

MANUFACTURER DOCUMENT PACKAGE

# Manufacturer's Manual

Selected official pages for procurement and maintenance review

PRODUCT BRAND

Siemens

PRODUCT MODEL

6ES7138-4HA00-0AB0

PROFIBUS DP Master Interface. Relevant section pages: 14, 20, 22, 23, 26, 27, 73, 74, 75, 76, 77, 156, 157, 159, 179, 180, 188, 189, 191, 193. Adjacent model text on shared pages is outside this product reference.

OFFICIAL SOURCE

SIMATIC ET 200S Distributed I/O - IM151-7 CPU Interface Module; 10/2011, A5E00058783-05

Source: Siemens 10/2011, A5E00058783-05. Original manufacturer pages follow this cover.

Siemens 10/2011 original: 4HA00 with IM151-7 CPU 7AA21. CPU capacities and services are configuration-specific; use the full station instructions.

AMIKON PRODUCT SUPPORT

+86-18020776786

INFO@AMIKON.CN

AMIKONG.COM

Amikon Limited prepared this independent reference package. Selected manufacturer pages follow with their original content and pagination visible.

## SIMATIC

### ET 200S Distributed I/O IM151-7 CPU Interface Module

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## 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.

|                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------------|
|  <b>DANGER</b>                   |
| indicates that death or severe personal injury <b>will</b> result if proper precautions are not taken.            |
|  <b>WARNING</b>                  |
| indicates that death or severe personal injury <b>may</b> result if proper precautions are not taken.             |
|  <b>CAUTION</b>                  |
| with a safety alert symbol, indicates that minor personal injury can result if proper precautions are not taken.  |
| <b>CAUTION</b>                                                                                                    |
| without a safety alert symbol, indicates that property damage can result if proper precautions are not taken.     |
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| 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.

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Note the following:

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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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.

# 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.

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### 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>).

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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.

## 1.3 Properties of the DP master module

Together with the DP master module you can operate the IM 151-7 CPU interface module as a DP master.

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### Note

The IM 151-7 CPU interface module can be expanded by no more than **one** DP master module.

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### Properties of the DP master module

The DP master module has the following special features:

- The PROFIBUS DP address is saved alongside the HW Config configuration on the SIMATIC Micro Memory Card in the IM 151-7 CPU interface module.
- There is 1 LED on the front of the DP master module to indicate bus faults on the PROFIBUS DP (BF).
- Connection to PROFIBUS DP via the DP interface (RS 485) on the DP master module

### Integration of the DP master module in ET 200S

The DP master module is connected to the IM 151-7 CPU from the right and hence integrated in the ET 200S.

### How do I configure and program the ET 200S with IM 151-7 CPU and DP master module?

To configure an ET 200S with IM 151-7 CPU and DP master module (configuration and parameter assignment) and to program the IM 151-7 CPU interface module you will need the *STEP 7* configuration software as of V5.2 + SP1 + HSP219 or V5.5 + SP1.

The procedure for configuring the ET 200S with IM 151-7 CPU and DP master module is described in the section Commissioning (Page 85) of these operating instructions.

## 2.3 Display elements of the DP master module

### Display elements

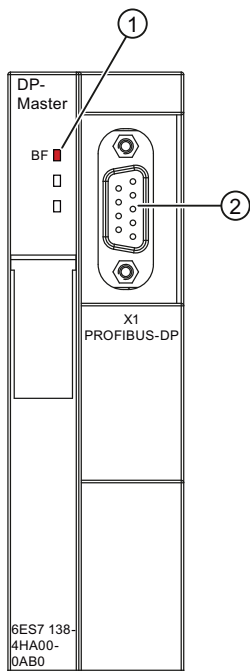


Figure 2-1 Display elements of the DP master module

| The figure shows ... | the following elements of the DP master module |
|----------------------|------------------------------------------------|
| ①                    | Status and error displays                      |
| ②                    | 9-pin sub D socket for PROFIBUS DP             |

### 3.1.2 PROFIBUS DP

#### Availability

The IM151-7 CPU interface module has a combined MPI / DP interface (X1) with **DP slave functionality**. This RS 485 interface is configured as an MPI interface when the unit is first supplied. If you want to use the DP interface, you have to reconfigure it in *STEP 7* as DP interface.

