PROPRIETARY NOTICE

emPC-CX+

embedded PC

(Hardware Manual)

Version 1.1

refers to product revision no.
-

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About this Manual

This is the hardware manual for the emPC-CX+ embedded PC.

Conventions

If numbers are specified in this manual, they will be either decimal or hexadecimal. We use C-notation to identify hexadecimal numbers (the 0x prefix).

If we refer to low active signal names, they will suffixed by a "#" character.

Some parts of the contains notices you have to observe to ensure your personal safety, or to prevent damage to property. These are visually marked with the following alert symbols:

DANGER

Indicates that death or severe personal injury *will* result if proper precautions are not taken.

WARNING

Indicates that death or severe personal injury *may* result if proper precautions are not taken.

CAUTION

Indicates that *minor* personal injury can result if proper precautions are not taken.

NOTICE

Indicates that damage to equipment can result if proper precautions are not taken.

Indicates information that we think you should have read to save your time by avoiding common problems. Important suggestions that should be followed will also be marked with this sign.

Acronyms and Abbreviations

EMC	Electromagnetic capability.
ESD	Electrostatic discharge.
GND	System ground potential. Inside the product this is connected to the metal housing, which might be connected to protective earth by the installation. There exist some isolated reference grounds for communication interfaces or IO. These reference signals are referred to as GND-x, where x indicates function.
SELV	Safety extra low voltage.

1 Introduction

1.1 Features

1.1.1 Hardware

- COM Express Processing Core with various CPU options
  - Celeron, Core i3/i5/i7 (3rd Gen)
  - Atom E38xx (Baytrail)
- DDR3 memory as defined by COM Express Module
- PCI or PCIe expansion slots. Available options:
  - No slots
  - 2 x PCIe x1
  - 2 x PCIe x1 + 2 x PCIe x4 (not possible with Atom)
  - 2 x PCI 32 bit 5V
- Internal CFast Socket for SATA based SSD modules
- Up to two internal SATA connectors
- 2 x 10/100/1000 Mbit/s Ethernet
- 4 x USB interface. USB 3.0 if supported by COM Express Module, else USB 2.0 only
- 128 kB of M-RAM which does not require battery backup
- Battery backed up RTC
- COM express internal watchdog function
- Power supply/temperature/FAN monitoring
- DVI-I display connector
- PCI express mini card
- internal LVDS display interface
- System Power supply 9..34 VDC
- Reset Push Button and Power LED
- 4 user defined LEDs
- Personality Board for IO expansion. Available options:
  - 2 x CAN (optionally with digital IO)
  - 1 x CAN, 1 x RS232/RS485 (optionally with digital IO)

1.1.2 Hardware Customization

Due to it's flexible system architecture, the emPC-CX+ can be customized if the standard products do not provide optimum features or price. Customization is possible even at moderate quantities. Ask sales department for details.

1.1.2.1 PCI(e) Cards

Refer to the available riser cards. More options are possible, e.g. 1 x PCIe x8.

1.1.2.2 PCI Express Mini Card

One internal slot is available. Ask for customized connector panels with additional holes to be utilized by the Mini Card connectors.

1.1.2.3 Internal USB

Two internal USB interfaces are available on 10 pin header, e.g. for integration of dongles.

1.1.2.4 Personality Board

System depended IO interfaces are implemented by the personality board (refer to the block diagram). Either existing personality boards can be customized or a custom personality board can be build.
The personality board is connected to the system by the following interfaces:

- FPGA (up to 30 IO signals)
- 2 x PCIe x1 (not available on ATOM)
- HDA (high definition audio)

1.1.2.5 COM Express

The emPC-CX+ is open for all COM express modules with the following constraints:

- Type 6 (Compact or Basic)
- DDI1 must support T.M.D.S (HDMI,DVI)
- Sufficient PCIe lanes available

1.1.3 Software

Supported by

- Windows 7/8
- Windows 7/8 embedded
- Linux

Contact Janz Tec for more information about the available software packages.

1.2 Functional Overview

The functional components of the product are shown in figure 1.

