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Clock Synchronization between a HMI Operator Panel and a SIMATIC PLC

WinCC V13, Comfort Panels, S7-1200/S7-1500 und S7-300/S7-400 CPUs

https://support.industry.siemens.com/cs/ww/en/view/69864408

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1.1 Introduction

1 Task

1.1 Introduction

In order for components, such as, for example, HMI operator panels and SIMATIC controllers to work in a plant with identical time, one of the listed components has to be the timer for all other components.

- The component acting as timer is called clock master.
- The time receiving components are clock slaves.

The application shows the respective options of clock synchronization and their implementation in the program.

Select the clock synchronization you would like to use, based on the chapters.

1.2 Overview of the automation task

The figure below provides an overview of the automation task.

Figure 1-1



Description of the automation task

There are several HMI operator panels in a plant that exchange data with a SIMATIC controller.

The following tasks are to be implemented:

- 1. In the first job, a HMI operator panel is to be the timer component (HMI operator panel \rightarrow SIMATIC controller).
- 2. In the second job, a SIMATIC controller is to be the timer component (SIMATIC component \rightarrow HMI operator panel).

2.1 Solution overview

2 Solution

2.1 Solution overview

WinCC TIA Portal offers various solutions for the tasks described in chapter 1. The solutions depend on

- the SIMATIC controller.
- used and the required clock synchronization.
- used HMI operator devices.

The figure below shows the different clock synchronization options schematically between the listed HMI operator panels and SIMATIC controllers.

HMI operator devices:

- Multi Panels
- Mobile Panels
- Basic Panels
- Comfort Panels
- RT Advanced

Table 2-1

	S7-1200	S7-1500	S7-300	S7-400
HMI time synchronization (Master)	X ¹	X²		
HMI time synchronization (Slave)	X ³	X ⁴		
Area pointer: Date/time	Х	Х	Х	Х
Area pointer: Date/time PLC	Х	Х	Х	Х
Area pointer: Job mailbox 14 and 15	Х	Х	Х	Х

In the further course the individual "clock synchronizations" are described in more detail.

¹ Except Basic Panels

² Except Basic Panels

³ At WinCC V12 also Basic Panels

⁴ At WinCC V12 also Basic Panels

2.2 Description of the core functionality

Delimitation

This application does not include a description of...

- the SIMATIC controller used
- the HMI operator panels used
- the configuration interface of WinCC V13

Basic knowledge of these topics is assumed. If required, please refer to the appropriate manuals (\underline{Link}).

Required knowledge

For the implementation of the clock synchronization via area pointer, basic knowledge of STEP 7 configuration is assumed.

2.2 Description of the core functionality

For the various clock synchronization options, an example project is included for each application. In the further course of the application the individual projects are described in detail.

You can adjust the configurations to your wishes to your tasks or copy the respective blocks.

The following types of clock synchronization are described.

- Project_01 (includes two projects):
 - HMI time synchronization (master).
 In this application the HMI operator panel is the timer component.
 - HMI time synchronization (slave). In this application the SIMATIC controller is the timer component.
- Project_02: Area pointer: Date/Time. In this application the HMI operator panel is the timer component.
- Project_03: Area pointer: Date/Time PLC. In this application the SIMATIC controller is the timer component.
- Project_04: Area pointer: Control job 14 and 15. In this application the SIMATIC controller is the timer component, whereas the time and the date of the operator panel can be synchronized irrespective from each other with the PLC system time/date.

2.3 Hardware and software components used

2.3 Hardware and software components used

The application was set up with the following components:

Hardware components

Table 2-2

Component	No.	Order number	Note
CPU S7-1200 CPU 1212C DC/DC/DC	1	6ES7 212-1AD30-0XB0	In principal all S7-1200 or S7-1500 controllers can be used.
SIMATIC S7-300 CPU 315-2 PN/DP	1	6ES7 315-2EH14-0AB0	In principal all S7-300 or S7-400 controllers can be used.
TP1200 Comfort Panel	1	6AV2124-0MC01-0AX0	In principal all WinCC (TIA Portal) operator panels can be used. See notes in the docu.

Standard software components

Table 2-3

Component	No.	Order number	Note
WinCC V13 Advanced	1	6AV2102-0AA03-0AA5	Depending on the operator panel used from WinCC V13 Basic onward.
STEP 7 Professional V13	1	6ES7822-1AA03-0YA7	The use of CPU S7-1500 from WinCC V13 onward is possible.

Sample files and projects

The following list includes all files and projects that are used in this example.

Table 2-4

Component	Note
69864408_WinCC_TimeSyn _CODE_v20.zip	This zip file contains the STEP 7 and the HMI project
The zip file includes four example projects.	
Project_01	
 HMI time synchronization (master) 	
 HMI time synchronization (slave) 	
Project_02	
 Area pointer: Date/Time PLC 	
Project_03	
 Area pointer: Date/Time 	
Project_04	
 Area pointer: Control job 14 and 15 	
69864408_WinCC_TimeSyn _DOKU_V13_en.pdf	This document.

3.1 HMI time synchronization mode

3 Basics

3.1 HMI time synchronization mode

If a S7-1200 or S7-1500 controller is selected in the WinCC Engineering System as communication partner, then one of the following options can be selected in the connection settings under "HMI time synchronization mode".

- None: No clock synchronization is used.
- Master: The operator panel specifies the time. If several operator panels are used, one operator panel is configured as "master" and all other operator panels as "slave".
- Slave: The controller specifies the time.

For this type of clock synchronization **no** other configuration steps are required.

Properties of the clock synchronization

- The operator panel can specify the time as master.
 - In the "master mode" clock synchronization takes place every time a connection is established.
- The operator panel can accept the time from the controller as slave.
 - In the "slave mode" clock synchronization is carried out every time a connection is established and then every 10 minutes.
- The first clock synchronization is performed straight after the start of runtime on the operator panel.
- The clock synchronization is only performed during the operation or runtime on the operator panel.

Restricting the clock synchronization

Clock synchronization with the "HMI time synchronization mode" function can be configured with the following operator panels:

- Basic Panels
- TP177 4
- Multi Panel 177
- Multi Panel 277
- Multi Panel 377
- Mobile Panel 277
- Mobile 277 IWLAN V2
- Comfort Panels
- Windows PC Systems with WinCC RT

3.2 Area pointer

Restrictions during configuration

- If several connections are configured to a SIMATIC S7-1200 or SIMATIC S7-1500 for an operator panel, you can only configure one connection as "slave".
- If you have enabled the clock synchronization for the operator panel as "slave", you can no longer use the "Date/time PLC" global area pointer.
- Basic Panels can only be configured as "slave".
- If you are using basic panels for the configuration, unfortunately it is not possible to simultaneously use clock synchronization via NTP and the "Date/time PLC" area pointer.
- If a controller is configured with protection type "complete protection", an
 operator panel can only poll the time, if the correct access password was
 configured on the operator panel. The access password for communication to
 a controller with protection class "complete protection" is configured in the
 "connections" editor of the operator panel. The access password has to match
 the configured password in the controller. The password for the controller is
 assigned in the properties of the controller under: "General > Protection".

3.2 Area pointer

The area pointers are centrally managed in the "Connections" editor and used for the exchange of data from certain user data areas.

The area pointers are divided into two "groups".

Area pointer

- Coordination.
- Date/Time.
- Control job.
- Data record.

These are area pointers that can be enabled separately for each configured connection. This means that if a configuration has several controller connections, the "coordination" area pointer, for example, can be assigned to "Controller_1" as well as to "Controller_2" etc. at the same time.

Global area pointer of HMI device

- Image number.
- Date/Time PLC.
- Project identification.

These are area pointers that can explicitly only be assigned to one connection. This means that if a configuration has several controller connections, the "image number" area pointer, for example, can be either assigned to "Controller_1" or to "Controller_2" but not to both at the same time.

3 Basics

3.2 Area pointer

3.2.1 Date/time (operator panel \rightarrow controller)

The area pointer is used for the transmission of date and time from the operator panel to the controller. For the implementation of the task, the "control job" area pointer is required in addition.

With the evaluation of control job "40" the operator panel writes the current date and time in the configured data area of the "Date/Time" area pointer. Details on establishing the data area can be found in chapter 4.

Note:

When you have configured the "date/time" area pointer you cannot use the "date/time PLC" area pointer.

3.2.2 Date/time PLC (controller→ operator panel)

The area pointer is used for the transmission of date and time from the controller to the operator panel.

You are using this area pointer, when the controller is master for the time.

The controller is loading the data area of the area pointer. The area pointer reads the data cyclically via the configured acquisition cycle and synchronizes itself.

Notes:

- Do not make the acquisition cycle too small.
 Recommendation: Acquisition cycle ≥ 1 minute.
 (An acquisition cycle of 1 hour is usually enough).
- When you have configured the "date/time PLC" area pointer, you cannot use the "date/time" area pointer.

Details on establishing the data area can be found in chapter 4.

3.2.3 Control job

You can transfer control jobs via the control job compartment and thus trigger functions/actions on the operator panel.

Among these functions are, e.g. setting the date and time.

Note:

In contrast to the "date/time PLC" area pointer, you can, for example, transfer the time and/or date separately from the controller to the operator panel by the control jobs 14 and 15.

Control job 14

The time from the controller to the operator device is transferred via control job 14. Details on establishing the control job compartment can be found in chapter 4.

Control job 15

The date from the controller to the operator device is transferred via control job 15. Details on establishing the control job compartment can be found in chapter 4.

3.3 PLC clock blocks

Control job 40

Date and time are transferred from the operator panel to the controller via control job 40.

Details on establishing the control job compartment can be found in chapter 4.

3.3 PLC clock blocks

System blocks used for setting and reading the PLC time

In the application the following system blocks are used for reading or setting the CPU clock.

