

# USER MANUAL

## Brick Controller IMS-II

Brick Controller IMS-II

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February 2013



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## Operating Conditions

All Delta Tau UK Ltd. motion controller products, accessories, and amplifiers contain static sensitive components that can be damaged by incorrect handling. When installing or handling Delta Tau UK Ltd. products, avoid contact with highly insulated materials. Only qualified personnel should be allowed to handle this equipment.

In the case of industrial applications, we expect our products to be protected from hazardous or conductive materials and/or environments that could cause harm to the controller by damaging components or causing electrical shorts. When our products are used in an industrial environment, install them into an industrial electrical cabinet or industrial PC to protect them from excessive or corrosive moisture, abnormal ambient temperatures, and conductive materials. If Delta Tau UK Ltd. products are directly exposed to hazardous or conductive materials and/or environments, we cannot guarantee their operation.



## Safety Instructions

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Qualified personnel must transport, assemble, install, and maintain this equipment. Properly qualified personnel are persons who are familiar with the transport, assembly, installation, and operation of equipment. The qualified personnel must know and observe the following standards and regulations:

IEC 364 resp. CENELEC HD 384 or DIN VDE 0100

IEC report 664 or DIN VDE 0110

National regulations for safety and accident prevention or VBG 4

The following British standards also apply:

BS EN 954-1:1997 Safety of machinery. Safety related parts of control systems. General principles for design.

Incorrect handling of products can result in injury and damage to persons and machinery. Strictly adhere to the installation instructions. Electrical safety is provided through a low-resistance earth connection. It is vital to ensure that all system components are connected to earth ground.

This product contains components that are sensitive to static electricity and can be damaged by incorrect handling. Avoid contact with high insulating materials (artificial fabrics, plastic film, etc.). Place the product on a conductive surface. Discharge any possible static electricity build-up by touching an unpainted, metal, grounded surface before touching the equipment.

Keep all covers and cabinet doors shut during operation. Be aware that during operation, the product has electrically charged components and hot surfaces. Control and power cables can carry a high voltage, even when the motor is not rotating. Never disconnect or connect the product while the power source is energized to avoid electric arcing.

After removing the power source from the equipment, wait at least 10 minutes before touching or disconnecting sections of the equipment that normally carry electrical charges (e.g., capacitors, contacts, screw connections). To be safe, measure the electrical contact points with a meter before touching the equipment.

The following text formats are used in this manual to indicate a potential for personal injury or equipment damage. Read the safety notices in this manual before attempting installation, operation, or maintenance to avoid serious bodily injury, damage to the equipment, or operational difficulty.

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### **WARNING:**

A Warning identifies hazards that could result in personal injury or death. It precedes the discussion of interest.

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### **Caution:**

A Caution identifies hazards that could result in equipment damage. It precedes the discussion of interest.

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### **Note:**

A Note identifies information critical to the user's understanding or use of the equipment. It follows the discussion of interest.

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REVISION HISTORY				
REV.	DESCRIPTION	DATE	CHG	APPVD
1	PRELIMINARY MANUAL CREATION	12/06/12	AJ	
2	Released	01/02/13	AJ	T. Jacobs
3				

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## INTRODUCTION

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### Philosophy of the Brick Controller-IMS

The Brick Controller-IMS is essentially a wrapper around the Brick Controller product inserting it into a 19" 4U high rack mountable enclosure with specific connectivity.

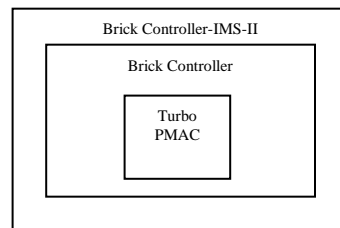
The Brick Controller-IMS consists of a Turbo PMAC section and Plant Interface Module or PIM. It is important to understand how the product is constructed so as to be able to select the correct hardware, firmware and software manuals. It is also important to understand the modular approach that Delta Tau adopts with its manuals.

Each product has a number of very specific manuals associated with the finished product and the Brick Controller-IMS assembly is no exception. The following diagram aims to show what manuals are appropriate for the system as a whole.

## Documentation

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In conjunction with this hardware reference manual, the Turbo Software Reference Manual and Turbo PMAC User Manual and Brick Controller HRM are essential for proper use, motor setup, and configuration of the Brick Controller IMS-II. It is highly recommended to always refer to the latest revision of the manuals found on Delta Tau's website, under Support>documentation>Manuals: [Delta Tau Manuals Link](#)



### Turbo PMAC

Turbo Software Reference Manual

<http://www.deltatau.com/fmenu/TURBO%20SRM.PDF>

Turbo PMAC User Manual

<http://www.deltatau.com/fmenu/TURBO%20PMAC%20USER%20MANUAL.PDF>

### Brick Controller-IMS

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#### ***Caution:***

The connectivity shown in the Brick Controller User Manual becomes internal when incorporated into the –IMS system. None of the external connections for the –IMS-II are shown in the Brick Controller User Manual..

