SIEMENS

MOBY® Identification System

FC 44
Function for ASM 450
With Supplements for FB 240

Technical Description

Contents

6GT2 097-3AC30-0DA2

Release 10.2001

Safety Guidelines

This manual contains notices which you should observe to ensure your own personal safety, as well as to protect the product and connected equipment. These notices are highlighted in the manual by a warning triangle and are marked as follows according to the level of danger:

Danger

indicates that death, severe personal injury or substantial property damage will result if proper precautions are not taken.

Warning

indicates that death, severe personal injury or substantial property damage can result if proper precautions are not taken.

Caution

indicates that minor personal injury or property damage can result if proper precautions are not taken.

Note

draws your attention to particularly important information on the product, handling the product, or to a particular part of the documentation.

Qualified Personnel

The device/system may only be set up and operated in conjunction with this manual.
Only **qualified personnel** should be allowed to install and work on this equipment. Qualified persons are defined as persons who are authorized to commission, to ground, and to tag circuits, equipment, and systems in accordance with established safety practices and standards.

Correct Usage

Note the following:

Warning

This device and its components 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.

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Siemens AG
Automation and Drives
Systems Engineering
P.O. Box 2355, D-90713 Fuerth

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We have checked the contents of this manual for agreement with the hardware and software described. Since deviations cannot be precluded entirely, we cannot guarantee full agreement. However, the data in this manual are reviewed regularly and any necessary corrections included in subsequent editions. Suggestions for improvement are welcomed.

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Order No. 6GT2 097-3AC30-0DA2

Contents

General Features

1

The ASM 450 interface module is a module for operation of MOBY on PROFIBUS-DP. A protection rating of IP67 permits use in almost any environment.

Figure 1-1 ASM 450 interface module

- One or 2 SLGs from the MOBY family can be connected. When 2 SLGs are used, these are addressed in multiplex operation.
- These SLGs can be MOBY type I, E, F or V. If 2 SLGs are connected, these must be of the same type. The MOBY type is switched with the RESET command.
- Function FC 44 is available for the SIMATIC S7.
- Function block FB 240 is available for the SIMATIC S5.
  FB 240 has the same call interface as FC 44. The S5 user can use both the FB 240 description and this FC 44 description. Cf. appendix B.3.
- FC 44 and FB 240 have the same user interface. See section 5 for differences in the parameterization.
- See the appendix A for a description of the programmer interface for non-SIMATIC users.
- The ASM 450 can be equipped with 2 digital inputs and 2 digital outputs as an option. These can be used for MDS control (see section 6) or as desired by the user. These inputs/outputs are updated via the DI/DQ command.

PROFIBUS configuration

File SIEM804C.GSD must be used. The file is included together with FC 44 on the “MOBY Software” product (6GT2 080-2AA10). The GSD file can also be downloaded from the Internet.

Compatibility

When used with MOBY-I, the ASM 450 module is command-compatible with the ASM 440 module. Only the new GSD file (i.e., SIEM804C) must be linked for the ASM 450.

Byte and word pointer for FC 44

Two versions of the FC 44 are included in SIMATIC project file ASM450.

- FC44_Byte
  The user data are addressed in S5-compatible mode. One byte each is available for addressing DATDB and DATDW.
- FC44_Word
  One word each is available for addressing DATDB and DATDW. All data blocks available in S7 can be addressed.

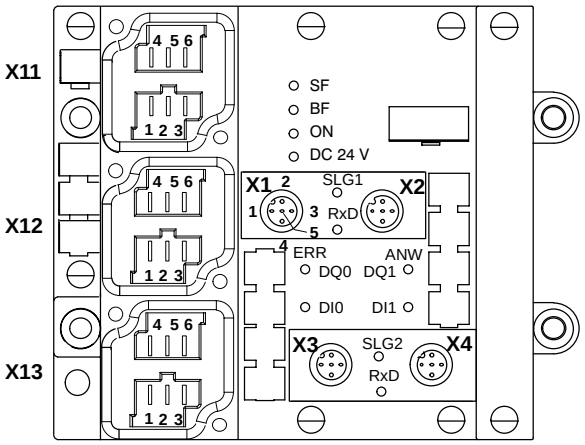
Chapter 4 of this manual describes the differences in the layout of BEDB.

Hardware Description of ASM 450

2

Pin assignments

The following figure shows the pin assignment of the ASM 450.



LEDs for PROFIBUS-DP
(See also section 8.1)

SF:	System fault (hardware error on the ASM 450)
BF:	Bus fault (error on PROFIBUS-DP)
ON:	On when the logic voltage is present on the ASM 450 (is generated from the 24 V supply voltage)
DC 24 V:	On when the 24 V supply voltage is connected to the ASM 450

LEDs for MOBY

RxD:	SLG with command active
ANW:	MDS present or status of DQ1
ERR:	Error indication or status of DQ0
SLG1/2:	Indicates the selected SLG. Only SLG1 or SLG2 can be selected.
DI0/1:	Status of the digital inputs
DQ0/1:	Status of the digital outputs These LEDs are identical to ERR and ANW. They can be changed to the DQ0/1 meaning with the OPT parameter. See chap. 3.3.

Socket	Pin Assignment
X11 and X12 (PROFIBUS-DP)	1 Signal B (red) 2 PE 3* PE 4 Signal A (green) 5* L+ 6* M
X13 (supply voltage)	1 PE 2 L+ 3 M 4 PE 5 L+ 6 M

Socket	Pin Assignment (SLG)		Socket	Pin Assignment (SLG)	
X1	1	+RxD	**X2**	1	+24 V
	2	+TxD		2	DQ1
	3	-TxD		3	0 V
	4	-RxD		4	DQ0
	5	PE		5	PE
X3	1	+RxD	**X4**	1	+24 V
	2	+TxD		2	DI1
	3	-TxD		3	0 V
	4	-RxD		4	DI0
	5	PE		5	PE

* Not circuited

Figure 2-1 Pin assignment and LEDs of the ASM 450

Dimensional drawing of ASM 450 with mounting holes

The following figure shows a dimensional drawing of the ASM 450 with bus plug connectors. The length of the PG screw connections and the radius of the cable must be added to the total width and depth specified.

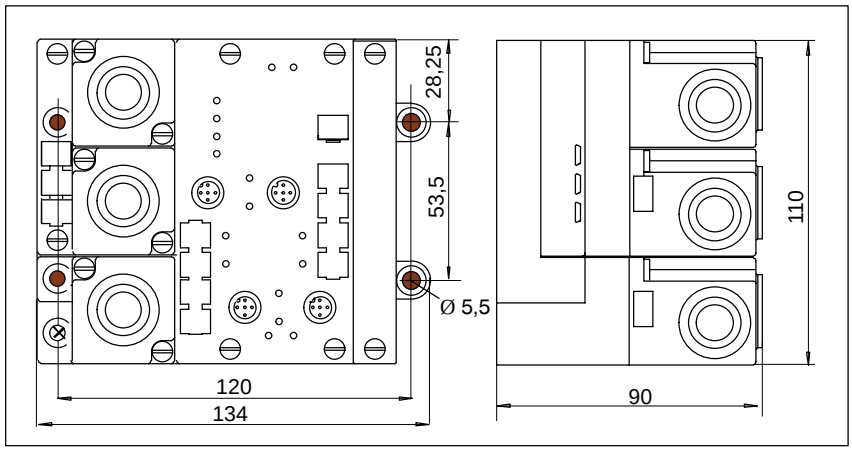


Figure 2-2 Dimensional drawing of the ASM 450

2.1 PROFIBUS Address and Terminal Resistance

PROFIBUS adress

The PROFIBUS address is used to specify the address under which the ASM 450 interface module will be addressed by the DP master of PROFIBUS-DP.

The 7 DIP switches on the basic module are used to set a PROFIBUS address from 1 to 125.

Purpose of the terminal resistance

Both ends of a bus cable must be terminated with its impedance. The terminal resistance is connected in the first and last station of the network.

Location of the DIP switches

The DIP switches for setting the PROFIBUS address and connecting the terminal resistance are located inside the ASM 450 under the plug connector plate for the connection plugs for PROFIBUS-DP and the supply voltage.

How to proceed

The plug connector plate of the ASM 450 must be removed before the PROFIBUS address can be set and the terminal resistance connected. The plug connector plate covers the DIP switches. The following figure shows the location of the DIP switches on the ASM 450 and gives an example of the setting of each.

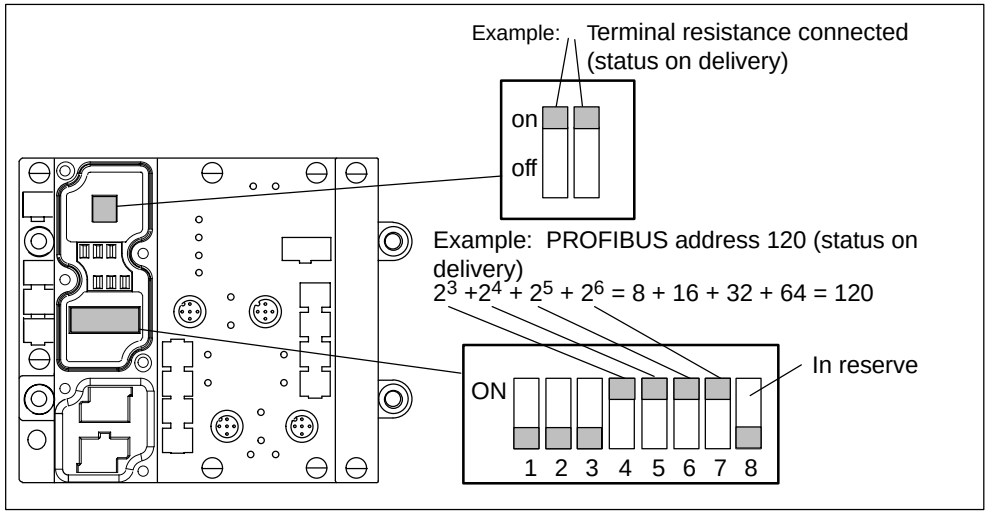


Figure 2-3 Setting the PROFIBUS address and connecting the terminal resistance

Note

- The PROFIBUS address on the ASM 450 must always correspond to the PROFIBUS address specified by the configuration software for this ASM 450.
- To ensure that the terminal resistance functions correctly, always set **both** DIP switches of the terminal resistance to “on” or “off.”

2.2 Wiring the Plug Connectors for the Voltage Supply and PROFIBUS-DP

Possible connections

The voltage supply must be connected to each ASM 450 separately (on X13). The plug connectors for PROFIBUS and the voltage supply are not included. You can order them from Siemens under order number 6ES7 194-1AA00-0XA0.

PROFIBUS-DP plug connector assignment

Connect the plug connectors as shown in the figure below. The pins for the PROFIBUS-DP connection are shown in bold type.

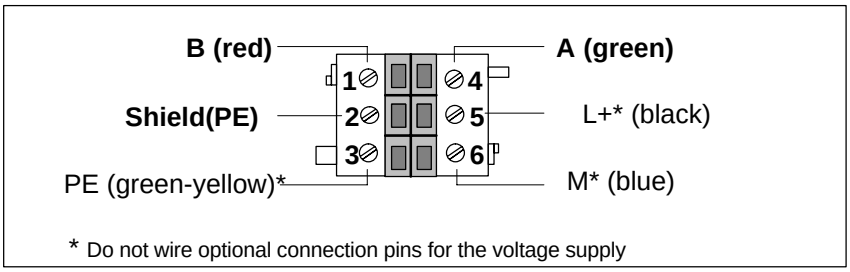


Figure 2-4 Pin assignment of the plug connector for wiring PROFIBUS-DP

Looping through PROFIBUS-DP

If you want to loop through PROFIBUS-DP to the next ASM 450, wire the second plug connector. This plug connector is wired the same as the plug connector for the connection to the first ASM 450. See figure 2-4.

Note

When baud rates of 3 Mbaud, 6 Mbaud and 12 Mbaud are used, the cable between two bus stations must be at least 1 m.

Wiring the voltage supply

You will need the following materials when you connect the voltage supply (24 V DC).

- One plug connector
- 3-core, flexible copper cable

Connect the plug connector to pins 1, 2 and 3 as shown in the next figure. Terminals 1 and 4, 2 and 5, and 3 and 6 are jumpered internally.

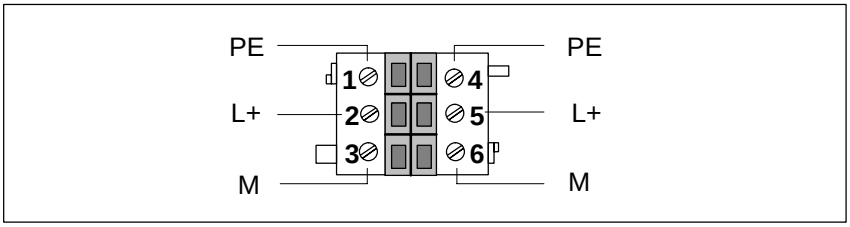


Figure 2-5 Pin assignment of the plug connector for connection of the voltage supply

Caution

Wiring the plug connector incorrectly can destroy all or part of the device.

Note

To ensure protection rating IP65, IP66 or IP67, all 3 plug connectors must always be connected to the ASM 450 regardless of whether they are wired or not.

2.3 SLG Connection

With prefabricated cable

All SLGs are connected with a 2-m prefabricated cable. Other cables are available on request.

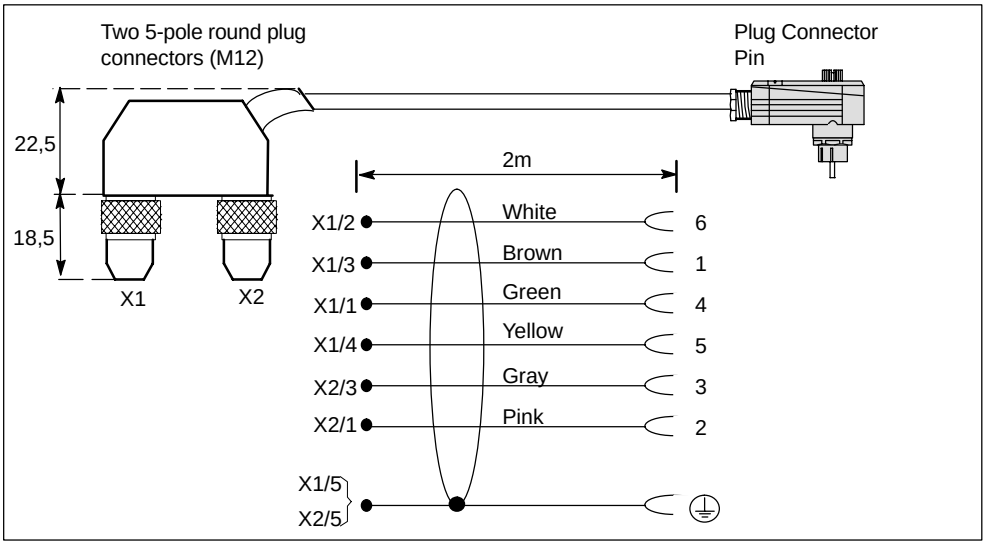
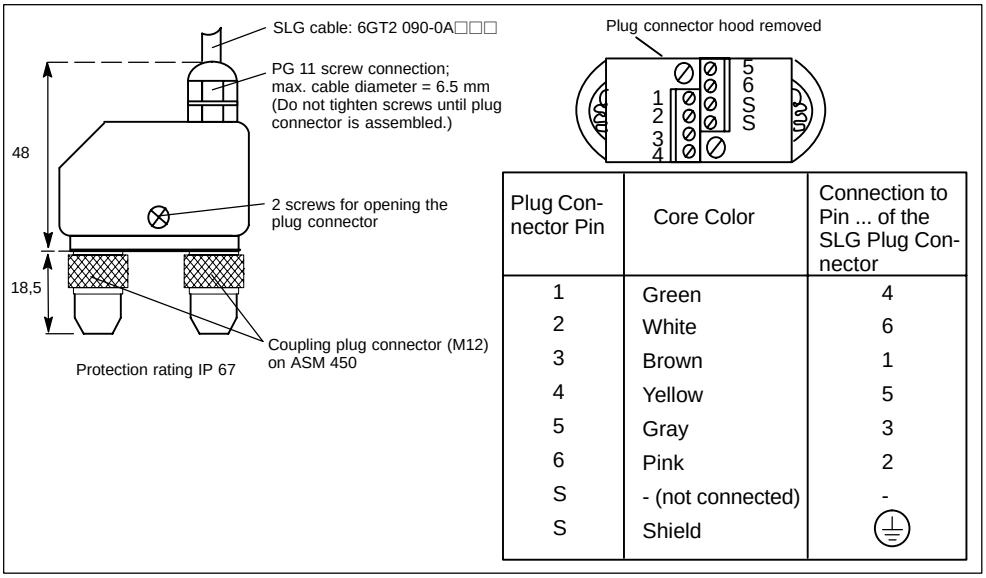


Figure 2-6 ASM 450 ↔ SLG connection cable (6GT2091-1CH20)

With cable made by you

An SLG plug connector with screw terminals is available for users who want to make their own cables. Cable and SLG plug connector can be ordered from the MOBY catalog.



Plug Connector Pin	Core Color	Connection to Pin ... of the SLG Plug Connector
1	Green	4
2	White	6
3	Brown	1
4	Yellow	5
5	Gray	3
6	Pink	2
S	- (not connected)	-
S	Shield	⏚

Figure 2-7 Plug connector ASM 450 ↔ SLG (6GT2090-0BC00)

Specifications of the FC 44

3

FC 44 can be used with all S7 CPUs equipped with an integrated PROFIBUS-DP master.

3.1 Technical Data

Block number:	FC 44
Block name:	MOBY 450
Family:	S7 MOBY
Block length:	Approx. 2800 bytes
Blocks called:	None
Data blocks used:	BEDB ≥ 17 data words
Flags used:	None
Counters used:	None
Registers used:	AR 1, AR 2
Call:	Cyclic

Table 3-1 Typical Run Times of FC 44 (PLC cycle load specified in msec)

	S7-CPU	Idle Pass	Read Bytes	Write Bytes
FC 44	315-2 DP	0.16	0.5 +n * 0.028	0.5 +n * 0.028
	416-2 DP	0.01	0.5 +n * 0.0003	0.5 +n * 0.0003

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

Note: See catalogue for the ASM 450 times required for data communication with the data memories. The times are valid for FC 44 read/write commands with and without ECC.

Note

If the FC 44 is used with a CPU 414-2 DP, version $\underline{\geq}$ 2.1 of the MOBY 450 block must be used.

3.2 Communication between ASM 450 and FC 44

The ASM 450 is a MOBY slave module for use with PROFIBUS-DP.

In terms of hardware, the S7/PROFIBUS and ASM 450 communicate by reading or writing the appropriately parameterised address areas (i.e., input and output areas) of the ASM 450. The start address and size of the input/output areas are specified with parameterisation (see also chapter 5).

The software interface communicates with command and acknowledgement telegrams which are transferred back and forth between the ASM 450 and the S7 by the PROFIBUS-DP.

The command to the ASM 450 and the acknowledgement from the ASM 450 consist of header and user data. The headers for command and acknowledgement of the read/write commands are each 6 bytes long.

Table 3-3 in chapter 3.4 shows the relationship between parameterization and user data.

Calculation of MOBY data throughput

Calculation of data throughput becomes important when long data sequences are to be exchanged with the MDS (e.g., reading 1000 bytes). Incorrect configuration of PROFIBUS may increase MOBY transmission times significantly. The primary factors which determine data throughput are listed below.

- Cycle time of the PLC (user program)
- Cycle time of PROFIBUS (see PROFIBUS configuration; table 3-3)
- MOBY transmission time (see chap. 3 of MOBY configuration manual)

An Excel calculation program is available on request. This can be used to predetermine data throughput during configuration.

3.3 Engineering Procedure

Table 3-2 Engineering procedure (from V2.0 of FC 44)

LAD Box	Parameter	Data type	Permissible Values/Characters	Description
MOBY 450 **ADR** **BEDB** **MOBY** **ANW** **ABTA** **OPT** **OPT2**	ADR	INT	≥256*	Start address of the input areas and output areas of the ASM 450
	BEDB	INT	≥ 1	Working data
	MOBY	INT	0, 1...7	MOBY oper. mode
	ANW	INT	0...6	MDS control
	ABTA	BYTE	00...FF	Scanning time for MDS 507 operation
	OPT	BYTE	00...FF	Options
	OPT2	WORD	W#16#0000	Reserved (Enter 2 or 3 for CPU 414-2 DP.)

* Depends on the CPU. The value must be located outside the process image.

ADR:

Parameterized start address of the input/output areas of the ASM 450 slave in the I/O area of the SIMATIC S7. This parameterization must match that of the PROFIBUS configuration.

Note

- The start address of the input/output areas must always be an even number.
- The start address of both the input areas and the output areas is identical. The input and output area is specified with ADR.

BEDB:

Command data block for internal FC 44 use. (See also chapter 4)
The user must set up one BEDB for each ASM 450 slave. A BEDB must have at least 17 words (DBW 0 to DBW 32). Starting at DBW 34, the BEDB can be used as desired (e.g., for DATDB with the user data).

MOBY:

Setting of the MOBY operating mode

0 = MOBY I/E (without MDS 507)

1 = Reserved

2 = MOBY I with MDS 507

3 = Reserved

4 = MOBY V

5 = MOBY F with MDS F1xx

6 = MOBY F with MDS F4xx

7 = MOBY F with MDS F2xx

8, 9 = Reserved

ANW:

Setting of MDS control (Cf. chapter 6)

0 = Without MDS control and ANW check via firmware

1 = Without MDS control and with ANW check via firmware

2 = With MDS control and with ANW check via firmware

4 = With MDS control and with ANW check via DI0 and DI1

6 = With MDS control and with ANW check via DI0

Note

When setting 2, 4, or 6 is used, only one SLG may be used on the ASM 450.

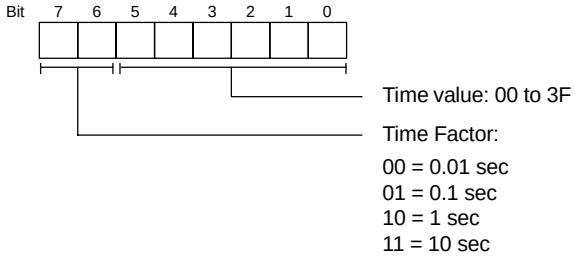
ABTA:

This parameter only applies to MOBY I and MOBY V operation with the MDS 507. All other users must set this parameter to 00.