Together with the optional DP master module, the IM 151-7 CPU interface module has an RS 485 interface (X2) with **DP master functionality**.

#### Properties of the PROFIBUS DP interfaces

##### PROFIBUS DP interface at IM151-7 CPU

The PROFIBUS DP interface (X1) with **DP slave functionality** is mainly used to connect the IM151-7 CPU interface module to a PROFIBUS DP subnet (use of CPU as I slave).

The PROFIBUS DP interface offers a transmission rate of up to 12 Mbps.

You can configure the DP slave interface as active or passive by using the "Test, Commissioning, Routing" checkbox in the properties of the DP interface in *STEP 7*.

- Active DP slave interface ("Test, Commissioning, Routing" checkbox is activated):
  - The PROFIBUS DP interface broadcasts its bus configuration (the transmission rate, for example). A programming device, for example, can thus receive the correct parameters and automatically connect to a PROFIBUS subnet. In your configuration you can specify to disable bus parameter broadcasting.
  - Routing/data set routing in other subnets that can be accessed by an additionally connected DP master module is possible.
  - PG/OP functions (e. g. for testing and commissioning) are possible without restrictions.
  - Do not operate a DP slave with active DP interface in an isochronous subnet.
- Passive DP slave interface ("Test, Commissioning, Routing" checkbox is deactivated):
  - The configured transmission rate is ignored and set automatically to the transmission rate of the master (automatic transmission rate search)
  - Routing/data set routing is no longer possible via a passive DP slave interface.
  - PG/OP functions are possible but with less performance than with active interface.
  - If you want to operate the CPU as I slave in a subnet in which isochronous DP slaves are used, the DP slave interface of the I slave CPU must be operated passively (the CPU as I slave does not support isochronous slave operation itself)

### DP master interface on the DP master module

The DP master interface on the DP master module (X2) is mainly used to connect distributed I/O (slaves). PROFIBUS DP allows you to create large subnets.

The DP master interface offers a transmission rate of up to 12 Mbps.

You can configure the DP master interface as DP master or to be inactive.

- The interface needs a configuration as DP master.
  - Slaves can be operated with loaded configuration; PG/OP functions and routing are possible.
  - The CPU sends its set bus parameters (the baud rate, for example) via the PROFIBUS DP interface if master mode is set. This functionality automatically provides the correct parameters for online operation of a programming device, for example. In your configuration you can specify to disable bus parameter broadcasting.
- The interface is always inactive without configuration.

### Devices capable of PROFIBUS DP communication

Devices that can be connected via PROFIBUS DP:

- Programming device / PC
- OP/TP
- DP slaves
- DP master
- Actuators/Sensors
- S7-300/S7-400 with PROFIBUS DP interface

### Time synchronization using PROFIBUS

Time synchronization is possible if the MPI / DP interface is programmed as a DP interface on the IM151-7 CPU interface module and via the DP interface on the DP master module. For information on time synchronization via PROFIBUS DP, please refer to the section Time synchronization (Page 44).

### Reference

Additional information on PROFIBUS: "PROFIBUS (<http://www.profibus.com>)"

**PROFIBUS DP: Electrical cables or fiber-optic cables?**

Use fiber optic cables on a field bus with greater length, rather than copper conductors, in order to be independent on the transmission rate, and to exclude external interference.

**3.2.2 Network components of MPI/DP and cable lengths****MPI subnet segment**

You can install cables with a length of up to 50 m in an MPI subnet segment. This length of 50 m is the distance between the first and the last node of the segment.

Table 3- 3 Permissible cable length of a segment on the MPI subnet

| Baud rate  | Maximum cable length of a segment |
|------------|-----------------------------------|
| 19,2 Kbps  | 1000 m                            |
| 187,5 Kbps |                                   |
| 1,5 Mbps   | 200 m                             |
| 3,0 Mbps   | 100 m                             |
| 6,0 Mbps   |                                   |
| 12,0 Mbps  |                                   |

**Segment on the PROFIBUS subnet**

The maximum cable length of a segment on the PROFIBUS subnet is determined by the set transmission rate.

