



DELTA TAU

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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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 "half" 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 (over)
 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

G **B** **D** **A** - **B** **B** - **C** **D** **D** - **E** **F** **G** **H** **H** **H** **I** **J**
4 - **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

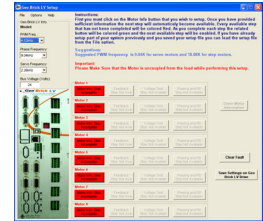
HHH - Feedback Options *
 000 - None
 4A0 - Sinusoidal Encoder, 4 channels
 4C1 - Serial: SSI Protocol, 4 channels
 4C3 - Serial: EnDat Protocol, 4 channels
 8C1 - Serial: SSI Protocol, 8 channels

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

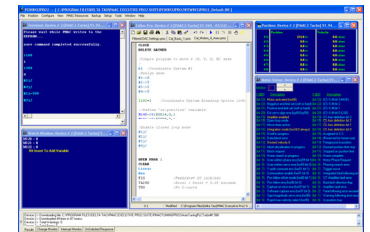
J - Fieldbus Options *
 1 - DeviceNet slave module
 6 - EtherCat master module

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

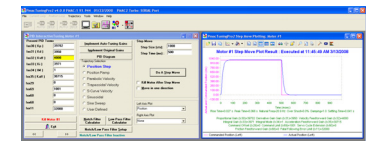
Tools & Software



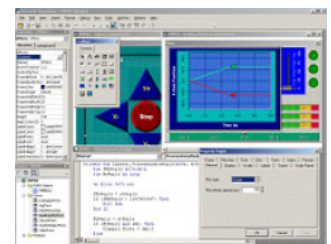
Geo Brick LV Setup software make it easy to setup your 'LV' controller/amplifier & motors



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

