EASY21x/23x-EVA

Evaluation Board for EASY21x / EASY23x PLC core

frenzel + berg electronic

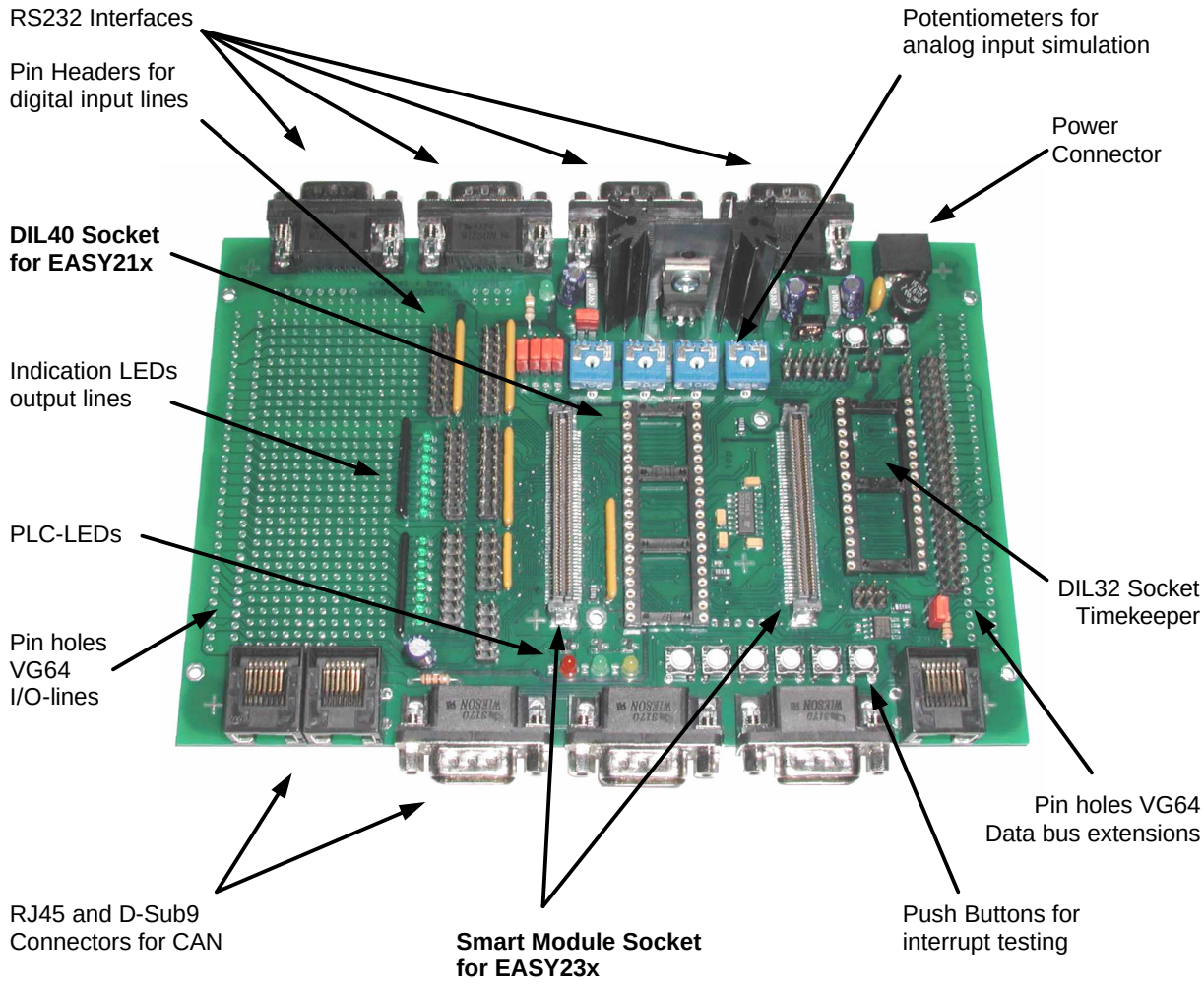
General Description

The EASY21x/23x-EVA is an evaluation board for the PLC core modules and PLC chips just like the EASY215 or EASY235 series. The board supports all the main features of these devices.
All digital and analog in- and output pins are wired to pin headers. For the output pins there are diagnostic LEDs and 4 analog input pins are connected to potentiometers. Four of the digital and two of the interrupt input pins are wired to bush buttons.
Especially for EASY235 applications there is a DIL32 socket for Timekeeper or additional memory chips.

Furthermore D-SUB or RJ45 connectors and bus termination resistors support the CAN interfaces. For the serial interfaces there are D-SUB connecters and RS232 transceiver chips on board.

Ordering Information

Part	Description
EASY21x/23x-EVA/FCI	Evaluation board for EASY21x PLC-Chips EASY23x PLC core modules Wall socket power supply incl.



Info

This document specifies the all components and units of the evaluation board. But note that different EASY's uses Board in part. If a EASY a specific part make available, it was marked as [X] EASYxxx in the corresponding chapter. Special functions therefore are supplemented as Notification marked with '➔'.

