

V Box Express

User's Manual
Version 1.0

Kontron Embedded Computers GmbH

0-0096-4045

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Introduction

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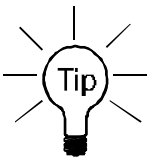
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Symbols used in this Manual

Symbol	Meaning
	This symbol indicates the danger of injury to the user or the risk of damage to the product if the corresponding warning notices are not observed.
	This symbol indicates that the product or parts thereof may be damaged if the corresponding warning notices are not observed.
	This symbol indicates general information about the product and the user manual.
	This symbol indicates detail information about the specific product configuration.
	This symbol precedes helpful hints and tips for daily use.

Important Instructions

This chapter contains instructions which must be observed when using the V Box Express.

The manufacturer's instructions provide useful information on the V Box Express.

Warranty Note

Due to their limited service life, parts which by their nature are subject to a particularly high degree of wear (wearing parts) are excluded from the warranty beyond that provided by law. This applies to batteries and display, for example.

Exclusion of Accident Liability Obligation

Kontron Embedded Computers shall be exempted from the statutory accident liability obligation if the user fails to observe the safety instructions.

Liability Limitation / Exemption from the Warranty Obligation

In the event of damage to the device caused by failure to observe the hints in this manual and on the device (especially the safety instructions), Kontron Embedded Computers shall not be required to honor the warranty even during the warranty period and shall be exempted from the statutory accident liability obligation.



Safety Instructions

Please read this section carefully and observe the instructions for your own safety and correct use of the device.

The chapter also contains information on approval and interference suppression of your device.

Observe the warnings and instructions on the device and in the manual.

The device has been built and tested by Kontron Embedded Computers in accordance to EN 60950-1 and left the company in a perfectly safe condition.

In order to maintain this condition and ensure safe operation, the user must observe the instructions and warnings contained in this manual.

- ☐ The device must be used in accordance with the instructions for use.
- ☐ The electrical installations in the room must correspond to the requirements of the respective regulations.
- ☐ Take care that there are no cables, particularly power cables, in areas where persons can trip over them.
- ☐ Do not use a power cable in sockets shared by a number of other power consumers. Do not use an extension cable.
- ☐ Only use the power cord supplied.
- ☐ Do not place the device in direct sunlight, near heat sources or in a damp place. Make sure the device has adequate ventilation.
- ☐ Only devices and components which fulfill the requirements of an SELV circuit (safety extra low voltage) in accordance with EN60950 may be connected to the interfaces of the system.
- ☐ All plugs on the connection cables must be screwed or locked to the housing.
- ☐ The device is designed to be used in vertical position with the interfaces to the front.

- ☐ Repairs may only be carried out by a person authorized by Kontron Embedded Computers.
- ☐ Maintenance or repair on the open device may only be done out by qualified personnel authorized by Kontron Embedded Computers which is aware of with the associated dangers.
- ☐ The device may only be opened for the installation and removal of PCI cards in accordance with the description in this manual. These procedures have to be carried-out only by qualified specialist personnel.
- ☐ If extensions are made to the device the legal stipulations and the device specifications must be observed.
- ☐ The device must be switched off before installation and removal of any PCI and CompactFlash™ cards.
- ☐ Only original accessories approved by Kontron Embedded Computers may be used.
- ☐ It must be assumed that safe operation is no longer possible,
  - if the device has visible damage or
  - if the device no longer functions.

  In these cases the device must be shut down and secured against unintentional operation.

For DC Powered Systems

- ☐ The DC-input must fulfill SELV requirements of EN60950-1 standard.
- ☐ DC/DC-supplies do not fulfill the requirements for centralized DC power systems as required for use in the USA.



Electrostatic Discharge (ESD)

A sudden discharge of electrostatic electricity can destroy static-sensitive devices or micro-circuitry. Therefore proper packaging and grounding techniques are necessary precautions to prevent damage. Always take the following precautions:

1. Transport boards in ESD-safe containers such as boxes or bags.
2. Keep electrostatic sensitive parts in their containers until they arrive at the ESD-safe workplace.
3. Always be properly grounded when touching a sensitive board, component, or assembly.
4. Store electrostatic-sensitive boards in protective packaging or on antistatic mats.

Grounding Methods

The following measures help to avoid electrostatic damages to the device:

1. Cover workstations with approved antistatic material. Always wear a wrist strap connected to workplace as well as properly grounded tools and equipment.
2. Use antistatic mats, heel straps, or air ionizers for more protection.
3. Always handle electrostatic sensitive components by their edge or by their casing.
4. Avoid contact with pins, leads, or circuitry.
5. Turn off power and input signals before inserting and removing connectors or connecting test equipment.
6. Keep work area free of non-conductive materials such as ordinary plastic assembly aids and Styrofoam.
7. Use field service tools such as cutters, screwdrivers, and vacuum cleaners which are conductive.
8. Always place drives and boards PCB-assembly-side down on the foam.

Instructions for the Lithium Battery

The installed board is equipped with a lithium battery. To replace this battery refer to the instructions described in the chapter

“**Replacing the Lithium Battery** ”



Warning

There is a danger of explosion if the wrong type of battery is used for replacement. Replace only with the same or equivalent type of battery as recommended by the manufacturer. Dispose of used batteries according to the manufacturers instructions.

