Second edition

32 INDUSTRIAL OUTPUT MODULE

GESOUT-3A is the logical complement to the input module. It creates the interface between the microprocessor and the industrial environment. This Euroboard provides 32 output lines isolated by opto-coupler and can drive currents to 100 mA on 12, 24 or 48 V.

It therefore offers a very interesting balance between number of outputs/occupied surface, which will be greatly appreciated for industrial systems.

The GESOUT-3A module uses Darlington type cicuits in order to supply a high output current. It can work on 12, 24 or 48 V with a selectable jumper. It is also possible to read the state of the module outputs directly from the processor.

The output signals are connected via two 26-pin connectors (16 output each) compatible with the standard PC board terminal/visualisation modules available as an option (GESICU-1).

Technical features

- 32 industrial outputs
- Four 8-channel ports
- 2500 V opto-coupler isolation
- Darlington amplifiers
- Output voltage 12 V, 24 V or 48 V
- Output current max. 100 mA
- Output state readable by the processor
- Fully decoded address
- External connection by two 26-pin flat cable connectors
- Identical standard pin-out for both connectors
- Single power supply: + 5 V
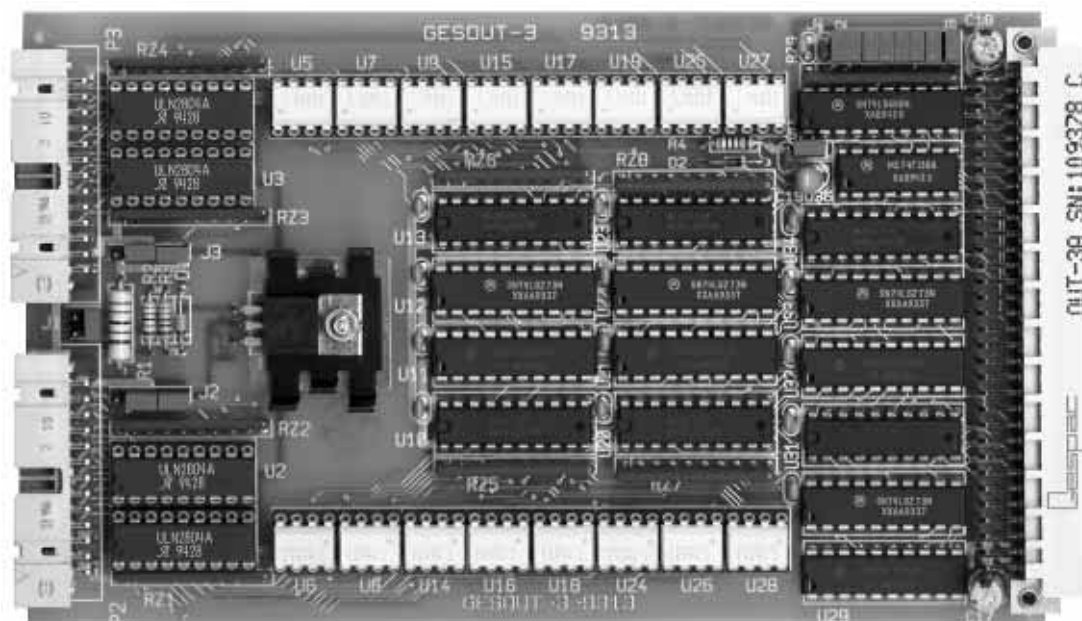
References

