



PLC Integration of HT3C_2151

IO-Link service data function block + process data parser function for Beckhoff (TwinCAT 3.x) PLC systems in combination with a EtherCAT IO-Link Master

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1 Legal information

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2 About this document

Please read this chapter carefully before working with this documentation and the Leuze IO-Link device.

2.1 Purpose of use

These instructions have been designed for the technical personnel for the use of the IO-Link PLC blocks.

These instructions are intended to provide support during the commissioning of a Leuze IO-Link sensor using standard software from Siemens. The described module is part of this standard software.

2.2 Target group

These instructions are addressed to programming engineers and the operators of machines and systems, which are operated by one or several IO-Link devices. They also address people, who connect the IO-Link device via an IO-Link-Master-Gateway to a PLC-Control for data exchange.

3 General use of function block

3.1 Short description

The function block "FB_Leuze_IOL_ HT3C_2151" simplifies the usage of Leuze IO-Link devices on Beckhoff (TwinCAT 3.x) PLC controls. This FB supports IO-Link Masters which can be connected via EtherCAT to the PLC system.

The function block is device type-specific and thus only suitable for the appropriate Leuze IO-Link devices. The FB interprets the call-up of the acyclic service data between the PLC and the IO-Link device.

The IO-Link function block can only be used in combination with the listed helper functions / libraries.

3.2 Calling and designation



Fig. 3.1: Example of module call

3.3 Configuration

Tab. 3.1: Parameter IN

Parameter	Data type	Description
bExecute	Bool	Positive trigger: Start data transfer
bRW	Bool	Read or write the selected IO-Link parameter. FALSE: Read parameter TRUE: Write Parameter
nPort	T_AmsPort	Port number of the ADS device.
sNetId	T_AmsNetID	String containing the AMS network identifier of the target device to which the ADS command is directed. Beckhoff EL6224/EP6224: AoeNetId of the IO-Link Master
nIdxGroup	UDInt	Index group number.
tTimeOut	Time	Time, after a Timeout-Error is triggered.

Tab. 3.2: Parameter INOUT

Parameter	Data type	Description
stDeviceData	ST_Leuze_IOL_ HT3C_2151	Sensor data

See structure description of ST_Leuze_IOL_ HT3C_2151 in chapter 7.

Tab. 3.3: Parameter OUT

Parameter	Data type	Description
bDone	Bool	Indicates whether data is valid.

Parameter	Data type	Description
bBusy	Bool	Request in process. FALSE: Request is terminated TRUE: Request is being processed
bError	Bool	Error flag FALSE: No error TRUE: Error detected
stErrorCode	ST_Leuze_IOL_Error	Status of the function block

See structure description of ST_Leuze_IOL_Error in chapter 6.

3.4 Method of function

The function block uses the data structure "ST_Leuze_IOL_HT3C_2151". The PLC data structure contains the values of all IO-Link variables. Before you can use it, the structure must be instantiated by a data block. Each IO-Link FB parameter has a data point representing it in this data structure. This data point will be actualized every time a read request was executed successfully.

The desired parameters can be selected via the input variables. Depending on the device definition, IO-Link parameters are read or writable. The input variable must be "bRW" = FALSE to read parameter. The value that should be written can be defined in the data structure, as soon as the input parameter "bRW" = TRUE. You start each transfer by calling up the "FB_Leuze_IOL_HT3C_2151" with a positive trigger at the "bExecute" input. As long as there is no valid answer the output "bBusy" is TRUE. In the case that the chosen timeout period has elapsed a timeout error will be generated and the thread will be terminated. The "bDone" = TRUE output shows that the transmission was successful. The outputs retain there states as long as there is no new positive trigger at the "bExecute" input again.

The function block allows you to read or write multiple IO-Link parameters sequentially (multi-selection). Please note that it may happen, that a single parameter can not be written. The function block aborts at this point and it is possible, that the IO-Link device contains an inconsistent set of parameters.

3.5 Behavior when error occurs


An error bit (bError) is set and an error code (ST_Leuze_IOL_Error) generated, if there is a spurious input value or an incorrect input connection of the FB. In this case, no further processing is carried out, until the input has been corrected.

4 Integration into the PLC project

The function block "FB_Leuze_IOL_ HT3C_2151" is a part of the TwinCAT V3.x library. The library can be installed by using the Library Repository. Afterwards the library can be added to your project (References --> Add library...).

Integration step by step:

- Download the library
- Open the Library repository in Library Manager tab in Beckhoff TwinCAT
- Click Install... and select downloaded library
- Open Add library in Library Manager tab
- Find installed library under Leuze electronic GmbH + Co. KG

NOTICE	
	If several devices connect to the IO-Link Master, you can only exchange acyclic data (service data) with one device at the same time. Due this restriction, the service data communication blocks must to be blocked against each other.

5 Process data parser function

The function F_Leuze_PD_HT3C_2151 simplifies the interpretation of composed IO-Link process data. This data is provided as a data structure on the PLC side.

