SPB 15

Switch Power BUS 15 slots

TECHNICAL MANUAL

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ITALIAN TECHNOLOGY

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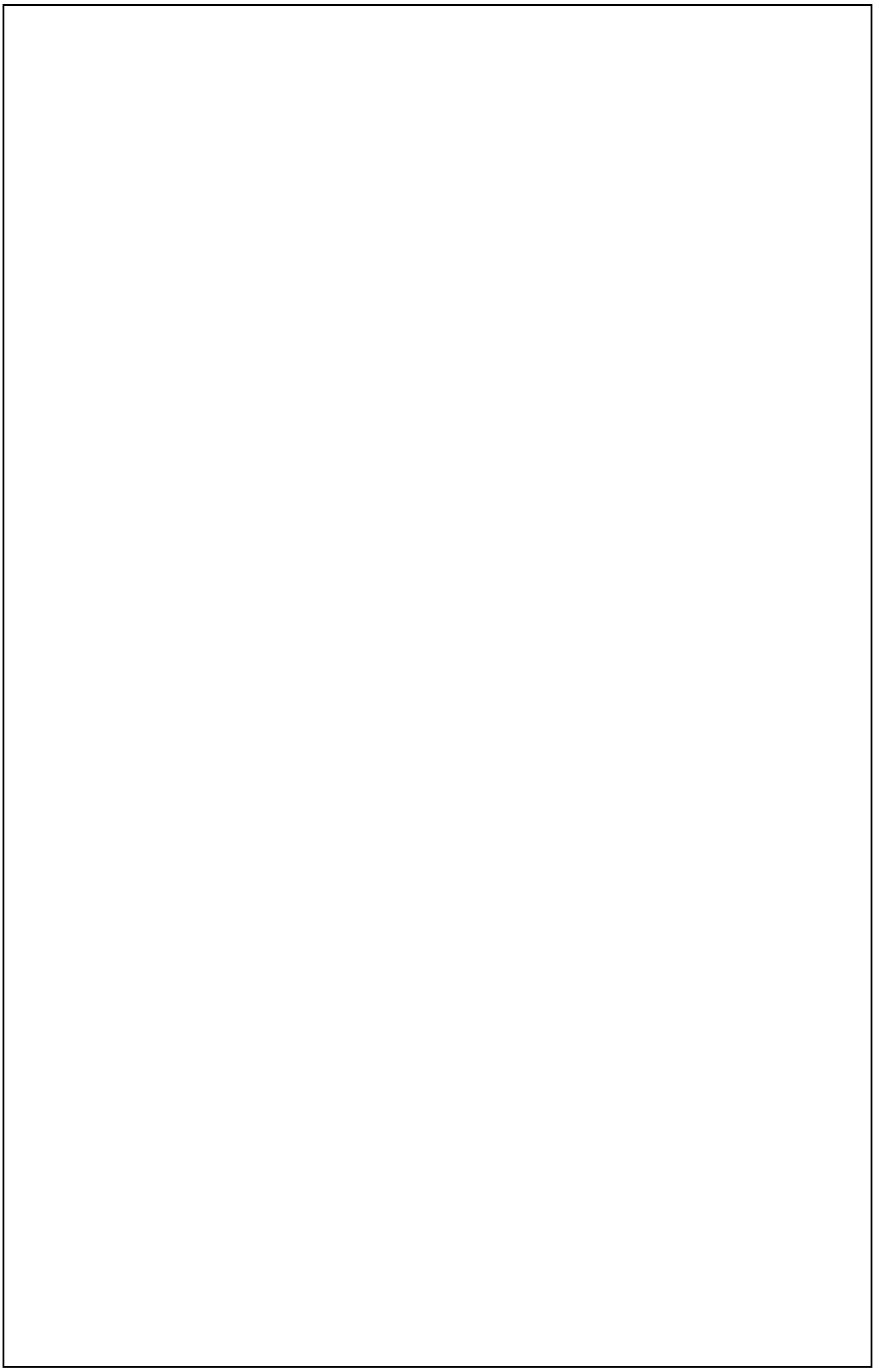

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Switch Power BUS 15 slots

TECHNICAL MANUAL

Mother Boards with 15 slots of BUS industrial **ABACO®**; pitch of slots 5 TE; sta dard power supply connector; termination resistors; connector type F for power supply card **SPC XX**; fholes for rack mounting; holing pitch 3 TE.