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Brick Controller-IMS

Brick Controller-IMS Hardware Addendum

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**Note:**

It is highly recommended to refer to the latest revision of the manuals.  
They can be found at: <http://www.deltatau.com/fmenu/fmenu.htm>

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## Environmental Specifications

Description	Specifications
Ambient operating Temperature Range (EN50178 Class 3K3 – IEC721-3-3)	Minimum operating temperature:.....0°C (32°F) Maximum operating temperature:..... 45°C (113°F)
Storage Temperature Range (EN 50178 Class 1K4 – IEC721-3-1/2)	Minimum Storage temperature:.....-25°C (-13°F) Maximum Storage temperature:..... 70°C (158°F)
Humidity Characteristics (with no condensation and no formation of ice) (IEC721-3-3)	Minimum Relative Humidity:..... 5% HU Maximum Relative Humidity up to 35°C (95°F):.....95% HU Maximum Relative Humidity from 35°C up to 50°C (122°F) :.....85% HU
De-rating for Altitude	0~1000m (0~3300ft):..... no modification 1000 ~3000m (3300~9840ft):.....-1%/m (-0.33%/ft) 3000 ~4000m (9840~13000ft):.....-2%/m (-0.67%/ft)
Environment (ISA 71-04)	For use in pollution degree 2 environments
Atmospheric Pressure (EN50178 class 2K3)	70KPa to 106 KPa
Shock	Unspecified
Vibration	Unspecified
Air Flow Clearances	Additional fans and clearances may be required when stacking units
Cooling	Fans situated on the front face of the unit should be kept clear
Standard IP Protection	IP20

## Electrical Specifications

Description	Specifications
Logic Power Supply	Input Voltage:.....240Vac Continuous Input Current:.....A (rms)
Number of Axes	4/8
Output	+/- 10V 16Bit or Pulse and Direction for use with external stepper drives

## Recommended Fusing and Wire Gauge

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Model	Recommended Fuse (FRN/LPN)	Recommended Wire Gauge*
4 axes		
8 axes		
* See local and national code requirements		

## RECEIVING AND UNPACKING

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Delta Tau products are thoroughly tested at the factory and carefully packaged for shipment. Upon receipt of hardware, please follow carefully the instructions below for proper maintenance and handling:

1. Observe the condition of the shipping container and report any damage immediately to the commercial carrier.
2. Remove the hardware from the shipping container and remove all packing materials. Check all shipping material for connector kits and documentation. Some components may be quite small and can be accidentally discarded if care is not used when unpacking the equipment. The container and packing materials may be retained for future shipment.
3. Verify that the part number of the unit received matches the part number listed on the purchase order.
4. Inspect the drive for external physical damage that may have been sustained during shipping and report damages immediately to the commercial carrier. Document any damage with photographs.
5. Electronic components in this unit are design-hardened to reduce static sensitivity. However, use proper procedures when handling the equipment to avoid electrostatic discharges (ESD).
6. If the Brick Controller-IMS is to be stored for several weeks before integration (i.e., spare part), be sure that it is stored in a location that conforms to environmental specifications on page 5 of this manual. Also, testing of the unit is recommended before storing it for future use.

## Use of Equipment

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The following restrictions will ensure the proper use of the Brick Controller-IMS:

- The components built into electrical equipment or machines can be used only as integral components of such equipment.
- The Brick Controller-IMS must not be operated on power supply networks without a ground
- If the Brick Controller-IMS is used in residential areas, or in business or commercial premises, implement additional filter measures.
- The Brick Controller-IMS may be operated only in a closed switchgear cabinet, taking into account the ambient conditions defined in the environmental specifications.

Delta Tau guarantees the conformance of the Brick Controller-IMS with the standards for industrial areas stated in this manual only if Delta Tau components (cables, accessories, etc.) are used.

## Mounting

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The controller placement in the machine cabinet is important. Installation should be in an area that is protected from direct sunlight, corrosives, harmful gases or liquids, dust, metallic particles, and other contaminants. Exposure to these conditions can reduce the operating life and degrade performance of the drive.

Several other factors should be carefully evaluated when selecting a location for installation:

- For effective cooling and maintenance, the control should be mounted in a suitable 19" rack system
- Top and bottom clearance must be provided for air flow.
- Temperature, humidity and Vibration specifications should also be taken into account.

It is extremely important that the airflow is not obstructed by the placement of conduit tracks or other devices in the enclosure.

Make sure that all metal chips are cleaned up before the drive is mounted so there is no risk of getting metal chips inside the drive.

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### *Caution:*

Units must be installed in an enclosure that meets the environmental IP rating of the end product (ventilation or cooling may be necessary to prevent enclosure ambient from exceeding 45° C [113° F]).

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## SYSTEM WIRING



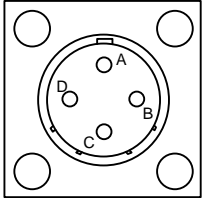
Installation of electrical control equipment is subject to many regulations including national, state, local, and industry guidelines and rules. General recommendations can be stated but it is important that the installation be carried out in accordance with all regulations pertaining to the installation.