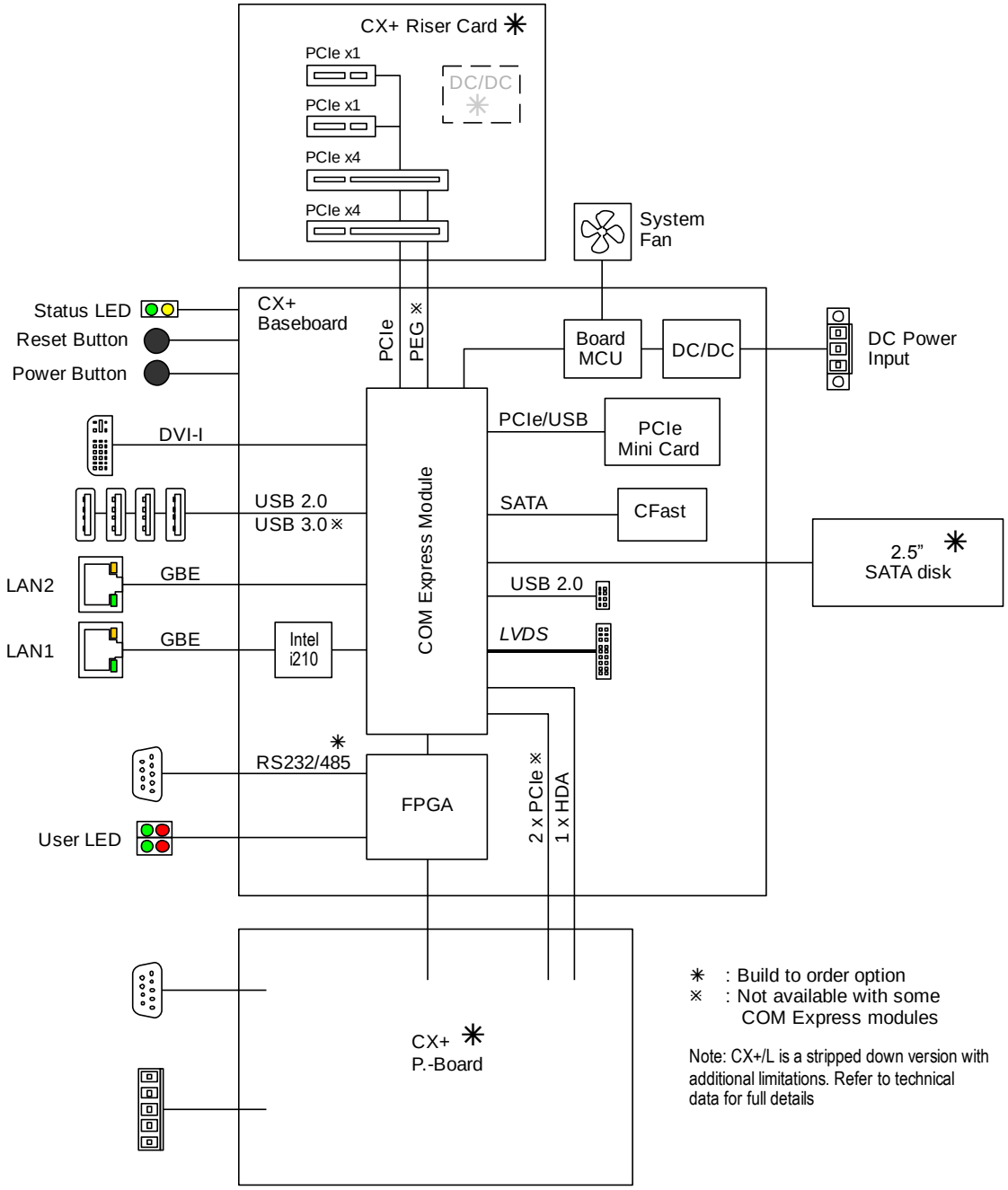


figure 1: block diagram (with 4 slot riser card shown)

2 Safety Instructions

Refer to page iii for explanation of the warning notice system.

The product described in this documentation may be operated only by personnel qualified for the specific task in accordance with the relevant documentation for the specific task, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products.

2.1 Installation and Maintenance

The power supply of the product operates with hazardous voltages.

DANGER: Electrical Shock

Danger to life.
This product operates with 9..34 V DC SELV power supply. Do not connect this product to an improper power supply.

DANGER: Electrical Shock

Danger to life.
The IO interfaces (connectors) of the product are only suited to be connected to SELV circuits. Use interfaces (connectors) for their intended use only.

CAUTION: Explosive Risk

The installed computer board is equipped with a Lithium battery.
Danger of explosion if battery is incorrectly replaced. Replace only with battery of the same or equivalent type.

WARNING: Burns Hazard

The product generates considerable amount of heat. The housing transports this heat to the environment and therefore gets hot. **Caution when touching the housing, burns hazard**!

2.2 Ambient and Environmental Conditions

CAUTION: Damage

Do not operate the product beyond the specified ambient conditions

DANGER: Explosive Risk

Do not operate the product in potentially explosive atmosphere.

NOTICE: EMI

This product is a class A device. This product may cause radio interference. In this case the user must take adequate measures.

3 Installation

WARNING: Burns Hazard

The product generates considerable amount of heat. The housing transports this heat to the environment and therefore gets hot. **Caution when touching the housing, burns hazard**!

The product can be operated with DC power supply from 9 to 34 V. The lower limit is system dependent and might be higher for systems high power consumption (e.g. 14 to 34 V).

3.1 Mounting

The emPC-CX+ is intended for wall mount. Refer to figure 2 for the recommended mounting orientation.

