E I P

# N300-IO

English

# N300 – Input/Output Extension

## Hardware Manual

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E I P

**UNE GAMME COMPLETE DE CONTROLEURS D'AXES**
**EINE VOLLSTANDIGE PALETTE VON ACHSENSTEUERUNGEN**
**A COMPLETE RANGE OF MOTION CONTROLLER**

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# 1 Description

N300-IO is a 16 Inputs and 16 Outputs extension card intended to be used with the EIP N300 CPU Card. Red LEDS are indicating each Input and Output state and lights when active.

Eight N300-IO cards can be connected simultaneously to an N300 CPU card. In this case 128 Inputs and 128 Outputs are available. A rotate selector allows to addressing the different cards.

## 1.1 Power Supplies

N300-IO Card needs 2 different power supplies:

- + 5 V, provided by the N300 CPU Card.
- + 24 V, provided by an external power supply through J4 connector.

# 2 N300-IO Card Layout

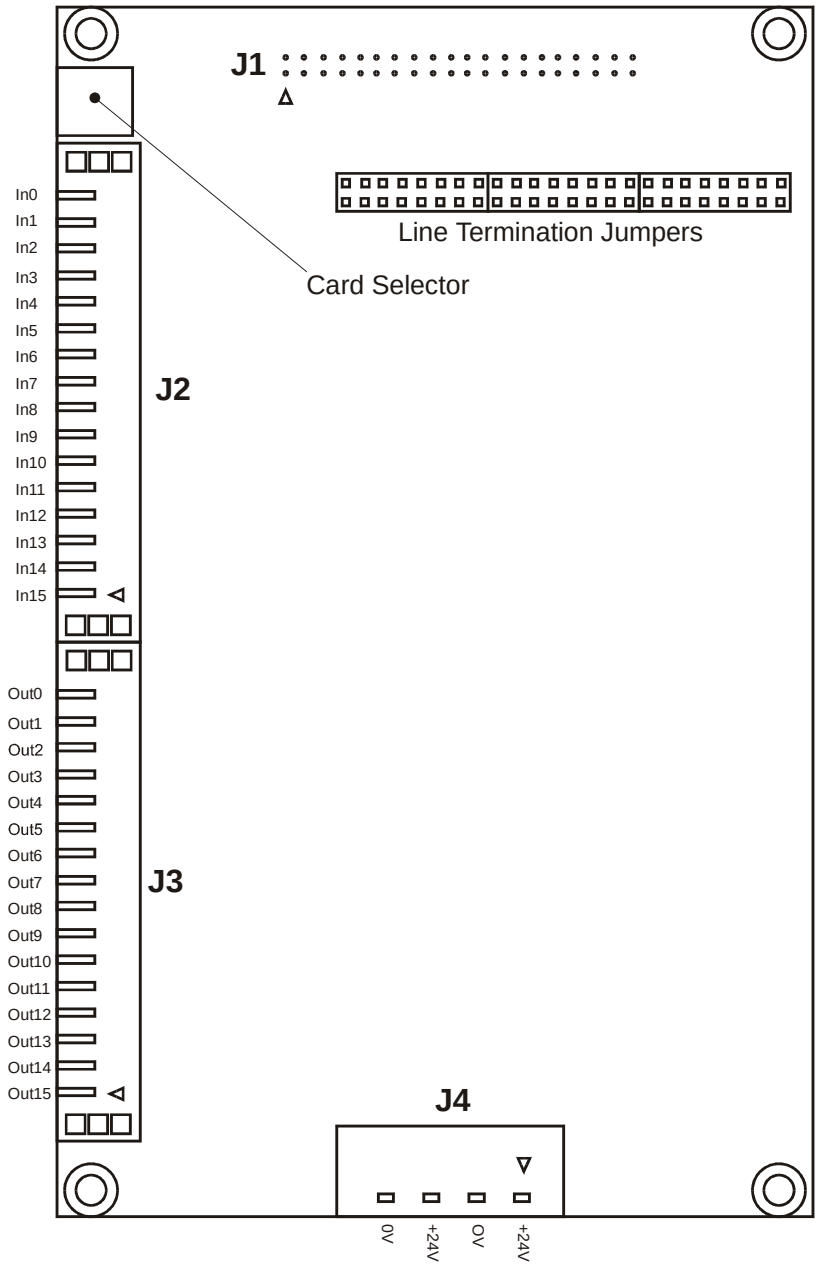


***Figure 2-1 : N300-IO Card Layout***

**J1**: N300 Bus Connector
**J2**: External Inputs Connector
**J3**: External Outputs connector
**J4**: Power Supply Connector

**Note:** Line termination jumpers must be closed on the **last card** of the N300 Bus.

# 3 Connector Description

This chapter describes connectors pinning and gives input and output simplified schematic.

