IDEAL AEROSMITH
Setting the Future in Motion

OBSOLETE

AERO 8X2 Digital Motion Controller

The AERO 8X2 Digital Motion Controller is a digital motion controller for cost-effective control of rate tables, positioning systems, flight motion systems, and other direct drive inertial guidance motion test systems. Its modular design is capable of controlling one-, two-, or three-axis motion table systems that use optical encoder position feedback sensors. A companion Servo Amplifier Controller unit is delivered with each AERO 8X2, the size and configuration of which depend on the number of axes and the size of the motors being controlled.

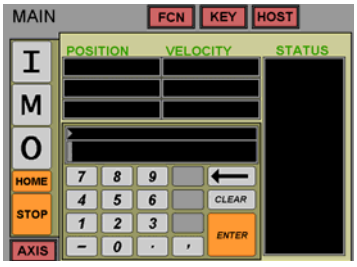
AERO 812 (1 axis), AERO 822 (2 axis), AERO 832 (3 axis) Controller Systems are comprised of:

Model AERO 8X2 Digital Motion Controller

- Micro-processor based axis motion control card with TTL Quadrature Encoder Interface for PID motion control
- Color VGA Touchscreen
- 12MHz maximum count rate
- RS-232 and GPIB (IEEE-488) Host Computer Interfaces
- Interfaces with Servo Amplifier Chassis configured to match system

Some of the **key features** of the AERO 8x2 Controller include:

- Front panel command input and display of position and velocity
- Trapezoidal velocity profiles with programmable velocity and acceleration
- Sinusoidal motion profiles with variable amplitude and frequency
- Position Profile Mode and Velocity Profile Mode for simulating complex motion profiles
- Flight Profile Mode for low dynamic “Hardware-in-the-Loop” applications
- Analog position / velocity input
- Analog velocity output (One axis only, axis is software selectable)



The AERO 8x2 Motion Controller is based on a single-board computer that handles all user I/O and communicates with the internal motion control processor. Up to three axes of motion can be controlled independently and simultaneously. The controller can be operated locally via the touchscreen, or remotely by executing ATL (Aerosmith Table Language) commands via a host computer.

The motion controller generates an output signal based on the error between the commanded position and actual position, the magnitude of which is determined by the PID filter settings. The controller can position the axis and remain stable within ±1 count. The controller also produces extremely accurate rotational velocities (rates).

The controller has multiple safety features, including the monitoring of discrete inputs such as limit switches, stow locks, or proximity interlocks. Based on the status of these inputs, the controller can operate relays or remove power from the servo amplifiers independent of the host computer. The status of these external inputs can also be displayed on the touchscreen or sent to the host computer via the remote interface.

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Modes of Operation

Axis Mode: Position, velocity, and/or acceleration commands are sent to each axis as determined by the user. This capability allows the user to test position error, velocity error, scale factor, and to measure drift. Sinusoidal function facilitates frequency response testing.

Position / Velocity Profile Modes: A pre-recorded file of periodic position (or velocity) data for each axis is read by the controller and synchronously executed at rates of 32, 64, 128, or 256 Hz. This capability allows the user to record random motion (e.g. ship's motion, ground vehicle motion over rough terrain, aircraft in turbulence, etc.) and have the motion table replicate it. This mode is also useful for PSD (power spectral density) testing.

Flight Profile Mode: This mode allows the user to send the controller periodic, real-time position (or position + velocity) commands at frame rates up to 256 Hz to implement a low dynamic "Hardware-in-the-Loop" motion system. The system has a maximum latency of 4 msec, which is typically adequate for simulating flight motion for control systems with bandwidths up to 25 Hz.

AERO 8X2

Size (fits 19 inch rack mount – front panel handles included)	19 wide x 8.72 high x 19.8 deep (inches) [48.3 x 22.1 x 50.3 (mm)]
Weight	50 lb (23 kg)
Electrical Power Requirement	90 to 264 VAC, 5 Amps
Display Resolution (each axis) Position Velocity	 X.XXXXX degrees X.XXXXX degrees/second
Display Units	User selectable: degrees, arc-seconds, radians, mradians, revolutions, or encoder counts
Position Control	± 1 interpolator count (typically 0.9 arc-seconds with 3600 line encoder)
Front Panel Controls	Color Touchscreen Servo Enable Switch Brake Enable Switch Emergency Stop Button Power Switch
User Connector Signals Position Latch Inputs Rate Pulse Outputs Minimum Pulse Interval Maximum Pulse Interval Maximum Pulse Frequency Analog Input Analog Output Encoder Outputs Torque Command Output Emergency Stop	 5V compatible opto-coupled input Programmable range 1 count Less than 2 x 10^9 counts 512 Hz ± 10V, Axis position and velocity control. Software selectable axis and scaling ± 10V, Single axis velocity output. Software selectable axis and scaling 5 Volt TTL Differential Quadrature outputs with index ± 10V, Analog Fail-Safe circuit loop is provided to connect safety equipment, such as floor mats, safety gates, or door switches.
Interface to Host Computer	RS-232C (115200 baud maximum) IEEE-488 (GPIB)
Software Interface	Aerosmith Table Language (ATL) – simple 3 character ASCII commands + argument LabVIEW™ or WIN32 Host application – Available Upon Request
Optional Kit	8 kHz Analog Velocity Output

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