ZBR 84  ZBT 84  
ZBR 168  ZBT 168  
ZBR 246  ZBT 246  
ZBR 324  ZBT 324

Zipped BLOCK Relais  
Zipped BLOCK Transistors

TECHNICAL MANUAL
ZBR 84, ZBR 168, ZBR 246, ZBR 324
Zipped BLOCK Relais, 8÷32 Input, 4÷24 Output
Peripheral featuring 8÷32 optocoupled and displayed NPN Inputs; 4÷24 3A relais with MOV; screw terminal connectors for optocoupled inputs and outputs; standard 26 pins ABACO® I/O BUS connector; visualization LEDs; on board power supply section to generate +5 Vdc and +Vopto; galvanically isolated supply sections; quick connection to DIN 46277-1 and 3 rails.

ZBR 84, ZBT 168, ZBT 246, ZBT 324
Zipped BLOCK Transistors, 8÷32 Input, 4÷24 Output
Peripheral featuring 8÷32 optocoupled and displayed NPN Inputs; 4÷24 4A Darlington transistor with back EMF protection diode; screw terminal connectors for optocoupled inputs and outputs; standard 26 pins ABACO® I/O BUS connector; visualization LEDs; on board power supply section to generate +5 Vdc and +Vopto; galvanically isolated supply sections; quick connection to DIN 46277-1 and 3 rails.
IMPORTANT

Although all the information contained herein have been carefully verified, grifo® assumes no responsibility for errors that might appear in this document, or for damage to things or persons resulting from technical errors, omission and improper use of this manual and of the related software and hardware.

grifo® reserves the right to change the contents and form of this document, as well as the features and specification of its products at any time, without prior notice, to obtain always the best product.

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

SYMBOLS DESCRIPTION

In the manual could appear the following symbols:

-Attention: Generic danger
-Attention: High voltage

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INTRODUCTION

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

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

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

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

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

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

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

The present manual is reported to the versions of ZBR and ZBT below reported:

- ZBR 84: version 120497 and later.
- ZBT 84: version 120497 and later.
- ZBR 168: version 220796 and later.
- ZBT 168: version 230796 and later.
- ZBR 246: version 110596 and later.
- ZBT 246: version 110596 and later.
- ZBR 324: version 270298 and later.
- ZBT 324: version 130196 and later.

The validity of the bring informations is subordinate to the number of the card release. The user must always verify the correct correspondence among the two denotations. Version number is printed on the boards in several positions both in serigraph and in printed circuit.

GENERAL FEATURES

ZBR (Zipped BLOCK Relais) and ZBT (Zipped BLOCK Transistor) serie boards are Input - Output peripheral modules in BLOCK format featuring ABACO® I/O BUS interface and Ω rail mounting capabilities. The amount of input and output signals available depends on the model, in particular:

- ZBR 84 and ZBT 84: 8 optocoupled Input signals, 4 Relais or Transistor Output signals.
- ZBR 164 and ZBT 164: 16 optocoupled Input signals, 8 Relais or Transistor Output signals.
- ZBR 246 and ZBT 246: 24 optocoupled Input signals, 16 Relais or Transistor Output signals.
- ZBR 324 and ZBT 324: 32 optocoupled Input signals, 24 Relais or Transistor Output signals.

ZBR and ZBT I/O modules take an extremly small room, nevertheless they feature a very high number of Input - Output signals provided with two separate power supply sections. The first supply section outputs 5 Vdc, it can supply on board logic, output relais or Darlington transistors and also an eventual external logic, such as other peripherals or a CPU section. The second supply section, galvanically isolated, can supply the optocouplers section lade by Inputs and also other eventual external peripherals.

Typical applications for ZBR and ZBT serie boards are the ones that require a rather high number of logic I/O signals. These signals are available on the modules that can be mounted on an Ω rail in any electric rack. Quick relais connectors are already installed on the modules to connect the signals form the external world, only 220 Vac mains power supply is required. The status of any I/O signals is displayed through a LED, placed near the connector that connects the signal itself. This makes easier both the cabling verification and the serch of problems during the diagnostic phase or the debugging phase. Also the power supply section is provided with diagnostic LEDs that signal eventual anomalous situations.

In addition to the logic I/O signals, two more optocoupled and displayed lines are installed to manage directly the /INT and /NMI signals present on the BUS. There is also the comfortable possibility to read the configuration of logic outputs through accessing a specific register.
**Figure 1: ZBR series boards block diagram**

- **CN1 - ABACO® I/O BUS**
  - **INTERFACE AND ADDRESSING SECTION**
    - **JAddr**
  - **CONTROL LOGIC**
    - **JPwr**
  - **POWER SUPPLY**
    - **CN2**
    - **CN3**
      - **Switching**
      - **+Vopto**
      - **+Va**
      - **+5Vdc**
  - **CN4**
  - **OPTO**

- **OUTPUT LINES**
  - **RELAYS**
    - **CONNECTOR(S)**

- **INPUT LINES**
  - **OPTO-COUPLERS**
    - **CONNECTOR(S)**
ZBR and ZBT boards are the most comfortable I/O expansion possibility for ABACO® CPU cards, single Europe format.

Connection is performed through Ω rail compliant Motherboard module ABB 03 or ABB 05, to which the CPU board connects through a 26 pins flat cable.

In this case it is possible, according to the number of boards installed on ABB 03, to supply directly the ZBR or ZBT module. These boards are the natural I/O complement for all the BLOCK format CPU cards provided with ABACO® I/O BUS expansion connector such as, for example, GPC® 15R, GPC® 153, GPC® 183, GPC® 323, GPC® 553, GPC® 554, etc.

- BLOCK format, with plastic mount for Ω rail
- Standard 26 pins ABACO® I/O BUS interface
- 8, 16, 24 or 32 Optocoupled NPN LED displayed Input signals, with RC filter
- Optocoupled LED displayed Input for /NMI and /INT signals
- 8, 16, 24 or 32 Output signals: 3 A Relais provided with MOV noise suppressor
  24 Vac all signals (ZBR serie) Optocoupled NPN Darlington, 4 A, 45 Vdc without heat sink (ZBT serie)
- All the Output signals are provided with LED to display the status and read register
- Strong quick extraction standard connectors for any I/O signal
- Board I/O addressing takes only 2, 4 or 8 Bytes
- Standard connector to supply external devices
- On board power supply for logic and Output section
- Galvanically isolated power supply for Optocoupled section
- Only one external 220 Vac mains power supply required, or different configurations

Here follows a description of ZBR and ZBT 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 figures 1 and 2.

**ZBR BOARDS OUTPUT SECTION**

This section features 4, 8, 16 or 24 Output signals driven by one or more latches. These components are managed through specific read/write registers, according to the information contained in the chapters dedicated to board's hardware and software description. Any Output signal, visualized through its own LED, controls a 3A Relays, normally open, provided with a MOV 24 Vac noise suppressor.

**ZBT BOARDS OUTPUT SECTION**

This section features 4, 8, 16 or 24 Output signals driven by one or more 74273 latches. These components are managed through specific read/write registers, according to the information contained in the chapters dedicated to board's hardware and software description. Any Output signal, galvanically isolated and visualized through its own LED, controls a 45 Vdc, 4A (not continuous) Darlington transistor, connected in Open Collector, provided with a back EMF protection diode.
FIGURE 2: ZBT SERIE BOARDS BLOCK DIAGRAM

CN1 - ABACO® I/O BUS

INTERFACE AND ADDRESSING SECTION

CONTROL LOGIC

OUTPUT LINES

OPTO

OPEN COLLECTOR TRANSISTORS

CONNECTOR(S)

INPUT LINES

OPTO-COUPLECTORS

CONNECTOR(S)

POWER SUPPLY

JPwr

Switching

+Vopto

+Va

+5Vdc

JAddr

/NMI

/INT

CN2

CN3

CN4

FIGURE 2: ZBT SERIE BOARDS BLOCK DIAGRAM
INPUT SECTION

This section features 4, 8, 16, 24 or 32 Input signals, acquired through input buffers. These components are managed by specific read/write registers, according to the informations contained in the chapters dedicated to board's hardware and software description. Any Input signal is galvanically isolated, NPN type and visualized through its own LED. Optocouplers of this section are supplied through +Vopto voltage generated by the specific power supply section.

CONTROL LOGIC

This section generates all the chip-select signals needed to access the several peripherals on ZBR or ZBT boards. Using this section the programmer can interact to the board's several sections, verifying their status, reading digital input configurations, setting output signals, etc. All this can be done through a simple software management based on ABACO® I/O BUS, to which the control logic connects through the interfacing and addressing section. For further informations please refer to the chapter dedicated to board's software description.

INTERFACING AND ADDRESSING SECTION

This section manages the data exchange between control logic and command board through ABACO® I/O BUS. In particular, all written or read data transit across this section that, in addition, provides the board I/O management, by setting a specific jumper called JAddr. For further informations please refer to the chapter dedicated to board's software description.

INTERFACING TO /INT AND /NMI SECTION

This section, which is based on two optocoupled inputs and two visualization LEDs, allows to interface two signals to /INT and /NMI ABACO® I/O BUS signals. Using this feature the User can always promptly and efficiently react to particular external events.

POWER SUPPLY SECTION

ZBR and ZBT serie boards feature an efficient supply circuitry including: a switching power supply providing +5 Vdc supply voltage needed to Output and logic section, under several conditions of load and input voltage; a simple rectifying group generates +Vopto voltage needed to supply Input signals optocouplers. These voltages are also available on CN3 connector contacts; this way it is also possible to supply eventual external modules, such as a control card.
Figure 3: ZBR 84 Card Photo

Figure 4: ZBT 84 Card Photo
TECHNICAL FEATURES OF ZBR 84

GENERAL FEATURES OF ZBR 84

BUS Type: **ABACO® I/O**

On board resources:
- 8 NPN Optocoupled Inputs
- 4 Normally open 3 A Relais
- 4 Open collector 500 mA **not continuous** Outputs
- 2 NPN Optocoupled Inputs for /NMI and /INT BUS signals

Power supplies: Provided with disturb and noise suppressor filter

PHYSICAL FEATURES OF ZBR 84

Connectors:
- CN1: 26 pins low profile vertical M (**ABACO® I/O BUS**)
- CN2: 2 or 4 quick release screw terminal (Power supply)
- CN3: 5 pins low profile vertical M (Supply external loads)
- CN4: 3 pins quick release (/NMI and /INT Inputs)
- CN5: 9 pins quick release (**IN1** Optocoupled Inputs)
- CN6: 6 pins quick release (**OUT1** Relais Outputs)
- CN6B: 6 pins strip M (Non Optocoupled O. C. Outputs)

Size: 100 x 95 mm

Weight: 450 g max

Temperature range: from 0 to 50 Centigrade degrees

Relative Humidity: 20% up to 90% (without condense)

ELECTRIC FEATURES OF ZBR 84

FVac fuse: 100 mA; 250 V delayed
FPwr fuse: 1 A; 250 V delayed
FOpto fuse: 1 A; 250 V delayed

To easily locate the fuses please refer to figure 52.

