8. S5 95U program

Neccessary components or networks for the operation of the software:

FB180	main program.	
FB181	diagnosis evaluation (only for 95U)	(sub-program of FB180).
FB182	evaluation of received data	(sub-program of FB180).
FB183	construction of to-be-sent data	(sub-program of FB180).
FB184	control and lock of the commands	(sub-program of FB180).
FB185	send the data to the CP16 via the Profibus	(sub-program of FB180).
FB186	receive the data from the CP16 via the Profibus	(sub-program of FB180).
FB187	initialization of the CP16	(sub-program of FB180).
FB188	initialization of the S5 software	(execution through OB21).
FB230	read diagnosis data (only for 95U)	(sub-program of FB181).
DBxx	DB for cam data (256 data words, for 64 outputs with 1 cam each).	
OB1	for execution of the FB180 with parameters.	
OB31	new start for Profibus DP error (only BE).	

8.1. Used variables

A total of 6 register bytes (MB100 to MB105) in FB180 and its sub-program are used. These are stored in the data component at the execution of FB180 and are restored upon the end of the FB. This makes it possible to use these bytes for other functions, or if several CamCon CP16 modules are operating at one S5 betrieben, no additional registers are needed.
There are also the parameters at the execution of FB180, which can be adjusted to the requirements of the application. It currently uses the DB20, MB50, MB51 and the timer T0. The parameters S_NR and S_BI depend on the CPU and are currently only available for a 95U.

8.2. OB1

The OB1 serves for the execution of the FB180. The parameters (registers, timers and data components) of the FB180 can be adjusted to the requirements of the application, but the parameter DBNR of the FB188 in the OB21 also has to be changed. The rest of the commands in the OB1 are meant as example for testing the software and can be deleted or changed.

8.3. FB180 - main module

The FB180 is the main module of the software and has to be executed in cycles in the OB1. The communication to the cam controller is started automatically. If there are no pending commands, a status request (command 0x01) is sent to the CamCon and the data received from the CamCon are stored in the data DB. See also chapter "8.7. DBxx - data component for cam data" on page 15. The data words DW 81 and 82 are being sent to the CamCon at the same time as the status request; they are **AND** linked to the outputs of the CamCon cam controller (output deactivation) or are available as V - inputs, when the PLC Logic Module is active.

The read status information is evaluated by the FB184 component.

First check, if the an error was entered in the status byte (DW 78L) of the cam controller. If this is the case, an error reset (command 0x02) is sent automatically to the CamCon cam controller.

Afterwards the current program number (DW77) is compared to the desired program number (DW83). If they do not match, a program change (command 0x03) with the desired program number is sent. I.e., to change a program, it is sufficient to write the desired number in the data word 83.

Now it is checked, wether a command for cam or dead time programming should be triggered. This is controlled by setting the bits in the command byte (BEF parameter currently MB50). The data for the corresponding commands have to be entered into the data DB in advance. See herefor the following chapter. If the command was executed without an error, the command bit is reset through the FB180.

In the status byte (STAT parameter currently MB51) of the FB180, the status information of the communication and of the CamCon cam controller is stored. This will be evaluated by the application and, in case of an error, lead to a deactivation of the automatic of the machines and to an error message.

8.3.1. Parameters of the FB180

1. DATA = Number of the data component where the data is stored.
   The DB has to be created and be 256 words long.

2. BEF = Register byte where the commands (Bits) of the application have to be set (e.g. MB50). When a command is executed, this bit is reset. If a read command ends, the read cam or dead time values are in the DB.

   Bit 0.0 (read/write) = Program a cam.
   The data has to be in the DB.
   1. Program number (DW 89).
   2. Output number (DW 90L).
   3. Number of cams (DW 90R) (currently only 1 cam possible).
   4. Activation and deactivation point (starting at DW91).

   Bit 0.1 (read/write) = Program all cams.
   The data has to be in the DB.
   1. Control output number (DW 88L).
   2. Program number (DW 89).
   3. Number of cams (DW 90R) (currently only 1 cam possible).
   4. Activation and deactivation point (starting at DW91).

   Bit 0.2 (read/write) = Read a cam.
   The data has to be in the DB.
   1. Program number (DW 89).
   2. Output number (DW 90L).
   The read cam is in the DB from DW91 on.

   Bit 0.3 (read/write) = Read all cams.
   The data has to be in the DB.
   1. Control the output number (DW 88L).
   2. Program number (DW 89).
   The even read cam is in the DB from DW91 on.

