Development of a multifunctional unit: Blanc4
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Introduction
A beamline experimental station control system at SPring-8 has two types of systems installed.

1. A VMEbus system
- It is developed by the control group.
- It is a main stream that controls the accelerators, the insertion device, the front end, and the transport channel of beamlines.
- It can be used to develop a flexible control system by combining many VME modules.

2. A desktop PC-based system
- It is developed by beamline staffs.
- It is of relatively low cost and suitable for a compact experimental system.
- Beamline staffs have been adapting their control system to the experimental condition.
- The system is not unified in Spring-8, because beamline staffs develop the system on their own way.
- They tend to save the time to develop the application software for a stable operation.

Requirements
We aimed to develop a convenient multifunctional unit instead of a VMEbus system for compact control system.
- It is just 1 U in height and it is a 19-inch rack mount-type.
- High portability, easy setup
- It can develop a flexible control system by combining many modules. It can provide at least 4 cards supporting PCI or PCI Express.
- It has a reliable hardware system, i.e., it has zero spindles. It is low power consumption system.
- It dose not need a dedicated component to connect external equipment.

Blanc4
We developed a multifunctional unit to satisfy our requirements.

Blanc4 was developed in cooperation with ARKUS Inc. (http://www.arkus.co.jp/).

Motion control
In a beamline experimental station control, a motion control is one of the most important controls.

Blanc4 can drive up to 8-axis motors.

Specifications of Blanc4

<table>
<thead>
<tr>
<th>COM Express Module type2</th>
<th>AM 105 Model 110 (PFU Ltd.)</th>
<th>Intel Atom processor Z530 (1.6 GHz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCI Express slot</td>
<td>PCI x 1 lane 2 slots (half size)</td>
<td>Memory : 1 GB</td>
</tr>
<tr>
<td>PCI slot</td>
<td>PCI12 3/66 Mhz 3.3 V 2 slots (half size)</td>
<td></td>
</tr>
<tr>
<td>Interfaces</td>
<td>Analog BGP (1280 x 1024) x 1</td>
<td>Card x 1</td>
</tr>
<tr>
<td></td>
<td>USB 2.0 x 4</td>
<td>USB2.0 x 4</td>
</tr>
<tr>
<td></td>
<td>RS232C x 1</td>
<td>RS232C x 1</td>
</tr>
<tr>
<td>On-board connector</td>
<td>Serial ATA (7 pins) x 2</td>
<td>Parallel ATA (44 pins) x 1</td>
</tr>
<tr>
<td>Size (mm)</td>
<td>413 (W) x 43.65 (H) x 400 (D)</td>
<td>Power supply: 5V, 3V, 12V, 24V</td>
</tr>
<tr>
<td>Power supply</td>
<td>50 W</td>
<td>Total power : 220 W</td>
</tr>
</tbody>
</table>

Blanc4 has 8-axis motor controller and other functions...