LX2 Standalone Operation

ASI's LX2 card is capable of driving two motorized axes and is available with a special build of MS2000 firmware. This allow the LX2 card to be operated in standalone configuration without any additional electronics to support it. LX2 supports the same serial commands as MS2000 controller. The LX1 is identical in terms of interfacing, but supports only a single motorized axis.

LX2 card firmware has the `TWO_AXIS_CARD` module in the BUILD X response.

Features

- 100 MHz Microcontroller for faster command processing and servo control
- Closed-loop DC servo control of up to two motorized axes
- Firmware upgradeable via serial connection
- Remembers last position on power down/up
- RS232 serial control with baud rates to 115200 Baud
- Compact unit 6.3”D x 3.9”W x 1”H (160 x 100 x 25 mm)

Basic Spec

Digital Servo Loop Time	250 microsec × number of axes
Digital-Closed-Loop Speed Dynamic Range	> 40 dB
Motor Type	Brushed DC Servo Motors
Maximum Motor Current	1 Amp
Motor Voltage	6-24 V
Encoder Options	Internal Rotary or External Linear Encoders are supported
Number of Axes	Up to two Motor Axes
Manual Controls	none
Display	none
Computer Interface	RS232 Serial
Interface Baud Rate	115200
Electrical Requirements from External Power Supply Voltage	
24V DC Current (max)	1 Amp
5V DC Current (max)	200 ma

Some notable differences with MS2000 are

- Serial communication only through a DB9 connector, no USB available.
- No LCD output
- No Manual input devices
- Controls upto 2 Motorised axis
- Serial baud rate fixed at 115200 baud

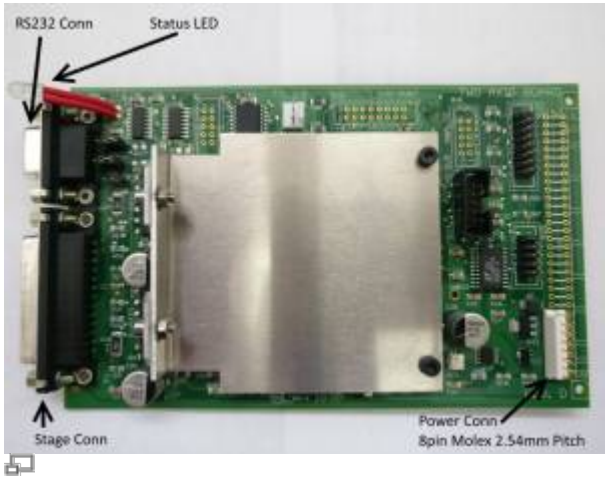
Some notable Similarities with MS2000 are

- Same drive electronics and performance as MS2000
- Same serial command set as MS2000 and RM2000
- Fully supported on ASI Console, and other 3rd party software that already support MS2000 like Micro-Manager etc.
- Similar TTL Functionality as MS2000
- Advanced features like Ring Buffer, Array module also supported. Other modules available on request.

Power

Connector

The LX2 card is available with two styles of power connector. 8Pin Molex connector, or a 64pin Harting Dim connector. User can make their preference known at the time of order.

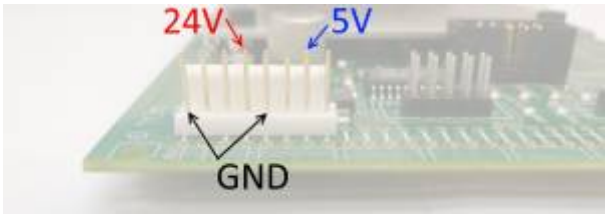


LX2 with 8pin Molex Connector 2.54mm pitch

LX2 with 64pin Harting Connector 2.54mm pitch

Pinout

The LX2 card needs 24V and 5V to operate. Their Pinout on the two connectors are as follows.

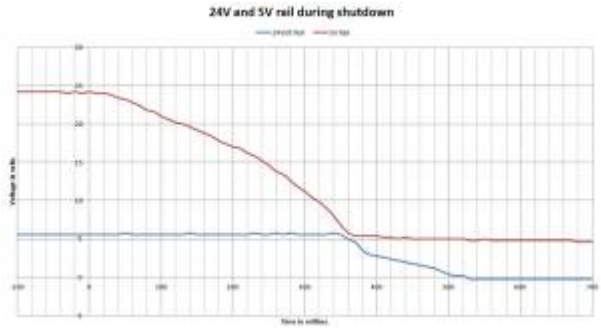


On the 8-pin Molex . 24V is on the 4th Pin , 5V on 7th pin and Grounds are on 1st and 5th Pin.

On the 64-pin Dim connector. 24V is on the 29th Pin , 5V on 26th pin and Ground is on 28th and 32nd pin.

