



Product: Yaskawa CANopen over EtherCAT	Doc#: SRV-Y4P05Q
Title: Beginning EtherCAT Master Development with Yaskawa Drive	

Question:

I am beginning EtherCAT master development. What do I need to know in regards to the Yaskawa drive interface?

Answer:

Table of Contents

<i>PRELIMINARY:</i>	2
ESI File Usage:	2
<i>COMMUNICATIONS:</i>	3
Enabling Distributed Clocks:	3
Supported EtherCAT Commands:	3
EtherCAT State Machine:	3
File Over EtherCAT (FoE):	3
ENI File:	4



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PRELIMINARY:

- Start with Yaskawa.com SRV-E17E47.
- Proceed with AN.MTN.01 “EtherCAT Master Architecture”.
- Additional topics pertaining to EtherCAT master development are below:

ESI File Usage:

- By reading the Yaskawa ESI file, the Yaskawa drive’s manufacturer specific objects may be visible to be read and written (example: Yaskawa drive parameters).
- For SGDV, if reading the ESI file, only 1 PDO map assignment per Sync Manager assignment is allowed (due to the “exclude” tag), when in fact 2 are possible if reading the PDO information from the EEPROM.
- Therefore, the recommendation is to read the ESI file for CoE objects, and then read the EEPROM for the PDO info.

Network Trace Tool:

- Obtain a network trace tool if a Wireshark trace can provide useful information for development.
 - Product: Beckhoff ET2000. A nanosecond timestamp is added to the packet.
- Search ethercat.org for additional information about Wireshark usage.

Known Working EtherCAT Master For Comparison:

- Refer to AN.MTN.03 “EtherCAT Servo Drive Quick Start Guide” for instructions to set up a known working EtherCAT Master for comparison for EtherCAT master development.



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COMMUNICATIONS:

Enabling Distributed Clocks:

- Some stack vendors distribute the Distributed Clock (DC) mechanism as a separate package (example: acontis). Yaskawa requires using DC when using Cyclic motion modes as indicated in AN.MTN.01.
- The DC mechanism is possible to be implemented independent of using the DC mechanism package from the master stack vendor, but support from Yaskawa to implement a successful DC mechanism may be limited, as Yaskawa recommends obtaining the developed DC mechanism package from the master stack vendor. Implementation of the DC mechanism may require additional documentation from Yaskawa regarding ESC registers. This may be available upon request.
- Refer to AN.MTN.01 for a process to determine usage and settings of DC.

Supported EtherCAT Commands:

- For SGDV, as mentioned in the Yaskawa EtherCAT drive's user's manual SIEPC72082904, the Yaskawa drive supports: APRD, FPRD, BRD, LRD, APWR, FPWR, BWR, LWR, ARMW, FRMW.
- The Yaskawa drive does not support APRW, FPRW, BRW, LRW.

EtherCAT State Machine:

- The state transition diagram is available in the user's manual (for SGDV, SIEPC72082904). However, one alarm, A.A12 "Synchronization Error" will cause the EtherCAT state to drop to Safe-Operational, as described in the Yaskawa EtherCAT drive's user's manual (for SGDV, SIEPC72082904).

File Over EtherCAT (FoE):

- The Yaskawa drive supports FoE. Therefore, implementing FoE in the master may be desirable to utilize future features of the Yaskawa drive that utilize FoE.



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ENI File:

- When using a non-Beckhoff ENI file generator, and issues occur such as initialization failure, generate an ENI file using the Beckhoff EtherCAT Configuration Tool (ET9000), and re-test.
- Example: The drive may need to be instructed to transition to INIT, even though the assumed first state is INIT. The ENI file generated by Beckhoff's EtherCAT Configuration Tool (ET9000) include this.