Delta Tau

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HARDWARE REFERENCE MANUAL

UMAC System

UMAC Hardware Reference Manual

3A0-UMACIM-xHxx

August 3, 2006

CE

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

Single Source Machine Control *Power // Flexibility // Ease of Use*
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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.

REVISION HISTORY				
REV.	**DESCRIPTION**	**DATE**	**CHG**	**APPVD**
1	NEW MANUAL	08/03/06	CP	S.FIERRO

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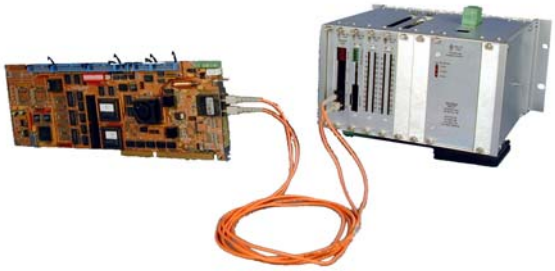
INTRODUCTION

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 UMAC CPU or MACRO CPU 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 and 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.

UMAC Turbo with PC/104 and the Turbo PMAC2 CPU



UMAC MACRO with the MACRO interface card and PMAC2 Ultralite

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

UMAC SYSTEM SPECIFICATIONS

Please note that these are design specifications. Performance may differ slightly from these design specifications.

Environmental Specifications

Description	Unit	Specification
Operating Temperature	ºC	0°C to 45°C,
Storage Temperature	ºC	-25°C to 70°C
Humidity	%	10% to 95 % non-condensing

Physical Specifications

Item	Specification
Dimensions	10 Slot: 218.4 mm x 222.2 mm x 132.1 mm 8.60 in. x 8.75 in. x 5.20 in. 15 Slot: 325.1 mm x 222.2 mm x 132.1 mm 12.80 in. x 8.75 in. x 5.20 in. 21 Slot: 431.8 mm x 222.2 mm x 132.1 mm 17.0 in. x 8.75 in. x 5.20 in.
Weight (max)	10 Slot: 13.0 lbs 15 Slot: 15.0 lbs 21 Slot: 17.0 lbs

EMC and Safety

Item	Description
CE Mark	Full Compliance
EMC	EN55011 Class A Group 1 EN61000-3-2 Class A EN61000-3-3 EN61000-4-2 EN61000-4-3 EN61000-4-4 EN61000-4-5 EN61000-4-6 EN61000-4-11
Safety	EN 61010-1
Flammability Class	UL 94V0 for all boards and connectors

Power and Space Requirements

The power and space requirements of a UMAC system are dependent on the boards used in the system. The following tables are listed to allow the user to calculate the system requirements for their system.

3U-Format Boards

Name	Core Part Number	Description	Rack Slots Required	+5V Current Required	+15V Current Required[1]	-15V Current Required[2]	Notes
UMAC CPU	603766	CPU	1	1.0 A	0A	0A	Current
UMAC CPU	603382	CPU	1	1.10A	0A	0A	Legacy
MACRO CPU	602804	CPU	1	1.50A	0A	0A	
MACRO16	603719	CPU	1	2.5A	0A	0A	
ACC-24E2	603397	2-axis PWM	1	0.50A[3]	0A	0A	
ACC-24E2 Opt-1D	(603397)	+2-axis PWM	1	0.25A[3]	0A	0A	Piggyback board; creates 2-slot module
ACC-24E2A	603398	2-axis analog	1	0.55A[3]	0.16A[4,5]	0.07A[4,5]	
ACC-24E2A Opt-1A	(603398)	+2-axis analog	1	0.40A[3]	0.14A[4,5]	0.05A[4,5]	Piggyback board; creates 2-slot module
ACC-24E2S	603441	4-axis stepper/ enc	1	0.70A[3]	0A	0A	
ACC-51E	603438	2-Chan. interpolator	1	0.50A	0.08A	0.04A	
ACC-51E Opt-1	(603438)	+2 channels interpolator	0	0A	0.02A	0.01A	
ACC-9E	603283	48 inputs	1	0.05A	0A	0A	Ext. supply for isolated I/O
ACC-10E	603299	48 outputs	1	0.05A	0A	0A	Ext. supply for isolated I/O
ACC-11E	603307	24 inputs, 24 outputs	1	0.05A	0A	0A	Ext. supply for isolated I/O
ACC-14E	603474	48 TTL I/O	1	0.15A	0A	0A	
ACC-28E	603404	2-channel 16-bit ADCs	1	0.15A	0.10A	0.06A	
ACC-28E Opt-1	(603404)	+ 2 channels 16-bit ADCs	0	0A	0.02A	0.03A	
ACC-36E	603485	12-bit ADCs	1	0.15A	0.02A	0.02A	
ACC-54E	603467	USB interface	1	1.10A	0A	0A	
ACC-5E	603437	MACRO comm.. and IO	1	0.92A	0A	0A	
ACC-5E option 2	603437	+16 nodes MAC Interface	0	0.3A	0A	0A	
ACC-65E	603595	24in & 24 out	1	0.38A	0A	0A	

