M1400 Parallel Input / Output

Technical Documentation

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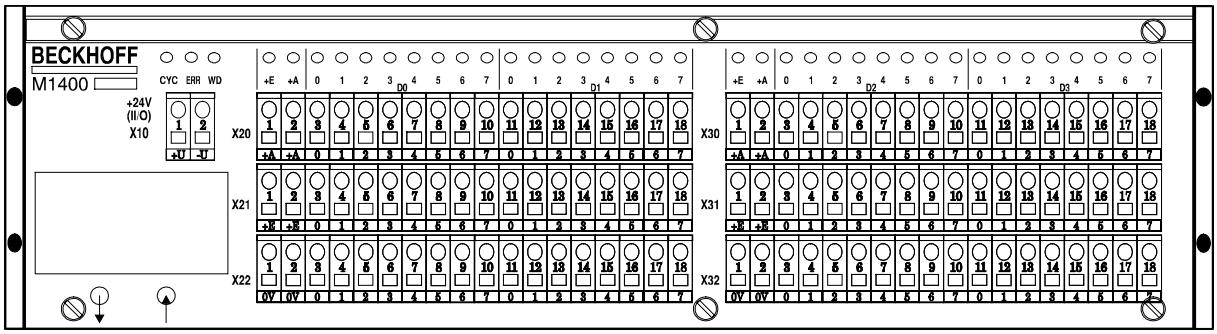


M1400

About the Hardware

The parallel module M1400 is an input / output module used in the II/O system. There are 32 Standard 24 V inputs / outputs, which achieve 4 ports of 8 bit each.
These 4 ports (D0..D3) correspond to the data bytes in the FO transmissions protocol and according to the way they are to be used, they can be configured as input or output.

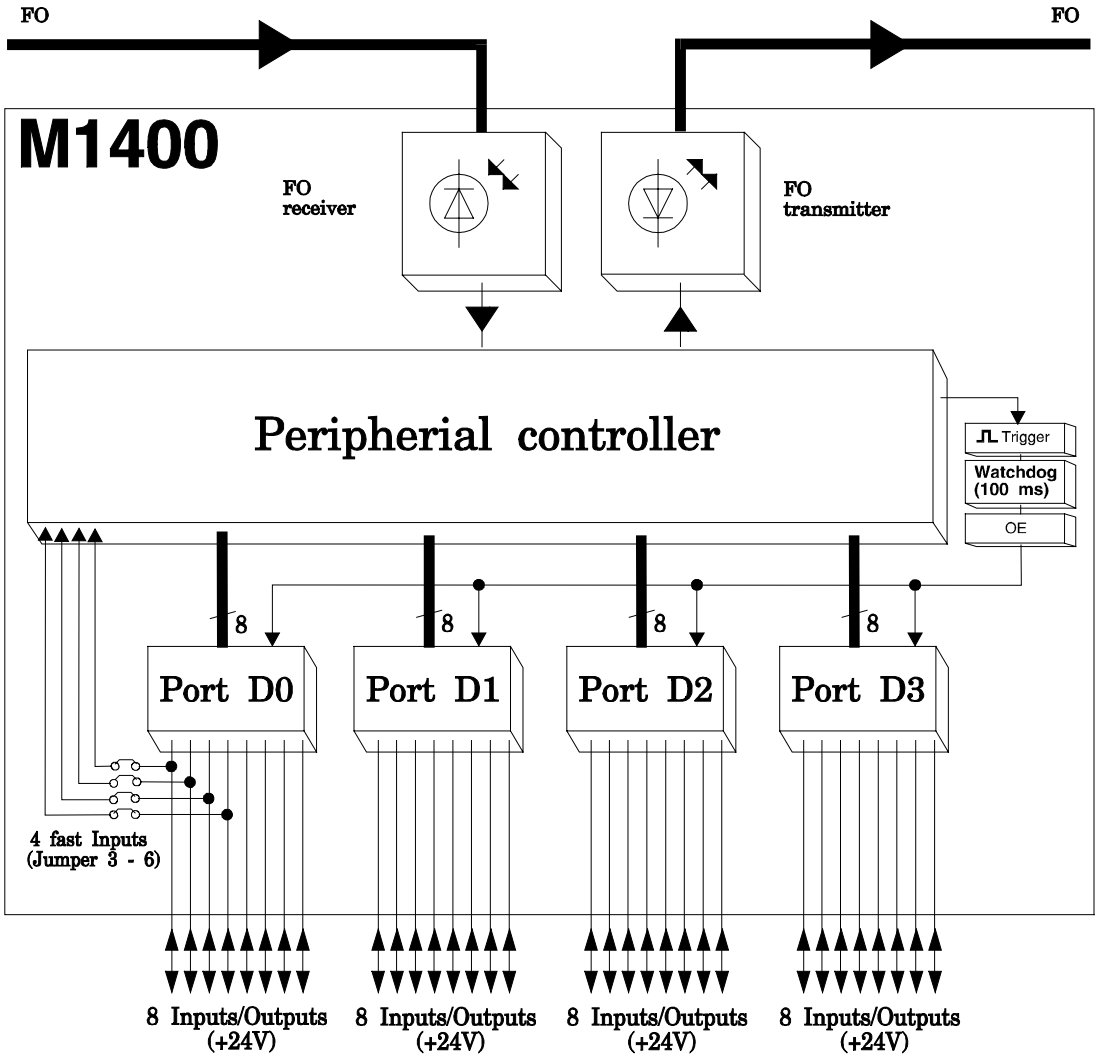
Each input / output has an LED, that indicates the current state. Furthermore there are three LED's installed used for diagnosis of the II/O fibre optical ring:

