CLICKER 4

for TMPM3H

USER MANUAL

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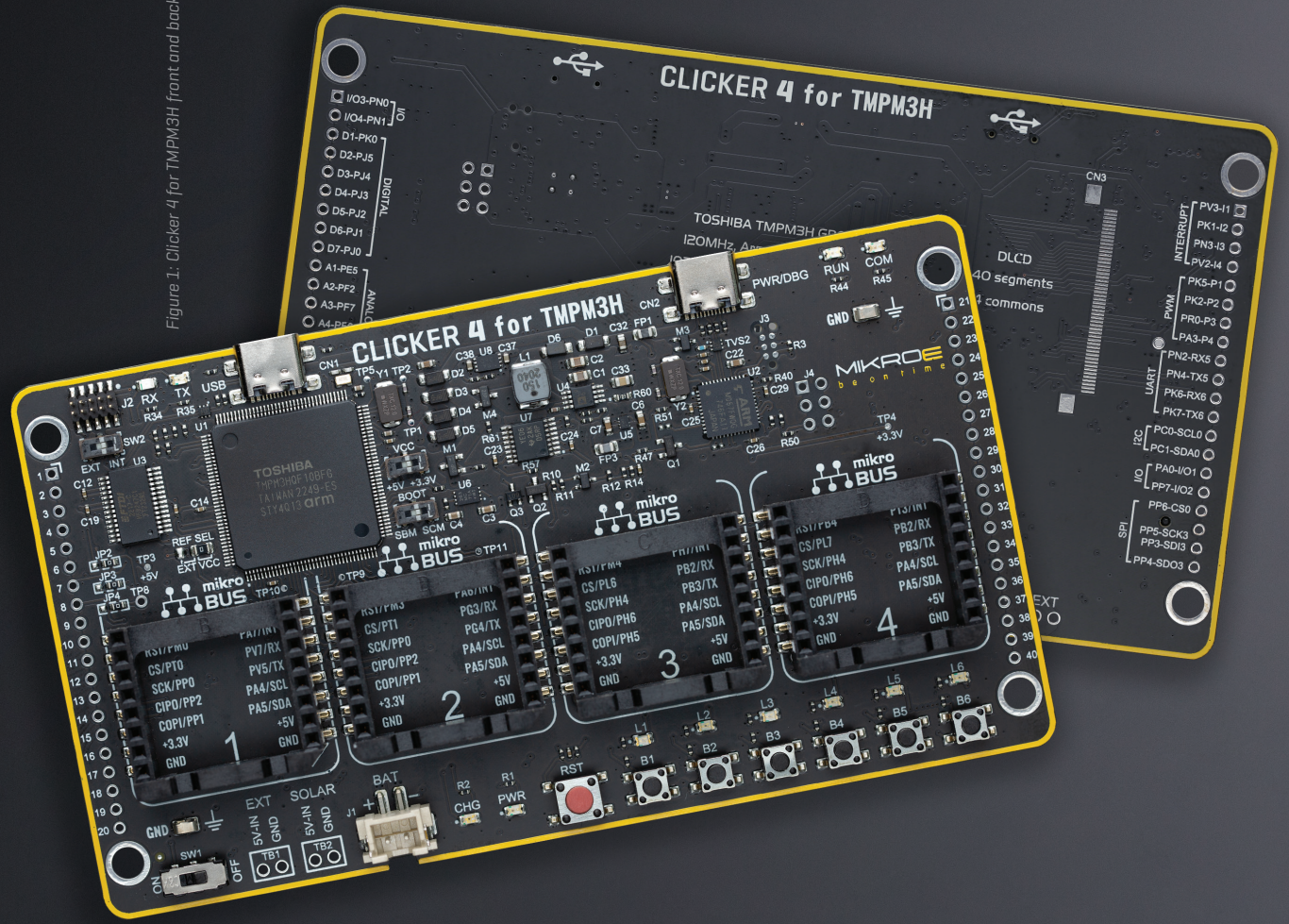

Figure 1: Clicker 4 for TMPM3H front and back view

Clicker 4 for TMPM3H is a compact development board designed as a complete solution, you can use it to quickly build your own gadgets with unique functionalities.

Featuring a TMPM3HQF10BFG MCU, four mikroBUS™ sockets for Click boards™ connectivity, power managment, and more, it represents a perfect solution for the rapid development of many different types of applications.