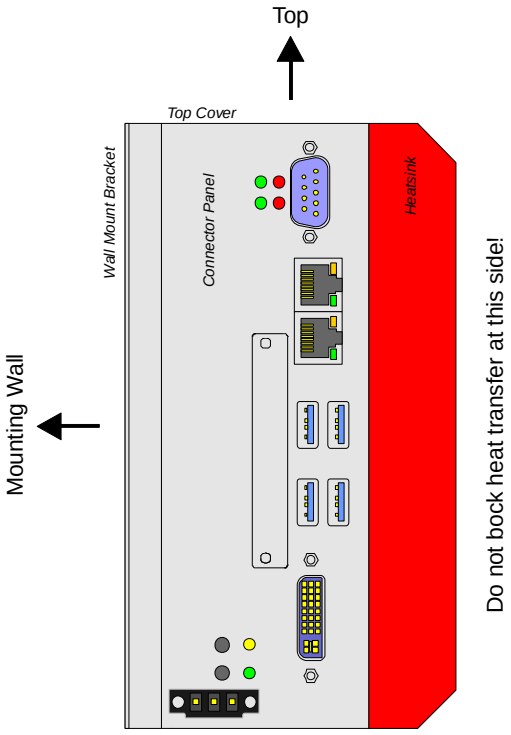


figure 2: emPC-CX+ mounting options

3.2 Connectors and Operators

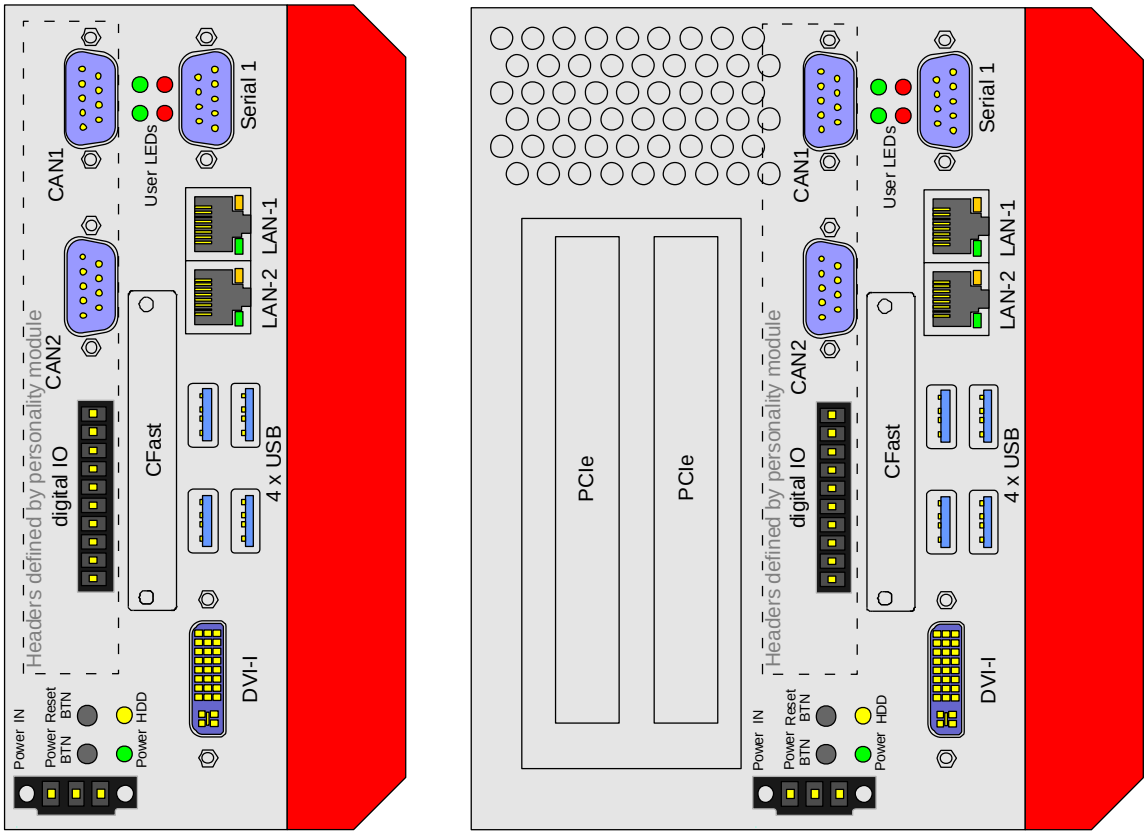


figure 3: emPC-CX+ connector panel

3.2.1 POWER IN

The system power supply is connected with a 3 pin screw terminal with 5.08 mm pitch.

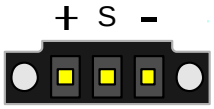


Figure 4: Power connector

Pin	Description
1 (+)	+9 ..34 VDC
2 (S)	Control input (0 .. 34 V)
3 (-)	GND

Table 1: Power connector pin assignment

A suitable mating connector is Phoenix Contact 1900895. Equivalent Models exists from other vendors.

DANGER

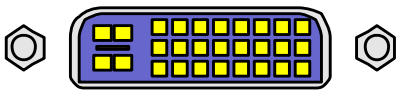
The product may only be operated with power supplies which can be considered SELV circuits.

NOTICE

Do not insert the power connector when power is applied, instead turn power off before inserting the power connector.

3.2.2 Graphics connector (DVI-I)

Combined digital and analog graphics connectors. The digital interface provides single link only.

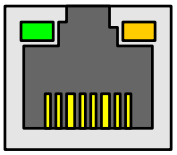


1	TMDS 2-	13	N/C
2	TMDS 2+	14	+5V
3	SHIELD	15	GND
4	N/C	16	Hotplug detect
5	N/C	17	TMDS 0-
6	DDC clock	18	TMDS 0+
7	DDC data	19	SHIELD
8	N/C	20	N/C
9	TMDS 1-	21	N/C
10	TMDS 1+	22	SHIELD
11	SHIELD	23	TMDS C+
12	N/C	24	TMDS C-
C1	RED	C3	BLUE
C2	GREEN	C4	H-Sync
C5	GND		

table 2: DVI-D connector

3.2.3 Ethernet Interfaces (LAN1 and LAN2)

Ethernet interfaces of the motherboard. The Ethernet physics is 10/100/1000BaseT, available through the shielded modular jack at the connector panel. Twisted pair cable can be used to connect to this port.