Table 3- 4 Permissible cable length of a segment on the PROFIBUS subnet

| Baud rate              | Maximum cable length of a segment |
|------------------------|-----------------------------------|
| 9,6 Kbps to 187.5 Kbps | 1000 m                            |
| 500 Kbps               | 400 m                             |
| 1,5 Mbps               | 200 m                             |
| 3 Mbps to 12 Mbps      | 100 m                             |

**Longer cable lengths via RS485 repeater/RS485 diagnostic repeater**

You need to install RS485 repeaters for segments requiring cable lengths longer than the allowed length. For additional information about the RS485 Repeater, refer to the RS 485 Repeater Manual (<http://support.automation.siemens.com/WW/view/en/48598071>).

## Stub cables

Make allowances for the maximum stub cable length when you connect bus nodes to a segment by means of stub cables, for example, a PG via standard PG cable.

For transmission rates up to 3 Mbps, you can use a PROFIBUS bus cable with bus connector as stub cable for connecting. For transmission rates of 3 Mbps and higher, use the PG patch cord to connect the PG or PC. You can use multiple PG connecting cables in one bus structure. Other types of stub cables are not permitted.

## Length of stub cables

The table below shows the maximum permitted lengths of stub cables per segment:

Table 3- 5 Lengths of stub cables per segment

| Baud rate                                                                                                                                                                                                                                                                                | Max. length of stub cables per segment | Number of nodes with stub cable length of ... |     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-----------------------------------------------|-----|
|                                                                                                                                                                                                                                                                                          |                                        | 1.5 m or 1.6 m                                | 3 m |
| 9,6 Kbps to 93.75 Kbps                                                                                                                                                                                                                                                                   | 96 m                                   | 32                                            | 32  |
| 187,5 Kbps                                                                                                                                                                                                                                                                               | 75 m                                   | 32                                            | 25  |
| 500 Kbps                                                                                                                                                                                                                                                                                 | 30 m                                   | 20                                            | 10  |
| 1,5 Mbps                                                                                                                                                                                                                                                                                 | 10 m                                   | 6                                             | 3   |
| 3 Mbps to 12 Mbps                                                                                                                                                                                                                                                                        | 1                                      | 1                                             | 1   |
| <sup>1</sup> To connect PGs or PCs for operation at transmission rates starting at 3 Mbps, use the PG patch cord with order number 6ES7901-4BD00-0XA0. In a bus configuration, you can use multiple PG patch cords with this order number. Other types of stub cables are not permitted. |                                        |                                               |     |

## PG connecting cable

Table 3- 6 PG connecting cable

| Type                | Order number       |
|---------------------|--------------------|
| PG connecting cable | 6ES7901-4BD00-0XA0 |

## Mounting and connecting

### 5.1 Content

#### Where can I find what information?

You will find comprehensive information about fitting and connecting an ET 200S in the relevant sections of the ET 200S Distributed I/O Device (<http://support.automation.siemens.com/WW/view/en/1144348>) Operating Instructions.

The following sections will show you the differences and special features associated with using an ET 200S with the IM 151-7 CPU interface module.

### 5.2 Installing the IM151-7 CPU interface module

#### Requirement

The mounting rail is installed.

#### Procedure

1. Install the IM 151-7 CPU interface module.
2. Mount the required terminal modules.

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#### Note

##### Note the installation sequence

If you wish to extend the IM 151-7 CPU interface module with an optional DP master module, you must first of all install the DP master module before you install the required terminal modules.

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3. Mount the terminating module.

#### Reference

The mounting is described in the ET 200S Distributed I/O System (<http://support.automation.siemens.com/WW/view/en/1144348>) Operating Instructions.

## **5.3 Connecting the IM151-7 CPU interface module**

### **Introduction**

You connect the supply voltage and PROFIBUS DP to the IM151-7 CPU interface module.

### **Requirements**

- The IM151-7 CPU interface module is installed on the mounting rail.
- Wire the interface module with the supply voltage switched off.
- Observe the wiring rules in the ET 200S Distributed I/O System (<http://support.automation.siemens.com/WW/view/en/1144348>) Operating Instructions.