## 3.1 Bus Connector (J1)

This connector is used to connect all extension cards to the Master N300 CPU Card. J1 is a 40 pins connector.

| Pin Nbr. | Signal Name | Type | Remark |
|---|---|---|---|
| 1 | VCC Supervision | - | Not Connected |
| 2 | BUSCLK | In | System Clock |
| 3 | GND | Supply | Logical 0V |
| 4 | BUSTOUT | - | Not Used |
| 5 | RESET | In | System Reset |
| 6 | /IBF | - | Not Connected |
| 7 | OBF | - | Not Connected |
| 8 | /REQ | Out | Axis Interrupt |
| 9 | + 12 V | Supply | + 12V from Master Card |
| 10 | + 12 V | Supply | Internally connected to Pin 9 |
| 11 | BUSALE | - | Not Used |
| 12 | GND | Supply | Logical 0V |
| 13 | (Reserved) | - | |
| 14 | GND | Supply | Logical 0V |
| 15 | DT/R | In | Data Direction |
| 16 | GND | Supply | Logical 0V |
| 17 | /BUSRD | In | System /RD signal |
| 18 | + 5V | Supply | Logical supply |
| 19 | /BUSWR | In | System /WR Signal |
| 20 | + 5V | Supply | Internally connected to Pin 18 |
| 21 | GND | Supply | Logical 0V |
| 22 | A7 | In | Address Bus, Bit 7 |
| 23 | A6 | In | Address Bus, Bit 6 |
| 24 | A5 | In | Address Bus, Bit 5 |
| 25 | A4 | In | Address Bus, Bit 4 |
| 26 | A3 | In | Address Bus, Bit 3 |
| 27 | A2 | In | Address Bus, Bit 2 |
| 28 | A1 | In | Address Bus, Bit 1 |
| 29 | A0 | In | Address Bus, Bit 0 |
| 30 | GND | Supply | Logical 0V |
| 31 | D7 | In/Out | Data Bus, Bit 7 |
| 32 | D6 | In/Out | Data Bus, Bit 6 |
| 33 | D5 | In/Out | Data Bus, Bit 5 |
| 34 | D4 | In/Out | Data Bus, Bit 4 |
| 35 | D3 | In/Out | Data Bus, Bit 3 |
| 36 | D2 | In/Out | Data Bus, Bit 2 |
| 37 | D1 | In/Out | Data Bus, Bit 1 |
| 38 | D0 | In/Out | Data Bus, Bit 0 |
| 39 | + 24V | Supply | + 24V Main Supply |
| 40 | + 24V | Supply | Internally connected to Pin 39 |

***Table 3-1 : Bus Connector (J1)***

## 3.2 External Inputs connector (J2)

This 16 pins Weidmüller connector allows to bind all externals inputs to the N300-IO card. Input is active when +24V is applied to it, and inactive when no voltage in applied.

| Pin Nbr. | Signal Name | Type | Remark |
|---|---|---|---|
| 1 | IN15 | In | Input 15 |
| 2 | IN14 | In | Input 14 |
| 3 | IN13 | In | Input 13 |
| 4 | IN12 | In | Input 12 |
| 5 | IN11 | In | Input 11 |
| 6 | IN10 | In | Input 10 |
| 7 | IN9 | In | Input 9 |
| 8 | IN8 | In | Input 8 |
| 9 | IN7 | In | Input 7 |
| 10 | IN6 | In | Input 6 |
| 11 | IN5 | In | Input 5 |
| 12 | IN4 | In | Input 4 |
| 13 | IN3 | In | Input 3 |
| 14 | IN2 | In | Input 2 |
| 15 | IN1 | In | Input 1 |
| 16 | IN0 | In | Input 0 |

***Table 3-2 : External Inputs Connector (J2)***

### 3.2.1 External Input, simplified schematic

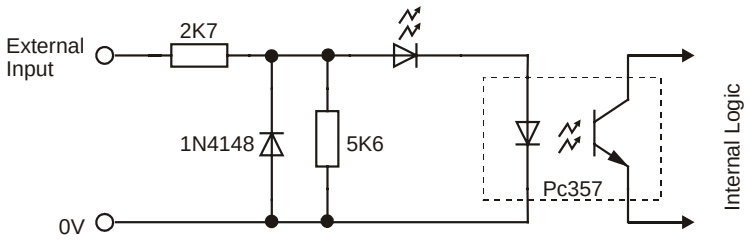


***Figure 3-1 : External input, simplified schematic***

## 3.3 External Output connector (J3)

This 16 pins Weidmüller connector allows to bind the N300-IO card with all external Outputs. +24V voltage is present on Output when active, no voltage is present in the other case.

