

The SB1292 Universal Motion Control Module

**Motion Control Module with Digital 500W
Drive offers Dual-Axis Control for Brush,
Brushless and AC Induction Motors**

DC Brush DC Brushless AC Induction

Standalone and Fully Programmable Operation

Powerful I/O handling with advanced PLC capabilities

Advanced Real-Time Position Event Generator-PEG

Optional CANbus Interface with CANOPEN Protocol

Optional Resolver Feedback

**Integrated Digital Drive with Advanced 20/40kHz PWM
Power bridge**

Comprehensive Safety, Diagnostics, and Protection

Full Interactive Application Development Suite

**Comprehensive C, C++, and Visual Basic libraries for DOS,
Windows 3.x/95/98/NT and Linux**

The SB1292 is a powerful and cost effective combination of an advanced programmable controller, two all-digital drives, and a power supply (with a separate, backup input for the control section). The universal drives are software configurable for the following motor types: DC brushless (with sinusoidal s/w commutation), AC induction, DC brush, and stepper (with 256 micro-step resolution). The drive is suitable for motors rated up to 500W (60VDC, 7.5A continuous, and 15A peak).

The SB1292 supports encoder (+ Hall) or resolver (12 bit resolution) as primary feedback. In addition to dedicated safety inputs, it has sixteen inputs, sixteen outputs, two analog inputs, and two analog outputs.

ACS control modules are based on state of the art, proprietary technology that is used in thousands of demanding systems, such as, semiconductor assembly and testing, electronic assembly and inspection, digital printing, medical imaging, and packaging. Built-in capabilities simplify programming common applications, such as, advanced pick & place, master/slave, and electronic gearing and cam.

The modules can be programmed to handle motion, time, and I/O events. They can operate standalone, without a PLC or a PC. RS-232/422/485 serial communications is standard and CANbus with CANOPEN protocol is optional. Every module meets stringent safety and EMC standards and is CE compliant.

Windows tools are provided for setting up and tuning the modules and for developing application programs. Libraries for Microsoft C/C++, Borland C/C++ and Visual Basic are available for DOS, Windows 3.11/95/98/NT and Linux. The libraries support multithreading in Windows 95/98/NT and Linux.

Main Features

Standalone and Fully Programmable Operation

- Easy to program using ACSPL, a powerful, high level language that is generic for all ACS motion control modules.
- 32k user program memory
- General purpose I/O: 16 inputs and 16 outputs, all opto-isolated
- Two 12 bit analog inputs that can be used for feedback, such as, force and position control
- Two 10 bit analog outputs for monitoring and additional control functions
- Powerful I/O handling with advanced PLC capabilities
- Teach & go for up to 1,024 XY points
- Built-in smart XY joystick interface
- RS-232/422/485 high speed serial communications interface, up to 57600 baud rate
- Optional CAN interface with CANOPEN protocol

Special Features for Demanding Applications

- Master/slave, electronic gearing, and electronic cam operation
- PEG (Position Event Generator) for real-time position compare
- High-speed registration mark input with 1 count accuracy position capture
- Advanced “search for contact” motion mode for pick & place applications

Universal Digital Drive

- 7.5A continuous, 15A peak, 24VDC to 60VDC (18VAC to 45VAC)
- Software configurable for DC brushless, AC induction, DC brush, and step motors
- High performance digital current control
- State of the art 20kHz/40kHz PWM power bridge with optimized current ripple and efficiency
- Sinusoidal commutation with automatic setup for three-phase motors

Outstanding Performance and Capabilities

- Fully digital position, velocity, and current control at 20kHz sampling rate, for excellent dynamic and tracking performance
- Special built-in features and support for DC brushless linear motor applications
- Dual loop capability supports two encoders (per axis), one mounted on the motor and one on the load, for accurate belt-driven and lead-screw based applications
- State of the art, proprietary Servo Processor technology

Comprehensive Safety, Diagnostics, and Protection

- Programmable automatic routine for each fault, error, and exception
- Real-time data collection of one or two variables, programmable sampling rate up to 1kHz.
- Two separate power supplies: 24VDC backup supply for the control logic section, 24VDC to 60VDC (18VAC to 45VAC) for the power section
- 7-segment display for error, status, and programmable messages
- CE marked, meets European safety standard EN60204-1 and EMC standards EN50081-2 (emission) and EN50082-2 (immunity)