Power-Supply (PL7)

The evaluation board has an own 5V power regulator. It needs an external power supply unit with 9V to 12V DC at the power input connector PL7. The polarity at PL7 is optional.
A external wall socket power supply unit with unregulated 9VDC output and 230VAC input is included.

PCOM0

PCOM0 is a D-SUB9 connector that is used for RS232-Interface COM0. The Interface uses the RS232 transceiver on the EASY board.

PCOM0		**[ ] EASY215 [X] EASY235**
Pin No.	***Pin Name***	***Function***
2	RS232R0	Receiver line of SIO 0
3	RS232T0	Transmitter line of SIO 0
5	GND	Common Ground
1,4, 6..9	NC	Not connected
frame	GND	Common Ground

➔ ***Programming interface of EASY235.***

PCOM1

PCOM1 is a D-SUB9 connector that is used for RS232-Interface COM1. This Interface uses also the RS232 transceiver on the EASY board.

PCOM1		**[ ] EASY215 [X] EASY235**
Pin No.	Pin Name	Function
2	RS232R1	Receiver line of 16C554
3	RS232T1	Transmitter line of 16C554
5	GND	Common Ground
1,4, 6..9	NC	Not connected
frame	GND	Common Ground

PCOM2

PCOM2 is a D-SUB9 connector that is used for RS232-Interface COM2. This Interface uses the RS232 transceiver (U5) on this evaluation board.

PCOM2		**[ ] EASY215 [X] EASY235**
Pin No.	***Pin Name***	***Function***
2	RS232R2	Receiver line of 16C554
3	RS232T2	Transmitter line of 16C554
5	GND	Common Ground
1,4, 6..9	NC	Not connected
frame	GND	Common Ground

➔ asynchronous interface 2 of EASY235

PCOM3

PCOM3 is a D-SUB9 Connector that is used for RS232-Interface COM3. This Interface uses the RS232 transceiver (U5) on this evaluation board.

PCOM2		**[X] EASY215 [X] EASY235**
Pin No.	***Pin Name***	***Function***
2	RS232R3	Receiver line of 16C554
3	RS232T3	Transmitter line of 16C554
5	GND	Common Ground
1,4, 6..9	NC	Not connected
frame	GND	Common Ground

➔ ***Programming interface of EASY215***
➔ Asynchronous interface 3 of EASY235

PCAN0A and PCAN0B

PCAN0A and PCAN0B are both D-SUB9 Connectors and they are used for the CAN0-Interface of the controller internal CAN interface unit 0. This Interface uses the CAN transceiver on the EASY module.
(See also PCAN0C and PCAN0D / they are also used with the CAN0 interface)
Note: The Lx lines are only connected from Header PCAN0A to PCAN0B.

PCAN0A, PCAN0B		[X] EASY215 [X] EASY235
Pin No.	***Pin Name***	***Function***
1	L1	Line 1
2	CANL0	CANL line of bus interface 0
3, 6	GND	Common Ground
4	L4	Line 4
5	L5	Line 5
7	CANH0	CANH line of bus interface 0
8	L8	Line 8
5	L9	Line 9

PCAN0C and PCAN0D

PCAN0C and PCAN0D are both RJ45 Connectors and they are used for the CAN0-Interface. (See also PCAN0A and PCAN0B / they are also used with the CAN0 interface)

PCAN0C, PCAN0D		[X] EASY215 [X] EASY235
Pin No.	***Pin Name***	***Function***
3, 7	GND	Common Ground
4	CANL0	CANL line of bus interface 0
5	CANH0	CANH line of bus interface 0
1,2,6,8	NC	Not connected

PCAN1A

PCAN1A is a D-SUB9 Connector that is used for the CAN1-Interface of the EASY internal CAN interface unit 1. This Interface uses the CAN transceiver on this evaluation board.
(See also PCAN1B / this is also used with the CAN1 interface)

PCAN1A		[ ] EASY215 [ ] EASY235
Pin No.	***Pin Name***	***Function***
2	CANL0	CANL line of bus interface 0
3, 6	GND	Common Ground
7	CANH0	CANH line of bus interface 0
1,4,5,8,9	L8	Line 8

➔ For future use

PCAN1B

PCAN0C is a RJ45 Connector that is used for the CAN1-Interface. (See also PCAN1A / they are also used with the CAN1 interface)

PCAN1A		[ ] EASY215 [X] EASY235
Pin No.	***Pin Name***	***Function***
3, 7	GND	Common Ground
4	CANL0	CANL line of bus interface 0
5	CANH0	CANH line of bus interface 0
1,2,6,8,9	NCE	Not connected to EASY

➔ For future use.

PL1 External Interrupt Header

The pin header PL1 is provided as interface connector for external interrupts. The valid inputs depend on the EASY device. Lock to the EASY corresponding table.

PL1		[X] EASY215 [ ] EASY235
Pin No.	***Pin Name***	***Function***
2	IRQ0	External interrupt input 0
4	IRQ1	External interrupt input 1
1,3,5,7,9	GND	Common ground
other	NCE	Not connected to EASY

PL1		[ ] EASY215 [X] EASY235
Pin No.	***Pin Name***	***Function***
2	IRQ0	External interrupt input 0
4	IRQ1	External interrupt input 1
6	IRQ2	External interrupt input 2
8	IRQ3	External interrupt input 3
10	IRQ4	External interrupt input 4
1,3,5,7,9	GND	Common ground

PL2 Encoder Input Header

The pin header PL2 is provided as interface connector for incremental encoders. The valid input lines depend on the EASY device. Look at the EASY corresponding table.