   Bit 0.4 (read/write) = Program a dead time.
   The data has to be in the DB.
   1. Output number (DW 90L).
   2. Dead time value 0.1ms steps (starting at DW 224).

   Bit 0.5 (read/write) = Program all dead times.
   The data has to be in the DB.
   1. Control the output number (DW 88L).
   2. All dead time values in 0.1ms steps (starting at DW 224).

   Bit 0.6 (read/write) = Read a dead time.
   The data has to be in the DB.
   1. Output number (DW 90L).
   The read dead time is in the DB from DW 224 on.

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Bit 0.7	(read/write)	=	Read all dead times. The data has to be in the DB. 1. Control the output number (DW 88L). The read dead times are in the DB from DW 224 on.

3. STAT = Register byte where the status of the CamCon CP16/P/IO and the CamCon are stored (e.g. MB51).

Bit 0.0	(write only)	=	If this bit of the status byte = 1, the entire communication is reset and a restart is tried.
Bit 0.1	(read only)	=	Command is still being implemented.
Bit 0.2	(read only)	=	Reserve.
Bit 0.3	(read only)	=	Reserve.
Bit 0.4	(read only)	=	Error during the transmission of a command e.g. memory of the CamCon is full.
Bit 0.5	(read only)	=	CamCon displays position errorr 1,2,3,5 or output error.
Bit 0.6	(read only)	=	CP16 is connected and activated.
Bit 0.7	(read only)	=	A timeout occurred during the data trransmission. It will be tried to resend the command.

4. TIME = Number of a time that is used internally to determine timeouts (e.g. T 0).

5. S_NR = Participant number of the CP16 in the Profibus (only with 95U).

6. S_BI = Diagnosis bit in the diagnosis register of the CPU for the CP16 (only for 95U).

8.4. FB181, 182, 183, 184, 185, 186 and 187 - sub-program of FB180

These components are being executed by the FB180 and may not be executed by any other command.

8.5. FB188 - Initialization

Through the execution of this FB, the software is initialized with the corresponding parameters and the communication is reset.

8.5.1. Parameters of the FB188

1. DBNR = Number of the data Components where the data is stored.
   The DB has to be created and be 256 words long.
2. DB_A = Pointer address of the data DB.
   For DB20 with S5 95U = 7E28,
   For DB20 with S5 115 CPU 941 = E428.
3. CPAS = Physicali address of the CP16 transmission area.
   For periphery address 128 with S5 95U = 5780,
   For periphery address 128 with S5 115 CPU 941 = F080.
4. CPAE = Physical address of the CP16 reception area.
   For periphery address 128 with S5 95U = 5700,
   For periphery address 128 with S5 115 CPU 941 = F080.
5. UNIT = Unit number of the cam controller (currently always 0).
6. AUS = Number of controlled outputs (currently max. times 64).
7. ANZN = Number of controlled cams (currently always 1).

8.6. Read FB230 - Profibus DP Slave Diagnosis

FB for reading the Profibus diagnosis. This FB is s standard FB of the S5 95U CPU with Profibus DP Master.

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8.7. DBxx - data component for cam data

The cams or dead times are stored in a data component, that is given to the FB180 as a parameter. Data like actual position, speed, output status, cam controller status, current program number, desired program number and the output deactivation are stored in this DB.

Data component DBxx:

DW 0		
"		
DW 74	are reserved for data exchange and may not be written.	
DW 75	Current position	(only read possible)
DW 76	Current speed value	(only read possible)
DW 77	Current program number	(only read possible)
DW 79	Status outputs 1-16	(only read possible)
DW 80	Status outputs 17-32	(only read possible)
DW 81	Output deactivation bits	(only write possible)
DW 82	Output deactivation bits	(only write possible)
DW 83	Desired program number	(only write possible)
DW 84	Reserved	
DW 85	Reserved	
DW 86	Reserved	
DW 87	Reserved	
DW 88L	Controlled output number	(only write possible)
DW 89	Program for programming	(only write possible)
DW 90L	Current output no.	(only write possible)
DW 90H	Number of cams currently only 1 possible	(only write possible)
DW 91	1. Activation point for 1. output	(write and read possible)
DW 92	1. Deactivation point for 1. output	(write and read possible)
"		
DW 154	32. Deactivation point	(write and read possible)
DW 224	Dead time for 1. output	(write and read possible)
"		
DW 255	Dead time for 32. output	(write and read possible)

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9. S7 CPU315-DP program

The software is in an S7 project V3.2 on the disc, that you have to dearchive for installation. The project name is "Profibus". You can check the software version in the component header of OB1 or FB41.

