INTRODUCTION MANUAL

UMAC System

UMAC Products Introduction Manual

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DELTA TAU
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NEW IDEAS IN MOTION ...

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Operating Conditions

All Delta Tau Data Systems, Inc. motion controller products, accessories, and amplifiers contain static sensitive components that can be damaged by incorrect handling. When installing or handling Delta Tau Data Systems, Inc. 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 Data Systems, Inc. products are directly exposed to hazardous or conductive materials and/or environments, we cannot guarantee their operation.

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UMAC SYSTEM

UMAC Description

UMAC Turbo with PC/104 and the Turbo PMAC2 CPU

UMAC MACRO with the MACRO interface card and PMAC2 Ultralite

The UMAC (Universal Motion and Automation Controller) is a modular PMAC system built with a set of 3U-format Eurocards. The configuration of any UMAC system starts with the selection of the PMAC CPU or MACRO fiber optic interface and continues with the addition of the necessary axes boards, I/O boards, communication interfaces (USB, Ethernet, etc.) and any other interface boards selected from the rich variety of available accessories. For example, accessory boards interface with virtually any kind of feedback sensor or to implement almost any kind of communication method with the host computer or external devices. In addition, a PC/104 computer can be installed inside the UMAC system yielding an incredibly powerful system inside a compact industrial package

UMAC type boards are mounted inside 3U racks and the system is completed with the appropriate selection of power supplies and optional 3U servo amplifiers. UMAC 3U racks are available in different sizes, providing a CE compliant, rugged, and integrated package that puts all the electronics, built-in breakout connectors, and power supply in an enclosed system. Individual boards can slide in and out of the rack, making configuration and troubleshooting a snap.

Delta Tau provides a rich selection of accessories for axes boards, digital I/O boards, analog inputs boards, communication interfaces, feedback interfaces and many others. However, because UMAC is based on the UBUS (Universal BUS), if a particular feature for the UMAC system is desired but not yet supported, Delta Tau provides all the necessary information for its development. Some examples of custom designed UMAC boards include vision inputs cards, temperature control cards, etc.

Each UMAC system is expandable and scalable by connecting multiple racks together via the MACRO fiber optic protocol. Delta Tau's 3U and Geo servo amplifiers with MACRO interface capability can also reside in a MACRO fiber optic ring.

Features

- Up to 32 axes of motion control
- Analog ± 10V, digital PWM or pulse and direction (stepper) command signals quadrature, incremental, encoder inputs
- Parallel binary feedback inputs
- Laser interferometer feedback devices inputs
- Analog feedback inputs
- Sinusoidal encoder feedback inputs with
- 4096 interpolation lines
- SSI encoders inputs
- 16-bit resolver-to-digital converter inputs
- MLDTs feedback inputs
- Thousands of I/O points
- High-power, sinking, sourcing or OPTO-22 compatible I/O

- Up to 256 analog-to-digital converted inputs (12-bits or 16-bits resolution) Stand-alone or host commanded operation
- PC/104, USB, Ethernet or RS-232/422 communication methods supported
- Device Net and Profibus protocols supported

Ordering UMAC Parts

Ordering parts for the UMAC is simple. Given the characteristics of the application in question these items should be considered:

CPU Board

Order either a Turbo PMAC2 3U CPU board, which can operate stand-alone, or a combination of a MACRO Interface/CPU board with a PMAC2 Ultralite board. Commands for the MACRO Interface/ CPU board can alternatively be given from a UMAC Turbo system with an ACC-5E instead of the PMAC2 Ultralite board. Different memory sizes, CPU speeds and other optional features are available for the 3U Turbo CPU or the PMAC2 Ultralite board.

Number of Axis Boards

Either the MACRO Interface/CPU board or the Turbo PMAC2 3U CPU board requires axis boards to control the motors. A UMAC MACRO can control up to eight axes and a UMAC Turbo up to 32 axes. The number and type (digital, analog or stepper) of axis boards must be added accordingly, and it is limited either by the size of the UBUS backplane (4 to 18 slots) or the space provided by the UMAC rack.

Number and Type of Digital Inputs and Outputs Required

A great variety of I/O boards are available for potentially hundreds of I/O control lines. The selection could be made from TTL I/O, OPTO22 compatible boards, high or low power outputs, optically isolated boards, AC or DC I/O signals and so on.

Kind of Position Feedback Devices Used

The standard feedback type that the UMAC supports is one quadrature incremental encoder per motor. Other feedback devices are supported through the addition of optional accessory boards. The alternative options for feedback devices include dual-quadrature, sinusoidal encoders, parallel feedback interfaces and SSI encoder types.

Type of Communications Desired

When the Turbo PMAC2 3U CPU board is used, a variety of communication protocols and interfaces are available for high-speed communications. Options include USB/Ethernet, field bus adapters such as DeviceNet, Profibus or CanBus as well as the MACRO link between UMAC systems, I/O and digital or analog servo drives.

PC/104 Products

A UMAC Turbo system can be equipped with a built-in PC/104 computer. The PC/104 computer plugs directly into the Turbo PMAC2 3U CPU board and has all the peripherals associated with any other IBM© compatible computer: Optional CD-ROM, hard drive, keyboard, monitor or LCD display, mouse, floppy drive, etc.

UMAC 3U Amplifiers

3U format linear or digital PWM amplifiers are provided for installation inside either a UMAC Turbo or a UMAC MACRO system. In addition, single or double axis MACRO compatible amplifiers are provided for a direct connection to a MACRO link.

Power Supplies, Cables and Racks Dimensions

Each board has its own power requirements and number of slots it occupies inside a UMAC system. After all the components have been selected, simply compute the total electrical current requirements and the number of slots necessary and then select the appropriate power supplies and rack dimensions accordingly. For convenience, a selection of fiber optics and PWM digital amplifier cables is also provided.

