SPB 04    SPB 08
Switch Power BUS 4 slots
Switch Power BUS 8 slots

TECHNICAL MANUAL

Mother Boards featuring 4 or 8 BUS ABACO® slots; pitch 5 TE; termination resistors; reset key; dual power supply: stabilized through standard supply connector or through F type connector for SPC XXX power supply cards; holes for rack mounting.
IMPORTANT

Although all the information contained herein have been carefully verified, grifo® assumes no responsibility for errors that might appear in this document, or for damage to things or persons resulting from technical errors, omission and improper use of this manual and of the related software and hardware. grifo® reserves the right to change the contents and form of this document, as well as the features and specification of its products at any time, without prior notice, to obtain always the best product.

For specific informations on the components mounted on the card, please refer to the Data Book of the builder or second sources.

SYMBOLS DESCRIPTION

In the manual could appear the following symbols:

- ! Attention: Generic danger
- ⚡ Attention: High voltage

Trade Marks

GPC®, grifo®: are trade marks of grifo®. Other Product and Company names listed, are trade marks of their respective companies.
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INTRODUCTION

The use of these devices has turned - IN EXCLUSIVE WAY - to specialized personnel.

The purpose of this handbook is to give the necessary information to the cognizant and sure use of the products. They are the result of a continual and systematic elaboration of data and technical tests saved and validated from the manufacturer, related to the inside modes of certainty and quality of the information.

The reported data are destined- IN EXCLUSIVE WAY- to specialized users, that can interact with the devices in safety conditions for the persons, for the machine and for the environment, impersonating an elementary diagnostic of breakdowns and of malfunction conditions by performing simple functional verify operations, in the height respect of the actual safety and health norms.

The informations for the installation, the assemblage, the dismantlement, the handling, the adjustment, the reparation and the contingent accessories, devices etc. installation are destined - and then executable - always and in exclusive way from specialized warned and educated personnel, or directly from the TECHNICAL AUTHORIZED ASSISTANCE, in the height respect of the manufacturer recommendations and the actual safety and health norms.

The devices can't be used outside a box. The user must always insert the cards in a container that respect the actual safety normative. The protection of this container is not threshold to the only atmospheric agents, but specially to mechanic, electric, magnetic, etc. ones.

To be on good terms with the products, is necessary guarantee legibility and conservation of the manual, also for future references. In case of deterioration or more easily for technical updates, consult the AUTHORIZED TECHNICAL ASSISTANCE directly.

To prevent problems during card utilization, it is a good practice to read carefully all the informations of this manual. After this reading, the user can use the general index and the alphabetical index, respectly at the begining and at the end of the manual, to find information in a faster and more easy way.

CARD VERSION

The present manual is reported to the boards SPB 04 version 260595 and later and SPB 08 version 050989 and later.

The validity of the bring informations is subordinate to the number of the card release. The user must always verify the correct correspondence among the two denotations. Version number is printed on the boards in several positions both in serigraph and in printed circuit (for example on SPB 04 between CN2 and CN3 on the solder side and on SPB 08 between CN8 and CN9 on the component side).
GENERAL INFORMATIONS

Back panels **SPB 04** and **SPB 08** have been designed to provide the User support panels for interfacing boards that feature industrial BUS ABACO®. They can be mounted on any 3HE rack and can host 4 or 8 BUS ABACO® boards plus one grifo® power supply board in Eurocard format. This manual contains all the information needed to use Switch Power Bus 4 and 8 slots back panels obtaining the best results and profits.

**SPB 04** and **SPB 08** are the ideal choice for all the applications that must use at most 4 or 8 cards featuring BUS ABACO® plus a supply section, getting a reduction of encumbrances and an optimization of the costs.

Industrial BUS ABACO® allows the immediate connection of Eurocard format boards of the grifo® listing, which includes CPU cards, digital and analog I/O cards, axis control cards, etc.

By taking advantage of **SPB 04** and **SPB 08** mother boards becomes possible to comprise all the electronic devices (including the supply section) in a comfortable 3 HE rack, avoiding the problem to manage several containers and their numerous connections.

Should the **SPB 04** and **SPB 08** be insufficient or exceeding for the application to build, other back panels, belonging to grifo® industrial cards listing, can be used to fulfil the requirements of the User application.