GESOUT-3A: 32 industrial outputs : 12 V, 24 V, 48 V/100 mA max., open collector
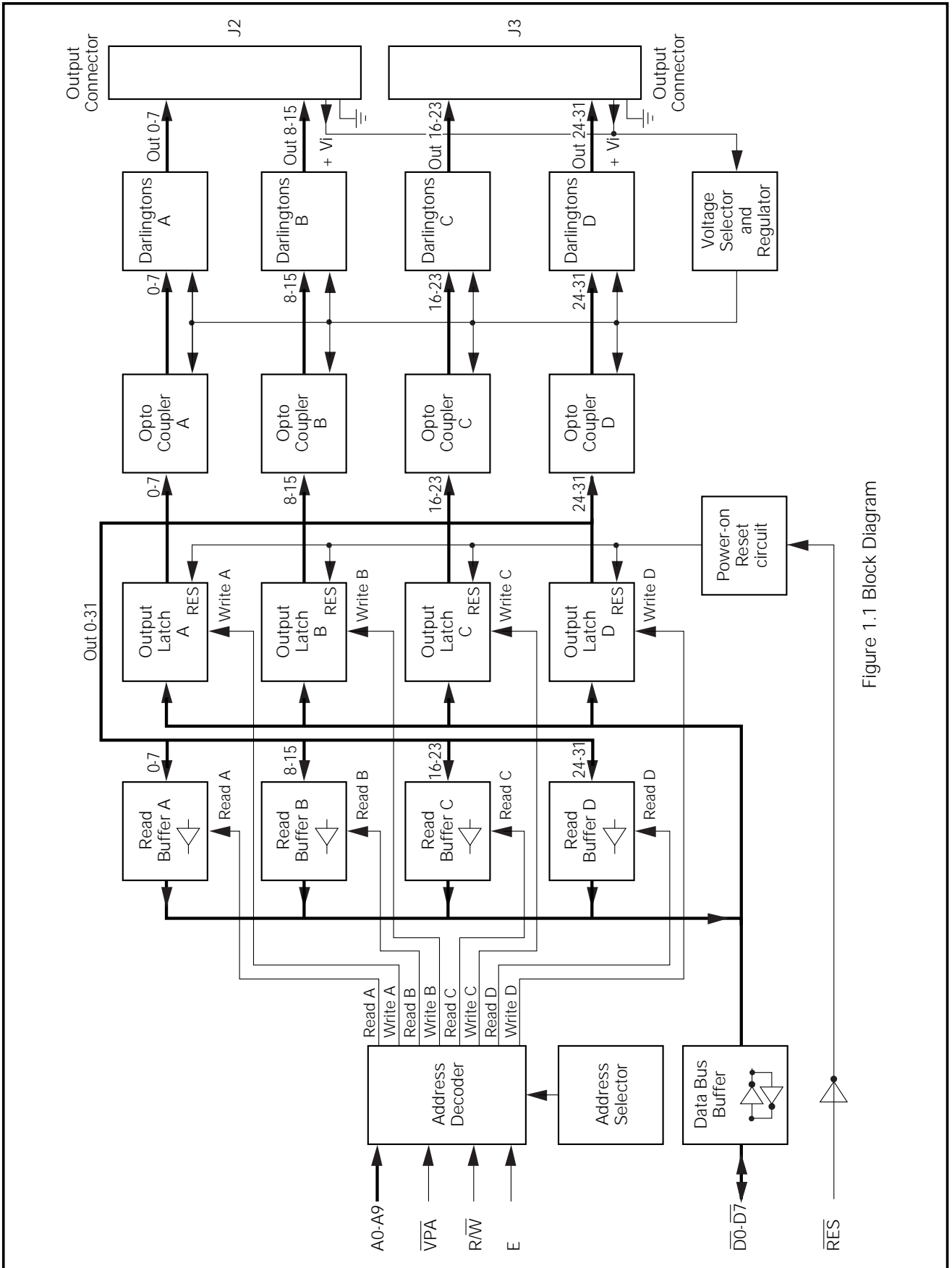GESOUT-3B: 32 industrial outputs : 12 V, 24 V, 48 V/100 mA max., open emitter

Figure 1.1 Block Diagram

1. GENERAL INFORMATION

1.1 DESCRIPTION

The GESOUT-3A & 3B Euroboard provides 32 output lines isolated by opto-coupler and can drive 100 mA current on each output with the user's voltage of 12 V, 24 V or 48 V.

the 32 output lines are programmable through four 8-channel ports that are addressable in read and write mode.

The module can be equipped with two Darlington driver types for sinking or sourcing current.

The GESOUT-3A module is fully compatible with the standard G-64 Bus. The block diagram of figure 1.1 illustrates the different parts of the module and their interconnections.

1.2 SPECIFICATIONS

Output lines :	32 opto-coupled, amplified by Darlington drivers
Access :	Write and read through 4 ports of 8 channels each
Isolation :	≤2500 V by opto-couplers
User's voltage inputs :	12 V, 24 V or 48 V selectable
Darlington driver selectable types :	ULN2814A (sinking current) UDN2983A (sourcing current)
Output current :	100 mA max. (sinking/sourcing)
Delay time between the write command and the output swing for I = 100 mA :	t_{ON} = 2,5 µs typ. (ULN2814A) t_{ON} = 2 µs typ. (UDN2983A) t_{OFF} = 14 µs typ. (ULN2814A) t_{OFF} = 35 µs typ. (UDN2983A)
Output rise time for I = 100 mA :	t_{LH} = 3 µs max. (ULN2814A) t_{LH} = 1 µs max. (UDN2983A)
Output fall time for I = 100 mA :	t_{HL} = 1 µs max. (ULN2814A) t_{HL} = 2 µs max. (UDN2983A)
Bus interface :	- Data bus: 3- state TTL compatible - Other signals: TTL compatible
Bus drivers :	48 mA type
Power requirements:	+ 5 Vdc = 650 A typ.
Operating temperature:	+ 5° to 55°C
PCB dimensions:	100 X 160 mm

