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Program Library Karlsruhe

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Product Information

PCS 7/TM-EA

Var. **V2.3**

Issue: November, 2002

Descriptors

TELEPERM M , PCS 7 , AS416 , I/O Peripherals , Update

Summary

The present Product Information relates to the System Software Packages:

Name	Variant	Issue	Product no. (MLFB)
PCS 7/TM-EA	V	2.3	6ES7 478-2DA10-0AC0
PCS 7/TM-EA update	V	2.3	6DL5 100-8AX00-1XX3

Description:

Manual Connecting TM I/O to PCS 7	English	C79000-G8076-C710
Reference Manual Library of Driver Blocks	English	C79000-G8076-C711

This manuals have to be ordered separate if required.

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1 Scope

This Product Information contains **supplements** to the product. The product information is part of the product supplied and the information in it should be considered more up-to-date if uncertainties arise.

The delivery consists of:

6ES7 478-2DA10-0AC0 / 6DL5 100-8AX00-1XX3
1 CD with Library of Driver Blocks, FM456 system software, OCX and Object manager
Software contract
Product Information

2 Commissioning

Requirement: PCS 7/TM requires the STEP 7 package for its installation (version V4.02).

PCS 7/TM-EA occupies approximately 13 Mbytes of storage space on your hard disk drive.

You need administrator's privileges in order to install the PCS 7/TM software under Windows NT.

Attention: For operation with the FM456-4 a copy licence of the operating system software M7-SYS Realtime V4.0 is needed (order no. 6ES7 802-0FA14-0XX0).

This licence is not included in the change over package PCS 7/TM-EA, as one licence per customer is sufficient. Therefore it has to ordered separatly.

At the moment all customers ordering the number above, were automatically supplied with the version 5.0 of M7-SYS (-0FA15-).

As this version does no longer support the FM456-4, these customers have to reorder the version 4.0 via the TELEPERM M – Hotline with specification of the original order (phon +49 180 5050 222).

Procedure:

Insert the CD in the drive of the PC/programming device and start the *Setup* program. The files for the library of driver blocks, the FM456 system software, the OCX and the TPM478 object manager are then copied to the PC/programming device and entries are made in the MS Windows files. Important information on handling will be displayed during the Setup process.

Note

PCS 7/TM-EA registers itself in MS Windows NT system files. With MS Windows utilities such as Explorer, you cannot move PCS 7/TM files or folders, nor can you modify PCS 7/TM data in the MS Windows register. Programs will not run properly after such changes.

Deinstallation

When removing PCS 7/TM-EA from the PC/programming device, entries which were made in the WINSTART.BAT file by the system are not deleted.

Further information:

If using the block TM_S5KS, the functions FC10, FC26 and FC29 have to be copied from the library into the block container of your project before loading the project into the PLC. If they are missing, the PLC will carry out an error stop.

If the cycle monitoring time of the S7-CPU, configured with HW Config, exceeds, the CPU goes into STOP, if no OB80 is defined. To avoid this, the function SFC39 DIS_IRT should be installed in OB100 (MODE=2, OB_NR=80). But the CPU goes into STOP yet, if the monitoring time is exceeded more than 100%. Therefore the CPU capacity should be monitored with the CFC function **PLC → Module Information → Scan Cycle Time**. Detailed informations may be taken from the SIMATIC documentation.

If using a programming device with Pentium \geq 266 MHz and MPI on Board, within WinCC in the menu **MPI → System Parameter** you have to adjust „**CP5611(MPI)**“ as **Logical Device Name**. This menu is reachable in the MCP under **Tag Management → SIMATIC S7 PROTOCOL SUITE → MPI** by clicking on **MPI** with the right mouse key. The same setting has to be done in STEP 7 for installing the MPI interface under **Start → Settings → System Control → PG/PC Interface**. Here the CP5611 has to be selected.

After creating a new project following settings have to be done in the CFC.
In the menu **Options → Compilation Settings** the areas disabled for the CFC have to be changed in the following matter:
DB numbers: 1 to 20, FC numbers: 1 to 700.