9.1. Installation of the S7 software

- After the dearchiving, open the created project "Profibus" and copy the components FB41, FC41,42,43,45,46,47,DB40 and 41 from the "Profibus" project into your application.
- Copy the network 1 of the OB100 from the "Profibus" project into the OB100 of your application.
- Change the component parameters for the execution of the FB41 in your entire program (OB100 and the main execution) to your desired parameters.
- Define the data component DB40.
  For a better view, the data was gathered into structures.

  - Determine the number of controlled outputs (cam tracks), and enter them in the OB100 into the DB40.DBW36.
  - Define the cam table in the DB40 (see chapter "9.8.2. DBxx area 2 = cam table" on page 23 and the example in the Profibus project). There has to be memory available for each output for the output number, the number of cams and the (de)activation points. There may not be any gaps or overlaps. If an output is not entered into the table, it is deleted in the CamCon with a programming command. Up to 13 cams per output can be programmed.
  - Define the dead time table in the DB40 (see chapter "9.8.3. DBxx area 3 = dead times" on page23 and the example in the Profibus project). For every output one data word.
  - Enter the cam and dead time values into the table.
  - Define the RK512 command table. The RK512 commands are used for the parameterization of the CamCon (see chapter "9.8.4. DBxx area 4 = RK512 table" on page 24 and the example in the Profibus project). E.g. it is possible to alter the shifting of the zero point or the rotation direction of the CamCon. Again, there may be not gaps or overlaps.
  - Now enter the activation points (data word number) of the cams, dead times and RK512 table into the OB100 in the DB40. The position of the cam table is in the DW0, that of the dead time in the DW2 and that of the RK512 table in the DW4.

9.1.1. Necessary components and networks

Necessary components or networks for the operation of the software:

FB41	Main program.	
FC41	Diagnosis evalutation .	
FC42	Evaluation of the reception data	(sub-program of FB41).
FC43	Structure of the sending data	(sub-program of FB41).
FC45	Sending the data to the CP16 via the Profibus	(sub-program of FB41).
FC46	Receiving the data from the CP16 via the Profibus	(sub-program of FB41).
FC47	Initialization of the CP16	(sub-program of FB41).
DBxx	Instance DB for FB41.	
DBxx	DB for cam data.	
OB1	Network for execution of FB41 and FC41.	
OB82	Network for diagnosis monitoring.	
OB86	Restart upon Profibus DP error (only BE).	
OB100	Network for initialization of the software.	

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9.2. OB1

Most networks of the OB1 are meant as exampl for testing the software and can be deleted or changed. The nets with the FB41 and FC41 execution have to be executed in the cycles, however. The parameters (registers, timers and data components) of these two can be adjusted to the requirements of the application, but then they also have to have to be changed in the OB100 (starting OB) and in the OB82 (diagnosis OB) !

9.3. FB41 - main module

The FB41 is the main module of the software and has to be executed in the OB1 in cycles. Through the ENABLE bit 0.0 in the IN_BEFEHLE word, the FB41 and the communication is can be accessed. If the FB is locked, no data can be read or programmed, and you decrease the cycle time by approx. 4 ms.

Note: If the ENABLE Bit 0.0 is reset, the last command still in operation is terminated.

Note: If the ENABLE bit 0.0 is not set, the command bits of the FB41 are not executed.

Through access to the FB41, the communication to the cam controller is started. If there are no pending commands, a status request (command 0x01) is sent to the CamCon and data received by the CamCon are stored in the DB. See also chapter "9.8. DBxx - data component for cam data" on page 22. At the same time as the status request, the data words DW 22 and 24 are sent to the CamCon, that are **AND** linked to the outputs of the CamCon cam controller (output deactivation) or are available as V - inputs with activated PLC - Logic - Module.

The read status information is evaluated in the FB41 component.

Now you check, if an error was entered in the status byte (DB16) of the cam controller. If that is the case, an error reset (command 0x02) is automatically sent to the CamCon cam controller.

Then the current program number (DW14) is compared to the desired program number (DW26). If they do not match, a program change (command 0x03) with the desired program number is sent. I.e., to change a program it is sufficient to write the desired number to the data word 26.