- Reading local time "RD_LOC_T".
- Reading time "RD_SYS_T".
- Setting clock: "WR_SYS_T".

Details for the setup are available in chapter 4.

RD_LOC_T: Reading local time

With the "RD_LOC_T" instruction the current local time is read out from the CPU clock.

RD_SYS_T: Reading time

With the "RD_SYS_T" instruction the current date and the current time is read out from the CPU clock.

WR_SYS_T: Setting time

By calling "WR_SYS_T" the time and the date of the CPU clock is set.

3.4 NTP time format

The NTP (network time protocol) is a general process for the synchronization of system clocks in local and global networks.

With the NTP process, the interface of the CPU sends time requests at regular intervals (in client mode) to the NTP server in the subnet (LAN), whose addresses have to be configured. Based on the replies of the server, the most reliable and precise time is detected and synchronized. The advantage of this process is the possible clock synchronization across subnet boundaries.

The precision depends on the quality of the NTP server used.

3.5 "Date_And_Time" data format

3.5 "Date_And_Time" data format

Figure 3-1

ne DT (DA ne followir	TE_AND_T	IME) data type save ws the properties o	es the information on date and time f data type DT:	e of day in BCD format.
Length (bytes)	Format		Range of values	Example of value input
8	Date and (year-mol hour:mini	time nth-day- ute:second) ³⁾)	Min.: DT#1990-01-01-0:0:0 Max.: DT#2089-12-31- 23:59:59.999	DT#2008-10-25-8:12:34.567, DATE_AND_TIME#2008-10-25 08:12:34.567
he followir	ng table sho	ws the structure of f	the DT data type:	
Byte		Contents		Range of values
0		Year		0 to 99 (Years 1990 to 2089) BCD#90 = 1990 BCD#0 = 2000
				BCD#89 = 2089
1		Month		BCD#0 to BCD#12
2		Day		BCD#1 to BCD# 31
3		Hour		BCD#0 to BCD#23
4		Minute		BCD#0 to BCD#59
5		Second		BCD#0 to BCD#59
6		The two most sig	nificant digits of MSEC	BCD#0 to BCD#999
7 (4MSB)	1)	The least signific	ant digit of MSEC	BCD#0 to BCD#9
7 (4LSB) ²⁾ Weekday				BCD#1 to BCD#7 BCD#1 = Sunday BCD#7 = Saturday

4.1 Area pointer setup

4 Functional Mechanisms of this Application

Introduction

Below, detailed information regarding setup and data structure of the area pointer and the PLC system blocks used in the sample projects are described. This information can also be read in the online help or in the WinCC Advanced V13.0 system manual (Link).

There is furthermore a description of the details on the data and program blocks to be created.

4.1 Area pointer setup

4.1.1 Date/time (operator panel → controller)

The data area date/time has the following setup:

Figure 4-1

Data word		Most significant byte						Le	east	slgn	fica	nt by	te				
	7							0	7							0	
n+0	Reserved						Ho	our (() to 2	23)							
n+1	Minute (0 to 59)						Second (0 to 59)						Time				
n+2	Reserved										Rese	erve	ł				
n+3	Reserved						V	Veek	day	(1 to	o 7, 1	=Su	inday	y)			
n+4	Day (1 to 31)						Мо	nth (1 to	12)			Date				
n+5		Ye	ar (8	30 to	99/() to 2	29)					Rese	erve	ł			

"Date_And_Time" is used as data type in the controller. For this purpose, look at the setup of the configured DB10 in chapter 4.3.

4.1.2 Date/time PLC (controller→ operator panel)

The data area date/time has the following setup: Figure 4-2

Data word		Most significant byte			Least significant byte			
	7		0	7		•	0	
n+0		Year (80 to 99/0 to 29)			Month (1 to	o 12)		
n+1		Day (1 to 31)			Hour (0 to 23)			
n+2		Minute (0 to 59)			Second (0 to 59)			
n+3		Reserved			Reserved	Weekda (1 to 7, 1=Sunda	y y)	
n+4 1)		Reserved			Reserve	ed		
n+5 1)		Reserved			Reserve	ed		

"Struct" is used as data type in the controller. For this purpose, look at the setup of the configured DB10 in chapter 4.3.

4.1 Area pointer setup

4.1.3 Control job

The order number is in the first word of the control job compartment. Depending on the control job, up to three parameters can then be transmitted. Figure 4-3

Word	Most significant byte	Least significant byte					
n+0	0	Job number					
n+1	Parameter 1						
n+2	Parameter 2						
n+3	Parameter 3						

When the first word of the control job compartment is not equal to 0, the operator panel evaluates the control job. This is why the parameters of the control job compartment (parameter 1 to parameter 3) have to be entered and only then the order number.

If the operator panel has accepted the control job, the first word is reset to 0. At this time the execution of the control job is generally **not** yet completed.

In the controller, "Array [0..3] of Word" is used as data type. For this purpose, look at the setup of the configured DB10 in chapter 4.3.

Control job 14 (order number)

The time (BCD coded) is transmitted from the controller to the operator device with control job 14.

Parameter control job 14 Figure 4-4

No	Function	
•		
14	Setting the time (BCD coded)	
	Parameter 1	Left byte: - Right byte: hours (0-23)
	Parameter 2	Left byte: minutes (0-59) Right byte: seconds (0-59)
	Parameter 3	-

4.1 Area pointer setup

Control job 15 (order number)

The date (BCD coded) is transmitted from the controller to the operator device with control job 15.

Parameter control job 15

Figure 4-5

No	Function	
15	Setting the date (BCD code)	
	Parameter 1	Left byte: - Right byte: weekday (1-7: Sunday-Saturday)
	Parameter 2	Left byte: day (1-31) Right byte: month (1-12)
	Parameter 3	Left byte: year

Notes:

- The KTP 600 BASIC PN operator panel ignores the day of the week.
- If you are using the "date/time PLC" area pointer, the day of the week is ignored.

Control job 40 (order number)

The date (BCD coded) is transmitted from the controller to the operator device with control job 40.

Parameter control job 40

No	Function	
40	Transfer date/time to PLC	
	(in the S7 format DATE_AND An interval of at least 5 secon prevent overload of the HMI d	_TIME) ds must be maintained between two successive jobs in order to evice.
	Parameter 1, 2, 3	-

4.2 PLC clock blocks

4.2 PLC clock blocks

4.2.1 Calling clock blocks

The different clock functions can be found in the "Instructions" task card. The individual clock functions are listed under the "Extended instructions" palette. Figure 4-7

In	Instructions 🔳 🔳 🕨			
0	ptions			-=
				Inst
>	Favorites			fruc
>	Basic instructions			tion
~	Extended instructions			~ ~
Na	ime	Description	Version	
•	🛅 Date and time-of-day			3
	=- T_COMP	Compare time tags		est
	I CONV	Convert times and extract		ing
	=- T_ADD	Add times		
	🚍 T_SUB	Subtract times		
	= T_DIFF	Time difference	<u>V2.0</u>	-
	=- T_COMBINE	Combine times		Ast
	Clock functions			S
	■ WR_SYS_T	Set time-of-day		
	RD_SYS_T	Read time-of-day		
	-TIME_TCK	Read system time		ibro
	=- RTM	Runtime meters		arie
	=- SET_RTM	Set runtime meters		30
	=- CTRL_RTM	Start and stop runtime meters		
	=- READ_RTM	Read runtime meters		
	🕨 🛅 Local time			
•	🔁 String + Char			

4.2.2 RD_SYS_T: Reading time

With the "RD_SYS_T" instruction, the current date and the current time is read out from the CPU clock. The read out data is output in DT format at the OUT output of the instruction. In the output value there are no details regarding the local time zone or summer time. At the RET_VAL output you can enquire whether errors occurred during the execution of the instruction.

Parameters	Declaration	Data type	Memory area	Description
RET_VAL	Return	INT	I, Q, M, D, L	If an error occurs while the instruction is being executed, the return value contains an error code.
OUT	Output	DT	D,L	Date and time of CPU

4.2 PLC clock blocks

4.2.3 WR_SYS_T: Setting time

By calling "WR_SYS_T", you set the time and the date of the CPU clock. The clock then runs from the set time and the set date. Date and time is entered in the DT date format at the "IN" input of the instruction. To transfer the formats DATE and TOD into the required DT data format, you can use the "T COMBINE" instruction.

If the clock is a master clock, the CPU additionally starts the synchronization of the time when it is called. The synchronization intervals are set via configuration. Details on local time zone or summer time cannot be transmitted with the "WR_SYS_T" instruction.

At the "RET_VAL" output you can enquire whether errors occurred during the execution of the instruction.

Figure 4-9

Parameters	Declaration	Data type	Memory area	Description
IN	Input	DT	D, L	Date and time
RET_VAL	Return	INT	I, Q, M, D, L	Status of the instruction

4.2.4 RD_LOC_T: Reading local time

Read out the current local time from the CPU clock and output it at the "OUT" output with the "RD_LOC_T" instruction. To output the local time, the details on time zone as well as the start of the summer and winter time is used which you set when you configured the CPU clock.

Parameter	Declaration	Data type		Memory area	Description
		S7-1200	S7-1500		
RET_VAL	Return	INT	INT	M, D, L	Status of the instruction
OUT	Output	DTL	DT, LDT, DTL	D	Local time

4.3 Data block "DB10_HMI_AreaPointer" (DB10)

4.3 Data block "DB10_HMI_AreaPointer" (DB10)

DB10_HMI_AreaPointer

The DB10 includes a summarization of the possible area pointer and their data areas. For the implementation of the clock synchronization not all of the listed area pointers are required.