PL2		[X] EASY215
Pin No.	***Pin Name***	***Function***
3	ENC1-A	input of encoder 1 track A
4	ENC1-B	input of encoder 1 track B
5	ENC2-A	input of encoder 2 track A
6	ENC2-B	input of encoder 2 track B

PL2		[X] EASY235
Pin No.	***Pin Name***	***Function***
1	ENC0-A	input of encoder 0 track A
2	ENC0-B	input of encoder 0 track B
3	ENC1-A	input of encoder 1 track A
4	ENC1-B	input of encoder 1 track B
5	ENC2-A	input of encoder 2 track A
6	ENC2-B	input of encoder 2 track B
7	ENC3-A	input of encoder 3 track A
8	ENC3-B	input of encoder 3 track B
9	ENC4-A	input of encoder 4 track A
10	ENC4-B	input of encoder 4 track B

PL3 Hardware Expansion Header

PL3 is provided as interface for external extensions. The valid signals depend on the EASY device. Look at the EASY corresponding table.

PL3		[X] EASY215
Pin No.	***Pin Name***	***Function***
C1, C2, C32,C32,	GND	Common Ground
C3, C4, C30	VCC	VCC
C28	IRQ1	External interrupt input 1
A1, A2, A31,A32	GND	Common Ground
A3, A4, A30	VCC	VCC
A27	IRQ0	External interrupt input 0
other	NCE	Not connected to EASY

PL3		[X] EASY235
Pin No.	***Pin Name***	***Function***
C1, C2, C32,C32	GND	Common Ground
C3, C4, C30	VCC	VCC
C5	CS4#	External chip select 4 (See also Jumper J4)
C6	CS11#	External chip select 11
C7	CS9#	External chip select 9 (See also Jumper J4)
C8	WRH#	Write High signal for external extensions
C9	RD#	Read signal for external extensions
C10 to C19	A18, A16, … A2, A0	Even Address lines A18-A0 for external extensions
C20 to C27	D14, D12, … D2, D0	Even Data lines D14-D0 for external extensions
C28	IRQ1	External interrupt input 1
C29	IRQ3	External interrupt input 3
C1, C2, C31,C32	GND	Common Ground
C3, C4, C30	VCC	VCC
A5	CS12#	External chip select 12
A6	CS10#	External chip select 10
A7	NC	Not connected
A8	WRL#	Write Low signal for external extensions
A9 to A18	A19, A17, … A3, A1	Odd Address lines A19-A1 for external extensions
A19 to A26	D15, D13, … D3, D1	Odd Data lines D15-D1 for external extensions
A27	IRQ0	External interrupt input 0
A28	IRQ2	External interrupt input 2

PL4 SPI Interface Header

PL4 is provided as interface for external serial or SPI extensions in future use. The valid signals depend on the EASY device. Look at the EASY corresponding table.

PL4		[X] EASY215
Pin No.	***Pin Name***	***Function***
1	MTSR	Synchronous serial interface Master transmit Slave receive
2	MRST	Synchronous serial interface Master receive Slave transmit

PL4		[X] EASY235
Pin No.	***Pin Name***	***Function***
1	MTSR	Synchronous serial interface Master transmit Slave receive
2	MRST	Synchronous serial interface Master receive Slave transmit
3	SCLK	Synchronous serial interface Shift clock in- or output
4	Reserved7	Connected to RESERVED7
5	RXD4	Asynchronous Interface 4 receiver (TTL level)
6	TXD4	Asynchronous Interface 4 transmitter (TTL level)

PL5 IO Header

PL5 is a global header to contact I/O lines. The valid signals depend on the plugged EASY device.

PL5		[X] EASY215 [ ] EASY235
Pin No.	***Pin Name***	***Function***
1, 3, 5, 7, 9, 11	IO0 to IO5	Synchronous serial interface Master transmit Slave receive
2, 4, 6, 8, 10, 12	GND	Common Ground

PL6 (IO Header)

PL6 is a global header (VG64) to connect I/O lines from External devices in example. The valid signals depend on the EASY device.

