# Two-axis and four-axis PC bus servo controllers

The AT6250 and AT6450 are multi-processor-based, two-axis and four-axis servo controllers designed to be inserted into a single open 16-bit PC bus-based (ISA) expansion slot. These servo controllers provide sophisticated multi-axis control of any Parker servo motor/drive or any standard ±10V analogue input servo drive system.

The AT6250 and AT6450 utilise a dual processor approach, comprising a microprocessor for executing high-level motion programs and a digital signal processor (DSP) for high-speed sophisticated servo control. A separate auxiliary board simplifies connections with encoders, motor drives, joystick, limits and programmable I/O.

The AT6250 and AT6450 come as standard with Motion Architect® support software for the Microsoft® Windows™ operating environment. Motion Architect allows you to easily create and implement motion programs. Also standard are the AT6450 DOS™ and AT6250 DOS™ support software disks which provide terminal emulation and programming examples in ASSEMBLY, PASCAL, C, and BASIC.

The AT6250 and AT6450 use the 6000 Series command language. This popular language is powerful enough to implement complex motion control applications and simple enough to not overwhelm the novice programmer.

## Features

### *Motion*

- 1 to 4 axes of optically isolated servo control (±10V-12 bit analogue interface) with incremental encoder feedback (1 to 2 axes for AT6250, 1 to 4 axes for AT6450); Analogue input option provides one 14-bit ±10VDC feedback input per axis
- Controls servo drives in velocity or torque mode
- Update rates for servo loop as fast as 150 microseconds for one axis
- 1.2 MHz post-quadrature position feedback frequency

### *I/O (All I/O optically isolated)*

- Home limit, Pos and Neg end-of-travel limits for each axis
- 48 programmable inputs (24) and outputs (24)
- Auxiliary, high-speed programmable inputs and outputs providing position capture or output on position to ±1 count at maximum encoder frequency
- Drive Enable Relay outputs, Drive Fault inputs
- 4 analogue inputs that can be used for joystick or variable inputs (temperature, tension, etc.)

### *Language*

- Soft operating system (6000 Series Command Language)
- Dedicated hardware registers for commanded position, I/O, system status, axis status, and encoder position

- Multi-axis teach capability
- Position-based following
- 2- or 4-axis linear interpolation, 2-axis contouring
- S curve or trapezoidal motion profiling
- Variable storage, conditional branching, and maths capability
- Capability to interrupt program execution on error conditions
- Program debug tools—trace mode, break points, and simulation of I/O
- Scaling of distance, velocity and acceleration

### *Software Provided*

- Motion Architect—Microsoft Windows-based application development software
- DOS support software program editor and terminal emulator software
- Dynamic Link Library (DLL) provided for use with Microsoft Windows software development kit

### *Optional Software*

- Servo Tuner provides graphical feedback of real-time motion information to make determining tuning gains simple
- CompuCAM™ Computer Aided Motion Software imports geometry from CAD programs, plotter files, or NC programs and generates 6000 Series code
- Motion Toolbox library of LabVIEW® virtual instruments (VIs) for icon-based programming of 6000 Series controllers
- Dynamic Data Exchange server available allowing data exchange with other Windows software applications
- Motion Builder provides a visual development environment for graphical icon-based programming of 6000 Series Products

