



Delta Industrial PC User Guide

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Document Issue: 1.3

This Document Refers to the following Models

- Delta 2U ATX
- Delta 4U ATX
- Delta 4U Passive

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Regulatory Statements

CE

This product meets the essential protection requirements of the European EMC Directive (2004/108/EC) and the Low Voltage Directive (2006/95/EC), and is eligible to bear the CE mark.

Warning

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

FCC

NOTE:

This equipment has been designed to meet the requirements of a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.

WARNING:

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

Safety Warning for North America

If the power lead (cord) is not supplied with the computer, select a power lead according to your local electrical regulations. In the USA use a 'UL listed' lead. In Canada use a CSA approved or 'cUL listed' lead.

Si le cordon secteur n'est pas livré avec l'ordinateur, utiliser un cordon secteur en accord avec votre code électrique nationale. En l'Etat Unis utiliser un cordon secteur 'UL listed'. En Canada utiliser un cordon secteur certifié CSA, ou 'cUL listed'.

Manual Organisation

This manual describes in detail the Delta Industrial PC Product range.

We have tried to include as much information as possible but we have not duplicated information that is provided in the standard IBM Technical References, unless it proved to be necessary to aid in the understanding of the product.

The manual is sectioned as follows:

- Introduction;
- Overview, listing the unit's features and specification;
- Installation, including what software to install
- Layout, showing where the various connectors are located, and their pin-out details;
- How to upgrade the system;
- Bios Setup
- Maintenance

We strongly recommend that you study this manual carefully before attempting to interface with the Delta 4U or change the standard configurations. Whilst all the necessary information is available in this manual we would recommend that unless you are confident, you contact your supplier for guidance.

IT IS PARTICULARLY IMPORTANT THAT YOU READ THE SECTION 'PRECAUTIONS' BEFORE HANDLING ANY COMPONENTS INSIDE THE UNIT.

If you have any suggestions or find any errors concerning this manual and want to inform us of these, please contact our Technical Services department with the relevant details.

Introduction

The Delta Industrial Chassis is a ruggedised PC compatible microcomputer designed for reliable operation in adverse environments. The unit can take a variety of PC-compatible PCI and PCI-Express cards with both passive and active motherboard. It is available as a 19" rack mountable unit, and as a desktop unit. Both units use a common chassis and layout. The chassis comes in standard 4U and 2U heights

System controls are easily accessible on the front of the unit and can optionally be protected behind a lockable steel door.

The machine is cooled internally by air, which enters through the front panel and exits at the rear. Optionally a removable filter can be fitted to reduce the amount of dust ingress. Access to boards is by a removable top cover. Connections to the boards are made at the rear of the chassis, with two USB ports also accessible at the front.

Features

- Robust painted zintec chassis using recognised electromagnetic compatible (EMC) emission and immunity design techniques.
- ATX, PICMG & ISA compliant.
- Various switch mode power supply options
- (Optionally filtered) air through two 92 x 25 mm, 12V DC fans (4U chassis) or single 80 x 25 mm 12V DC fan (2U Chassis) mounted behind the front panel.
- Quick access to the optional air filter. The filter is a coated polyester material of 30 PPI porosity having a flammability rating to UL94 Class V0.
- Optional Front door with lockable security for system controls.
- Optional shock and vibration protection for hard drives
- Optional card retention mechanism.
- Optional telescopic slide rail fittings.
- Each system is supplied configured to order. The System Release Documentation details each particular system's configuration

Chassis

The basic chassis is common to both types of assembly (rack mounting and desktop), and comprises several sub-assemblies:

- Chassis body including the cooling fan assembly
- Optional Chassis front panel
- Chassis cover
- Internal drive cage assembly
- Power supply unit and associated battery pack

The common metalwork is of painted zintec construction with riveted fitments. Removable items are fixed by screws.

Fitted internally are cooling fans, the chosen passive/active back plane and drives.

The front panel can be supplied with an optional lockable door, which has a perforated front to allow air through to the filter.

Specification

Chassis

- 19" Rack mountable painted zintec chassis
- High Capacity fans
- Air Filter approved to UL94 V-0
- Optional Locking door
- Optional Card restraining system
- Optional Shock mounting for Drives
- Optional Front Panel Handles
- Optional fully extending heavy duty slide rails

Temperature

Non-operating	-20 °C to +70 °C
Operating	0 °C to +45 °C

Note 1: Unit should not be started at temperatures below 5°C as items With mechanical parts such as HDD may not operate correctly

Note 2: Maximum temperature changes are restricted to $\pm 20^{\circ}\text{C}$ per hour. Rates above this may result in data loss and damage to electronic components

Note 3: Operating Temperature is based on basic configuration of CPU, HDD, DVD, no expansion
It may be necessary to de-rate the upper operating temperature limit for specific expansion card options in order to compensate for aspects such as; impact on airflow, significant added power loading, specific operating limitations of particular cards added

Humidity

0-90% RH non-condensing

Refer to Specific Datasheets for detailed information on configuration options

General Precautions

The Electronic components within the Delta Industrial PC are susceptible to damage by electrostatic discharges. In order to avoid damage, you should work at an anti-static bench and observe normal anti-static precautions. Wear an anti-static wrist strap connected to an earth point *before* opening any packaging.

