

BALLUFF

Software-Description

BVS SMART *CAMERA*

Sample Program S7-300/400



CONTENT

1	BVS-SC SAMPLE PROGRAM:	2
1.1	Sample Functions	2
1.2	General Data	2
1.3	Description	2
1.4	PLC program overview	3
1.5	Camera system settings	3
1.6	Configuration of result container and PLC-receive data block	4
1.7	Control and watch options with the variable table	5
1.7.1	Function block input parameters	5
1.7.2	Function block output parameter	6
1.7.3	Sequence diagram of sample inspection with Smart Camera Function Block	7
1.8	Disclaimer of Liability sample program	8

Sample Program description for SMART CAMERA

1 BVS-SC SAMPLE PROGRAM:

The demo program **BVS_SC_Sample** allows a communication a Balluff Smart Camera BVS-SC_* and a Simatic® S7-300 PLC.

1.1 Sample Functions

The following commandos are supported in the demo program:

Switch Application	Switches the application
Get Application ID	Gets the ID of the currently active application
Get Results	Gets the result container
Send Data	Sets the input data
Get Camera Info	Gets the camera information
Get Date Time	Get the time stamp
Set Date Time	Sets the time stamp
Set Sequence Number	Sets the sequence number

Please, examine which of the given functions are supported by the camera!

The maximum read/write length of the FB is 32.767 byte.

1.2 General Data

Program name:	BVS_SC_Sample
Invoked blocks:	FB10, FB50
Reserved memory bits:	MW0 – 2, MB4 Clock Memory, MW10, MW100-MW122
Reserved Timers:	none
Reserved Counters:	none
Configured I/O Range	64 Byte
Invoke:	absolute
Device compatibility:	Siemens Simatic® S7 300/400
Software version:	Siemens Simatic® S7-300 CPU 315 2PN/DP with S7 V5.5

1.3 Description

The Simatic® S7-project „**BVS_SC_Sample**“ contains in FB10 an example invoke of the BVS_SC function block FB50. The used PLC type is a S7-300 CPU 315 2PN/DP. Configured I/O length 64 byte, peripheral I/O start address 256. The FB50 parameters are set suitable to the hardware configuration. The FB is initialized automatically by the program. The memory bit „DB_BVS_SC“.Init is set in the OB100 at PLC startup. For controlling the example, the variable table „VAT_BVS-SC_IBN“ is available.

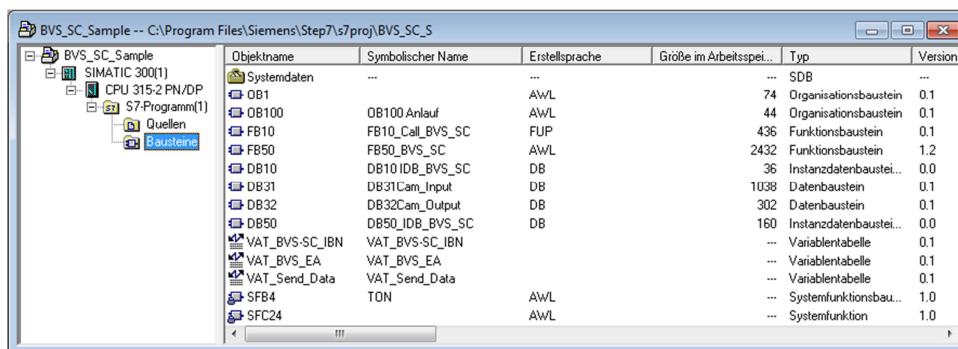
If the memory bit „M100.4 Cam_Start_Run“ is set, the running mode starts in the camera and an inspection is executed. The trigger input is used for this example. If the result is ready, the memory bit „M101.2 Result_Ready“ is set. With bit „M100.6 Get_Results“ the result container can be transmitted to the PLC.

If the results are not read from the PLC the camera overwrites the results and the bit „M102.0 WarnOutBufferErr“ is set.

