SIEMENS

SIMATIC Sensors

RFID systems
FC 45

Function manual

Release 03/2006
J31069-D0167-U001-A2-7618

Safety Guidelines

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 corresponding 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 device/system may only be set up and used in conjunction with this documentation. Commissioning and operation of a device/system may only be performed by **qualified personnel**. Within the context of the safety notes in this documentation qualified persons are defined as persons who are authorized to commission, ground and label devices, systems and circuits in accordance with established safety practices and standards.

Prescribed Usage

Note the following:

Warning

This device may only be used for the applications described in the catalog or the technical description and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens. Correct, reliable operation of the product requires proper transport, storage, positioning and assembly as well as careful operation and maintenance.

Trademarks

All names identified by ® are registered trademarks of the Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

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.

Siemens AG
Automation and Drives
Postfach 48 48
90437 NÜRNBERG
GERMANY

Order No.: J31069-D0167-U001-A2-7618
Edition 06/2006

Table of contents

Tables

Introduction 1

1.1 Preface

Purpose of this document

This Function Manual contains all the information needed to configure and commission the system.

It is intended both for programming and testing/debugging personnel who commission the system themselves and connect it with other units (automation systems, further programming devices), as well as for service and maintenance personnel who install expansions or carry out fault/error analyses.

Scope of this documentation

This documentation is valid for FC 45. The documentation describes the condition on delivery as of March 2006.

Conventions

The following terms/abbreviations are used synonymously in this document:

- Reader, read/write device, write/read device
- Tag, transponder, mobile data memory, MDS
- Communication module, interface module, ASM

History

Previous editions of these operating instructions:

Edition
03/2006
05/2005
03/2004
08/2002
12/2001

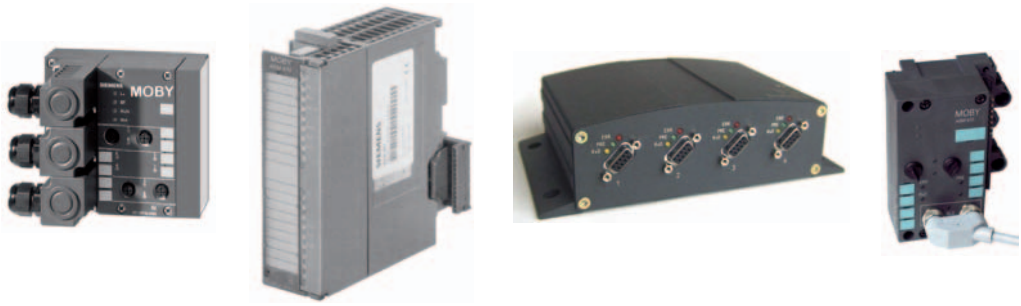
1.2 Navigating in the Function Manual

Structure of contents	Contents
Table of Contents	Organization of the documentation, including the index of pages and chapters
Introduction	Purpose, layout and description of the important topics.
Parameterizing	Description of the parameter settings
Commissioning	Description of the commissioning procedure
Error messages and troubleshooting	Overview of error messages and troubleshooting guide
Examples/applications	Describes the application of FC 45 based on example applications.
Appendix: Brief description of ASM hardware	Description of the interface modules used for FC 45
Appendix: Programming the MOBY-ASM on PROFIBUS DP-V1	Information for control using a PC or third-party control system
Appendix: Service & Support	Service and support, contact partners, training centers

Description

2

The FC 45 is a STEP7 function for MOBY identification technology. It can be used with both the SIMATIC S7-300 and S7-400 for various MOBY interface modules.



ASM 452 | ASM 475 | ASM 454, ASM 754, ASM 854, ASM 850 | ASM 473

Figure 2-1 Interface modules for FC 45

Section "Brief description of ASM hardware" illustrates configurations with the various interface modules. The FC 45 can be operated in various different configurations:

- The interface module is operated directly in a SIMATIC S7-300.
- The interface module is located in the rack of an ET 200M or ET 200X. The ET200M/ET200X is used on an S7-300 or S7-400.
- Since the interface module is a self-contained PROFIBUS slave, it is linked with the integrated PROFIBUS connection to a SIMATIC S7-300 or S7-400.

These configurations can be mixed. Different interface modules can also be connected.

Features of the interface

For the features of the individual interface modules, see Section "Brief description of ASM hardware".
Since the features of the individual ASMs are continuously being added to, you should always use the latest edition of this description.

Performance features of FC 45

- All MOBY systems (write/read devices and MDSs) can be used with the FC 45.
- The user can process a complete MDS with one command (up to 32KB).
- The user can chain several commands together. This means that many small data areas of an MDS can be processed with one command start.
- The data structures are set up conveniently via user-defined data types (UDTs). The UDTs are available with English (UDT 10, 20), German (UDT 11, 21) and Spanish (UDT 24) commentary. In this description, the UDTs are always referred to by their English designation (UDT 10, 20).
- Transmission of the data to and from the ASM and execution of the commands on the ASM take place in parallel. This means optimal data throughput.
- The use of symbolic names enhances the clarity in the user program, even where complex configurations are involved.

PROFIBUS configuration

A GSD file on the "Software MOBY" product (6GT2 080-2AA10) is included for the interface modules which can be connected directly to PROFIBUS.

Technically, the FC 45 uses the PROFIBUS DP-V1 protocol. Important control data are cyclically sent in a data word. Actual MOBY data are transmitted in non-cyclic telegrams.

Non-SIMATIC applications

Applications programmed on third-party PLCs cannot use FC 45. The PROFIBUS interface for such applications is described in Section "Programming the MOBY-ASM on PROFIBUS DP-V1". Programmers of a remote controller can use this interface to develop their own MOBY function. The same or similar data structures as in FC 45 can be reproduced on a third-party PLC in conjunction with the FC 45 description and the UDTs.

Requirements for using FC 45

The FC 45 can access the communication module (ASM) via any PROFIBUS master that has the system functions SFC 58/59. It is immaterial whether the PROFIBUS master is integrated into the S7-CPU or plugged into the rack as an add-on module (e.g. IM 467).

Remember that the FC 45 uses non-cyclic message frames (SFC 58/59). Older CPUs of the SIMATIC family or a small model series may not have these services. Be sure to check this during configuration.

- STEP7 Version
  The ASM 475 and ASM 473 modules require a STEP7 Version ≥ V5.1.

2.1 Block specification

Block number:	FC 45
Block name:	FC 45
Symbolic name:	"MOBY FC"
Family:	–
Work memory requirement:	7260 bytes
Local data:	132 bytes
Version:	2.6
Called blocks:	SFC 58, SFC 59, SFC 20, SFC 21, SFC 1
Data block resources:	MOBY Param = 300 bytes per channel (defined via UDT 10)
Bit memories used:	none
Counters used:	none
Registers used:	AR1, AR2
Call:	cyclic

Table 2-1 Typical runtimes of FC 45 (cycle load of AS in ms)

S7-CPU	Idle pass	ASM Centrally in S7-300		Distributed ASM on PROFIBUS	
		Read MDS	Write MDS	Read MDS	Write MDS
315-2 DP	1.9	3.7 + n * 0.023	3.6 + n * 0.022	3.4	3.6
318-2 DP	0.13	1 + n * 0.01	1.3 + n * 0.007	0.4	0.45
416-2 DP	0.1	–	–	0.35	0.38
315-2 PN/DP					
317-2 PN/DP					
318-2 PN/DP					

n = Amount in bytes of processed **user data** per read or write command

When a command processes more than 233 bytes of MDS data, n = 233 must always be used in the table.

Remarks:
The times of the ASM for data communication with the data memories are described in the MOBY manual for configuration, mounting and service.

Calculating MOBY data throughput

The formulas in the MOBY manual for configuration, mounting and service (Chapter 3) can be used to calculate data throughput with the FC 45.
Configuration manuals are currently available for MOBY I (6GT2 097-4BA00-0EA2), MOBY E (6GT2 397-4BA00-0EA2), MOBY F (6GT2 497-4BA00-0EA2), MOBY U (6GT2 597-4BA00-0EA2) and MOBY D (6GT2 697-4BA00-0EA2).

Applicable in general:

$$t_k = k + t_{bytes} \cdot n$$

t_k	Communication time between ASM, write/read device and MDS
n	Amount of user data
k	Constants (see table in configuration manual)
t_{bytes}	Transmission time for 1 byte (see table in configuration manual)

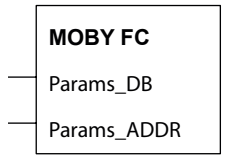
Transmission of the data to the MDS and transmission of the data between ASM and FC 45 take place in parallel. Usually no further time must be added for data transmission between ASM and FC 45 so that the time t_k calculated above represents the total duration of the command.

However, commands may require more time under the following conditions.

- A very large number of MOBY channels are processed in parallel.
- Very few (or only one) system resources are available for non-cyclic telegrams.
- Slow transmission speeds are used on PROFIBUS.
- Other applications are running on the S7 which require the non-cyclic telegram services (SFC 58/59) of the SIMATIC very frequently.

2.2 Configuration scheme

Table 2-2 MOBY FC configuration scheme

Ladder logic programming box	Parameters	Data type	Permissible range	Description
	Params_DB Params_ADDR	INT INT	2 to 32767 0, 300, 600,*...	Parameter data block number for a MOBY channel (write/read device) Address pointer in the parameter data block to the start of a UDT 10
*) These values are exemplary whenever only data structures of the UDT 10 type are arranged in succession. These values change if UDT 10 is followed by the MOBY command (UDT 20).				

Params_DB and Params_ADDR form a pointer to a data structure. This data structure is defined by calling UDT 10 (English) or UDT 11 (German). A separate data structure must be defined for each MOBY channel (ASM or write/read device).

See also

Data structures of FC 45 (Page 2-6)

2.3 Data structures of FC 45

The following figure shows an example of a definition of several MOBY channels with the related MDS commands and the user data.

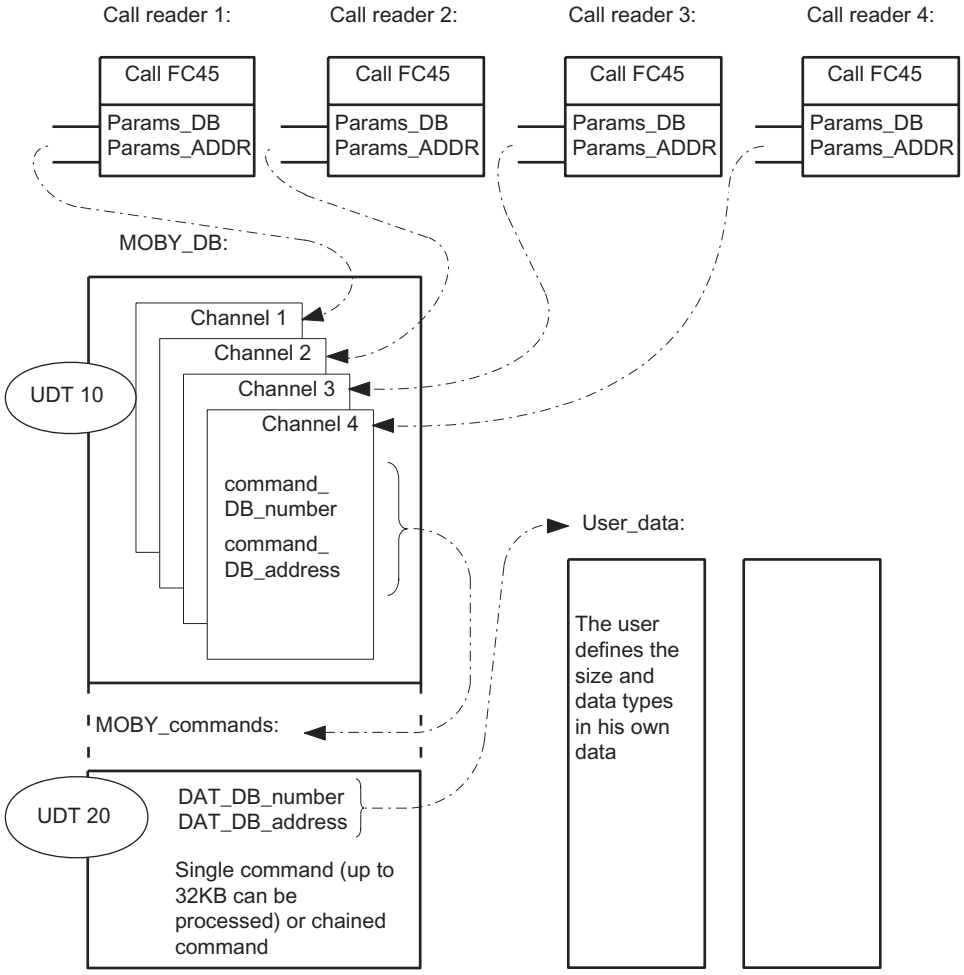


Figure 2-2 Configuration scheme of FC 45

Each FC 45 call points to a separate parameter data block (Params_DB, Params_ADDR), which is defined by a UDT 10. The variables "command_DB_number" and "command_DB_address" are stored in the UDT 10. These variables point to the MOBY command which is to be executed with the MDS.

UDT 20 is used to define the MOBY command. Different commands can be defined by calling UDT 20 several times (see Section "Command chaining"). The variables "DAT_DB_number" and "DAT_DB_address" are defined in the UDT 20. This variable definition generates the pointer to the user data. MDS data are stored there when they are read out. When using a write command, the user must store his data before executing the command.

2.4 Number of MOBY channels which can be connected

Each MOBY channel occupies 1 word in the input and output area of a SIMATIC S7. The maximum number of MOBY modules supported by SIMATIC can always be operated. The following table provides an overview.

Table 2-3 Number of MOBY channels

S7 CPU type[5]	315-2 DP		316-2 DP; 318-2 DP		416; 417; CP 443-5 Ext	
	Max. no. of ASMs	Max. no. of write/read devices (channels)	Max. no. of ASMs	Max. no. of write/read devices (channels)	Max. no. of ASMs	Max. no. of write/read devices (channels)
ASM 475 (centralized)[2]	32	64	32	64	–	–
ASM 475 (distributed via ET 200M) [3]	64 x 8	1024	123 x 8	1968	123 x 8	1968
ASM 473 (distributed via ET 200X) [4]	64 x 7	448	123 x 7	861	123 x 7	861
ASM 452	64	64/128 [1]	123	123/246 [1]	123	123/246 [1]
ASM 454, 854	64	256	123	492	123	492
ASM 754	64	64/256 [1]	123	123/492 [1]	123	123/492 [1]

1) No. of channels in multiplex mode (only static operation possible)
2) The centralized configuration can contain up to three expansion racks. A DP connection is not necessary in this variant.
3) In the distributed configuration, up to eight MOBY modules (ASM 475) can be installed in each ET 200M.
4) Up to seven ASM 473 modules can be installed in a distributed ET 200X I/O.
5) The CPU types specified here may be incomplete, as the range of CPUs and associated functions is expanded continuously.

2.5 Addressing of MOBY channels

Centralized configuration with ASM 475

In the centralized configuration, HW Config assigns fixed slot-specific addresses for the ASM 475. The ASM 475 is located in the analog area of a SIMATIC S7-300 and starts at address 256.

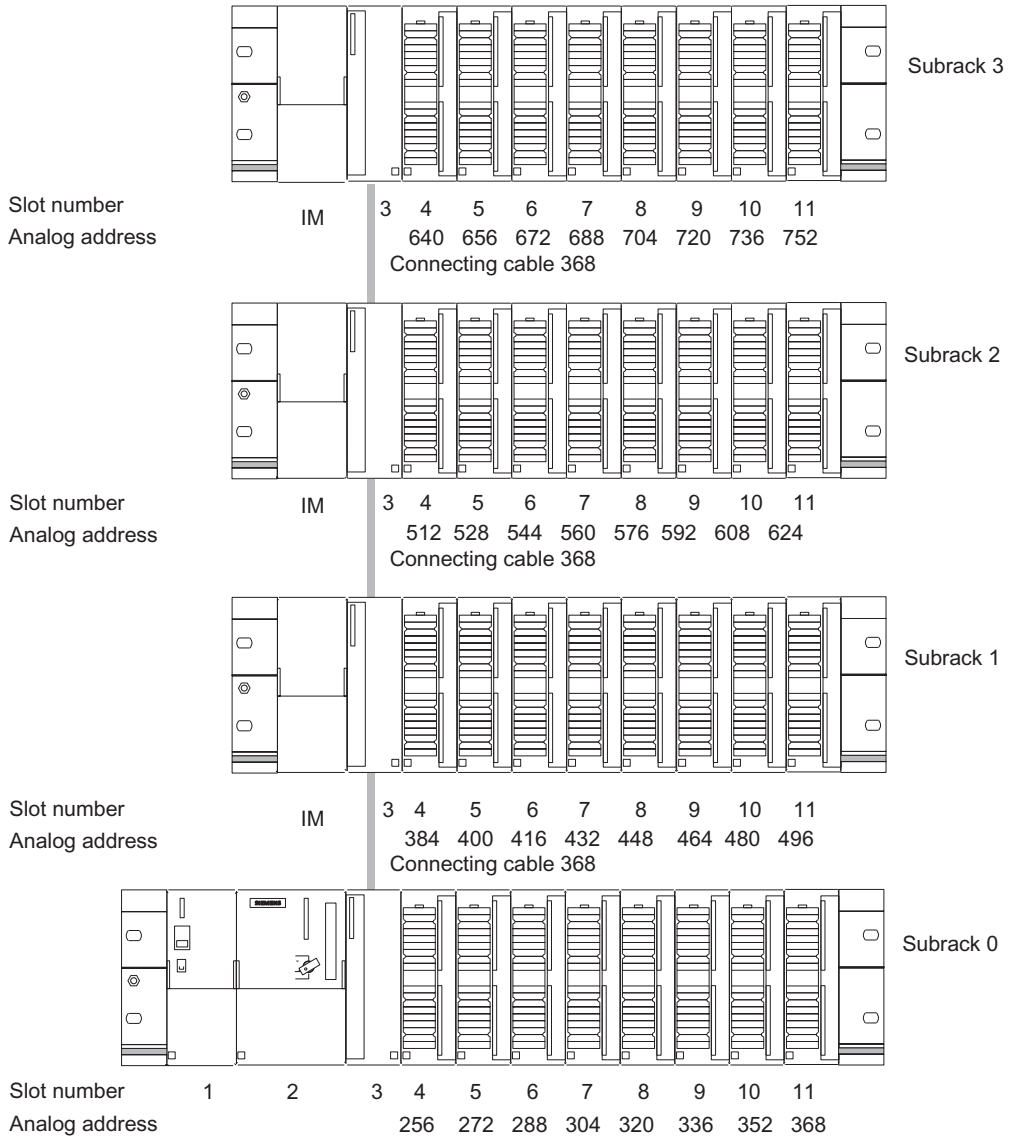


Figure 2-3 Slots for S7-300 and analog addresses for ASM 475

Addressing via PROFIBUS

When addressing via PROFIBUS, any addresses for the MOBY communication module can be selected in HW Config. HW Config assigns a free address by default.

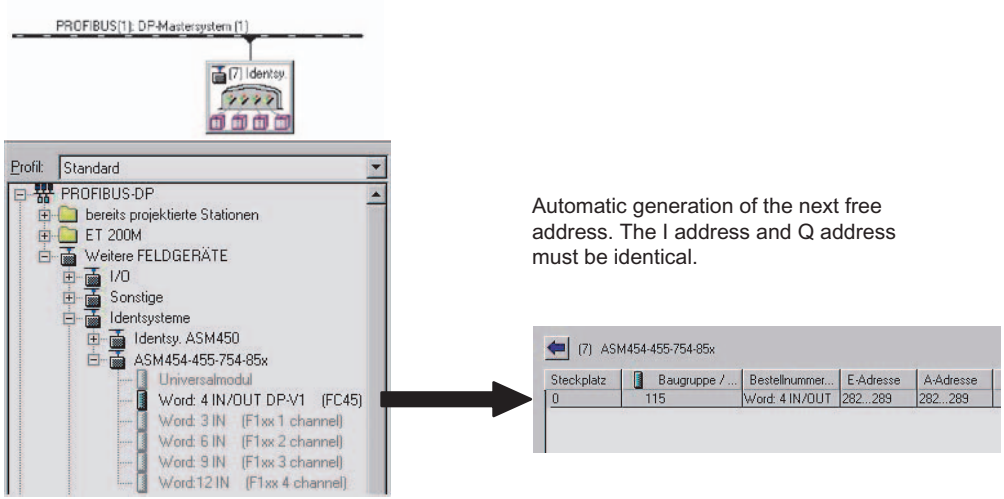


Figure 2-4 Example: Automatic address generation for a MOBY PROFIBUS slave

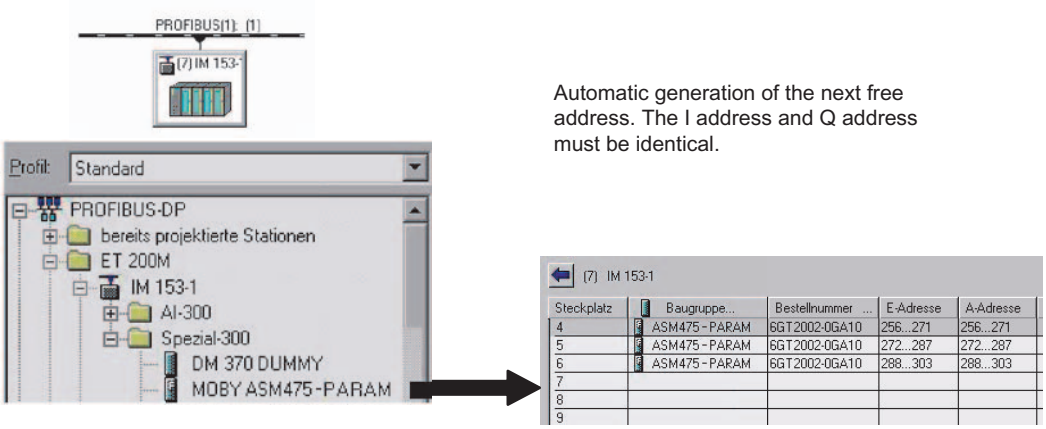


Figure 2-5 Example: Automatic address generation of a MOBY-ASM in ET 200 configuration

Assignment of addresses in FC 45

The unique I/O addresses of the interface module of HW Config must be saved in the parameter data block (UDT 10).

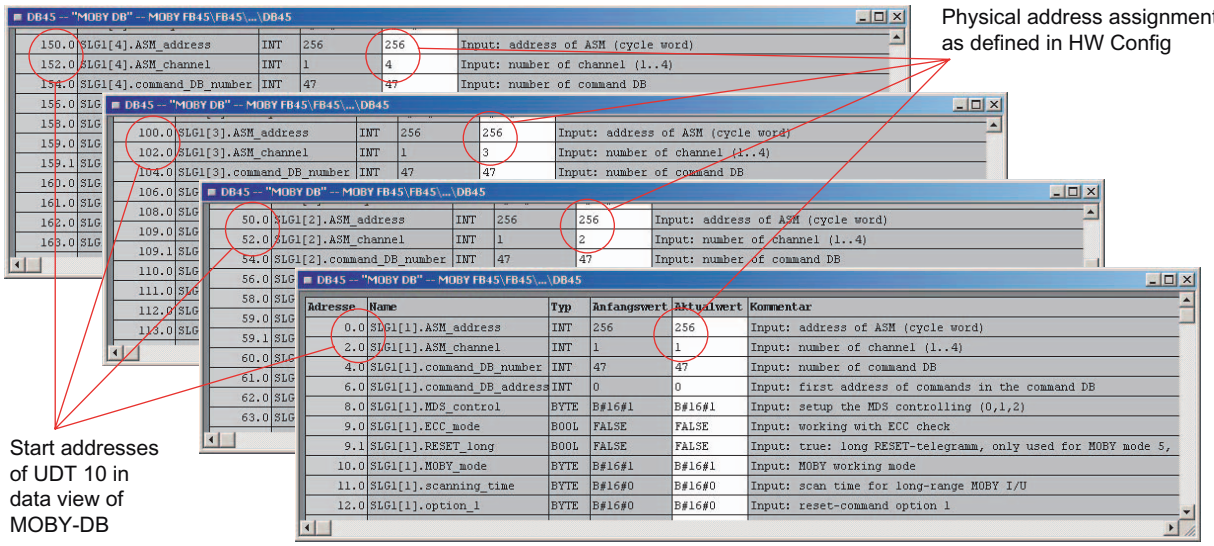


Figure 2-6 Setting the physical address assignment in UDT 10

The MOBY channel (ASM_channel) must be assigned uniquely in addition to the address (ASM_address). When an ASM is used with several channels (ASM 475, 452, 454, 754, 854), a separate UDT 10 must be defined for each channel. The "ASM_address" entry is the same. The "ASM_channel" is changed from 1 to 4.

Parameterizing

3

3.1 Parameter data block

Each MOBY channel (write/read device) requires its own parameters. These are predefined in a data structure as UDT 10 (with commentary in English), UDT 11 (with commentary in German) or UDT 14 (with commentary in Spanish). That UDT must be called in a data block for each MOBY channel. Various variables are defined in UDT 10:

- **INPUT parameters:** These variables *must* be entered by the user once during configuration (exception: command_DB_number/command_DB_address). Throughout the run time it is not necessary to change or scan these parameters.

  Please note that you need to execute an init_run after changing an INPUT parameter before the new setting is activated (see Section "Programming a cold and warm restart").
- **Control bits:** The user starts his commands with these Boolean variables.
- **Displays:** The displays indicate the command progress to the user. Error analyses can be performed easily.
- **FC-internal variables:** These variables are not relevant for the user. They must not be changed by the application. Malfunctions and data corruption would otherwise ensue.

Notice

You will need FC 45 with a version ≥ 2.2 for the variables and UDTs described in this chapter.

The following table shows the complete UDT 10. For programmers who prefer to address using absolute values, the first column specifies the relative addresses.

Table 3-1 UDT 10 "MOBY Param"

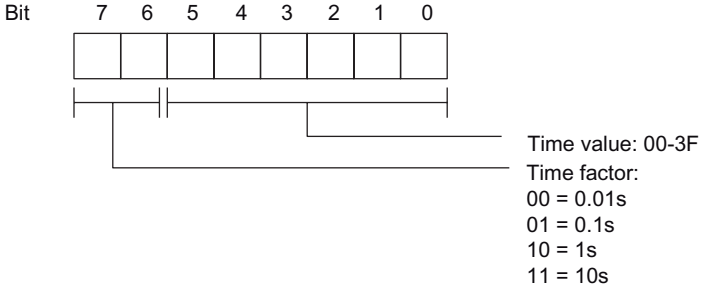
Address	Name	Type	Initial value	Comment
0.0		STRUCT		
+0.0	ASM_address	INT	0	Input: Basic address of the ASM (cyclic word)
+2.0	ASM_channel	INT	1	Input: Number of the channel (1 to 4)
+4.0	command_DB_number	INT	47	Input: Command data block number
+6.0	command_DB_address	INT *	0	Input: Start address of data in the BEDB
+8.0	MDS_control	BYTE	B#16#1	Input: presence check and MDS(0, 1, 2)
+9.0	ECC mode	BOOL	FALSE	Input: mode with ECC
+9.1	RESET_long	BOOL	FALSE	Input: true: long RESET telegram, only for MOBY mode 5
+10.0	MOBY mode	BYTE	B#16#1	Input: MOBY mode
+11.0	scanning time	BYTE	B#16#0	Input: Scanning time for MOBY I/U
+12.0	option 1	BYTE	B#16#0	Input: RESET command option 1
+13.0	distance limiting	BYTE	B#16#F	Input: Distance/capacity setting
+14.0	multitag	BYTE	B#16#1	Input: max. number of MDS in field
+15.0	field ON control	BYTE	B#16#0	Input: BERO
+16.0	field_ON_time	BYTE	B#16#0	Input: MOBY U: BERO time MOBY D: MDS type
+17.0	reserved0	BYTE	B#16#0	
+18.0	ANZ MDS present	BOOL	FALSE	MDS is present
+18.1	ANZ cancel	BOOL	FALSE	Cancel-bit in the PEW is set.
+18.2	ANZ ECC	BOOL	FALSE	Error correctionen done
+18.3	reserved	BOOL	FALSE	
+18.4	LR bat	BOOL	FALSE	Battery of the MDS507
+18.5	battery_low	BOOL	FALSE	Battery check has indicated low voltage
+18.6	error	BOOL	FALSE	Error during command execution
+18.7	ready	BOOL	FALSE	Command chain has been finished.
+19.0	cancel	BOOL	FALSE	Set: abort command or command chain
+19.1	command_start	BOOL	FALSE	Set: start signal for command or command chain
+19.2	repeat command	BOOL	FALSE	Set: repeat last command
+19.3	init_run	BOOL	TRUE	Set: reset ASM and set new parameters
+19.4	ASM failure	BOOL	FALSE	OB122 Set: ASM failed
+19.5	FC45 active	BOOL	FALSE	FC-active
+19.6	ANZ next	BOOL	FALSE	NEXT command was last command
+19.7	ANZ reset	BOOL	FALSE	RESET command was last command
+20.0	ASM busy	BOOL	FALSE	A command is processed by ASM
+20.1	command_rep_active	BOOL	FALSE	ASM command repetition has been activated.
+21.0	number MDS	BYTE	B#16#0	Number of MDS actual in field
+22.0	error_MOBY	BYTE	B#16#0	Error indication of interface module
+23.0	error FC	BYTE	B#16#0	Error indication of FC
+24.0	error BUS	WORD	W#16#0	Error indication of PROFIBUS
+26.0	version_MOBY	WORD	W#16#0	Firmware version of MOBY
+28.0 to +299.0				FC-internal variables; these must not be changed by the user
=300.0		END_STRUCT		

*) Parameter data block UDT 60 is available for data media > 32 KB. The data type here is WORD.

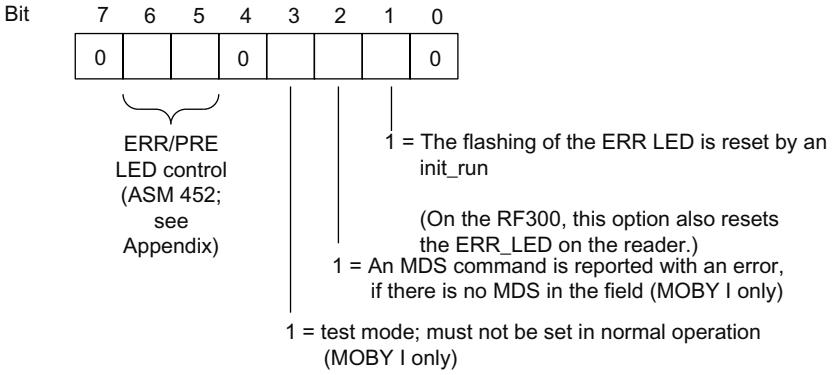
3.1.1 INPUT parameters

Table 3-2 INPUT parameters

<table>
<tr><th>Variable</th><th colspan="4">Description</th></tr>
<tr><td>ASM_address</td><td colspan="4">Logical base address of the ASM. This address must match the "start address" of the ASM in HW Config of the SIMATIC Manager. Remember that this address has nothing to do with the PROFIBUS address which is set on the ASM or the ET 200M.</td></tr>
<tr><td rowspan="3">ASM_channel</td><td colspan="4">Number of the MOBY channel which is to be used</td></tr>
<tr><td colspan="2">ASM type</td><td colspan="2">Value range</td></tr>
<tr><td colspan="2">ASM 475, 452
ASM 454, 754, 854
ASM 473, 850</td><td colspan="2">1, 2
1, 2, 3, 4
1</td></tr>
<tr><td>command_DB_ number</td><td colspan="2">Number of the data block in which the MDS command is specified</td><td colspan="2" rowspan="2">These INPUT parameters can be changed whenever ready = 1. An init_run does not need to be executed after changing these parameters.</td></tr>
<tr><td>command_DB_ address</td><td colspan="2">Address within the "command_DB". The next MDS command starts at this address. "command_DB_number" and "command_DB_address" form a data pointer to the next command (see Section "Configuration scheme").</td></tr>
<tr><td rowspan="5">MDS_control</td><td colspan="4">MDS_control turns on/off the presence check or the MDS control on the ASM (see Section "Presence check and MDS control").</td></tr>
<tr><td>Value</td><td colspan="2">MDS control</td><td>ASM type</td></tr>
<tr><td>0</td><td colspan="2">Presence check is off. The variable ANZ_MSD_present doesn't indicate a valid value.</td><td>all</td></tr>
<tr><td>1</td><td colspan="2">Presence check is on. MDS control is off. The variable ANZ_MDS_present indicates an MDS is the transmission window of a write/read device.</td><td>all</td></tr>
<tr><td>2</td><td colspan="2">Presence check is on. MDS control is on, and control takes place with the presence check of the MDS. The NEXT command must be sent to the ASM each time an MDS is processed.</td><td>454</td></tr>
<tr><td>ECC_mode</td><td colspan="4">Turns ECC mode on (true) or off (false). Remember that ECC mode can only be used with MOBY I.</td></tr>
<tr><td>RESET_long</td><td colspan="4">The init_run command transfers all INPUT parameters to the ASM. This bit must be set to TRUE when MOBY U/D or RF300 are used (MOBY_mode = 5).</td></tr>
<tr><td rowspan="2">MOBY_mode</td><td colspan="4">Setting of the MOBY operating mode</td></tr>
<tr><td>Value</td><td colspan="2">Operating mode</td><td>ASM type</td></tr>
</table>

<table>
<tr><th>Variable</th><th colspan="3">Description</th></tr>
<tr><td></td><td>0</td><td>Default</td><td>-; Reserved for setting the operating mode with switch or GSD parameterization. Various interfaces without switches interpret MOBY mode = 0 as MOBY I mode.</td></tr>
<tr><td></td><td>1</td><td>MOBY I or MOBY E
(without MDS 507)</td><td>all</td></tr>
<tr><td></td><td>4</td><td>MOBY I with MDS 507</td><td>452; 454</td></tr>
<tr><td></td><td>5</td><td>MOBY U/D or RF300 - without multitag handling</td><td>475; 473; 452</td></tr>
<tr><td></td><td>6</td><td>Res. for MOBY U - with multitag handling (FB 55)</td><td>–</td></tr>
<tr><td></td><td>7</td><td>Res. for MOBY D or RF300 - with multitag handling (FB 55)</td><td>–</td></tr>
<tr><td></td><td>8</td><td>MOBY I dialog</td><td>454; 452</td></tr>
<tr><td></td><td>9</td><td>MOBY V</td><td>452</td></tr>
<tr><td></td><td>A</td><td>MOBY F with MDS F1xx</td><td>475; 473: 452; 854; 850</td></tr>
<tr><td></td><td>B</td><td>MOBY F with MDS F4xx</td><td>475; 473: 452; 854; 850</td></tr>
<tr><td></td><td>C</td><td>MOBY F (res. for MDS F2xx)</td><td>–</td></tr>
<tr><td></td><td colspan="3">The following should be carefully noted:
MOBY_mode may only be changed after an ASM is turned on.</td></tr>
<tr><td>scanning_time</td><td colspan="3">MOBY I/V:
Scanning_time is the scanning time for the MDS 507 of MOBY I and MOBY V. A value of 00 can be used here for all other types of MDS. The scan time setting (ABTA) is shown below (see also configuration manual of write/read device 44/MDS 507).
 

