

SPC 512

Switching Power Card +5 Vdc +12 Vdc

TECHNICAL MANUAL



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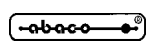
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SPC 512

Edition 5.00

Rel. 26 March 2002

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Single Europa size measuring **100x170x35 mm**; electrical connection by the strong connector **DIN 41612** type **F**; matching mechanically and electrically to **YPB 01**, **SPB 04**, **SPB 08**, etc.; **3** coloured **LEDs** which indicate the presence of the two generated voltages and possible **failure**, placed on the front side; noises reduction filters on the inputs and outputs; wide **heat sink** that ensures the correct functionality even with heavy external environment conditions; digital signal that can be used as **/RESET** for the other cards; protection on overtemperature and overload by **TransZorb™**; generated voltages: **+5Vdc 5 A** and **+12Vdc 2.5A**; availability of special configurations with only +5Vdc or only +12Vdc output; input for auxiliary voltage from a 24 Vdc battery, for **UPS** function; required voltage: **11÷33 Vac** or **16÷46 Vdc**

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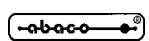
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For specific informations on the components mounted on the card, please refer to the Data Book of the builder or second sources.

SYMBOLS DESCRIPTION

In the manual could appear the following symbols:

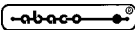


Attention: Generic danger



Attention: High voltage

Trade Marks

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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 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 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 **SPC 512** card release **150296** 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 in the bottom right corner near board's name and type on the component side or below heat sink on the solder side).

GENERAL INFORMATION

The **SPC 512** card is a compact power supply, standard **Single Europa** size measuring 100x160mm, inserted in a standard **3HE Rack** together with the cards it supplies power to.

Thanks to the small size and to the industrial format, it is the ideal component to match to other **Motherboards** as **YPB 01, SPB 04, SPB 08**, etc to enable the composition of boards which afford any automation problems.

The **SPC 512**, to respect the security norms, provides for a low power supply input which can be alternate or continuous; there is also an auxiliary input coming from an external battery; in this case, **SPC 512** works like an **UPS** (Uninterruptible Power Supply), assuring power to the load, with no discontinuity, even without external mains voltage.

Special filters on the inputs and outputs, the accuracy in the circuitry disposition, an efficient protection executed by **TransZorb™**, unfailing thermic protections, etc. make of **SPC 512** a reliable and safe power supply which can be used in the strongest applications. Three **LEDs** in the front side inform about the correct working of the power supply. One of them indicates the **failure**. It lights whenever each anomalous condition (over load, extra voltage, high temperature, etc.) cause an interruption of power supply on +5Vdc.

The **SPC 512** produces two typical supplies which are necessary for the power supply of the **ABACO®** board. The first is **+5Vdc** which can have maximum **5A** and which supplies power to all the logics. The **SPC 512** provides a **/RESET** signal, so that the boards start only once +5Vdc is within the correct values. The second power supply is **+12Vdc** with a maximum of **2.5A**. This power supply is generally used only by peripheral boards which mount output relays as **CI/O 01, CI/O R16**, etc. It is necessary to have two different power supplies to avoid noises, generated by the simultaneous commutation of all the output relays, on the same voltage that supplies the control logic, above all when the number of relays is very high. For example, the **SPC 512** supplies power at least twelve **CI/O 01** giving a total of **192 relays** and still are available **2A** on **5Vdc** to supply further single power boards .

- Single Europa size measuring **100x170x35 mm**
- Electrical connection by the strong connector **DIN 41612** type **F**
- Matching mechanically and electrically to **YPB 01, SPB 04, SPB 08**, etc.
- **3** coloured **LEDs** which indicate the presence of the two generated voltages and possible **failure**, placed on the front side
- Noises reduction filters on the inputs and outputs
- Wide **heat sink** that ensures the correct functionality even with heavy external environment conditions
- Digital signal that can be used as **/RESET** for the other cards
- Protection on overtemperature and overload by **TransZorb™**
- Generated voltages: **+5Vdc 5 A** and **+12Vdc 2.5A**
- Availability of special configurations with only +5Vdc or only +12Vdc output
- Input for auxiliary voltage from a 24 Vdc battery, for **UPS** function
- Required voltage: **11÷33 Vac** or **16÷46 Vdc**

Here follows a description of the board's functional blocks, with an indication of the operations performed by each one. To easily locate these blocks and verify their connections please refer to figure 1.