Sample Program description for SMART CAMERA

1 BVS-SC SAMPLE PROGRAM:

1.4 PLC program overview

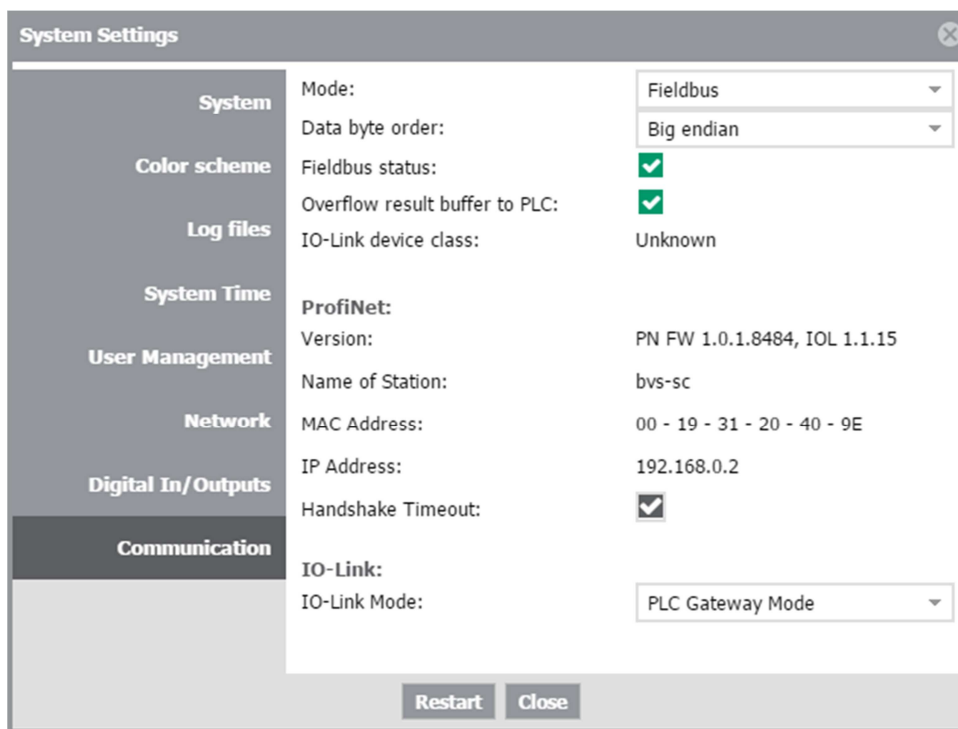


Objektname	Symbolischer Name	Erstellsprache	Größe im Arbeitsspei...	Typ	Version
Systemdaten	---	---	---	SDB	---
OB1	---	---	---	---	---
OB100	OB100_Anlaut	AWL	74	Organisationsbaustein	0.1
FB10	FB10_Call_BVS_SC	AWL	44	Organisationsbaustein	0.1
FB50	FB50_BVS_SC	FUP	436	Funktionsbaustein	0.1
DB10	DB10_IDB_BVS_SC	AWL	2432	Funktionsbaustein	1.2
DB31	DB31Cam_Input	DB	36	Instanzdatenbaustei...	0.0
DB32	DB32Cam_Output	DB	1038	Datenbaustein	0.1
DB50	DB50_IDB_BVS_SC	DB	302	Datenbaustein	0.1
VAT_BVS-SC_IBN	VAT_BVS-SC_IBN	---	160	Instanzdatenbaustei...	0.0
VAT_BVS_EA	VAT_BVS_EA	---	---	Variablenbaustein	0.1
VAT_Send_Data	VAT_Send_Data	---	---	Variablenbaustein	0.1
SFB4	TON	AWL	---	Systemfunktionsbau...	1.0
SFC24	---	AWL	---	Systemfunktion	1.0

(Figure S7 V5.5, Quickstart project)

1.5 Camera system settings

The "Fieldbus" Mode has to be activated in the system settings of the camera. The byte order "Big Endian" and the IO-Link mode "PLC Gateway" is set.



System	Mode:	Fieldbus
Color scheme	Data byte order:	Big endian
Log files	Fieldbus status:	<input checked="" type="checkbox"/>
System Time	Overflow result buffer to PLC:	<input checked="" type="checkbox"/>
User Management	IO-Link device class:	Unknown
Network	ProfiNet:	
Digital In/Outputs	Version:	PN FW 1.0.1.8484, IOL 1.1.15
Communication	Name of Station:	bvs-sc
	MAC Address:	00 - 19 - 31 - 20 - 40 - 9E
	IP Address:	192.168.0.2
	Handshake Timeout:	<input checked="" type="checkbox"/>
	IO-Link:	
	IO-Link Mode:	PLC Gateway Mode