Notes:

1. Supply can be +12V to +15V nominal (+11.5 to +16.5V actual)
2. Supply can be -12V to -15V nominal (-11.5 to -16.5V actual)
3. Must add current for external encoders if these encoders are powered from UMAC. Typically 50 – 100mA per encoder.
4. This total includes 10mA external draw per analog output.
5. Users are encouraged to bring in external +/-12/15V power through the amplifier connectors (typically from the amplifiers) to power the analog circuitry on these boards. With jumpers removed, this circuitry is optically isolated from the UMAC's 5V digital circuitry.

Backplane Boards

Part	Core Part Number	Description[1]	Minimum Rack Size (slots)[2]	Backplane Data Slots *Provided*	+5V Current Required[3]	Notes
ACC-U4	603462	4+1-slot backplane	7	4	1.00A	
ACC-U6	603403	6+1-slot backplane	9	6	1.00A	
ACC-U8	603463	8+1-slot backplane	11	8	1.00A	Cannot fit in ACC-P1 rack with 3-slot power supply
ACC-U10	603464	10+1-slot backplane	13	10	1.00A	Cannot fit in ACC-P1 rack with 3-slot power supply
ACC-U12	603465	12+1-slot backplane	15	12	1.00A	Cannot fit in ACC-P1 rack with 3-slot power supply
ACC-U14	603466	14+1-slot backplane	17	14	1.00A	Cannot fit in ACC-P1 or P2 rack with 3-slot power supply
ACC-U16	603471	16+1-slot backplane	19	16	1.00A	Cannot fit in ACC-P1 or P2 rack with 3-slot power supply
ACC-U18	603491	18+1-slot backplane	21	18	1.00A	Cannot fit in ACC-P1 or P2 rack with 3-slot power supply

Notes:

1. "n+1-slot" means "n" data slots for inter-board communications, and 1 power slot for direct installation of a power supply
2. Assumes a 3-slot power supply is installed in the power slot (rightmost connector), extending 2 slots past right end of backplane
3. Current draw of backplane boards is due to bus termination resistors

Power Supplies

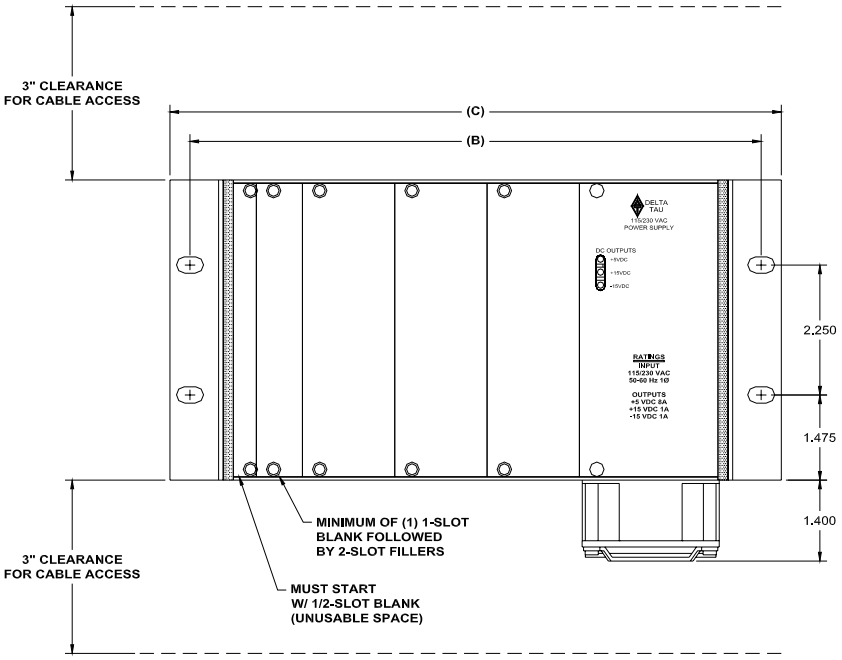
Part	Core Part Number	Description	Rack Slots Required	+5V Current *Provided*	+15V Current *Provided*[2]	-15V Current *Provided*[3]	AC Power (MAX)
ACC-E1	603269	AC-input power supply	3	14.0A	1.5A	1.5A	3.3A rms
ACC-F1	603909	DC-input power supply	3	14.0A	1.5A	1.5A	-

