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Program Library Karlsruhe

S79451-A3496-A-18-7637

Product Information

PCS 7/TM-EA

Var. **V3.1 + SP2**

Issue: July, 2006

Descriptors

TELEPERM M , PCS 7 , AS416 , AS417 , I/O Peripherals , Update

Summary

This Product Information relates to the System Software Packages:

Name	Variant	Issue	Product no. (MLFB)
PCS 7/TM-EA	V	3.1 SP2	6ES7 478-2DA10-0AC0
PCS 7/TM-EA update	V	3.1 SP2	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

These manuals have to be ordered separately if required. They are also included as PDF files on the CD (in the DOK directory).

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-EA requires the PCS 7 package version V6.1 + SP1 for its installation.

If the function 'Configuration in Run' (CiR) which is available up from PCS 7 V6.0 SP3 should be used together with PCS 7/TM-EA an interface module IF961-DIO has to be plugged in the FM456-4.

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

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

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 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.

2.1 M7-SYS Realtime

For operation with FM456-4 the operating system software M7-SYS Realtime V4.0 is needed. As this can no longer be ordered since 10/01/2003, it is now included on this CD (PCS7_Version_6 \ SW \ M7_SYS).

For installing M7-SYS please start the *Setup* program from the directory DISK1. After that you have to install the correction version from the directory K40008 additionally.

Note

It is not possible to do a "normal" installation of SIMATIC M7-SYS under MS Windows 2000. To carry out the installation, you must proceed as follows:

- First choose "Start → Run".
- In the "Run" dialog window enter the **full path** of "Setup.exe" with the parameter "-ntall" (e.g. "D:\...\disk1\setup.exe" -ntall).
Important: Make sure the "-ntall" parameter in the "Run" dialog window is **not** enclosed in the quotation marks. Only the file path should be enclosed by quotation marks.
- Then follow the remaining installation instructions (see also SIMATIC M7 FAQ Entry ID 9375417).

2.2 Migration of Projects < V5.2 to PCS 7 V6.x

With projects created under PCS 7 V4.x, V5.0 or V5.1 (i.e. with PCS 7/TM-EA V1.x/V2.02) the **Alarmrangierer** wizard had to be started after each transfer of connection data from the PLC to WinCC, for ranking the TELEPERM M I&C alarm messages to the SIMATIC alarm messages, and to set the informations for status transfer correctly.

Up from PCS 7 V5.2 the 'Alarmrangierer' wizard is only needed for generating the TELEPERM M message class. The alarm and status ranking of all driver blocks has already been set correctly within the library.

That means, after creating a new project, or after upgrading a project to V6.x the wizard has to be run once.

In projects created with previous versions, these settings have to be corrected for all block instances in the Engineering System.

For this please contact the Technical Support for TELEPERM M:

Phone: +49 (180) 5050 222

Fax: +49 (180) 5050 223

Support Request: <http://www.siemens.de/automation/support-request>

Further information:

If using the TM_S5KS block, the functions FC10, FC26 and FC29 have to be copied from the PCS 7 library into the PCS7_TM library after installing the block library of PCS 7/TM-EA. With this the CFC will find the FCs when defining a TM_S5KS.

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 information 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 the wizard **Alarmrangierer** has to be started once for creating the TELEPERM M message class (see also the enclosed description: **Alarmrangierer.pdf** in the \Dok directory).

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 a new connection always a STOP/RUN of the FM456-4 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 5 of this product information).

Display blocks S7/TM-OCX (NORA)

The present CD also includes display blocks in TELEPERM M NORA style.

These are located in the directory sw\OCX_S7M together with the authorization DLL TelepermOCX.dll, necessary for regular working. The authorization is delivered on a separate disk (A7TMFP50 for PCS 7 V5.x or A7TMFP60 for V6.x).

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 grafic 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. Additional 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 5.2 of this product information).

3.8 Hotfix 1 for Version V2.3:

- F: TM_EK: S10
 - A: The driver signals S10 for channel 3, when the command from CLOSED to OPEN has been given, even though the 6DS1503 module doesn't signal an error. But this only happens, if a running-time > 0,5 s has been set on the module.
 - M: Evaluation of the module data corrected within the FM456 firmware.

