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Multi Axis Digital Motion Control System
ACUTROL®3000e Controller

ACUTROL®3000e is an evolution of the ACUTROL®3000, the leading motion control system for high precision single and multi-axis Inertial Guidance, Electro-Optics Test Systems and Hardware in the Loop (HWIL) simulation platforms. A modular architecture both improves adaptability to various applications and facilitates obsolescence handling. The controller is backward compatible with the well-proven and established ACUTROL® Control Language (ACL). ACUTROL®3000e offers unparalleled flexibility, reliability, versatility and performance.

Flexibility

- Adaptable servo topology, including configurable digital filters, allows customized control strategies
- Configurable events based on limit tests of system variables
- Data Logging and Data Playback at the ACUTROL®3000e frame rate make accurate reproduction of motion profiles possible
- Even without a real-time interface, a customizable freeze pulse can trigger a motion data snapshot

Reliability

- Digital pressure and torque loops reduce motion simulator hardware complexity
- Only one encoder for both position detection and motor commutation improves MTBFs
- Global ACUTROL® user community of over one thousand ACUTROL® systems

Versatility

- An integrated Ethernet router allows for easy integration of simulators with facility networks
- Example code, simulation utilities, and demo kits enable application development before delivery of the actual motion system
- Built-in capability to use a wide range of encoder types, including absolute optical encoders
- Remote control of simulators, including Power On / Off is possible

Performance

- Compensation of deterministic cogging and position errors resulting in high position accuracy and smooth rate performance
- Advanced vector processing algorithms provide asynchronous, multi-rate, real time communication, ensuring high fidelity motion simulation

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System Architecture
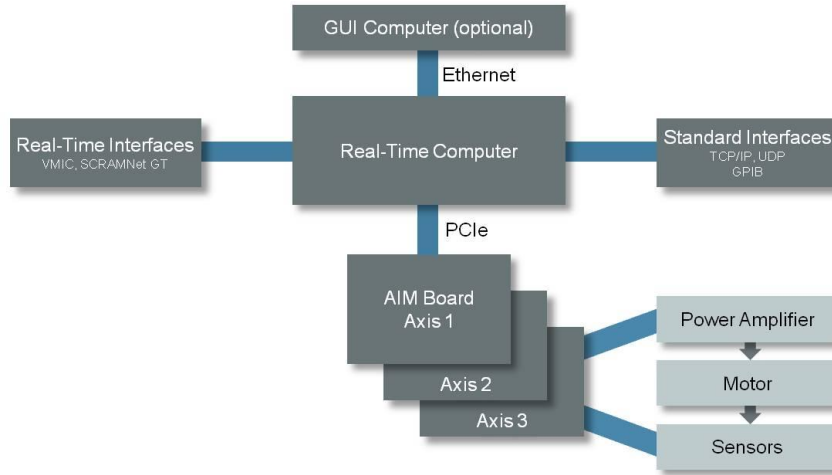
Interfaces

- Remote ON/OFF control through Ethernet Interface
- Graphical User Interface (GUI): selection of modes of operation, motion demands, configuration parameters and monitoring of system variables and system states
- Native Remote Computer Interfaces
  - Non real-time: Ethernet TCP/IP, GPIB (IEEE-488)
  - Real-time Interface: VMIC, SCRAMNet GT, Ethernet UDP
- IRIG Timing card

Performance Features (instrumentation)

Position Accuracy	< 0.05 arc sec
Position Stability	< 0.02 arc sec
Position Resolution	0.017 arc sec
Position Sensitivity to Rate	< 0.1 arc sec / rad/sec

Measurement Features

Number of axes	1 – 3 axes
Display Format	Full Scale User Units (bi-polar or uni-polar)
Data Format	Float or 32 bit binary
Analog I/O	± 10 V (16 bit)
Axis Synchronization	All axes synchronized simultaneously
Position Event Pulses	2 events/axis, N/revolution; 32 nsec resolution
Motion snapshot	Position, rate and acceleration data with an aperture of 32 nsec
Encoder Interfaces	Analog, SSI, EnDat, BiSS

Servo Features

Digital Control	classical or hybrid architecture
Frame Rate	up to 10 kHz
Estimated Motion States	Position, rate, and acceleration
Motion State Limits	± position, |rate|, and |acceleration|
Motion Profile Playback	at ACUTROL frame rate or slower

Mechanical Features

Chassis	19 in Rack mount; 10.5 in height (removable front panel)
Display	12 in LCD w. touch (version without display available)
	Removable Front Panel