1	MDI0+	5	MDI2+
2	MDI0-	6	MDI2-
3	MDI1+	7	MDI3+
4	MDI1-	8	MDI3-

1

table 3: Ethernet connector

The two LEDs indicate Ethernet status as follows:

LED1

No activity
Activity

LED2

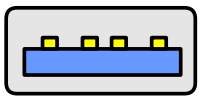
No Link
10/100/1000 MBit Link

3.2.4 USB type A receptacle (USB1-USB4)

Four USB interfaces are available at the connector panel.

If the system's COM Express Module supports USB 3.0, then Super Speed USB is available on the supported ports. USB 2.0 is available on all connectors.

The color coding of the connectors is blue, regardless whether USB 3.0 is available or not.



1	+5V, I_{MAX} = 900 mA, 1500 mA total
2	USB-
3	USB+
4	GND
5	SSRX-
6	SSRX+
7	GND_DRAIN
8	SSTX-
9	SSTX+

table 4: USB connector

The USB connectors provide standby power, thus wake on USB is possible.

NOTICE

Although each port can deliver supply current of 900 mA, the overall load on USB1 to USB4 interfaces should be limited to 1500 mA to prevent power supply from overheating.

3.2.5 CFast card

The cFAST memory card is accessible after removing the cover on the connector panel of system. Push the ejector button to remove.

Figure 5: CFast slot cover

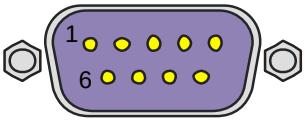
NOTICE

The CFast card **must NOT be inserted or removed** when power is applied to the

system.

3.2.6 RS232 connector

If RS232 connector is provided, it has the following pinout.



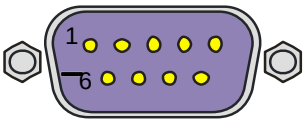
9pin male D-Sub

1	DCD	6	DSR
2	RxD	7	RTS
3	TxD	8	CTS
4	DTR	9	RI
5	GND		

table 5: RS232 connector

3.2.7 CAN

The CAN connector (if available) is a standard 9 pin D-SUB plug with a pin out shown in table 6. The CAN interface is isolated and has a software switchable 120 Ohm termination.



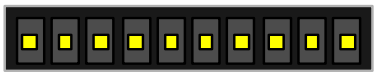
9pin male D-Sub

1	n.c.	6	GND
2	CANL	7	CANH
3	GND	8	n.c.
4	n.c.	9	VEXT[1]
5	n.c.		

table 6: CAN connector

3.2.8 Digital IO

The digital IO connector (if available) is a standard screw terminal with 3.81 mm pitch. Variants with 4 inputs plus 4 outputs and with 8 inputs only are available.



10pin 3.81mm connector

1	DIGIN-0
2	DIGIN-1
3	DIGIN-2
4	DIGIN-3
5	GND-DIO
6	VIN-DIO (24VDC nom.)
7	DIGIN-4 / DIGOUT-0
8	DIGIN-5 / DIGOUT-1
9	DIGIN-6 / DIGOUT-2
10	DIGIN-7 / DIGOUT-3

table 7: digital IO connector

A suitable mating connector is Phoenix Contact 1803659. Equivalent Models exists from other vendors. Mating connectors with spring-cage connection are also available.

Digital output pins drive VIN-DIO to the output pins (high side switch). See figure 6 for details.

[1] This signal is optionally available to provide power to supply an external transceiver module

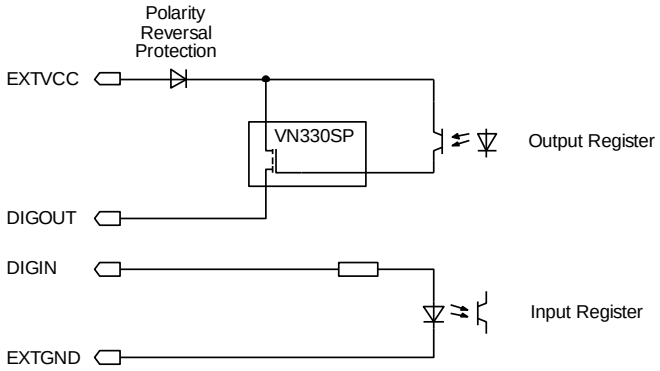


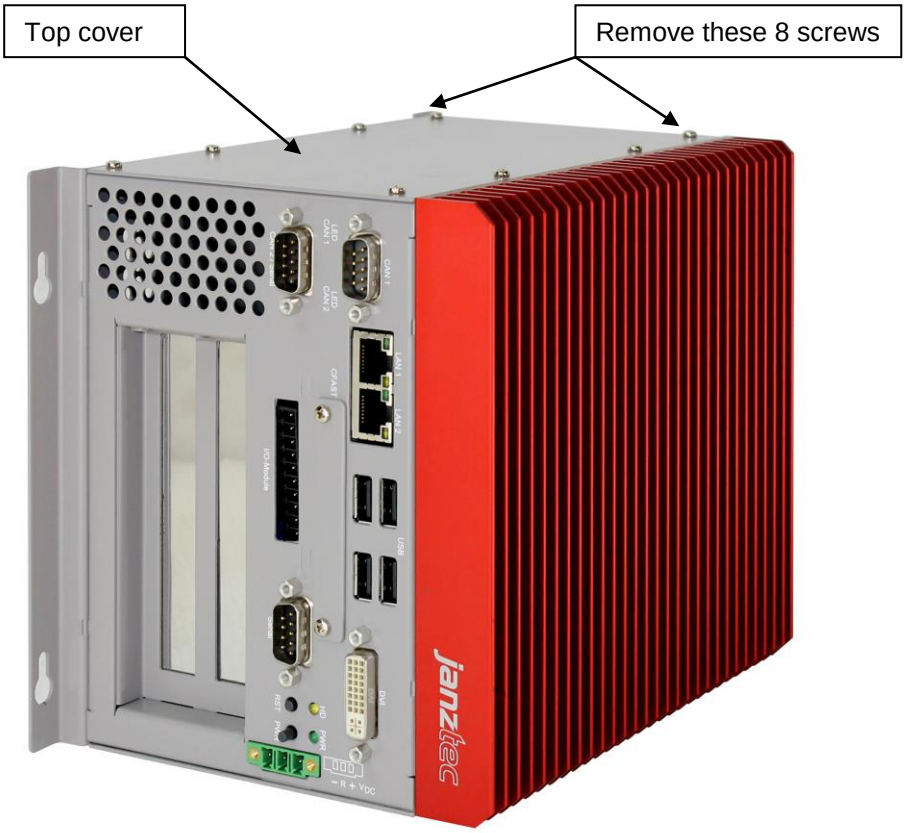
figure 6: Digital input /output structure

