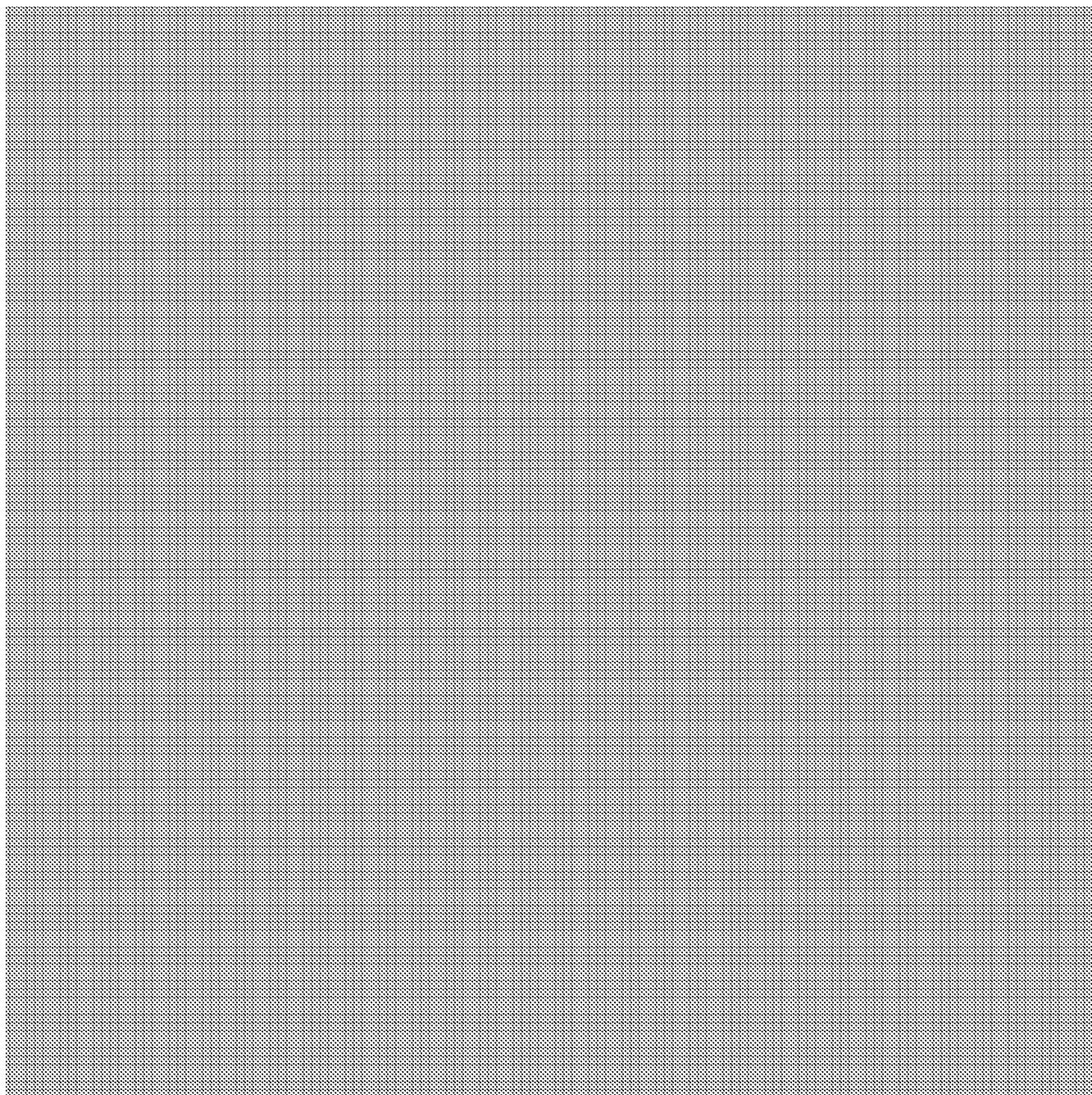


Equipment for Machine Tools
WF 463 S
External Data Memory

Description		Edition 11.92
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Equipment for Machine Tools

Application 1

WF 463 S External Data Memory

Design 2

Description

Operation 3

Installation and
Commissioning 4

Ordering Data 5

This manual applies to the following PLC's:

- SIMATIC S5 - 115 U
- SIMATIC S5 - 135 U
- SIMATIC S5 - 150 U
- SIMATIC S5 - 155 U

Note

Because of clear arrangement, this documentation does not inform about all details of all types of the product. Therefore, it cannot take into account all possible cases of installations, operation and maintenance.

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1 Application

Programmable controllers are used in a wide range of automation systems. These applications generally require data and text to be processed and stored. The quantity of such data may exceed the normal memory capacity of the individual controller. An additional memory will then be required to store data externally to the programmable controllers' main memory.

The WF 463 S external memory card has been developed for this purpose, for use in the SIMATIC S5 family of programmable controllers.

The WF 463 S may be used in such applications as:

- the storage of data blocks containing message texts and pictures, for example when the VISRAM module and the DIMOS systems are used in machine tool applications.
- the saving and re-loading tool set-up data and tool parameters in transfer and press-line applications.
- storing part program data for the WF 625 und WF 725 axis positioning cards.
- saving machine management data and report messages.

2 Design

The WF 463 S external data memory card consists of:

- A 16 bit microprocessor (Intel iAPX 186).
- A 16 kByte firmware EPROM containing the operating system and program to control the data exchange and communication with the SIMATIC S5.
- A 16 kByte internal CMOS RAM memory for internal buffer storage of data blocks (about 6 kByte) and for the Dual Port RAM. (A DPR is a RAM module which can be written from two sides or ports.)
- A slot for a memory sub-module (32 kByte or 64 kByte) which will contain the application data.
- A 20 mA serial interface port to allow the WF 463S to be connected to a programming unit or an external data storage medium i.e. data cassette recorder or floppy disk drive unit.

The following three memory sub-modules may be used with the WF 463S.

- EPROM sub-modules (Read-Only-Memory)
6ES5 373-0AA41 with 32 kByte
- RAM sub-modules (Read and Write Memory)
6ES5 377-0AB31 with 32 kByte
6ES5 377-0AB21 with 64 kByte

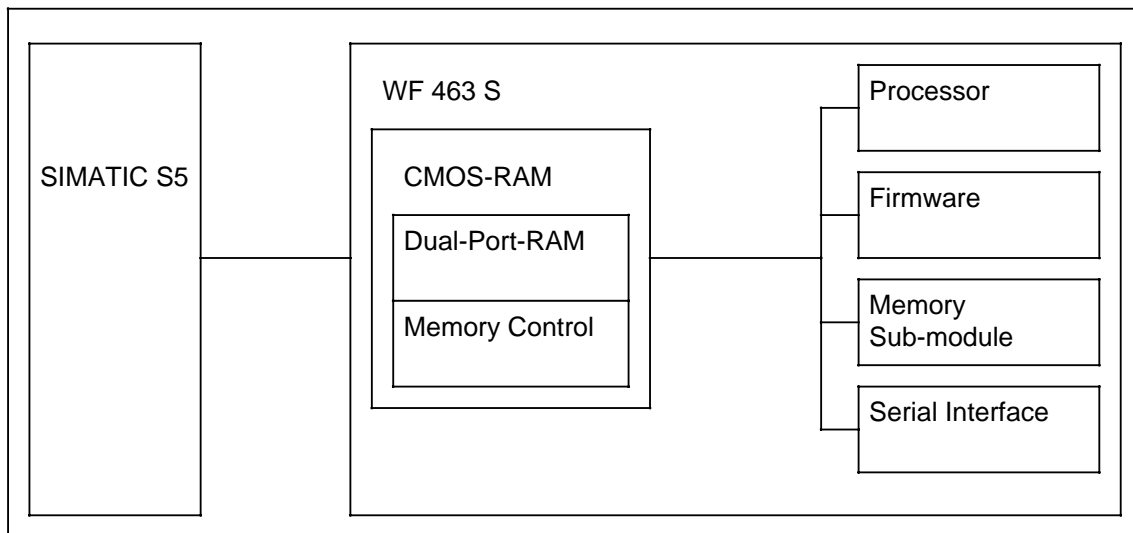


Fig 2.1 WF 463 S Memory Block Diagram

3 Operation

3.1 Data Transfer

3.1.1 Function blocks

The standard function block S5-WF 463 S controls the data exchange between the SIMATIC S5 and the WF 463 S module.

FB No.	Lib Number	PLC type	Block length	Process time ms	System data used	Flags used
FB 250	E88530-B 4131-A-10	S5-115 U-941	251	2 - 14	/	MB240-255
FB 250	E88530-B 4134-A-10	S5-115 U-944	251	0.1 - 2	/	MB240-255
FB 250	E88530-B 4134-C-10	S5-135 U-921	413	2.3 - 30	SD60	MB234-255
FB 251	E88530-B 4134-C-10	S5-135 U-928	249	0.2 - 3	SD60	MB234-255
FB 250	E88530-B 4131-D-20	S5-150 U	274	0.2 - 10	/	MB240-255
FB 250	E88530-B 4134-D-10	S5-155 U	286	0.1 - 1.5	/	MB234-255

Common data:

Block name S5-WF463
Call length 18
Nesting depth 1
Blocks called none
Timers as parameterized
Counters none
DB / DW as parameterized

When using the SIMATIC S5 - 135 U with S-Processor, DB255 will be automatically generated and then used as a buffer store. The function blocks for all PLC types can be transferred into the PLC number under a different number should the standard number clash with an existing FB number. This is necessary for the SIMATIC S5 - 115 U, as the FB 250 is already used.

3.1.2 Programming

The WF 463 S stores PLC data blocks i.e. DB1, DB2 etc. If an EPROM sub-module is fitted in the sub-module slot, the data blocks in the WF 463 S can only be read into the PLC memory. The EPROM sub-module is then programmed via the PG as if it is plugged directly into the SIMATIC S5.*

When a RAM sub-module is used, data blocks can also be transferred from the PLC to the WF 463 memory. If a data block which does not already exist in the WF memory is transferred, it is automatically generated before the data is transferred. If the data block already exists, the existing data is overwritten with the new data. The data block length is automatically extended if the new data is longer than the existing data block. Data blocks which are no longer required can be deleted.

Data blocks can be stored in the WF 463 S under a different number to their number in the SIMATIC S5. For instance DB5 in the PLC can be stored as DB140 in the WF 463 S. Parts of a data block can also be transferred. For example, twenty words of DB7, starting from data word DW30 can be transferred to the WF 463 as DB10 starting from DW530.

The control of the data exchange between the S5 and the WF 463 S is performed at the S5 and by the standard function block S5-WF 463 (see 3.1.1). This block must be called cyclically in the PLC program. The function block parameters are shown in Fig. 3.1.