Where a wrist strap is not available, discharge any static charge you may have built-up by touching an earth point. Avoid any further movement that could build up another static charge. Touch an earth point from time to time to avoid further build-up, and remove the items from their anti-static bags only when required

On-Board Battery

The processor board is fitted with a Lithium battery. Great care should be taken with this type of battery. If the battery is mistreated in any way there is a very real possibility of fire, explosion, and personal harm. Under NO circumstances should it be short-circuited, exposed to temperatures in excess of 100°C or burnt, immersed in water, recharged or disassembled.

Expired batteries remain hazardous and must be disposed of in a safe manner, according to local regulations.

Le panneau de processeur est équipé d'une batterie de lithium. Le grand soin devrait être pris avec ce type de batterie. Si la batterie est mistreated il y a de dans de toute façon un possibility très vrai du feu, d'explosion et de mal personnel. Dans au cunes circonstances il est sous peu circuité, exposé aux températures au dessus de 100 degrés de centigrade ou brûlé, immergé dans l'eau, rechargée ou dissassembled.

Les batteries expirées restent dazaedous et doivent être reejetées d'une façon sûre, selon des règlements locaux.

BIOS & CMOS Memory

Please be aware that with personal computer products, it is possible to create configurations within the CMOS memory that make booting impossible. If this should happen, clear the CMOS settings; (refer to the User Guide for the particular SBC or Motherboard fitted to your system).

It is recommended that the unit is switched off and any mains cables disconnected before removing any cover. Some systems may incorporate battery-backed power supplies, in which case a failure to switch off the supply may result in internal electronics still receiving power.

Note that some components may become hot during operation, and so it is generally good practice to allow the unit to cool before starting any significant internal maintenance work

Electromagnetic Compatibility

This product has been assessed operating in representative, standard configurations. As with any PC product, however, final installation & configuration can vary significantly, and so the following guidelines are offered to help ensure that compatibility is maintained.

- All components added to a system should either carry appropriate equivalent levels of compliance, or be tested for compliance as part of the final system, and should be installed in accordance with supplier recommendations.
- The external enclosure should be securely fastened (with standard lids and covers in place) to ensure good metal-to-metal contact around the internal electronics
- Any metal back plate must be securely screwed to the chassis of the computer to ensure good metal-to-metal (i.e. earth) contact.
- Metal, screened, connector bodies should be securely connected to the enclosure.
- The external cabling to boards causes most EMC problems. It is recommended that any external cabling to the board be totally screened, and that the screen of the cable connects to the metal end bracket of the board or the enclosure and hence to earth. Round, screened cables with a braided wire screen are used in preference to those with a foil screen and drain wire. Wherever possible, use metal connector shells that connect around the full circumference of the cable screen: they are far superior to those that earth the screen by a simple “pig-tail”.
- The keyboard and mouse will play an important part in the compatibility of the processor card since they are ports into the board. Similarly, they will affect the compatibility of the complete system. Fully compatible peripherals must be used otherwise the complete system could be degraded. They may radiate or behave as if keys/buttons are pressed when subject to interference. Under these circumstances it may be beneficial to add a ferrite clamp on the leads as close as possible to the connector. A suitable type is the Chomerics type H8FE-1004-AS.
- USB cables should be high quality screened types.
- Ensure that the screens of any external cables are bonded to a good RF earth at the remote end of the cable.
- An earth stud is available on the back of the unit to improve grounding in extreme environments

Failure to observe these recommendations may invalidate the EMC compliance.

Quick Start

The following sections explain how to install the DELTA INDUSTRIAL PC (IPC).

First ensure that you are familiar with the contents of the section "Precautions". It contains important information to avoid damage to the board.

If choosing your own cooling solution for the CPU, check the application notes for the particular CPU from the Intel website to ensure that your solution is capable of cooling the processor throughout the desired operating temperature range.

If the mouse and keyboard are to be removed for normal operation, shut down the computer and switch off the power before removing them.

In most cases the Delta Industrial PC will be supplied with a factory image. If not then follow the recommended software installation instructions relating to the particular SBC/Motherboard fitted

Once the Operating System and drivers has been installed, then any additional hardware can be added and configured

It is recommended that prior to installation, the BIOS settings are recorded for future use.

Chassis Layout

The rack mount chassis is made of painted zintec and is shown in Figure 1a and 1b below. It comprises the same chassis as the bench mount version, but has mounting ears. The chassis is completed by a painted zintec lid.

The optional front door is a 4U/2U high, full 19" racking width panel. The mounting ears secure the unit to the rack ladder by four fixing screws. To permit withdrawal from the racking, handles are fitted to the ears.

The rack mount unit has tapped holes along each side to facilitate the mounting of slide rails. Take care not to insert longer screws than those provided in the side (M4 x 4mm maximum). Overly long screws may cause internal damage.