- "Coordination" area pointer (not used).
- "Date/Time" area pointer
- "Control job" area pointer.
- "Data record" area pointer (not used).
- "Project identification" area pointer (not used).
- "Image number" area pointer (not used).
- "Date/Time PLC" area pointer

	DBT0_HMI_AreaPointer							
	N	ame	9	Data type	Offset	Start value	Retain	Visible in
1	-	- St	atic					
2			Coordination	Word	0.0	16#0		
3			DateTime	Date_And_Time	2.0	DT#1990-01-01-00:00:00	\checkmark	\sim
4		•	JobMailbox	Array [03] of Word	10.0			
5			JobMailbox[0]	Word	0.0	16#0	\checkmark	V
6			JobMailbox[1]	Word	2.0	16#0	\checkmark	V
7			JobMailbox[2]	Word	4.0	16#0	\checkmark	V
8			JobMailbox[3]	Word	6.0	16#0		V
9		•	DataRecord	Array [04] of Word	18.0			
10			ProjectID	Word	28.0	16#0		
11		•	ScreenNumber	Array [04] of Word	30.0			\sim
12		•	DateTimePLC	Struct	40.0			\sim
13			DateTime	Date_And_Time	0.0	DT#1990-01-01-00:00:00	\checkmark	
14			Reserve_01	Word	8.0	16#0	\checkmark	
15			Reserve_02	Word	10.0	16#0	\checkmark	

4.4 Function block "FB110_TimeSyn_HMI_To_PLC" (FB110)

4.4 Function block "FB110_TimeSyn_HMI_To_PLC" (FB110)

Clock synchronization "Operator panel → Controller"

Via the function block the clock synchronization is implemented via the area pointers

- "Date/Time"

_

"Control job", with order number "40".

The block includes the system function blocks

- WR SYS T
 - (The time and the date of the CPU clock is set with the call).
- RD_SYS_T
 - (With the "RD_SYS_T" instruction the current date and the current time is read out from the CPU clock).

The FB110 is used in the "TimeSyn_Project_03" project.

View of the "FB110"

The "FB110" has an "input/output parameter" that is switched according to the specification. You can edit the FB if needed. By default the FB does **not** have to be edited.



4.4 Function block "FB110_TimeSyn_HMI_To_PLC" (FB110)

Function sequence FB110

Below the program sequence of FB110 is described. The program sequence is in the form of a step chain.

Table 4-1

Network	Comment
1	General: Copying values into the static area from the "Date/clock" area pointer.
	Via the " AreaPointer_DateTime " input parameter the content on the assigned "Date/time" area pointer is read in. The input parameter has the "Date_And_Time" data type.
	For the later evaluation of the clock synchronization it is required to divide the input parameter "by byte". The result is copied in the data area of the static
	"Edited_AreaPointer_DateTime" tag.
	"AreaPointer_DateTime" \rightarrow "Edited_AreaPointer_DateTime".
2	Step 1: Start of the clock synchronization.
	Via the " SetTime " InOut parameter the "start signal" for enabling the clock synchronization is read in and read out. The InOut parameter has the "Bool" data type.
	The content of the "control job" area pointer is read in and out via the "AreaPointer_JobMailbox" InOut parameter.
	The input parameter has the "Array [03] of Word" data type.
	With the start of the clock synchronization the parameters 1 to 3 of the "control job" area pointer are preassigned with "0".
3	Step 2: Save the current value from the date/time area pointer.
	The " Edited_AreaPointer_DateTime " tag is read out in the network and its content is divided and temporarily stored in the - "SaveData_Previous_HMI_Time_01" "SaveData_Previous_HMI_Time_02" tags.
	Technical background: The "Edited_AreaPointer_DateTime" tag has the "Date_And_Time" data type, which corresponds to a length of 2 double words. In the further course, the tag is required for a "clock comparison". In order to be able to compare the content of the tag with the "==D" instruction, the tag is divided into two individual double words.

4 Functional Mechanisms of this Application

4.4 Function block "FB110_TimeSyn_HMI_To_PLC" (FB110)

Network	Comment
4	Step 3: Execute control job "40".
	The "AreaPointer_JobMailbox" InOut parameter is transferred to "order number" 40.
	Note: The order number has to be specified in "hex format".
5	Step 4: Evaluation, finish job "40".
	Via the "AreaPointer_JobMailbox" InOut parameter it is evaluated when the previously set control job "40" is reset to "0" by the operator panel.
	Note:
	If the operator panel has accepted the control job the control job is reset to "0". At this time the execution of the control job is generally not yet completed.
6	Step 5: Evaluation, new HMI time accepted?
	The "Edited_AreaPointer_DateTime" static tag can be read out via the network and divided and temporarily stored in the following tags
	- "SaveData_New_HMI_Time_01" - "SaveData_New_HMI_Time_02"
	Technical background: In order to detect that the control job has been fully completed, the network performs a time comparison.
	The control job is completed when the comparison of the tags "SaveData_Previous_HMI_Time" and "SaveData_New_HMI_Time" are unequal.
7	Step 6: Transfer new HMI system time to the PLC.
	The PLC system time is synchronized with the system time of the operator panel via the network.
	For this purpose the " AreaPointer_DateTime " input parameter tag is assigned to the "IN Parameter" of the "WR_SYS_T" system function block.
8	General: Output of the current PLC time on the operator panel.
	The read out PLC system time is output via the "Current_PLCTime" output parameter tag.
	For this purpose the " Current_PLCTime " tag is assigned to the "OUT Parameter" of the "RD_SYS_T" system function block.
	The output parameter has the "Date_And_Time" data type.

4.5 Function block "FB120_TimeSyn_HMI_To_HMI" (FB120)

4.5 Function block "FB120_TimeSyn_HMI_To_HMI" (FB120)

Clock synchronization "Controller -> Operator panel"

Via the function block the **time** and the **date** of the HMI operator panel can be synchronized separately with the time of the PLC. The implementation of the clock synchronization is performed via the area pointer

- "Control job", with order number "14" (time)
- "Control job", with order number "15" (date)

The FB120 is used in the "TimeSyn Project 04" project.

View of the "FB120"

The "FB120" has an "input/output parameter" that is switched according to the specification. You can edit the FB if needed. By default the FB does **not** have to be edited.





4.5 Function block "FB120_TimeSyn_HMI_To_HMI" (FB120)

Function sequence FB120

Below the program sequence of FB120 is described. The program sequence is in the form of a step chain.

Table 4-2

Network	Comment
1	General: Copying values into the temp area from the "control job" area pointer.
	The content of the "Control job" area pointer is read in via the "AreaPointer_JobMailbox" InOut parameter.
	The InOut parameter has the "Array [03] of Word" data type.
	For the parameter assignment later on, it is necessary to divide the input parameter "by byte". The result is temporarily saved in the "temp area".
	Note: The InOut parameter has to be edited for the implementation. How a compound data type of a FB can be programmed in the InOut area and a function run can be configured with an ARRAY tag can be found in entry ID: <u>19106712</u>
2	General:
	Copying and excluding the "ms" from the PLC time.
	The current PLC system time can be read out via the "Actual_PLC_Time" In parameter.
	The In parameter has the "Date_And_Time" data type.
	For the parameter assignment later on it is necessary to divide the input parameter "by byte" as well as hiding the "milliseconds" included in the time.
	The result is copied in the data area of the static "Edited_PLC_Time" tag.
	Details on the structure of the "Date_And_Time" format can be found in chapter 3.5.
	"Actual_PLC_Time" \rightarrow "Edited_PLC_Time".
3	Step 1: Start of the clock synchronization via control job "14" \rightarrow time.
	Via the " SetTime " InOut parameter the "start signal" for enabling the clock synchronization is read in and read out.
	The InOut parameter has the "Bool" data type.
	With the start of the clock synchronization the parameters 1 to 3 of the "control job" area pointer are preassigned with "0".

4 Functional Mechanisms of this Application

4.5 Function block "FB120_TimeSyn_HMI_To_HMI" (FB120)

Network	Comment
4	Step 2: Enter parameter in the "control job" area pointer.
	The parameters provided for job number "14" are transferred to the "control job" area pointer in the network. Details on establishing the control job "14" can be found in chapter 4.1.3.
	From the tag area of the "Edited_PLC_Time" tag, the following is read out and transmitted to the parameters of the "control job" area pointer
	Minute
	Second
_	
5	Step 3: Execute control job "14".
	The auxiliary tag of the "AreaPointer_JobMailbox" InOut parameter is transferred to the order number "14".
	Note: The order number has to be specified in "hex format".
6	Step 4: Evaluation, job "40" finished.
	Via the auxiliary tag of the "AreaPointer_JobMailbox" InOut parameter, it is evaluated when the previously set control job "14" is reset to "0" by the operator panel.
	Note:
	If the operator panel has accepted the control job the control job is reset to "0". At this time the execution of the control job is generally not yet completed.
	The evaluation of the clock synchronization via control job "14" is thus completed.
7	Step 1: Start of the clock synchronization via control job "15" \rightarrow date.
	Via the "SetDate " InOut parameter, the "start signal" for enabling the clock synchronization is read in and read out.
	The InOut parameter has the "Bool" data type.
	With the start of the clock synchronization the parameters 1 to 3 of the "control job" area pointer are preassigned with "0".

