AN205432

F²MC-8FX/16LX/16FX/FR, All Series, Lin Conformance Test

This application note describes the procedure for LIN conformance tests to get a LIN certification for a product.

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1 Introduction

This application note describes the procedure for LIN conformance tests to get a LIN certification for a product.

2 LIN Conformance Test Procedure

How LIN conformance tests are done

2.1 Overall Information

Up-to-date information about LIN compliance test can be found on the official LIN web page:

http://www.lin-subbus.org → COMPLIANCE

In summary the conformance test is used to verify the functionality of a LIN device according to the current LIN specification. The current version is 2.1 (July 2008).

A conformance test specification is currently under development. Only LIN 2.0 physical layer conformance test should be applied according LIN 2.0 physical layer specification, which did not change in version 2.1.

It is important to know, that a compliance test only can be performed for a complete system. The test cannot be done for LIN software drivers or ECUs without application. This means also, that an MCU without on-chip LIN line driver/physical transceiver has to be tested together with a selected external LIN line driver IC.

Any changes or modifications in hard or software lead to the need of a new conformance test qualification.

Please note that because of these reasons the LIN certification is different from CAN certification.

2.2 Test Items

The following items can be tested for LIN compliance.

- LIN component
- LIN device
- LIN implementation
- ECU

2.3 German Test Houses

LIN conformance tests are offered currently by three German test houses, which are specialized for these tests. All houses offer tests for the LIN OSI layer 1 (Physical layer) and LIN OSI layer 2 (Data link layer). The contact persons and addresses can be found in the appendix A (→3). These test houses are:

- Communication & Systems group GmbH (C&S group), Wolfenbuettel
- Ihr GmbH, Rheinmünster
- MBtech group GmBH & Co. KGaA, Sindelfingen

All these three test houses have acquired the “Testhouse Accreditation Certificate” from the LIN steering group.

2.4 Test Types

There are two basic conformance tests for

- Physical Layer
- Data Link Layer

Additionally some test houses also offer tests for EMC and/or SAE-J2602 conformance. All tests are appropriate for LIN master and LIN slave systems.

Please refer to test house documentation for exact test cases and concept.

2.4.1 Physical Layer Tests

The physical layer tests contain mostly the electrical and timing characteristics of the item under test (IUT). This implies for example signal threshold voltages, propagation delays, duty cycle of the signals, V_{BAT} shifts, internals resistance and capacity, etc.

2.4.2 Data Link Layer Tests

The data link layer tests contain tests for the LIN protocol itself. This implies for example synch break length measurement, oscillator tolerance, message frame length, slave response frame investigation, bit error tests, etc.

For Node Configuration / Network Management there are tests for error in frames, wake-up behavior, sleep mode tests, frame ID assignment, NAD (Node Address for Diagnostic) assignment tests, etc.

2.4.3 EMC Tests

Some test houses offer also EMC tests for electrical immunity to external disturbance such as transients or ESD and emission of the IUT.

2.4.4 SAE-J2602 Tests

Some test houses also offer tests for SAE-J2602 standard, which is generally used by US American OEMs. SAE-J2602 is based on LIN 2.0 specification with some differences. Please refer SAE-J2602 specification for more details.

2.5 LIN Compliance Test of 16FX MB96300 Series

Cypress has done a LIN compliance test with 16FX MB96300 devices at one of the above mentioned certified test houses using a commercial LIN driver, Cypress Starter kits and example applications. Both tests for LIN master and LIN slave were performed successfully.

The certificate and test report can be requested under NDA from Cypress.

3 Appendix A

Contact data of test houses

3.1 C&S Group

Address:

Administration
C&S group GmbH

Am Exer 19c

D-38302 Wolfenbuettel

E-Mail:

info@cs-group.de
LIN@cs-group.de

Phone:

+49 (0) 5331 90555 0

Fax:

+49 (0) 5331 90555 110

Webpage:

http://www.cs-group.de/

LIN conformance:

http://www.cs-group.de/index.php?id=64

3.2 Ihr GmbH

Address:

ihr GmbH

Airpark Business Center

Airport Boulevard B210

D-77836 Rheinmünster

E-Mail:

info@ihr.de

Phone:

+49(0)7229 18475 0

Fax:

+49(0)7229 18475 11

Webpage:

http://www.ihr.de/index.php?lang=en

LIN conformance:

http://www.ihr.de/ihr/index.php?lang=en&Itemid=555

3.3 MBtech Group

Address:

MBtech Group GmbH & Co. KGaA

Kolumbusstraße 19+21

D-71063 Sindelfingen

E-Mail:

info@mbtech-group.com

Phone:

+49 (0) 7031 686 3000

Fax:

+49 (0) 7031 686 4500

Webpage:

http://www.mbtech-group.com/start.html

Conformance Tests:

http://www.mbtech-group.com/eu-en/electronics_solutions/xil_test_operations/databus_validation_center.html

3.4 LIN Administration

Address:

LIN Administration

c/o Altran GmbH & Co. KG

Bernhard-Wicki-Straße 3

D-80636 München

E-Mail:

info@lin-subbus.org

Phone:

+49 (0) 711 220 611-515

Webpage:

https://vector.com/vi_local_interconnect_network_en.html

Document History

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Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	-	MKEA	08/28/2008	V1.0; 1st version; MWi/HWe
			05/27/2010	V1.1; 16FX Conformance test note added, Test Houses contacts updated; MWi
*A	5068245	MKEA	01/06/2016	Converted Spansion Application Note “MCU-AN-300106-E-V11” to Cypress format
*B	5868024	AESATMP9	08/30/2017	Updated logo and copyright.

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198 Champion Court
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