

# MB4 01 MB8 01

Mother Board ABACO® 4 slot

Mother Board ABACO® 8 slot

## TECHNICAL MANUAL



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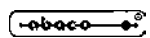
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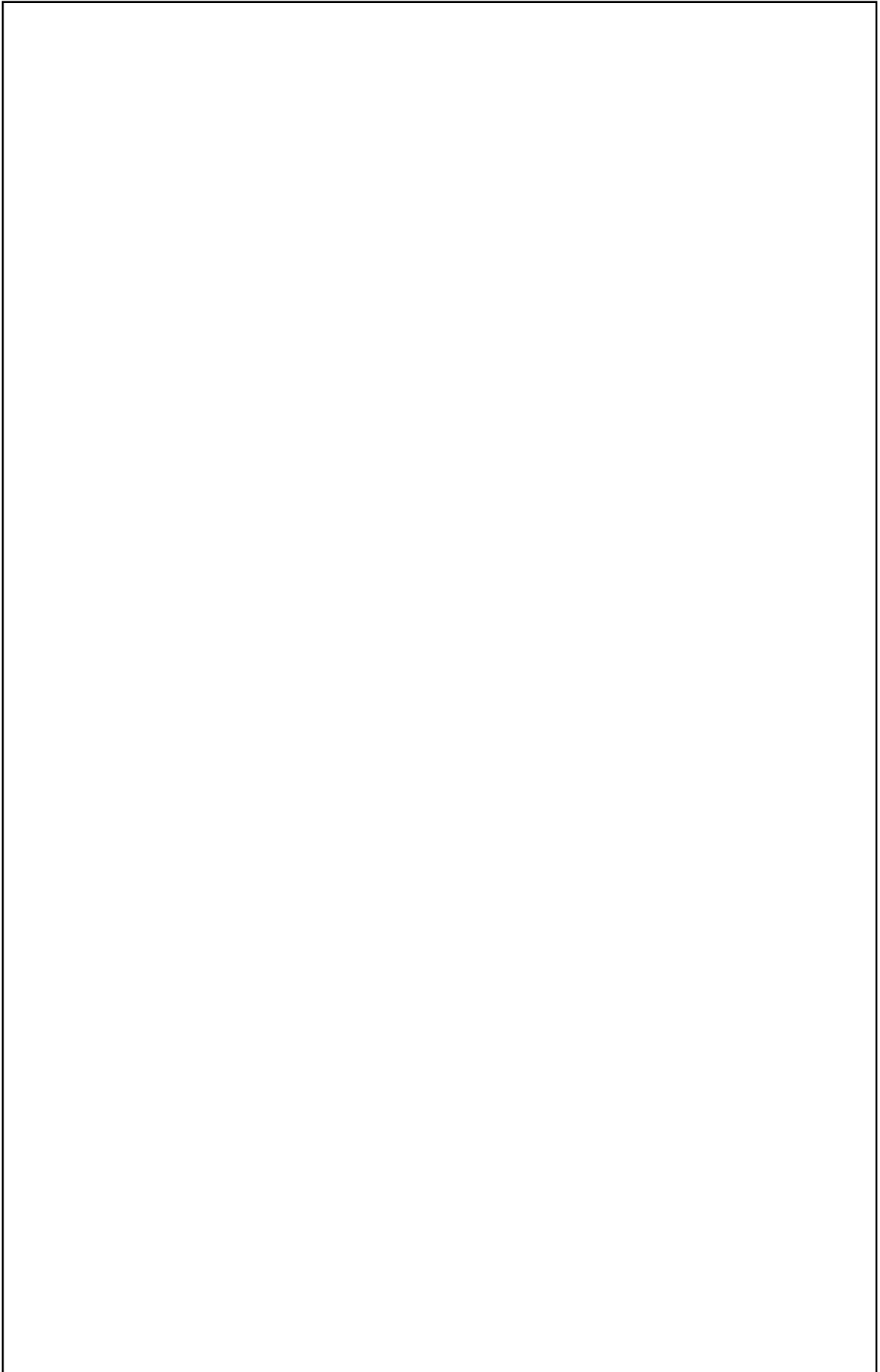


MB4 01, MB8 01

Rel. 5.00

Rel. 19 March 2003

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# MB4 01 MB8 01

**Mother Board ABACO® 4 slot**  
**Mother Board ABACO® 8 slot**

## TECHNICAL MANUAL

Mother Boards featuring **4 or 8 ABACO® BUS** slots for Eurocard standard 100x160 mm size boards with **DIN 41612 A+C** type C connectors; standard size for **3 HE** racks; slots pitch **5 TE**; double row of holes for mounting pitch 3 TE; **3 LEDs** for showing status of power supplies; local key for **RESET**; low profile connector for **remote connection of LEDs and RESET key**; AMP connector for power supply voltages **+5 Vdc, +12 Vdc and -12 Vdc** remote connection; noise filters on supply lines.

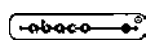
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**MB4 01, MB8 01** Rel. 5.00 *Rel. 19 March 2003*

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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:

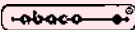


Attention: Generic danger



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 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 information 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 information 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 **MB4 01 and MB8 01** cards release **050391** and later. The validity of the bring information is subordinate to the number of the cards release. The user must always verify the correct correspondence among the two denotations. On the cards the release number is present in more points both board printed diagram (serigraph) and printed circuit (for example in along the left side on the component side).

## GENERAL FEATURES

Back panels **MB4 01** and **MB8 01** have been designed in order to provide the user supports for interfacement to **BUS ABACO®** cards.

They feature all the fastening for mounting on every rack for three units (3 HE) and four or eight slots for interfacement to **BUS ABACO®** cards.

**MB4 01** and **MB8 01** are suitable for applications that require up to four or eight **BUS ABACO®** cards in a reduced room and with optimization of total system costs.

Should the modules be too few or too many for the application, any other model of back panel from **grifo®** listing can be used.

Both mother boards are provided with a connector to remote the reset key and the LEDs that indicate the presence of supply voltages.

This feature allows to install LEDs and reset key also at distance from the electronic cards, for example in the front panel of a rack.

Overall features are:

### **MB4 01**

- Size: **130x100x30** mm for rack **3 HE**
- **4 ABACO® BUS** slots for Eurocard standard 100x160 mm size boards with **DIN 41612 A+C** type C connectors slots
- double row of holes for mounting pitch **3 TE**
- **3 LEDs** for showing status of power supplies
- local key for **RESET**
- low profile connector for **remote connection of LEDs and RESET key**
- AMP connector for power supply voltages **+5 Vdc, +12 Vdc and -12 Vdc** remote connection
- **noise suppression filters** on supply lines.

### **MB8 01**

- Size: **130x200x30** mm for rack **3 HE**
- **8 ABACO® BUS** slots for Eurocard standard 100x160 mm size boards with **DIN 41612 A+C** type C connectors slots
- double row of holes for mounting pitch **3 TE**
- **3 LEDs** for showing status of power supplies
- local key for **RESET**
- low profile connector for **remote connection of LEDs and RESET key**
- AMP connector for power supply voltages **+5 Vdc, +12 Vdc and -12 Vdc** remote connection
- **noise suppression filters** on supply lines.

Here follow the block diagrams of the cards.



