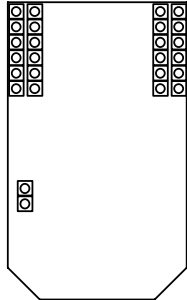


## TECHNICAL DATA

### **BUS INTERFACE MODUL**

### **BIM M111/02, BIM M115/02**



### **Ordering Information**

BIM M111: 5WG1 111 8AA02

BIM M115: 5WG1 115 8AA02

### **Features**

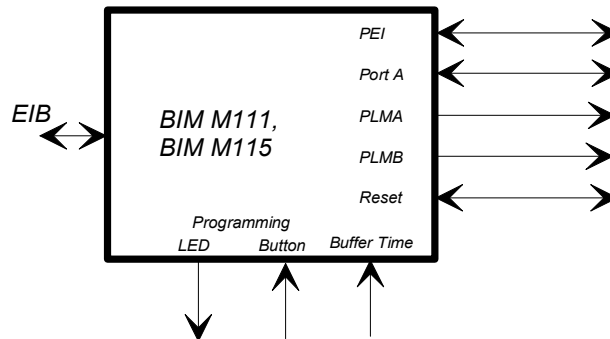
- *EIB* Bus Interface Module for piggyback-use on PCBs
  - MC68HC05B6 with mask programmed ROM, contains the *EIB* System Software
  - PEI <sup>\*)</sup> and Port A, PLM A and PLM B for applications available
  - Smallest *instabus* *EIB* Bus Access Unit
  - Operating Temperature Range:
    - BIM M111: - 5 to + 45 °C
    - BIM M115: - 25 to + 70 °C
  - EIB/KNX certified part
- <sup>\*)</sup> = *Peripheral External Interface*

### **DESCRIPTION**

The BIM M111 or the BIM M115 are members of Siemens *instabus* *EIB* BCU - family. They are especially designed as small modules for piggyback use and can be fitted directly into PCBs. The modules contain all functional parts of an *EIB* - BCU with the exception of the shift register for the serial synchronous interface. Additionally access to such microcontroller ports as Reset, PLMA, or Port A is possible. These ports are directly accessible by the user. Additional pins for the connection of an external programming button and a LED are available. For applications with the need of longer 'Bus Buffer Time' the BIM allows to connect an additional capacitance at bus voltage level.

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### Schematic Block Diagram



### Absolute Maximum Electrical Ratings

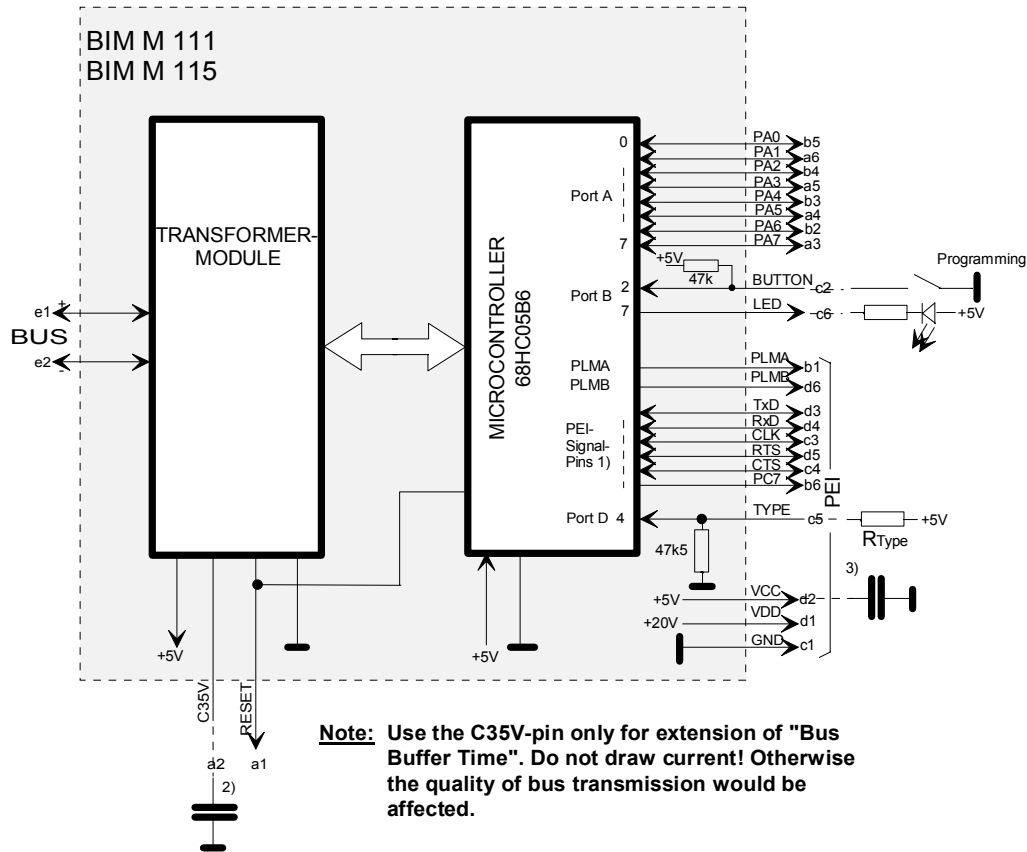
Rating	Symbol	Value	Units
Bus Voltage	V Bus	$\pm 35$	V
Microcontroller Input Voltage PEI, PLMA, PLMB, Reset, LED, Button	V...	GND - 0,5 to Vcc + 0,5	V
Microcontroller input or output current per Pin	I	see Motorola Technical Data MC68HC05B6	