At its core, there is a TMPM3HQF10BFG MCU, a powerful microcontroller by Toshiba, based on the high-performance Arm® Cortex®-M3 32-bit processor core operating at up to 120 MHz frequency.

It provides sufficient processing power for the most demanding tasks, allowing Clicker 4 to adapt to any specific application requirements.

Besides two 1x20 pin headers, four improved mikroBUS™ sockets represent the most distinctive connectivity feature, allowing access to a huge base of Click boards™, growing on a daily basis.

Each section of Clicker 4 is clearly marked, offering an intuitive and clean interface. This makes working with the development board much simpler and thus, faster.

The usability of Clicker 4 doesn't end with its ability to accelerate the prototyping and application development stages: it is designed as a complete solution which can be implemented directly into any project, with no additional hardware modifications required. Four mounting holes [4.2mm/0.165"] at all four corners allow simple installation by using mounting screws. For most applications, a nice stylish casing is all that is needed to turn the Clicker 4 development board into a fully functional, custom design.

1. Key microcontroller features

At its core, Clicker 4 for TMPM3H uses the **TMPM3HQF10BFG** MCU.

TMPM3HQF10BFG is the 32-bit ARM® Cortex®-M3 core. This MCU is produced by Toshiba, featuring a DMA Controller (DMAC), memory protection unit (MPU), and advanced features ideal for motor control and industrial equipment applications. Among many peripherals available on the host MCU, key features include:

- 1024kB Code Flash
- 32kB Data Flash
- 128kB of SRAM
- Operating frequency up to 120 MHz
- Advanced programmable motor control circuit (A-PMD)
- Advanced Encoder input circuit (32-bit) (A-ENC32)

For the complete list of MCU features, please refer to the **TMPM3HQF10BFG** ***datasheet.***

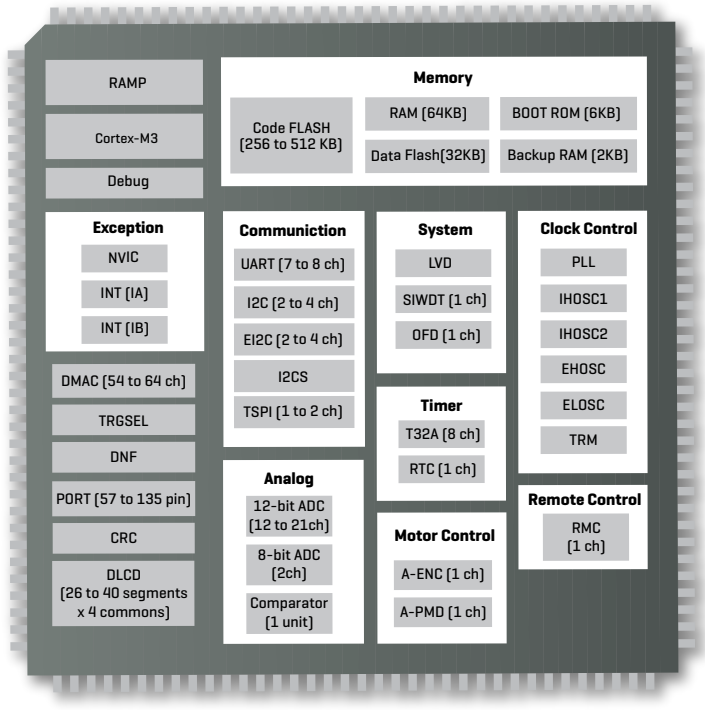

Figure 2: TMPM3HQF10BFG MCU block schematic

2. MCU Programming

2.1 Programming with on-board debug unit

Clicker 4 for TMPM3H uses Toshiba's **TMPM067FWQG** as the on-board Debug Unit. It is compliant with an on-board emulator standard called CMSIS-DAP.

CMSIS-DAP is the interface firmware for a Debug Unit that connects the Debug Port to USB. Debuggers, which execute on a host computer, connect via USB to the Debug Unit and to the Device that runs the application software. The Debug Unit connects via JTAG or SWD to the target Device. Once Clicker 4 is powered up, and PWR/DBG connector is connected to the PC, it takes a few seconds for the on-board Debug Unit to initialize. After the on-board CMSIS-DAP is initialized, two LEDs RUN and COM blink one time.

