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



- 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).

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earch Solution Explorer (Ctrl+;)	۹.						
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b Syncomits		-					
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 Drive 1 (AKD2G Dual Axis FS1) 	🤗 Chatharana	Aut V		LUNIT	20 710 lanut 0 sState1 sStat		

- 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 transitioing 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.

Device Topology P	Terminal						
A Reviect	A command line interface to the device. Type a command and press return.						
 Project no-name (Online)* 	>CANOPEN.SDOLOGEN 1 >CANOPEN.SDOLOGUMP 20d:15h:44m:55s: Write (0x2f) (lc12h:00h) "RxEDO assignment" Data: 0x00 0x00 0x00 0x00 20d:15h:44m:55s: Write (0x2f) (lc13h:00h) "TxEDO assignment" Data: 0x00 0x00 0x00 0x00						
	20d:15h:44m:55s: Write (0x2f) (1a00h:00h) "TxPDO mapping parameter 1" Data: 0x00 0x00 0x00 0x00						
	20d:15h:44m:55s: Write (0x23) (1a00h:01h) "Mapping entry 1" Data: 0x10 0x00 0x41 0x60						
Add New Device Add New Group	[20d:15h:44m:55s: Write (0x23) (1a00h:02h) "Mapping entry 2" Data: 0x20 0x00 0x64 0x60						
	[20d:15h:44m:55s: Write (0x23) (1a00h:03h) "Mapping entry 3" Data: 0x20 0x00 0x6c 0x60						
A V no-name (Online)*	20d:15h:44m:55s: Write (0x23) (la00h:04h) "Mapping entry 4" Data: 0x20 0x01 0x04 0x50						
Baramatar Land/Saus	20d:15h:44m:55s: Write (0x2r) (la00h:00h) "TxPDO mapping parameter 1" Data: 0x04 0x00 0x00 0x00						
	20d:15h:44m:555; Write (0x21) (la01h:00h) "TxrDo mapping parameter 2" Data: 0x00 0x00 0x00 0x00						
Device Settings	20d-15h-44m-55s, Wiles (vz3) (laoh-oth) Mapping entry 1 Data. 0x10 0x00 0x11 0x00						
Device Diagnostics	20d:15h:44m:55s: Write (0x23) (la01h:02h) Manning energy 2 Data: 0x20 0x00 0xf4 0x68						
Axis 1 (1)	20d:15h:44m:55s: Write (0x2f) (la01h:00h) "TxPDO mapping parameter 2" Data: 0x03 0x00 0x00 0x00						
Axis 2 (2)	20d:15h:44m:55s: Write (0x2f) (1a02h:00h) "TxPDo mapping parameter 3" Data: 0x00 0x00 0x00 0x00						
	20d:15h:44m:55s: Write (0x2f) (1a03h:00h) "TxPDO mapping parameter 4" Data: 0x00 0x00 0x00 0x00						
	20d:15h:44m:55s: Write (0x2f) (1600h:00h) "RxPDO mapping parameter 1" Data: 0x00 0x00 0x00 0x00						
	20d:15h:44m:55s: Write (0x23) (1600h:01h) "Mapping entry 1" Data: 0x10 0x00 0x40 0x60						
	20d:15h:44m:55s: Write (0x23) (1600h:02h) "Mapping entry 2" Data: 0x20 0x05 0x03 0x50						
	20d:15h:44m:55s: Write (0x2f) (1600h:00h) "RxPDO mapping parameter 1" Data: 0x02 0x00 0x00 0x00						
	20d:15h:44m:55s: Write (0x2f) (1601h:00h) "RxPDO mapping parameter 2" Data: 0x00 0x00 0x00 0x00						
	20d:15h:44m:55s: Write (0x23) (1601h:01h) "Mapping entry 1" Data: 0x10 0x00 0x40 0x68						
	20d:15h:44m:55s: Write (0x23) (1601h:02h) "Mapping entry 2" Data: 0x20 0x00 0x7a 0x68						
	[20d:15h:44m:55s: Write (0x2f) (1601h:00h) "RxPDO mapping parameter 2" Data: 0x02 0x00 0x00 0x00						
	20d:15h:44m:55s: Write (0x2f) (1602h:00h) "RXPDO mapping parameter 3" Data: 0x00 0x00 0x00 0x00						
	Macro 1 Macro 2 Macro 3 Macro 5 Edit Macros						

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.SDOLOG	EN 1			
>CANOPEN.SDOLOG	DUMP			
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	(0x2 Cu	ıt	"Mapping entry 1
20d:15h:44m:55s:	Write	(0x2	2017	"Mapping entry 2
20d:15h:44m:55s:	Write	(0x2	рру	"Mapping entry 3
20d:15h:44m:55s:	Write	(0x2 Pa	ste	"TxPDO mapping p
20d:15h:44m:55s:	Write	(0x2 se	lect All	"TxPDO mapping p
20d:15h:44m:55s:	Write	(0x2		"TxPDO mapping p
20d:15h:44m:55s:	Write	(0x2 CI	ear	"RxPDO mapping p
20d:15h:44m:55s:	Write	(0x2 Hi	de Intellisense	"Mapping entry 1
20d:15h:44m:55s:	Write	(0x2 Ex	port Content	"Mapping entry 2
20d:15h:44m:55s:	Write	(0x2	(2000	"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.SYNCOTIME
- 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.

Channels	Time-base and Trigger	User Traces	Service Motion	Motion Tasks	Servo Gains	Obser
Sampling			Trigger			7
Recording	time:	2500.0000 r	ms Type:	0 - Immediate	~	
Sampling I	Frequency: 4,	000.000	Hz Source:	IL.FB		
Number of	f samples:	10,000	Level:	0.0	000	
Sampling I	Interval:	250	Position:		10 %	
Less <<	Rep	eat Arming	Slope:	0 - Negative	\sim	

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