AMIKON TECHNICAL DOCUMENTATION

Installation Instructions

Siemens 6ES7953-8LJ31-0AA0

512 KB Flash-EPROM Micro Memory Card

CAPACITY	TECHNOLOGY	VOLTAGE	BODY
512 KB	**Flash-EPROM**	**3.3 V**	**24 x 32 x 1.4 mm**

For qualified personnel only. Isolate the equipment and follow the complete manufacturer and site safety procedures. This reference does not replace the approved project design or the full installation manual.

01 PREPARATION AND WIRING CHECKS

- Scope: SIMATIC MMC handling in IM151-7 CPU 6ES7151-7AA21-0AB0, not a universal host procedure.
- The original accessory table covers the512k 6ES7953-8LJxx-0AA0 range; the exact LJ31 identity is independently confirmed.
- Never remove the card in RUN or during write access; follow every original warning and qualified-personnel requirement.
- Retain the approved project and verify the correct program before reset or operational release.
- Use the beveled edge and original host figure for card orientation.
- Memory reset and formatting are distinct operations. Do not format this card with Windows.

02 ORIGINAL WIRING REFERENCE

Original source PDF pages 2, 3, 61, 62, 90, 91, 92, 93, 94, 95, 96, 97, 194. The following pages retain the original Siemens drawings and printed page numbers.

Siemens original installation documentation

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠ DANGER

indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠ WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠ CAUTION

with a safety alert symbol, indicates that minor personal injury can result if proper precautions are not taken.

CAUTION

without a safety alert symbol, indicates that property damage can result if proper precautions are not taken.

NOTICE

indicates that an unintended result or situation can occur if the relevant information is not taken into account.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

⚠ WARNING

Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

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Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Preface

Purpose of the operating instructions

These operating instructions are intended to supplement the ET 200S Distributed I/O System (http://support.automation.siemens.com/WW/view/en/1144348) Operating Instructions. It contains a description of all the functions performed by the IM 151-7 CPU interface module. The operating instructions do not include functions that relate generally to ET 200S. These can be found in the *ET 200S Distributed I/O System* Operating Instructions.

The information contained in these operating instructions and the *ET 200S Distributed I/O System* Operating Instructions allows you to commission ET 200S with the IM 151-7 CPU interface module and to run it as an I slave on the PROFIBUS DP or in an MPI network. You will also find information on how the IM 151-7 CPU interface module can be operated together with the DP master module on the PROFIBUS DP.

Basic knowledge required

To understand these operating instructions you should have general experience in the field of automation engineering.

Range of validity of these operating instructions

These Operating Instructions are valid for

- the IM 151-7 CPU interface module (order number 6ES7151-7AA21-0AB0)
- the DP master module (order number 6ES7138-4HA00-0AB0)
- the components of the ET 200S distributed I/O system specified in the *ET 200S Distributed I/O System* Operating Instructions.

Note

A description of the special features of the interface module IM151-7F CPU (6ES7151-7FA21-0AB0) can be found in the product information on the Internet (http://support.automation.siemens.com/WW/view/en/11669702/133300).

These operating instructions contain a description of the components that was valid at the time of publication. We reserve the right to issue a Product Information which contains up-to-date information about new components and new versions of components.

4.1.5 Properties of the SIMATIC Micro Memory Card

The SIMATIC Micro Memory Card as a memory module for the IM 151-7 CPU interface module

Your IM151-7 CPU interface module uses a SIMATIC Micro Memory Card as memory module. It can be used as load memory or as a portable storage medium.

Note

The IM151-7 CPU interface module requires the SIMATIC Micro Memory Card for operation.

The following data are stored on the SIMATIC Micro Memory Card:

- User programs (all blocks)
- Archives and recipes
- Configuration data (*STEP 7* projects)
- Data for operating system update and backup

Note

You can either store user and configuration data or the operating system on the SIMATIC Micro Memory Card.

Properties of a SIMATIC Micro Memory Card

The SIMATIC Micro Memory Card ensures maintenance-free and retentive operation of the IM 151-7 CPU interface module .

