

SIMOCRANE

Basic Technology V2.0 SP2

Main Changes

Siemens Cranes
Product Management
December 2010, Germany

Overview of changes

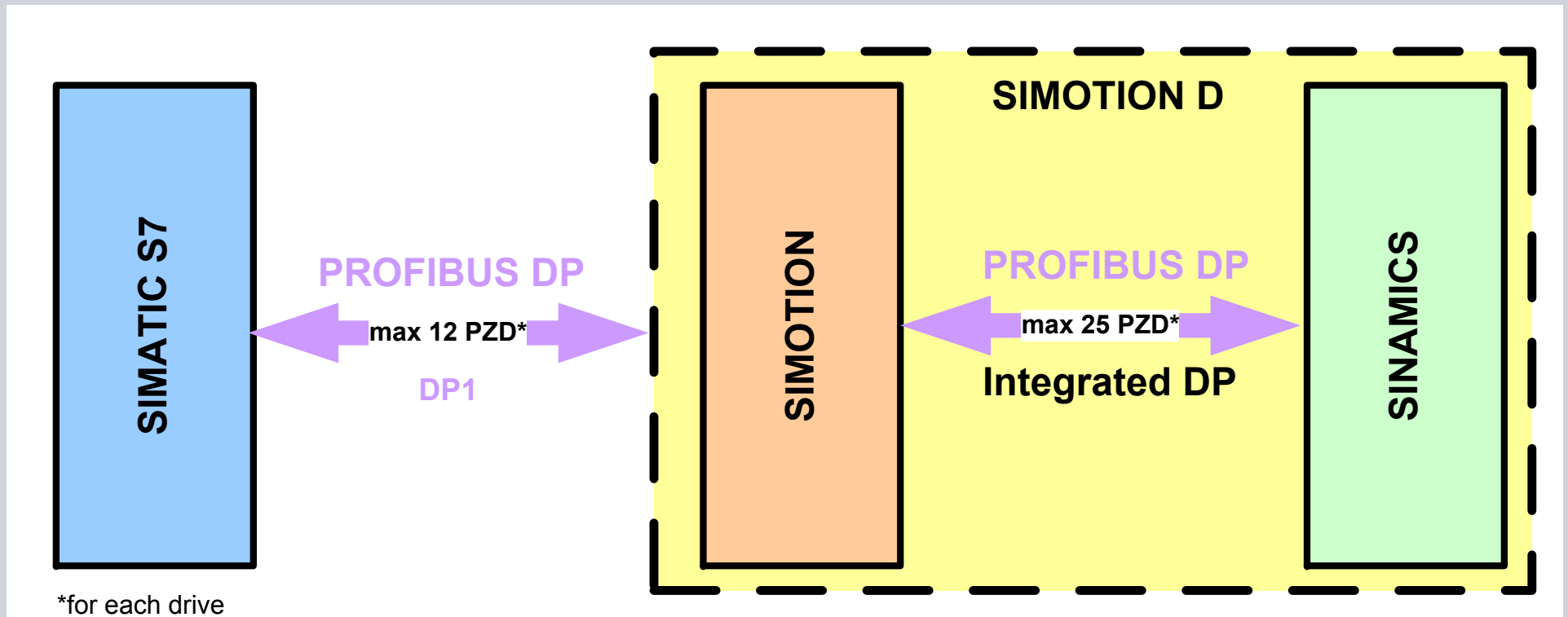
Target of V2.0 SP2: To improve usability and to extend functionality

1. Simplify of communication interface S7 \leftrightarrow Simotion D
 - Simplify of control signals (to select operation mode, switchover,...)
2. New classification of fault messages
 - Some fault messages were changed to warning 'messages
3. Simplification and extension in DCC-Library
 - most 20-points polygons were changed to 6-points polygons
 - Extension of DCC_Overspeed
 - Extension of DCC_SlackRopeControl
4. Simplify in variable setting
 - Automatically setting via Scripting
5. Extended Functions
 - Offset compensation control in synchronous operation
 - Offset-Mode in Tandem-operation
 - Brake test
 - Extension of communication interface (S7 \leftrightarrow Simotion, Simotion \leftrightarrow Sinamics)
 - Profinet RT option for communication between S7 \leftrightarrow Simotion D
 - ...

1

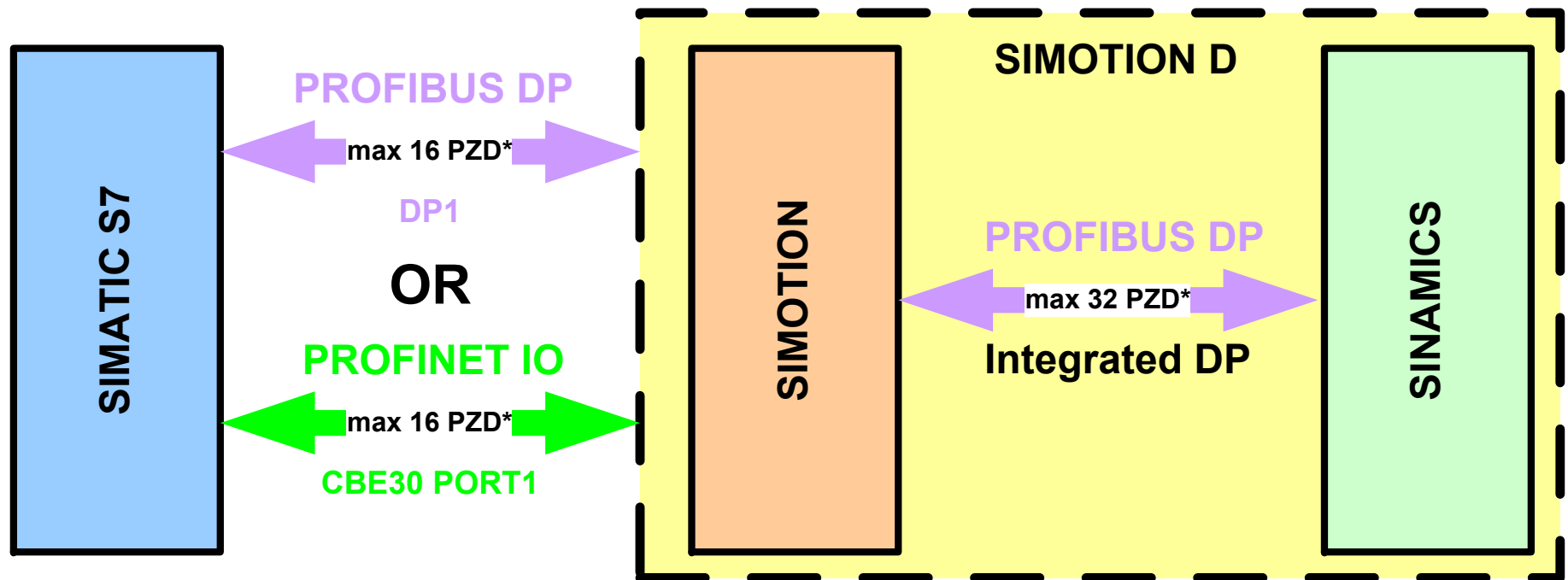
Simplify of communication interface S7 ↔ Simotion

Communication between PLC / Simotion / Sinamics OLD



Communication between PLC / Simotion / Sinamics

NEW



*for each drive

Changes in Communication S7 → Simotion



The changed signals are in red color

Communication S7 – Simotion OLD	
PZD	Signal name
1	Control word_1_S7
2	Master switch_S7 or for the AUTOMATIC operating mode, variable velocity
3	Control word_2_S7
4	Reserved
5	Ramp-up time_S7
6	Ramp-down time_S7
7	Setpoint for the start_pulse_S7
8	Actual working radius
9	Application_control_word_1_S7
10	Application_control_word_2_S7
11	Target_position_S7
12	