After each transfer of connection data from the PLC to WinCC the wizard **Alarmrangierer** has to be started, for ranking the TELEPERM M I&C alarm messages to the SIMATIC alarm messages (see also the enclosed description: **Alarmrangierer.pdf** in the **\Dok** directory). Besides the informations for the status transfer are set correctly.

Caution: If the alarm ranking wizard V1.01 has not been started, the funktion status transfer to the OCX is not guaranteed !

For installing the object manager (OM) for the TPM478-2 under Windows95, the accessory program may be started from the enclosed CD directly. For this the program **Setup** has to be started from the directory **..IOM** on the CD.

Communication connections after general resetting the CPU

After a general reset of the S7-CPU only the system data and the blocks must be loaded into the CPU, i.e. the entire block container, but not the connection data. Then the connections are active after a restart of the CPU immediately.

After loading the connections always a boot of the FM456 is necessary.

Setting up the Memory Card for FM456-4

Please consider the extended chapter 4.2 (Input of Configuration) in release 2 of the manual (resp. in section 4 of this product information).

3 Removed Errors

3.1 Removed errors from version V1.00 to V1.01

F: Function concerned
A: Appearance
M: Modification

- F: Driver block TM_DZ
A: The communication of all drivers build in behind the TM_DZ is disturbed.
M: Handing-over of the channel number to the FM456-4 and length of receive data at the communication PCS 7 driver with FM456-4 corrected.
- F: Driver block TM_S5KE
M: Length of receive data at communication PCS 7 driver with FM456-4 optimized.
- F: Driver block TM_EU
M: The signal S80 will now be send additional in the low status no. 3, so that the old block EM also may be replaced compatible.
- F: Driver block TM_MELD
A: The signal output 6 supplies no watch-dog trigger signal.
M: The input MA6 has been removed. Instead of this an inverted trigger signal is given to the DIO module with each cycle (sign of life).

- F: Driver block TM_BU16
A: At this driver low and high byte are exchanged at the outputs.
M: Block corrected.
- F: Communication block TM_KOM
A: Break-off of the communication between S7-CPU and FM456 (all connections are blocked). Cause: Internal configuration lists are faulty.
M: Interpretation of the modules configured in DB1 corrected.
- F: Driver blocks TM_EG, TM_EK, TM_EU
A: The feedback signals of the unit controls should be visible from the operator system (OS), because graphic displays may be controlled by this signals.
M: Outputs made visible.
- F: TM_EK, TM_EU, TM_RK
A: At these driver blocks the S interference bits cannot be read from the OS.
M: Outputs made visible.
- F: TM_EG and TM_RK
A: At these driver blocks some inputs with text for the OCX are missing: (TM_EG: TEI, TAU, TA, TH; TM_RK: TH, TA, TC).
The output BGF is not visible from the operator system.
M: Missing inputs added and BGF made visible.
- F: Driver block TM_EU
A: In the status the signal S16 is send instead of S31 for the status bit command interlocking.
M: Block corrected.
- F: Group acknowledgement of the I&C messages
A: The I&C messages of the drivers cannot be acknowledged with the group acknowledgement key in WinCC, but only individual.
M: Attribute in the library changed for all driver blocks.
Note:
Because this attribute is specific for each instance, the attribute "Individual Message" has to be changed to "Group Message" for all instances already defined in the project (menue "Edit → Special Object Properties → Message...").
- F: Alarm archives
A: Status bits are put violet into the alarm archives in spite of the alarm ranking wizard and are acknowledged automatically at going. I.e. a status bit cannot be acknowledged while it is 1.
M: The alarm ranking wizard has been expanded in the way that status messages were put into the alarm archives no more.
- F: OCX for all drivers
A: In the OCX a wrong status word is calculated if the highest bit is set in a status variable EventRaw within WinCC/TM. Because of that wrong operating modes may be displayed.
M: Calculation corrected within the OCX.