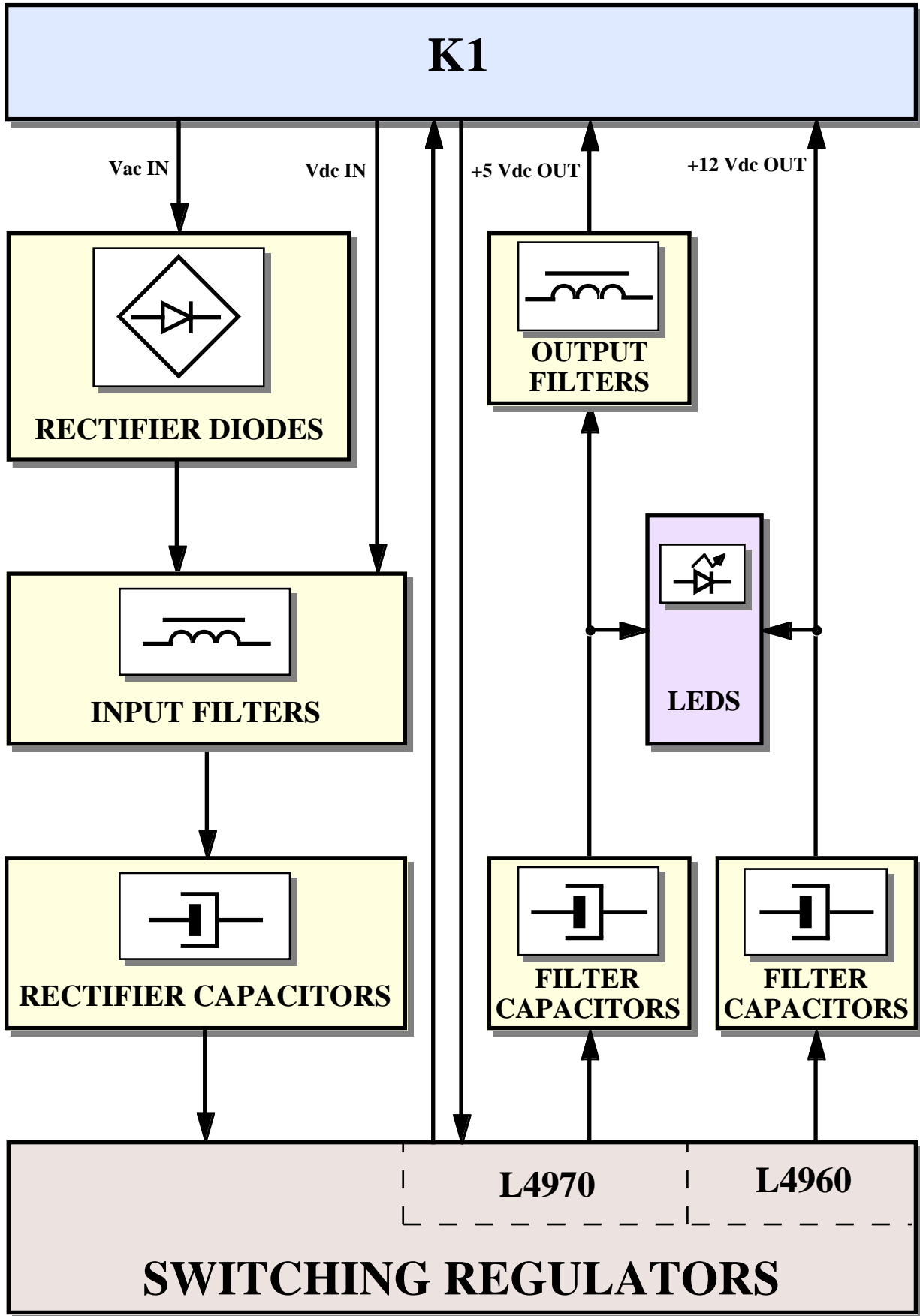


FIGURE 1: BLOCK DIAGRAM

RECTIFIER SECTION

Voltage in input to **SPC 512** is rectified by the specific rectifying section that generates a filtered DC voltage for the switching power supply. Rectifying section is made of a simple bridge rectifier with capacitors that assure a DC voltage erogation in all the operating conditions of the power supply. Components are selected to reduce the value of ripple on the switching input whatever input voltage or output load is present. Rectifier section is always present but, as indicated in the block diagram, is used only in part if a DC voltage is provided as input. In such condition the bridge rectifier is not used and the input voltage is just filtered by the capacitors.

The presence of two different inputs for AC voltage and DC voltage allows the possibility to use the power supply as an UPS (connected, for example, to a battery) and provides the possibility to have output voltage referred to the same potential as input voltage.

SWITCHING REGULATOR

SPC 512 power supply is based on two efficient switching regulators that perform the task to keep the output voltages under control and limit the output currents. The main components of this section are two integrated voltage regulators, **L4970** and **L4960**, manufactured by SGS. These devices have been designed specifically to build industrial power supplies of middle-high power; L4970 is charged to generate +5 Vdc while L4960 generates +12 Vdc. So we obtain best price/performance rate and a good reliability, thanks also to matching with some external components. The overall features of switching regulation section are:

- soft start after a power on
- high efficiency, up to 80%
- protection against overcurrent or output short circuit
- protection against overheat
- protection against undervoltage in input
- switching frequency is 220 KHz
- duty cycle from 0 to 90%
- step down regulation
- automatic compensation of voltage drop due to connection cables
- generation of /RESET signal for power failure
- huge heatsink
- low noise and reduced output voltage ripple

Also in this section components have been selected to reach maximum efficiency and warrant anyway the maximum output currents 5 and 2.5 A for the selected output voltage.