Data exchange is initiated via function block parameter ANST. This control bit must be triggered as a pulse, i.e. the result of logical operation (RLO) to set the bit must only be present for one S5 cycle. Data exchange is initiated when this control bit changes state from 0 to 1. Once the data exchange has been initiated the function block parameters must not be changed until the data transfer is complete.

The ANST trigger is reset to 0 when the data transfer has been successfully completed, or if an error has been detected. A new data transfer command can only be initiated when the ANST bit = 0.

A data exchange which has been interrupted by a manual re-start or the PLC performing a new start in OB20 (or OB21 in S5 115U) must be terminated by the application program as follows:

- Reset the ANST trigger bit
- Write 0 into the data location set in the DAT4 parameter.

A data exchange which was interrupted by a power failure will continue after the warm restart, provided that the WF 463 S is in a battery buffered slot.

The data exchange takes place via a dual port ram. Each S5 cycle, a Dual Port Ram size block of data (less 8 bytes for the data header) can be transferred between the S5 and WF card. If a data block which is longer than the Dual Port Ram is to be transferred, the data will be transferred as a series of "blocks" or portions of 128 bytes. For example, if a data block of 512 bytes is transferred, this will be sent as 4 blocks of 120 bytes and one block of 32 bytes. The complete data block transfer will then take 5 PLC program cycles.

* = If data blocks with the same number are in the EPROM module as well as in the RAM, then there must be an initial RESET for the WF 463 S.

Name	Function	Type	Form
ANST	Trigger data exchange or delete OB functions Automatically reset by the function block	I	BI
RICH	Data transfer direction 1 = S5 - WF 0 = WF -S5	I	BI
LOE	Delete data block from WF 463 S	I	BI
ANZ	Number of words to be transferred	I	W
DPRA	Start address of DPR	D	KH
DPRL	Size of Dual Port Ram (in bytes)	D	KF
T-UE	Timer for monitoring the WF 463 S	T	
DBS5	Data block number in the SIMATIC S5	I	BY
DWS5	Data word number in the SIMATIC S5	I	W
DBWF	Data block number in the WF 463 S	I	BY
DWWF	Data word number in the WF 463 S	I	W
DAT1 DAT2 DAT3 DAT4	Internal workspace for the FB	Q Q Q Q	W W W W
FEHL	Error Message	Q	BY
SICH	Trigger bit for data saving on recorder or disk drive; Automatically reset by the function block	I	BI

Fig. 3.1 S5-WF463 Function Block Parameters

If the WF 463 S is used in a SIMATIC S5 150 U, the transfer of large quantities of data can cause the function block to have a processing time in excess of 10 ms. This can result in the reinterrupt error WEKA if the 10 mS time interrupt OB10 is being used. Should this occur, the size of the dual port ram may be shortened to reduce the processing time of the S5-WF463 function blocks via parameter DPRL.

3.1.3 Error messages

The WF 463 S and the S5-WF 463 function block perform monitor and check operations. Any errors which occur are reported to the user program via the error byte parameter FEHL. The following error codes can be displayed:

FEHL value	Cause
0	No error (normal condition)
1	The data block in the SIMATIC S5 is not present or is too short
2	DB0 is an invalid data block
3	WF 463 S Memory is full
4	The data block in the WF 463 S is not present or is too short
5	The data block is in EPROM Module
6	The monitor time has expired
7	Access to the data block selected is inhibited, since it is being written to/read by the data recorder or floppy drive unit.

Fig. 3.2 Error Codes

3.1.4 Program example

The following SIMATIC S5 Program is designed to perform as follows: When input I5.0 is switched from OFF to ON, data-block DB8-words DW20 to DW89 will be transferred from the SIMATIC PLC to the WF 463 S memory and will be stored in data block DB10 from data word DW0. When input I5.1 is switched from OFF to ON the data will be transferred back from the WF 463 S to the PLC.

PLC Type	SIMATIC S5 150 U
Dual Port Ram Address	E400H
Dual Port Ram Size	256 Byte
Trigger flag	F 10.0
Transfer direction flag	F 10.1
Edge evaluation flags	F 11.0, F11.1
Data storage medium selection	F 10.3
Error byte	DB1/DR10

OB1

NETWORK 1

0000 : JU PB5 (Jump to Program Block 5)
0002 :
0004 :
0006 : BE

DB1

(Parameter for FB250)

0 : KH = 0000;
1 : KF = +00008; (SIMATIC S5 Data block 8)
2 : KF = +00020; (SIMATIC S5 Data word 20)
3 : KF = +00010; (WF 463 S Data block 10)
4 : KF = +00000; (WF 463 S Data word 0)
5 : KF = +00070; (Transfer 70 words)
6 : KH = 0000;
7 : KH = 0000;
8 : KH = 0000;
9 : KH = 0000;
10 : KH = 0000;
11 :

PB5

NETWORK 1

0000 : AN I 5.0 (Reset edge evaluation flag)
0002 : R F 11.0
0004 : AN I 5.1
0006 : R F 11.1
0008 :
000A : A I 5.0 (Detect signal charge from 0 to 1)
000C : AN F 11.0
000E : AN I 5.1
0010 : AN F 10.0
0012 : S F 11.0 (Set edge evaluation flag)
0014 : S F 10.0 (Set trigger flag)
0016 : S F 10.1 (Set direction SIMATIC S5 WF 463 S)
0018 :
001A : A I 5.1 (Detect signal change from 0 to 1)
001C : AN F 11.1
001E : AN I 5.0
0020 : AN F 10.0
0022 : S F 11.1 (Set edge evaluation flag)
0024 : S F 10.0 (Set trigger flag)
0026 : R F 10.1 (Direction WF 463 S SIMATIC S5)
0028 :
002A : C DB1 (Call DB1 for parameter list)
002C :

002E	:	JU	FB250	(Call function block with
0030	NAME :	S5-WF	463	Parameters from DB1)
0032	ANST :	F	10.0	
0034	DPRA :	KH	E400	
0036	DPRL :	KF	+256	
0038	T-UE :	T	25	
003A	DBS5 :	DR	1	
003C	DWS5 :	DW	2	
003E	DBWF :	DR	3	
0040	DWWF :	DW	4	
0042	ANZ :	DW	5	
0044	RICH :	M	10.1	
0046	LOE :	M	10.2	
0048	DAT1 :	DW	6	
004A	DAT2 :	DW	7	
004C	DAT3 :	DW	8	
004E	DAT4 :	DW	9	
0050	FEHL :	DR	10	
0052	SICH :	M	10.3	
0054	:	BE		

3.1.5 Delete All Function

The Delete All function deletes all blocks from the WF 463 S module and resets the system memory to its original state. If the WF 463 S module resets the system memory to its original state. If the WF 463 S module is removed and replaced in the PLC, the module must be reset using the Delete All function.

The Delete All function is performed using the programming unit connected to the WF 463 S serial port (see section 3.3). The delete all function can be initiated during normal program execution in all PLC's except the 135U. The S5-WF 463 function block must not be called during the deleting operation. The Delete All function is carried out as follows:

- Remove or disable the program call to S5-WF463.
- Select the direct address display mode on the programming unit starting with the first address of the dual port ram, and overwrite the address as follows:

DPR + 0	00 00	since the 150 U wordwise
DPR + 2	00 00	addressed, only the right byte
DPR + 4	00 00	is relevant.
DPR + 6	80 00	
- The WF 463 S replies by writing:

DPR + 6	80 80
---------	-------
- Display the dual port ram memory address

DPR + 6	and overwrite 80 80 with 00 00
---------	--------------------------------
- Recall or re-enable the S5-WF463 function block in the PLC program
- The Delete All function is now complete.

3.1.6 Data Block Directory

The data block directory is stored by the WF 463 S in Data Block 0. If the user requires information from the directory, DB0 should be read from the WF 463 S and placed in a data block in the SIMATIC PLC. This can then be displayed on the programming unit by outputting the data block in KH format. DB0 can be transferred as a complete block or just the relevant section can be selected.

The parameter DWWF must be 0 or >3, values 1, 2, 3 cannot be used.

For example: the WF 43 S directory in DB0 is to be read from data word 0 and transferred to DB8 in the SIMATIC PLC from data word 0. This could then contain the following:

```
0 : KH = 0004;   There are 4 blocks in the WF 463 S
1 : KH = 0000;
2 : KH = 0000;
3 : KH = 12D7;   Number of words free in the ram in Hex (=4823 decimal)
4 : KH = E001;   DB1 is in EPROM
5 : KH = 0131;   DB1 is 131 words long
6 : KH = B005;   DB5 is in RAM
7 : KH = 0027;   DB5 is 27 words long
8 : KH = B028;   DB28 is in RAM
9 : KH = 1037;   DB28 is 1037 word long
10 : KH = E113;   DB113 is in EPROM
11 : KH = 0516;   DB113 is 516 words long
12 : KH = 0000;
13 : KH = 0000;
14 : KH = 0000;           No further blocks exist in the WF 463 S
15 : KH = 0000;
16 : KH = 0000;
17 :
```

3.2 Data Storage on the Data Cassette Recorder

We recommend the use of the following data recorder:

Sanyo ZE 601 or CR232 option 4

Supplier:	INDEXIM GmbH, Friedrichsthaler Weg 12, 13467 Berlin Tel: 030-4 04 50 64 Fax: 030-4 04 02 25
Data Transfer Rate:	1200 Bd = 109 byte/sec
Interface:	20 mA current loop
Format:	Standard compact cassette
Cassette recommendation:	Drop-Out protected digital cassette, e.g. Compusette (BASF)

3.2.1 Programming

Data blocks which are stored on the WF 463 S can be transferred to a data cassette recorder using the 20mA current loop interface connection. The WF 463 S must be supplied with 24 volts via the two "fast-on" spade connectors on the front of the module. The data cassette can be written by or used by other devices such as a punch tape reader/loader and can be transferred for archive or for further processing by other external devices.

Data blocks can be transferred to and read from the data cassette recorder. Individual data blocks or groups of data blocks can therefore be loaded from cassette into the SIMATIC. The WF 463 S uses data block 255 as a buffer memory for storing task information, data block selection, and error status codes. This data block is therefore reserved in the WF 463 S. It should be transferred from the PLC and must be 256 data words long. Note: DB255 is not permitted in an S5 135 U.

During data transfer between the WF 463 S and the data cassette recorder, all the normal WF 463 S SIMATIC functions are available with the following exceptions:

- A data block which is currently being transferred to the cassette recorder cannot be written into, or deleted by the SIMATIC PLC.
- A data block which is currently being transferred from cassette to WF 463 S cannot be transferred from the WF 463 S into the SIMATIC PLC or deleted in the WF 463 S.
- DB255 cannot be written to on the WF 463 S. An attempt to do this will result in error 07.