Communication S7 – Simotion NEW	
PZD	Signal name
1	Control word_1_S7
2	Master switch_S7 variable velocity
3	Control word_2_S7
4	Automatic velocity
5	Ramp-up time_S7
6	Ramp-down time_S7
7	Setpoint for the start_pulse_S7
8	Actual working radius (only SlewingGear) / TorqueLimit (BrakeTest STS)
9	Application_control_word_1_S7
10	Application_control_word_2_S7
11	Target_position_S7
12	
13	Material factor (only HoldingGear / free
14	TorqueLimit (only HoldingGear) / free
15	Free for user-engineered applications
16	Free for user-engineered applications

Changes in Control word 2

The changed signals are in red color

Control word 2 OLD	
Bit	Signal name
0	Drive Data Set selection DDS bit0
1	Drive Data Set selection DDS bit1
2	TandemHomig
3	TandemMode
4	SlaveTandemMode
5	Reserved
6	SelectMasterAxis2
7	SelectMasterAxis3
8	CheckbackSlave
9	CheckbackSlaveTandem
10	CheckbackSlaveSlaveTandem
11	OffsetHoming
12	OffsetMode
13	Reserved
14	Reserved
15	Reserved

Control word 2 NEW	
Bit	Signal name
0	PositiveSuperimpose
1	NegativeSuperimpose
2	TandemHomig
3	TandemMode
4	SlaveTandemMode
5	DriveMasterSuperimpose
6	SelectMasterAxis2
7	SelectMasterAxis3
8	CheckbackSlave
9	CheckbackSlaveTandem
10	CheckbackSlaveSlaveTandem
11	OffsetHoming
12	OffsetMode
13	Reserved
14	Reserved
15	Reserved

Changes in Application control word 1

The changed signals are in red color

Application control word 1 OLD	
Bit	Signal name
0	Command, positive
1	Command, negative
2	Enable start pulse
3	Select heavy duty operation
4	Enable field-weakening
5	Reset load memory
6	Selecting master-slave operation
7	Selecting synchronous operation
8	Save offset
9	Start AUTOMATIC operating mode
10	AUTOMATIC operating mode
11	MANUAL operating mode
12	JOGGING operating mode (speed controlled)
13	SPEED_CONTROLLED operating mode
14	SENSORLESS EMERGENCY operating mode
15	SWAYCONTROL operating mode

Application control word 1 NEW	
Bit	Signal name
0	Not used
1	Not used
2	Enable start pulse
3	Select heavy duty operation
4	Enable field-weakening
5	Reset load memory
6	Selecting master-slave operation
7	Selecting synchronous operation
8	Save offset
9	Start AUTOMATIC operating mode
10	AUTOMATIC operating mode
11	MANUAL operating mode
12	Not used
13	SPEED_CONTROLLED operating mode (=JOGGING)
14	SENSORLESS EMERGENCY operating mode
15	SWAYCONTROL operating mode

Changes in application: Application control word 1 (Appl_STW_1)

Appl_STW1

0: Cmd, positive

OLD

Setpoint >0 necessary

NEW

not necessary

1: Cmd, negative

Setpoint <0 necessary

not necessary

6: Selecting Master Slave operation

only Slave

Master and Slave

7: Selecting synchronous Operation

only Slave

Master and Slave

9: Start Auto

must be set to start positioning and for changing position on the fly

only set to start positioning

12: Operating mode

JOGGING

not used

13: Operating mode

SPEED_CONTROLLED

SPEED_CONTROLLED
(=JOGGING)

Changes in Application control word 2

The changed signals are in red color

Application control word 2 OLD	
Bit	Signal name
0	Feedback signal, brake opened
1	Select velocity limit, bit 1
2	Select velocity limit, bit 2
3	Select prelimit switch velocity
4	Enable slack rope controller
5	Command, save grab open
6	Command, save grab closed
7	Select orange-peel bucket
8	Enable current equalization controller
9	Select grab change
10	Homing
11	Select torque limiting
12	Select encoder switchover
13	SlaveMode
14	SlaveAvailable
15	changeTechnologyObject

Application control word 2 NEW	
Bit	Signal name
0	Not used
1	Select velocity limit, bit 1
2	Select velocity limit, bit 2
3	Select prelimit switch velocity
4	Enable slack rope controller
5	Command, save grab open
6	Command, save grab closed
7	Select orange-peel bucket
8	Enable current equalization controller
9	Select grab change
10	Homing
11	Select torque limiting
12	Select encoder switchover
13	SlaveMode
14	Brake Test
15	changeTechnologyObject

Changes in application: Application control word 2 (Appl_STW_2)



Appl_STW2

0: Feedback signal,
brake opened

14: SlaveAvailable

OLD

Master and Slave

only Master

NEW

not necessary

not necessary

Changes in Communication Simotion → S7



The changed signals are in red color

Communication Simotion – S7 OLD	
PZD	Signal name
1	Status word_1_S7
2	Speed_actual_value_S7
3	Status word_2_S7
4	Fault and alarm numbers
5	Current_actual_value_total_smoothed_S7
6	Load actual value_S7 / free
7	Torque_actual_value_smoothed_S7
8	Speed_setpoint_before_speed_controller_S7
9	Application_status_word_1_S7
10	Application_status_word_2_S7
11	ActualPositionVal_S7
12	

Communication Simotion – S7 NEW	
PZD	Signal name
1	Status word_1_S7
2	Speed_actual_value_S7
3	Status word_2_S7
4	Fault and alarm numbers
5	Current_actual_value_total_smoothed_S7
6	Load actual value_S7 / free
7	Torque_actual_value_smoothed_S7
8	Speed_setpoint_before_speed_controller_S7
9	Application_status_word_1_S7
10	Application_status_word_2_S7
11	ActualPositionVal_S7
12	
13	GrabOpenStatus (only HoldingGear) / free
14	free for user-engineered applications
15	free for user-engineered applications
16	free for user-engineered applications

Changes in Status word 2

The changed signals are in red color

Status word 2 OLD	
Bit	Signal name
0	Drive data set DDS effective, bit 0
1	Drive data set DDS effective, bit 1
2	TandemHomingActive
3	TandemModeActive
4	SlaveTandemModeActive
5	Safe Torque Off active
6	SelectMasterAxis2Active
7	SelectMasterAxis3Active
8	CheckbackSlaveActive
9	CheckbackSlaveTandemActive
10	CheckbackSlaveSlaveTandemActive
11	OffsetHomingActive
12	OffsetModeActive
13	Reserved
14	Reserved
15	Reserved

Status word 2 NEW	
Bit	Signal name
0	Not Used
1	Safe Torque Off active
2	TandemHomingActive
3	TandemModeActive
4	SlaveTandemModeActive
5	DriveMasterSuperimpose
6	SelectMasterAxis2Active
7	SelectMasterAxis3Active
8	CheckbackSlaveActive
9	CheckbackSlaveTandemActive
10	CheckbackSlaveSlaveTandemActive
11	OffsetHomingActive
12	OffsetModeActive
13	Reserved
14	Reserved
15	Reserved

Changes in Application status word 1

The changed signals are in red color

Application Status word 1 OLD	
Bit	Signal name
0	Axis moves in the positive direction
1	Axis moves in the negative direction
2	Message, drive stationary
3	Message, current distribution monitoring responded
4	Message, field weakening enabled
5	Message, AUTOMATIC operating mode, target position reached
6	Message, master-slave operation active
7	Message, synchronous operation active
8	Message, offset active
9	Message, AUTOMATIC request active
10	AUTOMATIC operating mode
11	MANUAL operating mode
12	JOGGING operating mode
13	SPEED_CONTROLLED operating mode
14	Operating mode SENSORLESS EMERGENCY
15	SWAYCONTROL operating mode

Application Status word 1 NEW	
Bit	Signal name
0	Axis moves in the positive direction
1	Axis moves in the negative direction
2	Message, drive stationary
3	Message, current distribution monitoring responded
4	Message, field weakening enabled
5	Message, AUTOMATIC operating mode, target position reached
6	Message, master-slave operation active
7	Message, synchronous operation active
8	Message, offset active
9	Message, AUTOMATIC request active
10	AUTOMATIC operating mode
11	MANUAL operating mode
12	free
13	SPEED_CONTROLLED operating mode (=JOGGING)
14	Operating mode SENSORLESS EMERGENCY
15	SWAYCONTROL operating mode

