

R-IN32M3-EC, EC-1, RZ/T1

EtherCAT[®] Conformance Test Tool

Outline

This document gives an introduction to running the EtherCAT Conformance Test Tool.

Target Devices

R-IN32M3-EC EC-1 RZ/T1 R01AN3779EJ0100 Rev.1.00 Apr 04, 2017



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1. Overview

EtherCAT slave devices developed for manufacture need to pass a Conformance Test regulated by the EtherCAT Technology Group (hereinafter referred to as the ETG) to guarantee conformance. This document covers how to run the Conformance Test Tool provided by the ETG to perform in-house testing.

1.1 Acquiring the Conformance Test Tool

The Conformance Test Tool is available for downloading from the Web site of the ETG.

https://www.ethercat.org/default.htm

To download the Conformance Test Tool, you need to be a registered member of the ETG and have a valid EtherCAT vendor ID issued by the ETG.



2. Usage of Conformance Test Tool

This section covers how to run conformance tests with the Conformance Test Tool for EtherCAT.

2.1 Launching the Conformance Test Tool

Launch the EtherCAT conformance testing program (ECConformanceTest.exe) from the Start menu or otherwise.

The screen below should be shown once the Conformance Test Tool for EtherCAT is running.

) 🛃 💕 🕨 💷	
roject Explorer	
X Untitled Insts EtherCAT Devices	Settings Test Repetitions: Image: Cycle Run selected tests for all slaves (started from selected slave) Start Save Test Report Method: None Image: Cycle Image: Cycle Start Stop Run test cases in random order Cycle: Image: Cycle Run test cases for all configurations Reload the online Object Diotrary before Test Concellests in first error
	Selected Tests: I Gancer test on Inst error Test Id Version Name State
	- Description
	Lotter 0 0 Success 10 Warnings 0 Errors 0 Kipped 0 Dutputs 0 Verbose
	Log No. Time Stamp TestGase Info

Figure 2-1 Initial Screen of the Conformance Test Tool



2.2 Setting up Folders for EtherCAT Slave Information Files

Connecting a device requires an EtherCAT slave information (hereinafter referred to as ESI) file. In the Conformance Test Tool, ESI files are managed through the ESI cache, which is simply a list of directories that hold ESI files, a list of the files in the currently selected directory, and the associated window.

The folder "EtherCAT Conformance Test¥DeviceDescriptions" is set up as the standard folder in the ESI cache, so install the ESI files you wish to use in this folder.

To set up another folder for the reading of ESI files, follow the procedure below.

You can check the folder setting for the reading of ESI files by opening the [ESI Cache] window. Select the [ESI Cache] tab on the right edge of the main window to display the [ESI Cache] window. If the tab is not displayed, please select the [Windows] sub-menu from the [Tool] menu, then the [ESI Cache] item.

) 🖬 🐸 🕨 💷					
roject Explorer 🛛 👻 🕂 🗙	1001				▲ ↓ ×
Chritied Control Contro Control Control Control Control Control	E - Settings Test Repetitions 1 Save Test Report Method None	Update logg	r in real time es in random order es for selected configur nline Object Dictionary b		
		Cancel test	on first error		
	-Slave Configurations				
	-Slave Configurations	Config Name	Cycle (ms)	Description	
		Config Name	Cycle (ms)	Description	
	Activated Slave		State		
	Activated Slave Selected Tests Test 16 Vercion Name Name 0x1300 120 TF-11 0x100 0x100 120 TF-20 0x200 0x200 120 TF-20 0x200	Config Name EfferCAT Slave Information 0 End Link Love 0 End Link Love 1 ESM – Exploit Device Identifi, 10 AL CoE SDO Service 2 Oct SDO Service			

Figure 2-2 Selecting Display of the [ESI Cache] Window

The [ESI Cache] window displays a pull-down list for selecting the path to the folder and a list of the ESI files in the selected folder.

