

MultiCore Handling

Automation and Control Solutions

1. Load the Webinterface of the MultiCore PLC

To load the Webinterface please connect the MultiCore PLC with your PC open you default browser and type the IP of the PLC as the URL.

If you have a Berghof display controller, the current IP address of the first Ethernet port is shown on screen.

Every Berghof PLC is shipped with a default IP address.

The default address is: 169.254.255.XX

Where XX denotes the last two digits of the device serial number.



Exception 1: If XX = 00, then the IP address is 169.254.255.100.

Exception 2: If XX = 0X, then the IP address is 169.254.255.X, X is the last digit of the devices serial number.

The network mask is always set to 255.255.255.0.

Please note that for a successful connection to a PC, the PC also needs to have an IP address with the range of 169.254.255.xxx and the network mask must be 255.255.255.0. Both devices cannot have the same IP address!

2. Login into the Webinterface of the MultiCore PLC

If the IPs on PLC and PC are correctly configured the browser will load a login screen.

Default: User: admin / password: admin

Newer devices (e.g. like the MC-Pi) have a randomly generated password which is printed on the device label.

The users remain the same.

3. Install MultiCore compatible firmware (1.24.x or newer) onto your MultiCore PLC (optional)

If your MultiCore PLC already has Firmware 1.24.x or newer installed go to step 6.

Go to the update page and press the Button for “File Search” and select the downloaded firmware file.

Upload the file to the PLC by pressing “Send Data”

The screenshot shows the PLC web interface with a sidebar menu on the left and a main content area. The sidebar menu includes sections for Configuration, System, PLC-Manager, and Diagnostics. The 'Update' option under System is highlighted. The main content area is titled 'Package Update' and contains a warning message: 'For package update, control has to be in a save mode!'. Below this is a message: 'Choose package for update process. Wrong handling could passivate the module.' There are two buttons: 'Durchsuchen...' (highlighted with a red box) and 'Daten absenden'. A file selection dialog is open, showing a list of files in a folder named 'firmware-plc'. The file 'firmware_mx6-plc_1.24.99.tgz' is selected and highlighted with a red box. The dialog also shows a search bar with 'public' entered and a file name field containing 'firmware_mx6-plc_1.24.99.tgz'.

4. Start firmware flashing (optional)

The firmware file will be loaded onto the PLC, after the upload is complete an update information screen is loaded. Press “Start” to engage the firmware flashing.

A log screen will be shown and reloaded automatically; you can also reload manually.

Wait until the log displays “Update Succeeded” then reboot the PLC.

5. Lock the EtherCAT port to Core

With a MultiCore PLC it is possible to lock the EtherCAT port to a CPU core (recommended for SoftMotion) to enable, load the network page in the Webinterface. By default "eth1" is set to ethercat. By setting a port to "ethercat" it is automatically locked to the last CPU core of the MultiCore PLC Which is Core1 on a DualCore PLC and Core3 on QuadCore PLC.

Configuration

- Network
- CAN
- Time and Date
- VNC-Server
- FTP-Server
- SSH-Server
- WEB-Server
- VPN
- IXON
- Users
- SVC Config
- Easy-Connect
- Config Protection
- Reset Config

System

- Info
- Licenseinfo
- Screenshot
- Update
- Reboot**

PLC-Manager

- Control
- Config
- Application Info
- Application Files
- Font Files

Diagnose

Network Configuration

COMMON

Hostname:

DNS Server 1:

DNS Server 2:

ETH0

Mode:

IPAddress:

NetMask:

Gateway:

ETH0:1

Mode:

ETH1

Mode:

If it is not required that the EtherCAT is locked to a core select an unconfigured mode like "dhcp" CODESYS will do the correct configuration of the Port on startup. Be aware that by not selecting "ethercat" mode, the real time behavior of EtherCAT on this port may differ. If EtherCAT is not required at all select the required mode.

