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TRIO MOTION TECHNOLOGY **NEW PRODUCTS**



- THE MOTION SPECIALIST -

PC-MCAT-2

Software Integration Controller

NEW
'24

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PC-MCAT-2 i7 500%
PC-MCAT-2 CELERON 360%
PC-MCAT-64 100%

TRIO BENCHMARK

PC-MCAT-2 i7 470%
PC-MCAT-2 CELERON 380%
PC-MCAT-64 100%

WINDOWS BENCHMARK

PC-MCAT-2 is an innovative 'Motion + PC Solution'. A choice of Intel processors (from **Celeron** through to **core i3 - core i7**) is used to drive both a high performance motion controller and a compact PC that can run user applications under Windows.

PC-MCAT-2 is especially suitable where a machine needs the software and hardware features of a PC, paired with a powerful 64 axis *Motion Coordinator*.

AT A GLANCE

- * Motion + PC solution for Automation Machinery
- * Fanless Compact PC with a choice of processors
- * Up to 64 EtherCAT axes
- * Plug and play EtherCAT configuration
- * Built on Trio's Motion-iX advanced motion core
- * Programmable in Trio's multi-tasking language or IEC61131-3
- * Shared memory API interface to allow PC side applications to interface with Motion-iX
- * RTX64 Real Time Extensions to Windows
- * Up to 8 Gbyte DDR4 + 256 Gbyte SSD
- * Built in Gbit ports for vision cameras



Flex-7

Flexible Machine Controller

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AT A GLANCE

- ★ Up-to 128 EtherCAT axes with update rates down to 125μs
- ★ Advanced Motion-iX core with new architecture for communications
- ★ Gigabit Ethernet ports
- ★ Flexible Ethernet or EtherCAT port configuration
- ★ Fully integrated into *Motion Perfect*
- ★ Programming TrioBASIC and IEC 61131-3 with PLCopen
- ★ eBUS interface, compatible with existing Flexslice hardware
- ★ Memory expansion via SD card or USB 2.0 drives
- ★ CAN port
- ★ Real time clock
- ★ 1.2GHz Quad Core 64-bit ARM Cortex A53
- ★ 2Gbytes DDR4 Memory, 16Gbyte eMMC storage
- ★ Dot matrix display (96 x 64)
- ★ RoHS, CE and UL approved



The Flex-7 is Trio's next generation high performance, compact Flexible Machine Controller. Offering 128 axes of motion via EtherCAT, with update rates down to 125μs.

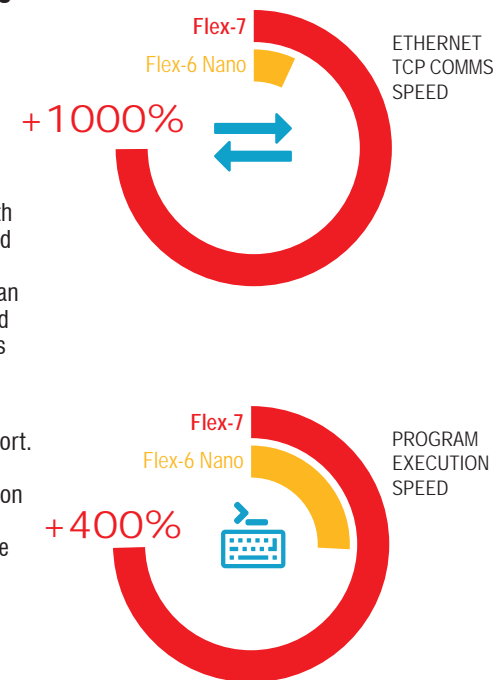
Benefiting from a re-architected communications interface and a quad core processor the Flex-7 offers a step change in performance in Trio's Flexible Machine Controller range. With separate cores dedicated to motion and communications combined with the Gigabit Ethernet hardware the Flex-7 can handle complex motion and high-speed communication interfaces for high axis count machines.

