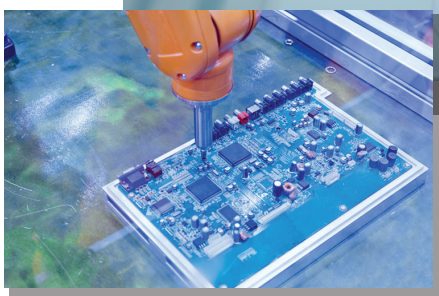
Modules



CUSTOMIZED SERVO & STEPPER DRIVES WITH FIRMWARE AND SOFTWARE

2019 OEM Products

copley controls

modules

Copley Controls delivers high performance motion solutions to a wide range of industries including semiconductor, life sciences, test systems, automated assembly, and COTS military. An ISO 9001:2015 company, Copley produces products of the highest quality in state-of-the-art manufacturing facilities in the US and China. Copley drives carry a full 2-year warranty.

With over 35 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.

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 100 W - 6 kW power range. They provide a comprehensive range of motor feedback interfaces, advanced tuning and commutation algorithms that 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.

copley controls

Modules (Servo & Stepper)

Modules are pin versions of Copley panel drives with size and cost optimized circuits. The OEMs can select the required interface circuits and connectors to mount on their own PCBs. Copley provides development kits, PCB layout reference designs, customized hardware, firmware, and software to help expedite the development cycle.

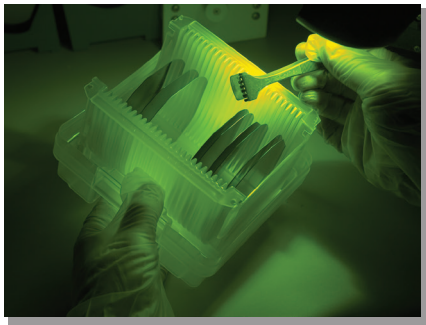
Feedback

Digital incremental encoder and Halls are the standard interface on servo drives with position mode capability. Optional features include Sin/Cos encoders and Resolvers. Firmware incorporates a wake-and-wiggle algorithm for commutation without Halls. Copley Plus drives are available with a growing range of open standard absolute encoder interfaces including BiSS, SSI, Absolute A and EnDat.

Configuration & Control Software

Copley drive configuration software, CME is highly intuitive and incorporates powerful diagnostic tools. An easy-to-use Indexer is built in. For more complex applications, Copley Programming Language (CPL), 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.



modules

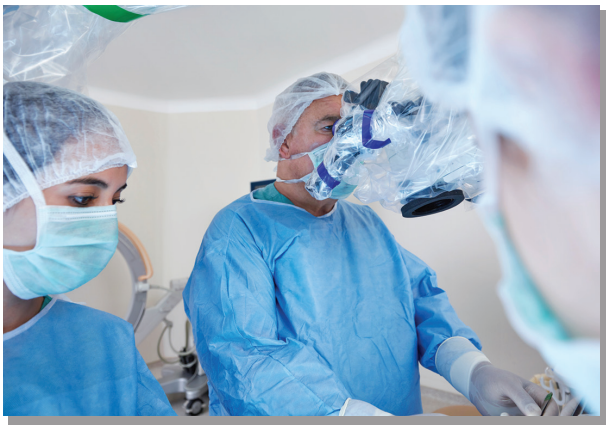
Networking Software

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

Copley supports two development environments. Copley Motion Libraries (CML) source code can be complied with a C++ application program for CANopen and EtherCAT. Copley Motion Objects (CMO) for CANopen is a .Net® assembly that can be used by Visual Studio® or any program supporting the .Net® framework.

The Copley PLUS Advantage

PLUS drives support EtherCAT or CANopen and offer expanded feedback options. Multi-axis 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 set point trigger output.



