

# **CLICKER 4**

## **for STM32F7**

USER MANUAL

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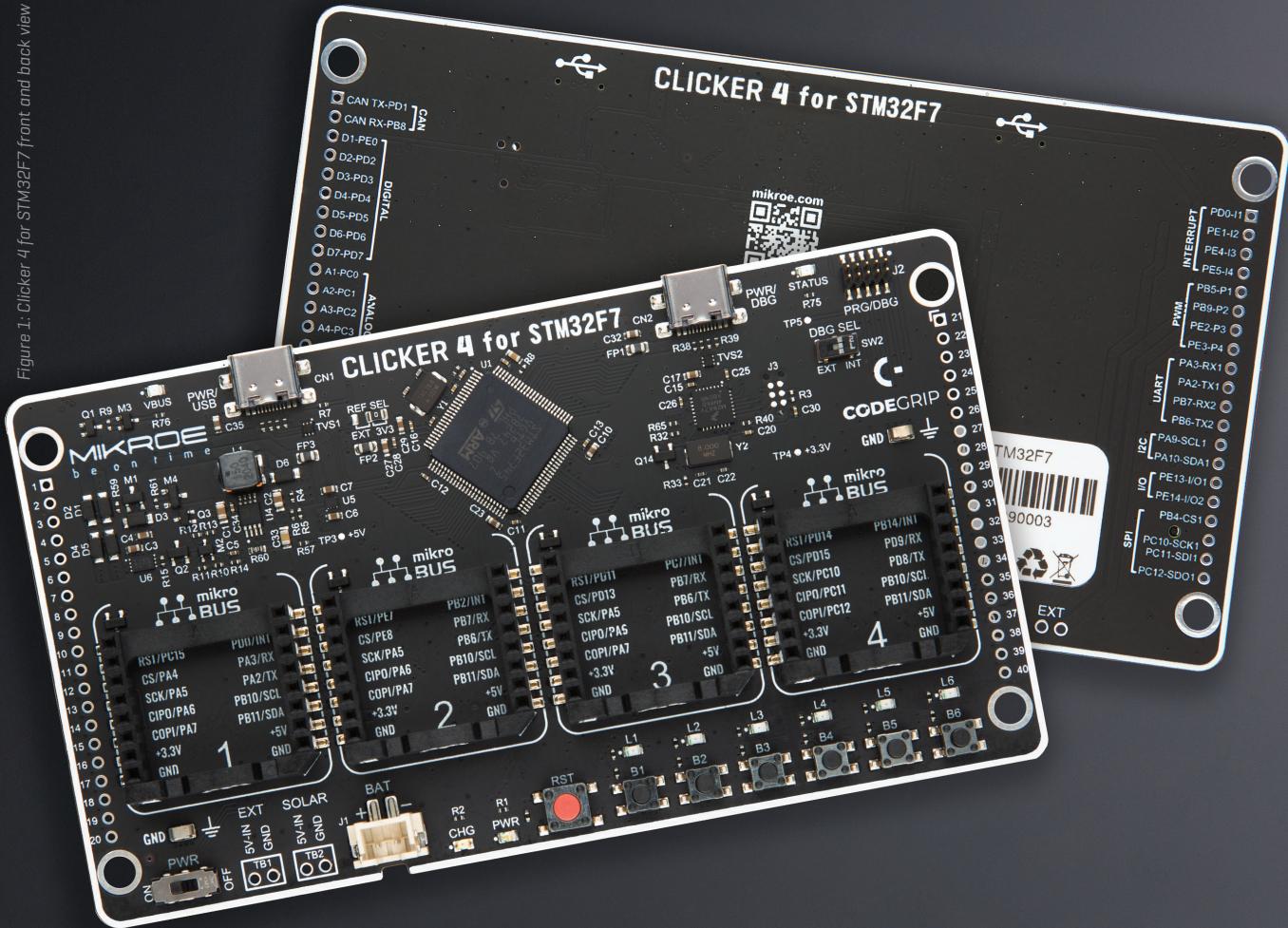
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Figure 1: Clicker 4 for STM32F7 front and back view



**Clicker 4 for STM32F7** 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 STM32F745VGT6, four mikroBUS™ sockets for Click boards™ connectivity, power management, and more, it represents a perfect solution for the rapid development of many different types of applications.