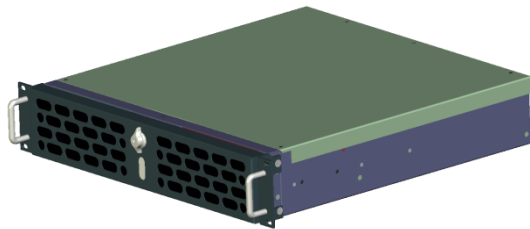


Figure 1a: Delta 2U with door

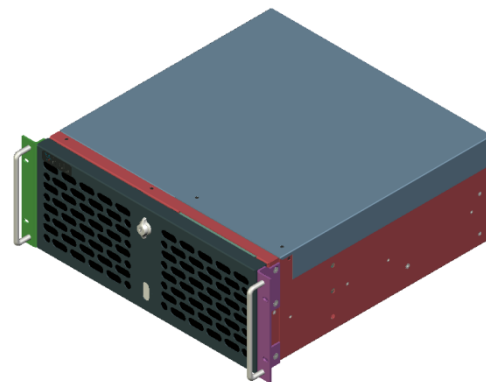


Figure 1b: Delta 4U with Door

4U Dimensions

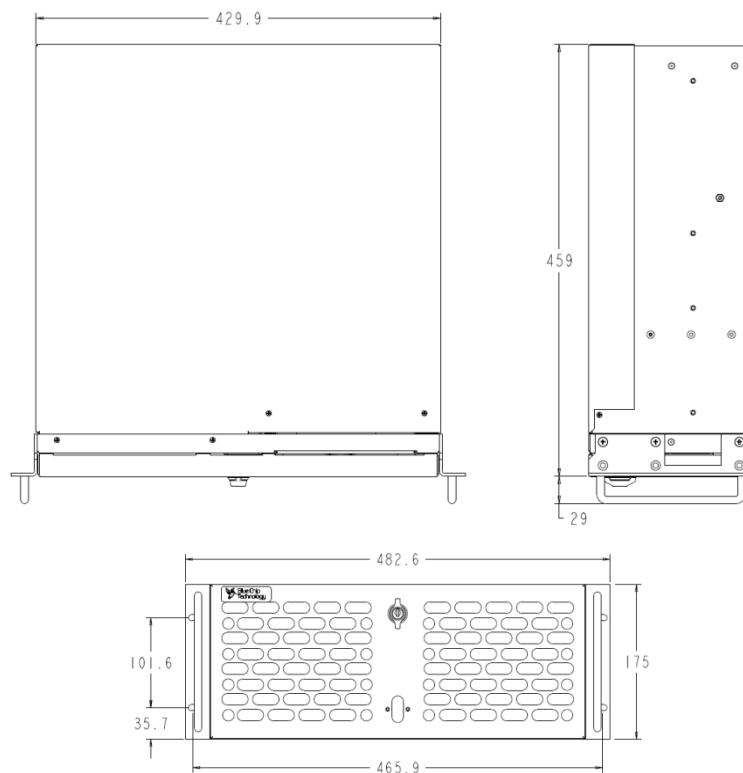


Figure 2a: dimensions in mm

2U Dimensions

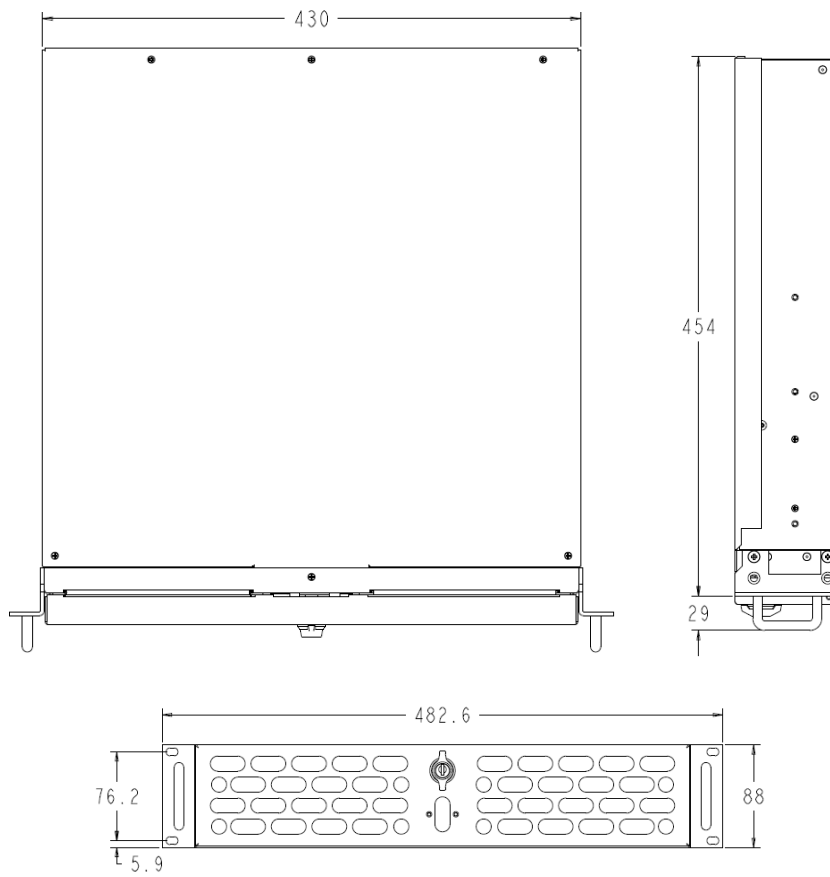


Figure 2b: dimensions in mm

Depth without Front door and mounting ears is 436mm

Chassis Cover Removal

4U Cover

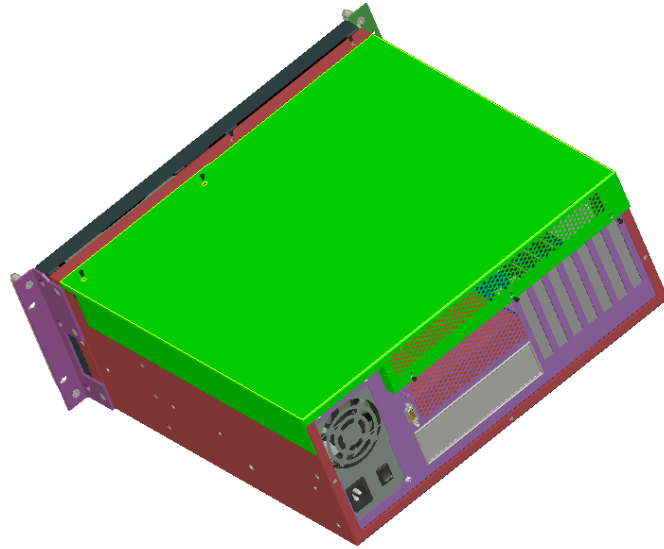


Figure 3:

Removal of the cover to access the internal electronics, is achieved by removal of the 7 screws as shown in figure 3 above

2U Cover

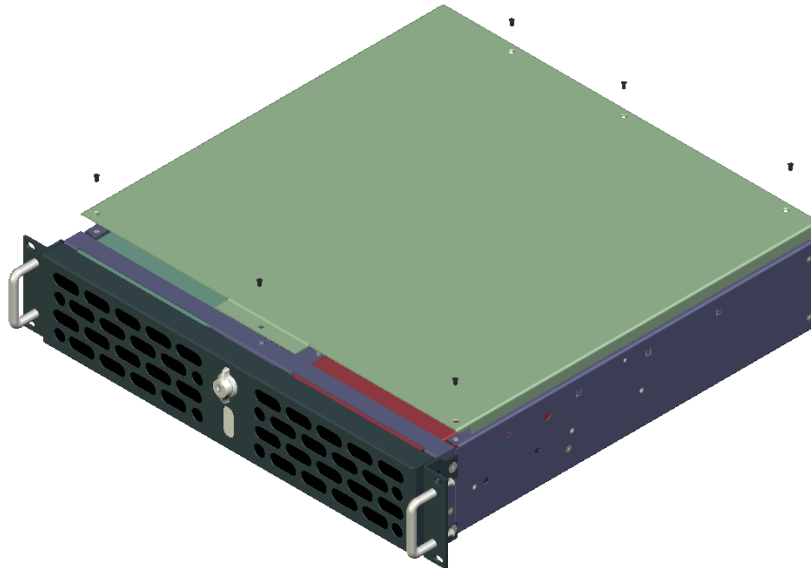