Consumption:
- 175 mA max (+5 Vdc)
- 21 mA max (+Vopto)

Maximum current for each Relais: 3 A
Maximum tension for each Relais: 30 Vdc / 250 Vac
Maximum current for Open Collector Output: 500 mA not continuous
Maximum tension for Open Collector Output: 5 Vdc
Maximum power for Open Collector Output (no heat sink): 2.5 W

Mains power supply version
Required tension: 230 Vac +6 -10 % 50 Hz
Provided tensions:
+5 Vdc 1 W (200 mA)
+Vopto 0.6 W

Low voltage power supply version
Required tensions: V2 (+5 Vdc) 15÷18 Vac or 18÷24 Vdc
V1 (+Vopto) 15÷18 Vac or 18÷24 Vdc
Provided tensions:
+5 Vdc 6 W (1.2 A)
+Vopto 12.5 W

Stabilized power supply version
Required and provided tension:
+5 Vdc
+18÷24 Vdc

* Data here reported are referred to 20 Centigrad degrees of environmental temperature

FIGURE 5: ZBR 84 COMPONENTS MAP
GENERAL FEATURES OF ZBT 84

BUS Type: ABACO® I/O

On board resources: 8 NPN Optocoupled Inputs
4 Open Collector 4 A Darlington transistor
4 TTL Outputs
2 NPN Optocoupled Inputs for /NMI and /INT BUS signals

Power supplies: Provided with disturb and noise suppressor filter

PHYSICAL FEATURES OF ZBT 84

Connectors: CN1: 26 pins low profile vertical M (ABACO® I/O BUS)
CN2: 2 or 4 quick release screw terminal (Power supply)
CN3: C(Supply external loads)
CN4: 3 pins quick release (/NMI and /INT Inputs)
CN5: 9 pins quick release (IN1 Optocoupled Inputs)
CN6: 6 pins quick release (OUT1 Relais Outputs)
CN6B: 6 pins strip M (TTL Outputs)

Size: 100 x 145 mm

Weight: 415 g max

Temperature range: from 0 to 50 Centigrades

Relative Humidity: 20% up to 90% (without condense)

ELECTRIC FEATURES OF ZBT 84

FVac fuse: 100 mA; 250 V delayed
FPwr fuse: 1 A; 250 V delayed
FOpto fuse: 1 A; 250 V delayed

To easily locate the fuses please refer to figure 55.

Consumption: 90 mA max (+5 Vdc)
21 mA max (+Vopto)

Maximum current for transistor: 4 A not continuous *
Maximum tension for transistor: 45 Vdc *
Maximum power for transistor: 1.25 W without heat sink *
**Mains power supply version**

Required tension: 230 Vac +6 -10 % 50 Hz

Provided tensions:  
- +5 Vdc 1.45 W (290 mA)  
- +Vopto 0.6 W

**Low voltage power supply version**

Required tensions:  
- V2 (+5 Vdc) 15÷18 Vac or 18÷24 Vdc  
- V1 (+Vopto) 15÷18 Vac or 18÷24 Vdc

Provided tensions:  
- +5 Vdc 6.5 W (1.3 A)  
- +Vopto 12.5 W

**Stabilized power supply version**

Required and provided tension:  
- +5 Vdc  
- +18÷24 Vdc

* Data here reported are referred to 20 Centigrad degrees of environmental temperature

---

**Figure 6: ZBT 84 components map**
TECHNICAL FEATURES OF ZBR 168

GENERAL FEATURES OF ZBR 168

BUS Type: ABACO® I/O

On board resources: 16 NPN Optocoupled Inputs
8 Normally open 3 A Relais
2 NPN Optocoupled Inputs for /NMI and /INT BUS signals

Power supplies: Provided with disturb and noise suppressor filter

PHYSICAL FEATURES OF ZBR 168

Connectors:
CN1: 26 pins low profile vertical M (ABACO® I/O BUS)
CN2: 2 or 4 quick release screw terminal (Power supply)
CN3: 5 pins low profile vertical M (Supply external loads)
CN4: 5 pins quick release (/NMI and /INT Inputs)
CN5: 9 pins quick release (IN1 Optocoupled Inputs)
CN6: 11 pins quick release (OUT1 Relais Outputs)
CN7: 9 pins quick release (IN2 Optocoupled Inputs)

Size: 100 x 145 mm
Weight: 670 g max
Temperature range: from 0 to 50 Centigrade degrees
Relative Humidity: 20% up to 90% (without condense)

ELECTRIC FEATURES OF ZBR 168

FVac fuse: 100 mA; 250 V delayed
FPwr fuse: 1 A; 250 V delayed
FOpto fuse: 1 A; 250 V delayed

To easily locate the fuses please refer to figure 57.

Consumption: 200 mA max (+5 Vdc)
50 mA max (+Vopto)

Maximum current for each Relais: 3 A
Maximum tension for each Relais: 30 Vdc / 250 Vac
**Mains power supply version**

<table>
<thead>
<tr>
<th>Required tension:</th>
<th>230 Vac +6 -10 % 50 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provided tensions:</td>
<td>+5 Vdc 2.8 W (560 mA) *</td>
</tr>
<tr>
<td></td>
<td>+Vopto 3 W</td>
</tr>
</tbody>
</table>

**Low voltage power supply version**

<table>
<thead>
<tr>
<th>Required tensions:</th>
<th>V2 (+5 Vdc) 15÷18 Vac or 18÷24 Vdc</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>V1 (+Vopto) 15÷18 Vac or 18÷24 Vdc</td>
</tr>
<tr>
<td>Provided tensions:</td>
<td>+5 Vdc 6 W (1.2 A) *</td>
</tr>
<tr>
<td></td>
<td>+Vopto 12.5 W</td>
</tr>
</tbody>
</table>

**Stabilized power supply version**

<table>
<thead>
<tr>
<th>Required and provided tension:</th>
<th>+5 Vdc</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>+18÷24 Vdc</td>
</tr>
</tbody>
</table>

* Data here reported are referred to 20 Centigrad degrees of environmental temperature
**Figure 7: ZBR 168 Card Photo**

**Figure 8: ZBR 168 Components Map**
TECHNICAL FEATURES OF ZBT 168

GENERAL FEATURES OF ZBT 168

BUS Type: ABACO® I/O

On board resources: 16 NPN Optocoupled Inputs
8 Open Collector 4 A Darlington transistor
2 NPN Optocoupled Inputs for /NMI and /INT BUS signals

Power supplies: Provided with disturb and noise suppresor filter

PHYSICAL FEATURES OF ZBT 168

Connectors:
- CN1: 26 pins low profile vertical M (ABACO® I/O BUS)
- CN2: 2 or 4 quick release screw terminal (Power supply)
- CN3: 5 pins low profile vertical M (Supply external loads)
- CN4: 5 pins quick release (/NMI and /INT Inputs)
- CN5: 9 pins quick release (IN1 Optocoupled Inputs)
- CN6: 11 pins quick release (OUT1 transistor Outputs)
- CN7: 9 pins quick release (IN2 Optocoupled Inputs)

Size: 100 x 145 mm

Weight: 630 g max

Temperature range: from 0 to 50 Centigrad degrees

Relative Humidity: 20% up to 90% (without condense)

ELECTRIC FEATURES OF ZBT 168

FVac fuse: 100 mA; 250 V delayed
FPwr fuse: 1 A; 250 V delayed
FOpto fuse: 1 A; 250 V delayed

To easily locate the fuses please refer to figure 58.

Consumption: 75 mA max (+5 Vdc)
50 mA max (+Vopto)

Maximum current for transistor: 4 A not continuous
Maximum tension for transistor: 45 Vdc
Maximum power for transistor: 1.25 W without heat sink
Mains power supply version

Required tension: 230 Vac +6 -10 % 50 Hz

Provided tensions: +5 Vdc 3.4 W (680 mA) *
+Vopto 3 W *

Low voltage power supply version

Required tensions: V2 (+5 Vdc) 15÷18 Vac or 18÷24 Vdc
V1 (+Vopto) 15÷18 Vac or 18÷24 Vdc

Provided tensions: +5 Vdc 6.5 W (1.3 A) *
+Vopto 12.5 W *

Stabilized power supply version

Required and provided tension: +5 Vdc
+18÷24 Vdc

* Data here reported are referred to 20 Centigrad degrees of environmental temperature
FIGURE 9: ZBT 168 CARD PHOTO

FIGURE 10: ZBT 168 COMPONENTS MAP
TECHNICAL FEATURES OF ZBR 246

GENERAL FEATURES OF ZBR 246

BUS Type: ABACO® I/O

On board resources:
- 24 NPN Optocoupled Inputs
- 16 Normally open 3 A Relais
- 2 NPN Optocoupled Inputs for /NMI and /INT BUS signals

Power supplies: Provided with disturb and noise suppresor filter

PHYSICAL FEATURES OF ZBR 246

Connectors:
- CN1: 26 pins low profile vertical M (ABACO® I/O BUS)
- CN2: 2 or 4 quick release screw terminal (Power supply)
- CN3: 5 pins low profile vertical M (Supply external loads)
- CN4: 5 pins quick release (/NMI and /INT Inputs)
- CN5: 9 pins quick release (IN1 Optocoupled Inputs)
- CN6: 11 pins quick release (OUT1 Relais Outputs)
- CN7: 9 pins quick release (IN2 Optocoupled Inputs)
- CN8: 11 pins quick release (OUT2 Relais Outputs)
- CN9: 9 pins quick release (IN3 Optocoupled Inputs)

Size: 100 x 195 mm

Weight: 800 g max

Temperature range: from 0 to 50 Centigrad degreeses

Relative Humidity: 20% up to 90% (without condense)
FIGURE 11: ZBR 246 COMPONENTS MAP
ELECTRIC FEATURES OF ZBR 246

FVac fuse: 100 mA; 250 V delayed
FPwr fuse: 1 A; 250 V delayed
FOpto fuse: 1 A; 250 V delayed

To easily locate the fuses please refer to figure 59.

