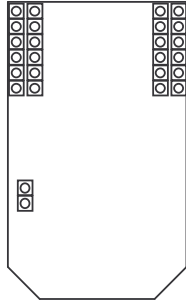# SIEMENS

TECHNICAL DATA

BUS INTERFACE MODULES
BIM M130, BIM M131, BIM M132, BIM M135

Features

- *EIB* and KNX Bus Interface Module for piggyback-use on PCBs
- NEC 78K0/Kx2 microcontroller, contains the KNX System 2 stack and application
- PEI (Physical External Interface), one 8-bit I/O port and two PWMs for applications available
- User Flash memory
- User RAM
- Same pin-out as BIM M111/115 and M113
- Operating Temperature Range:
  - 5 to + 45 °C (M130, M131, M132)
  - 25 to + 70 °C (M135)
- Complies to KNX specification

Description

The BIM M13x series of bus interface modules is based on the NEC 78K0/Kx2 microcontroller family providing state of the art flash memory technology. This enables the application designer to utilize a modern tool chain including debug tools leading to shorter software development times.
In addition the BIM M13x series is designed with a high degree of hardware compatibility to BIM M111/115 and BIM M113 enabling to replace the BIM M111/113/115 in existing hardware in most cases reducing the development effort to the application software. As in BIM M111/113/115 the application interface includes the PEI, Reset, two PWMs and one 8-bit processor port. Additional pins to connect the external programming button and LED are available.
The BIM M13x modules contain the System 2 software compliant to the Konnex specification.

Order Numbers

Device	Order Number
BIM M130	5WG1 130-8AA01
BIM M131	5WG1 131-8AA01
BIM M132	5WG1 132-8AA01
BIM M135	5WG1 135-8AA01

Absolute Maximum Electrical Ratings

Rating	Symbol	Value	Units
Bus Voltage	V Bus	$\pm$ 35	V
Microcontroller Input Voltage PEI, PWMs, Reset, LED, Button	V	GND - 0,3 to Vcc + 0,3	V

Features of the Controller

- CPU NEC 78K0/Kx2

- 8-Bit A/D-converter API

- 8-Bit pulse length modulator (PLM)

- Serial asynchronous communication

- Serial synchronous communication in software

- Input capture Interrupt available

- Output compare interrupt available

- Watch dog

- one 8-bit timer

- one 16-bit timer

Hardware block diagram
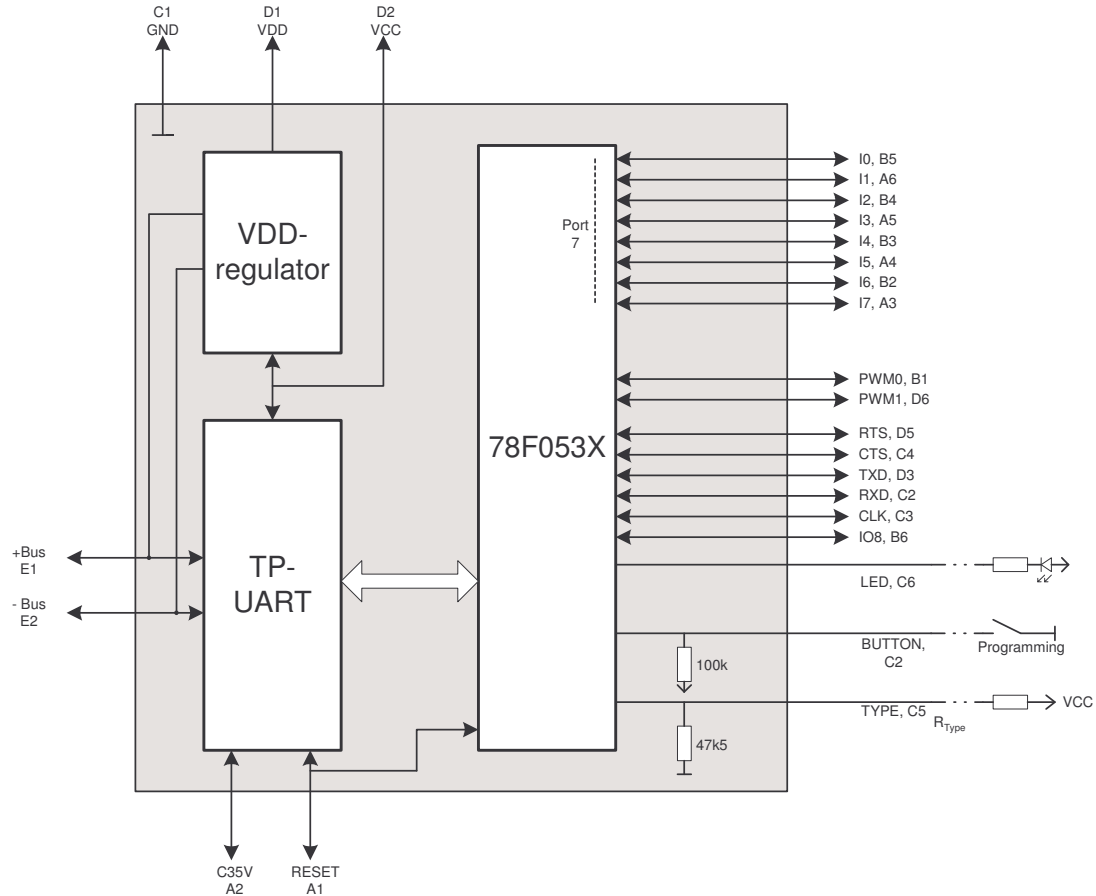
Note: Use the C35V-pin only for extension of "bus buffer time". Do not draw current.

