ENGLISH

Anybus© CompactCom 40 - EtherCAT® Communication, SDO and PDO Services

APPLICATION NOTE

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Version 2.2
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Contact Information

Postal address:
Box 4126
300 04 Halmstad, Sweden

E-Mail: info@hms.se

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1. Preface

1.1. About this Document

This document is intended to provide a description of how to establish an EtherCAT communication and use SDO and PDO Services with the CompactCom 40 EtherCAT module using TwinCAT3.

This document is meant for trained and skilled personnel working with the equipment described.

The reader of this document is expected to be familiar with high level software design and industrial network communication systems in general.

For additional information, documentation, support etc., please visit the support website at anybus.com/support.

1.2. Referenced Documents

Short	Title	Number	Author
[ABCC40SDG]	Anybus CompactCom 40 Software Design Guide	HMSI-216-125	HMS Industrial Networks AB
[ABCC40NWG]	Anybus CompactCom 40 EtherCAT Network Guide	SCM-1202-034	HMS Industrial Networks AB

1.3. Version History

Version	History	Date
1.00	Initial version	2021-11-10

2. Overview

The Beckhoff TwinCAT3® tool can be used to configure EtherCAT communication projects. This tool can also be used if there is no physical EtherCAT master device available, since an EtherCAT master device can be simulated in the TwinCAT3 tool. Consequently, an EtherCAT communication can be established with an EtherCAT slave device to test and exchange process data and acyclic data with that slave. In the EtherCAT communication, there is a cyclic data channel to exchange the process data (PDOs - Process Data Objects) and there are parameters which either could not or should not be exchanged cyclically. These types of parameters will instead be exchanged acyclically using SDOs (Service Data Objects) services for read and write access.

This application note describes how to establish communication using the simulated master device in the TwinCAT3 tool, and how to use SDO and PDO services. The CompactCom EtherCAT module is acting as a slave device on the EtherCAT network in this application note.

3. Configuration

3.1. Slave Device Preparation

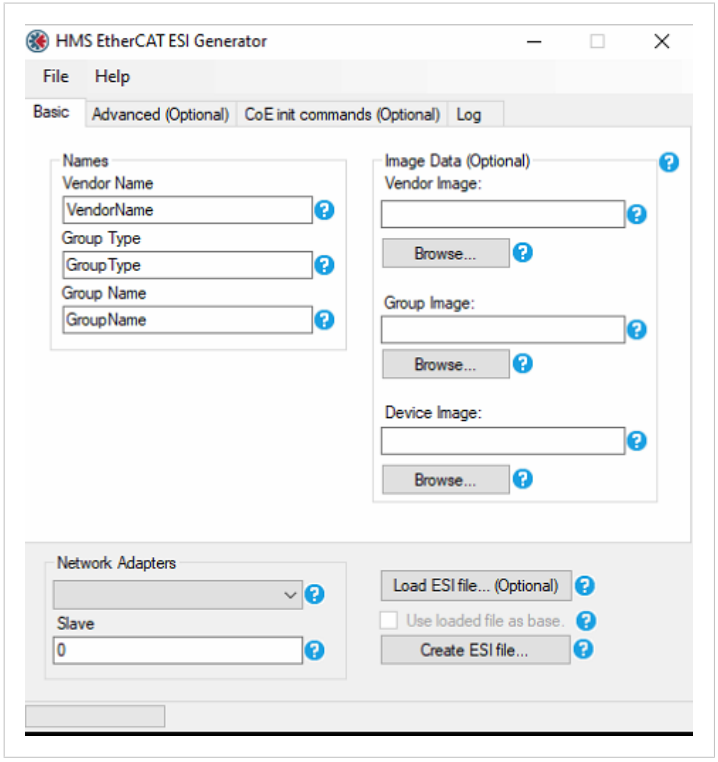
1. **Process data and parameter data configuration:**
   The IOs/ADIs (Application Data Instances)/Parameters should be created in the slave device application where the CompactCom 40 EtherCAT interface is mounted. Any number of the created ADIs can be mapped to the Process data channel to be exchanged cyclically. The ADIs not mapped to the process data image can be exchanged acyclically with the master device.
   In this test the slave device has the following ADI configuration:

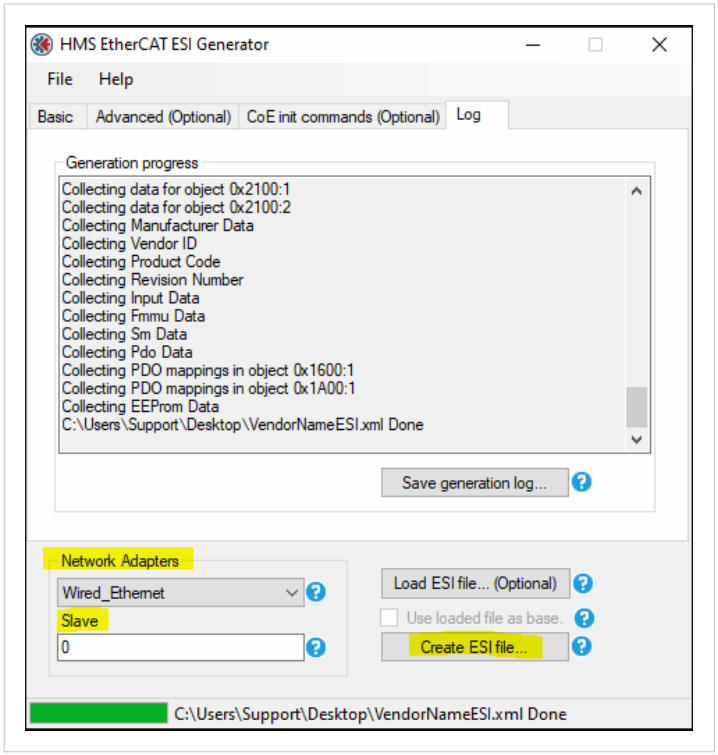
   - ADI 1 called “SPEED” and mapped to the Input Process Data Image of the Master. This ADI has 2 bytes.
   - ADI 2 called “REF_SPEED” and mapped to the Output Process Data Image of the Master. This ADI has 2 bytes.
   - ADI 100 called “ByteArray” is NOT mapped to the Process Data Image and can only be accessed using acyclic services. This ADI has 10 bytes.

2. **Initialize the CompactCom 40 slave device:**
   Start and initialize the CompactCom 40 EtherCAT module. If the module was configured correctly it should achieve the WAIT_PROCESS State. If the WAIT_PROCESS state is not achieved, EtherCAT communication can not be established. For more information, see Anybus CompactCom 40 Software Design Guide, available at anybus.com/support.

3. **Generate an ESI file:**

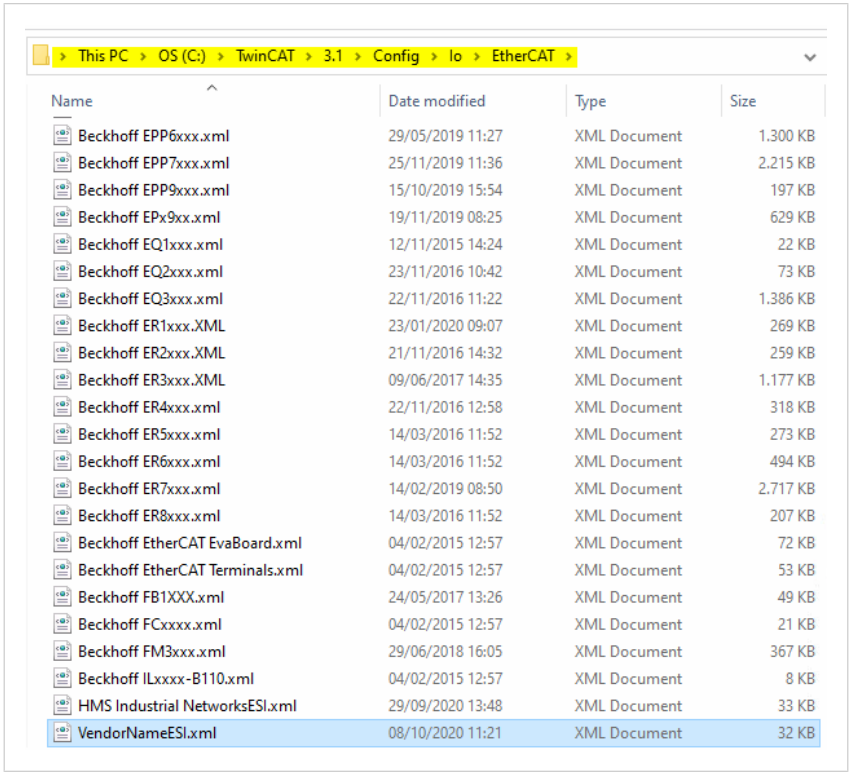
Connect the initialized CompactCom 40 EtherCAT module directly (without using a switch) to the PC where HMS ESI generator is installed. Use the HMS ESI generator to create the ESI file from the connected CompactCom 40 module, the HMS ESI generator can be downloaded from anybus.com/support.