4 Functional Mechanisms of this Application

4.5 Function block "FB120_TimeSyn_HMI_To_HMI" (FB120)

Network	Comment
8	Step 2: Enter parameter in the "control job" area pointer.
	The parameters provided for job number "15" are transferred to the "control job" area pointer in the network. Details on establishing the control job "15" can be found in chapter 4.1.3.
	From the tag area of the "Edited_PLC_Time" tag, the following is read out and transmitted to the parameters of the "control job" area pointer
	Week day
	Day Month
	Year
9	Step 3: Execute control job "15".
	The auxiliary tag of the "AreaPointer_JobMailbox" InOut parameter is transferred to the order number "15".
	Note: The order number has to be specified in "hex format".
10	Step 4: Evaluation, job "15" finished.
	Via the auxiliary tag of the "AreaPointer_JobMailbox" InOut parameter, it is evaluated when the previously set control job "15" is reset to "0" by the operator panel.
	Note:
	If the operator panel has accepted the control job the control job is reset to "0". At this time the execution of the control job is generally not yet completed.
	The evaluation of the clock synchronization via control job "15" is thus completed.
11	General: Writeback of the values into the "AreaPointer_JobMailbox" InOut tag.
	The parameter values of job numbers "14" and "15" have been written into the respective auxiliary tags in network 1 for evaluation (#Tmp_JobMailBox_Byte0 etc.).
	The values of the auxiliary tags are now written back into the "AreaPointer_JobMailbox" InOut parameter.
	The implementation of the "clock synchronization" via control jobs "14" and "15" is thus completed.

Below, the individual example configurations are described in detail. In detail these are:

Project_01, "TimeSyn_Project_01".

Clock synchronization via the HMI system function "HMI time synchronization mode" (master/slave).

- PLC (Master) → HMI operator panel (Slave).
- HMI operator panel (Master) → PLC (Slave).

Project_02, "TimeSyn_Project_02".

Clock synchronization via the "Date/Time PLC" area pointer

- PLC (Master) → HMI operator panel (Slave).

Project_03, "TimeSyn_Project_03".

Clock synchronization via the "date/clock" and "control job" area pointers with job number 40.

- HMI operator panel (Master) \rightarrow PLC (Slave).

Project_04, "TimeSyn_Project_04".

Clock synchronization via the "control job" area pointer with the control job numbers 14 (time) and 15 (date).

PLC (Master) \rightarrow HMI operator panel (Slave).

For this clock synchronization the time and the date of the operator panel can be synchronized independently from each other with the PLC system time/date.

General info on the configurations

The example configurations include program elements that are not essential for implementing the respective task. This includes for example the output of the PLC time on the operator panel or the option to manually specify the system time of the operator panel.

If a program element is not essential for implementing the task, it will be marked accordingly with "**not essential**".

5.1 Project_01, "TimeSyn_Project_01"

5.1 Project_01, "TimeSyn_Project_01"

Clock synchronization between a S7-1200 and a TP1200 Comfort Panel

In the example project the clock synchronization takes place via the HMI system function "HMI time synchronization mode" (Master/Slave).

For the "TimeSyn_Project_01" project the following hardware is used.

- CPU: \$7-1200
- HMI_1: TP1200 "HMI time synchronization mode" => Slave
- HMI_2: TP1200 "HMI time synchronization mode" => master

Note The instruction can also be used for a SIMATIC S7-1500 controller.

5.1.1 PLC program

Table 5-1

No.	Action	Screens			
1.	OB1 (Main), network 1 (not essential)				
	The " RD_LOC_T " system block is called via OB1. The local time of the PLC time is read out with the block. The time is output in a picture on the HMI operator panel via the tag used on the output.				
	In this example: "DB100_HMI_DataExchang	e".PLC_Time_RD_LOC_T (DB100.DBX0.0)			
	The DB100 is used for data exchange betwee	n the PLC and the HMI operator panel.			
	Block title: "Main Program Sweep (Cycle)"				
	Comment				
	▼ Network 1: Ausgabe der aktuellen Lokalzeit der SPS				
	Instruction to read out the current local time from the CPU	J clock			
	RD_LOC_T DTL				
	EN ENO				
	%DB100.DBW12 "DB100_HMI_ DataExchange". PLC_Time_RD_ RET_VAL P#DB100.DBX0.0 "DB100_HMI_ DataExchange". PLC_Time_RD_ OUT OUT				

5.1 Project_01, "TimeSyn_Project_01"

No.	Action					Screens		
2.	DB100 (DB100_HMI_DataExchange) (not essential)							
	You only require the data block if you are usin The data exchange between the PLC and the DB100_HMI_DataExchange			re using the	e " RD_I operat	LOC_T" system block in (or panel is performed via	DB1. DB100.	
	_	-	Na	me	Data type	Offset	Start value	
	1	-00	•	Static				
	2		•	PLC_Time_RD_LOC_T	DTL 🔳	0.0	DTL#1970-01-01-00:00:00	
	З	-00	•	PLC_Time_RD_LOC_T_RetVal	Int	12.0	0	
3.	Oth	ner s	sett	ings regarding the clock synch	nronization	are no	t required in the PLC.	

5.1.2 HMI configuration

The example project includes two HMI configurations. The configurations only differ in the type of clock synchronization (master/slave).

HMI_1 (Slave)

In this configuration the **PLC** is timer (master). The HMI operator panel is the time receiving component (slave).

Table 5-2

No.	Action			Scr	eens		
1.	Connections						
	Open the " Connections " component via the project navigation. The existing connections are displayed in the working window.						
	Note: It is assumed that a connec	tion to a S7-120	00 or S7-150	00 controller is alr	eady configu	red.	
	Project tree 🛛 🔳 🖣	TimeSyn_Project_01 [V	11] → HMI_01_TP1	200_Slave [TP1200 Comfort] → Connections		_ = = X
	Devices						
		A Connections to S7 PLCs	in Devices & Networks				
		Connections					
	▼ TimeSyn_Project_01 [V11]	Name	Communication driver	HMI time synchronization mode	Station	Partner	Node
	💕 Add new device	HMI_connection_1	SIMATIC S7 1200	Slave	SIMATIC 1200 station_1	PLC_1	CPU 1212C DC/DC
	🃸 Devices & networks	<add new=""></add>					
	PLC_1 [CPU 1212C DC/DC/DC]						
	III Device configuration	<					>
	Online & diagnostics Parameter Accanciliter						
	TRuntime settings						
	Screens This construction This construction This construction					Station	
	HII tags	TFT200 Controlt					station
	2 Connections	Interfac	e:				1000 ALC:
	MII alarms	ETHERN	IET 🔻				ill 202

No.	Action	Screens								
2.	Selecting clock synchronization									
	Open the dropdown menu under the "HMI time synchronization mode" item and select the " Slave " item there. Thus the settings for the time synchronization are completed. The PLC connected is now the timer component.									
	Connections									
	Name Communication driver HMI time synchro HMI_connection_1 SIMATIC S7 1200 Slave Add new> None Master Slave	ization mode Station Partner Node								
	<pre></pre>	>								
	Parameter Area pointer	•								
	TP1200 Comfort	zation are not required.								
3.	Overview screen (not essential)									
	 The configured "plant screen" can be called "Images > 001_Application > Topic_001.1". Overview of the functions: The PLC time as well as the HMI time is In the bottom part of the image, the HM 	via the project tree under output via the image. time can be changed manually for test purposes.								
	Display of the system time									
	HMI system time (Slave)	e (Master)								
	12/31/2000 10:59:59 AM 12/31/2000 10:5	D:59 AM								
	Manual setting of t	e system time								
	HMI system timeTo test the clock s12/31/2000 10:59:59 AMBy enabling "HMIHMI system time s	nchronization, you can change the HMI system time synchronization mode - Slave", the rill be sychronized with the plc system time.								





5.1 Project_01, "TimeSyn_Project_01"

HMI_2 (Master)

In this configuration the **HMI operator panel** is timer (master). The PLC is the time receiving component (slave).

Table 5-3

No.	Action	Screens
4.	Connections	· · · ·
	Open the " Connections " component via displayed in the working window. Note: It is assumed that a connection to a S7-	a the project navigation. The existing connections are 1200 or S7-1500 controller is already configured.
	Project tree II 4 TimeSyn_Project_01 [V11]	> HMI_02_TP1200_Master [TP1200 Comfort] → Connections _ 외 프×
	Devices	avices & Networks
	Connections Commetions Add new device Devices & networks Add new device Add new	unication driver HMI time synchronization mode Station Partner Node 197 1200 Master SIMATIC 1200 station_1 PLC_1 CPU 1212C DCDC
	Parameter Area poir Online & diagnostics	tter
	Puntime settings Streens Connections Milt tags Connections	station
5	Selecting clock synchronization	
	Open the dropdown menu under the "H " Master " item there. Thus the settings f The HMI operator panel connected is no	MI time synchronization mode" item and select the or the time synchronization are completed. The timer component.
	Connections	
	Name Communication driver HMI time syn	chronization mode Station Partner Node
	Add new> None Add new> None None Slave	SIMATIC 1200 station_1 PLC_1 CPU 1212C DC/DC
	<	III >
	Parameter Area pointer	
	TP1200 Comfort Interface:	Station
	Other settings regarding the clock synch	pronization are not required





5.2 Project_02, "TimeSyn_Project_02"

5.2 Project_02, "TimeSyn_Project_02"

Clock synchronization between a S7-300 and a TP1200 Comfort Panel

In the example project the clock synchronization is performed via the "date/time PLC" area pointer (controller \rightarrow operator panel)

For the "TimeSyn_Project_02" project the following hardware is used.

