General Description

The EASY242 is an all-round very high performance PLC kernel. **It covers the powerful CoDeSys PLC runtime system, a CANopen master and the Serial Grafic Interface (SGI) as an interface to visualization panels in one device**. This gives an optimized platform for realizing OEM control systems and operator panel controls. Its small form factor allows the module to be easily inserted into target hardware.

Top View

PLC

The implemented PLC runtime system is programmable with the (3S) CoDeSys Software. It is one of the most powerful IEC 61131-3 programming tools for controllers' applications for Windows. All five languages of this standard are supported, plus a graphic editor for freehand FBD (function block diagram). CoDeSys produces native machine code for the EASY242 based CPU.

CANopen

The EASY242 supports two CANopen interfaces, that work independent from each other. Bothe interfaces supports either CANopen master or slave functionality. The on board CAN transceiver for the first channel allows direct connection to a CAN bus line according to ISO11898. For opto isolated CAN applications, the CAN transceiver may be bypassed.

Visualization

One of the serial channels can be configured as Serial Graphic Interface (SGI) in order to connect a visualization panel of the VISU-Pxxx series. With this panels a peripheral operator interface, that is also programmed with the CoDeSys development environment, can be added to the system. So the EASY242 is the perfect solution to realize OEM control systems with operator interface.

Communication

Four asynchronous serial interfaces (RS232 / TTL) provide communications with several external components, PCs, scanners, machines etc.

The communication from the EASY242 to the CoDeSys programming tools, running on a PC, will be done with the RS232 interface. This allows online debugging, and in circuit programming.

Interrupt

There, are four dedicated external interrupt input pins, and 8 digital inputs with additional interrupt capabilities for providing direct interrupt usage from within IEC61131 applications.

I/O and special features

16 digital inputs, 8 analog or digital inputs and 16 digital outputs with several special functions are realized on this module.

There are several additional features provided with the I/O pins:

Three pairs of input pins may be used for direct connection of encoders with tracks A and B. One additional channel provides hardware counting features with direction control. The encoder channels may also be configured as event counter input pins.

A data bus extension unit gives great flexibility to expand the system with any types of peripherals just like Memory, LCDs etc. Access from within IEC61131 applications is done with a special library.

You need more ??

Costumer specific features, libraries or firmware extensions are available on request.

Features

The following Chapters describe the main features of the EASY242 PLC core module. Additional features and libraries are available on request.

PLC features

- **High speed 16 bit CPU kernel**
  2000 IEC commands per millisecond
- **IEC 61131-3 programmable**
  with CoDeSys development environment
- **Powerful preemptive multi tasking operating system. 8 CoDeSys application tasks.**
- **Memory**
  2 MByte PLC application code memory
  512 kByte PLC application data memory
  16 kByte of EEPROM memory in order to enable storing of non volatile data.
- **Real Time Clock**
- **16 digital input lines (TTL)**
- **8 digital input lines (TTL) with additional analog conversion (10 bit Resolution)**
- **16 digital output lines (TTL)**

CANopen features

The EASY242 supports two completely independent CANopen interfaces that can be configured to work as a CANopen master or slave.

- **CANopen master according to**
  DS301 Version 4
  DSP302 Version 3.0
  DSP405 Version 2.0
- **Up to 32 CANopen slaves supported**
- **Slave configuration with EDS files directly with CoDeSys PLC programming tool.**
- **CANopen slave according to**
  DS401 Version 2.1
- **Up to 250 Transmit PDOs (master mode)**
  Up to 16 Transmit PDOs (slave mode)
- **Up to 250 Receive PDOs (master mode)**
  Up to 16 Receive PDOs (slave mode)
- **Dynamic PDO mapping**
- **Variable PDO Identifier**
- **Node guarding, Life guarding, Heartbeat**
- **Sync**
- **Emergency reporting for PLC application**
- **Client SDO transfer for PLC application**
- **Baud rate up to 1 MBaud**
- **CAN bus ISO11898 transceiver 82C251**

VISU features

- **Powerful CoDeSys target visualization with peripheral VISU-Pxxx series of operator panels.**
- **In system Serial Grafic Interface (SGI) Driver**
- **External Graphic Controller reduces system load caused by visualization to a minimum.**
- **Support of multiple predefined graphic objects like lines, rectangles, buttons, bitmaps etc.**
- **Several fonts and text sizes.**
- **Support of Unicode16 characters.**
- **Support for different languages using the CoDeSys .xml file based language switching.**
- **Connection to operator panel with any serial interface possible.**
- **Baud rate up to 115200 Baud**

Bus Interface

- **Bus Extension unit for additional intelligent peripherals.**
- **4 Chip Select lines for 8 bit peripherals with an address space of 64 kByte each**
- **Built in library for bus access.**

Interrupt features

- **Interrupt processing for IEC61131 tasks**
- **4 separated interrupt input lines**
- **8 of the digital input lines with additional interrupt features.**
- **Programmable edge sensitivity for all interrupt channels:**
  rising, falling or both edges
- **Programmable priority level for each channel with 30 interrupt levels**

Encoder Interface

- **Integrated incremental encoder interface with 4 channels.**
- **Direct connection of 2 track encoder types**
- **Event counter mode optional**
- **32 Bit count values**
- **Built in library for complete encoder control**

Serial Interfaces

- 1 serial programming interface RS232 for connection to the CoDeSys development environment.
  57600 baud, no parity, 8 data bits ,
  1 stop bit
- 1 additional serial RS232 interface
- 3 additional serial TTL interfaces programmable baud rates up to 115200.
- Each of the additional interface ports can be used as an SGI interface port to a visualization panel.