Changes in Application status word 2

The changed signals are in red color

Application Status word 2 OLD		Application Status word 2 NEW	
Bit	Signal name	Bit	Signal name
0	Closed-loop torque control active (H) or grab ½ open (H)	0	Closed-loop torque control active (H) or grab ½ open (H)
1	Closed-loop speed control active	1	Closed-loop speed control active
2	Closed-loop position control active (H) or grab 2/3 closed (H)	2	Closed-loop position control active (H) or grab 2/3 closed (H)
3	Message a/v reduction	3	Message a/v reduction
4	Message, grab open	4	Message, grab open
5	Message, grab closed	5	Message, grab closed
6	SIMOTION fault	6	SIMOTION fault
7	Fault, SINAMICS	7	Fault, SINAMICS
8	Fault, function block	8	Fault, function block
9	Message torque limiting active (H) or message torque limit exceeded (H)	9	Message torque limiting active (H) or message torque limit exceeded (H)
10	Message, homed	10	Message, homed
11	SynchOutOfPositionToleranceActive	11	SynchOutOfPositionToleranceActive
12	Encoder switchover active	12	Encoder switchover active
13	SlaveModeActive	13	SlaveModeActive
14	SlaveAvailableActive	14	BrakeTestActive
15	TechnologyObjectActive (H) or message "Grab touchdown" (H)	15	TechnologyObjectActive (H) or message "Grab touchdown" (H)

Example: Select Master-Slave or Synchronous operation

Control word / status word	Bit	Signal name	Control OLD		Control NEW	
			MASTER (Hoist_1)	SLAVE (Hoist_2)	MASTER (Hoist_1)	SLAVE (Hoist_2)
Appl_STW1	6	Selecting master-slave operation	FALSE	TRUE	TRUE	TRUE
Appl_STW1	7	Selecting synchronous operation	FALSE	FALSE	FALSE	FALSE
Appl_STW2	13	SlaveMode	FALSE	TRUE	FALSE	TRUE
Appl_STW2	14	SlaveAvailable	TRUE	FALSE	-	-
Appl_ZSW1	6	Message, master-slave operation active	FALSE	TRUE	TRUE	TRUE
Appl_ZSW1	7	Message, synchronous operation active	FALSE	FALSE	FALSE	FALSE
Appl_ZSW2	13	SlaveModeActive	FALSE	TRUE	FALSE	TRUE
Appl_ZSW2	14	SlaveAvailableActive	TRUE	FALSE	-	-

Control word / status word	Bit	Name	Control OLD		Control NEW	
			MASTER (Gantry_1)	SLAVE (Gantry_2)	MASTER (Gantry_1)	SLAVE (Gantry_2)
Appl_STW1	6	Selecting master-slave operation	FALSE	FALSE	FALSE	FALSE
Appl_STW1	7	Selecting synchronous operation	FALSE	TRUE	TRUE	TRUE
Appl_STW2	13	SlaveMode	FALSE	TRUE	FALSE	TRUE
Appl_STW2	14	SlaveAvailable	TRUE	FALSE	-	-
Appl_ZSW1	6	Message, master-slave operation active	FALSE	FALSE	FALSE	FALSE
Appl_ZSW1	7	Message, synchronous operation active	FALSE	TRUE	TRUE	TRUE
Appl_ZSW2	13	SlaveModeActive	FALSE	TRUE	FALSE	TRUE
Appl_ZSW2	14	SlaveAvailableActive	TRUE	FALSE	-	-

Example: Select / Deselect operation modes

Prerequisites:

1. Only one operating mode is selected.
2. **Function block OperationMode does not have an error. (not necessary anymore)**
3. The drive is not being controlled (the drive is at standstill).
4. It is only necessary to home the axis in AUTOMATIC, MANUAL or SWAYCONTROL
5. It is necessary that Appl_STW2 Bit15 "boChangeTechnologyObject" for each operating drive is set to high level

Appl_STW1

10: Automatic operation mode	OLD: FB error = 0	NEW: FB error <>0
11: Manual operation mode	FB error = 0	FB error <>0
12: Not used	FB error = 0	
13: SpeedControlled (=Jogging) operation mode	FB error = 0	FB error <>0
14: Sensorless_Emergency mode	FB error = 0	FB error <>0
15: Sway Control mode	FB error = 0	FB error <>0

Change name of operation mode:

Application control word 1 (Appl_STW1)	OLD:	NEW:
Change name	SpeedControlled	SpeedControlled(=Jogging)

Example: Changeover Trolley to Boom(Appl_STW1 Bit15) OLD

Trolley:

- | | | |
|---|-----------------------|---------|
| 1. Deselect the operationmode of Trolley: | Appl_STW1 Bit 10 – 15 | = FALSE |
| 2. Check if it is deselected: | Appl_ZSW1 Bit 10 – 15 | = FALSE |
| 3. Deselect Enable Off1 / Pulse disable: | STW1 Bit 3 or Bit 0 | = FALSE |
| 4. Deselect “boChangeTechnologyObject”: | Appl_STW2 Bit 15 | = FALSE |
| 5. Check Trolley drive: | ZSW1 Bit 9 | = FALSE |

Boom:

- | | | |
|--|-----------------------|---------|
| 6. Check OPmode of Boom is deselected: | Appl_ZSW1 Bit 10 – 15 | = FALSE |
| 7. Select the Technology Object of Boom: | Appl_STW2 Bit 15 | = TRUE |
| 8. Check “boChangeTechnologyObject”: | Appl_ZSW2 Bit 15 | = TRUE |
| 9. Check Boom drive: | ZSW1 Bit 9 | = TRUE |
| 10. Select operationmode of Boom: | Appl_STW1 Bit 10 – 15 | |
| 11. Check if OPmode is selected: | Appl_ZSW1 Bit 10 – 15 | |
| 12. Select Enable Pulse or Off1: | STW1 Bit 3 or Bit 0 | = TRUE |

Example: Changeover Trolley to Boom(Appl_STW1 Bit15)

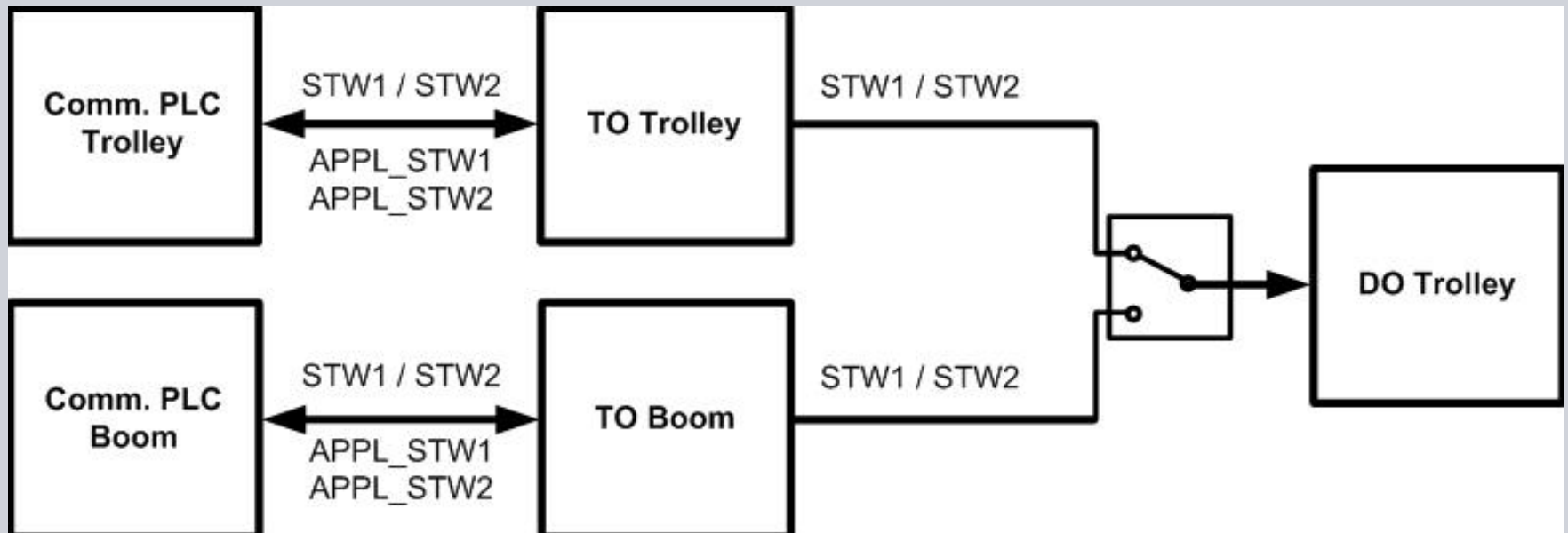
NEW

Trolley:

