OBI 01   OBI 02
PBI 01   RBO 01
TBO 01   XBI 01

TECHNICAL MANUAL

OBI 01, OBI 02, PBI 01, RBO 01, TBO 01, XBI 01   Rel. 5.00 *Edition 18 May 2005*

OBI 01   OBI 02
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TECHNICAL MANUAL

OBI 01 is an interface between 16 optocoupled NPN inputs on a quick release screw terminal connector visualized by LEDs, and 16 TTL signals on a low profile connector. Power suply for optocouplers is on board. Delivered in a container for mounting on Ω rail standard DIN 247277-1 and 3.

OBI 02 is an interface between 16 optocoupled PNP inputs on a quick release screw terminal connector visualized by LEDs, and 16 TTL signals on a low profile connector. Power suply for optocouplers is on board. Delivered in a container for mounting on Ω rail standard DIN 247277-1 and 3.

PBI 01 is an interface between 16 optocoupled PNP inputs, on a quick release screw terminal connector, and 16 transistor NPN outputs, visualized by LEDs, on a low profile connector. Delivered in a container for mounting on Ω rail standard DIN 247277-1 and 3.

RBO 01 interfaces 8 inputs (TTL or relays), visualized by LEDs, on a low profile connector and 16 relay outputs 5 or 10 A, on a quick release screw terminal connector. Delivered in a container for mounting on Ω rail standard DIN 247277-1 and 3.

TBO 01 interfaces 16 optocoupled TTL inputs, visualized by LEDs, on a low profile connector, and 16 transistor NPN outputs, on a quick release screw terminal connector. Delivered in a container for mounting on Ω rail standard DIN 247277-1 and 3.

XBI 01 interfaces 8 optocoupled TTL inputs, visualized by LEDs and 8 transistor NPN outputs; is also interfaces 8 optocoupled NPN inputs and 8 TTL outputs. Delivered in a container for mounting on Ω rail standard DIN 247277-1 and 3.

OBI 01, OBI 02, PBI 01, RBO 01, TBO 01, XBI 01   Rel. 5.00 *Edition 18 May 2005*

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IMPORTANT

SYMBOLS DESCRIPTION

In the manual could appear the following symbols:

 Attention: Generic danger

 Attention: High voltage

 Attention: ESD sensitive device

Trade Marks

GENERAL INDEX

FIGURES INDEX

INTRODUCTION

The use of these devices has turned - IN EXCLUSIVE WAY - to specialized personnel.
This device is not a **safe component** as defined in directive **98-37/CE**.

Pins of Mini Module are not provided with any kind of ESD protection. They are connected directly to their respective pins of microcontroller. Mini Module is affected by electrostatic discharges. Personnel who handles Mini Modules is invited to take all necessary precautions to avoid possible damages caused by electrostatic discharges.

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

This handbook makes reference to cards:

OBI 01 revision	**220888**
OBI 02 revision	**220888**
PBI 01 revision	**220888**
RBO 01 revision	**220888**
TBO 01 revision	**100189**
XBI 01 revision	**101204**.

The validity of the bring informations is subordinate to the number of the card release.

PRINTED CIRCUIT REVISION NUMBER

PRINTED CIRCUIT REVISION NUMBER
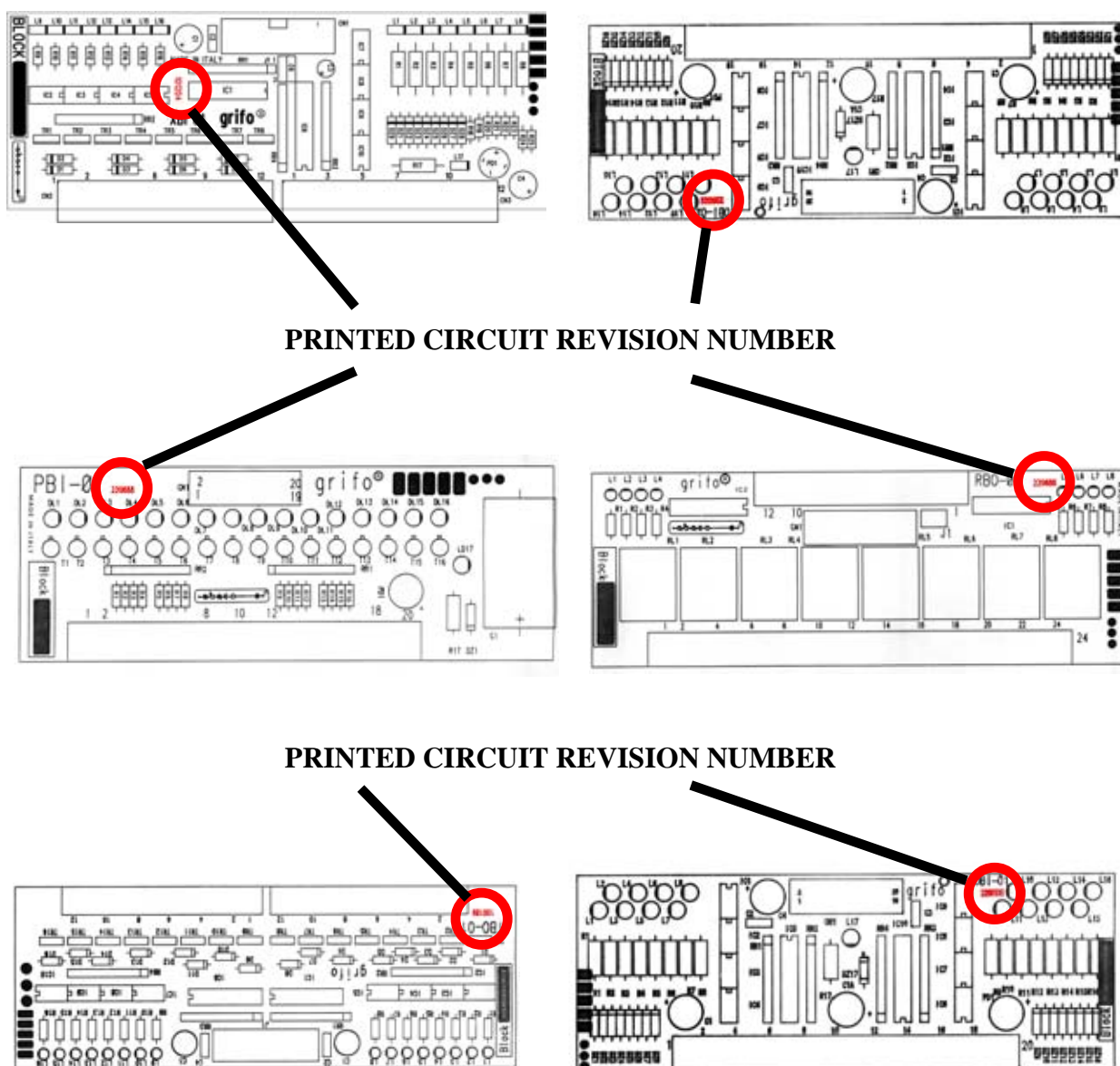
FIGURE 1: LOCATION OF REVISION NUMBER

GENERAL INFORMATION

The present manual reports information about some **BLOCK** serie modules:

OBI 01 revision **220888**
OBI 02 revision **220888**
PBI 01 revision **220888**
RBO 01 revision **220888**
TBO 01 revision **100189**
XBI 01 revision **101204**.

These block allow to solve the most common problems of connecting electornic devices to the external world.
The following chapaters will show the several blocks singularly, explaining electrical and physical features, connection, supplying and use modalities. Also, the meaning of the several LEDs installed on the modules will be described.
About connectors location and their enumeration, please always refer to the serigraph printed on the boards; should this not be readable please refer to the components maps contained in this manual.

NOTE
In the pin out description of standard 20 pins I/O **ABACO®** connector, some signals are called port 1 and 2. For this pin out has been made a standard, all the boards provided with a connector compliant to this standard can be connected to **BLOCK** serie modules, even if the signals name is different. For example, on the boards provided with PPI 8255, the port A on the 20 pins connector corresponds to port 1 on **BLOCK** serie modules and port B corresponds to port 2.

OBI 01 AND OBI 02

The modules of Block serie **OBI 01** ed **OBI 02** (**O**pto **B**lock **I**nput) are designed to interface input signals from the fiekd to boards of **ABACO®** listing provided with 20 ways standard I/O TTL connector.

They feature 16 input lines, optocoupled and visualized by LEDs, and 16 TTL level outputs.

OBI 01 features inputs for NPN drivers, while **OBI 01** features inputs for PNP drivers.

Both modules can interface intelligent boards, like **GPC® 188F**, **GPC® 150**, **GPC® 550**, etc., through a standard I/O **ABACO®** connector.

Modules **OBI 01** and **OBI 02** use a quick release screw terminal connector to allow the connection of optocoupled inputs from external world and optocouplers power supply.

To easy the recognition of inputs lines, all visualized by LEDs, a standard has been implemented on all boards of **ABACO®** family.

This standard is assigning to 8 yellow LEDs the byte of port 2, while the byte of port 1 is assigned to 8 green LEDs.

A specific section generates the optocouplers power supply tension (+24 Vcc nominl), starting from a tension in the range between 18 and 24 Vac.

A red LED, when ON, indicates the presence of above mentioned voltage.

A specific output allows to connect the 24 Vcc rectified by on board circuitery and so to supply small external loads, for example the relays module **RBO 01**.

Modules **OBI 01** and **OBI 02** are delivered with container for Ω rails standard DIN 46277-1 and 3.

TECHNICAL FEATURES

Number of signals:	16 NPN inputs for **OBI 01**
	16 PNP inputs for **OBI 02**
Size:	168 x 72 x 41 mm
Weight:	116 g
Connectors:	CN1: 20 ways, low profile, vertical, male
	CN2: 20 ways, quick release screz terminal, horizzontal
Temperature range:	from 0 to 50 centigrad degreeses
Relative humidity:	20% up to 90% without condense
Input voltage:	+24 Vcc nominal
Optocouplers power supply:	+24 Vcc nominal or from 18 to 24 Vac
Optocouplers consumption:	max 240 mA
Buffer power supply:	+5 Vcc
Buffer consumption:	35 mA

CN1 - I/O ABACO® CONNECTOR

CN1 is a 20 ways low profile male connector, vertical, pitch 2.54 mm.
It allows the connection between the optocoupled input signals on CN2 to the corresponding TTL outputs.
All signals are TTL level signals and are compliant to standard I/O **ABACO®** pin out.

P1.1	1	2	P1.0
P1.3	3	4	P1.2
P1.5	5	6	P1.4
P1.7	7	8	P1.6
P2.6	9	10	P2.7
P2.4	11	12	P2.5
P2.2	13	14	P2.3
P2.0	15	16	P2.1
GND	17	18	+Vcc
GND	19	20	N.C.
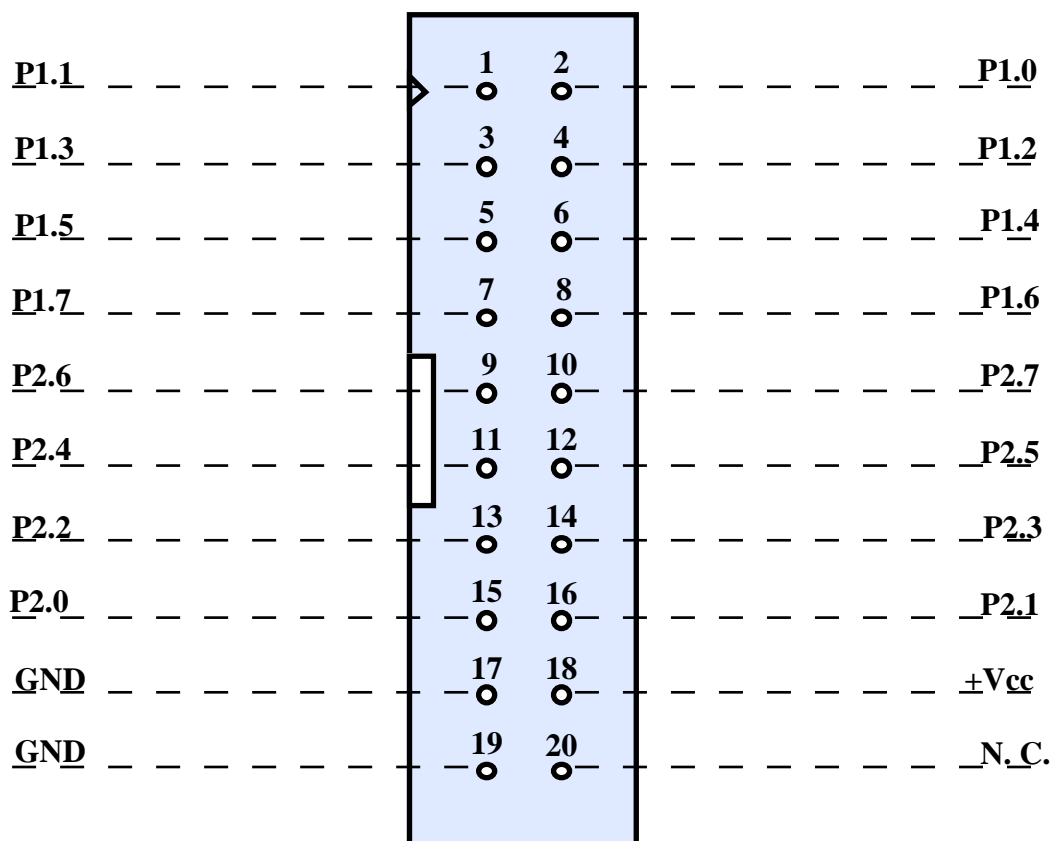
FIGURE 2: CN1 - I/O ABACO® CONNECTOR

Signals description:

P1.n = I/O - n-th signals of port 1.
P2.n = I/O - n-th signals of port 2.
+5 Vdc = I/O - Power supply +5 Vdc.
GND = - Ground.
N.C. = - Not connected.
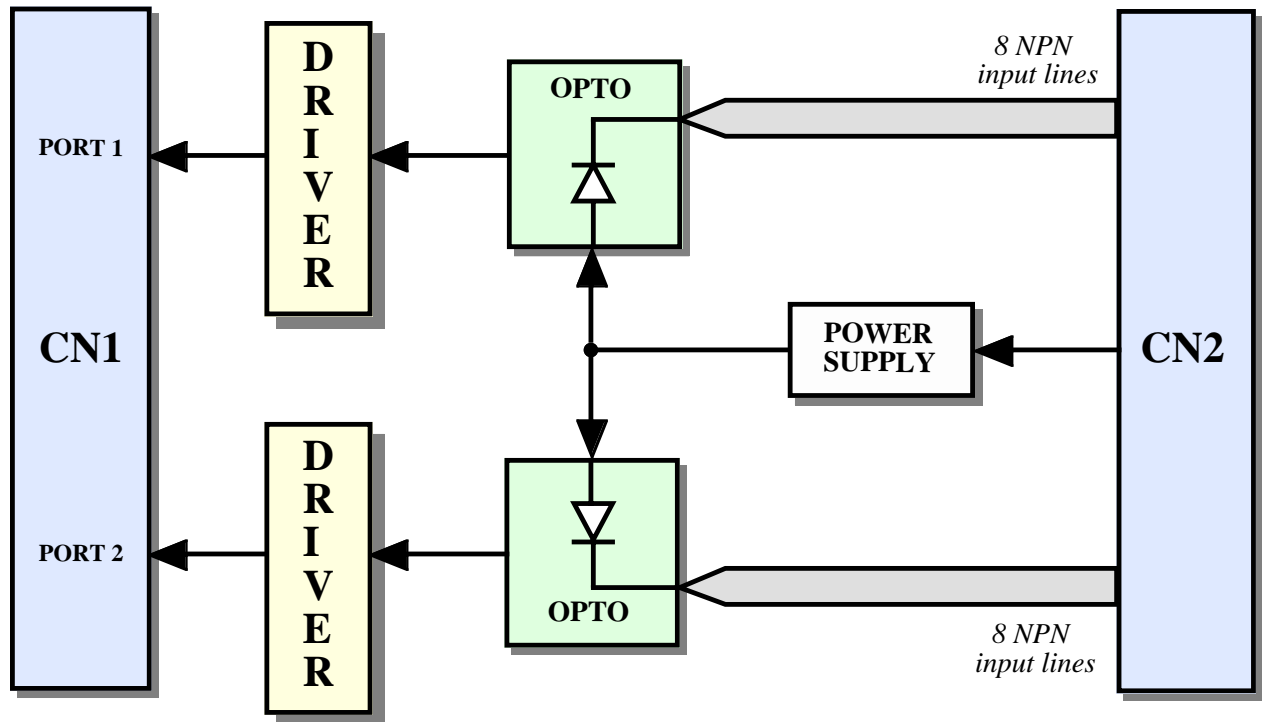
FIGURE 3: BLOCKS DIAGRAM OF OBI 01
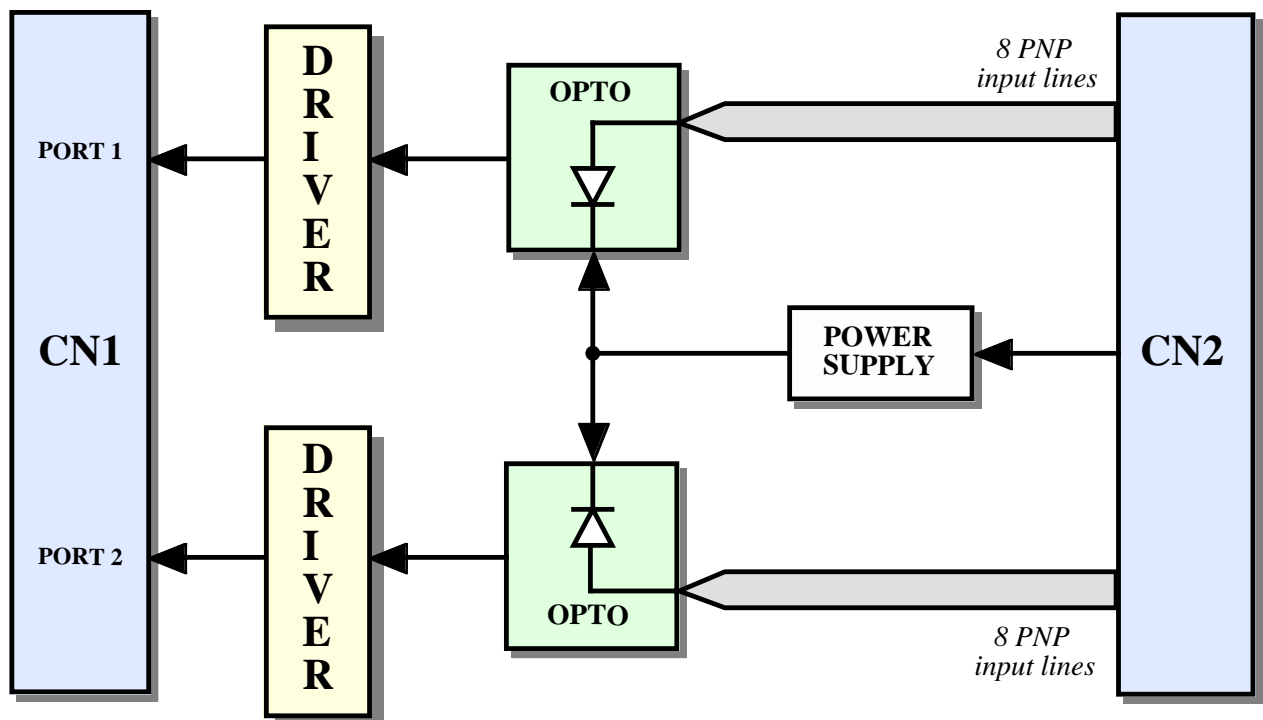
FIGURE 4: BLOCKS DIAGRAM OBI 02

CN2 - INPUT SCREW TERMINAL CONNECTOR

CN2 is a 20 ways quick release screw terminal connector,horizzontal.
It allows the connection of the optocoupled input signals that drive corresponding TTL output on CN1. It also allows to connect optocouplers power supply.
Following figure is referred to a view on the components side.

