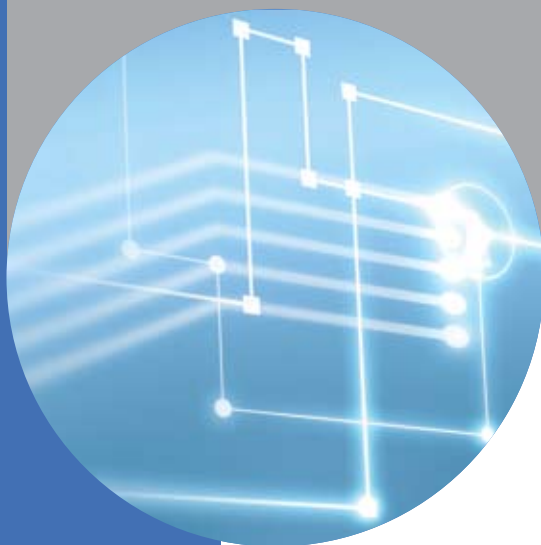


# Selection Guide



Servo Drives  
Stepper Drives  
Control Software



[www.motiontech.com.au](http://www.motiontech.com.au)

copley   
controls  
Analogic Motion Control

# Copley Controls



## About Copley

Copley Controls delivers high performance motion solutions to a wide range of industries including semiconductor, life sciences, automated assembly, test and measurement and COTS military. An ISO 9001:2008 company, Copley produces RoHS compliant products of the highest quality in a state-of-the-art US manufacturing facility. Copley drives carry a full 2-year warranty.

With over 25 years of experience in OEM partnerships, Copley's application team combines with R&D to deliver world-class, highly responsive support. Our global commitment is backed with sales offices and local technical resources in the US, Europe and Asia.



As part of Analogic Corporation, Copley Controls has the buying power and resources to compete long term in the global marketplace. Our OEM commitment has stood the test of time with many models in production for well over a decade.

## Servo & Stepper Drives

From networked servo and stepper drives to traditional torque amplifiers, Copley has the solution for your system architecture. Both AC- and DC-powered drives with flexible packaging options are offered in the 100W - 6kW power range. A comprehensive range of motor feedback interfaces is provided. Advanced tuning and commutation algorithms maximize motor performance.

Ruggedized versions of select servo drives are available for COTS military applications. Built to withstand extremes of temperature and vibration with conformal coating for humidity tolerance, the Copley R-Series delivers reliable performance in the harshest environments.



## Configuration & Control Software

Copley drive configuration software is highly intuitive and incorporates powerful diagnostic tools. An easy-to-use Indexer is built in. For more complex applications, a flexible high-level language is provided with powerful editing and debugging capabilities.

Network software tools make multi-axis control system commissioning fast and simple. Proven Copley source code for the control and management of both EtherCAT and CANopen networks facilitates application implementation. Migration from CANopen to EtherCAT is straightforward and seamless.



## Custom Drives and Motion Subsystems

Copley provides competitive advantage to the OEM by tailoring designs to precisely fit the application. Copley development engineers and application team will work closely with you to define your requirements and deliver a just-right solution.

Customization can be as simple as special I/O functions or as complex as a multi-axis drive package. Software customization includes application-specific indexer functions, control filters and specialized analysis and diagnostic tools.

In addition to customized drives, Copley's motion subsystem design and manufacturing capability can significantly reduce time to market while freeing-up key OEM resources to focus on core design issues. Copley's expertise in power and thermal management as well as experience in the accelerated life test of complex subsystems guarantee lowered cost of ownership. Optimized motion subsystem design ensures the highest level of performance in the smallest footprint.

# System Connectivity

## CONTROL

### PC Architecture

Copley drives connect seamlessly to both CANopen and EtherCAT - the networks of choice for PC-based systems. Copley drives are also integrated into third-party software tools, including LabVIEW and CoDeSys SoftMotion, for complete PC-based multi-axis motion control solutions.

### Motion Control Cards

Both the traditional  $\pm 10$  V and PWM current/velocity command interfaces are built-in on all drives. For Delta Tau motion cards, MACRO drives enable an optimal motion control system solution.

### PLC Systems

Control via PLCs is facilitated by a step/direction interface as well as I/O selection and execution of predefined indexer programs. An ASCII command interface is also available.

## FEEDBACK

### Incremental Encoders

Digital incremental encoder and Halls are the standard interface on all drives with position mode capability. Xenus and Accelnet feature an analog encoder option and incorporate a wake-and-wiggle algorithm for commutation without Halls.

### Resolvers

Resolvers are the feedback of choice for rugged environments. Available as an option on Xenus and Accelnet, Copley's proprietary interface delivers 14-bit resolution up to 10,000 RPM.

### Absolute Encoders

Select Copley drives are available with a range of open standard absolute encoder interfaces including EnDat, BiSS and SSI.





## NETWORKS

### CANopen

CANopen is a highly cost-effective implementation of distributed control. In PVT mode, the drive accepts tightly synchronized position/velocity/time points. In profile mode, the drive executes a move based on pretransmitted parameters. CANopen also accommodates velocity and torque modes.