Table 1.1   Specifications

2. PREPARATION FOR USE, INTERCONNECTIONS

2.1 CONNECTOR, SWITCH, AND JUMPER IDENTIFICATION

Table 2.1 identifies the jumpers and connectors of the GESOUT-3A & 3B module. Figure 2.1 shows their location on the printed circuit.
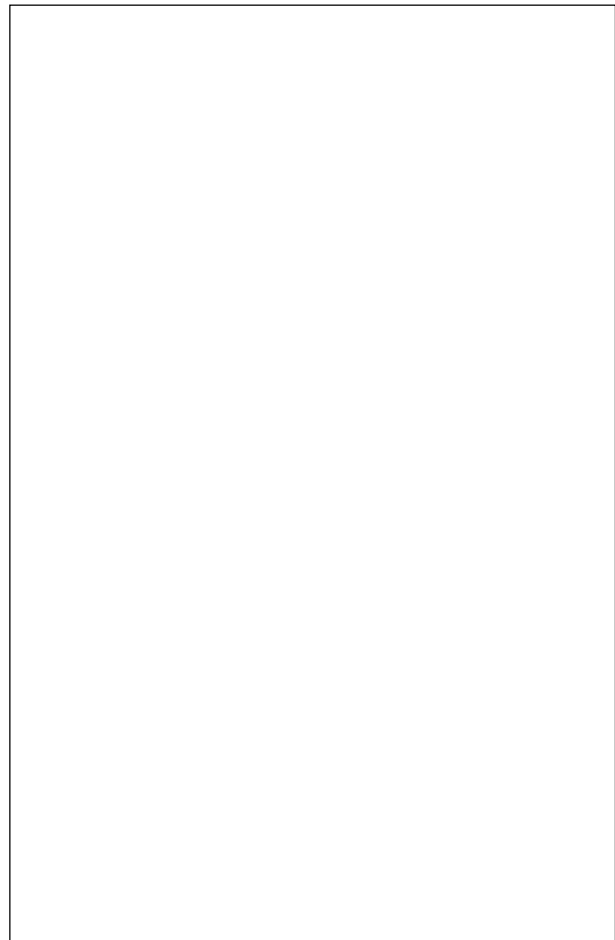

Figure 2.1 Implementation

Designation	Function
P1	G-64 Bus interface connector
P2, P3	Opto-isolated output connectors
J1	User's voltage selector
J2, J3	Darlington driver type selector
J4	Module base address selector
J6	Reset mode selection

Table 2.1   Connector, switch and jumper identification

2.2 ADDRESS SELECTION

The base address of the module is jumper selectable on J4 in the field reserved for peripherals which is characterized by the $\overline{VPA}$ signal. Table 2.2 shows how to select 1 of 256 base addresses in the 1 K VPA field.

A field of four consecutive addresses is required by the module as defined in the table 2.3.

J4	Jumper	
position	OFF	ON
1 o o 16	A2	$\overline{A2}$
2 o o 15	A3	$\overline{A3}$
3 o o 14	A4	$\overline{A4}$
4 o o 13	A5	$\overline{A5}$
5 o o 12	A6	$\overline{A6}$
6 o o 11	A7	$\overline{A7}$
7 o o 10	A8	$\overline{A8}$
8 o o 9	A9	$\overline{A9}$

Table 2.2   Base address selection

Module Base address	Read and Write operations
+0	output lines 0 - 7 (data bit 0-7)
+1	output lines 8 - 15 (data bit 0-7)
+2	output lines 16 - 23 (data bit 0-7)
+3	output lines 24 - 31 (data bit 0-7)

Note :   A RESET disactivates all output lines. Refer to chapter 2.6 for more details.

Table 2.3   Module address registers

2.3 EXTERNAL VOLTAGE

The external power connected on P2 or P3 provides power supply for the isolated outputs and the Darlington drivers

T he module can operate with the external voltages 12 V, 24 V or 48 V selectable by the jumper J1 as shown in the table 2.4.