| Pin Nbr. | Signal Name | Type | Remark |
|---|---|---|---|
| 1 | OUT15 | Out | Output15 |
| 2 | OUT14 | Out | Output14 |
| 3 | OUT13 | Out | Output13 |
| 4 | OUT12 | Out | Output12 |
| 5 | OUT11 | Out | Output11 |
| 6 | OUT10 | Out | Output10 |
| 7 | OUT9 | Out | Output9 |
| 8 | OUT8 | Out | Output8 |
| 9 | OUT7 | Out | Output7 |
| 10 | OUT6 | Out | Output6 |
| 11 | OUT5 | Out | Output5 |
| 12 | OUT4 | Out | Output4 |
| 13 | OUT3 | Out | Output3 |
| 14 | OUT2 | Out | Output2 |
| 15 | OUT1 | Out | Output1 |
| 16 | OUT0 | Out | Output0 |

***Table 3-3 : External outputs connector (J3)***

**Notes:**
External outputs are internally protected against short-circuits. Protection is made by thermal dissipation control. If over current occurs, the output circuit reduces itself its current to avoid thermal overload.

### 3.3.1 External output, simplified schematic

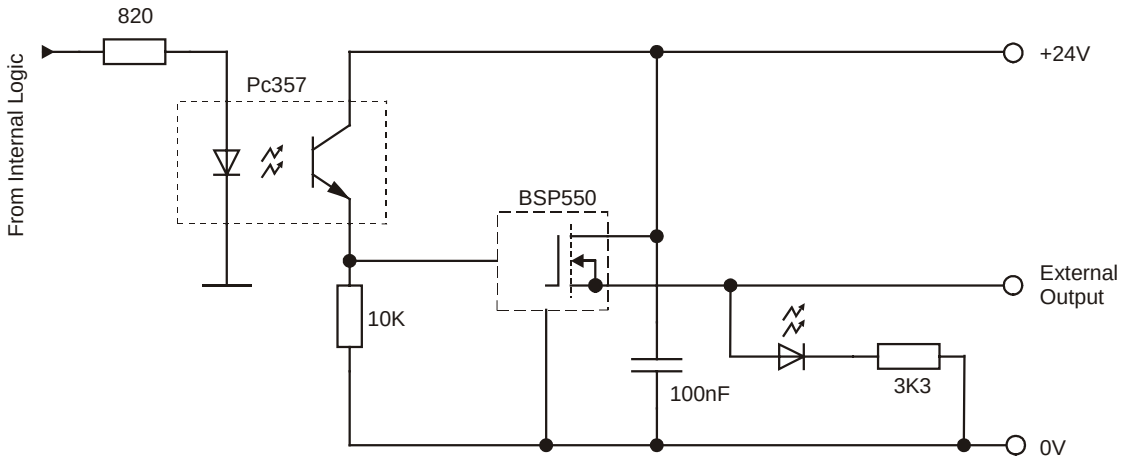


***Figure 3-2 : External Output, simplified schematic***

# 4 Configuration

This chapter describes what is necessary to do before connecting an N300-IO card.

## 4.1 Card Selector setting

A selector (located near J2), allows to address the different N300-IO cards. The following table gives the addresses where it is possible to read Input or write Output. It is only possible to read 8 inputs or write 8 outputs at a time.

| Selector Position | Access Addresses | Access Mode | Input or output number | N300-IO card number |
|---|---|---|---|---|
| 0 | 00A0H | Read | IN7 → IN0 | 1 |
| | 00A0H | Write | OUT7 → OUT0 | 1 |
| | 00A1H | Read | IN15 → IN8 | 1 |
| | 00A1H | Write | OUT8 → OUT15 | 1 |
| 1 | 00A2H | Read | IN7 → IN0 | 2 |
| | 00A2H | Write | OUT7 → OUT0 | 2 |
| | 00A3H | Read | IN15 → IN8 | 2 |
| | 00A3H | Write | OUT8 → OUT15 | 2 |
| 2 | 00A4H | Read | IN7 → IN0 | 3 |
| | 00A4H | Write | OUT7 → OUT0 | 3 |
| | 00A5H | Read | IN15 → IN8 | 3 |
| | 00A5H | Write | OUT8 → OUT15 | 3 |
| 3 | 00A6H | Read | IN7 → IN0 | 4 |
| | 00A6H | Write | OUT7 → OUT0 | 4 |
| | 00A7H | Read | IN15 → IN8 | 4 |
| | 00A7H | Write | OUT8 → OUT15 | 4 |
| 4 | 00A8H | Read | IN7 → IN0 | 5 |
| | 00A8H | Write | OUT7 → OUT0 | 5 |
| | 00A9H | Read | IN15 → IN8 | 5 |
| | 00A9H | Write | OUT8 → OUT15 | 5 |
| 5 | 00AAH | Read | IN7 → IN0 | 6 |
| | 00AAH | Write | OUT7 → OUT0 | 6 |
| | 00ABH | Read | IN15 → IN8 | 6 |
| | 00ABH | Write | OUT8 → OUT15 | 6 |
| 6 | 00ACH | Read | IN7 → IN0 | 7 |
| | 00ACH | Write | OUT7 → OUT0 | 7 |
| | 00ADH | Read | IN15 → IN8 | 7 |
| | 00ADH | Write | OUT8 → OUT15 | 7 |
| 7 | 00AEH | Read | IN7 → IN0 | 8 |
| | 00AEH | Write | OUT7 → OUT0 | 8 |
| | 00AFH | Read | IN15 → IN8 | 8 |
| | 00AFH | Write | OUT8 → OUT15 | 8 |

