BECKHOFF New Automation Technology

Manual | EN

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TwinCAT 2 EtherCAT Redundancy

Supplement | Communication

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Table of contents

1 Foreword 5
1.1 Notes on the documentation 5
1.2 Safety instructions 6
1.3 Notes on information security 7
2 Introduction 8
3 Installation 11

1 Foreword

1.1 Notes on the documentation

This description is only intended for the use of trained specialists in control and automation engineering who are familiar with applicable national standards.
It is essential that the documentation and the following notes and explanations are followed when installing and commissioning the components.
It is the duty of the technical personnel to use the documentation published at the respective time of each installation and commissioning.

The responsible staff must ensure that the application or use of the products described satisfy all the requirements for safety, including all the relevant laws, regulations, guidelines and standards.

Disclaimer

The documentation has been prepared with care. The products described are, however, constantly under development.
We reserve the right to revise and change the documentation at any time and without prior announcement.
No claims for the modification of products that have already been supplied may be made on the basis of the data, diagrams and descriptions in this documentation.

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Patent Pending

The EtherCAT Technology is covered, including but not limited to the following patent applications and patents:
EP1590927, EP1789857, EP1456722, EP2137893, DE102015105702
with corresponding applications or registrations in various other countries.

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1.2 Safety instructions

Safety regulations

Please note the following safety instructions and explanations!
Product-specific safety instructions can be found on following pages or in the areas mounting, wiring, commissioning etc.

Exclusion of liability

All the components are supplied in particular hardware and software configurations appropriate for the application. Modifications to hardware or software configurations other than those described in the documentation are not permitted, and nullify the liability of Beckhoff Automation GmbH & Co. KG.

Personnel qualification

This description is only intended for trained specialists in control, automation and drive engineering who are familiar with the applicable national standards.

Description of symbols

In this documentation the following symbols are used with an accompanying safety instruction or note. The safety instructions must be read carefully and followed without fail!

⚠ DANGER

Serious risk of injury!

Failure to follow the safety instructions associated with this symbol directly endangers the life and health of persons.

⚠ WARNING

Risk of injury!

Failure to follow the safety instructions associated with this symbol endangers the life and health of persons.

⚠ CAUTION

Personal injuries!

Failure to follow the safety instructions associated with this symbol can lead to injuries to persons.

NOTICE

Damage to the environment or devices

Failure to follow the instructions associated with this symbol can lead to damage to the environment or equipment.

Tip or pointer

This symbol indicates information that contributes to better understanding.

1.3 Notes on information security

The products of Beckhoff Automation GmbH & Co. KG (Beckhoff), insofar as they can be accessed online, are equipped with security functions that support the secure operation of plants, systems, machines and networks. Despite the security functions, the creation, implementation and constant updating of a holistic security concept for the operation are necessary to protect the respective plant, system, machine and networks against cyber threats. The products sold by Beckhoff are only part of the overall security concept. The customer is responsible for preventing unauthorized access by third parties to its equipment, systems, machines and networks. The latter should be connected to the corporate network or the Internet only if appropriate protective measures have been set up.

In addition, the recommendations from Beckhoff regarding appropriate protective measures should be observed. Further information regarding information security and industrial security can be found in our https://www.beckhoff.com/secguide.

Beckhoff products and solutions undergo continuous further development. This also applies to security functions. In light of this continuous further development, Beckhoff expressly recommends that the products are kept up to date at all times and that updates are installed for the products once they have been made available. Using outdated or unsupported product versions can increase the risk of cyber threats.

To stay informed about information security for Beckhoff products, subscribe to the RSS feed at https://www.beckhoff.com/secinfo.

2 Introduction

TwinCAT EtherCAT Redundancy is an extension option for the TwinCAT EtherCAT master offering cable redundancy. From the last logical device, a cable is returned back to the master. The TwinCAT System Manager is used for configuration and diagnostics.

In case of a single cable break/detachment all slaves can still be reached either from the primary or from the secondary (redundancy) EtherCAT adapter. This fault has to be resolved before the next fault can be handled.

Now it is not possible to combine EtherCAT redundancy with Distributed clocks or with Hot Connect.

Configuration

The configuration of the redundancy can be done via the Advanced Settings of the EtherCAT-Adapter.