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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

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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 enviroment, 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 rispect 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 handbook is reported to the **SPB 15** card release **121002** 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. On the card the release number is present in more points both board printed diagram (serigraph) and printed circuit (for example near **ABACO®** connector CN2, CN3 and CN4 on both sides).

GENERAL INFORMATION

Back panel **SPB 15** has been designed to provide the user support panels for interfacing boards that feature industrial BUS **ABACO®**. It can be mounted on any 3HE rack and can host 15 BUS **ABACO®** boards plus one **grifo®** power supply board in Eurocard format.
This manual contains all the information needed to use **S**witch **P**ower **B**us 15 slots back panels obtaining the best results and profits.
SPB 15 are the ideal choice for all the applications that must use at most 15 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 fomat boards of the **grifo®** listing, which includes CPU cards, digital and analog I/O cards, axis control cards, etc.
By taking advantage of **SPB 15** 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 numberous connections.
Should the **SPB 15** be insufficent or exceding 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 15 have the following features:

- **Pitch of slots** 5 TE
- Termination **resistors**
- **Reset** key
- **Dual** power **supply**:
  stabilized through standad supply connector
  through F type connector for **SPC XXX** power supply cards
- Holes for **rack mounting pitch 3 HE**
- Mother Board featuring 15 BUS **ABACO®** slots

Here follows a description of **SPB 15** back panel's functional blocks, with an indication of the operations performed by each block. To easily locate these blocks and verify their connections pleare refer to figure 1.