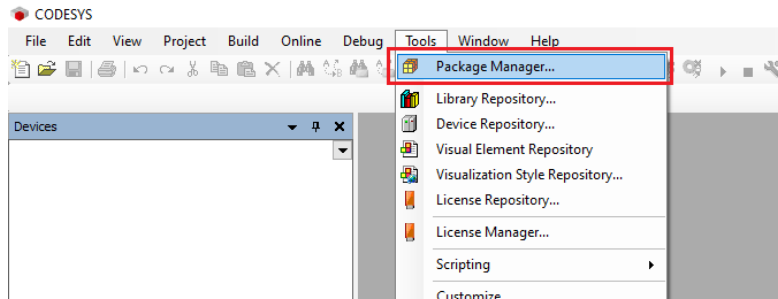
After the required settings are done, save the configuration and reboot the PLC.

6. Install MultiCore compatible CODESYS Development System (3.5.16.xx or newer)

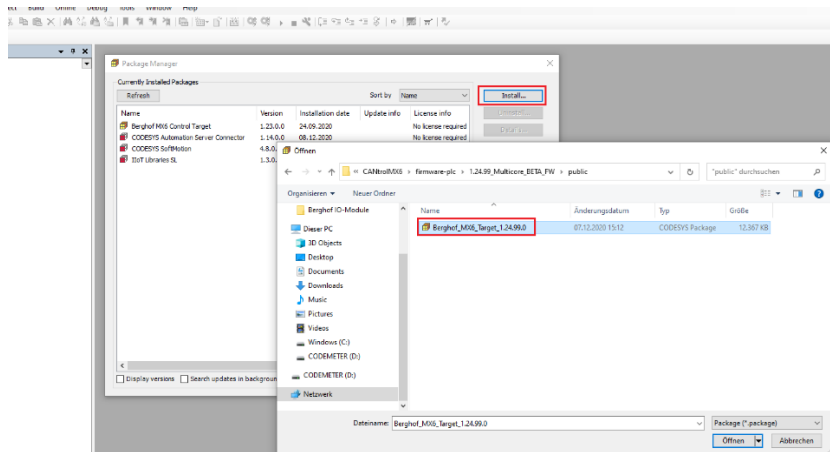
The matching CODESYS Version can either be downloaded from the CODESYS Store at <https://store.codesys.com/en/> Please do not install the latest CODESYS version found at the store but check about the supported versions. Alternatively, you can find the supported CODESYS versions at the closed Berghof download area.

7. Install MultiCore compatible Target Package file (1.24.x or newer)

Using the Package Manager (3.5.16.xx or older):

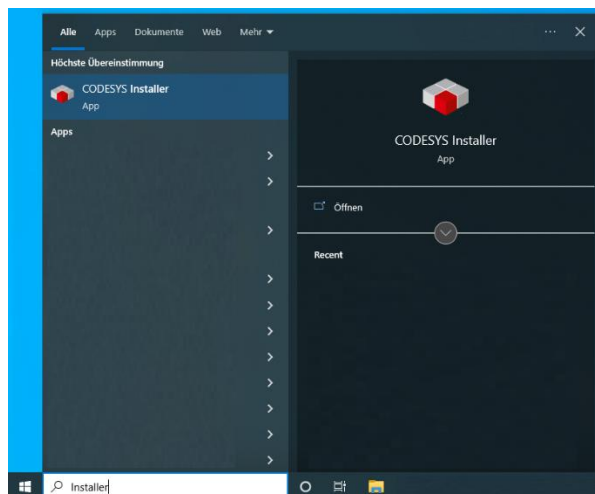


Open the Package manager and click on Install to open file browser and select the Target Package file

