General Description

The module hipecs-GW30 is a very compact and powerful CANopen / RS232 gateway.

The gateway module hipecs-GW30 gives the possibility to integrate devices with RS232 interface into CANopen networks very easily. The gateway uses a simple serial data stream and directly converts this into the CANopen protocol. For the serial interface based device, the protocol is completely transparent, there is no special gateway protocol overhead needed. This feature guarantees, that already existing hardware may be connected to CAN networks as well as new components.

The serial communication parameters may be set from CAN bus side. The gateway supports baud rates up to 460,800 baud. The free programmable prescaler supports unusual baud rates as well as the standards.

Additionally 2 digital inputs and 1 digital output for 24V are implemented. These may be used for handshake or general purposes.

The RS232 interface and the I/Os are isolated from CPU and CAN bus line.

Features

- RS232 / CAN Gateway
- CANopen Remote-I/O-Module with 2 digital inputs and 1 digital output for DC 24V
- According to CiA Draft Standards DS301 version 4.2 und DS401 version 3
- Setting of CAN parameter such as node ID and baud rate with DIP switches
- CAN baud rates up to 1Mbit
- CAN bus line according to ISO11898 with transceiver TJA1050 electrically isolated
- 4 transmit und 4 receive-PDOs
- Dynamic PDO mapping
- Variable PDO identifier
- CANopen PDO transmission modes: synchron, asynchronous, event triggered, cyclic, acyclic and remote frame dependant
- Event timer and inhibit timer for all transmit PDOs
- Node guarding, life guarding und heart beat
- Emergency messages
- Minimum boot up
- RS232 interface electrically isolated transmit/receive buffer: 1 kByte/2 kByte
- Setup of serial communication parameters via CAN bus line
- Available in a plastic housing suitable for mounting on DIN carrier rails.
- Operating temperature 0 .. 55°C (optional: -40 .. 70°C)

Ordering Information

Part	Ordering Number
hipecs-GW30-i	EZ.00000.2410.00
CANopen gateway isolated RS232 interface and I/O isolated CAN interface operating temperature 0 .. 55 °C	
hipecs-GW30-ie	EZ.00000.2411.00
CANopen gateway isolated RS232 interface and I/O isolated CAN interface operating temperature -40 .. 70 °C	

Technical Data

The module hipecs-GW30 has separated power domains for the CPU and for the serial interface and I/O on the other hand. The RS232 interface and the digital I/O use a common ground and are galvanically isolated from then CPU and the CAN bus line.

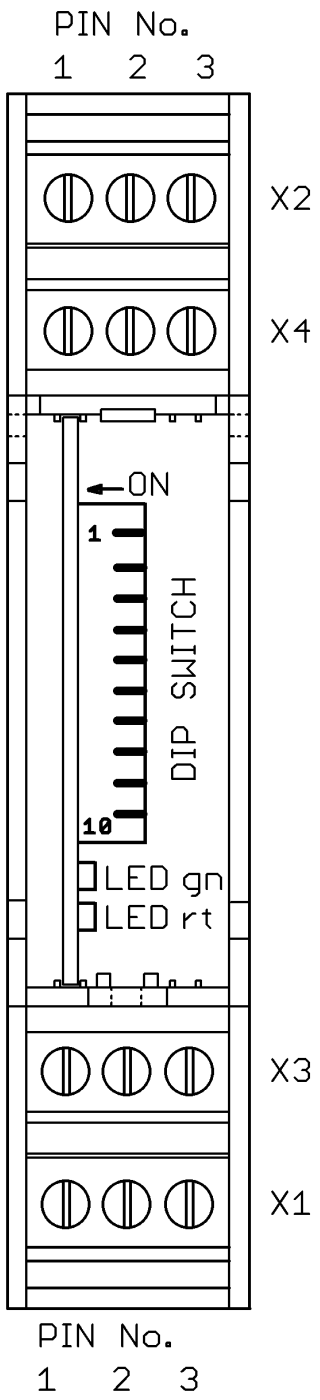
Power supply	min.	typ.	max.
Power supply voltage CPU / VCC	11 V	24 V	32 V
Supply current	20 mA (@ Vcc=32V)	30 mA	60 mA (@ Vcc=11V)
Power supply IO	11 V	24 V	32 V
CAN bus line standard	ISO11898		
CiA Draft standards	DS301 version 4.2 and DS401 version 3		
Conformance	CE		

Digital Input	
Number of input channels	2
Signal level LOW	< 5 V
Signal level HIGH	> 10 V
CAN reaction time	typ. 1ms
Input current @ DC 24V	6 mA
Isolation to CAN bus / CPU	100 V

Digitale output	
Output switching mode	PNP / High side switch
Short circuit protection	Yes
Isolation to CAN bus / CPU	100 V
Power supply for digital output	DC 24 V (11- 32 V)
CAN reaction time	typ. 1ms
Output load types	Resistor, Inductor, Relay, Lamp
Maximum output current continuous	1,0 A
Maximum output peak current	3,0 A max.1 sec.
Overload protection	Short circuit protection, current limitation, thermal shutdown

connectors and measurement	
connectors	screw terminal
cross section [mm²]	0,08 to 1,5 mm²
cross section [AWG]	14 to 28 AWG
strip length	7 mm
measurement housing	17,8 x 90 x 62 mm (please check chapter plastic housing measurements)
operating temperature	0 .. 55°C / -40 .. 70°C

Connector



Connector X1 (Supply)

pin no.	*name*	*function*
1	U1	supply voltage DC +24V for system / bus
2	GND	ground for system / bus
3	P1	Supply voltage DC +24V for digital I/Os. **Please note:** The ground connector for the digital I/O is the same as for serial RS232 interface and located at X4.3 PIN3 (G1)

Connector X2 (CAN)

pin no.	*name*	*function*
1	L0	CAN Low Signal
2	H0	CAN High Signal
3	G0	CAN GND Masse für CAN-Bus

Connector X3 (I/O)

pin no.	*name*	*function*
1	I0	Input 0.0 DC 24V
2	I1	Input 0.1 DC 24V
3	O0	Output 0.0 DC 24V

The ground for the digital I/O is the same as for serial interface and must be connected to X4 pin 3.

Connector X4 (RS232)

pin no.	*name*	*function*
1	RX	RS232-RX receiver line for serial interface.
2	TX	RS232-TX transmitter line for serial interface.
3	G1	Ground signal for serial RS232 interface and digital I/O.

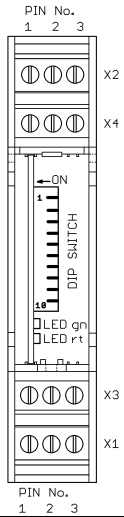
Configuration DIP Switches

The DIP switches for baud rate and node ID adjustment are placed behind the front cover. The cover can be opened.

Switch Nr										Function
1	2	3	4	5	6	7	8	9	10	
RT										RT CAN bus termination resistor
	BD2	BD1	BD0							BDx baudrate CAN-Bus
				ID5	ID4	ID3	ID2	ID1	ID0	IDx CANopen Node-ID
ON										CAN termination on (120 Ohm)
OFF										CAN termination off
	OFF	OFF	OFF							1 Mbit / sec
	OFF	OFF	ON							800 kbit / sec
	OFF	ON	OFF							500 kbit / sec
	OFF	ON	ON							250 kbit / sec
	ON	OFF	OFF							125 kbit / sec
	ON	OFF	ON							50 kbit / sec
	ON	ON	OFF							20 kbit / sec
	ON	ON	ON							reserved
				OFF	OFF	OFF	OFF	OFF	ON	Node ID = 1
				OFF	OFF	OFF	OFF	ON	OFF	Node ID = 2
				OFF	OFF	OFF	OFF	ON	ON	Node ID = 3
				…	…	…	…	…	…	…
				ON	ON	ON	ON	OFF	OFF	Node ID = 60
				ON	ON	ON	ON	OFF	ON	Node ID = 61
				ON	ON	ON	ON	ON	OFF	Node ID = 62
				ON	ON	ON	ON	ON	ON	Node ID = 63

CAN Signal LED's

The LEDs are placed behind the front cover.