FCC Statement

This equipment has been tested and found to comply with the limits for 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 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 residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Electromagnetic Compatibility

This product has been designed for industrial, commercial and office use, including small business use. The most recent version of the EMC guidelines (2004/108/EC) and/or the German EMC laws apply. If the user modifies and/or adds to the equipment (e.g. installation of add-on cards), the prerequisites for the CE conformity declaration (safety requirements) may no longer apply.

Scope of Delivery

- ☐ V Box Express
- ☐ V Box Express - User's Manual

Optional Parts

- ☐ CF Card
- ☐ DC Power Cable

Type Label and Product Identification

The type label with the corresponding Kontron product part number is at the rear right hand side of the system.

Type Label for Systems	**Kontron Product Identification**
V Box Express	2-AOH8-xxxx for V Box Express with ETXexpress-PM Module
V Box Express	2-AOH8-xxxx for V Box Express with ETXexpress-CD Module

On the type label of your system, the "XXXX" group is replaced by Arabic numerals combination according to the ordered system configuration.

Product Description

The V Box Express is a industrial machine designed for high industrial application.

The system is designed for:

- Installation in control cabinet or control desk

The hardware of the V Box Express system can be flexibly configured corresponding to customized requirements. The rugged design offers excellent mechanical stability. The V Box Express provides the demanding characteristics required for a computer that is very suitable for using in harsh industrial environment.
The system accommodates a baseboard with an ETXexpress® module. Depending on the ordered system configuration, your V Box Express can be equipped with the ETXexpress®-PM or ETXexpress® -CD module.

The V Box Express accommodates two connector side accessible drive bays:

- drive bay (removable) for 2.5" SATA (I or II) HDD) and
- Compact Flash™-drive for CF card, type I.



Fig 1: V Box Express (total view)



Fig 1a: V Box Express (interface side)

The power button, the RESET button, the LED control indicators and user interfaces such as DVI-I/VGA, USB (2.0) LANs (10/100Mbps or 1Gbps) and serial ports (RS232) are accessible on the connector side of the system.

The V Box Express is designed to be powered from a AC/DC high voltage external power sources with an output of 24VDC

☞ When powering on the V Box Express, make sure that the air intake and exhaust openings are not obstructed.

Back Side view

At the back side of the V Box Express are the 4 mounting holes and the air convection holes for the heat sink.

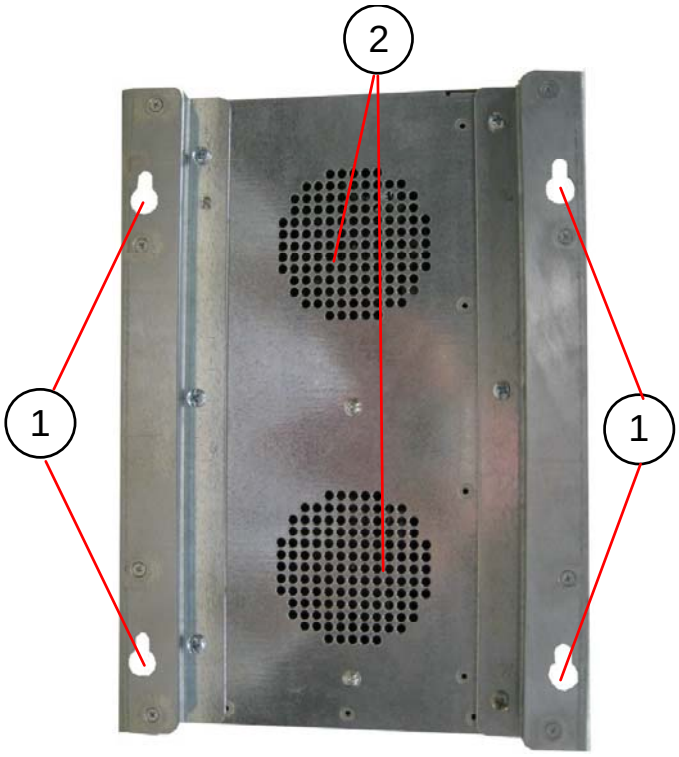


Fig. 3: V Box Express (back side)

1 Mounting holes (panel mount)

2 Exhaust openings

Front Side view (with Interfaces)