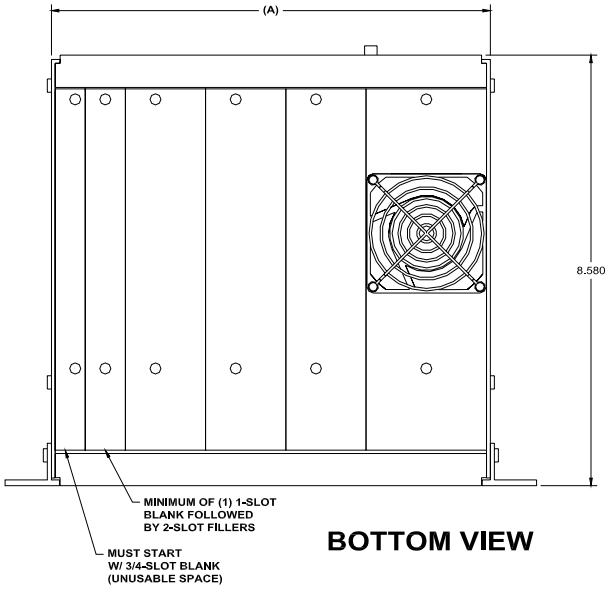
Notes:

1. Must be installed in the single power slot in the ACC-U*n* backplane board
2. Power may be provided in the range of +12V to +15V nominal (+11.5V to +16.5V actual)
3. Power may be provided in the range of -12V to -15V nominal (-11.5V to -16.5V actual). 0.12A of this quantity is required for the power supply's own cooling fan and is not available for other boards.

UMAC Mechanical Specifications

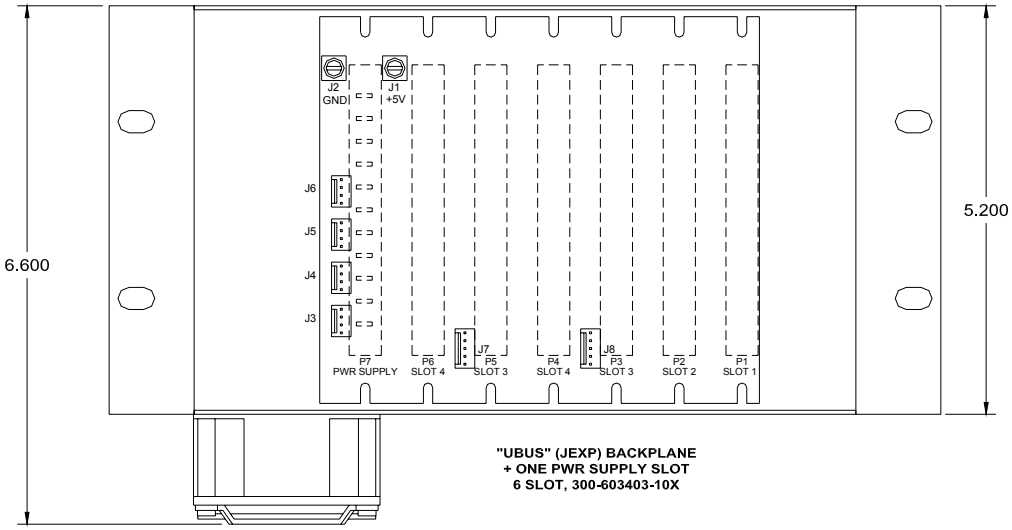
The UMAC rack system can be ordered in three sizes: 10 ½ slot (42T), 15 ¾ slot (63T) , and 21 slot (84T) configurations.