Additional features

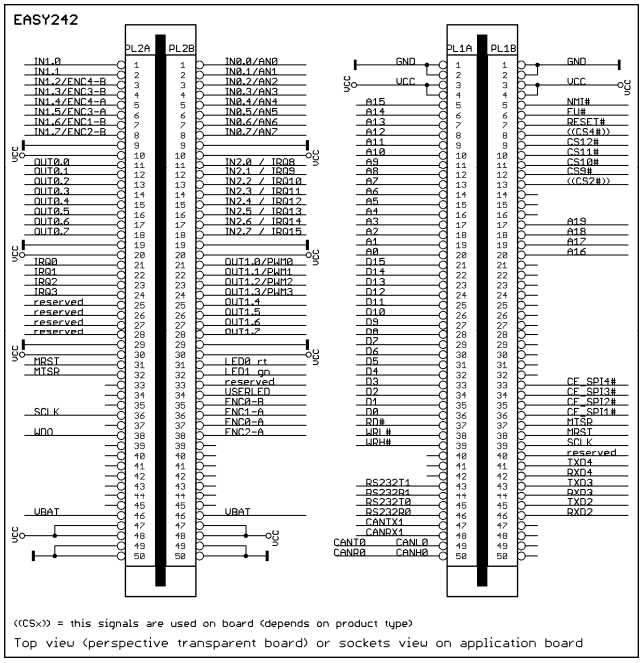
- Temperature range 0°-70° (other on request)
- Package FBESmartModule (64mm x 54mm)

Customer features

Additional library features or OEM versions with own CoDeSys target file are available on request. Do not hesitate to contact us.

Pin Assignment

This view shows the pinning and the headers position as they are used on an application board.



See attachment for enlarged figure

Pin Listing

Header PL1A		
Pin No.	***Pin Name***	***Funktion***
1, 2	GND	Ground
3, 4	VCC	5V Power Supply
5 to 20	A15 to A0	Address lines A15-A0 for external extensions
21 to 36	D15 to D0	Data lines for external extensions
37	RD#	Read Signal for external extensions
38	WRL#	Write Low Signal for external extensions
39	WRH#	Write High Signal for external extensions
40 to 42	Nc	Not connected
43	RS232T1	Asynchronous Interface 1 Transmitter (RS232)
44	RS232R1	Asynchronous Interface 1 Receiver (RS232)
45	RS232T0	Asynchronous Interface 0 Transmitter (RS232)
46	RS232R0	Asynchronous Interface 0 Receiver (RS232)
47	CANTX1	CAN Interface Transmitter Not supported
48	CANRX1	CAN Interface Receiver Not supported
49	CANL0 / CANTX0	*J8 (1-2):* CAN-LOW signal for ISO11898 CAN-Bus *On board CAN transceiver enabled* *J8 (2-3):* Signal CAN Tx (transmit) *On board CAN transceiver not used*
50	CANH0 / CANRX0	*J7 (1-2):* CAN-HIGH signal for ISO11898 CAN-Bus *On board CAN transceiver enabled* *J7 (2-3):* Signal CAN Rx (receive) *On board CAN transceiver not used*

Header PL1A		
Pin No.	**Pin Name**	**Funktion**
45	RS232T0	Asynchronous Interface 0 Transmitter (RS232)
46	RS232R0	Asynchronous Interface 0 Receiver (RS232)
47	CANTX1	CAN Interface Transmitter Not supported
48	CANRX1	CAN Interface Receiver Not supported
49	CANL0 / CANTX0	*J8 (1-2):* CAN-LOW signal for ISO11898 CAN-Bus *On board CAN transceiver enabled* *J8 (2-3):* Signal CAN Tx (transmit) *On board CAN transceiver not used*
50	CANH0 / CANRX0	*J7 (1-2):* CAN-HIGH signal for ISO11898 CAN-Bus *On board CAN transceiver enabled* *J7 (2-3):* Signal CAN Rx (receive) *On board CAN transceiver not used*

Header PL1B		
Pin No.	**Pin Name**	**Funktion**
1, 2	GND	Ground
3, 4	VCC	5V Power Supply
5	NMI#	Non-Maskable Interrupt
6	BOOT#	Boots Trap Loader Input (active low)
7	RESET#	Reset in- or output
8	CS4#	Reserved
9 to 12	CS12# to CS9#	External Chip Select 12 to external Chip Select 9
13 to 16	nc	Not connected
17 to 20	A19 to A16	Address lines A19-A16
21 to 32	nc	Not connected
33 to 36	CE_SPI4# to CE_SPI1#	Chip select lines for external SPI bus extensions. Reserved for future use and OEM versions
37	MTSR	- Synchronous serial interface Master transmit Slave receive
38	MRST	- Synchronous serial interface Master receive Slave transmit
39	SCLK	- Synchronous serial interface Shift clock in- or output
40	reserved	Reserved for future use
41	TXD4	Asynchronous Interface 4 transmitter (TTL level)
42	RXD4	Asynchronous Interface 4 receiver (TTL level)
43	TXD3	Asynchronous Interface 3 transmitter (TTL level)
44	RXD3	Asynchronous Interface 3 receiver (TTL level)
45	TXD2	Asynchronous Interface 2 transmitter (TTL level)
46	RXD2	Asynchronous Interface 2 receiver (TTL level)
47 to 50	nc	Not connected

