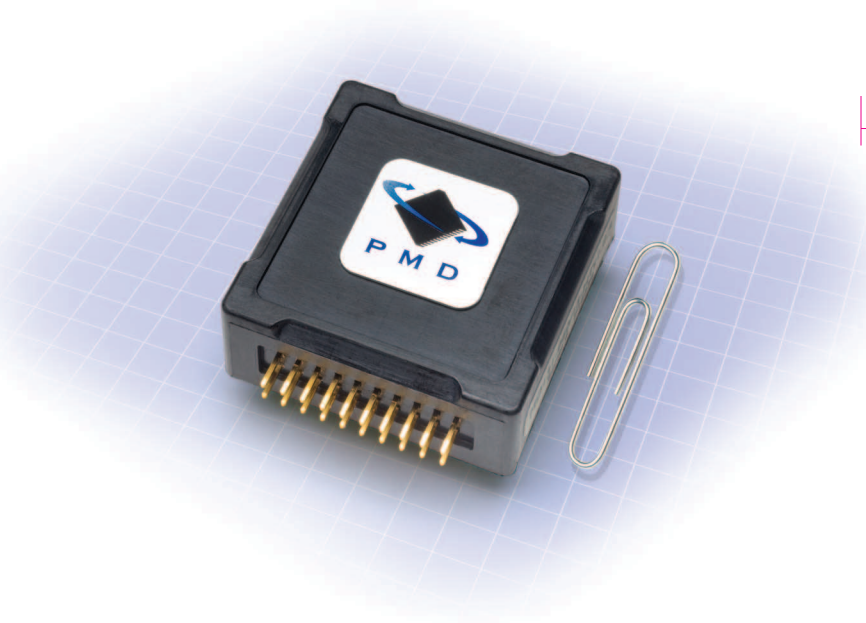
PERFORMANCE**MOTION**DEVICES

# **ATLAS**® Digital Amplifiers




## ›FEATURES

- High Performance all digital power amplifier
- Ultra compact 1.52" (38.5 mm) x 1.52" (38.6 mm) x .60" (15.2 mm)
- Controls Brushless DC, DC Brush & step motors
- Operating supply voltage range of 12 V to 56 V
- Up to 14 A continuous, 25 A peak current
- Total power output up to 1 Kilowatt
- Field oriented control
- Space vector modulation drive
- Fully digital current loop
- $I^2t$ current foldback limiting
- On-board performance trace
- Rugged solderable format
- SPI (Serial Peripheral Interface) eliminates analog +/- 10 V signals
- Pulse & direction input
- Up to 256 microsteps per step
- Overcurrent, short circuit, overvoltage, undervoltage & overtemperature protection
- Enable input and Fault output safety interlock
- Selectable 20 kHz, 40 kHz, and 80 kHz PWM frequencies
- Single supply operation
- Works with Magellan® ICs, FPGAs or microprocessor-based controllers
- Comes in horizontal and vertical mount configurations
- Available with mechanical mounting tabs

## ATLAS® Digital Amplifiers

are compact single-axis amplifiers that provide high performance torque control of DC brush, brushless DC, and step motors. They are packaged in a compact solderable module and utilize standard through-hole pins for all connections.

### High Performance in an Ultra Compact Package

ATLAS Digital Amplifiers are used for direct control of motor torque, or in conjunction with higher level controllers for velocity or positioning applications. Their very compact size and high power output make them ideally suited for applications such as laboratory automation, scientific instruments, general purpose motion control, HVAC, fan & pump controllers, and industrial motor control applications. ATLAS Amplifiers are provided in both vertical and horizontal mounting configurations, and with and without heat sink attachment tabs.

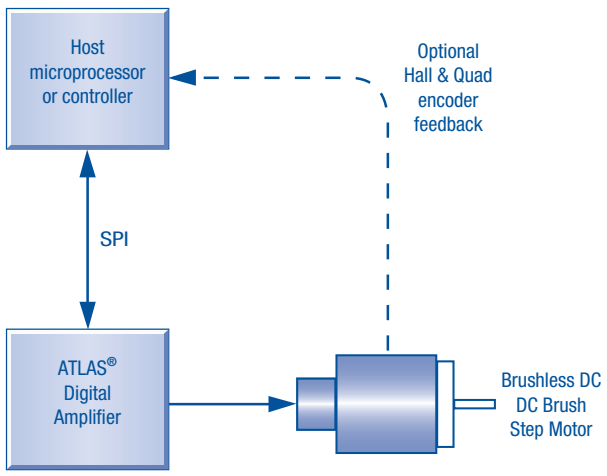
### Programmability

ATLAS digital amplifiers provide many advanced control features including user-programmable gain parameters, performance trace, field oriented control, and $I^2t$ current management. Atlas amplifiers are powered from a single supply voltage, and provide automatic protection from overcurrent, undervoltage, overvoltage, overtemperature, and short circuit faults.