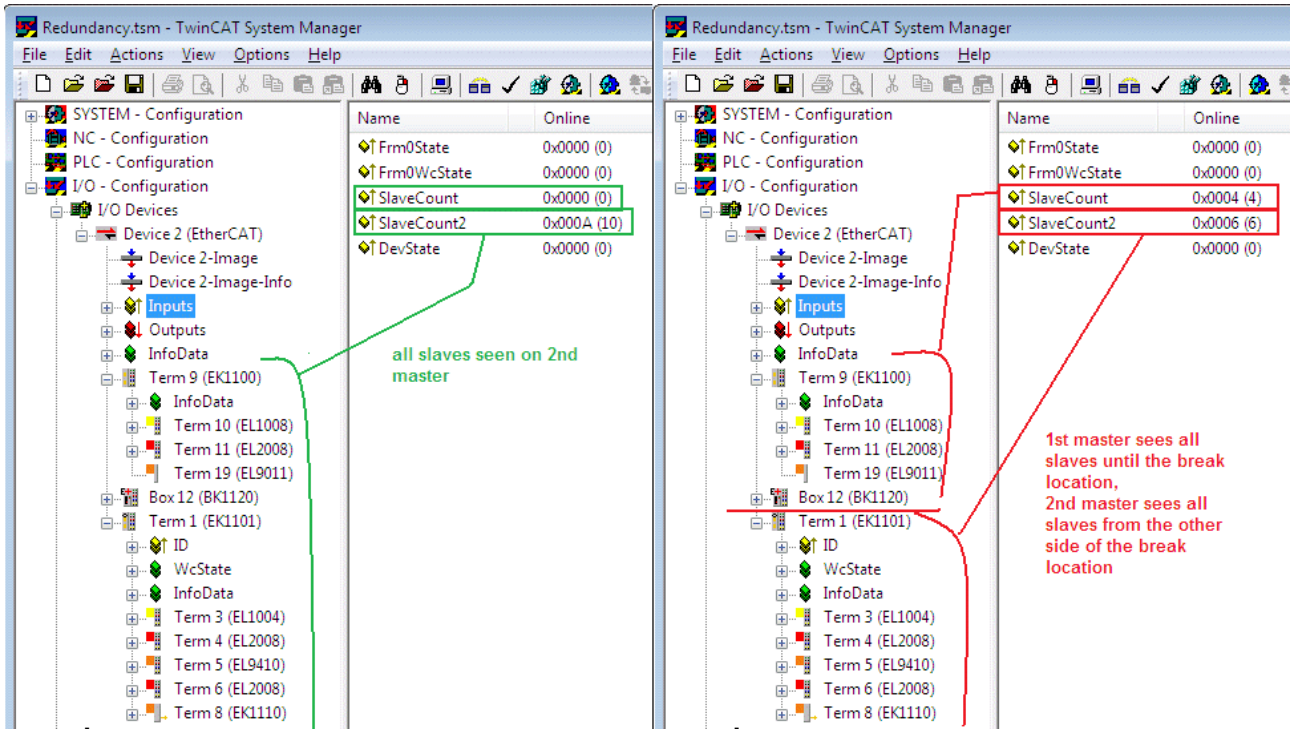
It is necessary to select a second EtherCAT adapter as the redundancy adapter. The adapter can be selected in the System Manager via the search button.

Also, the redundancy port needs to be declared, which is (the logically last EtherCAT slave), attached to the redundancy adapter. The System Manager shows all available EtherCAT ports of the EtherCAT slaves in a drop-down list.