OUTPUT SECTION AND FILTERS

Output section of **SPC 512** simply filters the stabilized voltages generated by the switching regulator through specific capacitors (for high and low frequencies) and visualizes the power supply status by specific LEDs. As usual, all components have been selected to assure stability of output voltages under any operating condition; +5 Vdc output is provided with a filter that reduces high frequency noise. Another feature of output section is to include two jumpers that allow the possibility to connect the output voltage sensing circuitry directly to the power supply, without any external connection.

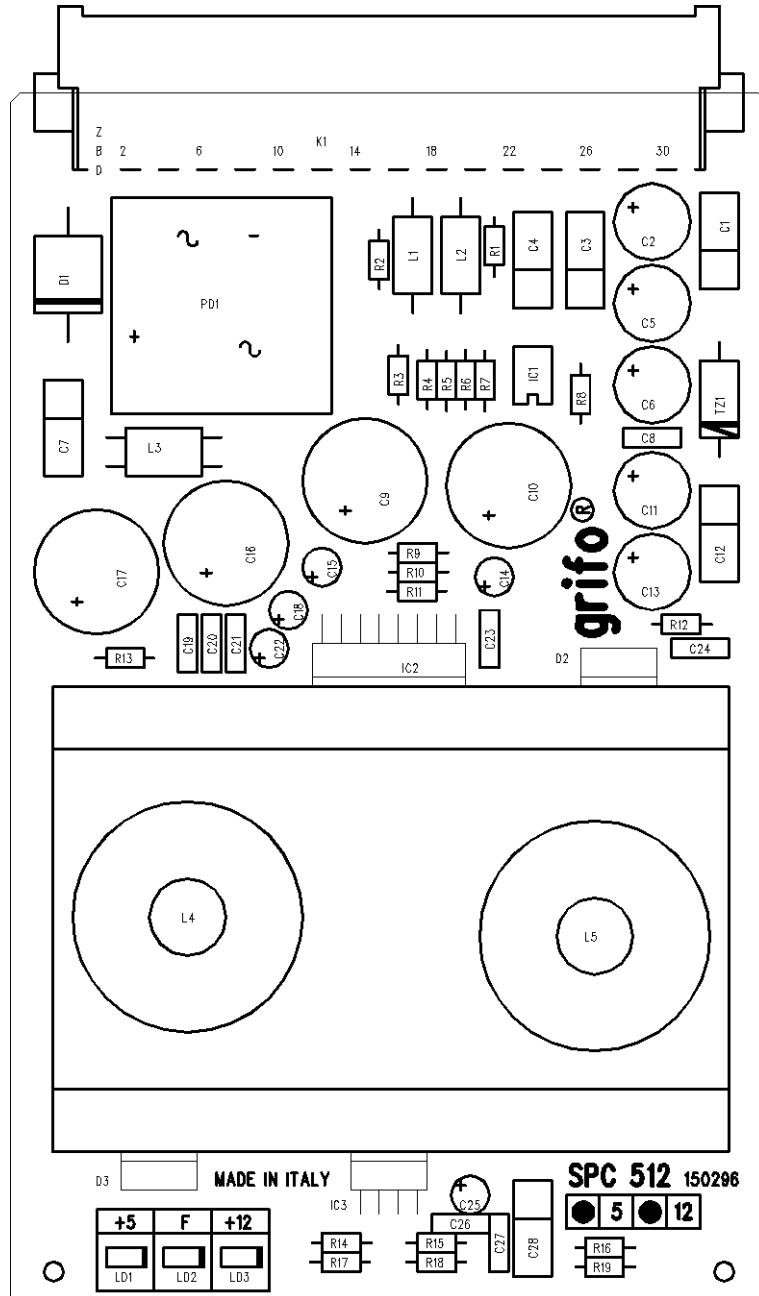


FIGURE 2: COMPONENTS MAP

TECHNICAL FEATURES

GENERAL FEATURES

Switching Frequency:	+5 Vdc	220 KHz maximum
	+12 Vdc	200 KHz maximum
Average efficiency:	+5 Vdc	80% average
	+12 Vdc	90% average
Overheat protection:	+5 Vdc	150 °C, disables output and recovers automatically
	+12 Vdc	150 °C, disables output and recovers automatically
Overload protection:	+5 Vdc	11 A, disables output and recovers automatically
	+12 Vdc	3 A, disables output and recovers automatically
Undervoltage in input:	+5 Vdc	+12 Vdc, disables output and recovers automatically
	+12 Vdc	none
Visualization:	3 status LEDs	
Reset signal duration:	10 msec minimum	
Reset signal type:	Open collector	
Reset activation threshold:	4.9 V	
Frequence of AC input:	50÷60 Hz	

PHYSICAL FEATURES

Size:	100 x 170 x 35 mm	
Weight:	460 g	
Mounting:	rack 3HE	
Connectors:	K1:	DIN 41612 type F, 48 pins, rows d, b, z
Temperature range:	0÷70 °C	
Relative humidity:	20%÷90%	(without condense)