Terminal	Signal
20	18 ÷ 24 Vac
19	18 ÷ 24 Vac
18	+Vcc Opto
17	GND Opto
16	P2.7
15	P2.6
14	P2.5
13	P2.4
12	P2.3
11	P2.2
10	P2.1
9	P2.0
8	P1.7
7	P1.6
6	P1.5
5	P1.4
4	P1.3
3	P1.2
2	P1.1
1	P1.0
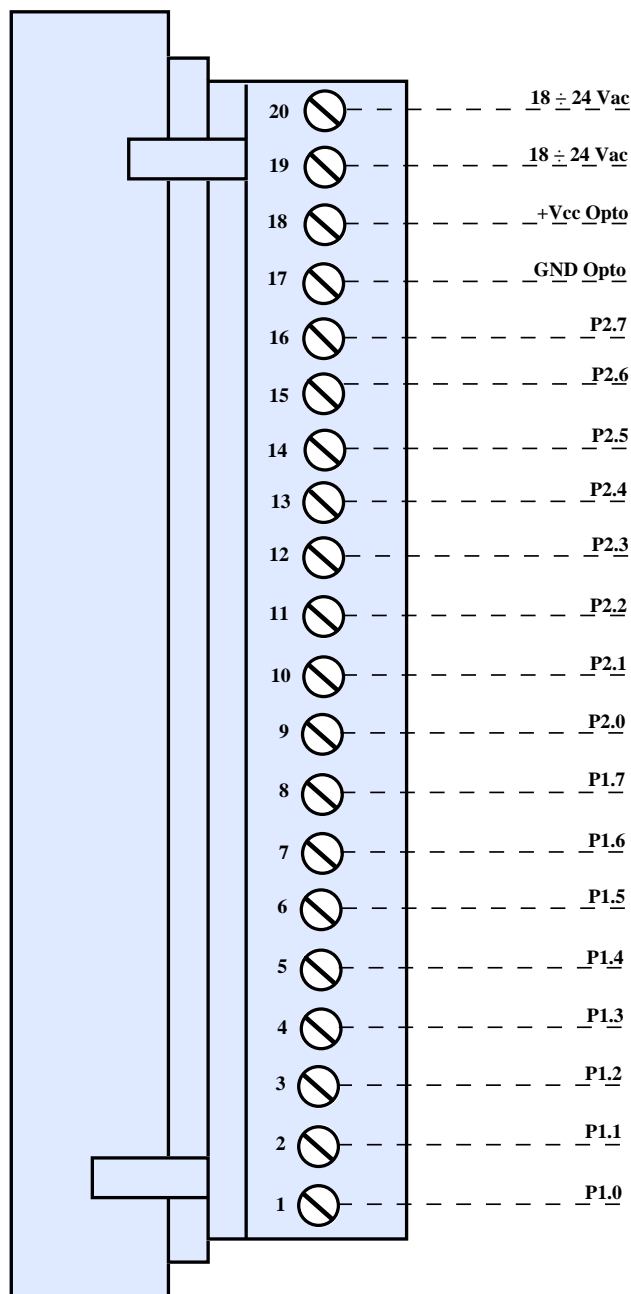
FIGURE 5: CN2 - INPUT SCREW TERMINAL CONNECTOR

Signals description:

P1.n	=	I/O	- n-th signal of port 1.
P2.n	=	I/O	- n-th signal of port 2.
+Vcc Opto	=	I	- DC Power supply +24 Vcc of optocouplers.
GND Opto	=		- Ground of optocouplers.
18 ÷ 24 Vac	=	I	- Alternate voltage for optocouplers supply.
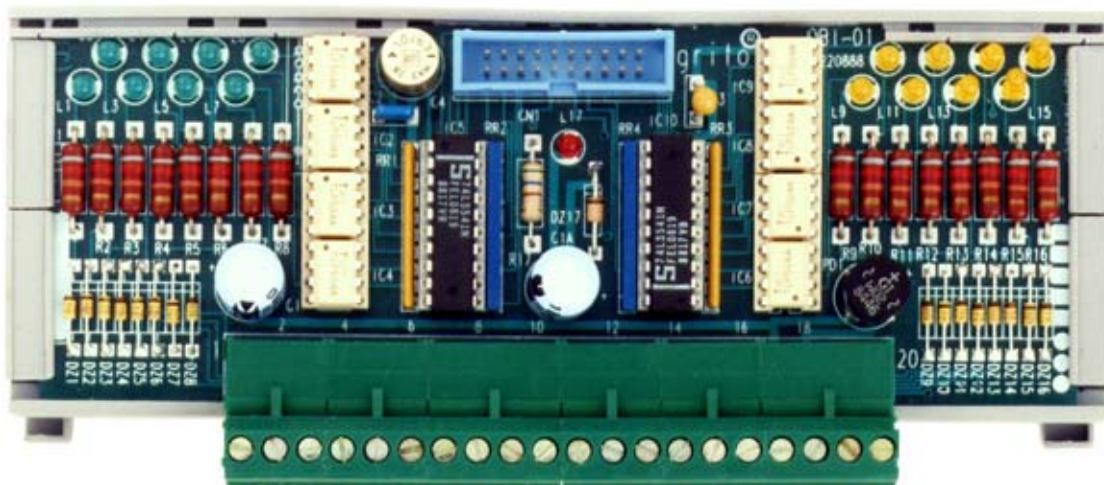
FIGURE 6: PHOTO OF OBI 01 IN CONTAINTER FOR Ω RAIL
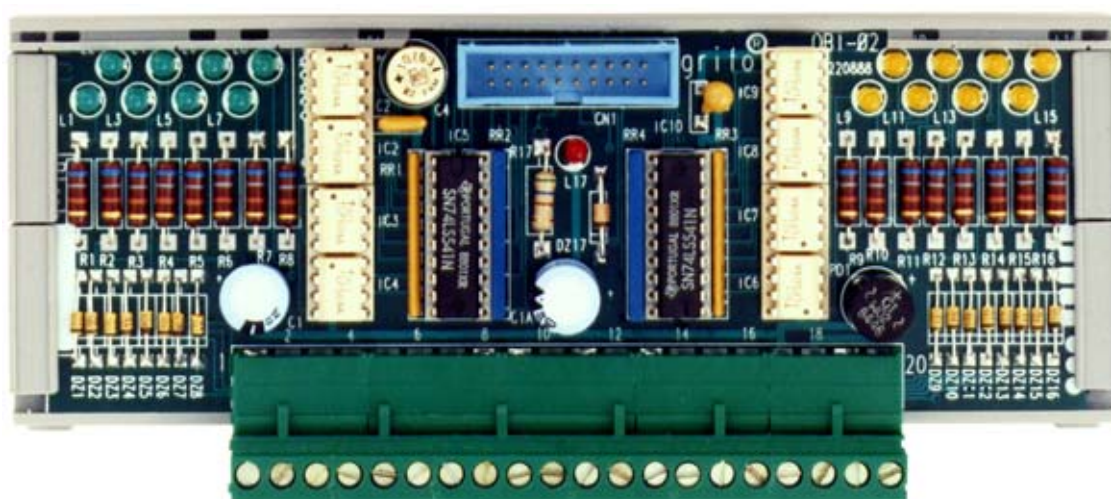
FIGURE 7: PHOTO OF OBI 02 IN CONTAINTER FOR Ω RAIL

OPTOCOUPLERS POWER SUPPLY

Optocouplers can be supplied directly from the field using a DC voltage of +24 Vcc, in this case it has to be connected to pin 17 (GND) and pin 18 (+Vcc Opto) of quick release screw terminal connector CN2.

Power supply for optocoupled sections can be provided also using alternate voltage, in the range from 18 to 24 Vac. It is rectified and filtered by a specific circitery on board.

Pins of quick release screw terminal connector CN2 to use in this case are 19 and 20.

The presence of optocouplers power supply voltage is alwats indicated by the status of LED L17.

SOFTWARE DESCRIPTION

The 16 optocoupled inputs of CN2 (NPN for **OBI 01**, PNP for **OBI 02**) are acquired directly on the TTL outputs of CN1 with the same name. Correspondance is:

Px.0 of CN2	->	Px.0 of CN1
Px.1 of CN2	->	Px.1 of CN1
Px.2 of CN2	->	Px.2 of CN1
Px.3 of CN2	->	Px.3 of CN1
Px.4 of CN2	->	Px.4 of CN1
Px.5 of CN2	->	Px.5 of CN1
Px.6 of CN2	->	Px.6 of CN1
Px.7 of CN2	->	Px.7 of CN1

where Px stands for P1 or P2.

Correspondance between logic status of bit read from CN1 and status of corresponding optocoupled input on CN2 is:

Bit at logic 0   ->   Contact closed (to +V Opto for **OBI 01**, to GND Opto for **OBI 02**)
Bit at logico 1   ->   Contact

VISUALIZATIONS

Both **OBI 01** and **OBI 02** are provided with 17 LEDs (8 yellow LEDs, 8 green LEDs and 1 red LED) that feature a visual feed back of the situation of the optocoupled inputs lines (PNP for **OBI 01**, NPN for **OBI 02**).

When a LED is ON, the corresponding input is actived, that is closed (to +V Opto for **OBI 01**, to GND Opto for **OBI 02**).

In addition, when the red LED L17 is ON, it indicated the presence of power supply for optocouplers.

Correspondance between LEDs and signals is:

LED	COLOUR	MEANING
L1	Green	Shows the status of optocoupled input driven by P1.0 of CN2. When LED is ON there is a current circulation from P1.0 to +Vcc Opto.
L2	Green	Shows the status of optocoupled input driven by P1.1 of CN2. When LED is ON there is a current circulation from P1.1 to +Vcc Opto.
L3	Green	Shows the status of optocoupled input driven by P1.2 of CN2. When LED is ON there is a current circulation from P1.2 to +Vcc Opto.
L4	Green	Shows the status of optocoupled input driven by P1.3 of CN2. When LED is ON there is a current circulation from P1.3 to +Vcc Opto.
L5	Green	Shows the status of optocoupled input driven by P1.4 of CN2. When LED is ON there is a current circulation from P1.4 to +Vcc Opto.
L6	Green	Shows the status of optocoupled input driven by P1.5 of CN2. When LED is ON there is a current circulation from P1.5 to +Vcc Opto.
L7	Green	Shows the status of optocoupled input driven by P1.6 of CN2. When LED is ON there is a current circulation from P1.6 to +Vcc Opto.
L8	Green	Shows the status of optocoupled input driven by P1.7 of CN2. When LED is ON there is a current circulation from P1.7 to +Vcc Opto.
L9	Yellow	Shows the status of optocoupled input driven by P2.0 of CN2. When LED is ON there is a current circulation from P2.0 to +Vcc Opto.
L10	Yellow	Shows the status of optocoupled input driven by P2.1 of CN2. When LED is ON there is a current circulation from P2.1 to +Vcc Opto.
L11	Yellow	Shows the status of optocoupled input driven by P2.2 of CN2. When LED is ON there is a current circulation from P2.2 to +Vcc Opto.
L12	Yellow	Shows the status of optocoupled input driven by P2.3 of CN2. When LED is ON there is a current circulation from P2.3 to +Vcc Opto.
L13	Yellow	Shows the status of optocoupled input driven by P2.4 of CN2. When LED is ON there is a current circulation from P2.4 to +Vcc Opto.
L14	Yellow	Shows the status of optocoupled input driven by P2.5 of CN2. When LED is ON there is a current circulation from P2.5 to +Vcc Opto.
L15	Yellow	Shows the status of optocoupled input driven by P2.6 of CN2. When LED is ON there is a current circulation from P2.6 to +Vcc Opto.
L16	Yellow	Shows the status of optocoupled input driven by P2.7 of CN2. When LED is ON there is a current circulation from P2.7 to +Vcc Opto.
L17	Red	When ON, optocouplers power supply is present.

FIGURE 8: VISUAL SIGNALATIONS TABLE
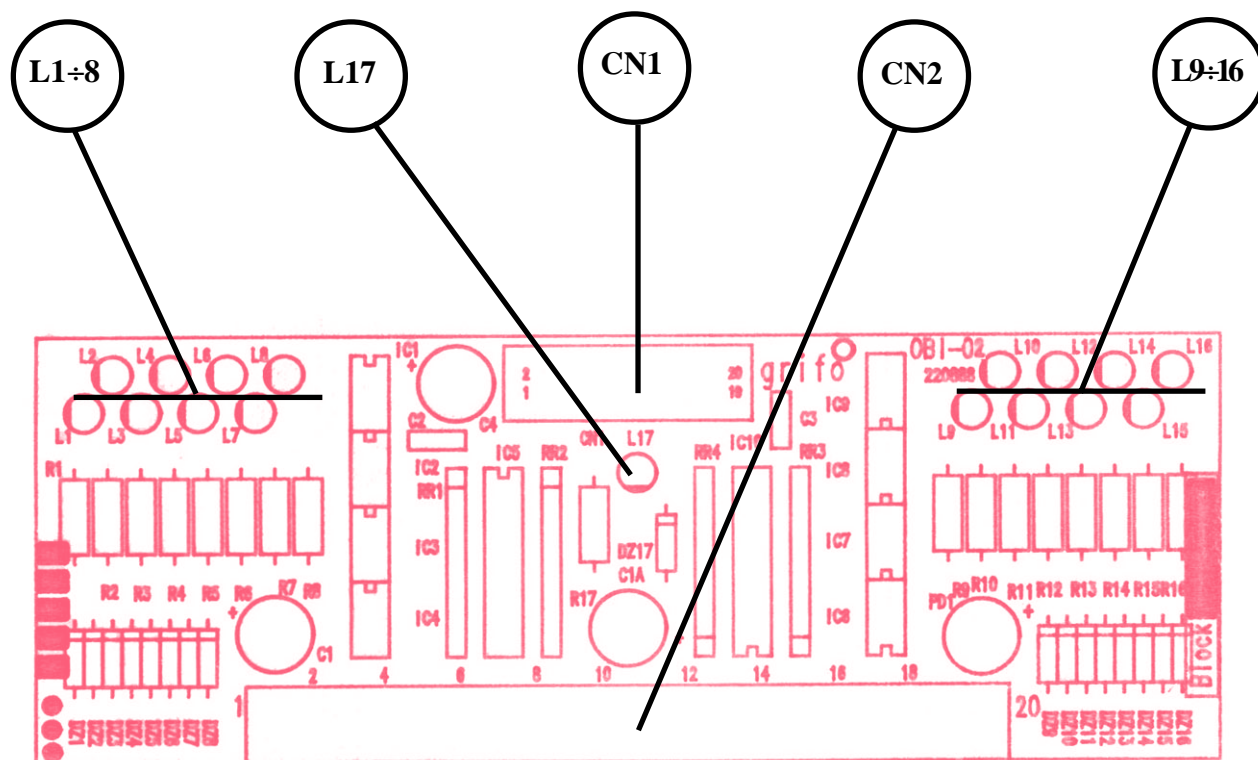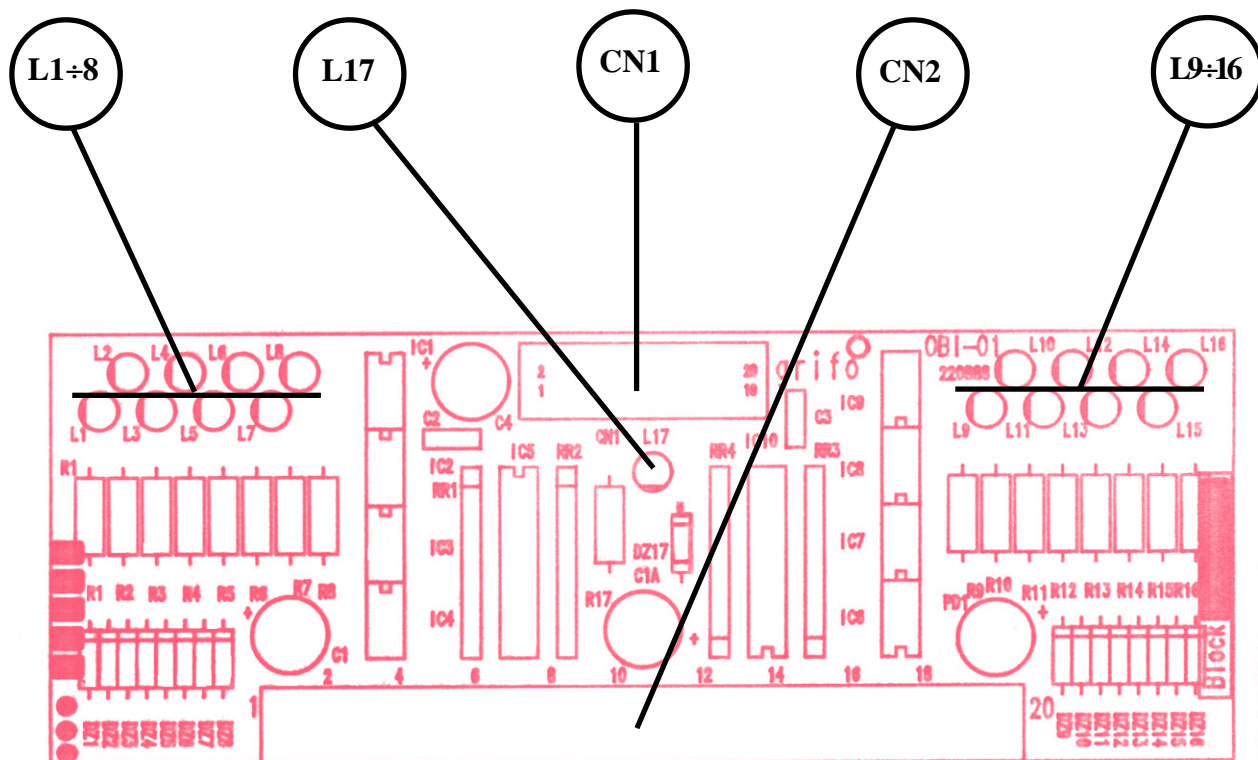
FIGURE 9: LEDS AND CONNECTORS LOCATION

PBI 01

Module of Block serie **PBI 01** (**P**NP **B**lock **I**nput) is designed to transform PNP outputs into NPN inputs connectable to **grifo®** listing peripheral boards like **CIO xxx**, **PCI xxx**, **PCO xxx**, etc.
So, module **PBI 01** features 16 PNP inputs, alla visualized by LEDs, and 16 corresponding NPN outputs.
NPN output signals are connected to the external world through a standard 20 ways I/O **ABACO®** connector, that allows to connect quickly to several I/O peripheral cards.
PNP input signals are connected to the module through a 20 ways quick release screw terminal connector.
Module is provided with a power supply circuitery, that allows to suppply external optocouplers to which **PBI 01** can be interfaced. Inpu voltage for this purpose can be AC in the range 18 to 24 Vac. Working status of this circuitery is indicated by a red LED.
Module **PBI 01** can also be used as field buffer for PNP input signals.
Above mentioned power supply is suitable for optocouplers of **grifo®** **CI/O** and **PCI**.
Module **PBI 01** is delivered by default with a plastic container for mouning on standard Ω rails type DIN 46277-1 and 3.