Figure 4: 2U cover removal

Removal of the cover to access the internal electronics, is achieved by removal of the 6 screws as shown in figure 4 above

Adding Expansion Cards

4U Chassis

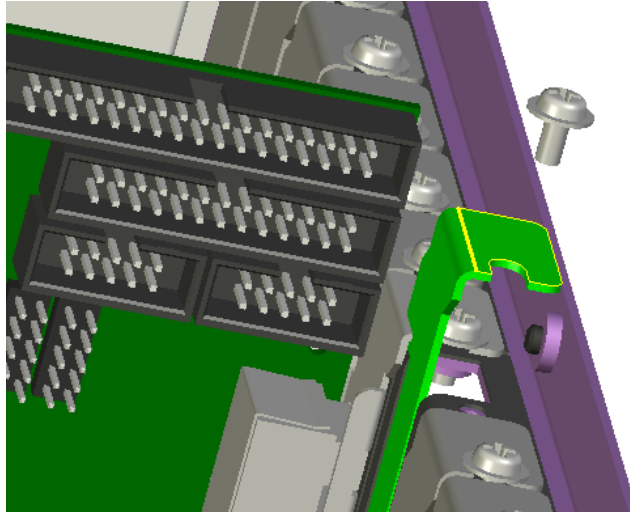


Figure 5a: 4U expansion I/O plate

To install an expansion card, first remove the I/O plate associated with the expansion slot to be used. Remove the internal card clamp if fitted, and then carefully align the connector of the expansion card with the appropriate slot on the motherboard. Slowly insert the expansion card, taking care not to damage the connector in the process.