The data transfer between the WF 463 S and the cassette recorder is triggered from the SIMATIC PLC.- Before any data transfer between cassette and WF is attempted, DB255 must be transferred from the PLC to the WF 463 S unless it is already present on the WF card. The task list format in DB255 is shown in Fig. 3.3. The data cassette recorder must be switched to the required mode i.e. record or replay. The trigger to start the cassette can then be given by the PLC program by setting the SICH trigger bit in FBS5-WF 463 S to 1.

The WF 463 S then starts the recorder and transfers data to or from the recorder, whilst concurrently performing other data transfer tasks. The recorder transfer task list in DB255 is processed, starting from data word 1 and is continued until a data word with a content of 0.0 is found, or until the end of DB255 is reached. The data format of the data written onto the data cassette is shown in Fig. 3.4.

When the task is finished, the cassette recorder is stopped and the parameter SICH in FB S5-WF 463 is reset to 0. This bit is also reset if the trigger bit is set when DB255 is not present on the WF 463 S, or if DB255 is erased whilst the cassette is in operation. If the PLC is reset with a new start, or a warm restart is performed after power failure, the operation of the cassette recorder is terminated.

The SIMATIC PLC can also read DB255 from the WF 463 S whilst the cassette is in operation. The user can therefore read the sequence of the tasks to be performed and their result.

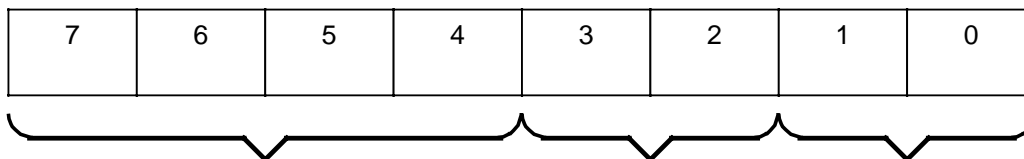
Task format
in DB 255
in the WF 463 S

	DL	DR
DW0	Acknowledge	Mode
DW1	Block Acknowledge	Block Number
	.	.
	.	.
	.	.
DWn	0	0
	.	.
	.	.
	.	.

Acknowledge:

- 0 : Task completed
- 1 : Task running
- 2 : Incorrect mode selected

Mode:



Transfer rate:

0000	1200 Bd	00: read from cassette without any blocks already present	00: no task
0001	75 Bd		
0010	110 Bd		01: Process all blocks (DB255 from DW1 irrelevant)
0011	134.5 Bd		
0100	150 Bd		
0101	300 Bd	01: read from cassette overwrite any blocks already present	
0110	600 Bd		10: Process all requested blocks (sequence must correspond)
0111	50 Bd		
1000	1800 Bd		
1001	2000 Bd		
1010	2400 Bd		
1011	3600 Bd	10: transfer from cassette	
1100	4800 Bd		11: free
1101	7200 Bd		
1110	9600 Bd	11: test read	
1111	19200 Bd		

(1200 Bd = 109 Byte/s)

Fig. 3.3 Task Format

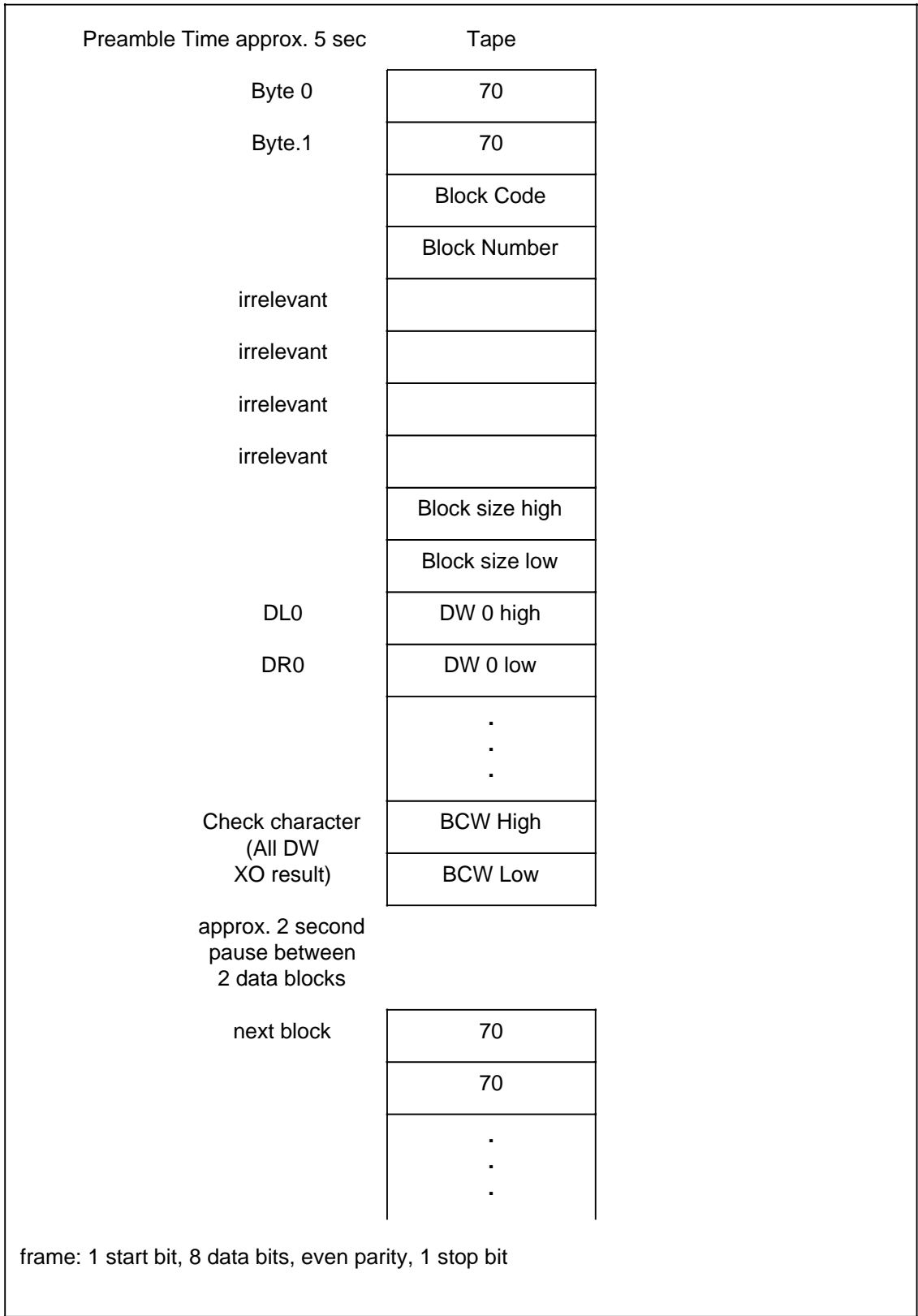


Fig. 3.4 Data format on cassette tape

3.2.2 Error messages

The user must transfer DB255 to the WF 463 S. This must contain at least as many data words as there are data blocks on the WF 463 S. These data words will contain the number of the blocks to be transferred and any error codes which are generated. They are stored in the following format starting from DW1.

DL	DR
Error Number	Data block number

Fig. 3.5 Error Code Format

The error code is written in the left hand byte of the word containing the number of the data block which causes the error. The following error codes can be displayed:

- 0 = Task completed without errors
- 1 = No space available in the WF 463 S
- 2 = Data block already present on the WF 463 S
- 3 = Data block not present on the WF 463 S
- 4 = Data block not present on the data cassette
- 5 = Data block read with errors
- 6 = Data block in EPROM
- 7 = Buffer overflow
- 8 = Error during test read

3.2.3 Example

Fig. 3.6 shows an example data transfer task, and Fig. 3.7 shows the possible acknowledgements or error messages which could be received.

DB255		
Task	DL	DR
DW 0	0	6
DW 1	0	5
DW 2	0	7
DW 3	0	8
DW 4	0	9
DW 5	0	20
DW 6	0	21
DW 7	0	23
DW 8	0	0

Mode:

- Transfer rate 1200 Bd
- Read from cassette with overwrite of any blocks present
- Process all selected blocks

Data blocks to be transferred are:
5, 7, 8, 9, 20, 21, 23

End of file code

Fig. 3.6 Example Task List

DB255			
Acknowledgement	DL	DR	Mean. of error/acknowledgem. code in DL
DW 0	0	6	Task complete
DW 1	0	5	DB 5 OK
DW 2	0	7	DB 7 OK
DW 3	4	8	DB 8 was not on cassette
DW 4	6	9	DB9 in EPROM, cannot be overwritten
DW 5	0	20	DB 20 OK
DW 6	2	21	DB21 would be overwritten on WF463 S
DW 7	0	23	DB 23 OK
DW 8	0	0	

Fig. 3.7 Possible error/acknowledgement codes

3.3 Data Storage on the Programming Unit

Data can be saved onto a SIMATIC programming unit (PG) by connecting the unit to the 20mA serial interface on the WF 463 S. The PG supplies the active side of the current loop, so no 24V supply is required onto the fast-on pins on the front of the WF 463 S card. If the WF 463 S is supplying the active side of the current loop for the connection to a cassette recorder etc., a 24V supply is required to these pins. This 24V supply can be left connected if the WF 463 S is connected to a programming unit.

The programming unit connected to the WF 463 S performs as if it were connected to a SIMATIC PLC, although not all the functions are available. The programming unit operations and error messages are exactly the same as when connected to a PLC and are therefore familiar to the user. The programming unit manual may be referred to for further information.

The following PG functions are available when connected to the WF 463 S (Language area B):

OUTPUT	DIRECTORY:PC	
OUTPUT	PC,DBx	
INPUT	PC,DBx	x = Data block number
TRANSFER	PC,DBx:FDy	y = Disk drive number
TRANSFER	FDy,DBx:AG	
DELETE	PC,DBx	PC = WF 463 S
DELETE ALL		

3.4 Ordering Information for the Floppy Disk Drive

The WF 363 external memory module contains special driver firmware which allows the unit to be linked to floppy disk drives produced by CAN.

Fa. CAN Computeranwendungen GmbH
Postfach 6607, Markgrafenstr. 66,
7750 Konstanz, Tel.: 07531/50077

The floppy disk drive is available in 3 mechanical variants. Each type is available with a choice of two memory capacities.