3.9 Hotfix 2 for Version V2.3:

- F: TM_RK: the controller oscillates
 - A: According to the control parameters and the controlled system it may happen, that the control loop oscillates. Besides this some parameters read from the module are displayed faulty (EBR1/3, K2/K3 and K5).
 - M: TM_RK driver and FM456 firmware corrected.

3.10 Removed Errors from Version V2.3+HF2 to V3.0:

- F: TM_S5KS
A: If a non-standardized zero in S5 or S7 floating point format is transmitted with the TM_S5KS block, a very large number is generated from it.
M: Standardization corrected.

- F: Configuration of connections
A: If the connection configuration has been changed, the new connection data in the FM456-4 is only accepted after power off/on of the CPU. But for the CPU changing to STOP mode and back to RUN is sufficient.
M: With transition from RUN to STOP and from RUN to HALT, all communication connections between CPU and FM456-4 were disconnected. With transition from STOP to RESTART all possibly changed connections will be established again.

3.10.1 Using Version 3.1 of the S7-CPU Firmware

For PCS 7/TM-EA generally the use of firmware version 3.1 for the S7-CPU41x is recommended. This includes an optimizing of the communication processing, which removes some sporadically appearing communication errors. Such errors have been recognized by the PCS 7/TM-EA communication blocks, and signaled with the alarm message 'Communication error FM'.

For the update of previous firmware versions to V3.1, an appropriate download has been offered since 1/2003 in the intranet of SIMATIC S7 Support.

3.11 Hotfix 1 for Version V3.0:

- F: Module outputs at restart
A: On rare occasions (using several time interrupts with the same basic cycle and with phase shifting) the outputs of the TELEPERM modules may be reset for a short time at resumption of power supply (i.e. after power off/on).
M: The FM456 firmware has been corrected to the effect that the outputs will hold their former state or the current state of the driver blocks.

Note: This hotfix can also be used with former versions 2.x .

3.12 Service Pack 1 for Version V3.0:

- F: Display block for TM_EK
M: The display block for the TM_EK function block has been extended for the incremental adjustment (Y).

3.13 Removed Errors from Version V3.0 SP1 to V3.1:

- F: TM_RK
A: The manipulated value can only be adjusted between 20 and 80% at DDC mode.
M: Division of output value DeltaC can only be done at SPC mode.

Note:

From V3.1 following both new CPUs are released for PCS 7/TM-EA:

- 6ES7416-3XL04-0AB0
- 6ES7414-3XJ04-0AB0

3.14 Removed Errors from Version V3.1 to V3.1 SP1:

- F: TM_AE
A: Sporadically the analog input driver sends an I&C system message S321 (above all if an interrupt module is used in the automation system).
M: The FM456 firmware TM_EA_S7.EXE has been corrected.

3.14.1 Improvement of the Monitoring between CPU and TPM 478-2

The central processing unit of the automation system PCS 7/TM-EA includes besides the CPU module an interface module TPM 478-2. If one of both modules breaks down (e.g. by a HW defect) it may happen that the information about the partial failure of the AS will not be forwarded to the I/O modules or the Operating&Monitoring Systems. This can cause the following incorrect reaction:

- After failure of the TPM 478-2 alone the CPU of the automation system gets no information about the TPM 478's operating state. By this the processing of the TPM 478-2 is blocked without the CPU of the automation system can recognize this. Thus also no I&C system message is generated.
- The PCPLK signal between TPM 478-2 and the I/O modules (control signal 'CPU ready' to the peripherals) is controlled by the TPM 478-2 assisted by the TPM firmware. If the firmware processing fails the PCPKL signal cannot go to 'not ready'. By this the function configured via jumpers on the I/O modules (keep / reset outputs in case of CPU failure) will not be triggered.
- The failure of the CPU module or the system software cannot be recognized by the TPM 478-2, so the PCPKL signal will not be set correspondingly. (Impact like the previous point)

Functional improvement:

As from TPM 478-2 release 7 better use of the HW watchdog causes the PCPKL signal to be set to 'not ready' shortly if the TPM 478-2 fails. Together with PCS 7/TM-EA from version 3.1 SP1 this reaction is further improved by an extended mutual monitoring between both modules.