Example: A scanning time of 1 second results in ABTA = 81 hex for the parameter.</td></tr>
</table>

Variable	Description
scanning_time	**MOBY U:** Scanning_time describes the standby time for the MDS. If the MDS receives an additional command before scanning_time has expired, this command can be executed immediately. If the MDS receives a command after scanning_time has expired, command execution is delayed by sleep_time of the MDS. Scanning_time should only be set when both of the following conditions exist. • The MDS uses several commands *and* • command execution must be concluded within a minimum time. 00 hex = no standby time (default) 01 hex = 7ms standby time 02 hex = 14ms standby time : C8 hex = 1400ms standby time Remember: Scanning_time affects the life of the battery. The longer scanning_time is, the shorter the life of the battery. For precise calculations, see the MOBY U manual for configuration, mounting and service.
	MOBY D or RF300: 00 hex (reserved)
option_1	This byte is bit-coded. Its standard value is B#16#0. It can be used for special control on the ASM. 

<table>
<tr><th>Variable</th><th colspan="4">Description</th></tr>
<tr><td rowspan="5">distance_limiting</td><td colspan="4">MOBY U: Range limitation</td></tr>
<tr><td>Normal transmission power</td><td colspan="3">Reduced transmission power</td></tr>
<tr><td>05 hex = 0.5 m
0A hex = 1.0 m
0F hex = 1.5 m
14 hex = 2.0 m
19 hex = 2.5 m
1E hex = 3.0 m
23 hex = 3.5 m</td><td>85 hex
8A hex
8F hex
91 hex
99 hex
9E hex
A3 hex</td><td colspan="2">Reduced sending capacity must be set when several write/read devices are positioned close together or when data memories which are located in the vicinity of a write/read device are detected later or not at all.
Disadvantage: The field lobe becomes smaller and there is less time for communication or positioning must be more precise.</td></tr>
<tr><td colspan="4">MOBY D: HF power from 0.5 W to 10 W in increments of 0.25 W
02 hex = 0.5 W
:
10 hex = 4 W (default)
:
28 hex = 10 W</td></tr>
<tr><td colspan="4">RF300: 00 hex (reserved)</td></tr>
<tr><td>multitag</td><td colspan="4">MOBY U/D or RF300: Maximum number of MDSs being processed in parallel in the field.
Permissible values: 1</td></tr>
<tr><td rowspan="4">field_ON_control</td><td colspan="4">MOBY U: BERO mode; automatic activation/deactivation of antenna field. The "Antenna ON/OFF" command is superimposed by the BERO mode.</td></tr>
<tr><td>00 hex
01 hex

02 hex

03 hex</td><td>=
=

=

=</td><td colspan="2">No BEROs; no write/read device synchronization
One or two BEROs
The BEROs are logically ORed. The field is ON during actuation of a BERO.
One or two BEROs.
The 1st BERO switches the field on and the 2nd BERO switches the field off.
If two BEROs exist and a field_ON_time is configured, the field is automatically deactivated if the 2nd BERO does not switch within that BERO time.
If no field_ON_time is configured, the field remains on until the 2nd BERO is actuated.
Activate write/read device synchronization via cable connection (see manual for configuration, mounting and service for MOBY U)</td></tr>
<tr><td colspan="4">MOBY D or RF300: 00 hex (reserved)</td></tr>
<tr><td rowspan="5">field_ON_time</td><td colspan="4">MOBY U: Time for BERO mode (field_ON_control = 02)</td></tr>
<tr><td>00 hex

01 hex ... FF hex</td><td>=

=</td><td colspan="2">Timeout monitoring is deactivated. The 2nd BERO is needed in order to switch the field off.
1 ... 255s turn on time for the write/read device field.</td></tr>
<tr><td colspan="4">MOBY D: MDS type</td></tr>
<tr><td>00 hex
01 hex</td><td>=
=</td><td colspan="2">I-Code 1 (e.g. MDS D139)
ISO transponder</td></tr>
<tr><td colspan="4">RF300: 00 hex (reserved)</td></tr>
<tr><td>reserved0</td><td colspan="4">Reserved</td></tr>
</table>

The permissible values of the INPUT parameters are listed in the hardware specifications.

3.1.2 Command and status word

The **control bits** of FC 45 are defined in the command and status word.

The command and status word and the variables are generated using UDT 10. The variables and the associated relative addresses in UDT 10 are shown in the following figure.

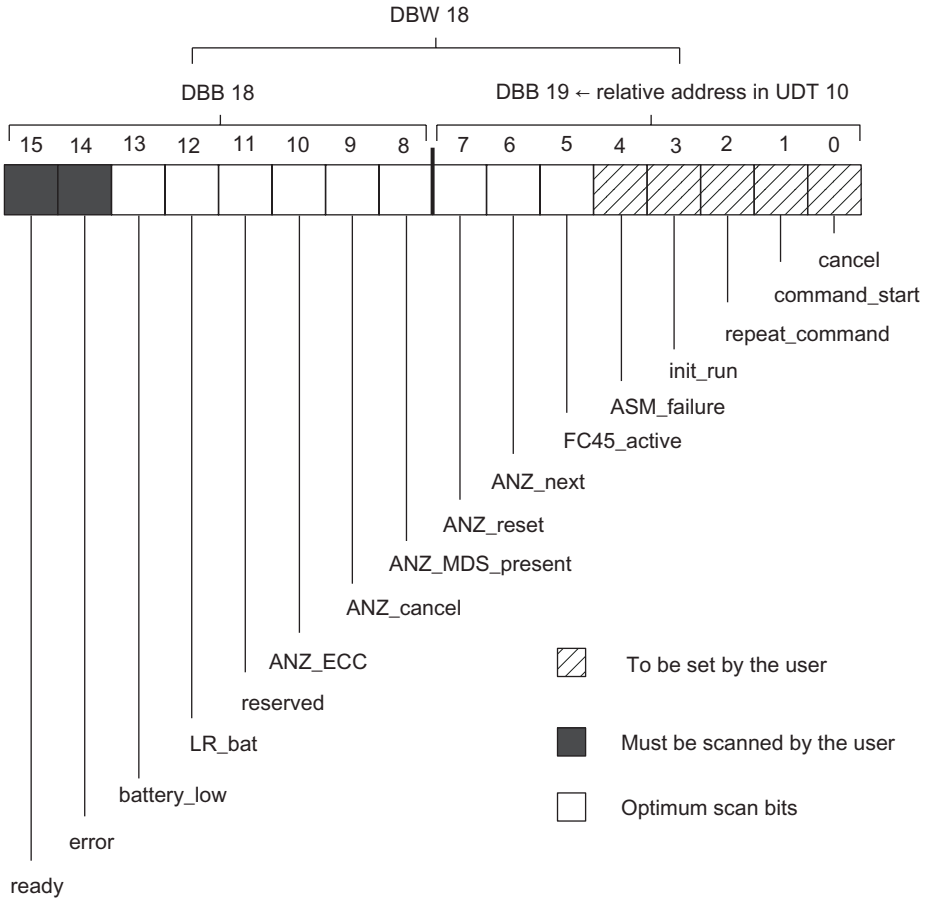


Figure 3-1 Assignment of the command and status word (DBW 18) with variable names

Table 3-3 Variables in command and status word

Variable	Description
cancel	*True* = Interrupts a running command or a command chain. FC 45 then sets the "ready" variable. **MOBY U/D:** The cancel variable is not available. A command termination must be executed via the init_run variable.
command_start	*True* = Starts a command or a command chain
repeat_command	*True* = Command repetition: The last command or command chain stored on the interface module is processed again with the next MDS. Command processing for the MDS is not started until the MDS, which has already been processed, has left the transmission window (ANZ_MDS_present = 0) and a new MDS has entered the transmission window of the write/read device (ANZ_MDS_present: 0 → 1). *False* = No command repetition or command repetition is stopped after the command started with the repeat command has been processed. Remember that this bit must be reset **by the user** to stop command repetition. The result of command repetition is fetched when command_start is set by the user. repeat_command is not automatically reset by the FC 45 after command processing. The init_run and cancel commands reset the repeat_command variable. This also interrupts a command repetition on the ASM. repeat_command can be set again by the application with the next command_start. Handling of command repetition is described in Section "Command repetition".
init_run	*True* = Restart interface module FC 45 is reset and the interface module is initialized. All data and commands on the ASM are lost. This bit must be set in the restart OB (OB 100) for each MOBY channel or interface module. After a MOBY-ASM failure, error_MOBY=0F is signaled to the user. The user must then execute an init_run. **Note:** • The init_run bit is initialized with TRUE when a parameter data block is downloaded from the programming device to SIMATIC. This causes an automatic new start for the ASM. • The execution time of init_run is normally in the millisecond range. In the event of an error, the time may be up to 40s.
ASM_failure	*True* = The ASM has failed. This bit is set by the user in OB 122 (see Section "Programming a module failure"). FC 45 signals an error to the user (error_FC = 09) and interrupts a command in progress. If OB 122 is not programmed by the user, the PLC switches to the STOP state on an interface module failure.
FC45_active	FC 45 is currently executing a command. This variable is set when the command is started (command_start=True) and remains active until • FC 45 has received the last acknowledgment from ASM. • the init_run bit has been set • The Cancel bit was set. • An error message was reported from the ASM.
ANZ_next	This bit is set when the last command executed was a NEXT command.
ANZ_reset	This bit indicates that the last command to be executed was a RESET. The RESET command was started by the user with "init_run."

Variable	Description
ANZ_MDS_present	Indicates the presence of an MDS in the write/read device's transmission window. ANZ_MDS_present is only indicated when the INPUT parameter MDS_control (see Section "INPUT parameters") was set by the user. Remember that when an init_run is being executed, the ANZ_MDS_present indication disappears briefly even when an MDS is permanently located in the transmission window.
ANZ_cancel	The last command executed was a command interruption (cancel). The bit is set when the ASM indicates a cancel acknowledgment with the cyclic word (see Section "Cyclic control word between master and MOBY-ASM"). The bit is reset automatically when a new command is started.
ANZ_ECC	**MOBY I only:** When the ECC driver is on (INPUT parameter "ECC mode" = TRUE), the bit indicates that the data read by the MDS have been corrected. ANZ_ECC is *not* an error message since the data are okay. ANZ_ECC is an indication that the MDS memory just processed may soon fail completely.
reserved	Not used at this time
LR_bat	This bit only applies when MDS is used with **MOBY I**. It indicates that a dialog battery of the MDS507 is dead. With all other MDSs, this bit can assume any state.
battery_low	**Only with MOBY I/V with RAM-MDS:** The back-up battery of the RAM-MDS is below the threshold value. Although, at room temperature, it will continue functioning with its remaining capacity for several months, we recommend changing the MDS's battery immediately or, when its battery cannot be changed, replacing the entire MDS.
error	FC 45 sets this bit if a command is terminated abnormally. The error bit is the checksum error bit for all errors which occur. The exact cause of the error is stored in variable error_ MOBY, error_FC or error_BUS (see Section "Further displays" and Section "Error messages and troubleshooting"). The error bit is reset when a command is restarted.
ready	Ready message: error bit = FALSE must be checked after ready = TRUE is signaled. This ensures that the command was executed normally. **Note:** The ready bit does not need to be set in order to start init_run or cancel.

3.1.3 Further displays

Table 3-4 Displays

Variable	Description
ASM_busy	This bit is set when the ASM is processing a command. "ASM_busy" is normally inverse to "ready". The interface module signals ASM_busy via the cyclic word (see Section "Cyclic control word between master and MOBY-ASM" under "ASM_busy_"). When the repeat_command automatic command start is used, this bit shows the processing of a new MDS with the command to be executed. **MOBY U/D:** No meaning. This variable is always false.
command_rep_active	The ASM is processing a command repetition. The bit is set as a response to the control variable repeat_command. After an init_run, command_rep_active is first reset by FC 45 and then set again after a delay following the transfer of the MOBY commands to the ASM by FC 45.
number_MDS	**MOBY U/D:** The number of MDSs presently located in the transmission window is indicated. If more than 15 MDSs are located in the field, number_MDS is indicated as 0F hex.
error_MOBY	This error was reported by the ASM. The error is usually displayed on the ERR LED of the ASM channel display (see Section "Error messages and troubleshooting").
error_FC	Error messages from FC 45 (see Section "Error messages and troubleshooting")
error_BUS	The transmission path between FC 45 and ASM reports an error. It is usually a PROFIBUS error. (see Section "Error messages and troubleshooting"). This error is signaled by system functions SFC 58/59.
version_MOBY	Indicates the firmware version of the MOBYASM. The value entered here is updated each time the ASM starts up. It is ASCII-coded. Example: DBB 26 = 31 hex = "1"; DBB 27 = 30 hex = "0" → Version 1.0

All other variables of UDT 10 are for FC-internal use. They must never be changed by the user.

3.2 MOBY commands

Note

This chapter provides a description of all commands which can by processed by FC 45. The commands, which can actually be processed by the interface module you are using, are described here.

Before you can start a MOBY command with command_start, you need to define the command. UDT 20 (commentary in English), UDT 21 (commentary in German) or UDT 24 (Spanish commentary) is available for the simple definition of a command.

Table 3-5 UDT 20 "MOBY CMD"

Address	Name	Type	Initial value	Comment
0.0		STRUCT		
+0.0	command	BYTE	B#16#2,	MDS: 2 = read, 1 = write
+1.0	sub_command	BYTE	B#16#0	INIT = bit pattern; END, SET, MDS, SLG=mode
+2.0	length	INT *	1	Amount of data to be written/read in bytes
+4.0	address_MDS	WORD	W#16#0	Start address on MDS, memory size for INIT; date for MDS
+6.0	DAT_DB_number	INT	48	Number of DAT_DB, data for MDS
+8.0	DAT_DB_address	INT *	0	Pointer to start word in DAT DB
=10.0		END_STRUCT		
*) UDT 70 (data type WORD instead of INT) must be used for MDS/transponder memory > 32 KB. The "length" value is then specified in hexadecimal notation.				

The "actual value" of the variables can be modified using the editor in the data view of the DB or in the STEP 7 application program.

Please note that the actual values can only be changed if no command is active (ready = 1).

3.2.1 Command parameters

Overview of commands

Table 3-6 Overview of commands

Command [hex]		Command
normal	chained*	
01	41	Write data to MDS
02	42	Read data from MDS
03	43	Initialize MDS
04	44	SLG status
06	–	NEXT
08	48	END; conclude communication with the MDS
0A	4A	Antenna on/off
0B	4B	MDS status
*) Chained commands are not supported by all write/read devices or ASMs. Adhere to the information in the MOBY manuals for configuration, mounting and service.		

Write

Table 3-7 Write to MDS

Command [hex]	sub_command [hex]	length [dec]	address_MDS [hex]	DAT_DB [dec]	Note
01	–	1 to 32767 * length of the MDS data to be written	0000 to FFFF The data are written to the MDS starting at this start address.	Pointer to the user data which are to be written to the MDS	
*) When UDT 70 is used, "length" is specified as a hexadecimal value. The value range is then from 0001 to FFFF. A complete 64 KB transponder can thus be processed.					

Read

Table 3-8 Read MDS

Command [hex]	sub_command [hex]	length [dec]	address_MDS [hex]	DAT_DB [dec]	Note
02	–	1 to 32767 * length of the MDS data to be read	0000 to FFFF The data are read from the MDS starting at this start address.	Pointer to user data. FC 45 reads and stores the MDS data here.	
*) When UDT 70 is used, "length" is specified as a hexadecimal value. The value range is then from 0001 to FFFF. A complete 64 KB transponder can thus be processed.					

Initialization

Table 3-9 Initialize MDS

Command [hex]	sub_command [hex]	length [dec]	address_MDS [hex]	DAT_DB [dec]	Note
03	00 to FF, hex value with which the MDS is written	–	Memory size of the MDS to be initialized	–	

MDS type			Memory size	Init duration normal	INIT duration with ECC
1KB	MOBY I:	VMDS ASM452	**05 00**	< 0.1 s	–
2KB	MOBY I:	RAM	**08 00**	0.4 s	5 s
8KB	MOBY I:	FRAM	**20 00**	0.8 s	20 s
8KB	MOBY I:	EEPROM	**20 00**	18 s	54 s
32KB	MOBY I:	RAM/FRAM	**80 00**	3 s	75 s
752 bytes	MOBY E:	EEPROM	**02 F0**	0.8 s	–
192 bytes	MOBY F:	EEPROM	**00 C0**	2.2 s	–
16 bytes	MOBY F:	EEPROM	**00 10**	0.25 s	–
2KB	MOBY U:	RAM*	**08 00**	approx. 1 s	–
32KB	MOBY U:	RAM*	**80 00**	approx. 1.5 s	–
44 bytes	MOBY D:	MI-Code 1	**00 2C**		
112 bytes	MOBY D:	ISO I-Code SLI	**00 70**		
256 bytes	MOBY D:	ISO Tag-it HF-I	**01 00**		
1000 bytes	MOBY D:	ISO my-d	**04 00**		
64 bytes	MOBY D:	ISO ST LRI512	**00 40**		
20 bytes	RF300:	EEPROM	**00 14**	approx. 0.2 s	-
8KB	RF300:	FRAM	**20 00**	0.3 s	-
32KB	RF300:	FRAM	**80 00**	1.2 s	-
64KB	RF300:	FRAM	**FF 00**	2.4 s	-
*) The OTP memory is not initialized with this command.					

SLG status

Table 3-10 SLG status

Command [hex]	sub_command [hex]	length [dec]	address_MDS [hex]	DAT_DB [dec]	Note
04	01 = status after UDT 110[1] 02 = status after UDT 120[1] (last commands) 03 = status after UDT 130[1] (error messages) 04 = status after UDT 140[1] (MDS in field) 05 = status after UDT 150 (communication quality) 06 = Status after UDT 280 (diagnostics data)	–	–	Pointer to result. The result is indicated with the respective UDT (see sub_command).	MOBY U/D MOBY U MOBY U MOBY U MOBY U RF300
1) You will find the UDT description in Section "UDTs of FC45".					

NEXT

Table 3-11 NEXT

Command [hex]	sub_command [hex]	length [dec]	address_MDS [hex]	DAT_DB [dec]	Note
06	–	–	–	–	NEXT: Processing of this MDS is finished.

The NEXT command can also be used in a command chain (see Section "Command chaining"). However, the NEXT command must always be the last command in the chain.

END

Table 3-12 Terminate communication with MDS

Command [hex]	sub_command [hex]	length [dec]	address_MDS [hex]	DAT_DB [dec]	Note
08	00 = Processing with MDS has terminated 01 = Processing pause with MDS[1]	–	–	–	ANZ_MDS_present is reset. ANZ_MDS_present remains set.
1) MOBY U: This command is recommended when scanning_time parameter is greater than 0 (standby time). Use of this command optimizes the life of the MDS battery. An additional MDS command must now wait for sleep_time of the MDS to expire again.					

Antenna on/off

Table 3-13 Antenna of write/read device ON/OFF

Command [hex]	sub_command [hex]	length [dec]	address_MDS [hex]	DAT_DB [dec]	Note
0A	01 = antenna on 02 = stand-by; antenna off 09 = match antenna to environment (FFT)	–	–	–	The "antenna on/off" command connot be started by command repetition (see Section "Command repetition"). Write/read device 80 only (MOBY F)

Only for MOBY F/U/D:
This command is not needed for normal operation because, when a write/read device is turned on, its antenna is always on.
The antennas must be turned off when two sensitive write/read devices are positioned very close to each other. The application software must ensure that only one antenna is on at a time.

MDS status

Table 3-14 MDS status and diagnosis

Command [hex]	sub_command [hex]	length [dec]	address_MDS [hex]	DAT_DB [dec]	Note
0B	00 = status and diagnosis	–	Today's date (week/year) for calculating the battery life (e.g. 1401 hex = 20th week of the year 2001)	Pointer to result. The result is presented with UDT 100.	Only MOBY U (see Section "UDTs of FC 45")
	01 = type and write protection status	–	–	Pointer to result. The result is presented with UDT 260.	RF300 (see Section "UDTs of FC 45")
	02 = diagnostic data	–	–	Pointer to result. The result is presented with UDT 270.	RF300 (see Section "UDTs of FC 45")

3.2.2 Command chaining

Command chaining permits various address areas of the MDS to be processed by starting just one command. The advantage of command chaining is the optimum speed at which commands can be processed on the ASM.

A command chain is set up by the user by storing a succession of UDT 20s in a DB. The chained commands must all be command type 4x. The last command in a chain must be type 0x.

The FC 45 uses this to detect the end of a command chain.

Example:

An MDS is to process 4 data records. The command structure is stored in DB 47. The MDS data are stored consecutively in DB 48.

Read	MDS address	0000 hex	Length 600
Read	MDS address	1000 hex	Length 100
Read	MDS address	1200 hex	Length 1
Write	MDS address	1200 hex	Length 1

Execution steps:

1. Define structure

Table 3-15 DB 47 - declaration view

Partial command	STRUCT	
Partial command	ARRAY [1 ... 4]	**Note**: 1 ... 4 = No. of partial commands
Partial command	UDT 20	
Partial command	END_STRUCT	

2. Specify the "starting values" in the data view

Table 3-16 DB 47 - data view

Name	Initial value	Comment
Partial command [1].command	42	Read command; followed by another command
Partial command [1].pattern	00	
Partial command [1].length	600	
Partial command [1].adress_MDS	0000	
Partial command [1].DAT_DB_number	48	
Partial command [1].DAT_DB_address	0	
Partial command [2].command	42	Read command; followed by another command
Partial command [2].pattern	00	
Partial command [2].length	100	
Partial command [2].adress_MDS	1000	
Partial command [2].DAT_DB_number	48	
Partial command [2].DAT_DB_address	600	
Partial command [3].command	42	Read command; followed by another command
Partial command [3].pattern	00	
Partial command [3].length	1	
Partial command [3].adress_MDS	1200	
Partial command [3].DAT_DB_number	48	
Partial command [3].DAT_DB_address	700	
Partial command [4].command	01	Write command, last command in chain
Partial command [4].pattern	00	
Partial command [4].length	1	
Partial command [4].adress_MDS	1200	
Partial command [4].DAT_DB_number	48	
Partial command [4].DAT_DB_address	701	

See also

Command parameters (Page 3-12)

3.2.3 Command repetition

Operating principle

After a new start (or init_run) of the ASM, the FC 45 transmits the command (or command chain) once to the ASM. Command transmission is automatic with the first command_start. This command (or the last command or the command chain) always remains intermediately stored in the ASM. If command repetition is started now, the intermediately stored command on the ASM is executed again, and the result(s) transferred to the FC 45.

Advantages of command repetition

- Data transmission on the (PROFI) BUS is minimized. This is particularly noticeable with extensive bus configurations and slow (bus) transmission speeds.
- The ASM processes each MDS independently of the FC 45. In concrete terms, this means each MDS is processed even in applications with a very fast sequence of MDSs. This takes place no matter what the (PROFI) BUS speed.
- Total data throughput is increased considerably particularly with controllers which have few system resources for non-cyclic telegrams.
- Use of command repetition to read fixed-code MDSs also has its advantages (see Section "Processing of data memories").

Programming

There are two programming methods.

- Reading (processing) each MDS which comes by. After the ASM is programmed with a command, repeat_command is set and remains set. The following diagram shows the primary states.

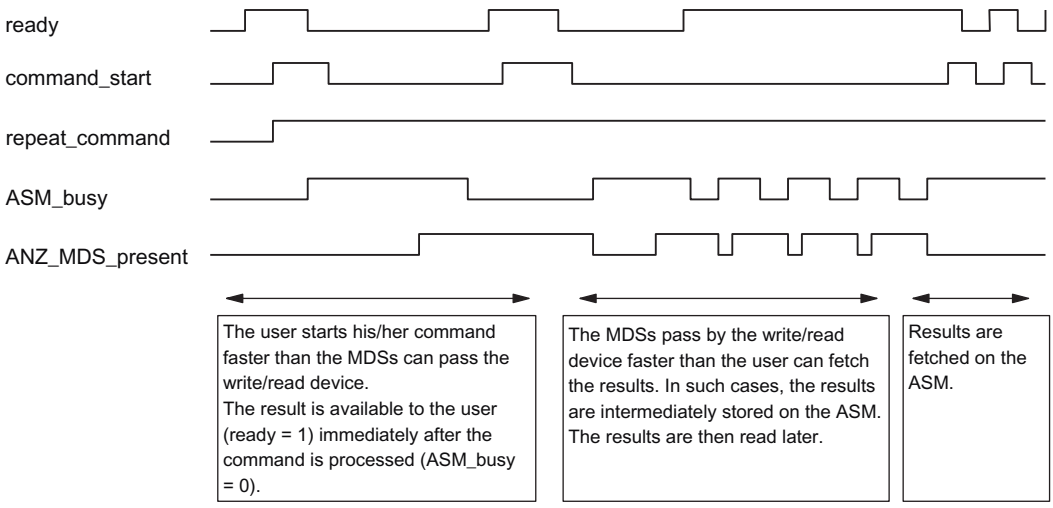


Figure 3-2 Continuous reading of each passing MDS/transponder (repeat_command remains set)

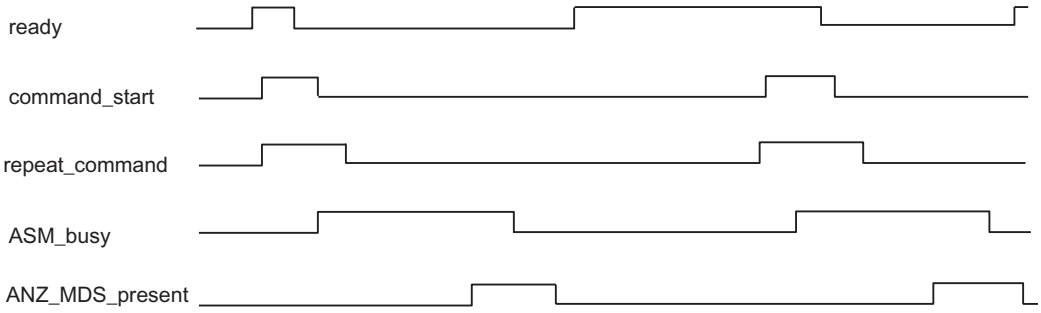
When permanent command repetition is used, data may be transferred to the FC 45 slower than new MDSs are being processed (fast MDS sequence, slow data transmission). In such cases, the results are intermediately stored on the ASM. The ASM has a number of buffers for this intermediate storage. When the buffers are full and the FC 45 has not fetched data and additional MDSs arrive, these MDSs are no longer processed.

Table 3-17 Number of buffers on the ASM

ASM type	No. of buffers per channel	Max. user data which can be processed with command repetition
ASM 475/473	70	16310 bytes
ASM 454	39	9087 bytes
ASM 754	9	2097 bytes
ASM 854	39	9087 bytes
ASM 452	3	699 bytes
Write/read device U92*	150	34950 bytes
Write/read device D10	100	23300 bytes
RF300	246	57318 bytes
*) The number of buffers described here can always be used by MOBY U regardless of the ASM type.		

One buffer can hold up to 233 bytes of user data.

- Specific reading (processing) of an MDS. The user starts the processing of each new MDS in his/her application. The following time diagram illustrates this principle.



The following sequence must be programmed by the user.
- The user sets "command_start" and "repeat_command" simultaneously at the start of the command.
- The user waits for ASM_busy = 1 and then resets "repeat_command".
- The command has been processed after ready = 1 is reported by the FC. No further MDSs are processed automatically by the ASM.

Figure 3-3 Starting specific reading with repeat_command by the user

3.3 Presence check and MDS control

Various operating modes can be parameterized for MDS control (with parameter MDS_control).
The exact interaction between these modes for the following components:

- Presence check
- MDS control
- Next command

is described in this chapter. In its default state, the ASM uses presence check and no MDS control.

Presence check

The presence check is a piece of logic in the MOBY-ASM's firmware which recognizes whether a mobile data memory is in the transmission window of the write/read device. It can be controlled with various mechanisms. The selection is performed with parameter MDS_control. A mechanism is currently available.

Field scanning (MDS_control = 1, 2):

The ASM's firmware continuously scans its surroundings via the magnetic field to determine whether a mobile data memory is present. A hysteresis during field scanning suppresses most of the switching back and forth of ANZ_MDS_present when a mobile data memory stops on the border of the field.

Presence

A mobile data memory is located in the field of the write/read device. The presence bit (ANZ_MDS_present in command and status word) is set (see Section "Command and status word). The presence display is usually implemented via the PRE LED on the front of the ASM (see Section "Brief description of ASM hardware").

MDS control

MDS control is turned on when "MDS_control = 2" is set. MDS control is an option of the firmware of the ASM. It synchronizes the MDSs in the material flow with the user program. It supplies an error message when synchronization is lost.

The following are considered asynchronous.

- MDS whose command was not fully processed by the ASM leaves the transmission window.
- MDS which is moving through the transmissionn window but is not processed by the user program.

An enabled MDS conrtol forces use of the NEXT command in the application.

NEXT command

The Next command switches ASM control to the next mobile data memory. **The Next command must always be programmed when MDS control is used (MDS_control = 2)**.

After the ASM acknowledges the Next command, a read/write job for the next MDS can be sent immediately to the write/read device. The new command waits on the ASM until the old MDS has left the field and a new one has entered.

This type of programming makes it possible to execute an ASM command as soon as an MDS enters the field of the write/read device.

It can be very advantageous to add the NEXT command at the end of a command chain (see Section "Command chaining").

See also

INPUT parameters (Page 3-3)

3.3.1 No MDS Control, No Presence Check: MDS_control = 0

The magnetic field of the write/read device is not turned on unless a valid MDS command (read, write, initialize) is started. After a data memory has been detected and the command has been executed, the write/read device is turned off again. This makes it possible to implement projects in which the distance from one write/read device to another write/read device may be less than specified. Prerequisite: the write/read device stations which are close to each other must be addressed in multiplex mode. This may become necessary in applications in which large amounts of data must be transferred in dynamic operation. Stopping the conveyor belt can be avoided by dividing up the data and spreading it over several write/read devices.

Note

The NEXT command cannot be used when the MOBY-ASM is run with MDS_control = 0. If NEXT is started anyway, the error message error_MOBY = 10 hex is generated.

3.3.2 No MDS Control, Presence Control with Field Scanning: MDS_control = 1

In this mode, the field of the selected write/read device is always on. As soon as an MDS moves into the field of the write/read device, this is indicated to the user via the ANZ_MDS_present bit (see Section "Command and status word"). The user can then start a command at any time. There is no error message if the MDS leaves the field during processing.

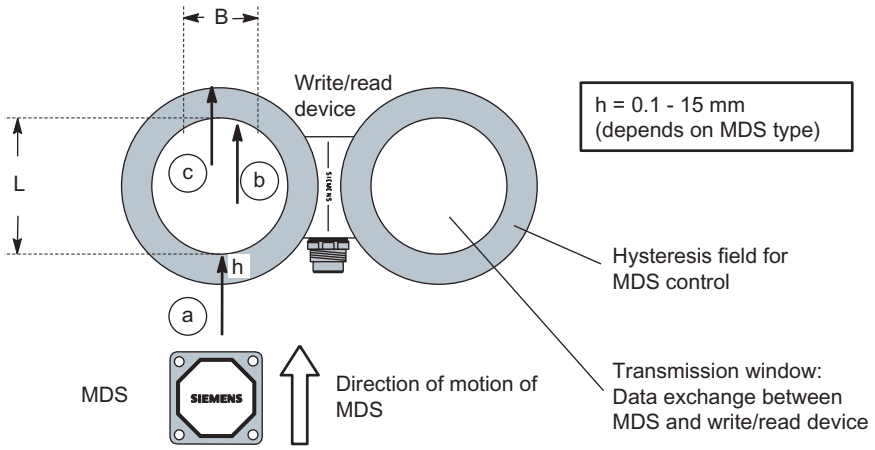
Note

The NEXT command cannot be used when the MOBY-ASM is run without MDS control. If NEXT is started anyway, the error message error_MOBY = 10 hex is generated.