Each port pin (DIGOUT-0…DIGOUT-3) is able to source 500mA into a load. The sum of all output currents should be limited to 1A.

Systems without the digital IO option have the connector mounted, with all contacts not connected to any logic.

4 Maintenance

NOTICE
Always follow common ESD practice when you service the product!



To open the housing, you can remove the mounting bracket or the top cover. Different maintenance tasks require one of them to be removed, others both.

Task	Top Cover	Mounting Bracket	Remarks
Replace PCI card	remove		
Replace SSD/HDD	remove		
Replace FAN	remove		
Replace Battery		remove	PCI cards must be removed
Replace PCIe mini card		remove	PCI cards must be removed
Replace CFast			Only remove CFast cover from mouting panel

4.1 Battery Replacement

CAUTION

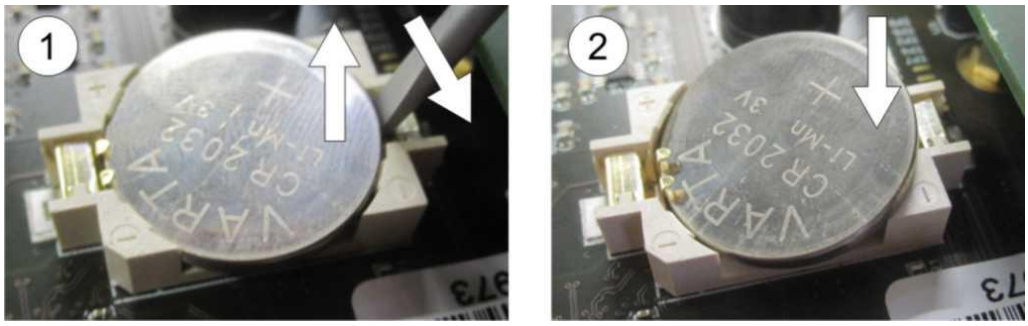
The installed computer board is equipped with a Lithium battery.
Danger of explosion if battery is incorrectly replaced. Replace only with battery of the same or equivalent type (3-volt lithium coin cell battery).

- Do not attempt to recharge the battery.
- Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.

Compatible battery type: CR2032 (3 Volt lithium coin cell battery)

The battery is used for backing up the system time when the power supply is removed.

1. Turn off the computer properly through the operating system, then turn off any external devices.
2. Disconnect the power supply from the power inlet and disconnect any external devices.
3. Unmount the wall mount bracket product and locate the battery on the system main board
4. Remove the battery from the holder (See figure 7)
5. Insert the new battery (See figure 7)
6. Reinstall the wall mount bracket



1. Removal: Insert screwdriver at right side and bend so that the battery pops outs. Use only gentle force, otherwise the battery holder might be damaged.
   The use a plastic tool is preferred to avoid shorting the battery
2. Insertion: Align new battery to the left side of the holder and gently press down on the right side of the battery until the battery snaps into the holder.

figure 7: Removing and replacing coin cell battery

4.2 PCI Express Mini Card

NOTICE

The PCI express mini card must not be inserted or removed when power is applied to the system.

After inserting the mini card into the connector, it must be push down and locked with two M2,5 screws.

NOTICE

- The insertion depth of the screws that lock the PCI express mini card must not exceed 3.2mm.
- Make sure that the diameter of the screw or the washer does not make contact with components or traces on the mini card. Some cards have components very near to the mounting holes.

The PCI express mini card socket does not support mSATA modules or other SATA based storage modules.

4.3 Installing PCI-Cards

The PCI/PCIe slot versions of the emPC-CX+ series allows the use of add-on cards.

When installing PCI cards, please consider that the card must support $5V_{IO}$ signalling. Additionally the amount of current the emPC-CX+ system can provide to the slots is limited.

A large amount of current drawn by the PCI card usually leads to a large amount of heat dissipated inside the housing. This causes the system to overheat and a damage of the systems is possible. If high power PCI cards are used a system fan is recommended. Contact the Janz Tec AG for further information. Before installing a PCI card, please make sure that the system is turned off. To get access to the PCI slot, the top cover must be removed. If you use a system with a built-in hard disk drive, please be careful when opening the housing because the hard disk drive is mounted on the backside of the top cover.

