Product:	**OIT...-F113-B12-CB.**
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SIMATIC S7 Demo FB for EASY Mode Operation

To activate the EASY Mode with the OIT System, the connection needs to be established via the die TCP/IP port 10100 from the PLC to the OIT System.
If this connection is established, the OIT now operates automatically in the EASY-Mode. This means that it is waiting for a trigger signal then it takes a picture of the code plate and sends a response telegram.

The trigger signal could either be given via a trigger sensor, which is connected to the trigger input connector of the OIT System, or a trigger command, send from the PLC. The trigger sensor could be any PNP NO sensor, e.g. a proximity switch from Pepperl+Fuchs with an E2 output. A rising edge will activate the reading.

To start a reading via a trigger command, the PLC needs to send a telegram which consists of a Start character '#', the command 'R' and the termination sequence CR + LF.

After every operation the OIT System sends a 14 byte telegram to the PLC.
The telegram consists of a Start character '#', a 6-digit code, 4 byte Status information, a checksum character and the termination sequence CR + LF.
If the code plate could not be read properly, instead of the 6-digit code number the error code 'NOREAD' appears.

Communication OIT -> SPS

Response telegram for ‚Codeplate detected' OIT->SPS:

Byte 0	Byte 1-6	7-10	Byte 11	Byte 12	Byte 13
Start delimiter	Code number	Status	Checksum	End delimiter 1	End delimiter 2
# (23 hex)	000001-999999 (ASCII)	See status table	Value x	CR (0D hex)	LF (0A hex)

Response telegram ‚Codeplate not detected' OIT->SPS:

Byte 0	Byte 1-6	7-10	Byte 11	Byte 12	Byte 13
Start delimiter	Code number	Status	Checksum	End delimiter 1	End delimiter 2
# (23 hex)	NOREAD (ASCII)	See status table	Value x	CR (0D hex)	LF (0A hex)

Checksum Calculation:

Definition x = unsigned byte

X = Byte0 XOR Byte1
X = X XOR Byte2
.
.
.
X = X XOR Byte9
X = X XOR Byte10

Byte 11 = Value X

Status table (Bytes 7-10):

1 = active and 0 = not active.

Byte				Group messages	sub group messages
7	8	9	10		
bin	bin	bin	hex		
Bit 0				General information	OITControl client connected
Bit 1					Parameterization lock active
	Bit 0			Task could not started or is not running	HTTP-Server not running
	Bit 1				FTP-Server not running
	Bit 2				NTP-Client not running
	Bit 3				Logging Program not running
	Bit 4				Data Matrix Decoder not running at power on
	Bit 5				Decoder not running
		Bit 0		OIT warnings	Camera picture too bright
		Bit 1			Camera picture too dark
		Bit 2			Too many structures in the picture
		Bit 3			Distance between code carrier and OIT system too big
		Bit 4			Distance between code carrier and OIT system too small
		Bit 5			Bad contrast
		Bit 6			Code carrier close to border of detection range
			0x01	OIT status messages	No punched holes found
			0x02		Few punched holes found, loop 1
			0x03		Few punched holes found, loop 2
			0x04		No check marks found in range, check 1
			0x05		Decryption not possible, check 1
			0x06		No check marks found in range, check 2
			0x07		Contrast too low
			0x08		No check marks found in range, check 3
			0x0A		No check marks found in range, check 4
			0x0B		Decryption not possible, check 2
			0x0F		Checksum error
			0x2A		Timeout
			0x31		Code plate has poor quality
			0x32		Timeout
			0x33		Timeout
			0x99		Max. repeat of code reached (multiple reads of same code plate)
			0x9A		Disconnect in process
			0xFE		No valid data from PLC