3.3.3 Field Scanning as MDS Control: MDS_control = 2

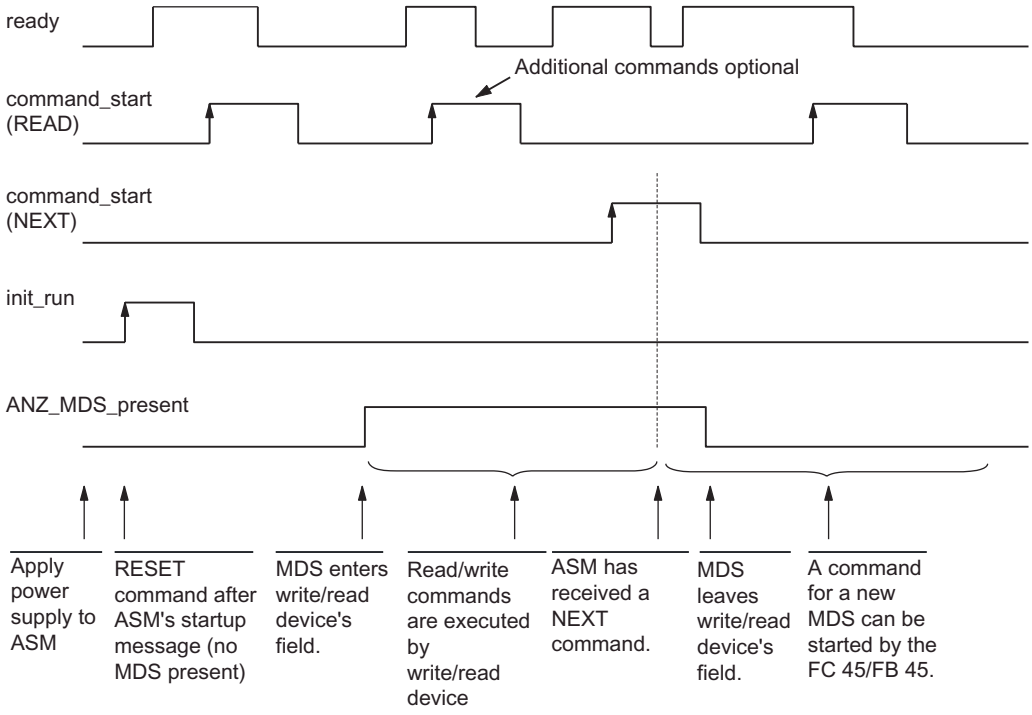
After a new start or a restart of the AS or after a new start or RESET command of the FC 45, the write/read device is turned on and remains active until the AS or ASM is turned off.
The ASM continuously scans the field around the write/read device for the presence of a data memory. When the ASM detects a data memory, the ANZ_MDS_present bit is returned to the user during the next bus cycle or FC call. Similarly, ANZ_MDS_present becomes 0 when the data memory moves out of the write/read device's field.
If the data memory stops exactly on the border of the magnetic field of the write/read device, there is no danger of ANZ_MDS_present switching back and forth continuously. This hysteresis function is handled by the processor on the ASM.
Read/write commands can be sent to the FC 45 with complete transparency for the MDS control. The ANZ_MDS_present variable also retains complete validity after the start of a command.

Table 3-18 Field scanning as MDS control



L, B:	Dimensions of the transmission window of a write/read device at working distance to MDS (see MOBY I configuration manual) L = field length; B = field width
h:	Hysteresis: Area in which an ANZ_MDS_present bit which has been set once remains set
a:	Point at which the mobile data memory is detected by the write/read device. From this point on, the waiting MOBY command is processed with the MDS. ANZ_MDS_present remains set.
b:	The MOBY command must have been executed by this point since the data memory is leaving the transmission window. ANZ_MDS_present still remains set.
c:	Reset ANZ_MDS_present in control and status word. The MDS has left the transmission window of the write/read device. A command which has still not been processed is terminated, and ASM error 01 hex is generated.

Time diagram



↑) These edges must be controlled by the user.

Figure 3-4 Time diagram for MDS_control = 2

ASM error messages

Error 01 hex:	The MDS leaves the write/read device's field while a command is being processed with this MDS. The command is aborted. The read data are invalid. With a write command, the data on the MDS may be inconsistent.
Error 02 hex:	No command is active on the ASM. During this time, an MDS passes through the write/read device's field shown above or command processing of the MDS is not concluded with NEXT. The error is reported during the next FC 45 command.

Notice

- The ASM is unable to determine whether an MDS passed through the complete field or whether the MDS moved into the field briefly and then backed out again.
- When using field scanning, it is essential to maintain the distance between two write/read devices specified in the configuration guidelines (see manual on configuration, installation and service).

Commissioning

4

1st step: Install ASM in STEP 7

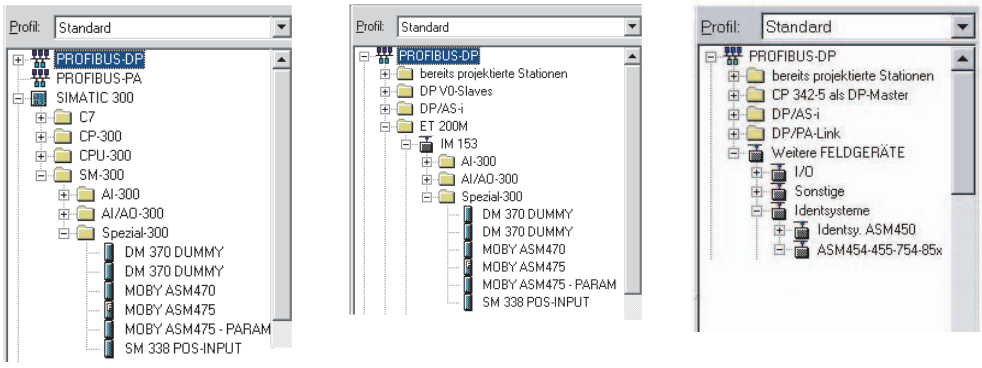
- ASM 475, 473: The installation program for the ASM 475, 473 must be executed once on the STEP 7 PC.
- PROFIBUS-ASM: The GSD file (Siem809F.GSD for ASM 454, 754, 854, 850 or Siem80B6.GSD for ASM 452) must be linked to the device catalog with HW Config (Tools > Install new GSD...).

2nd step: Configure hardware in STEP 7

The configuration varies depending on which MOBYASM is being used.

- ASM 475: Centralized configuration in S7-300
- ASM 475, 473: Distributed setup with PROFIBUS and ET 200M, ET 200X
- ASM 452, 454, 754, 854, 850: Distributed setup with PROFIBUS

The following figure shows the placement of the MOBY-ASMs in the hardware catalog.



ASM 475 in centralized

e.g.: ASM 475 in distributed configuration via

ASM 452, 454, 754, 850, 854 in distributed configuration via

Figure 4-1 Placement of the MOBY-ASMs in the hardware catalog

When configuring the ASMs, make sure that the I address and the Q address have the same values. The value in the I address field must be copied later on into the ASM_address variable in the STEP 7 project. If a MOBY-ASM has more than one channel (e.g. ASM 475 = 2 channels, ASM 454 = 4 channels), the same I address must be used for every channel. The following figure shows an example of a hardware configuration:

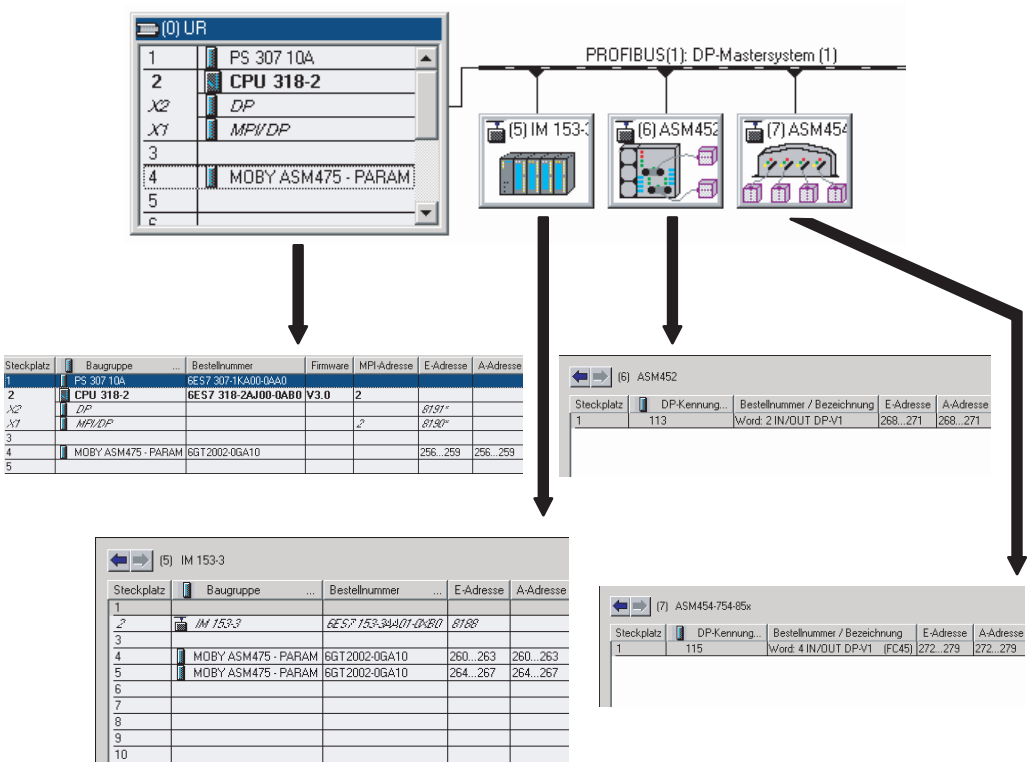
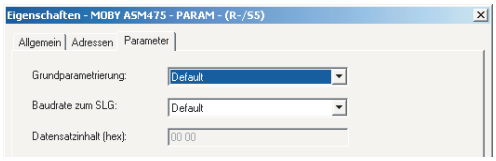


Figure 4-2 Example of a hardware configuration

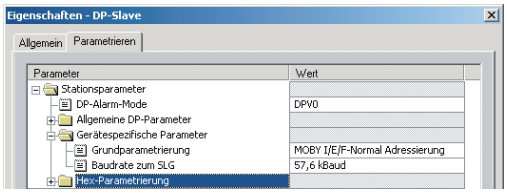
If the project is downloaded onto the hardware in this state (without the user program), the SIMATIC CPU and the PROFIBUS should switch to the RUN state. If they don't, continue with PROFIBUS trouble-shooting (check the PROFIBUS address settings on the ASM against the configuration in HW Config).

3rd step: Set caracteristics of the ASM

If the interfaces (e.g., ASM 452, 473, 475) are different, you can now set the basic function of the ASM (e.g., MOBY U, filehandler, etc.) in the object properties of the module. The object properties are shown in one of the following windows. The possible options are shown in the drop-down menus.



ASM 473, 475 object properties



ASM 452 object properties are stored in the GSD file

Figure 4-3 Configuring the object properties

4th step Process STEP 7 project

This step is based on the sample program supplied with the system.

- Copy the sample program for FC 45 into the new STEP 7 project.
- Continue as shown below based on the number of MOBY channels (number of write/read devices).
  - Declare the UDT 10 in DB 45 and the associated MOBY command(s) (UDT 20) in DB 47
  - Then display DB 45 in the "data view" of the editor and modify the "input parameters" in the "actual value" column. For simple commissioning of MOBYI/E, all you have to do is adjust parameters ASM_address and ASM_channel to the HW Config addresses. General requirement: All MOBY channels (write/read devices) use the same command (DB47) and the same data (DB48).

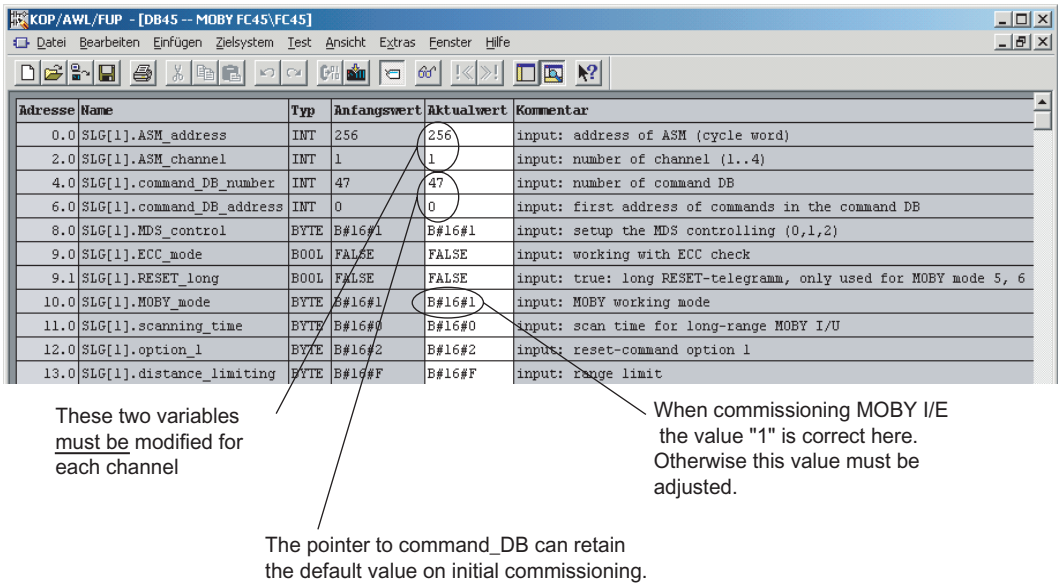


Figure 4-4 Edit DB 45

- Edit OB 1 and program a cyclic FC 45 call for each channel; declare a bit memory for the command start for each MOBY channel.
- Set the variable "init_run" in the parameter DB in OB 100 for each MOBY channel.

5th step: Download and test the program

- Download the project onto the SIMATIC CPU
- Connect a write/read device of the parameterized MOBY type to each MOBY channel.
- After restarting the SIMATIC CPU (STOP → RUN), the CPU should not be in STOP mode. If the CPU does indicate STOP, you should continue by troubleshooting. This is done by evaluating the diagnostic messages of the CPU (function: destination system - module status).

  The main causes of errors are:

  – There is a mismatch between the I/O address of the modules in HW Config and the ASM_address configured in the MOBY DB (UDT 10) or the ASM_address does not exist on the I/O.

  – A slave has failed and OB 122 is not programmed.
- Since the default parameterization of the FC 45 is set with MDS_control = B#16#1, the presence check on the write/read device must already be active now. This is indicated by the flickering RxD LED on the ASM. If you now place an MDS in the transmission window of a write/read device, the PRE or ANW LED must go on.

  If the RxD LED does not go on, continue with trouble-shooting as described in the next point.
- Checking operation using the programming device

  Use the "Modify variable" function to indicate the state of communication between FC 45 and ASM, examine errors and start commands. The following figure shows the necessary variables: It can be found in the sample project under the name "Status Channel 1":

Status Channel 1 -- MOBY FC45\FC45

	Operand	Symbol	Statuswert	Steuerwert
1	M 1.0	"Strt_cmd_chn1"		
2	M 1.2	"Strt_init_run_chn1"		
3				
4	// Cancel			
5	DB45.DBX 19.0	"MOBY DB".SLG[1].cancel		
6	// Command Start			
7	DB45.DBX 19.1	"MOBY DB".SLG[1].command_start		
8	// System Start Up			
9	DB45.DBX 19.3	"MOBY DB".SLG[1].init_run		
10	// Ready			
11	DB45.DBX 18.7	"MOBY DB".SLG[1].ready		
12	// Presence of a MDS			
13	DB45.DBX 18.0	"MOBY DB".SLG[1].ANZ_MDS_present		
14				
15	// Error			
16	DB45.DBX 18.6	"MOBY DB".SLG[1].error		
17	// Errors			
18	DB45.DBB 22	"MOBY DB".SLG[1].error_MOBY		
19	DB45.DBB 23	"MOBY DB".SLG[1].error_FC		
20				
21	// MOBY Command			
22	DB47.DBB 0	"Command".Kanal_1_Befehl[1].command		
23	DB47.DBB 1	"Command".Kanal_1_Befehl[1].sub_command		
24	DB47.DBW 2	"Command".Kanal_1_Befehl[1].length		
25	DB47.DBW 4	"Command".Kanal_1_Befehl[1].address_MDS		
26	DB47.DBW 6	"Command".Kanal_1_Befehl[1].DAT_DB_number		
27	DB47.DBW 8	"Command".Kanal_1_Befehl[1].DAT_DB_address		
28				

Figure 4-5 Variables for checking operation - VAT1

The variables ready = TRUE and error = FALSE should now be indicated for each channel.

If ready = FALSE:

- This channel is not called in OB 100.
- This channel is not processed cyclically by an FC 45 call in OB 1.

If error = TRUE:

- The exact cause of the error is stored in variable error_MOBY, error_FC or error_BUS. The error causes and their remedy are described in Section "Error messages and troubleshooting".

  The variable ANZ_MDS_present now indicates the presence of an MDS as soon as you place an MDS in the transmission window of the write/read device. This is the same indication as the PRE LED on the ASM.

  You can now start the configured MOBY command via the auxiliary variable "command_start" = TRUE. If there is no MDS in the write/read device's transmission window, the command remains in processing on the ASM for an indefinite length of time.

  This status is indicated by "ready" = FALSE in the "Modify variable" window. Now place an MDS in the transmission window. As soon as the MDS has been processed, the result is transferred to FC 45 and "ready" = TRUE is indicated.
- Commissioning of the MOBY components is thus complete. You can now program your own MOBY application based on the sample program.

Error messages and troubleshooting

5

5.1 General errors

Automation system switches to STOP

- OB 86 not programmed and a slave has failed.
- A slave has failed, and OB122 is not programmed.

The error does not occur until FC 45 is called.

- The pointer Params_DB, command_DB or DAT_DB does not exist or is pointing to a non-existent address area.

5.2 Error messages

An error condition exists in FC 45 whenever the "error" variable is enabled on a channel. If this is the case, the exact cause of the error can be determined from variable "error_MOBY", "error_FC" or "error_BUS".

Table 5-1 Classification of error messages

Error variable	Classification
error_MOBY	This error was reported by the MOBY-ASM / write/read device. There are two main reasons for this: • Communication between ASM and write/read device or between write/read device and MDS is faulty. • The ASM is unable to process the command. Error_MOBY is indicated on the ASM on the ERR LED with an appropriate flashing pattern.
error_FC	This error is signaled by FC 45. Main cause • There is a parameter error in "Params_DB" or "command_DB".
error_BUS	The transport layer of PROFIBUS is signaling an error. A PROFIBUS tracer and a PROFIBUS tester (BT 200; Order No. 6ES7 181-0AA00-0AA0) is an invaluable tool for accurate troubleshooting. The PROFIBUS system diagnostics can provide further information about the cause of the error. The error shown here is reported by the SFC 58/59 system function in the RET_VAL parameter. For a detailed description of the RET_VAL parameter, please refer to the SIMATIC S7 system manuals (see System software for S7-300/400).

Notice

When several error occur with chained commands, the "error variable" always indicates the first error detected.

error_MOBY

The ERR LED flashes when the ASM reports error messages.

Table 5-2 Error messages of the MOBY-ASM via the "error_MOBY" variable

Error code (B#16#..)	Flashing of ERR LED	Description
00	–	No error Default value if everything is ok.
	1x	No error ASM has executed a start-up and is waiting for an init_run.
01	2x	Presence error: The MDS has moved out of the write/read device's transmission window. The MOBY command was executed only partially. Read command: No data are transmitted to FC 45. Write command: The MDS which just left the field contains an incomplete data record. • Distance between write/read device and MDS not adhered to • Configuration error: The data record to be processed is too large (in dynamic mode) The next command is automatically executed on the next MDS. A read, write or NEXT command is possible. • With timeout: No MDS in field
02	2x	Presence error: An MDS has passed by a write/read device without being processed by a MOBY command. Processing error: Command processing of an MDS (read and/or write) was not concluded with NEXT. This error message is not reported immediately. Instead, the ASM waits for the next command (read, write, NEXT). This command is immediately replied to with this error. This means that a read or write command is not processed. The next command is executed normally by the ASM again. An init_run from the FC 45 also resets this error state. Bit2 is set in parameter option_1 and no MDS is in the transmission window.
03	3x	Error in the connection to the write/read device. Write/read device does not answer. • Cable between MOBY-ASM and write/read device is wired incorrectly or cable break. • The 24 V supply voltage is not connected or is not on or has failed briefly. • Automatic fuse on the ASM has blown. • Hardware defect • Another write/read device is in the vicinity or is active. • Interference on DI/DO, write/read device or PROFIBUS line • Execute init_run after error correction

Error code (B#16#..)	Flashing of ERR LED	Description
04	4x	Error in MDS's memory The MDS has never been write-accessed or has lost the contents of its memory due to battery failure. • Replace MDS (if battery bit is set). • Install MDS with the STG. • Reinitialize MSD (see Section "Command parameter settings").
05	5x	Unknown command FC 45 is sending an uninterpretable command to the MOBY-ASM. • Command_DB contains invalid command parameters. • The command_DB was overwritten by the user • The MDS reported an address error. MOBY F: • Read/write area is protected by password. • FFT command can only be used when ANW check is off.
06	6x	Field interference on write/read device The write/read device is receiving interference from its environment. • External interference field. The field of interference can be verified with the "inductive field indicator" of the STG. • The distance between two write/read devices is too small and does not correspond to the configuration guidelines • The connecting cable to the write/read device is defective or too long or does not comply with the specification • MOBY U: MDS has left the field during communication. • MOBY U: Communication between write/read device and MDS was terminated by interference (e.g., person/foreign body moving between write/read device and MDS).
07	7x	Too many transmit errors The MDS was not able to correctly receive the command or the write data from the ASM even after several attempts. • The MDS is positioned exactly on the boundary of the transmission window. • Data transmission to the MDS is being affected by external interference. MOBY F: Another MDS was detected in the field while the command was being processed.
08	8x	CRC sending error • The receiver monitor has detected at least one fault during transmission. – Cause same as error B#16#06. • MDS signaling CRC error frequently. – The MDS is positioned exactly on the boundary of the write/read device. – The hardware of the MDS and/or write/read device is defective.
09	9x	Only during initialization: CRC error during acknowledgment receipt from MDS • Cause same as error B#16#06.

Error code (B#16#..)	Flashing of ERR LED	Description
0A	10x	Only during initialization: MDS is unable to perform the initialization command. • MDS is defective.
0B	11x	MOBY I: Only during initialization: Timeout during initialization of the MDS • The MDS is positioned exactly on the boundary of the transmission window. • The MDS needs too much current (defect). • For MDS 507 only: Check FC 45 parameters MOBY_mode and scanning_time MOBY U: Memory of MDS cannot be read correctly.
0C	12x	Memory of the MDS cannot be write-accessed. • Memory of the MDS is defective. • EEPROM MDS was written too frequently and has reached the end of its service life • MOBY E: The MDS left the transmission window while being write-accessed. The data on the MDS may be incorrect.
0D	13x	Address error The address area of the MDS was exceeded. • The start address in command_DB is invalid at command start (see Section "Processing data memories") • The start address must be ≥ 40 hex for MOBY F (MDS F4xx). • The MDS is not the right type. • RF300: Attempted write access to write-protected areas (address area FF00 - FF90)
0E	14x	ECC error (only possible when ECC_mode = TRUE) The data could not be read by the MDS. • Data of the MDS have been lost (MDS defective). • The MDS was not initialized with ECC driver. – Initialize MDS • MDS with EEPROM has reached the end of its service life. The data have been lost. – Replace the MDS • → The MDS was moved out of the transmission window while being write-accessed. – The MDS is not positioned correctly. • → Command to ASM was issued incorrectly by user.
0F	1x 15x	Start-up message from ASM. The ASM was off and has not yet received a RESET command. • Execute an init_run • The same physical ASM channel is used in two (or more) UDT 10 structures. Check ASM_address and ASM_channel in *all* UDT 10 structures. Only with MOBY F: • Internal driver error. Repeat command. • FFT command was started with MDS F1xx in the field.

Error code (B#16#..)	Flashing of ERR LED	Description
10	16x	Next command not possible or not permitted • ASM is running without MDS control (MDS_control = 0,1). • ASM has already received a Next command. • ASM / write/read device doesn't recognize NEXT command.
11	–	Short circuit or overload of the 24 V outputs (DQ, error code, presence) • The affected output is turned off. • All outputs are turned off when total overload occurs. • A reset can only be performed by turning the 24 V voltage off and on again. • Then start init_run.
12	18x	Internal ASM communication error • Connector contact problem on the ASM • Defective ASM hardware – Return ASM for repair • Start init_run command after error correction.
13	19x	ASM / write/read device U does not have enough buffer to store the command intermediately.
14	20x	Internal ASM / write/read device error • Program sequence error on the ASM • Turn power of ASM off and on again. • Start init_run command after error correction. • MOBY U: Watchdog errror on write/read device.
15	21x	Wrong parameterization of the ASM/SLG • Check INPUT parameters in UDT 10 • Check parameters in HW Config • RESET command is parameterized incorrectly. • After a start-up, the ASM has still not received an init_run.
16	22x	The FC command cannot be executed with the ASM parameters on PROFIBUS. • Length of the input/output areas too small for the cyclic I/O word. Did you use the right GSD file? • FC command (e.g., read) with too much user data (data length > 233 bytes).
17	23x	Communication error between FC 45 and MOBY-ASM. Handshake error • Params_DB (UDT 10) of this ASM station is being overwritten by other parts of the program • Check parameters of MOBY-ASM in UDT 10 • Check FC 45 command which caused this error • Start init_run command after error correction.
18	–	An error has occurred which must be acknowledged with an init_run. • A temporary short circuit has occurred on PROFIBUS. • The RESET command is faulty. • Start init_run command after error correction. • Check parameters ASM_address, ASM_channel, and MOBY_mode.

Error code (B#16#..)	Flashing of ERR LED	Description
19	25x	Previous command is active or buffer overflow. The user sent a new command to the ASM although the last command was still active. • Active command can only be terminated with an init_run. • Before a new command can be started the READY bit must be 1 (exception: init_run). • Two FC 45 calls were parameterized with the same "ASM_address" and "ASM_channel" parameters • Two FC 45 calls are using the same Params_DB pointer. • Start init_run command after error correction. • When command repetition (e.g., fixed code MDS) is used, no data are fetched from the MDS. The data buffer on the ASM has overflowed. MDS data have been lost.
1A	–	PROFIBUS DP error occurred. • The PROFIBUS DP bus connection was interrupted – Wire break on the bus – Bus connector on ASM was removed briefly • PROFIBUS DP master no longer addresses the ASM • Execute an init_run • The ASM has detected a message frame interruption on the bus. The PROFIBUS may have been reconfigured (e.g. with HW Config). This error is only indicated when access monitoring has been enabled in the PROFIBUS configuration.
1B	27x	Only with MOBY F: • CRC check in data telegram is incorrect. Checksum error between ASM and write/read device • Interface on ASM or write/read device is defective (hardware defect). • Check wiring of ASM-write/read device cable.
1C	28x	The antenna of the write/read device is turned off. An MDS command to the ASM was started in this state. • Turn on the antenna with the command "antenna on/off." • The antenna is turned on (off) and has received an additional turn-on (turn-off) command. • MOBY F: An FFT command was started when antenna was off (antenna on/off with sub_command = 09).
1D	–	More MDSes are in the transmission window than the SLG is capable of processing simultaneously. • Only 1 MDS can be processed at a time with FC 45.
1E	30x	Error when processing the function • The data in UDT 10 are invalid (e.g. write command with length = 0); check UDT 10 and execute init_run • ASM hardware defect: ASM receives wrong data during init_run. • The "number of bytes" byte does not match the user data length (see Section "Programming the MOBY-ASM on PROFIBUS DP-V1").

Error code (B#16#..)	Flashing of ERR LED	Description
1F	–	Running command canceled by RESET (init_run or cancel) or bus connector removed • Communication with the MDS was terminated by init_run. • This error can only be reported on init_run or cancel

error_FC

Table 5-3 Error variable "error_FC"

Error code (B#16#..)	Description
00	No error; default value if everything is ok.
01	Params_DB not available in SIMATIC
02	Params_DB too small • UDT 10/11 was not used during definition • Params_DB must be 300 bytes in length (for each channel) • Check that Params_DB and Params_ADDR are correct
03	The DB after the "command_DB_number" pointer is not available in the SIMATIC.
04	"command_DB" in the SIMATIC too small • UDT 20/21 was not used during command definition • The last command in "command_DB" is a chained command; reset the chaining bit • Check command pointer command_DB_number/command_DB_address
05	Invalid command type. The valid commands are described in Section "MOBY commands". • Check command pointer command_DB_number/command_DB_address • Check the current values in command_DB – Execute an init_run
06	Unexpected acknowledgement received. The parameters of the command and acknowledgement telegram do not match (command, length, address_MDS). • The user changed the command_DB_number/_address pointer during command execution. • The user changed the command parameters in the MOBY CMD data block (UDT 20) during command execution. • Check the ASM_address and ASM_channel parameter settings. ASM_address and ASM_channel have the same parameters for different channels. • Acknowledgement and command counters (see Section "Cyclic control word between master and MOBY-ASM") between ASM and FC no longer synchronized – Execute an init_run
07	The MOBY_mode or MDS_control parameter (defined in UDT 10) has an illegal value (see Section "Parameter data block").
08	A bus error has occurred which is reported by system functions SFC 58/59. More information on this error is available in the error_BUS variable. • ASM_address or ASM_channel not available • Execute an init_run

Error code (B#16#..)	Description
09	The ASM has failed. • Power failure on MOBY-ASM • PROFIBUS connector removed or PROFIBUS cable interrupted • ASM_address or ASM_channel not available This error is indicated if the ASM_failure bit (see Section "Command and status word") was set in OB 122. OB 122 is called if FC 45 can no longer access the cyclic word for MOBY-ASM.
0A	Another init_run was started without waiting for ready during execution of the init_run command • Do *not* set init_run cyclically • The same physical ASM channel is used in two (or more) UDT 10 structures. Check ASM_address and ASM_channel in *all* UDT 10 structures.
0B	init_run cannot be executed; cyclic Process image to the ASM is faulty; FC 45 reports timeout of the process image to the ASM The timeout time can be adapted in the DBB 58 of the UDT 10 if required. The default value is 50 (dec)=2 seconds. Greater values (255 max.) will increase the timeout time. • ASM_address in UDT 10 is parameterized incorrectly. ASM_address may be for wrong module. • ASM_channel setting is ≥16 or ≤0 • ASM hardware/firmware is faulty. • The same physical ASM channel is used in two (or more) UDT 10 structures. Check ASM_address and ASM_channel in *all* UDT 10 structures.
0C	Area length error on block move for FC 45. • DAT_DB does not exist or is too small. Check DAT_DB_number and DAT_DB_address in UDT 20 • Write command with length = 0 was issued. • Execute an init_run
0D	An init_run was not completed correctly. The process image is inconsistent. This message is equivalent to a timeout. A timeout is reported 40s after starting init_run. This time can be adjusted in DBW 52 if necessary. • Run init_run again • Turn ASM off and on again. • The RUN/STOP switch on the CPU was pressed rapidly several times in succession (particularly with slow PROFIBUS baud rates) • The same physical ASM channel is used in two (or more) UDT 10 structures. Check ASM_address and ASM_channel in *all* UDT 10 structures.

error_BUS

Table 5-4 Error variable "error_BUS"

Error code (W#16#...)	Description
800A	ASM is not ready (temporary message). • This message is given to a user who is not using the FC 45 and is continuously polling the ASMs acyclicaly.
8x7F	Internal error on parameter x. Cannot be remedied by the user.
8x22 8x23	Area length error on reading parameter. Area length error on writing parameter. This error code indicates that parameter x is partially or completely outside the operand area or the length of a bit array for an ANY parameter is not divisible by 8.
8x24 8x25	Area error on reading parameter. Area error on writing parameter. This error code indicates that parameter x is within an area not allowed for the system function.
8x26	Parameter contains a time cell number which is too high.
8x27	Parameter contains a counter cell number which is too high.
8x28 8x29	Alignment error on reading parameter. Alignment error on writing parameter. The reference to parameter x is an operand whose bit address is not equal to 0.
8x30 8x31	The parameter is located within the write-protected global DB. The parameter is located within the write-protected instance DB.
8x32 8x34 8x35	The parameter contains a DB number which is too high. The parameter contains an FC number which is too high. The parameter contains an FB number which is too high.
8x3A 8x3C 8x3E	The parameter contains a DB number which is not loaded. The parameter contains an FC number which is not loaded. The parameter contains an FB number which is not loaded.
8x42 8x43	An access error occurred while the system was attempting to read a parameter from the I/O area of the inputs. An access error occurred while the system was attempting to write a parameter to the I/O area of the outputs.
8x44 8x45	Error on nth (n > 1) read access after an error occurred. Error on nth (n > 1) write access after an error occurred.
8090	Specified logical base address is invalid: No assignment in SDB1/SDB2x exists, or it is not a base address.
8092	A type other than BYTE has been specified in an ANY reference.
8093	The area identifier contained in the configuration (SDB1, SDB2x) of the logical address is not permitted for these SFCs. Permitted: • 0 = S7-400 • 1 = S7-300 • 2, 7 = DP modules

Error code (W#16#...)	Description
80A0	Negative acknowledgment while reading from module. FC fetches acknowledgment although no acknowledgment is ready. A user who is not using the FC 45 would like to fetch DS 101 (or DS 102 to104) although no acknowledgment is available. • Perform an init_run for new synchronization between ASM and application.
80A1	Negative acknowledgment while writing to the module. FC sends command although ASM is unable to receive a command.
80A2	DP protocol error in layer 2. Could be a hardware defect.
80A3	DP protocol error in Direct-Data-Link-Mapper or User-Interface/User. Could be a hardware defect.
80B0	• SFC not possible for module type • Data record unknown to module • Data record number ≥ 241 is not allowed. • Data records 0 and 1 are not permitted for SFC58 "WR_REC."
80B1	The length specified in the RECORD parameter is wrong.
80B2	The configured slot is not occupied.
80B3	Actual module type is not the module type specified in SDB1.
80C0	• RDREC: The module has record, but it doesn't have any read data. • WRREC: ASM is not ready to receive new data – Wait until the cyclic counter has been incremented
80C1	The data of the preceding write job on the module for the same data record have not yet been processed by the module.
80C2	The module is currently processing the maximum possible number of jobs for a CPU.
80C3	Required resources (memory, etc.) are currently in use. This error is not reported by FC 45. If this error occurs, FC 45 waits until the system is able to provide resources again.
80C4	Communication error • Parity error • SW ready not set • Error in block length management • Checksum error on CPU side • Checksum error on module side
80C5	Distributed I/O not available

Examples/applications

6

6.1 FC 45 scanning by user

Scanning of FC 45 takes place in accordance with the structogram in the following figure.