Parameterisation of the scanning time for MDS 507 operating mode. FC 44 does not evaluate this parameter unless MOBY = 2 was specified.

The MDS 507 was designed for long-distance read and write accesses. It is equipped with a battery for communication with the SLG 44. This means that, to prevent the battery from being discharged too quickly, the MDS 507 should only be processed when data communication is actually to take place. If no command has been issued for the MDS, its presence in the field of the SLG 44 is scanned at the parameterised scanning interval ABTA (i.e., low load on the MDS battery). If, however, a command has been issued for the MDS, this is always processed immediately regardless of the ABTA.

The following table shows the scanning time ABTA. (See also configuring manual for SLG 44/MDS 507/MDS 407E.)



Example:

A scanning time of 1 second results in ABTA = 0081HEX.

OPT:

Setting the options on the ASM 450

In normal operating mode, OPT can be set to 00HEX. The options are described in appendix A.2 (OPT).

OPT is binary–coded, e.g.
- 01 HEX = A MOBY error generates a system diagnosis (Cf. chap. 8.1).
- 02 HEX = Clear error LED
- 10 HEX = The DQs can be used as desired.

The OPT parameter is transferred to the ASM after every RESET.

Note

Remember the following when using the DQs as desired.
After the ASM 450 is turned on, an error code is indicated on DQ0. Actuators connected to DQ0 may be switched uncontrollably. Do not use DQ0 to control a signal affecting safety.

OPT2:

Reserved for expansions

OPT2 must currently be preset to 0000HEX.

Starting with version V2.1 of FC 44

A value of 2 or 3 must be entered here for CPU 414-2 DP to ensure data consistency. The value specifies the number of wait cycles until the data become valid.

3.4 How Many ASM 450 Slaves Can Be Connected

The controller or CPU used determines the maximum number of ASM 450 slave modules.

The following table shows the relationship between the size of the input/output areas and the length of the user data. The user data length is the maximum number of bytes which can be read from the MDS or written to the MDS on this ASM 450 station by one FC 44 command.

Parameterization of the input/output area applies to the entire module and also to each individual SLG. Since only one SLG can be active at a time, each SLG uses the entire input/output area.

Also listed is the maximum number of ASM 450 modules which can be operated on one master (when appropriately parameterised).
(See also chapter 3.2).

Table 3-3 Size of the input/output areas and lengths of the user data

			Number of ASM 450 slave Stations			
			SIMATIC S5 with IM 308-C[1]		**SIMATIC S7**	
Parameterization of the Input/Output Area		**Number of User Data Bytes** Which Can Be Read/Written by One FC 44 Command on One ASM 450 Station	In the **Linear P I/O Area**	In the 16 **P Area Page Frames**	**315-2 DP**[2]	**416-2 DP**[3]
Words	**Bytes**					
4	**8**	2	16	7 * 16=112	64	96
6	**12**	6	10	5 * 16 = 80	64	96
8	**16**	10	8	3 * 16 = 48	64	96
10	**20**	14	6	3 * 16 = 48	51	96
12	**24**	18	5	2 * 16 = 32	42	96
14	**28**	22	4	2 * 16 = 32	36	96
16	**32**	26	4	1 * 16 = 16	32	96
32	**64**	58	2	–	16	64
64	**128**	122	(1)[4]	–	(8)[4]	(32)[4]
104	**208**	202	–	–	4	19

1 FB 240 must be used for SIMATIC S5 with IM 308–C. Cf. appendix B.
2 CPU 315–2 DP can address up to 64 slaves. The max. address area for PROFIBUS is 1024 bytes.
3 CPU 416–2 DP can address up to 96 slaves. The max. address area for PROFIBUS is 4096 bytes. We recommend parameterization in words for the S7-400 for optimum performance.
4 Since, for STEP 7, the maximum PROFIBUS data length is 61 words or 122 bytes, the configuration must be changed manually for the 64-word or 128 byte parameterization. In the menu “Object Properties” (S7) or “Slave Properties → Configure” (COM PROFIBUS), the data length in the last slot must be changed to 13 words or 10 bytes.

Note

If the user data length is parameterized for a write command longer than that specified in table 3–3, the PLC will assume STOP status with QVZ or the telegram data will be sent to a wrong address.

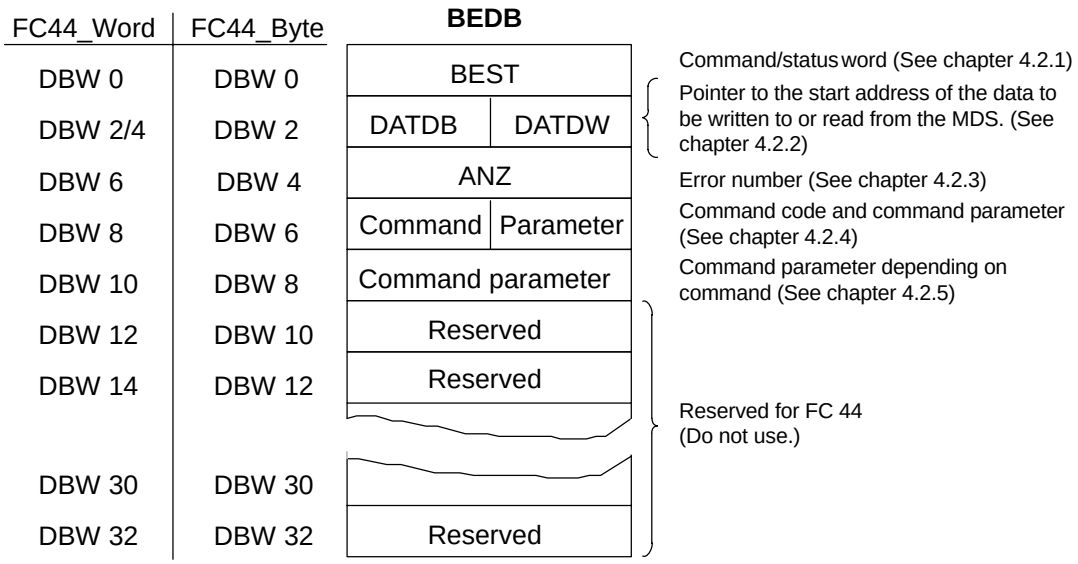
BEDB Command Data Block

4

4.1 BEDB-General Description

To function correctly, the FC 44 requires one BEDB command data block for each ASM 450. All control information (e.g., pointer to the data field (DATDB/DATDW), error messages, and status and state bits) is stored in the BEDB. The BEDB is updated each time the cycle changes.
A minimum length of 17 data words (DBW 0 to DBW 32) is required.

4.2 BEDB-Layout



Note

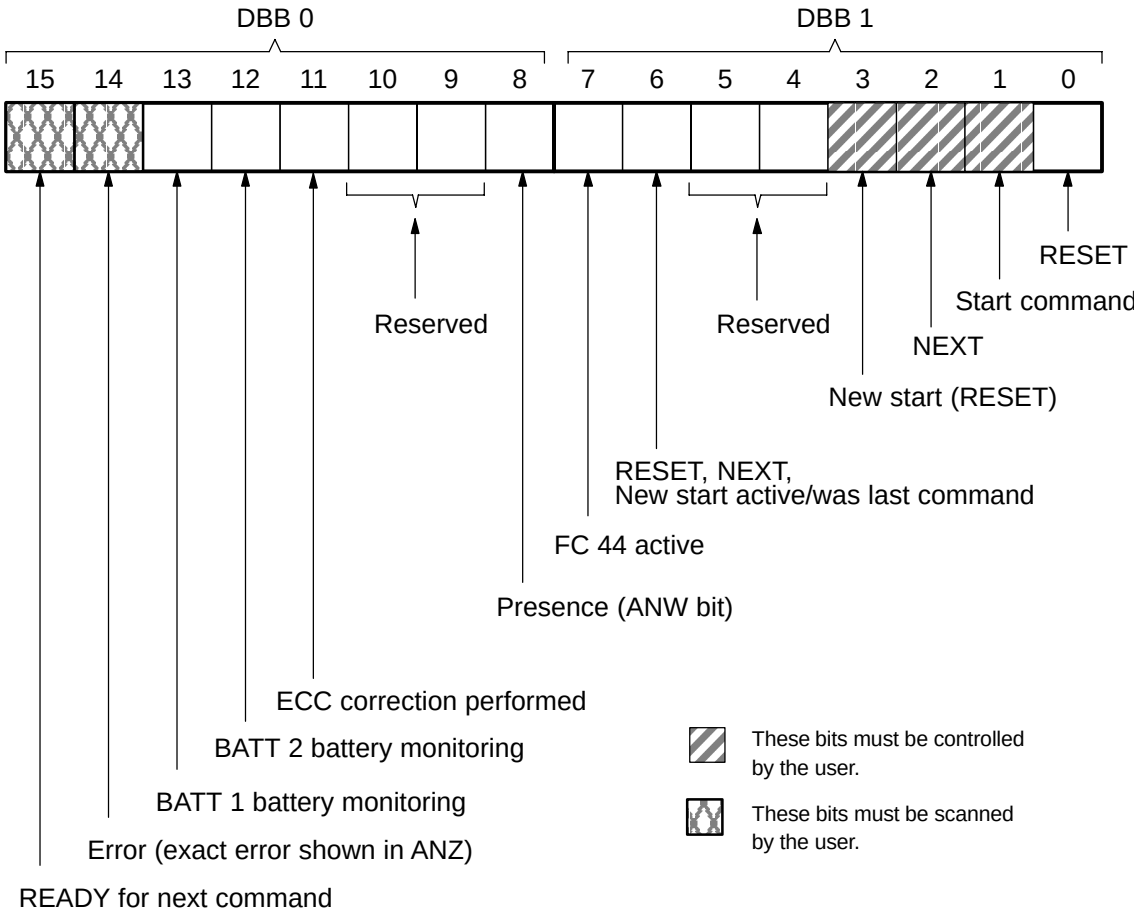
BEDB must be at least 17 data words or 34 data bytes long (DBW 0 to DBW 32).

Data words DBW 0 to DBW 8 in BEDB are available to the user. Single commands can be sent to the ASM 450 or messages for the user indicated by writing, reading or setting the parameters of these data words.

4.2.1 BEST Command and Status Word

DBW 0 = BEST

BEST is valid at all times. It can be scanned by the user at all times.



Note:

The BEST parameter must be preset to W#16#0008 in the applicable OB (see catalogue) for new start and restart.

- OB 100 for new start
- OB 101 for manual restart

Permitted Modifications to the Control Bits in BEST

BEST bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Set:	F	F	F	F	F	F	F	F	F	F	F	F	U	U	U	F/U
Reset:	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
Scan	F/U	F/U	U	U	U	0	0	U	U	U	0	0	F/U	F/U	F/U	F/U

U = User F = FC 0 = always 0

BIT 0

RESET

Reset a read or write command. Perform a reset after initial commissioning and each time the ADR, BEDB, MOBY, ANW, ABTA, OPT and OPT2 parameters are changed. This reset is necessary so that the parameters are checked and the commands in BEDB restructured.

BIT 1

Start command

Start signal for FC 44. Execution of the parameterised command. The FC resets this bit after starting execution of the commands.

BIT 2

NEXT command

Start NEXT command. The command following the NEXT command refers to the next MDS. This permits you to start a command immediately even though the old MDS is still in the field. Some operating modes require that the NEXT command be used. (See chapter 6).

BIT 3

New start

Set by the user after a new start and after return of power. Its functions are the same as those of reset except that the bit is also scanned while the command is being executed.

BITs 4 and 5

Reserved

BIT 6

RESET, NEXT, New start active/was last command

This bit is set after a RESET, NEXT or new start command was started. It indicates that one of these commands is active or was last executed.

BIT 7

FC 44 active

The FC is active (i.e., busy with the execution of a command).
If BIT 7 is set, then BIT 15 is reset.

BIT 8

Presence (ANW bit)

This bit is not set unless MDS control was set on the ASM 450.
(See also chapter 6)

0 = No MDS in the field of the SLG

1 = MDS is now in the field SLG

BITs 9 and 10

Reserved

BIT 11

ECC correction

This bit is not set unless the ECC driver has performed an EEC correction. The command was concluded correctly. The data are correct.

BIT 12

BATT 2

Status of battery 2 on the MDS. If there is no battery 2 on the MDS, this bit can assume any state.

BIT 13

BATT 1

Battery monitoring of the MDS has been triggered (only for MDS models equipped with RAM). Although the remaining capacity of the battery will still allow the MDS to operate at room temperature for a few more months, we recommend replacing the battery of the MDS immediately (or replacing the MDS if it does not have a replaceable battery).

BIT 14

Error

FC 44 sets this bit when a command is concluded with errors. The exact cause of the error is located in data word ANZ (i.e., DBW 4). Starting a new command resets the error bit.

BIT 15

READY

- The last command is finished.
- The user may now start a new command.

Remember: The start of a RESET command does not require that READY be set.

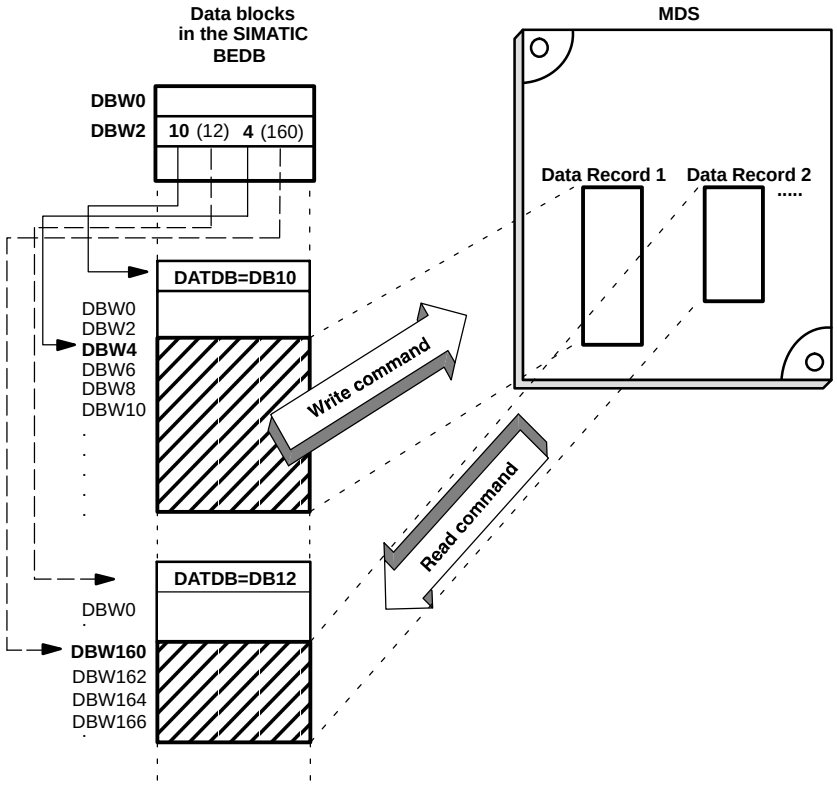
4.2.2 DATDB / DATDW Data Field Pointers

The entire command set of the FC 44 can be divided into so-called “read” and “write” commands. When a read command is started (e.g., read without ECC), the arriving data to be read must be stored in a data block (DATDB). When a write command is started (e.g., write without ECC), the data to be written to the MDS are also taken from a data block. This means that, when starting a command, the user must specify a DATDB (i.e., generate it in the PLC beforehand) indicating to what locations the user data are to be transferred back and forth. The DATDW specifies the start address of the data stored in the DATDB.

Note

- DATDB can also be BEDB if DATDW ≥ DBW 34.
  The start of a read or write command requires that a DATDB/DATDW be specified in DBW 2 of BEDB.
- The DATDB can have a total length of up to 256 words (DBW 0 to DBW 510). (See position of the DATDW pointer.)

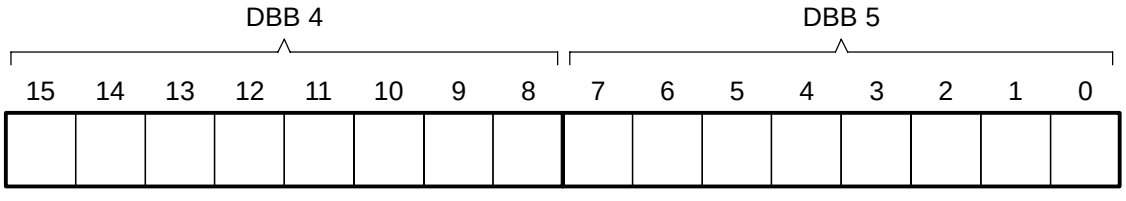
We will now give you an example to make things clearer:
The data to be written to the MDS are to be taken from data block DB 10 starting at data word DBW 4. The data to be read from the MDS are to be stored in data block DB 12 starting at "address" DBW 160. These DATDB and DATDW values must always be entered in data field pointer DBW 2 of the BEDB before FC 44 commands are started.



4.2.3 ANZ Error Indication Word

DBW 4 = ANZ

ANZ is valid when the READY bit is set in BEST or when the READY bit and the error bit are set in BEST. The error is indicated in hexadecimal format.



01 → Presence error: MDS out of field when command active
02 → Presence error: MDS passed by SLG without command
03 → Error in connection to the SLG
04 → Error in MDS memory (not initialised)
05 → Unknown command from ASM 450
06 → Field disturbance on SLG
07 → To many send errors
08 → CRC send error
09 → INIT: CRC error
0A → INIT: MDS cannot be initialised
0B → INIT: Timeout during initialisation
0C → INIT: Write error during initialisation
0D → Address error
0E → ECC mode: Data on MDS are not correct.
10 → NEXT command not permitted
11 → Short circuit or DQ overload
12 → ASM 450-internal communication error
14 → ASM 450-internal error
15 → ASM 450 parameters set incorrectly
16 → ASM 450 parameters are not suitable for this FC 44 command.
17 → Handshake error between ASM 450 and FC 44
18 → Only RESET command permitted.
19 → Previous command is active.
1A → PROFIBUS-DP error
1E → Error while processing function block FC 44
1F → Current command was aborted by RESET.

1 → FC 44 parameter wrong
2 → Command code or parameter wrong
3 → Only RESET command permitted
4 → Synchronisation error
5 → Startup message of the ASM 450 or PROFIBUS-DP error
6 → Command code and acknowledgement code not equal
7 → Length of acknowledgement illegal
8 → User data lengths not equal
9 → Read user data length too long

1 → Any command permitted as next command
2 → Only RESET command permitted as next command

For a more detailed error description, see chapter 8.2

Applicable to ANZ

Set:	FB
Reset:	FB
Scan:	User

4.2.4 Table of MOBY Commands

Command code (hexadecimal)	Description	Notes
00	Reserved for RESET	Do not use command. Set bit 0 and bit 3 in BEST.
01	Write data to MDS without ECC	Communication with the data memory. If necessary, evaluate the status bits (battery and ECC correction).
02	Read data from MDS without ECC	
03	Initialise (INIT) MDS without ECC	
04	Write data to MDS with ECC	
05	Read data from MDS with ECC	
06	Initialise (INIT) MDS with ECC	
07	Scan status of the ASM 450 MOBY-F: Perform FFT (no MDS may be in the field of the SLG)	No communication with the data memory. Do not evaluate the status bits (battery and ECC correction).
08	Directly address 2 digital outputs (DQs) and read in the values of the 2 digital inputs (DIs) of the ASM 450; Switch SLG.	
0A	**Only for MOBY F:** The SET-ANT command switches the SLG's antenna on or off. During normal operation, this command is not needed since once an SLG is turned on, the antenna is always on. The antennas must be turned off when two sensitive SLGs are to be positioned very close together. The application software must then ensure that only one antenna is on at a time.	
–	RESET. Started by setting bit 0 in BEST.	
–	NEXT. Started by setting bit 2 in BEST.	
–	New start. No command code exists here; is started by setting bit 3 in BEST.	
09	Reserved for NEXT	Do not use command. Set bit 2 in BEST.

4.2.5 Setting the Parameters of the Commands

To be able to start the commands listed here, you must first preset the command parameters (i.e., DBW 6 and DBW 8). **The READY bit (i.e., bit 15 in BEST) must be set before parameters can be set and the commands started.**

Write without ECC

FC44_Word	FC44_Byte	BEDB		
DBW 2/4	DBW 2	DATDB	DATDW	Pointer to the user data to be written to the MDS. The data are located in DATDB starting at "address" DATDW.
DBW 8	DBW 6	01 H	Length	Command code = 01HEX. Length in bytes of the data to be written
DBW 10	DBW 8	Addr. (High)	Addr. (Low)	The data are to be written to the MDS starting at this address.

As the result of the started command, the user receives the READY bit (bit 15 in BEST) set. The user data area (DATDB) is not changed.

Read without ECC

FC44_Word	FC44_Byte	BEDB		
DBW 2/4	DBW 2	DATDB	DATDW	Pointer to the user data to be read from the MDS. The data are located in DATDB starting at "address" DATDW.
DBW 8	DBW 6	02 H	Length	Command code = 02HEX. Length in bytes of the data to be read
DBW 10	DBW 8	Addr. (High)	Addr. (Low)	The data are to be read from the MDS starting at this address.

As the result of the started command, the user receives the READY bit (bit 15 in BEST) set. The read data are located in DATDB starting at "address" DATDW.

Initialise (INIT) without ECC

FC44_Word	FC44_Byte	BEDB		
DBW 2/4	DBW 2	DATDB	DATDW	Pointer to the user data. The initialisation command does not generate user data in the acknowledgement.
DBW 8	DBW 6	03 H	INIT pattern	Command code = 03HEX. The MDS is completely written with the INIT pattern.
DBW 10	DBW 8	Addr. (High)	Addr. (Low)	Memory size of the MDS

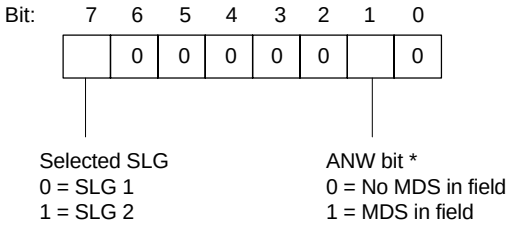
MDS Model		INIT Duration	**Memory**
62-byte	RAM	0.1 sec	**00 40**
128-byte	EEPROM	6 sec	**00 80**
2-Kbyte	RAM	0.4 sec	**08 00**
8-Kbyte	EEPROM	18 sec	**20 00**
32-Kbyte	RAM	3 sec	**80 00**
752-byte	EEPROM (MOBY E)	0.8 sec	**02 F0**
192-byte	EEPROM (MOBY F)	2.2 sec	**00 C0**
16-byte	EEPROM (MOBY F)	0.25 sec	**00 10**

As the result of the started command, the user receives the READY bit (bit 15 in BEST) set. The user data area (DATDB) is not changed.