**SPB 04** and **SPB 08** have the following features:

- Pitch 5 TE
- Termination resistors
- Reset key
- Dual power supply:
  - stabilized through standard supply connector
  - through F type connector for SPC XXX power supply cards
- Holes for rack mounting
- Mother Boards featuring 4 or 8 BUS ABACO® slots

Here follows a description of **SPB 04** and **SPB 08** back panels' functional blocks, with an indication of the operations performed by each block. To easily locate these blocks and verify their connections please refer to figures 1 and 5.
FIGURE 1: SPB04 BLOCK DIAGRAM
TECHNICAL FEATURES OF SPB 04

GENERAL FEATURES OF SPB 04

BUS type: ABACO®

On board resources:
- 4 slots for BUS ABACO®
- 1 connector for alternate current to supply SPC XXX cards
- 1 connector for stabilized power supply
- 1 reset key

BUS signals: Provided with termination resistors

Power supply: Provided with disturb suppressor filter

PHYSICAL FEATURES OF SPB 04

Connectors:
- CN1: 48 pins DIN 41612 D+B+Z type F
- CN2: 64 pins DIN 41612 A+C type C
- CN3: 64 pins DIN 41612 A+C type C
- CN4: 64 pins DIN 41612 A+C type C
- CN5: 64 pins DIN 41612 A+C type C
- J1: 4 pins quick release screw terminal connector M
- J2: 4 pins AMP connector

Size: 130x117 mm for 3 HE rack

Slots pitch: 5 TE

Weight: 178 g

Temperature range: from 0 to 70 Centigrad degreeses

Relative humidity: from 20% to 90% (without condense)

ELECTRIC FEATURES SPB 04

Supply voltages:
- Stabilized voltages: +5 Vdc, +12 Vdc, -12 Vdc
- Voltage for SPC XXX: please refer to SPC manual
- Voltage for back up battery: please refer to SPC manual

Current consumption: 0 mA
Figure 2: SPB 04 Components Map
TECHNICAL FEATURES OF SPB 08

GENERAL FEATURES OF SPB 08

BUS type: ABACO®

On board resources:
- 8 slots for BUS ABACO®
- 1 connector for alternate current to supply SPC XXX cards
- 1 connector for stabilized power supply
- 1 reset key

BUS signals: Provided with termination resistors

Power supply: Provided with disturb suppressor filter

PHYSICAL FEATURES OF SPB 08

Connectors:
- CN1: 48 pins DIN 41612 D+B+Z type F
- CN2: 64 pins DIN 41612 A+C type C
- CN3: 64 pins DIN 41612 A+C type C
- CN4: 64 pins DIN 41612 A+C type C
- CN5: 64 pins DIN 41612 A+C type C
- CN6: 64 pins DIN 41612 A+C type C
- CN7: 64 pins DIN 41612 A+C type C
- CN8: 64 pins DIN 41612 A+C type C
- CN9: 64 pins DIN 41612 A+C type C
- J1: 4 pins quick release screw terminal connector M
- J2: 4 pins AMP connector

Size: 130x220 mm for 3 HE rack

Slots pitch: 5 TE

Weight: 305 g

Temperature range: from 0 to 70 Centigrad degreeses

Relative humidity: from 20% to 90% (without condense)

ELECTRIC FEATURES SPB 08

Supply voltages:
- Stabilized voltages: +5 Vdc, +12 Vdc, -12 Vdc
- Voltage for SPC XXX: please refer to SPC manual
- Voltage for back up battery: please refer to SPC manual

Current consumption: 0 mA
FIGURE 3: SPB 08 COMPONENTS MAP
INSTALLATION

In this chapter there are information for a right installation and correct use of mother boards **SPB 04** and **SPB 08**. The User can find the location and functions of each connector and some explanatory diagrams.

CONNECTIONS

The **PB 04** and **SPB 08** mother boards have several connectors that can be linkeded to the other cards of the system or directly to the field, according to system requirements. In this paragraph there are connectors pin outs, a short signals description (including the signals direction) and connectors location (please see figures 7 and 9).