Copley provides comprehensive hardware and software tools for CANopen. CAN-PCI-02 is a fully isolated dual-channel PCI card with an on-board micro controller. CAN-IPM-01 I/O Processor Module enables OEMs to design optimal system interfaces and integrate them seamlessly into a CANopen network.

### EtherCAT

EtherCAT is an open, real-time Ethernet network. Fast and deterministic, EtherCAT supports a variety of network topologies including line, tree and star. EtherCAT leverages standard CANopen device profiles, facilitating migration to an Ethernet based system. Both centralized and distributed control architectures can be implemented with EtherCAT.

### MACRO

Designed for Delta Tau controllers, MACRO is Ethernet based and available in both fiber and copper physical layers. MACRO is typically used in a centralized control architecture with position and velocity loops closed in the motion card.

### RS-232 ASCII

RS-232 is used for point-to-point motion in both PLC- and PC-based systems. Drives operate as Indexers or execute moves based on pretransmitted parameters. Multiple axes can be addressed via a transparent CANopen connection between drives.



# Software Tools



## Networking Software

Copley distributed control software makes system commissioning fast and simple. The development of low-level code to control a CANopen or EtherCAT network is eliminated. All network management is accomplished with a few simple commands linked into your application program.

The application program interacts with amplifier “objects.” Amplifier objects are in turn connected to EtherCAT or CANopen objects. This means that a program written for one network can easily be ported to another network without changing the basic program.

Copley supports two development environments. Copley Motion Libraries (CML) source code can be compiled with a C++ application program. Copley Motion Objects (CMO) can be used by Visual Basic®, Visual C#® or any program supporting the .NET® framework.

### Network Management

- Configuration and startup
- Synchronization
- Node guarding
- Message generation
- Heartbeat
- Error management

### Motion Control

- Path planning
- PVT generation
- Profile execution
- PVT buffer management

### General

- Parameter set/get
- Setup file download
- Drive fault handling
- I/O interfacing



## High Level Language

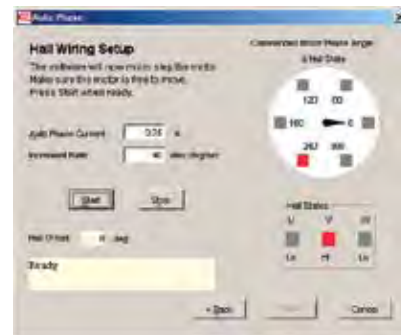
Copley Programming Language (CPL) is a powerful, flexible OEM programming environment for PLUS versions of Copley drives. Combining the best features of BASIC, C, and Java, CPL incorporates a rich set of motion system calls. Data types are extensive and include arrays and structures. The availability of both local and global variables enables well-structured code development.

CPL is based on the Netbeans Platform IDE, featuring an intuitive source code editor and powerful debugger. Project templates are provided for easy startup along with a comprehensive collection of example code. For real-time analysis, CME 2 diagnostic tools can run simultaneously.

## Configuration

Java based CME 2 configuration software is powerful and intuitive. Comprehensive diagnostics, auto-tuning, frequency response analysis and advanced oscilloscope tools simplify system commissioning.

Auto-phasing eliminates the time-consuming rewire-and-try procedure for encoder/Halls/motor connections. CME 2 automatically compensates for crossed wires - the most common cause of startup headaches.



## Easy-to-Use Indexer

For simpler applications, Copley provides a very easy-to-use indexer. Just point-and-click to define up to 32 indexes or index sequences. Index sequences can include parameter changes, dwell times and I/O control. Simply select the index/sequence and command GO.

Any parameter (e.g., move distance) can be assigned to a register for efficient adjustment by a PLC. For further simplification, Copley can also provide custom functions. Just install and fill in the blanks.

## Cam Tables

Camming is an effective way to produce repetitive motion synchronized to an external device. A pre-defined cam table of slave positions is typically cycled through by a master encoder connected to the drive. The drive performs linear interpolation between points to minimize cam table size.

# Digital Drive Overview

## The PLUS Advantage

Copley offers a complete range of high power density digital drives for brushless, brush and stepper motors. Both AC- and DC-powered versions are available. Xenus, Accelnet and Stepnet feature CANopen for distributed control. **PLUS** versions incorporate EtherCAT as well as CANopen and offer expanded feedback options. Metal enclosures ensure the highest level of noise immunity. Multi-axis **PLUS** versions deliver the lowest cost per node. **PLUS** drives feature high resolution A/D converters for optimal current control as well as fast, hardware-based position capture and setpoint trigger output.