ASM Status

FC44_Word	FC44_Byte	BEDB		
DBW 2/4	DBW 2	DATDB	DATDW	Pointer to the user data. The ”ASM status” command does not generate user data in the acknowledgment.
DBW 8	DBW 6	07 H	Status**	Command code = 07HEX. Current status of the ASM 450.
DBW 10	DBW 8	Version**	Version**	ASCII-coded version of the firmware of the ASM 450 (e.g., 10 indicates version 1.0)

Status



* Since DBW 0 also contains the ANW bit, the status command for the ANW information is not absolutely necessary.
** These bytes do not have to be prespecified for the command start.

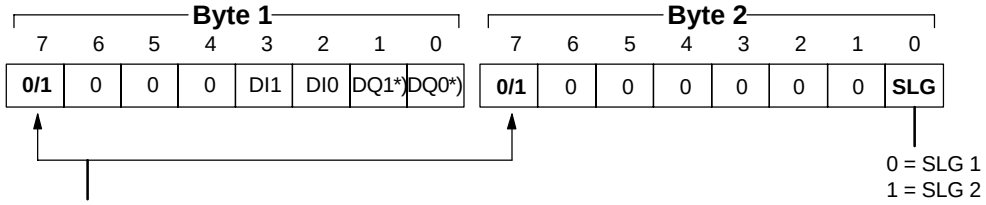
The started command gives the user the set READY bit (i.e., bit 15 of BEST). The user data area of the user (DATDB) is not changed. The status of the ASM is indicated in DBW 6 and DBW 8.

Meaning of ASM Status for MOBY-F

With the status command, an FFT command is executed for the SLG. This can improve system performance. With the FFT command, the SLG scans its surroundings for sources of interference. During MDS operations which follow, these sources of interference are masked out (as far as possible).

Digital Input/Output (DI/DQ Command) or Switchover SLG

FC44_Word	FC44_Byte	BEDB		
DBW 2/4	DBW 2	DATDB	DATDW	Pointer to the user data. This command does not generate user data in the acknowledgement.
DBW 8	DBW 6	08 H	Reserved	Command code = 08HEX. Reserved = 00HEX.
DBW 10	DBW 8	Byte 1	Byte 2	Bit pattern for the individual digital inputs and outputs and the selection of SLG



Control bits for the corresponding byte

Functionally, byte 1 and byte 2 can be handled separately.

0 = Control: Set or reset DQ unconditionally. The binary value entered for DQ0 and DQ1 (byte 1) is output on the ASM 450 after the command is started.

1 = Scan: OR-link DQ (i.e., set outputs on the ASM 450 selectively or leave unchanged). A binary “1” (OR-link of a DQ with 1) would set a DQ. A binary “0” (OR-link of a DQ with 0) would leave a DQ unchanged or read in the current, binary signal status of the DQ on the ASM 450.

***) Remember:**
DQ0 and DQ1 are available to the user for use as desired if both of the following conditions are met.

- **The ANW parameter was parameterized with 0 or 1. Cf. chapter 3.3.**
- **The OPT parameter was preset with 10HEX. Cf. chapter 3.3 or appendix A.2.**

<u>CAUTION</u> for free use of the DQs
After the ASM 450 has been switched on, an error code is indicated for DQ0. Actuators connected to DQ0 may be switched uncontrollably. Do not use DQ0 to control a signal affecting safety.

DIs are always read. The user may use this information or evaluate it. DIs must be preset with binary 0 before command start.

As the result of the started command, the user receives the READY bit (bit 15 in BEST) set. The user data area (DATDB) is not changed.

Note

The DI/DQ are updated exclusively via this command and not via the process image.

SET-ANT (only MOBY F)

FC44_Word	FC44_Byte	BEDB		
DBW 2/4	DBW 2	DATDB	DATDW	Pointer to user data. The SET-ANT command does not generate user data in the acknowledgement.
DBW 8	DBW 6	0A H	Mode	Mode: 01 = Turn on antenna 02 = Turn off antenna
DBW 10	DBW 8	Addr. (High)	Addr. (Low)	Not used

RESET

Resetting a read or write command
A RESET must be performed after initial commissioning, after some error messages (see chapter 4.2.3) or after any change in the ADR, BEDB, MOBY, ANW, ABTA, OPT and OPT2 parameters. This reset is necessary so that the parameters are checked and the commands in BEDB restructured. The connection between FC 44 and ASM 450 is also initialised and synchronised again.

The RESET command is started by setting bit 0 in BEST (DBW 0). As the result of the started command, the user receives the READY bit (bit 15 in BEST) set. The user data area (DATDB) is not changed.

NEXT

The command following the NEXT command refers to the next MDS. This permits the user to start a command immediately even if the old MDS is still in the field of the SLG. Do not use the NEXT command unless MDS control on the ASM 450 has been parameterized. The NEXT command switches over the DQs during MDS control (see chapter 6).

The NEXT command is started by setting bit 2 in BEST (DBW 0). As the result of the started command, the user receives the READY bit (bit 15 in BEST) set. The user data area (DATDB) is not changed.

New start

Set by the user after new start or after return of power
Functions same as RESET except that the bit is also scanned while commands are being processed.

The NEXT command is started by setting bit 3 in BEST (DBW 0). As the result of the started command, the user receives the READY bit (bit 15 in BEST) set. The user data area (DATDB) is not changed.

4.2.6 Using the ECC Driver (All MDS Models)

The ECC (error correction code) driver can be switched on via command code.

Use

The ECC driver provides additional assurance of data integrity on the MDS. MDS models equipped with EEPROMs are only guaranteed by the manufacturer for 10,000 write accesses. If the ECC driver is used, you can use the MDS until the end of its actual life and still be assured of equal data integrity.
The ECC driver can also be used with RAM-MDS models to assure data integrity in situations where extremely intensive interference could affect communication.

Write with ECC

FC44_Word	FC44_Byte	BEDB		
DBW 2/4	DBW 2	DATDB	DATDW	Pointer to the user data to be written to the MDS. The data are located in DATDB starting at "address" DATDW.
DBW 8	DBW 6	04 H	Length	Command code = 04HEX. Length in bytes of the data to be written
DBW 10	DBW 8	Addr. (High)	Addr. (Low)	The data are to be written to the MDS starting at this address.

As the result of the started command, the user receives the READY bit (bit 15 in BEST) set. The user data area (DATDB) is not changed.

Read with ECC

FC44_Word	FC44_Byte	BEDB		
DBW 2/4	DBW 2	DATDB	DATDW	Pointer to the user data to be read from the MDS. The data are located in DATDB starting at "address" DATDW.
DBW 8	DBW 6	05 H	Length	Command code = 05HEX. Length in bytes of the data to be read
DBW 10	DBW 8	Addr. (High)	Addr. (Low)	The data are to be read from the MDS starting at this address.

As the result of the started command, the user receives the READY bit (bit 15 in BEST) set. The read data are located in DATDB starting at address DATDW.

Initialise (INIT) with ECC

FC44_Word	FC44_Byte	BEDB		
DBW 2/4	DBW 2	DATDB	DATDW	Pointer to the user data. The initialisation command does not generate user data in the acknowledgement.
DBW 8	DBW 6	06 H	INIT pattern	Command code = 06HEX. The MDS is completely written with the INIT pattern.
DBW 10	DBW 8	Addr. (High)	Addr. (Low)	Memory size of the MDS

MDS Model	INIT Duration	**Memory**
62-byte RAM	0.2 sec	**00 40**
128-byte EEPROM	12 sec	**00 80**
2-Kbyte RAM	5 sec	**08 00**
8-Kbyte EEPROM	54 sec	**20 00**
32-Kbyte RAM	75 sec	**80 00**

As the result of the started command, the user receives the READY bit (bit 15 in BEST) set. The user data area (DATDB) is not changed.

Correction of data

Should an MDS lose one bit of data at some point (e.g., when an EEPROM-MDS has been write-accessed very frequently), the ECC driver is able to reconstruct the data bit that was lost. Data integrity is guaranteed. A status bit (bit 11) in BEST is available to the user for scanning and evaluating the data correction (e.g., to initiate replacement of the “worn out” MDS as soon as possible).

Function

The ECC driver divides MDS memory into 16-byte blocks of which 14 bytes are user data and 2 bytes ECC information. Each time the MDS is accessed, at least one block is read or written (even if the user only programmed 1 byte). This increases access time to MDS data (see table in the catalogue). If an ECC-MDS is read without an ECC driver (e.g., with command code 02HEX), the ECC bytes are shown between the user data. If, however, an ECC-MDS is written without an ECC driver, the data structure of the MDS is destroyed. The MDS (or the destroyed block) can no longer be read with the ECC driver.

Example

The data structure of a 62-byte MDS is shown below. It does not concern either programmer or user and is shown for clarification purposes only.

MDS Address from User's Viewpoint	Address on MDS	Meaning
0	0	14 bytes of user data
1	1	
13	13	
	14	ECC
	15	ECC
14	16	14 bytes of user data
15	17	
27	29	
	30	ECC
	31	ECC
28	32	14 bytes of user data
29	33	
41	45	
	46	ECC
	47	ECC
	48	An incomplete block at the end of MDS memory cannot be used for user data.
	61	

1st block

2nd block

3rd block

Note

- Access time to MDS data is increased (i.e., less data can be processed during dynamic operation).
- Net MDS capacity is reduced (see chapter 5.2)
- A data correction may be delayed by up to one second.
- Before being commissioned, a "normal" MDS must first be initialised with the ECC driver switched on (e.g., with STG).

4.3 Starting the Commands

There are two ways to start commands.

– Start a command directly (only RESET and NEXT)

  Start RESET command by setting bit 0 in BEST
  Start NEXT command by setting bit 2 in BEST

– Start a parameterised command with the “start” bit (bit 1 in BEST)

  All other commands are started by setting bit 1 in BEST.
  (The commands are parameterised as shown in chapters 4.2.5 and 4.2.6, and started

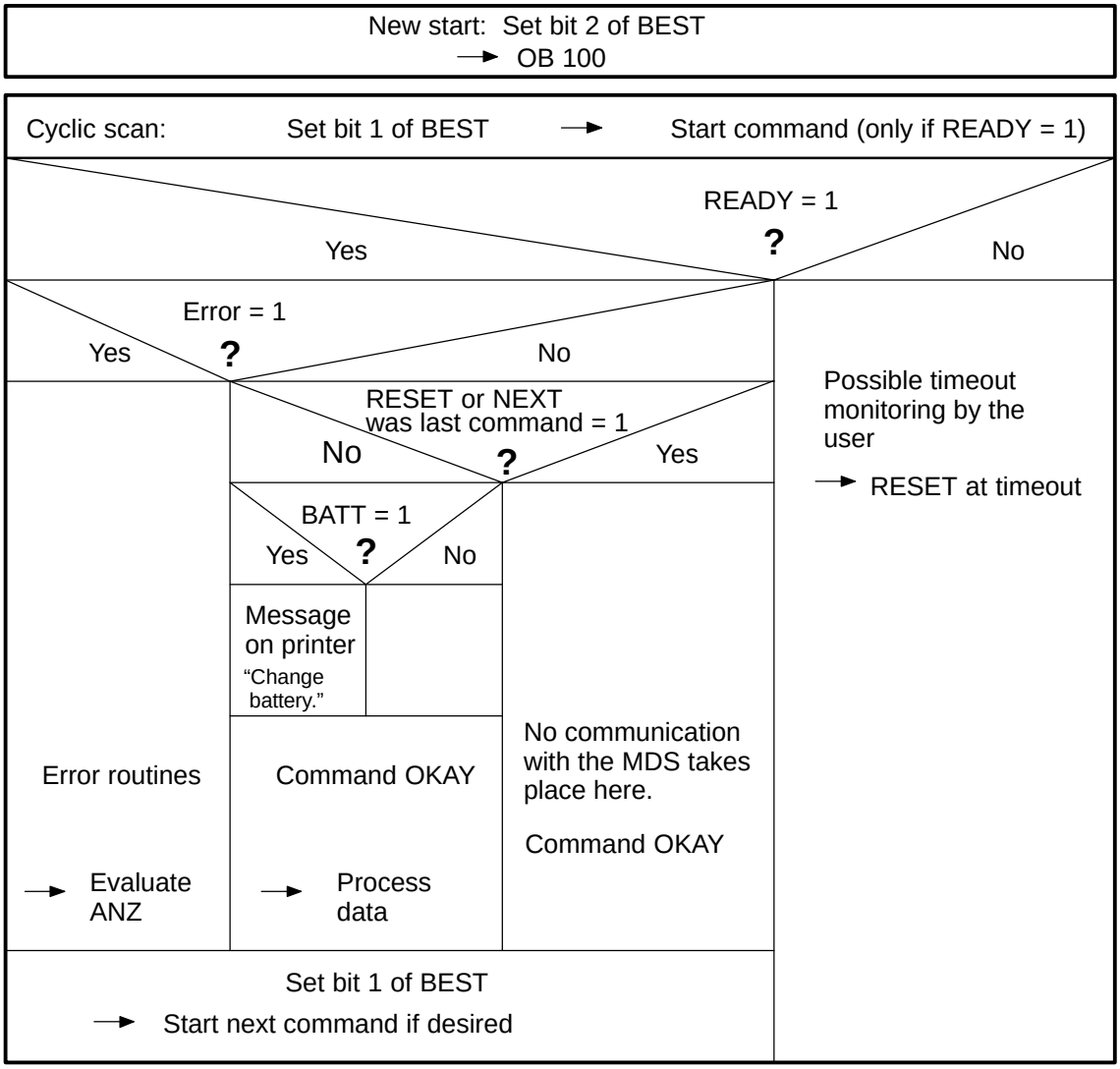
Sample Applications

5

5.1 Flowchart: Scanning the FC 44 by the User

Note:

A presence check was not parameterized to the ASM 450. This means that the NEXT command is not used in the program (see also chapter 6).



5.2 Processing the Data Memories

Types of data memories

The following mobile data memories are available in various types and sizes:

–	62	(42)*	Byte	RAM	(e.g., MDS 114)
–	128	(112)*	Byte	EEPROM	(e.g., MDS 213E)
–	2	(1.7)*	Kbyte	RAM	(e.g., MDS 302)
–	8	(7)*	Kbyte	EEPROM	(e.g., MDS 413E)
–	32	(28)*	Kbyte	RAM	(e.g., MDS 506)
–	752		Byte	EEPROM	(e.g., MDS E600/MOBY E)
–	40		Bit	Fixed code	(MOBY F MDS F1xx)
–	32		Byte	EEPROM	(MOBY F MDS F2xx)
–	256		Byte	EEPROM	(MOBY F MDS F4xx)

* Net capacity in ECC mode

Addressing

The data memories are addressed linearly from address 0000 to the end address. The ASM 450 automatically recognizes the size of the MDS memory. The user receives an error message if the end address of the MDS is exceeded.

The following table shows the address areas of the individual MDS models:

Addressing	16-Bit Hexadecimal Number		16-Bit Fixed Point Number	
	Normal	with ECC	Normal	with ECC
62-byte data memory with RAM				
Start address	0000	0000	+ 0	+ 0
End address	003D	0029	+ 61	+ 41
128-byte data memory with EEPROM				
Start address	0000	0000	+ 0	+ 0
End address	007F	006F	+ 127	+ 111
2-Kbyte data memory with RAM				
Start address	0000	0000	+ 0	+ 0
End address	07FC	06F1	+ 2044	+ 1777
8-Kbyte data memory with EEPROM				
Start address	0000	0000	+ 0	+ 0
End address	1FFC	1BF1	+ 8188	+ 7153
32-Kbyte data memory with RAM				
Start address	0000	0000	+ 0	+ 0
End address	7FFC	6FF1	+ 32764	+ 28657
752-byte data memory with EEPROM (MOBY E)				
Start address	0000	–	+ 0	–
End address	02EF	–	+ 751	–
Read serial number for MOBY E*				
Start address	1FF0	–	+8176	–
Length	4	–	+ 4	–
MOBY F MDS F1xx (5 byte				
Start address	0000	–	+ 0	–
End address	0004	–	+ 4	–
MOBY F MDS F2xx (32 byte)				
Start address	0010	–	+ 16	–
End address	001F	–	+ 31	–
ID no. (can only be read completely)				
Start address	0000	–	+ 0	–
Length	4	–	+ 4	–
MOBY F MDS F4xx (256 byte)				
Start address	0040	–	+ 64	–
End address	00FF	–	+ 255	–
ID no. (can only be read completely)				
Start address	0000	–	+ 0	–
Length	4	–	+ 4	–

* Data representation in DATDB: DBB0 = MSB, DBB3 = LSB

5.3 Initialising the Data Memories

Function

The entire data memory is written with the INIT pattern (see the initialisation command).

Required when:

- A new data memory has just been installed and has never been write-accessed.
- After battery failure or replacement
- Data memory is to be operated in ECC mode (read/write with ECC).

The error “error in RAM of data memory” (04HEX) is deleted. Initialisation is started with the initialisation command (with or without ECC).
The initialisation command is not needed during normal operation.

Example of Setting the Parameters

EXAMPLE : Call FC 44 and set parameters for initialisation

```
AUF     C DB 100        call BEDB
CALL    FC 44
ADR     : = 256
BEDB    : = 100
MOBY    : = 0
ANW     := 1
ABTA    := B#16#00
OPT     := B#16#00
OPT2    := W#16#0000
        L DBW 0         LOAD BEST
        T FW 250        AND STORE INTERMEDIATELY
        AN F 250.7      READY ?
        BEC             CALL FC 44 AGAIN UNCONDITIONALLY. WAIT FOR
                        READY

        AN F 10.0       IF AUXILIARY FLAG IS NOT YET...
        S F 251.0       ...SET, THEN A RESET MUST...
        S F 10.0        ...BE PERFORMED
        JC=END
        L W#16#0A64     DATDB = 10 AND DATDW = 100, SET ANY
        T DBW 2         VALUE
        L W#16#0300     SET INITIALISE WITHOUT ECC WITH
        T DBW 6         PATTERN = 00 HEX
        L W#16#8000     SET MEMORY SIZE TO 32 KBYTES
        T DBW 8
        S F 251.1       START COMMAND
ENDE:   L FW 250        LOAD FLAG WORD 250
        T DBW 0         BACK TO BEST

        BE
```

Time Required for Initialisation after MDS Is Located in the SLG's Field

					Without ECC [sec]	With ECC [sec]
62	byte	MDS	(RAM)	: Approx.	0.1	0.2
128	byte	MDS	(EEPROM)	: Approx.	6	12
2	Kbyte	MDS	(RAM)	: Approx.	0.4	5
8	Kbyte	MDS	(EEPROM)	: Approx.	18	54
32	Kbyte	MDS	(RAM)	: Approx.	3	75
752	byte	MDS	(EEPROM; MOBY E)	: Approx.	0.8	–
192	byte	MDS	(F4xx; MOBY F)	: Approx.	2.2	–
16	byte	MDS	(F2xx; MOBY F)	: Approx.	0.25	–

You will receive an error message if the memory cannot be initialised.

5.4 Calling FC 44 Cyclically (e.g., in OB 1)

OB1

The following program shows an example of calling the FC 44. A command is sarted when flag 0.0 is set.

```
AUF     C DB 100    CALL FBDB USED
                    RESET:                  DBW 0.0
                    START READ/WRITE        DBW 0.1

                    RESPONSE MESSAGE:
                    FINISHED                DBW 0.15
                    ERROR                   DBW 0.14
                    DATDB/DATDW             DBW 2
                    TYPE OF ERROR/ANZ       DBW 4
CALL    FC 44
ADR     : = 256
BEDB    : = 100
MOBY    : = 0
ANW     : = 1
ABTA    : = B#16#00
OPT     : = B#16#00
OPT2    : = W#16#0000
        L DBW 0     LOAD BEST
        T FW 250    AND STORE INTERMEDIATELY

        AN F 250.7  READY ?
        BEC         CALL FC 44 AGAIN

        A F 250.6   SCAN FOR ERRORS
        BEC         IF ERRORS, THEN NO NEW COMMAND START

        A F 0.0     START MOBY COMMAND AGAIN ?
        BEC         → NO

        L W#16#0A00 DATDB = 10 AND DATDW = 0
        T DBW 2
        L W#16#0114 COMMAND = 1 → WRITE W/O ECC, LENGTH = 20 BYTES
        T DBW 6
        L W#16#4711 SET STARTING WITH ADDRESS 4711HEX
        T DBW 8     ON THE MDS


        AN F 0.0
        S F 251.1   START MOBY COMMAND AGAIN IN BEST
        R F 0.0     MOBY COMMAND STARTED


        L FW 250    ... AND PUT THE START BIT BACK
        T DBW 0     ... IN BEDB

        BE
```

5.5 Presetting the BEDB

Example 1: DB 100 is BEDB and DATDB

DB 100		
DBW 0	W#16#0008	PRESET NEW START IN OB 100
DBW 2	W#16#6422	DATDB = 100 AND DATDW = 34
DBW 4	W#16#0000	Careful: DBW 34 is the smallest possible
DBW 6	W#16#0000	value for DATDW. Larger values
DBW 8	W#16#0000	are possible. DBW 2 can also be
DBW 10	W#16#0000	preset in OB 100.
DBW 12	W#16#0000	
DBW 14	W#16#0000	
DBW 16	W#16#0000	
DBW 18	W#16#0000	
DBW 20	W#16#0000	
DBW 22	W#16#0000	
DBW 24	W#16#0000	
DBW 26	W#16#0000	
DBW 28	W#16#0000	
DBW 30	W#16#0000	
DBW 32	W#16#0000	BEDB IS USED FOR FC 44 UP TO DBW 32
DBW 34	‘MOBY I’	
	‘SIEMENS’	
	‘HERE ARE THE DATA’	

Example 2: DB 100 is BEDB, and DB 10 is DATDB

DB 100		
DBW 0	W#16#0008	PRESET NEW START IN OB 100
DBW 2	W#16#0A08	DATDB = 10 AND DATDW = 8
DBW 4	W#16#0000	
DBW 6	W#16#0000	
DBW 8	W#16#0000	
DBW 10	W#16#0000	
	...	
	...	
	...	
DBW 30	W#16#0000	
DBW 32	W#16#0000	BEDB IS USED FOR FC 44 UP TO DBW 32

DB 10	
DBW 0	W#16#0000
DBW 2	W#16#0000
DBW 4	W#16#0000
DBW 6	W#16#0000
DBW 8	‘MOBY I’
	‘SIEMENS’
	‘HERE ARE THE DATA’

5.6 Programming New Starts and Restarts

Assumption: DB 100 is BEDB; DB 10 is DATDB, and DBW 0 is DATDW in DATDB.