SIMATIC Micro Memory Card copy protection

Your SIMATIC Micro Memory Card has an internal serial number that implements an MMC copy protection. You can read this serial number from the SSL partial list $011C_H$ index 8 using SFC 51 "RDSYSST". If the reference and actual serial number of your SIMATIC Micro Memory Card are not the same, program a STOP command in a know-how-protected module, for example.

Reference

Additional information

- on the *SSL partial list* refer to the S7-300-CPUs and ET 200-CPUs Instruction list (http://support.automation.siemens.com/WW/view/en/31977679) or the System and standard functions for S7-300/400 (http://support.automation.siemens.com/WW/view/en/1214574) Reference Manual.
- For memory reset of the IM151-7 CPU interface module go to section Memory reset of the IM151-7 CPU interface module using the mode selector switch (Page 93).

Useful life of a SIMATIC Micro Memory Card

The life of an SIMATIC Micro Memory Card depends mainly on the following factors:

1. The number of delete or programming cycles
2. External influences, such as ambient temperature.

At ambient temperatures up to 60 °C, up to 100,000 delete/write operations can be performed on a SIMATIC Micro Memory Card.

CAUTION
To prevent data losses, do not exceed this maximum of delete/write operations.

See also

Retentivity of load memory, system memory and RAM (Page 54)

Operating and display elements of the IM151-7 CPU interface module (Page 17)

4.2 Memory functions

4.2.1 General: Memory functions

Memory functions

Memory functions are used to generate, modify or delete entire user programs or specific blocks. You can also ensure that your project data are retained by archiving these. If you created a new user program, use a programming device/PC to download the complete program to the SIMATIC Micro Memory Card.

7.4 Commissioning the modules

7.4.1 Inserting/Replacing a SIMATIC Micro Memory Card

SIMATIC Micro Memory Card (MMC) as memory module

Your IM151-7 CPU interface module uses a SIMATIC Micro Memory Card as memory module. You can use the SIMATIC Micro Memory Card as a load memory or a portable data medium.

Note

You must have a connected SIMATIC Micro Memory Card in order to operate the IM151-7 CPU interface module.
The SIMATIC Micro Memory Card is not supplied as standard with the IM151-7 CPU interface module.

Note

The IM151-7 CPU interface module goes into STOP and requests a memory reset when you remove the SIMATIC Micro Memory Card while the IM151-7 CPU interface module is in RUN state.

CAUTION

Data on a SIMATIC Micro Memory Card can be corrupted if you remove the card while it is being accessed by a write operation. You may have to delete the SIMATIC Micro Memory Card using the PG or format it in the IM151-7 CPU interface module if you remove it from the live system.
DO NOT remove the SIMATIC Micro Memory Card when the system is in RUN state; always shut down power or set the IM151-7 CPU interface module to STOP in order to prevent any write access of a programming device. If the CPU is in STOP mode and you cannot determine whether or not a programming device function is active (e.g. load / delete block), disconnect the communication lines.

WARNING

Make sure that the SIMATIC Micro Memory Card to be inserted contains the proper user program for the IM151-7 CPU interface module (for the system). The wrong user program may have fatal processing effects.

Inserting/replacing the SIMATIC Micro Memory Card

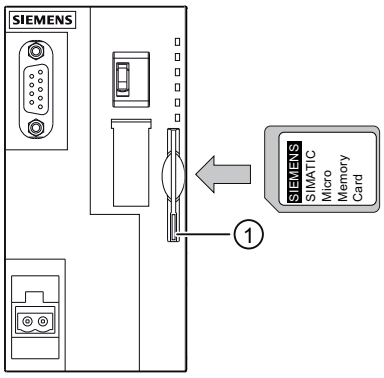
1. First of all, switch the IM151-7 CPU interface module to STOP.
2. Is there a SIMATIC Micro Memory Card inserted?

   If yes, first of all ensure that no writing PG functions (e.g. downloading blocks) are running. If you cannot ensure this, interrupt the communication connections of the IM151-7 CPU interface module.

   Press the ejector and remove the SIMATIC MMC.

   An ejector ① is located on the frame of the module receptacle to enable you to remove the SIMATIC Micro Memory Card.
   Use a small screwdriver or ball-point pen to eject.
3. Insert the ("new") SIMATIC Micro Memory Card into the receptacle so that its beveled edge points towards the ejector.
4. Gently press the SIMATIC Micro Memory Card into the IM151-7 CPU interface module until it engages.
5. Perform a reset (refer to section Resetting the IM151-7 CPU interface module using the mode selector switch (Page 93)).