### **Required tools**

3 mm screwdriver

### **Power supply**

You may only use SELV / PELV-type power supply units with a guaranteed electrically isolated extra-low voltage ( $\leq 60$  V DC).

### **Required accessories**

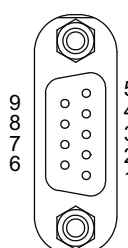
- Cable with maximum 2.5 mm<sup>2</sup> conductor cross section for the supply voltage
- PROFIBUS DP bus connector  
Suitable bus connectors are listed in section Order numbers of accessories (Page 194).

## Connecting PROFIBUS DP

Connect the PROFIBUS DP as follows:

1. Use a pre-fabricated PROFIBUS cable.
2. Plug the bus connector into the PROFIBUS DP socket.
3. Screw the bus connector into the connection socket.

**Pin assignment for the bus connector:**

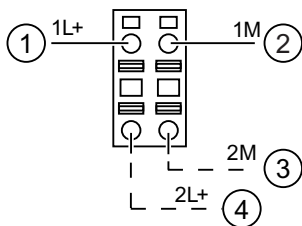
| View of the connection socket                                                                             | Terminal | Signal      | Designation                        |
|-----------------------------------------------------------------------------------------------------------|----------|-------------|------------------------------------|
|  <p>RS 485 interface</p> | 1        | –           | –                                  |
|                                                                                                           | 2        | M24         | external 24 V supply               |
|                                                                                                           | 3        | RxD/TxD-P   | Data line B                        |
|                                                                                                           | 4        | RTS         | Request To Send                    |
|                                                                                                           | 5        | M5V2        | Data reference potential (station) |
|                                                                                                           | 6        | P5V2        | Supply plus (station)              |
|                                                                                                           | 7        | P24         | external 24 V supply               |
|                                                                                                           | 8        | RxD / TxD-N | Data line A                        |
|                                                                                                           | 9        | –           | –                                  |

## Connecting the supply voltage

The voltage supply is over a connecting plug. When it ships, this is connected to the connection for the supply voltage on the IM151-7 CPU interface module.

The connecting plug makes it possible to loop the voltage supply uninterrupted.

**Pin assignment of the interface:**

|                                                                                     |   |               |
|-------------------------------------------------------------------------------------|---|---------------|
|  | ① | 24 VDC (red)  |
|                                                                                     | ② | Ground (blue) |
|                                                                                     | ③ | Ground (blue) |
|                                                                                     | ④ | 24 VDC (red)  |

Connect the supply voltage as follows:

1. Strip the wires for the supply voltage to 10 mm.
2. Insert the individual cables into the spring-loaded terminal (round openings) of the cable connector.
3. Insert the wired connector onto the 24 VDC terminal of the IM151-7 CPU interface module.
4. Please ensure that there is sufficient strain relief.

## 5.4 Installing and connecting the DP master module

If you wish to extend the IM151-7 CPU interface module with an optional DP master module, you can use the IM151-7 CPU interface module as a DP master. Connect the PROFIBUS DP to the DP master module.

### Requirements

- The mounting rail has been fitted (see the ET 200S Distributed I/O Device (<http://support.automation.siemens.com/WW/view/en/1144348>) Operating Instructions).
- The IM151-7 CPU interface module is installed on the mounting rail (see section Installing the IM151-7 CPU interface module (Page 73)).

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### Note

You should install the required terminal module only having first installed the DP master module.

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### Installing the DP master module

1. Suspend the DP master module in the mounting rail to the right of the IM151-7 CPU interface module.
2. Rotate the DP master module to the back until it engages.
3. Slide the DP master module to the left until it audibly engages with the IM151-7 CPU interface module.