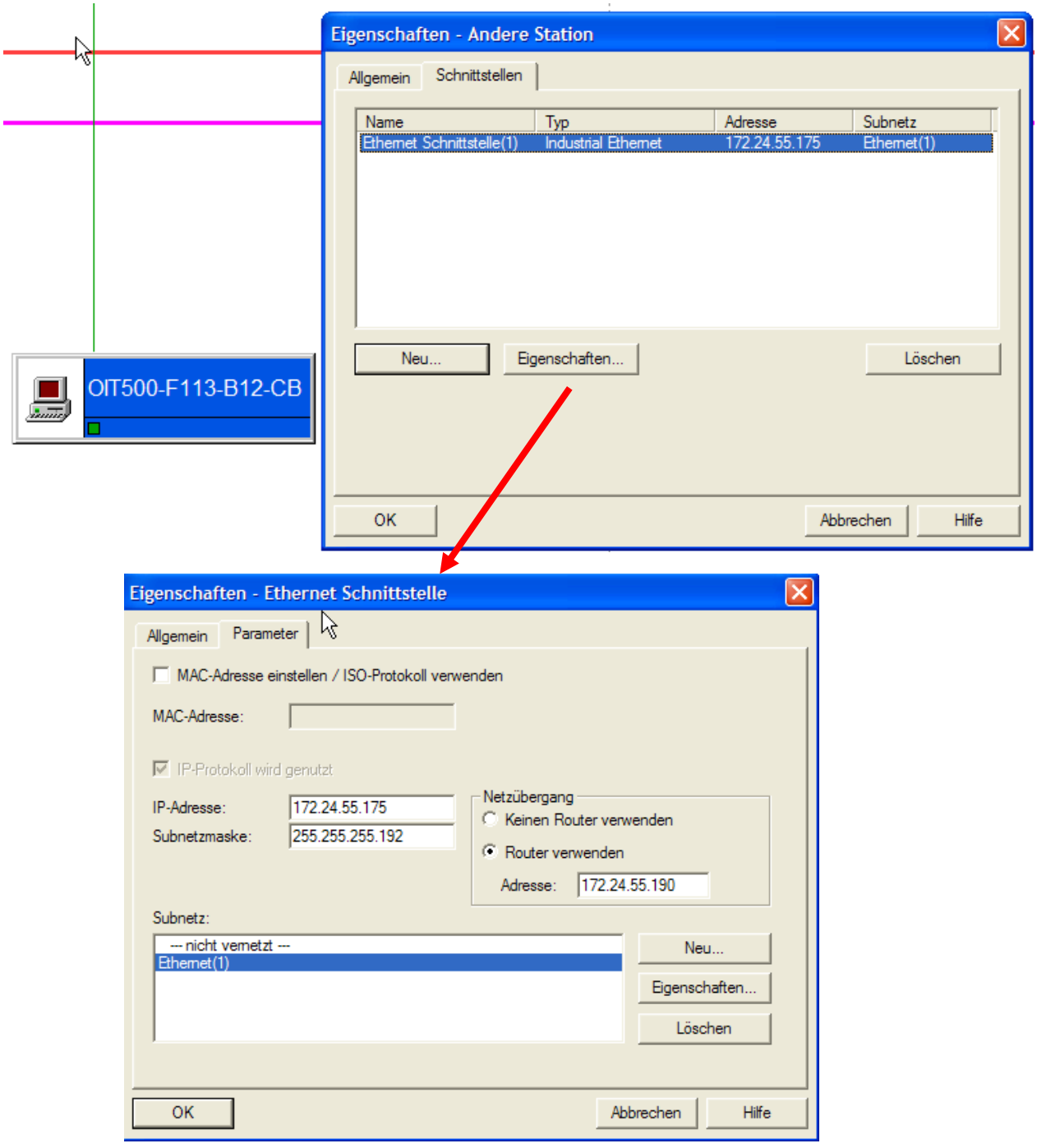
Communication SPS -> OIT

Trigger Telegram SPS->OIT:

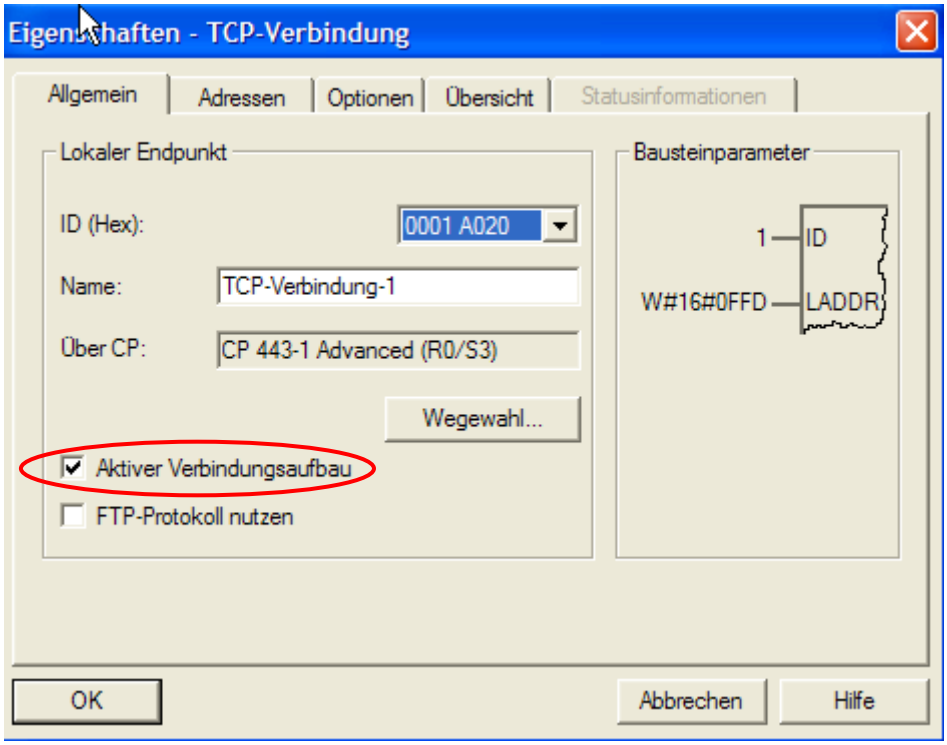
Byte 0	Byte 1	Byte 2	Byte 3
Start delimiter	Command Read code	End delimiter 1	End delimiter 2
# (23 hex)	R (52 hex)	CR (0D hex)	LF (0A hex)

Commissioning of OIT…-F113-B12-CB with S7 PLC, using the EASY Mode

1. Setting up the network connection
Enter IP-Address and Subnet mask values
Default settings of OIT System are 192.168.0.65 and 255.255.255.0