**J1 - SUPPLY BOARD SPC XXX INPUT VOLTAGES CONNECTOR**

J1 is an asymmetric quick release connector featuring 4 lines of pins, where all the signals required by the eventual supply section must be connected. By means of this connector it is possible to supply the whole control system even through a simple alternate current (output of a transformer), and to perform the back up of the system itself through a specific external battery. For further information about the supply cards, please refer to the technical manuals of **SPC XXX** boards.

![Figure 4: J1 - Supply Board SPC XXX Input Voltages Connector](image)

Signals description:

- **+Vbat** = I - Positive input for back up battery
- **GND bat** = - Negative input for back up battery.
- **Vac1** = I - Alternate voltage input
- **Vac2** = I - Alternate voltage input
FIGURE 5: SPB 08 BLOCK DIAGRAM
J2 - STABILIZED SUPPLY VOLTAGES CONNECTOR

J2 is an asymmetric 4 pins AMP connector M, that connects the supply voltages for industrial BUS ABACO®. This connector features a standard pin out for an easy installation, even in case of replacement of the mother board with a model having a greater or lower number of slots. This connector must be used to supply the mother board only when no supply card is connected on J1, otherwise it can be used to supply external devices.

Signals description:

+5 Vdc = I/O - Supply +5 Vdc for BUS ABACO®.
+12 Vdc = I/O - Supply +12 Vdc for BUS ABACO®.
-12 Vdc = I/O - Supply -12 Vdc for BUS ABACO®.
GND = - Ground signal for BUS ABACO®.
Figure 7: SPB 04 Connectors and Reset Key Location
## CN1 - SUPPLY BOARD SPC XXX CONNECTOR

<table>
<thead>
<tr>
<th>N. PIN</th>
<th>Fila d</th>
<th>Fila b</th>
<th>Fila z</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>+Vbat</td>
<td>+Vbat</td>
<td>+Vbat</td>
</tr>
<tr>
<td>4</td>
<td>Vac1</td>
<td>Vac1</td>
<td>Vac1</td>
</tr>
<tr>
<td>6</td>
<td>Vac1</td>
<td>Vac1</td>
<td>Vac1</td>
</tr>
<tr>
<td>8</td>
<td>Vac2</td>
<td>Vac2</td>
<td>Vac2</td>
</tr>
<tr>
<td>10</td>
<td>Vac2</td>
<td>Vac2</td>
<td>Vac2</td>
</tr>
<tr>
<td>12</td>
<td>VOUT-Var</td>
<td>SYNC</td>
<td>/RESET</td>
</tr>
<tr>
<td>14</td>
<td>P</td>
<td>OSC</td>
<td>INH</td>
</tr>
<tr>
<td>16</td>
<td>+5Vdc</td>
<td>+5Vdc</td>
<td>+5Vdc</td>
</tr>
<tr>
<td>18</td>
<td>REF +5Vdc</td>
<td>C.L.</td>
<td>REF GND</td>
</tr>
<tr>
<td>20</td>
<td>GND +5Vdc</td>
<td>GND +5Vdc</td>
<td>GND +5Vdc</td>
</tr>
<tr>
<td>22</td>
<td>GND bat</td>
<td>GND bat</td>
<td>GND bat</td>
</tr>
<tr>
<td>24</td>
<td>+12Vdc</td>
<td>+12Vdc</td>
<td>+12Vdc</td>
</tr>
<tr>
<td>26</td>
<td>REF GND</td>
<td>N.C.</td>
<td>REF +12Vdc</td>
</tr>
<tr>
<td>28</td>
<td>GND +12Vdc</td>
<td>GND +12Vdc</td>
<td>GND +12Vdc</td>
</tr>
<tr>
<td>30</td>
<td>GND +12Vdc</td>
<td>GND +12Vdc</td>
<td>GND +12Vdc</td>
</tr>
<tr>
<td>32</td>
<td>GND -12Vdc</td>
<td>N.C.</td>
<td>-12Vdc</td>
</tr>
</tbody>
</table>

**Figure 8: CN1 - Supply board SPC XXX connector**

Signals description:

+Vbat = I - Positive input for back up battery  
Vac1 = I - Input for alternate current  
Vac2 = I - Input for alternate current  
VOUT-Var = O- Voltage signal for supply cards capable to give tensions different from standard tension values (SPC 03 VB and SPC 03 VT)  
SYNC = I - Synchronization signal  
/RESET = O- Power failure signal for system reset  
P = I - Output voltage regulation signal  
OSC = O- Power supply internal oscillator signal  
INH = I - TTL level inhibition signal  
+5Vdc = O- +5Vdc power supply  
C.L. = I - Current limitation signal  
REF+5Vdc = I - Reference signal for +5Vdc supply  
REF GND = I - Reference signal for ground  
GND +5Vdc = O- +5Vdc power supply ground  
GND bat = O- Negative input for back up battery  
+12 Vdc = O- +12 Vdc power supply  
GND +12Vdc = O- +12 Vdc power supply ground  
REF +12Vdc = I - Reference signal for +12Vdc supply  
-12 Vdc = O- -12Vdc power supply  
GND -12 Vdc = O- -12Vdc power supply ground  
N.C. = - Not connected
FIGURE 9: SPB 08 CONNECTORS AND RESET KEY LOCATION
CN2, CN3, CN4, CN5, CN6, CN7, CN8, CN9 - BUS ABACO® CONNECTORS

CN2, CN3, CN4, CN5, CN6, CN7, CN8, CN9 are 64 pins DIN 41612 A+C type C female connectors, to interface with the industrial BUS ABACO®.

Here follows the standard 8 bits and 16 bits BUS ABACO® pin-out.

Please remark that all the signals here described are TTL, except for the power supplies.

<table>
<thead>
<tr>
<th>A 16 bit BUS</th>
<th>A 8 bit BUS</th>
<th>PIN</th>
<th>C 8 bit BUS</th>
<th>C 16 bit BUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>GND</td>
<td>GND</td>
<td>1</td>
<td>GND</td>
<td>GND</td>
</tr>
<tr>
<td>+5 Vdc</td>
<td>+5 Vdc</td>
<td>2</td>
<td>+5 Vdc</td>
<td>+5 Vdc</td>
</tr>
<tr>
<td>D0</td>
<td>D0</td>
<td>3</td>
<td>N. C.</td>
<td>D8</td>
</tr>
<tr>
<td>D1</td>
<td>D1</td>
<td>4</td>
<td>N. C.</td>
<td>D9</td>
</tr>
<tr>
<td>D2</td>
<td>D2</td>
<td>5</td>
<td>N. C.</td>
<td>D10</td>
</tr>
<tr>
<td>D3</td>
<td>D3</td>
<td>6</td>
<td>/INT</td>
<td>/INT</td>
</tr>
<tr>
<td>D4</td>
<td>D4</td>
<td>7</td>
<td>/NMI</td>
<td>/NMI</td>
</tr>
<tr>
<td>D5</td>
<td>D5</td>
<td>8</td>
<td>/HALT</td>
<td>D11</td>
</tr>
<tr>
<td>D6</td>
<td>D6</td>
<td>9</td>
<td>/MREQ</td>
<td>/MREQ</td>
</tr>
<tr>
<td>D7</td>
<td>D7</td>
<td>10</td>
<td>/IORQ</td>
<td>/IORQ</td>
</tr>
<tr>
<td>A0</td>
<td>A0</td>
<td>11</td>
<td>/RD</td>
<td>/RDLDS</td>
</tr>
<tr>
<td>A1</td>
<td>A1</td>
<td>12</td>
<td>/WR</td>
<td>/WRLDS</td>
</tr>
<tr>
<td>A2</td>
<td>A2</td>
<td>13</td>
<td>/BUSAK</td>
<td>D12</td>
</tr>
<tr>
<td>A3</td>
<td>A3</td>
<td>14</td>
<td>/WAIT</td>
<td>/WAIT</td>
</tr>
<tr>
<td>A4</td>
<td>A4</td>
<td>15</td>
<td>/BUSRQ</td>
<td>D13</td>
</tr>
<tr>
<td>A5</td>
<td>A5</td>
<td>16</td>
<td>/RESET</td>
<td>/RESET</td>
</tr>
<tr>
<td>A6</td>
<td>A6</td>
<td>17</td>
<td>/M1</td>
<td>/IACK</td>
</tr>
<tr>
<td>A7</td>
<td>A7</td>
<td>18</td>
<td>/RFSH</td>
<td>D14</td>
</tr>
<tr>
<td>A8</td>
<td>A8</td>
<td>19</td>
<td>/MEMDIS</td>
<td>/MEMDIS</td>
</tr>
<tr>
<td>A9</td>
<td>A9</td>
<td>20</td>
<td>VDUSEL</td>
<td>A22</td>
</tr>
<tr>
<td>A10</td>
<td>A10</td>
<td>21</td>
<td>/IEI</td>
<td>D15</td>
</tr>
<tr>
<td>A11</td>
<td>A11</td>
<td>22</td>
<td>N. C.</td>
<td>N. C.</td>
</tr>
<tr>
<td>A12</td>
<td>A12</td>
<td>23</td>
<td>CLK</td>
<td>CLK</td>
</tr>
<tr>
<td>A13</td>
<td>A13</td>
<td>24</td>
<td>N. C.</td>
<td>/RDUDS</td>
</tr>
<tr>
<td>A14</td>
<td>A14</td>
<td>25</td>
<td>N. C.</td>
<td>/WRUDS</td>
</tr>
<tr>
<td>A15</td>
<td>A15</td>
<td>26</td>
<td>N. C.</td>
<td>A21</td>
</tr>
<tr>
<td>A16</td>
<td>N. C.</td>
<td>27</td>
<td>N. C.</td>
<td>A20</td>
</tr>
<tr>
<td>A17</td>
<td>N. C.</td>
<td>28</td>
<td>N. C.</td>
<td>A19</td>
</tr>
<tr>
<td>A18</td>
<td>N. C.</td>
<td>29</td>
<td>/R.T.</td>
<td>/R.T.</td>
</tr>
<tr>
<td>+12 Vdc</td>
<td>+12 Vdc</td>
<td>30</td>
<td>-12 Vdc</td>
<td>-12 Vdc</td>
</tr>
<tr>
<td>+5 Vdc</td>
<td>+5 Vdc</td>
<td>31</td>
<td>+5 Vdc</td>
<td>+5 Vdc</td>
</tr>
<tr>
<td>GND</td>
<td>GND</td>
<td>32</td>
<td>GND</td>
<td>GND</td>
</tr>
</tbody>
</table>