At its core, there is a STM32F745VGT6 MCU, a powerful microcontroller by STMicroelectronics, based on the high-performance Arm® Cortex®-M7 32-bit processor core operating at up to 168 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 STM32F7 uses the **STM32F745VGT6** MCU.

**STM32F745VGT6** is the 32-bit RISC ARM® Cortex®-M7 core.

This MCU is produced by STMicroelectronics, featuring a dedicated floating-point unit [FPU], a complete set of DSP functions, and a memory protection unit [MPU] for elevated application security. Among many peripherals available on the host MCU, key features include:

- 1 MB of Flash memory
- 320 KB of SRAM  
[including 64KB of data TCM RAM for critical real-time data]
- LCD parallel interface, 8080/6800 modes
- Dual mode Quad-SPI
- Up to 168 I/O ports with interrupt capability

For the complete list of MCU features, please refer to the

**STM32F745VGT6 datasheet**.

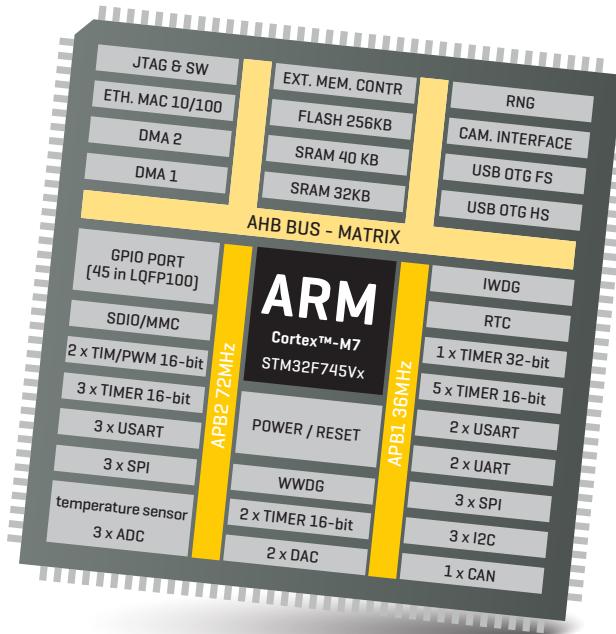


Figure 2: STM32F745VGT6 MCU block schematic

# 2. MCU Programming

## 2.1 Programming with on-board CODEGRIP

The powerful CODEGRIP is an integrated programmer/debugger, it offers many useful programming/debugging options and seamless integration with the MIKROE software environment.

CODEGRIP connects via JTAG or SWD interface to the target STM32F7 MCU, and uses the USB-C connector for a reliable and secure connection with the personal computer (host PC). It does not require any additional drivers because it utilizes an HID driver model, natively supported by the computer's operating system (OS). The USB-C connector is also used to power the development board, simplifying the cable management. Once Clicker 4 is powered up, and PWR/DBG connector is connected to the PC, it takes a few seconds for the on-board CODEGRIP to initialize.

A blue STATUS LED indicator is active only when the USB cable is connected to PWR/DBG port. It provides visual feedback about the CODEGRIP status:

- Blinks on board start-up to indicate the CODEGRIP bootloader mode, then it is constantly turned ON for CODEGRIP normal operation
- Blinks for 3s at 5Hz when the USB connection with CODEGRIP suite is attempted
- Blinks for 3s at 1Hz during the communication with the target MCU

## 2.2 Programming with an external programmer

Figure 3: Clicker 4 for STM32F7 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.

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 corresponding adapter might be needed.

**NOTE**

### 3. MCU reset

Clicker 4 for STM32F7 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.