• 8	
ache	
<u> </u>	
	Cache

Figure 2-3 [ESI Cache] Window



To designate another folder for the storage of ESI files, select [Browse...] from the drop-down list and set up the folder.



Figure 2-4 Setting a Folder for ESI Files 1

Select the folder from which ESI files to be read are stored. Setting the folder adds it to the list.

ESI Cache	→ + × 🔊	
Browse		
C:¥Program Files¥EtherCAT Confo C:¥	rmance Test¥DeviceDescriptions 🗟	

Figure 2-5 Setting a Folder for ESI Files 2



Figure 2-6 Setting a Folder for ESI Files 3



2.3 Scanning for Devices

Follow the instructions below to scan for devices.

Click on the right mouse button over [EtherCAT Devices] and select [Add Network Device...] from the sub menu to start the scan for devices. This operation is the equivalent to selecting [Scan For EtherCAT Devices] from the [Action] menu.

<u>File Tool Action H</u> elp	
1 🔁 🖬 💕 🕨 💷	
Project Explorer	- 7 X Test
-⊕ ×	Settings
🖂 🔫 Untitled	Test Repetitions: 1
EtherCAT De	Saye Test Report Method: None
Add Net	twork Device

Figure 2-7 [Add Network Device]

An [Available Network Devices] window is displayed on completion of scanning after [Add Network Device...] is selected. [True] is displayed under [ECAT Link] in the case of connections where a link with a device can be established. Select the name of the connection for the device to be conformance tested and press [OK].

ローカル エリア接続 2 True 34-95-DB-2A ASIX AX88179 ¥DEVICE¥[D174F65D-FF ローカル エリア接続 False 00-1F-E2-67 Realtek PCIe G ¥DEVICE¥[04D600D6-758	Name	ECAT Link	MAC Address	Driver	ID
ローカル エリア接続	ローカル エリア接続 2				¥DEVICE¥LD174F65D-FF
	ローカル エリア接続		00-1F-E2-67	Realtek PCIe G	¥DEVICE¥{04D600D6-758
OK Refresh Cancel				1	

Figure 2-8 [Available Network Devices] Window

The dialog box below should pop-up and scanning of the selected connection for an EtherCAT slave device will proceed in response to pressing [Yes].

EtherCAT Conformance Test 🔀
Scan for EtherCAT Slaves? ແລະເຊັດແຫຼງ ເປັນເວັດເຫຼ

Figure 2-9 [Devices Scan] Check Window



When the scan is completed, the device should be displayed under [EtherCAT Devices].

The device name will be displayed if a corresponding EtherCAT slave information (ESI) file was read.

<u>File Tool Action H</u> elp	
2 🖬 😅 🕨 💷	
Project Explorer	Slave1 R-IN32M3 EtherCAT demo 1[Default]
	Slave Configurations
	Activated Slave Config Nam No Slave1 Unknown Default

Figure 2-10 Result of Scanning for a Device

When the device name is displayed as "Unknown" as in the figure below, reading of the ESI File did not proceed normally. Please check that the ESI file to be is among the designated files in [ESI Cache]. If you need to change the designated folder for [ESI Cache], please see the procedure for setting folders where files are stored in section 2.2, Setting up Folders for EtherCAT Slave Information Files.

<u>File T</u> ool <u>A</u> ction <u>H</u> elp	
🎦 🔜 📂 🕨 💷	
Project Explorer	 Test Settings Test Repetitions: 1 Save Test Report Method: None
	Slave Configurations Activated Slave Config Nat

Figure 2-11 Result of Scanning for a Device (Device Unknown)



A message asking if you want to rebuild the ESI cache is displayed as shown in the figure below when an ESI file is placed in the folder designated in the [ESI Cache] window while the device remains connected. Press [Yes] to proceed with rebuilding.