Note: These new monitoring functions for mutual monitoring can be switched off in PCS 7/TM-EA by configuring "TPM478:NO_WATCHD" at the module type of a free module number (see chapter 5.2 of this product information).

System behavior (message):

A failure of the interface module TPM 478-2 release ≥ 7 with V3.1 SP1 results in following:

- The failure is signalled by PCS 7/TM-EA with a new entry in the diagnostic buffer of the FM 456-4: Additional info 1 = 16#A007 \rightarrow TPM broken down. Additionally both LEDs USR1 and USR2 at FM 456-4 are flashing with 2 Hz.
- All driver blocks each give the I&C system message 'Module timeout (S305)'.
- The I/O bus processing is stopped (the PCPKL signal is set to 'not ready' by reset of the TPM 478-2). The complete TELEPERM M I/O peripherals can no longer be read.

A failure of the CPU module or the system software V3.1 SP1 results in following:

- The TPM 478-2 release ≥ 7 sets the PCPKL signal to 'not ready', the I/O bus processing is stopped. The function configured via jumpers on the I/O modules (keep / reset outputs in case of CPU failure) is executed correctly.

Required user activities (restart by operation):

The fault condition (failure of CPU or TPM 478-2) cannot be eliminated automatically. Instead the plant operator has to carry out following actions:

- Bring the process into a save state by hand (configuration by ARS jumpers, main switch, subordinate protective level, etc.) if not already done.
- Switch off and on the power at PCS 7/TM-EA.
- If the fault appears again the TPM 478-2 module or CPU has to be exchanged.

3.14.2 Modified Configuration for the I/O Modules 6DS1500/1501

When using an open-loop control module 6DS1500 or 6DS1501 at unfavorable conditions it may sporadically happen that the general fault indicator lights up without I&C system message. In this case also the indicators at a connected control station were set. In extreme cases this will result in a permanently defect which can only be repaired by shortly removing the module fuse with following restart of the module.

Therefore new configuration strings were adopted for these two I/O modules up from version 3.1 SP1:

6DS1500-8AA-2
6DS1500-8BA-2
6DS1501-8AA-2
6DS1501-8AB-2
6DS1501-8BA-2
6DS1501-8BB-2

Attention: For using this new configuration an interface module TPM 478-2 with version A7 or later has to exist!

3.15 Removed Errors from Version V3.1 SP1 to V3.1 SP2:

- F: Downloading connections
 - A: If net connections are downloaded while running (e.g. in NetPro: PLC / Download to Current Project / Connections and Gateways) the coupling between CPU and FM456-4 gets lost. The new (or unchanged) connections will be activated again first after STOP/RUN of the FM456-4.
 - M: The FM456 firmware TM_EA_S7.EXE has been extended:
If a connection has been modified (deleted, new or overwritten) the communication connection is removed or restarted automatically. Actuating the keyswitch is no longer necessary,
Note: While establishing the connection again no data exchange between S7-CPU and FM456-4 is possible for a short time.