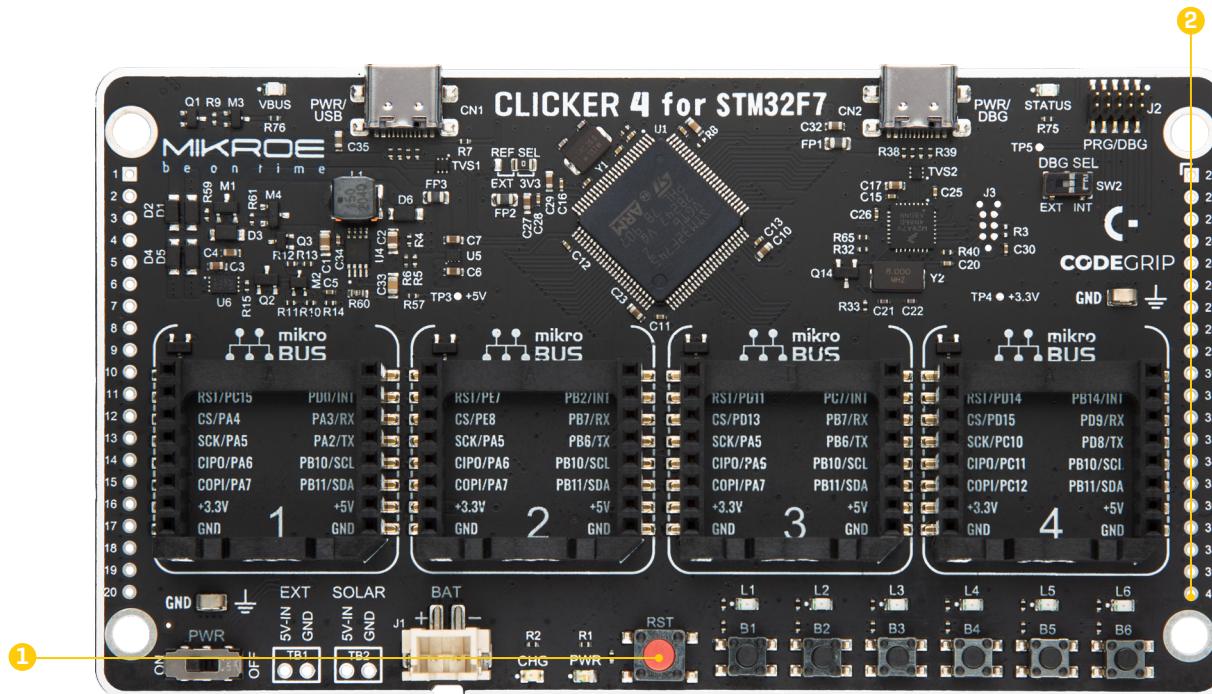
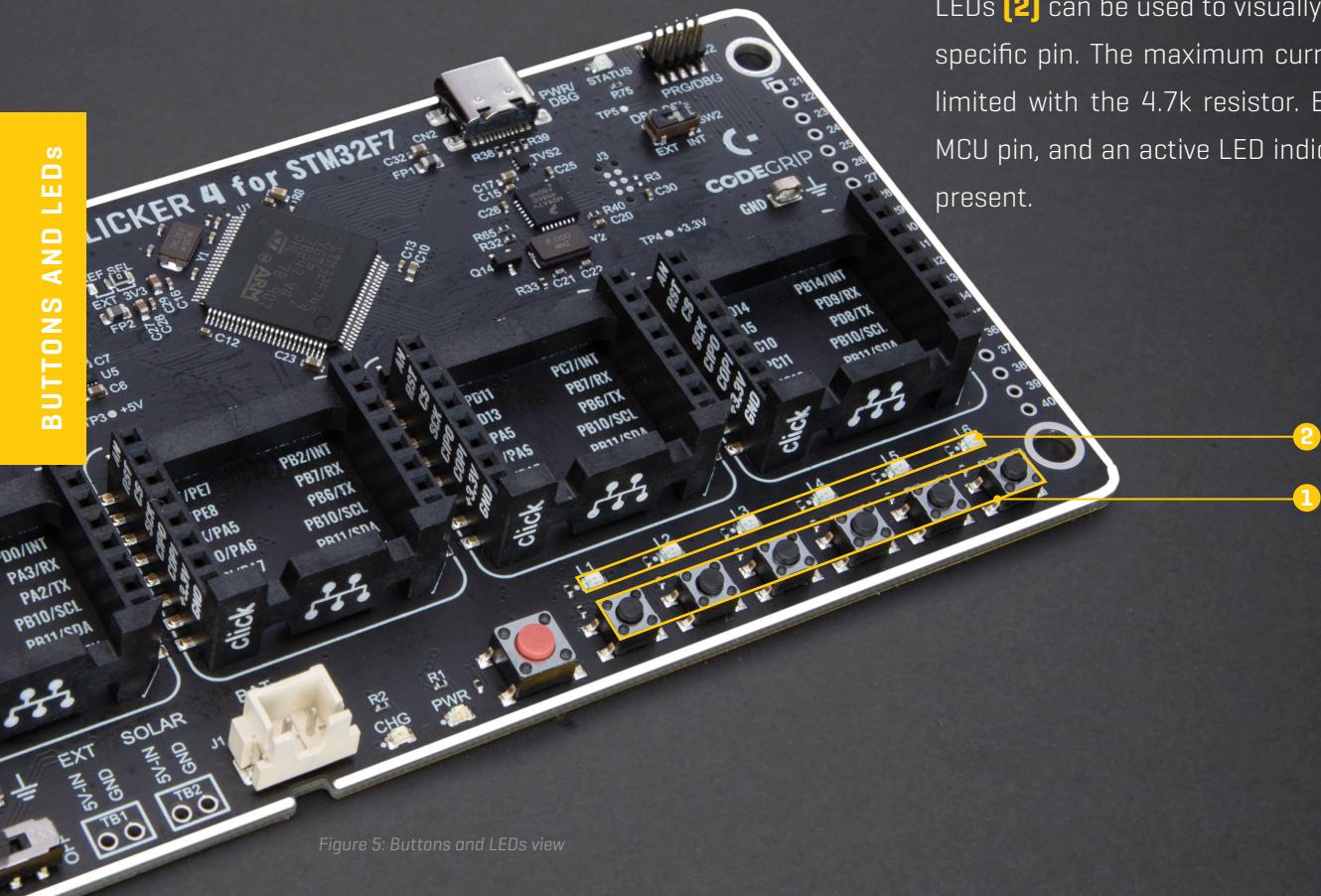


