

Using EtherCAT with TwinCAT

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Synapticon GmbH
Steinbeisstr. 1
71101 Schönaich
Germany, Europe
www.synapticon.com

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3. Using EtherCAT with TwinCAT

Designed to empower users with the knowledge and tools necessary for seamless operation, this section provides a structured approach to understanding and leveraging the full capabilities of Synapticon hardware within a TwinCAT environment.

This section serves as a comprehensive guide for integrating and controlling Synapticon devices using the EtherCAT protocol in conjunction with TwinCAT.

Designed to empower users with the knowledge and tools necessary for seamless operation, this section provides a structured approach to understanding and leveraging the full capabilities of Synapticon hardware within a TwinCAT environment.

The section is organized into five subsections, each one addressing a critical aspect of the integration process:

- Quick Start
- TwinCAT Library
- EtherCAT Slave Information (ESI) File
- Object Dictionary
- Using the Library

By following the information in this EtherCAT section, users will gain the expertise required to efficiently integrate, configure, and operate Synapticon devices within their EtherCAT-based automation systems.

3.1. Quick Start

Quick Start provides a practical foundation and offers a [downloadable example TwinCAT program](#) that demonstrates drive movement across all supported operational modes.

[Controlling Synapticon Devices Using TwinCAT3 - a Quick Start Guide](#) includes detailed, step-by-step instructions to guide users through its usage, ensuring a smooth initiation into controlling Synapticon devices.

3.2. TwinCAT Library

The TwinCAT Library introduces Synapticon's specially developed TwinCAT library, designed to simplify complex control tasks.

Download the Library files [here](#), accompanied by the [TwinCAT3 Motion Control Library for Synapticon Drives](#) documentation, which details the inputs, outputs, and functionalities of each function block.

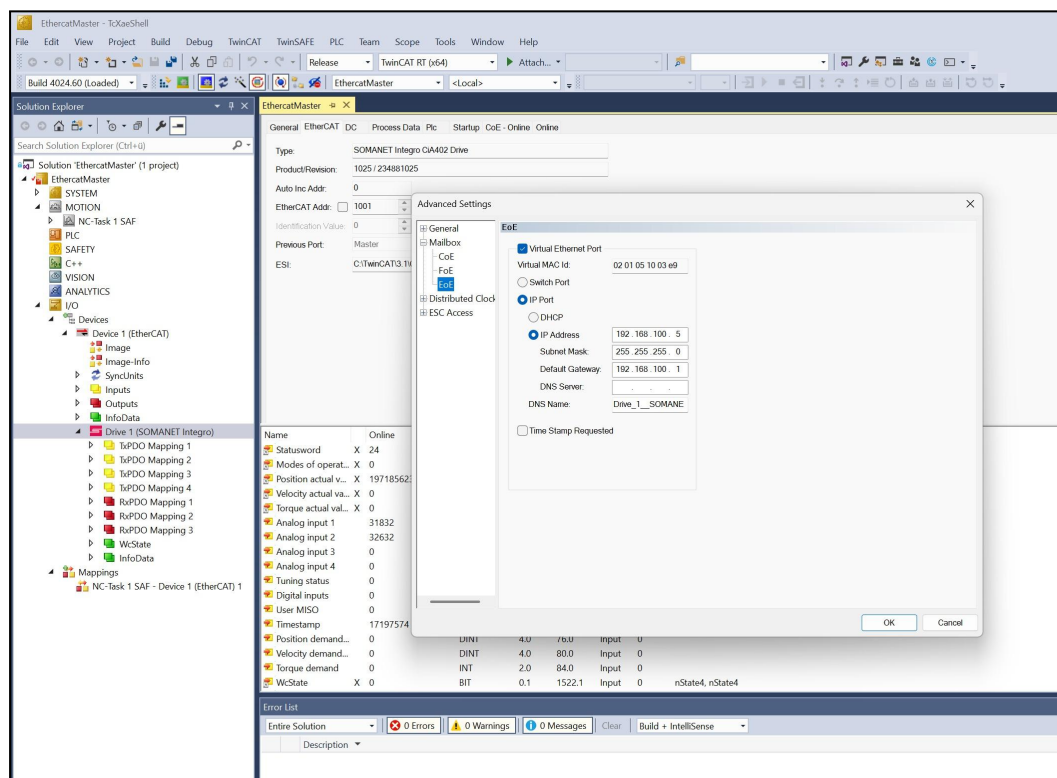
3.3. Using EoE (Ethernet over EtherCAT) with TwinCAT