ELECTRIC FEATURES

Input voltage:	11÷33 Vac or 16÷46 Vdc	
Output voltages:	+5 Vdc +12 Vdc	
Output ripple:	+5 Vdc	typical 10 mV; maximum 50 mV
	+12 Vdc	typical 15 mV; maximum 50 mV
Voltage/temperature variation:	+5 Vdc	0.4 mV/°C
	+12 Vdc	0.4 mV/°C
Output current (*):	+5 Vdc	5 A
	+12 Vdc	2.5 A
Maximum output power (*):	+5 Vdc	25 W
	+12 Vdc	30 W

(*) Data here reported are referred to a 20 centigrad degrees environmental temperature.

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, jumpers, LEDs and some explanatory diagrams.

VISUAL FEEDBACK

SPC 512 module is provided with LEDs, as described in the following table:

LED	COLOUR	DESCRIPTION
LD1	Green	When lit, indicates the presence of +5 Vdc OUT regulated voltage.
LD2	Red	When lit, indicates the intervent of one of the protections (overload, overheat, short circuit, etc.) on +5 Vdc section.
LD3	Yellow	When lit, indicates the presence of +12 Vdc OUT regulated voltage.

FIGURE 3: VISUAL FEEDBACK TABLE

The main purpose of these LEDs is to give a visual indication of the board status, making easier the operations of system working verify. Through the LEDs it is possible to check:

	LD1	LD2	LD3
- no input voltage	-> OFF	OFF	OFF
- protection section +5 Vdc engaged	-> OFF	ON	don't care
- protection section +12 Vdc engaged	-> don't care	don't care	OFF
- Everything is OK	-> ON	OFF	ON

LEDs are in the front side of the card, to be easily visible also when the card is inserted in a rack. To easily locate these LEDs on the board, please refer to figure 5.

CONNECTIONS

The **SPC 512** power supply has one connector that can be linkeded to other devices or directly to the field, according to system requirements. In this paragraph there are connector pin out, a short signals description (including the signals direction) and connections examples. Following description is reported to standard numeration of pins: such numeration is easily recognizable by connector internal print or board printed serigraph.

Connectors view are reported to the external side of power supply and are easily recognizable through their shape and serigraph.

DIN 41612 type F connector, that can be connected directly to **grifo**[®] cards like **YPB 01**, **SPB 04**, **SPB 08**, eases cabling phase and allows a faster (eventual) replacement of the whole power supply in case of damage or maintenance. Also, the wide contact surface assures a good transport of power provided and fetched. Value of input voltages and powers varies in a wide range as described in paragraphs "ELECTRIC FEATURES" and "POWER PROVIDED".

K1 - VOLTAGES AND SIGNALS CONNECTOR

K1 is a DIN 41612 type F, 48 pins connector, featuring rows d, b, z.

Through K1 any kind of external generator (like a transformer, a battery, another power supply, etc.) can provide AC or DC input voltage. It also allows to fetch the regulated output voltage to connect it to the external device to supply and to connect some signals related to sensing circuitry.

PIN	Row d	Row b	Row z	PIN
2	+Vdc IN	+Vdc IN	+Vdc IN	2
4	Vac1 IN	Vac1 IN	Vac1 IN	4
6	Vac1 IN	Vac1 IN	Vac1 IN	6
8	Vac2 IN	Vac2 IN	Vac2 IN	8
10	Vac2 IN	Vac2 IN	Vac2 IN	10
12	N.C.	SYNC	/RESET	12
14	N.C.	N.C.	N.C.	14
16	+5 Vdc	+5 Vdc	+5 Vdc	16
18	REF +5 Vdc	N.C.	REF GND +5 Vdc	18
20	GND +5 Vdc	GND+5 Vdc	GND+5 Vdc	20
22	-Vdc IN	-Vdc IN	-Vdc IN	22
24	+12 Vdc	+12 Vdc	+12 Vdc	24
26	N.C.	N.C.	N.C.	26
28	GND +12 Vdc	GND +12 Vdc	GND +12 Vdc	28
30	GND +12 Vdc	GND +12 Vdc	GND +12 Vdc	30
32	N.C.	N.C.	N.C.	32

FIGURE 4: K1 - SPC 512 VOLTAGES AND SIGNALS CONNECTOR

Signals description:

Vac1 IN	=	I	- AC input voltage.
Vac2 IN	=	I	- AC input voltage.
+Vdc IN	=	I	- Positive terminal of DC input voltage.
-Vdc IN	=		- Negative terminal of DC input voltage.
+5 Vdc	=	O	- Positive terminal of +5 Vdc regulated output voltage.
GND +5 Vdc	=		- Negative terminal of +5 Vdc regulated output voltage.
REF +5 Vdc	=	I	- Positive terminal of +5 Vdc sensing signal.
REF GND +5 Vdc	=	I	- Negative terminal of +5 Vdc sensing signal.
+12 Vdc	=	O	- Positive terminal of +12 Vdc regulated output voltage.
GND +12 Vdc	=		- Negative terminal of +12 Vdc regulated output voltage.
/RESET	=	O	- Valid +5 Vdc output voltage signal, in open collector.
SYNC	=	I	- Synchronization signal in case several regulators are connected in parallel.
N.C.	=		- Not connected.