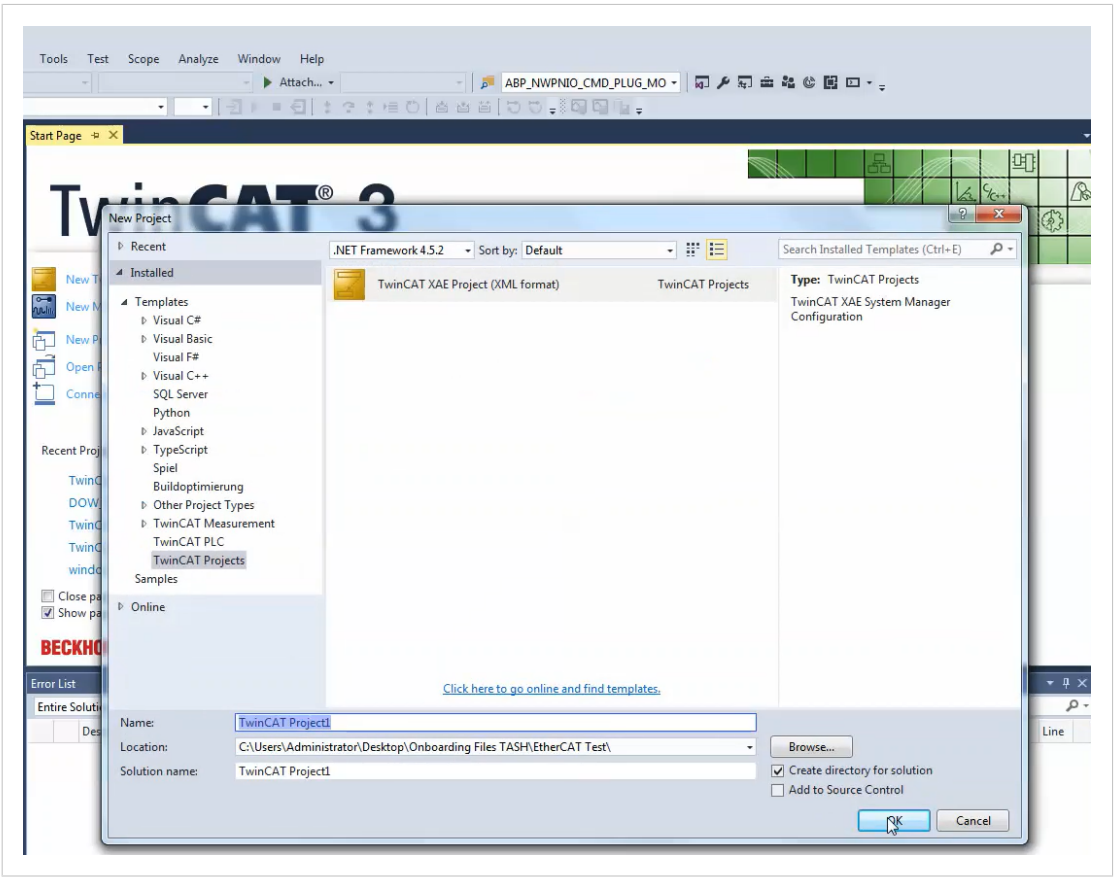
The CompactCom 40 module is now ready to communicate with the TwinCAT3 master simulator, and the created ESI file can be used in the TwinCAT3 tool.

4. Save the created ESI file in the Hardware catalog repository of the TwinCAT3 tool before starting the project creation.