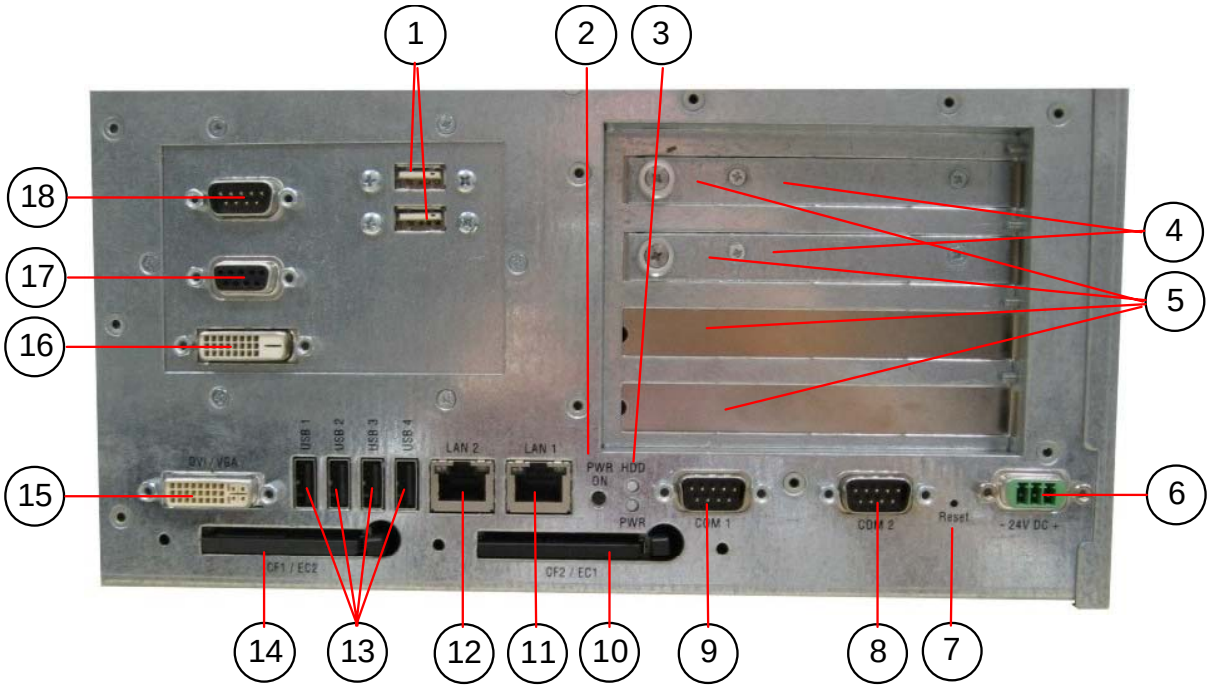


Fig. 4: V Box Express (interface side)

1 2x USB (2.0) connector **(option)**

2 Power button (ATX)

3 LED control indicators

4 HDD drive cage with knurled screws **(option)**

5 4x Free expansion slots for PCI cards 32bit@33MHz (half size)

6 DC power plug (shown with DC terminal for the power cord)

7 Reset switch

8 COM2 (RS232) port connector

9 COM1 (RS232) port connector

10 CF2 slot (shown with installed CF card (type I) **(option)**

11 LAN1 interface connector

12 LAN2 interface connector

13 4 x USB (2.0) connector

14 CF1 slot (shown with installed CF card (type I) **(option)**

15 DVI-I/VGA connector

16 DVI-D connector

17 COM3 RS 232/422/485 **(option)**

18 COM4 RS 232/422/485 **(option)**

Interfaces on the Bottom Side

USB 2.0 Connectors

The system is equipped at the front side with 4x USB 2.0 interface connectors. These connectors and provide connections for USB-compatible devices.

DVI-I Interface Connector

The DVI-I interface (Single Link) supports both digital and analog connections. Digital devices can be connected directly to this interface of the V Box Express but analog devices should be connected to this interface via a DVI to VGA adapter (not included).

Serial Interface Connectors (COM1, COM2 and COM3,COM4)

These RS232 connections are available as 9-pin D-SUB plugs and provide connection for serial devices.

Ethernet Interface Connectors

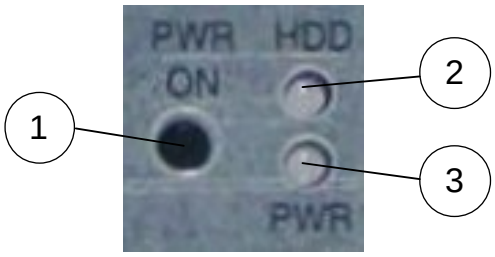
These interface connectors are provided as RJ45 sockets with integrated LEDs. The data transfer rate depends on the installed ETXexpress module (see below):

Ethernet Port	Data Transfer Rate for System Configuration with:	
	ETXexpress-PM Module	ETXexpress-CD Module
LAN1	10/100 Mbps	10/100/1000 Mbps
LAN2	10/100/1000 Mbps	10/100/1000 Mbps

LED States:

Left LED State	Link Speed	Right LED State	Link Activity State
off	10 Base-T	Off	Link not active
green	100 Base-T	Green	Link active
yellow	1000 Base-T		

Power Button



1 Power button

2 HDD LED

3 Power LED

Fig. 5: Power button and LED indicators

The power button “PWR ON“ is located on the bottom side of the system. Press this button in order to turn the system on or off. The power button behavior can be set in the BIOS Setup.



Even the system is turned off via the ATX power button there is still a standby-voltage of 5 V on the ETX express baseboard.
The system is not completely disconnected from the main power source by turning it off via the ATX power button.
The unit is only completely disconnected from the main power source, when the power cord is disconnected either from the power source or the unit.
Therefore, the power cord and its connectors must always remain easily accessible.

LED Control Indicators

The V Box Express is equipped with two LED indicators.

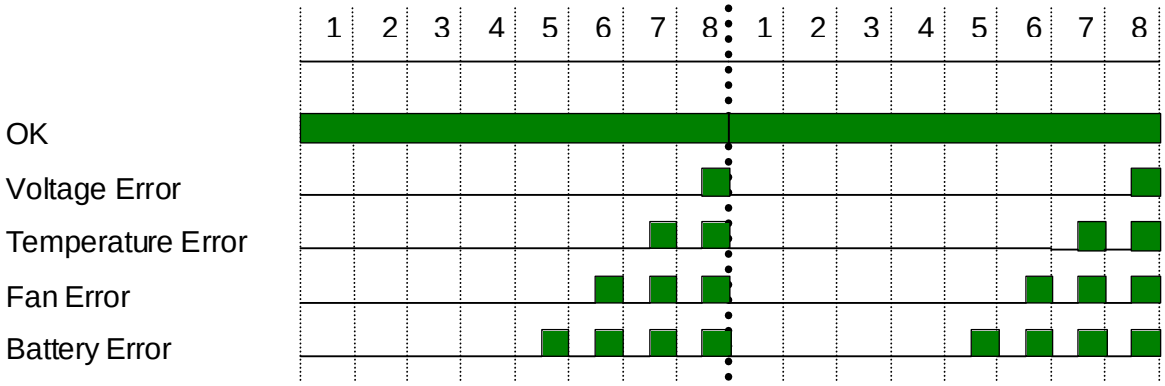
Power LED	Lights up green when the system is powered on via the power button.
	Lights up red when the system is in standby (depends on the behavior of the power button (BIOS Setup setting).
HDD LED	Lights up red for hard disk activity.