The function is device type-specific and thus only suitable for the appropriated Leuze IO-Link devices.

5.1 Calling and designation



Fig. 5.1: Example of process data parsing function call

5.2 Configuration

Tab. 5.1: Parameters

Parameter name	Declaration	Data type	Description
aProcessData	INPUT	ARRAY OF BYTE	Raw process data of the IO-Link device.
bError	OUTPUT	BOOL	Error flag FALSE: No error TRUE: Error detected
F_Leuze_PD_HT3C_2151	OUTPUT	ST_Leuze_PD_HT3C_2151	Reference to the instance of the data structure ST_Leuze_PD_HT3C_2151. The structure includes the disaggregated values of the process data.

See structure description of ST_Leuze_PD_HT3C_2151 in chapter 7.

6 Error description

The parameter "ErrorCode" can be interpreted using the PLC data type ST_Leuze_IOL_Error. This data type contains the following error information:

Tab. 6.1: ST_Leuze_IOL_Error description

Parameter name	Data type	Description
ErrorStatus.nBlockError	WORD	Error number representing FB where error occurred
ErrorStatus.nAdsReadError	UDINT	ADS read error code
ErrorStatus.nAdsWriteError	UDINT	ADS write error code
ErrorStatus.nIndex	INT	IO-Link index to which the error code refers
ErrorStatus.nSubIndex	INT	IO-Link sub-index to which the error code refers

Tab. 6.2: Error description for nBlockError

Error code (nBlockError)	Error description
0x0000	No error
0x8001	Time out error occurred
0x8002	No parameter selected
0x8003	Error in FB_Leuze_IOL_AdsReadWrite block

For additional information see the Beckhoff ADS Return Codes (<https://infosys.beckhoff.com>).

7 Data structures

Tab. 7.1: ST_Leuze_IOL_HT3C_2151

Parameter name	Data type	Description
stDeviceData.stSelection.stCommands.bDeviceReset	BOOL	[WRITE_ONLY] Device Reset
stDeviceData.stSelection.stCommands.bApplicationReset	BOOL	[WRITE_ONLY] Application Reset
stDeviceData.stSelection.stCommands.bRestoreFactorySettings	BOOL	[WRITE_ONLY] Restore Factory Settings
stDeviceData.stSelection.stCommands.bTeachSp	BOOL	[WRITE_ONLY] Teach SP
stDeviceData.stSelection.stCommands.bActivationTakesPriorityOverPdout	BOOL	[WRITE_ONLY] Activation (Takes Priority over PDout)
stDeviceData.stSelection.stCommands.bDeactivationTakesPriorityOverPdout	BOOL	[WRITE_ONLY] Deactivation (Takes Priority over PDout)
stDeviceData.stSelection.stCommands.bResetPriorityPdoutWorking	BOOL	[WRITE_ONLY] Reset Priority (PDout working)
stDeviceData.stSelection.stDirectParameters1.bAll	BOOL	[READ_WRITE] all parameters of complex data type
stDeviceData.stSelection.stDirectParameters1.bReserved_1	BOOL	[READ_ONLY]
stDeviceData.stSelection.stDirectParameters1.bMasterCycleTime	BOOL	[READ_ONLY]
stDeviceData.stSelection.stDirectParameters1.bMinCycleTime	BOOL	[READ_ONLY]
stDeviceData.stSelection.stDirectParameters1.bMSequenceCapability	BOOL	[READ_ONLY]
stDeviceData.stSelection.stDirectParameters1.bIoLinkVersionId	BOOL	[READ_ONLY]
stDeviceData.stSelection.stDirectParameters1.bProcessDataInputLength	BOOL	[READ_ONLY]
stDeviceData.stSelection.stDirectParameters1.bProcessDataOutputLength	BOOL	[READ_ONLY]
stDeviceData.stSelection.stDirectParameters1.bVendorId1	BOOL	[READ_ONLY]
stDeviceData.stSelection.stDirectParameters1.bVendorId2	BOOL	[READ_ONLY]
stDeviceData.stSelection.stDirectParameters1.bDeviceId1	BOOL	[READ_ONLY]
stDeviceData.stSelection.stDirectParameters1.bDeviceId2	BOOL	[READ_ONLY]
stDeviceData.stSelection.stDirectParameters1.bDeviceId3	BOOL	[READ_ONLY]
stDeviceData.stSelection.stDirectParameters1.bReserved_13	BOOL	[READ_ONLY]
stDeviceData.stSelection.stDirectParameters1.bReserved_14	BOOL	[READ_ONLY]
stDeviceData.stSelection.stDirectParameters1.bReserved_15	BOOL	[READ_ONLY]
stDeviceData.stSelection.stDirectParameters2.bAll	BOOL	[READ_WRITE] all parameters of complex data type