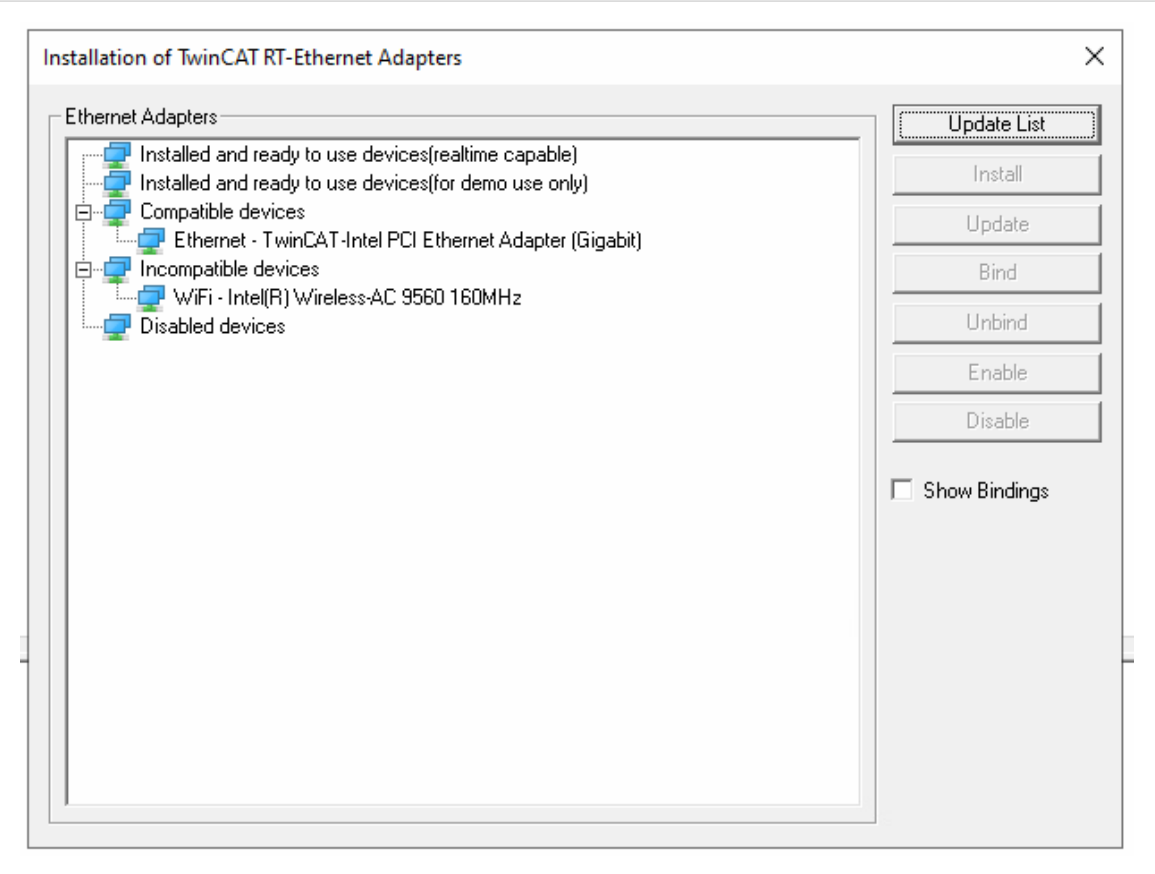


3.2. Configure the Communication in TwinCAT3

1. Open the TwinCAT3 tool and create a new project.



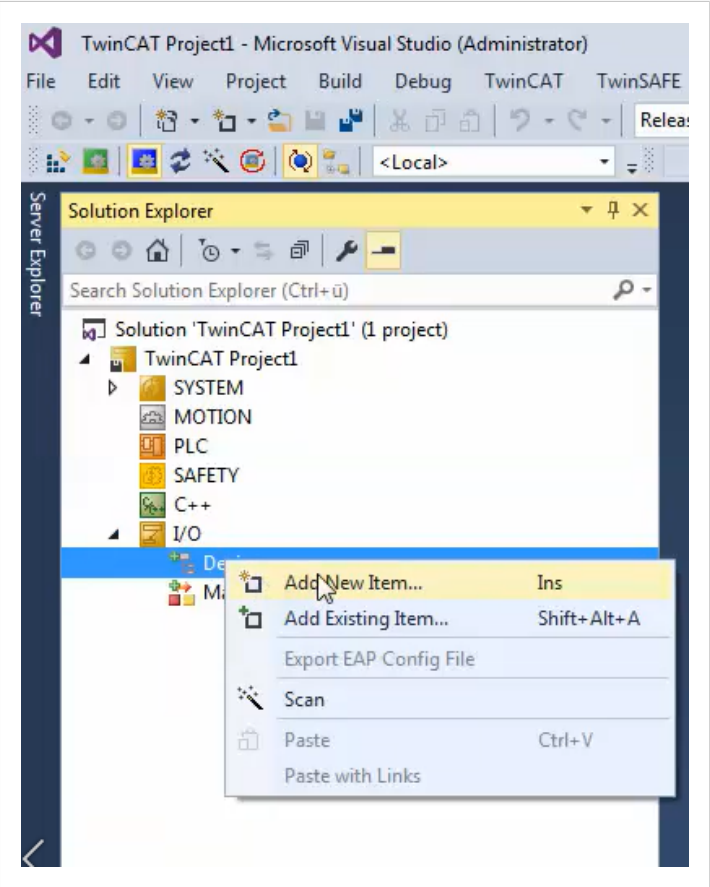
2. Install the TwinCAT real-time driver. In the System Manager bring up the TwinCAT overview of the local network interfaces via “TwinCAT” → “Show Real Time Ethernet Compatible Devices”. The following dialog appears:



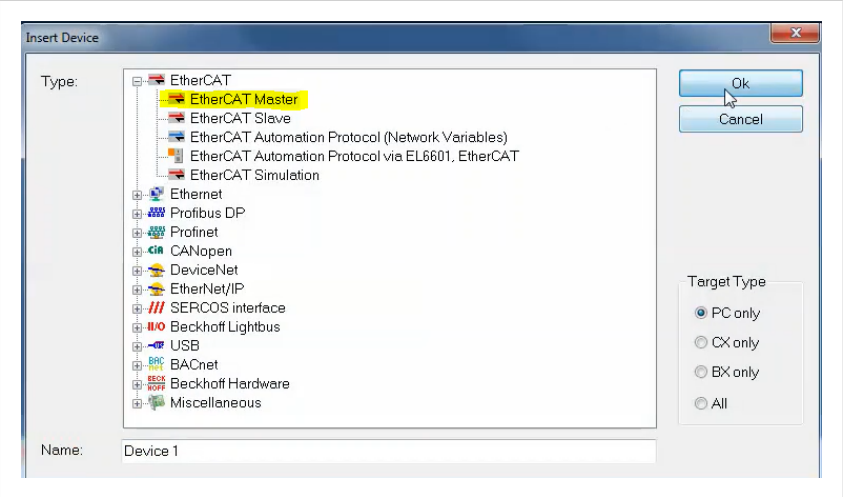
Interfaces listed under “Compatible devices” can be assigned a driver via the **Install** button. A driver should only be installed on compatible devices.

NOTE
This step only needs to be done once per system.