LD1 The green 'CYCLE' LED is switched on by each start bit of a telegram and is switched off again by the stop bit.

LD2 The red 'ERROR' LED is switched on after the recognition of a bad telegram (checksum, frame). After a sequence of three correct telegrams (checksum, frame) were processed it is switched off again.

LD3 The green LED 'WATCHDOG' is switched on by a valid writing telegram with matching address. If no telegram with the properties defined above is recognised for the next 100 ms a special unit of the module switches off all outputs.

In case an error is detected, all outputs are reset.



Basic Circuit Diagram

2. Function Description Software

3. Technical Data

Inputs / Outputs	32, can be configured for each port; LED shows state of all inputs / outputs
input specifications	24 VDC, 10 mA, digital filter
input switching voltages	0 - 8V = LOW 15 - 24V = HIGH
input delay	0,7 ms RC network 6,8 ms input latch
Output specifications	24 VDC, max. 500 mA, short circuit proof
Output check	watchdog system 100 ms
Connections	can be connected for 16 I/O; +,-,signal
Data connection	fibre optic II/O system
transmission rate	2,5 MBaud, 25 µs for 32 Bit
Supply Voltage	24 VDC (± 10%)
Input Current	0,1 A (without load and input currents)
Cartridge	closed, can be installed to cartridge carrier according to DIN EN 50022, 50035
Size (B * W * D)	270 * 76 * 68 mm
Weight	about 1100 g
Working Temperature	±0..+55 ØC
Storage Temperature	-20..+70 ØC

4. Installation

Montage

The M1400 is connected to the fibre optic ring using fibre optic connections (Toshiba). The maximum length of the FO cable, leading to the neighbouring boxes, should not be more then 600m for glass fibre or 45 meters for other fibres. These values are only valid if for bending the cable a radius of at least 30 mm is used. If there are no glass fibres used, no special tools are needed for installation of the plugs.

Common actors and sensor are connected directly to the inputs / outputs (using"+,-,signal").

The M1400 is installed at the machine or simply by installing it to a cartridge carrier according to DIN EN 50022 or DIN EN 50035.