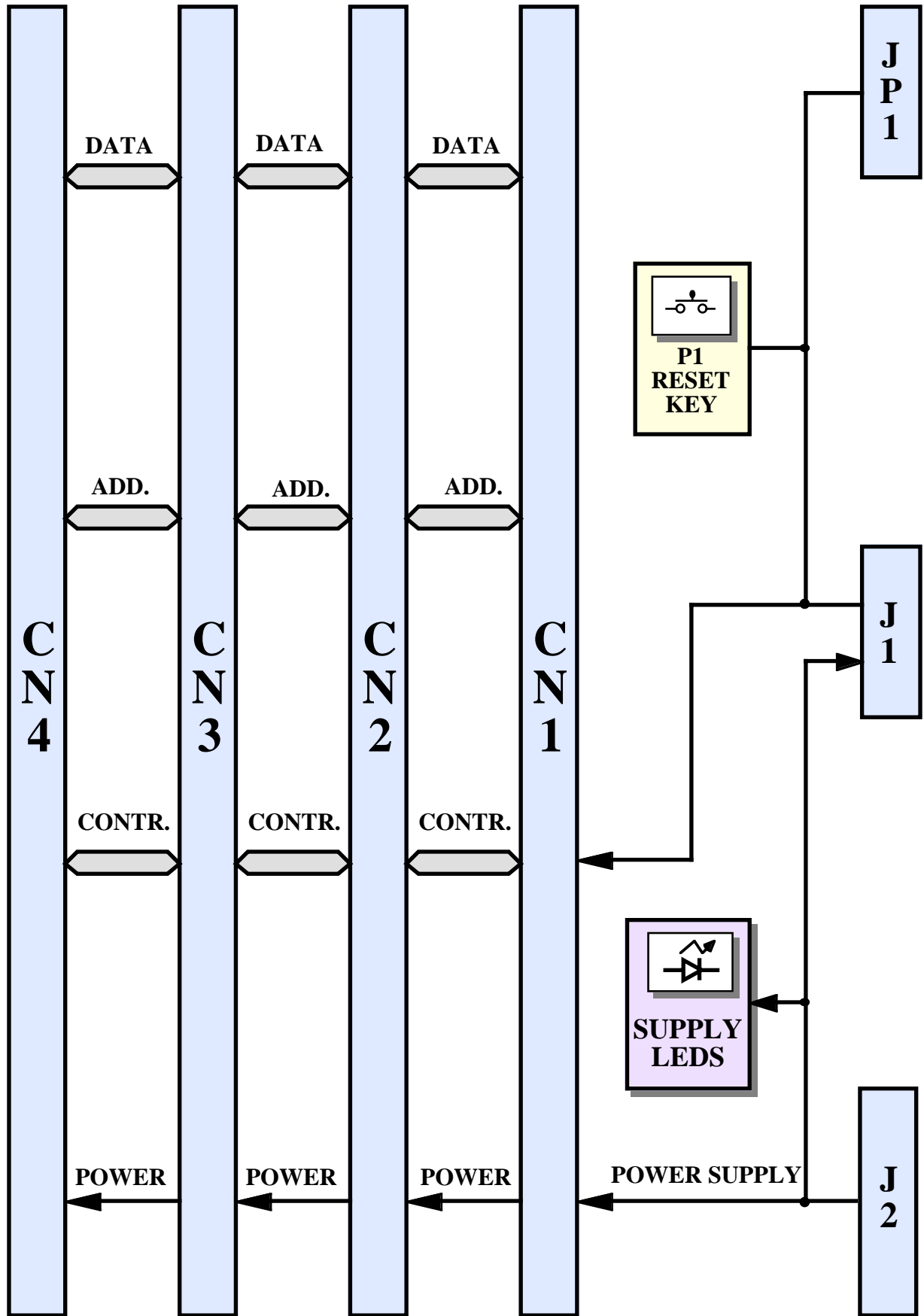


FIGURE 1: BLOCK DIAGRAM OF MB4 01

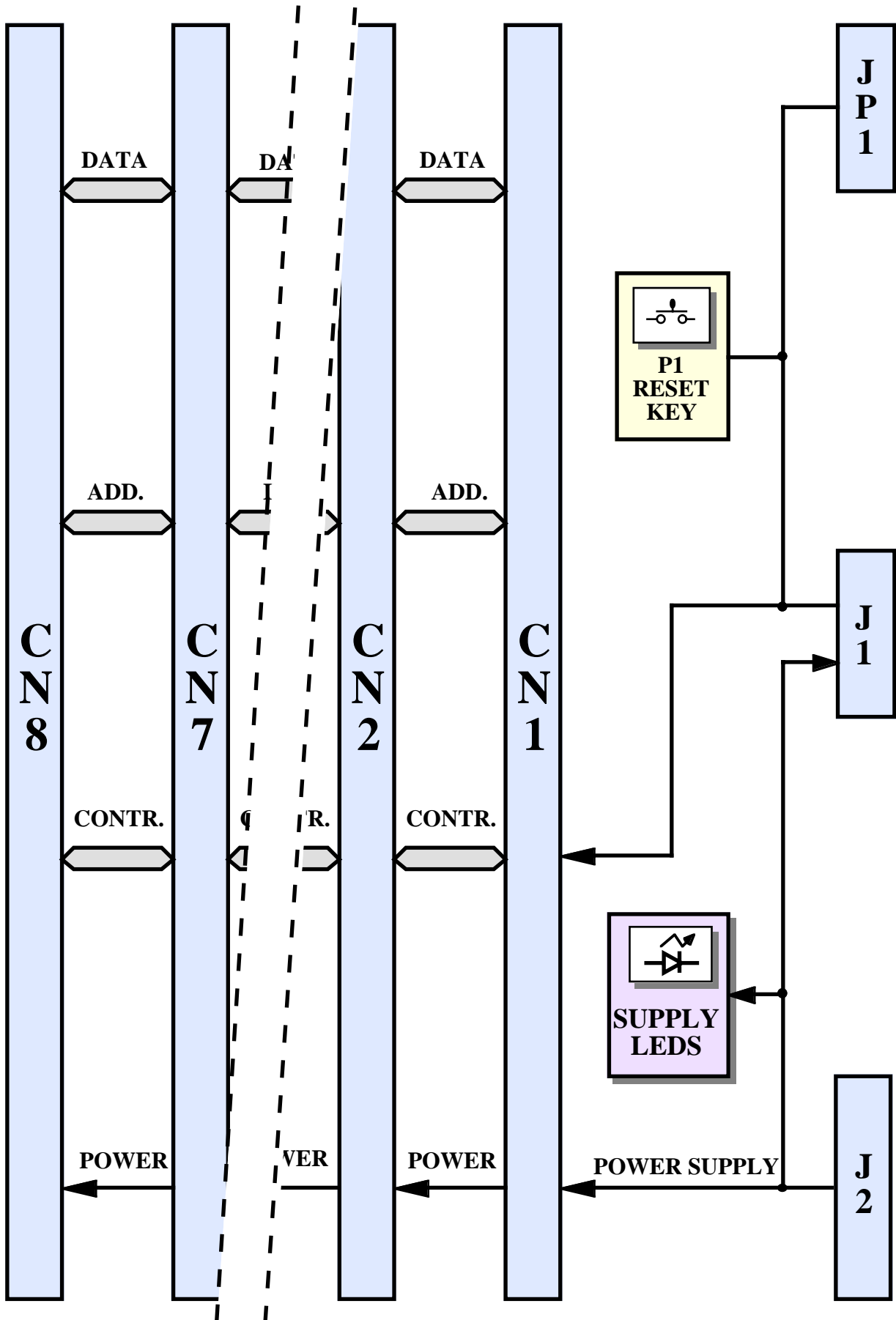


FIGURE 2: BLOCK DIAGRAM OF MB8 01

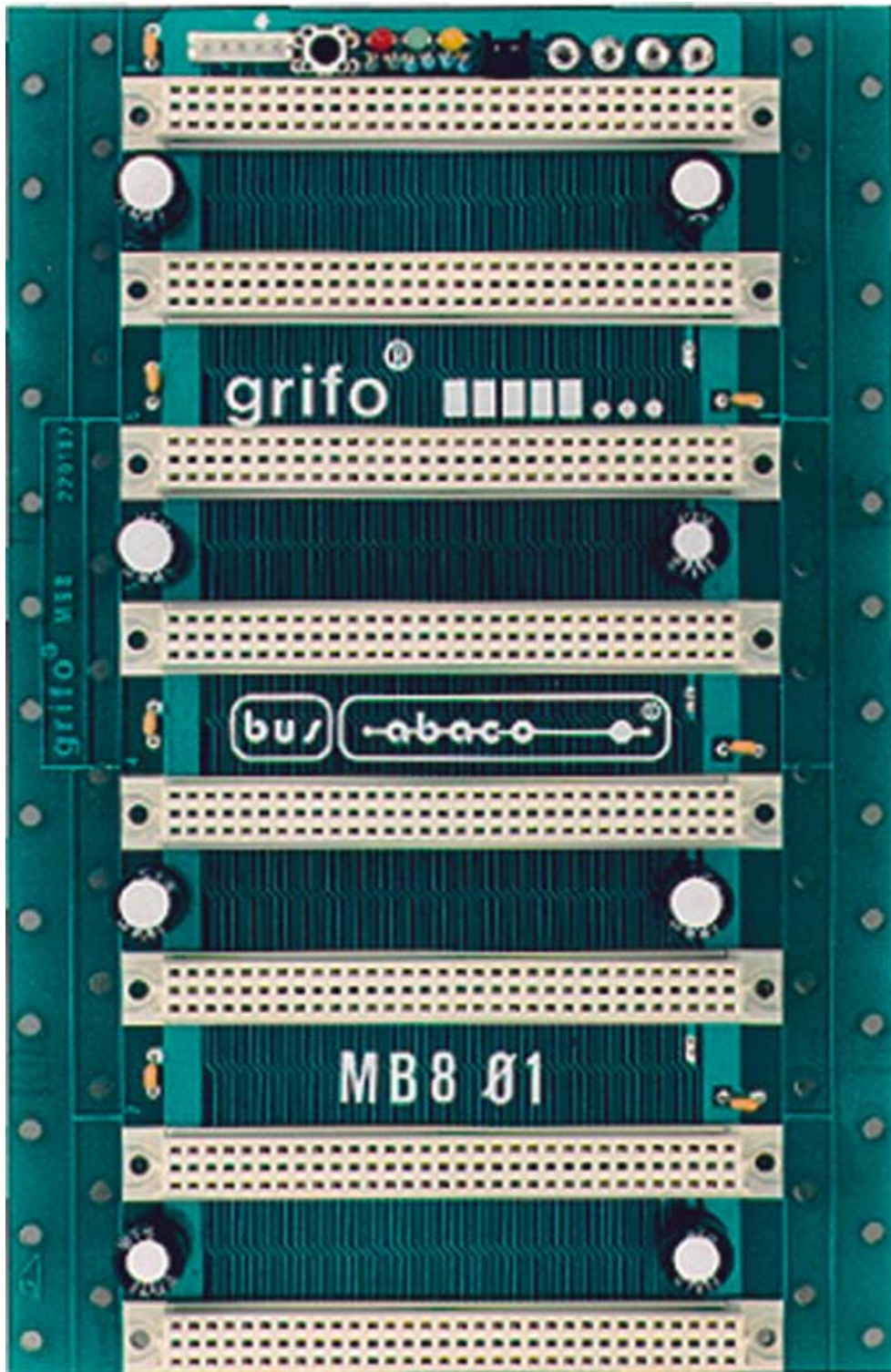


FIGURE 3: PHOTO OF MB8 01

## TECHNICAL FEATURES OF MB4 01

### GENERAL FEATURES OF MB4 01

<b>BUS type:</b>	BUS ABACO®
<b>Devices:</b>	4 slots for BUS ABACO® 1 local reset key 2 connectors for remote reset key and LEDs 3 LEDs to visualize power supply status
<b>BUS line type:</b>	NOT terminated by resistors
<b>Power supply:</b>	provided with noise reduction filters

### PHYSICAL FEATURES OF MB4 01

<b>Size:</b>	130 x 100 x 30 mm, for rack 3 HE
<b>Slots pitch:</b>	5 TE
<b>Mounting:</b>	<b>double row of holes</b> pitch 3 TE, diameter 2.5 mm
<b>Weight:</b>	130 g
<b>Connectors:</b>	J1: 5 pins, male, vertical, low profile connector J2: 4 pins AMP MATE N LOK, male vertical JP1: 2 pins AMP MOD. II, male vertical CN1÷CN4: 64 pins DIN 41612 A+C type C, vertical, female
<b>Temperature range:</b>	0÷70 °C
<b>Relative humidity:</b>	20%÷90% (without condense)

### ELECTRIC FEATURES OF MB4 01

<b>Power supply:</b>	+5 Vdc	15 mA
	+12 Vdc	15 mA
	-12 Vdc	15 mA

## TECHNICAL FEATURES OF MBS 01

### GENERAL FEATURES OF MB8 01

<b>BUS type:</b>	BUS ABACO®
<b>Devices:</b>	8 slots for BUS ABACO® 1 local reset key 2 connectors for remote reset key and LEDs 3 LEDs to visualize power supply status
<b>BUS line type:</b>	NOT terminated by resistors
<b>Power supply:</b>	provided with noise reduction filters

### PHYSICAL FEATURES OF MB8 01

<b>Size:</b>	130 x 200 x 30 mm, for rack 3 HE	
<b>Slots pitch:</b>	5 TE	
<b>Mounting:</b>	<b>double row of holes</b> pitch 3 TE, diameter 2.5 mm	
<b>Weight:</b>	245 g	
<b>Connectors:</b>	J1:	5 pins, male, vertical, low profile connector