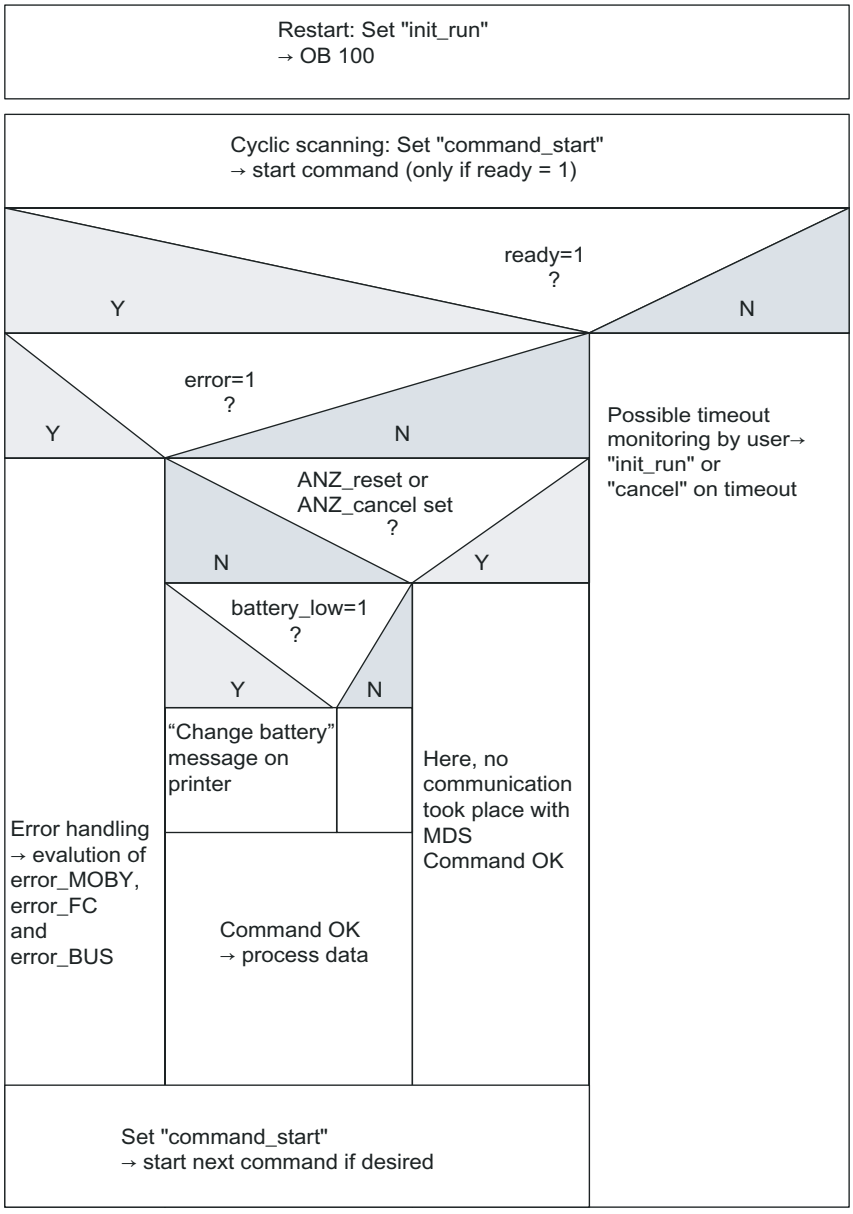


Figure 6-1 Structogram for scanning of FC 45

6.2 Processing of data memories/transponders

Data memory types

Mobile data memories with different storage capacities are available. The following table specifies the memory capacities currently available.

Table 6-1 Available memory capacities

Memory capacity	Memory type	MOBY family	MDS type
2 (1.7) Kbytes	RAM	MOBY I	e.g. MDS 302
8 (7) Kbytes	EEPROM / FRAM	MOBY I	e.g. MDS 413E
32 (28) Kbytes	FRAM	MOBY I	e.g. MDS 514
752 bytes	EEPROM	MOBY E	e.g. MDS E600
5 bytes	RAM	MOBY F	e.g. MDS F125
192 bytes	EEPROM, 4 bytes of fixed code	MOBY F	e.g. MDS F415
2KB	RAM, 16 bytes OTP	MOBY U	e.g. MDS U313
32 KB	RAM, 16 bytes OTP	MOBY U	e.g. MDS U524
44 bytes	EEPROM	MOBY D	e.g. MDS D139/ I-Code 1
112 bytes	EEPROM	MOBY D	I-Code SLI
256 bytes	EEPROM	MOBY D	Tag-it HF-I
1000 bytes	EEPROM	MOBY D	my-d
20 bytes	EEPROM	RF300	RF320T
8KB	FRAM	RF300	e.g. RF340T
32 KB	FRAM	RF300	e.g. RF350T
64KB	FRAM	RF300	e.g. RF350T (64K)

Addressing

The data memories are addressed linearly from address 0000 to the end address. The ASM or write/read device automatically recognizes the size of the memory on the MDS. When the end address on the MDS is exceeded, the user receives an error message in error_MOBY.

The next table shows the address space of the individual MDS versions. The variables address_MDS and length (see Table "UDT 20 MOBY CMD" in Section "MOBY commands") must be configured according to this address space.

Address space of MDS versions for MOBY I, E, F, U and D

System	Addressing	16-Bit Hexadecimal Number		Integer number	
MOBY I	**2 KB data memory with RAM**				
	Start address	0000	0000 (with ECC)	+0	+0 (with ECC)
	End address	07FC	06F1 (with ECC)	+2044	+1777 (with ECC)
	8 KB data memory with EEPROM/RAM/FRAM				
	Start address	0000	0000 (with ECC)	+0	+0 (with ECC)
	End address	1FFC	1BF1 (with ECC)	+8188	+7153 (with ECC)
	32 KB data memory with RAM/FRAM				
	Start address	0000	0000 (with ECC)	+0	+0 (with ECC)
	End address	7FFC	6FF1 (with ECC)	+32764	+28657 (with ECC)
MOBY E	**752 byte data memory with EEPROM**				
	Start address	0000		+0	
	End address	02EF		+751	
	ID no.: (fixed-coded; can only be read as a whole)				
	Start address	1FF0		+8176	
	Length	0004		+4	
MOBY F	**MDS F1xx (5-byte fixed code)**				
	Start address	0000		+0	
	Length	0005		+5	
	MDS F4xx (192 bytes)				
	Start address	0040		+64	
	End address	00FF		+255	
	ID no.: (fixed-coded; can only be read as a whole)				
	Start address	0000		+0	
	Length	0004		+4	
MOBY U	**2 KB data memory**				
	Start address	0000		+0	
	End address	07FF		+2047	
	Read OTP memory (write access only possible once) The OTP memory of MOBY U can only be processed completely, i.e. the start address must always be specified with value FFF0 hex and the length with value 10 hex.				
	Start address	FFF0		-16	
	Length	10		+16	
	ID no.: (four fixed-coded bytes; can only be read with the MDS status command)				
	32 KB data memory				
	Start address	0000		+0	
	End address	7FFF		+32767	
	Read OTP memory (write access only possible once)*				
	Start address	FFF0		-16	
	Length	10		+16	
	ID no.: (four fixed-coded bytes; can only be read with the MDS status command)				

System	Addressing	16-Bit Hexadecimal Number	Integer number
MOBY D	**MDS D139 (I-Code 1; 44 bytes)**		
	Start address	0000	+0
	End address	002B	+43
	ID no.: (fixed-coded; can only be read as a whole)		
	Start address	FFF0	-16
	Length	0008	+8
	ISO-MDS (I-Code SLI; 112 bytes)		
	Start address	0000	+0
	End address	006F	+111
	ID no.: (fixed-coded; can only be read as a whole)		
	Start address	FFF0	-16
	Length	0008	+8
	ISO MDS (Tag-it HF-I; 256 bytes)		
	Start address	0000	+0
	End address	00FF	+255
	ID no.: (fixed-coded; can only be read as a whole)		
	Start address	FFF0	-16
	Length	0008	+8
	ISO MDS (my-d SRF55V10P; 1000 bytes)		
	Start address	0018	+24
	End address	03FF	+1023
	ID no.: (fixed-coded; can only be read as a whole)		
	Start address	FFF0	-16
	Length	0008	+8

Address space of the transponder versions for RF300

System	Addressing	16-Bit Hexadecimal Number	Integer number
RF300	**20 bytes of data memory (EEPROM)**		
	R/W or OTP memory (EEPROM) (The EEPROM user memory for RF300 can be used either as R/W memory or as an OTP memory (see RF300 system manual))		
	Start address	FF00	-256
	End address	FF13	-237
	ID no.: (fixed-coded; can only be output as a whole)		
	Start address	FFF0	-16
	Length	0008	+8

System	Addressing	16-Bit Hexadecimal Number	Integer number
RF300	**8 KB data memory (FRAM/EEPROM)**		
	R/W or OTP memory (EEPROM) (The EEPROM user memory for RF300 can be used either as R/W memory or as an OTP memory (see RF300 system manual))		
	Start address End address	FF00 FF13	-256 -237
	R/W memory (FRAM)		
	Start address End address	0000 1FFC	+0 +8188
	ID no.: (fixed-coded, can only be read as a whole)		
	Start address Length	FFF0 0008	-16 +8
	32 KB data memory (FRAM/EEPROM)		
	R/W or OTP memory (EEPROM) (The EEPROM user memory for RF300 can be used either as R/W memory or as an OTP memory (see RF300 system manual))		
	Start address End address	FF00 FF13	-256 -237
	R/W memory (FRAM)		
	Start address End address	0000 7FFC	+0 +32764
	ID no.: (fixed-coded; can only be output as a whole)		
	Start address Length	FFF0 0008	-16 +8
	64 KB data memory (FRAM/EEPROM)		
	R/W or OTP memory (EEPROM) (The EEPROM user memory for RF300 can be used either as R/W memory or as an OTP memory (see RF300 system manual))		
	Start address End address	FF00 FF13	-256 -237
	R/W memory (FRAM)		
	Start address End address	0000 FEFC	+0 –
	ID no.: (fixed-coded; can only be output as a whole)		
	Start address Length	FFF0 0008	-16 +8

RF300: Address mapping on the transponder

R/W EEPROM memory and OTP memory is only available once on the transponder.

The following table shows the mapping of addresses on the transponder.

Data can be read via the R/W address or the OTP address.

R/W EEPROM		Write OTP once	
Address	Length	Address	Length
FF00	1 .. 20	FF80	4,8,12,16,20
FF01	1 .. 19		
FF02	1 .. 18		
FF03	1 .. 17		
FF04	1 .. 16	FF84	4,8,12,16
FF05	1 .. 15		
FF06	1 .. 14		
FF07	1 .. 13		
FF08	1 .. 12	FF88	4,8,12
FF09	1 .. 11		
FF0A	1 .. 10		
FF0B	1 .. 9		
FF0C	1 .. 8	FF8C	4,8
FF0D	1 .. 7		
FF0E	1 .. 6		
FF0F	1 .. 5		
FF10	1 .. 4	FF90	4
FF11	1 .. 3		
FF12	1 .. 2		
FF13	1		

Notice

Write access to addresses starting at FF80 to FF93 activates the write protection (OTP function) on the EEPROM user memory. This operation is not reversible. Switching on write protection must always take place in ascending order without gaps, starting at address FF80.

See also

MOBY commands (Page 3-11)

6.3 Cyclic calling of FC 45 (e.g. in OB 1)

The following program is an example of how to call and scan FC 45 in an application. The definition of the data structure is described in Section "Data structure definition". The parameter settings for the MOBY command were set up during the definition of the "MOBY DB".

```
Block: OB1 cycle execution
```

```
Network: 1    call FC45
memory bit 1.0 is set: Start MOBY command for 1st SLG
memory bit 1.1 is set: Start MOBY command for 2nd SLG
memory bit 1.2 is set: Start init_run for 1st SLG
memory bit 1.3 is set: Start init_run for 2nd SLG
memory byte 2: OB1 used as edge triggered memory
```

```
      CALL "MOBY FC"                    // Call FC 45 for each SLG in
      Params_DB :=45                       each cycle
      Params_ADDR :=0


      CALL "MOBY FC"
      Params_DB :=45
      Params_ADDR :=300

      A M 1.2                           // memory bit init_run for
      FP M 2.2                             1st SLG
      S "MOBY DB".SLG[1].init_run
      SPB x01


      UN "MOBY DB".SLG[1].ready
      SPB x01
      U "MOBY DB".SLG[1].error
      SPB x01

      A M 1.0                           // memory bit command_start
      FP M 2.0                             for 1st SLG
      S
      "MOBY DB".SLG[1].command_start

x01:  A M 1.3                           // memory bit init_run for
      FP M 2.3                             2nd SLG
      S "MOBY DB".SLG[2].init_run
      SPB x02


      UN "MOBY DB".SLG[2].ready
      SP B x02
      U "MOBY DB".SLG[2].error
      SPB x02

      U M 1.1                           // memory bit command_start
      FP M 2.1                             for 2nd SLG
      S
      "MOBY DB".SLG[2].command_start

x02:  NOP 0
```

6.4 Programming a cold and warm restart

The MOBY-ASM is restarted by setting the "init_run" variable. The ASM and FC 45 are completely reparameterized and synchronized with init_run.

An init_run is necessary after

- switching on the SIMATIC (OB 100)
- Power supply of ASM is turned on.
- an interruption in PROFIBUS communication
- an error message in variable "error_BUS"

```
Block: OB100 complete restart
```

```
Network: 1 set init_run bit for all channels which are configured in DB45
```

```
SET
S     "MOBY DB".SLG[1].init_run
S     "MOBY DB".SLG[2].init_run
```

In a distributed configuration of an ASM (e.g. via PROFIBUS), the ASM may be switched off and on again due to system conditions (see Section "Programming a module failure"). When this happens, the ASM reports the power failure to the FC 45 (and thus to the user). The user must then perform an init_run for this ASM before a MOBY command can be started again.

Note:
The "init_run" variable is set to TRUE in the project supplied with the system. This automatically triggers an "init_run" whenever the parameter data block is downloaded onto the PLC (see Table "INPUT parameters" in Section "INPUT parameters").

6.5 Programming a module failure

The failure of a PROFIBUS module can be detected primarily using the PROFIBUS system diagnostics.

However, if a failed slave is addressed via FC 45, an I/O access error is generated in SIMATIC.

As a result

- OB 122 is called.
- the PLC switches to STOP if no OB 122 is programmed.

A feature implemented in FC 45 allows a normal error to be signaled to the user (error_FC=09) when a MOBY PROFIBUS slave fails. To do this, the user sets bit "ASM_failure = 1" in OB 122 for the failed MOBY channel. The following example shows a possible OB 122 implementation.

```
Block: OB122
```

```
Network: 1 Reset channel 1 on error
```

```
      L #OB122_MEM_ADDR              // Temporary OB122
      L
      "MOBY DB".SLG[1].ASM_address
      -D
      SRW 1                          // Formula:
      L 1                            // (#OB122_MEM_ADDR -
      +D                                SLG[x].ASM_address) / 2 + 1

      L                              // Compare with config.
      "MOBY DB".SLG[1].ASM_channel      channel
      ==I
      SPBN x1

      SET                            // Power failure on ASM
      S
      "MOBY DB".SLG[1].ASM_failure

x1:   NOP 0
```

```
Network: 2 Reset channel 2 on error


      L #OB122_MEM_ADDR
      L
      "MOBY DB".SLG[2].ASM_address
      -D
      SRW 1
      L 1                                  // Formula:
      +D                                   // (#OB122_MEM_ADDR -
                                              SLG[x].ASM_address) / 2 + 1


      L                                    // Compare with config.
      "MOBY DB".SLG[2].ASM_channel            channel
      ==I
      SPBN x2


      SET                                  // Power failure on ASM
      S "MOBY DB".write/read
      device[2].ASM_failure

x2:   NOP 0
```

OB 86 must also be available on the automation system in addition to OB 122 to prevent the system from switching to STOP if a PROFIBUS slave fails. No code needs to be programmed in OB 86 for the correct operation of FC 45.

After the error on the ASM has been corrected and the ASM is ready for operation again, the user must send an init_run to the FC 45. The ASM is then ready for operation.

6.6 Data structure definition

The developer can define different MOBY data structures depending on the structure of the application. Some example structures are given below.

1st example

Four SLGs are parameterized. One command is assigned to each write/read device. MOBY parameters (DB 45), MDS commands (DB 47), and data (DB 48) are assigned to different data blocks. The declaration view is shown.

```
Block: DB45; MOBY parameters
```

Address	Name	Type	Initial value	Comment
0.0		STRUCT		
+0.0	Write/ read device	ARRAY [1..4]		
*300.0		UDT10		
=1200.0		END_STRUCT		

```
Block: DB47; 4 MDS commands
```

Address	Name	Type	Initial value	Comment
0.0		STRUCT		
+0.0	Command	ARRAY [1..4]		
*10.0		UDT20		
=40.0		END_STRUCT		

```
Block: DB48; MOBY data
```

Address	Name	Type	Initial value	Comment
0.0		STRUCT		
+0.0	Data	ARRAY [1..1024]		
*1.0		BYTE		
=1024.0		END_STRUCT		

When the data blocks have been defined, the "actual value" of the data must be edited using the "View → Data view" menu.

2nd example

2 commands are assigned directly to each MOBY channel. The MOBY parameters and the MOBY commands of all write/read devices are stored in a "MOBY DB". A nested structure is used in the declaration.

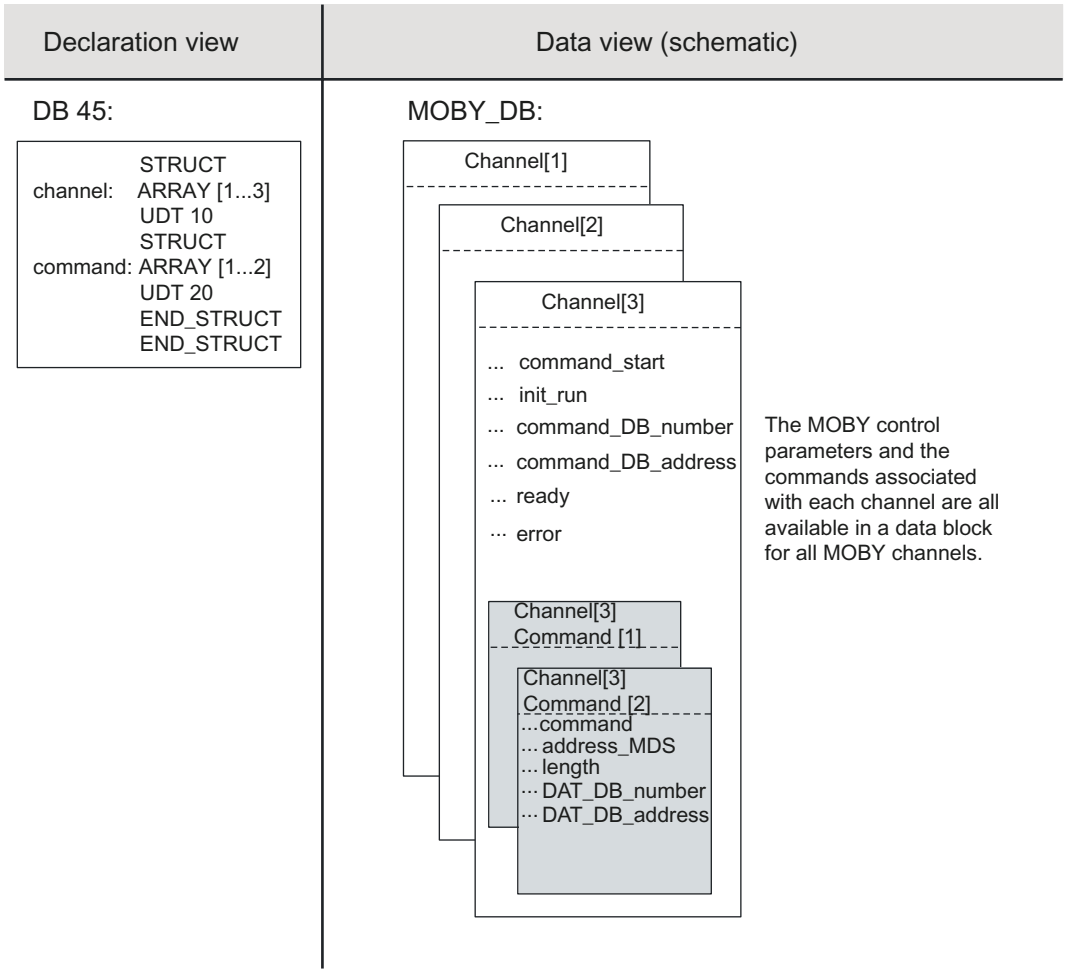


Figure 6-2 Example of several MOBY commands assigned to one channel

The following shows an extract from a STEP 7 user program. It shows how a large number of MOBY channels can be handled easily using symbolic names. A command is started via each of the inputs 0.0, 0.1 and 0.3. An edge trigger flag is used to prevent the command from being started several times:

```
A       MOBY_DB.channel[1].ready        // 1st MOBY
AN      MOBY_DB.channel[1].error
A       I 0.0
AN      EdgeTriggerFlag_1
S       MOBY_DB.channel[1].command_start
S       EdgeTriggerFlag_1
AN      I 0.0
R       EdgeTriggerFlag_1

A       MOBY_DB.channel[2].ready        // 2nd MOBY
AN      MOBY_DB.channel[2].error
A       I 0.1
AN      EdgeTriggerFlag_2
S       MOBY_DB.channel[2].command_start
S       EdgeTriggerFlag_2
AN      I 0.1
R       EdgeTriggerFlag_2

A       MOBY_DB.channel[3].ready        // 3rd MOBY
AN      MOBY_DB.channel[3].error
A       I 0.3
AN      EdgeTriggerFlag_3
S       MOBY_DB.channel[3].command_start
S       EdgeTriggerFlag_3
AN      I 0.3
R       EdgeTriggerFlag_3

Call    "MOBY_FC"
        Params_DB: = 45
        Params_ADDR: = 0

Call    "MOBY_FC"
        Params_DB: = 45
        Params_ADDR: = 320

Call    "MOBY_FC"
        Params_DB: = 45
        Params_ADDR: = 640
```

3rd example

A separate data block is assigned to each MOBY channel. It contains the parameters, commands and data for a channel. Space for 10 MOBY channels should be reserved on each channel.

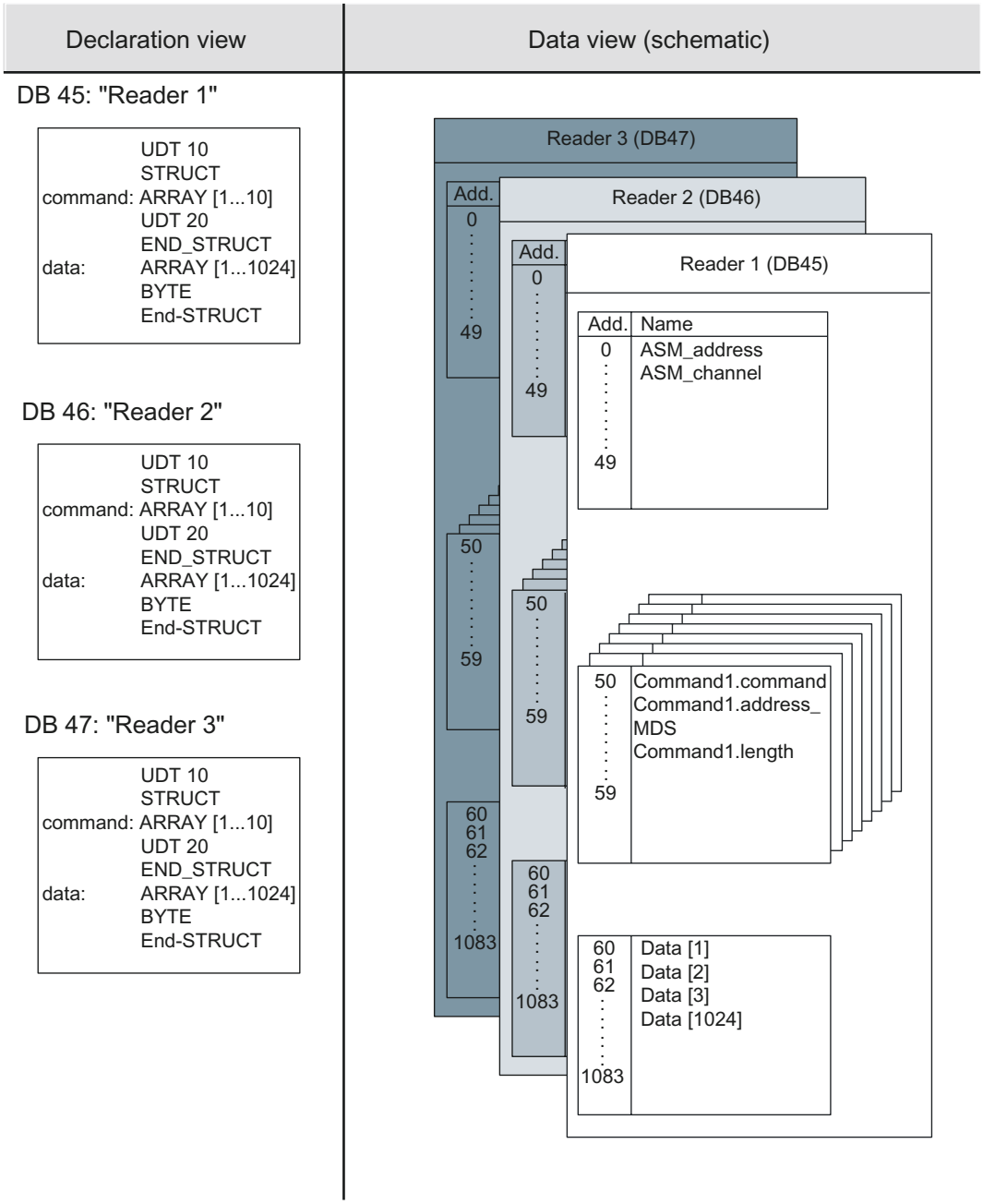


Figure 6-3 Example of a separate data block assigned to each MOBY channel

6.7 UDTs of FB 45 / FC 45

The "MDS status" and "Write/read device status" commands supply a variety of data. The UDTs described in the following section can be used for clear presentation and easy definition of the data blocks for the result.

Table 6-2 UDT overview table

UDT			Description	Described in
English	German	Spanish		
10	11	14	Parameter data block	Section "Parameter data block"
20	21	24	MOBY commands	Section "MOBY commands"
60	61	64	Parameter data block for MDS > 32 KB	
70	71	74	MOBY commands for MDS > 32 KB	
100	101	104	Result of MDS status	Section "UDTs of FB 45 / FC 45"
110	111	114	Result of write/read device status (sub_command = 01)	Section "UDTs of FB 45 / FC 45"
120	121	124	Result of write/read device diagnosis I (sub_command = 02)	Section "UDTs of FB 45 / FC 45"
130	131	134	Result of write/read device diagnosis II (sub_command = 03)	Section "UDTs of FB 45 / FC 45"
140	141	144	Result of write/read device diagnosis III (sub_command = 04)	Section "UDTs of FB 45 / FC 45"
260	261	264	Result of MDS status (sub_command = 01, RF300)	Sample project on software CD
270	271	274	Result of MDS status (sub_command = 02, RF300)	Sample project on software CD
280	281	284	Result of read/write device status (sub_command = 06, RF300)	Sample project on software CD

UDT 100: Result of MDS status

Table 6-3 UDT 100 "MOBY MDS status"

Address	Name	Type	Comment
0.0		STRUCT	
+0.0	UID	DWORD	MDS (unique identifier)
+4.0	MDS_type	BYTE	MDS
+6.0	sum_subframe_access	DINT	Sum of subframe access
+10.0	sum_searchmode_access	INT	Sum of searchmode
+12.0	ST_date_Week	BYTE	Date of last sleep-time change (week of year)
+13.0	ST_date_Year	BYTE	Date of last sleep-time change (year)
+14.0	battery_left	INT	Battery left (percentage)
+16.0	ST	BYTE	Actual sleep-time value on MDS
=18.0		END_STRUCT	

UDT 110: Result of write/read device status (mode 1)

Table 6-4 UDT 110 "MOBY write/read device status"

Address	Name	Type	Comment
0.0		STRUCT	
+0.0	status_info	BYTE	Write/read device mode
+1.0	hardware	CHAR	Type of hardware
+2.0	hardware_version	WORD	HW version
+4.0	loader_version	WORD	Version of loader
+6.0	firmware	CHAR	FW
+8.0	firmware_version	WORD	Firmware version
+10.0	driver	CHAR	Type of driver
+12.0	driver_version	WORD	Version of driver
+14.0	interface	BYTE	Interface (RS 232/RS 422)
+15.0	baud	BYTE	Baud rate
+16.0	reserved1	BYTE	Reserved
+17.0	reserved2	BYTE	Reserved
+18.0	reserved3	BYTE	Reserved
+19.0	distance_limiting_write/read_device	BYTE	Ranges/performance setting (RF300: res.)
+20.0	multitag_write/read device	BYTE	Multitag write/read device
+21.0	field_ON_control_write/read_device	BYTE	BERO operating mode (RF300: res.)
+22.0	field_ON_time_write/read device	BYTE	MOBY U: BERO time MOBY D: MDS type (RF300: res.)
+23.0	sync_write/read device	BYTE	Semaphore control (synchronization with write/read device) (RF300: res.)
+24.0	status_ant	BYTE	Status of antenna
+25.0	stand_by	BYTE	Time of standby after command execution (RF 300: res.)
+26.0	MDS_control	BYTE	Presence
=28.0		END_STRUCT	

UDT 120: Result of write/read device diagnosis I

Table 6-5 UDT 120 "MOBY write/read device-Stat Diag 1"

Address	Name	Type	Comment
0.0		STRUCT	
+0.0	status_info	BYTE	Write/read device status mode
+1.0	number_functions	BYTE	Range: 1...33
+2.0	function_01_01	BYTE	*
+3.0	function_01_02	BYTE	*
+4.0	function_01_03	BYTE	*
. . .	. . .		
=234.0		END_STRUCT	
*) An area of seven bytes each is reserved for 33 commands.			

UDT 130: Result of write/read device diagnosis II

Table 6-6 UDT 130 "MOBY write/read device-Stat Diag 2"

Address	Name	Type	Comment
0.0		STRUCT	
+0.0	status_info	BYTE	Write/read device status mode
+1.0	number_errors	BYTE	Range: 1...235
+2.0	error_number	ARRAY [1...235]	Error appeared on write/read device
*1.0		BYTE	
=238.0		END_STRUCT	

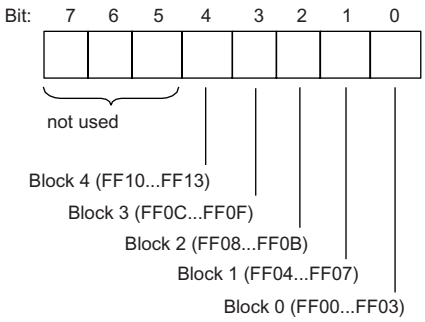
UDT 140: Result of write/read device diagnosis III

Table 6-7 UDT 140 "MOBY write/read device-Stat Diag 3"

Address	Name	Type	Comment
0.0		STRUCT	
+0.0	status_info	BYTE	Write/read device status mode
+1.0	number_MDS	BYTE	Range: 1...24
+2.0	UID	ARRAY [1...24]	Identified UID (MDS number)
*4.0		DWORD	
=98.0		END_STRUCT	

UDT 260: Result of MDS status (mode 1, RF300)

Table 6-8 UDT 260 "MDS status (mode 1, RF300)"

Address	Name	Type	Comment
0.0		STRUCT	
+0.0	status info	BYTE	MDS status mode
+1.0	UID	ARRAY[1...8] BYTE	Number of MDS (unique identifier)
+9.0	MDS_type	BYTE	MDS type 01 = Tag without FRAM 02 = Tag with FRAM 8KB 03 = Tag with FRAM 32KB 04 = Tag with FRAM 64KB
+10.0	Lock_state	BYTE	EEPROM write protection status  Write protection status: 0 = block not protected (r/w) 1 = block protected (ro)
+11.0 to +16.0	res.		Reserved
=18.0		END_STRUCT	

UDT 270: Result of MDS status (mode 2, RF300)

Table 6-9 UDT 270: "MDS status (mode 2, RF300)"

Address	Name	Type	Comment
0.0		STRUCT	
+0.0	status info	BYTE	MDS status mode
+1.0	UID	ARRAY[1...8] BYTE	Number of MDS (unique identifier)
+9.0	LFD	BYTE	Relationship between power flow density limit and actual measured value
+10.0	FZP	BYTE	Error counter, passive (errors during idle time)
+11.0	FZP	BYTE	Error counter, active (errors during communication)
+12.0	ANWZ	BYTE	Presence counter
+13.0 to +16.0	res.	BYTE	Reserved
=18.0		END_STRUCT	

UDT 280: Result of read/write status (mode 6, RF300)

Table 6-10 UDT 280 "write/read device status (mode 6, RF300)"

Address	Name	Type	Comment
0.0		STRUCT	
+0.0	status info	BYTE	Write/read device status mode
+1.0	FZP	BYTE	Error counter, passive (errors during idle time)
+2.0	ABZ	BYTE	Abort counter
+3.0	CFZ	BYTE	Code error counter
+4.0	SFZ	BYTE	Signature error counter
+5.0	CRCFZ	BYTE	CRC error counter
+6.0	BSTAT	BYTE	Current command status
+7.0	ASMFZ	BYTE	Interface error counter for ASM
+8.0 to +26.0	res.	BYTE	Reserved
=28.0		END_STRUCT	

6.8 Determing the memory requirement in the SIMATIC

The memory resources used in SIMATIC S7 by a MOBY application should normally not reach the system limits on the PLC. However, if the following conditions occur simultaneously, the memory requirement must be considered:

- SIMATIC S7 with small memory configuration
- Many MOBY channels (write/read devices) are processed in one S7.
- Processing of large volumes of data on each MOBY channel

The following example shows a configuration for the memory required by FC 45 in an S7. Twenty write/read devices with 1KB of MDS data each are to be processed:

	Memory Requirements [KB]	
	per channel	Total
FC 45 (needed once)	–	~7
Parameter data block (UDT 10)	0.3	6
Command data block (UDT 20)	0.01	0.2
DB for MDS data	1	20
Total	1.31	**33.2**

In this configuration, a SIMATIC CPU with only 48 KB memory can reach the memory limits quickly if further programs are also running.

Brief description of ASM hardware

A

This appendix discusses the special features of the individual interface modules which can be addressed with the FC 45.

For a detailed hardware description of the interface modules with installation notes, see the appropriate MOBY manual on configuring, mounting and service.

A.1 ASM 475

The ASM 475 is an S7-300 module. It can be used in a centralized layout with an S7-300 or in a distributed layout with an ET 200M.