### WARNING

## Connectors on Back Panel

### 5V DC EXT ENC Supply (X4)

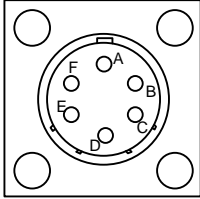
This connector is to provide the external 5 volts to the encoder power. In order to use it, it also requires changing the jumpers on 300-603946-10X board. Please see the jumper setting in this manual.

<b>5V DC EXT Encoder Supply</b>  (PN: UT00104PH Manufactured By SOURIAU)			
Pin #	Symbol	Function	Description
A	5 V	Input	5 volts input power from Power Supply
B	N.C.		
C	0 V	Common	Common Ground
D	N.C.		

This is a list of mating connector and pin.

Part Number	Manufacture	Description
UT06104SH	SOURIAU	Circular Conn Plug, Size 10, 4 pos, cable
UT010JCS	SOURIAU	CABLE CLAMP, 10, BRASS
RC16M23K	SOURIAU	Crimp Socket, 20-16AWG

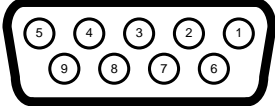
## 24V I/O and 24V Logic (X2)

<b>24V I/O and 24V Logic Power Supply Input Connector</b>  <b>(PN: UT0W0106PH, Manufactured By SOURIAU)</b>			
Pin #	Symbol	Function	Description
A	24VLogic	Input	24 volts for Logic Power Input
B	0VLogic	Common	24 volts return for Logic Power
C	24VI/O	Input	24 volts for I/O Power Input
D	0VI/O	Common	24 volts return for I/O power.
E	N.C.		
F	N.C.		

This is a list of mating connector and pin.

Part Number	Manufacture	Description
UT06106SH	SOURIAU	Circular Conn Plug, Size 10, 6 pos, cable
UT010JCS	SOURIAU	CABLE CLAMP, 10, BRASS
RC18W3K	SOURIAU	CONTACT SOCKET, UT0W, 22-20AWG

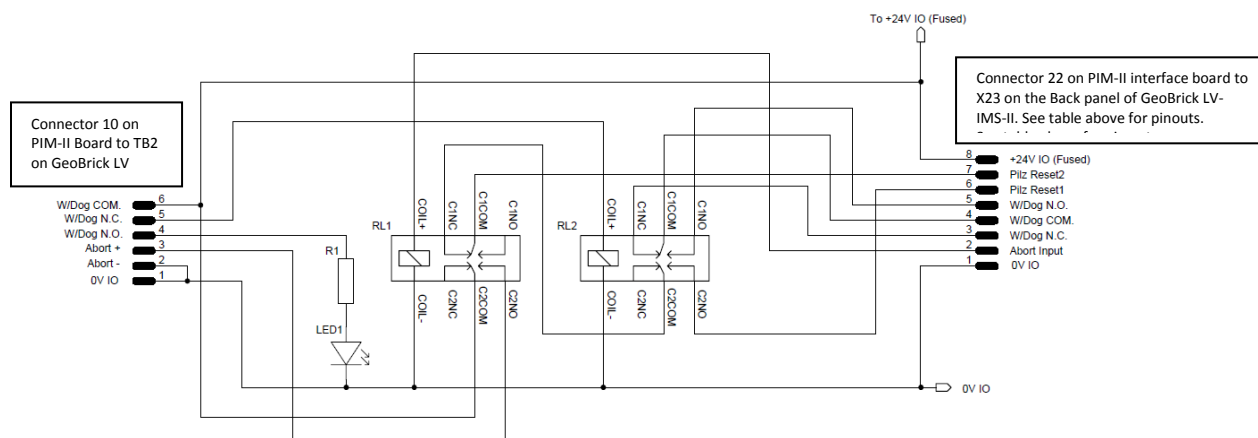
## Watchdog & Abort I/P (X23)

<b>Watchdog &amp; Abort I/P D-sub 9 Female</b>			
Pin #	Symbol	Function	Description
1	0V I/O	Common	Common return for 24V I/O
2	Abort	Input	Abort Input 24VDC reference to 0V I/O
3	WD N.C.	Output	Watchdog Relay (Open Contact in Normal Operation)*
4	WD Common	Common	Watchdog Common
5	WD N.O.	Output	Watchdog Relay (Closed Contact in Normal Operation)*
6	Pilz Reset1	I/O	When Abort Input is off, Pilz Reset1 to Pilz Reset2 are connected together. When Abort Input is on, Pilz Reset1 to Pilz Reset2 are not connected.
7	Pilz Reset2	I/O	
8	24V I/O	Output	24V Power Output.
9	N/C		

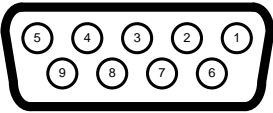
\* When the Brick Controller-IMS is operating normally, the contact for WD N.C. is open, and the contact for WD N.O. is closed. When a watchdog condition occurs, the WD N.C. contact will be closed, and the WD N.O. contact will be open.