IM151-7 CPU



Removing and inserting a SIMATIC Micro Memory Card

After you replace a SIMATIC Micro Memory Card in POWER OFF state, the IM151-7 CPU interface module detects

- A physically identical SIMATIC Micro Memory Card with a different content
- A new SIMATIC Micro Memory Card with the same content as the old SIMATIC Micro Memory Card

It automatically performs a Memory reset after POWER ON.

Reference

Additional information about the SIMATIC Micro Memory Card can be found in the S7-300, CPU 31xC and CPU 31x (http://support.automation.siemens.com/WW/view/en/12996906) manual, in the *Technical Data* section.

7.4.2 Initial power on

Requirements

- You have installed and wired up the ET 200S.
- The SIMATIC Micro Memory Card is inserted in the IM151-7 CPU interface module.
- The mode selector of your IM151-7 CPU interface module is set to STOP.

Initial power on of an ET 200S with IM151-7 CPU

Switch on the supply voltage for the ET 200S.

Result:

On the IM151-7 CPU interface module

- The ON LED lights up
- the STOP LED flashes at 2 Hz when the IM151-7 CPU interface module carries out an automatic memory reset
- The STOP LED lights up after the memory reset.

7.4.3 Memory reset of the IM151-7 CPU interface module using the mode selector switch

When must I perform a memory reset of the IM151-7 CPU interface module?

You must perform a memory reset of the IM151-7 CPU interface module,

- When all retentive memory bits, timers and counters have been cleared and the initial values of retentive data blocks in the load memory are to be used as actual values in the work memory.
- if the retentive memory bits, timers and counters could cause unwanted responses after "Load user program onto memory card" with the user program just downloaded to the IM151-7 CPU interface module.

  Reason: "Load user program onto memory card" does not delete the retentive areas.
- if the IM151-7 CPU interface module requests a memory reset with its STOP LED flashing at 0.5 Hz intervals. Possible reasons for this request are listed in the table below.

Table 7- 3 Possible reasons for the request to reset the memory by the IM151-7 CPU interface module

Reasons for the request to reset the memory by the IM151-7 CPU interface module	Special features
The SIMATIC Micro Memory Card has been replaced.	–
RAM error in the IM151-7 CPU interface module	–
Work memory is too small, i.e. not all the blocks of the user program on a SIMATIC Micro Memory Card can be loaded.	IM151-7 CPU with inserted SIMATIC Micro Memory Card: This causes continuous requests for a memory reset. This may be prevented by formatting the SIMATIC Micro Memory Card (see Formatting the SIMATIC Micro Memory Card (Page 96)). For additional information on the way the SIMATIC Micro Memory Card responds to a memory reset, see Memory reset and restart (Page 67).
Attempts to load faulty blocks; if a wrong instruction was programmed, for example.	

How to reset memory

There are two ways to reset the IM151-7 CPU interface module memory:

Memory reset using the mode selector switch	Memory reset using the programming device
... is described in this section.	... is only possible when the IM151-7 CPU interface module is in STOP mode (see *STEP 7 Online Help*).