OUTPUT VOLTAGE LOAD SENSING

SPC 512 is provided with a professional sensing circuitry that allows to work correctly also in critical connections situations. This feature allows the power supply to compensate autonomously the eventual voltage drop across the connection cables that carry the +5 Vdc regulated tension to the load.

The sensing signals REF +5 Vdc and REF GND +5 Vdc must be connected respectively to signals +5 Vdc and GND +5 Vdc directly on the load supplied that is on the farthest point from **SPC 512**.

This connection must be always performed: should this connection be uncomfortable or useless it is possible simply to short circuit pin **16d** to pin **18d** and pin **20z** to pin **18z** directly on K1, after having verified that external connection conditions allow to do this (cable thick enough, not inductive load, short distance connection, etc.). Please remark that **grifo**[®] mother boards already make the connection of sensing signals directly on the printed circuit board.

Figure 5 shows the suggested connection for sensing signals.

/RESET AND POWER FAILURE

Switching section of **SPC 512** generates a /RESET signal that informs eventual users of +5 Vdc regulated output voltage validity. In detail /RESET is an open collector signal that, when closed, connects to negative terminal of output voltage GND +5 Vdc. Its status has the following meaning:

Contact open	->	/RESET = +5 Vdc	->	Regulated +5 Vdc output voltage is valid
Contact closed	->	/RESET = GND +5 Vdc	->	Regulated +5 Vdc output voltage not valid because input voltage is too low or output voltage is out of range

The sections warrants at least 10 msec of duration for the signal (contact closed) to provide enough intervene time to the external circuitry.

Previous description shows that /RESET signal acts also as power failure and can be matched to microprocessor-based boards with the same signal with no problem. This is one of motivations for which **grifo**[®] mother boards already connect signal /RESET to the corresponding circuitry on CPU board directly on the printed circuit.

CONFIGURATIONS AVAILABLE

By default **SPC 512** is provided with both regulated sections that generate +5 Vdc and +12 Vdc. In case the customer has special needs the board can be provided in two different configurations, as described here:

SPC 512.5	->	provided only with section +5 Vdc; 5 A
SPC 512.12	->	provided only with section +12 Vdc; 2.5 A

Please remark that building of above configurations is subject to a minimum quantity of items ordered which must be agreed directly with **grifo**[®]. Indicator of sections installed on the board is in the bottom right corner of serigraph on the component side, as shown in figure 5.