Header PL2A		
Pin No.	**Pin Name**	**Funktion**
1	IN1.0	Digital input Byte 1 Bit 0
2	IN1.1	Digital input Byte 1 Bit 1
3	IN1.2	- Digital input Byte 1 Bit 2
4	IN1.3 / ENC3-B	- Digital input Byte 1 Bit 3 or - input of encoder 3 track B
5	IN1.4	- Digital input Byte 1 Bit 4
6	IN1.5 / ENC3-A	- Digital input Byte 1 Bit 5 or - input of encoder 3 track A
7	IN1.6 / ENC1-B	- Digital input Byte 1 Bit 6 or - input of encoder 1 track B
8	IN1.7 / ENC2-B	- Digital input Byte 1 Bit 7 - input of encoder 2 track B
9	GND	Ground
10	VCC	5V Power Supply
11 to18	OUT0.0 to OUT0.7	Digital output Byte 0 bit 0..7
19	GND	Ground
20	VCC	5V Power Supply
21 to 24	IRQ0 to IRQ3	External interrupt request input 0 .. 3
25 to 28	reserved	Reserved for future use
29	GND	Ground
30	VCC	5V Power Supply
31	MRST	Synchronous serial inter-face Master receive Slave transmit
32	MTSR	Synchronous serial inter-face Master transmit Slave receive
33 to 35	nc	Not connected
36	SCLK	Synchronous serial interface Shift clock in- or output
37	nc	Not connected
38	WDO	Watchdog output
39 to 45	nc	Not connected
46	VRTC	Battery power supply input of Real Time Clock
47,48	VCC	5V Power Supply
49, 50	GND	Ground

Header PL2B		
Pin No.	**Pin Name**	**Funktion**
1 to 8	IN0.0 to IN0.7 / AN0 to AN7	- Digital input byte 0 bit 0..7 - Analog input 0..7
9	GND	Ground
10	VCC	5V Power Supply
11 to18	IN2.0 to IN2.7 / IRQ8 to IRQ15	- Digital input byte 2 bit 0..7 - Interrupt 8..15
19	GND	Ground
20	VCC	5V Power Supply
21 to 24	OUT1.0 to OUT1.3 / PWM0 to PWM3	- Digital output Byte 1 bit 0..3 - PWM output 0 .. 3
25 to 28	OUT1.4 to OUT1.7	- Digital output Byte 1 bit 4..7
29	GND	Ground
30	VCC	5V Power Supply
31,32	LED0, LED1	- Status indication LED output
33	reserved	Reserved for future use
34	USERLED, SPI-CS0	LED output with user defined indication or CS0 for SPI-Device
35	ENC0-B	input of encoder 0 track B
36	ENC1-A	input of encoder 1 track A
37	ENC0-A	input of encoder 0 track A
38	ENC2-A	input of encoder 2 track A
39 to 45	nc	Not connected
46	VRTC	Battery power supply input of Real Time Clock
47,48	VCC	5V Power Supply
49, 50	GND	Ground

Pin Description

All Pins of the device in exception Power-, RS232- and CAN-Pins, work with 5V logic levels. The ranges of the analog inputs are also 0V to +5V. All ground signals are connected to module ground.
All input / output pins are high impedance during reset. The EASY242 does not support internal pull up/down resistors. Use external components where needed. All digital input pins have Schmitt trigger characteristics. See chapter “Typical Applications” for additional information.

Also many of the in- or outputs have an alternative special function that depends on setting of the selected hardware configuration. So see also chapter “Hardware Configuration” for details.

RESET#: Reset input/output pin

The on board reset chip does the power up reset. It pulls the RESET# line low. So it is possible to reset external components during power up using this signal.
The reset pin may also be used as reset input. For a correct device reset by external components, provide a low level longer than 50 ms to the input RESET#.

***Note:* Do never drive a high level to the RESET#. This may cause permanent damage to the device. Use a push button or an open drain driver for this condition.**

IN0.0 to IN2.7: Input pins

In default operation mode this pins are digital inputs with a range from 0V to VCC (TTL-level). They all use internal Schmitt trigger circuits. The function of several input lines (IN0.0 to IN0.7 and IN1.2 to In1.6) depend on setting of the selected hardware-configuration. See also “analog inputs” and “incremental encoder channels”.

AN0 to AN7: Analog Inputs

This inputs are alternative functions of the digital inputs IN0.0 to IN0.7. The resolution of each analog input is 10Bit by the maximum input voltage range from 0V to +5V. For using these analog inputs they must be activated by selection of the corresponding hardware-configuration. See also chapter “Hardware Configuration” for details.

ENC0 to ENC3: Incremental encoder channels

The encoder inputs are alternative functions of the digital inputs. An incremental encoder must be connected to both track inputs (A and B) of the selected channel for correct up/down counter function. To enable these input lines for encoder channels, they must be activated by selection of the corresponding hardware-configuration.

OUT0.0 to OUT1.7: Digital output pins

In default operation mode this pins are used as digital output lines with TTL-levels. All output pins are high impedance during reset. The function of any alternative Output (OUT1.0 to OUT1.3) depends on setting of the selected hardware-configuration.