Restart Close

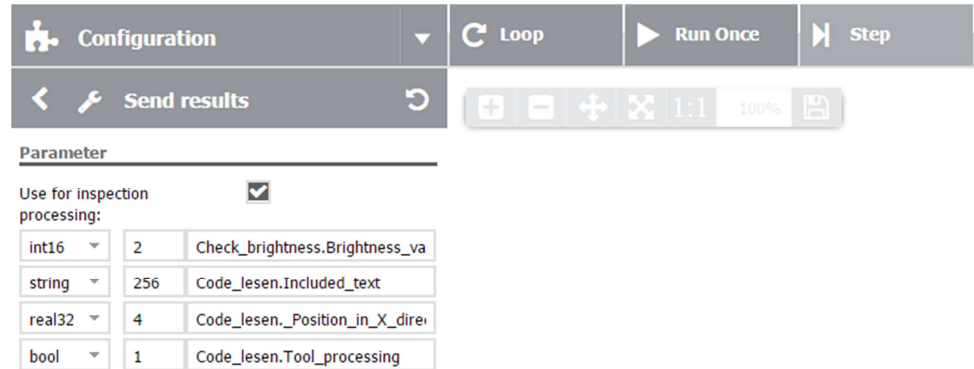
(Figure: BVS Cockpit, system settings) The PLC settings are made according to the camera settings.

Sample Program description for SMART CAMERA

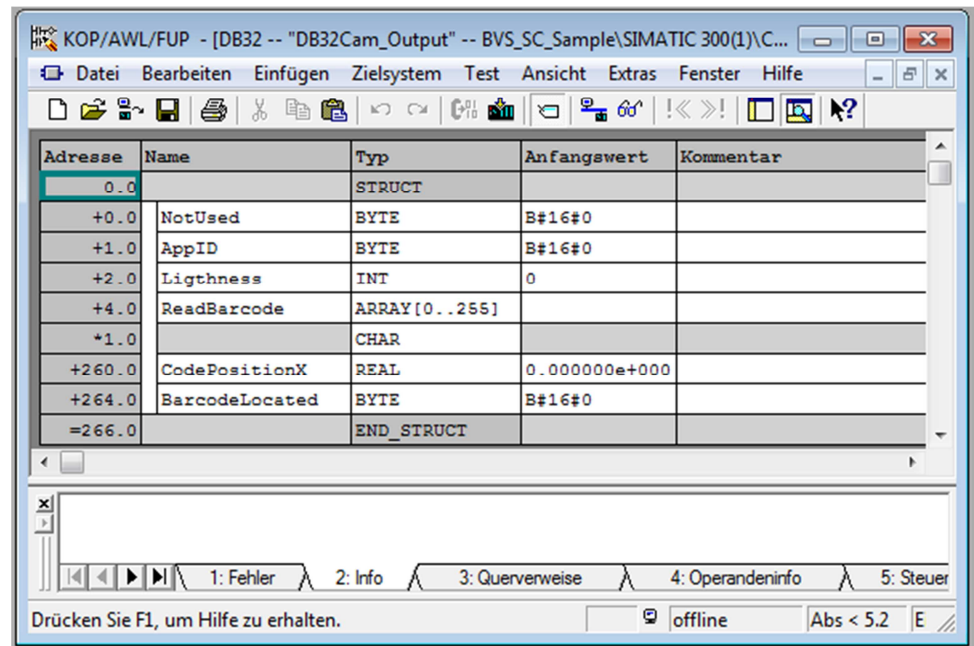
1 BVS-SC SAMPLE PROGRAM:

1.6 Configuration of result container and PLC-receive data block

The SmartCamera send result settings and the PLC receive data block using same data types with the same length. The folder sample „Quickstart.zip“ contains the SmartCamera inspection.



(Figure BVS Cockpit, result data)



(Figure S7 V5.5, DB32Cam_Output, SmartCamera output data)

The FB input parameter Offset_DBReceive is set to 1, therefore word variables from SmartCamera are sent to even byte addresses in the PLC. In the first byte, the camera transfers the AppID of the Inspection. Data types >1 starting in the Simatic® PLC at an even byte address. For processing of camera variables from data type string the datatype „Array[..] of Char“ must be used in the datablock. String variables in the Simatic® PLC containing an additional length information. The „Array of Char“ can be formatted in data type String.

Sample Program description for SMART CAMERA

1 BVS-SC SAMPLE PROGRAM:

1.7 Control and watch options with the variable table

1.7.1 Function block input parameters

- M100.0 Init – function block is initialized
- M100.1 CommandStart – starts the commando
- M100.2 Cam_ResetWarn – resets the SmartCamera
- M100.3 Cam_Stop_Run – SmartCamera is stopped
- M100.4 Cam_Start_Run – SmartCamera is started
- M100.5 Cam_Trigger – SmartCamera is triggered
- M100.6 Get_Results – gets the results from SmartCamera
- M 10.3 Cam_Default – set the FB input values to default
- MW104 Command – FB commando input
- MW106 Offset_DBSend – data offset in send data block
- MW108 Offset_DBReceive – data offset in receive data block
- MW110 Data_Length – amount of data, that is send to camera