12 V operation	24 V operation	48 V operation
1 o o 4	1 o—o 4	1 o o 4
2 o—o 3	2 o o 3	2 o o 3
J1	J1	J1

Table 2.4   User's system voltage selector

2.4 OUTPUT SIGNAL CONNECTORS

Table 2.5 identifies the output lines connected to P2 and P3.

Pin number P2 or P3	P2 function	P3 function
8	OUT 0	OUT 16
9	OUT 1	OUT 17
10	OUT 2	OUT 18
11	OUT 3	OUT 19
12	OUT 4	OUT 20
13	OUT 5	OUT 21
14	OUT 6	OUT 22
15	OUT 7	OUT 23
16	OUT 8	OUT 24
17	OUT 9	OUT 25
18	OUT 10	OUT 26
19	OUT 11	OUT 27
20	OUT 12	OUT 28
21	OUT 13	OUT 29
22	OUT 14	OUT 30
23	OUT 15	OUT 31
1, 2, 3	User's ground	User's ground
5, 6	User'a voltage (12 V, 24 V or 48 V)	User'a voltage (12 V, 24 V or 48 V)
25, 26	User's ground	User's ground

Table 2.5   P2 and P3 connectors description

2.5 ACTIVE OUTPUT LEVELS

The 32 outputs are isolated by opto-couplers and amplified by Darlington drivers. The user can choose the output active levels by changing the Darlington type. Selection is shown in figure 2.2.

The GESOUT 3 is available in two models : the GESOUT-3A with a common power supply line (ULN 2814) and the GESOUT-3B with a common ground line (UDN 2983).

```
J2/J3                               J2/J3
  o                                   o
  o         ULN2814                   o         UDN2983
  o      driver active low            o      driver active high
  o      (open collector)             o      (open emitter)
  o         GESOUT-3A                 o         GESOUT-3B
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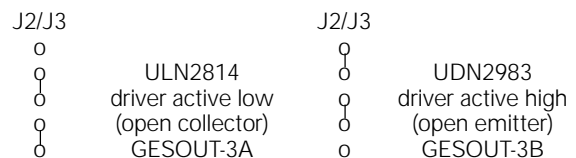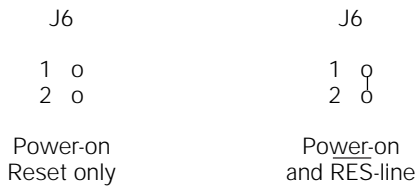
Figure 2.2 : Darlington drivers selection

2.6 RESET MODE SELECTION

Since data code 9313 and above, the GESOUT-3A & 3B includes an automatic power-on reset. Therefore, it is now possible to disable the $\overline{\text{RES}}$-bus line by the means of J6 jumper. This feature allows the user to prevent that an external module on the G-96 Bus, which asserts the $\overline{\text{RES}}$-line, modifies the output state of the GESOUT-3A & 3B.