4 Restrictions

- If the function 'Configuration in Run' (CiR) which is available up from PCS 7 V6.0 SP3 should be used together with PCS 7/TM-EA an interface module IF961-DIO has to be plugged in the FM456-4.
If you try to load the FM456-4 module in RUN state this will otherwise be rejected with an error message, i.e. loading will only be possible in STOP state without IF.
- If using the TM_S5KS block, the functions FC10, FC26 and FC29 have to be copied from the PCS 7 library 'Standard Library \ IEC Function Blocks' into the PCS7_TM library after installing the block library of PCS 7/TM-EA.
Without this copy procedure the CFC will report that he cannot find these three FCs when installing a TM_S5KS block, and will not allow the definition.
- The TM_ZE block (in conjunction with the metering pulse input module 6DS1607) is not suitable for frequency measuring, as the cycle equidistance is not ensured. Cause: The cycles within CPU, FM456-4 and TPM478-2 are not synchronized.
- If driver blocks were installed within a run-time group for which a specific scan rate and/or phase offset has been defined, following restrictions have to be observed:
 - A reducing factor of 4 must not be exceeded.
 - A total cycle of 3 seconds (time interrupt OB + scan rate) must not be exceeded; this would cause restart problems after power OFF/ON or STOP/RUN.
 - A scan rate is not be possible
 - at sub-modules used via an interface module (6DS1310, 6DS1318, 6DS1321, 6DS1322, 6DS1327, 6DS1333).
 - at modules 6DS1717 and 6DS1613.