The Flex-7 allows flexible port configuration on the central Ethernet port. Allowing software selection of either a Gigabit Ethernet port, for communication to PLC or factory networks, or a second EtherCAT port to allow machine partitioning.

Application programs can be written in TrioBASIC, Trio's established multi-tasking programming language, or industry standard IEC-61131-3 using the powerful *Motion Perfect* application development software.

The Flex-7 is fully compatible with Trio's **Flexslice** system consisting of a range of high performance I/O peripherals including digital and analogue I/O along with stepper controllers, temperature measurement and encoder interfaces.

Built on Trio's advanced motion core, the complete suite of motion functionality is available through all languages, making complex motion easy.



Flex-6X Nano

Flexible Machine Controller

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AT A GLANCE

- * EtherCAT cycles down to 125us
- * Up to 64 EtherCAT axes
- * Plug and play EtherCAT configuration
- * Built on Trio's Motion iX advanced motion core
- * Programmable in Trio's multi-tasking language or IEC61131-3
- * Application programming through *Motion Perfect*
- * Supports Trio's Flexslice system
- * Real time clock
- * 1.2 GHz, 64-bit Dual Core ARM Cortex A55
- * 128Mbyte DDR3, 128Mbyte Flash
- * Clip-Together Design With 'Quick Release' Locks For Mechanical Integrity
- * RoHS, CE and UL Approved



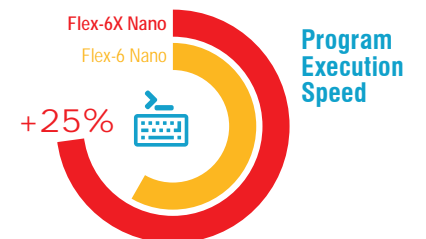
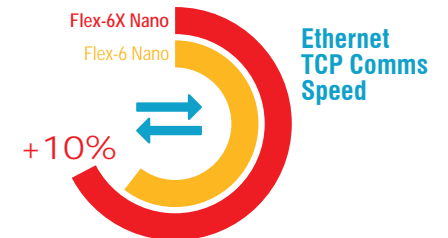
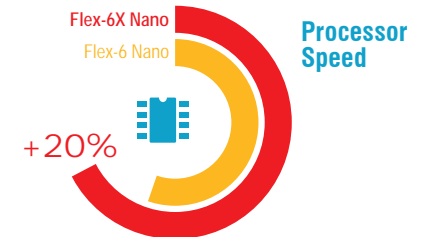
The Flex-6X Nano offers a compact integrated EtherCAT solution with up to 64 axes of motion and expandable through the matching Flexslice system.

The Ethernet port on the Flex-6X Nano supports application programming via Trio's easy to use *Motion Perfect* along with common HMI and PLC protocols for up-stream connections.

In addition to Ethernet communications, the Flex-6X Nano is an EtherCAT master, with a connection for EtherCAT devices through an RJ45 port or through the EBUS connector for Trio's **Flexslice** system consisting of a range of high performance I/O peripherals.

User programs can be written in Trio's established multi-tasking programming language or industry standard IEC61131-3 using the powerful *Motion Perfect* application development software.

Built on Trio's advanced motion core, the complete suite of motion functionality is available through all languages, making complex motion easy.



Flexslice Couplers

Integrated Fieldbus Couplers

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AT A GLANCE

- ★ Couplers for:
EtherCAT
Profinet
Ethernet/IP
- ★ Digital I/O and Analogue I/O expansion
- ★ Easy integration into PLC application

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Trio's Flexslice couplers offers modular, scalable and flexible expansion for motion applications.

Offering slice based I/O expansion through a fieldbus coupler, Trio has solutions for market leading industrial Ethernet fieldbuses; EtherCAT, PROFINET and EtherNet/IP systems. Allowing a broad range of machine controllers and PLCs to benefit from Trio's Flexslice system.

