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Geo Brick LV™

Multi-axis controller with Low Voltage (12V to 60V) amplifiers

Product Information

PRODUCT DESCRIPTION:

The *Geo Brick LV*™ is Delta Tau's latest addition to the *Brick* family of multi-axis 'Smart Amplifiers'. The '*LV*' combines the power of Delta Tau's Turbo PMAC2 controller with MOSFET motor amplifiers in a sleek industrial package.

The Turbo PMAC2 'processing engine' provides for a full-featured motion controller with Ethernet, USB, and RS232 communications. Each 'LV' axis includes incremental encoder inputs for position feedback and optically isolated motor I/O flags (Home, Limit +/-). Standard *'LV'* I/O for machine control includes 16 optically isolated inputs and 8 fused protected outputs.

The '*LV*' utilizes Delta Tau's Direct Digital PWM technology to provide superior position/velocity control of Brushless (linear & rotary), Brush, and Stepper motors. Available in 4 or 8 axis versions, the '*LV*' delivers 5A continuous current (15A peak) with a voltage range of 12 to 60 volts per axis.

The *'LV'* supports applications ranging from stand-alone to real-time PC based. The integrated controller/amplifier reduces wiring costs, while increasing system robustness. For lower voltage/current applications the *'LV'* is the Delta Tau solution that you have been waiting for!

Geo Brick LV

114mm x 178mm x 391mm (4.5" x 7.0" x 15.4")



MOTION CONTROL BASE SPECIFICATIONS:

- 4 or 8 axes of simultaneous servo / stepper control
- All axes independent or coordinated in any combination
- Multitasking of up to 16 motion programs and 64 asynchronous PLC programs
- Communications: Ethernet, & USB
- Easy-to-use, high-level programming language
- 128K X 24 SRAM memory (programs, variables, tables)
- Linear, circular, rapid, B-spline, Hermite-spline interpolation
- Embedded forward and inverse kinematics routines for Non-Cartesian geometries
- True S-curve accel/decel for jerk-limited profiles
- PID/notch/feedforward servo algorithms
- Dynamic multi-move lookahead for robust acceleration control and efficient cornering/contouring
- Coordinate system translation and rotation, 2D and 3D
- Tool-radius compensation
- Hardware position capture and compare for high precision
- On-board G-code execution

AMPLIFIER BASE SPECIFICATIONS:

- Motor types: Brushless (AC/DC), DC Brush, Stepper
- DC Bus (Input) Voltage: 12 VDC to 60 VDC
- Output Current: 5A continuous, 15A peak (1 sec.)
- PWM Frequency: 2KHz to 15 KHz
- Status display: 7 segment
- Protections: voltage (over/under), over temperature, short circuit, and over current

OPTIONS:

- Axes: 8 (default = 4)
- CPU: 240 MHZ CPU, 4Mx8 flash (80 MHz, 1MB flash standard)
- Dual Port Ram (required for NC program)
- Digital I/O (additional): 16 inputs (12V-24V), 8 outputs (24V @ 0.5A)
- Analog Inputs: 2 or 4 channels, +/- 5V, 16 bit resolution
- Analog outputs: 2 or 4 channels , +/- 10V, 12 bit resolution
- RS232 interface
- MACRO (Fiber Optic or RJ45)
- Modbus TCP Master/Slave communications
- FieldBus: DeviceNet, Profibus, EtherCAT, CanOpen, CC-Link

CONNECTORS:

- Motor connectors: Terminal Block
- Power (Logic & DC Bus): Terminal Block
- Watchdog: Terminal Block
- Encoders: D-Sub, 15
- Limits & Flags: D-Sub, 25
- General Purpose Digital I/O: D-Sub, 37
- RS232 (opt.): D-Sub, 9
- Analog I/O (opt.): D-Sub, 9