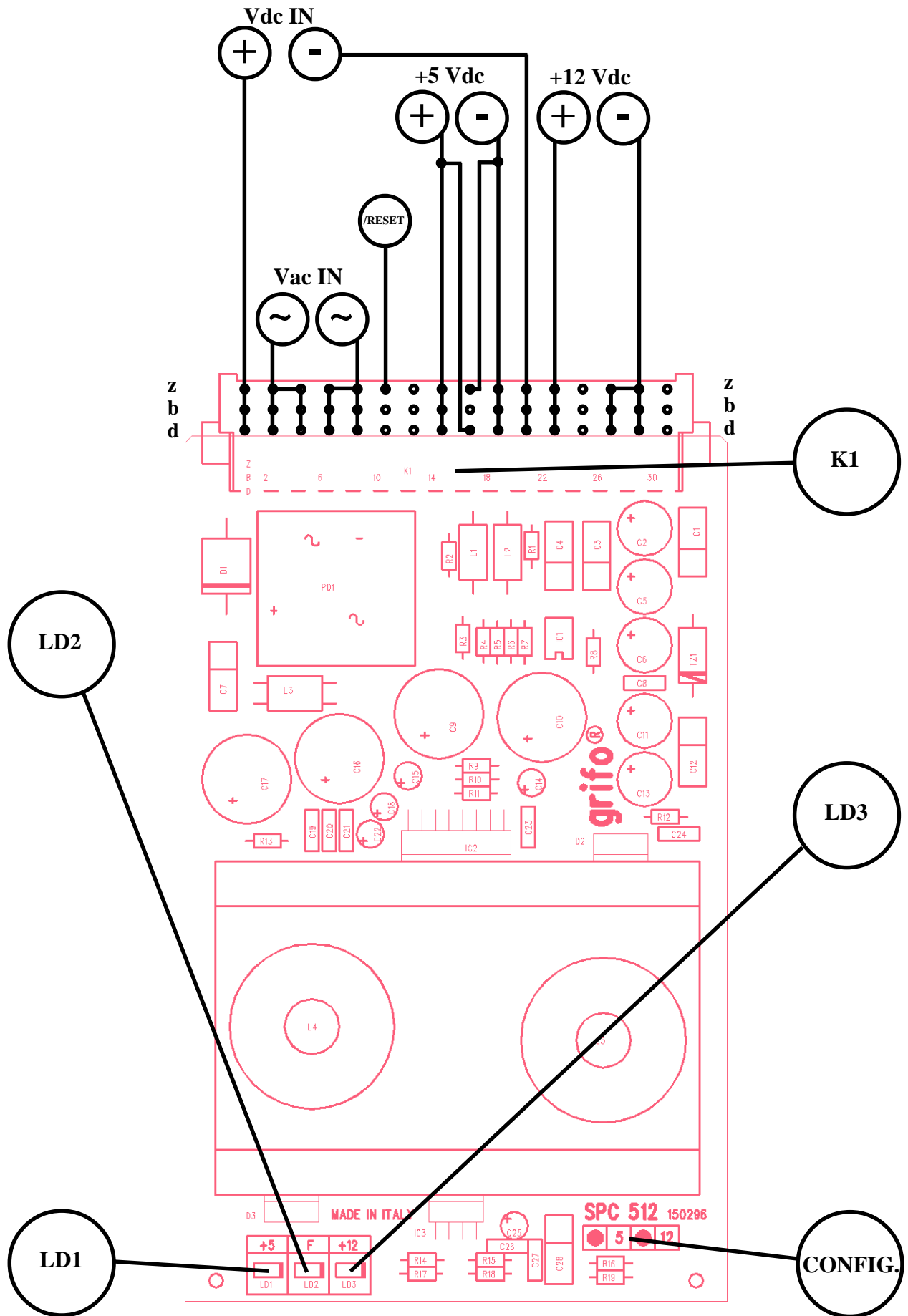


FIGURE 5: LEDs, CONNECTOR, EXTERNAL SENSING CONNECTION AND CONFIGURATION LOCATION

INPUT VOLTAGES AND UPS

Connector K1 features two pins for AC input voltage and two separated pins for DC input voltage; these should be used only in the possible combinations described here:

- 1) unique AC voltage on pins Vac1 and Vac2 of K1;
- 2) AC voltage on pins Vac1 IN and Vac2 IN of K1 and back up DC voltage on pins +Vdc IN and -Vdc IN of K1;
- 3) DC voltage on pins Vac1 IN and Vac2 IN of K1 and back up DC voltage on pins +Vdc IN and -Vdc IN of K1;

Please remark that -Vdc IN signal of K1 is physically connected to GND +5 Vdc and GND +12 Vdc signal always of K1 to warrant the same ground potential between output voltage and DC input voltage; differently, in case 3 ground of DC input voltage is not physically connected to ground of regulated output voltage. In fact the two grounds differ of about 1.5 V, typical difference of potential due to the bridge rectifier.

In cases 2 and 3 **SPC 512** acts as an UPS, that is should the voltage on pins Vac1 IN and Vac2 IN black out the regulated output voltages are still present through back up input voltage, which is usually provided by an opportune battery.

POWER PROVIDED

Double regulation section of **SPC 512** can provide a maximum total power of 55 W, as described in the following table:

SECTION	Vac Vdc IN	Power IN	Vdc OUT	Power OUT
+5 Vdc	11÷33 Vac or 16÷46 Vdc	34.4 W	5 Vdc	25 W
+12 Vdc	11÷33 Vac or 16÷46 Vdc	41.3 W	12 Vdc	30 W
Total	11÷33 Vac or 16÷46 Vdc	75.7 W	+5; +12 Vdc	55 W

FIGURE 6: POWER TABLE

Values of input power reported are referred to average efficiency of power supply (80%) and increased of 10%. For safety it is always opportune to choose a greater power and an input voltage close to the maximum value reported. To obtain maximum output power it is essential to provide an input voltage with the features specified in figure 6 considering that such values are referred to an environmental temperature of 20 °C. Changes of this temperature may influence remarkably both maximum output power and output voltage: the user must employ all techniques to keep temperature in admitted range. Should thermal dissipation be insufficient, forced ventilation may be used.

SPC 512 features components and circuits designed to reduce noise sensibility and increase efficiency; also, the lay out has been carefully tracked to carry the generated power in the best way possible, avoiding mass rings, instability, emissions, etc.



FIGURE 7: CARD PHOTO

PROTECTIONS

SPC 512 features the typical protections that allow to save them against improper uses and contemporarily assure that the power supply remains in the range of nominal working values. In detail the power supply is provided with the following protections:

Section +5 Vdc:

Overheat Switching regulation section keeps under control its own working temperature so when this latter exceeds **150 °C** it disables the +5 Vdc output voltage to allow the temperature to decrease. Output is automatically restored when the temperature value gets lower than hysteresis threshold to prevent instable output conditions.

Overload Switching regulation section keeps under control output current on pins 16 dbz of K1 so when current exceeds **11 A** it disables the +5 Vdc output voltage. After this, current is automatically restored softly. Soft start delay assures a limitation on output current in case the overload condition is still present.

Short circuit Considered as overload condition.