Figure 4: Clicker 4 for STM32F7 front view



# 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 STM32F7 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 STM32F7 development board. It is equipped with four different power supply inputs, offering all the flexibility that Clicker 4 for STM32F7 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]

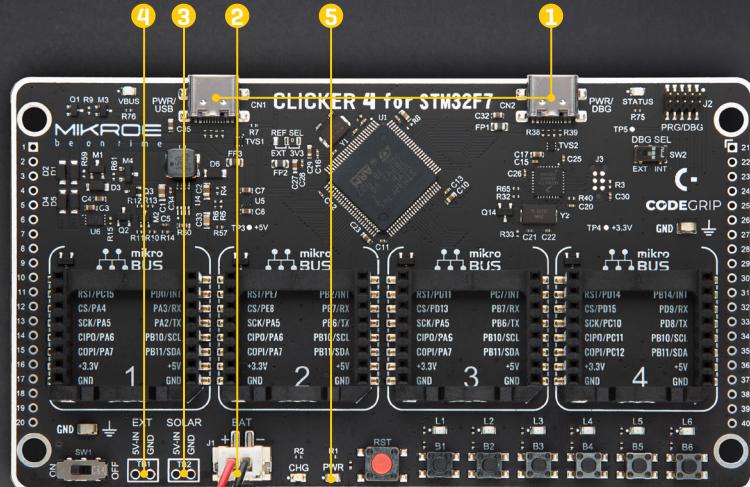


Figure 6: Power supply view

# 6. Connectivity

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

Clicker 4 supports USB [Universal Serial Bus] interface, allowing the development of a wide range of various USB-based applications.