4.4 SATA drives

The emPC-CX+ System supports the installation of a 2.5” HDD or SSD. For 2/4-Slot systems, the drive can be mounted on the bottom side of the top cover. 0-Slot systems are equipped with a special mounting plate, which is fitted to the top cover in a right angle direction. The drives must be mounted using four M3x4 screws. The emPC-CX+ supports 2.5” disks with standard SATA connector

Please be careful when opening the top cover, because the optionally mounted drive cable is connected. Therefore, the top cover can’t be removed completely without disconnecting.

Figure 8: Drive mounting for 0 slot systems

Figure 9: Disk mounting for 2+ slot systems

5 Appendices

5.1 Technical Data

emPC-CX+/C-1047UE
emPC-CX+/i3-3217UE
emPC-CX+/i7-3517UE

Processing Core

CPU	**C-1047UE**: Intel Celeron 1047UE, 2 x 1.4 GHz, 2 MB cache **i3-3217UE**: Intel i3 3217UE, 2 x 1.6 GHz, 3 MB Cache **i7-3517UE**: Intel i7 3517UE, 2 x 1.7 / 2.8 GHz, 4 MB Cache See http://ark.intel.com/ for more details about the CPUs
Chipset	QM77 (HM76 for Celeron)
COMexpress Module	Congatec TS77

Memory

Main Memory	2 GB DDR3 1600, up to 16 GB (SO-DIMM)
nvSRAM	128 kB mRAM

Storage

CFast	1 x with SATA 6 GB/s, externally accessible
HDD/SSD	2 x SATA 3 GB/s, internal 7 pin connector Mounting kit for 1 x 2,5” internal drive available

Video

Controller	Chipset graphics
Memory	Shared with main memory
Interface	Dual Display Interface 1 x DVI-I single link connector on front panel, up to 2048x1536 (analog) or 1920x1200 (digital) 1 x Dual channel LVDS on internal connector, up to 1920x1200

External Interfaces (connector panel)

Video	1 x DVI-I
Ethernet	1 x 10/100/1000 Mbit/s Ethernet (LAN1: Intel i210) 1 x 10/100/1000 Mbit/s Ethernet (LAN2: Intel 82579)
USB	4 x USB3.0
Serial Port	1 x 9 pin D-Sub, RS232 8 wire,
CAN	2 x 9 pin D-Sub, ISO/DIS 11898-2, isolated from logic, switchable termination resistor, SJA1000 controller
Expansion options	PCI cards (opt.), CX+ personality module

Indicators and Switches

Control	1 x Power Pushbutton (Power management event) 1 x Reset Pushbutton
Remote Control	1 x Signal input on power connector for pushbutton or run-control function
Status LEDs	1 x Green LED for power supply status 1 x Yellow LED for SATA activity
User LEDs	4 x User programmable LEDs (2 x red, 2 x green)

System

Housing	galvanized steel sheet, outside painted

Battery	CR 2032, for real time clock
System controller	Temperature sensing and power supply management (accessible via FPGA I2C bus)
FAN controller	Speed control and monitoring for optional fan (accessible via system controller)
Watchdog	Yes, implemented by COM Express module
FPGA	Spartan 6 LX25T, PCI express interface to baseboard IOs

Expansion

PCI Express	1 x PCI Express Mini Card slot Riser cards connector with 2 x PCIe x1, 8 lanes PEG Personality Board with 2 x PCIe x1, HDA and FPGA IOs
USB	2 x USB2.0, internal connector

Power Requirements

Power Supply	DC power, 9 .. 34 V (lower limit with adjustable UVL)
Inrush Current (max)	4 A [3]
Power Dissipation	Without external load or expansion cards **C-1047UE**: 30 W **i3-3217UE**: 33 W **i7-3517UE**: 35 W

External Load Capabilities

+5V (USB)	Max. 0.9 A per USB 3.0 port, max 1500 mA for all ports (depends on total power supply load)

Environmental Specifications

Ambient Temperature operating	**C-1047UE**: 0-45 °C (0-50 °C with FAN) **i3-3217UE**: 0-45 °C (0-50 °C with FAN) **i7-3517UE**: 0-45 °C (0-50 °C with FAN) at sea level, derating of 1 °C per 300 m above sea level to a maximum of 2000 m.
Temperature storage	-40..+85 °C [2]
Humidity	5%..95% r.H., non condensing
Protection Class	IP20

Physical Dimensions

Size	Including wall mount flanges (WxHxD)	
	0 Slot:	96 x 171 x 230 mm
	2 Slot (2P/2X):	147 x 171 x 230 mm
	4 Slot (4P/4X):	179 x 171 x 230 mm
Weight	**0 Slot**:	2.4 kg
	2 Slot (2P/2X):	2.8 kg
	4 Slot (4P/4X):	TBD

emPC-CX+/A-E3827

Processing Core

CPU	**A-E3827**: Intel Atom E3827, 2 x 1.75 GHz, 1 MB L2 cache See http://ark.intel.com/ for more details about the CPUs
Chipset	Integrated in SoC
COMexpress Module	Congatec TCA3

Memory

Main Memory	2 GB DDR3L w. 1333 MT/s, up to 8 GB (SO-DIMM)
nvSRAM	128 kB mRAM

Storage

CFast	1 x with SATA 3 GB/s, externally accessible
HDD/SSD	1 x SATA 3 GB/s, internal 7 pin connector Mounting kit for 1 x 2,5” internal drive available

