

AKD2G EtherCAT Troubleshooting List Rev B. 5-2-24

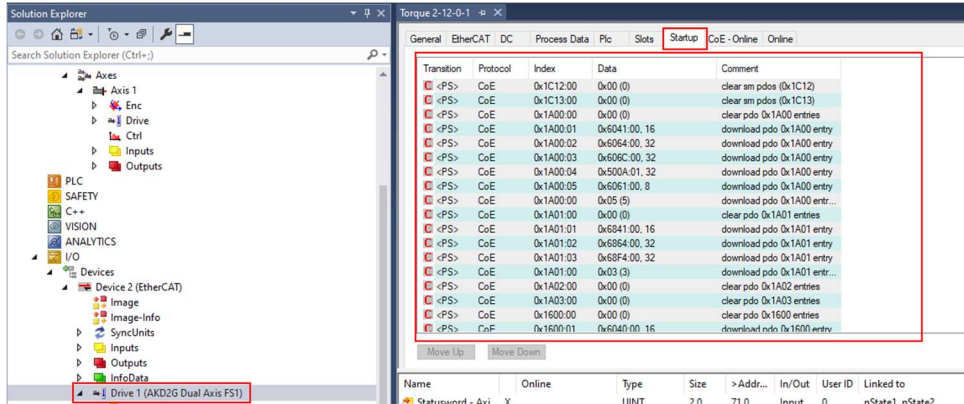
1. What is the ECAT master?
2. DRV.INFO (for each drive on the network)
 - Includes: Drive model number
 - Includes: Drive Firmware version
3. Revision of ESI file currently being used.
 - ESI file name, as provided by Kollmorgen,-
 - Or revision number listed in the xml file under Descriptions / Devices / Device / Type / RevisionNo

```
version="1.0" encoding="utf-8"
http://www.w3.org/2001/XMLSchema-instance
EtherCATInfo.xsd
1.2
1213
106
Kollmorgen
424de600000000000000007600000028000000100000000e
520
Drive
424DD602000000000000003600000028000000100000000E
YY
#x11210100
#xa010001
EQ_OR_G
AKD2G Dual Axis FS1
```

4. Revision of Workbench
5. Does the issue occur when running the same profile with Workbench (without EtherCAT control) using Service Motion or running a Motion Task.
 - Unplug EtherCAT cable and reboot the drive.

6. Master startup script/list and PDO mappings

- For example in TwinCAT3 under the AKD2G drive there is a Startup Tab with a list of SDOs that are sent when TwinCAT3 starts up (configuration mode->run mode).



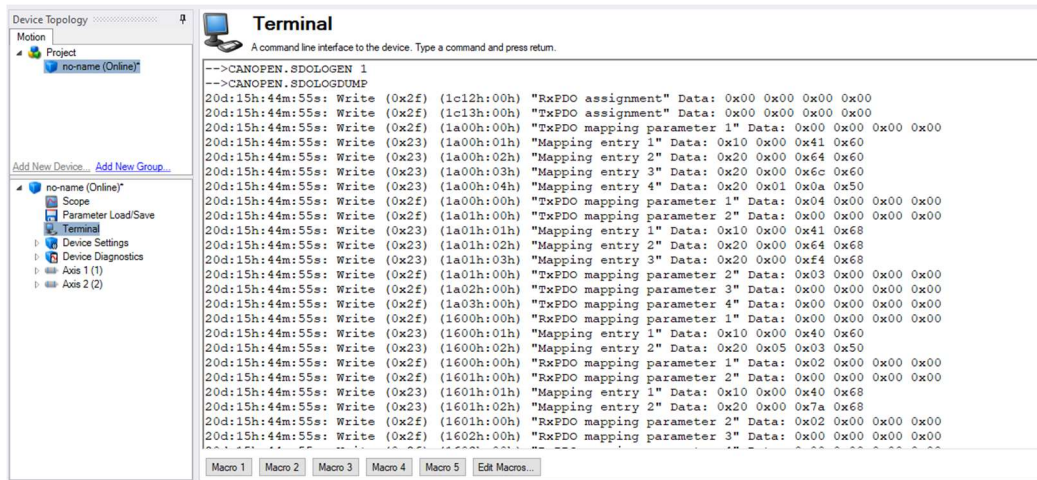
- If the Startup list location is unknown contact the EtherCAT master vendor for details.
- It is also possible using Workbench terminal to log the SDOs sent from the master to the AKD2G drive when the master starts up/initializes. To demonstrate how to do this:

With TwinCAT or other EtherCAT master in configuration mode (not in run mode), go to Workbench Terminal and type

CANOPEN.SDOLOGEN 1 and then enter as shown below to enable the log capture.