Resetting the memory of the IM151-7 CPU using the mode selector switch

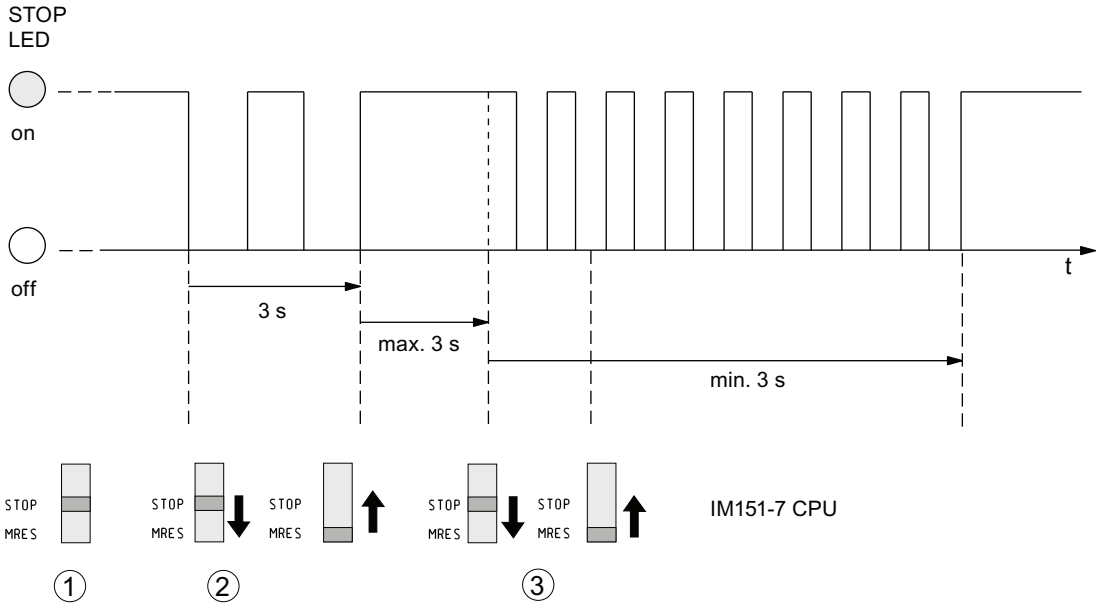
The following table contains the steps required to reset the memory of the IM151-7 CPU interface module.

Table 7- 4 Steps for performing a memory reset of the IM151-7 CPU interface module

Step	Memory reset of IM151-7 CPU
1.	Turn the key to STOP position. ①
2.	Turn the key to MRES position. Hold the key in this position until the STOP LED lights up for the second time and remains on (this takes 3 seconds). ② Now release the key.
3.	You must turn the key to MRES position again within 3 seconds and hold it there until the STOP LED flashes (at 2 Hz). ③ You can now release the switch. When the IM151-7 CPU interface module has completed the memory reset, the STOP LED stops flashing and lights up. The memory reset has been carried out by the IM151-7 CPU interface module.

The procedure described in the table above is only required if you wish to reset the IM151-7 CPU interface module memory without this being requested by the IM151-7 CPU interface module itself (STOP LED flashing slowly). If the IM151-7 CPU interface module prompts you for a memory reset, you only have to turn the mode selector briefly to the MRES position to initiate the memory reset operation.

The figure below shows how to use the mode selector switch to reset the IM151-7 CPU interface module memory:



If the IM151-7 CPU interface module prompts you for another memory reset following a successful memory reset operation, the SIMATIC Micro Memory Card may need to be reformatted (see section Formatting the SIMATIC Micro Memory Card (Page 96)).

STOP LED does not flash during the memory reset

What should I do if the STOP LED does not flash during the memory reset or if other LEDs are lit?

1. You must repeat steps 2 and 3.
2. If the IM151-7 CPU interface module does not perform a memory reset again, you must evaluate the diagnostics buffer of the IM151-7 CPU interface module.

What happens in the IM151-7 CPU interface module during a memory reset?

Table 7- 5 Internal processes in the IM151-7 CPU interface module during a memory reset

Event	Action in the IM151-7 CPU interface module	
Process in the IM151-7 CPU interface module	1.	The IM151-7 CPU interface module deletes the entire user program in the work memory.
	2.	The IM151-7 CPU interface module deletes the retentive user data (flags, times, counters and DB contents).
	3.	The IM151-7 CPU interface module tests its hardware.
	4.	The IM151-7 CPU interface module copies the sequence-related content of the SIMATIC Micro Memory Card (load memory) to the work memory. **Tip:** If the IM151-7 CPU interface module is unable to copy the content of the SIMATIC Micro Memory Card and requests a memory reset: • Remove the SIMATIC Micro Memory Card • Memory reset of IM151-7 CPU • Read the diagnostics buffer
Memory contents after reset	The user program is transferred back from the SIMATIC Micro Memory Card to the work memory and the memory utilization is indicated accordingly.	
What's left?	• Parameters of the MPI/DP interface: – MPI address and highest MPI address as well as parameterized transmission rate or – PROFIBUS address, highest PROFIBUS address, transmission rate, setting as active or passive interface when the MPI/DP interface of the IM151-7 CPU is parameterized as DP interface.	
	• Data in the diagnostics buffer. (Only the last 100 entries in the diagnostics buffer are retained in the event of a POWER OFF / POWER ON.) You can read the diagnostics buffer with the programming device (see *STEP 7 Online Help*).	
	• The content of the operating hours counter and the time.	

