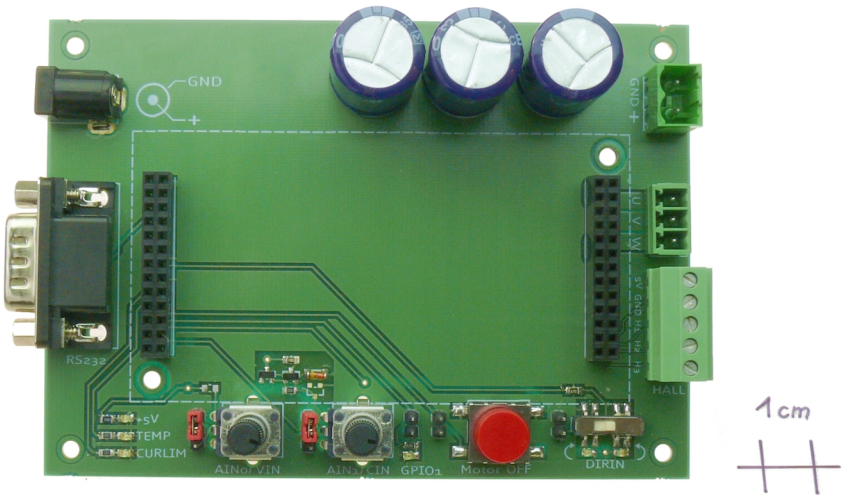
BB-160

Manual

Base Board for the TMCM-160 Module



TRINAMIC

MOTION CONTROL

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1 Features

The baseboard BB-160 allows to build a ready to use BLDC motor driver unit using the TMCM-160 driver module. All important signals and the power supply lines can be connected easily. For motor, power supply and hall sensors screw terminals are available and for RS232 (or RS485) a 9-pin D-SUB connector. Some signals like the analog inputs are adjustable either onboard or they can be controlled remotely.

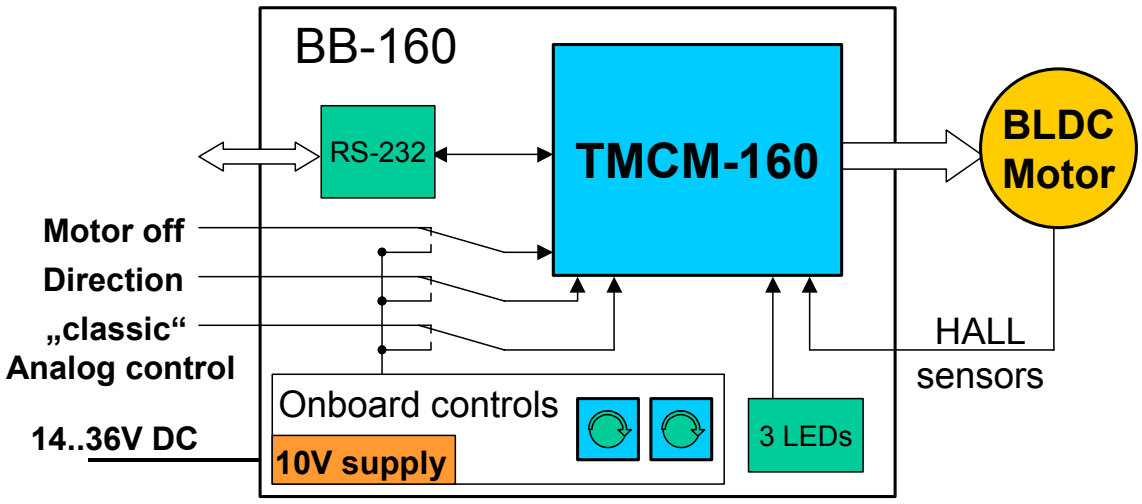

Figure 1 : Functional Block Diagram of the BB-160

Applications

- fast prototyping of motion control applications with BLDC motors (e.g. lab use)
- ad-hoc evaluation of the TMCM-160 module without the need of developing a custom PCB
- BB-160 + TMCM-160 suitable for series production

Highlights

- screw connectors for motors and hall sensors for fast prototyping
- access to all control inputs of the TMCM-160
- screw holes for reliable mounting beyond prototyping
- compact size (120 mm x 85 mm)
- setting of motor velocity and current (torque) with the help of two potentiometers

Order code	Description
BB-160	Baseboard for TMCM-160

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2 Life Support Policy

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Specifications subject to change without notice.