	J2:	4 pins AMP MATE N LOK, male vertical
	JP1:	2 pins AMP MOD. II, male vertical
	CN1÷CN8:	64 pins DIN 41612 A+C type C, vertical, female
<b>Temperature range:</b>	0÷70 °C	
<b>Relative humidity:</b>	20%÷90%	(without condense)

### ELECTRIC FEATURES OF MB8 01

<b>Power supply:</b>	+5 Vdc	15 mA
	+12 Vdc	15 mA
	-12 Vdc	15 mA

## INSTALLATION

In this chapter there are the information for a right installation and correct use of the card. The user can find the location and functions of each connectors and LEDs and some explanatory diagrams.

### CONNECTIONS

The **MB4 01** and **MB8 01** modules are provided respectively with 7 and 11 connectors that can be linked to control system cards or directly to the field, according to system requirements. In this paragraph there are connectors pin out, a short signals description (including the signals direction) and connectors location (please refer to figures 5 and 7).

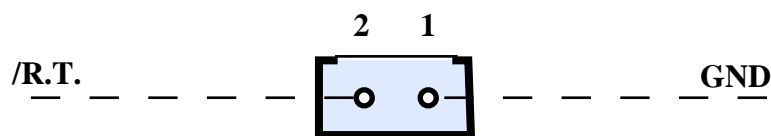
Following figures show the frontal view of connectors; they can be easily recognized because they reproduce exactly the shape of the connectors and also thanks to the serigraph on the board.

#### **JP1 - REMOTE CONNECTION OF RESET KEY**

JP1 is a 2 pins, AMP MOD. II, vertical, male connector, pitch 2.54 mm.

It allows to connect remotely a reset key, which can be a simple normally open button. For further information please see the specific paragraphs and the electric diagrams in the following pages.

Female connector can be made using the separated sets of pieces orderable from **grifo**<sup>®</sup> (code **CKS.AMP2**), while to purchase it directly from AMP catalog the part numbers are 280358 (connector AMP MOD II female 2 pins) and 182206-2 (pins to crimp).