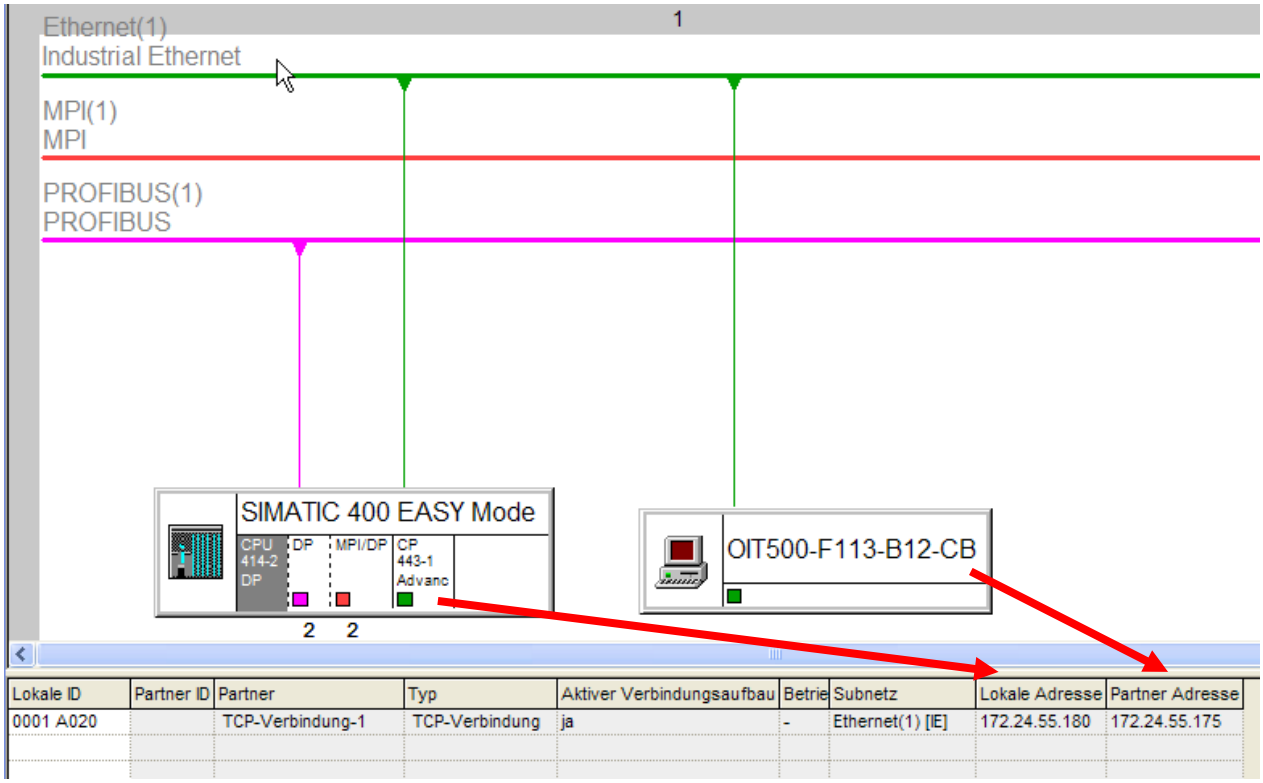


The OIT System operates as a server, so the option ‘Active Connection Establishment’ needs to be activated. Insert values for the parameter ID and LADDR.



The EASY Mode requires a connection via Port 10100.

Sample allocation of Demo project.



2. Demo Function blocks FBxx

The Demo Functions block evaluates the response telegram from the OIT System and sets the flags for further data processing.

Our Demo Function block is realized as Multi-instance FB and uses the following standard FBs from Siemens:

FC50	AG_LSEND	Send TCP Telegram
FC60	AG_LRECV	Receive TCP Telegram
SFC21	FILL	Initialize a Memory Area

If there are new data available, the output ‘NewData’ will be set for one PLC cycle. If the reading was successful, the flag ‚ReadOK‘ is set to ‚1‘ and the ID Code is available in the ‘IDCode’ data area. If the reading failed, the flag ‚ReadError‘ is set instead.

The reading of the code plate could be started in two ways: Either via a signal from a sensor, connected to the trigger input – or via software by setting the input flag ‘ReadCode‘ (positive slope)
A rising slope on the input flag ‚ResetData‘ deletes the FB flags and the data.

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OB1 :   "Main Program Sweep (Cycle)"
Kommentar:

Netzwerk 1: OIT EASY Mode
Kommentar:

      CALL  FB    94 , "DB94"
       OIT_ID       :=1
       OIT_LADDR    :=W#16#FFD
       StartReadCode:="OIT Read Code"
       ResetData    :="OIT ClearData"
       ReadOK       :="OIT Read OK"
       Busy         :="OIT Busy"
       ReadError    :="OIT Read Error"
       NewData      :="OIT NewData"
       IDCode       :="DB100".Code
```

The ‚Busy‘ output flag behaves different, depending if the reading is started via a trigger sensor (hardware) or via trigger command (software).

Status information of the OIT Systems are available in the response telegram and could be found in the Instance-datablock ‘OIT_recv’ (see status table on page 3).

OIT_recv.OIT_Read[8]
OIT_recv.OIT_Read[9]
OIT_recv.OIT_Read[10]
OIT_recv.OIT_Read[11]

Reading activated via trigger sensor:

Cycle 1:

Inputs:

ResetData	= 1	Initialize Function Block
StartReadCode	= 0	

Outputs:

ReadOK	= x
Busy	= 0
ReadError	= x
NewData	= 0
IDCode	= Last value

(Reset after FB call)

ResetData	= 0

Cycle 2:

Inputs:

ResetData	= 0
StartReadCode	= 0

Outputs:

ReadOK	= 0
Busy	= 0
ReadError	= 0
NewData	= 0
IDCode	= Last value

Cycle 3: Reading attempt via trigger sensor

Inputs:

ResetData	= 0
StartReadCode	= 0

Outputs:

ReadOK	= 0
Busy	= 0
ReadError	= 0
NewData	= 0
IDCode	= Last value

Cycle 4a: **Reading was successful**

Inputs:

ResetData	= 0
StartReadCode	= 0

Outputs:

ReadOK	= 1
Busy	= 0
ReadError	= 0
NewData	= 1 set for one cycle
IDCode	= New ID Code

or Cycle 4b: **Reading was not successful**

Inputs:

ResetData	= 0
StartReadCode	= 0

Outputs:

ReadOK	= 0
Busy	= 0
ReadError	= 1
NewData	= 1
IDCode	= Data deleted

Cycle 5a: **Reading was successful**

Inputs:

ResetData	= 0
StartReadCode	= 0

Outputs:

ReadOK	= 1
Busy	= 0
ReadError	= 0
NewData	= 0
IDCode	= New ID Code

or Cycle 5b: **Reading was not successful**

Inputs:

ResetData	= 0
StartReadCode	= 0

Outputs:

ReadOK	= 0
Busy	= 0
ReadError	= 1
NewData	= 0
IDCode	= Data deleted

Operand	Symbol	Anzeigeformat	Statuswert
M 100.0	"OIT Read Code"	BOOL	false
M 100.6	"OIT ClearData"	BOOL	false
M 100.3	"OIT NewData"	BOOL	false
M 100.1	"OIT Read OK"	BOOL	true
M 100.2	"OIT Busy"	BOOL	false
M 100.7	"OIT Read Error"	BOOL	false
DB100.DBB 0	"DB100".Code[1]	ZEICHEN	'9'
DB100.DBB 1	"DB100".Code[2]	ZEICHEN	'1'
DB100.DBB 2	"DB100".Code[3]	ZEICHEN	'7'
DB100.DBB 3	"DB100".Code[4]	ZEICHEN	'5'
DB100.DBB 4	"DB100".Code[5]	ZEICHEN	'0'
DB100.DBB 5	"DB100".Code[6]	ZEICHEN	'3'

Reading activated via trigger telegram:

Cycle 1:

Inputs:

ResetData	= 1	Initialize Function block
StartReadCode	= 0	

Outputs:

ReadOK	= x
Busy	= 0
ReadError	= x
NewData	= 0
IDCode	= Last value

(ResetData after FB call)

ResetData	= 0

Cycle 2:

Inputs:

ResetData	= 0
StartReadCode	= 0

Outputs:

ReadOK	= 0
Busy	= 0
ReadError	= 0
NewData	= 0
IDCode	= Last value

Cycle 3: StartReadCode performs sending of trigger Telegram

Inputs:

ResetData	= 0
StartReadCode	= 1

Outputs:

ReadOK	= 0
Busy	= 0
ReadError	= 0
NewData	= 0
IDCode	= Last value

(Reset of StartReadCode after FB call)

StartReadCode	= 0

Cycle 4: OIT System starts operation

Inputs:

ResetData	= 0
StartReadCode	= 0

Outputs:

ReadOK	= 0	
Busy	= 1	Signals that OIT is in operation
ReadError	= 0	
NewData	= 0	
IDCode	= Last value	

Cycle 5a: **Reading was successful**

Inputs:

ResetData	= 0
StartReadCode	= 0

Outputs:

ReadOK	= 1
Busy	= 0
ReadError	= 0
NewData	= 1 set for one cycle
IDCode	= New ID Code

or Cycle 5b: **Reading was not successful**

Inputs:

ResetData	= 0
StartReadCode	= 0

Outputs:

ReadOK	= 0
Busy	= 0
ReadError	= 1
NewData	= 1
IDCode	= Data deleted

Cycle 6a: **Reading was successful**

Inputs:

ResetData	= 0
StartReadCode	= 0

Outputs:

ReadOK	= 1
Busy	= 0
ReadError	= 0
NewData	= 0
IDCode	= New ID Code

or Cycle 6b: **Reading was not successful**

Inputs:

ResetData	= 0
StartReadCode	= 0

Outputs:

ReadOK	= 0
Busy	= 0
ReadError	= 1
NewData	= 0
IDCode	= Data deleted

Operand	Symbol	Anzeigeformat	Statuswert
M 100.0	"OIT Read Code"	BOOL	false
M 100.6	"OIT ClearData"	BOOL	false
M 100.3	"OIT NewData"	BOOL	false
M 100.1	"OIT Read OK"	BOOL	true
M 100.2	"OIT Busy"	BOOL	false
M 100.7	"OIT Read Error"	BOOL	false
DB100.DBB 0	"DB100".Code[1]	ZEICHEN	'6'
DB100.DBB 1	"DB100".Code[2]	ZEICHEN	'4'
DB100.DBB 2	"DB100".Code[3]	ZEICHEN	'8'
DB100.DBB 3	"DB100".Code[4]	ZEICHEN	'7'
DB100.DBB 4	"DB100".Code[5]	ZEICHEN	'3'
DB100.DBB 5	"DB100".Code[6]	ZEICHEN	'5'