Feature	Xenus	Accelnet	Stepnet	Accelus	Junus
Motor	Brushless/Brush	Brushless/Brush	Stepper	Brushless/Brush	Brush
Input Power	100-240 VAC	20-180 VDC	VAC, VDC	20-180 VDC	20-180 VDC
Continuous Current	1-20 A	1-30 A	2-10 A	3-12 A	5-15 A
Standard Feedback*	E, R, S	E, R, S	E	E	V
PLUS Feedback*	E, R, S, A	E, R, S, A	E, S, A	NA	NA
Ruggedized Version	•	•	•		
CANopen	•	•	•		
EtherCAT	PLUS	PLUS	PLUS		
MACRO	PLUS	MACRO Version			
Safe Torque Off	PLUS	PLUS Panels	PLUS Panels		
CPL	PLUS	PLUS	PLUS		
Indexer	•	•	•		
Gearing/Camming	•	•	•	•	
Step/Direction	•	•	•	•	
PWM velocity/current	•	•	•	•	•
±10V velocity/current	•	•	•	•	•

\* E=Incremental Encoder, R=Resolver, S=Analog Encoder, A=Absolute Encoder, V=Back-EMF

## Custom Drive Designs

A broad spectrum of technology expertise enables Copley to respond rapidly and cost-effectively to OEM needs. Custom capabilities include:

- Optimized Packaging: connectors and form factor
- Power Ratings: custom current and voltage
- Multi-Axis: 2-4 axis packages
- Java Beans: custom indexer functions
- Feedback: special encoders
- Enhanced Firmware: custom compensation filters





## Safe Torque Off

The Safe Torque Off capability of **PLUS** Panel drives eliminates the expensive contactors and complex wiring traditionally used in safety critical applications. Safe Torque Off provides two drive enable inputs facilitating system conformance to SIL 3 (IEC 61800-5-2) & Category 3 PLd (ISO 13849-1).

## Technology Edge

### Field Oriented Control

- Optimal orientation of magnetic field
- Motors run faster and cooler

### Servo & PWM Performance

- High-bandwidth nested loops
- Biquad filter for notch or low pass filters
- High-efficiency dynamic PWM
- Edge filter accessories for low emissions

### Stepper Technology

- Smooth, low audible noise
- Precision microstepping, low resonance
- Servo mode for closed loop control
- Detent torque compensation



AC Powered

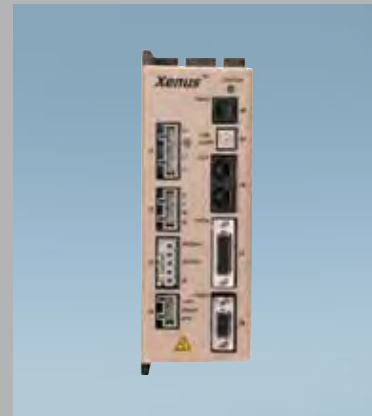


DC Powered

## Ruggedized Drives

R-Series drives are ruggedized versions of Xenus and Accelnet. Designed to endure temperature extremes, high humidity, vibration and shock, the R-Series finds application in COTS military, nautical, aviation, oil refining and vehicle-based systems.

Ambient Temp.	-40°C to 70°C
Thermal Shock	-40°C to 70°C in 1 minute
Relative Humidity	95% non-condensing at 60°C
Vibration	5 Hz to 500 Hz, up to 3.85 grms
Altitude	-400 m to 5,000 m
Shock	40 g peak acceleration



# Xenus<sup>PLUS</sup> Panel - Servo

## XEL, XPL 1-Axis



Model	VAC	Ic	Ip
X*L-230-18	100-240	6	18
X*L-230-36	100-240	12	36
X*L-230-40	100-240	20	40

## XE2, XP2 2-Axis



Model	VAC	Ic	Ip
X*2-230-20	100-240	10	20

**EtherCAT & CANopen**  
1-Axis & 2-Axis  
Safe Torque Off  
Absolute encoders  
Precision current loop

\* E=EtherCAT, P=CANopen

Xenus<sup>PLUS</sup> AC-powered drives are available in both EtherCAT and CANopen versions. Multi-axis models deliver optimal cost per node. A wide range of absolute encoder interfaces are built-in, including EnDat, BiSS, Absolute A and SSI.

High resolution A/D converters ensure optimal current loop performance. Isolated I/O, as well as high-speed non-isolated I/O are provided. For safety critical applications, redundant power stage enable inputs can be employed [Safe Torque Off].

### Control Modes

- CPL, Indexer, Point-to-Point, PVT, PT
- Camming, Gearing
- Position, Velocity, Torque

### Command & Communications

- EtherCAT CoE DS-402 [XEL, XE2]
- CANopen DS-402 [XPL, XP2]
- RS-232 ASCII
- Step/Direction, Step Up / Step Down
- $\pm 10V$  position/velocity/torque
- PWM velocity/torque
- Master encoder

### Feedback

- Incremental quadrature encoder & Halls
- BiSS, SSI, Absolute A, EnDat encoders
- Panasonic, Tamagawa, Sanyo Denki
- Analog sin/cos encoder
- Resolver [-R option]
- Aux. encoder / encoder out

### Safety Disable

- Safe Torque Off [see datasheet for certifications]

### I/O

- Digital 1-Axis: 15 inputs, 6 outputs
- Digital 2-Axis: 22 inputs, 7 outputs
- Analog 1-Axis: 2, 16-bit inputs; 1, 12-bit output
- Analog 2-Axis: 2, 14-bit inputs