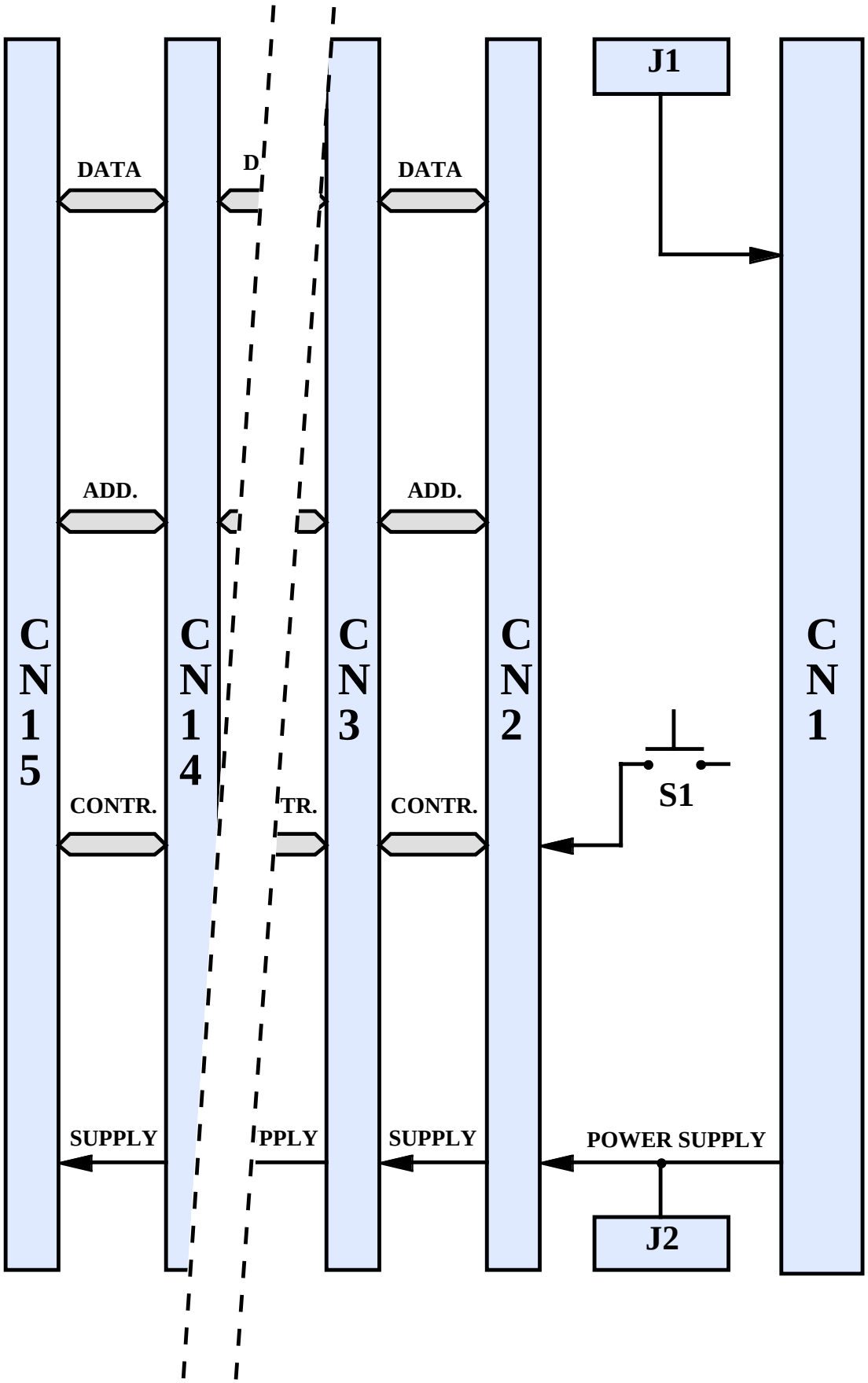

FIGURE 1: SPB 15 BLOCK DIAGRAM

TECHNICAL FEATURES

GENERAL FEATURES

BUS type: **ABACO®**

On board resources:
15 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

Connectors:
JD+JB+JZ: 48 pins DIN 41612 D+B+Z type F
CN1÷15: 64 pins DIN 41612 A+C type C
J1: 4 pins quick release screw terminal connector M
J2: 4 pins AMP connector

Size: 396x117 mm for 3 HE rack

Slots pitch: 5 TE

Weight: 512 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

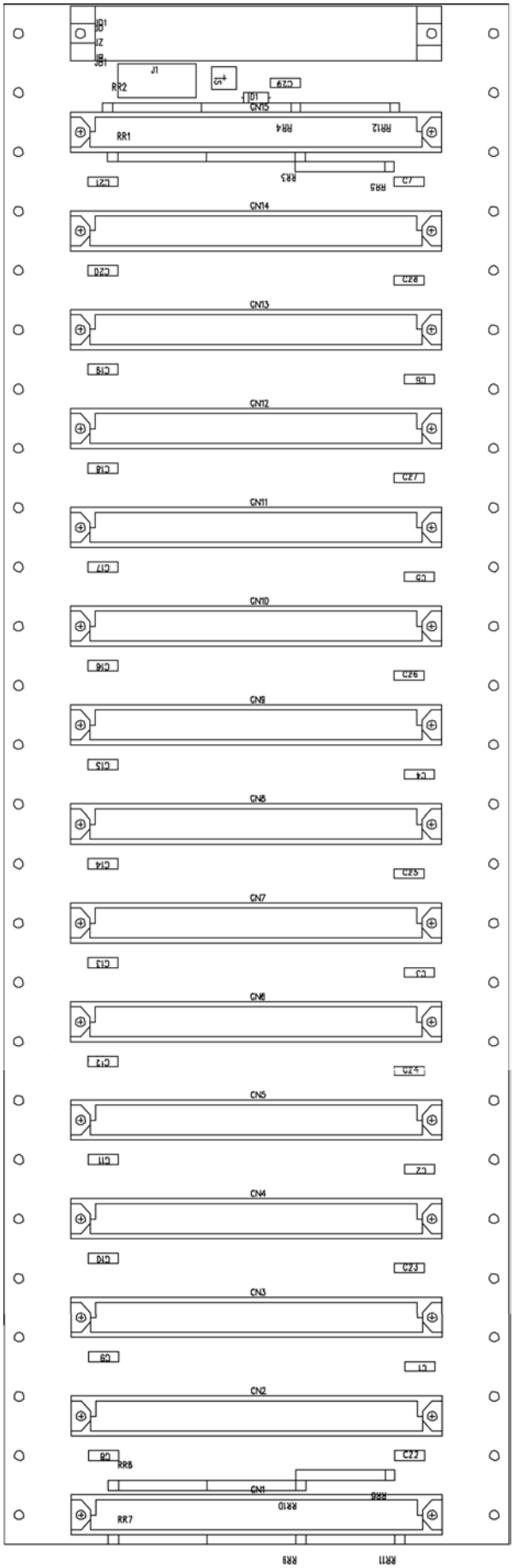

FIGURE 2: COMPONENTS MAP

INSTALLATION

In this chapter there are information for a right installation and correct use of mother board **SPB 15**. The User can find the location and functions of each connector and some explanatory diagrams.