PL6		[X] EASY215
Pin No.	***Pin Name***	***Function***
C2	IN1.0 / ENC2-A	Digital input 1.0 or input of encoder 2 track B
C3	IN1.2 / ENC1-A	Digital input 1.2 or input of encoder 1 track A
C5	SCLK	Synchronous serial interface Shift clock in- or output
C12	IRQ1	External interrupt input 1
C13	IRQ0	External interrupt input 0
C14 to C21	OUT0.7 / OUT0.0	Digital output 0.7 to 0.0
A22 A23	IN0.1 to IN0.0 / AN0 to AN1	Digital input 0.7 to 0.0 or Analog input 0 to 1
A24 to A29	IN0.2 / to IN0.0	Digital input 0.7 to 0.0
Others	NC	Not connected to EASY

PL6		[ ] EASY235
Pin No.	***Pin Name***	***Function***
C2	IN1.0 / ENC2-A	Digital input 1.0 or input of encoder 2 track A
C3	IN1.2 / ENC1-A	Digital input 1.2 or input of encoder 1 track A
C4	USERLED	User LED output
C5	LED1	LED1 output
C10 to C13	IRQ3 / IRQ0	External interrupt input 3-0
C14 to C21	OUT0.7 / OUT0.0	Digital output 0.7 to 0.0
C22	IN1.7 ENC2-B	Digital input 1.7 input of encoder 2 track B
C23	IN1.6 / ENC1-B	Digital input 1.6 or input of encoder 1 track B
C24	IN1.5 / ENC3-A	Digital input 1.5 or input of encoder 3 track A
C25	IN1.4 / ENC4-A	Digital input 1.4 or input of encoder 4 track A
C26	IN1.3 / ENC3-B	Digital input 1.3 or input of encoder 3 track B
C27	IN1.2 / ENC4-B	Digital input 1.2 or input of encoder 4 track B
C28	IN1.1	Digital input 1.1
C29	IN1.0	Digital input 1.0

PL6 continued		[ ] EASY235
Pin No.	***Pin Name***	***Function***
A2	ENC0-A	input of encoder 0 track A
A3	ENC0-B	input of encoder 0 track B
A4	IRQ4	
A5	LED0	LED0 output
A6 to A9	OUT1.7 to OUT1.4	Digital output 1.7 to 1.4
A10 to A13	OUT1.3 / OUT1.0 PWM3 / PWM0	Digital output 1.3 to 1.0 or output PWM3 to PWM0
A14 to A21	IN2.7 to IN2.0	Digital input 2.7 to 2.0
A22 to A29	IN0.7 to IN0.0 / AN7 to AN0	Digital input 0.7 to 0.0 or Analog input AN7 to AN0
Others	NCE	Not connected to EASY

PL7 (Power supply Connector)

DC-Power supply input for wall socket power supply. Because of an on board rectifier, the polarity of the supply input is don't care.
The Input voltage must be in the range 9 .. 12V DC

P7 (O Header)

The pin header PL1 is provided as interface connector for external outputs. The valid outputs depend on the EASY device. Lock at the EASY corresponding table.

P7		[ ] EASY215 [X] EASY235
Pin No.	***Pin Name***	***Function***
1,3,5,7,9, 11,13,15	GND	Common Ground
2, 4, 6, 8	OUT1.0 to OUT1.3 / PWM0 to PWM3	Digital output 1.0 to 1.3 or output PWM0 to PWM3
10, 12, 14, 16	OUT1.4 to OUT1.7 /	Digital output 1.0 to 1.3 or output PWM0 to PWM3

P5A (Input Header)

The pin header PL5A is provided as interface connector for external input signals. The valid inpputs depend on the EASY device. Look to the EASY corresponding table.

P5A		[X] EASY235
Pin No.	***Pin Name***	***Function***
1,3,5,7,9, 11,13,15	GND	Common Ground
2, 4, 6, 8, 10, 12, 14, 16	IN0.0 to IN0.7 / AN0 to AN7	Digital input 0.0 to 0.7 or Analog input AN0 to AN7

Jumper Settings

Jumper	Setting	Function
J1	open	No bus termination at CAN0
	closed	Bus termination 120 Ohms at CAN0 active
J2	open	No bus termination at CAN1
	closed	Bus termination 120 Ohms at CAN1 active
J3	open	Normal operation
	closed	Activate the firmware update mode.
J4	All open	Chip select CS4# and CS9# are not connected
	1-2	CS4# connected to chip select of chip socket U6 This setting is required, if a NV-RAM for keeping the Retain Variables is used.
	2-3	CS9# connected to chip select of chip socket U6.
J6	All open	IN0.0 / AN0 not connected to header P5A or potentiometer
	1-2	IN0.0 / AN0 is connected to potentiometer R1 (Analog Input for this pin)
	2-3	IN0.0 / AN0 is digital input with 6,8 kOhm Pull-Up resistor
J7	All open	IN0.1 / AN1 not connected to header P5A or potentiometer
	1-2	IN0.1 / AN1 is connected to potentiometer R1 (Analog Input for this pin)
	2-3	IN0.1 / AN1 is digital input with 6,8 kOhm Pull-Up resistor
J8	All open	IN0.2 / AN2 not connected to header P5A or potentiometer
	1-2	IN0.2 / AN2 is connected to potentiometer R1 (Analog Input for this pin)
	2-3	IN0.2 / AN2 is digital input with 6,8 kOhm Pull-Up resistor
J9	All open	IN0.3 / AN3 not connected to header P5A or potentiometer
	1-2	IN0.3 / AN3 is connected to potentiometer R1 (Analog Input for this pin)
	2-3	IN0.3 / AN3 is digital input with 6,8 kOhm Pull-Up resistor