Under Voltage in input Switching regulation section keeps under control input voltage on K1 so when this goes under **12 Vdc** it disables the +5 Vdc output voltage. Output is automatically restored when input voltage exceeds the 1 Vdc hysteresis threshold, to prevent instable output conditions.

Section +12 Vdc:

Overheat Switching regulation section keeps under control its own working temperature so when this latter exceeds **150 °C** it disables the +12 Vdc output voltage to allow the temperature to decrease. Output is automatically restored when the temperature value gets lower than hysteresis threshold to prevent instable output conditions.

Overload Switching regulation section keeps under control output current on pins 24 dbz of K1 so when current exceeds **3 A** it disables the +12 Vdc output voltage. After this, current is automatically restored softly. Soft start delay assures a limitation on output current in case the overload condition is still present.

Short circuit Considered as overload condition.

Intervent of one of the above described protections is visualized by status LEDs, as described in paragraph “VISUAL FEEDBACK”.

After protection intervent, output voltage restore is always performed gradually (soft start), with gradual power increase.

NOTE

It is always a good idea to consider to put an opportunely dimensioned protection fuse on input voltage, both AC and DC, to keep safe the power source.

EXTERNAL DEVICES

The **SPC 512** can supply most of **grifo®** cards, or many systems of other companies. Most common applications are to provide power supply to mother boards, galvanically isolated input and output sections, or to many **GPC® xxx** control cards. As an example here is reported a list with a short description of overall performances; for further information please consult specific documentation.

MB3 01 , MB4 01 , MB8 01 , WMB 12 , WMB 16 , MMB 21

Mother Board 3, 4, 8, 12, 16, 21 slots

Motherboard with 3, 4, 8, 12, 16, or 21 slots of **ABACO®** industrial BUS industriale; slot pitch 4 or 5 TE; standardized power supply connectors; LEDs for supply visual feed back; local reset key; termination resistors on signals; holes for docking to rack 3 HE.

ABB 03

ABACO® Block BUS 3 slots

3 slots **ABACO®** mother board; 4 TE pitch connectors; **ABACO®** I/O BUS connector; screw terminal for power supply; connection for DIN C type and Ω rails.

OBI 01 - OBI 02

Opto BLOCK Input NPN-PNP

Interface between 16 NPN, PNP optocoupled and displayed input lines, with screw terminal and **ABACO®** standard I/O 20 pins connector; power supply section; connection for DIN Ω rails.

OBI N8 - OBI P8

Opto BLOCK Input NPN-PNP

Interface between 8 NPN, PNP optocoupled and displayed input lines, with screw terminal and **ABACO®** standard I/O 20 pins connector; power supply section; connection for DIN Ω rails.

TBO 01 - TBO 08

Transistor BLOCK Output

Interface for **ABACO®** standard I/O 20 pins connector; 16 or 8 transistor output lines 45 Vdc 3 A open collector; screw terminal; optocoupled and displayed lines; connection for DIN 247277-1 and 3 rails.

RBO 08 - RBO 16

Relé BLOCK Output

Interface for **ABACO®** standard I/O 20 pins connector; 8 or 16 displayed Relays 3A with MOV; screw terminal; connection for DIN Ctype and Ω rails.

XBI 01

miXed BLOCK Input Output

Interface for **ABACO®** standard I/O 20 pins connector; 8 transistor output lines 45 Vdc 3A; 8 input lines; screw terminal; optocoupled and displayed I/O lines; connection for DIN 247277-1 and 3 rails.

XBI R4 - XBI T4

miXed BLOCK Input-Output

Interface for **ABACO®** standard I/O 20 pins connector; 4 Relays 3A with MOV or 4 optocoupled Transistors 3A open collectors; 4 input lines optocoupled; screw terminal; connection for DIN Ctype and Ω rails.

FBC xxx

Flat Block Contactxxx pins

This interconnection system "wire to board" allows the connection to many type of flat cable connectors to terminal for external connections. Connection for DIN Ω rails.
for DIN 247277-1 and 3 rails; 4 type dimension.

C/O R16

16 Coupled Input Output Relé

16 optocoupled input with π -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.

PCI 01

32 Peripheral Coupled Input

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

JMS 34

Jumbo Multifunction Support for axis control

Smart peripheral for axis control; 3 optocoupled inputs for acquisition of incremental bidirectional encoders; zero sign; 4 D/A converter channels 12 bits; output range ± 10 V; 8 NPN optocoupled inputs; 8 Open Collector transistor outputs 45 Vdc, 500 mA; all I/O visualized through LEDs; 8 bit BUS; extended addressing.

GPC® 188F

General Purpose Controller 80C188

80C188 μ 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® 554

General Purpose Controller 80C552

Microprocessor 80C552 at 22 MHz; implementation completely CMOS; 32K EPROM; 32 K SRAM; 32 K EEPROM or SRAM; EEPROM; 2 RS 232 serial lines; 16 I/O TTL; 2 PWM lines; 16 bits Timer/Counter; Watch Dog; 6 signals A/D converter with resolution 10 bit; interface for **ABACO®** I/O BUS.