3U Rack Sizes			
Width	**A**	**B**	**C**
D1 - 10 ½ Slot wide	22.23cm (8.75in)	25.15cm (9.9in)	26.92cm (10.6in)
D2 – 15 ¾ Slot wide	32.89cm (12.95in)	35.81cm (14.10in)	37.60cm (14.8in)
D3 – 21 Slot wide	43.56cm (17.15in)	46.48cm (18.30in)	48.26cm (19in)

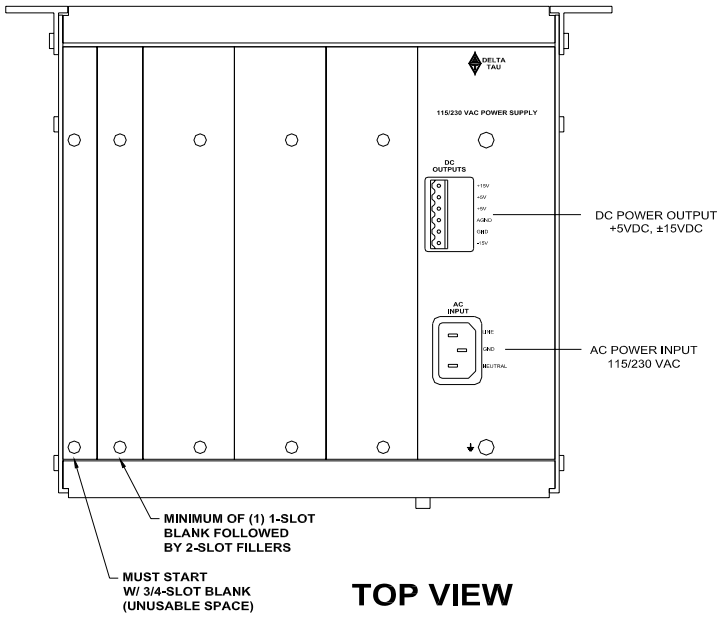
Rear View



REAR VIEW

BACK COVER NOT SHOWN

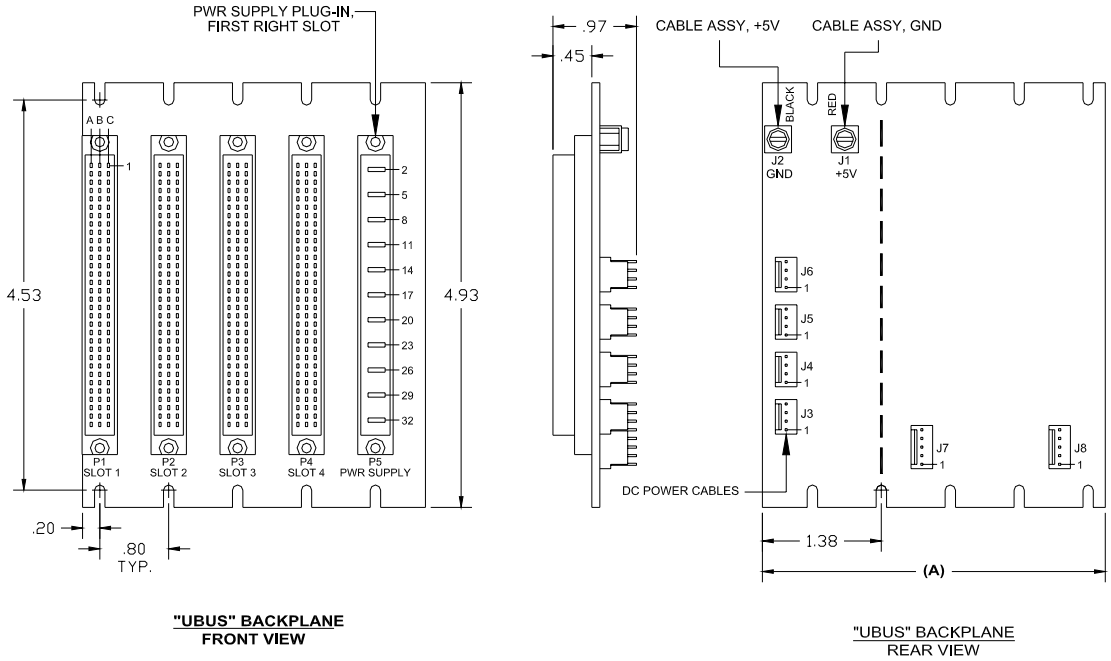
Top View



TOP VIEW

UBUS BACKPLANE Specifications

The UBUS backplane that permits communication between the CPU board and the accessory boards can be ordered in many different sizes and is usually installed inside the UMAC rack.