When Abort Input is off, Pilz Reset1 and Pilz Reset 2 are connected at normal condition. When Abort Input is On, Pilz Reset 1 and Pilz Reset 2 are not connected at normal condition. When PMAC gets watchdog, Pilz Reset 1 and Pilz Reset 2 are not connected in any conditions of Abort Input.

There is a schematic in below as a reference.

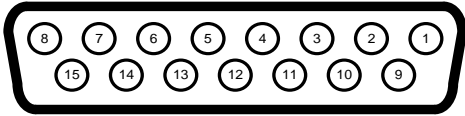


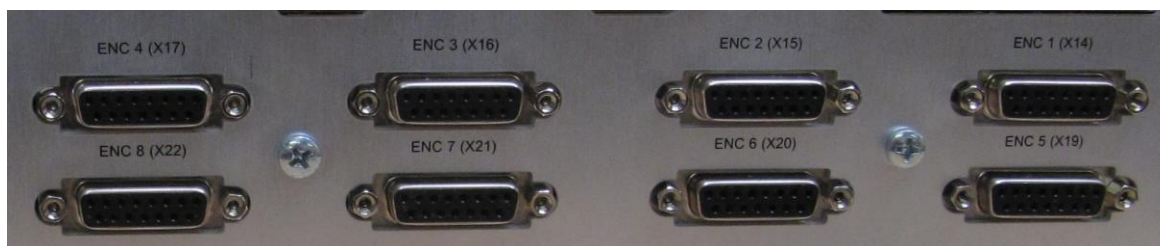
## Axis Flags 1(X6) to Axis Flags 8 (X13)

Axis Flags D-sub 9 Female			
Pin #	Symbol	Function	Description
1	24V+	Output	24V +ve Output
2	PLIM	Input	Positive Limit
3	MLIM	Input	Negative Limit
4	HOME	Input	Home Flag
5	USER	Input	User Flag
6	24V Ground	Common	24V Return
7	24V+	Output	24V +ve Output
8	5V +	Output	5V +ve Output
9	5V Ground	Common	5V Return

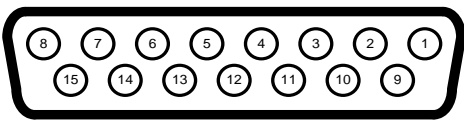


## ENCODER 1(X14) – ENCODER 8(X22): Digital A Quad B

ENCODER # D-sub 15 Female			
Pin #	Symbol	Function	Description
1	CHA+	Input	Encoder A+
2	CHA-	Input	Encoder A-
3	CHB+	Input	Encoder B+
4	CHB-	Input	Encoder B-
5	CHC+	Input	Encoder Index+
6	CHC-	Input	Encoder Index-
7	Encoder Pwr	Output	Encoder Power 5VDC
8	GND	Common	Common Ground
9	CHU/DIR+	Input/Output	Hall Effect U / Direction+ output for PFM mode
10	CHV/DIR-	Input/Output	Hall Effect V / Direction- output for PFM mode
11	CHW/PUL+	Input/Output	Hall Effect W /Pulse+ output for PFM mode
12	CHT/PUL-	Input/Output	Hall Effect T / Pulse- output for PFM mode
13	Res exc +		Resolver Excitation
14	Encoder Pwr	Input	Encoder Power 5VDC
15	Res Exc- /GND	Common	Common Ground

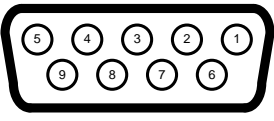


## ENCODER 1(X14) – ENCODER 8(X22): SSI (Available as option)

<b>ENCODER #</b> <b>D-sub 15 Female</b>			
Pin #	Symbol	Function	Description
1			Not used for SSI Feedback
2			Not used for SSI Feedback
3			Not used for SSI Feedback
4			Not used for SSI Feedback
5			Not used for SSI Feedback
6			Not used for SSI Feedback
7	Encoder PWR	Output	Encoder Power 5VDC
8	0V	Common	Common Ground
9	DATA-	Input	Data- Packet
10	CLOCK+	Output	Serial Encoder Clock+
11	CLOCK-	Output	Serial Encoder Clock-
12	DATA+	Input	Data+ Packet
13			Not used for SSI Feedback
14	Encoder PWR	Output	Encoder Power 5VDC
15	0V	Common	Common Ground

## EQU (X5)

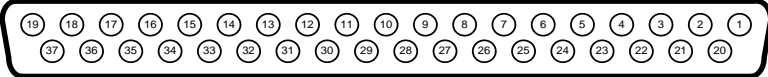
All EQU outputs is TTL 5V.

<b>EQU</b> <b>D-sub 9 Female</b>			
Pin #	Symbol	Function	Description
1	EQU5	output	EQU output for Channel 5
2	EQU6	output	EQU output for Channel 6
3	EQU7	output	EQU output for Channel 7
4	EQU8	output	EQU output for Channel 8
5	EQU1	output	EQU output for Channel 1
6	EQU2	output	EQU output for Channel 2
7	EQU3	output	EQU output for Channel 3
8	EQU4	output	EQU output for Channel 4
9	0V I/O	Common	Reference 0V I/O



## GPIO (X18)

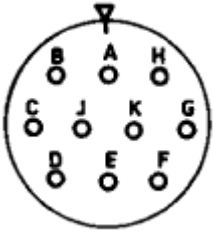
GPIO working voltage is 12-24V. It is configurable to work either sourcing or sinking output/input by hardware wiring.