Video

Controller	Chipset graphics
Memory	Shared with main memory
Interface	Dual Display Interface 1 x DVI-I single link connector on front panel, up to 1920x1200 (analog) or 1920x1200 (digital) 1 x Dual channel LVDS on internal connector, up to 1920x1200

External Interfaces (connector panel)

Video	1 x DVI-I
Ethernet	1 x 10/100/1000 Mbit/s Ethernet (LAN1: Intel i210) 1 x 10/100/1000 Mbit/s Ethernet (LAN2: Intel i210)
USB	1 x USB3.0, 3 x USB 2.0
Serial Port	1 x 9 pin D-Sub, RS232 8 wire,
CAN	2 x 9 pin D-Sub, ISO/DIS 11898-2, isolated from logic, switchable termination resistor, SJA1000 controller
Expansion options	PCI cards (opt.), CX+ personality module

Indicators and Switches

Control	1 x Power Pushbutton (Power management event) 1 x Reset Pushbutton
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Status LEDs	1 x Green LED for power supply status 1 x Yellow LED for SATA activity
User LEDs	4 x User programmable LEDs (2 x red, 2 x green)

System

Housing	galvanized steel sheet, outside painted
Battery	CR 2032, for real time clock
System controller	Temperature sensing and power supply management (accessible via FPGA I2C bus)
FAN controller	Speed control and monitoring for optional fan (accessible via system controller)
Watchdog	Yes, implemented by COM Express module
FPGA	Spartan 6 LX25T, PCI express interface to baseboard IOs

Expansion

PCI Express	1 x PCI Express Mini Card slot Riser cards connector with 2 x PCIe x1 Personality Board with HDA and FPGA IOs
USB	2 x USB2.0, internal connector

Power Requirements

Power Supply	DC power, 9 .. 34 V (lower limit with adjustable UVL)
Inrush Current (max)	2 A [3)]
Power Dissipation	Without external load or expansion cards
	A-E3827: 18 W

External Load Capabilities

+5V (USB)	Max. 0.9 A per USB 3.0 port, max 1500 mA for all ports (depends on total power supply load)

Environmental Specifications

Ambient Temperature	**A-E3827**: 0 .. 50 °C
operating	at sea level, derating of 1 °C per 300 m above sea level to a maximum of 2000 m.
Temperature storage	-40..+85 °C [2)]
Humidity	5%..95% r.H., non condensing
Protection Class	IP20

Physical Dimensions

Size	Including wall mount flanges (WxHxD)	
	0 Slot:	96 x 171 x 230 mm
	2 Slot (2P/2X):	147 x 171 x 230 mm
	4 Slot (4P/4X):	179 x 171 x 230 mm
Weight	**0 Slot**:	2.4 kg
	2 Slot (2P/2X):	2.8 kg
	4 Slot (4P/4X):	TBD

emPC-CX+/**L**/A- E3827

Processing Core

CPU	**A-E3827**: Intel Atom E3827, 2 x 1.75 GHz, 1 MB L2 cache See http://ark.intel.com/ for more details about the CPUs
Chipset	Integrated in SoC
COMexpress Module	Congatec TCA3

Memory

Main Memory	2 GB DDR3L w. 1333 MT/s, up to 8 GB (SO-DIMM)
nvSRAM	N/A

Storage

CFast	1 x with SATA 3 GB/s, externally accessible
HDD/SSD	1 x SATA 3 GB/s, internal 7 pin connector Mounting kit for 1 x 2,5" internal drive available

Video

Controller	Chipset graphics
Memory	Shared with main memory
Interface	Dual Display Interface 1 x DVI-I single link connector on front panel, up to 1920x1200 (analog) or 1920x1200 (digital)

External Interfaces (connector panel)

Video	1 x DVI-I
Ethernet	1 x 10/100/1000 Mbit/s Ethernet (LAN1: Intel i210) 1 x 10/100/1000 Mbit/s Ethernet (LAN2: Intel i210)
USB	1 x USB3.0, 3 x USB 2.0
Serial Port	4 x 9 pin D-Sub, RS232 8 wire, implemented with internal USB to serial converter (FTDI FT4232H)
CAN	N/A
Expansion options	N/A

Indicators and Switches

Control	1 x Power Pushbutton (Power management event) 1 x Reset Pushbutton
Remote Control	1 x Signal input on power connector for pushbutton or run-control function
Status LEDs	1 x Green LED for power supply status 1 x Yellow LED for SATA activity
User LEDs	4 x User programmable LEDs (2 x red, 2 x green)

System

Housing	galvanized steel sheet, outside painted
Battery	CR 2032, for real time clock
System controller	Temperature sensing and power supply management (accessible via COM Express module I2C bus)
FAN controller	N/A
Watchdog	Yes, implemented by COM Express module
FPGA	N/A

Expansion

PCI Express	N/A
USB	2 x USB2.0, internal connector

Power Requirements

Power Supply	DC power, 9 .. 34 V (lower limit with adjustable UVL)
Inrush Current (max)	2 A [3)]

Power Dissipation	Without external load or expansion cards **A-E3827**: 16 W

External Load Capabilities

+5V (USB)	Max. 0.9 A per USB 3.0 port, max 1500 mA for all ports (depends on total power supply load)

Environmental Specifications

Ambient Temperature operating	**A-E3827**: 0 .. 50 °C at sea level, derating of 1 °C per 300 m above sea level to a maximum of 2000 m.
Temperature storage	-40..+85 °C [2)]
Humidity	5%..95% r.H., non condensing
Protection Class	IP20

Physical Dimensions

Size	Including wall mount flanges (WxHxD)	
	0 Slot:	96 x 171 x 230 mm
Weight	**0 Slot**:	2.4 kg

Notes:

1) -

2) Storage at high temperature will decrease battery life time

3) Insteantous Current drawn at minimum input voltage when the system is powered on (e.g. by pressing the power button).
Note: This is not the inrush current that happens when the power supply input is connected directly to a powered power supply. The inrush current is not controlled in this case.
Rise time of external power supply should be limited to below 5 V/ms.