Consumption:
- 385 mA max (+5 Vdc)
- 80 mA max (+Vopto)

Maximum current for each Relais: 3 A *
Maximum tension for each Relais: 30 Vdc / 250 Vac *

Mains power supply version

Required tension: 230 Vac +6 -10 % 50 Hz
Provided tensions:
- +5 Vdc 1.85 W (370 mA) *
- +Vopto 2.4 W *

Low voltage power supply version

Required tensions:
- V2 (+5 Vdc) 15÷18 Vac or 18÷24 Vdc
- V1 (+Vopto) 15÷18 Vac or 18÷24 Vdc
Provided tensions:
- +5 Vdc 5 W (1 A) *
- +Vopto 12.5 W *

Stabilized power supply version

Required and provided tension:
- +5 Vdc
- +18÷24 Vdc

* Data here reported are referred to 20 Centigrad degrees of environmental temperature
## TECHNICAL FEATURES OF ZBT 246

### GENERAL FEATURES OF ZBT 246

**BUS Type:**  
ABACO® I/O

**On board resources:**  
- 24 NPN Optocoupled Inputs  
- 16 Open Collector 4 A Darlington transistor  
- 2 NPN Optocoupled Inputs for /NMI and /INT BUS signals

**Power supplies:**  
Provided with disturb and noise suppressor filter

### PHYSICAL FEATURES OF ZBT 246

**Connectors:**

<table>
<thead>
<tr>
<th>Connector</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CN1:</td>
<td>26 pins low profile vertical M (ABACO® I/O BUS)</td>
</tr>
<tr>
<td>CN2:</td>
<td>2 or 4 quick release screw terminal (Power supply)</td>
</tr>
<tr>
<td>CN3:</td>
<td>5 pins low profile vertical M (Supply external loads)</td>
</tr>
<tr>
<td>CN4:</td>
<td>5 pins quick release (/NMI and /INT Inputs)</td>
</tr>
<tr>
<td>CN5:</td>
<td>9 pins quick release (IN1 Optocoupled Inputs)</td>
</tr>
<tr>
<td>CN6:</td>
<td>12 pins quick release (OUT1 transistor Outputs)</td>
</tr>
<tr>
<td>CN7:</td>
<td>9 pins quick release (IN2 Optocoupled Inputs)</td>
</tr>
<tr>
<td>CN8:</td>
<td>12 pins quick release (OUT2 transistor Outputs)</td>
</tr>
<tr>
<td>CN9:</td>
<td>9 pins quick release (IN3 Optocoupled Inputs)</td>
</tr>
</tbody>
</table>

**Size:**  
100 x 195 mm

**Weight:**  
800 g max

**Temperature range:**  
from 0 to 50 Centigrade degrees

**Relative Humidity:**  
20% up to 90% (without condense)
ELECTRIC FEATURES OF ZBT 246

FVac fuse: 100 mA; 250 V delayed
FPwr fuse: 1 A; 250 V delayed
FOpto fuse: 1 A; 250 V delayed

To easily locate the fuses please refer to figure 60.

Consumption:
- 150 mA max (+5 Vdc)
- 80 mA max (+Vopto)

Maximum current for transistor: 4 A **not continuous**
Maximum tension for transistor: 45 Vdc
Maximum power for transistor: 1.25 W **without heat sink**

Mains power supply version

Required tension: 230 Vac +6 -10 % 50 Hz
Provided tensions:
- +5 Vdc 3 W (600 mA) *
- +Vopto 2.4 W *

Low voltage power supply version

Required tensions:
- V2 (+5 Vdc) 15÷18 Vac or 18÷24 Vdc
- V1 (+Vopto) 15÷18 Vac or 18÷24 Vdc
Provided tensions:
- +5 Vdc 6.25 W (1.25 A) *
- +Vopto 12.5 W *

Stabilized power supply version

Required and provided tension:
- +5 Vdc
- +18÷24 Vdc

* Data here reported are referred to 20 Centigrad degreeses of environmental temperature
Figure 14: ZBT 246 Card Photo
TECHNICAL FEATURES OF ZBR 324

GENERAL FEATURES OF ZBR 324

BUS Type: ABACO® I/O

On board resources: 32 NPN Optocoupled Inputs
24 Normally open 3 A Relais
2 NPN Optocoupled Inputs for /NMI and /INT BUS signals

Power supplies: Provided with disturb and noise suppressor filter

PHYSICAL FEATURES OF ZBR 324

Connectors: CN1: 26 pins low profile vertical M (ABACO® I/O BUS)
CN2: 2 or 4 quick release screw terminal (Power supply)
CN3: 5 pins low profile vertical M (Supply external loads)
CN4: 5 pins quick release (/NMI and /INT Inputs)
CN5: 9 pins quick release (IN1 Optocoupled Inputs)
CN6: 11 pins quick release (OUT1 Relais Outputs)
CN7: 9 pins quick release (IN2 Optocoupled Inputs)
CN8: 11 pins quick release (OUT2 Relais Outputs)
CN9: 9 pins quick release (IN3 Optocoupled Inputs)
CN10: 11 pins quick release (OUT3 Relais Outputs)
CN11: 9 pins quick release (IN4 Optocoupled Inputs)

Size: 100 x 245 mm

Weight: 1350 g max

Temperature range: from 0 to 50 Centigrad degreeses

Relative Humidity: 20% up to 90% (without condense)
ELECTRIC FEATURES OF ZBR 324

FVac fuse: 200 mA; 250 V delayed
FPwr fuse: 1 A; 250 V delayed
FOpto fuse: 1 A; 250 V delayed

To easily locate the fuses please refer to figure 61.

Consumption:
490 mA max (+5 Vdc)
110 mA max (+Vopto)

Maximum current for each Relais: 3 A *
Maximum tension for each Relais: 30 Vdc / 250 Vac *

Minimum current for Optocoupled Inputs: 1 mA

Mains power supply version

Required tension: 230 Vac +6 -10 % 50 Hz
Provided tensions: +5 Vdc 14.5 W (370 mA) *
+Vopto 9 W *

Low voltage power supply version

Required tensions: V2 (+5 Vdc) 15÷18 Vac or 18÷24 Vdc
V1 (+Vopto) 15÷18 Vac or 18÷24 Vdc
Provided tensions: +5 Vdc 4.5 W (900 mA) *
+Vopto 12.5 W *

Stabilized power supply version

Required and provided tension: +5 Vdc
+18÷24 Vdc

* Data here reported are referred to 20 Centigrad degreeses of environmental temperature
Figure 16: ZBR 324 card photo
TECHNICAL FEATURES OF ZBT 324

GENERAL FEATURES OF ZBT 324

BUS Type: ABACO® I/O

On board resources: 32 NPN Optocoupled Inputs
24 Open Collector 4 A Darlington transistor
2 NPN Optocoupled Inputs for /NMI and /INT BUS signals

Power supplies: Provided with disturb and noise suppressor filter

PHYSICAL FEATURES OF ZBT 324

Connectors:
- CN1: 26 pins low profile vertical M (ABACO® I/O BUS)
- CN2: 2 or 4 quick release screw terminal (Power supply)
- CN3: 5 pins low profile vertical M (Supply external loads)
- CN4: 5 pins quick release (/NMI and /INT Inputs)
- CN5: 9 pins quick release (IN1 Optocoupled Inputs)
- CN6: 12 pins quick release (OUT1 transistor Outputs)
- CN7: 9 pins quick release (IN2 Optocoupled Inputs)
- CN8: 12 pins quick release (OUT2 transistor Outputs)
- CN9: 9 pins quick release (IN3 Optocoupled Inputs)
- CN10: 12 pins quick release (OUT3 transistor Outputs)
- CN11: 9 pins quick release (IN4 Optocoupled Inputs)

Size: 100 x 245 mm

Weight: 1250 g max

Temperature range: from 0 to 50 Centigrad degreeses

Relative Humidity: 20% up to 90% (without condense)
FIGURE 17: ZBT 324 COMPONENTS MAP
ELECTRIC FEATURES OF ZBT 324

FVac fuse: 200 mA; 250 V delayed
FPwr fuse: 1 A; 250 V delayed
FOpto fuse: 1 A; 250 V delayed

To easily locate the fuses please refer to figure 63.

Consumption:
190 mA max (+5 Vdc)
110 mA max (+Vopto)

Maximum current for transistor: 4 A not continuous
Maximum tension for transistor: 45 Vdc
Maximum power for transistor: 1.25 W without heat sink

Mains power supply version

Required tension: 230 Vac +6 -10 % 50 Hz
Provided tensions: +5 Vdc 6 W (1.2 A) *
+Vopto 9 W *

Low voltage power supply version

Required tensions: V2 (+5 Vdc) 15÷18 Vac or 18÷24 Vdc
V1 (+Vopto) 15÷18 Vac or 18÷24 Vdc
Provided tensions: +5 Vdc 6 W (1.2 A) *
+Vopto 12.5 W *

Stabilized power supply version

Required and provided tension: +5 Vdc
+18÷24 Vdc

* Data here reported are referred to 20 Centigrad degreeses of environmental temperature
FIGURE 18: ZBT 324 CARD PHOTO
INSTALLATION

In this chapter there are the information for a right installation and correct use of ZBT and ZBR cards. The user can find the location and functions of each connectors, trimmers, jumpers and some explanatory diagrams.

CONNECTIONS

The ZBT and ZBR cards have several connectors that can be linkeded to other devices or directly to the field, according to system requirements. In this paragraph there are connectors pin outs, a short signals description (including the signals direction) and connectors location (see figure referring to the card in use), plus some figures that describe how the interface signals are connected on the card.

CN3 - AUXILIARY POWER SUPPLY CONNECTOR

CN3 is a 5 pins low profile vertical male 2.54 mm pitch connector.
If the ZBR or ZBT card is provided with on board power supply, the two galvanically isolated voltages generated by this section can be accessed through CN3, to supply external loads.
Otherwise, if the ZBR or ZBT card is provided with on board power supply, through CN3 it is possible to provide the card +5 Vdc and +Vopto voltages, essential to supply correctly the card itself (for further informations please see the paragraph “SUPPLY VOLTAGES SELECTION”).

![Figure 19: CN3 - Auxiliary power supply connector](image)

Signals description:

<table>
<thead>
<tr>
<th>Signal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>+Vopto</td>
<td>I/O - Positive terminal of external optocoupled I/O supply</td>
</tr>
<tr>
<td>GND opto</td>
<td>- Common terminal of external optocoupled I/O supply</td>
</tr>
<tr>
<td>GND</td>
<td>O - Ground signal</td>
</tr>
<tr>
<td>+Va</td>
<td>O - Positive terminal of board switching supply input voltage</td>
</tr>
<tr>
<td>+5 Vdc</td>
<td>I/O - +5 Vdc supply signal</td>
</tr>
</tbody>
</table>
CN1 - ABACO® I/O BUS CONNECTOR

CN1 is a 26 pins, male, vertical, low profile connector with 2.54 mm pitch. Through CN1 the ZBT or ZBR card can be connected to external expansion modules developed by the user or to the numerous grifo® boards, both intelligent and not. All this connector signals are at TTL level and follow the ABACO® I/O BUS standard.

