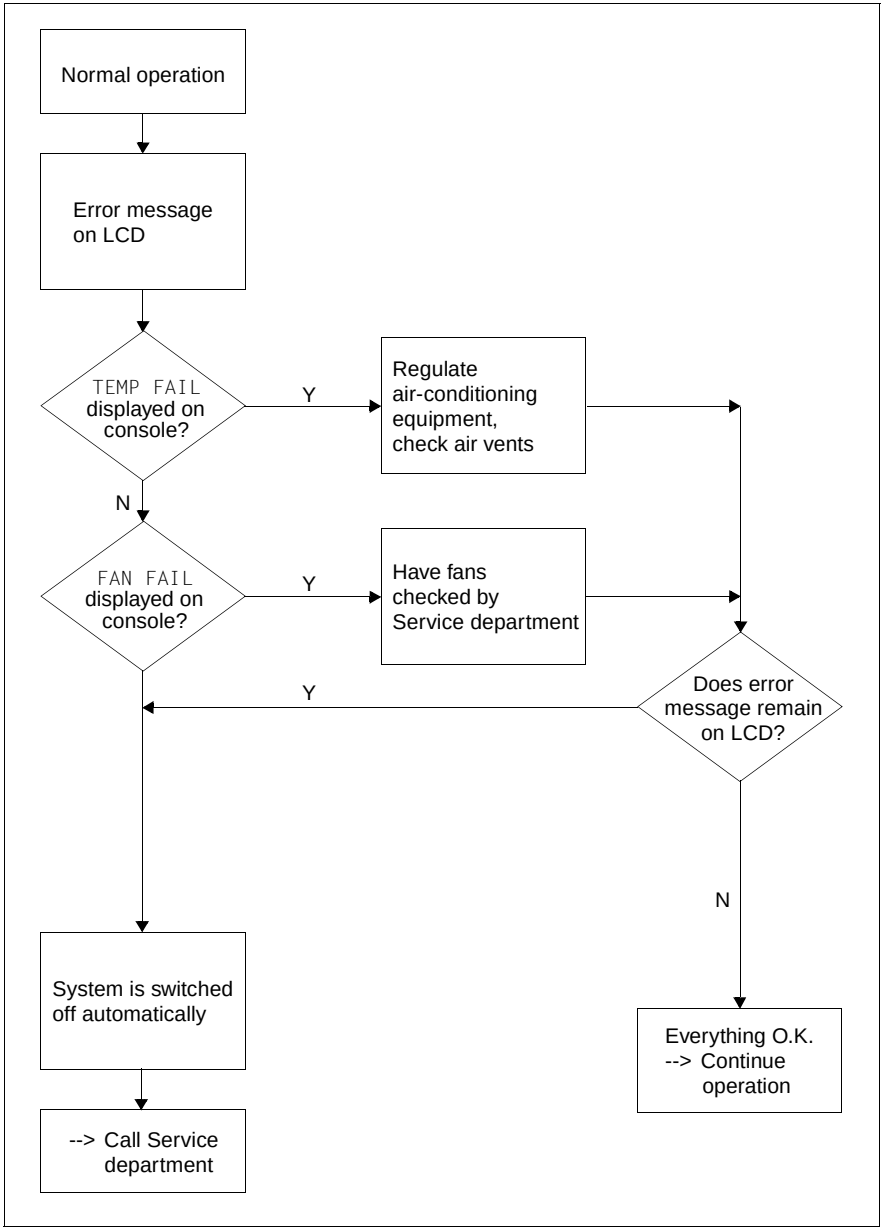


Figure 22: Possible errors during runtime

8 Installing hard disks

Magnetic disks (hard disks) can be replaced online from Reliant UNIX 5.43 onwards. The installation of hard disks involves two different operations that are described in the following sections:

- Replacing defective disks (Online Replacement: OLR)
- Installing additional disks (Online Installation)

8.1 Prerequisites

Unlike other OLR functions, the online installation of hard disks may be executed independently by a trained and experienced system administrator, provided the configuration of the hard disk and the characteristics of the drives and drive frames used fulfill certain requirements (see section “Hardware and software requirements” on page 96). If one of these requirements is not fulfilled, the replacement of a defective hard disk or the installation of an additional hard disk may only be carried out by our Service department.

8.1.1 Requirements for the system administrator

The system administrator must have the following knowledge and experience:

– general knowledge of the operating system (UNIX and Reliant UNIX, see the section “Target group” on page 2)

– fundamental knowledge of system administration (obtained through in-depth experience as an RM600 E system administrator)

– experience using the VConfig graphical user interface under WebSysAdmin

– and experience of the Config character-mode user interface under SYSADM

If these requirements are not fulfilled, the hard disk must be replaced by our Service department.

8.1.2 Hardware and software requirements

The following hardware and software requirements must be fulfilled to enable the system administrator to replace a defective hard disk or install an additional hard disk while the system is operating.

The operating manual for the 19" FC chassis to be installed in the FC600 E cabinet describes how to replace and add hard disks connected via a Fibre Channel (FC) connection. The exact title for the manual can be found in the Related publications chapter towards the end of this book.

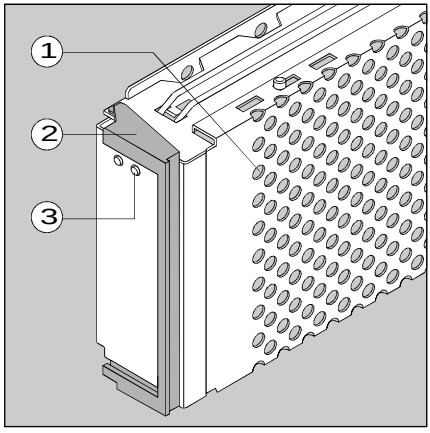
HW/SW component	Requirement
Configuration	From Reliant UNIX 5.43 Disk mirroring[1], i.e.: 1. Only hard disks may be connected to the SCSI channel containing the defective hard disk. 2. The hard disk to be replaced must be included in an OLR vdisk definition (mirror disk mode). 3. The disk interface (SCSI 16 bit, SE) must correspond to the disk interface of the cabinet (see label in cabinet).
Drive	3½ inch
Mounting frame	– 3½ inch with handle – option of automatically addressing the hard disk (slot encoding) – LEDs (on the front of the mounting frame) – integrated 3½ inch hard disk

[1] Disk mirroring is described in the manuals “Virtual Disks” and "Configuring Virtual Disks with VDisk Lite"

If one of these conditions is not fulfilled, the replacement of a defective hard disk or installation of an additional hard disk may only be carried out by our Service department.

If you replace a hard disk, which is not contained in an OLR vdisk definition (mirror disk mode), all data on this disk will be lost.

The mounting frame is illustrated below.



(1) = Air vents

(2) = Handle on mounting frame

(3) = LEDs:
One of the LEDs lights up green when the disk is being accessed. The other LED lights up red if the disk is replaced using VConfig.

Figure 23: Required 3½ inch mounting frame for 3½ inch hard disk

8.2 Replacing defective disks

First check that the requirements listed in the section “Hardware and software requirements” on page 96 are fulfilled. If so, you can then replace the defective disk as described below. If the required conditions do not correspond to your RM600 E, please contact our Service department.

The online replacement of hard disks involves the following tasks:

- Identify the defective disk
- Uninstall the defective disk
- Install and configure the replacement disk

Transport the disk in its original packaging. Do not carry it by the handle on the mounting frame. This handle is intended solely for removing the disk from the slot.

8.2.1 Identifying defective disks

You can identify the defective disk using VConfig.

If you log on to the system with root authorization, a message automatically appears to indicate that a hard disk is defective. You can display this message at any time using the */usr/bin/lar/show_defects* command.

8.2.1.1 Identifying defective disks using VConfig

In order to work with VConfig, you need a terminal with graphics capability and a Java-enabled browser.

A message will inform you if a hard disk is defective after you call up the user interface.

If a device is defective or has been deactivated, VConfig will illustrate this in different ways (see the help text under the WebSysAdmin user interface).

- To replace the disk, select the *Disks* tab.
- Select the appropriate disk and select the item *Online replace*.

You can find information about this process in the online help text for *Replace disks online* in the *Index*.

VConfig checks the requirements, deconfigures the hard disk and outputs a graphical representation where the disk is marked in color. The query *Replacing disk done?* then appears. If you do not want to replace a disk, you must now exit by selecting Cancel. If the replacement is to go ahead, you can now remove the defective disk and install and configure the new disk (see sections below).

8.2.2 Removing defective disks

Before you begin to remove the defective disk, it is recommended that you bring the new disk in its **original packaging** to the immediate vicinity of the peripherals cabinet, so that the defective disk can be replaced quickly without damaging the devices. The disk must be room temperature.

► Firstly, check that the original packaging of the disk has not been damaged.

If the packaging has been damaged, this may indicate that the hard disk or the disk drive has been exposed to adverse external effects. Under no circumstances should you install such a disk in your system. Instead, you should contact our Service department and have the disk checked. Further information on handling magnetic disks can be found in the chapter “Using data media” on page 107.

► Open the packaging and remove the disk, which is enclosed in a protective ESD[1] jacket.

► Carefully lay the magnetic disk in its ESD jacket on a soft surface (e.g. on the package material) with its largest surface facing down, so that the extremely sensitive mechanics are not damaged.

► Depending on whether the defective hard disk is located in the front or back of the cabinet you should open the door on the front or back.

Approximately 30 seconds after the hard disk has been deconfigured, the read/write heads are still hovering just above the surface of the hard disk **(shutdown time)**.

You should therefore wait until this **shutdown time** has expired before opening the cabinet. This is the only way to ensure that the drive is actually deactivated.

► You should now find out the location of the defective hard disk displayed on the screen by VConfig. You will recognize it by the red LED.

[1] The term ESD (ElectroStatic Discharge) encompasses measures for protecting components or assemblies that are sensitive to electrostatic discharge, thereby protecting against corruption.

When you have found the defective disk:

► Carefully pull the handle on the disk mounting frame to the left.

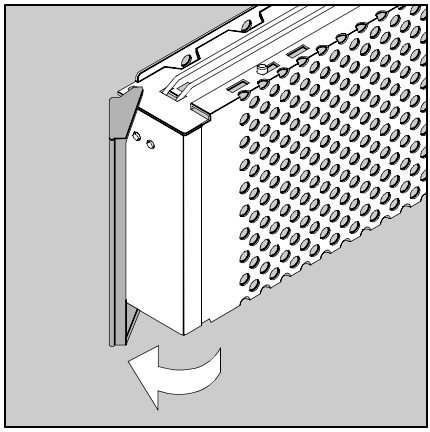


Figure 24: Handle on the 3½ inch mounting frame for 3½ inch hard disks

► Remove the mounting frame with the hard disk from the slot. For safety reasons, hold your free hand under the mounting frame.

Even if a disk is defective, do not touch the plug connector at the back of the mounting frame. Electrostatic discharge may damage the electronics of the drive.

Transport the hard disk in its original packaging. Do not carry it by the handle on the mounting frame. This handle is intended solely for removing the disk from the slot.

► Carefully place the defective disk in the original packaging of the new disk with its largest surface facing down.

8.2.3 Installing replacement disks

The installation of a new hard disk as a replacement for a defective hard disk comprises the following steps:

- Installing the new disk in the RM600 E
- Configuring the replacement disk

8.2.3.1 Installing replacement disks in the RM600 E system

► Remove the protective ESD jacket[1] from the replacement disk.

► Take the disk integrated in the mounting frame by the frame area and hold your free hand under the mounting frame.

Do not touch the plug connector at the back of the mounting frame. Electrostatic discharge may damage the electronics of the drive.

Transport the hard disk in its original packaging. Do not carry it by the handle on the mounting frame. This handle is intended solely for removing the magnetic disk from the slot.

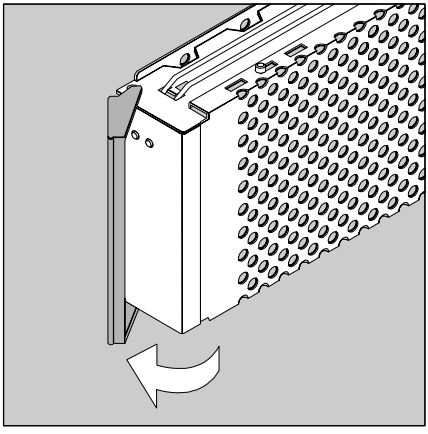


Figure 25: 3½ inch mounting frame with a 3½ inch hard disk

[1] Use this protective ESD jacket to protect the defective disk against electrostatic discharge.

► Insert the mounting frame with the disk into the peripherals cabinet slot that previously contained the defective disk.

The address assigned automatically to the magnetic disk is correct only if the new disk is installed at the same location at which the defective disk was inserted. The new hard disk only correctly assumes the function of the old one if this is the case.

When the hard disk is in place:

► Close the cabinet.

8.2.3.2 Configuring replacement disks

When you have installed the new disk:

► Select Continue in response to the query *Replacing disk done?*

If you enter *Cancel*, you quit the installation.

Once the replacement procedure is complete, a background process performs a hardware analysis on the new disk. This is accompanied by corresponding messages on your screen. An equalization with the mirror disk is then started in the background.

Depending on the volume of data and the number of disks, it may take some time until full disk mirroring is restored again. All data on the remaining disks is available to users throughout the installation period.

8.3 Installing hard disks

First check that the requirements listed in the section “Hardware and software requirements” on page 96 are fulfilled. If so, you can then replace the defective disk as described below. If the required conditions do not correspond to your RM600 E, please contact our Service department.

The online installation of additional hard disks comprises the following tasks:

- Install the additional disk with Config
- Install and configure the replacement disk in the RM600 E

Transport the hard disk in its original packaging. Do not carry it by the handle on the mounting frame. This handle is intended solely for removing the disk from the slot.

8.3.1 Installing additional disks with Config

In order to work with Config, you need a terminal with a character-oriented user interface.

It is assumed that you have read the manual “System Administration and Hardware Configuration Using the SYSADM User Interface”.

Confirm each of the following steps by pressing ↵. This is the only way to get to the next step.

► Start SYSADM.

► Select the following menu items in sequence.

Configuration – Load – Cabinets

► Select the cabinet from the *Cabinets* submenu and then select the SCSI chain in which the disk is to be installed from the follow-on menu. Do **not** confirm here by pressing ↵.

► Then select *Operation->Online device insertion* using the Actions key.

Config checks the requirements and then prompts you to install the additional disk. You can now install the hard disk in the system and then configure it (see sections below).

8.3.2 Installing additional disks

First check that the original packaging of the hard disk has not been damaged.

If the packaging has been damaged, this may indicate that the hard disk or the disk drive has been exposed to adverse external effects. Under no circumstances should you install such a disk in your system. Instead, you should contact our Service department and have the disk checked. Further information on handling magnetic disks can be found in the chapter “Using data media” on page 107.

- Bring the disk in its **original packaging** to the cabinet in which it is to be installed.

Depending on where the additional disk is to be installed:

- Open the door to the front or back of the cabinet.

Please note the following important warning when opening the cabinet or installing the additional disk:

Since the hard disks are operating, make sure that you do not bump against the cabinet. External forces (e.g. dust, vibrations, etc.) that exceed certain values will inevitably cause impact between the read/write heads and the magnetic disk surface, thereby resulting in loss of data.

- Select the free slot in the cabinet in which you want to install the disk.
- Remove the slot cover by carefully pulling the handle on the cover to the left and towards you.

Slots must either be covered or contain a hard disk. If a slot remains open, neither the EMC limit values nor proper ventilation can be guaranteed.

- Open the packaging and remove the disk which is housed in a protective ESD[1] jacket.
- Carefully lay the disk in its ESD jacket on a soft surface (e.g. on the package material from the original packaging) with its largest surface facing down, so that the extremely sensitive mechanics are not damaged.

[1] The term ESD (ElectroStatic Discharge) encompasses measures for protecting components or assemblies that may be damaged by electrostatic discharge from being corrupted, thereby avoiding corruption. Use this ESD jacket to protect a defective disk from electrostatic discharge.

- ► Remove the protective ESD jacket from the disk.
- ► Take the disk integrated in the mounting frame by the frame area and hold your free hand under the mounting frame.

Do not touch the plug connector at the back of the mounting frame. Electrostatic discharge may damage the electronics of the drive.