***Table 4-1 : Accessing Inputs and Outputs***

### Warning:

- If more that one extension card is present, **each selector of each card must be on a different position**.

## 4.2 Inputs and Outputs software access

At this moment, Inputs and outputs can only be acceded using APEX language. Following example shows how to do this.

```
; Testing Input 8 of N300-IO Card number 1
        MOV     RA, PORTW($00A0)        ; RA ← IN15-IN0
        AND     RA, $0010               ; Input 8 insulation
        JNZ     address                 ; jump at address if input 8 is active
        ....

; Activating Output 4 of N300-IO Card number 2
                                        ; The following program needs a variable called
                                        ; "out2_img", who contains Outputs image of IO Card 2
        OR      out2_img, $0008         ; Modifying Output 4 in Outputs image of IO Card 2
        MOV     PORTW($00A2), out2_img  ; Refreshing of Outputs of I/O Card 2
        ....
```

## 4.3 Bus Termination setting

To prevent signal reflection, it is necessary to put a Bus Termination on the last card of the Bus. Components necessary to termination are present on every card. Termination is obtained by closing the 3 groups of jumpers (See Figure 2-1 : N300-IO Card Layout)

# 5 Electrical Characteristics

| | | | |
|---|---|---|---|
| +24 V Power Supply Voltage: | | 24V ± 5V | |
| +24V Power Supply Current: | All inputs ON (connected to +24V)<br>All outputs ON, but without load | Typical: | 300 mA |
| +5V Power Supply Voltage: | | 5V ± 0,5V | |
| +5V Power Supply Current | | Typical: | 140 mA |
| External input Voltage:<br>(IN0–IN15) | | Low level:<br>High level: | 0 – 5V<br>19 – 29V |
| External Input current:<br>(IN0-IN15) | Vcc=24V | Typical: | 8 mA |
| External Output current[1)] | Not all outputs active simultaneously | High level: | 1,7 A |
| External Output voltage:<br>(OUT0 – OUT15) | Output current = 1,7 A<br>Vcc = 24V | High level: | 23,5 V |

Note [1)] : when all outputs are conducting simultaneously, maximal current is limited like in Figure 5-1.

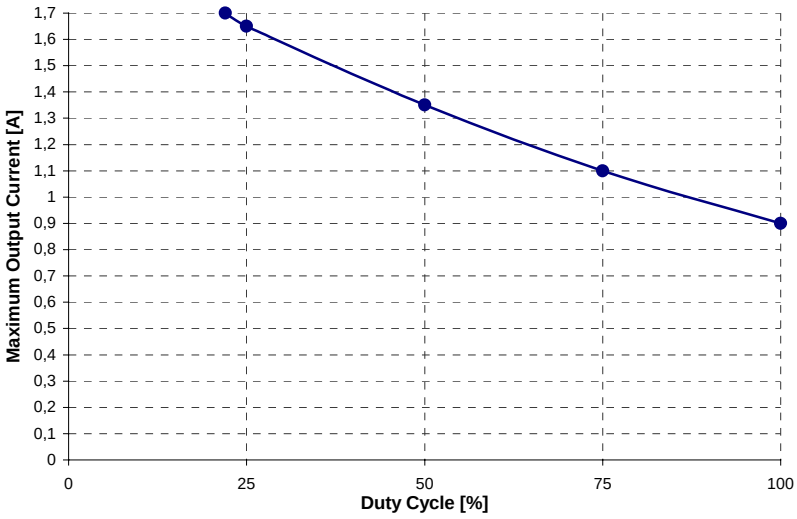


***Figure 5-1 : Current limitation when all outputs are conducting simultaneously (T=50°C)***