

KPA Master Development Kit (MDK) for EtherCAT enables OEMs to configure Master functionality. The MDK is available for various platforms and any of the following real-time operating systems (OS):



A) Overview

The MDK consists out of up to seven parts:

1. Master integration package (MIP)

EtherCAT Master, OS-, HW-dependent libraries

- Remote Procedure Call (RPC) Server for connecting several remote clients with console application
- **Master Core** and **API** depending on OS for Kernel space with IoDev
- OSAL
- "C"-Headers of RPC, Master Core and API library
- Setup - sample and documentation
- More than 20 samples in source code with description
- Several documents:
 - o Master architecture (white paper)
 - o MDK Manual
 - o API (Application Programming Interface) help..

2. MDK Tutorials

- How to install KPA EtherCAT Master for OS
- How to run KPA EtherCAT Studio with Master on OS.
- How to configure "Distributed Clocks" functionality with slave as reference....

3. Master Runtime package (MRP) with licenses

Binaries and license allowing using following master classes:

Master Full = "Premium" and all FP and Extensions und Master Standard (2 licenses)

Included are licensing utility with documentation and "What is new?"

4. EtherCAT Studio executables

KPA EtherCAT Studio Premium Plus with all Plug-ins for configuration and diagnostics, setup and license. The "Windows-based" KPA EtherCAT Studio is usable for all OS's and Platforms.

5. Support and Maintenance (S&M)

- Technical support and update of OS and EtherCAT Master/Studio with access to Build Portal and Ticket System for one year.
- Prolongation on annual base upon request

6. IP Cores and drivers for FPGAs (depending on HW Platform)

- Encrypted Binaries of IP-Cores: KPA MAC, KPA MAC2, KPA LINK
- OS dependent binaries of drivers for KPA_NIC, KPA_LINK
- See separate document

7. Tool Chain (TC) is handled by following 6 steps

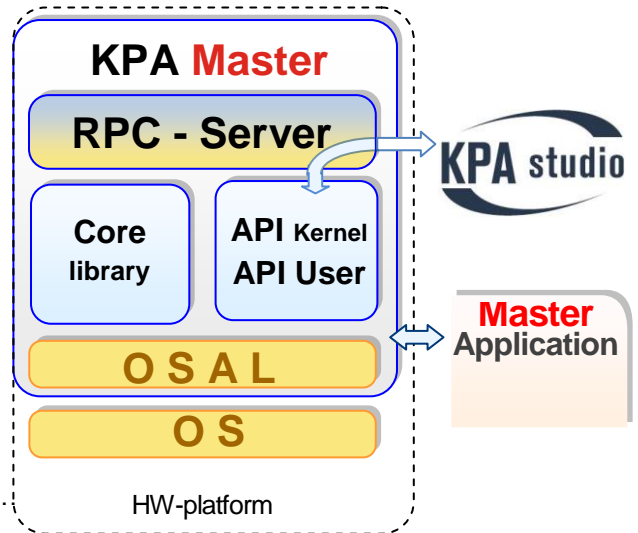
1. Developer uploads Toolchain

- Login to KPA Website
- Enter sent password on Build Portal. This will be changed every 3 month
- Chose from validated available TC or upload compressed TC-file or share link of TC setup of TC provider
- Define OS, OS version, platform, master version, master class, feature packs, extensions

2. KPA checks and activates Toolchain

After TC installation and validation, KPA manually notifies via ticket whether

- a. Tool chains is matching to OS
- b. Tool chain is complete
- c. KPA Build Server is available for desired configuration



3. KPA enables link to matching OSAL and gives optional access to Source Code

Besides the OSAL of mentioned above OSes additionally OnTime RTOS-32, PikeOS (partly), RTAI with RTnet were ported and can be adapted. Upon correct checking KPA manually provides developers with access to:

- a. Latest tested released MDK matches the desired configuration and adapted OSAL
- b. Optional Read / Write access to Source of a matching OSAL as "C" plus documentation

4. Optionally Developer adapts KPA OSAL to his OS and hardware

5. Developer parameterizes Make – File for next built with

- customized Master Sources (master -version, -class, feature packs, extensions)
- custom specific Build Job (OS, OS-version, platform, BSP Package, (custom specific) OSAL)