Parameter name	Data type	Description
stDeviceData.stSelection.stDirectParameters2.bDeviceSpecificParameter1	BOOL	[READ_WRITE]
stDeviceData.stSelection.stDirectParameters2.bDeviceSpecificParameter2	BOOL	[READ_WRITE]
stDeviceData.stSelection.stDirectParameters2.bDeviceSpecificParameter3	BOOL	[READ_WRITE]
stDeviceData.stSelection.stDirectParameters2.bDeviceSpecificParameter4	BOOL	[READ_WRITE]
stDeviceData.stSelection.stDirectParameters2.bDeviceSpecificParameter5	BOOL	[READ_WRITE]
stDeviceData.stSelection.stDirectParameters2.bDeviceSpecificParameter6	BOOL	[READ_WRITE]
stDeviceData.stSelection.stDirectParameters2.bDeviceSpecificParameter7	BOOL	[READ_WRITE]
stDeviceData.stSelection.stDirectParameters2.bDeviceSpecificParameter8	BOOL	[READ_WRITE]
stDeviceData.stSelection.stDirectParameters2.bDeviceSpecificParameter9	BOOL	[READ_WRITE]
stDeviceData.stSelection.stDirectParameters2.bDeviceSpecificParameter10	BOOL	[READ_WRITE]
stDeviceData.stSelection.stDirectParameters2.bDeviceSpecificParameter11	BOOL	[READ_WRITE]
stDeviceData.stSelection.stDirectParameters2.bDeviceSpecificParameter12	BOOL	[READ_WRITE]
stDeviceData.stSelection.stDirectParameters2.bDeviceSpecificParameter13	BOOL	[READ_WRITE]
stDeviceData.stSelection.stDirectParameters2.bDeviceSpecificParameter14	BOOL	[READ_WRITE]
stDeviceData.stSelection.stDirectParameters2.bDeviceSpecificParameter15	BOOL	[READ_WRITE]
stDeviceData.stSelection.stDirectParameters2.bDeviceSpecificParameter16	BOOL	[READ_WRITE]
stDeviceData.stSelection.bStandardCommand	BOOL	[WRITE_ONLY]
stDeviceData.stSelection.stDeviceAccessLocks.bAll	BOOL	[READ_WRITE] all parameters of complex data type
stDeviceData.stSelection.stProfileCharacteristic.bAll	BOOL	[READ_ONLY] all parameters of complex data type
stDeviceData.stSelection.bVendorName	BOOL	[READ_ONLY]
stDeviceData.stSelection.bVendorText	BOOL	[READ_ONLY]
stDeviceData.stSelection.bProductName	BOOL	[READ_ONLY]
stDeviceData.stSelection.bProductId	BOOL	[READ_ONLY]
stDeviceData.stSelection.bProductText	BOOL	[READ_ONLY]
stDeviceData.stSelection.bSerialNumber	BOOL	[READ_ONLY]
stDeviceData.stSelection.bHardwareVersion	BOOL	[READ_ONLY]
stDeviceData.stSelection.bFirmwareVersion	BOOL	[READ_ONLY]

Parameter name	Data type	Description
stDeviceData.stSelection.bApplicationSpecificTag	BOOL	[READ_WRITE]
stDeviceData.stSelection.bFunctionTag	BOOL	[READ_WRITE]
stDeviceData.stSelection.bLocationTag	BOOL	[READ_WRITE]
stDeviceData.stSelection.bDeviceStatus	BOOL	[READ_ONLY]
stDeviceData.stSelection.stDetailedDeviceStatus.bAll	BOOL	[READ_ONLY] all parameters of complex data type
stDeviceData.stSelection.bSscParamSp	BOOL	[READ_WRITE] SSC1 Param - SP
stDeviceData.stSelection.bSscConfigLogic_57	BOOL	[READ_WRITE] SSC1 Logic
stDeviceData.stSelection.bTeachInSelect	BOOL	[READ_WRITE] Selection of Teaching Target
stDeviceData.stSelection.stTiResult.bAll	BOOL	[READ_ONLY] all parameters of complex data type
stDeviceData.stSelection.bSsc2TeachingReserveFactor	BOOL	[READ_WRITE] This three-step Addition Setting only has an Effect on Teaching Operations
stDeviceData.stSelection.bSsc1TeachingReserveFactor	BOOL	[READ_WRITE] This three-step Addition Setting only has an Effect on Teaching Operations
stDeviceData.stSelection.bTemporaryCounter	BOOL	[READ_ONLY] Counter for Future Use
stDeviceData.stSelection.bAnalysisDepthSsc2	BOOL	[READ_WRITE] Number of Scans considered for the Switching Output SSC2 to toggle
stDeviceData.stSelection.bTimerUnitSsc2	BOOL	[READ_WRITE] Timer Unit SSC2
stDeviceData.stSelection.bFunctionOfTimerUnitSsc2	BOOL	[READ_WRITE] Function of Timer Unit SSC2
stDeviceData.stSelection.bTimeSsc2	BOOL	[READ_WRITE] Time SSC2
stDeviceData.stSelection.bNumberOfObjectsSsc2	BOOL	[READ_WRITE] Internal Object Counter SSC2
stDeviceData.stSelection.bSsc2ParamSp	BOOL	[READ_WRITE] SSC2 Param - SP
stDeviceData.stSelection.bSsc2ConfigLogic_187	BOOL	[READ_WRITE] SSC2 Logic
stDeviceData.stSelection.bAnalysisDepthSsc1	BOOL	[READ_WRITE] Number of Scans considered for the Switching Output SSC1 to toggle
stDeviceData.stSelection.bTimerUnitSsc1	BOOL	[READ_WRITE] Timer Unit SSC1
stDeviceData.stSelection.bFunctionOfTimerUnitSsc1	BOOL	[READ_WRITE] Function of Timer Unit SSC1
stDeviceData.stSelection.bTimeSsc1	BOOL	[READ_WRITE] Time SSC1
stDeviceData.stSelection.bNumberOfObjectsSsc1	BOOL	[READ_WRITE] Internal Object Counter SSC1