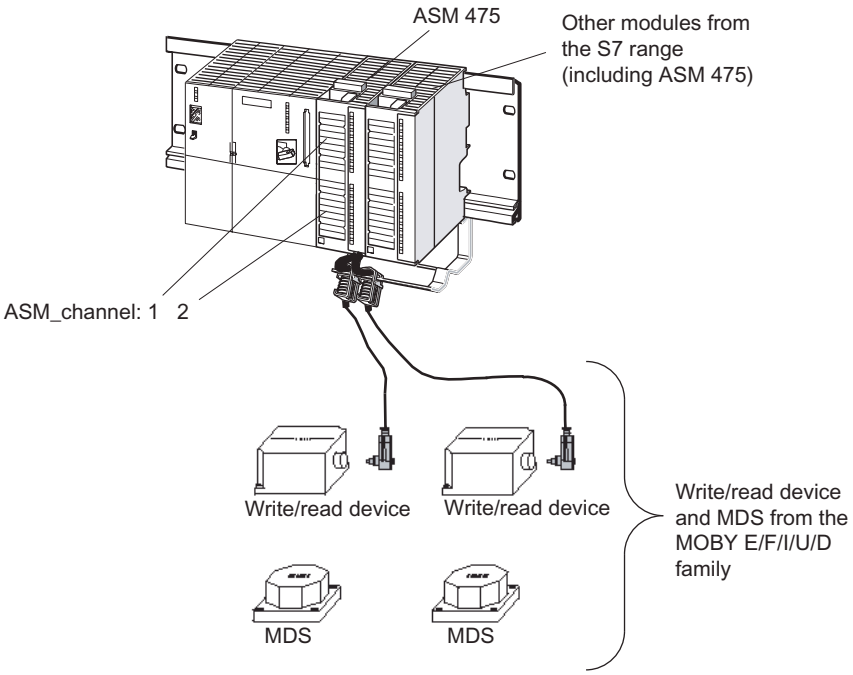


Figure A-1 Configurator for ASM 475 (centralized layout)

Hardware configuration

The ASM 475 is integrated in the hardware configuration of the SIMATIC Manager by calling Setup.exe in the directory daten\S7_OM on the *RFID Systems Software & Documentation* CD. Currently, the ASM 475 cannot be integrated in masters of other manufacturers.

Write/read device / reader connection system

Prefabricated write/read device connection cables are available in various lengths for the ASM 475. The cores at the open end to the ASM/communication module are marked with connection numbers. When making the connections, make sure that the cable shield is led over the shield connecting element. See MOBY manual on configuration, installation and service for more information.

Input parameters for ASM 475

The assignment is made in UDT 10 (see Section "Parameter data block").

Table A-1 Input parameters for ASM 475

Address	Name	Permissible values	Comment
+0.0	ASM_address	256, 272, 288 ... 752 256, 272, 288, ... [2] 256, 260, 264, ... [1]	Centralized layout: Addresses are specified by HW Config (see Section "Addressing of MOBY channels"). Distributed layout: Automatic or manual address assignment
+2.0	ASM_channel	1, 2	2 parallel channels
+8.0	MDS_control	B#16#0, 1	Enable/disable presence check
+9.0	ECC_mode	TRUE, FALSE	TRUE is only permitted when MOBY mode is parameterized with 1.
+9.1	RESET_long	TRUE, FALSE	TRUE, if MOBY mode = 5 (MOBY U or RF300)
+10.0	MOBY_mode	B#16#1, 5, A, B	MOBY I/E/F/U[1]/D[1]
+11.0	scanning_time	B#16#00 ... FF	A value other than 00 is only recommended when MOBY_mode was parameterized appropriately (see Section "INPUT parameters").
+12.0	option_1	B#16#00, 02, 04, ...	See Section "INPUT parameters"
+13.0	distance_limiting	B#16#05, 0A, 0F, 14, 19, 1E, 23	MOBY U[1]/D[1](see Section "INPUT parameters")
+14.0	multitag	B#16#1	MOBY U[1]/D[1]or RF300[1]
+15.0	field_ON_control	B#16#0, 1, 2	MOBY U[1]/D[1](see Section "INPUT parameters")
+16.0	field_ON_time	B#16#00 ... FF	MOBY U[1]/D[1](see Section "INPUT parameters")
1) valid only for 6GT2 002-0GA10 2) valid only for 6GT2 002-0GA00			

Table of commands for ASM 475

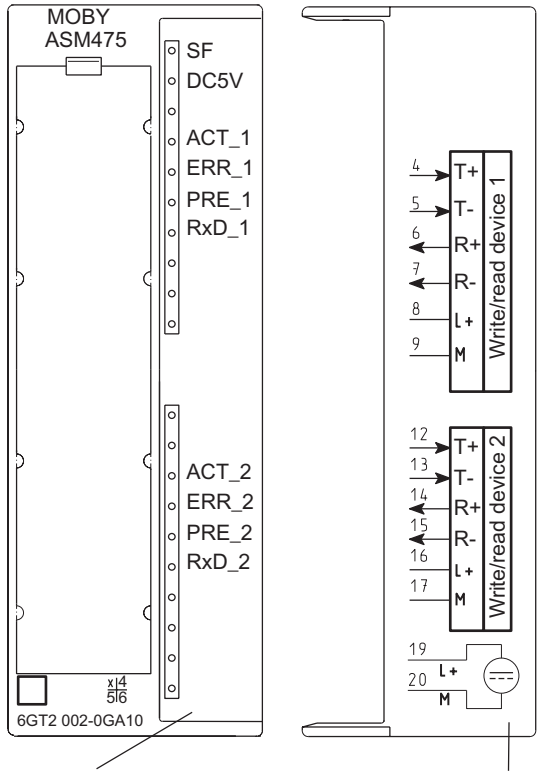
The assignment is made in UDT 20 using the "Command" variable (see Section "Command parameter settings").

Table A-2 Commands for ASM 475

Command code		Description	available in the MOBY system
normal	Chained[3]		
01	41	Write to MDS/transponder	all
02	42	Read MDS/transponder. Read fixed code	all
03	43	Initialize MDS/transponder	all
04	44	Write/read device status[1]	U/D[2] or RF300[2]
08	48	END[1]	U
0A	4A	Turn antenna on/off	F/U/D or RF300
0B	4B	MDS status[1]	U or RF300
1) These commands are only available for 6GT2 002-0GA10. 2) Please read Section "Command parameters". 3) Chained commands are not supported by all write/read devices, please note the information in the MOBY manuals for configuration, mounting and service.			

Command repetition:
Command repetitionn as described in Section "Command repetition" is available on ASM 475 with MLFB 6GT2 002-0GA10.

Interfaces and indicators of the ASM 475



SF:	System fault (hardware error on ASM)
DC 5 V:	24V are connected to ASM and the 5V on ASM are okay.
ACT_1, ACT_2:	The corresponding write/read device is active in processing an application command.
ERR_1, ERR_2:	A flashing pattern indicates the last error to occur. This indicator can be reset with the parameter option_1 (see Section "INPUT parameters").
PRE_1, PRE_2:	Indicates the application of an MDS.
RxD_1, RxD_2:	Indicates live communication with the write/read device. May also indicate malfunctions on the write/read device.

The following ASM states are indicated with the LEDs PRE, ERR and SF.

SF	PRE_1	ERR_1	PRE_2	ERR_2	Description, Causes, Remedy
ON	OFF/ON	ON (perm.)	OFF/ON	ON (perm.)	Hardware is defective (RAM, Flash, …)
ON	OFF	ON	OFF	OFF	Loader is defective (can only be fixed at the plant).
OFF	2 Hz	OFF	2 Hz	OFF	Firmware loading process is active and/or no firmware detected → load firmware
OFF	2 Hz	2 Hz	2 Hz	2 Hz	→ do not switch off ASM during this process
any	5 Hz	5 Hz	5 Hz	5 Hz	Loading of firmware aborted due to error → restart needed → reload firmware → check update files
OFF	OFF	1x flash every 2 s	OFF	1x flash every 2 s	Operating system error → switch ASM off/on
					ASM has booted and is waiting for a RESET (init_run) from the user.

A.2 ASM 473

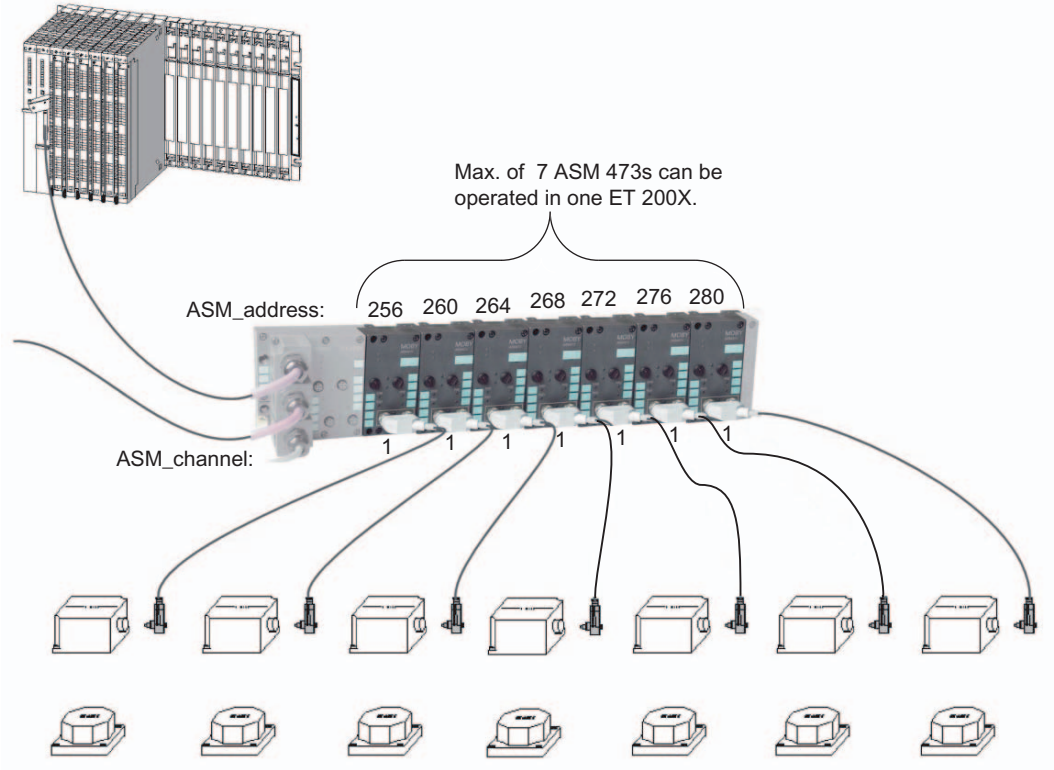


Figure A-2 Maximum configuration of ASM 473 on an ET 200X with sample addressing

Depending on the PROFIBUS master, up to 126 ET 200X modules can be run on one PROFIBUS branch.

Hardware configuration

The ASM 473 is integrated in the hardware configuration of the SIMATIC Manager by calling Setup.exe in the directory daten\S7_OM on the *RFID Systems Software & Documentation* CD. Currently, the ASM 473 cannot be integrated in masters of other manufacturers.

Reader connection system

A write/read device always occupies the two M12 connection sockets X3 and X4 on the ASM 473. A prefabricated cable makes it easy to connect the write/read device. The standard model of the connection cable is 2 m in length. Other lengths are available on request.

An SLG cable connector with screw-type terminals is available for users who want to make their own cables. Cables and SLG cable connectors can be ordered from the MOBY catalog.

Input parameters for ASM 473

The assignment is made in UDT 10 (see Section "Parameter data block").

Table A-3 Input parameters for ASM 473

Address	Name	Permissible values	Comment
+0.0	ASM_address	256, 260, 264, 268, ...	Automatic or manual address assignment Each ASM 473 occupies four bytes of I/O in the peripheral area of the controller.
+2.0	ASM channel	1	1 channel per ASM
+8.0	MDS control	B#16#0, 1	Enable/disable presence check
+9.0	ECC_mode	TRUE, FALSE	TRUE is only permitted when MOBY_mode is parameterized with 1.
+9.1	RESET_long	TRUE, FALSE	TRUE, if MOBY mode = 5 (MOBY U or RF300)
+10.0	MOBY_mode	B#16#1, 5, A, B	MOBY I/E/F/U[1]/D[1]
+11.0	scanning_time	B#16#00 ... FF	A value other than 00 is only recommended when MOBY_mode was parameterized appropriately (see Section "INPUT parameters").
+12.0	option 1	B#16#00, 02, 04, ...	See Section "INPUT parameters"
+13.0	distance_limiting	B#16#05, 0A, 0F, 14, 19, 1E, 23	MOBY U[1]/D[1] (see Section "INPUT parameters")
+14.0	multitag	B#16#1	MOBY U[1]/D[1] or RF300[1]
+15.0	field_ON_control	B#16#0, 1, 2	MOBY U[1]/D[1] (see Section "INPUT parameters")
+16.0	field_ON_time	B#16#00 ... FF	MOBY U[1]/D[1] (see Section "INPUT parameters")
1) valid only for 6GT2 002-0HA10			

Table of commands for ASM 473

The assignment is made in UDT 20 using the "Command" variable (see Section "Command parameter settings").

Table A-4 Commands for ASM 473

Command code		Description	available in the MOBY system
normal	Chained[3]		
01	41	Write to MDS	all
02	42	Read MDS; read fixed code	all
03	43	Initialize MDS	all
04	44	Write/read device status[1]	U/D[2] or RF300[2]
08	48	END[1]	U
0A	4A	Turn antenna on/off	F/U/D or RF300
0B	4B	MDS status[1]	U or RF300
1) These commands are only available for 6GT2 002-0HA10. 2) Please read Section "Command parameters". 3) Chained commands are not supported by all write/read devices. Bitte beachten Sie entsprechende Please adhere to the information in the MOBY manuals for configuration, mounting and service.			

Command repetition:
Command repetition as described in Section "Command repetition" is available on ASM 473 with MLFB 6GT2 002-0HA10.

Interfaces and indicators of the ASM 473

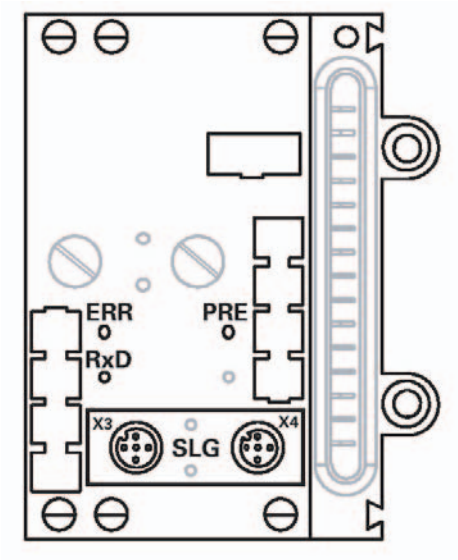


Figure A-3 Interfaces and indicators of the ASM 473

Table A-5 Pin assignment of sockets X3, X4

Socket	Pin	Pin Assignment (write/read device)
X3	1	+RxD
	2	+TxD
	3	-TxD
	4	-RxD
	5	PE
X4	1	+24 V
	2	n. c.
	3	0 V
	4	n. c.
	5	PE

LEDs for PROFIBUS DP
General indicators (SF, BF, ON, DC24V) are located on the basic model of the ET 200X.

LEDs for MOBY

RxD:	Indicates live communication with the write/read device.
PRE:	Indicates the presence of an MDS.
ERR:	Error indication by flashing pattern (see Section "Error messages") This indicator can be reset with the parameter option_1 (see Section "INPUT parameters").

The following ASM states are also indicated with the LEDs "PRE" and "ERR".

PRE	ERR	Description, Causes, Remedy
OFF/ON	ON (perm.)	Hardware is defective (RAM, flash,...)
ON	OFF	Loader is defective (can only be fixed at the plant).
2 Hz	OFF	Firmware loading process is active and/or no firmware detected → load firmware → do not switch off ASM during this process
2 Hz	2 Hz	Loading of firmware aborted due to error → restart needed → reload firmware → check update files
5 Hz	5 Hz	Operating system error → switch ASM or ET 200X base station OFF/ON
OFF	1x flash every 2 s	ASM has booted and is waiting for a RESET (init_run) from the user.

A.3 ASM 452

The ASM 452 is a PROFIBUS DP-V1 slave with degree of protection IP67. Up to two write/read devices / readers can be connected in parallel to it. The two write/read devices are processed in pseudo parallel. This means that, from the user's point of view, command processing takes place in parallel. Internally, however, the ASM/communication module processes the two write/read devices in succession. The MDS / transponder which enters the transmission window of a write/read device first is processed first. This may significantly increase the processing time of the other write/read device. This is the reason dynamic processing of several MDSs simultaneously has not been approved.

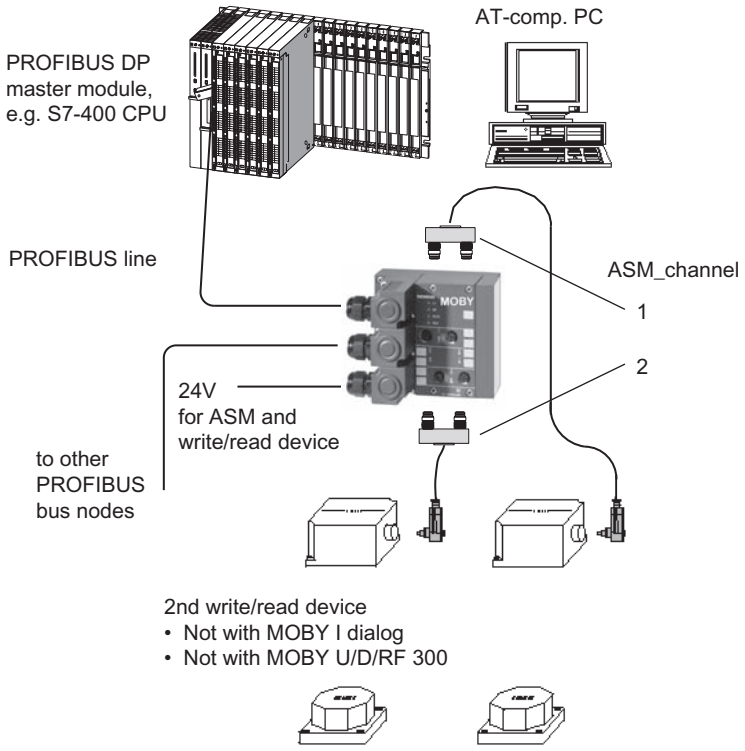


Figure A-4 ASM 452 configurator

Hardware configuration

The ASM 452 is integrated into the hardware configuration of the SIMATIC Manager or into another PROFIBUS Master by means of the GSD file SIEM80B6.GSD. The file is incorporated in the hardware configuration of the SIMATIC Manager using the function "Tools > Install new GSD ...". This file is located in the directory daten\PROFI_GSD\ASM452 of the *RFID Systems Software & Documentation* CD.

Parameter setting by means of GSD file

In addition to the PROFIBUS-relevant control parameters, several MOBY-relevant control parameters are also defined for the ASM 452 in the GSD file. The MOBY-relevant parameters are set using the "Object properties" of the slave in the hardware configuration. The following table shows the possible settings:

Table A-6 Setting of MOBY-relevant parameters

Parameter name	Value	Comment
MOBY mode	MOBY I, E, F normal addressing	(Default)
	MOBY I filehandler	only with FC 46
	MOBY U/D normal addressing	
	MOBY U filehandler	only with FC 46 or FC 56 (multitag)
Baud rate for write/read device MOBY U	19.2 kbps	
	57.6 Kbps	(Default)

Input parameters for ASM 452

The assignment is made in UDT 10 (see Section "Parameter data block").

Table A-7 Input parameters for ASM 452

Address	Name	Permissible values	Comment
+0.0	ASM_address	256, 260, 264, 268, ...	Each ASM 452 occupies four bytes of I/O in the I/O area of the controller.
+2.0	ASM_channel	1, 2	2 quasi parallel channels; channel 2 not for MOBY U/D/I dialog
+8.0	MDS_control	B#16#0, 1	0= no presence check 1= presence check
+9.0	ECC_mode	TRUE, FALSE	
+9.1	RESET_long	TRUE, FALSE	TRUE, if MOBY mode = 5 (MOBY U)
+10.0	MOBY_mode	B#16#1, 4, 5, 8, 9, A, B	Special features of the MOBY I dialog (8): • Write/read device must be type SLG4x. • Write/read device must be connected to channel 1 (ASM_channel = 1). • Channel 2 is not available. • The VMDS memory size is 1280 bytes. The INIT command for the VMDS must be specified using 0500 hex. Special features of the MOBY U/D (5): • Channel 2 is not available.
+11.0	scanning_time	B#16#00 ... FF	A value other than 00 is only recommended when MOBY mode was parameterized appropriately (see Section "INPUT parameters").
+12.0	option 1	B#16#00, 02, 04	See Section "INPUT parameters"
+13.0	distance_limiting	B#16#05, 0A, 0F, 14, 19, 1E, 23	MOBY U/D (see Section "INPUT parameters")
+14.0	multitag	B#16#1	MOBY U/D
+15.0	field ON control	B#16#0, 1, 2	MOBY U/D (see Section "INPUT parameters")
+16.0	field ON time	B#16#00 ... FF	MOBY U/D (see Section "INPUT parameters")

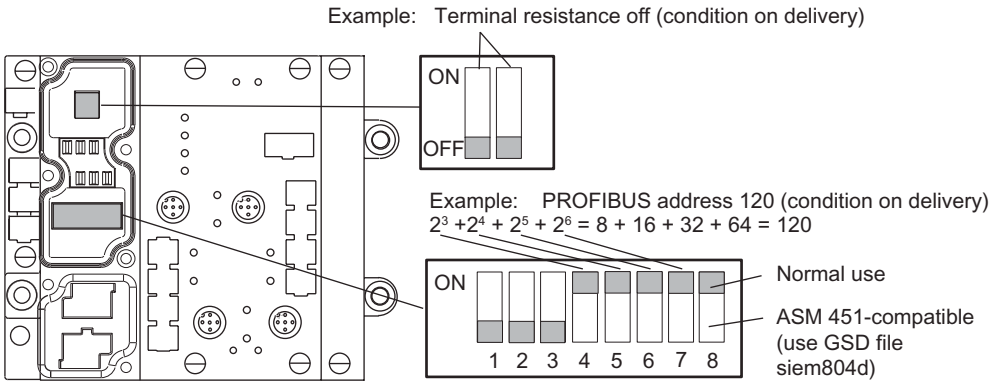
Table of commands for ASM 452

The assignment is made in UDT 20 using the "Command" variable (see Section "Command parameter settings").

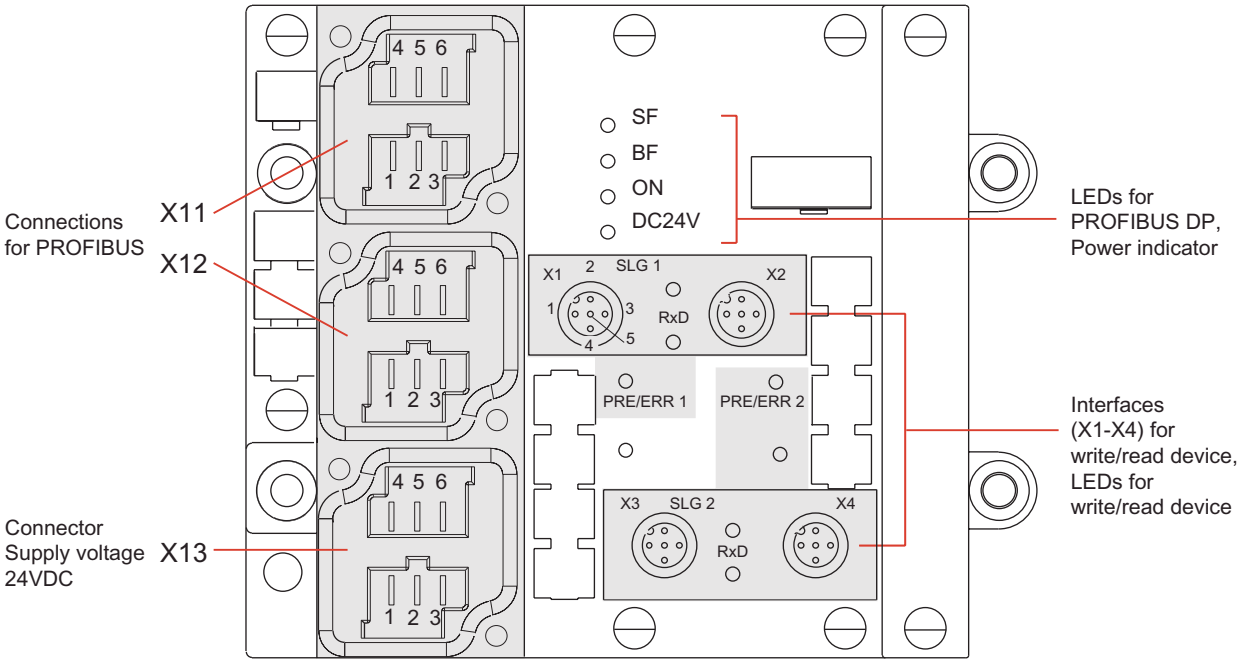
Table A-8 Commands for ASM 452

Command code		Description	available in the MOBY system
normal	Chained[2]		
01	41	Write to MDS	all
02	42	Read MDS; read fixed code	all
03	43	Initialize MDS	all
04	44	SLG status	U[1]/D[1]
08	48	Turn off MDS	U
0A	4A	Turn antenna on/off. With MOBY F the command is only effective when **one** write/read device is used on the ASM 452.	F/U/D
0B	4B	MDS status	U
1) Please read Section "Command parameters". 2) Chained commands are not supported by all write/read devices, please adhere to the information in the MOBY manuals for configuration, mounting and service.			

Setting the PROFIBUS address, activating/deactivating the terminating resistor



Interfaces and indicators of the ASM 452



LEDs for PROFIBUS DP, Power display	**Meaning**	
SF	System Fault (see Table "LED indication for PROFIBUS diagnosis")	
BF	Bus Fault (see Table "LED indication for PROFIBUS diagnosis")	
ON	Lights up when there is logic voltage at the ASM (is generated by the 24 V supply voltage).	
DC 24 V	Lights up when the 24 V supply voltage is connected to the ASM.	
LEDs for write/read device	**Meaning**	
SLG 1	Write/read device 1 is selected	Only write/read device 1 *or* write/read device 2 can be selected.
SLG 2	Write/read device 2 is selected	
PRE/ERR 1	Channel 1: MDS present or error display	**MDS present:** The LED is permanently ON; if more than one MDS is in the field (multitag only), the number of MDSs is indicated by short interruptions of the LED.
PRE/ERR 2	Channel 2: MDS present or error display	**Error indication:** The LED is permanently OFF. The last error number is indicated by brief light pulses.
RxD	SLG active with command	

Interface assignments

Interface			
Connection for PROFIBUS	**Pin**	**Assignment**	
X 11 and X 12	1 2 3 4 5 6	Signal B (red) PE PE (not wired) Signal A (green) L+ (not wired) M (not wired)	
Connection for power supply	**Pin**	**Assignment**	
X 13	1 2 3 4 5 6	PE L+ M PE L+ M	
Connection for write/read device	**Pin**	**Assignment**	
X1/X3	1 2 3 4 5	+RxD +TxD -TxD -RxD PE	
X2/X4	**Pin**	**X2**	**X4**
	1 2 3 4 5	+24 V PRE/ERR2 0 V PRE/ERR1 PE	+24 V res. (DE1) 0 V res. (DE0) PE

Change indication mode of the LEDs PRE/ERR1 and PRE/ERR2

INPUT parameter option_1 can be used to change the indication mode of LEDs PRE/ERR1 and PRE/ERR2 (see also the "INPUT parameters" table in Section "INPUT parameters").

Table A-9 Control of the LEDs PRE/ERR1 and PRE/ERR2

option_1	Meaning of PRE/ERRx
	The LED indicates both ANZ_MDS_present and error_MOBY. When an MDS is in the field (ANZ_MDS_present = 1), errors are not indicated by the LEDs.
	The LED only indicates error_MOBY.
	The LED only indicates ANZ_MDS_present.
	The LED indicates both ANZ_MDS_present and error_MOBY. When an error output is queued, no ANZ_MDS_present is indicated. The error indication can only be reset with the init_run command and setting bit 1 in option_1.

PROFIBUS Diagnosis

"ON" LED is not on or is flashing

If the "ON" LED is not on, this means that either no supply voltage or too low voltage is available to the ASM452. Possible causes include a bad fuse or missing/too low supply voltage. Flashing or absence of this LED may mean that the module is defective.

Diagnosis with LEDs

The following table lists possible error indications with their meanings and provides remedies.

Table A-10 LED indication for PROFIBUS diagnosis

"BF" LED	"SF" LED	Cause of error	Error correction
On	Status not relevant	• ASM 452 is in start-up mode.	–
		• Connection to DP Master failed. • ASM 452 not detecting a baud rate.	• Check the PROFIBUS DP connection. • Check the DP master.
		• Bus interrupt • DP Master not functioning	• Check all cables on your PROFIBUS DP network. • Check whether the connector plugs for PROFIBUS DP are securely plugged into the ASM 452.
Flashes	On	• The configuration data sent to the ASM 452 by the DP master do not match the configuration of the ASM 452.	• Check the configuration of the ASM 452 (input/output, PROFIBUS address). • Correct GSD file used? (SIEM80B6.GSD)
Flashes	Off	• ASM 452 has detected the baud rate, but is not being addressed by the DP Master. • ASM 452 has not been configured.	• Check the PROFIBUS address set on the ASM 452 or in the configuration software. • Check the configuration of the ASM 452 (station type).
On	Flashes	• There is a hardware defect in the ASM 452.	• Replace the ASM 452.

A.4 ASM 454

The ASM 454 is a PROFIBUS slave. Up to four MOBY I/E/V write/read devices can be connected.

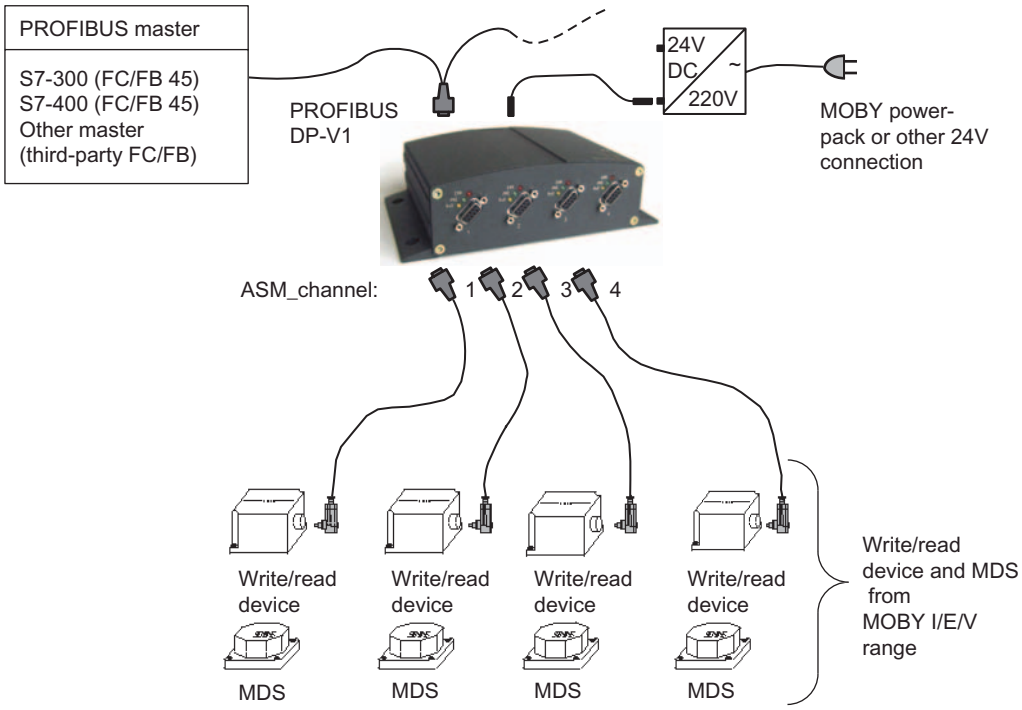


Figure A-5 Configurator for ASM 454

Hardware configuration

The ASM 454 is integrated into the hardware configuration of the SIMATIC Manager or into another PROFIBUS Master by means of the GSD file SIEM809F.GSD. The file is incorporated in the hardware configuration of the SIMATIC Manager using the function "Tools > Install new GSD ...". You will find the file on the CD *RFID Systems Software & Documentation* in the directory daten\PROFI_GSD\ASM454-754-85x.

Input parameters for ASM 454

The assignment is made in UDT 10 (see Section "Parameter data block").

Table A-11 Input parameters for ASM 454

Address	Name	Permissible values	Comment
+0.0	ASM_address	256, 264, 272, 280, ...	Each ASM 454 occupies 8 byte of I/O in the I/O area of the control unit
+2.0	ASM channel	1, 2, 3, 4	4 parallel channels
+8.0	MDS_control	B#16#0, 1, 2	0 = no presence check 1 = presence check 2 = MDS control via NEXT activated
+9.0	ECC_mode	TRUE, FALSE	
+9.1	RESET long	FALSE	(no MOBY U)
+10.0	MOBY_mode	B#16#1, 4, 8, 9	MOBY I dialog with 16KB VMDS on request. (Dialog only possible with write/read device of type write/read device 4x.)
+11.0	scanning_time	B#16#00 ... FF	A value other than 00 is only recommended when MOBY mode was parameterized appropriately (see Section "INPUT parameters").
+12.0	option 1	B#16#00, 02, 04	See Section "INPUT parameters"
+13.0	distance limiting	B#16#0	Not relevant (no MOBY U)
+14.0	multitag	B#16#1	
+15.0	field ON control	B#16#0	
+16.0	field ON time	B#16#0	

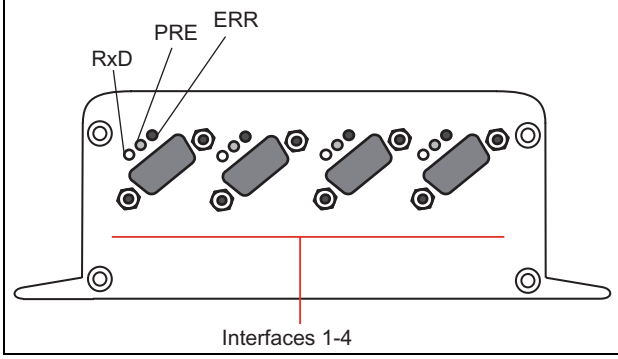
Table of commands for ASM 454

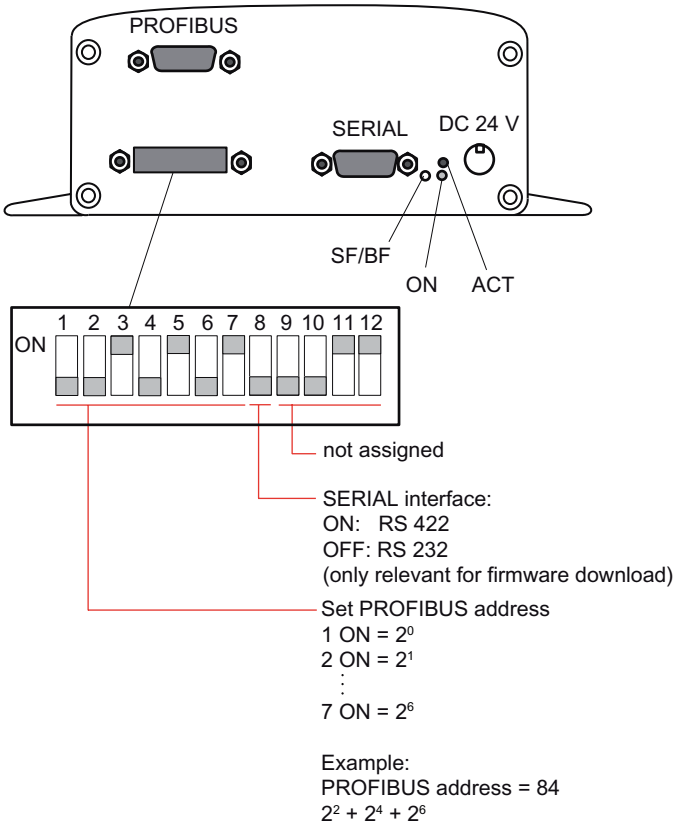
The assignment is made in UDT 20 using the "Command" variable (see Section "Command parameter settings").

