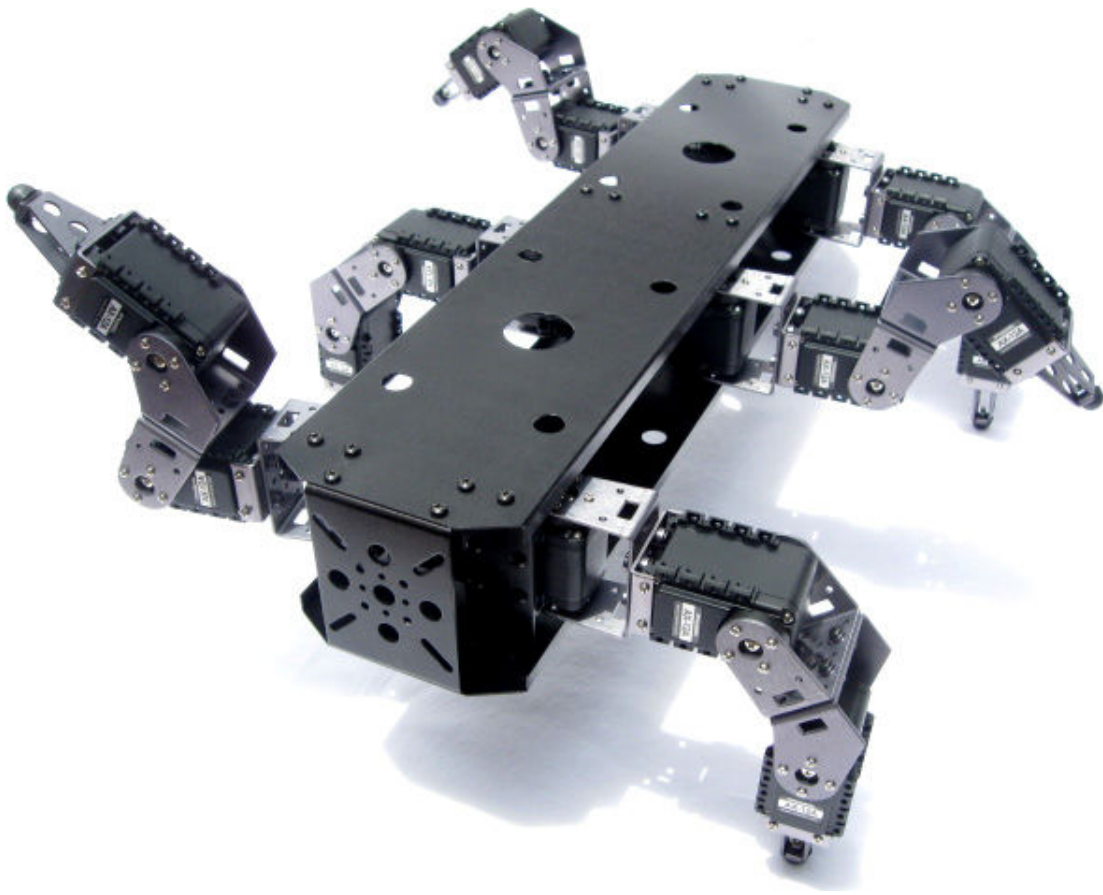# AX12-18 Smart Hexapod

Technical Specifications

VERSION 1.0

Author –Alex Dirks

The AX12-18 Smart Hexapod is CrustCrawlers next generation of walkers to implement "Smart Servo" Technology. Featuring the AX12A and/or the AX18A actuators, the Smart Hexapod is no longer limited to the poor torque / cost ratios, no feedback shortcomings of standard R/C servo based hexapods. Due to the rich feedback nature of the AX series of actuators, true kinematic walking routines can be implemented seamlessly.

Smart Hexapod Structure Features

- Power Optimized 3DOF (3-degrees of Freedom) Leg Design with over 220 oz/in.(15kgf/cm)of torque per joint
- Rugged, all aluminum construction for maximum payload capacity and walking kinematic accuracy
- Spacious upper and lower decks (16in. X 3.5in.)(40.64cm X 8.89cm) for controlling electronics, power and accessories.
- Weight with (18) AX12A or AX18A actuators – 3.12 pounds (1.41kg)
- Ground Clearance – 3.5 in.(8.89cm)
- Hard Anodized finish for maximum scratch and corrosion resistance (Body – Black, Legs – Gray)
- Integrated Pem nuts on all brackets for quick and seamless assembly
- Compatible with ANY micro-controller/computer control system

AX12A / AX18A Features

- Any combination of AX-18A (18kgf/cm and 97 rpm) or AX-12A (15kgf/cm and 59 rpm) actuators can be used.
- The AX series of actuators provide full feedback for position, speed, load, voltage and temperature with automatic shutdown based on voltage or temperature
- Full control over position (300 degrees), speed, and torque in 1024 increments
- Fast 1M bps communication speed.
- For more information on the AX12A and AX18A actuators, see our web site www.crustcrawler.com or the Robotis support site at http://support.robotis.com

Free Software

The AX12A and AX18A are controlled using a simple 1mbps serial communication. Any computer / microcontroller can be used to control the AX series of servos. The Robotis support site (http://support.robotis.com) contains free SDK libraries. These libraries include but are not limited to

- Embedded C (For CM-510/700 controllers)
- Dynamixel SDK (For Windows)
- Dynamixel SDK (For Linux)
- Zigbee SDK (For Windows)
- Zigbee SDK (For Linux)

The source code contains examples for LABVIEW, MATLAB, JAVA, C/C++, Python etc.

We strongly suggest that for latest drivers, software, firmware, CAD drawings and technical guides related to the Robotis line of AX12A, AX18A servos, USB2dynamixel, CM-510 and CM-700 controllers, please reference the Robotis support web site (http://support.robotis.com)

Controller Options

There are an unlimited number of controller options that can be used with the AX12-18 Smart Hexapod. Any microcontroller / computer can be used for programming / control including the popular Arduino line of microcontrollers and Parallax Propeller. Here are just a few of the options available from the CrustCrawler Web site:

USB2Dynamixel

A great choice when using a computer for control. The USB2dynamixel plugs right into your computers USB port to provide a convenient interface and control option for your computer. Download the free Dynamixel Manager to set AX12A / AX18A ID's, current, voltage, temperature and speed settings. USB2dynamixel features also include:

- USB to RS-232, RS-485, and AX-12 (TTL) interfaces in one unit.
- Status LED displays power status, TxD (data write), and RxD (data read).
- Connects to the AX series Dynamixel via TTL
- Connects to the DX, RX series Dynamixel via RS-485
- Converts a USB port to a serial port via RS-232
- Download the free Dynamixel SDK from http://support.robotis.com which contains example source code for LABVIEW, MATLAB, JAVA, C/C++, Python etc.

CM-700 Controller

- CM-700 kit includes CM-700 module with built in power supply
- CD-ROM which includes the powerful *RoboplusTask*, *Robotplus Manager* and *Motion Editor* software, mounting kit and interface cable
- TTL/RS485 Communication with Zig 110 Connector
- Sensors: 2 - (1) Temperature & (1) Voltage
- Dynamixel 3-pin ports: (4)
- RS-485 Ports: (5)

Questions / Inquiries

If you have any additional questions about the AX12-18 Smart Hexapod, please feel free to contact CrustCrawler at:

Phone: 480-577-5557
Web: support@crustcrawler.com
Forum: http://forum.crustcrawler.com/phpBB3/index.php