UBUS Backplane Sizes

Slots	Part Number	A
4	603462-10x	3.98
6	603403-10x	5.58
8	603463-10x	7.18
10	603464-10x	8.78
12	603465-10x	10.38
14	603466-10x	11.98
16	603471-10x	13.58
18	603491-10x	15.18

UBUS Connector Pinout

J3, J4, J5, J6: 4-pin Molex

Pin	Description
1	+5V
2	AGND
3	A+15V
4	A-15V

J7 and J8 : 5-pin Molex

Pin	Description
1	GND
2	+5V
3	AGND
4	A+15V
5	A-15V

H11: UBUS Power Supply Connector

PIN#	Name	Description
2	Chassis GND	Chassis GND
5	Sense-	5V DC Sense- input
8	Sense+	5V DC Sense+ input
11	Spare	-
14	GND	0V reference for 5V
17	+5V	+5V DC Power
20	-15V	-15V DC Power
23	+15V	+15V DC Power
26	AGND	0V Reference for ± 15V
29	+5V	+5V DC Power
32	GND	0V reference for 5V

INSTALLATION

The following guidelines have been established to ensure the proper operation of a UMAC System.

Mounting

The UMAC rack should be mounted to the electrical enclosure with the mounting brackets provided on the unit. The mounting bracket dimension data is provided in the Mechanical Specifications section.

The connections to the UMAC cards are on the top, bottom and front panels of the system. When mounting your system to the electrical cabinet remember to account for the cables (cable bending radius) that will connect to the UMAC system on the top and bottom.

System Wiring

A common ground must be established for almost all electrical devices in your machine system for safety. The UMAC rack should be tied to earth ground using screws on either side panel of the unit.

The user should try to separate the high power lines (AC) from the low power lines (DC) to avoid EMI interference.

Wiring to the cards installed in the UMAC rack should be connected as specified in their hardware reference manuals. The UMAC system should never have power applied when connecting cables to the system. Always turn off the power to the unit when making any changes to the wiring system. Delta Tau Data Systems, Inc. cannot guarantee the operation of its components if the user makes changes to the wiring system while the power is applied to the UMAC rack.

Initial Power-On Settings

When receiving a completely built UMAC system from Delta Tau Data Systems, Inc., the system will be ready for operation. Prior to shipment, the unit is re-initialized and saved to its factory default status. This is done to allow the system to be shipped at a known state.

The UMAC CPU boards have extensive capabilities for configuring and identifying the boards in its system. The CPU card of the system will detect the number of Servo cards and MACRO, and DPRAM cards in the backplane. The firmware of the CPU uses the Turbo ID and UMAC ID features to read the boards at power up to ensure that there has not been a change in the hardware configuration. If the CPU board detects a change at power-up, then the global status register will be updated to warn the user of a change. For details about the Turbo ID features and UMAC ID features, please read the TURBO PMAC/PMAC2 SYSTEM CONFIGURATION AND AUTO-CONFIGURATION section of the Turbo PMAC Software Reference Manual.

INSTALLING AND REMOVING BOARDS

The user must use caution when installing and removing boards from a UMAC system. Some of the boards in the UMAC product line are densely populated on both the front and back of the card because of the complexity of the features supported by the UMAC CPU and the compact size of the boards. Always make sure that all power to the UMAC system (including external power supplies required by some boards) are turned off before you add or remove a board to the system.

Prior to installation, make sure that you have set the jumpers and address settings to your desired settings. Use the guide tracks that have been installed in the empty slots of your UMAC system when installing a board. As you slide the board into the rack use caution to ensure none of the components on the board make contact with the front plates of the boards on either side. If the user has any questions about board installation, please contact the factory for assistance.

When removing a board from the system, the user must loosen the pem-nuts on the front of the rack and also pull out the wiring connections to the board from the top, bottom, and front panels. Next, the user can gently pull the board from the rack and use caution to ensure that none of the components on the board make contact with the boards on either side. If the user has any questions about board removal, please contact the factory for assistance.

Because the CPU of a UMAC system detects changes based on the Turbo ID and UMAC ID features, the user must be aware of how to correct the changes when permanently removing or adding boards to their system. Depending of the type of UMAC board added, removed, or replaced, the user will either be required to re-initialize the system or do nothing.

