News in MOTION

DELTA TAU | SUMMER 2007

TURBO PMAC – NEW FEATURES

Did You Know?

The Turbo PMAC has a whole set of new features that permit users easily to optimize the performance of multi-axis path-control applications. These features, added in the version 1.941 firmware, provide great flexibility in specifying how paths are traversed

- *New optimized feedrate override: The new override technique (patent pending), combined with Turbo PMAC's lookahead algorithms, permits interactive control of move speeds without affecting acceleration rates. And it does so without compromising path accuracy, something existing techniques that maintain acceleration times over varying override percentages cannot accomplish.*

- *Corner blending control: New setup (I-) variables permit you to specify how corners are traversed based on the corner angle. Angles slighter than that specified in one new variable will be blended; motion will stop at sharper angles. Users can specify whether the stop is just in the commanded trajectory, or whether all axes must physically come within the "in-position" band. For corners where blending is enabled, two other new variables specify when a "dwell" time is to be automatically inserted, and how long that time will be.*

- *Circle Acceleration Limit: A new variable containing the maximum centripetal acceleration permitted in a circle-mode move automatically limits the speed of tight arcs and circles, so high accuracy can be maintained.*

PMAC POWERS AHEAD

Delta Tau's PowerPMAC motion controller sets new standards for accuracy, speed and overall performance putting them years ahead of the competition.

Perhaps better described as motion computers than motion controllers, PowerPMAC is founded on a Power PC processor with double precision floating point capability. PCI, USB and Ethernet connectivity is provided as standard. Compared with conventional products, the new controllers give speed increases of up to 100%, while providing the platform for up to 32 axes and 32 co-ordinate systems.

Versions with dual-core processors will shortly be added to the range, allowing trajectory control and motion control to be handled by separate cores, leading to still further speed gains.

PowerPMAC controllers carry the technological pedigree of Delta Tau's renowned UMAC product range.

Key features inherited from UMAC controllers include parabolic S-curve acceleration ramps to give smooth motion; and a lookahead facility through which motion blocks are identified in advance and hence, allow automatic deceleration to negotiate tight cornering, a useful feature for machine tools, laser cutting and other controls where geometric paths are followed.

New to PowerPMAC controllers, however, this invaluable velocity lookahead feature is now complemented by acceleration lookahead, which allows even greater performance gains to be achieved.

For users to get the best from PowerPMAC, programming is in high-level C, making use of a proprietary high-efficiency math library. Further benefits of PowerPMAC controllers include their open architecture and their Linux-based real-time operating system that offers sub-microsecond response times for interrupts.

NEW "CLIPPER" IS LAUNCHED
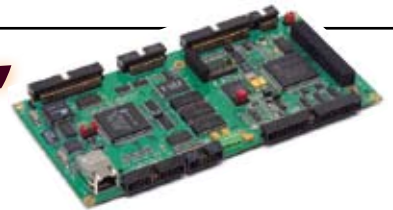
To meet the need for inexpensive, yet precise motion control, Delta Tau has launched the new Turbo PMAC2 "Clipper" controller. Communicating via Ethernet or RS-232, the multi-axis controller is very powerful but compact and cost-effective. It has a full Turbo PMAC2 CPU section and provides a minimum of 4 axes of servo or stepper control with 32 general-purpose digital I/O on a single board.

Because of the Turbo PMAC2 CPU, the "Clipper" is capable of Inverse and Forward Kinematics for robotic applications, dynamic Multi-Block Lookahead for high speed path fidelity and true "S"-curve acceleration for precise, smooth and jerk-free trajectory control.

In addition, all PMAC PC/104 accessories are compatible with the Turbo PMAC2 Clipper, including:

- *ACC-1P PC/104-format Channel 5-8 board*
- *ACC-8ES 4-channel dual 18-bit true-DAC output board*
- *ACC-8FS 4-channel direct-PWM output board*
- *ACC-8TS 4-channel ADC-interface board*
- *ACC-51S 2/4-channel high-resolution encoder interpolator board*
- *4-axis 3-phase direct-PWM amplifier board (48V, 5A cont./10A peak) Coming Soon!*

NEW IDEAS IN MOTION™

NEW BRICKS FORTIFY THE GEO FAMILY

Delta Tau's Brick range of versatile and powerful stand alone controllers has been extended to include the new, soon to be released, Geo Brick LV (low voltage) model for controlling all types of low voltage servo and stepping motors. This latest product completes a family of motion controls to suit all types of machinery and motion applications. Also released is the latest Brick Controller, which is a fully programmable motion controller, based around a powerful Turbo PMAC platform.

Another Brick in the wall

The new Geo Brick LV provides control of up to eight disparate motor types. Like its high voltage counterpart, the Geo Brick LV features an integrated high performance Turbo PMAC controller. It includes up to eight configurable low voltage amplifiers capable of running any type of motor from DC synchronous, AC servo, to stepper technology.