**FIGURE 4: JP1 - CONNECTOR FOR REMOTE RESET KEY**

Signals description:

**/R.T.** = I - RESET key.  
**GND** = - Ground.

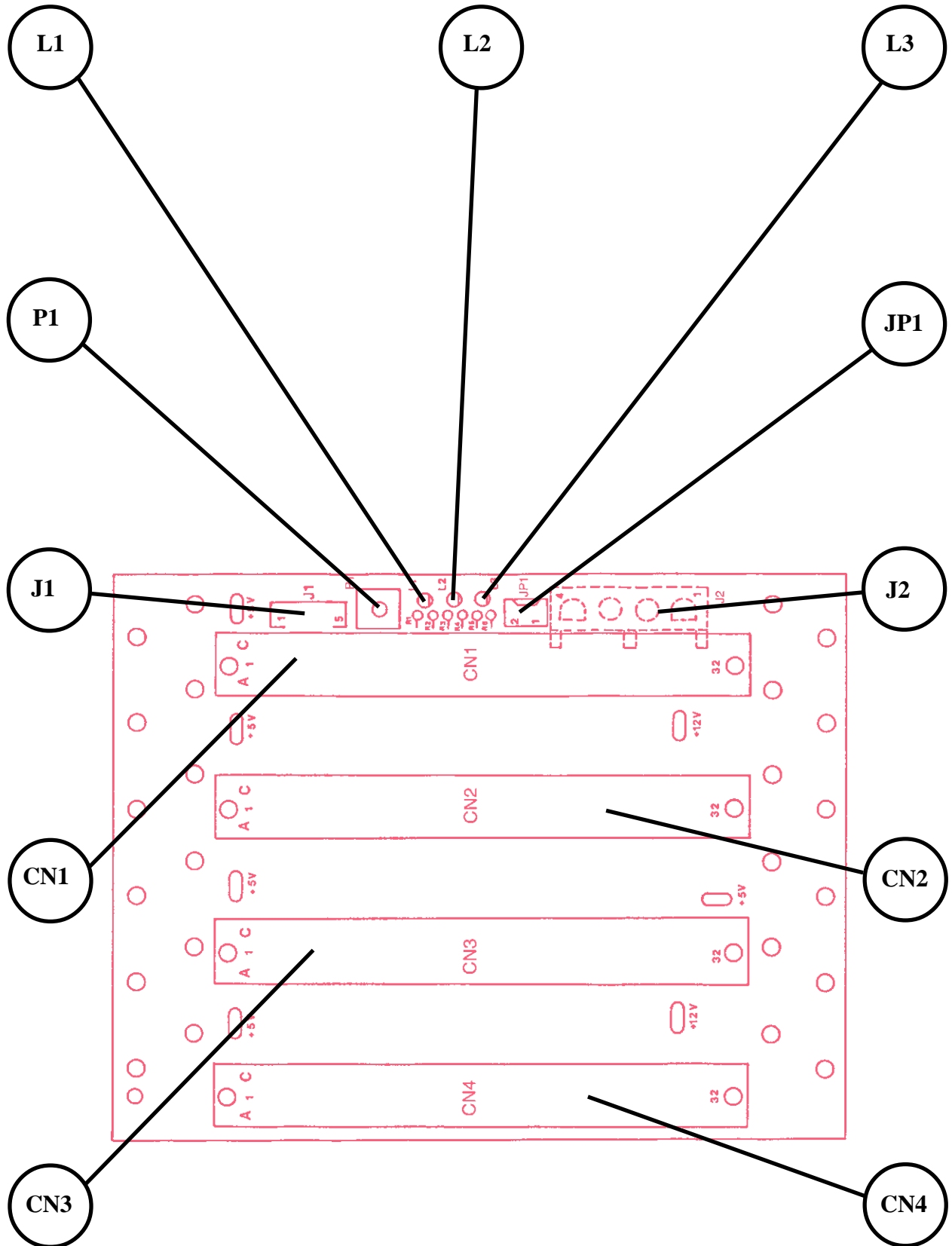


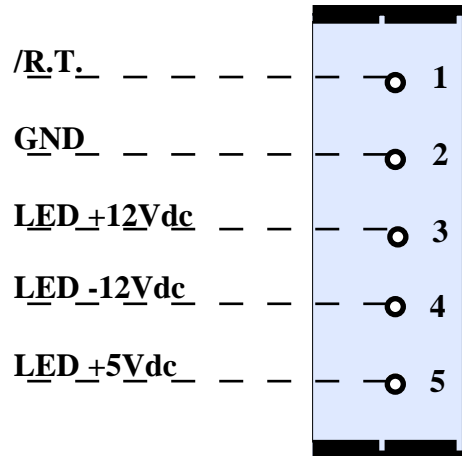
FIGURE 5: LEDs, CONNECTORS, RESET KEY, ETC. LOCATION ON MB4 01

## J1 - REMOTE CONNECTION OF RESET KEY AND LEDS

J1 is a 5 pins, vertical, low profile, male connector, ptch 2.54 mm.

It allows to connect remotely a reset key and up to three LEDs that indicate the power supplies presence. For further information please see the specific paragraphs and the electric diagrams in the following pages.

Female connector can be made using the separated sets of pieces orderable from **grifo**<sup>®</sup>: code **CS5 AUX** (5 pins female connector) and code **CSF Cable** (set of crimped cables, one meter long).



**FIGURE 6: J1 - CONNECTOR FOR REMOTE RESET KEY AND LEDS**

Signals description:

- /R.T.** = I - RESET key.
- GND** = - Ground.
- LED +12Vdc** = O - Anod of LED that signals the presence of +12 Vdc.
- LED -12Vdc** = O - Cathod of LED that signals the presence of -12 Vdc.
- LED +5Vdc** = O - Anod of LED that signals the presence of +5 Vdc.

As shown in figure 15, LEDs can be connected directly to mother board, which has its drop resistors.