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

Stepper Technology

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

Design Standards

- UL/IEC 61010-1, 3rd Edition
- UL/IEC 61800-5-1
- UL/IEC 61800-5-2
- IEC 61800-3
- EN 55011
- EN 61000-6-1

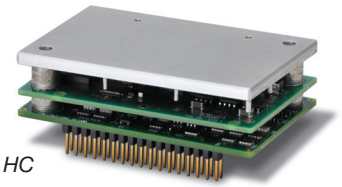
STO (Safe Torque Off)

The STO capability of PLUS module drives, eliminates the expensive contactors and complex wiring traditionally used in safety critical applications. STO provides two drive enable inputs, facilitating system conformance to *SIL* 3 (IEC 61800-5-2) and Category 3 PL d (ISO 13849-1).

modules

Accelnet Module
(Servo)

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



Accelnet ACK HC

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

Command & Communications
- CANopen DS-402
- RS-232, ASCII & Serial Binary
- Step/Direction, Step Up / Step Down
- ±10 V Position/Velocity/Torque
- PWM Velocity/Torque
- Master encoder

Feedback
- Incremental encoder & digital Halls

Advanced Feature Set (ACK HC)
- Fast indexer, CSP (Cyclic Synchronous Position)
- 32-bit floating point multi loop filters
- CPL (Copley Programming Language)
- Frequency analysis tools

I/O
- 9 inputs, 2-3 outputs
- 1, 12-bit Analog input

Dimensions: mm (in)
- **ACM102** x
- **ACK 64** x

	Model	Vdc	Ic	Ip
ACM	ACM-090-60	20-90	30	60
	ACM-180-09	20-180	3	9
	ACM-180-18	20-180	6	12
	ACM-180-20	20-180	10	20
	Model	**Vdc**	**Ic**	**Ip**
ACK	ACK-055-06	14-55	3	6
Micro	ACK-055-10	20-55	5	10
	ACK-090-04	14-90	2	4
	ACK-090-08	20-90	4	8
	Model	**Vdc**	**Ic**	**Ip**
ACK	ACK-090-20	14-90	10	20
Micro HC	ACK-090-30	14-90	15	30

Stepnet Module
(Stepper)

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
- PVT, PT
- Camming, Gearing, Indexer, Point-to-Point
- Position, Velocity, Torque (Servo Mode)
- Position (Microstepping)

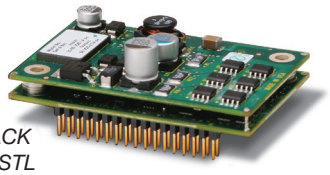
Command & Communications
- CANopen DS-402
- RS-232, ASCII & Serial Binary
- Step/Direction, Step Up / Step Down
- ±10 V Position/Velocity/Torque (STM)
- PWM Velocity/Torque
- Master encoder

Feedback
- Incremental encoder

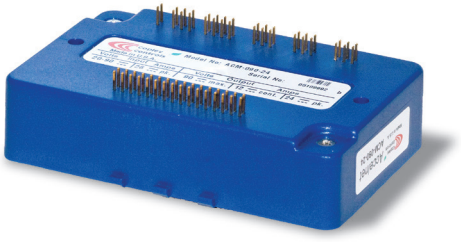
I/O
- STM, STL: 12 inputs, 4 outputs
- STM: 1, 12-bit Analog input

Dimensions: mm (in)
- **STM 102** x
- **STL 64** x

	Model	Vdc	Ic	Ip
STM	STM-075-07	20-75	5	7
	Model	**Vdc**	**Ic**	**Ip**
STL	STL-055-04	20-55	3	4.5
Micro	STL-075-03	20-75	2	3



Accelnet ACK & Stepnet STL



Accelnet ACM & Stepnet STM

Argus^{PLUS} Module
(Servo)

Argus^{PLUS} sets new levels of performance, connectivity, and flexibility. EtherCAT and CANopen versions are available. A wide range of absolute encoders are supported. Both isolated and high-speed non-isolated I/O are provided.