WDO: Watchdog Output

This pin toggles if the CPU is running and might be used to trigger an external watchdog timer in order to support output shut off in case of critical errors.

PWM0 to PWM1: Pulse wide modulation

Reserved for future use. The PWM outputs are alternative functions of the digital outputs OUT1.0 to OUT1.3 with the same voltage and current range.

IRQ0 to IRQ3, IRQ8 to IRQ15: External interrupt request inputs

The interrupt request input allows the user to run real-time functions with a high priority. An interrupt starts with changing the input level. All Interrupts are edge triggered. The edge, rising or falling, that starts an interrupt, can be set by software configuration.

NMI#: Non mask able interrupt inputs

There is no function realized in the runtime system this time. Leave this Pin open. An on board pull up resistor is implemented. (Reserved for future use)

D0 to D15 / A0 to A19: data / address lines

Data bus lines and Address lines of the PLC core controller.

RD#, WRL#, WRH#: Read write control lines

Data bus control signals of the PLC core controller

CSx: Chip select lines

Chip Select lines for data bus extensions of the PLC core controller.

External bus unit

Ax, Dx, CSx, RD#, WRH# and WRL# are pins of the external bus unit for external extensions like RAM's and display drivers in example. The runtime system provides functions for external bus access.

FU#: Firmware Update

A low level during the reset at this pin activates the boots trap mode of the device. In boots trap mode, the asynchronous serial interface 0 (RS232T0 and RS232R0) are used for the in circuit firmware update. For normal operation, the FU# pin must be not connected or pulled to a high level (VCC). Make sure, that FU# is at high level during reset for normal operation.

The update may be done with a COM-Port from a PC/Notebook and an update tool (FLASHJET) from the manufacturer of EASY242. For the correct connection to the PC/Notebook and the firmware update, see also the pin description of "Programming Interface" in this Chapter.

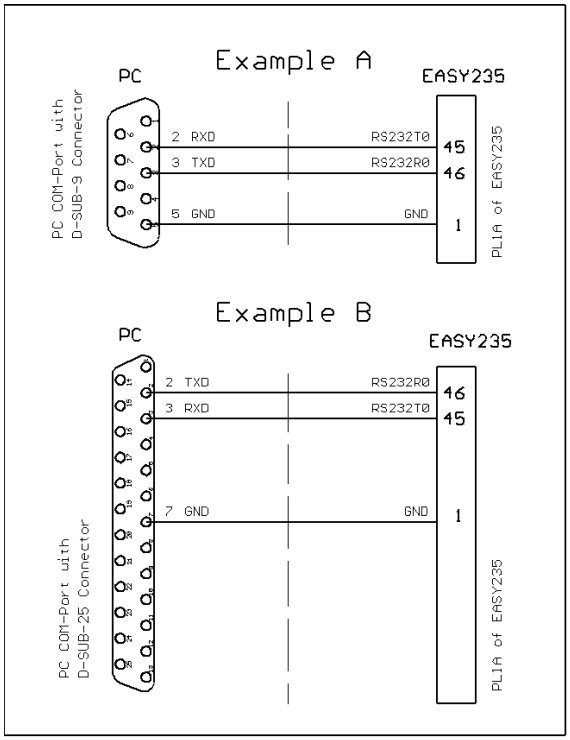
RS232T0, RS232R0: Programming Interface

RS232T0 and RS232R0 is the transmitter and receiver pins of the asynchronous serial interface that is fixed used for the software development, visualization or firmware update. The pin RS232T0 and RS232R0 are driven by an on board RS232-transceive and uses RS232-level referenced to common ground (GND). So if you need a connection to a PC COM-Port, you need only a null modem connection like it is shown by the followed figure

Software Developing Mode (normal operation): The Interface provides serial communication between the EASY242 and the CoDeSys development tool, running on a PC/Notebook.
Setup the connection between CoDeSys and the EASY242 to 57600 baud, 8 data bits, no parity, 1 stop bit.

Firmware Update: This interface also is used for the firmware update with the same null modem connection.

Null-Modem connection:



Use the Software FlashJet2 for downloading the new firmware to the EASY242's Flash memory.

The FlashJet2 software uses the EASY242's integrated boots trap loader. For activation of the boot mode, the Pin 6 of PL1B (FU#) must be pulled down to GND during reset.

Steps for download:

1) Connect your application board to a serial interface of your PC.
2) Provide power supply to your application board
3) Start FlashJet2 software on your PC
4) Select file to download
5) Pull down signal BOOT# to GND level
6) Reset EASY242
7) Start download on FlashJet software
8) After download remove GND level from signal BOOT#
9) After the next reset the EASY242 will start the downloaded firmware version.

Download the FlashJet2 software from our web site www.frenzel-berg.de for free.