6. Developer gets executable

Optional Products based on MDK See separate documents: OSAL in source code, Motion Development Kit

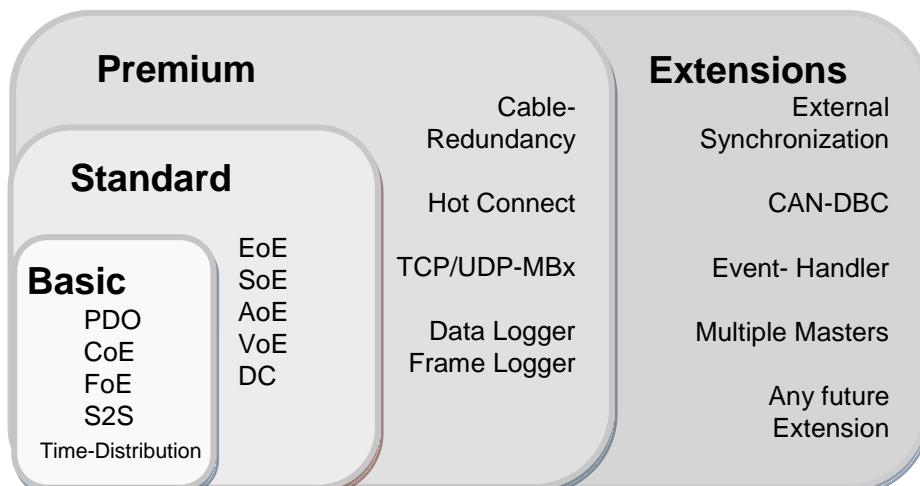
B. Comparison MDK with MDK trial

Item	Criteria	MDK 71OS VVVH 76OS FTMH (for M)	MDK trial 72OS VVVH 77OS FTMH (for M)
	Purpose	Development	Evaluation
1	Master Integration Package (MIP)	Y	Y
2	MDK Tutorials	Y	Y
3	Licenses for Master Runtimes (MRT)	3 ¹⁾	Trial ²⁾ -
4	KPA EtherCAT Studio License	Premium unlimited	Premium 3 months
5	Support & Maintenance 66OS FTMH ³⁾	1 year	Startup support
	Support & Maintenance 61OS VVVH ³⁾	2 years	Startup support
6	FPGA IP-Core(s) with drivers	encrypted IPs	Board spec. image ⁴⁾
7	Tool Chain support for 76OS FTMH only	1 year	3 months

Remarks

- 1) 3 Master-licenses are included within MDK. One Full incl. Premium with all FP and Ext and two Standard.
- 2) Trial Master works for one hour in OPERATIONAL and cannot be licensed
- 3) S&M-conditions you find on our customer portal after Login
- 4) Upon request

C. Master Classes



Standard Master cannot be combined with all Feature- and Extension-packs from the premium package in Master Version 1.5 and 1.6.

KPA Names	Basic	Standard
ETG.1500, Version 1.0.0	Class B	Class A
Basic Features		
Service Commands	✓	✓
Slaves with Device Emulation	✓*	✓*
EtherCAT State Machine	✓	✓
Error Handling	✓	✓
EtherCAT Frame Types	✓	✓
Process Data Exchange		
Cyclic PDO	✓	✓
Multiple Tasks = Leveling	✓	✓
Network Configuration		
Reading ENI	✓	✓
Compare Network configuration	✓	✓
Access to EEPROM	✓	✓
Access to Memory	✓	✓
Mailbox Support		
Support Mailbox	✓	✓
Mailbox polling	✓	✓
CoE		
SDO Up/Download	✓	✓
Segmented Transfer	✓	✓
Complete Access	✓	✓
SDO Info Service	✓	✓
Emergency Messages	✓	✓
EoE		
EoE Protocol		✓
Virtual Switch		✓
FoE		
FoE Protocol	✓	✓
Firmware Up/Download	✓	✓
Boot State	✓	✓
SoE		
AoE		
VoE		
Synchronization with Distributed Clock (DC)		
DC Support		✓
Continuous Propagation Delay compensation		✓
Time Distribution	✓	✓
Synchronization of Master with Slaves		✓
Slave-to-Slave Communication		
Necessary for FSoE configuration via ENI or via API	✓	✓

* is supported by mean of Init commands generated by Studio