Special feature: Interface parameters of the MPI/DP interface

The table below describes which interface parameters are valid after a CPU memory reset.

Memory reset ...	MPI/DP parameters of the combined MPI/DP interface	DP parameters of the DP master interface with DP master module inserted
with inserted SIMATIC Micro Memory Card	... the MPI parameters on the SIMATIC Micro Memory Card or integrated read-only load memory are valid.	... the MPI parameters on the SIMATIC Micro Memory Card or integrated read-only load memory are valid.
	If here no parameters are stored (SDB), the previously set parameters stay valid.	If no parameters are stored here (SDB), neither are any DP interface parameters present.
without inserted SIMATIC Micro Memory Card	... are retained and valid.	... neither are any DP interface parameters present.

7.4.4 Formatting the SIMATIC Micro Memory Card

You must format the SIMATIC Micro Memory Card in the following cases

- The SIMATIC Micro Memory Card module type is not a user module.
- The SIMATIC Micro Memory Card has not been formatted.
- The SIMATIC Micro Memory Card is defective.
- The content of the SIMATIC Micro Memory Card is invalid.

  The content of the SIMATIC Micro Memory Card has been identified as invalid.
- The "Load user program" operation was interrupted as a result of POWER OFF.
- The "Write RAM to ROM" operation was interrupted as a result of POWER OFF.
- Error when evaluating the module content during Memory reset.
- Formatting error, or formatting failed.

If one of these errors has occurred, the IM151-7 CPU interface module prompts for yet another memory reset, even after the memory has already been reset. The card's content is retained until the SIMATIC Micro Memory Card is formatted, unless the "Load user program" or "Write RAM to ROM" operation was interrupted as a result of POWER OFF.

The SIMATIC Micro Memory Card is only formatted if there is a reason to do so (see above) and not, for example, when you are prompted for a memory reset after a module is changed. In this case, a switch to MRES triggers a normal memory reset for which the module content remains valid.

Use the following steps to format your SIMATIC Micro Memory Card

CAUTION
Do not use the memory cards for other than SIMATIC purposes and do not format it with third-party devices or Windows means. You overwrite the internal structure of the memory card this way and it cannot be restored. This means the memory card will become useless for SIMATIC devices.

If the IM151-7 CPU interface module is requesting a memory reset (STOP LED flashing slowly), you can format the SIMATIC Micro Memory Card with the following switch operation:

1. Toggle the switch to the MRES position and hold it there until the STOP LED lights up and remains on (after approx. 9 seconds).
2. Within the next three seconds, release the switch and toggle it once again to MRES position. The STOP LED flashes to indicate that formatting is in progress.

Note

Always perform this sequence of operation within the specified time. Otherwise, the SIMATIC Micro Memory Card will not be formatted, but rather returns to memory reset status.

See also

Memory reset of the IM151-7 CPU interface module using the mode selector switch (Page 93)

A.1.2 Order numbers of accessories

IM151-7 CPU interface module accessories

Table A- 3 IM151-7 CPU accessories order numbers

Designation	Order number
SIMATIC Micro Memory Card 64k	6ES7953-8LFxx-0AA0
SIMATIC Micro Memory Card 128k	6ES7953-8LGxx-0AA0
SIMATIC Micro Memory Card 512k	6ES7953-8LJxx-0AA0
SIMATIC Micro Memory Card 2M	6ES7953-8LLxx-0AA0
SIMATIC Micro Memory Card 4M	6ES7953-8LMxx-0AA0
SIMATIC Micro Memory Card 8M (suitable for an FW update)	6ES7953-8LPxx-0AA0
Label sheets DIN A4, 10 units	
• beige	6ES7193-4BA00-0AA0
• Yellow	6ES7193-4BB00-0AA0
• red	6ES7193-4BD00-0AA0
• petrol	6ES7193-4BH00-0AA0