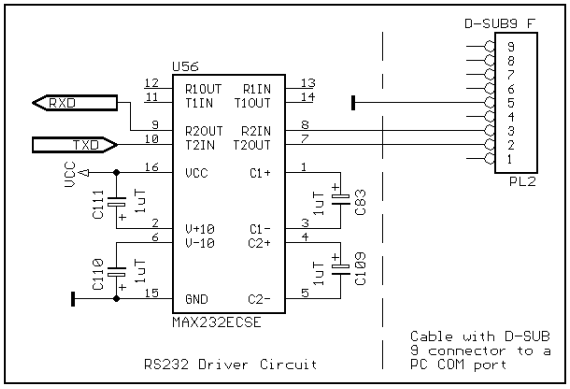
RS232T1, RS232R1: Serial interface 1

The serial interface 1 has the same functions as the serial interfaces 2 to 4. There is only one different point. There is an on board RS232-Tranceiver for Interface 1. The same as prescribed with the programming interface. Interface 2 to 4 uses TTL-level.

TXDx, RXDx: Serial interface 2 to 4

The asynchronous serial interface 1 to 4 provides serial communication between the EASY242 and other devices. The interface 1 to 4 supports full-duplex asynchronous communication up to 115,2 Kbaud.

With exception of interface 1, all signals of these pins have TTL-levels. So if you need a connection to a PC or another RS232 device, you need an external RS232 driver circuit as shown in the following figure.



Note: The runtime system is using the interrupt mode of these interfaces. So the interrupt output jumpers J3 to J6 have to be closed (factory setting). Do not open this jumper.

MRST, MTSR, SCLK: High-Speed Synchronous Serial Interface

The High-Speed Synchronous Serial Interface SSC provides flexible high-speed communication between the EASY242 and other devices like microcon-trollers, I/O-Chips, ADC/DAC's and more. The SSC supports full-duplex and half-duplex communication up to 5 MBaud. The serial clock signal can be generated by the SSC itself (master mode) or be received from an external master (slave mode). This allows communication with SPI compatible devices.

Note: This is a general description of the possibilities using the interface. The functions, which were realised in the device, must be given by the manufacturers firmware. User specific functions can be realized on request. See chapter "Hardware Configuration" for the implemented standard function.

CANH, CANL CAN Interface

The CAN Bus with its associated protocol allows communication between a number of stations which are connected to this bus with high efficiency. (Transfer speed up to 1 MBaud)

s the CANopen protocol standard with full master functionality.
The on board CAN transceiver can be used or not, depending on the setting of Jumper J7 and J8.

EASY242 without using the CAN transceiver:

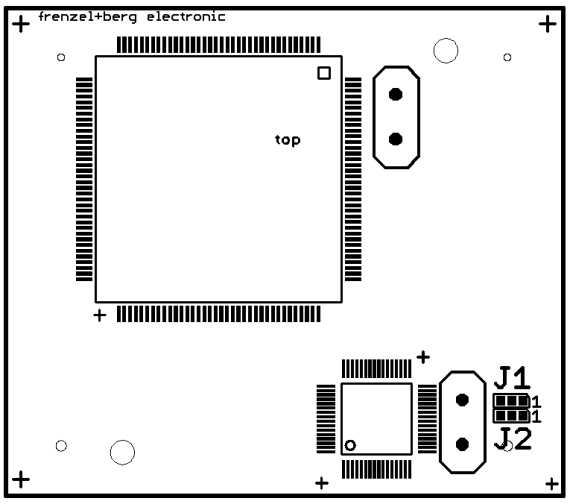
EASY242 without using the CAN transceiver:
In case without using the on board CAN transceiver, a user specific (opto isolated) CAN driver circuit may be realised on the application board. Therefore the Jumpers J7 and J8 have to be set to position 2-3. In this condition the CANH pin is connected to signal CANRX and CANL to CANTX (TTL level).

EASY242 with using the CAN transceiver:
By using the on board CAN transceiver it is possible to connect the board directly to a two wire CAN bus associated to ISO11898.

Note: It is not allowed to set the Jumper J7 or J8 in position 1-2-3 same times. This might cause permanent damage to the device.

Jumper-Setting

Jumper	Setting	Prescription
J1	1-2	CAN-Transceiver line CANL0 of CAN0 is connected to PL1A Pin 49
	3-2	CANTxD TTL line of CAN0 is connected to PL1A Pin 49
J2	1-2	CAN-Transceiver line CANH0 of CAN0 is connected to PL1A Pin 50
	3-2	CANRxD TTL line of CAN0 is connected to PL1A Pin 50



top view

Memory

The following table shows the memory that is available for the PLC application program and data

PLC	Memory IEC program	Memory IEC data
EASY242	2 MByte	512 kByte

Handling the Device

Preventing latch up

The EASY242 is a CMOS device and may suffer latch up under the following conditions:

1) A voltage higher than VCC or lower than GND is applied to any pin.
2) Absolute maximum ratings are exceeded

Handling of unused Pins

Do not leave unused input pins open. This might cause malfunction of the device.

Power Supply Pins

Make sure that all ground and power supply pins are connected to the same potential. Connect at least two ceramic capacitors of 100 nF and a tantalum capacitor of 1 µF between VCC and GND as close as possible to the device.

Output pins

All input pins are high impedance. All output pins for digital signals have a push/pull driver while PLC is running. But they are also high impedance during reset.

Pull up/down resistors

The EASY242 does not support internal pull up/down resistors. Use external components where needed.

Development Environment

For software development and software test the CoDeSys programming tool must be connected to the destination hardware via COM-port. Debugging, Tracing and more then can be done online. For such an environment, the following conditions must be met.

For the serial connection the serial interface setup of CoDeSys must use:
57600 baud, no parity, 8 data bits , 1 stop bit

Note: If CoDeSys is already installed on your PC/Notebook start installation with Point 2).