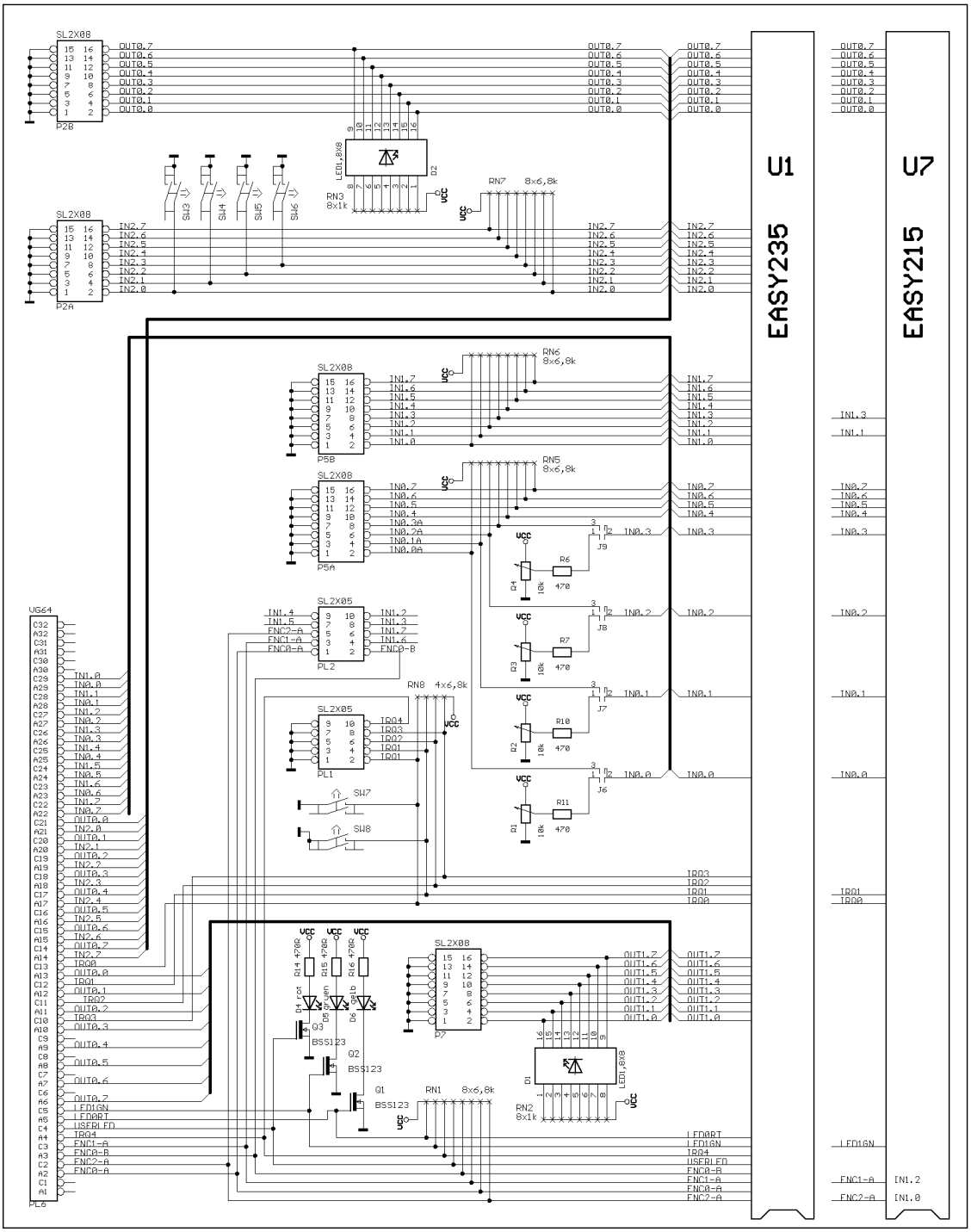
Switch buttons

Jumper	Function
SW1	Resets the EASYxxx board
SW2	Activates the external NMI Interrupt of the controller PLC core controller
SW3 .. SW6	Digital input simulation for digital input lines IN2.0 to IN2.3
SW7, SW8	Interrupt generation for IRQ0 and IRQ1