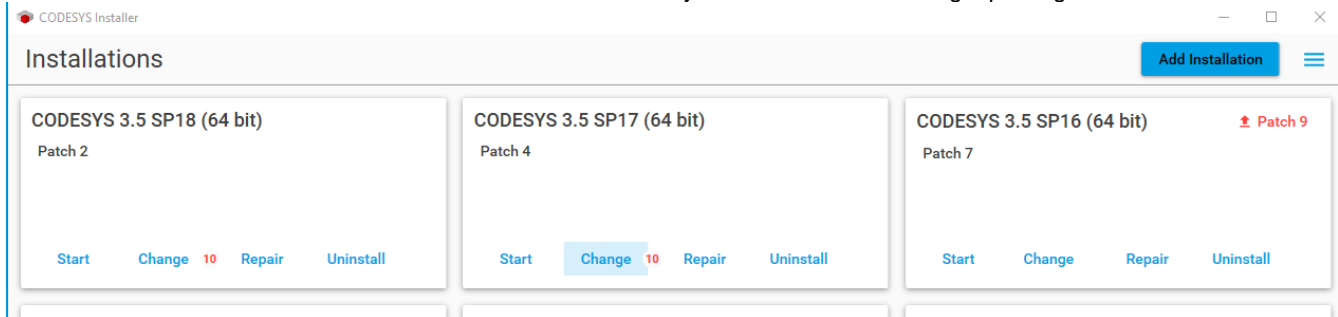


Continue through the setup and select full installation.

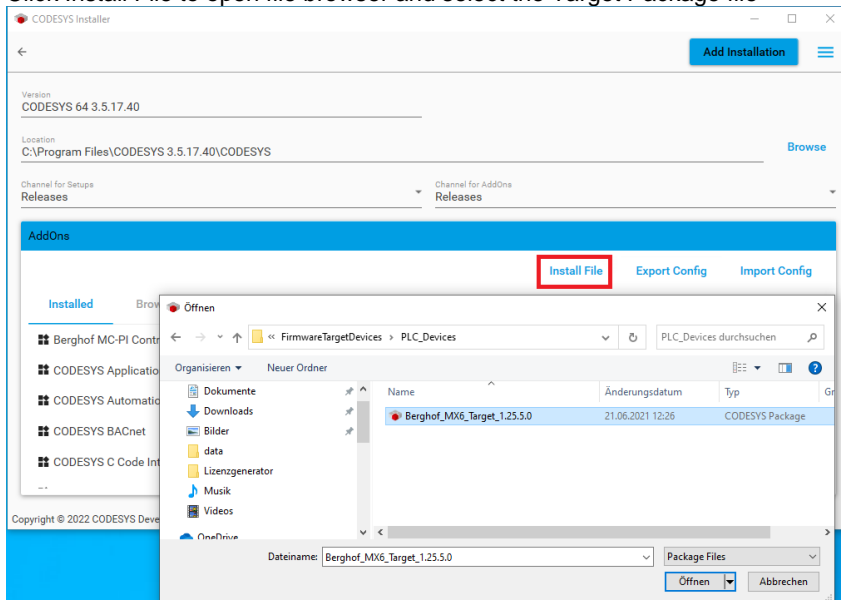
Using the CODESYS Installer (3.5.17.xx or newer):



Run installer as administrator and select CODESYS installation you want to install the target package



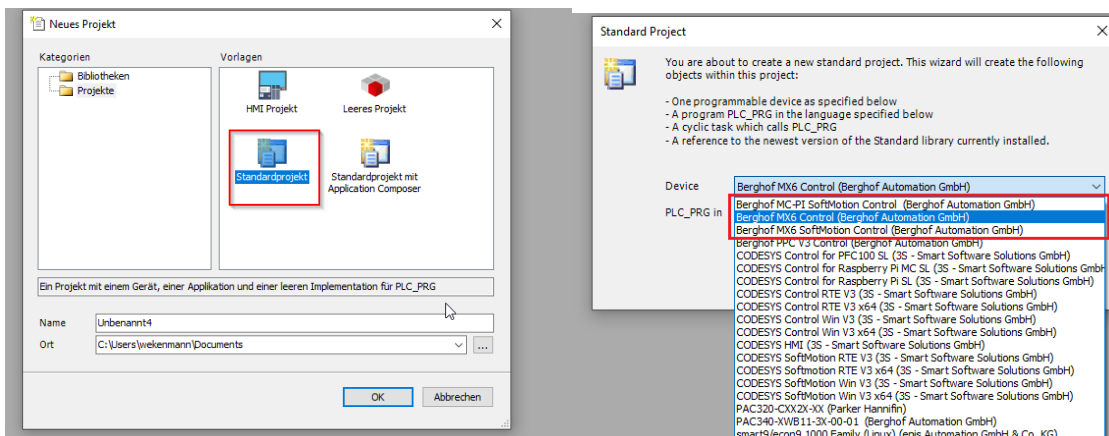
Click Install File to open file browser and select the Target Package file