Configuration

Each I/Oport of the M1400 can be configured as input or as output. This does not dependent on the configuration of the other ports. There are DIP switches under the XILINX board of the M1400. In order to change the state of the switches the module's cartridge has to be opened.

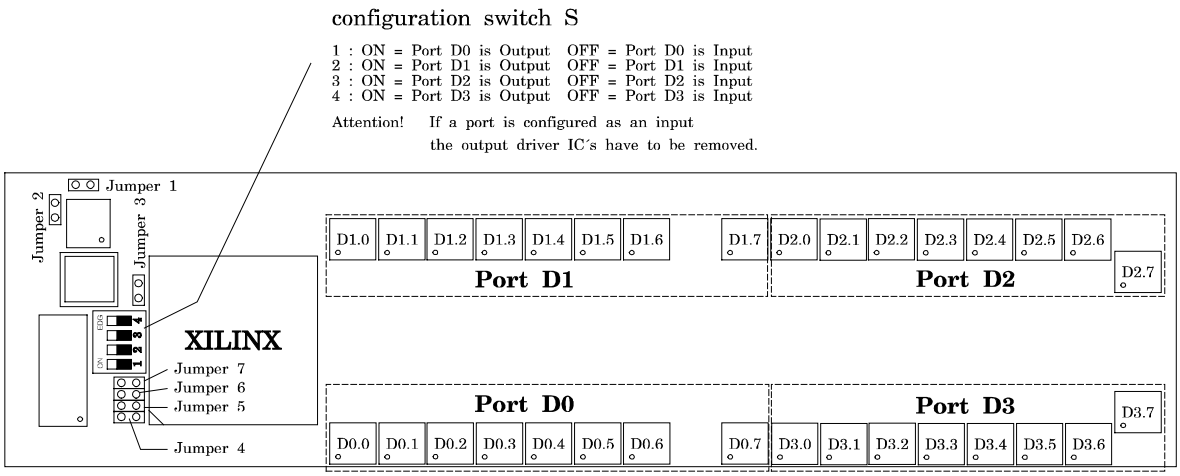
The DIP switches are assigned as follows:

switch 1 => port D0
switch 2 => port D1
switch 3 => port D2
switch 4 => port D3

It depends on the state of the switch whether a port is an output or an input :

'ON' => port is output
'OFF'=> port is input

ATTENTION:
Configuring a port as input (switch "OFF") all of the eight output controller ICs of the port concerned have to be removed.
If the ICs are not removed the port is not functional as input, but the module remains undamaged.



View under the M1400 XILINX board

The following module configuration is possible by setting jumpers 1 to 3 :

Jumper 1	***Watchdog on / off for Port D0 and D1***
	If this jumper is set the 'Watchdog' function is switched off. This means if an error is detected the outputs set of Port D0 and D1 are not switched off.
Jumper 2	***Watchdog on / off for Port D2 und D3***
	If this jumper is set the 'Watchdog' function is switched off. This means if an error is detected the outputs set of Port D2 and D3 are not switched off.
Jumper 3	***Latch on / off***
	standard configuration is jumper 'set' input are latched in intervals of 6,8 ms otherwise inputs are latched permanently

The following modul configuration is possible by setting jumpers 4 to 7 :

	Fast Inputs M1400 (Interrupt Inputs)
Jumper 4	Fast input II3 : If jumper connection betwenn port D0.3 and XILINX II3 is established Fast input is activated
Jumper 5	Fast input II2 : If jumper connection betwenn port D0.2 and XILINX II3 is established Fast input is activated
Jumper 6	Fast input II1 : If jumper connection betwenn port D0.1 and XILINX II3 is established Fast input is activated
Jumper 7	Fast input II0 : If jumper connection betwenn port D0.0 and XILINX II3 is established Fast input is activated