Now it is checked, wether or not a command for cam, dead time or RK512 programming or reading is supposed to be triggered. This is controlled by setting the bits in the parameter word IN_BEFEHLE. The data for the corresponding commandshave to be entered into the data DB. Please see the following chapter. If the command command was executed without error, the command bit is reset through the FB41.

Attention: In the STATUS_OUT word of the FB41, the status information of the communication and the CamCon cam controller are stored. These will be evaluated by the application and should lead to a deactivation of the automatic of the machine and to an error message in case of emergency.

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9.3.1. Parameters of the FB41

1. Instance DB = Static data of the FB41. This DB has to be created in the S7 software (Offline) through inserting the FB41 in the OB1.

2. DP_ADR = Projected address of the in- and outputs of the communication blocks (16Byte range) address in HEX e.g. 256 = 100hex.

3. DATE_DB = Number of the data component where the cam data is stored. The DB always has to exist and be 374 words long.

4. TIMER_TIMEOUT = Number of one time used internally for timeout monitoring (e.g. 0).

5. STATUS_OUT = Register word where the status of the CamCon CP16/P/IO and of the CamCon is stored (e.g. MW0).

Bit 0.0	=	DP_ERR	=	DP communication range not found.
Bit 0.1	=	CP_INIT	=	CP16 connected and started.
Bit 0.2	=	BEF_IA	=	Command is still being implemented
Bit 0.3	=	BEFERR	=	Error during the sending of a command, e.g. the memory of the CamCon is full.
Bit 0.4	=	TIMEOUT	=	A timeout occurred during the data transmission. It will be tried to send the command again.
Bit 0.5	=	res	=	Currently not used.
Bit 0.6	=	res	=	Currently not used.
Bit 0.7	=	res	=	Currently not used.
Bit 1.0	=	ISTERR1	=	CamCon reports Pos. Error 1.
Bit 1.1	=	ISTERR2	=	CamCon reports Pos. Error 2.
Bit 1.2	=	ISTERR3	=	CamCon reports Pos. Error 3 or Clear with incremental generator.
Bit 1.3	=	AUSERR	=	CamCon reports Output Error.
Bit 1.4	=	ISTERR5	=	CamCon reports Pos. Error 5.
Bit 1.5	=	UNBEKA	=	Unknown error message of the CamCon.

Note: The program tries to automatically sign the error messages 1.0 to 1.5.

Bit 1.6	=	res	=	Currently not used.
Bit 1.7	=	res	=	Currently not used.

6. IN_BEFEHLE = Register word where the commands (bits) of the application program have to be set (e.g. MW2). If a command was executed, this bit is reset. If a read command ends, the DB contains the read cam, dead time or RK512 values.

Bit 0.0	=	ENABLE	=	FB Granting access and make a status request.

Note: If this bit is reset, the last command that still operates is terminated.

Note: If this bit is not set, the command bits are not executed by the FB41.

Bit 0.1	=	RESET	=	The intire communication is reset with an increasing flank, and it is tried to restart.

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Bit 0.2 = NP = Program a cam.
The data has to be in the DB.
1. Offset on cam table (DW 0).
2. Program number (DW 38).
3. Output number (DB 40).
4. Cam table from data word = Offset in DW 0.
5. Activation and Deactivation points.

Bit 0.3 = NAP = Program all cams.
The data has to be in the DB.
1. Offset on cam table (DW 0).
2. Program number (DW 38).
3. Controlled output number (DW 36).
4. Cam table from data word = Offset in DW 0.
5. Activation and Deactivation points.

Bit 0.4 = NL = Read a cam.
The data has to be in the DB.
1. Offset on cam table (DW 0).
2. Program number (DW 38).
3. Output number (DB 40).
The read cams are in the table from data word = Offset in DW 0.

Bit 0.5 = NAL = Read all cams.
The data has to be in the DB.
1. Offset on cam table (DW 0).
2. Program number (DW 38).
3. Controlled output number (DW 36).
The read numbers are in the table from data word = Offset in DW 0.

Bit 0.6 = TP = Program a dead time.
The data has to be in the DB.
1. Offset on dead time table (DW 2).
2. Output number (DB 40).
3. Dead time value in 0.1ms steps in the table from data word = Offset in DW 2.