Power LED Error codes

This function display four important fail conditions:

- Voltage Error
- Temperature Error
- Fan Error
- Battery Error

All these errors will be notified by the status led and by a beeper. The following illustration shows the blink/beep for different conditions:



If more than one fail condition occurs simultaneously, only the highest priority error code will be shown.
The priority order is:

1.	most	Voltage Error
2.	less	Temperature Error
3.	less	Fan Error
4.	at least	Battery Error

E.g. is there a temperature error and a fan error, only the temperature error will be displayed.

		Error	**Good:**	**Error**
Voltage Error	12V	0..<11,4V	11,4V..12.6V	>12.6V..
	5V	0..<4.7V	4.7V..5.2V	>5.2V
	3.3V	0..<3.1V	3.1V..3.5V	>3.5V
Temperature Error		…<-10°C	-10°C… +79°C	>79°C
Fan Error	1	…<900 1/min	900 1/min...20000 1/min	>20000 1/min
	2	…<900 1/min	900 1/min...20000 1/min	>20000 1/min
Battery Error		0..<2.5V	2.5V … 3.5V	>3.5V

CompactFlash™ Slot (Option)

The V Box Express is equipped with a bottom side accessible CompactFlash™ slot. The CF slot will accept only CF cards type I.

☞ The system must be powered down before the Compact Flash™ card can be installed or removed.

Removable HDD Drive Cage (Option)

The V Box Express is equipped with two removable drive cage for a 2.5” SATA HDD. The drive cage is secured to the system with knurled screws.

It is allowed to remove/replace the hard disk while the system is powered-up.

☞ In order to prevent the loss of data do not remove the hard disk during HDD read or write activities.

System operation is allowed only with closed HDD drive cage and secured by the knurled screws.

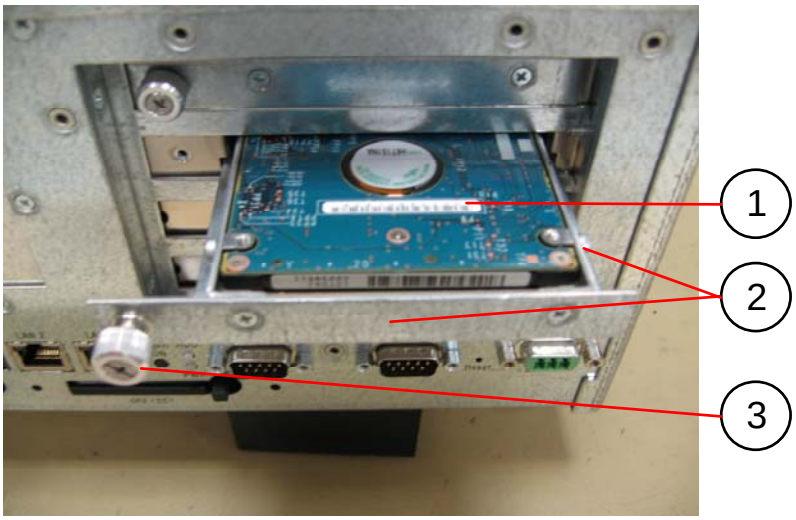


Fig. 6: SATA Drive of V Box Express (shown with opened removable drive cage)