Power Supply

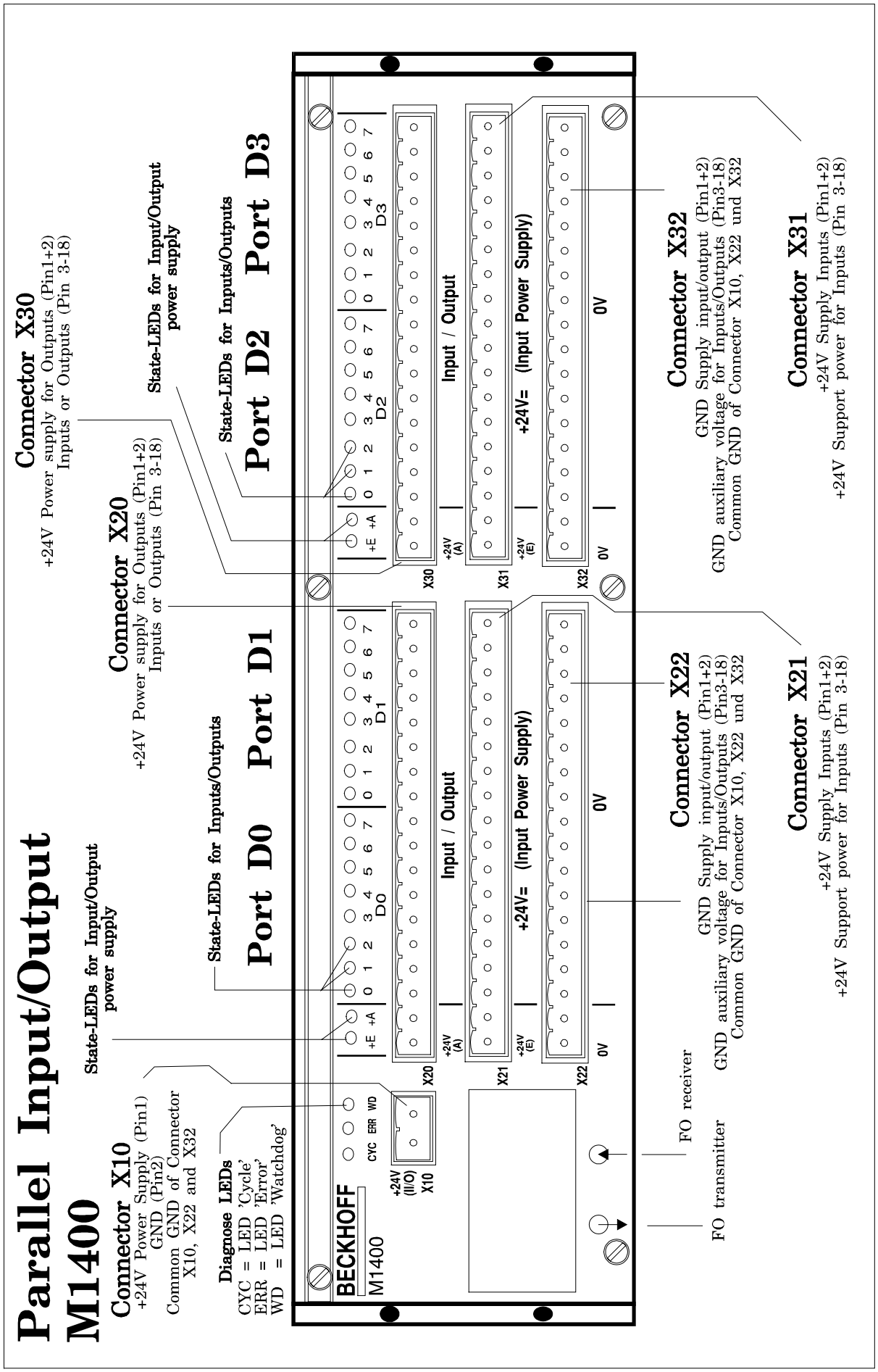
There are the following connections for power Supply :

(1) two pole plug connection for the controller (X10 Pin1+2)