### Regen

- X\*L: external regen resistor accessory
- X\*2: built-in regen resistor

### Dimensions: mm [in]

- 1-Axis: 201 x 145 x 59 [7.9 x 5.7 x 2.3]
- 2-Axis: 235 x 138 x 91 [9.3 x 5.5 x 3.6]

# Xenus Panel - Servo

## XTL Panel



Model	VAC	Ic	Ip
XTL-230-18	100-240	6	18
XTL-230-36	100-240	12	36
XTL-230-40	100-240	20	40

## XSJ Micro Panel



Model	VAC	Ic	Ip
XSJ-230-02	100-240	1	2
XSJ-230-06	100-240	3	6
XSJ-230-10	100-240	5	10

Xenus is available in two AC line operated compact packages delivering power up to 6 kW. A +24Vdc input powers control circuits, ensuring keep-alive operation. Control interfaces include CANopen as well as traditional analog commands. Incremental encoder feedback is standard with optional resolver and analog encoder interfaces.

### Control Modes

- Indexer, Point-to-Point, PVT, PT
- Camming, Gearing
- Position, Velocity, Torque

### Command & Communications

- CANopen DS-402
- RS-232 ASCII
- Step/Direction, Step Up / Step Down
- $\pm 10V$  position/velocity/torque
- PWM velocity/torque
- Master encoder

### Feedback

- Incremental quadrature encoder
- Digital Halls
- Analog sin/cos encoder [-S option]
- Resolver [-R option]
- Aux. encoder / encoder out

### I/O - Digital

- XTL: 12 inputs, 4 outputs
- XSJ: 14 inputs, 4 outputs

### Regen

- XTL: internal transistor, external resistor
- XSJ: internal dissipation

### Accessories

- External regen resistors
- External edge filter

### Dimensions: mm [in]

- XTL: 191 x 140 x 64 [7.5 x 5.5 x 2.5]
- XSJ: 125 x 89 x 53 [5.0 x 3.5 x 2.1]

**CANopen**  
Available ruggedized

# Accelnet<sup>PLUS</sup> Panel - Servo

## BEL, BPL 1-Axis



Model	VDC	I <sub>c</sub>	I <sub>p</sub>
B*L-090-06	14-90	3	6
B*L-090-14	14-90	7	14
B*L-090-30	14-90	15	30

## BE2, BP2 2-Axis



Model	VDC	I <sub>c</sub>	I <sub>p</sub>
B*2-090-06	14-90	3	6
B*2-090-14	14-90	7	14
B*2-090-20	14-90	10	20

Accelnet<sup>PLUS</sup> sets new levels of performance and is available in both EtherCAT and CANopen versions. Multi-axis models deliver optimal cost per node. A wide range of absolute encoder interfaces are built-in, including EnDat, BiSS, Absolute A and SSI. Higher-resolution current loops enable Accelnet<sup>PLUS</sup> to meet the needs of the most demanding applications. For safety critical applications, redundant power stage enable inputs can be employed [Safe Torque Off].

### Control Modes

- CPL, Indexer, Point-to-Point, PVT, PT
- Camming, Gearing
- Position, Velocity, Torque

### Command & Communications

- EtherCAT CoE DS-402 [BEL, BE2]
- CANopen DS-402 [BPL, BP2]
- RS-232 ASCII
- Step/Direction, Step Up / Step Down
- $\pm 10V$  position/velocity/torque
- PWM velocity/torque
- Master encoder

### Feedback

- Incremental quadrature encoder
- Digital Halls
- BiSS, SSI, Absolute A, EnDat encoders
- Panasonic, Tamagawa, Sanyo Denki
- Analog sin/cos encoder
- Resolver [-R option]
- Aux. encoder / encoder out

### Safety Disable

- Safe Torque Off [see datasheet for certifications]

### I/O

- Digital 1-Axis: 11 inputs, 4 outputs
- Digital 2-Axis: 17 inputs, 6 outputs
- Analog: one 12-bit input per axis

### Dimensions: mm [in]

- 1-Axis: 129 x 87 x 51 [5.1 x 3.4 x 2.0]
- 2-Axis: 172 x 119 x 44 [6.8 x 4.7 x 1.7]

**EtherCAT & CANopen**  
1-Axis & 2-Axis  
Safe Torque Off  
Absolute encoders  
Precision current loop

\* E=EtherCAT, P=CANopen

# Accelnet<sup>PLUS</sup> Module - Servo

## AEM, APM 1-Axis



Model	VDC	I <sub>c</sub>	I <sub>p</sub>
A*M-090-06	14-90	3	6
A*M-090-14	14-90	7	14
A*M-090-30	14-90	15	30
AEM-180-20	40-180	10	20

## AE2, AP2 2-Axis



Model	VDC	I <sub>c</sub>	I <sub>p</sub>
A*2-090-06	14-90	3	6
A*2-090-14	14-90	7	14
A*2-090-30	14-90	15	30

Accelnet<sup>PLUS</sup> Modules deliver high performance in two compact PCB-mounted packages. EtherCAT and CANopen versions are available. Multi-axis models deliver optimal cost per node. A wide range of absolute encoder interfaces are built-in, including EnDat, BiSS, Absolute A and SSI. Higher-resolution current loops enable Accelnet<sup>PLUS</sup> to meet the needs of the most demanding applications.