Bit 0.7 = TAP = Program all dead times.
The data has to be in the DB.
1. Offset on dead time table (DW 2).
2. Controlled output number (DW 36).
3. Dead time values 0.1ms steps in the table from data word = Offset in DW 2.

Bit 1.0 = TL = Read a dead time.
The data has to be in the DB.
1. Offset on dead time table (DW 2).
2. Output number (DW 40).
The read dead time is in the table from data word = Offset in DW 2.

Bit 1.1 = TAL = Read all dead times.
The data has to be in the DB.
1. Offset on dead time table (DW 2).
2. Controlled output number (DW 36).
The read dead times are in the table from data word = Offset in DW 2.

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Bit 1.2	=	PRK	=	Program a RK512 data set. The data has to be in the DB. 1. Offset on RK512 table (DW 4). 2. Data set number = 1.DW of the RK512 table (DW 4). 3. Data to be written of the table with DB No., DB Offset and the data.
Bit 1.3	=	LRK	=	Read a RK512 data set. The data has to be in the DB. 1. Offset on RK512 table (DW 4). 2. Data set number = 1.DW of the RK512 table (DW 4). 3. Data to be read of the table with DB No. and DB Offset. The read data is in the RK512 table from data word = Offset in DW 4.
Bit 1.4	=	PARK	=	Program all RK512 data sets. The data has to be in the DB. 1. Offset on RK512 table (DW 4). 2. All data to written of the table with DB No., DB Offset and the data.
Bit 1.5	=	LARK	=	Read all RK512 data sets. The data has to be in the DB. 1. Offset on RK512 table (DW 4). The read data is in the RK512 table from data word = Offset in DW 4.
Bit 1.6	=	res	=	Currently not used.
Bit 1.7	=	res	=	Currently not used.

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9.4. FC41 - Diagnosis evaluation

To save cycle time in the PLC, it is possible to block the execution of the FB41 by resetting the command bits 0.0, but because no status can be read, you cannot monitor the CamCon. To prevent that, the CP16 - module sends a diagnosis through an error. This starts the OB82 in the S7-CPU. Here, it is checked through the diagnosis address determined during projection, wether or not this diagnosis is from the CP16t. If that is the case, the bit DIAG_CP in the OB82 is set and thus made accessible to the FC41. In the status byte of the FC41, the current diagnosis data is stored. This should be evaluated by the application and, in case of an error, lead to the deactivation of the automatic of the machine and to an error message.

The diagnosis evaluation of the CP16 is started, when the bit DIAG_CP in the OB82 is set.

If a diagnosis evaluation is not desired or necessary, the FC41 can be deleted. The OB82 has to be set in this case, so the S7 CPU does not go into the 'Stop' state, when the CamCon CP16 module sends a diagnosis.

9.4.1. Parameters of the FC41

1. DIAGADR = Projected DP diagnosis address in HEX.
   e.g. 1021 = 3FDHex (like in OB82).
2. STATUS = Status byte where the diagnosis is stored (e.g. MB4).

   If all bits are 0, the state of the CP16 is OK and the CamCon cam controller operates.

Bit 0.0=	ISTERR	CamCon reports a Pos. Error 1,2,3 or 5 (e.g. encoder defect).
Bit 0.1=	AUSERR	CamCon reports Output Error (e.g. short-circuit)
Bit 0.2=	KABEL	Cable from the CP to the CamCon broke or a restart was executed at the CamCon (e.g. through reset of an error message).
Bit 0.3=	NKOM	Communication with the CamCon is not possible. Possibly an older version of the software in the CamCon is used (Software from at least 10.9.1998 = DC50.25).
Bit 0.4=	UNBEKA	Unknown diagnosid reports from the CP16.
Bit 0.5=	DIAGLEN	The length of the diagnosis data is not 16 bytes or there is an error in the Profibus DP (e.g. if wrong diagnosis address was specified).
Bit 0.6=	KENNUNG	The Profibus identifier is not that of a CamCon CP16 (00E5).
Bit 0.7=	Currently not used or DIAG_CP bit.	

3. DIAG_CP = Bit set in the OB82, when the diagnosis comes from the CP16.
   The best value is the highest bit of the status byte (e.g. M4.7).

9.5. FC42, 43, 45, 46 and 47 - sub-programs of FB41

These FC components are executed by the FB41 and may not be executed by a different command.