### Features of the Controller

- CPU MC68HC05B6
- Operating Frequency 2,0 MHz (crystal frequency of 4,0 MHz)
- On-Chip RAM 176 Bytes ( 18 Bytes available for user )
- On-Chip EEPROM 256 Bytes (230 Bytes available for user)
- 8-Bit A/D-converter (5 channels available for user)
- 8-Bit pulse length modulator (PLM)
- Serial asynchronous communication interface
- Serial synchronous communication interface
- Watch dog

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### HARDWARE BLOCK DIAGRAM



- 1) For detailed description see "PEI" - table.
- 2) Additional capacitance ( $V_c=35V$ ) for extended "Bus Buffer Time", e.g.  $100\mu F$ .
- 3) Additional capacitance ( $V_c=5V$ ) for extended "Bus Buffer Time", e.g.  $470\mu F$ .

### Memory Map

Address Range		Memory	Bytes
0000	001F	I/O, Register	32
0020	004F	ROM	48
0050	00BF	RAM	176
00C0	00FF	Stack	64
0100	0100	OPTR	1
0101	011F	EEPROM non protected	31
0120	01FF	EEPROM protected	224
0200	1FF1	ROM and unused areas	
1FF2	1FFF	Special functions	

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### PEI (Physical External Interface)

PEI – Pin – Assignment

	Pin Mnemonics	Power Supply	Serial Interface Async./sync.	I - Ports or A / D - Ports	Digital I / O - Ports	Remarks
a1	RESET				_RESET	In-/Output
a2	C35V					Buffer Capacitor
a3	PA7				PA7	Digital Input / Output
a4	PA5				PA5	Digital Input / Output
a5	PA3				PA3	Digital Input / Output
a6	PA1				PA1	Digital Input / Output
b1	PLMA				PLMB	Pulse-Length-Mod.
b2	PA6				PA6	Digital Input / Output
b3	PA4				PA4	Digital Input / Output
b4	PA2				PA2	Digital Input / Output
b5	PA0				PA0	Digital Input / Output
b6	PC7				PC7	Digital Output (Input / Output when PEI-Type17)
c1	GND	Ground				
c2	BUTTON				PB2	Digital Input
c3	CLK		SCLK	PD6	PC4	Clock •→
c4	CTS			PD3	PC6	Clear to Send •←
c5	TYPE			PD4		PEI - Type
c6	LED				PB7	Digital Output
d1	VDD	Vdd (20V)				2mA Current Limit.
d2	VCC	Vcc (5V)				
d3	TxD		TDO	PD5	PC3	Data •→
d4	RxD		RDI	PD7	PC2	Data •←
d5	RTS			PD2	PC5	Request to Send •→
d6	PLMB				PLMB	Pulse-Length-Mod.
e1	+ Bus					Bus Line
e2	- Bus					Bus Line

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### ELECTRICAL SPECIFICATION

See also KNX Specification, Version 1.0

Bus Interface Characteristics:

Characteristics	Symbol	Min	Max	Typical	Unit	Remarks
Operating Voltage	V <sub>Bus</sub>	21	30		V	
Current consumption	I <sub>Bus</sub>			4	mA	
Reset conditions	V <sub>cc</sub>	< 4,6			V	Reset generated by transceiver
BCU-Buffer-Time		TBD			ms	PEI-Load:50mW
Transmission Rate				9600	bit/s	