Argus^{PLUS} GEM

Control Mode
- PVT, PT, CSP, CSV, CST
- Camming, Gearing, CPL, Indexer, Point-to-Point
- Position, Velocity, Torque

Command Interface
- ASCII, Serial Binary and discrete I/O
- Stepper commands
- ±10 V Position/Velocity/Torque
- PWM Velocity/Torque command
- Master encoder (Gearing/Camming)

Communication
- EtherCAT (GEM)
- CANopen (GPM)
- RS-232
- RS-422

Feedback

Incremental
- Digital quad A/B encoder
- Analog Sin/Cos encoder

Absolute
- SSI
- EnDat 2.1 & 2.2
- Absolute A
- BiSS (B & C)

Other
- Dual Absolute
- Digital Halls
- Resolver (-R model)

Functional Safety
- STO

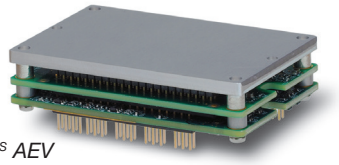
I/O Digital
- 11 inputs, 9 outputs
- 1, 12-bit Analog input

Dimensions: mm (in)
- 78.7 x 60.1 x 23.4 (3.10 x 2.40 x 0.92)

	Model	Vdc	Ic	Ip
GEM, GPM	G*M-055-60	9-55	30	60
	G*M-090-60	14-90	30	60
			Resolver: -R	

Accelnet^{PLUS} Module
(Servo)

Accelnet^{PLUS} Modules deliver high performance in compact PCB-mounted packages. EtherCAT and CANopen versions are available. Multi-axis models deliver optimal cost per node. Higher-resolution current loops enable Accelnet^{PLUS} to meet the needs of the most demanding applications.



Accelnet^{PLUS} AEV

Control Modes
- PVT, PT, CSP, CST and CSV
- Camming, Gearing, CPL, Indexer, Point-to-Point
- Position, Velocity, Torque

Command & Communications
- EtherCAT CoE DS-402 (AEM, AE2, AEV)
- CANopen DS-402 (APM, AP2, APV)
- RS-232 ASCII & Serial Binary
- Step/Direction, Step Up / Step Down
- ±10 V Position/Velocity/Torque
- PWM Velocity/Torque
- Master encoder

Feedback
- Incremental encoder & digital Halls
- BiSS, SSI, Absolute A, EnDat encoders
- Analog Sin/Cos encoder
- Aux. encoder / encoder out
- Dual absolute (AEV, APV)

Functional Safety
- STO: AEV, APV

I/O – Digital
- 7-20 inputs, 6-7 outputs
- 1-2, 12-bit Analog inputs

Dimensions: mm (in)
- **A*M** 77 x 59 x 20 (3.0 x 2.3 x 0.8)
- **A*2** 114 x 73 x 20 (4.5 x 2.9 x 0.8)
- **A*V** 64 x 41 x 27 (2.5 x 1.6 x 1.1)

	Model	Vdc	Ic	Ip
AEM, APM	A*M-090-06	14-90	3	6
	A*M-090-14	14-90	7	14
	A*M-090-30	14-90	15	30
	Model	**Vdc**	**Ic**	**Ip**
AE2, AP2	A*2-090-06	14-90	3	6
2-Axis	A*2-090-14	14-90	7	14
	A*2-090-30	14-90	15	30
	Model	**Vdc**	**Ic**	**Ip**
AEV, APV	A*V-090-14	9-90	7	14
Micro	A*V-090-30	9-90	15	30
	A*V-090-50	9-90	25	50
	A*V-180-10	20-180	5	10
	A*V-180-20	20-180	10	20

* Indicates E for EtherCAT and P for CANopen.

Stepnet^{PLUS} Module
(Stepper)

Stepnet^{PLUS} Modules deliver high performance in 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.