- | | | |
|---|------------------|---------|
| 1. Pulse disable: | STW1 Bit 3 | = FALSE |
| 2. Deselect “boChangeTechnologyObject”: | Appl_STW2 Bit 15 | = FALSE |
| 3. Check Trolley drive: | ZSW1 Bit 9 | = FALSE |

Boom:

- | | | |
|---------------------------------------|------------------|--------|
| 4. Select “boChangeTechnologyObject”: | Appl_STW2 Bit 15 | = TRUE |
| 5. Check Boom drive: | ZSW1 Bit 9 | = TRUE |
| 6. Pulse enable: | STW1 Bit 3 | = TRUE |



Changes in your project (1)

- PLC-program
 - Communication Interface S7 \leftrightarrow Simotion D
 - Sequential control (refer to examples of S7 control, Chapter 8.4)

- Scout-project
 - Taking standard application of V2.0 SP2 (new interfaces, new Libraries)

2

New classification of fault messages

Changes in Application Error Messages (Chapter 7.6)

The changed numbers are in red color

Error No.	Description
0000	No error
0001 - 0048	Description of the return value: Corresponds to the list of return values under the _move function in SIMOTION; see Ref. [3].
2700	FB_ControlAxis: The technology object is neither a positioning axis, nor is it a speed axis. To correct or avoid errors: Set up a a positioning axis or a speed axis at the TO
2900	FB_ControlAxis: The technology object system variables could not be read To correct or avoid errors: Check communication with the axis. Call the expert list of the relevant axis (right-click Axis → Expert → Expert list) and then check at System variables → Actuator monitoring whether cyclicinterface is "active".
3000	FB_OperationMode: The input variables "SelectSynchronousOperation" and "SelectMasterSlaveOperation" are selected at the same time. To correct or avoid errors: It is not permitted to set the "SelectSynchronousOperation" and "SelectMasterSlaveOperation" in parallel.
3100	FB_OperationMode: The input variables "SlaveMode" and "SlaveAvailable" are selected at the same time. To correct or avoid errors: It is not permitted to set the "SlaveMode" and "SlaveAvailable" in parallel.
3200	FB_OperationMode: (with tandem mode not active) Slave feedback signal: Synchronous velocity or synchronous position is not active. Remedy: Check the selection for synchronous mode in the slave; refer to Synchronous operation control type (Page 211).
3210	FB_OperationMode: (with tandem mode not active) Slave feedback signal: The two operating modes are not the same (AUTOMATIC, MANUAL, SPEED_CONTROLLED, JOGGING, SWAYCONTROL). Remedy: Assign the same operating mode to the master and the slave.
3220	FB_OperationMode: (with tandem mode not active) Slave feedback signal: Master-slave operation or synchronous mode is not active. Remedy: Select master-slave operation or synchronous mode in the slave; refer to Master-slave operation control type (Page 206) and/or Synchronous operation control type (Page 211).

Error means that Simotion will stop the movement or will not start the movement. It must be acknowledged.

Warning means that Simotion will not stop the movement. Warnings are coming and going without any acknowledgement.

Error No.

2700

2900

3000

3100

3200

3210

3220

Change

no change

no change

no change

cancelled in future

no change

no change

no change

Changes in Application Error Messages (Chapter 7.6)

The changed numbers are in red color

Error No.	Description
3230	FB_OperationMode: (with tandem mode not active) Slave drive state is not active. Remedy: Check the ramp-function generator enable STW1 bit 4 and speed controller enable STW1 bit 8 in the slave.
3240	FB_OperationMode: (with tandem mode not active) Slave power is not active. Remedy: Check STW1 (STW1 bit 0,1,2,3,8). These bits must be set in the slave.
3250	FB_OperationMode: (with tandem mode not active) Slave setpoint is not active. Remedy: Activate slave setpoint (STW1 bit 6).
3300	FB_OperationMode: (with tandem mode active) Slave feedback signal: Synchronous velocity or synchronous position is not active. Remedy: Check the selection for synchronous mode in the slave; refer to Synchronous operation control type (Page 211).
3310	FB_OperationMode: (with tandem mode active) Slave feedback signal: The two operating modes are not the same (AUTOMATIC, MANUAL, SPEED_CONTROLLED, JOGGING, SWAYCONTROL). Remedy: Assign the same operating mode to the master and the slave.
3320	FB_OperationMode: (with tandem mode active) Slave feedback signal: Master-slave operation or synchronous mode is not active Remedy: Select master-slave operation or synchronous mode in the slave; refer to Master-slave operation control type (Page 206) and/or Synchronous operation control type (Page 211).
3330	FB_OperationMode: (with tandem mode active) The master switch has been deflected, but the slave drive state is not active. Remedy: Check the ramp-function generator enable STW1 bit 4 and speed controller enable STW1 bit 8 in the slave.
3340	FB_OperationMode: (with tandem mode active) The master switch has been deflected, but slave power is not active. Remedy: Check STW1 (STW1 bit 0,1,2,3,8). These bits must be set in the slave.

Error No.

3230

3240

3250

3260

3270

3300

3310

3320

3330

3340

Change

change to warning

change to warning

change to warning

new warning

new warning

no change

no change

no change

change to warning

change to warning

Changes in Application Error Messages (Chapter 7.6)

The changed numbers are in red color

Error No.	Description
3350	FB_OperationMode: (with tandem mode active) The master switch has been deflected, but the slave setpoint is not active. Remedy: Activate slave setpoint (STW1 bit 6).
3360	FB_OperationMode: (with tandem mode not active) Slave available is active and the slave is affected by a TO, DO or FB error. Remedy: Eliminate the TO, DO, or FB error in the slave.
3400	FB_OperationMode: (with tandem mode active) Tandem slave feedback signal: Synchronous velocity or synchronous position is not active. Remedy: Check the selection for synchronous mode in the tandem slave; refer to Synchronous operation control type (Page 211).
3410	FB_OperationMode: (with tandem mode active) Tandem slave feedback signal: The two operating modes are not the same (AUTOMATIC, MANUAL, SPEED_CONTROLLED, JOGGING, SWAYCONTROL). Remedy: Assign the same operating mode to the tandem master and the tandem slave.
3420	FB_OperationMode: (with tandem mode active) Tandem slave feedback signal: Master-slave operation or synchronous mode is not active Remedy: Select master-slave operation or synchronous mode in the tandem slave; refer to Master-slave operation control type (Page 206) and/or Synchronous operation control type (Page 211).
3430	FB_OperationMode: (with tandem mode active) The master switch has been deflected, but the tandem slave drive state is not active. Remedy: Check the ramp-function generator enable STW1 bit 4 and speed controller enable STW1 bit 8 in the tandem slave.
3440	FB_OperationMode: (with tandem mode active) The master switch has been deflected, but the tandem slave power is not active. Remedy: Check STW1 (STW1 bit 0,1,2,3,8). These bits must be set in the tandem slave.
3450	FB_OperationMode: (with tandem mode active) The master switch has been deflected, but the tandem slave setpoint is not active. Remedy: Activate tandem slave setpoint (STW1 bit 6).

Error No.