~	File: O¥Program Files	(EtherCAT Conformance Tee	+¥DauiaaDaaarintiona¥P-1N23	M3 EtherCAT demo 1 xml Crea
1	Rebuild the ESI cache	Petrierowi Conformance res ?	(#DeviceDescriptions#r<-1462	Mo Ethero Ar demo 1 xmi orea

Figure 2-12 Rebuilding the ESI Cache

Refreshing of the ESI files is indicated as shown by the figure below on completion of rebuilding of the ESI cache.

The ESI file for the device will be read again in response to pressing [OK].

A		
ESI Cach	e has been changed. The assignment of the ESI	files to the DuTs will be refreshed.

Figure 2-13 ESI File Refresh 1



The ESI file should be read after completion of refreshing, and the name of the device should be displayed if it is recognized normally.

Project Explorer ● ● × ESI Gacke ● ◆ × Settings ● ◆ × ■ ● Untitle# ● ○ Tests Test Repetitions: 1 ■ ● Run selected tests for all slaves (started from C#Program Files#Ether Dearses = Ether	→ + ×		
Contrais Test Repetitions: 1 Run selected tests for all slaves (started from C¥Program Files¥Ether C¥Program Files¥Ether			
By EtherCAT Devices Save Test Report Method: None Update logger in real time Genesas SI			
-Slave Configurations			
Activated [Save Config Name Cycle (ms) Descript			
Test Id Version Name State	>		
EEPROM	specified		
Description EtherCAT Slave Con	troller not specified Items: 3		
GroupType	Renesas Slave		
HideType	No Items		
Image	Type = ImageData16x1		
II Info	specified		
I Mailbox	specified		
Name	Items: 2		
Profile	Items: 1		
RxPdos	Items: 1		
Siots	not specified		
Sync Manager Tubles			
Name Profile RvPdos Slots Snot Manager	Items: 2 Items: 1 Items: 1 not specified Items: 4		
	Bono: 1		

Figure 2-14 ESI File Refresh 2



2.4 Running Conformance Tests

Clicking on the [Tests] tab produces a display of the individual test items under [EtherCAT] in the [Project Explorer] tree view.

Selecting a test item in the tree leads to its details being displayed under [Description] on the [Test] tabbed page.

Project Explorer	Slave1 R-IN32M3 EtherCAT demo 1 [Default] Test 4 🕨 🗙
÷ X	Settings
Control	Test Repetitions: 1 Image: Constraint of the constraint of
Device Hanne Device Hanne Device Hanne Device Hanne Device Group Type Device Group Type Comparison ESI to SII Comparison ESI to SIC Resis Comparison ESI to ESI Resist Comparison ESI to SIC Resis Comparison ESI to ESI Resist Comparison ESI to SIC Resis Comparison ESI to ESI Resist Comparison ESI Resist Resister ESI Resister Comparison ESI Resister Comparison ESI Resister Comparison ESI Resist Resister Comparison ESI Resister	pe Contra du Tistave Configuration Configuration Configuration Configuration
	-Selected Testa Test Id Version Name State 0.1300(1)[1] 1.3.0 Secondary Vendor ID NetPerformed er te Machini
TF-1201 ESM - Explicit TF-2300 AL CoE SDO	
H ● TF-2020 AL CoL SDO Service H ● TF-2020 AL CoL SDO Complete AL H ● TF-2021 AL CoL Column Column H ● TF-2011 AL CoL Column Column H ● TF-4100 (Al20 20) H ● Ether(AT Devices H ● Ether(AT Devices H ● Sisvel R+N32M3Ether(AT demice H ● Sisvel R+N32M3Ether(AT demicee H ● Sisvel R+N32M3Ether(AT de	plete Act t Dictiona Action: Post Condition: Post Condition: Post Condition:

Figure 2-15 Display of Test Items 1



Conformance tests should be run according to the following procedure.