CONNECTIONS

The **SPB 15** mother board has 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 figure 4).

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.

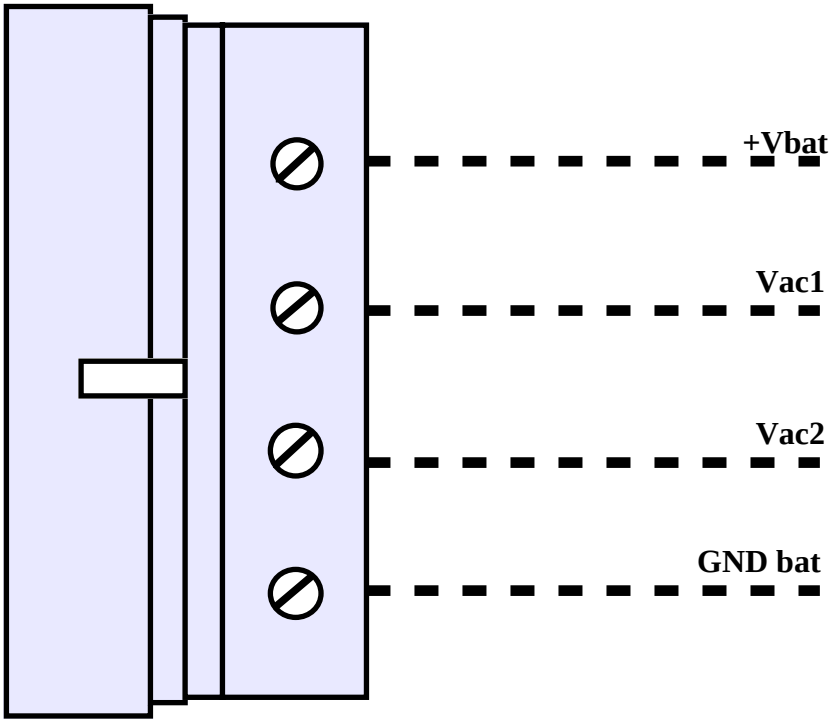

FIGURE 3: J1 - SUPPLY BOARD SPC XXX INPUT VOLTAGES CONNECTOR

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

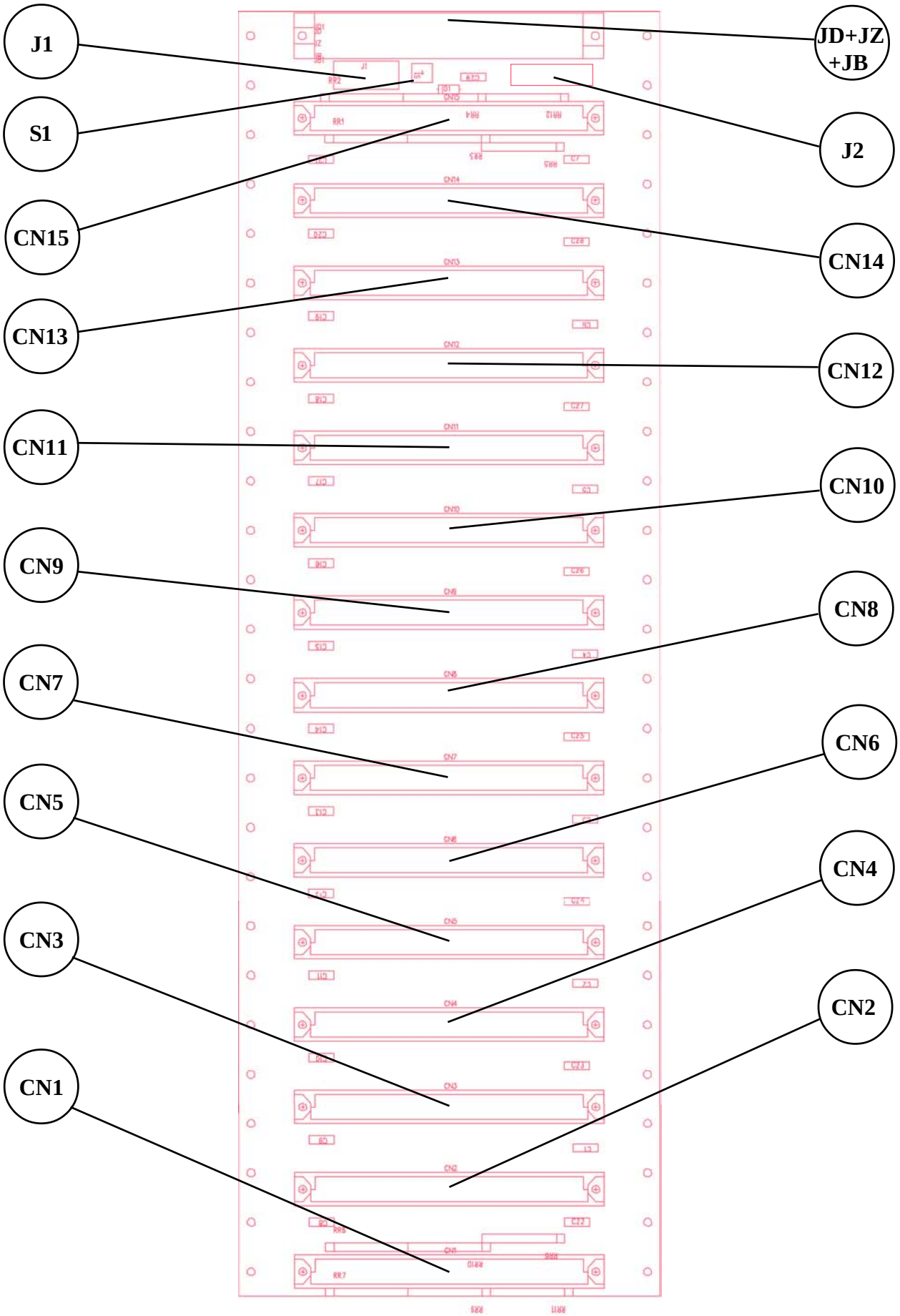

FIGURA 4: CONNECTORS, ETC. LOCATION

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.