### Control Modes

- CPL, Indexer, Point-to-Point, PVT, PT
- Camming, Gearing
- Position, Velocity, Torque

### Command & Communications

- EtherCAT CoE DS-402 [AEM, AE2]
- CANopen DS-402 [APM, AP2]
- RS-232 ASCII
- Step/Direction, Step Up / Step Down
- $\pm 10V$  position/velocity/torque
- PWM velocity/torque
- Master encoder

### Feedback

- Incremental quadrature encoder
- Digital Halls
- BiSS, SSI, Absolute A, EnDat encoders
- Panasonic, Tamagawa, Sanyo Denki
- Analog sin/cos encoder
- Aux. encoder / encoder out

### I/O

- Digital 1-Axis: 11 inputs, 6 outputs
- Digital 2-Axis: 20 inputs, 7 outputs
- Analog: one 12-bit input per axis

### Dimensions: mm [in]

- 1-Axis: 77 x 59 x 20 [3.0 x 2.3 x 0.8]
- 2-Axis: 114 x 73 x 20 [4.5 x 2.9 x 0.8]

**EtherCAT & CANopen**  
1-Axis & 2-Axis  
Absolute encoders  
Precision current loop  
Available ruggedized [APM]

\* E=EtherCAT, P=CANopen



# Accelnet Panel - Servo

## ADP Panel



Model	VDC	Ic	Ip
ADP-055-18	20-55	6	18
ADP-090-09	20-90	3	9
ADP-090-18	20-90	6	18
ADP-090-36	20-90	12	36
ADP-180-09	20-180	3	9
ADP-180-18	20-180	6	18
ADP-180-30	20-180	15	30

## ACJ Micro Panel



Model	VDC	Ic	Ip
ACJ-055-09	20-55	3	9
ACJ-055-18	20-55	6	18
ACJ-090-03	20-90	1	3
ACJ-090-09	20-90	3	9
ACJ-090-12	20-90	6	12

Accelnet is available in two DC-powered panel-mounted packages. Control interfaces include CANopen as well as traditional analog commands. Incremental encoder feedback is standard with optional resolver and analog encoder interfaces.

### Control Modes

- Indexer, Point-to-Point, PVT, PT
- Camming, Gearing
- Position, Velocity, Torque

### Command & Communications

- CANopen DS-402
- RS-232 ASCII
- Step/Direction, Step Up / Step Down
- $\pm 10V$  position/velocity/torque
- PWM velocity/torque
- Master encoder

### Feedback

- Incremental quadrature encoder
- Digital Halls
- Analog sin/cos encoder [-S option]
- Resolver [-R option]
- Aux. encoder / encoder out

### I/O - Digital

- ADP: 12 inputs, 3 outputs
- ACJ: 9 inputs, 4 outputs

### Dimensions: mm [in]

- ADP: 168 x 104 x 30 [6.6 x 4.1 x 1.2]
- ACJ: 97 x 63 x 33 [3.8 x 2.5 x 1.3]

## CANopen

Available ruggedized

# Accelnet Module - Servo

## ACM Module



Model	VDC	Ic	Ip
ACM-055-18	20-55	6	18
ACM-090-09	20-90	3	9
ACM-090-24	20-90	12	24
ACM-090-60	20-90	30	60
ACM-180-09	20-180	3	9
ACM-180-18	20-180	6	18
ACM-180-20	20-180	10	20

## ACK Micro Module



Model	VDC	Ic	Ip
ACK-055-06	14-55	3	6
ACK-055-10	20-55	5	10
ACK-090-04	14-90	2	4
ACK-090-08	20-90	4	8

Accelnet Modules are available in two compact DC-powered PCB-mounted packages for optimal OEM flexibility. Control interfaces include CANopen as well as traditional analog commands. Incremental encoder feedback is standard with an optional resolver interface.

### Control Modes

- Indexer, Point-to-Point, PVT, PT
- Camming, Gearing
- Position, Velocity, Torque

### Command & Communications

- CANopen DS-402
- RS-232 ASCII
- Step/Direction, Step Up / Step Down
- $\pm 10V$  position/velocity/torque
- PWM velocity/torque
- Master encoder

### Feedback

- Incremental quadrature encoder
- Digital Halls
- Resolver [-R option]

### I/O - Digital

- ACM: 10 inputs, 2 outputs
- ACK: 10 inputs, 3 outputs

### Dimensions: mm [in]

- ACM: 102 x 71 x 25 [4.0 x 2.8 x 1.0]
- ACK: 64 x 41 x 21 [2.5 x 1.6 x 0.8]