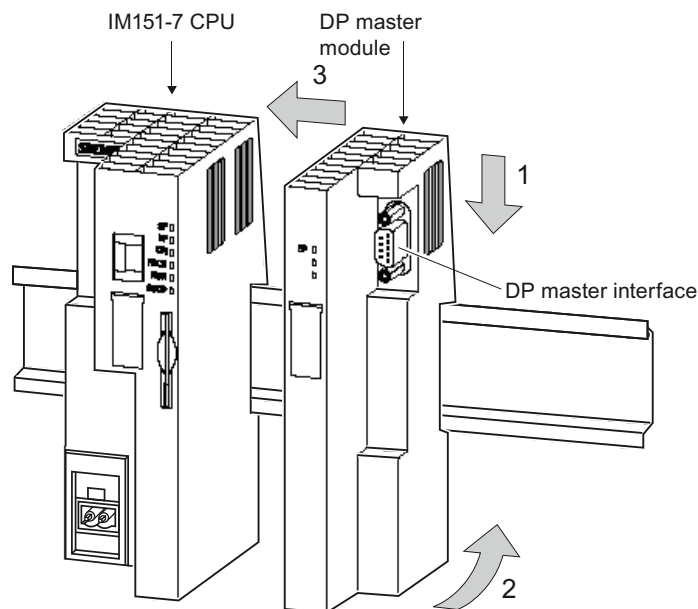


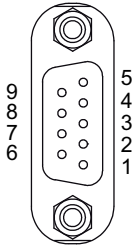
Figure 5-1 Installing the DP master module

## Connecting PROFIBUS DP

Connect the PROFIBUS DP as follows:

- Use a pre-fabricated PROFIBUS cable.
- Insert the bus connector in the X1 connection socket on the DP master module.
- Screw the bus connector into the connection socket.

**Pin assignment for the bus connector:**

| View of the connection socket                                                                             | Terminal | Signal      | Designation                        |
|-----------------------------------------------------------------------------------------------------------|----------|-------------|------------------------------------|
|  <p>RS 485 interface</p> | 1        | –           | –                                  |
|                                                                                                           | 2        | –           | –                                  |
|                                                                                                           | 3        | RxD / TxD-P | Data line B                        |
|                                                                                                           | 4        | RTS         | Request To Send                    |
|                                                                                                           | 5        | M5V2        | Data reference potential (station) |
|                                                                                                           | 6        | P5V2        | Supply plus (station)              |
|                                                                                                           | 7        | –           | –                                  |
|                                                                                                           | 8        | RxD / TxD-N | Data line A                        |
|                                                                                                           | 9        | –           | –                                  |

## Reference

A detailed description of the OBs and on SFCs required for their evaluation can be found in the *STEP 7 Online Help* and in the S7-300/400 System and Standard Functions (<http://support.automation.siemens.com/WW/view/en/1214574>) reference manual.

### 10.5.6 Status and error displays of the DP master module (parameterization as DP master)

#### Explanation of the BF LED on the DP master module

Table 10- 9 BF LED

| IM151-7 CPU | DP master module | Meaning                                                                         |
|-------------|------------------|---------------------------------------------------------------------------------|
| SF          | BF               |                                                                                 |
| On          | On/flashes       | PROFIBUS DP interface error.<br>To correct or avoid error: See the tables below |

Table 10- 10 BF LED on the DP master module lights up

| Possible error                                                                                                 | Response of the IM151-7 CPU interface module                                                                                                                                                      | Possible remedies                                                                                                                                                                                                                   |
|----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>Bus fault (hardware fault)</li> <li>Short-circuit on the bus</li> </ul> | <p>Call of OB 86 (if the IM151-7 CPU interface module is in RUN and has previously run DP slaves that are now failing).</p> <p>The IM151-7 CPU interface module STOPS if OB 86 is not loaded.</p> | <ul style="list-style-type: none"> <li>Check to see if the connector for PROFIBUS DP is inserted properly.</li> <li>Check the bus cable for short-circuit.</li> <li>Analyze the diagnostic data. Edit the configuration.</li> </ul> |