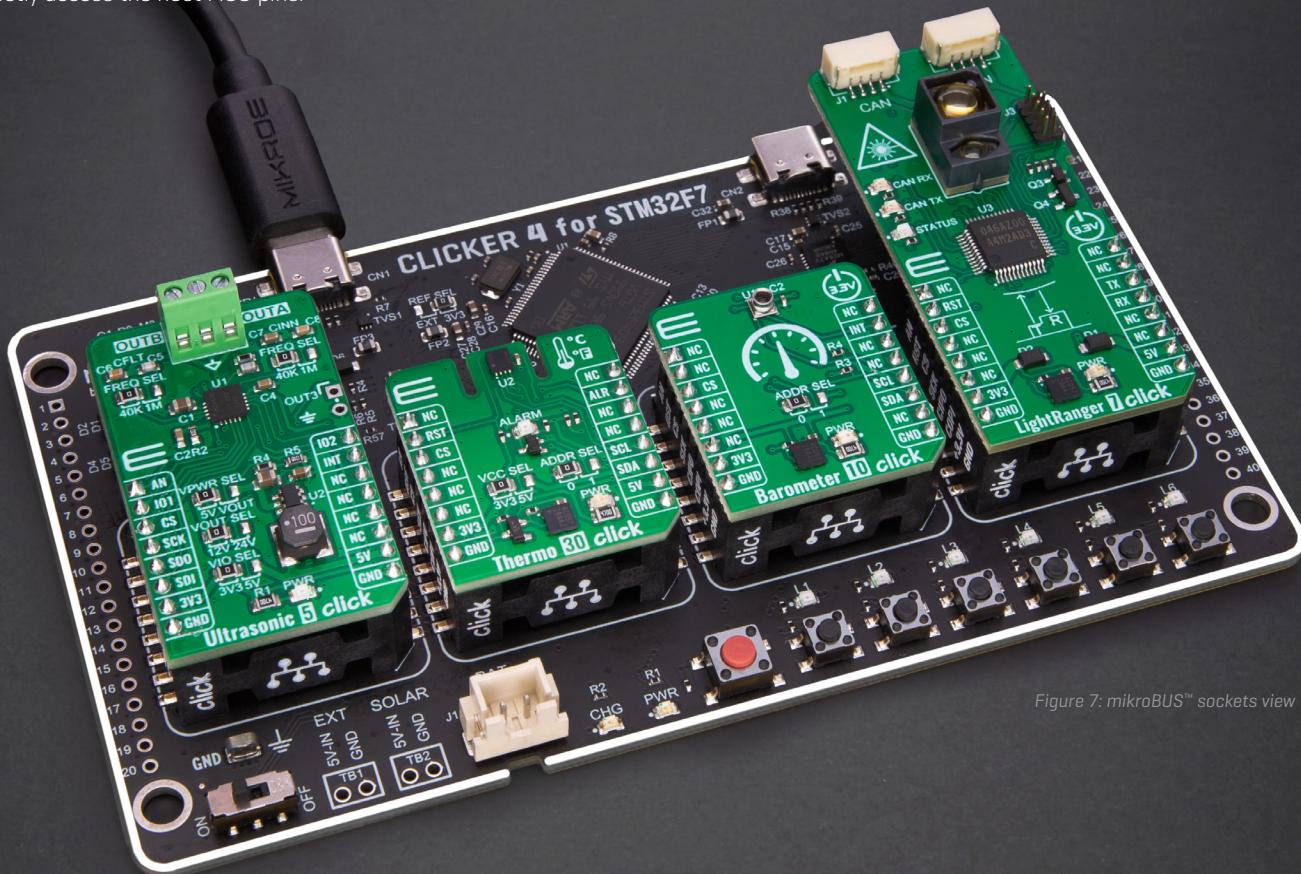


Figure 7: mikroBUS™ sockets view

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.

