Master Protocol Test Report

IO-Link Master Stack Test Sitara AM64x

Document Version: 1.3

Release date: 2021-06-10

Revision History

Date	Version	Author	Chapter	Change
2021-06-09	1.0	C. Tesch	all	Stack Version 1.0.2.183d27bd
2021-06-09	1.1	C. Tesch	4-3	Changed versioning
2021-06-10	1.2	C. Tesch	Cover, 1, 2, 3, 4	Fixed spelling errors, adjusted formatting
2021-06-10	1.3	C. Tesch	Cover, 1, 4	Changed dates to ISO standard, minor text changes

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1 Summary

Release IO-Link Master Stack Conformance Tests according to:

IO-Link Test Specification Version 1.1.2 (July 2014).

End of validity date for Package 2015 is 2022-12-31.

Package 2020 which includes IO-Link Test Specification V1.1.3 was released on 2021-02-01.

Stack-Version: 1.0.2.183d27bd

Test-Cases Passed: 133/133

Tester	Date
C. Tesch	2021-06-01

2 Introduction

This document presents the results for a release-test of the IO-Link Master Stack for the AM64x EVM Processor Board.

All tests are done with a KUNBUS GmbH internal automated test tool. For the Device side of the tests an internal Master-Tester is used.

3 Test-Configuration

3-1 Test Environment

Hardware	Subcomponents	Installed Software
Windows 10 PC	Separate network card in the address space 192.168.0.xxx	KUNBUS GmbH IO-Link Master-Test-Tool
IO-Link Master	- AM64x EVM Board PROC101 (Rev: E2) - IO Link/Breakout Board TMDS64DC01EVM PROC102 (Rev: E1)	KUNBUS GmbH IO-Link-Sitara-Master-App
Master-Tester Unit	KUNBUS GmbH IO-Link Test-Device BG0214R01 (Rev.: 01)	KUNBUS GmbH IO-Link-STM32-Device-App
Power supplies	- 12 Volt DC power supply for AM64x EVM Board - 24 Volt DC power supply for IO Link/Breakout Board	

4 Automated Tests

The automated tests are done with the KUNBUS GmbH internal tool **RegTestIOLink**. The test tool can verify that all master test cases according to IO-Link Test-Specification V1.1.2 are satisfied on the master hardware.

The naming scheme of the test cases is as follows:

SDCI_TC_XXXX where XXXX represents the test case-number.

4-1 Log Files

The Log files are exported as:

- *.xml
- Interpret_Test SDCI_TC_*.txt
- Raw_Test SDCI_TC_*.txt
- Test SDCI_TC_*.pcap

The automated test tool triggers, controls, measures and evaluates the test suites. A human readable summary can be found in the .xml files (one per test suite). All lower-level communication is written into the corresponding raw .txt and .pcap files. The test tool generates additional .txt files on top of the raw output, with interpreted test results for more detailed information and debug purposes.

The following diagram shows how the log files are produced with our Test-Tool:
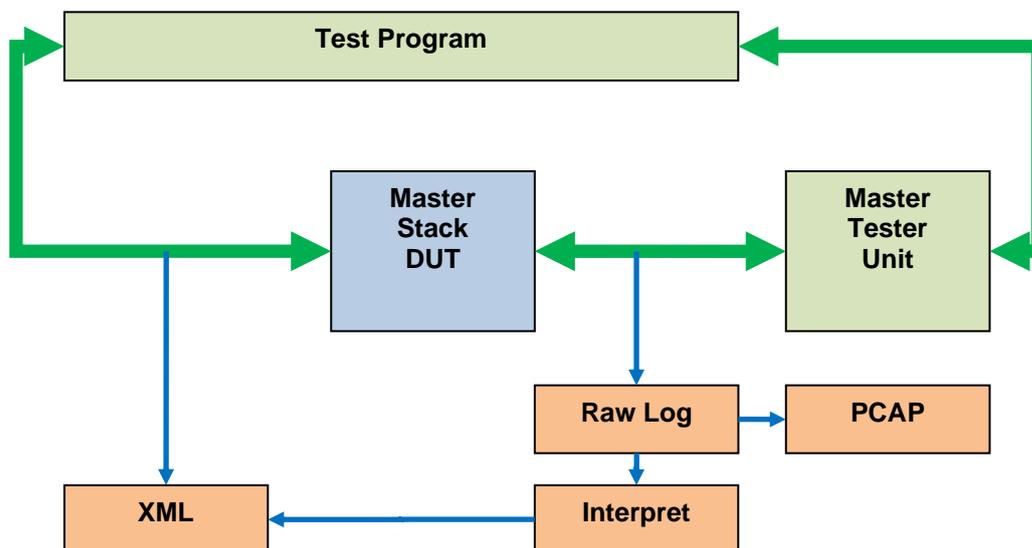
4-2 Test Procedure

Test suites are built according to the IO-Link Test-Specification V1.1.2. The naming scheme of the test suites was made according to the IOL Test-Specification chapters:

<Test-Specification Chapter> - <Chapter Headline>

Example: Testspec 8.03 - ProcessData

Every suite has internal initialization procedures to initialize the master and the device, to have a defined common start for every suite.