NOTE

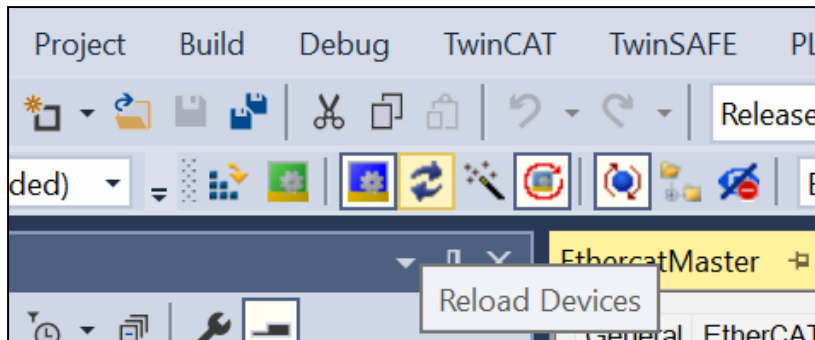
This section is valid **only for ACTILINK-S Integro and SOMANET Integro**.

Synapticon ACTILINK-S and SOMANET Integro devices support EoE through the SPOE protocol. The following information illustrates how to configure this feature.

1. Once the device is successfully found in TwinCAT, assign its IP address:

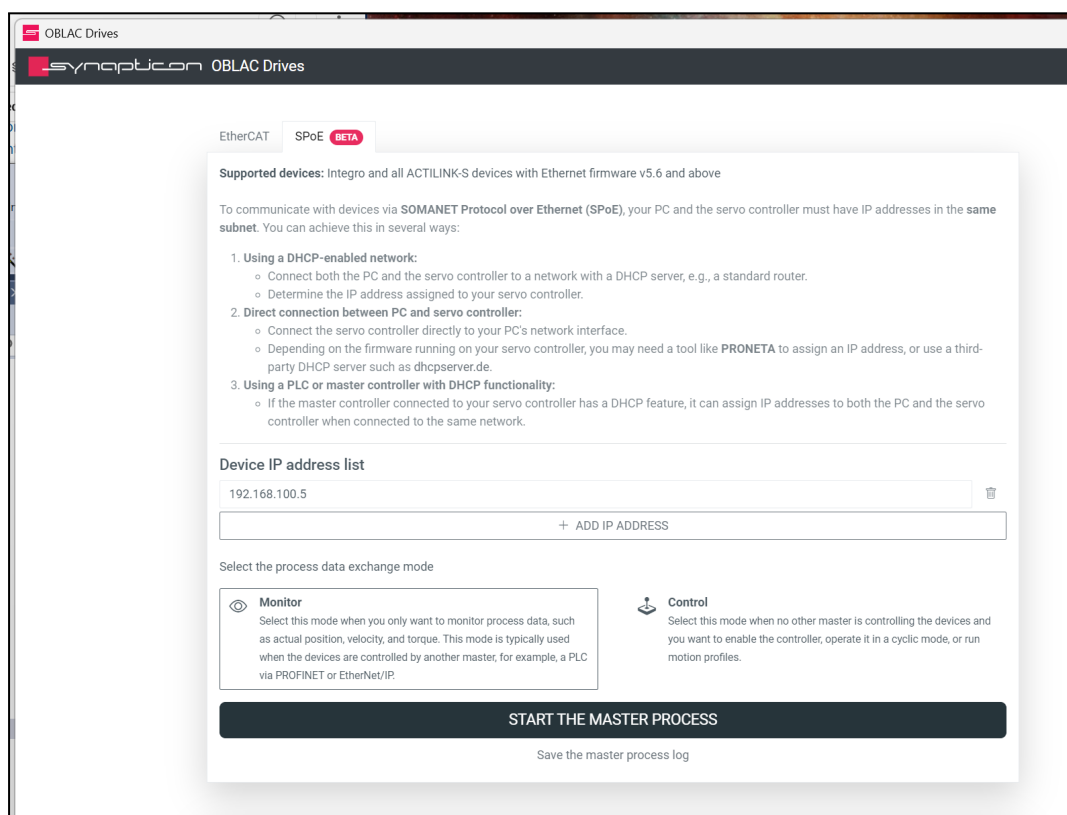


2. Reload the devices.



3. In OBLAC Drives:
 - a. Select **SPoE**.
 - b. Enter the assigned IP address.
 - c. Select **Monitor** mode.

When Monitor mode is selected, OBLAC Drives will be able to receive all PDOs and read/write SDO objects. PDOs cannot be sent to the drive while in **Monitor** mode. Sending PDOs is handled by the master (TwinCAT).



4. Press the **Connect** button.


OBLAC Drives

EtherCAT
SPoE BETA

STOP THE MASTER PROCESS

Save the master process log

Hostname

ws:// localhost

The host IP address or domain name. Examples include: 192.168.1.112 or oblac-drives-2ef2360f.local

Client ID

6c49c66e

Every client connecting to the system must provide a unique ID. The ID will be appended to the URL as a clientId query parameter.

Port 1 (Req/Res)

63524

This port supports non-real-time request/response messaging and a keep-alive mechanism.

Port 2 (Pub/Sub)

63525

This port is used exclusively for monitoring real-time data. Client requests are not supported.

Client alive timeout

9000 ms

The time system considers the client alive without receiving a message from it.

System alive timeout

3000 ms

The time client considers the system alive without receiving a message from it.

Ping system period

500 ms

The time intervals in which the client will send the ping messages to the system.

CONNECT

3.4. EtherCAT Slave Information (ESI) File

The EtherCAT Slave Information (ESI) File offers a concise description of the ESI file's role in EtherCAT communication. This subsection also provides a direct link to the Synapticon Web site, where users can download the latest ESI files specific to their devices, which is crucial for proper device identification and configuration for any EtherCAT based master.

An EtherCAT Slave Information (ESI) file is an essential XML-based document that acts as a comprehensive instruction manual for an EtherCAT slave device. Its primary purpose is to provide an EtherCAT master controller, e.g., a PLC or industrial PC, with all the necessary details to correctly identify, configure, and communicate with a specific slave device within an EtherCAT network.