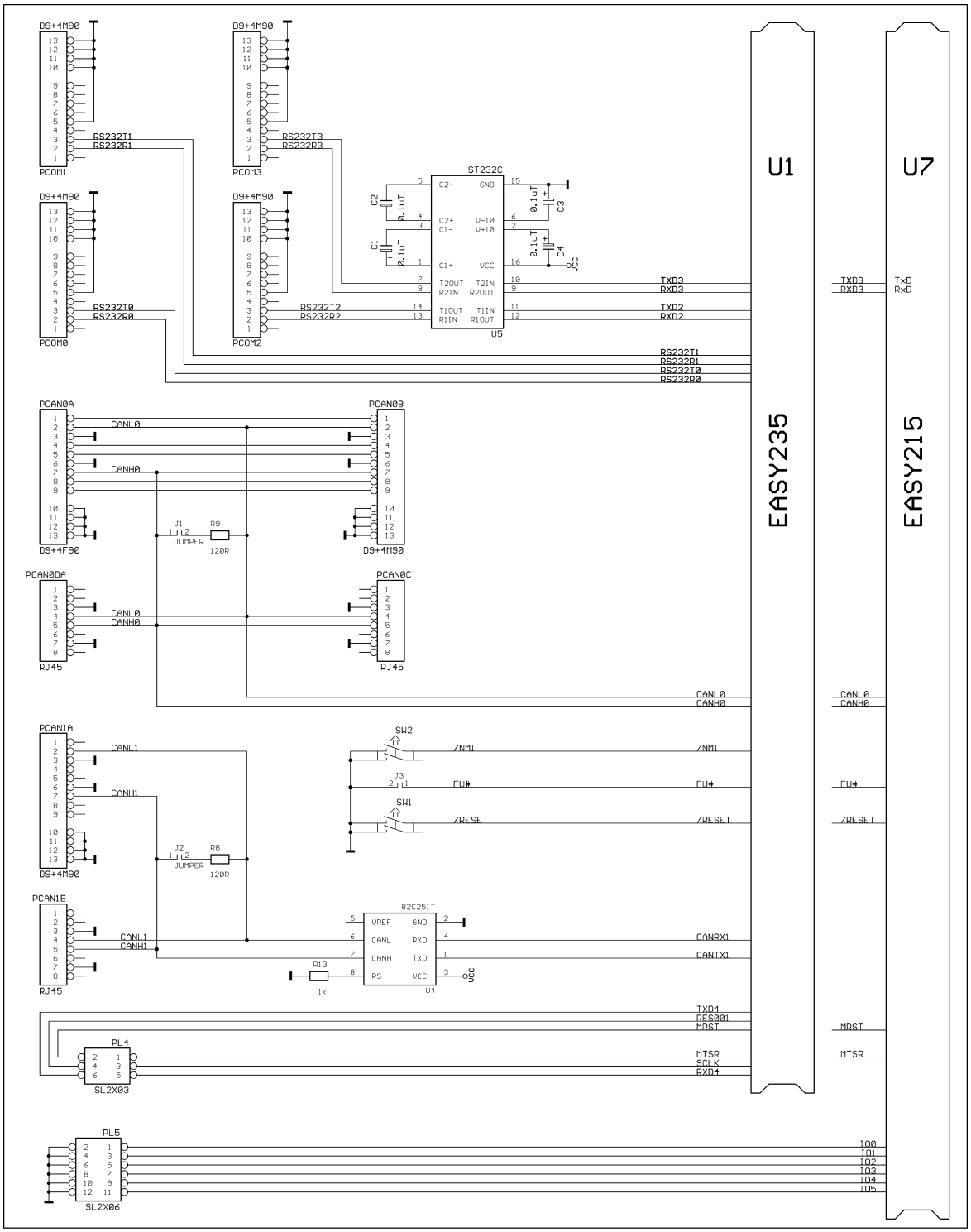
LED's

LED	Function
D1	Is an 8-LED line witch is connected to output port OUT0.
D2	Is an 8-LED line witch is connected to output port OUT0.
D3	Indicates power on
D4	USERLED of EASYxxx PLC core module
D5	LED1gn of EASYxxx PLC core module
D6	LED0rt of EASYxxx PLC core module