Requirements

- 5V power lines would need to provide **upto 200ma** of current. Maximum acceptable voltage is 5.5V. Higher voltage would damage the electronics.
- 24V power lines would need to provide **upto 1Amp** of current. Expect higher inrush currents on start-up.
- For proper operation on startup. 24V needs to turn-on before 5V. Then on shutdown 24V needs to turn-off before 5V.
- On Shutdown , the LX2 card performs a few tasks like saving the stage/axis position to memory. The Task take about 25millisec to complete.For this feature to work the 24V line should be turned off before the 5V line. An easy way to achieve this is to generate the 5V from the 24V rail with a Buck regulator or a linear voltage regulator.



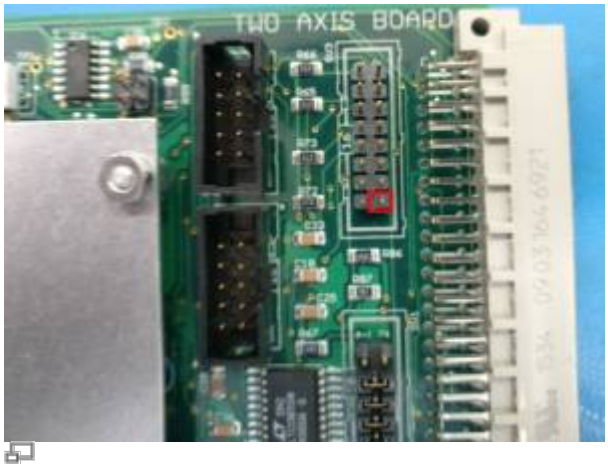
Voltage Rails during shutdown on ASI systems

Above is an example of the voltage rails behavior in an ASI system. 5V is derived from 24V rails , and so the 5V rails doesn't decay until 24V rails decays to 5V. In our system , this gives us about 300-360millisec delay between the two rails.

LX2 initiates shutdown task when 24V rails reaches 17Volts. Micro-controller runs off the 5V rail, there is a 1000uF Cap and diode on board the LX2 to slow down the decay of 5V rail for as long as possible.

Reset

The 16th pin of the SV3 connector is attached to the RESET line of the MicroController. Its an Active-low, so the pin is being pulled up to 5V with a 2.7K resistor. Shorting the pin to ground will reset the controller.



16th Pin of SV3 conn is reset

Communication

The LX2 communicates with a PC or other devices through the front DB9 connector, over a RS232 protocol. A null modem cable is required. Apart from the drivers PC needs to support the RS232 interface, no special drivers are required. LX2 will readily work with ASI Console or other serial terminal programs like Termite.

Link Information is as follows

Baud rate	fixed at 115200 bps
Data Bits	8
Parity	None
Stop Bits	1
Flow Control	None

DB9 Connector Pinout

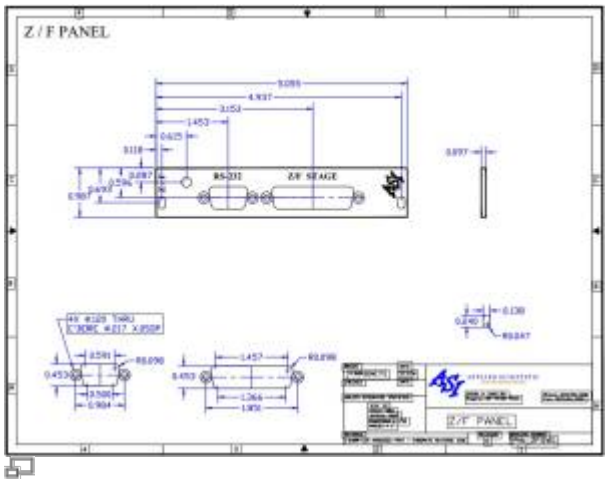
Pin#	Desp
1	5V
2	Rx
3	Tx
4	nc
5	gnd
6	nc
7	nc
8	nc
9	nc

Mounting the Card

There are two options for mounting the LX2 in your system. First is through the 4 mounting holes shown in the image below.

Dimensions in millimeters

Another method is to mount the card to a panel through the holes on the DB9 and DB25 connector . Dimensions shown in image below.



Dimensions in inches

DB25 Stage Connector Pinout

Signal Name	DB-25 Male
X Mot -	1
X Mot +	14
X Gnd	2
X + 5 Volts G	15
X Enc Ch A	3
X Enc Ch B	16
X Left Limit	22
X Right Limit	10
X 2nd Gnd	23
X 2nd + 5 Volts	11

Signal Name	DB-25 Male
Y Mot -	4
Y Mot +	17
Y Gnd	5
Y + 5 Volts	18
Y Enc Ch B	19
Y Enc Ch A	6
Y Left Limit	12
Y Right Limit	24
Y 2nd Gnd	25
Y 2nd + 5 Volts	13

manual, ms2000, lx2