Parameter name	Data type	Description
stDeviceData.stSelection.bTemperature	BOOL	[READ_ONLY] Temperature inside the Device
stDeviceData.stSelection.bButtonFunctionLevel1	BOOL	[READ_WRITE] Button Function Level 1
stDeviceData.stSelection.bButtonFunctionLevel2	BOOL	[READ_WRITE] Button Function Level 2
stDeviceData.stSelection.bButtonFunctionLevel3	BOOL	[READ_WRITE] Button Function Level 3
stDeviceData.stSelection.bPin4Function	BOOL	[READ_WRITE] Pin 4 Function
stDeviceData.stSelection.bPin2Function	BOOL	[READ_WRITE] Pin 2 Function
stDeviceData.stData.stCommands.nDeviceReset	UINT	[WRITE_ONLY] Device Reset
stDeviceData.stData.stCommands.nApplicationReset	UINT	[WRITE_ONLY] Application Reset
stDeviceData.stData.stCommands.nRestoreFactorySettings	UINT	[WRITE_ONLY] Restore Factory Settings
stDeviceData.stData.stCommands.nTeachSp	UINT	[WRITE_ONLY] Teach SP
stDeviceData.stData.stCommands.nActivationTakesPriorityOverPdout	UINT	[WRITE_ONLY] Activation (Takes Priority over PDout)
stDeviceData.stData.stCommands.nDeactivationTakesPriorityOverPdout	UINT	[WRITE_ONLY] Deactivation (Takes Priority over PDout)
stDeviceData.stData.stCommands.nResetPriorityPdoutWorking	UINT	[WRITE_ONLY] Reset Priority (PDout working)
stDeviceData.stData.stDirectParameters1.nReserved_1	UINT	[READ_ONLY]
stDeviceData.stData.stDirectParameters1.nMasterCycleTime	UINT	[READ_ONLY]
stDeviceData.stData.stDirectParameters1.nMinCycleTime	UINT	[READ_ONLY]
stDeviceData.stData.stDirectParameters1.nMSequenceCapability	UINT	[READ_ONLY]
stDeviceData.stData.stDirectParameters1.nIoLinkId	UINT	[READ_ONLY]
stDeviceData.stData.stDirectParameters1.nProcessDataInputLength	UINT	[READ_ONLY]
stDeviceData.stData.stDirectParameters1.nProcessDataOutputLength	UINT	[READ_ONLY]
stDeviceData.stData.stDirectParameters1.nVendorId1	UINT	[READ_ONLY]
stDeviceData.stData.stDirectParameters1.nVendorId2	UINT	[READ_ONLY]
stDeviceData.stData.stDirectParameters1.nDeviceId1	UINT	[READ_ONLY]
stDeviceData.stData.stDirectParameters1.nDeviceId2	UINT	[READ_ONLY]
stDeviceData.stData.stDirectParameters1.nDeviceId3	UINT	[READ_ONLY]
stDeviceData.stData.stDirectParameters1.nReserved_13	UINT	[READ_ONLY]