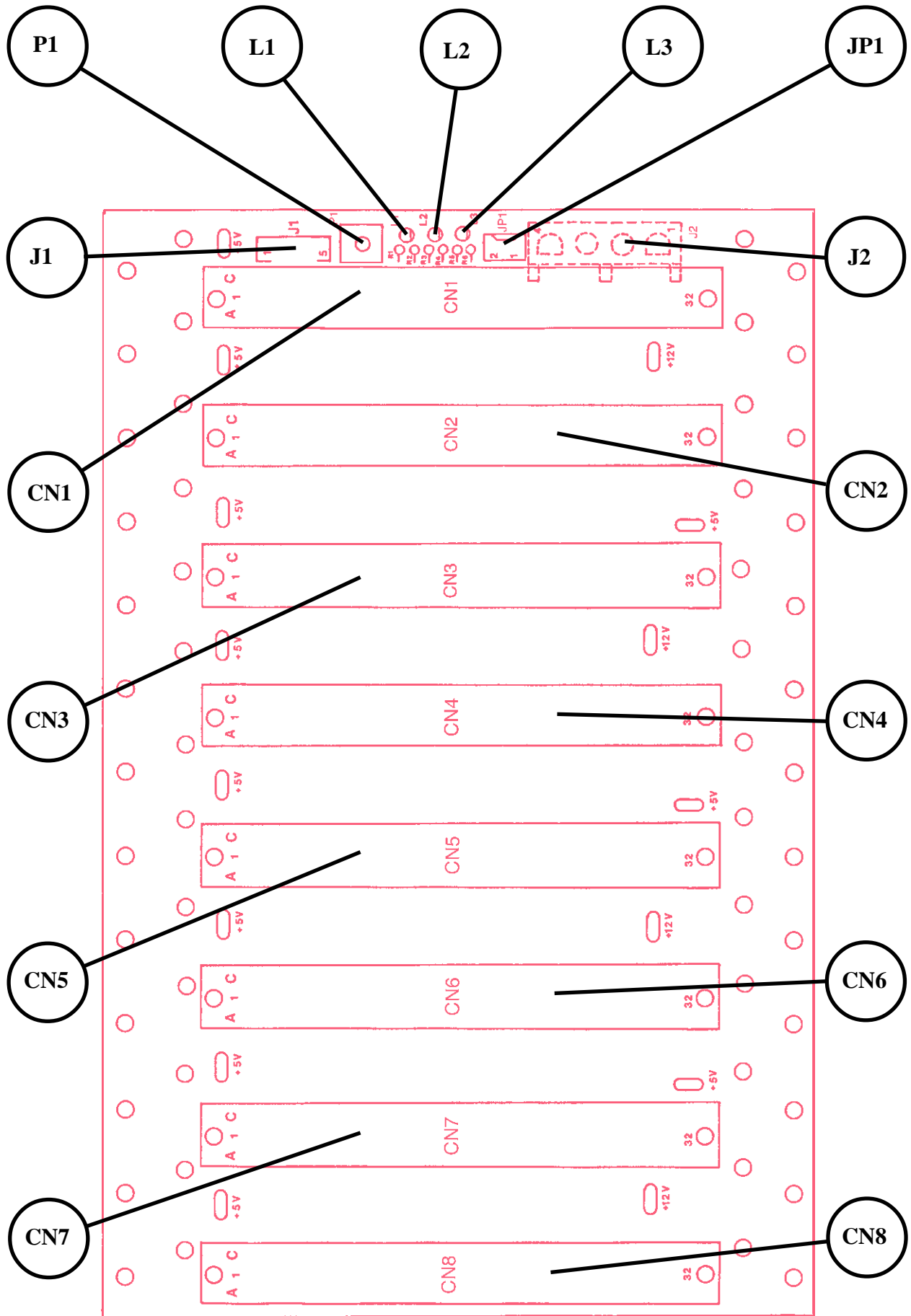


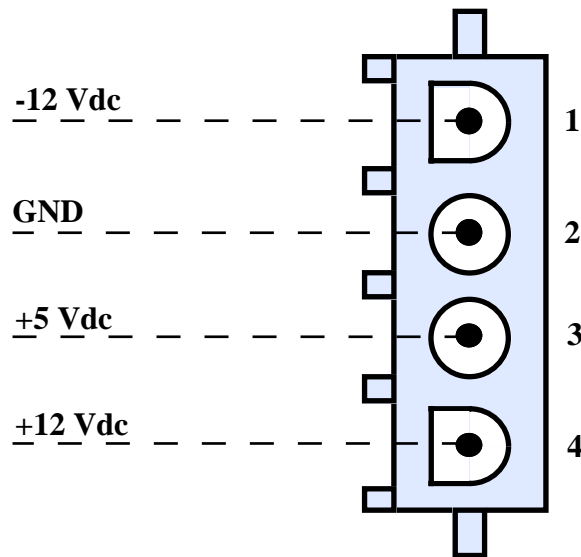
FIGURE 7: LEDs, CONNECTORS, RESET KEY, ETC. LOCATION ON MB8 01

## J2 - POWER SUPPLY CONNECTOR

J2 is a 4 AMP MATE N LOK connector, vertical, male, pitch 6.35 mm.

Any external power source, like for example a power supply, can provide standard supply voltages to **ABACO**<sup>®</sup> slots through J2. Pin out of this connector is standard, so replacing present mother board with another one provided with a greater number of slots is not a problem.

Female connector can be made using the kit orderable from **grifo**<sup>®</sup> with codes **CS4 POWER** (set of 4 pins plug containers) and **CSP Pins** (set of pins to crimp to wire and insert in the container) or, purchasing directly from AMP catalog, part numbers **350779-1** (connector plug AMPMATENLOK 4 pins) and **350536-1** (socket contacts to crimp).



**FIGURE 8: J2 - POWER SUPPLY CONNECTOR**

Signals description:

<b>+12Vdc</b>	=	I - Supply voltage +12 Vdc for BUS <b>ABACO</b> <sup>®</sup> .
<b>-12Vdc</b>	=	I - Supply voltage -12 Vdc for BUS <b>ABACO</b> <sup>®</sup> .
<b>+5Vdc</b>	=	I - Supply voltage +5 Vdc for BUS <b>ABACO</b> <sup>®</sup> .
<b>GND</b>	=	- Ground.

Please remember that only the boards to install can determine which supply voltages should be provided, in fact mother board does not require any supply, it just indicates presence of voltages. Also power to provide must be calculated summing the power required by the boards to install, considering that on board visualization requires additional 15 mA and eventual remote visualization would require another additional 15 mA.

Please remark also that both **MB4 01** and **MB8 01** is provided with noise reduction filters on all the supply lines, made by tracks shielding and several capacitors.

These capacitors will have to be loaded during power on, this produces an peak of current that the generator must be able to provide.