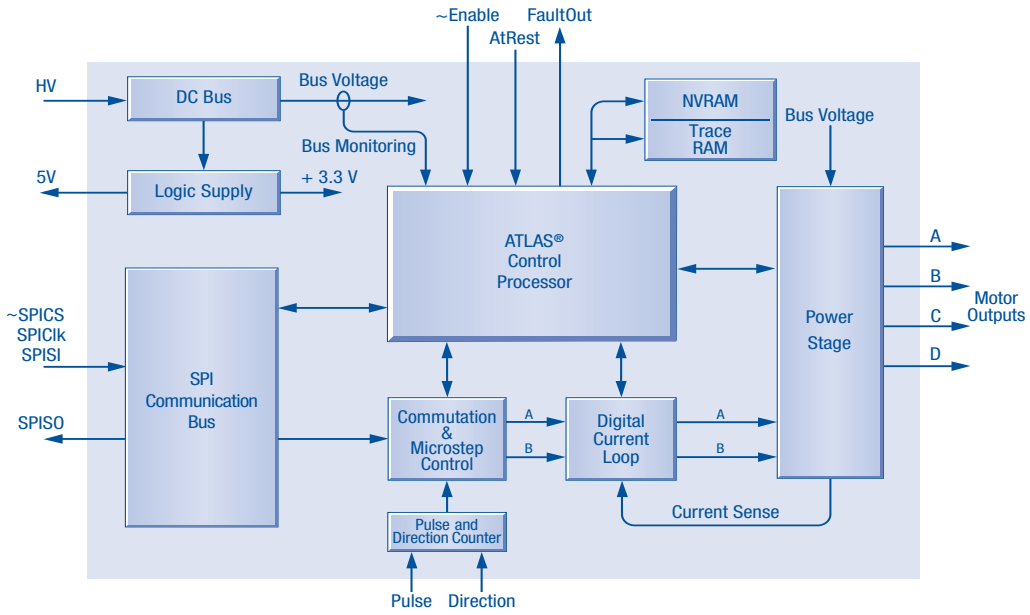
### Flexibility

The ATLAS family has been designed to work seamlessly with PMD's Magellan family of Motion Processor ICs. Alternatively, they can be used with dedicated FPGAs, digital signal processors, or general purpose microprocessors. Communication is via SPI (Serial Peripheral Interface) using a simple, packet-oriented protocol. For step motors, in addition to the SPI format a pulse & direction input mode is provided.

## ›CONFIGURATION



# Technical**Overview**

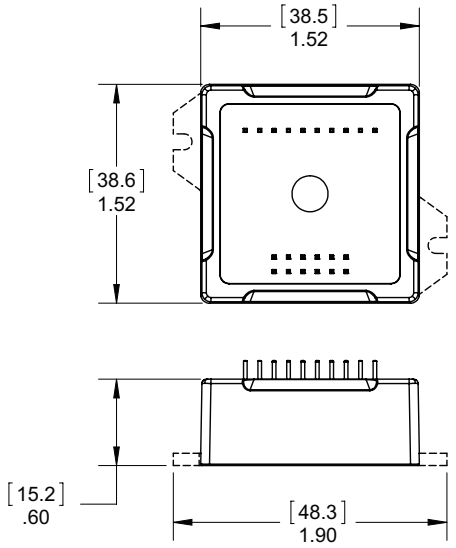



## SPECIFICATIONS

| Parameter | | Value |
|---|---|---|
| **Supported Motor Types** | | Brushless DC, DC brush, Step motor |
| **Voltage Input** | | 12-56 VDC |
| **Brushless DC Continuous current output** | | 10 Arms |
| **Brushless DC Peak current output** | | 25 A |
| **Brushless DC Continuous power output** | | 590 W |
| **DC Brush Continuous current output** | | 14 ADC |
| **DC Brush Peak current output** | | 25 A |
| **DC Brush Continuous power output** | | 670 W |
| **Step Continuous current output** | | 9 Arms |
| **Step Peak current output** | | 25 A |
| **Step Continuous power output** | | 610 W |
| **Microstepping resolution** | | 256 |
| **PWM frequency** | | 20, 40, 80 kHz |
| **Current Loop rate** | | 20 kHz |
| **User Programmability:** | | Non-volatile user configuration storage |
| | Trace Memory | 2KB |
| | I/Os | FaultOut, Enable |
| **Safety:** | | Short Circuit, OverCurrent, $I^2t$ Current Foldback, SPI Watchdog, Overvoltage, Undervoltage |
| **Environmental:** | Operating Temperature | 0° - 40° C |
| **Compliance:** | | RoHs, CE LVD:EN60204-1, EMC-D: EN61000-6-1, EN61000-6-3, EN55011 |
| | UL | Designed to UL508C, UL840, and EN60204-1 |
| **Mechanical Dimensions** | | 1.52" (38.5 mm) x 1.52" (38.6 mm) x .60" (15.2 mm) |
| **Weight** | | 1.0 oz (28.5 g) |