Control Modes

- PVT, PT, CSP, CSV, CST
- Camming, Gearing, CPL, Indexer, Point-to-Point
- Position, Velocity, Torque (Servo Mode)
- Position (Microstepping)

Command & Communications

- EtherCAT CoE DS-402 (SEM, SE2, SE4)
- CANopen DS-402 (SPM, SP2, SP4)
- RS-232 ASCII & Serial Binary
- Step/Direction, Step Up / Step Down
- ±10 V Position/Velocity/Torque
- PWM Velocity/Torque
- Master encoder

Feedback

- Incremental encoder (S*M, S*2)
- BiSS, SSI, Absolute A, EnDat encoders

I/O – Digital

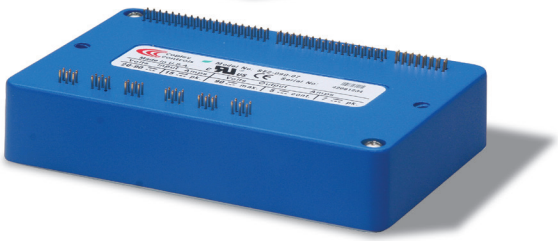
- Digital S*M: 14 inputs, 6 outputs
- Digital S*2: 26 inputs, 7 outputs
- Digital S*4: 24 inputs, 8 outputs
- Analog S*M, S*2: 1-2, 12-bit inputs per axis

Dimensions: mm (in)

- **S*M** 76 x 59 x 20 (3.0 x 2.3 x 0.8)
- **S*2** 114 x 73 x 20 (4.5 x 2.9 x 0.8)
- **S*4** 102 x 76 x 21 (4.0 x 3.0 x 0.8)

	Model	Vdc	Ic	Ip
SEM, SPM	S*M-090-07	14-90	5	7
	S*M-090-10	14-90	10	10
	Model	**Vdc**	**Ic**	**Ip**
SE2, SP2	S*2-090-07	14-90	5	7
2-Axis	S*2-090-10	14-90	10	10
	Model	**Vdc**	**Ic**	**Ip**
SE4, SP4	S*4-055-03	14-55	3	3
4-Axis				

Accelnet^{PLUS} AEM & Stepnet^{PLUS} SEM



Accelnet^{PLUS} AE2 & Stepnet^{PLUS} SE2

M Series Module
(Servo/Stepper)

M-Series PCB-mounted modules have the flexibility to drive both servo and stepper motors. EtherCAT and CANopen versions are available. The 3-axis M3 and 4-axis M4 deliver extremely low cost per node. Incremental encoder feedback is standard.

Control Modes

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

Command & Communications

- EtherCAT CoE (ME3, ME4)
- CANopen DS-402 (MP3, MP4)
- RS-232 ASCII & Serial Binary
- Step/Direction, Step Up / Step Down
- ±10 V Position/Velocity/Torque
- PWM Velocity/Torque
- Master encoder

Feedback

- Incremental encoder & digital Halls
- BiSS, SSI, Absolute A, EnDat encoders (M*3)
- Analog Sin/Cos encoder (M*3)
- Aux. encoder / encoder out (M*3)

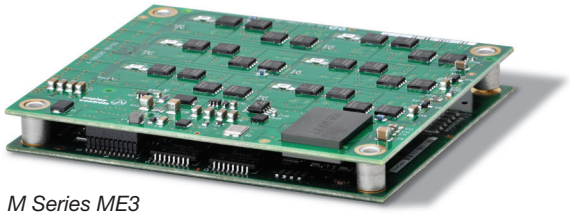
I/O

- Digital M*3: 19 inputs, 6 outputs
- Digital M*4: 24 inputs, 7-8 outputs
- Analog M*3: 1, 12-bit input per axis

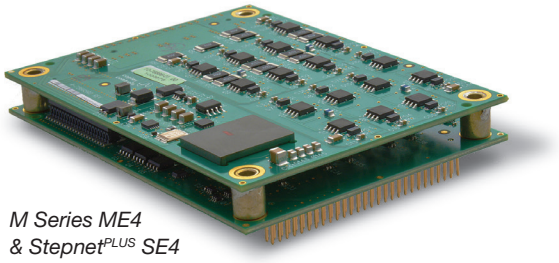
Dimensions: mm (in)

- **M*3** 102 x 85 x 21 (4.0 x 3.4 x 0.8)
- **M*4** 102 x 76 x 21 (4.0 x 3.0 x 0.8)

	Model	Vdc	Ic	Ip
ME3, MP3	M*3-090-10	14-90	5	10
3-Axis				
	Model	**Vdc**	**Ic**	**Ip**
ME4, MP4	M*4-055-03	14-55	3	3
4-Axis				



M Series ME3



M Series ME4 & Stepnet^{PLUS} SE4

* Indicates E for EtherCAT and P for CANopen.