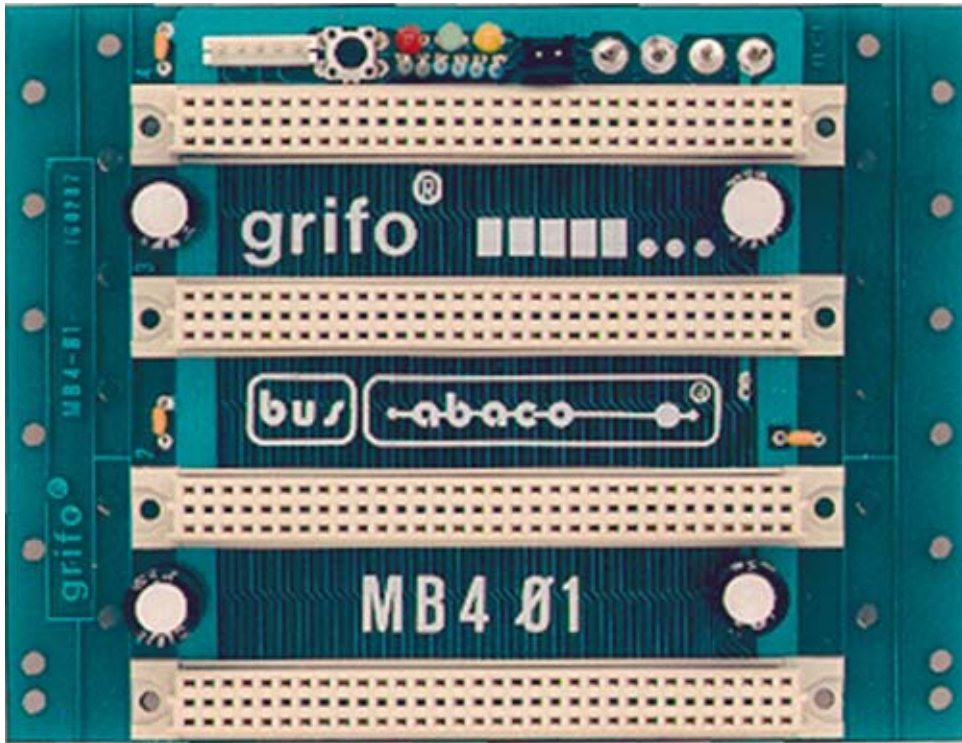


FIGURE 9: PHOTO OF MB4 01

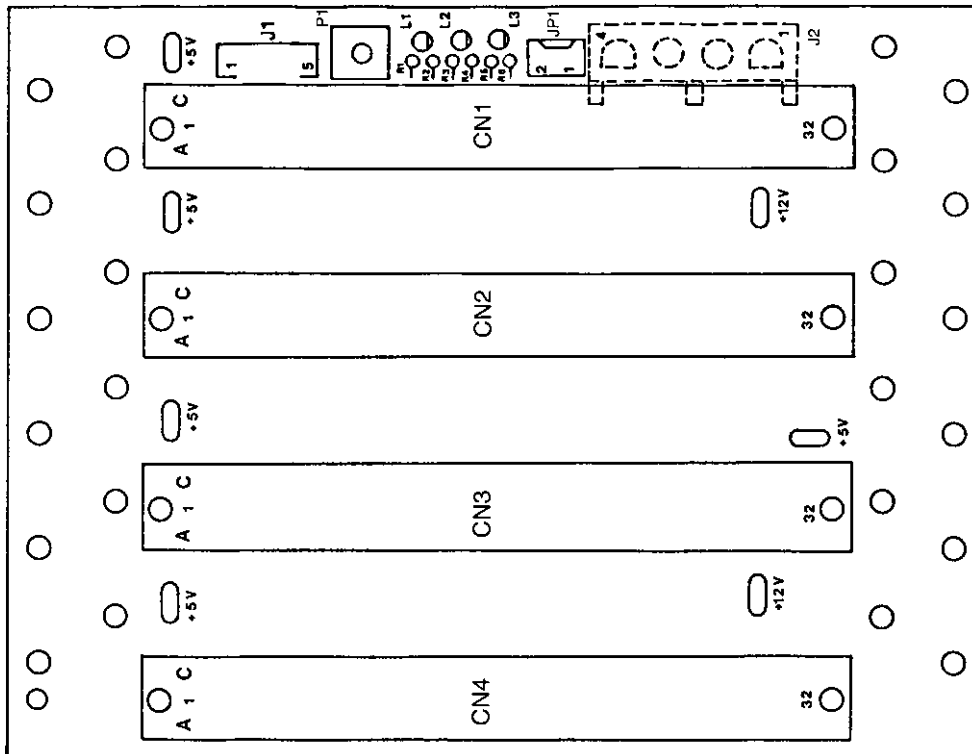


FIGURE 10: COMPONENTS MAP OF MB4 01

## CN1÷CN8 - ABACO® BUS CONNECTORS

CN1÷CN8 are 64 pins DIN 41612 A+C type C female connectors, to interface with the industrial **ABACO® BUS**.

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

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

**MB401** is provided with CN1÷CN4 only, while **MB801** is provided with all CN1÷CN8 connectors.

Row A 16 bit BUS	Row A 8 bit BUS	PIN	Row C 8 bit BUS	Row C 16 bit BUS
GND	GND	1	GND	GND
+5 Vdc	+5 Vdc	2	+5 Vdc	+5 Vdc
D0	D0	3	-	D8
D1	D1	4	-	D9
D2	D2	5	-	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	-	-
A12	A12	23	CLK	CLK
A13	A13	24	-	/RDUDS
A14	A14	25	-	/WRUDS
A15	A15	26	-	A21
A16	-	27	-	A20
A17	-	28	-	A19
A18	-	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 11: CN1÷CN8 - ABACO® BUS CONNECTORS

## Signals description:

## 8 bits CPU

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

## 16 bits CPU

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

**NOTE**

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

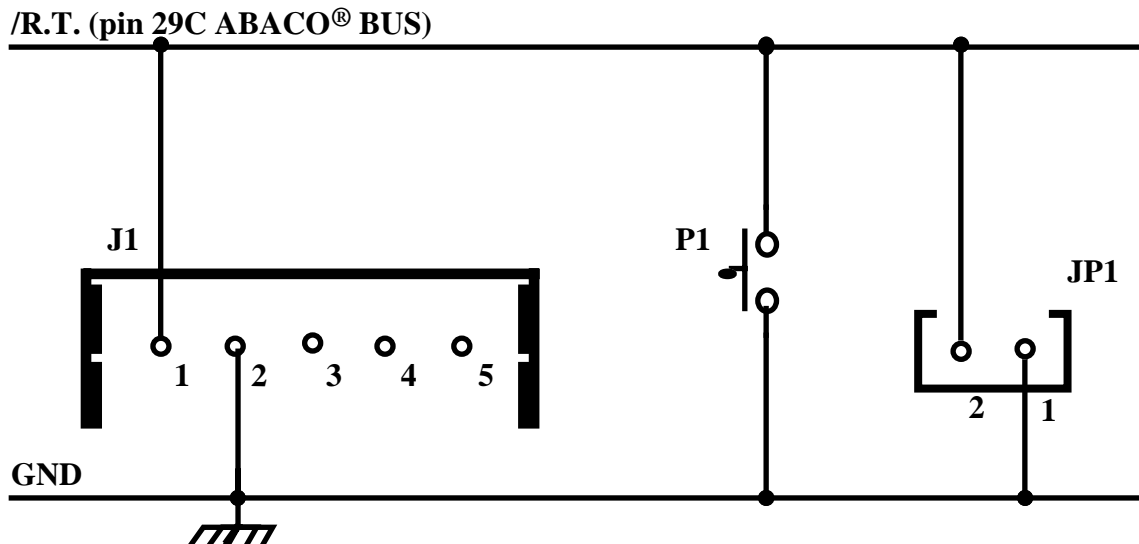
**ABACO®** BUS is not multimaster. Please remark that only one CPU intelligent control board can be installed in the **ABACO®** BUS chain.

## RESET KEY

**MB4 01** and **MB8 01** modules feature a reset key called P1, whose purpose is to activate the signal **/R.T.** of **ABACO® BUS**. Using this key the user can easily reset the whole application installed on the module without any need to use an external device; please remark that key P1 has an effect only when a CPU card (**GPC®**) is installed on the **BUS**, in fact only CPU cards activate the **/RESET** signal in response to the activation of **/R.T.** signal.

Mother board **MB4 01** and **MB8 01** are provided with two connectors (**JP1** and **J1**) featuring the signals to remote the reset key, if needed. The main purpose of these connectors is to provide the possibility to install the reset key in a place distant from the board, like an electrical panel, etc. Signal **/R.T.** is active low, so it must be connected to **GND** for activating. This allows to use a simple normally-open button connected to **GND** and **/R.T.** as remote reset key.

For further information about the reset key connections please refer to the following figure, while to locate key P1 and connectors **JP1** and **J1** please refer to figures 5 and 7.