GPIO D-sub 37 Female			
Pin #	Symbol	Function	Description
1	GPI1	Input	Input 1
2	GPI3	Input	Input 3
3	GPI5	Input	Input 5
4	GPI7	Input	Input 7
5	GPI9	Input	Input 9
6	GPI11	Input	Input 11
7	GPI13	Input	Input 13
8	GPI15	Input	Input 15
9	IN COM 1-8	Common	Input 1 to 8 common
10	N.C.		Not Connected
11	COM-EMT	Input	Common Emitter
12	GPO1-	Output	Sourcing Output 1
13	GPO2-	Output	Sourcing Output 2
14	GPO3-	Output	Sourcing Output 3
15	GPO4-	Output	Sourcing Output 4
16	GPO5-	Output	Sourcing Output 5
17	GPO6-	Output	Sourcing Output 6
18	GPO7-	Output	Sourcing Output 7
19	GPO8-	Output	Sourcing Output 8
20	GPI2	Input	Input 2
21	GPI4	Input	Input 4
22	GPI6	Input	Input 6
23	GPI8	Input	Input 8
24	GPI10	Input	Input 10
25	GPI12	Input	Input 12
26	GPI14	Input	Input 14
27	GPI16	Input	Input 16
28	IN_COM9-16	Common	Input 9 to 16 common
29	COM_COL	Input	Common Collector
30	GPO1+	Output	Sinking Output 1
31	GPO2+	Output	Sinking Output 2
32	GPO3+	Output	Sinking Output 3
33	GPO4+	Output	Sinking Output 4
34	GPO5+	Output	Sinking Output 5
35	GPO6+	Output	Sinking Output 6
36	GPO7+	Output	Sinking Output 7
37	GPO8+	Output	Sinking Output 8

**Note:**

- ✓ All General Purpose I/Os are optically isolated.
- ✓ The Inputs are 12-24V, and can be wired as sinking or sourcing.
- ✓ The Outputs are 24V nominal, 0.5A maximum current overload protected.
- ✓ For Sinking Outputs, connect the COM\_EMT (pin11) line to the Analog Ground of the power supply and the outputs to the individual plus output lines, e.g. GPO1+
- ✓ For Sourcing Outputs, connect the COM\_COL (pin29) line to 12-24V and the outputs to the individual minus output lines, e.g., GPO1-
- ✓ Do not mix topologies, i.e., all sinking or all sourcing outputs. If the common emitter is used, the common collector should not be connected and vice versa.

## AMP 1(X24) – AMP 8(X31)

<b>AMP #</b>  <b>(PN: UT0W1210SH</b> <b>Manufactured By</b> <b>SOURIAU)</b>		
<b>Pin #</b>	<b>Servo Connections</b>	
A	Phase A+	
B	Enable +	
C	Phase B+	
D	AGND Phase B	
E	Phase B-	
F	Enable -	
G	Phase A-	
H	AGND Phase A	
J	Amp Fault +	
K	Amp Fault -	

This is a list of mating connector and pin.

<b>Part Number</b>	<b>Manufacture</b>	<b>Description</b>
UT0W61210PH	SOURIAU	CIRCULAR CONN PLUG SIZE 12, 10POS, CABLE
UT012JCS	SOURIAU	CABLE CLAMP, 12, BRASS
RM24W3K	SOURIAU	CRIMP PIN, 26-24AWG

## RESET & BOOTSTRAP SWITCH

### Reset Switch Back Panel

When this switch is on at power up, Geo Brick LV is going to re-initialize.

### Bootstrap Switch Back Panel

When this switch is on at power up, geo Brick LV is now bootstrap mode. The user is able to download PMAC Firmware.

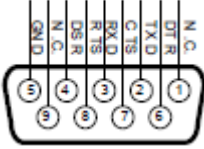
When this switch is on and hold at the normal operating condition, the user can change the IP address for Ethernet communication. There are two ways to change the IP address. The one way is to connect USB cable to the unit and open “Configure Ethernet 100 BaseT”, which is coming with PMAC Executive Pro2 Suite. The user can change to the desired IP address. After change it, press “Store IP” button, and then click “Done” button.

Another way is to Open PMAC Executive Pro2 and open PCOMM server. Select Ethernet communication, and then click “Properties...” button. Click “General” button, and then change the IP address.

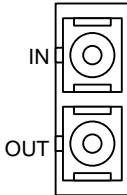
## Connectors on Front Panel

### RS232(Front Panel)

This port can be used as a primary communication mean or employed as a secondary port that allows simultaneous communication.

