



Koheras Basik™ Module

Integration guide



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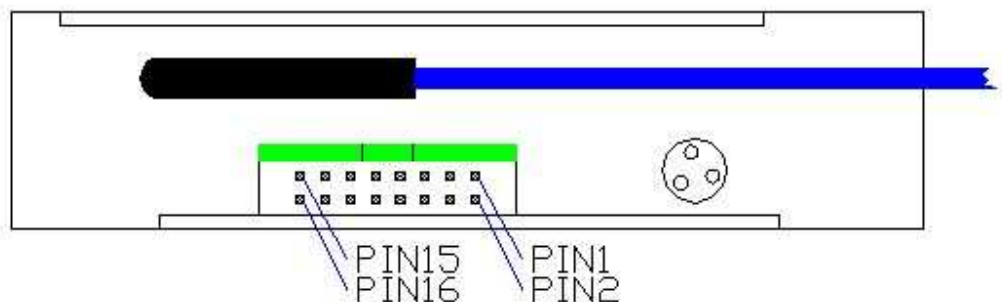
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This document describes the integration of a Koheras BasiK module.

1 BasiK module hardware integration

Connector type

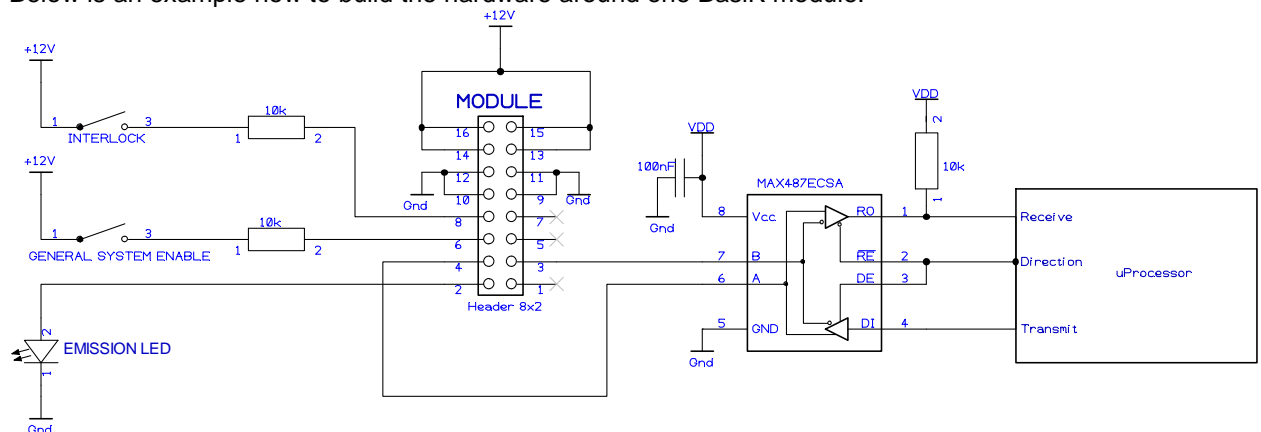
To connect to the Basik module use IDC-16 female (Ex.: Molex 90635-1162)



