
# syncAXIS Master-Slave-Synchronizer

## sync*AXIS* control V1.6.0

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# Content

# 1 sync*AXIS* Master-Slave-Synchronizer

This manual describes the tool Master-Slave-Synchronizer from SCANLAB, in the following briefly referred to as:

- `MasterSlaveSynchronizer.exe`

**Note**

- `MasterSlaveSynchronizer.exe` is *not* required for standard XL *SCAN* systems, see Chapter 1.5 "Intended Use"!

## 1.1 Manufacturer

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## 1.2 Scope of Delivery

- `MasterSlaveSynchronizer.exe` and this manual are part of the sync*AXIS* control-software package and are located in its subfolder
  `".\Tools\syncAXIS MasterSlaveSynchronizer\"`.

## 1.3 System Requirements

- Same as sync*AXIS* control.

## 1.4 Related Documents

- "Installation of SCANLAB XL *SCAN* Components and Initial Operation of the XL *SCAN* System" Manual
- "syncAXIS-DLL – Application Programming Interface" Manual
- "syncAXIS Viewer" Manual
- "syncAXIS Configurator" Manual

## 1.5 Intended Use

**Notice!**

`MasterSlaveSynchronizer.exe` is not useful for standard XL *SCAN* systems.

**Notice!**

`MasterSlaveSynchronizer.exe` is solely intended to be used with a special XL *SCAN* system, see figure 1, page 5.

With this special-XL *SCAN* system, 2 sync*AXIS* control instances on a single PC control 2 master/slave-connected RTC6 boards that feed via 2 different SLECs into the same EtherCAT network.

The `MasterSlaveSynchronizer.exe` is an command line tool (no GUI) for MS Windows.

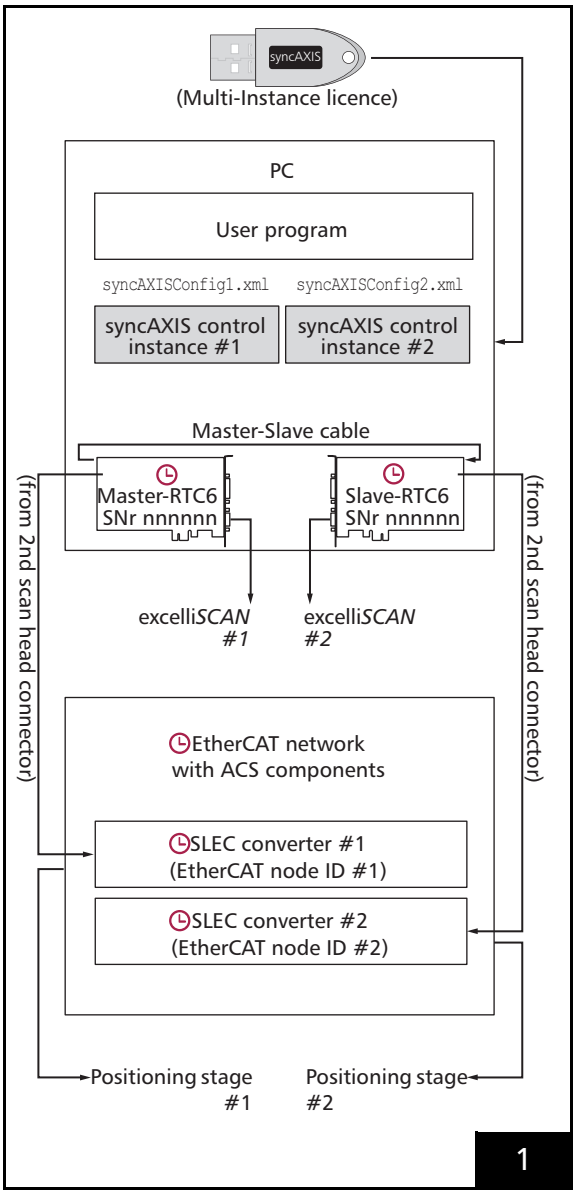
It is intended to be executed once on the PC with the RTC6 boards before the first creation of the sync*AXIS* control instance.

It establishes the clock synchronicity within the intended Special-XL *SCAN* system, that is, of

- all Master-Slave(1) connected RTC6 boards
- all SLECs and of the
- EtherCAT protocol

can only be used with sync*AXIS* control XML configuration files.

`MasterSlaveSynchronizer.exe` takes the relevant information from the corresponding sync*AXIS* control XML configuration files (which are passed by the user as an argument).




`MasterSlaveSynchronizer.exe` is supplied only for the special-XL *SCAN* system depicted here, see "Notice!", page 5. The tool synchronizes the clocks of the components indicated by ◷.

(1) Master-board of an master/slave-RTC6 board composite is the board with occupied Master connector and free Slave connector.

## 1.6 Functionality

The XL *SCAN* component synchronization procedures with `MasterSlaveSynchronizer.exe` are as follows.

