

BALLUFF

Software- Description

BIS M-4008

Function Block S7-300/400



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1 INTRODUCTION

This function block is an example for the communication with a BIS M-4008 processor unit. The example is free of charge. The FB 32 is optimized for reading high memory data carriers up to 128kByte. Please test carefully if the FB is suitable for your application! This function block enables a communication between a Balluff - BIS M-4008 processor and a Simatic® S7-300/400 PLC.

The following commandos are supported:

- Read data carrier
- Write data carrier
- Store Auto Read start address
- Type and serial number
- Copy data between data carrier
- Initialize CRC_16 data check
- Write constant value to data carrier

For each read/write head the function block has to be called with an own instance data block.

ATTENTION

Please test carefully if the used commandos are supported by the BIS processor and the read/write head!

If an existing function block is replaced by this, the instance data block has to be re-generated, because the static variables have been extended.

1.1 General Data

Function block name:	FB32
Instance data block:	(an own instance data block has to be setup for each antenna or r/w head)
Invoked blocks:	SFB4 TON
Reserved memory bits:	none
Reserved Timers:	none
Reserved Counters:	none
I/O length:	16 - 254 byte
Invoke:	absolute
Device compatibility:	Siemens Simatic® S7 300/400 with SIMATIC Manager

1.2 Recommendations of FB invoke

The function block should be called only once for each read/write head. Multiple calls of the function lock at the same time are not allowed.

If the function block is conditionally called and the calling condition is false before FB sets it **Ready** output, the **Init** input have to be set.

If the PLC restarts the **Init** input have to be set for one cycle. FB parameters could be attached dynamic if necessary.

2 COMMISSIONING

The I/O data length of the processor unit depends on the available in-/outputs in the PLC (maximum 254 bytes). Modules of the same length have to be used for process data input and output.

2.1 DB parameter

The maximum read/write data length of the function block is 131,068 bytes. Data length that exceed 65,534 byte, have to use a second data block. The DB numbers have to be assigned as input parameter of the FB. For the most S7 CPU the send/receive data block has to be set to non-retain, because the retain memory size is 128 kByte.

The data blocks for transmitting and receiving data have to be adjusted in size according to the parameters **Offset_DBSend**, **Offset_DBReceive** and **TAG_NumbOfByte**.

2.2 Device parameter for BIS M-4008

Same values for the parameters **Dynamic Mode**, the **I/O start address** and the **IO length** have to be set in HW configuration and for FB call!

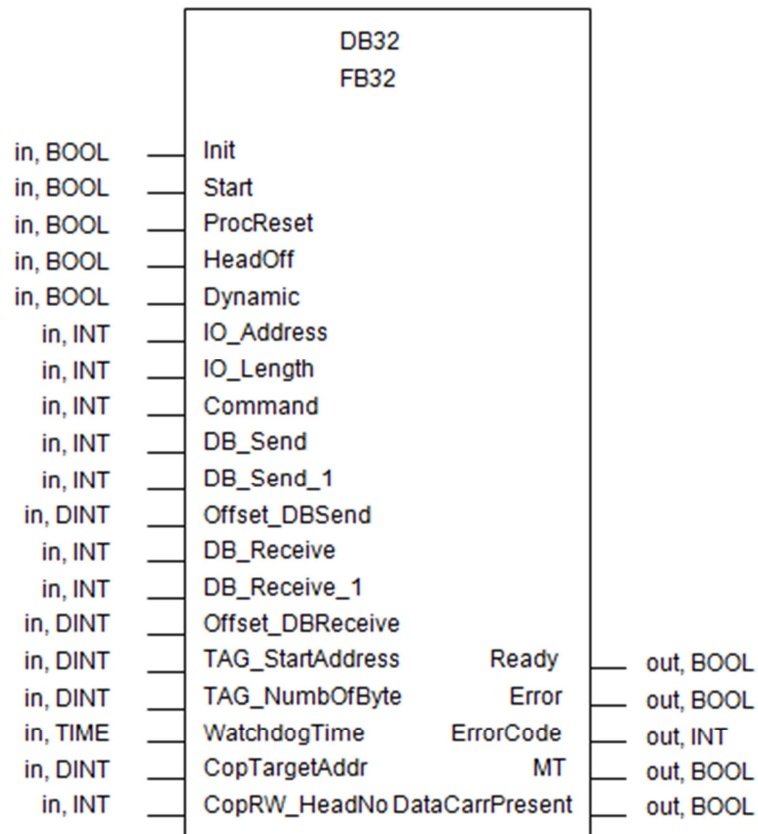
RFID Head Parameter:

CRC	disable	=	Not active
	enable	=	The CRC check is a procedure for determining a check value for data in order to be able to recognize transmission errors.
Dynamic Mode	disable	=	Dynamic mode deactivated. Error number 1 is applied if job is started without tag
	enable	=	The processor unit accepts the job and stores it regardless of whether a tag is in the active zone or not. If the tag enters the active zone the stored job is run.
Type and Serial Number	disable	=	First bytes of data carrier are displayed.
	enable	=	the type of the read/write head and serial number are displayed when CP occurs
Slow Tag Detection	disable	=	Default, fast tag detection
	enable	=	The antenna is switched on for tag detection only every 200ms

More information concerning the parameters is available in the BIS manual.

3 FB PARAMETER DESCRIPTION

3.1 FB illustration S7-300/400



3.2 Input parameter

Init	Function block initialization Must be set for one cycle each time the PLC is restarted. Static variables, control bits and upcoming commandos are reset. The function is done when Ready is set again.
Start	Start function Start = 1 starts a job. This signal must be set until the Ready output goes to 0. The function is done when Ready or Error is set again.
ProcReset	Reset function block and r/w head ProcReset = 1 sets the function block and ground state r/w head. The signal must be set until the Ready parameter goes to false. The function is done when Ready is set again. The processor unit needs a few seconds for a reset sequence!
HeadOff	Head power is switched off.
Dynamic	Activation or deactivation of the WatchdogTime for dynamic mode Dynamic = 0: Watchdog Timer is on Dynamic = 1: Watchdog Timer is off

3 FB PARAMETER DESCRIPTION

	If the Dynamic Mode is used, the watchdog timer has to be disabled.
IO_Address	Start address of the in-/ output range of the PLC. The address may lie in the normal I/O range of the PLC or in the peripheral range.
IO_Length	Length of the in-/ output range, specified in byte. The value has to be set assuming parameterization in HW configurator.
Command	Job type Command = 81 _{hex} : Read data carrier (USER-data) Command = 82 _{hex} : Write data carrier (USER-data) Command = 87 _{hex} : Store Auto Read start address Command = 09 _{hex} : Type and serial number Command = 91 _{hex} : Copy Data between data carrier Command = 92 _{hex} : Initialize CRC_16 data check Command = B2 _{hex} : Write constant value to data carrier
DB_Send	Data block for write data, Tag byte 0-65,553
DB_Send_1	Data block for write data, Tag byte 65,554-131,068
Offset_DBSend	Start address for write data in the data block
DB_Receive	Data block for read data
Offset_DBReceive	Start address of read data in the data block
TAG_StartAddr	Write/read start address in the data carrier or parameter number.
TAG_NumbOfByte	Length in the code tag for read or write procedures. For the jobs 81 (read), 82 (write), 91(copy), 92(CRC init), B2 write constant value, length have to be set there.
WatchdogTime	Monitoring timer for commands
CopTargetAddr	Copy data carrier. Start address target data carrier
CopRW_HeadNo	Copy data carrier. Number of read/write head that target data carrier is in front of

3 FB PARAMETER DESCRIPTION

3.3 Output parameter

Ready	Job completed This bit is set when the job was completed. This output will be reset by a rising edge of Start or Reset input.
Error	Job completed with error This bit is set if the job was completed with an error and is reset with a rising edge at Reset or Start input.
ErrorCode	If the Error bit is set, the error number will be displayed here as hex value.
MT	Notification Multiple Tags are detected, more than one data carrier in range of antenna.
DatCarrPresent	Data carrier present / data valid. This bit is only true when a tag is activated from processor. A positive edge of the codetag present signal means data are available starting with address 0 of the code tag in the input buffer of the instance data module without requiring that a read request be initiated. The length of data to be read, is the buffer size of read/write head minus 2 (bit headers).

3.4 General error codes

Error No.	Meaning	Effect	Remedy
00 _{hex}	No error		
01 _{hex}	No data carrier in range of antenna	Depends on parameter Dynamic	Check distance between code tag and read/write head
02 _{hex}	Read error	Command canceled. Processor- and FB go to base state.	Check distance between code tag and read/write head
03 _{hex}	Read canceled because data carrier was removed	Command canceled. Processor- and FB go to base state.	Check distance between code tag and read/write head. and read/write head. For dynamic mode: Check velocity
04 _{hex}	Write error	Command canceled. Processor- and FB go to base state Command Caution: Some data may have already been written to the code tag	Check distance between code tag and read/write head
05 _{hex}	Write canceled because data carrier was removed	Command canceled. Processor- and FB go to base state Command Caution: Some data may have already been written to the code tag	Check distance between code tag and read/write head. and read/write head. For dynamic mode: Check velocity