System requirements:
MS Windows 95, Windows NT 4.0 or later
32 MB RAM, Hard disc required: 25MB
CD-ROM drive

1) Installation of CoDeSys development tool on your PC/Notebook.

   - Insert CoDeSys compact disk into the CD-ROM drive.
   - If setup boots not automatically, open CD-drive in the windows explorer. In explorer double-click SETUP.EXE.
   - Follow the instructions that appear on your screen.

2) Install EASY242 targets and libraries from CD to your PC / Notebook.

   - Insert compact disk with targets and libraries into CD-ROM drive.
   - With CoDeSys installation the "Install Targets" program was installed.
   - Start "Install Targets" program.
   - Then press button OPEN (öffnen) and open the target information file *.tnf from the directory *Targets* on CD.
   - Target must now shown in the left window. Do not change the path of targets destination. So the entry looks like the following example:
     "*C:\CoDeSys\Targets\FBE*"
   - At last select the target in the left window and press button INSTALL (installieren).
   - The right window shows the installed targets.

Using EASY242 stand-alone:

3) For using EASY242 stand-alone with CoDeSys development tool, you must connect the asynchronous interface 0 of EASY242 to a COM-port of the PC. Therefore you have to use a null modem connection as shown in chapter "Programming Interface" of this manual. In addition with a 5V power supply, connected to the Pins VCC and GND, the development environment is ready to start.

Using EASY242 with M167-EVA-Board:

3) For using EASY242 on the M167-EVA Evaluation board with the CoDeSys development tool, you must connect the header PCOM0 of the evaluation board to a COM-port of the PC with a Null-Modem cable.

Null-Modem cable:

M167-EVA (PCOM0)		PC COM-port (D-SUB 9)	PC COM-port (D-SUB 25)
Pin 2	-	Pin 3	Pin 2
Pin 3	-	Pin 2	Pin 3
Pin 5	-	Pin 5	Pin 7

After the asynchronous interface is connected, the power supply of the evaluation board may be plugged in. The development environment is ready to start.
For details of the evaluation board, refer to 'Users Manual M167-EVA'.

Using EASY242 with your own application:

3) If you need the in-circuit programming in your application, it must be able to connect the serial interface 0 to a PC/Notebook. In example, place a plug for the interface on your application. In addition place a switch or a jumper, if in-circuit firmware update must be done in future time. (See the pin description "FU#" for details).

Absolute Maximum Ratings

Stresses greater than those listed parameters may cause permanent damage to the device. Functional operation should be restricted to recommended operation conditions. Exposure to absolute maximum rating conditions for extended times may affect reliability.

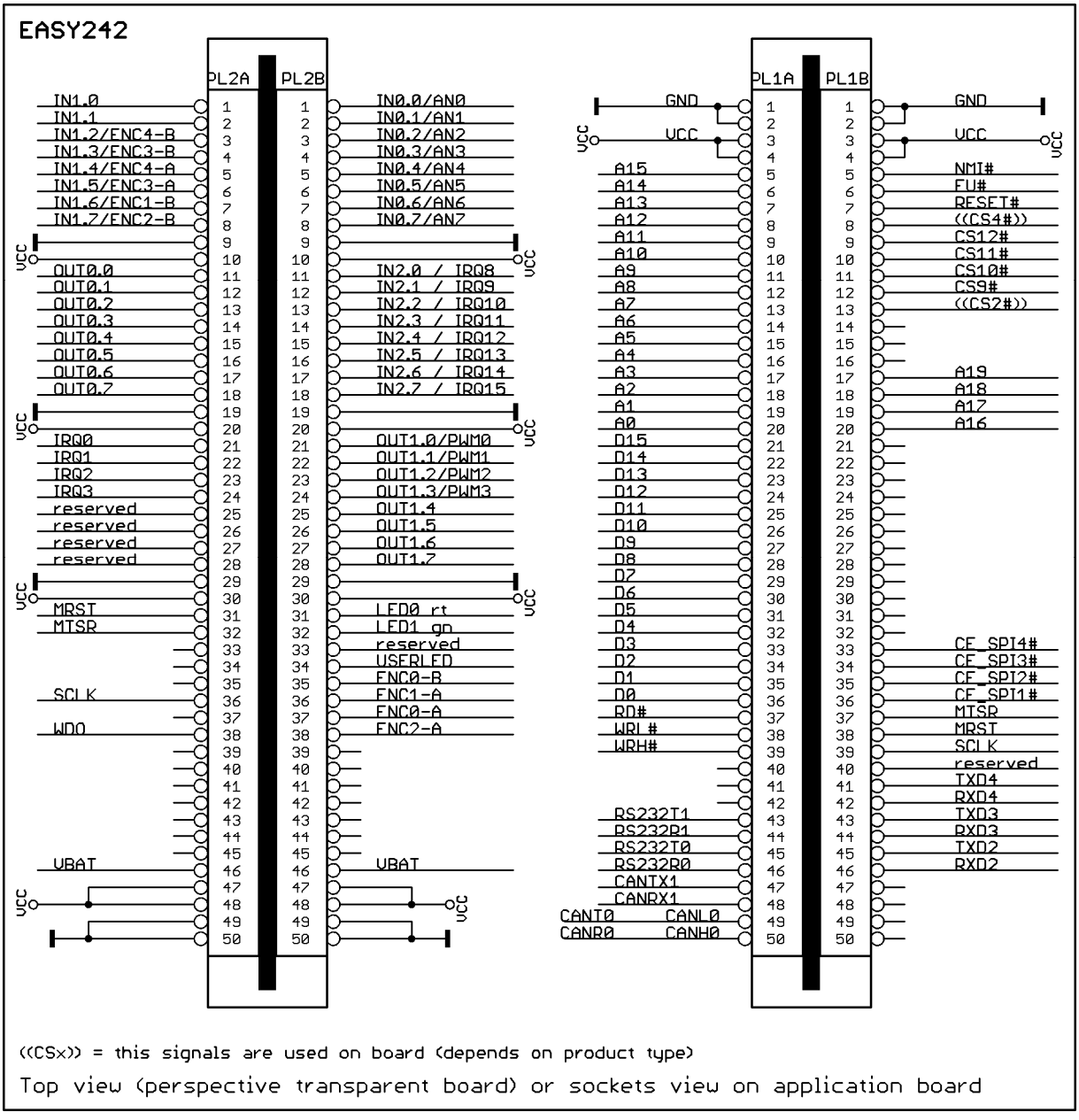
Parameter	Symbol	Rated Value		Units	Remarks
		Min.	Max.		
Power supply voltage	VCC	VSS – 0.3	VSS + 6.0	V	
Analog power supply voltage	AVCC	VSS – 0.3	VCC	V	
Analog reference voltage	AVREF	VSS – 0.3	VCC	V	
Input voltage	Vi	VSS – 0.3	VSS + 6.0	V	Vi < VCC + 0.3V
Output voltage	Vo	VSS – 0.3	VSS + 6.0	V	Vo < VCC + 0.3V
L level maximum output current	I_{OLMAX}			mA	Time < 20 msec
L level maximum output current	I_{OL}			mA	
H level maximum output current	I_{OHMAX}			mA	Time < 20 msec
H level maximum output current	I_{OH}			mA	
Maximum Power dissipation	P_{MAX}			mW	
Operating temperature	T_A	0	+70	°C	Standard temperature version
	T_A	-40	+85	°C	Extended temperature version
	T_A	-40	+105	°C	On request
Storing temperature	T_A	-55	+150	°C	

