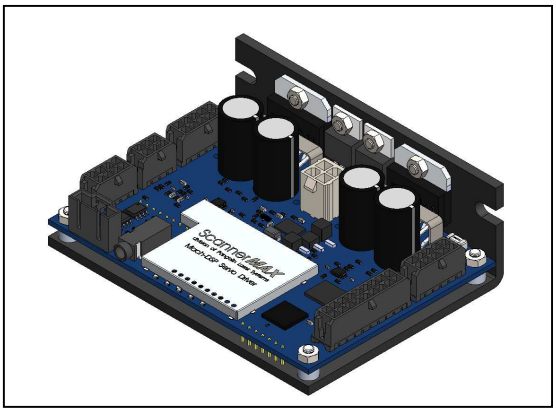
Mach-DSP Servo Driver for all ScannerMAX galvos

APPLICATIONS

- Raster Imaging
- Optical Layout Templates
- Optical Coherence Tomography
- Laser entertainment (light show) displays
- Laser Marking (including XY2-100 support)



UNIQUE ScannerMAX FEATURES

- PC-based Graphical User Interface
- Six user-configurable test / status outputs
- Up to four, instantly-accessible scanner tunings
- Built-in diagnostic and performance analysis tools
- Supports PD, PID, PDF and PDFF servo control laws

BENEFITS

- Compact package size
- Modest power requirements
- Highly configurable and versatile
- Single package handles both X and Y axis
- Ability to add customizations via firmware updates

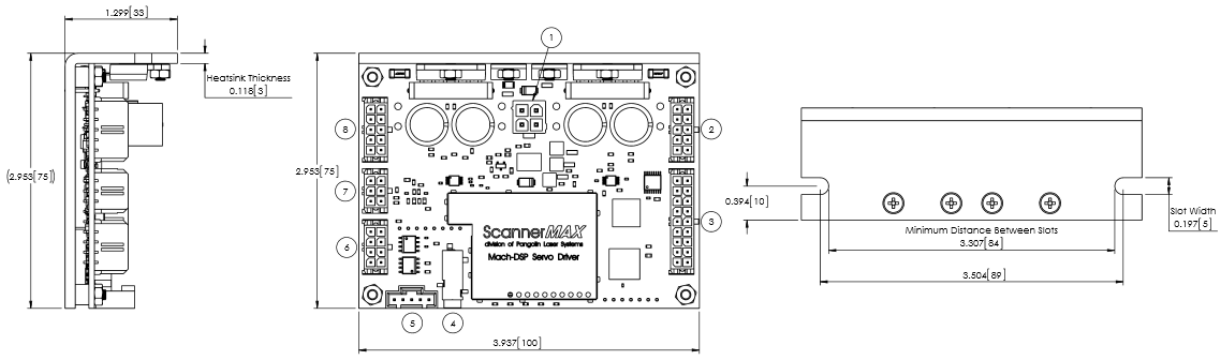
GENERAL DESCRIPTION

The *Mach-DSP* servo driver is Pangolin's latest and most advanced development in galvo control technology. By taking advantage of high-speed floating-point Digital Signal Processors, 16-bit data converters, direct digital command input, and highly configurable servo algorithms, the *Mach-DSP* provides full-function, two-axis servo driver electronics in a cost-effective and compact package. Many advanced techniques and user-customizable features are embodied within the *Mach-DSP* which, when combined with Pangolin's ScannerMAX scanners, deliver a level of speed, accuracy and convenience that were unattainable before now.

The *Mach-DSP* can be accessed using a PC-based Graphical User Interface software package, where the built-in Test Pattern Generator, Oscilloscope and Dynamic Signal Analyzer can be used to monitor and adjust the more than 50 performance parameters per axis. These performance parameters can be stored in four separate memory areas (called "tunings") for instant access and recall at any time. Additional features and behavioral customizations can be added via firmware updates that take only a few minutes to download, helping to make the *Mach-DSP* "future-proof".