Parameter name	Data type	Description
stDeviceData.stData.stDirectParameters1.nReserved_14	UINT	[READ_ONLY]
stDeviceData.stData.stDirectParameters1.nReserved_15	UINT	[READ_ONLY]
stDeviceData.stData.stDirectParameters2.nDeviceSpecificParameter1	UINT	[READ_WRITE]
stDeviceData.stData.stDirectParameters2.nDeviceSpecificParameter2	UINT	[READ_WRITE]
stDeviceData.stData.stDirectParameters2.nDeviceSpecificParameter3	UINT	[READ_WRITE]
stDeviceData.stData.stDirectParameters2.nDeviceSpecificParameter4	UINT	[READ_WRITE]
stDeviceData.stData.stDirectParameters2.nDeviceSpecificParameter5	UINT	[READ_WRITE]
stDeviceData.stData.stDirectParameters2.nDeviceSpecificParameter6	UINT	[READ_WRITE]
stDeviceData.stData.stDirectParameters2.nDeviceSpecificParameter7	UINT	[READ_WRITE]
stDeviceData.stData.stDirectParameters2.nDeviceSpecificParameter8	UINT	[READ_WRITE]
stDeviceData.stData.stDirectParameters2.nDeviceSpecificParameter9	UINT	[READ_WRITE]
stDeviceData.stData.stDirectParameters2.nDeviceSpecificParameter10	UINT	[READ_WRITE]
stDeviceData.stData.stDirectParameters2.nDeviceSpecificParameter11	UINT	[READ_WRITE]
stDeviceData.stData.stDirectParameters2.nDeviceSpecificParameter12	UINT	[READ_WRITE]
stDeviceData.stData.stDirectParameters2.nDeviceSpecificParameter13	UINT	[READ_WRITE]
stDeviceData.stData.stDirectParameters2.nDeviceSpecificParameter14	UINT	[READ_WRITE]
stDeviceData.stData.stDirectParameters2.nDeviceSpecificParameter15	UINT	[READ_WRITE]
stDeviceData.stData.stDirectParameters2.nDeviceSpecificParameter16	UINT	[READ_WRITE]
stDeviceData.stData.nStandardCommand	UINT	[WRITE_ONLY]
stDeviceData.stData.stDeviceAccessLocks.bParameterWriteAccessLock	BOOL	[READ_WRITE]
stDeviceData.stData.stDeviceAccessLocks.bDataStorageLock	BOOL	[READ_WRITE]
stDeviceData.stData.stDeviceAccessLocks.bLocalParameterizationLock	BOOL	[READ_WRITE]
stDeviceData.stData.stDeviceAccessLocks.bLocalUserInterfaceLock	BOOL	[READ_WRITE]
stDeviceData.stData.stProfileCharacteristic.nDeviceProfile1	UINT	[READ_ONLY] 0x0007: Adjustable Switching Sensor, Single Value Teach, Disable Function
stDeviceData.stData.stProfileCharacteristic.nApplicationProfile	UINT	[READ_ONLY] 0x4000: Identification and Diagnosis
stDeviceData.stData.sVendorName	STRING	[READ_ONLY]

Parameter name	Data type	Description
stDeviceData.stData.sVendorText	STRING	[READ_ONLY]
stDeviceData.stData.sProductName	STRING	[READ_ONLY]
stDeviceData.stData.sProductId	STRING	[READ_ONLY]
stDeviceData.stData.sProductText	STRING	[READ_ONLY]
stDeviceData.stData.sSerialNumber	STRING	[READ_ONLY]
stDeviceData.stData.sHardwareVersion	STRING	[READ_ONLY]
stDeviceData.stData.sFirmwareVersion	STRING	[READ_ONLY]
stDeviceData.stData.sApplicationSpecificTag	STRING	[READ_WRITE]
stDeviceData.stData.sFunctionTag	STRING	[READ_WRITE]
stDeviceData.stData.sLocationTag	STRING	[READ_WRITE]
stDeviceData.stData.nDeviceStatus	UINT	[READ_ONLY]
stDeviceData.stData.stDetailedDeviceStatus.sltem_1	STRING	[READ_ONLY]
stDeviceData.stData.stDetailedDeviceStatus.sltem_2	STRING	[READ_ONLY]
stDeviceData.stData.nSscParamSp	INT	[READ_WRITE] SSC1 Param - SP
stDeviceData.stData.nSscConfigLogic_57	UINT	[READ_WRITE] SSC1 Logic
stDeviceData.stData.nTeachInSelect	UINT	[READ_WRITE] Selection of Teaching Target
stDeviceData.stData.stTiResult.nState	UINT	[READ_ONLY]
stDeviceData.stData.stTiResult.bFlagSpTp1	BOOL	[READ_ONLY]
stDeviceData.stData.nSsc2TeachingReserveFactor	INT	[READ_WRITE] This three-step Addition Setting only has an Effect on Teaching Operations
stDeviceData.stData.nSsc1TeachingReserveFactor	INT	[READ_WRITE] This three-step Addition Setting only has an Effect on Teaching Operations
stDeviceData.stData.nTemporaryCounter	UINT	[READ_ONLY] Counter for Future Use
stDeviceData.stData.nAnalysisDepthSsc2	INT	[READ_WRITE] Number of Scans considered for the Switching Output SSC2 to toggle
stDeviceData.stData.nTimerUnitSsc2	UINT	[READ_WRITE] Timer Unit SSC2
stDeviceData.stData.nFunctionOfTimerUnitSsc2	UINT	[READ_WRITE] Function of Timer Unit SSC2
stDeviceData.stData.nTimeSsc2	UINT	[READ_WRITE] Time SSC2