If the user must re-initialize the system, they must have a proper back-up file(s) or source code. In some cases, it is possible they will have to modify this backup file source code for proper configuration. We suggest that only highly-qualified users attempt the modification of the backup file or source code. If the user has any questions about this process, please call the factory for assistance.

There are five types of boards that exist in the UMAC product line: CPU, MACRO (Acc-5E), Servo, IO, and DPRAM. The following table lists the changes that must be made if the board is removed, installed, or replaced.

Board Type	Replacement	New Installation	Notes
CPU	Re-initialize	Re-initialize	Both UMAC and MACRO CPU must be re-initalized to factory defaults
ACC-5E	No action required*	Re-initialize	UMAC CPU will use ACC-5E for clocks for new install
Servo	No action required*	Re-initialize	UMAC CPU will need to recognize new Servo IC to set it up properly
IO	No action required	No action required	IO refers to boards that are mapped to UMAC general purpose IO memory.
DPRAM	No action required*	Re-initialize	UMAC CPU will have to setup its DPRAM registers for new installations if DPRAM is installed
* if replacement board has the same options and address settings.			

UMAC Board Types

The following table lists the category of each UMAC card.

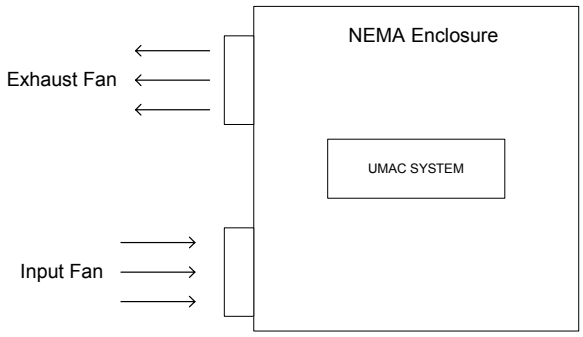
UMAC Board (s)	Category
UMAC CPU, MACRO CPU, MACRO16 CPU	CPU
ACC-5E	MACRO
ACC-24E2A, ACC-24E2, ACC-24E2S, ACC-51E, ACC-69E	Servo
ACC-9E, ACC-10E, ACC-11E, ACC-12E, ACC-65E, ACC-66E, ACC-67E, ACC-68E, ACC-28E, ACC-36E, ACC-59E, ACC-14E, ACC-53E, ACC-70E	I/O
ACC-72E, UMAC CPU Option 2, ACC-54E	DPRAM

UMAC COOLING REQUIREMENTS

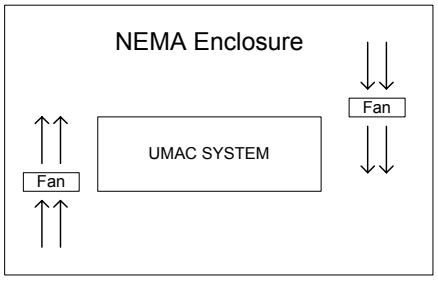
The cooling of the PCB's of a UMAC System is very important to ensure proper operation of the UMAC system. A typical UMAC system will be placed into an electronic cabinet with many different components of the electrical system for a machine and those components could also be adding heat to the enclosure. These other components in the electrical enclosure might be the power supplies, servo amplifiers, PC, relays, and shunt resistors.

When the UMAC System is used in a temperature controlled environment, make sure the ambient temperature of the unit does not exceed 45°C. By "temperature controlled," we refer to systems that are in enclosures with heat exchangers, air conditioning units, or a system that is not inside an enclosure but in the open-air environment of a laboratory.

If the UMAC System is inside an electrical cabinet and the temperature of the unit is not controlled, the user will have to cool the unit using a forced air cooling approach with fans. The customer application will define where the UMAC System is placed in the enclosure and if fans can be installed on the inside or outside of the enclosure. For optimal cooling Delta Tau Data Systems, Inc. recommends using an input and exhaust fan for the enclosure.



If the user has an enclosure that must be manufactured without input or exhaust openings, we recommend one or two fans be installed on the inside of the enclosure to ensure even air circulation throughout the enclosure. The ambient temperature outside of the sealed enclosure should not exceed 45°C. For a completely sealed enclosure, Delta Tau Data Systems, Inc. recommends using a properly sized air conditioning unit or heat exchanger unit.