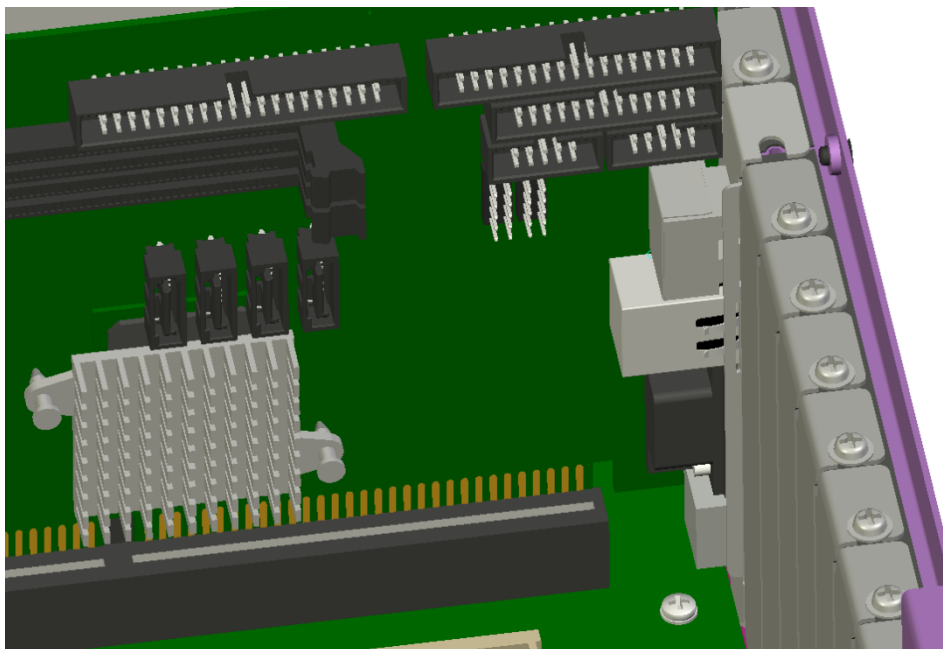


Figure 5b: align expansion card

2U Chassis

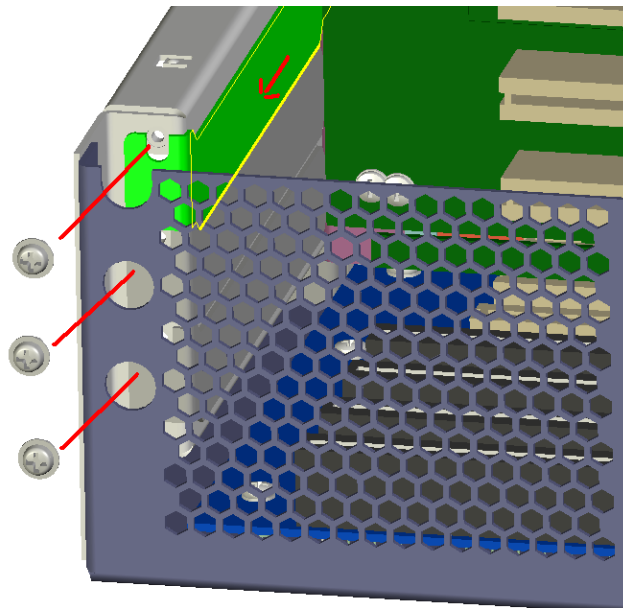


Figure 6: 2U Expansion

The 2U chassis can support up to 3 short expansion cards. Nominally on this side of the chassis, a DVD is fitted at the front, which will limit the length of an expansion card to around 225mm (to allow clearance and fit of cables).

If a HDD removable caddy is fitted then this can reduce the amount of space available, and can limit the expansion cards to less than 185mm overall length.

To install an expansion card, remove the relevant screw as shown in figure 6 above and remove the I/O bracket. Carefully fit your expansion card ensuring that it is securely seated into the connector on the riser card. Re fit the screw to lock it in place.

Note: the I/O plate on expansion cards can sometimes be difficult to fit into the expansion section. If this occurs, loosen slightly the two screws on the rear of the unit as shown in figure 7 below and when the expansion cards are fitted in place, re-tighten the screws.



Figure 7: Rear I/O Screws

Card Clamp

This is available on the Delta 4U chassis only and helps secure expansion cards fitted to the chassis via adjustable paddles.



Figure 8a: Card Clamp Paddles

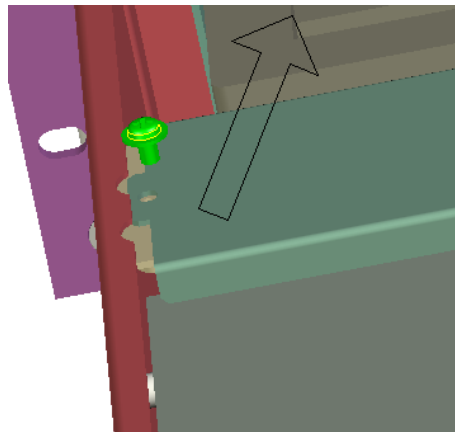


Figure 8b: Removing Clamp

The card clamp can be removed by removing the screw on the flat section of the clamp, and by lifting up. The clamp then swivels on the locating section shown in figure 8c below

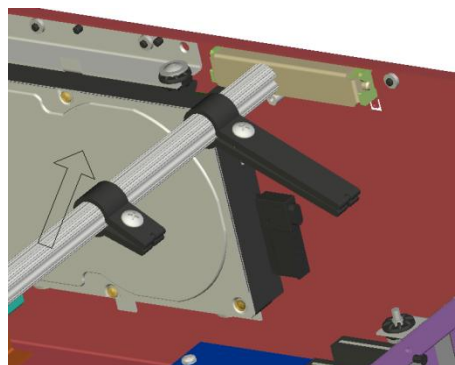


Figure 8c

5¼ Drive Bay

Both the Delta 4U and Delta 2U use the same mounting arrangement for items such as Optical drive and removable caddies which use the 5¼ drive bay. Access to these devices is achieved by removing the cables on the inside of the chassis, unscrew the two screws on the front and then pull the assembly forward