Female connector for J2 can be self-made or ordered from **grifo®** using codes **CS4 POWER** (set of plug 4 pins) and **CSP Pins** (set of contacts to crimp and insert in plugs) or purchased directly from AMP catalogue, please refer to P/N: 350779-1 (plug connector AMP MATE N LOK 4 pins) and 350536-1 (contacts socket to crimp).

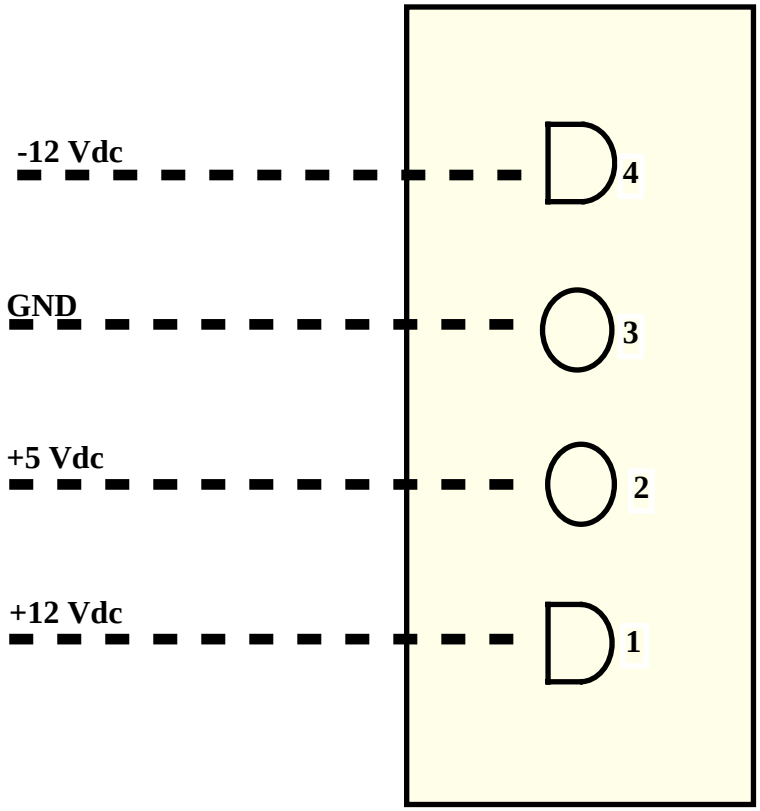

FIGURE 5: J2 - STABILIZED SUPPLY VOLTAGES CONNECTOR

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®**.