Add capacitors to VCC, VDD and C35V to increase the "bus buffer time".

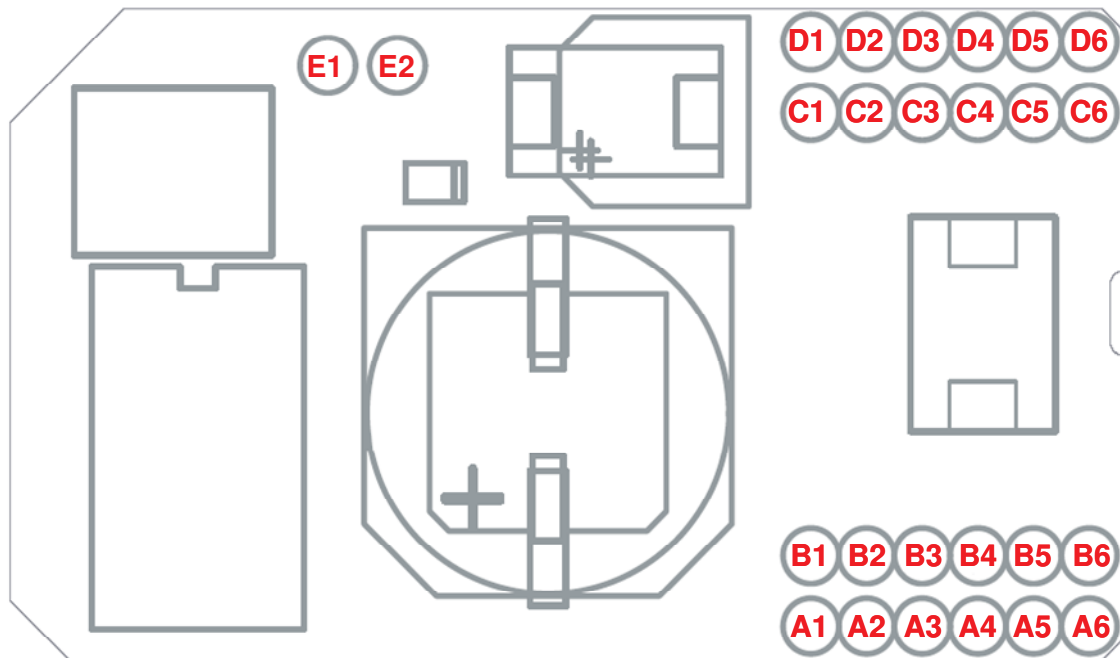The following rule for a capacitor on VCC has to be obeyed:

$C_{VCC} < C_{C35} + 300uF$

PEI (Physical External Interface)