TECHNICAL FEATURES

Number of signals in input:	16 PNP inputs
Number of signals in output:	16 NPN outputs
Size:	168 x 72 x 46 mm
Weight:	120 g
Connectors:	CN1: 20 ways, low profile, vertical, male
	CN2: 20 ways, quick release screz terminal, horizzontal
Temperature range:	from 0 to 50 centigrad degreeses
Relative humidity:	20% up to 90% without condense
Input voltage:	+24 Vcc nominal
Optocouplers power supply:	+24 Vcc nominal or from 18 to 24 Vac

CN1 - NPN OUTPUTS I/O ABACO® CONNECTOR

CN1 is a 20 ways low profile male connector, vertical, pitch 2.54 mm.
It allows the connection to the external world of the 16 NPN outputs.
NOTE: output signals are **NOT** TTL. This connector must be interfaced, for examples, to input of **grifo®** board like **CI/O xxx**, **PCI xxx**, etc.
Connector is compliant to standard I/O **ABACO®** pin out.

P2.3	1 2	P2.4
P2.2	3 4	P2.5
P2.1	5 6	P2.6
P2.0	7 8	P2.7
P1.7	9 10	P1.0
P1.6	11 12	P1.1
P1.5	13 14	P1.2
P1.4	15 16	P1.3
±Vcc Opto	17 18	+Vcc Opto
GND Opto	19 20	GND Opto
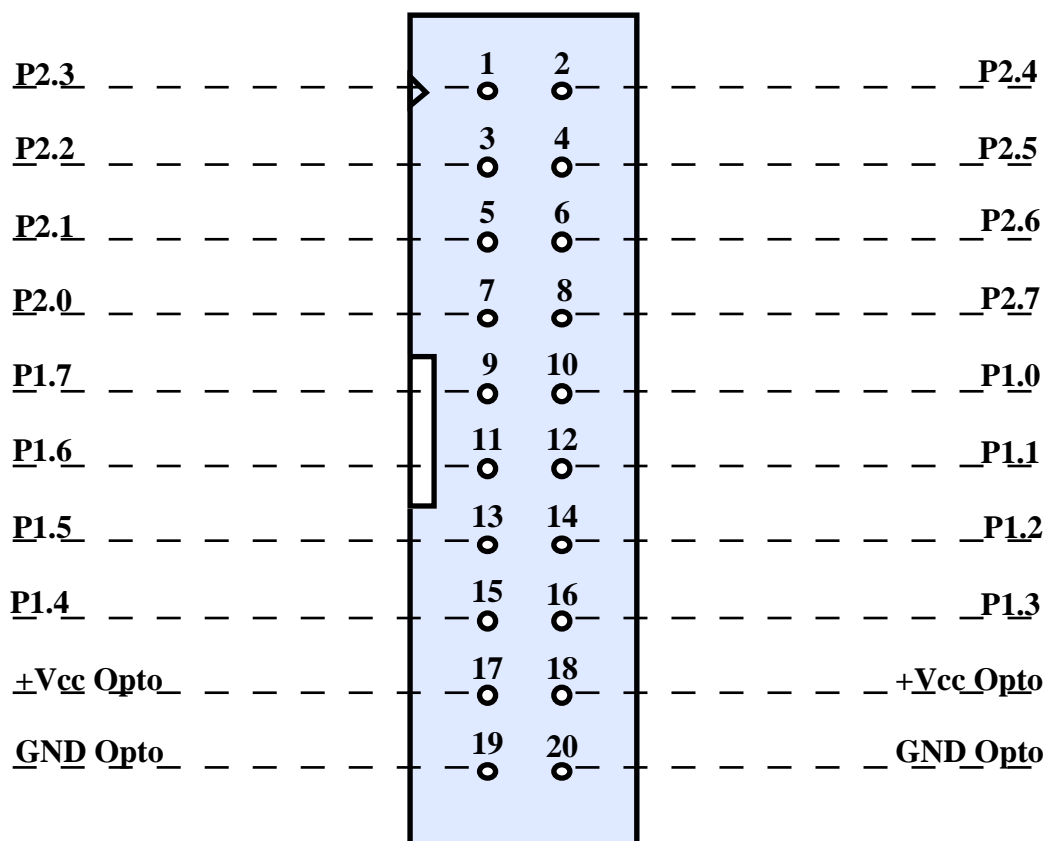
FIGURE 10: CN1 - NPN OUTPUTS I/O ABACO® CONNECTOR

Signals description:

P1.n	=	O	- n-th NPN output signals of port 1.
P2.n	=	O	- n-th NPN output signals of port 2.
+Vcc Opto	=	O	- Power supply for external optocouplers interfaced to this module.
GND Opto	=		- Ground for external optocouplers interfaced to this module.
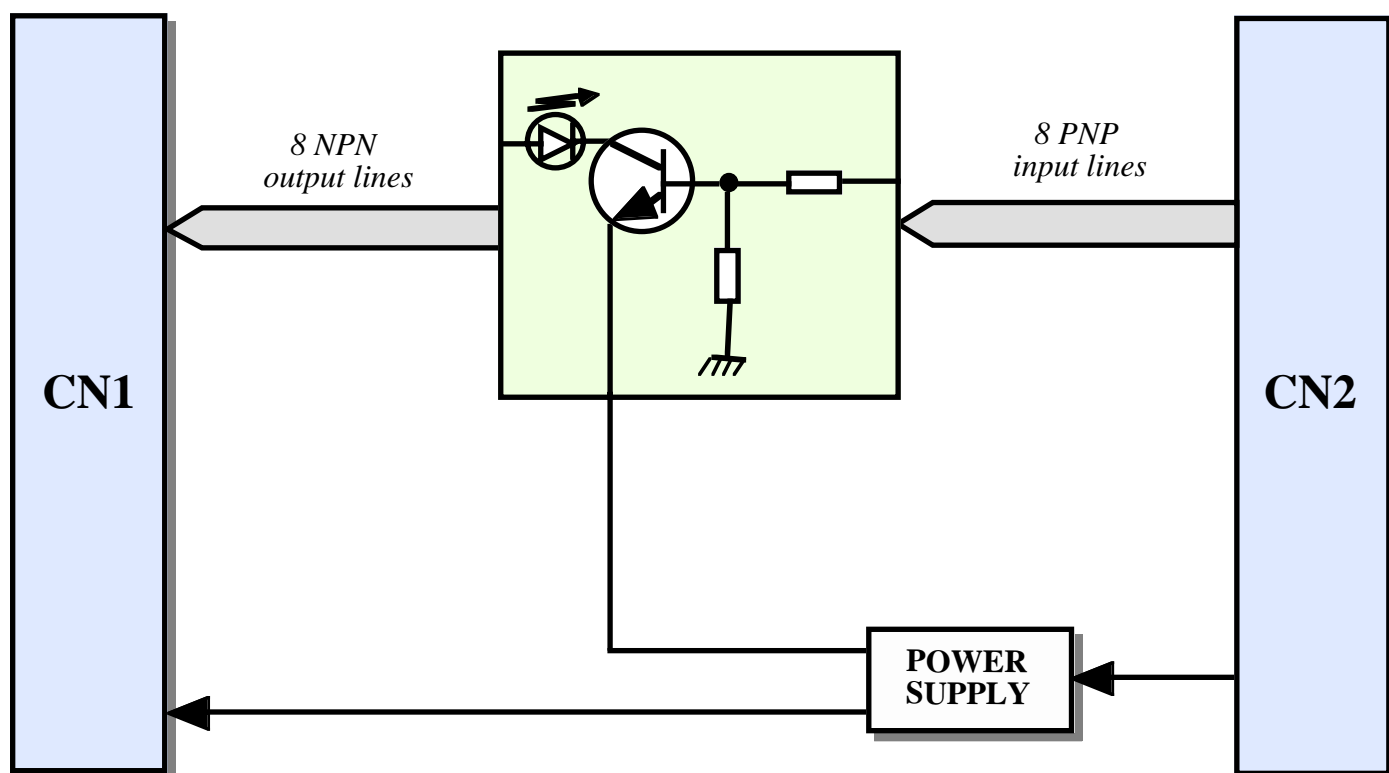
FIGURE 11: BLOCKS DIAGRAM OF PBI 01

CN2 - INPUT SCREW TERMINAL CONNECTOR

CN2 is a 20 ways quick release screw terminal connector,horizzontal.
It allows the connection of 16 PNP outputs from the field.
Following figure is referred to a view on the components side.

Terminal	Signal
20	18 ÷ 24 Vac
19	18 ÷ 24 Vac
18	+24 Vcc
17	GND
16	P2.7
15	P2.6
14	P2.5
13	P2.4
12	P2.3
11	P2.2
10	P2.1
9	P2.0
8	P1.7
7	P1.6
6	P1.5
5	P1.4
4	P1.3
3	P1.2
2	P1.1
1	P1.0
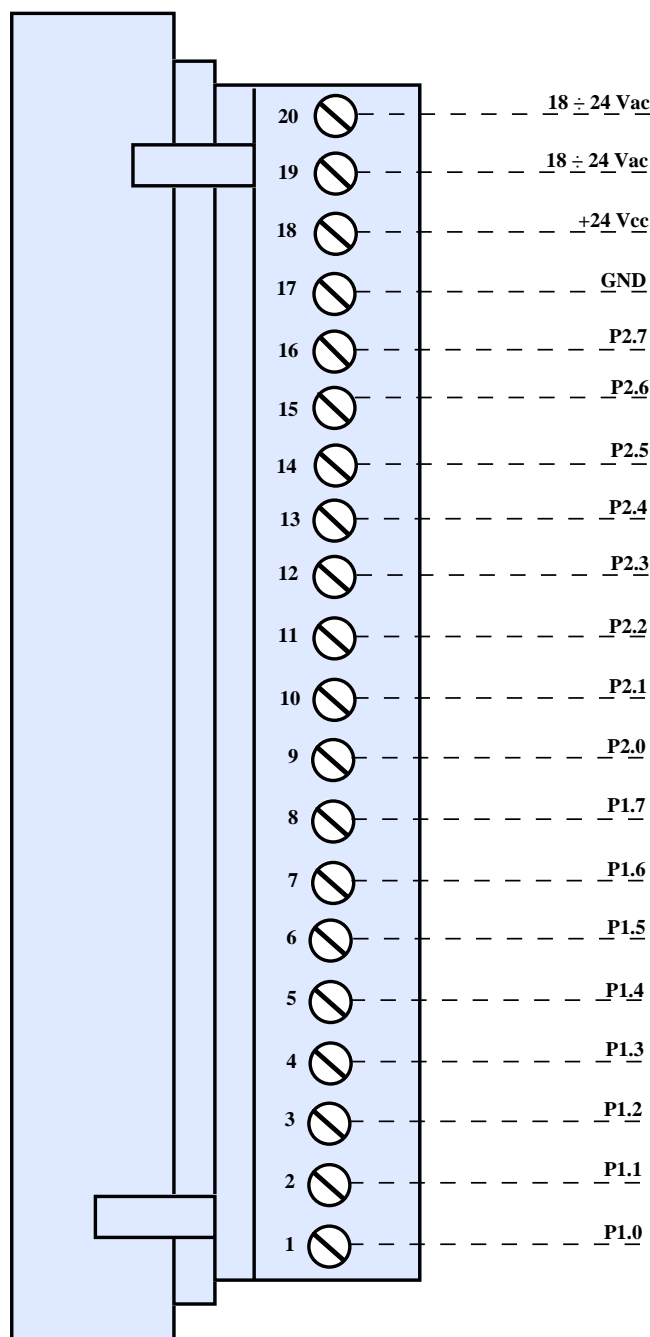
FIGURE 12: CN2 - INPUT SCREW TERMINAL CONNECTOR

Signals description:

P1.n	=	I	- n-th PNP input signal of port 1.
P2.n	=	I	- n-th PNP input signal of port 2.
+24 Vcc	=	I	- Input DC Power supply +24 Vcc for external optocouplers.
GND	=		- Ground of power supply +24 Vcc for external optocouplers.
18 ÷ 24 Vac	=		- Alternate voltage for optocouplers supply.
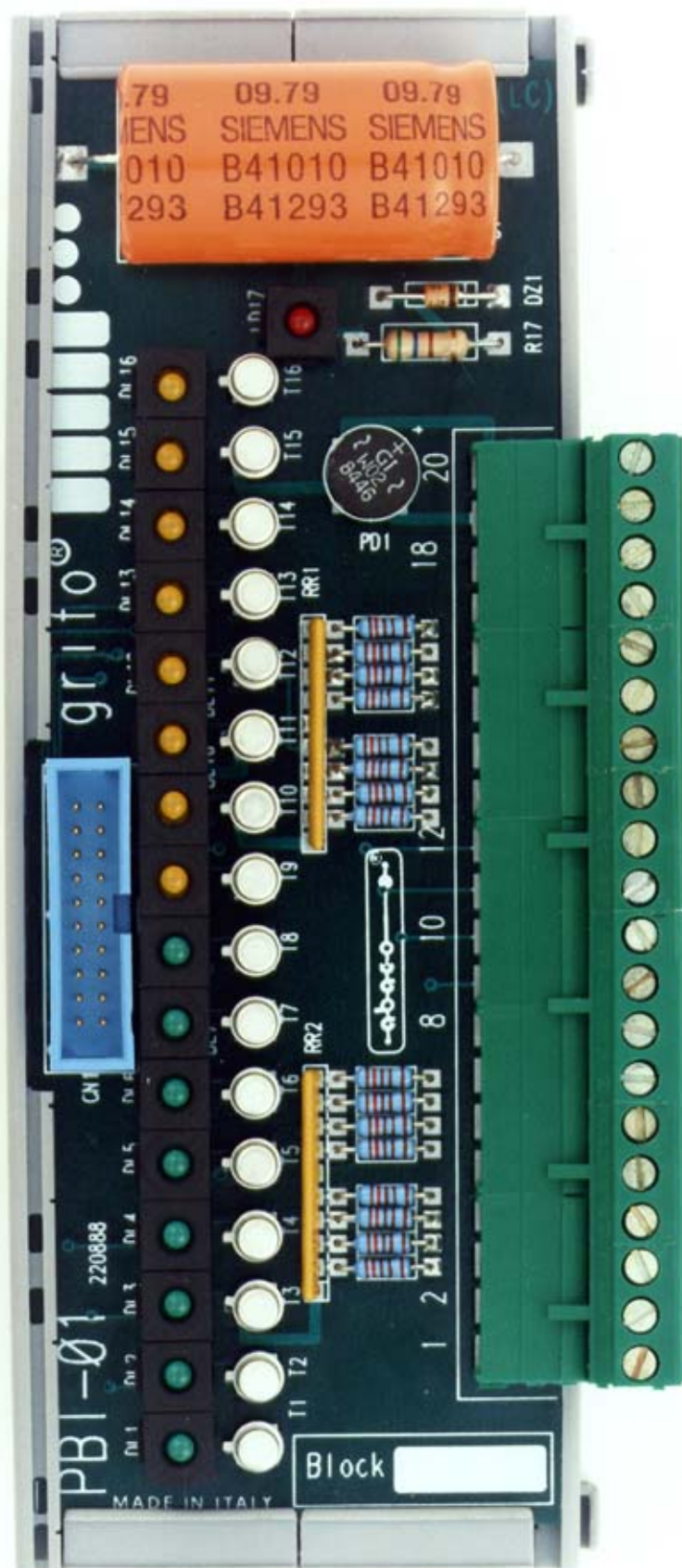
FIGURE 13: PHOTO OF PBI 01 IN CONTAINTER FOR Ω RAIL

OPTOCOUPLERS POWER SUPPLY

PBI 01 does not have any circuitery that nedds power supply, but it allows to supply external optocouplers to which it can be interfaced. This can be done directly from the field using a DC voltage of +24 Vcc, in this case it has to be connected to pin 17 (GND) and pin 18 (+24 Vcc) of quick release screw terminal connector CN2, or using alternate voltage, in the range from 18 to 24 Vac, in this case it must be connected to pin 19 and 20 of CN2.
It is rectified and filtered by a specific circitery on board.
The presence of optocouplers power supply voltage is alwats indicated by the status of LED LD17.