place plan	LED	color	function
	RUN-LED	green	The RUN-LED shows the NMT state according to the DRP303-3 off no supply voltage or faulty flickering node has not yet transmitted the boot up message single flash stopped blinking preoperational on operational
	ERR-LED	red	The ERROR-LED shows the NMT state according to the DRP303-3 off no errors single flash CAN hardware is in error warning status double flash node guarding error on node is bus off

CANopen Object Dictionary

The following object dictionary is completely implemented within the hipecs-GW30.

hipecs-GW30 Objects

All values given in this table are in hexadecimal notation.
The following access types are defined:
ro read only
wo write only
rw read and write access enabled
rww read and write access enabled by SDO, write only by PDO

Index	Sub-Index	Name	Data type	Acc.	Map-pable	Default Value / Note	Object Category
1000	-	Device Type	Unsigned 32	ro	no	0083 0191 h	Global
1001	-	Error Register	Unsigned 8	ro	yes	-	Global
1002	-	Manufacturer Status Register	Unsigned 32	ro	yes	-	Global
1005	-	COB-ID Sync Identifier Sync Object	Unsigned 32	ro	no	80 h	Global
1008	-	Device Name	Visible String	ro	no	"hipecs-GW30"	Global
1009	-	Hardware Version	Visible String	ro	no	-	Global
100A	-	Software Version	Visible String	ro	no	active Version	Global
100C	-	Guard Time	Unsigned 16	rw	no	0 h	Global
100D	-	Life Time Factor	Unsigned 8	rw	no	0 h	Global
1014	-	COB ID Emergency	Unsigned 32	rw	no	80 h + Node-ID	Global
1015	-	Inhibit Time Emergency	Unsigned 16	rw	no	0 h (disabled)	Global
1016	-	Consumer Heartbeat Time	Array	-	-		Global
	0	Nr of Subobjects	Unsigned 8	ro	no	04 h	Global
	1	Consumer Heartbeat Time 1	Unsigned 32	rw	no	0 h	Global
	2	Consumer Heartbeat Time 2	Unsigned 32	rw	no	0 h	Global
	3	Consumer Heartbeat Time 3	Unsigned 32	rw	no	0 h	Global
	4	Consumer Heartbeat Time 4	Unsigned 32	rw	no	0 h	Global
1017	-	Producer Heartbeat Time	Unsigned 16	rw	no	0 h	Global
1018		Identity Object	Record	-	-	-	Global
	0	Nr of Subobjects	Unsigned 8	ro	no	04 h	Global
	1	Vendor ID	Unsigned 32	ro	no	0000 0058 h	Global
	2	Product Code	Unsigned 32	ro	no	0600 3000 h	Global
	3	Revision Number	Unsigned 32	ro	no	active Rev. Code	Global
	4	Serial Number	Unsigned 32	ro	no	-	Global
1029		Error Behavior Object	Array	-	-	-	Global
	0	Nr of Subobjects	Unsigned 8	ro	no	2 h	Global
	1	Communication error	Unsigned 8	rw	no	0 h	Global
	2	Application error	Unsigned 8	rw	no	0 h	Global
1400		Receive PDO1 - Communication Parameters	Record	-	-	-	PDO
	0	Nr of Subobjects	Unsigned 8	ro	no	2 h	PDO
	1	COB-ID	Unsigned 32	rw	no	200 h + Node-ID	PDO
	2	Transmission Type	Unsigned 8	rw	no	FF h	PDO
1401		Receive PDO2 - Communication Parameters	Record	-	-	-	PDO
	0	Nr of Subobjects	Unsigned 8	ro	no	2 h	PDO
	1	COB-ID	Unsigned 32	rw	no	300 h + Node-ID	PDO
	2	Transmission Type	Unsigned 8	rw	no	FF h	PDO

Index	Sub-Index	Name	Data type	Acc.	Map-pable	Default Value / Note	Object Category
1402		Receive PDO3 - Communication Parameters	Record	-	-	-	PDO
	0	Nr of Subobjects	Unsigned 8	ro	no	2 h	PDO
	1	COB-ID	Unsigned 32	rw	no	0x80000400 + Node-ID	PDO
	2	Transmission Type	Unsigned 8	rw	no	FF h	PDO
1403		Receive PDO4 - Communication Parameters	Record	-	-	-	PDO
	0	Nr of Subobjects	Unsigned 8	ro	no	2 h	PDO
	1	COB-ID	Unsigned 32	rw	no	0x80000500 + Node-ID	PDO
	2	Transmission Type	Unsigned 8	rw	no	FF h	PDO
1600		Receive PDO1 - Mapping Parameters	Record	-	-	-	PDO
	0	Nr of Subobjects	Unsigned 8	rw	no	1 h	PDO
	1	Mapped Object	Unsigned 32	rw	no	6200 0108 h Dig. Output O0	PDO
1601		Receive PDO2 - Mapping Parameters	Record	-	-	-	PDO
	0	Nr of Subobjects	Unsigned 8	rw	no	8 h	PDO
	1	Mapped Object	Unsigned 32	rw	no	4811 0008 h COM Tx Command	PDO
	2	Mapped Object	Unsigned 32	rw	no	4810 0108 h COM Tx Byte 1	PDO
	3	Mapped Object	Unsigned 32	rw	no	4810 0208 h COM Tx Byte 2	PDO
	4	Mapped Object	Unsigned 32	rw	no	4810 0308 h COM Tx Byte 3	PDO
	5	Mapped Object	Unsigned 32	rw	no	4810 0408 h COM Tx Byte 4	PDO
	6	Mapped Object	Unsigned 32	rw	no	4810 0508 h COM Tx Byte 5	PDO
	7	Mapped Object	Unsigned 32	rw	no	4810 0608 h COM Tx Byte 6	PDO
	8	Mapped Object	Unsigned 32	rw	no	4810 0708 h COM Tx Byte 7	PDO
1602		Receive PDO3 - Mapping Parameters	Record	-	-	-	PDO
	0	Nr of Subobjects	Unsigned 8	rw	no	0 h	PDO
1603		Receive PDO4 - Mapping Parameters	Record	-	-	-	PDO
	0	Nr of Subobjects	Unsigned 8	rw	no	0 h	PDO
1800		Transmit PDO1 - Communication Parameters	Record	-	-	-	PDO
	0	Nr of Subobjects	Unsigned 8	ro	no	5 h	PDO
	1	COB-ID	Unsigned 32	rw	no	180 h + Node-ID	PDO
	2	Transmission Type	Unsigned 8	rw	no	FF h	PDO
	3	Inhibit Time	Unsigned 16	rw	no	0 h	PDO
	4	Compatibility Entry	Unsigned 8	rw	no	-	PDO
	5	Event Time	Unsigned 16	rw	no	0 h	PDO