- F: All Driver blocks with status
A: At these drivers (TM_DZ, TM_EG, TM_EK, TM_EU, TM_RK, TM_MSB) wrong values were send to the OCX at status transfer.
M: Status transfer of the blocks corrected and alarm ranking wizard expanded.
- F: Installation
A: There is no possibility in the setup to install the OCX without PCS 7/TM-EA. Because of that an installation is only possible if the SIMATIC Manager is installed.
M: New setup with the possibility to install the OCX separate (e.g. on an OS).
- F: README
A: There is no readme file on the delivered CD for the OCX.
M: File Readme.txt added on the CD for the PCS 7/TM-EA OCX.
- F: Communication block TM_KOM
A: Very sporadically break-off of the communication between S7-CPU and FM456-4 (one or several OBs are blocked). Remedy: Restart of the CPU.
M: Calling of the internal sending blocks changed.
- F: Boot procedure
A: During the boot procedure of the FM456-4 all outputs of the TM I/O modules were resetted, even if they are configured to hold. Cause: The TPM478-2 clears his process image when it gets a new configuration.
M: The restart reaction has been changed as shown below:
Boot: As before, e.g. the TPM478-2 is resetted (HW) and supplied with new configuration data.
Restart: If DB1 or DB2 has been changed, a soft reset of the TPM478-2 is performed (with new configuration data).
The output on the I/O bus is released only after all connections (OBs) have run once.

Note:

This function requires the release 2 of the TPM478-2.

3.2 Hotfix 1 for version V1.01:

- F: Operation of the Interrupt Collecting Module
A: The blocks in the Alarm Organisation Block OB40 didn't work. Therefore no interrupt working was given.
M: The firmware program for the FM456-4 module was corrected.

3.3 Hotfix 2 for version V1.01:

- F: Communication on the K-Bus between S7 CPU and FM456-4
A: If the communication on the K-Bus was very strained by WinCC and CFC it could be possible in rare cases that the data transfer between S7 CPU and FM456-4 was stopped, and the IO peripherals were no more actualized.
M: Expansion of the recovery functions in the firmware program for the FM456-4 module.

3.4 Removed errors from version V1.01+HF2 to V2.00:

- F: Function concerned
- A: Appearance
- M: Modification

- F: Driver block TM_DZ
 - A: The analog values (final value, intermediate value, correction factor, measuring time) are not transmitted to the DZ module. Additionally the inputs ZS and ZR are not set back.
 - M: Transmission of the analog values corrected. Internal marker for ZS and ZR are deleted after one cycle. Status bits ZL, ES and SP corrected.

- F: Driver block TM_RK
 - A: The binary signals for mode and command inhibits are exchanged.
 - M: Internal processing corrected.

- F: Driver block TM_RK
 - A: The values for YCO and YCU are not shown in the OCX.
 - M: Inputs YCO and YCU are now readable from the OCX.

- F: Driver block TM_ZE
 - A: The block gives wrong values with channel numbers > 0.
 - M: Evaluation of the parametrized KNR corrected.

- F: All driver blocks
 - A: English and French texts are missing.
 - M: English and French message texts added.

- F: All driver blocks
 - A: Up from version 5.0 of PCS 7 exists the function cold restart (OB102) additional to the restart OB100. This OB102 is not supported by the driver blocks.
 - M: All driver blocks are now placed in OB102 in addition to OB100 during definition in the CFC. Internal both OBs are evaluated for the block restart.
Note:
If a CPU416 is used, which doesn't support the OB102, the driver blocks have to be removed from the OB102 before translating.

- F: Communication CPU – FM456
 - A: With very high communication level on the K bus, and a communication factor set too low (within hardware configuration of FM456-4), a remaining connection break-off may appear. The connection restart can be caused by turning the key switch from RUN to STOP and RUN again.
 - M: The correction in the FM task guarantees the connection restart after communication trouble on the K bus between S7 CPU and FM456-4.