Table 10- 11 BF LED on the DP master module flashes

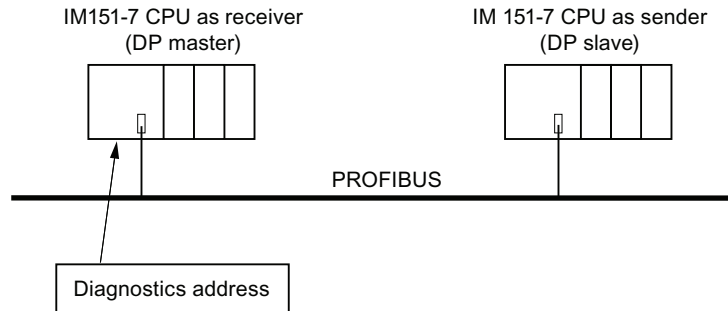
| Possible error                                                                                                                                                                                                                                                                                                                                  | Response of the IM151-7 CPU interface module                                                                                                                                          | Possible remedies                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The IM151-7 CPU interface module is a DP master:</p> <ul style="list-style-type: none"> <li>• Failure of a connected station</li> <li>• At least one of the configured slaves cannot be accessed.</li> <li>• Incorrect configuration (configured address areas of the actual structure do not correspond with the set structure.)</li> </ul> | <p>Call of OB 86 (if the IM151-7 CPU interface module is in RUN and connected DP slaves have since failed).</p> <p>The IM151-7 CPU interface module STOPS if OB 86 is not loaded.</p> | <ul style="list-style-type: none"> <li>• Check whether the bus cable on the DP master module is connected to the IM151-7 CPU interface module and that the bus is not interrupted.</li> <li>• Wait until the IM151-7 CPU interface module has started up. If the LED does not stop flashing, check the DP slaves or evaluate the diagnostic data for the DP slaves.</li> <li>• Check the settings for the configured address areas for the DP master.</li> </ul> |

## Reference

A detailed description of the OBs and on SFCs required for their evaluation can be found in the *STEP 7 Online Help* and in the S7-300/400 System and Standard Functions (<http://support.automation.siemens.com/WW/view/en/1214574>) reference manual.

## Diagnostics addresses for DP masters and DP slaves

With the IM151-7 CPU interface module you assign diagnostics addresses for the PROFIBUS DP. Verify in your configuration that the DP diagnostics addresses are assigned once to the DP master (for the DP master module) and once to the DP slave.



| Description of the DP master configuration                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Description of the DP slave configuration                                                                                                                                                                                                                                                                                                             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>When you configure the DP master, assign two different diagnostics addresses for an intelligent DP slave, that is, one diagnostics address for slot 0, and one for slot 2. These two addresses perform the following functions:</p> <ul style="list-style-type: none"> <li>The diagnostics address for slot 0 reports in the master all events relating to the entire slave (station representative), for example, node failure.</li> <li>The diagnostics address for slot 2 is used to report events concerning this slot. For example, if the IM151-7 CPU is acting as an intelligent DP slave, it returns the diagnostic interrupts for operating state transitions.</li> </ul> <p>These diagnostics addresses are referred to as <i>assigned to the DP master</i> below.</p> <p>These diagnostics addresses are used by the DP master to obtain information about the state of the DP slave, or about bus interruptions.</p> | <p>When you configure the DP slave, you also assign it a diagnostics address (in the associated DP slave project).</p> <p>This diagnostics address is referred to as <i>assigned to the DP slave</i> below.</p> <p>This diagnostics address is used by the DP slave to obtain information about the state of the DP master, or bus interruptions.</p> |

## Technical data

### 11.1 General technical data

#### Reference

The IM151-7 CPU interface module and the DP master module conform to the standards and test values that apply to the ET 200S distributed I/O device. Detailed information on the general technical specifications can be found in the ET 200S Distributed I/O Device (<http://support.automation.siemens.com/WW/view/en/1144348>) Operating Instructions.

## 11.2 IM151-7 CPU Interface Module

### 11.2.1 Block diagram IM 151-7 CPU with DP master module

The following figure shows the block diagram of the IM151-7 CPU interface module with the optional DP master module.