Transport the hard disk in its original packaging. Do not carry it by the handle on the mounting frame. This handle is intended solely for removing the magnetic disk from the slot.

- ► Ensure that the magnetic disk is integrated in a 3½ inch mounting frame, equipped with LEDs visible from the front and a handle.

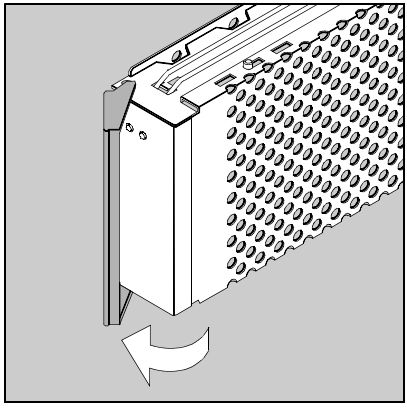


Figure 26: 3½ inch mounting frame with a 3½ inch hard disk

- ► Insert the mounting frame with the disk into a free slot on the selected SCSI channel.

When you have installed the disk:

- ► Close the cabinet again.

8.3.3 Configuring additional disks

When you have installed the new disk:

- Select yes in response to the query *Installation complete?*

If you enter *abort*, the installation is ended.

Once the installation is complete, a background process performs a hardware analysis on the new disk during which time it is configured. During this installation period, all data on the remaining disks is accessible to users.

9 Using data media

This chapter describes what to look out for when using removable RM600 E data media. You will also learn how to protect data media against accidental deletion or overwriting.

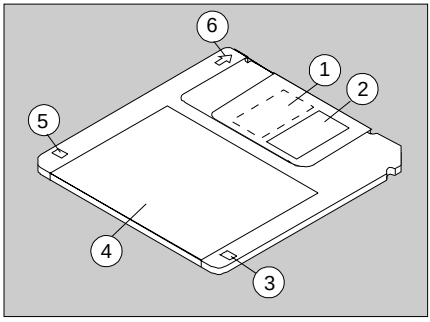
All of the data media that you require for your system can be found in the extensive range of accessories available from your local Siemens office. For information on how to order data media and additional accessories, refer to the section “Accessories” on page 168.

All data media are supplied with blank stickers. Label them and stick them onto the data media at the space provided. Remember that proper labeling can save you a lot of trouble.

9.1 Using diskettes

New diskettes must be formatted before they are first written to, if they are not already preformatted.

The structure of a 3½ inch diskette is as follows:



(1) = Slot for read and write head

(2) = Contact protector

(3) = Hole for automatic recognition of a HD diskette (High Density)

(4) = Text field

(5) = Write protection marker

(6) = Insertion arrow

Figure 27: Components of a 3½ inch diskette

9.1.1 Handling diskettes

Diskettes should be handled as follows:

- Only write on a label with a felt-tip pen.
  Do not use a sharp pencil or a biro.
  Do not use an eraser.
- Do not touch an unprotected area.
- Do not bend diskettes.
- Avoid direct sunlight or excessive heat (optimum storage temperature is between +10 °C (50 °F) and +52 °C (125 °F)).
- Keep diskettes away from magnetic objects.

9.1.2 Mechanical write protection of a 3½ inch diskette

Protect 3½ inch diskettes against accidental deletion or overwriting while in the drive as follows:

► Move the small indented write protection tab in the corner on the reverse side of the diskette, so that a small rectangular opening is visible.

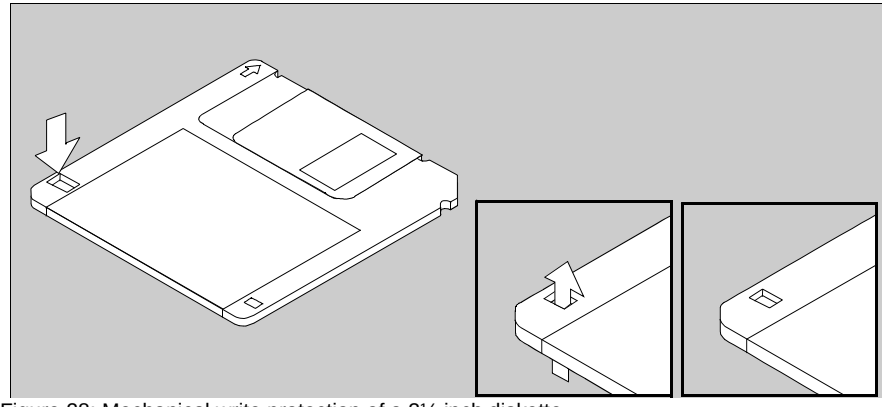


Figure 28: Mechanical write protection of a 3½ inch diskette

The diskette can neither be written to nor deleted from while in the drive.

Write protection does not protect against destruction and deletion caused by external influences, e.g. magnetism or heating.

To make the diskette writable again, proceed as follows:

- Push the write protection tab back in the other direction, so that the opening is closed and you can no longer see through it.

The chapter “Operating the drives” on page 123 explains how to insert and remove 3½ inch diskettes from the drive.

9.2 Using magnetic tape cassettes

Magnetic tape cassettes (MTC) are data storage units for large volumes of data.

Cassettes with a capacity of 525 Mbytes and 4 Gbytes are available for the ¼ inch MTC drive (depending on the device type).

Cassettes with a maximum capacity of 4 Gbytes and 12 Gbytes are available for the 4 mm MTC drive.

The following table provides an overview of the various 8 mm magnetic tape cassettes.

Model name EXABYTE	Model name Reliant UNIX ("autoconf" label)	**Max. capacity [1]**	**Max. data rate[2]**	Data compression	**Data cassette[3]**	Cleaning cassette
EXB8200	MC10	2.3 Gbyte	250 Kbyte/s	no	MP cassette max. 112m	EXABYTE Premium 18c
EXB8500	MC10 (5 Gbyte)	5 Gbyte	500 Kbyte/s	no	MP cassette max. 112m	EXABYTE Premium 18c
EXB8500C	not integrated	5 Gbyte	500 Kbyte/s	yes	MP cassette max. 112m	EXABYTE Premium 18c
EXB8505	MC10 (5 Gbyte compr. small)	5 Gbyte	500 Kbyte/s	yes	MP cassette max. 112m	EXABYTE Premium 18c
Eliant820	MC12	7 Gbyte	1 Mbyte/s	yes	MP cassette max. 160m	EXABYTE Premium 18c
EXB8900 (Mammoth1)	MC75	20 Gbyte	3 Mbyte/s	yes	AME cassette max. 170m	Mammoth Cleaning Cartridge 18c

Table 14: Overview of various 8 mm magnetic tape cassettes

[1] Uncompressed capacity using tape cassettes with maximum tape length and maximum possible recording density.

[2] Data rate in uncompressed mode using maximum possible recording density.

[3] The only permitted MP (Metal Particle) cassettes are the EXATAPE from EXABYTE and the QG cassette from Sony
The only permitted AME (Advanced Metal Evaporated) cassette is the AME EXATAPE from EXABYTE

In compression mode, the capacity and data rate increase by the factor of data compression. The factor of data compression depends on the data type and is generally in the range 1 to 4. A compression factor of 2 is often specified as a rule of thumb.

Model name EXABYTE	**writes formats with UNIX nodes**	**can read format**	**Capacaty/ data rate**
EXB8200	8200 rstapexxx	8200	2,3 Gbyte/250 Kbyte/s
EXB8500	8500 rstapexxxh 8200 rstapexxx	8500 8200	5 Gbyte/500 Kbyte/s 2,3 Gbyte/250 Kbyte/s
EXB8500C	8500C rstapexxxhc 8500 rstapexxxh 8200 rstapexxx	8500C 8500 8200	10 Gbyte/1 Mbyte/s 5 Gbyte/500 Kbyte/s 2,3 Gbyte/250 Kbyte/s
EXB8505	8500C rstapexxxhc 8500 rstapexxxh 8200 rstapexxx	8500C 8500 8200	10 Gbyte/1 Mbyte/s 5 Gbyte/500 Kbyte/s 2,3 Gbyte/250 Kbyte/s
Eliant820	8500C rstapexxxhc 8500 rstapexxxh	8500C 8500 8200 [1]	14 Gbyte/2 Mbyte/s 7 Gbyte/1 Mbyte/s 2,3 Gbyte/500 Kbyte/s
EXB8900 (Mammoth1)	Mammoth 1C rstapexxxc od. rstapexxxhc Mammoth1 rstapexxxc od. rstapexxxh	Mammoth1C Mammoth1 8500C 8500 8200	20 Gbyte/3 Mbyte/s 40 Gbyte/6 Mbyte/s 14 Gbyte/1 Mbyte/s 5 Gbyte/500 Kbyte/s 2,3 Gbyte/250 Kbyte/s

Overview of various 8 mm magnetic tape cassettes

[1] Write protection must be activated for the cassettes.

We recommend you use cassettes from the central Siemens supplies department to ensure optimum recording quality (see the section “Accessories” on page 168), as these are specifically designed to suit the device features.

Only use EXABYTE®cassettes for the 8 mm MTC drive. Other cassettes may damage the magnetic heads of the drive. Never use Video-8 cassettes.

Only use 4 mm magnetic tape cassettes bearing the symbol “DDS” (Digital Data Storage) and “MRS IIII” (Media Recognition System) for the 4 mm MTC drive. The use of other magnetic tape cassettes may cause malfunctions. You will find suitable 4 mm magnetic tape cassettes in the section “Accessories” on page 168. Neither reading nor writing is possible with DAT audio cassettes.

Life of a magnetic tape cassette

“The life depends on how often the tape is drawn past the magnetic head. The number of these head passes” is proportional to the volume of written data.

- For ¼ inch magnetic tape cassettes with 525-Mbyte and 4-Gbyte capacity:

  A maximum of **1500** head passes can be carried out.

  The magnetic tape has 18 tracks. The complete length of the tape is drawn past the write/head for each track. If 155 Mbytes, 525 Mbytes or 4 Gbytes of data are written to this tape, the entire tape is drawn past the magnetic head 18 times. The cassette can be written to accordingly approx. **260 times** with 155 Mbytes, 525 Mbytes or 4 Gbytes of data. If this data is also to be read each time, the life of the cassette is reduced to **130 times** reading and writing 155 Mbytes, 525 Mbytes or 4 Gbytes of data.

- For 8 mm magnetic tape cassettes:

  A maximum of **1500** head passes can be carried out.

  The tape has to be run through twice for a backup, i.e. deleted from and written to at the same time and then rewound. Consequently, approximately **750** backup runs are possible.

  However, if each backup run is to be read, the life of an 8 mm cassette is reduced to approx. **375** passes.

  The life of the tape is reduced drastically if the drive operates in start/stop mode, i.e. the tape is always halted though the read/write head continues to turn. The drive must also be cleaned more frequently in this case.

Once this number of passes has been carried out, a magnetic tape cassette should no longer be used.

- The same applies to 4 mm magnetic tape cassettes as to 8 mm magnetic tape cassettes.

Environmental conditions also have an effect on the life of a magnetic tape cassette. You should therefore read the next section "Handling magnetic tape cassettes" very thoroughly, as it deals with the handling of magnetic tape cassettes.

9.2.1 Handling magnetic tape cassettes

This is the **correct** way to handle magnetic tape cassettes:

- Always store cassettes in the transport holder.
- Cassettes should be stored in the operating environment for four hours before they are used. If the cassettes were exposed to high humidity or high temperature, they must be stored in the operating environment for at least three to four days. Poorly acclimatized magnetic tape cassettes are difficult to read and affect the magnetic head.

You must **always** observe the following rules when handling magnetic tape cassettes:

- Protect the cassettes against direct sunlight and heat (the optimum storage temperature is between +5 °C and +45 °C).
- Do not bring the cassettes into contact with magnetic objects.
- Do not use cleaning agents or solutions, or thinners on the cassettes.
- Do not leave a magnetic tape cassette in the drive for several days. Because the tape is wound around the write/read head, even a small amount of dust can cause damage.

In general:

Magnetic tape cassettes and drives will quickly become less efficient and less reliable due to:

- rapid fluctuations in temperature
- increased dust accumulation (printer nearby)
- improper handling and storage of cassettes
- inadequate cleaning of the drives
- periodic use of unsuitable or used tape and cleaning materials

Please refer also to the section “Tips for avoiding data backup problems” on page 148, as well as the sections on maintaining the 4 mm and 8 mm MTC drives in the chapter “Maintaining the hardware” on page 155.

9.2.2 Mechanical write protection of a ¼ inch magnetic tape cassette

Protect magnetic tape cassettes against accidental overwriting or deletion by turning the write lock until the tip of the arrow points to the SAFE position.

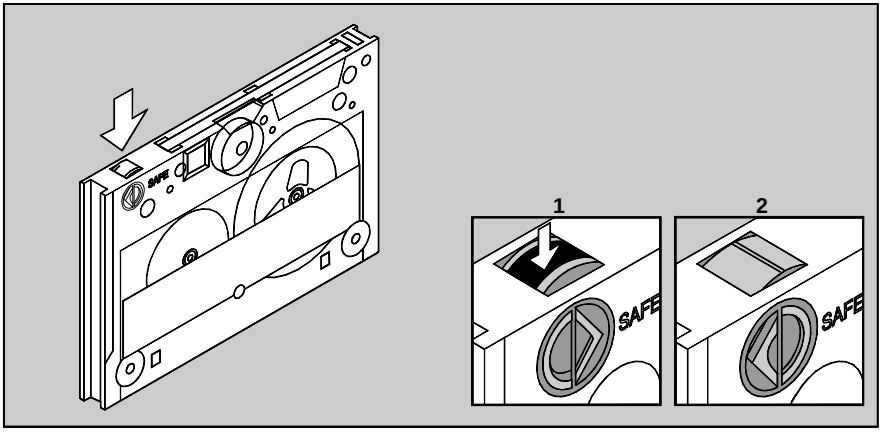


Figure 29: Mechanical write protection of a ¼ inch magnetic tape cassette

1 = write protected
2 = not write protected

The chapter “Operating the drives” on page 123 explains how to insert and remove a magnetic tape cassette.

9.2.3 Mechanical write protection of a 4 mm magnetic tape cassette

4 mm magnetic tape cassettes have a write lock on the narrow long side opposite the tape. The write lock is switched on if the tab is pushed to the right (see figure), i.e. to the middle of the cassette, and the sliding latch is not covering the opening.

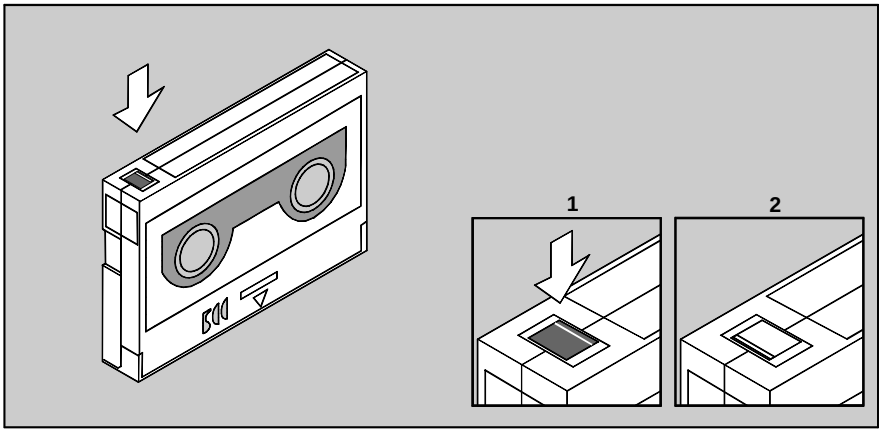


Figure 30: Mechanical write protection of a 4 mm magnetic tape cassette

1 = write protected
2 = not write protected

The chapter “Operating the drives” on page 123 explains how to insert and remove a 4 mm magnetic tape cassette.

9.2.4 Mechanical write protection of an 8 mm magnetic tape cassette

8 mm magnetic tape cassettes have a write lock on the narrow long side opposite the tape. The write lock is switched on if the tab is pushed to the left (see figure) and the sliding latch covers the opening.