Supply section of **SPB 15** is provided with filters against external disturbs and noise.
These filters are made with capacitors that must be charged at power on, producing and overload.
External power supply will have to be able to erogate this current overload.

JD+JB+JZ - SUPPLY BOARD SPC XXX CONNECTOR

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

FIGURE 6: JD+JB+JZ - 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 regolation 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- -12CVdc power supply
GND -12 Vdc = O- -12Vdc power supply ground
N.C. = - Not connected

CN1÷15 - BUS ABACO® CONNECTORS

CN1÷15 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.

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

FIGURE 7: CN1÷15 - BUS ABACO® CONNECTORS

Signals description:

8 bits CPU

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

16 bits CPU

A16-A22	=	O	- Address BUS
D8-D15	=	I/O	- Data BUS
RD UDS	=	O	- Read Upper Data Strobe
WR UDS	=	O	- Write Upper Data Strobe
IACK	=	O	- Interrupt Acknowledge
RD LDS	=	O	- Read Lower Data Strobe
WR LDS	=	O	- Write Lower Data Strobe

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 15 mother board is 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 figure 4.

TERMINATION RESISTORS

A very important feature of **SPB 15** mother board 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 funcionality 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 15** mother board 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 conficts.

- *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.

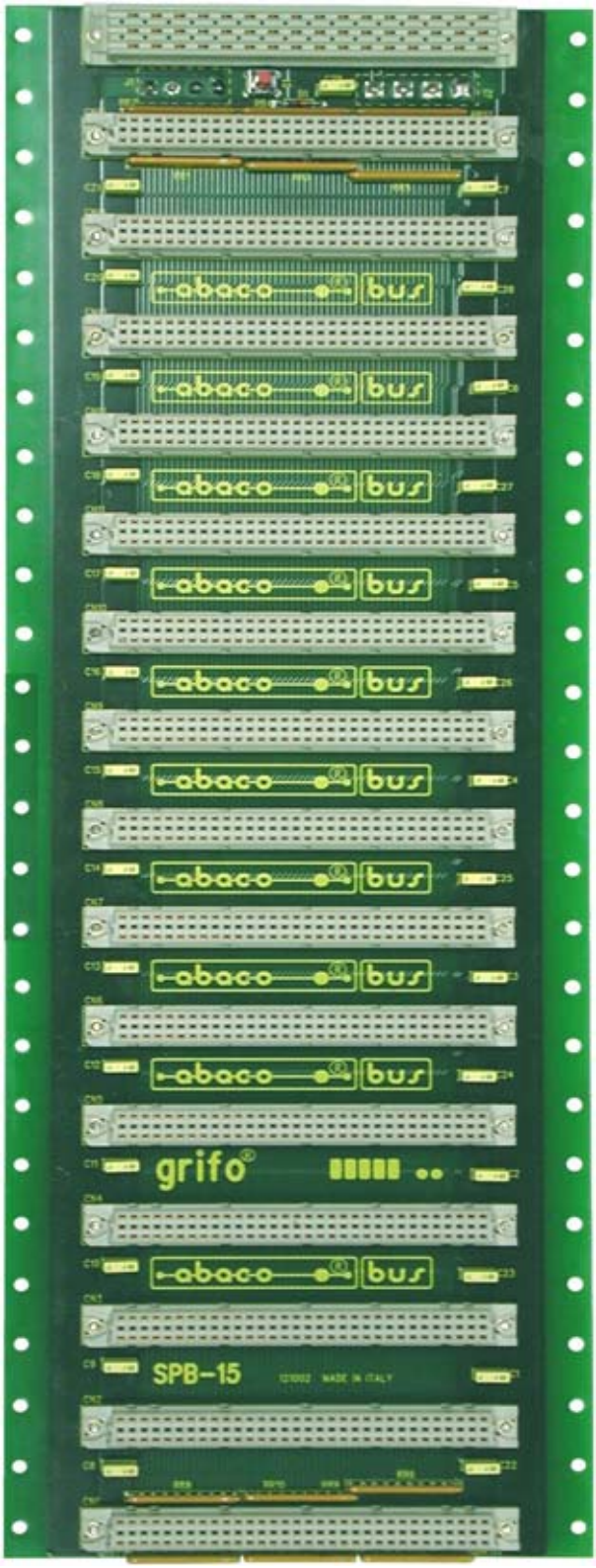

FIGURE 8: CARD PHOTO

EXTERNAL CARDS

SPB 04 and **SPB 08** boards can interface to most of **grifo®** industrial boards. Their main purpose is to perform a digital Inpu/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; controlloer 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.