3 Electrical and Mechanical Interfacing

3.1 Pinning

Caution:

1. Do not connect or disconnect the TMCM-160 module, the baseboard or the motor while the system is powered on. This could damage the drivers of the TMCM-160 module.
2. The TMCM-160 has two complementary connectors on each side. Make sure the module is inserted correctly (pay attention to the orientation of the logo in the figure below). Wrong insertion of the module will most probably damage the TMCM-160. The motor and power connector of the TMCM-160 has to be next to those on the BB-160 (the top of the Trinamic triangle points towards the motor connectors).
3. Before powering up the unit make sure the TMCM-160 is inserted correctly (correct direction of board, no misalignment of pins, board firmly inserted).

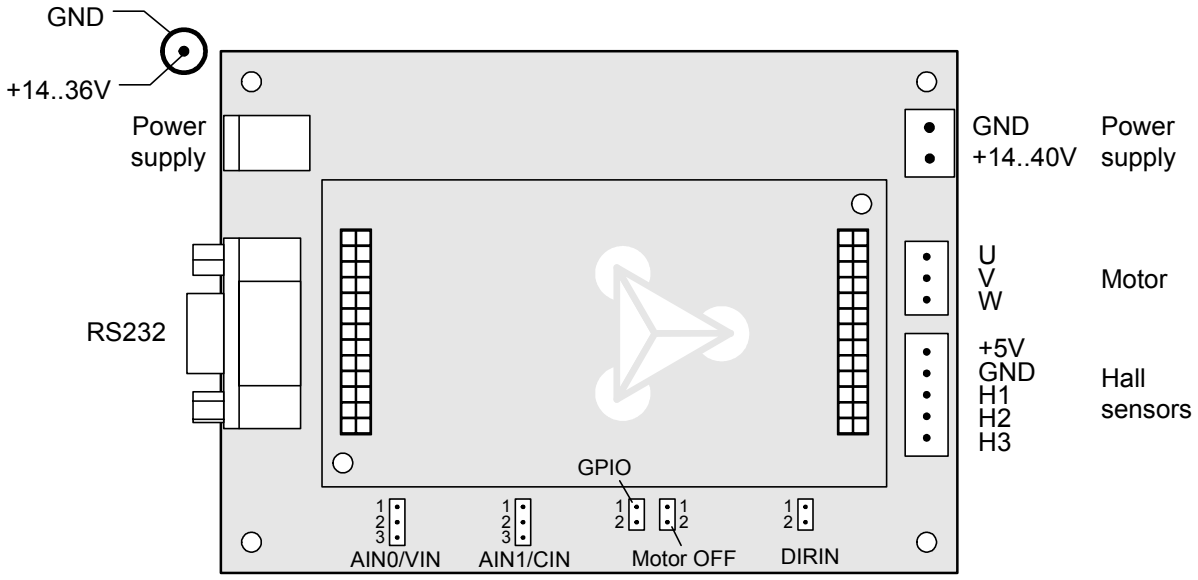

Figure 2 : Pinning of BB-160

Pin	Function
GND	ground
+14..36V	positive power supply

Table 3.1 : Connector Power supply

Pin	Function
U	motor coil U
V	motor coil V
W	motor coil W

Table 3.2 : Connector MOTOR

Pin	Function
5V	+5V power supply
GND	ground
H1	Hall sensor signal H1
H2	Hall sensor signal H2
H3	Hall sensor signal H3

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Table 3.3 : Connector Hall sensor

Pin	Function
2	RxD
3	TxD
5	ground

Table 3.4 : Connectors RS232

Jumper	Pin	Description	Function
AIN0/VIN	1	Link with pin 2 for Potentiometer control	Analog input (pin 2): Used for velocity control in stand alone operation by supplying external 0 - 10V signal (adjusts motor velocity)
	2	AIN0/VIN input of TMCM-160	
	3	Ground	
AIN1/CIN	1	Link with pin 2 for Potentiometer control	Analog input (pin 2): Used for torque control in stand alone operation by supplying external 0 - 10V signal (adjusts motor current)
	2	AIN1/CIN input of TMCM-160	
	3	Ground	
GPIO1	1	GPIO1 input/output of TMCM-160	Starting from Firmware version 1.02: this pin outputs a tacho impulse, that is toggles on each hall sensor change
	2	Ground	
Motor off	1	Motor off input of TMCM-160	Emergency stop. Tie this pin to GND to stop the motor. The motor can be restarted via the interface, or by cycling the power supply.
	2	Ground	
DIRIN	1	Close jumper to activate switch	Close jumper to activate the onboard direction selection switch.
	2	DIRIN input of TMCM-160	