2.2 Programming with an external programmer

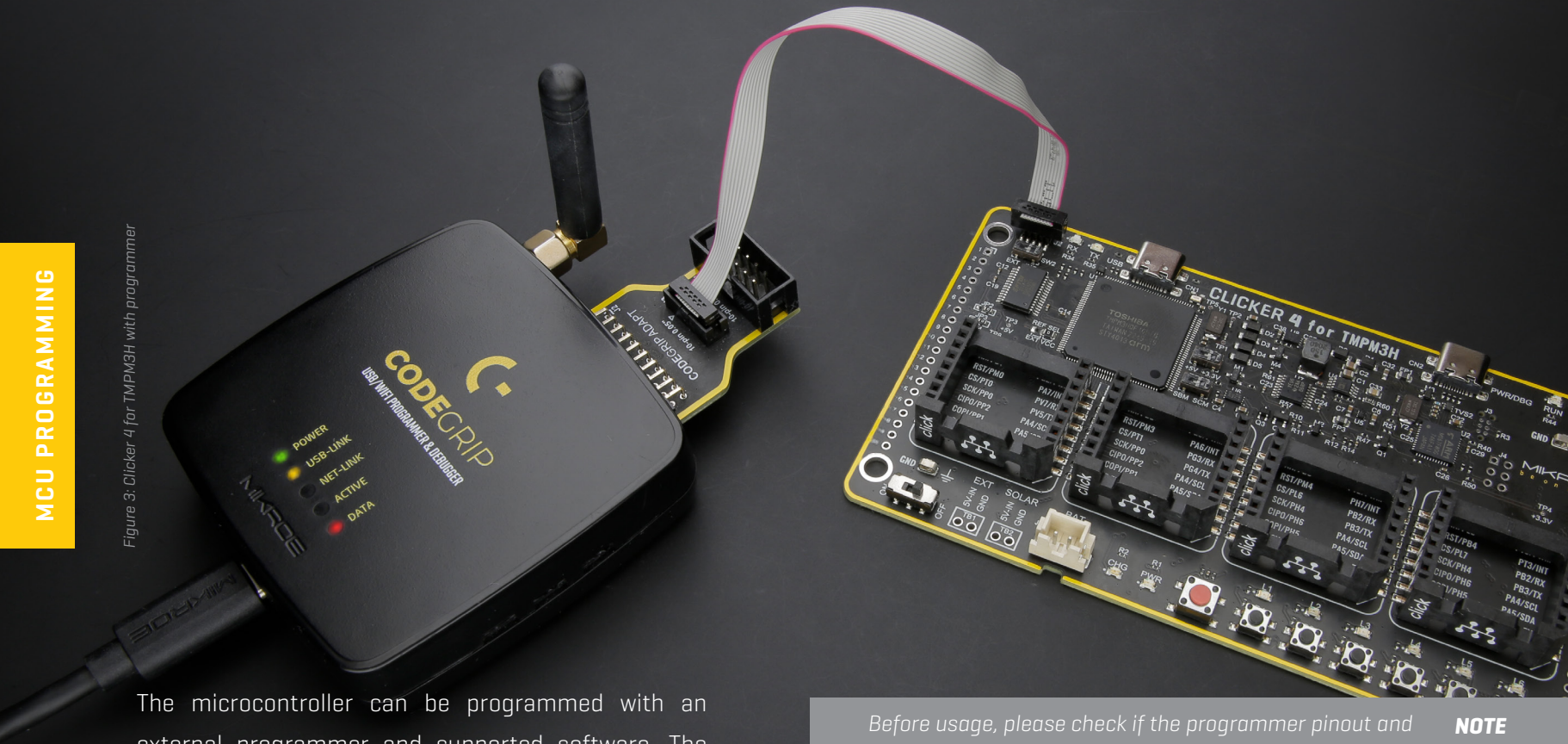

Figure 3: Clicker 4 for TMPM3H with programmer

The microcontroller can be programmed with an external programmer and supported software. The external programmer is connected to the development board via a 2x5 JTAG/SWD connector soldered on the J2 connector pads.

NOTE

Before usage, please check if the programmer pinout and the 2x5 pin header pinout are compatible. Based on the used programmer/debugger tool pinout, a coresponding adapter might be needed.

3. MCU reset

Clicker 4 for TMPM3H development board is equipped with the reset button labeled as RST **(1)**, located on the front of the board. It is used to generate a LOW logic level on the MCU reset pin.

The RST pin of the host MCU is also routed to the pin 40 of the 1x20 pin header **(2)**, allowing an external signal to reset the MCU.