**Figure 20: CN1 - ABACO® I/O BUS CONNECTOR**

Signals description:

A0-A7 = O - Address BUS.
D0-D7 = I/O - Data BUS.
/INT BUS = I - Interrupt request (open collector type).
/NMI BUS = I - Non maskable interrupt (open collector type).
/IORQ = O - Input output request.
/RD = O - Read cycle status.
/WR = O - Write cycle status.
/RESET = O - Reset.
+5 Vdc = I/O - +5 Vdc power supply.
GND = - Ground signal.
N.C. = - Not connected
CN2 - MAINS POWER SUPPLY CONNECTOR

CN2 is a 2 pins quick release screw terminal connector. Through CN2 mains voltage is provided to on board power supply section, properly configured (for further informations please see the paragraph “SUPPLY VOLTAGES SELECTION”).

![Figure 21: CN2 - Mains Power Supply Connector]

Signals description:

230 Vac = I - 230 Vac mains power supply signals

CN2 - LOW VOLTAGE POWER SUPPLY CONNECTOR

CN2 is a 4 pins quick release screw terminal connector. Through CN2 low voltage is provided to on board power supply section, properly configured (for further informations please see the paragraph “SUPPLY VOLTAGES SELECTION”).

![Figure 22: CN2 - Low Voltage Power Supply Connector]

Signals description:

V1 = I - Vopto power supply signals
V2 = I - +5 Vdc power supply signals
**Figure 23: ZBR 84 Connectors Locations**

**Figure 24: ZBT 84 Connectors Locations**
CN4 - /NMI AND /INT SIGNALS OPTOCOUPLED INPUT CONNECTOR

CN4 is a 3 pins quick release screw terminal connector. By CN4 two signals coming from external world can be connected to /NMI and /INT signals of ABACO® I/O BUS, through specific NPNOptocoupled inputs.

![CN4 Diagram]

**Figure 25: CN4 - /NMI and /INT Signals Optocoupled Input Connector**

Signals description:

- /NMI opto = I - Open collector NPN input interfaced to /NMI signal
- /INT opto = I - Open collector NPN input interfaced to /INT signal
- GND opto = - Common terminal of Optocoupled inputs
The two input lines for /NMI and /INT signals are Optocoupled to warrant a high degree of protection for on-board electronics against noise and disturbances from the external world.

Both signals are provided with a LED for visual feedback (the LED will light whenever the input will have the potential of GND opto signal); this means that the inputs are going to support normally open contacts. These contacts are suitable to be connected to NPN drivers. In case the User would want to connect PNP drivers then he/she will have to put a PBI 01 BLOCK module between the drivers and the card.

The interface circuitry for /NMI and /INT signals is shown in the following diagram.

The Optocouplers power supply is generated by on-board power supply or, if the board is not provided with power supply circuitry, must be provided through the specific connector CN3.

**Figure 26: /INT and /NMI Optocoupled Inputs Block Diagram**
CN5 - IN1 OPTOCOUPLED INPUTS CONNECTOR

CN5 is a 9 pins quick release screw terminal connector. By CN5 eight optocoupled NPN inputs of ZBR and ZBT cards can be connected to the external world, in particular the IN1 inputs section. Open Collector inputs and optocoupled section supply common terminal are present.

**Figure 27: CN5 - IN1 optocoupled inputs connector**

Signals description:

IN1.\textsubscript{n} = I - NPN Open Collector input connected to IN1 section  
GND opto = - Common terminal of Optocoupled inputs
The input signals available on ZBR and ZBT are Optocoupled to warrant a high degree of protection for on board electronics against noise and disturbances from the external world. Each signal is provided with a LED for visual feedback (the LED will light whenever the input will have the potential of GND opto signal); this means that the inputs are going to support normally open contacts. These contacts are suitable to be connected to NPN drivers. In case the User would want to connect PNP drivers then he/she will have to put a PBI 01 BLOCK module between the drivers and the card.

The interface circuitry for this input section is shown in the following diagram.

The Optocouplers power supply is generated by on board power supply or, if the board is not provided with power supply circuitry, must be provided through the specific connector CN3.

**Figure 28: Optocoupled input section block diagram**
CN6 - ZBR 84 OUT1 RELAYS OUTPUT CONNECTOR

On ZBR 84 card, CN6 is a 6 pins quick release screw terminal connector. By CN6 four relays outputs can be connected to the external world, in particular the OUT1 outputs section. Normally open contacts of each relay output and two common terminal related to two output groups are present; please remark that the maximum current for each relay is 3 A.

**Figure 29: CN6 - ZBR 84 OUT1 RELAYS OUTPUT CONNECTOR**

Signals description:

COMMON 1.x÷y = - Common terminal of OUT1 relays from x to y
NO OUT 1.n = O - Normally open contact of n-th OUT1 relay output
The relays output signals available on ZBR 84 are provided with a LED for visual feedback (the LED will light whenever the relay contact is closed); the relays are normally open, they can bear a maximum current of 3 A with a maximum tension of 30 Vdc or 250 Vac.

It is remarkable that the current status of output signal can be acquired by software to simplify the application software development.

The interface circuitry for this relays output section is shown in the following diagram.

**NOTE**

Each signal is provided with a transient suppressor type MOV 24 Vac; if the outputs of ZBR 84 must bear a greater voltage then the card must not install these components.

This need must be specified in the order, in fact this implies a different hardware configuration that must be performed by grifo® technicians.

---

**FIGURE 30: ZBR 84 RELAYS OUTPUT SECTION BLOCK DIAGRAM**
CN6 - OUT1 TRANSISTOR OUTPUT CONNECTOR

On ZBT 84 card, CN6 is a 6 pins quick release screw terminal connector. By CN6 four Darlington transistor outputs can be connected to the external world, in particular the OUT1 outputs section. Open collector signals of each transistor output and one common terminal (emitter) related to all the four outputs are present; in addition there is a pin to connect to the load power supply voltage, to discharge any eventual inductive tension.
Please remark that the maximum current for each transistor is 4 A non continuous.

![Figure 31: CN6 - OUT1 Transistor Output Connector](image)

Signals description:

- COMMON 1.x±y = Common emitter of OUT1 transistors from x to y
- NO OUT 1.n = O - Open collector contact of n-th OUT1 transistor output
- +VL 1 = I - Load power supply voltage pin (+45 Vdc max)
  It is also the common point for back EMF protection diodes
The transistor output signals available on **ZBT 84** are provided with a LED for visual feedback (the LED will light whenever the transistor is ON); they are optocoupled to warrant galvanical isolation between on board electronics and the external world.

The final stage of these outputs is made by a **NPN** Open Collector Darlington transistor, capable to bear a maximum current of **4 A non continuous**, with a maximum tension that can be **+45 Vdc**. This component, lacking the heat sink, can drive continuously a resistive load that, supplied with a tension of **24 Vdc**, consumes a maximum current of **600 mA**; these figures are valid only if environmental temperature is **20 Centigrad degrees**.

It is remarkable that the current status of output signal can be acquired by software to simplify the application software development.

The interface circuitry for this transistors output section is shown in the following diagram.

**Figure 32: ZBT 84 Transistor output block diagram**
CN6B - ZBR 84 OUT1 OPEN COLLECTOR OUTPUTS CONNECTOR

CN6B is a male strip connector featuring 2 rows of 3 pins. Through CN6B four Open Collector outputs from ZBR 84 OUT1 section can be connected to the external world. The connector provides the output signals and two power supply signals; please remark that the maximum current for each output signal is 500 mA non continuous.

[Diagram of CN6B - OUT1 open collector output connector]

Signals description:

- **OC OUT 1.n** = O - n-th OUT1 open collector output signal
- **+5 Vdc** = - External device power supply +5 Vdc signal
- **GND** = - External device power supply ground signal

Also the current status of these signals can be acquired by softaware, to simplify the application program development.

CN6B - ZBT 84 OUT1 TTL OUTPUTS CONNECTOR

CN6B is a male strip connector featuring 2 rows of 3 pins. Through CN6B four TTL outputs from ZBT 84 OUT1 section can be connected to the external world. The connector provides the output signals and two power supply signals; please remark that the maximum current for each output signal is 5 mA non continuous.

[Diagram of CN6B - OUT1 TTL output connector]

Signals description:

- **OC OUT 1.n** = O - n-th OUT1 open collector output signal
- **+5 Vdc** = - External device power supply +5 Vdc signal
- **GND** = - External device power supply ground signal

Also the current status of these signals can be acquired by softaware, to simplify the application program development.
Figure 35: ZBR 168 Connectors Location
CN6 - ZBR 168:324 OUT1 RELAYS OUTPUT CONNECTOR

On ZBR 168, ZBR 246 and ZBR 324 cards, CN6 is a 11 pins quick release screw terminal connector. By CN6 eight relays outputs can be connected to the external world, in particular the OUT1 outputs section. Normally open contacts of each relay output and three common terminal related to three output groups are present; please remark that the maximum current for each relay is 3 A.

Figure 36: CN6 - ZBR 168:324 OUT1 RELAYS OUTPUT CONNECTOR

Signals description:

COMMON 1.x:y = - Common terminal of OUT1 relays from x to y
NO OUT 1.n = O - Normally open contact of n-th OUT1 relay output
The relays output signals available on **ZBR 168**, **ZBR 246** and **ZBR 324** cards are provided with a LED for visual feedback (the LED will light whenever the relay contact is closed); the relays are normally open, they can bear a maximum current of 3 A with a maximum tension of **30 Vdc** or **250 Vac**.

It is remarkable that the current status of output signal can be acquired by software to simplify the application software development.

The interface circuitry for this relays output section is shown in the following diagram.

**NOTE**

Each signal is provided with a transient suppressor type **MOV 24 Vac**; if the outputs of **ZBR 84** must bear a greater voltage then the card must not install these components.

This need must be specified in the order, in fact this implies a different hardware configuration that must be performed by **grifo®** technicians.

![Block Diagram of ZBR 168÷324 Relays Output Section](image-url)
CN6 - ZBT 168÷324 OUT1 TRANSISTOR OUTPUT CONNECTOR

On **ZBR 168, ZBR 246 and ZBR 324** cards, CN6 is a 12 pins quick release screw terminal connector. By CN6 eight Darlington transistor outputs can be connected to the external world, in particular the **OUT1** outputs section. Open collector signals of each transistor output and three common terminal (emitter) related to all the outputs are present; in addition there is a pin to connect to the load power supply voltage, to discharge any eventual inductive tension.

Please remark that the maximum current for each transistor is 4 A non continuous.