Table 3.5 : Jumpers and onboard switches

3.2 LEDs

Pin	Action	Function
+5V	On	+5V power supply of the TMCM-160 works (power on)
TEMP	Blink	The power stage on the module has exceeded a critical temperature of 100°C. (Pre-warning)
	On	The power stage on the module has exceeded a critical temperature of 125°C. The motor becomes switched off, until temperature falls below 115°C. The measurement is correct to about +/-10°C
CURLIM	Blink	The current limit LED blinks upon under voltage switch off
	On / Flicker	Motor PWM is reduced due to exceeding the set motor current limit
GPIO1	On/Blink	On at high signal of GPIO1 pin
DIRIN	On	Indicates the active direction

Table 3.6: LEDs

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3.3 Dimensions

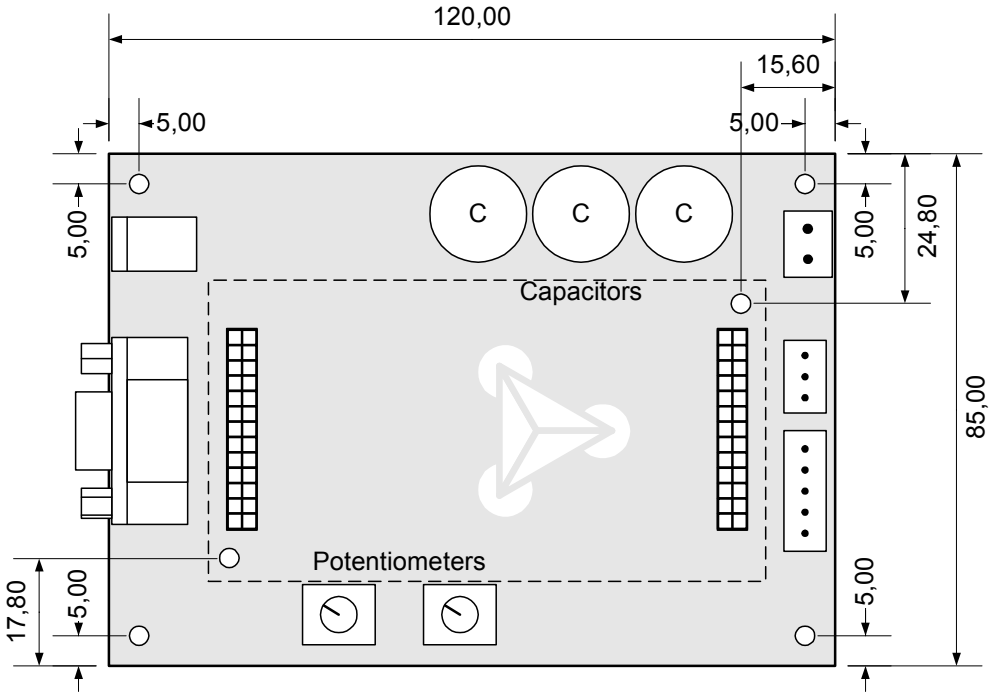

Figure 3 : Dimensions in mm

The height of the capacitors and potentiometers is about 28mm.

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4 Operational Ratings

The operational ratings show the intended / the characteristic range for the values and should be used as design values. In no case shall the maximum values be exceeded.

Symbol	Parameter	Min	Typ	Max	Unit
VS	Power supply voltage for operation	15	36	40	V
T_{ENV}	Environment temperature	-25		+60	°C

Table 4.1 : Operational Ratings (pls. refer [TMCM-160])

The power supply has to be disconnected when plugging in a TMCM-160 module into the BB-160. Do not connect or disconnect the motor while the unit is powered. Connecting or disconnecting the motor while the unit is powered might damage it.

4.1 Power supply requirements

The power supply should be designed in a way, that it supplies the nominal motor voltage at the desired maximum motor current. In no case shall the supply voltage exceed the upper voltage limits. To be able to cope with voltage which might be fed back by the motor, the supply should provide a sufficient output capacitor and / or a 39V suppressor (zener-)diode.

4.2 Motors

The TMCM-160 operates with a wide range of block commutated 3 phase BLDC motors with hall sensors. Motors with 12, 24 or 36V (ask for 48V option) nominal voltage or any value in between are supported with a coil current up to 3A nominal , 5A with forced cooling (up to 8.5 A current for short time).

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5 References

[TMCM-160] TMCM-160 Controller and Driver Manual, www.trinamic.com

6 Revision History

Version	Date	Author	Description
1.00	30-Oct-07	HC	Initial version

Table 6.1: Documentation Revisions

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