**CANopen**  
Available ruggedized

# Stepnet<sup>PLUS</sup> Panel - *Stepper*

## TEL 1-Axis



Model	VDC	Ic	Ip
TEL-090-07	14-90	5	7
TEL-090-10	14-90	10	10

## TE2, TP2 2-Axis



Model	VDC	Ic	Ip
T*2-090-07	14-90	5	7
T*2-090-10	14-90	10	10

Stepnet<sup>PLUS</sup> sets new levels of performance and is available in both EtherCAT and CANopen versions. Multi-axis models provide optimal cost per node. Microstepping delivers smooth, low-resonance performance. In Servo Mode, with encoder feedback, stepper motors run quietly and can operate at higher speeds without stalling. A wide range of absolute encoder interfaces are built-in, including EnDat, BiSS, Absolute A and SSI.

### Control Modes

- CPL, Indexer, Point-to-Point, PVT, PT
- Camming, Gearing
- Position, Velocity, Torque [Servo Mode]
- Position [Microstepping]

### Command & Communications

- EtherCAT CoE DS-402 [TEL, TE2]
- CANopen DS-402 [TP2]
- RS-232 ASCII
- Step/Direction, Step Up / Step Down
- $\pm 10V$  position/velocity/torque
- PWM velocity/torque
- Master encoder

### Feedback

- Incremental quadrature encoder [Servo Mode]
- BiSS, SSI, Absolute A, EnDat encoders
- Analog sin/cos encoder

### Safety Disable

- Safe Torque Off [see datasheet for certifications]

### I/O

- Digital 1-Axis: 11 inputs, 6 outputs
- Digital 2-Axis: 20 inputs, 7 outputs
- Analog: one 12-bit input per axis

### Dimensions: mm [in]

- 1-Axis: 129 x 87 x 51 [5.1 x 3.4 x 2.0]
- 2-Axis: 172 x 119 x 44 [6.8 x 4.7 x 1.7]

## EtherCAT & CANopen

1-Axis & 2-Axis  
Safe Torque Off  
Microstepping  
Servo Mode

\* E=EtherCAT, P=CANopen

# Stepnet<sup>PLUS</sup> Module - *Stepper*

## SEM, SPM 1-Axis



Model	VDC	Ic	Ip
S*M-090-07	14-90	5	7
S*M-090-10	14-90	10	10

## SE2, SP2 2-Axis



Model	VDC	Ic	Ip
S*2-090-07	14-90	5	7
S*2-090-10	14-90	10	10

## SP4 4-Axis



Model	VDC	Ic	Ip
SP4-055-03	14-55	3	3

Stepnet<sup>PLUS</sup> Modules deliver high performance in two compact PCB-mounted packages. EtherCAT and CANopen versions are available. Multi-axis models provide optimal cost per node. Microstepping delivers smooth, low-resonance performance. In Servo Mode, with encoder feedback, stepper motors run quietly and can operate at higher speeds without stalling. A wide range of absolute encoder interfaces are built-in, including EnDat, BiSS, SSI and Absolute A.

### Control Modes

- CPL, Indexer, Point-to-Point, PVT, PT
- Camming, Gearing
- Position, Velocity, Torque [Servo Mode]
- Position [Microstepping]

### Command & Communications

- EtherCAT CoE DS-402 [SEM, SE2]
- CANopen DS-402 [SPM, SP2, SP4]
- RS-232 ASCII
- Step/Direction, Step Up / Step Down
- $\pm 10V$  position/velocity/torque
- PWM velocity/torque
- Master encoder

### Feedback

- Incremental quadrature encoder [Servo Mode]
- BiSS, SSI, Absolute A, EnDat encoders [S\*M, S\*2]

### I/O

- Digital 1-Axis: 11 inputs, 6 outputs
- Digital 2-Axis: 20 inputs, 7 outputs
- Digital 4-Axis: 24 inputs, 8 outputs
- Analog: one 12-bit input per axis [S\*M, S\*2]

### Dimensions: mm [in]

- 1-Axis: 77 x 59 x 20 [3.0 x 2.3 x 0.8]
- 2-Axis: 114 x 73 x 20 [4.5 x 2.9 x 0.8]
- 4-Axis: 102 x 76 x 21 [4.0 x 3.0 x 0.8]

**EtherCAT & CANopen**  
1-Axis, 2-Axis, 4-Axis  
Microstepping  
Servo Mode  
Available ruggedized [SPM]

\* E=EtherCAT, P=CANopen

# Stepnet Panel

## STX Panel



Model	VAC	Ic	Ip
STX-115-07	100-120	5	7
STX-230-07	200-240	5	7

## STP Panel



Model	VDC	Ic	Ip
STP-075-07	20-75	5	7
STP-075-10	20-75	10	10

The Stepnet Panel family comprises both AC- and DC-powered versions. Control interfaces include CANopen as well as traditional Step/Direction inputs. Microstepping delivers smooth, low-resonance performance. In Servo Mode, with encoder feedback, stepper motors run quietly and can operate at higher speeds without stalling.