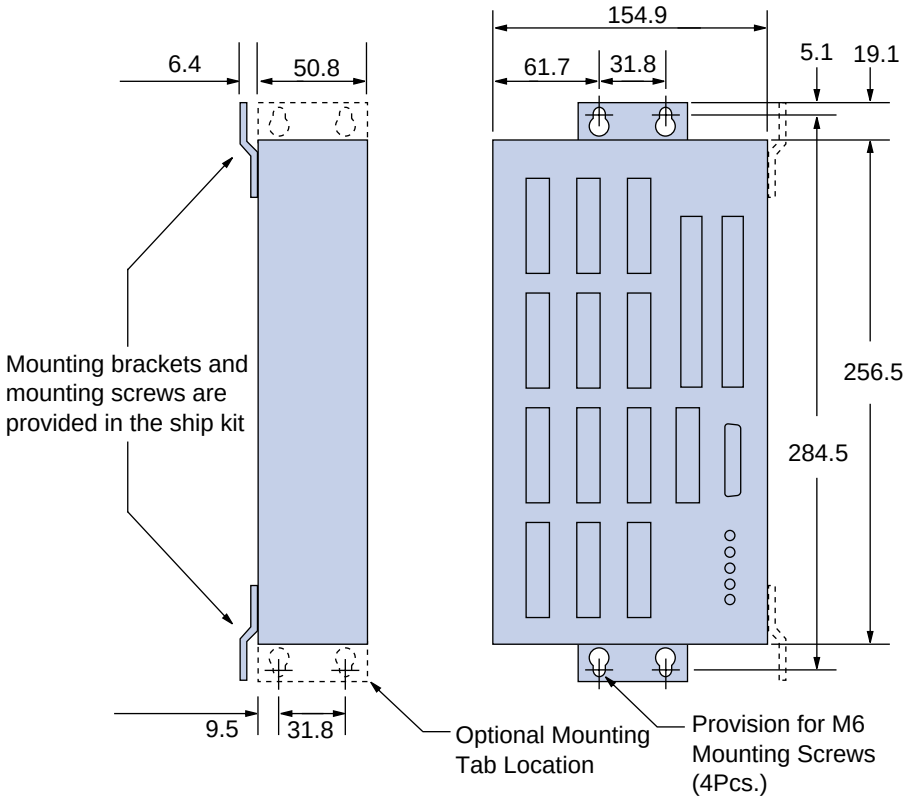
### *Physical*

- Auxiliary board is available in three versions: a 120VAC input; a 240VAC input; or a +5VDC and ±15VDC input open frame version
- All connections from PC card to auxiliary board are through a single high-density cable

| *Parameter* | *Value* |
|---|---|
| Performance | |
| Position range | ±2,147,483,648 steps |
| Velocity range | 0.001 to 1,200,000 counts/sec |
| Acceleration range | 0.001 to 2,147,483,648 counts/sec$^2$ |
| Velocity accuracy | ±0.02% of maximum rate |
| Velocity repeatability | ±0.02% of set rate |
| Motion trajectory update period | Default: 1.6 ms for AT6250; 3.0 ms for AT6450 |
| Servo sampling update period | Default: 400 µs for AT6250; 785 µs for AT6450 |
| System update period | Default: 1.6 ms for AT6250; 3.0 ms for AT6450 |
| Power | |
| AT6250 and AT6450 PC Card | 5VDC @ 3.5A from the PC-AT bus |
| ANI Card | 5VDC @ 0.75A for each card from PC-AT bus |
| 240V Auxiliary Board (AC or DC input) | 90 - 264VAC, 50/60Hz, 0.75A @ 240VAC, single phase, or 115-340VDC |
| 120V Auxiliary Board (AC or DC input) | 90 - 123VAC, 50/60Hz, 1.5A @ 120VAC, single phase, or 115-165VDC |
| DC Auxiliary Board | +5VDC @ 1.6A and ±15VDC @ 50mA, ±10% from an external source |
| Inputs | All inputs are optically isolated |
| Home, Pos/Neg limits, drive fault, joystick trigger, joystick release, joystick axes select, joystick velocity | HCMOS-compatible**; internal 6.8 KΩ pull-ups to 5V; voltage range is 0-24V |
| Encoder | Differential comparator accepts two-phase quadrature incremental encoders with differential (recommended) or single-ended outputs (+5VDC TTL-compatible*). Maximum frequency = 1.2 MHz, minimum time between transitions = 833 ns |
| 24 programmable | HCMOS-compatible** with internal 6.8KΩ pull-up (connect IN-P to +5V to source current or connect IN-P to GND to sink current). Voltage range = 0-24V, 50-pin plug is compatible with OPTO-22™ signal conditioning equipment. Controllable with the 6000 Series programming language. |
| Trigger inputs | AT6250 has 3 & AT6450 has 4 HCMOS compatible** high speed inputs for position capture & general purpose functions |
| Analogue (Joystick) | Voltage range = 0-2.5VDC, 8-bit A/D converter. Input voltage must not exceed 5V. |
| Analogue (ANI option) | Voltage range = ±10VDC, 14-bit A/D converter. One per axis. Requires an 8-bit slot. |
| Outputs | All outputs are optically isolated |
| 24 programmable | TTL compatible*, open collector output. Can be pulled up by connecting OUT-P to +5V on the auxiliary board, or to user-supplied voltage of up to 24V. Max. current in ON state (sinking) = 30mA. 50-pin plug is compatible with OPTO-22™ signal conditioning equipment. |
| Auxiliary outputs | AT6250 has 3 and AT6450 has 4 TTL compatible* open connector high-speed outputs for output on position & general purpose functions. |
| Command Out (CMD) | ±10V analogue output. 12-bit DAC. Load should be >2KΩ impedance. |
| Shutdown (SHTNO, SHTNC, and COM) | Shutdown relay output. Max. rating: 175VDC, 0.25A, 3W |
| Auxiliary Analogue output (ANA) | ±10V analogue output. 8-bit DAC. Load should be >2KΩ impedance. Accuracy is ±5%. |
| Board monitor alarm (BMA) | Detects unrecoverable faults in hardware and software. |
| Environmental | |
| Operating temperature | 0° to 50°C |
| Storage temperature | –30° to 85°C |
| Humidity | 0% to 95% non-condensing |

* TTL-compatible voltage levels: Low ≤0.4V, High ≥2.4V ** HCMOS-compatible voltage levels: Low ≤1.67V, High ≥3.33V

## 120VAC and 240VAC Input AUX Boards




## DC Input Open Frame AUX Board