EMC CONSIDERATIONS

The Delta Tau Data Systems, Inc. UMAC system has been tested and certified in accordance with the standards listed below:

- EN55011 Class A Group 1
- EN61000-3-2 Class A
- EN61000-3-3
- EN61000-4-2
- EN61000-4-3
- EN61000-4-4
- EN61000-4-5
- EN61000-4-6
- EN61000-4-11

The five main areas of concern for meeting the European Electromagnetic Compatibility Directive (CE certification) are:

- Enclosure Construction
- AC Filter
- Grounding
- Cables
- Shielding Techniques
- Use of Ferrite Cores

Enclosure Construction

The electrical cabinet or enclosure should be manufactured from conductive material to allow the cabinet to share a common ground with the UMAC system. Enclosure paint should be removed at locations needed for direct ground contact such as wire glands inputs, connector inputs, cable clamp fixtures, etc.

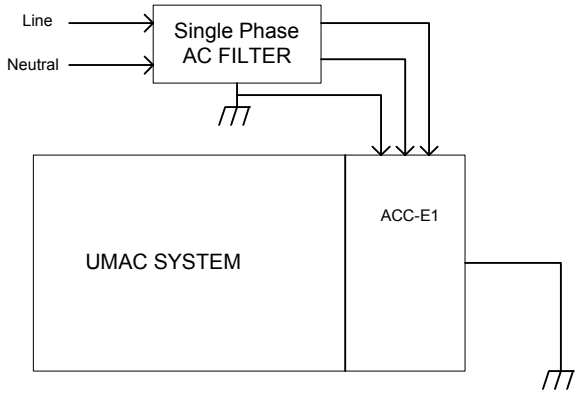
The enclosure used to house the UMAC system will typically have a back-plate to mount all equipment that is used to control the user's servo system, such as the amplifiers, power supplies, IO modules, and UMAC. The back plate can also be used as the earth ground for the servo system. If the back-plate is painted, then the paint will have to be removed to ensure a low-inductance earth ground connection.

AC Filter

To minimize the radiated and conducted EMI (electromagnetic interference) from a UMAC system powered with an AC power supply, Delta Tau Data Systems, Inc. recommends using an AC line filter. When an AC line filter is used with a UMAC System, please follow these guidelines:

- Properly size the filter based on the voltage and current requirements of your system. Use specifications in the UMAC Hardware Reference manual to calculate your UMAC system.
- Mount the filter as close as possible to incoming cabinet power.

- When mounting the filter to the panel, remove any paint or material covering. Use an unpainted metallic back panel, if possible.
- Filters are provided with a ground connection. All ground connections should be tied to ground.
- Filters can produce high leakage currents; they must be grounded before connecting the supply.
- Do not touch filters for a period of ten seconds after removing the power supply to allow full discharge of filter capacitors.



Grounding

The primary function of the system ground is to provide a low impedance path to earth to prevent potentially dangerous or disruptive voltage potentials from building up on the system. The system grounding needs to be tied to a central location. This single point ground will provide the safety ground to all components of the system. This electrical ground connection allows for each device within the enclosure to have a separate wire brought back to the central wire location. The ground connection is usually a copper plate directly bonded to the back panel or a copper strip with multiple screw locations. A short grounding strap from the main bus bar to the UMAC rack will properly tie the UMAC chassis to theearth ground and minimize the loop area of the high frequency current paths.

- Star point all ground connections. Each device wired to earth ground should have its own conductor brought directly back to the central earth ground plate.
- Use unpainted back panels. This allows a wide area of contact for all metallic surfaces reducing high frequency impedances.
- Conductors made up of many strands of fine conducts outperform solid or conductors with few strands at high frequencies.
- Motor cable shields should be bound to the back panel using 360-degree clamps at the point they enter or exit the panel.
- Motor shields are best grounded at both ends of the cable. Again, connectors using 360-degree shield clamps are superior to connector designs transporting the shield through a single pin. Always use metal shells.
- Running motor armature cables with any other cable in a tray or conduit should be avoided. These cables can radiate high frequency noise and couple into other circuits.

