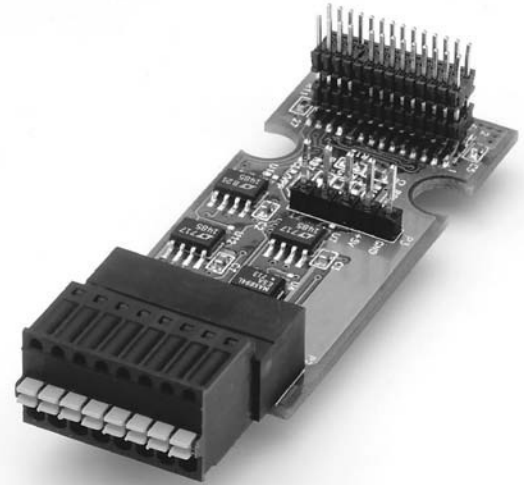


MICRO LYNX™ EXPANSION MODULE

HIGH SPEED DIFFERENTIAL I/O

FEATURES

- Low Cost
- 3 High Speed 0 to +5 VDC Differential I/O Channels
- 3 Clock Types – Step/Direction, Up/Down, Quadrature
- Programmable Digital Filtering for Inputs
- 150 mA (Current Limited) +5 VDC Output
- Adds the Capability for:
 - Closed Loop Control
 - Electronic Gearing
 - Additional Axis for Sequential Motion Control
- Plugs Directly into MicroLYNX Controller
- Removable Terminal Strip or Pin Header



DESCRIPTION

The Differential Digital I/O Module adds 3 high speed 0 to +5 VDC differential I/O channels to the MicroLYNX motion control system. The channels can be used differentially or single ended as inputs or outputs.

The Differential Module can be used for encoder feedback, electronic gearing, or to control an additional axis sequentially.

The I/O channels can be individually programmed by the user to be one of three clock types: Step/Direction (output only), Up/Down (input or output), or Quadrature (input or output).

When used as inputs, these I/O channels have seven programmable digital filter settings ranging from 39.1 kHz to 5.0 MHz.

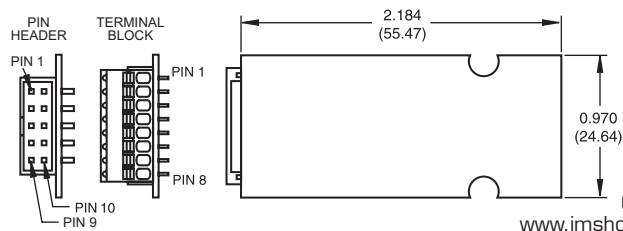
PIN ASSIGNMENTS

PIN	CONNECTOR OPTION	
	TERMINAL BLOCK	PIN HEADER
1	CHANNEL C -	NO CONNECT
2	GROUND	+5 VDC
3	+5 VDC	GROUND
4	CHANNEL B -	CHANNEL B -
5	CHANNEL A +	CHANNEL A -
6	CHANNEL B +	CHANNEL A +
7	CHANNEL C +	CHANNEL B -
8	CHANNEL A -	CHANNEL B +
9		CHANNEL C -
10		CHANNEL C +

ELECTRICAL SPECIFICATIONS

Differential Input Threshold	-0.2 to +0.2 volts
Input Hysteresis	60 millivolts typical
Input Common Mode Range.....	-6 to +6 volts
Open Circuit Input Voltage	
Positive Input.....	4.3 volts
Negative Input.....	1.4 volts
Output Voltage (each output).....	No Load/6 milliamp load
Logic "0"	0.5 volts/0.8 volts
Logic "1"	4.5 volts/4.2 volts
Short Circuit Current	250 mA max
Filter Cutoff Frequencies.....	5.00, 2.50, 1.25 MHz
	625, 313, 156, 78.1, 39.1 kHz

INTERFACE INFORMATION



NOTE:

Terminal Block Mating Connector **Supplied.**

Pin Header Mating Connector **Not Supplied.**

Order Information at www.imshome.com/quick.html

ENVIRONMENTAL

Storage Temperature	-20 to +70° C
Operating Temperature.....	0 to +50° C
Humidity.....	0 to 90% non-condensing

ORDER INFORMATION

PART NUMBER	TERMINAL BLOCK	PIN HEADER
		<i>MX-DD100-000</i>

Standard product shown in bold italics. Lead times may apply to other versions.