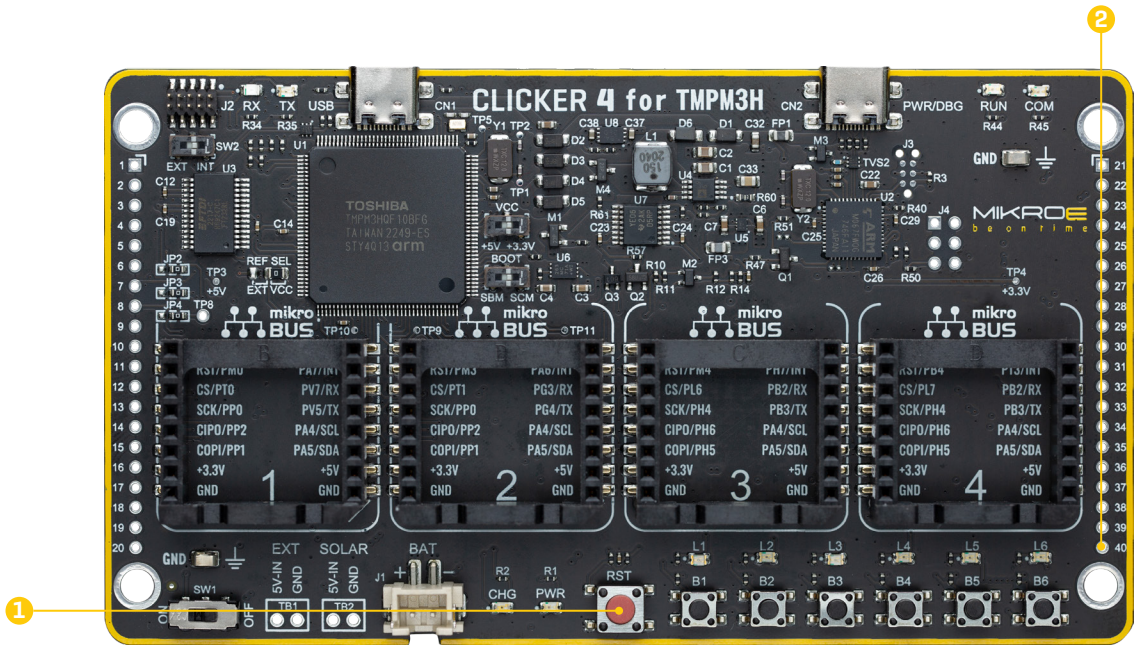

Figure 4: Clicker 4 for TMPM3H front view

4. Buttons and LEDs

The board also contains six buttons and LEDs, located on the front side. Buttons **(1)** can be used to apply the desired logic state to pins of the MCU they are routed to. Pressing any of the six buttons can change the logic state of the microcontroller pins from logic high (1) to logic low (0).

LEDs **(2)** can be used to visually indicate a logic state of the specific pin. The maximum current through a single LED is limited with the 4.7k resistor. Each LED is connected to a MCU pin, and an active LED indicates that a logic high (1) is present.