**FIGURE 12: RESET KEY CONNECTION DIAGRAM**

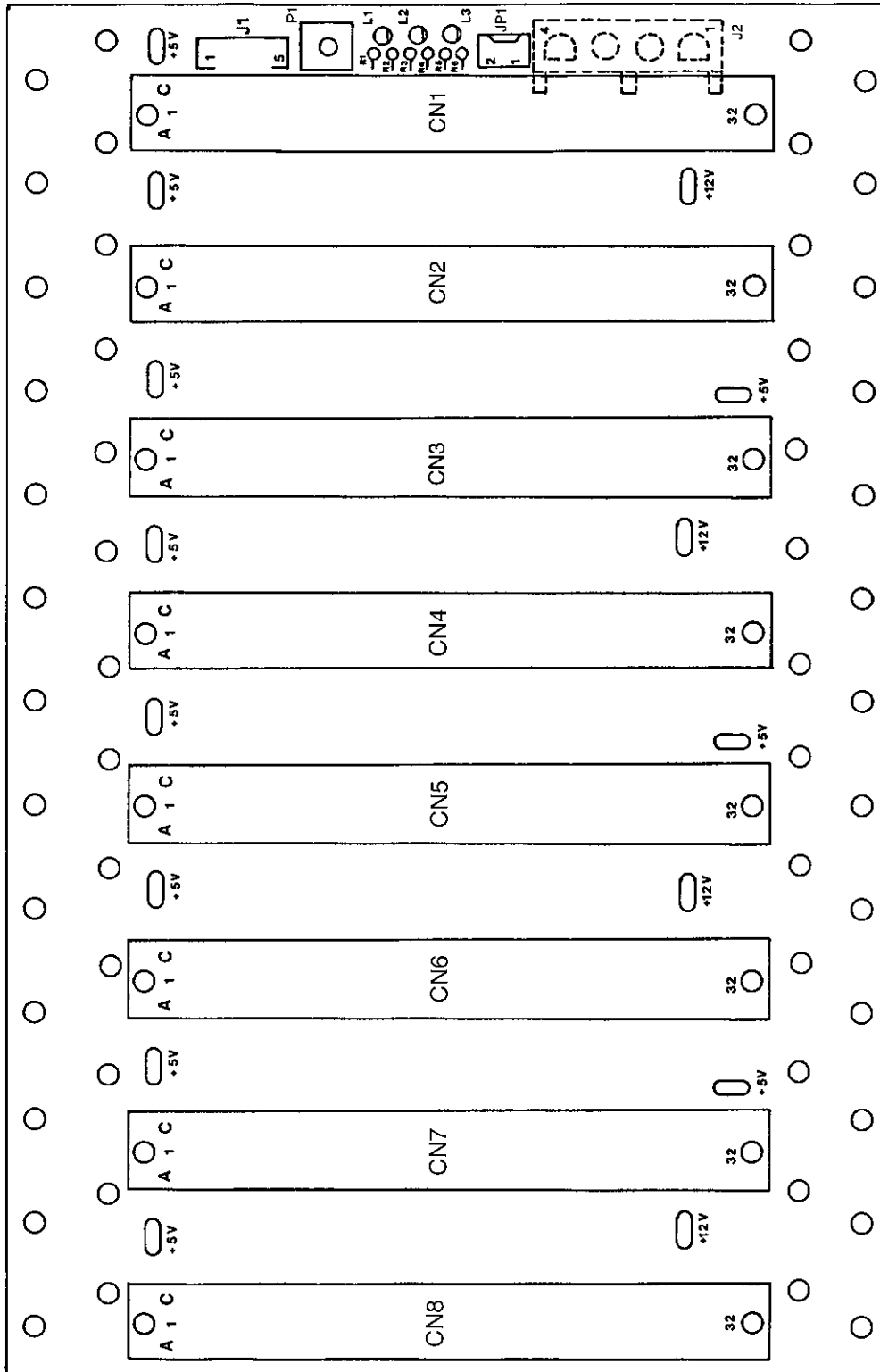


FIGURE 13: COMPONENTS MAP OF MB8 01

**VISUAL SIGNALATIONS**

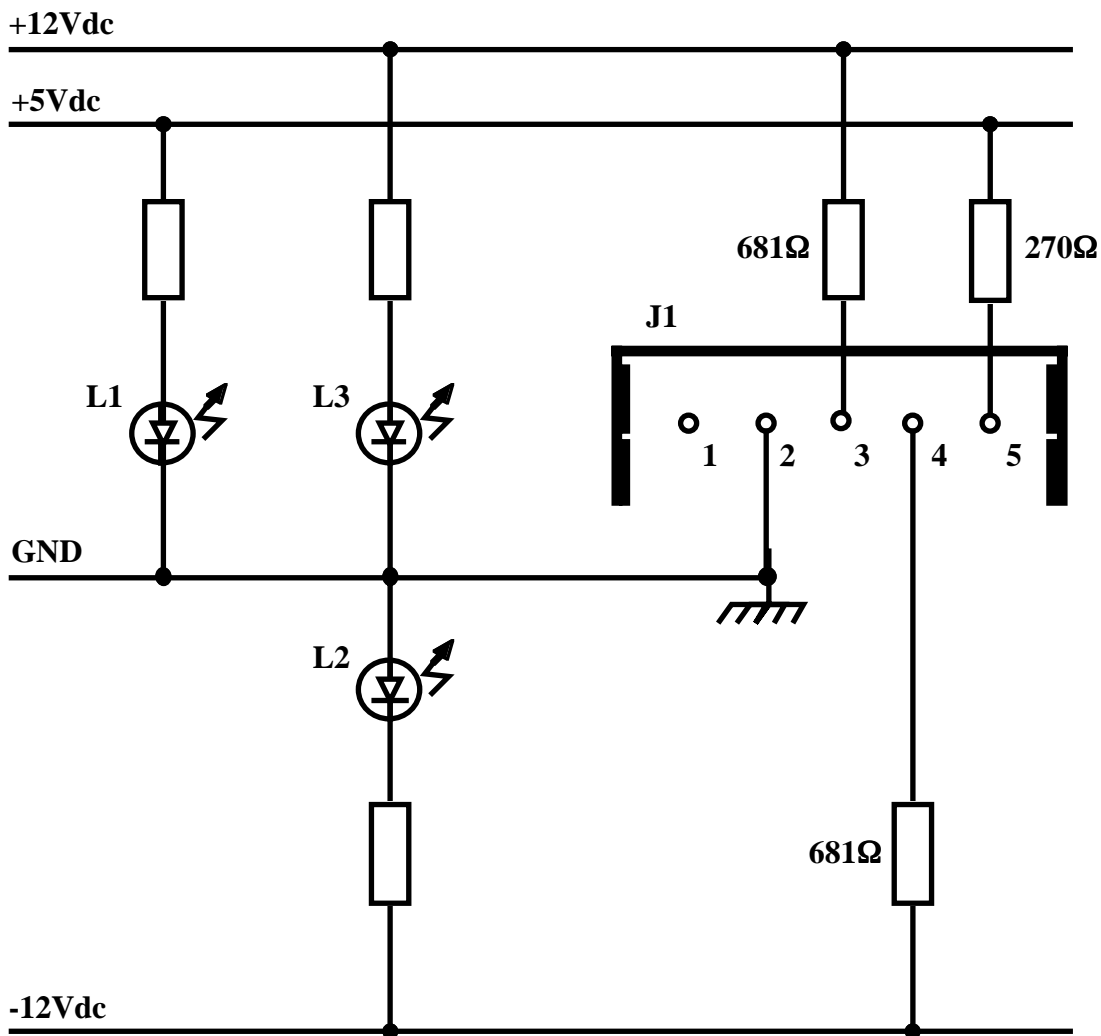
MB4 01 and MB8 01 boards are provided with three LEDs for visual signalations as described here:

LED	COLOUR	DESCRIPTION
L1	Red	When lit, indicates the presence of +5 Vdc power supply.
L2	Green	When lit, indicates the presence of -12 Vdc power supply.
L3	Yellow	When lit, indicates the presence of +12 Vdc power supply.

**FIGURE 14: VISUAL SIGNALATIONS TABLE**

The main purpose of these LEDs is to provide a visual indication of supply normalized voltages, making easier to verify the working status of the system. In addition, connector J1 allows to remote these signalations and install them, for example, on an indicator board, etc. LEDs can be connected directly from the boards, in fact this latter features also the drop resistors.

To easily locate the visual signalations, please refer to figures 5 and 7.



**FIGURE 15: LEDs CONNECTION DIAGRAM**



## EXTERNAL CARDS

**MB4 01** and **MB8 01** mother boards can interface to most of **grifo**® industrial boards. Their main purpose is to perform a digital Input/Output interfacement between CPU (**GPC**®) cards in EUROCARD format installed on an electric rack provided with  $\Omega$  rails and the external world.

Please remark that **ABACO**® BUS is not multimaster, so there must be only one **GPC**® card installed on the BUS.

Here is reported an illustrative list of cards capable to interact with **MB401** and **MB80** mother boards with a short description of their features; for further information please request the specific documentation.

### **EXA 01**

Extension Card **ABACO**®

Rigid zxtension for industrial BUS **Abaco**®. Keeps the card to examine out of the rack and connected; jumpers to dock the strumentation and to segment the signals to be examined; LEDs to visualize power supply.

### **SPB 04-SPB 08**

Switch Power BUS 4-8 slots

Motherboard featuring 4-8 slots of **ABACO**® industrial BUS; pitch 4 TE; standard power supply connectors; termination resistances; connector type F for **SPC xxx** supply ; holes for rack docking.

### **SBP 02-xx**

Switch BLOCK Power xx version

Low cost switching power supply able to generate voltage from +5 to +40 Vdc and current up to 2.5 A; Input from 12 to 24 Vac; Connection for DIN C Type and  $\Omega$  rails.

### **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  $\pm 10$ Vdc D/A channels. 8 Opto-in; 8 NPN Opto-output 40Vdc 500 mA. All I/O lines displayed with LEDs.

### **IPC 52**

Intelligent Peripheral Controller, 24 analogic input

This intelligent peripheral card acquires 24 independent analogic input lines: 8 PT 100 or PT 1000 sensors, 8 J,K,S,T termocouples, 8 analog input  $\pm 2$ Vdc or  $4 \div 20$ mA; 16 bits + sign A/D section; 0.1 °C resolution; 32K RAM for local data logging; buzzer; 16 TTL I/O lines; 5 or 8 conversion per second; facility of networking up to 127 IPC 52 cards using serial line. BUS interfacing or through RS 232, RS 422, RS 485 or current loop line. Only 5Vdc power supply.