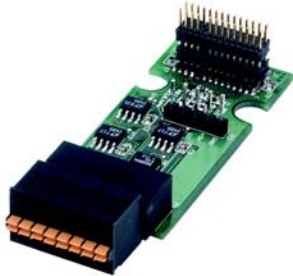
INTELLIGENT MOTION SYSTEMS, INC.

Excellence in Motion™

MicroLYNX EXPANSION MODULE

HIGH SPEED DIFFERENTIAL I/O MODULE

QUICK REFERENCE




370 N. MAIN ST., PO BOX 457, MARLBOROUGH, CT 06447
PH: (860) 295-6102, FAX: (860) 295-6107
Internet: www.imshome.com, E-Mail: info@imshome.com


Differential I/O Quick Reference Guide


The primary function of this guide is to acquaint the user with the specifications and configuration of the MicroLYNX High Speed Differential I/O Module. The full MicroLYNX product manual is available in Acrobat PDF format on the IMS Product CD. It also may be downloaded from the IMS web site at www.imshome.com.

Notes And Warnings

Please observe the following when handling, connecting and using your MicroLYNX Expansion Modules. Failure to observe these points may result in damage. All warranty and disclaimer information is located in the full product manual and should be referenced for more information.

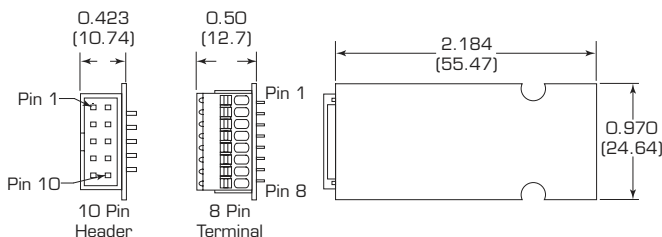
 The MicroLYNX Expansion Module components are sensitive to Electrostatic Discharge (ESD). All handling should be done at an ESD protected workstation.

 Hazardous Voltage Levels may be present if using an open frame power supply to power the MicroLYNX Controller and Modules.

 Do not connect or disconnect the AC power or the motor leads with the AC power on.

Mechanical Specifications

Dimensions in Inches (mm)



NOTE: The 8 Pin Terminal Block is supplied with the mating connector. The 10 Pin Header is **NOT SUPPLIED** with a mating connector. (Use AMP 3-1437026-4 or equivalent).

Thermal Specifications

	Range
Operating Temperature	0 to +50°C
Storage Temperature	-20 to +70°C
Humidity	0 to 90% non-condensing

Electrical Specifications

Differential Input Threshold	-0.2 to +0.2 Volts
Input Hysteresis	60 Millivolts Typical
Input Common Mode Range	-6 to +6 Volts
Open Circuit Input Voltage	
Positive Input	4.3 Volts
Negative Input	1.4 Volts
Output Voltage [each output]	No Load/6 Milliamp Load
Logic "0"	0.5 Volts/0.8 Volts
Logic "1"	4.5 Volts/4.2 Volts
Short Circuit Current	250 mA Max.
Filter Cutoff Frequencies	5.00, 2.50, 1.25 MHz
	625, 313, 156, 78.1, 39.1 kHz

The Four Clocks Explained

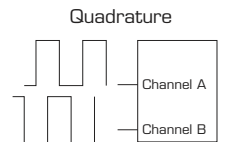
The MicroLYNX has four clock pairs that are used by the high-speed I/O. Clock pair 11 and 12, is fixed as an output and used internally to provide step clock and direction pulses to the driver of the MicroLYNX. The step clock output increments CTR1 [Counter 1]. The user has no access to this clock, however, CTR1 may be read from or written to by software instructions in either program or immediate mode.