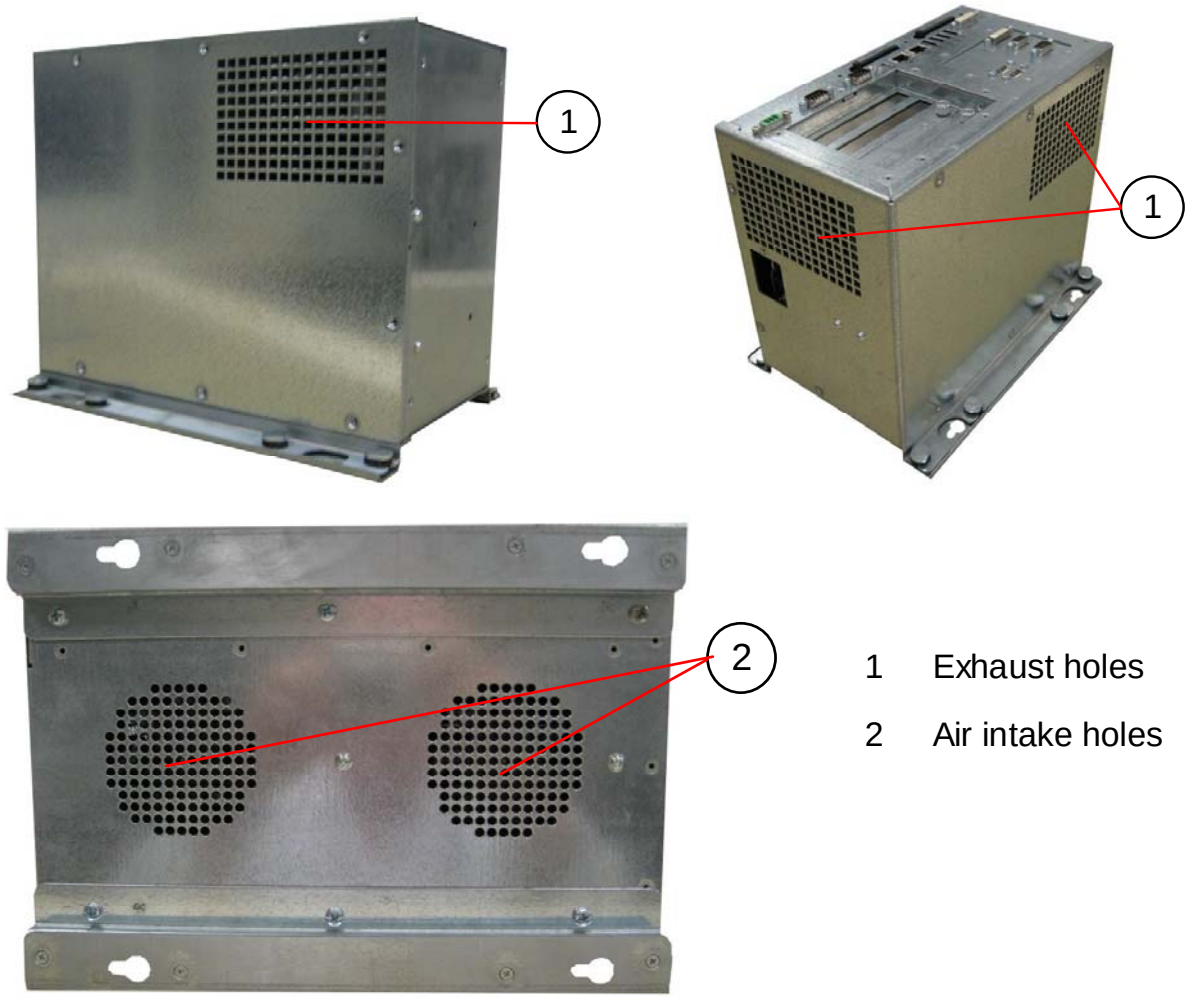
1 2.5” SATA hard disk

2 Removable drive cage

3 Knurled screws

Air intake and exhaust openings

☞ When powering on the V Box Express, make sure that the air intake and exhaust openings are not covered.



1 Exhaust holes

2 Air intake holes

Fig. 7:Total viewV Box Express

Integrated ETXexpress® Module

Depending on the ordered system configuration, your V Box Express accommodates a baseboard with either an ETXexpress-PM (Pentium-M)or an ETXexpress-CD (Core duo) module.



Refer to the information and technical data in the user manual of the installed baseboard and ETXexpress Module.

The user's manual of the installed board can be downloaded from our web page www.kontron.com . Search for the name of the installed board.

Riser Card

The V Box Express accommodates a riser card with 4x 32 bit PCI slots. You can expand your system with PCI extension cards as half size length.



To expand your system with additional cards, please observe the power consumption specification specified in the "Power Specifications" chapter and that every additional card does not exceed 25 W power consumption.

Starting Up

The DC power socket is located on the front side of the system.

☞ The voltage of the power source must correspond to the voltage value on the type label.

DC-Connection

☞ The length of the DC connecting wires may not exceed 3m. Strip and twist the connecting wire-ends but do not tin it the with solder.

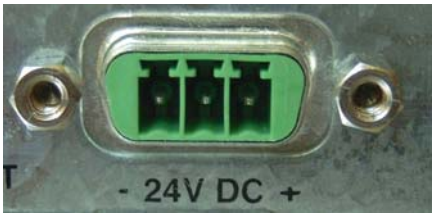


Fig.8: DC-connector (without Phoenix plug terminal)



*Fig. 8a: DC-Terminal (Phoenix plug terminal **AWG 28-16**)*

For the DC-connection prepare the connecting wires with the supplied Phoenix plug. Pay attention to the right polarity of the wires (refer to *Fig. 9* and *9a*).

The second end of each wire will be prepared as required for the connection to the DC-power supply.

Accessing Internal Components

This section contains important information that you must read before accessing the internal components. You must follow these procedures properly when installing, removing or handling any board.

Please consider following instruction when you install (or remove) expansion cards.



The installation and removal of expansion cards have to be carried-out only by qualified specialist personnel in accordance with the description in this manual.

Before removing the cover to gain access to the internal components, the system must be powered-down and the power cord has to be disconnected from the power source.

To expand your system with additional cards, please observe the power consumption specification specified in the “Power Specifications” chapter and that each additional card does not exceed 25 W power consumption.



Please observe the safety instruction for handling assemblies with static sensitive device.
Failure to take heed of this warning instruction can result in damage to the device.