3350

3360

3400

3410

3420

3430

3440

3450

Change

change to warning

no change

no change

no change

no change

change to warning

change to warning

change to warning

Changes in Application Error Messages (Chapter 7.6)

The changed numbers are in red color

Error No.	Description
3500	<p>FB_OperationMode: (with tandem mode active) Tandem slave slave feedback signal: Synchronous velocity or synchronous position is not active.</p> <p>Remedy: Check the selection for synchronous mode in the tandem slave slave; refer to Synchronous operation control type (Page 211).</p>
3510	<p>FB_OperationMode: (with tandem mode active) Tandem slave slave feedback signal: The two operating modes are not the same (AUTOMATIC, MANUAL, SPEED_CONTROLLED, JOGGING, SWAYCONTROL).</p> <p>Remedy: Assign the same operating mode to the tandem slave and the tandem slave slave.</p>
3520	<p>FB_OperationMode: (with tandem mode active) Tandem slave slave feedback signal: Master-slave operation or synchronous mode is not active</p> <p>Remedy: Select master-slave operation or synchronous mode in the tandem slave slave; refer to Master-slave operation control type (Page 206) and/or Synchronous operation control type (Page 211).</p>
3530	<p>FB_OperationMode: (with tandem mode active) The master switch has been deflected, but the tandem slave slave drive state is not active.</p> <p>Remedy: Check the ramp-function generator enable STW1 bit 4 and speed controller enable STW1 bit 8 in the tandem slave slave.</p>
3540	<p>FB_OperationMode: (with tandem mode active) The master switch has been deflected, but tandem slave slave power is not active.</p> <p>Remedy: Check STW1 (STW1 bit 0,1,2,3,8). These bits must be set in the tandem slave slave.</p>
3541	<p>FB_OperationMode: Slave mode or tandem slave mode is activated, although no valid technology object is available at input TO_checkbackMasterAxis.</p> <p>Remedy: Connect input TO_checkbackMasterAxis to a valid technology object or deselect slave mode or tandem slave mode again.</p>
3542	<p>FB_OperationMode: Slave mode or tandem slave mode is activated, although no valid technology object is available at input TO_checkbackMasterAxis2.</p> <p>Remedy: Connect input TO_checkbackMasterAxis2 to a valid technology object or deselect slave mode or tandem slave mode again.</p>

Error No.

3500

3510

3520

3530

3540

3541

3542

Change

no change

no change

no change

change to warning

change to warning

no change

no change

Changes in Application Error Messages (Chapter 7.6)

The changed numbers are in red color

Error No.	Description
3543	FB_OperationMode: Slave mode or tandem slave mode is activated, although no valid technology object is available at input TO_checkbackMasterAxis3. Remedy: Connect input TO_checkbackMasterAxis3 to a valid technology object or deselect slave mode or tandem slave mode again.
3544	FB_OperationMode: Inputs boSelectMasterAxis2 and boSelectMasterAxis3 are set simultaneously (with the result that more than one master is selected). Remedy: Select just one master.
3550	FB_OperationMode: (with tandem mode active) The master switch has been deflected, but the tandem slave slave setpoint is not active. Remedy: Activate tandem slave slave setpoint (STW1 bit 6).
3560	FB_OperationMode: Slave available is active and a TO, DO, or FB error is present at the slave, tandem slave, or tandem slave slave. Remedy: Eliminate the TO, DO, or FB error in the slaves.
3600	FB_OperationMode: Synchronous mode or master-slave operation is selected, but neither slave mode nor tandem slave mode is selected. Remedy: Either deselect synchronous mode or master-slave operation, or select slave mode or tandem slave mode.
3630	FB_OperationMode: The master switch has been deflected, but the master DriveState is not active. Remedy: Check the ramp-function generator enable STW1 bit 4 and speed controller enable STW1 bit 8 in the master.
3640	FB_OperationMode: The master switch has been deflected, but master Power is not active. Remedy: Check STW1 (STW1 bit 0,1,2,3,8). These bits must be set in the master.
3650	FB_OperationMode: The master switch has been deflected, but the master setpoint is not active. Remedy: Activate master setpoint (STW1 bit 6).
3660	FB_OperationMode: No operating mode selected. Remedy: Select operating mode (AppSTW1 bit 10...15).
3670	FB_OperationMode: Speed controller enable missing. Remedy: Set STW1 bit 8.

Error No.

3543

3544

3550

3560

3600

3620

3630

3640

3650

3660

3670

3680

3690

Change

no change

no change

change to warning

no change

modified

new warning

change to warning

change to warning

change to warning

change to warning

change to warning

new warning

new warning

Changes in Application Error Messages (Chapter 7.6)

The changed numbers are in red color

Error No.	Description
3900	FB_OperationMode: The technology object system variables could not be read. To correct or avoid errors: refer to error number 2900
3910	FB_OperationMode: SENSORLESS EMERGENCY is selected but the maximum permissible velocity for SENSORLESS EMERGENCY is zero. Remedy: Increase the limit for SENSORLESS EMERGENCY in the interface of the MCC unit.
3920	FB_OperationMode: The master switch is deflected in the positive direction but the velocity setpoint is negative. Remedy: Deflection in the positive direction must result in a positive setpoint too.
3930	FB_OperationMode: The master switch is deflected in the negative direction but the velocity setpoint is positive. Remedy: Deflection in the negative direction must result in a negative setpoint too.
3940	FB_OperationMode: The master switch is deflected in the positive direction and the target position is smaller than the actual position in AUTOMATIC or MANUAL operating mode. Remedy: If the deflection direction is correct, the actual position and target position must be checked and corrected.
3950	FB_OperationMode: The master switch is deflected in the negative direction and the target position is greater than the actual position in AUTOMATIC or MANUAL operating mode. Remedy: If the deflection direction is correct, the actual position and target position must be checked and corrected.
3960	FB_OperationMode: The positive and negative signals of the master switch are set simultaneously. Remedy: Activate just one direction.
3990	FB_OperationMode: Changing the target position in MANUAL operating mode decreases the distance-to-go to the new target. A check is made to determine whether the deceleration value can be increased to a level that allows the drive to decelerate within the shortened distance-to-go. If the deceleration required for this is greater than the maximum permissible deceleration value, this error is generated. Remedy: Make sure that the selected distance-to-go is long enough to enable the drive to come to a standstill at the maximum deceleration.
4000	FB_Cornering: Incorrect operating mode selected for cornering movement. Remedy: Select SPEED_CONTROLLED, JOGGING, or SENSORLESS_EMERGENCY operating mode.

Error No.

3900

3910

3920

3930

3940

3950

3960

3990

4000

Change

no change

no change

cancelled

cancelled

change to warning

change to warning

cancelled

no change

no change

Changes in Application Error Messages (Chapter 7.6)

The changed numbers are in red color

Error No.	Description
5950	FB_Monitoring: The velocity difference between the motor encoder and the external encoder of the master is outside the tolerance range. Remedy: Check for axis fracture or adjust tolerance limits, increase deceleration time, check encoders and/or the signals "toDriveAxis.sensordata[1].velocity" and "toDriveAxis.sensordata[2].velocity".
5960	FB_Monitoring: The velocity difference between the motor encoder and the external encoder of the slave is outside the tolerance range. Remedy: Refer to error number 5950
6900	FB_TractionControl: The technology object system variables could not be read. To correct or avoid errors: refer to error number 2900
7100	FB_SpeedOrTorqueControl: Drive object number is too high (higher than 63). Remedy: The number is displayed in the corresponding drive object under "Configuration" → "Drive object no.".
7200	FB_SpeedOrTorqueControl: The subindex number of the drive object is too high (higher than 1023). Remedy: Check the subindex number. It must not exceed 1023.
7300	FB_SpeedOrTorqueControl: No valid slave technology object available. Remedy: Connect a valid technology object as the following axis.
7400	FB_SpeedOrTorqueControl: The logical address for the input data area of the following axis cannot be read or is set to zero. Remedy: Check and, if necessary, correct the logical address. Check that the following axis has been interconnected properly.
7500	FB_SpeedOrTorqueControl: Connection was not able to be set. To correct or avoid errors: Repeat the FB call.
7600	FB_SpeedOrTorqueControl: Time exceeded (watchdog) To correct or avoid errors: Extend the monitoring time.

Error No.