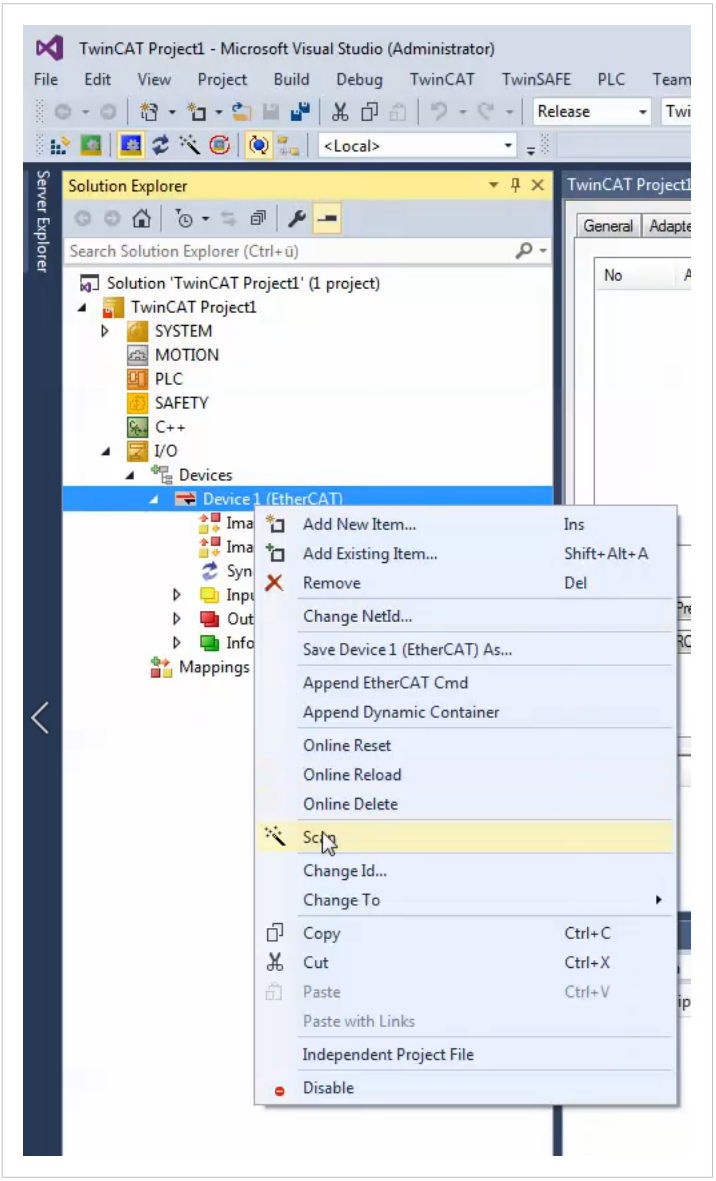
3. a. Add a virtual Master device by right-clicking on **Devices** and choosing **Add New Item...**.



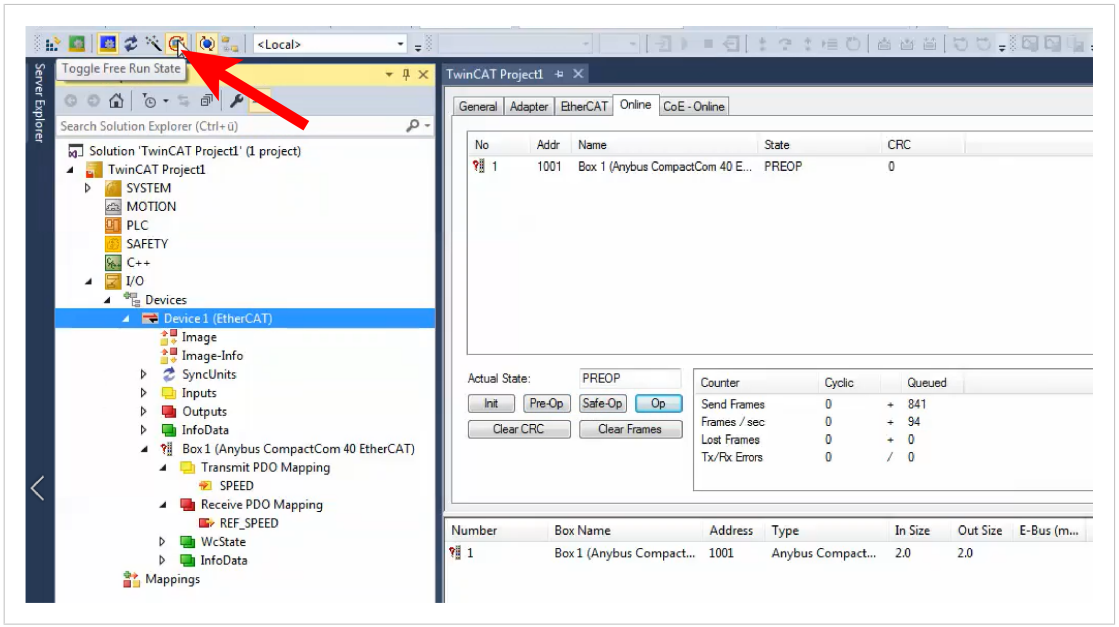
b. Choose **EtherCAT Master** and click **Ok**.