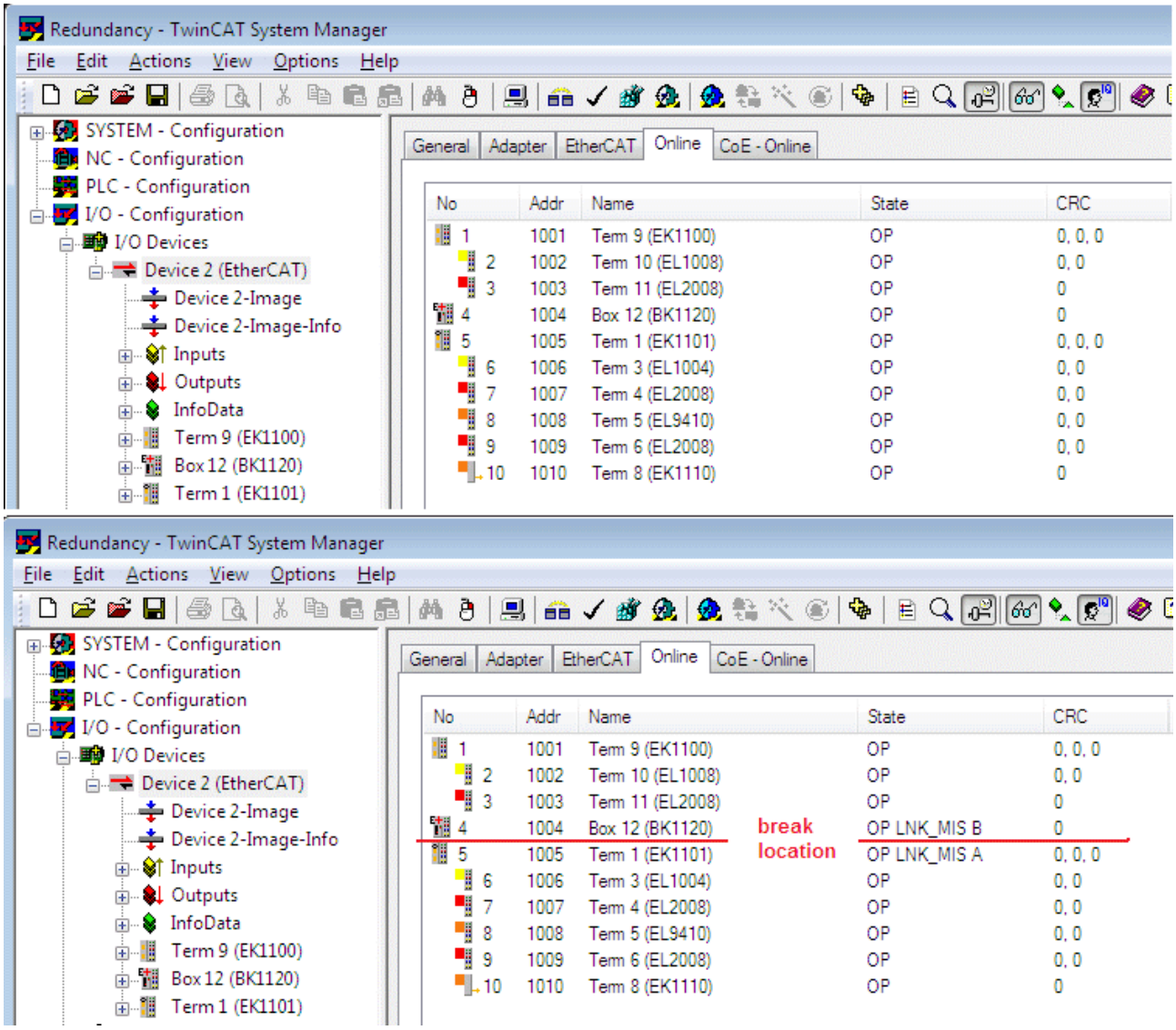
See samples below.

Diagnostics

In case of a cable failure the break location can be detected via the SlaveCount (SlaveCount <> 0) and via SlaveCount2 (SlaveCount2 < CfgSlaveCount). CfgSlaveCount is located in the InfoData of the EtherCAT Master. These counters can be mapped to the PLC for evaluation.