PEI-Pin- Assignment:

	BIM Pin Mnemonics	µC-Pins (BIM M113)	Input Options (•) (BIM M113)	Output Options(•) (BIM M113)	µC-Pins (BIM M13x)	Input Options (•) (BIM M13x)	Output Options(•) (BIM M13x)	Remarks
A1	RESET	_RESET			_RESET			In-/Output
A2	C35V							Buffer Capacitor
A3	IO7	PA7			P77			Digital I/O
A4	IO5	PA5			P75			Digital I/O
A5	IO3	PA3			P73			Digital I/O
A6	IO1	PA1			P71			Digital I/O
B1	PWM0	PC0	•AN0 •BEI06	•PWMA •BEI06	P15	•ANI0	•TOH0	Digital I/O, A/D-Converter, Pulse-Width-Modulation
B2	IO6	PA6			P76			Digital I/O
B3	IO4	PA4			P74			Digital I/O
B4	IO2	PA2			P72			Digital I/O
B5	IO0	PA0			P70			Digital I/O
B6	IO8	PC7	•AN1	•PWMA •TCMPB	P01	•ANI1 •TI010	•TO00	Digital I/O, A/D-Converter, Capture, Compare
C1	GND							Ground
C2	BUTTON	BEI05			P63			Only Digital In
C3	CLK	PC4	•AN6 •SPI-CLK •TCAPB •BEI07	•SPI-CLK •BEI07	P04	•ANI6 •SCK11		Digital I/O, A/D-Converter, (SPI-Clock-Out only in Software)
C4	CTS	PC6	•AN3 •TCAPA	•PWMA •BEI01	P33	•ANI3	•TO51	Digital I/O, A/D-Converter, Pulse-Width-Modulation, Clear to Send •←
C5	TYPE		•AN4		P25	•ANI4		PEI-Type, A/D-Converter
C6	LED	BEI05			P62			Port is an open drain
D1	VDD							20V
D2	VCC							5V
D3	TxD	PC3	•AN5 •SPI-MOSI	•SCI-TDO •SPI-MOSI •TCMPA	P10	•ANI5 •SI11	•TxD0	Digital I/O, A/D-Converter, UART-TxD, (SPI-Master-Out only in software)
D4	RxD	PC2	•AN7 •SCI-RDI •SPI-MISO	•SPI-MISO	P11	•ANI7 •RxD0	•SO11	Digital I/O, A/D-Converter, UART-RxD, (SPI-Master-In only in software)
D5	RTS	PC5	•AN2	•PWMB •TCMPB	P00	•ANI2 •TI000		Digital I/O, A/D-Converter, Capture, Request to Send •→
D6	PWM1	PC1		•PWMB	P16		•TOH1	Digital I/O, Pulse-Width-Modulation
E1	+ Bus							Bus Line
E2	- Bus							Bus Line

PIN Mapping

Electrical Characteristics

Complies to KNX Specification

Bus Interface Characteristics:

Characteristics	Symbol	Min	Max	Typical	Unit	Remarks
Operating Voltage	V_{Bus}	21	30		V	
Current consumption	I_{Bus}			5,5	mA	V_{bus} = 30 V IDD = 0mA, ICC = 0mA
Reset activation condition	VCC	4.0	4.6		V	Reset generated by transceiver. Conditions
	V_{C35V}	5.8	6.2			for active to reset state
Transmission Rate				9600	bit/s	

PEI DC-Characteristics:

Characteristics	Symbol	Min	Typ	Max	Unit	Remarks
Supply Output Voltage +5V	VCC	4.65		5.3	V	Load ≤ 10mA
Supply Output Voltage +20V	VDD	17	19	23	V	Load ≤ 5mA
Supply current	ICC			10	mA	I_{PIN} < 2,5mA (source).
	ICC			7,5 -I_{PIN}		I_{PIN}: sum of current on i/o pins.
Current limitation	IDD		10		mA	ICC ≤ 5mA
	IDD		5		mA	ICC = 10mA
Data output voltage	VOL VOH	VCC-0.7		0.7	V	Isink < 5mA Isource < 3mA
Data input voltage	VIL VIH	0.8 VCC		0.2 VCC		
Analog input voltage range	VAIL VAIH	0		VCC		
Input leakage current	IL		1		uA	
IO selectable pullup		10	20	100	kΩ	
Internal reset pullup		10		25	kΩ	

The data contained herein are subject to change without notice. Siemens does not warrant for correctness or completeness of the documentation or that the products described are qualified for certification.