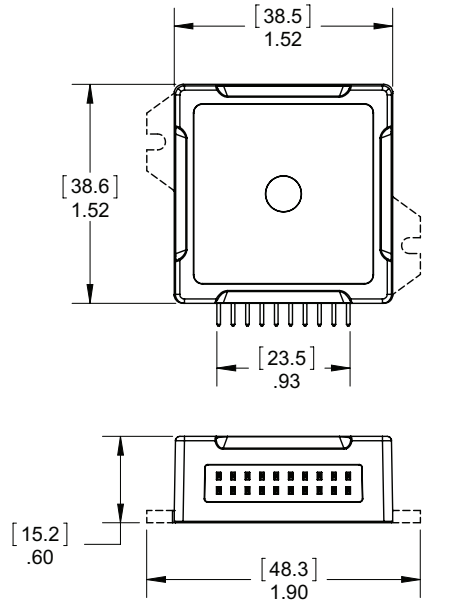
## MECHANICAL DIMENSIONS

### Horizontal Configuration




*Available with and without heat sink attachment tabs*

### Vertical Configuration




*Available with and without heat sink attachment tabs*

# Development Tools

## DEVELOPER'S KIT


### Includes

- ATLAS® unit(s):
  Available in vertical and horizontal mounting configurations, with and without heat sink attachment tabs.
- ATLAS carrier card (horizontal and vertical versions available)
- L-bracket base with optional heat sink attachment (1, 2, or 4 axis versions)
- Pro-Motion CD and User's Guide
- Development Software CD with C-Motion and VB-Motion Software, and ATLAS documentation
- ATLAS DK DB9 communications cable

## C-MOTION® SOFTWARE

C-Motion is a complete, easy-to-use, motion programming language that includes a source library containing all the code required for communicating with PMD motion processors, cards and ATLAS® Digital Amplifiers. C-Motion may be used to communicate with ATLAS Digital Amplifiers through a Magellan motion processor, either as part of a PMD card or a user-designed product.

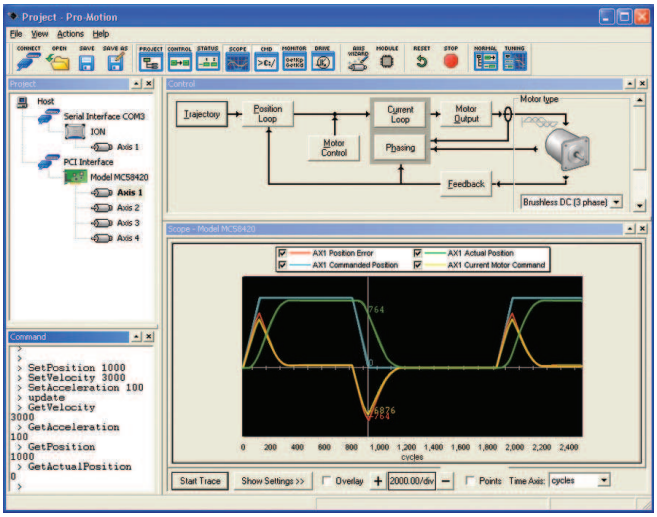
### C-Motion features include:

- Extensive library of commands for virtually all motion design needs
- Develop embeddable C/C++ applications
- Many complete, functional examples available
- Supports serial, CAN and Ethernet communications