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DELTA TAU

Geo Brick LV™

Multi-axis controller with Low Voltage (12V to 60V) amplifiers

Specifications and Features

Hardware Features

80 MHz DSP56303 Turbo PMAC CPU (* 240 MHz optional)
256k x 24 user SRAM (firmware, compiled PLC's, phasing, user servos)
128k x 24 user SRAM (motion, PLC's, variables, tables, & buffers)
1M x 8 flash memory for user backup & firmware
Latest released firmware version
100 Mbps Ethernet interface
480 Mbps USB 2.0 interface
RS-232 serial interface *
4 (or 8 *) channels axis-interface circuitry, each including:
- 3-channel differential/single-ended encoder input
- 4 input flags (Home, Limit +, Limit -, User)
- 1 output flag (Compare)
- UVW TTL-level "hall" inputs
- Pulse-&-direction digital outputs (for use with external stepper driver)

PID/notch/feedforward servo algorithms
Digital Inputs: 16 channels, optically isolated, 12V to 24V (* 5V opt.)
* Additional 16 channels optional
Digital Outputs: 8 channels, thermal-fuse, 24V @ 0.5A (sink or source)
* Additional 8 channels optional
Analog I/O *: In - 2 or 4, +/- 5V, 16 bit Out - 2 or 4, +/- 10V, 12 bit
Dual Ported Ram *

Amplifier - Specifications

4 channels (standard) / 8 channels * (optional)
DC Bus (Input) Voltage: 12 VDC to 60 VDC
Output Current: 5A continuous, 15A peak (1 sec.)
Power Dissipation (per axis): 240W
PWM Frequency: 2KHz to 15 KHz
Status display: 7 segment
Protections: voltage (over/under), temperature (over), short circuit, current (0ver)
Input Logic Power (req.): +24 VDC (2A, +/- 20%)
Cooling: Fully rated cooling standard (none additional required)

Motion Features

Trajectory Generation
- Linear interpolation mode with S-curve accel/decel
- Circular interpolation mode with S-curve accel/decel
- Rapid point-to-point move mode
- Cubic B-spline interpolation mode
- Cubic Hermite-spline (PVT) interpolation mode
- Automatic move-until-trigger functions with hardware capture
- Altered destination on the fly
- Interactive jog moves
- Multi-move lookahead for velocity and acceleration limiting

Servo
- Standard digital PID feedback filter
- Velocity, acceleration, and friction feedforward
- 2nd-order notch/low-pass filter
- Gains changeable at any time
- Programmable input, integrator, and output limits
- Alternate 35-term "pole-placement" servo filter
- Alternate user-written high-level "Open Servo" algorithms

Commutation
- Sinusoidal commutation of AC servo motors
- Digital current-loop closure with direct digital PWM control

* Optional

Motion Features (continued)

Cartesian geometries
- Electronic gearing (no programming required)
- Electronic cams with programmable profiles

Compensation
- Position compensation tables (1D & 2D)
- Torque compensation tables
- Backlash compensation
- Tool radius compensation

Safety
- Hardware and software overtravel limits
- Amplifier enable/fault handshaking
- Following error limits
- Integrated current limit
- Watchdog timer
- Program and communications checksums

Computational
- Real-time multi-tasking operating system
- 48-bit floating-point math for user programs
- Trigonometric and transcendental functions
- Automatic type-matching of different variable types
- User-defined pointer variables to any registers

Coordination and Master/Slave
- User-defined coordinate systems for auto coordination of axes
- Separate coordinate systems for independent motion of axes
- Multi-motor axis support (e.g. gantries)
- Dynamic axis transformations (e.g. offsets, rotations, mirroring)
- User-written forward and inverse-kinematic algorithms for non-

Motion Program
- High-level programming language for up to 8 axes of control
- Automatic sequenced execution of moves
- Calculations and I/O synchronous to motion
- Axes programmed in user engineering units
- Motion values as constants or expressions
- Automatic coordination of multiple axes
- Ability to execute G-code programs

PLC Features

- Execution asynchronous to programmed motion
- I/O control as in hardware PLC
- Executive functions for standalone applications
- Safety and status monitoring
- Servo gain scheduling
- Data reporting functions
- Access to all registers in controller
- ModBus I/O control *

Supported Feedback types / devices

- Digital quadrature encoders
- Potentiometers *
- Sinusoidal encoders, Resolver, SSI, EnDat, Sigma II, HiperFace *