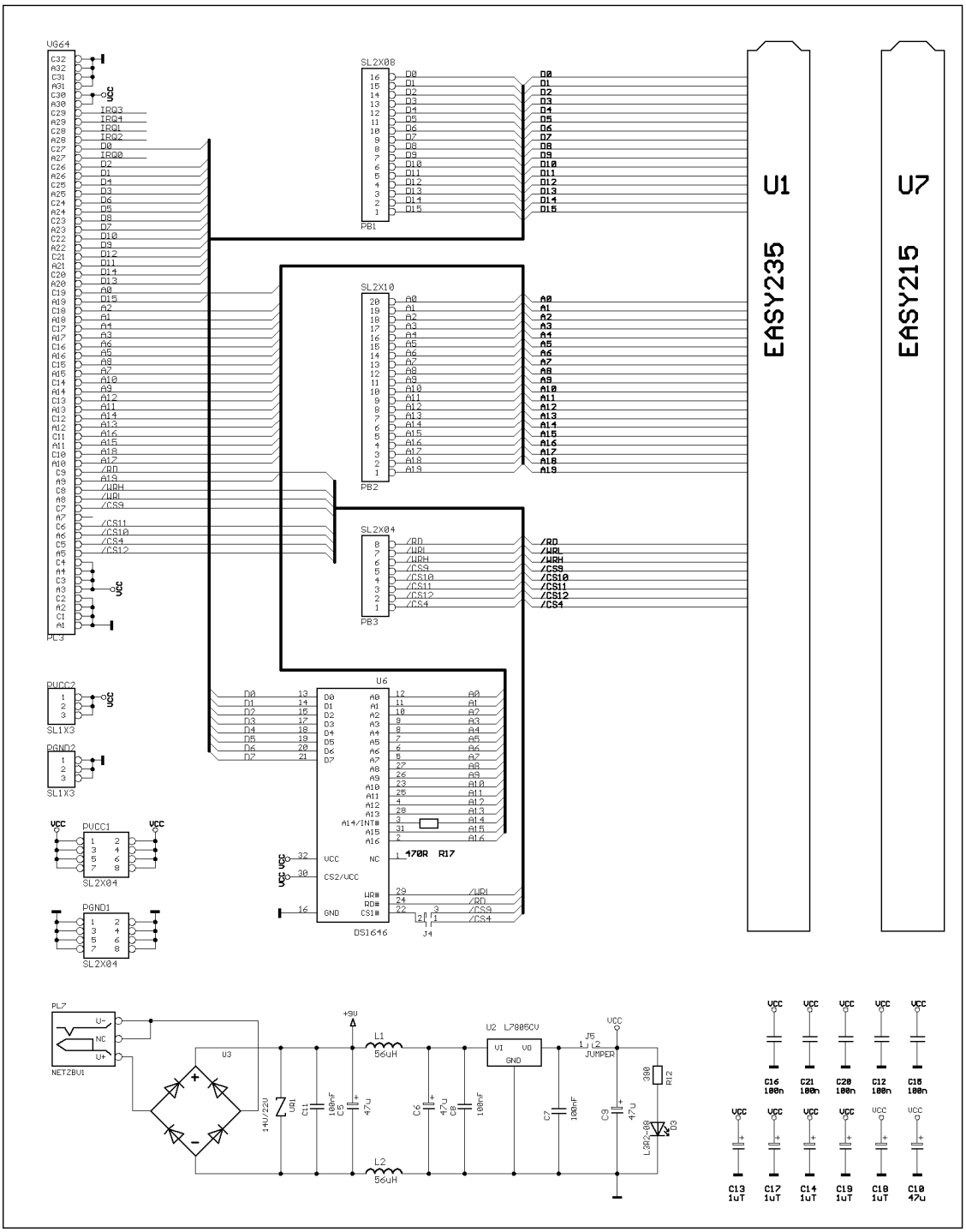
Schematic 1/3



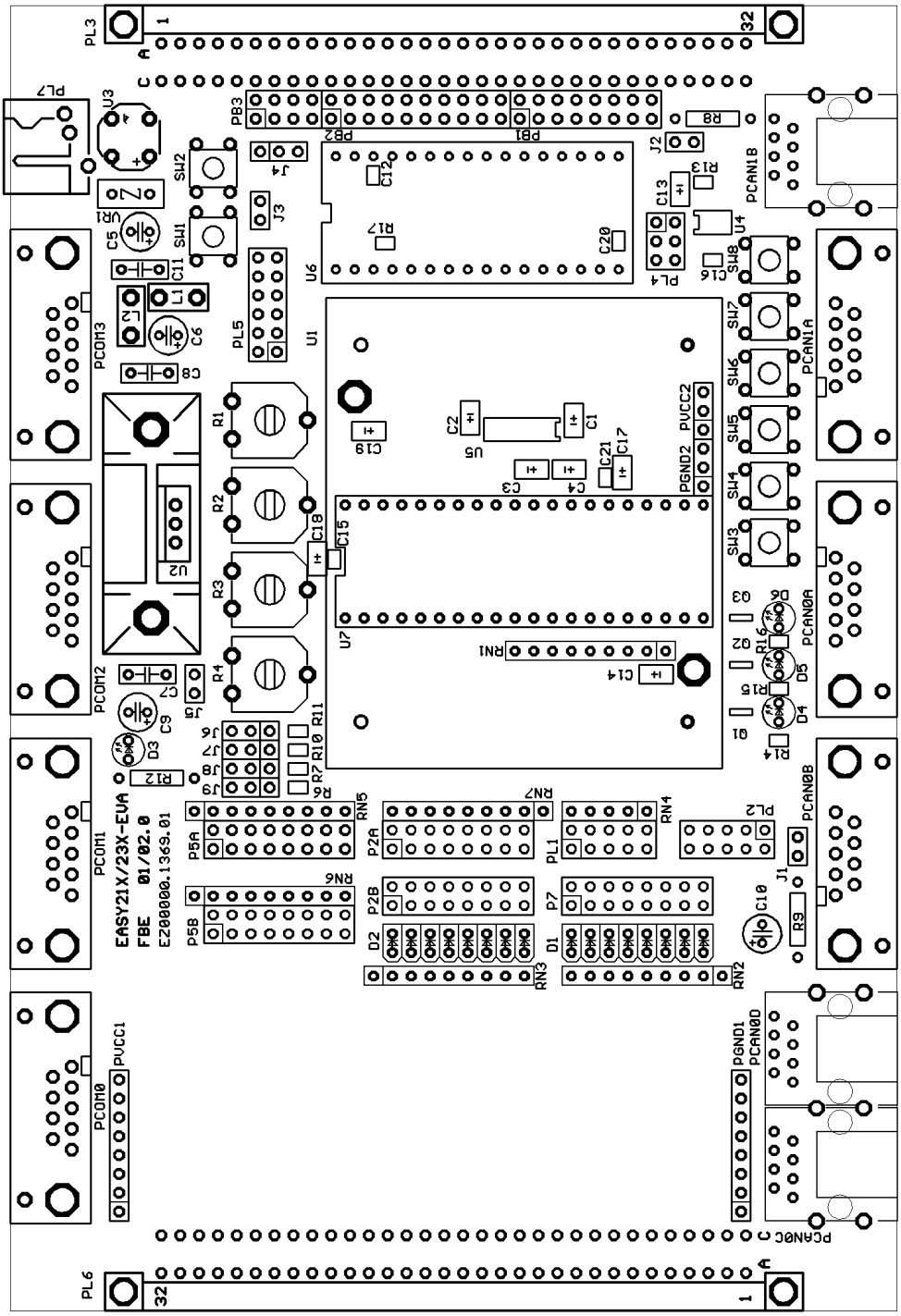
Schematic 2/3



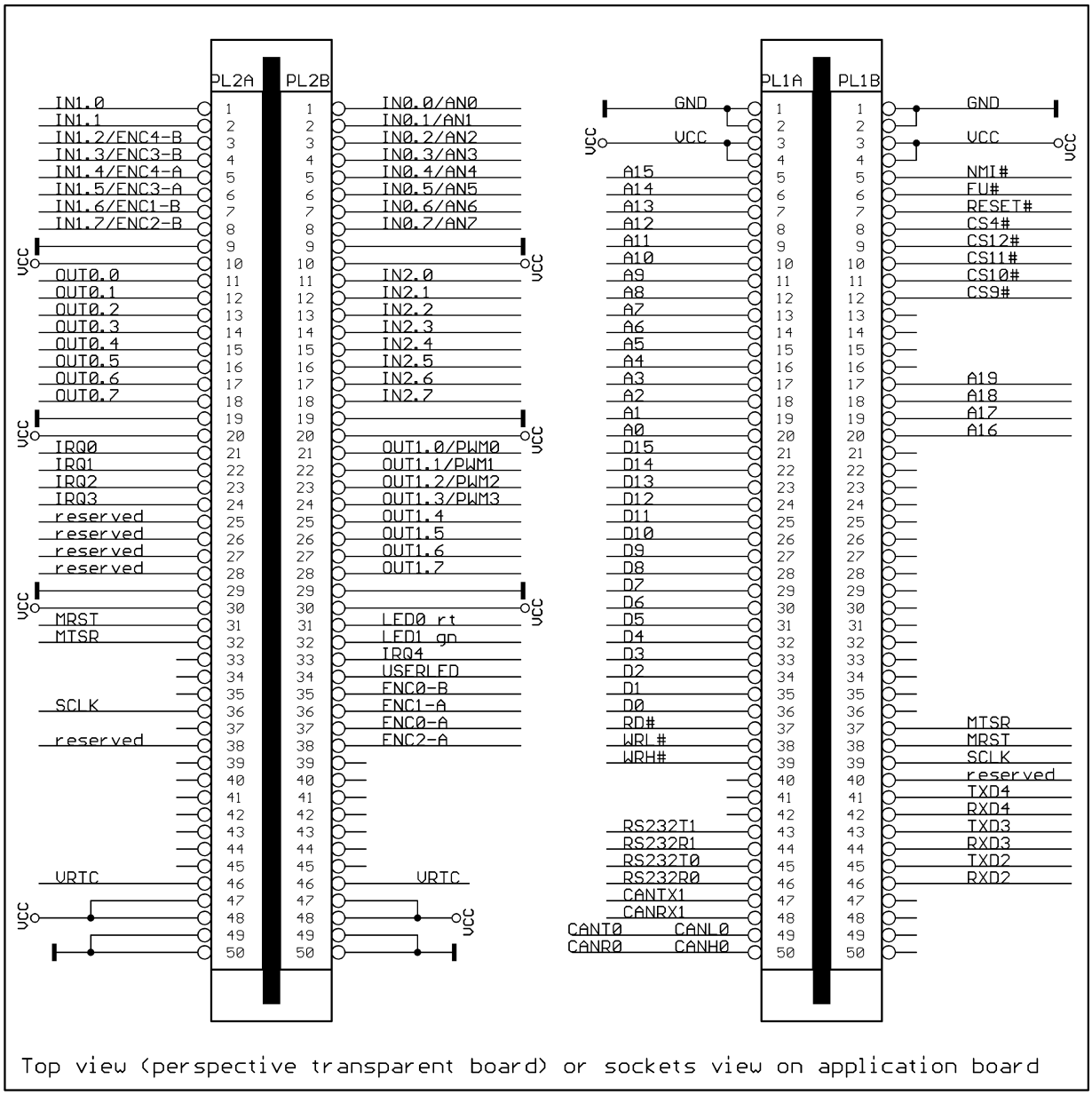
Schematic 3/3



Place Plan


EASY21X/23X-EVA
FBE 01/02.0
E200000.1369.01
PL3
PL6
PL7
PCOM0
PCOM1
PCOM2
PCOM3
PCAN0A
PCAN0B
PCAN0C
PCAN0D
PCAN1A
PCAN1B
PVCC1
PVCC2
PGND1
PGND2
U1
U2
U3
U4
U5
U6
U7
SW1
SW2
SW3
SW4
SW5
SW6
SW7
SW8

Addendum (Pin Assignment of EASY235)



The Pinning shows the pin configuration from EASY235 controller module from TOP view. Use this pinning on your application board. For More Information about the pinning and pin functions see EASY235 data sheet.