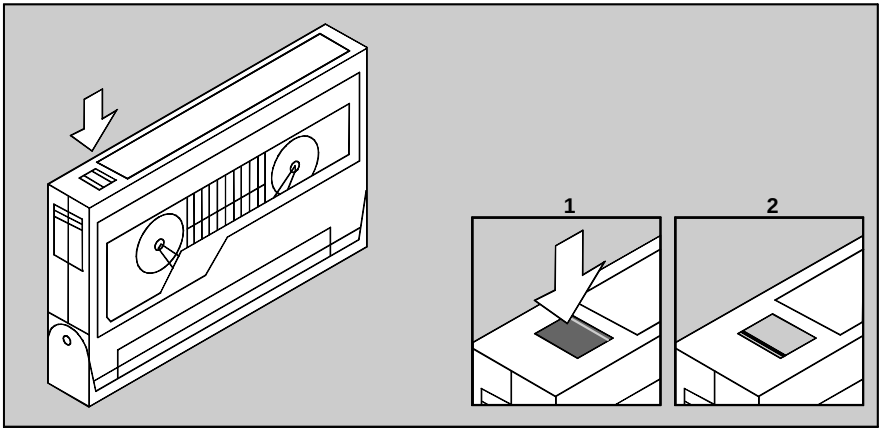


Figure 31: Mechanical write protection of an 8 mm magnetic tape cassette

1 = write protected
2 = not write protected

The chapter “Operating the drives” on page 123 explains how to insert and remove an 8 mm magnetic tape cassette.

9.3 Using CD-ROMs

In contrast to other the diskette or magnetic tape data media described previously, the CD-ROM cannot be written with data (ROM = Read Only Memory).

9.3.1 Handling CD-ROMs

When removing a CD-ROM from its packaging, you must observe the following rules:

- If the CD-ROM is dirty, you can wipe it carefully with a clean, dry, soft cloth. Never use a damp cloth or cleaning agent or solution. Vapor (e.g. ammonia) can also cause damage. Most hi-fi shops supply special cleaning cloths for CDs, which you can also use for your CD-ROMs.
- CD-ROMs should be kept away from direct sunlight or intense heat (> 55 °C). You should never attempt to blow off dirt using a hair-drier. The maximum permitted temperature increase is 15 °C per hour.
- As with diskettes, CD-ROMs must never be bent or scratched on the surface. Dropping the CD-ROM can also damage it.

9.3.2 Inserting a CD-ROM in a caddy

Before you insert a CD-ROM in the drive, it must first be placed in a caddy.

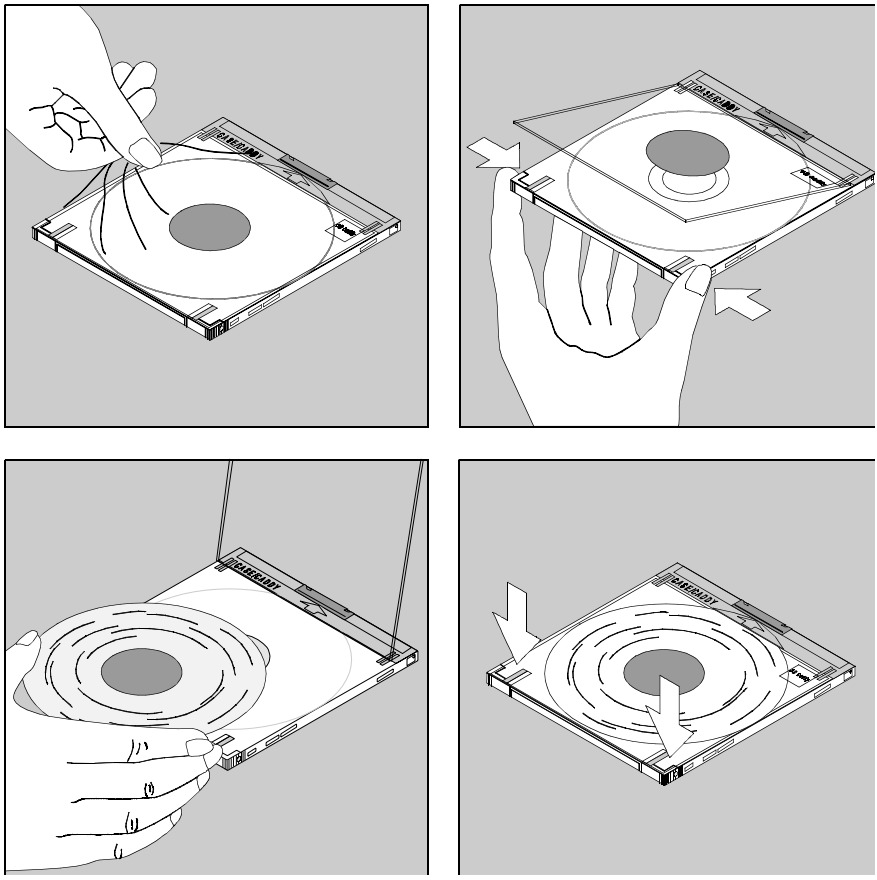


Figure 32: Inserting a CD-ROM in a caddy

- ► If there is a protective film around the caddy, you must remove it before using the caddy for the first time.
- ► Open the caddy by lightly pressing together the two sides where the cover opens, and lifting up the cover with your other hand.
- ► Insert the CD-ROM in the caddy with the labeled side facing upwards.
- ► Close the caddy again. The lock must click shut.

The chapter “Operating the drives” on page 123 explains how to insert and remove a caddy and a CD-ROM.

9.4 Using hard disks

Hard disk drives not only use extremely sensitive mechanics, but also contain a board that must be protected against electrostatic discharge. The following sections describe how to handle hard disks without damaging these sensitive components. They cover the following aspects:

– operation
– transport and installation in the RM600 E system
– temperature and environmental conditions

9.4.1 Handling hard disks during operation

During operation, i.e. from approximately 10 seconds after switching on to approximately 30 seconds after switching off the hard disk drive or the RM600 E system, the read/write heads are hovering an extremely small distance above the surface of the hard disk (**shutdown time**). External forces (e.g. shock, vibration, etc.) that exceed certain values will inevitably cause impact between the read/write heads and the disk surface, thereby resulting in loss of data.

To prevent such serious problems, please observe the following rules:

- Never move a hard disk drive or an RM600 E system while it is operating.
- After switching off a hard disk drive or an RM600 E system, you must take account of the **shutdown time** of approximately 30 seconds.

9.4.2 Handling hard disks during transport and installation in the RM600 E system

The transport of hard disks integrated in a mounting frame can easily result in damage to these sensitive devices. As such damage is not always immediately evident, and may give rise to faults or loss of data later on after installation, it is important to carefully check the packaging when you receive a delivery of hard disks.

If the packaging has been damaged, this may indicate that the hard disk or the disk drive has been exposed to adverse external effects, and may have been damaged.

Under no circumstances should you install such a disk in your RM600 E system. Instead, you should contact our Service department and have the disk checked.

9.4.2.1 Handling hard disk components that are sensitive to electrostatic discharge

When transporting, storing, and installing hard disks, you must observe the following rules in order to protect the disk against electrostatic discharge:

- Hard disks use components that are sensitive to electrostatic discharge and may only be handled cautiously by the mounting frame. Do not disturb the plug connector at the back of the mounting frame. Electrostatic discharge may damage the electronics of the drive.
- Hard disks are supplied in a protective ESD jacket[1]. Keep the disk in this jacket until such time as it is to be installed in the RM600 E system.
- Even in the case of defective disks, do not touch any ESD-sensitive components. Defective disks should also be kept in an ESD jacket if they are to be checked by our Service department.
- Hard disks should be transported only in their original packaging or in an ESD-proof container (even over the shortest distances).

[1] The term ESD (ElectroStatic Discharge) encompasses measures for protecting components or assemblies that may be damaged by electrostatic discharge.

9.4.2.2 Handling hard disk mechanics

Hard disks are highly sensitive devices that must be handled with care. Damage can even occur if the disks are carelessly placed on a hard surface and the read/write heads impact with the disk surface.

Hard disks should always be placed carefully on a soft surface with their largest surface facing down in order to prevent overturning.

9.4.3 Temperature and environmental conditions for hard disks

Hard disks may only be transported under certain temperature and environmental conditions:

Transport temperature	-40 – +65 °C
Environmental conditions (transport)	10 – 90 % humidity
Temperature change	< 20°C per hour

Certain rules must also be observed when storing hard disks to ensure that the devices are in full working order even after long periods in storage. Magnetic disks must be stored long-term under the following temperature and environmental conditions:

Storage temperature	15 – 25 °C
Environmental conditions	10 – 50 % humidity

Throughout the lifetime of the hard disks, you must ensure that condensation does not occur on the hard disks or in the hard disk drives. Condensation can occur if the hard disk drive is transported into the operating room from a cold environment, therefore allow an acclimatization time of at least two hours before operating it. This is the only way to guarantee that the hard disk drive is completely dry.

10 Operating the drives

The drives integrated in the various RM600 E cabinets are powered up when the system is switched on:
– 3½ inch diskette drive
– ¼ inch MTC drive (4 Gbyte)
– 4 mm MTC drive (4 und 12 Gbyte)
– 8 mm (20 Gbyte) MTC drive
– 8 mm (7 Gbyte) MTC drive
– DVD drive

If you want to read or write to a drive, you need to know its device name. The *gettypes* command allows you to display all the devices configured on your system on the screen. A detailed description of the *gettypes* command is provided in the manual page of the same name, which you can also call up on screen by entering *man gettypes*.

The diskette drive and DVD drive are required as part of the basic system configuration. However, the basic configuration does not necessarily have to include the other drives, which are nevertheless useful expansion options for the RM600 E due to their high storage capacity.

The following sections describe how to operate the drives. The section “Using data media” on page 107 explains how to handle the various data media and protect them against accidental deletion or overwriting.

A separate chapter is devoted to maintenance.

All of the data media you require for the drives described below are included in the extensive range of accessories available from your local Siemens office. The section “Accessories” on page 168 tells you how to order data media and additional accessories.

10.1 Accessing the drives

10.1.1 Opening/closing the drive door of the E45 model

The drive door of the RM600 E45 system is located on the top left of the front panel of the system cabinet. If you want to use one of the drives, the first thing you must do is open the drive door. For this, you will need the same key you use to switch on and off the RM600 E:

► Turn the key to the left (horizontal position) and pull open the drive door with the key.

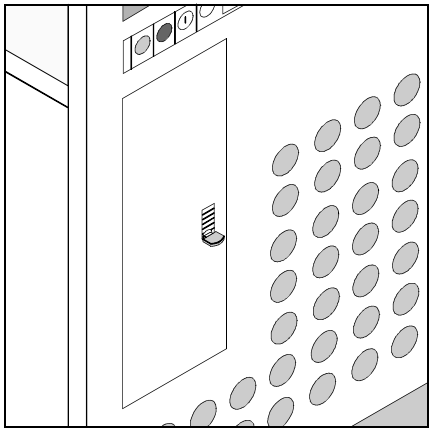


Figure 33: RM600 E45 drive door

The drives are arranged in rows one above the other. The diskette drive is always on the top, and the CD-ROM drive beside it. Additional drives can be located in different places, depending on the configuration of your system.

To close the drive door

► simply press it shut and turn the key to the right (vertical position).

If you are not going to be using the drives for a long time, you should keep the drive doors closed.

10.1.2 Accessing the drives of large cabinets

There are no drive doors on the other models. The front door must be opened to access the drives.

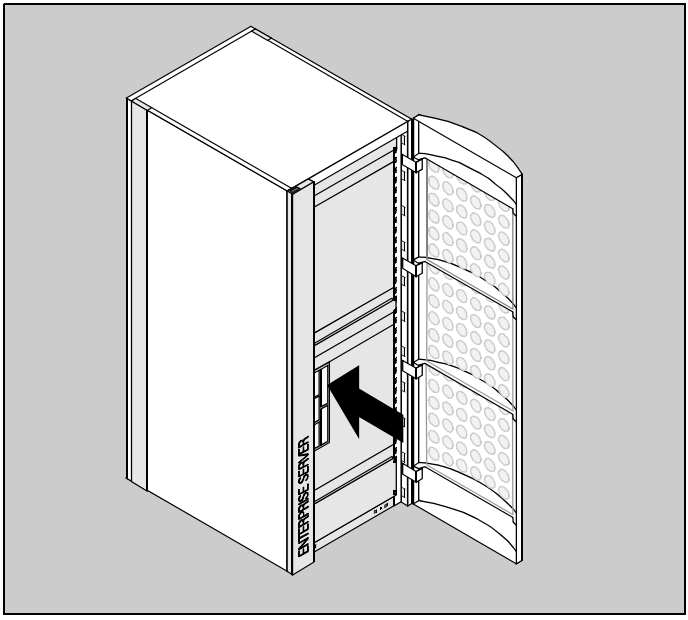
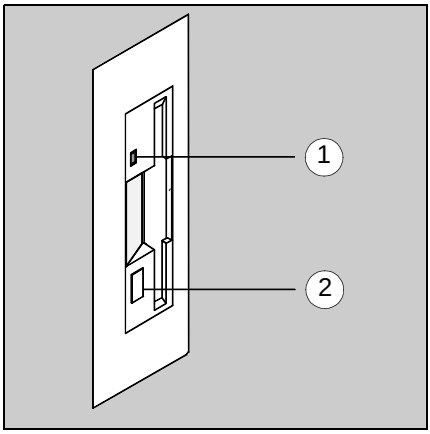


Figure 34: Opening the cabinet door of the large RM models

10.2 Operating diskette drives

The diskette drive has the following controls:



(1) = Access indicator

(2) = Release button

Figure 35: Diskette drive controls

The **access indicator** on the diskette drive is always lighting when the drive is active (e.g. when checking whether a diskette is inserted or is formatted, when reading data from the diskette, or when data is being written to the diskette).

The release button on the diskette drive must not be pressed while the access indicator is lighting.

Inserting the diskette

► Hold the diskette by the contact protector and direct it towards the drive slot with the round disk in the middle of the diskette facing the left.

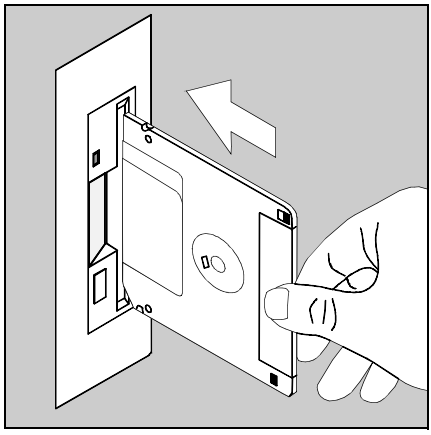


Figure 36: Inserting the diskette

► Insert the diskette fully into the drive until it clicks into place and the release button springs out.

Removing the diskette

The diskette must not be removed while the access indicator on the diskette drive is lighting.

► Press the release button.

The diskette springs out slightly from the drive slot.

► Remove the diskette from the drive.

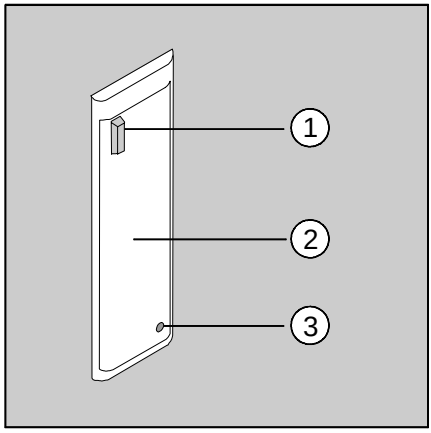
10.3 Operating ¼ inch MTC drives (4 Gbytes)

The ¼ inch (4 Gbyte) MTC drive enables reading from and writing to cassettes with a capacity of 525 Mbytes and 4 Gbytes

You should only open the drive flap if you want to insert or remove a cassette. Otherwise the drive (drive flap) should be kept shut, so that contamination (e.g. through dust) can be avoided.

Opening/closing the drive

► Press the release button (1) in the top left-hand corner of the drive flap of the ¼ inch MTC drive.



(1) = Release button of drive

(2) = Drive flap
The drive slot, into which the ¼ inch magnetic tape cassette is inserted, is located behind the drive flap.