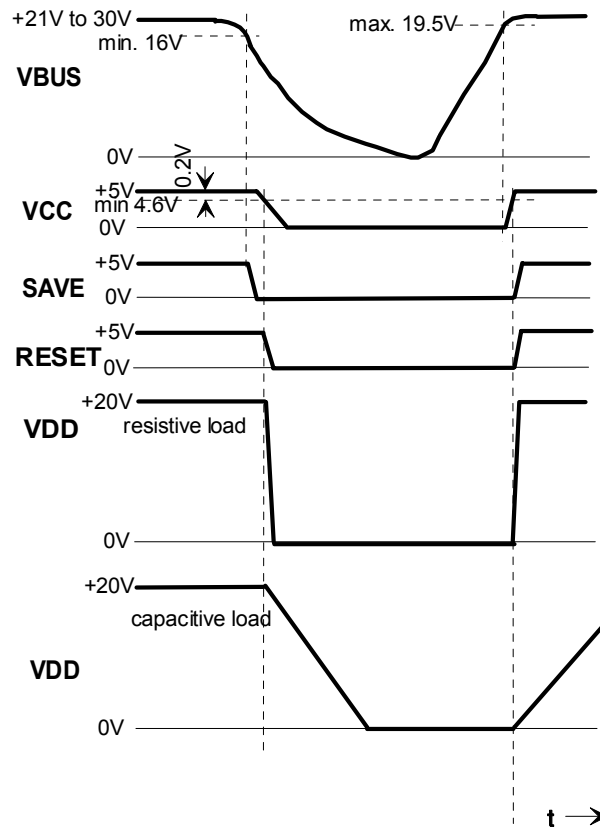
PEI DC-Characteristics:

Characteristics	Symbol	Min	Max	Typical	Unit	Remarks
Supply Output Voltage +5V	V <sub>CC</sub>	4.7	5.3		V	Max. 10mA
Supply Output Voltage +20V	V <sub>DD</sub>	18	20.5		V	load = 2mA V <sub>BUS</sub> - V <sub>DD</sub> > 1,5V V <sub>BUS</sub> = 21V ... 30V
Current Limitation	I <sub>DD</sub>	2	5		mA	
Data Output Voltage Port A, Port B, Port C	V <sub>OL</sub> V <sub>OH</sub>	V <sub>CC</sub> -0,8	0.4		V	I <sub>load</sub> =1,6mA I <sub>load</sub> =0,8mA
Data Output Voltage TDO, SCLK, PLMB	V <sub>OL</sub> V <sub>OH</sub>	V <sub>CC</sub> -0,8	0.4		V	I <sub>load</sub> =1,6mA I <sub>load</sub> =1,6mA
Data Output Voltage Reset	V <sub>OL</sub>		1,0		V	I <sub>load</sub> =1,6mA
Data Input Voltage Port A, Port B, Port C Reset, RDI	V <sub>IL</sub> V <sub>IH</sub>	0 0.7 V <sub>CC</sub>	0.2 V <sub>CC</sub> V <sub>CC</sub>		V	
Analog Input Voltage Range	V <sub>AIL</sub> V <sub>AIH</sub>	0	V <sub>CC</sub>		V	
I/O Ports Three-State-Leakage	I <sub>OZ</sub>		±10		µA	
Input Capacitance	C <sub>IN</sub>		50		pF	

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### Timing

The timing of Save, Reset, VCC and VDD which are depending on VBUS are shown in the following depiction:



### Environmental Conditions

Rating	Symbol	Value	Unit	Remarks
Operation Temperature Range BIM M111	TA	- 5 to + 45	°C	no condensation
Operation Temperature Range BIM M115	TA	- 25 to + 70	°C	no condensation
Storage Temperature Range BIM M111	TSTG	- 25 to + 55	°C	
Storage Temperature Range BIM M115	TSTG	-25 to + 70	°C	
Relative Humidity		5 to 93	%	no condensation

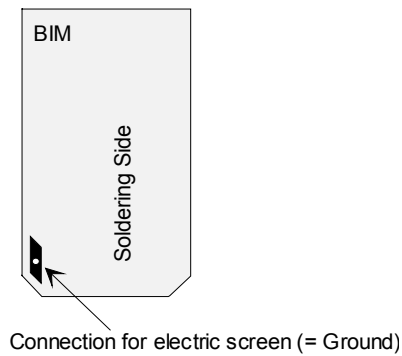
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## SOFTWARE SPECIFICATION