Index	Sub-Index	Name	Data type	Acc.	Map-pable	Default Value / Note	Object Category
1801		Transmit PDO2 - Communication Parameters	Record	-	-	-	PDO
	0	Nr of Subobjects	Unsigned 8	ro	no	5 h	PDO
	1	COB-ID	Unsigned 32	rw	no	280 h + Node-ID	PDO
	2	Transmission Type	Unsigned 8	rw	no	FF h	PDO
	3	Inhibit Time	Unsigned 16	rw	no	0 h	PDO
	4	Compatibility Entry	Unsigned 8	rw	no	-	PDO
	5	Event Time	Unsigned 16	rw	no	0 h	PDO
1802		Transmit PDO3 - Communication Parameters	Record	-	-	-	PDO
	0	Nr of Subobjects	Unsigned 8	ro	no	5 h	PDO
	1	COB-ID	Unsigned 32	rw	no	8000 0380 h + Node-ID	PDO
	2	Transmission Type	Unsigned 8	rw	no	FF h	PDO
	3	Inhibit Time	Unsigned 16	rw	no	0 h	PDO
	4	Compatibility Entry	Unsigned 8	rw	no	-	PDO
	5	Event Time	Unsigned 16	rw	no	0 h	PDO
1803		Transmit PDO4 - Communication Parameters	Record	-	-	-	PDO
	0	Nr of Subobjects	Unsigned 8	ro	no	5 h	PDO
	1	COB-ID	Unsigned 32	rw	no	8000 0480 h + Node-ID	PDO
	2	Transmission Type	Unsigned 8	rw	no	FF h	PDO
	3	Inhibit Time	Unsigned 16	rw	no	0 h	PDO
	4	Compatibility Entry	Unsigned 8	rw	no	-	PDO
	5	Event Time	Unsigned 16	rw	no	0 h	PDO
1A00		Transmit PDO1 – Mapping Parameters	Record	-	-	-	PDO
	0	Nr of Subobjects	Unsigned 8	rw	no	1 h	PDO
	1	Mapped Object	Unsigned 32	rw	no	6000 0108 h Digital Input I0 – I1	PDO
1A01		Transmit PDO2 – Mapping Parameters	Record	-	-	-	PDO
	0	Nr of Subobjects	Unsigned 8	rw	no	8 h	PDO
	1	Mapped Object	Unsigned 32	rw	no	4801 0008 h COM Rx Status	PDO
	2	Mapped Object	Unsigned 32	rw	no	4800 0108 h COM Rx Byte 1	PDO
	3	Mapped Object	Unsigned 32	rw	no	4800 0208 h COM Rx Byte 2	PDO
	4	Mapped Object	Unsigned 32	rw	no	4800 0308 h COM Rx Byte 3	PDO
	5	Mapped Object	Unsigned 32	rw	no	4800 0408 h COM Rx Byte 4	PDO
	6	Mapped Object	Unsigned 32	rw	no	4800 0508 h COM Rx Byte 5	PDO
	7	Mapped Object	Unsigned 32	rw	no	4800 0608 h COM Rx Byte 6	PDO
	8	Mapped Object	Unsigned 32	rw	no	4800 0708 h COM Rx Byte 7	PDO
1A02		Transmit PDO3 – Mapping Parameters	Record	-	-	-	PDO
	0	Nr of Subobjects	Unsigned 8	rw	no	0 h	PDO

Index	Sub-Index	Name	Data type	Acc.	Map-pable	Default Value / Note	Object Category
1A03		Transmit PDO4 – Mapping Parameters	Record	-	-	-	PDO
	0	Nr of Subobjects	Unsigned 8	rw	no	0 h	PDO
2000	-	Device Manufacturer	Visible String	ro	no	“FRENZEL+BERG”	Global
2009		Serial Number 64 Bit	Array	-	-	-	Global
	0	Nr of Subobjects	Unsigned 8	ro	no	2 h	Global
	1	Serial Number 64 Bit LSDW	Unsigned 32	ro	no	-	Global
	2	Serial Number 64 Bit MSDW	Unsigned 32	ro	no	-	Global
2101	-	System Configuration	Unsigned 32	ro	no	Setting of Config. Input Pins	Global
2102	-	Remapping Enabled Info	Unsigned 8	ro	no	1 h (enabled)	Global
2103	-	Enable Guarding Warning	Unsigned 8	rw	no	0 h (disabled)	Global
2105	-	Internal API State	Unsigned 32	ro	yes	-	Global
2110	-	Conformance Test Object	Record	-	-		Global
	0	Nr of Subobjects	Unsigned 8	ro	no	1 h	Global
	1	Range Check Object	Unsigned 16	rw	no	500	Global
2180	-	CAN Restart Time	Unsigned 16	rw	no	1000 h (restart after one second)	Global
4800	-	COM Rx DataByte	Array	-	-	-	RS232
	0	Nr of Subobjects	Unsigned 8	ro	no	7 h	RS232
	1	COM Rx DataByte 1	Unsigned 8	ro	yes	-	RS232
	2	COM Rx DataByte 2	Unsigned 8	ro	yes	-	RS232
	3	COM Rx DataByte 3	Unsigned 8	ro	yes	-	RS232
	4	COM Rx DataByte 4	Unsigned 8	ro	yes	-	RS232
	5	COM Rx DataByte 5	Unsigned 8	ro	yes	-	RS232
	6	COM Rx DataByte 6	Unsigned 8	ro	yes	-	RS232
	7	COM Rx DataByte 7	Unsigned 8	ro	yes	-	RS232
4801	-	COM Rx Status	Unsigned 8	ro	yes	-	RS232
480F	-	COM Rx Status Transmit Period Time	Unsigned 16	rw	no	1000	RS232
4810	-	COM Tx DataByte	Array	-	-	-	RS232
	0	Nr of Subobjects	Unsigned 8	ro	no	7 h	RS232
	1	COM Tx DataByte 1	Unsigned 8	rww	yes	-	RS232
	2	COM Tx DataByte 2	Unsigned 8	rww	yes	-	RS232
	3	COM Tx DataByte 3	Unsigned 8	rww	yes	-	RS232
	4	COM Tx DataByte 4	Unsigned 8	rww	yes	-	RS232
	5	COM Tx DataByte 5	Unsigned 8	rww	yes	-	RS232
	6	COM Tx DataByte 6	Unsigned 8	rww	yes	-	RS232
	7	COM Tx DataByte 7	Unsigned 8	rww	yes	-	RS232
4811	-	COM Tx Command	Unsigned 8	rww	yes	-	RS232
48E0	-	COM Configuration Command	Unsigned 32	rw	no	0 h	RS232
48F0	-	Gateway Operation Mode	Unsigned 16	rw	no	0 h	RS232
5200	-	Reset Output Object on Error	Unsigned 8	rw	no	1 h	Dig. Output
6000		Digital Input 8 Bit	Array	-	-	-	Dig. Input
	0	Nr of Subobjects	Unsigned 8	ro	no	1 h	Dig. Input
	1	Digital Input Byte 0	Unsigned 8	ro	yes	-	Dig. Input
6002		Polarity Input 8 Bit	Array	-	-	-	Dig. Input
	0	Nr of Subobjects	Unsigned 8	ro	no	1 h	Dig. Input
	1	Polarity Input Byte 0	Unsigned 8	rw	no	0 h	Dig. Input
6005	-	Global Interrupt Enable	Unsigned 8	rw	no	1 h	Dig. Input
6006		Interrupt Mask any Change	Array	-	-	-	Dig. Input
	0	Nr of Subobjects	Unsigned 8	ro	no	1 h	Dig. Input
	1	Interrupt Mask Any Change Byte 0	Unsigned 8	rw	no	FF h (interrupt enabled)	Dig. Input

Index	Sub-Index	Name	Data type	Acc.	Map-pable	Default Value / Note	Object Category
6007		Interrupt Mask Rising Edge	Array	-	-	-	Dig. Input
	0	Nr of Subobjects	Unsigned 8	ro	no	1 h	Dig. Input
	1	Interrupt Mask Rising Edge Byte 0	Unsigned 8	rw	no	0 h (interrupt disabled)	Dig. Input
6008		Interrupt Mask Falling Edge	Array	-	-	-	Dig. Input
	0	Nr of Subobjects	Unsigned 8	ro	no	1 h	Dig. Input
	1	Interrupt Mask Falling Edge Byte 0	Unsigned 8	rw	no	0 h (interrupt disabled)	Dig. Input
6100		Read Digital Input 16 Bit	Array	-	-	-	Dig. Input
	0	Nr of Subobjects	Unsigned 8	ro	no	1 h	Dig. Input
	1	Read Digital Input 16 Bit	Unsigned 16	ro	yes	-	Dig. Input
6120		Read Digital Input 32 Bit	Array	-	-	-	Dig. Input
	0	Nr of Subobjects	Unsigned 8	ro	no	1 h	Dig. Input
	1	Read Digital Input 32 Bit Long 0	Unsigned 16	ro	yes	-	Dig. Input
6200		Write Digital Output 8 Bit	Array	-	-	-	Dig. Output
	0	Nr of Subobjects	Unsigned 8	ro	no	1 h	Dig. Output
	1	Dig. Output Byte 0	Unsigned 8	rww	yes	-	Dig. Output
6206		Error Mode Output 8 bit	Array	-	-	-	Dig. Output
	0	Nr of Subobjects	Unsigned 8	ro	no	1 h	Dig. Output
	1	Error Mode Output 8 Bit Byte 0	Unsigned 8	rw	no	FF h	Dig. Output
6207		Error State Output	Array	-	-	-	Dig. Output
	0	Nr of Subobjects	Unsigned 8	ro	no	1 h	Dig. Output
	1	Error Value Output 8 Bit Byte 0	Unsigned 8	rw	no	0 h (Inactive, high level)	Dig. Output
6300		Write Digital Output 16 bit	Array	-	-	-	Dig. Output
	0	Nr of Subobjects	Unsigned 8	ro	no	1 h	Dig. Output
	1	Dig. Output Word 1	Unsigned 16	rww	yes	-	Dig. Output
6320		Write Digital Output 32 bit	Array	--	-	-	Dig. Output
	0	Nr of Subobjects	Unsigned 8	ro	no	1 h	Dig. Output
	1	Dig. Output Long 1	Unsigned 32	rww	yes	-	Dig. Output

Description of Object Dictionary

The following list gives a short description of all dictionary entries.