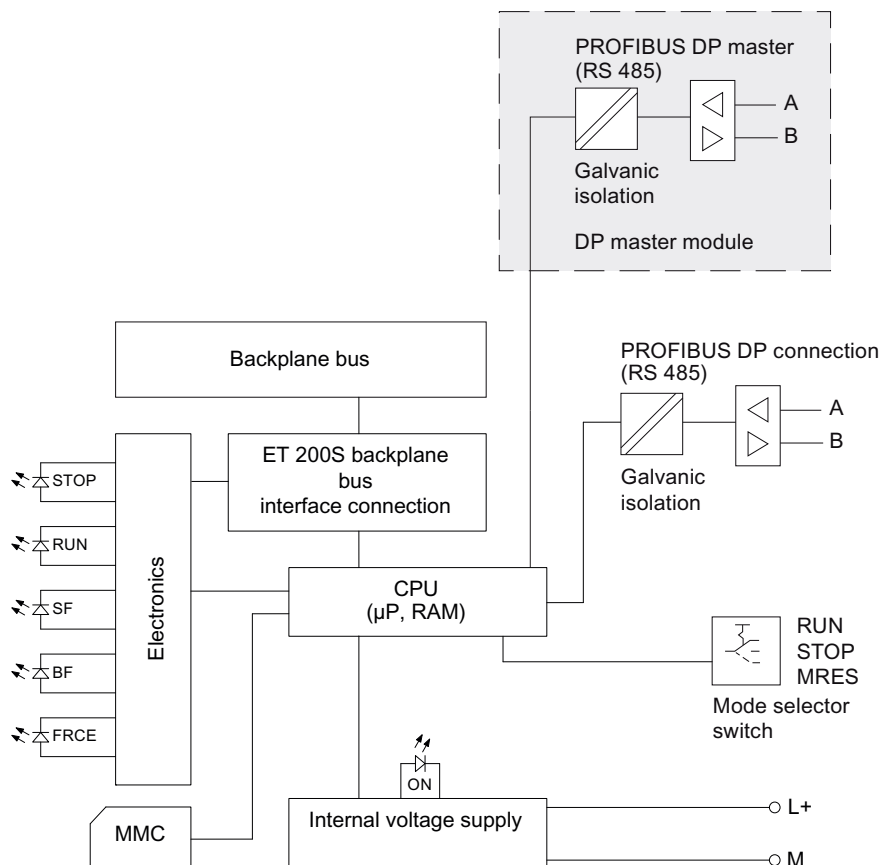


Figure 11-1 Block diagram of the IM151-7 CPU interface module with DP master module

| Technical specifications                                                 |                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Transfer memory                                                          |                                                                                                                                                                                                                       |
| • Inputs                                                                 | 244 bytes                                                                                                                                                                                                             |
| • Outputs                                                                | 244 bytes                                                                                                                                                                                                             |
| Address range, max.                                                      | 32                                                                                                                                                                                                                    |
| • User data per address range, max.                                      | 32 bytes                                                                                                                                                                                                              |
| GSD file                                                                 | The current GSD file is available for download from the Internet ( <a href="http://support.automation.siemens.com/WW/view/en/10805317/133100">http://support.automation.siemens.com/WW/view/en/10805317/133100</a> ). |
| 2nd interface                                                            |                                                                                                                                                                                                                       |
| Port designation                                                         | X2; on the DP master module                                                                                                                                                                                           |
| Type of interface                                                        | RS 485, integrated interface on the DP master module                                                                                                                                                                  |
| Physics                                                                  | RS 485                                                                                                                                                                                                                |
| Isolated                                                                 | Yes                                                                                                                                                                                                                   |
| Max. interface power supply (15V DC to 30 V)                             | No                                                                                                                                                                                                                    |
| Connection                                                               | 9-pin sub-D socket                                                                                                                                                                                                    |
| Functionality                                                            |                                                                                                                                                                                                                       |
| MPI                                                                      | No                                                                                                                                                                                                                    |
| DP master                                                                | Yes                                                                                                                                                                                                                   |
| DP slave                                                                 | No                                                                                                                                                                                                                    |
| DP master                                                                |                                                                                                                                                                                                                       |
| Services                                                                 |                                                                                                                                                                                                                       |
| PG/OP communication                                                      | Yes                                                                                                                                                                                                                   |
| Routing                                                                  | Yes                                                                                                                                                                                                                   |
| Data set routing                                                         | Yes (to field devices on the PROFIBUS DP)                                                                                                                                                                             |
| Global data communication                                                | No                                                                                                                                                                                                                    |
| S7 basic communication                                                   | Yes (intelligent blocks only)                                                                                                                                                                                         |
| S7 communication                                                         | Yes (only server; connection configured at one end)                                                                                                                                                                   |
| Transmission rate, max.                                                  | Up to 12 Mbps                                                                                                                                                                                                         |
| Support for constant bus cycle time                                      | Yes                                                                                                                                                                                                                   |
| Isochronous mode                                                         | No                                                                                                                                                                                                                    |
| Enable/disable DP slaves                                                 | Yes                                                                                                                                                                                                                   |
| • Max. number of DP slaves that can be enabled / disabled simultaneously | 8                                                                                                                                                                                                                     |
| SYNC/FREEZE                                                              | Yes                                                                                                                                                                                                                   |
| Direct data exchange                                                     | Yes                                                                                                                                                                                                                   |
| DPV1                                                                     | Yes                                                                                                                                                                                                                   |
| Number of DP slaves, max.                                                | 32                                                                                                                                                                                                                    |