OB 100

```
C DB 100          open BEDB
L W#16#0008       new start bit
T DBW 0           to best
L W#16#0A00       DATDB=10 and DATDW=0 or preset directly in BEDB
T DBW 2           see also Chapters 4.2.2 and 4.2.4
```

OB 101

```
C DB 100          open BEDB
L W#16#0008       new start bit
T DBW 0           to best
L W#16#0A00       DATDB=10 and DATDW=0 or preset directly in BEDB
T DBW 2           see also Chapters 4.2.2 and 4.2.4
```

MDS Control, Presence Check and Digital Inputs/Outputs

6

Various operating modes of the MDS control can be parameterized (the ANW parameter). This chapter contains a detailed description of how these modes and the components below affect each other.

- Digital inputs/outputs (DI/DQ)
- Presence check
- DI/DQ command
- NEXT command

With the default settings, the ASM works with the presence check but without MDS control.

Precence Check

The presence check is a logic routine in the firmware of the ASM 450 which recognizes whether a mobile data memory is currently located in the vicinity of the SLG. The presence check can be controlled in three ways. Selection is made via the ANW parameter.

a) **With 2 DIs (ANW = 4):**

DI0 gives ASM 450 a pulse when the data memory moves into the vicinity of the SLG.
DI1 gives ASM 450 a pulse when the data memory moves out of the field.

b) **With field scanning (ANW = 1, 2):**

The firmware of the ASM 450 scans the area around the magnetic field continuously for the presence of a mobile data memory. A hysteresis during field sampling prevents (to the extent possible) presence identification from changing back and forth when a mobile data memory stops on the edge of the field.

c) **With 1 DI (ANW = 6):**

DI1 tells the ASM 450 that an MDS has left the field. The ASM 450 is ready for the next MDS. The presence of an MDS is determined by field scanning.

Presence

A mobile data memory is currently located in the vicinity of the SLG. The presence bit (ANW bit, bit 8 in BEST) is set. The presence of an MDS can also be recognized by the state of digital outputs DQ0 and DQ1 when ANW = 2,4 or 6.

MDS control

MDS control is switched on when ANW = 2, 4 or 6 is set. MDS control is an option of the ASM firmware. It permits the MDS to run with the flow of material synchronously with the user program. An error message is output when asynchronization occurs.
Use of MDS control forces the NEXT command to be used in the application.

Digital Inputs DI0 and DI1

Inputs may be used

a) for automatic MDS control (ANW = 4,6)

b) as one or two all-purpose, digital inputs which can be scanned by the computer with the DI/DQ command

---

Note

Scanning the DIs with the DI/DQ command is also possible if you are working with a).

Digital Outputs DQ0 and DQ1

After an ASM 450 is switched on, the DQs have the function of the ANW and ERR LEDs. Not until OPT has been parameterized with the value 40HEX (cf. chapter 4.2.4) can the DQs be used.
Outputs may be used

a) for transport control when working with MDS control (ANW = 2,4,6):
DQ0 controls the motor of a conveyor belt. DQ0 can also be used as an output signal for the presence of a mobile data memory.
DQ1 controls a pallet stopper, and indicates the presence of a mobile data memory. DQ0/DQ1 can just as easily be applied to the inputs of a controller.

b) as 2, all-purpose, digital outputs when working without MDS control (ANW = 0, 1):
The state of the DQs can be scanned and changed by the computer (i.e., set, reset).

NEXT command

The NEXT command is used to switch the ASM 450 controller to the next mobile data memory. **The NEXT command must always be used if you are working with MDS control (ANW = 2, 4, 6).** The NEXT command causes the ASM 450 to switch the digital outputs (cf diagrams on the next few pages).

A read/write job for the next MDS can be sent to the SLG as soon as the NEXT command is acknowledged by the ASM 450. This new command remains in the ASM 450 until the old MDS has left the field and a new MDS arrives.

This means that an ASM 450 command can be executed as soon as an MDS enters the field of the SLG.

SLG switchover (SLG1↔ SLG2)

Use of 2 SLGs on an ASM 450 is only permitted in mode ANW = 0, 1. SLG switchover is performed with the DI/DQ command. If MDS control is on (ANW = 2, 4, 6), only one SLG may be used with the ASM 450.

6.1 No MDS Control; No Presence Check: ANW = 0

The magnetic field of the SLG is only switched on when a valid MDS command (read, write or initialise) is started. The SLG is switched off again after a data memory has been detected and the command executed.
This permits projects to be implemented in which the specified distance from SLG to SLG can be shortened as desired. The only requirement is that the SLG stations which are close together must be addressed in multiplex mode. This may also be necessary for applications requiring large amounts of data to be transferred in dynamic operation. Stopping the conveyor belt can be avoided by dividing up the data and distributing it consecutively among several SLGs.

DI0, DI1: The digital inputs can be used as desired. The inputs can be scanned with the DI/DQ command.

DQ0, DQ1: The digital outputs can be set/reset as desired with the DI/DQ command.

Note

Do not use the NEXT command when operating the ASM 450 without MDS control (ASM 450 error message: 10HEX).

6.2 No MDS Control; Presence Control via Field Scanning: ANW = 1

In this operating mode, the field of the selected SLG is always on. As soon as an MDS moves into the field of the SLG, this is indicated to the user with the ANW bit (bit 8 of BEST). Cf. chapter 4.2.1. The user can always start a command. If the MDS leaves the field during processing, this does not generate an error message.

DI0, DI1: The digital inputs can be used as desired. The inputs can be scanned with the DI/DQ command.

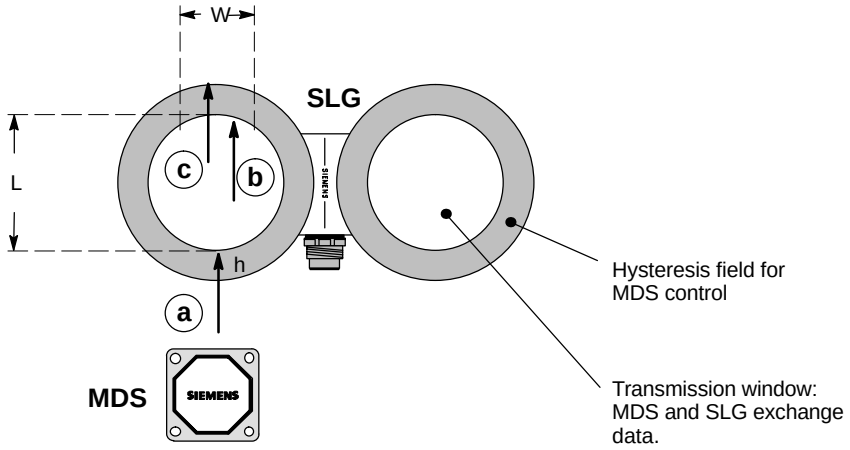
DQ0, DQ1: The digital outputs can be set/reset as desired with the DI/DQ command.

Note

The NEXT command cannot be used with the ASM 450 without MDS control (ASM 450 error message: 10HEX).

6.3 Field Scanning as MDS Control: ANW = 2

After a new start or restart of the PLC, or after a new start or RESET command of FC 44, the SLG is switched on and remains active until the PLC or the ASM 450 is switched off.
The ASM 450 scans the field continuously for the presence of a data memory near the SLG. When the ASM 450 detects a data memory, the user receives “presence bit = 1” (bit 8 in BEST) at the next bus cycle or the next FC call. Similarly, BEST bit becomes “0” when the data memory leaves the SLG’s field.
When the data memory stops directly on the edge of the SLG’s magnetic field, a hysteresis function prevents the presence bit from switching back and forth continuously. This hysteresis function is handled by the processor on the ASM 450.
Read/write commands can be sent to the FC 44 for totally transparent MDS control. In addition, the presence bit retains its unrestricted validity after the start of a command.



L, W: Dimensions of the transmission window of an SLG at working distance to the MDS (See MOBY I catalogue)
L = Field length W = Field width

h: Hysteresis: Area in which an ANW bit that has been set once remains set

h = 0.1 - 15 mm
(depends on MDS model)

a: Point at which the mobile data memory is recognized by the SLG. Starting at this point, the queued MOBY command is executed with the MDS. The presence bit remains set.

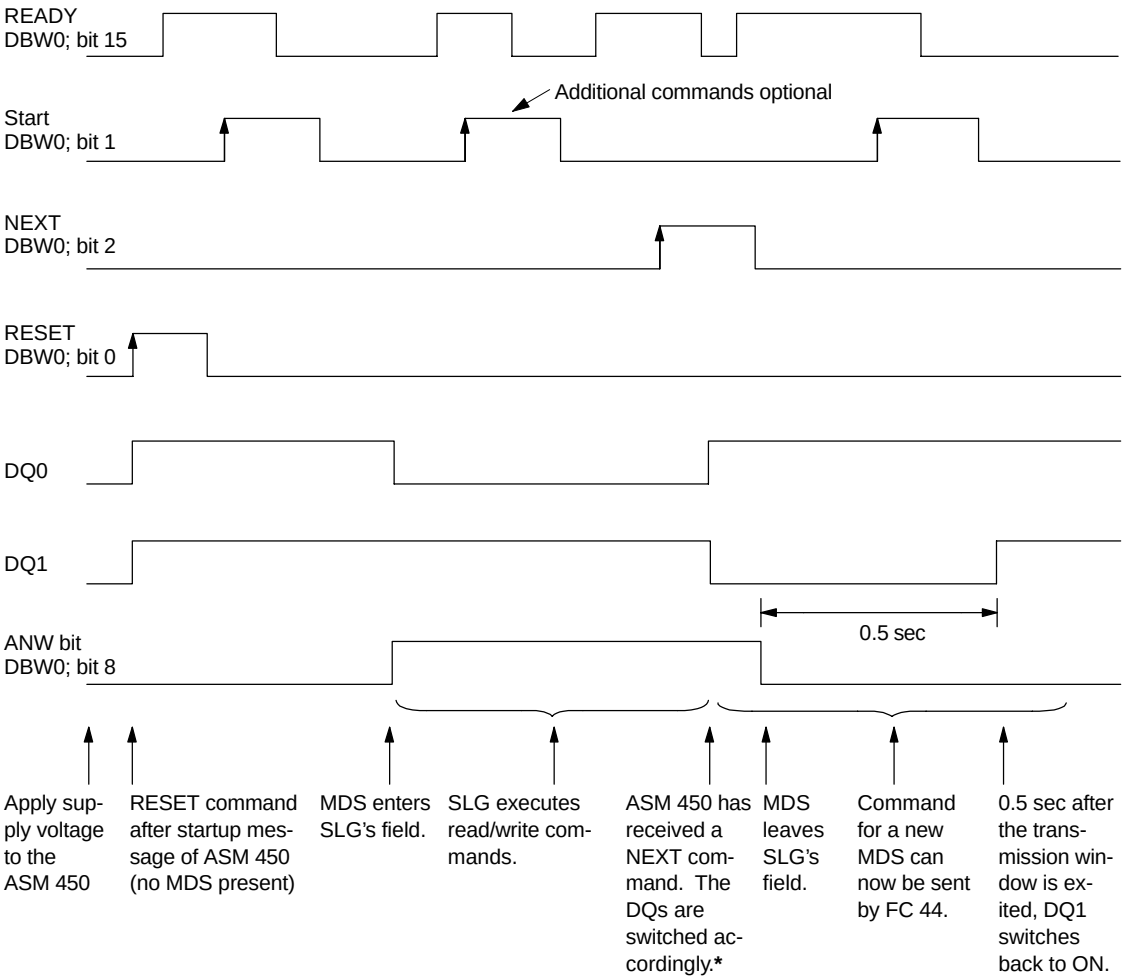
b: Execution of the MOBY command must be completed by this time since the data memory is now leaving the transmission window. The presence bit still remains set.

c: Reset of the presence bit in the status byte. The MDS has left the vicinity of the SLG. A command which is not yet finished is aborted, and ASM 450 error 01HEX is output.

DI0, DI1: You can use all four digital inputs as desired. The inputs can be scanned with the DI/DQ command.

DQ0, DQ1: These two digital outputs are set by the ASM 450 as shown in the time diagram below. Do not set/reset these outputs with the DI/DQ command.

Time Diagram



* The DQs switch over even when the MDS leaves the SLG's hysteresis field without a NEXT command.

↑ These edges must be controlled by the user.

ASM 450 Error Messages

Error 01H: The MDS leaves the field of the SLG even though a command is still being executed with the MDS. The command is aborted. The read data are invalid. If a write command is involved, the data on MDS may contain errors.

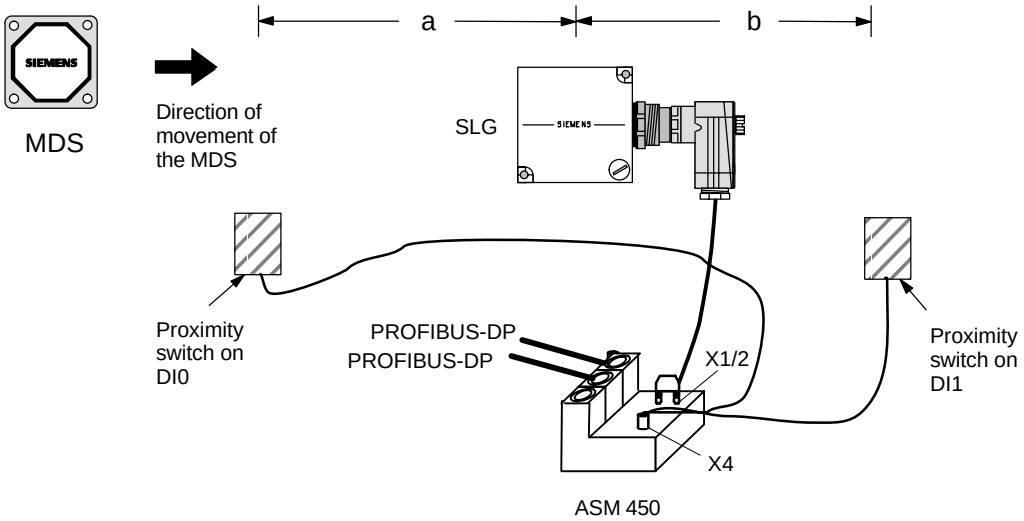
Error 02H: No command is active on the ASM 450. During this time, the MDS moves through the field of the SLG as shown above, or command processing of the MDS was not concluded with NEXT. The error is reported with the next FC 44 command.

Note

- The ASM 450 cannot tell whether an MDS has passed through the entire field, or whether the MDS only entered the field very briefly and then backed out of it again.
- When working with field scanning, it is essential that the distance between two SLGs be maintained as specified in the planning guidelines. (See manual on configuration, installation and service.)

6.4 MDS Control with 2 DIs: ANW = 4

Setup



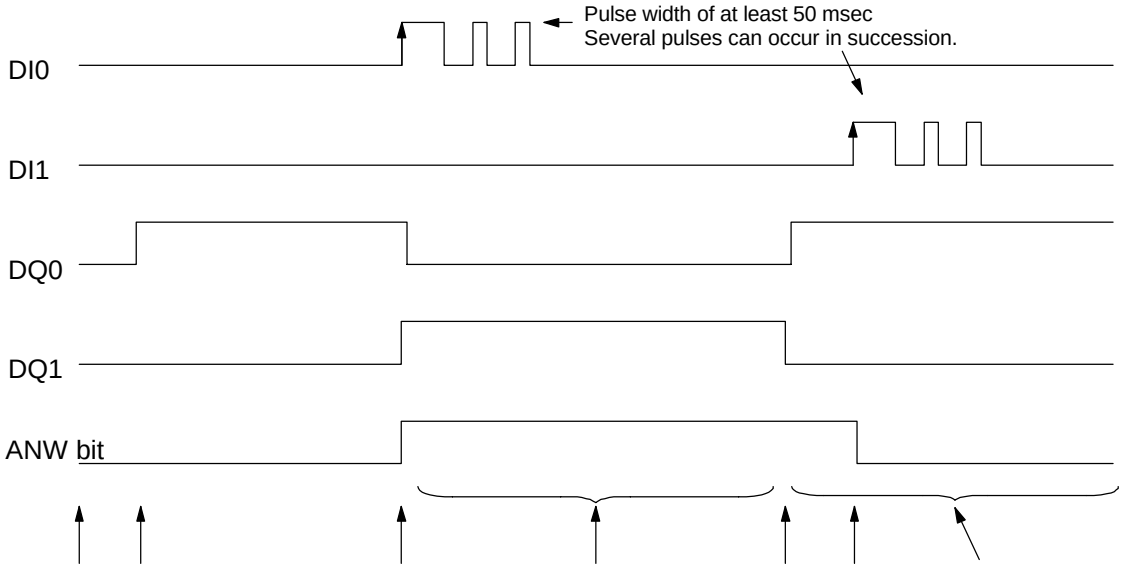
a, b: Distance to be configured from the middle of the SLG to the input/output proximity switch: 10 cm < a or b < 50 cm
The maximum value of a or b can also be greater. Remember, however, that two MDSs cannot be positioned between the input and output proximity switches at the same time. Also make sure that the minimum distances from MDS to MDS are maintained.

DI0: Receives a pulse when the MDS enters the area of the SLG. This pulse can already occur before the SLG field is reached. The input pulse can also be generated by a controller.

DI1: Receives a pulse when the MDS leaves the area of the SLG. The ASM 450 is ready to process the next data memory. While a command is active, the MDS can leave and reenter the magnetic field of the SLG any number of times.
Execution of the ASM 450 command must be completed before the DI1 switch is reached.

DQ0, DQ1: These two digital outputs are set by the ASM 450 as shown in the following time diagram. Do not set/reset these outputs with the DI/DQ command.

Time Diagram



* The DQs switch over even when the MDS leaves the SLG's area without a NEXT command (pulse on DI1).

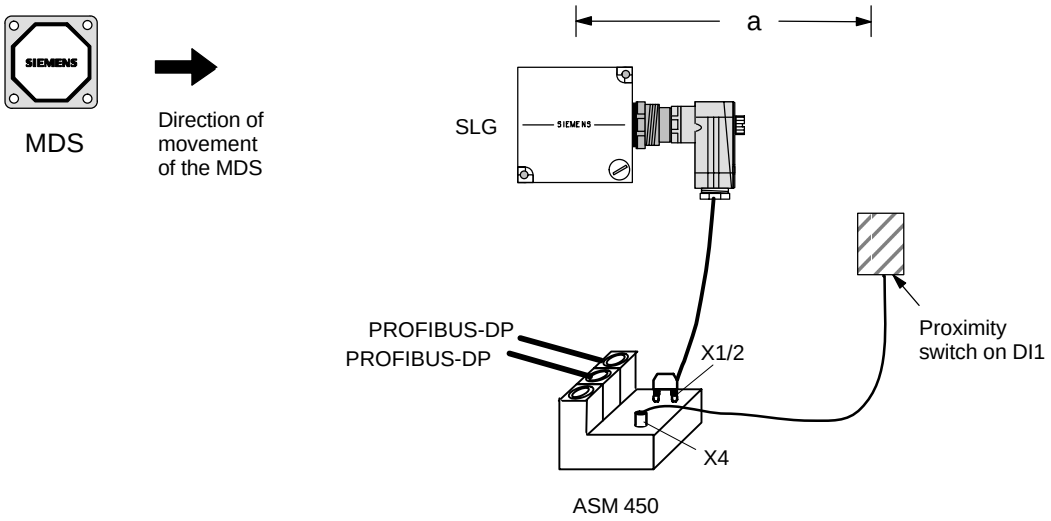
ASM 450 Error Messages

Error 01: A pulse occurs on DI1 while the ASM 450 is processing a command with the MDS. The command is aborted. The read data are invalid. When a write command is involved, the data on MDS may contain errors.

Error 02: The ASM 450 registered a pulse at MDS entry (DI0) and then a pulse at MDS exit (DI1) without having received an MDS command from the user, or command processing of the MDS was not concluded with NEXT. The error is reported with the next FC 44 command.

6.5 MDS Control with Field Scanning and 1 DI: ANW = 6

Setup



Field scanning is used to detect the MDS (see chapter 6.3). The DQs switch over when the SLG detects an MDS. The MDS then remains “present” (bit 8 in BEST) until a pulse occurs on DI1.

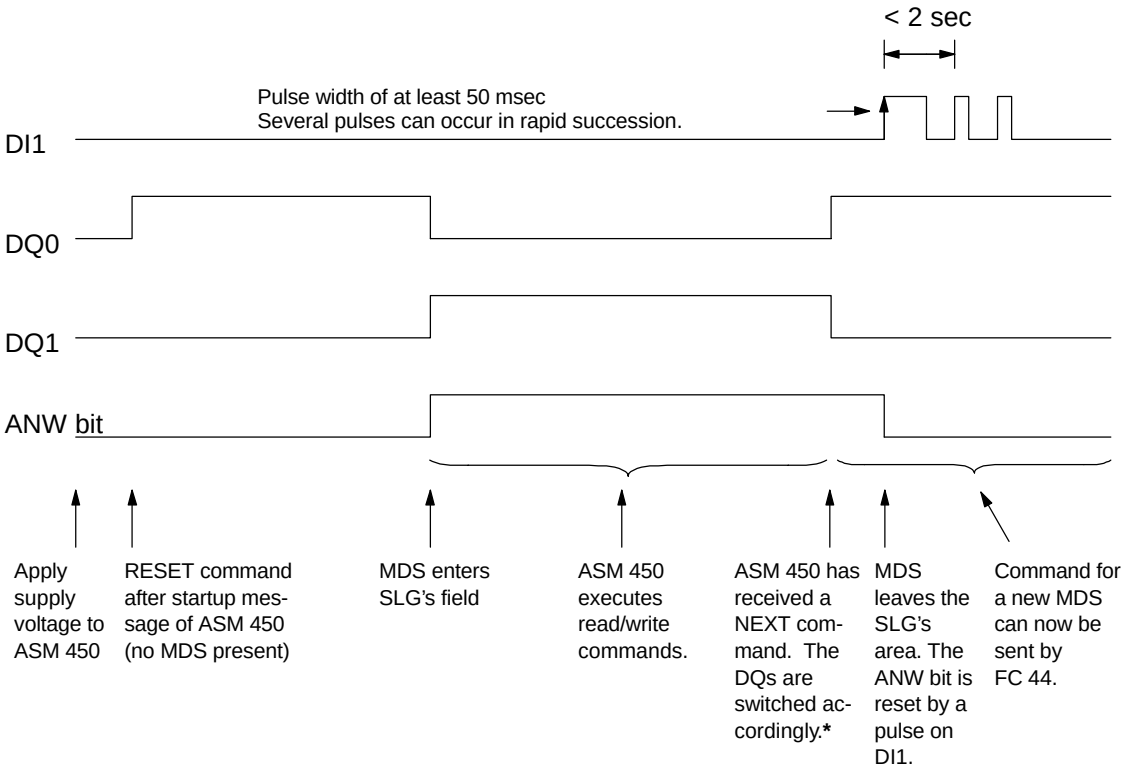
a: Distance to be configured from the middle of the SLG to the output proximity switch: 20 cm < a < 50 cm.
The maximum value of “a” can also be greater. Remember, however, that two MDSs cannot be positioned between start of the SLG field and output proximity switch at the same time. Also be sure to maintain the minimum distances from MDS to MDS.