Index 0005

This object is implemented to enable reservation of data space in PDOs by mapping dummy entries.

Index	0005
Name	Dummy 8
Description	
Data Type	Unsigned 8
Access modes	RO
PDO Mapping	Yes
Value Range	-
Default Value	0

Index 0006

This object is implemented to enable reservation of data space in PDOs by mapping dummy entries.

Index	0006
Name	Dummy 16
Description	-
Data Type	Unsigned 16
Access modes	RO
PDO Mapping	Yes
Value Range	-
Default Value	0

Index 0007

This object is implemented to enable reservation of data space in PDOs by mapping dummy entries.

Index	0007
Name	Dummy 32
Description	-
Data Type	Unsigned 32
Access modes	RO
PDO Mapping	Yes
Value Range	-
Default Value	0

DS301: Global Objects

Index 1000 : Device Type

Description of the device type. The Object gives the CiA device profile number and additionally the functionality of the device.

Index	1000h
Name	Device Type
Description	-
Data Type	Unsigned 32
Access modes	RO
PDO Mapping	No
Value Range	-
Default Value	0083 0191 h

Index 1001 : Error Register

This object holds an error of the device.

Index	1001h
Name	Error Register
Description	-
Data Type	Unsigned 8
Access modes	RO
PDO Mapping	Yes
Value Range	-
Default Value	-

The error register has the following structure

Bit	Meaning
0	Generic error. This bit is set, if any error is active
1	0
2	0
3	0
4	CAN bus or communication error
5	0
6	0
7	Device Error

Index 1002 : Status Register

This object gives additional information for the device

Index	1002h
Name	Status Register
Description	-
Data Type	Unsigned 32
Access modes	RO
PDO Mapping	Yes
Value Range	-
Default Value	-

Index 1005 : COB-ID Sync

Identifier of Can Object for the Synchronisation message. The hipecs-GW30 may only operate in Sync consumer mode. Generating of Sync messages is not possible. Therefore the Identifier for the Sync message can only be set to the value range 1 . 7FFh.

Index	1005h
Name	COB-ID Sync
Description	-
Data Type	Unsigned 32
Access modes	RW
PDO Mapping	No
Value Range	1 .. 7FFh
Default Value	80h

Index 1008 : Device Name

This object shows the name of the device as visible string.

Index	1008h
Name	Device Name
Description	-
Data Type	Visible String
Access modes	RO
PDO Mapping	No
Value Range	The maximum string length is 20 characters
Default Value	“hipecs-GW30”

Index 1009 : Hardware Version

This object shows the hardware version and firmware version as visible string.

Index	1009h
Name	Hardware Version
Description	-
Data Type	Visible String
Access modes	RO
PDO Mapping	No
Value Range	The maximum string length is 20 characters
Default Value	-

Index 100A : Software Version

This object shows the software version as visible string.

Index	100Ah
Name	Software Version
Description	-
Data Type	Visible String
Access modes	RO
PDO Mapping	No
Value Range	The maximum string length is 20 characters
Default Value	-

Index 100C : Guard Time

The objects at index 100Ch (Guard Time in milli-seconds) and 100Dh (Life Time Factor) are used to implement the life guarding protocol. The Guard Time multiplied with the Life Time Factor gives the Life Time in milliseconds.
It is 0 (zero) if not used.

Index	100Ch
Name	Guard Time
Description	-
Data Type	Unsigned 16
Access modes	RW
PDO Mapping	No
Value Range	
Default Value	0

Index 100D : Life Time Factor

The objects at index 100Ch (Guard Time in milli-seconds) and 100Dh (Life Time Factor) are used to implement the life guarding protocol. The Guard Time multiplied with the Life Time Factor gives the Life Time in milliseconds.
It is 0 (zero) if not used.

Index	100Dh
Name	Life Time Factor
Description	-
Data Type	Unsigned 8
Access modes	RW
PDO Mapping	No
Value Range	
Default Value	0

Index 1014 : COB-ID Emergency

Identifier of Can Object for the emergency messages.

Index	1014h
Name	COB-ID Emergency
Description	-
Data Type	Unsigned 32
Access modes	RW
PDO Mapping	No
Value Range	-
Default Value	80h + Node-ID

Index 1015 : Inhibit Time Emergency

Inhibit Time for emergency messages. If the Inhibit Time is set to 0, inhibit delay is disabled. The Inhibit Time is a multiple of 100usec, but the hipecs-GW30 offers a maximum resolution of 1 millisecond.

Index	1015h
Name	Inhibit Time Emergency
Description	-
Data Type	Unsigned 16
Access modes	RW
PDO Mapping	No
Value Range	-
Default Value	0 (disabled)

Index 1016 : Consumer Heartbeat Time

The objects of Index 1016 are used to define the consumer heartbeat times for up to 4 nodes. With each sub index, the configuration for one monitored node can be set.

Index	1016h
Name	Consumer Heartbeat Time
Description	-
Data Type	Structure

Index	1016h Subindex 0
Name	Largest SubIndex supported
Description	-
Data Type	Unsigned 8
Access modes	RO
PDO Mapping	No
Value Range	-
Default Value	4

Index	1016h Subindex 1
Name	Consumer Heartbeat Time 1
Description	-
Data Type	Unsigned 32
Access modes	RW
PDO Mapping	No
Value Range	-
Default Value	0

Index	1016h Subindex 2
Name	Consumer Heartbeat Time 2
Description	-
Data Type	Unsigned 32
Access modes	RW
PDO Mapping	No
Value Range	-
Default Value	0

Index	1016h Subindex 3
Name	Consumer Heartbeat Time 3
Description	-
Data Type	Unsigned 32
Access modes	RW
PDO Mapping	No
Value Range	-
Default Value	0

Index	1016h Subindex 4
Name	Consumer Heartbeat Time 4
Description	-
Data Type	Unsigned 32
Access modes	RW
PDO Mapping	No
Value Range	-
Default Value	0

Structure of consumer heartbeat time:

MSB LSB

Byte3	Byte2	Byte1	Byte0
reserved	Node-ID	Heartbeat time	

Note:
Monitoring of the heartbeat producer starts after the reception of the first heartbeat.
The consumer heartbeat time should be higher than the corresponding producer heartbeat time.
Before the reception of the first heartbeat the status of the heartbeat producer is unknown.

Index 1017 : Producer Heartbeat Time

The producer heartbeat time defines the cycle time of the heartbeat. The producer heartbeat time is 0 if it is not used. The time has to be a multiple of 1ms.

Index	1017h
Name	Producer Heartbeat Time
Description	-
Data Type	Unsigned 16
Access modes	RW
PDO Mapping	No
Value Range	-
Default Value	0

Note:
Either Heartbeat or node guarding may be allowed at the same time. Do not use both protocols at the same time.

Index 1018 : Identity Object

The object at index 1018h keeps general information of the device and the CANopen chip manufacturer frenzel + berg electronic GmbH & Co.KG.
It cannot be modified.