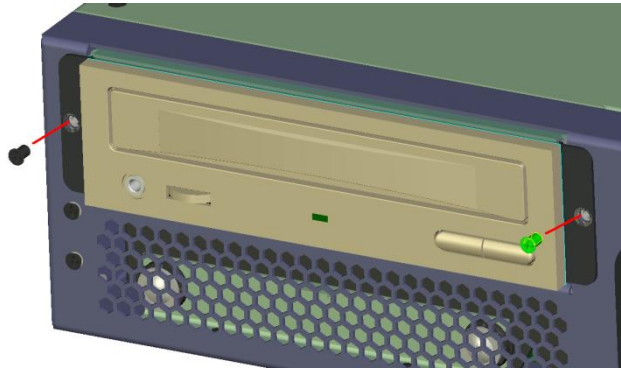


Figure 9: Drive removal

Two mounting ears are attached to the side of the 5¼ device as shown in figure 10 below. These are factory fitted, so if you are fitting your own 5¼ device, you will need to order these separately. The part numbers, descriptions and quantity required are

1072-1433	BRKT DELTA DRIVE MTG	(qty 2 per 5¼ device)
1033-1004	SCREW CSK M3 X 6 POZI S/S	(qty 4 per 5¼ device)



Figure 10: 5¼ device mounting ears and screws

Note: Some 5¼ device such as plastic removable caddies will require grounding straps to ensure the HDD is properly grounded. To facilitate this, the drive bays in both the 2U and 4U chassis have additional threaded holes (shown in Figure 11a and 11b) to allow M3 screws and grounding straps to be used

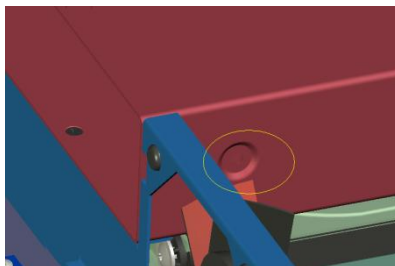


Figure 11a: 2U grounding location

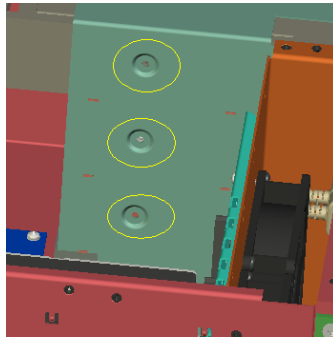


Figure 11b: 4U grounding locations

Rack Mounting

If the Delta chassis is to be installed in a 19" rack unit, it is recommended that telescopic slide rails are used. A slide rail kit is available from Blue Chip Technology Ltd.

WARNING

Under no circumstances must the Delta chassis be mounted in a 19" rack solely by its front panel fixings. Slide rails, side supports or a rear support must be used.

Before installation carefully assess the space available. Figures 1 and 2 give outline dimensions of the different chassis. Ensure there is enough room at the rear of the unit for cables. DO NOT mount the unit in such a way that air inlet or outlet vents are covered or blocked.

The slide rail kit will accommodate cabinets with front to rear ladder depths from 540mm to 790mm. The slide rail kit comprises:

M6 cage nut	12	(Attach to ladder assembly)
M6 x 10 Pan Head screw	4	(secure chassis to cabinet)
M6 Washer	4	(secure chassis to cabinet)
10/32 UNF Fillister Head Screw	8	(secure Slide bracket clamp and slide rail)
Slide Bracket Clamp	4	(secure slide rail)
Telescopic slide rail	2	
M4 x4 Screw & washers	8	(attach slide to side of chassis)

The following procedure describes the installation for one slide rail. Both sets of slides will need to be installed to mount the Delta chassis within a cabinet.

WARNING:

Depending on the configuration and equipping levels the Delta chassis may exceed 20Kg in weight. Assistance may be required in installing the unit into a rack/cabinet

Cage Nut Installation

Refer to Figures 12 and 13 to identify the pattern of the ladder holes. Holes 'A' hold cage nuts to which the front panel will eventually be secured. Holes 'B' hold cage nuts and clamp the front and rear ends of the fixed section of the slide rails.

Clip M6 cage nuts into front ladder sections in positions A and B. Repeat on the right hand side. A total of 8 cage nuts will be fitted to the front of the 19in cabinet.

Clip M6 cage nuts into rear ladder sections in positions B only. Repeat on the right hand side. A total of 4 cage nuts will be fitted to the rear of the 19in cabinet.