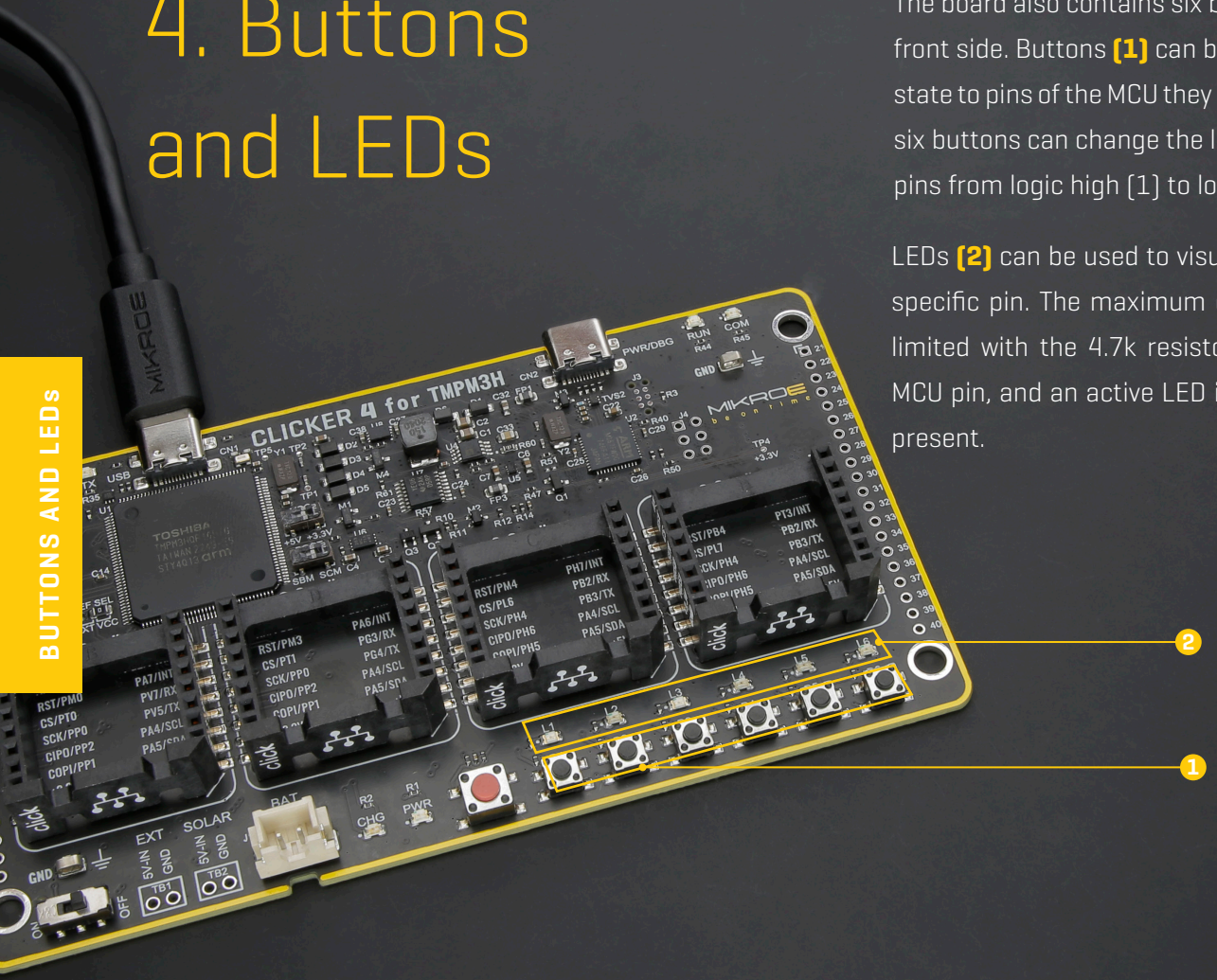

Figure 5: Buttons and LEDs view

5. Power Supply

After a valid power supply source is connected **(1 – 2 – 3 - 4)**, Clicker 4 for TMPM3H can be powered on by sliding switch SW1 to the ON position. A LED indicator labeled as PWR **(5)** indicates that the board is powered ON.

The power supply unit (PSU) provides clean and regulated power, necessary for proper operation of the Clicker 4 for TMPM3H development board. It is equipped with four different power supply inputs, offering all the flexibility that Clicker 4 for TMPM3H needs, and a reliable and safe battery charging circuit, which allows a single-cell Li-Po/Li-Ion battery to be charged.

As explained, the advanced design of the PSU allows four types of power sources to be used, offering unprecedented flexibility: when powered by a Li-Po/Li-ION battery, it offers an ultimate degree of autonomy.
Power is not an issue even if it is powered over the USB cable. It can be powered over the USB-C connector, using power supply delivered by the USB HOST (i.e. personal computer), USB wall adapter, or a battery power bank. There are five power supply connectors available, each with its unique purpose:

CN1, CN2: USB-C connector **(1)**
J1: Standard 2.5mm pitch XH battery connector **(2)**
TB1, TB2: A place for a standard 2.54mm terminal block **(3,4)**