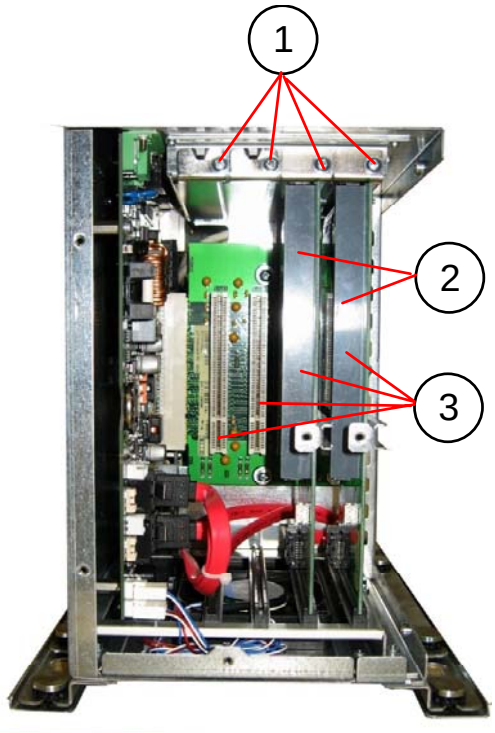
Please consult the documentation provided by the manufacturer of the expansion card for instructions before attempting to install/remove an expansion card into/from the V Box Express.

Installing/Removing the Expansion Cards

The expansion cards for performance extension of your computer can be installed into the slots of the riser card. Please consider following instruction when you install (or remove) expansion cards.

To install (or remove) an expansion card, follow these steps:

1. Turn off your system and disconnect the power cord from the power source.
2. The V Box Express should lie on a flat, clean surface with the top side downwards
3. Drill out the screws on the cover plate of the unit, to get access to the internal connectors.
4. To remove/install an expansion card, you have to remove the corresponding expansion card/slot bracket. Loosen the corresponding fastening screw on the internal side, which secures the slot bracket and remove it. Retain the screws for later use
5. Insert/remove the expansion card into/from the slot of the riser card.
6. If you have removed an expansion card, re-insert a slot bracket.
7. Secure the bracket (slot bracket or card bracket) to the chassis with the fastening screw.
8. Close the access door and secure it with the knurled screw.



1 Screws to secure the expansion cards/slot brackets

2 Installed SATA Drives (OPTION)

3 Free PCI slots (32bit@32 MHz)

Fig. 9: V Box Express viewopened expansion cards

Maintenance and Prevention

Kontron Embedded Computers systems require minimal maintenance and care to keep them operating correctly.

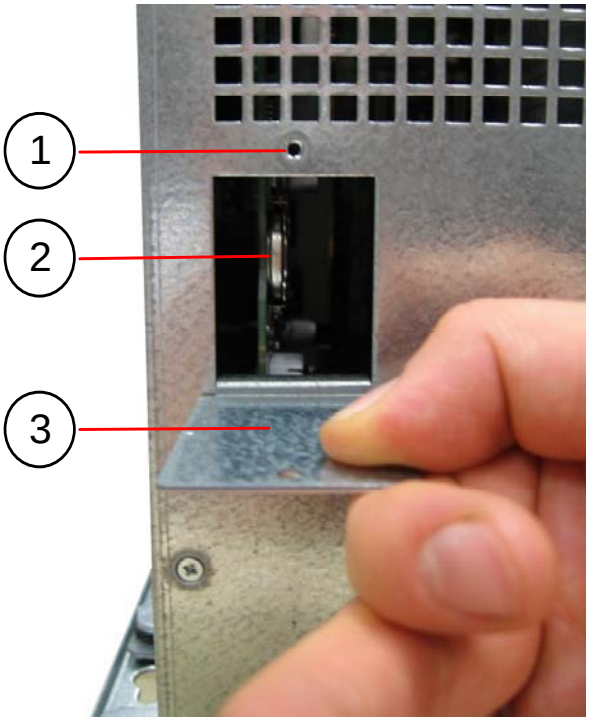
- ☐ Occasionally wipe the system with a soft dry cloth.
- ☐ You should only remove persistent dirt by use of a soft, slightly damp cloth (use only a mild detergent).

Replacing the Lithium Battery

The baseboard is equipped with a lithium battery. To replace this battery, please proceed as follows:

1. Remove the battery cover plate on the small side of the system
2. Remove the battery by pressing outwards the ejector spring.
3. Insert the new battery into the socket.
4. Make sure that you insert the battery correctly. The plus pole must be on top!
5. Reinstall the battery cover plate.

The lithium battery must be replaced with an identical battery or a battery type recommended by Kontron Embedded Computers (Lithium battery 3.0 V for RTC, type: CR2032).



1 Screw for battery cover plate
2 Battery
3 Cover plate



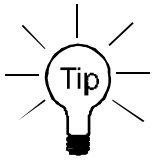
Do not dispose of lithium batteries in domestic waste. Dispose of the battery according to the local regulations dealing with the disposal of these special materials (e.g. to the collecting points for the disposal of batteries).



Warning

There is a danger of explosion if the wrong type of battery is used for replacement. Replace only with the same or equivalent type of battery as recommended by the manufacturer. Dispose of used batteries according to the manufacturers instructions.

Installation Instructions



Expansion card installation should be performed before installing the V Box Express system into an industrial cabinet or into a control panel. Refer to the chapter “Accessing Internal Components”.

Leave sufficient space at the interface side for connecting the peripheral devices.



Important Instructions!

If you mount the V Box Express into an industrial cabinet, it is advisable to use two people for the mounting, because the system weighs approx. 11 kg (approx. 24,25 lbs).



Ensure there is sufficient air circulation around the device when installing the V Box Express. The openings for air intake and exhaust on the device must not be covered.

Leave at least 5 cm (approx. 2”.) of free space around the PC unit to prevent the device from possibly overheating!