	Operand	Symbol	Anzeigeformat	Statuswert	Steuervwert
1		// FB input parameter bit			
2	M 100.0	"M100.0 Init"	BOOL		
3	M 100.1	"M100.1 CommandStart"	BOOL		
4	M 100.2	"M100.2 Cam_ResetWarn"	BOOL		
5	M 100.3	"M100.3 Cam_Stop_Run"	BOOL		
6	M 100.4	"M100.4 Cam_Start_Run"	BOOL		
7	M 100.5	"M100.5 Cam_Trigger"	BOOL		
8	M 100.6	"M100.6 Get_Results"	BOOL		
9	M 10.3	"M10.3 Cam_Default"	BOOL		
10		// FB input parameter int			
11	MW 104	"MW104 Command"	DEZ		3
12	MW 106	"MW106 Offset_DBSend"	DEZ		0
13	MW 108	"MW108 Offset_DBReceive"	DEZ		1
14	MW 110	"MW110 Data_Length"	DEZ		32
15		// FB output parameter bit			
16	M 101.0	"M101.0 FB_Ready"	BOOL		
17	M 101.1	"M101.1 FB_Error"	BOOL		
18	M 101.2	"M101.2 Result_Ready"	BOOL		
19	M 101.3	"M101.3 Cam_WaitForTrig"	BOOL		
20	M 101.4	"M101.4 Cam_Busy"	BOOL		
21	M 101.5	"M101.5 Cam_Running"	BOOL		
22	M 101.6	"M101.6 Cam_Ready"	BOOL		
23	M 101.7	"M101.7 WarnOvertriggerd"	BOOL		
24	M 102.0	"M102.0 WarnOutBufferErr"	BOOL		
25	M 102.1	"M102.1 WarnInBufferErr"	BOOL		
26		// FB output parameter word			
27	MW 122	"MW122 ErrorNumber"	HEX		
28		// Camera output data			
29	DB32.DBB 0	"DB32Cam_Output".NotUsed	HEX		
30	DB32.DBB 1	"DB32Cam_Output".AppID	DEZ		
31	DB32.DBW 2	"DB32Cam_Output".Lighthness	DEZ		
32	DB32.DBB 264	"DB32Cam_Output".BarcodeLocated	BIN		
33	DB32.DBB 4	"DB32Cam_Output".ReadBarcode[0]	ZEICHEN		
34	DB32.DBB 5	"DB32Cam_Output".ReadBarcode[1]	ZEICHEN		
35	DB32.DBB 6	"DB32Cam_Output".ReadBarcode[2]	ZEICHEN		
36	DB32.DBB 7	"DB32Cam_Output".ReadBarcode[3]	ZEICHEN		
37		// Camera input data			
38	DB31.DBB 0	"DB31Cam_Input".SendByte[0]	HEX		
39	DB31.DBB 1	"DB31Cam_Input".SendByte[1]	HEX		
40	DB31.DBB 2	"DB31Cam_Input".SendByte[2]	HEX		
41	DB31.DBB 3	"DB31Cam_Input".SendByte[3]	HEX		
42					

(Figure S7 V5.5, variable table)