Table A-12 Commands for ASM 454

Command code		Description	available in the MOBY system
normal	Chained[1]		
01	41	Write to MDS	all
02	42	Read MDS; read fixed code	all
03	43	Initialize MDS	all
06	–	NEXT command. Only permitted when "MDS_control = 2" is used.	all
1) Chained commands are not supported by all write/read devices. Bitte beachten Sie entsprechende Please adhere to the information in the MOBY manuals for configuration, mounting and service.			

Switch settings, interfaces and indicators of the ASM 454

ASM 454: Write/read device / write/read device side	LED	Meaning
	PRE:	"Presence" of an MDS in transmission window.
	RxD:	SLG active with command
	ERR:	Error indicated by flashing LED
	Interfaces 1-4	Connections for up to four write/read devices

ASM 454: PROFIBUS side	LED	Meaning
	ON: (green)	24 V on ASM
	ACT: (green)	This LED flashes once briefly when a command is finished.
	SF/BF: (red)	System Fault/Bus Fault RAM Error
	Interfaces	**Meaning**
	PROFIBUS	PROFIBUS DP interface
	SERIAL	RS 232/RS 422 interface (only relevant for firmware download)
	DC 24 V	Power supply for ASM 454

A.5 ASM 754

The ASM 754 is a PROFIBUS slave. Up to four MOBY E SLAs (read/write antenna) can be operated on it. The 4 SLAs are processed in "pseudo parallel." This means that, from the user's point of view, command processing takes place in parallel. However, in reality, the ASM processes the 4 antennas in succession. The MDS which enters the transmission window of an SLA first is processed first. This may considerably lengthen the processing times of the other channels (SLAs). This is the reason dynamic processing of several MDSs simultaneously has not been approved.

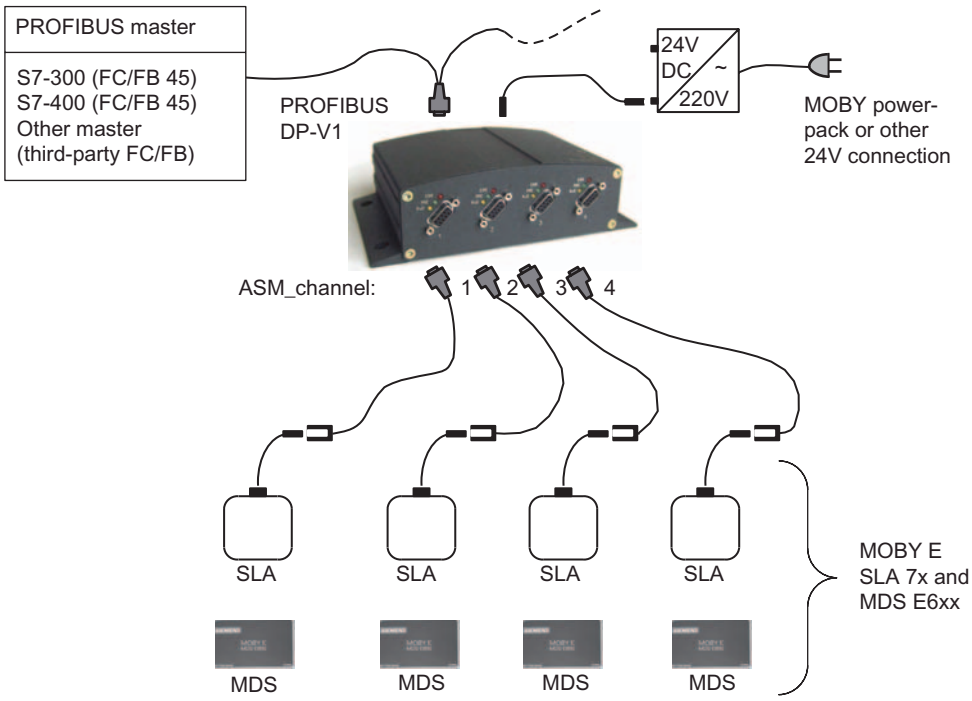


Figure A-6 Configurator for ASM 754

Hardware configuration

The ASM 754 is integrated into the hardware configuration of the SIMATIC Manager or into another PROFIBUS Master by means of the GSD file SIEM809F.GSD. The file is incorporated in the hardware configuration of the SIMATIC Manager using the function "Tools > Install new GSD ...". Sie finden die Datei auf der CD *RFID Systems Software & Documentation* in the directory daten\PROFI_GSD\ASM454-754-85x.

Processing times of MDS E6xx in multiple channel operation

The following table shows the processing times when one command is started simultaneously on 1, 2, 3, or 4 channels.

Table A-13 Processing times of MDS E6xx in multiple channel operation

SLA per ASM	Time to Read 752 Byte		Time to Write 752 Byte
	Single Command	Chained Command	
1	3.3 s		2.5 s
2	6.6 s		5 s
3	9.8 s		7.5 s
4	13 s		10 s

The times in the table are minimum times.
Slow PROFIBUS baud rates and large bus configurations may increase these times.

Input parameters for ASM 754

The assignment is made in UDT 10 (see Section "Parameter data block").

Table A-14 Input parameters for ASM 754

Address	Name	Permissible values	Comment
+0.0	ASM_address	256, 264, 272, 280, ...	Each ASM 754 occupies 8 byte of I/O in the I/O area of the control unit
+2.0	ASM_channel	1, 2, 3, 4	4 pseudo parallel channels
+8.0	MDS_control	B#16#0, 1	0 = no presence check 1 = presence check
+9.0	ECC_mode	FALSE	No ECC driver
+9.1	RESET_long	FALSE	(no MOBY U)
+10.0	MOBY_mode	B#16#1	Only MOBY I/E protocol permitted
+11.0	scanning_time	B#16#00	No parameterization of the scanning time
+12.0	option_1	B#16#00, 02, 04	See Section "INPUT parameters"
+13.0	distance_limiting	B#16#0	Not relevant (no MOBY U)
+14.0	multitag	B#16#1	
+15.0	field_ON_control	B#16#0	
+16.0	field_ON_time	B#16#0	

Table of commands for ASM 754

The assignment is made in UDT 20 using the "Command" variable (see Section "Command parameter settings").

Table A-15 Commands for ASM 754

Command code		Description
normal	Chained	
01	41	Write to MDS
02	42	Read MDS; read fixed code
03	43	Initialize MDS

Switch settings, interfaces and indicators of the ASM 754

See Section "Switch settings, interfaces and indicators of the ASM 454" in Chapter "ASM 454"

A.6 ASM 854

The ASM 854 is a PROFIBUS slave. Up to four MOBY F SLAs can be connected in parallel to it. In addition to standard programming with the FB 45, the ASM 854 can also directly process the fixed-code data memories (type MDS F1xx) using the process image. Programming is described later (process image mode).

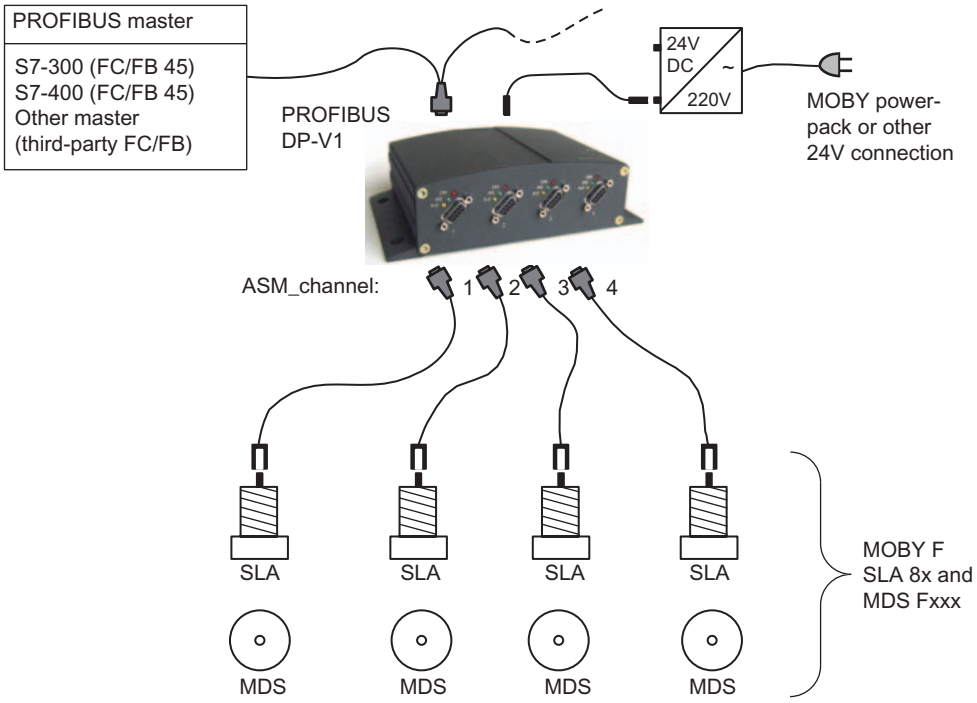


Figure A-7 Configurator for ASM 854

Hardware configuration

The ASM 854 is integrated into the hardware configuration of the SIMATIC Manager or into another PROFIBUS Master by means of the GSD file SIEM809F.GSD. The file is incorporated in the hardware configuration of the SIMATIC Manager using the function "Tools > Install new GSD ...". Sie finden die Datei auf der CD *RFID Systems Software & Documentation* in the directory daten\PROFI_GSD\ASM454-754-85x.

Input parameters for ASM 854

The assignment is made in UDT 10 (see Section "Parameter data block").

Table A-16 Input parameters for ASM 854

Address	Name	Permissible values	Comment
+0.0	ASM_address	256, 264, 272, 280, ...	Each ASM 854 occupies 8 byte of I/O in the I/O area of the control unit
+2.0	ASM channel	1, 2, 3, 4	4 parallel channels
+8.0	MDS_control	B#16#0, 1	0 = no presence check 1 = presence check (must always be set when using MOBY_mode = A (MDS F1xx))
+9.0	ECC_mode	FALSE	No ECC driver
+9.1	RESET long	FALSE	(no MOBY U)
+10.0	MOBY mode	B#16#A, B	Only MOBY F parameterization
+11.0	scanning time	B#16#00	No parameterization of the scanning time
+12.0	option 1	B#16#00, 01, 04, 08	(See Section "INPUT parameters")
+13.0	distance_limiting	B#16#0	Not relevant (no MOBY U)
+14.0	multitag	B#16#1	
+15.0	field ON control	B#16#0	
+16.0	field ON time	B#16#0	

Table of commands for ASM 854

The assignment is made in UDT 20 using the "Command" variable (see Section "Command parameter settings").

Table A-17 Commands of the ASM 854 when MOBY_mode = B

Command code		Description
normal	Chained	
01	41	Write to MDS
02	42	Read MDS
03	43	Initialize MDS
0A	4A	Antenna on/off

The command table is valid for the FB 45. No commands are transferred to the ASM when fixed-code MDSs are processed with the process image.

Special features of the fixed-code MDS (MOBY_mode = A)

When in this mode, the ASM *automatically* reads each new MDS as it arrives. The user does not need to start a command.

The user issues the read command using UDT 20. repeat_command and command_start must then be issued simultaneously to start the command and fetch the data.

Switch settings, interfaces and indicators of the ASM 854

See Section "Switch settings, interfaces and indicators of the ASM 454" in Chapter "ASM 454"

Parameterizing process image mode

Note

Process image mode does not use the FB 45. This section describes how to handle and program the process image mode. Only fixed-code MDSs of type "MDS F1xx" can be read in this mode.

Process image mode is parameterized in HW Config by selecting the appropriate entry from the GSD file. Process image mode does not offer functions for the application.

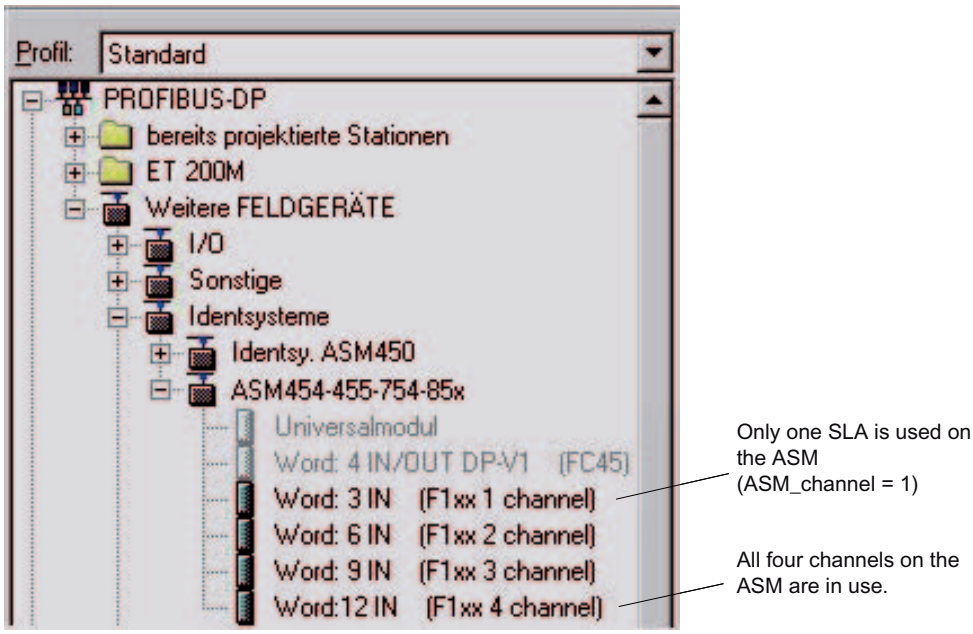


Figure A-8 Selecting process image mode for ASM 854/850 based on the number of channels

Process image mode: Operating principle

After the ASM and PROFIBUS have powered up, code 00 00 00 00 00 is stored in the process image for each MDS. Each SLA channel immediately starts to scan its surroundings for a new MDS no. As soon as the MDS no. has been read, the process image indicates the fixed-code information. The new MDS no. is retained until an MDS with a new no. is read. The new MDS overwrites the old number. The data must be read to a data block with SFC 14 to ensure that the number is always transferred consistently with PROFIBUS or is indicated on the S7. In addition to the 5 bytes of fixed-code information, status information is located in the 1st byte of the process image which the user can evaluate.

Process image mode: Programming

The data must be scanned by SFC 14 to ensure consistent representation of the information which was read. The following example shows the programming of the ASM 854 in process image mode.

```
Block: OB1 MOBY F with ASM 854 in process image mode
```

```
Network: 1
The data of 9 MOBY F channels are read consistently to DB 20. The 9
channels are distributed over 3 ASM 854s.
```

```
CALL "DPRD_DAT"                          // = SFC14
     LADDR :=W#16#0                      // 1st ASM 854 has I/O address
     RET_VAL :=MW0                          0
     RECORD :=P#DB20.DBX 0.0 BYTE 24     // The data are stored in DB
                                            20 starting at address 0.
                                            Since 4 channels are used,
                                            the data length is
                                            24 bytes.

CALL "DPRD_DAT"                          // 2nd ASM 854 has I/O address
     LADDR :=W#16#24                        24
     RET_VAL :=MW1                       // The data are stored in DB
     RECORD :=P#DB20.DBX 24.0 BYTE          20 starting at address 24.
24                                          Since 4 channels are used,
                                            the data length is
                                            24 bytes.

CALL "DPRD_DAT"                          // 3rd ASM 854 has I/O address
     LADDR :=W#16#48                        48
     RET_VAL :=MW2
     RECORD :=P#DB20.DBX 48.0 BYTE 6     // The data are stored in DB
                                            20 starting at address 48.
                                            Since 1 channel is used,
                                            the data length is
                                            6 bytes.
// New data can be processed in DB20 starting here.
```

Process image mode: data representation and evaluation

The following figure shows the layout of the ASM data after SFC 14 is called. The presentation also applies when the ASM data are directly viewed in the process image.

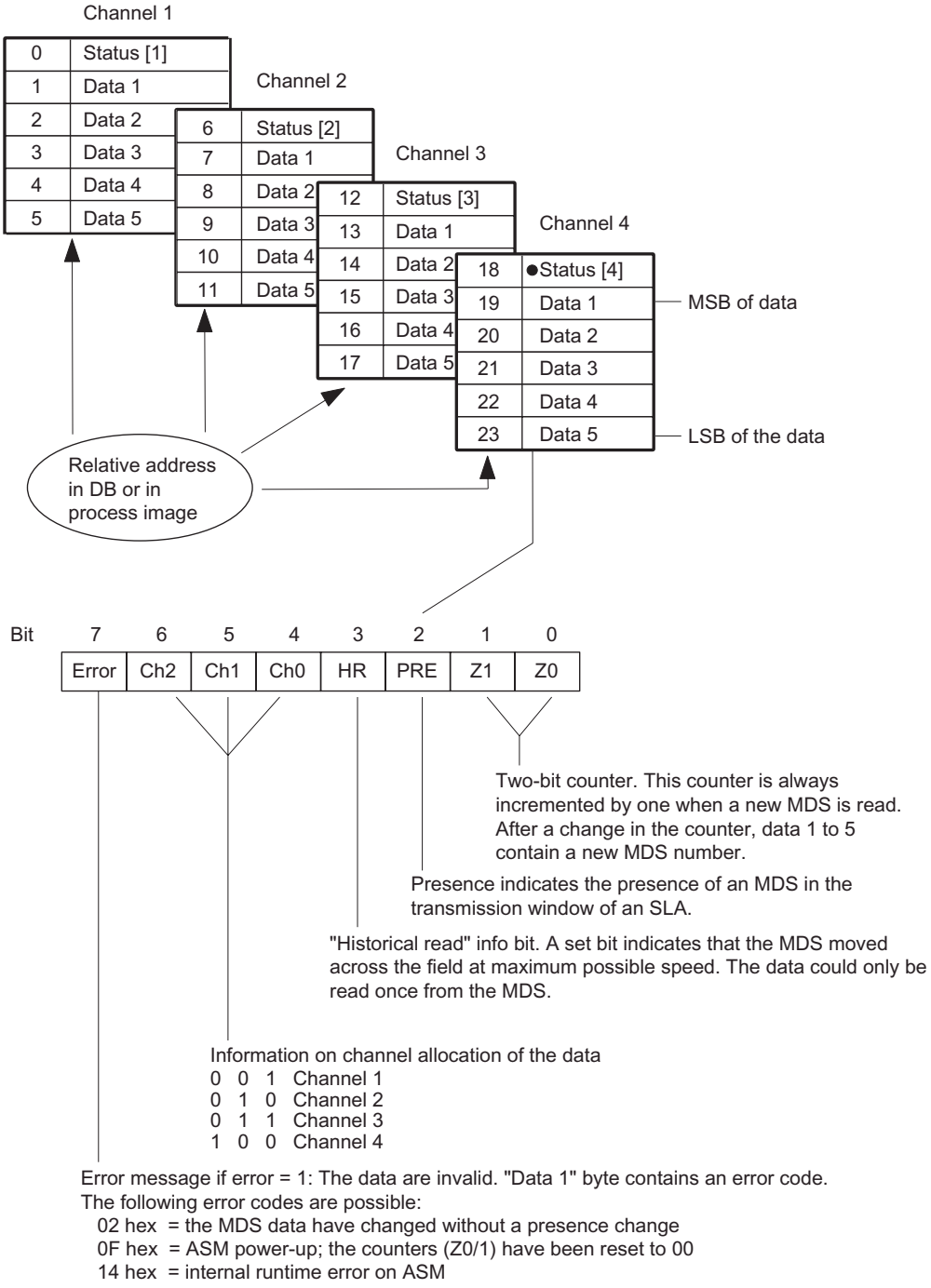


Figure A-9 Data presentation and evaluation in process image mode

Process image mode: time diagram

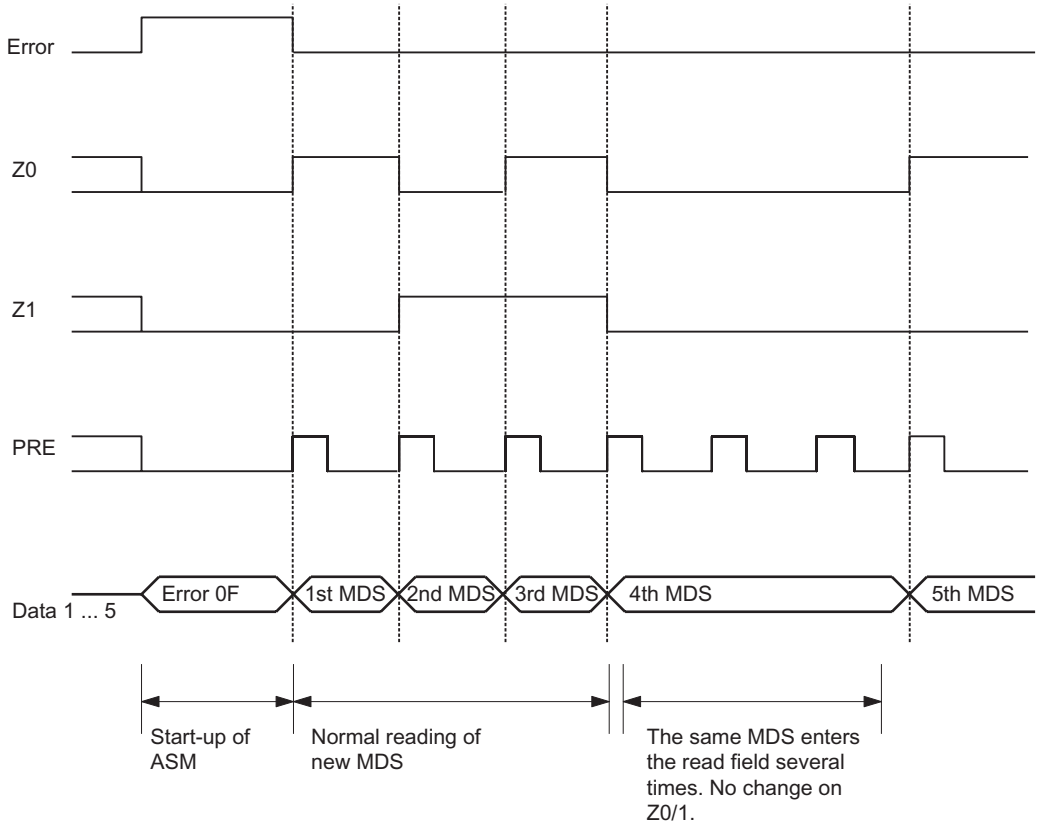


Figure A-10 Time diagram for process image mode

A.7 ASM 850

The ASM 850 is a PROFIBUS slave. One MOBY F SLA can be connected. In addition to standard programming with the FB 45, the ASM 850 can also directly process the fixed-code data memories (type MDS F1xx) using the process image. The programming is described in Section "ASM 854".

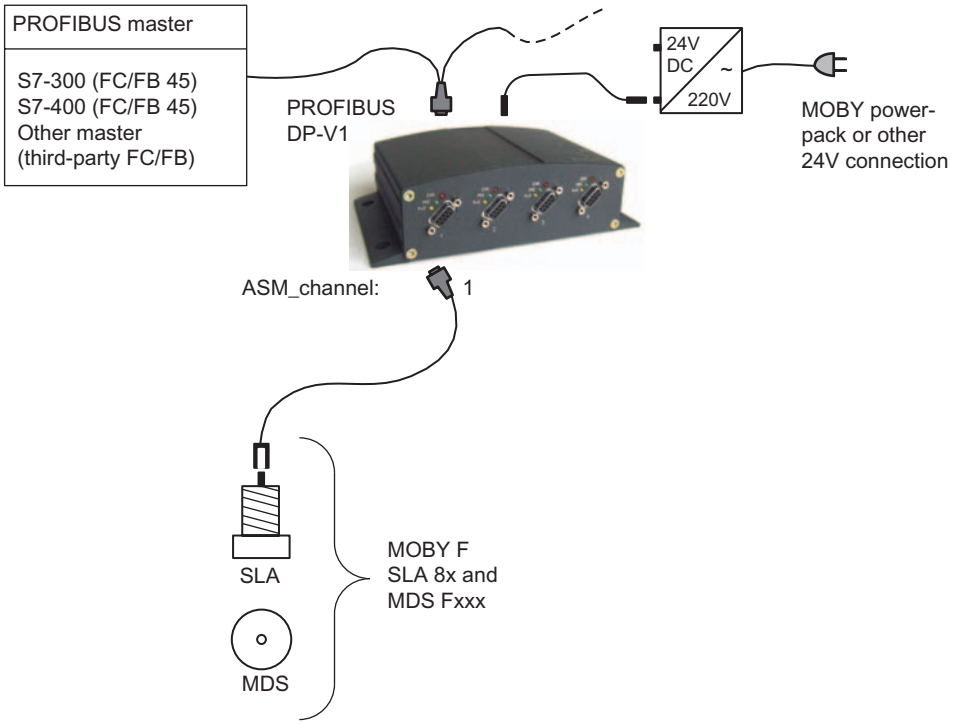


Figure A-11 Configurator for ASM 850

Hardware configuration

The ASM 850 is integrated into the hardware configuration of the SIMATIC Manager or into another PROFIBUS Master by means of the GSD file SIEM809F.GSD. The file is incorporated in the hardware configuration of the SIMATIC Manager using the function "Tools > Install new GSD ...". Sie finden die Datei auf der CD *RFID Systems Software & Documentation* in the directory daten\PROFI_GSD\ASM454-754-85x.

Input parameters for ASM 850

The assignment is made in UDT 10 (see Section "Parameter data block").

Table A-18 Input parameters for ASM 850

Address	Name	Permissible values	Comment
+0.0	ASM_address	256, 264, 272, 280, ...	Each ASM 850 occupies 8 byte of I/O in the I/O area of the control unit
+2.0	ASM_channel	1	1 channel
+8.0	MDS_control	B#16#0, 1	0= no presence check 1= presence check
+9.0	ECC_mode	FALSE	No ECC driver
+9.1	RESET_long	FALSE	(no MOBY U)
+10.0	MOBY_mode	B#16#A, B	Only MOBY F parameterization
+11.0	scanning_time	B#16#00	No parameterization of the scanning time
+12.0	option_1	B#16#00, 01, 04, 08	(See Section "INPUT parameters")
+13.0	distance_limiting	B#16#0	Not relevant (no MOBY U)
+14.0	multitag	B#16#1	
+15.0	field_ON_control	B#16#0	
+16.0	field_ON_time	B#16#0	

Table of commands for ASM 850

The assignment is made in UDT 20 using the "Command" variable (see Section "Command parameter settings").

Table A–18 Commands of the ASM 850

Command code		Description
normal	Chained	
01	41	Write to MDS
02	42	Read MDS; read fixed code
03	43	Initialize MDS
0A	4A	Antenna on/off

The command table is valid for the FB 45. No commands are transferred to the ASM when fixed-code MDSs are processed with the process image.

Switch settings, interfaces and indicators of the ASM 850

See Section "Switch settings, interfaces and indicators of the ASM 454" in Chapter "ASM 454"

Programming the MOBY-ASM on PROFIBUS

B

B.1 Programming the MOBY-ASM on PROFIBUS DP-V1

For whom is this Appendix intended?

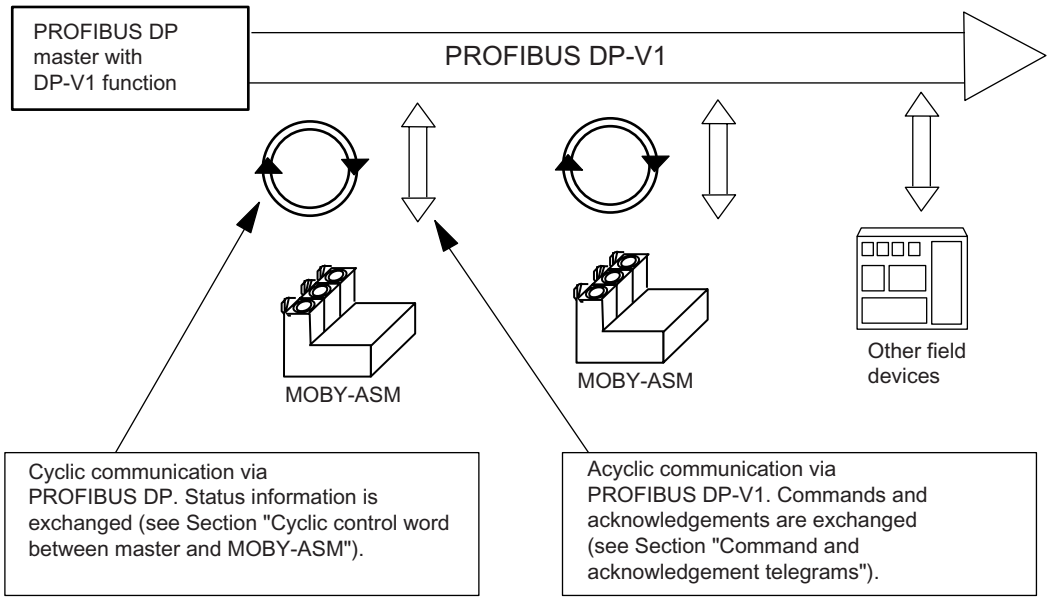
This section does not need to be considered by SIMATIC users. It is intended particularly for programmers of PCs and third-party PLCs. The information enables the programmer to develop customized function blocks or drivers for the MOBY-ASM.

Note

Some signals in this appendix have the same meaning as the variables in Section "Parameter data block". In order to distinguish between them, an underscore "_" is appended to the relevant signals (e.g. ANZ_MDS_present_).

Communication between ASM and PROFIBUS master

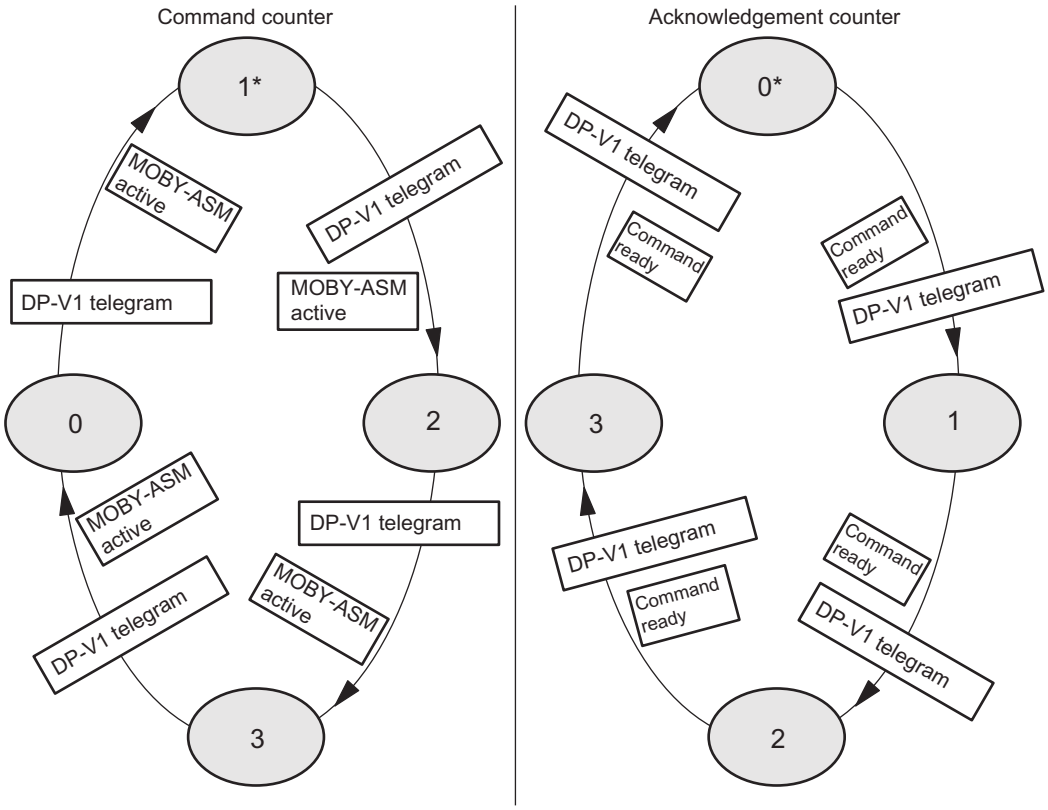
PROFIBUS-DP must be able to transfer both the cyclic (DP) and the *non-cyclic data* (DP-V1).



The master may only send **new commands** to the slave (MOBY-ASM) when the ASM is ready. *Status information* is used to indicate that the MOBY-ASM is ready. The same applies to acknowledgments. The MOBY-ASM may only fetch **new acknowledgments** when a new acknowledgment is actually waiting (i.e. has not yet been read). This information is also indicated by a *state info*.

