

StackPC – New Standard of Embedded Stackable Systems Design



Embedded modules • Industrial PCs • Systems & Customization

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Overview

The StackPC Specification defines new approach to stackable systems design and development. The specification includes all valuable heritage of PC/104 standards along with the new features of StackPC connector.





Target Applications



10/100/150g Shock



IP67



-50/+90 °C



Salty mist



-40/+85 °C







StackPC Form-Factor

Expansion Connectors A,B

Connector A

PCIe/104 compatible pinout

- BANK1: 4x PCIe x1, 2x USB, SMB
- BANK2,3: 1x PCIe x4, 2x SATA, LPC, 2x GbE, 4x USB, SPI, CAN/RS485/UART

• Connector B

PCI/104 or FPE (Fat Pipe Expansion)

- PCI/104: 32-bit PCI 4 masters
- FPE: PCle 1x16/2x8/2x4, Display Port, 6x USB 3.0 or 61x UserIO

• PC/104, PC/104+wings, EPIC, EBX, 3.5" Adopted







Key competitive distinctions of the StackPC Form-Factor

1. New system approach

• Stack Up Only

- Easy schematic (No signal switches)
- No strict height limitation for CPU
 & Power modules Bottom side
- Interface module as a standard part
- Compatibility with PCIe/104
- Communication interfaces support through the stack connector
- Minimization of wired connections
- System power connector standardization
- New areas of stackable modules application





Key competitive distinctions of the StackPC Form-Factor

2. Ruggedized systems orientation

• Design

-IP20, IP65, IP67 enclosures

-Cost Effective Conduction Cooling

-Interface module as a standard part

-Easy of assembly and maintenance

• Compatibility with PC/104-Express

-CPU module with wings is normal

-BANK1 is fully compatible

- -BANK2,3 has levels of full compatibility
- Communication interfaces support through the stack connector

-Minimization of wired connections





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2. Ruggedized systems orientation

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Key competitive distinctions of the StackPC Form-Factor

- 3. Schematic and Layout simplification
- Lane switches reduction
- PCle x1, x4
- SATA
- USB 2.0, 3.0
- Host module bottom connector reduction
- Hire level of modules compatibility
- Expansion modules are always above the HOST
- HOST bottom side can be used for huge and hot components
- No bottom side components height limitations for Power module
- Host module can use wings without violating cables routing from bottom side stack

• Power module expensive expansion connectors reduction







Key competitive distinctions of the StackPC Form-Factor

4. COM application

• Stack Host as COM-module

- One side Stack
- One side Heatspreader
- COM required interfaces:

4x PCIe x1, 1x PCIe x4, 2x SATA, LPC, 2x GbE, 6x USB, SMB, SPI, CAN/RS485/UART

- PCI: 32-bit PCI 4 masters
- FPE: PCIe 1x16/2x8/2x4, DP, 6x USB 3.0 or 61x UserIO
- Stack Peripheral as COM-expansion
- Easy to design functional carrier board





StackPC Connector Functionality:

4x1 PCle	- 4 root ports, 4 clocks
1x4 PCle	- 1 root port, 1 clock
USB 2.0	- 6 ports
SATA	- 2 ports
Gigabit Ethernet	- 2 ports
LPC	- 1
FBUS	- 2 ports
SPI	- 3 slaves
SMB	- 1
ATX power and control	+5V_SB, PS_ON#, POWERGOOD
Power	+3.3V, +5V, +12V









Top Connector



Bottom Connector





StackPC Conduction Cooling Solution

Benefits

- Regular modules adaptation
- Common rules
- Heat- effective solution
- Low cost







StackPC Conduction Cooling Solution

Host and Power modules:

- One way stack only
- Bottom side for heatspreader
- Bottom side for HOT components
- Mass production modules adaptation
- Cost effective solution







StackPC Conduction Cooling Solution

Expansion modules:

- Regular modules dimensions
- Top side for heatspreader
- Top side for HOT components
- Mass production modules adaptation
- Cost effective solution





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StackPC Conduction Cooling Solution

Stack with Conduction cooling:

- Regular Stack
- Regular modules
- Modules with Conduction Cooling
- Common Heat plates
- Flexibility

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• Easy to manufacture







StackPC Conduction Cooling Solution

Off the shelf application of the Conduction Cooling Modules







StackPC Conduction Cooling Solution

System Example with Conduction Cooling







StackPC Conduction Cooling Solution

System Example with Conduction Cooling





StackPC Conduction Cooling Solution

System Example with Conduction Cooling:

- Regular Stack
- Regular modules
- Modules with Conduction Cooling
- Common Heat plates
- Flexibility
- Easy to manufacture





Fastwel

CPC309+Conduction Cooling



MK300





Thank You!