SOFTWARE DESCRIPTION

The 8 PNP inputs of CN2 are directly related to NPN outputs of CN1 with the same name. Correspondance is:

Px.0 of CN2	->	Px.0 of CN1
Px.1 of CN2	->	Px.1 of CN1
Px.2 of CN2	->	Px.2 of CN1
Px.3 of CN2	->	Px.3 of CN1
Px.4 of CN2	->	Px.4 of CN1
Px.5 of CN2	->	Px.5 of CN1
Px.6 of CN2	->	Px.6 of CN1
Px.7 of CN2	->	Px.7 of CN1

where Px stands for P1 or P2.
Correspondance between logic status of bit read from CN1 and status of corresponding optocoupled input on CN2 is:

Bit at logic 0   ->   Contact closed
Bit at logico 1   ->   Contact

VISUALIZATIONS

PBI 01 is provided with 17 LEDs (8 yellow LEDs, 8 green LEDs and 1 red LED) that feature a visual feed back of the situation of the optocoupled inputs lines.
When a LED is ON, the corresponding NPN input is actived, that is closed signals on pins 19 and 20 of CN1 (GND Opto).
In addition, when the red LED DL17 is ON, it indicates the presence of power supply for external optocouplers.
Correspondance between LEDs and signals is:

LED	COLOUR	MEANING
DL1	Green	Shows status of output driven by P1.0 of CN2. When ON, there is current circulation between P1.0 of CN1 and GND Opto of CN1.
DL2	Green	Shows status of output driven by P1.1 of CN2. When ON, there is current circulation between P1.1 of CN1 and GND Opto of CN1.
DL3	Green	Shows status of output driven by P1.2 of CN2. When ON, there is current circulation between P1.2 of CN1 and GND Opto of CN1.
DL4	Green	Shows status of output driven by P1.3 of CN2. When ON, there is current circulation between P1.3 of CN1 and GND Opto of CN1.
DL5	Green	Shows status of output driven by P1.4 of CN2. When ON, there is current circulation between P1.4 of CN1 and GND Opto of CN1.
DL6	Green	Shows status of output driven by P1.5 of CN2. When ON, there is current circulation between P1.5 of CN1 and GND Opto of CN1.
DL7	Green	Shows status of output driven by P1.6 of CN2. When ON, there is current circulation between P1.6 of CN1 and GND Opto of CN1.
DL8	Green	Shows status of output driven by P1.7 of CN2. When ON, there is current circulation between P1.7 of CN1 and GND Opto of CN1.
DL9	Yellow	Shows status of output driven by P2.0 of CN2. When ON, there is current circulation between P2.0 of CN1 and GND Opto of CN1.
DL10	Yellow	Shows status of output driven by P2.1 of CN2. When ON, there is current circulation between P2.1 of CN1 and GND Opto of CN1.
DL11	Yellow	Shows status of output driven by P2.2 of CN2. When ON, there is current circulation between P2.2 of CN1 and GND Opto of CN1.
DL12	Yellow	Shows status of output driven by P2.3 of CN2. When ON, there is current circulation between P2.3 of CN1 and GND Opto of CN1.
DL13	Yellow	Shows status of output driven by P2.4 of CN2. When ON, there is current circulation between P2.4 of CN1 and GND Opto of CN1.
DL14	Yellow	Shows status of output driven by P2.5 of CN2. When ON, there is current circulation between P2.5 of CN1 and GND Opto of CN1.
DL15	Yellow	Shows status of output driven by P2.6 of CN2. When ON, there is current circulation between P2.6 of CN1 and GND Opto of CN1.
DL16	Yellow	Shows status of output driven by P2.7 of CN2. When ON, there is current circulation between P2.7 of CN1 and GND Opto of CN1.
DL17	Red	When ON, optocouplers power supply is present.

FIGURE 14: VISUAL SIGNALATIONS TABLE
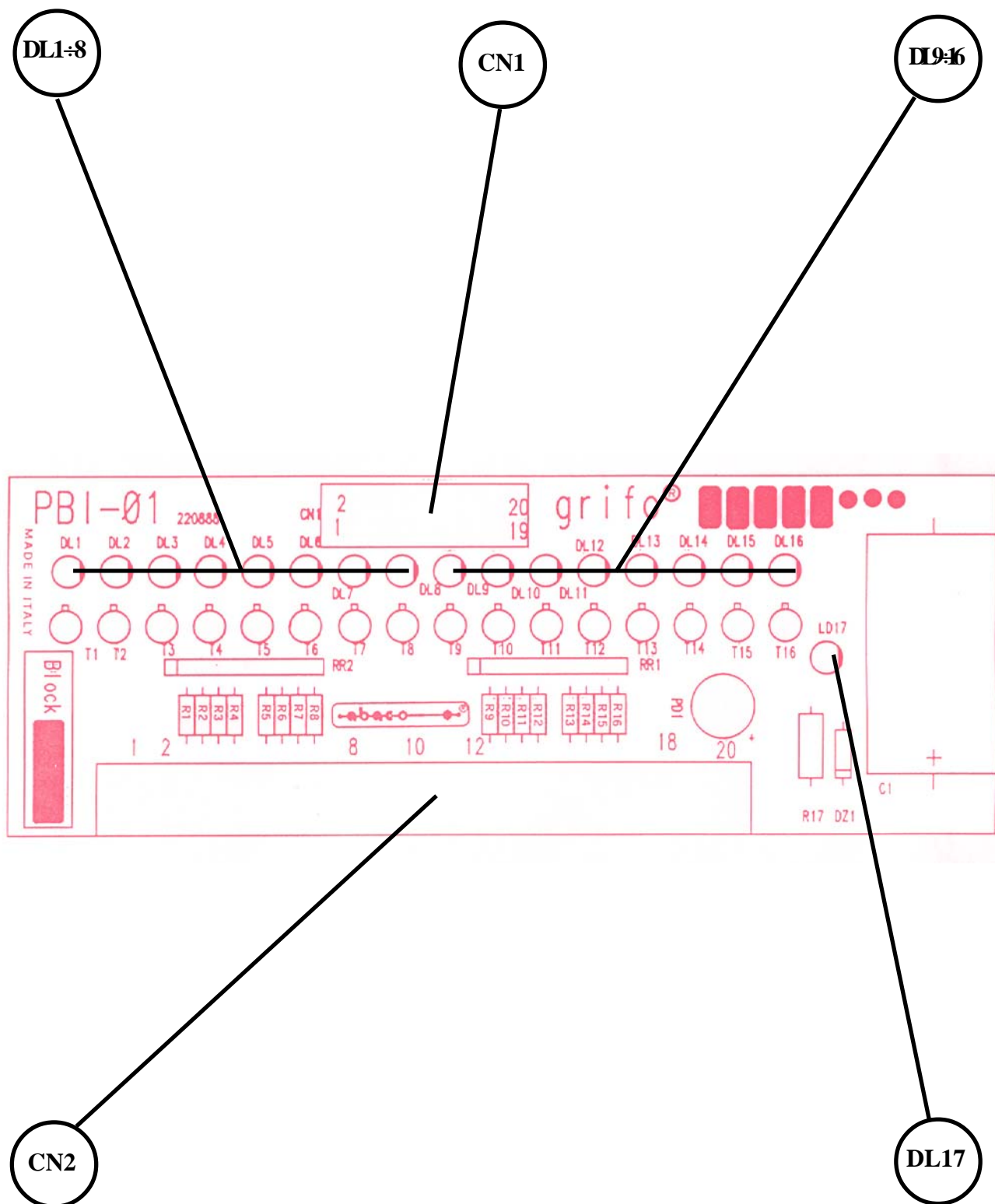
FIGURE 15: LEDS AND CONNECTORS LOCATION

RBO 01

Modules of Block serie **RBO 01** (**R**elay **B**lock **O**utput) is designed as a power interface to the field for boards of **ABACO®** listing provided with 20 ways standard I/O TTL connector.

RBO 01 features eight 5A normally open relay outputs, available on a 24 ways quick release screw terminal connector. For special orders, it is possible to have 10 A relay outputs.

Module can be driven by TTL signals through a standard I/O **ABACO®** connector, or by external relay contacts, connected through a 12 ways quick release screw terminal connector.

Output relays are visualized through 8 LEDs.

Module **RBO 0**1 can be interfaced both to port 1 and to port 2 of a standard I/O **ABACO®** connector, it is enough to move the driver ULN 2803 from socket IC1 to socket IC2.

Removing the chip, thus leaving empty both IC1 and IC2, the module con be controlled by relay contacts on CN2.

Remarkable is the possibility to control two **RBO 01** modules through an unique flat cable.

Module **RBO 01** is delivered with container for Ω rails standard DIN 46277-1 and 3.

TECHNICAL FEATURES

Number of signals in input:	8 TTL signals or 8 relay contacts
Number of signals in output:	8 normally open relay outputs
Size:	168 x 83 x 41 mm
Weight:	173 g
Connectors:	CN1: 20 ways, low profile, vertical, male CN2: 24 ways, quick release screw terminal, horizzontal CN3: 12 ways, quick release screw terminal, horizzontal
Temperature range:	from 0 to 50 centigrad degreeses
Relative humidity:	20% up to 90% without condense
Input voltage:	+24 Vcc nominal
Relays power supply:	+12 Vcc nominal (12 Volt relays) +24 Vcc nominal (24 Volt relays)
Current consumption:	max 120 mA
Relays maximum current:	5 A (for special orders, 10 A)

CN1 - TTL INPUTS I/O ABACO®CONNECTOR

CN1 is a 20 ways low profile male connector,vertical, pitch 2.54 mm.
It allows the connection of two 8 bit ports, one of which will be used to drive the relays.
It also allows to supply the relays. Power supply input of this connector can be disconnected by operning jumper J1.
All signals are TTL level signals and are compliant to standard I/O **ABACO®** pin out.

P1.1	1 2	P1.0
P1.3	3 4	P1.2
P1.5	5 6	P1.4
P1.7	7 8	P1.6
P2.6	9 10	P2.7
P2.4	11 12	P2.5
P2.2	13 14	P2.3
P2.0	15 16	P2.1
GND	17 18	N. C.
GND	19 20	+12 Vcc
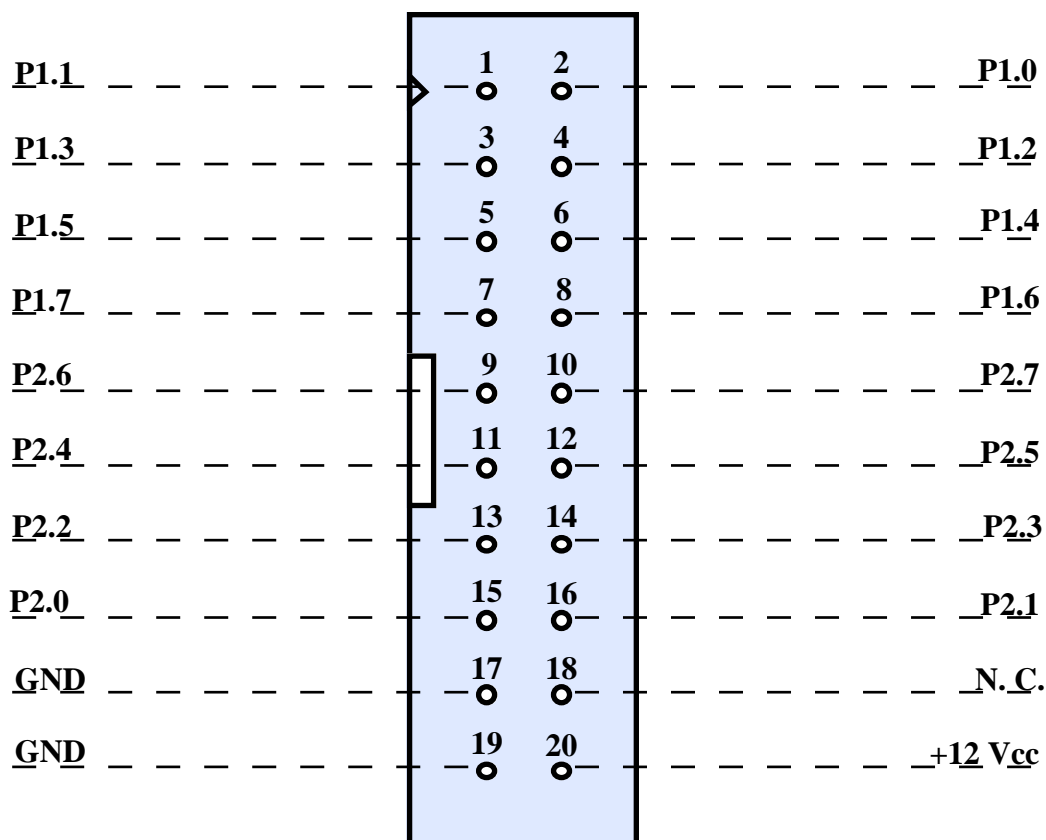
FIGURE 16: CN1 - TTL INPUTS I/O ABACO® CONNECTOR

Signals description:

P1.n	=	O	- n-th TTL input signal of port 1.
P2.n	=	O	- n-th TTL input signal of port 2.
+12 Vcc	=	O	- Power supply for relays.
GND	=		- Ground for relays power supply.
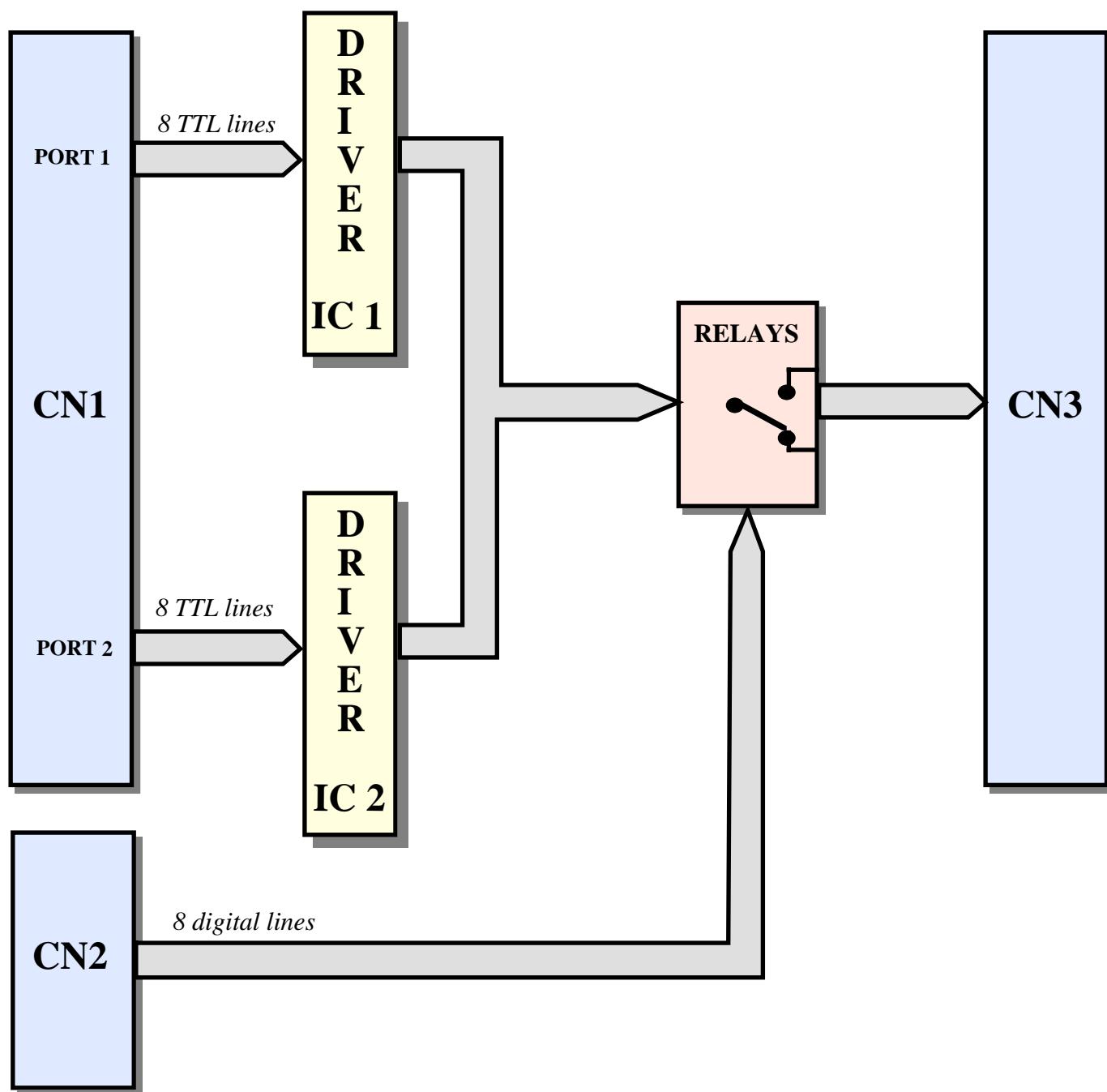
FIGURE 17: BLOCKS DIAGRAM OF RBO 01

CN2 - RELAY CONTACTS INPUT SCREW TERMINAL CONNECTOR

CN2 is a 12 ways quick release screw terminal connector,horizzontal.
This connector is used when the driver for TTL input (ULN 2803) is not installed, so normally open relay outputs can be driven by external relay contacts on this connector.
Following figure is referred to a view on the components side.

12	N. C.
11	GND
10	+Vcc
9	+Vcc
8	Bit D0
7	Bit D1
6	Bit D2
5	Bit D3
4	Bit D4
3	Bit D5
2	Bit D6
1	Bit D7
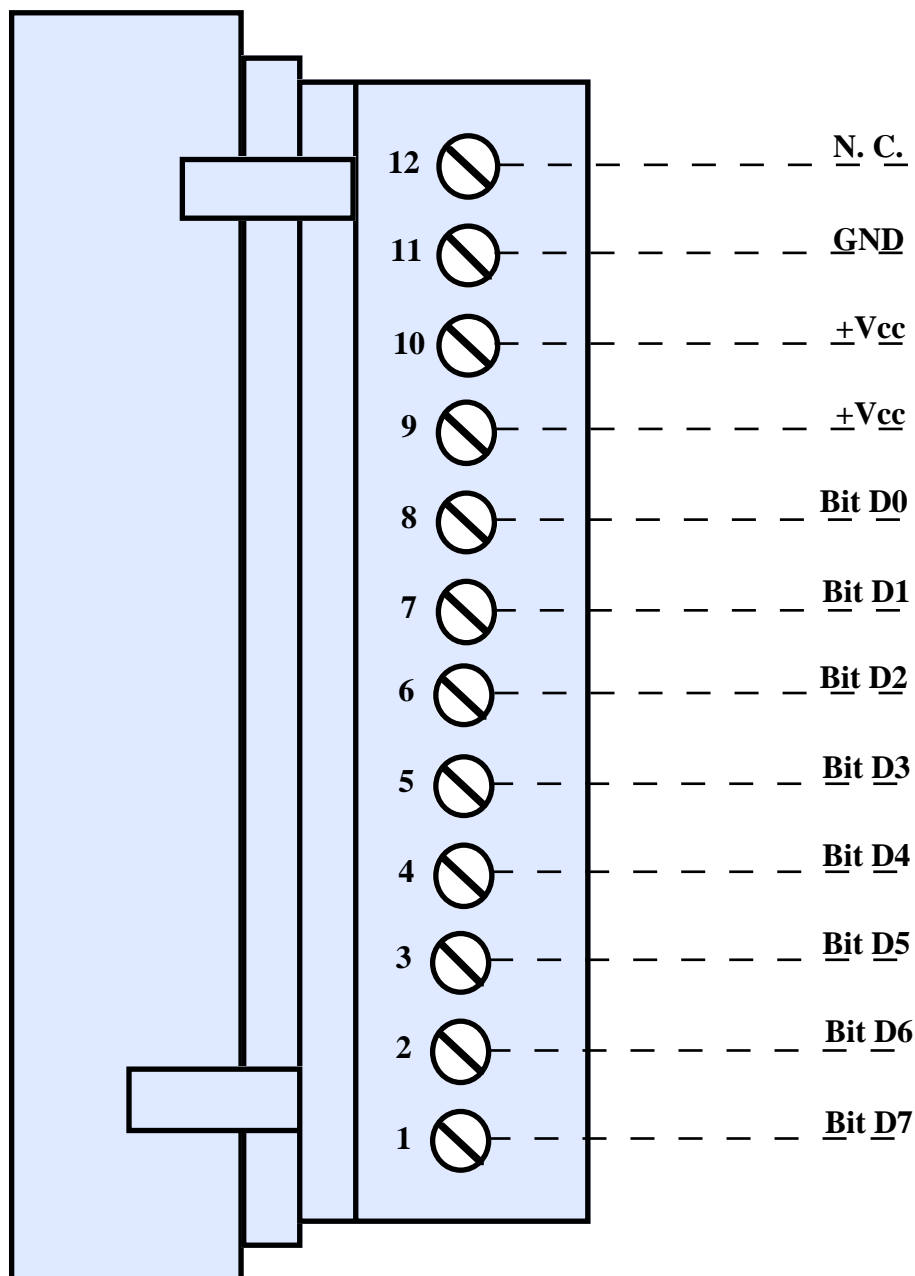
FIGURE 18: CN2 - RELAY CONTACTS INPUT SCREW TERMINAL CONNECTOR