### Control Modes

- Indexer, Point-to-Point, PVT, PT
- Camming, Gearing
- Position, Velocity, Torque [Servo Mode]
- Position [Microstepping]

### Command & Communications

- CANopen DS-402
- RS-232 ASCII
- Step/Direction, Step Up / Step Down
- $\pm 10V$  position/velocity/torque [STX]
- PWM velocity/torque [Servo Mode]
- Master encoder

### Feedback

- Incremental quadrature encoder [Servo Mode]

### I/O - Digital

- 12 inputs, 4 outputs

### Dimensions: mm [in]

- STX: 146 x 119 x 55 [5.7 x 4.7 x 2.2]
- STP: 136 x 82 x 42 [5.4 x 3.2 x 1.7]

**CANopen**  
Microstepping  
Servo Mode



# Stepnet Module

## STM Module



Model	VDC	Ic	Ip
STM-075-07	20-75	5	7

## STL Micro Module



Model	VDC	Ic	Ip
STL-055-04	20-55	3	4.5
STL-075-03	20-75	2	3

## ST3 3-Axis Module



Model	VDC	Ic	Ip
ST3-055-04	18-55	2	4

The Stepnet Modules provide optimal OEM installation flexibility. Control interfaces include CANopen as well as traditional Step/Direction inputs. Microstepping delivers smooth, low-resonance performance. In Servo Mode, with encoder feedback, stepper motors run quietly and can operate at higher speeds without stalling.

### Control Modes

- Indexer, Point-to-Point, PVT, PT
- Camming, Gearing
- Position, Velocity, Torque [Servo Mode]
- Position [Microstepping]

### Command & Communications

- CANopen DS-402
- RS-232 ASCII
- Step/Direction, Step Up / Step Down
- $\pm 10V$  position/velocity/torque [STM]
- PWM velocity/torque
- Master encoder

### Feedback

- Incremental quadrature encoder [Servo Mode]

### I/O - Digital

- STM, STL: 12 inputs, 4 outputs
- ST3: 15 inputs, 6 outputs

### Dimensions: mm [in]

- STM: 102 x 70 x 25 [4.0 x 2.8 x 1.0]
- STL: 64 x 41 x 16 [2.5 x 1.6 x 0.6]
- ST3: 121 x 70 x 27 [4.8 x 2.8 x 1.1]

**CANopen**  
Microstepping  
Servo Mode

# MACRO Drives

## Xenus<sup>PLUS</sup> XML, XM2 Panel



Model	VAC	I <sub>c</sub>	I <sub>p</sub>
XML-230-18	100-240	6	18
XML-230-36	100-240	12	36
XML-230-40	100-240	20	40

Model	VAC	I <sub>c</sub>	I <sub>p</sub>
XM2-230-20	100-240	10	20

## Accelnet AMP Panel



Model	VDC	I <sub>c</sub>	I <sub>p</sub>
AMP-055-18	20-55	6	18
AMP-090-09	20-90	3	9
AMP-090-18	20-90	6	18
AMP-090-36	20-90	12	36
AMP-180-09	20-180	3	9
AMP-180-18	20-180	6	18

MACRO facilitates the powerful combination of Delta Tau controllers and Copley drives. Both AC-powered Xenus<sup>PLUS</sup> and DC-powered Accelnet are available. Xenus<sup>PLUS</sup> (1 & 2-axis) features high resolution A/D converters for optimal current loop performance as well as Safe Torque Off capability. All MACRO drives interface to a comprehensive range of encoders. A resolver option is available for Xenus<sup>PLUS</sup>.

### Control Modes

- Indexer, Point-to-Point, PVT, PT
- Camming, Gearing
- Position, Velocity, Torque

### Command & Communications

- MACRO [fiber optic]
- RS-232 ASCII
- Step/Direction, Step Up / Step Down
- $\pm 10V$  position/velocity/torque
- PWM velocity/torque
- Master encoder

### Feedback

- Incremental quadrature encoder
- Digital Halls
- BiSS, SSI, Absolute A, EnDat encoders
- Panasonic, Tamagawa, Sanyo Denki
- Analog sin/cos encoder
- Resolver [XML -R option]
- Aux. encoder / encoder out

### Safety Disable [XML, XM2]

- Safe Torque Off [see datasheet for certifications]

### I/O

- Digital XML: 15 inputs, 6 outputs
- Digital XM2: 22 inputs, 7 outputs
- Digital AMP: 11 inputs, 4 outputs
- Analog XML: 2, 16-bit input; 1, 12-bit output
- Analog XM2: 2, 14-bit inputs
- Analog AMP: 2, 12-bit inputs

### Regen

- XML: external regen resistor accessory
- XM2: built-in regen resistor

### Dimensions: mm [in]

- XML: 201 x 145 x 50 [7.9 x 5.7 x 2.3]
- XM2: 235 x 138 x 91 [9.3 x 5.5 x 3.6]
- AMP: 196 x 104 x 30 [7.7 x 4.1 x 1.2]

MACRO

# Junus & Accelus

## JSP Panel



Model	VDC	Ic	Ip
JSP-090-10	20-90	5	10
JSP-090-20	20-90	10	20
JSP-180-10	20-180	5	10
JSP-180-20	20-180	10	20
JSP-180-30	20-180	15	30

## ASC Card



Model	VDC	Ic	Ip
ASC-055-18	20-55	6	18
ASC-090-09	20-90	3	9

Junus is a cost-effective solution for the control of brush motors. Operating in torque and velocity mode, Junus accepts both analog and PWM commands. Sensorless velocity feedback is derived from the motor back-EMF.