**Figure 10: CN2,CN3,CN4,CN5,CN6,CN7,CN8,CN9 - BUS ABACO® Connectors**
Signals description:

8 bits CPU

<table>
<thead>
<tr>
<th>Signal</th>
<th>Direction</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A0-A15</td>
<td>O</td>
<td>Address BUS</td>
</tr>
<tr>
<td>D0-D7</td>
<td>I/O</td>
<td>Data BUS</td>
</tr>
<tr>
<td>INT</td>
<td>I</td>
<td>Interrupt request</td>
</tr>
<tr>
<td>NMI</td>
<td>I</td>
<td>Non Maskable Interrupt</td>
</tr>
<tr>
<td>HALT</td>
<td>O</td>
<td>Halt state</td>
</tr>
<tr>
<td>MREQ</td>
<td>O</td>
<td>Memory Request</td>
</tr>
<tr>
<td>IORQ</td>
<td>O</td>
<td>Input Output Request</td>
</tr>
<tr>
<td>RD</td>
<td>O</td>
<td>Read cycle status</td>
</tr>
<tr>
<td>WR</td>
<td>O</td>
<td>Write cycle status</td>
</tr>
<tr>
<td>BUSAK</td>
<td>O</td>
<td>BUS Acknowledge</td>
</tr>
<tr>
<td>WAIT</td>
<td>I</td>
<td>Wait</td>
</tr>
<tr>
<td>BUSRQ</td>
<td>I</td>
<td>BUS Request</td>
</tr>
<tr>
<td>RESET</td>
<td>O</td>
<td>Reset</td>
</tr>
<tr>
<td>M1</td>
<td>O</td>
<td>Machine cycle one</td>
</tr>
<tr>
<td>RFSH</td>
<td>O</td>
<td>Refresh for dynamic RAM</td>
</tr>
<tr>
<td>MEMDIS</td>
<td>I</td>
<td>Memory Display</td>
</tr>
<tr>
<td>VDUSEL</td>
<td>O</td>
<td>VDU Selection</td>
</tr>
<tr>
<td>IEI</td>
<td>I</td>
<td>Interrupt Enable Input</td>
</tr>
<tr>
<td>CLK</td>
<td>O</td>
<td>System clock</td>
</tr>
<tr>
<td>R.B.</td>
<td>I</td>
<td>Reset button</td>
</tr>
<tr>
<td>+5 Vdc</td>
<td>I</td>
<td>Power supply at +5 Vdc</td>
</tr>
<tr>
<td>+12 Vdc</td>
<td>I</td>
<td>Power supply at +12 Vdc</td>
</tr>
<tr>
<td>-12 Vdc</td>
<td>I</td>
<td>Power supply at -12 Vdc</td>
</tr>
<tr>
<td>GND</td>
<td></td>
<td>Ground signal</td>
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16 bits CPU