Sample Program description for **SMART CAMERA**

1 BVS-SC SAMPLE PROGRAM:

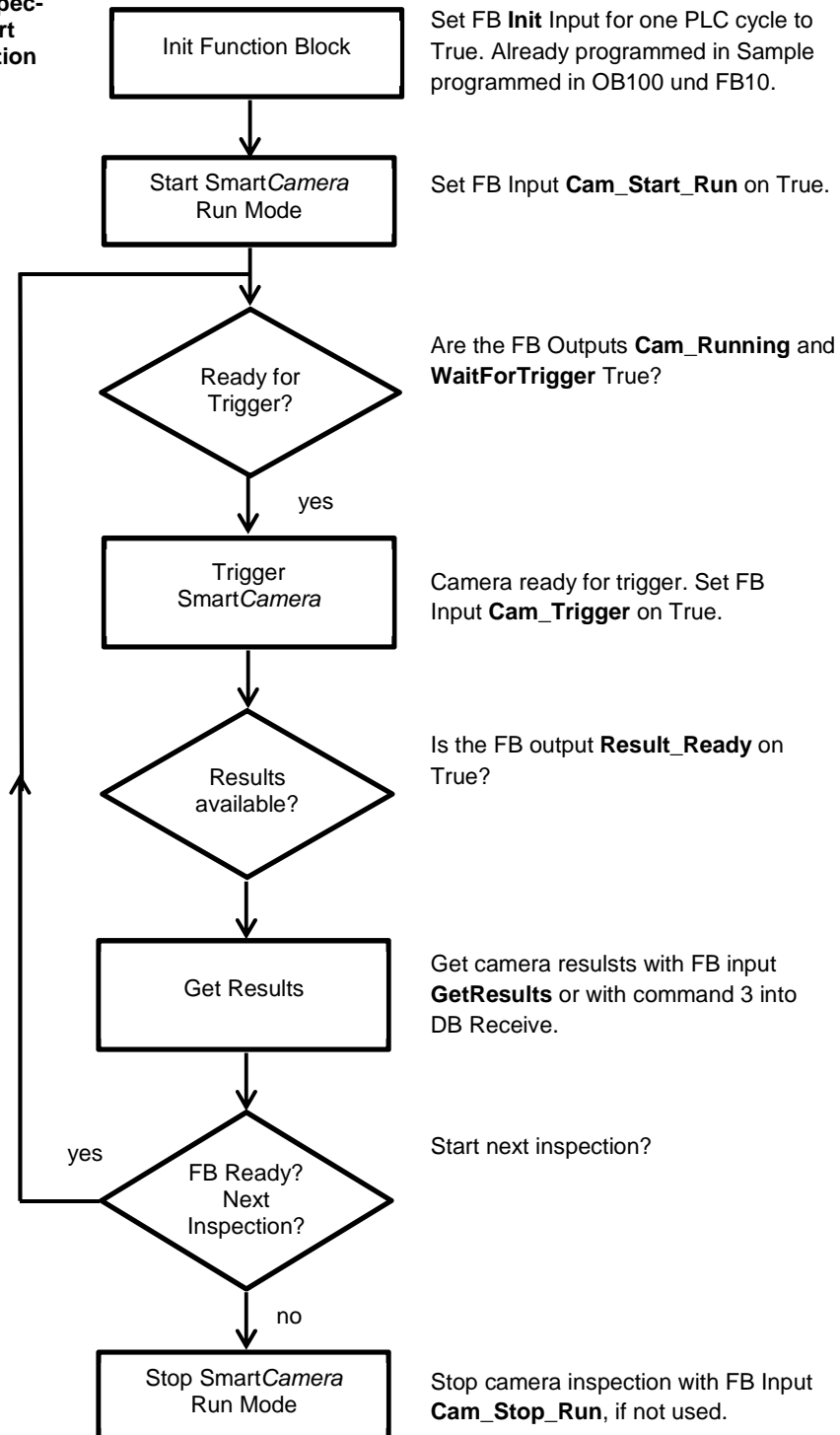
1.7.2 Function block output parameter

- M101.0 FB_Ready – job done
- M101.2 Result_Ready – inspection is done, data can be received from PLC
- M101.3 Cam_WaitForTrig – SmartCamera is ready for a trigger impulse
- M101.4 Cam_Busy – SmartCamera is busy at the moment
- M101.5 Cam_Running – SmartCamera is in running mode
- M101.6 Cam_Ready – SmartCamera is ready
- M101.7 WarnOvertriggerd – trigger was discarded
- M102.0 WarnOutBufferErr – output container overwritten
- M102.1 WarnInBufferErr - – input container error
- M102.4 WarnOverheat – temperature over limit
- M102.5 WarnSystemError - SmartCamera system errorr
- M101.1 FB_Error – Auftrag mit Fehler beendet
- MW122 ErrorNumber – FB or SmartCamera error number

Sample Program description for SMART CAMERA

1 BVS-SC SAMPLE PROGRAM:

1.7.3 Sequence diagram of sample inspection with Smart Camera Function Block



FB = SmartCamera Function Block

Sample Program description for **SMART CAMERA**

1 BVS-SC SAMPLE PROGRAM:

1.8 Disclaimer of Liability sample program

This demo program is free of charge and is a universal application example. This demo program shall help program and configure PLC applications and shall provide possible solutions.

The user is not entitled to claim for warranty, error correction and updates. In particular there is excluded any claims against Balluff GmbH for damages that might result from the use of this demo program. Excluded from this limitation of liability shall be (a) those damages that are based on injury to life, limb or health, (b) a liability according to the Produkthaftungsgesetz (German Product Liability Law) and (c) cases of willful intent.

Please check if the demo program is intended for your application before adapting it in plants and machineries.

By using the S7 sample, made available free of charge you accept the limitation of warranty and liability!

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Valid from function block version 1.2 • C17; Subject to change.