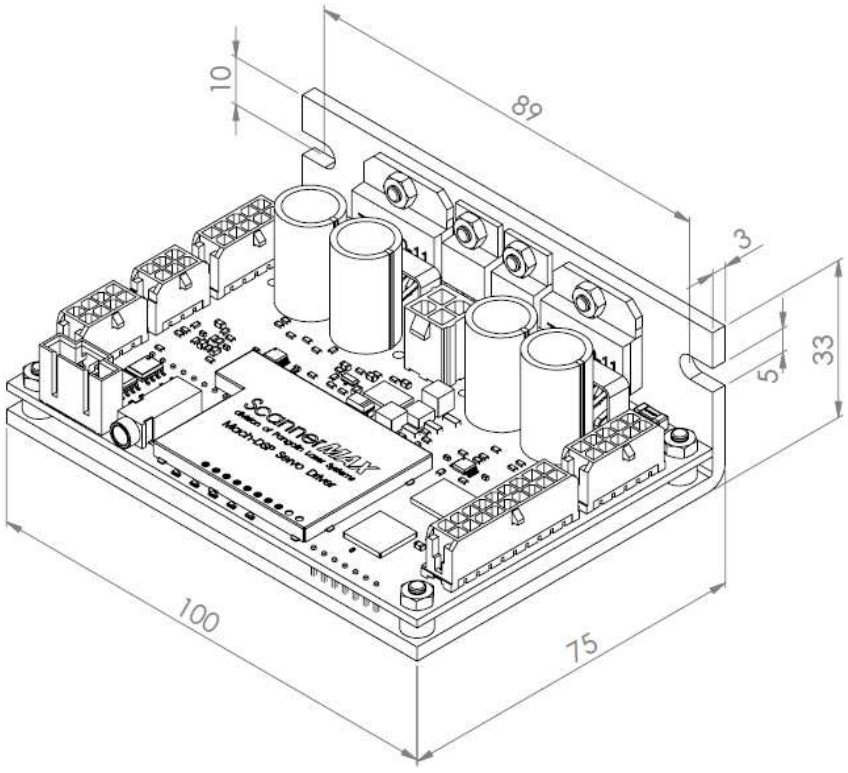
The *Mach-DSP* servo driver was created with OEMs in mind, incorporating a simple yet comprehensive and flexible interface structure, consisting of the usual analog command input and analog position output, but also including two optically-isolated TTL inputs and outputs, two serial ports, and six user-configurable analog outputs. This, together with the modest power requirement and compact size allows laser system manufactures to package the servo driver electronics, the scanners, and often the power supply as well, directly into the laser projector head.