**Example C-Motion code for executing a profile and tracing some processor variables**
*The information captured in this example could be used for tuning the PID filter.*

```
// set the trace buffer wrap mode to a one time trace
SetTraceMode(hAxis1, PMDTraceOneTime);
// set the processor variables that we want to capture
SetTraceVariable(hAxis1, PMDTraceVariable1, PMDAxis1, PMDTraceActualPosition);
SetTraceVariable(hAxis1, PMDTraceVariable2, PMDAxis1, PMDTraceActualVelocity);
SetTraceVariable(hAxis1, PMDTraceVariable3, PMDAxis1, PMDTraceCommandedVelocity);
// set the trace to begin when we issue the next update command
SetTraceStart(hAxis1, PMDTraceConditionNextUpdate);
// set the trace to stop when the MotionComplete event occurs
SetTraceStop(hAxis1, PMDTraceConditionEventStatus,
  PMDEventMotionCompleteBit, PMDTraceStateHigh);
SetProfileMode(hAxis1, PMDTrapezoidalProfile);
// set the profile parameters
SetPosition(hAxis1, 200000);
SetVelocity(hAxis1, 0x200000);
SetAcceleration(hAxis1, 0x1000);
SetDeceleration(hAxis1, 0x1000);
// start the motion
Update(hAxis1);
```

## PRO-MOTION® GUI




Pro-Motion is a sophisticated, easy-to-use Windows-based exerciser program for use with the ATLAS Digital Amplifiers, ION Digital Drives and other PMD motion control ICs and cards.

### Features

- Motion oscilloscope graphically displays processor parameters in real-time
- Autotuning
- Ability to save and load settings
- Distance and time units conversion
- Motor-specific parameter setup
- Axis shuttle performs continuous back and forth motion between two positions
- Communications monitor echoes all commands sent by Pro-Motion to the drive

## › PMD PRODUCT OVERVIEW

| | MOTOR CONTROL IC | MAGELLAN MOTION PROCESSOR ICs | ATLAS® DIGITAL AMPLIFIERS | PRODIGY® MOTION CARDS | ION® DIGITAL DRIVES |
|---|---|---|---|---|---|
| |  |  |  |  |  |
| **No. Axes** | 1 | 1, 2, 3, 4 | 1 | 1, 2, 3, 4 | 1 |
| **Format** | • 64-pin TQFP | • 144-pin TQFP<br>• 100-pin TQFP | • 20-pin solderable module | • PCI<br>• PC/104<br>• Standalone | • Fully enclosed module |
| **Voltage** | 3.3 V | 3.3 V | 12 - 56 V | 5 V | 12 - 56 V / 20 - 195 V |
| **Function** | • Velocity control<br>• Torque/Current control<br>• Commutation<br>• Field-oriented control | • Position control<br>• Profile generation<br>• Commutation<br>• Network communications<br>• Multi-motor support | • Torque/Current Control<br>• Field Oriented Control<br>• Trace Buffer<br>• MOSFET Amplifier<br>• Pulse & Direction Input<br>• SPI Interface<br>• User Configuration Storage | • Position control<br>• Profile generation<br>• Commutation<br>• Network communications<br>• Signal conditioning<br>• Multi-motor support<br>• Analog output<br>• PWM output<br>• Trace buffer<br>• Programmable<br>• General purpose user I/Os | • Position control<br>• Profile generation<br>• Commutation<br>• Network communications<br>• Field oriented control<br>• Torque/current control<br>• Trace buffer<br>• MOSFET amplifier<br>• Pulse & direction input<br>• Programmable (ION/CME only)<br>• General purpose user I/Os (ION/CME only) |
| **Motor Types** | • Brushless DC | • DC brush<br>• Brushless DC<br>• Pulse & direction<br>• Microstep | • DC brush<br>• Brushless DC<br>• Microstep | • DC brush<br>• Brushless DC<br>• Pulse & direction<br>• Microstep | • DC brush<br>• Brushless DC<br>• Microstep |
| **Communication** | • Standalone<br>• RS232/485 | • Parallel<br>• RS232/485<br>• CANbus | • SPI | • PCI and PC/104 bus<br>• Ethernet<br>• RS232/485<br>• CANbus | • CANbus<br>• Ethernet<br>• RS232/485 |
| **Loop Rate** | 20 kHz – current<br>10 kHz – velocity | 50 – 75 µsec/axis | 20 kHz – current | 50 – 150 µsec/axis | 20 kHz – current<br>10 kHz – position |

## › HOW TO ORDER

**MD1 □ 1 P - 056 / 25 - □ □ V. □ . □**

- **Motor type** — 1 = DC brush; 3 = brushless DC; 4 = step
- **Voltage** — 056
- **Current** — 25
- **Orientation** — H = Horizontal; V = Vertical
- **Mounting options** — T = Tabs; N = no Tabs
- **Major Version Contact PMD** — 0-9
- **Minor Version Contact PMD** — 0-9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### About Performance Motion Devices

Performance Motion Devices (PMD) is a worldwide leader in motion control ICs, boards and modules. Dedicated to providing cost-effective, high performance motion systems to OEM customers, PMD utilizes extensive in-house expertise to minimize time-to-market and maximize customer satisfaction.




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