![Figure 38: CN6 - ZBT 168÷324 OUT1 TRANSISTOR OUTPUT CONNECTOR](image)

**Signals description:**

- COMMON 1.x÷y = Common emitter of OUT1 transistors from x to y
- NO OUT 1.n = O - Open collector contact of n-th OUT1 transistor output
- +VL 1 = I - Load power supply voltage pin (+45 Vdc max)

It is also the common point for back EMF protection diodes.
The transistor output signals available on ZBR 168, ZBR 246 and ZBR 324 cards are provided with a LED for visual feedback (the LED will light whenever the transistor is ON); they are optocoupled to warrant galvanic isolation between on board electronics and the external world. The final stage of these outputs is made by a NPN Open Collector Darlington transistor, capable to bear a maximum current of 4 A non continuous, with a maximum tension that can be +45 Vdc. This component, lacking the heat sink, can drive continuously a resistive load that, supplied with a tension of 24 Vdc, consumes a maximum current of 600 mA; these figures are valid only if environmental temperature is 20 Centigrad degrees.

It is remarkable that the current status of output signal can be acquired by software to simplify the application software development.

The interface circuitry for this transistor output section is shown in the following diagram.

**Figure 39: ZBT 168/324 Transistor Output Block Diagram**
CN7 - IN2 OPTOCOUPLED INPUTS CONNECTOR

CN7 is a 9 pins quick release screw terminal connector. By CN7 eight optocoupled NPN inputs of ZBR and ZBT cards can be connected to the external world, in particular the IN2 inputs section. Open Collector inputs and optocoupled section supply common terminal are present.

Signals description:

IN2.n = I - NPN Open Collector input connected to IN2 section
GND opto = - Common terminal of Optocoupled inputs
FIGURE 41: ZBT 168 CONNECTORS LOCATION
CN8 - ZBR 246÷324 OUT2 RELAYS OUTPUT CONNECTOR

On ZBR 246 and ZBR 324 cards, CN8 is a 11 pins quick release screw terminal connector. By CN8 eight relays outputs can be connected to the external world, in particular the OUT2 outputs section. Normally open contacts of each relay output and three common terminal related to three output groups are present; please remark that the maximum current for each relay is 3 A.

![Diagram of CN8 connector]

**Figure 42: CN6 - ZBR 246÷324 OUT1 RELAYS OUTPUT CONNECTOR**

Signals description:

- COMMON 2.x÷y = - Common terminal of OUT2 relays from x to y
- NO OUT 2.n = O - Normally open contact of n-th OUT2 relay output
Figure 43: ZBR 246 Connectors Location
CN8 - ZBT 246÷324 OUT2 TRANSISTOR OUTPUT CONNECTOR

On ZBR 246 and ZBR 324 cards, CN8 is a 12 pins quick release screw terminal connector. By CN8 eight Darlington transistor outputs can be connected to the external world, in particular the OUT2 outputs section. Open collector signals of each transistor output and three common terminal (emitter) related to all the outputs are present; in addition there is a pin to connect to the load power supply voltage, to discharge any eventual inductive tension. Please remark that the maximum current for each transistor is 4 A non continuous.

![Diagram of CN8 connector](image)

**Figure 44: CN6 - ZBT 246÷324 OUT2 TRANSISTOR OUTPUT CONNECTOR**

Signals description:

- **COMMON 2.x÷y** = Common emitter of OUT2 transistors from x to y
- **NO OUT 2.n** = O - Open collector contact of n-th OUT2 transistor output
- **+VL 2** = I - Load power supply voltage pin (+45 Vdc max)
  
  It is also the common point for back EMF protection diodes
Figure 45: ZBT 246 Connectors Location
CN9 - IN3 OPTOCOUPLED INPUTS CONNECTOR

CN9 is a 9 pins quick release screw terminal connector. By CN9 eight optocoupled NPN inputs of ZBR and ZBT cards can be connected to the external world, in particular the IN3 inputs section. Open Collector inputs and optocoupled section supply common terminal are present.

Signals description:

IN3.n = I - NPN Open Collector input connected to IN3 section
GND opto = - Common terminal of Optocoupled inputs
Figure 47: ZBR 324 Connectors Location

- CN6
- CN4
- CN1
- CN11
- CN8
- CN9
- CN10
- CN7
- CN3
- CN2
- CN5
CN10 - ZBR 324 OUT3 RELAYS OUTPUT CONNECTOR

On ZBR 324 card, CN10 is a 11 pins quick release screw terminal connector. By CN10 eight relays outputs can be connected to the external world, in particular the OUT3 outputs section. Normally open contacts of each relay output and three common terminal related to three output groups are present; please remark that the maximum current for each relay is 3 A.

Signals description:

COMMON 3.x÷y = - Common terminal of OUT3 relays from x to y
NO OUT 3.n = O - Normally open contact of n-th OUT3 relay output
FIGURE 49: ZBT 324 CONNECTORS LOCATION
CN10 - ZBT 324 OUT3 TRANSISTOR OUTPUT CONNECTOR

On ZBR 324 card, CN10 is a 12 pins quick release screw terminal connector. By CN10 eight Darlington transistor outputs can be connected to the external world, in particular the OUT3 outputs section. Open collector signals of each transistor output and three common terminal (emitter) related to all the outputs are present; in addition there is a pin to connect to the load power supply voltage, to discharge any eventual inductive tension.

Please remark that the maximum current for each transistor is 4 A non continuous.

![Diagram of CN10 - ZBT 324 OUT3 Transistor Output Connector]

**Figure 49: CN10 - ZBT 324 OUT3 Transistor Output Connector**

Signals description:

- **COMMON 3.x÷y** = Common emitter of OUT3 transistors from x to y
- **NO OUT 3.n** = O - Open collector contact of n-th OUT3 transistor output
- **+VL 3** = I - Load power supply voltage pin (+45 Vdc max)

It is also the common point for back EMF protection diodes.
CN11 - IN4 OPTOCOUPLED INPUTS CONNECTOR

CN11 is a 9 pins quick release screw terminal connector. By CN11 eight optocoupled NPN inputs of ZBR 324 and ZBT 324 cards can be connected to the external world, in particular the IN4 inputs section. Open Collector inputs and optocoupled section supply common terminal are present.

**Figure 50: CN11 - IN4 OPTOCOUPLED INPUTS Connector**

Signals description:

IN4\(_n\) = I - NPN Open Collector input connected to IN4 section
GND opto = - Common terminal of Optocoupled inputs
### VISUAL SIGNALATIONS

**ZBR** and **ZBT** cards are provided with signalation LEDs to show several status informations, as described in the following table:

<table>
<thead>
<tr>
<th>LEDS</th>
<th>COLOUR</th>
<th>FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>LI1.0:LI1.7</td>
<td>Green</td>
<td>They show the status of IN1 optocoupled eight input signals, respectively IN1.0:IN1.7. LED ON means contact closed.</td>
</tr>
<tr>
<td>LI2.0:LI2.7</td>
<td>Yellow</td>
<td>They show the status of IN2 optocoupled eight input signals, respectively IN2.0:IN2.7. LED ON means contact closed.</td>
</tr>
<tr>
<td>LI3.0:LI3.7</td>
<td>Green</td>
<td>They show the status of IN3 optocoupled eight input signals, respectively IN3.0:IN3.7. LED ON means contact closed.</td>
</tr>
<tr>
<td>LI4.0:LI4.7</td>
<td>Yellow</td>
<td>They show the status of IN4 optocoupled eight input signals, respectively IN4.0:IN4.7. LED ON means contact closed.</td>
</tr>
<tr>
<td>LO1.0:LO1.7</td>
<td>Red</td>
<td>They show the status of OUT1 eight output signals, respectively OUT1.0:OUT1.7. LED ON means output active (relay closed or transistor conducting).</td>
</tr>
<tr>
<td>LO2.0:LO2.7</td>
<td>Red</td>
<td>They show the status of OUT2 eight output signals, respectively OUT2.0:OUT2.7. LED ON means output active (relay closed or transistor conducting).</td>
</tr>
<tr>
<td>LO3.0:LO3.7</td>
<td>Red</td>
<td>They show the status of OUT3 eight output signals, respectively OUT3.0:OUT3.7. LED ON means output active (relay closed or transistor conducting).</td>
</tr>
<tr>
<td>LOpto</td>
<td>Green</td>
<td>It signals the presence of +Vopto optocouplers power supply voltage.</td>
</tr>
<tr>
<td>LFault</td>
<td>Red</td>
<td>If ON, it signals an anomalous condition (temperature too high, excessive erogated current, ecc.), on the switching section.</td>
</tr>
<tr>
<td>LNMI</td>
<td>Yellow</td>
<td>It shows the status of optocoupled line interfaced to /NMI signal. LED ON means input contact closed.</td>
</tr>
<tr>
<td>LINT</td>
<td>Green</td>
<td>It shows the status of optocoupled line interfaced to /INT signal. LED ON means input contact closed.</td>
</tr>
<tr>
<td>LPwr</td>
<td>Red</td>
<td>It signals the presence of +5 Vcc power supplt voltage.</td>
</tr>
</tbody>
</table>

**Figure 51: Visual signalations table**

The main purpose of LEDs is to show a visual indication about the card's status, making so easier debug and verify operations.

To easily locate these visual signalations please refer to the figure, in the following pages, related to the **ZBR** or **ZBT** card being used.
FIGURE 52: ZBR 84 LEDS, JUMPERS AND FUSES LOCATION
JUMPERS

On ZBR and ZBT boards there are 3 jumpers for card configuration. Below there is the jumpers list, location and function.

<table>
<thead>
<tr>
<th>JUMPERS</th>
<th>N. PINS</th>
<th>USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>JPwr</td>
<td>2</td>
<td>It select the connection of +5 Vdc on ABACO® I/O BUS connector.</td>
</tr>
<tr>
<td>JRes</td>
<td>2</td>
<td>It select the connection of /RESET signal coming from ABACO® I/O BUS connector.</td>
</tr>
<tr>
<td>JAddr</td>
<td>10 ÷ 14</td>
<td>It selects the address of the board in the ABACO® I/O BUS addressing space.</td>
</tr>
</tbody>
</table>

**FIGURE 53: JUMPERS SUMMARIZING TABLE**

The following tables describe all the right connections of the three jumpers with their relative functions. For recognizing jumpers location, please refer to the figure, in the following pages, that is related to the card being used.

