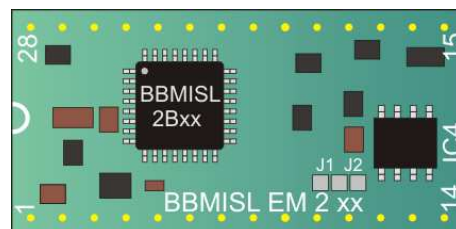
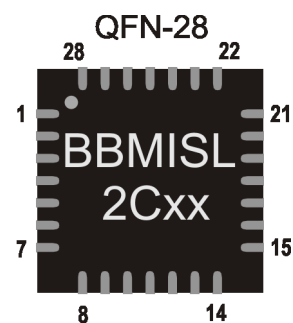
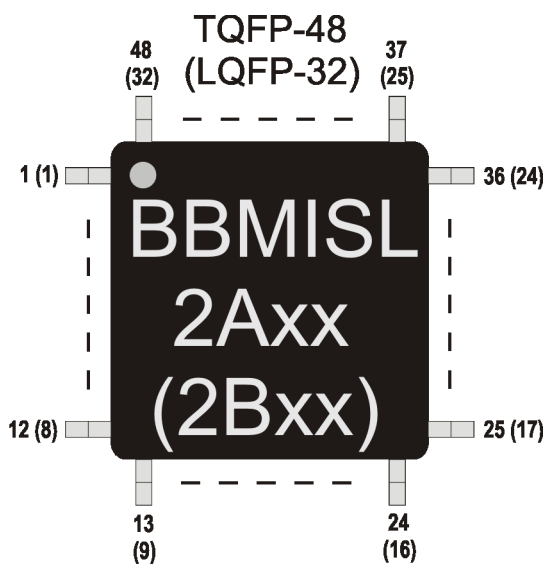


Instruction manual for configuration Miniatur Bitbus Slave BBMISL2A,B,C u. BBMISL EM2

The Miniature Bitbus Slave's BBMISL2Axx, BBMISL2Bxx or BBMISL2Cxx are today the worldwide smallest Slave IC's with complete analog- and digital periphery. At the first time there is a part available for using in restricted space applications, like sensors or actors. With this also Bitbus can be used economical in such areas. The Evaluations Module BBMISL EM1xx is a complete Bitbus Slave Module based on the Miniatur Slave IC BBMISL2Bxx. All important components for operating, like 12MHz Clock generator, RS232 and RS485 Transceiver are integrated. Therefore a high flexibility in configuration for the 32 (22) [18] I/O ports on IC's and 16 I/O ports on Evaluation Module, inaccessible in the past, was got. The ADC- Digital inputs, also DAC and Digital outputs can be arranged in any way. The complete configuration is done by RS232 and is permanently stored. Pinout and circuit details can be found in the corresponding datasheets.



Inh. Ing. Helmut Krös
Rosenthalgasse 25
A-2380 Perchtoldsdorf

email: sykat@sykat.com
<http://www.sykat.com>

Tel: +43(0)1/ 865 26 87
Fax: +43(0)1/ 865 16 61

Configuration of parameters

The configuration of the I/O Ports, of ADC reference., also node address is done by RS 232. The terminal must have the following setup:

9600Bd, No Parity, 8 Bit, 1 Stopbit, No Handshake.

The description of configuration in the following be valid for both IC packages of BBMISL 1Axx, and BBMISL 1Bxx. The specific description with the shown number of ports and pinout are in relation to BBMISL EM1xx Modul and the built in IC BBMISL 1Axx. For the other IC variant BBMISL 1Bxx with different number of I/O Ports a modified firmware is used, it follows from that with change in configuration.

The configuration of the 16 (12) I/O Ports is done by RS232 and can be arranged nearly in any way. The only exception are the 2 DAC outputs. DAC1 and DAC2 is only useable at Port1 and Port2. The ADC measurement runs asynchron for all 16 channels in background. The time for actualisation is 5ms.

The I/O Ports can be configured as:

- Digital Input: Weak Pullup 100k Ω , 0-activ
- Digital Output: Push Pull, $\pm 5\text{mA}$, 0-activ
- ADC Input: 12Bit Resolution, Voltage range 0- V_{REF}
- DAC Output: 12 Bit Resolution, 0-2mA, 0,5%, max. Restistance 650 Ω , (Only Port1 u. 2)

- ADC Referenz Voltage: Intern 2,2V $\pm 2\%$, o. V_{DD} (2,5V), o. Extern max. 2,5V

The Node Adress setup area is 1-240.

The setup for Bitbus Datarate is 62.5 or 375kBd.

ON PRIINCIPLE

At command or data input there is a control of plausibility, i fit is possible. There is controlling of syntax and values from the setup commands. If the input is different about this, an errormessage „**ERROR**“ is generated.

At correctness of input „**OK**“ is generated. Each command input for query of stored configurations or data input is finished with **RETURN**. For input it is possible to use uppercase or lowercase letters.

QUERY OF ABBREVIATIONS FOR CONFIGURATIONS

After entering of „**H,h**“ the used abbreviations are displayed.

Commands

D=(D)atarate
N=(N)odeaddress
P=(P)ort Nr.
R=(R)eference ADC
S=(S)etups

Assignements (D)atarate

L=(L)ow 62,5
H=(H)igh 375

Assignements (P)ort

A=(A)DC
D=(D)AC
I=(I)nput
O=(O)utput

Assignements (R)eference

I= (I)ntern
E=(E)xtern
V=(V)DD

QUERY OF CONFIGURATION

After entering of „S,s“ the stored complete configuration is displayed. Displayed are always uppercase letters, independent of input.

Example: (Basic setup):

```
s
P01=I          Dig. Eing.
P02=D          DAC Ausg. Nur Port 2 möglich
P03=A          ADC Eing.
P04=A
P05=A
P06=A
P07=I          Dig. Eing.
P08=I
P09=I
P10=I
P11=O          Dig. Ausg.
P12=O
P13=O
P14=O
P15=O
P16=O
R=I            Interne VREF
D=H            Datarate High 375kBd
N=001         Node Adresse
```

INPUT OF CONFIGURATION

Be careful to use the right syntax, always leading 0 must be used.
If the input was correct, the answer is **OK**, otherwise **ERROR**.

Example of correct input:

```
p11=a (Finish with return)
OK
```

Example of wrong input:

```
p9=i          No leading 0 was used
ERROR
```

```
r=a          Wrong configuration for r, only i,e, v possible
ERROR
```

```
N=245       Node adress only till 240 possible
ERROR
```

Implemented RAC commands:

A Multitasking Operating System is not implemented. One reason is, for the used tasks it is not necessary, another one is to extend the usage of other microcontrollers, because of the limited space of RAM. Therefore it is also not necessary to use all known RAC commands. Experience shows that in a lot of applications only a fraction from the whole spectrum is used.

The implemented RAC commands are:

- Software Reset (0)
- Read I/O (5), only for Port 1 and 2
- Write I/O (6), only for Port 1 and 2
- Read and Write I/O (7), only for Port 1 and 2
- Upload Memory (8), only Address 2000h – 2026h
- Download Memory (9), only Address 2000h – 2005h
- Read Node Info (15)

At all other RAC commands and exceeding of area limits Response Code FEh instead of 0, will be sent.

Memory Organisation, Upload and Download

| Address | Upload | Description | Download | Description |
|---------|--------------------|-----------------|---------------------|------------------|
| 2000h | Port 1-8 Dig.Inp. | Read I/O Port 1 | Port 1-8 Dig.Outp. | Write I/O Port 1 |
| 2001h | Port 9-16 Dig.Inp. | Read I/O Port 2 | Port 9-16 Dig.Outp. | Write I/O Port 2 |
| 2002h | ADC1 High Byte | | DAC1 High Byte | |
| 2003h | ADC1 Low Byte | | DAC1 Low Byte | |
| 2004h | ADC2 High Byte | | DAC2 High Byte | |
| 2005h | ADC2 Low Byte | | DAC2 Low Byte | |

| | | | | |
|-------|-----------------|-----------|--|--|
| 2018h | ADC12 High Byte | | | |
| 2019h | ADC12 Low Byte | | | |
| 201Eh | ADC15 High Byte | | | |
| 201Fh | ADC15 Low Byte | | | |
| 2020h | ADC16 High Byte | | | |
| 2021h | ADC16 Low Byte | | | |
| 2022h | I/O Config. 1 | Port 1-8 | | |
| 2023h | I/O Config. 2 | Port 9-16 | | |
| 2024h | ADC Config.1 | Port 1-8 | | |
| 2025h | ADC Config.2 | Port 9-16 | | |
| 2026h | DAC Config. | Port 1,2 | | |

Not configured ADC inputs are filled with FFh in High, and Low Byte.

Description of configuration bytes

The configuration of I/O Ports 1-16 are stored in configuration bytes. There are 3 groups, I/O , ADC, and DAC configuration. The configuration bytes are modified at Port configuration with RS232 and can be read back with Upload.

| Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|----------|
| Port8(16) | Port7(15) | Port6(14) | Port5(13) | Port4(12) | Port3(11) | Port2(10) | Port1(9) |

0 = ADC, DAC on Port not active, or Dig. Output at I/O configuration
1 = ADC, DAC on Port active, or Dig. Input at I/O configuration.

Technical Data:

- Message length: max. 255 Byte
- Datarate: 62.5,375 kBd
- Number of I/O Ports: BBMISL2Axx: 32, BBMISL2Bxx: 22, BBMISL2Cxx: 18 free configuration
- Digital Input: Weak Pullup 100k Ω , 0-active
- Digital Output: Push Pull, ± 5 mA, 0-active
- ADC Input: 12Bit resolution, Voltage Range 0- V_{REF}
- ADC Reference: Intern 2,2V $\pm 2\%$, o. V_{DD} (2,5V), o. Extern max. 2,5V
- ADC Clock rate: 200 Measurements /s, at 16 Inputs
- DAC Output: 12 Bit resolution, 0-2mA, 1%, max. load resistor 650 Ω , (Only Port 2)
- UART: 9600Bd, for configuration of I/O Ports, ADC Ref, Node Adress, Datarate
- Power Supply: 3,3-5V=, for BBMISL2A,B, C ap. 70 mA, for BBMISL EM2 ap. 85mA

Subject to change