Index	1018h
Name	Identity Object
Description	-
Data Type	Structure

Index	1018h Subindex 0
Name	Largest SubIndex supported
Description	-
Data Type	Unsigned char
Access modes	RO
PDO Mapping	No
Value Range	-
Default Value	4

Index	1018h Subindex 1
Name	Vendor ID
Description	Registration Code of frenzel + berg electronic at the CiA
Data Type	Unsigned 32
Access modes	RO
PDO Mapping	No
Value Range	-
Default Value	58h

Index	1018h Subindex 2
Name	Product Code
Description	Internal Product Code hipecs-GW30 at frenzel + berg electronic
Data Type	Unsigned 32
Access modes	RO
PDO Mapping	No
Value Range	-
Default Value	0600 3000 h

Index	1018h Subindex 3
Name	Revision Code
Description	
Data Type	Unsigned 32
Access modes	RO
PDO Mapping	No
Value Range	-
Default Value	Revision of the device

Index	1018h Subindex 4
Name	Serial Number
Description	
Data Type	Unsigned 32
Access modes	RO
PDO Mapping	No
Value Range	-
Default Value	0

Index 1029 : Error Behaviour

With object 1029 the CANopen chip can be configured to enter alternatively the preoperational or the stopped state or remain in the current state in case of a device failure. Device failures shall include the following communication errors:
Bus-off conditions of the CAN interface, Life guarding error, Serious device errors also can be caused by device internal failures.
The value of the Error Classes is as follows:
0 = pre-operational
(only if current state is operational)
1 = no state change
2 = stopped
3 .. 127 = reserved

Index	1029h
Name	Error Behaviour Object
Description	-
Data Type	Structure

Index	1029h Subindex 0
Name	Largest SubIndex supported
Description	-
Data Type	Unsigned char
Access modes	RO
PDO Mapping	No
Value Range	-
Default Value	2

Index	1029h Subindex 1
Name	Communication Error
Description	NMT state change in case of communication error
Data Type	Unsigned 8
Access modes	RW
PDO Mapping	No
Value Range	-
Default Value	00h

Index	1029h Subindex 2
Name	Application Error
Description	NMT state change in case of internal error due to hardware malfunction
Data Type	Unsigned 8
Access modes	RW
PDO Mapping	No
Value Range	-
Default Value	00h

DS301: PDO Parameter Objects

Communication Parameter Objects

The following table shows the communication parameter objects for Index 140x (Receive PDOs) and Index 180x (Transmit PDOs). The tables show Index 1400 as an example for all PDOs
The transmission type (sub-index 2) defines the mode for transmission / reception of the PDO. See table for detailed description of this entry.
Description of transmission type:

Type	PDO transmission				
	cyclic	acyclic	Sync related	Async.	Only on remote
0		X	X		
1-240	X		X		
241-251	Reserved				
252			X		X
253				X	X
254				X	
255				X	

Synchronous transmission types 0-240 and 252 mean that the transmission of the PDO shall be related to the SYNC object. Asynchronous means that the transmission of the PDO is not related to the SYNC object.
A transmission type of zero means that the message shall be transmitted synchronously with the SYNC object but not periodically but only in case of data change.
A value between 1 and 240 means that the PDO is transferred synchronously and cyclically, the transmission type indicating the number of SYNC signals, which are necessary to trigger PDO transmissions or receptions.
The transmission types 252 and 253 mean that the PDO is only transmitted on reception of a remote frame. At transmission type 252, the data is updated (but not sent) immediately after reception of the SYNC object. At transmission type 253 the data is updated at the reception of the remote frame. These values are only possible for transmit PDOs.

Transmission type 255 means, the application event is defined in the device profile. For receive PDOs the reception of a PDO will update the mapped data (normally the analog or digital outputs).
Sub-index 3h contains the inhibit time. This time is a minimum interval for PDO transmission. The value is defined as multiple of 100ms.

In mode 254/255 additionally an event time can be used for TPDO. If an event timer exists for a TPDO (value not equal to 0) the elapsed timer is considered to be an event. The event time is a multiple of 1 ms. This event will cause the transmission of this TPDO in addition to otherwise defined events.
The PDO communication parameter objects have the same structure for all PDOs. The following Objects are used.
Sub-index 4h is reserved.

Index	PDO
1400h	Receive PDO1
1401h	Receive PDO2
1402h	Receive PDO3
1403h	Receive PDO4
1800h	Transmit PDO1
1801h	Transmit PDO2
1802h	Transmit PDO3
1803h	Transmit PDO4

Index	14xxh / 18xxh
Name	Receive / Transmit PDOx Communication Parameters
Description	-
Data Type	Structure

Index	14xxh / 18xxh Subindex 0
Name	Largest SubIndex supported
Description	-
Data Type	Unsigned 8
Access modes	RO
PDO Mapping	No
Value Range	-
Default Value	2 / 5

Index	14xxh / 18xxh Subindex 1	
Name	COB-ID	
Description	Identifier for CAN-Object for PDO	
Data Type	Unsigned 32	
Access modes	RW	
PDO Mapping	No	
Value Range	-	
Default Value	1400.01	Node-Id + 200h
	1401.01	Node-Id + 300h
	1402.01	Node-Id + 80000400h
	1403.01	Node-Id + 80000500h
	1800.01	Node-Id + 180h
	1801.01	Node-Id + 280h
	1802.01	Node-Id + 80000380h
	1803.01	Node-Id + 80000480h

An Identifier of 8xxxxxxxh means, that this PDO is disabled by default and must be enabled from the CANopen master by assigning a valid PDO ID.

Index	14xxh / 18xxh Subindex 2
Name	Transmission Type
Description	-
Data Type	Unsigned 8
Access modes	RW
PDO Mapping	No
Value Range	-
Default Value	FFh

Index	14xxh / 18xxh Subindex 3
Name	Inhibit Time
Description	-
Data Type	Unsigned 16
Access modes	RW
PDO Mapping	No
Value Range	-
Default Value	0

Index	14xxh / 18xxh Subindex 4
Name	Reserved
Description	-
Data Type	-
Access modes	-
PDO Mapping	No
Value Range	-
Default Value	-

Index	14xxh / 18xxh Subindex 5
Name	Event Time
Description	-
Data Type	Unsigned 16
Access modes	RW
PDO Mapping	No
Value Range	-
Default Value	0

Attention: By default, only the transmit and receive PDO 1 is enabled. Transmit and receive PDO2..4 are disabled by default and must be activated by your CANopen Master.

PDO Mapping Objects

The following table shows the PDO Mapping Objects. The principle of PDO mapping is the same for all PDOs. The PDO Mapping table is the cross reference between the Object dictionary entries (for example the data of an digital output byte) and the data field inside an PDO data field (position in the data field of a CAN message for PDO transfer).

Subindex 0 determines the valid number of objects that have been mapped. The hipecs-GW30 allows a maximum of 8 mapped objects for each PDO. For changing the PDO mapping first subindex 0 must be set to 0 (mapping is deactivated). Then the objects can be remapped. When a new object is mapped by writing a subindex between 1 and 8, the device may check whether the object specified by index /subindex exists. If the object does not exist or the object cannot be mapped, the SDO transfer will be aborted.

Subindexes 1 to 8 keep the pointers of the mapped objects as unsigned 32 values. The value is 0 if there is no mapped object. The structure for these pointers is as follows.

MSB			LSB
Byte3	Byte2	Byte1	Byte0
Mapped index		Subindex	Length

Mapped Index and Subindex together are the Pointer to the Object dictionary data to be mapped at this location.
Length gives the length of the mapped object in bits.

Index	160xh / 1A0xh
Name	Receive / Transmit PDO Mapping Parameters
Description	-
Data Type	Array

Index	160xh / 1A0xh Subindex 0
Name	Largest Subindex supported
Description	Number of mapped objects
Data Type	Unsigned 8
Access modes	RW
PDO Mapping	No
Value Range	-
Default Value	See table below

Index	160xh / 1A0xh Subindex 1 to 8
Name	Mapped object
Description	
Data Type	Unsigned 32
Access modes	RW
PDO Mapping	No
Value Range	-
Default Value	See table below

Receive PDOs
The **hipecs-GW30** CANopen / RS232 Gateway uses the following default mapping entries for receive PDO mapping:

Index	Entry	Explanation
Receive-PDO1		
1600.00	1	RPDO1: 1 mapped object
1600.01	62000108h	Digital Output Byte0
Receive-PDO2		
1601.00	8	RPDO2: 8 mapped objects
1601.01	48110008h	COM Tx Command
1601.02	48100108h	COM Tx DataByte 1
1601.03	48100208h	COM Tx DataByte 2
1601.04	48100308h	COM Tx DataByte 3
1601.05	48100408h	COM Tx DataByte 4
1601.06	48100508h	COM Tx DataByte 5
1601.07	48100608h	COM Tx DataByte 6
1601.08	48100708h	COM Tx DataByte 7
Receive-PDO3		
1602.00	0	RPDO3: no mapped objects
Receive-PDO4		
1603.00	0	RPDO4: no mapped objects

Attention: Receive PDO1 & 2 is active by default. RPDO3..4 have to be activated by CANopen Master.