Two indications are defined in the *state info*. The PROFIBUS DP master uses these two indications to decide whether a DP-V1 telegram can be executed to or from the MOBY-ASM.

Principle of controlling non-cyclic communication with command and acknowledgment counter



* Status of counters after ASM power-up or after an init_run_

Figure B-1 Command and acknowledgement counter states

As you can see from the diagram above, a DP-V1 telegram triggers the change from one *defined state* to the next. A new DP-V1 telegram is not permitted until the *next state* is reached. A DP-V1 telegram is either a command to the ASM or an acknowledgment from the ASM.

For this reason, it is important to tell the master whether a new DP-V1 telegram can be executed. *Each state is coded in 2 bits and counted up (as shown in the diagram above)*- hence the name **state bits or state counters**.

The state bits are transmitted cyclically to the master via PROFIBUS DP. The user must evaluate the bits in his program. When the state bit changes, a new state (new state = old state + 1) is created. Only now can the next DP-V1 telegram be sent.

Two states must be coded.

1. *Command state (command counter)* to tell the user whether a new/next command may be transferred to the MOBY-ASM
2. *Acknowledgment state (acknowledgment counter)* to tell the user whether a new acknowledgment from the MOBY-ASM is waiting

The user must evaluate the acknowledgement state with higher priority. I.e. when the user wants to send a telegram to the ASM but a telegram from the ASM is waiting to be fetched at the same time, the telegram from the ASM must be fetched first.

Both the command and the acknowledgment state are coded in 2 bits each. Both states are stored in a byte (see Section "Cyclic control word between master and MOBY-ASM").

B.2 Cyclic Control Word between Master and MOBY-ASM

The cyclic control word is used to synchronize telegram communication between master (FB / FC) and slave (MOBY-ASM). The actual non-cyclic command and acknowledgment frames via DP-V1 may not be started until this is indicated by the cyclic byte of the MOBY-ASM in the command or acknowledgment counter.

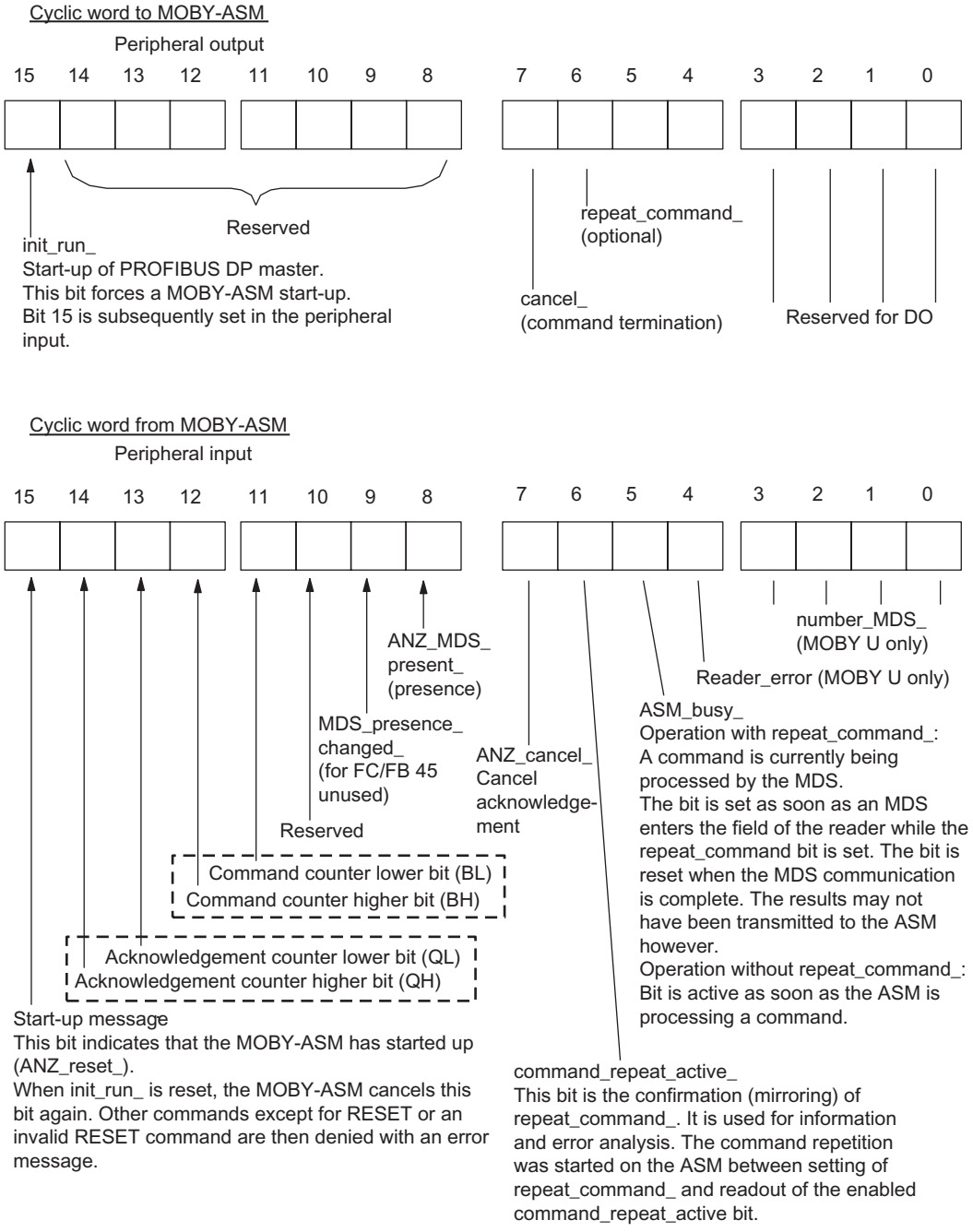
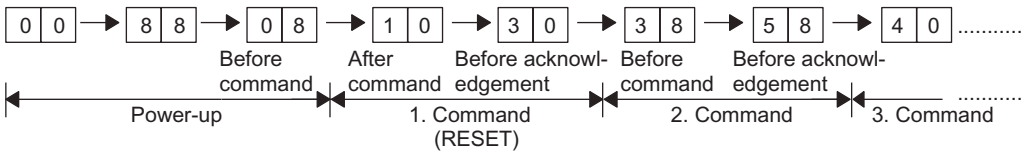


Figure B-2 Structure of the cyclic control word

After start-up, the cyclic word of MOBY-ASM takes on the following states (bits 8 to 15 are shown).



Synchronizing of command and acknowledgment counters

The command (BZ) and acknowledgment (QZ) counters are synchronized during a start-up. The ASM sets QZ = 0 and BZ = 1. The start-up can be triggered by both the ASM (return of power) and the user (init_run_).

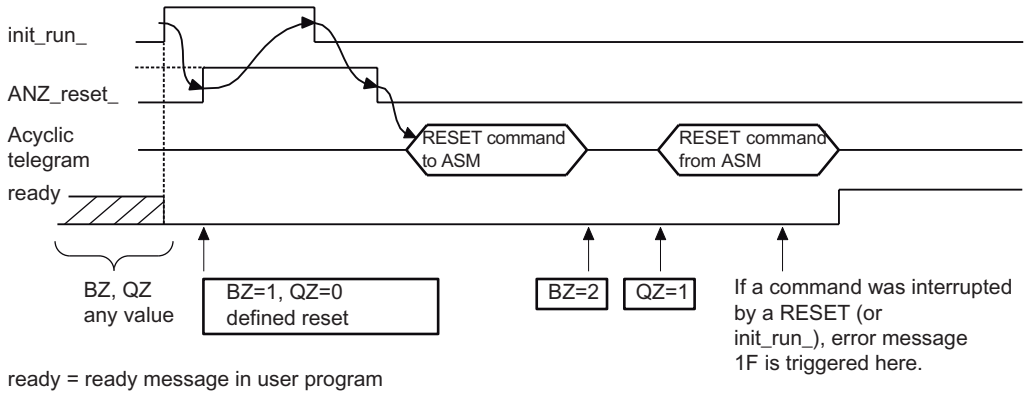


Figure B-3 Power-up timing initiated by user

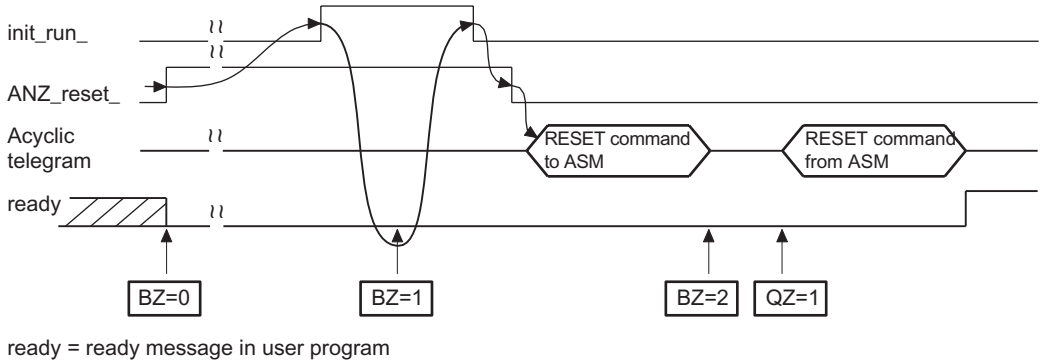
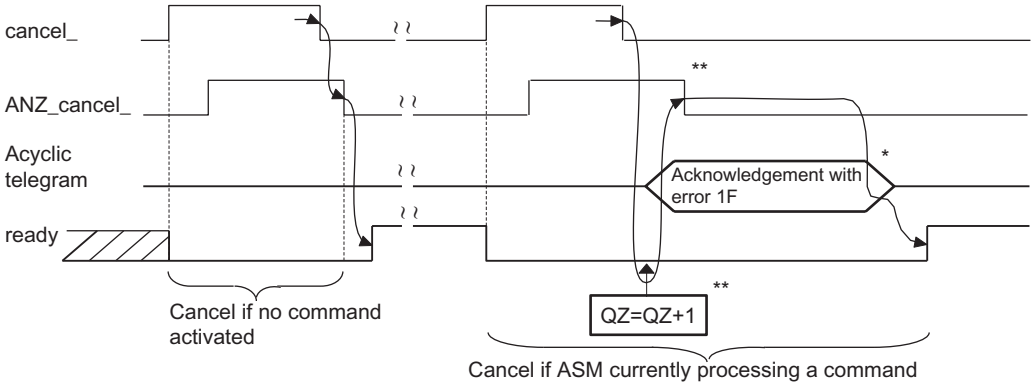


Figure B-4 Power-up timing of ASM initiated by power failure

Terminating a command with Cancel

BZ and QZ are not reset with Cancel.



* only one error acknowledgement is made if several commands (command chains) are canceled.
** the incrementation of QZ and withdrawal of Anz_cancel_ can be indicated simultaneously to the user.

ready = ready message in user program

Figure B-5 Cancel timing

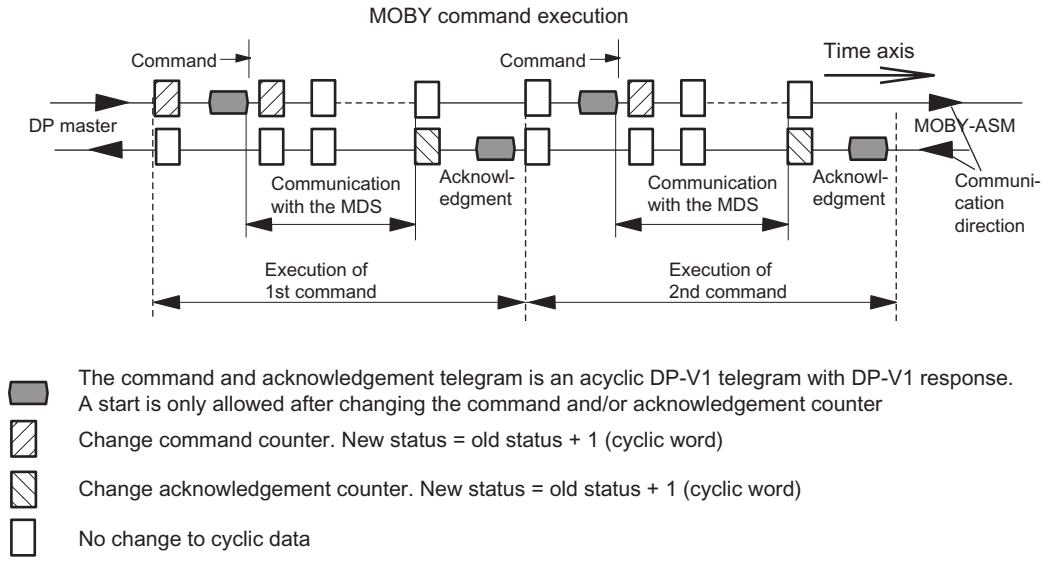
B.3 Methods of operation with the ASM

Commands are executed one at a time

This means that, after each command, the user must wait for the acknowledgment (result) before the next command is sent to the ASM. This type of programming involves the following characteristics.

- Simple function block programming
- No optimal-speed data transmission for several consecutive commands

The following diagram shows the sequence of command and acknowledgement exchange between user (DP master) and MOBY-ASM.



The command and acknowledgement telegram is an acyclic DP-V1 telegram with DP-V1 response. A start is only allowed after changing the command and/or acknowledgement counter

Change command counter. New status = old status + 1 (cyclic word)

Change acknowledgement counter. New status = old status + 1 (cyclic word)

No change to cyclic data

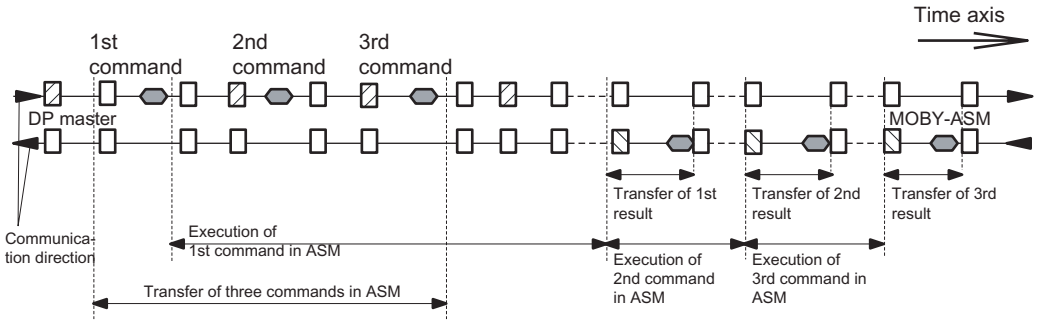
Figure B-6 Command execution: one command at a time

Command chaining and command buffering on the ASM

Command chaining is indicated when the chaining bit (bit 6 in the command) is set (see also Section "MOBY commands).
Command buffering is a characteristic of the ASM. A variety of buffers are available to the ASM for intermediate storage of commands and results.
Use of command chaining and command buffering involves the following characteristics:

- Programming a function block becomes more complex.
- Optimum data throughput to and from the MDS.
  This is particularly noticeable with large amounts of data (1 KB) and slower PROFIBUS transmission rates.

The following diagram shows the procedure used for command and acknowledgment communication between user (DP master) and MOBY-ASM when a chained command is used.



The command and acknowledgement telegram is an acyclic DP-V1 telegram with DP-V1 response. A start is only allowed after changing the command and/or acknowledgement counter

Change command counter. New status = old status + 1 (cyclic word)

Change acknowledgement counter. New status = old status + 1 (cyclic word)

No change to cyclic data

Figure B-7 Command execution: Command chaining and buffering

The following general conditions apply to the procedures shown in the diagram above.

- It is obvious that data transmission and execution of the commands take place parallel to each other.
- The sequences shown in the diagram above may vary depending on the transmission speeds of PROFIBUS and the MOBY-MDS.
- If the PROFIBUS implementation on the DP master only provides limited resources (buffer) for non-cyclic data transmission, the PROFIBUS data transmission may take quite a while. This is particularly noticeable in extensive bus configurations with MOBY-ASM.

- If the PROFIBUS master can be set to permit several non-cyclic telegrams between cyclic data communication, PROFIBUS data transmission can be accelerated in a bus configuration with many MOBY-ASMs. However, this has a negative effect on the cyclic data communication of I/O modules which are also part of the same PROFIBUS branch. The cycle time of PROFIBUS becomes irregular and sporadically may become very high.
- When more commands are to be processed by the ASM than ASM buffer space, the user must first fetch results from the ASM before new commands can be sent to the ASM.
- The ASM does not absolutely require the chaining bit in the command. However, from the user's point of view, it is an elegant way to identify related partial commands. A chaining bit which is set in the command is returned by the ASM in the acknowledgment.
- The number of buffers on the ASM varies with the type of ASM. For more information, see Section "Command repetition".

Command repetition

The procedure for command repetition and its advantages have already been described in Section "Command repetition".

Programming of command repetition at the PROFIBUS level will now be discussed. The I/O input or I/O output word controls command repetition (see Section "Cyclic control word between master and MOBY-ASM").

The following diagram shows telegram communication between user (DP master) and MOBY-ASM.

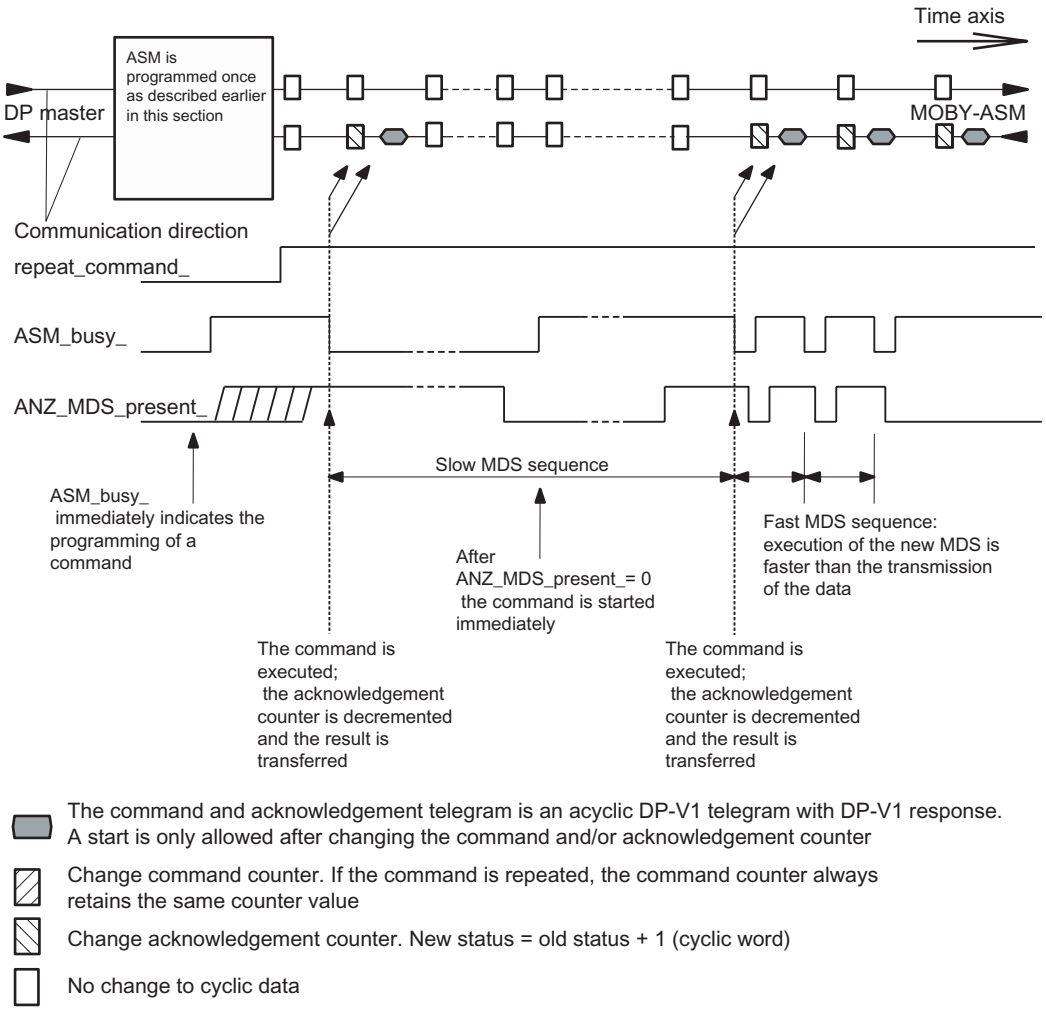


Figure B-8 Command repetition using I/O words

Command repetition can also be concretely controlled as shown below.

- An external proximity switch is used to signal that a new MDS is entering the transmission window (see figure below: Ⓐ).
- A new MDS is detected with the ANZ_MDS_present_ bit, and command repetition is then started (see figure below: Ⓑ).

In this case, the command_repeat_active_ bit must be scanned to make sure the command repetition was accepted.

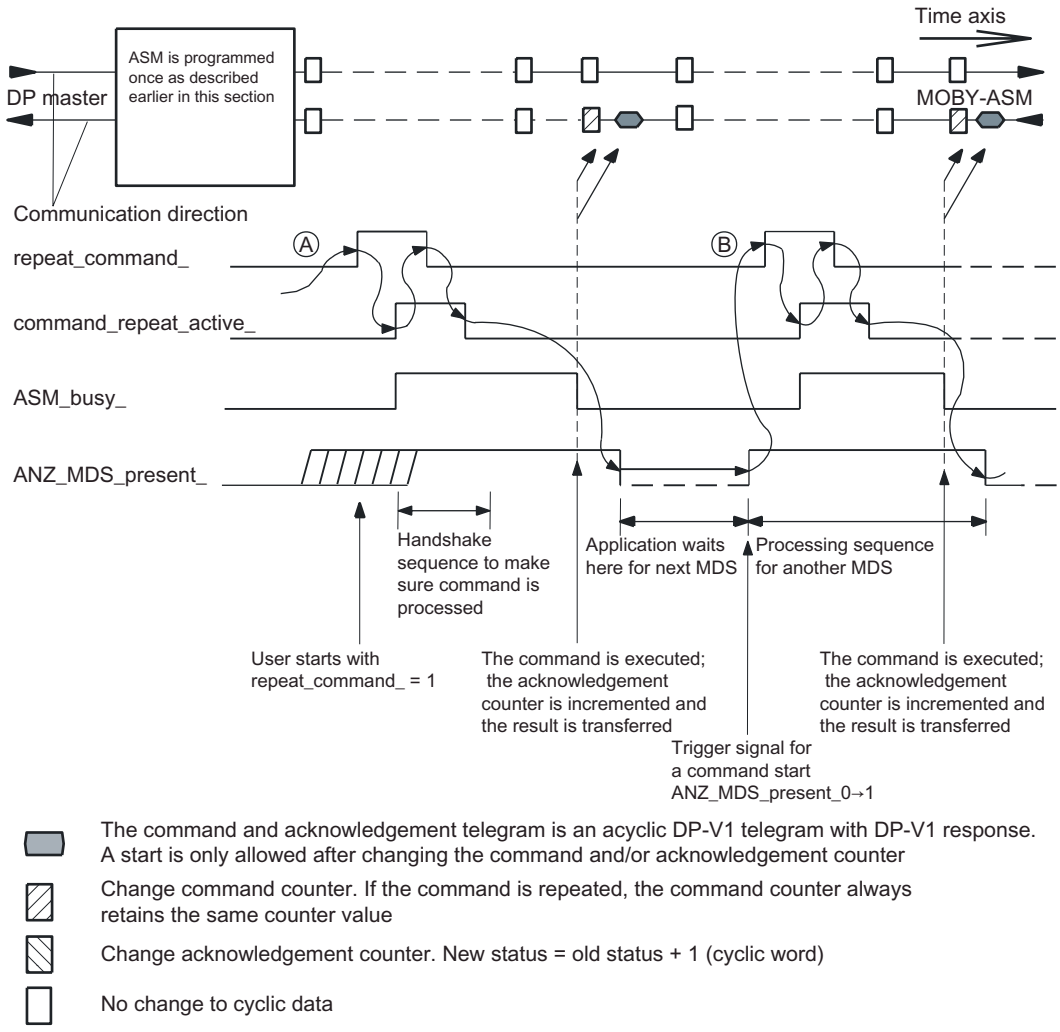


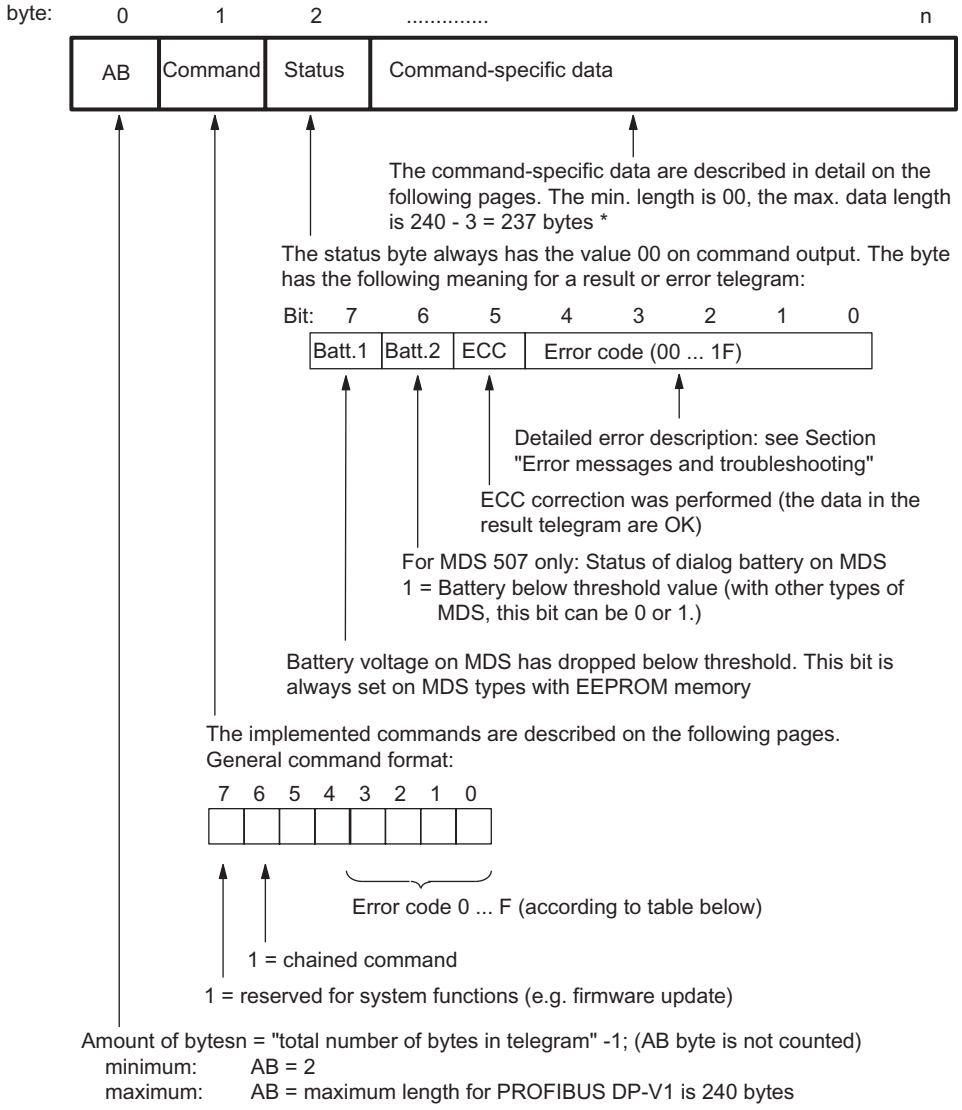
Figure B-9 Focused command repetition

B.4 Command and acknowledgement telegrams

Commands and results are sent and received with the non-cyclic telegram service of PROFIBUS DP-V1. The telegrams are described in this section.

General telegram format

The telegram layout applies to both command telegrams to the MOBY-ASM and result telegrams from the MOBY-ASM.



* The length specified here is the maximum length for PROFIBUS. The ASM 475, 473 is an exception with a length 1 byte shorter (max. data length = 239; command-specific data = 236).

Figure B-10 General telegram format

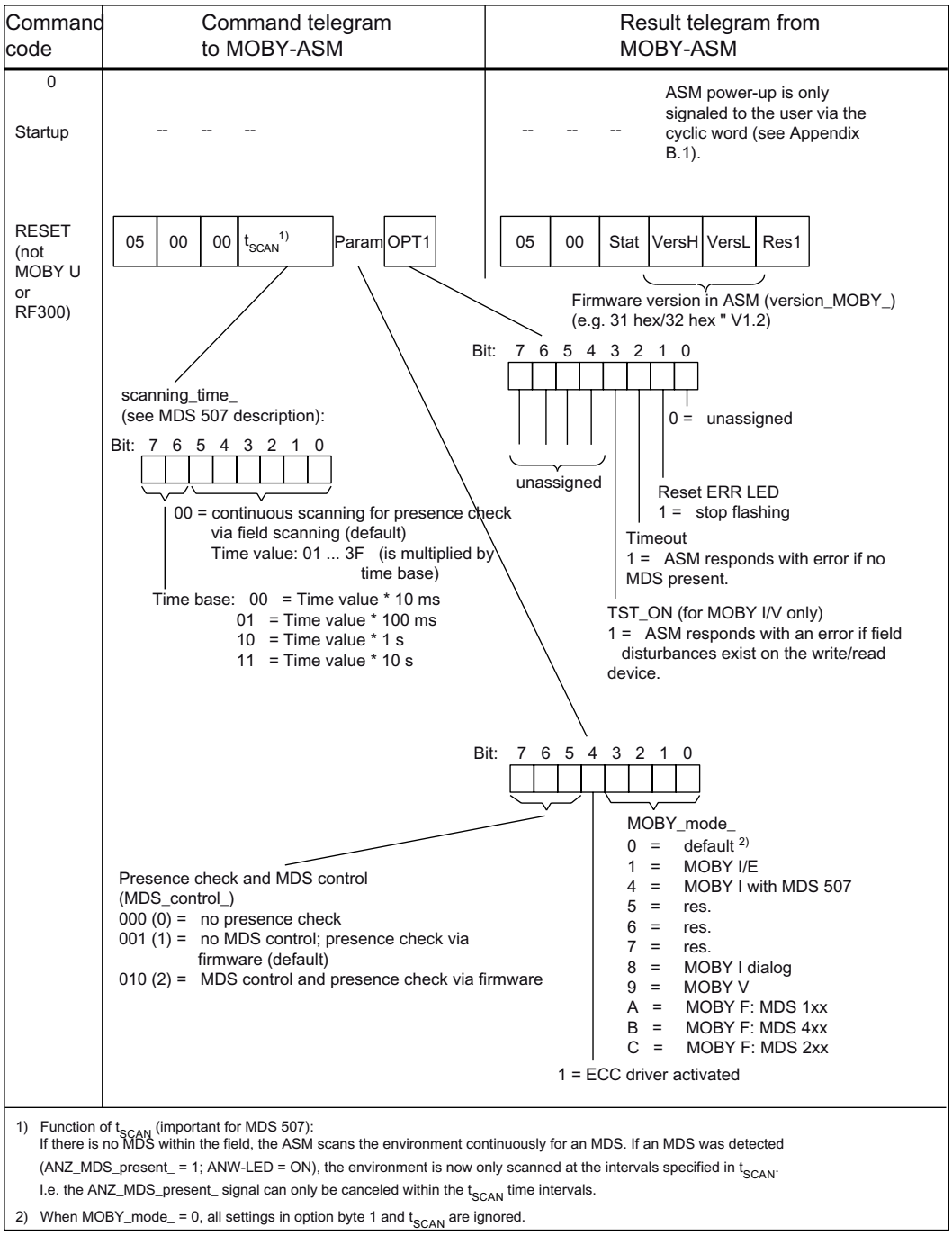
Command table

<table>
<tr><th>Command code

[hex]</th><th>Command code chained [hex]</th><th>Command</th><th>Description</th></tr>
<tr><td>0</td><td>–</td><td>RESET</td><td>ASM is reset. The active command is terminated.
(If an MDS command was terminated with RESET, the reset acknowledgment reports error 1F.)
The RESET command can be used to switch the ASM to various operating modes.</td></tr>
<tr><td>1</td><td>41</td><td>Write</td><td>Write data block to MDS</td></tr>
<tr><td>2
3</td><td>42
43</td><td>Read
Initialization</td><td>Read data block from MDS
This command is required when a new (not yet write-accessed) MDS is being used or after failure/replacement of the battery or when MDS is to be run in ECC mode. The MDS is already initialized for normal use.
<table>
<tr><th colspan="3">MDS type</th><th>INIT duration (normal)</th><th>INIT duration (with ECC)</th><th>Memory size + 1</th></tr>
<tr><td>1KB</td><td>VMDS</td><td>(MOBY I)</td><td>< 0.1 s</td><td>–</td><td>00 05 00</td></tr>
<tr><td>2KB</td><td>RAM</td><td>(MOBY I)</td><td>0.4 s</td><td>5 s</td><td>00 08 00</td></tr>
<tr><td>8KB</td><td>FRAM</td><td>(MOBY I)</td><td>0.8 s</td><td>20 s</td><td>00 20 00</td></tr>
<tr><td>8KB</td><td>EEPROM</td><td>(MOBY I)</td><td>18 s</td><td>54 s</td><td>00 20 00</td></tr>
<tr><td>32KB</td><td>RAM</td><td>(MOBY I)</td><td>3 s</td><td>75 s</td><td>00 80 00</td></tr>
<tr><td>752 bytes</td><td>EEPROM</td><td>(MOBY E)</td><td>0.8 s</td><td>–</td><td>00 02 F0</td></tr>
<tr><td>192 bytes</td><td>MDS 4xx</td><td>(MOBY F)</td><td>2.2 s</td><td>–</td><td>00 00 C0</td></tr>
<tr><td>16 bytes</td><td>MDS 2xx</td><td>(MOBY F)</td><td>0.25 s</td><td>–</td><td>00 00 10</td></tr>
<tr><td>2KB</td><td>RAM</td><td>(MOBY U)</td><td>approx. 1 s</td><td>–</td><td>00 08 00</td></tr>
<tr><td>32KB</td><td>RAM</td><td>(MOBY U)</td><td>approx. 1.5 s</td><td>–</td><td>00 80 00</td></tr>
<tr><td>44 bytes</td><td>I-Code</td><td>(MOBY D)</td><td></td><td></td><td>00 00 2C</td></tr>
<tr><td>112 bytes</td><td>I-Code SLI</td><td>(MOBY D)</td><td></td><td></td><td>00 00 70</td></tr>
<tr><td>256 bytes</td><td>Tag-it HF-I</td><td>(MOBY D)</td><td></td><td></td><td>00 01 00</td></tr>
<tr><td>1000 bytes</td><td>my-d</td><td>(MOBY D)</td><td></td><td></td><td>00 04 00</td></tr>
<tr><td>20 bytes</td><td>EEPROM</td><td>(RF300)</td><td>approx. 0.2 s</td><td>–</td><td>00 00 14</td></tr>
<tr><td>8KB</td><td>FRAM</td><td>(RF300)</td><td>0.3 s</td><td>–</td><td>00 20 00</td></tr>
<tr><td>32KB</td><td>FRAM</td><td>(RF300)</td><td>1.2 s</td><td>–</td><td>00 80 00</td></tr>
<tr><td>64KB</td><td>FRAM</td><td>(RF300)</td><td>2.4 s</td><td>–</td><td>00 FF 00</td></tr>
</table></td></tr>
<tr><td>4</td><td>44</td><td>SLG status</td><td>Returns as result the status byte, the selected write/read device and the ANZ_MDS_present_ bit. This command checks to determine whether a write/read device is connected to the ASM and, if so, whether it is okay and ready for operation. An appropriate error is reported, if necessary. With MOBY U various diagnostic data can be fetched from the write/read device.</td></tr>
<tr><td>6</td><td>–</td><td>NEXT</td><td>The following command(s) refer(s) to the next MDS. The user can immediately start a command even though the old MDS is still in the field. The NEXT command must only be programmed when MDS_control_ = 2 was set in the RESET command.
A NEXT command must arrive between 2 MDS passes or an error message will occur. Conclusion of an MDS pass with a NEXT command is also valid after the MDS has already left the field or the next MDS is already in the field.</td></tr>
<tr><td>8</td><td>48</td><td>END</td><td>Terminate communication with MDS</td></tr>
</table>