Continue through the setup and select full installation.

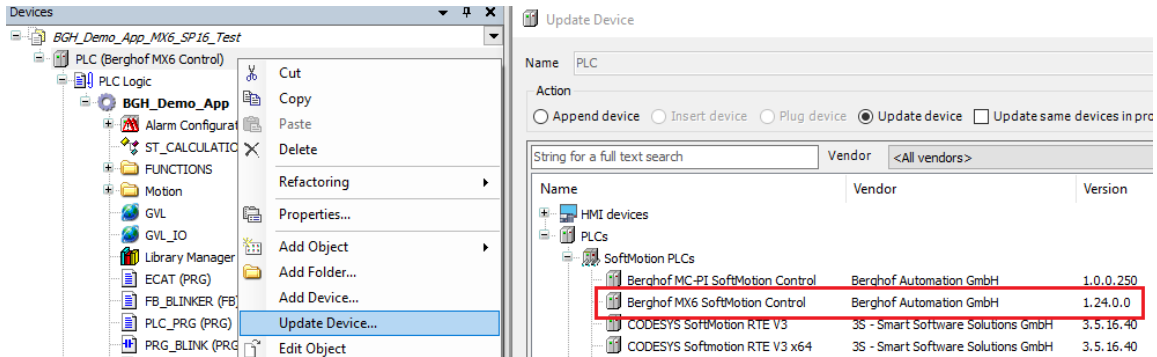
8. First Project (optional)

Create a Standard Project and Select a Berghof MX6 or MC-Pi device Description (with or without Softmotion)

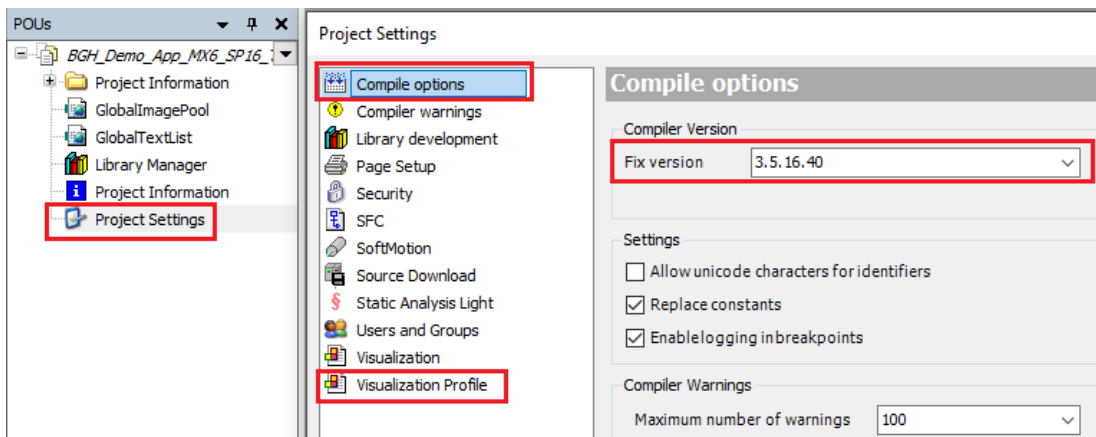


9. Open Existing Project

Open an already existing project and update the PLC device to a MultiCore compatible Version (1.24.x with or without SoftMotion or newer)



If the existing project is based on an older CODESYS Version, please upgrade the rest of the project properly to the installed CODESYS Version. Besides the PLC device please check the sub devices like the EtherCAT Master, CANOpen Manager etc, the configured Compiler and Visu Profile Version in the project settings.