- F: All driver blocks with status word transmission
 - A: If driver blocks are deleted and re-defined in the CFC, gaps and mix-ups may result within the message system.
 - M: Because the assignment of system messages (LTM), low status (STL) and high status (STH) to EV_ID1, 2, 3 is not defined, a code is transmitted in the upper 2 bits of each status byte (LTM: 10, STL: 00, STH: 01). For this, status bits were switched from STL to STH with some blocks. At TVB and MSB each 2 x 2 system messages were summarized (see user documentation 'Reference Driver Blocks' C79000-G8076-C7111-03).

3.4.1 New Block

A new subordinate communication block TM_KIDB (FC 330) is included within the driver library. This block is copied to the block container automatically as soon as a TM_KOM is installed in the chart. The present configuration of the communication blocks TM_KOM and TM_KST remains unchanged.

3.4.2 Use of PCS 7 Version V5.2

When loading CFC charts which are constructed with PCS 7 V5.2 it is required that the CPU module contains the system block SFC83. This system block exists for the following types of CPU:

6ES7 414-3XJ00-0AB0
6ES7 416-3XL00-0AB0
6ES7 416-2XK02-0AB0
6ES7 417-4XL00-0AB0
6ES7 417-4HL01-0AB0
6ES7 414-4HJ00-0AB0

with firmware version of at least V3.0.

Therefore the use of PCS 7 V5.2 is restricted for these types of CPUs at the moment. It is still open whether this restriction will be changed by PCS 7.

3.5 Hotfix 1 for version V2.02

- F: TM_AE und TM_BEI: Simulation
 - A: The outputs BGF and XF were set if the connection CPU – FM456 doesn't work (if no FM456 is present for example), even if simulation has been selected.
 - M: TM_AE: If the simulation input SIMON is set now, BGF and XF were reset, and the simulated value output irrespective of the CPU-FM communication state.
TM_BEI: Now the corresponding simulated bits can be switched through always via the separate simulation inputs SIMONx (but BGF is set furthermore).

3.6 Hotfix 2 for version V2.02

- F: ET100 modules via interface module 6DS1327
 - A: The S5 sub-modules at the interface module are configured in DB2 as described in the configuring manual. For S5 analog modules this configuration is evaluated faulty. By that the data exchange with the analog modules cannot be achieved in many cases.
 - M: Evaluation of the module configuration corrected within the FM456 firmware.

3.7 Removed errors from version V2.02+HF1+HF2 to V2.3:

F: Function concerned
A: Appearance
M: Modification

- F: TM_BEI: Reading the interrupt module
 - A: The driver TM_BEI can also be used to replace the former BRA block. This could read all 6 bytes of the module 61 via setting the channel number. But the driver TM_BEI allows only BTYP=1 at BGNR=61, i.e. reading byte 2.
 - M: Now with the module number BGNR=61 you can select the BTYP parameter at TM_BEI in the same manner as with all other module numbers, i.e. BTYP=1, 2, 3, 4 whether 1, 2, 4, or 6 bytes should be read.
- F: TM_AE: Open circuit message
 - A: If for example the channels of an analog input module 6DS1700-8AA are set to a measuring range of 4 to 20 mA, the driver should report open circuit (S320) with non-wired inputs. But in addition to the XF output also the BGF output (module defective) is set (error message S321).
 - M: Evaluation of the error bits corrected within the FM456 firmware.

3.7.1 Extended Function in V2.3:

F: Reaction of the Output Modules in STOP or HALT State
A: With transition from RUN state to STOP or HALT state of the CPU the values at the TELEPERM M output modules normally remain unchanged.
M: With the new configuration 'STOP:NULL_TO_OUT' at the module type of a free module number you can select now, whether the outputs are set to zero if the CPU goes to STOP or HALT, and if a corresponding setting has been done on the module (see chapter 4.2 of this product information).

4 Input of Configuration

4.1 Expanded Chapter 4.2 of the Manual

Data Blocks from Library First the data blocks DB1 and DB2 as well as the data types UDT1 and UDT2 have to be copied from the library into the current project.