- (1) Select the device on which the conformance tests are to be run.
- (2) Select the test item. Selecting an upper-layer item includes all items in the lower layer as tests to be applied.
- (3) The selected tests will be run in order from the top one in response to pressing the [Run Test] button.



Figure 2-16 Display of Test Items 2

The color of the \circ mark next to each test item changes according to the result of execution when the test has been run after the [Run Tests] button has been pressed.

🎦 🔜 😂 🕨 💷 Project Explorer 🔹 🗸 🕂	Slave1 R-IN32M3 EtherCAT demo 1 [Default] Test	4 Þ 🗙 👰			
\$ X	Settings	ES			
E 🔫 Untitled*	Test Repetitions: 1 🔽 🗌 Run selected tests for all slaves (started from selected slave) Start	I Ca			
E T= EtherCAT	Save Test Report Method: None Update logger in real time Stop	de la			
Secondary Vendor ID	Run test cases for selected configurations				
Device.RevisionNo ESI Port Type Consist	Reload the online Object Dictionary before Test				
Number of Offline Dict	on Cancel test on first error				
PDO Upload/Config/A	State Configurations				
- Device:HideType	Activated Slave Config Name Cycle (ms) Description				
Device:GroupType Device:Mailbox:DataLir	Le Yes Slave1 R-IN32M3 EtherCAT d Default 4 Esi default configuration				
B Comparison ESI to SII B Comparison ESI to ESI Regit B Comparison ESI to collere OD B Comparison ESI to collere OD B Comparison ESI tements B Reserved ESI Elements B Reserved ESI Elements B Reserved ESI Elements					
	en viewe vie				
	Selected Tests				
⊞ OTxPdoTests ⊞ OFmmuTests	Test Id Version Name State 0x1300[2][1] 13.0 Vendor ID Valid				
Device DataType Tests	0x1300[2][2] 1.3.0 Product Code Valid				
Device Object Tests SyncManager Tests	0x1300[2][3] 1.3.0 Revision Number Valid 0x1300[2][4] 1.3.0 Serial Number Skipped				
TF-1100 Data Link Layer	0x1300[2][5] 1.3.0 Mailbox Protocols Valid				
TF-1200 EtherCAT State Mac TF-1201 ESM - Explicit Devic					
TF-2300 AL CoE SDO Service					
TE-2301 AL CoE Object Dicti					
TF-4100 CiA402 OD EtherCAT Devices					
EtherCAT					
ProcessImage Slave1 R-IN32M3 EtherCAT der	Report Term 1 [TF-1300 EtherCAT Slave Information/Comparison ESI to SI]	→ # X			
	227 Success 🔔 0 Warnings 📀 0 Errors 🔊 116 Skipped 🕦 2036 Outputs 🕦 16881 Verbose				
	Log No. Time Stamp TestCase Info	-			
	21 2007/01/01 15:13:33:963 Device:Group Device:GroupType definition valid.				
	2007/01/01 15:13:33:953 Device:Mailb SUCCESS Mailbox@DataLinkLayer = True.				

Figure 2-17 Results of Running Tests 1

The color coding is as follows: success=green, skipped=white, error= red, not implemented=gray. Of the tests, only those relevant to functions designated in the ESI file are run. Tests of non-designated functions are skipped without being run.



Figure 2-18 Results of Running Tests 2

The details of the results are shown in the report pane.

Color-coding of results in the report window is the same as in the project tree (success=green,

warnings=yellow, errors=red, skipped=white) but icons are used for each type.