Powerful Programming and Support Tools

ACS Adjuster for Windows: Interactive tool for setting up and tuning

ACS Debugger for Windows: Development environment for ACSPL applications

ACS Saver/Loader for Windows: Tool for copying system setup and application data from one controller to another

ACSLIB C Libraries: Comprehensive C, C++, and Visual Basic libraries for DOS, Windows 3.11/ 95/ 98/ NT and Linux; Full multithreading support for Windows 95 and NT

Specifications

Position Control

Sampling Rate: 20kHz

Control Algorithms: Pgain, acceleration feed-forward, automatic velocity feed-forward, anti-reset windup

Trajectory Calculation Rate: 1kHz

Position Range: $\pm 999,999,999$ counts

Position Accuracy: ± 1 encoder count

Position Feedback:

Primary: Incremental encoder (+ Hall) or resolver

Secondary: Incremental encoder only

Encoder: Incremental, 3 channel (A, B, I), differential line drivers, 0V to 5V

Supply Voltage: 5V

Maximum current consumption from onboard supply:

100mA per encoder (400mA total) (Use external supply if higher current is needed.)

Hall: 3 channel, 0V to 5V or equivalent commutation tracks

Resolver (must be specified with order):

Onboard RDC: 12 bit resolution (4096 counts/rev), 1kHz bandwidth

Frequency: 5 to 7kHz

Reference Voltage: $4V \pm 20\%$ rms

Reference Current (@5kHz): $< 25\text{mA}$ rms

Transformation Ratio: 0.5

DC Resistance: rotor $> 15\Omega$, stator $> 40\Omega$

Pole Pairs: 1

Dual Loop Support:

Primary feedback (encoder only) for velocity and commutation; secondary feedback (encoder only) for position

Position Registration Delay: $< 1\mu\text{second}$

Position Event Generator (PEG™):

Output: Differential line driver, 0V to 5V

Delay: $< 0.2\mu\text{second}$

Position Compare Accuracy: ± 1 count at up to 5,000,000 count/second

Repetition Rate:

Random Mode: 5 events/0.001 second

Incremental Mode: up to 1MHz

Velocity Control

Sampling Rate: 20kHz

Control Algorithm: PI + second order low pass filter

Range: Up to 128,000,000 count/second

Resolution: 1 count/second

Incremental Encoder Count Rate: Up to 32,000,000 count/second

Velocity Accuracy:

Long Term: 0.005%

Short Term: 0.01% - 0.5% (system-dependent)

Acceleration Range: Up to 2,000,000,000 count/second²

Power Supplies

Separate Supplies: Drive and control. (For I/O, see I/O section)

Drive: 24 to 60VDC (18 to 45VAC)

Control (Backup): 24VDC $\pm 20\%$ or 18VAC $\pm 20\%$, 20W

Regeneration: R = 100 Ω , 30W

Drive

Type: PWM, digital current control

PWM Frequency: 20kHz/40kHz, programmable

Motor Types: DC brushless, AC induction, DC brush

Current Loop Sampling Rate: 20kHz

Control Algorithm: PI

Current Resolution: 12 bit

Bus Voltage: 24 to 60VDC (18 to 45VAC)

Phase Current (Sine Wave Amplitude): 7.5A continuous, 15A peak for 1 second

Minimum Inductance: 0.25mH

Current Ripple (60VDC, 6A, L=2mH): $< 0.1\text{A}$

I/O

Safety Inputs: Left and right limit per axis. E-stop

General Purpose Inputs: 16

General Purpose Outputs: 16, 50mA/output, maximum total current 350mA

Features Common to Safety and General I/O:

Type: Source Opto-isolated (contact factory for other configurations)

Fed by common external supply via the I/O connector

Response Time: $< 1\text{msecond}$

External Supply Range: 5VDC (10%) or 24VDC (20%), detected automatically

Analog Inputs: One per axis. Differential, $\pm 10\text{V}$, 12 bit resolution

Analog Outputs: One per axis. Single ended, $\pm 10\text{V}$, 10 bit resolution

Communication

Standard: RS-232/422/485, up to 57,600 baud.

