Geo Brick LV^{TM}
Multi-axis controller with Low Voltage (12V to 60V) amplifiers

DELTA TAU
Data Systems, Inc.
NEW IDEAS IN MOTION ...

Product Announcement

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

Geo Brick LV™

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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 "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 (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

Tools & Software

Geo Brick LV **Setup software** make it easy to setup your 'LV' controller/amplifier & motors
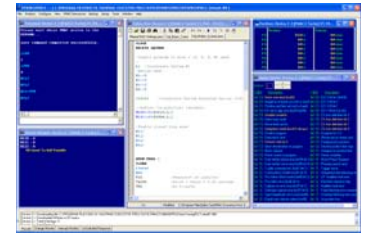
Use the PMAC Executive (**PEWIN**) to: jog motors, issue commands, monitor status & positions, download motion & PLC programs

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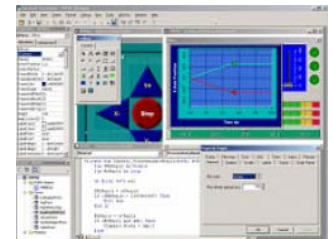
PMAC HMI - object oriented environment for creating GUI's, includes a wide selection of controls & ActiveX objects

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

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

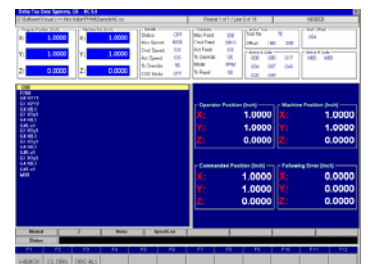Blue = default   * Additional options available, contact distributor / factory for complete listing