- CPU: S7-300
- HMI: TP1200 Comfort Panel

5.2.1 PLC program

Table 5-4

No.	Action	Screens						
7.	OB1 (Main), Network 1							
	In network 1 the " RD_SYS_T " system block is called. The system time is read out via the PLC and transferred to the " Date/Time PLC " area pointer. For this purpose the " DateTime " tag of the " Date/Time PLC " area pointer is assigned to the output the system block.							
	In this example: "DB10_HMI_AreaPointer".DateTimePLC.DateTime (DB10.DBX40.0)							
	Details on DB10 (DB10_HMI_AreaPointer) car	n be found in chapter 4.3.						
	▼ Network 1: Übergabe der SPS-Systemzeit an de	n Bereichszeiger Datum/Uhrzeit PLC						
	Transfer the PLC system time to the area pointer Date	e/Time PLC						
	RD_SYS_T Date_And_Time							
	EN ENO							
	%DB100.DB "DB100_HM DataExchan PLC_Time_RD RET_VAL — SYS_T_RetVa	NB 						
	P#DB10.DBX "DB10_HMI_ AreaPointer" DateTimePL0 OUT — DateTime	40.0 P#DB10.DBX40.0 / Date_And_Time						



5.2 Project_02, "TimeSyn_Project_02"

5.2.2 HMI configuration

HMI_1_TP1200

In this configuration the **PLC** is timer (master). The HMI operator panel is the time receiving component (slave).

Table 5-5

No.	A	ction		Screens					
11.	Connections	Connections							
	Open the " Connections " component via the project navigation. The existing connections are displayed in the working window.								
	Note: It is assumed that a connection to a SIMATIC S7 controller is already configured.								
	In this example:	SIMATIC S7300/400							
	Project tree II	TimeSyn_Project_02 [V11] → HMI_1 [TP1:	200 Comfort] → Connection	ns	_ # = ×				
	B00 B	P Connections to S7 PLCs in Devices & Networks							
		Connections							
	▼ 📄 TimeSyn_Project_02 [V11]	Name Communication driver	HMI time synchronization mode	Partner Node Statio	on Online				
	Add new device	HMI_connection SIMATIC S7 300/400		PLC_1 CPU 315-2 PN/DP S7300	0/ET200M station_1				
	Devices & networks	<add new=""></add>							
	▶ Lm PLC_1 [CPU 315-2 PN/DP]	<			>				
	HMI_T[IP1200 continuit] Device configuration	Parameter Area pointer							
	Q. Online & diagnostics								
	Y Runtime settings	TP1200 Comfort			Station				
	Screens								
	Gereen management	interface:			e la				
	HMI tags	ETHERNET							
	Recipes								
	🔛 Historical data	HMI device		PLC					
	Geripts	Address: 172.16.34.20		Address: 1	72.16.34.34				
	5 Scheduled tasks	Access point: S7ONLINE		Expansion slot: 2					
	Cycles			Back 0					
	Text and graphic lists			Ordic operation:					
	ês User administration			cyclic operation.					

No.	Action			Screens						
12.	Selecting area pointer									
	Enable the "Area pointer" in the "Connections" editor. The "Area pointer" tab includes two tables with area pointers. Open the " Global area pointer " table for this application.									
	Note: You may have to open the "Global area pointer" table via the arrow button (1).									
	Parameter A	rea pointer			•	•				
	Active	Display name	PLC tag	Access mode	Address	Length	Ac			
		Coordination	<undefined></undefined>	<symbolic access=""></symbolic>		1	9			
		Date/time	<undefined></undefined>	<absolute access=""></absolute>		6	9			
		Job mailbox	<undefined></undefined>	<symbolic access=""></symbolic>		4	9			
		Data record	<undefined></undefined>	<symbolic access=""></symbolic>	_	5 1	9			
	Clabel and a size	ten ef likti des des			-		_			
	Global area poir	iter of HMI device	PL C to a							
	Connection	Display name	PLC tag			Acces	is mi			
	<undefined></undefined>	Screen purcher	<undefined></undefined>	Jndefined <sy< th=""></sy<>						
	HML connection	Date/time PLC DB10_HML AreaPointer DateTimePLC DateTimecab					olute			
		Datestine rec	0010_1111_71	car officer.baterinier	Eo.baten					
13	Configuring "Date/	Time PI C" area po	ointer							
10.	eenigunig Date									
	The screen below sh	nows the configured	"Date/Time	PLC" area pointe	er.					
	Global area pointer of HM	l device		•						
	Connection Display r	name PLC tag	ag Address Length Acquisition cycle Access mode							
	<undefined> Screen</undefined>	number <undefined></undefined>		_	5 <un< td=""><td>defined><sym< td=""><td>bolic access></td></sym<></td></un<>	defined> <sym< td=""><td>bolic access></td></sym<>	bolic access>			
	HMI_connection Date/tim	ne PLC DB10_HMI_AreaPointer.	.DateTimePLC.DateTir	ne 🔜 %DB10.DBX40.0 💌	6 1m	in <abs< td=""><td>olute access></td></abs<>	olute access>			
	Description of para	imeters								
	Connection:	Select the PLC cor	nnection in th	ne window. By se	lecting a	controller t	he area			
		pointer is enabled.			Ū					
	D . 1	In this example:	HMI_co	nnection						
	Display name:	Name of the area p	pointer. Spec	cified by WinCC.			.			
	PLC tag:	Here you select the	e PLC tag th	at you have confi	gured as	s data area	for the			
		In this example:	DB10_H	HMI_AreaPointer.	DateTim	ePLC.Date	Time			
	Address:	When you have sy	mbolically se	elected the tag in	the "PLC	C tag" box, t	he			
		address of the tag	is displayed	in this box.						
		Alternatively, you c In this example:	an specity ti: 0B10%	ne address of the .DBX40.0	tags ma	inually.				
	Length:	The length of the a	rea pointer.	Specified by Win	CC.					
	Acquisition mode:	In this box you spe	cify the acqu	uisition mode. No	te that a	very short				
	·	acquisition time ma	ay influence	the performance	of the op	perator pane	el.			
		In this example:	1 min							
	Other pattings rages	ding the cleak avec	ronization -	ro not required						
	other settings regard	uing the clock synch	nomzation a	re not required.						





5.3 Project_03, "TimeSyn_Project_03"

5.3 Project_03, "TimeSyn_Project_03"

Clock synchronization between a S7-300 and a TP1200 Comfort Panel

In the example project the clock synchronization takes place via the "Date/Time" area pointer (operator panel \rightarrow controller) and "control job" with the control job number 40.

For the "TimeSyn_Project_03" project the following hardware is used.

- CPU: S7-300
- HMI: TP1200 Comfort Panel

5.3.1 PLC program

Table 5-6



No.	Action			Screens	
16.	FB110, configuration				
	Name/No. of the FB:	The name of the In this example:	FB as	well as the FB number can be selected Name: FB110_TimeSyn_HMI_To_PLC FB no.: 110	
	Instance DB:	The name of the In this example:	instanc	e DB as well as the number can be selected Name: DB110_TimeSyn_HMI_To_PLC FB no.: 110	
	AreaPointer_DateTime:	IN parameter of t Link the paramet In this example:	he "Da er with	te_And_Time" type the address of the "date/time" area pointer. "DB10_HMI_AreaPointer".DateTime DB10.DBX2.0	
	AreaPointer_Job_Mailbox:	INOUT paramete Link the paramet In this example:	* "Array [03] of Word" type the address of the "control job" area pointer. "DB10_HMI_AreaPointer".JobMailbox DB10.DBX10.0		
	SetTime:	INOUT parameter off the "Bool" type The clock synchronization is started via a button on the panel. Link the parameter with the address of this button (link). In this example: "DB100_HMI_DataExchange".Start_TimeSyn DB100.DBX12.0 OUT parameter of the "Date_And_Time" type The current system time of the PLC is output on the panel via the tag Link the parameter with the address of this "date/time field" (link). In this example: "DB100_HMI_DataExchange".PLC_Time_RD_SYS_T DB100.DBX0.0			
	Current_PLCTime:				
17.	FB110 (FB110_TimeSyn_	HMI_To_PLC)			
	Note: For the implementation of the job is not necessary to edit the "FB110" program block. The block includes all necessary functions.				
	Details on FB110 (DB10_H	IMI_AreaPointer) c	an be f	ound in chapter 4.4.	
18.	DB10 (DB10_HMI_AreaPo	ointer)			
	Details on DB10 (DB10_HM	/II_AreaPointer) ca	in be fo	ound in chapter 4.3.	

No.	Action					Screens		
19.	DB	DB100 (DB100_HMI_DataExchange)						
	The	e da	ata exchange between the PL	C and the HMI op	erator pa	anel is performed via DI	3100.	
		DB	100_HMI_DataExchange					
			Name	Data type	Offset	Start value		
	1	-00						
	2		PLC_Time_RD_SYS_T	Date_And_Time	0.0	DT#1990-01-01-00:00:00		
	3	-	PLC_Time_RD_SYS_T_RetVal	Int	8.0	0		
	4	-	PLC_Time_WR_SYS_T_RetVal	Int	10.0	0		
	5		Start_TimeSyn	Bool	12.0	false		
20.	DB	11() (DB110 TimeSyn HMI To	PLC)				
				- /				
	Ine	tan	ce DB for the EB110 (EB110	TimeSvn HMI T				
	113	an			0_i LO)			
21.	Oth	ner	settings regarding the clock sy	nchronization are	e not req	uired in the PLC.		

5.3 Project_03, "TimeSyn_Project_03"

5.3.2 HMI configuration

HMI_1_TP1200

In this configuration the **operator panel** is timer (master). The PLC is the time receiving component (slave).