Parameter name	Data type	Description
stDeviceData.stData.nNumberOfObjectsSsc2	UINT	[READ_WRITE] Internal Object Counter SSC2
stDeviceData.stData.nSsc2ParamSp	INT	[READ_WRITE] SSC2 Param - SP
stDeviceData.stData.nSsc2ConfigLogic_187	UINT	[READ_WRITE] SSC2 Logic
stDeviceData.stData.nAnalysisDepthSsc1	INT	[READ_WRITE] Number of Scans considered for the Switching Output SSC1 to toggle
stDeviceData.stData.nTimerUnitSsc1	UINT	[READ_WRITE] Timer Unit SSC1
stDeviceData.stData.nFunctionOfTimerUnitSsc1	UINT	[READ_WRITE] Function of Timer Unit SSC1
stDeviceData.stData.nTimeSsc1	UINT	[READ_WRITE] Time SSC1
stDeviceData.stData.nNumberOfObjectsSsc1	UINT	[READ_WRITE] Internal Object Counter SSC1
stDeviceData.stData.nTemperature	INT	[READ_ONLY] Temperature inside the Device
stDeviceData.stData.nButtonFunctionLevel1	INT	[READ_WRITE] Button Function Level 1
stDeviceData.stData.nButtonFunctionLevel2	INT	[READ_WRITE] Button Function Level 2
stDeviceData.stData.nButtonFunctionLevel3	INT	[READ_WRITE] Button Function Level 3
stDeviceData.stData.nPin4Function	UINT	[READ_WRITE] Pin 4 Function
stDeviceData.stData.nPin2Function	UINT	[READ_WRITE] Pin 2 Function

Tab. 7.2: ST_Leuze_PD_HT3C_2151

Parameter name	Data type	Description
ST_Leuze_PD_HT3C_2151.bSsc1	BOOL	
ST_Leuze_PD_HT3C_2151.bSsc2	BOOL	
ST_Leuze_PD_HT3C_2151.bMeasure	BOOL	
ST_Leuze_PD_HT3C_2151.bSignal	BOOL	
ST_Leuze_PD_HT3C_2151.bWarning	BOOL	
ST_Leuze_PD_HT3C_2151.nQuality	UINT	

8 Parameter descriptions

Tab. 8.1: IODD parameter descriptions

(AR - Access Rights, R - Read only, W - Write only, RW - Read and Write, NS - Not specified)

Parameter	Index	Subindex	Data type	Default	AR	Description
Commands			RecordT		W	
Device Reset			UIntegerT	128	W	Device Reset
Application Reset			UIntegerT	129	W	Application Reset
Restore Factory Settings			UIntegerT	130	W	Restore Factory Settings
Teach SP			UIntegerT	65	W	Teach SP
Activation (Takes Priority over PDout)			UIntegerT	176	W	Activation (Takes Priority over PDout)
Deactivation (Takes Priority over PDout)			UIntegerT	177	W	Deactivation (Takes Priority over PDout)
Reset Priority (PDout working)			UIntegerT	178	W	Reset Priority (PDout working)
Direct Parameters 1	0	0	RecordT		RW	
Reserved	0	1	UIntegerT		R	
Master Cycle Time	0	2	UIntegerT		R	
Min Cycle Time	0	3	UIntegerT		R	
M-Sequence Capability	0	4	UIntegerT		R	
IO-Link Version ID	0	5	UIntegerT	17	R	
Process Data Input Length	0	6	UIntegerT		R	
Process Data Output Length	0	7	UIntegerT		R	
Vendor ID 1	0	8	UIntegerT		R	
Vendor ID 2	0	9	UIntegerT		R	
Device ID 1	0	10	UIntegerT		R	
Device ID 2	0	11	UIntegerT		R	
Device ID 3	0	12	UIntegerT		R	
Reserved	0	13	UIntegerT		R	
Reserved	0	14	UIntegerT		R	
Reserved	0	15	UIntegerT		R	

Parameter	Index	Subindex	Data type	Default	AR	Description
Standard Command	0	16	UIntegerT		W	(0 ... 63): Reserved 128: Device Reset 129: Application Reset 130: Restore Factory Settings (131 ... 159): Reserved
Direct Parameters 2	1	0	RecordT		RW	
Device Specific Parameter 1	1	1	UIntegerT		RW	
Device Specific Parameter 2	1	2	UIntegerT		RW	
Device Specific Parameter 3	1	3	UIntegerT		RW	
Device Specific Parameter 4	1	4	UIntegerT		RW	
Device Specific Parameter 5	1	5	UIntegerT		RW	
Device Specific Parameter 6	1	6	UIntegerT		RW	
Device Specific Parameter 7	1	7	UIntegerT		RW	
Device Specific Parameter 8	1	8	UIntegerT		RW	
Device Specific Parameter 9	1	9	UIntegerT		RW	
Device Specific Parameter 10	1	10	UIntegerT		RW	
Device Specific Parameter 11	1	11	UIntegerT		RW	
Device Specific Parameter 12	1	12	UIntegerT		RW	
Device Specific Parameter 13	1	13	UIntegerT		RW	
Device Specific Parameter 14	1	14	UIntegerT		RW	
Device Specific Parameter 15	1	15	UIntegerT		RW	
Device Specific Parameter 16	1	16	UIntegerT		RW	
Standard Command	2	0	UIntegerT		W	(0 ... 63): Reserved 128: Device Reset 129: Application Reset 130: Restore Factory Settings (131 ... 159): Reserved 65: Teach SP 176: Activation (Takes Priority over PDout) 177: Deactivation (Takes Priority over PDout) 178: Reset Priority (PDout working)
Device Access Locks	12	0	RecordT		RW	
Parameter (write) Access Lock	12	1	BooleanT		RW	
Data Storage Lock	12	2	BooleanT		RW	