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<th>Direction</th>
<th>Description</th>
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<tr>
<td>A16-A22</td>
<td>O</td>
<td>Address BUS</td>
</tr>
<tr>
<td>D8-D15</td>
<td>I/O</td>
<td>Data BUS</td>
</tr>
<tr>
<td>RD UDS</td>
<td>O</td>
<td>Read Upper Data Strobe</td>
</tr>
<tr>
<td>WR UDS</td>
<td>O</td>
<td>Write Upper Data Strobe</td>
</tr>
<tr>
<td>IACK</td>
<td>O</td>
<td>Interrupt Acknowledge</td>
</tr>
<tr>
<td>RD LDS</td>
<td>O</td>
<td>Read Lower Data Strobe</td>
</tr>
<tr>
<td>WR LDS</td>
<td>O</td>
<td>Write Lower Data Strobe</td>
</tr>
</tbody>
</table>

N.B.
Directionality indications as above stated are referred to a master (CPU or GPC®) board and have been kept untouched to avoid ambiguity in case of multi-boards systems.
RESET KEY

SPB 04 and SPB 08 mother boards are provided with a reset key whose purpose is to activate the signal R. T. of industrial BUS ABACO®. By means of this feature the User can easily reset the whole system installed on the modules, without any need to use an external tool. To easily locate the reset key please refer to figures 7 and 9.

TERMINATION RESISTORS

A very important feature of SPB 04 and SPB 08 mother boards is that all the signals of BUS ABACO® are provided with a termination resistor. This feature minimizes the eventual effects due to signals that otherwise would remain floating and in the meantime it warrants the functionality and the perfect interfacing to all the grifo® industrial boards listing. Thanks to the termination resistors in fact, also boards provided with CMOS BUS interfaces can be connected, obtaining an overall reduction of the power consumption for the application system.

POWER SUPPLY

To simplify as much as possible the supply of the User application system, SPB 04 and SPB 08 mother boards accept two different power sources:

- Stabilized power supply

Connector J2 can be used to provide through an external power supply the supply voltages to the BUS ABACO® connector signals; such voltages are +12 Vdc, -12 Vdc and +5 Vdc. The User must verify that the external supply can deliver enough power to fulfil the need of all the cards in the system. When a power source is connected to connector J2 no card must be installed in connector CN1 in order to avoid electric conflicts.

- SPC XXX supply cards

Connector CN1 allows to install an SPC XXX supply cards. This kind of grifo® cards is a powerful switching supply in format Eurocard, such format gives the comfortable advantage to be able to mount the supply cards in 3 HE racks and so also on these mother boards. There are several models that deliver different combinations of voltages and maximum power to fulfil all the possible needs, starting from an external supply provided through connector J1. It is also possible to fetch the stabilized voltages generated by supply cards from connector J2 to supply external loads, in this case please refer to the technical documentation of SPC XXX cards to determine the maximum power that can be fetched.
FIGURE 11: SPB 04 AND SPB 08 CARDS PHOTO
EXTERNAL CARDS

SPB 04 and SPB 08 boards can interface to most of grifo® industrial boards. Their main purpose is to perform a digital Input/Output interfacement between CPU (GPC®) cards and the external world. Here is reported an illustrative list of cards capable to interact with SPB 04 and SPB 08 boards with a short description of their features; for further informations please request the specific documentation.