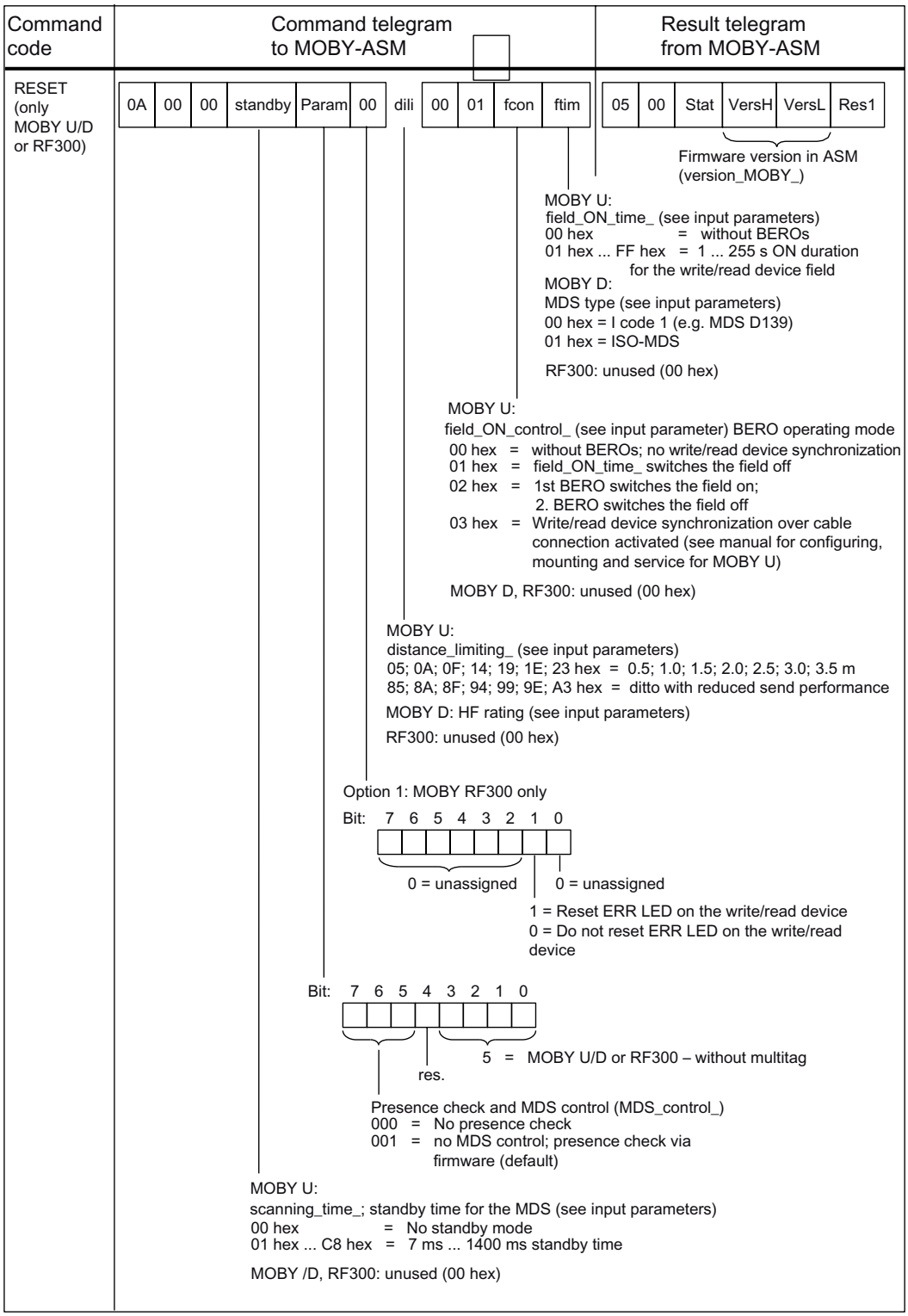
Command code [hex]	Command code chained [hex]	Command	Description
A	4A	Antenna on/off	Only MOBY F/U/D or RF300: This command turns the antenna field on the write/read device off and on again.
B	4B	MDS status	Returns the characteristics of the MDS in the result.

Exact telegram format



1) Function of t_{SCAN} (important for MDS 507):
If there is no MDS within the field, the ASM scans the environment continuously for an MDS. If an MDS was detected (ANZ_MDS_present_ = 1; ANW-LED = ON), the environment is now only scanned at the intervals specified in t_{SCAN}.
I.e. the ANZ_MDS_present_ signal can only be canceled within the t_{SCAN} time intervals.

2) When MOBY_mode_ = 0, all settings in option byte 1 and t_{SCAN} are ignored.


Command code
Command telegram to MOBY-ASM
Result telegram from MOBY-ASM
RESET (only MOBY U/D or RF300)
0A 00 00 standby Param 00 dili 00 01 fcon ftim
05 00 Stat VersH VersL Res1
Firmware version in ASM (version_MOBY_)
MOBY U:
field_ON_time_ (see input parameters)
00 hex = without BEROs
01 hex ... FF hex = 1 ... 255 s ON duration for the write/read device field
MOBY D:
MDS type (see input parameters)
00 hex = I code 1 (e.g. MDS D139)
01 hex = ISO-MDS
RF300: unused (00 hex)
MOBY U:
field_ON_control_ (see input parameter) BERO operating mode
00 hex = without BEROs; no write/read device synchronization
01 hex = field_ON_time_ switches the field off
02 hex = 1st BERO switches the field on; 2. BERO switches the field off
03 hex = Write/read device synchronization over cable connection activated (see manual for configuring, mounting and service for MOBY U)
MOBY D, RF300: unused (00 hex)
MOBY U:
distance_limiting_ (see input parameters)
05; 0A; 0F; 14; 19; 1E; 23 hex = 0.5; 1.0; 1.5; 2.0; 2.5; 3.0; 3.5 m
85; 8A; 8F; 94; 99; 9E; A3 hex = ditto with reduced send performance
MOBY D: HF rating (see input parameters)
RF300: unused (00 hex)
Option 1: MOBY RF300 only
Bit: 7 6 5 4 3 2 1 0
0 = unassigned
0 = unassigned
1 = Reset ERR LED on the write/read device
0 = Do not reset ERR LED on the write/read device
Bit: 7 6 5 4 3 2 1 0
5 = MOBY U/D or RF300 – without multitag
res.
Presence check and MDS control (MDS_control_)
000 = No presence check
001 = no MDS control; presence check via firmware (default)
MOBY U:
scanning_time_; standby time for the MDS (see input parameters)
00 hex = No standby mode
01 hex ... C8 hex = 7 ms ... 1400 ms standby time
MOBY /D, RF300: unused (00 hex)

<table>
<tr><th>Command code</th><th>Command telegram to MOBY-ASM</th><th>Result telegram from MOBY-ASM</th></tr>
<tr><td>01, 41 (write)</td><td>AB | 01, 41 | 00 | Address MSB \| LSB | LNG | D1 ... Dn</td><td>02 | 01, 41 | 00** (40,C0)</td></tr>
<tr><td>02, 42 (read)</td><td>05 | 02, 42 | 00 | Address MSB \| LSB | LNG
-- -- --</td><td>AB | 02, 42 | 00** (40,C0) | Address MSB \| LSB | LNG | D1 ... Dn
For ASM 854/850 only:
0A | 02 | 00 | 0X | ZZ | 05 | D1...D5 ***
Counter is incremented with each new MDS
Bit 0 = ANZ_MDS_present_
Bit 1 = HR (see Appendix A.6; process image mode)</td></tr>
<tr><td>03, 43 (initialize)</td><td>06 | 03, 43 | 00 | INIT pattern | End add. + 1 00 \| MSB \| LSB</td><td>02 | 03, 43 | 00** (40,C0)</td></tr>
</table>

This means:

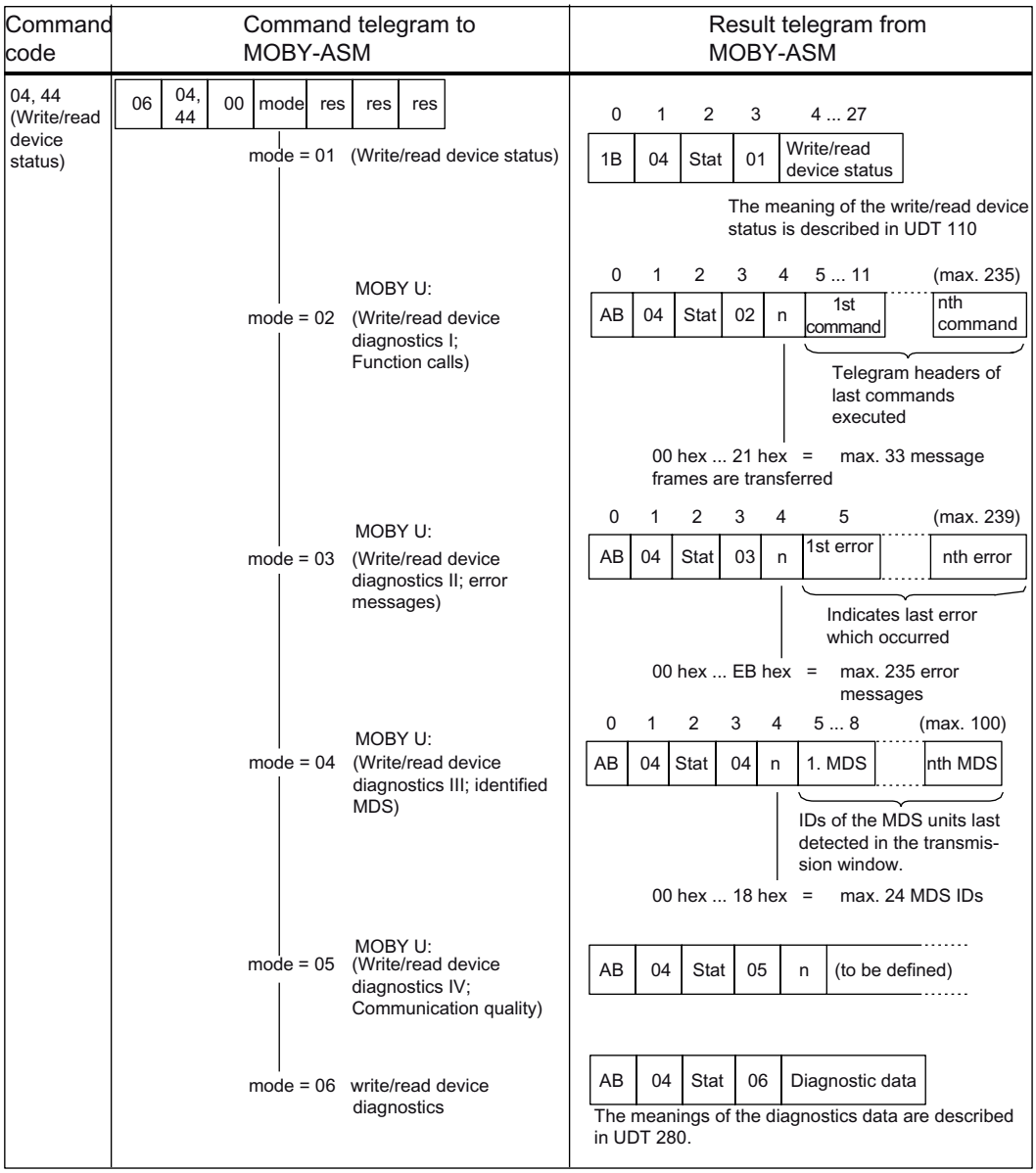
D1 ... Dn	user data (1 to 234; for ASM 475, 473: 1 to 233)
LNG	Length of the data block (D1 to Dn) Remarks: Address + LNG must be less than end address of the MDS
Address	Start address of the data to be processed on the MDS: MSB = Most significant address portion LSB = Least significant address portion
AB	Number of characters in the telegram AB = LNG + 5 Remarks: AB + 1 may not be greater than the bus configuration.
INIT pattern	During initialization, the MDS is written with the value "INIT pattern."
End add. + 1	Memory size of the MDS

*) In the event of an error, the format of the result telegram is as follows:
The AB byte (02) can store a value > 2 for the read command.
In this case, the data are only partially correct and must be rejected.

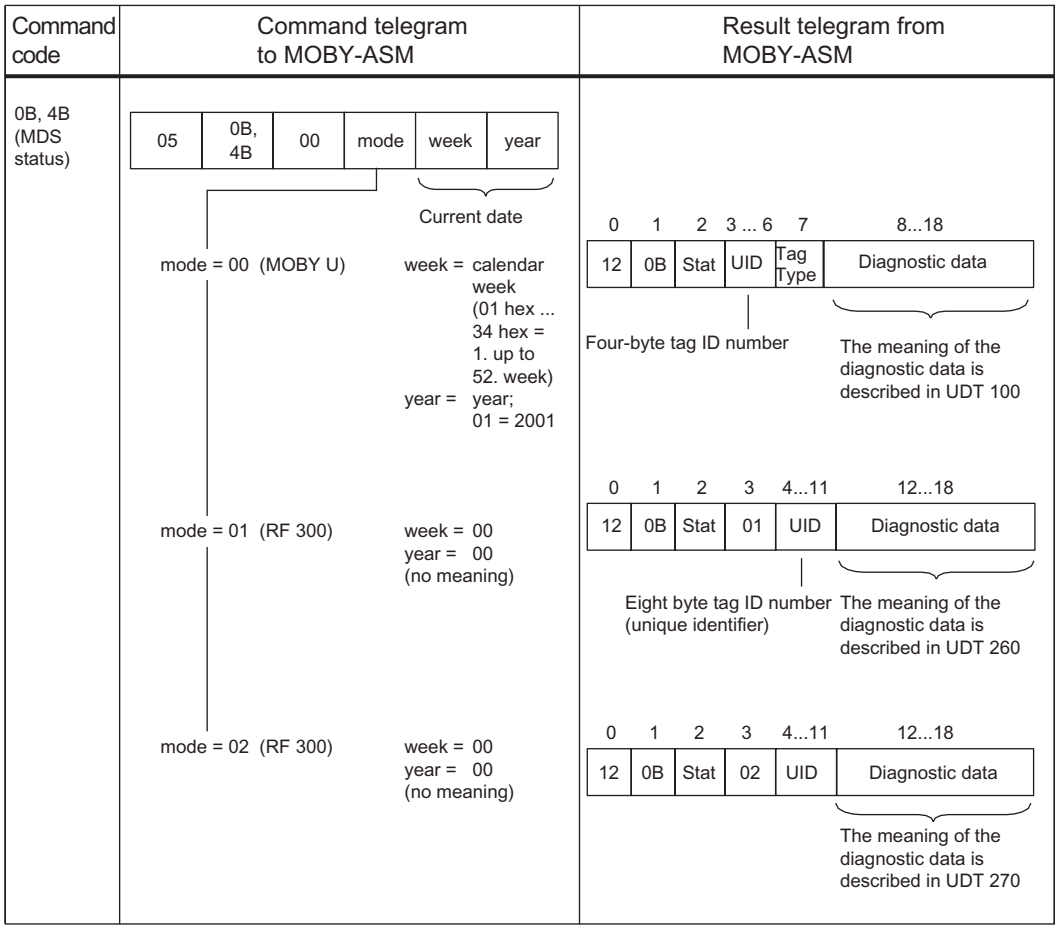
02	Command	Error

**) The status byte in the result telegram depends on the MDS type (battery states)

***) Telegram when reading fixed-code MDS (MOBY F). The ASM reads each MDS automatically. Only results are transmitted.


Command code
Command telegram to MOBY-ASM
Result telegram from MOBY-ASM
04, 44 (Write/read device status)
06 | 04, 44 | 00 | mode | res | res | res
mode = 01 (Write/read device status)
0 1 2 3 4 ... 27
1B | 04 | Stat | 01 | Write/read device status
The meaning of the write/read device status is described in UDT 110
MOBY U:
mode = 02 (Write/read device diagnostics I; Function calls)
0 1 2 3 4 5 ... 11 (max. 235)
AB | 04 | Stat | 02 | n | 1st command | nth command
Telegram headers of last commands executed
00 hex ... 21 hex = max. 33 message frames are transferred
MOBY U:
mode = 03 (Write/read device diagnostics II; error messages)
0 1 2 3 4 5 (max. 239)
AB | 04 | Stat | 03 | n | 1st error | nth error
Indicates last error which occurred
00 hex ... EB hex = max. 235 error messages
MOBY U:
mode = 04 (Write/read device diagnostics III; identified MDS)
0 1 2 3 4 5 ... 8 (max. 100)
AB | 04 | Stat | 04 | n | 1. MDS | nth MDS
IDs of the MDS units last detected in the transmission window.
00 hex ... 18 hex = max. 24 MDS IDs
MOBY U:
mode = 05 (Write/read device diagnostics IV; Communication quality)
AB | 04 | Stat | 05 | n | (to be defined)
mode = 06 write/read device diagnostics
AB | 04 | Stat | 06 | Diagnostic data
The meanings of the diagnostics data are described in UDT 280.

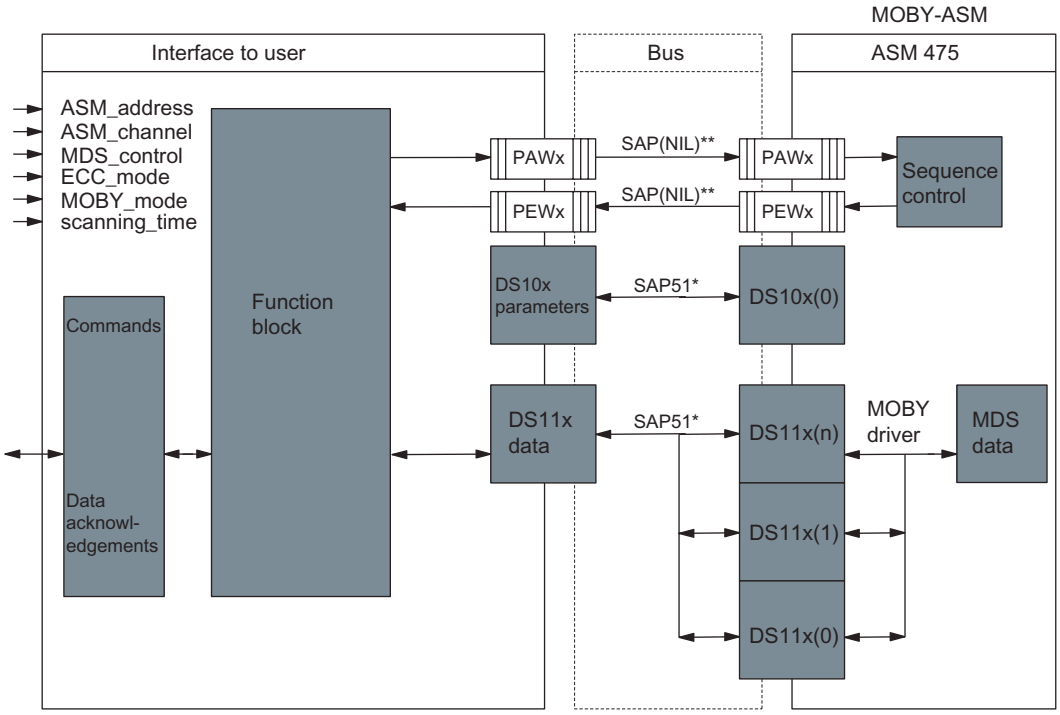
Command code	Command telegram to MOBY-ASM	Result telegram from MOBY-ASM
06 (NEXT)	02 | 06 | 00	02 | 06 | Stat
08, 48 (END)	03 | 08, 48 | 00 | mode 00 = Processing with this MDS has terminated. 01 = Processing pause with the MDS. Terminate scanning_time for MOBY U-MDS immediately.	02 | 08 | Stat
0A, 4A (antenna ON/OFF)	03 | 0A, 4A | 00 | mode 01 = Switch on antenna 02 = Standby; switch off antenna 09 = Match antenna to environment (MOBY F; FFT)	02 | 0A, 4A | Stat


Command code
Command telegram to MOBY-ASM
Result telegram from MOBY-ASM
0B, 4B (MDS status)
05
0B, 4B
00
mode
week
year
Current date
mode = 00 (MOBY U)
week = calendar week (01 hex ... 34 hex = 1. up to 52. week)
year = year; 01 = 2001
mode = 01 (RF 300)
week = 00
year = 00
(no meaning)
mode = 02 (RF 300)
week = 00
year = 00
(no meaning)
0 1 2 3 ... 6 7 8...18
12 0B Stat UID Tag Type Diagnostic data
Four-byte tag ID number
The meaning of the diagnostic data is described in UDT 100
0 1 2 3 4...11 12...18
12 0B Stat 01 UID Diagnostic data
Eight byte tag ID number (unique identifier)
The meaning of the diagnostic data is described in UDT 260
0 1 2 3 4...11 12...18
12 0B Stat 02 UID Diagnostic data
The meaning of the diagnostic data is described in UDT 270

B.5 PROFIBUS implementation

PROFIBUS is implemented on the MOBY-ASM strictly in accordance with standard IEC 61784-1:2002 Ed1 CP 3/1. Cyclic data communication (standard specified by EN 50170) and optional non-cyclic data communication are used.

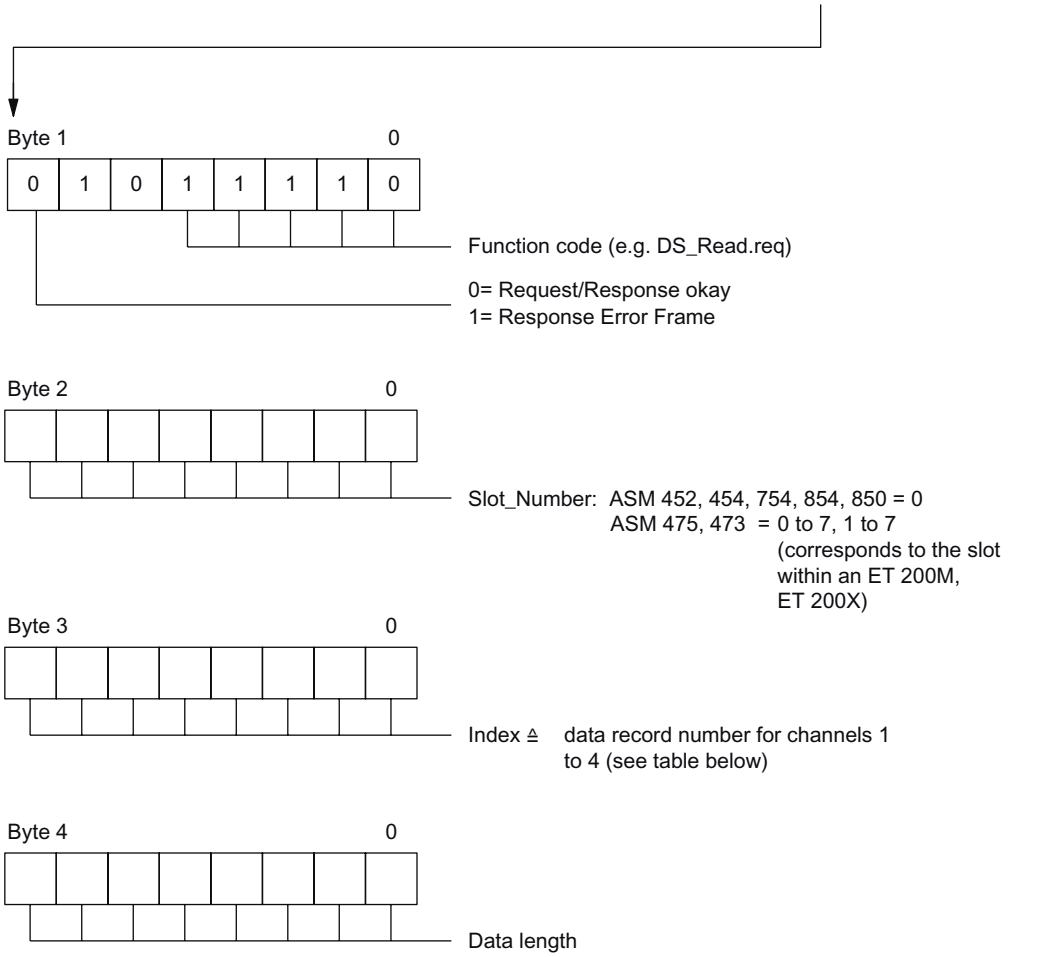
The following figure shows the communication interface to a MOBY-ASM. PAW and PEW are exchanged cyclically between ASM and function block. PEW tells the function block when commands and data may be transferred to the ASM. Commands and data are put into data records.



x = channel
n = No. of command in ASM (n_{max} = number of buffers in ASM; see Section "Command repetition".)
* = SIMATIC S7 uses SAP 51 and SAP 54 for acyclic communication.
** = The transfer of the control word (PAW/PEW) takes place via the cyclic data_exchange service of PROFIBUS (SAP = 255 = NIL).

The following figure shows the layout of a non-cyclic data record. SAP 51 is used to transmit the data. The data unit (DU) indicates how the MOBY-ASM is addressed.

SD	LE	LEr	SD	DA	SA	FC	DSAP	SSAP	DU	FCS	ED
68H	x	x	68H	8x	8x	x	51/33H	51/33H	x...	x	16H



The following data records have been implemented on the MOBY-ASM for communication.

Table B-1 Data record numbers (index)

Data record number	Present on MOBY-ASM	Description
0	all	Reserved
1	all	Reserved
101	all	Parameterization channel 1
102	ASM 452, 454, 475, 754, 854, 456, RF170C	Parameterization channel 2
103	ASM 454, 754, 854	Parameterization channel 3
104	ASM 454, 754, 854	Parameterization channel 4
111	all	Data transmission channel 1
112	ASM 452, 454, 475, 754, 854, 456, RF170C	Data transmission channel 2
113	ASM 454, 754, 854	Data transmission channel 3
114	ASM 454, 754, 854	Data transmission channel 4
150	ASM 475, 473	Reserved (diagnosis of powerparameters)
151	ASM 475, 473	Reserved (diagnostic buffer)
231	RF170C	I&M0 (module data)
232	RF170C	I&M1 (maintenance data 1)
233	RF170C	I&M2 (maintenance data 2)
234	RF170C	I&M3 (maintenance data 3)
239	ASM 475, 473, 456, RF170C	FW update (optional)
246	ASM 475, 473, 456	Reserved (read FW version)
248	ASM 475, 473, 456, RF170C	Reserved (SZL list)
255	ASM 456	Reserved (I&M functions)

Data record 10x

Each of data records (DR) 101 to 104 parameterizes one MOBY channel. DR 10x must contain a RESET command. After the module starts up, DR 10x must be sent to each MOBY channel. The channel is not ready for operation until this is done.

A DR 10x is also accepted during normal operation. DS 10x interrupts a running command. The user receives no further acknowledgment for the interrupted command.

Data record 11x

DRs 111 to 114 are used for sending the actual commands and related acknowledgments (all commands except RESET).

B.6 Example of a PROFIBUS Trace

The following trace shows all telegrams which were sent on the PROFIBUS interface during an ASM start-up or a MOBY read command. The trace illustrates the information in Sections "Cyclic control word between master and MOBY-ASM" to "PROFIBUS implementation". It can also be used for orientation or for trouble-shooting of customer-specific MOBY-ASM implementations.

Note

Using FC 45 on PROFINET

If the FC 45 is used on PROFINET, the PROFINET trace is similar to the PROFIBUS trace. The data contents are identical. The header data of the telegrams are different.

Start-up of an ASM 754 and RESET sequence on 4th channel

68 0b 0b 68 03 02 5d 00 00 00 00 00 00 00 00 00 16 68 0b 0b 68 02 03 08 80 00 80 00 80 00 80 00 00 16	Start-up of ASM
68 0b 0b 68 03 02 7d 80 00 80 00 80 00 80 00 00 16 68 0b 0b 68 02 03 08 80 00 80 00 80 00 80 00 00 16	FC sets the start-up bit.
68 0b 0b 68 03 02 5d 80 00 80 00 80 00 80 00 00 16 68 0b 0b 68 02 03 08 88 00 88 00 88 00 88 00 00 16	ASM sets the command counter to one.
68 0b 0b 68 03 02 7d 00 00 00 00 00 00 00 00 00 16 68 0b 0b 68 02 03 08 88 00 88 00 88 00 88 00 00 16	FC resets the start-up bit.
68 0b 0b 68 03 02 5d 00 00 00 00 00 00 00 00 00 16 68 0b 0b 68 02 03 08 08 00 08 00 08 00 08 00 00 16	ASM also resets the start-up bit.
68 0f 0f 68 83 82 5c 33 36 5f 01 68 06 05 00 00 00 2b 02 00 16 E5	RESET telegrams to 4th channel
68 05 05 68 83 82 5c 33 36 00 16 68 09 09 68 82 83 08 36 33 5f 01 68 06 00 16	PROFIBUS confirmation of the RESET
68 0b 0b 68 03 02 7d 00 00 00 00 00 00 00 00 00 16 68 0b 0b 68 02 03 08 08 00 08 00 08 00 10 00 00 16	Command counter for 4th channel is incremented to 2.
68 0b 0b 68 03 02 7d 00 00 00 00 00 00 00 00 00 16 68 0b 0b 68 02 03 08 08 00 08 00 08 00 30 00 00 16	Acknowledgment counter for 4th channel is incremented to one.
68 0b 0b 68 03 02 7d 00 00 00 00 00 00 00 00 00 16 68 0b 0b 68 02 03 08 08 00 08 00 08 00 31 00 00 16	Optional: Presence is set.
68 09 09 68 83 82 5c 33 36 5e 01 68 06 00 16 E5	Request of FC for a non-cyclic telegram
68 05 05 68 83 82 5c 33 36 00 16 68 0f 0f 68 82 83 08 36 33 5e 01 68 06 05 00 00 00 00 00 00 16	Return acknowledgment telegram of the RESET to the FC

RESET and read command to channel 1 of a MOBY-ASM

(only acyclic telegrams are recorded)

68 0f 0f 68 83 82 7c 33 36 5f 01 65 06 05 00 00 00 2b 02 00 16	RESET command
68 05 05 68 83 82 7c 33 36 00 16 68 09 09 68 82 83 08 36 33 5f 01 65 06 00 16	Acknowledgment that RESET is being processed
68 09 09 68 83 82 5c 33 36 5e 01 65 06 00 16	Request for an acknowledgment from ASM
68 05 05 68 83 82 5c 33 36 00 16 68 0f 0f 68 82 83 08 36 33 5e 01 65 06 05 00 00 00 00 00 00 16	RESET acknowledgment
68 0f 0f 68 83 82 7c 33 36 5f 01 6f 06 05 02 00 00 40 0c 00 16	Read command: MDS addr. = 0, length = 0c
68 05 05 68 83 82 7c 33 36 00 16 68 09 09 68 82 83 08 36 33 5f 01 6f 06 00 16	Acknowledgment that read is in progress
68 09 09 68 83 82 7c 33 36 5e 01 6f 12 00 16 68 05 05 68 83 82 7c 33 36 00 16	Request for an acknowledgment from ASM
68 1b 1b 68 82 83 08 36 33 5e 01 6f 12 11 02 00 00 40 0c aa aa bb bb cc cc dd dd ee ee ff ff 00 16	Acknowledgment for read with the MDS data

Service & Support

C

C.1 Service & Support

Technical support

You can reach the technical support team for all A&D projects at:

- Telephone: +49 (0) 180 5050 222
- Fax: +49 (0) 180 5050 223

Internet

Visit our site on the Internet at:
`http://www.siemens.com/automation/service&support`

You can send a support query to:
`http://www.siemens.com/automation/support-request`

You can find the latest general information about our RFID systems on the Internet at:
`http://www.siemens.com/simatic-sensors/rfid`

You can find the catalog and online ordering systems at:
`http://www.siemens.com/automation/mall`

C.2 Contacts

If you have any further questions on the use of the products described in this manual, please contact one of our representatives at your local Siemens office.

The addresses are found on the following pages:

- On the Internet at: `http://www.siemens.com/automation/partner`
- In catalog CA 01
- In Catalog FS 10 specially for factory automation sensors

C.3 Training

Training center

We offer appropriate courses to get you started. Please contact your regional training center or the central training center in D-90327, Nuremberg, Germany.

Telephone: +49 (911) 895-3200

`http://www.siemens.com/sitrain`