Cables

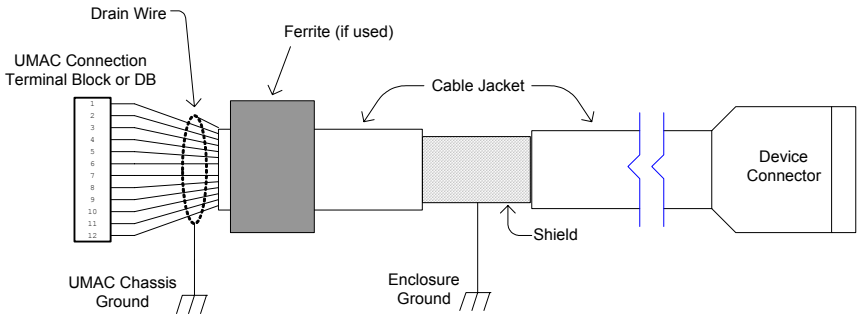
The cables selected for the application will also impact the system performance to meet the EMC directive. Delta Tau Data Systems, Inc. recommends using combination foil/braided shield cables that have the highest percentage total coverage braid with twisted pair wires with the highest number of turns/length.

There are several types of cables and connectors that can be used to install in accordance with CE requirements. No matter which type of cables and connectors are used, the user must ensure that each cable and connector is properly grounded in order to conform to the CE Class A emissions requirements.

Shielding Techniques

For the UMAC system, Delta Tau Data Systems, Inc. has found that the optimal place to ground the cable shields is at the point of entry of the enclosure, which minimizes the EMI emissions for the UMAC system. The customer can achieve this with cable clamps or grounding glands used at the point of entry of the enclosure.

The drain wire shield of the cable should also be tied to the chassis ground of the UMAC rack and tied to the case ground of the device to which it is connected. If the customer is using UMAC terminal blocks, the shield drain wire must be wired directly to the chassis ground screw on the UMAC rack. For best results, minimize the length of the drain wire from the cable jacket to chassis ground. If the customer is using DB connections, the shield must be making contact to the conductive casing of the DB connector because the DB connector on the UMAC Accessory device is connected directly to the chassis ground.



Use of Ferrite Cores

The use of ferrite cores on the cables (AC and DC), flat ribbon cables, and individual IO lines can reduce the amount of radiated emissions from the UMAC System. Ferrite cable clamps or beads are effective because their RF resistance is greater than the radiation resistance of the cable and it essentially chokes the RF energy at that point on the cable instead of transmitting the energy by the cable.

The ferrite core should be placed at the point of connection of the signal to the cable. On the UMAC system this would be at the terminal blocks, DB connections, or IDC connections of the UMAC card.

For cables Delta Tau Data Systems, Inc. recommends using the two-piece snap-on type ferrite cores. For individual wires, the user can use a solid single piece ferrite core or two-piece snap on ferrite core. We also recommend using either ferrite Material 43 for broadband frequencies (25 MHz to 300 MHz) or Material 31 for the lower and broadband frequencies (1 MHz to 300 MHz).

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

DECLARATION OF CONFORMITY

Application of Council Directive: 89/336/EEC, 72/23/EEC

Manufacturers Name: Delta Tau Data Systems, Inc.

Manufacturers Address: 21314 Lassen Street
Chatsworth, CA 91311
USA

We, Delta Tau Data Systems, Inc. hereby declare that the product
Product Name: UMAC System
And all of its options conforms to the following standards:

EN61326: 1997	Electrical equipment for measurement, control, and laboratory use- EMC requirements
EN55011: 1998	Limits and methods of measurements of radio disturbance characteristics of information technology equipment
EN61010-1	Electrical equipment for measurement, control, and laboratory use- Safety requirements
EN61000-3-2 :1995 A14:1998	Limits for harmonic current emissions. Criteria A
EN61000-3-3: 1995	Limitation of voltage fluctuations an d flicker in low-voltage supply systems for equipment with rated current ≤ 16A. Criteria B.
EN61000-4-2:1995 A1: 1998	Electro Static Discharge immunity test. Criteria B
EN61000-4-3: 1995 A1: 1998	Radiated, radio-frequency, electromagnetic field immunity test. Criteria A
EN61000-4-4: 1995	Electrical fast transients/burst immunity test. Criteria B
EN61000-4-5: 1995	Surge Test. Criteria B
EN61000-4-6: 1996	Conducted immunity test. Criteria A
EN61000-4-11: 1994	Voltage dips test. Criteria B and C

Date Issued: 11 May 2006
Place Issued: Chatsworth, California USA

Yolande Cano
Quality Assurance Manager

Mark of Compliance

CE