64-Axis EtherCAT Master PCIe Board for Motion Control

APCIe-8064-EC

PCI Express® x 1 compliant

On-board execution of the EtherCAT master to isolate hard real-time fieldbus handling from the host PC application layer

Up to 64-axis motion control

Up to 7 interpolated group of 5 axis

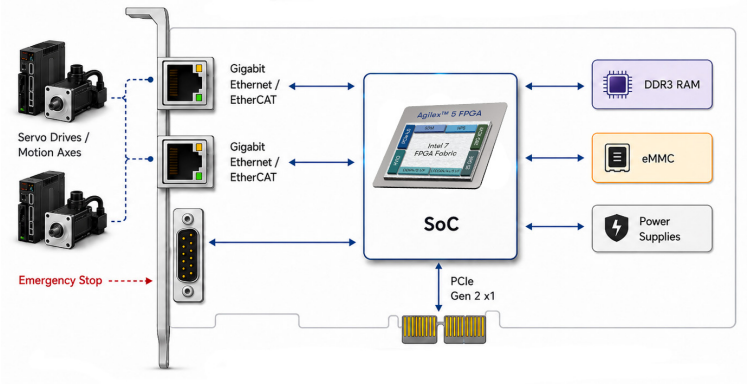
CSP / CSV / CST / PP / PV / HM Motion Modes

One axis for positioning - encoder reading

EtherCAT cycle times up to 250µs

Open EtherCAT ecosystem approach based on CiA 402 / CoE device integration rather than a closed drive stack

8 Optically Digital General I/Os



RoHS 2011/65/EU

Windows 11
64/32-bit drivers

The **APCIe-8064-EC EtherCAT Master Board** is a PCI Express EtherCAT motion controller designed for PC-based industrial automation. It is a ready-to-use platform enabling deterministic control of up to **64 synchronized axes** for motion and I/O applications. The EtherCAT master stack is executed autonomously on the board, allowing the host system to operate independently from real-time constraints.

For motion applications, communication cycle times are as low as **125 µs**, ensuring stable and precise synchronization across all axes.
Real-time execution and high-precision control make the APCIe-8064-EC suitable for demanding automation tasks.

The board supports the open **CiA-402 EtherCAT** standard, enabling compatibility with a wide range of third-party drives and devices. It also provides advanced motion functions such as interpolation, camming, and gearing, with the ability to execute motion programs directly on the hardware.

In addition, ADDI-DATA provides a ADDI-PACK our unified software environment for DAQ applications including configuration tools, and user-friendly examples, simplifying application development, system integration, and maintenance while reducing programming effort.

Contact us!

Compute and System Architecture

- On-board SoC-based execution environment for EtherCAT master and motion functions
- Host CPU is relieved from hard real-time fieldbus scheduling and remains focused on application-level control, HMI and process logic
- Architecture intended to provide deterministic EtherCAT behavior independent from Windows or Linux application timing jitter
- On-board resources sized for motion runtime, diagnostics, configuration data and scalable network handling
- Safety features with integrated watchdog and reset

Motion control

- Maximum targeted platform envelope of up to 64 EtherCAT axes
- Up to 7 interpolated groups of 5 axes each for coordinated path motion
- Additional independent axes for positioning, synchronization and auxiliary machine functions
- Target function set includes coordinated path motion and point-to-point motion within a CiA 402 driven EtherCAT architecture
- Preliminary interpolation set: linear interpolation, circular interpolation, helix / spiral-related path motion, spline interpolation and table interpolation, 3D circular Interpolation, CAD interpolation
- Additional functions such as homing, electronic gearing and camming can be included where required by the final specification baseline

EtherCAT Communication

- EtherCAT master executed on-board for deterministic bus handling
- Open ecosystem integration based on CoE / CiA 402 compatible servo drives and distributed I/O
- Platform intended for both high-axis-count systems and reduced retrofit-oriented configurations derived from the same architecture
- Minimum achievable cycle time depends on number of axes, PDO mapping, drive characteristics and distributed I/O loading
- Target cycle classes for the platform are 125 µs / 250 µs / 500 µs / 1 ms depending on final system configuration
- Support for EtherCAT Distributed Clocks for synchronized operation of drives and distributed I/O

Isolated Digital I/O Signals

- Optical isolation: 1000 V
- 8 Optically isolated Dig I/Os
- Emergency stop I/O channel

Connectors

- 2* RJ45
- 1 I/O Sub D Connector

Applications

- Packaging and high-speed automation machines
- Electronic manufacturing equipment (PCB, semiconductor backend)
- Multi-axis synchronization systems (gantry, XY tables)
- Test benches and measurement systems
- General-purpose machine automation (OEM platforms)
- Motion control and high-precision position measurement (e.g. optical systems)
- Laser processing machines
- Bonding and assembly robots
- Water-jet and cutting machines
- Tube bending and tube welding machines

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SPIRIT OF EXCELLENCE

- Pick-and-place and component mounting machines (SMD)
- Composite and fibreglass processing equipment
- Handling and positioning systems for analysis and laboratory automation
- Medical and dental manufacturing machines (e.g. contact lenses, prostheses)
- Production quality control and inspection systems
- Cutting-to-length systems with flying saw

Software drivers

Standard drivers for:

- Linux
- 64 bits Windows 7 / 8 / 10 / 11
- On Request : RTX, Xenomai, VxWorks, QNX Supported Drivers

Supported Drivers Languages:

- C/C++
- Python
- .NET
- Other on Request

Utility:

- ConfigTools

On request:

- Documentation and developer resources

The software functions can be adapted to your applications on request. The board can also be implemented for other software applications.

Retrocompatibility:

This board is retrocompatible with MCUG3.dll library from Roesch and Walter GmbH.

Specifications

Physical and environmental conditions

Dimensions:	To be defined
System bus:	Acc. to PCI Express base specification, Revision 1.0a (PCI Express 1.0a)
Space required:	1-/4-/8-/16-lane PCI Express slot
Operating voltage:	+ 3.3 V from PC
Current consumption:	To be measured
Front connector:	RJ45 male connector
Additional connector:	Male connector for the TTL I/O function
Temperature range:	0 to 60 °C (with forced cooling)
Safety compliance:	CE/FCC, RoHS

EMC – Electromagnetic compatibility

The product complies with the European EMC directive. The tests were carried out by a certified EMC laboratory in accordance with the norm from the EN 61326 series (IEC 61326). The limit values as set out by the European EMC directive for an industrial environment are complied with. The respective EMC test report is available on request.

Ordering information

APCIe-8064-EC

64-Axis EtherCAT Master Board for Motion Control.

APCIe-8064-EC-6A:	A Full Function 6-Axis EtherCAT PCIE Device Card
APCIe-8064-EC-16A:	A Full Function 16-Axis EtherCAT PCIE Device Card
APCIe-8064-EC-32A:	A Full Function 32-Axis EtherCAT PCIE Device Card
APCIe-8064-EC-64A:	A Full Function 64-Axis EtherCAT PCIE Device Card

Accessories

RS232 Connector