Signals description:

Bit Dn	=	I	- n-th externa relay contact that drives corresponding output relay.
+Vcc	=	I	- Input DC Power supply (+12 Vcc or +24 Vcc) for output relays.
GND	=		- Ground of relays power supply.
N.C.	=		- Not connected.
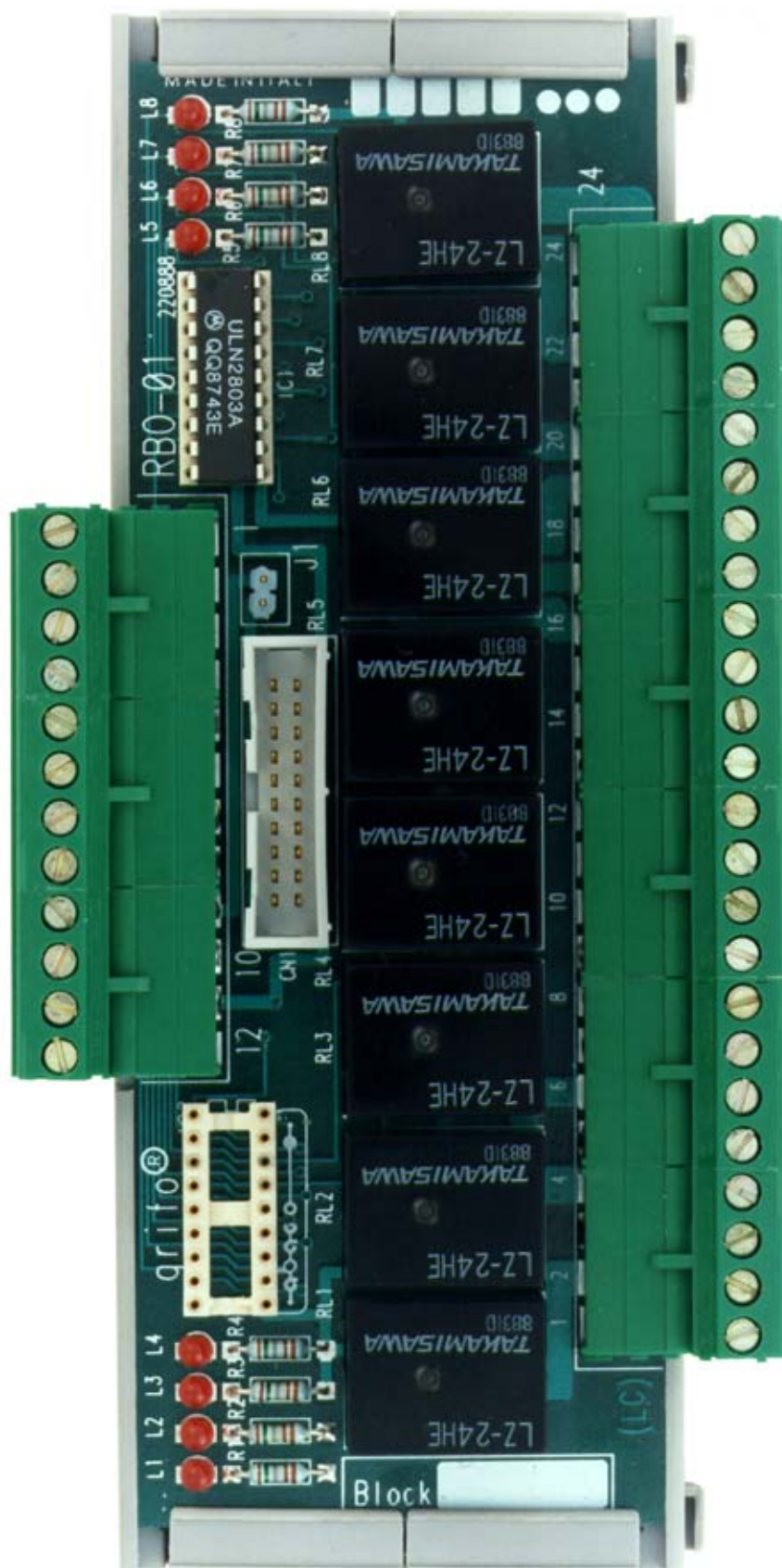
FIGURE 19: PHOTO OF RBO 01 IN CONTAINTER FOR Ω RAIL

CN3 - N. O. RELAYS OUTPUT SCREW TERMINAL CONNECTOR

CN2 is a 24 ways quick release screw terminal connector,horizzontal.
This connector is used to connect to the field the eight output relays (each relay has a normally open contact and a normally closed contact).

Terminal	Signal
24	RL7 C
23	RL7 NO
22	RL7 NC
21	RL6 C
20	RL6 NO
19	RL6 NC
18	RL5 C
17	RL5 NO
16	RL5 NC
15	RL4 C
14	RL4 NO
13	RL4 NC
12	RL3 C
11	RL3 NO
10	RL3 NC
9	RL2 C
8	RL2 NO
7	RL2 NC
6	RL1 C
5	RL1 NO
4	RL1 NC
3	RL0 C
	RL0 NO

FIGURE 20: CN3 - N. O. RELAYS OUTPUT SCREW TERMINAL CONNECTOR

Signals description:

RLn = O - Signals of n-th output relay driven by corresponding input Bit Dn.
  C = - Common contact of n-th relay.
  NO = O - Normally open contact of n-th relay.
  NC = O - Normally closed contact of n-th relay.

FIGURE 21: LEDS, CONNECTORS, ETC. LOCATION

HARDWARE DESCRIPTION

RBO 01 feature eight normally open relayt outputs (corresponding to port 1), but input connector CN1 features 16 bit (corresponding to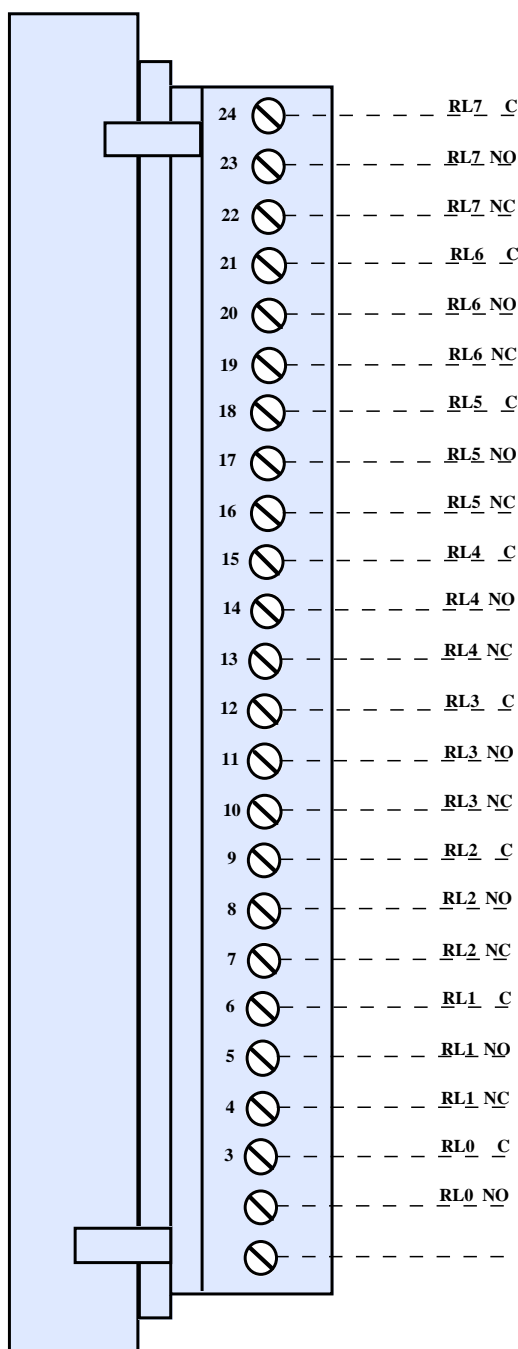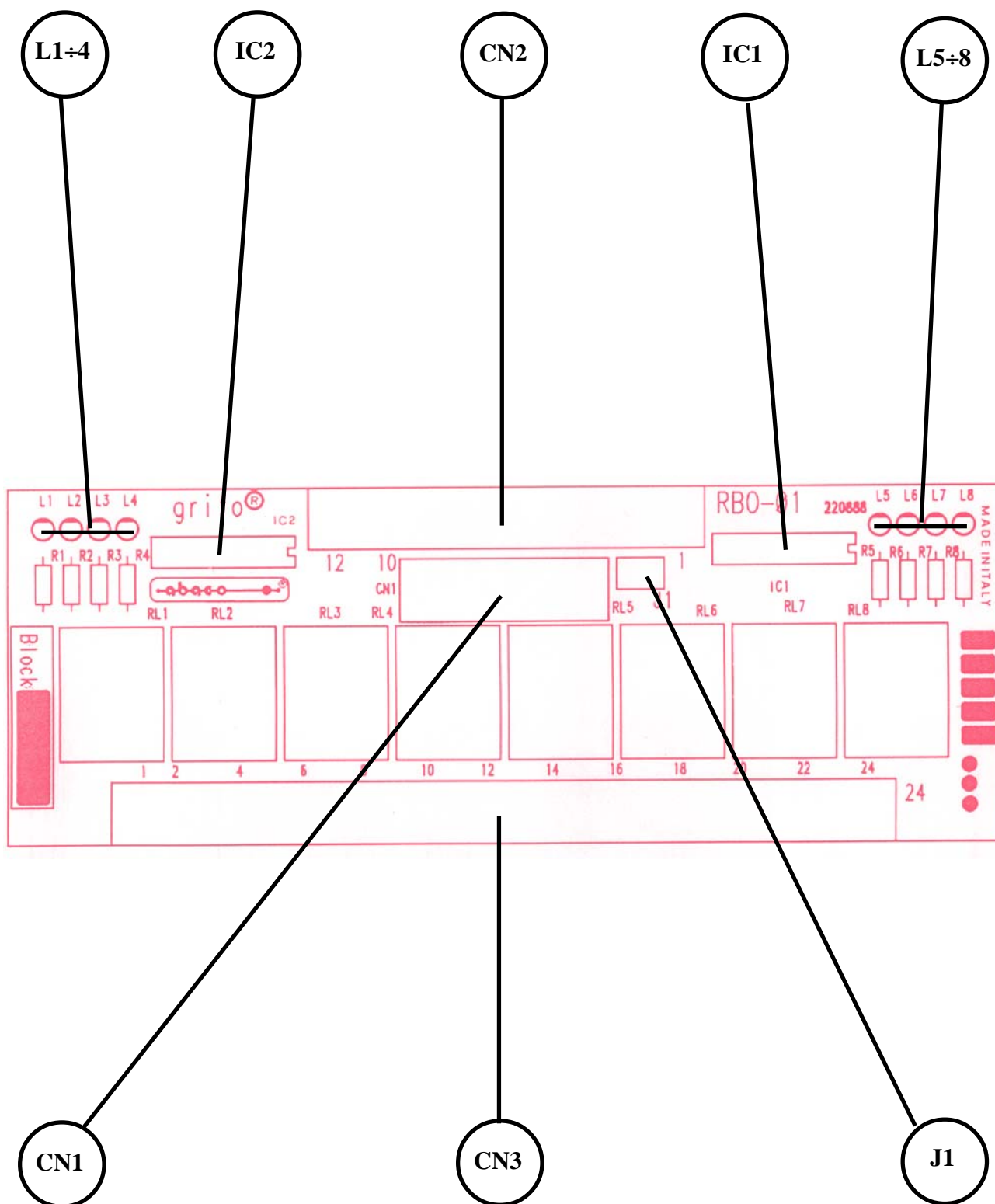 two ports, as for standard I/O **ABACO®**), so it is possible to select which input port to use to drive the output relays.
Selection is made by mounting the driver ULN 2803 on a specific socket. In detail:

SIGNALS THAT DRIVE OUTPUTS	CONFIGURATION
Port 1 of CN1	IC1 = ULN 2803 IC2 = No device
Port 2 of CN1	IC1 = No device IC2 = ULN 2803
CN2	IC1 = No device IC2 = No device

SOFTWARE DESCRIPTION

The eight inputs of CN1 or CN2 drive directly output of CN3:

Px.0 of CN1 or bit D0 di CN2	->	RL0 of CN3
Px.1 of CN1 or bit D1 di CN2	->	RL1 of CN3
Px.2 of CN1 or bit D2 di CN2	->	RL2 of CN3
Px.3 of CN1 or bit D3 di CN2	->	RL3 of CN3
Px.4 of CN1 or bit D4 di CN2	->	RL4 of CN3
Px.5 of CN1 or bit D5 di CN2	->	RL5 of CN3
Px.6 of CN1 or bit D6 di CN2	->	RL6 of CN3
Px.7 of CN1 or bit D7 di CN2	->	RL7 of CN3

Where Px stands for P1 or P2. Correspondance between logic staut of port on CN1 and relay is:

Bit at 0 logic or contact Dx closed	->	Contact closed in position NO
Bit at 1 logic or contact Dx open	->	Contact closed in position NC

JUMPER

Module **RBO 01** features a jumper, called J1, which, when connected, allows to supply the output relays from the pins of CN1 (pin 20 = +Vcc, pin 19 = GND).
When not connected, relays can be supplied trough the pins of CN2 (pin 9, 10 = +Vcc, pin 11 = GND).
Power supply +Vcc by default is +12 Volt (+24 Volt for special orders).

JUMPER	CONNECTION	PURPOSE	DEF.
J1	connected	Allows to supply the relays through pin 19 (GND) and 20 (+12 Vcc) of CN1.	
	not connected	Allows to supply the relays through pin 11 (GND) and 10 (+Vcc) of CN2.	*

FIGURE 22: JUMPER J1 DI RBO 01

VISUALIZATIONS

RBO 01 is provided with 8 red LEDs that feature a visual feed back of the situation of the optocoupled inputs lines.
When a LED is ON, the signal where is connected is at logic level low, because this module implements complemented logic.

LED	COLOUR	MEANING
L1	Red	Shows status of signal P1.0 or P2.0 of CN1 or status of bit D0 of CN2 which drive relay on output RL0 of CN3. When LED is ON the relay is actived.
L2	Red	Shows status of signal P1.1 or P2.1 of CN1 or status of bit D1 of CN2 which drive relay on output RL1 of CN3. When LED is ON the relay is actived.
L3	Red	Shows status of signal P1.2 or P2.2 of CN1 or status of bit D2 of CN2 which drive relay on output RL2 of CN3. When LED is ON the relay is actived.
L4	Red	Shows status of signal P1.3 or P2.3 of CN1 or status of bit D3 of CN2 which drive relay on output RL3 of CN3. When LED is ON the relay is actived.
L5	Red	Shows status of signal P1.4 or P2.4 of CN1 or status of bit D4 of CN2 which drive relay on output RL4 of CN3. When LED is ON the relay is actived.
L6	Red	Shows status of signal P1.5 or P2.5 of CN1 or status of bit D5 of CN2 which drive relay on output RL5 of CN3. When LED is ON the relay is actived.
L7	Red	Shows status of signal P1.6 or P2.6 of CN1 or status of bit D6 of CN2 which drive relay on output RL6 of CN3. When LED is ON the relay is actived.
L8	Red	Shows status of signal P1.7 or P2.7 of CN1 or status of bit D7 of CN2 which drive relay on output RL7 of CN3. When LED is ON the relay is actived.

FIGURE 23: VISUAL SIGNALATIONS TABLE

TBO 01

Modules of Block serie **TBO 01** (**T**ransistor **B**lock **O**utput) is designed as an interface for 16 open collector transistor outputs to the field for boards of **ABACO®** listing provided with 20 ways standard I/O TTL connector.

TBO 01 features sixteen TTL inputs and +5 Vcc required to supply the first section of optocouplers, these signals are connected to the module through a standard I/O **ABACO®** connector that allows to interface with several intellignet boards of **grifo®** listing, like: **GPC®** 188F, **GPC®** 150, **GPC®** 550, etc.

The sixteen 3A open collector transistor outputs are connected to the field through two 12 ways quick release screw terminal connectors.

Each connector features eight outputs capable to bear up to 3 A (not continuative), corresponding to the eight bits of one port.

This makes the access to the signals easier, in case a check has to be done.

Remarkabke and very efficent is the protection featured by suppression diodes for the power transistors, useful especially when used with inductive loads.

This module also features 16 red LEDs that offer the user a visual feed back of the status of the sixteen signals on the module.

Module **TBO 01** is delivered with container for Ω rails standard DIN 46277-1 and 3.