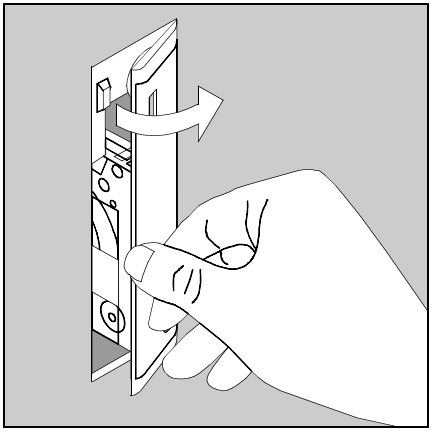
(3) = Access indicator

Figure 37: ¼ inch MTC drive controls

The access indicator (3) is always lighting when the drive is being accessed with a write or read command, and when the drive is active (e.g. when checking whether a cassette is inserted, if a tape is being wound and rewound, if data is being read from the tape, or if data is being written to the tape).

i The drive flap must not be unlocked while the access indicator is lighting.

► Now open the drive flap fully.



You must open the drive as far as it will go if you want to insert or remove a cassette (do not try and force the drive flap open any further).

Figure 38: Opening the ¼ inch MTC drive

► Close the drive by pressing lightly on the drive flap.

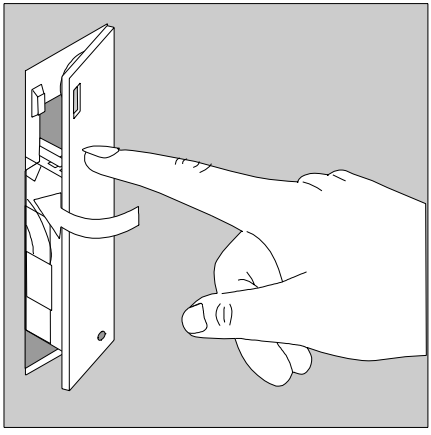


Figure 39: Closing the ¼ inch MTC drive

Inserting the ¼ inch magnetic tape cassette

- ► Make sure that the access indicator is not lighting.
- ► Open the drive flap by pressing the release button.
- ► Insert the cassette into the drive slot as far as it will go, making sure that the metal disk is facing to the right and that the tape opening is facing upwards.

The cassette should still be slightly visible after it is inserted in the drive slot.

If you insert the cassette incorrectly, you will notice some resistance. Do not try to force the cassette into the drive.

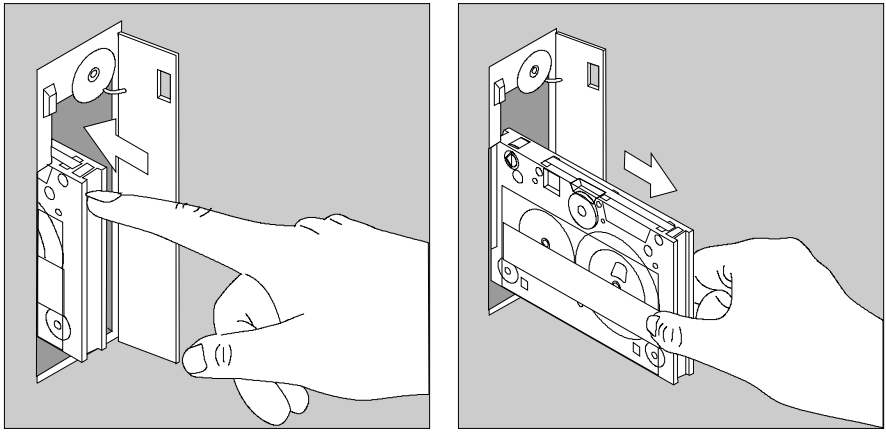


Figure 40: Inserting and removing a ¼ inch magnetic tape cassette

- ► Close the drive flap.

  The cassette is now fully inserted. The lock must click into place.

When a cassette is inserted, the tape is first tightened by winding and rewinding. The magnetic head is then positioned in the drive, and the tape is wound and rewound a few more times in the process.

When the access indicator extinguishes, the drive is ready for reading and/or writing.

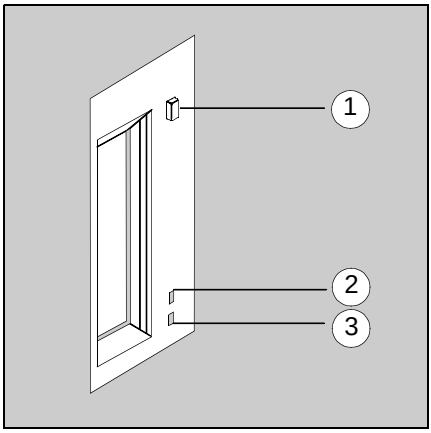
Removing the ¼ inch magnetic tape cassette

Always wait until the cassette tape in the drive has stopped, i.e. the access indicator is no longer lighting (figure 37 on page 128).

- ► Open the drive flap by pressing the release button (figure 37 on page 128).
- ► Remove the cassette from the drive (figure 40 on page 130).
- ► Close the drive flap or insert another cassette and then close the flap.

10.4 Operating 4 mm MTC drives

The 4 mm MTC drive has the following controls:



(1) = Release button

(2) = Amber LED (error indicator)

(3) = Green LED (ready indicator)

Figure 41: 4 mm MTC drive controls

The indicators have the following meaning:

- The **error indicator** (2) can display two colors: amber or green. It only lights up green for a short time in one special case, i.e. after the system unit is switched on. The indicator extinguishes if the self-test is positive.

  If the error indicator lights up amber, there is an error in the drive.

  If the error indicator flashes amber, the drive should be cleaned immediately, as error-free operation can no longer be guaranteed.

  Please follow the instructions given in the chapter “Maintaining the hardware” on page 155 when cleaning this drive.

- The **ready indicator** (3) flashes during the drive self-test after the system unit is switched on.

  It also flashes during operation when the drive is being accessed.

  It lights up when a magnetic tape cassette has been inserted, and no data is being sent to the drive or the tape is not moving.

It does not light up if no magnetic tape cassette has been inserted.

Relatively long startup and positioning times are required for a 4 mm tape. The ready indicator flashes for the respective length of time.

Do not press the release button on the MTC drive while the ready indicator is flashing, as data may be lost.

Inserting the 4 mm magnetic tape cassette

Only use 4 mm magnetic tape cassettes bearing the symbol “DDS” (Digital Data Storage) and “MRS ||||” (Media Recognition System). The use of other magnetic tape cassettes may cause malfunctions. You will find suitable 4 mm magnetic tape cassettes listed in the section “Accessories” on page 168. Neither reading nor writing is possible with DAT audio cassettes.

- ► Make sure that the ready indicator is neither lighting nor flashing.
- ► Insert the magnetic tape cassette (with the viewing window facing to the left) as far as it will go into the drive slot, until it is pulled in automatically.

If you insert the cassette incorrectly, you will notice some resistance. Do not try to force the cassette into the drive.

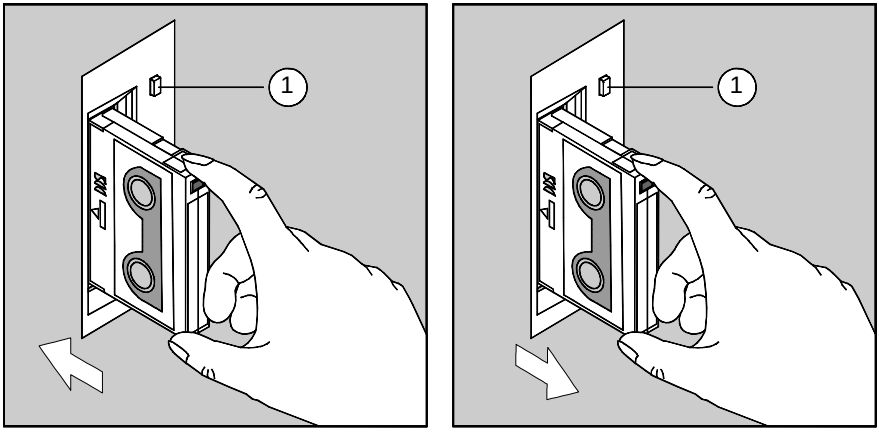


Figure 42: Inserting and removing a 4 mm magnetic tape cassette

(1) = Release button.

The magnetic tape cassette is now inserted. The ready indicator (green LED) lights up.

Removing the 4 mm magnetic tape cassette

The 4 mm magnetic tape cassette should never be left in the drive any longer than is necessary. Store the magnetic tape cassettes in their original packaging, as this is the best way of protecting them against dust.

Always wait until only the ready indicator (green LED) is left lighting, i.e. the tape has stopped in the drive and the write or read action has been completed.

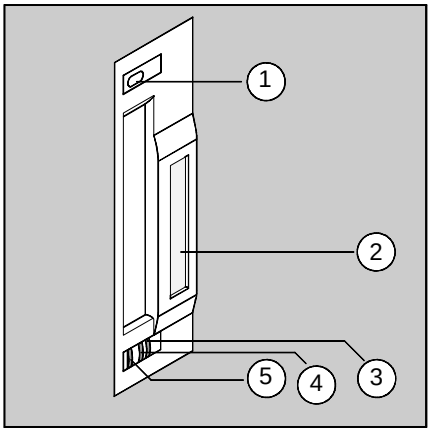
► Press the release button so that the magnetic tape cassette springs out.

After the release button is pressed, the tape is first rewound and spooled. The cassette is then ejected automatically.

► Remove the magnetic tape cassette.

10.5 Operating 8 mm (20 Gbyte) MTC drives

The 8 mm (20 Gbyte) MTC drive has the following controls:



(1) = Release button
(2) = LCD (Liquid Crystal Display)
(3) = Green LED (activity indicator)
(4) = Green LED (ready indicator)
(5) = Amber LED (error indicator)

Figure 43: 8 mm MTC drive controls (20 Gbyte)

- The **error indicator** (5, amber LED) lights up after the system unit is switched on and extinguishes if the self-test is positive. It only flashes slowly if there is a fault on the drive. It lights continuously if the drive needs cleaning or if cleaning is in progress.

  Access to the drive is prevented if the cleaning instructions have been ignored repeatedly.
  When cleaning the drive you should follow the instructions in the section “8 mm (20 Gbyte) MTC drive” on page 159.

- The **ready indicator** (4, green LED) lights up after the system unit is switched on, then flashes, and extinguishes if the self-test is positive.

  – It lights continuously if a cassette has been inserted and the cassette tape is not spooled. The tape is wound around the read/write head.

  – It does not light up if a cassette is not inserted.
  Likewise, it does not light up if the cassette tape is not wound around the read/write head even though a cassette has been inserted.

- The **activity indicator** (3, green LED) lights up after the system unit is switched on and extinguishes if the self-test is positive.
  It only flashes if the cassette tape is spooled.
  Three different flashing speeds are identified:
  - regular, slow flashes indicate a read/write procedure in streaming mode.
  - regular, fast flashes indicate that the tape is spooling backwards or forwards.
  - irregular flashes indicate that data is being loaded or unloaded or a read/write procedure in start/stop mode.

Do not press the release button of the MTC drive while the activity indicator is flashing, as data may be lost.

The LCD displays reset messages, status information and drive errors.

Please note the following information:

Only use 8 mm magnetic tape cassettes with a capacity of 20 Gbytes supplied by EXABYTE. The use of other cassettes can cause malfunctions. You will find suitable 8 mm cassettes listed in the section “Accessories” on page 168. You should refer also to the section “Tips for avoiding data backup problems” on page 148.

Lower capacity 8 mm magnetic tape cassettes (2.3/5/7 Gbyte) can be read by this MTC drive. You should, however, keep the number of read accesses to a minimum since these tapes cause considerably higher abrasion than the 20-Gbyte tapes. If a lower capacity cassette has been read and a 20-Gbyte cassette is to be used subsequently, then the drive must be cleaned first. If the drive is not cleaned, then the drive will not accept this cassette and will eject it immediately.

The reactions of the LEDs (Light Emitting Diodes) in certain situations are listed below.

Situation	**Error indicator (5) (amber)**	**Ready indicator (4) (green)**	**Activity indicator (3) (green)**
Power-on self-test or reset	**lights up**	**lights up**	**lights up**
Error	**flashes slowly**	off/lights up[1]	off
Tape not wound around magnetic head	off	off	off
No cassette inserted	off	off	off
Ready (tape wound around magnetic head)	off	**lights up**	off
Read/write	off	off/lights up[1]	**flashes** slowly
Read/write in start/stop mode	off	off/lights up[1]	**flashes** irregularly
Spool forwards/backwards	off	off/lights up[1]	**flashes** rapidly
Cleaning required	**lights up**	off/lights up[1]	off
Cleaning in progress	**lights up**	lights up	**flashes** slowly

[1] When a cassette is inserted

The following reset messages appear in sequence when the system unit in which the drive is installed is switched on:

Reset messages	Meaning
RESET	Basic drive setting (message appears when system unit is switched on or the SCSI bus is reset)
MODEL:	Drive model name
SUBMOD:	Drive software configuration (combination of letters and digits)
SN:	Drive serial number (combination of letters and digits)
CODE:	Drive firmware version (combination of letters and digits)
LAST CLEAN:	The operating time (tape activity) since the last cleaning: e.g. 1.1 HRS
COMPRESS ON	Data compression is on or
COMPRESS OFF	Data compression is off
SINGLE-ENDED	Drive connected to system via single-ended SCSI port or
DIFFERENTIAL	Drive connected to system via differential SCSI port
WIDE	Drive has a WIDE-SCSI port (16 bits), higher data transmission rate than NARROW-SCSI or
NARROW	Drive has a NARROW-SCSI port (8 bits)
SCSI-ID:	Drive identification (SCSI address)

These messages are for information purposes only and do not require any action by the user.

The following status messages can be displayed for the drive in response to the appropriate actions:

Status messages	Meaning
READY-NO TAPE	Drive is ready, cassette can be inserted
LOADING	Drive is drawing in the cassette
READY–TAPE	Cassette has been drawn in, drive is ready for read/write procedures
EJECT	Eject button has been pressed, cassette will be ejected when the drive has completed the current operation
EJECT–PREVNT	Drive is set so that the software prevents the cassette from being ejected

These messages are for information purposes only and do not require any action by the user.

The following tape activity messages may appear while you are using the drive:

Tape activity messages	Meaning – possible solution
READ+	Drive reading data, +- sign means: data is compressed
WRITE+	Drive writing data, +- sign means: data is being compressed
PROTECTED	Cassette is write-protected, data cannot be written to the tape ► Remove cassette write protection, see page 107
ILLEGAL TAPE	Cassette cannot be accessed by the drive ► Use a different cassette(20 Gbyte)
SEARCH	Data is being searched for on the tape
REWIND	Tape is being rewound
ERASE	Data is being deleted

The following messages may appear while the tape is being cleaned:

Cleaning message	Meaning – possible solution
CLEAN REQD	Drive should be cleaned immediately
CLEANING...	Cleaning is in progress
USE NEW CARTRIDGE	The cleaning cassette is used up; the cassette will be ejected ► Use a new cleaning cassette
MUST CLEAN	Cleaning is essential (after a cassette with lower capacity has been used)

The following code loading messages may appear when new firmware is being loaded:

Code loading messages	Meaning – possible solution
LOADING CODE	New drive firmware is being loaded. If this is successful, the drive will execute an automatic reset
CODE LOAD FAIL	Indicates that the LOADING CODE action has not been successful
RETRY CODE LOAD	
MAKE CODE LOAD TP	Drive creates a copy of the CODE LOAD on tape

You should contact our Service department if the suggested solutions for tape activity, cleaning and code loading messages are unsuccessful.

The following error messages may appear when a hardware error occurs:

Error messages	**Meaning - possible solution**
ERR:	An error has occurred, possible error codes 1-15 Solution to error code: 1, 2, 3 Repeat UNIX command 4 Inform the Service department 5 Remove cassette's write protection 6 Insert a new cassette and repeat the UNIX command 7 UNIX command has been issued without inserting a cassette 8 Inform the Service department 9 Error due to dirt, clean drive, repeat command 10 Drive self-corrects 11 See error code 9 12 Inform the Service department 13 1. Repeat UNIX command 2. Restart system 14 Use a different cassette 15 Inform the Service department
PREV:	Previous three errors, only of interest to the Service department
ACTION:	Suggested solution or description of problem

You should contact our Service department if none of the suggested solutions works.

Inserting an 8 mm (20 Gbyte) magnetic tape cassette

- ► Make sure that the LEDs are not lighting or flashing.
- ► Look in the drive to check that there is no cassette in it.
- ► Insert the magnetic tape cassette (with the viewing window facing to the left) as far as it will go into the drive slot, until it is pulled in automatically.