```
        J6                      J6

       1  o                    1  o
       2  o                    2  o

   Power-on                Power-on
   Reset only              and RES-line
```

Note : J6 must be installed for compatibility with GESOUT-3A & 3B below data code 9313.

Figure 2.3   Reset mode selection

2.7 INTERFACE WITH THE G-64 BUS

The GESOUT-3A & 3B module interconnects directly on the G-64 Bus. Signals used by the module are identified in table 2.6. For more information on the bus, refer to the G-64 Specification Manual.
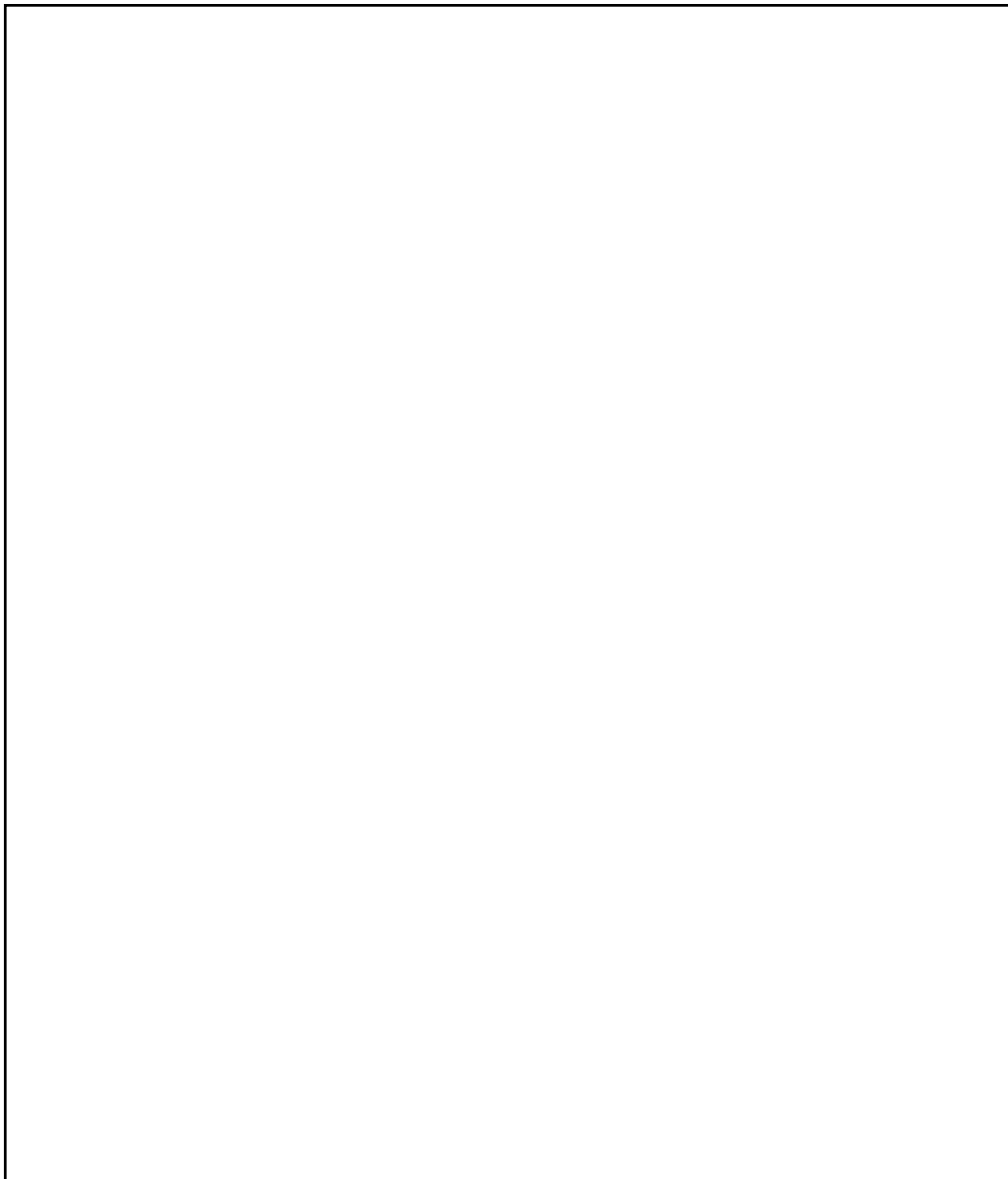
ROW B		ROW A			Definition
GND		GND		1	Power
A8		A0		2	
A9		A1		3	
A10	*	A2	*	4	Address
A11	*	A3		5	Lines
A12	*	A4		6	A0 to A23
A13	*	A5		7	
A14	*	A6		8	
A15	*	A7		9	
$\overline{\text{BRQ}}$	*	$\overline{\text{BGRT}}$	*	10	
$\overline{\text{DS1}}$	*	$\overline{\text{DS0}}$	*	11	
$\overline{\text{BGACK/BBUSY}}$	*	$\overline{\text{HALT}}$	*	12	
Enable		SYCLK	*	13	Control and
$\overline{\text{RES}}$		VPA		14	Interrupt
$\overline{\text{NMI}}$	*	$\overline{\text{RDY}}$ /$\overline{\text{DTACK}}$	*	15	Lines
$\overline{\text{IRQ}}$	*	VMA	*	16	
$\overline{\text{FIRQ}}$	*	R/W		17	
$\overline{\text{IACK}}$	*	$\overline{\text{IRQ4}}$	*	18	
D12	*	D8	*	19	
D13	*	D9	*	20	
D14	*	D10	*	21	Data Lines
D15	*	D11	*	22	D0 to D15
D4		D0		23	and
D5		D1		24	Arbitration
D6		D2		25	Lines
D7		D3		26	
$\overline{\text{Parity Error}}$					
$\overline{\text{BERR}}$	*	$\overline{\text{Page}}$	*	27	
Chain in	*	Chain out	*	28	Misc.
+ 5 V bat.	*	$\overline{\text{PWF}}$	*	29	
– 12 V	*	+ 12 V	*	30	
+ 5 V		+ 5 V		31	Power
GND		GND		32	

* Not used on the GESOUT-3A & 3B module

Table 2.6   P1 connector, G-64 bus

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