4-2.1 Test Suites

4-2.1.1 Suite 8.02 – Timing

Test ID	Test Name
SDCI_TC_0158	Measure TDMT
SDCI_TC_0159	Measure Time between Wakeups
SDCI_TC_0160	Wakeup retries
SDCI_TC_0161	Check TSD
SDCI_TC_0162	Check TinitCycle
SDCI_TC_0163	Write MinCycleTime
SDCI_TC_0164	Check Master CycleTime
SDCI_TC_0165	Different response times
SDCI_TC_0166	Different UART delays
SDCI_TC_0167	Master UART frame tolerance

4-2.1.2 Suite 8.03 – ProcessData

Test ID	Test Name
SDCI_TC_0168	Type 2_1 for 8bit PD In
SDCI_TC_0169	Type 2_2 for 16bit PD In
SDCI_TC_0170	Type 2_3 for 8bit PD Out
SDCI_TC_0171	Type 2_4 for 16bit PD Out
SDCI_TC_0172	Type 2_5 for 8-8bit PD
SDCI_TC_0298	Type 2_6 for 16-16bit PD
SDCI_TC_0173	Type 1 for 256bit PDin
SDCI_TC_0175	Master Wrong checksum
SDCI_TC_0174	Master No Response
SDCI_TC_0176	Master Read Mirrored Data
SDCI_TC_0177	Master PD Invalid
SDCI_TC_0178	Master PD Valid

4-2.1.3 Suite 8.04 – OD Type 2V

Test ID	Test Name
SDCI_TC_0179	Type 2_V OD 1 Byte
SDCI_TC_0180	Type 2_V OD 2 Byte
SDCI_TC_0181	Type 2_V OD 8 Byte
SDCI_TC_0182	Type 2_V OD 32 Byte

4-2.1.4　Suite 8.05 – Startup

Test ID	Test Name
SDCI_TC_0183	Master Read Com Param
SDCI_TC_0184	Master Adjust V11
SDCI_TC_0185	Master Adjust V10
SDCI_TC_0186	Startup with no Vendor
SDCI_TC_0187	Startup with configured Vendor
SDCI_TC_0188	Overwrite compatible DID
SDCI_TC_0189	Overwrite incompatible DID
SDCI_TC_0190	Overwrite incompatible RID
SDCI_TC_0192	Startup with no Vendor V1.0
SDCI_TC_0193	Startup with configured Vendor V1.0
SDCI_TC_0194	Startup with wrong DID V1.0
SDCI_TC_0307	Overwrite compatible RID
SDCI_TC_0195	Wrong Serial V1.0
SDCI_TC_0196	Correct Serial V1.0

4-2.1.5　Suite 8.06 – Preoperate

Test ID	Test Name
SDCI_TC_0198	PREOP correct serial
SDCI_TC_0199	PREOP without serial
SDCI_TC_0200	PREOP Write and Upload
SDCI_TC_0201	PREOP Read and Upload
SDCI_TC_0202	PREOP Type 0 Read
SDCI_TC_0203	PREOP Type 1_2 Read
SDCI_TC_0204	PREOP Type 1_V 8OD Read
SDCI_TC_0205	PREOP Type 1_V 32OD Read
SDCI_TC_0206	PREOP Type 0 Write
SDCI_TC_0207	PREOP Type 1_2 Write
SDCI_TC_0208	PREOP Type 1_V 8OD Write
SDCI_TC_0209	PREOP Type 1_V 32OD Write

4-2.1.6　Suite 8.07 – Operate

Test ID	Test Name
SDCI_TC_0210	OPERATE Type 0 Read
SDCI_TC_0211	OPERATE Type 0 Write
SDCI_TC_0212	OPERATE Type 1_2 Write

4-2.1.7　Suite 8.08 – Fallback

Test ID	Test Name
SDCI_TC_0213	Fallback from Preop
SDCI_TC_0214	Fallback from Preop Fail
SDCI_TC_0215	Fallback from Op
SDCI_TC_0216	Fallback from Op Fail