- 1) Desk top model
Order code: NTC - FD / WF 463 S
or NTC - FH / WF 463 S
or NTC - 07 / WF 463 S
- 2) Panel mounted model
Order code: NSCL - FD / WF 463 S
or NSCL - FH / WF 463 S
or NSCL - 07 / WF 463 S
- 3) Panel mounted model
Order code: NCC - FD / WF 463 S
or NCC - FH / WF 463 S
or NCC - 07 / WF 463 S
- 4) 19" rack mounted model
Order code: NNC - FD / WF 463 S
or NNC - FH / WF 463 S
or NNC - 07 / WF 463 S

Recommended disk types: 3.5" disk type SSDD for units with the FD code.
3.5" disk type DSDD for units with the FH / 07 code.

Capacity: 320 kByte for FD types, 640 kByte for FH types and 720 kByte for M07 units in format MSDOS.

When the code "/WF 463 S" is placed at the end of the order code, the disk drive will automatically be supplied with the following settings (see figure 3.8):

Data transfer rate:	9600 Bd	SW11 on SW12 off SW13 off SW14 on
Parity:	even parity	SW15 on SW16 on
Stop-bits:	1 stop bit	SW18 off
Handshake:	Xon/Xoff (DC3/DC1)	SW21 on
Number of data bits:	8 bits	SW25 on SW26 on
end code:	CR LF CR LF (0D0A0D0AH)	SW27 off SW28 on

SW	11	12	13	14	15	16	17	18	21	22	23	24	25	26	27	28
ON	O			O	O	O			O				O	O		O
OFF		O	O				X	O		X	X	X			O	

X = reserved (SW 22 to SW 24)

Fig. 3.8 DIP switch settings on the CAN drive.

3.4.1 Programming

Data blocks which are stored on the WF 463 S external memory module can be transferred to the disk drive via the 20 mA serial connection, and stored on disk. Data blocks can also be read from disk and transferred back into the WF 463 S.

The data transfer rate is set by the WF 463 S at 9600 Bd.

Data blocks are grouped and stored in a file with a file name. The files can then be accessed using their file names. The file name also allows additional information about the files to be stored.

For the NC-recorders series M07, the additional information is necessary, but is not evaluated. Instead, these files are automatically given the additional information "Date" by the NC-recorder when recording in format "DD/MM/YY" (day/month/year).

Each disk can contain a maximum of 316 files if it is the FD type or 320 files for the FH type and maximum of 111 files for the M07 type.

Each file can contain data blocks DB1 to DB254.

DB 0 is reserved for use by the WF 463 S, and is used as the data block directory (see section 3.1.6).

DB255 is also reserved for use by the WF 463 S. This data block is used to store the task queue and status information. It should be generated by the user and must be at least 271 words long (see section 3.9).

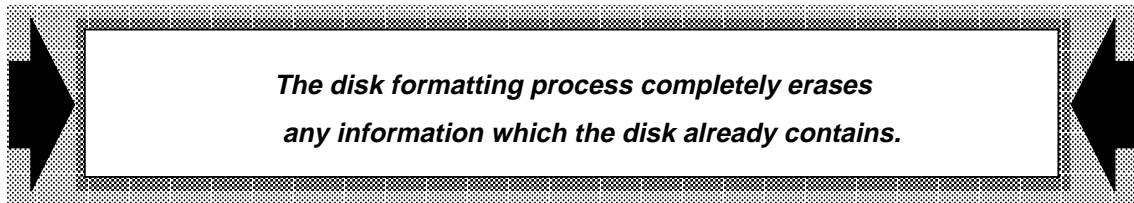
A data transfer task can only access one file. All data blocks contained in this file can be transferred to the WF 463 S; alternatively, all data blocks in the WF 463 S can be transferred to a file. Individual data blocks or groups of blocks can also be transferred both to and from the WF 463 S. A file on disk cannot be expanded by having extra data blocks added to it.

During the data transfer operation between the WF 463 S and the disk drive, data transfer between the SIMATIC S5 and the WF 463 S can also take place. All normal functions are available with the following limitations:-

- A data block which is currently being transferred to the floppy disk cannot be written into from the SIMATIC S5, and cannot be deleted.
- A data block which is currently being read from the disk cannot also be read from the SIMATIC S5, and cannot be deleted.

- DB255 in the WF 463 S cannot be overwritten. An attempt to do this will result in an error.

Before the first data is transferred to the disk drive, the floppy disk must be formatted. During this process the disk is checked, completely erased, and then control information including the disk's name is written onto the disk.



The transfer of data blocks between the WF 463 S and the disk drive is controlled from the SIMATIC S5. Firstly DB255 must be transferred to the WF 463 S. This must contain the data transfer task control information. The format of DB255 is shown in fig. 3.9. The data transfer operation is triggered in the SIMATIC program using the SICH parameter bit in the function bloc S5-WF 463.

The WF 463 S controls the processing of the tasks and carries these out concurrently with any SIMATIC-WF transfers which are requested. If the block selection from list mode is selected (DL15-O1H) the data transfer tasks specified in DB25 (starting from DW16) are performed until the data word contains zero, or the end of the data block is reached.

When the data transfer tasks have been completed, or if DB255 is not present or has been erased during the operation, the parameter bit SICH in FB S5-WF 463 is reset to 0. This bit is also reset to zero if the PLC performs a newstart or a warm restart after power interruption. In either case, the operation of the disk drive will have been interrupted.

The DB255 in the WF 463 S can be read in into the SIMATIC S5 during the processing of a data transfer order. In this way, the data transfer can be monitored.

DB255 can be read into the PLC during the data transfer operation. This enables the application program to monitor the progress of the disk read or write tasks.

DW-Nr	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Function Code								Unit Code							
1																
2	Floppy disk name															
3																
4																
5																
6	File name															
7																
8																
9																
10	File name extension															
11																
12																
13	Error code from disk drive															
14																
15	Block selection								Acknowledgement							
16	Status/error code								DB-Number							
17	"								"							
	"								"							

Fig. 3.9 Data transfer task format for the Floppy disk drive (DB 255 in the WF 463 S).

Further information for fig. 3.9:

Unit code in DR0: (data word 0, right byte)

FF_{Hex}: CAN drive

Function code in DL0: (data word 0, left byte)

- 00_{Hex}: Write file onto disk, overwrite existing file with same name if present. Note: a file which is already present cannot be expanded.
- 01_{Hex}: Read file from disk, overwrite existing data blocks on the WF 463 S if present.
- 02_{Hex}: Read file from disk, do not overwrite existing data blocks present on the WF 463 S.
- 03_{Hex}: Test/compare
Compare the data blocks in a file on disk with data blocks of the same number in the WF 463 S.
- 04_{Hex}: Read the directory of a file on disk into the WF 463 S in DB255 starting from DW16. (The directory of the data blocks contained in a file). DL contains 0, DR contains the data block number.
- 05_{Hex}: Read the disk file directory into the WF 463 S in DB255 starting from DW16. Each file present requires 4 data words for its name, and 4 data words for its extension. The user must generate DB255 to the required length and transfer it into the WF 463 S. If DB255 is not sufficiently long to contain the complete directory, the directory is transferred until the end of the block is reached, and the function is terminated.
- 06_{Hex}: Erase file on disk.
- 07_{Hex}: Format disk.

DW1 to DW4 contain the alphanumeric name of the floppy disk. When a disk is formatted, this name is written into the disk directory. If the disk directory is read (function code 05 Hex) this name is written into DW1-4. All other functions are only carried out when the disk name in DB255 DW1-4 corresponds with the disk name in the disk directory.

DW5 to DW8 contain the alphanumeric name of the file to be read, written to, erased, or whose directory is to be read.

DW9 to DW12 contain the alphanumeric extension for the file name. This extension name is required if the user wishes to store additional information with the file name, e. g. date, version, number etc..

DW13 and DW14 contain the error and status information from the drive. The following codes can be displayed:

During disk formatting:

Code	Error/cause	Suggestion
F 100	No disk in drive	Insert disk
F 200	Disk write protected	Remove write protect
F 400	Read/write error	Disk faulty/incorrect type
F 001	System error 1	Hardware/software incompatible
F 002	System error 2	Syntax error code
F 003	System error 3	Syntax error code
F 004	System error 4	Syntax error command

When opening a file:

Code	Error/cause	Suggestion
O 100	No disk in drive	Insert disk
O 200	Disk write protected	Remove write protect
O 300	Disk or directory full	Erase file or insert new disk
O 400	Write error	
O 010	Transfer error 1	Check transfer parameters
O 020	Transfer error 2	Check transfer parameters
O 030	Transfer error 3	Check transfer parameters
O 001	System error 1	Hardware/software incompatible
O 002	System error 2	Syntax error code
O 003	System error 3	Syntax error code
O 004	System error 4	Syntax error command
O 005	Disk not formatted	Insert formatted disk
O 007	File already present	Erase file Rename file present Select alternative name

When reading information:

Code	Error/cause	Suggestion
I 100	No disk in drive	Insert disk
I 400	Read error	
I 001	System error 1	Hardware/software incompatible
I 002	System error 2	Syntax error code
I 003	System error 3	Syntax error code
I 004	System error 4	Syntax error command
I 005	Disk not formatted	Insert formatted disk

When writing files on disk:

Code	Error/cause	Suggestion
W 100	No disk in drive	Insert disk
W 200	Disk write protected	Remove write protect
W 400	Write error	Disk defective
W 010	Transfer error 1	Check transfer parameters
W 020	Transfer error 2	Check transfer parameters
W 030	Transfer error 3	Check transfer parameters
W 001	System error 1	Hardware/software incompatible
W 002	System error 2	Syntax error code
W 003	System error 3	Syntax error code
W 004	System error 4	Syntax error command
W 005	Disk not formatted	Insert formatted disk
W 330	Disk full	

When reading files from disk:

Code	Error/cause	Suggestion
L 100	No disk in drive	Insert disk
L 400	Read error	
L 001	System error 1	Hardware/software incompatible
L 002	System error 2	Syntax error code
L 003	System error 3	Syntax error code
L 004	System error 4	Syntax error command
L 005	Disk not formatted	Insert correct disk
L 006	File not present	Insert correct name Insert correct disk

When erasing files:

Code	Error/cause	Suggestion
E 100	No disk in drive	Insert disk
E 200	Diskwrite protected	Remove write protect
E 400	Read/write error	
E 001	System error 1	Hardware/software incompatible
E 002	System error 2	Syntax error code
E 003	System error 3	Syntax error code
E 004	System error 4	Syntax error command
E 005	Disk not formatted	Insert formatted disk
E 006	File not present	Specify correct name Insert correct disk

Block selection in DL15:

- 00_{Hex}: All blocks will be processed (DB1 to DB254 inclusive)
- 01_{Hex}: The task list will be processed starting from DW16.
The data blocks must be specified in increasing numbers. DB-Number in DR, DL contains 0.