<b>RS232</b>			
Pin #	Symbol	Function	Description
1	N.C.		
2	TXD	Output	Receive Data
3	RXD	Input	Send Data
4	DSR	Bi-directional	Data set ready
5	GND	Common	Common Ground
6	DTR	Bi-directional	Data term ready
7	CTR	Input	Clear to send
8	RTS	Output	Request to send
9	N.C.		

### MACRO (Available for Enhanced Unit) Front Panel

MACRO SC-Style Fiber Connector		
Pin #	Symbol	Function
1	IN	MACRO Ring Receiver
2	OUT	MACRO Ring Transmitter
The fiber optic version of MACRO uses 62.5/125 multi-mode glass fiber optic cable terminated in an SC-style connector. The optical wavelength is 1,300 nm.		

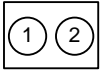
## APPENDIX A: E-POINT JUMPERS

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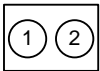
### E-Point Jumper Description for Geo Brick LV Controller (603793)

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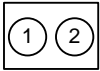
#### E0: Reset Control

E-Point	Description	Default
E0 	Factory use only; the board will not operate with E0 installed.	No Jumper

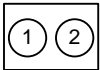
#### E1: Card0 Select

E-Point	Description	Default
E1 	Remove jumper to specify that this PMAC is Card 0, which generates its own phase and servo clock (default). Jump pins 1 to 2 to specify that this PMAC is not Card 0, but Card 1 to F (15), which requires external phase and servo clock signals from the serial port to operate.	No Jumper

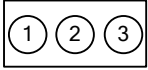
#### E2: (Reserved For Future Use)

E-Point	Description	Default
E2 	Factory Use Only	No Jumper

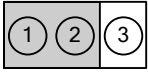
#### E4: (Reserved For Future Use)

E-Point	Description	Default
E4 	Factory Use Only	No Jumper

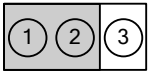
#### E5: (Reserved For Future Use)

E-Point	Description	Default
E5 	Factory Use Only	No Jumper

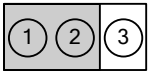
## E6: AENA5 Source Selection on J15

E-Point	Description	Default
E6 	1-2 to set AENA5 on J15 connector from GPIO  2-3 to set AENA5 on J15 connector from AENA5	1-2

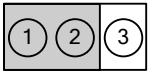
## E7: AENA6 Source Selection on J15A

E-Point	Description	Default
E7 	1-2 to set AENA6 on J15A connector from GPIO  2-3 to set AENA6 on J15A connector from AENA6	1-2




## E8: AENA7 Source Selection on J16

E-Point	Description	Default
E8 	1-2 to set AENA7 on J16 connector from GPIO  2-3 to set AENA7 on J16 connector from AENA3	1-2

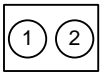
## E9: AENA8 Source Selection on J16A

E-Point	Description	Default
E9 	1-2 to set AENA8 on J16A connector from GPIO  2-3 to set AENA8 on J16A connector from AENA4	1-2

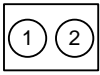
## E10, E11 & E12: CPU Configuration

E-Point	Description	Default
E10  E11  E12 	Other combination is for factory use only.	E10—No Jumper E11—1-2 E12—1-2

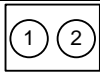
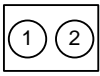
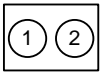
### E13: Load Firmware

E-Point	Description	Default
E13 	1-2 to enable to re-download Turbo PMAC2 Firmware  No jumper for normal operation	No Jumper

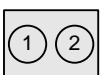
### E14: Watchdog Disable

E-Point	Description	Default
E4 	1-2 to disable watchdog circuit.  No jumper for normal operation.	No Jumper

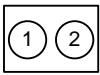
### E15A, E15B & E15C: Flash Memory Bank Select

E-Point	Description	Default
E15A 	Factory Use Only	E15A— No Jumper
E15B 		E15B— No Jumper
E15C 		E15C— No Jumper

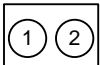
### E40: USB/Ethernet Firmware Re-Download Enable

E-Point	Description	Default
E40 	1-2 for normal operation.  Remove Jumper at Power up and then install jumper. It will be able to download USB/ETH Firmware.	1-2

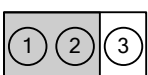
### E41: USB/Ethernet Disable

E-Point	Description	Default
E41 	1-2 to disable USB/Ethernet communication  No jumper for normal operation.	No Jumper

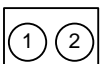
### PL1: Stepper Output Enable for CH1

E-Point	Description	Default
PL1 	1-2 to enable PFM output from Encoder 1 connector	No Jumper

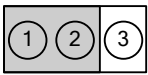
### PL2: Encoder Power Selection for Encoder 1

E-Point	Description	Default
PL2 	1-2 is to use an internal 5V for Encoder Power.  2-3 is to use an external 5V for Encoder Power	1-2

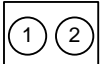
### PL3: Stepper Output Enable for CH2

E-Point	Description	Default
PL3 	1-2 to enable PFM output from Encoder 2 connector	No Jumper