5.2 References

These references direct you to manuals and specifications that you might need to know when you attempt to program the product. Most of the documents can be downloaded from the Internet. Look for the WWW servers of the component/chip manufacturers.

[1]
[2]
[3]

WWW-References

Janz Tec AG	www.janztec.com
Intel Corporation	www.intel.com

5.3 Dimensions

Refer to figure 10 for the housing and mounting hole dimensions.

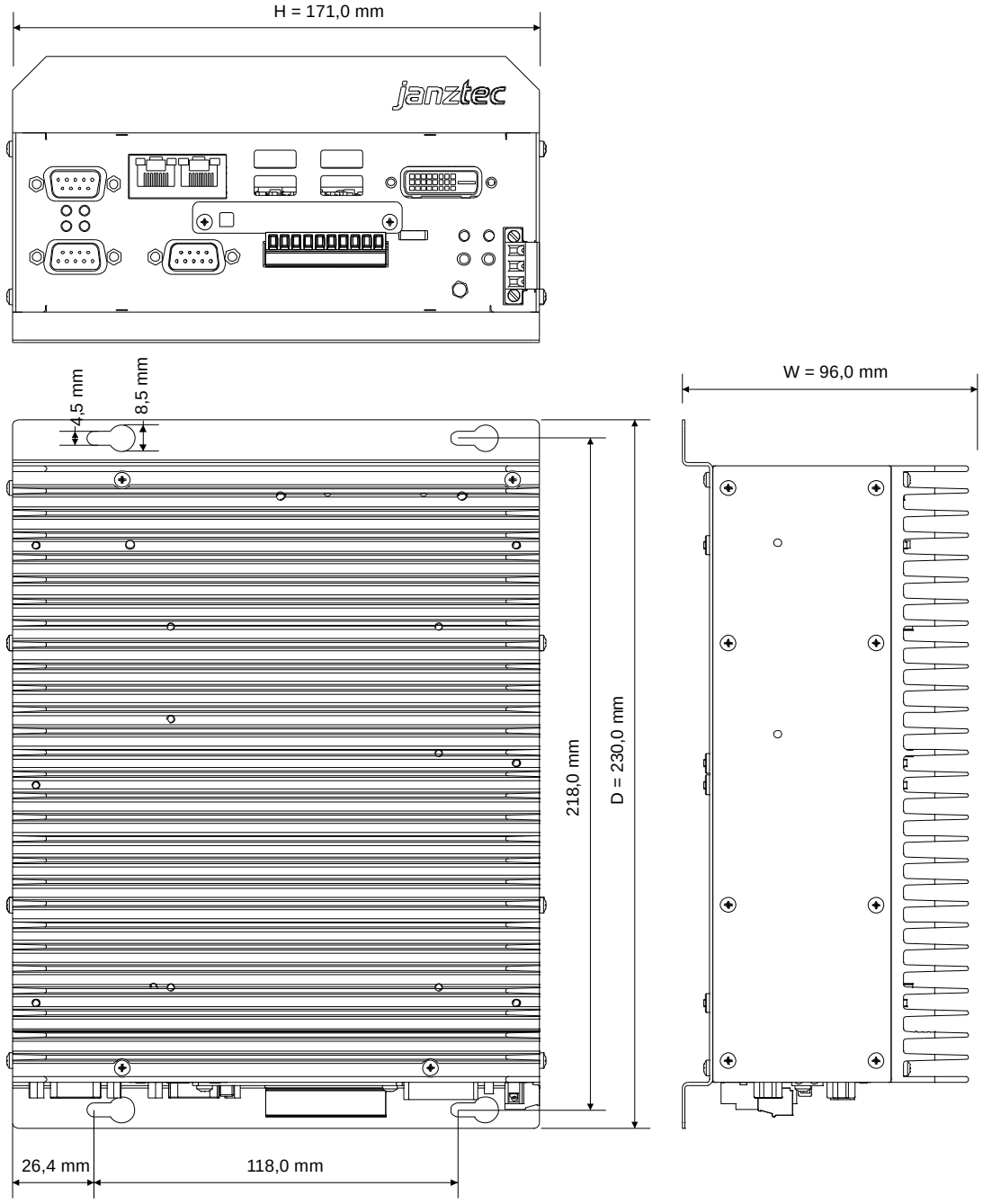

figure 10: housing dimensions (0 slot system shown)

emPC-CX+ Systems with PCI Slots just differ in dimension W

Slot Variant	W
0	96 mm
2P/2X	147 mm
4P/4X	179 mm

5.4 Product History

TBD

5.5 Manual History

Version	Release Date	Name	Changes
V1.0	2014-11-24	As	• Initial release
V1.1	2015-09-23	As	• Filled some TBD with values • Added warning about use of power connector
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