9.6. OB82 - diagnosis component

Here you check, if a diagnosis was initialized by a CamCon CP16. This is checked by comparing the projected diagnosis address with the address in the valiables "OB82_MDL_ADDR". If this is identical, the DIAG_CP bit is set and the FC41 is accessible.

9.7. OB100 - starting component

The data DB is initialized and the communication is reset in this OB.

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9.8. DBxx - data component for cam data

The cam, dead time or RK512 parameter data is stored in a data component, that is given to the FB41 as a parameter. This DB also stores data like e.g. actual position, speed, output status, cam controller status, current program number and desired program number. The DB is divided into the 4 parts: 1.Status, 2.Cam, 3.Dead times and 4.RK512 parameters. The position of these areas is stored in the first 3 data words as Offset with the exception of the status area.

9.8.1. DBxx area 1 = Status

DW 0	OFFSET	Offset for area 2 = cam data.	
DW 2	OFFSET	Offset for area 3 = dead time data.	
DW 4	OFFSET	Offset for area 4 = RK512 data or parameter data.	
DW 6	res	Reserved.	
DW 8	res	Reserved.	
DW 10	ISTWERT	Current position	(only read possible).
DW 12	SPEED	Current speed value	(only read possible).
DW 14	PROG	Current program number	(only read possible).
DB 16	NSWSTATUS	NSW status	(only read possible).
DB 17	AUSANZIST	Number of outputs of the CamCon	(only read possible).
DW 18	AUSSTAT1	Status outputs 1-16	(only read possible).
DW 20	AUSSTAT2	Status outputs 17-32	(only read possible).
DW 22	VEIN1	Output deactivation bits	(only write possible)
DW 24	VEIN2	Output deactivation bits	(only write possible)
DW 26	GPROG	Desired program number	(only write possible).
DW 28	res	Reserved.	
DW 30	res	Reserved.	
DW 32	res	Reserved.	
DW 34	res	Reserved.	
DW 36	AUSANZV	Controlled output number	(only write possible).
DW 38	PROGPRG	Program for programming	(only write possible).
DB 40	AUSGNR	Current output No.	(only write possible).
DB 41	res	Reserved.	

The data words DW10 to 20 are filled through the answer to a status request.

The data words DW22 and 24 are sent to the CamCon through the status request and they are **AND** linked to the outputs of the CamCon cam controller (output deactivation) or are available as V - inputs, when the PLC Logic Module is active.

If data words 14 and 26 do not match, a program change command is sent to the CamCon. I.e., for changing a program, it is sufficient to write the desired number to the DW26.

In DW36, the number of controlled outputs for cams and dead times has to be specified. In the OB100, it it done at every start.

The data word DW38 and the data byte DB40 have to be set to the desired program or output number for reading or programming cams or dead times before the execution of command bits.

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9.8.2. DBxx area 2 = cam table

The Offset pointer (DW0) of the data DB has to point to the starting point of the cam table, that is to be used for reading or programming the cams. They have the possibilitiy to store several tables in the data DB and by changing the DW0, to send a different program to the cam controller.

Attention: The Offset may only be changed, if no cam command is active.

The cam table is divided into structures, the table itself representing a structure itself and and every cam track (output) representing a sub-structure. A cam table has the folowing structure: at the beginn as the identifier the output number (byte) then the number of cams (byte) for the output (currently up to 13) and then the data words with the activation and deactivation points. If the number of cam s is set to 2, there **have to** follow a total of 4 data words (DW), before there can follow a new output number. The program now searches from the first output number to the table until it has found the desired output number and then programs or reads that cam.

At the end of the cam table, you have to add a data word with the content FFFF, so the program can recognized the end of the table.

xx = Offset from DW0

DBxx +	0	AUSG_NR	= E.g. 1	1. First output number.
DBxx +	1	ANZ_NOCKEN	= E.g. 2	Number of cams for this output.
DWxx +	2	EIN_0001	= Cam value	Activation point 1.
DWxx +	4	AUS_0001	= Cam value	Deactivation point 1.
DWxx +	6	EIN_0002	= Cam value	Activation point 2.
DWxx +	8	AUS_0001	= Cam value	Deactivation point 2.
DBxx +	10	AUSG_NR	= E.g. 2	Next output number.
DBxx +	11	ANZ_NOCKEN	= E.g. 1	Number of cams for this output.
DWxx +	12	EIN_0001	= Cam value	Activation point 1.
DWxx +	14	AUS_0001	= Cam value	Deactivation point 1.
DWxx +	16	ENDE	= FFFF	End identifier.