Clock Types Defined

There are three basic configurations of clocks for the MicroLYNX. They are:

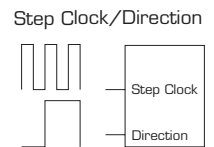
1) Quadrature

The quadrature clock function is the most commonly used input clock function. This is the default setting for each high-speed I/O channel except 11 & 12. This clock function will typically be used for closed loop control [encoder feedback] or for following applications



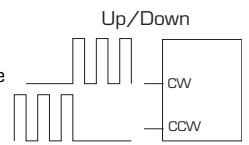
2) Step/Direction

The step/direction clock function would typically be used in an application where a secondary or tertiary clock output is required to sequentially control an additional axis.



3) Up/Down

The up/down clock type would typically be used as an output function where a secondary axis is being driven by a stepper or servo drive with dual-clock direction control circuitry.



Default Line Placement Of The Four Clocks

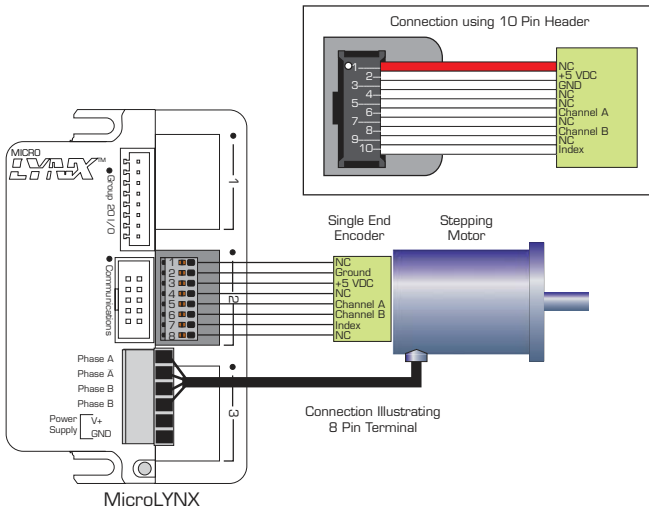
Clock #	I/O Line Pair	Slot Position	Counter	Function
1	11 & 12	None	CTR1	This clock is an internally generated motion clock. It provides Step Clock and Direction control to the driver section. This clock is not available on any external connector.
2	13 & 14	Slot 2	CTR2	This clock may be configured as an input or output. By default this clock is configured as a Quadrature Input. It can be configured as a secondary clock output electronically geared to CLK1.
3	15 & 16	Slot 3	CTR3	This clock may be configured as an input or output. By default this clock is configured as a Quadrature Input. It can be configured as a tertiary clock output electronically geared to CLK1.
4	17	Slot 2	None	This clock may be configured as a High Speed Input or Output. As an Output, it is a 1MHz reference clock. By default it is an Input, and it can be used to detect the Encoder Index channel.
	18	Slot 3	None	This clock may be configured as a High Speed Input or Output. As an Output, it is a 10MHz reference clock.



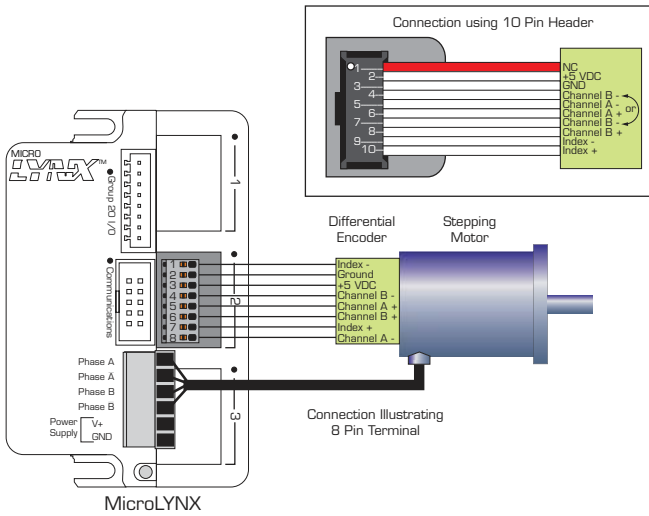
When using a clock pair as Step and Direction, the lower number of the "A" of the pair will always be the Direction. The higher number or the "B" clock of the pair will always be the Step Clock.