Transmit PDOs
The **hipecs-GW30** CANopen / RS232 Gateway uses the following default mapping entries for transmit PDO mapping:

Index	Entry	Explanation
Transmit - PDO1		
1A00.00	1	TPDO1: 1 mapped object
1A00.01	60000108h	Digital Input Byte0
Transmit – PDO2		
1A01.00	8	TPDO2: 8 mapped objects
1A01.01	48010008h	COM Rx Status
1A01.02	48000108h	COM Rx DataByte 1
1A01.03	48000208h	COM Rx DataByte 2
1A01.04	48000308h	COM Rx DataByte 3
1A01.05	48000408h	COM Rx DataByte 4
1A01.06	48000508h	COM Rx DataByte 5
1A01.07	48000608h	COM Rx DataByte 6
1A01.08	48000708h	COM Rx DataByte 7
Transmit – PDO3		
1A02.00	0	TPDO3: no mapped objects
Transmit – PDO4		
1A03.00	0	TPDO4: no mapped objects

Attention: Transmit PDO1 & 2 is active by default. TPDO3..4 have to be activated by CANopen Master.

Manufacturer Specific Profile Area

The Objects in this area offer special device specific functions in order to configure additional functions implemented in the devices firmware. These additional functions can not be edited within the standardized profile areas.

Index 2000 : Device Manufacturer

This Object shows “Frenzel + Berg” as visible string. If OEMs do not want to give access to this entry, it may be removed from the EDS (electronic data sheet).

Index	2000h
Name	Device Manufacturer
Description	-
Data Type	Visible String
Access modes	RO
PDO Mapping	No
Value Range	The maximum string length is 20 characters
Default Value	„FRENZEL + BERG“

Index 2101 : System Configuration

This Object returns the operation mode of the hipecs-GW30.

Index	2101h
Name	System Configuration
Description	-
Data Type	Unsigned 32
Access modes	RO
PDO Mapping	No
Value Range	-
Default Value	0

Index 2102 : Remapping Enabled Info

This Object informs the user whether the system configuration enables remapping of the PDOs.
A value of 0 means that remapping is dsabled, all other values indicate that remapping of the PDOs is enabled.

Index	2102h
Name	Remapping Enabled Info
Description	-
Data Type	Unsigned 8
Access modes	RO
PDO Mapping	No
Value Range	-
Default Value	1

Index 2103 : Enabled Guarding Warning

This Object enables/disables transmission of emergency messages in case of a node guarding warning.
The condition of a guarding warning is met, if the time between two node guarding frames increases the guarding time given in object 100C independent of the setting of the life time (object 100D). The node guarding warning does not cause any NMT state change or switching the output pins to the error state. It is implemented to give the CANopen master an early information that the guarding interval has already exceeded the predefined value.
0 : Guarding Warning is disabled
1 : Guarding Warning is enabled

Index	2103h
Name	Enable Guarding Warning
Description	-
Data Type	Unsigned 8
Access modes	RW
PDO Mapping	No
Value Range	-
Default Value	0

Index 2105 : Internal Error Code

This Object holds error information of the CANopen controller.

Index	2105h
Name	Internal Error Code
Description	-
Data Type	Unsigned 32
Access modes	RO
PDO Mapping	YES
Value Range	-
Default Value	0 (no error condition)

Index 2110 : Test Object

This Object is implemented for testing purposes and should not be used.
The test entry does not have any functional behaviour.

Index	2110h
Name	Test Object 01
Description	-
Data Type	Structure

Index	2110h Subindex 0
Name	Largest SubIndex supported
Description	-
Data Type	Unsigned char
Access modes	RO
PDO Mapping	No
Value Range	-
Default Value	0x01

Index	2110h Subindex 1
Name	Range Check Object
Description	-
Data Type	Unsigned 16
Access modes	RW
PDO Mapping	No
Value Range	100 .. 1000
Default Value	500

Index 2180 : CAN Restart Time

This Object gives the restart time out for the CAN communication layer in case of bus off errors in milliseconds.
If the restart time is set to 0 automatic restart of the device in case of bus off is prohibited.

Index	2180h
Name	CAN Restart Time
Description	-
Data Type	Unsigned 16
Access modes	RW
PDO Mapping	No
Value Range	0 .. 50000
Default Value	1000 (restart after one second)

DS401: I/O Configuration Objects

The following objects are describing the objects for configuration of the input and output channels.

DS401: Digital Input Objects

The following objects are describing the functionality of the digital input lines of the hipecs-GW30. The module supports 8, 16 and 32 bit access to the digital inputs.

The mapping of the I/O lines to object 6000 is explained in chapter "Mapping I/O to Object Dictionary"

Index 6000 : Read Digital Input 8 Bit

This object represents the digital input bytes. The value of the input lines is written to this object.

Index	6000h
Name	Digital Input 8 Bit
Description	-
Data Type	Array

Index	Subindex 0
Name	Nr of Subobjects
Description	
Data Type	Unsigned 8
Access modes	ro
PDO Mapping	No
Value Range	-
Default Value	1h

Index	Subindex 1
Name	Digital Input 8 Bit Byte 0
Description	
Data Type	Unsigned 8
Access modes	RO
PDO Mapping	Yes
Value Range	-
Default Value	-

Index 6002 : Polarity Input 8 Bit

With this object, the digital inputs may be inverted. See also Index 6000 for additional information.

Index	6002h
Name	Polarity Input 8 Bit
Description	-
Data Type	Array

Index	Subindex 0
Name	Nr of Subobjects
Description	
Data Type	Unsigned 8
Access modes	ro
PDO Mapping	No
Value Range	-
Default Value	1h

Index	Subindex 1 to Nr of input bytes
Name	Polarity Input 8 Bit Byte 1
Description	
Data Type	Unsigned 8
Access modes	rw
PDO Mapping	No
Value Range	-
Default Value	0

Index 6005 : Global Interrupt Enable

This object enables or disables globally the interrupt behaviour without changing the interrupt masks.
In event-driven mode the device transmits the input values depending on the interrupt masks in objects 6006h, 6007h, and 6008h and the PDO transmission type.
TRUE (1)= global interrupt enabled
FALSE (0)= global interrupt disabled

Index	6005h
Name	Global Interrupt Enable
Description	-
Data Type	Boolean
Access modes	RW
PDO Mapping	No
Value Range	-
Default Value	TRUE

Index 6006 : Interrupt Mask Any Change

This object determines which input lines shall activate an interrupt by any change of the input line. Both negative and positive edge will cause an interrupt, if enabled.
An interrupt will cause a PDO transmission in case of event driven transmission mode.
1 = interrupt enabled
0 = interrupt disabled

Index	6006h
Name	Interrupt Mask any change
Description	-
Data Type	Array

Index	Subindex 0
Name	Nr of Subobjects
Description	
Data Type	Unsigned 8
Access modes	RO
PDO Mapping	No
Value Range	-
Default Value	Number of digital input bytes

Index	Subindex 1 to Nr of input bytes
Name	Interrupt Mask any change
Description	
Data Type	Unsigned 8
Access modes	RW
PDO Mapping	No
Value Range	-
Default Value	0FFh (interrupt enabled)

Index 6007 : Interrupt Mask Low to High

This object has the same structure and behaviour as object 6006h but will cause interrupts only on rising edge of object index 6000. Note that input lines are active low, so rising edge of input data (object 6000) means falling edge of input port line.
Default value is 0.

Index 6008 : Interrupt Mask High to Low

This object has the same structure and behaviour as object 6006h but will cause interrupts only on falling edge of object index 6000. Note that input lines are active low, so falling edge of input data (object 6000) means rising edge of input port line.
Default value is 0.

Index 6100 : Read Digital Input 16 Bit

This object enables 16-Bit access to the digital input bytes. The Object addresses the same data area as object 6000 but using unsigned integer data type. See Index 6000 for further details.

Index 6120 : Read Digital Input 32 Bit

This object enables 32-Bit access to the digital input bytes. The Object addresses the same data area as object 6000 but using unsigned long data type. See Index 6000 for further details.

DS401: Digital Output Objects

The following objects are describing the functionality of the digital output lines of the hipecs-GW30. The module supports 8, 16 and 32 bit access to the digital outputs.