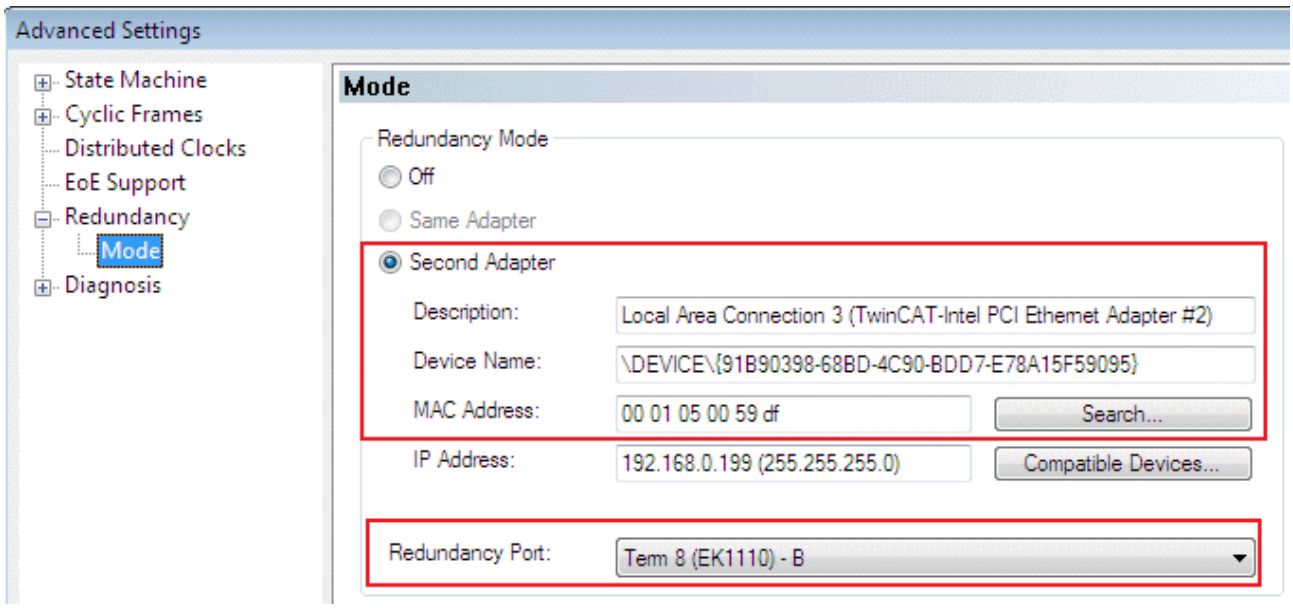


Additionally, the states of the EtherCAT slaves can be evaluated. The break location is shown as a pair of missing links, on the outgoing port (i.e., Port B) of one EtherCAT slave and the ingoing port (i.e., Port A) of the logically following EtherCAT slave.

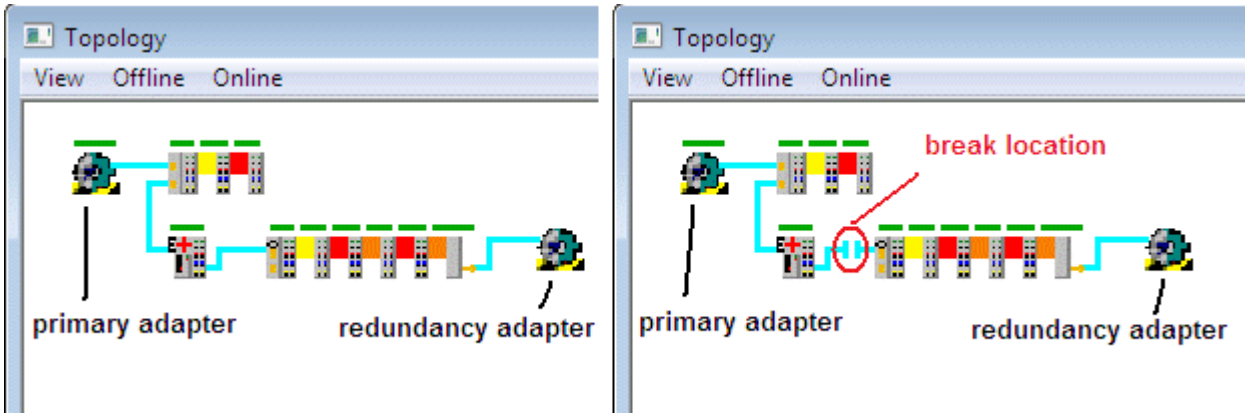


Sample A

The redundancy ring is closed via the Port B of the EK1110.