TECHNICAL FEATURES

Number of signals in input: 16 TTL signals

Number of signals in output: 16 transistor open collector outputs

Size: 168 x 72 x 41 mm

Weight: 124 g

Connectors: J1: 20 ways, low profile, vertical, male
CN1: 12 ways, quick release screw terminal, horizzontal
CN2: 12 ways, quick release screw terminal, horizzontal

Temperature range: from 0 to 50 centigrad degreeses

Relative humidity: 20% up to 90% without condense

Relays maximum voltage: +45 Vcc

Relays maximum current: 3 A (not continuative)

Relays maximum power: 1.25 W (free to air)

PORT 1

DRIVER

OPTO

8 NPN output lines

CN2

J1

PORT 2

DRIVER

OPTO

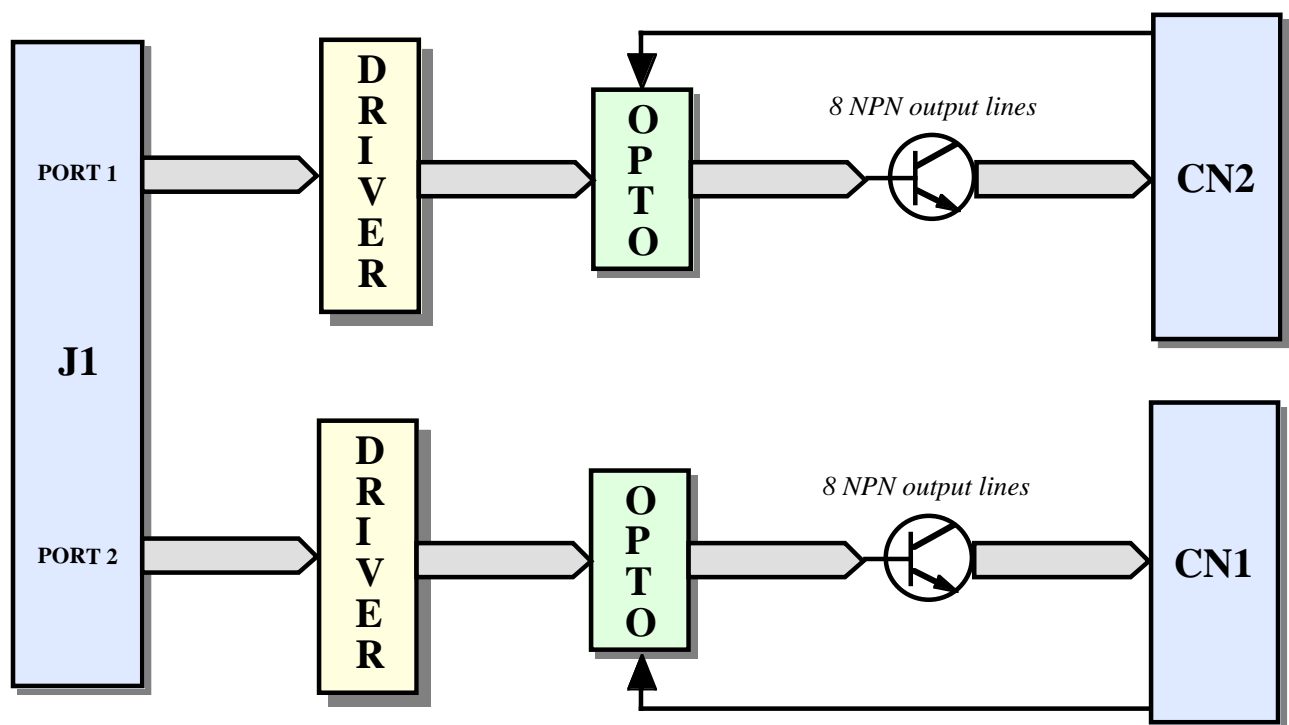*8 NPN output lines*

CN1

FIGURE 24: BLOCKS DIAGRAM OF TBO 01

J1 - TTL INPUTS I/O ABACO®-CONNECTOR

J1 is a 20 ways low profile male connector,vertical, pitch 2.54 mm.
It allows the connection of two 8 bit ports, that will be used to drive the sixteen open collector power transistors on connector CN2 and CN3.
It also allows to supply the first section of optocouplers.
All signals are TTL level signals and are compliant to standard I/O **ABACO®** pin out.

P1.1	1	2	P1.0
P1.3	3	4	P1.2
P1.5	5	6	P1.4
P1.7	7	8	P1.6
P2.6	9	10	P2.7
P2.4	11	12	P2.5
P2.2	13	14	P2.3
P2.0	15	16	P2.1
GND	17	18	+5 Vcc
GND	19	20	N. C.

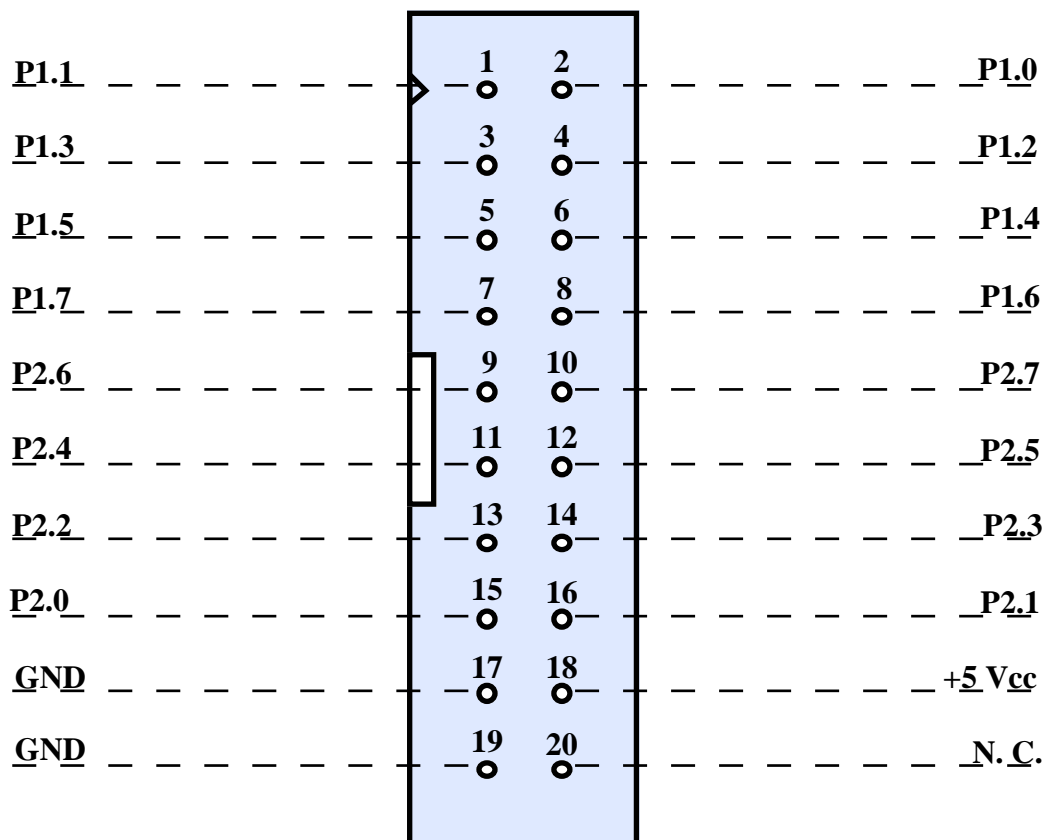**FIGURE 25: J1 - TTL INPUTS I/O ABACO® CONNECTOR**

Signals description:

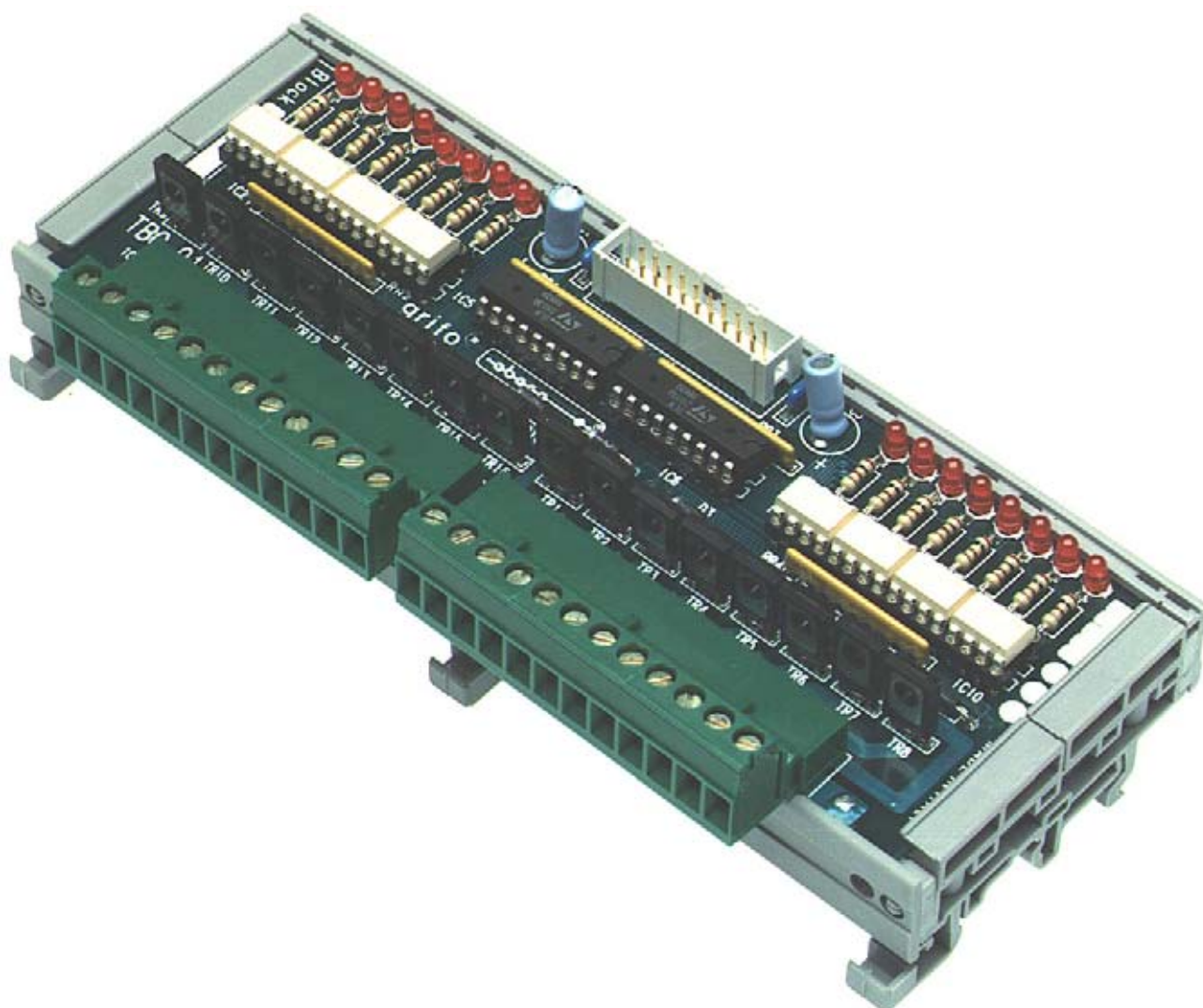|			
P1.n	=	I	- n-th TTL input signal of port 1.
P2.n	=	I	- n-th TTL input signal of port 2.
+5 Vcc	=	I	- Power supply for first section of optocouplers.
GND	=		- Ground for supply of first section of optocouplers.
N.C.	=		- Not connected.

FIGURE 26: PHOTO OF TBO 01 IN CONTAINTER FOR Ω RAIL

CN1 - POWER NPN OUTPUTS SCREW TERMINAL CONNECTOR

CN1 is a 12 ways quick release screw terminal connector,horizzontal.
This connector is used to connect to the external world the eight power open collector transistors driven by bits of port 1 on connector J1.
Following figure is referred to a view on the components side.
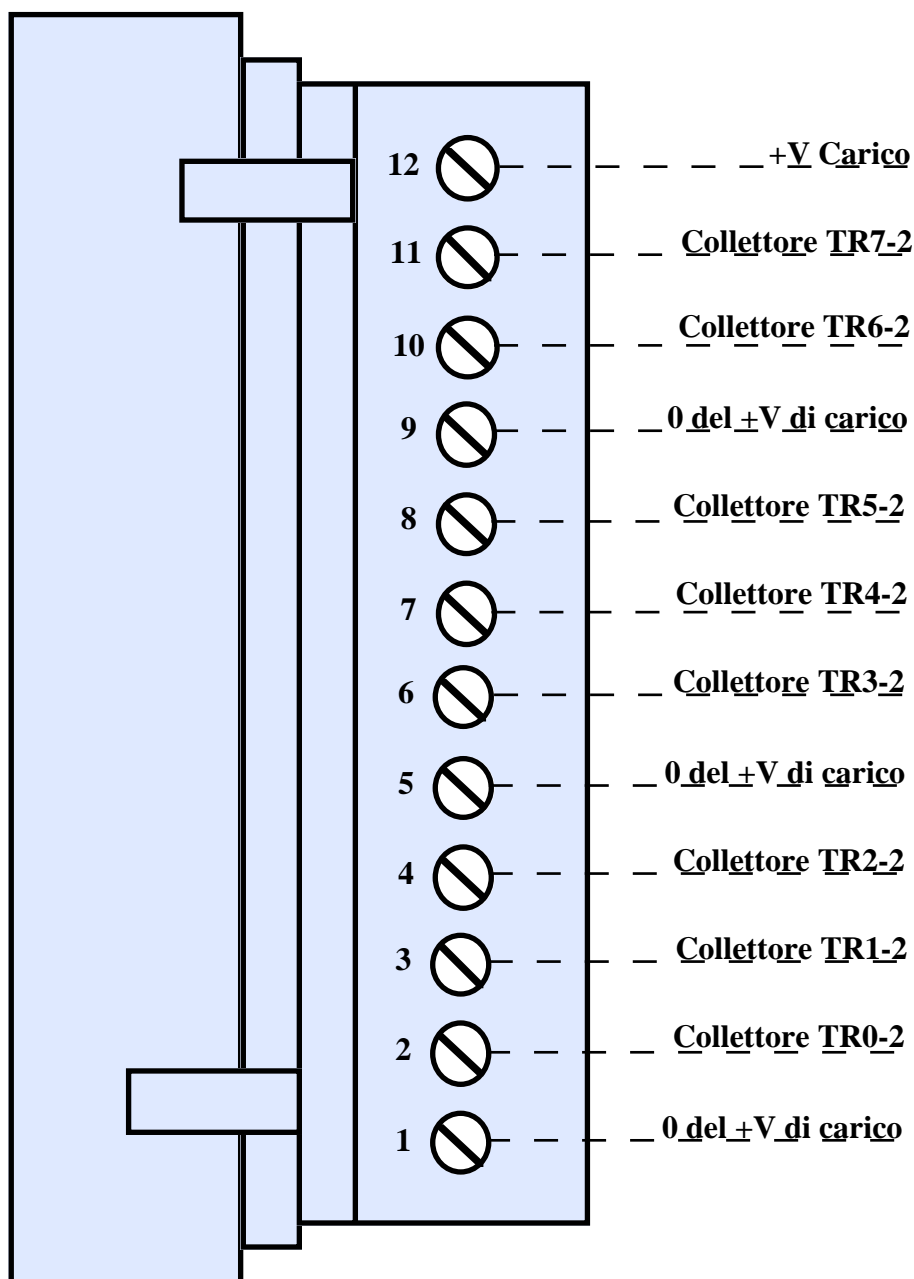
FIGURE 27: CN1 - POWER NPN OUTPUTS SCREW TERMINAL CONNECTOR

Signals description:

+V Carico	=	I	- Power supply of controlled load (+45 Vcc max) and suppression diodes terminal.
0 del +V carico	=	I	- Ground of power supply of controlled load.
Collettore TRn-1	=	O	- Collector of n-th power output, to be connected to its load.

FIGURE 28: LEDS AND CONNECTORS LOCATION

CN2 - POWER NPN OUTPUTS SCREW TERMINAL CONNECTOR

CN2 is a 12 ways quick release screw terminal connector, horizzontal.
This connector is used to connect to the external world the eight power open collector transistors driven by bits of port 2 on connector J1.
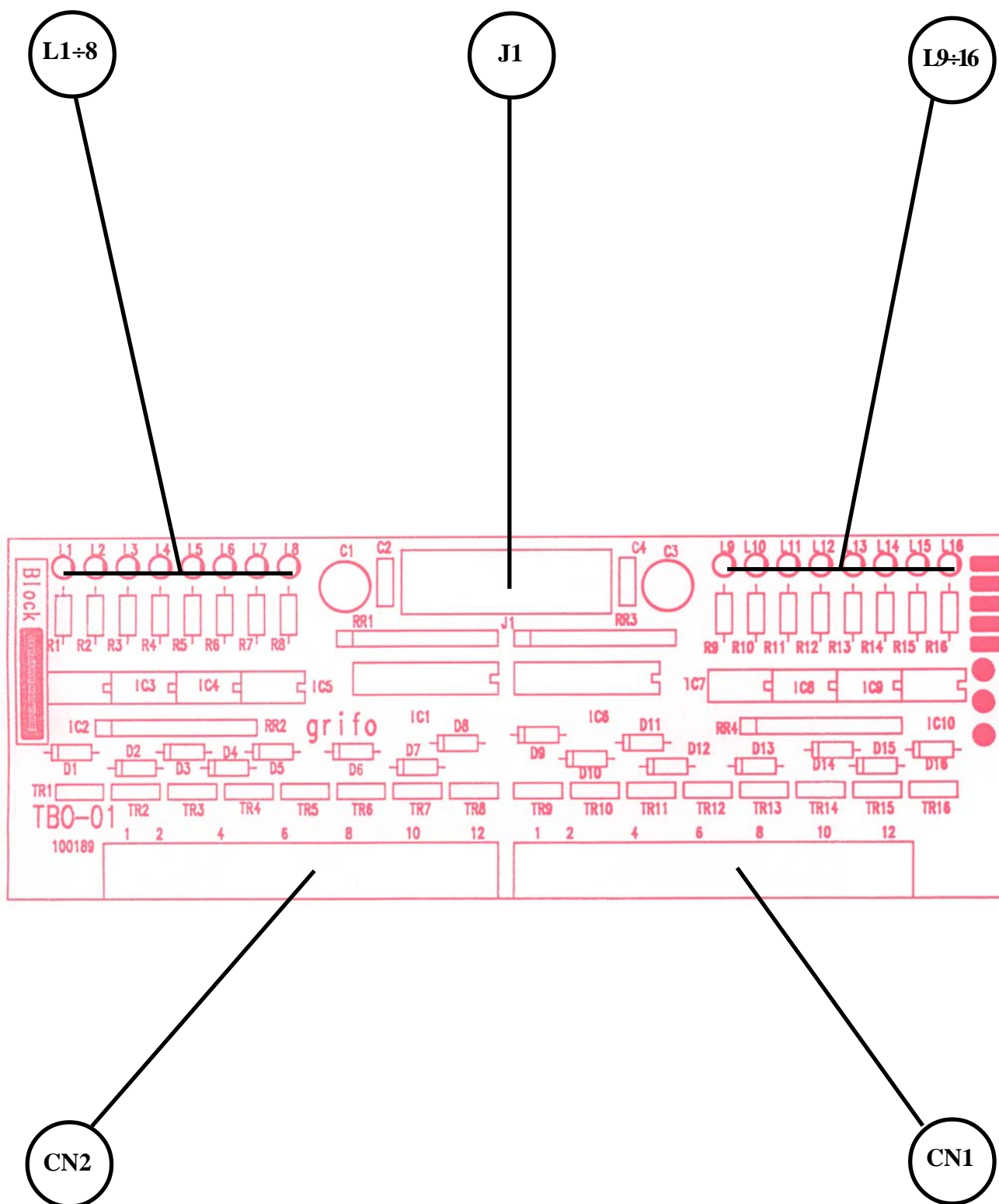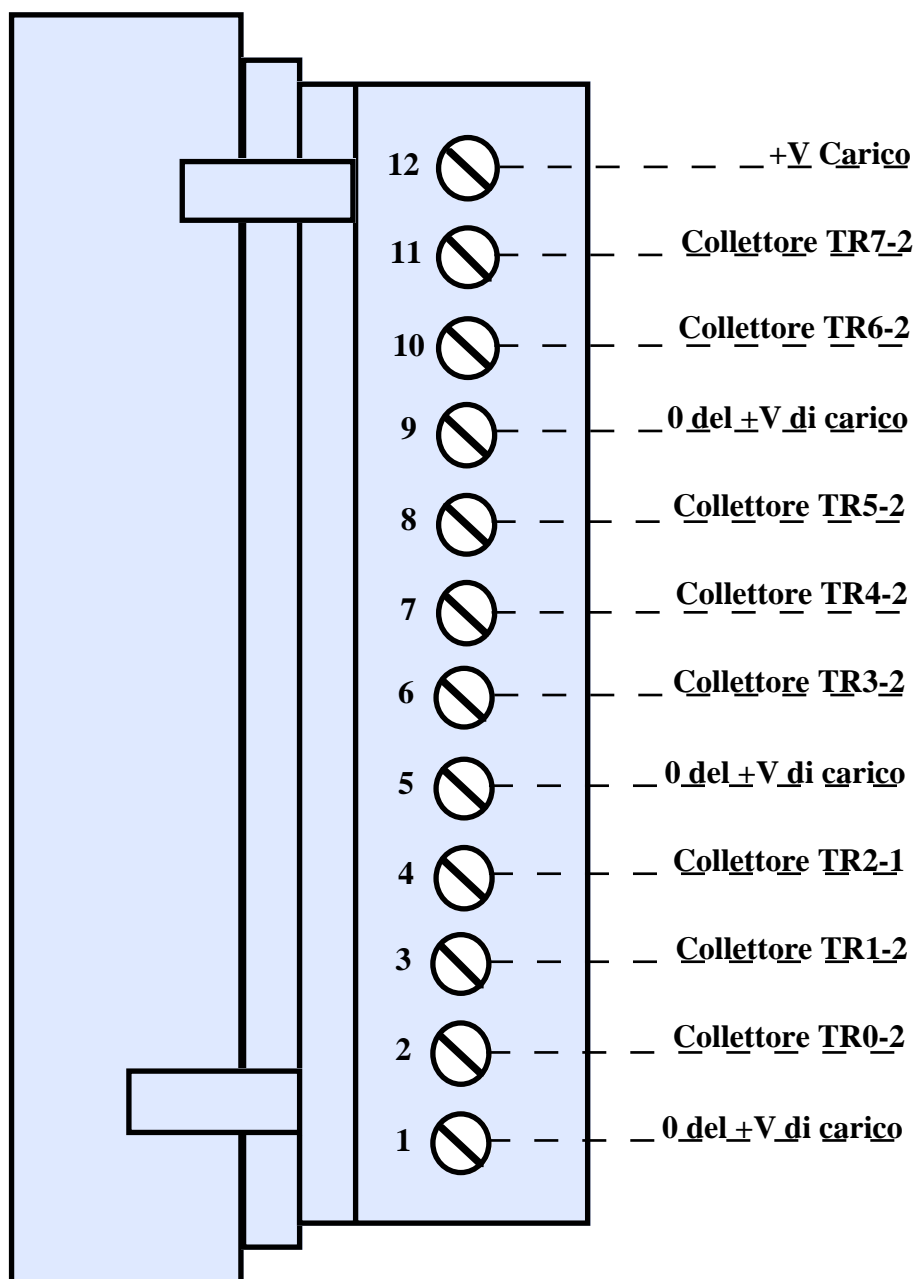Following figure is referred to a view on the components side.