### **GPC® 188F**

General Purpose Controller 80C188

80C188  $\mu$ P 20MHz; 1 RS 232 line; 1 RS 232, RS 422-485 or Current Loop line; 24 TTL I/O lines; 1MEPROM 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.

### **GPC® 15R**

General Purpose Controller 84C15

84C15  $\mu$ P, 10÷16 MHz; 1 RS 232 line; 1 RS 232 or RS 422-485 or C. L. line; 16÷24 TTL I/O lines; 16 Opto-in; 8 Relays; 4 Opto Coupled Timers Counters; 512K EPROM or FLASH; 512K RAM and RTC backed; 8K serial EEPROM; 8K Backed RAM modul; Buzzer; 1 Activity LED; Watch dog; 4÷12 readable DIPs; LCD Interface.

### **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® 550**

General Purpose Controller 80C552

Microprocessor 80C552 at 22 MHz. 32K EPROM; 32 K SRAM; 32 K EEPROM or SRAM; RTC; serial EEPROM; 1 line RS 232 + 1 RS 232 or RS 422-485 or current loop; 40 I/O TTL; 2 PWM lines; 16 bits timer/counter; watch dog; dip switch; 8 A/D lines with resolution 10 bit; interface for BUS **ABACO®**; galvanucally isolated CAN serial line. Unique power supply +5 Vdc; EUROCARD format.

### **LDA 01**

Low cost Digital to Analog converter 12 bits

2 D/A converter resolution 12 bit; 8 open collector da 45 Vdc transistor outputs, 500 mA, optocoupled; data view by LED; selectable analog output: 0÷5, 0÷10,  $\pm 5$  and  $\pm 10$  Vdc; gain and offset regulation; 8 or 16 bit BUS; extended addressing.

### **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  $\pm 2,048$  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  $\pm 3,2768$  Vdc or 0÷20 mA; automatic running mode; 2 LEDs; 2 TTL input lines; 8 bit Bus; front panel.

### **CI/O R16**

16 Coupled Input Output Relé

16 optocoupled input with  $\pi$ -filter; input voltage 24 Vdc. 16 micro-relays 1 A with disturb suppression by MOV 24 Vac. I/O visualized through LEDs; 8 bit BUS; standard addressing.

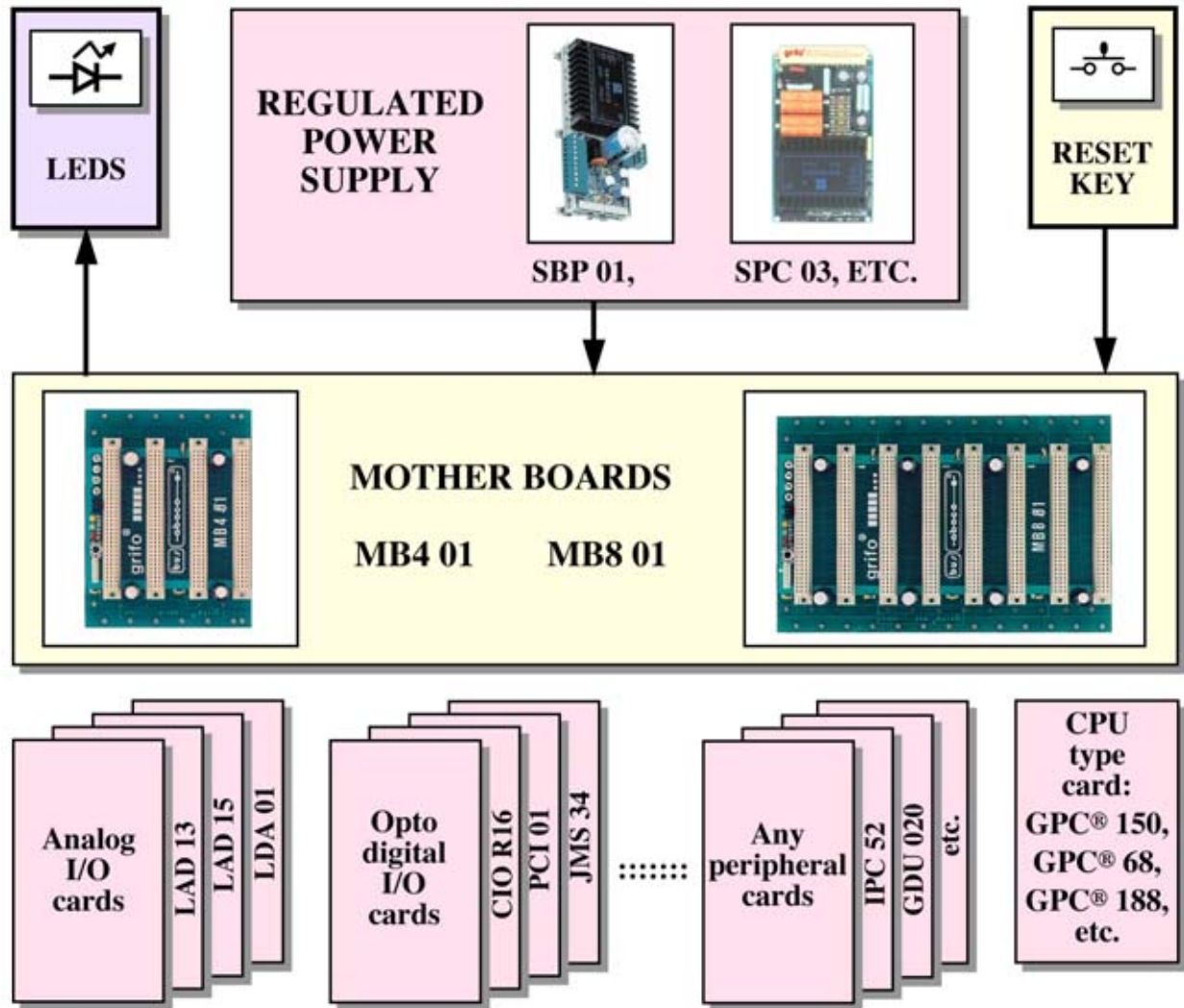


FIGURE 16: POSSIBLE CONNECTIONS DIAGRAM

**PCI 01**

32 Peripheral Coupled Input

16 optocoupled input with  $\pi$ -filter; input voltage 24 Vdc; I/O visualized through LEDs; 8 or 16 bit BUS; standard addressing.

**PIO 01**

Peripheral Input/Output

96 I/O TTL signals grouped in 12 ports 8 bit wide; 6 standard 20 pins I/O connectors; 4 PPI 82C55 drive the signals; Watch dog with intervention time and modality selectable.

**UCC 08**

UART Communication Card 8 linee

8 independent serial lines RS 232 or RS 422-485. Each line: 4 chars buffer; asynchronous communication; Baud rate (50 up to 38.4K baud), parity, stop bit and data bit are software selectable; 3 Dip Switch; 8 bit BUS; extended addressing.

**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**.

## APPENDIX A: ALPHABETICAL INDEX

**SYMBOLS****+12 VDC 12, 18****+5 VDC 12, 18****-12 VDC 12, 18****/R.T. 16****/RESET 16****3 HE 6****3 TE 6****5 TE 6****A****ABACO® BUS 14****B****BUS TYPE 6****C****CARD VERSION 1****CONNECTORS****CN1÷CN8 14****J1 10****J2 12****JP1 8****E****EXTERNAL CARDS 19****L****LEDS 10, 18****M****MOUNTING 6****P****POWER SUPPLY 6**

**R**

RELATIVE HUMIDITY 6  
RESET KEY 8, 10, 16

**S**

SIZE 6  
SLOTS PITCH 6

**T**

TEMPERATURE RANGE 6

**V**

VISUAL SIGNALATIONS 18

**W**

WEIGHT 6