Acknowledgement in DR15: contains

- 00_{Hex}: when the data transfer task is completed.
- 01_{Hex}: while the data transfer task is being processed.
- 02_{Hex}: If the function or block selection is invalid.
- 03_{Hex}: If the disk name and that specified in DB255 do not correspond.
- 04_{Hex}: If the monitor timer has expired.
- 05_{Hex}: when error 5 is signalled after reading a data block (Data block not correctly read in)

3.4.2 Size of DB255 in the WF 463 S.

If all data blocks DB1 to DB254 (Block selection = 0) are to be transferred, the user must generate DB255 to be at least the following length.

Number of data words = number of files in the WF 463 S (or in file to be transferred, number of present data blocks) +16.

The numbers of the data blocks to be transferred and their associated error/status codes are placed in this DB starting from DW16 (see section 3.2.2).

3.4.3 Example

Fig. 3.10 shows an example data transfer task "Read Disk directory" for the CAN disk drive.

The possible acknowledgements, error messages, disk name, file name entries etc. are shown in fig. 3.11.

DW-Nr	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	05 (Read disk directory)								FF (CAN-NC Recorder NTC-FD/FH)							
1																
2	Floppy disk name (Any entry is permitted)															
3																
4																
5																
6	File name (Any entry is permitted)															
7																
8																
9																
10	File name extension (Any entry is permitted)															
11																
12																
13	Error code from disk drive															
14																
15	Block selection (0 or 1)								Acknowledgement (any entry)							
16																
17	The disk contains 3 files for example. 3 x 8 = 24 data words (starting from DW16) must be available here to contain the response message. (any entry is permitted).															
.																
38																
39																

Fig. 3.10 Entries in DB255 when the task is triggered.

DW-Nr	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	05 (Read disk directory)								FF (CAN-NC recorder NTC-FD/FH)							
1	Floppy disk name (Read from disk e.g. NEW-DISK)															
2																
3																
4																
5	File name (Remains the same)															
6																
7																
8																
9	File name extension (Remains the same)															
10																
11																
12																
13	Error message from CAN drive															
14	(entry i.e. MI+000, see CAN recorder handbook)															
15	Block selection (unchanged)								00 (TASK COMPLETE)							
16	File names and extensions entered from DW16 to DW39 e.g. File-01PROGRAM File-03PROGRAM															
17																
18																
19																
20	File names and extensions entered from DW16 to DW39 e.g. File-01PROGRAM File-03PROGRAM															
21																
22																
23																
24	File names and extensions entered from DW16 to DW39 e.g. File-01PROGRAM File-03PROGRAM															
25																
26																
27																
28	File names and extensions entered from DW16 to DW39 e.g. File-01PROGRAM File-03PROGRAM															
29																
30																
31																
32	File names and extensions entered from DW16 to DW39 e.g. File-01PROGRAM File-03PROGRAM															
33																
34																
35																
36	File names and extensions entered from DW16 to DW39 e.g. File-01PROGRAM File-03PROGRAM															
37																
38																
39																

Fig. 3.11 Entries in DB255 when task is complete

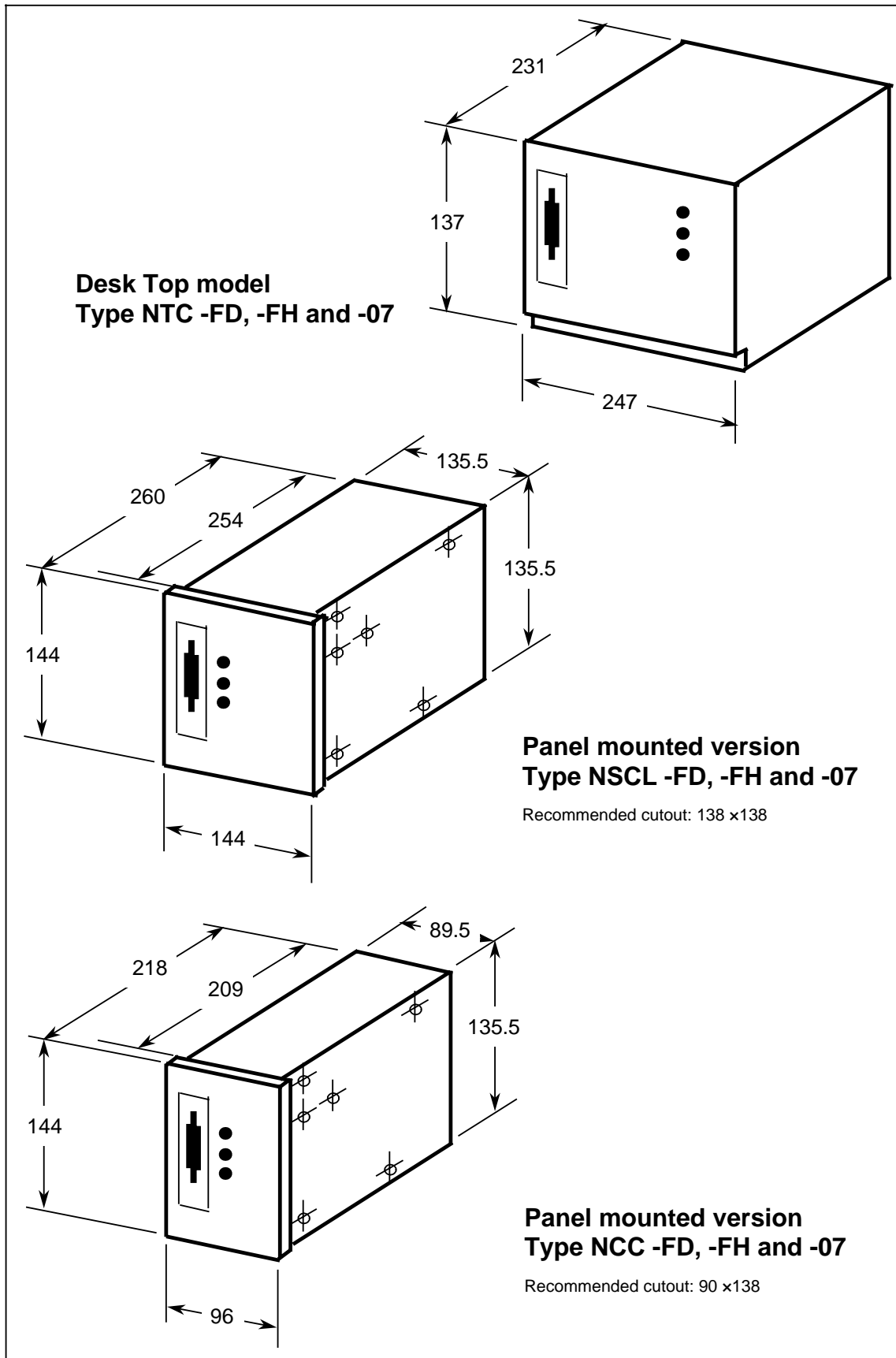


Bild 3.12a Disk drive dimensions for CAN units

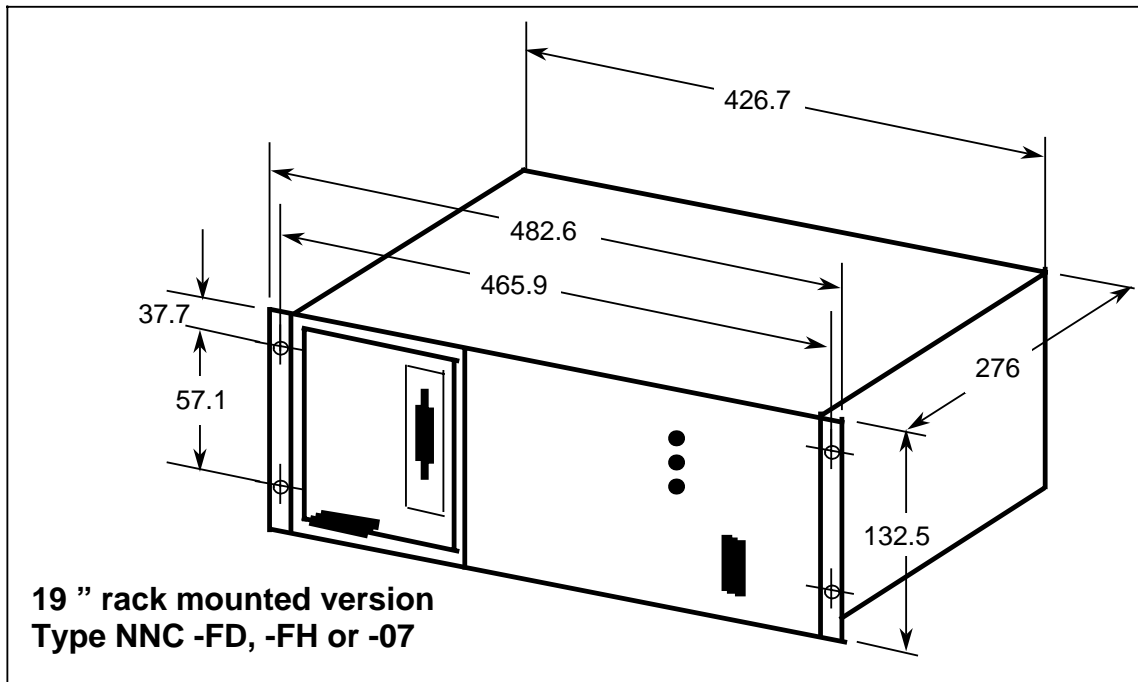


Bild 3.12b Disk drive dimensions for CAN units

Types NSCL and NCC are available as option with full-view door (42 mm deep).

Leave a space of approx. 50 mm at the back for the connections.

For further details, e.g. operating data, connection line, current supply, please contact the manufacturer (see chapter 5).

4 Installation and Commissioning

4.1 Module slot locations

The WF 463 S can be used in in the SIMATIC S5 with battery buffer:

This means all slots in the SIMATIC in which, according to the catalogue, CP modules can be operated.

4.2 Addressing

The WF 463 S can be used in the address windows stated in the following table.

