



syncAXIS Master-Slave-Synchronizer

syncAXIS control **V1.8.0**

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1 About this Manual

This manual describes the software SCANLAB **syncAXIS Master-Slave-Synchronizer**.

In the following, it is briefly referred to as:

- MasterSlaveSynchronizer.exe

Notice!

MasterSlaveSynchronizer.exe is not useful for standard XL SCAN systems.
See **Chapter 2.1 "Intended Use"**.

Notice!

Carefully read the document "syncAXIS control Software License Agreement" before installing and using syncAXIS control. This agreement defines matters such as terms of usage, warranty information and liability disclaimers. If you have questions, simply contact SCANLAB.



Caution!

Read and observe all safety instructions in this manual!

SCANLAB accepts no liability for damages or consequential losses resulting from non-observance of this manual, in particular the safety instructions contained herein.

1.1 Related Documents

- RTC6 Manual
- "syncAXIS control-DLL – Application Programming Interface" Manual
- "Installation of SCANLAB XL SCAN Components and Initial Operation of the XL SCAN System" Manual
- "syncAXIS Viewer" Manual
- "syncAXIS Configurator" Manual

1.2 Manufacturer

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1.3 Glossary

ACS	Designates the manufacturer of machine control systems whose components must be used at present.
ACS Motion Controller	XL SCAN component from ACS, see “syncAXIS control-DLL – Application Programming Interface” Manual, Figure 1, page 10.
syncAXIS control Instance	A software object which is created in the PC-RAM when a valid <code>syncAXISConfig.xml</code> is called by a syncAXIS control-based user program. See “syncAXIS control-DLL – Application Programming Interface” Manual.
SLEC	Short for “ACS SL2-100-to-EtherCAT converter”. XL SCAN component from ACS, see “syncAXIS control-DLL – Application Programming Interface” Manual, Figure 1, page 10.
<code>syncAXISConfig.xml</code>	XML configuration file. Although the file name can be freely chosen, it is denominated as “ <code>syncAXISConfig.xml</code> ” throughout this document. The complete tag descriptions can be found in “syncAXIS control-DLL – Application Programming Interface” Manual, Chapter 13 “Appendix F: Reference of syncAXISConfig.xml Tags”, page 357.

2 syncAXIS Master-Slave-Synchronizer

2.1 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 7](#).

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

`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 **syncAXIS control Instances**
- Establishes the clock synchronicity within the intended Special-XL SCAN system, that is, of
 - all Master-Slave⁽¹⁾ connected RTC6 boards
 - all **SLECs**
 - EtherCAT protocol
- Takes the relevant information from the corresponding syncAXIS control `syncAXISConfig.xml` files (which are passed by the user as an argument)

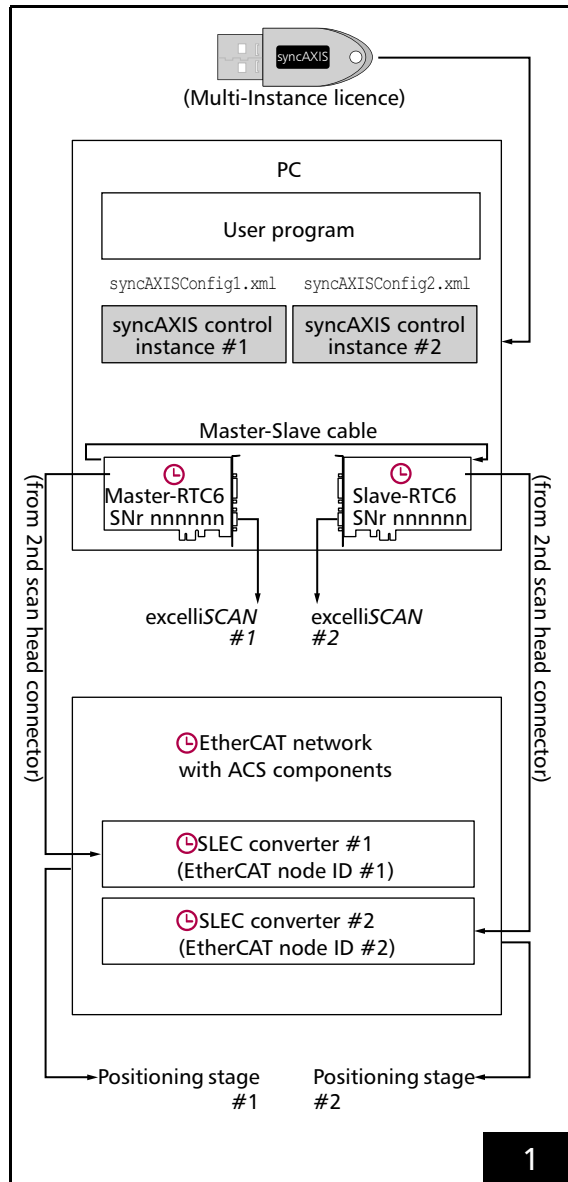
2.2 Scope of Delivery

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

2.3 System Requirements

- As with syncAXIS-DLL.

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



MasterSlaveSynchronizer.exe is supplied only for the special-XL SCAN system depicted here, see "Notice!", page 6. The tool synchronizes the clocks of the components indicated by ⌚.

2.4 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 μ s clocks of all Slave-RTC6 board(s) with the 10 μ 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 syncAXIS control user program and for synchronization with `MasterSlaveSynchronizer.exe` always the identical RTC6 files (RTC6DLL.dll, RTC6DAT.dat, RTC6OUT.out, RTC6RBF.rbf) are used!

2.5 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:RTCCfg> → <cfg:ProgramFileDirectory>C:\Folder path</cfg:ProgramFileDirectory>` ⁽²⁾
- RTC6 serial numbers from
`<cfg:Configuration> → <cfg:RTCCfg> → <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 syncAXIS control instance creation, it is not sufficient for `MasterSlaveSynchronizer.exe`.

2.6 Prerequisites for MasterSlaveSynchronizer.exe

Before starting-up, make sure that

- **MasterSlaveSynchronizer.exe**

and the following DLLs from the syncAXIS control-software package **V1.8.0**

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

are in the same folder.

2.7 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 syncAXIS control instance with Master-RTC6 board
- **Mandatory argument:**
C:\Folder Path To\syncAXISconfig2.xml"
XML configuration file for the syncAXIS 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 syncAXIS control instances. This is recommended, if syncAXIS control instances are to be operated independently from each other.
– If passed, then through the syncAXIS control instances are forwarded:
 - External START
 - External STOP
 - **slsc_ctrl_start_execution**
This is recommended, if the syncAXIS 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

3 Change Index

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

Changes to document revision **1.0.4 en-US** from document revision 1.0.3 en-US

Name of chapter / function table	Notes / Changes
Global	Document Revision <ul style="list-style-type: none"> 1.0.4 en-US applies to syncAXIS control-software package <ul style="list-style-type: none"> V1.8.0
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