The voltage feeds must not be overloaded. Adjust the cabling and the external overcharge protection to correspond with the electrical data indicated on the type label.

The type label is located on the rear right hand side of the system.

Mechanical Drawings for V Box Express on the web page www.kontron.com.

Operating System and Hardware Component Drivers

The V-Box Express can optionally be supplied with or without a pre- installed operating system.

If you have ordered your V-Box Express with a pre- installed operating system, all drivers are installed, corresponding to the ordered computer configuration (optional hardware components). Your computer is fully functional, when you switch it on for the first time.

If you have ordered your V-Box Express without pre- installed operating system, you have to install the operating system and the corresponding drivers for the ordered computer configuration (optional hardware components).



The needed drivers can be downloaded from our web page: www.kontron.com. Search for the product name.



Consider the manufacturer specifications of the operating system and the integrated hardware components.



To expand your system with additional cards, please observe the power consumption specification specified in the “Power Specifications” chapter and that every additional card does not exceed 25 W power consumption.

Main Specifications

Mounting	Wall mount, Desk top
V Box Express Dimensions	270x145x218 mm (HxWxD)
Processor	Up to Intel® Core™ Duo T2500
Memory	Up to 2 GB SDRAM
Lithium Battery	Type: CR2032; 3.0 V; 0.22Ah;
External Interfaces (accessible from the bottom side)	1x DVI-I (single Link) and 1x DVI-D **optional** 4x USB (2.0/1.0), 2x USB **optional** 1x LAN2 10/100/1000 Mbps 1x LAN1 (10/100 Mbps for ETXexpress-PM) **OR** 1x LAN1 (10/100/1000 Mbps for ETXexpress-CD) 2x Serial Port (RS232) 2x Serial Port RS232/422/485 **optional**
Free Expansion Slots	4x PCI 32 bit @ 33MHz (half size)
Drive Bay	2x Compact Flash™ for CF card type I **optional** 2x 2.5” SATA removable HDD on PCI slot **optional**
Operating Elements (on connector side)	Power button / Reset button
LED Indicators (on connector side)	Power LED HDD LED
DC Power Plug	On the bottom/connector side
Operating System	- Microsoft Windows XP embedded German - Microsoft Windows XP embedded English - Microsoft Windows XP Prof. Multiling.

Power Specifications

Power Specification (max. power value for additional customized applications)	Total power of all additional customized applications	max.: 125W
	Power consumption per slot (PCI)	max.: 25W
	Power consumption at +3.3 VDC +5 VDC and +12 VDC (combined)	max.: 75W

Electrical Specifications

System Type	Input voltage	Input current
V Box Express	24 VDC PSU +/- 20%	A: max. 5,4A

Mechanical Specifications

Weight (without packaging)	11 kg (24,25 lbs.) max
Housing	Zinc-coated steel

Environmental Specifications

Operating Temperature	0 … +50°C
Storage / Transit Temp.	-25 … +70°C
Relative Humidity	Operating: 5% to 80% non condensing at 40°C Storage / transit: 0% to 95% non-condensing at 25°C
Operating Altitude	0 to 10.000 ft (3000 m)
Storage / Transit Altitude	0 to 30.000 ft (3000 m)
Operating Shock	15 G, 11 ms duration, half sine
Storage / Transit Shock	30 G, 11 ms duration, half sine
Operating Vibration	10 – 500 Hz, 1.0 G
Storage / Transit Vibration	10 – 500 Hz, 2.0 G
Protection class	IP20

CE Directives and Standards

CE Directives	
Low Voltage Directive (Electrical Safety)	2006/95/EC
EMC Directive	2004/108/EC
CE Marking	93/68/EEC

Electrical Safety	Standards
EUROPE	EN 60950-1
U.S.A.	to meet UL 60950-1, First Edition

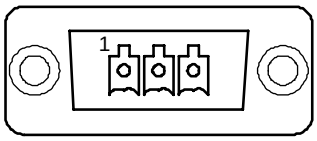
EMC	Standards
EUROPE	Generic emission standard for industrial environments (Emission): EN 61000-6-4 Generic standards - Immunity for industrial environments (Immunity): EN 61000-6-2
U.S.A.	FCC 47 CFR Part 15, Class A

Technical Appendix - Interfaces

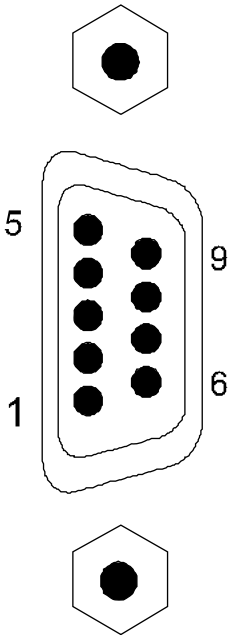
The following tables contain the plug assignments for the external connections of the V Box Express.

Low-active signals are indicated by a minus sign.