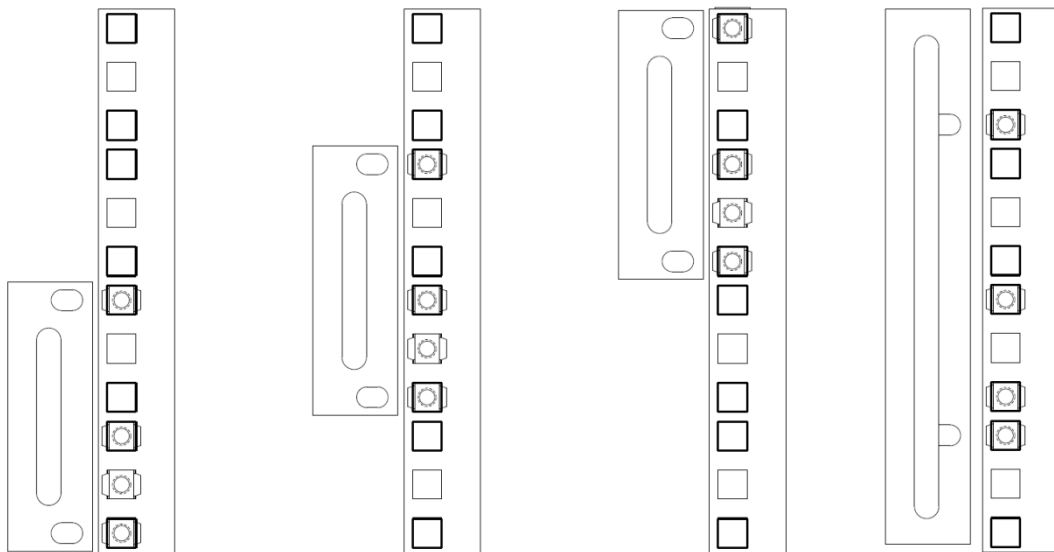


Figure 12: three 2U Mounting Position within the 4U area

Figure 13: 4U mounting Position

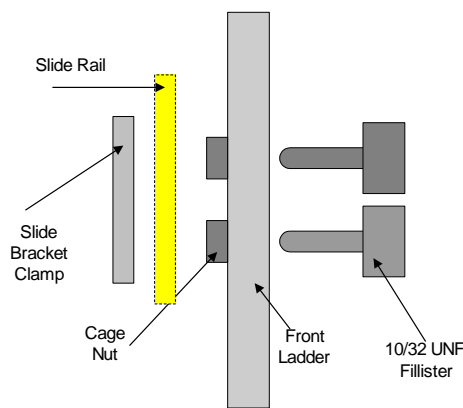


Figure 14: Ladder Assembly

Slide Rail Assembly

The first step is to remove the inner section of the Slide Rail assembly. This is the part that screws to the outside of the chassis.

Slide the inner section out as far as it goes (figure 15), and while pressing the white catch (figure 16) pull the inner section from the Slide Rail.



Figure 15: Inner Slide Rail



Figure 16: slide rail catch

Chassis Attachment

With the inner slide rail removed, it can now be attached to the side of the chassis. On both the 4U Chassis (figure 17) and the 2U Chassis (figure 18), align the 2nd hole in the slide with the forward hole in the chassis



Figure 17: 4U front mounting hole

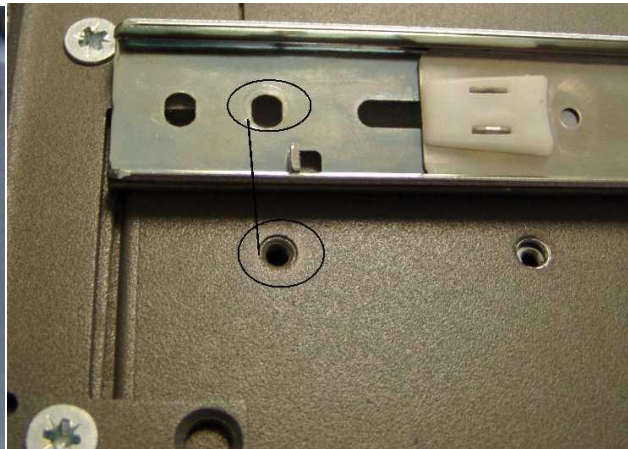


Figure 18: 2U front mounting hole and slide

On a 4U Chassis, 4 M4 x 4mm screws are required to secure the slide, while on the 2U, 3 M4 x 4mm screws are required.

Caution: Do not use greater than 4mm screws or damage to internal components will occur

Cabinet Assembly

Before fitting the remaining parts of the slide rail to the cabinet, check that the front bracket assembly is positioned in the correct holes as shown in Figure 19 below



Figure 19: Slide Rail front section

In order to allow adjustment in the rack, the two screws shown (as well as the two on the rear section) should be loosely fastened.

To access the screws heads, extend the slide section until it locks in the fully extended position as shown in figure 20.

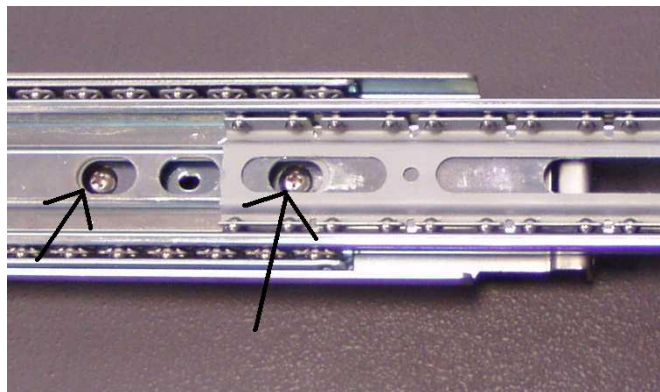


Figure 20: Bracket screws

To unlock the extension, press the catch as shown in figure 21.