2 PINS JUMPERS

<table>
<thead>
<tr>
<th>JUMPER</th>
<th>CONNECTION</th>
<th>USE</th>
<th>DEF.</th>
</tr>
</thead>
<tbody>
<tr>
<td>JPwr</td>
<td>not connected</td>
<td>It does not connect the +5 Vdc supply voltage, generated by the on board circuitry, to the ABACO® I/O BUS connector.</td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>connected</td>
<td>It connects the +5 Vdc supply voltage, generated by the on board circuitry, to the ABACO® I/O BUS connector. This way it is possible to supply an eventual control card.</td>
<td></td>
</tr>
<tr>
<td>JRes</td>
<td>not connected</td>
<td>It does not connect the /RESET signal, coming from ABACO® I/O BUS, to the board internal circuitry.</td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>connected</td>
<td>It connects the /RESET signal, coming from ABACO® I/O BUS, to the board internal circuitry.</td>
<td></td>
</tr>
</tbody>
</table>

**FIGURE 54: 2 PINS JUMPERS SUMMARIZING TABLE**

The "*" used in the following tables, denotes the default connection, or on the other hand the connection set up at the end of testing phase, that is the configuration the user receives.
FIGURE 55: ZBT 84 LEDs, Jumpers and Fuses Location

FVac, LO1.0÷3, LNMI, LPwr, FPwr, LINT, JAddr.2÷8, LOpto, LFault, JRes, LO1.0÷7, FOpto, LI1.0÷3, LO1.0, LO1.3, L1.0, L1.7
**10÷14 Pins Addressing Jumper**

Through jumper JAddr it is possible to select the address of the board in the ABACO® I/O BUS addressing space. On ZBR 84 and ZBT 84 it features 7x2 pins (JAddr.2÷JAddr.8), on ZBR 168 and ZBT 168 it features 6x2 pins (JAddr.3÷JAddr.8), while on the remaining boards it features 5x2 pins (JAddr.4÷JAddr.8).

Here follows a table with the possible configurations, while the mapping configurations are explained in the paragraph dedicated to the board mapping.

<table>
<thead>
<tr>
<th>Jumper</th>
<th>Connection</th>
<th>Use</th>
<th>Def.</th>
</tr>
</thead>
<tbody>
<tr>
<td>JAddr.2</td>
<td>not connected</td>
<td>Sets A1 of mapping address to logic “1”</td>
<td></td>
</tr>
<tr>
<td>(ZBx 84) connected</td>
<td></td>
<td>Sets A1 of mapping address to logic “0”</td>
<td>*</td>
</tr>
<tr>
<td>JAddr.3</td>
<td>not connected</td>
<td>Sets A2 of mapping address to logic “1”</td>
<td></td>
</tr>
<tr>
<td>(ZBx 84÷168) connected</td>
<td></td>
<td>Sets A2 of mapping address to logic “0”</td>
<td>*</td>
</tr>
<tr>
<td>JAddr.4</td>
<td>not connected</td>
<td>Sets A3 of mapping address to logic “1”</td>
<td></td>
</tr>
<tr>
<td>connected</td>
<td></td>
<td>Sets A3 of mapping address to logic “0”</td>
<td>*</td>
</tr>
<tr>
<td>JAddr.5</td>
<td>not connected</td>
<td>Sets A4 of mapping address to logic “1”</td>
<td></td>
</tr>
<tr>
<td>connected</td>
<td></td>
<td>Sets A4 of mapping address to logic “0”</td>
<td>*</td>
</tr>
<tr>
<td>JAddr.6</td>
<td>not connected</td>
<td>Sets A5 of mapping address to logic “1”</td>
<td></td>
</tr>
<tr>
<td>connected</td>
<td></td>
<td>Sets A5 of mapping address to logic “0”</td>
<td>*</td>
</tr>
<tr>
<td>JAddr.7</td>
<td>not connected</td>
<td>Sets A6 of mapping address to logic “1”</td>
<td></td>
</tr>
<tr>
<td>connected</td>
<td></td>
<td>Sets A6 of mapping address to logic “0”</td>
<td>*</td>
</tr>
<tr>
<td>JAddr.8</td>
<td>not connected</td>
<td>Sets A7 of mapping address to logic “1”</td>
<td></td>
</tr>
<tr>
<td>connected</td>
<td></td>
<td>Sets A7 of mapping address to logic “0”</td>
<td>*</td>
</tr>
</tbody>
</table>

**Figure 56: Addressing Jumpers Table**

The "*" used in the following tables, denotes the default connection, or on the other hand the connection set up at the end of testing phase, that is the configuration the user receives.
FIGURE 57: ZBR 168 LEDs, Jumpers and Fuses Location
I/O CONNECTIONS

To prevent possible connecting problems between ZBR and ZBT boards and the external systems, the User has to read carefully the information of the previous paragraphs and he must follow these instructions:

- To connect to the optocoupled input signals, only the contacts to acquire must be connected from the external system(s). These contacts (relays, switches, etc.) must connect or not connect the input signal INx.y to GND opto.
  About the correspondence between logic signals and contact status, remember that a contact open generates a logic 1, while a contact closed generates a logic 0, following the NPN standard.

- To connect to the optocoupled /NMI and /INT input signals, only the contacts to acquire must be connected from the external system(s). These contacts (relays, switches, etc.) must connect or not connect the input signal to GND opto.
  About the correspondence between logic signals and contact status, remember that only a contact closed generates an interrupt request.

- The relays output signals, featured only by ZBR serie cards, must be connected directly to the load to drive (power relays, etc.). The board provides the normally open contact NO OUTx.y, capable to bear a maximum current of 3 A with a tension that can be 30 Vdc or 250 Vac.
  To allow the User to drive several loads having different power supplies, each output section is provided with three different COMMON terminals connected to groups of three, three and two relays.

NOTE

Each signal is provided with a transient suppressor type MOV 24 Vac; if the outputs of ZBR 84 must bear a greater voltage then the card must not install these components.

This need must be specified in the order, in fact this implies a different hardware configuration that must be performed by grifo® technicians.

- The Darlington transistor NPN output signals, featured only by ZBT serie cards, must be connected directly to the load to drive (power relays, etc.). The board provides the Open Collector OC OUTx.y output signal, capable to bear a maximum current of 4 A non countinous with a tension that can be +45 Vdc.
  The transistors, lacking the heat sink, can drive continuously a resistive load that, supplied with a tension of 24 Vdc, consumpts a maximum current of 600 mA; these figures are valid only if environmental temperature is 20 Centigrad degrees.

- The open collector output signals, features only by ZBR 84 card, can be connected directly to a small load to be driven (power relays, optocouplers, etc.), in fact the board provides the open collector output signal O.C. OUT1.n, capable to bear a maximum current of 500 mA non continuous, with a tension that can be up to +5 Vdc.
  About the correspondence between logic signals and open collector output status, remember that an open output generates a logic 0, while a closed output generates a logic 1.
  Please remark that these outputs are not galvanically isolated, so an opportune separation circuitry must be put between the board and the external world.
FIGURE 58: ZBT 168 LEDs, Jumpers and Fuses Location
- The TTL output signals, featured only by ZBT 84, can be connected directly only to a device featuring the same type of interface.

About the correspondence between logic signals and TTL output status, remember that a logic 0 generates a TTL 0 Vdc, while a logic 1 generates a TTL +5 Vdc.

Please remark that these outputs are not galvanically isolated, so an opportune separation circuitry must be put between the board and the external world.

RESET CIRCUITRY CONFIGURATION

Jumper JRes selects whether to connect or not the /RESET signal coming from ABACO® I/O BUS to the corresponding circuitry on ZBR or ZBT board; if the jumper is connected when a /RESET occurs the cards’ outputs are disabled. Vicevers if JRes is not connected the /RESET signal does not modify the status of the outputs, that are disabled in any case when a Power On occurs. This feature is essential when, for example, the status of the card outputs must not be modified when a reset of the control board, due to its Watch Dog circuitry, happens.

SUPPLY VOLTAGES SELECTION

ZBR and ZBT cards serie are provided with an efficient power supply circuitry that is designed to solve in a comfortable way the problem to supply the system despite the condition of utilization. The boards power supply section includes: a switching that provides the correct voltage on +5 Vdc in any admitted condition of load and input tension; a simple rectifier group that generates +Vopto voltage suitable to supply the optocoupled input sections.

Here follow the three possible configurations of supply section:

- Mains power supply
In this configuration the board requires mains 230 Vac (+6% -10%) power supply that must be provided on the 2 pins CN2 connector. The board generates in autonomy the +5 Vdc and +Vopto keeping them galvanically isolated. Supported external loads depend on the kind of ZBR or ZBT card being used and are reported in the chapters about technical features.

- Low voltage power supply
In this configuration the board requires two 15÷18 Vac galvanically isolated tensions (normally available in control machines electric racks) that must be provided on 4 pins CN2 connector. The board generates in autonomy the +5 Vdc and +Vopto keeping them galvanically isolated. Supported external loads depend on the kind of ZBR or ZBT card being used and are reported in the chapters about technical features.

Such data imply that, of course, the two external are enough to supply also external loads.
FIGURE 59: ZBR 246 LEDs, Jumpers and Fuses Location
- Stabilized power supply
In this configuration the board has no power supply section. The +5 Vdc and +Vopto voltages must be provided by an external source through CN3 connector.
Available voltages and acceptable powers are exactly the ones provided on this connector by the external power supply.

Please remark that +Vopto voltage has a nominal value of +24 Vdc but being generated by a not stabilized rectifier section it may vary heavily. For this motivation across the whole manual the current value has never been reported, instead the value of power has been reported.
Interfacing systems through ABACO® I/O BUS external cards featuring their own power supply section (GPC® 15R, ABB 05, series 3 and 4) may supply the ZBT or ZBR card through this BUS.
In such case the +5 Vdc supply voltage must be provided through the specific connector (CN3); only after a careful verification of powers involved and external working conditions the +5 Vdc voltage can be provided directly to the CN1 ABACO® I/O BUS connector.

In case of doubts about which power supply section to choice and the connections to perform, please contact grifo®.
This need must be specified in the order, in fact this implies a different hardware configuration that must be performed by grifo® technicians.
FIGURE 60: ZBT 246 LEDS, JUMPERS AND FUSES LOCATION
HARDWARE DESCRIPTION

INTRODUCTION

This chapter provides all the hardware informations needed to use ZBR and ZBT boards. Here the User will find informations about I/O card mapping and on board peripheral devices addressing.

BOARD MAPPING

ZBR 84 and ZBT 84 boards are mapped into a 2 bytes I/O addressing space, ZBR 168 and ZBT 168 take 4 bytes while the remaining boards take 8 bytes. These bytes can be mapped starting from different base addresses according to how the board is configured. This feature allows to use several ZBR and ZBT cards on the same ABACO® I/O BUS, or to install them on a BUS where other peripheral modules are installed obtaining a structure that can be expanded without any difficulty or modifications to the application software.