OUTLINE DRAWING

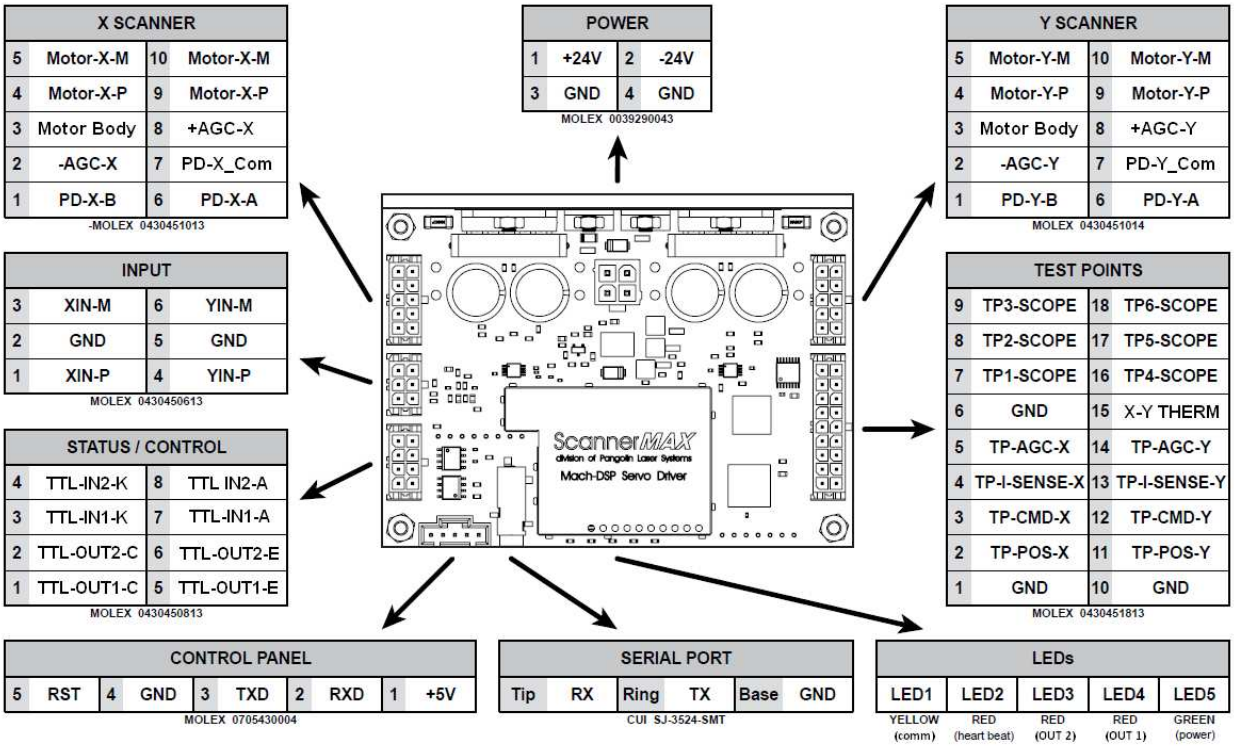


SPECIFICATIONS

Parameter	Value	Units and Comments
Power Supply Voltage (standard configuration)	±24	Volts, DC
Power Supply Range (upon special order)	±12 to ±30	Volts, DC
Power Supply Quiescent Current	+200, -230	mA, with ±24V power supply
Motor Drive RMS Current	5	Amperes, RMS, Per Axis
Motor Drive Peak Current	10	Amperes, Maximum, Per Axis
Analog Command Input Signal	up to ±10	Volts, user-configurable Scale
Analog Command Input Impedance	20	KΩ differential
XY2-100 compatible Digital Command Input Signal	16-bits or 18-bits	3.3V direct-connect or RS-422 signaling
Digitizing Resolution	16-bits	for all analog inputs and outputs
Enhanced Resolution (for low dither applications)	17 / 18-bits	for Position / Command
Sample rate for analog inputs and outputs	200 / 300	Dual-axis / Single-axis, ksps
Position Test Point Output	±10	Volts, scanner-dependent scale
Current Test Point Output	±10	Volts, full scale (1 volt per amp)
AGC Test Point Output	0 to -15	Volts, full scale
Six separate user-configurable Analog Outputs	±5	Volts, User-configurable Scale
Two separate programmable Digital Inputs	TTL-level	Optically-isolated
Two separate programmable Digital Outputs	TTL-level	Optically-isolated
Bi-directional Serial / USB and Control Panel Ports	3.3V TTL-level	Asynchronous and Synchronous
Size (inches)	2.95 x 3.94 x 1.3	W x L x H, Inches
Size (millimeters)	75 x 100 x 33	W x L x H, mm
Mass	170	Grams



Mach-DSP Connector Locations and Pinout



CONNECTORS

Connector Function	Connector Housing P/N	Pin P/N	AWG
POWER	Molex 0039012040	0039000073 or 0039000074	#18-#24
COMMAND INPUT	Molex 0430250600	0430300001 through 0430300012	#20-#30
X & Y SCANNER	Molex 0430251000	0430300001 through 0430300012	#20-#30
CONTROL PANEL	Molex 0050579405	0016020082 or 0016020088	#22-#30
TEST POINTS	Molex 0430251800	0430300001 through 0430300012	#20-#30
STATUS / CONTROL	Molex 0430250800	0430300001 through 0430300012	#20-#30
USB / SERIAL PORT	-	-	

MORE INFORMATION

More information about ScannerMAX scanners and servo drivers, including additional application hints and tips can be found at www.ScannerMAX.com.

LASER SCANNING BOOK AVAILABLE

Detailed information about galvanometer scanners, servo driver techniques, and scanner applications can be found in the #1 best-selling book *LASER SCANNERS: Technologies and Applications*, written by Pangolin's President William R. Benner, Jr. The book can be found at www.LaserScanningBook.com.

PATENT AND TRADEMARK INFORMATION

ScannerMAX products are covered by one or more of the following patents:

US Utility Patent Number: 7,092,135
US Utility Patent Number: 7,688,432
US Utility Patent Number: 7,940,380
US Utility Patent Number: 8,254,045
US Utility Patent Number: 8,508,726
US Utility Patent Number: 8,963,396
US Utility Patent Number: 9,077,219
US Utility Patent Number: 9,195,061
US Utility Patent Number: 9,244,273
US Utility Patent Number: 9,270,144
US Utility Patent Number: 9,366,860
US Utility Patent Number: 9,530,559
US Utility Patent Number: 9,991,773
US Utility Patent Number: 10,284,038
US Utility Patent Number: 10,305,358
US Utility Patent Number: 10,539,433
US Utility Patent Number: 10,720,824
US Utility Patent Number: 10,734,857
German Patent (Utility Model) Number: 20 2012 009 275.8
German Patent (Utility Model) Number: 20 2013 000 369.3
German Patent (Utility Model) Number: 20 2013 003 263.4
German Patent (Utility Model) Number: 20 2014 000 846.9
German Patent (Utility Model) Number: 20 2014 002 094.9
German Patent (Utility Model) Number: 20 2016 000 737.9
German Patent (Utility Model) Number: 20 2019 002 282.1
German Patent (Utility Model) Number: 20 2020 000 007
German Patent (Utility Model) Number: 20 2020 000 420
Chinese Patent No. ZL201110066043.6
Chinese Patent No. ZL201210363949.9
Chinese Patent No. ZL201210363955.4
Chinese Patent No. ZL201310151544.3
Chinese Patent No. ZL201920775937.4
Chinese Application for Invention No. 201310128586.5
Chinese Utility Model No. ZL201420101575.8
Chinese Utility Model No. ZL201420102156.6
Chinese Utility Model No. ZL201620112019.X
Other US and International Patents Pending.

Mach-DSP and *ScannerMAX* are trademarks of Pangolin Laser Systems, Inc.

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