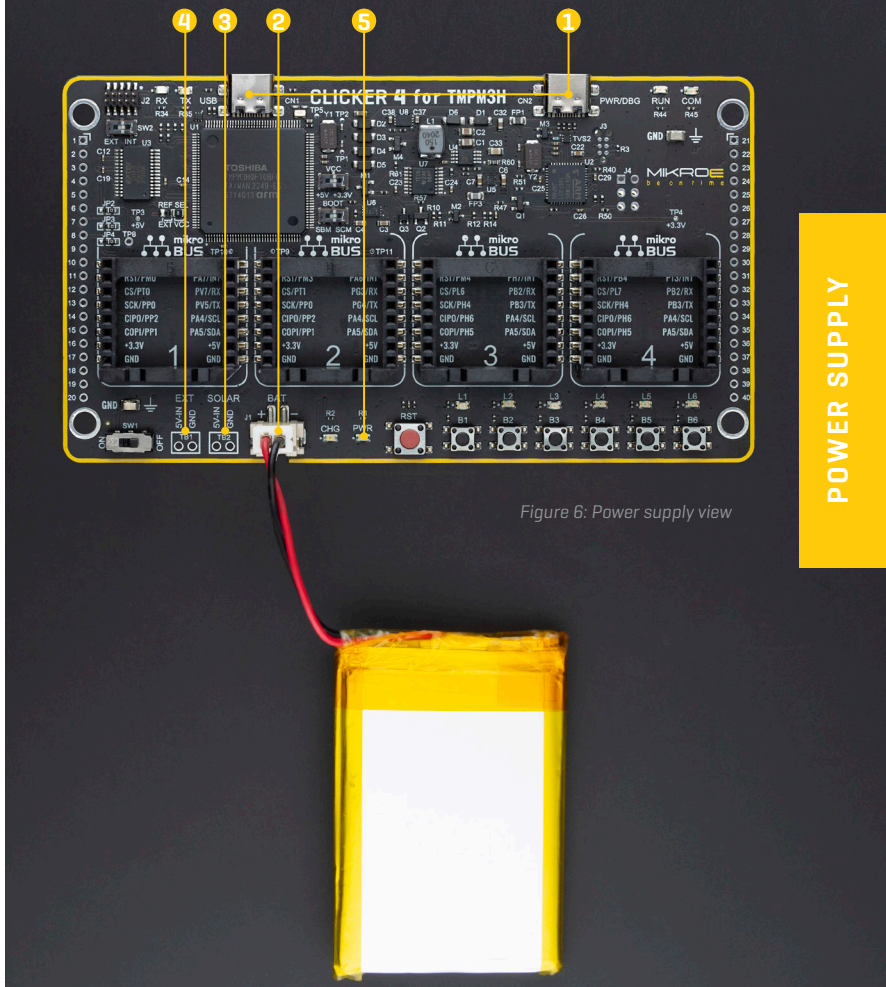

Figure 6: Power supply view

6. Connectivity

Clicker 4 offers a variety of connectivity options including USB-UART, four standardized mikroBUS™ sockets, and two 1x20 pin headers which are used to directly access the host MCU pins.

Clicker 4 supports USB to serial UART interface, allowing the development of a wide range of various USB-based applications.