The base address can be defined through the specific BUS interface circuitry on the board itself; this circuitry uses the jumpers group called JAddr, described in the previous chapter, from which it reads the address set by the User. Here follows the correspondence between jumpers configuration and address signals.

JAddr.2 -> A1 address signal (Installed only on ZBT 84 and ZBR 84)
JAddr.3 -> A2 address signal (Installed only on ZBx 84 and ZBx 168)
JAddr.4 -> A3 address signal
JAddr.5 -> A4 address signal
JAddr.6 -> A5 address signal
JAddr.7 -> A6 address signal
JAddr.8 -> A7 address signal

These jumpers are driven in complemented logic, this means that if a jumper is CONNECTED generates a logic zero, vice versa if a jumper is NOT CONNECTED generates a logic one.

About jumpers location, please refer to the figure referring to the ZBT or ZBR card being used.

Here follow some examples of mapping:

1) If the User wants to map a ZBT 168 starting from the address <baseaddr>=088H, then he/she will have to configure the board as follows:

JAddr.3    ->    Connected
JAddr.4    ->    Not Connected
JAddr.5    ->    Connected
JAddr.6    ->    Connected
JAddr.7    ->    Connected
JAddr.8    ->    Not Connected
FIGURE 61: ZBR 324 LEDs, JUMPERS AND FUSES LOCATION
2) If the User wants to map a ZBR 84 starting from the address <baseaddr>=062H, then he/she will have to configure the board as follows:

<table>
<thead>
<tr>
<th>JAddr.2</th>
<th>-&gt;</th>
<th>Not Connected</th>
</tr>
</thead>
<tbody>
<tr>
<td>JAddr.3</td>
<td>-&gt;</td>
<td>Connected</td>
</tr>
<tr>
<td>JAddr.4</td>
<td>-&gt;</td>
<td>Connected</td>
</tr>
<tr>
<td>JAddr.5</td>
<td>-&gt;</td>
<td>Connected</td>
</tr>
<tr>
<td>JAddr.6</td>
<td>-&gt;</td>
<td>Not Connected</td>
</tr>
<tr>
<td>JAddr.7</td>
<td>-&gt;</td>
<td>Not Connected</td>
</tr>
<tr>
<td>JAddr.8</td>
<td>-&gt;</td>
<td>Connected</td>
</tr>
</tbody>
</table>

3) If the User wants to map a ZBR 84 starting from the address <baseaddr>=062H, then he/she will have to configure the board as follows:

<table>
<thead>
<tr>
<th>JAddr.4</th>
<th>-&gt;</th>
<th>Connected</th>
</tr>
</thead>
<tbody>
<tr>
<td>JAddr.5</td>
<td>-&gt;</td>
<td>Connected</td>
</tr>
<tr>
<td>JAddr.6</td>
<td>-&gt;</td>
<td>Not Connected</td>
</tr>
<tr>
<td>JAddr.7</td>
<td>-&gt;</td>
<td>Connected</td>
</tr>
<tr>
<td>JAddr.8</td>
<td>-&gt;</td>
<td>Connected</td>
</tr>
</tbody>
</table>

**INTERNAL REGISTERS ADDRESSING**

Indicating the board base address with <baseaddr>, that is the address set using the JAddr jumpers, as indicated in the previous paragraph, ZBR or ZBT internal registers are addressable as explained in the following tables.

**NOTE**

If using several boards on the same ABACO® I/O BUS, when setting the boards mapping address the User should be careful not to allocate more than one board in the same addressing space (consider the base address plus the bytes taken by the board addressing). If this condition is not satisfied a BUS conflict situation will occur, prejudicing the correct working of the whole system.

**ZBT 84 AND ZBR 84 INTERNAL REGISTERS ADDRESSING**

Here follow ZBR 84 and ZBT 84 registers addresses.

<table>
<thead>
<tr>
<th>DEVICE</th>
<th>REG.</th>
<th>ADDRESS</th>
<th>R/W</th>
<th>MEANING</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUTPUT 1</td>
<td>OUT1</td>
<td>&lt;baseaddr&gt;+00H</td>
<td>R/W</td>
<td>OUT1 4+4 outputs section setting and acquisition register.</td>
</tr>
<tr>
<td>INPUT 1</td>
<td>IN1</td>
<td>&lt;baseaddr&gt;+01H</td>
<td>R</td>
<td>IN1 8 optocoupled inputs section acquisition register.</td>
</tr>
</tbody>
</table>

**Figure 62: ZBR 84 and ZBT 84 internal registers addressing table**
Figure 63: ZBT 324 LEDs, Jumpers and Fuses Location
ZBT 168 AND ZBR 168 INTERNAL REGISTERS ADDRESSING

Here follow ZBR 168 and ZBT 168 registers addresses.

<table>
<thead>
<tr>
<th>DEVICE</th>
<th>REG.</th>
<th>ADDRESS</th>
<th>R/W</th>
<th>MEANING</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUTPUT 1</td>
<td>OUT1</td>
<td>&lt;baseaddr&gt;+00H</td>
<td>R/W</td>
<td>OUT1 8 outputs section setting and acquisition register.</td>
</tr>
<tr>
<td></td>
<td>NU</td>
<td>&lt;baseaddr&gt;+01H</td>
<td>--</td>
<td>Address Not Used</td>
</tr>
<tr>
<td>INPUT 1</td>
<td>IN1</td>
<td>&lt;baseaddr&gt;+02H</td>
<td>R</td>
<td>IN1 8 optocoupled inputs section acquisition register.</td>
</tr>
<tr>
<td>INPUT 2</td>
<td>IN2</td>
<td>&lt;baseaddr&gt;+03H</td>
<td>R</td>
<td>IN2 8 optocoupled inputs section acquisition register.</td>
</tr>
</tbody>
</table>

**Figure 64: ZBR 168 and ZBT 168 internal registers addressing table**

ZBT 246 AND ZBR 246 INTERNAL REGISTERS ADDRESSING

Here follow ZBR 246 and ZBT 246 registers addresses.

<table>
<thead>
<tr>
<th>DEVICE</th>
<th>REG.</th>
<th>ADDRESS</th>
<th>R/W</th>
<th>MEANING</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUTPUT 1</td>
<td>OUT1</td>
<td>&lt;baseaddr&gt;+00H</td>
<td>R/W</td>
<td>OUT1 8 outputs section setting and acquisition register.</td>
</tr>
<tr>
<td>OUTPUT 2</td>
<td>OUT2</td>
<td>&lt;baseaddr&gt;+01H</td>
<td>R/W</td>
<td>OUT2 8 outputs section setting and acquisition register.</td>
</tr>
<tr>
<td></td>
<td>NU</td>
<td>&lt;baseaddr&gt;+02H</td>
<td>--</td>
<td>Address Not Used</td>
</tr>
<tr>
<td></td>
<td>NU</td>
<td>&lt;baseaddr&gt;+03H</td>
<td>--</td>
<td>Address Not Used</td>
</tr>
<tr>
<td>INPUT 1</td>
<td>IN1</td>
<td>&lt;baseaddr&gt;+04H</td>
<td>R</td>
<td>IN1 8 optocoupled inputs section acquisition register.</td>
</tr>
<tr>
<td>INPUT 2</td>
<td>IN2</td>
<td>&lt;baseaddr&gt;+05H</td>
<td>R</td>
<td>IN2 8 optocoupled inputs section acquisition register.</td>
</tr>
<tr>
<td>INPUT 3</td>
<td>IN3</td>
<td>&lt;baseaddr&gt;+06H</td>
<td>R</td>
<td>IN3 8 optocoupled inputs section acquisition register.</td>
</tr>
<tr>
<td></td>
<td>NU</td>
<td>&lt;baseaddr&gt;+07H</td>
<td>--</td>
<td>Address Not Used</td>
</tr>
</tbody>
</table>

**Figure 65: ZBR 246 and ZBT 246 internal registers addressing table**
ZBT 324 AND ZBR 324 INTERNAL REGISTERS ADDRESSING

Here follow ZBR 324 and ZBT 324 registers addresses.

<table>
<thead>
<tr>
<th>DISP.</th>
<th>REG.</th>
<th>INDIRIZZO</th>
<th>R/W</th>
<th>SIGNIFICATO</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUTPUT 1</td>
<td>OUT1</td>
<td>&lt;baseaddr&gt;+00H</td>
<td>R/W</td>
<td>OUT1 8 outputs section setting and acquisition register.</td>
</tr>
<tr>
<td>OUTPUT 2</td>
<td>OUT2</td>
<td>&lt;baseaddr&gt;+01H</td>
<td>R/W</td>
<td>OUT2 8 outputs section setting and acquisition register.</td>
</tr>
<tr>
<td>OUTPUT 3</td>
<td>OUT3</td>
<td>&lt;baseaddr&gt;+02H</td>
<td>R/W</td>
<td>OUT3 8 outputs section setting and acquisition register.</td>
</tr>
<tr>
<td>n.u.</td>
<td>NU</td>
<td>&lt;baseaddr&gt;+03H</td>
<td>--</td>
<td>Address Not Used</td>
</tr>
<tr>
<td>INPUT 1</td>
<td>IN1</td>
<td>&lt;baseaddr&gt;+04H</td>
<td>R</td>
<td>IN1 8 optocoupled inputs section acquisition register.</td>
</tr>
<tr>
<td>INPUT 2</td>
<td>IN2</td>
<td>&lt;baseaddr&gt;+05H</td>
<td>R</td>
<td>IN2 8 optocoupled inputs section acquisition register.</td>
</tr>
<tr>
<td>INPUT 3</td>
<td>IN3</td>
<td>&lt;baseaddr&gt;+06H</td>
<td>R</td>
<td>IN3 8 optocoupled inputs section acquisition register.</td>
</tr>
<tr>
<td>INPUT 4</td>
<td>IN4</td>
<td>&lt;baseaddr&gt;+07H</td>
<td>R</td>
<td>IN4 8 optocoupled inputs section acquisition register.</td>
</tr>
</tbody>
</table>

**Figure 66: ZBR 324 and ZBT 324 internal registers addressing table**
PERIPHERAL DEVICES SOFTWARE DESCRIPTION

In the previous paragraph allocation addresses of all the peripherals have been reported, here follows a detailed description of function and meaning of internal registers (please always refer to the peripheral mapping tables to understand completely the following informations). Should the present documentation be inadequate please refer to the component's manufacturer documentation.