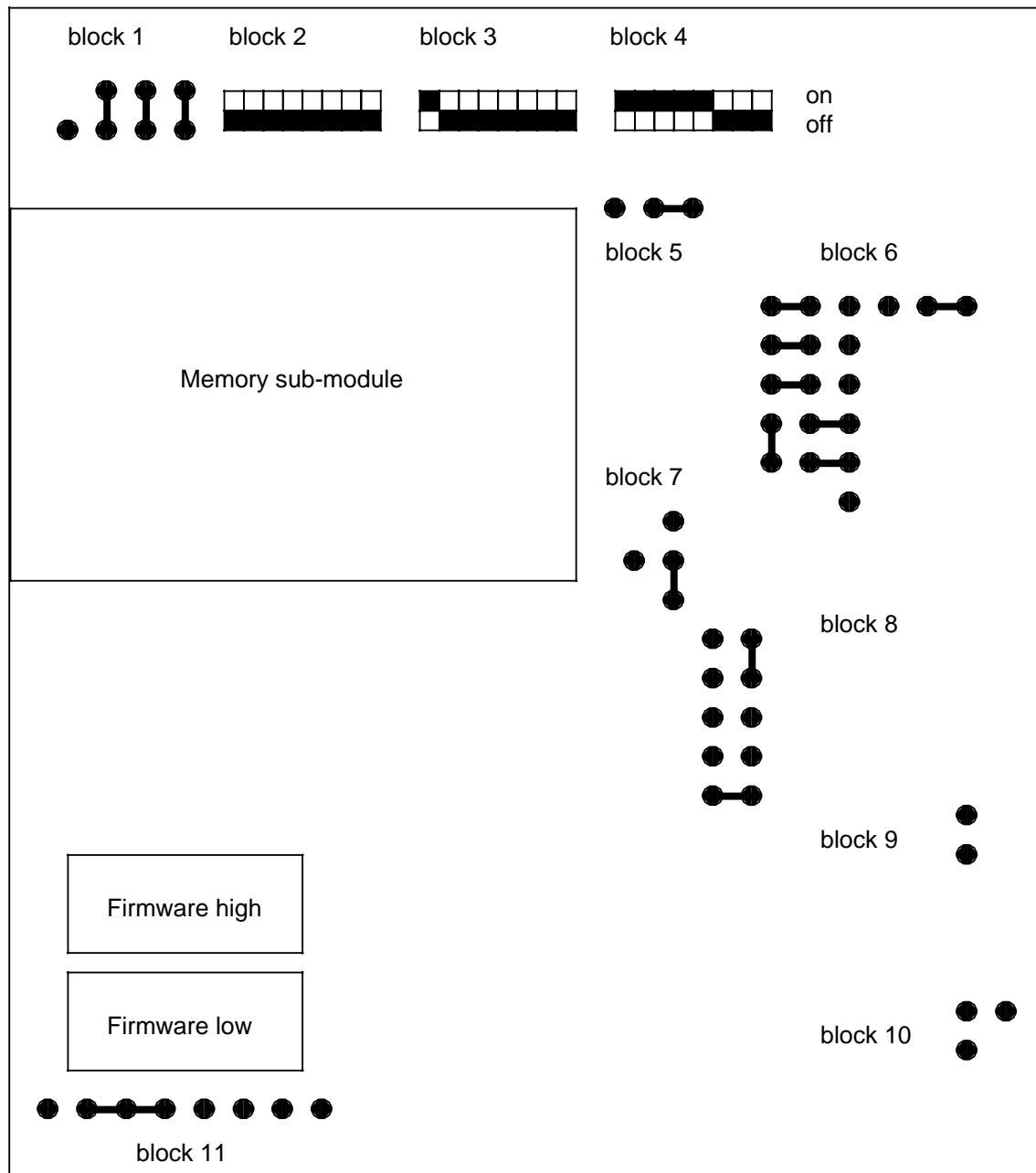
Unit	115 U	135 U	150 U	155 U
Start address of DPR (DPRA)	0000 to 0F00 F800 to FB00	F800 to FB00	E000 to E700 F800 to FB00	0000 to CF00 F800 to FB00
Size of DPR (DPRL)	256 Byte	256 Byte	256 Byte	256 Byte

The start address and size of the DPR are set via function block parameters (see chapter 4.3).
The WF 463 S must not be addressed in the CP paged memory area.

4.3 Link and switch settings

4.3.1 Versions from mid 1985 to mid 1987 (see section 4.7 for versions from mid 1987)

MLFB: 6FM1 463-3SA20



The module is delivered ex-factory with the following settings:

DPR address E H

DPR size 256 Byte

If the module is to be used in a memory address window in the central rack the only links which will require changing are block 4 to set the memory address.

Blocks 5, 6, 7, 8, 9 and 10

Fixed settings. These must be in their ex-factory settings.

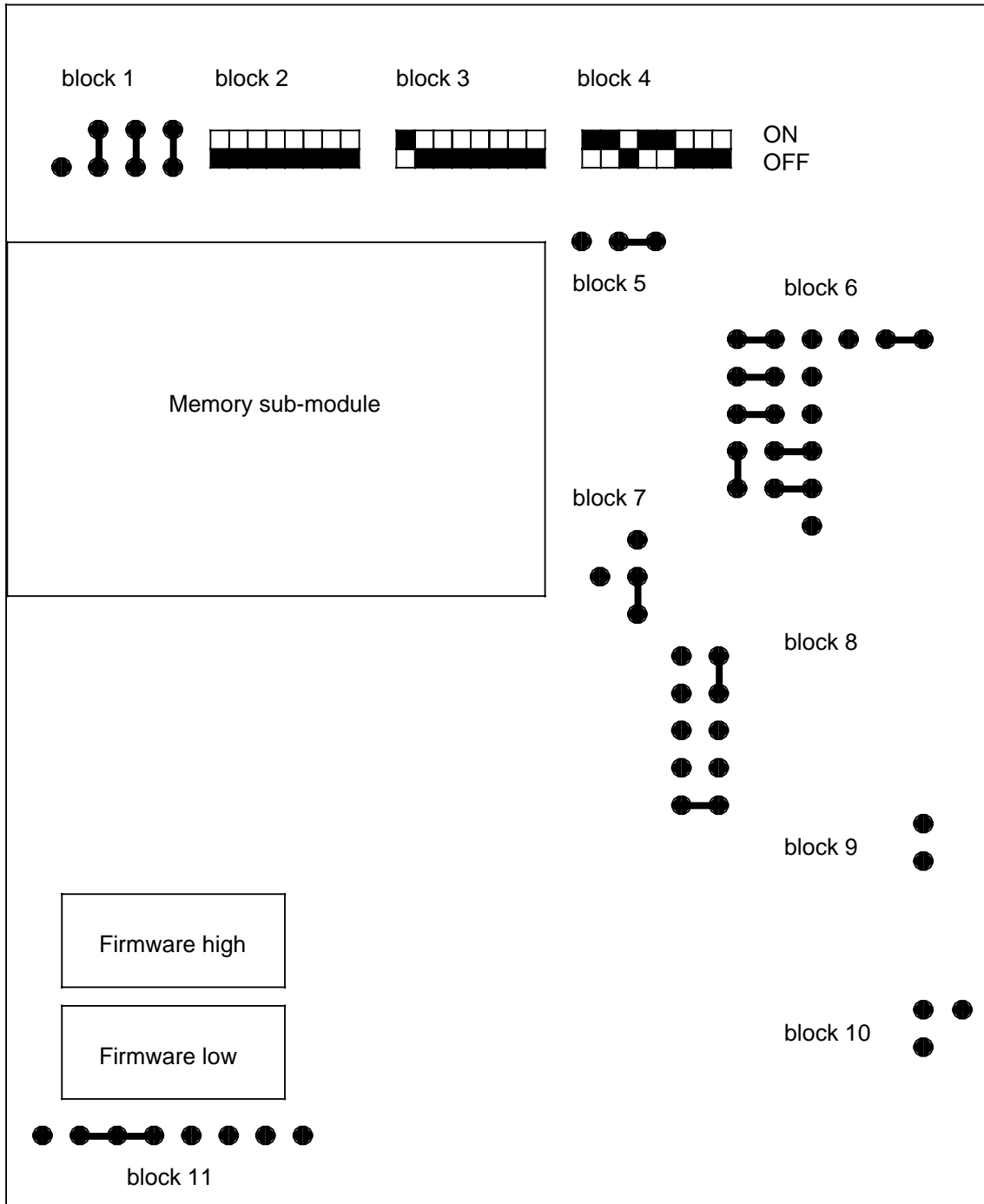
Block 11

This sets the size of the firmware EPROMS. The setting varies according to the hardware/software version.

Modules Pre Mid 1987 are shown in section 4.3.1. Modules delivered after 1987, or with a firmware update are shown in section 4.7.

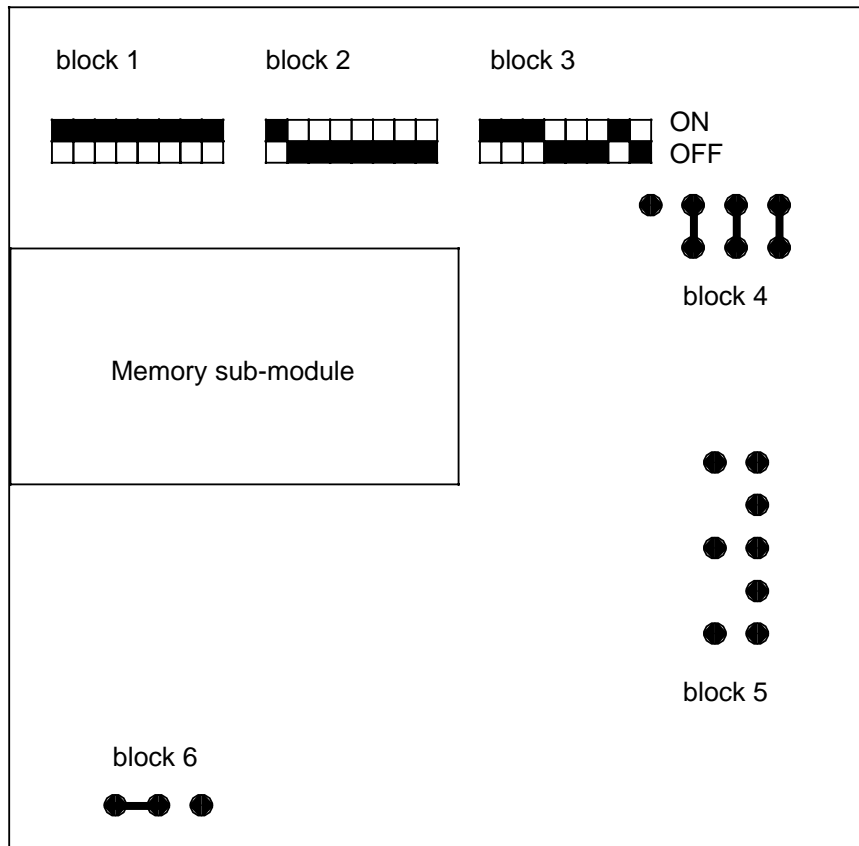
4.3.2 Example Settings

The DPR start address is E400 in the memory address window, and is 256 B long.
Note - Block 11 Setting varies according to version.