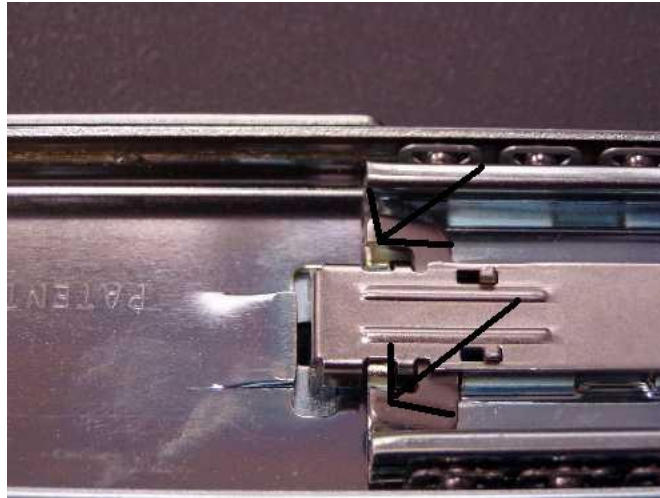


Figure 21: Unlocking the slide extension

Referring back to Figure 14, the slide rail is clamped between the Slide Bracket Clamp and the Cage Nuts (shown as 'B' in figure 12 and 13) using the 10/32 UNF Fillister screw. This operation is easier to carry out if there are at least two people present, typically one person at the front and one at the rear of the cabinet.



Figure 22 + 23: Slide rail attachment to rear ladder

As the screws are loose, the Slide Rail will extend to suit the particular cabinet in which it is being fitted. Similarly do not fully tighten the fillister screws at this stage.

Once both slide rails have been fitted to the cabinet the Delta chassis and inner slide rail assembly can be fitted to the cabinet rails.

Warning: Some configurations of the Delta Industrial PC can be over 20Kg in weight, so assembly into the cabinet may require two people



Figure 24: Insert Chassis into Cabinet

Push Chassis fully home and check the alignment of the M6 Pan Head screw with the cage nut. It may be necessary to lift the chassis slightly to achieve a good match. Once the chassis has been aligned correctly, carefully pull the chassis away from the cabinet and tighten all the fillister screws retaining the slide rail.

Now fully tighten the rear fillister screws. Extend the slide rails to give access to the internal screws on the Slide Assembly, and tighten all the screws as shown in Figure 25



Figure 25: tighten internal slide rail screws

Note: The slide rails will lock in the fully extended position. To unlock pull the white catches forward and at the same time push the chassis back into the cabinet. Alternatively, to remove the chassis from the cabinet, pull the white catches forward and pull the chassis from the slide rails.

The installation is now complete, and the Delta Industrial PC is now ready for connection and use.

System Software

The Delta Industrial chassis can accommodate a range of Single Board Computers (SBC's) and motherboards.

Refer to the User Guide for the particular SBC or Motherboard fitted to your Delta Industrial PC for instruction on installing your operating system

If the Delta unit is supplied with a factory fitted Microsoft Windows XP Professional operating system, then all the user needs to do is start the PC and complete the Microsoft mini-setup process

Support DVD

The Blue Chip Technology Support DVD supplied with the Delta Industrial PC contains Drivers, User Guides and information relating to Blue Chip products.

Drivers are organised by product line, and the structure of the Drivers folder looks like



For Delta products which utilise a passive SBC, then drivers for these can be found under the SBPC folder



For example, for a unit which contains the BCT-2040 PICMG 1.0 SBC, drivers can be found in the BCT2040 folder

Delta ATX type chassis will typically contain an Intel Motherboard. A separate driver CD from Intel will be supplied along with the Support DVD, and further information or latest drivers/BIOS can be downloaded direct from the Intel Website.

System BIOS

Refer to the User Guide for the particular SBC/Motherboard fitted to your Delta IPC for details on the System BIOS.

In general, to access BIOS pages is dependent on the SBC/Motherboard manufacturer as well as the type of BIOS, the most common ways are

- Press key during POST (more common on SBC's)
- Press <F2> key during POST (more common on Motherboards)

Caution: Permanently holding down the key can fill the keyboard buffer causing the system to lock up. If this happens, then power cycle the unit to recover

On some hardware, if you want to temporarily change the BOOT order, for example to boot from a USB device, then during POST or when the Splash screen is being displayed, press the <ESC> key to enter the BOOT selection Menu.

Maintenance

The Delta IPC will require regular maintenance to ensure it continues to perform efficiently.

After a period of several years of operation, it may be necessary to replace the battery on the processor board, if it cannot maintain the CMOS memory whilst the AC power is disconnected.

On a regular basis the inside of the System Unit, and in particular the fan filter, should be cleaned to prevent dust build up which could eventually clog the fans and prevent efficient operation.

Failure to do so will increase the internal temperature of the system unit, potentially causing the System to overheat and become unstable. Operation at higher temperatures will also decrease the MTBF of the components inside the System.

If the Delta IPC is to be stored for any length of time before use, then it is recommended that the CMOS battery be removed, and that the BIOS settings are recorded for future use. The battery can be re fitted and the BIOS settings set prior to installation

Amendment History

Issue Level	Issue Date	Author	Amendment Details
1.0	30/09/08	T Mck	First Release for Review
1.1	14/10/08	T Mck	Document release
1.2	30/06/09	T Mck	Updated EMC references
1.3	22-07-09	tmck	Added some warning comments re handling and installation

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www.bluechiptechnology.co.uk

Plasma PC Sales

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Technical Support

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