| Technical specifications                               |                                 |
|--------------------------------------------------------|---------------------------------|
| Address area                                           |                                 |
| • Inputs, max.                                         | 2048 bytes                      |
| • Outputs, max.                                        | 2048 bytes                      |
| User data per DP slave                                 |                                 |
| • Inputs, max.                                         | 244 bytes                       |
| • Outputs, max.                                        | 244 bytes                       |
| Programming                                            |                                 |
| • LAD                                                  | Yes                             |
| • FBD                                                  | Yes                             |
| • STL                                                  | Yes                             |
| • SCL                                                  | Yes                             |
| • CFC                                                  | Yes                             |
| • GRAPH                                                | Yes                             |
| • HiGraph                                              | Yes                             |
| Instruction set                                        | See <i>Instruction List</i>     |
| Nesting levels                                         | 8                               |
| System functions (SFC)                                 | See <i>Instruction List</i>     |
| System function blocks (SFB)                           | See <i>Instruction List</i>     |
| User program protection / password protection          | Yes                             |
| Encryption of blocks                                   | Yes; with S7 Block Privacy      |
| Voltages, currents, electrical potentials              |                                 |
| Rated supply voltage for the electronic components 1L+ | 24 VDC                          |
| • Permissible range                                    | 19.2 V to 28.8 V                |
| • Reverse polarity protection                          | Yes; against destruction        |
| • Short-circuit protection                             | Yes                             |
| • Power failure buffering                              | 5 ms                            |
| Current consumption from rated supply voltage 1L+      |                                 |
| • IM151-7 CPU                                          | Typically 320 mA                |
| • IM151-7 CPU + DP master module                       | Typically 410 mA                |
| • Power supply for the ET 200S backplane bus           | Max. 700 mA                     |
| Inrush current                                         | Typically 1.8 A                 |
| I <sup>2</sup> t                                       | Typically 0.09 A <sup>2</sup> s |

## 11.3 DP master module

### 11.3.1 Technical specifications - DP master module

Table 11- 2 Technical specifications of the DP master module

| Technical specifications               |                             |
|----------------------------------------|-----------------------------|
| <b>Removal</b>                         |                             |
| DP master module                       |                             |
| • Position                             | To the right of IM151-7 CPU |
| • Number per IM151-7 CPU               | 1                           |
| <b>Dimensions</b>                      |                             |
| Mounting dimensions W x H x D (mm)     | 35 x 119.5 x 75             |
| Weight                                 | ca. 100 g                   |
| <b>Status, interrupts, diagnostics</b> |                             |
| PROFIBUS DP bus monitoring             | Red "BF" LED                |

## Appendix

### A.1 Order numbers

#### A.1.1 Module order numbers

##### IM151-7 CPU interface module

Table A- 1 IM151-7 CPU order numbers

| Designation                                                    | Order number       |
|----------------------------------------------------------------|--------------------|
| IM151-7 CPU interface module with terminating module, 1 unit * | 6ES7151-7AA21-0AB0 |
| * The SIMATIC Micro Memory Card is not supplied as standard.   |                    |

##### DP master module

Table A- 2 DP master module order numbers

| Designation              | Order number       |
|--------------------------|--------------------|
| DP master module, 1 unit | 6ES7138-4HA00-0AB0 |