12 — — — — — +V Carico

11 — — — Collettore TR7-2

10 — — — Collettore TR6-2

9 — — — 0 del +V di carico

8 — — — Collettore TR5-2

7 — — — Collettore TR4-2

6 — — — Collettore TR3-2

5 — — — 0 del +V di carico

4 — — — Collettore TR2-1

3 — — — Collettore TR1-2

2 — — — Collettore TR0-2

1 — — — 0 del +V di carico

FIGURE 29: CN2 - POWER NPN OUTPUTS SCREW TERMINAL CONNECTOR

Signals description:

+V Carico	=	I	- Power supply of controlled load (+45 Vcc max) and suppression diodes terminal.
0 del +V carico	=	I	- Ground of power supply of controlled load.
Collettore TRn-2	=	O	- Collector of n-th power output, to be connected to its load.

HARDWARE DESCRIPTION

Module **TBO 01** features 16 input signals and 16 output signals.
The 16 inputs are connected to the module through connector J1, and are visualized by LEDs. Driving of power transistor is performed by ULN 2803 or equivalent.
Each of these signals are galvanically isolated by optocouplers, the are used to drive a transistor darlington, whose collector output signal is fetched by the quick release screw terminal connector.
In parallel connection to each 3 A output, a suppression diode is present.
This diode offers a high degree of protection for transistors, especially with inductive loads, like relays or remote control switches.
In fact, as soon as power supply of an inductor is removed, it discharges all its previuously stored energy, with very high energy loads.
In the specific case of module **TBO 01**, this would destroy the power transistor where the inductive load is connected.
To solve this problem, the suppression diode must be connected between signals +V carico (that must be connected to a voltage lower than +45 Vcc) and collector of power transistor corresponding to each output.
Output drivers are darlington BD675A supplied with a voltage not greater than +45 Vcc, they can bear a current not continuous up to 3 A.
These transistor are free to air and placed to easy the identification the output signal they drive.
They are all ready for installing a small heat sink.

SOFTWARE DESCRIPTION

The sixteen inputs of J1 drive directly the outputs of CN1 and CN2:

Px.0 of J1	->	TR0-x of CNx
Px.1 of J1	->	TR1-x of CNx
Px.2 of J1	->	TR2-x of CNx
Px.3 of J1	->	TR3-x of CNx
Px.4 of J1	->	TR4-x of CNx
Px.5 of J1	->	TR5-x of CNx
Px.6 of J1	->	TR6-x of CNx
Px.7 of J1	->	TR7-x of CNx

where x stands for 1 or 2 (e.g.: P1 or P2, CN1 or CN2).
Correspondance between logic status of bit on J1 and status of corresponding output transistor on CN1 or CN2 is:

Bit at logic 0	->	Transistor is conducting
Bit at logico 1	->	Transistor is not conducting

VISUALIZATIONS

TBO 01 is provided with 16 red LEDs that feature a visual feed back of the situation of the optocoupled inputs lines.

LED	COLOUR	MEANING
L1	Red	Shows the status of optocoupled input driven by P1.0 of J1. When LED is ON P1.0 is at TTL high level.
L2	Red	Shows the status of optocoupled input driven by P1.1 of J1. When LED is ON P1.0 is at TTL high level.
L3	Red	Shows the status of optocoupled input driven by P1.2 of J1. When LED is ON P1.0 is at TTL high level.
L4	Red	Shows the status of optocoupled input driven by P1.3 of J1. When LED is ON P1.0 is at TTL high level.
L5	Red	Shows the status of optocoupled input driven by P1.4 of J1. When LED is ON P1.0 is at TTL high level.
L6	Red	Shows the status of optocoupled input driven by P1.5 of J1. When LED is ON P1.0 is at TTL high level.
L7	Red	Shows the status of optocoupled input driven by P1.6 of J1. When LED is ON P1.0 is at TTL high level.
L8	Red	Shows the status of optocoupled input driven by P1.7 of J1. When LED is ON P1.0 is at TTL high level.
L9	Red	Shows the status of optocoupled input driven by P2.0 of J1. When LED is ON P1.0 is at TTL high level.
L10	Red	Shows the status of optocoupled input driven by P2.1 of J1. When LED is ON P1.0 is at TTL high level.
L11	Red	Shows the status of optocoupled input driven by P2.2 of J1. When LED is ON P1.0 is at TTL high level.
L12	Red	Shows the status of optocoupled input driven by P2.3 of J1. When LED is ON P1.0 is at TTL high level.
L13	Red	Shows the status of optocoupled input driven by P2.4 of J1. When LED is ON P1.0 is at TTL high level.
L14	Red	Shows the status of optocoupled input driven by P2.5 of J1. When LED is ON P1.0 is at TTL high level.
L15	Red	Shows the status of optocoupled input driven by P2.6 of J1. When LED is ON P1.0 is at TTL high level.
L16	Red	Visualizza lo stato dell'ingresso optoisolato pilotato daP2.7 di J1. Il LED è attivo seP2.7 è a livello TTL alto.

FIGURE 30: VISUAL SIGNALATIONS TABLE

XBI 01

Module of BLOCK serie **XBI 01** (mi**X**ed **B**lock I/**O**) features a section with eight optocoupled inputs lines and visualized through LEDs to connect to **grifo**® listing cards plus a second section with eight open collector 3 A output lines, optocoupled and visualized.

First section fetches input signals and power supply for optocoupler from the filed lines through a 12 ways quick release screw terminal connector, while the corresponding output signals are present on port 1 of a standard I/O **ABACO**® connector.

Second section receives its input signals from port 2 of a standard I/O **ABACO**® connector that are used to drive NPN 3A optocoupled transistor outputs, available on a specific 12 ways quick release screw terminal connector.

XBI 01 can interface several **grifo**® listing cards with field signals simply using a 20 ways flat cable. All the signals are visualized by LEDs, the eight input signals of port 1 are visualized by green LEDs, while the eight output signals are visualized by red LEDs.

First section is supplied by +24 Vcc, that can be provided direclty by the user, or by an alternate voltage in the range 18 ÷ 14 Vac, rectified by a circuitery on the module.

When the rectifing circuit is generating its output, red LED L17 is ON.

Input buffers of the second sections comes from the +5 Vcc of standard I/O **ABACO**® connector, while the quick release screw terminal connector CN2 can also supply the transistor outputs, using a tension not greater than +45 Vcc.

Status that the power transistor outputs must have after a power on or a reset depends on the kind of intelligent board to which the module is connected.

As microcontrollers of different manufacturers have completely opposite behaviour about the status of their ports after a power on or a reset, and as **grifo**® intelligent cards may have installed micocontrollers of several manufacturers, status of transistor output signals of **XBI 01** can be modified by the user acting on jumer J1.

In detail, according to the connection of the jumper, outputs can be actived or disabled after a power on or a reset, despite the manufacturer of the microcontroller on the intelligent card connected.

Module **XBI 01** is delivered with container for Ω rails standard DIN 46277-1 and 3.

TECHNICAL FEATURES

|	
Number of signals in input:	8 digital optocoupled inputs
Number of signals in output:	8 transistor open collector outputs
Size:	168 x 72 x 41 mm
Weight:	122 g
Connectors:	J1: 20 ways, low profile, vertical, male
	CN2: 12 ways, quick release screw terminal, horizzontal
	CN3: 12 ways, quick release screw terminal, horizzontal
Temperature range:	from 0 to 50 centigrad degreeses
Relative humidity:	20% up to 90% without condense
Optocouplers power supply:	+24 Vcc or 18 ÷ 24 Vac
Buffer power supply:	+5 Vcc
NPN output voltage:	maximum +45 Vcc
NPN output current:	maximum 3 A <u>non continuously</u>
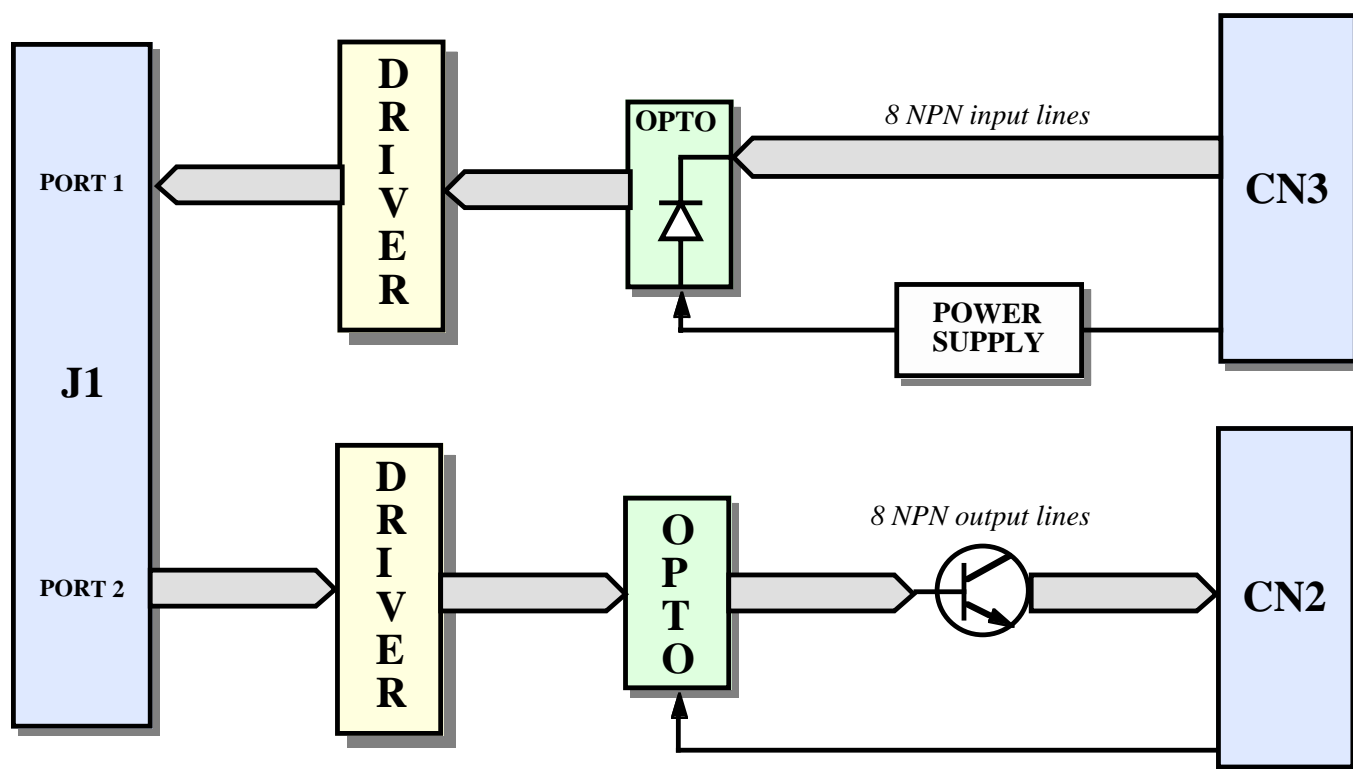
FIGURE 31: BLOCKS DIAGRAM OF XBI 01

J1 - TTL INPUTS I/O ABACO®CONNECTOR

J1 is a 20 ways low profile male connector,vertical, pitch 2.54 mm.
It allows the connection of two 8 bit ports, that will be used to drive the NPN open collector outputs on CN2 and to read the optocoupled input on CN3.
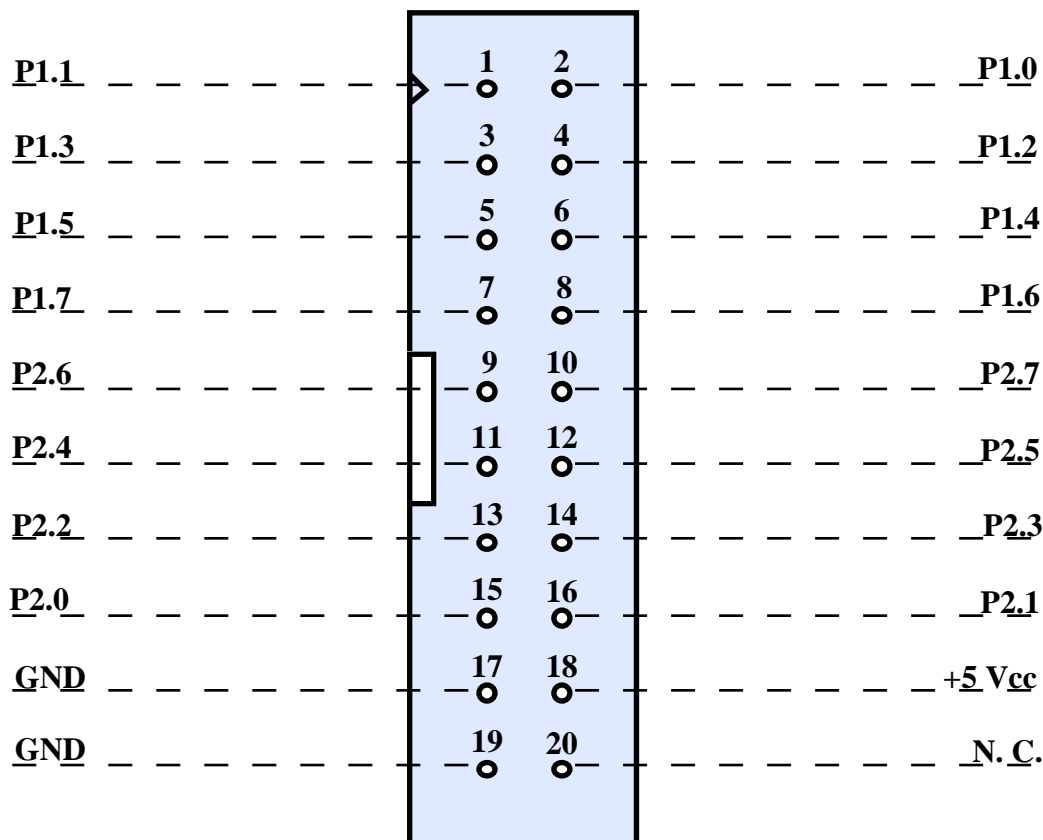All signals are TTL level signals and are compliant to standard I/O **ABACO®** pin out.