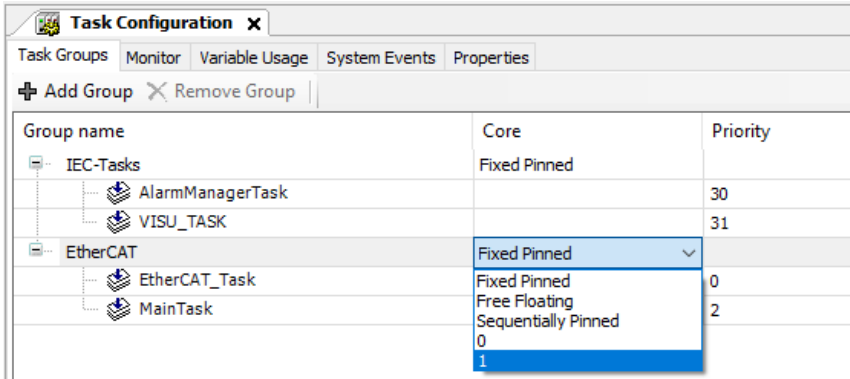


As well as manually added libraries in the library manager.

10. Multicore Task Configuration

Under „Task Configuration-> Task Groups“you can add additional task groups and select the scheduling algorithm for the task group. Then tasks can be added to a task group.

When using EtherCAT locked to a core, create a new Task group and add the EtherCAT task to it. Other Tasks that are of high priority or linked to the EtherCAT task may be added as well.



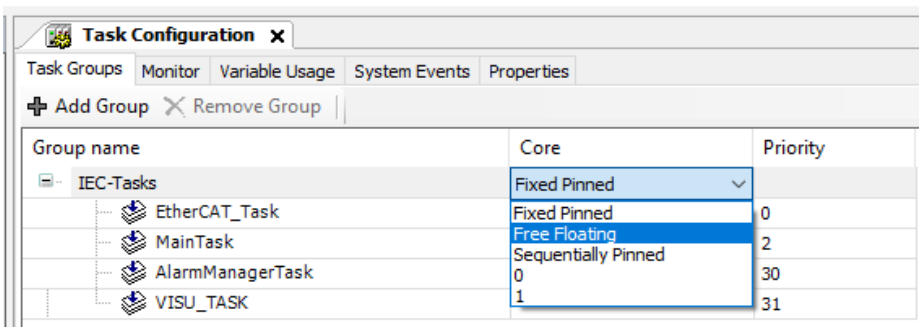
Select the last Core (Core1 or Core3) on the EtherCAT Task group.

It is possible to create multiple task groups, but it is not recommended to create more task groups than actual cores.

On the DualCore it is enough to select Core0 for the other Task group if no high priority tasks are used in that group.

On a QuadCore PLC the configuration is more flexible. But for an easy to use start we recommend having one more task group besides the EtherCAT task group and set it to “Free Floating”.

If there is no core locked to EtherCAT the best practice is to go with one task group and select “Free Floating”.



In “Free Floating” mode the system is responsible for scheduling the tasks over the two or four cores.

More information about the multicore features and the scheduling modes can be found in the CODESYS help:

https://help.codesys.com/webapp/cds_obj_task_config_task_groups;product=codesys;version=3.5.16.20;language=en

In case of manually assigning the cores on either DualCore or QuadCore PLCs it is recommended to only pin low priority tasks (Prio 16 or higher) to Core0 and to use the remaining cores to pin high priority tasks (15 or lower) to, as Core0 is additionally running the OS and the Runtime.

Be aware that MultiCore systems perform real multitasking on separate cores, and thus race conditions can occur on unoptimized applications that were previously running on SingleCore systems.

Please make sure that different task groups are not writing the same variables or lock parallel writing with the help of state machines or semaphores.