The mapping of the I/O lines to object 6200 is explained in chapter "Mapping I/O to Object Dictionary"

Index 6200 : Write to Digital Output

With object 6200, the digital outputs of the hipecs-GW30 can be written.

Index	6200h
Name	Write to digital output
Description	-
Data Type	Array

Index	Subindex 0
Name	
Description	Number of mapped objects
Data Type	Unsigned 8
Access modes	RO
PDO Mapping	NO
Value Range	-
Default Value	1h

Index	Subindex 1
Name	Write to digital output
Description	
Data Type	Unsigned 8
Access modes	RW
PDO Mapping	YES
Value Range	-
Default Value	0

Index 6206 : Error Mode Output 8 Bit

This object indicates, whether an output is forced to a predefined value (given in object 6207) in case of a device error.

1 = Output will be forced to the value selected in object 6207

0 = Output will be unchanged even in case of an error condition.

Index	6206h
Name	Error Mode Output 8 Bit
Description	-
Data Type	Array

Index	Subindex 0
Name	Nr of Subobjects
Description	
Data Type	Unsigned 8
Access modes	RO
PDO Mapping	No
Value Range	-
Default Value	1h

Index	Subindex 1
Name	Error Mode Output 8 Bit Byte 0
Description	
Data Type	Unsigned 8
Access modes	RW
PDO Mapping	No
Value Range	-
Default Value	0FFh (Take error condition from object 6207)

Index 6207 : Error Value Output 8 Bit

This object selects the level the outputs are forced to in case of device error mode if the error mode (object 6206 is enabled)
1 = Output will be forced to active state
0 = Output will be forced to inactive state.

Index	6207h
Name	Error Value Output 8 Bit
Description	-
Data Type	Array

Index	Subindex 0
Name	Nr of Subobjects
Description	
Data Type	Unsigned 8
Access modes	RO
PDO Mapping	No
Value Range	-
Default Value	1h

Index	Subindex 1
Name	Error Value Output 8 Bit Byte n
Description	
Data Type	Unsigned 8
Access modes	RW
PDO Mapping	No
Value Range	-
Default Value	0 (Inactive, high level)

Index 6300 : Write Digital Output 16 Bit

This object enables 16-Bit access to the digital output bytes. The Object addresses the same data area as object 6200 but using unsigned integer data type. See Index 6200 for further details.

Index 6320 : Write Digital Output 32 Bit

This object enables 32-Bit access to the digital output bytes. The Object addresses the same data area as object 6200 but using unsigned long data type. See Index 6200 for further details.

Gateway Stream Mode Objects

These Objects are used to control serial interface for gateway communications from CAN bus side and are **only valid for operation Mode 0**

The data transfer works as a stream.
A maximum of 7 data bytes together with a control byte can be transferred within one PDO.
Data that has been received from CAN side, will directly be output from the serial port and vice versa.

The default PDO mapping always uses the control object and the corresponding data byte objects in single PDO.

It is strongly recommended to use the default PDO mapping. The following description assumes, that the default PDO mapping is used.

Index 4800 : COM-Rx-Data-Bytes

This Object holds the data bytes, that have been received from serial COM port.
A maximum of 7 data bytes received from serial interface can be forwarded in a single PDO.

Index	4800h
Name	COM-Rx-Data-Bytes
Description	-
Data Type	Array

Index	Subindex 0
Name	Nr of Subobjects
Description	
Data Type	Unsigned 8
Access modes	RO
PDO Mapping	No
Value Range	-
Default Value	7h

Index	Subindex 1..7
Name	COM-Rx-Data-Byte 1..7
Description	Data bytes that have been received from serial interface. Byte 1 has been received at first.
Data Type	Unsigned 8
Access modes	RO
PDO Mapping	Yes
Value Range	-
Default Value	

Index 4801 : COM-Rx-Status

This Object holds the status information for the COM-Rx-Bytes object 4800.

Index	4801h
Name	COM-Rx-Status
Description	Status for received bytes
Data Type	Unsigned 8
Access modes	RO
PDO Mapping	YES
Value Range	
Default Value	

Index 4801 : COM-Rx-Status							
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
TB	-	-	RDA	-	DLC		

TB Toggle Bit
The Gateway toggles this bit on each transmission of the COM-Rx-Status object. The CANopen master may use this toggle bit in order to indicate new incoming gateway data from CAN bus

RDA Receiver Data Available
The Gateway indicates, that more data than transmitted in this CAN frame, which was received from serial interface, is available. Whether this bit is set or not, depends on the chosen speeds of CAN interface and serial interface.

DLC Data Length Code
The Gateway indicates the number of valid data bytes that will be transmitted within this PDO.

Index 480F : COM-Rx-Status Transmit Time

This object holds the period time. With this period time, the gateway transmits a COM-Rx-Status, and with this status the complete PDO, even if there is no new data received from serial interface. In this case, only the toggle bit is altered, all other data is forced to zero.

Index	480Fh
Name	COM-Rx-Status Transmit Time
Description	Status for received bytes
Data Type	Unsigned 16
Access modes	RW
PDO Mapping	No
Value Range	0 .. 60000
Default Value	1000 (period time is 1 sec)

0 No periodic status message is sent.
1...19 Invalid setting, will be changed to 20
20… period time in milliseconds

Index 4810 : COM-Tx-Data-Bytes

This Object holds the data bytes that shall be transmitted via serial COM port.
A maximum of 7 data bytes can be transmitted within in a single PDO.

Index	4810h
Name	COM-Tx-Data-Bytes
Description	-
Data Type	Array

Index	Subindex 0
Name	Nr of Subobjects
Description	
Data Type	Unsigned 8
Access modes	RO
PDO Mapping	No
Value Range	-
Default Value	7h

Index	Subindex 1..7
Name	COM-Tx-Data-Byte 1..7
Description	Data bytes that shall be transmitted using the serial interface. Byte 1 shall be transmitted at first.
Data Type	Unsigned 8
Access modes	RW
PDO Mapping	Yes
Value Range	-
Default Value	

The default PDO mapping always transmits a PDO with a command byte (object 4811) and 7 data bytes. The number of valid data bytes must be indicated within the command byte.

Index 4811 : COM-Tx-Command

This Object is used to control transmission of data from serial interface. It controls transmission of COM-Tx-Bytes object 4810.

Index	4811h
Name	COM-Tx-Command
Description	
Data Type	Unsigned 8
Access modes	RW
PDO Mapping	YES
Value Range	
Default Value	

Index 4811 : COM-Tx-Command							
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
TB	-	CST	CSR	-	DLC		

TB Toggle Bit
The CANopen master may use this toggle bit for internal purposes for example to start a new transmission in event triggered PDO transmission mode. The gateway does not evaluate this bit and will trigger a new serial transmission on each incoming PDO or SDO that writes data to object 4811.

CST Clear Serial Transmitter
The transmit buffer of the serial interface is cleared.

CSR Clear Serial Receiver
The receive buffer of the serial interface is cleared

DLC Data Length Code
The Gateway indicates the number of valid data bytes of this PDO that shall be transmitted with serial interface.
If DLC = 0, no serial data frame will be sent.

Gateway Configuration Objects

Index 48E0 : COM Configuration Command

This Object is used to configure the serial COM port. Each write access to object 48E0 will initiate a new configuration and clears the serial receive and transmit buffers.

Index	48E0h
Name	COM Configuration Command
Description	
Data Type	Unsigned 32
Access modes	RW
PDO Mapping	No
Value Range	
Default Value	

Index 48E0 : COM Configuration Command							
Bit							
31	30	29	28	27	26	25	24
-	STP	PS	PE	DB			

Index 48E0 : COM Configuration Command							
Bit							
23	22	21	20	10	18	17	16
BD (highest Byte)							

Index 48E0 : COM Configuration Command							
Bit							
15	14	13	12	11	10	9	8
BD							

Index 48E0 : COM Configuration Command							
Bit							
7	6	5	4	3	2	1	0
BD (lowest Byte)							

STP Stop-Bits
Number of Stop-Bits = STP + 1
PS Parity Select
PS = 0 : Even parity
PS = 1 : Odd parity
PE Parity Enable
PE = 0 : Parity disabled
PE = 1 : Parity enabled
DB Data-Bits
Number of Data-Bits
BD Baud rate
supported baud rates:
2400 .. 460800

If configuration of the serial COM port fails, the gateway resets object 48E0 to zero.