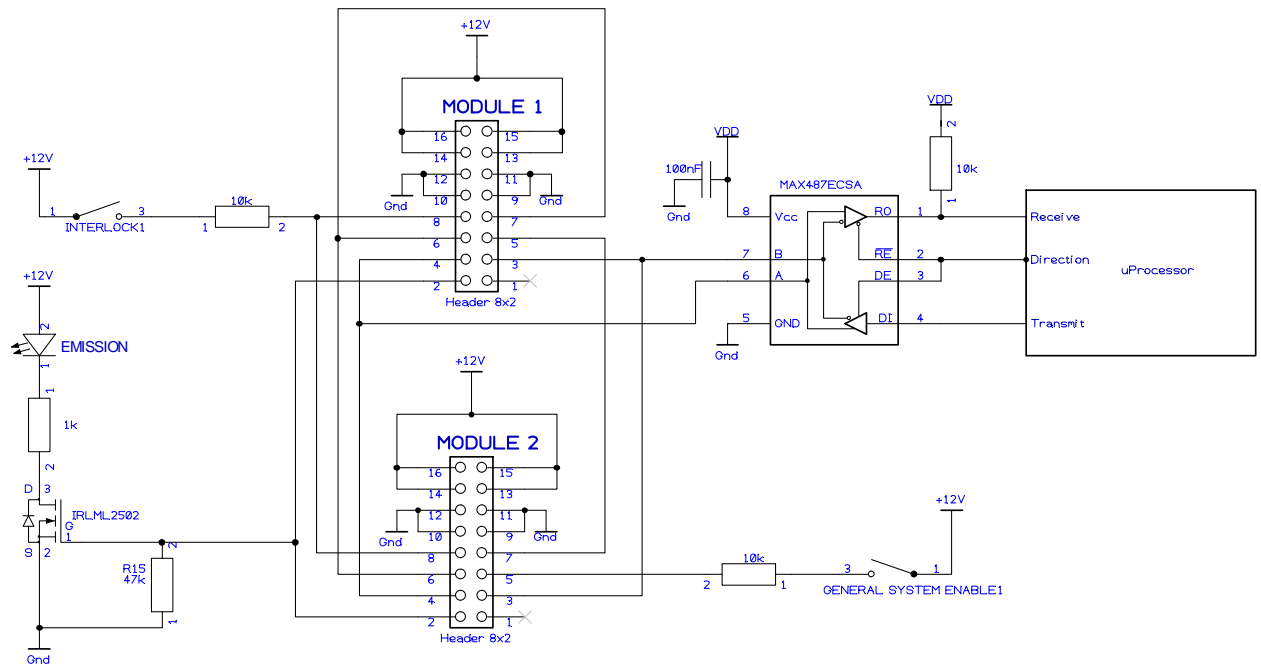
Pin description

1	Not used
2	Emission indicator logic output, High (5V) = Emission, Low = No emission Output is capable of driving one LED. Output impedance = 330Ω.
3	RS485 D-
4	RS485 D+
5	Interlock loop+
6	General system enable, logic input, must be pulled high with a 4.7kΩ resistor to 5V or with 10kΩ resistor to 12V.
7	Interlock loop-
8	Interlock, logic input, must be pulled high with a 4.7kΩ resistor to 5V or with 10kΩ resistor to 12V.
9-12	GND
13-16	+12V

Below is an example how to build the hardware around one BasiK module.



Below is an example how to build the hardware around more than one Basik module. Interlock loop + and – has been used to loop the General System Enable signal through both modules. This is done to insure that both modules are connected. The emission indicator outputs are connected to a common external LED driver.



2 Communication

2.1 Physical

The NKT Interbus standard is based on a 2 wire RS485. Baudrate 115200 kbit, 8 data bits, 1 stop bit, No parity.

2.2 Protocol description

The description of the protocol are explained in the document “NKT Photonics Interbus description”.

2.2.1 Example of communication

This example shows the communication between an external device (PC, embedded system, micro controller etc.) and the BasiK module.

Telegram for reading BasiK module status and warning register:

This BasiK module has by default the address 0A hex. If more the one BasiK module is combined in a system – each module will have a different address.

The PC or the unit communicating with the module has the address 42 hex, any value higher then 32 are legal.

Status and warning register is 1F hex.

Read command is 04 hex.

All values are in hexadecimal.

[0D][5E][4A][42][04][1F][34][7C][0A]

The BasiK module responds with

[0D][42][5E][4A][08][1F][63][00][13][16][0A]

42 = Destination

5E 4A = Source (same as 0A hex when it is escape sequence converted)

08 = Datagram

1F = Status and warning register

63 = Emission on, Constant power mode, Piezo tuning off, No RIN suppression, Temperature tuning

00 = No warnings

1316 = CRC16 for the telegram

Telegram for switching BasiK module on:

This BasiK module has the address 0A hex

The PC or the unit communicating with the module has the address 42 hex, any value higher then 32 are legal.

Emission control register is 30 hex.

Write command is 05 hex.

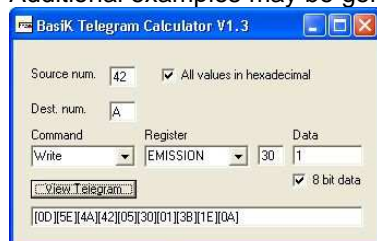
All values are in hexadecimal.

[0D][5E][4A][42][05][30][01][3B][1E][0A]

Telegram for switching BasiK module off.

[0D][5E][4A][42][05][30][00][2B][3F][0A]

Additional examples may be generated with the “BasiK Telegram Calculator” software.



3 BasiK module register definition

Attention: Do not read or write BasiK module more than 50 times pr. sec.

Some registers are write protected with password.

Register (Hex)	Description	char = 8 bit integer = 16 bit
10	All internal measurements including status and warnings, More info about measure telegram later in this chapter	14 integers (signed and unsigned)
1F	Status and warnings , 2 bytes variable	2 unsigned chars
21	HF gain setting, 2 bytes variable	1 unsigned integer
22	Pump driver voltage setting, 2 bytes variable	1 unsigned integer
23	Pump current setting in constant current mode or output power setting in constant power mode, 2 bytes variable	1 unsigned integer
24	Pump temperature setting, 2 bytes variable	1 unsigned integer
25	Fiberlaser temperature setting in temperature tuning mode or wavelength setting in wavelength tuning mode, 2 bytes variable	1 unsigned integer
28	Wavelength offset , 2 bytes variable	1 unsigned integer
60	Module address , 1 byte variable	
61	Module type , 1 byte variable. 20h: Communication module, 21h: BasiK module 22h: PreAmp module, 23h: Booster module 24h AWG module	
62	Hardware version	1 unsigned integer
64	Firmware version	1 unsigned integer
65	Module S/N	8 bytes ascii string
69	Module error log ,	12 unsigned char
6A	Module measurement log	12 unsigned integers
6B	Module actual errors	12 unsigned char
6D	Bootloader version	1 unsigned integer
6E	PCB S/N	8 bytes ascii sting
41	Fiberlaser measurement parameters	16 bytes
42	Pump peltier current measurement parameters	16 bytes
43	Fiberlaser petier current measurement parameters	16 bytes
44	Pump temperature measurement parameters	16 bytes
45	Pump current measurement parameters	16 bytes
46	Pump monitor current measurement parameters	16 bytes
47	Pump voltage measurement parameters	16 bytes
48	Fiberlaser output power measurement parameters	16 bytes
49	Module temperature measurement parameters	16 bytes
4A	Pump driver voltage measurement parameters	16 bytes
4B	Module input voltage measurement parameters	16 bytes
4C	Wavelength calculation parameters	16 bytes
51	HF gain settings parameters	16 bytes
52	Pump driver voltage settings parameters	16 bytes
53	Pump current settings parameters	16 bytes
54	Pump temperature settings parameters	16 bytes
55	Fiberlaser temperature settings parameters	16 bytes
56	Wavelength settings parameters	16 bytes
57	Fiberlaser output power settings parameters	16 bytes

Status register (1 byte)

Each byte in the status register indicates a state or a configuration of the module.

Bit	Bit = 0	Bit = 1
0	Emission off	Emission on
1	Constant Current mode	Constant Power mode
2	Piezo tuning disabled	Piezo tuning enabled
3	HF gain circuit disabled	HF gain circuit enabled
4	Temperature tuning	Wavelength tuning
5	Fiberlaser temperature not stable	Fiberlaser temperature stable
6	Pump temperature not stable	Pump temperature stable
7	General system enable released (HighZ)	General system enable dragged low by module

Warning register (1 byte)

Value	
1	A measurement has exceeded a non critical limit
2	A measurement has exceeded a critical limit, module is shut down
3	A measurement has exceeded a critical limit, module has shut down complete system

By writing 01h to register 69h warnings will be cleared and General System Enable released (HighZ).

If the condition which has caused the warning still is present a warning will be generated immediately after.

Measure telegram (28 bytes)

Byte		char = 8 bit integer = 16 bit
1	Status register	unsigned char
2	Warning register	unsigned char
3,4	Fiberlaser temperature in 1/1000 °C	unsigned integer
5,6	Pump peltier current in mA	unsigned integer
7,8	Fiberlaser peltier current in mA	signed integer
9,10	Pump temperature in 1/1000 °C	unsigned integer
11,12	Pump current in mA	unsigned integer
13,14	Pump monitor current in µA	unsigned integer
15,16	Pump voltage in mV	unsigned integer
17,18	Fiberlaser output power in 1/100 mW	unsigned integer
19,20	Module temperature in 1/10 °C	signed integer
21,22	Pump driver voltage in mV	unsigned integer
23,24	Module input voltage in mV	unsigned integer
25,26	Wavelength in pm (Note 1)	unsigned integer
27,28	Wavelength offset in nm (Note 1)	unsigned integer

Note 1: The actual wavelength is calculated from the fiberlaser temperature. A fiberlaser with wavelength 1556.021 nm => Wavelength offset = 1550 (byte 27,28) and wavelength = 6021 (byte 25,26)

Parameter telegram (16 bytes)

Byte	Description	char = 8 bit integer = 16 bit
1	Unit	unsigned char
2	Warning action	unsigned char
3,4	Start up	unsigned integer
5,6	Factory start up	unsigned integer
7,8	Upper limit	unsigned integer
9,10	Lower limit	unsigned integer
11,12	Correction X	signed integer
13,14	Correction Y	signed integer
15,16	Correction B	signed integer

Parameter telegram, Units

0	None	10	W
1	mV	11	m°C (1/1000 °C)
2	V	12	c°C (1/100 °C)
3	µA	13	d°C (1/10 °C)
4	mA	14	pm
5	A	15	dnm (1/10 nm)
6	µW	16	nm
7	cmW (1/100 mW)	17	% (percent)
8	dmW (1/10 mW)	18	‰ (per mille)
9	mW		

Parameter telegram, Warning action

The upper 4 bits of the warning action byte describes how an upper limit violation is handled.
The lower 4 bits of the warning action byte describes how a lower limit violation is handled.
The BasiK module has 7 different actions.

No	Description
0	Ignore limit violation
1	Raise a warning flag – no further actions
2	Raise a warning flag – shut down module
3	Raise a warning flag – Shut down and pull down General System Enable pin.
4	If emission is on do like 1 else no action
5	If emission is on do like 2 else no action
6	If emission is on do like 3 else no action

Ex: Warning action = 20h, module is shut down when the upper limit is violated but no actions occurs in case of a lower limit violation.

Parameter telegram, Start up and Factory

Measurement parameter sets: Not used, set to 0

Settings parameter sets: The start up value is loaded to the DAC controls at power up.

Factory is a copy of the start up value when the module leaves the factory.

This value is used to restore the module to factory settings (write AA00h to register 68h).

Parameter telegram, *Upper and lower limit*

Measurement parameter sets: Defines the upper and lower limit for a measurement value.

Settings parameter sets: Defines the upper and lower limit for a user input control value.

Parameter telegram, *Correction X, Y and B*

Measurement parameter sets: For linear conversion of ADC value to user readable value.

Readout = (X/Y) * ADC + B

Settings parameter sets: For linear conversion of a user written control value to a DAC setting.

DAC = (X/Y) * User value + B

Writing 1 byte: [Destination][Source][05][Register][Data][CRC msb][CRC lsb]

Writing 2 bytes: [Destination][Source][05][Register][Data lsb][Data msb][CRC msb][CRC lsb]

Register (Hex)	Description
30	Data=00h : Emission off, Data=01h : Emission on
31	Data=00h : Constant Current mode, Data=01h : Constant Power mode
32	Data=00h : Piezo tuning disabled, Data=01h : Piezo tuning enabled
33	Data=00h : HF gain circuit disabled, Data=01h : HF gain circuit enabled
34	Data=00h : Temperature tuning, Data=01h : Wavelength tuning
21	HF gain setting, 2 bytes variable
22	Pump driver voltage setting, 2 bytes variable
23	Pump current setting in constant current mode or output power setting in constant power mode, 2 bytes variable.
24	Pump temperature setting, 2 bytes variable
25	Fiberlaser temperature setting in temperature tuning mode or wavelength setting in wavelength tuning mode, 2 bytes variable
68	Data=0100h: Restart module, Data=AA00h: Restore factory settings and restart module
69	Data=01h: Clear Error and release General System Enable