If you insert the cassette incorrectly, you will notice some resistance. Do not try to force the cassette into the drive.

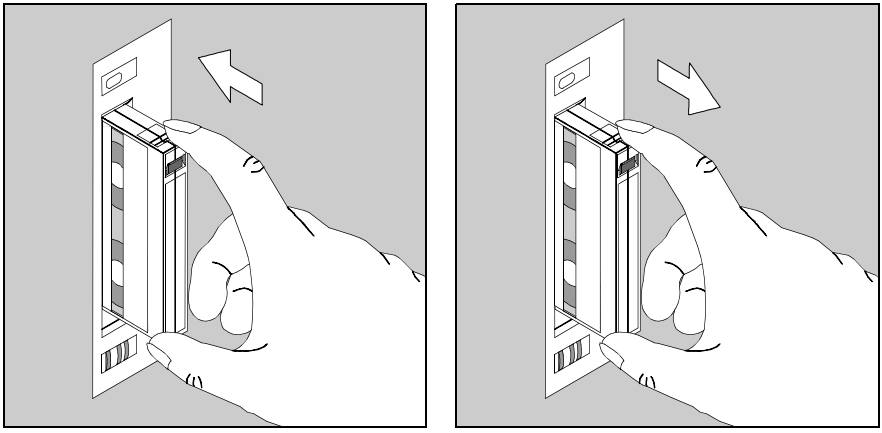


Figure 44: Inserting and removing the 8 mm magnetic tape cassette

When the cassette has been inserted, the drive can be accessed using the appropriate command. It is irrelevant here whether or not the ready indicator is lighting.

Removing an 8 mm (20 Gbyte) magnetic tape cassette

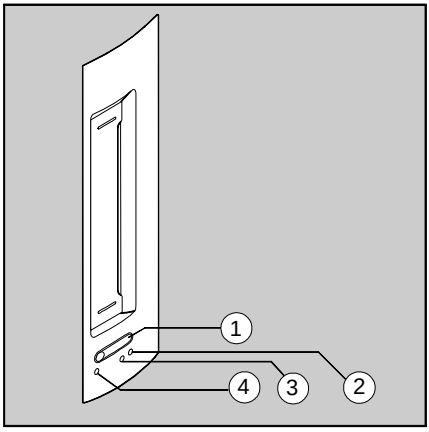
Do not leave a magnetic tape cassette in the drive for any longer than necessary. Even a small amount of dust will contaminate the cassette and result in damage to the drive when it is operating.

- ► Always wait until the tape has stopped, i.e. the activity indicator (green LED) is no longer flashing, and only the ready indicator is lighting.
- ► Press the release button (see figure below) to eject the cassette. After the release button is pressed, the tape is rewound. The cassette is then ejected automatically.

► Remove the cassette.

10.6 Operating 8 mm (7 Gbyte) MTC drives

The 8 mm (7 Gbyte) MTC drive has the following controls:



(1) = Release button

(2) = Green LED (ready indicator, tape positioned or moving (activity indicator)

(3) = Green/amber LED (data transfer indicator)

(4) = Amber LED (error indicator)

Figure 45: 8 mm MTC drive controls (7 Gbyte)

Please note the following information:

Only use 8 mm magnetic tape cassettes supplied by EXABYTE. The use of other cassettes can cause malfunctions. You will find suitable 8 mm cassettes listed in the section “Accessories” on page 168.

If this drive is to read a cassette which was written in 2.3-Gbyte mode, you have to enable the write protect tab for the cassette. Otherwise the cassette will be ejected again.

2.3-Gbyte recording mode is not possible. If this mode is selected, operating system-specific routines access 5-Gbyte/7-Gbyte mode internally. A message is issued to this effect on the console.

- The **error indicator** (4, amber LED) lights up after the system unit is switched on and extinguishes if the self-test is positive. It only starts flashing if the drive shows an error or needs to be cleaned.

  Access to the drive is prevented if the cleaning instructions have been ignored repeatedly.

  Please follow the instructions given in the section “8 mm (7 Gbyte) MTC drive” on page 160 when cleaning this drive.

- The **data transfer indicator** (3) only lights up green after the system unit is switched on. It starts to flash, and then extinguishes if the drive self-test is positive.

  When the drive is being accessed, the data transfer indicator flashes. If no data is being sent to the drive, it does not flash at all.

  When compressed data is being transferred, the indicator flashes irregularly in amber, while for uncompressed data it flashes irregularly in green.

- The **ready indicator** (2) refers to the following situations:

  – It does not light up or flash if no cassette has been inserted. The same applies when, even though a cassette has been inserted, the cassette tape is not wound around the read/write head.

  – It lights up when a cassette has been inserted and the cassette tape is not spooled. The tape is wound around the write/read head.

  – It flashes if a cassette has been inserted and the cassette tape is spooled. It also flashes if the drive has to be cleaned.

Relatively long startup and positioning times are required for an 8 mm tape. The ready indicator flashes for the respective length of time.

Do not press the release button on the MTC drive while the data transfer indicator is lighting or flashing, as data may be lost.

Inserting the 8 mm (7 Gbyte) magnetic tape cassette

- ► Make sure that the drive can handle 7-Gbyte cassettes.
- ► Make sure that the data transfer and ready indicators are not flashing.
- ► Look in the drive to check that there is no cassette in it.
- ► Insert the magnetic tape cassette (with the viewing window facing to the left) as far as it will go into the drive slot, until it is pulled in automatically.

If you insert the cassette incorrectly, you will notice some resistance. Do not try to force the cassette into the drive.

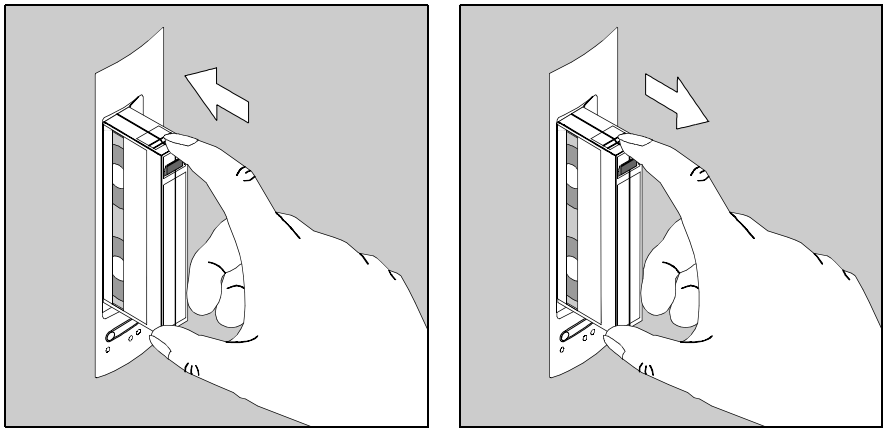


Figure 46: Inserting and removing the 8 mm magnetic tape cassette

The magnetic tape cassette is now inserted and the ready indicator (green LED) lights up.

Removing the 8 mm (7 Mbyte) magnetic tape cassette

Do not leave a magnetic tape cassette in the drive for any longer than is necessary. Even a small amount of dust can cause contamination and result in damage to the drive when it is operating.

- ► Make sure that the tape has stopped, i.e. the ready indicator (green LED) is no longer flashing and is now only lighting. The data transfer indicator must not be lighting.
- ► Press the release button to eject the cassette.

After the button is pressed, the tape is rewound. The cassette is then ejected automatically.

► Remove the magnetic tape cassette.

10.7 Tips for avoiding data backup problems

By observing just a few important rules for handling the 8 mm MTC drive and cassettes, you will be able to avoid problems occurring with the drive, and thus have a reliable data backup device with a remarkably high capacity at your disposal.

- Keep the area around systems with 8 mm MTC drives free from dust and dirt. Paper and toner dust from printers and photocopiers can be particularly harmful.
- Clean the MTC drive regularly, and in doing so follow the instructions given for this drive in the chapter “Maintaining the hardware” on page 155.
- Only use the MTC drive in streaming mode, i.e. data is written or read without halting the tape.

In contrast, using the MTC drive in start/stop mode causes a considerable increase in wear and tear on the magnetic head drum and magnetic tape cassettes.

The MTC drive is in streaming mode when you perform backups at times of reduced system load, or if specify one of the following block sizes for the backup command:

8 mm MTC drive (7 Gbytes)	block size ≥ 16 Kbytes
8 mm MTC drive (20 Gbytes)	block size ≥ 64 Kbytes

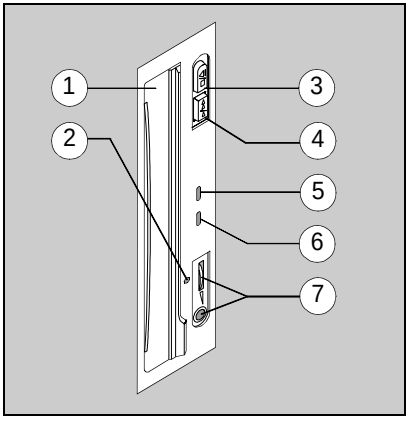
Only use cassettes supplied by Fujitsu Siemens and the device manufacturer EXABYTE® for the 8 mm MTC drive. Other cassettes can cause damage to the write/read heads of the drive. Never use Video-8 cassettes.

Do not leave an 8 mm magnetic tape cassette in the drive for any longer than is necessary. Even small amounts of dust can cause contamination and result in damage to the drive when it is operating.

You should also refer to the notes on handling magnetic tape cassettes contained in the chapter “Using data media” on page 107.

10.8 Operating CD-ROM drives

In contrast to the diskette and magnetic tape data media described above, the CD-ROM cannot be written to (ROM = Read Only Memory).



(1) = Drive flap

(2) = Emergency eject button (recessed)

(3) = Release button

(4) = Title button (for music CDs)

(5) = Access indicator

(6) = Ready indicator (= CD-ROM is inserted)

(7) = Headphone connection and volume control

Figure 47: CD-ROM drive controls

Before you insert a CD-ROM in the drive, it must first be placed in a caddy (flat plastic box). This procedure is explained in the section “8 mm (7 Gbyte) MTC drive” on page 160.

Inserting the CD-ROM

- ► Insert the CD-ROM into the caddy with the labeled side facing upwards.
- ► Open the drive by pulling open the drive flap.

You should only open the drive if you want to insert or remove a caddy. Otherwise the drive flap should be kept shut, so that contamination (e.g. through dust) can be avoided.

- ► Insert the caddy in the slot so that the labeled side is to the left and the caddy opening is to the front.
- ► Insert the caddy until it is pulled in automatically.

If there is a problem with the caddy, it is ejected automatically. The access indicator in the CD-ROM drive lights up while the CD-ROM is being read.

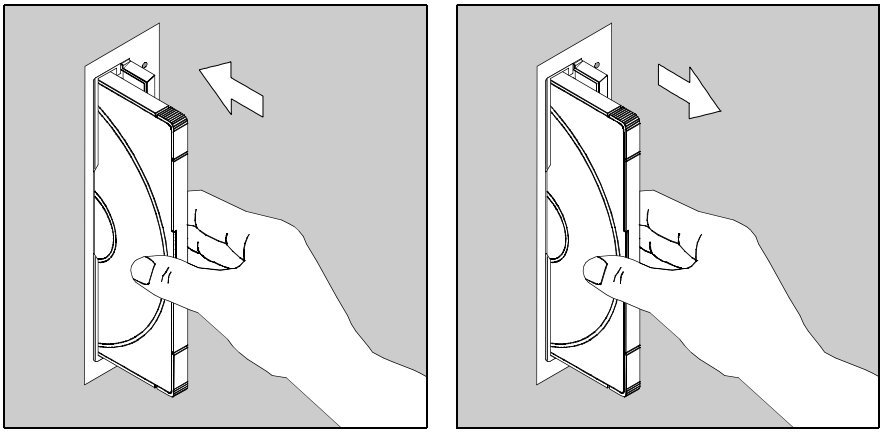


Figure 48: Inserting and removing a caddy with CD-ROM

Removing the CD-ROM

Please note that the CD-ROM cannot be removed while the drive is being accessed.

► Press the release button (figure 47 on page 149).

The caddy is partly ejected after a short time.

► Remove the caddy and CD-ROM.

Removing the caddy manually in the event of a malfunction

If there is a power failure or the drive is damaged, the caddy can get stuck in the drive with the CD-ROM. You then have to shut down the system fully and remove the CD-ROM manually as follows:

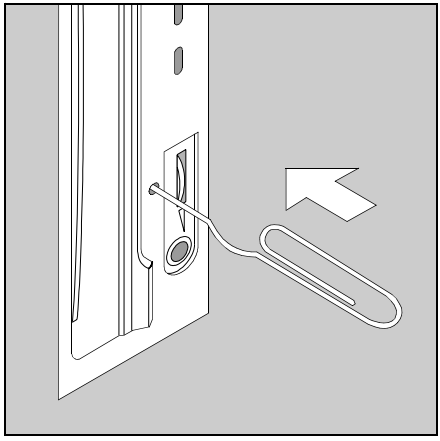


Figure 49: Apply eject mechanism with emergency eject button

- ► Shut down the system properly.
- ► Insert a hard object with a diameter of approximately one millimeter (e.g. an open paperclip) into the opening of the emergency eject button.
- ► Use this to activate the ejection mechanism.
- ► Remove the caddy and the CD-ROM.

10.9 Operating the DVD drive

All models apart from the RM600 E45 have a DVD drive instead of the CD-ROM drive. However, this drive can only read CDs at present. The figure below shows how the DVD drive is opened:

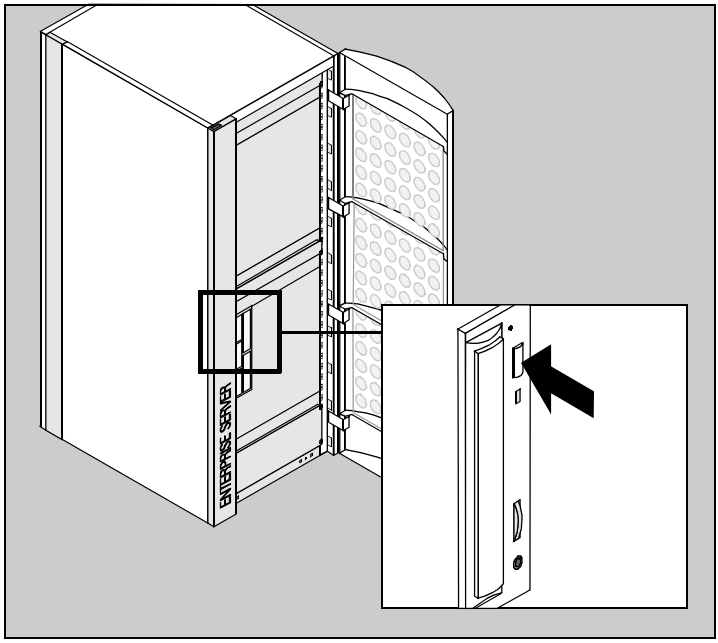


Figure 50: Release button of the DVD drive

The figure below shows how the DVD is inserted in the vertically installed drive:

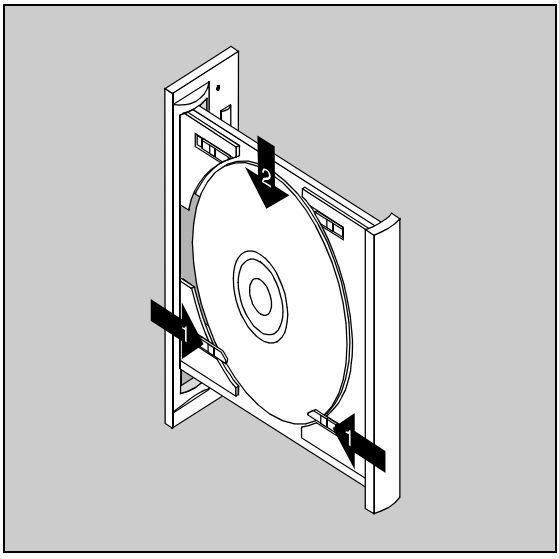


Figure 51: Inserting the DVD

- ► Push the mounting catches (1) inwards.
- ► Insert the CD in behind the catches (2) with the label facing left.