See also KNX Specification, Version 1.0

### Application Hint

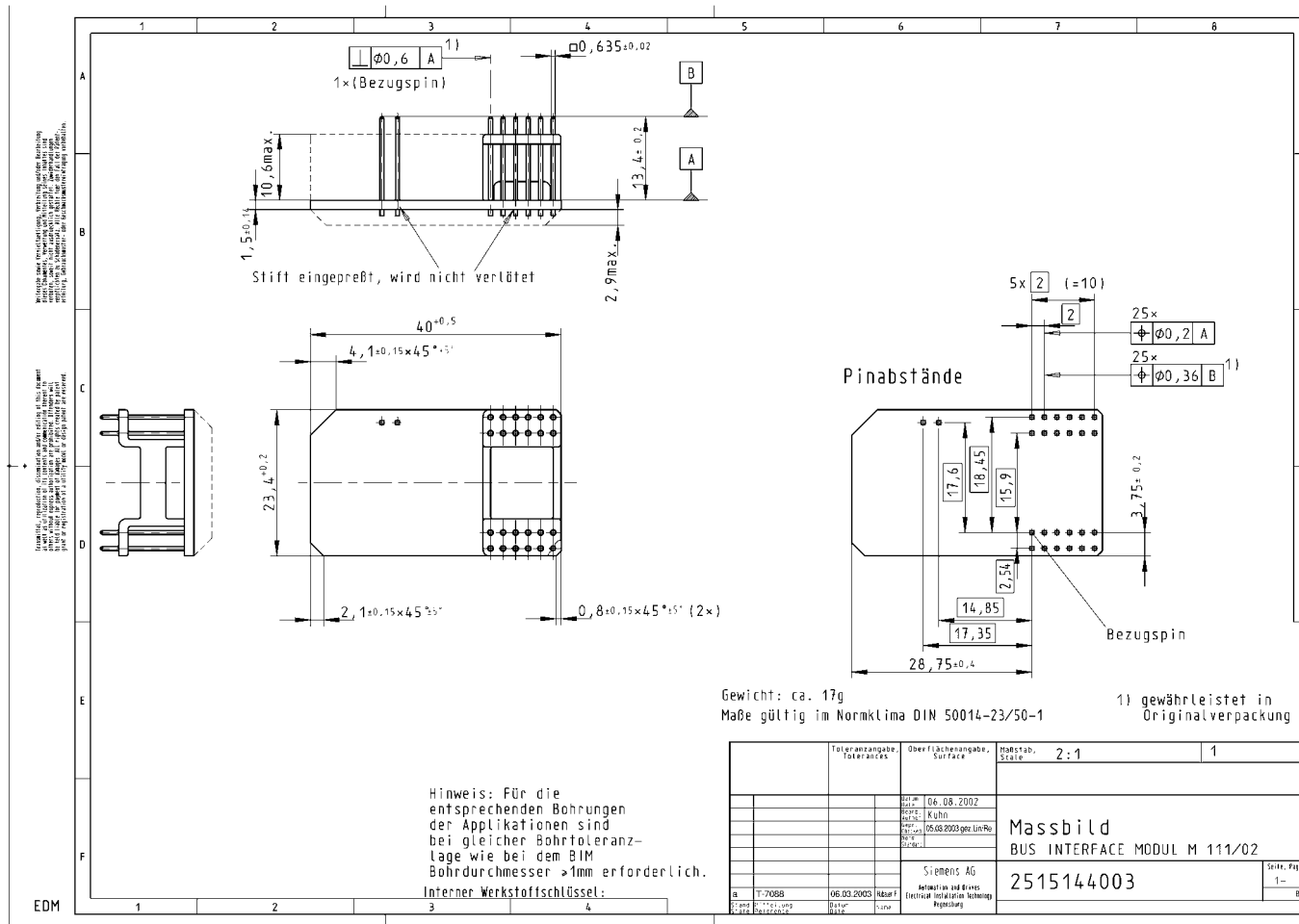
To avoid malfunctioning by EMI, it is recommended to shield the BIM. The connection for the electric screen is shown in the figure below.



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### MECHANICAL SPECIFICATION (BIM M111/02)



The mechanical specification of the BIM M115/02 is identical to BIM M111/02.

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