Up to 16 Flexslice modules can be connected per coupler allowing optimization of I/O based on the machine requirements saving on panel footprint and cost.

The Flexslice system is DIN rail mounted with a lockable assembly to ensure a robust and reliable solution.

With easy integration into PLC applications via ESI, EDS or GSD files the Trio Flexslice couplers offer an I/O solution for all machines.



NEW
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NEW
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EtherCAT

EtherNet/IP

PROFI
NET

DX1

48V Servo Solutions Flexslice Servo Drive

NEW
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AT A GLANCE

- * Compatible with Trio's FLEX range
- * Fully integrated into *Motion Perfect*
- * Matched with Trio's MX motor range
- * Internal drive protection functions
- * Comprehensive tuning technology
- * Field upgradable firmware
- * Electronic motor nameplate
- * Ultra Compact Size
- * 48V dc from 50W to 100W
- * 350% overload capability
- * Dedicated motor brake output
- * LED indicators for drive state



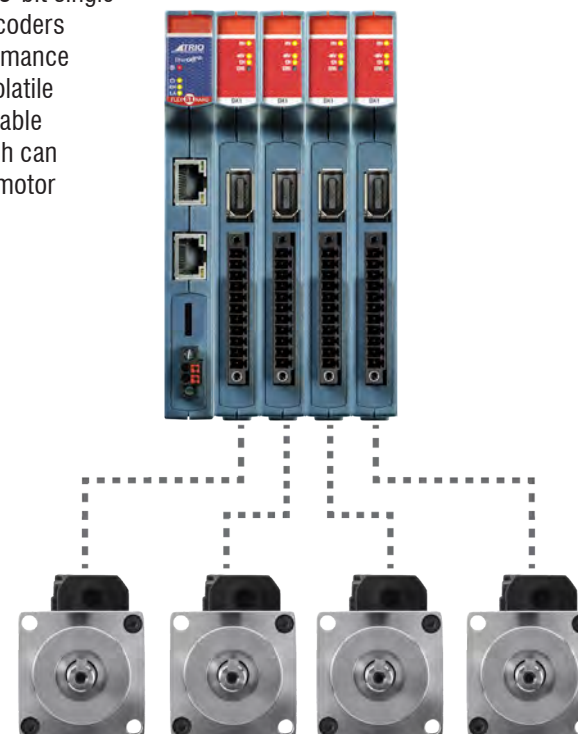
DX1, is a 48V flexslice servo drive paired with 50W and 100W MXL servo motors.

Up to four DX1 servo drives can be fitted to Trio's FLEX range of machine controllers alongside any of the existing Flexslice modules to create a servo solution suitable for low power, high performance applications.

The **MXL** low inertia 48V motors designed for DX1 are available in 50W or 100W. With 23-bit single turn and 17-bit multi-turn absolute encoders these motors offer high control performance with the application benefits of non-volatile position. Both power ratings are available with and without a holding brake which can be driven directly from the dedicated motor brake output on DX1.

Providing up to 350% overload capability the DX1 can manage demanding loads. With update rates down to 125us and advanced motor control algorithms the DX1 can handle complex motion profiles.

Fully integrated into Trio's application development tool, *Motion Perfect*, DX1 offers a high-performance servo solution with the compact size of Trio's Flexslice range.



DX3

200V - 480V Servo Solutions Cost Optimised Servo Drive

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AT A GLANCE

- ★ Fully integrated into *Motion Perfect*
- ★ Matched with Trio's MX motor range
- ★ Internal drive protection functions
- ★ Comprehensive tuning technology
- ★ Functional Safety STO (SIL3, PLe) - EtherCAT drives only
- ★ Field upgradable firmware
- ★ Electronic motor nameplate
- ★ Compact size
- ★ Zero stacking
- ★ USB or EtherCAT commissioning
- ★ Keypad interface
- ★ 200V - 240V ac from 50W to 2kW
- ★ 380V - 480V ac from 1kW to 7.5kW
- ★ 350% overload capability
- ★ Digital I/O
- ★ 2 Touch Probe inputs
- ★ Simulated encoder output
- ★ Preset positions, up to 32 stored positions - Conventional drives only (no *Motion Coordinator* required)
- ★ EtherCAT or Conventional (Pulse & Direction, Analogue, CANopen) control