11 Maintaining the hardware

Hardware maintenance must be carried out regularly by users. Your local Siemens office offers an extensive cleaning and maintenance program. The appendix of this manual contains information about ordering cleaning and maintenance material for the RM600 E.

11.1 Maintaining cabinets

When cleaning the housing components (system cabinet, expansion cabinet and peripherals cabinet), wiping with a dry, lint-free cloth is sufficient. The cleaning kit, which is available from your local Fujitsu Siemens office, includes a special cloth for cleaning very dirty surfaces (see the section “Accessories” on page 168).

11.2 Maintaining terminals

Maintenance of the terminal and keyboard housing components is the same as that for the cabinets.

Antiseptic cloths, available from all chemists, can be used to clean the keys. The cloth should not be used for any longer than five minutes. Do not leave these cloths on the housing as the cleaning agent corrodes the plastic if left for a long period of time.

However, the screen surface should be cleaned regularly. Use a soft, damp, lint-free cloth, followed by a soft, dry cloth. You can also use special screen cleaning cloths which are also included in the cleaning kit (see the section “Accessories” on page 168).

11.3 Maintaining diskette drives

Please use a commercial cleaning diskette for the maintenance of the magnetic head of the diskette drive.

Cleaning intervals:

– once a week (for daily use)
– once a month (for weekly use)
– quarterly (maximum interval)

The instructions for cleaning the drive are provided in the cleaning diskette packaging.

11.4 Maintaining the ¼ inch MTC drive (4 Gbyte)

You should use a cleaning cassette for maintenance of the write/read head of the MTC drive (see the section “Accessories” on page 168).

Cleaning intervals:

– following 8 hours of use
– every 2 to 3 hours if using predominantly new cassettes straight from the factory
– quarterly (maximum interval)

The instructions for cleaning the drive are provided on the cover of the cleaning cassette.

11.5 Maintaining the 4 mm MTC drive

Only use the cleaning cassette supplied with the 4 mm MTC drive for cleaning the write/read head. The order number can be found in the section “Accessories” on page 168.

The drive should be cleaned regularly to maintain write/read reliability. The following cleaning intervals are recommended:

– used four to five times daily: daily cleaning
– used two to three times daily: twice-weekly cleaning
– cleaning used once a day: weekly cleaning

Always clean the write/read head after you have used a new tape, as the friction on the tape can lead to write/read errors.

You should always clean the drive **before** the error indicator of the drive starts flashing. If, however, the error indicator should start flashing, the drive must be cleaned immediately in order to prevent damage caused by dust particles.

The cleaning procedure is explained on the cleaning cassette packaging.

The cleaning procedure takes approximately 30 seconds to complete. If the cleaning cassette is ejected before this time has elapsed, it can no longer be used. Repeat the cleaning procedure with a new cleaning cassette.

A 5 m cleaning cassette can be used a total of 40 times and a 15 m cleaning cassette a minimum of 150 times. You should make a note on the cleaning cassette each time you use it, so that you know how many more times it can be used.

11.6 Maintaining the 8 mm MTC drive

An 8 mm MTC drive must be cleaned regularly. Inadequate cleaning, or no cleaning at all, increases the write/read error rate and causes faster deterioration of the tape material and the head drum, until particles of dirt burn in the head drum. When this happens, the use of a cleaning cassette is no longer enough and the drive has to be checked and cleaned by our Service department.

There are a whole range of cleaning procedures, most of which are based on video technology (e.g. the use of cleaning fluid). Many procedures are not suitable for an MTC drive. Unsuitable procedures can considerably impair operation of the drive and can damage it.

Only use cleaning cassettes supplied by Fujitsu Siemens and the device manufacturer EXABYTE®, as otherwise the write/read heads of the drive may be damaged.

You can order cleaning cassettes by calling your local Siemens office toll-free (Germany only) (see the section “Accessories” on page 168).

Cleaning must be carried out at least one a month, or after a maximum of 30 operating hours, whichever happens to occur first.

A system environment where there is a lot of dust, as is the case with many offices, obviously demands more frequent cleaning.

11.6.1 8 mm (20 Gbyte) MTC drive

The information provided in the section “Maintaining the 8 mm MTC drive” on page 158 also applies for this 8 mm (20 Gbyte) MTC drive.

If the drive needs to be cleaned, the error indicator on the drive lights up.

You can still use the drive even if the error indicator is lighting. However, you should try and clean it as soon as possible, as even a small amount of dust can impair operation of the drive.

The drive consequently blocks all access if the cleaning instructions are repeatedly ignored.

This is how you clean the 8 mm MTC drive:

- Enter the *clean8mm device-name* command at shell level.
- Insert the EXABYTE cleaning cassette entitled “Mammoth Cleaning Cartridge 18c” in the drive.

The cleaning procedure is started. It takes approximately 1–2 minutes to complete. Once cleaning has finished, the drive automatically ejects the cassette.

- Remove the cleaning cassette.
- Note the cleaning date on the sticker provided.

The cleaning procedure is completed.

A cleaning cassette can be used up to eighteen times!

You will find more information on cleaning in the notes on the cover of the cleaning cassette.

11.6.2 8 mm (7 Gbyte) MTC drive

The general information provided in the section “Maintaining the 8 mm MTC drive” on page 158 also applies for the 8 mm (7 Gbyte) MTC drive.

If the drive needs to be cleaned, the error and ready indicators on the drive start to flash rapidly.

You can still use the drive even if the two indicators are flashing rapidly. However, you should try and clean it as soon as possible, as even a small amount of dust can impair operation of the drive.

The drive consequently blocks all access if the cleaning instructions are repeatedly ignored.

This is how you clean the 8 mm MTC drive:

- Enter the *clean8mm device-name* command at shell level.
- Insert the EXABYTE cleaning cassette entitled “Premium Cleaning Cartridge 18c” in the drive.

The cleaning procedure is started. It takes approximately 1–2 minutes to complete. Once cleaning has finished, the drive automatically ejects the cassette.

- Remove the cleaning cassette.
- Note the cleaning date on the sticker provided.

The cleaning procedure is completed.

A cleaning cassette can be used up to eighteen times.

You will find additional information about cleaning in the notes on the cover of the cleaning cassette.

11.7 Maintaining the CD-ROM drive

The CD-ROM drive is extremely easy to maintain and does not require any special care.

11.8 Maintaining printers

Printers should be cleaned regularly because they contain expensive components and collect a massive amount of dust because of the paper.

For further details, refer to the operating manual for your printer.

11.9 Maintaining magnetic tape devices

The write/read head, erase head and tape cleaner need to be cleaned regularly for this device.

For further details, refer to the operating manual for your magnetic tape device.

If the cleaning instructions for the drives and the operating system are **not followed** in the case of magnetic tape devices, the tape driver may stop transferring data to the drive. Data transmission can then only be resumed following cleaning.

11.10 Maintaining a jukebox for 8 mm magnetic tape cassettes

Regular cleaning of the drive with a cleaning cassette is recommended in order to maintain write/read reliability (see the section “8 mm (20 Gbyte) MTC drive” on page 159 and the section “8 mm (7 Gbyte) MTC drive” on page 160).

Only use the recommended cleaning cartridge, as otherwise the heads of the drive may be damaged.

The cassette transport system inside the housing must also be cleaned occasionally. You should always clean the device as soon as you notice that there is dust inside or around it, and at least after 1000 cassette removals/insertions.

Before opening the device for cleaning, make sure that the power switch is off and the power cable is removed from the device.

For further details, refer to the operating manual for your device.

11.11 Maintaining an optical disk library

For cleaning the housing components, wiping with a dry cloth is sufficient. A special cloth for cleaning very dirty surfaces is available from the local Siemens office (see the section “Accessories” on page 168).

The magneto-optical principle of the device means that no further maintenance is required. For further details, refer to the operating manual for your device.

12 Moving your system

The procedure for transporting your RM600 E depends on whether your system comprises one cabinet or several cabinets.

You can transport a system that comprises only one cabinet yourself. If you wish to transport a multi-cabinet system, please contact our Service department.

Before transporting a multi-cabinet system, the cables must be removed. These preparations must also only be carried out by our Service department. The conditions and statements described below, with the exception of the activities just described, apply when transporting your system.

The cabinets can be wheeled over short distances, for instance within a room. There are castors in the cabinet feet for this purpose. Please ensure that the cabinets are handled with care during transport, as otherwise the hard disk drives may be damaged.

12.1 Transporting the RM600 E system

Before moving your system, please note the following:

- Select a suitable new location on an even surface.
- Make sure that the new location fulfills the necessary environmental conditions, such as temperature conditions, humidity and dust accumulation. You should refer to the environmental conditions in table “Environmental conditions for the cabinets” on page 17.
- Before transporting the individual system cabinets, make sure that all the data on the hard disks is backed up.

The manual “System Administrator’s Guide” describes how data is backed up.

- Remove all media (e.g. diskettes and magnetic tape cassettes) from the drives.
- Shut down the operating system (see the section “Switching off the system” on page 72).
- Keep the original packaging (or other suitable packaging that will protect against shock or impact) ready for transporting the system as well as the original palettes, if possible.

► Disconnect all cables (applies only to the transport of a single-cabinet system).

The system cabinet is very heavy and therefore requires at least two people to pack, unpack and transport it.

12.2 Transporting the terminal

Before moving your system, please note the following:

► Select a location which fulfills the environmental conditions for the terminals and other devices which are to be reconnected to the system.

You will find the relevant data in the operating instructions for the respective devices.

Before transporting terminals:

► First, switch off all the connected devices (computer systems, printers, etc.).

► Remove the power plugs of these devices, or switch off the power supply to the cabinets to which the devices are connected.

Please note the procedures for cabinets with a mains buffer (BBU or UPS) as described in the chapter “Important notes” on page 5.

► Finally, disconnect the data lines.

► Always transport the terminals in their original packaging or other suitable packaging that will protect them against shock or impact.

The terminals must be protected from mechanical interference, otherwise the CRTs may implode.

13 Telephone and fax numbers of the support centers

Germany

Call Management Center (CMC)

telephone number from Germany:	**+ 49 180-540 40**
fax number from Germany:	**+ 49 180-533 6779**

USA and Canada

Customer Support Center (CCSC)

telephone number USA and Canada:	**800-695-2272**
international telephone number ++1	**408-428-9000**
fax number (primary):	**408-428-7450**
fax number (secondary):	**408-428-7020**

International (except Germany, USA, and Canada)

Ask your local Siemens provider or subsidiary for the telephone and fax numbers of the Support Center near you.

14 Appendix

The appendix contains the following information:

– a list of accessories for the RM600 E with order numbers
– cable types for peripheral devices
– default settings for consoles
– configuring the PC as a console

14.1 Accessories

Item	Order no.
Diskette drive	
3½ inch unformatted diskettes, max. 2 Mbytes	10600003138
3½ inch formatted diskettes, max. 2 Mbytes	10600003139
MTC drives	
¼ inch magnetic tape cassettes, 155 Mbyte	10600003137
¼ inch magnetic tape cassettes, 525 Mbyte	10600003141
¼ inch magnetic tape cassettes, 4 Gbyte	10600031096
Cleaning cassette for MTC drive, 4 Gbyte	10600034814
4 mm magnetic tape cassette, 2 Gbyte (90 m)	10600003142
4 mm magnetic tape cassette, 4 Gbyte (120 m)	10600003143
4 mm magnetic tape cassette, 12 Gbyte (125 m)	10600013454
Cleaning cassette for 4 mm MTC drive	10600003258
8 mm magnetic tape cassette, 2.3/5 Gbytes (112 m)	10600003285
8 mm magnetic tape cassette, 7 Gbytes (160 m)	10600003144
8 mm magnetic tape cassette, 20 Gbytes (170 m)	10600004459
Cleaning cassette for 8 mm MTC drive (5 Gbyte and 7 Gbyte, Premium Cleaning Cartridge, 18 cleanings)	10600003112
Cleaning cassette for 8 mm MTC drive (20 Gbyte, Mammoth Cleaning Cartridge 18c, 18 cleanings)	10600004461
CD-ROM drive	
Caddy	35265.00.7.08
Optical Disk Library	
ROD (Magneto Optical Disk), min. 1300 Mbytes	10600003150
ROD (Magneto Optical Disk), min. 2600 Mbytes	10600003098
WORM disk (Magneto Optical Disk), min. 1300 Mbytes	10600003151
WORM disk (Magneto Optical Disk), min. 2600 Mbytes	10600003341
Cabinets, auxiliary devices, and terminal	
Profi cleaning kit	10600003259

14.2 Central ordering department

Fujitsu Siemens Computers

Accessories Group

Werner-von-Siemens Str. 6

D-86159 Augsburg

Using a single phone or fax number you can order accessories from anywhere in Germany.

By phone

+49 18 05-25 27 23

By fax

+49 18 05-25 27 24

The central ordering department provides a prompt and efficient service:

Note down your order, phone or fax in the names and order numbers of the requested items to our ordering department, and your order will be processed immediately.

You can call or fax us:

24 hours a day in Germany.

By Internet

You can order **directly** from our entire catalogue at the following Internet address:

http://www.siemensplus.de

With this method your order will be accepted and processed immediately.

14.3 Fujitsu Siemens Computers AG offices

Austria

Fujitsu Siemens Computers GmbH
Obere Donaustraße 23-27
A-1020 Vienna

Tel. (0 04 31) 3 31 19-99 30
Fax (0 04 31) 3 31 19-82 02

Switzerland

Fujitsu Siemens Computers GmbH
Obstgartenstrasse 25
CH-8302 Kloten

Tel. (+41 1) 8 16-81 11
Fax (+41 1) 8 16-81 50

Fujitsu Siemens Computers GmbH
Ifangstrasse 6
CH-8952 Schlieren

Tel. (+41 1) 8 16-91 11
Fax (+41 1) 8 16-94 36

14.4 Cable types for peripherals

The cables required are not included in the delivery packages for the individual peripherals. The following list shows the cable types required.

The line above the table indicates the function of the respective cable, for example, the line

- T100/TM10 (console) <--->LAN or EH IOS basic controller

  reads as follows:

Cable for connecting the T100/TM10 console to a LAN or EH IOS basic controller. Check the label to make sure it is either affixed directly to the cable or to a paper tag on the label.

Order number	Cable label	Interface
● T100/TM10 (console) <---> LAN or EH IOS basic controller		
D:KB072-M3 D:KB072-M15	7488.00 7488.01	V.24 V.24
● PC <---> LAN or EH IOS basic controller (25 pin / 9 pin)		
D:KB001-M5 D:KB001-M10	57856.00.4.16 57856.01.4.16	V.24 V.24
● PC <---> LAN or EH IOS basic controller (9 pin / 9 pin)		
D:KB072-M3 D:KB072-M15	7488.00 7488.01	V.24 V.24
● Modem <---> LAN or EH IOS basic controller (25 pin / 9 pin)		
D:KB011-M5 D:KB011-M10 D:KB011-M15	96748.00.2.16 96748.01.2.16 96748.02.2.16	V.24 V.24 V.24
● Modem <---> LAN or EH IOS basic controller (9 pin / 9 pin)		
D:KB068-M5 D:KB068-M10 D:KB068-M15	T26139-Y457-V1 T26139-Y457-V2 T26139-Y457-V15	V.24 V.24 V.24

All modems come with a 3-meter cable. Alternatively, you can use the cables listed here.
The number displayed to the right of ”-M” in the order number refers to the length of the cable in meters.

14.5 Default settings for consoles

You can connect a whole range of different terminals and printers to your RM600 E. For more detailed information on terminals and printers, see the relevant operating instructions provided with the device. For information on terminals and printers suitable for your system, contact your local Fujitsu Siemens office.

Because terminals and printers are supplied with default settings, you may have to adjust them to the interface of the system unit. In order to operate the RM600 E, you will require a terminal as a console. This terminal is connected to the top V.24 port of the EH IOS basic controller (figure 8 on page 57, Position 1).

The interface was preconfigured during installation of the operating system on your RM600 E. You must adjust the console settings to this configuration. Please refer to the operating instructions for your terminal for assistance.

14.5.1 Special features of the LAN console

A password must be entered in the RCA for reinstallations.

14.5.2 T100/TM10 console parameters

The TERM variable must be set to **TERM=97801** if the TASIL T82 (German) or TASIL T81 (US English) keyboard is connected.