- Open the SIMATIC Manager
- Open current project and library Pcs7_tm
- Select FM456-Task \ Blocks
- Select DB1, DB2, UDT1 and UDT2 and copy it into the block container of the FM456-4 within the current project.

I/O Configuration The configuration is carried out with the block editor in DB1 and DB2 of the FM456-4 (View → Data View). The configuring for the interface to the TELEPERM M I/O bus is limited to

- the assignment of the module identification (MLFB) to the module number (slot number) in the TELEPERM M I/O subrack,
- the processing cycle for cyclic repetition of the process image.

The information arising during configuration of the I/O peripherals are saved in DB1 and DB2 of the FM456-4. During processing, these can be entered and modified for every module number. They are not simultaneously activated with the entry.

The definitions of the configuration lists are activated by restart of the FM456-4 after power-on.

Setting up the FM456 – Memory Card

Necessary Software Components The memory card of the FM456-4 has to contain the following software components:

- the operating system M7-SYS Realtime V4.0
- the hardware configuration
- the configured connections to the S7-CPU (see Reference Manual Library of Driver Blocks for TM-I/O Chapter 4.5)
- the task TM_EA_S7 for operating with the I/O interface module TPM478-2 and for communication with the S7-CPU
- the I/O configuration data (DB1 and DB2)

The user has to install these software components on the memory card of the FM456-4 using the operations described in the following sections.

Operations for installing the memory card of the FM456-4:

M7-SYS

- Open the SIMATIC Manager
- Open the current project
- Select the M7 Program of the FM456-4
- PLC → Manage M7 System...
- Select medium "MemoryCard"
- Select index "Install Op. System"
- Select "M7 RMOS32" → Install (confirm all questions)
⇒ Memory card will be formatted, M7-SYS will be installed

Blocks

- PLC → Manage M7 System...
- Select medium "MemoryCard"
- Select index "Programs"
- Select "Bausteine" (Blocks) → Install (Response the question, whether batch files have to be entered in \etc\inittab with "Yes")
⇒ HW configuration, configured connections and configuration DBs are copied.

System SW

Because the system software is not visible in the SIMATIC Manager, if the optionally SW package M7-ProC/C++ is not installed, the system software with all components has to be copied with the Windows Explorer on the memory card:

- Select directory \Siemens\Step7\S7libs\Pcs7_tm\hrs\P0000002\
• Copy file TM_EA_S7.EXE to mc:\romdir
- Create directory \S7auto on the memory card mc:
- Copy file TM_EA_S7.BAT to mc:\S7auto
- Copy file BGRLISTE.TYP to mc:\romdir
- Edit file mc:\etc\inittab

The following line has to be added at the end of this file in the block "Init 2 – not synchronized user ...":

```
2 \s7auto\tm_ea_s7.bat
```

4.2 Supplement to Chapter 4.9 of the Manual

4.9.3 Reaction of the Output Modules in STOP or HALT State

With transition from RUN state to STOP or HALT state of the CPU41x the values at the TELEPERM M output modules normally remain unchanged. This reaction can be changed by configuration. For that the following pseudo module has to be defined within DB1 of the FM456-4:

Module type: **STOP:NULL_TO_OUT**

Cycle: n = 0 or $0 < n < 21$, with:

n = 0 (default value): The last output values survive if the CPU goes to STOP or HALT.

$0 < n < 21$: If the CPU goes to STOP or HALT, the outputs are set to zero if a corresponding setting has been done on the module. On this $(n-1) * 250$ msec will be waited between occurrence of the STOP/HALT state and the zero output. If the CPU changes from the STOP/HALT state to the RUN state during this waiting period, the last output state survives.