UMAC PRODUCTS SUMMARY

CPU Options

Turbo PMAC2 3U CPU can control up to 32 axes and interface with a PC/104 computer, communication accessories (Ethernet, USB, fieldbus) and the MACRO interface with other UMAC MACRO systems.

The MACRO Interface/CPU Board can control up to 16 axes. It must receive servo commands from a remote motion controller, either a PMAC2 Ultralite board or a UMAC Turbo system with an ACC-5E. It cannot directly interface with PC/104 or communication adapters.

Axis Boards

- ACC-24E2 provides two or four digital PWM channels.
- ACC-24E2A provides two or four analog ±10V channels.
- ACC-24E2S provides two or four pulse and direction (stepper) channels ACC-69E: provides six channels for SLM Technology amplifiers.

Digital I/O Boards

- ACC-5E is a MACRO Interface that allows the Turbo PMAC2 3U CPU to communicate with MACRO systems.
- ACC-11E provides 24 digital outputs (12-24VDC, 100 mA/output max) and 24 digital inputs (12 to 24VDC).
- ACC-12E provides 24 outputs (up to 60VDC or 240 VAC, 1A/ output max) and 24 inputs (12 to 24VDC).
- ACC-14E provides 48 TTL I/O points for direct connection to OPTO22 type boards.
- ACC-65E provides isolated, self-protected sourcing 24 inputs and 24 outputs.
- ACC-66E: provides isolated, self-protected sourcing 48 inputs.
- ACC-67E provides isolated, self-protected sourcing 48 outputs.

Position Feedback and Analog Inputs Interfaces

- ACC-14E provides 48 TTL I/O points typically used for the interface to parallel position feedback devices.
- ACC-28E Two or four channels high resolution 16-bit A/D converter board with ± 10V input range
- ACC-36E 16 channels 12-Bit A/D converter board with ± 10V input range
- ACC-51E Two or four axes 4096x high resolution Sinusoidal Analog Encoder Interpolator board
- ACC-53E Four or eight channel Synchronous Serial Encoder Interface (SSI) Board
- ACC-57E Two or four channel encoder inputs for either Yaskawa or Mitsubishi absolute encoders
- ACC-59E Eight channel 12-Bit A/D converter board plus eight channel 12-Bit DAC outputs
- ACC-70E UMAC feedback interface for FA-CODER type encoders.

Communication Boards (UMAC Turbo Only)

ACC-72E is the UMAC Field Bus Gateway.

Power Supplies

ACC-E1 is a high-power AC-input power supply, input of 85-240VAC, output of 14A at +5V, 1.5A each at +/-15V.

ACC-PC104: PC/104 Computer Assembly

- CPU: Embedded VIA low power Eden processor, 128KB L1 cache memory on die Eden-667 (PCM-9372F-M0A1)
- System chipset: VIA PN133T (Twister T), VIA VT82C686B
- BIOS: Award 256 KB Flash memory
- System memory: 256Meg PC133 144pin SODIMM
- USB: Two universal serial bus ports, USB 1.1 compliant
- Serial ports: COM1: RS-232, COM2: RS-422
- Ethernet interface: IEEE 802.3u 100BASE-T Fast Ethernet
- MS Windows 2000 (when Option-1 is ordered)
- MS Windows 98 (when Option-2 is ordered)

Backplanes

- ACC-U4: 4-slot UBUS backplane board (+1 slot for power supply connection)
- ACC-U6: 6-slot UBUS backplane board (+1 slot for power supply connection)
- ACC-U8: 8-slot UBUS backplane board (+1 slot for power supply connection)
- ACC-U10: 10-slot UBUS backplane board (+1 slot for power supply connection)
- ACC-U12: 12-slot UBUS backplane board (+1 slot for power supply connection)
- ACC-U14: 14-slot UBUS backplane board (+1 slot for power supply connection)
- ACC-U16: 16-slot UBUS backplane board (+1 slot for power supply connection)
- ACC-U18: 18-slot UBUS backplane board (+1 slot for power supply connection)

Racks

- ACC-P1: 10-slot (42T) 3U Eurocard rack with connections for top, front, and bottom panel mounting
- ACC-P2: 15-slot (63T) 3U Eurocard rack with connections for top, front, and bottom panel mounting
- ACC-P3: 21-slot (84T) 3U Eurocard rack with connections for top, front, and bottom panel mounting
- ACC-R1: Integrated UMAC 6-slot rack including backplane and power supply
- ACC-R2: Integrated UMAC 12-slot rack including backplane and power supply
- ACC-R3: Integrated UMAC 18-slot rack including backplane and power supply

Cables

- ACC-7A: 1.5m (5ft) terminated glass optical fiber cable
- ACC-7B: 5m (15ft) terminated glass optical fiber cable
- ACC-7C: 8m (28ft) terminated glass optical fiber cable
- ACC-7D: Custom length terminated glass optical fiber cable
- Option-5A: Amplifier PWM cable, 600 mm (24) inches long, mini-D, 36 conductor, 1/axis
- Option-5B: Amplifier PWM cable, 900 mm (36 inches long), mini-D, 36 conductor, 1/axis
- Option-5C: Amplifier PWM cable, 1.5 m (60 inches) long, mini-D, 36 conductor, 1/axis
- Option-5D: Amplifier PWM cable, 1.8 m (72 inches) long, mini-D, 36 conductor, 1/axis
- Option-5E: Amplifier PWM cable, 2.1 m (84 inches) long, mini-D, 36 conductor, 1/axis
- Option-5F: Amplifier PWM cable, 3.6 m (144 inches) long, mini-D, 36 conductor, 1/axis