DI1: Receives a pulse when the MDS leaves the area of the SLG. The DI1 switch does not have to correspond to the field boundary of the SLG. If DI1 is behind the field boundary, the MDS can leave and reenter the SLG’s field as often as desired while a command is active. Execution of the ASM 450 command must be finished before the DI1 switch is reached.

DI0: You can use this digital input as desired. The input can be scanned with the DI/DQ command.

DQ0, DQ1: These two digital outputs are set by the ASM 450 as shown in the following time diagram. Do not set/reset these outputs with the DI/DQ command.

Time Diagram



* The DQs switch over even when the MDS leaves the SLG's area without a NEXT command (pulse on DI1).

Error Messages

Error 01: A pulse occurs on DI1 while the ASM 450 is processing a command with the MDS. The command is aborted. The read data are invalid. When a write command is involved, the data on MDS may contain errors.

Error 02: A second DI1 pulse is registered by the ASM 450 (after T > 2 sec has expired). During this time, the ASM 450 did not receive a data memory command (including the NEXT command) from FC 44, or command processing was not concluded with NEXT. The error is reported with the next FC 44 command.

6.6 New Starts and Restarts

The new start and restart procedure is always performed by the ASM 450 after a 24 V supply voltage failure.

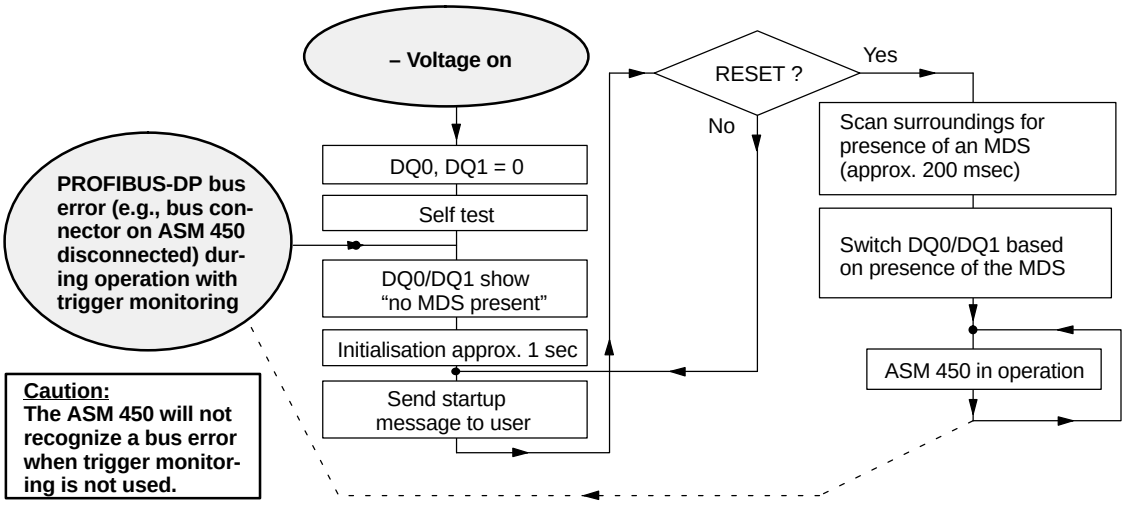
After an extensive self test, the ASM 450 gives the startup message (FC 44 error message 15HEX, see chapter 4.2.3). This message tells you that the ASM 450 is ready for operation (duration of the startup: not more than 3 seconds). It is then mandatory that the user start a RESET command.

Caution

When the supply voltage of the ASM 450 is switched on or off, spikes (i.e., short pulses) in the msec range may occur on all DQs.

Presence Check after Execution of the RESET Command

During the first RESET command after the startup of the ASM 450, recognition of whether an MDS is located in the field of the SLG is always the same. The ASM 450 scans its surroundings for a mobile data memory for approximately 200 msec (i.e., the first RESET command by the user always requires approximately 200 msec to be executed). DQ0/DQ1 are then controlled by MDS control (ANW) (see flowchart below).



The ASM 450 and, with it, the presence check are no longer functional under the following circumstances: the PROFIBUS-DP is in STOP, BUS-FAULT or IM-FAULT status; the PROFIBUS-DP master does not address the station number set on the ASM 450.

After the first RESET command, the ASM 450 exhibits the following behavior under the following conditions:

a) **No MDS is present.**
The ASM 450 waits for an MDS or a read/write command.

b) **An MDS is present.**
The ASM 450 waits for a read/write command before the MDS leaves the field of the SLG. A NEXT command causes the next read/write command to be executed on the next MDS entering the field, and not on the MDS currently in the field.

Commissioning the ASM 450 with FC 44 7

Installing the Module

- Using the DIP switch, set the desired PROFIBUS address. (cf. section 2.1)
- Connect the SLG to the ASM 450.
- Connect the PROFIBUS-DP and the 24 V DC to the module.

Note

Do not plug in/unplug connections when the power is on.

Loading the FC 44

- Load the FC 44 in the user program.

Presetting the Organization Blocks

- Preset the BEST parameter in the OB for restart and new start as follows.
  For restart 0008HEX
  For new start 0008HEX

Note

When operating several SLGs in one PLC, BEST must be preset in each BEDB.

Setting Up the BEDB and DATDB Data Blocks

- A separate BEDB must be set up for each ASM 450.
- Set up data block DATDB, if DATDB is unequal to BEDB.

Calling FC 44 in the User Program

- Always call FC 44 unconditionally. (CALL FC 44)
- The ADR, BEDB, MOBY, ANW. ABTA, OPT and OPT2 parameters must be specified. (See chapter 3.3 for setting the parameters.)

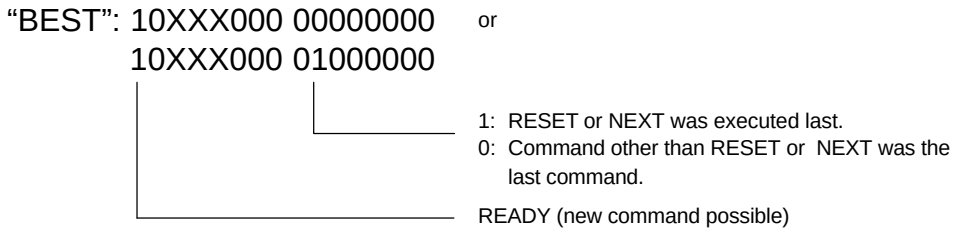
Running the Program

- Call user program cyclically in OB1, for example.

Monitoring the Functions

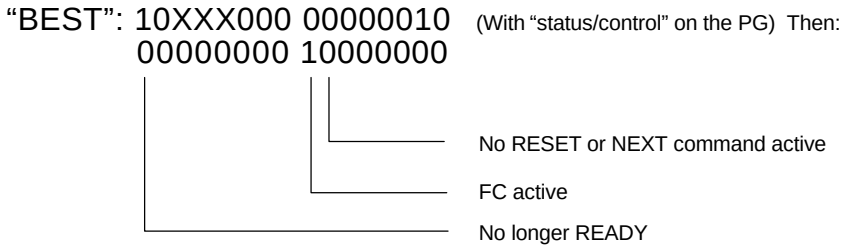
The functions of the ASM 450 can be monitored with the “status/control” function on a PG. The BEST parameter (= DBW 0 in BEDB) appears on the monitor screen.

Program Running – No Command Being Executed



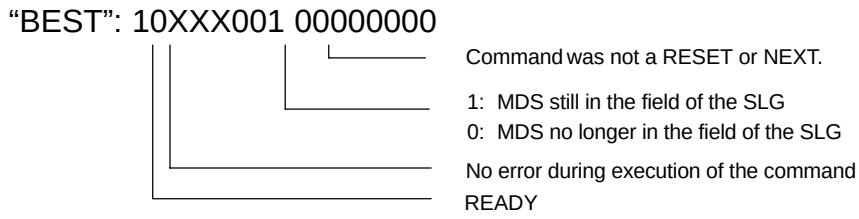
Execute a RESET command if the status of the two parameters is different than that shown above. If the contents of the two parameters are still different, proceed as shown in chapter 8 (error description).

Command Issued



The status of the two parameters remains the same until an MDS enters the vicinity of the SLG and the command was executed correctly with the MDS.

Command Executed

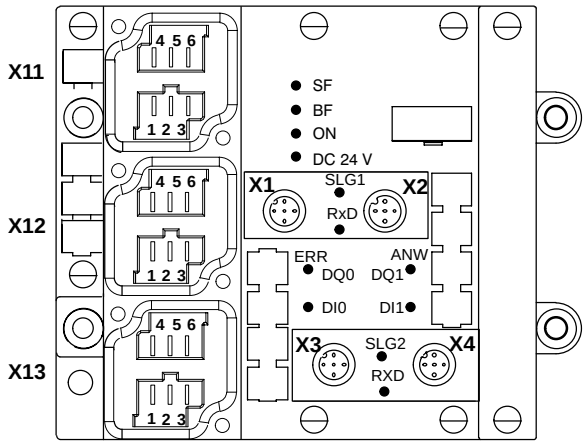


The values of BEST and ANZ have the same states for read and write.

After execution of the command, BEST returns to the basic setting.
If an error is detected and one of the parameters is different than shown above, proceed as shown in chapter 8 (error description).

Indicator Elements and Trouble-Shooting

8



LEDs for PROFIBUS-DP
(See also section 8.1)

SF:	System fault (hardware error on the ASM 450) (RED)
BF:	Bus fault (error on PROFIBUS-DP) (RED)
ON:	On when the logic voltage is present on the ASM 450 (is generated from the 24 V supply voltage)
DC 24 V:	On when the 24 V supply voltage is connected to the ASM 450

LEDs for MOBY

RxD:	SLG with command active
ANW:	MDS present or status of DQ1
ERR:	Error indication or status of DQ0
SLG1/2:	Indicates the selected SLG. Only SLG1 or SLG2 can be selected.
DI0/1:	Status of the digital inputs
DQ0/1	Status of the digital outputs These LEDs are identical to ERR and ANW. They can be changed to the DQ0/1 meaning with the OPT parameter. See chap. 3.3.

Figure 8-1 LEDs of the ASM 450

8.1 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 ASM 450. 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.

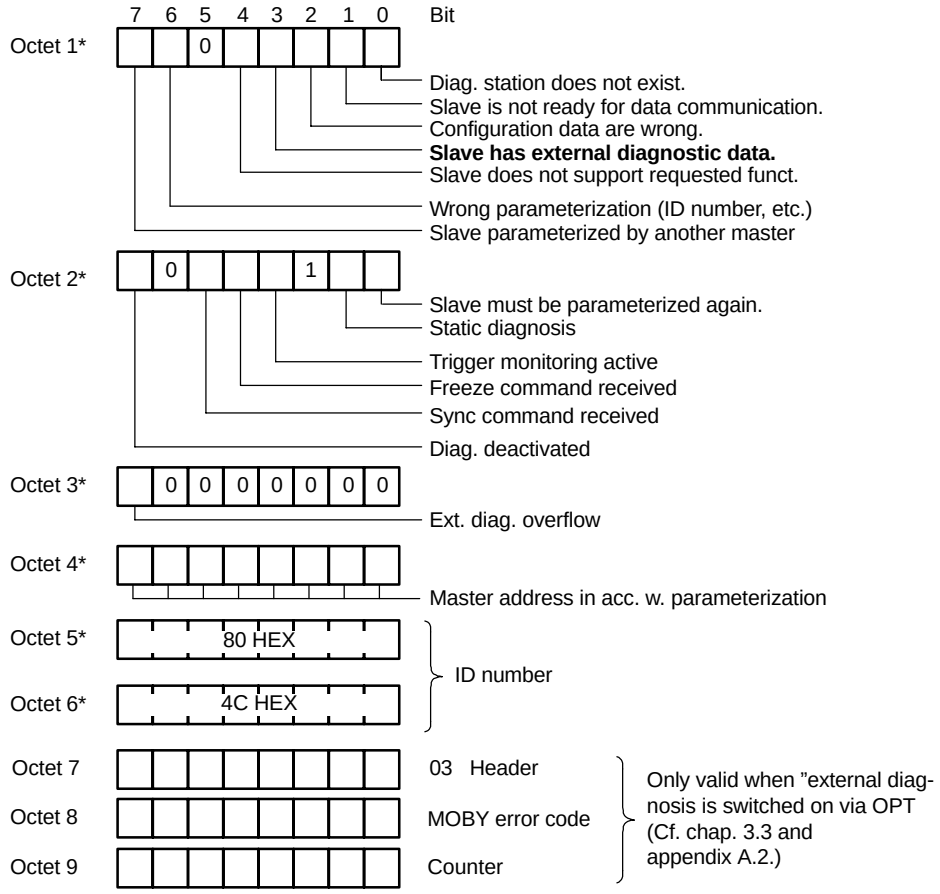
Table 8-1 LED indication

"BF" LED	"SF" LED	Cause of Error	Error correction
On	*	• ASM 450 is starting up.	–
		• The connection to the DP master has failed. • ASM 450 does not detect a baud rate.	• Check the PROFIBUS-DP connection. • Check the DP master.
		• Bus interruption • DP master is not in operation.	• Check all cables in your PROFIBUS-DP network. • Check to determine whether the plug connectors for PROFIBUS-DP are securely connected to the ASM 450.
Off	On	• The PROFIBUS address set on the ASM 450 is illegal.	• Change the PROFIBUS address set on the ASM 450.
Flashing	On	• The configuration data sent by the DP master to the ASM 450 do not correspond to the setup of the ASM 450.	• Check the configuration of the ASM 450 (i.e., input/output and PROFIBUS address). • Correct GSD file used? (SIEM804C.GSD)
Flashing	Off	• ASM 450 has detected the baud rate but is not addressed by the DP master. • ASM 450 was not configured.	• Check the PROFIBUS address set on the ASM 450 or in the configuration software. • Check the configuration of the ASM 450 (i.e., station type).
On	Flashing	• ASM 450 has a hardware defect.	• Replace the ASM 450.

* Status not relevant

System diagnosis

The ASM 450 offers device-related diagnostic capability (i.e., external diagnostic data). These data can be evaluated as required. This is indicated by bit 3 of octet 1. The data consist of a total of 3 bytes and are added after the first 6 bytes of the system diagnosis. Their layout is shown below.



Header: Number of external diagnostic bytes including header

Error code: Same as error messages in section 8.2.2. The code of the last error always remains stored. The MOBY error code ist deleted with a RESET command.

Counter: The counter is incremented by 1 each time an error occurs. This indicator can be used to evaluate repeated errors with the same code. When the counter exceeds 255, it begins again at zero. After the startup, the counter is 0. After the RESET command which immediately follows, the counter is 1.

* System diagnosis. Contents correspond to PROFIBUS-DP. EN 50170 vol. 2 PROFIBUS.

Note

The SIMATIC S7 always goes into STOP status when PROFIBUS requests a system diagnosis. If this STOP status is to be bypassed, an OB 86 (i.e., ignore diagnosis) or SFC 13 (i.e., read diagnosis) must be programmed for the S7. Cf. SIMATIC S7 manual.

8.2 Evaluating the Errors Indicated by ANZ

Meaning of the LEDs for MOBY

ERR: Flashing LED indicates errors.
The error state detected last is always indicated. The error indication is overwritten by a new error. The error indicator can only be reset with a hardware reset or by parameterizing the OPT parameter appropriately.

Note

Flashing of the ERR-LED during normal operation is of secondary importance to the user as long as the system continues running correctly. The programmer can evaluate some of these errors in his/her program and provide a reaction.
This error LED is a particular help during commissioning or servicing work.

RxD: Rapid irregular flashing indicates that diaglog is taking place with the SLG or the mobile data memory (MDS). This LED is always on when the presence check is selected.

ANW: This LED has only one function when the user has parameterized a type of presence check. The LED indicates the presence of an MDS in the field of the SLG.
OFF = No data memory is present or MDS control is not on.
ON = An MDS is currently located in the field of influence of an SLG.

Error indicators

Errors are indicated by the ERR-LED.

Hardware errors on the ASM 450:
The ASM 450 cannot be addressed after a hardware error occurs. The error is not sent via the bus. The ASM 450 must be replaced.

- **Permanently ON (bright)**
  The PROM of the ASM 450 is defective.
- **Permanently ON (dim)**
  The CPU of the ASM 450 is defective.
- **Rapid flashing**
  Approx. 4 Hertz: External RAM of the ASM 450 is defective.
  Approx. 8 Hertz: Dual port RAM (PLC) of the ASM 450 is defective.

Flashing pattern:
All other errors are indicated by an easy-to-identify flashing patterns. To identify the pattern, count the pulses between two long pulse pauses. The number of pulses corresponds to the ASM error message last output.

8.2.1 Error Messages of the FC 44: Right Byte of ANZ (DBB 5 in BEDB)

The ERR-LED does **not** flash for error messages of the FC 44. DBB 5 is in hexadecimal format (i.e., HEX) and is specified as a fixed point number (i.e., DEC).

Table 8-2 Error messages of the FC 44

ANZ (Right Byte)	Description
02HEX/ 02DEC	Illegal command code or command parameter was entered. → Set parameters of the data words in BEDB correctly (see command description).
06HEX/ 06DEC	The command code and the acknowledgement code received are not identical. → Length of the ASM 450 input and output area is too short. → Set parameters of PROFIBUS master correctly.
07HEX/ 07DEC	The acknowledgement received is too long. → Length of the ASM 450 input and output area is too short. Cf. table 3-3. → Read command. The specified length of the data to be read is too long. → Set parameters of PROFIBUS master correctly.
08HEX/ 08DEC	The parameterized user data length in BEDB of the read/write command and the user data length of the acknowledgment received are not identical. → Length of the ASM 450 input and output area is too short. → Set parameters of PROFIBUS master correctly.
09HEX/ 09DEC	The user data received are too long. → Length of the ASM 450 input and output area is too short (not 32 bytes). Cf. table 3-3. → Read command. The specified length of the data to be read is too long. → Set parameters of PROFIBUS master correctly.
11HEX/ 17DEC	The formal operands of FC 44 were set incorrectly, or the parameters of the PROFIBUS master are wrong. → Set parameters of FC 44 correctly. → Set parameters of PROFIBUS master correctly. Check ADR parameter in particular. → Then start RESET command.
13HEX/ 19DEC	FC 44 reports that the next command must be a RESET. → RESET was not performed after a startup message by the ASM 450. → RESET was not performed after an error message requiring a RESET as the next command. → Then start RESET command.

Table 8-2 Error messages of the FC 44

ANZ (Right Byte)	Description
14HEX/ 20DEC	Synchronisation error between ASM 450 and FC 44 → The handshake between command and acknowledgement telegrams is out of step. There may be a problem with the contacts, or the supply voltage is not steady. → Then start RESET command.
15HEX/ 21DEC	ASM 450 has performed a startup, or a PROFIBUS-DP error has occurred. → Supply voltage of the ASM 450 is not steady. → See ASM 450 error message 1AHEX in chapter 8.2.2 → Then start RESET command.

8.2.2 Error Messages of the ASM 450: Left Byte of ANZ (DBB 4 in BEDB)

The ERR-LED flashes for error messages of the ASM 450. DBB 4 is in hexadecimal format (i.e., HEX) and is specified as a fixed point number (i.e., DEC). If this error message is also to be reported as an external diagnosis via PROFIBUS, the OPT parameter must be assigned with 01. Cf. chap. 3.3 or appendix A.2.

Table 8-3 Error messages of the ASM 450

ANZ (Left Byte)	Flashing of ERR-LED	Description
00HEX/ 00DEC	–	No error Standard value when everything is okay
	1x	No error ASM 450 has performed a startup and is waiting for a RESET or new start command (see chapter 5.6)
01HEX/ 01DEC	2x	Presence error: The MDS has moved out of the SLG's transmission window. The MOBY I command was only partially executed. Read command: No data are supplied to FC 44. Write command: The MDS which has just left the field contains an incomplete data record. → Working distance from SLG to MDS not maintained → Configuration error: Data record to be processed is too long (during dynamic operation). The next command is automatically executed on the next MDS. This can be a read, write or NEXT command.