5 Input of Configuration

5.1 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
```


5.2 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.

4.9.5 Mutual Monitoring between CPU and TPM 478-2

With the following configuration of a pseudo module within the DB1 data block of the FM456-4 the mutual monitoring between CPU and TPM 478-2 can be switched on/off:

Module type: **TPM478:NO_WATCHD**
Cycle: n = 0 or n > 0, with:
n = 0 (default value): Monitoring is deactivated.
n > 0: Monitoring is activated.

5.3 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.

5.4 Extensions in Chapter 4.5 of the Manual (Configuring Coupling Modules)

- With configuration errors, e.g. if a driver block accesses a subordinate I/O module which has not been configured and is therefore not existing because of a wrong configured channel number, possibly no acknowledgement error S305 will be signaled.
- In principle the corresponding module width has to be configured for each S5 module with S5_Typ as far as possible. Especially combining several modules has to be avoided.
Example: 2 byte binary input S5_Typ = DE2;
4 byte binary output S5_Typ = DA4;

4.5.1 Configuration Notes for the Coupling Modules 6DS1333, 6DS1318

Among the module operating manuals and the driver documentation for TM_S5KS/TM_S5KE, the notes described below are relevant for configuring the coupling modules.

A migration from AS230 / AS235 / AS488/TM to PCS 7/TM-EA is possible, if the links within the system configuration and its structure meets the following standard configuration:

Standard configuration, quantified project scope:

- Settings relating to the number of coupling modules:

Number of coupling mod.	Number transm. channels / mod.	Number receive channels / mod.	TM_S5KS/S5KE driver cycle	DB1 cycle
2	2	1	1 s	16 (500 ms)
4	2	0	1 s	16 (500 ms)
4	2	1	2 s	32 (1 s)

- Up to 6 TM_S5KS driver per channel KNR can send to a single module. The partner device transmits no more than 12 telegrams per TM_S5KE cycle.
- With acyclic stress by process alarms, and by transmission times of I/O modules behind coupling modules 6DS1322-8AA, the number of coupling modules which can be used in the same cycle, may be reduced (recommendation: slot for the coupling module immediately in the migration rack).

If a system departs from this standard scope (e.g. a larger number of coupling modules or more driver blocks), such couplings often can be replaceable nevertheless. But sometimes changing the configuration may be necessary (e.g. parameter adjustment, extension of TM_S5KE cycle).

Common settings:

- All TM_S5KS of a module have to be installed in the same cycle.
- The DB1 cycle for these coupling modules has always to be set faster than the assigned TM_S5KE block.

Operating mode, settings for 6DS1333-8AB:

- The 6DS1333-8AB interface module works with high priority, on the partner side 'low priority' has to be set; 1 stop bit, even parity, same baudrate. ED telegrams can be initiated only by the AS.
- For reading data from a partner device (with FETCH), and for monitoring a TM_S5KE has to be configured in the AS coupled with SIMATIC S5/S7. Only one TM_S5KE is used for each module, which has been installed in the cycle list only once.
- Protocol 3964(R) and RK512 procedure.
 The RK512 procedure is essential required. The 3964 or 3964R protocol is open selectable. The X5/11-12 jumper has to be set like configured on the partner side [optional parameter for (R)].
 S7 protocol parameter = 'Standard settings'.

- When coupling to SIMATIC S7, the setting 'RK512' includes the '3964' protocol. Using 3964R is recommended because of the improved communication in disturbed environment.
- Coupling to SIMATIC S7: On 6DS1333-8AB the X5/13-14 jumper has to be set for disabling the function 'check telegram'. This is also necessary for other devices without check function.
 - Coupling to SIMATIC S7-300: If the X5/13-14 jumper has been installed, the 6DS1333-8AB sends the data type DAAR=n (TM_S5KS block) for the coordination flag within the telegram array. The P_RCV_RK S7 block then sets the flag with this number (e.g. M 0.1 for DAAR=1) after each receiving. The next telegram can be received only, after the S7 software has reset this flag. This enabling has to be done quickly.

Operating mode, settings for 6DS1318-8AB:

- The 6DS1318-8AB module has to be treated in the same manner as the 6DS1333-8AB.

5.5 Extensions in Chapter 4.7.2 of the Manual (Substitute Configuration)

For PCS7/TM the result is the following configuration of 6DS1504-8AA / 6DS1505-8AA :

Configuration rules

DB1	BGNR021 .BG_Typ=6DS1310-8AA .Zyklus=...	Example for module number Substitute configuration (always enter 6DS1310!) The cycle must always be faster than the fastest cycle of the TM_EG driver blocks assigned to this module.
DB2	.Kanal=8 .S5_Typ=DE2 .Kanal=0 .S5_Typ=DA1 .Kanal=1 .S5_Typ=DA1 .Kanal=2 .S5_Typ=DA1 .Kanal=3 .S5_Typ=DA1	<i>new!</i> Only enter if operating TM_EG driver type 0, 1 or 2 with KNR=0. Only enter if operating TM_EG driver type 0, 1 or 2 with KNR=0. Only enter if operating TM_EG driver type 0, 1 / KNR=1 or type 2 / KNR=0. Only enter if operating TM_EG driver type 0, 1 / KNR=1 or type 2 / KNR=0. Only enter if operating TM_EG driver type 0, 1 or 2 with KNR=2. Only enter if operating TM_EG driver type 0, 1 or 2 with KNR=2. Only enter if operating TM_EG driver type 0, 1 / KNR=3 or type 2 / KNR=2. Only enter if operating TM_EG driver type 0, 1 / KNR=3 or type 2 / KNR=2.

Die restlichen Einträge sind nur für 6DS1505-8AA relevant:

.Kanal=4	Only enter if operating TM_EG driver type 0, 1 or 2 with KNR=4.
.S5_Typ=DA1	Only enter if operating TM_EG driver type 0, 1 or 2 with KNR=4.
.Kanal=5	Only enter if operating TM_EG driver type 0, 1 / KNR=5 or type 2 / KNR=4.
.S5_Typ=DA1	Only enter if operating TM_EG driver type 0, 1 / KNR=5 or type 2 / KNR=4.
.Kanal=6	Only enter if operating TM_EG driver type 0, 1 or 2 with KNR=6.
.S5_Typ=DA1	Only enter if operating TM_EG driver type 0, 1 or 2 with KNR=6.
.Kanal=7	Only enter if operating TM_EG driver type 0, 1 / KNR=7 or type 2 / KNR=6.
.S5_Typ=DA1	Only enter if operating TM_EG driver type 0, 1 / KNR=7 or type 2 / KNR=6.

5.6 Extension in Chapter 3.14 of the Library Reference Manual (TM_EK)

Standardized Display for the TM_EK Block

Configuring the button text:

In continuous operation mode (DLBT = 0) the 2nd character of the TY string has to be set to '*'. The TZU, TST, and TAU strings must not include a '*', if they should be operated.

In inching operation mode (DLBT = 1) the 2nd character of the TZU, TST, and TAU strings has to be set to '*'. The TY string must not include a '*', if it should be operated.

A dynamic switchover of the continuous / inching operation mode during run-time must not be realized, as no automatic adjustment of the strings will be possible.