P1.1	1	2	**P1.0**
P1.3	3	4	**P1.2**
P1.5	5	6	**P1.4**
P1.7	7	8	**P1.6**
P2.6	9	10	**P2.7**
P2.4	11	12	**P2.5**
P2.2	13	14	**P2.3**
P2.0	15	16	**P2.1**
GND	17	18	**+5 Vcc**
GND	19	20	**N. C.**

FIGURE 32: J1 - TTL INPUTS I/O ABACO® CONNECTOR

Signals description:

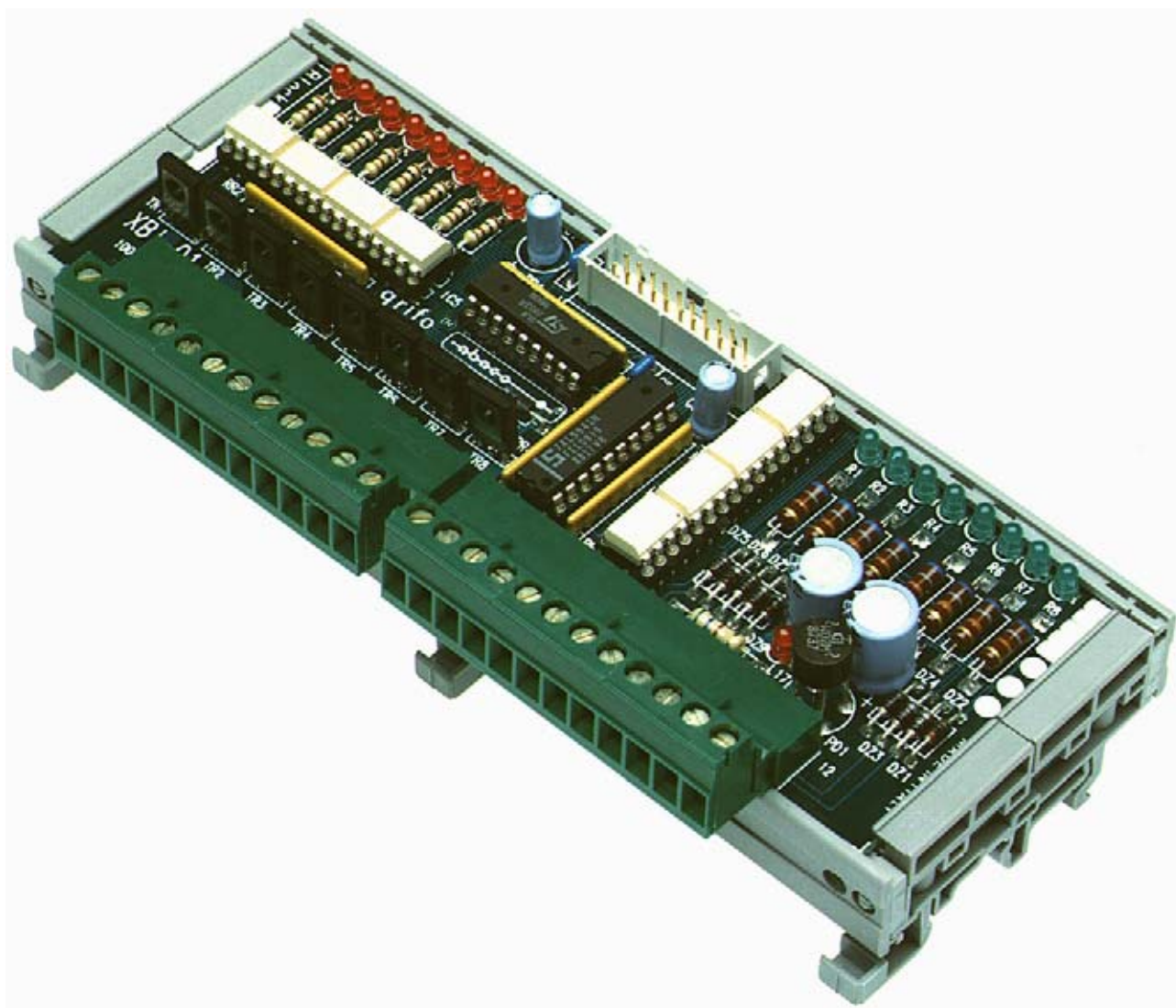|			
P1.n	=	I	- n-th TTL input signal of port 1.
P2.n	=	I	- n-th TTL input signal of port 2.
+5 Vcc	=	I	- Power supply for first section of optocouplers.
GND	=		- Ground for supply of first section of optocouplers.

FIGURE 33: PHOTO OF XBI 01 IN CONTAINTER FOR Ω RAIL

CN2 - NPN OUTPUTS SCREW TERMINAL CONNECTOR

CN2 is a 12 ways quick release screw terminal connector,horizzontal.
This connector is used to connect to the external world the eight power open collector transistors driven by bits of port 2 on connector J1.
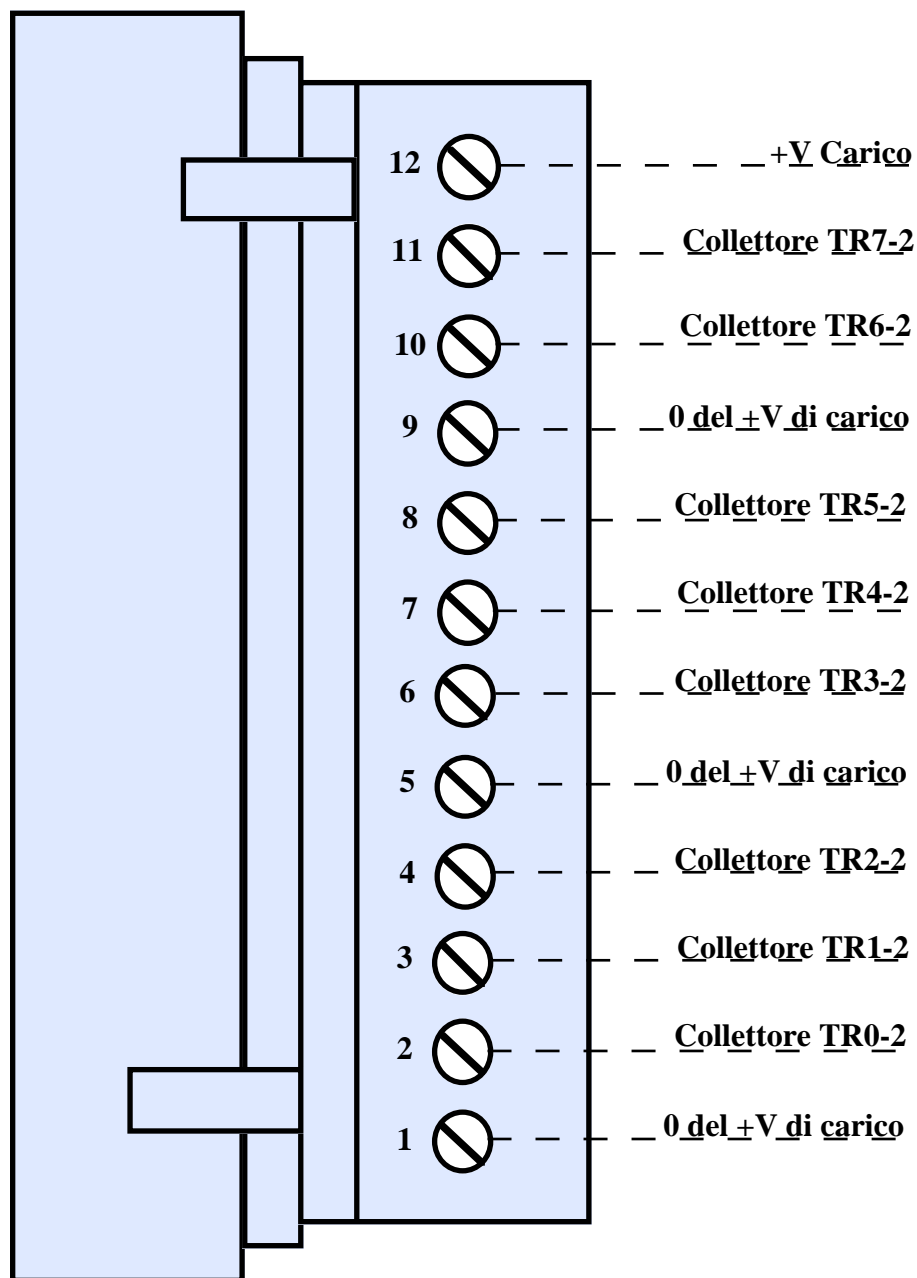Following figure is referred to a view on the components side.

FIGURE 34: CN2 - NPN OUTPUTS SCREW TERMINAL CONNECTOR

Signals description:

+V Carico   =   I   - Power supply of controlled load (+45 Vcc max) and suppression diodes terminal.

0 del +V carico   =   I   - Ground of power supply of controlled load.

Collettore TRn-2   =   O   - Collector of n-th power output, to be connected to its load.

CN3 - NPN INPUTS SCREW TERMINAL CONNECTOR

CN2 is a 12 ways quick release screw terminal connector,horizzontal.
This connector is used to connect from the external world the eight NPN optocoupled inputs whose status will be read by bits of port 1 on connector J1.
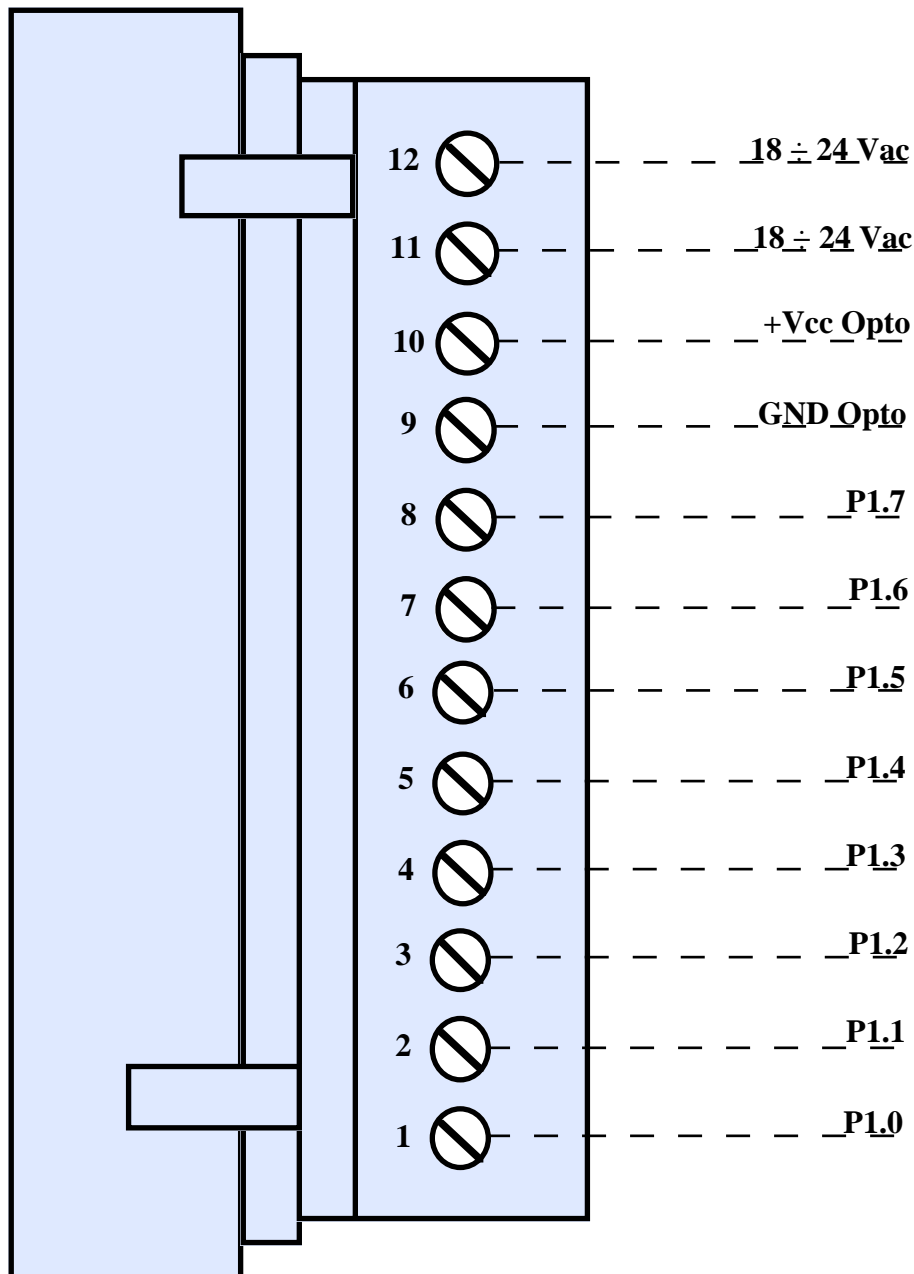Following figure is referred to a view on the components side.

Terminal	Signal
12	18 ÷ 24 Vac
11	18 ÷ 24 Vac
10	+Vcc Opto
9	GND Opto
8	P1.7
7	P1.6
6	P1.5
5	P1.4
4	P1.3
3	P1.2
2	P1.1
1	P1.0

FIGURE 35: CN3 - NPN OUTPUTS SCREW TERMINAL CONNECTOR

Signals description:

P1.n	=	I	- n-th PNP input signal of port 1.
+Vcc Opto	=	I	- Input DC Power supply +24 Vcc for external optocouplers.
GND Opto	=		- Ground of power supply +24 Vcc for external optocouplers.
18 ÷ 24 Vac	=	I	- Alternate voltage for optocouplers supply.

POWER SUPPLY

Module **XBI 01** has different power supplies for the several components installed on it.
The +5 Vcc supply come from the connector I/O **ABACO®**, in detail pin 18 is +5 Vcc while pins 17 and 19 are GND.
This latter supplies the TTL buffer of port 1 and the diodes of optocouplers of port 2.
Voltage +V Carico, on connector CN2, must not be more than +45 Vcc, supplies the fototransistors of optocouplers for port 2.
In detail pin 2 of CN2 is +V Carico, while pins 1, 5 and 9 are the ground for ths signal.
Voltage +V Opto, that supplies optocouplers of port 1, may come directly from pin 10 of connector CN3 (in such case the ground is pin 9), or it can be generated from an alternate voltage in the range 18 ÷ 24 Vac, through a rectifier circuitery.
In this last case the voltage must be connected through pins 11 and 12 of CN3.
A red LED monitor the presence of optocoupler power supply.

HARDWARE DESCRIPTION

The status of power outputs immediatly after a power on or a reset of the intelligent control card depends on the type of microcontroller installed on board of the intelligent card itself.
As microcontroller of different manufacturers have a completely different behaviour about the status of I/O signals after a power on or a reset, and as **grifo®** listing has intelligent cards with several types of microcontrollers installed, the status of transistor outputs of **XBI 01** after a power on or a reset can be changed by the user by moving the jumper J1.

JUMPER	CONNECTION	PURPOSE	DEF.
J1	position 1-2	Inserts a pull-up between the TTL inputs on port 2 of J1 and the driver of transistor NPN outputs.	
	position 2-3	Inserts a pull-down between the TTL inputs on port 2 of J1 and the driver of transistor NPN outputs.	*

FIGURE 36: JUMPER J1 TABLE

SOFTWARE DESCRIPTION

The eight TTL outputs of J1 are directly report the status of optocoupler inputs of CN3:

P1.0 of J1	->	P1.0 of CN3
P1.1 of J1	->	P1.1 of CN3
P1.2 of J1	->	P1.2 of CN3
P1.3 of J1	->	P1.3 of CN3
P1.4 of J1	->	P1.4 of CN3
P1.5 of J1	->	P1.5 of CN3
P1.6 of J1	->	P1.6 of CN3
P1.7 of J1	->	P1.7 of CN3

Correspondance between logic status of bit read from J1 and status of corresponding optocoupled inputs on CN3 is:

Bit at logic 0   ->   Contact closed
Bit at logico 1   ->   Contact

The eight inputs of port 2 on J1 drive directly the NPN outputs of CN2:

P2.0 of J1	->	TR0-2 of CN2
P2.1 of J1	->	TR1-2 of CN2
P2.2 of J1	->	TR2-2 of CN2
P2.3 of J1	->	TR3-2 of CN2
P2.4 of J1	->	TR4-2 of CN2
P2.5 of J1	->	TR5-2 of CN2
P2.6 of J1	->	TR6-2 of CN2
P2.7 of J1	->	TR7-2 of CN2

Correspondance between logic status of bit on J1 and status of corresponding output transistor on CN2 is:

Bit at logic 0   ->   Transistor is conducting
Bit at logico 1   ->   Transistor is not conducting

VISUALIZATIONS

XBI 01 is provided with 17 LEDs (eight green plus nine red) that feature a visual feed back of the situation of the lines and power supply.

LED	COLOUR	MEANING
L1	Green	Shows the status of optocoupled input driven by P1.0 of CN3. When LED is ON there is a current circulation between P1.0 and +Vcc Opto.
L2	Green	Shows the status of optocoupled input driven by P1.1 of CN3. When LED is ON there is a current circulation between P1.1 e +Vcc Opto.
L3	Green	Shows the status of optocoupled input driven by P1.2 of CN3. When LED is ON there is a current circulation between P1.2 e +Vcc Opto.
L4	Green	Shows the status of optocoupled input driven by P1.3 of CN3. When LED is ON there is a current circulation between P1.3 e +Vcc Opto.
L5	Green	Shows the status of optocoupled input driven by P1.4 of CN3. When LED is ON there is a current circulation between P1.4 e +Vcc Opto.
L6	Green	Shows the status of optocoupled input driven by P1.5 of CN3. When LED is ON there is a current circulation between P1.5 e +Vcc Opto.
L7	Green	Shows the status of optocoupled input driven by P1.6 of CN3. When LED is ON there is a current circulation between P1.6 e +Vcc Opto.
L8	Green	Shows the status of optocoupled input driven by P1.7 of CN3. When LED is ON there is a current circulation between P1.7 e +Vcc Opto.
L9	Red	Shows the status of transistor output driven by P2.0 of J1. When LED is ON the signal P2.0 of J1 is at logic level high.
L10	Red	Shows the status of transistor output driven by P2.1 of J1. When LED is ON the signal P2.1 of J1 is at logic level high.
L11	Red	Shows the status of transistor output driven by P2.2 of J1. When LED is ON the signal P2.2 of J1 is at logic level high.
L12	Red	Shows the status of transistor output driven by P2.3 of J1. When LED is ON the signal P2.3 of J1 is at logic level high.
L13	Red	Shows the status of transistor output driven by P2.4 of J1. When LED is ON the signal P2.4 of J1 is at logic level high.
L14	Red	Shows the status of transistor output driven by P2.5 of J1. When LED is ON the signal P2.5 of J1 is at logic level high.
L15	Red	Shows the status of transistor output driven by P2.6 of J1. When LED is ON the signal P2.6 of J1 is at logic level high.
L16	Red	Shows the status of transistor output driven by P2.7 of J1. When LED is ON the signal P2.7 of J1 is at logic level high.
L17	Red	Visualizza la presenza dell'alimentazione degli optoisolatori.

FIGURE 37: VISUAL SIGNALATIONS TABLE

BIBLIOGRAPHY

In this chapter there is a complete list of technical books and notes, where the user can find all the necessary documentations on the components mounted on these modules.

Manual SGS-THOMSON: *Industrial and Computer Peripheral ICs - Data Book*
Manual SGS-THOMSON: *Small Signal Transistors - Data Book*
Manual SGS-THOMSON: *Discrete Power Device - Data Book*

Manual TEXAS INSTRUMENTS   *The TTL Data Book - SN54/74 Families*

Manual TOSHIBA: *Photo Couplers - Data Book*

Manual MOTOROLA: *Bipolar Power Transistor Data*

Manual NATIONAL: *Linear 1 Data Book*

The described manual can be requested directly to manufacturer or local dealers. Alternatively this information and/or upgrades can be found in specific internet web pages, of the listed companies.

APPENDIX A: ALPHABETICAL INDEX

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