(2) two pole plug connection for outputs (X20 and X30 Pin1+2)
(16 outputs)

(3) two pole plug connection for inputs (X21 and X31 Pin1+2)
(16 inputs)

(4) two pole plug connection for ground (X22 and X32 Pin1+2)


Parallel Input/Output
M1400
Connector X10
+24V Power Supply (Pin1)
GND (Pin2)
Common GND of Connector
X10, X22 and X32
Diagnose LEDs
CYC = LED 'Cycle'
ERR = LED 'Error'
WD = LED 'Watchdog'
State-LEDs for Input/Output
power supply
State-LEDs for Inputs/Outputs
Port D0 Port D1
Connector X20
+24V Power supply for Outputs (Pin1+2)
Inputs or Outputs (Pin 3-18)
State-LEDs for Input/Output
power supply
State-LEDs for Inputs/Outputs
Port D2 Port D3
Connector X30
+24V Power supply for Outputs (Pin1+2)
Inputs or Outputs (Pin 3-18)
BECKHOFF
M1400
CYC ERR WD
+24V (II/O)
X10
X20
X21
X22
X30
X31
X32
+E +A
+24V (A)
+24V (E)
0 1 2 3 4 5 6 7
D0
D1
D2
D3
Input / Output
+24V= (Input Power Supply)
0V
FO receiver
FO transmitter
Connector X22
GND Supply input/output (Pin1+2)
GND auxiliary voltage for Inputs/Outputs (Pin3-18)
Common GND of Connector X10, X22 und X32
Connector X21
+24V Supply Inputs (Pin1+2)
+24V Support power for Inputs (Pin 3-18)
Connector X32
GND Supply input/output (Pin1+2)
GND auxiliary voltage for Inputs/Outputs (Pin3-18)
Common GND of Connector X10, X22 und X32
Connector X31
+24V Supply Inputs (Pin1+2)
+24V Support power for Inputs (Pin 3-18)

5. Table of Connections

Connector pin assignment with Signal Description

CONNECTOR X10

Connector	Pin	Signal	Description
X10	1	+U	+24V control power supply
X10	2	-U	GND ground

CONNECTOR X20

Connector	Pin	Signal	Description
X20	1	+A	+24V supply for output
X20	2	+A	+24V supply for output
X20	3	D0.0	Bit 0 of Data byte 0 D0.0 is output, if DIL switch S1 = ON D0.0 is input, if DIL switch S1 = OFF
X20	4	D0.1	Bit 1 of Data byte 0 D0.1 is output, if DIL switch S1 = ON D0.1 is input, if DIL-switch S1 = OFF
X20	5	D0.2	Bit 2 of Data byte 0 D0.2 is output, if DIL switch S1 = ON D0.2 is input, if DIL switch S1 = OFF
X20	6	D0.3	Bit 3 of Data byte 0 D0.3 is output, if DIL-switch S1 = ON D0.3 is input, if DIL switch S1 = OFF
X20	7	D0.4	Bit 4 of Data byte 0 D0.4 is output, if DIL switch S1 = ON D0.4 is input, of DIL switch S1 = OFF
X20	8	D0.5	Bit 5 of Data byte 0 D0.5 is output, if DIL switch S1 = ON D0.5 is input, if DIL switch S1 = OFF

continuation connector X20:

Connector	Pin	Signal	Description
X20	9	D0.6	Bit 6 of Data byte 0 D0.6 is output, if DIL switch S1 = ON D0.6 is input, if DIL switch S1 = OFF
X20	10	D0.7	Bit 7 of Data byte 0 D0.7 is output, if DIL switch S1 = ON D0.7 is input, if DIL switch S1 = OFF
X20	11	D1.0	Bit 0 of Data byte 1 D1.0 is output, if DIL switch S1 = ON D1.0 is input, if DIL switch S1 = OFF
X20	12	D1.1	Bit 1 of Data byte 1 D1.1 is output, if DIL switch S1 = ON D1.1 is input, if DIL switch S1 = OFF
X20	13	D1.2	Bit 2 of Data byte 1 D1.2 is output, if DIL switch S1 = ON D1.2 is input, if DIL switch S1 = OFF
X20	14	D1.3	Bit 3 of Data byte 1 D1.3 is output, if DIL switch S1 = ON D1.3 is input, if DIL switch S1 = OFF
X20	15	D1.4	Bit 4 of Data byte 1 D1.4 is output, if DIL switch S1 = ON D1.4 is input, if DIL switch S1 = OFF
X20	16	D1.5	Bit 5 of Data byte 1 D1.5 is output, if DIL switch S1 = ON D1.5 is input, if DIL switch S1 = OFF
X20	17	D1.6	Bit 6 of Data byte 1 D1.6 is output, if DIL switch S1 = ON D1.6 is input, if DIL switch S1 = OFF
X20	18	D1.7	Bit 7 of Data byte 1 D1.7 is output, if DIL switch S1 = ON D1.7 is input, if DIL switch S1 = OFF

CONNECTOR X21

Connector	Pin	Signal	Description
X21	1	+E	+24V supply inputs
X21	2	+E	+24V supply inputs
X21	3	+24V	+24V power supply for input 0.0
X21	4	+24V	+24V power supply for input 0.1
X21	5	+24V	+24V power supply for input 0.2
X21	6	+24V	+24V power supply for input 0.3
X21	7	+24V	+24V power supply for input 0.4
X21	8	+24V	+24V power supply for input 0.5
X21	9	+24V	+24V power supply for input 0.6
X21	10	+24V	+24V power supply for input 0.7
X21	11	+24V	+24V power supply for input 1.0
X21	12	+24V	+24V power supply for input 1.1
X21	13	+24V	+24V power supply for input 1.2
X21	14	+24V	+24V power supply for input 1.3
X21	15	+24V	+24V power supply for input 1.4
X21	16	+24V	+24V power supply for input 1.5
X21	17	+24V	+24V power supply for input 1.6
X21	18	+24V	+24V power supply for input 1.7

CONNECTOR X22

Connector	Pin	Signal	Description
X22	1	0V	GND Supply input/output
X22	2	0V	GND Supply input/output
X22	3	0V	GND Input/output D0.0
X22	4	0V	GND Input/output D0.1
X22	5	0V	GND Input/output D0.2
X22	6	0V	GND Input/output D0.3
X22	7	0V	GND Input/output D0.4
X22	8	0V	GND Input/output D0.5
X22	9	0V	GND Input/output D0.6
X22	10	0V	GND Input/output D0.7
X22	11	0V	GND Input/output D1.0
X22	12	0V	GND Input/output D1.1
X22	13	0V	GND Input/output D1.2
X22	14	0V	GND Input/output D1.3
X22	15	0V	GND Input/output D1.4
X22	16	0V	GND Input/output D1.5
X22	17	0V	GND Input/output D1.6
X22	18	0V	GND Input/output D1.7

CONNECTOR X30

Connector	Pin	Signal	Description
X30	1	+A	+24V supply for output
X30	2	+A	+24V supply for output
X30	3	D2.0	Bit 0 of Data byte 2 D2.0 is output, if DIL switch S1 = ON D2.0 is input, if DIL switch S1 = OFF
X30	4	D2.1	Bit 1 of Data byte 2 D2.1 is output, if DIL switch S1 = ON D2.1 is input, if DIL switch S1 = OFF
X30	5	D2.2	Bit 2 of Data byte 2 D2.2 is output, if DIL switch S1 = ON D2.2 is input, if DIL switch S1 = OFF
X30	6	D2.3	Bit 3 of Data byte 2 D2.3 is output, if DIL switch S1 = ON D2.3 is input, if DIL switch S1 = OFF
X30	7	D2.4	Bit 4 of Data byte 2 D2.4 is output, if DIL switch S1 = ON D2.4 is input, if DIL switch S1 = OFF
X30	8	D2.5	Bit 5 of Data byte 2 D2.5 is output, if DIL switch S1 = ON D2.5 is input, if DIL switch S1 = OFF
X30	9	D2.6	Bit 6 of Data byte 2 D2.6 is output, if DIL switch S1 = ON D2.6 is input, if DIL switch S1 = OFF
X30	10	D2.7	Bit 7 of Data byte 2 D2.7 is output, if DIL switch S1 = ON D2.7 is input, if DIL switch S1 = OFF