5950

5960

6900

7100

7200

7300

7400

7500

7600

Change

no change

no change

no change

no applicable

no applicable

no applicable

no applicable

no applicable

no applicable

Changes in Application Error Messages (Chapter 7.6)

The changed numbers are in red color

Error No.	Description
7650	FB_SpeedOrTorqueControl: Sign-of-life not provided by drive. ZSW1 bit 9 or cyclic interface of the following axis missing. Remedy: Check if a TO switchover is active and, if it is, deactivate it. Deactivate AppSTW2 bit 15, deactivate, STW1 bit 8, deselect operating mode, activate AppSTW2 bit 15, select operating mode, activate STW1 bit 8. If no TO switchover is in place, set InterfaceAllocation to "Exclusive (939)" for the relevant axis (Expert list → Configuration data → TypeofAxis → NumberOfEncoders → Encoder) and also set TypeofAxis → SetpointDriverInfo → InterfaceAllocation to "Exclusive (939)".
8750	FB_ReferenceMode: The technology object master is not a positioning axis. To correct or avoid errors: refer to error number 2700
8850	FB_ReferenceMode: The slave technology object slave is not a positioning axis. To correct or avoid errors: refer to error number 2700
8950	FB_ReferenceMode: No valid gear (TO_GearPos) available. Remedy: Connect a valid gear (fixed gear).
Note: For information on any other error messages output by FB_SpeedOrTorqueControl, see the return values described in the SIMOTION Help under "_writeDriveParameter" (see Ref. [8], Chapter 1.6.3.9) and "_readDriveParameter" (see Ref. [8], Chapter 1.6.3.6).	

Error No.

7650

8750

8850

8950

Change

no applicable

no change

no change

no change

Changes in your project (2)

- PLC-program
 - Fault handling, if necessary

- Scout-Project
 - Taking standard application of V2.0 SP2 (new interfaces, new Libraries)

3

Simplification and extension in DCC-Library

Changed DCC-Blocks (Chapter 4.2)

Old

DCC_MasterSwitch

DCC_SlackRopeControl

DCC_CurrentEqualControl

DCC_ContLoadMeasurement

DCC_OverSpeed

New

DCC_MasterSwitch_1

DCC_SlackRopeControl_1

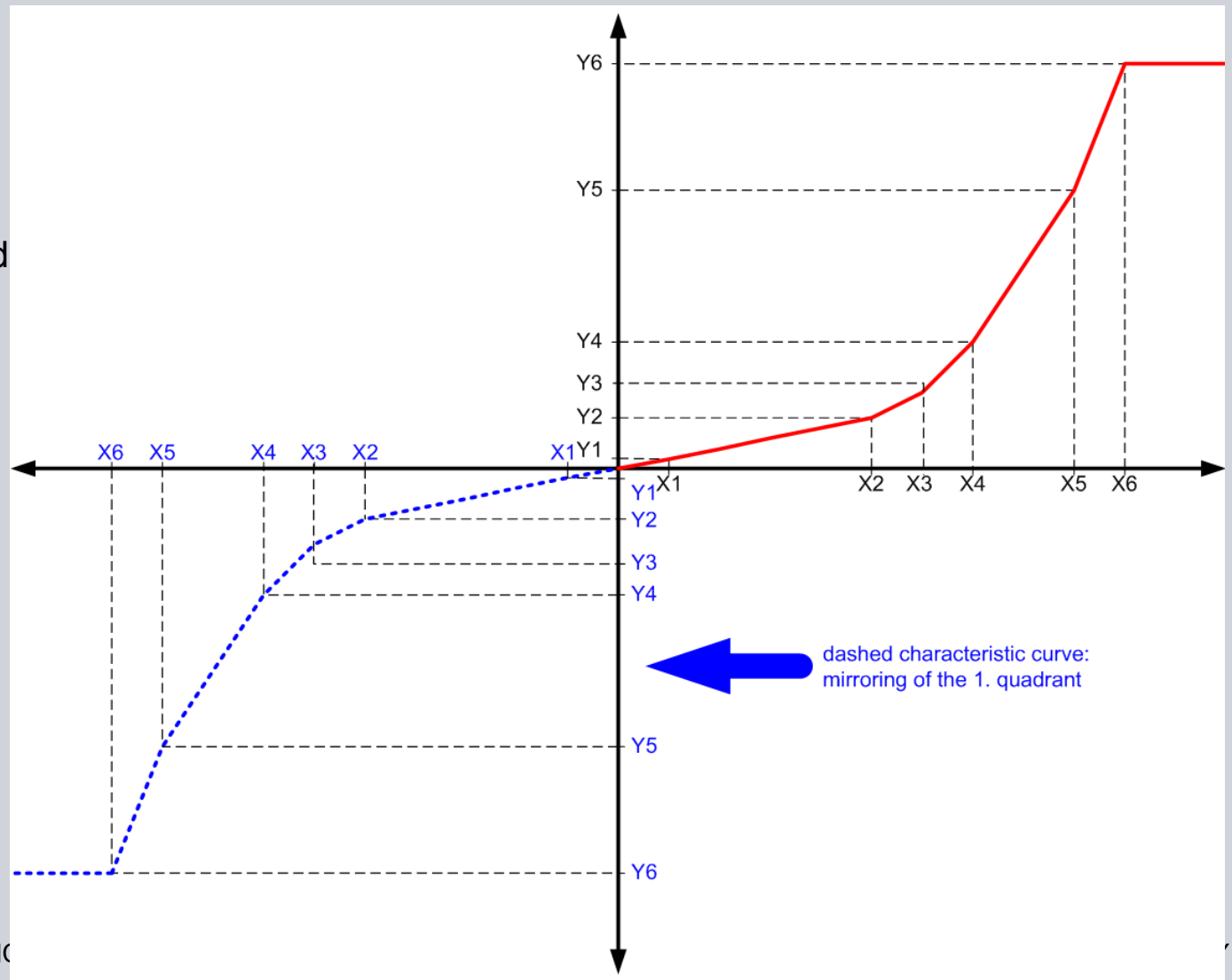
DCC_CurrentEqualControl_1

DCC_ContLoadMeasurement_1

DCC_OverSpeed

DCC_MasterSwitch_1

- 6 point polygon
- Q3 is mirroring of Q1
- direction bits
(boPosMasterSwitch" and
"boNegMasterSwitch“)