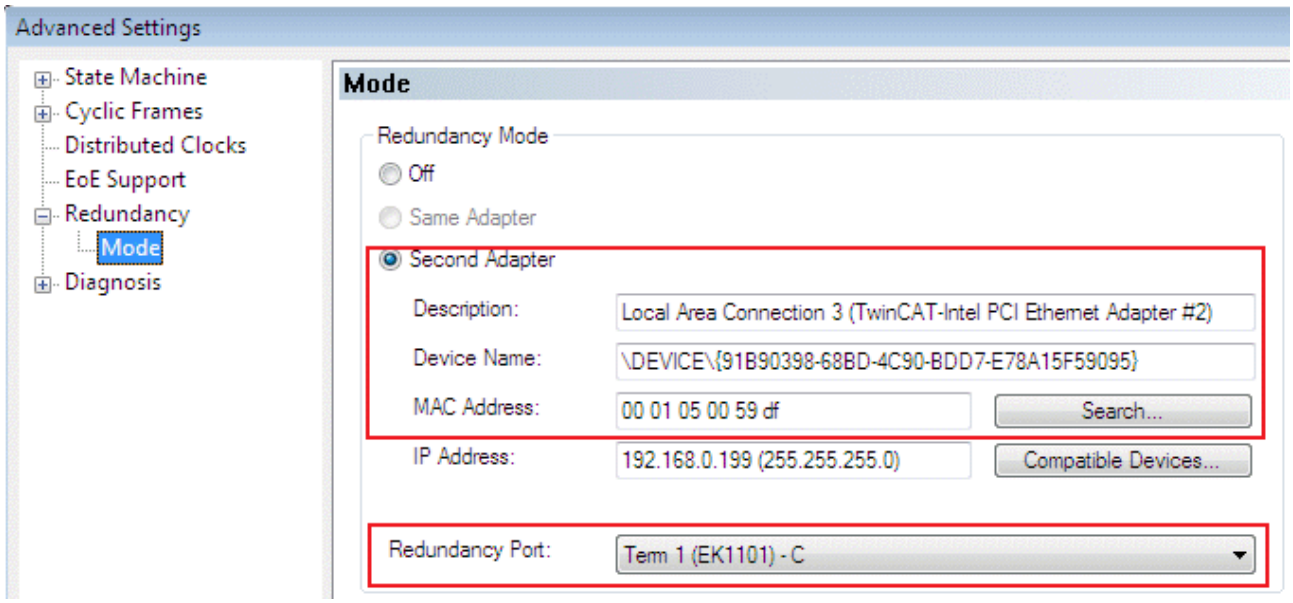


In case of a cable failure the break location is shown in the Topology View Online.

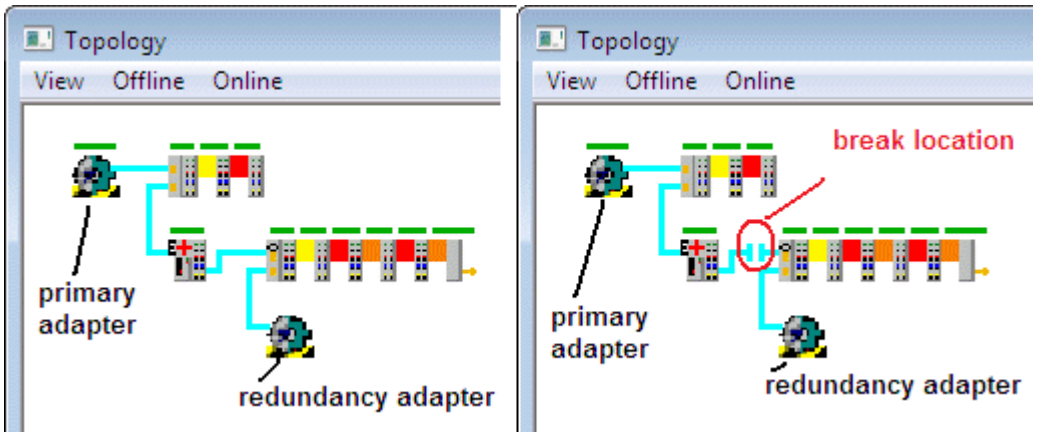


Sample B

The redundancy ring is closed via the Port C of the EK1101.



In case of a cable failure the break location is shown in the Topology View Online.



3 Installation

The setup enables the EtherCAT Redundancy on the PC, on which the installation takes place.

There are three levels for EtherCAT Redundancy defined by the product key:

- for up to 250 used EtherCAT slaves
- for up to 1000 used EtherCAT slaves
- for more than 1000 used EtherCAT slaves

Requirements:

TwinCAT 2.10 Build 1340 or higher resp. TwinCAT 2.11 Build 1536 or higher.

More Information:
www.beckhoff.com/en-en/products/automation/twincat/tsxxxx-twincat-2-supplements/ts622x.html

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