DX3, the single-axis ac servo drive, is designed to create the most cost-effective optimised entry level solution with excellent performance and practical control functions. The Trio DX3 drive is compatible with Trio MX servo motors and Trio *Motion Coordinators* to provide high-speed, high-precision, high performance machine solutions.

With a power range from 50W to 7.5kW and options for EtherCAT with STO or Conventional (Pulse & Direction, Analogue, CANopen and stand-alone indexing) control, DX3 will suit a wide variety of machine types.

DX3 is fully integrated into Trio's application development tool, *Motion Perfect*, our software environment for system planning, drive and controller configuration, virtualisation and machine programming.

The DX3 **EtherCAT** drive series is equipped with dual safe torque off (STO) inputs. These inputs are safety rated SIL3 level according to IEC 61508, IEC 62061 standards

INCLUDING
STO



RX-SCARA

400mm - 700mm SCARA Robot

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Why Interface when you can Integrate?

Using a traditional robot controller approach presents challenges of programming the interaction between a machine controller and the robot controller, and two separate systems to maintain.

An integrated solution with robot and machine control as one coordinated system, maximizes performance, simplifies the programming and future maintainability and extensibility of the system.

AT A GLANCE

- ★ Trio SCARA package based on standard parts for simpler maintenance and offers standard cabinet install (no custom box required)
- ★ Applications specific integration, adaptation of the application is possible, including I/O extension with our FlexSlice I/O offer
- ★ Motion is simpler to implement in the Trio software environment (which includes IEC61131-3) than many PLCs
- ★ The Trio controller can be programmed to control more of the machine solution and integrate machine elements, including additional axes, simplifying the PLC hardware and project
- ★ Upstream Ethernet connection to the machine system / PLC (Ethernet/IP, Modbus TCP, Profinet I/O)
- ★ DX standard drives can be used for other machine axes, making spares and maintenance even simpler



Integration Efficiency

Rapid application development of controller and robot configuration with TrioRPS within *Motion Perfect*.



Design Efficient

One system to program, simplifying development and any future production changes needed.



Performance Efficient

Tightly coupled actions between robot and machine axes improves process quality and performance.



Maintenance Efficient

Spares holding of the robot control unit is simplified by using standard servo drives and motors to minimize downtime and reduce spares value.

VFFS PACKAGING

Scalable System Solutions
For Machinery OEM's

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Trio provides Motion-First machine solutions for packaging machine builders. Designing and manufacturing technologies that include *Motion Coordinators*, I/O systems, servo drives and motors, SCARA and HMI for engineers who develop their own packaging programs. Trio and its global channel partners also create bespoke packaging machine applications for OEMs.

From form-fill-seal, vertical packaging, cartoners or bottling machine applications, Trio has helped machine builders increase the capability of their machines. We understand that a packaging machine builder's goals are to make more productive machines and, with rapidly changing market pressures on the industry, we can help reduce the time and cost of development.

Our Motion-First Approach

The productivity of your packaging machine centres on the motion cycle because motion matters! Getting the cycle profile right is the key requirement to optimise the performance of your machines. This is also a major element in machine design, which can be simplified by Trio's Motion-First approach.

This is Trio's focus and expertise.



The AVHP CAM designer is the core of the VFFS Packaging Tool.

With high-speed machines, more complex motion is required to minimize vibration and optimize cycle time. In packaging applications, there are many factors that decide the motion. For example, pulling the film with high acceleration will stretch or even tear the film. Transitioning between different profile segments can generate vibration which can shorten machine life.