Amplifier - Supported Motor types include

- Brushless (AC/DC, Rotary/Linear)
- DC Brush
- Stepper (open / closed loop)

* Optional

Geo Brick 'LV' Ordering Information

		A		B	B		C	D	D		E	F	G	H	H	H	I	J
G	B	D	4	-	F	3	-	4	0	5	-	1	3	T	4	C	1	1	0

A - # of Axes
4 : 4 axes
8 : 8 axes

BB – CPU & Memory
C0 : 80 MHz, 8Kx24, 256Kx24 SRAM, 1MB Flash
C3 : 80 MHz, 8Kx24, 256Kx24 SRAM, 4MB Flash
F3 : 240 MHz, 192Kx24, 1Mx24 SRAM, 4MB Flash

C - Axes 1-4 Options
4 – 5A/15A, 4 Phase (Step Outputs)

DD - Axes 5-8 / Flags Options *
00 – 4 axis, 12V-24V Flag Inputs
05 – 4 axis, 5V Flag Inputs
42 – 8 axis, 12V-24V Flag Inputs

E – Digital I/O Options
0 – 16 Inouts, 8 outputs
1 – 32 Inouts, 16 outputs

F – Analog I/O Options *
0 - No Options
2 – 4 GPIO Relays
3 – 2 A/D In, 2 A/D Out, 4 GPIO Relays
4 – 4 A/D In, 4 A/D Out, 4 GPIO Relays

G – Communications Options *
0 – USB, Ethernet
D – DPRAM, 8K x 16 bit
M – ModBus Ethernet Comm. Protocol
T – Modbus, DPRAM, RS232

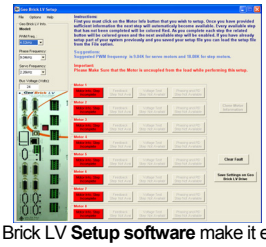
HHH – Feedback Options *
000 – None
4A0 – Sinusoidal Encoder, 4 channels
4C1– Serial: SSI Protocol, 4 channels
4C3– Serial: EnDat Protocol, 4 channels
8C1– Serial: SSI Protocol, 8 channels

I – Macro Ring Options *
0 – None
1 - RJ45 Macro
2 - Fiber Optic Macro

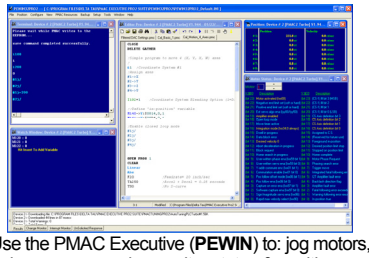
J – Fieldbus Options *
1 – DeviceNet slave module
6 – EtherCat master module

Blue = default *** Additional options available, contact distributor / factory for complete listing**

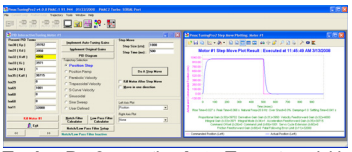
Tools & Software



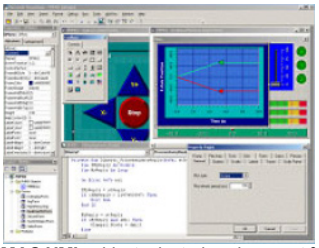
Geo Brick LV **Setup software** make it easy to setup your 'LV' controller/amplifier & motors



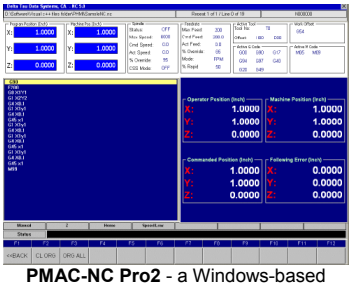
Use the PMAC Executive (**PEWIN**) to: jog motors, issue commands, monitor status & positions, download motion & PLC programs



Tuning Pro2 - use the **Auto-Tuner** to quickly get servo motors moving. Then use the **Interactive Tuning** tool to 'fine tune' servo performance and generate response plots



PMAC HMI - object oriented environment for creating GUI's, includes a wide selection of controls & ActiveX objects



PMAC-NC Pro2 - a Windows-based customizable GUI for PC based CNC control

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