The table above would read or program two cam s for output number 1 and one cam for output number 2.

Attention: There may not be any gaps or overlaps in the definition of the structure, otherwise the S7 CPU goes into 'Stop' mode or the OB121 with cycletime overflow or the access error in the DB.

9.8.3. DBxx area 3 = dead times

The Offset pointer (DW2) of the data DB has to point to the starting point of the dead time table, that is supposed to be used for reading or programming dead times. If the DW2 is set to 0, no dead time can be transmitted.

A dead time table has the following structure:

DWxx = Offset from DW2

DWxx +	0	TZK1	= e.g. 10	Dead time for output 1 (10 => 1.0ms).
DWxx +	2	TZK2	= e.g. 15	Dead time for output 2.
"				
DWxx +	62	TZK32	= e.g. 0	Dead time for output 32.

Attention: There must be a data word (DW) defined for every controlled output.

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9.8.4. DBxx area 4 = RK512 table

The electronic cam cam controller of the CamCon series from the company DIGITRONIC Automationsanlagen GmbH support the RK512 computer coupling procedure. The CamCon simulates a PLC control and makes its data (parmeters, status, cams and dead times) available in data double words. In the RK512 table the data sets determining the access to the parameters are stored.

The Offset pointer (DW4) of the data DB has to point to the starting point of the RK512 table, that is to be used for reading or programming parameters. If the DW4 is set to 0, no parameter can be transmitted.

The RK512 table is divided into structures, the table itself representing a structure and every parameter data set represents a sub-structure. The RK512 table has the following strucure: It begins with the current data set number (DW) that is supposed to be worked on. Then there is the identifier of the 1. data set through the data set number (DW). Then there is the number (byte) (currently up to 11) of the data double words that are defined in the data set. The next two bits (DBxx.DBx) determine, if the data set may be read and/or written. Then there is a byte for the simulated DB number and a byte for the Offset in the DB of the CamCon. Then there is the exact number of data double words that were defined earlier. Behind them, there may be the identifier for the next data set. The program searches from the first data set to the table until the desired data set is found or the data is read. A data word with the contents FFFF has to be added to the end of the RK512 Tabelle, so the program can recognize the end of the table.

Attention: There may not be any gaps or overlaps in the definition of the structure, otherwise the S7 CPU goes into 'Stop' mode or the OB121 with cycletime overflow or the access error in the DB.

xx = Offset from DW4

DWxx +	0	RK_AKT_SATZ	= z.B. 1	Current data set.
DWxx +	2	RK_SATZ_NR	= z.B. 0	Identifier for the first data set.
DBxx +	4	RK_DATA_LEN	= 4	Number of the data double words (max.11).
DXxx +	5.0	RK_DATA_L	= TRUE	Data set read on or off.
DXxx +	5.1	RK_DATA_P	= FALSE	Data set write on or off.
DBxx +	6	RK_DBNR	= 203	DB No. in the CamCon.
DBxx +	7	RK_DBOFFSET	= 1	Offset in the DB from where the data is.
DDxx +	8	WERT_00	= Wert	1. Value of the data.
DDxx +	12	WERT_01	= Wert	2. Value of the data.
DDxx +	16	WERT_02	= Wert	3. Value of the data.
DDxx +	20	WERT_03	= Wert	4. Value of the data.
DWxx +	24	RK_SATZ_NR	= z.B. 0	Identifier for the next data set.
DBxx +	26	RK_DATA_LEN	= 2	Number of the data double words (max.11).
DXxx +	27.0	RK_DATA_L	= FALSE	Data set read on or off.
DXxx +	27.1	RK_DATA_P	= TRUE	Data set write on or off.
DBxx +	28	RK_DBNR	= 204	DB No. in the CamCon.
DBxx +	29	RK_DBOFFSET	= 15	Offset in the DB from where the data is.
DDxx +	30	WERT_00	= Wert	1. Value of the data.
DDxx +	34	WERT_01	= Wert	2. Value of the data.
DWxx +	38	ENDE	= FFFF	End identifier.

The table above would read the RK512 data set 0 out of the CamCon DB203 from Offset 1. The programming of the data set would not be permitted and would result in an error message. The second data set can only program 2 values in the DB 204 from Offset 15 on. Reading the 2. data set would not be permitted and would result in an error message.

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10. Key word table

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