4-2.1.8   Suite 8.09 – Retry

Test ID	Test Name
SDCI_TC_0217_1	Retry Wrong Cks 2 Times Startup
SDCI_TC_0217_2	Retry Wrong Cks 2 Times Preoperate
SDCI_TC_0217_3	Retry Wrong Cks 2 Times Operate
SDCI_TC_0218_1	Retry Wrong Cks 3 Times Startup
SDCI_TC_0218_2	Retry Wrong Cks 3 Times Preoperate
SDCI_TC_0218_3	Retry Wrong Cks 3 Times Operate
SDCI_TC_0219_1	Retry No Response 2 Times Startup
SDCI_TC_0219_2	Retry No Response 2 Times Preoperate
SDCI_TC_0219_3	Retry No Response 2 Times Operate
SDCI_TC_0220_1	Retry No Response 3 Times Startup
SDCI_TC_0220_2	Retry No Response 3 Times Preoperate
SDCI_TC_0220_3	Retry No Response 3 Times Operate
SDCI_TC_0221	Retry WURQ final success
SDCI_TC_0222	Retry WURQ final no success

4-2.1.9   Suite 8.10 – ISDU App Error Types

Test ID	Test Name
SDCI_TC_0223	ISDU Write Reject
SDCI_TC_0224	ISDU Write Unsup Idx Reject
SDCI_TC_0225	ISDU Write Unsup SubIdx Reject
SDCI_TC_0226	ISDU Write Temp Unvailable Idx Reject
SDCI_TC_0227	ISDU Write Temp Unv Idx Loc Ctrl Reject
SDCI_TC_0228	ISDU Write Temp Unv Idx Dev Ctrl Reject
SDCI_TC_0229	ISDU Write Read Only Idx Reject
SDCI_TC_0230	ISDU Write Invalid Len
SDCI_TC_0231	ISDU Write Val Out Of Range
SDCI_TC_0232	ISDU Write Val Above limit
SDCI_TC_0233	ISDU Write Val Below limit
SDCI_TC_0234	ISDU Write Invalid Param
SDCI_TC_0235	ISDU Write Dev App Fault
SDCI_TC_0236	ISDU Write Dev App Not Ready
SDCI_TC_0237	ISDU Write Reserved ID
SDCI_TC_0238	ISDU Write Reserved ID No ISDU

4-2.1.10   Suite 8.11 – ISDU Derived Error Types

Test ID	Test Name
SDCI_TC_0239	ISDU Derived No Busy
SDCI_TC_0240	ISDU Derived Timeout after Busy
SDCI_TC_0241	ISDU Derived Illegal service code
SDCI_TC_0242	ISDU Derived Checksum Fault
SDCI_TC_0244	ISDU Derived Length Fault

4-2.1.11 Suite 8.12 – ISDU Limit Checks

Test ID	Test Name
SDCI_TC_0243	ISDU Read Resp No Data
SDCI_TC_0245	ISDU Write Min Data
SDCI_TC_0246	ISDU Write Max Data
SDCI_TC_0248	ISDU Read Max Data
SDCI_TC_0249	ISDU Write 8 Bit Idx No SubIdx
SDCI_TC_0250	ISDU Write 8 Bit Idx 8 Bit SubIdx
SDCI_TC_0251	ISDU Write 16 Bit Idx 8 Bit SubIdx
SDCI_TC_0252	ISDU Write Response No Busy Bit
SDCI_TC_0253	ISDU Write Response Busy Bit
SDCI_TC_0254	ISDU Write Service Max Len
SDCI_TC_0255	ISDU Write Service Min Ext Len

4-2.1.12 Suite 8.13 – Events

Test ID	Test Name
SDCI_TC_0256	Event No Details - Notification
SDCI_TC_0257	Event No Details - Warning
SDCI_TC_0258	Event No Details – Error
SDCI_TC_0259	Event No Details - Parameter Error
SDCI_TC_0260	Event No Details - Communication Error
SDCI_TC_0261	Event With Details - Single Evt
SDCI_TC_0262_1	Event With Details - Double Evt Case 1
SDCI_TC_0262_2	Event With Details - Double Evt Case 2
SDCI_TC_0262_3	Event With Details - Double Evt Case 3
SDCI_TC_0262_4	Event With Details - Double Evt Case 4
SDCI_TC_0262_5	Event With Details - Double Evt Case 5
SDCI_TC_0262_6	Event With Details - Double Evt Case 6
SDCI_TC_0263	Event With Details - Six Evts
SDCI_TC_0264	Event No Details - While ISDU Write
SDCI_TC_0265	Event No Details - While ISDU Read
SDCI_TC_0266	Event With Details - While ISDU Write
SDCI_TC_0267	Event With Details - While ISDU Read
SDCI_TC_0268	Event With Details - One Evt From Buffer
SDCI_TC_0269_1	Event With Details - Sev Evt From Buffer Case 1
SDCI_TC_0269_2	Event With Details - Sev Evt From Buffer Case 2
SDCI_TC_0269_3	Event With Details - Sev Evt From Buffer Case 3
SDCI_TC_0269_4	Event With Details - Sev Evt From Buffer Case 4
SDCI_TC_0269_5	Event With Details - Sev Evt From Buffer Case 5
SDCI_TC_0269_6	Event With Details - Sev Evt From Buffer Case 6