Index 48F0 : Gateway Operation Mode

This Object is used to set the operation mode of the gateway.

Index	48F0h
Name	Gateway Operation Mode
Description	
Data Type	Unsigned 16
Access modes	RW
PDO Mapping	No
Value Range	0
Default Value	0

Operation modes:

0 Streaming Mode
This operation mode uses objects 4800, 4801, 480F, 4810 and 4811 for data exchange.
The mode directly forwards data from CAN to RS232 and vice versa.

All other modes are reserved for future gateway versions.

Emergency Messages

The hipecs-GW30 module supports several emergency messages. All of them have the same structure.

Byte							
0	1	2	3	4	5	6	7
EMY-Code		1001	0	GWXX-Code			

EMY-Code: emergency-Error-Code according to DS301
1001: content of object 1001

GW-Code: Emergency-Error-Code as unsigned 32 value

GW-XX-Code (hex)	changes:		description
	NMT	I/O	
8000 0000	X	X	CAN bus is Bus-OFF
4000 0000			CAN bus in error warning state
2000 0000			Node guarding warning
3000 0000	X	X	Life guarding error
1000 0000	x		Heartbeat error
0000 0100			Wake up from power down mode

Emergency 2000 0000 (Node guarding warning) must be enabled with object 2103.
If more than one error is active at the same time, the bitmap of the GW-Codes for all active errors are combined with a logical or conjunction.
Some of the emergencies may cause a NMT state change and/or may force the output pins to the error state. This behaviour depends on the setting of object 1029.
The ID for emergency transmission is fixed to:
0x80 + $NodeID.

List of emergency messages:

Node-Guarding warning							
30	81	01	00	00	00	00	20

This warning occurs, if the masters fails to transmit the guarding remote frame within the specified Guard Time object 100C and if transmission is enabled in object 2103

Life-Guarding error							
30	81	11	00	00	00	00	30

This error occurs, if the masters fails to transmit the guarding remote frame within the specified Life Time (Guard Time object 100C multiplied with Life Time Factor object 100D)

Heartbeat error							
30	81	11	00	00	00	00	10

This message indicates a Heartbeat error.

CAN Bus in error warning state							
00	81	01	00	00	00	00	40

This error occurs, if the chips internal CAN module is in error warning state.

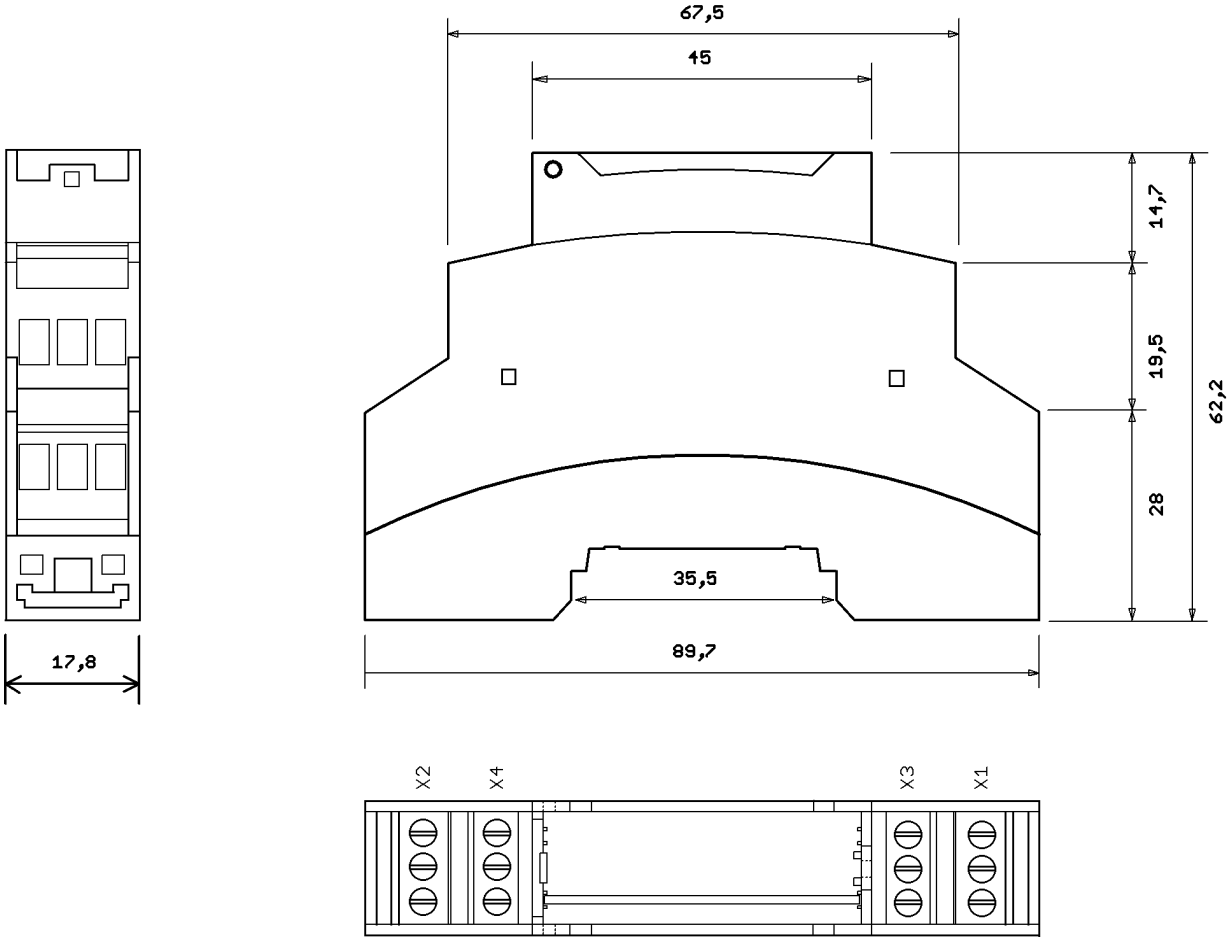
CAN Bus-OFF error							
40	81	11	00	00	00	00	80

This message indicates a CAN Bus-OFF error.

Data Mapping to Dictionary

operation mode 0 2 dig. inputs / 1 dig. output EDS-file: hipecs_GW-030.EDS								
mapping to dictionary								
Index.	mapped I/O signal bit/value							
SubIndex	7	6	5	4	3	2	1	0
4800.01	COM Rx DataByte 1							
4800.02	COM Rx DataByte 2							
4800.03	COM Rx DataByte 3							
4800.04	COM Rx DataByte 4							
4800.05	COM Rx DataByte 5							
4800.06	COM Rx DataByte 6							
4800.07	COM Rx DataByte 7							
4801.00	COM Rx Status							
4810.01	COM Tx DataByte 1							
4810.02	COM Tx DataByte 2							
4810.03	COM Tx DataByte 3							
4810.04	COM Tx DataByte 4							
4810.05	COM Tx DataByte 5							
4810.06	COM Tx DataByte 6							
4810.07	COM Tx DataByte 7							
4811.00	COM Tx Command							
6000.01	I0 to I1							
6200.01	O0							
Default PDO Mapping								
PDO	mapped data							
RPDO1	6200.01 dig. output O0							
RPDO2	4811.00 COM Tx Command 4810.01 Tx DataByte1 4810.02 Tx DataByte2 4810.03 Tx DataByte3 4810.04 Tx DataByte4 4810.05 Tx DataByte5 4810.06 Tx DataByte6 4810.07 Tx DataByte7							
RPDO3	unused							
RPDO4	unused							
TPDO1	6000.01 dig. inputs I0..I1							
TPDO2	4801.00 COM Rx Status 4800.01 Rx DataByte 1 4800.02 Rx DataByte 2 4800.03 Rx DataByte 3 4800.04 Rx DataByte 4 4800.05 Rx DataByte 5 4800.06 Rx DataByte 6 4800.07 Rx DataByte 7							
TPDO3	unused							
TPDO4	unused							

Plastic Housing Measurements



Version History

version	date	change
1.611 Rev. 0	Dec/10/2014	first version

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