Recommended Operation Conditions and Characteristics

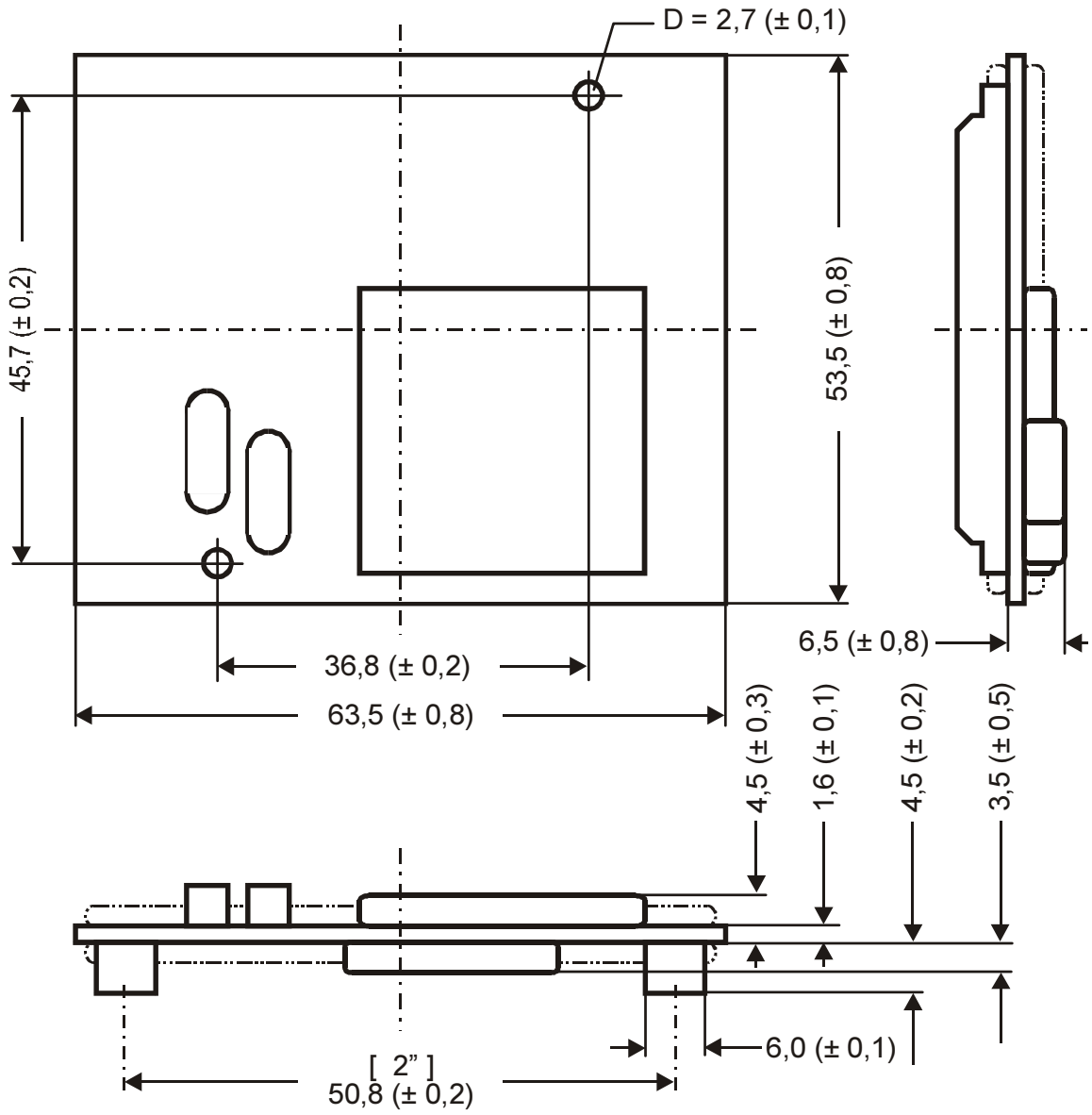
Functional operation should be restricted to recommended operation conditions.