**(1)** It resets all RTC6 boards (prior to the actual synchronization) whereby the RTC6 files (`RTC6DAT.dat`, `RTC6OUT.out`, `RTC6RBF.rbf`) are loaded to the RTC6 boards.

**(2)** It synchronizes the 10 $\mu$s clocks of all Slave-RTC6 board(s) with the 10 $\mu$s clock of the Master-RTC6 board(1)

**(3)** It synchronizes the clock of the EtherCAT protocol (for example, 20 kHz; which is sent by the RTC6 boards) Master-Slave-RTC6 board composite.

**(4)** It waits until the clocks of the ACS controllers (depending on the ACS cycle time = "CTIME"; either 2 kHz or 4 kHz) have also synchronized.

### Notice!

Note the synchronicity set via `MasterSlaveSynchronizer.exe` is lost as soon one of the RTC6 boards is reset.

Therefore, make sure that both in your sync*AXIS* control user program and for synchronization with `MasterSlaveSynchronizer.exe` always the identical RTC6 files (`RTC6DLL.dll`, `RTC6DAT.dat`, `RTC6OUT.out`, `RTC6RBF.rbf`) are used!

## 1.7 Prerequisites for the XML Configuration Files

The XML configuration files to be specified with `MasterSlaveSynchronizer.exe` must differ in content as the following information is extracted.

- ACS IP address from
  `<cfg:Configuration>` → `<cfg:GeneralConfig>` → `<cfg:ACSController>nnn.nnn.nnn.nnn</cfg:ACSController>` (1)
- Path to the RTC6 files from
  `<cfg:Configuration>` → `<cfg:RTCConfig>` → `<cfg:ProgramFileDirectory>C:\Folder path</cfg:ProgramFileDirectory>` (2)
- RTC6 serial numbers from
  `<cfg:Configuration>` → `<cfg:RTCConfig>` → `<cfg:Boards>` → `<cfg:RTC6>` → `<cfg:SerialNumber>nnnnnn</cfg:SerialNumber>`
- EtherCAT node ID of the SLECs from
  `<cfg:Configuration>` → `<cfg:StageConfig>` → `<cfg:StageList>` → `<cfg:Stage …>` → `<cfg:SlecEtherCATNodeID> n</cfg:SlecEtherCATNodeID>`

(1) If ACS IP address values differ, the first found is used.

(2) The correct RTC6 serial numbers must actually have been entered in the XML configuration file. That is, although the combination `SerialNumber` value "(random number)" and `BoardIdentificationMethod` value "`UseFirstFound`" is a valid combination for a successful sync*AXIS* control instance creation, it is not sufficient for `MasterSlaveSynchronizer.exe`.

## 1.8 Prerequisites for MasterSlaveSynchronizer.exe

Before starting-up, make sure that

- `MasterSlaveSynchronizer.exe`

and the following DLLs from the sync*AXIS* control-software package V1.6.0

- `syncAXIS.dll`
- `RTC6DLL.dll`
- `xerces-c_3_2.dll`

are in the same folder.

## 1.9 Running MasterSlaveSynchronizer.exe

The syntax is as follows:

```
MasterSlaveSynchronizer.exe [-WaitNotForSyncFinished]
"C:\Folder Path To\syncAXISconfig1.xml"
"C:\Folder Path To\syncAXISconfig2.xml"
```

- Mandatory argument:
  `C:\Folder Path To\syncAXISconfig1.xml"`
  XML configuration file for the sync*AXIS* control instance with Master-RTC6 board
- Mandatory argument:
  `C:\Folder Path To\syncAXISconfig2.xml"`
  XML configuration file for the sync*AXIS* control instance with Slave-RTC6 board
- Optional arguments:
  `-WaitNotForSyncFinished`
  - If not passed, `MasterSlaveSynchronizer.exe` waits for ACS to confirm the synchronization. Note that this may take up to 15 s.
  - If passed, `MasterSlaveSynchronizer.exe` does *not* wait for ACS to confirm the synchronization.

  `-ConnectExternalStartStop`
  - If not passed, then external START and external STOP are *not* forwarded through the sync*AXIS* control instances. This is recommended, if sync*AXIS* control instances are to be operated independently from each other.
  - If passed, then through the sync*AXIS* control instances are forwarded:
    - External START
    - External STOP
    - **slsc_ctrl_start_execution**

    This is recommended, if the sync*AXIS* control instances are to be run together – and in particular, synchronously.

**Notes**

- The call can either be done by entering in a MS Windows Command Prompt (Windows key + R, type `cmd` and then Return key) or by utilizing a batch file, for example,

```
ECHO Execute Master-Slave Synchronizer
MasterSlaveSynchronizer.exe "1.xml" "2.xml"
pause
```

# 2 Change Index

The following are changes in this manual due to the technical evolution of the product as well as significant editorial changes.

**Changes from document revision 1.0.2 en-US to document revision 1.0.3 en-US**

| Name of chapter / function table | Notes / Changes |
|---|---|
| Global | Document Revision<br>• 1.0.3 en-US<br>applies to sync*AXIS* control-software package<br>• V1.6.0 |