4-2.1.13 Suite 8.14 – Data Storage

Test ID	Test Name
SDCI_TC_0270	Data Storage upload – PREOPERATE
SDCI_TC_0271	Data Storage upload - OPERATE
SDCI_TC_0272	Data Storage download replace
SDCI_TC_0273	Data Storage download UPLOAD REQ Preoperate

SDCI_TC_0274	Data Storage download UPLOAD REQ Operate
SDCI_TC_0275	Data Storage Download upon mismatch PREOPERATE
SDCI_TC_0276	Data Storage Size Check
SDCI_TC_0277	Data Storage Activation executes upload
SDCI_TC_0278	Data Storage Read unavailable index
SDCI_TC_0279	Data Storage Index insufficient length
SDCI_TC_0280	Data Storage Upload locked
SDCI_TC_0281	Data Storage blocks higher level request
SDCI_TC_0282	Data Storage overwrite via ActState
SDCI_TC_0283	Data Storage Clear after Change PortCfg
SDCI_TC_0284	Data Storage checks consistency autocom

4-2.1.14   Suite 8.15 – Legacy Device

Test ID	Test Name
SDCI_TC_0285	Legacy Startup
SDCI_TC_0286	Legacy Startup Interleave
SDCI_TC_0287	Legacy Event without Details
SDCI_TC_0288	Legacy Idle between two ISDU
SDCI_TC_0289	Legacy Write Event Interrupt
SDCI_TC_0290	Legacy input invalid event
SDCI_TC_0291	Legacy input valid event

4-3   Test Results

Tests according to Specification	IOL-Link Test Specification Version 1.1.2 (July 2014)
Test-Tool	RegTestIOLink Version: 1.0.1.0.673921076
Test-Tool Configuration	Log level: 0 and 1 (raw and interpreted results)
Versions	Master Stack Version: 1.0.2.183d27bd Master App Version: 1.03.02.cd7296f7-rc Master Hardware Version: AM64x EVM Board PROC101 (Rev: E2), IO Link/Breakout Board TMDS64DC01EVM PROC102 (Rev: E1) Master-Tester Stack Version: 1.0.2.52800 Master-Tester App Version: 1.1.3462478820 Master-Tester Hardware Version: Rev 01
Date Last Run / Tester	C. Tesch, 2021-06-01
Test State	133/133 passed

Test Suite	Comments	Result
Suite 8.02 – Timing	All test cases run without any remarks. See log files for detailed information.	**Passed: 10** **Failed: 0**
Suite 8.03 – ProcessData	All test cases run without any remarks. See log files for detailed information.	**Passed: 12** **Failed: 0**
Suite 8.04 – OD Type 2V	All test cases run without any remarks. See log files for detailed information.	**Passed: 4** **Failed: 0**
Suite 8.05 – Startup	All test cases run without any remarks. See log files for detailed information.	**Passed: 14** **Failed: 0**
Suite 8.06 – Preoperate	All test cases run without any remarks. See log files for detailed information.	**Passed: 12** **Failed: 0**
Suite 8.07 – Operate	All test cases run without any remarks. See log files for detailed information.	**Passed: 3** **Failed: 0**
Suite 8.08 – Fallback	All test cases run without any remarks. See log files for detailed information.	**Passed: 4** **Failed: 0**
Suite 8.09 – Retry	All test cases run without any remarks. See log files for detailed information.	**Passed: 6** **Failed: 0**
Suite 8.10 – ISDU App Error Types	All test cases run without any remarks. See log files for detailed information.	**Passed: 16** **Failed: 0**
Suite 8.11 – ISDU Derived Error Types	All test cases run without any remarks. See log files for detailed information.	**Passed: 5** **Failed: 0**
Suite 8.12 – ISDU Limit Checks	All test cases run without any remarks. See log files for detailed information.	**Passed: 11** **Failed: 0**
Suite 8.13 – Events	All test cases run without any remarks. See log files for detailed information.	**Passed: 14** **Failed: 0**
Suite 8.14 – Data Storage	All test cases run without any remarks. See log files for detailed information.	**Passed: 15** **Failed: 0**
Suite 8.15 – Legacy Device	All test cases run without any remarks. See log files for detailed information.	**Passed: 7** **Failed: 0**