The TERM-Variable mst be set to **TERM=vt02-mf2** or **vt02** if the TA MF (German or US English) keyboard is connected. However:

In the case of the **vt02** TERM variable setting, the function keys F6 to F12 are used to control the SYSADM user interface. However, the EXIT function can only be accessed from the CMD-MENU.

In the case of the **vt02-mf** TERM variable setting, the function keys F1 to F8 are used to control the SYSADM user interface.

- ► Press the key combination CTRL + Alt + ESC at the same time to be able to change the main menu settings on the screen.
- ► Enter the values from the tables below in the menus and work through the operating instructions.

Refer to the operating manual for the console for further information on operating the console and working through the main menu.

Language/Keyboard

Field	Value to be entered
Language:	German
Keyboard layout:	Germany

Ports

Field	Value to be entered
Port settings for:	COM2 - V.24
Speed:	19200
Parity:	none
Word Width:	8
Stop Bits:	1
Flow Control:	XON/XOFF
Local Printer:	none

Mouse

Field	Value to be entered
Mouse Type:	none

Graphics/Display

Field	Value to be entered	Comments
Screen Mode:	640x480 - 75	
Window Manager:	none	for standard console
	local	on request

Sessions

► First select *New*.

Field	Value to be entered	Comments
Title:	console	
Connected by:	COM2	
Emulation:	SNI 97801 / 8 Bit	(for TASIL keyboard)
	VT320	(for TA MF keyboard)
Character Set:	ISO	
Character Size:	full-screen	
Local Printer:	none	
Rows	25	
Columns	80	

- ► Now choose *Exit*.
- ► Confirm the following query with *Save*.
- ► Confirm the final query *Restart terminal ?* with *Yes*.

14.6 Configuring the PC as a console

The connection between the PC and the RM600 E system is described in the section “Connecting a PC as a console” on page 55. Further information is provided here in relation to the requirements for the connection, and we take a detailed look at how the connection is configured.

14.6.1 Hardware and software requirements

There are specific hardware requirements to be fulfilled for both the PC and the RM600 E in order to enable a PC to be used as a console on the RM600 E system.

HW element	PC specification	RM600 E specification
Processor:	486/66 MHz minimum	–
Main memory:	16 Mbytes or larger	–
Graphics controller:	1024 x 768 pixel minimum resolution, 256 colors	–
Color monitor:	40 cm (17”) or 50 cm (21”)	–
Hard disk:	see requirements for SW	–
V.24 interface:	a free COM interface	V.24 console connection

There are specific software requirements to be fulfilled on the PC side in order to enable a PC to be connected as a console on the RM600 E system.

– DOS Version 6.2 or later

– Windows Version 3.11 or later or Windows 95

– SINIX TE Version 2.1 or later

Please refer to the descriptions that come with the software in relation to software requirements for hard disk capacity.

It is assumed for PC that the software packages listed are already installed.

With its Reliant UNIX operating system, the RM600 E system already meets all software-related requirements for using the PC as a console on the RM600 E system.

The PC is used via the V.24 interface in alphanumeric mode. This interface allows the PC to be used as an alphanumeric console.

If the PC is connected to the system by means of the hardware, certain parameters need to be configured on the PC to enable the PC to function as a console.

14.6.2 Configuration steps on the PC

When these hardware and software requirements are fulfilled, the PC can be connected as a console on the RM600 E system to the COM interface (PC) via the V.24 interface (RM600 E).

- ► Make sure you have already installed a SINIX-TE version with a configuration program on your PC.
- ► If a configuration manager has not been entered in the SINIX-TE program group, you need to perform a user-defined installation. Install the *COM* component with the *Communication asynchronous* menu item. For further information here, please refer to the manual “SINIX TE”.
- ► Following successful installation, choose the *Configuration* icon from the *SINIX TE* program group.

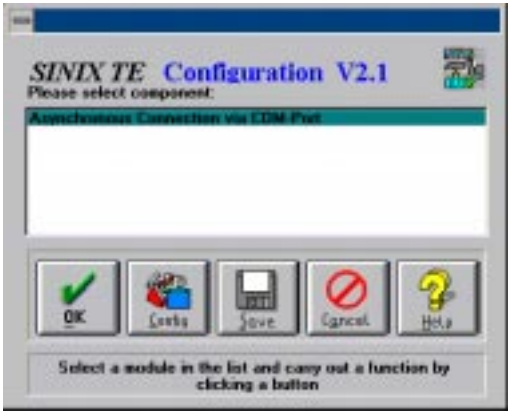


Figure 52: Window: SINIX TE configuration Manager

- ► Activate *Asynchronous Connection via COM-Port* and click on *Config*. Another window is then opened.

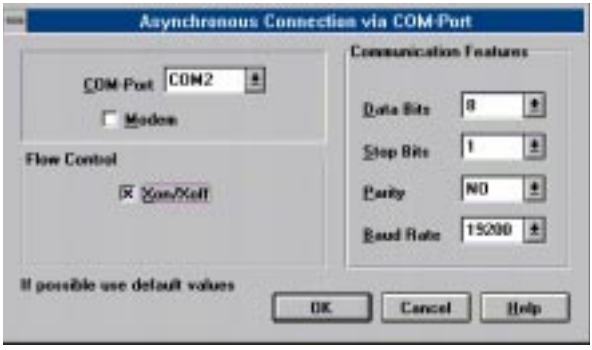


Figure 53: Window: Asynchronous connection via COM port

- In this window, set the free COM interface of your PC as well as any other fields as shown, and confirm with *OK*.
- The window as shown in figure 52 on page 176 then appears again. Click on *Save* and then *OK*.
- Confirm the query with *Yes*.
- Then choose *Restart Windows* in the next window.
- If Windows has been restarted and the program manager is displayed, choose the *Emulation Manager* icon from the *SINIX TE* program group.
- Choose *Session* from the menu bar and from there the *New* ... menu.

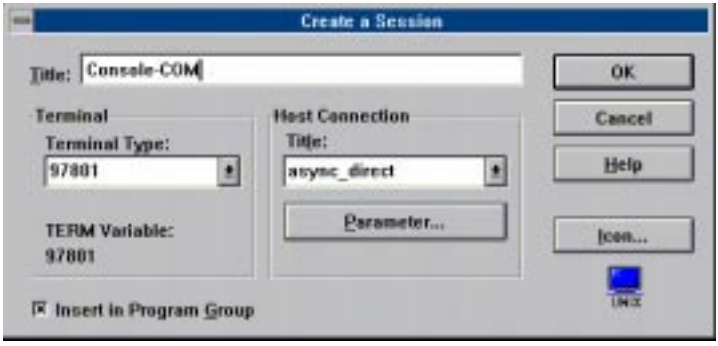


Figure 54: Window: Create a new session

- In this window, set all fields here as shown.
- If you should go to the *Select Host Connection* menu, click on *OK*.

- Confirm the new *Create a new Session* window with *OK*. You can enter a name of your own choice as the title. A new session is then created by SINIX TE.
- Close the *Emulation Manager*.
- Double-click on the icon for the new session. A window is opened displaying *Console login* where you can log in with root authorization.

The PC behaves like an alphanumeric console screen, i.e. among other things all system messages are output on the PC and the system can be managed from the PC.

15 Environmental protection and service

The RM600 E has a long life expectancy, not only because of the excellent expansion options it offers, but also because of the quality of the product.

As technology continues to develop, however, ever greater volumes of data will need to be processed. More and more demands are being placed on storage capacity, speed and computer system design. So when you eventually want to replace your RM600 E with a newer model and dispose of the old device, we can also offer you support in this area.

Recycling old computer equipment is already a tradition at Fujitsu Siemens. We have been redeeming and reusing old computer systems for over ten years now.

Even at the design stage, particular emphasis is placed on the reusability of components and materials.

Your RM600 E has been manufactured to the greatest possible extent from environment-friendly materials that can be fully recycled.

Read on through the next sections for a brief look at some of the measures we have introduced in an effort to protect the environment as well as our tips and suggestions for environmentally-friendly handling of your system.

Environmentally friendly product design and development

This product has been designed in accordance with the Fujitsu Siemens standard “environmentally friendly product design and development”.

This means that the designers have taken into account critical factors such as durability, selection of materials and coding, emissions, packaging, the ease with which the product can be dismantled and the extent to which it can be recycled.

This saves resources and thus reduces the harm done to the environment.

An environment management system was certified in accordance with DIN ISO 14001 for the production and development of the RM600 E.

Note on saving energy

If your device does not have to remain on permanently, only switch it on when you are ready to use it and then switch it off again during long breaks and when you finish your work.

Note on dealing with consumables

Please dispose of printer consumables and batteries in accordance with local government regulations.

Note on labeling plastic housing parts

Please avoid sticking your own labels on plastic housing parts wherever possible, since this makes it difficult to recycle them.

Take-back, recycling and disposal

For details on redeeming and re-using devices and consumables within Europe, contact your local Siemens branch office/subsidiary or our recycling center in Paderborn:

Tel. +49 (0) 5251 8180-10

Fax +49 (0) 5251 8180-15

Further information on environmental protection

If you have any further questions concerning environmental protection, for example returning packaging, batteries and printer consumables, contact us at:

Tel. +49 (0) 821 599-2999

Fax +49 (0) 821 599-3440

Service

Should you have any complaints in relation to missing/faulty parts, please contact the complaints department of Fujitsu Siemens:

Tel. +49 05251 8 22222

Fax **+49 05251 8 22029**

You can also submit complaints via the Internet:

http://www.siemens.de/servers/quality/reklamation_de.htm

If you have questions on setup or operation or if problems occur, please contact your local service office.

Fujitsu Siemens IT service can be reached on the Internet (http://its.siemens.de/helpdesk) under the heading “IT Service”.

You will also find information here on products, telephone numbers, etc. The information is available in English and German.

The Call Management Center (CMC) can be reached in Germany as follows:

Tel. +49 01805 4040

Fax +49 01805 336779

Glossary

alternating edge pulse transmission method

Alternating edge pulse transmission (AFP) is a method of data transmission. The electrical isolation of communication lines enable components to be connected to various distribution boxes.

asynchronous data transmission

This is a transmission method where synchronization between sender and receiver is established for a series of bits. Start and stop bits form the beginning and end of a character. The time interval between the transferred characters can vary. The mode of transfer is also known as start/stop transmission.

Battery Backup Unit (BBU)

The Battery Backup Unit supplies power (DC voltage) to a system cabinet, expansion cabinet, peripherals cabinet or I/O cabinet for a short period. Thus, short power failures can be bridged and the system can be switched off properly. AC voltage devices cannot be connected to a BBU.

board

A board is a module for computers, where instead of using wires, the connections are etched on the carrier plate of the module (also known as card, printed wiring or printed circuit). The individual modules are placed on the board, and the connections are automatically soldered with copper strips.

boot process

The switching on or daily operation of a computer and loading the operating system is known as the boot process or simply booting.

bus

A bus is a part of a system comprising several lines and corresponding plug connections. This system is used to transfer signals, data and power supply. The bus type, narrow band lines for control signals in a central unit or a microprocessor are known as a bus. All devices or systems connected to the bus can receive every transferred signal or character if these signals or characters were addressed to this device. Various bus systems can be used with the RM600 E.

cache

A cache is a buffer memory with very short access times between the main memory and other parts of the central unit. It is used to shorten the access times to the main memory.

caddy

A caddy is a flat plastic box, in which a CD-ROM must be placed before it can be inserted in the drive.

CEE

International commission for regulating licenses for use of electrical equipment. The commission is made up of representatives of the respective inspection authorities in the different European countries. CEE documents often form the basis for IEC documents.

central processing unit (CPU)

See under central unit.

central unit

The central unit (CPU) of a computer comprises several components that perform data transfer and execute logical and arithmetical operations.

cluster

A cluster refers to the configuration of two or more systems that are connected to one another. Each system has its own copy of the operating system as well as its own or shared applications. From the user's perspective, a cluster represents a single system. The purpose of such a cluster is to increase the availability and/or performance of the entire system (see also RCS II).

cluster console

A UNIX system is typically controlled by means of a special connection with the help of a terminal, known as a console. If a terminal or, in this case, an RM200 system or a LAN console, is used for several UNIX systems gathered together to form a cluster, it is termed a cluster console. The integration of systems in a group, so-called clustering, is an important element of high availability.

cluster interconnect (CI)

The cluster interconnect enables communication to be processed quickly and securely between the individual systems or nodes in a cluster. In addition to the familiar Ethernet connections, an SCI-based (Scalable

Coherent Interface) communications controller is provided, which comprises an SCI adapter for the EHIOS technology of the RM600 E system. Transfer rates of up to 400 Mbyte/s can be achieved using an EHIOS-CI board, a copper cable of up to 5 m in length and FO cabling of up to 150 m (Fibre Optic) in length.

configuration

Configuration is the combination of the hardware of a system. The specified basic configuration can be extended up to a maximum configuration.

console

The operating facility of a computer or a data processing system, which provides direct user access to the system is known as a console (see also cluster console)

controller

A controller is a control unit or a processor. It is an intelligent unit for controlling peripheral devices. A controller has two main functions, i.e. controlling the internal processes and the input and output.

data transmission

Data transmission is the transfer of data between systems locally separated by means of networks. Data transmission is used wherever the transport of data on data media (e.g. magnetic tape, diskette) is inefficient for time reasons.

dualported

Dualported hard disks are used to increase data throughput to the disk subsystem and for straightforward installation of a 2-node multihost configuration without the need for additional hardware.

ECC

The ECC (error correction code) is a system for detecting and correcting errors in the memory.

EHIOS

The EHIOS (Enhanced High Performance Input Output System) is a concept for connection peripherals.

EHIOS basic controller

The EHIOS basic controller is a controller in the RM600 E system, which allows connection of a console, Ethernet and a modem for the Teleservice function. It also controls internal processes and can be configured with other submodules.

ethernet

This local network was developed in 1979 by the firms DEC, Intel and Xerox. As one of the first LANs, it was accepted as the de facto standard and by IEEE (a standardization body for electrical and electronics standards). Ethernet is currently the most frequently used local network, transmitting data at a speed of 10 Mbit/s preferably using a yellow coaxial cable (also termed 10 base 5). New networks are based on 100 Mbit/s ethernet, where data is transferred using copper cables of a suitable quality class.Fibre optic cables can also be used once the relevant conversion has been performed.

ethernet controller

The ethernet controller is used for connecting the RM600 E to local networks.

fan redundancy

All RM600 E cabinets are equipped with redundant fans. Each cabinet shelf is equipped with three fan units, each containing two fans. If one of these six fans fails, the remaining five are sufficient for ventilation purposes. The faulty fan can be exchanged while the system is still running (OLR).

fibre channel (FC)

FC is short for FC-AL (Fibre Channel Arbitrated Loop), a fast (1Gbit/s) serial bus standard. One advantage over SCSI cabling is that larger distances can be bridged: Fibre optic (up to 10 km). FC-AL is the preferred choice in high end servers.

FDDI

FDDI (Fibre Distributed Data Interface) is an interface to a network standard with light guides as the transfer medium and transmission speeds of 100 Mbits per second. This network requires a fibre optic dual line, which is used to transmit opposite signals. FDDI is based on an ANSI standard and can be used as a connection between individual ethernet segments.

fibre channel (FC)

Abbreviated form of FC-AL (fibre channel arbitrated loop), which is a fast (1Gbit/s) serial bus standard. One advantage over SCSI cabling is that larger distances can be bridged: fiber optic (up to10 km). FC-AL is the preferred choice in high end servers.

floating point processor

A floating point processor is a hardware unit that supports floating point arithmetic. It is also known as an FPU (Floating Point Unit) or a (mathematical) coprocessor.

HDLC

HDLC (High Level Data Link Control) is an ISO/OSI standard protocol class that protects the exchange of information over physically unsafe transmission media from transmission errors.

high availability

This term refers to the possibility for increasing the average availability of a system using specific hardware and software measures. One option here is the formation of special system groups or clusters. With its Reliant Cluster Server II, Siemens offers solution packages for achieving scalability with high availability and failover performance. The system that can be extended here to form a cluster is the RM600 CS42 model, also referred to as a consolidation server.

hub

A hub is a nodal point in a communications network. Any two connected devices can communicate with one another via a hub at a given time.

inhouse interface (IHSS)

This is an interface in a local network, i.e. in a private digital network for data communication within a locally restricted area, e.g. within an office building.

jukebox

A jukebox is a device that can access more than one data medium of a storage medium in a software-controlled process. This enables the capacity of a data medium to be virtually multiplied. The RM600 E provides jukeboxes for ROD/WORM media (optical disk library) and magnetic tape cassettes.