Table 5-7

No.	A	ction	Scre	eens			
22.	Connections						
	Open the " Connections " component via the project navigation. The existing connections are displayed in the working window.						
	Select the connection via which the operator panel is to be synchronized. In this example: HMI_connection						
	Notes:						
	 It is assumed th 	at a connection to a SIMA	TIC S7 controller is alread	v configured			
	The area pointer	rs used in this example c	an be enabled separately fo	or each configured			
	connection.			or each configured			
	In this example:	SIMATIC S7300/400 cor	inection				
	Project tree 🔲 🕻	TimeSyn_Project_03 [V11] → HMI_1 [T	P1200 Comfort] ▶ Connections				
	Devices						
		Connections to S7 PLCs in Devices & Netwo	rks	-4			
	- D Time Car Designst 02 [3/11]	Connections	- Chatian III II diana any dianaisai	an ana da Danta an Marda			
	Add new device	HML connection SIMATIC S7 300/400	S7300/ET200M station 1	PLC 1 CPU 315-2 PN/DP			
	Devices & networks	<pre> Add new></pre>	57500/E1200W Station_1				
	PLC_1 [CPU 315-2 PN/DP]						
	▼ → HMI_1 [TP1200 Comfort]						
	时 Device configuration						
	😺 Online & diagnostics 🍸 Runtime settings	Parameter Area pointer					
	Screens	TP1200 Comfort		Station			
	Screen management	Interface:		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
	HMI tags	TUSPUST -		a			
	Recipes			· • •			
	🛄 Historical data						
	Scripts	HMI device	PLC				
	5 Scheduled tasks	Address: 172.16.34.	200 A	ddress: 172.16.34.34			
	Cycles	Access point: S7ONLINE	Expansi	on slot: 2			
	Text and graphic lists			Rack: 0			
	ig User administration		Ordie and	eration:			
	🕨 🧊 Common data		cyclic opr				

No.	A	ction				Scree	ns			
23.	Selecting area pointer									
	Enchle the "Area pointer" in the "Connectional editor									
	Enable the Area po	hinder in the Conne	ections ealt	or. nointar	_					
	Open the " Area pointer ta	ter" table for this a	es with area	pointers	5.					
	The table with the "G	lohal area pointers	" is not requi	red						
			lo notroqu	ieu.						
			A							
	Parameter Are	a pointer								
	Active Display name	PLC tag		Address		Length	Acquis	ition cycle	Acc	
	Coordination	<undefined></undefined>	n DistaTina a	0000101		1	<unde< th=""><th>fined></th><th><syi< th=""><th></th></syi<></th></unde<>	fined>	<syi< th=""><th></th></syi<>	
	Jate/time	DB10_HMI_AreaPointe	r.Daterime r.JobMailbox	%DB10.L	DBX2.0	4	<unde< th=""><th>tined></th><th><ab< th=""><th></th></ab<></th></unde<>	tined>	<ab< th=""><th></th></ab<>	
	Data record	<undefined></undefined>	1.50bmanbox	1000101		5	<unde< th=""><th>fined></th><th><ab< th=""><th></th></ab<></th></unde<>	fined>	<ab< th=""><th></th></ab<>	
	4			-					>	
	Global area pointe	r of HMI device		1						
	Connection	Display name	PLCtag	1	Access m	ode		Address	Leng	
	<undefined></undefined>	Project ID	<undefined></undefined>		<symboli< th=""><th>c access></th><th></th><th></th><th>1</th><th></th></symboli<>	c access>			1	
	<undefined></undefined>	Screen number	<undefined></undefined>		<symboli< th=""><th>c access></th><th></th><th></th><th>5</th><th></th></symboli<>	c access>			5	
	<ondenned></ondenned>	Date/unie r EC	<ondenned></ondenned>		<symboli< th=""><th>c access></th><th></th><th></th><th>0</th><th></th></symboli<>	c access>			0	
24.	Configuring "Date/	Time" and "contro	l job" area	pointer						
	Parameter descript	ion "Date/Time"								
	Active:	Enable the option	box next to t	he "date	e/time"	area po	ointer.			
	Display name:	Name of the area	pointer. Spe	cified by	WinCC					
	PLC tag:	Here you select the	e PLC tag th	at you h	ave cor	nfigured	l as da	ata area	for the	
		In this example:	DB10	-IMI Are	Pointe	er Date	Time			
	Address:	When you have sy	mbolically s	elected t	the tag i	n the "I	PI C ta	aa" box	the	
		address of the tag	is displayed	in this b	00X.		20 10	.g,		
		Alternatively, you	can specify t	he addre	ess of th	ne tags	manu	ally.		
		In this example:	DB10.E	BX2.0						
	Length:	The length of the a	area pointer.	Specifie	ed by W	inCC.				
	Paramotor descript	ion "control iob"								
		Enable the option	hav nevt ta t	he " con	trol iob	" area	nointe	r		
	Display name:	Name of the area	nointer Sne	rified by		area	pointe	1.		
	PI C tag:	Here you select th	o PI C tan th	at you h		'. Nigurec	l as da	ata area	for the	
	T LO tag.	area pointer.		at you i		inguice	1 23 26			
		In this example:	DB10_	HMI_Are	eaPointe	er.JobN	lailbox	(
	Address:	When you have sy	mbolically s	elected	the tag i	n the "I	PLC ta	ag" box,	the	
		address of the tag	is displayed	in this b	DOX.					
		Alternatively, you o	can specify t DB10 F	he addre BX10 0	ess of th	ie tags	manu	ally.		
	Lenath:	The length of the a	area pointer	Specifie	ed bv W	inCC				
	Acquisition mode	In this box you	specify the	acquisiti	on mod	e. Note	that a	a verv sh	ort	ľ
	acquisition time may	influence the perfo	rmance of th	e opera	tor pane	el.				
		In this example:	1 min	-						
	Other settings regard	ding the clock synch	nronization a	re not re	equired.					







5.4 Project_04, "TimeSyn_Project_04"

5.4 Project_04, "TimeSyn_Project_04"

Clock synchronization between a S7-300 and a TP1200 Comfort Panel

In the example project the clock synchronization takes place via the "control job" with the

- job number 14.(time)
- job number 15 (date)

For this clock synchronization the time and the date of the operator panel can be synchronized independently from each other with the PLC system time.

For the "TimeSyn_Project_04" project the following hardware is used.

- CPU: \$7-300
- HMI: TP1200 Comfort Panel

5.4.1 PLC program

Table 5-8

No.	Action	Screens						
26.	OB1 (Main), Network 1	OB1 (Main), Network 1						
	In network 1 the "RD_SYS_T " system block is called. The system time of the PLC is read out via the block and transferred to the FB120 "FB120_TimeSyn_PLC_To_HMI " via a tag. The tag used is furthermore output via the PLC system time on the operator panel.							
	In this example: "DB100_HMI_DataExchange".PLC_Ti	me_RD_SYS_T (DB100.DBX0.0)						
	The DB100 is used for the data exchange between oper	ator panel and PLC.						
	▼ Network 1: Auslesen der aktuellen SPS Systemzeit							
	Read current PLC system time							
	RD_SYS_T Date_And_Time							
	EN ENO							
	%DB100.DBW8 "DB100_HMI_ DataExchange". PLC_Time_RD_ SYS_T_RetVal P#DB100.DBX0. "DB100_HMI_ DataExchange". PLC_Time_RD_ OUT - SYS_T	0						



No.	Action		Screens			
28.	FB120, configuration					
	Name/No. of the FB:	The name of the In this example:	FB as well as the FB number can be selected Name: FB120_TimeSyn_PLC_To_HMI FB no.: 120			
	Instance DB:	The name of the In this example:	instance DB as well as the number can be selected Name: DB120_TimeSyn_PLC_To_HMI FB no.: 120			
	Current_PLCTime:	IN parameter of t The current syste the parameter wi (network 1) syste In this example: "DB100_HMI_Da DB100.DBX0.0	the "Date_And_Time" type em time of the PLC is read in via this parameter. Link ith the OUT parameter of the "RD_SYS_T" em block. : ataExchange".PLC_Time_RD_SYS_T			
	AreaPointer_Job_Mailbox:	INOUT paramete Link the paramet In this example:	er of the "Array [03] of Word" type ter with the address of the "control job" area pointer. : "DB10_HMI_AreaPointer".JobMailbox DB10.DBX10.0			
	SetTime:	INOUT parameter off the "Bool" type The synchronization of the time on the operator panel is started via a button on the operator panel. Link the parameter with the address of the button used. In this example: "DB100_HMI_DataExchange".Start_TimeSyn DB100.DBX10.0 INOUT parameter off the "Bool" type The synchronization of the date on the operator panel is started via a button on the operator panel. Link the parameter with the address of the button used. In this example: "DB100_HMI_DataExchange".Start_DateSyn DB100.DBX10.1				
	SetDate:					
29.	DB10 (DB10_HMI_AreaPo	ointer)				
	Details on DB10 (DB10_HM	/II_AreaPointer) ca	an be found in chapter 4.3.			

No.			Action				Screens				
30.	DB	DB100 (DB100_HMI_DataExchange)									
	The	e da	ata exchange between the PL	C and the H	MI ope	erator p	anel is performed via DE	3100.			
	DB100_HMI_DataExchange										
			Name	Data type		Offset	Start value				
	1	-00	- Static								
	2	-00	PLC_Time_RD_SYS_T	Date_And_Tir	ne 🔳	0.0	DT#1990-01-01-00:00:00				
	3	-00	PLC_Time_RD_SYS_T_RetVal	Int		8.0	0				
	4		Start_TimeSyn	Bool		10.0	false				
	5		Start_DateSyn	Bool		10.1	false				
31.	DB	120) (DB110_TimeSyn_HMI_To	_PLC)							
	Inst	an	ce DB for the FB120 (FB110_	TimeSyn_P	LC_IC	o_ HMI)					
32.	Oth	er	settings regarding the clock s	ynchronizati	on are	not rec	uired in the PLC.				

5.4 Project_04, "TimeSyn_Project_04"

5.4.2 HMI configuration

HMI_1_TP1200

In this configuration the **PLC** is timer (master). The HMI operator panel is the time receiving component (slave).