GPC® 154

"4" Type General Purpose Controller Z80

84C15 μ P, 10÷16 MHz; Full CMOS; 1 RS 232 line; 1 RS 232 or RS 422-485 line; 16 TTL I/O lines; 2÷4 Timers Counters; 512K EPROM or FLASH; 512K RAM and RTC backed; 8K serial EEPROM; Watch dog; 2 readable DIPs; LCD Interface; Abaco® I/O BUS; 5Vdc Power supply; Size: 100x50 mm.

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 ± 2 Vdc or 4÷20mA; 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.

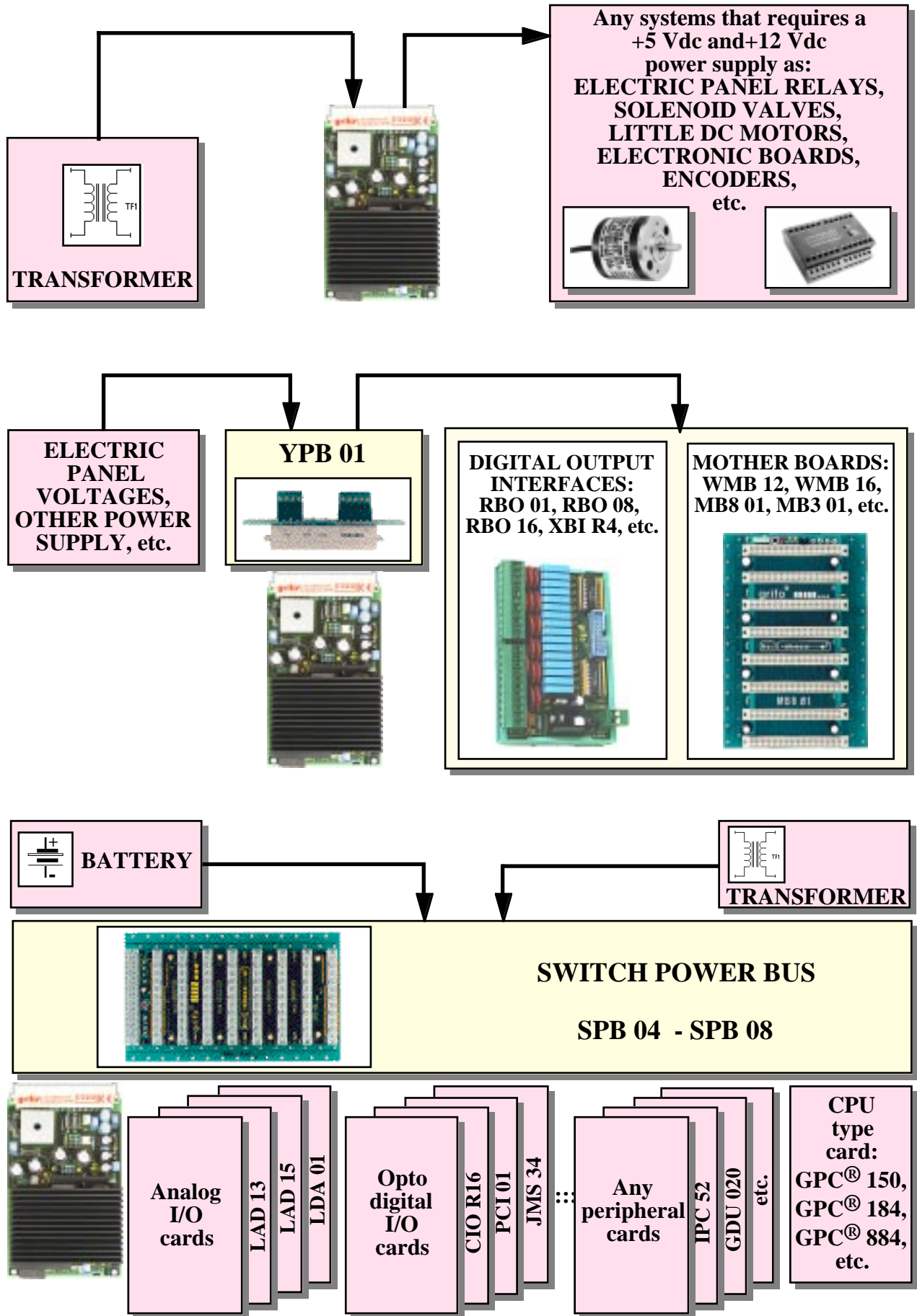


FIGURE 8: POSSIBLE CONNECTIONS DIAGRAM

BIBLIOGRAPHY

In this chapter there is a complete list of technical books, where the user can find all the necessary documentations on the components mounted on **SPC 512**.

Manual SGS: *Power supply application manual*

Manual Motorola semiconductor: *Rectifiers and zener diodes data book*

Manual Toshiba: *Photo couplers - Data book*

For further information and upgrades please refer to specific internet web pages of the manufacturing companies.



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