4.9.4 Diagnosis Function: Time Measurement at FM456-4

This function gives information about the FM456-4 load, and about the communication running times between CPU41x and FM456-4. But the interpretation of this data can only be done by the TELEPERM M support. With the following configuration of a pseudo module within the DB1 data block of the FM456-4 this diagnosis function can be switched on/off:

Module type: **DIAG_FM456*****

Cycle: n = 0 or $n > 0$, with:

n = 0 (default value): Diagnosis / time measurement deactivated on the FM456-4.

n > 0: Diagnosis / time measurement activated on the FM456-4.

4.3 Extension in Chapter 4.3 of the Manual (Interrupt Configuring)

Furthermore, configure the following FM456-4 parameters in SIMATIC Manager → HW Config:

- Properties FM456-4 → Basic Parameters:
Interrupt Selection: Default is "none". Set it to "Process" in order to enable throughput of the process interrupt from the interrupt triggering module.
- Properties FM456-4 → Addresses:
The parameters process image (OB PI) and in/output addresses (512) within this mask must not be changed.

The reaction to the process interrupt has to be programmed by the user in the OB selected within the addresses mask (e.g. OB40).

The 48 bits read from the group interrupt module by the system, are written to the FM456-4 process image, and can be read from PIW 512 to PIW 516 by the user application.

5 Block Data:

Block (Type name)	Typical run time (ms)	Block length (bytes)	Instance data length (bytes)	Temporary memory (bytes)	Multi-instance block	FB/FC No.
TM_AA	0,33 / 0,60	2744	220	38	SFB 35 + FB 330	FB 304
TM_ABR		5104	242	56	SFB 35 + FB 330	FB 315
TM_AE	0,33 / 0,62	3294	226	40	SFB 35 + FB 330	FB 303
TM_A110	0,32 / 0,62	3310	222	44	SFB 35 + FB 330	FB 308
TM_BAU	0,35 / 0,68	3332	208	42	SFB 35 + FB 330	FB 302
TM_BEI	0,66 / 1,06	8602	222	44	SFB 35 + FB 330	FB 301
TM_BRBK		4460	236	80	SFB 35 + FB 330	FB 314
TM_BU8	0,41 / 0,81	4722	198	38	SFB 35 + FB 330	FB 305
TM_BU16	0,62 / 0,97	7462	202	38	SFB 35 + FB 330	FB 306
TM_DZ		5934	394	76	SFB 35 + SFB 34 + FB 330	FB 309
TM_EG	0,34 / 1,34	4380	304	52	SFB 35 + SFB 34 + FB 330	FB 311
TM_EK		9942	374	76	SFB 35 + SFB 34 + FB 330	FB 312
TM_EU		7382	324	70	SFB 35 + SFB 34 + FB 330	FB 313
TM_E110	0,29 / 0,66	4362	220	36	SFB 35 + FB 330	FB 307
TM_MELD	0,36 / 0,63	2752	192	40	SFB 35 + FB 330	FB 323
TM_MSB		9164	332	66	SFB 35 + SFB 34 + FB 330	FB 317
TM_RK		10024	500	104	SFB 35 + SFB 34 + FB 330	FB 318
TM_RZ		4240	256	50	SFB 35 + FB 330	FB 319
TM_RZA		2612	212	44	SFB 35 + FB 330	FB 320
TM_S5KE		4294	224	54	SFB 35 + FB 330	FB 321
TM_S5KS		7940	262	298	SFB 35 + FB 330	FB 322
TM_TVVB		7050	328	52	SFB 35 + SFB 34 + FB 330	FB 316
TM_ZE	0,29 / 0,59	2390	206	34	SFB 35 + FB 330	FB 310
TM_KOM		5424	146	248	FB 332 + FB 333	FB 331
TM_KIDB		142	-	8		FC 330
TM_KST		160	-	8		FC 331

The run times each are specified for EN_MSG=0 (without I&C) and EN_MSG=1 (with I&C).

used multi-instance blocks:

Block	FB/FC No.	Code (bytes)	Local data
TM_ANM	FB 330	1250	74
TM_BRCV	FB 332	204	18
TM_BSEND	FB 333	212	18
ALARM_8	SFB 34	2	-
ALARM_8P	SFB 35	2	-