Behavior on power loss

After a bus voltage breakdown for more than 1,5ms the save-routine of the bcu will be called. The time to reset will be sufficient to write a 64 byte data block to the internal flash memory if VCC, VDD and Pins have no load.

Software

The microcontroller of the BIM contains a System 2 stack in flash memory compliant with the KNX-Specification. An application program may be loaded via the bus. The development environment supports application software to be written in the C programming language. Note that application code written for BIM M111/113/115 cannot be used on BIM M13x.

The available Flash and RAM space for the application program in the different BIMs are:

BIM M130:   8 kbyte flash and 200 byte application and object ram

BIM M131:   16 kbyte flash and 1.2 kbyte application and object ram

BIM M132:   48 kbyte flash (banked) and 5,2 kbyte application and object ram

BIM M135:   8 kbyte flash and 200 byte application and object ram

Note: The necessary space for code with same functionality as in BIM M111/113/115 may vary because a microcontroller with a new architecture is used and the programming language is C instead of assembler.
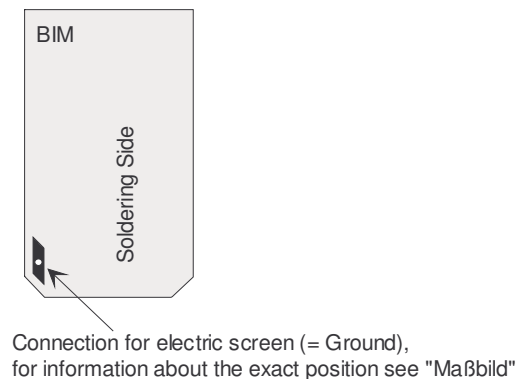
Tool Chain

The BIM M13x supports a state of the art tool chain including On-Chip Debugging (IAR Embedded Workbench).

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.

Connection for electric screen (= Ground),
for information about the exact position see "Maßbild"

Mechanical Specification:

Mechanical drawing (Maßbild) for BIM M130, M131, M132, M135.

Key annotations visible in the drawing:

- ⊥ ∅ 0,6 A 1x (Bezugspin)
- □ 0,635 ± 0,02
- 1,5 ± 0,2
- 10,6 max
- 13,4 ± 0,2
- Stift eingepresst, wird nicht verlötet
- 25x ⊕ 0,36 B 1) 5x2 (=10)
- 25x ⊕ 0,2 A 2
- Pinabstände
- 40 +0,5
- 4,1 ± 0,15 x 45° ± 5°
- 23,4 +0,2
- 0,8 ± 0,15 x 45° ± 5° (2x)
- 2,1 ± 0,15 x 45° ± 5°
- 17,6 2,54 15,9 18,44
- 14,85 17,35 28,75 ± 0,4 3,75 ± 0,2
- Bezugspin
- Gewicht: ca. 17g
- Maße gültig im Normklima DIN 50014-23/50-1
- 1) gewährleistet in Originalverpackung

Hinweis: Für die entsprechenden Bohrungen der Applikationen sind bei gleicher Bohrtoleranz-lage wie bei BIM Bohrdurchmesser >1mm erforderlich

MLFB	Benennung
5WG1130-8AA01	BIM M130
5WG1131-8AA01	BIM M131
5WG1132-8AA01	BIM M132
5WG1135-8AA01	BIM M135

Volumen in mm³
Oberflaeche in mm²

Allgemeintol. | Oberfläche | Maßstab 2:1

Datum 28.06.06
Bearb. Sedlmeier
Gepr.

Maßbild
BIM M130_M131_M132_M135

Siemens AG
Automation and Drives
Electrical Installation Technology
Regensburg

A5E00740721B

Blatt 1
1 Bl.

01 | 79B03269 | 28.06.06 | Sedlm
Zust. | Mitteilung | Datum | Name