Readily programmable for virtually any kind of motion control application, the versatile PMAC2 controller within offers advanced features which include S-curve acceleration and deceleration, cubic B-spline interpolation and optional multi-move look ahead for velocity and acceleration limiting.

Amplifiers within the new Geo Brick LV are rated at 5A continuous, with a 10A Peak facility at 48V.

Among the options available are a MACRO interface that complements USB and Ethernet interfaces which are fitted as standard.

There are also facilities for adding analog inputs and digital I/O that, in many applications, eliminates the need for a separate PLC to be used to provide standard machine control functions.

Bricks in motion

The new Brick Controller is an open architecture controller utilizing the intelligence and capability of its embedded Turbo PMAC. With the ability to store programs locally and its built-in PLC execution, it is suitable for virtually any kind of automation application. This tried and tested architecture allows for complete machine motion and logic control.

This product has 4 or 8 (optional) axes of analog +/-10V filtered-PWM (12-bit resolution) or pulse and direction outputs as standard. Options are available for dual true-DAC analog outputs at 18-bit resolution or Direct-PWM with current loop. Feedback with quadrature incremental encoders is standard. Options for sinusoidal, resolver or serial encoders are available.

The Brick Controller provides a standard I/O capability of 16 inputs and 8 outputs at 12-24V fully protected and isolated with separate commons for each bank of 8 inputs. Outputs are rated for 1 ampere each and are thermal-fuse protected.

Outputs can be current sinking or sourcing depending on use of common emitter or common collector connections. Additional I/O is an option (up to 64 inputs and 32 outputs). Also an option for up to four 16 bit analog inputs is available.

The Brick Controller's functionality doesn't stop there with features such as extensible I/O via ModBus TCP master, or ModBus TCP slave for third party HMI hardware. Our PC-based HMI package connected through USB 2.0 or Ethernet makes the Brick Controller a powerful single source system solution.

BRICK FAMILY OF PRODUCTS

GEO BRICK DRIVE
Amplifier package description

Geo Brick Drive	*Brick Controller*	*Geo Brick LV* *(low voltage)*
4-, 6- or 8- Axis *Amplifier and Controller* *in one compact package!* *220 V.A.C. 5/10 Amps, 8/16* *Amps, 15/30 Amps*	*4-or 8- Axis Controller* *with +/-10V output* *in a compact package!*	*4-or 8- Axis Low Voltage Servo/* *Stepper* *Amplifier and Controller* *in one compact package!* *48 V.D.C. 5/10 Amps*

NEW MACRO and Interpolation Options for all Bricks Coming Soon!

NEW IDEAS IN MOTION™

ENDAT GROWS

Here at Delta Tau we have registered an increasing use of the EnDat interface for encoders in place of conventional absolute encoder technology. In response, we have added an EnDat feature to the widely used Acc-51 interpolator boards. These boards make it easy to connect quadrature encoders to PMAC controllers.

EnDat is a bidirectional synchronous digital interface that was developed by encoder specialist Heidenhain. It provides fast, reliable data transfer, yet needs only four signal lines between the encoder and the interpolator board. This economy of wiring allows EnDat users to achieve significant cost reductions, with savings of up to 50% already reported.

The technical advantages of EnDat, combined with the high performance of the 4096x interpolator chips used on Acc-51 interpolator boards, give encoder feedback with amazingly high resolution. This in turn leads to greatly enhanced velocity loop stability and much greater static and dynamic stiffness.

Currently, Delta Tau's Acc-51 boards implement EnDat Version 2.1, which provides power-up only via the serial interface with subsequent positional information derived from sine/cosine data. In the future, however, support will be added for the recently announced EnDat Version 2.2, which provides a fast serial interface for every servo cycle.

ADVANTAGE 400 GETS A NEW FACE

Delta Tau's Advantage 400 CNC/general purpose controllers have been given a major makeover in the form of a completely new operator control panel.

The Machine Operator Panel Lite (MOP-LT) is self-powered, and operates via a convenient USB 2.0 connection that requires only a single plug-in cable to link it to the controller.

The smallest in Delta Tau's MOP range of operator control panels, the new MOP-LT features IP65 ingress protection with dustproof seals. While it is ideal for use with Advantage 400 controllers, it is also fully compatible for machine upgrades with any computers running Delta Tau CNC software.

MOP-LT panels provide facilities for mode change and for manual axis management, including axis selection, increment selection together with jog and handwheel movements. Spindles can likewise be controlled manually, along with continuously variable spindle and feedrate overrides.

The handy USB hub allows accessories such as a mouse or keyboard to be easily connected.

Panels come with easy-to-use software that allows users to configure custom applications.

The Advantage 400 controllers, for which the MOP-LT panels are primarily intended, provide simple and inexpensive motion control for machines of all types, from metal cutting tools to lasers, flatbed cutters and Cartesian robots.

In addition to their motion control functions, the controllers also offer PLC functionality, which allows significant cost savings to be made in many applications.

A NEW LIGHT LINK IN MOTION...