Switching back to TwinCAT (or other master) start up EtherCAT communications (with TwinCAT this is transitioning from configuration mode to run mode).

After the master finishes initialization and running I go back to Workbench and type CANOPEN.SDOLOGDUMP and enter to get the report/capture.



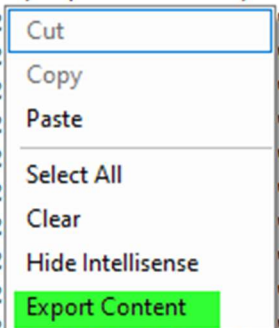
Right-click in the Terminal screen and then by selecting Export Content a Save As window will open and you can name the file (*.txt type) and save to your PC.



Terminal

A command line interface to the device. Type a command and press return.

```
-->CANOPEN.SDOLOGEN 1
-->CANOPEN.SDOLOGDUMP
20d:15h:44m:55s: Write (0x2f) (1c12h:00h) "RxPDO assignmen
20d:15h:44m:55s: Write (0x2f) (1c13h:00h) "TxPDO assignmen
20d:15h:44m:55s: Write (0x2f) (1a00h:00h) "TxPDO mapping p
20d:15h:44m:55s: Write (0x23) (1a00h:01h) "Mapping entry 1
20d:15h:44m:55s: Write (0x23) (1a00h:02h) "Mapping entry 2
20d:15h:44m:55s: Write (0x23) (1a00h:03h) "Mapping entry 3
20d:15h:44m:55s: Write (0x23) (1a00h:04h) "Mapping entry 4
20d:15h:44m:55s: Write (0x2f) (1a00h:00h) "TxPDO mapping p
20d:15h:44m:55s: Write (0x2f) (1a01h:00h) "TxPDO mapping p
20d:15h:44m:55s: Write (0x2f) (1a01h:00h) "Mapping entry 1
20d:15h:44m:55s: Write (0x2f) (1a01h:00h) "Mapping entry 2
20d:15h:44m:55s: Write (0x2f) (1a01h:00h) "Mapping entry 3
20d:15h:44m:55s: Write (0x2f) (1a01h:00h) "TxPDO mapping p
20d:15h:44m:55s: Write (0x2f) (1a01h:00h) "TxPDO mapping p
20d:15h:44m:55s: Write (0x2f) (1a01h:00h) "TxPDO mapping p
20d:15h:44m:55s: Write (0x2f) (1a01h:00h) "RxPDO mapping p
20d:15h:44m:55s: Write (0x2f) (1a01h:00h) "Mapping entry 1
20d:15h:44m:55s: Write (0x2f) (1a01h:00h) "Mapping entry 2
20d:15h:44m:55s: Write (0x2f) (1a01h:00h) "RxPDO mapping p
20d:15h:44m:55s: Write (0x2f) (1601h:00h) "RxPDO mapping p
20d:15h:44m:55s: Write (0x23) (1601h:01h) "Mapping entry 1
20d:15h:44m:55s: Write (0x23) (1601h:02h) "Mapping entry 2
```



Please run this test and email us the text file along with the other requested information.

7. Mode of Operation used (object 6060h)
 - If object 6060h is not set, it will use the default value of 8 – Cyclic Synchronous Position Mode.
 - Or read object 6061h
8. Object numbers related to the problem
 - What objects and subindices are being accessed?
 - Are they used over SDO or PDO?
9. EtherCAT master's ECAT update rate.
10. Is Distributed Clocks (DC) enabled in master?

11. Save new *.akd parameter files and include them in the email to Kollmorgen support.

12. Read-only parameters – read in Workbench Terminal

- ECAT.INFO
 - Diagnostics Report

- ECAT.STATE
 - Reads the state of the EtherCAT state machine.
 - Read this or scope this while replicating the problem

- ECAT.PLLSTATE
 - Reads the state of the PPL

- ECAT.INPUTSHIFT
 - Reads time offset of PLL.
 - Note: Only valid in OP state.