Encoder Connections

Single Ended Encoder



Differential Encoder



Testing Your Encoder Setup and Operation

Once the encoder is connected, the setup and operation can be tested and verified by typing the following into your terminal:

NOTE: It is not necessary to type the remarks into the terminal.

Command	Remarks
MUNIT=51200	'set munits to correspond with MSEL=256
EUNIT=2000	'set encoder units (EUNIT) to the number = 4 x 'resolution, ie 500 line encoder x 4 = 2000, '200 line encoder x 4 = 800 etc.
STLF=200	'Set the stall factor variable to 10% of EUNIT (10% of a revolution)
EE=1	'Enable encoder functions
POS=0	'set position counter to 0
CTR2=0	'set counter 2 to 0
SAVE	'save the aforementioned settings.

Test the encoder setup by entering the following into your terminal:

MOVR 10	'the motor should move 10 revolutions
PRINT POS	'read the POS variable, it should be "10.000"
PRINT CTR2	'read CTR2, it should read 10 X EUNIT or 20000

Pin Assignments

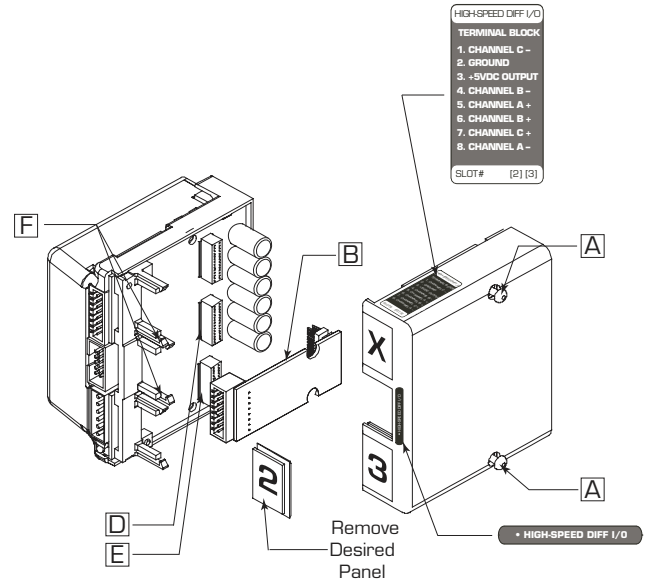
Pin #	Connector Option	
	8 Pin Terminal Block	10 Pin Header
1	Channel C -	NC
2	Ground	+5 VDC
3	+5 VDC	Ground
4	Channel B -	Channel B - or Pin 7
5	Channel A +	Channel A -
6	Channel B +	Channel A +
7	Channel C +	Channel B - or Pin 4
8	Channel A -	Channel B +
9		Channel C -
10		Channel C +

MicroLYNX Slot Usage

The High Speed Differential I/O Expansion Module may be used in Slots 2 or 3 in the MicroLYNX with a maximum of two Modules per MicroLYNX.

MicroLYNX Expansion Slot Usage				
Expansion Module	Slot 1	Slot 2	Slot 3	Maximum Allowed
Isolated Digital I/O	Yes	Yes	Yes	3*
High Speed Differential I/O	No	Yes	Yes	2
Analog Input/Joystick	Yes	Yes	Yes	1
Isolated Communication	No	Yes	No	1
Analog Output	Yes	Yes	Yes	2
12 Channel I/O	Yes	Yes	No	1*

Installing High Speed Differential I/O Module



To Install the Module:

- 1) Remove the two retaining screws (A) from the cover.
- 2) Remove the blank panel (2 or 3) from the desired slot you want to use.
- 3) Carefully press the Expansion Module (B) into place by plugging the 28 pin connector into the desired receptacle (D or E) and snapping it into place under the retaining clips (F).
- 4) Reinstall the MicroLYNX cover.
- 5) Affix the labels supplied with the Module as shown.

For More Information:
See the complete LYNX Product Family Operating Manual on the IMS Product CD or at www.imshome.com