DCC_SlackRopeControl_1

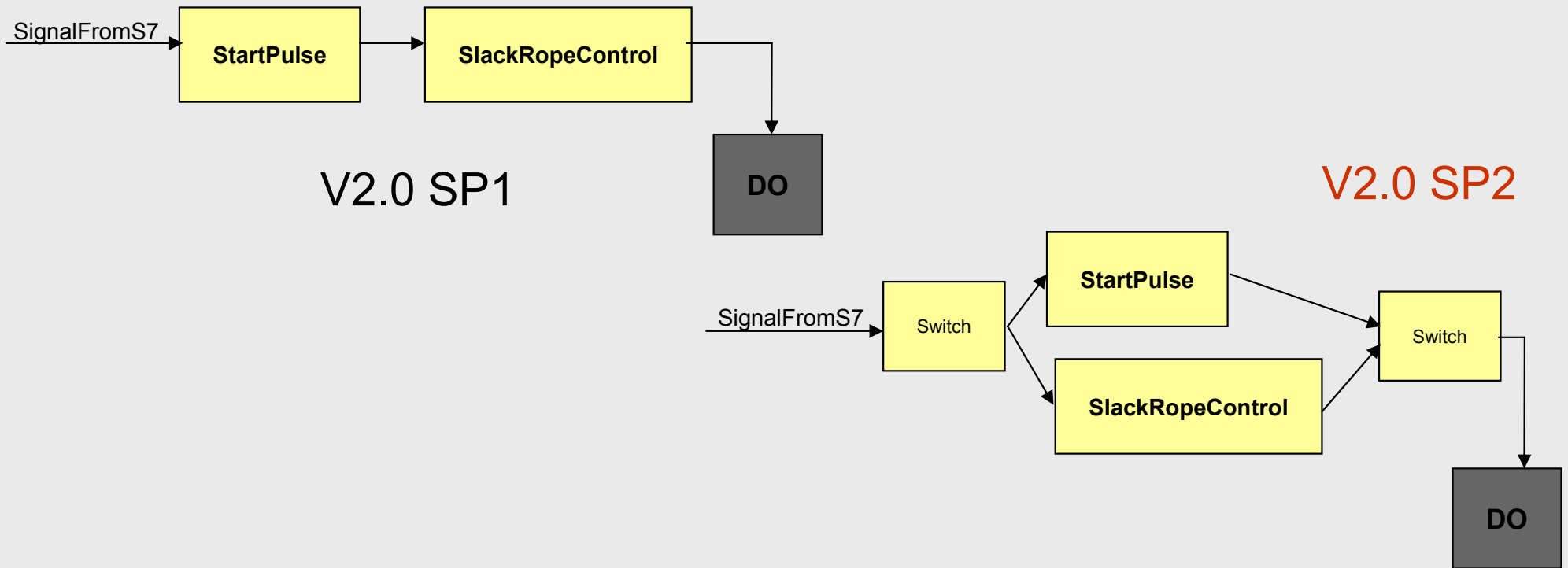
Three methods for slack rope control

1. Closed-loop control using a setpoint value (P controller)
 - A filter is added to avoid setpoint jump
 2. Closed-loop control using a saved characteristic (polygon)
 - 20 points polygon was changed to 6 point polygon
 - A filter is added to avoid setpoint jump
 3. Specifying a torque limit from S7
 - Enabled by "boEnableTorqueLimit"
 - TorqueLimit from S7 (e.g. PZD 14)
-
- Easy-Closing function
 - Enabled by "boEnableEasyClosing"
 - An additional 6-point polygon for evaluating closing gear current
 - Additional hoisting as function of closing gear current
 - Adaptation to several types of material
 - Enabled by "boEnableMaterialFactor"
 - A multiplier with the "rMaterialFactor" is added
 - MaterialFactor from S7 (e.g. PZD13)
 - Remove input "rInVelocitySetpoint"
 - Refer to DCC_CurrentEqualControl_1

DCC_CurrentEqualControl_1

- Remove "rInVelocitySetpoint"

- This input was originally added to switch through from the setpoint channel of the start pulse. However, in the future, the setpoint channel of the start pulse will be externally connected in parallel.



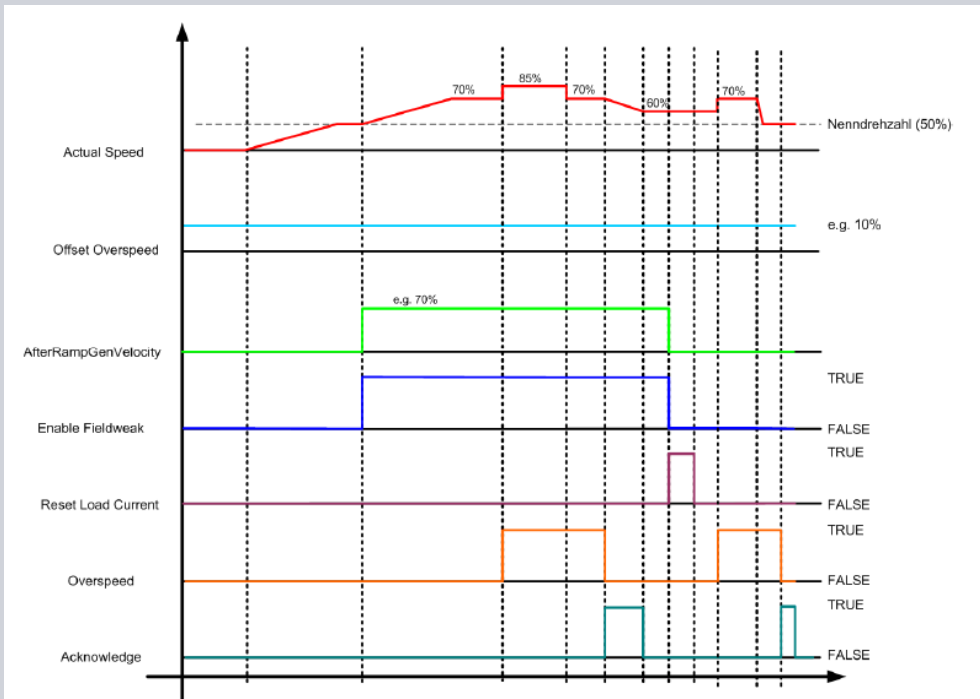
- Identical with the DCC_CurrentEqualControl

DCC_ContLoadMeasurement_1

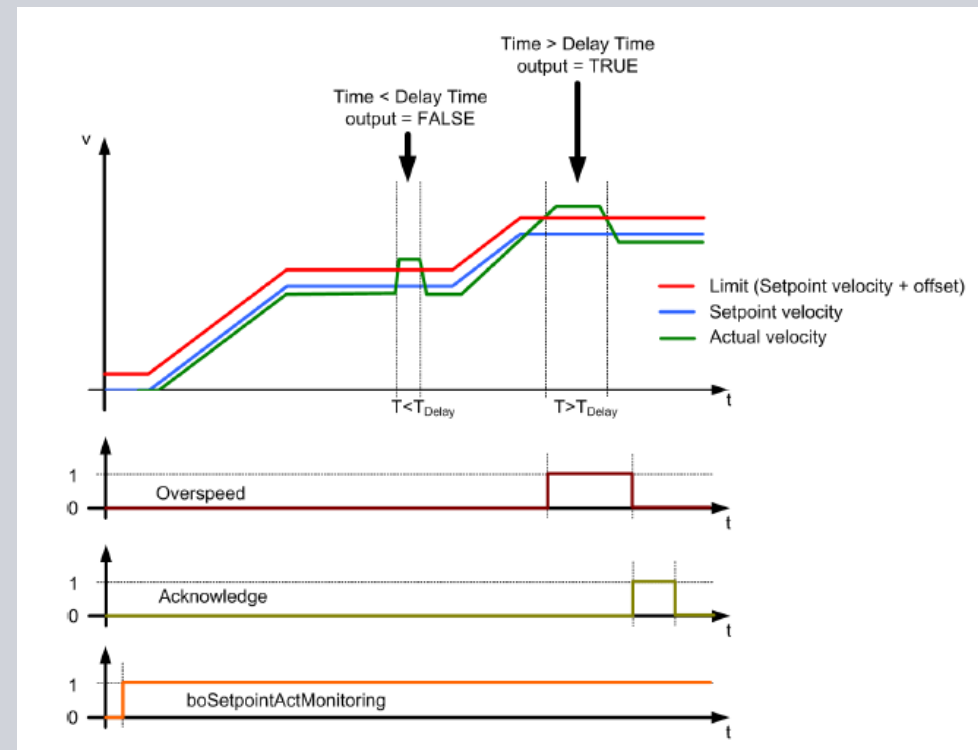
- **6 points polygon for friction replaces 20 points polygon**
- **The second gearbox has been removed**
 - Procedure for drives with a switchable gear is similar to DCC_Fieldweakening (Chapter 8.9.4)
- **The existing saw-tooth generator was replaced by sliding mean value generator (MVS)**
- **The limit values for load and depth can be provided to S7 or HMI for visualization**
 - Actual Rope length when grab 'touch down' → 'rRopeLengthScaling'
 - Grab weight value when it 'touch down' → rGrabWeightScal
 - Rope length under water → rUnderWaterScal

DCC_OverSpeed with extension

"boSetpointActualMonitoring" = False



"boSetpointActualMonitoring" = TRUE



Change in your project (3)

- PLC-Programm
 - Adaption of control bits to new DCC-blocks

- Scout-project
 - Taking standard application of V2.0 SP2 ((new interfaces, new Libraries)

4

Simplify in variable setting

Simplify the parameter-setting of reference value (Simotion & Sinamics p2000)