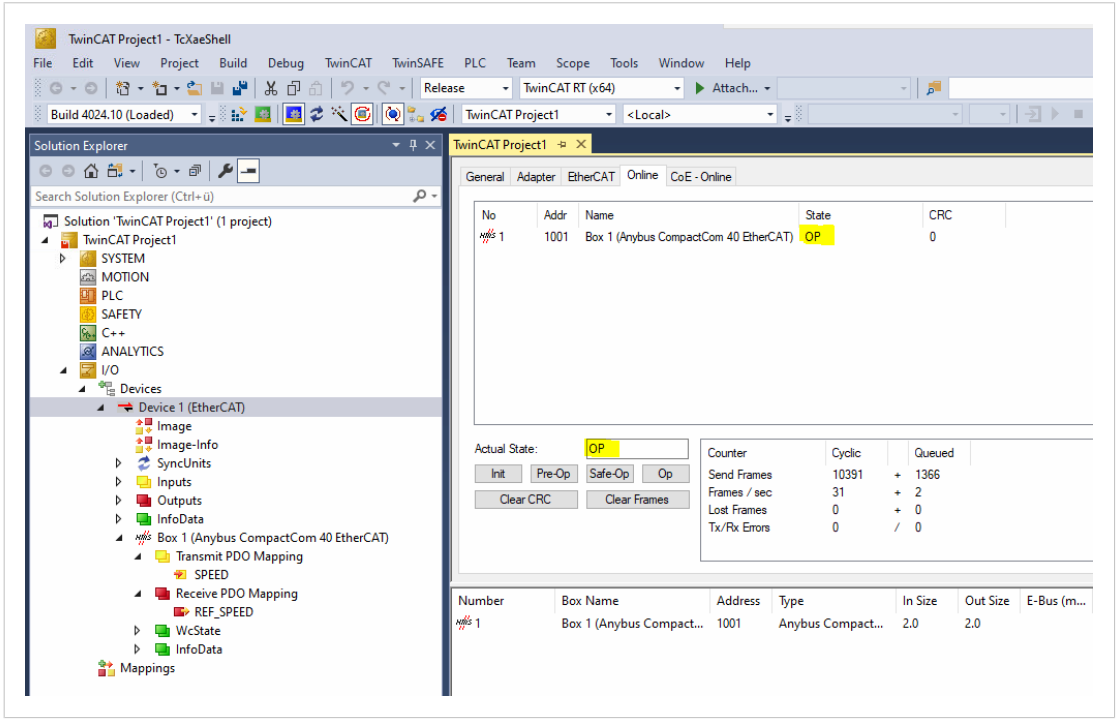


4. Initialize the CompactCom 40 module and then connect it to the computer's Ethernet port. Right-click on the master device and select **Scan**.