The new Turbo PMAC2 Ethernet Ultralite is a new MACRO ring controller capable of handling 32-axes of control in a convenient, standalone package. Communicating to the PC via Ethernet, the controller provides a single wire connection to the UMAC MACRO, Geo MACRO Drives, MACRO Peripherals and any other third party MACRO devices.

The new Turbo PMAC2 Ethernet Ultralite high-speed 125 Mbits/sec transfer rate is capable of closing the servo loops across the MACRO ring, allowing the flexibility to choose distributed intelligence or centralized control through a fiber optic or twisted pair copper (RJ45 connector) ring.

Available options include:

- 32k x 16 dual-ported RAM for shared-memory communications on USB or Ethernet
- Two 12-bit analog-to-digital converter inputs, one 12-bit digital-to-analog converter output
- 240 MHz CPUs, 1M x 24 user SRAM active memory
- Fieldbus interfaces: Profibus, DeviceNet, CCLink; master or slave

Additional information:

As MACRO's popularity increases, more third party products are becoming available including:

- The MACRO SIGMA-II Application Module (ACC-82M) which provides a MACRO interface to the Yaskawa Sigma-II (SGDH) amplifier.
- Coming Soon – Copley provides a MACRO interface for their Accelnet Servo Drive.

Please visit www.macro.org for more information about other third party products!

NEW IDEAS IN MOTION™

DELTA TAU & PANASONIC ANNOUNCE:

TURBO PMAC2 MOTION CONTROLLER FOR REALTIME EXPRESS™ SERVO NETWORK

Delta Tau Data Systems and Panasonic Electric Works Corporation of America, have joined together to create the world class Turbo PMAC2 for Realtime Express™ (RTEX controller). The control for Panasonic A4N servomotors and drives, based on the Panasonic Realtime Express™ (RTEX) network, provides a cost-efficient and performance packed system that delivers high speed, high resolution, single Ethernet cable connectivity, and precise synchronization.

"The Turbo PMAC2 and RTEX simultaneously control up to 32 axes at a speed close to a 2-kHz servo loop (0.5 ms cycle time) and 8-kHz commutation and digital current loop. Half of the Turbo PMAC2's processing power is used for axes control, while the other half is available for other tasks such as Programmable Logic Control and peripheral I/O management which is extremely flexible. Provisions are made for using various industrial modules in order to interface with networks, such as A/B, profibus, controlnet, etc. Modbus connectivity is provided via a separate Ethernet connection and can be master or slave.

The RTEX Controller can be used as a standalone system for controlling a complete machine independently, or they can be connected to a P.C. via USB/Ethernet and thus provide very high speed control of NC machine tools with tool radius compensation and lookahead capabilities. Other dynamic, reprogrammable machines can also be controlled efficiently.

Programming is easy because he RTEX Controller supports from 1 to 16 coordinate systems with 2 to 32 axes each independently, and with random motion sequences for each coordinate system.

OEM's utilizing Panasonic's Realtime Express™ network tap the Turbo PMAC's powerful features, including:

- Up to 32 axes of simultaneous control (0.5 ms cycle time)
- Up to 16 independent coordinate systems
- Multitasking of up to 16 motion programs and 64 asynchronous PLC programs
- Easy-to-use, high-level programming language
- Linear, circular, rapid, B-spline, Hermite-spline interpolation modes
- True S-curve accel/decel for jerk-limited profiles
- Dynamic multi-move lookahead for robust acceleration and jerk-free continuous control
- Path retrace capability
- Coordinate system translation and rotation, 2D and 3D
- Embedded forward and inverse kinematic routines for outstanding robotics control
- Tool-radius compensation
- Gantry control

The Panasonic Realtime Express™ protocol is an all-digital minimal-hardware control architecture allowing the use of low-cost Ethernet cables with Panasonic (Matsushita Electric) MINAS A4N servo drive systems. The system provides high speed, high resolution, simplified wiring and precision synchronization. Shielded twisted-pair cable reduces system costs, while providing IEC61000-4-4 compliant noise resistance allowing excellent servo performance.

TRAINING CLASS SCHEDULE:

2007

Oct 8-12	PMAC Beg & Adv (#133)
Oct 11-12	NC (#133N)
Dec 3-7	PMAC Beg & Adv (#134)
Dec 10-11	MACRO (#134M)

2008

Feb 25-29	PMAC Beg & Adv (#135)
Feb 28-29	NC (#135N)
Apr 7-11	PMAC Beg & Adv (#136)
Apr 14-15	MACRO (#136M)
June 2-6	PMAC Beg & Adv (#137)
June 5-6	NC (#137N)
Aug 11-15	PMAC Beg & Adv (#138)
Aug 14-15	MACRO (#138M)
Oct 6-10	PMAC Beg & Adv (#139)
Oct 13-14	NC (#139N)
Dec 8-12	PMAC Beg & Adv (#140)
Dec 15-16	MACRO (#140M)

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