With AVHP CAMs custom motion can be designed specifically for the machine requirements. Built into *Motion Perfect*, the easy to follow user interface allows flexible machine configuration. The wide range of options helps to design efficient, fast and smooth motion.

Motion-iX

Motion Optimal Engineering Technologies

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Trio Machine Automation Technology

Trio has developed a powerful rich set of software tools for use with Trio systems. These tools provide all the features necessary for setup and programming to ensure minimum development time.

Development Tools

Project Management	3D Visualisation
Security Project Encryption	6D Motion Scope
Simulation	CAMGen VFFS Packaging
Drive Configuration	CAD2Motion
HMI Design	Program Libraries

Motion-iX Technology

Programming	Advanced Motion Core	
Multi-tasking Programming Language	64bit Precision	Up to 128 axis Coordination Control
IEC61131-3 + PLCopen	Scalable Motion Technologies	Complex Motion AVHPCam
G-Code and HPGL	Path Planning Look Ahead	Kinematic SCARA Delta Cartesian
PC Application Development C#/C++ etc	API resources Windows DLL Linux Libs	Advanced Interpolation
ROBOTICS Programming	GEARING/CAM MOVELINK FLEXLINK	Registration Laser Power Modulation Laser Triggering

Network / Technologies

EtherCAT	RTEX
ETHERNET-IP	PROFINET
MODBUS	DEVICENET
CANOPEN	FUNCTIONAL SAFETY (STO)

Not all technologies are used with all Trio product.

Combining an advanced motion core with Trio's ease-of-use, Motion-iX offers performance and dependability of packaged solutions, from the "Motion Specialist", where motion is the core and not just a bolt-on capability.

- GEARING/CAM/MOVELINK/FLEXLINK:** Added new motion options for linked axes for specific machine mechanics.
- Path Planning/Look ahead:** New asymmetric blending algorithm to improve robot tool path.
- Complex Motion/AVHP cam:** Added AVHP cam profiles for minimized machine vibration and optimized cycle time.
- ROBOTICS Programming:** New asymmetric blending algorithm to improve robot tool path. Additional blending options for finer control of tool velocity while cornering. Added synchronization zones for robots to automatically start and end synchronization based on product position.
- Scalable Motion Technologies:** Added open architecture functions. Open frames, to allow user defined robot kinematics. Open Keyword, to allow user defined keywords. Open Moves, to allow user defined motion profiles.
- IEC61131 + PLCopen:** Added IEC function blocks to allow communication configuration from IEC languages.

Motion Perfect

Design, Develop, Test, Deploy and Secure

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Motion Perfect provides the user with an easy to understand interface for rapid application development, including configuration and setup of drives, controllers and HMI.

A fully featured IDE for program development and debugging in all Motion-iX languages, multi-page HMI screen development and diagnostic tools for machine commissioning. Motion Perfect allows complete machine setup from a single software package.

- Added Packaging machine configuration tool for vertical form fill and seal (VFFS) machines, combining machine application template with enhanced CAM generation.
- Improved IEC user interface with support for global data types and global variables, enhancements to project tree and additional function blocks for controller configuration.
- Allow direct connection to Trio drives for commissioning without Trio controller over EtherCAT and USB.
- Enhanced Uniplay toolbox items with a range of graphical buttons and indicators along with support for recipe editor and alarm pages.
- Export of HMI tags in a file format suitable for 3rd party HMI editor import.





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TRIO MOTION TECHNOLOGY **NEW PRODUCTS**



Trio Motion Technology specialises in advanced motion control as a core, providing a range of *Motion Coordinators*, drives and motors, expansion interfaces, I/O modules and HMI's built on Motion-iX technologies and designed to enable the control of industrial machines with the minimum of external components.

In support of the Trio concept, we aim to offer the best technical support by telephone, email, our comprehensive website and training courses held throughout the year. Please look at our web site for details.

www.triomotion.com