LAN

A LAN (Local Area Network) is a data network for exchanging data within a building or company group. The data is transferred using a coaxial cable, copper cable or fibre optic cable.

LAN 1

LAN 1 refers to the family of TCP/IP protocols.

LAN 2

LAN 2 refers to the family of ISO protocols.

LAN console

A LAN console handles the tasks of a system console for one or more RM systems. Because it is connected to the LAN (Local Area Network), the console can be located anywhere in the LAN, for example in another room or another building.

magnetic tape cassette

There are three different types of magnetic tape cassette that can be used with the RM600 E, generally the ¼ inch (¼ inch tape width and 5¼ inch drive width, also known as the SMC magnetic tape cassette), 4 mm, and 8 mm magnetic tape cassettes.

magnetic tape cassette jukebox

An MTC jukebox is a fully automated subsystem for magnetic tape cassettes. Direct access (random access) to the MTC is controlled by software.

modem

A modem (modulator-demodulator) is a piece of data circuit-terminating equipment that converts data signals to analog and vice versa. Data signals are thus adjusted to transmission paths which are impervious to direct current. In public telecommunication networks, modems delimit the area of the responsibility of the telecom organization to the user. Modems have internationally standardized interfaces for connecting the data terminal equipment.

NUMA

The main memory in the RM600 E system is distributed across the processor boards. However, the NUMA architecture (Non Uniform Memory Access) merges the individual main memory modules into a linear, global address space. This reduces memory latency, particularly

when accessing the local memory on the processor boards and increases the data throughput rate. The Reliant UNIX operating system makes full use of the advantages offered by NUMA.

OD drive

The OD drive is a multifunctional drive for the magneto-optical ROD and WORM media.

An optical disk library is a fully automated disk change subsystem for the RM600 E for magneto-optical WORM and ROD media. Access to the disks is controlled by software.

OLR

The OLR (Online Replacement) procedure allows defective hardware components, defective power supplies or defective fan-out units to be replaced online by a similar type of device.

OLR vdisk definition

Virtual disk concept that enables a defective disk to be replaced online. Since the disk is mirrored, no data is lost.

online installation

Online installation allows an additional hard disk to be installed online. The configuration is extended as a result.

OSI

OSI (Open Systems Interconnection) is a reference model for networks, which was developed by the International Organization for Standardization (ISO). It defines the interface standards between computer manufacturers in relation to hardware and software requirements. This standard is also known as LAN2.

peripheral devices

All of the devices connected to a computer are collectively known as peripheral devices. A distinction is made between external and internal peripheral devices.

power supply redundancy

The RM600 E cabinets can be equipped with redundant power supply units, i.e. in the case of small cabinets, one of two power supply units can fail without serious consequences, while with the larger cabinets and the E42 model, one of three units can fail. The defective power supply unit can be replaced online (OLR).

prompt

The prompt (input prompt) is a standby character on the screen to support the user. The default prompt for the operating system is the $ character string.

protocol

Rules for the exchange of data between two systems. They define the type of electrical connection, the data format and the sequence of data.

Reliant Cluster Server II (RCS II)

The Reliant Cluster Server II cannot be ordered as an individual delivery unit, rather it is represented by a defined set of products and components: the so-called building blocks of the RCS II. In addition to the operating system and the server (hardware), this includes parallel databases, high-availability monitors, the cluster interconnect and disk subsystems.

The concept of the RCS II makes it suitable for a variety of application areas. In the first instance, suitable solution packages are offered for achieving scalability with high-availability and failover performance. The CS42 is the special RM600 model that can be extended to form a cluster on which these solution packages can be used.

remote power-on

Remote power-on (FES) is an add-on, which enables asynchronous interfaces to be connected over unlimited distances worldwide using dial-up telephone lines. Access protection on the remote system is guaranteed by a callback mode, an identification number and fixed call numbers. FES is operated from a standard terminal through the use of menus.

ROD

The Rewritable Optical Disk (ROD, also known as OD or Magneto Optical Disk) is another optical storage principle in addition to the CD-ROM. The ROD can, however, be deleted and written to again.

slot

A slot is the plug-in location in which a module (board, module, card) is inserted. A 9-slot cabinet, for example, has nine plug-in locations for modules.

streaming mode

Data is read or written in streaming mode without the tape being halted.

swap device

A swap device is a hard disk or area on a hard disk which is available to the operating system for storing pages from the main memory. This area should be some two to three times larger than the main memory.

synchronous data transmission

Data bits are transferred from sender to receiver at precise time intervals. Start and stop bits may be omitted. The time intervals are set by transferring synchronization characters before the actual data transmission. Synchronous transmission is faster and more effective than asynchronous transmission. The synchronous interface enables the RM600 E to be connected to a WAN.

terminal

Another name for data station (the end device in a system for data transmission, which is set up for receiving or sending data, or both).

TACSI

TACSI (Terminal Attachment Concept in SINIX) is a connection concept for the inhouse area on a non-protected two-wire line (conventional telephone line) up to a distance of 2000 m (depending on the cable type and line quality). With TACSI, data is transmitted using alternating edge pulse transmission method (AFP) and the HDLC data backup procedure. The transmission speed is 187.5 Kbits per second.

token ring

The token ring is a network, where the power line is structured as a closed ring. Access to the network is controlled by a bit pattern (token), which runs through the network in one direction.

uninterruptible power supply (UPS)

A UPS installation is integrated in the network upstream of the computer system. It supplies the system with regular AC voltage independently of the network status. This ensures that the system is extensively protected from power failures, power interruptions and power peaks. The computer system peripherals can also be connected to the UPS.

V.24

The V.24 standard describes the function of lines to the interfaces between data terminal equipment and data transmission equipment. This CCITT interface recommendation is the most frequently used

connection between a data end device and a modem and is suitable for both synchronous data transmission and asynchronous data transmission.

WAN

A network with a larger range than a LAN is called a WAN (Wide Area Network). A WAN generally extends over private property and operates over Telecom or other telecommunications networks.

WORM

The WORM disk (Write Once Read Many, also called MO disk or Magneto Optical Disk), is another optical storage medium in addition to ROD and CD-ROM. In contrast to ROD, the WORM disk can only be written to once.

X.21

The X.21 interface is an interface between data terminal equipment and data transmission equipment for synchronous transmission procedures in public data networks.

Abbreviations

A
Ampere

Ado
Surface mounted socket

AFP
Alternating edge pulse transmission method

AK-A
Attachment concentrator (AFP)

ANSI
American National Standards Institute

ATM
Asynchronous Transfer Mode

AUI
Attachment Unit Interface

AWG
American Wire Gauge

BA
Display workstation

BBU
Battery Backup Unit

BDM
Board Debug Monitor

BNC
Bayonet Norm Connector

BZT
Bundesamt für Zulassung in der Telekommunikation (Federal Office for Licensing in Telecommunications)

C
Celsius

CCITT
Comité Consultatif International Télégraphique et Téléphonique

CD-ROM
Compact Disk – Read Only Memory

CE
Communauté Européenne

CEE
Commission Internationale de réglementation en vue de l'Approbation de l'Équipement Électrique

CI
Cluster Interconnect

CMC
Call Management Center

CMX
Communication Management under UNIX

CPU
Central Processing Unit

CSA
Canadian Standards Association

DAS
Dual Attached Station

dB
Decibel

DC
Data Compression

DCS
Disk Controller SCSI

DDS
Digital Data Storage

DIFF
Differential

DME
Data Transmission Unit

DMX
Data Multiplexer

DT
Data Transmission

E-PCI-L
EHIOS with PCI subsystem locally in the system cabinet

EC
European Community

ECC
Error Correction Code

EHIOS
Enhanced High Performance Input Output System

EIP
Environmental Interface Processor

EMC
Electromagnetic Compatibility

EN
European Norm

ESD
Electro Static Discharge

EU
European Union

F
Fahrenheit

FC
Fibre Channel

FCC
Federal Communications Commission

FDDI
Fibre Distributed Data Interface

FES
Remote power-on

FEZ
Remote power-on add-on

FO
Fibre Optic

FPU
Floating Point Unit

FTZ
Fernmeldetechnisches Zentralamt (Federal Bureau for Telecommunications)

Gbyte
Gigabyte (109 bytes in mass storage, 230 bytes in main memory)

HD
High Density

HDLC
High Level Data Link Control

Hz
Hertz

IEC
International Electrotechnical Commission

IEEE
Institute of Electrical and Electronic Engineers

IHSS
Inhouse interface

ISDN
Integrated Services Digital Network

ISO
International Standardization Organization

KB
Kilobyte (210 bytes in main memory)

KBd
Kilobaud

KVA
Kilovolt-Ampere

LAN
Local Area Network

LAR
Lockout Auto Recovery

LCD
Liquid Crystal Display

LED
Light Emitting Diode

LVS
License Verification System

LW
Drive

MB
Megabyte (10^6 bytes in mass storage, 2^{20} bytes in main memory)

MHz
Megahertz

MMM
Main Memory Module

MO
Magneto Optical

MPE
Multipoint Equipment

MRS
Media Recognition System

MT
Magnetic tape device

MTC drive
Magnetic Tape Cassette drive

NFS
Network File System

NSR
Low voltage guideline

NUMA
Non Uniform Memory Access

OD
Optical Disk

OSI
Open Systems Interconnection

OLR
Online Replacement

P-ETH
PCI LAN Controller Ethernet

P-LCF
PCI LAN Controller FDDI

P-LCT
PCI LAN Controller Token Ring

PCI
Peripheral Component Interconnect

PCNFS
Network File System for PC

PWXV
PCI WAN controller with X and V interfaces

RAID
Redundant Array of Independent Disks

RCA
Remote Communication Adapter

RFS
Remote File System

RISC
Reduced Instruction Set Computer

RM
RISC Multiterminal system

ROD
Rewritable Optical Disk

ROM
Read Only Memory

SAS
Single Attached Station

SCI
Scalable Coherent Interface

SCSI
Small Computer System Interface

SE
Single-Ended

SIDATA
System installation by the user

SMP
Symmetrical Multiprocessor Architecture

SNA
Systems Network Architecture

SPbus
Synchronous Pipelined Bus

SS 7
Signalling System 7

Tbyte
Terabyte (10^{12} bytes in mass storage)

TCA
Terminal Controller Asynchronous

TCP IP
Transmission Control Protocol/Internet Protocol

UDF
Universal Disk Format

UL
Underwriters Laboratories

UPS
Uninterruptible Power Supply

V
Volt

VA
Volt Ampere

VDE
Verband deutscher Elektrotechniker (Association of German Electrical Engineers)

W
Watt

WAN
Wide Area Network

WORM
Write Once Read Many

Figures

Related publications

Fujitsu Siemens Computers GmbH publications

The only manuals that were reprinted for Reliant UNIX 5.45 were those whose technical contents had to be adapted to the new operating system version. For that reason, the following publications list also contains manuals with the old operating system name SINIX.

Reliant UNIX 5.45
Reliant UNIX Installation
Installation Guide

Target group
System administrators

Content
The manual describes the re-installation and updating of Reliant UNIX as well as initial installation of it when there is a new system disk.

Reliant UNIX 5.45
Reliant UNIX Operation
System Administrator's Guide

Target group
System administrators

Content
Description of the administration of Reliant UNIX.

Reliant UNIX 5.45
User Guide

Target group
Users

Content
Overview of the Reliant UNIX 5.45 operating system and an introduction into the general basics for users

Reliant UNIX 5.45
Commands

Target group
Shell users

Content
Description of the Reliant UNIX commands in alphabetical order

Reliant UNIX 5.45
System Administrator's Guide
User Guide

Target group
System administrators

Content
Introduction to the system administration of RM systems

Reliant UNIX 5.45
System Administrator's Reference Manual

Target group
System administrators

Content
Commands and application programs for system maintenance, file formats, special files for system administration, diagnostic information

LAN Console
Installation, Operation and Maintenance
Product Manual

Target group
System engineers and system administrators

Content
The LAN console supports console functionality via a V.24/LAN converter (RCA).

Reliant UNIX 5.45
OBSERVE V1.2B
System Administrator's Guide

Target group
System administrators

Content
The manual describes OBSERVE V1.2B. It is aimed at system administrators who are responsible for the setting up and support of OBSERVE, as well as programmers who want to use the C interfaces available with OBSERVE.

Reliant UNIX 5.45
Network Administration
Description

Target group
System administrators

Content
Description of the configuration and administration of networks

Reliant UNIX 5.45
Networking Reference Manual
Reference Manual

Target group
System administrators, programmers

Content
Brief description of the network commands and interface functions

Reliant UNIX 5.45
System Administration within a Domain
System Administrator's Guide

Target group
Service engineers and system administrators

Content
Grouping und administration of multiple systems (nodes) with the help of WSA (web based system administration) and Domain Admin.

Reliant UNIX 5.45
System Administration and Hardware Configuration Using the SYSADM User Interface
System Administrator Guide

Target group
System administrators

Content
Operating SYSADM, system administration with SYSADM (administering file systems and network services, installing software, system configuration, user administration). Description of the configuration tool *Config*, which facilitates the configuration and administration of input/output devices.

Reliant UNIX 5.45
Virtual Disks
System Administrator Guide

Target group
System administrators

Content
Description of the various types of virtual disk and how to configure them

Reliant UNIX 5.45
Configuring Virtual Disks with VDisk Lite
System Administrator Guide

Target group
System administrators

Content
Description of the interface to VDisk Lite

Reliant UNIX 5.45
High Availability
System Administrator Guide

Target group
System administrators

Content
Description of the hardware and software failover components in the RM system family

Reliant UNIX 5.45
OBSERVE V1.2B
System Administrator's Guide

Target group
System administrators

Content
The manual describes OBSERVE V1.2B. It is aimed at system administrators who are responsible for the setting up and support of OBSERVE, as well as programmers who want to use the C interfaces available with OBSERVE.

Reliant Monitor Software V3.1D
Installation of RMS
(Reliant UNIX, Solaris)
System Administrator's Guide

Content
Installation instructions for installing the Reliant Monitor Software (RMS) on Fujitsu Siemens RM systems.

Reliant Monitor Software V3.1
Administration of RMS with RCVM
(Reliant UNIX, Solaris)
System Administrator's Guide

Content
The manual describes the Motif-based RCVM graphical user interface, via which the Reliant Monitor Software (RMS) resources are administered.

Reliant Monitor Software V3.1
Configuration and Administration of RMS
(Reliant UNIX, Solaris)
System Administrator's Guide

Content
The manual describes the functionality as well as the configuration and administration tasks of RMS.

Reliant Monitor Software V3.1
RMS Concepts
(Reliant UNIX, Solaris)
System Administrator's Guide

Content
The manual describes the concept of the RMS product.

SINIX/windows
Clients Reference Manual

Target group
Programmers, users

Content
Description of the server and supported clients, their resources and menus for customizing the user interface

SINIX TE
UNIX Terminal Emulation under Windows
Product Manual

Target group
System administrators and users

Content
Using PCs as terminals on UNIX systems

Xprint

Target group
System administrators

Content

– User Guide and Administrator
– Graphical User Interface
– Reference Manual
– Application Programming Interface (APE)

Description of the management functions, graphical user interface, commands and the programming interface

FC600 E
Operating Manual

Target group
System administrators

SINIX, IRIX
License Verification System (LVS)

Target group
System administrators

Content
Setting up and managing licenses

MB 12
Operating Manual

Target group
Users of the 1/2 inch magnetic tape device

Content
Installation, setup, startup, operation, maintenance and care of the device

Ordering manuals

For ordering manuals please contact your local Fujitsu Siemens office.

Other publications

EXB-10i Cartridge Handling Subsystem
User's Manual

Target group
Users of the jukebox for 8 mm magnetic tape cassettes

Content
Setup, startup, operation and maintenance of the device

HP C1710A/C1710N – Optical Disk Library System
Operating Manual

Target group
Users of the Optical Disk Library

Content
Startup and operation of the device

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Comments
Suggestions
Corrections

Submitted by

Comments on RM600
E45/E85 CS45 FC45