Accelus delivers high performance control of brushless and brush motors in a cost-effective card. A panel mounted version is also available. Torque and velocity modes are complemented by Step/Direction position mode. Feedback is incremental encoder and digital Halls.

### Control Modes

- Velocity, Torque
- Gearing [Accelus]
- Position [Accelus]

### Command & Communications

- RS-232
- $\pm 10V$  velocity/torque
- $\pm 10V$  position [Accelus]
- Step & Direction [Accelus]
- PWM velocity/torque
- Master encoder [Accelus]

### Feedback

- Back-EMF [Junus]
- Incremental quadrature encoder [Accelus]
- Digital Halls [Accelus]

### I/O - Digital

- JSP: 5 inputs, 1 output
- ASC: 6 inputs, 2 outputs

### Dimensions: mm [in]

- JSP: 130 x 91 x 31 [5.1 x 3.6 x 1.2]
- ASC: 153 x 89 x 31 [6.0 x 3.5 x 1.2]

# Analog Servo Amplifiers

## Precision Applications

Free from quantization errors, an analog UV amplifier delivers high performance in precision applications. Accepting commutated current commands for both U and V motor windings, the amplifier synthesizes the commanded current for the W winding. For the most sensitive applications an internal edge filter option is available to minimize radiated switching noise.

## Cost-Effective Solutions

PCB-mounted, high density modules are an ideal solution for cost-sensitive multi-axis application of both brushless and brush motors. Trapezoidally commutated, the amplifier modules deliver high current levels from a very small footprint.

## Configuration

Analog amplifier modules are configured by host PCB components and analog control signal inputs. Panel-mounted amplifiers utilize a component header to set current limits and compensate for a wide range of motor inductances.

## Amplifier Technology

- Excellent linearity
- High PWM switching frequency
- Compact size
- Zero deadband
- Internal edge filter option

## Control Interface

- UV commutated current
- $\pm 10V$  current command
- Current limits
- Current monitor

## Protection

- Output short circuit
- Current limiting: continuous, peak, time
- Overtemperature
- Overvoltage shutdown
- Undervoltage shutdown

## 7000 Series



Model	VAC	I <sub>c</sub>	I <sub>p</sub>
7225AC	100-120	10	20
7425AC	100-240	10	20

7000 Series UV amplifiers with optional internal edge filter meet the needs of high precision brushless motor applications. AC-powered, the amplifier does not require transformer isolation. A configuration header is available factory-set for off-the-shelf performance.

Control Mode: Torque  
 Command Interface: UV  
 Commutation: Sinusoidal  
 Dimensions: 191 x 176 x 69 [7.5 x 6.9 x 2.7]

Digital In: Enable, Reset, Motemp  
 Digital Out: Amp OK, Current Limiting  
 Analog In: REF (UV)  
 Analog Out: Motor Current (UV)

## BTM Module



Model	VDC	I <sub>c</sub>	I <sub>p</sub>
BTM-055-20	12-55	10	20
BTM-090-10	12-90	5	10

The Bantam module is a highly cost-effective OEM solution for torque control of brushless and brush motors. PCB-mounted with solderless connectors, Bantam accepts a standard  $\pm 10V$  current command. Digital Hall feedback facilitates trapezoidal commutation of brushless motors. Analog control inputs set current limits and adjust balance.

Control Mode: Torque  
 Command Interface:  $\pm 10V$   
 Commutation: Trapezoidal  
 Feedback: Digital Halls  
 Dimensions: 53 x 46 x 15 [2.1 x 1.8 x 0.6]

Digital In: Enable, Limits, Inductance Select  
 Digital Out: Amp OK, Regen, Brake  
 Analog In: REF, Balance, I<sub>c</sub>/I<sub>p</sub>/I<sub>t</sub> Limits  
 Analog Out: Motor Current, Ref. Current

**BTM** available ruggedized





## **Distributors for Australia & New Zealand**

### **MOTION TECHNOLOGIES PTY LTD**

24/22-30 Northumberland Road  
Caringbah NSW 2229 Australia  
Phone: (02) 9524 4782  
Fax: (02) 9525 3878

[sales@motiontech.com.au](mailto:sales@motiontech.com.au)  
[www.motiontech.com.au](http://www.motiontech.com.au)

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### **Copley Controls**

20 Dan Road  
Canton, MA 02021  
USA  
Tel: 781-828-8090  
[www.copleycontrols.com](http://www.copleycontrols.com)