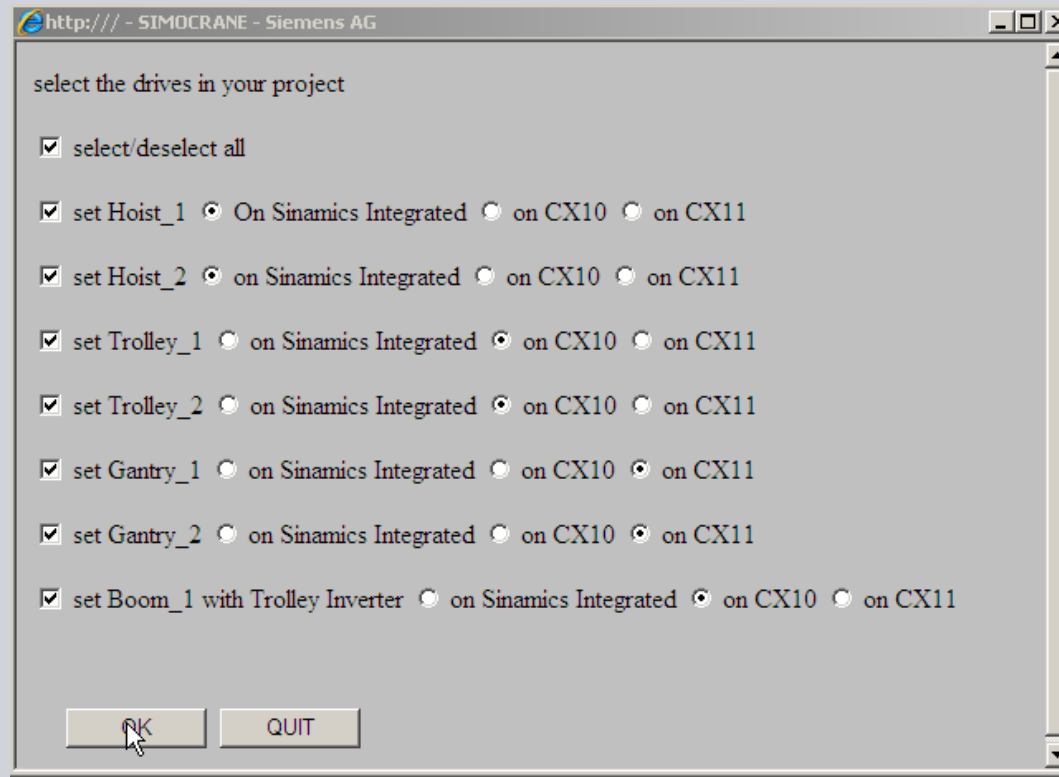
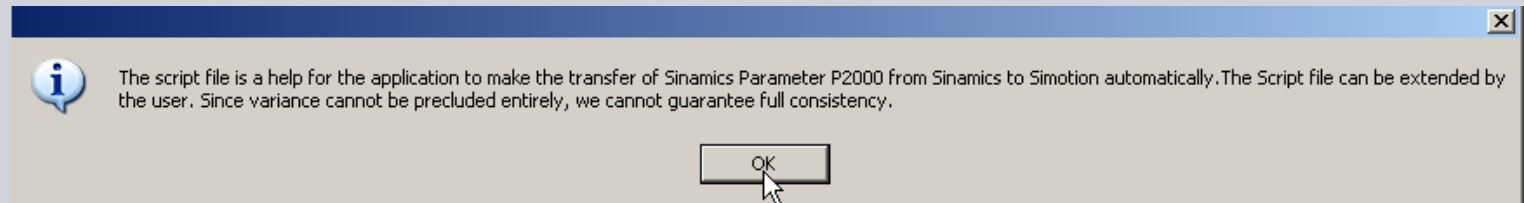
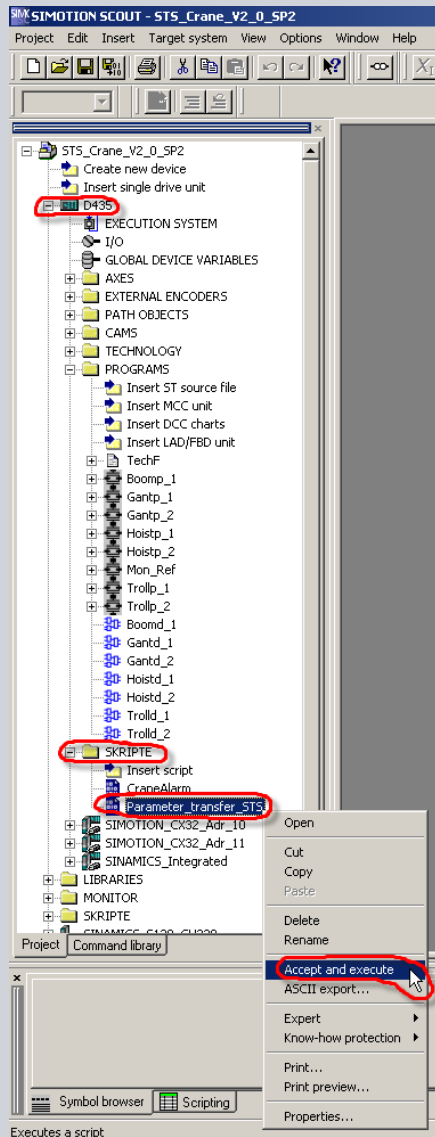
S7	Simotion	Sinamics
Ref. Speed [rev/min]	Ref. Speed [rev/min]	Ref. Speed [rev/min]

via script automatical setting of p2000 to Simotion

each Crane Type has its script-file for Crane Alarm and Parameter setting

Handling refers to the next page

Simplify the parameter-setting of reference value (Simotion & Sinamics p2000)



Simplify in MCC Unit



The changed signals are in red color

Jerk (Hoistp_2, Interface)

Old	New
mm/s ³	ms
mm/s ³	ms
mm/s ³	ms
mm/s ³	ms

12	Hoist_2_positiveAccelerationStartJerk	VAR_GLOB	LRE	0.0	[ms]
13	Hoist_2_positiveAccelerationEndJerk	VAR_GLOB	LRE	0.0	[ms]
14	Hoist_2_negativeAccelerationStartJerk	VAR_GLOB	LRE	0.0	[ms]
15	Hoist_2_negativeAccelerationEndJerk	VAR_GLOB	LRE	0.0	[ms]

Changes in your project (4)

- PLC-program
 - Nothing

- Scout-project
 - Simplifying in commissioning with standard application of V2.0 SP2 (new Scripting, new Libraries)

5

Extended Functions

Extension of functionality (1)

- Extension in 'Offset compensation control' in synchronous operation (Chapter 5.3.11)
 - If "boDriveMasterSuperimpose" = TRUE, compensation is performed, depending on an internal calculation, by the master or slave, after checking maximum and actual velocity
 - The supplementary velocity will added to the slave, if this is not at the velocity limit.
 - However, if the slave is at the limit, the supplementary velocity (with the inverse sign) is transferred to the master.

- Extension in 'Offset-Mode' in Tandem-operation (Chapter 8.14.6)
 - DriveMasterSuperimpose (STW2.5) should be used to define as to whether the tandem-master or tandem-slave is allocated the velocity superimposition.

- **New:** Brake test (Chapter 5.3.9.11)
 - The axis moves against the closed brake with a certain torque setpoint in order to check the braking capability of the brake.

- Extension of communication interface (S7 \leftrightarrow Simotion, Simotion \leftrightarrow Sinamics) (Chapter 6.1 – 6.3)
 - S7 \leftrightarrow Simotion (16 PZD /direction each drive)
 - Simotion \leftrightarrow Sinamics (32 PZD /direction each drive)

- **New:** Profinet RT option for communication S7 \leftrightarrow Simotion D (Chapter 6.1 - 6.2)

Extension of functionality (2)

- Extension of application examples
 - Application examples for the S7 control (Chapter 8.4)
 - Switching-on/off a drive
 - Selecting and deselecting operating modes
 - Externally switching over from trolley to boom and vice versa
 - Grab control (Chapter 8.4.4)
 - STS tandem crane (Chapter 10.8)
 - standard project in Profibus DP (12 PZD)
 - standard project in Profinet RT (16 PZD).
 - Easy RTG-Crane (Chapter 10.9)

- **New:** Getting started



Adobe Acrobat
Document

- **New:** SIMOCRANE Product-Support (news, FAQs, Manuals,..) in Internet

<http://support.automation.siemens.com/WW/view/en/10807397/130000>

Changes in your project (5)

- PLC-program
 - Depending on used function

- Scout-project
 - Taking standard application of V2.0 SP2 (new interfaces, new Libraries)

Thank you

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