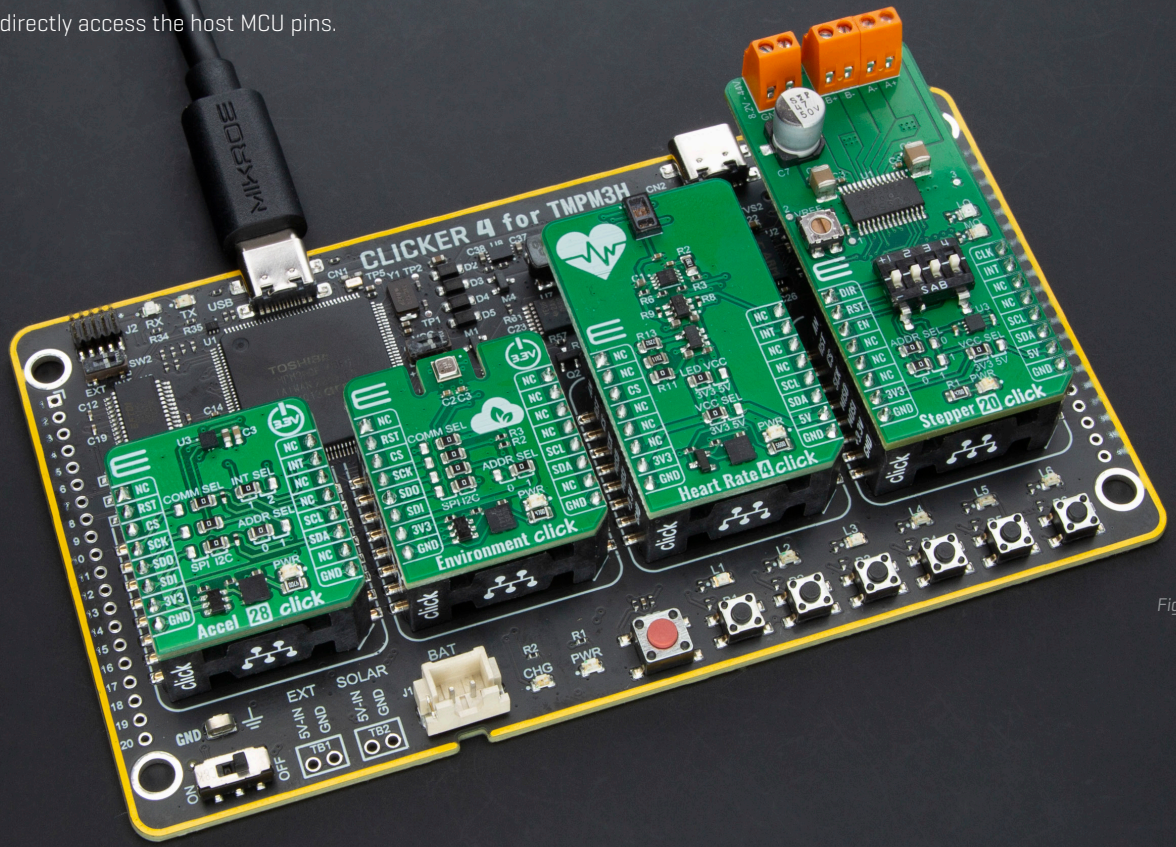

Figure 7: mikroBUS™ sockets view

A lot of the host MCU pins are routed to two 1x20 pin headers, making them available for further connectivity. In addition to MCU pins, some additional peripheral pins are also routed to this header.

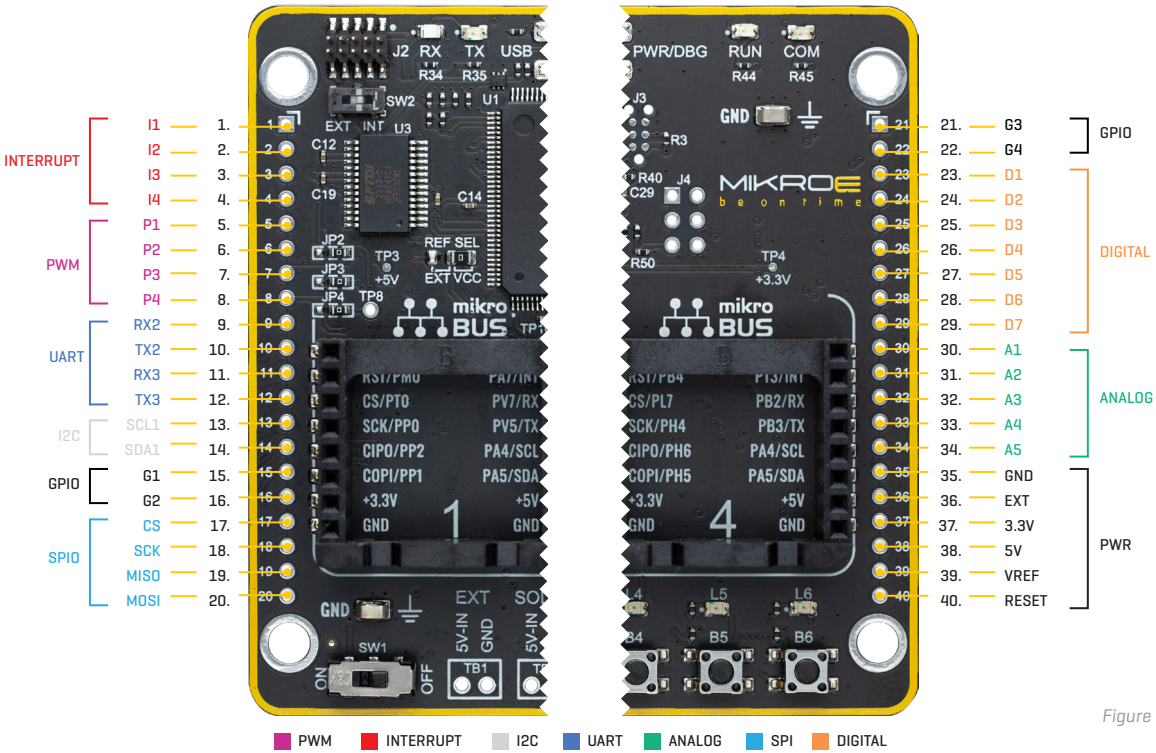

Figure 8: 1x20 pin header view

7. Click boards™

CLICK BOARD™

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Click boards™ are standardized add-on boards that carry a variety of different electronic devices. They are designed to perfectly fit the mikroBUS™ socket. Engineered to deliver the best performances for the used components, they save developers of testing and troubleshooting often associated with the prototyping phase. They enhance rapid development and accelerate time to market. These ready-to-use boards require no additional hardware configuration.