Function Block description for BIS M-4008

3 FB PARAMETER DESCRIPTION

Error No.	Meaning	Effect	Remedy
07 _{hex}	Wrong command identifier (Job) or number of bytes for read/write command is 0.	Processor- and FB go to base state.	Check parameter settings
09 _{hex}	Cable break on selected read/write head, r/w head not connected or r/w head defective.	Command canceled. Processor- and FB go to base state.	Check r/w head
0D	Communication to the R/W head disrupted.	Command canceled. Processor- and FB go to base state.	Check r/w head
0E _{hex}	CRC for the read data and CRC for the data carrier do not agree.	Command canceled. Processor- and FB go to base state.	Check data carrier
0F _{hex}	Bit headers are not equal	Processor and FB go to base state.	Check programming and content of bitheaders, I/O Addresses correct.
20 _{hex}	Address assignment of the read/write job is outside the memory range of the data carrier.	Processor and FB go to base state.	Check programming
21 _{hex}	This function is not possible for this data carrier	Processor and FB go to base state.	Check data carrier

This error list is corresponding to the status codes in user's manual.

3.5 FB internal error codes

Error No.	Meaning	Effect	Remedy
30 _{hex}	Monitoring time expired	Processor and FB go to base state	Check programming
31 _{hex}	Undefined command	Processor and FB go to base state	Check programming
32 _{hex}	R/W length exceeds the limit	Processor- and FB go to base state	Check programming Limit 131.068

3 FB PARAMETER DESCRIPTION

3.6 Description of commandos

The commandos are selected by a hexadecimal value at the “**Command**” input. With a rising edge at “**Start**” input the commando is executed. After successful execution the “**Ready**” Output is true and “**Error**” is false.

Read data carrier 81_{hex}:

Data carrier is read from “**TAG_StartAddr**”. The amount of data is defined by the parameter “**TAG_NumbOfByte**”. The data are stored in “**DB_Receive**”. The byte offset is defined by the parameter “**Offset_DBReceive**”.

Write data carrier 82_{hex}:

The data are read out of “**DB_Send**” and written to carrier at the byte “**TAG_StartAddress**”. The amount of data is defined by the parameter “**TAG_NumbOfByte**”.

Store start address for “Auto Read” function 87_{hex}:

The “Auto Read” start address is stored in the processor EEPROM. The “Auto Read” start address is defined by the parameter “**TAG_StartAddress**”.

Type and serial number 09_{hex}:

Read the read/write head type, data carrier type and UID of data carrier in the field. The dates are stored in “**DB_Receive**”. The ReadByte [0] contains the UID length information, ReadByte [1] contains the head type, ReadByte [2] contains the data carrier type, ReadByte [3..n] contains the UID. The amount of bytes stored in ReadByte[0] are transferred to data-block.

Copy data between data carrier 91_{hex}:

Data carrier is read from “**TAG_StartAddress**”. The amount of data is defined by the parameter “**TAG_NumbOfByte**”. The data are copied too the r/w head selected with FB input “**CopRW_HeadNo**”. The data are moved to the target data carrier, starting at “**CopTargetAddr**”.

Initialize CRC 16 data check 12_{hex}:

The data are read out of “**DB_Send**” and written to carrier at the byte “**TAG_StartAddress**” with CRC_16 checksum. The amount of data is defined by the parameter “**TAG_NumbOfByte**”. Parameter CRC must be selected for data carrier initialization, otherwise the command behaves the same as 02_{hex} write data carrier.

Write constant value to data carrier 32_{hex}:

Constant values are written to data carrier the parameter for start byte on tag is “**TAG_StartAddress**”. The amount of constant values is defined by the parameter “**TAG_NumbOfByte**”. The data byte for constant value is read from “**DB_Send**”.

Please refer to the device manual for further information.

4 DIACLAIMER OF LIABILITY

This demo function block is free of charge and is a universal application example. This demo function block shall help program and configure PLC applications and shall provide possible solutions.

The user is not entitled to claim for warranty, error correction and updates. In particular there is excluded any claims against Balluff GmbH for damages that might result from the use of this demo program. Excluded from this limitation of liability shall be (a) those damages that are based on injury to life, limb or health, (b) a liability according to the Produkthaftungsgesetz (German Product Liability Law) and (c) cases of willful intent.

Please check if the function block is intended for your application before adapting it in plants and machineries.

By using the S7 sample, made available free of charge you accept the limitation of warranty and liability!

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