Log No.	Time Stamp	TestCase	Info	
2	2007/01/01 23:39:41:625	Vendor ID	Comparison of VendorID values succeeded	
7	2007/01/01 23:39:41:703	Product Code	Comparison of Product Code values succeeded	
10	2007/01/01 23:39:41:781	Revision Nu	Comparison of Revision No. values succeeded	
511	2007/01/01 23:39:41:781	Serial Number	SerialNo is not defined	
21	2007/01/01 23:39:41:859	Mailbox Prot	Comparison of the named protocol values succeeded	
25	2007/01/01 23:39:41:953	E ² PROM Size	Comparison of EEPROM size values succeeded	
5 26	2007/01/01 23:39:41:968	E ² PROM Data	The element EtherCATInfo:Descriptions:Devices:Device:Eeprom:Data is not defined	
28	2007/01/01 23:39:42:265	E ² PROM Con	Comparison of EEPROM ConfigData to the corresponding ESI element succeeded	
5 29	2007/01/01 23:39:42:281	E ² PROM Boo	The element EtherCATInfo:Descriptions:Devices:Device:Eeprom:BootStrap is not defined	
@ 30	2007/01/01 23:39:42:312	E ² PROM Gen	Comparison of the EEPROM General category succeeded	
37	2007/01/01 23:39:42:375	E ² PROM FM	Comparison of the EEPROM FMMU categories succeeded	
0 54	2007/01/01 23:39:42:406	E ² PROM Syn	Comparison of the EEPROM SM categories succeeded	
55	2007/01/01 23:39:42:421	E ² PROM RXP	EEPROM category for RxPdo is not mandatory, because device supports CoE	•

Figure 2-19 Report Pane 1



You can see the details of a test by double-clicking on the corresponding result in the report pane.



Figure 2-20 Report Pane 2



Each test has its requirements so please read [Description] of each test before trying to run it to check whether the device fulfils the requirements of the test.

Example)

To run the test in the figure below, Explicit Device Identification must be supported as a function and the ID value must be 0x0005.

Project Explorer	X _ SI					4 5 40 6
	-Setting	we1 R-IN32M3 EtherCAT demo 1[Default]	Test			4 Þ 🗙 🕽
Bed Untilled* Tests Test EberCAT THE EberCAT THE THE DO Bata Link Layer THE THE THE THE THE THE THE THE THE	Save T Save Information ink Layer AT State Machine Explicit Device Identific from Init to Ar, AckF > Init. ErrFlag = 1, Ack	Test Repetitions: 1	☐ Update logge ☐ Run test cas ☐ Run test cas	r in real time es in random order es for selected confi nline Object Dictiona		StartStop
	ti > bit, ErrFlag = 1, Ack ti > bit, ErrFlag = 0 or Ack Dit, ErrFlag = 0 or Ack > bit, ErrFlag = 0 or Ack > hit, ErrFlag = 0 or Ack	Slave1 R-IN32M3 EtherCAT d Defa	iig Name ult	Cycle (ms) 4	Description Esi default configuration	
	> Init, ErrFlag = 0 or Ack > Init, Sm_Change ignore Correct Scheme ignore Correct Sc	11[1] 120 Test Cases from 11[2] 120 Test Cases from 11[3] 120 Test Cases from 11[4] 120 Test Cases from 11[5] 120 Test Cases from 11[4] 120 Test Cases from 11[5] 120 Test Cases from	om PreOp to Any om SafeOp to Any om Op to Any	State Skipped Skipped Skipped Skipped Valid		
	E SDO Service DO Complete Access E Object Dictionary	* ID value = 0x0005 *****			slaves with only 4 Bit value range of the Explicit Dev	vice ID value can
EtherCAT	3 EtherCAT demo 1(Defau stat Flag If th	request is possible without error (i.e. 0x0130.4 shall be set to 1 (register 0x0130.5)	ed by the master) the Explicite I = 0) then the Explicit Device I 0130.4 = 1) the Explicit Identif	Device Identifcation Va dentifcation Value shall cation Value shall not b	alue is requested by setting the ID Request Bit (0x12) be loaded to the register AL Status Code (0x0134:0) e loaded and the ID Flag shall not be set. Then the	(0135) and the ID

Figure 2-21 Explicit Device Identification



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Revision History

		Descript	ion
Rev.	Date	Page	Summary
1.00	Apr 04, 2017		First edition issued.

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