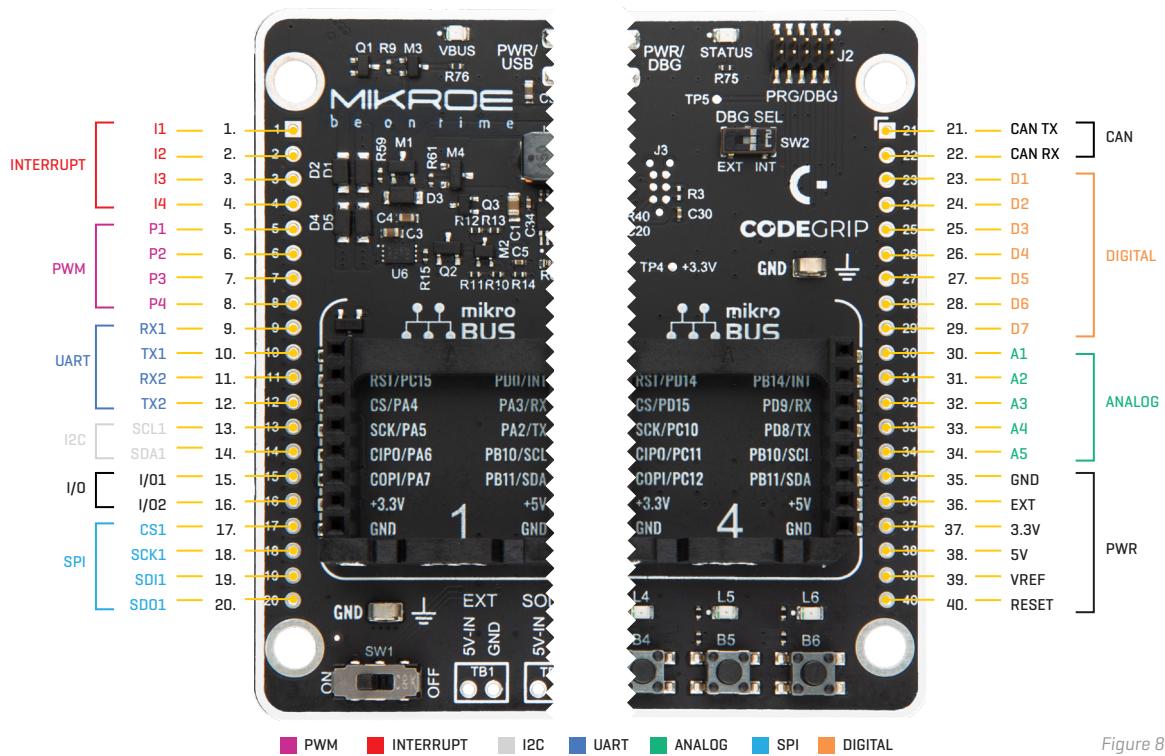


Figure 8: 1x20 pin header view

# 7. Click boards™

## THE LARGEST ADD-ON BOARD COLLECTION IN THE WORLD.

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](http://www.mikroe.com/click)

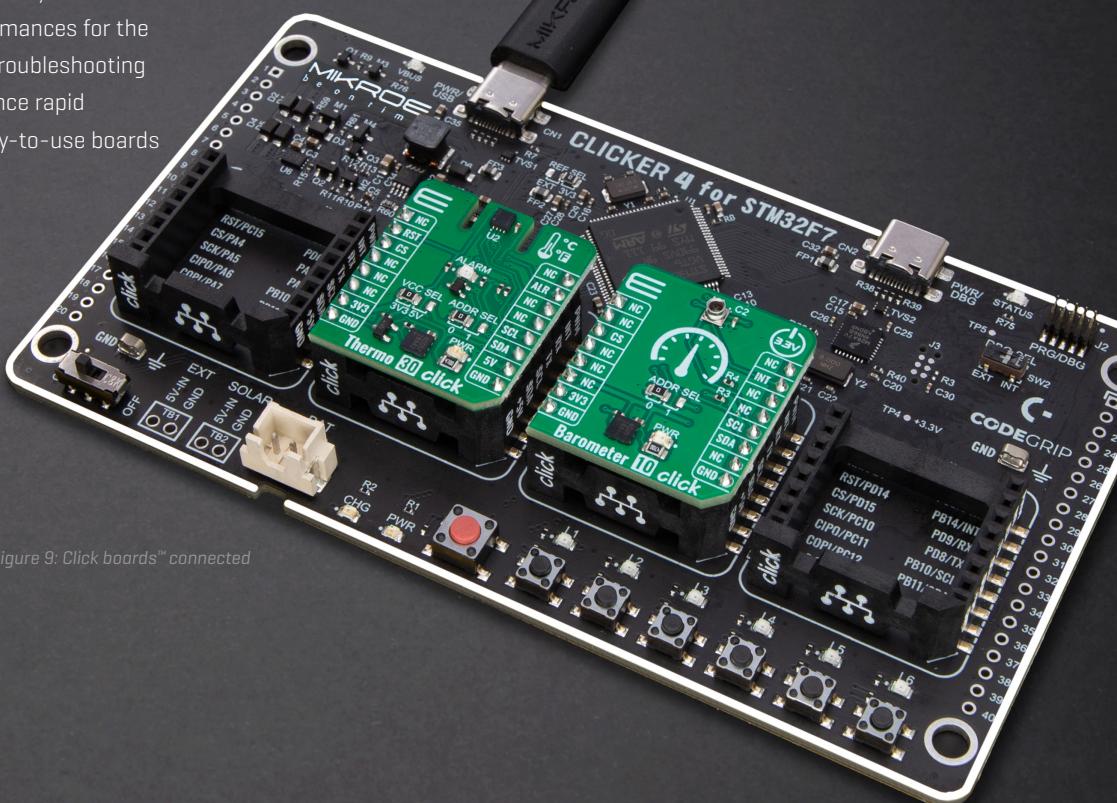


Figure 9: Click boards™ connected

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