RELAY OUTPUTS

Input/Output registers OUT1, OUT2 and OUT3 are used to perform the output management on ZBR boards. The 8 bits of these registers have the following meaning:

<table>
<thead>
<tr>
<th>D7</th>
<th>D6</th>
<th>D5</th>
<th>D4</th>
<th>D3</th>
<th>D2</th>
<th>D1</th>
<th>D0</th>
</tr>
</thead>
<tbody>
<tr>
<td>-&gt;</td>
<td>-&gt;</td>
<td>-&gt;</td>
<td>-&gt;</td>
<td>-&gt;</td>
<td>-&gt;</td>
<td>-&gt;</td>
<td>-&gt;</td>
</tr>
<tr>
<td>OUT1.7</td>
<td>OUT1.6</td>
<td>OUT1.5</td>
<td>OUT1.4</td>
<td>OUTn.3</td>
<td>OUTn.2</td>
<td>OUTn.1</td>
<td>OUTn.0</td>
</tr>
</tbody>
</table>

The indication NO OUTn.? stands for OUT1, OUT2 and OUT3 sections, whose output signals are available respectively on connectors CN6, CN8 and CN10; while the indication OC OUT1.? stands for OUT1 section, whose output signals are available on connector CN6B (installed only on ZBR 84).

Performing an output operation at the address of OUT1, OUT2 or OUT3 the corresponding eight outputs are set by the output data, while performing an input operation at the same address the status of the corresponding signals is input.

The correspondance between status of an output and value of a bit is:

- Bit at logic 0 -> Output disabled = Realy contact open / O. C. output disabled
- Bit at logic 1 -> Output enabled = Realy contact closed/O. C. output conducting

The possibility to read the outputs status is very intresting; in fact in every moment and in any condition the application program can check the status of the outputs and modify it according to its policy. OUT1, OUT2 and OUT3 registers are reset (all bits are 0) when a Reset or a Power On occur if JRes is connected, this disables all the outputs and opens all the relays contacts.
TRANSISTOR OUTPUTS

Input/Output registers OUT1, OUT2 and OUT3 are used to perform the output management on ZBT boards. The 8 bits of these registers have the following meaning:

<table>
<thead>
<tr>
<th>Bit</th>
<th>ZBR 84</th>
<th>ZBR 168÷324</th>
</tr>
</thead>
<tbody>
<tr>
<td>D7</td>
<td>TTL OUT1.7</td>
<td>D7</td>
</tr>
<tr>
<td>D6</td>
<td>TTL OUT1.6</td>
<td>D7</td>
</tr>
<tr>
<td>D5</td>
<td>TTL OUT1.5</td>
<td>D7</td>
</tr>
<tr>
<td>D4</td>
<td>TTL OUT1.4</td>
<td>D7</td>
</tr>
<tr>
<td>D3</td>
<td>OC OUTn.3</td>
<td>D7</td>
</tr>
<tr>
<td>D2</td>
<td>OC OUTn.2</td>
<td>D7</td>
</tr>
<tr>
<td>D1</td>
<td>OC OUTn.1</td>
<td>D7</td>
</tr>
<tr>
<td>D0</td>
<td>OC OUTn.0</td>
<td>D7</td>
</tr>
</tbody>
</table>

The indication **OC OUTn.?” stands for OUT1, OUT2 and OUT3 sections, whose output signals are available respectively on connectors CN6, CN8 and CN10; while the indication **TTL OUT1.?” stands for OUT1 section, whose output signals are available on connector CN6B (installed only on ZBT 84).

Performing an output operation at the address of OUT1, OUT2 or OUT3 the corresponding eight outputs are set by the output data, while performing an input operation at the same address the status of the corresponding signals is input.

The correspondence between status of an output and value of a bit is:

- Bit at logic 0 -> Output disabled = Transistor disabled/TTL output at logic 0
- Bit at logic 1 -> Output enabled = Transistor enabled/TTL output at logic 1

The possibility to read the outputs status is very interesting; in fact in every moment and in any condition the application program can check the status of the outputs and modify it according to its policy. OUT1, OUT2 and OUT3 registers are reset (all bits are 0) when a Reset or a Power On occur if **JRes** is connected, this disables all the outputs and all transistors are disabled.
OPTOCOUPLED INPUTS

Input registers IN1, IN2, IN3 and IN4 are used to perform the input management on ZBT and ZBR boards. The 8 bits of these registers have the following meaning:

D7  ->  INn.7
D6  ->  INn.6
D5  ->  INn.5
D4  ->  INn.4
D3  ->  INn.3
D2  ->  INn.2
D1  ->  INn.1
D0  ->  INn.0

The indication INn.? stands for IN1, IN2, IN3 and IN4 sections, whose input signals are available respectively on connectors CN5, CN7, CN9 and CN11.
Performing an input operation at the address of IN1, IN2, IN3 or IN4 the corresponding eight optocoupled input signals are acquired.

The correspondance between status of an input and value of a bit is:

Bit at logic 0  ->  Input disabled  =  Input contact open
Bit at logic 1  ->  Input enabled   =  Input contact closed
EXTERNAL CARDS

ZBR and ZBT serie boards can interface to most of grifo® industrial boards. Their main purpose is to perform a digital Input/Output interfacement between CPU (GPC®) cards and the external world. The on board power supply section is often enough to supply all the card electronics, but in case of need most of grifo® power supplies can be easily used.

Here is reported an illustrative list of cards capable to supply ZBR and ZBT serie boards with a short description of their features; for further informations please request the specific documentation.

**SBP 01-xx**
Switch BLOCK Power xx version

Switching power suppliers able to generate voltage from -12 to +40 Vdc and current up to 4A. Input from 12 to 26 Vac; battery backed; power good; quick connection for DIN 46277-1 and 3 rails.

**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 Ω rails.

**SBP 05-xx**
Switch BLOCK Power xx version

Low cost switching power supply able to generate voltage from +5 to +40 Vdc and current up to 6÷10 A; Input from 12 to 24 Vac; Battery backed input; Connection for DIN C Type and Ω rails.

**PCC A26**
P.C. Centronics <-> Abaco® I/O BUS adapter

Adapter card between standard PC centronics interface and Abaco® I/O BUS connectors; all Abaco® peripheral cards can be drived; wide range of software drivers (Pascal, C++, Basic, etc.); interrupt menagement; 256 bytes of address space; plastic box; direct connection to any PC.

**GPC® 188F**
General Purpose Controller 80C188

80C188 µP 20MHz; 1 RS 232 line; 1 RS 232, RS 422-485 or Current Loop line; 24 TTL I/O lines; 1M EPROM or 512K FLASH; 1M RAM Lithium battery backed; 8K serial EEPROM; RTC; Watch Dog; 8 Dip switch; 3 Timer Counter; 8 13 bit A/D lines; Power failure; activity LEDs; single power supply +5Vdc.
**GPC® 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® 15R**  
General Purpose Controller 84C15

84C15 µP, 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® 153**  
General Purpose Controller Z80

84C15 µP, 10÷16 MHz; Full CMOS; 1 RS 232 line; 1 RS 232 or RS 422-485 or Current Loop line; 16 TTL I/O lines; 8 A/D 12 bits lines; 2÷4 Timers Counters; 512K EPROM or FLASH; 512K RAM and RTC backed; 8K serial EEPROM; Buzzer; 1 Activity LED; Watch dog; 8K serial EEPROM; Buzzer; 1 Activity LED; Watch dog; 8 readable DIPs; LCD Interface.

**GPC® 323**  
General Purpose Controller 51 family

80C32 µP, 14 MHz; Full CMOS; 1 RS 232 line (software); 1 RS 232 or RS 422-485 or Current Loop line; 24 TTL I/O lines; 11 A/D 12 bits lines; 3 Timers Counters; 64K EPROM; 64K RAM; 32K RAM and RTC backed; 32K DIL EEPROM; 8K serial EEPROM; Buzzer; 2 Activity LED; Watch dog; 5 readable DIPs; LCD Interface.

**GPC® 553**  
General Purpose Controller 80C552

80C552 µP, 22÷33 MHz; 1 RS 232 line (software); 1 RS 232 or RS 422-485 or Current Loop line; 16 TTL I/O lines; 8 A/D 10 bits lines; 3 Timers Counters; 64K EPROM; 64K RAM; 32K RAM and RTC backed; 32K DIL EEPROM; 8K serial EEPROM; 2 PWM lines; 1 Activity LED; Watch dog; 5 readable DIPs; LCD Interface.

**GPC® 183**  
General Purpose Controller Z180

Z180 µP, 10÷16 MHz; Full CMOS; 1 RS 232 line; 1 RS 232 or RS 422-485 or Current Loop line; 24 TTL I/O lines; 11 A/D 12 bits lines; 2 Timers Counters; 512K EPROM or FLASH; 512K RAM and RTC backed; 8K serial EEPROM; Buzzer; 2 Activity LED; Watch dog; 4 readable DIPs; LCD Interface.
NOTE
Please always remind that **ABACO® I/O BUS** is not a multimaster BUS. In other words, on the BUS one and only one CPU master card can be present.

**ZBx Interconnections Blocks Diagram**

*Figure 67: External connections diagram*
GPC® 154
“4” Type General Purpose Controller Z80

84C15 µP, 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.

GPC® 184
“4” Type General Purpose Controller Z180

Z180 µP, 10÷16 MHz; Full CMOS; 1 RS 232 line; 1 RS 232 or RS 422-485 or Current Loop line; 2 Timers Counters; 512K EPROM or FLASH; 512K RAM and RTC backed; Watch dog; 1 readable DIP; LCD Interface; Abaco® I/O BUS; 5Vdc Power supply; Size: 100x50 mm.

GPC® 324/D
“4” Type General Purpose Controller 80C32/320

80C32 or 80C320 µP, 14÷22 MHz; Full CMOS; 1 RS 232 line; 1 RS 232 or RS 422-485 or Current Loop line; 4÷16 TTL I/O lines; 3 Timers Counters; 64K EPROM; 64K RAM; 32K RAM backed; 32K DIL E2; 8K serial EEPROM; Watch dog; 1 readable DIP; LCD Interface; Abaco® I/O BUS; 5Vdc Power supply; Size: 100x50 mm.

ABB 05
Abaco® BLOCK BUS 5 slots

5 slots Abaco® Mother Board with Power Supply. Double power supply built-in; 5Vdc 2.5A section for powering the on-board logic; second section at 24Vdc 400mA galvanically coupled, for the optocoupled input lines; Auxiliary connectoir for Abaco® I/O BUS; Housing with hooks for DIN Omega rails.

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.
BIBLIOGRAPHY

Here follows a list of manuals and technical notes that the User can read to acquire more informations about ZBR and ZBT boards.

SGS-THOMSON Manual: Industrial and Computer Peripheral ICs - Data Book
SGS-THOMSON Manual: Small Signal Transistors - Data Book

TEXAS INSTRUMENTS Manual: The TTL data Book - SN54/74 Families

TOSHIBA Manual: Photo Couplers - Data Book

MOTOROLA Manual: Bipolar Power Transistor Data
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