Table 8-3 Error messages of the ASM 450

ANZ (Left Byte)	Flashing of ERR-LED	Description
02HEX/ 02DEC	2x	Presence error. An MDS has moved past an SLG and was not processed with a MOBY I 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 450 waits for the next command (i.e., read, write or NEXT). This command is immediately answered with this error. This means that a read or write command will not be executed. The ASM 450 does not resume normal execution until the next command. A RESET command from FC 44 will also reset this error state.
03HEX/ 03DEC	3x	Error in the connection to the SLG. SLG does not respond. → Cable between ASM 450 and SLG is wired incorrectly, or there is a break in the cable. → 24 V supply voltage is not connected or has failed briefly. → Automatic fuse on the ASM 450 has been triggered. → Hardware defect → Another SLG is in the vicinity and is active. → Interference on DI/DQ, SLG or PROFIBUS line
04HEX/ 04DEC	4x	Error in the memory of the MDS The MDS has never been write-accessed before or has lost the contents of its memory because of a battery failure. (This error cannot occur on the MDS model equipped with the 128-byte EEPROM.) → Replace MDS (if the battery bit is set). → Initialise MDS with the STG. → Initialise MDS via SIMATIC with FC 44 (see chapter 5.2).
05HEX/ 05DEC	5x	Unknown command FC 44 has sent an unknown command to the ASM 450. → BEDB was overwritten by the user. → The MDS reported an address error. MOBY F → Read/write area has password protection. → FFT command is only permitted when ANW check is disabled. → Command not permitted since the antenna has just been turned off. → Turn on antenna with SET-ANT

Table 8-3 Error messages of the ASM 450

ANZ (Left Byte)	Flashing of ERR-LED	Description
06HEX/ 06DEC	6x	Field interference on the SLG The SLG is receiving interference pulses from its surroundings. → External interference field. The field can be located with the STG's "inductive field indicator". → Two SLGs are too close together. Distance of interval does not conform to the configuration guidelines. → The connection cable to the SLG is faulty, is too long or does not conform to specifications.
07HEX/ 07DEC	7x	Too many sending fields The MDS was not able to receive the command or write data from the ASM 450 correctly even after several attempts. → The MDS is standing right on the boundary area of the transmission window. → Data transmission to the MDS is being affected by external interference.
08HEX/ 08DEC	8x	CRC sending error – The monitoring receipt has detected an error during sending. → Same cause as for error 06HEX – The MDS is reporting very many CRC errors. → The MDS is located in the boundary area of the SLG. → The MDS and/or the SLG has/have a hardware defect.
09HEX/ 09DEC	9x	Only during initialisation. CRC error during acknowledgement receipt from MDS → Cause same as for error 06HEX
0AHEX/ 10DEC	10x	Only during initialisation. MDS is unable to execute the initialisation command. → MDS is defective.
0BHEX/ 11DEC	11x	Only during initialisation. Timeout during initialisation of the MDS → The MDS is standing right on the boundary area of the transmission window. → The MDS is using too much current (defective). → Only for MDS 507: Check FC 44 parameters MOBY and ABTA.
0CHEX/ 12DEC	12x	Memory of the MDS cannot be write-accessed. → MDS memory is defective. → EEPROM-MDS was write-accessed too many times and is at the end of its life.

Table 8-3 Error messages of the ASM 450

ANZ (Left Byte)	Flashing of ERR-LED	Description
0DHEX/ 13DEC	13x	Address error The address area of the MDS has been exceeded. → The start address in BEDB is set wrong during the command start. → Wrong model of the MDS
0EHEX/ 14DEC	14x	ECC error The data cannot be read by the MDS. → The data of the MDS have been lost (MDS is defective). → The MDS was not initialised with the ECC driver. → Initialise MDS with ECC driver. → EEPROM-MDS has reached the end of its life. Its data have been lost. → Replace MDS. → MDS moved out of the field during write-accessing. → MDS is not positioned correctly. → Command to ASM was issued incorrectly by the user
0FHEX/ 15DEC	15x	Only for MOBY F → Internal driver error. Repeat command. → FFT command was started with MDS F1xx in the field.
10HEX/ 16DEC	16x	NEXT COMMAND not possible or not permitted → ASM 450 is operating without presence check (ANW = 0). → ASM 450 has already received a NEXT command.
11HEX/ 17DEC	17x	24 V outputs have short-circuited or are overloaded. (DQs, error code, presence). → The affected output will be switched off. → If all outputs are overloaded, all outputs will be switched off. → A reset can only be performed by switching the 24 V supply voltage off and on again. → Then start RESET command.
12HEX/ 18DEC	18x	Internal ASM 450 communication error. → Contact problems in the plug connectors on ASM 450 → Hardware of the ASM 450 has a defect. → Send ASM 450 in for repairs. → Then start RESET command.
13HEX/ 19DEC		Reserved

Table 8-3 Error messages of the ASM 450

ANZ (Left Byte)	Flashing of ERR-LED	Description
14HEX/ 20DEC	20x	Internal ASM 450 error → Program execution error on the ASM 450 → Switch supply voltage of the ASM 450 off and on again. → Then start RESET command.
15HEX/ 21DEC	21x	Parameterisation of the ASM 450 has errors. → See chapters 3 and 5.
16EX/ 22DEC	22x	The FC 44 command cannot be executed with the ASM 450 parameters. → The input/output areas are not long enough for the user data of the FC 44 command. → FC 44 command (e.g., read) has wrong length of user data.
17HEX/ 23DEC	23x	Communication error between FC 44 and ASM 450. Handshake error → BEDB of the ASM 450 station was overwritten by other parts of the program. → Check parameterisation of the ASM 450. → Check FC 44 command which caused this error. → Then start RESET command.
18HEX/ 24DEC	24x	An error which must be acknowledged with a RESET has occurred. → Temporary short circuit on PROFIBUS → The RESET command has an error. → Then start RESET command.
19HEX/ 25DEC	25x	Previous command is still active. The user has sent a new command to the ASM 450 although the last command was still active. → The active command can only be aborted with a RESET. → The READY bit must equal 1 before a new command is started. Exception: RESET → Two FC 44 calls were set with the same ADR parameters. → Two FC 44 calls are working with the same BEDB. → Then start RESET command.

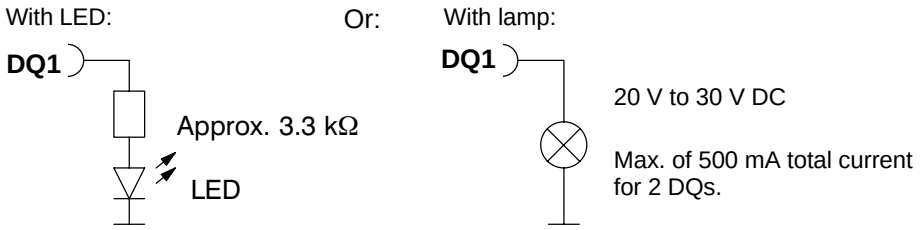
Table 8-3 Error messages of the ASM 450

ANZ (Left Byte)	Flashing of ERR-LED	Description
1AHEX/ 26DEC	26x	PROFIBUS-DP error has occurred. → PROFIBUS-DP bus link is interrupted. → Wire break on the bus → Bus connector on the ASM 450 or IM 308-C is unplugged. → PROFIBUS-DP master no longer addresses the ASM 450.
1BHEX/ 27DEC	27x	Only for MOBY F → CRC check in data telegram is wrong. Checksum error between ASM and SLG. → Interface on ASM or SLG is defective. → Check wiring in the ASM-SLG cable.
1EHEX/ 30DEC	30x	Error while processing the function → The data in BEDB are incorrect; execute RESET command. → Error in setting the parameters → ASM 450 hardware is defective. The ASM 450 receives incorrect data during RESET. → AB byte does not match user data length. Cf. appendix A.
1FHEX/ 31DEC	31x	Current command aborted by RESET → Communication with the MDS was aborted by RESET. → This error can only be reported back with a RESET command.

8.3 Notes on Trouble-Shooting

Testing the presence check, DI/DQ

If you are using MDS control, it is very easy to determine correct functioning with a lamp or LED on DQ1 or DQ0. See time diagrams in section 6.



The indicator circuits shown here can also be installed in an on-site distributor box for permanent indication of this ASM 450 function. This provides the user with a visual means of monitoring ASM 450 functions.

Note

If the master module is not functioning correctly or the ASM 450 is not parameterized correctly (i.e., wrong station address), MDS control will not function either.

What to do if nothing works ...

a) Using a measuring device under load, check the supply voltage directly on ASM 450 connecting plug or on the connector of the SLG.

b) Check parameter assignment.

- Master parameterization file
- Station address
- MDS control (ANW)

c) The DQs do not switch. Measure the current from the DQs (max. of 500 mA total current for 2 DQs). When the DQs have short-circuited or the current becomes too high, the excess-current fuse causes the DQs to switch off. The 24 V supply voltage of the ASM 450 must be switched off for approximately 3 seconds before commissioning can be performed again. After the voltage is applied again, the DQs are ready for operation again after approximately 2 seconds.

d) Check cabling.

- Check PROFIBUS-DP cabling.
- Correct cable to the SLG used ? Check cable length (adhere to cable configuration).
- Cable shield installed correctly ?
- Check ground wiring (see installation guidelines in the manual for configuration, installation and service)

e) Check master module, and replace if necessary.

f) Installation: Iron-free spaces provided? (See installation guidelines in manual on configuration, installation and service)

- Working distances maintained? (See technical specifications in manual on configuration, installation and service)
- Minimum distances maintained?: MDS $\leftrightarrow$ MDS
SLG $\leftrightarrow$ SLG
- Is the MDS conveyor located within the specified transmission window ?

Programming the ASM 450 on PROFIBUS-DP

A

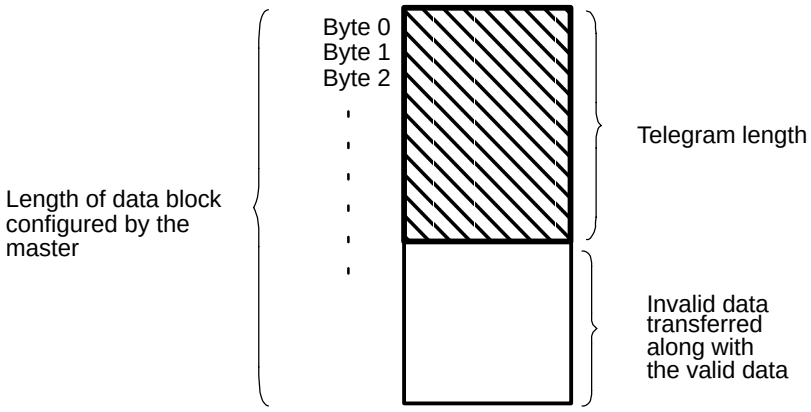
Who should read this appendix?

SIMATIC users can skip this section. This appendix has been written for programmers of PCs and controllers of other manufacturers. It shows programmers how to create their own function block or driver for the ASM 450.

Communication with the ASM 450

Data transmission via the bus is determined by the master which cyclically addresses each slave (ASM 450) in succession. In each cycle, data are both transferred to the slave and fetched from the slave. The length of the data blocks is specified in the bus configuration of the master. This length is the same for every cycle. The length of the input data (sent to the slave) and the length of the output data (fetched from the slave) can be parameterized separately.

Communication with the ASM 450 is performed with command telegrams which the user outputs via the bus, and result telegrams which the interface module returns. These telegrams are written in the configured data blocks. The first byte must be located at the very beginning of the block. The amount of valid data (i.e., telegram length) must be specified in every telegram (see telegram layout). Although the bus transfers the entire data block, the ASM 450 (and the user) only evaluates the valid bytes.



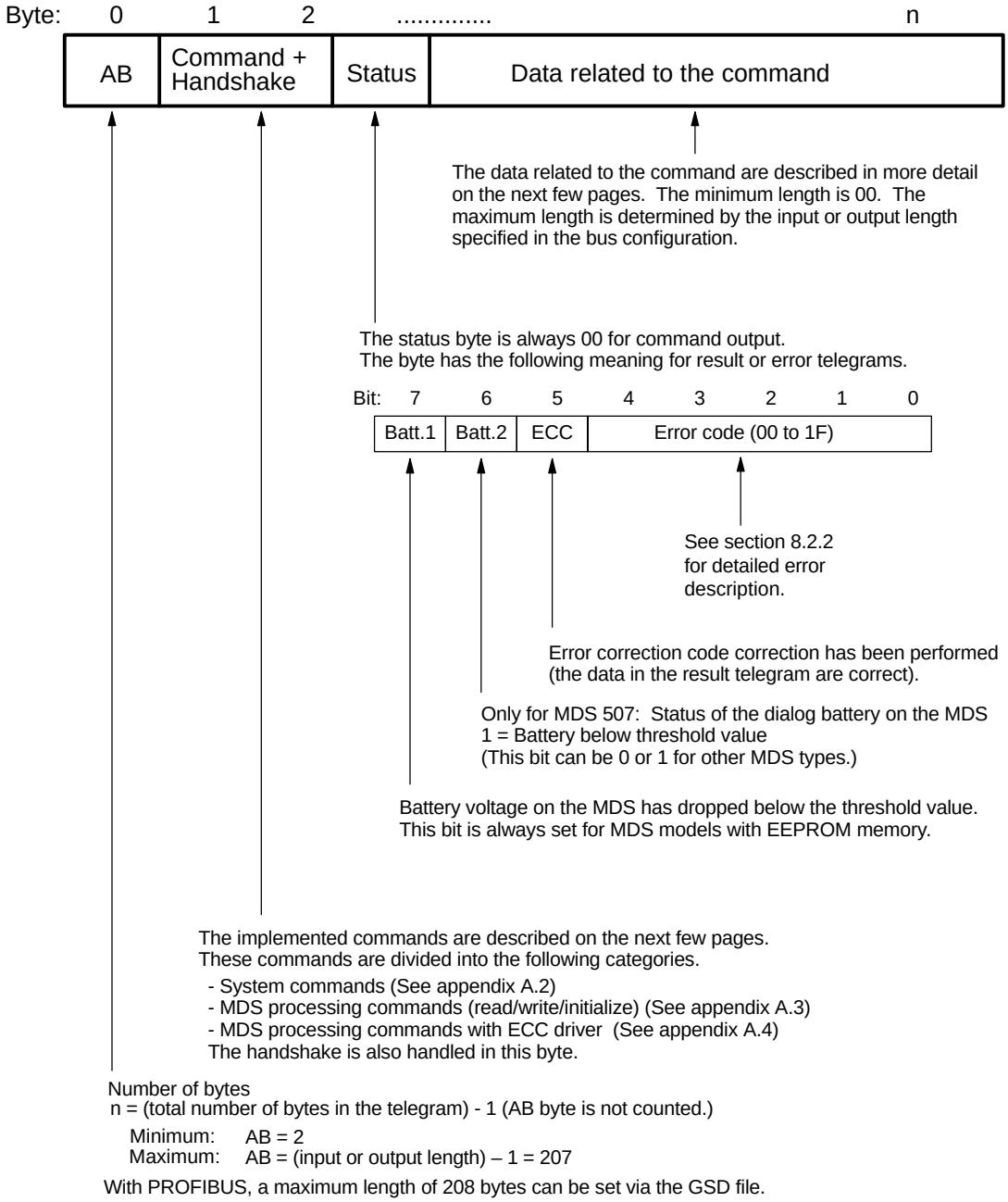
When there is no change in the data from one cycle to the next, the previous data blocks are transferred. The presence bit in the command byte always contains the current status. This is always the case even there is no previous command.

To ensure reliable telegram handling, remember to use the handshake procedure described in appendix A.5.

The telegrams which will now be described are the same for all types of MDSs for MOBY.

Telegram Layout

The telegram layout is applicable both to command telegrams to the ASM 450 and for result telegrams from the interface module.

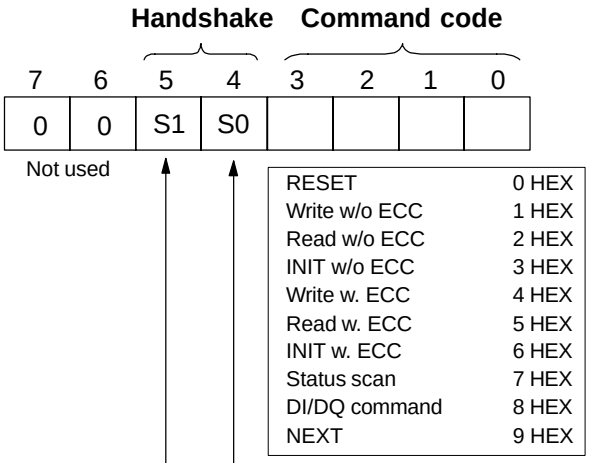


With PROFIBUS, a maximum length of 208 bytes can be set via the GSD file.

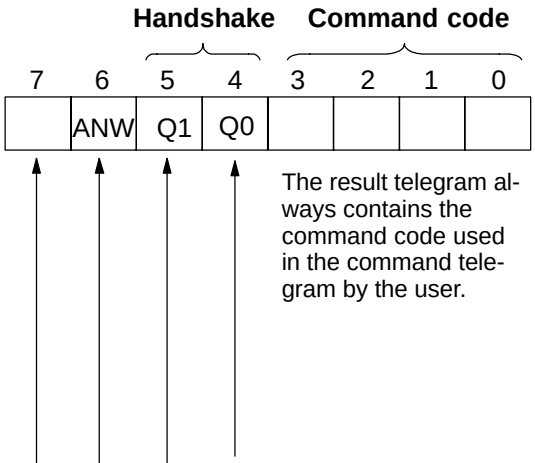
A.1 Layout of the Command Byte (Byte 1 of the Telegram)

The command byte is set up as shown below.

Byte 1 of the Command Telegram



Byte 1 of the Result Telegram



Presence of the MDS (ANW). This bit indicates the presence of the MDS in the SLG field. It is not a handshake signal.
0: No MDS present
1: MDS present
The current status of this bit is always transferred during every cycle even when there is no command telegram.

Startup indication
This bit indicates that the ASM 450 has performed a startup (e.g., after return of power). It is not a handshake signal. This bit arrives completely asynchronously (1 = startup). Handshake lines Q0 and Q1 always assume a defined state.
Q0 and Q1 = "1"

After a RESET command has been executed, the ASM 450 resets this bit. Other commands or an incorrect RESET command will be rejected with
error message 0FHEX.

A.2 System Commands

System commands are used to control and monitor the processing procedure.