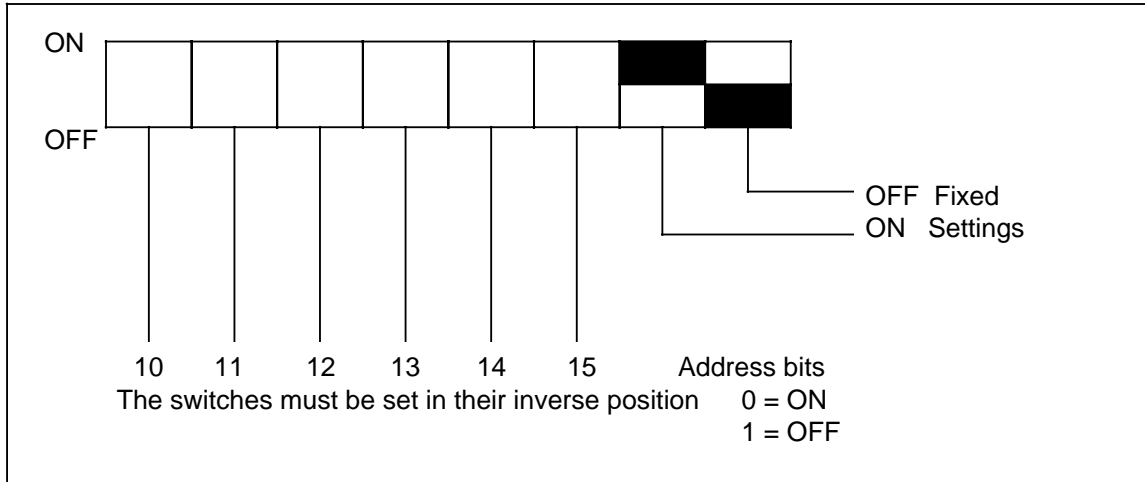
4.3.3 Versions Pre Mid 1985

MLFB: 6FM1 463-3AA10

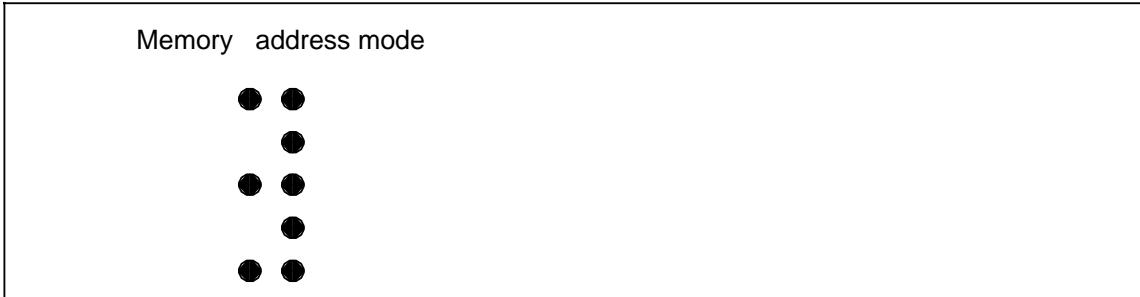


Factory pre set to: DPR address E000H, DPR size 256 B.

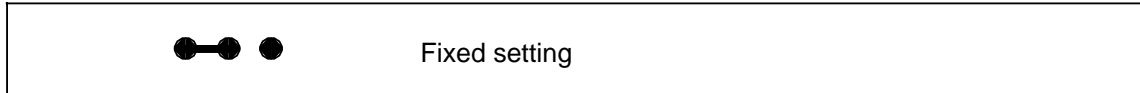
Block 3: The DPR start address is set via switches S1-6.
 The two remaining switches must remain in their factory set positions.



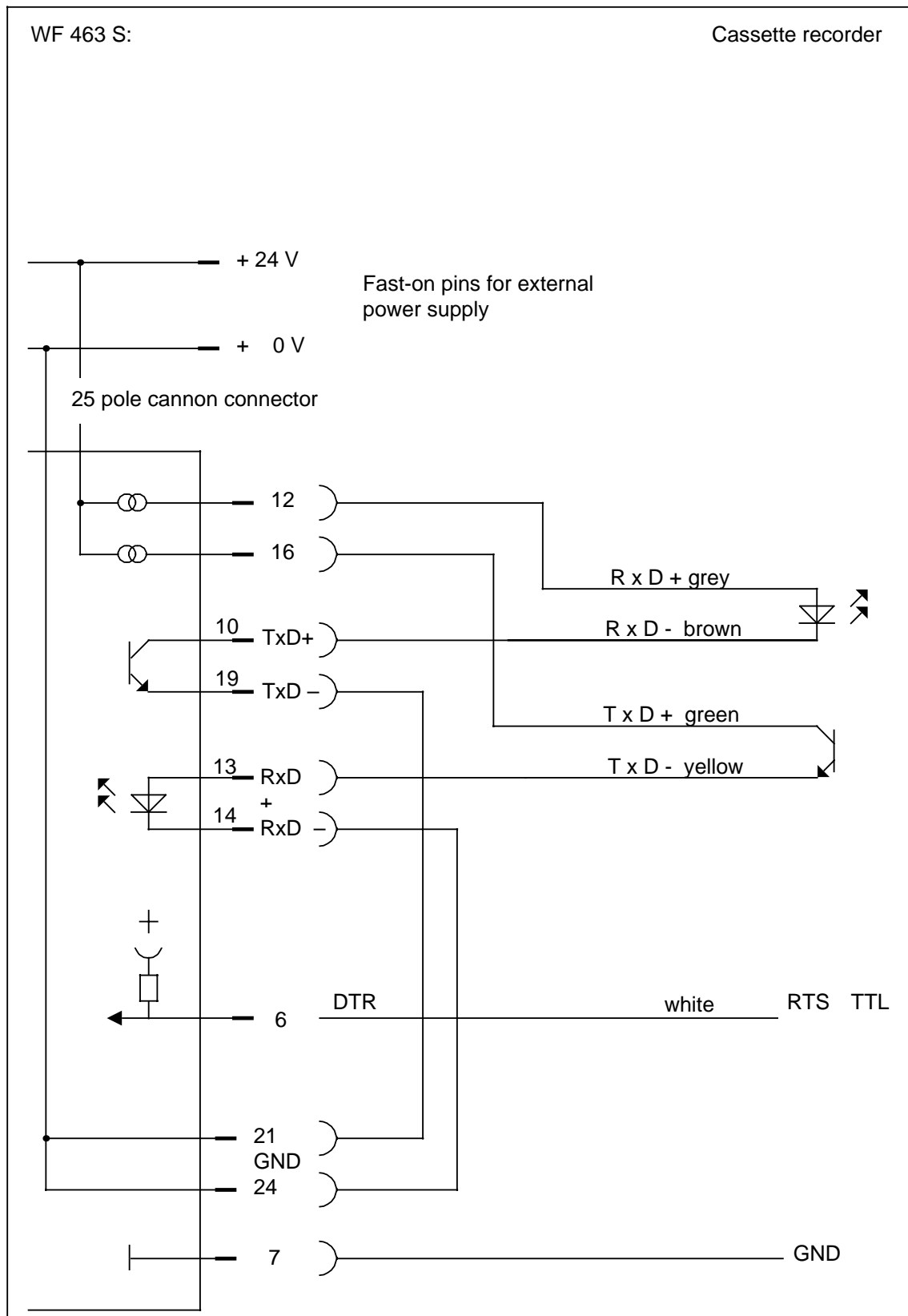
Block 5:



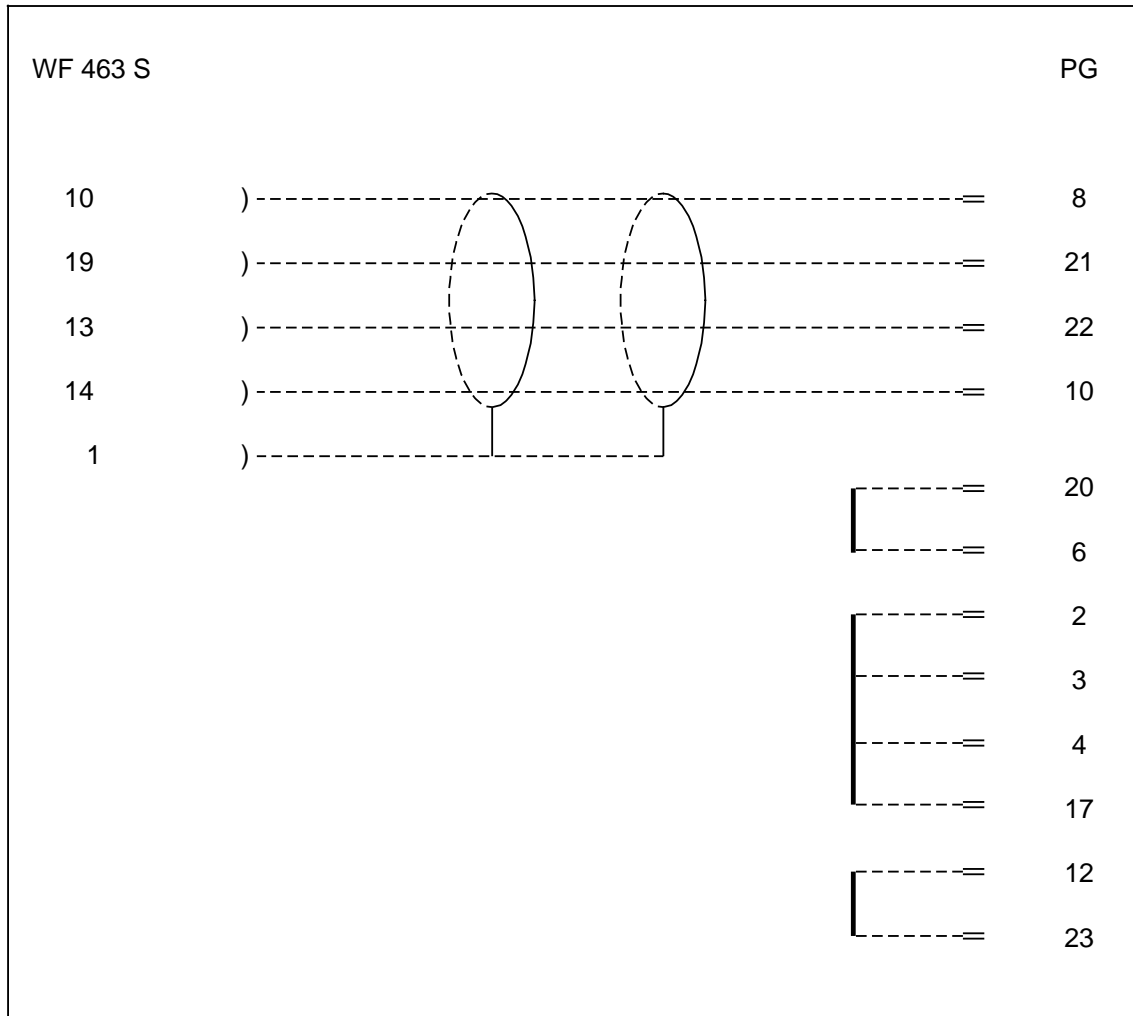
Block 6:



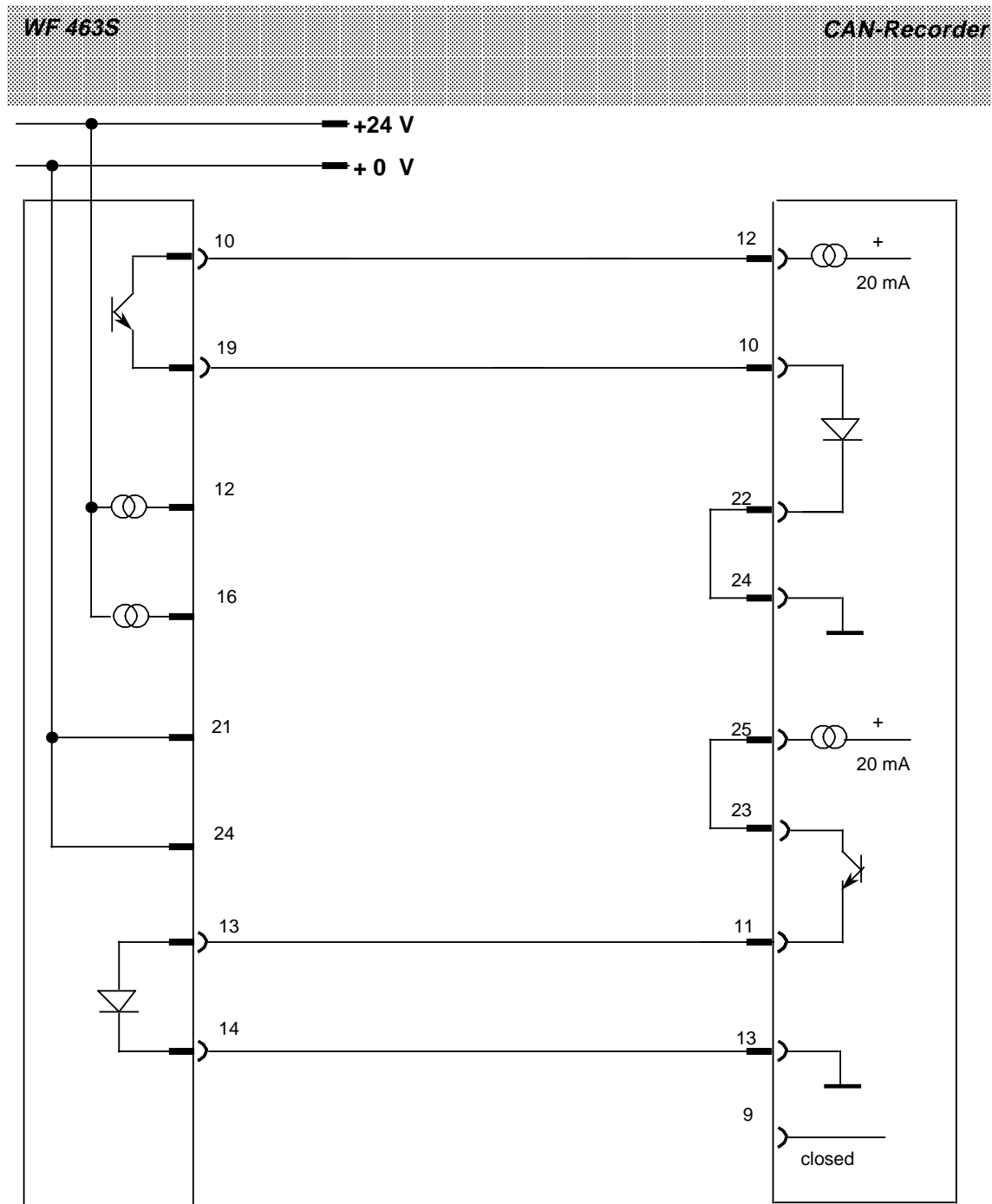
4.4 Serial interface connection to data cassette recorder



4.5 Cable connection diagram



4.6 Connection diagram for DISK drive (desk mounted version)

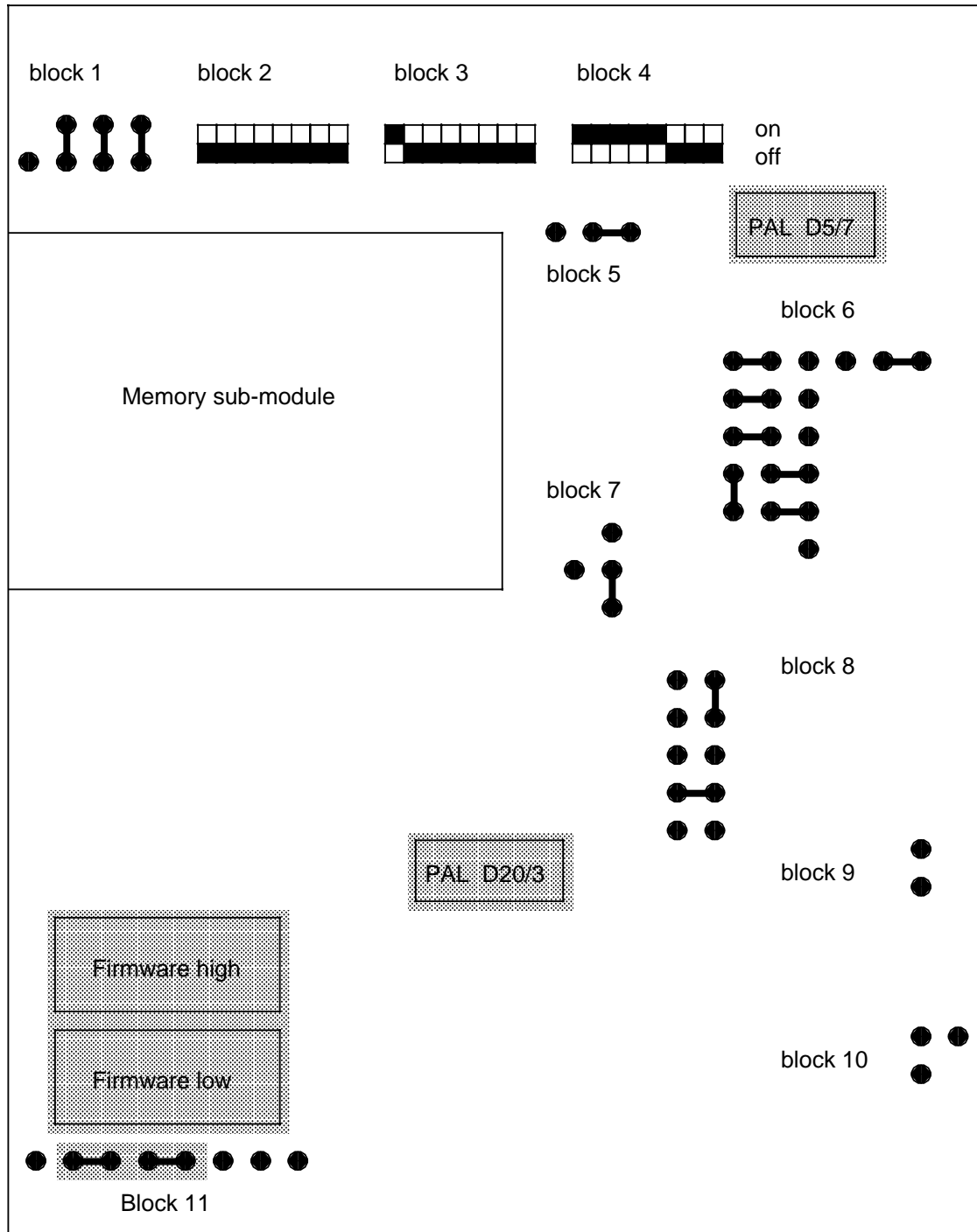


The panel mounted versions are supplied complete with a 2 m long cable. The desk top versions require a separate cable.

This pin layout applies from version 17N00.

4.7 Switch settings from versions mid 1987

MLFB: 6FM1 463-3SA20



Note: All changes from 1985 version are highlighted in grey.

5 Ordering Data

1. 6FM1463-3SA20 Module WF 463 S

The following must only be ordered when the system is upgraded:
6FM1463-7SA10 Firmware (exists on the module)

2. 6ES5377-0AB21 RAM module 32 kByte
6ES5377-0AB31 RAM module 64 kByte
6ES5377-0AA41 EPROM module 32 kByte

Modules according to SIMATIC catalogue.

3. 6FM1490-1B 00 Connection cable PG - WF 463 S
The cables are identical to the ones used by the WF 470.

A= 2 m
B= 5 m
C= 10 m
D= 18 m
F= 35 m

4. Software for SIMATIC S5:
6FM1463-6UA20 for S5 115 U
6FM1463-6UB20 for S5 135 U
6FM1463-6UD20 for S5 150 U
6FM1463-6UC20 for S5 155 U

5. Data recorder:
Sanyo ZE 601 or CR 232 Option 4

To be obtained from: Fa. INDEXIM GmbH
Friedrichsthaler Weg 12
13467 Berlin
Tel.: 030/4 04 50 64
Fax.: 030/4 04 02 25

Floppy disk drive:
To be obtained from: Fa. CAN Computeranwendungen GmbH
Maybachstraße 3
78467 Konstanz
Tel.: 07531/50077
Fax.: 07531/50079

The disk drive can be delivered in three mechanical versions. For every version, there are two types with different memory capacity:

Desk top model: NTC-FD/WF 463 S or NTC-FH/WF 463 S or NTC-07/WF 463 S
Panel-mounted version: NSCL-FD/WF 463 S or NSCL-FH/WF 463 S or NSCL-07/WF 463 S
Panel-mounted version: NCC-FD/WF 463 S or NCC-FH/WF 463 S or NCC-07/WF 463 S
19" rack mounted version: NNC-FD/WF 463 S or NNC-FH/WF 463 S or NNC-07/WF 463 S

The memory capacity is 320 kByte for FD types, 640 kByte for FH types and 720 kByte for M07 types.

Siemens AG

AUT V260
Postfach 4848
D-90327 Nürnberg
Fed. Rep. of Germany

Suggestions/Corrections

For Publication/Manual:
Equipment for Machine Tools
WF 463 S
External Data Memory

Description
Order No.: 6ZB5 440-0JG02-0BA1
Edition: 11.92

From:

Name _____
Company/Dept. _____
Address _____
Telephone /

Should you come across any printing errors when reading this publication, please notify us on this sheet. Suggestions for improvement are also welcome.

Suggestions and/or corrections: