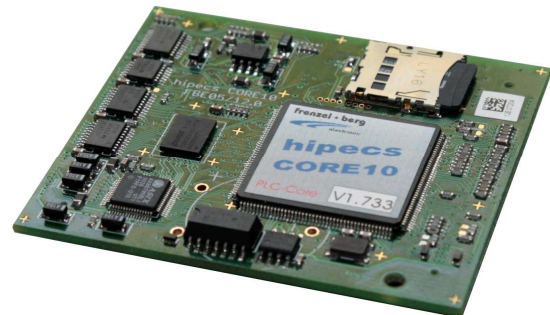


### General Description

The hipecsCORE 10 is an all round high performance PLC kernel. It offers the powerful CoDeSys PLC runtime system, a CANopen master, the Serial Graphic Interface (SGI) for frenzel + berg visualization panels and an Ethernet interface. This gives an optimized platform for realizing OEM control systems and operator panel controls. Its small form factor allows the module to be easily build into target hardware.



### PLC

The implemented PLC runtime system is programmable with the (3S) CoDeSys V2.3 Software. This 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 hipecsCORE based CPU. The integrated file system offers file handling with up to 3 SD-Cards.

### CANopen

The hipecsCORE supports four CANopen interfaces, that work independently from each other. All interfaces support either CANopen master or slave functionality.

### Visualization

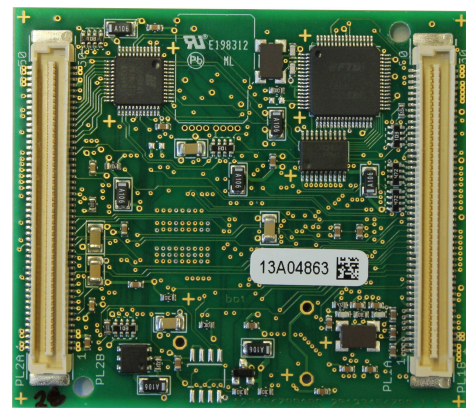
One of the serial channels can be configured as Serial Graphic Interface (SGI) in order to connect a visualization panel of the VISU-Pxxx series. With this panels a peripheral operator interface, that is also programmed with the CoDeSys development environment, can be added to the system. So the hipecsCORE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

### Communication

The hipecsCORE has an integrated web server, a FTP file server and free user programmable socket communication for the network interface. Functions for sending emails are implemented by several libraries.

3 asynchronous serial interfaces (RS232 / RS422 / TTL) provide communications with several external components like PCs, scanners, machines etc.

The hipecsCORE provides an USB interface for CoDeSys programming.



### I/O and special features

16 digital inputs and 16 digital outputs with several special functions are realized on this module. 2 additional analog inputs are implemented and with few external components, another two analog outputs can be integrated.

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. 8 channels may be used as interrupt inputs.

### You need more ?

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

## Features

The following chapters describe the main features of the hipecsCORE module. Additional features and libraries are available on request.

### PLC

- High speed 16 bit CPU kernel  
2000 IEC commands per millisecond
- IEC 61131-3 programmable  
CoDeSys V2.3 development environment
- Programming interface USB or Ethernet
- Powerful preemptive multi tasking operating system. 8 CoDeSys application tasks.
- Memory  
3 MByte PLC application code memory  
1 MByte PLC application data memory  
4 kByte of retain memory.
- Real Time Clock
- 16 digital input lines (3,3V)
- 16 digital output lines (3,3V)
- 2 analog inputs 0..3,3V 10 bit resolution
- 2 PWM controlled analog outputs (external components required)

### Network

- 1 Ethernet interface
- FTP file server
- web server
- simple mail transfer protocol SMTP
- DHCP client
- Telnet
- Socket communication with TCP and UDP protocol for CoDeSys application

### File System

- 1 SD-Card slot onboard
- optional soldered SD on board (on request)
- up to 2 external SD-card slots
- microSD max. 2GB, preformatted FAT16 or FAT32 file system
- Firmware and Application update using SD-Card

## CANopen

The hipecs CORE supports four completely independent CANopen interfaces that can be configured 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 within 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
- Basic CAN communication
- Baud rate up to 1 Mbaud

## VISU

- Powerful CoDeSys target visualization with peripheral VISU-PXXX series for operator panels.
- In system Serial Graphic 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 460000 Baud when using RS422

## Interrupt

- Interrupt processing for IEC61131 tasks
- 8 of the digital input lines can be configured as interrupt channels.
- Programmable edge sensitivity for all interrupt channels:  
rising, falling or both edges
- Programmable priority level for each channel with 30 interrupt levels

## Encoder

- Integrated incremental encoder interface with 3 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

- 3 serial interfaces (3,3 V) with programmable baud rates up to 115200
- 1 interface can be used as RS422 interface with programmable baud rate up to 460000
- Each of the interface ports can be used as a SGI interface port to a visualization panel.

## Additional features

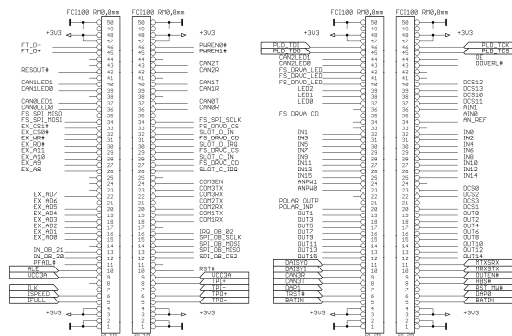
- Command Shell for PC
- PWM control library for digital outputs
- Position control library for stepper motors
- Firmware and Application update using SD-Card
- Temperature range 0°-70° (other on request)
- Package FBESmartModule (64mm x 54mm)

## 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	function
1, 2	GND	Ground
3, 4	+3V3	3,3V Power Supply
5,6, 7, 8	TPO-/TPO+/ TPI-/TPI+	Ethernet communication lines
9	VCC3A	3,3V Power output for Ethernet
10,11	nc	not connected
12	SPI_OB_CS2	reserved
13	SPI_OB_MISO	reserved
14	SPI_OB_MOSI	reserved
15	SPI_PB_SCLK	reserved
16	IRQ_OB_02	reserved
17	nc	not connected
18	COM1Rx	serial interface 1 Receiver
19	COM1Tx	serial interface 1 Transmitter
20	COM2Rx	serial interface 2 Receiver
21	COM2Tx	serial interface 2 Transmitter
22	COM3Rx	serial interface 3 Receiver
23	COM3Tx	serial interface 3 Transmitter
24	COM3EN	serial interface 3 Transmitter enable
25	nc	not connected
26	SLOT_C_IRQ	reserved
27	FS_DRVC_CD	Card detect for Drive C
28	SLOT_C_IN	reserved
29	FS_DRVC_CS	Card Select for Drive C
30	SLOT_D_IRQ	reserved
31	FS_DRVD_CD	Card detect for Drive D
32	SLOT_D_IN	Reserved
33	FS_DRVD_CS	Card Select for Drive D
34	FS_SPI_SCLK	File System SPI Shift Clock
35	nc	not connected
36	CAN0R	CAN interface 0 Receive
37	CAN0T	CAN interface 0 Transmit
38	Nc	not connected
39	CAN1R	CAN interface 1 Receive
40	CAN1T	CAN interface 1 Transmit
41	Nc	not connected
42	CAN2R	CAN interface 2 Receive
43	CAN2T	CAN interface 2 Transmit
44	nc	not connected

<b>Header PL1A continued</b>		
<b>pin no.</b>	<b>pin name</b>	<b>function</b>
45	PWREN1#	Reserved
46	PWREN0#	Reserved
47,48	+3V3	3,3V Power Supply
49,50	GND	Ground

<b>Header PL1B</b>		
<b>pin no.</b>	<b>pin name</b>	<b>function</b>
1, 2	GND	Ground
3, 4	+3V3	3,3V Power Supply
5	IFULL	Ethernet LED Full Duplex Mode
6	ISPEED	Ethernet LED Speed Status
7	ILK	Ethernet LED Link Status / Activity
8	nc	not connected
9	VCC3A	3,3V Power output for Ethernet
10	ALE	Address Latch Enable
11	PFAIL#	Power Fail
12	IN_OB_20	Reserved
13	IN_OB_21	Reserved
14	nc	not connected
15 .. 22,	EX_AD0 .. EX_AD7	External 8 bit data bus extension. Multiplexed address and data
23...25	nc	not connected
26 .. 29	EX_A8 .. EX_A11	External 8 bit data bus extension. Address output
30	EX_RD#	External Bus Read
31	EX_WR#	External Bus Write
32	EX_CS0#	External Bus Chip Select
33	EX_CS1#	External Bus Chip Select
34	FS_SPI_MOSI	File System SPI Master Out Slave In Line
35	FS_SPI_MISO	File System SPI Master In Slave Out Line
36	CAN0LED0	CAN interface 0 run LED
37	CAN0LED1	CAN interface 0 error LED
38	nc	not connected
39	CAN1LED0	CAN interface 1 run LED
40	CAN1LED1	CAN interface 1 error LED
41	nc	not connected
42	RESOUT#	Reset Output
43,44	nc	not connected
45	FT_D+	USB D+
46	FT_D-	USB D-
47,48	+3V3	3,3V Power Supply
49,50	GND	Ground

Header PL2A		
pin no.	pin name	function
1,2	GND	Ground
3,4	+3V3	3,3V Power Supply
5	BATIN	Battery input
6	DAP0	Reserved
7	RST_MW#	Reserved
8	HBS#	Reserved
9	OUTEN#	Output Enable for external output power driver
10	MRXSTX	Reserved
11	MTXSRX	Reserved
12	OUT14	Digital Output Byte 1.6
13	OUT12	Digital Output Byte 1.4
14	OUT10	Digital Output Byte 1.2
15	OUT8	Digital Output Byte 1.0
16	OUT6	Digital Output Byte 0.6
17	OUT4	Digital Output Byte 0.4
18	OUT2	Digital Output Byte 0.2
19	OUT0	Digital Output Byte 0.0
20 .. 23	DCS01, DCS03, DCS02, DCS00	Configuration Switch SW1
24	nc	not connected
25	IN14	Digital Input Byte 1.6
26	IN12	Digital Input Byte 1.4
27	IN10	Digital Input Byte 1.2
28	IN8	Digital Input Byte 1.0
29	IN6	Digital Input Byte 0.6
30	IN4	Digital Input Byte 0.4
31	IN2	Digital Input Byte 0.2
32	IN0	Digital Input Byte 0.0
33	nc	not connected
34	AN_REF	Input Analog Reference Voltage for AINx
35	AIN0	Analog Input Channel 0
36	AIN1	Analog Input Channel 1
37 .. 40	DCS11, DCS10, DCS13, DCS12	Configuration Switch SW2 Boot-Mode/Drive selection
41,42	nc	not connected
43	OOVERL#	Output Overload Monitoring Input
44	OE	Reserved
45	PLD_TCS	Reserved
46	PLD_TCK	Reserved
47,48	+3V3	3,3V Power Supply
49, 50	GND	Ground

Header PL2B		
pin no.	pin name	function
1,2	GND	Ground
3,4	+3V3	3,3V Power Supply
5	BATIN	Battery Input
6	TRST#	Firmware update mode
7	DAP1	Reserved
8	CAN3T	CAN interface 3 Transmit
9	CAN3R	CAN interface 3 Receive
10	DAISYi	Reserved
11	DAISYO	Reserved
12	OUT15	Digital Output Byte 1.7
13	OUT13	Digital Output Byte 1.5
14	OUT11	Digital Output Byte 1.3
15	OUT9	Digital Output Byte 1.1
16	OUT7	Digital Output Byte 0.7
17	OUT5	Digital Output Byte 0.5
18	OUT3	Digital Output Byte 0.3
19	OUT1	Digital Output Byte 0.1
20	POLAR_INP	Polarity Selector Input digital input channels
21	POLAR_OUTP	Polarity Selector Input digital output channels
22	nc	not connected
23	ANPW0	Analog Output 0 PWM
24	ANPW1	Analog Output 1 PWM
25	IN15	Digital Input Byte 1.7
26	IN13	Digital Input Byte 1.5
27	IN11	Digital Input Byte 1.3
28	IN9	Digital Input Byte 1.1
29	IN7	Digital Input Byte 0.7
30	IN5	Digital Input Byte 0.5
31	IN3	Digital Input Byte 0.3
32	IN1	Digital Input Byte 0.1
33,34	nc	not connected
35	P510	Reserved
36	nc	not connected
37	LED0	User LED 0
38	LED1	User LED 1
39	LED2	User LED 2
40	FS_DRVD_LED	LED File system drive D
41	FS_DRVC_LED	LED File system drive C
42	FS_DRVA_LED	LED File system drive A
43	CAN2LED0	CAN interface 2 run LED
44	CAN2LED1	CAN interface 2 error LED
45	PLD_TDO	Reserved
46	PLD_TDI	Reserved
47,48	+3V3	3,3V Power Supply
49, 50	GND	Ground

### Pin Description

All Pins of the device work with 3,3V logic levels. The ranges of the analog inputs are also 0V to +3,3V. All ground signals are connected to module ground. All input / output pins are high impedance during reset. The hipecsCORE 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.

#### IN0 to IN15: Digital Input pins

In default operation mode these pins are digital inputs with a range from 0V to 3,3V. They all use internal Schmitt trigger circuits. The function of several input lines depends on setting of the selected hardware-configuration. (e.g. encoders)

#### POLAR\_INP: Input Polarity

Pulling this pin to either low or high, sets the active polarity for the inputs to the corresponding level.

#### OUT0 to OUT15: Digital output pins

In default operation mode these pins are used as digital output lines with 3,3V levels. All output pins are high impedance during reset. The function of any alternative Output depends on setting of the selected hardware-configuration.

#### OUTEN#: Output Enable

The OUTEN# signal may be used to activate external output drivers.

#### POLAR\_OUTP: Output Polarity

By pulling this pin to low, the active output polarity is low. Pulling this pin to Vcc, turns the output polarity to active high.

#### ANPW0/1: Analog output PWM

The CoDeSys analog output block is represented as a PWM signal on the ANPWx pins with a signal frequency of 2,5 kHz. By using an external circuit, the signal can be converted into an analog voltage.

CoDeSys Value Range:

0: (100% duty cycle)

10000: (0% duty cycle)

#### AIN0/1: Analog Input 0/1

Analog input pins from 0 ..3,3 Volt. Resolution 10 bit.

#### ANREF: Analog Reference input

Input for the analog reference voltage. Attention! Maximum reference voltage is Vcc!

#### OOVERL#: Output Overload Input

Use this pin to connect a diagnostic pin of the output drivers in order to detect malfunction or overload.

#### RESOUT#: Reset 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. For resetting the device, use the PFI pin.

#### TRST#: Firmware update mode

For activating the firmware update mode, the TRST# pin must be pulled to Vcc via a 1k pull up resistor.

#### PFAIL#: Power Fail

By pulling the power fail pin to low, the power fail interrupt will be executed by the firmware. This routine stores all non-volatile data types into the FRAM. Triggering must be done by external circuit.

#### BATIN: Battery Input

In order to maintain the RTC functionality if the device is not connected to the supply voltage, the RTC may be connected to a 3,3V battery. The battery may be mounted on the hipecsCORE 10 module or the voltage is kept by supplying this pin.

#### COMx Rx/Tx:

Receive and transmit lines for serial RS232 interfaces. All signals are 3,3 Volt signals. To set up an external communication, interface drivers are required on the application board. COM3 can also be used as a RS422 interface.

#### ALE / EX\_AD0..7 / EX\_A8..11 / RD# / WR#:

The hipecs provides an external data bus extension. Address and data lines 0..7 are multiplexed by using the address latch enable (ALE) signal. An external Latch is necessary. Read (EX\_RD#), write (EX\_WR#) and chips select signals are generated by the hipecs firmware. Read/Write access is provided by a library.

#### FT\_D+/FT\_D-:

Data lines for USB interface. The data lines can be directly connected to a USB connector.

The hipecs provides 2 separated serial connections via USB. One (lower) is for CoDeSys programming, the other one (higher) provides a shell communication via hyper terminal.

## LEDs:

The hipecsCORE 10 module offers several pins for connecting specific LEDs. All of these pins are **active low**.

## FS\_XX: File system

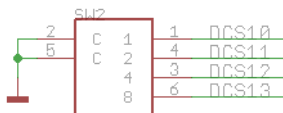
The hipecsCORE10 provides a file system, which can handle up to 3 SD cards. Depending on the device configuration, the cards can be on the module or on the application board. Please check jumper setting for exact information. The file system is realized with a SPI bus system and needs the following signal lines for all SPI devices: FS\_SPI\_MISO, FS\_SPI\_MOSI and FS\_SPI\_SCLK. The signals FS\_DRVX\_CD report detection of Drive X. ( A, C & D are available at this time) The signals FS\_DRVX\_CS are used for activating the corresponding drive X. ( A,C & D are available at this time)

## DCS00...DCS03: Configuration Switch 0

Reserved for future use. Leave these pins unconnected.

## DCS10...DCS13: Boot Drive Configuration Switch

By connecting rotary encoder switches to these pins, it is possible select the boot drive and the boot mode of the device.



The following configurations are supported at the moment.

Switch Pos	DCS				Boot-Mode
	10	11	12	13	
0	1	1	1	1	Normal boot from internal SD-Card Drive A
1	0	1	1	1	Normal boot from external SD-Card Drive C
E	1	0	0	0	Only start boot loader from internal SD-Card Drive A
F	0	0	0	0	Only start boot loader from external SD-Card Drive C

## Memory

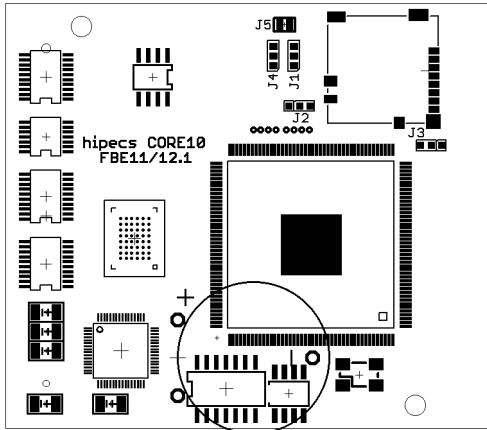
### Memory Size

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

	hipecsCORE10	
data memory	1 MByte	
code memory	3 Mbyte	
retain memory	4 kByte	
file system FAT16/FAT32	max. 3 SD-cards 4 GB each	



## Jumper Settings



Jumper	Setting	Function
J1	Card Select for SD-Card	
	1-2	onboard SD on top is drive C
	2-3	onboard SD on top is <b>drive A (default)</b>
J2	Reserved for future use. Do not change!	
	1-2	standard setting
	2-3	
J3	Reserved for future use. Do not change!	
	1-2	standard setting
	2-3	
J4	Card Detect Line for SD-Card	
	1-2	onboard SD on top is drive C
	2-3	onboard SD on top is <b>drive A (default)</b>
J5	Card Detect for soldered SD (special version!) Use only if card is soldered!	
	open	No Card Detect for soldered SD. This is <b>standard setting!</b>
	closed	Set Card Detect for soldered SD (bottom side). Card is drive A then!

## 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.

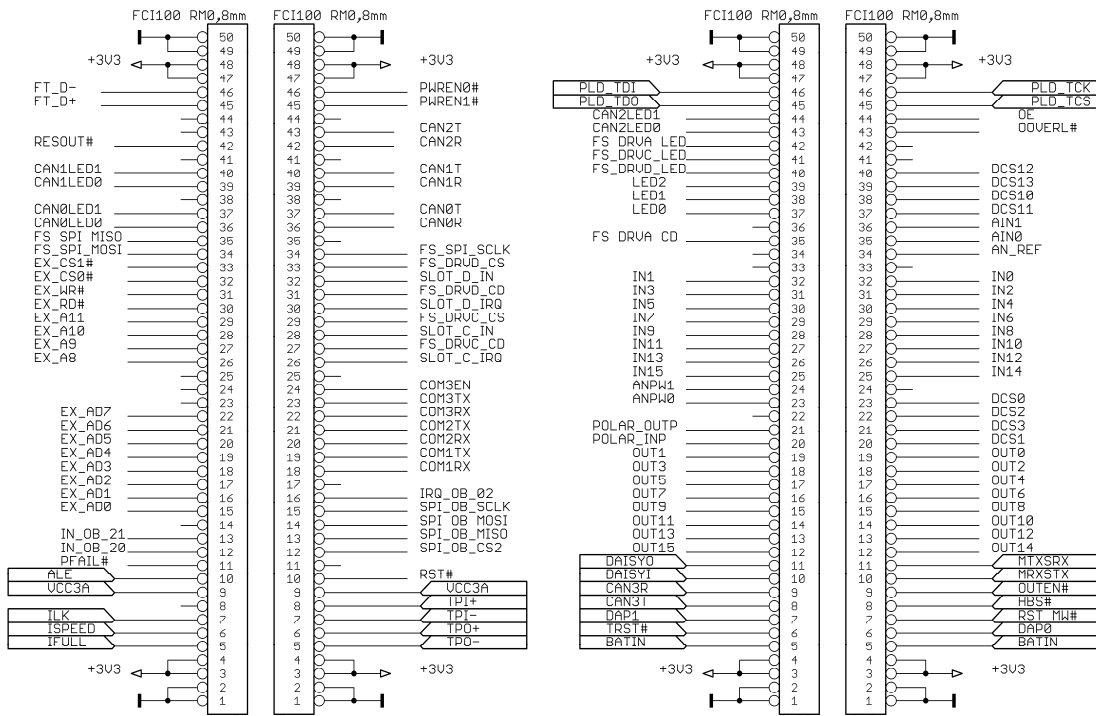
Parameter	Symbol	Rated Value			Units	Remarks
		Min.	Max.			
Power supply voltage	VCC	-0.2	3.5		V	
Analog power supply voltage	AVCC	VCC - 0.3	VCC		V	
Analog reference voltage	AVREF	VCC - 0.3	VCC		V	
Input voltage	V <sub>i</sub>	-0.3			V	
Output voltage	V <sub>o</sub>	VCC - 1.0			V	
L level maximum output current	I <sub>OLMAX</sub>				mA	
L level maximum output current	I <sub>OL</sub>				mA	
H level maximum output current	I <sub>OHMAX</sub>	10			mA	max. 3 parallel outputs / max 50 mA for all channels
H level nominal output current	I <sub>OH</sub>	2,5			mA	
Maximum Power dissipation	P <sub>MAX</sub>				mW	
Operating temperature	T <sub>A</sub>	0	70		°C	Standard temperature version
	T <sub>A</sub>	-40	85		°C	Extended temperature version
Storing temperature	T <sub>A</sub>	-50	125		°C	

## Recommended Operation Conditions and Characteristics

Functional operation should be restricted to recommended operation conditions.

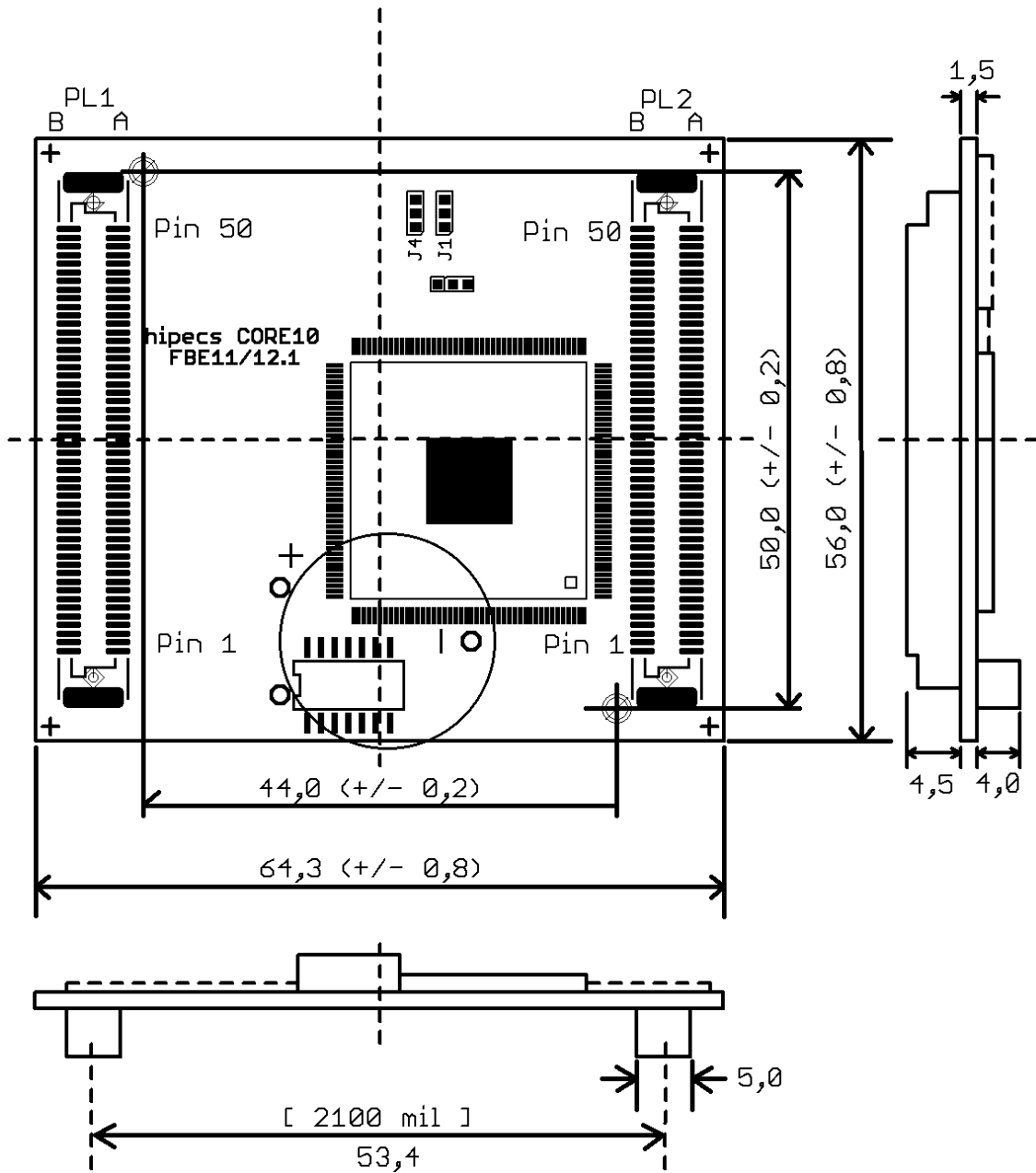
Parameter	Symbol	Rated Value			Units	Remarks
		Min.	Typ.	Max.		
Power supply voltage	VCC	3.0	3.3	3.5	V	
Analog power supply voltage	AVCC		VCC		V	
Analog reference voltage	AVREF		VCC		V	
Battery Voltage	V <sub>RTC</sub>		3.0		V	
Power supply current	I <sub>CC</sub>		250	350	mA	All inputs V <sub>IL</sub> or V <sub>IH</sub> All outputs open
Power supply current	I <sub>CC</sub>		380	500	mA	CAN-Tranceiver, Line drivers and Ethernet transformer connected. No Ethernet cable conn.
Power supply current	I <sub>CC</sub>		420	550	mA	Ethernet cable connected and communication running
Input H voltage	V <sub>IH</sub>	0.8 * VCC		VCC + 0.3	V	
Input L voltage	V <sub>IL</sub>	VSS - 0.3		0.3 * VCC	V	
Output H voltage	V <sub>OH</sub>	VCC - 0.4			V	
Output L voltage	V <sub>OL</sub>			0.4	V	
Input leakage current	I <sub>LKC</sub>		0.2	2.5	uA	
Reset pulse width	t <sub>res</sub>	100			us	
Power on rise time	t <sub>RESLH</sub>				ms	
Maximum Power dissipation	P <sub>MAX</sub>				mW	

### Pinning



Pinning of hipecs CORE10 FCI connectors  
(top view / module transparent)

**Dimensions**



All dimensions are given in mm! Exceptions in [ ]

## Version History And Changes

The following table shows all relevant changes of the device and datasheet during product life time.

Version	Date	Changes
1.0 Rev. 02	Oct/11/2012	First version
1.0 Rev. 03	Dec/03/2012	Changed number of CAN interfaces to four
1.0 Rev. 04	Dec/17/2012	Changed picture of pinning according to CAN interface changes
1.0 Rev. 05	Mar/04/2013	Rework of dimensions and ordering information, added jumper setting
1.0 Rev. 06	Mar/11/2013	Current draw added
1.0 Rev. 07	Aug/29/2013	Added TRST# pin description
1.0 Rev. 08	Mar/18/2014	Description of pins DCSxx corrected
2.0 Rev. 02	Apr/10/2017	Update: Dimensions (drawing)
2.0 Rev. 03	Sep/25/2020	Software-Update/Bug-Fix: DS401-Slave-Mode

## Ordering Information

Part Number	Part Name	Description
<b>PLC Modules</b>		
EZ00000.2000.01	hipecs CORE10	PLC-Core-Module with IEC61131 programmable embedded PLC, 16/16 digital I/O, 2 analog inputs, CANopen Master/Slave, SGI visualization, 3 ser. interfaces, CoDeSys programming system 2 x USB, Filesystem, SD-Card, Ethernet, RTC, FCI-connector <b>temperature range 0°... 70°C</b>
EZ00000.2100.01	hipecs CORE10E	PLC-Core-Module with IEC61131 programmable embedded PLC, 16/16 digital I/O, 2 analog inputs, CANopen Master/Slave, SGI visualization, 3 ser. interfaces, CoDeSys programming system 2 x USB, Filesystem, SD-Card, Ethernet, RTC, FCI-connector <b>extended temperature range -40°... 85°C</b>
<b>Evaluation Board</b>		
EZ00000.2040.01	hipecs-CORE10-EVA	Evaluation board for hipecs CORE10 module, wall power supply included, with FCI connectors
<b>FCI Connectors</b>		
EZ00000.0173.01	M167-CON9/FCI	SMD-Connector FCI / PCB to PCB distance <b>9 mm</b> / 2 pieces necessary
EZ00000.0174.01	M167-CON5/FCI	SMD-Connector FCI / PCB to PCB distance <b>5 mm</b> / 2 pieces necessary

**Attention please!**

All rights reserved.

The information herein is given to describe certain components and shall not be considered as warranted characteristics. Terms of delivery and all rights to technical changes are reserved.

We hereby disclaim any and all warranties, including but not limited to warranties of non-infringement, regarding circuits, descriptions and charts stated herein.

The electronic product described in this document is designed, developed and manufactured as contemplated for general use, including without limitation, ordinary industrial use, general office use, personal use, and household use, but is not designed, developed and manufactured for use in applications accompanying fatal risks or dangers that, could have a serious effect to the public, and could lead to death, personal injury, severe physical damage or other loss (i.e. nuclear reaction control in nuclear facility, aircraft flight control, air traffic control, mass transport control, medical life support system, missile launch or flight control or in weapon system).

The product is not designed, developed and manufactured for applications requiring extremely high reliability (i.e. submersible repeater and artificial satellites).

Please note that frenzel + berg electronic GmbH & Co.KG will not be liable against you and/or any third party for any claims or damages arising in connection with above-mentioned uses of the products.

Any electronic products and/or semiconductor devices have an inherent chance of failure. You must protect against injury, damage or loss from such failures by incorporating safety design measures into your application, facility and equipment such as redundancy, fire protection, and prevention of over-current levels and other abnormal operating conditions.

The product includes run time licenses for CODESYS PLC and VISU for international use, but the product is not licensed for usage in the United States of America (USA).

The product described herein is not UL rated.

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