More information at ***www.mikroe.com/click***

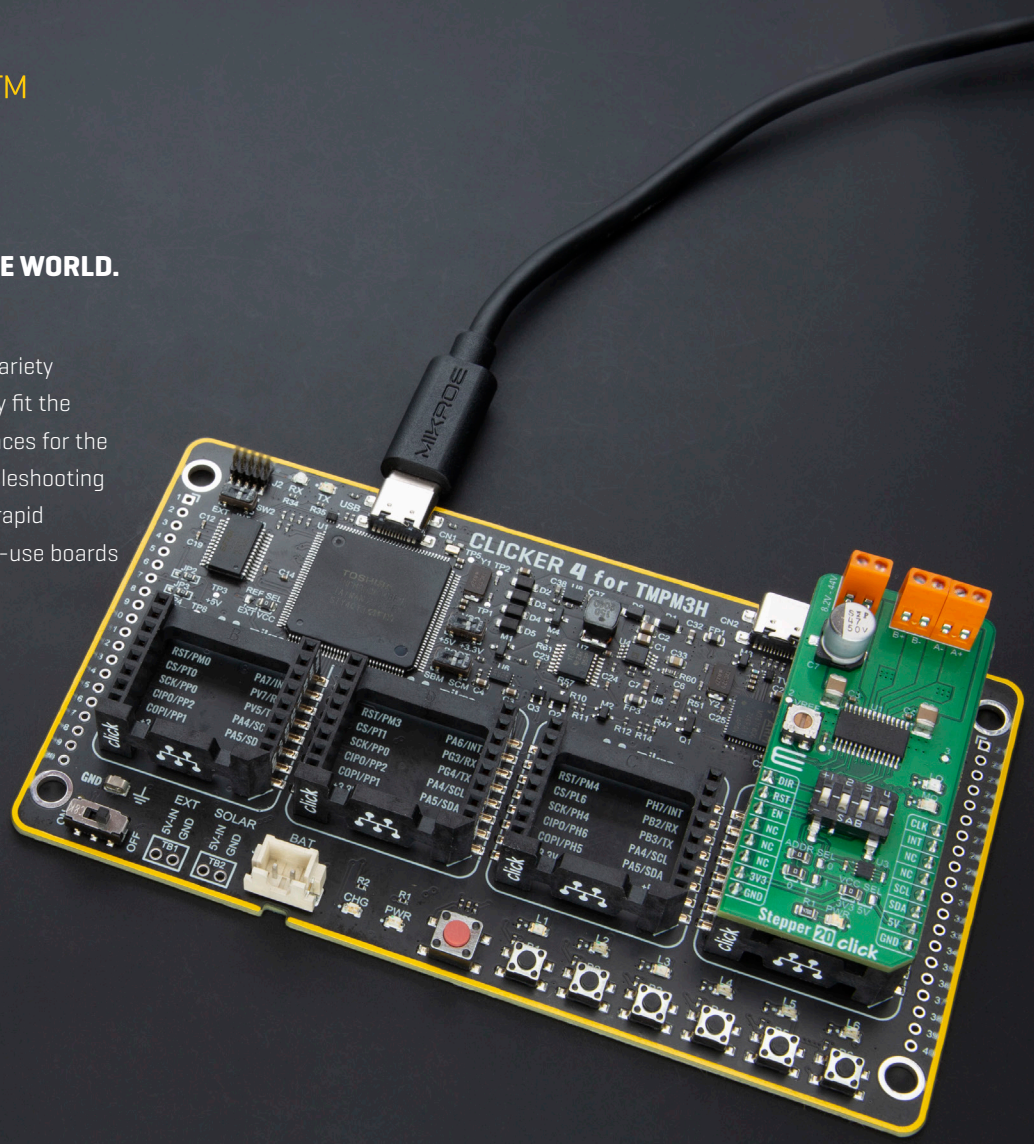

Figure 9: Click boards™ connected

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