### PL4: Encoder Power Selection for Encoder 2

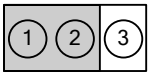
E-Point	Description	Default
PL4 	1-2 is to use an internal 5V for Encoder Power.  2-3 is to use an external 5V for Encoder Power	1-2

### PL5: Stepper Output Enable for CH3

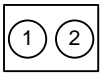
E-Point	Description	Default
PL5 	1-2 to enable PFM output from Encoder 1 connector	No Jumper



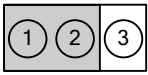
### PL6: Encoder Power Selection for Encoder 3

E-Point	Description	Default
PL6 	1-2 is to use an internal 5V for Encoder Power.  2-3 is to use an external 5V for Encoder Power	1-2

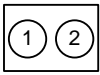
### PL7: Stepper Output Enable for CH4

E-Point	Description	Default
PL7 	1-2 to enable PFM output from Encoder 1 connector	No Jumper

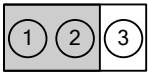
### PL8: Encoder Power Selection for Encoder 4

E-Point	Description	Default
PL8 	1-2 is to use an internal 5V for Encoder Power.  2-3 is to use an external 5V for Encoder Power	1-2

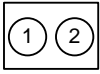
### PL9: Stepper Output Enable for CH5

E-Point	Description	Default
PL9 	1-2 to enable PFM output from Encoder 1 connector	No Jumper

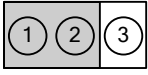
### PL10: Encoder Power Selection for Encoder 5

E-Point	Description	Default
PL2 	1-2 is to use an internal 5V for Encoder Power.  2-3 is to use an external 5V for Encoder Power	1-2

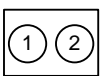
### PL11: Stepper Output Enable for CH6

E-Point	Description	Default
PL11 	1-2 to enable PFM output from Encoder 1 connector	No Jumper

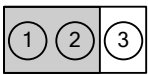
### PL12: Encoder Power Selection for Encoder 6

E-Point	Description	Default
PL12 	1-2 is to use an internal 5V for Encoder Power.  2-3 is to use an external 5V for Encoder Power	1-2

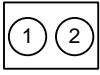
### PL13: Stepper Output Enable for CH7

E-Point	Description	Default
PL13 	1-2 to enable PFM output from Encoder 1 connector	No Jumper

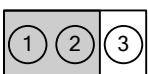
### PL14: Encoder Power Selection for Encoder 7

E-Point	Description	Default
PL14 	1-2 is to use an internal 5V for Encoder Power.  2-3 is to use an external 5V for Encoder Power	1-2

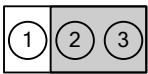
### PL15: Stepper Output Enable for CH8

E-Point	Description	Default
PL15 	1-2 to enable PFM output from Encoder 1 connector	No Jumper

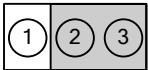
### PL16: Encoder Power Selection for Encoder 8

E-Point	Description	Default
PL16 	1-2 is to use an internal 5V for Encoder Power.  2-3 is to use an external 5V for Encoder Power	1-2

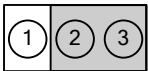
### LK1: HOME Flag Input Voltage Selection for Ch1

E-Point	Description	Default
LK1 	1-2 is for 5V Home flag Input  2-3 is for 24V Home flag Input	2-3

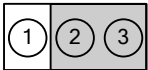
## LK2: HOME Flag Input Voltage Selection for Ch2

E-Point	Description	Default
LK2 	1-2 is for 5V Home flag Input  2-3 is for 24V Home flag Input	2-3

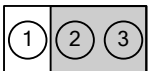
## LK3: HOME Flag Input Voltage Selection for Ch3

E-Point	Description	Default
LK3 	1-2 is for 5V Home flag Input  2-3 is for 24V Home flag Input	2-3

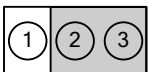
## LK4: HOME Flag Input Voltage Selection for Ch4

E-Point	Description	Default
LK4 	1-2 is for 5V Home flag Input  2-3 is for 24V Home flag Input	2-3

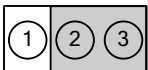
## LK5: HOME Flag Input Voltage Selection for Ch5

E-Point	Description	Default
LK5 	1-2 is for 5V Home flag Input  2-3 is for 24V Home flag Input	2-3

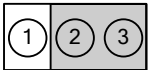
## LK6: HOME Flag Input Voltage Selection for Ch6

E-Point	Description	Default
LK6 	1-2 is for 5V Home flag Input  2-3 is for 24V Home flag Input	2-3

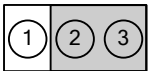
## LK7: HOME Flag Input Voltage Selection for Ch7

E-Point	Description	Default
LK7 	1-2 is for 5V Home flag Input  2-3 is for 24V Home flag Input	2-3

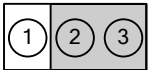
### LK8: HOME Flag Input Voltage Selection for Ch8

E-Point	Description	Default
LK1 	1-2 is for 5V Home flag Input  2-3 is for 24V Home flag Input	2-3