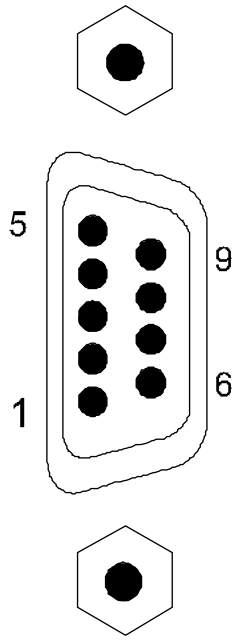
Power Supply Connector

Pin	Signal Name	Power SubCon _PSC 1,5/3-F
1	Ground	
2	Earth	
3	24V DC IN	

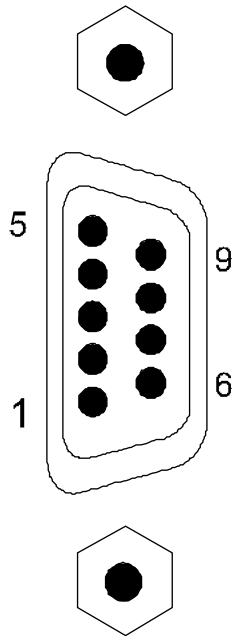
Serial Port (COM1, COM2) RS232

Pin	Signal Name	9-pin D-SUB Plug (male)
1	DCD (Data Carrier Detect)	
2	RXD (Receive Data)	
3	TXD (Transmit Data)	
4	DTR (Data Terminal Ready)	
5	GND (Signal Ground)	
6	DSR (Data Set Ready)	
7	RTS (Request to Send)	
8	CTS (Clear to Send)	
9	RI (Ring Indicator)	

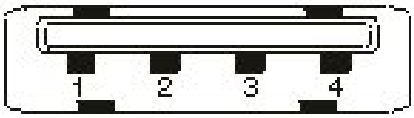
Serial Port (COM3, COM4) RS422 (Option)

Pin	Signal Name	9-pin D-SUB Plug (male)
1	TXD- (Transmit Data -)	
2	RXD+ (Receive Data +)	
3	TXD+ (Transmit Data +)	
4	RXD- (Receive Data -)	
5	GND (Signal Ground)	
6	RTS- (Request to Send -)	
7	RTS+ (Request to Send +)	
8	CTS+ (Clear to Send +)	
9	CTS- (Clear to Send -)	

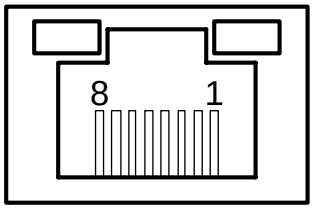
Serial Port (COM3, COM4) RS485 (Option)

Pin	Signal Name	9-pin D-SUB Plug (male)
1	TXD- (Transmit Data -)	
2	RXD- (Receive Data -)	
3	NC	
4	NC	
5	GND (Signal Ground)	
6	TXD+ (Transmit Data +)	
7	RXD+ (Receive Data +)	
8	NC	
9	NC	

USB Port

Pin	Signal Name	4-pin USB Socket Type A Version 2.0/1.1
1	VCC	
2	Data-	
3	Data+	
4	GND	

LAN Port

Pin	Signal Name	8-pin Jack with integrated magnetics and LEDs
1	MX0+	
2	MX0-	
3	MX1+	
4	MX2+	
5	MX2-	
6	MX1-	
7	MX3+	
8	MX3-	

DVI-I Connector (Single Link)

Pin	Signal Name	Description	DVI-I - Connector (female)
1	TMDS2–	Differential TMDS Data 2–	
2	TMDS2–	Differential TMDS Data 2+	
3	GND	TMDS Shield	
4–5	NC		
6	DVI_SCL	DDC EDID data clock	
7	DVI_SDA	DDC EDID data	
8	DVI_VS	Analog VSYNC	
9	TMDS1–	Differential TMDS Data 1–	
10	TMDS1+	Differential TMDS Data 1+	
11	GND	TMDS Shield	
12–13	NC		
14	DVI_5V	5V / 100mA Power Supply	
15	GND	Ground	
16	DISPDET	Hot Plug Detection	
17	TMDS0–	Differential TMDS Data 0–	
18	TMDS0+	Differential TMDS Data 0+	
19	GND	TMDS Shield	
20–21	NC		
22	GND	TMDS Shield	
23	TMDSSCL–	Differential TMDS Clock–	
24	TMDSSCL+	Differential TMDS Clock +	
C1	DVI_R	Analog red	
C2	DVI_G	Analog green	
C3	DVI_B	Analog blue	
C4	DVI_HS	Analog HSYNC	
C5	Analog GND	Analog Ground	

Technical Support

For technical support, please contact our Technical Support department.

German headquarter Hotline:
Tel: +49 (0)9461 950-104
Fax: +49 (0)9461 950-200
E-mail: support@kontron.com

Make sure you have the following information on hand when you call:
- the unit part id number (P/No #),
- and the serial number (S/No #) of the unit (provide the serial number found on the type label, placed on the rear right hand side of the system).

Be ready to explain the nature of your problem to the service technician.

If you have questions about Kontron Embedded Computers or our products and services, you may reach us at the aforementioned numbers, or at: www.kontron.com or by writing to:

Kontron Embedded Computers GmbH
Oskar-von-Miller-Str. 1

85386 Eching
Germany

Returning Defective Material

Before returning any material, please:

1. Contact our Service and request an
   RMA number (Return Material Authorization) by :
   Fax: +49 (0)9461 950-200
   E-mail: service@kontron.com
2. Make sure that you receive an RMA number from Kontron Embedded Computers-Service before returning any material. Clearly write or mark this number on the outside of the package you are returning.
3. Describe the device failure behavior.
4. When returning goods, include the name and telephone number of a person whom we can contact for further explanations if necessary. Where applicable, always include all duty papers and invoice(s) associated with the item(s) in question.
5. When returning a unit.
   - Ensure that the unit is properly packed in the original box.
   - Include a copy of the RMA form.