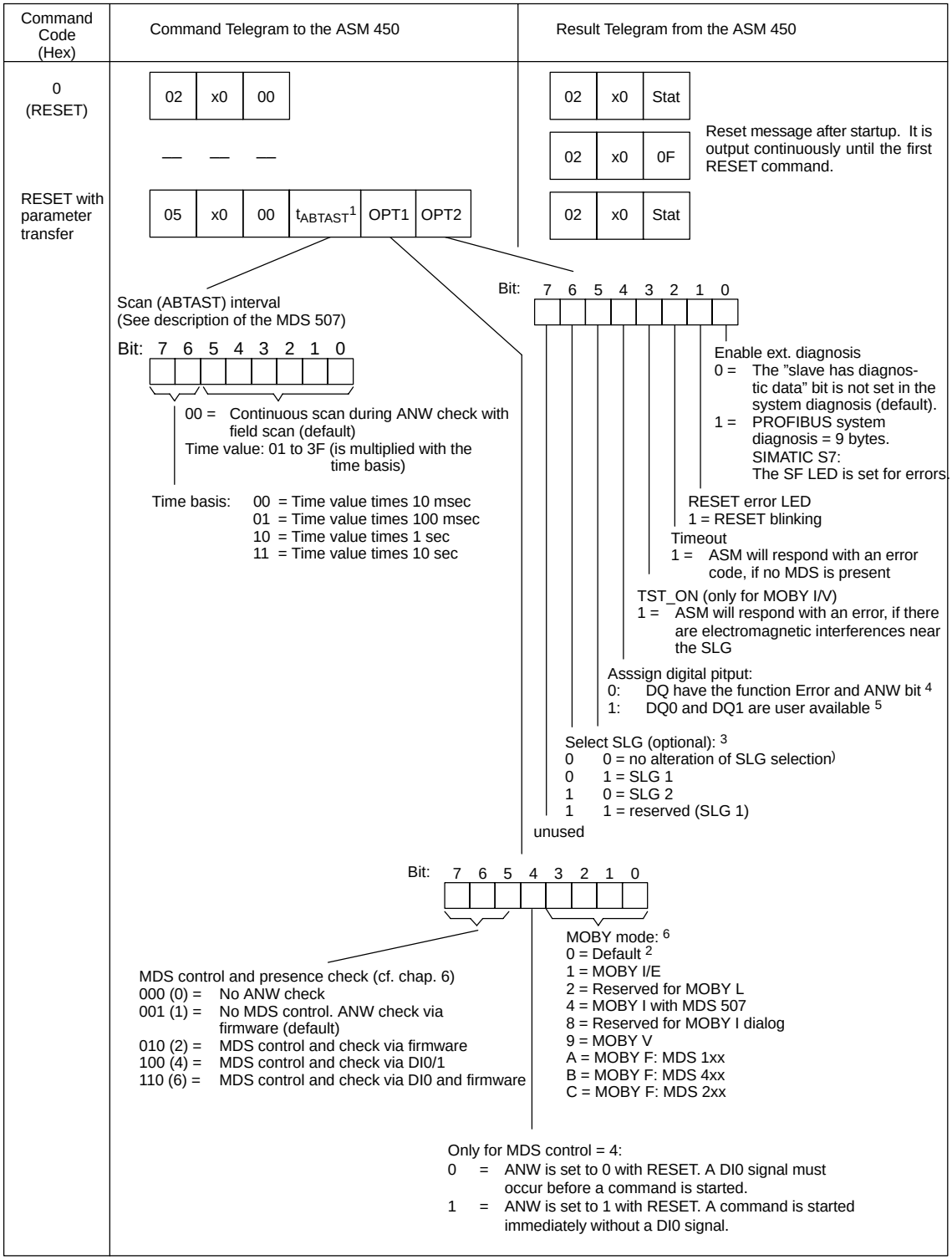
Table of Commands

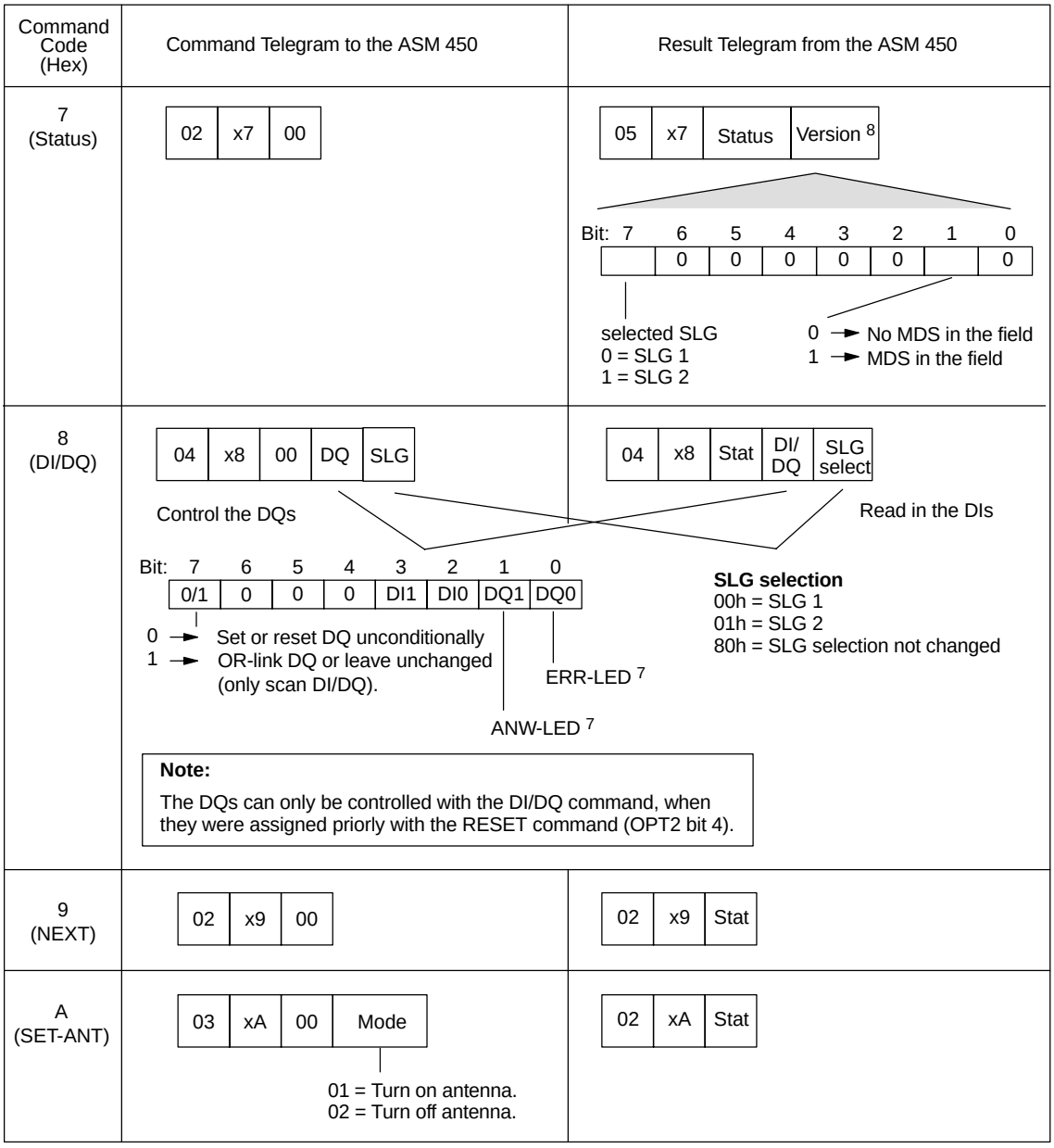
Command Code	Description	
0	RESET	The ASM is reset. The active command is terminated. (If an MDS command was interrupted with a RESET command, the reset acknowledgment contains the error 1F.) When the presence check is being used, DQ0 and DQ1 switch to their initial states (i.e., status after a startup reset). The ASM can be switched to different operating modes with the RESET command.
7	Status scan	Returns the status byte, the selected SLG and the ANW bit as the result. This command checks to determine whether an SLG is connected to the ASM and is ready for operation. An appropriate error is reported. MOBY F: The status command is used to perform the FFT. No MDS may be located in the field of the SLG.
8	DI/DQ command	Two digital output bits can be addressed directly. The result telegram contains the value of the two digital input bits.
9	NEXT	The command(s) following should refer to the next MDS. You can use the NEXT command to start a command immediately even when the old MDS is still located in the field. The NEXT command can only be programmed when an ANW check has been parameterized. When the NEXT command is used, the DQs are switched during the presence check. (See section 6.) A NEXT command must always be issued between 2 MDSs to prevent an error message from being generated. Conclusion of the passage of an MDS with a NEXT command remains valid even when the MDS has already left the field or the next MDS is already located in the field.
A	SET-ANT	**Only for MOBY F:** The SET-ANT command switches the SLG's antenna on or off. During normal operation, this command is not needed since once an SLG is turned on, the antenna is always on. The antennas must be turned off when two sensitive SLGs are to be positioned very close together. The application software must then ensure that only one antenna is on at a time.

Warning

Before an MDS 507 can be processed, an extended RESET command with the parameter $t_{ABTAST} > 0$ must be transferred to the module.

Detailed Telegram Layout





x Stands for the handshake signals in command code

1 Function of tABTAST (important for MDS 507)
When no MDS is in the field, the ASM scans its surroundings continuously for an MDS. When an MDS has been detected (i.e., ANW bit = 1, ANW-LED = ON), its surroundings are only scanned at the time interval specified in tABTAST (i.e., the ANW signal can only be removed at the time intervals spepcified in tABTAST).

2 When MOBY mode 00 is used, all settings in options byte 1+2 and tABTAST are ignored.

3 The standard method is SLG switchover via the DI/DQ command.

4 This setting can only be used when MDS control is off (cf. OPT1, bit 7, 6, 5 = 0 or 1). If MDS control is used, the DQs always have a predetermined meaning (cf. chap. 6).

5 CAUTION: After switchon, DQ0 indicates an error code. Any actuators connected to DQ0 may be switched uncontrollably.

6 NOTE: The coding of the ”MOBY operation” parameter differs from the ”MOBY” parameterization described in chap. 3.3.

7 Meaning of these bits depends on the configuration of the RESET command (OPT bit 4).

8 Version number of the ASM firmware is coded in ASCII (e.g., 10 means version 1.0).

A.3 MDS Processing Commands without ECC Driver

Table of Commands

<table>
<tr><th>Command Code</th><th>Description</th></tr>
<tr><td>1</td><td>Write data block to MDS</td></tr>
<tr><td>2</td><td>Read data block from MDS</td></tr>
<tr><td>3</td><td>Initialize MDS. This command is required when a new MDS which has never been write-accessed is used, or after a battery failure has occurred or the battery has been replaced. Initialization is not required during normal operation.
<table>
<tr><th colspan="3">MDS Type</th><th colspan="2">INIT Duration</th><th>End Addr. +1</th></tr>
<tr><td>62</td><td>Byte</td><td>RAM</td><td>0.1</td><td>sec</td><td>00 00 40</td></tr>
<tr><td>128</td><td>Byte</td><td>EEPROM</td><td>6</td><td>sec</td><td>00 00 80</td></tr>
<tr><td>2</td><td>KByte</td><td>RAM</td><td>0.4</td><td>sec</td><td>00 08 00</td></tr>
<tr><td>8</td><td>KByte</td><td>EEPROM</td><td>18</td><td>sec</td><td>00 20 00</td></tr>
<tr><td>32</td><td>KByte</td><td>RAM</td><td>3</td><td>sec</td><td>00 80 00</td></tr>
<tr><td>752</td><td>Byte</td><td>EEPROM (MOBY E)</td><td>0.8</td><td>sec</td><td>00 02 F0</td></tr>
<tr><td>192</td><td>Byte</td><td>MDS 4xx (MOBY F)</td><td>2.2</td><td>sec</td><td>00 00 C0</td></tr>
<tr><td>16</td><td>Byte</td><td>MDS 2xx (MOBY F</td><td>0.25</td><td>sec</td><td>00 00 10</td></tr>
</table>
</td></tr>
</table>

Detailed Telegram Layout

Command Code	Command Telegramm to the ASM 450	Result Telegram from the ASM 450 *
1	AB | x1 | 00 | Address MSB LSB | LNG | D1 to Dn	02 | x1 | 00** (40,C0)
2	05 | x2 | 00 | Address MSB LSB | LNG	AB | x2 | 00** (40,C0) | Address MSB LSB | LNG | D1 to Dn
3	06 | x3 | 00 | INIT pattern | Endaddr. +1 00 MSB LSB	02 | x3 | 00** (40,C0)

Meaning of:

D1 to Dn — User data (maximum length is specified in the bus configuration)

LNG — Length of the data block (D1 to Dn)

Note: Address + LNG must be less than the 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 — Amount of subsequent data in the telegram
AB = LNG + 5
Note: AB + 1 may not be larger than the value specified in the bus configuration.

INIT pattern — During initialization, the MDS is written with the value ”INIT pattern”.

End addr. +1 — Memory size of the MDS

* The layout of the result telegram when an error occurs is shown below.
The AB byte (02) can also assume a value > 2 during the read command. If this happens, the data are only partially correct and must be rejected.

02	Command	Error

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

A.4 MDS Processing Commands with ECC Driver (All Types of MDSs)

The ECC Driver

The ECC driver (Error Correction Code) can be switched on via the command code in the telegram.

Data Correction

If the MDS memory should lose a bit of data at some time (e.g., when an EEPROM-MDS has been write-accessed very frequently), the ECC driver is able to reconstruct the data bit which was lost. The user is assured of correct data. Using the status byte in the result telegram, you can scan and evaluate the data correction (e.g., to initiate replacement of the MDS at the earliest possible date).

Table of Commands

<table>
<tr><th>Command Code</th><th>Description</th></tr>
<tr><td>4</td><td>Write data block on MDS with ECC</td></tr>
<tr><td>5</td><td>Read data block from MDS with ECC</td></tr>
<tr><td>6</td><td>Initialize MDS. This command must always be executed during ECC operation before the MDS is used for the first time. The same applies to battery replacement or after an ECC error is reported.
<table>
<tr><th>MDS Type</th><th>INIT Duration</th><th>End Addr. +1</th></tr>
<tr><td>62 Byte RAM</td><td>0.2 sec</td><td>00 00 40</td></tr>
<tr><td>128 Byte EEPROM</td><td>12 sec</td><td>00 00 80</td></tr>
<tr><td>2 KByte RAM</td><td>5 sec</td><td>00 08 00</td></tr>
<tr><td>8 KByte EEPROM</td><td>54 sec</td><td>00 20 00</td></tr>
<tr><td>32 KByte RAM</td><td>75 sec</td><td>00 80 00</td></tr>
</table>
</td></tr>
</table>

Detailed Telegram Layout

Command Code	Command Telegram to the ASM 450	Result Telegram from the ASM 450 *
4	AB | x4 | 00 | Address MSB LSB | LNG | D1 to Dn	02 | x4 | 00** (40,C0)
5	05 | x5 | 00 | Address MSB LSB | LNG	AB | x5 | 00** (40,C0) | Address MSB LSB | LNG | D1 to Dn
6	06 | x6 | 00 | INIT pattern | Endaddr. +1 00 MSB LSB	02 | x6 | 00** (40,C0)

x stands for handshake signals.

Meaning of:

- **D1 to Dn** — User data (maximum length is specified in the bus configuration)
- **LNG** — Length of the data block (D1 to Dn)
  Note: Address + LNG must be less than the 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** — Amount of subsequent data in the telegram
  AB = LNG + 5
  Note: AB + 1 may not be larger than the value specified in the bus configuration.
- **INIT pattern** — During initialization, the MDS is written with the value "INIT pattern".
- **End addr. +1** — Memory size of the MDS

* The layout of the result telegram when an error occurs is shown below.

02	Command	Error

The AB byte (02) can also assume a value > 2 during the read command. If this happens, the data are only partially correct and must be rejected.

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

Function

The ECC driver divides the MDS memory into blocks of 16 bytes each. These 16 bytes contain 14 bytes of user data and 2 bytes of ECC information. Each time the MDS is read-accessed, at least one block is read or written even when the user has only programmed 1 byte. This increases access time to MDS data. (See table in the catalog.) When an ECC MDS is read-accessed without ECC driver (e.g., with the STG or with command code 2), the ECC bytes can be seen between the user data. When an ECC MDS is write-accessed without ECC driver, the data structure of the MDS is destroyed. The MDS or the destroyed data block can no longer be read-accessed with the ECC driver.

Application

The ECC driver increases the reliability of data validity on the MDS. Manufacturers of MDS models with EEPROM only guarantee 10,000 write-accesses. When the ECC driver is used, you can use the MDS until the actual end of its life and still be assured of the same data reliability.
The ECC driver can also be used with MDS models with RAM memory to increase data reliability when an extremely high degree of interference might affect the contents of the MDS memory.

Example

Data format of a 62-byte MDS. The following figure is only shown for explanatory purposes since it is not visible to the programmer or user.

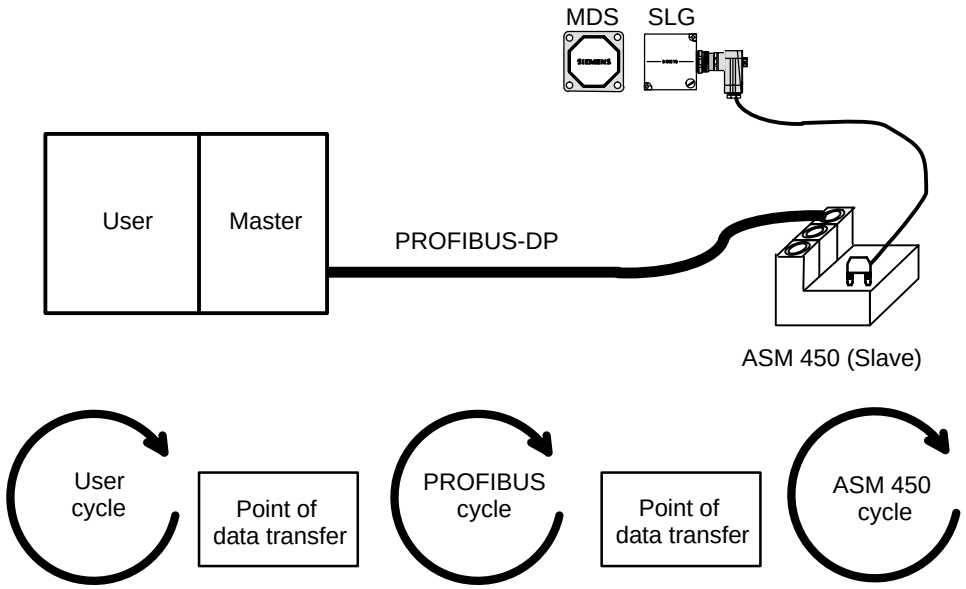
MDS Address from Viewpoint of User	Address on the MDS	Meaning
0	0	14 bytes of user data (1st block)
1	1	
13	13	
	14	ECC (1st block)
	15	ECC (1st block)
14	16	14 bytes of user data (2nd block)
15	17	
27	29	
	30	ECC (2nd block)
	31	ECC (2nd block)
28	32	14 bytes of user data (3rd block)
29	33	
41	45	
	46	ECC (3rd block)
	47	ECC (3rd block)
	48	An incomplete block at the end of the MDS memory cannot be used for user data.
	61	

Note

- Access times to MDS data are increased. During dynamic operation, less data can be processed.
- The net capacity of the MDS is decreased.
- When data correction is performed, the result can be delayed by up to 1 second.
- A “normal” MDS must be initialized (e.g., with the STG) before commissioning with the ECC driver activated.

A.5 Handshake Control

The figure below shows the principle of data transmission.



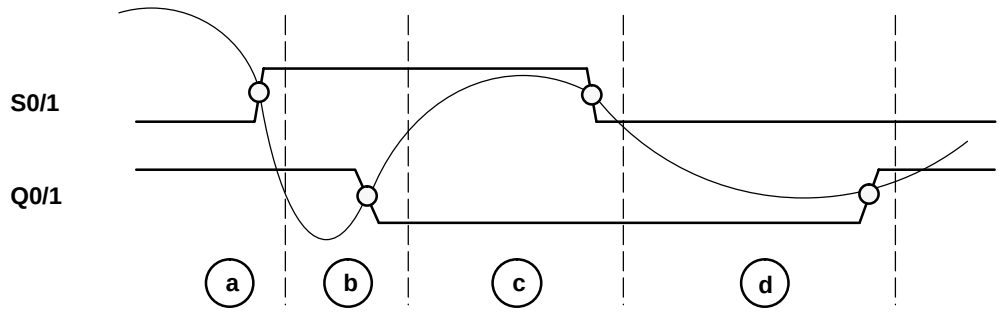
The cycles shown above operate separately from one another, and the cycle time varies from case to case. Since these conditions prevent total coordination of the points of data transfer, a handshake procedure must be used to ensure data consistency.

To be able to terminate a command with a RESET command an additional handshake must be provided for the RESET command.

The PROFIBUS-DP master addresses the slaves cyclically. The last telegram is always output when the ASM does not have new data because no new command has been started or because execution of a command has not yet been completed. Exception: The current status of the presence bit in the command byte is always transferred. This is performed even when there is no previous command.

A.5.1 General Handshake Procedure

The following diagram shows the principal flow of the handshake procedure for control of the command and acknowledgment transfer between user and ASM 450.



a) The user prepares the command. Bit S01/1 in byte 1 is then set (byte 1 = command byte). The ASM 450 uses the set bit S0/1 to recognize that a command telegram has been transferred completely and is valid.
Note: Q0/1 must be set by the ASM 450 prior to the start of the command.
CAUTION: The following procedure is important for assurance of data consistency.
1. Start command-related data after the AB byte.
2. Write command type with handshake bits in the transfer buffer last.

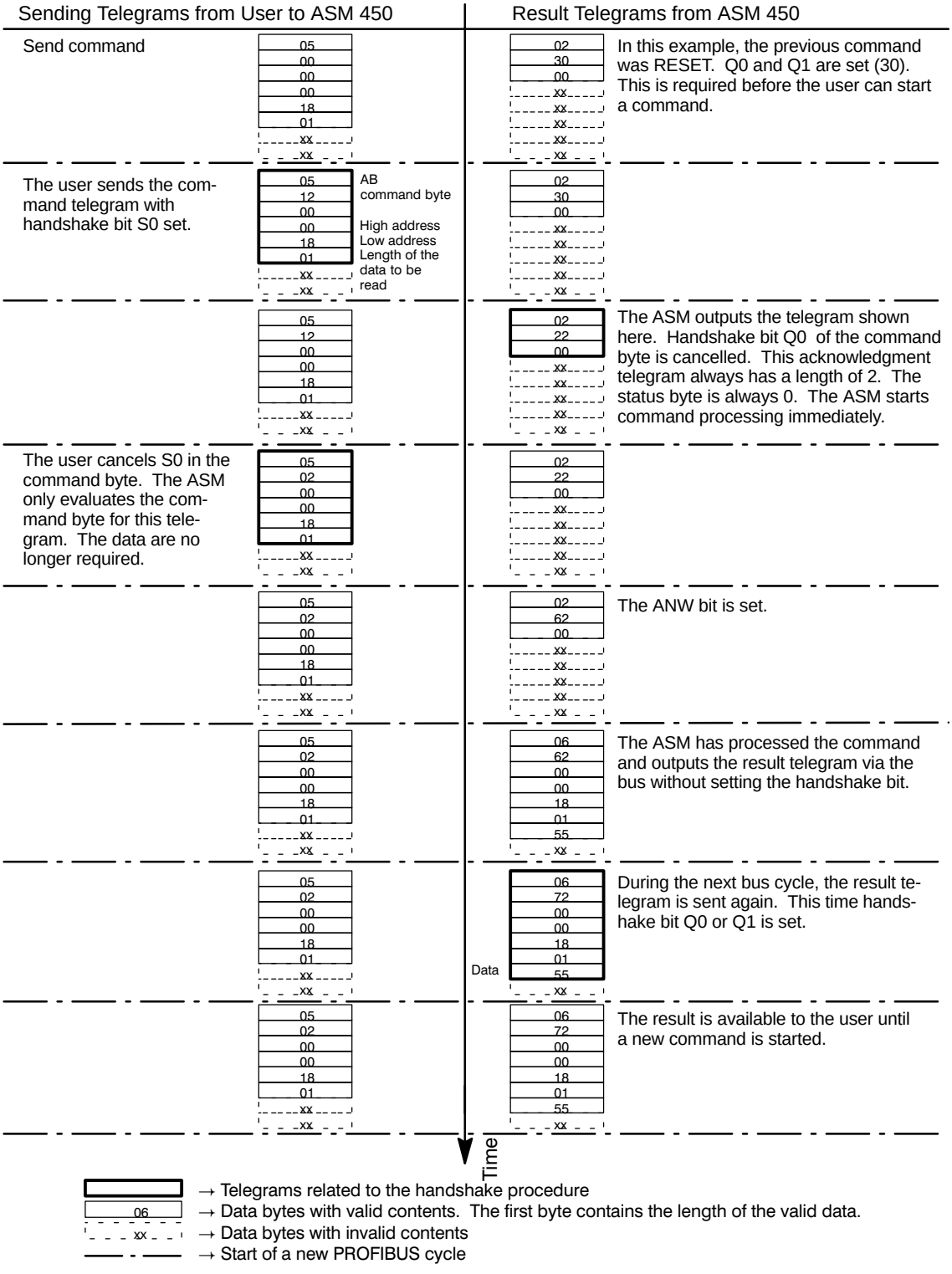
b) The ASM 450 acknowledges receipt of the command by resetting READY bit Q0/1. At the same time, the ASM 450 starts the command.
Note: The acknowledgment telegram is usually transferred during the next bus cycle after the command has been transferred.

c) When the user detects that Q0/1 is 0, the user also sets bit S0/1 to 0 to signal the ASM 450 that the user is ready to receive the result telegram.

d) The ASM 450 has finished executing the command and transfers the result telegram to the bus. The ASM 450 waits one bus cycle and then sets Q0/1. This ensures complete transmission of the telegram when the user recognizes that Q0/1 has been set.
Before processing the result telegram further, the user must then check the status byte (byte 2) of the acknowledgment for errors.
Note: The result telegram (set Q0/1) is not returned by the ASM until the bus cycle after next (at the earliest) after S0/1 is cancelled. When an MDS processing command has been started but no MDS is present, processing continues until an MDS arrives in the transmission field and the command can be concluded.