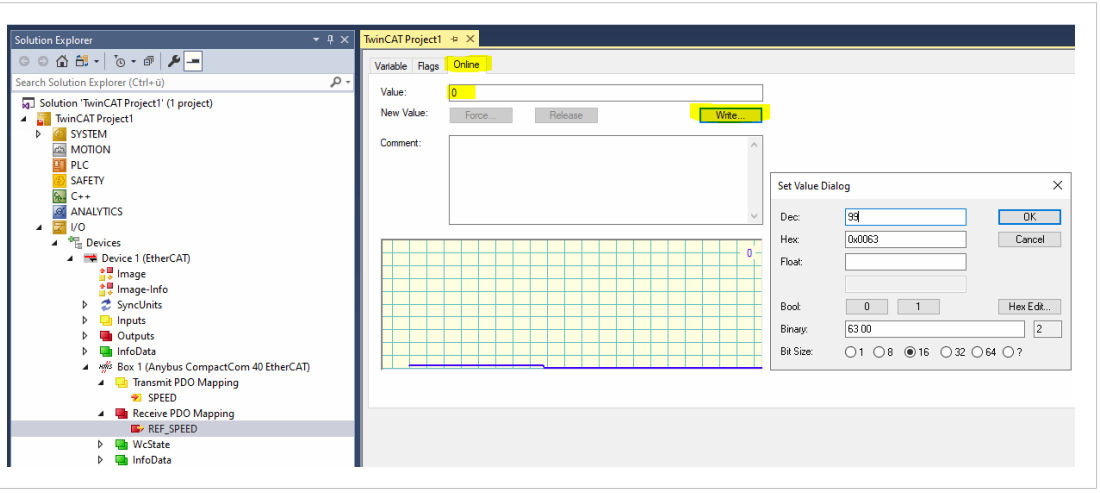


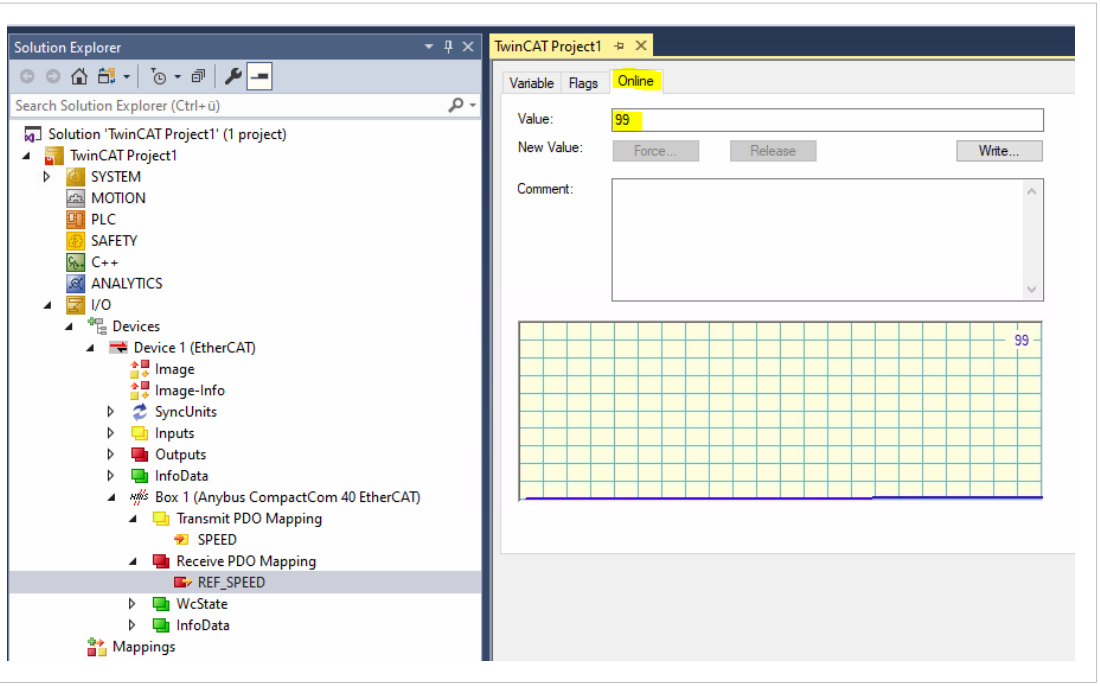
5. After the slave has been added to the project, the communication can be established using the **Toggle Free Run State** button. The communication state of both the master and the slave will change from PREOP to OP (Operational). This means that the communication has been established and the cyclic process data exchange is working.