Integrated Servo Drive

The Integrated EtherCAT Servo Drive is a single board connector designed for mounting on motors or in robotic joints. A center cut in the middle allows power and network cables to pass through.

Control Mode

- PVT, PT, CSP, CSV, CST

Command Interface

- EtherCAT
- ASCII and Serial Binary
- ±10 V position/velocity/torque command
- Master Encoder (Gearing/Camming)

AFS Advanced Feature Set

- Fast indexer, CSP (Cyclic Synchronous Position)
- BiSS -C Unidirectional, SSI
- 32-bit floating point multi loop filters
- CPL (Copley Programming Language)
- Frequency analysis tools

Communications

- EtherCAT
- RS-232

Feedback

- Dual loop feedback
- BiSS -C, Absolute Clock and data
- Digital quad A/B encoder
- Digital Halls
- Aux. encoder

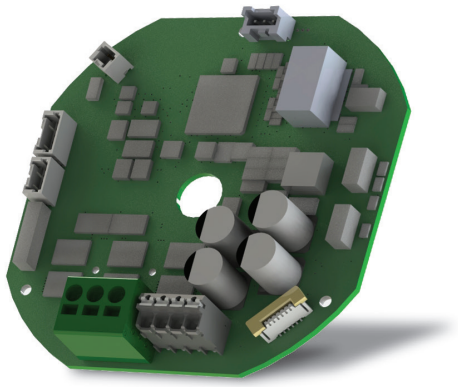
I/O – Digital

- 1 input, 2 outputs
- 2 Analog inputs

Dimensions: mm (in)

- **IES** 80 x 80 x 20 (3.15 x 3.15 x0.79)
  Radius: 44.7 (1.76)
  Center cut: 10 (0.39)

	Model	Vdc	Ic	Ip
IES	IES-060-30	14-60	15	30



AFS

Integrated Servo Drive IES

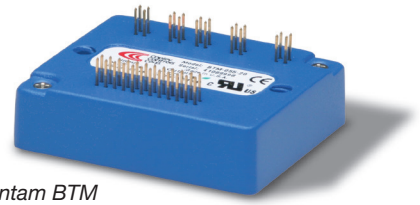
Bantam Module

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 ±10 V current command. Digital Hall feedback facilitates trapezoidal commutation of brushless motors. Analog control inputs set current limits and adjust balance. Analog outputs monitor current. Digital inputs are for enable, limits and low inductance while digital outputs are for Amp OK, brake and regen.

Dimensions: mm (in)

- **BTM** 53.3 x 45.7 x 15.2 (2.1 x 1.8 x 0.6)

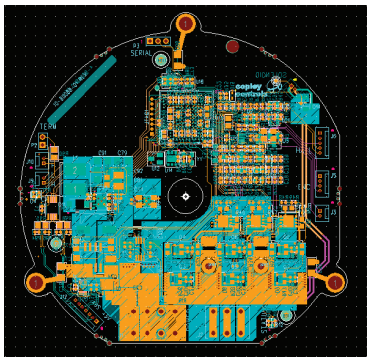
	Model	Vdc	Ic	Ip
BTM	BTM-055-20	12-55	10	20
	BTM-090-10	20-90	5	10



Bantam BTM

Custom Servo Drive

Copley Controls provides competitive advantage to the OEM by tailoring designs to precisely fit the application. Our engineers 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.



20 Dan Road | Canton, MA 02021 | USA

781-828-8090

copleycontrols.com