Parameter	Index	Subindex	Data type	Default	AR	Description
Local Parameterization Lock	12	3	BooleanT		RW	
Local User Interface Lock	12	4	BooleanT		RW	
Profile Characteristic	13	0	RecordT		R	Collection of Profile Identifiers
Device Profile 1	13	1	UIntegerT	7	R	0x0007: Adjustable Switching Sensor, Single Value Teach, Disable Function 7: 0x0007: Adjustable Switching Sensor, Single Value Teach, Disable Function (SSP 2.4) 16384: 0x4000: Identification and Diagnosis
Application Profile	13	2	UIntegerT	16384	R	0x4000: Identification and Diagnosis 7: 0x0007: Adjustable Switching Sensor, Single Value Teach, Disable Function (SSP 2.4) 16384: 0x4000: Identification and Diagnosis
Vendor Name	16	0	StringT	Leuze electronic GmbH + Co. KG	R	
Vendor Text	17	0	StringT	Leuze electronic - the sensor people	R	
Product Name	18	0	StringT		R	
Product ID	19	0	StringT		R	
Product Text	20	0	StringT	Scanner with Background Suppression	R	
Serial Number	21	0	StringT		R	
Hardware Version	22	0	StringT		R	
Firmware Version	23	0	StringT		R	
Application Specific Tag	24	0	StringT	***	RW	
Function Tag	25	0	StringT	***	RW	
Location Tag	26	0	StringT	***	RW	
Device Status	36	0	UIntegerT		R	0: Device is OK 1: Maintenance required 2: Out of specification 3: Functional check 4: Failure (5 ... 255): Reserved
Detailed Device Status	37	0	ArrayT		R	
	37	0	OctetStringT		R	

Parameter	Index	Subindex	Data type	Default	AR	Description
SSC Param - SP	56	0	IntegerT	83	RW	SSC1 Param - SP (30 ... 88)
SSC Config - Logic	57	0	UIntegerT	0	RW	SSC1 Logic 0: High active 1: Low active
Teach-In Select	58	0	UIntegerT		RW	Selection of Teaching Target 0: Teaching of Default SSC, that is SSC1 1: Teaching of SSC1 2: Teaching of SSC2 255: Teaching of all SSCs: SSC1 and SSC2
TI Result	59	0	RecordT		R	Teach-In Result (Teach State and Success Flags)
State	59	1	UIntegerT		R	0: Idle. No Teach since Power-On 1: Teach of SP succeeded 5: Busy. Teach is running 7: Teach Error
Flag SP TP1	59	2	BooleanT		R	False: No Teach of SP TP1 since Power-On or Teach Error True: Teach of SP TP1 was successful
SSC2 Teaching Reserve Factor	82	0	IntegerT	0	RW	This three-step Addition Setting only has an Effect on Teaching Operations 0: Minimum Reserve 1: Medium Reserve 2: Large Reserve
SSC1 Teaching Reserve Factor	92	0	IntegerT	0	RW	This three-step Addition Setting only has an Effect on Teaching Operations 0: Minimum Reserve 1: Medium Reserve 2: Large Reserve
Temporary Counter	156	0	UIntegerT		R	Counter for Future Use
Analysis Depth SSC2	180	0	IntegerT	2	RW	Number of Scans considered for the Switching Output SSC2 to toggle (1 ... 100)
Timer Unit SSC2	182	0	UIntegerT	0	RW	Timer Unit SSC2 0: Off 255: On
Function of Timer Unit SSC2	183	0	UIntegerT	0	RW	Function of Timer Unit SSC2 0: On Delay 1: Off Delay 2: Pulse Stretching 3: Pulse Suppression
Time SSC2	184	0	UIntegerT	200	RW	Time SSC2 (1 ... 50000)
Number of Objects SSC2	185	0	UIntegerT		RW	Internal Object Counter SSC2
SSC2 Param - SP	186	0	IntegerT	83	RW	SSC2 Param - SP (30 ... 88)