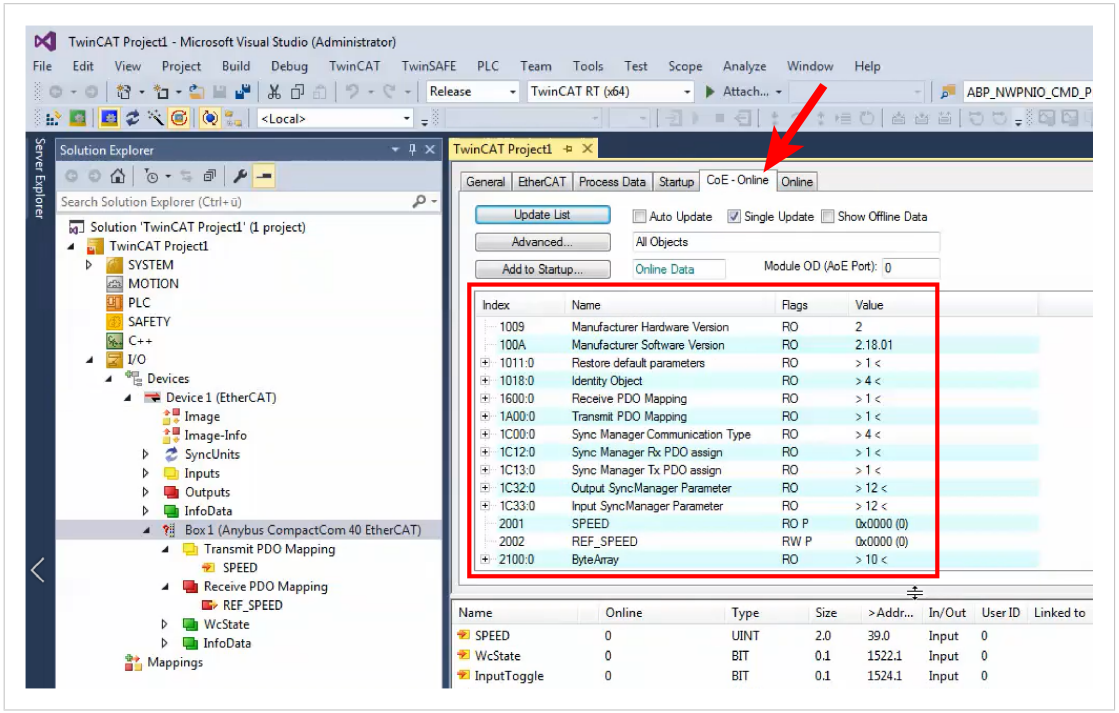


6. The Transmit PDO Mapping can be monitored and the Receive PDO Mapping can be written from the master online.

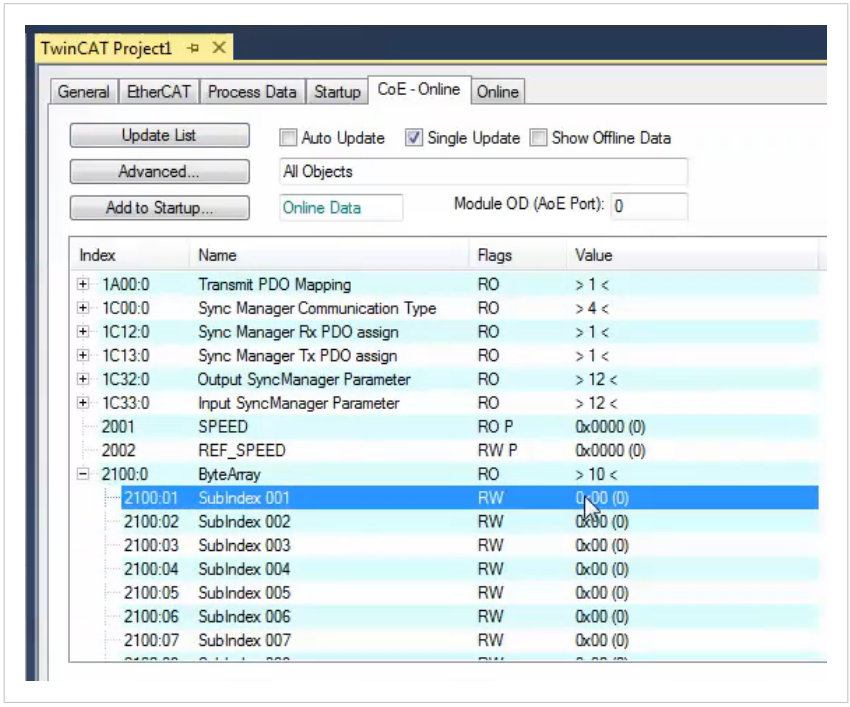


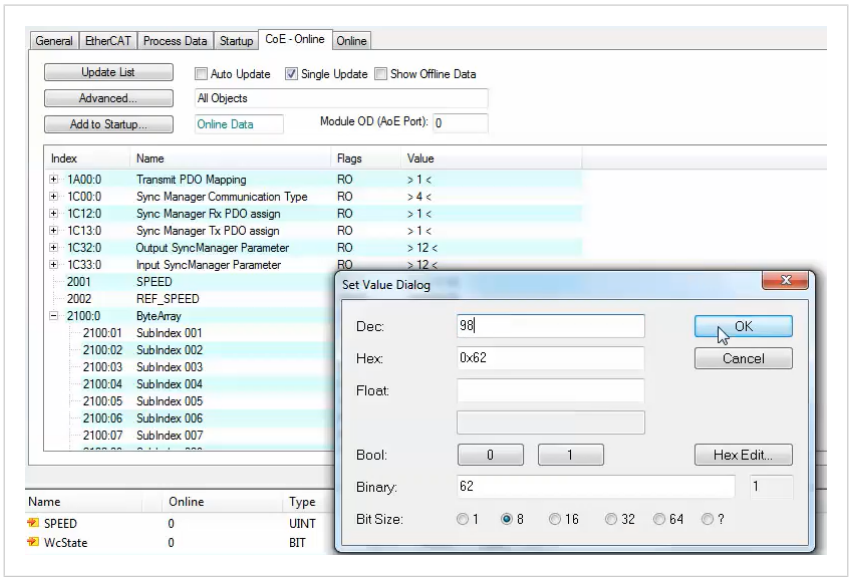


7. The available CoE objects, which can be accessed using SDO services, are now available under the **CoE-Online** tab of the CompactCom 40 EtherCAT slave device.

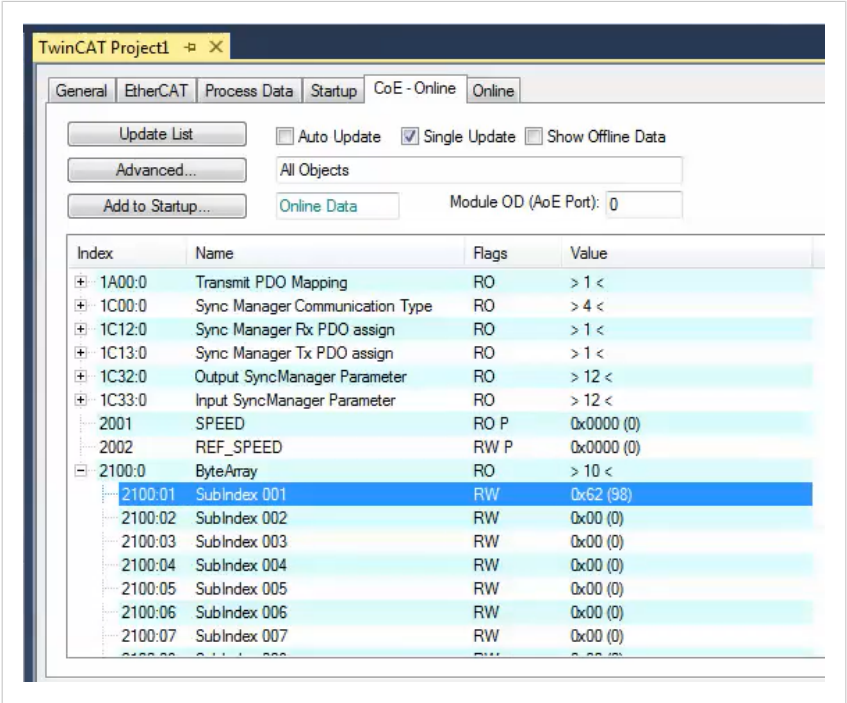


8. For objects flagged with RW (Read/Write), it is possible to modify the value by double-clicking on the value. For objects flagged with RO (Read Only) this is not possible.





9. After modifying the object/parameter value, the new value will be visible online.



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