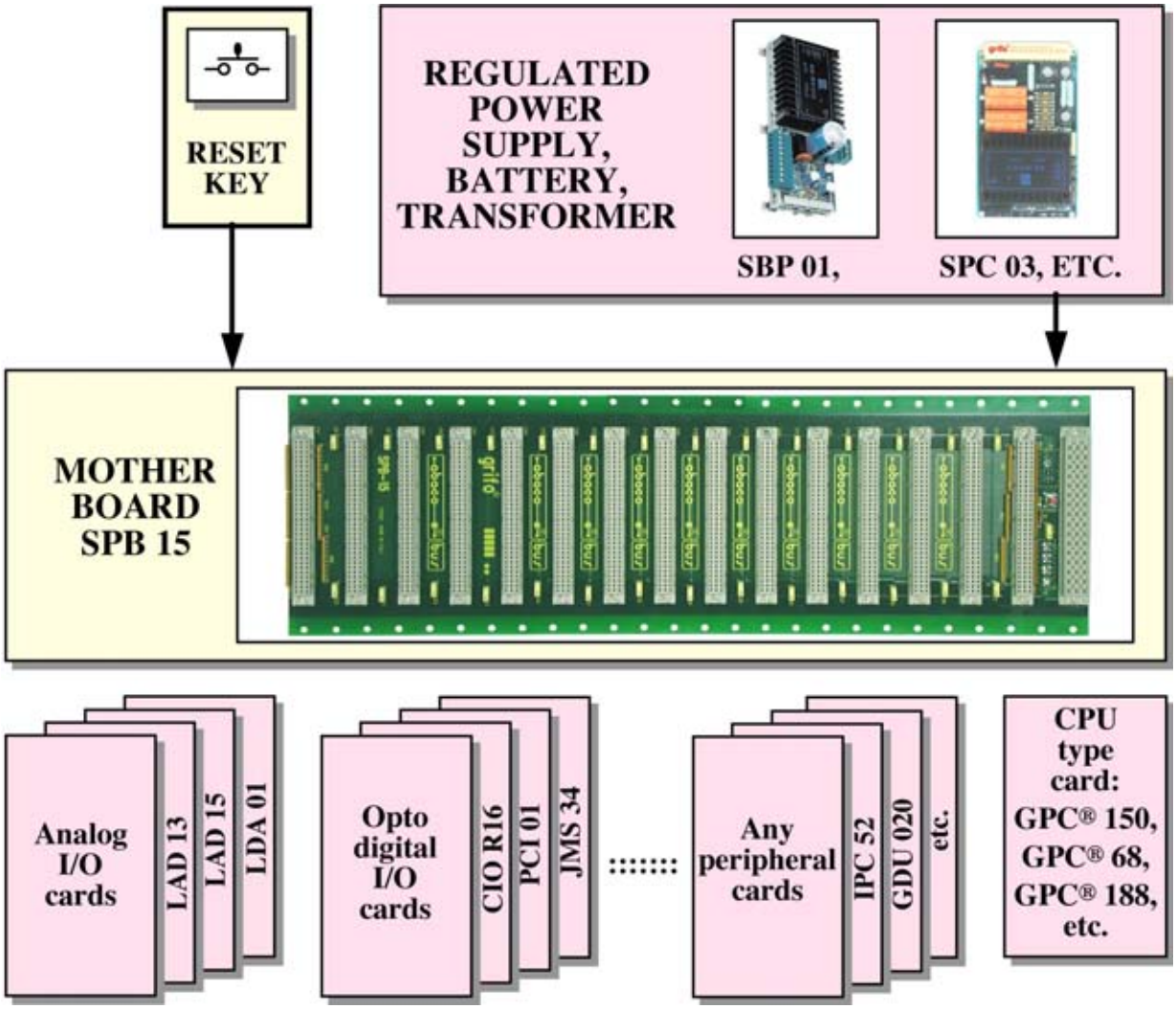

FIGURE 9: CONNECTIONS EXAMPLE

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 serail 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 indipendent 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.

APPENDIX A: ALPHABETICAL INDEX

SYMBOLS

+12 VDC **8**
+5 VDC **8**
-12 VDC **8**

A

AMP **8**

B

BATTERY **6**, **9**
BUS **4**
BUS ABACO® **4**, **10**

C

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