Parameter	Index	Subindex	Data type	Default	AR	Description
SSC2 Config - Logic	187	0	UIntegerT	0	RW	SSC2 Logic 0: High active 1: Low active
Analysis Depth SSC1	190	0	IntegerT	2	RW	Number of Scans considered for the Switching Output SSC1 to toggle (1 ... 100)
Timer Unit SSC1	192	0	UIntegerT	0	RW	Timer Unit SSC1 0: Off 255: On
Function of Timer Unit SSC1	193	0	UIntegerT	0	RW	Function of Timer Unit SSC1 0: On Delay 1: Off Delay 2: Pulse Stretching 3: Pulse Suppression
Time SSC1	194	0	UIntegerT	200	RW	Time SSC1 (1 ... 50000)
Number of Objects SSC1	195	0	UIntegerT		RW	Internal Object Counter SSC1
Temperature	220	0	IntegerT		R	Temperature inside the Device
Button Function Level 1	241	0	IntegerT	2	RW	Button Function Level 1 0: No Button Function 2: Teach SP of SSC1, minimum Reserve 3: Teach SP of SSC2, minimum Reserve 4: Teach SP of SSC1, medium Reserve 5: Teach SP of SSC2, medium Reserve 6: Teach SP of SSC1, large Reserve 7: Teach SP of SSC2, large Reserve 19: Set SSC1 Logic to Non-Inverted 20: Set SSC1 Logic to Inverted 21: Toggle SSC1 Logic 22: Enable SSC1 Time Module 23: Disable SSC1 Time Module 24: On/Off Toggle SSC1 Time Module 31: Set SSC2 Logic to Non-Inverted 32: Set SSC2 Logic to Inverted 33: Toggle SSC2 Logic 34: Enable SSC2 Time Module 35: Disable SSC2 Time Module 36: On/Off Toggle SSC2 Time Module 43: Set SSC1 and SSC2 Logic to Non-Inverted 44: Set SSC1 and SSC2 Logic to inverted 45: Toggle SSC1 and SSC2 Logic

Parameter	Index	Subindex	Data type	Default	AR	Description
Button Function Level 2	242	0	IntegerT	3	RW	Button Function Level 2 0: No Button Function 2: Teach SP of SSC1, minimum Reserve 3: Teach SP of SSC2, minimum Reserve 4: Teach SP of SSC1, medium Reserve 5: Teach SP of SSC2, medium Reserve 6: Teach SP of SSC1, large Reserve 7: Teach SP of SSC2, large Reserve 19: Set SSC1 Logic to Non-Inverted 20: Set SSC1 Logic to Inverted 21: Toggle SSC1 Logic 22: Enable SSC1 Time Module 23: Disable SSC1 Time Module 24: On/Off Toggle SSC1 Time Module 31: Set SSC2 Logic to Non-Inverted 32: Set SSC2 Logic to Inverted 33: Toggle SSC2 Logic 34: Enable SSC2 Time Module 35: Disable SSC2 Time Module 36: On/Off Toggle SSC2 Time Module 43: Set SSC1 and SSC2 Logic to Non-Inverted 44: Set SSC1 and SSC2 Logic to inverted 45: Toggle SSC1 and SSC2 Logic
Button Function Level 3	243	0	IntegerT	45	RW	Button Function Level 3 0: No Button Function 2: Teach SP of SSC1, minimum Reserve 3: Teach SP of SSC2, minimum Reserve 4: Teach SP of SSC1, medium Reserve 5: Teach SP of SSC2, medium Reserve 6: Teach SP of SSC1, large Reserve 7: Teach SP of SSC2, large Reserve 19: Set SSC1 Logic to Non-Inverted 20: Set SSC1 Logic to Inverted 21: Toggle SSC1 Logic 22: Enable SSC1 Time Module 23: Disable SSC1 Time Module 24: On/Off Toggle SSC1 Time Module 31: Set SSC2 Logic to Non-Inverted 32: Set SSC2 Logic to Inverted 33: Toggle SSC2 Logic 34: Enable SSC2 Time Module 35: Disable SSC2 Time Module 36: On/Off Toggle SSC2 Time Module 43: Set SSC1 and SSC2 Logic to Non-Inverted 44: Set SSC1 and SSC2 Logic to inverted 45: Toggle SSC1 and SSC2 Logic
Pin 4 Function	251	0	UIntegerT	1	RW	Pin 4 Function 0: No Pin Function 1: Pin is SSC1 2: Pin is not SSC1 3: Pin is SSC2 4: Pin is not SSC2 7: Pin is Warning 8: Pin is not Warning

Parameter	Index	Subindex	Data type	Default	AR	Description
Pin 2 Function	252	0	UIntegerT	3	RW	Pin 2 Function 0: No Pin Function 1: Pin is SSC1 2: Pin is not SSC1 3: Pin is SSC2 4: Pin is not SSC2 7: Pin is Warning 8: Pin is not Warning

9 Technical specifications

9.1 General data

Tab. 9.1: Sensor and IODD version

IODD version	V1.7
IODD release date	2020-8-10
Device family	Scanner with Background Suppression
Device ID	2151
Device name	HT3C.S3/L6
Device variants	HT3C.S3/L6-M8 (50141701), HT3C.BS3/L6-M8 (50141703)