13. Parameters of special interest – saved in parameter file

- Related to scaling
 - CANOPEN.WORKBENCHUNITS
 - AXIS#.CANOPEN.FCPRIMARY.FEED
 - AXIS#.CANOPEN.FCPRIMARY.SHAFTREV
 - AXIS#.CANOPEN.GEARPRIMARY.MOTORREV
 - AXIS#.CANOPEN.GEARPRIMARY.SHAFTREV
 - AXIS#.CANOPEN.VELSCALENUM
 - AXIS#.CANOPEN.VELSCALEDENOM
 - AXIS#.CANOPEN.PSCALE

- Related to PLL and cycle timing
 - ECAT.PLLMODE
 - ECAT.USEPLL
 - ECAT.ENRXWARN
 - ECAT.INPUTSHIFTU
 - ECAT.PLLOFFSET

14. Objects of Special Interest – used in the EtherCAT Master

- 6060h – mode of operation
- 6061h – read mode of operation
- 6040h - controlword
- 6041h - statusword
- 6091h subindex 1 – gear ratio numerator
- 6091h subindex 2 – gear ratio denominator
- 6092h subindex 1 – feed constant numerator
- 6092h subindex 2 – feed constant denominator
- 6096h subindex 1 – velocity factor numerator
- 6096h subindex 2 – velocity factor denominator

15. Scope plots

- CSV format is needed, so it can be analyzed in the Workbench scope tool.
- Images (.bmp or .jpg) are useful when several scope plots need to be opened at the same time for quick comparison (just make sure the image shows the pertinent information).

General Motion:

- AXIS#.IL.FB
- AXIS#.VL.FB
- AXIS#.VL.CMD
- AXIS#.PL.ERR
- AXIS#.PL.FB

EtherCAT State:

- ECAT.STATE
- AXIS#.CANOPEN.CONTROLWORD
- AXIS#.CANOPEN.STATUSWORD

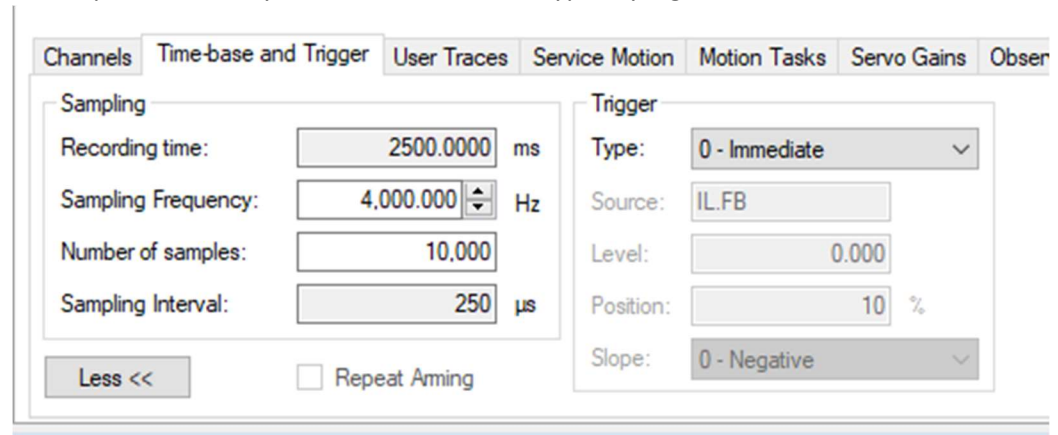
EtherCAT PLL and Cycle Timing: (use 16kHz sample rate)

- ECAT.SYNC0TIME
- ECAT.RXDONETIME
- ECAT.POSLOOPTIME
- ECAT.TXDONETIME
- ECAT.PLLSTATE

Scope Sample Rate:

Depending on the ECAT update rate the Scope Time-Base and Trigger tab will need to be setup such that the Scope is sampled fast enough to capture the issue.

In this example the ECAT update rate was 500usec, so the Sampling Frequency was adjusted such that the Sampling Interval was 250usec. The setup goal should be such that the Sampling Interval is at least at the EtherCAT fieldbus rate or faster. The number of samples can be any number but 10,000 is typically a good value.



16. Wireshark

- A Wireshark capture is sometimes needed to determine the sequence and timing of events.

[How to Capture and Use EtherCAT Trace Data with WireShark | Kollmorgen](#)
[Wireshark Training for EtherCAT and Profinet | Kollmorgen](#)