SPC 03-xx
Switch Power Card xx version
Switching power suppliers able to generate voltage from -12 to +40 Vdc and current up to 4A. Input from 12 to 26 Vac; battery backed; power good; front panel; ABACO® standard connector.

SPC 03.5S
Switch Power Card +5 Vdc
Europe format switching power supply capable to provide +5 Vdc to a load of 4 A; input voltage 12÷24 Vac; power-failure; connector for back-up battery; standard connector for mother board SPB 0x.

SPC 512
Switch Power Card +5 Vdc +12 Vdc
Europe format switching power supply capable to provide +5 Vdc 5A and +12 Vdc 2.5 A; input voltage 12÷24 Vac; power-failure; connector for back-up battery; standard connector for mother board SPB 0x.

JMS 34
Jumbo Multifunction Support for Axis control
Generic peripheral axis control card. 3 optocoupled acquisition channels, with 16 bits bidirectional counter, for incremental encoder. 4 12bits ±10Vdc D/A channels. 8 Opto-in; 8 NPN Opto-output 40Vdc 500 mA. All I/O lines displayed with LEDs.

GPC® 51
General Purpose Controller fam. 51
Microprocessor family 51 INTEL including the masked BASIC chip; the board features: 16 I/O TTL lines; dip switch; 3 timer/counter; RS 232; 4 A/D converter signals resolution 11 bit; buzzer; on board EPROM programmer; RTC and 32K SRAM with Lithium battery back up; controller for display and keyboard.

GPC® 15A
General Purpose Controller 84C15
Full CMOS card, 10÷20 MHz 84C15 CPU; 512K EPROM or FLASH; 128K RAM; 8K RAM and RTC backed; 8K serial EEPROM; 1 RS 232 line; 1 RS 232 line or RS 422-485 or Current Loop line; 32 or 40 TTL I/O lines; CTC; Watch dog; 2 Dip switches; Buzzer.
GPC® 188F
General Purpose Controller 80C188

80C188 µP 20MHz; 1 RS 232 line; 1 RS 232, RS 422-485 or Current Loop line; 24 TTL I/O lines; 1M EPROM or 512K FLASH; 1M RAM Lithium battery backed; 8K serial EEPROM; RTC; Watch Dog; 8 Dip switch; 3 Timer Counter; 8 13 bit A/D lines; Power failure; activity LEDs; single power supply +5Vdc.

GPC® 150
General Purpose Controller 84C15

Microprocessor Z80 at 16 MHz; implementation completely CMOS; 512K EPROM or FLASH; 512K SRAM; RTC; Back-Up through external Lithium battery; 4M serial FLASH; 1 serial line RS 232 plus 1 RS 232 or RS 422-485 or current loop; 40 I/O TTL; 2 timer/counter; 2 watch dog; dip switch; EEPROM; A/D converter with resolution 12 bit; activity LED.

LAD 12
Low cost Analog to Digital conv. 12 bits
Dual slope 16 lines A/D converter; 12 bit + sign conversion; 12.5 conversions per second rate; range ±2,048 Vdc or 0÷20 mA; automatic running mode; 1 LED, 2 TTL input lines; 8 bit Bus; front panel.

LAD 15
Low cost Analog to Digital conv. 15 bits
Dual slope 16 lines A/D converter; 15 bit + sign conversion; 2.5 conversions per second rate; range ±3,2768 Vdc or 0÷20 mA; automatic running mode; 2 LEDs; 2 TTL input lines; 8 bit Bus; front panel.

LAD 415
4 Low cost Analog to Digital conv. 15 bits
4 independent A/D converter; 15 bit + sign conversion; 40 conversions per second rate; range ±3,2768, ±5, ±10 Vdc; 4÷20 mA; automatic running mode; 2 LEDs; 2 TTL input lines; 8 bit Bus.

DAC 16
Digital to Analog Converter 16 bits
2 Digital to Analog converter, 16 bits galvanically insulated; programmed data displayed; ±10 Vdc output; gain and offset setting; 8 bit Bus; standard addressing.
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