continuation connector X30:

X30	11	D3.0	Bit 0 of Data byte 3 D3.0 is output, if DIL switch S1 = ON D3.0 is input, if DIL switch S1 = OFF
X30	12	D3.1	Bit 1 of Data byte 3 D3.1 is output, if DIL switch S1 = ON D3.1 is input, if DIL switch S1 = OFF
X30	13	D3.2	Bit 2 of Data byte 3 D3.2 is output, if DIL switch S1 = ON D3.2 is input, if DIL switch S1 = OFF
X30	14	D3.3	Bit 3 of Data byte 3 D3.3 is output, if DIL switch S1 = ON D3.3 is input, if DIL switch S1 = OFF
X30	15	D3.4	Bit 4 of Data byte 3 D3.4 is output, if DIL switch S1 = ON D3.4 is input, if DIL switch S1 = OFF
X30	16	D3.5	Bit 5 of Data byte 3 D3.5 is output, if DIL switch S1 = ON D3.5 is input, if DIL switch S1 = OFF
X30	17	D3.6	Bit 6 of Data byte 3 D3.6 is output, if DIL switch S1 = ON D3.6 is input, if DIL switch S1 = OFF
X30	18	D3.7	Bit 7 of Data byte 3 D3.7 is output, if DIL switch S1 = ON D3.7 is input, if DIL switch S1 = OFF

CONNECTOR X31

Connector	Pin	Signal	Description
X31	1	+E	+24V supply outputs
X31	2	+E	+24V supply outputs
X31	3	+24V	+24V power supply for input 2.0
X31	4	+24V	+24V power supply for input 2.1
X31	5	+24V	+24V power supply for input 2.2
X31	6	+24V	+24V power supply for input 2.3
X31	7	+24V	+24V power supply for input 2.4
X31	8	+24V	+24V power supply for input 2.5
X31	9	+24V	+24V power supply for input 2.6
X31	10	+24V	+24V power supply for input 2.7
X31	11	+24V	+24V power supply for input 3.0
X31	12	+24V	+24V power supply for input 3.1
X31	13	+24V	+24V power supply for input 3.2
X31	14	+24V	+24V power supply for input 3.3
X31	15	+24V	+24V power supply for input 3.4
X31	16	+24V	+24V power supply for input 3.5
X31	17	+24V	+24V power supply for input 3.6
X31	18	+24V	+24V power supply for input 3.7

CONNECTOR X32

Connector	Pin	Signal	Description
X32	1	0V	GND Supply input/output
X32	2	0V	GND Supply input/output
X32	3	0V	GND Input/output D2.0
X32	4	0V	GND Input/output D2.1
X32	5	0V	GND Input/output D2.2
X32	6	0V	GND Input/output D2.3
X32	7	0V	GND Input/output D2.4
X32	8	0V	GND Input/output D2.5
X32	9	0V	GND Input/output D2.6
X32	10	0V	GND Input/output D2.7
X32	11	0V	GND Input/output D3.0
X32	12	0V	GND Input/output D3.1
X32	13	0V	GND Input/output D3.2
X32	14	0V	GND Input/output D3.3
X32	15	0V	GND Input/output D3.4
X32	16	0V	GND Input/output D3.5
X32	17	0V	GND Input/output D3.6
X32	18	0V	GND Input/output D3.7