Table 5-9

No.	Action	Screens									
33.	Connections										
	Open the " Connections " component via the project navigation. The existing connections are displayed in the working window.										
	Select the connection via which the operator panel is to be synchronized. In this example: HMI_connection										
I	Notes:										
	• It is assumed that a connection to a SIMATIC S7 controller is already configured.										
	• The area pointers used in this example car connection.	n be enabled separately for each configured									
	In this example: SIMATIC S7300/400 conr	nection									
	A Compation to C2 Di Colio Devices & Maturela										
	Connections to 57 FLCs in Devices & Networks	14									
	Name Communication driver HMI time synchroniz.	ation mode Station Partner Node									
	HMI_connection SIMATIC S7 300/400	S7300/ET200M station_1 PLC_1 CPU 315-2 PN/DP,									
	<add new=""></add>										
1		*									
	Parameter Area pointer										
	TP1200 Comfort	Station									
	Interface:										
	ETHERNET										
		B									
	HMI device	PLC									
	Address: 172, 16, 34, 200	Address: 172, 16, 34, 34									
	Access point: S7ONLINE	Expansion slot: 2									
		Rack									
		Cyclic operation:									

No.	A	ction		Scre	ens		
34.	Selecting area poin	nter					
	Enable the " Area po The "Area pointer" t Open the " Area poi The table with the "o	Dinter " in the "Connections ab includes two tables with nter " table for this applicat Global area pointers" (1) is	s" editor. n area pointers iion. not required.				
	Parameter Area	a pointer N					
	Active Display name	RI C taa	Access mede	Addross	Longth	Acquisition quelo	
	Coordination	-Undefined	<pre>Access mode <symbolic access=""></symbolic></pre>	Address	1	-Lindefined>	
	Date/time	<undefined></undefined>	<absolute access=""></absolute>		6	<undefined></undefined>	
	Job mailbox	DB10_HMI_AreaPointer.JobMailbox	<absolute access=""></absolute>	%DB10.DB×10.0	4	1 s	
	Data record	<undefined></undefined>	<symbolic access=""></symbolic>		5	<undefined></undefined>	
	<					>	
	Global area pointer of HMI device 1						
	dundefi Project I	D		5		1	
	<undefined> Screen</undefined>					5	
	<undefined> Date/tin</undefined>	ne PLC <undefined> <symbolic acc<="" th=""><th>cess></th><th></th><th></th><th>6</th></symbolic></undefined>	cess>			6	
35.	Configure the "cor	ntrol job" area pointer					
	Parameter descrip	tion "control job"					
	Active:	Enable the option box ne	ext to the " cont	rol iob" area	a point	er.	
	Display name:	Name of the area pointer	r. Specified by	WinCC			
	PLC tag:	Here you select the PLC	tag that you ha	ave configure	ed as d	tata area for the	
	area	pointer	tag that you he	ave conliguit	54 45 (
	ulou	In this example: D	B10 HMI Area	aPointer.Job	Mailbo	X	
	Address:	When you have symbolic address of the tag is disp Alternatively, you can sp In this example:	cally selected the blayed in this be ecify the addre	ne tag in the ox. ss of the tag	"PLC s man	tag" box, the ually.	
	Lenath:	The length of the area of	pinter. Specifie	d by WinCC			
	Acquisition mode:	In this box you specify th	e acquisition m	node. Note th	nat a v	ery short	
		acquisition time may influ	uence the perfo	ormance of th	ne ope	rator panel.	
		In this example: 1	S				
	Other settings regar	ding the clock synchronize	ation are not re	quired.			







No.	Action	Screens
	Specifying the HMI date (not essential) For test purposes, the HMI date can be s added. Enable the "System time" option box and "Properties > General" in the "Format" se	specified manually. This is why a "date/time field" was in the "Field" section the "Show time" option box under action.
	HMI system time To te 10:59:59 AM Butto 12/31/2000 Butto	al setting of the system time est the clock synchronization, you can ch here. on 1: Synchronization of the HMI time w on 2: Synchronization of the HMI date w
	Date/time field_4 [Date/time field]	roperties 🚺 Info 👔 🕄 Diagnostics 📑 📼
	Property list General Appearance Layout Text format Flashing Miscellaneous Security Address: General Long date/time format Tag: Address:	at Field Show date Show time Type Mode: Input/output

6.1 General information

6 Operating the Application

6.1 General information

The functionality described below is identical for all projects.

Transferring configuration files

The following is assumed for the operation of the application:

- the STEP 7 program has been transferred into the controller. *)
- the HMI configuration was transferred into the operator panel.

*) CPU system date

In order to use the application, the system date of the CPU has to be set to a time after 2000. This has to be taken into account especially after a memory reset of the CPU.

You can edit the system time of the CPU via the

"Online > Online & diagnostics > Functions > Set time" menu command.

Figure 6-1

P	roject	Edit View	Insert	Online	Options	Tools	Window	Help											
	📑 🔁	🔒 Save pr	oject 昌	💋 Go o	nline			Ctrl+K	û 🛄 🖫	a 💋 i	Go online	🛚 🔊 Go offlin	e ሕ 🖪		* 🗆 🗆				
	Proie	ect tree		🔊 Go o	ffline			Ctrl+M								_			
				🖳 Simi	ulation			•											
		evices		Stop	vruntime/si	mulation													
	38	00		Dow	mload to de	vice		Ctrl+L											
				Exte	nded down	load to d	evice												
	- 🗋	TimeSyn_Pro	ject_04 [V	Dow	mload and i	reset PLC	program												
tart		🗳 Add new (device	Dow	mload user	program	to Memor	y Card											
- S		📩 Devices 8	networks	Upla	ad from de	vice											- 1		
		PLC_1 [CF	PU 317-2 PI	Back	cup from on	line devi	ce Time		oject_04	[V11]		_1 [CPU 317	'-2 PN/DP]						
		🔄 НМІ_1 (ТР	21200 Con	Uplo	ad device t	to PG/PC													
		Securron	data totion cott	HMI	Device mai	intenance	e or	line acce			Π					_			
		Language	s & resour	Acce	essible devi	ces	► Dia	anostics			Set	time							
	• 庙	Online acces	s		+ CBU		▼ Fu	nctions											
	•	Card Reader	USB mem	Ston	CPU			Assign IP	address										
							_	Set time				DO (DO L)							
				Ve Onli	ne & diagno	ostics		Firmware	e update			PG/PC tin	ne:						_
								Assign na	ame			(GMT+C	01:00) Amste	erdam,	Berlin, Bern	, Rom	ne, Stockho	olm, Vien	-
								Resetto	factory set	ttings		May 2	8 2013			1	10 - 23 -	32 AM	<u>^</u>
																			~
												Modulo t	ime						
												mouule	ume			1			
												May 2	8, 2013				10:24:	23 AM	-
												🔽 Take	from PG/PC				Ap	ply	
							00										· · · ·		2
																			•

6.1 General information

6.1.1 Calling the "Plant images"

Start screen

With the start of the HMI project on the operator panel, the following start screen is displayed.

You get to the navigation overview of the created plant images for the clock synchronization via the "**Application example**" button.

Figure 6-2



Navigation overview

This screen gives you the navigation overview of the configured plant images. In this example there is only the "**Overview**" image.

The "overview" image gives a summary of the task description.

The "time synchronization" button takes you to the "plant screen" of the time synchronization.



6.1 General information

6.1.2 Functionality of the plant screens

The screen shot below shows the user interface. Apart from the labeling, the objects shown in this screen are identical in all the example projects. Figure 6-4



Point 1:

There are two output fields in the top area of the image. The system time of the HMI operator panel as well as the system time of the PLC, are output via the output fields.

The two output fields are not essential for the implementation of the clock synchronization.

Point 2:

The "Input/output field" in the bottom part of the screen is used to test the functionality of the clock synchronization.

The system time of the HMI operator panel can be specified manually via the "I/O field".

If the system time of the "slave system" differs from the "master system", the time of the "slave system" is automatically synchronized with that of the "master system" (depending of the clock synchronization used).

The "input/output field" is not essential for the implementation of the clock synchronization.

6.2 Project_01, TimeSyn_Project_01

6.2 Project_01, TimeSyn_Project_01

Clock synchronization between a S7-1200 and a TP1200 Comfort Panel. The clock synchronization is performed via the HMI system function

"HMI time synchronization mode" (master/slave).

- PLC (Master) \rightarrow HMI operator panel (Slave).
- HMI operator panel (Master) \rightarrow PLC (Slave).

HMI_01_TP1200_Slave

PLC (Master) → HMI operator panel (Slave)

Table 6-1

No.	Actio	n	Scr	eens						
37.	Calling clock synchronization									
	Call the time synchronization via the "Application example > Overview > Time synchronization" button.									
38.	Specifying HMI time	Specifying HMI time								
	Change the HMI system "Enter" button (1).	Change the HMI system time via the I/O field and complete the entry with the "Enter" button (1).								
	In this example: The	e HMI time (hour) was	s changed to 9 pm.							
	The HMI system time is	adjusted to the PLC	system time within a minut	e.						
	5/2/2013 9:44 PM									
	Time synchronizati	Fime synchronization SIEMENS								
	🗲 🥕 🏠 📑	Time Inchronization								
	Overview	Display of th	ne system time							
		HMI system time (Slave)	Local plc system time (Master)							
		5/2/2013 9:44:38 PM	5/2/2013 2:44:53 AM							
	-									
			Manual setting of the system time							
		HMI system time 5/2/2013 9:44:38 PM 값 1	To test the clock synchronization, you time here. By enabling "HMI time synchronization HMI system time will be sychronized w	can change the HMI system 1 mode - Slave", the ifth the plc system time.						