A.5.2 Telegram Communication for a Command

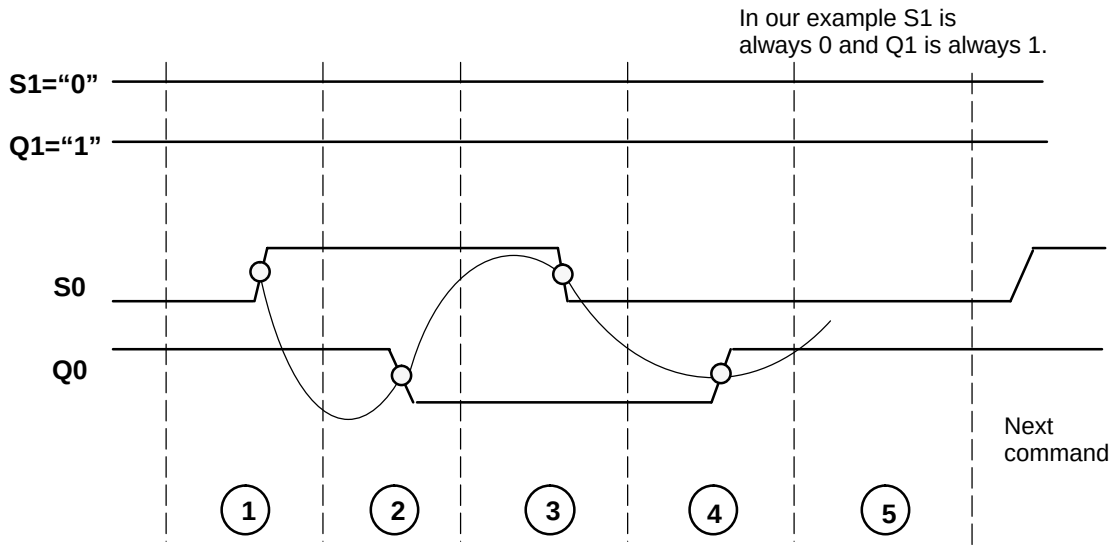
The following telegrams are required for the handshake procedure.
Example: Read command for address 18HEX with length of 1 byte. An MDS is not yet located in the field of the SLG.



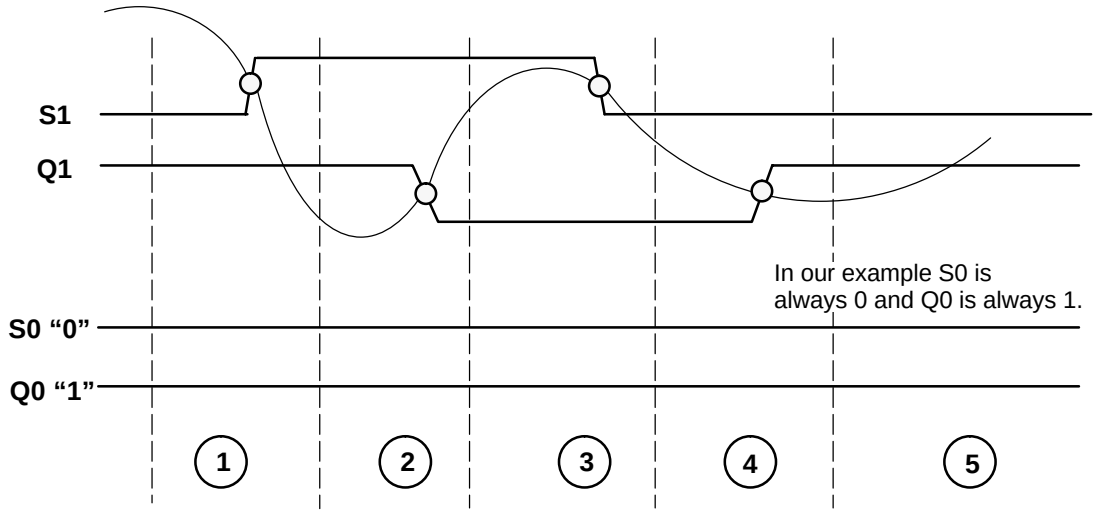
A.5.3 Signal Timing for Command and RESET Command Handshakes

The following diagram shows the handshake procedure in detail.

Command handshake



RESET command handshake



1 The user issues the command and sets S0 or S1 for the RESET command.

2 The ASM cancels the Q0 or Q1 bit.

3 The user acknowledges status 2 by cancelling bit S0 or S1.

4 The ASM has finished executing the command and sets acknowledgment signal Q0 or Q1.

5 The user evaluates the data. The ASM is ready for the next command. See also appendix A.5.1

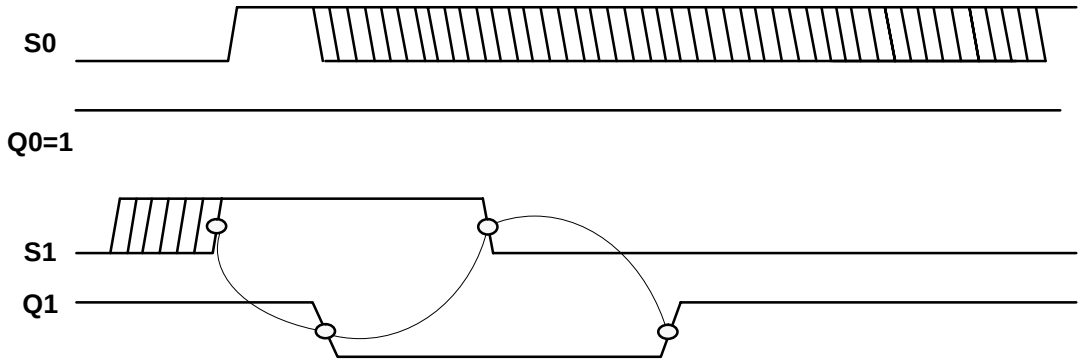
A.5.4 Termination of a Running Command

A command which has been started can always be terminated with a RESET command. The following diagrams show the procedure and the various states which can occur while a RESET command is being started.

Note

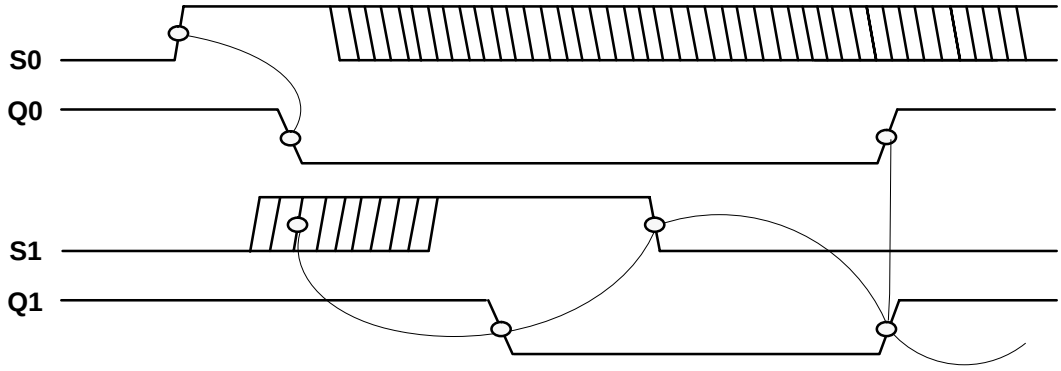
A running RESET command cannot be terminated by a new RESET command. If this happens anyway, the RESET command is rejected as long as Q1 is still 0 from the viewpoint of the ASM.

Command is terminated at the instance the RESET command is started



If the user transfers both S0 and S1 set during the same bus cycle, only the RESET command is considered. S0 has no effect between the setting of S1 and the setting of Q1 (from the viewpoint of the ASM). The time at which S0 is reset must be specified by the user. Further processing is the same as shown in the preceding diagrams.

Command termination when S0 has already been transferred to the ASM



A set S0 has already been transferred to the ASM, and a RESET command is started with S1 one or more bus cycles later. The started command is terminated. Q0 remains 0, and becomes 1 together with Q1 when the RESET command has been concluded. Only the result telegram of the RESET command is returned. S0 can be reset at any time.

Operation of the ASM 450 on a SIMATIC S5 B

This chapter is for those who are using the ASM 450 in a SIMATIC S5 environment.

The FB 240 function block is available for SIMATIC S5 users. The FB 240 has exactly the same layout and functions as the FC 44. The only difference is the syntax of S5 data blocks and sample S5 programs.

Appendix B documents these differences with examples. The S5 user can use the FC 44 documentation.

B.1 Parameterization of the FB 240 – Overview

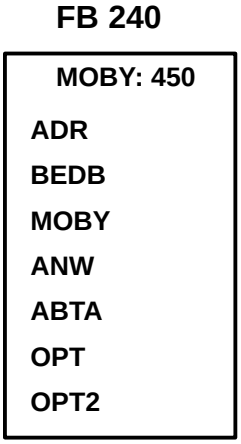
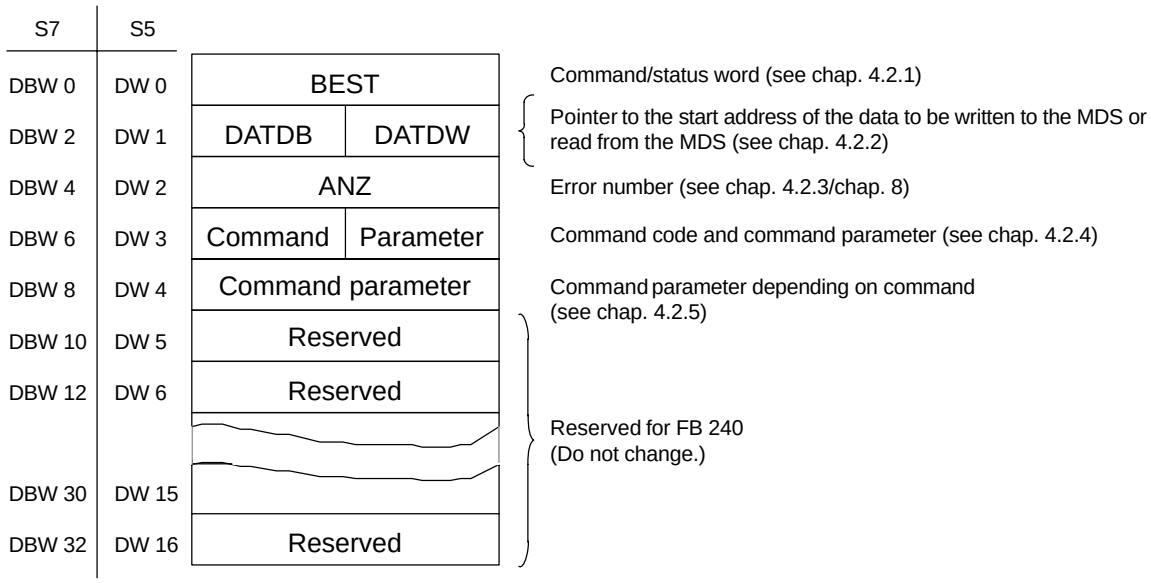


Table B-1 Explanation of the input and output parameters

Parameter Name	Designation	Class	Type	Permissible Values/Characters	Commentary
ADR	Start address and output areas of the ASM 450	D	KY	Linear P I/O address 128 to 246 Or P page frame adress 192 to 246 (of the opened page frame)	1) 1)
BEDB	Working data	D	KF	DB 1 to 255	≥ 14 DW
MOBY	MOBY operating mode	D	KF	0 to 7	see chap. 3.3
ANW	Presence	D	KF	0 to 6	see chap. 3.3
ABTA	Scanning time for MDS 507 operation	D	KH	0000 to 00FF	see chap. 3.3
OPT	Options	D	KH	0000 to 00FF	see chap. 3.3
OPT2	Options	D	KH	0000	Reserved

1) Since the start addresses of the input areas and the output areas must always be the same, the same value must be entered twice in KY format in the ADR parameter.
Example: Start address in the linear P I/O area is 128. For ADR: KY = 128, 128.

B.2 BEDB Command Data Block for SIMATIC S5



Caution!
The minimum length of BEDB is 17 data words (DW 0 to DW 16).

B.3 Example of a Cyclic Call of FB 240

Below is the call of FB 240 in a SIMATIC S5 environment versus the call of FC 44 in a SIMATIC S7 environment. The same example has already been described in chapter 5.4. There you will also find the commentaries for this program.

SIMATIC S5 with FB 240		SIMATIC S7 with FC 44	
	:A DB 100	AUF	DB 100
	:SPA FB240		
NAME	:MOBY:450	CALL	FC 44
ADR	: KY 128,128	ADR	: = W#16#8080
BEDB	: KF+100	BEDB	: = 100
MOBY	: KF+0	MOBY	: = 0
ANW	: KF+1	ANW	: = 1
ABTA	: KH 0000	ABTA	: = B#16#00
OPT	: KH 0000	OPT	: = B#16#00
OPT2	: KH 0000	OPT2	: = W#16#0000
	:L DW 0		L DBW 0
	:T MW 250		T MW 250
	:		
	:UN M 250.7		UN M 250.7
	:BEB		BEB
	:		
	:U M 250.6		U M 250.6
	:BEB		BEB
	:		
	:U M 0.0		U M 0.0
	:BEB		BEB
	:		
	:L KY 10,0		L W#16#0A00
	:T DW 1		T DBW 2
	:L KY 1,20		L W#16#0114
	:T DW 3		T DBW 6
	:L KH 4711		L W#16#4711
	:T DW 4		T DBW 8
	:		
	:		
	:UN M 0.0		UN M 0.0
	:S M 251.1		S M 251.1
	:S M 0.0		R M 0.0
	:		
	:		
	:L MW 250		L MW 250
	:T DW 0		T DBW 0
	:		
	:BE		BE

Warnings

C

English

Warning

Hazardous voltages are present in this equipment during operation.

To ensure safe operation of the equipment, maintenance shall only be performed by qualified personnel in accordance with the instructions in the MOBY catalog[1] and technical description.

Failure to observe these instructions can result in death, severe personal injury or substantial damage to property.

The following instructions and those on all product labels must be followed when carrying out any maintenance work.

- Always disconnect and earth the equipment before starting any maintenance.
- Use only spare parts authorized by the manufacturer.
- The servicing intervals as well as the instructions for repair and replacement shall be duly observed.
- A lithium battery is contained in mobile data memories with RAM. The following instructions must be observed:

  To avoid the risk of fire, explosion and severe burns, the battery should not be recharged, dismantled, exposed to heat over 100 degrees Celsius, ignited, or brought into contact with water.

The special instructions must be followed when using heat-resistant data storage media.

1 Should you not be in possession of the MOBY catalog, it can be obtained through your local Siemens office.

Deutsch

Warnung

Beim Betrieb elektrischer Geräte stehen zwangsläufig bestimmte Teile dieser Geräte unter gefährlicher Spannung.

Sicherer Betrieb der Geräte setzt voraus, daß diese von qualifiziertem Personal sachgemäß unter Beachtung der im MOBY-Katalog[1] und der technischen Beschreibung enthaltenen Hinweise eingesetzt werden.

Bei Nichtbeachtung können Tod, schwere Körperverletzung oder erheblicher Sachschaden die Folge sein.

Beachten Sie daher auch bei Instandhaltungsmaßnahmen an diesem Gerät alle hier und auf dem Produkt selbst aufgeführten Hinweise.

- Vor Beginn jeglicher Arbeiten ist das Gerät vom Netz zu trennen und zu erden.
- Es dürfen nur vom Hersteller zugelassene Ersatzteile verwendet werden.
- Die vorgeschriebenen Wartungsintervalle sowie die Anweisungen für Reparatur und Austausch sind unbedingt einzuhalten.
- Bei einem mobilen Datenspeicher mit RAM ist eine Lithiumbatterie integriert, hierzu sind folgende Hinweise zu beachten:

  Vermeiden Sie das Risiko von Feuer, Explosionen und schweren Verbrennungen. Die Batterie darf nicht nachgeladen, auseinandergebaut, über 100˚ Celsius erwärmt, entzündet oder ihr Inhalt mit Wasser in Berührung gebracht werden.

Beim hitzefesten Datenträger sind die besonderen Hinweise zu berücksichtigen.

1 Sollten Sie nicht im Besitz des MOBY-Katalogs sein, so kann er über jede örtliche SIEMENS-Niederlassung bestellt werden.

Français

Attention

Le fonctionnement d'un équipement électrique implique nécessairement la présence de tensions dangereuses sur certaines de ses parties.

L'exploitation sûre de cet équipement implique qu'il soit mis en oeuvre de façon adéquate par des personnes qualifiées, en respectant les consignes de sécurité figurant au catalogue MOBY[1] et aux descriptions techniques.

Le non-respect des consignes de sécurité peut conduire à la mort, à des lésions corporelles graves ou à un dommage matériel important.

Ne procéder à l'entretien que dans le plus grand respect des règles de sécurité énoncées ici ou figurant sur le produit.

- Avant toute intervention, mettre l'appareil hors tension et à la terre.
- N'utiliser que des pièces de rechange autorisées.
- Respecter la périodicité d'entretien et les instructions de réparation et de remplacement.
- Les mémoires embarquées (RAM) sont équipées d'une pile au lithium.

  Ne pas exposer la pile au feu, danger d'explosion et de lésions graves. La pile ne doit pas être rechargée, ouverte exposée à des températures supérieures à 100˚ C ou exposée au feu. Son contenu ne doit pas entrer en contact avec de l'eau.

En ce qui concerne les supports de données résistants à la chaleur, respecter les consignes spécifiques.

1 Si vous ne disposez pas ou du catalogue MOBY, ce peuvent être commandés auprès de votre agence SIEMENS.

Italiano

Pericolo

Durante il funzionamento di apparecchi elettrici, determinate parti di tali apparecchi si trovano inevitabilmente sotto tensione pericolosa.

Per un funzionamento sicuro di questi apparecchi è necessario che essi vengano adoperati, nel modo opportuno, solo da personale qualificato, che osservi le indicazioni contenute nel catalogo[1] per gli apparecchi MOBY e nella descrizione tecnica.

In caso di non osservanza si possono verificare la morte, gravi lesioni alle persone o notevoli vanni alle cose.

Per questo motivo è necessario che le avvertenze riportate qui e sul prodotto stesso vengano rispettate anche nel caso di misure di manutenzione degli apparecchi.

- Prima di iniziare qualsiasi lavoro è necessario staccare l'apparecchio dalla rete ed effettuare una messa a terra.
- Possono essere utilizzati solo pezzi di ricambio prodotti dal costruttore.
- E'assolutamente necessario rispettare i tempi di manutenzione previsti e le indicazioni riguardanti il ricambio e la riparazione.
- In una memoria dati mobile dotata di RAM è integrata una batteria al litio; in questo caso è necessario osservare le seguenti indicazioni:

  evitare il pericolo di incendio, di esplosioni e di gravi ustioni. E'vietato ricaricare, smontare, riscaldare oltre i 100˚ C o incendiare la batteria, oppure mettere il suo contenuto a contatto con acqua.

Nel caso di un supporto dati resistente al calore è necessario osservare le indicazioni speciali al riguardo.

1 Se non doveste essere in possesso del catalogo MOBY, potete ordinarlo presso qualsiasi filiale SIEMENS di zona.

Español

Precaución

Durante el funcionamiento de los equipos eléctricos hay partes de los mismos que se encuentran forzosamente bajo tensión peligrosa.

Un funcionamiento seguro de los equipos presupone que han sido instalados correctamente por personal calificado observando las indicaciones contenidas en el Catálogo[1] de los equipos MOBY y la Descripción técnica.

La no observación de dichas indicaciones puede provocar la muerte, lesiones corporales graves o daños materiales considerables.

Por este motivo es preciso observar también durante las operaciones de mantenimiento y reparación en dicho equipo todas las indicaciones que figuran aquí y en el producto.

- Antes de comenzar cualquier trabajo es preciso seccionar de la red el equipo y ponerlo a tierra.
- Solo deben utilizarse repuestos homologados por el fabricante.
- Es imprescindible observar los intervalos de mantenimiento especificados asi como las instrucciones de reparación y reemplazo.
- Las memorias de datos móviles con RAM tienen integrada una batería de litio; al respecto es preciso observar las indicaciones siguientes:

  Evite riesgos de fuego, explosiones y quemaduras graves. La batería no debe ser recargada, desmontada, calentada a mas de 100 grados centígrados, inflamada: su contenido no deberá ponerse en contacto con agua.

En los soportes de datos con protección térmica es preciso observar las indicaciones particulares respectivas.

1 Si no dispone del catálogo MOBY, estos pueden pedirse a través de cualquier sucursal local de SIEMENS.

Svensk

Varning

Vid drift av elektrisk utrustning ligger det alltid en farlig spänning på vissa delar av utrustningen.

Säker drift av utrustningen förutsätter att den utförs av kvalificerad personal med uppmärksamhet på anvisningarna i MOBY-katalogen[1] samt de anvisningarsom ges i den tekniska beskrivningen.

Om dessa anvisningar ej beaktas kan följden bli dödsfall, svår kroppskada eller avsevärda materielskador.

Uppmärksamma vid underhållsarbete också anvisningar som ges här och på själva produkten.

- Före allt arbete skall utrustningen skiljas fran nätet och jordas.
- Bara reservdelar som godkänts av tillverkaren får användas.
- lakttag alltid föreskrivna underhållsintervall samt de anvisningar som givits rörande reparation och utbyte.
- Det mobila dataminnet med RAM innehåller et litiumbatteri. För detta gäller följande anvisningar:

  Undvik risk för öppen låga, explosioner och förbränning. Batteriet får inte efterladdas, tas isär, värmas upp över 100˚ C eller tändas på., och dess innehåll får ej komma i beröring med vatten.

För värmebeständiga datamedier gäller speciella anvisningar, som måste beaktas.

1 Om Ni inte har ett exemplar av MOBY-katalogen så kan den beställas från närmaste SIEMENS-kontor.

TO:

Siemens AG

A&D SE ES4

PO Box 2355

D–90713 Fuerth

FROM:

Your name: _

Your title: _

Your company: _

Street: _

City: _

Telephone: _

Please tick your branch.

- ❑ Automotive industry
- ❑ Chemical industry
- ❑ Electrical industry
- ❑ Foodstuffs
- ❑ Process control technology
- ❑ Mechanical engineering
- ❑ Petrochemistry
- ❑ Pharmaceutics industry
- ❑ Plastics processing
- ❑ Paper industry
- ❑ Textiles industry
- ❑ Transportation industry
- ❑ Other _ _ _ _ _ _ _ _ _ _ _ _ _

Remarks/Suggestions

Your remarks and suggestions help us to improve the quality of our documentation. Please complete this questionnaire as soon as you have time, and return it to Siemens.

Title of your manual:_ _

Order number of your manual:_ _

Please enter your personal evaluation from 1 (good) to 5 (poor).

1. Do the contents of this manual meet your requirements ? ☐
2. Is it easy to find the information you need ? ☐
3. Is the information written in an easy-to-understand manner ? ☐
4. Does the amount of technical detail meet your requirements ? ☐
5. What is your opinion of the figures and tables ? ☐

If you encountered concrete problems, please use this space to explain.

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