Parameter	Symbol	Rated Value			Units	Remarks
		Min.	Typ.	Max.		
Power supply voltage	VCC	4.5	5.0	5.5	V	
Analog power supply voltage	AVCC	0		VCC	V	
Analog reference voltage	AVREF			VCC	V	
Battery Voltage	VRTC	2.7	3.0	3.7	V	
Power supply current	I_{CC}		180		mA	All inputs V_{IL} or V_{IH} All outputs open
Input H voltage	V_{IH}	0.8 * VCC		VCC + 0.3	V	
Input L voltage	V_{IL}	VSS – 0.3		0.2 * VCC	V	
Output H voltage	V_{OH}	VCC – 0.5			V	I_{OH} =
Output L voltage	V_{OL}			0.4	V	I_{OL} =
Input leakage current	I_{LKC}	-5		5	uA	
Crystal frequency	f_{osc}				MHz	
Reset pulse width	t_{res}	100			us	
Power on rise time	t_{RESLH}	0.05		60	ms	
Maximum Power dissipation	P_{MAX}				mW	
Operating temperature	T_A	0		+70	°C	Standard Module
	T_A	-40		+105	°C	On request

Pinning


EASY242
PL2A
PL2B
PL1A
PL1B
IN1.0
IN1.1
IN1.2/ENC4-B
IN1.3/ENC3-B
IN1.4/ENC4-A
IN1.5/ENC3-A
IN1.6/ENC1-B
IN1.7/ENC2-B
OUT0.0
OUT0.1
OUT0.2
OUT0.3
OUT0.4
OUT0.5
OUT0.6
OUT0.7
IRQ0
IRQ1
IRQ2
IRQ3
reserved
reserved
reserved
reserved
MRST
MTSR
SCLK
WDO
UBAT
IN0.0/AN0
IN0.1/AN1
IN0.2/AN2
IN0.3/AN3
IN0.4/AN4
IN0.5/AN5
IN0.6/AN6
IN0.7/AN7
IN2.0 / IRQ8
IN2.1 / IRQ9
IN2.2 / IRQ10
IN2.3 / IRQ11
IN2.4 / IRQ12
IN2.5 / IRQ13
IN2.6 / IRQ14
IN2.7 / IRQ15
OUT1.0/PWM0
OUT1.1/PWM1
OUT1.2/PWM2
OUT1.3/PWM3
OUT1.4
OUT1.5
OUT1.6
OUT1.7
LED0 rt
LED1 gn
reserved
USERLED
ENC0-B
ENC1-A
ENC0-A
ENC2-A
UBAT
VCC
GND
A15
A14
A13
A12
A11
A10
A9
A8
A7
A6
A5
A4
A3
A2
A1
A0
D15
D14
D13
D12
D11
D10
D9
D8
D7
D6
D5
D4
D3
D2
D1
D0
RD#
WRL#
WRH#
RS232T1
RS232R1
RS232T0
RS232R0
CANTX1
CANRX1
CANT0
CANL0
CANR0
CANH0
NMI#
FU#
RESET#
((CS4#))
CS12#
CS11#
CS10#
CS9#
((CS2#))
A19
A18
A17
A16
CF_SPI4#
CF_SPI3#
CF_SPI2#
CF_SPI1#
MTSR
MRST
SCLK
reserved
TXD4
RXD4
TXD3
RXD3
TXD2
RXD2
((CSx)) = this signals are used on board (depends on product type)
Top view (perspective transparent board) or sockets view on application board

Mechanical Dimensions



Package type: FBESmartModule

Ordering Information

Part Number	Part Name	Description	Temp. Range
PLC Core Module			
EZ00000.1387.01	EASY242-64-4	EASY242 PLC Core Module standard temperature range	0°C .. 70°C
Evaluation Board			
EZ00000.1370.01	EASY21x/23x-EVA/FCI	Evaluation board to use with EASY242 PLC core module FCI SMD connector type	0°C .. 70°C
SMD connector for application board			
EZ00000.0173.01	M167-CON9/FCI	SMD-Connector FCI PCB to PCB distance 9 mm 2 pieces needed	
EZ00000.0174.01	M167-CON5/FCI	SMD-Connector FCI PCB to PCB distance 5 mm 2 pieces needed	
Development Environment			
EZ00000.7060.01	CoDeSys-CD	Software development tool for IEC 61131 programming	

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