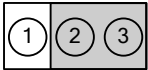
### LK9: Positive Limit Input Voltage Selection for Ch1

E-Point	Description	Default
LK9 	1-2 is for 5V Positive Limit Input  2-3 is for 24V Positive Limit Input	2-3

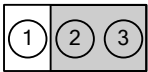
### LK10: Positive Limit Input Voltage Selection for Ch2

E-Point	Description	Default
LK10 	1-2 is for 5V Positive Limit Input  2-3 is for 24V Positive Limit Input	2-3

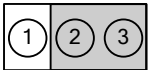
### LK11: Positive Limit Input Voltage Selection for Ch3

E-Point	Description	Default
LK11 	1-2 is for 5V Positive Limit Input  2-3 is for 24V Positive Limit Input	2-3

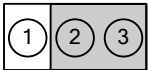
### LK12: Positive Limit Input Voltage Selection for Ch4

E-Point	Description	Default
LK12 	1-2 is for 5V Positive Limit Input  2-3 is for 24V Positive Limit Input	2-3

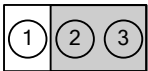
### LK13: Positive Limit Input Voltage Selection for Ch5

E-Point	Description	Default
LK13 	1-2 is for 5V Positive Limit Input  2-3 is for 24V Positive Limit Input	2-3

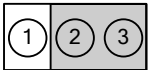
### LK14: Positive Limit Input Voltage Selection for Ch6

E-Point	Description	Default
LK14 	1-2 is for 5V Positive Limit Input  2-3 is for 24V Positive Limit Input	2-3

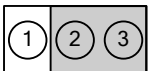
### LK15: Positive Limit Input Voltage Selection for Ch7

E-Point	Description	Default
LK15 	1-2 is for 5V Positive Limit Input  2-3 is for 24V Positive Limit Input	2-3

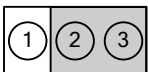
### LK16: Positive Limit Input Voltage Selection for Ch8

E-Point	Description	Default
LK16 	1-2 is for 5V Positive Limit Input  2-3 is for 24V Positive Limit Input	2-3

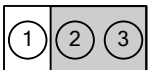
### LK17: Negative Limit Input Voltage Selection for Ch1

E-Point	Description	Default
LK17 	1-2 is for 5V Negative Limit Input  2-3 is for 24V Negative Limit Input	2-3

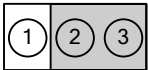
### LK18: Negative Limit Input Voltage Selection for Ch2

E-Point	Description	Default
LK18 	1-2 is for 5V Negative Limit Input  2-3 is for 24V Negative Limit Input	2-3

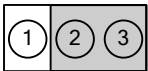
### LK19: Negative Limit Input Voltage Selection for Ch3

E-Point	Description	Default
LK19 	1-2 is for 5V Negative Limit Input  2-3 is for 24V Negative Limit Input	2-3

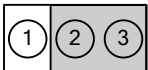
### LK20: Negative Limit Input Voltage Selection for Ch4

E-Point	Description	Default
LK17 	1-2 is for 5V Negative Limit Input  2-3 is for 24V Negative Limit Input	2-3

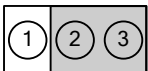
### LK21: Negative Limit Input Voltage Selection for Ch5

E-Point	Description	Default
LK21 	1-2 is for 5V Negative Limit Input  2-3 is for 24V Negative Limit Input	2-3

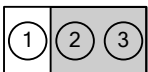
### LK22: Negative Limit Input Voltage Selection for Ch6

E-Point	Description	Default
LK22 	1-2 is for 5V Negative Limit Input  2-3 is for 24V Negative Limit Input	2-3

### LK23: Negative Limit Input Voltage Selection for Ch7

E-Point	Description	Default
LK23 	1-2 is for 5V Negative Limit Input  2-3 is for 24V Negative Limit Input	2-3

### LK24: Negative Limit Input Voltage Selection for Ch8

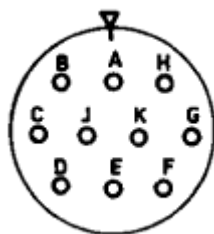
E-Point	Description	Default
LK24 	1-2 is for 5V Negative Limit Input  2-3 is for 24V Negative Limit Input	2-3

### Step & Direction (using external amplifier)

The cable wiring must be shielded and have a separate conductor connecting the motor frame back to the drive amplifier.

There are two pin definitions for this connector depending on whether the external amplifier takes step and direction type “stepper” inputs or analogue “servo” type inputs.

#### Step and direction connector:



Pin out:

	<i>Stepper:Polarisation N</i>	<i>Servo:Polarisation B</i>
Pin A	Step +	Phase A +
Pin B	Step -	Enable +
Pin C	N/C	Phase B +
Pin D	Direction +	Analogue Ground Phase B
Pin E	Direction-	Phase B -
Pin F	N/C	Enable -
Pin G	Enable +	Phase A -
Pin H	Enable -	Analogue Ground Phase A
Pin J	Logic Supply	Logic Supply
Pin K	Logic Ground	Logic Ground
Shell	Earth	Earth