Key information typically contained in an ESI file includes:

- **Device identification:** Vendor ID, product code, and revision number to uniquely identify the slave device.
- **Supported features and capabilities:** Information about the device's functionality, such as supported mailbox protocols, e.g., CoE - CANopen over EtherCAT, synchronization settings, and distributed clock configurations.
- **Process Data Object (PDO) mapping:** Descriptions of the input and output data structures that define how process data (real-time I/O) is exchanged between the master and slave.
- **Service Data Object (SDO) initialization sequences:** Instructions for configuring the device's parameters and behavior during network startup.
- **Physical port details:** Information about the device's physical connections.

ESI files are crucial for simplifying EtherCAT network setup, enabling automated configuration, ensuring compatibility across different manufacturers and device versions, and facilitating efficient integration of new devices into an existing EtherCAT system.

ESI files can be obtained for Synapticon devices as follows:

1. The easiest method is to connect your device to OBLAC Drives and select the **SAVE ETHERCAT SLAVE INFO. ESI (.xml)** option. This will download the correct ESI file directly from your connected device.
2. Alternatively, download the ESI files from the Synapticon Web site at: <https://bundles.synapticon.com/>. If this option is selected, it is crucial to **select the proper firmware version** that matches your device. Look for an arrow next to the firmware version; this will open a "Download" dropdown menu from which you can select **ESI File (.xml)**.

IMPORTANT

It is vital to use the correct ESI file version that matches the device's firmware version.

3.5. Object Dictionary

The Object Dictionary provides a complete object dictionary of Synapticon's firmware. This essential resource provides an in-depth understanding of the device's internal parameters and their respective functionalities, enabling advanced configuration and diagnostics.

3.6. Using the Library

Using the Library includes downloadable [Using the Synapticon TwinCAT3 Library Demo files](#) that illustrate the practical application of Synapticon's TwinCAT library. These demos are complemented by the [Using Synapticon TwinCAT3 Library - Demo Documentation](#), which provides step-by-step instructions, allowing users to quickly implement and customize solutions for their specific control needs.