Optional: CANbus with CANOPEN protocol, up to 1 Mbit/second

Processors

Dual Processor Architecture:

20MHz Intel 80C196KD for high level tasks and management

80MHz SB2500 ACS Servo Processor for each axis for real-time control tasks

Memory

Firmware: 256k

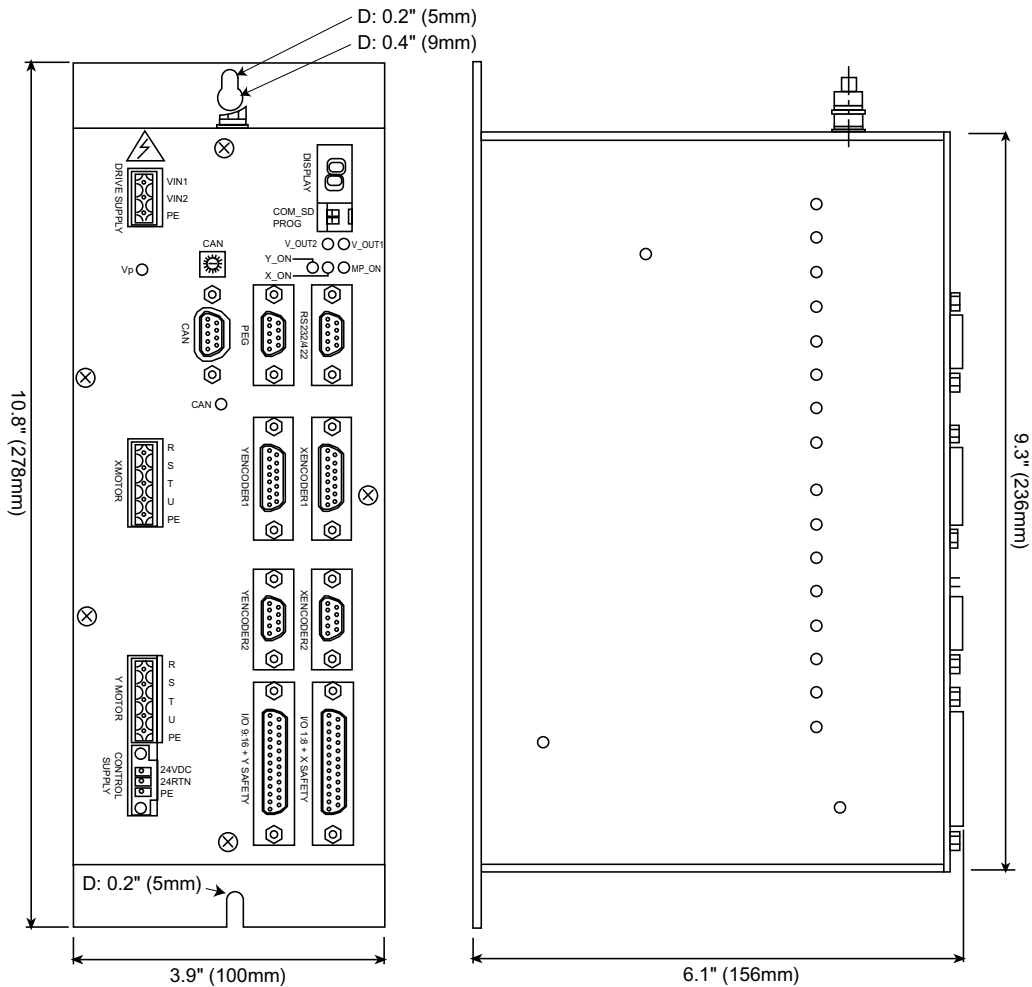
RAM: 256k

Nonvolatile Memory: 128k, 100,000 write cycles

User Program Memory: 32k

Dimensions

Unit Size: 11" H x 3.9" W x 6.1" D (278mm x 100mm x 156mm)



Need more information on the SB1292? Please visit: <http://www.acs-tech80.com/products/sb1292/>

How To Order

EXAMPLE

SB1291 - A - E - R - A

B 18-45VAC, 7.5A or 24-60VDC, 7.5A

E Encoder Feedback

R Resolver Feedback

R RS232/422/485

C CANBus (CANOPEN Protocol)

A All Firmware Options Included

(Documentation and ACSPL software tools are included)

1291SUP

Power Supply

ACSLIB

ACSPL C Libraries and documentation

Warranty

This product is warranted according to the Terms and Conditions of Sale and is effective for one year after shipment from ACS-Tech80. For further warranty information, please consult the hardware manual.

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