6.2 Project_01, TimeSyn_Project_01

HMI_02_TP1200_Master

HMI operator panel (Master) \rightarrow PLC (Slave)

Table 6-2

No.	Action	Screens								
39.	Calling clock synchronization									
	Call the time synchronization via the "Application example > Overview > Time synchronization" button.									
40.	Specifying HMI time									
	Change the HMI system time via the I/O field "Enter" button (1).	Change the HMI system time via the I/O field and complete the entry with the "Enter" button (1).								
	In this example: The HMI time (hour) w	as changed to 9 pm.								
	The PLC system time is adjusted to the HM	Il system time within a minute.								
	5/2/2013 9:22 PM									
	Time synchronization SIEMEN									
	Frime synchronization									
	Overview Display	f the system time								
	HMI system time (Master)	Local plc system time (Slave)								
	5/2/2013 9:22:43 PM	5/2/2013 2:23:57 AM								
		Manual setting of the system time								
	HMI system time	To test the clock synchronization, you can change the HMI system time here. By enabling "HMI time synchronization mode - Master", the plc system time will be sychronized with the HMI system time.								

6.3 Project_02, TimeSyn_Project_02

6.3 Project_02, TimeSyn_Project_02

Clock synchronization between a S7-300 and a TP1200 Comfort Panel. The clock synchronization is performed via the "Date/Time PLC" area pointer - PLC (Master) \rightarrow HMI operator panel (Slave).

HMI_01_TP1200

PLC (Master) \rightarrow HMI operator panel (Slave)

Table 6-3

No.	Action		Screens								
41.	Calling clock synchronization										
	Call the time synchronization via the Application example > Overview > Time synchronization " button.										
42.	Specifying HMI time	Specifying HMI time									
	Change the HMI system time "Enter" button (1).	Change the HMI system time via the I/O field and complete the entry with the "Enter" button (1).									
	In this example: The HM	his example: The HMI time (hour) was changed to 9 am.									
	The HMI system time is adjusted to the PLC system time within a minute.										
	5/14/2013 9:41 AM										
	Time synchronization	ne synchronization SIEMENS									
	🔶 🥕 🏫 Ti	me pnization									
	Overview	Displ	ay the time								
	н	MI system time (Slave)	PLC system time (Master)								
		i/14/2013 9:41:02 AM	5/14/2013 12:41:27 PM								
			Manual setting of the system time								
		HMI system time	To test the clock synchronization, you can cl time here. The HMI system time will be automatically s the plc system time. The update time are de acquisition cycle. In this case "1 minute".	nange the HMI system ychronized with spendent of the							

6.4 Project_03, TimeSyn_Project_03

6.4 Project_03, TimeSyn_Project_03

Clock synchronization between a S7-300 and a TP1200 Comfort Panel.

The clock synchronization is performed via the "date/clock" and "control job" area pointers with job number 40.

- Operator panel (Master) \rightarrow controller (Slave).

HMI_01_TP1200

HMI operator panel (Master) → PLC (Slave)

Table 6-4

No.	A	ction	So	reens					
43.	Calling clock syncl	hronization							
	Call the time synchro "Application examp	onization via the ole > Overview > Time s	synchronization" button.						
44.	Specifying HMI tim	e							
	 Change the HM "Enter" button (Click the "Start starts" 	Il system time via the I/O f 1). set plc time" button (2).	ïeld and complete the en	try with the					
	In this example: The HMI time (hour) was changed to 9 am.								
	By clicking the butto	n the PLC system time is	s adjusted to the HMI sys	tem time.					
	Time synchronization SIEMENS								
	← / ♠	Time synchronization							
	Overview	Displ	ay the time						
		HMI system time (Master) 5/14/2013 9:58:43 AM	PLC system time (Slave) 5/14/2013 2:58:51 PM	2 Start set plc time ∖					
			Manual setting if the system time						
		HMI system time 5/14/2013 9:58:43 AM	To test the clock synchronization, time here. With the button, the system time with the system time of the HMI.	you can change the HMI system of the plc will be synchronized					

6.5 Project_04, TimeSyn_Project_04

6.5 Project_04, TimeSyn_Project_04

Clock synchronization between a S7-300 and a TP1200 Comfort Panel.

The clock synchronization is performed via the "control job" area pointer with the control job numbers 14 (time) and 15 (date).

- Controller (Master) \rightarrow operator panel (Slave).

For this clock synchronization, the time and the date of the operator panel can be synchronized independently from each other with the PLC system time/date.

HMI_01_TP1200

PLC (Master) \rightarrow HMI operator panel (Slave)

Table 6-5

 45. Calling clock synchronization Call the time synchronization via the "Application example > Overview > Time synchronization" button. 46. Specifying HMI date (alternatively, the time) Change the HMI system date via the I/O field and complete the entry with the "Enter" button (1). Click the "Start set HMI date" button (3). In this example: The HMI date (month) was changed to "4". By clicking the button (3) the HMI system date is adjusted to the PLC system date. 									
Call the time synchronization via the "Application example > Overview > Time synchronization" button. 46. Specifying HMI date (alternatively, the time) • Change the HMI system date via the I/O field and complete the entry with the "Enter" button (1). • Click the "Start set HMI date" button (3). In this example: The HMI date (month) was changed to "4". By clicking the button (3) the HMI system date is adjusted to the PLC system date. 4/14/2013 3:35 PM Time synchronization									
 46. Specifying HMI date (alternatively, the time) Change the HMI system date via the I/O field and complete the entry with the "Enter" button (1). Click the "Start set HMI date" button (3). In this example: The HMI date (month) was changed to "4". By clicking the button (3) the HMI system date is adjusted to the PLC system date. 	Call the time synchronization via the "Application example > Overview > Time synchronization" button.								
 Change the HMI system date via the I/O field and complete the entry with the "Enter" button (1). Click the "Start set HMI date" button (3). In this example: The HMI date (month) was changed to "4". By clicking the button (3) the HMI system date is adjusted to the PLC system date. 	Specifying HMI date (alternatively, the time)								
In this example: The HMI date (month) was changed to "4". By clicking the button (3) the HMI system date is adjusted to the PLC system date.									
By clicking the button (3) the HMI system date is adjusted to the PLC system date.	In this example: The HMI date (month) was changed to "4".								
Time synchronization SIE									
Time synchronization	MENS								
Overview									
HMI system time (Slave) PI C system time (Master)	2								
4/14/2013 3:35:13 PM 5/14/2013 3:35:14 PM Start set HMI date	3								
Manual setting of the system time									
1 HMI system time 3:35:13 PM 4/14/2013 To test the clock synchronization, you can change the HMI stime here. Button 1: Synchronization of the HMI time with the plc time. Button 2: Synchronization of the HMI date with the plc date	ystem								

7.1 Replacing PLC

7 Notes and Tips

The hints and tips below are intended to provide an aid if you would like to adjust the included configurations to your project environment.

7.1 Replacing PLC

Instead of the SIMATIC controller used, a different SIMATIC controller from the WinCC TIA Portal hardware catalog can also be inserted.

When replacing the SIMATIC controller, the following points should be noted or checked afterwards.

- The clock synchronization via the "HMI time synchronization mode" only supports SIMATIC S7-1200 and S7-1500 controllers.
- If you are using the function blocks from the projects "TimeSyn_Project_03" (FB110) or "TimeSyn_Project_04" (FB120), the SIMATIC controller used has to support the "STL" programming language. The FBs were created in the STL programming language.
- If, for example, the connection paths (Ethernet/PROFIBUS) have changed, check the following in the HMI configuration...
 - the configured HMI connection
 - the connections used in the global area pointers
 - the addresses of the area pointer used

7.2 Changing HMI operator panel

Instead of the TP1200 Comfort Panel used, you can also use a different operator panel from the WinCC TIA Portal hardware catalog.

When replacing the HMI operator panel, the following points should be noted or checked afterwards.

- Area pointer used Before changing the operator panel, you have to make sure that the new operator panel supports the area pointer used. Information regarding this matter can be found in the system manual of WinCC (TIA Portal).
- Create new connection (PROFINET → PROFIBUS).
 If you create a new connection instead of the existing connection, you have to recreate the area pointer.

8 Further notes, tips and tricks, etc. (optional)

Note What might additionally be of interest concerning the subject but not necessary for the direct understanding of the example.

9 Related Literature

9.1 Bibliography

This list is not complete and only represents a selection of relevant literature. Table 9-1

	Торіс	Title
/1/	STEP7 SIMATIC S7-300/400	Automating with STEP7 in STL and SCL Author: Hans Berger
		Publicis Publishing ISBN: 978-3895784125
/2/	STEP7 SIMATIC S7-300/400	Automating with STEP 7 in LAD and FBD Author: Hans Berger Publicis Publishing ISBN: 978-3895784101
/3/	STEP7 SIMATIC S7-300	Automating with SIMATIC S7-300 inside TIA Portal Author: Hans Berger Publicis Publishing ISBN: 978-3895783821
/4/	STEP7 SIMATIC S7-400	Automating with SIMATIC S7-300 inside TIA Portal Author: Hans Berger Publicis Publishing ISBN: 978-3895783821
/5/	STEP7 SIMATIC S7-1200	Automating with SIMATIC S7-1200 Author: Hans Berger Publicis Publishing ISBN: 978-3895783562

9.2 Internet links

The following list is not complete and only represents a selection of relevant information.

Table 9-2

	Торіс	Title
\1\	Link to this document	https://support.industry.siemens.com/cs/ww/en/view/69864408
\2\	Siemens Industry Online Support	https://support.industry.siemens.com
\3\	WinCC Advanced V13.0 System Manual	https://support.industry.siemens.com/cs/ww/en/view/91479053
\4\		How do you parameterize a structured data type in the IN_OUT area
\4	FAQ	of an FB and a function call with an ARRAY variable?
		https://support.industry.siemens.com/cs/ww/en/view/19106712

10 History

Version	Date	Modifications
V1.0	08/2013	First version
V1.1	09/2013	Chapter 2.1, note added
V1.2	11/2013	Control job 13/14 => Control job 14/15
V1.3	04/2015	Initialize FB210